WHITEFISH SOLVENT SITE

INTERIM REMEDIAL ACTION

WHITEFISH, MONTANA

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SUBMITTED BY: Trihydro Corporation

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List of Acronyms and Abbreviations

ALS	ALS Environmental Laboratories
APH	Air-Phase Petroleum Hydrocarbons
ASEC property	All Saints Episcopal Church
BTV's	Montana Background Threshold Values
CERCLA SI	Comprehensive Environmental Response, Compensation, and Liability Act site investigation
cis-1,2-DCE	cis-1,2-dichloroethene
CVOC's	chlorinated volatile organic compounds
DEQ	Department of Environmental Quality
DEQ-7	DEQ-7 Numeric Water Quality Standard
DNAPL	dense non-aqueous phase liquid
DO	dissolved oxygen
Energy	Energy Laboratories
EPA	U.S. Environmental Protection Agency
EVO	emulsified vegetable oil
FID	flame ionization detection
ft	foot or feet
ft bgs	feet below ground surface
Flathead	Flathead Electric Cooperative, Inc.
GAC	granular activated carbon
in H2O	inches of water
L/min	liters per minute
LNAPL	light non-aqueous phase liquid

List of Acronyms and Abbreviations (cont.)

Martin's Cleaners	Martin's Cleaners and Laundromat
MCA	Montana Code Annotated
MIP	membrane interface probe
mg/kg	milligram per kilogram
µg/kg	microgram per kilogram
µg/L	microgram per liter
µg/m3	microgram per cubic meter
mmHG	millimeters of mercury
MT	Montana
MW	molecular weight
NAVD 88	North American Vertical Datum of 1988
ND	non-detect
ORP	oxygen reduction potential
PCE	tetrachloroethene
PDI	Pre-Design Investigation
PID	photoionization detector
Powerhouse	Powerhouse Electric, Inc.
ppm	parts per million
PSI	pounds per square inch
PTRCB	Petroleum Tank Release Compensation Board
PVC	polyvinyl chloride
RBCA	Risk-Based Corrective Action
RBSL	Risk Based Screening Level

List of Acronyms and Abbreviations (cont.)

RCRA	Resource Conservation and Recovery Act
Remington	Remington Technologies
Resource Technologies	Resource Technologies, Inc
River	River Design Group, Inc
ROI	radius of influence
RSL	Regional Screening Level
SCFM	standard cubic feet per minute
SSU	State Superfund Unit
SVE	soil vapor extraction
SVOC's	chlorinated volatile organic compounds
TCE	trichloroethene
TCLP	toxicity characteristic leaching procedure
TOC	top of well casing
ROW	right of way
trans-1,2-DCE	trans-1,2-dichloroethene
Trihydro	Trihydro Corporation
USGS	U.S. Geological Survey
UST	underground storage tank
UIC Program	Underground Injection Control Program
VC	vinyl chloride
VOCs	volatile organic compounds
XSD	halogen-specific detector
%	percent

1.0 BACKGROUND

The Montana Department of Environmental Quality (DEQ) contracted with Trihydro Corporation (Trihydro) under Task Order No. 32 DEQ Contract No.414031, to perform interim remedial actions at a former dry cleaning establishment (Martin's Cleaners and Laundromat) in Whitefish, Montana. The work occurred from March 29, 2016 through May 2017, and the interim remedial actions were meant to reduce chlorinated solvent contamination in the groundwater, vadose zone, and indoor air. The Whitefish Solvent Site includes soil and groundwater in an area of north-central Whitefish that is contaminated with solvents. The sources of the contamination are unknown and may include two former dry cleaners, Martin's Cleaners and Laundromat (Martin's Cleaners) and Lincoln/Anderson Cleaners. Interim remedial actions outlined in DEQ Task Order 32 were implemented as a result of elevated indoor air concentrations of tetrachloroethene (PCE) detected in samples from the former Martin's Cleaners building during the 2013 Comprehensive Environmental Response, Compensation, and Liability Act site investigation (CERCLA SI). Interim remedial actions prescribed by DEQ included implementation of a Pre-Design Investigation (PDI) of the Whitefish Solvent Site, installation of a soil vapor extraction (SVE) system with effluent treatment, and enhanced in-situ bioremediation.

1.1 REPORT ORGANIZATION

This Report is organized into sections that describe in detail the background, the means and methods used to obtain the information necessary to meet the report objectives, the quality, and usability of data, the results of the investigation, and the nature and extent of contamination at the Whitefish Solvent Site.

Accordingly, the summary report is comprised of the following sections:

Section 2 – Pre-Design Investigation

Section 3 – SVE Design, Installation, and System Startup

Section 4 – In Situ Bioremediation

Section 5 – Indoor Air Sampling

Section 6 – SVE Operation

Section 7 – Groundwater Sampling

Section 8 – Performance

Section 9 – Investigation Derived Waste

Section 10 – Summary and Recommendations

1.2 PURPOSE AND OBJECTIVES

The primary objective of this summary report is to summarize interim remedial actions performed at the Whitefish Solvent Site in 2016 and 2017. These actions included SVE system design, construction and operation, in-situ bioremediation injections, and groundwater, indoor air, and SVE system sampling conducted at the former Martin's Cleaners (area within the broader Whitefish Solvent Site).

1.3 WHITEFISH SOLVENT SITE DESCRIPTION

The Whitefish Solvent Site includes Martin's Cleaners and Lincoln/Anderson Cleaners, which formerly operated in downtown Whitefish.

1.3.1 MARTIN'S CLEANERS

Martin's Cleaners was formerly located at 239 Baker Avenue, in Whitefish, Montana (MT); the location is shown in Figure 1. The building at this location was constructed in 1940 (Montana Cadastral, 2017) and historically housed a variety of businesses. The former business known as Martin's Cleaners operated in the building between approximately 1961 and 1999 and reportedly used chlorinated solvents in the cleaning process. After the cleaners closed down, a hair salon operated before the current building tenant, Whitefish Liquor Store, occupied the location.

DEQ Hazardous Waste Program records from 1989 indicate Martin's Cleaners registered as a halogenated solvent user. Halogenated solvents contain a chlorine, bromine or iodine halogen. In 1998, Martin's Cleaners was reclaiming and recycling approximately 90 gallons of tetrachloroethene (also known as perchloroethene or PCE) per year according to DEQ Hazardous Waste Program records. PCE residue wastes were disposed of by an industrial recycling and disposal company; Resource Technologies, Inc. (Resource Technologies) "Sampling and Analytical Results Report for a CERCLA Site Investigation of the Whitefish Solvent Site, Whitefish, Montana" dated January 11, 2013 (SARR).

1.3.2 LINCOLN/ANDERSON CLEANERS

According to research conducted during the SI, Lincoln's Cleaners occupied two locations: the first was located at 325 East Second Street from the late 1930s or early 1940s until 1969, the second was listed at 306 East Second Street from 1970 through 1998; the location is shown in Figure 1. The cleaners operated from the 1930's until 2005. According to Montana Cadastral, the existing building was constructed in 1940. The business was purchased in 1998 and became Anderson Dry Cleaners. Anderson Dry Cleaners occupied 306 East Second Street until 2005 when the business moved. A 2005 DEQ Permitting and Compliance Division field inspection indicated Anderson Dry Cleaners was using halogenated solvents. In 2005 Anderson Dry Cleaners registered as a halogenated solvent user and was

using approximately 35 gallons of PCE in the cleaning process. Residues of PCE waste were disposed of at the local landfill; SARR (Resource Technologies 2013).

1.4 PREVIOUS INVESTIGATIONS AND ACTIONS

In March of 2010, chlorinated solvent contamination was discovered in soil and groundwater during an assessment at 214 Second Street East, in downtown Whitefish (All Saints Episcopal Church Environmental Site Assessment [ASEC Property]). In October 2011 and March 2012, DEQ conducted a CERCLA SI to evaluate chlorinated solvent contamination in downtown Whitefish. Indoor air, sub-slab, soil, and groundwater sampling was conducted in multiple locations in downtown Whitefish. Indoor air sampling results, as well as existing Whitefish Solvent Site soil and groundwater data are presented in Resource Technologies, Inc. (Resource Technologies) "Sampling and Analytical Results Report for a CERCLA Site Investigation of the Whitefish Solvent Site, Whitefish, Montana" dated January 11, 2013 (SARR).

The City of Whitefish is located in the Kalispell Valley subarea of the Flathead Lake groundwater resource area. Four hydrogeologic units have been identified in the Kalispell Valley subarea: shallow alluvium, till and fine-grained glacial-lake sediment confining units, intermediate or deep alluvial aquifers (Pleistocene), and bedrock aquifers (Patton, 2003).

The aquifer thicknesses and depths are estimated as follows:

- Shallow alluvial aquifer – approximately 50 feet in thickness and at land surface
- Intermediate alluvial aquifer – 5 to 30 feet thick, at a depth of 50-100 feet bgs
- Deep alluvial aquifer – 60 to 400 feet thick, at a depth of 75 to 300 feet bgs
- Bedrock aquifer – median depth of 250 feet (Patton, 2003)

The average hydraulic gradient measured between November 16, 2011, December 20, 2011, and March 1, 2012 in the uppermost saturated zone in the area of downtown Whitefish is approximately 0.015 feet/foot to the southwest (Resource Technologies 2011).

Results of the SARR investigation revealed chlorinated volatile organic compounds (CVOCs) in soil, groundwater, and soil vapor above the respective screening levels at various locations across the Whitefish Solvent Site. However, a soil sample collected between 14-16 feet below the ground surface (ft bgs) at WSMW-7 reported a PCE concentration of 6,400 micrograms per kilogram (µg/kg) in subsurface soils. This boring is located on the eastside of the Whitefish Liquor Store building and the seasonal depth to water was reported to be 10.42 – 12.57 feet below top of well casing

(TOC) in the SARR. In October 2011, groundwater from monitoring well WSMW-7 was sampled; the PCE concentration was reported as 8,800 micrograms per liter (µg/L) and the trichloroethene (TCE) concentration was reported as 20 µg/L. Montana's DEQ-7 Numeric Water Quality Standard (DEQ-7) for PCE and TCE is 5 ug/L. Sampling of indoor air in the former Martin's Cleaners building was performed March 4, 2012, a reported PCE concentration of 250 microgram per cubic meter (µg/m^3) exceeded the May 2016 EPA Regional Screening Level (RSL) for commercial indoor air of 47 µg/m^3. The indoor air TCE concentration was reported at 0.38 µg/m^3.

A corresponding sub-slab soil vapor sample taken from below the building concrete slab exhibited a PCE concentration of 960,000 µg/m^3 and Aliphatics C9-C12 range concentration of 42,000 µg/m^3; TCE was not detected with a reporting limit of 1200 µg/m^3. A subslab sample collected during the SARR from the property to the south of the former Martin's Cleaners (305 Baker Avenue) had a PCE detection of 110,000 µg/m^3, but the indoor air was below the commercial RSL of 47 µg/m^3. The presence of PCE beneath the former Martin's Cleaner building presents a significant potential vapor intrusion risk and is believed to be contributing to the commercial indoor air RSL exceedance. Vapor intrusion is the migration of chemical vapors from an underground source into overlying structures (Montana Vapor Intrusion Guide 2011). During the CERCLA SI, soil sampling results collected between 0.5-2 ft bgs at monitoring well WSB-1 located behind the former Lincoln/Anderson Cleaners building reported a PCE concentration of 3.4 µg/kg in the surface soils. Sampling of indoor air in the former Lincoln/Anderson Cleaners building was performed March 6, 2012; PCE concentrations were reported at 1.7 µg/m3 in the main floor and 2.8 µg/m3 in the basement. In addition, a sub-slab soil vapor sample taken from below the basement concrete slab exhibited a PCE concentration of 13,000 µg/m^3 and a TCE concentration of 520 µg/m^3.

The SARR concluded that CVOCs were released to soil and groundwater in at least three locations at the Whitefish Solvent Site. The first area is located in the vicinity of the former Martin's Cleaners. The second area encompassed the ASEC property and extends eastward as far as the former Lincoln/Anderson facility. A third isolated impact to soil was documented at the location of soil boring WSB-6 (in between 3rd and 2nd Street). There was insufficient data to attribute documented chlorinated impacts to a source or source areas. Chlorinated solvent vapor intrusion was documented in the former Martin's Cleaners building and in the building across 3rd Street to the south. Based on the necessity for more data to appropriate design and install the interim action systems, Trihydro performed a PDI that focused on the impacted areas identified in the SARR. The PDI also served to further constrain solvent impacts/source areas.

2.0 PRE-DESIGN INVESTIGATION

The PDI was implemented by Trihydro and Dakota Technologies (Dakota) of Maple Grove, Minnesota, during May 2016. A direct push drill rig equipped with a membrane interface probe (MIP) was used to collect data necessary to complete the PDI. The MIP collects data through a variety of detectors, including a photoionization detector (PID), a flame ionization detection (FID), and a halogen-specific detector (XSD). XSD data are of particular interest, as the XSD detects chlorinated volatile organic compounds (CVOCs) such as PCE.

MIP drilling was conducted on May 24, 2016 near Martin's Cleaners and May 25, 2016 near the Lincoln/Anderson Cleaners. The PDI concluded the CVOC contamination source area to be located on the east side of the building in the Whitefish Liquor Store parking lot. Elevated soil and groundwater concentrations extend to and potentially beyond the south right-of-way (ROW) of 3rd Street (MC-04 and MC-05); contamination was un-delineated in this direction. The silt lenses found in soils beneath the site were determined to be a possible preferential pathway for soil contamination. MIP borings were not installed east of the source area; contamination is un-delineated in this direction as well.

The PDI concluded a PCE source area was not present near the Lincoln/Anderson Cleaners building. CVOCs at concentrations exceeding the XSD detection limit were not observed in the three borings closest to the building (LA-02, LA-03, and LA-06). The PDI corroborated elevated CVOC concentrations in soil and groundwater in the vicinity of the sewer connection at East 2nd Street and Lupfer Avenue (upgradient from the ASEC property). However, the XSD results suggested that soil contamination may not extend to the Lincoln/Anderson Cleaners building.

The findings of the PDI suggested a targeted remediation effort at the former Martin's Cleaners would have the most impact on preventing the migration of CVOCs through soil and groundwater to other areas of the Whitefish Solvent Site. Additionally, vapor intrusion could be addressed at the former Martin's Cleaners. A memo reporting PDI results is included as Appendix A.

3.0 MARTIN'S CLEANERS SOIL VAPOR EXTRACTION

DEQ chose SVE as an interim remedial action for Martin's Cleaners because SVE is a widely-recognized means of remediating contaminants that are located in vadose zone soils (unsaturated soil), and that volatilize naturally (or can be induced to do so).

3.1 SVE CONCEPT

The main contaminant at the former Martin's Cleaner is PCE and its daughter products are volatile organic compounds that are liquid at room temperature but readily evaporate into air. SVE is a process by which soil vapor is removed from the unsaturated zone under vacuum, treated, and discharged to the atmosphere. SVE can reduce vadose zone contaminant concentrations, reducing contaminant migration to groundwater as well as direct contact risks. In close proximity to a building, an SVE system can also reduce or reverse pressure gradients that allow contaminants to migrate into the building. By applying a vacuum to the soil in utility corridors and underneath the building slab vapor intrusion can be mitigated.

3.2 SOIL VAPOR EXTRACTION SYSTEM DESIGN

The intent of the SVE system at the former Martin's Cleaners is to reduce migration of chlorinated solvent from the soil into the liquor store building, and to reduce contaminant concentrations in the vadose zone. The effectiveness of vapor extraction from subsurface soil is largely dependent upon the lithology of the subsurface soil, as air (and contaminant vapors) will move more easily through coarse-grained, loosely packed soil than fine-grained, compressed soil. Lithology at the Whitefish Solvent Site consists of, "high plasticity clays and silty clays that exhibit horizontal laminations or varve structures that range in thickness from a fraction of an inch to several inches. A non-conformable layer of silty fine sand of uniform thickness (approximately 1 foot) was encountered at six to seven feet bgs in the majority of the study area…the water table was situated within varved glacio-lacustrine clays and silty clays in most locations (Resource Technologies 2011)."

Locally at the former Martin's Cleaners a silt layer is observed at approximately 4-6 ft. The silt layer is the most permeable soil observed at the site, the SVE system is focused on extracting vapors from this layer; the PDI investigation memo (Appendix A) goes into further detail on the silted layer. This lithology suggests that with proper design, SVE may be used to effectively extract vapors from the former Martin's Cleaners. By installing a SVE recovery trench down to the bottom of the silt layer, installing horizontal SVE piping, and backfilling with gravel, vapors can be captured before migrating into the liquor store building. Positioning the horizontal wells near the liquor

store building foundation is possible on three sides, the western sidewalk (Baker Avenue), southern sidewalk (3rd Street), and eastern parking lot (highest recorded CVOCs in soil and groundwater). Each SVE extraction run is constructed of polyvinyl chloride (PVC) with slotted perforations for the length of its extraction run (approximate east, south, and west sidewalk lengths). Trench installation on the northern side of the building is not possible due the proximity of the three story neighboring building. The extraction well positioning was chosen to maximize extraction around the footings of the building to effectively reduce vapor intrusion into the building. Additionally, the extraction wells intercept PCE that may volatilize off of the groundwater plume; since groundwater flow direction is to the southwest, an extraction system located down/cross gradient from the potential source area (east side parking lot) will remove more contaminant mass. The former Martin's Cleaners SVE system is shown on Figure 2. Three horizontal wells are connected to a blower that exerts a vacuum on the well and trench system, creating a negative pressure gradient in the subsurface; thus, vapors in the subsurface are drawn up through the well and forced through a filtering system designed to capture the contaminants before the air is exhausted into the ambient environment. Commonly, granulated activated carbon (GAC) is the medium used to filter and capture most volatile organic compounds, including chlorinated solvents. One of the breakdown products is vinyl chloride (VC), which is not captured effectively by GAC filtration but is adsorbed by zeolite media.

3.2.1 SVE INSTALLATION UTILITY CLEARANCE

Utility clearances were conducted along the west, south, and east sides of the former Martin's Cleaners building where intrusive activity was planned, prior to excavation. The Montana 811 UDIG call center was contacted and utility markings were made by utility locators. The natural gas line, sewer line, water line, and roof drainage lines received special attention with regard to subsurface clearance and electrical, phone line, and cable with overhead clearance. The utility clearance ticket is provided in Appendix B1.

3.2.2 INSTALLATION PHASE 1 – HORIZONTAL WELLS

Bids for SVE system construction were evaluated and Remington Technologies (Remington) from Loveland, CO was contracted. SVE system construction activities included excavating and backfilling remediation trenches, installing three PVC horizontal SVE wells, installing a concrete slab, restoring disturbed surfaces to match surrounding surfaces, and disposing of soil generated from trenching activities. The traffic control plan for SVE system construction is provided in Appendix B2.

Remington performed this work between October 12 and October 18, 2016. Figure 3 shows the remediation trench design. Compact excavators John Deere 50D and GEHL Z17 were operated to remove the asphalt and concrete surfacing materials, and to excavate to 6 ft bgs. The compact excavators were able to operate under the western and

southern building awnings, and between the awning posts and liquor store building. Soils were hand dug around the water, sewer, natural gas, and storm water drainage utilities. The silt layer was identified during the trenching activities and was noted to range from a depth of 5 ft in the eastern and western trenches to a range of 5 ft to 5 ft 8-inches in the southern trench. The eastern 40 ft of 4-inch horizontal SVE well was installed between 4 and 5 ft east of the liquor store building under the parking lot. The eastern horizontal well was installed below a water line and gas line, but installed above two sewer lines. The shallowest portion of the eastern horizontal well was installed at a depth of approximately 36 inches bgs, whereas the deepest end of the eastern horizontal well was installed at 38-inches bgs; the horizontal wells were installed with a continuous slope of at least 0.5% towards the end of the well to allow condensation drainage. The southern 77 ft of 4-inch horizontal SVE piping was installed approximately 3 to 4 ft south of the southern liquor store building wall under the sidewalk with the end of the well installed at a final depth of 41-inch bgs. The western 43 feet of 4-inch horizontal SVE well was installed between three and four feet west of the front of the liquor store building under the sidewalk. The deepest end of the western well was installed at 43-inch bgs. The western horizontal well was installed over a water line. Pea gravel was installed in the trench between 2 ft 8-inches down to the bottom of the trench (6 ft), and fabric and utility marking tape were placed over the pea gravel. Flow fill was poured over the fabric and pea gravel. Asphalt and concrete were the surface completions. The footprint of the remediation system was excavated through the asphalt and poured with concrete. Daily SVE construction oversight reports, which include site personnel, equipment, work activities conducted, and photos are provided in Appendix B3. Additionally, field notes and tailgate safety forms are provided in Appendices C, and B4, respectively. Disposal of soil, asphalt, and concrete excavated during trenching activities is further discussed in Section 9, investigation derived waste.

Trihydro collected 3 backfill samples on October 16 and 18, 2016 and the samples were analyzed by Energy Laboratory (Energy) of Helena, MT. The samples were collected as 5-point composites and are each representative of 400 cubic yards of backfill per the State Superfund Frequently Asked Questions. Sample analytical results are listed in Table 1. Samples were collected from pea gravel originating at the Nelcon, Inc. pit at 304 Jellison Road, Kalispell, MT (Pea Gravel) and from sand and aggregate used in flowable backfill (Sand and Aggregate) from the Schellinger Construction pit at 4405 Whitefish Stage Rd, Whitefish, MT. Trihydro reviewed DEQ's interactive web mapping application and online query service tool for nearby contaminated sites to each of these pits. The interactive web mapper displays database listings from DEQ's Permitting and Compliance Division (Waste and Underground Tank Management Bureau), the State Superfund Unit (SSU), and the Petroleum Tank Release Compensation Board (PTRCB). The closest contaminated sites were a petroleum fund claim at the Kalispell Jet Center approximately one mile southwest of the Nelcon pit, and an underground storage tank (UST) site at Midway Mini Mart on Highway 93 approximately 1.7 miles west of the Schellinger pit. The distance of these potentially contaminated sites from the backfill sources makes impacts to the backfill material unlikely; therefore, samples were analyzed for the Resource

Conservation and Recovery Act (RCRA) 8 metals. Sample results were compared to the Montana Background Threshold Values (BTVs). Backfill sample analytical results did not exceed these levels, although detection limits for cadmium and silver did exceed the threshold values. Cadmium and silver were not detected, and detection limits did not exceed generic screening levels for residential or leaching to groundwater. Data validation was performed in accordance with DEQ guidelines, and data are determined to be useable for decision-making purposes. The lab report and data validation report for the three backfill samples are provided in Appendix D1.

3.2.3 INSTALLATION PHASE 2 – REMEDIATION SYSTEM

Trihydro researched costs for constructing a SVE remediation system concurrent with costs for obtaining a used SVE remediation system. Trihydro identified a used SVE system with a variable frequency drive 20 horsepower regenerative blower. Trihydro purchased the used SVE system from Onion Enterprises (Onion) of Naples, Florida. The system had previously operated on a hydrocarbon remediation project in Alaska before being stored in a laydown yard in Indiana. The SVE system arrived at the former Martin's Cleaners on October 17, 2016, and was placed on the foundation concrete pad; Trihydro secured the building to the pad. The system consists of a 7-ft 9-inch by 12-ft shed with a 3-phase 205 volt 50 amp electrical service panel, programmable controller for blower and system valves (9), variable frequency drive with capabilities of 450 standard cubic feet per minute (SCFM) regenerative blower, an inline air filter, 60-gallon capacity knockout tank, and knockout tank transfer pump. Onion provided Trihydro with a SVE operating and maintenance instructions manual and electrical schematics, provided in Appendices E1 and E2, respectively.

Trihydro contracted with Flathead Electric Cooperative Inc. (Flathead) to install a power pole and overhead power from a transformer further north in the alleyway. Flathead installed the power pole and overhead wire on December 14, 2016. Trihydro contracted with Powerhouse Electric, Inc. (Powerhouse) of Kalispell, MT to install a 120/208 7 jaw meter base with a 10 ft mast, install two grounding rods, and connect power from the meter to the remediation system. Powerhouse installed the meter base and mast on December 2, 2016 and connected power to the system on December 21 and 22, 2016. Daily construction oversight reports, which include site personal, equipment, work activities conducted, and photos are provided in Appendix B3. Additionally, field notes and tailgate safety forms are provided in Appendices C1, and B4, respectively.

On December 2, 2016, two 55-gallon GAC and two 55-gallon zeolite vapor filtration drums were purchased from Carbonair. One GAC and one zeolite drum were connected between the outlet of the regenerative blower and the exhaust duct of the SVE system.

Trihydro obtained a City of Whitefish Building Permit and Electrical Permit for the installation of the remediation system and electrical services. The City of Whitefish completed inspections and signed off on operating the system on December 20, 2016.

3.2.4 INSTALLATION PHASE 3 – MONITORING WELLS

Bids for drilling and installation of three nested wells were evaluated and Remington (supervised by a Montana-licensed water well driller from Inberg-Miller Engineers) was contracted to perform that phase of the work. Monitoring well locations are shown on Figure 2 and the nested well diagram is provided on Figure 4. Utility locates were requested by Remington via the Montana 811 UDIG call center and by private utility locator American Leak Detection of Lewistown, MT. The utility clearance ticket is provided in Appendix B1. The monitoring well MTN-MW3 location was moved because of street light electrical, street drainage, and water line utilities located near the proposed location. Nested monitoring wells MTN-MW1 and MTN-MW3 were drilled and installed on January 5, 2017 using a Geoprobe 7822DT with a hollow stem auger. Nested monitoring well MTN-MW1 (approximately 55 ft from the nearest horizontal SVE well) was advanced to approximately 19 feet bgs. Ten feet of 2-inch schedule 40 PVC with 0.010 slotted perforations was installed between 8.6 and 18.6 ft bgs. The ½ inch stainless steel vapor well inlet was set where the silt layer was located, between 3.5 and 4.5 ft bgs. Nested monitoring well MTN-MW3 (approximately 35 ft from the nearest SVE horizontal well) was advanced to approximately 18.5 ft bgs and the groundwater and vapor wells were installed. Ten feet of 2-inch schedule 40 PVC with 0.010 slotted perforations was installed between 8.2 and 18.2 ft bgs. The ½ inch stainless steel vapor well inlet was set where the silt layer was located, between 5.5 and 6.5 ft bgs. Nested monitoring well MTN-MW2 (approximately 22 ft from the nearest SVE horizontal well) was drilled and installed on January 8, 2017 also using the Geoprobe 7822DT with a hollow stem auger. The borehole was advanced to approximately 18.8 ft bgs and the groundwater and vapor wells were installed. Ten feet of 2-inch schedule 40 PVC with 0.010 slotted perforations was installed between 8.4 and 18.4 ft bgs. The ½ inch stainless steel vapor well inlet was set where the silt layer was located, between 5.5 and 6.5 ft bgs. Monitoring well boring logs and well completion logs are provided in Appendix F1 and F2, respectively. Daily oversight logs, which include photos, are provided in Appendix F3. Field notes and tailgate safety sheets are provided in Appendix C1 and F4, respectively. IDW handling and disposal is discussed in Section 9.

The groundwater monitoring wells were constructed in accordance with State of Montana monitoring well standards.

3.3 SVE SYSTEM START UP

Once the electrical power was installed to the remediation building, Powerhouse and Trihydro verified that electrical connections were correct and that system components operated. The system components check was performed on

December 21 and December 22, 2016. Since the shed did not have electrical power prior to startup, the shed could not be heated while temperatures reached below the freezing point. Frost was noted on the outside of the zeolite filtration drums, therefore the SVE system was not operated until the drums and other system components thawed out. The system was started up and began vapor mitigation of the liquor store on December 22, 2016 at 3:44 pm.

The SVE blower vacuum, vapor flowrate through the filtration media, influent and effluent PID readings, and knockout tank condensation level were monitored and adjusted to optimize the remediation system during startup and continued during the reporting period. Since pilot testing was not conducted prior to system installation, modifications and optimization were performed following startup to maximize system influence. The airflow from the wells was increased to the maximum amount the treatment media were capable of, while monitoring for condensation accumulation. Since condensation was not observed, the only modifications to the flowrate and vacuum were temporarily reducing both during injections to avoid water intake, and slightly reducing the vacuum and flowrate during the spring as the blower temperature increased. Future optimization will focus on adjustments due to seasonal changes (temperature and water levels), and adjustments if zeolite is no longer needed in the treatment of vapors.

3.4 REMEDIATION SYSTEM INITIAL SAMPLING

The remediation system was previously operated at a hydrocarbon impacted site prior to being installed at the former Martin's Cleaners. Therefore, before operating the SVE system Trihydro collected an air sample from the system, with the horizontal SVE well valves closed and the air dilution valve opened to provide air flow through the remediation system piping. The influent (i.e. the vapor entering the filter canister) was sampled in a 6-liter summa canister for laboratory analysis on December 22, 2016 over 30 minutes. The sample was submitted for U.S. Environmental Protection Agency (EPA) TO-15 SIM/low level scan and air-phase petroleum hydrocarbons (APH) and analyzed by ALS Environmental Laboratories (ALS) in Simi Valley, CA.

Laboratory results show a PCE concentration of 340 $\mu g/m^3$, benzene concentration of 2 $\mu g/m^3$, and aliphatic C9-C10 range concentration of 16 $\mu g/m^3$ in the startup of the remediation system; however, system piping was connected using PVC primer and PVC glue which contain VOCs and were the likely sources for these contaminants. The analytical data is provided in Table 2 and in Appendix D2.

Radius of Influence: Vacuum measurements from the nested monitoring wells were used to evaluate the radius of influence (ROI), i.e. the distance at which the wells would exert a sufficient pressure gradient to withdraw contaminants from the soil. Since the three horizontal SVE wells are installed within the same trench, the ROI measurements could only be collected with the three wells open and operating at the same time.

The ROI data collection began with system vacuum, measured at the SVE blower, and then measuring the induced vacuum at each of the three nested vapor wells. A limiting factor to the SVE system is the airflow vapor stream passing through the filtration media drums; the manufacturer recommends a flow rate below 130 scfm.

Maximum SVE vacuum achieved was 17.1 inches of water (in H2O) and 129 scfm flow rate through the three horizontal wells since startup. At this vacuum, induced vacuum measured at MTN-MW1 (approximately 55 ft away from the SVE recovery trench) was less than 0.1 in H2O; this result is below the acceptable threshold for indicating an influence by the SVE system. The maximum induced vacuum measured at MTN-MW2 (approximately 22 ft away from the SVE recovery trench) was -5.4 in H2O. The maximum induced vacuum measured at MTN-MW3 (approximately 35 ft from the SVE recovery trench) was below the acceptable threshold for indicating an influence by the SVE system. Induced vacuum at the sub-slab soil gas sample probe (MTN-SS; approximately 21 ft away from the SVE trench) located within the liquor store utility closet was measured but no vacuum was detected. This sample probe was installed below the sub-slab and above the approximate four feet of clay located above the silt layer, indicating that the vertical ROI may be limited. Monitoring well WSMW-7 cannot be used for induced vacuum measurements due to the top of the slotted well screen being installed at 12.5 ft bgs; the top of the slotted well screen is submerged below the top of the water table).

The radius of influence from the three SVE horizontal wells can be estimated using induced vacuums measured from monitoring well MTN-MW2. An approximate radius of influence of at least 0.1 in H20 is estimated at approximately 30 feet from the SVE recovery trench. This radius of influence covers all but the north central portion of the liquor store foot print, including portions of the utility trenches beneath the building (Figure 2). These trenches may be acting as preferential pathways for VOCs to migrate into the building, and applying vacuum to them will likely reduce or eliminate migration of VOCs into the building through utility penetrations.

4.0 MARTIN'S CLEANERS IN-SITU ENHANCED BIOREMEDIATION

Under favorable subsurface geochemical conditions, i.e., strongly reducing conditions, the natural degradation of PCE into daughter products is accelerated, producing TCE, which degrades to DCE, which degrades to VC. The end product of this process is ethane or methane. The degradation of PCE to these daughter products is a process known as reductive dechlorination in which hydrogen atoms are substituted for chlorine atoms in the chlorinated solvent molecule, to release an electron during the microbes' respiration process. Injecting EVO allows native microbes to deplete the electron acceptors in the soil and groundwater, leading to strongly reducing conditions. The EVO is designed to persist for approximately two years, allowing the populations of microbes performing reductive dechlorination to increase, and poses no threat to the environment.

Since clay soils make up most of the subsurface lithology at the former Martin's Cleaners, the injection ROI is relatively limited. As the primary contaminant source area is unknown, the former Martin's Cleaners injection was designed to target the parking lot area and sewer utility, and where it was feasible to inject along the south side of the liquor store building. The design injection radius of influence was estimated to be approximately 3.5 ft based on the clay site conditions, so a pattern of injection points with seven feet spacing was established to attempt to achieve coverage throughout the subsurface soil.

4.1 EVO INJECTION EVENT

Trihydro submitted a Class V application for performing EVO injections under the Underground Injection Control Program (UIC Program) to the EPA Region 8 office. Class V injections are classified as injections of non-hazardous fluids into or above underground sources of drinking water. The EPA authorization letter is provided in Appendix G1.

Remington Technologies was contracted to perform the injections. Utility locates were requested by Remington via the Montana 811 UDIG call center and by private utility locator American Leak Detection of Lewistown, MT. The utility clearance ticket is provided in Appendix G2. Injection points located in Third Street and the Third Street sidewalk were adjusted because of irrigation, street drainage, telephone, and cable utilities; these injection points were adjusted towards the south by approximately four feet. Injection points located in the parking lot of the liquor store were adjusted because of a water line and street drainage utilities; these affected injection points were adjusted north of the waterline by one foot and south of the street drainage by one foot. The minor injection point location adjustments did not result in changes to injection volumes, and are not expected to reduce the effectiveness of the injections as the EVO is anticipated to be mobile within the subsurface over small distances. Injection point locations are shown on Figure 5.

Injection activities began on January 6, 2017; penetrations were accomplished using a Geoprobe 7822DT. Injection water was acquired from a City of Whitefish fire hydrant and mixed with EVO concentrate inside a mixing trailer before being pumped to the Geoprobe 7822DT advance probe rod using a diaphragm pump. The Newman Zone EVO product information and Newman Zone non-ionic formulation Safety Data Sheet are provided in Appendices G3 and G4, respectively. As each boring was completed, a 3.1 percent (%) solution of EVO in water was injected into the subsurface at an average 17 pounds per square inch (PSI); most locations received approximately 410 gallons of solution and three took over 820 gallons (the two western most injection points and the eastern most injection point next to the sewer utility trench). Injection point locations and volumes of solution injected are provided in Appendix G5. Injections were made at 12 ft bgs into the shallow groundwater and then the injection rod was raised to 5.5 ft bgs and the final amount of EVO solution was injected into the silted layer located above the water table. When injection activities were completed at each location, the boring was filled with bentonite chips, and later sealed with asphalt cold patch or concrete to match the surrounding surface. A total of 47 locations were used to inject a total 20,500 gallons of 3.1% EVO solution into the subsurface. Subsurface injection of the fluid concluded January 11, 2017. Daily oversight logs, which include photos, are provided in Appendix G6. Field notes and tailgate safety sheets are provided in Appendix C and G7, respectively.

Injection point pressures, flow rates, and injection times over gallons of 3.1% EVO are included in the Daily Injection Field Log Sheets, which are provided in Remington's "Remediation Injection Report" (Remington's Report, Appendix G8).

5.0 MARTIN'S CLEANERS INDOOR AIR SAMPLING

Indoor air sampling was initially performed by Resource Technologies at the site in March 2012. At that time, concentrations of PCE exceeded the May 2016 commercial RSL for indoor air: liquor store main floor (250 µg/m^3); SARR (Resource Technologies 2013). TCE was also detected in the 2012 main floor sample (0.36 µg/m^3); SARR (Resource Technologies 2013). A sub-slab sample taken from below the concrete slab resulted in a PCE concentration of 960,000 µg/m^3; SARR (Resource Technologies 2013). In the sub-slab sample, aliphatics C9-C12 range was detected at a 42,000 µg/m^3 concentration; SARR (Resource Technologies 2013). Indoor air sampling was next performed at the site on February 22, 2017, less than nine weeks after the SVE system was started, and less than six weeks after subsurface EVO injections were performed. The indoor air and sub-slab field activities are being performed in accordance with the *Indoor Air/Subslab Vapor Sampling Work Plan Memo* (Indoor Work Plan) dated February 10, 2017. The Indoor Work Plan is provided in Appendix H1.

5.1 SUB-SLAB PROBE INSTALLATION AND LEAK TESTING

Utility clearances were conducted prior to probe installation activities. The Montana 811 UDIG call center was contacted and utility markings were made by utility locators. Additional scrutiny was made to the proximity of a natural gas, floor drain, and water lines in the liquor store utility closet. The UDIG utility ticket is included in Appendix H2.

On February 21, 2017, Trihydro installed a sub-slab soil gas sample probe (MTN-SS) inside the liquor store utility closet. The MTN-SS sub-slab location, along with the approximate sub-slab location collected in March 2012 are provided on Figure 6. A rotary hammer was operated with a constantly wetted one-inch drill bit as it cored through the nine inch concrete. The drill bit was advanced to a final depth of 15-inches below the top of the slab. MTN-SS was constructed by inserting ¼-inch Teflon tubing 14.5-inches into the borehole and backfilling with 10/20 silica sand. The top four-inches of the borehole were sealed with hydrated bentonite. A ¼-inch, stainless steel, compression-fit ball valve was attached to the top tubing extending above the concrete slab. The MTN-SS construction detail is shown on Figure 7.

Leak testing of the liquor store sub-slab probe tested the integrity of the surface seal and verified the connection between the sample container and subsurface probe. The sub-slab well was leak tested 14 hours after completion of the installation on February 22, 2017. Leak testing included the introduction of helium into a shroud cover at the surface while pumping three or more tubing volumes of subsurface gas and comparing the surface and subsurface helium concentrations. Section 4.7 in the Montana Vapor Intrusion Guide (DEQ 2011) provided guidance on leak testing

procedures and leak testing was documented on the field forms (Appendix H3). Daily oversight logs, which include photos, are provided in Appendix H4 and field notes in Appendix C.

5.2 INDOOR AIR AND SUB-SLAB LIQUOR STORE SAMPLING

On February 22, 2017, Trihydro performed indoor air sampling at the liquor store during normal business operating hours (1000-1900). Samples were collected from the main floor of the liquor store, below the utility closet concrete slab, and ambient air outside the structure. The indoor air field forms are provided in Appendix H5. A field duplicate sample was also collected from the main floor of the liquor store. Indoor and sub-slab sample locations are shown on Figure 6. The samples were collected as grab samples using gauges and 6-liter summa canisters which were certified as "clean." The main floor, duplicate, and ambient air outside the structure sampling collection was performed over eight hours while the sub-slab sample was collected in 30 minutes to ensure appropriate capture of VOCs from the indoor air and subsurface. Once the canister was filled, the summa canister was closed, labeled, and stored/shipped according to lab instructions. The samples were analyzed by ALS and the analytical results were validated by Trihydro. The ALS Environmental laboratory control sample (LCS) percent recovery for the sampling event were report outside laboratory quality control limits for PCE and TCE indicating high biases results for the indoor air and sub-slab data set; therefore the detected PCE and TCE results were assigned J+ qualifiers to indicate estimated concentrations that may be biased high. The laboratory analytical results and validated report are provided in Appendix D3.

5.3 INDOOR AIR AND SUB-SLAB LIQUOR STORE RESULTS

PCE was detected in the samples collected in the liquor store, the field duplicate (liquor store), sub-slab, and ambient air outside the liquor store at concentrations of 99, 100, 1,300, and 0.85 µg/m^3 respectively. TCE was detected in the same samples at concentrations of 0.16, 0.16, ND (1.3), and 0.033 µg/m^3 respectively. The liquor store indoor air PCE (99 µg/m^3) exceeded the 2016 EPA commercial screening levels for indoor air (47 µg/m^3) and the aliphatics C9-C12 range (60 µg/m^3) detection exceeded the DEQ APH residential screening level for indoor air (10.4 µg/m^3). The ambient air sample aliphatics C9-C12 range (110 µg/m^3) detection exceeded the DEQ APH residential screening level for indoor air (10.4 µg/m^3). The sub-slab PCE (99 µg/m^3) detection exceeded the 2016 EPA commercial screening levels for indoor air (47 µg/m^3); ethylbenzene, aliphatic C5-C8 range, aliphatic C9-C12 range, and aromatic C9-C10 range detection limits exceeded their respective screening limits but were not detected. There were no detections of cis-1,2-dichloroethene (cis-1,2-DCE) nor VC in the main floor, duplicate, sub-slab, and ambient air samples. The Martin's Cleaners indoor air analytical results are shown in Table 3 and selected results on Figure 8. The Martin's Cleaners sub-slab analytical results are shown in Table 4 and selected results on Figure 9.

6.0 MARTIN'S CLEANERS SVE OPERATION

The SVE system was programmed to run 24 hours per day, 7 days per week following start up on December 22, 2016. Trihydro initially visited the site approximately twice per month to perform O&M tasks, monitor system performance, and make adjustments as necessary. Beginning in March 2017, the frequency of routine visits was decreased to once per month. During each visit, in addition to performing routine maintenance, PID readings were taken at the following locations: inline sample ports for each well; pre-dilution air input sample port; inlet and outlet sample ports for the first filter canister (GAC); and at the outlet sample port for the second filter canister (zeolite). The field log readings obtained during each of these visits are shown in Table 5 and on Appendix I1 which contains system run time, flow, and vacuum readings for each visit. PID concentrations were measured from the combined three well manifold and ranged between 36,600 and 56,300 ppb the first 24 hours of system operation. Concentration dropped over the next few weeks, and after five weeks of SVE operations the PID measured concentrations dropped below 5,000 ppb. Between mid-February and mid-May measured manifold PID concentrations ranged in between 2,403 and 4,800 ppb. Additional information including photos are within the daily oversight logs are included as Appendix I2 and field notes (Appendix C).

6.1 LABORATORY ANALYTICAL VERIFICATION

The influent and effluent of the system, i.e. the vapor entering and leaving the first of the in-line filter canisters was sampled for laboratory analysis. Samples for laboratory analysis have been taken from these locations two times, January 2017 and February 2017; the sample forms are in Appendix I3. The samples were collected as 30-minute grab samples using 6-liter summa canisters which were laboratory certified as "clean." An influent and effluent sample event was not submitted for analysis in December 2016 due to a system piping fresh air leak discovered after sample collection had been completed. An influent sample could not be collected in January 2017 due to a canister arriving without proper vacuum. The results from the February 22, 2017 influent sampling event showed PCE (2700 µg/m^3), TCE (36 µg/m^3), and cis-1,2-dichloroethene (cis-1,2-DCE; 57 µg/m^3) being drawn from the subsurface into the remediation system. VC, benzene, and ethylbenzene exceeded their respective EPA commercial screening limits for air but were not detected from the February 22, 2017 influent sample. The aliphatic C5-C8 range, aliphatic C9-C12 range, and aromatic C9-C10 range detection limits exceeded DEQ APH residential screening levels but were not detected in the February 22, 2017 influent sample. The January 12, 2017 effluent sample showed PCE (320 µg/m^3) exceeded the EPA commercial screening limit for air and aliphatic C9-C12 range detection limits exceeded DEQ APH residential screening level but were not detected. The February 22, 2017 effluent sample showed aliphatic C9-C12 range detection limits exceeded DEQ APH residential screening level but were not detected. VC was nondetect in each of the sampling events. Results of the laboratory analyses are listed in Table 2.

6.2 FILTER MEDIA

Subsurface vapor is drawn into the three horizontal SVE wells located on the western, southern, and eastern sides of the liquor store, passes through a manifold, inline air filter, knockout tank, regenerative blower, and filtration media before discharging into the atmosphere. The extracted vapor influent passed through two filter media drums (GAC and zeolite) between December 22, 2016 through April 12, 2017; on April 12, 2017, the influent began passing through three filtration media drums (GAC, GAC, and zeolite). The samples were analyzed by ALS and the analytical results were validated by Trihydro. The lab results and validated report are provided in Appendix D2. GAC filtration media effectively captures PCE, TCE, and DCE, and hydrocarbon. Zeolite filtration media is effective at capturing VC. The only detection of VC at the site has been in a groundwater sample collected at monitoring well MTN-MW1 in February 2017. The initial GAC and zeolite drums were replaced with fresh filter media drums on February 12, 2017 due to break-through of contaminated influent vapor. Break-through is when the filter media no longer effectively captures vapor contamination due to ever decreasing carbon surface area (adsorption sites) as influent vapor passes over the carbon. A third fresh media GAC drum was received and installed between the initial GAC and zeolite drums to form a three drum vapor treatment on April 12, 2017. PID concentrations are measured in sample ports entering and exiting the media drums and the readings are used to estimate when break-though is approaching. As concentrations have dropped since SVE startup in December 2016, the corresponding loading rates have decreased. PID monitoring and quarterly influent and effluent sampling will help determine when break-through is approaching and when filter media drums are to be replaced. The PID reading are included Appendix I1 field forms.

7.0 MARTIN'S CLEANERS GROUND WATER SAMPLING

Groundwater sampling was initially performed at the Martin's Cleaners site in October, 2011 and March, 2012 from monitoring well WSMW-7. WSMW-7, which is positioned east of the liquor store sewer line, was drilled and installed on October 4, 2011; SARR (Resource Technologies 2013). The October 2011 and March 2012 PCE concentrations collected from WSMW-7 were 8,800 µg/L and 12,000 µg/L, respectively; SARR (Resource Technologies 2013).

7.1 MONITORING WELL DEVELOPMENT

Nested monitoring wells MTN-MW1, MTN-MW2, and MTN-MW3 were drilled and installed between January 5 and January 8, 2017. The monitoring well drilling and construction detail is provided in section 3.2.4. Each nested well group consists of a shallow groundwater monitoring well and one shallow vapor point that does not intercept groundwater.

The goals of well development are (1) to enhance the hydraulic connections between the water-bearing formation and the newly installed wells, and (2) to remove the clay, silt, and fine sand particles from the sand filter pack and adjacent formation. Monitoring wells MTN-MW1, MTN-MW2, and MTN-MW3 were developed by mechanically surging with a PVC surge block on January 26 and January 27, 2017. After surging, groundwater was removed by bailing. Monitoring well WSMW-7 was too small to redevelop with a surge block, so the well was bailed with a bailer. Each of the four wells were bailed until 10 well case volumes were removed over a 24-hour period. Portable field equipment was used to measure the conductivity, pH, temperature, turbidity, dissolved oxygen, and dissolved solids of samples of the fluid removed during well development. Purge water generated during well development activities were placed in a 55-gallon drum and stored within the locked remediation shed; additional information is provided in Section 9, investigation derived waste. The well development forms in Appendix F5 include the field parameter readings collected during development of the wells.

7.2 MONITORING WELL SURVEYS

The three new monitoring wells installed in January 2017 and monitoring well WSMW-7 were surveyed by River Design Group, Inc. (River) of Whitefish, Montana in April 2017. River is a Professional Land Surveyor licensed surveyor in the State of Montana. Surveys were conducted in accordance with DEQ guidance on the State Superfund Frequently Asked Questions website (DEQ, 2015), which indicates that Section 37-67-301, et seq., Montana Code Annotated (MCA), and ARM 24.183.101 et seq, requires groundwater monitoring well elevations to be completed by a licensed surveyor or professional engineer registered in the State of Montana (MCA, 2014 and ARM, 2014). Vertical

elevations were collected from the top of the PVC well and top of the outer casing. The survey adhered to the standards identified in the ARM Subchapter: 24.183.11, Subchapter Title: Uniform Standards for Monumentation, Certificates of Survey, and Final Subdivision Plats. (http://www.mtrules.org/gateway/Subchapterhome.asp?scn=24.183.11). The survey results provide an accuracy of plus or minus 0.1 ft horizontally and plus or minus 0.01 ft vertically. The vertical control datum used to determine the elevation of the well was the North American Vertical Datum of 1988 (NAVD 88), which was referenced to a nearby U.S. Geological Survey (USGS), or equivalent, benchmark. Survey data is provided in Appendix F6.

7.3 GROUNDWATER SAMPLING EVENT

Groundwater samples were collected from the three new monitoring wells and existing monitoring well WSMW-7 in February 2017. The monitoring well locations are displayed on Figure 2. The groundwater sampling activities are being performed in accordance with the *Groundwater Sampling Work Plan Memo* (Groundwater Work Plan) dated February 8, 2017. The Groundwater Work Plan is provided in Appendix I1.

7.3.1 WATER LEVELS

Prior to groundwater sampling, water levels were measured for each monitoring well location. An interface probe was used to measure the depth to light non-aqueous phase liquid (LNAPL), depth to water, dense non-aqueous phase liquid (DNAPL), and total depth for each groundwater monitoring well to be sampled. LNAPL and DNAPL have not been detected during the fluid level measuring events. Fluid level measurements were recorded to within 0.01 foot and are displayed in Table 6 and in Appendix J2. As presented in Section 4, approximately 20,500 gallons of 3.1 % EVO solution was injected at the former Martin's Cleaners site between January 6 and January 11, 2017. Water levels collected on February 21, 2017 show nearly a three foot higher water table near the three monitoring wells (MTN-MW1, MTN-MW2, and WSMW-7) near the injection points compared to MTN-MW3 located outside the injection area. The February 2017 potentiometric groundwater surface contours showing the groundwater mounding and the southwest groundwater surface flow direction are displayed on Figure 10. Fluid levels were measured on March 13, 2017, April 12, 2017, and May 15, 2017. The May 15, 2017 event shows the groundwater mounding dissipating and ranges between is 1.5 and 0.9 foot higher water table near the three monitoring wells (MTN-MW1, MTN-MW2, and WSMW-7) near the injection points compared to MTN-MW3 located outside the injection area. The May 2017 potentiometric groundwater surface contours showing a southwest groundwater surface flow direction are displayed on Figure 11.

7.3.1 GROUNDWATER SAMPLE COLLECTION

Groundwater samples were collected from existing and newly installed monitoring wells on February 21 and February 22, 2017. Monitoring wells are located on Figure 2. Groundwater samples were collected using low-flow sampling methods by operating a peristaltic pump and dedicated Teflon tubing for each well. DEQ guidance (DEQ 2005) suggests that VOC samples should not be collected using a peristaltic pump (particularly in wells deeper than 10-15 feet); however, monitoring well WSMW-7 was constructed with ¾-inch PVC. Submersible electric or bladder pumps are not available to collect a sample from a well this small. Therefore, the options for sampling WSMW-7 are using a small diameter bailer or low-flow using a peristaltic pump. By collecting groundwater samples using the same type of purging equipment, allows for comparability between monitoring well locations, although future samples will be collected with bladder pumps from the 2" wells.

Purging using a Geopump Easy Load II model 900-1280 peristaltic pump was conducted at a rate of approximately 0.1 to 0.2 liters per minute (L/min). Field parameters pH, conductivity, oxygen reduction potential (ORP), and dissolved oxygen (DO) were measured every 3 to 5 minutes using a water quality meter with a Horiba model U-52 flow-through cell. Purge forms are located in Appendix J3. Purging continued until these parameters varied less than 10% over three consecutive measurements. Water levels were measured during purging to confirm that minimal (less than approximately 0.3 ft) drawdown occurred. Following completion of purging, the flow-through multi-meter cell was removed and the groundwater sample was collected for the location. Monitoring well WSMW-7 was purged dry at a purge rate of 0.1 L/min. A grab sample was collected after allowing the monitoring well to recharge for five hours. Groundwater samples were collected for volatile organic compounds (VOCs) (short list) by Method EPA 8260B, extractable petroleum hydrocarbons, and volatile petroleum hydrocarbons by Montana-modified Massachusetts method. Groundwater samples were preserved in the field with preservatives provided by the laboratory and then placed on ice. Samples were analyzed by Energy, and analytical results were validated by Trihydro (Appendix D4). VOC analytical results in groundwater are shown in Table 7, SVOC analytical results are shown in Table 8, and VPH & EPH analytical results are shown in Table 9. The groundwater field parameters are shown in Table 10 and selected analytical results are shown on Figure 10.

Deviations from the submitted groundwater sampling plan that occurred during purging activities were primarily due to insufficient monitoring well recharge (groundwater drawdown greater than 0.3 ft) from the subsurface clay geology. The ¾" casing at monitoring well WSMW-7 is too small for both purge tubing and interface meter probe to be present in the well at the same time. Therefore, no water level could be collected during purging activities at this well.

8.0 MARTIN'S CLEANERS INTERIM REMEDIAL ACTION PERFORMANCE

Laboratory analytical data shown in Table 2, indicate that PCE has been the primary constituent of the soil vapor extracted from the subsurface, detected at two to three orders of magnitude greater concentrations than TCE. Therefore, the molecular mass of PCE (165.82 g/mol) was used to calculate mass removed by the system, using the formula below:

$$\frac{mg}{m3} = (ppm * MW)/24.46$$

Where: 24.46 = molar volume at 25 deg C and 760 mmHg
MW = molecular weight
mmHG = millimeters of mercury
ppm = parts per million

The cumulative mass removed by the system is plotted in Figure 12, which shows that an estimated 55 lbs. of chlorinated solvents have been removed from the subsurface in 16 weeks of SVE operation. The mass removal estimate is provided in Table 11.

The results of indoor air sampling indicate that constituent concentrations have decreased in the liquor store building, but still exceed the EPA's May 2016 commercial indoor air RSL for PCE. The concentration of APH C5-C8 range collected in February 2017 also exceeded the DEQ APH residential screening level for indoor air. Former Martin's Cleaners indoor air sampling results are provided on Table 3, Figure 8, and in Appendix D3. Martin's Cleaners sub-slab sampling results are provided on Table 4, Figure 9, and in Appendix D3.

February 2017 groundwater sample results were compared with monitoring well WSMW-7 samples collected from 2011 and 2012; SARR (Resource Technologies 2013). VOC sampling results are provided in Table 7 and in Appendix D4. SVOC groundwater sampling results are provided in Table 8 and in Appendix D4. VPH and EPH groundwater sampling results are provided in Table 9 and in Appendix D4. Selected groundwater analytical results are shown on Figure 10. Groundwater sampling results yield the following information:

- Well MTN-MW1: PCE (66 µg/L), TCE (14 µg/L), 1,2 cis DCE (118 µg/L), and VC (2.3 µg/L) exceed DEQ-7 groundwater standards from the February 2017 sampling event. 1,2-Dibromoethane (ND; 1 µg/L), Benzo(a)pyrene (ND; 0.2 µg/L), and Dibenz(a,h)anthracene (ND; 0.2 µg/L) reporting limits exceed their respective groundwater

standards. This is the only VC positive detection between system influent, indoor air, sub-slab, and groundwater sampling events.

- Well MTN-MW2: PCE (1,470 µg/L), TCE (1,290 µg/L), and 1,2 cis DCE (576 µg/L) exceed DEQ-7 groundwater standards from the February 2017 sampling event. VC (ND; 1.2 µg/L), 1,2-Dibromoethane (ND; 1), Benzo(a)pyrene (ND; 0.19 µg/L), and Dibenz(a,h)anthracene (ND; 0.19 µg/L) reporting limits exceed their respective groundwater standards. APH C5-C8 range (3,800 µg/L) exceeds the September 2016 Tier 1 Montana Risk-Based Corrective Action Guidance for Petroleum Releases Risk Based Screening Level (RBCA/RBSL) for groundwater of 650 µg/L.
- Well MTN-MW3: PCE (36 µg/L) exceeds Montana DEQ-7 groundwater standards from the February 2017 sampling event. VC (ND; 1.2 µg/L), 1,2-Dibromoethane (ND; 1), Benzo(a)pyrene (ND; 0.2 µg/L), and Dibenz(a,h)anthracene (ND; 0.2 µg/L), reporting limits exceed their respective groundwater standards.
- Well WSMW-7: PCE (2,760 µg/L), TCE (13,000 µg/L), 1,2 cis DCE (2,740 µg/L), and 1,2 trans DCE (304 µg/l), exceed DEQ-7 groundwater standards from the February 2017 sampling event. The C11-C22, Aromatic adjusted (2890 µg/L) result exceeds the RBCA ground water standard. VC (ND; 1.2 µg/L), 1,1,2,2-Tetrachloroethane (ND; 2.5 µg/L), 1,2-Dibromoethane (ND; 1), Benzo(a)pyrene (ND; 0.31 µg/L), and Dibenz(a,h)anthracene (ND; 0.31 µg/L) reporting limits exceed their respective groundwater standards. The February 2017 PCE concentration dropped from the March 2012 sampling event, whereas TCE, 1,2 cis DCE, and 1,2 trans DCE concentrations have increased since the March 2012 sampling event. APH C5-C8 range (2,150 µg/L) exceeds the RBCA RBSL. The APH C5-C8 sample result is less than the March 2012 (4,110 J µg/L) sampling event, but above the October 2011 (1,710 J µg/L) result.

9.0 INVESTIGATION DERIVED WASTE

Non-soil solid waste (e.g., gloves and disposable well development equipment) was bagged and placed in a dumpster for off-site disposal at the Flathead County Solid Waste Landfill in Kalispell, MT.

Soil wastes from the installation of subsurface trenching were transported, stored on plastic, and covered in plastic in the Cutting Edge Excavation laydown yard (3857 MT-40, Columbia Falls, MT) due to area constraints at the former Martin's Cleaners site. Trihydro collected one 5-point composite sample from the stockpile on October 19, 2016 and had the sample analyzed for toxicity characteristic leaching procedure (TCLP) for VOCs for acceptance at potential disposal facilities. The VOC TCLP results were less than reporting limits and regulatory limits for disposal. PID screening also indicated very low VOC concentrations in the soil. Therefore, Trihydro collected an additional 5-point composite sample on November 16, 2016, and had the sample analyzed for total metals and total VOCs. Metals concentrations were less than BTV's, although reporting limits for cadmium, selenium, and silver exceeded the threshold values. DEQ determined that despite the reporting limits for cadmium, selenium, and silver being above their respective BTVs, they were well below the respective EPA May 2016 residential RSLs. The VOC results were compared to screening levels for PCE, daughter products, and petroleum hydrocarbons listed in RBCA. VOCs were not detected, but reporting limits exceeded leaching to groundwater screening levels for some compounds. Based on these sample results, Trihydro requested approval to consider the excavated soil clean backfill to be used at the contractor's discretion. While reporting limits exceed some leaching to groundwater screening levels, and in one case (vinyl chloride) a residential screening level, there is evidence indicating that the soil is not contaminated by VOCs, including the lack of VOC detections and very low (less than 10 parts per million) VOC concentrations during field PID screening. The analytical results are included in Appendix D1.

Development, purge, and decontamination water was containerized in a drum and stored within the locked remediation shed. Approximately 40-gallons of water from February 2017 well development, well sampling, and decontamination activities were collected. A grab sample was collected from the container and analyzed for the VOCs (short list) and RCRA 8 metals. Final disposal of the water is still to be determined. The analytical results are included in Table 12 and Appendix D5.

Soil cuttings from well installation were collected in three drums by Remington. The drums were disposed of at a permitted landfill in Colorado.

The remediation system filter media treating the influent vapor passes through two media drums (GAC and zeolite). The initial GAC and zeolite drums were replaced with fresh filter media drums on February 12, 2017. The used GAC and zeolite drums media were sampled for future disposal. The analytical results are included in Table 13 and Appendix D6.

10.0 SUMMARY AND RECOMMENDATIONS

The SVE system continues to operate on a 24-hour basis, and is regularly serviced each month, with PID readings taken at that time. The system has removed approximately 52 pounds of chlorinated solvents from the subsurface since its installation in December 2016, and concentrations of chlorinated solvents in indoor air and in the liquor store sub-slab have decreased since the 2012 sampling event but still remain above EPA's May 2016 commercial RSLs. Groundwater samples were collected just over four weeks after the injection of the EVO solution, future groundwater sampling events will evaluate if the injection event has altered the makeup of chlorinated solvents in the subsurface.

Based on the SVE system extracting significant levels of PCE from the subsurface soil, Trihydro recommends the following:

- Continued SVE system operation at the current duty rate; i.e. 24-hour operation.
  - Monthly O&M schedule with PID readings to verify continued extraction, and quarterly laboratory analysis of the influent and effluent samples.
  - Submit a detailed O&M Plan for ongoing system operations based on the parameters and data collected to date.
- Continued groundwater sampling during high and low water table periods to evaluate the effectiveness of interim actions.

11.0 REFERENCES

Administrative Rules of Montana (ARM). et seq. 2014. Rule 24.183.1101, Uniform Standards for Monumentation found on the internet at http://www.mtrules.org/gateway/ruleno.asp?RN=24.183.1101. Effective Date 11/21/2014.

Administrative Rules of Montana (ARM). et seq. 2017. Rule 36.21.701 to 36.21.810 (requirement for licensing and construction standards for drilling and installation of wells found on the internet at http://www.mtrules.org/gateway/ChapterHome.asp?Chapter=36.21. Effective Date 6/14/1991.

DEQ. 2005. SRS Low-Flow Purging and Sampling Guidelines. Montana Department of Environmental Quality. April 2005.

DEQ. 2011. Montana Vapor Intrusion Guide. Montana Department of Environmental Quality, Remediation Division. April 22, 2011.

DEQ. 2015. Frequently Asked Questions. http://deq.mt.gov/StateSuperfund/frequentlyaskedquestions.mcpx#3. Updated April 1, 2015.

Montana Cadastral. et seq. 2017. Available on the internet at http://svc.mt.gov/msl/mtcadastral/.

Montana Code Annotated (MCA). et seq. 2017. Montana Code Annotated Title 37, Professions and Occupations. Chapter 43, Water well contractors. Section 101 to 402. Available on the internet at http://leg.mt.gov/bills/mca_toc/37_43.htm April 2017.

Montana Code Annotated (MCA). et seq. 2017. Montana Code Annotated Title 85, Water Use. Chapter 2, Water well contractors. Section 516 & 517. Available on the internet at http://leg.mt.gov/bills/mca/title_0850/chapter_0020/part_0050/sections_index.html April 2017.

Montana Code Annotated (MCA). et seq. 2014. Montana Code Annotated Title 37, Professions and Occupations. Chapter 67, Engineers and Land Surveyors. Section 101, Definitions. Available on the internet at http://leg.mt.gov/bills/mca/37/67/37-67-301.htm. April 2014.

Patton, T.W., Smith, L.N., and LaFave, J.I. 2003. Ground-Water Resources of the Flathead Lake Area: Flathead, Lake, Sanders, and Missoula Counties, Montana (GWOF 19-1).

Resource Technologies, Inc. 2013. Sampling and Analytical Results Report for a CERCLA Site Investigation of the Whitefish Solvent Site, Whitefish, Montana. January 11, 2013.

TABLES

TABLE 1. SYSTEM CONSTRUCTION IMPORT MATERIAL ANALYTICAL RESULTS
WHITEFISH SOLVENT SITE, WHITEFISH, MONTANA

Location ID	Date Sampled	Arsenic, Total (mg/kg)	Barium, Total (mg/kg)	Cadmium, Total (mg/kg)	Chromium, Total (mg/kg)	Lead, Total (mg/kg)	Mercury, Total (mg/kg)	Selenium, Total (mg/kg)	Silver, Total (mg/kg)
Pea Gravel	10/16/16	2	22	<1	2	3	<0.5	<1	<1
Aggregate	10/18/16	3	15	<1	7	2	<0.5	<1	<1
Sand	10/18/16	4	52	<1	9	6	<0.5	<1	<1
MT Background Threshold Values		22.5	429	0.7	41.7	29.8	1	0.7	0.3

Notes:

TABLE 2. SOIL VAPOR EXTRACTION INFLUENT & EFFLUENT FILTRATION ANALYTICAL RESULTS
WHITEFISH SOLVENT SITE, WHITEFISH, MONTANA

Location ID	Date Sampled	PCE (g/m3)	TCE (g/m3)	cis-1,2- DCE (g/m3)	trans-1,2-DCE (g/m3)	Vinyl Chloride (g/m3)	MTBE (g/m3)	Benzene (g/m3)	Toluene (g/m3)	Ethyl-benzene (g/m3)	m,p-Xylene (g/m3)	o-Xylene (g/m3)	Naphthalene (g/m3)	C5-C8, Aliphatic, Adj (g/m3)	C9-C12, Aliphatic, Adj (g/m3)	C9-C10, Aromatic, Adj (g/m3)
MTN-PRE-STARTUP	12/22/16	**340**	2.3	2.3 J+	ND(0.054)	ND(0.054)	ND(0.15)	**2**	2.3	ND(0.74)	1.3	ND(0.74)	1.8	52	**16**	4.6
MTN-PRE	02/22/17	**4700**	**36**	57	ND(4.9)	**ND(4.9)**	ND(4.9)	**ND(4.9)**	ND(25)	**ND(25)**	ND(25)	ND(25)	ND(25)	**ND(980)**	**ND(490)**	**ND(120)**
MTN-POST	01/12/17	**320**	0.53	0.31	ND(0.079)	ND(0.079)	ND(0.16)	ND(0.16)	ND(0.79)	ND(0.79)	ND(0.79)	ND(0.79)	ND(0.79)	ND(31)	**ND(16)**	ND(3.9)
	02/22/17	2.6 J+	ND(0.04)	ND(0.04)	ND(0.04)	ND(0.04)	ND(0.16)	ND(0.16)	ND(0.81)	ND(0.81)	ND(0.81)	ND(0.81)	ND(0.81)	ND(32)	**ND(16)**	ND(4)
EPA RSL Commercial Air		47	3	NA	NA	2.8	47	1.6	22,000	4.9	NA	440	NA	NA	NA	NA
DEQ APH Residential Air		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	62.6	10.4	10.4

Notes:
µg/m3 - microgram per cubic meter
PCE - tetrachloroethene
TCE - trichloroethene
cis-1,2-DCE - cis-1,2-dichloroethene
trans-1,2-DCE - trans-1,2-dichloroethene
MTBE - methyl tert-butyl ether
Adj - adjusted
J+ - result is an estimated concentration, but may be biased high.
ND - constituent below laboratory analytical detection limit in parentheses.
BOLD - indicates value exceedance of the respective screening level.

TABLE 3. FORMER MARTIN'S CLEANERS INDOOR AIR ANALYTICAL RESULTS
WHITEFISH SOLVENT SITE, WHITEFISH, MONTANA

Location ID	Date Sampled	PCE (g/m3)	TCE (g/m3)	cis-1,2- DCE (g/m3)	trans-1,2-DCE (g/m3)	Vinyl Chloride (g/m3)	MTBE (g/m3)	Benzene (g/m3)	Toluene (g/m3)	Ethyl-benzene (g/m3)	m,p-Xylene (g/m3)	o-Xylene (g/m3)	Naphthalene (g/m3)	C5-C8, Aliphatic, Adj (g/m3)	C9-C12, Aliphatic, Adj (g/m3)	C9-C10, Aromatic, Adj (g/m3)
MTN-VI-1 Dup	02/22/17	**100 J+**	0.16 J+	ND(0.043)	ND(0.043)	ND(0.043)	ND(0.17)	1.3	3.1	ND(0.86)	2.6	0.95	ND(0.86)	55	**66**	6
MTN-VI-1	02/22/17	**99 J+**	0.16 J+	ND(0.042)	ND(0.042)	ND(0.042)	ND(0.17)	1.3	2.9	ND(0.84)	2.4	0.9	ND(0.84)	44	**60**	5.5
MTN-AA-1	02/22/17	0.85 J+	0.033 J+	ND(0.033)	ND(0.033)	ND(0.033)	ND(0.13)	0.66	1.3	ND(0.65)	ND(0.65)	ND(0.65)	ND(0.65)	ND(26)	**110**	ND(3.3)
WS-IA-V9	03/03/12	**250**	0.36	ND(0.14)	ND(0.72)	ND(0.047)	ND(3.6)	**ND(3.7)**	ND(3.6)	ND(3.6)	ND(3.6)	ND(3.6)	ND(19)	ND(22)	**ND(22)**	**ND(18)**
EPA RSL Commercial Indoor Air	47	3	NA	NA	2.8	47	1.6	22,000	4.9	NA	440	NA	NA	NA	NA	NA
DEQ APH Residential Indoor Air	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	62.6	10.4	10.4	

Notes:
µg/m3 - microgram per cubic meter
PCE - tetrachloroethene
TCE - trichloroethene
cis-1,2-DCE - cis-1,2-dichloroethene
trans-1,2-DCE - trans-1,2-dichloroethene
MTBE - methyl tert-butyl ether
Adj - adjusted
ND - constituent below laboratory analytical detection limit in parentheses.
J+ - the result is an estimated concentration, but may be biased high
Bold - detected / non-detected value exceedance

TABLE 4. MARTIN'S CLEANERS SUB-SLAB ANALYTICAL RESULTS
WHITEFISH SOLVENT SITE, WHITEFISH, MONTANA

Location ID	Date Sampled	PCE (g/m3)	TCE (g/m3)	cis-1,2- DCE (g/m3)	trans-1,2-DCE (g/m3)	Vinyl Chloride (g/m3)	MTBE (g/m3)	Benzene (g/m3)	Toluene (g/m3)	Ethyl-benzene (g/m3)	m,p-Xylene (g/m3)	o-Xylene (g/m3)	Naphthalene (g/m3)	C5-C8, Aliphatic, Adj (g/m3)	C9-C12, Aliphatic, Adj (g/m3)	C9-C10, Aromatic, Adj (g/m3)
MTN-SS-1	02/22/17	**1300**	ND(1.3)	ND(1.3)	ND(1.3)	ND(1.3)	ND(1.3)	1.6	ND(6.7)	**ND(6.7)**	ND(6.7)	ND(6.7)	ND(6.7)	**ND(270)**	**ND(130)**	**ND(34)**
WS-SS-V9	03/04/12	**960000**	**ND(1200)**	ND(900)	ND(900)	**ND(580)**	**ND(1400)**	**ND(1400)**	ND(1400)	**ND(1400)**	ND(1400)	**ND(1400)**	ND(7600)	**ND(8700)**	**42000**	**ND(7200)**
EPA RSL Industrial Air		47	3	NA	NA	2.8	47	1.6	22,000	4.9	NA	440	NA	NA	NA	NA
DEQ APH Residential Air		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	62.6	10.4	10.4

Notes:
µg/m3 - microgram per cubic meter
PCE - tetrachloroethene
TCE - trichloroethene
cis-1,2-DCE - cis-1,2-dichloroethene
trans-1,2-DCE - trans-1,2-dichloroethene
MTBE - methyl tert-butyl ether
Adj - adjusted
ND - constituent below laboratory analytical detection limit in parentheses.
BOLD - indicates value exceedance of the respective screening level.

TABLE 5. SOIL VAPOR EXTRACTION OPERATION DATA
MARTIN'S CLEANERS INTERIM ACTION
WHITEFISH SOLVENT SITE, WHITEFISH, MT

		WELL #7 (EAST)					WELL #8 (SOUTH)					WELL #9 (WEST)					SVE MANIFOLD				BLOWER				FILTRATION			MTN-MW1		MTN-MW2		MTN-MW3		MTN-SS	
DATE	COLLECTED BY	HOURS	VACUUM (in H20)	DIFFERENTIAL PRESSURE (in H2O)	CONVERTED FLOW (SCFM)	PID (PPB)	HOURS	VACUUM (in H20)	DIFFERENTIAL PRESSURE (in H2O)	CONVERTED FLOW (SCFM)	PID (PPB)	HOURS	VACUUM (in H20)	DIFFERENTIAL PRESSURE (in H2O)	CONVERTED FLOW (SCFM)	PID (PPB)	TEMP (°F)	PID (PPB)	KO (ESTIMATED INCHES)	AIR FILTER VACUUM (in H2O)	HOURS	VACUUM (in H2O)	DISCHARGE PRESSURE (in H2O)	DISCHARGE TEMP (°F)	PRE GAC / ZEOLITE PID (PPB)	POST GAC DRUM PID (PPB)	POST ZEOLITE DRUM PID (PPB)	VACUUM (in H2O)	PID (PPB)	VACUUM (in H2O)	PID (PPB)	VACUUM (in H2O)	PID (PPB)	VACUUM (in H2O)	PID (PPB)
12/22/16 2:50 PM	JR	TURN ON BLOWER MOTOR WITH ONLY THE AIR DILUTION VALVE OPEN; COLLECT "MTN-PRE-STARTUP" SAMPLE															61	--	EMPTY	-11	Started	3.6	67	102	--	--	--	--	--	--	--	--	--	--	--
12/22/16 3:44 PM	JR	TURN ON BLOWER, OPEN SVE WELLS, SHUT OFF AIR DILUTION VALVE																																	
12/22/16 3:44 PM	JR	Started	-8	0.6	--	62,500	Started	-10	<0.1	--	43,800	Started	-10	<0.1		38,000	50	43,800	EMPTY	-10	0	3.6	84	135	17,900	200	<100	--	--	--	--	--	--	--	--
12/22/16 3:52 PM	JR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0	--	--	--	5,900	100	<100	--	--	--	--	--	--	--	--
12/22/16 4:00 PM	JR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0	--	--	--	6,100	<100	<100	--	--	--	--	--	--	--	--
12/22/16 4:10 PM	JR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0	--	--	--	8,800	100	<100	--	--	--	--	--	--	--	--
12/22/16 6:00 PM	JR	2	-13	0.2	--	--	2	-19	<0.1	--	--	2	-17	<0.1	--	--	52	--	EMPTY	-10	2	2.8	65	130	9,000	<100	<100	--	--	--	--	--	--	--	--
12/23/16 7:55 AM	JR	16	-13	0.2	--	87,100	16	-18	<0.1	--	37,700	16	-17	<0.1	--	29,200	52	45,400	EMPTY	-11	16	2.8	64	126	11,000	<100	<100	--	--	--	--	--	--	--	--
12/23/16 9:30 AM	JR	18	-11	0.2	--	79,400	18	-18	<0.1	--	53,100	18	-17	<0.1	--	31,000	53	36,600	EMPTY	-11	18	2.8	66	128	10,200	<100	<100	--	--	--	--	--	--	--	--
12/23/16 9:40 AM	JR	DISCOVERED FRESH AIR LEAK AT THE INLINE AIR FILTER																																	
12/23/16 9:55 AM	JR	18	-32	2.9	46	--	18	-38	2.6	44	--	18	-37	2.6	44	--	47	--	EMPTY	-28	18	21.5	44	129	64,100	600	<100	--	--	--	--	--	--	--	--
12/23/16 10:25 AM	JR	19	-27	2.2	39	144,300	19	-33	2	38	45,000	19	-32	1.9	37	54,900	45	56,300	EMPTY	-22	19	16.7	34	115	65,300	300	<100	--	--	--	--	--	--	--	--
1/3/17 1:00 PM	JR	285	-22.4	1.4	33	44,100	285	-27.8	1.2	30	9,300	285	-25.4	1.3	32	9,600	46	15,600	EMPTY	-20	285	10.3	36	106	16,900	100	<100	--	--	--	--	--	--	--	--
1/3/17 4:10 PM	JR	288	-25.1	2.1	39	46,500	288	-30.1	1.8	36	10,100	288	-29	1.8	36	10,400	44	17,600	EMPTY	-21	288	14.3	35	104	21,000	200	<100	--	--	--	--	--	--	--	--
1/4/17 4:55 PM	JR	313	-26	2.1	39	44,300	313	-31	1.8	37	8,900	313	-29	1.8	37	9,400	45	17,600	EMPTY	-22	313	14.3	35	104	19,000	100	<100	--	--	--	--	--	--	--	--
1/5/17 4:15 PM	JR	336	-25	2	39	40,900	336	-30	1.8	37	8,200	336	-28	1.8	37	10,300	44	15,900	EMPTY	-21	336	13.5	35	101	16,600	100	<100	--	--	--	--	--	--	--	--
1/7/17 4:00 PM	JR	376	-21	1.1	30	29,100	382	-25	1.1	30	6,000	382	-23	1.1	30	7,800	43	8,400	EMPTY	-16	382	8.7	22	82	8,900	100	<100	--	--	--	--	--	--	--	--
1/12/17 8:10 AM	JR	486	-26.5	1.8	36	16,900	496	-31.9	1.8	36	1,500	496	-29.7	1.8	36	5,200	43	6,700	EMPTY	-21	480	14.7	34	84	13,300	400	<100	--	--	--	--	--	--	--	--
1/12/17 8:40 AM	JR	SAMPLED AFTER GAC / ZEOLITE DRUMS																																	
1/25/17 5:55 PM	JR	807	-25	1.9	38	22,100	817	-29.5	1.7	36	4,600	817	-27	1.7	36	6,700	28	9,600	EMPTY	-20.5	801	13.1	37	87	9,700	<100	<100	-0.01	2,600	-0.02	32,000	-0.01	1,600	--	--
1/26/17 3:35 PM	JR	829	-26	2.2	40	21,600	839	-32	2	38	4,300	839	-30	2	38	5,400	38	9,800	EMPTY	-22	823	15.5	42	100	9,900	<100	<100	-0.03	--	-0.04	--	-0.02	--	--	--
2/12/17 3:45 PM	AV	1,237	-27	2	39	10,200	1,247	-32	2	39	2,300	1,247	-30	2	39	4,100	41	4,800	EMPTY	-20	1,231	14.7	41	112	6,900	<100	1,000	--	--	--	--	--	--	--	--
2/12/17 4:30 PM	AV	CHANGED GAC AND ZEOLITE DRUMS																																	
2/12/17 5:00 PM	AV	1,239	-30	2.4	43	10,700	1,249	-36	2.6	44	2,500	1,249	-34	2.9	47	4,400	40	4,800	EMPTY	-26	1,232	19.1	53	114	6,700	<100	<100	--	--	--	--	--	--	--	--
2/22/17 1:45 PM	JR	1,475	-31	2.7	45	5,264	1,485	-36	2.5	43	1,466	1,485	-33	2.9	47	1,823	42	2,403	EMPTY	-23	1,468	19.1	51	128	2,117	185	13	-0.03	364	-1.2	102,200	-0.02	1,829	--	571
2/22/17 1:45 PM	JR	SAMPLED BEFORE & AFTER GAC / ZEOLITE DRUMS																																	
3/13/17 10:30 PM	JR	1,927	-40	4.5	60	--	1,937	-47	4.3	56	--	1,937	-45	5.2	63	--	49	--	EMPTY	-28	1,919	29.4	50	96	--	--	--	--	--	-1.3	--	-0.02	--	--	--
4/10/17 3:30 PM	JR	2,604	-28	2.6	44	7223	2,614	-34	2.3	41	1210	2,614	-32	2.6	44	2284	52	3058	EMPTY	-24	2,596	17.1	50	140	2919	2	0	0.05	63	-5.4	5382	-0.03	29	0	417
4/12/17 11:30 AM	JR	ADDED A NEW THIRD DRUM TO THE FILTRATION: GAC (OLD), GAC (NEW), AND ZEOLITE (OLD) DRUMS																																	
4/25/17 5:15 PM	JR	2,966	-27	2.3	41	7765	2,976	-32	2.1	40	1365	2,976	-30	2.3	41	2305	58	3561	EMPTY	-22	2,957	15.5	57	149	3592	13	0	--	--	--	--	--	--	--	--
4/26/17 12:05 PM	JR	REDUCED THE BLOWER FROM 30.0 to 28.0 HZ TO COOL THE BLOWER; BLOWER TEMPERATURE INCREASE FROM PUSHING VAPOR THROUGH THREE DRUMS RATHER THAN TWO																																	
5/5/17 7:10 AM	JR	REDUCED THE BLOWER FROM 28.0 to 26.0 HZ TO COOL THE BLOWER																																	
5/15/17 5:30 PM	JR	3,446	-24	1.8	37	5774	3,456	-29	1.6	35	829	3,456	-26	1.7	36	2621	50	2477	EMPTY	-20	3,435	11.9	44	128	2379	8	0	-0.03	108	-3.5	66,370	-0.03	14,420	0	808

Notes:

in H2O - inches of water
SCFM - standard cubic feet per minute
PID - photoionization detector
ppb - parts per billion
°F - Fahrenheit
-- indicates item not able to be collected.
GAC - granular activated carbon
HZ - hertz

TABLE 6. FLUID LEVEL DATA
WHITEFISH SOLVENT SITE, WHITEFISH, MONTANA

Location	Date Measured	Measuring Point Elevation (ft-msl)	Depth to Product (ft-bmp)	Depth to Water (ft-bmp)	Water Elevation (ft-msl)
MTN-MW1	1/25/2017	3033.88	ND	11.36	3022.52
MTN-MW1	2/21/2017	3033.88	ND	7.23	3026.65
MTN-MW1	3/13/2017	3033.88	ND	NA	NA
MTN-MW1	4/12/2017	3033.88	ND	7.74	3026.14
MTN-MW1	5/15/2017	3033.88	ND	8.15	3025.73
MTN-MW2	1/25/2017	3032.92	ND	11.73	3021.19
MTN-MW2	2/21/2017	3032.92	ND	6.85	3026.07
MTN-MW2	3/13/2017	3032.92	ND	6.23	3026.69
MTN-MW2	4/12/2017	3032.92	ND	7.31	3025.61
MTN-MW2	5/15/2017	3032.92	ND	7.85	3025.07
MTN-MW3	1/25/2017	3031.78	ND	12.29	3019.49
MTN-MW3	2/21/2017	3031.78	ND	8.95	3022.83
MTN-MW3	3/13/2017	3031.78	ND	6.23	3025.55
MTN-MW3	4/12/2017	3031.78	ND	6.45	3025.33
MTN-MW3	5/15/2017	3031.78	ND	7.58	3024.20
WSMW-7	10/06/2011	3032.83	ND	10.41	3022.42
WSMW-7	3/07/2012	3032.83	ND	10.73	3022.10
WSMW-7	1/26/2017	3032.83	ND	11.49	3021.34
WSMW-7	2/21/2017	3032.83	ND	6.69	3026.14
WSMW-7	3/13/2017	3032.83	ND	6.46	3026.37
WSMW-7	4/12/2017	3032.83	ND	7.01	3025.82
WSMW-7	5/15/2017	3032.83	ND	7.74	3025.09

ft-msl - feet mean sea level
ft-bmp - feet below measuring point
ND - Indicates that free-phase hydrocarbon was not detected
NA - not available

NOTES:
WSMW-7 fluid levels from 2011 and 2012 first reported by Resource Technologies in the "Sampling and Analytical Results Report for a CERCLA Site Investigation of the Whitefish Solvent Site, Whitefish, Montana"

TABLE 7. VOC GROUNDWATER ANALYTICAL DATA
WHITEFISH SOLVENT SITE, WHITEFISH, MONTANA

Location ID	Date Sampled	PCE (g/L)	TCE (g/L)	cis-1,2-DCE (g/L)	trans-1,2-DCE (g/L)	Vinyl Chloride (g/L)	MTBE (g/L)	Benzene (g/L)	Toluene (g/L)	Ethyl-benzene (g/L)	Xylenes, Total (g/L)
MTN-MW1	02/21/17	**66**	**14**	**118**	ND(1)	**2.3**	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
MTN-MW1 Dup	02/21/17	**64**	**13**	**114**	ND(1)	**2.1**	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
MTN-MW2	02/21/17	**1470**	**1290**	**576**	18	**ND(1.2)**	ND(10)	ND(5)	ND(5)	ND(5)	ND(5)
MTN-MW3	02/21/17	**36**	ND(1)	ND(1)	ND(1)	**ND(1)**	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
WSMW-7	10/07/11	**8800**	**20**	15	ND(50)	**ND(50)**	ND(1)	ND(0.5)	ND(0.5)	0.68	0.65
	03/07/12	**12000**	**ND(100)**	**ND(100)**	ND(100)	**ND(100)**	**ND(100)**	ND(0.5)	53	1.9	3.2
	02/22/17	**2760**	**13000**	**2740**	**304**	**ND(2.5)**	ND(2.5)	ND(5)	ND(5)	ND(5)	ND(5)
DEQ 7		5	5	70	100	0.2	30	5	1,000	700	10,000

Notes:
PCE - tetrachloroethene
TCE - trichloroethene
cis-1,2-DCE - cis-1,2-dichloroethene
trans-1,2-DCE - trans-1,2-dichloroethene
MTBE - methyl tert-butyl ether
µg/L - microgram per liter
ND - constituent below laboratory analytical detection limit in parentheses

TABLE 7. VOC GROUNDWATER ANALYTICAL DATA
WHITEFISH SOLVENT SITE, WHITEFISH, MONTANA

Location ID	Date Sampled	1,1,1,2-Tetrachloro-ethane (g/L)	1,1,1-Trichloro-ethane (g/L)	1,1,2,2-Tetrachloro-ethane (g/L)	1,1,2-Trichloro-ethane (g/L)	1,1-Dichloro-ethane (g/L)	1,1-Dichloro-ethene (g/L)	1,1-Dichloro-propene (g/L)	1,2,3-Trichloro-propane (g/L)	1,2-Dibromo-ethane (g/L)	1,2-Di-chloro-benzene (g/L)
MTN-MW1	02/21/17	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	**ND(1)**	ND(1)
MTN-MW1 Dup	02/21/17	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	**ND(1)**	ND(1)
MTN-MW2	02/21/17	ND(1.2)	ND(1.2)	ND(1.2)	ND(1.2)	ND(1.2)	ND(1.2)	ND(1.2)	ND(1.2)	**ND(1.2)**	ND(1.2)
MTN-MW3	02/21/17	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	**ND(1)**	ND(1)
WSMW-7	10/07/11	--	--	--	--	--	--	--	--	--	--
	03/07/12	--	--	--	--	--	--	--	--	--	--
	02/22/17	ND(2.5)	ND(2.5)	**ND(2.5)**	ND(2.5)	ND(2.5)	ND(2.5)	ND(2.5)	ND(2.5)	**ND(2.5)**	ND(2.5)
DEQ 7		NA	200	2	3	NA	7	NA	NA	0.004	600

Notes:
PCE - tetrachloroethene
TCE - trichloroethene
cis-1,2-DCE - cis-1,2-dichloroethene
trans-1,2-DCE - trans-1,2-dichloroethene
MTBE - methyl tert-butyl ether
µg/L - microgram per liter
ND - constituent below laboratory analytical detection limit in parentheses

TABLE 7. VOC GROUNDWATER ANALYTICAL DATA
WHITEFISH SOLVENT SITE, WHITEFISH, MONTANA

Location ID	Date Sampled	1,2-Dichloro-ethane (g/L)	1,2-Dichloro-propane (g/L)	1,3-Di-chloro-benzene (g/L)	1,3-Dichloro-propane (g/L)	1,4-Di-chloro-benzene (g/L)	2,2-Dichloro-propane (g/L)	2-Butanone (g/L)	2-Chloro-toluene (g/L)	4-Chloro-toluene (g/L)	Bromo-benzene (g/L)
MTN-MW1	02/21/17	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(1)
MTN-MW1 Dup	02/21/17	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(1)
MTN-MW2	02/21/17	ND(1.2)	ND(1.2)	ND(1.2)	ND(1.2)	ND(1.2)	ND(1.2)	ND(20)	ND(1.2)	ND(1.2)	ND(1.2)
MTN-MW3	02/21/17	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(1)
WSMW-7	10/07/11	--	--	--	--	ND(50)	--	--	--	--	--
	03/07/12	--	--	--	--	**ND(100)**	--	--	--	--	--
	02/22/17	ND(2.5)	ND(2.5)	ND(2.5)	ND(2.5)	ND(2.5)	ND(2.5)	ND(20)	ND(2.5)	ND(2.5)	ND(2.5)
DEQ 7		4	5	600	NA	75	NA	NA	NA	NA	NA

Notes:
PCE - tetrachloroethene
TCE - trichloroethene
cis-1,2-DCE - cis-1,2-dichloroethene
trans-1,2-DCE - trans-1,2-dichloroethene
MTBE - methyl tert-butyl ether
µg/L - microgram per liter
ND - constituent below laboratory analytical detection limit in parentheses

TABLE 7. VOC GROUNDWATER ANALYTICAL DATA
WHITEFISH SOLVENT SITE, WHITEFISH, MONTANA

Location ID	Date Sampled	Bromo-chloro-methane (g/L)	Bromo-dichloro-methane (g/L)	Bromoform (g/L)	Bromo-methane (g/L)	Carbon tetrachloride (g/L)	Chlorobenzene (g/L)	Chloroethane (g/L)	Chloroform (g/L)	Chloromethane (g/L)	Cis-1,3-dichloro-propene (g/L)
MTN-MW1	02/21/17	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
MTN-MW1 Dup	02/21/17	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
MTN-MW2	02/21/17	ND(1.2)	ND(1.2)	ND(1.2)	ND(1.2)	ND(1.2)	ND(1.2)	ND(1.2)	ND(1.2)	ND(1.2)	ND(1.2)
MTN-MW3	02/21/17	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
WSMW-7	10/07/11	--	**ND(50)**	--	--	--	--	--	ND(50)	**ND(50)**	--
	03/07/12	--	**ND(100)**	--	--	--	--	--	**ND(100)**	**ND(100)**	--
	02/22/17	ND(2.5)	ND(2.5)	ND(2.5)	ND(2.5)	ND(2.5)	ND(2.5)	ND(2.5)	ND(2.5)	ND(2.5)	ND(2.5)
DEQ 7		NA	10	80	10	3	100	NA	70	30	4

Notes:
PCE - tetrachloroethene
TCE - trichloroethene
cis-1,2-DCE - cis-1,2-dichloroethene
trans-1,2-DCE - trans-1,2-dichloroethene
MTBE - methyl tert-butyl ether
µg/L - microgram per liter
ND - constituent below laboratory analytical detection limit in parentheses

TABLE 7. VOC GROUNDWATER ANALYTICAL DATA
WHITEFISH SOLVENT SITE, WHITEFISH, MONTANA

Location ID	Date Sampled	Dibromo-chloromethane (g/L)	Dibromomethane (g/L)	Dichloro-difluoro-methane (g/L)	m,p-Xylene (g/L)	Methylene Chloride (g/L)	o-Xylene (g/L)	Styrene (g/L)	trans-1,3-Dichloro-propene (g/L)	Trichloro-fluoromethane (g/L)
MTN-MW1	02/21/17	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
MTN-MW1 Dup	02/21/17	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
MTN-MW2	02/21/17	ND(1.2)	ND(1.2)	ND(1.2)	ND(5)	ND(1.2)	ND(5)	ND(1.2)	ND(1.2)	ND(1.2)
MTN-MW3	02/21/17	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
WSMW-7	10/07/11	--	--	ND(50)	0.65	--	ND(0.5)	ND(50)	--	--
	03/07/12	--	--	ND(100)	100	--	0.69	ND(100)	--	--
	02/22/17	ND(2.5)	ND(2.5)	ND(2.5)	ND(5)	ND(2.5)	ND(5)	ND(2.5)	**ND(2.5)**	ND(2.5)
DEQ 7		4	NA	1,000	10,000	5	10,000	100	2	10,000

Notes:
PCE - tetrachloroethene
TCE - trichloroethene
cis-1,2-DCE - cis-1,2-dichloroethene
trans-1,2-DCE - trans-1,2-dichloroethene
MTBE - methyl tert-butyl ether
µg/L - microgram per liter
ND - constituent below laboratory analytical detection limit in parentheses

TABLE 8. SVOC'S GROUNDWATER ANALYTICAL DATA
WHITEFISH SOLVENT SITE, WHITEFISH, MONTANA

Location ID	Date Sampled	1-Methyl-naphthalene (g/L)	2-Methyl-naphthalene (g/L)	Acenaph-thene (g/L)	Acenaph-thylene (g/L)	Anthracene (g/L)	Benzo(a)-anthracene (g/L)	Benzo(a)-pyrene (g/L)	Benzo(b)-fluor-anthene (g/L)	Benzo(ghi)-perylene (g/L)	Benzo(k)fluor-anthene (g/L)
MTN-MW1	02/21/17	ND(0.2) UJ	ND(0.2) UJ	ND(0.2) UJ	ND(0.2) UJ	ND(0.2) UJ	ND(0.2) UJ	**ND(0.2) UJ**	ND(0.2) UJ	ND(0.2) UJ	ND(0.2) UJ
MTN-MW1 Dup	02/21/17	ND(0.19) UJ	ND(0.19) UJ	ND(0.19) UJ	ND(0.19) UJ	ND(0.19) UJ	ND(0.19) UJ	**ND(0.19) UJ**	ND(0.19) UJ	ND(0.19) UJ	ND(0.19) UJ
MTN-MW2	02/21/17	0.49 J-	0.53 J-	ND(0.19) UJ	ND(0.19) UJ	0.27 J-	ND(0.19) UJ	**ND(0.19) UJ**	ND(0.19) UJ	ND(0.19) UJ	ND(0.19) UJ
MTN-MW3	02/21/17	ND(0.2) UJ	ND(0.2) UJ	ND(0.2) UJ	ND(0.2) UJ	ND(0.2) UJ	ND(0.2) UJ	**ND(0.2) UJ**	ND(0.2) UJ	ND(0.2) UJ	ND(0.2) UJ
WSMW-7	10/07/11	--	ND(5.8)	--	--	--	--	--	--	--	--
	03/07/12	--	--	--	--	--	--	--	--	--	--
	02/22/17	ND(0.31)	ND(0.31)	ND(0.31)	ND(0.31)	ND(0.31)	ND(0.31)	**ND(0.31)**	ND(0.31)	ND(0.31)	ND(0.31)
DEQ 7		NA	NA	670	NA	2,100	0.5	0.05	0.5	NA	0.5
RBCA RBSLs		11	36	670	NA	NA	0.5	0.05	0.5	NA	5

Notes:
µg/L - microgram per liter
ND - constituent below laboratory analytical detection limit in parentheses
UJ - Estimated reporting limit
J- - the result is an estimated concentration, but may be biased low
JB - estimated concentration due to blank contamination
* - The first result represents the laboratory reported concentration. The second result was evaluated to be undetected at the reported concentration by the data validator. The result was determined to be a false positive.

TABLE 8. SVOC'S GROUNDWATER ANALYTICAL DATA
WHITEFISH SOLVENT SITE, WHITEFISH, MONTANA

Location ID	Date Sampled	Chrysene (g/L)	Dibenz(a,h) anthracene (g/L)	Fluor-anthene (g/L)	Fluorene (g/L)	Indeno-(1,2,3-cd) pyrene (g/L)	Naphthalene (g/L)	Phen-anthrene (g/L)	Pyrene (g/L)
MTN-MW1	02/21/17	ND(0.2) UJ	**ND(0.2) UJ**	ND(0.2) UJ	ND(0.2) UJ	ND(0.2) UJ	0.24B/ND(0.24)U*	ND(0.2) UJ	ND(0.2) UJ
MTN-MW1 Dup	02/21/17	ND(0.19) UJ	**ND(0.19) UJ**	ND(0.19) UJ	ND(0.19) UJ	ND(0.19) UJ	0.21B/ND(0.21)U*	ND(0.19) UJ	ND(0.19) UJ
MTN-MW2	02/21/17	ND(0.19) UJ	**ND(0.19) UJ**	0.59 J-	0.21 J-	ND(0.19) UJ	0.86 JB	0.4 J-	0.61 J-
MTN-MW3	02/21/17	ND(0.2) UJ	**ND(0.2) UJ**	ND(0.2) UJ	ND(0.2) UJ	ND(0.2) UJ	0.27 JB	ND(0.2) UJ	ND(0.2) UJ
WSMW-7	10/07/11	--	--	--	--	--	ND(1)	--	--
	03/07/12	--	--	--	--	--	ND(1)	--	--
	02/22/17	ND(0.31)	**ND(0.31)**	ND(0.31)	ND(0.31)	ND(0.31)	0.46 JB	ND(0.31)	ND(0.31)
DEQ 7		50	0.05	130	1,100	0.5	100	NA	830
RBCA RBSLs		50	0.05	130	1,100	0.5	100	NA	830

Notes:
µg/L - microgram per liter
ND - constituent below laboratory analytical detection limit in parentheses
UJ - Estimated reporting limit
J- - the result is an estimated concentration, but may be biased low
JB - estimated concentration due to blank contamination
* - The first result represents the laboratory reported concentration. The second result was evaluated to be undetected at the reported concentration by the data validator. The result was determined to be a false positive.

TABLE 9. VPH & EPH GROUNDWATER ANALYTICAL DATA
WHITEFISH SOLVENT SITE, WHITEFISH, MONTANA

Location ID	Date Sampled	Benzene (g/L)	Toluene (g/L)	Ethyl-benzene (g/L)	Xylenes, Total (g/L)	MTBE (g/L)	Naphthalene (g/L)	C11-C22, Aromatic, Adj (g/L)	C19-C36, Aliphatic, Adj (g/L)	C9-C18, Aliphatic, Adj (g/L)	C5-C8 (g/L)
MTN-MW1	02/21/17	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(1)	ND(300) UJ	ND(300) UJ	ND(300) UJ	61
MTN-MW1 Dup	02/21/17	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(1)	ND(300) UJ	377 J	ND(300) UJ	61
MTN-MW2	02/21/17	ND(5)	ND(5)	ND(5)	ND(5)	ND(10)	ND(10)	ND(300) UJ	ND(300) UJ	ND(300) UJ	**3800**
MTN-MW3	02/21/17	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(1)	ND(306)	ND(306)	ND(306)	71
WSMW-7	10/07/11	--	--	--	--	--	--	--	--	--	**1710**
	03/07/12	--	53	--	--	**ND(100)**	--	--	--	--	**4110**
	02/22/17	ND(5)	ND(5)	ND(5)	ND(5)	ND(10)	ND(10)	**2890 J+**	ND(461)	ND(461)	**2150**
DEQ 7	5	1,000	700	10,000	30	100	NA	NA	NA	NA	NA
DEQ RBCA RBSLs	5	1,000	700	10,000	30	100	1,100	1,000	1,400	650	

Notes:
µg/L - microgram per liter
MTBE - methyl tert-butyl ether
Adj - adjusted
ND - constituent below laboratory analytical detection limit in parentheses
UJ - estimated reporting limit
J - estimated concentration
J+ - the result is an estimated concentration, but may be biased high

TABLE 9. VPH & EPH GROUNDWATER ANALYTICAL DATA
WHITEFISH SOLVENT SITE, WHITEFISH, MONTANA

Location ID	Date Sampled	C9-C10 (g/L)	C9-C12 (g/L)	Total Extractable Hydrocarbon (g/L)	Gasoline Range Organics (g/L)
MTN-MW1	02/21/17	ND(20)	ND(20)	ND(300) UJ	69 J+
MTN-MW1 Dup	02/21/17	ND(20)	ND(20)	752 J	69 J+
MTN-MW2	02/21/17	253	442	645 J	3590
MTN-MW3	02/21/17	ND(20)	ND(20)	ND(306)	86
WSMW-7	10/07/11	ND(20)	ND(20)	--	1450
	03/07/12	21	ND(20)	743	3450
	02/22/17	ND(200)	ND(200)	5560 J+	1770
DEQ 7		NA	NA	NA	NA
DEQ RBCA RBSLs		1,100	1,400	NA	NA

Notes:
µg/L - microgram per liter
MTBE - methyl tert-butyl ether
Adj - adjusted
ND - constituent below laboratory analytical detection limit in parentheses
UJ - estimated reporting limit
J - estimated concentration
J+ - the result is an estimated concentration, but may be biased high

TABLE 10. GROUNDWATER STABILIZATION FIELD PARAMETERS
WHITEFISH SOLVENT SITE, WHITEFISH, MONTANA

Location ID	Date Sampled	pH (Std Units)	Specific Conductance @25C (umhos/cm)	Turbidity (NTU)	Temperature (oC)	Oxygen, Dissolved (mg/L)	Oxidation-Reduction Potential (mV)
MTN-MW1	02/21/17	6.74	2200	126	7.88	0.58	-73
MTN-MW2	02/21/17	6.79	1960	221	7.39	0.59	123
MTN-MW3	02/21/17	6.95	1630	19.7	7.49	1.63	-73
WSMW-7	02/22/17	6.51	1740	>800	13.84	1.44	18

Notes:
Std - Standard
umhos/cm - micromhos per centimeter
NTU - nephelometric turbidity unit
°C - degree Celsius
mg/L - milligram per liter
mV - millivolts

TABLE 11. SOIL VAPOR EXTRACTION MASS REMOVAL ESTIMATE
MARTIN'S CLEANERS INTERIM ACTION
WHITEFISH SOLVENT SITE, WHITEFISH, MONTANA

DATE	BLOWER HOURS (hours)	INTERVAL (hours)	MANIFOLD FLOWRATE (cfm)	MANIFOLD FLOWRATE (m3/hr)	PID INFLUENT READING (ppb)	PID INFLUENT READING (ppm)	PID INFLUENT READING (mg/m3)	PCE MOLECULAR WEIGHT USED (g/mol)	MASS REMOVED (mg/hour)	MASS REMOVED (mg/period)	MASS REMOVED (lbs/period)	MASS REMOVED (lbs/cum)
12/22/2016	2	2	10	16.9902	9,000	9.00	61.04	165.82	1,037.05	2,074.10	0.00	0.00
12/23/2016	16	14	10	16.9902	11,000	11.00	74.60	165.82	1,267.50	17,745.05	0.04	0.04
12/23/2016	18	2	10	16.9902	10,200	10.20	69.18	165.82	1,175.32	2,350.64	0.01	0.05
12/23/2016	18	0	134	227.66868	64,100	64.10	434.73	165.82	98,973.60	0.00	0.00	0.05
12/23/2016	19	1	114	193.68828	65,300	65.30	442.86	165.82	85,777.73	85,777.73	0.19	0.24
1/3/2017	285	266	95	161.4069	16,900	16.90	114.62	165.82	18,499.79	4,920,944.71	10.85	11.09
1/3/2017	288	3	111	188.59122	21,000	21.00	142.42	165.82	26,859.55	80,578.66	0.18	11.26
1/4/2017	313	25	113	191.98926	19,000	19.00	128.86	165.82	24,739.37	618,484.17	1.36	12.63
1/5/2017	336	23	113	191.98926	16,600	16.60	112.58	165.82	21,614.39	497,131.07	1.10	13.72
1/7/2017	382	46	90	152.9118	8,900	8.90	60.36	165.82	9,229.73	424,567.64	0.94	14.66
1/12/2017	480	98	108	183.49416	13,300	13.30	90.20	165.82	16,551.29	1,622,026.74	3.58	18.24
1/25/2017	801	321	110	186.8922	9,700	9.70	65.79	165.82	12,294.79	3,946,626.16	8.70	26.94
1/26/2017	823	22	116	197.08632	9,900	9.90	67.14	165.82	13,232.74	291,120.24	0.64	27.58
2/12/2017	1,231	408	117	198.78534	6,900	6.90	46.80	165.82	9,302.32	3,795,348.45	8.37	35.95
2/12/2017	1,232	1	134	227.66868	6,700	6.70	45.44	165.82	10,345.13	10,345.13	0.02	35.97
2/22/2017	1,468	236	135	229.3677	2,117	2.12	14.36	165.82	3,293.15	777,182.78	1.71	37.68
4/10/2017	2,596	1,128	129	219.17358	2,919	2.92	19.80	165.82	4,338.91	4,894,287.12	10.79	48.47
4/25/2017	2,957	361	122	207.28044	3,592	3.59	24.36	165.82	5,049.55	1,822,887.64	4.02	52.49
5/15/2017	3,435	478	108	183.49416	2,379	2.379	16.13	165.82	2,960.57	1,415,150.51	3.12	55.61

Notes:

PCE - tetrachloroethene
cfm - cubic feet per minute
ppb - parts per billion
ppm - parts per million
PID - photoionization detector
mg/m3 - milligrams per cubic meter
g/mol - gram mole
mg - milligrams
lbs - pounds
cum - cumulative

TABLE 12. MARTIN'S CLEANERS GROUNDWATER PURGE ANALYTICAL RESULTS
WHITEFISH SOLVENT SITE, WHITEFISH, MONTANA

Location ID	Date Sampled	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	VC (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Xylenes, Total (µg/L)	MTBE (µg/L)	Arsenic (µg/L)	Barium (µg/L)	Cadmium (µg/L)	Chromium (µg/L)	Lead (µg/L)	Selenium (µg/L)	Silver (µg/L)	Mercury (µg/L)
MTN-PURGE	01/26/17	**840**	**412**	12	ND(1)	**ND(1)**	ND (1)	ND(1)	ND(1)	ND(1)	ND(1)	--	--	--	--	--	--	--	--
MTN-PURGE	02/03/17	--	--	--	--	--	--	--	--	--	--	6	290	ND(1)	ND(5)	3	ND(1)	ND(1)	ND(0.1)
DEQ 7		5	5	70	100	0.2	5	1,000	700	10,000	30	10	1000	5	100	15	50	100	2

Notes:

µg/L - microgram per liter

PCE - tetrachloroethene

TCE - trichloroethene

cis-1,2-DCE - cis-1,2-dichloroethene

trans-1,2-DCE - trans-1,2-dichloroethene

VC - vinyl chloride

MTBE - methyl tert-butyl ether

-- - not analyzed

ND - constituent below laboratory analytical detection limit in parentheses.

BOLD - indicates value exceedance of the respective screening level.

TABLE 13. MARTIN'S CLEANERS FILTRATION MEDIA ANALYTICAL RESULTS
WHITEFISH SOLVENT SITE, WHITEFISH, MONTANA

Location ID	Date Sampled	PCE (mg/kg)	TCE (mg/kg)	cis-1,2-DCE (mg/kg)	trans-1,2-DCE (mg/kg)	VC (mg/kg)	Chloroform (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Xylenes, Total (mg/kg)	MTBE (mg/kg)	PCE (mg/L)	TCE (mg/L)	cis-1,2-DCE (mg/L)	VC (mg/L)	Benzene (mg/L)
GAC	02/12/17	2,170	150	638	ND(10)	ND(10)	15	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	0.11	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
ZEOLITE	02/12/17	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)

Notes:
mg/kg - milligrams per kilogram
mg/L - milligrams per liter
PCE - tetrachloroethene
TCE - trichloroethene
cis-1,2-DCE - cis-1,2-dichloroethene
trans-1,2-DCE - trans-1,2-dichloroethene
VC - vinyl chloride
MTBE - methyl tert-butyl ether
ND - constituent below laboratory analytical detection limit in parentheses.

FIGURES

Image Citation: National Agriculture Imagery Program (NAIP) Colored Digital Orthophoto, Flathead County, MT, Publication: 2013

SITE LOCATION

EXPLANATION

93	U.S. HIGHWAY
36	SECTION NUMBER
	SECTION LINE
	TOWNSHIP/RANGE LINE

N

0 400'

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FIGURE 1

MARTIN'S CLEANERS AND LINCOLN/ANDERSON CLEANERS LOCATIONS

WHITEFISH SOLVENT SITE
239 BAKER AVENUE
WHITEFISH, MONTANA

Drawn By: PC	Checked By: JR	Scale: 1" = 400'	Date: 5/30/17	File: 776WF-SITEOVERVIEW201704

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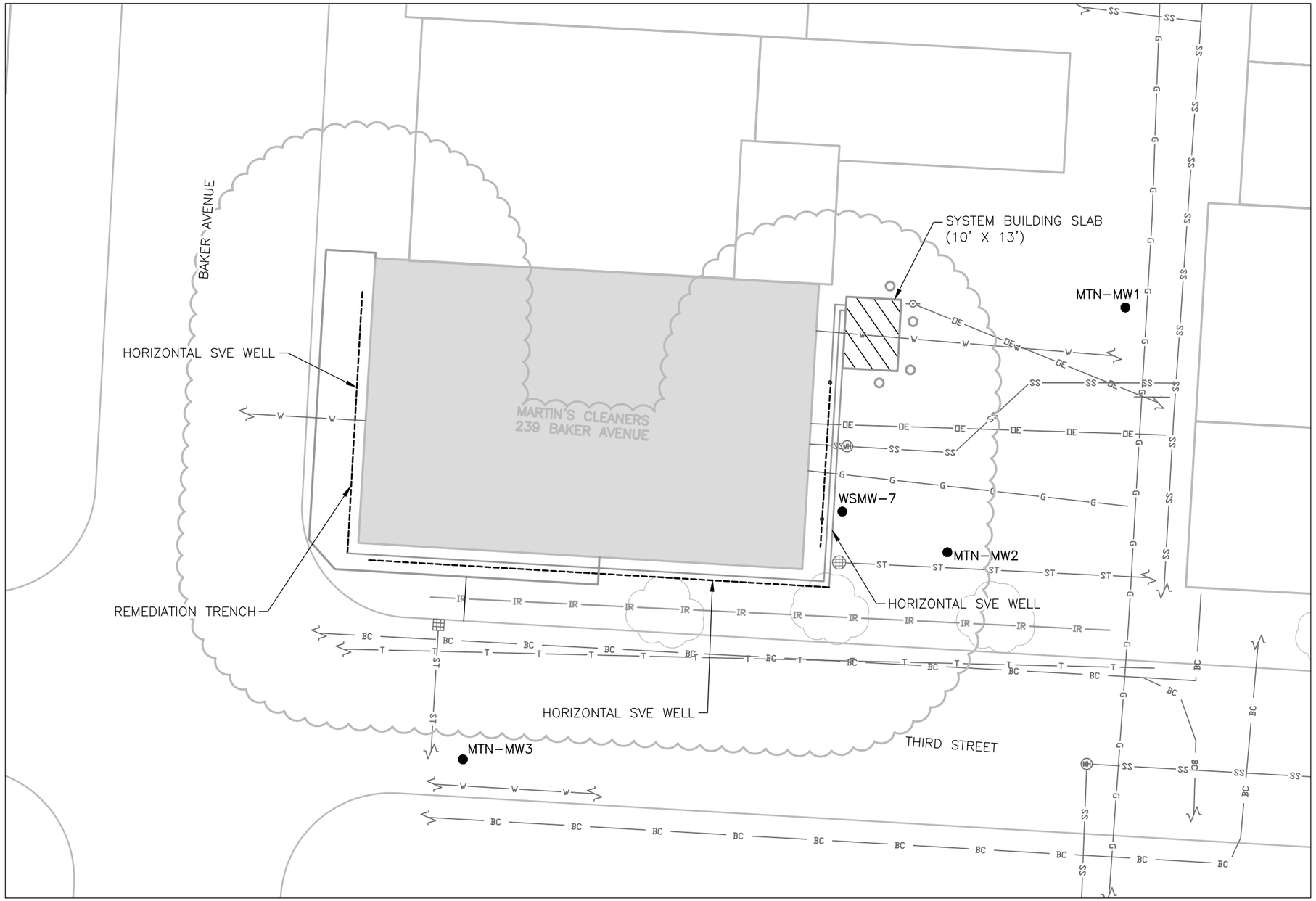

EXPLANATION

WSMW-7	MONITORING WELL (MW) AND DESIGNATION
	SEWER MANHOLE
	CONCRETE BOLLARD POST
	STREET DRAIN
	ELECTRICAL POWER POLE
	TREE
	APPROXIMATE SITE BOUNDARY
	HORIZONTAL EXTRACTION WELL RUNS
BE	UNDERGROUND ELECTRICAL LINE
OE	OVERHEAD ELECTRICAL LINE
SS	SANITARY SEWER LINE
ST	STORM WATER LINE
X	FENCE
W	WATER LINE
G	GAS LINE
BC	BURIED COMMUNICATION LINE
IR	COMMUNICATION LINE
T	TELEPHONE LINE
	SVE PIPING
	ESTIMATED RADIUS OF INFLUENCE
	SYSTEM BUILDING
	BUILDING OR OTHER STRUCTURE
SVE	SOIL VAPOR EXTRACTION
TYP.	TYPICAL

NOTE:

LOCATION OF UTILITIES ARE APPROXIMATE

N

0 20'

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FIGURE 2

MARTIN'S CLEANERS SOIL VAPOR EXTRACTION SYSTEM

WHITEFISH SOLVENT SITE
239 BAKER AVENUE
WHITEFISH, MONTANA

Drawn By: PC	Checked By: JR	Scale: 1" = 20'	Date: 5/30/17	File: 776WF-SITEMAP201704

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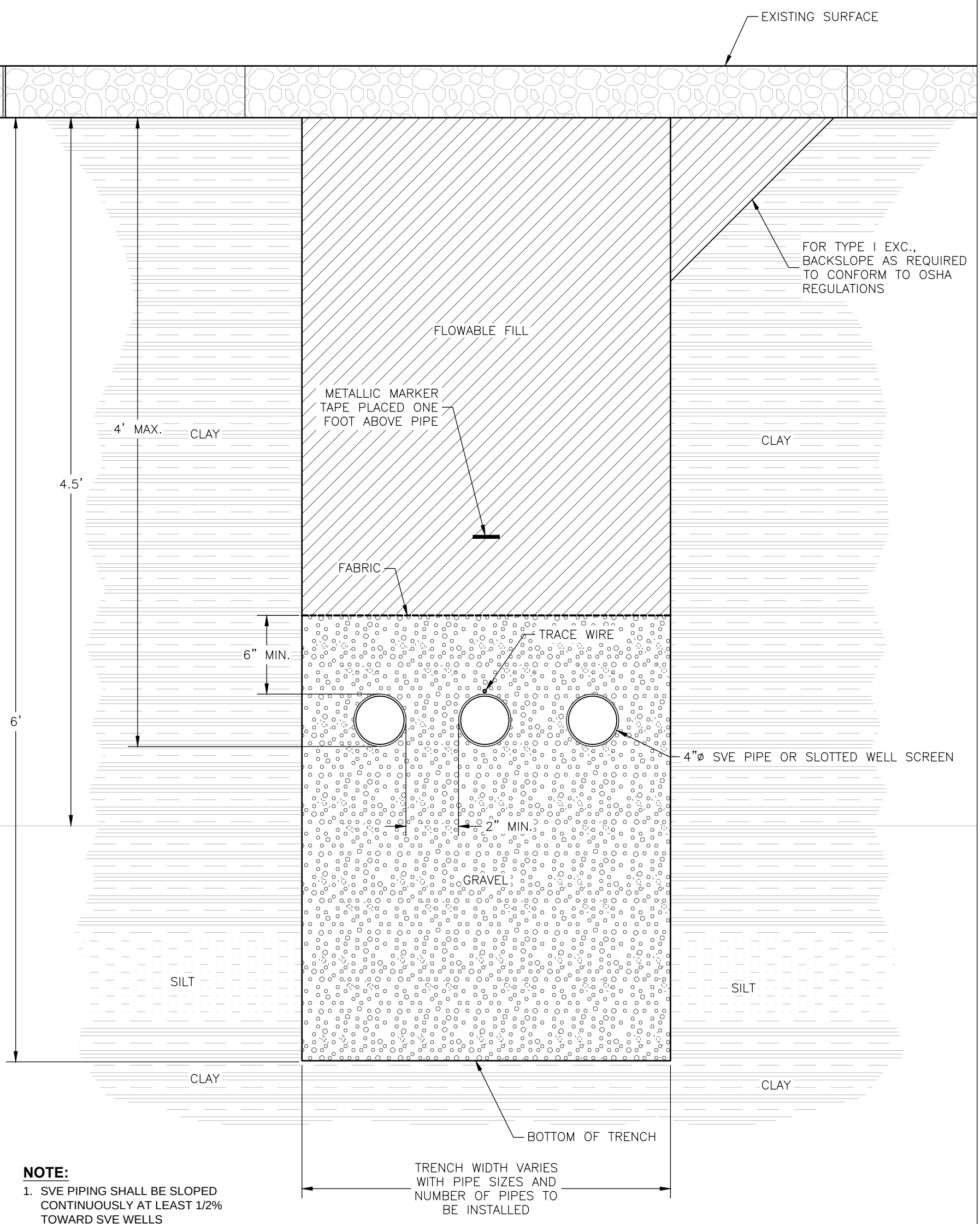

NOTE:

1. SVE PIPING SHALL BE SLOPED CONTINUOUSLY AT LEAST 1/2% TOWARD SVE WELLS

EXPLANATION

Ø	DIAMETER
EXC.	EXCAVATION
MAX.	MAXIMUM
MIN.	MINIMUM

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FIGURE 3

MARTIN'S CLEANERS REMEDIATION TRENCH DETAIL

WHITEFISH SOLVENT SITE
239 BAKER AVENUE
WHITEFISH, MONTANA

Drawn By: PC	Checked By: JR	Scale: NONE	Date: 4/28/17	File: 776WF-REMEDIATIONTRENCHDET201704

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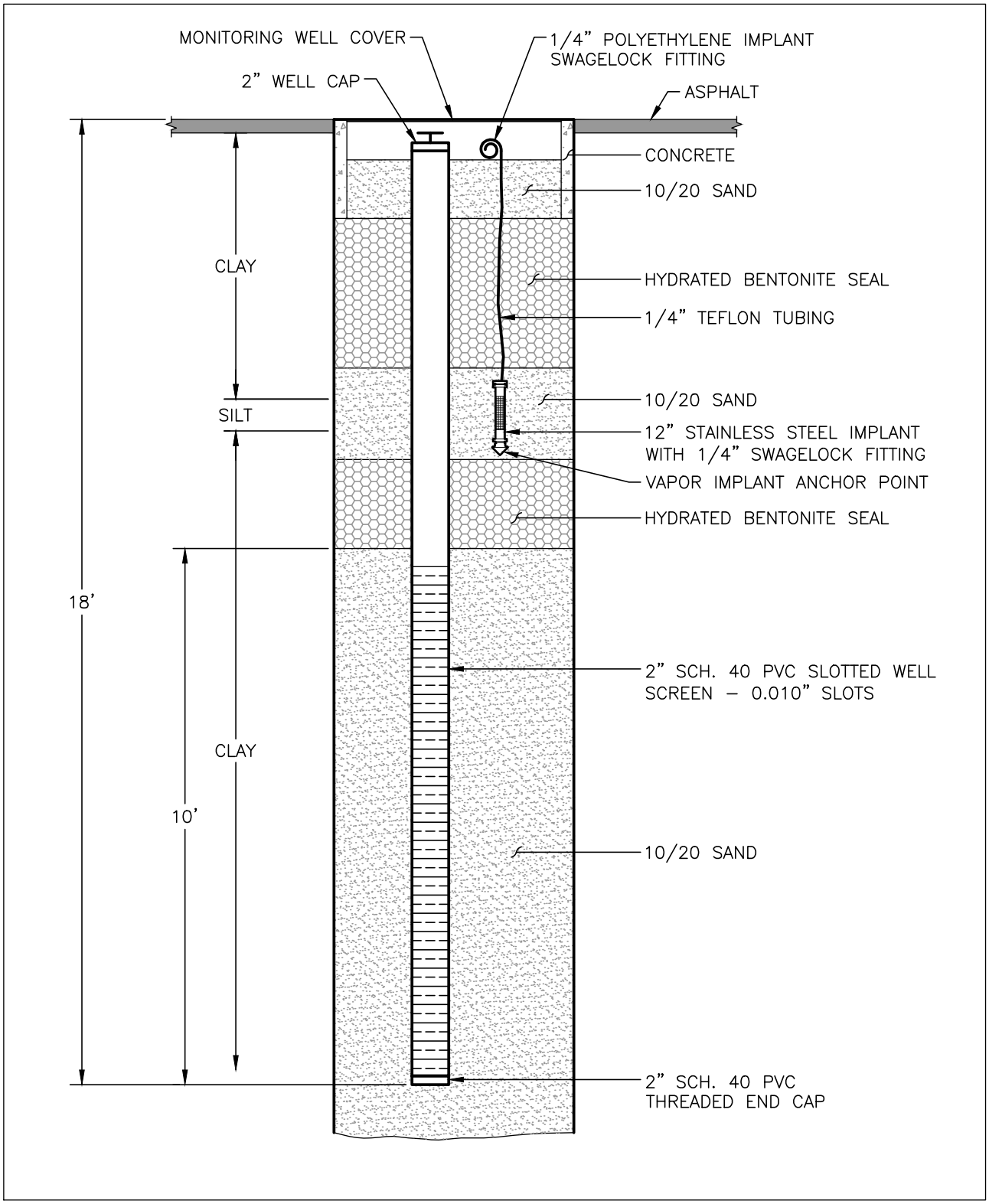

NOTE:

DRAWING IS NOT TO SCALE

EXPLANATION

PVC POLYVINYL CHLORIDE

SCH. SCHEDULE

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FIGURE 4

NESTED GROUNDWATER MONITORING WELL AND VAPOR POINT DIAGRAM

WHITEFISH SOLVENT SITE
239 BAKER AVENUE
WHITEFISH, MONTANA

Drawn By: PC	Checked By: JR	Scale: NONE	Date: 5/30/2017	File: 776WF-NESTEDWELL201704

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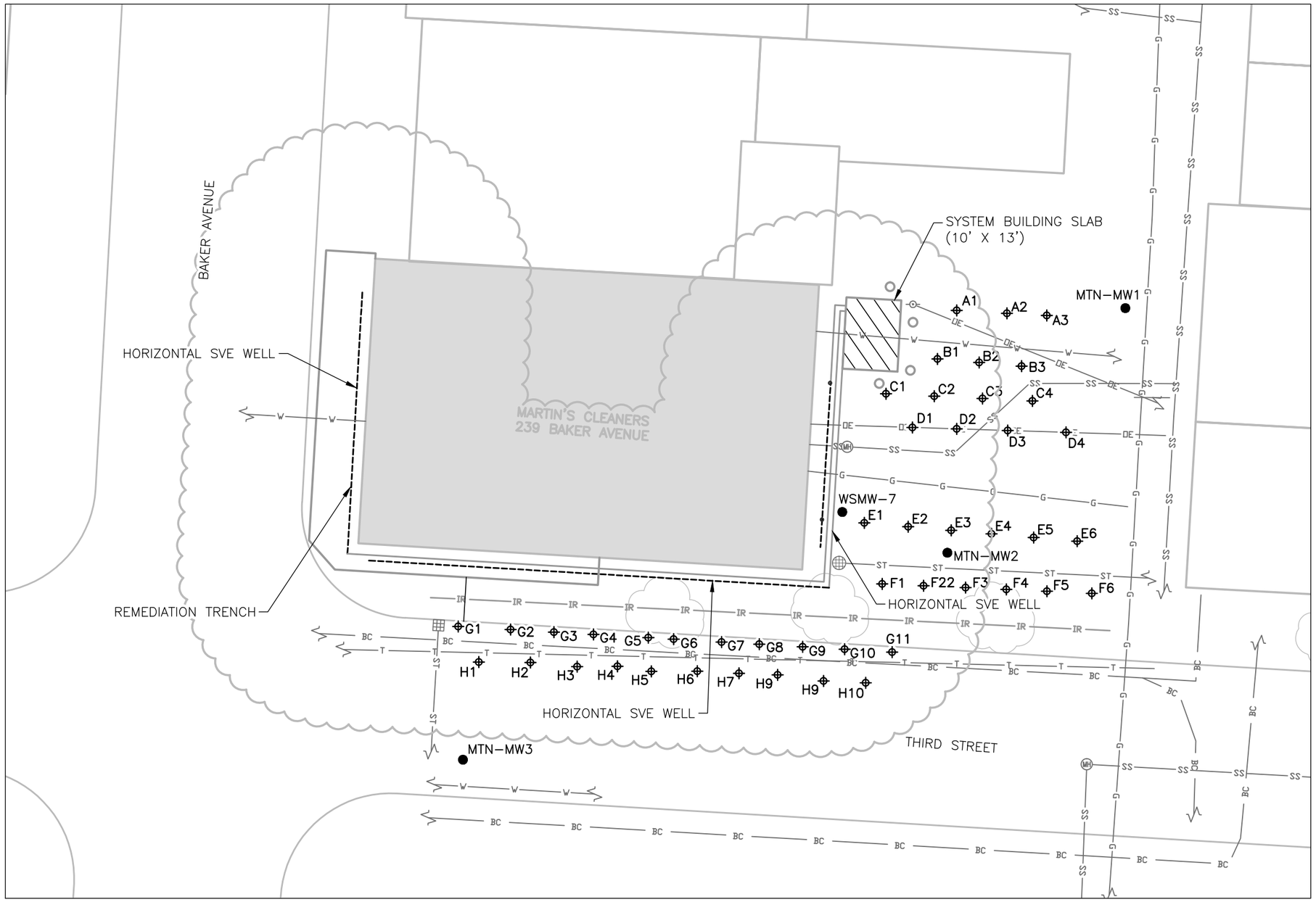

EXPLANATION

WSMW-7	MONITORING WELL (MW) AND DESIGNATION
A1	INJECTION POINT
	SEWER MANHOLE
	CONCRETE BOLLARD POST
	STREET DRAIN
	ELECTRICAL POWER POLE
	TREE
	APPROXIMATE SITE BOUNDARY
	HORIZONTAL EXTRACTION WELL RUNS
BE	UNDERGROUND ELECTRICAL LINE
OE	OVERHEAD ELECTRICAL LINE
SS	SANITARY SEWER LINE
ST	STORM WATER LINE
X	FENCE
W	WATER LINE
G	GAS LINE
BC	BURIED COMMUNICATION LINE
IR	COMMUNICATION LINE
T	TELEPHONE LINE
	SVE PIPING
	ESTIMATED RADIUS OF INFLUENCE
	SYSTEM BUILDING
	BUILDING OR OTHER STRUCTURE
SVE	SOIL VAPOR EXTRACTION
TYP.	TYPICAL

NOTE:

LOCATION OF UTILITIES ARE APPROXIMATE

N

0 20'

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FIGURE 5

MARTIN'S CLEANERS EMULSIFIED VEGETABLE OIL INJECTION LOCATIONS

WHITEFISH SOLVENT SITE
239 BAKER AVENUE
WHITEFISH, MONTANA

Drawn By: PC	Checked By: JR	Scale: 1" = 20'	Date: 5/30/17	File: 776WF-SITEMAP201704

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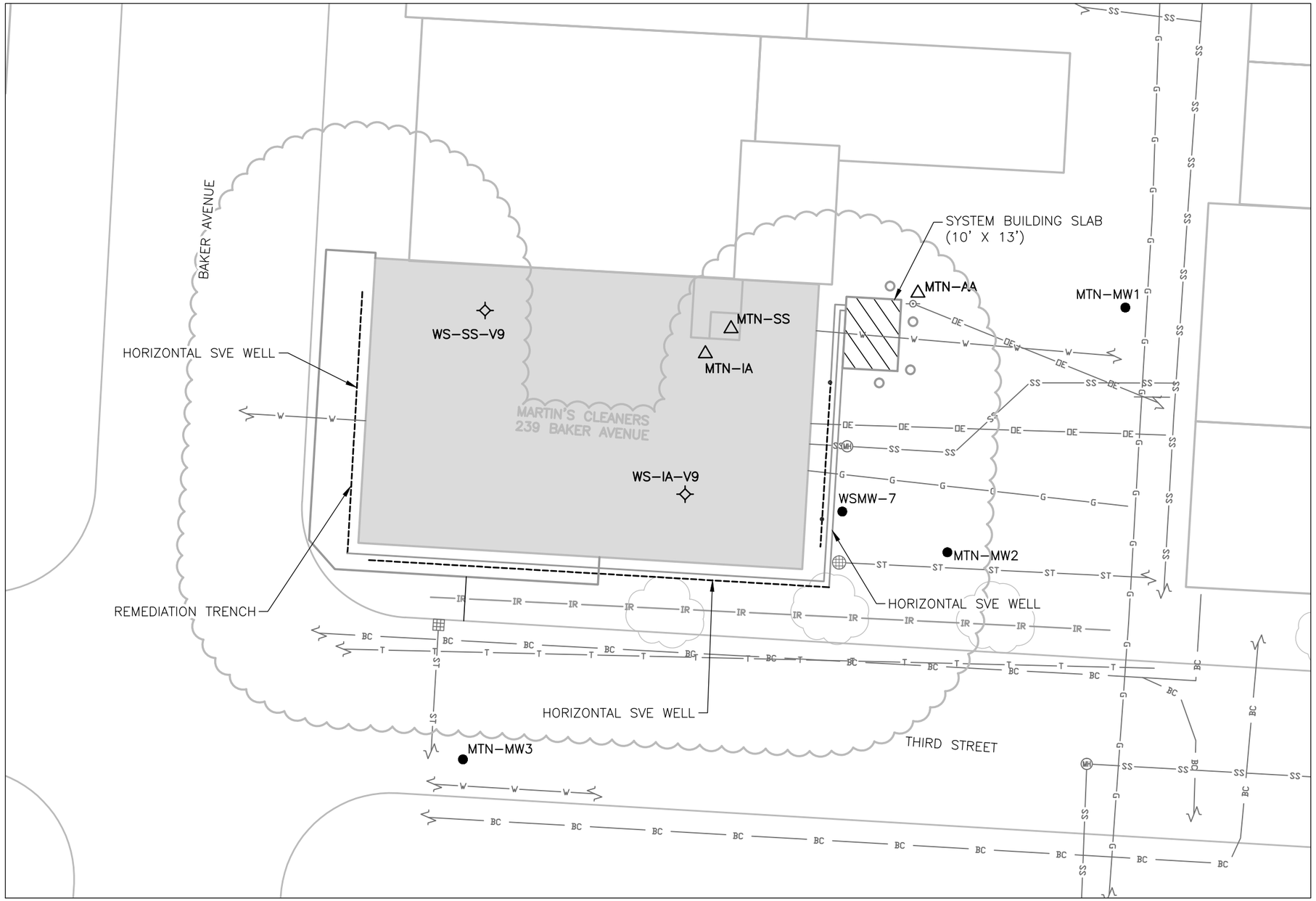

EXPLANATION

WS-SS-V9	INDOOR AIR SAMPLE AND DESIGNATION
MTN-SS	SUB-SLAB SAMPLE AND DESIGNATION
WSMW-7	MONITORING WELL (MW) AND DESIGNATION
	SEWER MANHOLE
	CONCRETE BOLLARD POST
	STREET DRAIN
	ELECTRICAL POWER POLE
	TREE
	APPROXIMATE SITE BOUNDARY
	HORIZONTAL EXTRACTION WELL RUNS
BE	UNDERGROUND ELECTRICAL LINE
OE	OVERHEAD ELECTRICAL LINE
SS	SANITARY SEWER LINE
ST	STORM WATER LINE
X	FENCE
W	WATER LINE
G	GAS LINE
BC	BURIED COMMUNICATION LINE
IR	COMMUNICATION LINE
T	TELEPHONE LINE
	SVE PIPING
	ESTIMATED RADIUS OF INFLUENCE
	SYSTEM BUILDING
	BUILDING OR OTHER STRUCTURE
SVE	SOIL VAPOR EXTRACTION
TYP.	TYPICAL

NOTE:

LOCATION OF UTILITIES ARE APPROXIMATE

N

0 20'

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FIGURE 6

MARTIN'S CLEANERS INDOOR AIR AND SUB-SLAB SAMPLE LOCATIONS

WHITEFISH SOLVENT SITE
239 BAKER AVENUE
WHITEFISH, MONTANA

Drawn By: PC	Checked By: JR	Scale: 1" = 20'	Date: 5/30/17	File: 776WF-INDOORAIR201704

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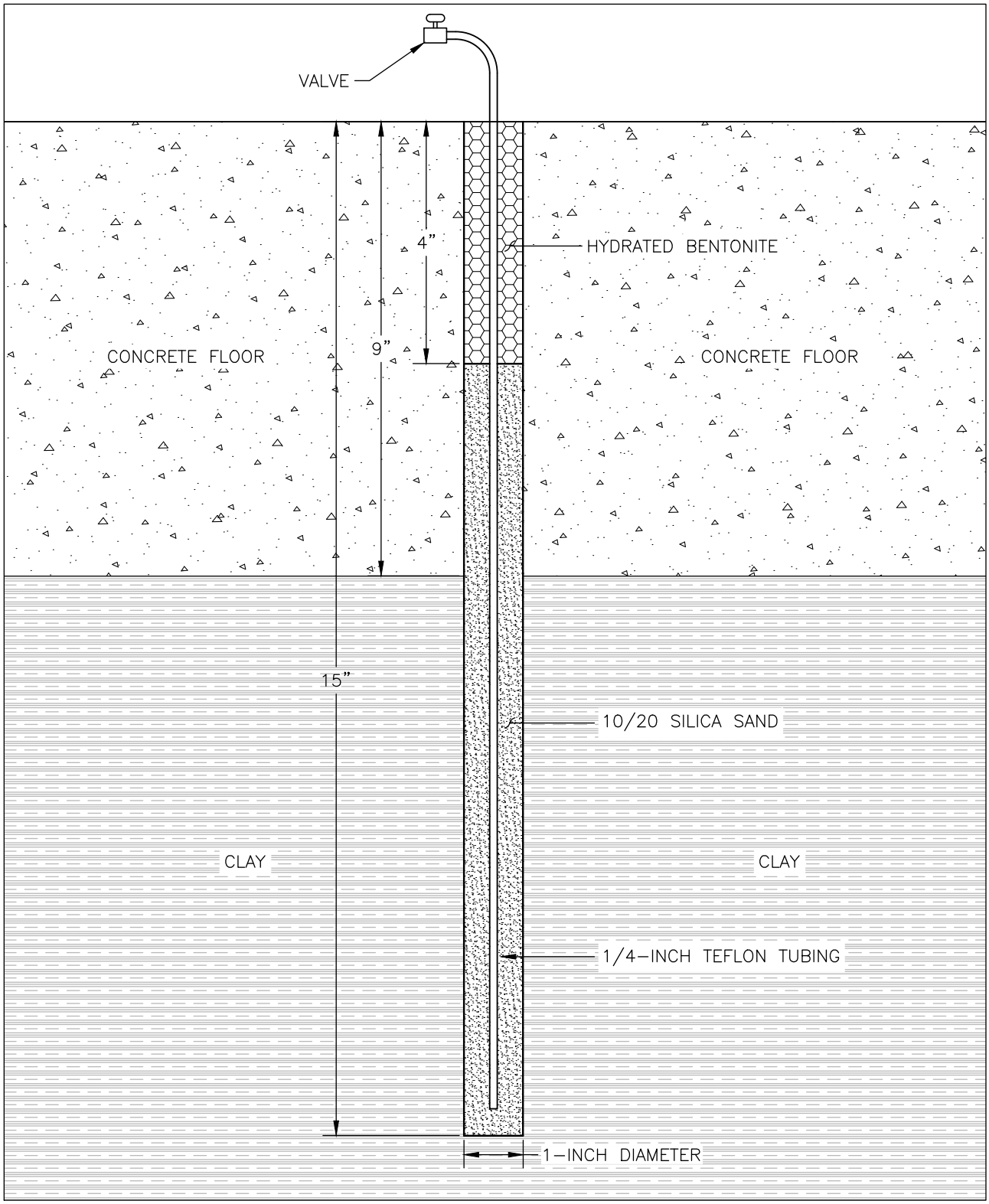

FIGURE 7

SUB-SLAB SAMPLE PORT DETAIL

WHITEFISH SOLVENT SITE
239 BAKER AVENUE
WHITEFISH, MONTANA

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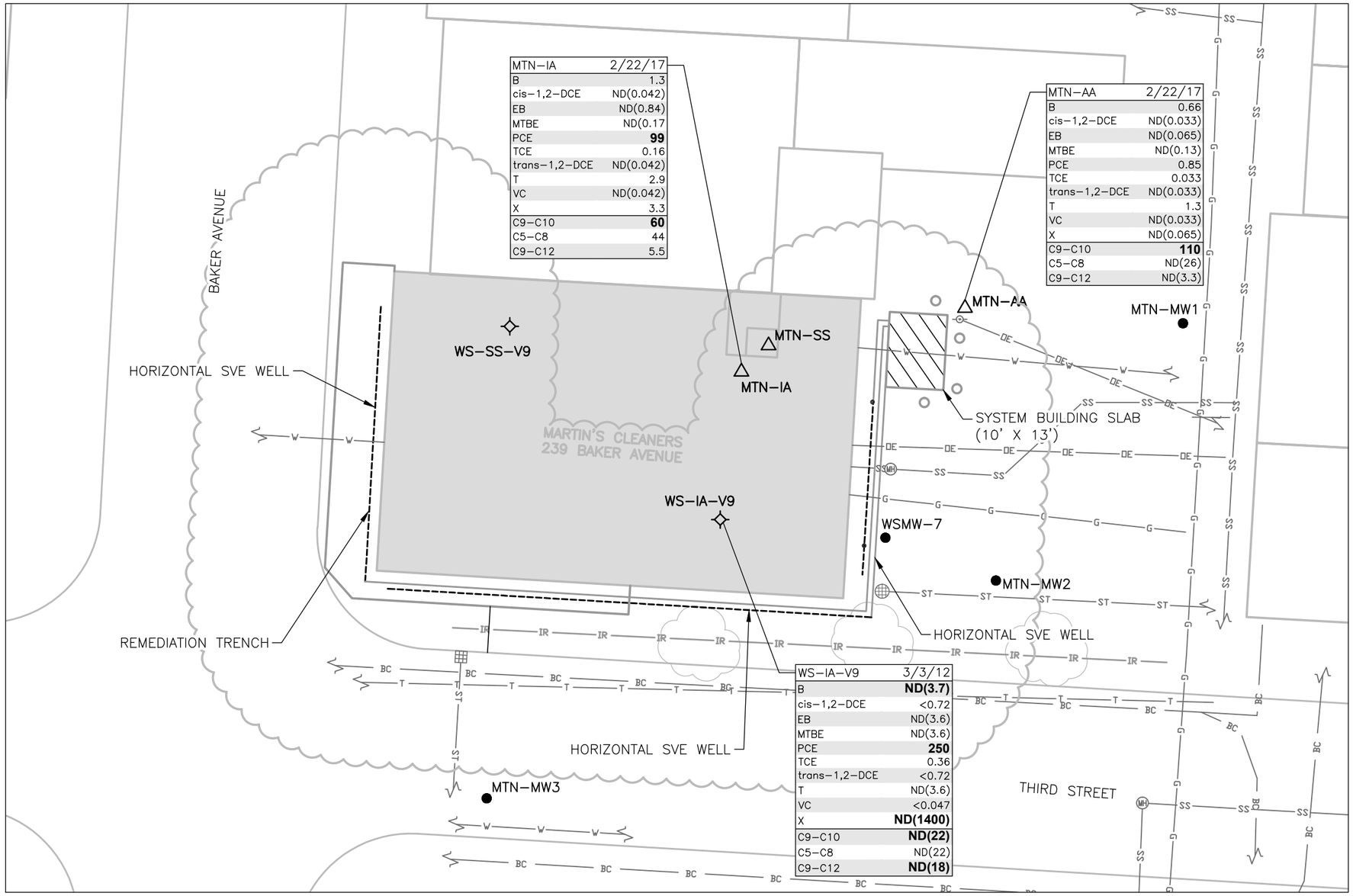

MTN-IA	2/22/17
B	1.3
cis-1,2-DCE	ND(0.042)
EB	ND(0.84)
MTBE	ND(0.17
PCE	**99**
TCE	0.16
trans-1,2-DCE	ND(0.042)
T	2.9
VC	ND(0.042)
X	3.3
C9-C10	**60**
C5-C8	44
C9-C12	5.5

MTN-AA	2/22/17
B	0.66
cis-1,2-DCE	ND(0.033)
EB	ND(0.065)
MTBE	ND(0.13)
PCE	0.85
TCE	0.033
trans-1,2-DCE	ND(0.033)
T	1.3
VC	ND(0.033)
X	ND(0.065)
C9-C10	**110**
C5-C8	ND(26)
C9-C12	ND(3.3)

WS-IA-V9	3/3/12
B	**ND(3.7)**
cis-1,2-DCE	<0.72
EB	ND(3.6)
MTBE	ND(3.6)
PCE	**250**
TCE	0.36
trans-1,2-DCE	<0.72
T	ND(3.6)
VC	<0.047
X	**ND(1400)**
C9-C10	**ND(22)**
C5-C8	ND(22)
C9-C12	**ND(18)**

EXPLANATION

MTN-IA	INDOOR AIR SAMPLE AND DESIGNATION
MTN-SS	SUB-SLAB SAMPLE AND DESIGNATION
WSMW-7	MONITORING WELL (MW) AND DESIGNATION
	SEWER MANHOLE
	CONCRETE BOLLARD POST
	STREET DRAIN
	ELECTRICAL POWER POLE
	TREE
	APPROXIMATE SITE BOUNDARY
	HORIZONTAL EXTRACTION WELL RUNS
BE	UNDERGROUND ELECTRICAL LINE
OE	OVERHEAD ELECTRICAL LINE
SS	SANITARY SEWER LINE
ST	STORM WATER LINE
X	FENCE
W	WATER LINE
G	GAS LINE
BC	BURIED COMMUNICATION LINE
IR	COMMUNICATION LINE
T	TELEPHONE LINE
	SVE PIPING
	ESTIMATED RADIUS OF INFLUENCE
	SYSTEM BUILDING
	BUILDING OR OTHER STRUCTURE
SVE	SOIL VAPOR EXTRACTION
TYP.	TYPICAL

NOTES:

1. LOCATION OF UTILITIES ARE APPROXIMATE
2. ($\mu g/m^3$) = MICROGRAMS PER CUBIC METER OF AIR
3. ND = NON DETECT
4. BOLD = DETECTED/NON-DETECTED VALUE EXCEEDANCE

ANALYTE TABLE EXPLANATION

SAMPLE DESIGNATION	MTN-AA	2/22/17 ← SAMPLE DATE
Benzene	B	1.6
Cis-1,2-dichloroethene	cis-1,2-DCE	--
Ethylbenzene	EB	4.9
Methyl tert butyl ether	MTBE	47
Tetrachloroethene	PCE	47
Trichloroethene	TCE	3
Trans-1,2-dichloroethene	trans-1,2-DCE	--
Toluene	T	22000
Vinyl chloride	VC	2.8
Total Xylene	X	44
C9-C10 Aromatics	C9-C10	10.4
C5-C8 Aliphatic	C5-C8	62.6
C9-C12 Aliphatic	C9-C12	10.4

EPA RSL COMMERCIAL AIR IN MICROGRAMS PER CUBIC METER OF AIR ($\mu g/m^3$)

RBCA APH RSL IN MICROGRAMS PER CUBIC METER OF AIR ($\mu g/m^3$)

N

0 20'

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FIGURE 8

MARTIN'S CLEANERS
INDOOR AIR SAMPLING RESULTS

WHITEFISH SOLVENT SITE
239 BAKER AVENUE
WHITEFISH, MONTANA

Drawn By: PC	Checked By: JR	Scale: 1" = 20'	Date: 5/30/17	File: 776WF-INDOORAIR201704

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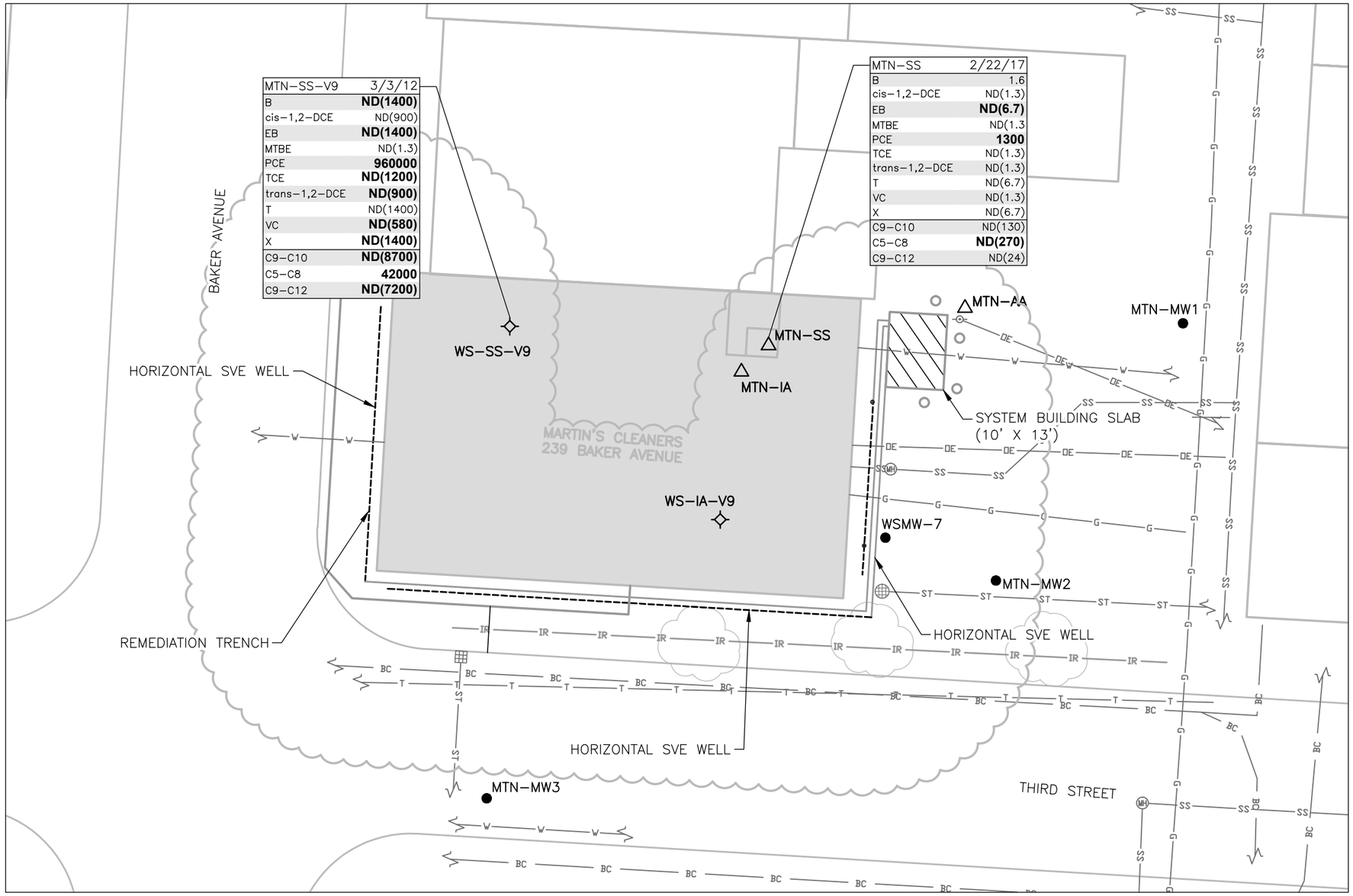

EXPLANATION

MTN–IA	INDOOR AIR SAMPLE AND DESIGNATION
MTN–SS	SUB-SLAB SAMPLE AND DESIGNATION
WSMW–7	MONITORING WELL (MW) AND DESIGNATION
	SEWER MANHOLE
	CONCRETE BOLLARD POST
	STREET DRAIN
	ELECTRICAL POWER POLE
	TREE
	APPROXIMATE SITE BOUNDARY
	HORIZONTAL EXTRACTION WELL RUNS
BE	UNDERGROUND ELECTRICAL LINE
OE	OVERHEAD ELECTRICAL LINE
SS	SANITARY SEWER LINE
ST	STORM WATER LINE
X	FENCE
W	WATER LINE
G	GAS LINE
BC	BURIED COMMUNICATION LINE
IR	COMMUNICATION LINE
T	TELEPHONE LINE
	SVE PIPING
	ESTIMATED RADIUS OF INFLUENCE
	SYSTEM BUILDING
	BUILDING OR OTHER STRUCTURE
SVE	SOIL VAPOR EXTRACTION
TYP.	TYPICAL

NOTES:

1. LOCATION OF UTILITIES ARE APPROXIMATE
2. ($\mu g/m^3$) = MICROGRAMS PER CUBIC METER OF AIR
3. ND = NON DETECT
4. BOLD = DETECTED/NON-DETECTED VALUE EXCEEDANCE

ANALYTE TABLE EXPLANATION

SAMPLE DESIGNATION	MTN–AA	2/22/17 (SAMPLE DATE)
Benzene	B	1.6
Cis-1,2-dichloroethene	cis–1,2–DCE	––
Ethylbenzene	EB	4.9
Methyl tert butyl ether	MTBE	47
Tetrachloroethene	PCE	18
Trichloroethene	TCE	0.88
Trans-1,2-dichloroethene	trans–1,2–DCE	––
Toluene	T	22000
Vinyl chloride	VC	2.8
Total Xylene	X	44
C9-C10 Aromatics	C9–C10	44
C5-C8 Aliphatic	C5–C8	260
C9-C12 Aliphatic	C9–C12	44

EPA RSL INDUSTRIAL AIR IN MICROGRAMS PER CUBIC METER OF AIR ($\mu g/m^3$)

RBCA APH RSL IN MICROGRAMS PER CUBIC METER OF AIR ($\mu g/m^3$)

N

0 20'

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FIGURE 9

MARTIN'S CLEANERS
SUB-SLAB SAMPLING RESULTS

WHITEFISH SOLVENT SITE
239 BAKER AVENUE
WHITEFISH, MONTANA

Drawn By: PC	Checked By: JR	Scale: 1" = 20'	Date: 5/30/17	File: 776WF-INDOORAIR201704

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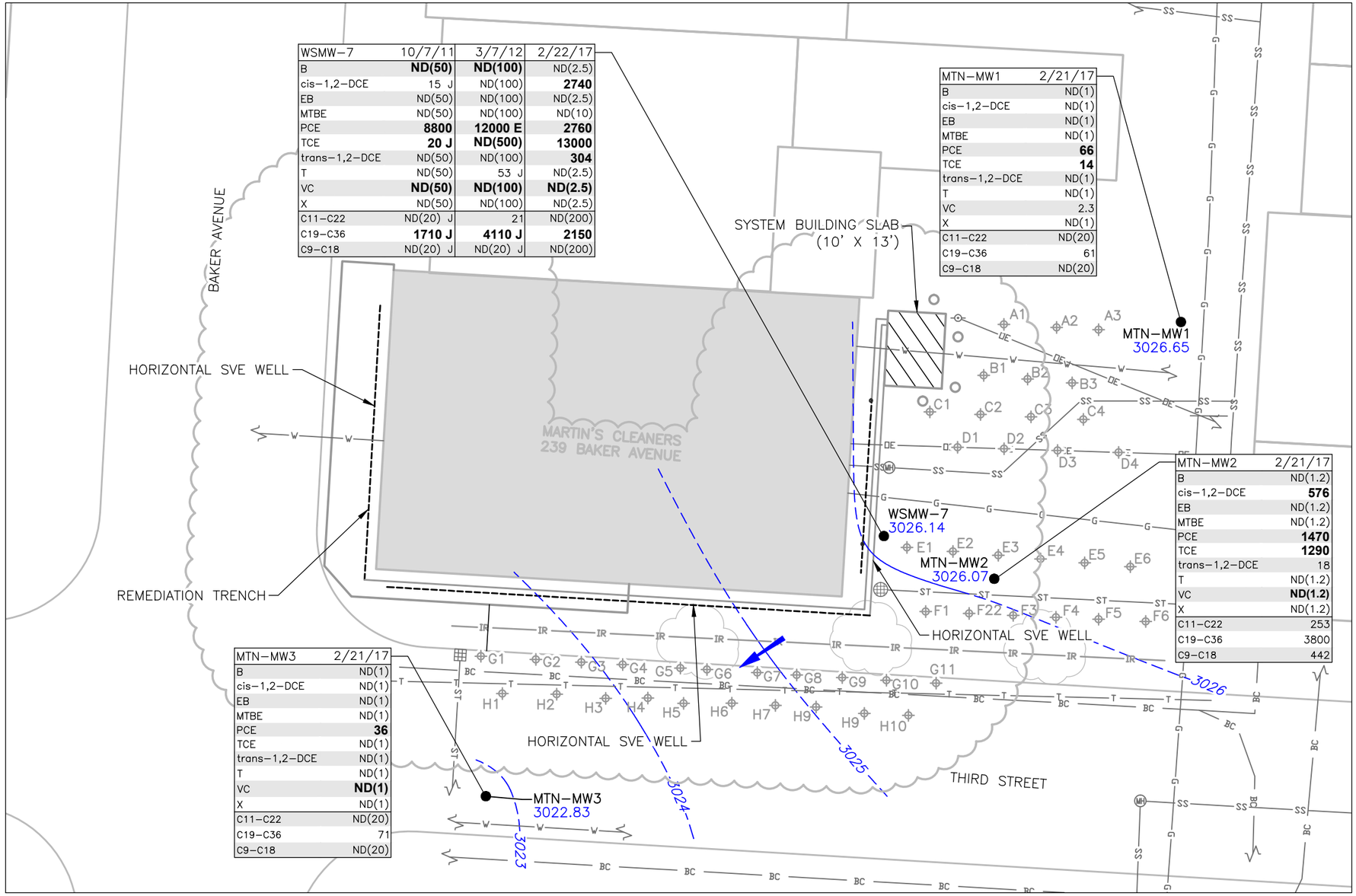

WSMW-7	10/7/11	3/7/12	2/22/17
B	**ND(50)**	**ND(100)**	ND(2.5)
cis-1,2-DCE	15 J	ND(100)	**2740**
EB	ND(50)	ND(100)	ND(2.5)
MTBE	ND(50)	ND(100)	ND(10)
PCE	**8800**	**12000 E**	**2760**
TCE	**20 J**	**ND(500)**	**13000**
trans-1,2-DCE	ND(50)	ND(100)	**304**
T	ND(50)	53 J	ND(2.5)
VC	**ND(50)**	**ND(100)**	**ND(2.5)**
X	ND(50)	ND(100)	ND(2.5)
C11-C22	ND(20) J	21	ND(200)
C19-C36	**1710 J**	**4110 J**	**2150**
C9-C18	ND(20) J	ND(20) J	ND(200)

MTN-MW1	2/21/17
B	ND(1)
cis-1,2-DCE	ND(1)
EB	ND(1)
MTBE	ND(1)
PCE	**66**
TCE	**14**
trans-1,2-DCE	ND(1)
T	ND(1)
VC	2.3
X	ND(1)
C11-C22	ND(20)
C19-C36	61
C9-C18	ND(20)

MTN-MW2	2/21/17
B	ND(1.2)
cis-1,2-DCE	**576**
EB	ND(1.2)
MTBE	ND(1.2)
PCE	**1470**
TCE	**1290**
trans-1,2-DCE	18
T	ND(1.2)
VC	**ND(1.2)**
X	ND(1.2)
C11-C22	253
C19-C36	3800
C9-C18	442

MTN-MW3	2/21/17
B	ND(1)
cis-1,2-DCE	ND(1)
EB	ND(1)
MTBE	ND(1)
PCE	**36**
TCE	ND(1)
trans-1,2-DCE	ND(1)
T	ND(1)
VC	**ND(1)**
X	ND(1)
C11-C22	ND(20)
C19-C36	71
C9-C18	ND(20)

EXPLANATION

- WSMW-7 3026.14 — MONITORING WELL (MW) AND DESIGNATION SHOWING FLUID LEVELS COLLECTED ON FEBRUARY 21, 2016 AND REPORTED AS FT AMSL
- A1 — INJECTION POINT
- SEWER MANHOLE
- CONCRETE BOLLARD POST
- STREET DRAIN
- ELECTRICAL POWER POLE
- TREE
- GENERALIZED GROUNDWATER FLOW DIRECTION
- 3025 — LINE OF EQUAL ELEVATION OF POTENTIOMETRIC SURFACE (FT AMSL, DASHED WHERE INFERRED, 1' CONTOUR INTERVAL)
- APPROXIMATE SITE BOUNDARY
- HORIZONTAL EXTRACTION WELL RUNS
- BE — UNDERGROUND ELECTRICAL LINE
- OE — OVERHEAD ELECTRICAL LINE
- SS — SANITARY SEWER LINE
- ST — STORM WATER LINE
- FENCE
- W — WATER LINE
- G — GAS LINE
- BC — BURIED COMMUNICATION LINE
- IR — COMMUNICATION LINE
- T — TELEPHONE LINE
- SVE PIPING
- ESTIMATED RADIUS OF INFLUENCE
- SYSTEM BUILDING
- BUILDING OR OTHER STRUCTURE
- FT AMSL — FEET ABOVE MEAN SEA LEVEL
- SVE — SOIL VAPOR EXTRACTION
- TYP. — TYPICAL

N

0 20'

NOTES:

1. LOCATION OF UTILITIES ARE APPROXIMATE.
2. (µg/L) = MICROGRAMS PER LITER.
3. ND = NON DETECT.
4. E = IDENTIFIES ANALYTES WITH CONCENTRATIONS EXCEEDING THE RESPONSE OF THE HIGHEST STANDARD IN THE INITIAL CALIBRATION RANGE OF THE ANALYTICAL INSTRUMENT.
5. J = INDICATES THE ESTIMATED VALUE.
6. AN ESTIMATED 20,500 GALLONS OF 3.1 % EVO WAS INJECTED INTO THE SITE SUBSURFACE BETWEEN JANUARY 6 AND JANUARY 11, 2017; THE INJECTIONS LIKELY EFFECT THE FEBRUARY 21, 2017 GROUNDWATER TABLE ELEVATIONS.
7. BOLD = DETECTED/NON-DETECTED VALUE EXCEEDANCE

ANALYTE TABLE EXPLANATION

	MTN-MW2	2/22/17	
Benzene	B	5	MONTANA DEQ-7 GW STANDARDS (µg/L)
Cis-1,2-dichloroethene	cis-1,2-DCE	70	
Ethylbenzene	EB	770	
Methyl tert butyl ether	MTBE	30	
Tetrachloroethene	PCE	5	
Trichloroethene	TCE	5	
Trans-1,2-dichloroethene	trans-1,2-DCE	100	
Toluene	T	1000	
Vinyl chloride	VC	0.2	
Total Xylene	X	10000	
C11-C22 Aromatic	C11-C22	1100	RBCA RBSL (µg/L)
C19-C36 Aliphatic	C19-C36	--	
C9-C18 Aliphatic	C9-C18	--	

SAMPLE DESIGNATION → MTN-MW2; SAMPLE DATE → 2/22/17

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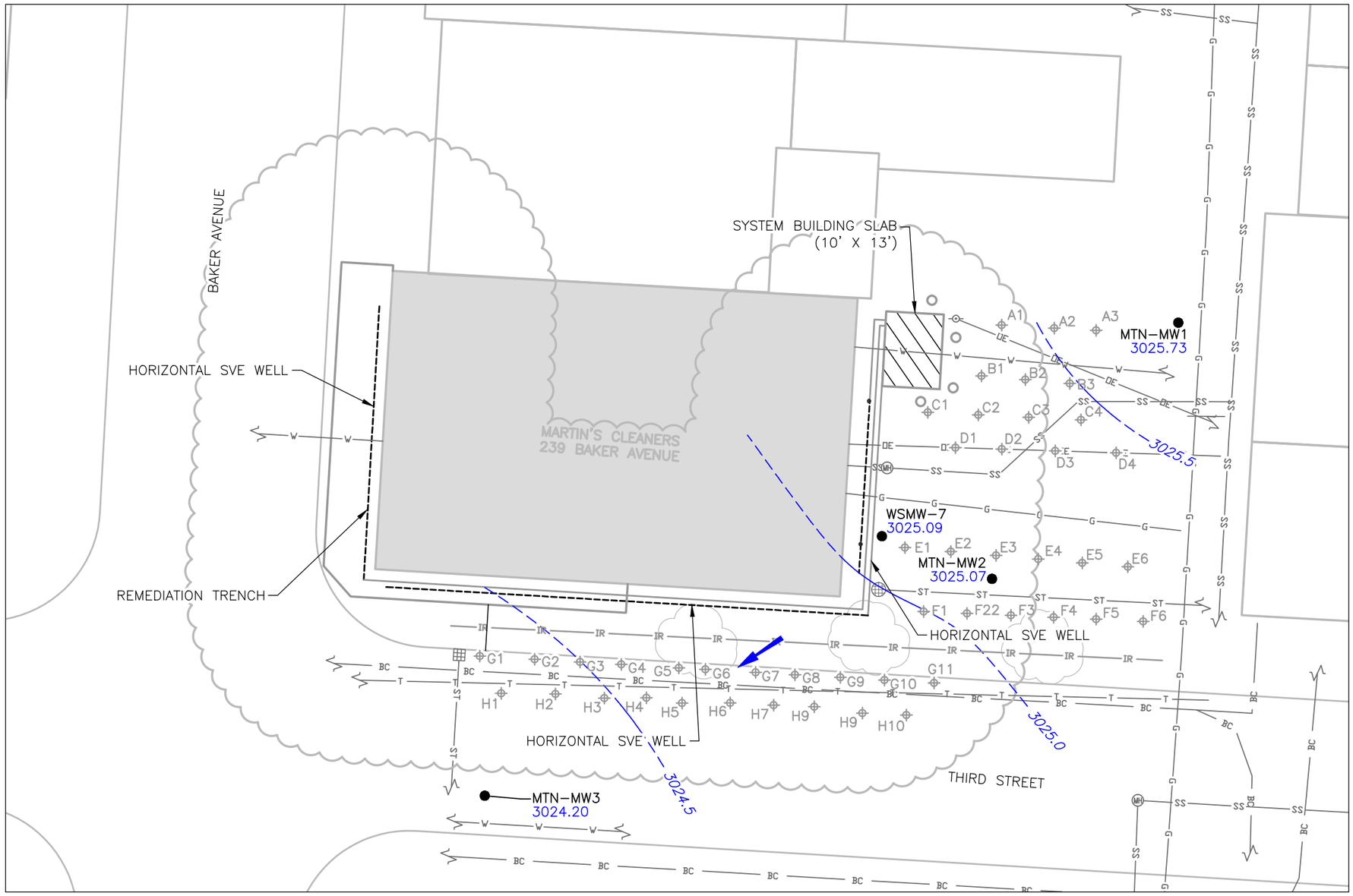
FIGURE 10

MARTIN'S CLEANERS GROUNDWATER RESULTS

WHITEFISH SOLVENT SITE
239 BAKER AVENUE
WHITEFISH, MONTANA

Drawn By: PC	Checked By: JR	Scale: 1" = 20'	Date: 5/31/2017	File: 776WF-GWSOLVENTRESULT201704

\\TRIHYDRO.COM\CLIENTS\GOVSTATE\MDEQSRS\WHITEFISHSOLVENT\CADD_EXHIBITS\SUMMARYREPORT\776WF-GWSOLVENTRESULT201704



EXPLANATION

WSMW-7 3025.09	MONITORING WELL (MW) AND DESIGNATION SHOWING FLUID LEVELS COLLECTED ON MAY 15, 2017 AND REPORTED AS FT AMSL
A1	INJECTION POINT
	SEWER MANHOLE
	CONCRETE BOLLARD POST
	STREET DRAIN
	ELECTRICAL POWER POLE
	TREE
	GENERALIZED GROUNDWATER FLOW DIRECTION
3025.5	LINE OF EQUAL ELEVATION OF POTENTIOMETRIC SURFACE (FT AMSL, DASHED WHERE INFERRED, 0.5' CONTOUR INTERVAL)
	APPROXIMATE SITE BOUNDARY
	HORIZONTAL EXTRACTION WELL RUNS
BE	UNDERGROUND ELECTRICAL LINE
OE	OVERHEAD ELECTRICAL LINE
SS	SANITARY SEWER LINE
ST	STORM WATER LINE
X	FENCE
W	WATER LINE
G	GAS LINE
BC	BURIED COMMUNICATION LINE
IR	COMMUNICATION LINE
T	TELEPHONE LINE
	SVE PIPING
	ESTIMATED RADIUS OF INFLUENCE
	SYSTEM BUILDING
	BUILDING OR OTHER STRUCTURE
FT AMSL	FEET ABOVE MEAN SEA LEVEL
SVE	SOIL VAPOR EXTRACTION
TYP.	TYPICAL

N

0 20'

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FIGURE 11

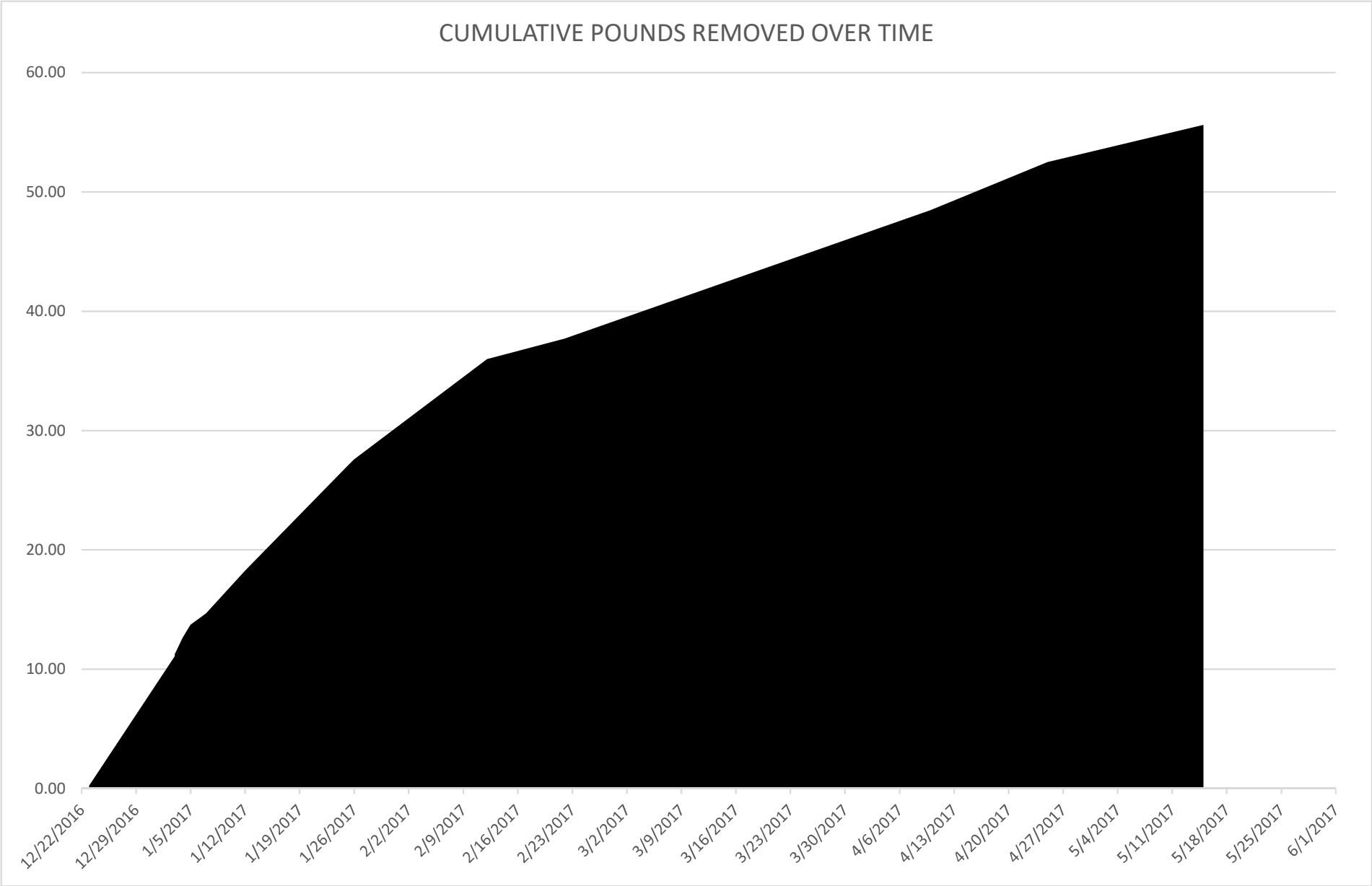
POTENTIOMETRIC SURFACE MAP
MAY 2017

WHITEFISH SOLVENT SITE
239 BAKER AVENUE
WHITEFISH, MONTANA

Drawn By: PC	Checked By: JR	Scale: 1" = 20'	Date: 5/31/2017	File: 776WF-POTSUFACE201705

\\TRIHYDRO.COM\CLIENTS\GOVSTATE\MDEQSRS\WHITEFISHSOLVENT\CADD_EXHIBITS\SUMMARYREPORT\776WF-POTSUFACE201705

FIGURE 12. SOIL VAPOR EXTRACTION CUMULATIVE POUNDS OF CHLORINATED SOLVENTS REMOVAL ESTIMATE
WHITEFISH SOLVENT SITE, WHITEFISH, MONTANA



APPENDICES A THROUGH J

(PLEASE SEE ATTACHED CD)

A. PDI INVESTIGATION

B. SVE CONSTRUCTION

C. FIELD NOTES

D. LABORATORY ANALYTICAL AND DATA VALIDATION REPORTS

E. SVE MANUALS

F. MONITORING WELL INSTALLATION

G. INJECTIONS

H. INDOOR AIR & SUB-SLAB SAMPLING

I. SVE OPERATION & MAINTENANCE

J. GROUNDWATER SAMPLING

APPENDIX A

PDI INVESTIGATION

technical memorandum addendum

To: Mr. Andrew Vann, Trihydro

From: Mr. Grant Price, Trihydro

Date: July 8, 2016

Re: May 2016 MIP Pre-Design Investigation Tech Memo, MDEQ Whitefish Solvent Site

1.0 INTRODUCTION

Trihydro Corporation (Trihydro) was contracted by the Montana Department of Environmental Quality (DEQ) to conduct interim remedial actions including installation of a soil vapor extraction (SVE) system and in situ bioremediation at DEQ's Whitefish Solvent Site in Whitefish, Montana per Task Order No. 32 (Task Order). The interim remedial actions are a being implemented as a result of elevated indoor air concentrations of tetrachloroethene (PCE) detected in samples collected from a building formerly housing Martin's Cleaners and Laundromat (Martin's Cleaners). Indoor air sampling results, as well as existing Whitefish Solvent Site soil and groundwater data are presented in Resource Technologies, Inc. (Resource Technologies) "Sampling and Analytical Results Report for a CERCLA Site Investigation of the Whitefish Solvent Site, Whitefish, Montana" dated January 11, 2013 (SARR). The Task Order also requires additional investigation of another former Whitefish dry cleaner, Lincoln/Anderson Cleaners. Task 5.B of the Task Order includes implementation of a Pre-Design Investigation (PDI). The purpose of the PDI is "to gather information necessary to support installation of an SVE system, and a round of in situ enhanced bioremediation at the Martin's Cleaners building". Task 5.B also includes additional investigation at the Lincoln/Anderson Cleaners building to evaluate the nature and extent of soil and groundwater chlorinated solvent contamination potentially related to the former dry cleaning operation. SARR data were reviewed to assist with development of the PDI scope. The PDI was implemented by Trihydro during May 2016. A direct push drill rig equipped with a membrane interface probe (MIP) was used to collect data necessary to complete the PDI. The MIP collects data through a variety of detectors, including a photoionization detector (PID), a flame ionization detection (FID), and a halogen-specific detector (XSD). XSD data are of particular interest, as the XSD detects chlorinated volatile organic compounds (CVOCs) such as PCE. The purpose of this technical memorandum (Tech Memo) is to document the completed PDI work and present the findings.

2.0 PRE-DRILLING PREPARATION

A significant amount of preparation is required to safely conduct any investigation consisting of subsurface disturbances. The amount of preparation necessary for the PDI was even greater due to the large number of stakeholders and congestion of downtown Whitefish businesses and subsurface utilities. The majority of the preparation work consisted of making the necessary notifications, obtaining required permits, and locating subsurface utilities.

2.1 NOTIFICATIONS

DEQ made initial contact to the City of Whitefish, the business owners of the businesses that now occupy the buildings that formerly housed Martin's and Lincoln/Anderson Cleaners, and the owners of these buildings. The building that formerly housed Martin's Cleaners is now occupied by the Whitefish Fine Wine and Liquor Store, and the building that formerly housed Lincoln/Anderson Cleaners is now occupied by Second Street Pizza. The scope and intent of the work was explained during these initial contacts. Upon finalization of the PDI schedule, Trihydro followed up with the above-referenced stakeholders to inform them of the anticipated schedule and inquired about potential conflicts. Identified conflicts were limited to not blocking the rear entrance of the liquor store during deliveries. In addition to the above-referenced stakeholders, Trihydro also contacted adjacent property and business owners, the City of Whitefish (COW) Public Works Department, the COW Fire Department, and the COW Police Department to provide information pertaining to scope, intent, and schedule. Additional concerns were limited to not blocking the alley east of the Liquor Store during anticipated deliveries to the ACE Hardware Store.

2.2 PERMITS

Permits required to complete the PDI scope included a COW Excavation Permit and Montana Department of Transportation (MDT) Encroachment Permit. Trihydro's drilling contractor, Dakota Technologies of Maple Grove, Minnesota (Dakota), was required to obtain the Excavation Permit. In order to be issued the Excavation Permit, Dakota was required to obtain a Montana Contractors License and a City Business License.

The MDT Encroachment Permit was required as portions of the PDI work were anticipated to be conducted in the Second Street/HWY 93 right of way (ROW). The Encroachment Permit included an MDT-required Environmental Checklist as well as a Traffic Control Plan (TCP). The TCP would need to be implemented if the PDI work extended into any of the traffic lanes of Second Street/HWY 93. Provisions were made to implement the TCP, because during the preparation stages of the PDI, it was uncertain if work would extend into the traffic lanes. Due to the small size of the drill rig, work did not extend into the traffic lanes, and it was not necessary to implement the TCP.

2.3 UTILITY LOCATE

A public utility locate was requested for each of the two sites by Dakota on May 10, 2016. In addition to the public utility locate, Trihydro contracted Pathfinder Utility Locating and Consulting Services, LLC (Pathfinder) of Butte, Montana to verify the public locator markings and attempt to identify additional unmarked private utilities. Under Trihydro oversight, Pathfinder conducted the private locate on May 16, 2016. While conducted the private locate, it was observed that some utility lines that should have been marked by the public locators were not marked at the Martin's Cleaners site, and that no public utilities were marked at the Lincoln/Anderson Cleaners site. At Trihydro's request, Dakota called in an update to both of the public locate tickets, notifying the utility companies that the utilities had not been marked.

Pathfinder was successfully able to locate/confirm locations of public and private gas, electric, and fiber optic utilities. Pathfinder was also able to locate some, but not all water lines. The ability to locate water lines was primarily dependent on the material of the line and whether or not the line was equipped with a tracer. Pathfinder was unable to locate sewer lines, aside from identifying the manholes.

COW provided maps showing water, sanitary sewer, and storm sewer mains, although COW indicated that they were not certain of the maps' accuracy. Additionally, the maps do not show service lines, only mains. Accordingly, extra steps were required to verify the location of sewer and water service lines. Trihydro contracted Roto-Rooter of Kalispell, Montana to assist with locating sewer service lines. On May 23, 2016, under Trihydro's oversight, Roto-Rooter used a sewer camera to identify the location and orientation of sewer lines within the anticipated drilling area. This process was successful in identifying the sewer services in the alley east of the Martin's Cleaners site, but less so in the alley north of the Lincoln/Anderson Cleaners site. The sewer in this alley was obstructed or otherwise damaged preventing the camera from moving beyond about 60 feet from the manhole from which it was inserted. This prevented locating the Second Street Pizza sewer service line, which was of particular importance due its proximity to the desired drilling locations. However, with the Second Street Pizza's Manager's consent, the camera was sent down one of the Second Street Pizza toilets, thus allowing for identification of the sewer service line.

Trihydro also met with a COW IT/GIS technician on May 23, 2016 to review the available building and sewer as-builts in an attempt to answer the remaining unknowns. COW was able to provide approximate measurements from the sewer manhole to the sewer service lines in the alley north of the Lincoln/Anderson site. Additionally, maps showing sewer and water service lines were available for a few of the buildings in question.

Finally, Trihydro interviewed property and/or business owners to receive information that they may have pertaining to building service lines. For some buildings, the location where the service lines entered the buildings were identifiable in the buildings' basements.

Based on the above-referenced utility locate processes, Trihydro was able to identify locations believed to be both utility-free and adequate to provide data necessary to complete PDI objectives.

3.0 MIP DRILLING

MIP drilling was conducted on May 24, 2016 (Martin's Cleaners) and May 25, 2016 (Lincoln/Anderson Cleaners). MIP boring locations are illustrated on Figure 3-1. Photo documentation is provided as Attachment 1. Photos were taken to document pre-drilling conditions, borehole locations, utility locations, general work processes, and post-drilling conditions.

3.1 MARTIN'S CLEANERS

PDI objectives at Martin's Cleaners were to gather information necessary to support installation of an SVE system, and a round of in situ enhanced bioremediation at the Martin's Cleaners building. In order to achieve these objectives, boring locations were selected to more accurately define and delineate the PCE source area, as well as providing lithologic data to assist with SVE/injection design.

3.1.1 LOCATION SELECTION

Martin's Cleaners MIP borings are designated MC-01 through MC-08. Locations are illustrated on Figure 3-1. Below is a list of Martin's Cleaners MIP boring locations and selection rationale:

- MC-01: This location was selected as a potential PCE source area boring based on SARR (Resource Technologies 2013) data and presumed facility operations. The boring was shifted north of desired location (just outside Martin's Cleaner's back door) due to underground utilities.
- MC-02: This location was selected due to its proximity to existing monitoring well MSMW-7, from which soil samples with elevated PCE concentrations were collected. An analytical soil sample was needed from an area with known contamination to help calibrate XSD results. Existing data suggested that this location may be suitable.
- MC-03: This location was selected to assist with delineation of contamination. The boring is down-gradient of known contamination.
- MC-04: This location was selected to assist with delineation of contamination. The boring is down-gradient of known contamination.
- MC-05: This location was selected to assist with delineation of contamination. The boring is side-gradient of known contamination. This was an "opportunistic" boring location selected in the field primarily due to XSD detects at MC-02.
- MC-06: This location was selected to assist with delineation of contamination (side-gradient of known contamination), and to evaluate if the elevated PCE concentrations identified at existing soil sample location WSB-6 are related to Martin's Cleaners soil contamination.
- MC-07: This location was selected as an up-gradient boring. It was initially thought that the boring might provide a "clean" (PCE-free) soil sample to calibrate XSD data. The boring might also identify potential up-gradient PCE sources (or lack thereof).
- MC-08: This boring was installed to help characterize/pin-point the source area. The boring was selected in the field as an opportunistic boring location, primarily because MC-01, which was also intended to characterize the source area, had to be shifted to the north of the desired location.

3.1.2 LITHOLOGIC DATA

Lithologic data were collected at select Martin's Cleaners boring locations primarily to provide information necessary for SVE system design. Lithologic data was also collected from locations

necessitating soil analytical data and to help identify potential preferential contamination migration pathways. Based on these objectives, lithologic data were collected from the following borings:

- MC-01: PCE contamination was expected at this location due to its proximity to Martin's Cleaners and historical PCE-contaminated soil samples. Accordingly, this location was considered a likely candidate for collecting a contaminated soil sample that could be used to help calibrate XSD results (see Section 3.1.5). Additionally, this location may provide useful lithologic data to assist with SVE system design.
- MC-02: This location was deemed appropriate for lithologic data collection for the same reasons as MC-01.
- MC-03: This location was selected for soil sampling/lithologic data collection due to the lack of XSD detections. A "clean" sample was desired to assist with XSD calibration. Additionally, the lithologic data may assist with SVE system design.
- MC-05: Lithologic data was collected at this location primarily to evaluate potential contamination migration pathways.

Martin's Cleaners boring logs, including lithologic data for the above-referenced borings, are provided as Attachment 2. As indicated on the boring logs, lithology in the vicinity of Martin's Cleaners appears to be relatively consistent throughout the area. The subsurface from 0 to 20 feet below ground surface (ft bgs) is comprised primarily of light olive-brown clay. Asphalt/road base was noted at all four locations from approximately 0 to 0.5 ft bgs. At the three locations located within the Third Street ROW, gravelly sand (road base) was noted beneath the asphalt to depths ranging from 2 to 3 ft bgs; this interval was not noted at MC-01, located in the Martin's Cleaner's parking lot. Light olive-brown clay was noted beneath this interval to total depth at all locations. At three borings, MC-01, MC-02, and MC-03, an approximately 1-foot thick medium brown silt lens was noted at depths ranging from approximately 4.75 ft bgs to 6.5 ft bgs. At borings MC-01 and MC-02, this lens corresponds well to XSD spikes (stronger XSD responses), indicating that the lens may be a preferential pathway for PCE contamination migration. Significant XSD responses were not noted at MC-03, so no correlation can be made. The silt lens was not noted at boring MC-05, but XSD responses were, with a spike at approximately 4 ft bgs. The only noteworthy lithologic differences in this interval are that the clay appeared to be light brown in color (as opposed to light olive-brown), and the clay was harder and drier than the deeper clay intervals of this boring. MC-05 soil recovery was only 50 percent (%), compared with recoveries averaging about 70% at the other lithologic data collection locations. It's possible that either the silt lens pinches out and is not present at MC-05, or that the silt lens was not observed at MC-05 due to poor recovery.

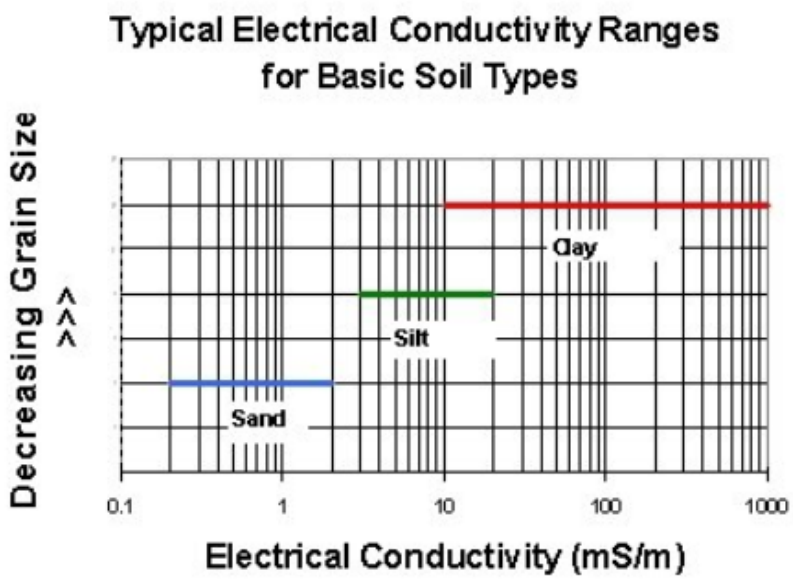
3.1.3 DEPTH TO WATER

Lithologic observations included on the Attachment 2 boring logs include moisture contents. However, determining depth to water based on the lithologic observations proved difficult due to high moisture content in the unsaturated zone above the water table. Soil was generally moist to wet at depths ranging

from 5 to 10 ft bgs. Fluid levels measured in nearby existing monitoring well WSMW-7 indicate that the depth to water is slightly deeper than 9 ft bgs.

3.1.4 ELECTRICAL CONDUCTIVITY

MIP data includes electrical conductivity (EC) measurements. EC is affected by particle size (as well as other factors). An attempt was made to correlate lithology to the EC data so that lithologic interpretations could be made at locations without lithologic data. Generally, higher EC measurements equate to finer particle size and vice versa. The following chart is taken from Geoprobe's website (Geoprobe manufactures MIP systems):



It should be noted that several other factors, including mineralogy, porosity, pore size distribution, connectivity, water content, ionic strength of soil pore water, and temperature affect EC measurements. Therefore, it is possible that EC values of a specific lithologic unit may not fall with the above-presented ranges. Accordingly, it is more useful to evaluate EC values collected from the MIP borings relative to each rather than comparing the values to the ranges presented above. None-the-less, the above chart is useful to help visualize the anticipated usual relationship between EC and particle size.

It should be noted that MIP data is typically not available for borings at depths shallower than about 2 to 3 ft bgs. MIP data was not collected from interval due to the subsurface hardness and potential presence of gravel. Collecting MIP data from this interval could result in probe damage. Accordingly, a "pre-probe push" was conducted through this interval to open the boring, and the probe was then inserted into the subsurface through the opening. Therefore, at the Martin's Cleaners lithologic data borings, lithology for which EC data is available is limited to clay and silt (sands and gravels did not extend beyond the pre-probe interval). Pre-probe depths are included in the MIP Field Summary Log which are provided as

Appendix A to Dakota's "High Resolution Site Characterization Report" (Dakota's Report, Attachment 3). EC data are included on the MIP logs and XSD plots which are provided as Appendices C and D to Dakota's Report, respectively. Comparing the lithologic data to the EC data yields the following observations:

- MC-01: There are lower EC values associated with the silt lens; the clay above the silt lens has a higher EC than the clay beneath the silt lens. The EC values that correspond with the clay intervals, ranging from approximately 35 to 80 mS/m, are on the very low end of the expected clay EC range based on Geoprobe's above-presented chart (Geoprobe 2016). The EC values associated with the silt lens (about 20 mS/m) are at the high end of expected EC values based on the above source.
- MC-02: There is a small trough (interval with lower EC values) at about 4.25 ft bgs. This is approximately 0.5 feet shallower than the top of the silt lens, as logged. However, this trough may correspond with the silt lens; tops and bottoms of the logged intervals may be slightly off due to the % recovery. Aside from this small trough, EC values appear to steadily decline with depth. The values are consistent with the clay values noted at MC-01 (ranging from up to approximately 80 mS/m in shallower depths to approximately 35 mS/M at deeper depths). The EC value of the trough (approximately 40 mS/m) is greater than the MC-01 silt EC value.
- MC-03: Lower EC values do appear to correspond with the silt lens. Consistent with the above-two borings, clay EC values are higher shallower and lower deeper. Clay EC values at this location, ranging from approximately 50 mS/m to over 100 mS/m, are slightly higher than the clay EC values at the above-two locations. The apparent silt EC value at this location is approximately 40 mS/m, consistent with the apparent MC-02 silt EC.
- MC-05: A large EC trough is indicated from about 4 to 6 ft bgs. This loosely corresponds to an interval with elevated XSD detections, and loosely corresponds to the 3 to 5 ft bgs interval documented to be slightly different from the underlying clay interval in that the clay appeared to be light brown in color (as opposed to light olive-brown), and the clay was harder and drier than the deeper clay intervals. Trough EC values ranged from approximately 10 to 30 mS/m, and the surrounding clay EC values ranged from approximately 40 to 90 mS/m.

Based on the above information, EC values of clay beneath the Martin's Cleaners area typically range from approximately 35 to 100 mS/m, and EC values of silt typically range from approximately 20 to 40 mS/m. Even though there is some overlap in these ranges, at each location, the coarser material (silt) generally yields lower EC values. The exception to this is the MC-05 trough described above, where a trough is noted and significant lithologic difference are not.

Using the above correlations to interpret the non-lithologic-data-borings yields the following observations:

- EC troughs with values generally corresponding the above-referenced site silt values are evident at borings MC-04 (3.5 to 5.5 ft bgs), MC-06 (4.75 to 5.75 ft bgs, slightly higher than the typical site silt

values), and MC-07 (3 to 3.75 ft bgs and 6.25 to 7.5 ft bgs, also slightly higher than the typical site silt values). These data may suggest that the silt lens is relatively continuous throughout the subsurface of this area. MC-07 is approximately 150 feet northeast of Martin's Cleaners, intended to provide up-gradient data. The slight variations in EC data at this location may indicate differing lithology at this location (perhaps two silt lenses). It should be noted that the troughs do not necessarily indicate silt lens presence; other variables in EC measurements may also cause troughs, as appears to be the case with boring MC-05 (see above MC-05 bullet).

Surprisingly, an EC trough is not noted for MC-08. Based on MC-08's location (between MC-01 and MC-02, where the EC trough is evident on the MIP logs and the silt lens was noted on the boring logs) the presence of the silt lens and an associated EC trough would be expected. MC-08 EC values are consistently comparatively high (over 100 mS/m) from 2 to 8 ft bgs, and then they taper off to expected site clay EC values. Without accompanying lithologic data, it is difficult to evaluate what may be causing these higher EC values. And, as previously mentioned other variables may be affecting the EC data.

- Aside from the above noted EC troughs, EC values at the non-lithologic-data-collection locations are typical of the site clay EC values, with the slightly anomalously high shallow EC values at MC-08. This suggests that the clay observed in the lithologic-data-collection locations is typical across the site.

3.1.5 SOIL SAMPLING AND COMPARISON OF SOIL ANALYTICAL RESULTS TO XSD DATA

Soil samples were collected for potential laboratory analysis from each of the lithologic-data-collection locations. The primary purpose for laboratory analysis of soil samples was to calibrate XSD results (specifically, XSD data). Since characterization of potential PCE source areas is an objective of the PDI, and since source areas are unsaturated, unsaturated soil samples were desired for XSD-calibration purposes. A relatively clean sample and a relatively PCE-contaminated sample would provide appropriate calibration data. The MIP logs (Appendix C of Attachment 3) and an XSD summary table provided by Dakota were referenced to assist in determining which samples should be selected for laboratory analysis. The XSD summary is provided as Table 3-1 and tabulates the maximum XSD responses for each MIP boring. Maximum responses are provided for intervals shallower than 10 ft bgs (to represent soil) and intervals deeper than 10 ft bgs (to represent water). Note that the MIP data summary table provided as Appendix B of Attachment 3 does not differentiate saturated versus unsaturated intervals. Of the lithologic-data-collection locations, relatively PCE-contaminated unsaturated samples could be obtained from MC-01(6.1 ft bgs, XSD detects of approximately 12 net millivolts (mV) or MC-05 (4 ft bgs, XSD detects of approximately 19 net mV). Note that "net" mV includes background values; XSD responses less than approximately 5 mV are likely background-related and are not considered significant responses. Due to poor recovery at MC-05, in order to completely fill the necessary sample jars, the sample collected to represent 4 ft bgs actually spanned 3 to 6.5 ft bgs. Because of this, the MC-01(6') sample was selected for laboratory analysis to represent relatively

PCE-contaminated soils. Significant XSD detects were not identified in boring MC-03. The MC-03(6') sample was submitted for laboratory analysis to represent relatively uncontaminated soils.

The laboratory analytical report and Tier II data validation are provided as Attachment 4. Analytical results indicate the following:

MC-01(6'): The PCE concentration is 0.49 mg/kg. All other analytes were non-detect (ND). This is in comparison with the maximum XSD detections of approximately 12 net mV. The Attachment 3 MIP Analytical Interpretation (Appendix B) indicates that the XSD detects from 2 ft bgs to the terminal depth of the boring equate to an estimated 1 to 3 parts per million (ppm) of CVOCs. The XSD spike at 6 ft bgs was greater than or similar to other spikes measured throughout the boring, suggesting that the estimated CVOC concentration (1 to 3 ppm) should apply to the 6-foot interval.

MC-03(6'): The PCE concentration is 0.051 mg/kg. All other analytes were ND. This is in comparison with XDS detections less than 4 net mV, which are considered background; the MIP Analytical Interpretation indicates there are no significant XSD detector responses for the MC-03 boring.

The following conclusions can be drawn from the XSD/soil analytical data calibration:

- Higher XSD results correlate with higher PCE concentrations, and vice versa.
- The estimated CVOC concentrations presented in the MIP Analytical Interpretation appear to be somewhat high. Based on the MC-01 analytical data, the only detected CVOC is PCE. The MIP Analytical Interpretation's estimated CVOC range is 2 to 6 times higher than the analytical soil sample's PCE concentration.
- Although lower XSD results correspond to lower PCE concentrations, an MIP Analytical Interpretation of "no significant detector response" does not necessarily indicate PCE/CVOC absence. The MIP Reference Log (Appendix F of Attachment 3) indicates that the XSD is capable of detected halogenated compounds with a detection limit of approximately 250 parts per billion (0.25 mg/kg). Therefore, it is not surprising that MC-03(6') PCE concentration of 0.051 mg/kg was not detected as a significant response via the XSD. Also noteworthy, the MC-03(6') concentration is higher than the PCE screening level used in the SARR (Resource Technologies 2013). Per the SARR, the most conservative DEQ PCE Soil Screening Level is 0.023 mg/kg ("DAF 10 MCL-Based Soil Screening Level"). Delineation discussions presented in the remainder of this tech memo rely primarily on XSD data. Generally, this tech memo will consider contamination delineated if CVOC concentrations are sufficiently low as to not yield an XSD response. However, the reader needs to be cognizant that low-level CVOC concentrations may be present at such locations, and that the concentrations may exceed relevant screening values.

3.1.6 XSD RESULTS AND CONCLUSIONS

The results and conclusions of individual boring XSD results are presented below. Overall conclusions are provided following the individual boring conclusions. Figure 3-2 and Figure 3-3 were prepared to illustrate the XSD results from Martin's Cleaner area unsaturated and saturated intervals, respectively. The figures contour the maximum spikes observed from each of the above-referenced intervals.

- MC-01: XSD results are compared with analytical data in the preceding section. XSD detections and analytical results confirm elevated CVOCs/PCE concentrations, respectively, suggesting that this location may be within or near a source area, as was the intent of the boring. The maximum XSD response was obtained from approximately 6 ft bgs, which corresponds to the depth of the silt lens described in Section 3.1.2. Saturated and unsaturated XSD detects were observed, indicating that CVOC/PCE contamination is present in both vadose zone soil and groundwater.
- MC-02: This location was selected primarily due to its proximity to existing monitoring well MSMW-7, from which soil samples with elevated PCE concentrations were collected. Significant unsaturated XSD responses were not observed. However, an approximately 2 ft pre-probe push was required to prevent potential damage to the MIP, and the MSMW-7 sample indicating elevated unsaturated PCE/TCE concentrations was collected from 0.5 to 2 ft bgs. Therefore, the MC-02 XSD data doesn't necessarily contradict the MSMW-7 soil analytical data. It's possible that shallow contamination was present in the pre-probe interval and, therefore, not detected by the XSD. It is also possible that the elevated PCE/TCE concentrations reported in the MSMW-7 soil sample are not present at MC-02 due to soil heterogeneities. Elevated XSD detects were observed in saturated portions of MC-02. The detects began at approximately 10 ft bgs and increased with depth. Appendix D of the Attachment 3 provides four XSD plots per page, allowing for quick boring to boring comparison. As shown on Table 3-1, the MC-02 saturated XSD detects were near the highest observed at the site, suggesting that this location is within a dissolved-phase CVOC plume. Additionally, the higher saturated XSD responses associated with MC-02 compared to the MC-01 responses may indicate that the most contaminated portion of the source area lies somewhere south of MC-01.
- MC-03: This location was selected to assist with delineation of contamination. Significant detector responses were not noted, indicating that XSD-detectable CVOC contamination (soil or groundwater) does not extend to the southwest corner of the Martin's Cleaners. However, as detailed in Section 3.1.5, the XSD response absence does not necessarily confirm contaminant absence, but rather lower contaminant concentrations.
- MC-04: Selected to assist with delineation of contamination, the boring is down-gradient of known soil and groundwater contamination (MSMW-7, MC-02). Unsaturated XSD responses were similar to those encountered at MC-01, with the maximum unsaturated detect occurring at approximately 5 ft bgs. The similarity of the MC-01 and MC-04 observations, as well as the EC trough noted from 3.5 to 5.5 ft bgs, could indicate that the previously described silt lens extends to the MC-04 boring location. Saturated XSD responses are similar, but somewhat less than those observed at MC-02. Note that the MC-04 boring only extends to 20 ft bgs, while the MC-02 boring extended to 25 ft bgs,

and the highest XSD responses were observed from the 20 to 25 ft interval. It is possible that higher CVOC concentrations are present at depths below 20 ft bgs in the vicinity of MC-04. The MC-04 XSD data indicates that CVOC soil and groundwater contamination extends to the south ROW of Third Street, downgradient from the apparent source area.

- MC-05: Selected to assist with delineation of contamination, this location is side-gradient of the presumed source. The intent of the opportunistic boring was to delineate soil and groundwater contamination to the south/southeast of the source area. However, XSD results are comparable to those of MC-01 and MC-04, with the unsaturated and saturated soil response actually slightly higher than those observed at the above-referenced borings.
- MC-06: Selected to assist with delineation of contamination (side-gradient of known contamination), and to determine if contamination identified at existing soil sample location WSB-6 is connected to Martin's Cleaner's soil contamination. Significant detector responses were not noted, indicating that XSD-detectable CVOC contamination does not extend to the northwest corner of the Martin's Cleaners. This also suggests that the contamination associated with Martin's cleaners is not connected to former soil sample location WSB-6, confirming the SARR's interpretation.
- MC-07: Collected as an up-gradient sample in an attempt to identify potential up-gradient sources (or lack thereof). Significant XSD responses were not observed, suggesting that there is not a significant up-gradient CVOC source impacting soil and groundwater beneath the Martin's Cleaners area. This appears to contradict the SARR interpretation of CVOCs in this area, which assumes that soil contamination associated with WSB-7 extends to the Martin's Cleaners area. However, WSB-7 PCE concentrations are below the XSD detection limit of approximately 0.25 mg/kg, so the XSD data does not conclusively indicate that lower concentration WSB-7 PCE contamination does not extend south to the Martin's Cleaners area.

  Although significant XSD responses were not observed, this boring is responsible for some of the more elevated PID and FID responses, potentially the result of being down-gradient of Frank's Conoco (see SARR Section 2.3.5). However, additional detail/evaluation pertaining to elevated PID/FID responses is not included in this Tech Memo, as the primary focus is on CVOCs and the former dry cleaners.
- MC-08: This location was selected to help characterize/pin-point the source area. This was a field-selected opportunistic boring, installed primarily because MC-01, which was also intended to characterize the source area, had to be shifted to the north of the desired location. This location is responsible for the highest XSD detects in both saturated and unsaturated intervals. Of the locations evaluated, this location appears to be closest to the center of the source, with unsaturated XSD detects more than twice that seen at the other CVOC-contaminated borings.

Overall Conclusions

Figures 3-2 and 3-3 utilize the XSD data presented on Table 3-1 to define and delineate the PCE source area, to the extent that the data allows. Figure 3-2 contours utilize the presumed unsaturated maximum XSD responses (those obtained from intervals shallower than 10 ft bgs) to represent CVOC soil contamination, and Figure 3-3 contours utilize the presumed saturated maximum XSD responses (those obtained from intervals deeper than 10 ft bgs) to represent CVOC groundwater contamination. The source area for Martin's Cleaners CVOC contamination is believed to be located in the vicinity of MC-08. Elevated concentrations of CVOCs in soil and groundwater extend north to MC-01, but are not present at XSD-detectable concentrations further up-gradient at MC-07. The MC-01 groundwater CVOC concentrations appear to be less than those observed closer to and down-gradient of the source area (MC-08). Elevated soil and groundwater concentrations extend to and potentially beyond the south ROW of Third Street (MC-04 and MC-05); contamination is un-delineated in this direction. However, the magnitude of contamination at these locations is less than that observed at MC-08. The silt lens described in Sections 3.1.2 and 3.1.4 may be a preferential pathway for soil contamination migration. MIP borings were not installed east of the source area; contamination is un-delineated in this direction. Elevated soil and groundwater CVOC concentrations were not identified in the western portion of the Martin's Cleaners area (MC-03 and MC-06), suggesting that contamination is delineated to XSD-detectable concentrations to the west.

3.2 LINCOLN/ANDERSON

Task Order Task 5.B includes investigation at the Lincoln/Anderson Cleaners building to evaluate the nature and extent of soil and groundwater chlorinated solvent contamination potentially related to the former dry cleaning operation.

3.2.1 LOCATION SELECTION

Lincoln/Anderson Cleaners MIP borings are designated LA-01 through LA-07. Locations are illustrated on Figure 3-1. Below is a list of Lincoln/Anderson Cleaners MIP boring locations and selection rationale:

- LA-01: This location was selected as an up-gradient location to assist in determining if up-gradient PCE sources could be contributing to PCE groundwater contamination in the vicinity of Lincoln/Anderson. Based on the potentiometric surface maps included in the SARR (Resource Technologies 2013), a sewer leak in the vicinity of Second Street in the sewer that runs north in the alley east of Martin's Cleaners could impact groundwater in the vicinity of Lincoln/Anderson.
- LA-02: This location was selected to help determine if the former Lincoln/Anderson Cleaners should be considered a PCE contamination source.
- LA-03: This location was selected to help determine if the former Lincoln/Anderson Cleaners should be considered a source.
- LA-04: This location was selected to 1) help delineate contamination potentially associated with Lincoln/Anderson, 2) evaluate if contamination potentially associated with Lincoln/Anderson is

extends to existing soil sample locations further to the west with elevated PCE concentrations (i.e., WSMW-4 and WSB-9) as suggested in the SARR, and 3) to evaluate whether the sewer running down Lupfer Avenue (downstream of both Martin's Cleaners and Lincoln Anderson Cleaners) may be leaking in this area.

- LA-05: This was a field-selected, opportunistic boring installed to determine if LA-04 XSD detects were associated with Lincoln/Anderson or the sewer.
- LA-06: This location was selected to help determine if the former Lincoln/Anderson Cleaners should be considered a source.
- LA-07: This location was selected to help evaluate if a sewer leak in the sewer that runs just north of Lincoln/Anderson Cleaners may be responsible for PCE contamination in the area.

3.2.2 LITHOLOGY

Lithologic data collection was not included in the scope of the Lincoln/Anderson Cleaners portion of the PDI. However, this section evaluates Lincoln/Anderson lithology using Lincoln/Anderson EC data and the Martin's Cleaners lithologic data/EC correlations detailed in Section 3.1.4. EC data are included on the MIP logs and XSD plots which are provided as Appendices C and D to Dakota's Report (Attachment 3), respectively. Although lithologic predictions based on the EC data are provided below, other variables can effect EC, as described in Section 3.1.4. Accordingly, the predictions presented below should not be used to make future remedial decisions without additional lithologic confirmation.

Pre-probe pushes from 4 to 5 ft bgs were necessary in the borings south of the Lincoln/Anderson building (LA-01, LA-02, and LA-03) due to the hardness of the Second Street/HWY 93 road base; MIP data is not available for these intervals. At these locations, beginning at 4 to 5 ft bgs, EC measurements are relatively low until approximately 6 ft bgs, ranging from approximately 0 to 20 mS/m. This is generally lower than the silt EC measurements observed at the Martin's Cleaners area, suggesting that this interval (at these three locations) may be comprised of silt or coarser material. At approximately 6 ft bgs, EC measurements increase ranging from approximately 90 to over 100 mS/m, indicative of Martin's Cleaners area clays. The EC values then decrease from approximately 6 ft bgs to approximately 10 ft bgs, stabilizing at a range from approximately 35 to 50 mS/m from 10 ft bgs to total depth (approximately 20 ft bgs). These EC values are on the higher end Martin's Cleaners area silts and the lower end of Martin's Cleaners area clays.

The remaining Lincoln/Anderson MIP borings (LA-04 through LA-07) have EC readings from 10 to 20 ft bgs generally consistent with the above-description for that interval. However, the 0 to 10 ft bgs intervals are generally characterized by several EC spikes and troughs ranging in values from 0 to over 100 mS/m, indicative of alternating layers of finer and coarser material. The LA-06 log as an exception, where higher EC values (over 100 mS/m) indicative of clay are observed from approximately 2 to 6 ft bgs.

3.2.3 DEPTH TO WATER

Fluid level measurements were not collected from the Lincoln/Anderson wells during the PDI; nor was lithologic data that could be used to approximate depth to water. The depth to water, as referenced in this Tech Memo, is assumed based on SARR (Resource Technologies 2013) fluid level measurements. The nearest monitoring wells to the facility are MW-N1 to the northwest, MW-N3 to the northeast, and WSMW-5 to the southeast. With the exception of the March 2012 fluid level measurement of 14.4 ft below measuring point at MW-N3, SARR fluid level measurements for these locations ranged from approximately 9 to 12 ft bgs. Based on a fluid level measurement collected at Martin's Cleaner's well WSMW-7, fluid levels at that location appear to be 2 to3 feet higher than those presented in the SARR. If the same is true in the Lincoln/Anderson area, the depth to water would be expected to be approximately 7 to 10 ft bgs.

3.2.4 XSD RESULTS AND CONCLUSIONS

Lincoln/Anderson boring logs are provided as Attachment 5 and Lincoln/Anderson MIP Logs are included in Appendix C of Attachment 3. The results and conclusions of individual boring XSD results are presented below. Overall conclusions are provided following the individual boring conclusions. Figure 3-4 and Figure 3-5 were prepared to illustrate the XSD results from Lincoln/Anderson Cleaners area unsaturated and saturated intervals, respectively. The figures contour the maximum spikes observed from each of the above-referenced intervals.

- LA-01: This location was selected as an up-gradient location to assist in determining if up-gradient PCE sources could be contributing to PCE groundwater contamination in the vicinity of Lincoln/Anderson. Significant XSD responses were not observed; a significant up-gradient PCE source was not identified via the installation of this boring.
- LA-02, LA-03, and LA-06: These locations were selected to help determine if the Lincoln/Anderson Cleaners was a source to soil and/or groundwater CVOC contamination. The locations are as close to the former cleaners building as neighboring buildings and utilities would allow, with LA-02 and LA-03 located immediately to the southwest and southeast, respectively, and LA-06 located immediately to the north. Significant XSD detector responses were not identified, suggesting that there may not be a Lincoln/Anderson Cleaners source area.
- LA-04: This location was selected for multiple purposes: 1) to help delineate contamination potentially associated with Lincoln/Anderson, 2) to evaluate if contamination potentially associated with the Lincoln/Anderson cleaners extends to existing soil sample locations further to the west with elevated PCE concentrations (i.e., WSMW-4 and WSB-9) as suggested in the SARR (Resource Technologies 2013), and 3) to evaluate whether the sewer running down Lupfer Avenue (downstream of both Martin's Cleaners and Lincoln Anderson Cleaners) may be leaking in this area. Elevated XSD responses were identified in the unsaturated zone with the highest spike occurring at approximately 6 ft bgs. The peak detection was approximately 24 net mV. Comparing this to the data obtained from Martin's Cleaners boring/sample MC-01(6'), it may be assumed that this XSD response is associated PCE concentrations greater than 0.5 mg/kg. Soil contamination at this boring

may extend west to historical soil sample locations WSMW-4 and WSB-9 where samples with elevated PCE concentrations were collected. However, this connection is not illustrated on Figure 3-4, as the WSMW-4 and WSB-9 sample PCE concentrations are below the XSD detection limit of approximately 0.25 mg/kg. LA-05 XSD data (see below) is needed to assist with evaluating the other above-referenced LA-04 objectives.

- LA-05: This was an opportunistic boring installed to determine if LA-04 XSD detects were associated with Lincoln/Anderson and/or the sewer. The boring is situated between the Lincoln/Anderson Cleaners building (north of the building) and boring LA-04. Note that the original MIP results seemed suspicious, and it was discovered that they were the result of membrane damage. Accordingly, LA-05A (a foot away from LA-05) was installed after the membrane was replaced. No significant XSD detector responses were observed. This suggests the that CVOC contamination in soil and groundwater identified in boring LA-04 and further to the west may not be associated with the Lincoln/Anderson Cleaners.
- LA-07: This location was selected to help evaluate if a sewer leak in the sewer that runs just north of Lincoln/Anderson cleaners may be responsible for PCE contamination in the area. No significant XSD detector responses were observed. This suggests the evaluated length of sewer line is not contributing to CVOC contamination.

Overall Conclusions

Figures 3-4 and 3-5 utilize the XSD data presented on Table 3-1 to evaluate potential CVOC source areas, to the extent that the data allows. Assuming an approximate depth to groundwater of 10 ft bgs, Figure 3-4 contours the unsaturated maximum XSD responses to represent CVOC soil contamination, and Figure 3-5 contours the saturated maximum XSD responses to represent CVOC groundwater contamination.

A PCE source area associated with the Lincoln/Anderson Cleaners building was not identified. CVOCs at concentrations exceeding the XSD detection limit were not observed in the three borings closest to the building installed with the intent of identifying a source area (LA-02, LA-03, and LA-06). An up-gradient source was not identified via the installation of LA-01. A sewer leak in the alley to the north of the Lincoln/Anderson building was not identified via the installation of LA-07. XSD data obtained from LA-04 indicates elevated CVOC concentrations (soil and groundwater) down-gradient of the Lincoln/Anderson Cleaners building, but the data obtained from LA-05 suggests that the contamination may not extend to the Lincoln/Anderson Cleaners building. Based on the MIP data, if XSD-detectable CVOC concentrations are present in the subsurface in the immediate vicinity of the Lincoln/Anderson Cleaners building or between the building and boring LA-04, they are confined to the footprint of the building itself or the building immediately to the west, inaccessible to the drill rig.

Note that PCE and TCE concentrations in historical soil samples collected just north of the Lincoln/Anderson Cleaners building (WSB-1 0.5-2 ft and 9-11 ft) are at concentrations likely undetectable with the XSD. The absence of an XSD response in the immediate vicinity of the building

does not necessarily indicate the absence of CVOC contamination, but rather that if contamination exists, concentrations are below the XSD detection limit of approximately 0.25 mg/kg.

The source of the LA-04 CVOC detections is uncertain. As previously mentioned, the absence of XSD detections at boring LA-05 (and the potential source area borings LA-02, LA-03, and LA-06) suggest that LA-04 CVOC contamination may not be related to the Lincoln/Anderson Cleaners, or that contamination is present at XSD-detectable concentrations in the vicinity of the Lincoln/Anderson Cleaners building or between the building and boring LA-04, it is confined to the footprint of the building itself or the building immediately to the west, inaccessible to the drill rig. LA-04 is installed immediately west of the sewer main running down Lupfer Avenue, which could be a potential source. However, the depth the top of the sewer main, as measured in the manhole just northeast of LA-04 is approximately 6.5 ft bgs. It's unlikely that a leak from a sewer at this depth would cause elevated CVOC concentrations at a depth shallower than the sewer. However, the manhole is approximately 40 ft from LA-04, the sewer depth closer to LA-04 may be slightly different, and the top of the sewer (as measured in the manhole) is only about 0.5 feet deeper than the LA-04 XSD spike. Therefore, the sewer may still be considered a potential source. Regardless of the source, LA-04 contamination may be connected with WSMW-4 and WSB-9 contamination. This theory is consistent with the SARR (Resource Technologies 2013) interpretation. Based on the XSD results and predicted soil concentrations, LA-04 soil CVOC concentrations are likely higher than those reported in the samples collected from the WSMW-4 and WSB-9, suggesting that LA-04 may be closer to a source area.

4.0 SITE CLEANUP

Upon completion of the MIP borings, the borings were plugged with bentonite crumble from total depth to approximately 4 inches bgs. The remaining interval (approximately 0 to 4 inches bgs) was plugged using asphalt cold patch, which was compacted using a hammer. After the borings were plugged, the owners of the current businesses that occupy the former Martin's Cleaners and the Lincoln/Anderson Cleaners buildings (or representatives of) were invited to inspect the locations of the borings that were installed on their property to confirm that the surfaces were satisfactorily restored to pre-work conditions. Property condition forms signed by the managers of the Whitefish Fine Wine and Liquor Store and Second Street Pizza are provided as Attachment 6.

5.0 IDW DISPOSAL

Investigation Derived Waste (IDW) consisted of disposables such as nitrile gloves and acetate core barrel liners, decontamination water, and soil cuttings from the lithology borings. Disposables were disposed of as general refuse. Soil cuttings were only generated from the lithology borings, and the total volume generated fit within a single 5 gallon bucket. The bucket was sealed, labeled, and transported to Trihydro's Helena office where it was temporarily stored until the analytical data was available. Analytical data was sent to the Lewis and Clark County Landfill, who agreed to accept the soil. Soil was transported to the Lewis and Clark Landfill on July 7, 2016. Decontamination water was generated

decontaminating the cutting shoe between lithology borings. Decontamination was performed using a Simple Green/distilled water scrub followed by two distilled water rinses. Approximately 3 gallons of decontamination water was generated. An inquiry was made to COW Public Works as to appropriate local disposal methods. Per COW Public Works' instructions, the decontamination water was poured in the center of a large pile of contaminated soil staged on plastic sheeting near the COW shop.

6.0 REFERENCES

Resource Technologies, Inc. 2013. Sampling and Analytical Results Report for a CERCLA Site Investigation of the Whitefish Solvent Site, Whitefish, Montana. January 11, 2013.

Geoprobe. 2016. Typical Electrical Conductivity Ranges for Basic Soil Types. Available at: http://geoprobe.com/ec-electrical-conductivity. (Accessed: June 22, 2016).

776-033-001

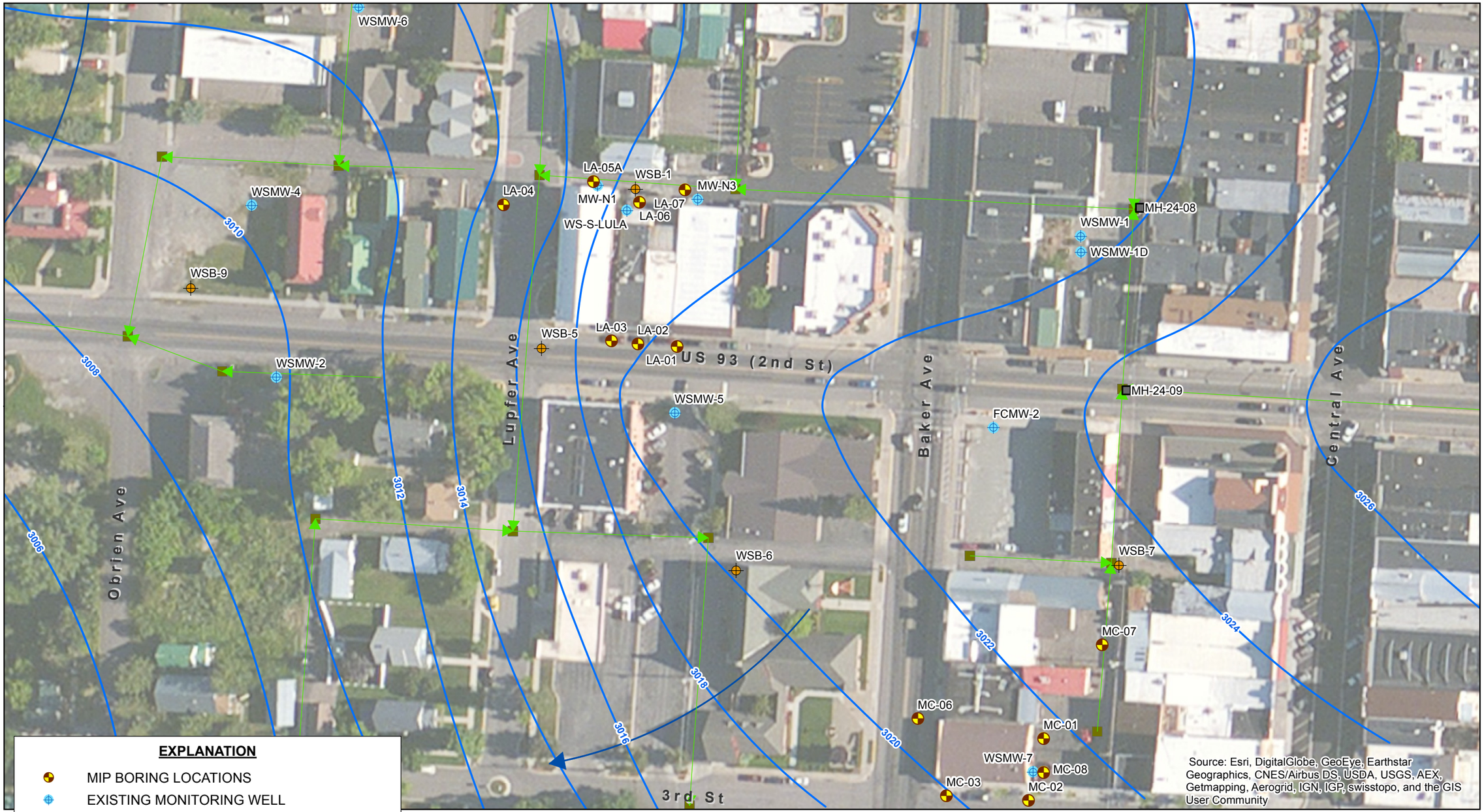
TABLE

TABLE 3-1. XSD SUMMARY TABLE
WHITEFISH SOLVENT SITE CECRA FACILITY
WHITEFISH, MONTANA

MIP Log ID number	XSD max (net mVolts) above 10 ft bgs	XSD max (net mVolts) below 10 ft bgs	Additional Comments
MC-01	**12 @ 6.1'**	**11 @ 19.1'**	
MC-02	4 @ 5'	**75 @ 26.1'**	
MC-03	4 @ 9.95'	4 @ 12'	no significant XSD response
MC-04	**8 @ 5'**	**27 @ 18'**	
MC-05	**19 @ 4'**	**48 @ 18.1'**	
MC-06	3 @ 2.7'	3 @ 11.1'	no significant XSD response
MC-07	3 @ 5'	2 @ 15'	no significant XSD response
MC-08	**57 @ 2'**	**89 @ 18'**	
LA-01	3 @ 5'	2 @ 16'	no significant XSD response
LA-02	2 @ 9.95'	2 @ 17'	no significant XSD response
LA-03	3 @ 3.9'	2 @ 12'	no significant XSD response
LA-04	**24 @ 5.9'**	**34 @ 20'**	
LA-05	na	na	membrane damaged
LA-05A	4 @ 2.9'	4 @ 19'	no significant XSD response
LA-06	3 @ 2.7'	4 @ 11.1'	no significant XSD response
LA-07	2 @ 4.1'	3 @ 14'	no significant XSD response

Notes:
MIP = Membrane Interface Probe
XSD = Halogen-Specific Detector
ft bgs = feet below ground surface
mVolts = millivolts
na = data not applicable due to damaged membrane.
A "significant" XSD responses is one above background values (approximately 5 mVolts).
Significant responses are shown in **bold font.**
The maximum detects shown above are followed by the interval from which they were observed.
Maximum detects above (shallower than) 10 ft bgs are intended to represent unsaturated intervals.
Maximum detects below (deeper than) 10 ft bgs are intended to represent saturated intervals.

FIGURES



EXPLANATION

- MIP BORING LOCATIONS
- EXISTING MONITORING WELL
- EXISTING SOIL BORING
- EXISTING MANHOLE SOIL SAMPLE
- SANITARY SEWER MANHOLE
- SANITARY LINE (DIRECTIONAL)
- GROUNDWATER FLOW DIRECTION
- POTENTIOMETRIC SURFACE DECEMBER 2011

NOTE: EXISTING SAMPLE LOCATIONS, SANITARY LINES, SANITARY SEWER MANHOLES, GROUNDWATER FLOW DIRECTION AND THE POTENTIOMETRIC SURFACES ARE APPROXIMATE.

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0 80'

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FIGURE 3-1

PRE-DESIGN INVESTIGATION BORING LOCATIONS

WHITEFISH SOLVENT SITE CECRA FACILITY
WHITEFISH, MONTANA

Drawn By: PH	Checked By: GP	Scale: 1" = 100'	Date: 7/8/16	File: Fig3-1_TechMemo_Soil.mxd

EXPLANATION

- MIP BORING LOCATIONS AND MAXIMUM UNSATURATED XSD DETECTION (NET MV)
- EXISTING MONITORING WELL
- EXISTING SOIL BORING
- EXISTING MANHOLE SOIL SAMPLE
- SANITARY SEWER MANHOLE

MAXIMUM PRESUMED UNSATURATED (LESS THAN 10 FT BGS) XSD DETECTION IN NET MV (DASHED WHERE INFERRED)

- 5 TO 10
- 10 TO 20
- > 20
- SANITARY LINE (DIRECTIONAL)
- GROUNDWATER FLOW DIRECTION
- POTENTIOMETRIC SURFACE DECEMBER 2011

NOTES:
- EXISTING SAMPLE LOCATIONS, SANITARY LINES, SANITARY SEWER MANHOLES, GROUNDWATER FLOW DIRECTION AND THE POTENTIOMETRIC SURFACES ARE APPROXIMATE.
- XSD DETECTIONS LESS THAN 5 MV ARE CONSIDERED BACKGROUND.
- XSD = HALOGEN SPECIFIC DETECTOR
- MV = MILLIVOLTS

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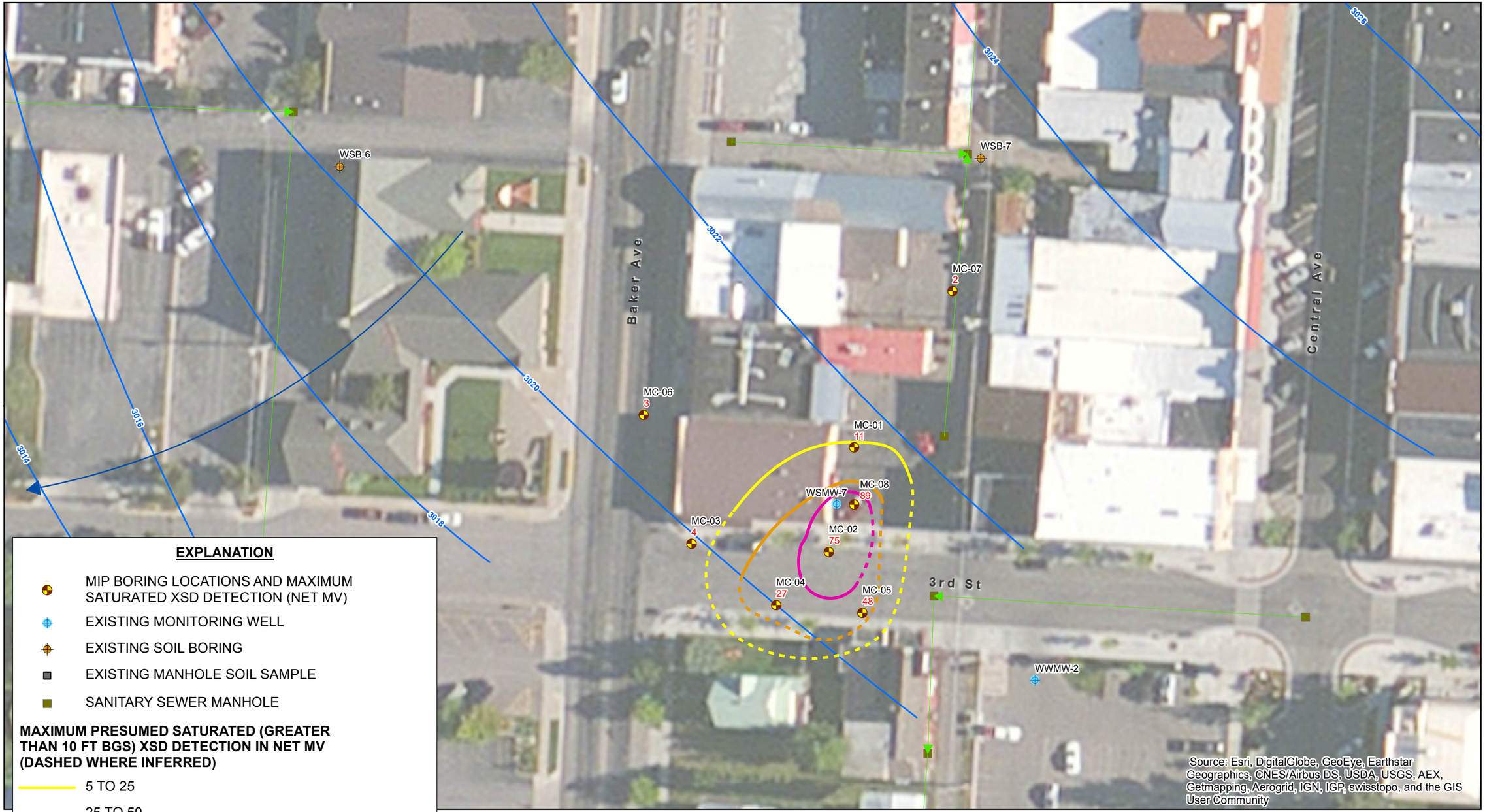
FIGURE 3-2

MARTIN'S CLEANERS UNSATURATED XSD RESULTS

WHITEFISH SOLVENT SITE CECRA FACILITY WHITEFISH, MONTANA

Drawn By: PH	Checked By: GP	Scale: 1" = 50'	Date: 7/8/16	File: Fig3-2_TechMemo_Cont.mxd



EXPLANATION

- MIP BORING LOCATIONS AND MAXIMUM SATURATED XSD DETECTION (NET MV)
- EXISTING MONITORING WELL
- EXISTING SOIL BORING
- EXISTING MANHOLE SOIL SAMPLE
- SANITARY SEWER MANHOLE

MAXIMUM PRESUMED SATURATED (GREATER THAN 10 FT BGS) XSD DETECTION IN NET MV (DASHED WHERE INFERRED)

- 5 TO 25
- 25 TO 50
- > 50
- SANITARY LINE (DIRECTIONAL)
- GROUNDWATER FLOW DIRECTION
- POTENTIOMETRIC SURFACE DECEMBER 2011

NOTES:
- EXISTING SAMPLE LOCATIONS, SANITARY LINES, SANITARY SEWER MANHOLES, GROUNDWATER FLOW DIRECTION AND THE POTENTIOMETRIC SURFACES ARE APPROXIMATE.
- XSD DETECTIONS LESS THAN 5 MV ARE CONSIDERED BACKGROUND.
- XSD = HALOGEN SPECIFIC DETECTOR
- MV = MILLIVOLTS

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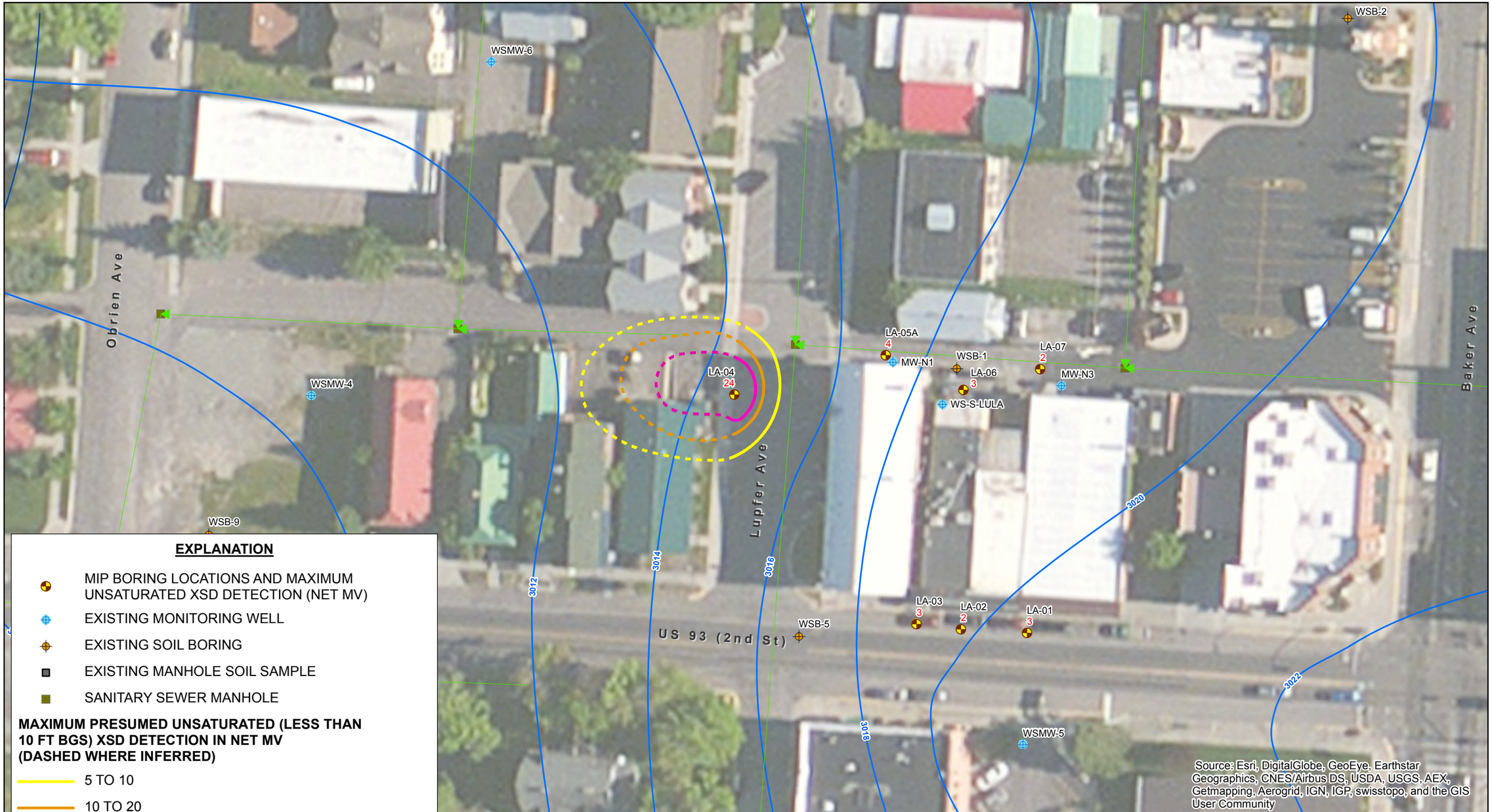
FIGURE 3-3

MARTIN'S CLEANERS SATURATED XSD RESULTS

WHITEFISH SOLVENT SITE CECRA FACILITY WHITEFISH, MONTANA

Drawn By: PH	Checked By: GP	Scale: 1" = 50'	Date: 7/8/16	File: Fig3-3_TechMemo_Cont.mxd



EXPLANATION

- MIP BORING LOCATIONS AND MAXIMUM UNSATURATED XSD DETECTION (NET MV)
- EXISTING MONITORING WELL
- EXISTING SOIL BORING
- EXISTING MANHOLE SOIL SAMPLE
- SANITARY SEWER MANHOLE

MAXIMUM PRESUMED UNSATURATED (LESS THAN 10 FT BGS) XSD DETECTION IN NET MV (DASHED WHERE INFERRED)

- 5 TO 10
- 10 TO 20
- > 20
- SANITARY LINE (DIRECTIONAL)
- GROUNDWATER FLOW DIRECTION
- POTENTIOMETRIC SURFACE DECEMBER 2011

NOTES:
- EXISTING SAMPLE LOCATIONS, SANITARY LINES, SANITARY SEWER MANHOLES, GROUNDWATER FLOW DIRECTION AND THE POTENTIOMETRIC SURFACES ARE APPROXIMATE.
- XSD DETECTIONS LESS THAN 5 MV ARE CONSIDERED BACKGROUND.
- XSD = HALOGEN SPECIFIC DETECTOR
- MV = MILLIVOLTS

N

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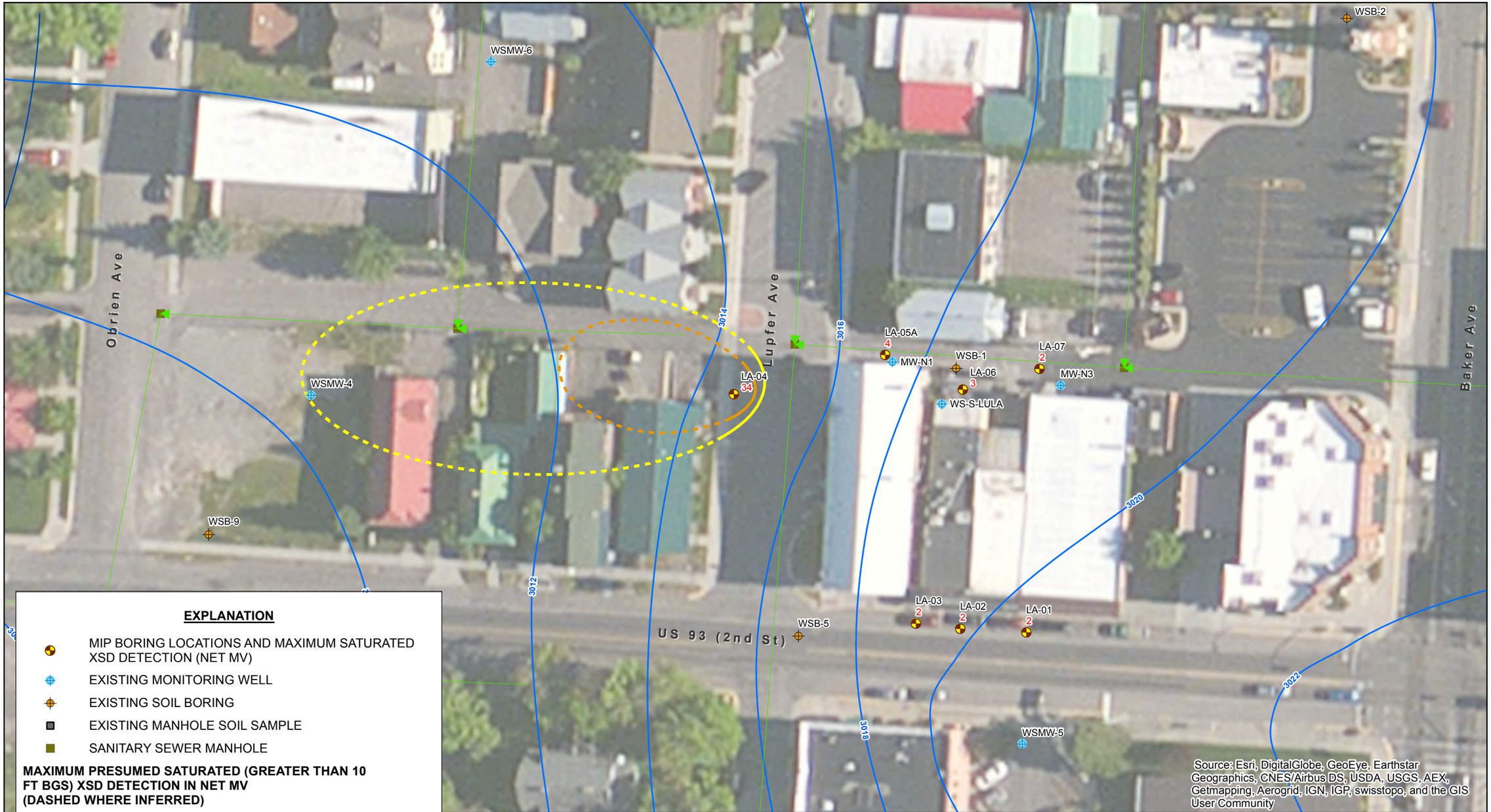
FIGURE 3-4

LINCOLN/ANDERSON CLEANERS UNSATURATED XSD RESULTS

WHITEFISH SOLVENT SITE CECRA FACILITY WHITEFISH, MONTANA

Drawn By: PH	Checked By: GP	Scale: 1" = 50'	Date: 7/8/16	File: Fig3-4_TechMemo_Cont.mxd



EXPLANATION

- MIP BORING LOCATIONS AND MAXIMUM SATURATED XSD DETECTION (NET MV)
- EXISTING MONITORING WELL
- EXISTING SOIL BORING
- EXISTING MANHOLE SOIL SAMPLE
- SANITARY SEWER MANHOLE

MAXIMUM PRESUMED SATURATED (GREATER THAN 10 FT BGS) XSD DETECTION IN NET MV (DASHED WHERE INFERRED)

- 5 TO 25
- 25 TO 50
- SANITARY LINE (DIRECTIONAL)
- GROUNDWATER FLOW DIRECTION
- POTENTIOMETRIC SURFACE DECEMBER 2011

NOTES:
- EXISTING SAMPLE LOCATIONS, SANITARY LINES, SANITARY SEWER MANHOLES, GROUNDWATER FLOW DIRECTION AND THE POTENTIOMETRIC SURFACES ARE APPROXIMATE.
- XSD DETECTIONS LESS THAN 5 MV ARE CONSIDERED BACKGROUND.
- XSD = HALOGEN SPECIFIC DETECTOR
- MV = MILLIVOLTS

N

0 50'

Trihydro CORPORATION
1252 Commerce Drive
Laramie, WY 82070
www.trihydro.com
(P) 307/745.7474 (F) 307/745.7729

FIGURE 3-5

LINCOLN/ANDERSON CLEANERS SATURATED XSD RESULTS

WHITEFISH SOLVENT SITE CECRA FACILITY WHITEFISH, MONTANA

Drawn By: PH	Checked By: GP	Scale: 1" = 50'	Date: 7/8/16	File: Fig3-5_TechMemo_Cont.mxd

ATTACHMENT 1

PHOTO DOCUMENTATION

ATTACHMENT 1. PHOTO DOCUMENTATION
WHITEFISH SOLVENT SITE CECRA FACILITY
WHITEFISH, MONTANA

Photo 1: MC-01 boring location looking to the west. The circle is the drilling location; the X was the original proposed location, but was moved due to proximity to the overhead powerline.

Photo 2: MC-01 boring location looking to the south. The circle is the drilling location; the X was the original proposed location, but was moved due to proximity to the overhead powerline.

Photo 3: Setting up to drill MC-01, looking to the north/northwest.

Photo 4: Setting up to drill MC-01, looking to the west, overhead power lines visible.

Photo 5: MC-01 pre-drilling condition.

Photo 6: Alley west of Martin's Cleaners looking north, showing overhead power lines, gas lines (yellow), and sewer (white).

Photo 7: MIP lab setup at MC-01, looking north. Existing monitoring well WSMW-7, gas service, and sewer service visible in the foreground.

Photo 8: MIP lab.

Photo 9: MC-01 soil cores, top of boring is the top left, bottom of boring is the bottom right. 6-foot silt interval missing; sampled for potential laboratory analysis.

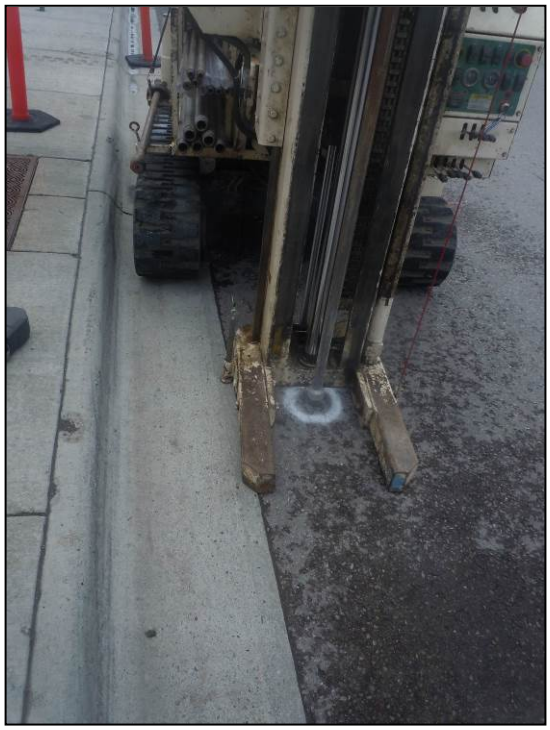


Photo 10: MC-02 pre-drilling conditions, looking east.

Photo 11: MC-02 pre-drilling conditions, looking east, electrical and fiber optic lines visible to the south of the boring.

Photo 12: Drilling MC-02, looking west.

Photo 13: MC-03 boring location, looking west, storm sewer just south of boring location, fiber optic and electrical to the south.

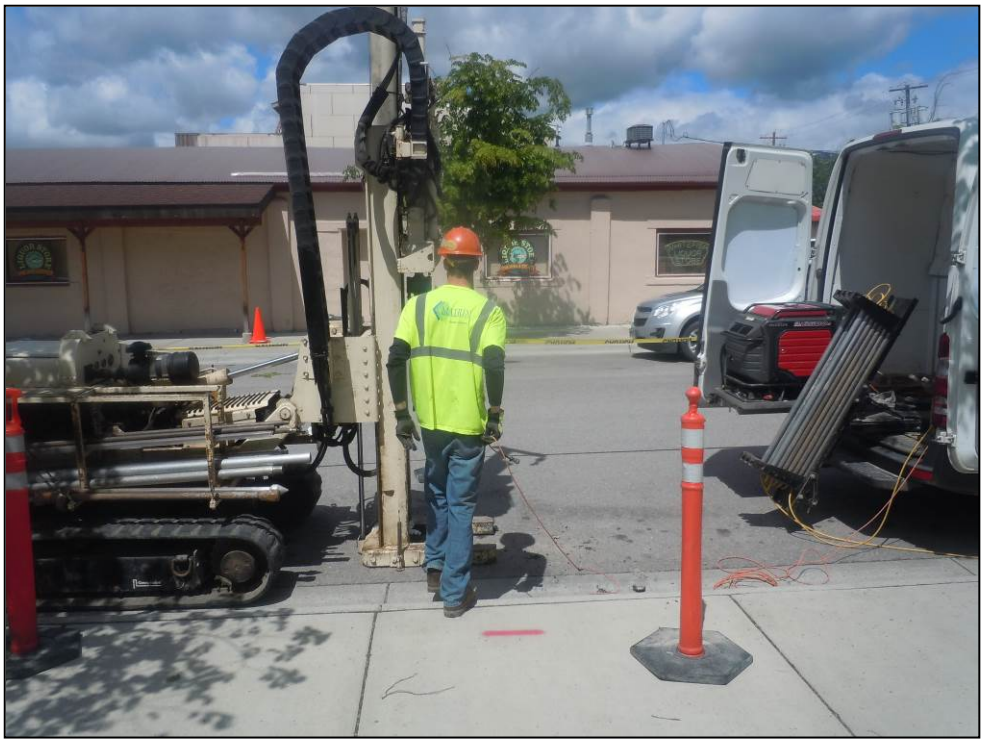


Photo 14: Drilling MC-04, looking north, electrical line in sidewalk south of drilling location.

Photo 15: Drilling MC-04, looking east.

Photo 16: MC-05 boring location/pre-drilling conditions, looking west.

Photo 17: MC-05 boring location/pre-drilling conditions, looking north.

Photo 18: MC-06 boring location/pre-drilling conditions, looking west. Additional, non-related construction going on in this area (which is why the sidewalk is demolished).

Photo 19: MC-06 boring location/pre-drilling conditions, looking south. Additional, non-related construction going on in this area (which is why the sidewalk is demolished).

Photo 20: MC-06 boring location/pre-drilling conditions, looking north. Additional, non-related construction going on in this area (which is why the sidewalk is demolished).

Photo 21: Drilling MC-07, looking south. Gas and sewer mains to the east of boring location.

Photo 22: MC-08 boring location/pre-drilling condition, looking west. WSMW-7 just west of boring location, storm sewer to the southwest, gas to the north.

Photo 23: MC-08 boring location/pre-drilling condition, looking south, sewer visible in foreground.

Photo 24: Drilling LA-01, looking east.

Photo 25: Drilling LA-01, looking west, zoomed out to show traffic control.

Photo 26: Drilling LA-02, looking south, electrical line visible in foreground.

Photo 27: Same as above, looking west, water service visible south of boring.

Photo 28: Drilling LA-03, looking south, electrical line visible in foreground.

Photo 29: Drilling LA-03, looking west, electrical line visible in foreground.

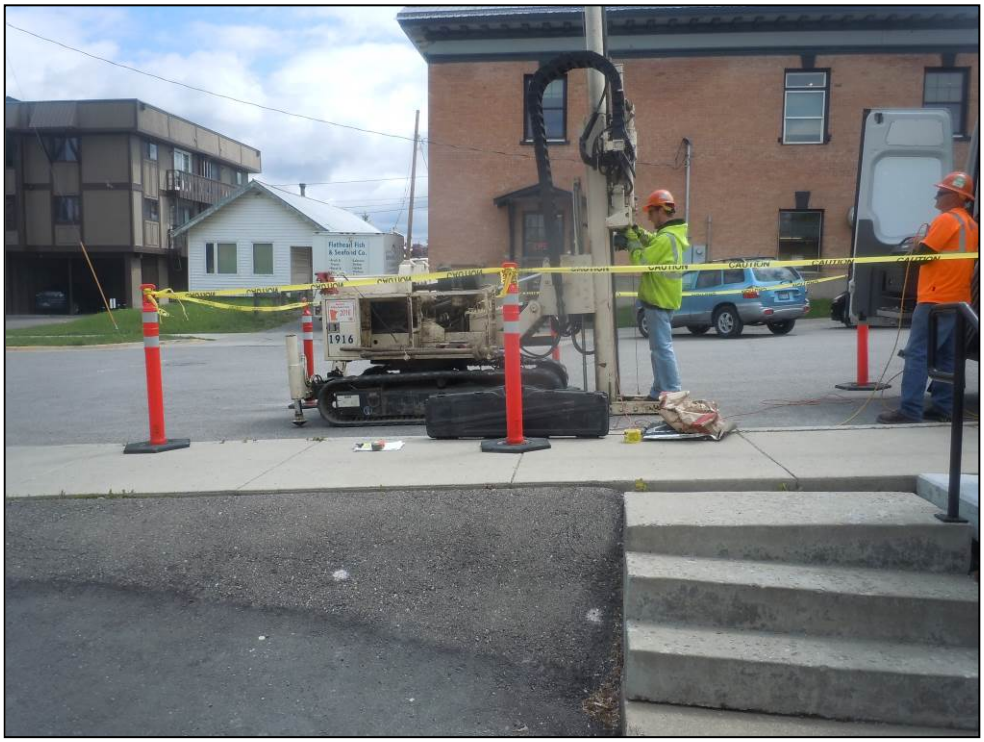


Photo 30: Drilling LA-04, looking east.

Photo 31: Drilling LA-04, looking south. Sewer manhole just beyond the extent of the photo to the east.

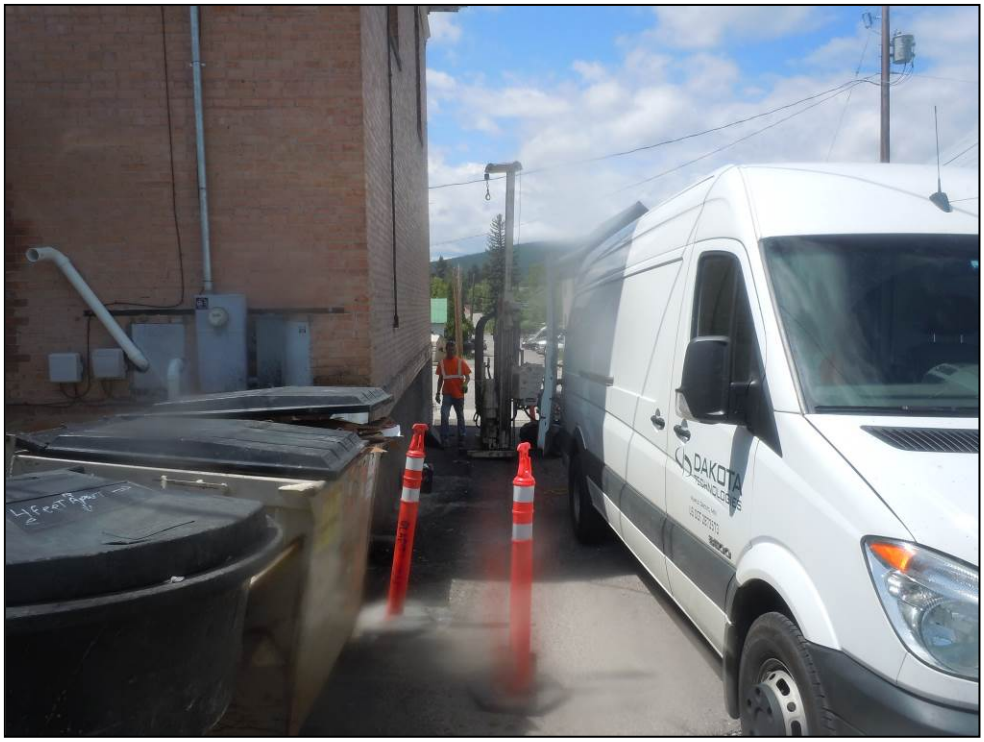


Photo 32: Drilling LA-05, looking west.

Photo 33: Drilling LA-05, looking south.

Photo 34: LA-06 boring location/pre-drill condition, looking south. The boring location is a small white dot in front of the center candlestick.

Photo 35: LA-06 boring location/pre-drill condition, looking west. The boring location is a small white dot in front of the center candlestick.

Photo 36: LA-07 boring location/pre-drill condition, looking south. Sewer and gas visible to the north of the boring location. MW-N3 to the southeast of boring location.

Photo 37: LA-07 boring location/-pre-drill condition, looking west.

Photo 38: LA-01 post-drilling patchwork.

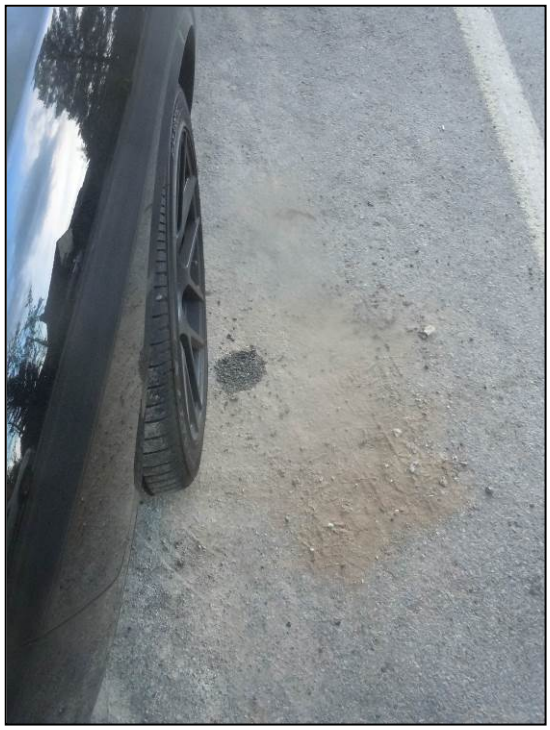


Photo 39: LA-02 post-drilling patchwork.

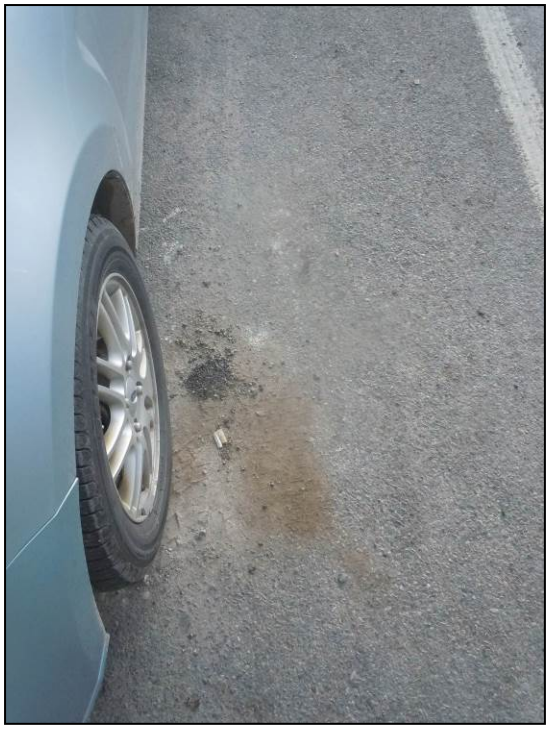


Photo 40: LA-03 post-drilling patchwork.

Photo 41: LA-04 post-drilling patchwork.

Photo 42: LA-05/LA-05A post-drilling patchwork. MW-N1 visible in top left of photo.

Photo 43: LA-06 post-drilling patchwork.

Photo 44: LA-07 post-drilling patchwork.

Photo 45: MC-01 post-drilling patchwork. Two borings, one for soil, one for MIP.

Photo 46: MC-08 post-drilling patchwork.

Photo 47: MC-02 post-drilling patchwork. Two borings, one for soil, one for MIP.

Photo 48: MC-03 post-drilling patchwork. Two borings, one for soil, one for MIP.

Photo 49: MC-06 post-drilling patchwork.

Photo 50: MC-07 post-drilling patchwork.

Photo 51: MC-04 post-drilling patchwork.

ATTACHMENT 2

MARTIN'S CLEANERS BORING LOGS

Location shifted ~20' N of [illegible] due to sewer @ overhead power. Can't go south due to gas. further south too close to next location.

Begin @ 0945

MIP done @ 0940 Soil done @ 1010

TRIHYDRO CORPORATION

FIELD BORING LOG

Sheet ___ of 1 Sheets

Project & Project Number:	MDEQ Whitefish Solvent Site - 776-033-001	Date:	5/24
Project Location/Address:	Martin's or Lincoln/Anderson (circle one)	Drilling Company:	Dakota Technologies
Client:	MDEQ	Driller:	Nate / Mike
Weather:	Calm, cloudy, ~50	Rig Type / Method:	Direct push with MIP. GeoProbe 6620 DT
Logged by:	Grant Price	Sample Method (circle one):	Direct Push Split Spoon Shelby Tube Other:
		Surface Elevation:	Casing Elevation: GE Elevation:
Logger's Signature:	[signature]	Equipment List:	

BORING ID: MC-01 **Boring Location:** NE corner of Martin's

Interval (ft bgs)	Texture - Grain Size Major	Texture - Grain Size Minor	Color Major	Color Modifier	Plasticity	Consistency (Lower clay content)	Consistency (Higher clay content)	Moisture	Odor	PID Interval/Reading	Additional Comments (Odor descriptor, sheen, nodules, structure, vegitation, etc.)
0-6"	GVL - F M C Sand - F M C Silt Clay road base	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted		MIP first, then soil, pre-probed to 2", no good XSD data.
6"-5.25'	GVL - F M C Sand - F M C Silt Clay olive brown	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		going ~1 foot/minute to allow for consistent volatilization. XSD detects beginning @ 2"
5.25'-6.5'	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		biggest spike (~10 ppm) @ 6". Target this for soil sample
6.5'-20'	GVL - F M C Sand - F M C Silt Clay olive brown	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		0-5, 60% rec. 5-10, 80% rec 10-15, 90% rec
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		reddish from 6"-1'. soft @ ~3.5' for 1".
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		TD drilled = 20' for soil.
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		

Sample Collected:	yes	Number/Size of Containers:	2 - 4 oz
Sample ID:	MC-01 (6')	Analysis to be Performed:	PCE - daughter products & EPH/VPH
Date:	5/24/16	Duplicate Collected:	No.
Time:	1000	Notes:	Collected for potential "dirty" sample.
Depth:	5.25 - 6.5		

Start w/ soil @ 1115

TRIHYDRO CORPORATION
FIELD BORING LOG

Sheet 1 of 1 Sheets

Project & Project Number: MDEQ Whitefish Solvent Site - 776-033-001	Date: 5/24/16
Project Location/Address: (Martin's) or Lincoln/Anderson (circle one)	Drilling Company: Dakota Technologies
Client: MDEQ	Driller: Nate, Mike
Weather: Calm, cloudy	Rig Type / Method: Direct push with MIP.
Logged by: Grant Price	Sample Method (circle one): (Direct Push) Split Spoon Shelby Tube Other:
	Surface Elevation: Casing Elevation: GE Elevation:
Logger's Signature: [signature]	Equipment List:

BORING ID: MC-02 **Boring Location:** SE corner of Martins, 3rd St. Row

Interval (ft bgs)	Texture - Grain Size Major	Texture - Grain Size Minor	Color Major	Color Modifier	Plasticity	Consistency (Lower clay content)	Consistency (Higher clay content)	Moisture	Odor	PID Interval/Reading	Additional Comments (Odor descriptor, sheen, nodules, structure, vegitation, etc.)
0-5"	GVL - F M C Sand - F M C Silt Clay road base	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		MV ~ 20' N is @ ▽ ~ 9'4"
5"-2'	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		only 1 shallow blip ~ 3 MV @ 5'
2'-4.75	GVL - F M C Sand - F M C Silt Clay olive brown	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		MIP spikes mostly deeper than GW. Went to 26 to VD. Not achieved.
4.75-5.75	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		
5.75-15	GVL - F M C Sand - F M C Silt Clay olive brown	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		Soft intervals periodically BTL 10-15, wet → sat. 10-15'
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		0-5 = 50% rec 5-10 = 90% rec
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		TD for soil = 15'

Sample Collected: Yes, 2 3

Sample ID: MC-02(2.5')/MC-02(5')/MC-02(14')

Date: 5/24/16

Time: 1120/1125/1145

Depth: 1.5-3.5/4.75-6/13.5-15

Number/Size of Containers: 2 - 4 oz each

Analysis to be Performed: None

Duplicate Collected: No

Notes: 5' collected just in case, but per MIP, not as hot as MC-01(6')
2.5' collected as potential clean.
13.5-15 dirtier, but submerged. May yield less accurate results

Sheet 1 of 1 Sheets

TRIHYDRO CORPORATION

FIELD BORING LOG

Project & Project Number: ~~MDEQ~~ Whitefish Solvent Site - 776-033-001	Date: 5/24/16
Project Location/Address: (Martin's) or Lincoln/Anderson (circle one)	Drilling Company: Dakota Technologies
Client: MDEQ	Driller: Mark / Mike
Weather: Calm, cloudy	Rig Type / Method: Direct push with MIP.
Logged by: Grant Price	Sample Method (circle one): Direct Push Split Spoon Shelby Tube Other:
	Surface Elevation: Casing Elevation: GE Elevation:
Logger's Signature:	Equipment List:

BORING ID: MC-03 **Boring Location:** SW side of MC, Row of 2nd

Interval (ft bgs)	Texture - Grain Size Major	Texture - Grain Size Minor	Color Major	Color Modifier	Plasticity	Consistency (Lower clay content)	Consistency (Higher clay content)	Moisture	Odor	PID Interval/Reading	Additional Comments (Odor descriptor, sheen, nodules, structure, vegitation, etc.)
0-6"	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		MIP to 18, GW presence <12", No spikes.
6"-2.5'	GVL - F M C Sand - F M C Silt Clay	F-M Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		Soil to 15'
2.5'-4.75	GVL - F M C Sand - F M C Silt Clay olive brown	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		
4.75-5.5	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		
5.5-10	GVL - F M C Sand - F M C Silt Clay olive brown	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other % olive brown	Red Brown Gray Green Rust Yellow Other	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		0-5 50% rec 5-10 70% rec 10-15 90% rec.
10-15	GVL - F M C Sand - F M C Silt Clay olive brown	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		TD for soil is 15'
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		

yes Sample Collected: ~~No, entire interval~~

Sample ID: MC-03 (6')

Date: 5/24/16

Time: 1300

Depth:

Number/Size of Containers: 2 4-oz

Analysis to be Performed: PCE/daughter products & EPH/VPH

Duplicate Collected: No

Notes: intended to be clean

TRIHYDRO CORPORATION

FIELD BORING LOG

Sheet 1 of 1 Sheets

Project & Project Number: MDEQ Whitefish Solvent Site - 776-033-001	Date: 5/24/16
Project Location/Address: Martin's or Lincoln/Anderson (circle one)	Drilling Company: Dakota Technologies
Client: MDEQ	Driller: Nate / Mike
Weather: sunny, warm	Rig Type / Method: Direct push with MIP.
Logged by: Grant Price	Sample Method (circle one): Direct Push Split Spoon Shelby Tube Other:
	Surface Elevation: Casing Elevation: GE Elevation:
Logger's Signature: D R	Equipment List:

BORING ID: MC-04 **Boring Location:** S of Martin's, S Row 2nd.

Interval (ft bgs)	Texture - Grain Size Major	Texture - Grain Size Minor	Color Major	Color Modifier	Plasticity	Consistency (Lower clay content)	Consistency (Higher clay content)	Moisture	Odor	PID Interval Reading	Additional Comments (Odor descriptor, sheen, nodules, structure, vegitation, etc.)
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		MIP only, no soil. intended to be down-gradient of MC-02, installed for delineation (water).
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		pre-probed to 2', same as all. initial soil XSD looks comparable
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		to 01, 02, water in shallow. Begins to spike more ~12'
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		TD w/ MIP = 20
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		

Sample Collected: No

Sample ID:

Date:

Time:

Depth:

Number/Size of Containers:

Analysis to be Performed:

Duplicate Collected:

Notes:

Sheet 1 of 1 Sheets

TRIHYDRO CORPORATION

FIELD BORING LOG

Project & Project Number: MDEQ-Whitefish Solvent Site - 776-033-001	Date: 5/24/16
Project Location/Address: (Martin's) or Lincoln/Anderson (circle one)	Drilling Company: Dakota Technologies
Client: MDEQ	Driller: Nate / Mike
Weather: Sunny	Rig Type / Method: Direct push with MIP
Logged by: Grant Price	Sample Method (circle one): (Direct Push) Split Spoon Shelby Tube Other:
	Surface Elevation: Casing Elevation: GE Elevation:
Logger's Signature:	Equipment List:

BORING ID: MC-05

Boring Location: SE of Martins, S. Row 3rd St. ~25' E of E edge of Martins.

Interval (ft bgs)	Texture - Grain Size Major	Texture - Grain Size Minor	Color Major	Color Modifier	Plasticity	Consistency (Lower clay content)	Consistency (Higher clay content)	Moisture	Odor	PID Interval/Reading	Additional Comments (Odor descriptor, sheen, nodules, structure, vegitation, etc.)
0-0.5'	(GVL) - F M C Sand - F M C Silt Clay road base	Grvlly Sandy Silty Clayey	Black (Gray) L M D Brn - L M D Red - L M D Other	Red Brown Gray (Green) Rust Yellow Other %	High Moderate Low (Non) –	Very Loose Loose Medium Dense Dense (Very Dense)	Very Soft Soft Firm Hard Very Hard	(Dry) Damp Moist Wet Saturated	Strong Moderate Slight (None Noted) –	parkWll cemented	MIP only, no soil. Side gradient of MC-02, installed for hor. delin.
0.5-3	GVL - F M C (Sand) (F M C) F-M Silt Clay	(Grvlly) Sandy Silty Clayey	Black Gray - L M D (Brn) L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low (Non) –	Very Loose Loose (Medium Dense) Dense Very Dense	Very Soft Soft Firm Hard Very Hard	(Dry) Damp Moist Wet Saturated	Strong Moderate Slight (None Noted) –		of GW. primarily. Based on MIP spike @ 4', decided to do soil
3-5	GVL - F M C Sand - F M C Silt (Clay)	Grvlly Sandy Silty Clayey	Black Gray - L M D (Brn) L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High (Moderate) Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft (Firm) (Hard) Very Hard	Dry (Damp) Moist Wet Saturated	Strong Moderate Slight (None Noted) –		
5-10	GVL - F M C Sand - F M C Silt (Clay) olive brown	Grvlly Sandy Silty Clayey	Black Gray - L M D (Brn) L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High (Moderate) Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft (Firm) Hard Very Hard	Dry (Damp) (Moist) Wet Saturated	Strong Moderate Slight (None Noted) –		no silt layer seen. perhaps missed due to poor recovery?
10-15	GVL - F M C Sand - F M C Silt (Clay) olive brown	Grvlly Sandy Silty Clayey	Black Gray - L M D (Brn) L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	(High) (Moderate) Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft (Soft) Firm Hard Very Hard	Dry Damp Moist (Wet) (Saturated)	Strong Moderate Slight (None Noted) –		0-5 50% rec. 5-10 50% rec. 10-15 55% rec.
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		MIP TD = 20' Soil TD = 15'
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		

Sample Collected: ~~No~~ yes

Sample ID: MC-05(4') / MC-05(14')

Date: 5/24/15

Time: 1620 / 1640

* Depth: 3-6.5

large interval due to poor recovery.

Number/Size of Containers:

Analysis to be Performed: None

Duplicate Collected:

Notes:

Sheet 1 of 1 Sheets

TRIHYDRO CORPORATION

FIELD BORING LOG

Project & Project Number:	MDEQ Whitefish Solvent Site - 776-033-001	Date:	5/24/16
Project Location/Address:	Martin's or Lincoln/Anderson (circle one)	Drilling Company:	Dakota Technologies
Client:	MDEQ	Driller:	Nate / Mike
Weather:	Sunny, cold	Rig Type / Method:	Direct push with MIP.
Logged by:	Grant Price	Sample Method (circle one):	Direct Push Split Spoon Shelby Tube Other:
		Surface Elevation:	Casing Elevation: GE Elevation:
Logger's Signature:		Equipment List:	

BORING ID: MC-06 **Boring Location:** NW corner of Martin's in Baker E Rd

Interval (ft bgs)	Texture - Grain Size Major	Texture - Grain Size Minor	Color Major	Color Modifier	Plasticity	Consistency (Lower clay content)	Consistency (Higher clay content)	Moisture	Odor	PID Interval/Reading	Additional Comments (Odor descriptor, sheen, nodules, structure, vegitation, etc.)
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		MIP only, no soil. No XSD ~~det~~ detects, so no step outs West.
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		

Sample Collected: No

Sample ID:

Date:

Time:

Depth:

Number/Size of Containers:

Analysis to be Performed:

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

FIELD BORING LOG

Project & Project Number: MDEQ Whitefish Solvent Site - 776-033-001	Date: 5/24/16
Project Location/Address: (Martin's) or Lincoln/Anderson (circle one)	Drilling Company: Dakota Technologies
Client: MDEQ	Driller: Noah / Mike
Weather: Calm, Sunny	Rig Type / Method: Direct push with MIP.
Logged by: Grant Price	Sample Method (circle one): (Direct Push) Split Spoon Shelby Tube Other:
	Surface Elevation: Casing Elevation: GE Elevation:
Logger's Signature:	Equipment List:

BORING ID: MC-07

Boring Location: NE of Martin's BTV Ace & thrift store. in Alley just E. of Vicks property

Interval (ft bgs)	Texture - Grain Size Major	Texture - Grain Size Minor	Color Major	Color Modifier	Plasticity	Consistency (Lower clay content)	Consistency (Higher clay content)	Moisture	Odor	PID Interval/Reading	Additional Comments (Odor descriptor, sheen, nodules, structure, vegitation, etc.)
	GVL - F M C	Grvlly	Black	Red Brown	High	Very Loose	Very Soft	Dry	Strong		intended to provide up-gradient data.
	Sand - F M C	Sandy	Gray - L M D	Gray Green	Moderate	Loose	Soft	Damp	Moderate		
	Silt	Silty	Brn - L M D	Rust Yellow	Low	Medium Dense	Firm	Moist	Slight		
	Clay	Clayey	Red - L M D	Other	Non	Dense	Hard	Wet	None Noted		
			Other	%	–	Very Dense	Very Hard	Saturated	–		
	GVL - F M C	Grvlly	Black	Red Brown	High	Very Loose	Very Soft	Dry	Strong		
	Sand - F M C	Sandy	Gray - L M D	Gray Green	Moderate	Loose	Soft	Damp	Moderate		
	Silt	Silty	Brn - L M D	Rust Yellow	Low	Medium Dense	Firm	Moist	Slight		
	Clay	Clayey	Red - L M D	Other	Non	Dense	Hard	Wet	None Noted		
			Other	%	–	Very Dense	Very Hard	Saturated	–		
	GVL - F M C	Grvlly	Black	Red Brown	High	Very Loose	Very Soft	Dry	Strong		
	Sand - F M C	Sandy	Gray - L M D	Gray Green	Moderate	Loose	Soft	Damp	Moderate		
	Silt	Silty	Brn - L M D	Rust Yellow	Low	Medium Dense	Firm	Moist	Slight		
	Clay	Clayey	Red - L M D	Other	Non	Dense	Hard	Wet	None Noted		
			Other	%	–	Very Dense	Very Hard	Saturated	–		
	GVL - F M C	Grvlly	Black	Red Brown	High	Very Loose	Very Soft	Dry	Strong		
	Sand - F M C	Sandy	Gray - L M D	Gray Green	Moderate	Loose	Soft	Damp	Moderate		
	Silt	Silty	Brn - L M D	Rust Yellow	Low	Medium Dense	Firm	Moist	Slight		
	Clay	Clayey	Red - L M D	Other	Non	Dense	Hard	Wet	None Noted		
			Other	%	–	Very Dense	Very Hard	Saturated	–		
	GVL - F M C	Grvlly	Black	Red Brown	High	Very Loose	Very Soft	Dry	Strong		
	Sand - F M C	Sandy	Gray - L M D	Gray Green	Moderate	Loose	Soft	Damp	Moderate		
	Silt	Silty	Brn - L M D	Rust Yellow	Low	Medium Dense	Firm	Moist	Slight		
	Clay	Clayey	Red - L M D	Other	Non	Dense	Hard	Wet	None Noted		
			Other	%	–	Very Dense	Very Hard	Saturated	–		
	GVL - F M C	Grvlly	Black	Red Brown	High	Very Loose	Very Soft	Dry	Strong		
	Sand - F M C	Sandy	Gray - L M D	Gray Green	Moderate	Loose	Soft	Damp	Moderate		
	Silt	Silty	Brn - L M D	Rust Yellow	Low	Medium Dense	Firm	Moist	Slight		
	Clay	Clayey	Red - L M D	Other	Non	Dense	Hard	Wet	None Noted		
			Other	%	–	Very Dense	Very Hard	Saturated	–		
	GVL - F M C	Grvlly	Black	Red Brown	High	Very Loose	Very Soft	Dry	Strong		
	Sand - F M C	Sandy	Gray - L M D	Gray Green	Moderate	Loose	Soft	Damp	Moderate		
	Silt	Silty	Brn - L M D	Rust Yellow	Low	Medium Dense	Firm	Moist	Slight		
	Clay	Clayey	Red - L M D	Other	Non	Dense	Hard	Wet	None Noted		
			Other	%	–	Very Dense	Very Hard	Saturated	–		

Sample Collected: No

Sample ID:

Date:

Time:

Depth:

Number/Size of Containers:

Analysis to be Performed:

Duplicate Collected:

Notes:

Sheet 1 of 1 Sheets

TRIHYDRO CORPORATION

FIELD BORING LOG

Project & Project Number: MDEQ Whitefish Solvent Site - 776-033-001	Date: 5/24/16
Project Location/Address: Martin's or Lincoln/Anderson (circle one)	Drilling Company: Dakota Technologies
Client: MDEQ	Driller: Mike / Nate
Weather: Sunny calm	Rig Type / Method: Direct push with MIP
Logged by: Grant Price	Sample Method (circle one): Direct Push Split Spoon Shelby Tube Other:
	Surface Elevation: Casing Elevation: GE Elevation:
Logger's Signature:	Equipment List:

BORING ID: MC-08

Boring Location: E of Martins, 1/2 way b/w Backdoor and Sidewalk

Interval (ft bgs)	Texture - Grain Size Major	Texture - Grain Size Minor	Color Major	Color Modifier	Plasticity	Consistency (Lower clay content)	Consistency (Higher clay content)	Moisture	Odor	PID Interval/Reading	Additional Comments (Odor descriptor, sheen, nodules, structure, vegitation, etc.)
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted		This location was put in since the location planned for outside the back door
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		was pushed so far North due to utilities. Also to represent source area.
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		Also, adjacent to MWMS-7
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		MC-08 is ~ 3' East of MWMS-7. The well has soil data that may be used to calibrate MIP results.
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		XSD spikes from 2-3' bgs. Hottest location yet.
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		

Sample Collected: No

Sample ID:

Date:

Time:

Depth:

Number/Size of Containers:

Analysis to be Performed:

Duplicate Collected:

Notes:

ATTACHMENT 3

DAKOTA TECHNOLOGIES HIGH RESOLUTION SITE CHARACTERIZATION REPORT

High Resolution Site Characterization Report – Membrane Interface Probe

Client: Trihydro

Project Name: MDEQ

Location: Whitefish, MT

Prepared by:

Dakota Technologies Company, LLC

11253 91st Avenue N.

Maple Grove, Minnesota 55369

763.424.4803

April 1, 2016

Project Number: 0117.16

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Appendix C MIP Logs with 100 mVolt Detectors
Appendix D MIP – XSD Plots (with EC)
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1.0 MIP SYSTEM DESCRIPTION AND ON-SITE CHEMICAL ANALYSIS

Volatile organic compounds (VOCs) are semi-quantitatively analyzed in-situ using a membrane interface probe (MIP). The probe is pushed into the ground at a rate of 1 foot per minute, including a 45 second residence time. The membrane block heats to a temperature of approximately 90 to 120°C. VOCs diffuse across the membrane into the trunkline carrier gas tubing and are brought to the surface and into the gas chromatograph (GC) analytical system. The carrier gas containing samples from the subsurface then passes through a naphion dryer (optional) and a heated GC oven to remove moisture prior to detector analysis. Compounds appropriate for the detectors and in high enough concentrations (approximately 1 ppm or higher for Standard MIP and approximately 100 ppb or higher for Low Level MIP) will produce an electrical signal, which is analyzed.

The GC system is comprised of the following three-detector system: laboratory grade photoionization detector (PID), a flame ionization detector (FID) tandem and a Halogen-Specific Detector (XSD). The MIP's trunkline return gas is Y-split in the GC to accommodate this detector configuration. The PID utilizes a 10.0 eV lamp and will ionize aromatic, olefinic, and unsaturated halogenated hydrocarbons with an ionization potential of 10.0 eV or less. The FID will respond to all types of hydrocarbons including methane, halogenated hydrocarbons and other saturated hydrocarbons, generally giving a good indication of total hydrocarbons present. The XSD responds selectively to only halogenated compounds (e.g., hydrocarbons containing fluorine, chlorine, bromine or iodine).

Electrical Conductivity (EC) is a measure of the soils ability to conduct an electrical current between two dipoles on the MIP/EC probe. Conductivity is the reciprocal of electrical resistivity and has the units (in our application) of millisiemens per meter (mS/m). Since soil is in the pathway of the charge flow, the grain size can be determined by comparing the EC log to a soil boring. Conductivity readings in the 100s typically indicate smaller grain size, such as clay. Larger grain sizes such as sand and gravels, are typically in the 10s of mS/m range. Prior to every log, the EC point of the MIP probe is checked for proper operation by performing a voltage test with a voltage meter and a conductivity test with a test block.

Since the MIP system is a screening tool, some laboratory analysis of soil or groundwater samples or some historical analytical data are needed in order to obtain optimum MIP log correlation. The following quality assurance/control measures are routinely conducted to ensure the validity of the analytical results:

> Chemical Response Test: MIP data must be validated with acceptable Quality Control (QC) at the beginning and end of every log. The probe is immersed into a 500 mL cylinder of water containing the compound(s) of interest. This test will be performed at multiple concentration levels at the beginning of each day to verify detector response and generate detection limits of the system (for

example: three levels of TCE at 1, 5 and 25 ppm). QC tests of at least one level are checked between each boring to determine system integrity and monitor membrane and detector fluctuations. The results of these tests are listed in the QA/QC report.

Butane response: Can be run between each boring by dispensing butane over the membrane. Measurement of the lag time of the carrier gas from the probe to the detectors is used to determine trip time and to verify FID detector response.

Continuity check: Performed before and after each boring to verify system continuity and validate the EC data.

2.0 DISCUSSION AND COMMENTS

Dakota Technologies Company, LLC (Dakota) pushed a total of 15 MIP borings (plus one aborted and restarted log at location LA-05) on 2 adjacent properties in the town of Whitefish, MT. LA-05 needed to be pushed a second time (LA-05A) about 1 foot from the original location due to membrane damage that occurred as soon as LA-05 was advanced into the subsurface.

The MIP logs were generally stopped at 20 feet per work plan. The drilling was fairly easy for all locations after the road material was pre-probed to the depth indicated on Summary Log.

Dakota performed chemical response tests at 0, 1, 5 and 25 ppm TCE at various times throughout the project. At a minimum, a one-level response test was performed before or after each log on the MIP system (PID/FID/XSD) to assure data quality. The response tests appeared normal and were indicative of a properly functioning MIP system.

For each log, the probe was advanced 1 foot and the probe was then allowed residence time of 45 seconds or longer. This amount of time allows the probe to reach operating temperature and for VOCs to diffuse through the membrane and into the trunkline. The trip time was approximately 35 seconds for the 100 foot trunkline.

EC data was collected simultaneously at each MIP location. The EC system was tested before and after each log for continuity and performance. All tests passed manufacturer QC specifications.

3.0 LIMITATIONS

The analysis and opinions expressed in this report are based upon data obtained from the samples collected at the indicated locations and from other information discussed in this report. Exceptions, if any, are discussed in the accompanying comments section of this report. This report is prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted practices. Reported results shall not be reproduced, except in full, without written approval of Dakota. The sample results relate only to the analytes of interest tested. No warranties, expressed or implied are intended or made.

Appendix A

MIP Field Log Summary

MIP Field Summary Log

117.16

Whitefish, MT

File Log ID	Date	QA/QC (*pass / fail*) EC Test Pre/Post Log	Chemical Response Test Pre-Log	Chemical Response Test Post-Log	Final Depth *(ft)*	Preprobed Depth *(ft)*	Comments
MC-01	05/24/16	pass	pass	pass	22.05	2	new membrane, near rear entry door of liquor store rear parking lot
MC-02	05/24/16	pass	pass	pass	26.10	2	SE corner of liquor store in street ROW
MC-03	05/24/16	pass	pass	pass	16.10	3	SW corner of liquor store in street ROW
MC-04	05/24/16	pass	pass	pass	20.00	3	S of MC-02 (in street ROW)
MC-05	05/24/16	pass	pass	pass	20.05	3	Post-Log QC slightly low, change membrane
MC-06	05/24/16	pass	pass	pass	20.05	2	NE corner of liquor store in street ROW
MC-07	05/24/16	pass	pass	pass	20.10	2	behind loft apartments
MC-08	05/24/16	pass	pass	pass	20.05	2	between MC-01 & MC-02, SE corner of liquor store parking lot
LA-01	05/25/16	pass	pass	pass	19.95	5	in front of Whitefish Pilot news, N side of 2nd street in ROW
LA-02	05/25/16	pass	pass	pass	20.00	4	W of LA-01
LA-03	05/25/16	pass	pass	pass	20.00	4	W of LA-02
LA-04	05/25/16	pass	pass	pass	20.00	2	no comments
LA-05	05/25/16	pass	pass	pass	5.00	2	membrane damaged at surface. Abnormal XSD response - stop, change membrane, move over 1'
LA-05A	05/26/16	pass	pass	pass	20.05	2	New membrane, near MW behind pizza restaurant
LA-06	05/25/16	pass	pass	pass	19.95	2	near pizza restaurant outside cooler
LA-07	05/25/16	pass	pass	pass	20.10	2	no comments
				Total Footage (this sheet)	**309.55**		

DAKOTA TECHNOLOGIES

Appendix B

MIP Analytical Interpretation

MIP Analytical Interpretation

117.16

Whitefish, MT

Probe ID	Date	Max mV[1] Detector (net) Response at Indicated Depth						Comments[2]
		PID (mVolts)	Depth (ft)	FID (mVolts)	Depth (ft)	XSD (mVolts)	Depth (ft)	
MC-01	05/24/16	**7**	6.1	**2**	19.1	11	19.1	Estimated 1-3 ppm CVOCs from 2 feet-bottom
MC-02	05/24/16	58	26.1	**2**	5.0	75	26.1	Estimated 1-25 ppm CVOCs (increasingly) from 10 feet-bottom (25-50 ppm @ bottom)
MC-03	05/24/16	**4**	5.1	**7**	5.1	NA	NA	no significant detector responses
MC-04	05/24/16	13	18.0	**2**	4.0	27	18.0	Estimated 1 ppm CVOCs @ 5 feet, 2-10 ppm CVOCs @ 12-19 feet
MC-05	05/24/16	29	19.0	8	6.1	48	18.1	Estimated 5 ppm CVOCs @ 4 feet, 1-2 ppm @ 7-13 and 5-20 ppm from 14-19 feet
MC-06	05/24/16	13	4.1	12	5.2	NA	NA	no significant XSD detector responses
MC-07	05/24/16	48	3.0	17	3.0	NA	NA	no significant XSD detector responses
MC-08	05/24/16	78	18.0	16	18.0	89	18.0	Estimated 5-100 ppm CVOCs starting @ 2 feet (25-50 ppm @ bottom)
LA-01	05/25/16	18	20.0	29	20.0	NA	NA	no significant XSD detector responses
LA-02	05/25/16	**7**	7.2	8	7.2	NA	NA	no significant XSD detector responses
LA-03	05/25/16	**2**	7.0	**4**	7.0	NA	NA	no significant XSD detector responses
LA-04	05/25/16	16	5.9	14	7.2	34	20.0	Estimated 1 ppm CVOCs @ 3, 4, 7, 17-19 feet. 5-15 ppm CVOCs @ 5.9 and 20 feet.
LA-05	05/25/16	NA	NA	NA	NA	NA	NA	membrane damaged. Change membrane and move over 1 foot.
LA-05A	05/26/16	12	9.0	11	9.0	NA	NA	no significant XSD detector responses
LA-06	05/25/16	12	20.0	NA	NA	NA	NA	no significant XSD detector responses
LA-07	05/25/16	**7**	4.1	NA	NA	NA	NA	no significant XSD detector responses

(1) For Standard MIP - 1 to 5 mVolt response on PID or XSD detector = approximately 1 ppm, and on FID 1 mVolt = approximately 10 ppm

(2) Petroleum (PID and FID) responses observed at several locations, but not estimated for concentration

Values displayed in **bold type** indicate concentrations at or near method detection limit

(XVOC) Halogenated Response typically refers more specifically to Chlorinated Volatile Organics (CVOCs)

VOC Response may refer to BTEX, GRO, methane or other lighter constituents of fuels and other hydrocarbons.

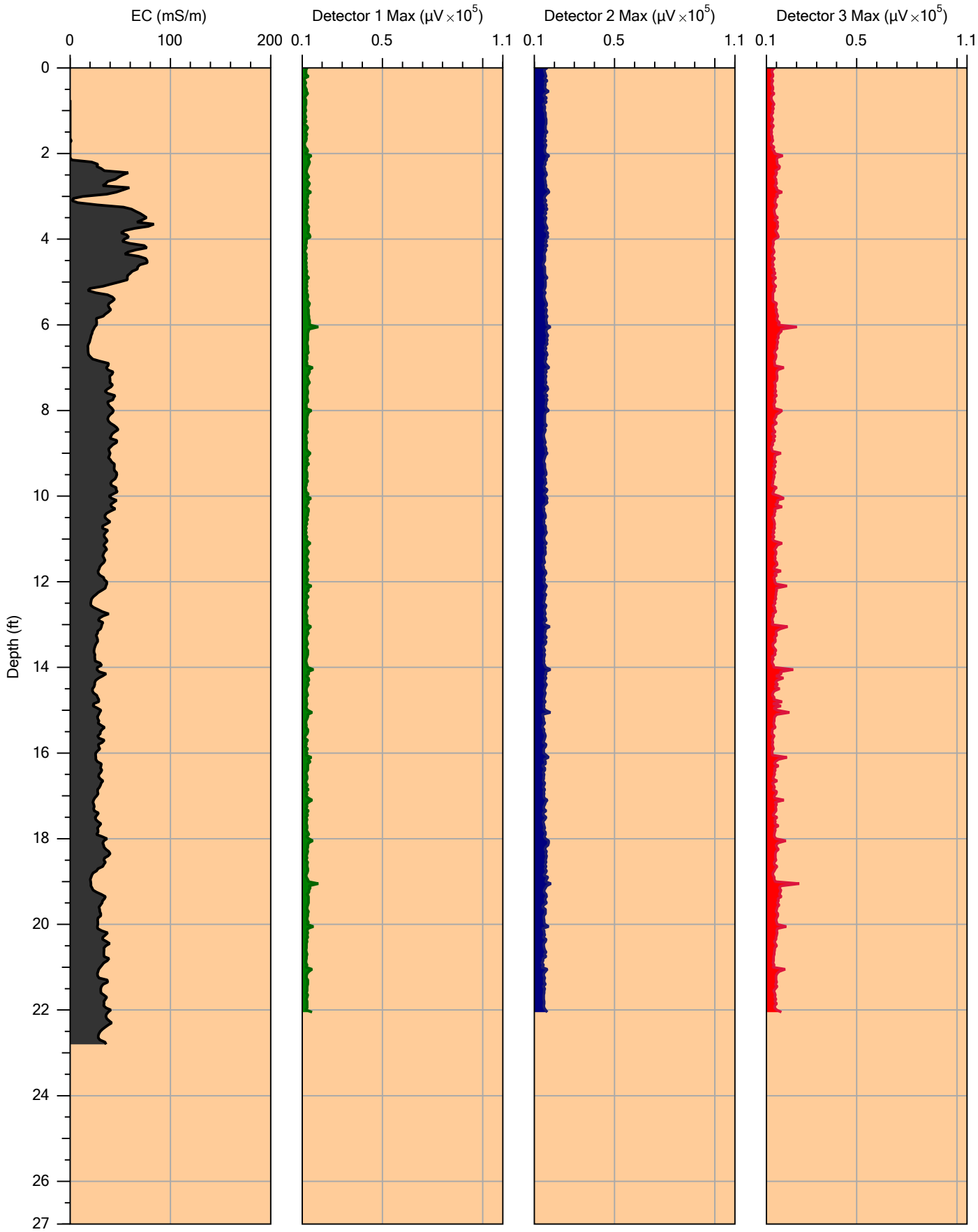
XSD Detector refers to Halogen Specific Detector (detects VOCs containing chlorine, bromine, fluorine, etc.)

na = not applicable

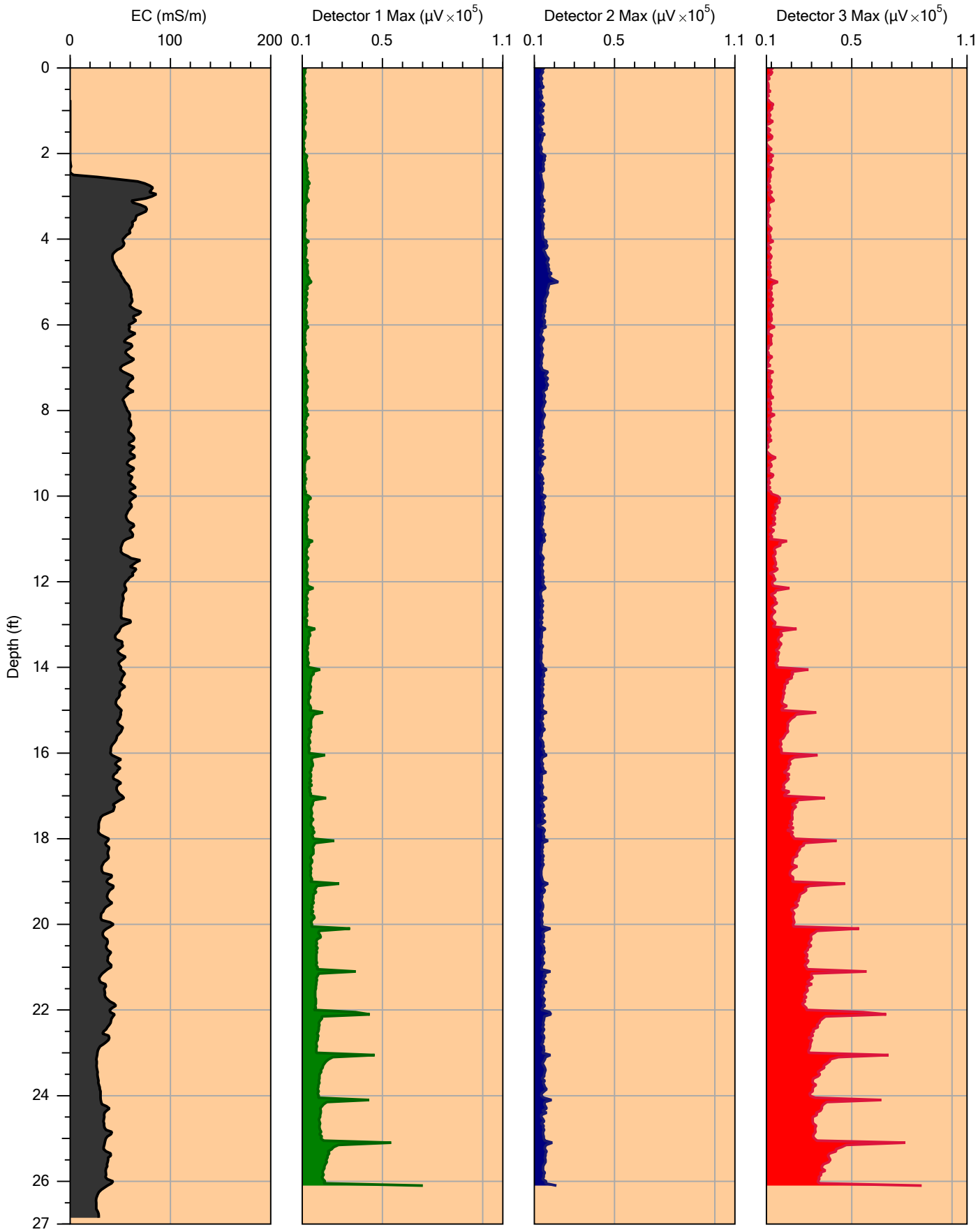
DAKOTA TECHNOLOGIES

Appendix C

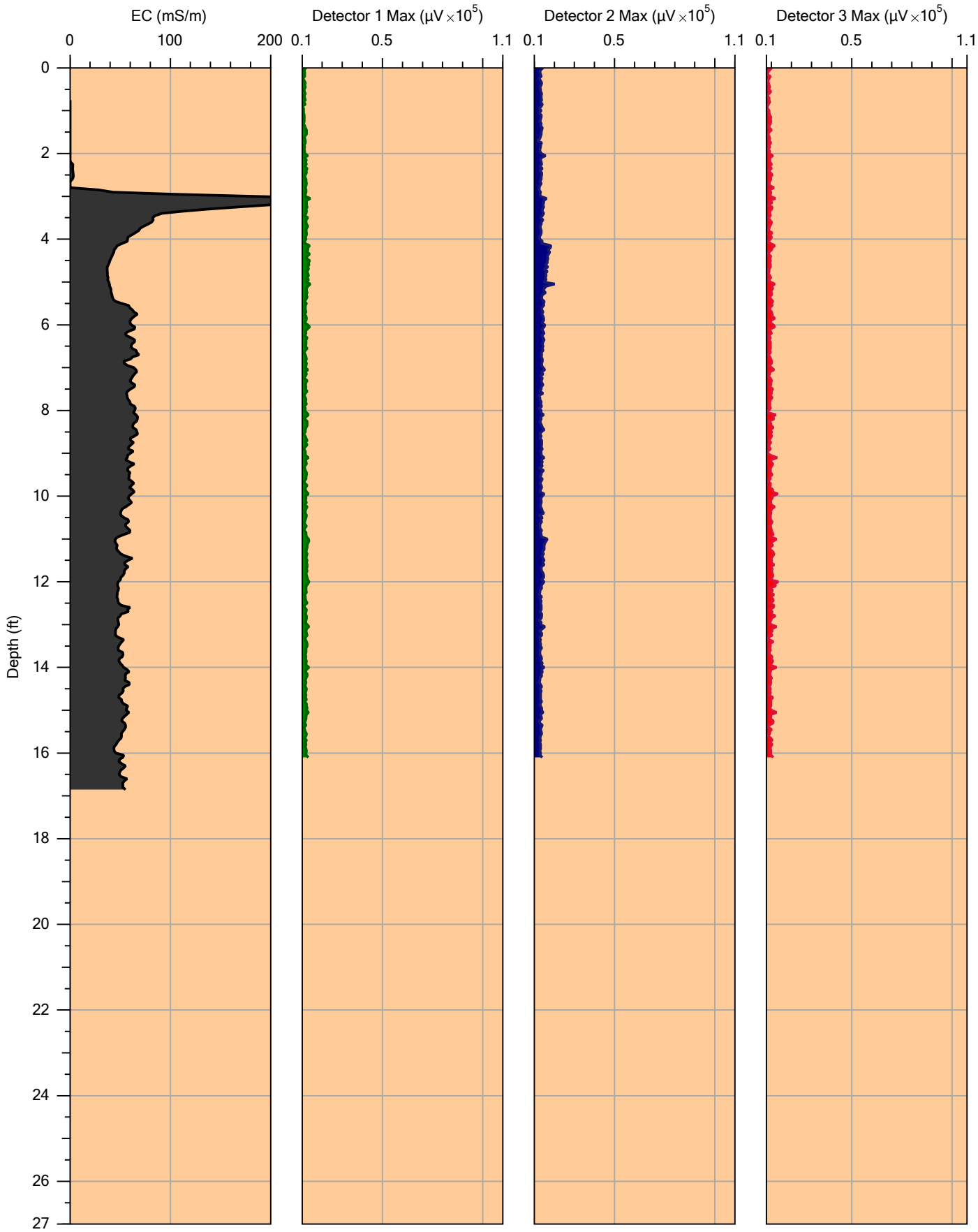
MIP Logs with 100 mVolt Detectors



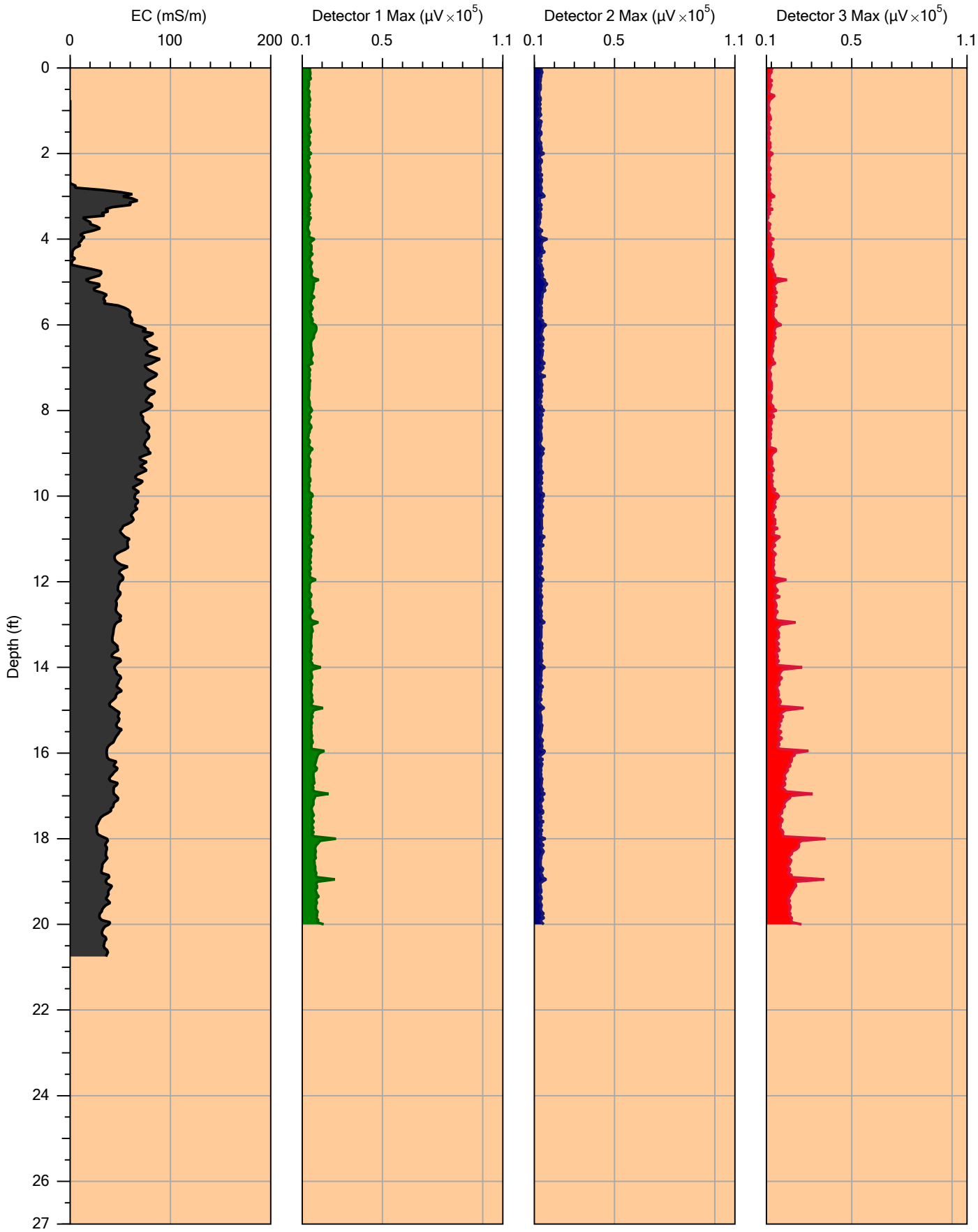
Company: Dakota Technologies	Operator: Mike Jenson	File: MC-01.MIP
		Date: 5/24/2016
Project ID: 117.16	Client: Trihydro	Location:



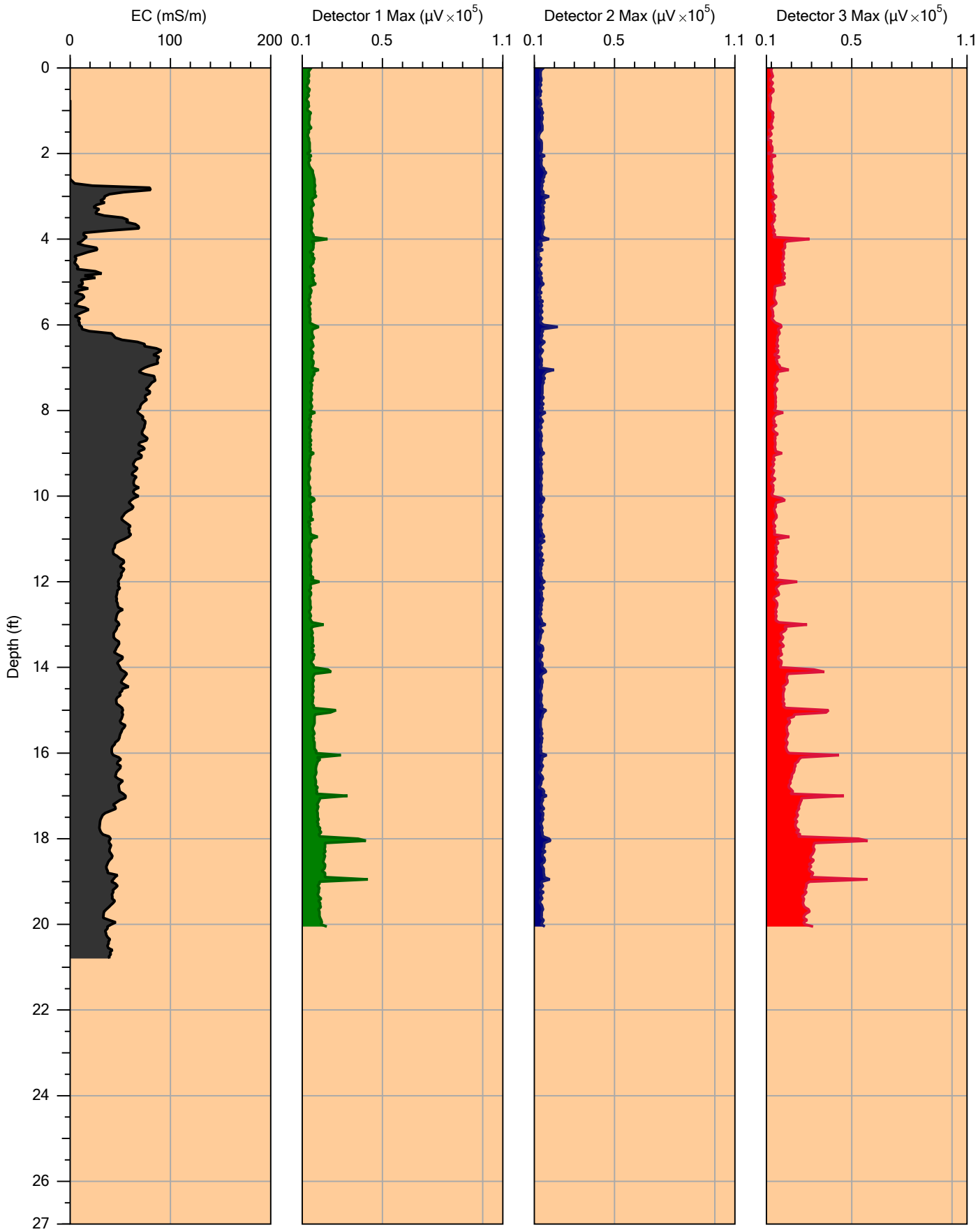
Company: Dakota Technologies	Operator: Mike Jenson	File: MC-02.MIP
		Date: 5/24/2016
Project ID: 117.16	Client: Trihydro	Location:



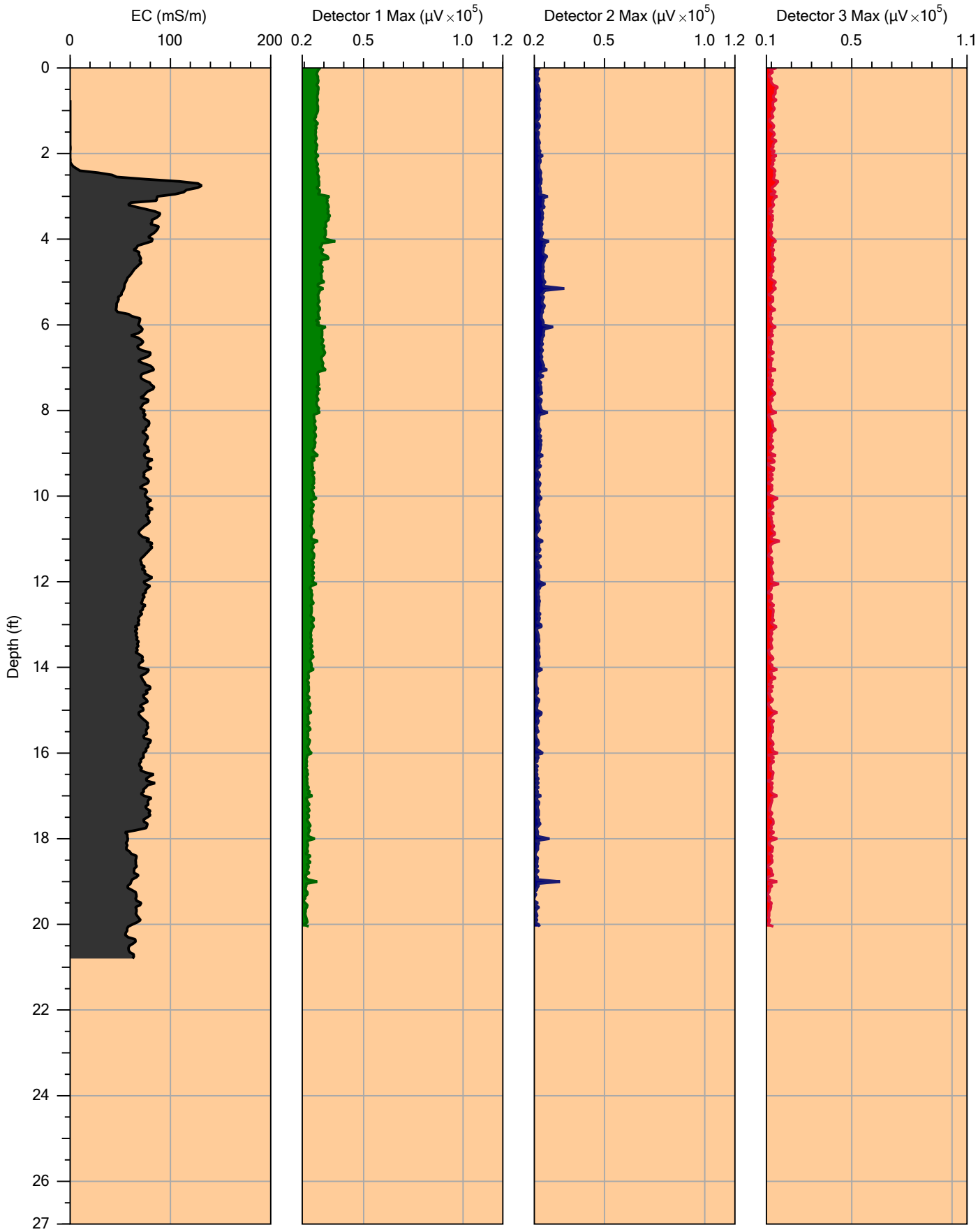
		File: MC-03.MIP
Company: Dakota Technologies	Operator: Mike Jenson	Date: 5/24/2016
Project ID: 117.16	Client: Trihydro	Location:



		File: MC-04.MIP
Company: Dakota Technologies	Operator: Mike Jenson	Date: 5/24/2016
Project ID: 117.16	Client: Trihydro	Location:



Company: Dakota Technologies	Operator: Mike Jenson	File: MC-05.MIP
		Date: 5/24/2016
Project ID: 117.16	Client: Trihydro	Location:



		File: MC-06.MIP
Company: Dakota Technologies	Operator: Mike Jenson	Date: 5/24/2016
Project ID: 117.16	Client: Trihydro	Location:

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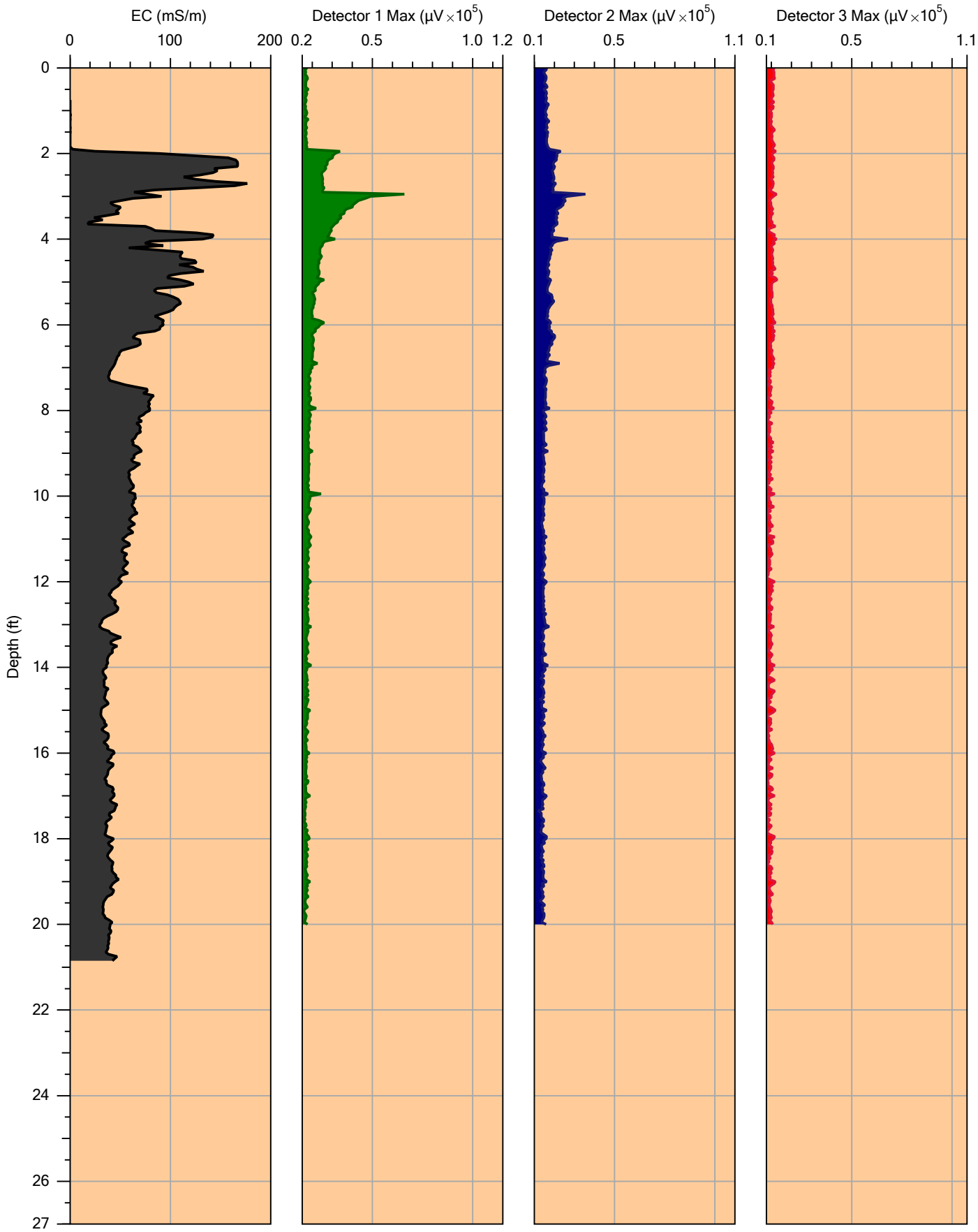
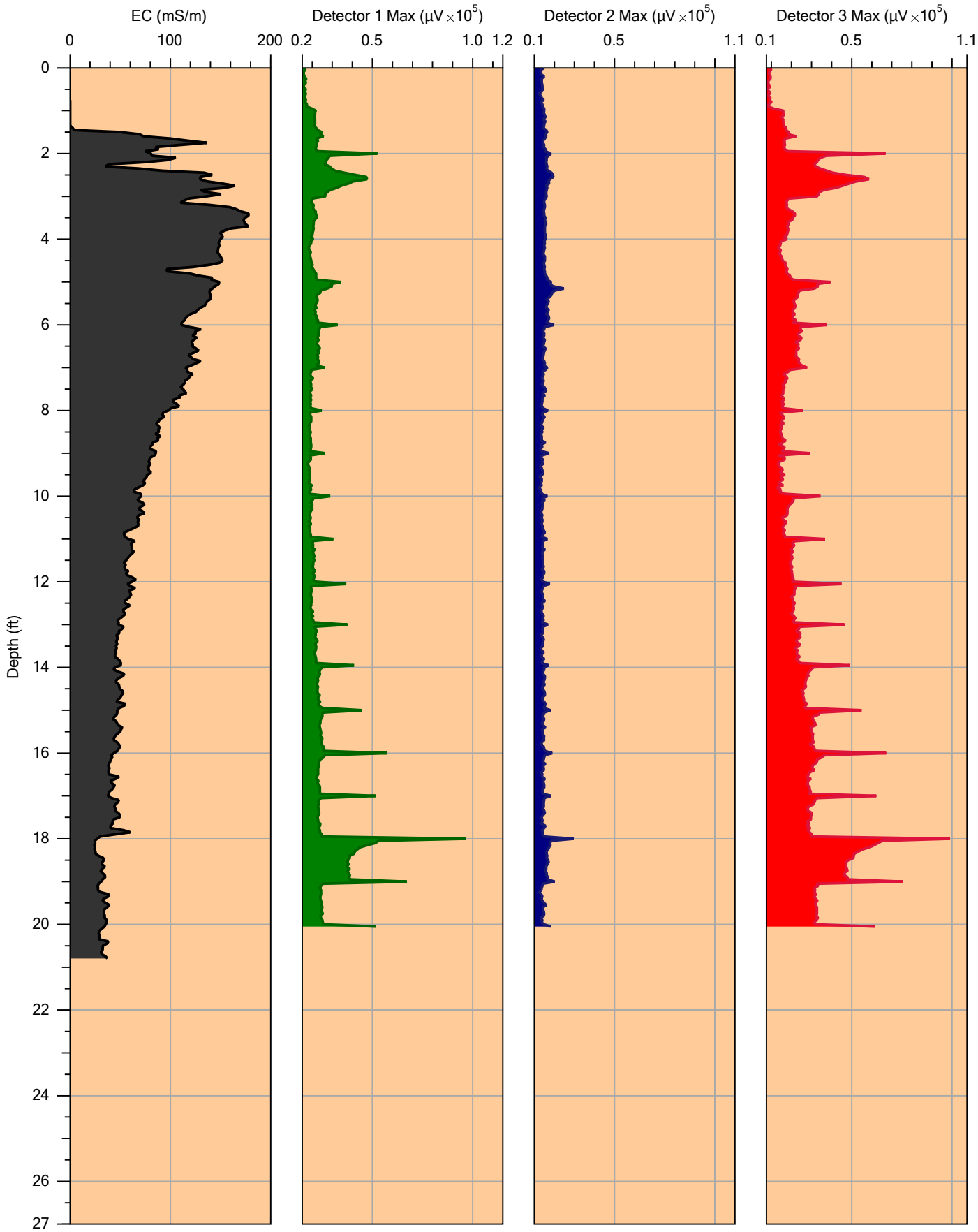


Company: Dakota Technologies	Operator: Mike Jenson	File: MC-07.MIP
		Date: 5/24/2016
Project ID: 117.16	Client: Trihydro	Location:



		File: MC-08.MIP
Company: Dakota Technologies	Operator: Mike Jenson	Date: 5/24/2016
Project ID: 117.16	Client: Trihydro	Location:

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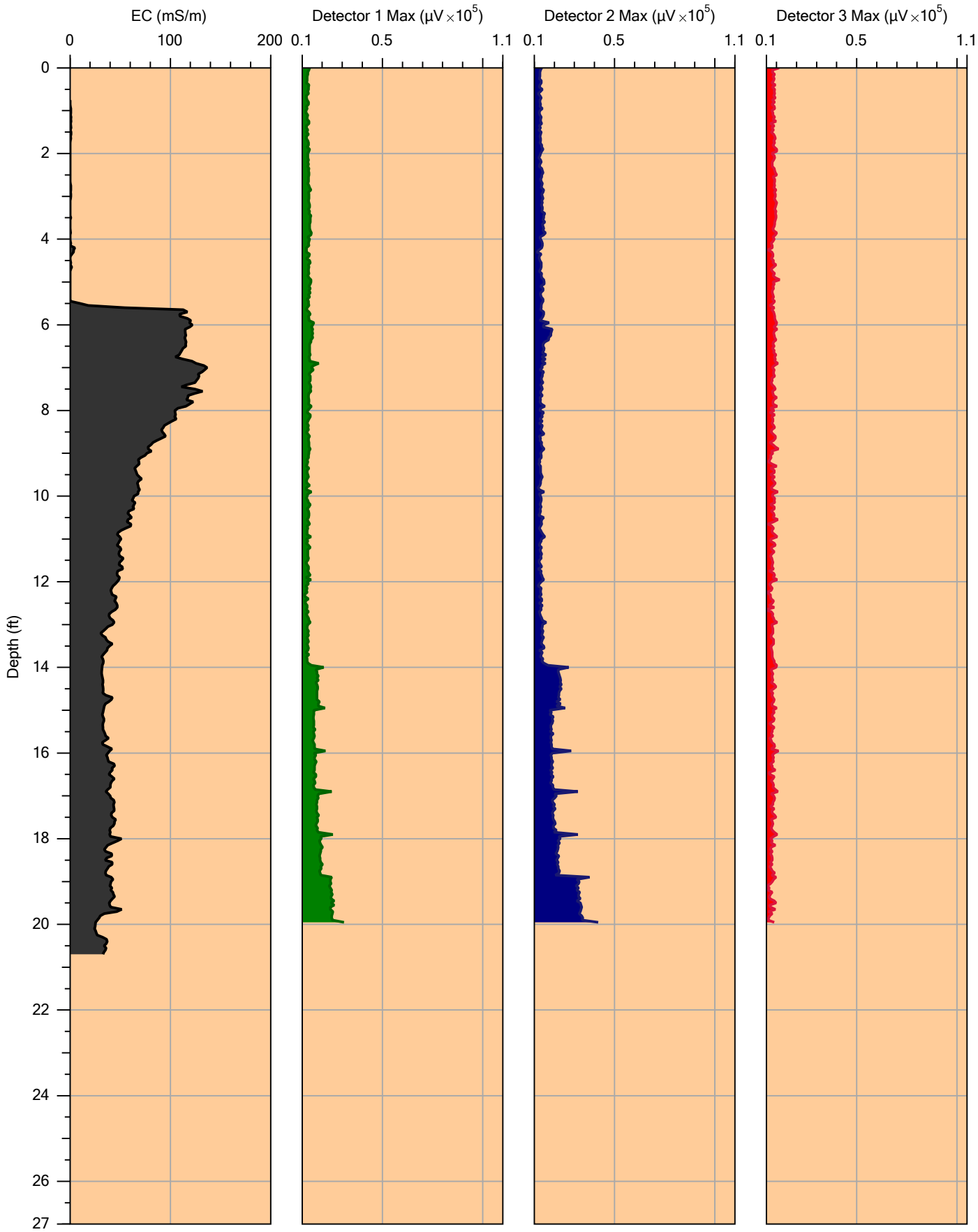

Company: Dakota Technologies	Operator: Mike Jenson	File: LA-01.MIP
		Date: 5/25/2016
Project ID: 117.16	Client: Trihydro	Location:

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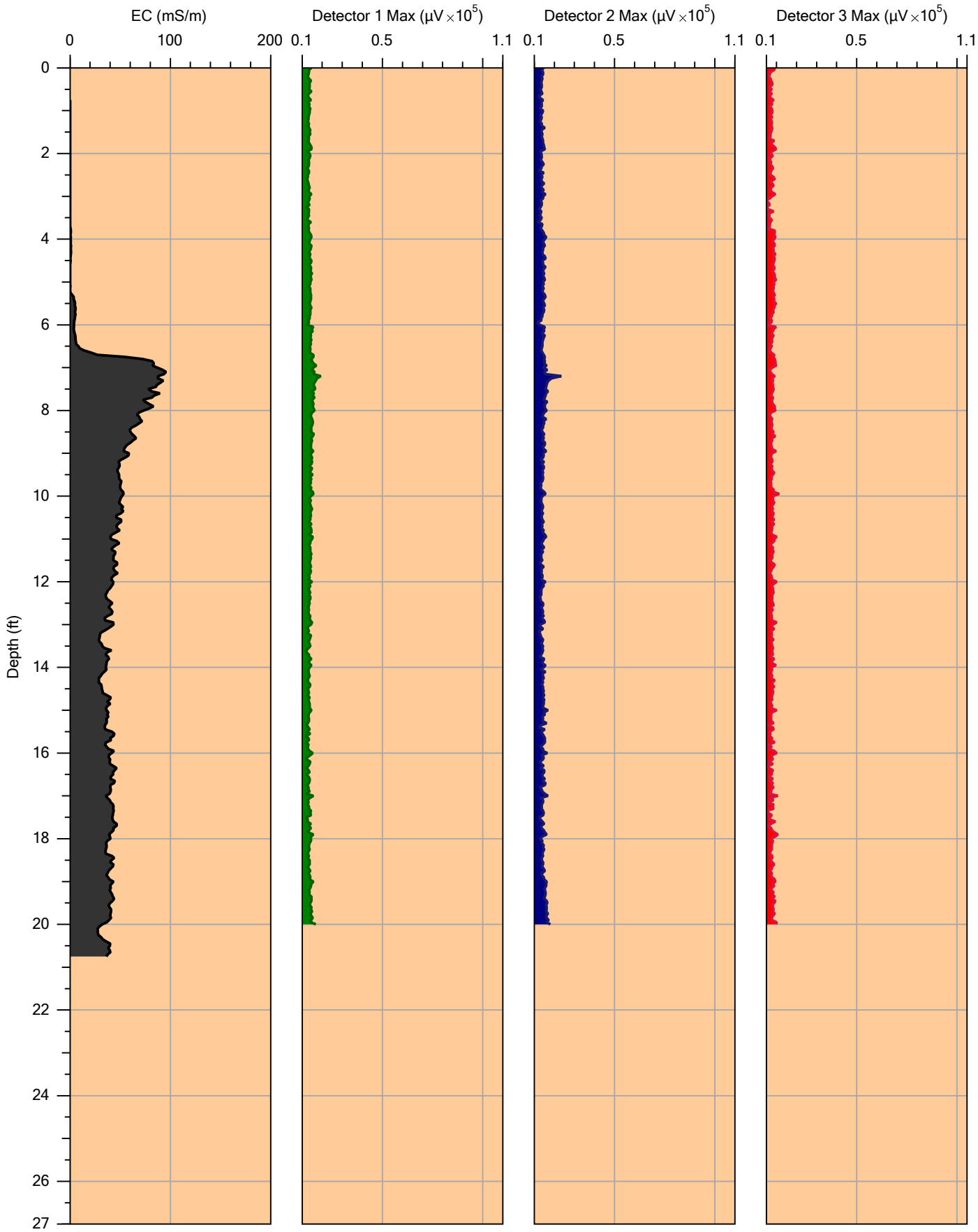
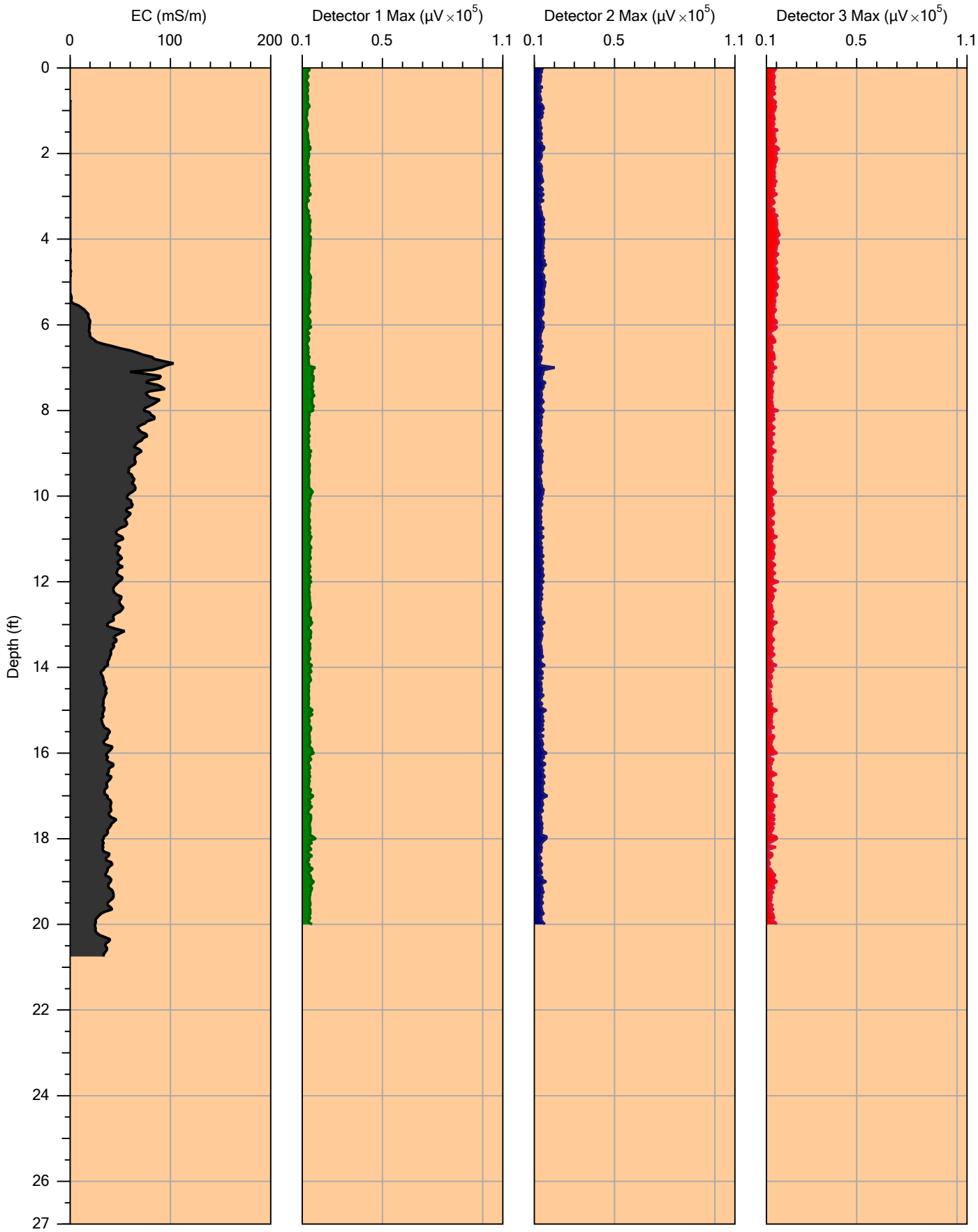
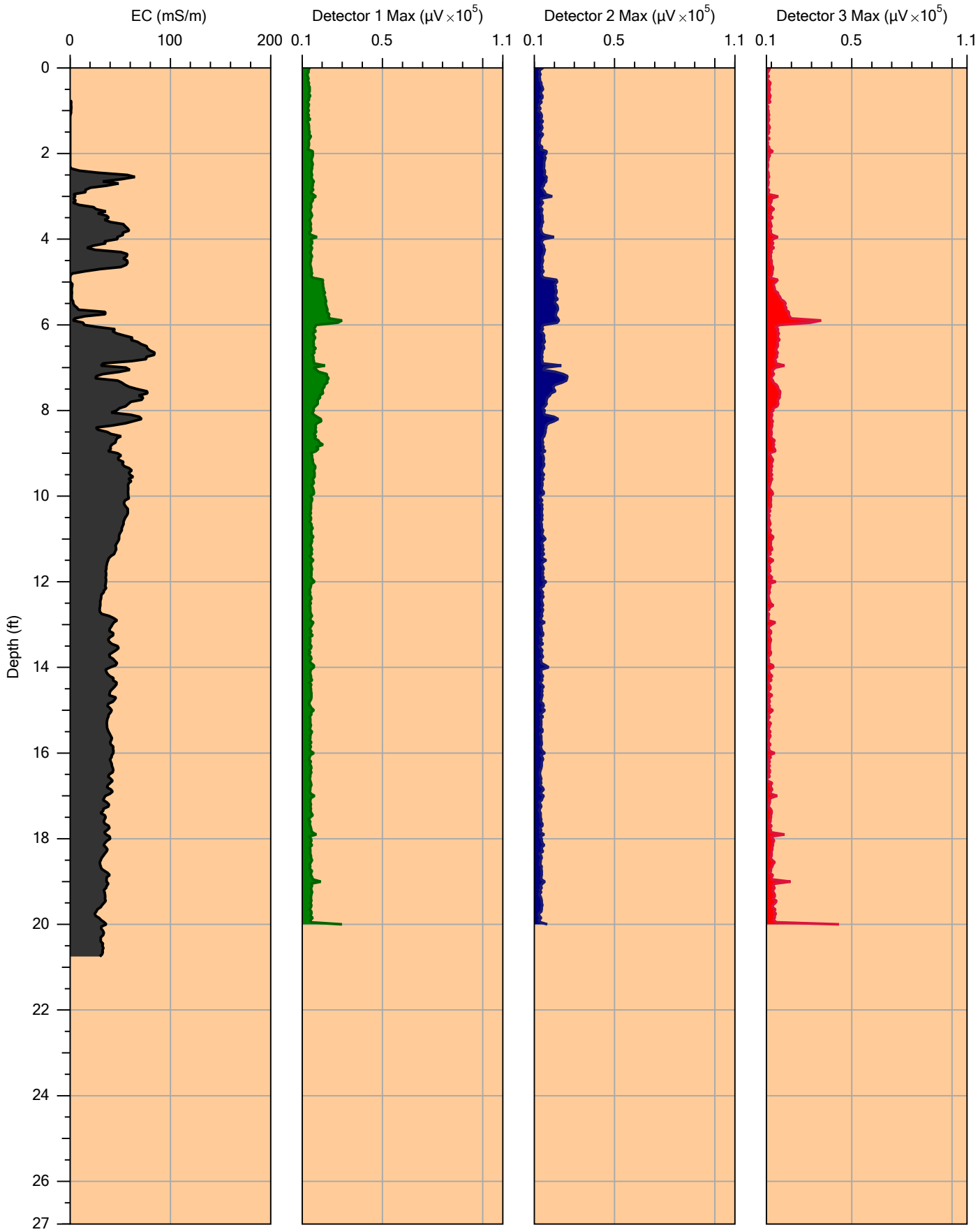


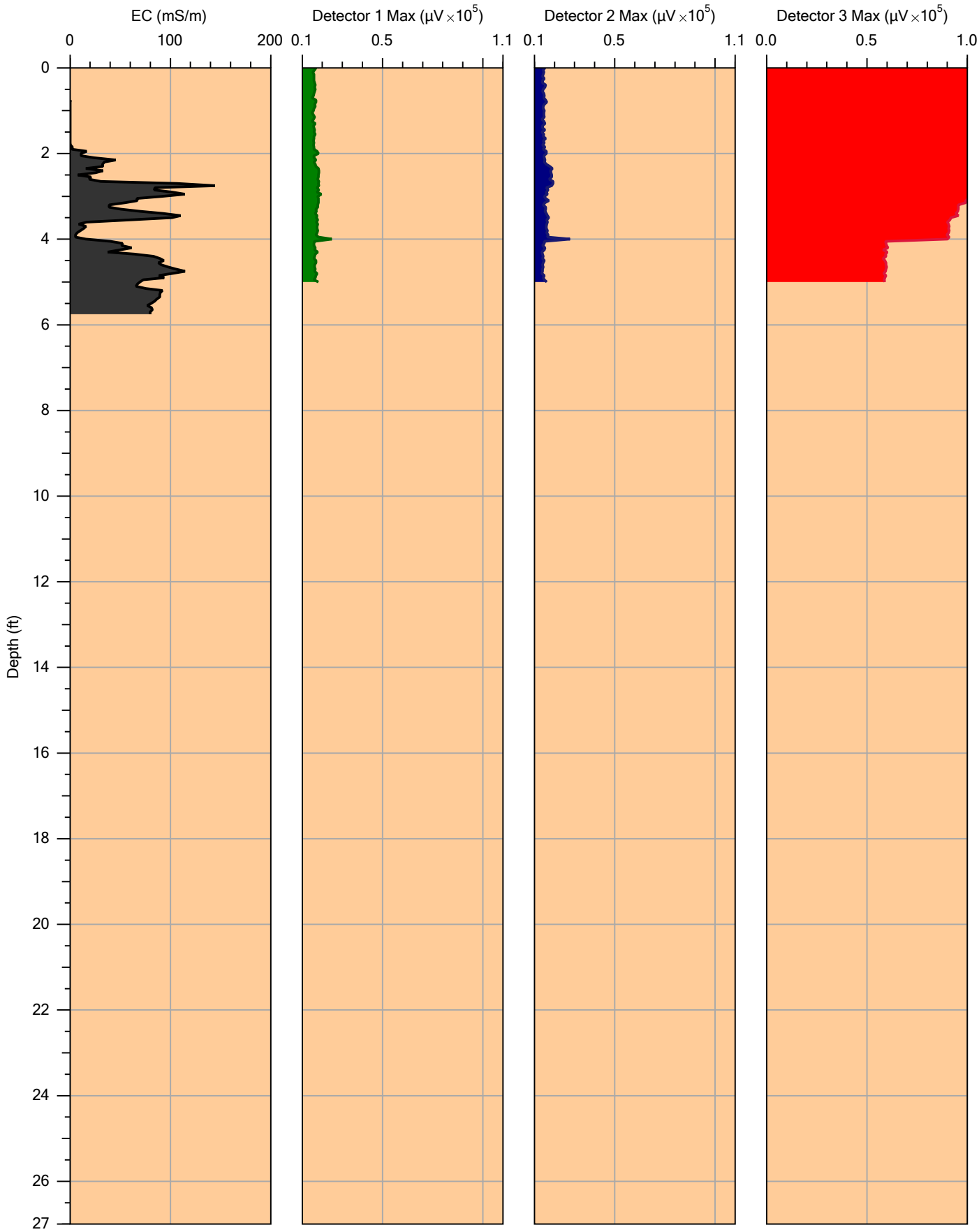
		File: LA-02.MIP
Company: Dakota Technologies	Operator: Mike Jenson	Date: 5/25/2016
Project ID: 117.16	Client: Trihydro	Location:



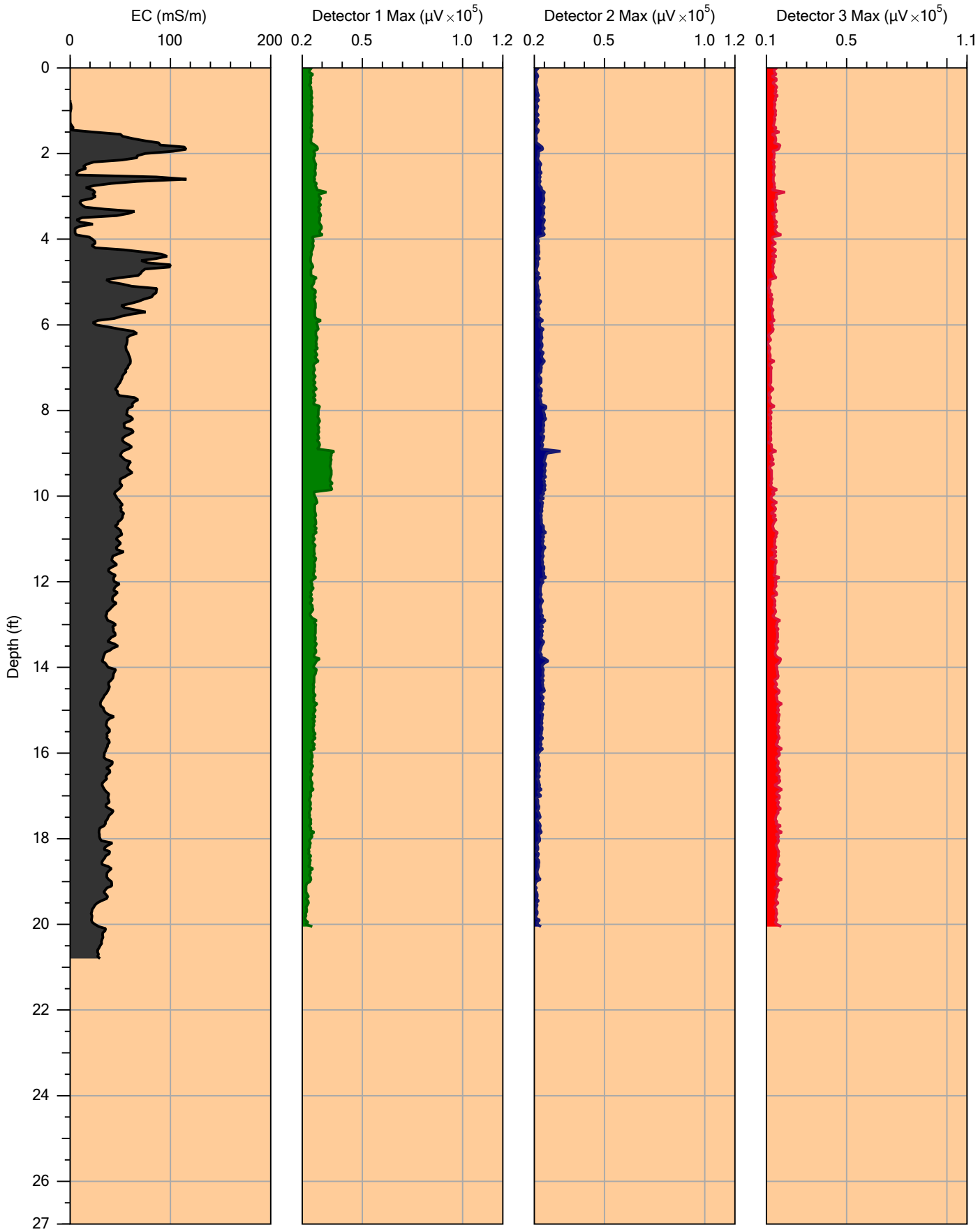
		File: LA-03.MIP
Company: Dakota Technologies	Operator: Mike Jenson	Date: 5/25/2016
Project ID: 117.16	Client: Trihydro	Location:



		File: LA-04.MIP
Company: Dakota Technologies	Operator: Mike Jenson	Date: 5/25/2016
Project ID: 117.16	Client: Trihydro	Location:



		File: LA-05.MIP
Company: Dakota Technologies	Operator: Mike Jenson	Date: 5/25/2016
Project ID: 117.16	Client: Trihydro	Location:



		File: LA-05A.MIP
Company: Dakota Technologies	Operator: Mike Jenson	Date: 5/25/2016
Project ID: 117.16	Client: Trihydro	Location:

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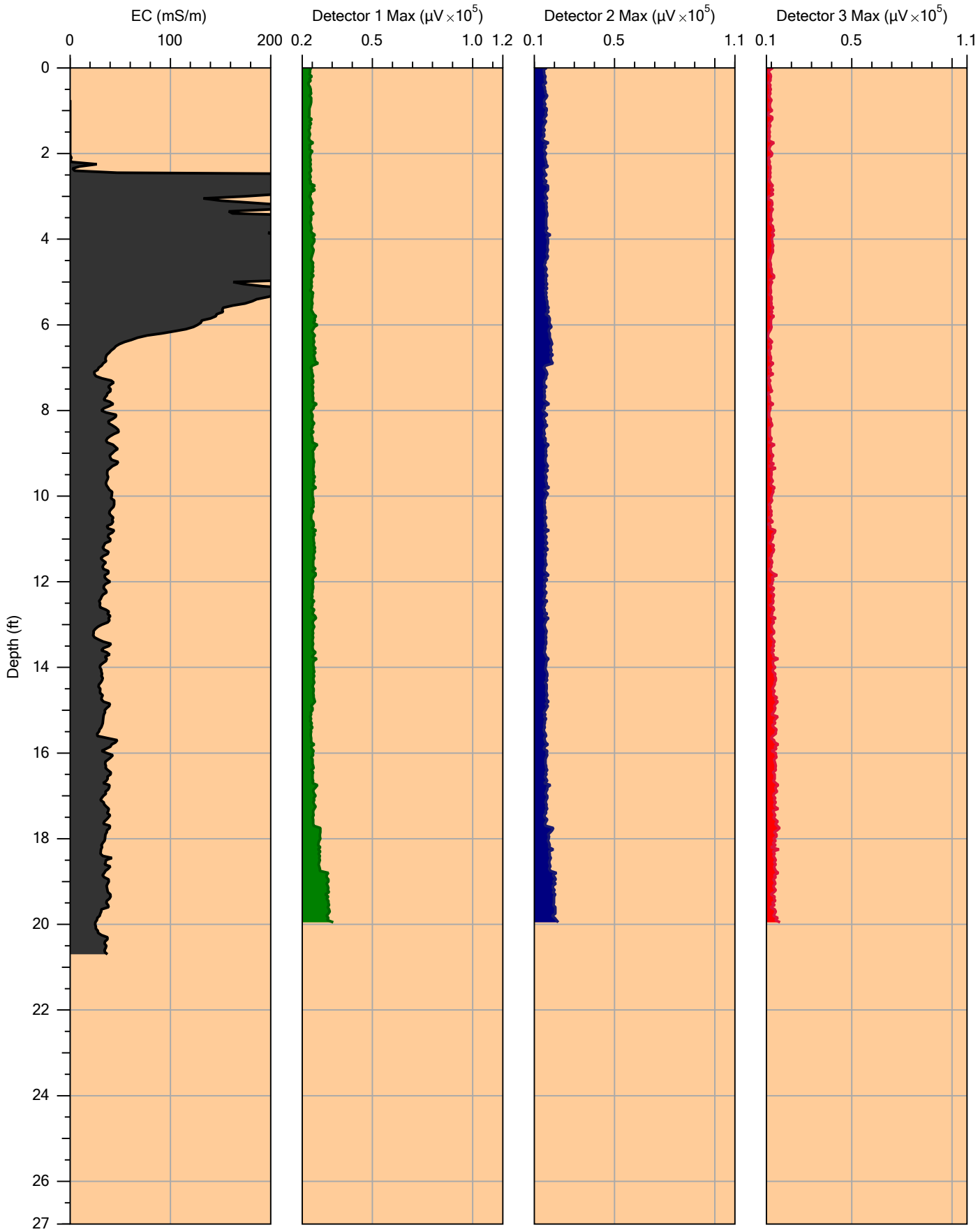
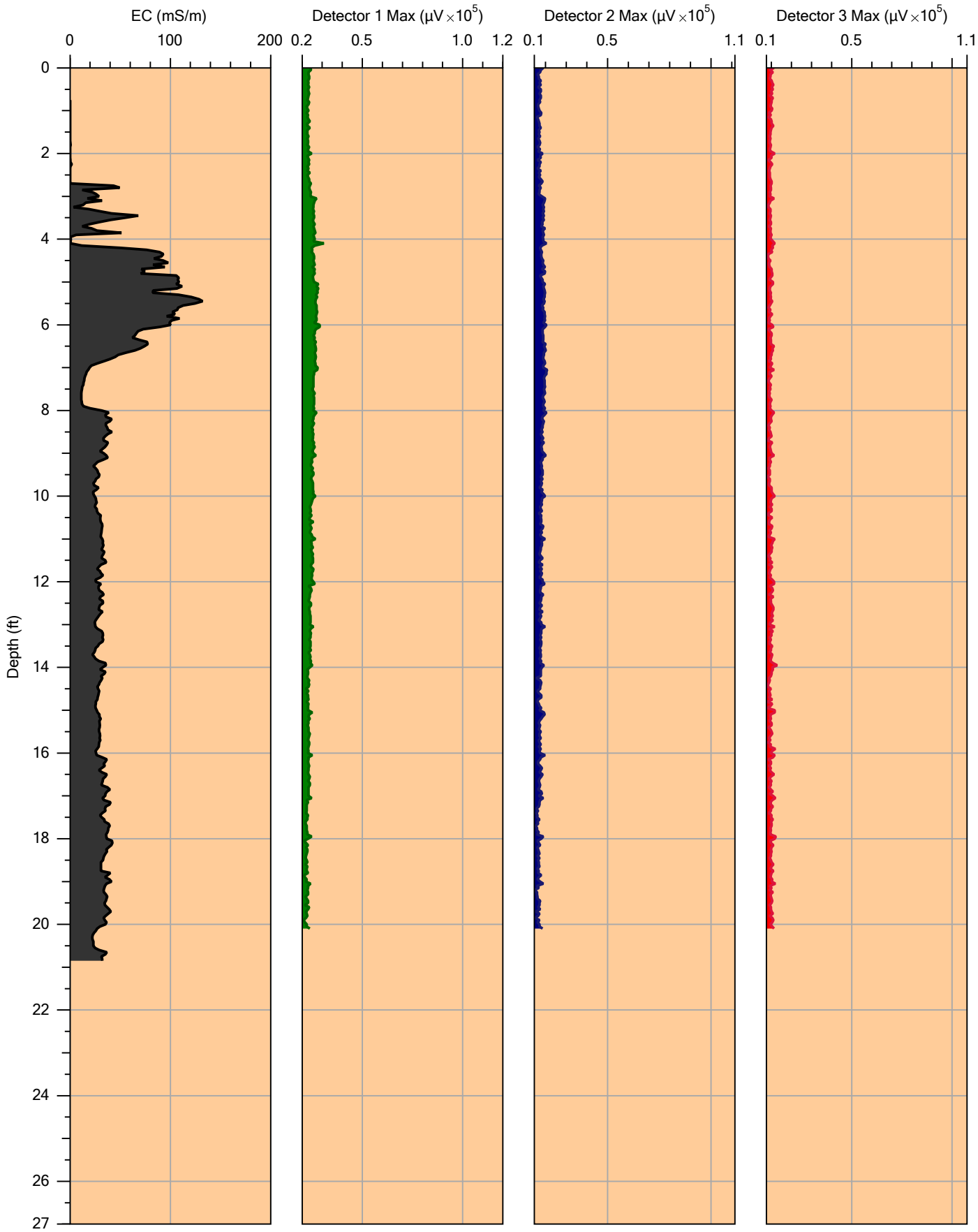


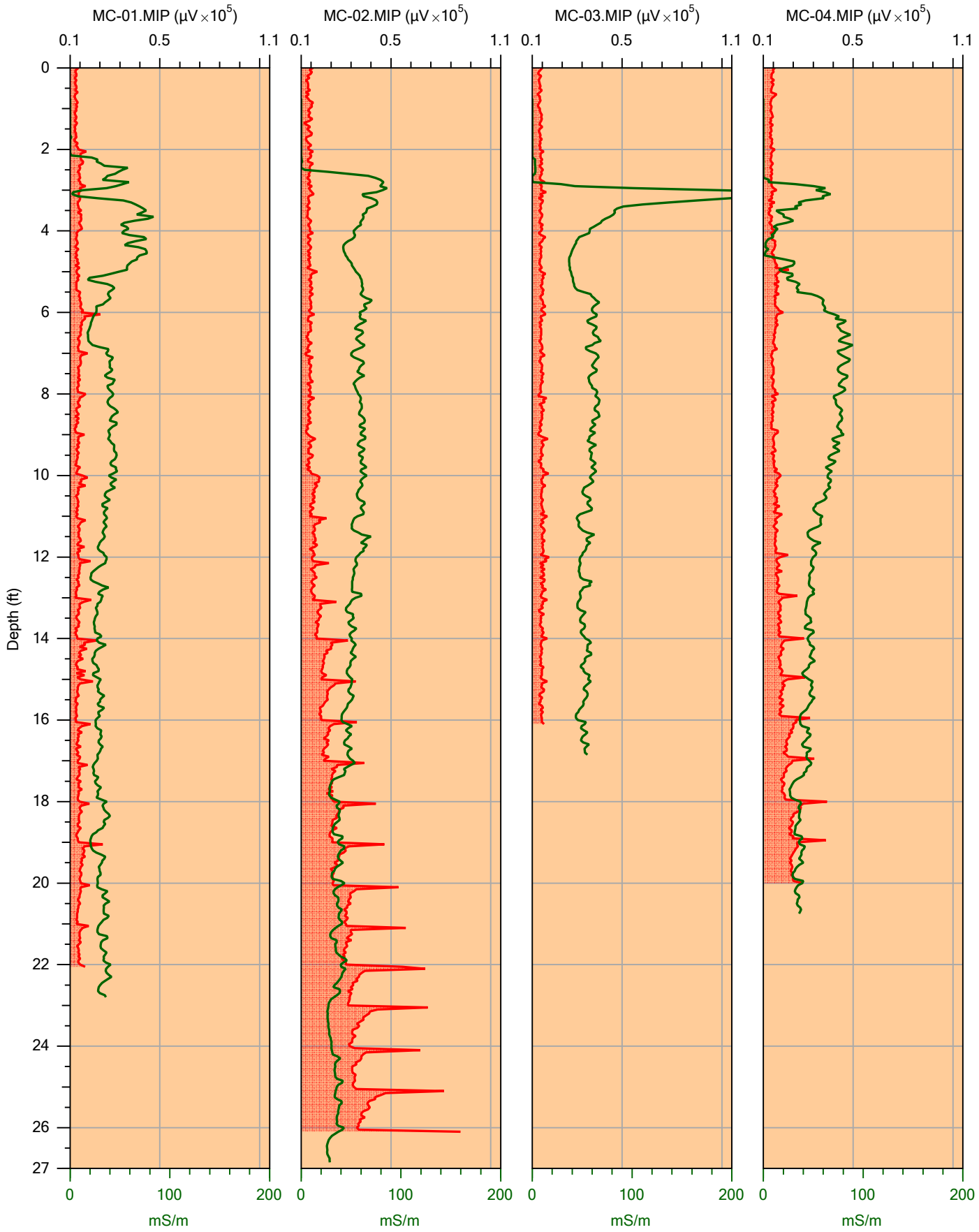
		File: LA-06.MIP
Company: Dakota Technologies	Operator: Mike Jenson	Date: 5/25/2016
Project ID: 117.16	Client: Trihydro	Location:



		File: LA-07.MIP
Company: Dakota Technologies	Operator: Mike Jenson	Date: 5/25/2016
Project ID: 117.16	Client: Trihydro	Location:

Appendix D

MIP – XSD Plots (with EC)



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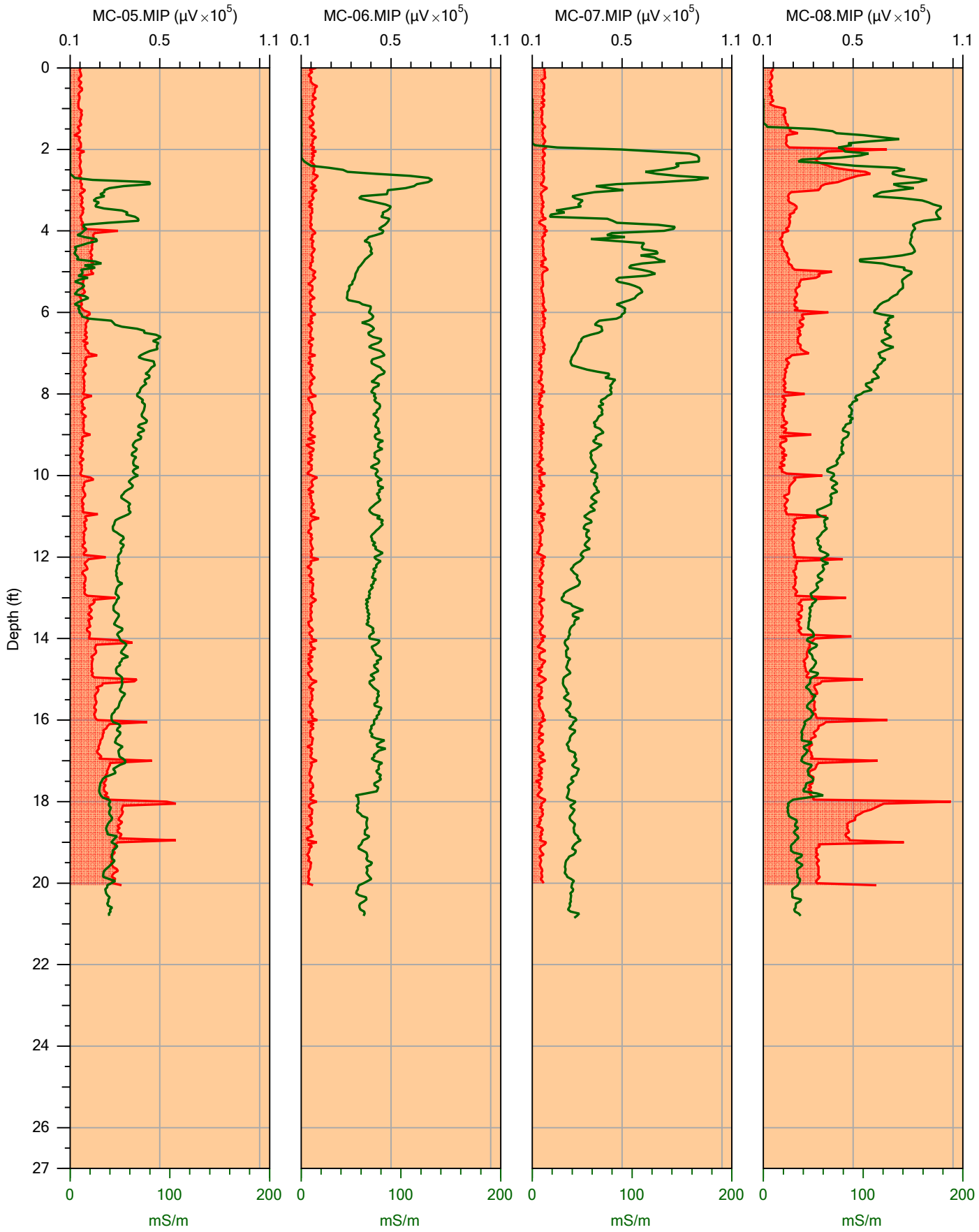
Detector 3 Max / EC

Company: Dakota Technologies	Operator: Mike Jenson
Project ID: 117.16	Client: Trihydro

MC-01.MIP	5/24/2016
MC-02.MIP	5/24/2016
MC-03.MIP	5/24/2016
MC-04.MIP	5/24/2016

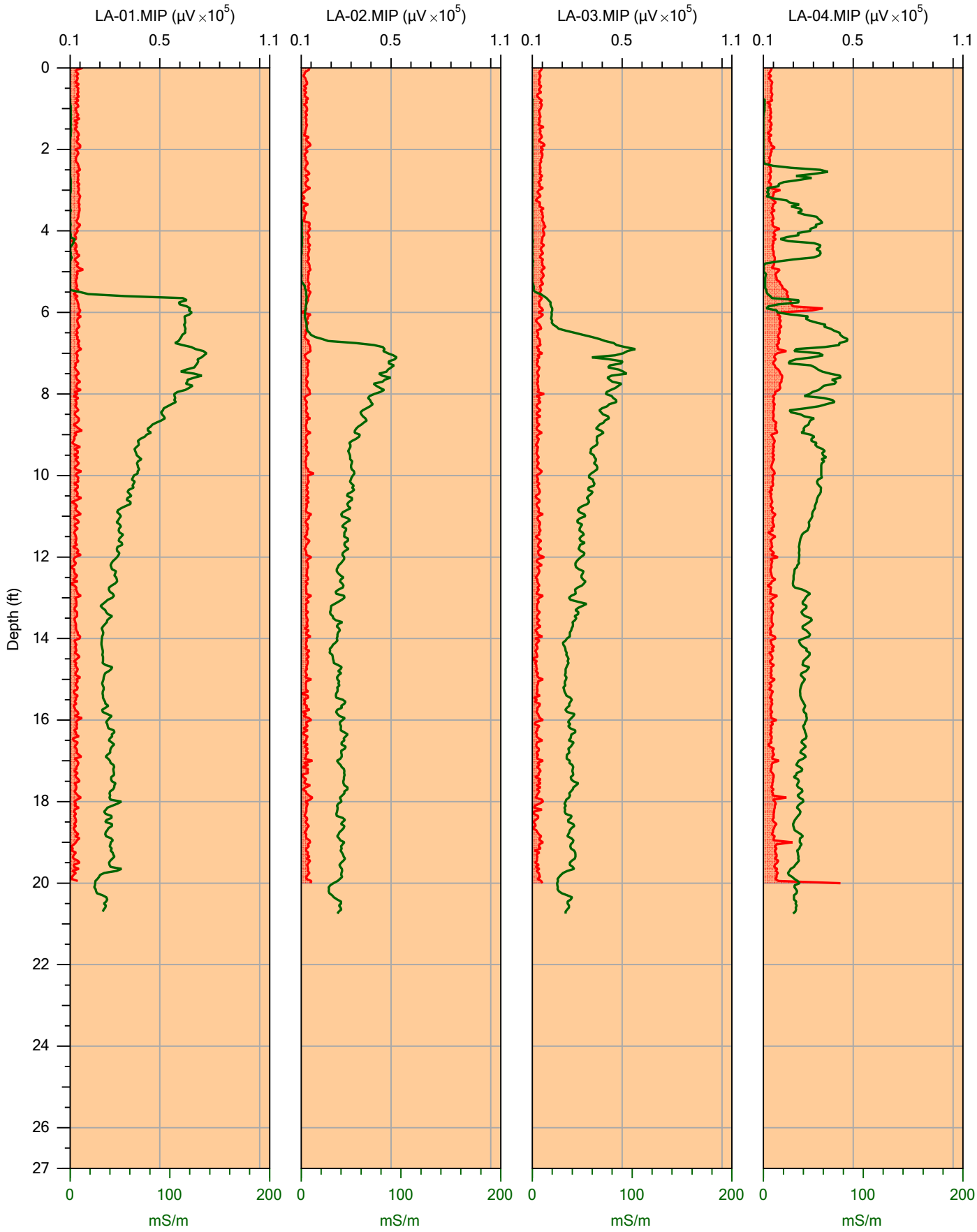


DAKOTA TECHNOLOGIES
www.DakotaTechnologies.com

Detector 3 Max / EC

Company: Dakota Technologies	Operator: Mike Jenson
Project ID: 117.16	Client: Trihydro

MC-05.MIP	5/24/2016
MC-06.MIP	5/24/2016
MC-07.MIP	5/24/2016
MC-08.MIP	5/24/2016



DAKOTA TECHNOLOGIES
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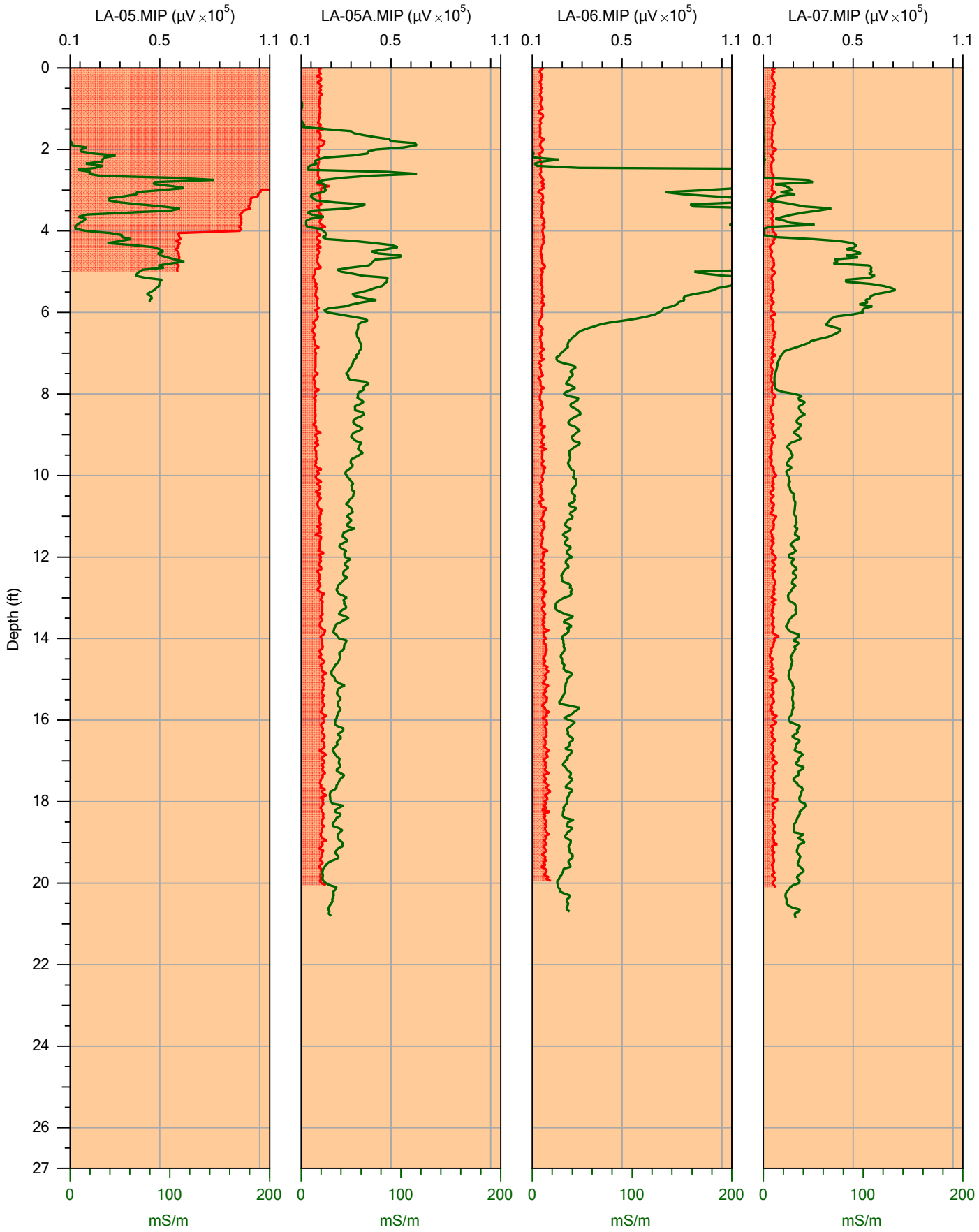
Detector 3 Max / EC

Company: Dakota Technologies	Operator: Mike Jenson
Project ID: 117.16	Client: Trihydro

LA-01.MIP	5/25/2016
LA-02.MIP	5/25/2016
LA-03.MIP	5/25/2016
LA-04.MIP	5/25/2016



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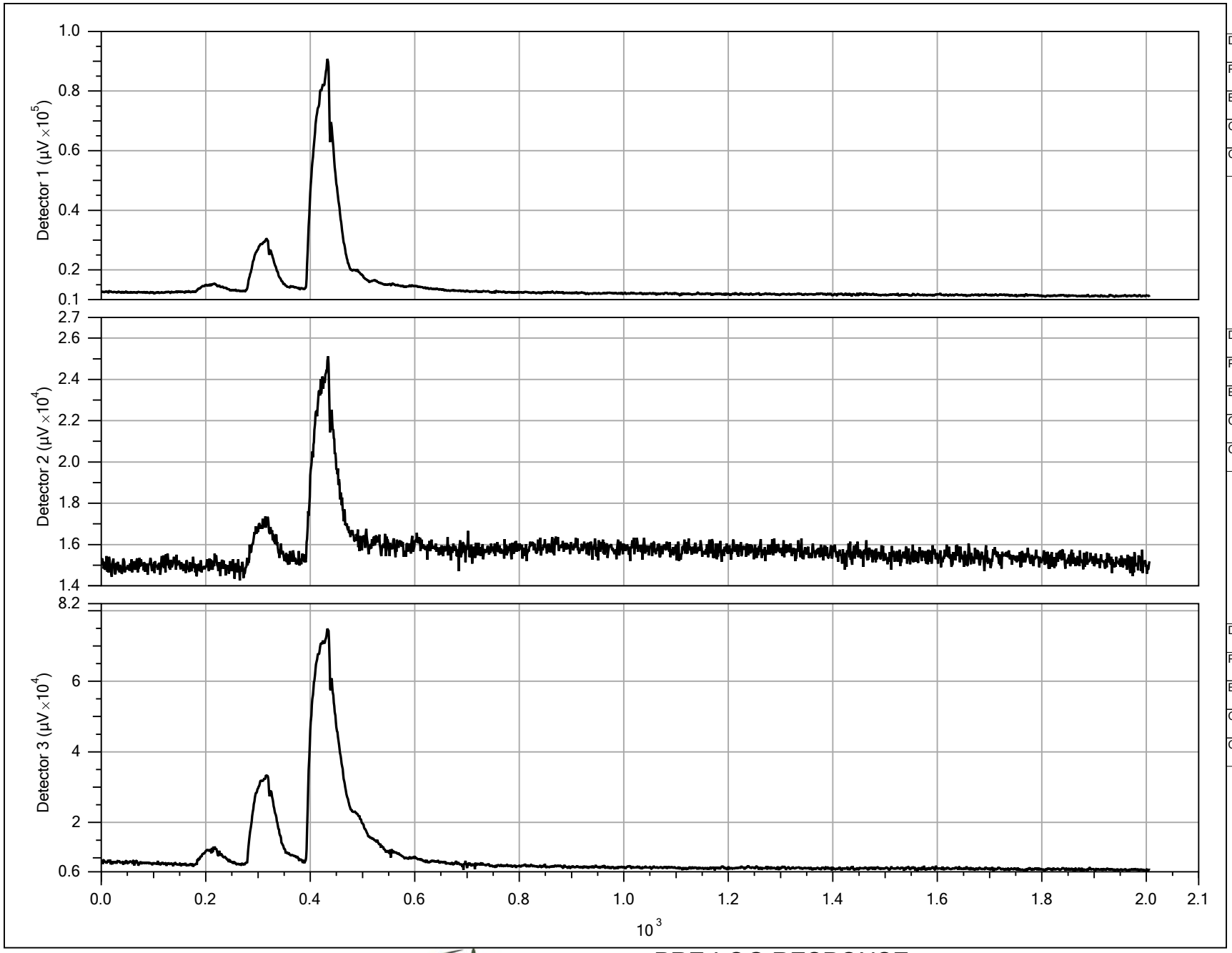
Detector 3 Max / EC

Company: Dakota Technologies	Operator: Mike Jenson
Project ID: 117.16	Client: Trihydro

LA-05.MIP	5/25/2016
LA-05A.MIP	5/25/2016
LA-06.MIP	5/25/2016
LA-07.MIP	5/25/2016

Appendix E

MIP Quality Control – Autoscaled Detectors



Detector:
Detector 1
Peak Response:
90762 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 1, 5, 25 ppm

Detector:
Detector 2
Peak Response:
25117 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 1, 5, 25 ppm

Detector:
Detector 3
Peak Response:
74892 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 1, 5, 25 ppm

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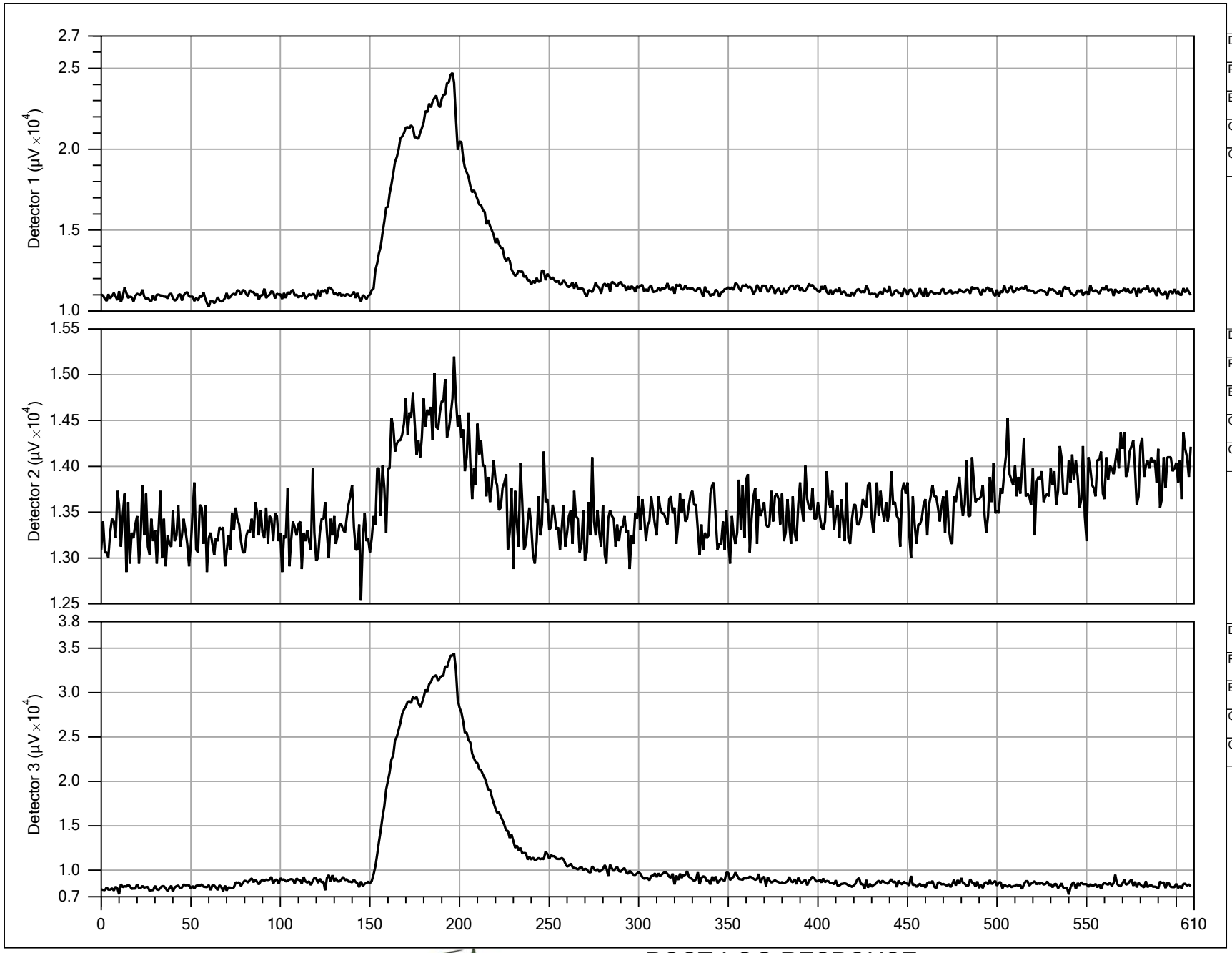
PRE-LOG RESPONSE

Company:	Operator:	File:
Dakota Technologies	Mike Jenson	MC-01.PRE.TIM
Project ID:	Client:	Date:
117.16	Trihydro	5/24/2016



Detector:
Detector 1
Peak Response:
24720 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 2
Peak Response:
15198 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 3
Peak Response:
34425 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

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POST-LOG RESPONSE

Company:	Operator:	File:
Dakota Technologies	Mike Jenson	MC-01.POST.TIM
Project ID:	Client:	Date:
117.16	Trihydro	5/24/2016

MIP PRE-LOG RESPONSE TEST

FILENAME: MC-01.pre.tim
COMPOUND: TCE
CONCENTRATION: 0, 1, 5, 25 ppm
FLOW: 40 mL/min
RESPONSE TEST START TIME: Tue May 24 2016 09:50:12

RESPONSE TEST ATTENUATION CHANGES

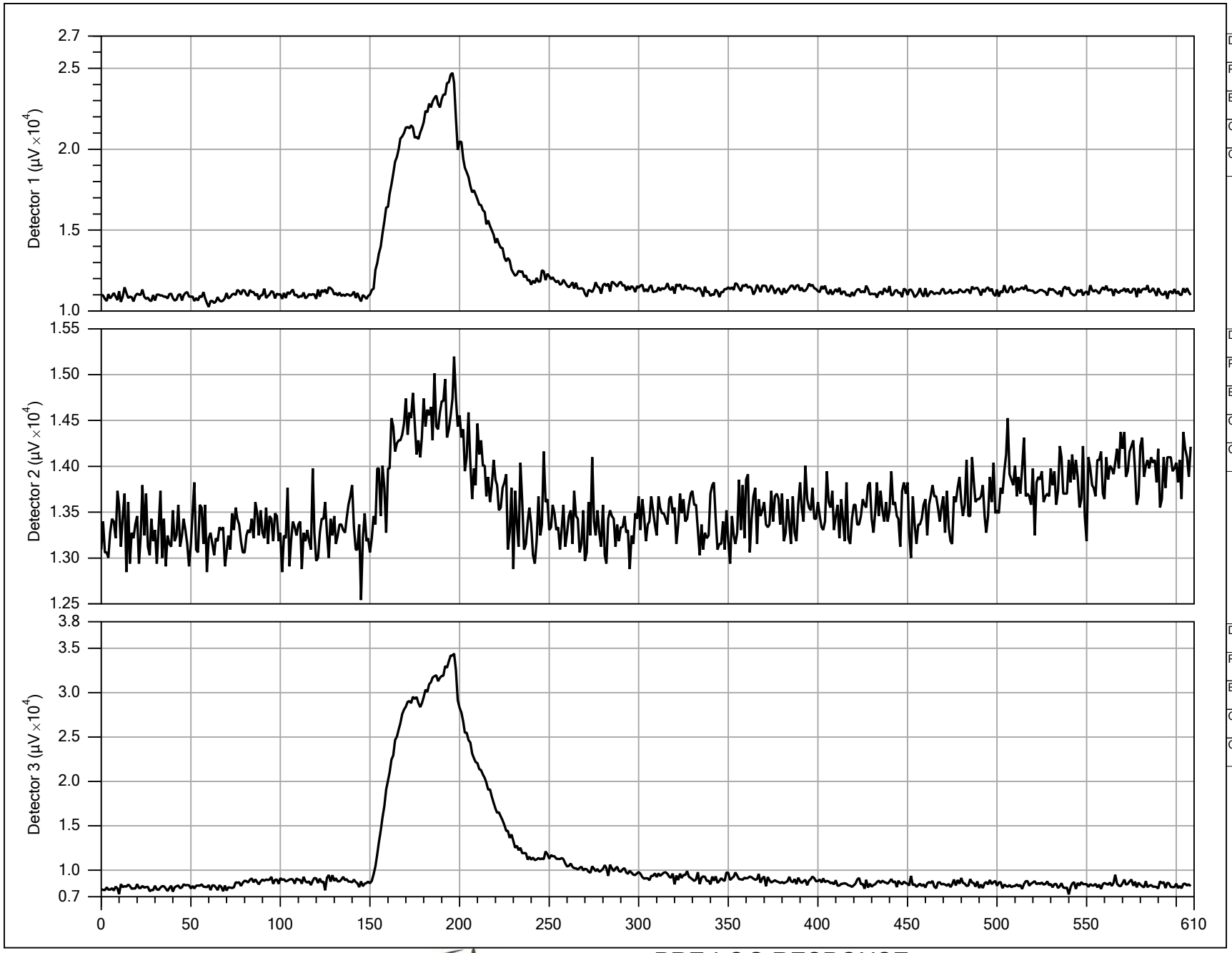
TIME	DET1	DET2	DET3	DET4
0	4	4	4	1

MIP POST-LOG RESPONSE TEST

FILENAME: MC-01.post.tim
COMPOUND: TCE
CONCENTRATION: 0, 5 ppm
FLOW: 40 mL/min
RESPONSE TEST START TIME: Tue May 24 2016 11:47:02

RESPONSE TEST ATTENUATION CHANGES

TIME	DET1	DET2	DET3	DET4
0	4	4	4	1



Detector:
Detector 1
Peak Response:
24720 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 2
Peak Response:
15198 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 3
Peak Response:
34425 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

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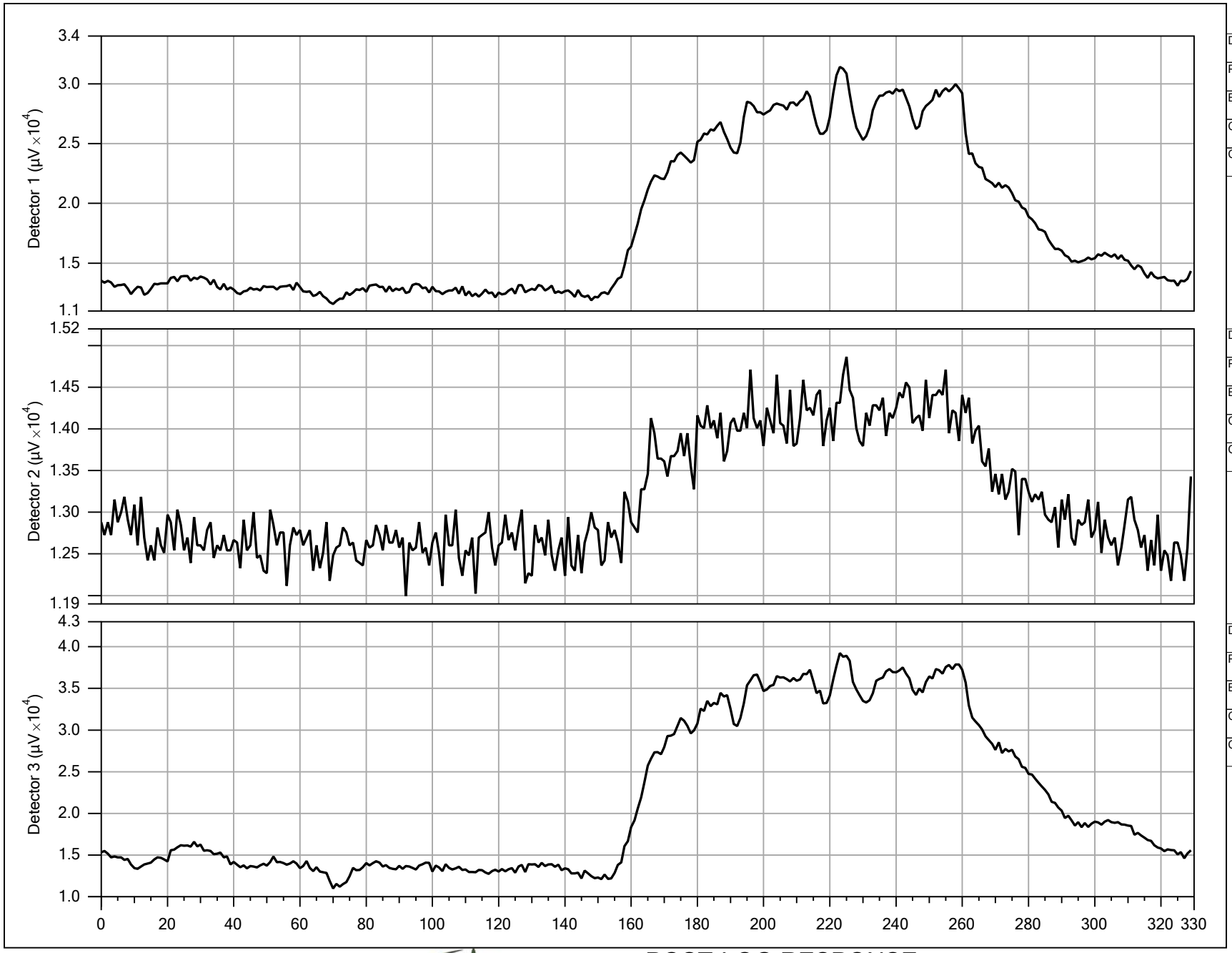
PRE-LOG RESPONSE

Company:	Operator:	File:
Dakota Technologies	Mike Jenson	MC-02.PRE.TIM
Project ID:	Client:	Date:
117.16	Trihydro	5/24/2016



Detector:
Detector 1
Peak Response:
31404 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 2
Peak Response:
14863 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 3
Peak Response:
39247 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

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POST-LOG RESPONSE

Company:	Operator:	File:
Dakota Technologies	Mike Jenson	MC-02.POST.TIM
Project ID:	Client:	Date:
117.16	Trihydro	5/24/2016

MIP PRE-LOG RESPONSE TEST (Post-Log From MC-01.zip)

FILENAME: MC-02.pre.tim
COMPOUND: TCE
CONCENTRATION: 0, 5 ppm
FLOW: 40 mL/min
RESPONSE TEST START TIME: Tue May 24 2016 11:47:02

RESPONSE TEST ATTENUATION CHANGES

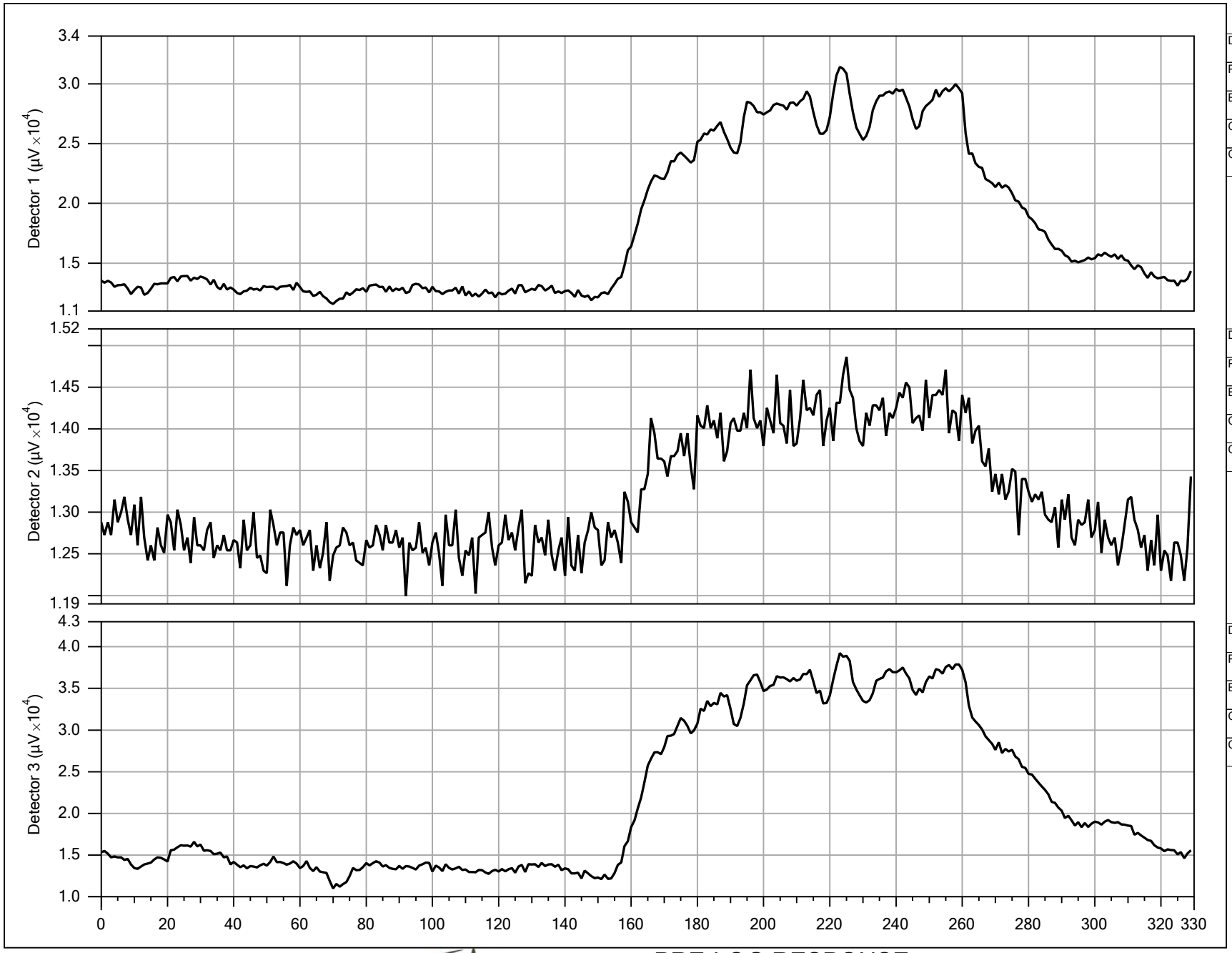
TIME	DET1	DET2	DET3	DET4
0	4	4	4	1

MIP POST-LOG RESPONSE TEST

FILENAME: MC-02.post.tim
COMPOUND: TCE
CONCENTRATION: 0, 5 ppm
FLOW: 40 mL/min
RESPONSE TEST START TIME: Tue May 24 2016 13:37:24

RESPONSE TEST ATTENUATION CHANGES

TIME	DET1	DET2	DET3	DET4
0	4	4	4	1



Detector:
Detector 1
Peak Response:
31404 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 2
Peak Response:
14863 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 3
Peak Response:
39247 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

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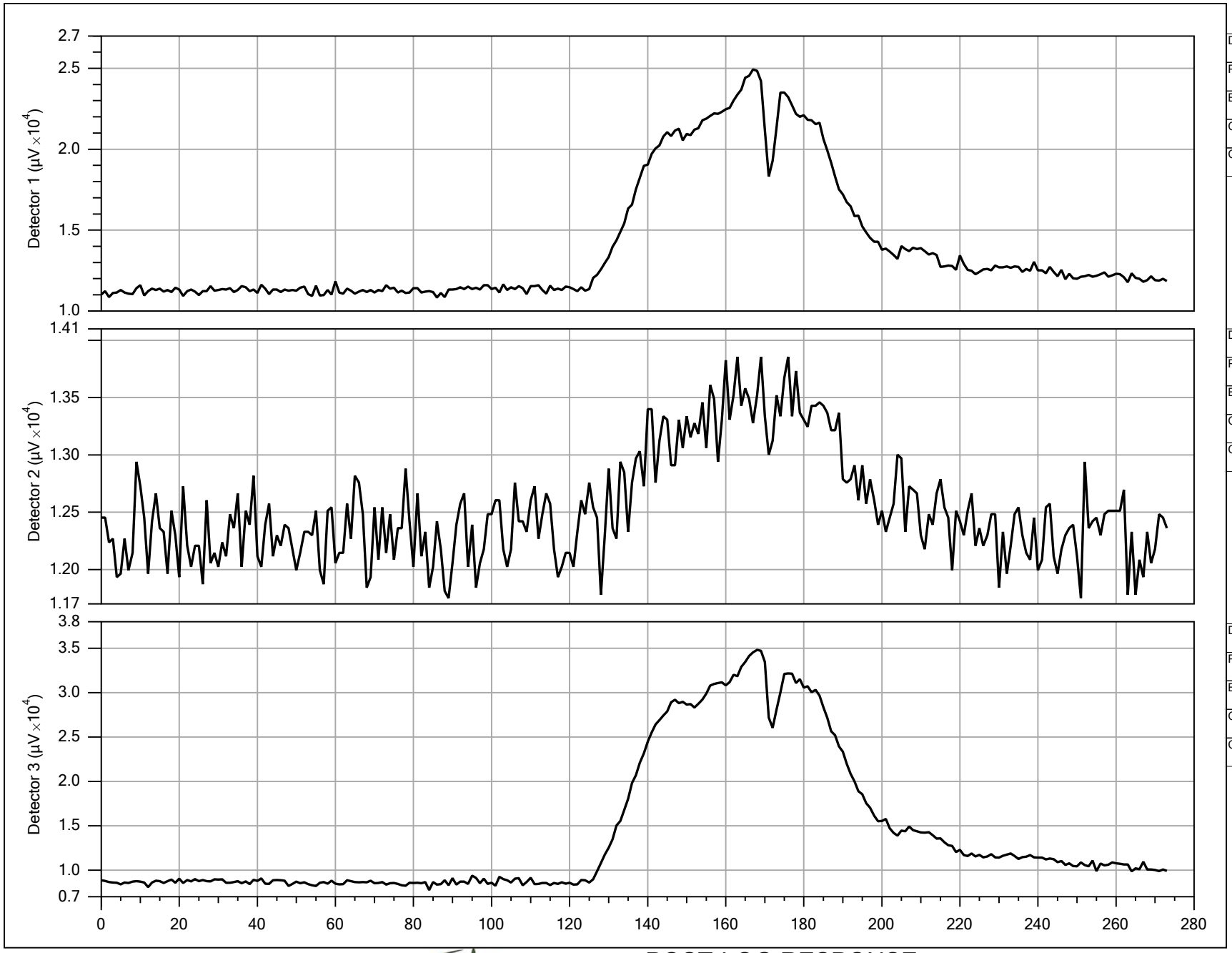
PRE-LOG RESPONSE

Company:	Operator:	File:
Dakota Technologies	Mike Jenson	MC-03.PRE.TIM
Project ID:	**Client:**	**Date:**
117.16	Trihydro	5/24/2016



Detector:
Detector 1
Peak Response:
24934 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 2
Peak Response:
13855 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 3
Peak Response:
34822 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

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POST-LOG RESPONSE

Company:	Operator:	File:
Dakota Technologies	Mike Jenson	MC-03.POST.TIM
Project ID:	Client:	Date:
117.16	Trihydro	5/24/2016

MIP PRE-LOG RESPONSE TEST (Post-Log From MC-02.zip)

FILENAME: MC-03.pre.tim
COMPOUND: TCE
CONCENTRATION: 0, 5 ppm
FLOW: 40 mL/min
RESPONSE TEST START TIME: Tue May 24 2016 13:37:24

RESPONSE TEST ATTENUATION CHANGES

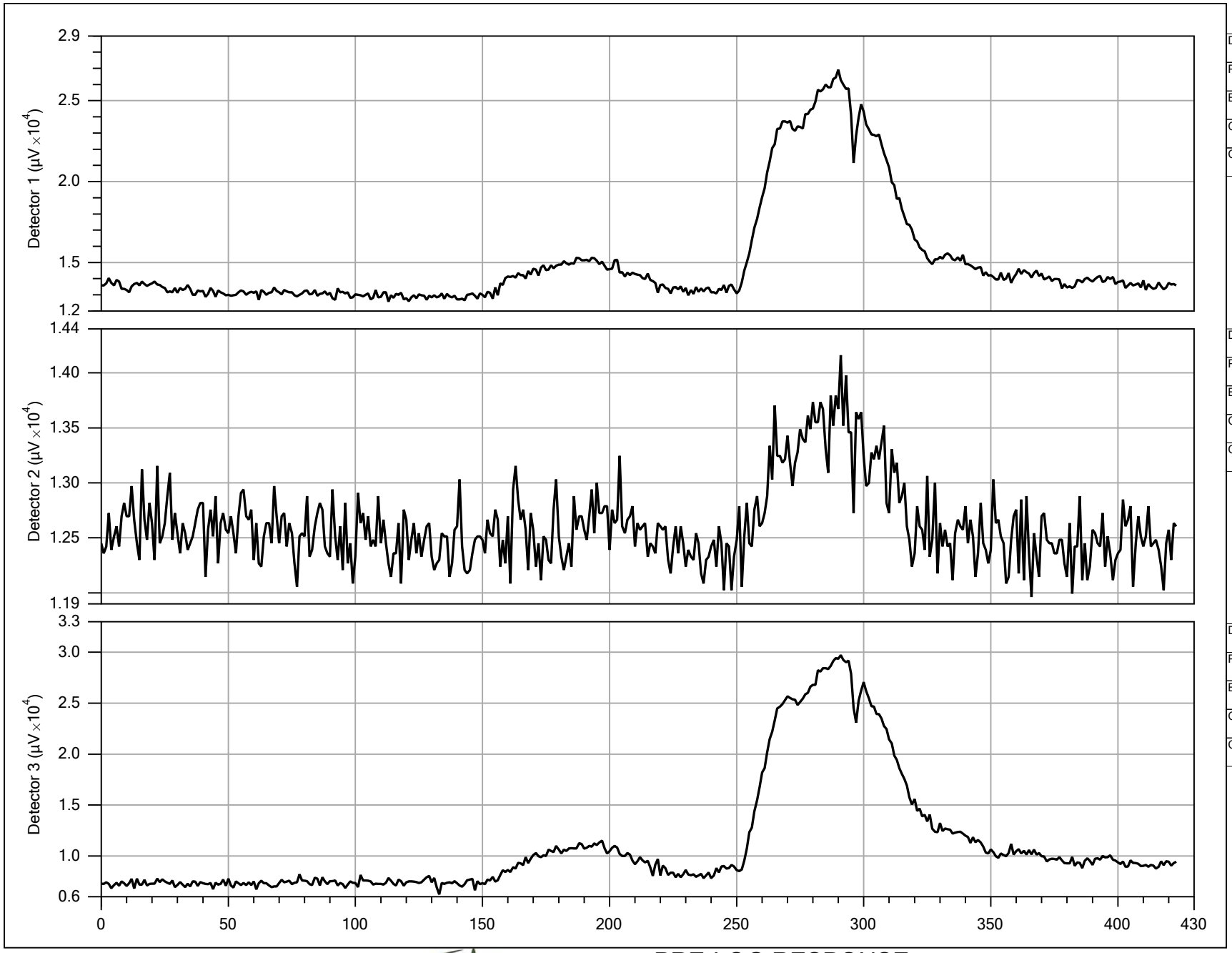
TIME	DET1	DET2	DET3	DET4
0	4	4	4	1

MIP POST-LOG RESPONSE TEST

FILENAME: MC-03.post.tim
COMPOUND: TCE
CONCENTRATION: 0, 5 ppm
FLOW: 40 mL/min
RESPONSE TEST START TIME: Tue May 24 2016 14:48:44

RESPONSE TEST ATTENUATION CHANGES

TIME	DET1	DET2	DET3	DET4
0	4	4	4	1



Detector:
Detector 1
Peak Response:
26917 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 1, 5 ppm

Detector:
Detector 2
Peak Response:
14161 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 1, 5 ppm

Detector:
Detector 3
Peak Response:
29725 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 1, 5 ppm

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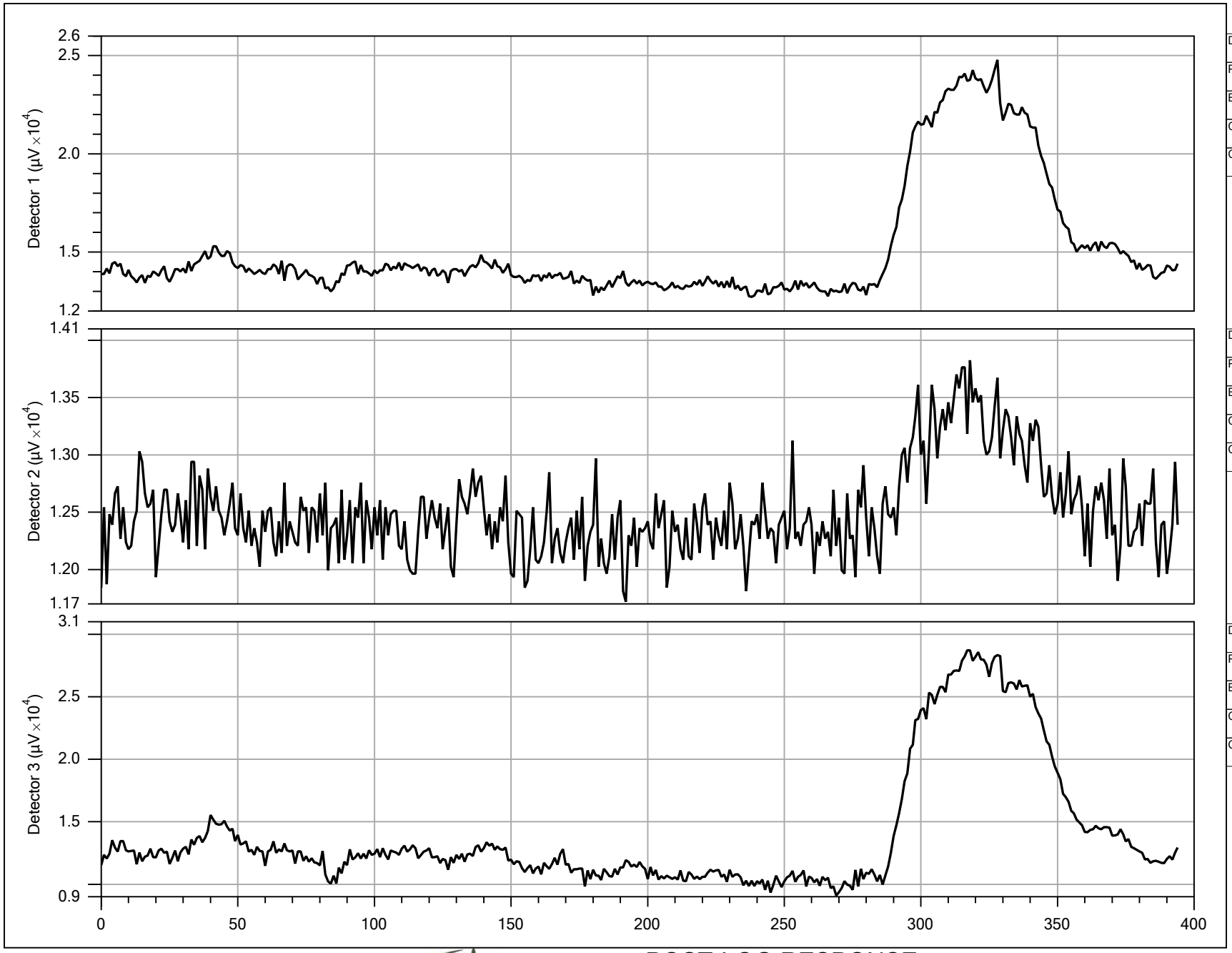
PRE-LOG RESPONSE

Company:	Operator:	File:
Dakota Technologies	Mike Jenson	MC-04.PRE.TIM
Project ID:	Client:	Date:
117.16	Trihydro	5/24/2016



Detector:
Detector 1
Peak Response:
24781 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 2
Peak Response:
13825 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 3
Peak Response:
28718 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

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POST-LOG RESPONSE

Company:	Operator:	File:
Dakota Technologies	Mike Jenson	MC-04.POST.TIM
Project ID:	Client:	Date:
117.16	Trihydro	5/24/2016

MIP PRE-LOG RESPONSE TEST

FILENAME: MC-04.pre.tim
COMPOUND: TCE
CONCENTRATION: 0, 1, 5 ppm
FLOW: 40 mL/min
RESPONSE TEST START TIME: Tue May 24 2016 16:15:09

RESPONSE TEST ATTENUATION CHANGES

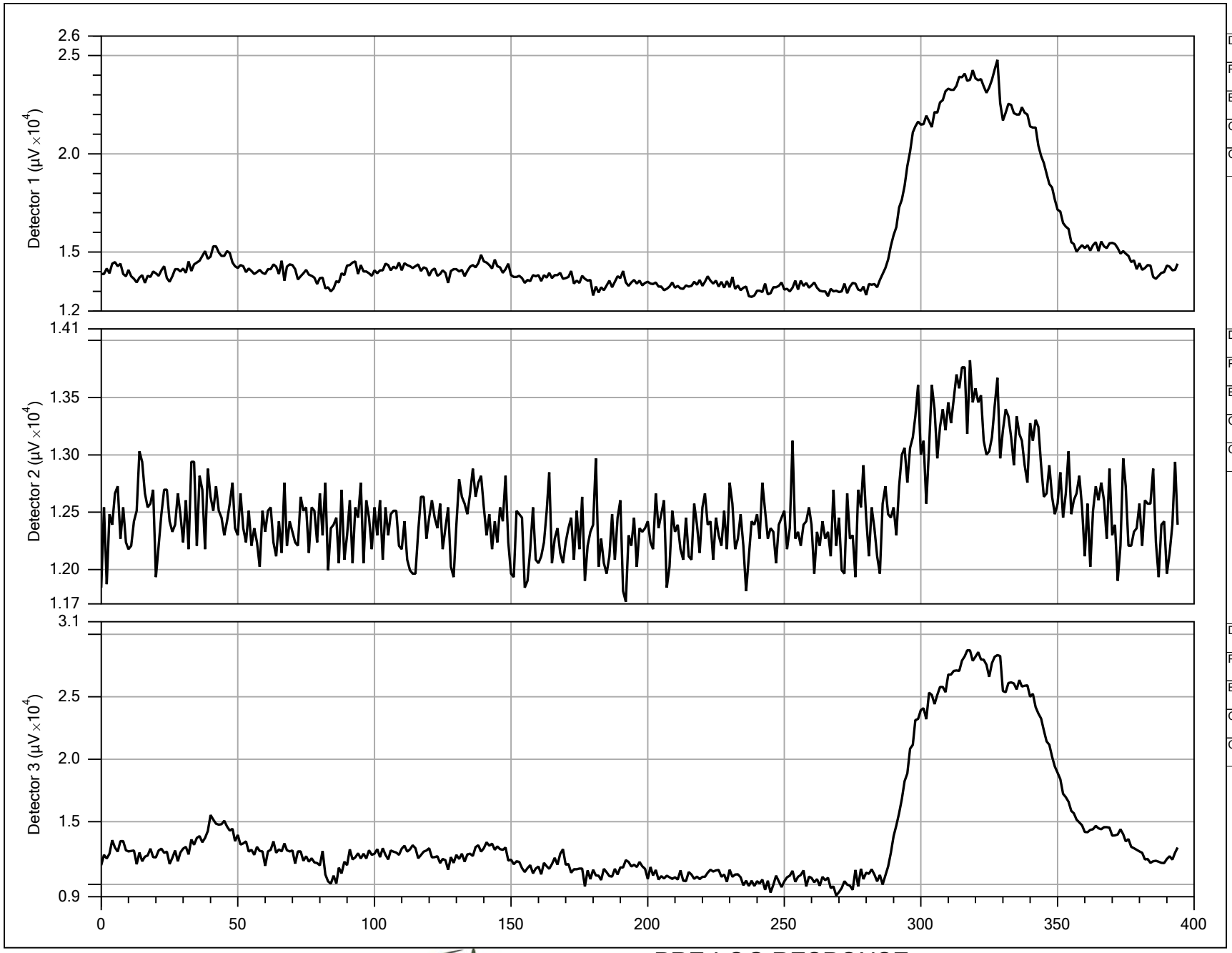
TIME	DET1	DET2	DET3	DET4
0	4	4	4	1

MIP POST-LOG RESPONSE TEST

FILENAME: MC-04.post.tim
COMPOUND: TCE
CONCENTRATION: 0, 5 ppm
FLOW: 40 mL/min
RESPONSE TEST START TIME: Tue May 24 2016 17:17:44

RESPONSE TEST ATTENUATION CHANGES

TIME	DET1	DET2	DET3	DET4
0	4	4	4	1



Detector:
Detector 1
Peak Response:
24781 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 2
Peak Response:
13825 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 3
Peak Response:
28718 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

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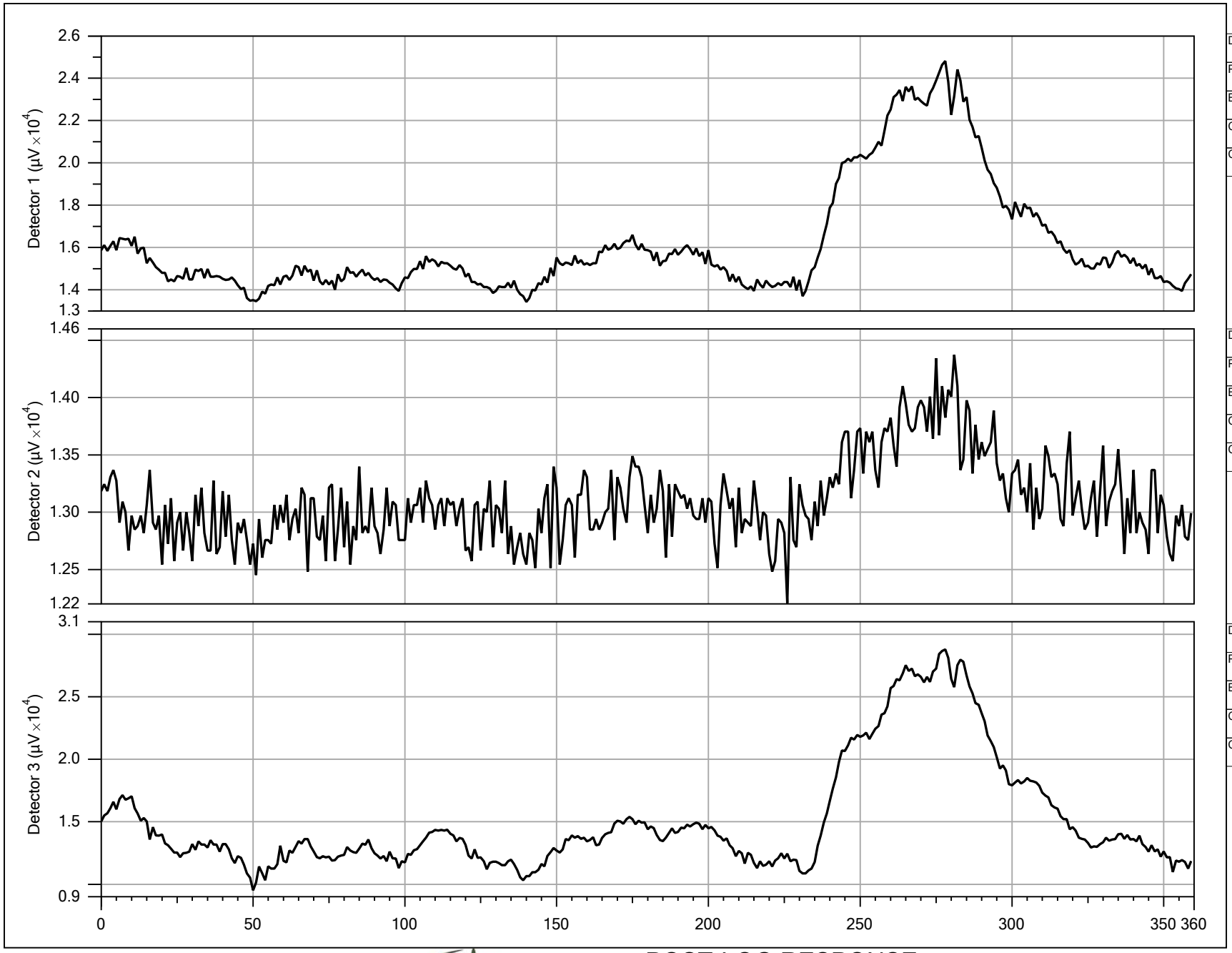
PRE-LOG RESPONSE

Company:	Operator:	File:
Dakota Technologies	Mike Jenson	MC-05.PRE.TIM
Project ID:	Client:	Date:
117.16	Trihydro	5/24/2016



Detector:
Detector 1
Peak Response:
24812 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 1, 5 ppm

Detector:
Detector 2
Peak Response:
14374 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 1, 5 ppm

Detector:
Detector 3
Peak Response:
28779 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 1, 5 ppm

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POST-LOG RESPONSE

Company:	Operator:	File:
Dakota Technologies	Mike Jenson	MC-05.POST.TIM
Project ID:	Client:	Date:
117.16	Trihydro	5/24/2016

MIP PRE-LOG RESPONSE TEST (Post-Log From MC-04.zip)

FILENAME: MC-05.pre.tim
COMPOUND: TCE
CONCENTRATION: 0, 5 ppm
FLOW: 40 mL/min
RESPONSE TEST START TIME: Tue May 24 2016 17:17:44

RESPONSE TEST ATTENUATION CHANGES

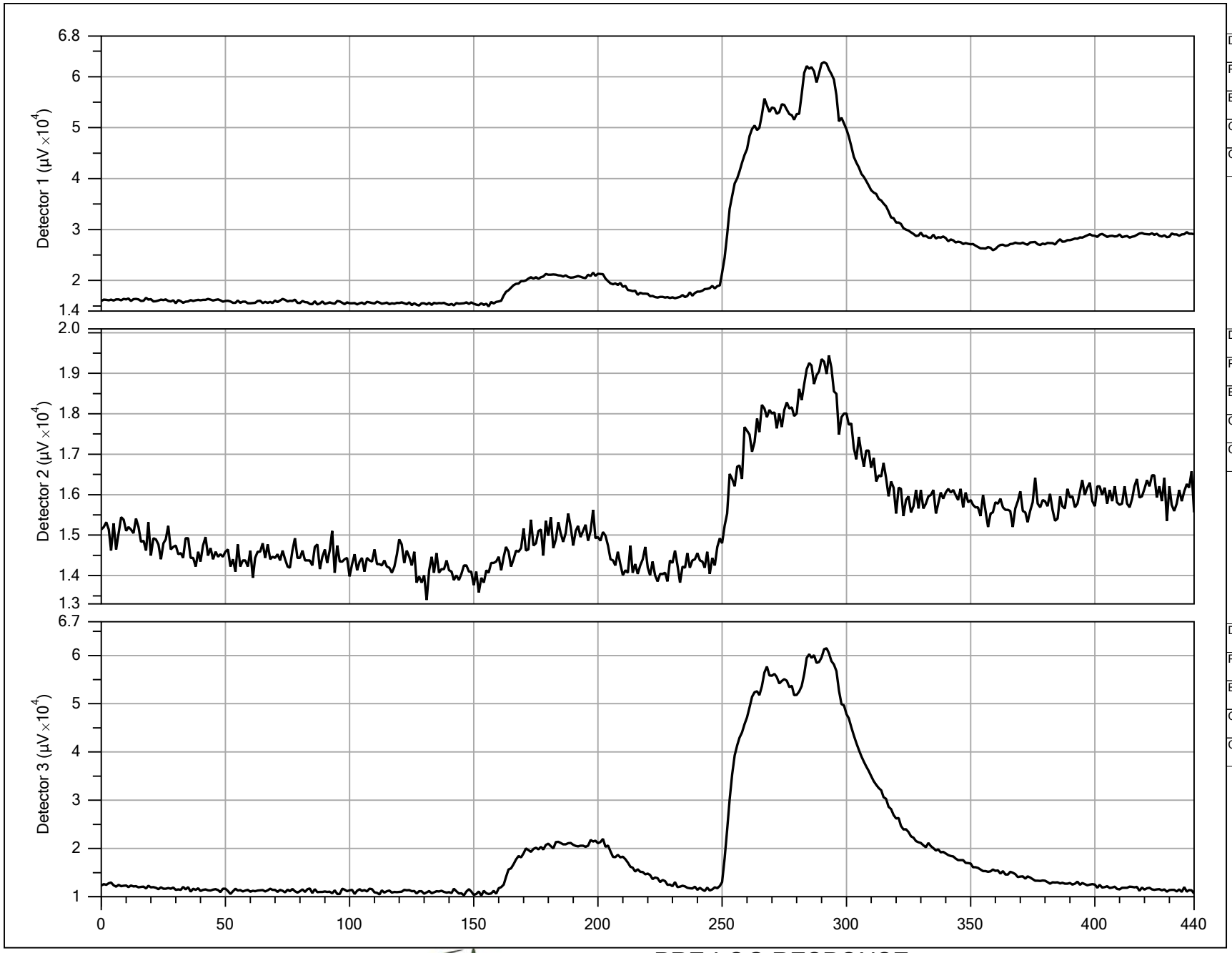
TIME	DET1	DET2	DET3	DET4
0	4	4	4	1

MIP POST-LOG RESPONSE TEST

FILENAME: MC-05.post.tim
COMPOUND: TCE
CONCENTRATION: 0, 1, 5 ppm
FLOW: 40 mL/min
RESPONSE TEST START TIME: Tue May 24 2016 18:39:36

RESPONSE TEST ATTENUATION CHANGES

TIME	DET1	DET2	DET3	DET4
0	4	4	4	1



Detector:
Detector 1
Peak Response:
62838 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 1, 5, 25 ppm

Detector:
Detector 2
Peak Response:
19440 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 1, 5, 25 ppm

Detector:
Detector 3
Peak Response:
61495 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 1, 5, 25 ppm

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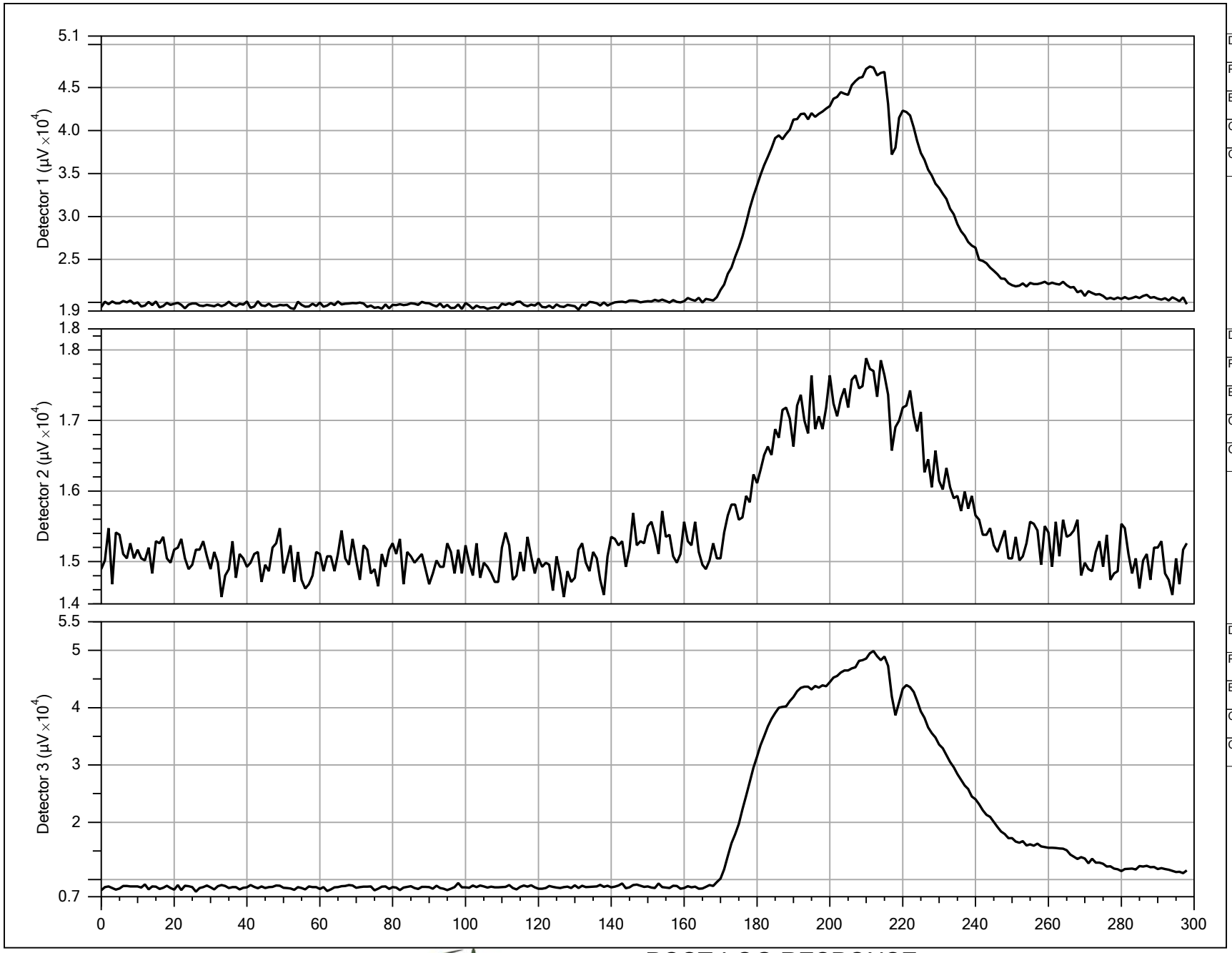
PRE-LOG RESPONSE

Company:	Operator:	File:
Dakota Technologies	Mike Jenson	MC-06.PRE.TIM
Project ID:	Client:	Date:
117.16	Trihydro	5/24/2016



Detector:
Detector 1
Peak Response:
47456 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 2
Peak Response:
17884 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 3
Peak Response:
49867 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

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POST-LOG RESPONSE

Company:	Operator:	File:
Dakota Technologies	Mike Jenson	MC-06.POST.TIM
Project ID:	Client:	Date:
117.16	Trihydro	5/24/2016

MIP PRE-LOG RESPONSE TEST

FILENAME: MC-06.pre.tim
COMPOUND: TCE
CONCENTRATION: 0, 1, 5, 25 ppm
FLOW: 40 mL/min
RESPONSE TEST START TIME: Tue May 24 2016 18:54:55

RESPONSE TEST ATTENUATION CHANGES

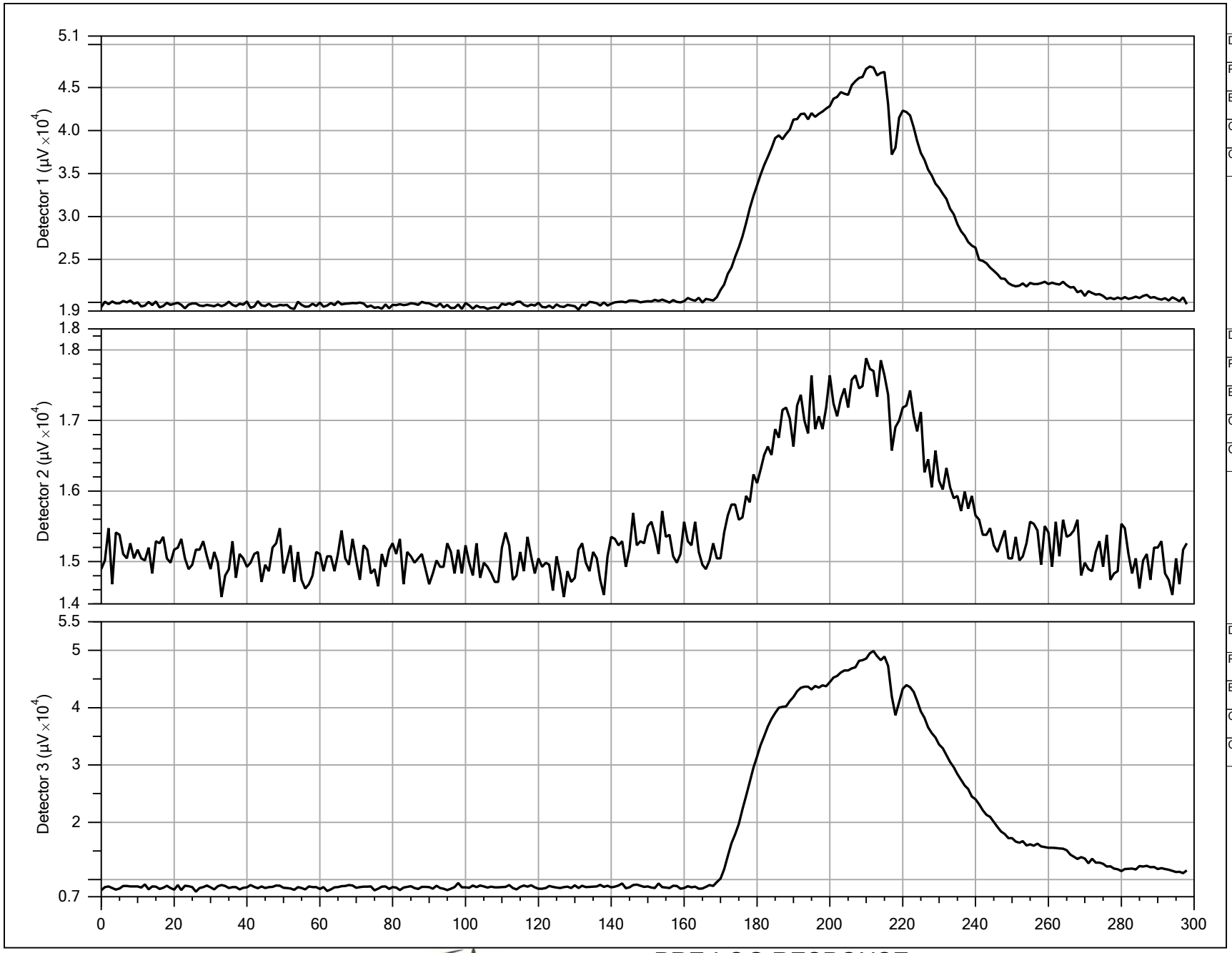
TIME	DET1	DET2	DET3	DET4
0	4	4	4	1

MIP POST-LOG RESPONSE TEST

FILENAME: MC-06.post.tim
COMPOUND: TCE
CONCENTRATION: 0, 5 ppm
FLOW: 40 mL/min
RESPONSE TEST START TIME: Tue May 24 2016 19:48:17

RESPONSE TEST ATTENUATION CHANGES

TIME	DET1	DET2	DET3	DET4
0	4	4	4	1



Detector:
Detector 1
Peak Response:
47456 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 2
Peak Response:
17884 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 3
Peak Response:
49867 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 5 ppm

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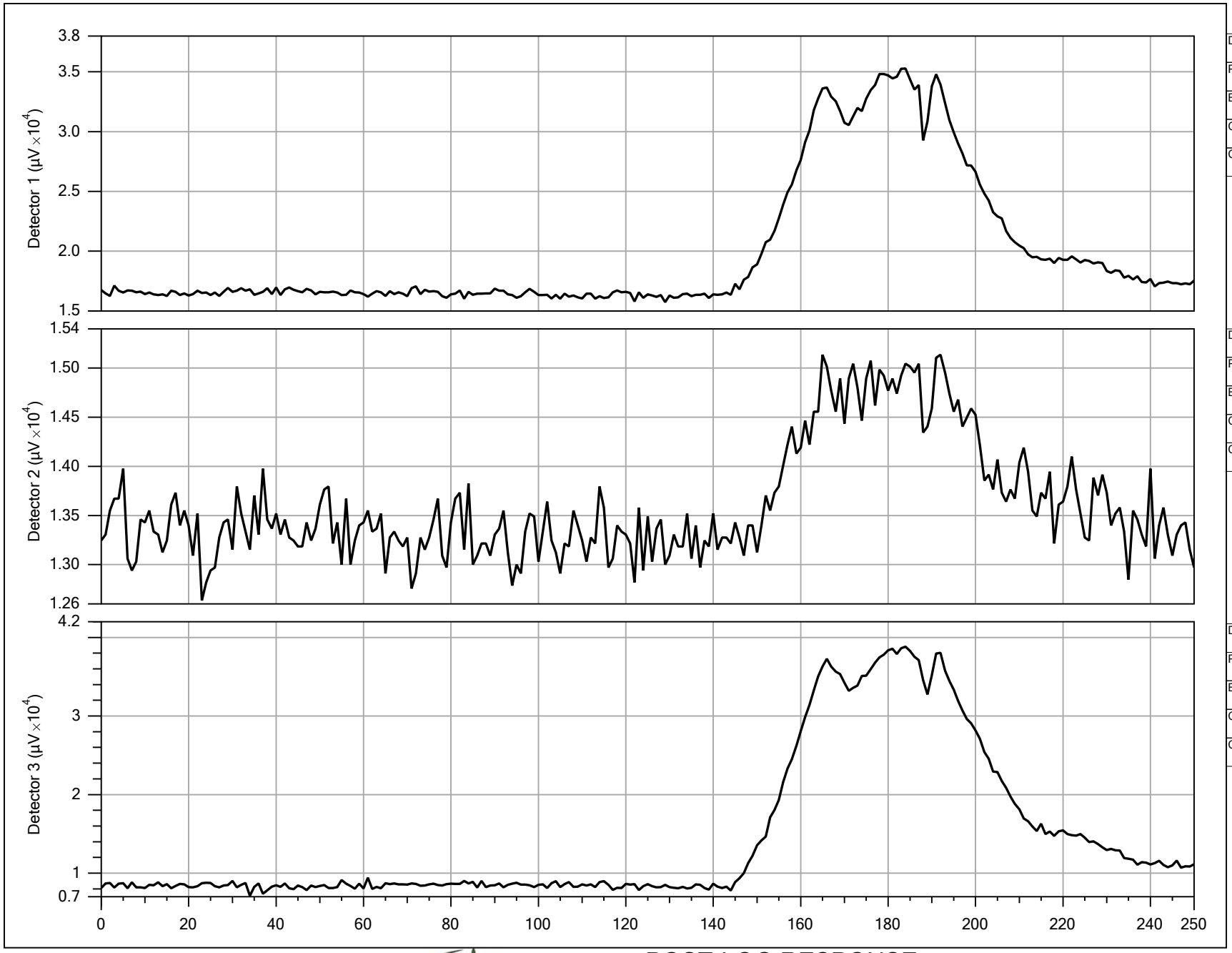
PRE-LOG RESPONSE

Company:	Operator:	File:
Dakota Technologies	Mike Jenson	MC-07.PRE.TIM
Project ID:	Client:	Date:
117.16	Trihydro	5/24/2016



Detector:
Detector 1
Peak Response:
35279 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 2
Peak Response:
15137 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 3
Peak Response:
38820 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

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POST-LOG RESPONSE

Company:	Operator:	File:
Dakota Technologies	Mike Jenson	MC-07.POST.TIM
Project ID:	Client:	Date:
117.16	Trihydro	5/24/2016

MIP PRE-LOG RESPONSE TEST (Post-Log From MC-06.zip)

FILENAME: MC-07.pre.tim
COMPOUND: TCE
CONCENTRATION: 0, 5 ppm
FLOW: 40 mL/min
RESPONSE TEST START TIME: Tue May 24 2016 19:48:17

RESPONSE TEST ATTENUATION CHANGES

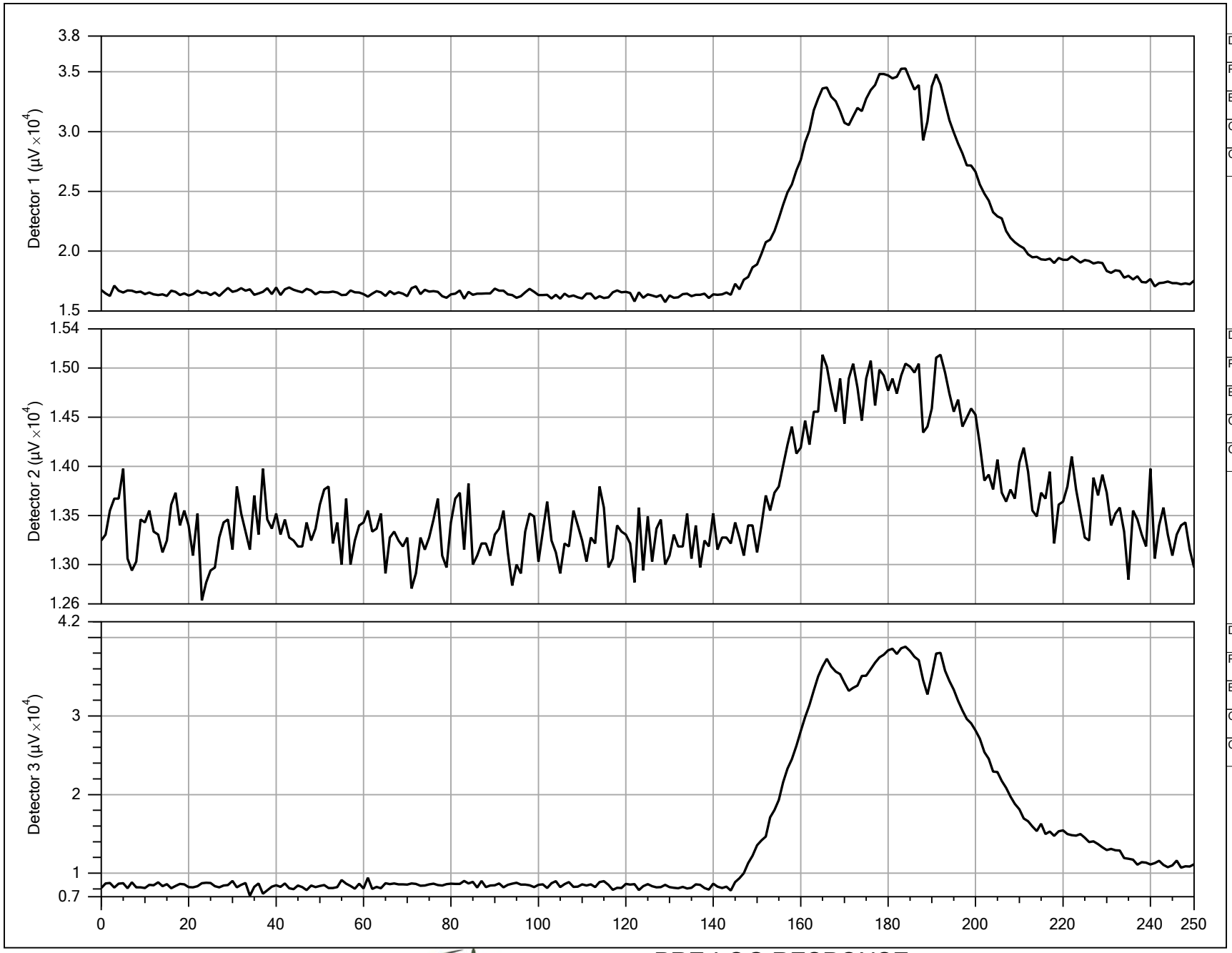
TIME	DET1	DET2	DET3	DET4
0	4	4	4	1

MIP POST-LOG RESPONSE TEST

FILENAME: MC-07.post.tim
COMPOUND: TCE
CONCENTRATION: 0, 5 ppm
FLOW: 40 mL/min
RESPONSE TEST START TIME: Tue May 24 2016 21:00:57

RESPONSE TEST ATTENUATION CHANGES

TIME	DET1	DET2	DET3	DET4
0	4	4	4	1



Detector:
Detector 1
Peak Response:
35279 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 2
Peak Response:
15137 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 3
Peak Response:
38820 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

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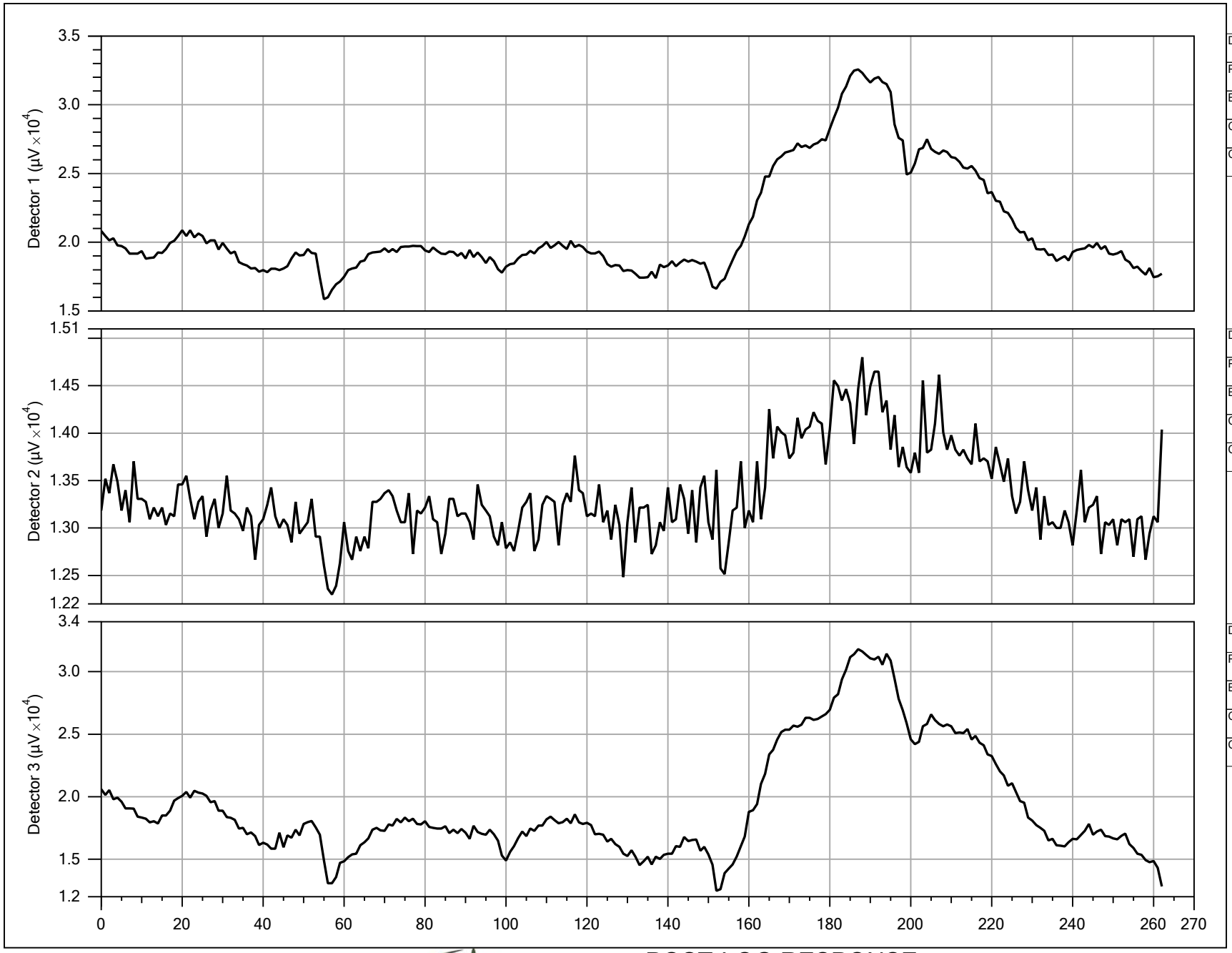
PRE-LOG RESPONSE

Company:	Operator:	File:
Dakota Technologies	Mike Jenson	MC-08.PRE.TIM
Project ID:	Client:	Date:
117.16	Trihydro	5/24/2016



Detector:
Detector 1
Peak Response:
32563 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 2
Peak Response:
14801 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 3
Peak Response:
31800 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 5 ppm

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POST-LOG RESPONSE

Company:	Operator:	File:
Dakota Technologies	Mike Jenson	MC-08.POST.TIM
Project ID:	Client:	Date:
117.16	Trihydro	5/24/2016

MIP PRE-LOG RESPONSE TEST (Post-Log From MC-07.zip)

FILENAME: MC-08.pre.tim
COMPOUND: TCE
CONCENTRATION: 0, 5 ppm
FLOW: 40 mL/min
RESPONSE TEST START TIME: Tue May 24 2016 21:00:57

RESPONSE TEST ATTENUATION CHANGES

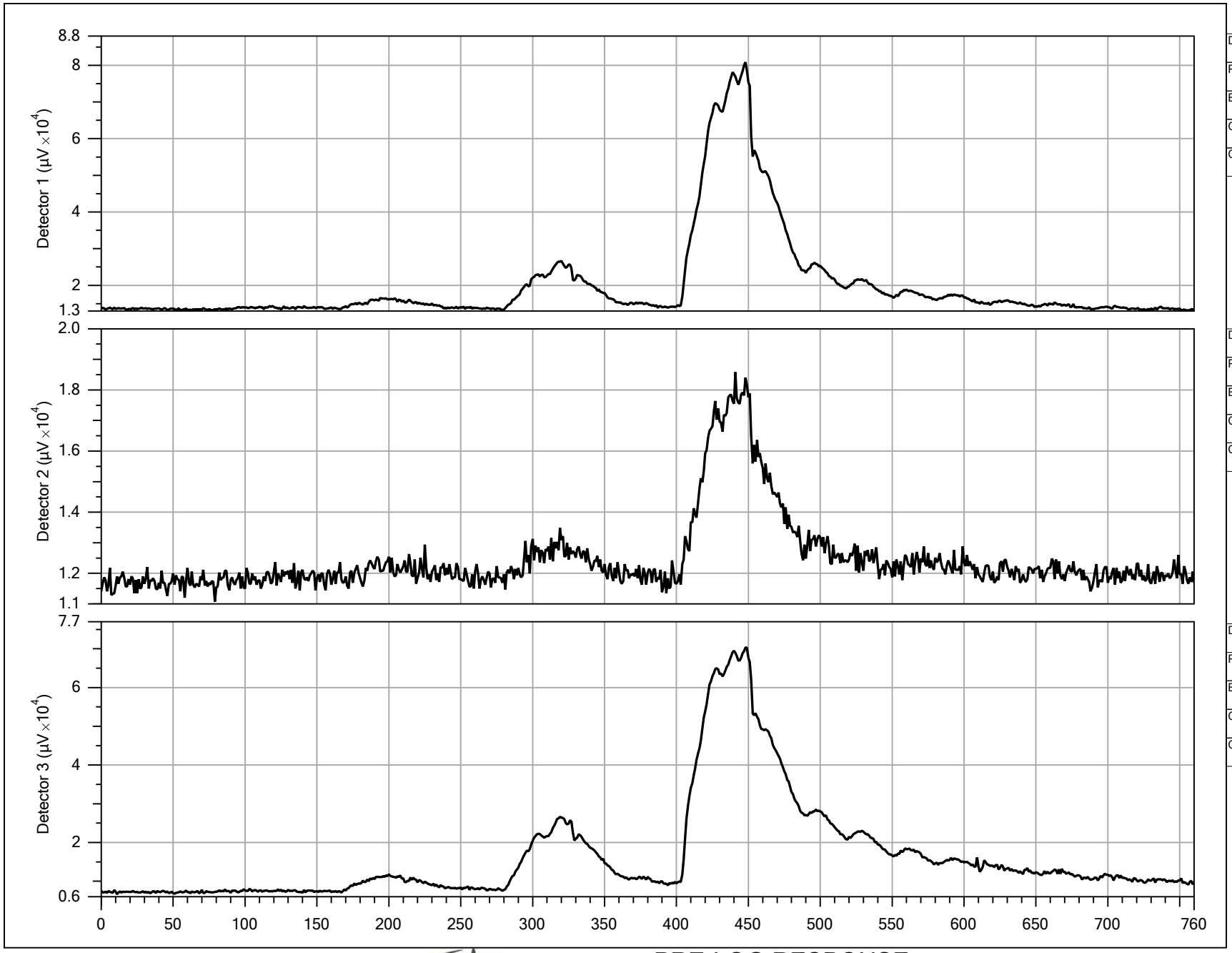
TIME	DET1	DET2	DET3	DET4
0	4	4	4	1

MIP POST-LOG RESPONSE TEST

FILENAME: MC-08.post.tim
COMPOUND: TCE
CONCENTRATION: 0, 5 ppm
FLOW: 40 mL/min
RESPONSE TEST START TIME: Tue May 24 2016 22:00:47

RESPONSE TEST ATTENUATION CHANGES

TIME	DET1	DET2	DET3	DET4
0	4	4	4	1



Detector:
Detector 1
Peak Response:
80874 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 1, 5, 25 ppm

Detector:
Detector 2
Peak Response:
18586 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 1, 5, 25 ppm

Detector:
Detector 3
Peak Response:
70345 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 1, 5, 25 ppm

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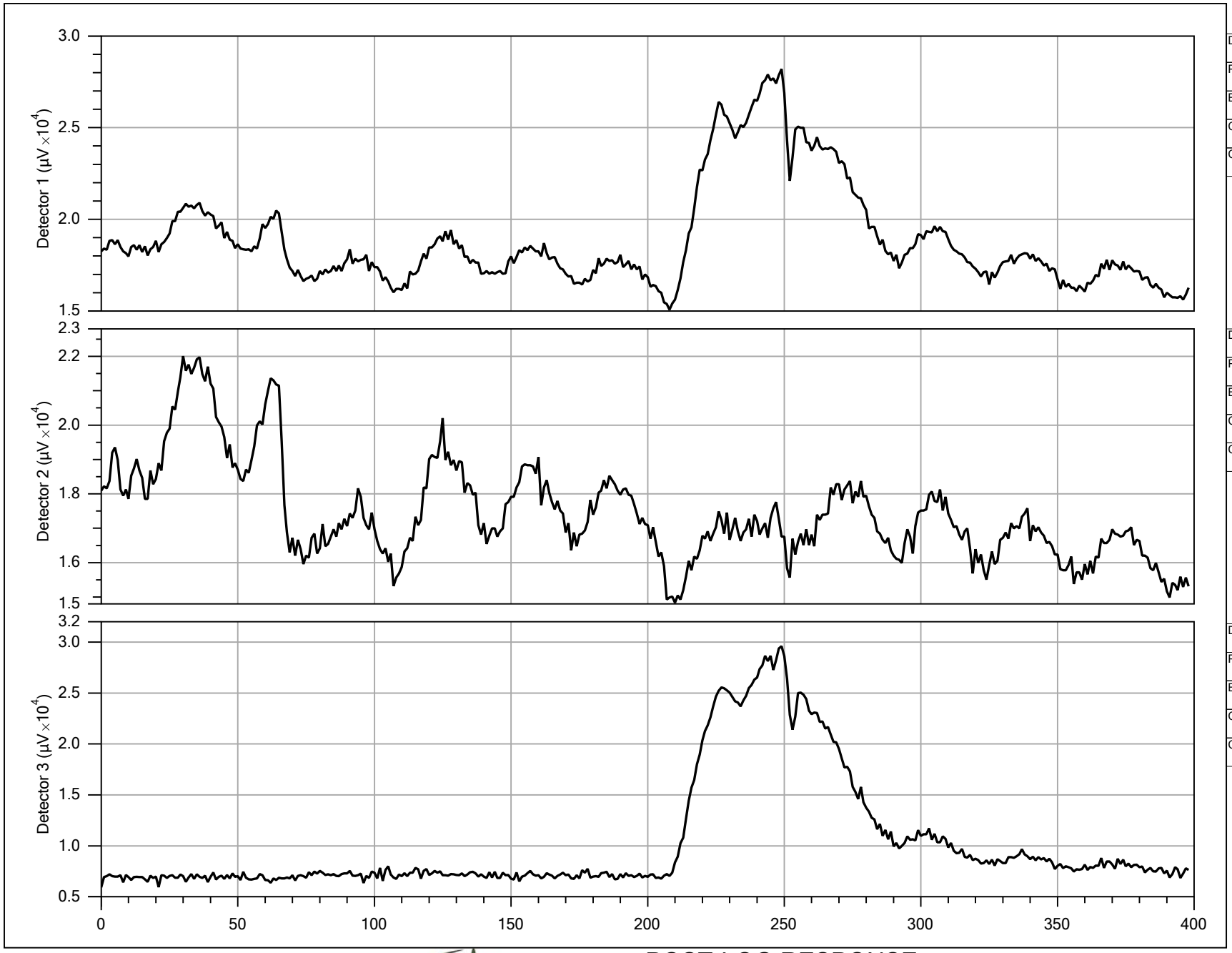
PRE-LOG RESPONSE

Company:	Operator:	File:
Dakota Technologies	Mike Jenson	LA-01.PRE.TIM
Project ID:	Client:	Date:
117.16	Trihydro	5/25/2016



Detector:
Detector 1
Peak Response:
28199 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 2
Peak Response:
22004 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 3
Peak Response:
29603 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 5 ppm

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POST-LOG RESPONSE

Company:	Operator:	File:
Dakota Technologies	Mike Jenson	LA-01.POST.TIM
Project ID:	Client:	Date:
117.16	Trihydro	5/25/2016

MIP PRE-LOG RESPONSE TEST

FILENAME: LA-01.pre.tim
COMPOUND: TCE
CONCENTRATION: 0, 1, 5, 25 ppm
FLOW: 40 mL/min
RESPONSE TEST START TIME: Wed May 25 2016 09:44:25

RESPONSE TEST ATTENUATION CHANGES

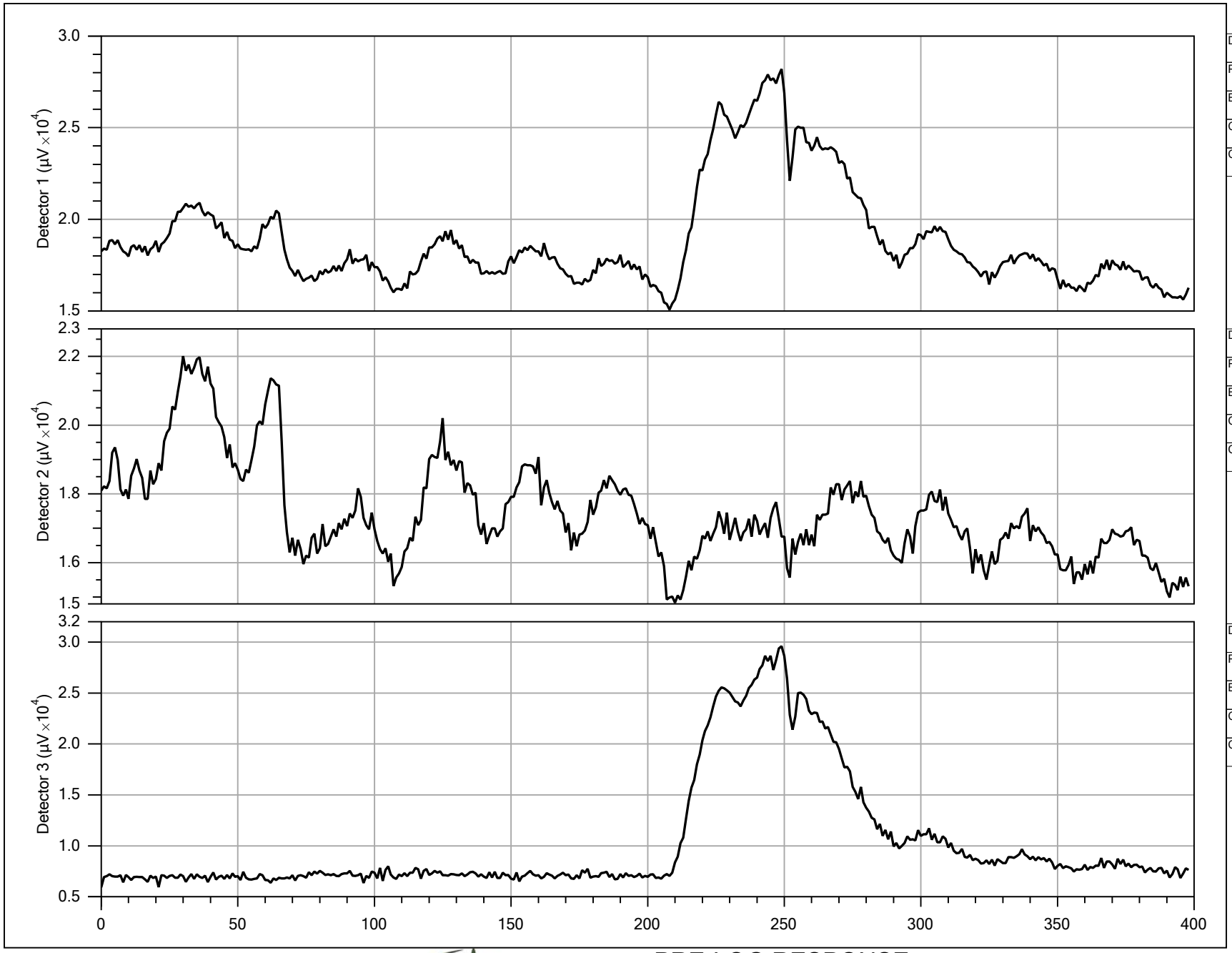
TIME	DET1	DET2	DET3	DET4
0	4	4	4	1

MIP POST-LOG RESPONSE TEST

FILENAME: LA-01.post.tim
COMPOUND: TCE
CONCENTRATION: 0, 5 ppm
FLOW: 40 mL/min
RESPONSE TEST START TIME: Wed May 25 2016 10:46:48

RESPONSE TEST ATTENUATION CHANGES

TIME	DET1	DET2	DET3	DET4
0	4	4	4	1



Detector:
Detector 1
Peak Response:
28199 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 2
Peak Response:
22004 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 3
Peak Response:
29603 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 5 ppm

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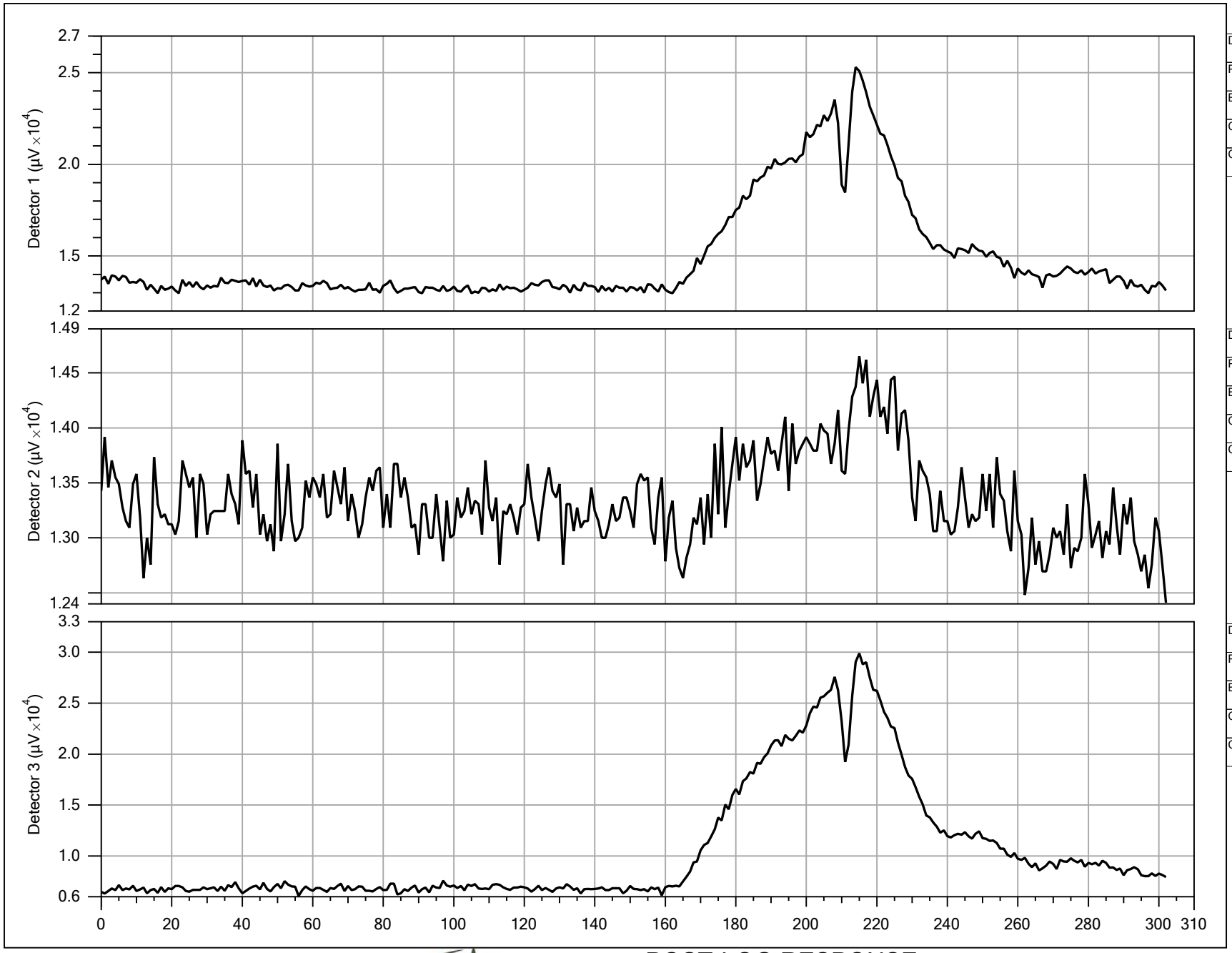
PRE-LOG RESPONSE

Company:	Operator:	File:
Dakota Technologies	Mike Jenson	LA-02.PRE.TIM
Project ID:	Client:	Date:
117.16	Trihydro	5/25/2016



Detector:
Detector 1
Peak Response:
25300 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 2
Peak Response:
14649 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 3
Peak Response:
29908 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 5 ppm

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POST-LOG RESPONSE

Company:	Operator:	File:
Dakota Technologies	Mike Jenson	LA-02.POST.TIM
Project ID:	Client:	Date:
117.16	Trihydro	5/25/2016

MIP PRE-LOG RESPONSE TEST (Post-Log From LA-01.zip)

FILENAME: LA-02.pre.tim
COMPOUND: TCE
CONCENTRATION: 0, 5 ppm
FLOW: 40 mL/min
RESPONSE TEST START TIME: Wed May 25 2016 10:46:48

RESPONSE TEST ATTENUATION CHANGES

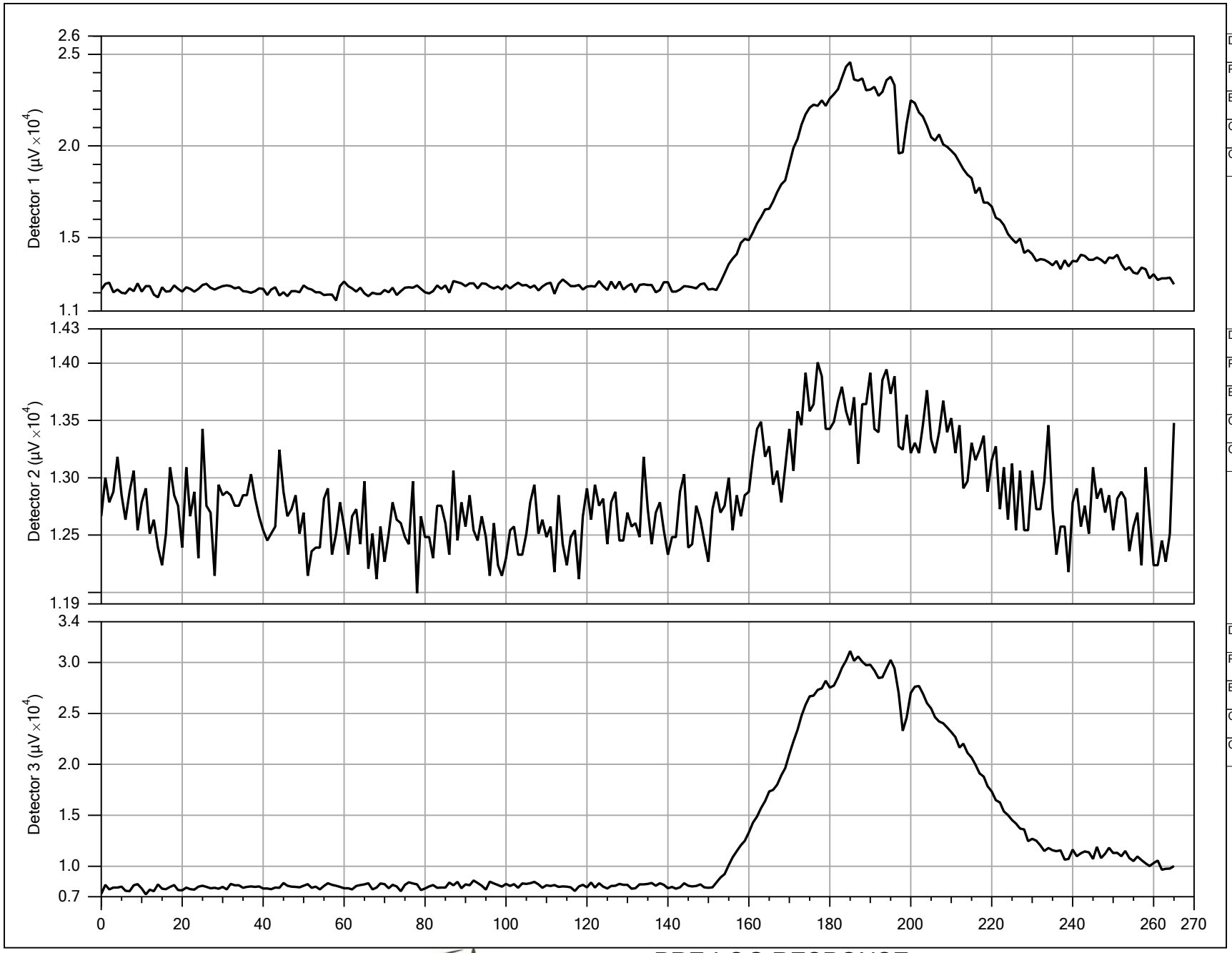
TIME	DET1	DET2	DET3	DET4
0	4	4	4	1

MIP POST-LOG RESPONSE TEST

FILENAME: LA-02.post.tim
COMPOUND: TCE
CONCENTRATION: 0, 5 ppm
FLOW: 40 mL/min
RESPONSE TEST START TIME: Wed May 25 2016 11:48:01

RESPONSE TEST ATTENUATION CHANGES

TIME	DET1	DET2	DET3	DET4
0	4	4	4	1



Detector:
Detector 1
Peak Response:
24567 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 2
Peak Response:
14008 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 3
Peak Response:
31129 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

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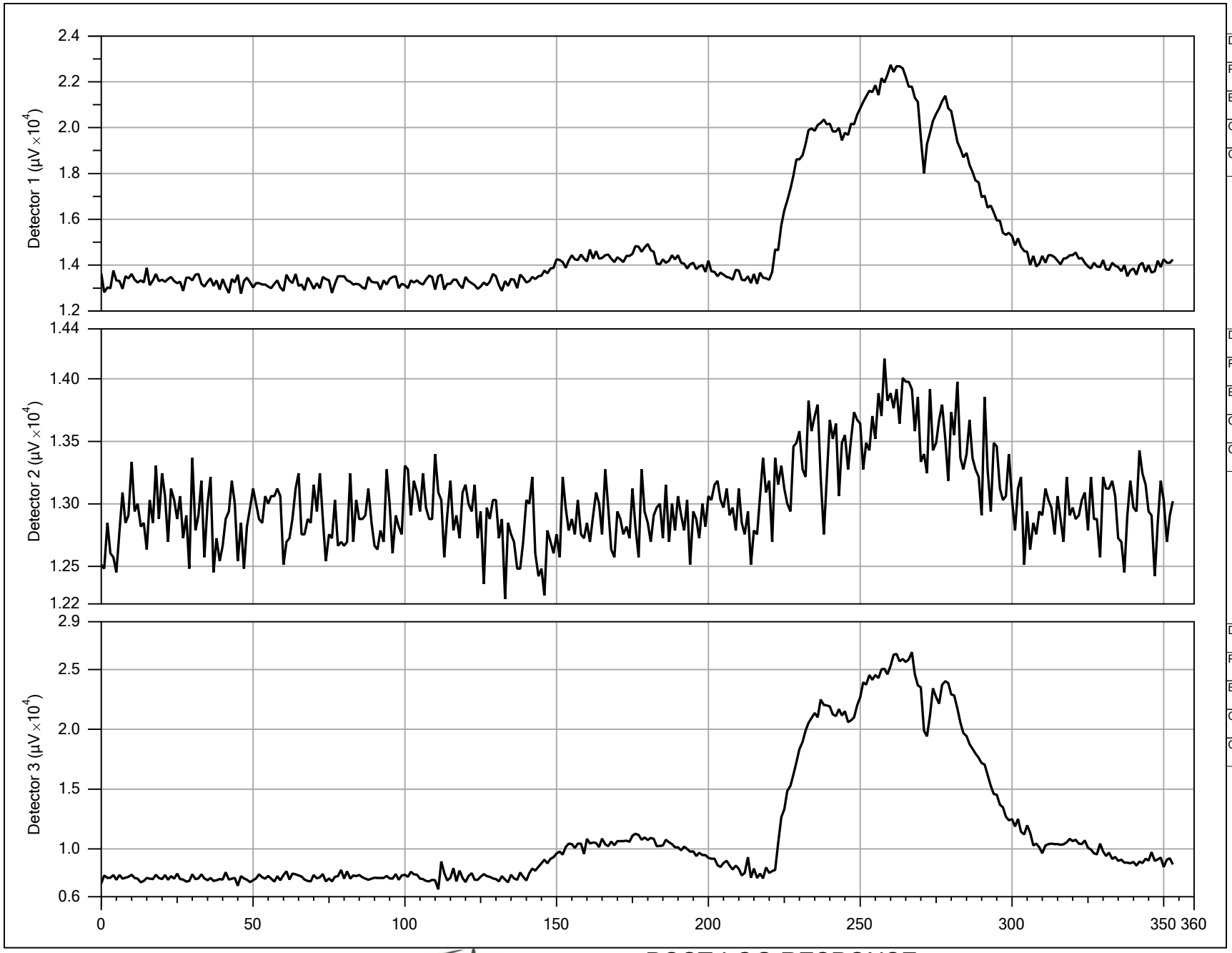
PRE-LOG RESPONSE

Company:	Operator:	File:
Dakota Technologies	Mike Jenson	LA-03.PRE.TIM
Project ID:	Client:	Date:
117.16	Trihydro	5/25/2016



Detector:
Detector 1
Peak Response:
22736 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 1, 5 ppm

Detector:
Detector 2
Peak Response:
14161 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 1, 5 ppm

Detector:
Detector 3
Peak Response:
26460 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 1, 5 ppm

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POST-LOG RESPONSE

Company:	Operator:	File:
Dakota Technologies	Mike Jenson	LA-03.POST.TIM
Project ID:	Client:	Date:
117.16	Trihydro	5/25/2016

MIP PRE-LOG RESPONSE TEST

FILENAME: LA-03.pre.tim
COMPOUND: TCE
CONCENTRATION: 0, 5 ppm
FLOW: 40 mL/min
RESPONSE TEST START TIME: Wed May 25 2016 13:06:40

RESPONSE TEST ATTENUATION CHANGES

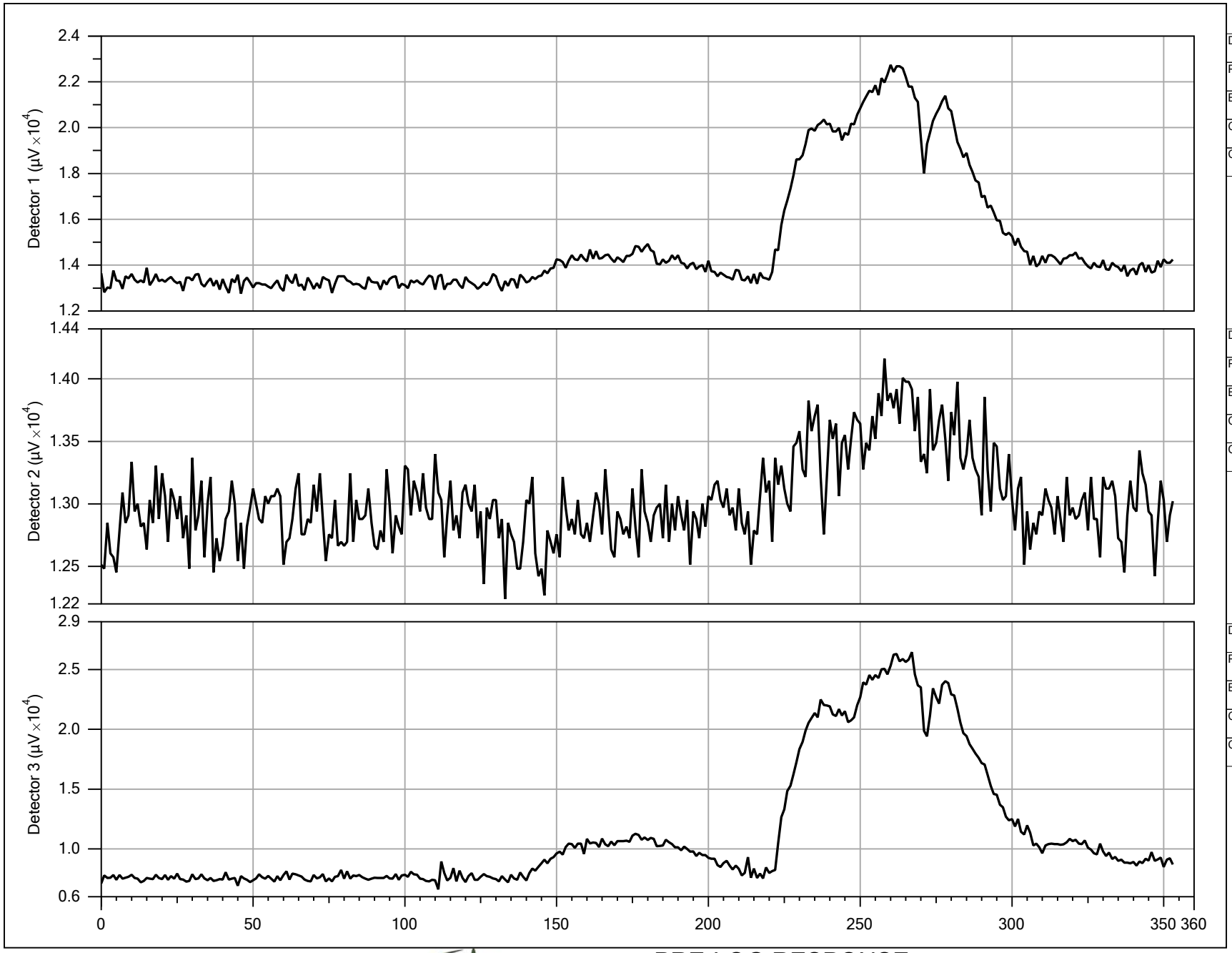
TIME	DET1	DET2	DET3	DET4
0	4	4	4	1

MIP POST-LOG RESPONSE TEST

FILENAME: LA-03.post.tim
COMPOUND: TCE
CONCENTRATION: 0, 1, 5 ppm
FLOW: 40 mL/min
RESPONSE TEST START TIME: Wed May 25 2016 13:59:59

RESPONSE TEST ATTENUATION CHANGES

TIME	DET1	DET2	DET3	DET4
0	4	4	4	1



Detector:
Detector 1
Peak Response:
22736 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 1, 5 ppm

Detector:
Detector 2
Peak Response:
14161 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 1, 5 ppm

Detector:
Detector 3
Peak Response:
26460 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 1, 5 ppm

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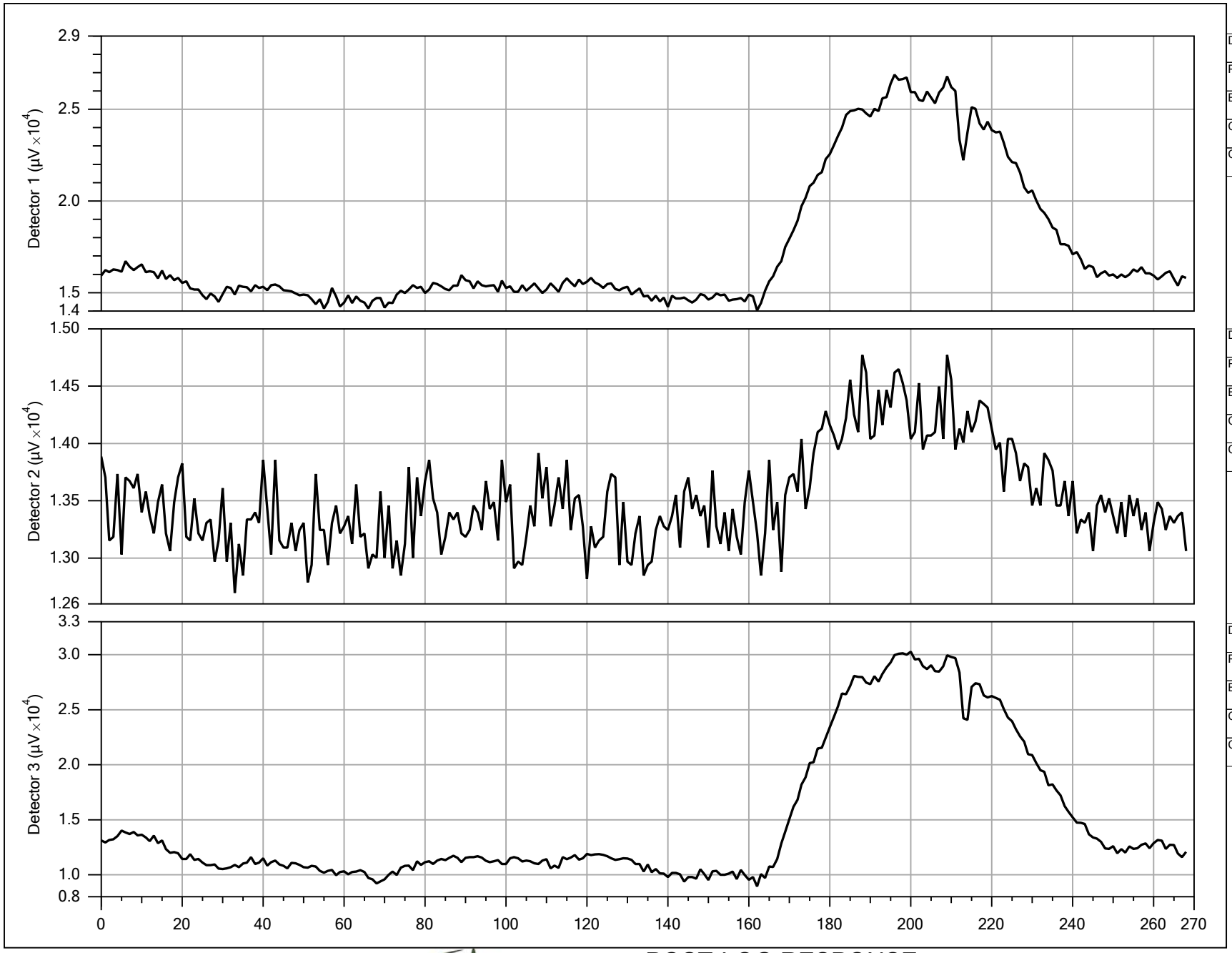
PRE-LOG RESPONSE

Company:	Operator:	File:
Dakota Technologies	Mike Jenson	LA-04.PRE.TIM
Project ID:	Client:	Date:
117.16	Trihydro	5/25/2016



Detector:
Detector 1
Peak Response:
26887 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 2
Peak Response:
14771 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 3
Peak Response:
30274 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 5 ppm

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POST-LOG RESPONSE

Company:	Operator:	File:
Dakota Technologies	Mike Jenson	LA-04.POST.TIM
Project ID:	Client:	Date:
117.16	Trihydro	5/25/2016

MIP PRE-LOG RESPONSE TEST (Post-Log From LA-03.zip)

FILENAME: LA-04.pre.tim
COMPOUND: TCE
CONCENTRATION: 0, 1, 5 ppm
FLOW: 40 mL/min
RESPONSE TEST START TIME: Wed May 25 2016 13:59:59

RESPONSE TEST ATTENUATION CHANGES

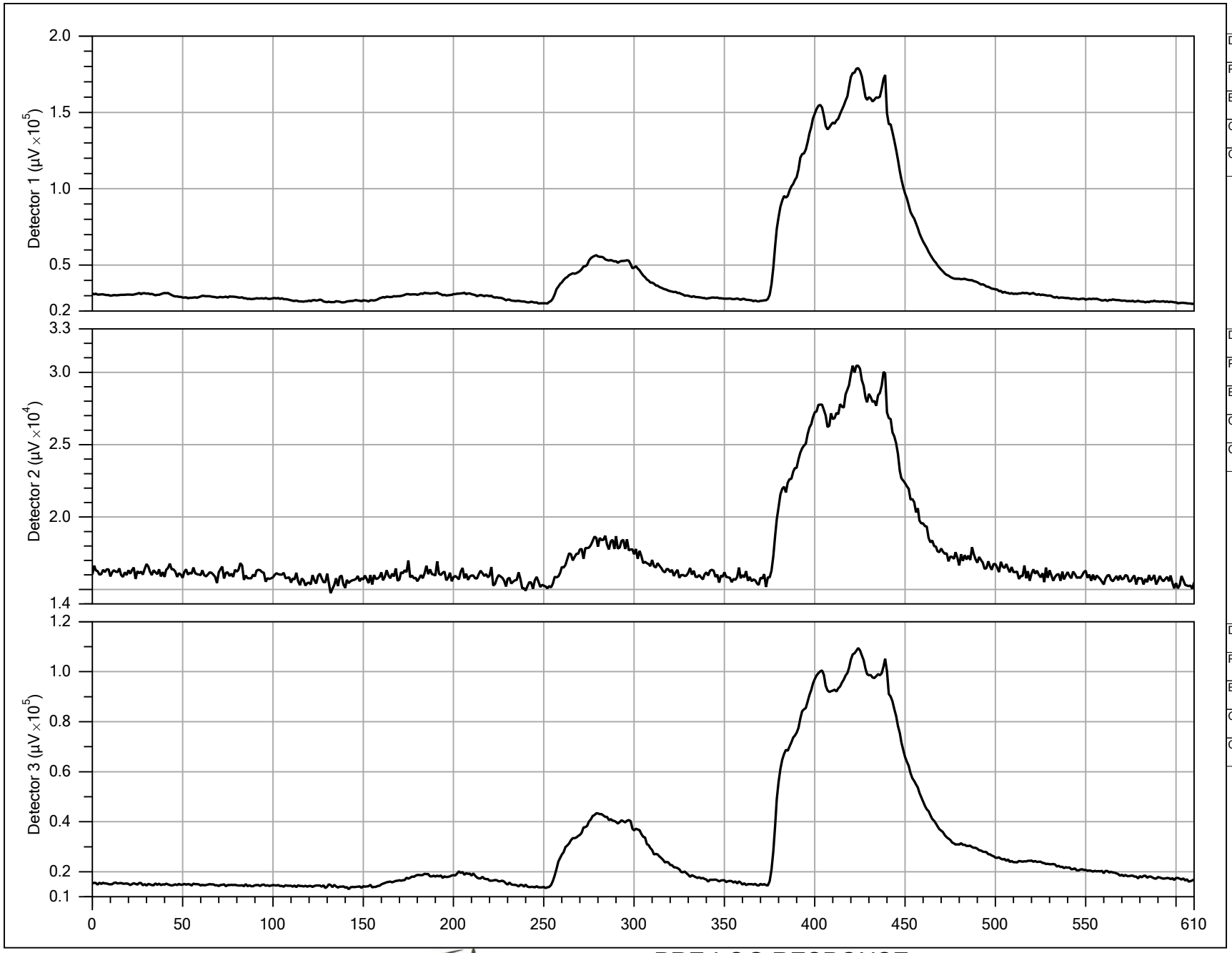
TIME	DET1	DET2	DET3	DET4
0	4	4	4	1

MIP POST-LOG RESPONSE TEST

FILENAME: LA-04.post.tim
COMPOUND: TCE
CONCENTRATION: 0, 5 ppm
FLOW: 40 mL/min
RESPONSE TEST START TIME: Wed May 25 2016 15:09:09

RESPONSE TEST ATTENUATION CHANGES

TIME	DET1	DET2	DET3	DET4
0	4	4	4	1



Detector:
Detector 1
Peak Response:
178900 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 1, 5, 25 ppm

Detector:
Detector 2
Peak Response:
30457 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 1, 5, 25 ppm

Detector:
Detector 3
Peak Response:
109439 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 1, 5, 25 ppm

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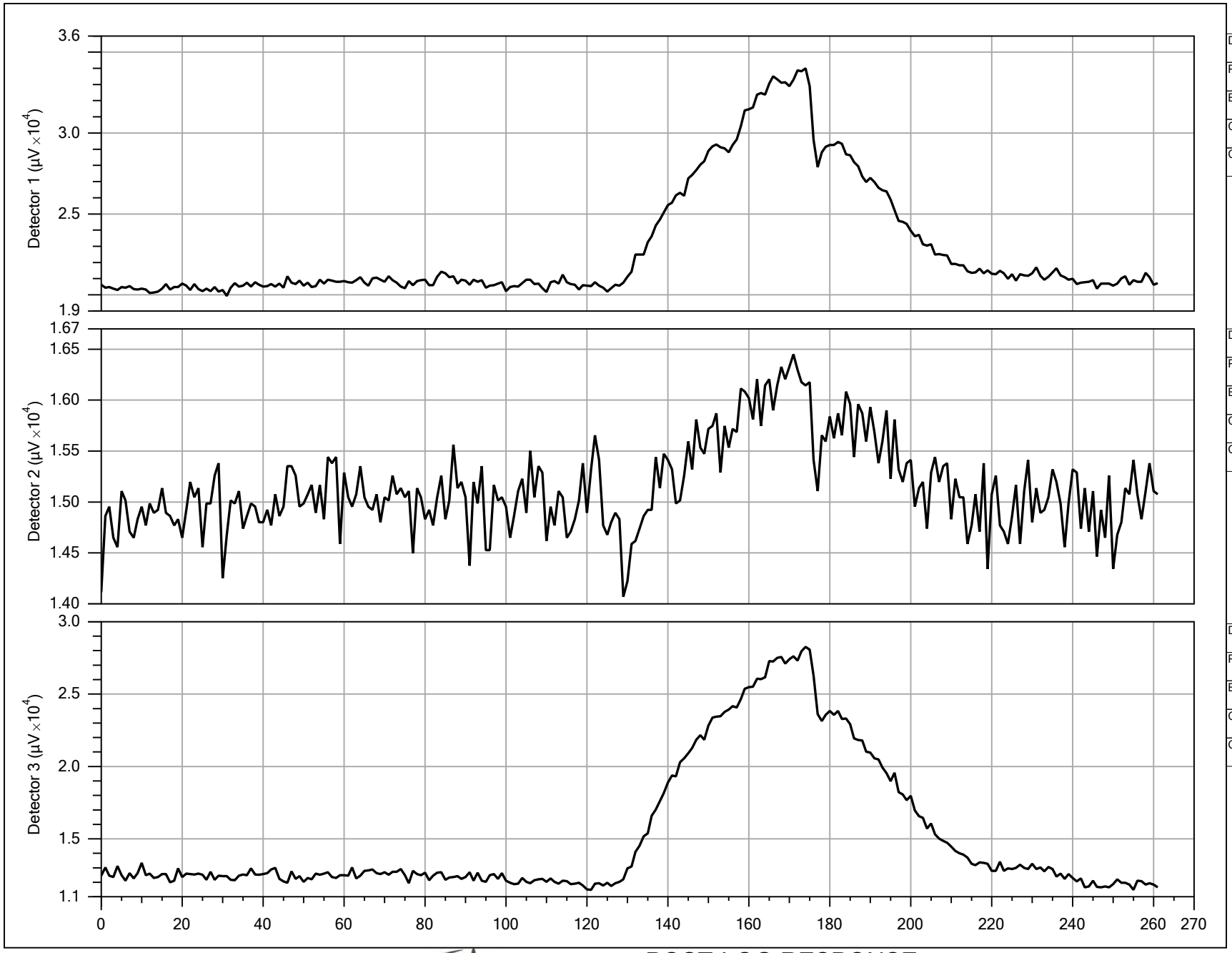
PRE-LOG RESPONSE

Company:	Operator:	File:
Dakota Technologies	Mike Jenson	LA-05A.PRE.TIM
Project ID:	Client:	Date:
117.16	Trihydro	5/25/2016



Detector:
Detector 1
Peak Response:
33998 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 2
Peak Response:
16449 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 3
Peak Response:
28260 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

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POST-LOG RESPONSE

Company:	Operator:	File:
Dakota Technologies	Mike Jenson	LA-05A.POST.TIM
Project ID:	Client:	Date:
117.16	Trihydro	5/25/2016

MIP PRE-LOG RESPONSE TEST

FILENAME: LA-05A.pre.tim
COMPOUND: TCE
CONCENTRATION: 0, 1, 5, 25 ppm
FLOW: 40 mL/min
RESPONSE TEST START TIME: Wed May 25 2016 16:07:37

RESPONSE TEST ATTENUATION CHANGES

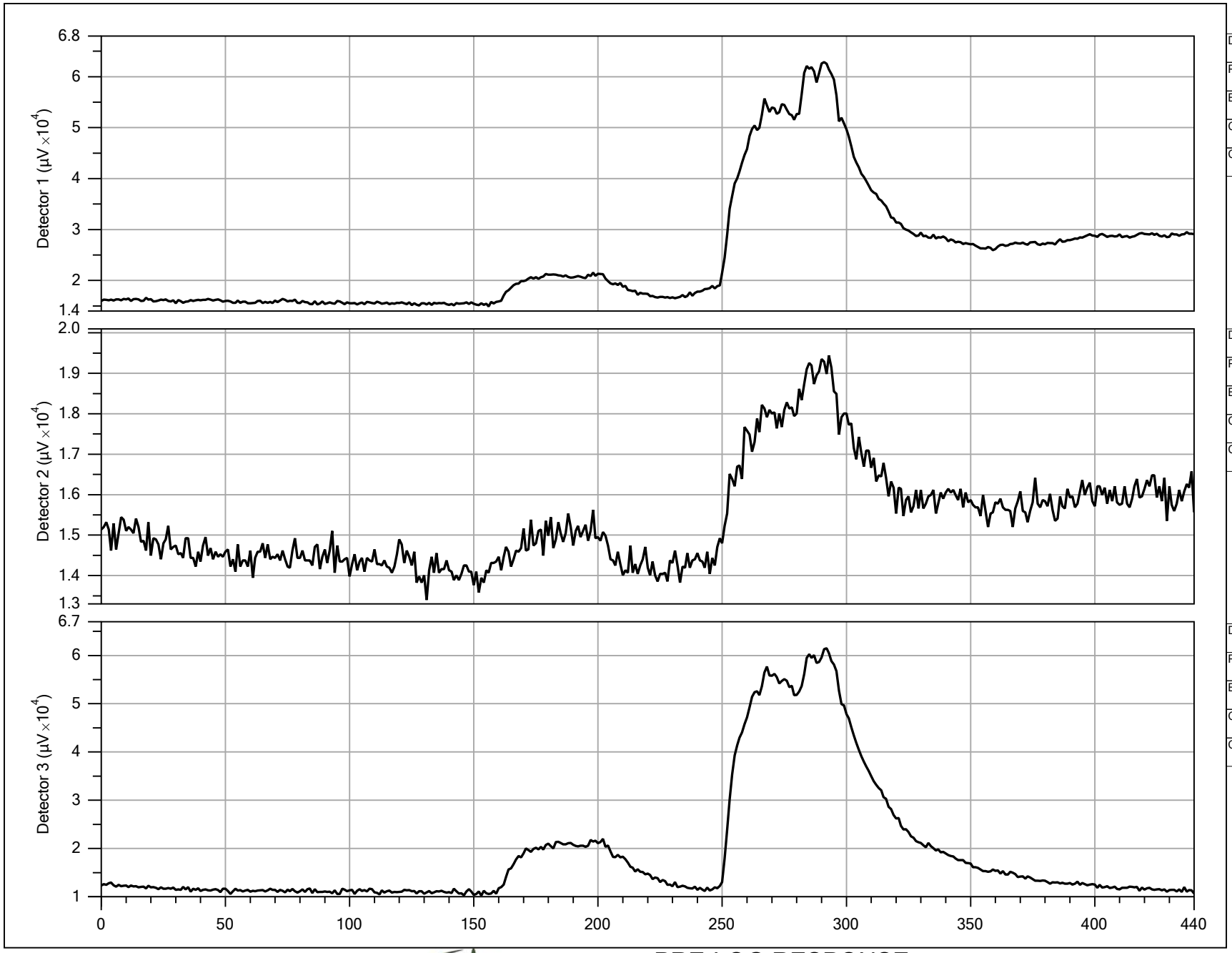
TIME	DET1	DET2	DET3	DET4
0	4	4	4	1

MIP POST-LOG RESPONSE TEST

FILENAME: LA-05A.post.tim
COMPOUND: TCE
CONCENTRATION: 0, 5 ppm
FLOW: 40 mL/min
RESPONSE TEST START TIME: Wed May 25 2016 16:58:49

RESPONSE TEST ATTENUATION CHANGES

TIME	DET1	DET2	DET3	DET4
0	4	4	4	1



Detector:
Detector 1
Peak Response:
62838 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 1, 5, 25 ppm

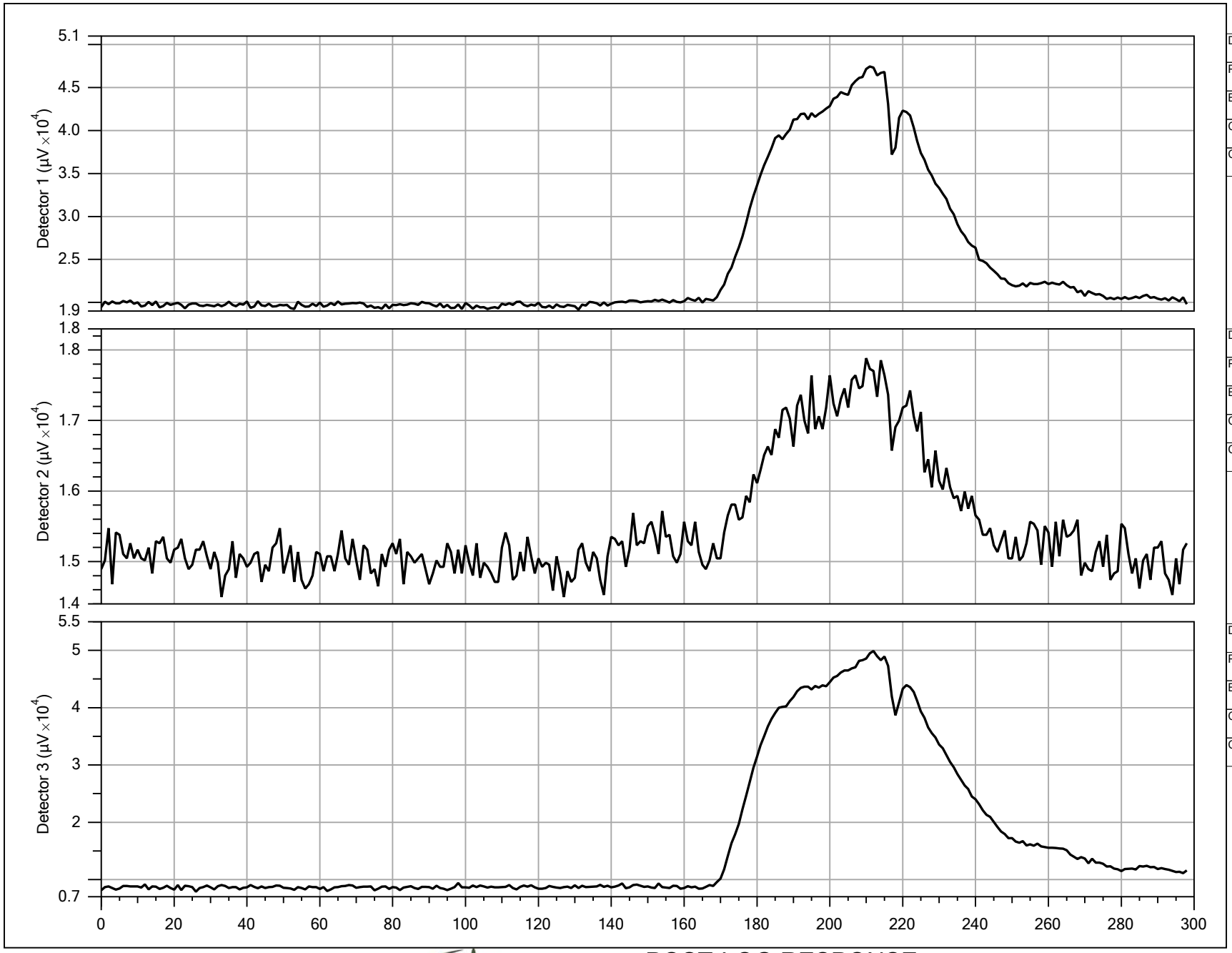
Detector:
Detector 2
Peak Response:
19440 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 1, 5, 25 ppm

Detector:
Detector 3
Peak Response:
61495 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 1, 5, 25 ppm

DAKOTA TECHNOLOGIES
www.DakotaTechnologies.com

PRE-LOG RESPONSE

Company:	Operator:	File:
Dakota Technologies	Mike Jenson	MC-06.PRE.TIM
Project ID:	Client:	Date:
117.16	Trihydro	5/24/2016



Detector:
Detector 1
Peak Response:
47456 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 2
Peak Response:
17884 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 3
Peak Response:
49867 µV
Baseline:
0 µV
Compound:
TCE
Concentration:
0, 5 ppm

DAKOTA TECHNOLOGIES
www.DakotaTechnologies.com

POST-LOG RESPONSE

Company:	Operator:	File:
Dakota Technologies	Mike Jenson	MC-06.POST.TIM
Project ID:	Client:	Date:
117.16	Trihydro	5/24/2016

MIP PRE-LOG RESPONSE TEST

FILENAME: MC-06.pre.tim
COMPOUND: TCE
CONCENTRATION: 0, 1, 5, 25 ppm
FLOW: 40 mL/min
RESPONSE TEST START TIME: Tue May 24 2016 18:54:55

RESPONSE TEST ATTENUATION CHANGES

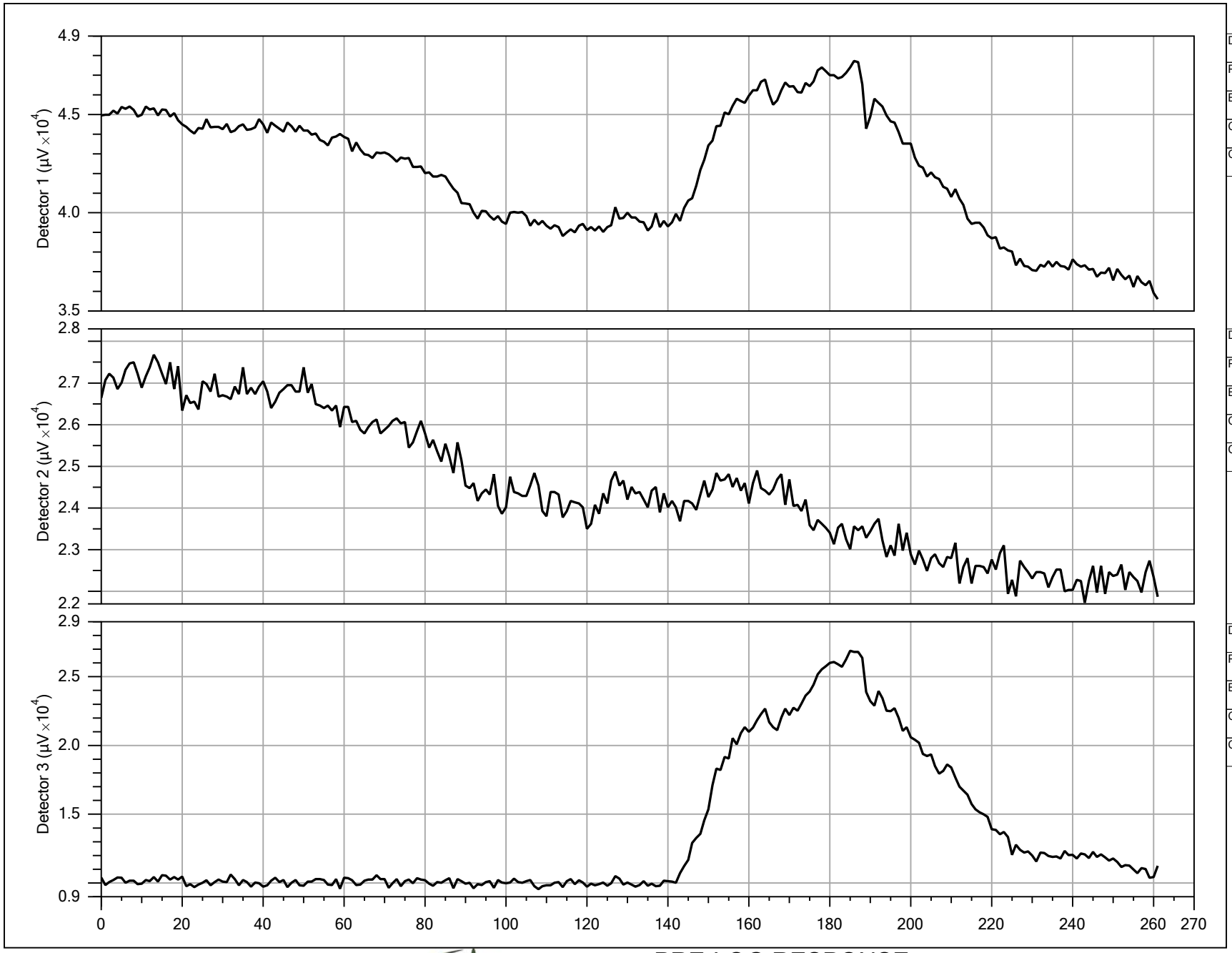
TIME	DET1	DET2	DET3	DET4
0	4	4	4	1

MIP POST-LOG RESPONSE TEST

FILENAME: MC-06.post.tim
COMPOUND: TCE
CONCENTRATION: 0, 5 ppm
FLOW: 40 mL/min
RESPONSE TEST START TIME: Tue May 24 2016 19:48:17

RESPONSE TEST ATTENUATION CHANGES

TIME	DET1	DET2	DET3	DET4
0	4	4	4	1



Detector:
Detector 1
Peak Response:
47731 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 5 ppm

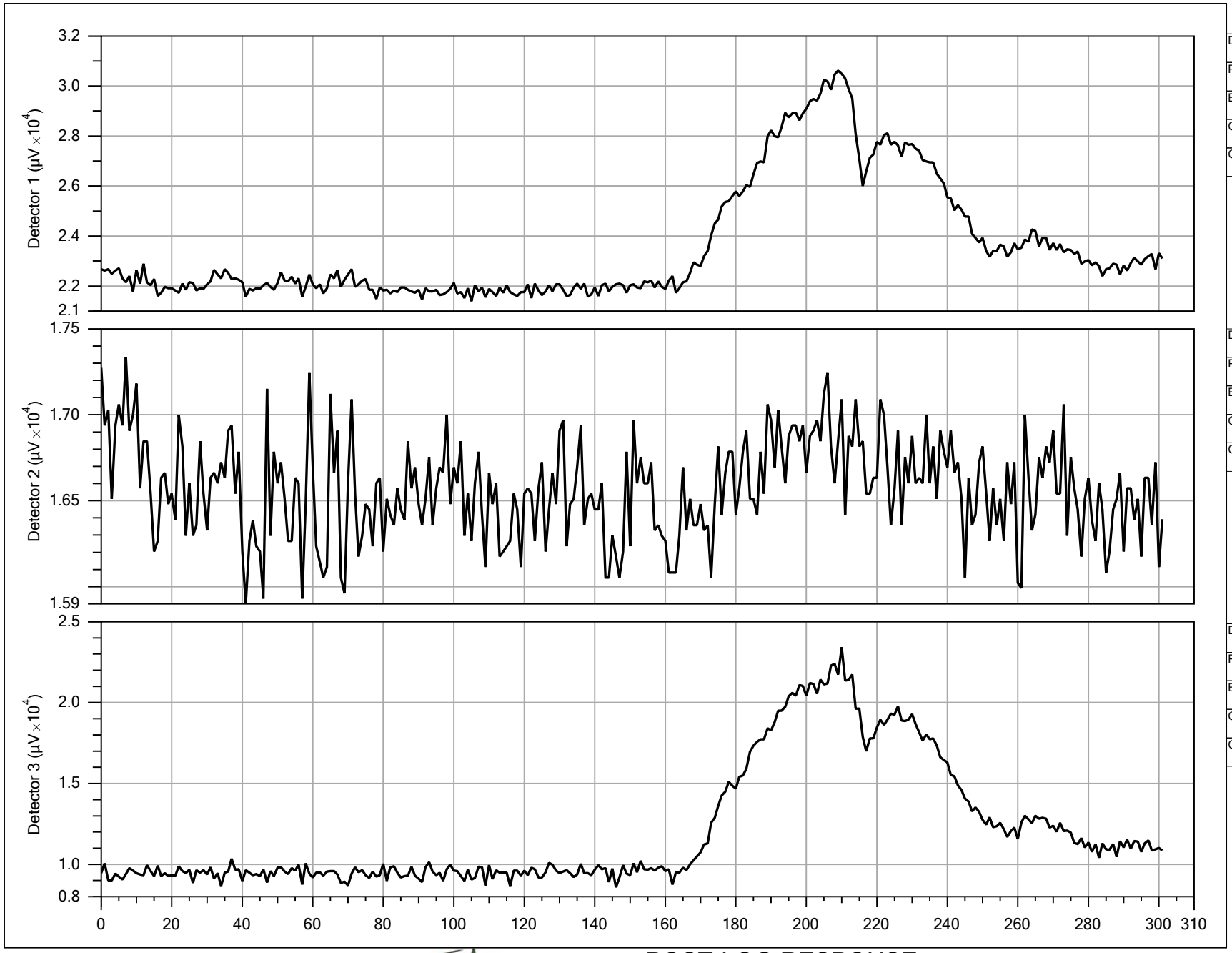
Detector:
Detector 2
Peak Response:
27680 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 3
Peak Response:
26887 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 5 ppm

DAKOTA TECHNOLOGIES
www.DakotaTechnologies.com

PRE-LOG RESPONSE

Company:	Operator:	File:
Dakota Technologies	Mike Jenson	LA-07.PRE.TIM
Project ID:	Client:	Date:
117.16	Trihydro	5/25/2016



Detector:
Detector 1
Peak Response:
30610 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 2
Peak Response:
17335 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 5 ppm

Detector:
Detector 3
Peak Response:
23408 μV
Baseline:
0 μV
Compound:
TCE
Concentration:
0, 5 ppm

DAKOTA TECHNOLOGIES
www.DakotaTechnologies.com

POST-LOG RESPONSE

Company:	Operator:	File:
Dakota Technologies	Mike Jenson	LA-07.POST.TIM
Project ID:	Client:	Date:
117.16	Trihydro	5/25/2016

MIP PRE-LOG RESPONSE TEST (Post-Log From LA-06.zip)

FILENAME: LA-07.pre.tim
COMPOUND: TCE
CONCENTRATION: 0, 5 ppm
FLOW: 40 mL/min
RESPONSE TEST START TIME: Wed May 25 2016 18:13:46

RESPONSE TEST ATTENUATION CHANGES

TIME	DET1	DET2	DET3	DET4
0	4	4	4	1

MIP POST-LOG RESPONSE TEST

FILENAME: LA-07.post.tim
COMPOUND: TCE
CONCENTRATION: 0, 5 ppm
FLOW: 40 mL/min
RESPONSE TEST START TIME: Wed May 25 2016 19:18:56

RESPONSE TEST ATTENUATION CHANGES

TIME	DET1	DET2	DET3	DET4
0	4	4	4	1

Appendix F

MIP Reference Log

Dakota Technologies MIP Reference Log

Conductivity Plot:

The Electrical Conductivity **(EC)** of the soil is logged simultaneously with the analytical detector data utilizing a dipole arrangement. The EC provides insight into stratigraphy and also contaminant pathways when viewed in relation to detector responses. Typically an increase in EC is indicative of finer grained, tighter soil types.

PID Plot:

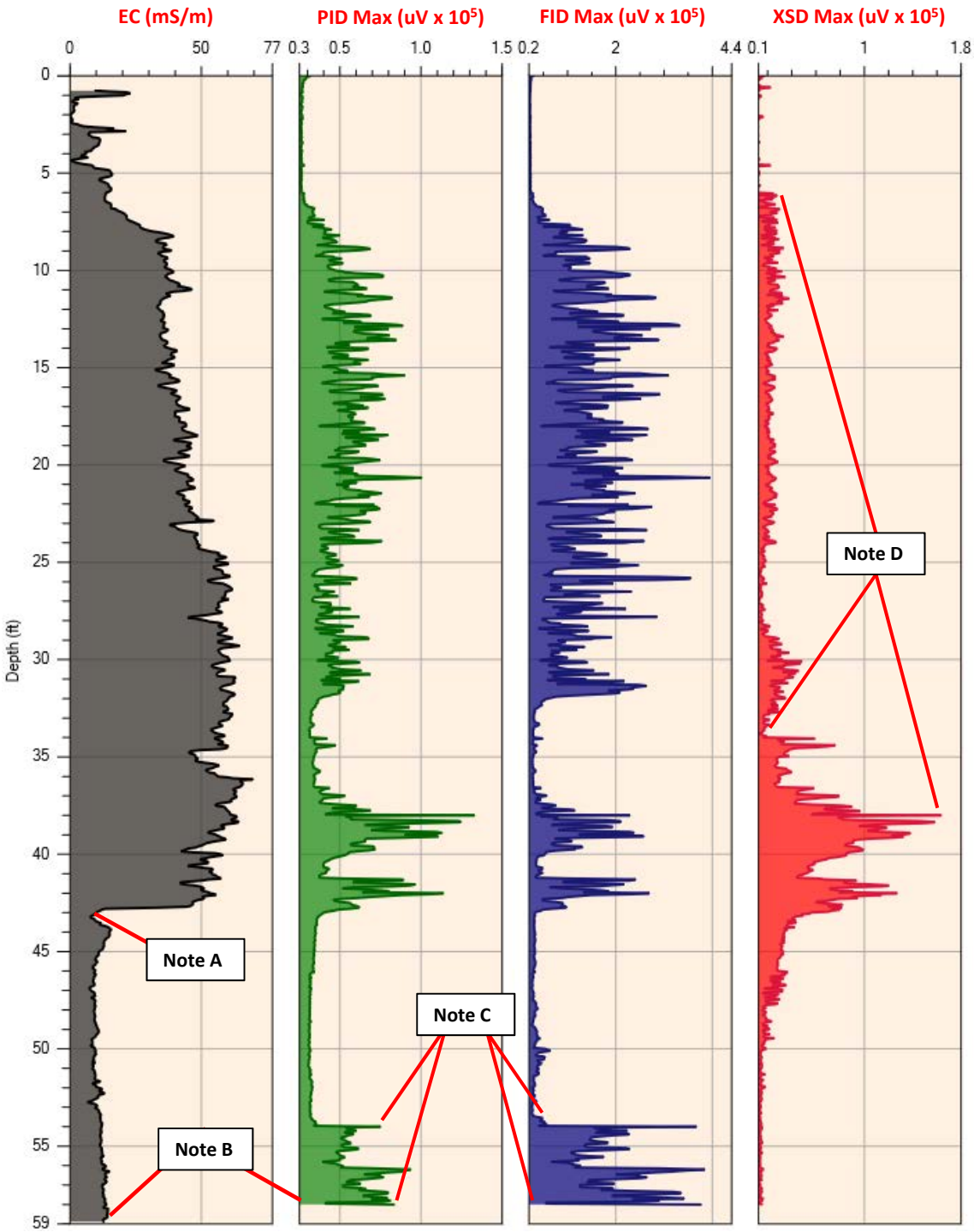
Detects unsaturated, multi-bond compounds (olefins) and aromatic (BTEX) hydrocarbons to approximately 0.5-1 ppm detection limit in all types of soil. Responses are recorded in microvolts.

FID Plot:

Detects all types of hydrocarbons (including methane and butane) to approximately 10 ppm detection limit. Generally, the FID response is an indication of total hydrocarbons present.

XSD Plot:

Detects halogenated compounds (i.e. TCE, PCE) to approximately 250 ppb detection limit.



Note A:

Decreasing EC readings starting at 43 feet are indicative of a transition from a finer soil type (glacial till containing clay) to coarser (sandy) soil type.

Note B:

The MIP probe was pushed until refusal (push rate of less than 1 ft. /min.) was achieved at 58 feet. Note that the EC readings are recorded to 59 feet. This is because the EC dipole is located about 1 foot lower down on the probe relative to the membrane.

Note C:

PID and FID responses (in the absence of an XSD response) at 54-58 feet are indicative of aromatics or other unsaturated hydrocarbon contamination (50-100 ppm gas in this example).

Note D:

XSD responses at 6-34 feet indicate halogenated compounds (TCE and breakdowns at 1-5 ppm in this example) at corresponding depths. The max peak at 38 feet indicates a relatively higher concentration (50-100 ppm in this example) of contaminant.

ATTACHMENT 4

LABORATORY ANALYTICAL DATA AND DATA VALIDATION REPORT

ANALYTICAL SUMMARY REPORT

June 03, 2016

Trihydro-Laramie
1252 Commerce Dr
Laramie, WY 82070-7000

Work Order: H16050503 Quote ID: H1251 - Whitefish

Project Name: MDEQ Whitefish Solvent Site

Energy Laboratories Inc Helena MT received the following 2 samples for Trihydro-Laramie on 5/26/2016 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
H16050503-001	MC-01 (6')	05/24/16 10:00	05/26/16	Soil	EPH-Ultrasonic Extraction Methanol Extraction for Volatiles Hydrocarbons, Extractable Petroleum-Scrn Volatile Petroleum Hydrocarbons Moisture Volatile Organics, Methanol Extraction 8260-Volatile Organic Compounds - Short List
H16050503-002	MC-03 (6')	05/24/16 13:00	05/26/16	Soil	Same As Above

The analyses presented in this report were performed by Energy Laboratories, Inc., 3161 E. Lyndale Ave., Helena, MT 59604, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

The results as reported relate only to the item(s) submitted for testing.

If you have any questions regarding these test results, please call.

Report Approved By:

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish Solvent Site
Lab ID: H16050503-001
Client Sample ID: MC-01 (6')

Report Date: 06/03/16
Collection Date: 05/24/16 10:00
DateReceived: 05/26/16
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL CHARACTERISTICS							
Moisture	22.9	wt%		0.2		SW3550C	05/27/16 11:39 / tjb
VOLATILE ORGANIC COMPOUNDS							
cis-1,2-Dichloroethene	ND	mg/kg		0.20		SW8260B	05/31/16 15:41 / kjw
trans-1,2-Dichloroethene	ND	mg/kg		0.20		SW8260B	05/31/16 15:41 / kjw
1,1,2,2-Tetrachloroethane	ND	mg/kg		0.20		SW8260B	05/31/16 15:41 / kjw
Tetrachloroethene	0.49	mg/kg		0.20		SW8260B	05/31/16 15:41 / kjw
Trichloroethene	ND	mg/kg		0.20		SW8260B	05/31/16 15:41 / kjw
Vinyl chloride	ND	mg/kg		0.20		SW8260B	05/31/16 15:41 / kjw
Surr: p-Bromofluorobenzene	96.0	%REC		60-143		SW8260B	05/31/16 15:41 / kjw
Surr: Dibromofluoromethane	90.0	%REC		71-135		SW8260B	05/31/16 15:41 / kjw
Surr: 1,2-Dichloroethane-d4	97.0	%REC		65-147		SW8260B	05/31/16 15:41 / kjw
Surr: Toluene-d8	83.0	%REC		76-133		SW8260B	05/31/16 15:41 / kjw
PETROLEUM HYDROCARBONS-VOLATILE							
Methyl tert-butyl ether (MTBE)	ND	mg/kg-dry		0.13	0.08	MA-VPH	06/01/16 00:25 / tjb
Benzene	ND	mg/kg-dry		0.064	0.04	MA-VPH	06/01/16 00:25 / tjb
Toluene	ND	mg/kg-dry		0.064	10	MA-VPH	06/01/16 00:25 / tjb
Ethylbenzene	ND	mg/kg-dry		0.064	10	MA-VPH	06/01/16 00:25 / tjb
m+p-Xylenes	ND	mg/kg-dry		0.064		MA-VPH	06/01/16 00:25 / tjb
o-Xylene	ND	mg/kg-dry		0.064		MA-VPH	06/01/16 00:25 / tjb
Xylenes, Total	ND	mg/kg-dry		0.064	30	MA-VPH	06/01/16 00:25 / tjb
Naphthalene	ND	mg/kg-dry		0.13	9	MA-VPH	06/01/16 00:25 / tjb
C9 to C10 Aromatics	ND	mg/kg-dry		2.6	100	MA-VPH	06/01/16 00:25 / tjb
C5 to C8 Aliphatics	ND	mg/kg-dry		2.6	40	MA-VPH	06/01/16 00:25 / tjb
C9 to C12 Aliphatics	ND	mg/kg-dry		2.6	90	MA-VPH	06/01/16 00:25 / tjb
Total Purgeable Hydrocarbons	ND	mg/kg-dry		2.6	100	MA-VPH	06/01/16 00:25 / tjb
Surr: VPH Aromatics Surrogate	85.0	%REC		70-130		MA-VPH	06/01/16 00:25 / tjb
Surr: VPH Aliphatics Surrogate	88.0	%REC		70-130		MA-VPH	06/01/16 00:25 / tjb

- Note 1: The C5 to C8 Aliphatics value is corrected for aromatic constituents Benzene and Toluene.
- Note 2: The C9 to C12 Aliphatics value is corrected for aromatic constituents Ethylbenzene, m+p-Xylenes, o-Xylene and C9 to C10 Aromatics.

EXTRACTABLE PETROLEUM HYDROCARBONS-SCREEN ANALYSIS							
Total Extractable Hydrocarbons	ND	mg/kg-dry		13	200	SW8015M	05/27/16 13:10 / kjw
Surr: o-Terphenyl	105	%REC		40-140		SW8015M	05/27/16 13:10 / kjw

- Note: Total Extractable Hydrocarbons are defined as the total hydrocarbon responses regardless of elution time.

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish Solvent Site
Lab ID: H16050503-002
Client Sample ID: MC-03 (6')

Report Date: 06/03/16
Collection Date: 05/24/16 13:00
DateReceived: 05/26/16
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL CHARACTERISTICS							
Moisture	20.8	wt%		0.2		SW3550C	05/27/16 11:39 / tjb
VOLATILE ORGANIC COMPOUNDS							
cis-1,2-Dichloroethene	ND	mg/kg		0.20		SW8260B	05/31/16 14:30 / kjw
trans-1,2-Dichloroethene	ND	mg/kg		0.20		SW8260B	05/31/16 14:30 / kjw
1,1,2,2-Tetrachloroethane	ND	mg/kg		0.20		SW8260B	05/31/16 14:30 / kjw
Tetrachloroethene	0.051	mg/kg	J	0.20		SW8260B	05/31/16 14:30 / kjw
Trichloroethene	ND	mg/kg		0.20		SW8260B	05/31/16 14:30 / kjw
Vinyl chloride	ND	mg/kg		0.20		SW8260B	05/31/16 14:30 / kjw
Surr: p-Bromofluorobenzene	91.0	%REC		60-143		SW8260B	05/31/16 14:30 / kjw
Surr: Dibromofluoromethane	86.0	%REC		71-135		SW8260B	05/31/16 14:30 / kjw
Surr: 1,2-Dichloroethane-d4	80.0	%REC		65-147		SW8260B	05/31/16 14:30 / kjw
Surr: Toluene-d8	78.0	%REC		76-133		SW8260B	05/31/16 14:30 / kjw
PETROLEUM HYDROCARBONS-VOLATILE							
Methyl tert-butyl ether (MTBE)	ND	mg/kg-dry		0.13	0.08	MA-VPH	05/31/16 18:44 / tjb
Benzene	ND	mg/kg-dry		0.063	0.04	MA-VPH	05/31/16 18:44 / tjb
Toluene	ND	mg/kg-dry		0.063	10	MA-VPH	05/31/16 18:44 / tjb
Ethylbenzene	ND	mg/kg-dry		0.063	10	MA-VPH	05/31/16 18:44 / tjb
m+p-Xylenes	ND	mg/kg-dry		0.063		MA-VPH	05/31/16 18:44 / tjb
o-Xylene	ND	mg/kg-dry		0.063		MA-VPH	05/31/16 18:44 / tjb
Xylenes, Total	ND	mg/kg-dry		0.063	30	MA-VPH	05/31/16 18:44 / tjb
Naphthalene	ND	mg/kg-dry		0.13	9	MA-VPH	05/31/16 18:44 / tjb
C9 to C10 Aromatics	ND	mg/kg-dry		2.5	100	MA-VPH	05/31/16 18:44 / tjb
C5 to C8 Aliphatics	ND	mg/kg-dry		2.5	40	MA-VPH	05/31/16 18:44 / tjb
C9 to C12 Aliphatics	ND	mg/kg-dry		2.5	90	MA-VPH	05/31/16 18:44 / tjb
Total Purgeable Hydrocarbons	ND	mg/kg-dry		2.5	100	MA-VPH	05/31/16 18:44 / tjb
Surr: VPH Aromatics Surrogate	80.0	%REC		70-130		MA-VPH	05/31/16 18:44 / tjb
Surr: VPH Aliphatics Surrogate	82.0	%REC		70-130		MA-VPH	05/31/16 18:44 / tjb

- Note 1: The C5 to C8 Aliphatics value is corrected for aromatic constituents Benzene and Toluene.
- Note 2: The C9 to C12 Aliphatics value is corrected for aromatic constituents Ethylbenzene, m+p-Xylenes, o-Xylene and C9 to C10 Aromatics.

EXTRACTABLE PETROLEUM HYDROCARBONS-SCREEN ANALYSIS							
Total Extractable Hydrocarbons	ND	mg/kg-dry		12	200	SW8015M	05/27/16 13:56 / kjw
Surr: o-Terphenyl	102	%REC		40-140		SW8015M	05/27/16 13:56 / kjw

- Note: Total Extractable Hydrocarbons are defined as the total hydrocarbon responses regardless of elution time.

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
J - Estimated value. The analyte was present but less than the reporting limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 06/03/16

Project: MDEQ Whitefish Solvent Site **Work Order:** H16050503

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: MA-VPH										Batch: 33086
Lab ID: LCS-33086	14	Laboratory Control Sample				Run: GC2_160531A				05/31/16 13:26
2-Methylpentane		2.44	mg/kg-dry	0.10	97	70	130			
n-Butylcyclohexane		2.62	mg/kg-dry	0.10	105	70	130			
n-Decane		2.69	mg/kg-dry	0.10	108	70	130			
n-Pentane		2.33	mg/kg-dry	0.10	93	30	130			
Methyl tert-butyl ether (MTBE)		2.38	mg/kg-dry	0.10	95	70	130			
Benzene		2.37	mg/kg-dry	0.050	95	70	130			
Toluene		2.31	mg/kg-dry	0.050	93	70	130			
Ethylbenzene		2.44	mg/kg-dry	0.050	98	70	130			
m+p-Xylenes		4.97	mg/kg-dry	0.050	99	70	130			
o-Xylene		2.45	mg/kg-dry	0.050	98	70	130			
Naphthalene		2.16	mg/kg-dry	0.10	86	70	130			
Total Purgeable Hydrocarbons		38.8	mg/kg-dry	2.0	103	70	130			
Surr: VPH Aromatics Surrogate				0.050	98	70	130			
Surr: VPH Aliphatics Surrogate				0.050	101	70	130			
Lab ID: MB-33086	14	Method Blank				Run: GC2_160531A				05/31/16 15:32
Methyl tert-butyl ether (MTBE)		ND	mg/kg-dry	0.10						
Benzene		ND	mg/kg-dry	0.050						
Toluene		ND	mg/kg-dry	0.050						
Ethylbenzene		ND	mg/kg-dry	0.050						
m+p-Xylenes		ND	mg/kg-dry	0.050						
o-Xylene		ND	mg/kg-dry	0.050						
Naphthalene		ND	mg/kg-dry	0.10						
C9 to C10 Aromatics		ND	mg/kg-dry	2.0						
C5 to C8 Aliphatics		ND	mg/kg-dry	2.0						
C9 to C12 Aliphatics		ND	mg/kg-dry	2.0						
Total Purgeable Hydrocarbons		ND	mg/kg-dry	2.0						
Xylenes, Total		ND	mg/kg-dry	0.050						
Surr: VPH Aromatics Surrogate				0.050	100	70	130			
Surr: VPH Aliphatics Surrogate				0.050	101	70	130			
Lab ID: H16050503-002AMS	10	Sample Matrix Spike				Run: GC3_160531A				05/31/16 19:18
Methyl tert-butyl ether (MTBE)		3.04	mg/kg-dry	0.13	96	70	130			
Benzene		2.91	mg/kg-dry	0.063	92	70	130			
Toluene		2.85	mg/kg-dry	0.063	91	70	130			
Ethylbenzene		2.94	mg/kg-dry	0.063	93	70	130			
m+p-Xylenes		5.80	mg/kg-dry	0.063	92	70	130			
o-Xylene		2.91	mg/kg-dry	0.063	92	70	130			
Naphthalene		2.74	mg/kg-dry	0.13	87	70	130			
Total Purgeable Hydrocarbons		46.3	mg/kg-dry	2.5	98	70	130			
Surr: VPH Aromatics Surrogate				0.063	84	70	130			
Surr: VPH Aliphatics Surrogate				0.063	84	70	130			
Lab ID: H16050503-002AMSD	10	Sample Matrix Spike Duplicate				Run: GC3_160531A				05/31/16 19:52
Methyl tert-butyl ether (MTBE)		3.19	mg/kg-dry	0.13	101	70	130	4.8	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 06/03/16

Project: MDEQ Whitefish Solvent Site **Work Order:** H16050503

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: MA-VPH										Batch: 33086
Lab ID: H16050503-002AMSD	10	Sample Matrix Spike Duplicate				Run: GC3_160531A			05/31/16 19:52	
Benzene		3.11	mg/kg-dry	0.063	99	70	130	6.8	20	
Toluene		3.04	mg/kg-dry	0.063	97	70	130	6.4	20	
Ethylbenzene		3.15	mg/kg-dry	0.063	100	70	130	6.8	20	
m+p-Xylenes		6.24	mg/kg-dry	0.063	99	70	130	7.3	20	
o-Xylene		3.10	mg/kg-dry	0.063	98	70	130	6.3	20	
Naphthalene		2.86	mg/kg-dry	0.13	91	70	130	4.5	20	
Total Purgeable Hydrocarbons		49.8	mg/kg-dry	2.5	105	70	130	7.3	20	
Surr: VPH Aromatics Surrogate				0.063	82	70	130			
Surr: VPH Aliphatics Surrogate				0.063	83	70	130			
Method: MA-VPH										Analytical Run: R115681
Lab ID: CCV_0531GC303r-S	15	Continuing Calibration Verification Standard							05/31/16 16:42	
1,2,4-Trimethylbenzene		2.10	mg/kg-dry	0.10	84	75	125			
2,2,4-Trimethylpentane		2.49	mg/kg-dry	0.10	99	75	125			
2-Methylpentane		2.50	mg/kg-dry	0.10	100	75	125			
n-Butylcyclohexane		2.21	mg/kg-dry	0.10	88	75	125			
n-Decane		1.88	mg/kg-dry	0.10	75	75	125			
n-Pentane		2.64	mg/kg-dry	0.10	106	75	125			
Methyl tert-butyl ether (MTBE)		2.14	mg/kg-dry	0.10	86	75	125			
Benzene		2.23	mg/kg-dry	0.050	89	75	125			
Toluene		2.18	mg/kg-dry	0.050	87	75	125			
Ethylbenzene		2.20	mg/kg-dry	0.050	88	75	125			
m+p-Xylenes		4.31	mg/kg-dry	0.050	86	75	125			
o-Xylene		2.20	mg/kg-dry	0.050	88	75	125			
Naphthalene		2.26	mg/kg-dry	0.10	90	75	125			
Surr: VPH Aromatics Surrogate				0.050	82	70	130			
Surr: VPH Aliphatics Surrogate				0.050	82	70	130			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 06/03/16

Project: MDEQ Whitefish Solvent Site **Work Order:** H16050503

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method:	**SW3550C**								Batch: R115658	
Lab ID:	**H16050503-002ADUP**	Sample Duplicate				Run: EXTRACT OV 2_160527A			05/27/16 11:39	
Moisture		21.6	wt%	0.20				3.8	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 06/03/16

Project: MDEQ Whitefish Solvent Site **Work Order:** H16050503

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8015M										Batch: 32982
Lab ID: MB-32982	2	Method Blank				Run: HHP_160523A				05/23/16 21:19
Total Extractable Hydrocarbons		ND	mg/kg-dry	10						
Surr: o-Terphenyl				0.17	91	40	140			
Lab ID: LCS-32982	2	Laboratory Control Sample				Run: HHP_160523A				05/23/16 22:04
Total Extractable Hydrocarbons		192.6	mg/kg-dry	10	94	60	140			
Surr: o-Terphenyl				0.17	91	40	140			
Lab ID: H16050376-003AMS	2	Sample Matrix Spike				Run: HHP_160523A				05/24/16 01:51
Total Extractable Hydrocarbons		264.3	mg/kg-dry	10	105	60	140			
Surr: o-Terphenyl				0.17	101	40	140			
Lab ID: H16050376-003AMSD	2	Sample Matrix Spike Duplicate				Run: HHP_160523A				05/24/16 02:36
Total Extractable Hydrocarbons		238.5	mg/kg-dry	10	93	60	140	10	20	
Surr: o-Terphenyl				0.17	91	40	140			
Method: SW8015M										Analytical Run: R115663
Lab ID: CCV_0527GC102r-S	15	Continuing Calibration Verification Standard								05/27/16 12:14
n-Nonane		7.581	mg/kg-dry		114	75	125			
n-Decane		7.757	mg/kg-dry		116	75	125			
n-Dodecane		7.553	mg/kg-dry		113	75	125			
n-Tetradecane		7.597	mg/kg-dry		114	75	125			
n-Hexadecane		7.284	mg/kg-dry		109	75	125			
n-Octadecane		7.362	mg/kg-dry		110	75	125			
n-Nonadecane		7.415	mg/kg-dry		111	75	125			
n-Eicosane		7.273	mg/kg-dry		109	75	125			
n-Docosane		7.276	mg/kg-dry		109	75	125			
n-Tetracosane		7.260	mg/kg-dry		109	75	125			
n-Hexacosane		7.254	mg/kg-dry		109	75	125			
n-Octacosane		7.318	mg/kg-dry		110	75	125			
n-Triacontane		7.383	mg/kg-dry		111	75	125			
n-Hexatriacontane		7.205	mg/kg-dry		108	75	125			
Surr: o-Terphenyl				0.17	107	75	125			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 06/03/16

Project: MDEQ Whitefish Solvent Site **Work Order:** H16050503

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B										Batch: 33072
Lab ID: LCS-32072	10	Laboratory Control Sample				Run: 1SATURN_160526A			05/26/16 14:25	
cis-1,2-Dichloroethene		1.03	mg/kg	0.20	103	68	133			
trans-1,2-Dichloroethene		1.09	mg/kg	0.20	109	70	130			
1,1,2,2-Tetrachloroethane		0.944	mg/kg	0.20	94	74	120			
Tetrachloroethene		1.12	mg/kg	0.20	112	84	108			S
Trichloroethene		1.03	mg/kg	0.20	103	70	144			
Vinyl chloride		1.18	mg/kg	0.20	118	64	124			
Surr: 1,2-Dichloroethane-d4				0.20	103	65	147			
Surr: Dibromofluoromethane				0.20	111	71	135			
Surr: p-Bromofluorobenzene				0.20	98	60	143			
Surr: Toluene-d8				0.20	105	76	133			
Lab ID: MBLK_32072	10	Method Blank				Run: 1SATURN_160526A			05/26/16 15:40	
cis-1,2-Dichloroethene		ND	mg/kg	0.20						
trans-1,2-Dichloroethene		ND	mg/kg	0.20						
1,1,2,2-Tetrachloroethane		ND	mg/kg	0.20						
Tetrachloroethene		ND	mg/kg	0.20						
Trichloroethene		ND	mg/kg	0.20						
Vinyl chloride		ND	mg/kg	0.20						
Surr: 1,2-Dichloroethane-d4				0.20	120	65	147			
Surr: Dibromofluoromethane				0.20	114	71	135			
Surr: p-Bromofluorobenzene				0.20	107	60	143			
Surr: Toluene-d8				0.20	98	76	133			
Lab ID: H16050376-002AMS	10	Sample Matrix Spike				Run: 1SATURN_160526A			05/26/16 19:13	
cis-1,2-Dichloroethene		1.01	mg/kg-dry	0.20	99	68	133			
trans-1,2-Dichloroethene		0.974	mg/kg-dry	0.20	96	70	130			
1,1,2,2-Tetrachloroethane		0.974	mg/kg-dry	0.20	96	74	120			
Tetrachloroethene		1.01	mg/kg-dry	0.20	99	84	108			
Trichloroethene		0.966	mg/kg-dry	0.20	95	70	144			
Vinyl chloride		0.991	mg/kg-dry	0.20	98	64	124			
Surr: 1,2-Dichloroethane-d4				0.20	100	65	147			
Surr: Dibromofluoromethane				0.20	97	71	135			
Surr: p-Bromofluorobenzene				0.20	90	60	143			
Surr: Toluene-d8				0.20	96	76	133			
Lab ID: H16050376-002AMSD	10	Sample Matrix Spike Duplicate				Run: 1SATURN_160526A			05/26/16 19:48	
cis-1,2-Dichloroethene		0.974	mg/kg-dry	0.20	96	68	133	3.3	20	
trans-1,2-Dichloroethene		0.991	mg/kg-dry	0.20	98	70	130	1.7	20	
1,1,2,2-Tetrachloroethane		0.974	mg/kg-dry	0.20	96	74	120	0.0	20	
Tetrachloroethene		0.983	mg/kg-dry	0.20	97	84	108	2.4	20	
Trichloroethene		0.934	mg/kg-dry	0.20	92	70	144	3.4	20	
Vinyl chloride		0.991	mg/kg-dry	0.20	98	64	124	0.0	20	
Surr: 1,2-Dichloroethane-d4				0.20	104	65	147			
Surr: Dibromofluoromethane				0.20	98	71	135			
Surr: p-Bromofluorobenzene				0.20	90	60	143			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

S - Spike recovery outside of advisory limits.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 06/03/16

Project: MDEQ Whitefish Solvent Site **Work Order:** H16050503

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B										Batch: 33072
Lab ID: H16050376-002AMSD	10	Sample Matrix Spike Duplicate				Run: 1SATURN_160526A				05/26/16 19:48
Surr: Toluene-d8				0.20	97	76	133			
Method: SW8260B										Analytical Run: R115635
Lab ID: 053116_CCV_3	10	Continuing Calibration Verification Standard								05/31/16 11:58
cis-1,2-Dichloroethene		0.984	mg/kg	0.20	98	70	130			
trans-1,2-Dichloroethene		1.04	mg/kg	0.20	104	70	130			
1,1,2,2-Tetrachloroethane		0.928	mg/kg	0.20	93	70	130			
Tetrachloroethene		1.07	mg/kg	0.20	107	70	130			
Trichloroethene		1.01	mg/kg	0.20	101	70	130			
Vinyl chloride		0.976	mg/kg	0.20	98	80	120			
Surr: 1,2-Dichloroethane-d4				0.20	95	70	130			
Surr: Dibromofluoromethane				0.20	100	70	130			
Surr: p-Bromofluorobenzene				0.20	104	70	130			
Surr: Toluene-d8				0.20	108	70	130			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

MC-01 (6') Batch ID: 32982

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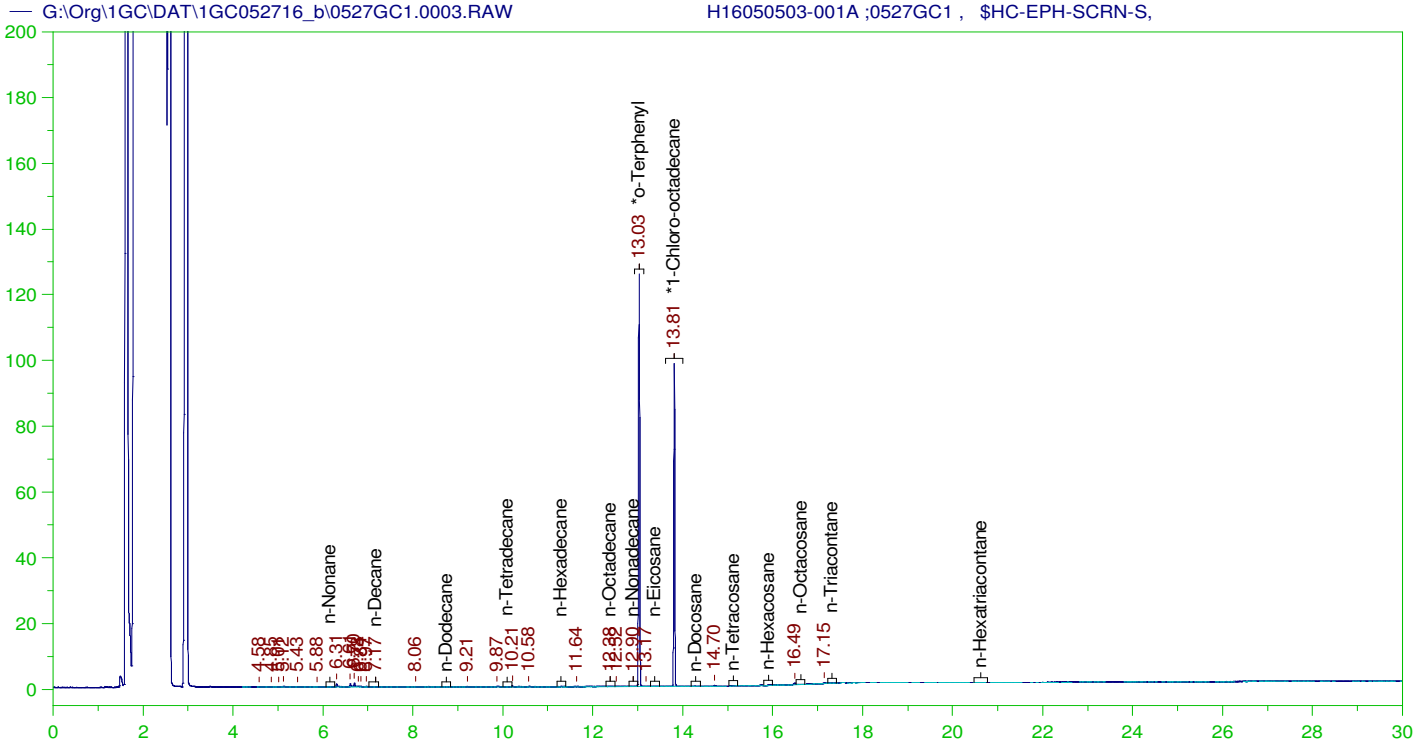

EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) SCREENING ANALYSIS CHROMATOGRAM

Sample Name: H16050503-001A ;0527GC1 , $HC-EPH-SCRN-S,
Raw File: G:\Org\1GC\DAT\1GC052716_b\0527GC1.0003.RAW
Date & Time Acquired: 5/27/2016 1:10:39 PM
Method File: G:\Org\1GC\Methods\SR101915L.MET
Calibration File: G:\Org\1GC\Cals\GC1_2015_CALS\SC101915L.CAL
Sample Weight: 23 Dilution: 2 S.A.: 1

Mean RF for C9 to C18 Hydrocarbons: 1642.781
Mean RF for C19 to C36 Hydrocarbons: 1715.496
Mean RF for Total Extractable Hydrocarbons: 1679.139
Rt range for Diesel Range Organics: 7.03 to 17.42
Rt range for C9 to C18 Hydrocarbons: 6.06 to 12.93
Rt range for C19 to C36 Hydrocarbons: 12.98 to 20.78

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	
*o-Terphenyl	13.027	8.696	9.154	105.27	-
*1-Chloro-octadecane	13.81	8.696	10.012	115.14	-

DRO Area:25850.41 DRO Amount: 1.338699
TEH Area:48832.03 TEH Amount: 2.528835
C9-C18 Area:27473.06 C9-C18 Amount: 1.454219
C19-C36 Area:11744.03 C19-C36 Amount: 0.5952913

MC-03 (6') Batch ID: 32982

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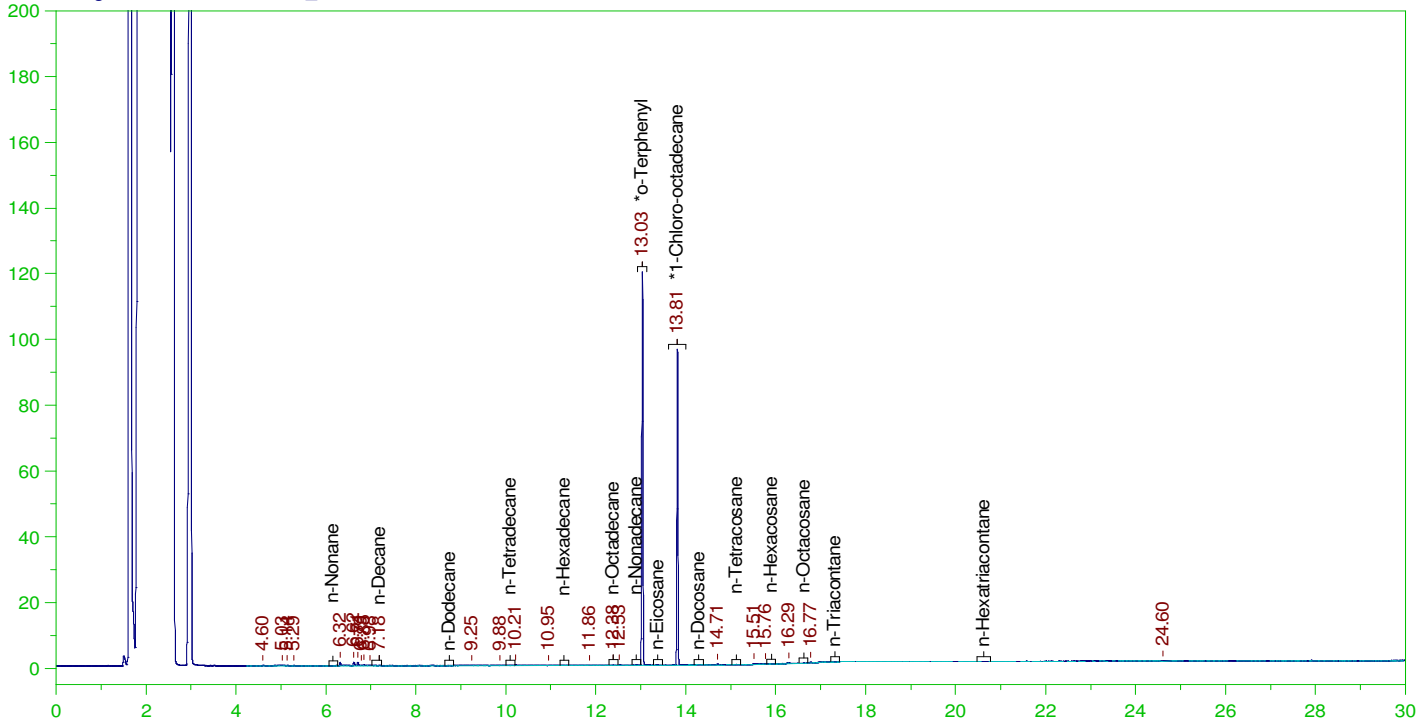

EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) SCREENING ANALYSIS CHROMATOGRAM

Sample Name: H16050503-002A ;0527GC1 , $HC-EPH-SCRN-S,
Raw File: G:\Org\1GC\DAT\1GC052716_b\0527GC1.0004.RAW
Date & Time Acquired: 5/27/2016 1:56:05 PM
Method File: G:\Org\1GC\Methods\SR101915L.MET
Calibration File: G:\Org\1GC\Cals\GC1_2015_CALS\SC101915L.CAL
Sample Weight: 24.4 Dilution: 2 S.A.: 1

Mean RF for C9 to C18 Hydrocarbons: 1642.781
Mean RF for C19 to C36 Hydrocarbons: 1715.496
Mean RF for Total Extractable Hydrocarbons: 1679.139
Rt range for Diesel Range Organics: 7.03 to 17.42
Rt range for C9 to C18 Hydrocarbons: 6.06 to 12.93
Rt range for C19 to C36 Hydrocarbons: 12.98 to 20.78

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	
*o-Terphenyl	13.033	8.197	8.404	102.52	-
*1-Chloro-octadecane	13.814	8.197	9.219	112.48	-

DRO Area:26017.3 DRO Amount: 1.270035
TEH Area:50063.14 TEH Amount: 2.443834
C9-C18 Area:26530.62 C9-C18 Amount: 1.323756
C19-C36 Area:11704.3 C19-C36 Amount: 0.5592368

MC-01 (6') Batch ID: 33086

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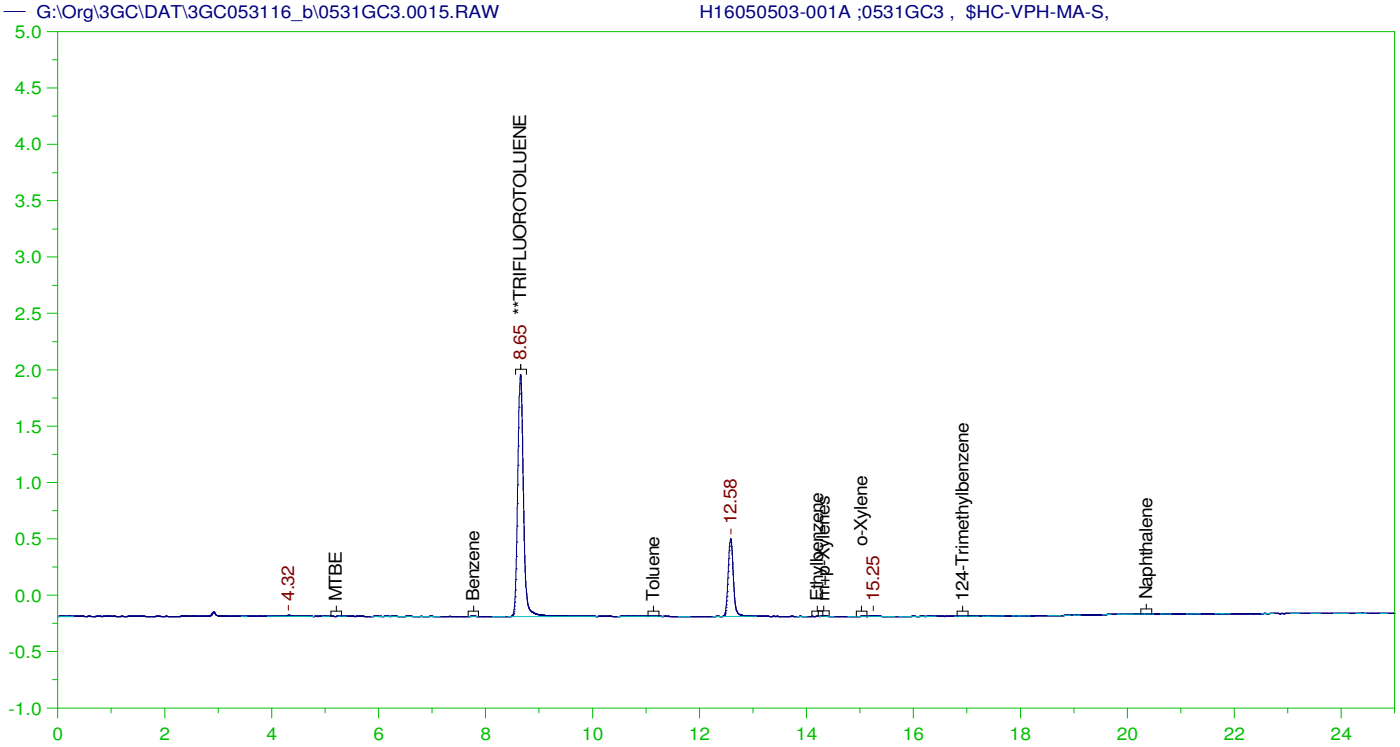


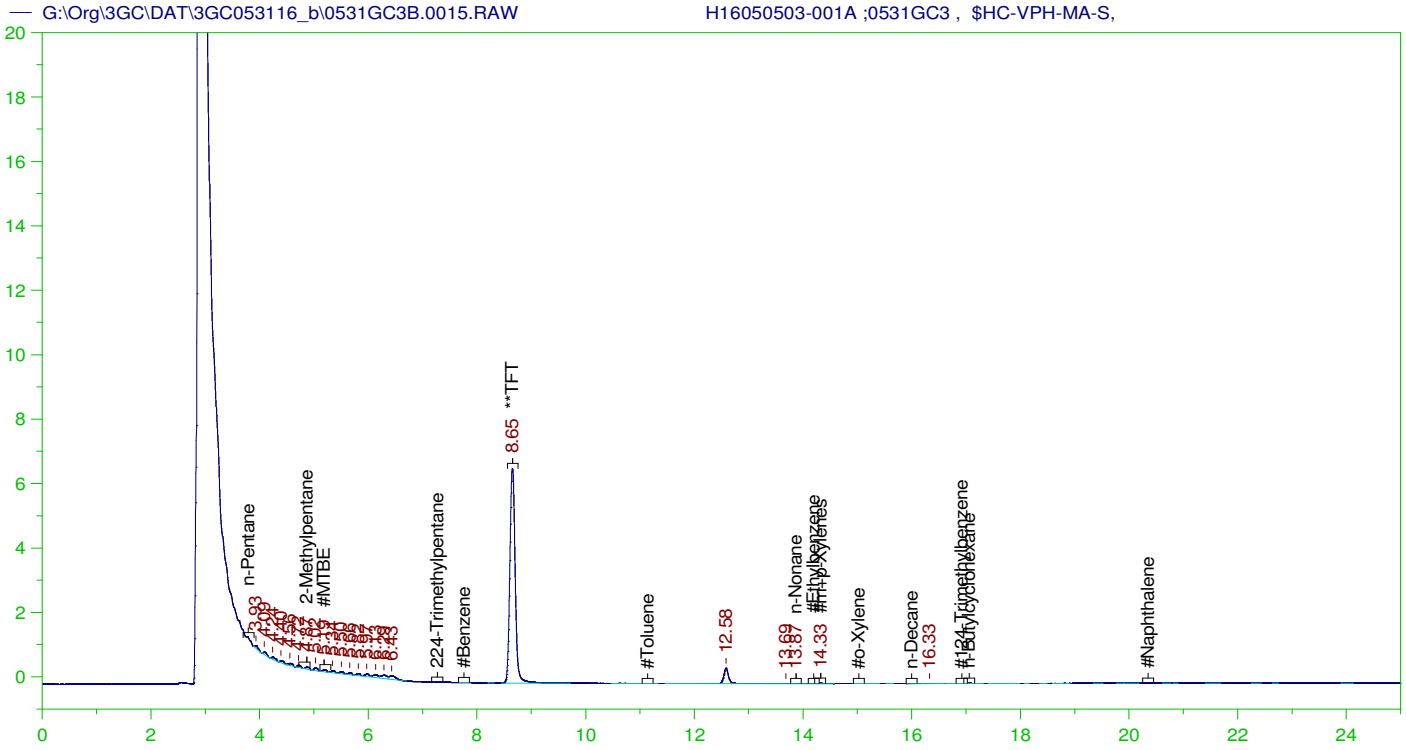
VPH AROMATICS PHOTOIONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: H16050503-001A ;0531GC3 , $HC-VPH-MA-S,
Raw File: G:\Org\3GC\DAT\3GC053116_b\0531GC3.0015.RAW
Date & Time Acquired: 6/1/2016 12:25:38 AM
Method File: G:\Org\3gc\Methods\GC3021616.MET
Calibration File: G:\Org\3gc\Cals\GC3021616.cal
Sample Weight: 50 Dilution: 1.29 S.A.: 1.29

Mean RF for C9 to C10 Aromatic Hydrocarbons: 344.4939
Rt range for C9 to C10 Aromatics: 15.13 to 20.25
Aromatic Hydrocarbon Range Area and Quantitation:
C9-C10 Aromatics Area:145.7946 C9-C10 Aromatics Amount: 1.091892E-02

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
MTBE	.	.	.		.129	U
Benzene	.	.	.		.065	U
Toluene	.	.	.		.065	U
Ethylbenzene	.	.	.		.065	U
m+p-Xylenes	.	.	.		.129	U
o-Xylene	.	.	.		.065	U
124-Trimethylbenzene	.	.	.		.065	U
Naphthalene	.	.	.		.129	U

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC
**TRIFLUOROTOLUENE	8.652	16021	3.225	2.748	85.21



VPH ALIPHATICS FLAME IONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: H16050503-001A ;0531GC3 , $HC-VPH-MA-S,
Raw File: G:\Org\3GC\DAT\3GC053116_b\0531GC3B.0015.RAW
Date & Time Acquired: 6/1/2016 12:25:38 AM
Method File: G:\Org\3gc\Methods\GC3021616B.MET
Calibration File: G:\Org\3gc\Cals\GC3021616B.cal
Sample Weight: 50 Dilution: 1.29 S.A.: 1.29

Mean RF for C5 to C8 Aliphatic Hydrocarbons: 396.2217
Mean RF for C9 to C12 Aliphatic Hydrocarbons: 297.6769
Mean RF for all calibrated compounds: 485.8004
Rt range for Gasoline Range Organics: 4.73 to 16.1
Rt range for C5 to C8 Aliphatic Hydrocarbons: 3.7 to 13.77
Rt range for C9 to C12 Aliphatic Hydrocarbons: 13.82 to 20.25

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
**TFT	8.652	45416	3.225	2.823	87.54	-

GRO Area:8987.766 GRO Amount: 0.4773243
TPH Area:11742.8 TPH Amount: 0.6236394

Aliphatic Hydrocarbon Areas and Quantitations uncorrected for Aromatics:
C5-C8 Area:10821.02 C5-C8 Amount: 0.7046116
C9-C12 Area:823.1762 C9-C12 Amount: 7.134562E-02

MC-03 (6') Batch ID: 33086

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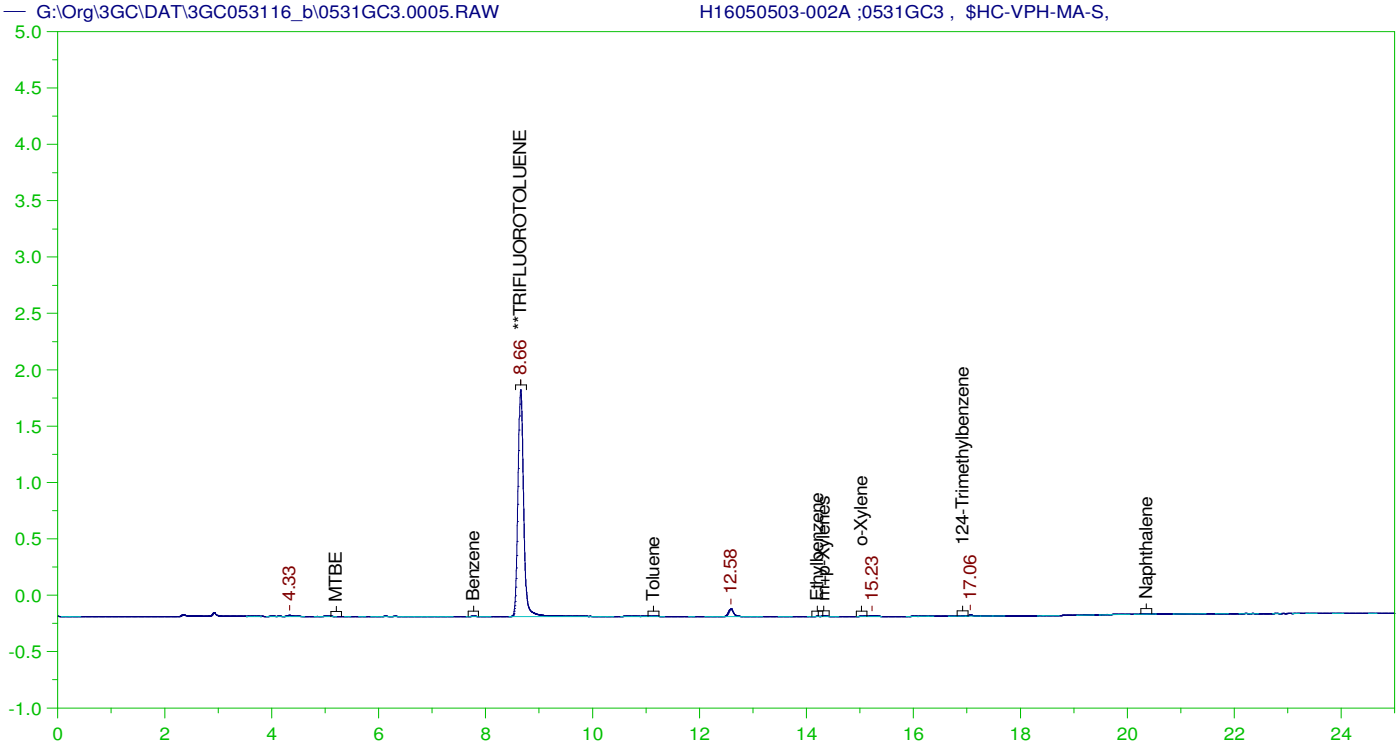


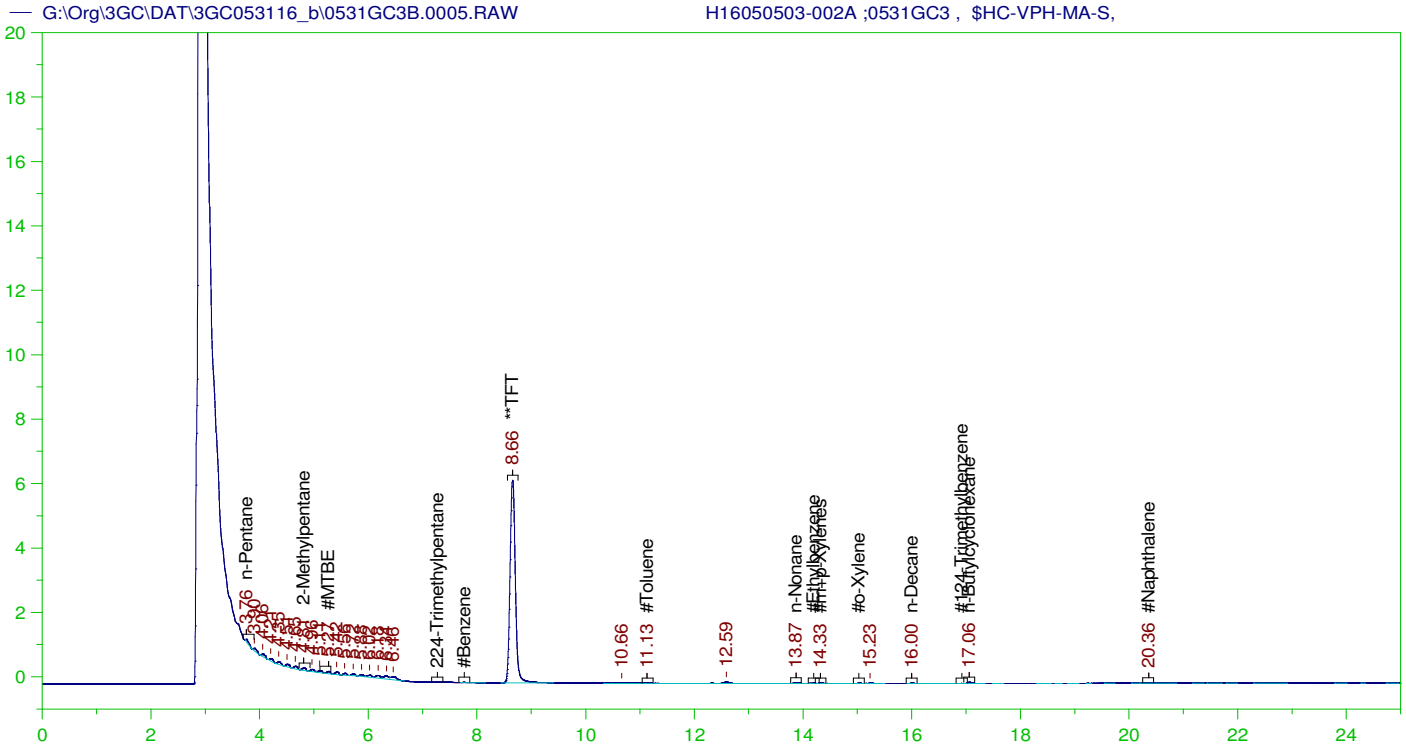
VPH AROMATICS PHOTOIONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: H16050503-002A ;0531GC3 , $HC-VPH-MA-S,
Raw File: G:\Org\3GC\DAT\3GC053116_b\0531GC3.0005.RAW
Date & Time Acquired: 5/31/2016 6:44:39 PM
Method File: G:\Org\3gc\Methods\GC3021616.MET
Calibration File: G:\Org\3gc\Cals\GC3021616.cal
Sample Weight: 50 Dilution: 1.26 S.A.: 1.26

Mean RF for C9 to C10 Aromatic Hydrocarbons: 344.4939
Rt range for C9 to C10 Aromatics: 15.13 to 20.25
Aromatic Hydrocarbon Range Area and Quantitation:
C9-C10 Aromatics Area:205.5844 C9-C10 Aromatics Amount: 1.503866E-02

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
MTBE	.	.	.		.126	U
Benzene	.	.	.		.063	U
Toluene	.	.	.		.063	U
Ethylbenzene	.	.	.		.063	U
m+p-Xylenes	.	.	.		.126	U
o-Xylene	.	.	.		.063	U
124-Trimethylbenzene	.	.	.		.063	U
Naphthalene	.	.	.		.126	U

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC
**TRIFLUOROTOLUENE	8.656	15006	3.15	2.514	79.81



VPH ALIPHATICS FLAME IONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: H16050503-002A ;0531GC3 , $HC-VPH-MA-S,
Raw File: G:\Org\3GC\DAT\3GC053116_b\0531GC3B.0005.RAW
Date & Time Acquired: 5/31/2016 6:44:39 PM
Method File: G:\Org\3gc\Methods\GC3021616B.MET
Calibration File: G:\Org\3gc\Cals\GC3021616B.cal
Sample Weight: 50 Dilution: 1.26 S.A.: 1.26

Mean RF for C5 to C8 Aliphatic Hydrocarbons: 396.2217
Mean RF for C9 to C12 Aliphatic Hydrocarbons: 297.6769
Mean RF for all calibrated compounds: 485.8004
Rt range for Gasoline Range Organics: 4.73 to 16.1
Rt range for C5 to C8 Aliphatic Hydrocarbons: 3.7 to 13.77
Rt range for C9 to C12 Aliphatic Hydrocarbons: 13.82 to 20.25

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
**TFT	8.656	42803	3.15	2.599	82.5	-

GRO Area:6715.32 GRO Amount: 0.3483449
TPH Area:10083.26 TPH Amount: 0.5230507

Aliphatic Hydrocarbon Areas and Quantitations uncorrected for Aromatics:
C5-C8 Area:8702.531 C5-C8 Amount: 0.5534876
C9-C12 Area:1092.853 C9-C12 Amount: 9.251607E-02

Work Order Receipt Checklist

Trihydro-Laramie

H16050503

Login completed by: Amanda B. Carlson

Date Received: 5/26/2016

Reviewed by: BL2000\rwilliams

Received by: wjj

Reviewed Date: 5/27/2016

Carrier name: Hand Del

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	1.7°C On Ice		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	Not Applicable ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☐	Not Applicable ☑

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

Contact and Corrective Action Comments:

None

ENERGY

Chain of Custody and Analytical Request Record

PLEASE PRINT (Provide as much information as possible.)

Company Name: Trihydro Corp.	Project Name, PWS, Permit, Etc.: MDEQ Whitefish Solvent Site	Sample Origin State: MT	EPA/State Compliance: Yes ☐ No ☐
Report Mail Address: avann@trihydro.com	Contact Name: Andrew Vann Phone/Fax: 307-745-7474 Email: avann@trihydro.com		Sampler: (Please Print) Grant Price
Invoice Address: 1252 Commerce Dr., Laramie, WY 82070	Invoice Contact & Phone:	Purchase Order:	Quote/Bottle Order: H1251

Special Report/Formats:

☐ DW
☐ POTW/WWTP
☐ State: _____
☐ Other: _____
☐ EDD/EDT (Electronic Data) Format: _____
☐ LEVEL IV
☐ NELAC

ANALYSIS REQUESTED

Number of Containers
Sample Type: A W S V B O DW
Air Water Soils/Solids
Vegetation Bioassay Other
DW - Drinking Water

SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	See attached quote	PCE & daughter products only	SEE ATTACHED	Standard Turnaround (TAT)	RUSH
1 MC-01 (6')	5/24/16	1000	Soil	X	X			
2 MC-03 (6')	5/24/16	1300	Soil	X	X			
3								
4								
5								
6								
7								
8								
9								
10 Trip Blank					X			

Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments: Quote # H1251

Shipped by: hand del
Cooler ID(s): Y
Receipt Temp 1.7 °C TB
On Ice: Y N
Custody Seal: On Bottle Y N; On Cooler Y N; Intact Y N; Signature Match Y N

LABORATORY USE ONLY #16050503

Custody Record MUST be Signed

Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
Grant Price	5/26/16 1500				
Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
			Received by Laboratory: Wanda	5-26-16 1500	

Sample Disposal: Return to Client: _____ Lab Disposal: _____

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report.
Visit our web site at www.energylab.com for additional information, downloadable fee schedule, forms, and links.

Quote #: H1251
Project Manager: Amanda B. Carlson
Expires: 5/9/2017

Analytical Quote

Grant Price
Trihydro-Laramie
2707 Broadwater Ave
Helena, MT 59601

TAT: 7 days
QC Level: STD

Project Name: Whitefish

Schedule: Soil Samples
Matrix: Soil
Comments:

Analyses	Method	Reporting Limit	Analyte Price
Physical Characteristics			
Moisture	SW3550C	0.2 wt%	$0.00
Volatile Organic Compounds			
8260-Volatile Organic Compounds - Short List			$120.00
1,1,2,2-Tetrachloroethane	SW8260B	0.2 mg/kg	**
cis-1,2-Dichloroethene	SW8260B	0.2 mg/kg	**
Tetrachloroethene	SW8260B	0.2 mg/kg	**
trans-1,2-Dichloroethene	SW8260B	0.2 mg/kg	**
Trichloroethene	SW8260B	0.2 mg/kg	**
Vinyl chloride	SW8260B	0.2 mg/kg	**

** Included in 8260-Volatile Organic Compounds - Short List Price

Petroleum Hydrocarbons-Volatile			
Volatile Petroleum Hydrocarbons			$120.00
Benzene	MA-VPH	0.05 mg/kg-dry	**
C5 to C8 Aliphatics	MA-VPH	2 mg/kg-dry	**
C9 to C10 Aromatics	MA-VPH	2 mg/kg-dry	**
C9 to C12 Aliphatics	MA-VPH	2 mg/kg-dry	**
Ethylbenzene	MA-VPH	0.05 mg/kg-dry	**
m+p-Xylenes	MA-VPH	0.05 mg/kg-dry	**
Methyl tert-butyl ether (MTBE)	MA-VPH	0.1 mg/kg-dry	**
Naphthalene	MA-VPH	0.1 mg/kg-dry	**
o-Xylene	MA-VPH	0.05 mg/kg-dry	**
Toluene	MA-VPH	0.05 mg/kg-dry	**

Total Purgeable Hydrocarbons	MA-VPH	2 mg/kg-dry	**
Xylenes, Total	MA-VPH	0.05 mg/kg-dry	**

** Included in Volatile Petroleum Hydrocarbons Price

Extractable Petroleum Hydrocarbons-Screen Analysis

Hydrocarbons, Extractable Petroleum-Scrn			$75.00
Total Extractable Hydrocarbons	SW8015M	10 mg/kg-dry	**

** Included in Hydrocarbons, Extractable Petroleum-Scrn Price

Preps For Soil Samples

EPH-Ultrasonic Extraction	SW3550B	$0.00
Methanol Extraction for Volatiles	SW5035	$0.00
Volatile Organics, Methanol Extraction	SW5035	$0.00

Schedule Price/Sample: $315.00

Schedule: EPH Afterscreen Soil w/o PAH

Matrix: Soil

Comments:

Analyses	Method	Reporting Limit	Analyte Price
Extractable Petroleum Hydrocarbons			
Hydrocarbons, Aliphatic Extractable Petroleum			$75.00
C19 to C36 Aliphatics	MA-EPH	10 mg/kg-dry	**
C9 to C18 Aliphatics	MA-EPH	10 mg/kg-dry	**

** Included in Hydrocarbons, Aliphatic Extractable Petroleum Price

Hydrocarbons, Aromatic Extractable Petroleum			$75.00
C11 to C22 Aromatics	MA-EPH	10 mg/kg-dry	**
Total Extractable Hydrocarbons	MA-EPH	10 mg/kg-dry	**

** Included in Hydrocarbons, Aromatic Extractable Petroleum Price

Preps For EPH Afterscreen Soil w/o PAH

EPH-Fractionation	MA-EPH	$0.00

Schedule Price/Sample: $150.00

Schedule: EPH Afterscreen Soil with PAH

Matrix: Soil

Comments:

Analyses	Method	Reporting Limit	Analyte Price
Extractable Petroleum Hydrocarbons			

Hydrocarbons, Aliphatic Extractable Petroleum			$75.00
C19 to C36 Aliphatics	MA-EPH	10 mg/kg-dry	**
C9 to C18 Aliphatics	MA-EPH	10 mg/kg-dry	**

** Included in Hydrocarbons, Aliphatic Extractable Petroleum Price

Hydrocarbons, Aromatic Extractable Petroleum			$125.00
2-MethylNaphthalene	MA-EPH	0.16667 mg/kg-dry	**
Acenaphthene	MA-EPH	0.16667 mg/kg-dry	**
Acenaphthylene	MA-EPH	0.16667 mg/kg-dry	**
Anthracene	MA-EPH	0.16667 mg/kg-dry	**
Benzo(a)Anthracene	MA-EPH	0.16667 mg/kg-dry	**
Benzo(a)Pyrene	MA-EPH	0.16667 mg/kg-dry	**
Benzo(b)Fluoranthene/Benzo (k)Fluoranthene	MA-EPH	0.167 mg/kg-dry	**
Benzo(g,h,I)perylene	MA-EPH	0.16667 mg/kg-dry	**
C11 to C22 Aromatics	MA-EPH	10 mg/kg-dry	**
Chrysene	MA-EPH	0.16667 mg/kg-dry	**
Dibenz(a,h) anthracene/Indeno(1,2,3-cd) pyrene	MA-EPH	0.167 mg/kg-dry	**
Fluoranthene	MA-EPH	0.16667 mg/kg-dry	**
Fluorene	MA-EPH	0.16667 mg/kg-dry	**
Naphthalene	MA-EPH	0.16667 mg/kg-dry	**
Phenanthrene	MA-EPH	0.16667 mg/kg-dry	**
Pyrene	MA-EPH	0.16667 mg/kg-dry	**
Total Extractable Hydrocarbons	MA-EPH	10 mg/kg-dry	**

** Included in Hydrocarbons, Aromatic Extractable Petroleum Price

Preps For EPH Afterscreen Soil with PAH

EPH-Fractionation	MA-EPH	$0.00

Schedule Price/Sample: $200.00

Schedule Name	Schedule Total
Soil Samples	$315.00
EPH Afterscreen Soil w/o PAH	$150.00
EPH Afterscreen Soil with PAH	$200.00

Quote Sub Total:	$665.00
Discount:	0.00%
Misc Charges:	$0.00
Quote Total:	$665.00

Tier II Data Validation Report Summary

Client: Montana Department of Environmental Quality (MDEQ)	Laboratory: Energy Laboratories
Project Name: Whitefish Solvent Site	Sample Matrix: Soil
Project Number: 776-033-001	Sample Start Date: 05/24/2016
Date Validated: 06/08/2016	Sample End Date: 05/24/2016
Parameters Included: ▪ Volatile Organic Compounds (VOC) by Environmental Protection Agency (EPA) Test Methods for Evaluating Solid Waste (SW-846) Method 8260B ▪ Total Extractable Hydrocarbons by SW-846 Method 8015M ▪ Volatile Petroleum Hydrocarbons (VPH) by Massachusetts Department of Environmental Protection (MADEP) Method MA-VPH ▪ Soil Moisture by SW-846 Method 3550C	
Laboratory Project ID: H16050503	
Data Validator: Charles Ballek, Senior Chemist	
Reviewer: Kyle Power, Environmental Chemist	

DATA EVALUATION CRITERIA SUMMARY

A Tier II Data Validation was performed by Trihydro Corporation's Chemical Data Evaluation Services Group on the amended analytical data report package generated by Energy Laboratories in Helena, Montana evaluating samples from the MDEQ Whitefish Solvent Site, located in Whitefish, Montana.

Precision, accuracy, method compliance, and completeness of this data package were assessed during this data review. Precision was determined by evaluating the calculated relative percent difference (RPD) values from:

- Laboratory duplicate pairs
- Matrix spike (MS) and matrix spike duplicate (MSD) pairs

Laboratory accuracy was established by reviewing the demonstrated percent recoveries (%R) of the following items to verify that data are not biased.

- MS/MSD samples
- Laboratory control samples (LCS)
- Organic system monitoring compounds (surrogates)

Method compliance was established by reviewing sample integrity, holding times, detection limits, surrogate recoveries, laboratory blanks, initial and continuing calibrations (where applicable) percent recoveries, and LCS percent recoveries against method-specific requirements.

Completeness was evaluated by determining the overall ratio of the number of samples and analyses planned versus the number of samples with valid analyses. Determination of completeness included a review of the chain-of-custody (CoC), laboratory analytical methods, and other laboratory and field documents associated with this analytical data set.

Tier II Data Validation Report Summary

SAMPLE NUMBERS TABLE

Client Sample ID	Laboratory Sample Number
MC-01 (6')	H16050503-001
MC-03 (6')	H16050503-002

Tier II Data Validation Report Summary

The laboratory data were reviewed to evaluate compliance with the methods and the quality of the reported data. Assessment of CoC completeness is included in Item 3 of the Data Validation Checklist. A check mark (✓) indicates that the referenced validation criteria were deemed acceptable, whereas a crossed circle (⊗) indicates validation criteria for which the data have been qualified by the data validator. An empty circle (○) indicates that the specified criterion does not apply to the reviewed data. Details are noted in the tables below.

Validation Criteria

- ✓ Data Completeness
- ✓ CoC Documentation (Item 3)
- ✓ Holding Times and Preservation (Items 6 and 7)
- ✓ Initial and Continuing Calibrations (Item 9)
- ✓ Laboratory Blanks (Item 10)
- ✓ MS/MSD (Item 12)
- ⊗ LCS (Item 14)
- ✓ System Monitoring Compounds (i.e., Surrogates) (Item 16)
- ○ Field, Equipment, and Trip Blanks (Item 17)
- ○ Field Duplicates (Item 19)
- ✓ Laboratory Duplicates (Item 21)

Guidance References

Chemical data validation was conducted in accordance with the United States Environmental Protection Agency (USEPA) Contract Laboratory Program (CLP) National Functional Guidelines for the analyses listed below, or by the appropriate method if not covered in the National Functional Guidelines.

- Data for organic analyses were evaluated according to validation criteria set forth in the USEPA CLP National Functional Guidelines for Superfund Organic Methods Data Review, document number EPA-540-R-014-002, August 2014 with additional reference to the USEPA CLP National Functional Guidelines for Organic Data Review, document number EPA 540/R-99/008, October 1999.
- Project-specific Quality Assurance Project Plans (QAPP) data validation requirements, as applicable.
- Trihydro Data Validation Variance Documentation, February 2016.

Tier II Data Validation Report Summary

OVERALL DATA PACKAGE ASSESSMENT

Based on a data validation review, the data are acceptable as delivered. Data qualified by the laboratory are discussed in Item 2 of the Validation Criteria Checklist.

The purpose of validating data and assigning qualifiers is to assist in proper data interpretation. Data that are not qualified meet the site data quality objectives. If values are assigned qualifiers other than an R (rejected, data not usable), the data may be used for site evaluation; however, consideration should be given to the reasons for qualification when interpreting sample concentrations. Data points that are assigned an R qualifier should not be used for site evaluation purposes.

Text identified in **bold font** in the Validation Criteria Checklist indicates that further action and/or qualification of the data were required. Data were qualified with J data flags by the laboratory if the result was greater than or equal to the method detection limit (MDL) but less than the reporting limit (RL). Laboratory J flags were preserved in the data and included in the Data Qualification Summary table at the end of this report. Data validation qualifiers were added for the items noted with crossed circles in the Validation Criteria section above. Please see the Data Qualification Summary table at the end of this report for a complete list of samples and analytes qualified.

Data that would be qualified with more than one flag were assigned one qualifier based on the severity; however, all reasons for qualification were retained. Data that would be qualified with both J+ and J- flags were evaluated based on validation criteria and assigned the appropriate flag. The hierarchy of qualifiers from the most to least severe is as follows:

- R > JB/U > NJ > J+/J- > J/UJ

Data qualifiers used during this validation are included in the following table.

Qualifier	Definition
J	Estimated concentration
J+	The result is an estimated concentration, but may be biased high

Data Completeness

The analyses were performed as requested on the CoC records. The associated samples were received by the laboratory and analyzed properly unless otherwise noted in the Criteria Checklist below. The complete data package consisted of 40 data points. No data points were rejected. The data completeness measure for this data package is calculated to be 100% and is acceptable.

VALIDATION CRITERIA CHECKLIST	
1. Was the report free of non-conformances identified by the laboratory?	Yes
Comments: The laboratory did not identify non-conformances related to the analytical data in the report.	
2. Were the data free of data qualification flags and/or notes used by the laboratory? If no, define.	No
Comments: The laboratory applied the following data qualifier to results reported for this data set. J – Estimated value. The analyte was present but less than the reporting limit. S – Spike recovery outside of advisory limits.	
3. Were sample CoC forms and procedures complete?	No
Comments: The CoC record from field to laboratory was complete and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt with the following exception. The CoC indicated that a trip blank was submitted with the sample set. The laboratory stated that a trip blank was not present in the cooler. The trip blank was not critical for the evaluation of the site or the validation of the lab results and no further action was required. Custody seals were noted to not present nor required since the samples were delivered to the laboratory by project personnel and custody was maintained at all times.	
4. Were detection limits in accordance with the quality assurance project plan (QAPP), permit, or method, or indicated as acceptable?	Yes
Comments: The detection limits appeared to be acceptable. Dilutions were not applied to the samples for analyses. Final determination of the data quality based on detection limits will be established by the project team.	
5. Were the reported analytical methods and constituents in compliance with the QAPP, permit, or CoC?	Yes
Comments: The reported analytical methods were in compliance with the CoC and the laboratory reported the requested constituents in accordance with the CoC.	
6. Were samples received in good condition within method-specified requirements?	No
Comments: Samples were received in good condition as noted on the Sample Receipt Checklist. Samples were received on ice, in good condition, with the cooler temperature outside the recommended temperature range of 4°C ± 2°C at a temperature of 1.7°C as noted on the CoC and the Work Order Receipt Checklist. The cooler temperature below 2.0°C was judged as acceptable since the laboratory did not report the sample containers as broken or frozen. The laboratory indicated that the sample containers were intact and sufficient sample volume/mass was provided to complete the requested analyses.	
7. Were samples extracted/digested and analyzed within method-specified or technical holding times?	Yes
Comments: The samples were extracted and analyzed within method-specific holding times.	
8. Were reported units appropriate for the sample matrix/matrices and analytical method(s)? Specify if wet or dry units were used for soil.	Yes
Comments: The analytical results for the submitted samples were reported in concentration units of milligrams per kilogram (mg/kg) and soil moisture was reported as percentage (%). These units were acceptable for the sample matrices and the analyses requested. The results for the soil samples were reported on a dry weight basis.	

VALIDATION CRITERIA CHECKLIST

9. Did the laboratory provide any specific initial and/or continuing calibration results? Yes

Comments: Limited continuing calibration summary data for Methods 8260B, 8015M, and MA-VPH were included as part of this data set. Full calibration data was not available for review.

10. If initial and/or continuing calibration results were provided, were the results within acceptable limits? Yes

Comments: The available continuing calibration data were within acceptable limits.

11. Was the total number of laboratory blank samples prepared equal to at least 5% of the total number of samples or analyzed as required by the method? Yes

Comments: The total number of laboratory blank samples prepared was equal to at least 5% of the total number of samples. Method blanks are not required for moisture by Method 3550C.

12. Were target analytes reported as not detected in the laboratory blanks? Yes

Comments: Target analytes were not detected in the laboratory blanks.

13. Was the total number of MS samples prepared equal to at least 5% of the total number of samples or analyzed as required by the method? Yes

Comments: The total number of matrix spike samples prepared was equal to at least 5% of the total number of samples, although MS samples were not prepared for all analyses. The matrix spike sample source for each analytical batch in this sample set has been indicated below.

Method	Analytes	Batch	MS Sample Source
MA-VPH	Volatile Petroleum Hydrocarbons	33086	MC-03 (6')
8015M	Total Extractable Hydrocarbons	32982	Not Associated
8260B	VOC	33072	Not Associated

Not Associated – The MS sample source was not associated with this project.

Matrix spike analyses were not prepared nor required for soil moisture analyses by Method 3550C.

14. For MS/MSDs prepared from project samples, were percent recoveries and RPDs within data validation or laboratory quality control (QC) limits? No

Comments: The recoveries and RPD values for MS/MSDs prepared from project samples were within data validation and laboratory QC limits.

The percent recoveries and RPD values for MS/MSDs prepared from non-project samples were evaluated and considered but data were not qualified based on those results since matrix similarity to project samples could not be guaranteed.

15. Was the total number of LCSs analyzed equal to at least 5% of the total number of samples or analyzed as required by the method? Yes

Comments: The total number of LCS analyzed was equal to at least 5% of the total number of samples. LCS were not prepared nor required for soil moisture analyses by Method 3550C.

16. Were LCS/LCSD percent recoveries and LCS/LCSD RPDs within data validation or laboratory QC limits? No

Comments: The LCS percent recoveries were within laboratory QC limits with the following exception.

The reported recovery for tetrachloroethene in the LCS for Method 8260B batch 33072 was outside the laboratory acceptance limits of 84-108% at 112%. Tetrachloroethene was detected in the associated samples in this batch and the results were assigned J+ qualifiers due to evidence of potential high bias.

The laboratory did not analyze LCSDs for the batches reported in this data set.

VALIDATION CRITERIA CHECKLIST	
17. Were surrogate recoveries within laboratory QC limits?	Yes
Comments: Surrogates recoveries for the submitted samples were within laboratory and data validation limits.	
18. Were the number of trip blank, field blank, and/or equipment blank samples collected equal to at least 10% of the total number of samples or as required by the project guidelines, QAPP, SAP, or permit?	No
Comments: Trip blank, field blank, and equipment blank samples were not submitted in this sample set.	
19. Were target analytes reported as not detected in the trip blank, field blank, and/or equipment blank samples?	N/A
Comments: Trip blank, field blank, and equipment blank samples were not submitted in this sample set.	
20. Was the number of field duplicates collected equal to at least 10% of the total number of samples or as required by the project guidelines, QAPP, SAP, or permit?	No
Comments: Field duplicate samples were not submitted in this sample set.	
21. Were field duplicate RPD values within data validation QC limits (soil 0-50%, water 0-30%, or air 0-25%)?	N/A
Comments: Field duplicate samples were not submitted in this sample set.	
22. For laboratory duplicates prepared from project samples, were RPDs within laboratory QC limits?	Yes
Comments: A laboratory duplicate was prepared for soil moisture by Method 3550C batch R115658 from sample MC-03 (6'). The RPD value for the laboratory duplicate analysis was within the acceptance limits.	

DATA QUALIFICATION SUMMARY

Abbreviation	Reason
HR-LCS	The LCS and/or LCSD percent recovery was greater than the upper acceptable limit indicating a possible high bias.
MDLRL	Flagged by the laboratory: The result was greater than the MDL but less than the RL.

Analyte	Method	Field Sample ID	Lab Sample ID	Result	Limit	Units	Reviewer Qualifier	DV Flag Reasons
Tetrachloroethene	SW8260B	MC-01 (6')	H16050503-001	0.49	0.2	mg/kg	J+	HR-LCS
Tetrachloroethene	SW8260B	MC-03 (6')	H16050503-002	0.051	0.2	mg/kg	J+	HR-LCS, MDLRL

ATTACHMENT 5

LINCOLN/ANDERSON BORING LOGS

Sheet 1 of 1 Sheets

TRIHYDRO CORPORATION

FIELD BORING LOG

Project & Project Number:	MDEQ Whitefish Solvent Site - 776-033-001	Date:	5/25/16
Project Location/Address:	Martin's or Lincoln/Anderson (circle one)	Drilling Company:	Dakota Technologies
Client:	MDEQ	Driller:	Nate / Mike
Weather:	sunny, cool, calm	Rig Type / Method:	Direct push with MIP
Logged by:	Grant Price	Sample Method (circle one):	Direct Push Split Spoon Shelby Tube Other:
		Surface Elevation:	Casing Elevation: GE Elevation:
Logger's Signature:	[signature]	Equipment List:	

BORING ID: LA-01 **Boring Location:** SW corner of cycle shop, N. 2nd St. Row

Interval (ft bgs)	Texture - Grain Size Major	Texture - Grain Size Minor	Color Major	Color Modifier	Plasticity	Consistency (Lower clay content)	Consistency (Higher clay content)	Moisture	Odor	PID Interval/Reading	Additional Comments (Odor descriptor, sheen, nodules, structure, vegitation, etc.)
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		intended as up-gradient boring, MIP only. Road base is very hard
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		had to pre-probe to 3½ ft bgs, so no MIP data from 0-3
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		PID / FID spike @ 14', but no XSD.
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		7' from curb 1' E of E edge of Whitefish pilot
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non –	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted –		

Sample Collected: ~~[illegible]~~

Sample ID:

Date:

Time:

Depth:

Number/Size of Containers:

Analysis to be Performed:

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

FIELD BORING LOG

Sheet 1 of 1 Sheets

Project & Project Number:	MDEQ Whitefish Solvent Site - 776-033-001	Date:	5/25/16
Project Location/Address:	Martin's or Lincoln/Anderson (circle one)	Drilling Company:	Dakota Technologies
Client:	MDEQ	Driller:	Mike / Nate
Weather:		Rig Type / Method:	Direct push with MIP.
Logged by:	Grant Price	Sample Method (circle one):	Direct Push Split Spoon Shelby Tube Other:
		Surface Elevation:	Casing Elevation: GE Elevation:
Logger's Signature:	DR	Equipment List:	

BORING ID: LA-52 **Boring Location:** SE of LA, N R>W of 2nd ST.

Interval (ft bgs)	Texture - Grain Size Major	Texture - Grain Size Minor	Color Major	Color Modifier	Plasticity	Consistency (Lower clay content)	Consistency (Higher clay content)	Moisture	Odor	PID Interval/Reading	Additional Comments (Odor descriptor, sheen, nodules, structure, vegitation, etc.)
	GVL - F M C	Grvlly	Black	Red Brown	High	Very Loose	Very Soft	Dry	Strong		intended to evaluate LA as potential source
	Sand - F M C	Sandy	Gray - L M D	Gray Green	Moderate	Loose	Soft	Damp	Moderate		
	Silt	Silty	Brn - L M D	Rust Yellow	Low	Medium Dense	Firm	Moist	Slight		
	Clay	Clayey	Red - L M D	Other	Non	Dense	Hard	Wet	None Noted		
			Other	%	--	Very Dense	Very Hard	Saturated	--		
	GVL - F M C	Grvlly	Black	Red Brown	High	Very Loose	Very Soft	Dry	Strong		No XSD detects.
	Sand - F M C	Sandy	Gray - L M D	Gray Green	Moderate	Loose	Soft	Damp	Moderate		
	Silt	Silty	Brn - L M D	Rust Yellow	Low	Medium Dense	Firm	Moist	Slight		
	Clay	Clayey	Red - L M D	Other	Non	Dense	Hard	Wet	None Noted		
			Other	%	--	Very Dense	Very Hard	Saturated	--		
	GVL - F M C	Grvlly	Black	Red Brown	High	Very Loose	Very Soft	Dry	Strong		Lift pre-probe - No data from 0-4
	Sand - F M C	Sandy	Gray - L M D	Gray Green	Moderate	Loose	Soft	Damp	Moderate		
	Silt	Silty	Brn - L M D	Rust Yellow	Low	Medium Dense	Firm	Moist	Slight		
	Clay	Clayey	Red - L M D	Other	Non	Dense	Hard	Wet	None Noted		
			Other	%	--	Very Dense	Very Hard	Saturated	--		
	GVL - F M C	Grvlly	Black	Red Brown	High	Very Loose	Very Soft	Dry	Strong		
	Sand - F M C	Sandy	Gray - L M D	Gray Green	Moderate	Loose	Soft	Damp	Moderate		
	Silt	Silty	Brn - L M D	Rust Yellow	Low	Medium Dense	Firm	Moist	Slight		
	Clay	Clayey	Red - L M D	Other	Non	Dense	Hard	Wet	None Noted		
			Other	%	--	Very Dense	Very Hard	Saturated	--		
	GVL - F M C	Grvlly	Black	Red Brown	High	Very Loose	Very Soft	Dry	Strong		7.5' from curb, 0.5' E of E corner of pizza place
	Sand - F M C	Sandy	Gray - L M D	Gray Green	Moderate	Loose	Soft	Damp	Moderate		
	Silt	Silty	Brn - L M D	Rust Yellow	Low	Medium Dense	Firm	Moist	Slight		
	Clay	Clayey	Red - L M D	Other	Non	Dense	Hard	Wet	None Noted		
			Other	%	--	Very Dense	Very Hard	Saturated	--		
	GVL - F M C	Grvlly	Black	Red Brown	High	Very Loose	Very Soft	Dry	Strong		
	Sand - F M C	Sandy	Gray - L M D	Gray Green	Moderate	Loose	Soft	Damp	Moderate		
	Silt	Silty	Brn - L M D	Rust Yellow	Low	Medium Dense	Firm	Moist	Slight		
	Clay	Clayey	Red - L M D	Other	Non	Dense	Hard	Wet	None Noted		
			Other	%	--	Very Dense	Very Hard	Saturated	--		

Sample Collected: No

Sample ID:

Date:

Time:

Depth:

Number/Size of Containers:

Analysis to be Performed:

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

FIELD BORING LOG

Sheet 1 of 1 Sheets

Project & Project Number:	MDEQ Whitefish Solvent Site - 776-033-001	Date:	5/25/16
Project Location/Address:	Martin's or Lincoln/Anderson (circle one)	Drilling Company:	Dakota Technologies
Client:	MDEQ	Driller:	Nate / Mike
Weather:	Cloudy, calm	Rig Type / Method:	Direct push with MIP.
Logged by:	Grant Price	Sample Method (circle one):	Direct Push Split Spoon Shelby Tube Other:
		Surface Elevation:	Casing Elevation: GE Elevation:
Logger's Signature:		Equipment List:	

BORING ID: LA-03

Boring Location: SW corner of LA, N. Second St. Row

Interval (ft bgs)	Texture - Grain Size Major	Texture - Grain Size Minor	Color Major	Color Modifier	Plasticity	Consistency (Lower clay content)	Consistency (Higher clay content)	Moisture	Odor	PID Interval/Reading	Additional Comments (Odor descriptor, sheen, nodules, structure, vegitation, etc.)
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		intended to eval. LA as potential source.
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		Max P only pre-probed to 4ft
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		No XSD spikes, TD = 20'. No need to step across 2nd. St.
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		7' from curb 1' E of W edge of paved place
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		

Sample Collected: No

Sample ID:

Date:

Time:

Depth:

Number/Size of Containers:

Analysis to be Performed:

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

FIELD BORING LOG

Sheet 1 of 1 Sheets

Project & Project Number:	MDEQ Whitefish Solvent Site - 776-033-001	Date:	5/25/16
Project Location/Address:	Martin's or Lincoln/Andersen (circle one)	Drilling Company:	Dakota Technologies
Client:	MDEQ	Driller:	Nate / Mike
Weather:	Cloudy calm	Rig Type / Method:	Direct push with MIP.
Logged by:	Grant Price /	Sample Method (circle one):	Direct Push Split Spoon Shelby Tube Other:
Logger's Signature:		Surface Elevation:	Casing Elevation: GE Elevation:
		Equipment List:	

BORING ID: LA-04

Boring Location: west of Lowlas, w row of Lupfer, just S. of Alley (~20')

Interval (ft bgs)	Texture - Grain Size Major	Texture - Grain Size Minor	Color Major	Color Modifier	Plasticity	Consistency (Lower clay content)	Consistency (Higher clay content)	Moisture	Odor	PID Interval/Reading	Additional Comments (Odor descriptor, sheen, nodules, structure, vegitation, etc.)
	GVL - F M C	Grvlly	Black	Red Brown	High	Very Loose	Very Soft	Dry	Strong		dual purpose:
	Sand - F M C	Sandy	Gray - L M D	Gray Green	Moderate	Loose	Soft	Damp	Moderate		1) opposite side of sewer
	Silt	Silty	Brn - L M D	Rust Yellow	Low	Medium Dense	Firm	Moist	Slight		in Lupfer.
	Clay	Clayey	Red - L M D	Other	Non	Dense	Hard	Wet	None Noted		
			Other	%	--	Very Dense	Very Hard	Saturated	--		
	GVL - F M C	Grvlly	Black	Red Brown	High	Very Loose	Very Soft	Dry	Strong		- sewer as source?
	Sand - F M C	Sandy	Gray - L M D	Gray Green	Moderate	Loose	Soft	Damp	Moderate		2) is LA cont. connected
	Silt	Silty	Brn - L M D	Rust Yellow	Low	Medium Dense	Firm	Moist	Slight		to cont. further west?
	Clay	Clayey	Red - L M D	Other	Non	Dense	Hard	Wet	None Noted		
			Other	%	--	Very Dense	Very Hard	Saturated	--		
	GVL - F M C	Grvlly	Black	Red Brown	High	Very Loose	Very Soft	Dry	Strong		5' off curb.
	Sand - F M C	Sandy	Gray - L M D	Gray Green	Moderate	Loose	Soft	Damp	Moderate		N 9.5 N of N edge of
	Silt	Silty	Brn - L M D	Rust Yellow	Low	Medium Dense	Firm	Moist	Slight		la cocina feliz
	Clay	Clayey	Red - L M D	Other	Non	Dense	Hard	Wet	None Noted		
			Other	%	--	Very Dense	Very Hard	Saturated	--		
	GVL - F M C	Grvlly	Black	Red Brown	High	Very Loose	Very Soft	Dry	Strong		xSD spike @ 6', correlates
	Sand - F M C	Sandy	Gray - L M D	Gray Green	Moderate	Loose	Soft	Damp	Moderate		w/ EC dip (coarser matrix)
	Silt	Silty	Brn - L M D	Rust Yellow	Low	Medium Dense	Firm	Moist	Slight		
	Clay	Clayey	Red - L M D	Other	Non	Dense	Hard	Wet	None Noted		
			Other	%	--	Very Dense	Very Hard	Saturated	--		
	GVL - F M C	Grvlly	Black	Red Brown	High	Very Loose	Very Soft	Dry	Strong		More spikes, > w/ depth @ 17-20
	Sand - F M C	Sandy	Gray - L M D	Gray Green	Moderate	Loose	Soft	Damp	Moderate		
	Silt	Silty	Brn - L M D	Rust Yellow	Low	Medium Dense	Firm	Moist	Slight		Pre-probe to 2'
	Clay	Clayey	Red - L M D	Other	Non	Dense	Hard	Wet	None Noted		
			Other	%	--	Very Dense	Very Hard	Saturated	--		
	GVL - F M C	Grvlly	Black	Red Brown	High	Very Loose	Very Soft	Dry	Strong		top of sewer in manhole in
	Sand - F M C	Sandy	Gray - L M D	Gray Green	Moderate	Loose	Soft	Damp	Moderate		lupfer/alley is 6'-6', bottom
	Silt	Silty	Brn - L M D	Rust Yellow	Low	Medium Dense	Firm	Moist	Slight		~7'.
	Clay	Clayey	Red - L M D	Other	Non	Dense	Hard	Wet	None Noted		
			Other	%	--	Very Dense	Very Hard	Saturated	--		
	GVL - F M C	Grvlly	Black	Red Brown	High	Very Loose	Very Soft	Dry	Strong		xSD spike on 6', but sewer
	Sand - F M C	Sandy	Gray - L M D	Gray Green	Moderate	Loose	Soft	Damp	Moderate		depth @ exact location is unknown
	Silt	Silty	Brn - L M D	Rust Yellow	Low	Medium Dense	Firm	Moist	Slight		manhole is
	Clay	Clayey	Red - L M D	Other	Non	Dense	Hard	Wet	None Noted		
			Other	%	--	Very Dense	Very Hard	Saturated	--		

Sample Collected: No

Sample ID:

Date:

Time:

Depth:

Number/Size of Containers:

Analysis to be Performed:

Duplicate Collected:

Notes: ~30' NE of LA-04

if hits are higher here than E side of sewer, could point to sewer as source

TRIHYDRO CORPORATION

FIELD BORING LOG

Project & Project Number:	MDEQ Whitefish Solvent Site - ~~776-033-001~~	Date:	5/25/16
Project Location/Address:	Martin's or Lincoln/Anderson (circle one)	Drilling Company:	Dakota Technologies
Client:	MDEQ	Driller:	Nate Mike
Weather:	calm, cool, cloudy	Rig Type / Method:	Direct push with MIP
Logged by:	Grant Price	Sample Method (circle one):	Direct Push Split Spoon Shelby Tube Other:
		Surface Elevation:	Casing Elevation: GE Elevation:
Logger's Signature:		Equipment List:	

BORING ID: LA-05

Boring Location: ~ N. of Laula's in alley, ~2' NW of MW-7

Interval (ft bgs)	Texture - Grain Size Major	Texture - Grain Size Minor	Color Major	Color Modifier	Plasticity	Consistency (Lower clay content)	Consistency (Higher clay content)	Moisture	Odor	PID Interval/Reading	Additional Comments (Odor descriptor, sheen, nodules, structure, vegitation, etc.)
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		DG of LA. S of sewer in alley. E of sewer in lupfer
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		pre-probe to 2' getting really high XSD from
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		0 ~ 5'. Mike questions reliability. about. sidestep 6'. stays over.
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		membrane has sludge that will come off. changing membrane.
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		On second run, no big spikes.
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		Conclusion membrane was [illegible] loaded.
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		Still, some XSD hits, but less
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		than LA-04.
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		

Sample Collected: NJ

Sample ID:

Date:

Time:

Depth:

Number/Size of Containers:

Analysis to be Performed:

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

FIELD BORING LOG

Sheet 1 of 1 Sheets

Project & Project Number:	MDEQ Whitefish Solvent Site - 776-033-001	Date:	5/25/16
Project Location/Address:	Martin's or Lincoln/Anderson (circle one)	Drilling Company:	Dakota Technologies
Client:	MDEQ	Driller:	Nate / Mike
Weather:	calm, clear	Rig Type / Method:	Direct push with MIP.
Logged by:	Grant Price	Sample Method (circle one):	Direct Push Split Spoon Shelby Tube Other:
		Surface Elevation:	Casing Elevation: GE Elevation:
Logger's Signature:		Equipment List:	

BORING ID: LA-06 **Boring Location:** outside LA bridedown.

Interval (ft bgs)	Texture - Grain Size Major	Texture - Grain Size Minor	Color Major	Color Modifier	Plasticity	Consistency (Lower clay content)	Consistency (Higher clay content)	Moisture	Odor	PID Interval/Reading	Additional Comments (Odor descriptor, sheen, nodules, structure, vegitation, etc.)
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		to evaluate LA as source
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		4' of back step 1.5' east of E edge of
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		concrete ramp. No XSD spikes.
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		

Sample Collected: No

Sample ID:

Date:

Time:

Depth:

Number/Size of Containers:

Analysis to be Performed:

Duplicate Collected:

Notes:

Sheet 1 of 1 Sheets

TRIHYDRO CORPORATION

FIELD BORING LOG

Project & Project Number:	MDEQ Whitefish Solvent Site - 776-033-001	Date:	5/25/16
Project Location/Address:	Martin's or Lincoln/Anderson (circle one)	Drilling Company:	Dakota Technologies
Client:	MDEQ	Driller:	Nate / Mike
Weather:	Sunny, calm	Rig Type / Method:	Direct push with MIP
Logged by:	Grant Price	Sample Method (circle one):	Direct Push Split Spoon Shelby Tube Other:
		Surface Elevation:	Casing Elevation: GE Elevation:
Logger's Signature:		Equipment List:	

BORING ID: LA-07 **Boring Location:** NE of LA, S of sewer, 6' NW of MW-N3

Interval (ft bgs)	Texture - Grain Size Major	Texture - Grain Size Minor	Color Major	Color Modifier	Plasticity	Consistency (Lower clay content)	Consistency (Higher clay content)	Moisture	Odor	PID Interval/Reading	Additional Comments (Odor descriptor, sheen, nodules, structure, vegitation, etc.)
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		intended to evaluate sewer as potential source.
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		depth to top of sewer in manhole NE of LA-07 is 13' 6". Topographically
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		alley slopes down to the west. Probably 6' diff. from Baker to Lupfer.
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		No XSD spikes to TD of 20'
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		
	GVL - F M C Sand - F M C Silt Clay	Grvlly Sandy Silty Clayey	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	High Moderate Low Non --	Very Loose Loose Medium Dense Dense Very Dense	Very Soft Soft Firm Hard Very Hard	Dry Damp Moist Wet Saturated	Strong Moderate Slight None Noted --		

Sample Collected: No

Sample ID:

Date:

Time:

Depth:

Number/Size of Containers:

Analysis to be Performed:

Duplicate Collected:

Notes:

ATTACHMENT 6

PROPERTY CONDITION FORM

253-3496
Jim NW Energy

PROPERTY CONDITION FORM

Trihydro Corporation is performing interim remediation activities as part of the Montana Department of Environmental Quality Whitefish Solvent Site Project. This form, along with photographs taken by Trihydro, will document site conditions prior to work, as well as agreements related to site condition following restoration.

Property Owner Liz Larsen

Address ~~306 2nd St. East~~ 239 Baker Ave.

Description of work to be performed installed borings in parking lot E of liquor store.

Utilities in work area sewer, gas, overhead power, storm sewer

Structures/features to be undisturbed NA

Structures/features to be moved/replaced holes in asphalt

Structures/features to be removed and replaced NA

Landscaping to be replaced NA

Liquor store GM

Owner signature (prior to work) Lana C Walker Date 5/24/16

Trihydro signature [illegible] Date 5/24/16

Work was completed to owner's satisfaction: Lana C Walker Date

PROPERTY CONDITION FORM

Trihydro Corporation is performing interim remediation activities as part of the Montana Department of Environmental Quality Whitefish Solvent Site Project. This form, along with photographs taken by Trihydro, will document site conditions prior to work, as well as agreements related to site condition following restoration.

Property Owner Dave ~~Sheern~~ ~~Sheer~~ Sheeran

Address 306 2nd St. East

Description of work to be performed installed boring outside of Back door

Utilities in work area sewer, gas, over head power

Structures/features to be undisturbed NA

Structures/features to be moved/replaced NA

Structures/features to be removed and replaced hole in asphalt

Landscaping to be replaced NA

~~Owner~~ Manager signature (prior to work) _____ Date 5/25/16

Trihydro signature _____ Date 5/25/16

Work was completed to owner's satisfaction. _____ Date 5/25/16

APPENDIX B

SVE CONSTRUCTION

NOTE: You MUST be authorized by the U-DIG Call Center before using this form!

Must Print or Type Ticket Information.
If not legible Ticket will be Rejected.

U-DIG FAX LOCATE REQUEST

FAX THIS REQUEST TO: (406) 752-7220

CONTRACTOR FAX NO 406-897-2239 *EMPLOYEE NAME MARC BLAIDEN

*CONTRACTOR PHONE NO. 406-253-3730 * CONTRACTOR NAME CUTTING EDGE EXCAVATION

A minimum of 2-full business days (not including the day you fax) notice is required. Be aware of observed U-Dig Holidays.

PLANNED DIG DAY ~~TUESDAY~~ MONDAY DIG DATE & TIME: OCTOBER 10, 2016 7:00AM

*WORK SITE ADDRESS 239 BAKER AVE

*NEAREST INTERSECTION EAST 3RD STREET *CITY/TOWN WHITEFISH

COMMUNITY / SUBDIVISION

TOWNSHIP RANGE SECTION QUARTER SECTION

Optional: GPS COORDINATES (Must be NAD83 or WGS84 & Decimal Format) (Example:Lat. 48.178010 Long. -114.300390)

Latitude 48.409773° Longitude -114.337950°

NAME OF PERSON / BUSINESS AT SITE WHITEFISH LIQUOR STORE

CONTACT PERSON (if other than contractor) PHONE

*PURPOSE OF DIG PIPE INSTALLATION FOR SOIL CLEANUP

*DESCRIPTION OF DIG SPOT & HOW IT WILL BE MARKED MARKED ON CONCRETE AND ASPHALT WITH PINK PAINT

ADDITIONAL INFORMATION / DIRECTIONS / COMMENTS LOCATE FROM EDGE OF BUILDING TO ROADWAY ON WEST & SOUTH SIDE AND ENTIRE PARKING LOT IN BACK

DEPTH OF EXCAVATION 7' ☐ Site Meet Requested Site Meet Contact & Ph#

☒ Public Property ☒ Machine Dig ☒ Right-Of-Way ☒ Map being Faxed

☒ Private Property ☒ Hand Dig ☐ Site Meet Requested # of Faxed Pages 2

EMERGENCY REQUESTS IF AN EMERGENCY, THE REQUEST MUST BE CALLED IN TO (406) 755-8344

DO NOT FAX EMERGENCY / PLANNED EMERGENCY LOCATE REQUESTS!!

*REQUIRED FIELDS, LOCATE WILL BE REJECTED IF NOT FILLED OUT

- All maps or diagrams must be legibly prepared using black ink (not pencil).
- Maps and diagrams must clearly show the dig area(s), buildings, named roads and cross roads, distances from roads, intersections, buildings, and rights-of-way.
- Maps must be black and white line drawings, aerial or google maps are NOT readable.
- Mark the direction of North.
- Maps may be on more than one page but each page cannot exceed 8.5 x 11 inches.
- If you do not receive a confirmation within 3 hours of submitting your request, there may be a problem in processing your request. Please call 406-755-8344 to resolve any processing problems.

MONTANA ONE CALL
Tel.406-755-8344 Tel.800-551-8344 Fax.406-752-7220
*** Locate Request Confirmation ***

Priority Type:STANDARD Request Type:REMARK
Ticket No: 2017010022
Update of: 2016530007

Original Call Date: 01/04/2017 Time: 09:07:26 AM OP: 46
Transmit Date: 01/04/2017 Time: 09:07:51 AM

Work to Begin Date: 01/07/2017 Time:

Company: REMINGTON TECHNOLOGIES
Contact Name: SUE HAREM Contact Phone: (970)278-1646
Alternate Contact: Altern. Phone:
Best Time to Call: Fax No:
Cell Phone: Pager/Work No:
Email Address: sharem@remingtontech.net

*** DIG SITE INFORMATION ***
County: FLATHEAD City: WHITEFISH
Community/Subdivision: WHITEFISH
Address: 239 , BAKER AVE
Lot/Unit#:
To Address:
Nearest Intersecting Street: E 3RD ST
2nd Intersecting Street:
On the side of street and approximately 0.00 FEET of Intersection 1
Latitude: 48.40995600 Longitude: -114.3378525

Purpose of the dig: ENVIRONMENTAL RE-MEDIATION & SOIL B Depth: 25.00 FT
Machine Dig: YES Public Property: YES Area is Marked: NO
Hand Dig: YES Private Property: YES Area is Not Marked: NO

Site meet requested: NO Map being faxed: NO Right of way: YES
Work order #:
Additional Information/Directions/Comments:
WHITEFISH LIQUOR STORE
PREVIOUS LINE LOCATE # 2016-48-0095

Description of dig spot & how it will marked:
LOCATE ENITRE PROPERTY TO INCLUDE EAST 3RD ST ON
SOUTH SIDE OF ADDRESS FROM RIGHT OF WAY TO RIGHT
OF WAY**NEEDS RELOCATED DUE TO WEATHER**

Work Being Done For:

The following utility owners have been notified of your proposed excavation site:
FLHE01 FLATHEAD ELECTRIC EL CENT01 CENTURYTEL KALISPELL
NWEG01 NORTHWESTERN ENERGY RONT01 ACCESS MONTANA
BREST01 CHARTER (BRESNAN) WHTWS01 CITY OF WHITEFISH
MDOT01 MONTANA DEPT OF TRAN SKYT01 SKYLINK FIBER COMMUN

*** PLEASE REMEMBER: ***
*You are not clear to excavate until all members notified have contacted you.
*During the course of excavation you are required to maintain identification as to where any buried facilities are located.
*Only hand digging can occur within 18 inches of buried facilities no machine digging.
*You must contact Montana One Call at 1 800 551-8344 (406-755-8344)
if there are any errors or omissions in this document. == END ==

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Phone: (970) 663-5311
Fax: (970) 663-5270

TRAFFIC CONTROL PLAN

Location: 239 Baker Ave
City: Whitefish, MT
For: Remington Technologies
Date: October 3rd, 2016

MHT #1

NOT DRAWN TO SCALE

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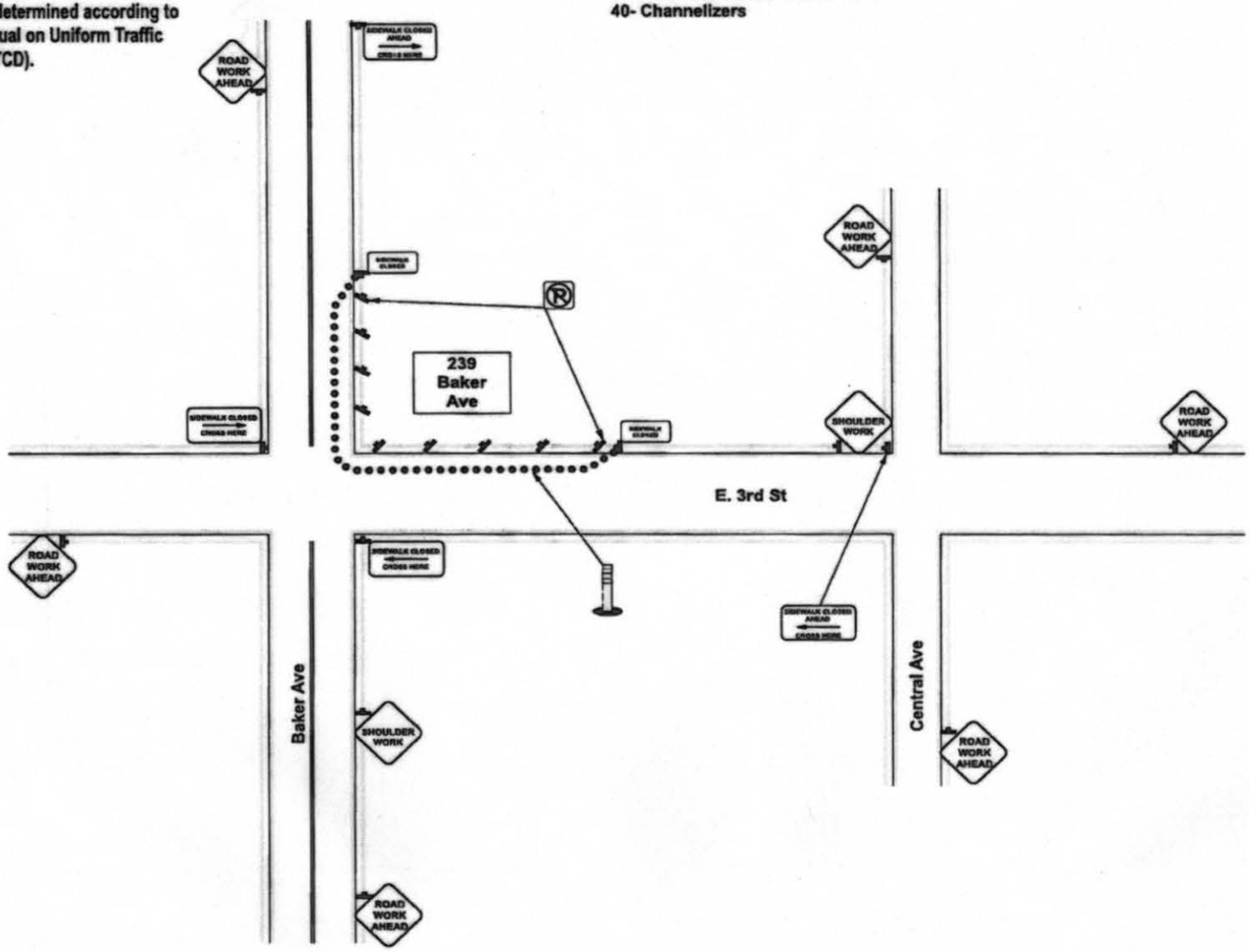
NOTE:

- Sign spacing will be determined according to Table 6H-3 in the Manual on Uniform Traffic Control Devices (MUTCD).

Tabulation of Devices:

6 - Road Work Ahead
2 - Shoulder Work
10- No Parking Signs
2 - Sidewalk Closed
1 - Sidewalk Closed Ahead Crossover -->
1 - Sidewalk Closed Ahead Crossover <--
1 - Sidewalk Closed Crossover -->
1 - Sidewalk Closed Crossover <--
40- Channelizers



Google Maps 239 Baker Ave

Close the parking lanes on the west and south sides of the property.

	Name:	Company:
Report Created By	Joel Riebli	Trihydro Corporation
Date	Tuesday, October 11, 2016	
Temperature	32-50 °F	**Work Day** 0
Weather	Clear	**Work Start**
Wind	Light (1-10 mph)	**Work Stop**

Onsite Personnel (name/company)	Role
Liz Larsen	Martin's Cleaners Property Owner
Lana Walker	Whitefish Liquor Store General Manager

Health and Safety Comments	NA
Record of Samples Collected	None
Work Activities Conducted	Paid $462 for building permit fees to the City of Whitefish Building Department. The fees are associated with the installation of the soil vapor extraction remediation shed and concrete pad at the former Martin's Cleaners property. Met with the Martin's Cleaners property owner and the current renter general manager. Reviewed the current site conditions, locations of the utilities, general locations of the SVE piping and remediation shed.

	Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes

Photo Date:	10/11/2016
Direction:	South
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Looking at the site conditions on the western side of the former Martin's Cleaners (Whitefish Liquor Store) before field activities start. Cracked sidewalk.

Photo Date:	10/11/2016
Direction:	East
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Site conditions along the southern end of the former Martin's Cleaners.

Photo Date:	10/11/2016
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	The southern side of the former Martin's Cleaners building prior to starting field activities.

Photo Date:	10/11/2016
Direction:	North
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Site conditions on the eastern side of the former Martin's Cleaners. Damaged downspout, a drain, gas meter.

Photo Date:	10/11/2016
Direction:	Southwest
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Site conditions on the eastern side of the former Martin's Cleaners.

Photo Date:	10/11/2016
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Northeastern portion of the former Martin's Cleaners with the downspout disconnected. Water tap.

Photo Date:	10/11/2016
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Back door access to the former Martin's Cleaners; concrete sewer repair surface completion that will be removed and asphalted in. Gas meter on the left side and electrical/phone on the right side (overhead).

Photo Date:	10/11/2016
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Drain, monitoring well, gas meter, and downspout on the southeast portion of the former Martin's Cleaners building.

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Wednesday, October 12, 2016		
Temperature	32-50 °F	**Work Day**	1
Weather	Clear	**Work Start**	800
Wind	Light (1-10 mph)	**Work Stop**	1800

Onsite Personnel (name/company)	Role
Robby Orr / Remington Technologies	Field Supervisor
Shayne Nelson / Cutting Edge Excavation	Foreman - equipment operator
Bryan Stephans /Cutting Edge Excavation	Equipment Operator
Dustin Gatch / Cutting Edge Excavation	Laborer
Bob Mathies / Cutting Edge Excavation	Driver
Lana Walker / Whitefish Liquor Store	General Manager

Equipment Present Onsite	Count
John Deere 50D Mini Excavator	1
GEHL Z17 Compact Excavator	1
Bobcat	1
End Dump Truck	2
Saw cutter	1

Health and Safety Comments	Kickoff safety meeting focusing on stop work authority, knowing not assuming, utility locations, equipment operation, spotting, former dry cleaner, traffic, pedestrians, ...
Record of Samples Collected	None
Work Activities Conducted	Walked work area with Remington Technologies and Cutting Edge Excavation. Reviewed utility locations and plan to work around the utilities. Cut asphalt on the eastern side of the former Martin's Cleaners (current Whitefish Liquor Store) for the system shed and eastern trench. Using the John Deere mini-excavator and the

GEHL compact excavator, removed six feet of clays and silts down to six feet below ground surface on the eastern side of the project building. The excavated soils were placed in end dumps and transported to the Cutting Edge Excavation yard for temporary stockpiling. A water line, two sewer lines, gas line, and down spout piping were exposed in the trench; some liquids were entering the trench from the alleyway along the lower sewer line trench (four feet below ground surface). Pea gravel was added to the trench and four inch diameter SVE piping was installed above the four feet depth in the trench. Forty feet of slotted screen was in the eastern trench. Pea gravel covered at least six inches above the piping. A fabric barrier was placed between the pea gravel and flow fill.

Met with the City of Whitefish regarding the southern and western sidewalks. The city engineer (Craig Workman) wasn't available but I did meet up with Karin Hilding (Senior Project Engineer). She said the city requirements will require the entire western sidewalk to be replaced, from the building to the curb since no control joints are present. On the southern side the concrete from the building to the control joint will need to be replaced.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

Photo Date:	10/12/2016
Direction:	South
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Using a compact excavation to excavate the eastern trench and the foot print of the remediation shed. In the trench is the sewer lines. The compact excavator is loading the bobcat which loads the end dump.

Photo Date:	10/12/2016
Direction:	South
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Adding pea gravel to the six foot deep excavated eastern trench. In the back ground two sewer lines and a gas line are exposed in the trench.

Photo Date:	10/12/2016
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Four inch diameter piping from the north end of the eastern trench and into the base of the remediation system. The top most piping in the trench begins the slotted screen for the eastern trench well.

Photo Date:	10/12/2016
Direction:	South
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Pea gravel being added above the four inch SVE piping. The piping on the right side is slotted screen where as the two pipes on the left are solid piping. The depth of the piping is just above four feet below the ground surface.

Photo Date:	10/12/2016
Direction:	North
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	The end of the forty feet of eastern trench slotted screen (left pipe) ends just before the crossing of the southern down spout piping. This piping is capped. The two pipes on the right will continue down the trench. On the top of the photo are the exposed gas line and sewer lines.

Photo Date: 10/12/2016
Direction: North
Taken By: Joel Riebli
X Coordinate: 0
Y Coordinate: 0
Location:
Description: Fabic installed over the pea gravel and a marking line added to the eastern trench. In the forground is the gas line where as the top sewer line is exposed in the center of the photo.

Photo Date: 10/12/2016
Direction: North
Taken By: Joel Riebli
X Coordinate: 0
Y Coordinate: 0
Location:
Description: Adding flow fill to the trench.

Photo Date:	10/12/2016
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Site secured after adding flow fill to trench and providing access to the rear Whitefish Liquor Store door.

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Thursday, October 13, 2016		
Temperature	32-50 °F	**Work Day**	2
Weather	Cloudy	**Work Start**	730
Wind	Light (1-10 mph)	**Work Stop**	1730

Onsite Personnel (name/company)	Role
Robby Orr / Remington Technologies	Field Supervisor
Shayne Nelson / Cutting Edge Excavation	Foreman - equipment operator
Bryan Stephans /Cutting Edge Excavation	Equipment Operator
Dustin Gatch / Cutting Edge Excavation	Laborer
Bob Mathies / Cutting Edge Excavation	Driver
Lana Walker / Whitefish Liquor Store	General Manager
Andrew Vann / Trihydro Corporation	Project Manager
Randy Reynolds / City of Whitefish	Utility Operations Supervisor

Equipment Present Onsite	Count
John Deere 50D Mini Excavator	1
GEHL Z17 Compact Excavator	1
Bobcat	1
End Dump Truck	2
Saw cutter	1
Jack hammer	1

Health and Safety Comments	No safety issues encountered. Safety topic focused on knowing your surroundings; look to see if traffic is nearby or how close your equipment is positioned near the site building and awning.
Record of Samples Collected	None collected; PID screening detected reading less than 3 parts per million in excavated soils.

Work Activities Conducted

Removed half of the sidewalk located south of the former Martin's Cleaners using a saw cutter, jack hammer, and both excavators. Resumed excavating the trenching of the soil vapor extraction system; trenching along the southern side of the building. The excavated soils were transported to Cutting Edge Excavations yard for stockpiling. PID readings of less than 2.8 ppm were noted from the excavated area. A silted layer of soil was more defined in the southern trench at five feet below ground surface; the layer is about eight inches thick.

Pea gravel was added to a approximate twenty five foot section of the trench, and four inch southern and western SVE piping installed approximately four feet below the ground surface. Locating tape and fabric were added before flow fill was installed between four inches and 38 inches below the ground surface.

Asphalt was installed in the parking lot to resurface the eastern trench; the asphalt was approximately 3 1/2 inches thick.

The City of Whitefish utility operations supervisor stopped by to look at the western sidewalk (front side of the former Martin's Cleaners). Looked at the high difference to the the building entryways, curb height, and the slope between. The City is looking into what options are available to resurface the western sidewalk.

Deviation from approved plans:

Work conducted in accordance with approved plans? Yes

Photo Date:	10/13/2016
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Removing half of the sidewalk located along the southern side of the former Martin's Cleaners using both excavator units.

Photo Date:	10/13/2016
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Silt layer that is about eight inches thick approximately five feet below the ground surface in the southeastern section of the trench.

Photo Date:	10/13/2016
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Using the micro excavator to excavate down to six feet below the ground surface along the southern side of the former Martin's Cleaners. Silt layer is just below the five foot depth and is appoximately eight inches thick. Roots from the two sidewalk trees are seen crossing the trench; no utilities encountered.

Photo Date:	10/13/2016
Direction:	South
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Looking at the southern end of the eastern trench and turn into the southern trench. The southern end of the eastern SVE piping is on the right. Pea gravel added on the four inch pipe. The southern SVE pipe inlet screen starts at the turn in the trench and is the center pipe. The utility near the surface of the trench, is the down spout piping that runs to the surface drain.

Photo Date:	10/13/2016
Direction:	South
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Pea gravel was added above the SVE pipe, a utility tape was installed before fabric installed in the transition from the southern and eastern trenches.

Photo Date:	10/13/2016
Direction:	Southwest
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Flow fill added between the 4 and 38 inch depths in the south end of the eastern trench and eastern side of the south trench. In the four ground is the floor drain and monitoring well.

Photo Date:	10/13/2016
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Excavated soils from the trenching and installation of the SVE piping is being stockpiled at Cutting Edge Excavations property.

Photo Date:	10/13/2016
Direction:	North
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	The eastern trench is being prepared for the installation of asphalt.

Photo Date:	10/13/2016
Direction:	North
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Compacting the asphalt in the eastern trench.

Photo Date:	10/13/2016
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Secured the southern trench excavation with candle sticks and caution tape.

Photo Date:	10/13/2016
Direction:	Northwest
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Asphalt resurfacing on the eastern side of the former Martin's Cleaners building.

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Friday, October 14, 2016		
Temperature	50-70 °F	**Work Day**	3
Weather	Rain	**Work Start**	700
Wind	Light (1-10 mph)	**Work Stop**	1800

Onsite Personnel (name/company)	Role
Robby Orr / Remington Technologies	Field Supervisor
Shayne Nelson / Cutting Edge Excavation	Foreman - equipment operator
Bryan Stephans /Cutting Edge Excavation	Equipment Operator
Dustin Gatch / Cutting Edge Excavation	Laborer
Bob Mathies / Cutting Edge Excavation	Driver
Lana Walker / Whitefish Liquor Store	General Manager
Andrew Vann / Trihydro Corporation	Project Manager
Randy Reynolds / City of Whitefish	Utility Operations Supervisor
Karin Hilding / City of Whitefish	City Engineer
Concrete Surfacing Crew / Sandon Construction	Concrete Crew

Equipment Present Onsite	Count
John Deere 50D Mini Excavator	1
GEHL Z17 Compact Excavator	1
Bobcat	1
End Dump Truck	1
CAT 287C Loader	1
Flowfill Truck	2

Equipment Present Onsite	Count
Concrete Truck	1
Pea Rock Truck	1

Health and Safety Comments	Stop work authority, trenching under the awning and next to the building, working next to traffic, communication, wet weather, slow and go, hand safety, safety knifes.
Record of Samples Collected	None collected; PID screening detected reading less than 2 parts per million in the silt layer located at ~5 feet below the ground surface under the southern building awning.
Work Activities Conducted	City of Whitefish Permit Department issued the permit for the remediation shed concrete pad and building; they said we can have the effluent from the remediation system at least nine feet from the property line. The City of Whitefish Planning Department is requiring all of the western sidewalk to be replaced from the front of the Whitefish Liquor Store to the curb. The concrete is to match the existing sidewalk sloping. Finished excavating the southern trench, excavating down six feet and through the silt layer (~5 feet below the ground surface) under the sidewalk awning. The southern SVE slotted inlet screen was installed 77 feet long. Three sections of the silt layer were hand dug underneath the southern building foundation and backfilled with pea rock. Near the eastern end of the southern wall the silt layer was removed one foot wide 7 inches north of the exterior wall. Under the second window west of the southeastern building corner, the silt layer was removed one foot wide 13 inches north of the exterior wall. Between the western window and the unused door, the silt layer was removed in a two foot side section 17 inches north of the exterior wall. Exposed the foundation along the southern wall and it extends 30 inches below the ground surface. Pea gravel, utility locating tape, and fabric were installed in the trench. Flowfill filled the trench to within three inches of the sidewalk elevation. Concrete sidewalk was poured to match the existing elevations. Excavated trench soils were transported by end dump to Cutting Edge Excavation's yard and placed on plastic sheeting. The remediation pad was formed at six inches thick, rebar was installed with a rebar extending out of the concrete for use as a grounding rod. Concrete was poured in the 9' by 13' foot form.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	No	At around 1530 almost all of the parking around the Whitefish Liquor Store was being used by the SVE installation field activities. Cutting Edge Excavation had both excavators, the CAT loader, and one field truck taking up parking, while two flowfill trucks were positioned along East Third Street to fill the southern trench, while the concrete resurfacing contractor parked two work trucks behind the liquor store taking up most of the parking while they offloaded supplies, and the City of Whitefish truck parked in front of the liquor store to check the western sidewalk. Liquor Store general manager brought up the problem of having no parking for customers. Within a few minutes the concrete contractors finished offloading supplies and moved their trucks, and one of the flowfill trucks and the City of Whitefish truck left the site.

Photo Date:	10/14/2016
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Excavating the southern trench using the micro excavator and loading the bobcat. Excavating down to six feet.

Photo Date:	10/14/2016
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Measuring the depth of the trench (six feet); the silt layer is still being observed between approximately five feet to five feet eight inched below the ground surface.

Photo Date:	10/14/2016
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Under the second window to the left, the silt layer was excavated north underneath the exterior building wall by 13 inches. The exposed silt layer was excavated about a foot wide and was backfilled with pea gravel. The subsurface southern wall was also exposed in this area, the southern wall was found to extend underneath the surface 30 inches.

Photo Date:	10/14/2016
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Micro excavator working between the southern building wall and the awning posts.

Photo Date:	10/14/2016
Direction:	North
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Excavating the southern trench below the awning and next to the former Martin's Cleaners building.

Photo Date:	10/14/2016
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Micro excavator continue to excavate below the awning and loading the bobcat (which loads the end dump). Extending the 4 inch SVE piping. The pipe near the building is the southern SVE slotted screen while the pipe near the road is solid western trench pipe. The pipe is on just under two feet of pea gravel.

Photo Date:	10/14/2016
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Micro excavator working under the sidewalk awning.

Photo Date:	10/14/2016
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Installing four inch SVE piping in the southern trench. Six inches of pea gravel added above the pipe. Fabric and utility locating tape installed above the pea gravel.

Photo Date:	10/14/2016
Direction:	North
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	The southern trench SVE slotted inlet pipe was installed at a lengh of 77 feet. The end of the SVE pipe almost reached the southwestern building corner. The pipe with the blue duct tape is the western SVE pipe.

Photo Date:	10/14/2016
Direction:	East
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Southern trench ready for flowfill with the trench east of the plywood containing pea gravel, SVE pipe, fabric, and utility locating tape.

Photo Date:	10/14/2016
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Adding flowfill to the southern trench, capping the SVE pea gravel trench.

Photo Date:	10/14/2016
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Southern trench with flowfill installed in the excavation; the work area is now three inches below the concrete surface elevation.

Photo Date: 10/14/2016

Direction: North

Taken By: Joel Riebli

X Coordinate: 0

Y Coordinate: 0

Location:

Description: Remediation shed pad area prepared for concrete. Rebar wired together with a rebar extending above where the concrete surface elevation will reach. The rebar can then be connect for grounding the electrical system.

Photo Date: 10/14/2016

Direction: North

Taken By: Joel Riebli

X Coordinate: 0

Y Coordinate: 0

Location:

Description: The 9 feet by 13 feet remediation pad poured with concrete. The pad thickness is six inches.

Photo Date:	10/14/2016
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Starting to pour concrete below the southern awning to resurface the sidewalk. The sidewalk thickness is three inches.

Photo Date:	10/14/2016
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Smoothing out the southern sidewalk.

Photo Date:	10/14/2016
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	End of day site security; the newly poured southern sidewalk covered with plastic because of light rain in the area.

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Saturday, October 15, 2016		
Temperature	32-50 °F	**Work Day**	
Weather	Rain	**Work Start**	915
Wind	Calm (<1 mph)	**Work Stop**	1020

Onsite Personnel (name/company)	Role
Lana Walker / Whitefish Liquor Store	General Manager

Health and Safety Comments	NA
Record of Samples Collected	NA
Work Activities Conducted	Met with Lana to update the field activities planned for Sunday (concrete removal, trenching, backfilling part way with pea gravel, covering with plywood), Monday (concrete removal, flowfill trench, pour half of sidewalk, shed arrives), and Tuesday (pour remaining half of sidewalk). Future activities include the power company install a power pole next to shed and injection of food grade oil. Lana is planning on repaving the parking lot while asphalt is still available.

	Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes

Photo Date:	10/15/2016
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Site conditions with plastic covering new sidewalk.

Photo Date:	10/15/2016
Direction:	East
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Open trench covered by micro excavator, candlesticks, and caution tape.

Photo Date:	10/15/2016
Direction:	Northwest
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	The site conditions behind the Whitefish Liquor store with plastic covering the new concrete sidewalk and remediation shed concrete slab.

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Sunday, October 16, 2016		
Temperature	32-50 °F	**Work Day**	4
Weather	Rain	**Work Start**	700
Wind	Light (1-10 mph)	**Work Stop**	1615

Onsite Personnel (name/company)	Role
Robby Orr / Remington Technologies	Field Supervisor
Shayne Nelson / Cutting Edge Excavation	Foreman - equipment operator
Bryan Stephans /Cutting Edge Excavation	Equipment Operator
Dustin Gatch / Cutting Edge Excavation	Laborer
Bob Mathies / Cutting Edge Excavation	Driver
Andrew Vann / Trihydro Corporation	Project Manager
Gem Wysel / Glacier Traffic Products	Flagger

Equipment Present Onsite	Count
John Deere 50D Mini Excavator	1
GEHL Z17 Compact Excavator	1
CAT 287C Loader	1
End Dump Truck	1
Pea Rock Truck	1

Health and Safety Comments	Stop work authority, trenching under the awning and next to the building, water line, building glass doors and windows, working next to traffic, flagger, communication, wet weather, slow and go, equipment operations.
Record of Samples Collected	Collected sample of pea gravel; to be ran for RCRA metals. PID screening detected reading less than 0.2 parts per million in the silt layer located at ~5.5 feet below the ground surface along the western building awning. The pit run sand around the water line detected PID reading of 0.0 parts per million

	in all three screenings.
Work Activities Conducted	Removed most of the western sidewalk and excavated the western trench, excavating down six feet and through the silt layer (~5 feet below the ground surface on the southern end of the trench and almost 6 feet below the ground surface at the north end of the trench) under the sidewalk awning. The western SVE slotted inlet screen was installed 43 feet long and at a depth of 43 inches below the ground surface (top of the four inch pipe). The water line to the Whitefish Liquor Store was hand dug and located at 5.5 feet below the ground surface. Pit run sand was noted down to six feet around the water line. Pea gravel, utility locating tape, and fabric were installed in the trench. Excavated soils were transported by end dump to Cutting Edge Excavation yard for temporary stockpiling. Andrew Vann spoke with Whitefish Liquor Store general manager Lana Walker about the different options for resurfacing the western sidewalk. Lana would like the entire western sidewalk poured on Monday; she will have customers use the parking lot back door for business access.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

Photo Date:	10/16/2016
Direction:	North
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Removing concrete on the western side of the former Martin's Cleaners using both mini excavators.

Photo Date:	10/16/2016
Direction:	East
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Removing concrete below the western awning using both mini excavators.

Photo Date:	10/16/2016
Direction:	North
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Most of the western sidewalk removed, ready to start excavating the western trench.

Photo Date:	10/16/2016
Direction:	North
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Excavating the western trench in front of the former Martin's Cleaners using the GEHL excavator. Excavating through the silt layer located between 5 feet and 6 feet below the gound surface.

Photo Date:	10/16/2016
Direction:	North
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Water line hand dug and marked with the shovel. Water line is 5.5 feet below the ground surface, crossing under the southern most building door, and has pit run sand surronding the pipe.

Photo Date:	10/16/2016
Direction:	Northeast
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Traffic control on Baker Street as excavating the western trench takes place under the awning.

Photo Date:	10/16/2016
Direction:	Southeast
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Excavating the western trench under the awning, CAT loader placing excavated soils into the end dump, and traffic control.

Photo Date:	10/16/2016
Direction:	South
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Completed the excavation of the western trench under the awning in front of the former Martin's Cleaners.

Photo Date:	10/16/2016
Direction:	South
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Adding pea gravel to the western trench using the John Deere excavator.

Photo Date:	10/16/2016
Direction:	South
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Adding pea gravel to the bottom of the western trench using the John Deere Excavator.

Photo Date:	10/16/2016
Direction:	East
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Transition of the southern and western trenches and the end of the southern slotted SVE piping.

Photo Date:	10/16/2016
Direction:	South
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Installing the 4 inch diameter slotted SVE well inlet screen on top of pea gravel; the top of the pipe is 43 inches below the ground surface at the north end of the trench.

Photo Date:	10/16/2016
Direction:	East
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	PVC glue can located below the northern window marks the end of the 43 foot long western SVE inlet screen.

Photo Date:	10/16/2016
Direction:	South
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	43 foot long 4 inch diameter slotted western inlet piping, with end cap. The end cap depth is 43 inches below the ground surface.

Photo Date:	10/16/2016
Direction:	North
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	fabric and utility locating tape installed over the western SVE trench.

Photo Date:	10/16/2016
Direction:	South
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Secured Baker Street side of the former Martin's Cleaners work area.

Photo Date:	10/16/2016
Direction:	East
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Secured western trench work area at end of day.

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Monday, October 17, 2016		
Temperature	50-70 °F	**Work Day**	5
Weather	Rain	**Work Start**	700
Wind	Light (1-10 mph)	**Work Stop**	1600

Onsite Personnel (name/company)	Role
Robby Orr / Remington Technologies	Field Supervisor
Shayne Nelson / Cutting Edge Excavation	Foreman - equipment operator
Bryan Stephans /Cutting Edge Excavation	Equipment Operator
Dustin Gatch / Cutting Edge Excavation	Laborer
Bob Mathies / Cutting Edge Excavation	Driver
Andrew Vann / Trihydro Corporation	Project Manager
Chris Waldusky / Cutting Edge Excavation	Laborer
Lana Walker / Whitefish Liquor Store	General Manager
Flowfill / Schelliger Construction Concrete Truck	Driver
Concrete / Schellinger Construction Concrete Truck	Driver
Concrete Surfacing Crew / Sandon Construction	Laborer
Transport Drive for Onion Equipment	Driver

Equipment Present Onsite	Count
CAT 287C Loader	1
End Dump Truck	1

Equipment Present Onsite	Count
Flowfill Truck	2
Concrete Truck	1
Jack hammer	1
Forklift	1
Concrete cutter	1

Health and Safety Comments	Stop work authority, hospital location, first aid, eye wash, fire extinguisher, and must point locations. Flying debris (protect nearby glass) with jack hammer, noise, overhead electric, phone, and cable lines when using forklift on moving shed. Traffic and pedestrians. Concrete cutter hazards.
Record of Samples Collected	None
Work Activities Conducted	Added two truck loads of flow fill to the western sidewalk trench, covering the installed pea gravel, SVE pipe, fabric, and utility tape. The remaining concrete along Baker Street was jack hammer out and removed. The sidewalk area was prepared for concrete. One truck of concrete was installed to resurface the western sidewalk. The sidewalk slope was installed to match the previous slope. The Whitefish Liquor Store let customers enter the store via the back door to the business. The remediation shed arrived from Onion Equipment. Damage to the roofing and vent fan were noted; replacement roofing material was provided with the delivery. The shed was off loaded and a section of the subsurface floor was cut open to allow the SVE piping to enter the shed. Four bollards were installed around the shed.

	Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes

Photo Date:	10/17/2016
Direction:	North
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Installing flowfill in the western trench over the installed SVE piping.

Photo Date:	10/17/2016
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Using a forklift to remove the remediation shed from the transporation truck.

Photo Date:	10/17/2016
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Using the forklift to off load the remediation shed from the transportation truck.

Photo Date:	10/17/2016
Direction:	North
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Using a jack hammer to breakup the remaining concrete in the western sidewalk. Using plywood to protect the windows and doors at the liquor store.

Photo Date:	10/17/2016
Direction:	North
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	The remediation pad with the plastic removed. Ready to recieve the remediation shed.

Photo Date:	10/17/2016
Direction:	North
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Moving the remediation shed and set it over the SVE piping.

Photo Date:	10/17/2016
Direction:	North
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Concrete has been removed from the western sidewalk and plywood placed down in front of the Whitefish Liqore Store for customers to enter the front of the store before concrete arrives.

Photo Date:	10/17/2016
Direction:	North
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Sandon Constructin sidewalk concrete crew installing the western sidewalk. Whitefish Liquor Store customers are using the back building enterance for access to the store.

Photo Date:	10/17/2016
Direction:	North
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Pouring the western sidewalk.

Photo Date:	10/17/2016
Direction:	South
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Smoothing out the western sidewalk; using plastic to keep the awning dripline from making water droplet markings in the wet sidewalk.

Photo Date:	10/17/2016
Direction:	Northwest
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Installing bollards around the remediation system / shed.

Photo Date:	10/17/2016
Direction:	East
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	End of day site conditions on the westside of the Whitefish Liquor Store. Signage attached to the plactic lets customers know to use the back door to enter the store.

Photo Date:	10/17/2016
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	The south end of the site at end of day.

Photo Date:	10/17/2016
Direction:	Northwest
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	The end of day site conditions on the east side of the liqore store. Bollards installed around the remediation shed.

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Tuesday, October 18, 2016		
Temperature	32-50 °F	**Work Day**	
Weather	Rain	**Work Start**	740
Wind	Light (1-10 mph)	**Work Stop**	1630

Onsite Personnel (name/company)	Role
Robby Orr / Remington Technologies	Field Supervisor
Lana Walker / Whitefish Liquor Store	General Manager
Sandon Construction	Laborer
Tad Lisowski / City of Whitefish	Building Inspector
Jeff Goudreau / Flathead Electric Coop	Distibution Designer
Jeff / Electric Man	Electrican

Health and Safety Comments	
Record of Samples Collected	Collected "sand" and "concrete aggregate" samples from the Schellinger Construction Co cement plant / quarry.
Work Activities Conducted	Opened up the western sidewalk, did a final clean up of the construction area. Met with the City of Whitefish building inspector, he will complete his final building inspection when the electric is installed. Met with electricians on power connection to the remediation system.

	Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes

Photo Date:	10/18/2016
Direction:	South
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Western sidewalk after resurfacing.

Photo Date:	10/18/2016
Direction:	North
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Western sidewalk after resurfacing.

Photo Date:	10/18/2016
Direction:	East
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Southern sidewalk after resurfacing.

Photo Date:	10/18/2016
Direction:	Northwest
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Eastern side of the project site with remediation system installed.

Photo Date:	10/18/2016
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	

Photo Date:	10/18/2016
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	

Photo Date:	10/18/2016
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	

Photo Date: 10/18/2016
Direction: Unknown
Taken By: Joel Riebli
X Coordinate: 0
Y Coordinate: 0
Location:
Description:

Photo Date: 10/18/2016
Direction: Unknown
Taken By: Joel Riebli
X Coordinate: 0
Y Coordinate: 0
Location:
Description:

Photo Date:	10/18/2016
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	

Photo Date: 10/18/2016
Direction: Unknown
Taken By: Joel Riebli
X Coordinate: 0
Y Coordinate: 0
Location:
Description:

Photo Date: 10/18/2016
Direction: Unknown
Taken By: Joel Riebli
X Coordinate: 0
Y Coordinate: 0
Location:
Description:

Photo Date: 10/18/2016
Direction: Unknown
Taken By: Joel Riebli
X Coordinate: 0
Y Coordinate: 0
Location:
Description:

Photo Date: 10/18/2016
Direction: Unknown
Taken By: Joel Riebli
X Coordinate: 0
Y Coordinate: 0
Location:
Description:

Photo Date: 10/18/2016
Direction: Unknown
Taken By: Joel Riebli
X Coordinate: 0
Y Coordinate: 0
Location:
Description:

Photo Date: 10/18/2016

Direction: Unknown

Taken By: Joel Riebli

X Coordinate: 0

Y Coordinate: 0

Location:

Description:

Photo Date: 10/18/2016

Direction: Unknown

Taken By: Joel Riebli

X Coordinate: 0

Y Coordinate: 0

Location:

Description:

Photo Date:	10/18/2016
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	

Photo Date:	10/18/2016
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	

Photo Date: 10/18/2016
Direction: Unknown
Taken By: Joel Riebli
X Coordinate: 0
Y Coordinate: 0
Location:
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Photo Date: 10/18/2016
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Taken By: Joel Riebli
X Coordinate: 0
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Photo Date: 10/18/2016
Direction: Unknown
Taken By: Joel Riebli
X Coordinate: 0
Y Coordinate: 0
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Description:

Photo Date: 10/18/2016
Direction: Unknown
Taken By: Joel Riebli
X Coordinate: 0
Y Coordinate: 0
Location:
Description:

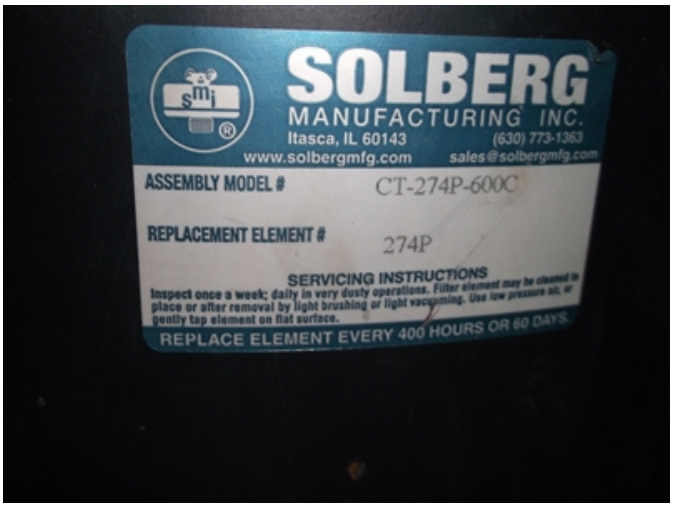


Photo Date:	10/18/2016
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Monday, November 28, 2016		
Temperature	32-50 °F	**Work Day**	1250
Weather	Cloudy	**Work Start**	1529
Wind	Light (1-10 mph)	**Work Stop**	

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
David Hudak / PowerHouse Electric	Electrican

Health and Safety Comments	
Record of Samples Collected	None
Work Activities Conducted	Mobilized from Helena. Met with PowerHouse Electric's David Hudak. He will purchase the City of Whitefish electrical permit for the electrical installation to the remediation system. Dry fitted SVE system piping modifications between the subsurface SVE wells and the system manifold.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Tuesday, November 29, 2016		
Temperature	32-50 °F	**Work Day**	
Weather	Clear	**Work Start**	800
Wind	Calm (<1 mph)	**Work Stop**	1715

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Lana Walker / Whitefish Liquor Store	General Manager

Health and Safety Comments	Next door construction
Record of Samples Collected	None
Work Activities Conducted	Rented a ladder and attempted to replace the damaged flashing located in the top of the remediation system. Didn't make any progress and will need to hire a contractor to perform this task. Continued dry fitting system modification piping runs. Had a quick conversation with Whitefish Liquor Store operator Lana Walker regarding electricians being on site on Thursday morning.

	Deviation from approved plans:
Work conducted in accordance with approved plans?	

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Wednesday, November 30, 2016		
Temperature	<32 °F	**Work Day**	
Weather	Cloudy	**Work Start**	830
Wind	Light (1-10 mph)	**Work Stop**	1708

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Lana Walker / Whitefish Liquor Store	General Manager

Health and Safety Comments	None
Record of Samples Collected	None
Work Activities Conducted	Installed PVC piping between the subsurface SVE wells to the manifolds. Quick conversation reminding Lana Walker (Whitefish Liquor Store general manager) that electricians will be on site tomorrow morning.

	Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Thursday, December 1, 2016		
Temperature	<32 °F	**Work Day**	
Weather	Cloudy	**Work Start**	725
Wind	Light (1-10 mph)	**Work Stop**	2120

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Viktor Gayvoronsky / PowerHouse Electric	Electrican
Daniel Pauluk / PowerHouse Electric	Electrican
David Hudak / PowerHouse Electric	Electrican

Health and Safety Comments	Continued construction work next door on the second and third floor near the remediation system.
Record of Samples Collected	None
Work Activities Conducted	PowerHouse Electric installed the meter base on the exterior of the remediation system. The site is now ready for the Flathead Electric Coop to install powerpole and service line if tomorrow inspection is cleared. Installed the exhaust system piping on the exterior of the system building.

	Deviation from approved plans:
Work conducted in accordance with approved plans?	

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Friday, December 2, 2016		
Temperature	<32 °F	**Work Day**	
Weather	Snow	**Work Start**	725
Wind	Light (1-10 mph)	**Work Stop**	1350

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Lana Walker / Whitefish Liquor Store	General Manager
Tad Lisowski / City of Whitefish	Building Inspector

Equipment Present Onsite	Count
Forklift	1

Health and Safety Comments	None
Record of Samples Collected	None
Work Activities Conducted	The City of Whitefish conducted a inspection of the electrical meter base, and inside and outside the remediation system. They said we can get power connected to the system but would like to conduct a final building inspection once the filtration drums are installed with the system piping. Quick conversation with Lana Walker (Whitefish Liquor Store general manager) regarding moving the liquor store delivery SUV from in front of the remediation system before 1330. The two 55-gallon drums of GAC and two 55-gallon drums of Zeolite drums were delivered to the site at 1320; drums were inspected and placed inside the remediation system.

Demobilized back to Helena.

Deviation from approved plans:

Work conducted in accordance with approved plans?	No

Photo Date:	12/2/2016
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Three of the four filtration drums located inside the remediaiton system building. Two drums contain GAC (two drums located on the left side of the photo) and two drums contain Zeolite (left drum and one just out of the photo).

Photo Date:	12/2/2016
Direction:	North
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Installed electrical meter base installed earlier this week by PowerHouse Electric. In the back ground is construction work taking place on the second and third floor of the neighboring building.

Photo Date:	12/2/2016
Direction:	North
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	The installed exhaust stack piping on the exterior of the building.

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Monday, December 12, 2016		
Temperature	<32 °F	**Work Day**	
Weather	Snow	**Work Start**	1800
Wind	Light (1-10 mph)	**Work Stop**	1800

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer

Health and Safety Comments	
Record of Samples Collected	None
Work Activities Conducted	On a morning call with Flathead Electric Coop's construction operations supervisor Al Thorson, Al said that Flathead is planning on installing the power pole and service line as soon as this afternoon or tomorrow. Notified Whitefish Liquor Store that the power pole could be installed today. Departed Helena at 1335 and arrived on site at 1800. Found some utility markings but no power pole installation activities.

	Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Tuesday, December 13, 2016		
Temperature	<32 °F	**Work Day**	
Weather	Snow	**Work Start**	840
Wind	Calm (<1 mph)	**Work Stop**	1445

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer

Health and Safety Comments	None
Record of Samples Collected	None
Work Activities Conducted	Installed filtration hosing between the filtration drums and blower / exhaust piping. Left multiple messages for Al Thorson (Flathead Electric Coop's construction operations supervisor) when the power pole and service line will be installed at the site but did not receive any responses. Had to depart the site at 1445 as I have other project commitments tomorrow and the rest of the week.

	Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Tuesday, December 20, 2016		
Temperature	<32 °F	**Work Day**	
Weather	Snow	**Work Start**	1305
Wind	Moderate (11-25 mph)	**Work Stop**	17

Onsite Personnel (name/company)	Role
Tad Lisowski / City of Whitefish	Building Inspector
Phil Holmes / City of Whitefish	Building Inspector

Health and Safety Comments	Site has about six inches of snow on the ground, very slick. Construction is ongoing next door with overhead work next to the remediation system unit. Hard hats are required at all times.
Record of Samples Collected	None
Work Activities Conducted	Arrived on site to find the power pole and service lines installed to the SVE remediation system by Flathead Electric Co-op. The City of Whitefish performed their final building inspection, inspecting the filtration drums and hose connections. They have no issue with system operation. Installed the knockout tank discharge line and installed sample ports on the inlet and outlets to the GAC and zeolite filtration drums. The zeolite drums are showing frost on the outside of the drums; assuming the water in the clay is frozen. (weekend temperatures reached ~ -20 F) Will need to thaw out the drums before the SVE system can be started up and ran through the GAC and zeolite filtration. The buildings heater will be started up tomorrow morning.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Wednesday, December 21, 2016		
Temperature	32-50 °F	**Work Day**	
Weather	Clear	**Work Start**	720
Wind	Calm (<1 mph)	**Work Stop**	1650

Onsite Personnel (name/company)	Role
Viktor Gayvoronsky / PowerHouse Electric	Electrican
Lana Walker / Whitefish Liquor Store	General Manager

Health and Safety Comments	Slick working surfaces with the melting snow.
Record of Samples Collected	None.
Work Activities Conducted	PowerHouse Electric checked the electrical wiring feeding the SVE system. Confirmed that the lights, electrical outlets, heater, PLC, and blower (did a five second bump test) operated correctly. Unable to test the cooling fan (will turn on when the interior building temperature reaches 80 F) and the transfer pump (no fluids). Ran the heater to defrost the equipment (found the zeolite drums in a frozen state). Will test and startup the SVE blower tomorrow after the zeolite drums are thawed out. Installed the final system piping (air dilution piping). Updated Whitefish Liquor Store general manager, Lana Walker, on the planned start up of the system this week and the EVO injection field event starting on January 4.

	Deviation from approved plans:
Work conducted in accordance with approved plans?	

Daily Tailgate Meeting Checklist

Site Name: Trihydro - Whitefish

Site Address: 239 Baker Avenue, Whitefish, Montana

Work Being Performed: System Installation

Date & Time of Meeting: 10/12/16 08:00 **Weather:** 34° Clear

Name of Presenter: Robby Orr

Itemize the Specific Topics Discussed (if more space is needed use the back of this page):

6 REMINGTON CARDINAL SAFETY PRINCIPLES

- ☑ I will report to work physically rested and mentally alert
- ☑ I will be responsible for my actions
- ☑ I will communicate with my co-workers
- ☑ I will be aware of all changing site conditions that may impact safety
- ☑ I will NOT tolerate willful unsafe acts
- ☑ I will STOP all unsafe work

✓	Introductions	✓	PPE check - Level D
✓	Scope of Work Discussion	N/A	Special PPE - Respirator, face shield etc.
✓	Site Walk	✓	JHAs reviewed prior to work start
✓	Utility locations checked - Look up	✓	Overhead Obstacles
✓	STOP WORK Authority	N/A	Short Service Employees (List them)
✓	Hospital Location/Route Explained	✓	Good Housekeeping
✓	HASP Reviewed	N/A	Communication with Mixer in Box Truck
✓	Emergency Evacuation Areas	✓	Exclusion zone
✓	Eye Wash/First Aid Kit Location	✓	Eating/Drinking/Smoking/Cell Phones
✓	Spotters needed for moving equipment	✓	Stakeholders - direct to client
✓	Fire Extinguisher Location	✓	Heat Stress
✓	3 Points of Contact for equipment	✓	Cold Stress
✓	Proper Lifting Technique	✓	Equipment Inspections
		✓	Shared Learnings

Job Hazard Analyses:

✓	Arrival and Site Setup	N/A	Chemical Injection
N/A	Core Drilling	N/A	Jackhammering
N/A	Borehole Clearance	✓	Skidsteer Operation
N/A	Drilling Operation (Direct Push)	N/A	Well Injection
	Other		Other

- **I have participated in the Job Hazard Analysis (JHAs) review and discussion of the above referenced JHAs.**
- **I have read and understood the contents of this Site Health and Safety Plan and I agree to abide by all provisions specified within.**

Daily Safety Tailgate Meeting Participants (Use the back of this form if needed)

Print Name:	Signature:	Company:	Date:
Robby Orr	[signature]	Remington Technologies	10/12/16
DUSTIN GATCH	[signature]		10/12/16
Joel Riebli	[signature]	Trihydro Corporation	10/12/2016
Bryan Stephens	[signature]		10/12/2016
Rob Mathias	[signature]		
[illegible]	SHAWNE NOKSON		

Daily Tailgate Meeting Checklist

Site Name: Trihydro - Whitefish

Site Address: 239 Baker Avenue, Whitefish, Montana

Work Being Performed: System Installation

Date & Time of Meeting: 10/13/16 07:00 **Weather:** 30° Clear

Name of Presenter: Robby Orr

Itemize the Specific Topics Discussed (if more space is needed use the back of this page):

6 REMINGTON CARDINAL SAFETY PRINCIPLES

- ✓ I will report to work physically rested and mentally alert
- ✓ I will be responsible for my actions
- ✓ I will communicate with my co-workers
- ✓ I will be aware of all changing site conditions that may impact safety
- ✓ I will NOT tolerate willful unsafe acts
- ✓ I will STOP all unsafe work

✓	Introductions	✓	PPE check - Level D
✓	Scope of Work Discussion	✓	Special PPE - Respirator, face shield etc.
✓	Site Walk	✓	JHAs reviewed prior to work start
✓	Utility locations checked - Look up	✓	Overhead Obstacles
✓	STOP WORK Authority	N/A	Short Service Employees (List them)
✓	Hospital Location/Route Explained	✓	Good Housekeeping
✓	HASP Reviewed	N/A	Communication with Mixer in Box Truck
✓	Emergency Evacuation Areas	✓	Exclusion zone
✓	Eye Wash/First Aid Kit Location	✓	Eating/Drinking/Smoking/Cell Phones
✓	Spotters needed for moving equipment	✓	Stakeholders - direct to client
✓	Fire Extinguisher Location	✓	Heat Stress
✓	3 Points of Contact for equipment	✓	Cold Stress
✓	Proper Lifting Technique	✓	Equipment Inspections
		✓	Shared Learnings

Job Hazard Analyses:

✓	Arrival and Site Setup	N/A	Chemical Injection
N/A	Core Drilling	✓	Jackhammering
✓	Borehole Clearance	✓	Skidsteer Operation
N/A	Drilling Operation (Direct Push)	N/A	Well Injection
	Other		Other

- **I have participated in the Job Hazard Analysis (JHAs) review and discussion of the above referenced JHAs.**
- **I have read and understood the contents of this Site Health and Safety Plan and I agree to abide by all provisions specified within.**

Daily Safety Tailgate Meeting Participants (Use the back of this form if needed)

Print Name:	Signature:	Company:	Date:
Robby Orr	[signature]	Remington Technologies	10-13-16
Dustin Gatch	[signature]		10/13/16
Shawn McBride	[signature]		
Rob Mathias	[signature]		
Bryan Stephens	[signature]		10/13/16
Joel Ricioli	[signature]	Trihydro corporation	10/13/16
Andrew Vann	[signature]	Trihydro	10/13/16

Daily Tailgate Meeting Checklist

Site Name: Trihydro - Whitefish

Site Address: 239 Baker Avenue, Whitefish, Montana

Work Being Performed: System Installation

Date & Time of Meeting: 07:00 10/14/16 **Weather:** Raining 30°

Name of Presenter: Robby Orr

Itemize the Specific Topics Discussed (if more space is needed use the back of this page):

6 REMINGTON CARDINAL SAFETY PRINCIPLES

- [x] I will report to work physically rested and mentally alert
- [x] I will be responsible for my actions
- [x] I will communicate with my co-workers
- [x] I will be aware of all changing site conditions that may impact safety
- [x] I will NOT tolerate willful unsafe acts
- [x] I will STOP all unsafe work

✓	Introductions	✓	PPE check - Level D
✓	Scope of Work Discussion	✓	Special PPE - Respirator, face shield etc.
✓	Site Walk	✓	JHAs reviewed prior to work start
✓	Utility locations checked - Look up	✓	Overhead Obstacles
✓	STOP WORK Authority	NA	Short Service Employees (List them)
✓	Hospital Location/Route Explained	✓	Good Housekeeping
✓	HASP Reviewed	NA	Communication with Mixer in Box Truck
✓	Emergency Evacuation Areas	✓	Exclusion zone
✓	Eye Wash/First Aid Kit Location	✓	Eating/Drinking/Smoking/Cell Phones
✓	Spotters needed for moving equipment	✓	Stakeholders - direct to client
✓	Fire Extinguisher Location	✓	Heat Stress
✓	3 Points of Contact for equipment	✓	Cold Stress
✓	Proper Lifting Technique	✓	Equipment Inspections
		✓	Shared Learnings

Job Hazard Analyses:

✓	Arrival and Site Setup	NA	Chemical Injection
NA	Core Drilling	✓	Jackhammering
✓	Borehole Clearance	✓	Skidsteer Operation
NA	Drilling Operation (Direct Push)	NA	Well Injection
	Other		Other

- **I have participated in the Job Hazard Analysis (JHAs) review and discussion of the above referenced JHAs.**
- **I have read and understood the contents of this Site Health and Safety Plan and I agree to abide by all provisions specified within.**

Daily Safety Tailgate Meeting Participants (Use the back of this form if needed)

Print Name:	Signature:	Company:	Date:
Robby Orr	Robby Orr	Remington Technologies	10/14/16
Rob Mathias	Rob Mathias		
DUSTIN GATCH	Dustin Gatch		10/14/16
Joel Riedli	Joel Riedli	Trihydro corporation	10/14/2016
[illegible]	[illegible]		
Bryan Stapler	[illegible]		10/14/16

Daily Tailgate Meeting Checklist

Site Name: Trihydro - Whitefish

Site Address: 239 Baker Avenue, Whitefish, Montana

Work Being Performed: System Installation

Date & Time of Meeting: 0700 10/16/16 **Weather:** 24° Raining

Name of Presenter: Robby Orr

Itemize the Specific Topics Discussed (if more space is needed use the back of this page):

6 REMINGTON CARDINAL SAFETY PRINCIPLES

- ☑ I will report to work physically rested and mentally alert
- ☑ I will be responsible for my actions
- ☑ I will communicate with my co-workers
- ☑ I will be aware of all changing site conditions that may impact safety
- ☑ I will NOT tolerate willful unsafe acts
- ☑ I will STOP all unsafe work

✓	Introductions	✓	PPE check - Level D
✓	Scope of Work Discussion	✓	Special PPE - Respirator, face shield etc.
✓	Site Walk	✓	JHAs reviewed prior to work start
✓	Utility locations checked - Look up	✓	Overhead Obstacles
✓	STOP WORK Authority	N/A	Short Service Employees (List them)
✓	Hospital Location/Route Explained	✓	Good Housekeeping
✓	HASP Reviewed	N/A	Communication with Mixer in Box Truck
✓	Emergency Evacuation Areas	✓	Exclusion zone
✓	Eye Wash/First Aid Kit Location	✓	Eating/Drinking/Smoking/Cell Phones
✓	Spotters needed for moving equipment	✓	Stakeholders - direct to client
✓	Fire Extinguisher Location	✓	Heat Stress
✓	3 Points of Contact for equipment	✓	Cold Stress
✓	Proper Lifting Technique	✓	Equipment Inspections
		✓	Shared Learnings

Job Hazard Analyses:

✓	Arrival and Site Setup	N/A	Chemical Injection
✓	Core Drilling	✓	Jackhammering
✓	Borehole Clearance	✓	Skidsteer Operation
N/A	Drilling Operation (Direct Push)	N/A	Well Injection
	Other		Other

- **I have participated in the Job Hazard Analysis (JHAs) review and discussion of the above referenced JHAs.**
- **I have read and understood the contents of this Site Health and Safety Plan and I agree to abide by all provisions specified within.**

Daily Safety Tailgate Meeting Participants (Use the back of this form if needed)

Print Name:	Signature:	Company:	Date:
Robby Orr	[signature]	Remington Technologies	10/16/16
DUSTIN GATCH	[signature]	CEE	
Rob Mathias	[signature]		
Roman Stryker	[signature]		
[illegible]	[signature]		
Gem Wysel	[signature]	GTP	
Joel Richelli	[signature]	Trihydro Corporation	10/16/2016
Andrew Vann	[signature]	Trihydro	10/16/16

Daily Tailgate Meeting Checklist

Site Name: Trihydro - Whitefish

Site Address: 239 Baker Avenue, Whitefish, Montana

Work Being Performed: System Installation

Date & Time of Meeting: 0:730 10/17/16 **Weather:** 42° Raining

Name of Presenter: Robby Orr

Itemize the Specific Topics Discussed (if more space is needed use the back of this page):

6 REMINGTON CARDINAL SAFETY PRINCIPLES

- ☑ I will report to work physically rested and mentally alert
- ☑ I will be responsible for my actions
- ☑ I will communicate with my co-workers
- ☑ I will be aware of all changing site conditions that may impact safety
- ☑ I will NOT tolerate willful unsafe acts
- ☑ I will STOP all unsafe work

✓	Introductions	✓	PPE check - Level D
✓	Scope of Work Discussion	✓	Special PPE - Respirator, face shield etc.
✓	Site Walk	✓	JHAs reviewed prior to work start
✓	Utility locations checked - Look up	✓	Overhead Obstacles
✓	STOP WORK Authority	N/A	Short Service Employees (List them)
✓	Hospital Location/Route Explained	✓	Good Housekeeping
✓	HASP Reviewed	N/A	Communication with Mixer in Box Truck
✓	Emergency Evacuation Areas	✓	Exclusion zone
✓	Eye Wash/First Aid Kit Location	✓	Eating/Drinking/Smoking/Cell Phones
✓	Spotters needed for moving equipment	✓	Stakeholders - direct to client
✓	Fire Extinguisher Location	✓	Heat Stress
✓	3 Points of Contact for equipment	✓	Cold Stress
✓	Proper Lifting Technique	✓	Equipment Inspections
		✓	Shared Learnings

Job Hazard Analyses:

✓	Arrival and Site Setup	N/A	Chemical Injection
✓	Core Drilling	✓	Jackhammering
✓	Borehole Clearance	✓	Skidsteer Operation
N/A	Drilling Operation (Direct Push)	N/A	Well Injection
	Other		Other

- **I have participated in the Job Hazard Analysis (JHAs) review and discussion of the above referenced JHAs.**
- **I have read and understood the contents of this Site Health and Safety Plan and I agree to abide by all provisions specified within.**

Daily Safety Tailgate Meeting Participants (Use the back of this form if needed)

Print Name:	Signature:	Company:	Date:
Robby Orr	Robby	Remington Technologies	10/17/16
Bryan Stephens	[illegible]		10/17/16
DUSTIN GATCH	[illegible]		
Joel Richli	[illegible]	Trihydro	10/17/2016
Rob Mathias	[illegible]		
Chris Waldusky	Chris Waldusky		
SHAYNE NELSON	[illegible]		

DAILY TAILGATE SAFETY MEETING

Trihydro CORPORATION

NOTE: A new tailgate meeting must be conducted if conditions, location, or personnel change.

Date: 11/28/2016 Time: 1340 ☐ a.m. ☒ p.m. Location: Whitefish, MT (city, state)

Project Name: Martin's Cleaners Client: MDEQ

Current Objective/Description: SVE piping modification, electrical installation

Commitment to Safety

1. I will protect myself for me, my family, Trihydro, clients, and contractors by watching for and mitigating risky behaviors, exercising stop-work authority to prevent incidents and injuries and by complying with Trihydro and client policies, procedures, and JSAs/JLAs
2. I understand that safety is my personal responsibility and that working safely is a key component in providing quality work.
3. I will set an example for my fellow employees, contractors, clients, and family by working safely.
4. I will drive defensively and "Safely for My Family," abiding by Trihydro and client policies and applicable laws and regulations
5. I will "slow down" appropriately to work at a pace that will allow me and others to complete each task efficiently and safely.
6. I will hold myself accountable for my safety and the safety of those around me. I will think about the safety of me, my coworkers, contractors, and our clients before I conduct each task

** Stop Work Authority (SWA) – "Everyone has the authority and obligation to immediately stop all unsafe work."*

Identify High-Hazard Work:

- ☐ Hot Work
- ☐ Elevated/overhead work
- ☐ Boat / over-water operations
- ☐ Work involving equipment within 15' of active overhead electrical line or pole supporting an electric line
- ☐ LOTO
- ☐ Excavations - any
- ☐ Demolition, removal of pipelines and buried structures
- ☐ Confined Space Entry
- ☐ Drilling - any

Associated and Identified Hazards:

- ☒ Abrasions, cuts, scrapes
- ☐ Allergies (self & co-workers)
- ☐ Asbestos
- ☐ Biological
- ☐ Buried utilities
- ☐ Burn hazards
- ☒ Chemical exposure
- ☒ Cold stress
- ☐ Compressed gases
- ☐ Crane or lifting equipment
- ☐ Drilling in area?
- ☐ Earthquake
- ☒ Electrical
- ☒ Equipment failure
- ☐ Ergonomic
- ☐ Excavations in area?
- ☒ Falling
- ☐ Fire/explosion
- ☐ H_2S
- ☒ Hand injury
- ☐ Heat stress
- ☐ Heavy equipment
- ☐ High-pressure processes
- ☐ High-temperature processes
- ☐ High wind
- ☒ Laceration
- ☐ Lightning
- ☒ Loud noise
- ☐ Machine guarding
- ☒ Motor vehicle crash
- ☒ No locking/fixed blades
- ☐ Overexertion
- ☐ Overhead utilities
- ☒ Pedestrian
- ☒ Pinch points
- ☐ Power tools
- ☐ Pulled into
- ☐ Radiation/X-ray
- ☐ Security
- ☐ Severe weather
- ☐ Scaffolds
- ☒ Slips, trips, falls
- ☐ Subsurface utilities
- ☒ Traffic
- ☐ Water
- ☐ Other: _____

See it! Identify Current Objective Hazards:

Assess Trihydro's 3 Most Serious Risks

- ☒ Traffic/Heavy Equipment
- ☐ Hazardous Atmosphere
- ☐ Utility Contact

Assess Trihydro's 5 Most Frequent Risks

- ☒ Hand Injuries
- ☐ Lifting
- ☐ Biological Hazards
- ☒ Chemical Exposure
- ☒ Slips, trips, falls

Other Hazards

- ☐ Weather
- ☐ Working at Heights

Personal Protective Equipment (PPE):

- [x] Hard hat
- [x] Safety glasses
- [x] Safety toed boots
- [ ] Ear plugs (as needed)
- [ ] Face shield
- [ ] Fall protection
- [x] Gloves (as needed)
- [ ] Arm sleeves
- [x] High visibility vest
- [ ] Rain gear
- [ ] Rubber boots
- [ ] SCBA
- [ ] Snake chaps
- [ ] Sunscreen (as needed)
- [ ] Dust mask
- [ ] Respirator Cartridges/filters:
  - [ ] VOC/H_2S escape
- [ ] H_2S monitor
  - [ ] Bump test
- [ ] FRCs/Nomex
- [ ] Tyvek®
- [ ] Insect repellant
  Do not apply DEET to FRCs

Other special equipment:

- [ ] _____
- [ ] _____
- [ ] _____
- [ ] _____
- [ ] _____
- [ ] _____

Before Beginning Work:

- [ ] Sign in and out of process unit [x] N/A
- [x] HASP reviewed & acknowledged
- [x] Locate the nearest evacuation point and a secondary location
- [x] Identify the nearest fire extinguisher, eyewash station, first aid kit, and Material Safety Data Sheets (MSDS)
- [x] Identify CPR/AED/first aid certified employees
- [ ] If lone worker, implement lone worker procedures [x] N/A
- [ ] Identify SSE, visitor(s), or guest(s) [x] N/A
- [x] Determine and acquire necessary permits [ ] N/A
  Permit required: Electrical workpermit (city of whitefish)
- [x] Review the JSA and "dirty up" if necessary
- [ ] Weather forecast: [ ] Hot [x] Cold [ ] Inclement
  Wind Direction: _____
- [x] Employee(s) are wearing proper PPE
- [ ] Perform a "self check" on each personal H_2S monitor
- [x] Perform a Work-Site Self Assessment (WSSA)
- [ ] Review the dashboard emergency flyer for the specific site; place in a visible location inside vehicle
- [ ] Barricade work zone (as needed)
- [x] Review WorkCare Injury Accident Program card
- [ ] PPE Action Levels (PID: 10ppm)

Safe Vehicle Use:

- [x] Pre-inspection complete
- [x] Seat belt
- [x] Follow all speed and traffic rules
- [x] Emergency brake used
- [ ] Keys left in vehicle ~0
- [ ] Trailer Safety Inspection form
- [x] Mileage sheet filled out
- [x] No cell phones used while driving
- [x] Parked in a safe location
- [ ] Orange cone used
- [ ] Chock tires (if needed)
- [ ] Other: _____
- [x] GOAL sticker in window
- [ ] Spotter used (if available)
- [x] First move forward, backed in
- [x] Load secured in vehicle
- [x] 3D-Driving (every 2 years)
- [ ] Other: _____

Site-Specific Comments: _____

Positive Reinforcement (R+): _____

Signatures:

Meeting Conducted By: Joel Riebli (designated project on-site safety responder) Company: Trihydro

Printed Name	Signature	Company	Attended Mid-Day Safety Focus	Is this worker new on-site?
1.			[ ] Yes [ ] No	[ ] Yes [ ] No
2.			[ ] Yes [ ] No	[ ] Yes [ ] No
3.			[ ] Yes [ ] No	[ ] Yes [ ] No
4.			[ ] Yes [ ] No	[ ] Yes [ ] No
5.			[ ] Yes [ ] No	[ ] Yes [ ] No
6.			[ ] Yes [ ] No	[ ] Yes [ ] No
7.			[ ] Yes [ ] No	[ ] Yes [ ] No
8.			[ ] Yes [ ] No	[ ] Yes [ ] No

DAILY TAILGATE SAFETY MEETING

Trihydro CORPORATION

NOTE: A new tailgate meeting must be conducted if conditions, location, or personnel change.

Date: 12/01/2016 Time: 0740 ☒ a.m. ☐ p.m. Location: whitefish, MT (city, state)

Project Name: Martins Cleaners Client: MDEQ

Current Objective/Description: Install Electrical base, add load filtration drums, SVE system modifications

Commitment to Safety

1. I will protect myself for me, my family, Trihydro, clients, and contractors by watching for and mitigating risky behaviors, exercising stop-work authority to prevent incidents and injuries and by complying with Trihydro and client policies, procedures, and JSAs/JLAs
2. I understand that safety is my personal responsibility and that working safely is a key component in providing quality work.
3. I will set an example for my fellow employees, contractors, clients, and family by working safely.
4. I will drive defensively and "Safely for My Family," abiding by Trihydro and client policies and applicable laws and regulations.
5. I will "slow down" appropriately to work at a pace that will allow me and others to complete each task efficiently and safely.
6. I will hold myself accountable for my safety and the safety of those around me. I will think about the safety of me, my coworkers, contractors, and our clients before I conduct each task.

** Stop Work Authority (SWA) – "Everyone has the authority and obligation to immediately stop all unsafe work."*

Identify High-Hazard Work:

- ☐ Hot Work
- ☒ Elevated/overhead work
- ☐ Boat / over-water operations
- ☐ Work involving equipment within 15' of active overhead electrical line or pole supporting an electric line
- ☐ LOTO
- ☐ Excavations - any
- ☐ Demolition, removal of pipelines and buried structures
- ☐ Confined Space Entry
- ☐ Drilling - any

Associated and Identified Hazards:

- ☒ Abrasions, cuts, scrapes
- ☐ Allergies (self & co-workers)
- ☐ Asbestos
- ☐ Biological
- ☐ Buried utilities
- ☐ Burn hazards
- ☒ Chemical exposure
- ☒ Cold stress
- ☐ Compressed gases
- ☐ Crane or lifting equipment
- ☐ Drilling in area?
- ☐ Earthquake
- ☒ Electrical
- ☒ Equipment failure
- ☐ Ergonomic
- ☐ Excavations in area?
- ☒ Falling
- ☐ Fire/explosion
- ☐ H_2S
- ☒ Hand injury
- ☐ Heat stress
- ☒ Heavy equipment
- ☐ High-pressure processes
- ☐ High-temperature processes
- ☐ High wind
- ☒ Laceration
- ☐ Lightning
- ☒ Loud noise
- ☐ Machine guarding
- ☒ Motor vehicle crash
- ☒ No locking/fixed blades
- ☒ Overexertion
- ☒ Overhead utilities
- ☐ Pedestrian
- ☒ Pinch points
- ☒ Power tools
- ☐ Pulled into
- ☐ Radiation/X-ray
- ☐ Security
- ☐ Severe weather
- ☐ Scaffolds
- ☒ Slips, trips, falls
- ☐ Subsurface utilities
- ☒ Traffic
- ☐ Water
- ☒ Other: snow

See it! Identify Current Objective Hazards:

Assess Trihydro's 3 Most Serious Risks

- ☒ Traffic/Heavy Equipment
- ☐ Hazardous Atmosphere
- ☐ Utility Contact

Assess Trihydro's 5 Most Frequent Risks

- ☒ Hand Injuries
- ☒ Lifting
- ☐ Biological Hazards
- ☒ Chemical Exposure
- ☒ Slips, trips, falls

Other Hazards

- ☒ Weather
- ☒ Working at Heights

Personal Protective Equipment (PPE):

- [x] Hard hat
- [x] Safety glasses
- [x] Safety toed boots
- [ ] Ear plugs (as needed)
- [ ] Face shield
- [ ] Fall protection
- [x] Gloves (as needed)
- [ ] Arm sleeves
- [x] High visibility vest
- [ ] Rain gear
- [ ] Rubber boots
- [ ] SCBA
- [ ] Snake chaps
- [ ] Sunscreen (as needed)
- [ ] Dust mask
- [ ] Respirator
  Cartridges/filters:
  - [ ] VOC/H_2S escape
- [ ] H_2S monitor
  - [ ] Bump test
- [ ] FRCs/Nomex
- [ ] Tyvek®
- [ ] Insect repellant
  Do not apply DEET to FRCs

Other special equipment:

- [ ] _____
- [ ] _____
- [ ] _____
- [ ] _____
- [ ] _____
- [ ] _____

Before Beginning Work:

- [ ] Sign in and out of process unit [x] N/A
- [x] HASP reviewed & acknowledged
- [x] Locate the nearest evacuation point and a secondary location
- [x] Identify the nearest fire extinguisher, eyewash station, first aid kit, and Material Safety Data Sheets (MSDS)
- [x] Identify CPR/AED/first aid certified employees
- [ ] If lone worker, implement lone worker procedures [x] N/A
- [ ] Identify SSE, visitor(s), or guest(s) [x] N/A
- [ ] Determine and acquire necessary permits [x] N/A
  Permit required: _____
- [x] Review the JSA and "dirty up" if necessary
- [ ] Weather forecast: [ ] Hot [x] Cold [ ] Inclement
  Wind Direction: _____
- [x] Employee(s) are wearing proper PPE
- [x] Perform a "self check" on each personal H_2S monitor
- [x] Perform a Work-Site Self Assessment (WSSA)
- [ ] Review the dashboard emergency flyer for the specific site; place in a visible location inside vehicle
- [ ] Barricade work zone (as needed)
- [ ] Review WorkCare Injury Accident Program card
- [ ] PPE Action Levels (PID: 10ppm)

Safe Vehicle Use:

- [ ] Pre-inspection complete
- [ ] Seat belt
- [ ] Follow all speed and traffic rules
- [ ] Emergency brake used
- [ ] Keys left in vehicle
- [ ] Trailer Safety Inspection form
- [ ] Mileage sheet filled out
- [ ] No cell phones used while driving
- [ ] Parked in a safe location
- [ ] Orange cone used
- [ ] Chock tires (if needed)
- [ ] Other: _____
- [ ] GOAL sticker in window
- [ ] Spotter used (if available)
- [ ] First move forward, backed in
- [ ] Load secured in vehicle
- [ ] 3D-Driving (every 2 years)
- [ ] Other: _____

Site-Specific Comments: _____

Positive Reinforcement (R+): _____

Signatures:

Meeting Conducted By: Joel Richi (designated project on-site safety responder) Company: Tri hydro

Printed Name	Signature	Company	Attended Mid-Day Safety Focus	Is this worker new on-site?
1. Viktor Gayvoronsky	V Gayv	Powerhouse Elec	[ ] Yes [ ] No	[ ] Yes [ ] No
2. Daniel Pavlik	[illegible]	Power house	[ ] Yes [ ] No	[ ] Yes [ ] No
3.			[ ] Yes [ ] No	[ ] Yes [ ] No
4.			[ ] Yes [ ] No	[ ] Yes [ ] No
5.			[ ] Yes [ ] No	[ ] Yes [ ] No
6.			[ ] Yes [ ] No	[ ] Yes [ ] No
7.			[ ] Yes [ ] No	[ ] Yes [ ] No
8.			[ ] Yes [ ] No	[ ] Yes [ ] No

DAILY TAILGATE SAFETY MEETING

Trihydro CORPORATION

NOTE: A new tailgate meeting must be conducted if conditions, location, or personnel change.

Date: 12/21/2016 Time: _____ ☐ a.m. ☐ p.m. Location: Whitefish, MT (city, state)

Project Name: Whitefish Solvent Site Client: MDEQ SRS

Current Objective/Description: Test electrical connect, bump test blower, heat up drums, possible start systems

Commitment to Safety

1. I will protect myself for me, my family, Trihydro, clients, and contractors by watching for and mitigating risky behaviors, exercising stop-work authority to prevent incidents and injuries and by complying with Trihydro and client policies, procedures, and JSAs/JLAs
2. I understand that safety is my personal responsibility and that working safely is a key component in providing quality work
3. I will set an example for my fellow employees, contractors, clients, and family by working safely
4. I will drive defensively and "Safely for My Family," abiding by Trihydro and client policies and applicable laws and regulations
5. I will "slow down" appropriately to work at a pace that will allow me and others to complete each task efficiently and safely
6. I will hold myself accountable for my safety and the safety of those around me. I will think about the safety of me, my coworkers, contractors, and our clients before I conduct each task

** Stop Work Authority (SWA) – "Everyone has the authority and obligation to immediately stop all unsafe work."*

Identify High-Hazard Work:

- ☐ Hot Work
- ☒ Elevated/overhead work Next door
- ☐ Boat / over-water operations
- ☐ Work involving equipment within 15' of active overhead electrical line or pole supporting an electric line
- ☐ LOTO
- ☐ Excavations - any
- ☐ Demolition, removal of pipelines and buried structures
- ☐ Confined Space Entry
- ☐ Drilling - any

Associated and Identified Hazards:

- ☐ Abrasions, cuts, scrapes
- ☐ Allergies (self & co-workers)
- ☐ Asbestos
- ☐ Biological
- ☐ Buried utilities
- ☐ Burn hazards
- ☒ Chemical exposure
- ☒ Cold stress
- ☐ Compressed gases
- ☐ Crane or lifting equipment
- ☐ Drilling in area?
- ☐ Earthquake
- ☒ Electrical
- ☒ Equipment failure
- ☐ Ergonomic
- ☐ Excavations in area?
- ☒ Falling next door
- ☐ Fire/explosion
- ☐ H_2S
- ☒ Hand injury
- ☐ Heat stress
- ☐ Heavy equipment
- ☐ High-pressure processes
- ☐ High-temperature processes
- ☐ High wind
- ☒ Laceration
- ☐ Lightning
- ☒ Loud noise
- ☐ Machine guarding
- ☒ Motor vehicle crash
- ☒ No locking/fixed blades
- ☐ Overexertion
- ☐ Overhead utilities
- ☐ Pedestrian
- ☒ Pinch points
- ☒ Power tools
- ☐ Pulled into
- ☐ Radiation/X-ray
- ☐ Security
- ☐ Severe weather
- ☐ Scaffolds
- ☒ Slips, trips, falls
- ☐ Subsurface utilities
- ☒ Traffic
- ☐ Water
- ☐ Other: _____

See it! Identify Current Objective Hazards:

Assess Trihydro's 3 Most Serious Risks

- ☒ Traffic/Heavy Equipment
- ☐ Hazardous Atmosphere
- ☐ Utility Contact

Assess Trihydro's 5 Most Frequent Risks

- ☒ Hand Injuries
- ☐ Lifting
- ☐ Biological Hazards
- ☒ Chemical Exposure
- ☒ Slips, trips, falls

Other Hazards

- ☒ Weather
- ☐ Working at Heights

Personal Protective Equipment (PPE):

- [x] Hard hat
- [x] Safety glasses
- [x] Safety toed boots
- [x] Ear plugs (as needed)
- [ ] Face shield
- [ ] Fall protection
- [x] Gloves (as needed)
- [ ] Arm sleeves
- [x] High visibility vest
- [ ] Rain gear
- [ ] Rubber boots
- [ ] SCBA
- [ ] Snake chaps
- [ ] Sunscreen (as needed)
- [ ] Dust mask
- [ ] Respirator
  - Cartridges/filters
  - [ ] VOC/H_2S escape
- [ ] H_2S monitor
  - [ ] Bump test
- [ ] FRCs/Nomex
- [ ] Tyvek®
- [ ] Insect repellant
  Do not apply DEET to FRCs

Other special equipment

- [ ] _____
- [ ] _____
- [ ] _____
- [ ] _____
- [ ] _____
- [ ] _____

Before Beginning Work:

- [ ] Sign in and out of process unit [x] N/A
- [x] HASP reviewed & acknowledged
- [x] Locate the nearest evacuation point and a secondary location
- [x] Identify the nearest fire extinguisher, eyewash station, first aid kit, and Material Safety Data Sheets (MSDS)
- [x] Identify CPR/AED/first aid certified employees
- [x] If lone worker, implement lone worker procedures [ ] N/A
  Part day
- [ ] Identify SSE, visitor(s), or guest(s) [x] N/A
- [ ] Determine and acquire necessary permits [x] N/A
  Permit required: _____
- [x] Review the JSA and "dirty up" if necessary
- [ ] Weather forecast: [ ] Hot [x] Cold [ ] Inclement
  Wind Direction: _____
- [ ] Employee(s) are wearing proper PPE
- [ ] Perform a "self check" on each personal H_2S monitor
- [x] Perform a Work-Site Self Assessment (WSSA)
- [ ] Review the dashboard emergency flyer for the specific site; place in a visible location inside vehicle
- [ ] Barricade work zone (as needed)
- [ ] Review WorkCare Injury Accident Program card
- [ ] PPE Action Levels (PID 10ppm)

Safe Vehicle Use:

- [x] Pre-inspection complete
- [x] Seat belt
- [x] Follow all speed and traffic rules
- [ ] Emergency brake used
- [ ] Keys left in vehicle
- [ ] Trailer Safety Inspection form
- [x] Mileage sheet filled out
- [x] No cell phones used while driving
- [x] Parked in a safe location
- [ ] Orange cone used
- [ ] Chock tires (if needed)
- [ ] Other: _____
- [x] GOAL sticker in window
- [ ] Spotter used (if available)
- [x] First move forward, backed in
- [x] Load secured in vehicle
- [x] 3D-Driving (every 2 years)
- [ ] Other. _____

Site-Specific Comments: _____

Positive Reinforcement (R+): _____

Signatures:

Meeting Conducted By: Joel Riebli (designated project on-site safety responder) Company: TP. hydro

Printed Name	Signature	Company	Attended Mid-Day Safety Focus	Is this worker new on-site?
1. Viktor Gryvorovsky	V Gryv	Powerhouse Elec	[ ] Yes [ ] No	[ ] Yes [ ] No
2.			[ ] Yes [ ] No	[ ] Yes [ ] No
3.			[ ] Yes [ ] No	[ ] Yes [ ] No
4.			[ ] Yes [ ] No	[ ] Yes [ ] No
5.			[ ] Yes [ ] No	[ ] Yes [ ] No
6.			[ ] Yes [ ] No	[ ] Yes [ ] No
7.			[ ] Yes [ ] No	[ ] Yes [ ] No
8.			[ ] Yes [ ] No	[ ] Yes [ ] No

DAILY TAILGATE SAFETY MEETING

Trihydro CORPORATION

NOTE: A new tailgate meeting must be conducted if conditions, location, or personnel change.

Date: 12/22/2016 Time: _____ ☐ a.m. ☐ p.m. Location: Whitefish, MT (city, state)

Project Name: Whitefish solvent site Client: MDEQ

Current Objective/Description: Start up SVE System; Electric check; Collect samples

Commitment to Safety

1. I will protect myself for me, my family, Trihydro, clients, and contractors by watching for and mitigating risky behaviors, exercising stop-work authority to prevent incidents and injuries and by complying with Trihydro and client policies, procedures, and JSAs/JLAs
2. I understand that safety is my personal responsibility and that working safely is a key component in providing quality work
3. I will set an example for my fellow employees, contractors, clients, and family by working safely
4. I will drive defensively and "Safely for My Family," abiding by Trihydro and client policies and applicable laws and regulations
5. I will "slow down" appropriately to work at a pace that will allow me and others to complete each task efficiently and safely
6. I will hold myself accountable for my safety and the safety of those around me. I will think about the safety of me, my coworkers, contractors, and our clients before I conduct each task

** Stop Work Authority (SWA) – "Everyone has the authority and obligation to immediately stop all unsafe work."*

Identify High-Hazard Work:

- ☐ Hot Work
- ☒ LOTO
- ☐ Confined Space Entry
- ☐ Elevated/overhead work
- ☐ Excavations - any
- ☐ Drilling - any
- ☐ Boat / over-water operations
- ☐ Demolition, removal of pipelines and buried structures
- ☐ Work involving equipment within 15' of active overhead electrical line or pole supporting an electric line

Associated and Identified Hazards:

- ☒ Abrasions, cuts, scrapes
- ☐ Allergies (self & co-workers)
- ☐ Asbestos
- ☐ Biological
- ☐ Buried utilities
- ☐ Burn hazards
- ☐ Chemical exposure
- ☒ Cold stress
- ☐ Compressed gases
- ☐ Crane or lifting equipment
- ☐ Drilling in area?
- ☐ Earthquake
- ☒ Electrical
- ☐ Equipment failure
- ☐ Ergonomic
- ☐ Excavations in area?
- ☐ Falling
- ☐ Fire/explosion
- ☐ H_2S
- ☒ Hand injury
- ☐ Heat stress
- ☐ Heavy equipment
- ☐ High-pressure processes
- ☐ High-temperature processes
- ☐ High wind
- ☒ Laceration
- ☐ Lightning
- ☐ Loud noise
- ☐ Machine guarding
- ☒ Motor vehicle crash
- ☒ No locking/fixed blades
- ☐ Overexertion
- ☐ Overhead utilities
- ☒ Pedestrian
- ☒ Pinch points
- ☐ Power tools
- ☐ Pulled into
- ☐ Radiation/X-ray
- ☐ Security
- ☐ Severe weather
- ☐ Scaffolds
- ☒ Slips, trips, falls
- ☐ Subsurface utilities
- ☒ Traffic
- ☐ Water
- ☐ Other: _____

See it! Identify Current Objective Hazards:

Assess Trihydro's 3 Most Serious Risks

- ☐ Traffic/Heavy Equipment
- ☐ Hazardous Atmosphere
- ☒ Utility Contact

Assess Trihydro's 5 Most Frequent Risks

- ☒ Hand Injuries
- ☐ Lifting
- ☐ Biological Hazards
- ☐ Chemical Exposure
- ☒ Slips, trips, falls

Other Hazards

- ☐ Weather
- ☐ Working at Heights

Personal Protective Equipment (PPE):

- ☐ Hard hat
- ☒ Safety glasses
- ☒ Safety toed boots
- ☒ Ear plugs (as needed)
- ☐ Face shield
- ☐ Fall protection
- ☒ Gloves (as needed)
- ☐ Arm sleeves
- ☐ High visibility vest
- ☐ Rain gear
- ☐ Rubber boots
- ☐ SCBA
- ☐ Snake chaps
- ☐ Sunscreen (as needed)
- ☐ Dust mask
- ☐ Respirator Cartridges/filters
  - ☐ VOC/H_2S escape
- ☐ H_2S monitor
  - ☐ Bump test
- ☐ FRCs/Nomex
- ☐ Tyvek®
- ☐ Insect repellant
  Do not apply DEET to FRCs

Other special equipment

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

Before Beginning Work:

- ☐ Sign in and out of process unit ☒ N/A
- ☒ HASP reviewed & acknowledged
- ☒ Locate the nearest evacuation point and a secondary location
- ☒ Identify the nearest fire extinguisher, eyewash station, first aid kit, and Material Safety Data Sheets (MSDS)
- ☒ Identify CPR/AED/first aid certified employees
- ☐ If lone worker, implement lone worker procedures ☒ N/A
- ☐ Identify SSE, visitor(s), or guest(s) ☒ N/A
- ☐ Determine and acquire necessary permits ☒ N/A
  Permit required: _____
- ☒ Review the JSA and "dirty up" if necessary
- ☐ Weather forecast: ☐ Hot ☒ Cold ☐ Inclement
  Wind Direction: _____
- ☒ Employee(s) are wearing proper PPE
- ☐ Perform a "self check" on each personal H_2S monitor
- ☒ Perform a Work-Site Self Assessment (WSSA)
- ☐ Review the dashboard emergency flyer for the specific site; place in a visible location inside vehicle
- ☐ Barricade work zone (as needed)
- ☐ Review WorkCare Injury Accident Program card
- ☐ PPE Action Levels (PID 10ppm)

Safe Vehicle Use:

- ☒ Pre-inspection complete
- ☒ Seat belt
- ☒ Follow all speed and traffic rules
- ☐ Emergency brake used
- ☐ Keys left in vehicle
- ☐ Trailer Safety Inspection form
- ☒ Mileage sheet filled out
- ☒ No cell phones used while driving
- ☒ Parked in a safe location
- ☐ Orange cone used
- ☐ Chock tires (if needed)
- ☐ Other: _____
- ☒ GOAL sticker in window
- ☐ Spotter used (if available)
- ☒ First move forward, backed in
- ☒ Load secured in vehicle
- ☒ 3D-Driving (every 2 years)
- ☐ Other: _____

Site-Specific Comments: _____

Positive Reinforcement (R+): _____

Signatures:

Meeting Conducted By: Joel Richll (designated project on-site safety responder) Company: Tilyda

Printed Name	Signature	Company	Attended Mid-Day Safety Focus	Is this worker new on-site?
1. VIKTOR GRYUZONSKY	V Gryuz	Powerhouse Elec.	☐ Yes ☐ No	☐ Yes ☐ No
2.			☐ Yes ☐ No	☐ Yes ☐ No
3.			☐ Yes ☐ No	☐ Yes ☐ No
4.			☐ Yes ☐ No	☐ Yes ☐ No
5.			☐ Yes ☐ No	☐ Yes ☐ No
6.			☐ Yes ☐ No	☐ Yes ☐ No
7.			☐ Yes ☐ No	☐ Yes ☐ No
8.			☐ Yes ☐ No	☐ Yes ☐ No

JFD wire 2000

APPENDIX C

FIELD NOTES

CONTENTS

PAGE	REFERENCE	DATE

Location Helena → Whitefish, MT Date 10/11/2016

Project / Client MDEQ Whitefish

776-033-001 pg 1/2

0815 Joel Riebli (JR) departs Helena office with fleet truck #108

1215 JR arrives in Whitefish

1305 Paid $462 of building permit fees to the City of Whitefish Building Permit for the installation of the remediation shed at 239 Baker. The permit will be issued after a few signatures are made. They will call.

1355-1420 JR met with Property owner Liz Larsen at 239 Baker property. Reviewed the project map and walked the property (unfortunately the operator of the Whitefish Liquor store - Lane Walker). Reviewed the utility locations, the site conditions, the system/shed installation area. Took photos and video's of the site. Signed the Property Condition form for the installation of the trench/well pipe & remediation system shed. The front of the building has the waterline near the second (southern) store entrance. Liz said the waterline is old could break very easy. The sidewalk on the west side is cracked. The southern side has a street drain and trees. The Eastern side

Location Whitefish, MT Date 10/11/2016

Project / Client MDEQ Whitefish - Martins Cleaners

Pg 2/2 776-033-001 JR

(The parking lot) has down spout, gas, sewer subsurface (asphalt). Electrical & phone are above the area. The northern down spout is disconnected next to the new construction. The sewer line was recently repaired and it has a concrete surface completion surrounding by asphalt. I asked Liz if she would like it replaced with asphalt rather than concrete. she said asphalt would look better but would default to Lana Walkers preference. - The concrete goes up to the back door of the liquior store. Liz & reviewed the down spout / parking lot drain and discussed cutting and replacing the piping crossing through the trench. I asked liz if she would like project updates daily - she said it wouldn't be needed since she will swing by the site almost daily.

1605-1610: JR & Lana Walker met, went over piping locations & shed position. The concrete sewer cap to be replaced by asphalt.

-Joel Riebli

JRR

Location Whitefish Date 10/12/2016

Project / Client

Pg 1/5

0740 Joel Riebli (Trihydro) arrives at the former Martin's Cleaners. Robby Orr (Remington Technologies) is on site. The traffic control is being off loaded.

0800 Cutting Edge Excavating: Shayne Nelson (foreman), Bryan Stephens (operator), Dustin Gatch (laborer) & Bob Mathias (driver) arrive on site.

* Tailgate Safety meeting: Stop work authority, utility locations, hand digging, traffic, equipment operation, spotter (working next to building, post, utilities - very tight working area, overhead utilities, former Dry cleaners, Pedestrian traffic, clay soils with possible buried debris, keep as much of the parking available for customers, construction next door, level D PPE, all public question direct to Joel.

* Saw cut the aspalt pad location and the eastern trench through the asphalt. Aspalt is ~3 1/2 inch thick.

* Equipment on site: John Deere 50D mini-excavator, GE HL Z17 mini excavator, bobcat, 2 end dump trucks

1055 Start excavating below the asphalt on the parking lot side using the 50D John deere, bobcat and end dump

Location Whitefish, MT Date 10/12/2016

Project / Client MDEQ Whitefish - Mart's Cleaners

Pg 2/5 776-033-001 JD

1100 Weekly status meeting with Joel (phone) Mike Gibson (MDEQ) & Andrew Vana —
* meet with Liz & Lara yesterday. started work today. might need to replace more concrete in the sidewalk per cutting Edge Excavation. They indicate that the city will likely want an entire section of concrete replaced expansion joint to expansion joint not just the trench. Joel to check with the city. The Remediation shed is arriving on Monday midday —
* ~~Sto~~ water line uncovered in the northern end of the trench, under the shed location 4' bgs.

1200 Joel met with City of Whitefish maintenance Randy - can't help with the decision on the concrete replacement. said to talk with Craig Workman over at City Hall —

1215 JR met briefly with Craig - he has a meeting will call back when he has time —
* Two sewer lines, a caster iron that is 4' bgs and a PVC 1' bgs. Some water is coming in along the alleyway of the caster iron pipe into the trench. Since there is a concern of water filling up the slotted screen if we cut a pipe bottom the cast iron pipe we will run

Location Date 10/12/2016

Project / Client

JD Pg 3/5

all three above the cast iron (above 4' bgs).

1420 Photo 20161012_001: Looking south at the excavation of the eastern trench with two exposed sewer lines —
* Gas line only 6" bgs —
* Dump truck of Pea gravel arrives —

1435 Photo 20161012_002: Pea gravel being added to the northern end of the piping run.

1556 Photo 20161012_003: The piping transition from the eastern trench to the remediation system floor. 4" pipe. The slotted screen begins in the top pipe (closest to the building).

1606 Photo 20161012_004: adding pea gravel over the pipe in the eastern trench —

1615 Photo 20161012_005: The end of the 40' of eastern slotted screen just prior to the south building down spout piping. End cap placed on well —

1625 Met with City of Whitefish Senior project engineer Karin Hiding since City Engineer Craig Workman has left for Colorado —
Karin said the city requirements for sidewalk replacement will require all western sidewalk to be replaced from building to curb (since no contract joint is present. On the southern

Location Whitefish, MT Date 10/12/2016

Project / Client MDEQ Whitefish Meating Cleaners

Pg 4/5 776-033-001 (JP)

end the sidewalk up to the control joint needs replaced.

1718 Photo 20161012-006: fabric → tape installed over the eastern trench piping/pea gravel.

1730 Photo 20161012_007: flow fill added to trench, leaving 6" at remodel shed and 3" at asphalt areas

1753 Photo 20161012_008: Eastern trench secured with candle sticks, caution tape → equipment covers open trench.

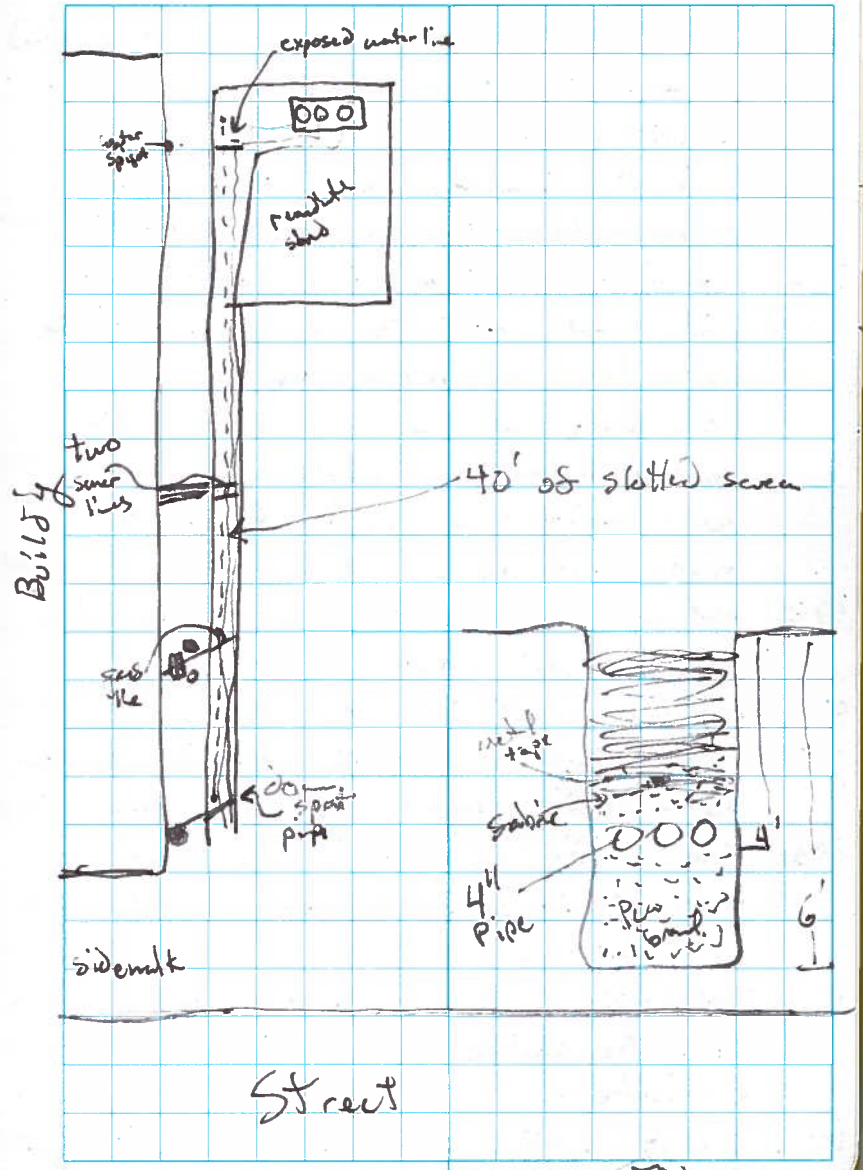
1800 Unable to meet with Whitefish Liquor store general manager Lana Walker as she is away from the store. Left her a voice message

—Joel Riehl

Location Date 10/12/2016

Project / Client

Pg 5/5



(JP)

Location Whitefish, MT Date 10/13/2016

Project / Client MDEQ Whitefish - Martins Cleaners

Pg 1/3 776-033-001 JR

0645 Joel Riebli (Trihydro) & Robby Orr (Remington Technologies) arrive at the Former Martins Cleaners; site is still secured

0730 Cutting Edge Excavating: Shayne Nelson (Foreman) Bryan Stephens (Equipment operator), Dustin Gatch (Laborer) & Bob Mathias (Driver) arrive on site.

* Tailgate safety meeting: stop work authority, utilities on the south sidewalk is irrigation & street drain; working under the awning; spotter, equipment movement; Traffic; people walking nearby; store gets delivery; cutting and removing concrete; muster points, Hospital; PPE

0755 Start cutting the concrete with concrete cutter along the south sidewalk

0820 Andrew Vona (Trihydro) arrives on site

0850 Left message for City of Whitefish Engineer Karin Hilding regarding the western sidewalk

0930 Karin Hilding called said she would have Randy with the city stop by and take a look at the sidewalk

0945 Photo 20151013_001: Concrete removal activities along the southern sidewalk using both excavators

1020 City of Whitefish Maintenance utility inspector Randy Reynolds stopped by and looked at

Location Date 10/13/2016

Project / Client

JR Pg 2/3

the western side walk, looked at the current condition, slope, nearby slope. Said he would see what option we have and get back with us.

1030 Spoke with Lana Walker about the back entrance of the property. She asked if we could block off the parking lot so no one blocks were the delivery truck needs to drive. Gave update on asphalt ~4 pm and unknown concrete work

1107 Photo 20161013_002: Silt layer at ~5 bgs in the southern trench near the southeast corner

1300 Photo 20161013_003: Progress made on the southern trench - silt layer ~5' bgs. excavating down 6'

1340 Photo 20161013_004: Adding Pea gravel on the southeast corner trench

1409 Photo 20161013_005: Sabrie installed on southeast corner covering pea gravel & pipe. 38" bgs

1416 Photo 20161013_006: Adding slow fill in the southeast corner trench up to base of the asphalt.

* Loading the excavated southern trench into the dump truck

1609 Photo 20161013_007: excavated trench walls on plastic at Cutting Edge Construction

Location Whitefish, MT Date 10/13/2016

Project / Client MDEQ Whitefish - Mcatts Cleaners

Pg 3/3 776-033-001

1628 Photo 20161013_008: Prep asphalt patch area

1700: Photo 20161013_009: Compacting the asphalt patch in the eastern trench

1725: Photo 20161013_010: Secured southern work area at end of day leaving part of side walk open

1725: Photo 20161013_011: Eastern work area with asphalt patch at end of day

* Meeting at 0700 tomorrow

Joel Riebli

Location Date 10/14/2016

Project / Client

Pg 1/6

0700 Joel Riebli (Trihydro); Robby Orr (Remington Technologies), Shayne Nelson (Cutting Edge Excavating), Dustin Gatch (Cutting Edge), Bob Mathias (Cutting Edge), Bryan Stephens (Cutting Edge) arrive on site. Light rain falling. Site is still secured from overnight

0720 Tailgate safety meeting: stop work authority; Traffic control working on both southern & western streets, flagging traffic; Pedestrians, weather (Rain), working next to awning and building; muddy conditions; slow and go; level D, communication

0745 Resume excavating the southern excavation using the GEHL micro excavator, bobcat, & dump truck

0814 Photo 20161014_001: Looking west at the excavation of the southern Trench using the mini excavator and bobcat

* PID screening levels at 5-6' bgs where the awning begins on the southern trench reading 3.5 ppm

0840 Photo 20161014_002: Measuring the depth of the southern trench. Depth 6' feet with about an 8" silt layer at 5'-5'8"

0940 Andrew Van (Trihydro) arrives on site

* Hand dug 13" under the southern building in the silt layer under the second window

Location Whitefish, MT Date 10/14/2016

Project / Client MDEQ Whitefish-Martin Cleaners

Pg 2/4 776-033-001 JR

from the southeast corner of the former Martins Cleaners building. Dug 25" and 13" are under the building. added pea gravel

1000 Photo 20161014-003. Under the second window to the left (black shovel on building concrete) is were hand dug at silt layer under the building 13"

1003 Photo 20161014-004: Micro excavator excavating under the southern awning and loading the bobcat

1021 Photo 20161014-005: Looking North at the micro excavator working under the awning along the southern building

1030 City of Whitefish Randy Reynolds stops by (Karin Hilding) to measure the slope of the western sidewalk He said it is ~5.5% towards the street

* Hand dug 18" under the southern building between the southwestern window and the unused door. Dug in 33" which would put the end of the excavation at 17" below the building exterior wall

1118 Photo 20161014-006: micro-excavator working under the southern awning

* PID reading from the excavated silt layer (~5' bgs) near the north end of the

Location Date 10/14/2016

Project / Client

Pg 3/6

southern trench measured at 1.9 ppm

1130 Cutting edge excavator changed out the Bobcat for a tracked CAT 287 C

1215 Reach end of southern excavation west portion that can be excavated without impacting the western sidewalk

1230 Met with City of Whitefish Building permits Linda Broscheit. Discussed the availability of gutting concrete to pour the pad today. She said they need one more signature as a question about the location of the remediation exhaust to the property line still needs to be discussed. Currently the exhaust will be 9' from the property line. But the pipe can be modified to be further away from the property line. I asked if we could start forming the pad and laying out the rebar right now. Linda said we could. I signed the permit and they will notify when the final signature has been made

1301 Photo 20161014-007: installing 4" SVE piping in the southern trench. The pipe nearest to the building is the slotted screen while the pipe nearest the street is blank western pipe

Location Whitefish, MT Date 10/14/2016

Project / Client MDEQ Whitefish - Martins Cleaners

Pg 4/6 776-033-001

1318 Photo 20161014_008: the end of the southern pipe 77' long almost reaching the western corner of the bldg

1322 Photo 20161014_009: Looking east at the southern trench with the SVE piping surrounded by pea gravel and covered by fabric and locating tape

1330 City of Whitefish senior Project Engineer Karin Hilding and Utility Inspector Randy Reynolds arrives on-site - must remove all of the western sidewall but match the exsistig concrete stope

* Whitefish Liquor store general manager Lana Walker stopped by - need more parking for customers

(1340) City of Whitefish building permits Linda Broscheit left message that the permet for the remediat shed concrete slab & building can be picked up Trihydro's copy of the permit. Linda also said in the permit that the City is fine if the remediant systems exhaust piping is set at 9' from the property line.

(1336) Photo 20161014_010: Adding Sand fill to the southern trench

Location Date 10/14/2016

Project / Client

Pg 5/6

* Concrete crew finishing the shed pad and wiring in the rebar and the rebar which will stick up through the pad for grounding

1419 Photo 20161014_011: Looking west at the southern trench with sand fill added above the SVE piping

1419 Photo 20161014_012: The remediation pad with rebar installed and ground rod

1425 stopped by the City of Whitefish permit department and picked up the shed/pad permit. Also was given the inspection ~~shed~~ sheet, noticed it required 24-hr notice for concrete inspection. Asked what we need to do as we have concrete arriving in less than two hours. That when I stopped by a few hours ago they didn't mention a 24-hr notice for the concrete. The City will have the inspector swing by to check it out

1440 Arrived back to the Martin's Cleaners and the concrete has arrived and most of the shed pad has been poured

1450 Photo 20161014_013: concrete shed pad with concrete

Location Whitefish, MT Date 10/14/2016

Project / Client MDEQ Whitefish Martins Cleaners

776-033-001 (50)

Pg 6/10

1450 Photo 20161014-015: pouring the southern sidewalk under the awning

1528 Photo 20161014-016: smoothing out the sidewalk on the southern side of the building

* Cover the sidewalk & shed pad with plastic as its starting to lightly rain

1625 stopped by to check in with Lana but she has already wrapped up her day but will be in at 10 am tomorrow.

1630 lunch break

1720 Pull plastic off the sidewalk and shed pad — final surfacing performed on the new concrete — Plastic placed back on the new concrete as it will rain tonight

1800 Photo 20161014-017: site secured with cones and caution tape

—Joel Riebli

Location Date 10/15/2016

Project / Client

Pg 1/2

0910 Joel Riebli (Trihydro) arrives at the former Martin's Cleaners. The site is still secured with cones and caution tape. Moved the cones to allow some of the southern side walk to be used by pedestrians

1005 Spoke with Whitefish liquor store general manager Lana Walker. Gave update on sunday concrete removal, trenching, pipe installation; Monday flowfill, concrete removal, boards covering the sidewalk area, and half of the sidewalk being poured (one door will not be open for customers), shed arriving Tuesday pouring the last of the sidewalk, (one door will not be available for customers) and future work (power pole install next to shed and injection. Lana said they are going to resurface the parking lot and repaint the parking spots. I mentioned that the state is looking into covering the costs for repainting the parking spots.

1018 Photo's 20161015-001, 20161015-002, 20161015-003: site with candle sticks, caution tape, and plastic

1715 Drove by the site - still same shape as 1015

Location Whitefish, MT Date 10/16/2016

Project / Client MDEQ Whitefish Martin's Cleaners

Pg 1/5 776-033-001

0655 Joel Riebli (Trihydro) arrives at Martin's Cleaners. Robby Orr (Remington) and GEM Wysel (GTP) are on site.

0700 Cutting Edge Excavating: Shayne Nelson, Dustin Gatch, bob Mathias, and Bryan Stephens arrive on site. Light rain Sally.

0705 Tailgate safety meeting. Stop work authority, Hospital location, Eye wash, first aid kit, fire extinguisher location, muster points, stagger in the street with traffic, water line in trench, overhead hazards (sign and awning), glass windows and doors - plywood protection, equipment operation, spotters, communication, wet weather, church traffic, noise operating wet concrete sand, hand safety, 3 points contact, Level D PPE

0720 Start cutting the western sidewalk with the concrete sidewalk

0725 Andrew Vonn (Trihydro) arrives on site

0810 Start removing the cut western sidewalk using the John Deere 50D excavator

0915 Photo 20161016_001: Removing sidewalk on the western side of the project site using Both excavators

Location Date 10/16/2016

Project / Client

Pg 2/5

0931 Photo 20161016_002. Looking east at concrete removal activities underneath the awning in front of the Whitefish liquor store. Using both excavators to pull the concrete ~~under~~ next to the building

1001 Photo 20161016_003: concrete removed next to the front entrance to the building

1005 Start excavating the western trench using the micro excavator

1100 Photo 20161016_004: The micro excavator excavating the western trench in front of the Whitefish liquor store.

1205 Hand digging out the around the waterline which is near the front doors on the western side of the building: sand and some pea gravel found

* Water line is 5.5 feet bgs and is poly line.

1251 Photo 20161016_005: The shovel in the trench is the location of the waterline at 5.5' bgs

* PID reading in the sand (pit run) around the waterline came back at 0.0 ppm in three different attempts

* silt layer located 5.5' bgs between the northern door and northern window reading 0.1 ppm on PID

Location White Fish, MT Date 10/16/2016

Project / Client MDEQ White Fish Martins Cleaners

Pg 3/5 776-033-001 (BP)

1337 Photo 20161016-006: Flaggers and candlesticks being used as the Baker street western sidewalk trench is being excavated

1341 Photo 20161016-007: Excavating under the awning, Cat loader placing excavated soils in dump truck, flagger monitoring traffic.

~1400 left message for Lana to call back —

1421 Photos 20161016-008 & 20161016-009: Western trench completed beyond 40', not seeing concentrations in the soils. Excavated down to the silt layer

1430 Start adding pea gravel

1435 Nelcon pea gravel sampled "Pea Gravel" for RCRA metals

1446 Photo 20161016-010: Adding pea gravel to the western trench.

1504 Photo 20161016-011: Adding pea gravel to the western trench below the awning using the John Deere excavator

1513 Photo 20161016-012: Transition from the southern trench to the western trench. End of the 4" southern slotted SVE piping, Start of the 4" western slotted SVE piping.

1515 Photo 20161016-013: installing western SVE inlet slotted well screen on the pea gravel.

Location Date 10/16/2016

Project / Client

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1523 Photo 20161016-014: The pipe glue comes in the dirt below the window mark the northern end of the 43' long western SVE well pipe. The pipe is 2.5' from the building.

1523 Photo 20161016-015: The 43' long 4" western slotted inlet screen, with end cap. The pipe is 43" below the ground surface on the north end of the trench & 41" below the ground surface on the southern end of the trench.

1545 Photo 20161016-016: Western trench with pea gravel, 4" slotted piping, pea gravel, fabric and tape locator installed in the western trench

1555 Andrew called and did talk on the phone with White Fish liquor store general manager Lana Walker. Dissussed the different options of repaving the front sidewalk. Lana said to pour all of the western sidewalk in one pour. The liquor store will use the back door for customers while the concrete is drying

1605 Photo's 20161016-017 & 20161016-018: Candle sticks, caution tape installed around the western sidewalk trench at

Location Whitefish, MT Date 10/16/2016

Project / Client MDEQ Whitefish, Martin's Cleaners

Pg 5/5 776-033-001

end of work day; There is a little room to walk around the marked off work area along the edge of the sidewalk

1615 Depart site. — Joel Riebli

Location Date 10/17/2016

Project / Client

Pg 1/5

0650 Joel Riebli (Trihydro) arrives to a rainy Former Martins Cleaners (currently Whitefish liquor store). On site is Robby Orr (Remington Technologies), Dustin Gatch (Cutting Edge Excavating), & Bryan Stephens (CEE). Caution tape, candlesticks are still as is around the western trench

* Tailgate safety meeting: stop work authority, Musterpoint, Hospital location, Eye wash, first aid kit, fire extinguisher; Flying concrete using jack hammer, protecting building windows & glass door, define work area, overhead electrical, phone cable lines in back partly when off locating shed, open trench, using concrete cutter

0720 Bob Mathias (CEE) arrives on site as does Schellinger Construction flow fill truck

0730 Start adding flow fill to western trench, covering the fabric & utility locating tape

* Sanders Construction removing the plastic from the sidewalk poured on Friday

0740 Shayne Nelson (CBTS) arrives on site

Location Whitefish, MT Date 10/17/2016

Project / Client MDEQ Whitefish, Martin's Cleaners

Pg 2/5 776-033-001 JP

0755 Second Slow Sill truck arrives

0800 Photo 20161017_001 Adding Slow Sill to the western trench

0800 The remediation shed arrives on site

0810 Spoke with the City of Whitefish Building Permit Clerk - said no inspector stopped by on Friday to inspect the concrete slab and we are looking at placing the shed on the pad in the next hour. The Clerk said when she spoke with the Building inspector - he didn't see the need to inspect concrete pour as it's not that crucial. I asked if we could place the shed on the pad. She said she didn't see any issue. She would let the building inspector know that the shed has arrived and is being placed on the concrete pad

0825 Cutting Edge Excavation is jack hammering out the remaining concrete on the western sidewalk. CEE's Chris Waldusky and Trihydro's Andrew Vann are on site.

0830 Plan on moving the remediation shed off the transport truck, plan on making the forklift work and traffic control

Location Date 10/17/2016

Project / Client

Pg 3/5

and overhead hazards

0836 Photo 20161017_002: starting to unload the remediation shed from the Transport Truck using the fork lift

0837 Photo 20161017_003: unloading the shed with fork lift

0837 Called Orion Equipment's Barry Z. asked if he knew where the keys to the remediation shed are located as the driver doesn't have them. Barry said the door should be unlocked and keys inside the building.

* Placed the shed behind the Whitefish liquor store but not on the concrete pad - need to cut through the Tin floor.

0856 Photo 20161017_004: Using jack hammer to remove concrete on the western sidewalk. Using plywood to protect the near by Whitefish liquor store windows and glass doors

0927 Photo ~~Camera~~ 20161017_005: Concrete pad after removing plastic before setting the remediation system on the new concrete pad

Location Whitefish, MT Date 10/17/2016

Project / Client MDEQ Whitefish - Martins Cleaners

Pg 4/5 776-033-001

0930 Barry Z. (Orion Equipment) said the keys to the shed are in the outside electrical panel

0930 Photo 20161017-006: Moving the remediation shed onto the concrete pad using the fork lift

0951 Photo 20161017-007: The western sidewalk with all the concrete removed and all area open for customers to enter the front of the liquor store

1115 Cutting Edge Excavation wraps up prep for installing the bollards around the remediation shed - loaded up the excavators, cat loader and equipment, Departs the site

1120 The ~~concrete truck~~ Schelligar Construction concrete truck arrives on site along with four Sandon Construction concrete sidewalk workers

1140 Photo 20161017-008 Pouring the north end of the western sidewalk; the Whitefish liquor store is using the back door for customers while the concrete work takes place today

Location Date 10/17/2016

Project / Client

Pg 5/5

1224 Photo 20161017-009: Concrete resurfacing in the western sidewalk

1250 Photo 20161017-010: setting the four concrete bollards with concrete around the remediation shed

* Clean up around the site, while the Sandon Construction crew places plastic over the western sidewalk (Rain possible)

* Wash parking lot and repair the bollards

1600 Spoke with Whitefish liquor store general manager Lana Walker - The plastic in front of the store will be removed by 0930 tomorrow. Discussed the upcoming injection work (will be in communication when more details in the schedule are known)

1605 Photo 20161017-011: The front (west side) of the liquor store to protect the wet concrete

1606 Photo 20161017-012: southern sidewalk at end of day

1607 Photo 20161017-013: The east side of the project site at end of day.

1610 Off site - Sal Riccoli

Location Whitefish, MT Date 10/18/2016

Project / Client MDEQ Whitefish, Martins Cleaners

Pg 1/4 776-033-001

0735 Joel Riebli (JR) arrives at the former Martin's Cleaners. Sandon Construction has already pulled all the plastic off the western sidewalk and is loading up there truck with concrete materials / tools. Robby Orr (Remington Technologies) ~~has a~~ is removing the candle sticks out of the western sidewalk area

* JR & Robby cleaned the western sidewalk / parking lane and area around the remediation shed with water and broom

0820 City of Whitefish chief building official Tad Lisowski stopped by and inspected the shed. He looked at the building location from the property line (is good) and was looking at the exhaust position (its not installed but showed him that it is located more than 10' from the property line - good for him). He said he will do a final building inspection at the time the electrician gets power installed

Location Date 10/18/2016

Project / Client

Pg 2/4

0920 Let the Whitefish Liquor store opening employee that the concrete in front of the store can be walked on without any restrictions

0925 Robby demobilizes from the site, he has contacted the traffic control company and porta-john company about picking up the rented items. The concrete resurfacing company still needs to pick up some fencing and plastic fence

0932 Photo 20161018_001: Looking south at the western sidewalk post trenching and resurfacing work

0932 Photo 20161018_002: Looking north at the western sidewalk

0933 Photo 20161018_003: Looking east at the southern sidewalk post trenching and ~~excav~~ resurfacing activities

0933 Photo 20161018_004: Looking northwest at the eastern side of the former Martin's Cleaners and the site conditions post trench and resurfacing and shed installation

1015 Calls with Andrew Vann about current site conditions and upcoming electric / utility

Location Whitefish, MT Date 10/18/2016

Project / Client MDEQ Whitefish Martins Cleaners

Pg 3/4 776-033-001 JR

work

1035 Called Greg Hensel (Damon Designs 406-257-2565) regarding welding work on the remediation shed - can work next week (Monday/Tuesday) on it.

1042 Called Justin at Electric Man about electrical work too busy said to call David over at Power House

1047 Called David Hudak with Power House Electric (406-257-2677). Plan on meeting tomorrow at 0900 to look at the work. He can likely in still in two weeks.

* Electrian with Electric Man stopped by to see the remediation shed and what electrical work needs performed

1250 Collected "Aggregate" sample from the Schelliger Construction concrete yard/quarry.

1255 Collected "Sand" sample from the Schelliger Construction concrete yard/quarry. Samples to be run for RCRA 8 metals

* Jeff Goudreau with Flathead Electric COOP stopped by to see what options there are for providing power

Location Date 10/18/2016

Project / Client

JR Pg 4/4

to the system. Dissused installing a mast on the western side of the shed rather than installing a power pole. Jeff said the power cable & guide wire would be applying 600 lbs of weight. I mentioned meeting with an electrian tomorrow mainly to go over his idea's. Jeff said to keep him or Andy in the loop as some of the alley way powerpoles are being replaced next week

1515 Take multiple photo's of the remediation shed & equipment

1630 JR off site - Joel Riebli

Location Whitefish, MT Date 10/19/2016

Project / Client MDEQ Whitefish Martin's Cleaners

Pg 1/2 776-033-001 (JP)

0805 Joel Riebli (Trihydro) arrives at the former Martin's Cleaners. Still have traffic control, port-a-john, and concrete resurfacers items on site. Called Robby Orr, he said he will contact each company about picking up these items from the site

0850 Dave Hudak with Power House Electric stopped by the site to check out the options on installing power to the site. Discussed installing a mast, grounding, day bone, and system start up

0950 Got in touch with Greg Hansel with Damon Design about updating cost estimate

1025 Arrived at the temporary soil stockpile containing the Former Martin Cleaners excavated soils. Soils are on plastic and covered with plastic

1030 Collected sample "Martins Cleaners" VOC's TCLP 5 point composite soil sample.

1100 Weekly project meeting

1200 Stopped by and spoke with Whitefish liquor store general manager Lana Walker

Location Date 10/19/2016

Project / Client

(JP) Pg 2/2

about the traffic control, port-a-johns, and concrete items being picked up today - call if they are on site tomorrow.

1235 Depart Whitefish

1640 Arrive at Energy labs in Helena, MT. Dropped off the four ("Martins Cleaners", "Pea Gravel", "sand", & "aggregate") samples

1715 Arrived at the Helena office.

- Joel Riebli

Location Helena / Whitefish Date 11/28/2016

Project / Client MDEQ Whitefish Solvent Site

Former Martin's Cleaners

Pg 1/1

0900 Joel Riebli (JR) departs the Helena office.

1250 JR arrives in Whitefish

1335 JR called David Hudak with Power House Electric. He said he would stop by the job site.

1415 David Hudak stopped by - he is going to get the electric permit for the system system said he could install the electrical item on thursday.

* Dry fitted SVE system piping modifications

1530 Departed the jobsite.

-Joel Riebli

Location Date 11/29/2016

Project / Client

Pg 1/1

0800 Joel arrives at the former Martin's Cleaners

* Trip to Kalispell to rent ladder
* Attempt to replace the damaged flashing on the top of the remediation system - not making any progress need to hire someone to perform this task.
* Meeting with Whitefish liquor store manager Lana Walker - gave update on system installation and electrician's on site on thursday
* Call with Andrew Vona on finding someone to replace the flashing
* Return ladder
* SVE piping modifications

1715 Depart jobsite.

-Joel Riebli

Location Whitefish Date 11/30/2016

Project / Client MDEQ Whitefish ~~Liquor Store~~ Solvent site

Former Martin's Cleaners

Pg 1/1

0830 Joel Riebli (JR) arrives at The former Martin's Cleaners

1000 Depart site, head to Kalispell for parts and a meeting

1610 Arrive back at the former ~~whitefish~~ martin's Cleaners.

* Meeting with Whitefish ~~Sate~~ Liquor Store Manager Lana Walker — still planning Electrian's on site tomorrow morning

x Call with powerhouse Electric about working earlier tomorrow as the Liquor store gets delivery around 2 PM and parking lot will be taken up.

1710 Depart Former martin's cleaners

— Joel Riebli

Location Date 12/01/2016

Project / Client

Pg 1/1

0725 Joel Riebli (JR) arrives at The former Martin's Cleaners

* Power house Electrical (Viktor Gaguarovsky and David Pavluk) arrive. Tailgate safety meeting, make a JSA, go over NSSA from each. Start installing the Electrical meter base and components. Installing it on the south facing building face, east side.

1050 Powerhouse complete install with the exception of a small connection to one of the two grounds. Either they will be on site or their boss will be on site this afternoon to install

1055 Depart to pick up supplies to install the exhaust stack in Kalispell

1320 Arrive back at the former martins cleaners. Start installing the unistrut bracing for the exhaust stack

1650 Powerhouse Electric David Hudak installs the last grounding point on the electrical.

2120 Depart The former Martins Cleaners after install of the exhaust stack

— Joel Riebli

Location Whitefish / Helena Date 12/2/2016

Project / Client MDEQ Solvent Site

Former Martins Cleaners

Pg 1/2

0725 Joel Riebli (JR) arrives at the former Martins Cleaners. Waiting for the delivery of the GAC & Zeolite filtration drums.

* Install SVE piping

* Call the carrier who will be delivering the filtration drums. They think it will be between 2 & 3 PM as the drums are in Missoula this morning

0850 City of Whitefish building Inspector Ted Lisowski stopped by and inspected the system and building. Everything looks good on the electrical meter base installation. He would like to inspect the filtration drums installed and connected for a final inspection. Otherwise everything looks good. Can install the electrical service.

* Meeting with Whitefish liquor store manager Lana Walker. Asked if their delivery SUV ~~truck~~ from in front of the system doors before 1:30 as filtration drums will be delivered.

1320 Delivery of the 4 filtration drums arrived. Placed in shed

1350 JR departs Whitefish

Location Date 12/2/2016

Project / Client

Pg 2/2

1815 JR arrives at the Helena office.

Joel Riebli

Location Helena → Whitefish Date 12/12/2016

Project / Client MDEQ Whitefish liquor store

Pg 1/1

* Called Flathead Electric CO-OP Al Thorson (Construction Operations Superintendent) when the former Martin's Cleaners power pole will be installed – he said it was planned for either today (this afternoon) or tomorrow. I said MDEQ would like me present for the work as a possible water line is near by.

1335 Joel Riebli (JR) departs Helena

1800 JR arrives ~~on site~~ at the former Whitefish Liquor Store – no powerpole nor any work has taken place today. –Joel Riebli

Location Whitefish → Helena Date 12/13/2016

Project / Client

Pg 1/1

0840 Joel Riebli (JR) arrives at the former Martin's Cleaners.

* Installed the filtration hosing between the drums (GAC & zeolite) and to the blower & exhaust piping runs

* Left multiple messages for Flathead Electric CO-OP's Al Thorson when the powerpole will be installed today. No response.

* I have other project commitments for tomorrow so can't stay any longer – no sign of Flathead Electric COOP.

1445 JR departs Whitefish

1955 JR arrives in Helena – winter driving conditions.

–Joel Riebli

Location _____ Date 12/15/2016

Project / Client _____

Pg 1/1

* Flathead Electric co-op's Al Thorsen called and said the powerpole and electric service wiring was installed on 12/14/16 at the former Martin's Cleaners - Flathead has completed their work.

-Joel Riebli

Location Helena → Whitefish Date 12/20/2016

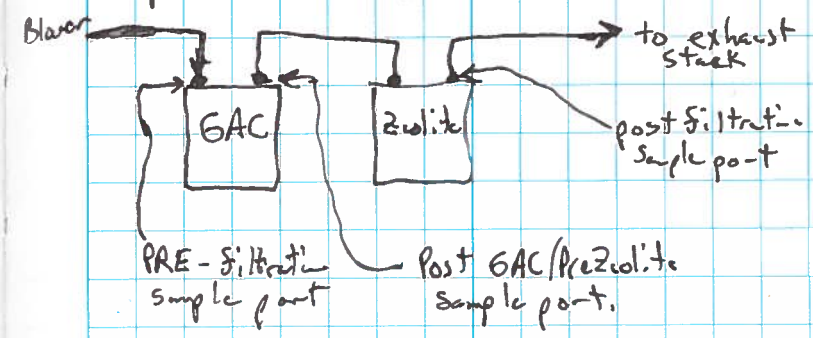
Project / Client _____

Pg 1/2

0820 Joel Riebli (JR) departs Helena, slick roads with snow

1305 JR arrives in Whitefish at the former Martin's Cleaners. The Power pole and service wire has ~~been~~ installed. Both zeolite drums have frost on the outside of the drums; The GAC drums do not. It got at least -20 °F during the past week and what moisture that is in the zeolite drums have froze. Will need to warm up the drums before running vapors through the frozen filter material.

* Install filtration drum sample ports on hose connections:



Location Whitefish Date 12/20/2016

Project / Client MDEQ Whitefish Solvent Site

Pg 2/2 Former Martins Cleaners

1500 Whitefish Building Inspectors Tad Lisowski & Phil Holmes arrives on site and inspects the filtration drums connection to the blower and exhaust stack. They said everything looks good and said all inspections look good. No further City of Whitefish building inspection action items.

* Finish installing the knockout tank discharge system modifications

1700 JR departs Former Martins Cleaners
— Joel Riebli

Location Whitefish Date 12/21/2016

Project / Client

Pg 2/2

0720 Joel Riebli (JR) arrives at the Former Martins Cleaners.

0800 Powerhouse Electric's Viktor Gayvoronsky arrives on site, conduct tailgate safety meeting and reviewed a JSA of Hazards associated with starting up the power to the remediation system. Tested the power coming into the meter box, looks good. Then turned on the breaker to the components inside the system. Lights work, heater works, electrical outlet works, turned on the cooling fan (it will kick on when the temp inside the building reaches 80°F). Turned on the breaker to the control panel, it powered up fine. Bumped the blower in manual mode for 5 seconds to confirm that the ~~not~~ unit is wired correctly and that the unit will suck from the SVE wells and blow out the exhaust stack (connect the hoses so to bypass the filtration drums on this test). Left the heating cuny to heat up the frozen Zeolite drums.

Location: White Fish Date: 12/21/2016

Project / Client: MDEQ White Fish Solvent Site.

Former Martin's Cleaners

Pg 2/2

0710 Power House Electric departs the site. Did not test the transfer pump since there isn't anything to test it with. Otherwise everything tested good.

* Installed the air dilution piping and housing to well #2 piping.

1650 JR departs the former Martin's cleaners. The zeolite drums are still defrosting.

-Joel Riebli

Location: Date: 12/22/2016

Project / Client:

Pg 1/5

0710 Joel Riebli (JR) arrives at the former Martin's cleaners. The zeolite drums are completely thawed out.

* Set up to collect the system piping decontamination sample. Attempted to place the blower in Auto mode but it would not start because of a low voltage error. System will bump start in Manual mode. Looked to see if any breakers had tripped or fuses needed changed out - couldn't find any electrical issue. Called Powerhouse Electric and they will send out Viktor to check the electrical.

1110 Viktor Gayvaronsky with Powerhouse Electrical arrives onsite. Conducted tailgate safety meeting, went over hazards. Viktor checked the power supply coming into the meter base and it checked fine (no low voltage on any of the lines). Checked the wiring inside the PLC but nothing was not low voltage. Checked the tightness of the wiring.

* Called Orion Equipment Barry to see if he had any suggestions as to

Location Whitefish Date 12/22/2016

Project / Client MDEQ Whitefish Solvent site

Pg 2/5 former Martin's Cleaners.

why the blower is showing a Oct 4, 2016 Low voltage Error. And how we can clear the error. He suggested checking the tightness of the wiring in the PLC. He was also going to reach out to ~~scoot~~ their PLC guy

* Orion Equipment called back and said to switch two of the control wires leading to the control unit, that that is while the low voltage error is occuring. Made the switch and the blower alarm did go away.

1440 Power House Electric departs

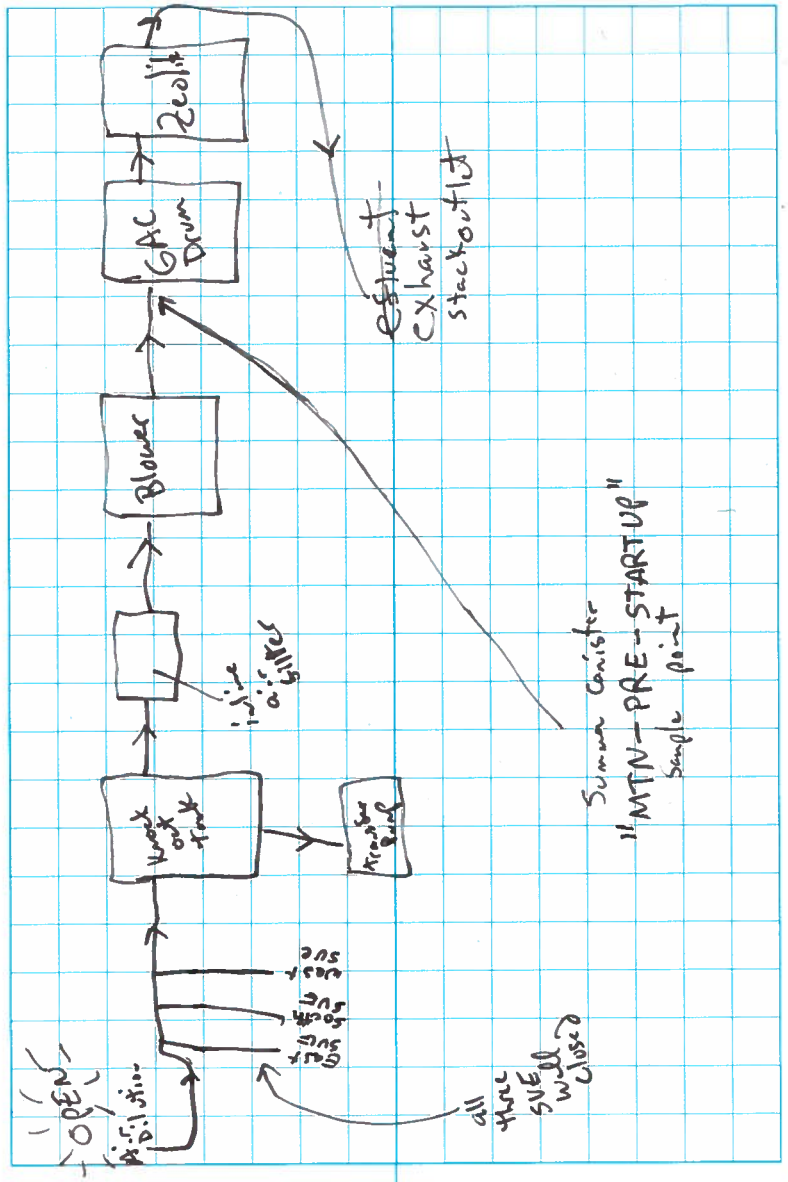
1450 Start up the blower with just the air dilution valve open. Started sampling using a summa canister at the inlet to the filtration drums (first GAC then Zeolite). Takes 30 minutes to collect the "MTN-PRE-STARTUP" sample.

1520 End collection of the startup sample with just the air dilution valve open and all SVE well closed.

Location Date 12/22/2016

Project / Client

Pg 3/5



Location: Whitefish Date: 12/22/2016

Project / Client: MDEQ Whitefish Solvent site

Former Martin's Cleaners

Pg 4/5

1544 Started up the blower with the three SVE wells open and the air dilution valve closed. Began collecting the thirty minute Pre & Post summa canister lab samples (see drawing to the right).

1644 End collection of "MTN-PRE" and "MTN-POST" summa canister pre and post filtration lab sample.

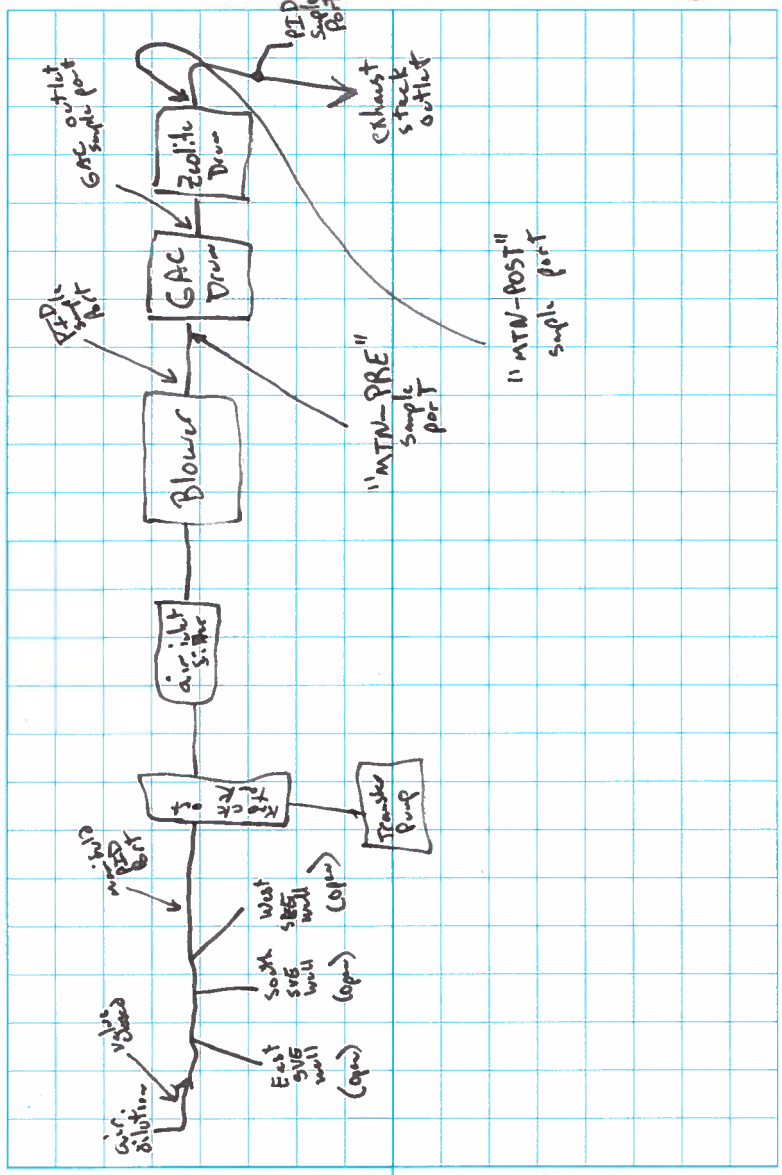
* In order to collect ~~vacuum~~ PID readings on the vacuum side, the system is briefly shut down and the PID is placed in the sample port to get the PID reading.

1810 Depart the former Martin's Cleaners. System is running on the SVE wells (air dilution is closed). — Joel Riehl

Location Date: 12/22/2016

Project / Client

Pg 5/5



Location Whitefish / Helena Date 12/23/2016

Project / Client MDEQ Whitefish Solvent Site

Former Martins Cleaners

Pg 1/1

0740 Joel Riebli (JR) arrives @ the Former Martin's Cleaners. System is running

* Collect system data.

* Stopped by Verizon to see if they have a cell phone booster for the Uplink unit. The Uplink unit is not connecting to a cell phone tower (my cell phones get 1 bar inside the building).

0940 Found an air leak at the inline air filter (between the blower & knockout tank). after sealing up the air leak, seeing good vacuums at the wells and concentrations are increasing. Called Andrew to see if we should re sample the "MTR-PRE" and "MTR-POST" in January

1130 Depart Whitefish, system is still running.

1515 Arrive in Helena

1630 Drop the summer canister samples off at FedEx; will only have the lab run the "MTR-PRE-STARTUP" sample

~Joel Riebli

Location Helena / Whitefish Date 01/03/2017

Project / Client

Pg 1/1

0830 Joel Riebli (JR) departs Helena

1235 JR arrives at the Former Martin's Cleaners; System is running

1300 Collected system data.

* Prep for injection & well installation field activities.

1610 Collected system data.

~Joel Riebli

Location Whitefish Date 01/04/2017

Project / Client MDEQ Whitefish Solvent Site

Pg 1/3 Former Martins Cleaners

0725 Joel Riebli (JR) arrives at the former Martin's Cleaners. Air temp is -10 F

0750 Robby Orr, Jeff Carls, & Eric Coonrad from Remington Technologies arrives some of their equipment will not start with the subzero temps

0750 Jose Pereda with Ensburg-Miller Engineer arrives

* Tailgate Safety meeting discussing the subzero temps, snow/ice surface conditions, traffic, pedestrians, stop work authority, Hospital location, muster point, first aid/eye wash locations, trailer safety. Discuss working on well installation and working on metal blasting

* Geoprobe will not start, have it plugged in to heat up the motor.

* Asked Remington to request an expedited utility locate since all the utility marking are very faint with all the weather since last week

* City of Whitefish water department/sewer arrived on site. have questions if a water line is located in Third Street since the ice cream

Location Date 01/04/2017

Project / Client

Pg 2/3

store has a water valve in the sidewalk of Third Street, the City said only a service line is running under the sidewalk of Third Street. Went over work area's and get all clear on water & sewer. (Asked about the water line near the remedial system - he said its not from the city he doesn't know where it goes

* Remington is moving the Geoprobe back to the hotel to get it started - as the fuel line is froze.

1030 The gas / t.v. cable utility locator arrives on site. go over work area and the utilities are marked out.

1230 Ice melt added to parking lot to remove the ~4" thick ice

1330 Start working on the flashing of the building. The current built up flashing is tarred into the roof. So the flashing is placed over the damaged sections.

Location Whitefish Date 01/04/2017

Project / Client MDEQ Whitefish Solvent site

Pg 3/3 Former Martin Cleaners.

* Buried phone utility locator marks utilities in Third Street

1655 Collected system data

1710 Left depart the former Martin Cleaners

– Joel Riebli

Location Date 01/05/2017

Project / Client

Pg 1/5

0700 Tailgate safety mtg with Joel Riebli (Trihydro), Robby Orr (Remington), Jedd Carb (Remington), Eric Coonrod (Remington), and Jose Pereda (Integ-miller). Discuss subzero temps, warm up when need to, cold stress, stop work authority, hospital location, muster points, pinch points, work'g with water gear, trouble, pedestrians, PPE for drill'g, mixing, injecting, site existing cisterns, eye wash/first aid locations, surface conditions, take it slow, utility clearance. Reviewed JSA's

0830 City of Whitefish water department stop by and provided a map of the waterline in Third Street and it effects monitoring well "MTW-MW3". The well will need to be moved towards the street center to avoid the waterline

0855 City of Whitefish parks & rec stopped by regarding the irrigation line going to the trees on the north side of Third Street. A row of injection points are in a few feet so will move them north.

Location Whitefish Date 01/05/2017

Project / Client MDEQ Whitefish Solvent site

Pg 2/5 Former Martins Cleaners

0925 Start coring the asphalt at MTN-MW3

2.9ppm Using the Geoprobe ~~6715~~ 7822 DT.

Air temp has warmed up to -2 F

* silt layer is at ~ 5.5-6.5' bgs at MTN-MW3

1030 Photo 1: Looking west at the drilling at MTN-MW3 with the Geoprobe unit.

1122 Reached 18' bgs at MTN-MW3

1128 Photo 2: the 2" slotted well screen and the vapor mesh screens before being installed in MTN-MW3

1130 Photo 3: the vapor inlet screen and tube ready for install

* MTN-MW3 install as drawn on Pg 61.

1220 start coring the asphalt at MTN-MW1

* silt layer at MTN-MW1 found at 4' bgs.

50.4ppm was only about 4" thick

1315 shut down for lunch

1410 Resume drilling MTN-MW1

1450 Reached 18.5' bgs at MTN-MW1

1458 Photo 4: inserting the 10' of 0.010 slotted 2" PVC well screen and 2" schedule 40 pipe down the MTN-MW1 borehole.

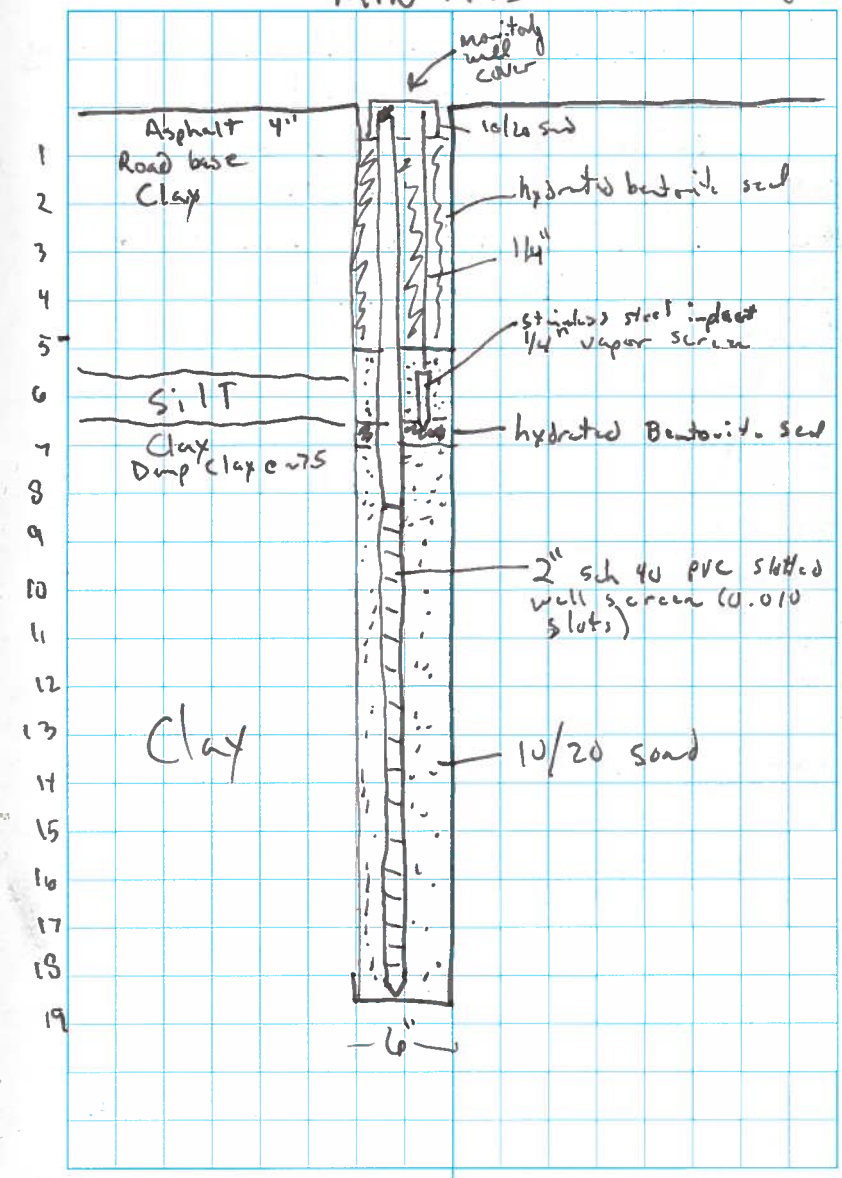
1523 Photo 5: inserting the vapor ~~probe~~ screen and tube into MTN-MW1

Location Date 01/05/2017

Project / Client

Pg 3/5

MTN-MW3



Location Whitefish Date 01/05/2017

Project / Client MDEQ Whitefish Subject site

Former Martin's Cleaners

Pg 4/5

1550 Wrap up well installation activities
- too late to start injection today - Remington & Inburg depart

1610 Collect system operations data.

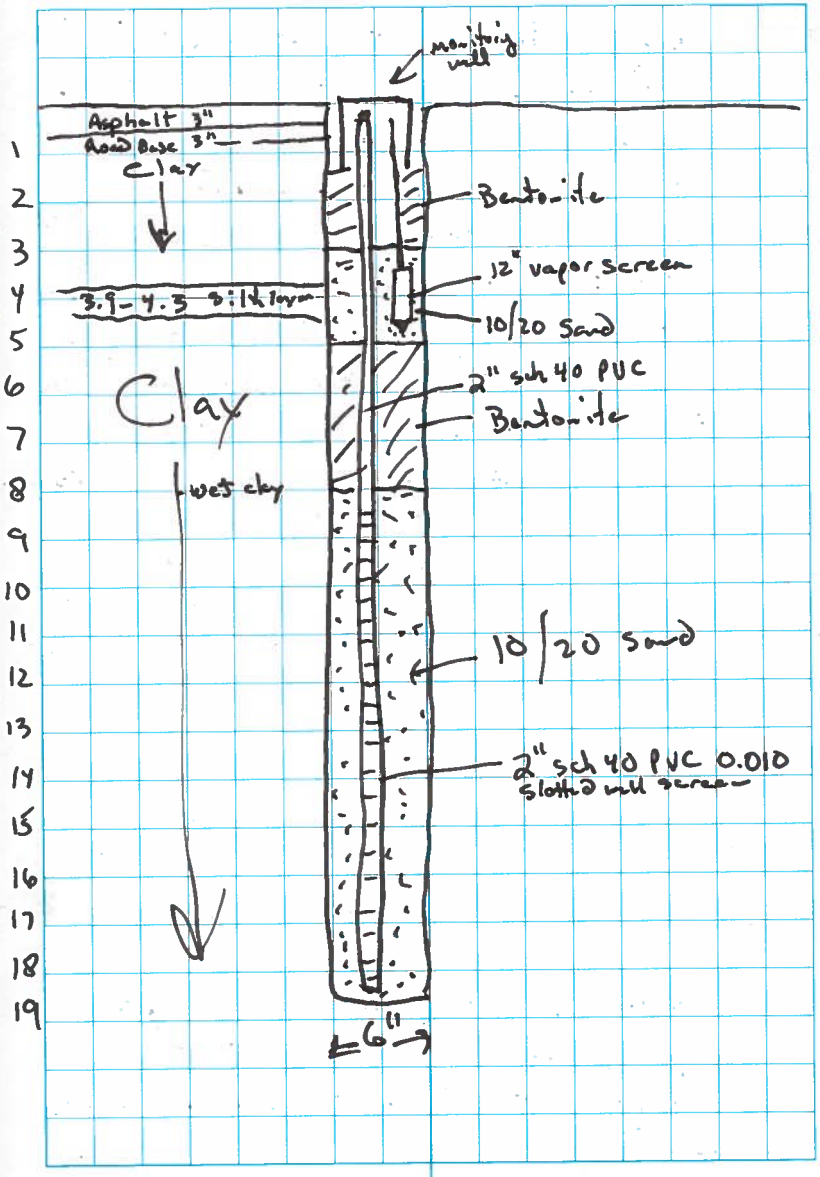
1620 check in with Lana Walker
- Joel Riebli

Location Date 01/05/2017

Project / Client

MTN-MW1

Pg 5/5



Location Whitefish Date 01/06/2017

Project / Client MDEQ Whitefish Solvent site

Former Martin's Cleaners

Pg 1/3

0700 Joel Riebli (Trihydro), Robby Orr (Remington) Jeff Carlo (Remington), Eric Coonrad (Remington) & Jose Pereda (Inberg-Miller) meet & have tailgate safety meeting. Temp is 6 °F. Forecast is call'g for snow snow and 16 °F as a high. Discuss stop work authority, Hospital location, First aid, eye wash, fire extinguisher, cold temps, slick surfaces, three points of contacts, exclusion area around the Geoprobe, Hose safety, chemical is EVO (food grade), snow possible, traffic, pedistrians, pinch points, Level D with hearing protection, confirm location is clear before drill'g

* issues starting compressor

0915 Reduced the SVE blower from 24.00 to 17.00 HZ. Closed the eastern well. This so if injection fluids flow into the trench it will not be sucked into the system

* Remington is having issues with injection equipment; delay in injecting EVO

1115 start pushing rod at injection location F1

1132-1212 Injection of EVO at 12' and 5.5' at location F1

Location Date 01/06/2017

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1222 Push geoprobe rod down to 12' at F2

1240-1310 Inject 3% EVO @ F2

1250 American Leak Detection (Private Utility locator) arrives to locate the water line and street drain

1325 Start Pushing rod at F3

1325 Photo 1: lable on 5 gallon pail of RNAS Nonpolar zone EVO

1336-1405 Inject at F3; some splashing of less than 1 gallon

1408 Increased the SVE blower from 17.00 to 19.00 HZ since we are injecting further away from the system

1422 start pushing geoprobe rod at F4

1423 Photo 2: Geoprobe pushing rod down at location F4

1436-1500 inject at F4 at 12' & 5.5'

1510 start pushing rod at injection location F5

1520 - Photo 3: Injecting EVO at 12' bgs at location F5

1520-1548 inject at F5 at 12' & 5.5'

1555 Start pushing rod at F6; down to 12'

1621-1650 inject at F6 at 12' & 5.5'

* Blows out injection equipment into F6 is easily about 5 gallon of mix

Location Whitefish Date 01/06/2017

Project / Client MDEQ Whitefish Solvent Site

Former Martins Cleaners

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to resurface at injection point F5. After it froze was shoveled up.

1720 Remington / Inberg-Miller off site.

1730 Joel & Lana go over what was injected today and what is planned for tomorrow

1740 Joel departs. -Joel Riebli

Location Date 01/07/2017

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0730 Joel Riebli (Trihydro) & Jose Pereda (Inberg-Miller) arrive at the former Martin's Cleaners. Temp -14 F

0800 Remington (Robby, Eric, & Jeff) arrive with the injection box truck.

* Tailgate safety meeting: Stop work authority, Ready & mentally ready to work, Hospital, muster, Safety first aid, eye wash, fire extinguishers, inspecting equipment, pinch points, three points of contact, spotter use, staying warm, drink water, Level D with heavy protection, emergency procedure to shut off Geoprobe and injection in box truck, pedestrians, Traffic

0850 Start using the Geoprobe 7822DT to push injection rod at location E1

* issues with frozen valves

0958 - 1038 inject EVO at point E1

1000 Photo 1: 100% oil & Injection fluids shown. Background injecting at E1

* About 1/2 gallon surfaced at E1 - Think it is due to a bad injection rod

1043 start pushing rod at location E2

1051 - 1132 inject EVO at location E2

1145 Pushing rod at location E3

Location Whitefish Date 01/07/2017

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1204-1237: inject EVO at location E3
1245 Pushing injection rod at E4
1246 Photo 2: Using the Geoprobe to push injection rod down to 12' bgs at location E4
1252-1334: inject EVO at location E4
1340 Pushing injection rod at E5
1350-1423 inject EVO at location E5
1427 Pushing injection rod at E6
1440-1507 inject EVO at location E6: this is the first location using EVO from the tote rather than the buckets
1514 Photo 3: Using the Geoprobe to push rod down 12' bgs at location C2.
1521 Start injecting EVO at location C2
1524 Photo 4: 21 psi reading for EVO slurry going in at 12' bgs at location C2
1553 End injecting at location C2; begin blowing out the injection lines.
1600 Collect system operation data (system blower has been reduced so not to suck up injection slurry)
1620 Remington shutting down
1620 Joel & Lance talk progress and work planned tomorrow. - Joel Riebli

Location Date 01/08/2017

Project / Client

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0700 Joel Riebli (Trihydro) arrives at the former Martin's cleaners. Temp ~ 8 °F with about 2" of new snow, begin snow removal.
0730 Remington (Robby, Eric, Jedd) & Inberg-Miller (Jose) arrive on site.
0735 Tailgate safety meeting
* Inspect equipment
0755 Start coring through the asphalt at monitoring well location MTN-MW2
0823 Photo 1: Pushing the soil sampler using the Geoprobe 7822DT unit at monitoring well location MTN-MW2
* MTN-MW2 silt layer found at 5.5-6.5 feet bgs. Is saturated with the previous two days of injections performed around the location.
0916 Photo 2: Drilling with 6" augers at MTN-MW2 at 18' bgs
0917 Reached 18.5' bgs at MTN-MW2
* Silt layer at MTN-MW2 = 26.4 ppm at the 5.5-6.5' bgs
* MTN-MW2 has 10' of 2" slotted well screen set at

Location Whitefish, MT Date 01/08/2017

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8-18' bgs and a vapor inlet screen set at the silt layer of 5.5-6.5' bgs

* Had a delay as the vapor well screen had to be fished out of the borehole - no damage to the vapor screen.

1233 start pushing injection rod with the Geoprobe at location C1

1255-1327 injected EVO (12.5 gallons EVO with 410 gallons city of Whitefish water) at location C1. Took 100 psi initial to start; about 1/2 gallon surfaced.

1337 Pushing injection rod at location D1

1346-1415 inject at D1

1354 Photo 3: Monitoring well (Water & Vapor) at MTN-MW2

1422 start pushing injection rod at location A1

1430-1458: injected EVO at location A1

1431 - Photo 4: injecting at location A1. The cone is monitoring well MTN-MW1. Box truck is mixing the EVO to inject at the Geoprobe.

Location

Date 01/08/2017

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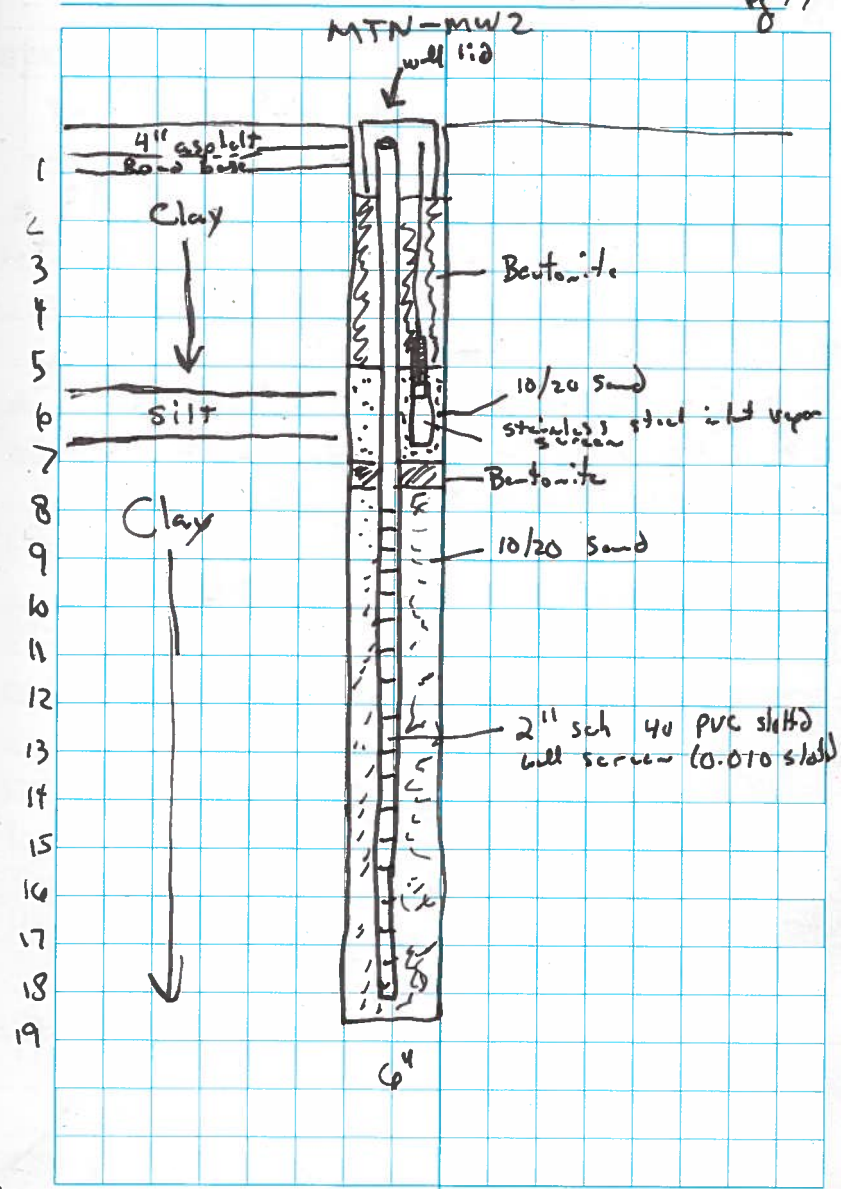

Location Whitefish Date 01/08/2017

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Pg 4/4 Former ~~Whitefish~~ Martin Cleaners

1502 Pushing injection rod at location A2

1508 - 1539: inject EVO mixed fluids at injection point location A2

1545 Pushing injection rod at location A3

1550 - 1621: inject EVO mix into location A3

1625 Photo 5: Adding bentonite chip to plug the injection borehole A3

1631 Pushing injection rod at location D2

1637 - 1716: Inject EVO mix into location D2

* Blow out injection lines down D2.

1730 Trihydro, Remington off site.

— Joel Riebli

Location Date 01/09/2017

Project / Client

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0700 Tailgate safety meeting with Joel Riebli (Trihydro), Robby (Remington), Jeff (Remington), & Eric (Remington)

* About 5 inches of snow fell over night and continues to fall - removing snow to find utility markings & injection point.

* Inspect the Geoprobe unit

0844 Using Geoprobe to push injection rod at location D3

0859 - 0919 inject EVO mix into location D3

0925 Push injection rod at location D4

0933 - 1000 inject EVO mix into location D4.

1012 Push injection rod at location C4

1018 - 1125 injected a double shot (twice the volume at injection point C4

1132 Push injection rod at location C3 down to 12'

1135 Photo 1: Remington adding a 5' rod extension to push injection rod down to 12' bgs at location C3

1138 - 1204 injected EVO mix into injection point C3 at 12 & 5.5' bgs

Location Whitefish Date 1/9/2016

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1209 Push injection rod down 12' bgs at injection point B1

1215-1241 injected EVO mix into injection point B1 at 12' & 5.5' bgs

1249 Push injection rod down 12' bgs at injection point B2

1251 Photo 2: Geoprobe pushing injection rod at injection point B2 (behind the snow pile and SVG Building)

1256-1327 inject EVO mix into injection point B2. about 2 gallons surface at the B1 point

1335 Push injection rod down 12' bgs at injection point B3

1341-1407 inject EVO mix into injection point B3.

1403 Photo 3: injecting in the shallow depth a location B3

1409 Begin blowing out the injection equipment. last point in the parking lot is completed.

1435 Start cleaning out the injection points and the surrounding asphalt to plug the surface with cold patch.

* Use heater to warm up the asphalt and plug the 26 borehole locations

Location Date 01/09/2017

Project / Client

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* Mix cold weather concrete mix and pour the surface completions at monitoring wells MTN-MW1 & MTN-MW2. Covering the concrete in the 30°F weather

* Multiple photo's of the patched parking lot.

1650 Remington departs the site.

1705 Trihydro departs the site.

Joel Riehl

Location: White Fish Date: 01/10/2017

Project / Client: MDEQ whitefish solvent site

Pg 1/4 Former Mattins Cleaners

0700 Joel Riebli (Trihydro), Robby/Eric/Justin (Remington Technologies) tail gate safety meeting. Working in the street hazards; Telephone, cable, street drain, irrigation utilities. caution of work area along street.

* About 1 inch of snow fell overnight.

* Moving the "G" & "H" injection point to the south. The "G" are over the irrigation and street drain. if we move them north we would be injecting next to the SVE well, The "H" location are on the Telephone and cable, so moving them to the south away from the utility

0834 Using the Geoprobe to push injection rod down 12' at injection location H1. This location will get a double amount of injection fluids since we are not drilling the two location further west ward

0836 Photo 1: Remington caution off work area and start using Geoprobe to push injection rod down 12' at location H1

Location: Date: 01/10/2017

Project / Client:

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0853-0949: injected a double amount of EVO mix fluids into point H1

0959 start pushing injection rod at injection point location G1. This location will also recieve a double amount of injection mix

1006-1118 inject a double amount of EVO mix fluids into point G1

1025 Push injection rod at injection point H2

1121-1204 inject normal EVO fluid solution into point H2

1234 Push injection rod at injection point G2

1207-1234 inject EVO mixed fluids into injection point G2

1214 Push injection rod at injection point location H3

1239-1312: inject EVO mixed fluids into injection point H3

1240 Photo 2: injecting EVO mix into injection point H3, while Remington removes the injection rod from point G2 in the background

Location whitefish Date 01/10/2017

Project / Client MDEQ Whitefish Solvent Site

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1250 Pushed injection rod down 12' bgs at injection point G3

1320 - 1356 inject EVO mix at injection point G3

1330 Push injection rod down 12' bgs at injection point H4

1402 - 1439 inject EVO mix at injection point H4;

1406 Push injection rod down 12' bgs at injection point G4

1443 - 1519 inject EVO mix at injection point G4

1457 Push injection rod down 12' bgs at injection point H5

1453 Photo 3: Geoprobe pushing injection rod at H5 while the ~~rig~~ rod hose is pumping EVO injection mixed fluids at G4

1523 - 1604 inject EVO mix at injection point H5; ~~surfaced about 3 gallons~~

1532 Push injection rod down 12' bgs at injection point G5

1608 - 1645 inject EVO mix fluids at injection point G5

1620 Push injection rod down 12' bgs at injection point H6

Location Date 01/10/2017

Project / Client

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1649 - 1723 inject EVO mixed fluids at injection point H6. About 5 gallons surfaced

1725 Blew injection equipment with air line down point H6 -

* Asphalt patches with cold patch

1730 Joel spoke with Whitefish liquor store manager Lara Walker. Gave update on progress and best place to position trucks on the last few injection point.

1740 Remington off site

1745 Trihydro off site. - Joel Riebli

Location White Fish Date 01/11/2017

Project / Client MDEQ Whitefish Solvent Site

Pg 1/4 Former Martin's Cleaners

0700 Tailgate safety meeting with Joel (Tihydro), Robby/Eric/Jeff (Remington). Subzero windchills this morning with a high of only 10°F. Near miss on a drunk driver, watch for all vehicles assume they are impaired and have an out. Traffic again in Second street. Cold stress, drink water and seek warmth. Pressure hoses, ice surfaces, line of fire, Utilities (irrigation & street drain to the north and telephone & cable to the south). Pedestrians

* Site temp -7°F

* inspect Geoprobe and injection hoses

0833 Using Geoprobe to push injection rod down 12' bgs at injection point G6

0845 Attempted to inject at point G6 - would not break through the injection rod tip. plug borehole.

0907 move point G6 to the south and push rod down 12' bgs

0918 - 0954 inject EVO mix into injection point G6; About 5 gallons surrounded

Location Date 01/11/2017

Project / Client

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	DTW TOC (BGS)	TWD TOC (BGS)
MTN-MW1 @0920	9.25 (9.81)	18.29 (18.85)
MTN-MW2 @1000	8.38 (8.84)	17.18
MTN-MW3 @0900	8.15 (8.58)	18.41 (18.84)

0937 Push injection rod down 12' bgs at injection point H7

1002 - 1036 injected EVO mixed fluids into injection point H7

1019 Push injection rod down 12' bgs at injection point G7

1039 - 1104 inject EVO mixed fluids into injection point G7 - all fluids injected at 12' bgs.

1047 Push injection rod down 12' bgs at injection point H8

1105 - 1139 inject EVO mixed fluids into injection point H8 (12' & 5.5' bgs)

1120 Pushed injection rod down 12' bgs at injection point G8

1124 Photo 1: injecting EVO into H8 (Red hose) and ~~drilling~~ pushing injection rod at G8

Location Whitefish, Date 01/11/2017

Project / Client MDEQ Whitefish Solvent Site

Former Martin's Cleaners

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1143 – 1222 injection EVO mix into injection point G8; All injection into 12' bgs

1151 Pushing injection rods down to 12' bgs at injection point H9

1225 – 1255 inject EVO mix into injection point H9 (12' & 5.5' bgs)

1235 pushing injection rod down to 12' bgs at injection point G9

1258 – 1327 inject EVO mix into injection point G9; All injected into 12' bgs

1307 pushing injection rod down to 12' bgs at injection point H10

1324 – 1406 inject EVO mix into injection point H10 (12' & 5.5' bgs)

1345 – push injection rod down to 12' bgs at injection point G10

1418 – 1504 injected EVO mix into injection point G10; all injected into 12' bgs

1515 push injection rod down to 12' bgs at injection point G11

1523 – 1550 injected EVO mix into injection point G11; All injection ~~solution~~ at 12' bgs

1552 blew out injection hose, rod down point G11

Location Date 01/11/2017

Project / Client

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* Patched the two boreholes with cold patch.

* Load up equipment and supplies. The three drums of soil cuttings loaded up by remington.

1750 Remington off site.

1755 Joel & Whitefish liquor store's Lance walker go over project status: injection have been completed.

1815 Joel Riddle off site.

Location Whitefish Date 01/12/17

Project / Client MDEQ Whitefish Solvent Site

Pg 1/1 Former Martin's Cleaners

0715 Joel Riebli arrives at the former Martins cleaners. Increased the blower from 18.00 HZ to 24.00 HZ shut down and set up for summa canister sampling. One of the canister has no vacuum.

0800 Call with Andrew, Use the good canister on the outlet of the filter units.

0810 Start up the SUE system and start collecting summa canister post GAC & Zeolite filtration drum "MTN-POST"

* Collect system data

0840 End "MTN-POST" 6L summa canister sampling (Methane, BTEX, MTBE, Naphth, MA APH HC's Sim-PCE, TCE, cis, trans, 1,2DCE & VC)

0850 ~~increase~~ decrease blower HZ from 24.00 HZ to 20.00 HC.

0935 Depart Whitefish

1340 Arrive at the Helena office.

—Joel Riebli

Location Date 01/24/2017

Project / Client

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1455 Joel Riebli departs Missoula

1730 Joel arrives in Whitefish at the former Martin's Cleaners. System is running. — Joel Riebli

Location Whitefish Date 01/25/2017

Project / Client MDEQ Whitefish Solvent Site

Former Martin's Cleaners

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1110 Joel Riebli (Trihydro) departs Whitefish

1135 Purchase well development items from Home Depot in Kalispell. Purchased PVC pipe, fittings, glue, & rope.

1230 Joel arrives at the former Martin's Cleaners. Sunny. System is running.

* Start putting well development surge tool & piping together.

1410 : Well measurements:

well ID	Depth to GW (TOC)	Depth to GW (BGS)	Total well Depth (TOC)
MTN-MW1	11.36'	11.92'	18.29'
MTN-MW2	11.73'	12.19'	17.04'
MTN-MW3	12.29'	12.72'	18.14'
WSMW-7	11.79'	NM	12.35'

1420 Start developing MTN-MW3 using a new 2" surge well development. Surging the well casing. Using a Horiba U-52 water quality meter & disposable bailer to purge and collect water quality parameters.

1500 MTN-MW3 nearly dry

1530 Set up at MTN-MW1. Decon interface meter & water quality meter. Use new surge tool & bailer for MW1. Start surging the well case volume followed by bailing the well

Location Date 01/25/2017

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1606 MTN-MW1 nearly dry

1615 Set up at MTN-MW2. Decon interface meter & water quality meter. Use new surge tool, piping, & bailer at MTN-MW2. Surge well case slowly followed by bailing slowly out of the well.

1656 MTN-MW2 nearly dry

1710 Resume at MTN-MW3; well reaches 10 well case volumes removed

1730 Resume at MTN-MW1

* Purge placed in 55-gallon drum stored in the system shed

1805 Joel departs site.

—Joel Riebli

Location Whitefish Date 01/26/2017

Project / Client MDEQ Whitefish Solvent site

Pg 1/1 Former Martin's Cleaners.

0820 Joel Riebli (Trihydro) arrives at Former Martin's Cleaners; system is running

0845 Resume well development field activities. Start at WSMW-7. Since the well is 0.75" diameter, can only use a bailer to remove solids & silt from the well. Can't surge it. Use decon's interface meter, new bailer, and decon'd water quality meter.

1032 WSMW-7 nearly dry

* Work on MTN-MW2 & MTN-MW1 wells; surging and bailing. Taking readings and data every from well casings.

1525 Wrap up well development activities.

Well ID	Final Total Well depth (TOC)	~~Starting well casing~~ purged
MTN-MW1	18.32	12.25
MTN-MW2	18.21	11.75
MTN-MW3	18.49	11
WSMW-7	21.47	1.3

1545 Collect 3 VOA's from the 55-gallon purge drum. "MTN-Purge"

1555 Depart site. -Joel Riebli

Location Date 01/27/2017

Project / Client

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0740 Joel Riebli departs Whitefish

1630 Joel arrives at Energy labs in Helena. Drop off the MTN-Purge water sample.

* Return PID & Horiba U-52 water quality meter back to Farwest Environmental.

-Joel Riebli

Location _____ Date 02/21/2017

Project / Client MDEQ Whitefish Solvent site

Pg 1/4 Former Martin's Cleaners

0630 Joel Riebli (JR) arrives at Helena office. Start loading fleet truck. Sarah Seitz (SS) arrives

0730 JR & SS depart Helena

1140 Arrive at the former Martin's Cleaners. SVE System is running

* Wet Snow / rain weather at site.

Well ID	Vapor Reading (V)	Vapor Reading (W)	Depth to Groundwater
MTN-MW1	202ppb	0ppb	7.23 'btoc
MTN-MW2	549.5ppm	167ppb	6.85
MTN-MW3	8ppb	202ppb	8.95
WSMW-7	—	NM	6.69

* Purchased 21 lbs of ice, 3.5 gallons of distilled water, trash bags, & ziplocks from Safeway. T.H = 16.70

1440 Set up at MTN-MW3. Depth to groundwater = 8.95. Set peristaltic pump inlet tubing at 13.7' btoc. Using new teflon tubing and peristaltic pump slow tubing. Horiba U-52 flow through cell.

1449 Begin purging MTN-MW3. Purge rate 0.1 lpm. Groundwater still dropping below 0.3' in well.

1520 MTN-MW3 well stabilizes.

Location _____ Date 02/21/2017

Project / Client _____

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1525 Sample MTN-MW3

1550 Set up at MTN-MW1. Use decon'ed Interface meter & flow through cell. Depth to GW = 7.23. Set new teflon tubing at 11.1' btoc.

1559 Begin purging MTN-MW1. Purge rate 0.14 lpm. Groundwater stabilized at 8.2' btoc.

1611 MTN-MW1 purge water stabilized

1615 Sample MTN-MW1 & BD-1

1700 Set up at MTN-MW2. Use decon'ed Interface meter & flow through cell. Depth to GW = 6.85' btoc. Set the new teflon tubing inlet at 11.4' btoc.

1710 Begin purging MTN-MW2. Purge rate of 0.15 lpm

1730 Collect FB-1 using new distilled water. Some odor is in the air. Smells like burning plastic

1731 MTN-MW2 stabilized

1735 Sample MTN-MW2

1830 Meet with Lana Walker (Whitefish liquor store manager).

* Use 1" drill bit and drill through the concrete in the closet (water heater

Location Whitefish Date 02/21/2017

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and water meter room). Concrete is ~9" thick. Pushed the 1" drill bit down to 15" below top of floor, inserted teflon tubing and clean 10/40 silica sand into the opening. Added bentonit at the surface to temporarily seal up the vapor ~~well~~ sub slab vapor well.

1950 JR/SS depart the former Martins Cleaners. — Jul Riebli

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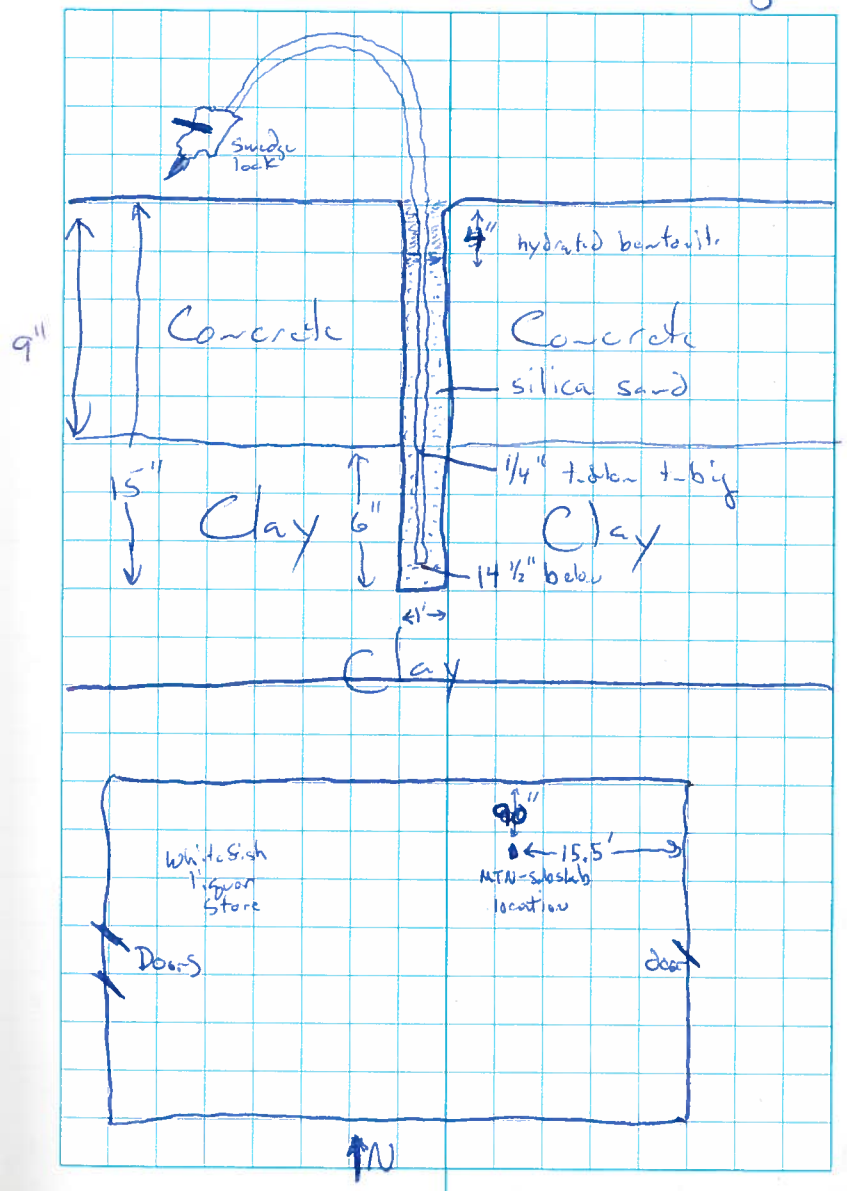

Location Whitefish Date 02/22/2017

Project / Client MDEQ Whitefish Solvent Site

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0940 Joel Riebli (JR) & Sarah Seitz (SS) arrive at the former Martin's Cleaners.

1000 start the 8-hr indoor air & ambient air testing inside and outside of the Whitefish liquor store with 6L summa canisters. The ambient air wind direction is 1mph out of the north. The ambient air sample being collected on the power pole located north of the SVE remediation system. The indoor air samples collected south of the Whitefish liquor store bathroom/utility closet. A duplicate ambient air sample also being collected

* The subslab vapor well was purged and helium tested by Sarah. The subslab port sampled for 30 minutes into a 6L summa canister.

1130 Calibrated the Horiba U-52 water quality meter.

1135 Set up at monitoring well WSMW-7. Depth to GW = 6.69' bmp. Set new teflon tubing inlet at 14.1' bgs.

1144 Begin purging WSMW-7 with the peristaltic pump; purge rate 0.1 lpm.

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Project / Client

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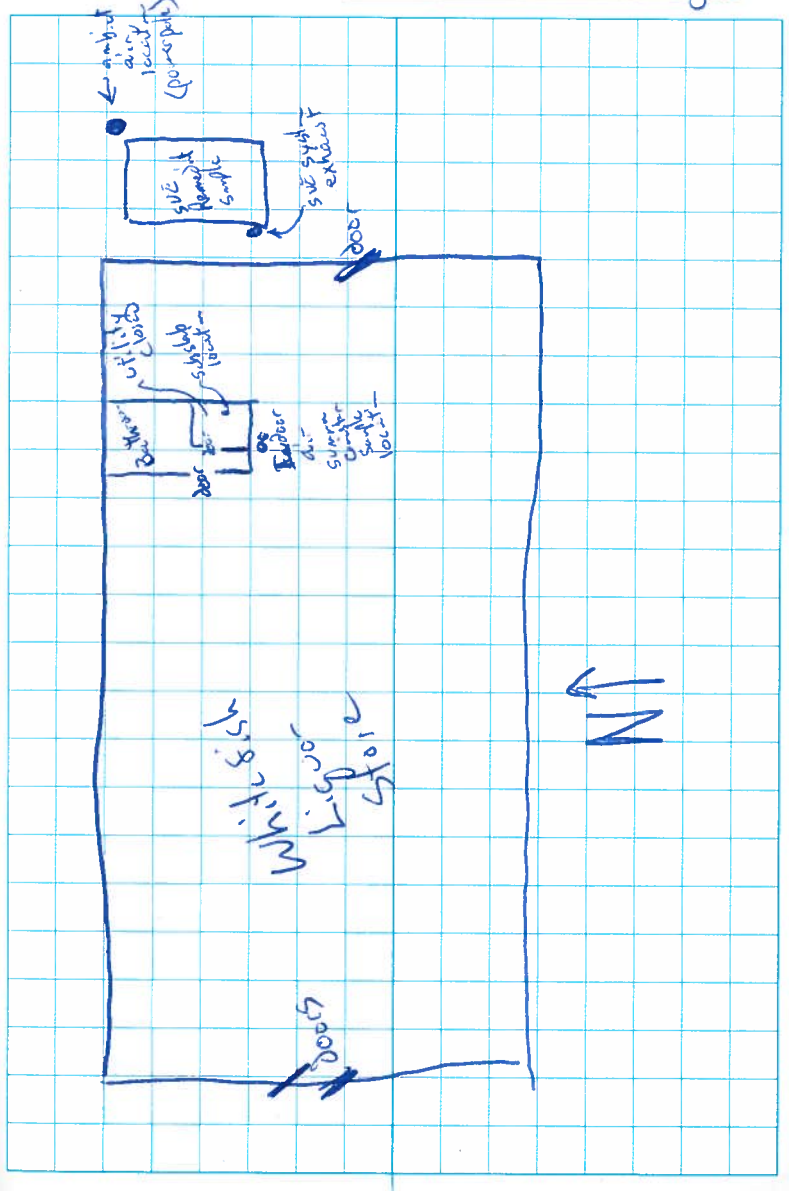

Location Whitefish Date 02/22/2017

Project / Client MDEQ Whitefish Solvent Site

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* Purge in WSMW-7 not stabilizing and the water elevation dropping with in the 0.75" diameter well with the 0.1 lpm purge rate, lowering inlet tubing.

1215 Purged WSMW-7 dry with the peristaltic pump and the 0.1 lpm purge rate. If you include the flow through cell volume, a total of 2.5 liters was purged from the well. Let'g the well recharge.

1240 Returned the rotary hammer drill and 1" drill bit to Midway Rentals.

1255-1310 lunch

1345-1415 Collected 30 minuted 6L Summa canister lab samples on the vapor flow into the GAC drum (MTN-PRE) & after the zeolite drum (MTN-POST). Collected system operat'g data.

1315 End the ambient air Summa canister sample after 5 hrs 15 minutes - the canister filled faster than the planned 8-hrs.

1715 Monitoring well WSMW-7 has recharged

Location Date 02/22/2017

Project / Client

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over 13.5 feet of groundwater over the past five hours.

1725 Collected a grab sample from monitoring well WSMW-7 using the peristaltic pump. The inlet tubing was set at 19.5' (2' off the well bottom).

1806 End indoor air 8-hr long Summa canister sampling.

1840 JR & SS depart the former Martin Cleaners. — Joel Riehl

Location

Date 02/23/2017

Project / Client MDEQ Whitefish solvent Site

Pg 1/1 Former Martin's Cleaners.

0700 Joel Riebli (JR) & Sarah Seitz (SS) depart hotel.

* Stop by the former Martins Cleaners Whitefish liquor Store and load up rental equipment.

0715 Depart Whitefish

1110 JR & SS arrive in Helena

1335 Ship the 6 summa canister to ALS labs and the rented groundwater, pid, helium rental equipment.

1340 Dropped off the groundwater samples to Energy labs.

—Joel Riebli

Location

Date 03/13/2015

Project / Client

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0625 Joel Riebli (JR) departs Helena

1005 JR purged marking paint, tape, & scoop from Columbia Falls, Murdocks. Total $16.47

1020 JR arrives at the former Martin's Cleaners. SVE System is running

1030 Collected system operating data. I do not have a PID for this quick site visit.

*

Well ID	Depth to water (TOC)
MTN-MW1	ICE over
MTN-MW2	6.18
MTN-MW3	6.23
WSMW-7	6.46

* The WSMW-7 well lid is missing. looked in the near by snow piles but could not locate it. Called two near by supply companies but neither have replacement lids. Made a temp lid so no one steps into the well.

* Painted yellow made where trip hazard is present where the sidewalk has dropped below the SVE piping trench

1245 Collected a sample from the drum containing well development & purge water. Need to run for RCRA 8 metals

Location

Date 03/13/2017

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Former Martin's Cleaners

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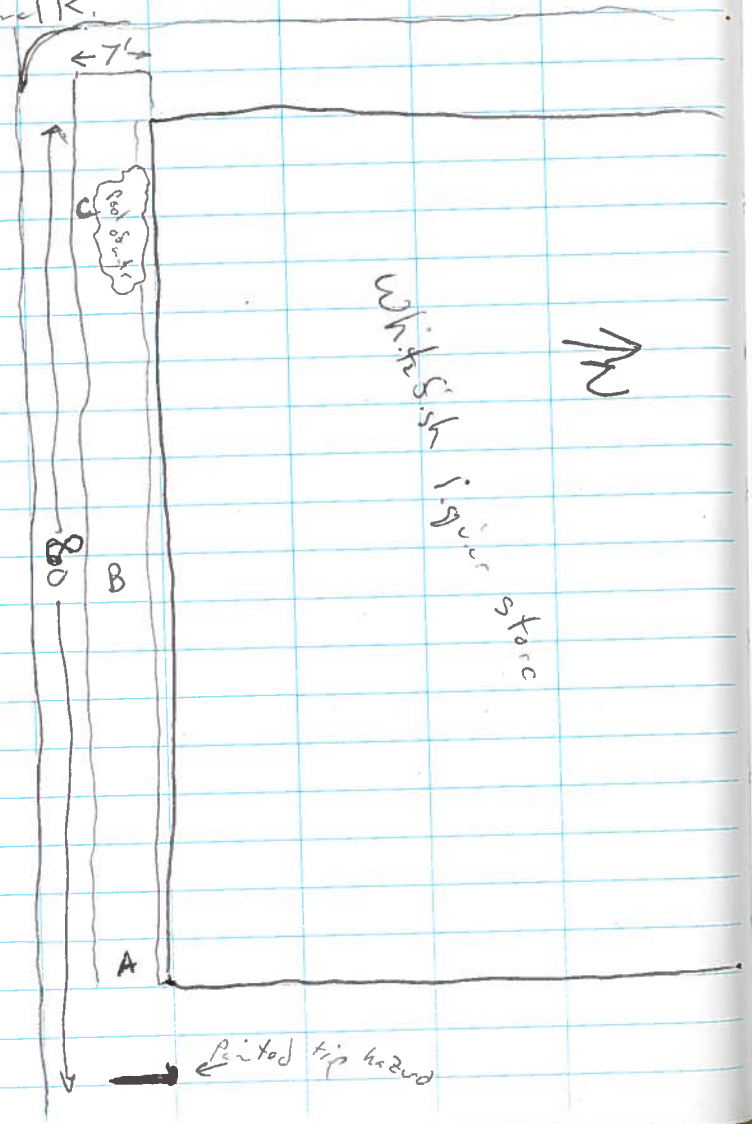
Collected reading of the South side sidewalk.



Location

Date 03/13/2017

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A: sidewalk is 1 1/2" lower next to building than the center of the sidewalk

B. sidewalk is 1 1/4" lower next to building than the center of the sidewalk

C: sidewalk is 2" lower at the lowest spot in the standing water.

1255 JR departs the former Martins Cleaners

1300 Purchased 7 lbs of ice from gas station total $1.69

1305 JR talks with Andrew

1650 JR arrives at Energy Labs, drops off RCRA 8 sample.

1725 JR arrives back at Helena office.

— Joel Riebli

Location _____ Date 04/10/2017

Project / Client MDEQ Whitefish Solvent Site

Pg 1/1 Former Martins Cleaners

0800 Joel Riebli called YRC Trucking – filtration drums will be delivered on 4/11/17 by YRC. We will need a forklift to offload the pallet

* Load field truck

1110 JR departs Helena

1500 JR purchases bucket lids at Murdochs in Columbia Falls. Total $14.95

* Stopped by Mid-Way Rentals in Whitefish – rent forklift. Will drive to the site this afternoon

1525 JR arrives at the former Martins Cleaners. The SVE System is running

1530 Collect SVE operations data (using PgbRAE 3000 1'594-905182 meter)

* Some of the sidewalk where the southern trench is located as come back to approx the height of the original pour. No more trip hazard.

1655 JR departs site. – Joel Riebli

Location _____ Date 04/11/2017

Project / Client _____

Pg 1/1

0740 Joel Riebli (JR) arrives at the former Martins Cleaners site, the SVE System is running

* Transfered the used zeolite filtrate from zeolite drum #1 from the 55-gallon drum to 8 5-gallon buckets – place the buckets in the rear of the shed.

* Purchased additional buckets & lids from the near by hardware store.

* Transfered the used GAC into 9 5-gallon buckets (all with lids), placed in the back of the remediation shed.

1030 Called YRC trucking – they transfered the drum shipment to North Park transportation in Missoula. They are scheduled to delivery before 5 PM tomorrow.

1150 Called North Park transportation – they will have lift gate so no fork lift required. Should expect the truck between 1-5 PM tomorrow

1155 Called midwest rentals, called off the fork lift rental

1245 Midwest rentals picked up the rented fork lift

Location

Date 04/11/2017

Project / Client MDEQ Whitefish Solvent Site

Former Martin's Cleaners

Pg 2/2

* Call with Andrew Vann with update on the filtration drums & meeting with Cutting Edge Excavation on site. About half of the sidewalk has resettled back in place where half still has a slight drop.
* Correspondence with River Design Group will met at 0930 tomorrow

—Joel Riehl

Location

Date 04/12/2017

Project / Client

Pg 1/2

0800-0905 tried getting uplink to send email SVE system status

0910 JR arrived at former Martin's Cleaners SVE System is running

0930 River Design Groups Andrew Belski & Nate Wyatt arrive on site. Have tailgate Safety meeting and review hazards. They survey the measuring point on all four monitoring wells.

0950 River Design Group wraps up surveying for today, They will be back on Friday morning to collect additional data.

0955 North Peak transport & Lana Walker arrive on site. Give Lana an update on Friday morning surveying and receiving shipment.

1005 The two GAC drums dropped off in front of SVE System

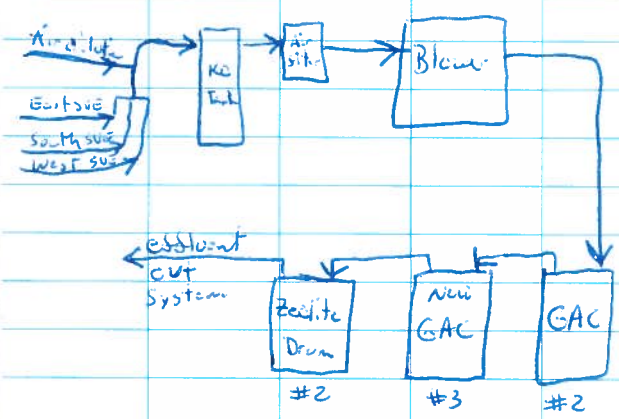
Well ID	Depth to GW
MTN-MW1	7.74
MTN-MW2	7.31
MTN-MW3	6.45
WSMW-7	7.01

Location _____ Date 04/12/2017

Project / Client MDEQ Whitefish Solvent Site

Pg 2/2

* ~~Re~~ Connected ~~the~~ one of the new GAC drums to the two existing drums. Now set as:



1145 JR departs the Whitefish Solvent site

* Stopped by hotel emailed River Design Group information previously collected at monitoring well WSMW-7

1215 Stop by Cutting Edge Excavating who are excavating on Baker Ave (about 1 mile south of our site). excavated down 7' - no frost.

1225 JR departs Whitefish

1645 JR arrives in Helena.

1720 shipped PID Back to FedEx

Location _____ Date 04/24/2017

Project / Client _____

Pg 1/1

1450 Joel Riebli (JR) departs missoula.

1550 Phone call with Marc with Cutting Edge Excavation - will meet tomorrow morning to remove portion of liquor store side walk

1735 Arrive at the former Martin's Cleaners site. SVE system is running. Inspect side walk. One panel next to the ADA plate has recieved some more movement and has some damage on the northeastern corner of the panel.

1750 Depart Martin's Cleaners.

—Joel Riebli

Location _____ Date 04/25/2017

Project / Client MDEQ Whitefish Solvent Site

Pg 1/5 Former Martin's Cleaners

0635 Joel Riebli (JR) arrives on site, The SVE system is running. Overcast ~40°F, Calm

0720 Cutting Edge Excavating (Marc Blanden, Dustin Gatch, Chris Waldusky, Bryan Stephen, & Valere Edwards) arrive.

1727 Take photo's of the sidewalk, liquor store wall condition before work begins. Cutting Edge puts of traffic cones. Has a skid steer, jack hammer air compressor, two dump trucks.

* Tailgate safety meeting & WSSA. Identified that we need to protect the windows when we are jack hammering. Also working around the awning posts and the ADA plate.

0755 JR departs the site and purchases two sheets of OSB board from WBS. Total $26.98

* JR arrives back on site. Whitefish liquor store operator Lana Walker is on site.

* Meet with Lana and go over the sidewalk panel touching the ADA

Location _____ Date 04/25/2017

Project / Client _____

Pg 2/5

plate. She showed where she had concerns with the western sidewalk.

* The southern most awning post surface is ~1/4 inch higher than the sidewalk
* 4 other awning post are lower than the sidewalk – Trihydro will make those to grade
* two small sections of a few inches in length next to the curb are showing degregation. Minor crackly around some of the awning posts.

* Cutting Edge using a jack hammer to break up the southern sidewalk. Use a saw cutter to score the edges of the panel with the ADA plate. Apply water when operating the saw

0924 Photo: Jack hammer and concrete removal activities in the western end of the southern sidewalk. Placing the concrete into the skid steer

1130 heavy rain; stop field activities

1216 Photo: Jack hammering the sidewalk, protecting the windows with OSB boards, loading the skid steer.

Location

Date 04/25/2017

Project / Client MDEQ Whitefish Solvent Site

Pg 3/5

Former Martin's Cleaners

1220 Andrew Belski with River Design Group arrives. Collecting GPS positions from the four monitoring wells

1243 Photo Jack hanging on the eastern end of the sidewalk covering the trench. Monitoring well MTN-MW2 GPS by Surveyor

1255 Photo. Last bobcat skid steer bucket of sidewalk being loaded into the Dump truck.

* Dump truck departs with second load of concrete taking it to Kalispell River (near the airport)

1330 Call with Andrew Vann, Update the current status. Andrew does want the wire mesh added to the concrete pour. Price is $0.80 sq ft.

* Cutting Edge Excavating locating the position of the new sidewalk along the building figuring a 1.95% slope. The slope would fall on the building footer with just <1" of sidewalk. Lots of cracking would take place if sidewalk is run over to the building.

Location

Date 04/25/2017

Project / Client

Pg 4/5

1430 Call with Andrew Vann about the building footer & foundation excavating out. That if sidewalk is poured up to the building a very thin layer of sidewalk would be all we could do. Or we could pour a small section of sidewalk (1' wide) next to the building where the thickness would be greater than 1'. Andrew said we will need to pour the 6' at 2% and the 1' at greater than 2%.

1500 Randy Reynolds (City of Whitefish) stopped by at Cutting Edge has question as to what the city of Whitefish reqs are for the 1' concrete pour next to the building. Randy will pull ~~that~~ the paperwork for a pour that was recently performed in down town a few months ago

* Load of 7/8" course washed rock brought to the site.

* Round tips used to find the bottom of the concrete pad with 1.95% slope

* The ~~bott~~ top of the old bottom of sidewalk leveled and compacted without walkers

Location

Date 04/25/2017

Project / Client MDEQ Whitefish Valley Site.

Pg 5/5 Martin's Cleaners

1551 Photo: Adding 7/8 crushed rock so concrete slab will be 4" (Top of the round tips - red painted wood next to building)

1650 Wrap up site activities

1715 Collect SVE system operating data using a ppb RAE3000 PID.

1730 Joel Riebli off site

Location

Date 04/26/2017

Project / Client

Pg 1/6

1200 Arrive at the former Martin's Cleaners - light rain falling.

1205 Reduce the blower from 30 Hz to 23 Hz to lower the blower temp (150 F)

* Sander Construction Company concrete crew arrives on site (Frank, Brad, Josh) Marc Blauer (Cutting Edge) look at the area to be poured. Go over the city spec's for the strip of side walk against the building (posts connecting the building and the new pour, & zip strip) Go over the 2% grade for the 6' section of sidewalk. Look at the western sidewalk (front of the liquor store) inspect the posts with the dips and the small cracking. Sander has applied an epox compound in similar areas.

* I asked Mark to add the epox applicant by Sander on the four western posts to the 1' zip strip concrete work.

* Code w/ Sander Construction stops by.

* Install the rods and prep for the pour.

1536 Photo of prepped area.

1545 off site

Location

Date 04/28/2017

Project / Client Whitefish Solvent Site
Former Martin's Cleaners

Pg 1/2

0830 Joel Riebli (JR) arrives on site, plan to pour the 6' wide concrete around 9 AM. Sandor Construct Co trucks are on site but crew is pouring sidewalk 2 blocks away. The wire mesh is not in the area to be poured

0835 Called Marc with cutting edge regarding the wire mesh - he is going to call Cory with Sandor Construction

0840 talk with Ligurio-Stone operator Lana Walker - give her the update about pouring most of the sidewalk today and possible pouring the 10" section up against the building tomorrow. talked about the posts in the front of the store, that the four post will be filled in with a special bonding adesive - date for the post work is unknown

0900 Wire mesh arrives. pour scheduled for 1030

1100 Photo of the wire mesh installed along with the Zip Strip.

Location

Date 04/28/2017

Project / Client

Pg 2/2

1100 Concrete truck (Schellinger Construction) arrives on site.

1105 Sandor Construction crew arrives on site (Josh Clark, Frank Simon, Chris Fraleigh, James McHenry, Rodney Dyer) * Tailgate Safety meeting.

1122 Photo: pouring concrete over the southern SVE trench

1304 Photo: Brooming the wet concrete, light rain falling.

1408 Photo: concrete covered up as rain is in the forecast 3 PM through midnight

1410 Sandor's offsite, could pour zip strip mid-day tomorrow

- Joel Riebli

Location

Date 04/29/2017

Project / Client Whitefish Solvent Site

Former Martin's Cleaners

Pg 1/2

0820 Joel Riebli (JR) arrives at former Martin's Cleaners.

0825 Concrete truck and Sander Construction Crew arrives on site. ~~Start~~

(Josh Clark, Chris Fraleigh, James McHenry, Rodney Dyer, & Brad Clark & Cody Sander)

* Tailgate

* Strip off framing board to show the Zip strip; Install fiber board next to the building.

0850 Photo: Zip strip exposed from yesterday's pour

0900 Photo: Pouring concrete in the space between the building, expansion fibre board and the Zip Trip

1016 Photo: Wrapping up and covering the concrete next to the building

1020 Sander Construction off site

1025 Spoke with liquor store operator Lana Walker; Plastic covering the new sidewalk will be removed on Monday. Looking at maybe the front sidewalk work sometime next week

1030 Collect sample "zeolite" from one

Location

Date 04/29/17

Project / Client

Pg 2/2

of the buckets containing material from the original zeolite drum.

1035 JR off site

1050 Purchased bag of ice for the zeolite sample.

* Depart Whitefish

1520 JR arrives at Helena office

-Joel Riebli

Location

Date 5/1/2017

Project / Client

Pg 1/1

0820 Joel Riebli (JR) drops off zeolite used media sample collected on 4/29/17 at Energy Labs in Helena. Running the sample for 8260 VOC's

— Joel Riebli

Location

Date 5/3/2017

Project / Client

Pg 1/1

1330 Joel Riebli (JR) departs Helena.

1705 Arrive in Kalispell, purchase concrete mix

1750 JR arrives in Whitefish

— Joel Riebli

Location

Date 05/04/2017

Project / Client Whitefish Solvent site

Former Martin's Cleaners

Pg 1/2

0635 Joel Riebli (JR) ~~arrives~~ departs Whitefish

0655 JR purchases concrete mix

0710 JR arrives at the whitefish solvent site. Sandon Construction Company (Rodney Dyer & Ty Weber) are on site.

* Tailgate Safety meeting

0817 ~~Photo~~ Photo: Concrete patch materials arrive: Cement All (Rapid Set), MaCon Ma-Ca-Bond, and Eucopatch

* Applying a mix of Cement All & Ma-Ca-Bond to the four western sidewalk posts and small areas were its needed.

0900 Whitefish Liquor store operator Lana Walker arrives on site. Walk the area's were the concrete patch was installed

0927 Photo 2: The Cement All /Ma-Ca-Bd drying in the western posts

0945 Sandon Construction Co off site

* Replace the concrete that was around monitoring wells ~~MTN-~~ MTN-MW1, MTN-MW2, MTN-MW3

Location

Date 05/04/2017

Project / Client

Pg 2/2

as when they were poured back in January the water froze and the cement didn't bond to the sand and gravel.

—Joel Riebli

Location

Date 05/05/2017

Project / Client MDEQ Solvent Site

Pg 1/2 Former Martin's Cleaners

0710 Joel Riebli (JR) arrives at the former Martin's Cleaners. The SVE system is running but the motor is running at 150°F. Reduced the motor from 28.0 HZ down to 26.0 HZ to lower the temperature the temp is likely due to the system pushing the vapor through the three filtrate drums.

* Added SVE vapor monitor point on the outlet of the second GAC drum.

0800 JR off site.

1255 MDEQ Mike Bipson on site - Walk parking lot, sidewalks, and SVE system

1400 Mike, JR, & Whitefish Liquor Store operator Lana Walker meet. Look at the two panel that Lana would like replaced. Discuss the parking lot being replaced in a few weeks and a fence being installed on the north side of the parking lot.

Location

Date 05/05/2017

Project / Client

Pg 2/2

1420 Mike & JR depart site

1430 JR departs Whitefish

1835 JR arrives in Helena; 451 miles on personal vehicle for Whitefish project. - Joel Riebli

Location _____ Date 05/15/2017

Project / Client MDEQ Solvent Site

Former Mort's Cleaners

Pg 1/3

1155 Joel Riebli (JR) departs Helena

1345 JR arrives in Whitefish, SVE system is running

* Using the site magnehelic gauges, rented PID (ppb RAE3000 S/N 594-905182) and Trihydro owned interface meter (Solinst model 122 SN 287940) collect field data from the site monitoring wells

Well ID	Depth to water ft (ft bgs)	VOC's ~~PPB~~ (PPB)	Vac ~~(in H_2O)~~ (in H_2O)
MTN-MW1	8.15	108	-0.03
MTN-MW2	7.85	66,370	-3.5
MTN-MW3	7.58	14,420	-0.03
WS-MW7	7.74	—	—
MTN-SS	—	808	Ø

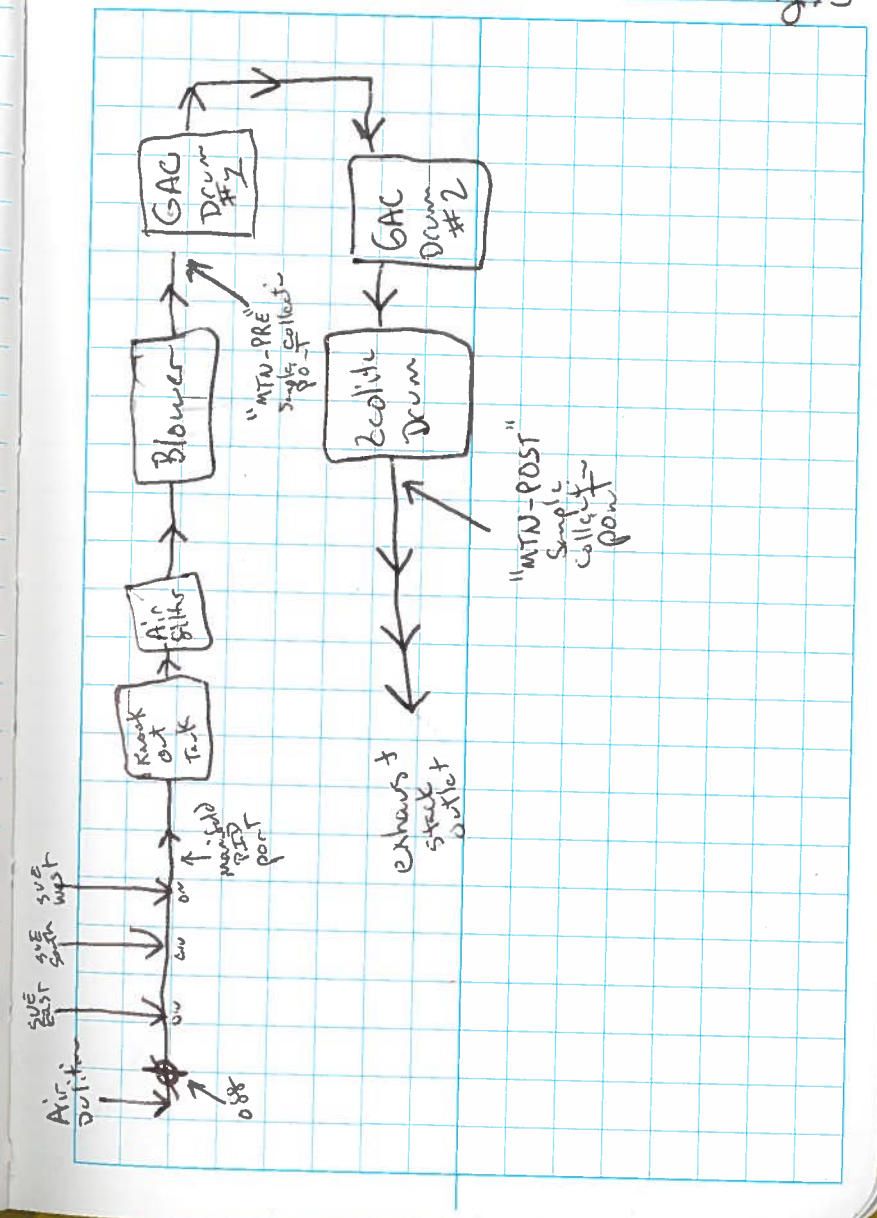
* Using ALS vacuum gauge DV600157 to collect pre and post sample collection

1730-1800 Collect 30 minute 6L summa canister lab samples on the SVE vapor going into the GAC (MTN-PRE) and after the zeolite (MTN-POST) Collect SVE system operating data.

Location _____ Date 5/15/2017

Project / Client _____

Pg 2/3



Location _____ Date 5/15/2017

Project / Client MDEQ Solvent Site

Pg 3/3 Former Martin's Cleaners.

* "MTN-PRE" Canister ID SC01978
Filter ID ØA02108. initial pressure = 25.60 final pressure = 3.11

* "MTN-POST" Canister ID AC02123
Filter ID OA01909 initial pressure 25.91 final pressure 5.36

1845 JR offsite.

-Joel Riebl

Location _____ Date _____

Project / Client _____

APPENDIX D

LABORATORY ANALYTICAL AND DATA VALIDATION REPORTS

ANALYTICAL SUMMARY REPORT

November 01, 2016

Trihydro-Laramie
1252 Commerce Dr
Laramie, WY 82070-7000

Work Order: H16100367 Quote ID: H1323 - 8260 TCLP/GW sampling

Project Name: MDEQ Whitefish Solvent Site

Energy Laboratories Inc Helena MT received the following 4 samples for Trihydro-Laramie on 10/19/2016 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
H16100367-001	Pea Gravel	10/16/16 14:35	10/19/16	Soil	Metals by ICP/ICPMS, Total Mercury in Solid By CVAA Percent Moisture Digestion, Total Metals Digestion, Mercury by CVAA Soil Preparation
H16100367-002	Aggregate	10/18/16 12:50	10/19/16	Soil	Metals by ICP/ICPMS, Total Mercury in Solid By CVAA Percent Moisture Digestion, Total Metals Digestion, Mercury by CVAA
H16100367-003	Sand	10/18/16 12:55	10/19/16	Soil	Same As Above
H16100367-004	Martin's Cleaners	10/19/16 10:30	10/19/16	Soil	TCLP Zero Headspace Extraction, Volatiles Volatile Organic Compounds, TCLP

The analyses presented in this report were performed by Energy Laboratories, Inc., 3161 E. Lyndale Ave., Helena, MT 59604, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

The results as reported relate only to the item(s) submitted for testing.

If you have any questions regarding these test results, please call.

Report Approved By:

CLIENT: Trihydro-Laramie
Project: MDEQ Whitefish Solvent Site
Work Order: H16100367

Report Date: 11/01/16

CASE NARRATIVE

Tests associated with analyst identified as ELI-B were subcontracted to Energy Laboratories, 1120 S. 27th St., Billings, MT, EPA Number MT00005.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish Solvent Site
Lab ID: H16100367-001
Client Sample ID: Pea Gravel

Report Date: 11/01/16
Collection Date: 10/16/16 14:35
DateReceived: 10/19/16
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL CHARACTERISTICS							
Moisture	2.0	wt%		0.2		D2974	10/24/16 11:35 / sld
3050 EXTRACTABLE METALS							
Arsenic	2	mg/kg-dry		1		SW6020	10/24/16 16:50 / dck
Barium	22	mg/kg-dry		1		SW6020	10/24/16 16:50 / dck
Cadmium	ND	mg/kg-dry		1		SW6020	10/24/16 16:50 / dck
Chromium	2	mg/kg-dry		1		SW6020	10/24/16 16:50 / dck
Lead	3	mg/kg-dry		1		SW6020	10/24/16 16:50 / dck
Selenium	ND	mg/kg-dry		1		SW6020	10/24/16 16:50 / dck
Silver	ND	mg/kg-dry		1		SW6020	10/24/16 16:50 / dck
METALS, TOTAL							
Mercury	ND	mg/kg-dry		0.50		SW7471B	10/25/16 16:12 / rgk

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish Solvent Site
Lab ID: H16100367-002
Client Sample ID: Aggregate

Report Date: 11/01/16
Collection Date: 10/18/16 12:50
DateReceived: 10/19/16
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL CHARACTERISTICS							
Moisture	1.7	wt%		0.2		D2974	10/24/16 11:35 / sld
3050 EXTRACTABLE METALS							
Arsenic	3	mg/kg-dry		1		SW6020	10/24/16 16:54 / dck
Barium	15	mg/kg-dry		1		SW6020	10/24/16 16:54 / dck
Cadmium	ND	mg/kg-dry		1		SW6020	10/24/16 16:54 / dck
Chromium	7	mg/kg-dry		1		SW6020	10/24/16 16:54 / dck
Lead	2	mg/kg-dry		1		SW6020	10/24/16 16:54 / dck
Selenium	ND	mg/kg-dry		1		SW6020	10/24/16 16:54 / dck
Silver	ND	mg/kg-dry		1		SW6020	10/24/16 16:54 / dck
METALS, TOTAL							
Mercury	ND	mg/kg-dry		0.50		SW7471B	10/25/16 16:14 / rgk

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish Solvent Site
Lab ID: H16100367-003
Client Sample ID: Sand

Report Date: 11/01/16
Collection Date: 10/18/16 12:55
DateReceived: 10/19/16
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL CHARACTERISTICS							
Moisture	4.3	wt%		0.2		D2974	10/24/16 11:35 / sld
3050 EXTRACTABLE METALS							
Arsenic	4	mg/kg-dry		1		SW6020	10/24/16 16:57 / dck
Barium	52	mg/kg-dry		1		SW6020	10/24/16 16:57 / dck
Cadmium	ND	mg/kg-dry		1		SW6020	10/24/16 16:57 / dck
Chromium	9	mg/kg-dry		1		SW6020	10/24/16 16:57 / dck
Lead	6	mg/kg-dry		1		SW6020	10/24/16 16:57 / dck
Selenium	ND	mg/kg-dry		1		SW6020	10/24/16 16:57 / dck
Silver	ND	mg/kg-dry		1		SW6020	10/24/16 16:57 / dck
METALS, TOTAL							
Mercury	ND	mg/kg-dry		0.50		SW7471B	10/26/16 10:59 / rgk

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish Solvent Site
Lab ID: H16100367-004
Client Sample ID: Martin's Cleaners

Report Date: 11/01/16
Collection Date: 10/19/16 10:30
DateReceived: 10/19/16
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS, TCLP EXTRACTABLE							
Benzene	ND	mg/L		0.10	0.5	SW8260B	10/25/16 13:55 / eli-b16
Carbon tetrachloride	ND	mg/L		0.10	0.5	SW8260B	10/25/16 13:55 / eli-b16
Chlorobenzene	ND	mg/L		0.10	100	SW8260B	10/25/16 13:55 / eli-b16
Chloroform	ND	mg/L		0.10	6	SW8260B	10/25/16 13:55 / eli-b16
1,4-Dichlorobenzene	ND	mg/L		0.10	7.5	SW8260B	10/25/16 13:55 / eli-b16
1,2-Dichloroethane	ND	mg/L		0.10	0.5	SW8260B	10/25/16 13:55 / eli-b16
1,1-Dichloroethene	ND	mg/L		0.10	0.7	SW8260B	10/25/16 13:55 / eli-b16
Methyl ethyl ketone	ND	mg/L		2.0	200	SW8260B	10/25/16 13:55 / eli-b16
Tetrachloroethene	ND	mg/L		0.10	0.7	SW8260B	10/25/16 13:55 / eli-b16
Trichloroethene	ND	mg/L		0.10	0.5	SW8260B	10/25/16 13:55 / eli-b16
Vinyl chloride	ND	mg/L		0.10	0.2	SW8260B	10/25/16 13:55 / eli-b16
Surr: 1,2-Dichloroethane-d4	97.0	%REC		70-130		SW8260B	10/25/16 13:55 / eli-b16
Surr: Dibromofluoromethane	97.0	%REC		77-126		SW8260B	10/25/16 13:55 / eli-b16
Surr: p-Bromofluorobenzene	99.0	%REC		76-127		SW8260B	10/25/16 13:55 / eli-b16
Surr: Toluene-d8	100	%REC		79-122		SW8260B	10/25/16 13:55 / eli-b16

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Report Date: 11/01/16
Project: MDEQ Whitefish Solvent Site
Work Order: H16100367

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: D2974									Batch: R119737
Lab ID: H16100384-003ADUP	Sample Duplicate				Run: SOIL DRYING OVEN 2_16102			10/24/16 11:35	
Moisture	5.41	wt%	0.20				9.4	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Report Date: 11/01/16
Project: MDEQ Whitefish Solvent Site
Work Order: H16100367

Analyte		Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method:	**SW6020**								Analytical Run: ICPMS204-B_161024A	
Lab ID:	**ICV STD**	Initial Calibration Verification Standard							10/24/16 11:02	
Arsenic		0.0623	mg/L	0.0010	104	90	110			
Barium		0.0639	mg/L	0.0010	107	90	110			
Cadmium		0.0318	mg/L	0.0010	106	90	110			
Chromium		0.0618	mg/L	0.0010	103	90	110			
Lead		0.0607	mg/L	0.0010	101	90	110			
Selenium		0.0646	mg/L	0.0010	108	90	110			
Silver		0.0309	mg/L	0.0010	103	90	110			
Method:	**SW6020**									Batch: 34828
Lab ID:	**MB-34828**	Method Blank				Run: ICPMS204-B_161024A			10/24/16 16:07	
Arsenic		0.06	mg/kg	0.05						
Barium		ND	mg/kg	0.4						
Cadmium		ND	mg/kg	0.2						
Chromium		ND	mg/kg	0.8						
Lead		ND	mg/kg	0.10						
Selenium		ND	mg/kg	0.1						
Silver		0.2	mg/kg	0.05						
Lab ID:	**LCS-34828**	Laboratory Control Sample				Run: ICPMS204-B_161024A			10/24/16 16:11	
Arsenic		169	mg/kg	1.0	86	71.4	105.1			
Barium		177	mg/kg	1.0	95	78.6	112.8			
Cadmium		93.7	mg/kg	1.0	95	73.9	106.1			
Chromium		116	mg/kg	1.0	99	73.5	108.5			
Lead		102	mg/kg	1.0	97	74.4	108.6			
Selenium		196	mg/kg	1.0	96	71.2	110.2			
Silver		41.1	mg/kg	1.0	97	70.8	111.9			
Lab ID:	**LFB-34828**	Laboratory Fortified Blank				Run: ICPMS204-B_161024A			10/24/16 16:14	
Arsenic		51.5	mg/kg	1.0	104	80	120			
Barium		50.8	mg/kg	1.0	103	80	120			
Cadmium		25.2	mg/kg	1.0	102	80	120			
Chromium		53.3	mg/kg	1.0	108	80	120			
Lead		51.3	mg/kg	1.0	104	80	120			
Selenium		50.1	mg/kg	1.0	102	80	120			
Silver		26.4	mg/kg	1.0	107	80	120			
Lab ID:	**H16100359-023APDS**	Post Digestion/Distillation Spike				Run: ICPMS204-B_161024A			10/24/16 16:41	
Arsenic		538	mg/kg-dry	1.0	97	75	125			
Barium		1390	mg/kg-dry	1.0	100	75	125			
Cadmium		249	mg/kg-dry	1.0	92	75	125			
Chromium		589	mg/kg-dry	1.0	102	75	125			
Lead		591	mg/kg-dry	1.0	103	75	125			
Selenium		493	mg/kg-dry	1.0	91	75	125			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Report Date: 11/01/16
Project: MDEQ Whitefish Solvent Site
Work Order: H16100367

Analyte		Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method:	**SW6020**									Batch: 34828
Lab ID:	**H16100359-023APDS**	Post Digestion/Distillation Spike				Run: ICPMS204-B_161024A				10/24/16 16:41
Silver		164	mg/kg-dry	1.0	60	75	125			S
Lab ID:	**H16100359-023AMS**	Sample Matrix Spike				Run: ICPMS204-B_161024A				10/24/16 16:44
Arsenic		64.7	mg/kg-dry	1.0	101	75	125			
Barium		1120	mg/kg-dry	1.0		75	125			AE
Cadmium		26.0	mg/kg-dry	1.0	96	75	125			
Chromium		98.0	mg/kg-dry	1.0	116	75	125			
Lead		91.0	mg/kg-dry	1.0	107	75	125			
Selenium		49.3	mg/kg-dry	1.0	90	75	125			
Silver		26.9	mg/kg-dry	1.0	99	75	125			
Lab ID:	**H16100359-023AMSD**	Sample Matrix Spike Duplicate				Run: ICPMS204-B_161024A				10/24/16 16:47
Arsenic		65.2	mg/kg-dry	1.0	102	75	125	0.8	20	
Barium		1220	mg/kg-dry	1.0		75	125	7.9	20	AE
Cadmium		27.0	mg/kg-dry	1.0	99	75	125	3.7	20	
Chromium		101	mg/kg-dry	1.0	121	75	125	3.2	20	
Lead		90.4	mg/kg-dry	1.0	105	75	125	0.7	20	
Selenium		48.4	mg/kg-dry	1.0	88	75	125	2.0	20	
Silver		28.2	mg/kg-dry	1.0	103	75	125	4.7	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

A - The analyte level was greater than four times the spike level. In accordance with the method % recovery is not calculated.

E - Estimated value. Result exceeds the instrument upper quantitation limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Report Date: 11/01/16
Project: MDEQ Whitefish Solvent Site
Work Order: H16100367

Analyte		Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method:	**SW7471B**							Analytical Run: HGCV201-H_161025A		
Lab ID:	**ICV**	Initial Calibration Verification Standard							10/25/16 13:06	
Mercury		0.0011	mg/kg	0.50	107	90	110			
Lab ID:	**CCV**	Continuing Calibration Verification Standard							10/25/16 15:51	
Mercury		0.0024	mg/kg	0.50	95	90	110			
Method:	**SW7471B**								Batch: 34871	
Lab ID:	**MB-34871**	Method Blank				Run: HGCV201-H_161025A			10/25/16 14:53	
Mercury		ND	mg/kg	0.001						
Lab ID:	**LCS-34871**	Laboratory Control Sample				Run: HGCV201-H_161025A			10/25/16 15:23	
Mercury		5.7	mg/kg	0.50	115	71	126.4			
Lab ID:	**LFB-34871**	Laboratory Fortified Blank				Run: HGCV201-H_161025A			10/25/16 15:25	
Mercury		0.21	mg/kg	0.50	108	80	120			
Lab ID:	**H16100359-023AMS**	Sample Matrix Spike				Run: HGCV201-H_161025A			10/25/16 16:08	
Mercury		0.20	mg/kg-dry	0.50	92	80	120			
Lab ID:	**H16100359-023AMSD**	Sample Matrix Spike Duplicate				Run: HGCV201-H_161025A			10/25/16 16:10	
Mercury		0.15	mg/kg-dry	0.50	68	80	120		20	S
Method:	**SW7471B**							Analytical Run: HGCV201-H_161026A		
Lab ID:	**ICV**	Initial Calibration Verification Standard							10/26/16 10:41	
Mercury		0.00096	mg/kg	0.50	96	90	110			
Lab ID:	**CCV**	Continuing Calibration Verification Standard							10/26/16 10:43	
Mercury		0.0024	mg/kg	0.50	95	90	110			
Method:	**SW7471B**								Batch: 34883	
Lab ID:	**MB-34883**	Method Blank				Run: HGCV201-H_161026A			10/26/16 10:50	
Mercury		ND	mg/kg	0.001						
Lab ID:	**LFB-34883**	Laboratory Fortified Blank				Run: HGCV201-H_161026A			10/26/16 10:54	
Mercury		0.21	mg/kg	0.50	107	80	120			
Lab ID:	**LCS-34883**	Laboratory Control Sample				Run: HGCV201-H_161026A			10/26/16 10:57	
Mercury		6.3	mg/kg	0.50	126	71	126.4			
Lab ID:	**H16100370-001BMS**	Sample Matrix Spike				Run: HGCV201-H_161026A			10/26/16 11:05	
Mercury		0.26	mg/kg-dry	0.50	104	80	120			
Lab ID:	**H16100370-001BMSD**	Sample Matrix Spike Duplicate				Run: HGCV201-H_161026A			10/26/16 11:07	
Mercury		0.26	mg/kg-dry	0.50	103	80	120		20	

Qualifiers:

RL - Analyte reporting limit.
ND - Not detected at the reporting limit.
S - Spike recovery outside of advisory limits.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 11/01/16

Project: MDEQ Whitefish Solvent Site **Work Order:** H16100367

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B									Batch: B_103879
Lab ID: mb-103879	Method Blank				Run: SUB-B269255				10/25/16 11:58
Benzene	ND	mg/L	0.010						
Carbon tetrachloride	ND	mg/L	0.010						
Chlorobenzene	ND	mg/L	0.010						
Chloroform	ND	mg/L	0.010						
1,4-Dichlorobenzene	ND	mg/L	0.010						
1,2-Dichloroethane	ND	mg/L	0.010						
1,1-Dichloroethene	ND	mg/L	0.010						
Methyl ethyl ketone	ND	mg/L	0.20						
Tetrachloroethene	ND	mg/L	0.010						
Trichloroethene	ND	mg/L	0.010						
Vinyl chloride	ND	mg/L	0.010						
Surr: 1,2-Dichloroethane-d4			0.010	96	70	130			
Surr: Dibromofluoromethane			0.010	96	77	126			
Surr: p-Bromofluorobenzene			0.010	98	76	127			
Surr: Toluene-d8			0.010	101	79	122			
Lab ID: H16100367-004A	Sample Matrix Spike				Run: SUB-B269255				10/25/16 14:24
Benzene	0.540	mg/L	0.10	108	71	133			
Carbon tetrachloride	0.516	mg/L	0.10	103	61	144			
Chlorobenzene	0.508	mg/L	0.10	102	78	136			
Chloroform	0.480	mg/L	0.10	96	69	133			
1,4-Dichlorobenzene	0.516	mg/L	0.10	103	78	132			
1,2-Dichloroethane	0.520	mg/L	0.10	104	57	146			
1,1-Dichloroethene	0.552	mg/L	0.10	110	66	142			
Methyl ethyl ketone	4.32	mg/L	2.0	86	55	145			
Tetrachloroethene	0.540	mg/L	0.10	108	78	137			
Trichloroethene	0.532	mg/L	0.10	106	75	138			
Vinyl chloride	0.524	mg/L	0.10	105	66	140			
Surr: 1,2-Dichloroethane-d4			0.10	92	70	130			
Surr: Dibromofluoromethane			0.10	94	77	126			
Surr: p-Bromofluorobenzene			0.10	97	76	127			
Surr: Toluene-d8			0.10	104	79	122			
Lab ID: lcs102516	Laboratory Control Sample				Run: SUB-B269255				10/25/16 10:30
Benzene	0.00528	mg/L	0.0010	106	71	133			
Carbon tetrachloride	0.00496	mg/L	0.0010	99	61	144			
Chlorobenzene	0.00496	mg/L	0.0010	99	78	136			
Chloroform	0.00468	mg/L	0.0010	94	69	133			
1,4-Dichlorobenzene	0.00504	mg/L	0.0010	101	78	132			
1,2-Dichloroethane	0.00492	mg/L	0.0010	98	57	146			
1,1-Dichloroethene	0.00520	mg/L	0.0010	104	66	142			
Methyl ethyl ketone	0.0436	mg/L	0.020	87	55	145			
Tetrachloroethene	0.00504	mg/L	0.0010	101	78	137			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Report Date: 11/01/16
Project: MDEQ Whitefish Solvent Site
Work Order: H16100367

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B									Batch: B_103879
Lab ID: lcs102516	Laboratory Control Sample				Run: SUB-B269255				10/25/16 10:30
Trichloroethene	0.00496	mg/L	0.0010	99	75	138			
Vinyl chloride	0.00504	mg/L	0.0010	101	66	140			
Surr: 1,2-Dichloroethane-d4			0.0010	92	70	130			
Surr: Dibromofluoromethane			0.0010	92	77	126			
Surr: p-Bromofluorobenzene			0.0010	98	76	127			
Surr: Toluene-d8			0.0010	100	79	122			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

Work Order Receipt Checklist

Trihydro-Laramie

H16100367

Login completed by: Wanda Johnson

Date Received: 10/19/2016

Reviewed by: BL2000\rwilliams

Received by: wjj

Reviewed Date: 10/21/2016

Carrier name: Hand Del

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☐	No ☑	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	2.7°C On Ice		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	Not Applicable ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☐	Not Applicable ☑

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

Contact and Corrective Action Comments:

Sample containers have quotations as part of the name on the jars, logged in per COC. wj 10/20/16

ENERGY LABORATORIES

Chain of Custody and Analytical Request Record

Page 1 of 1

PLEASE PRINT (Provide as much information as possible.)

Company Name: Trihydro Corporation

Report Mail Address (Required): 1252 Commerce Drive, Laramie WY 82070

☐ No Hard Copy Email:

Invoice Address (Required): 1252 Commerce Drive, Laramie, WY 82070

☐ No Hard Copy Email:

Project Name, PWS, Permit, Etc.: MDEQ White Fish

Sample Origin State: MT

EPA/State Compliance: Yes ☒ No ☐

Contact Name: Andrew Vann

Phone/Fax: 307-745-7474

Cell:

Sampler: (Please Print) Joel Riebl

Invoice Contact & Phone: Andrew Vann 307-745-7474

Purchase Order: 776033001

Quote/Bottle Order: 1323

Special Report/Formats:

☐ DW
☐ POTW/WWTP
☐ State:
☐ Other:
☒ EDD/EDT (Electronic Data) Format: Trihydro
☐ LEVEL IV
☐ NELAC

ANALYSIS REQUESTED

SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX (Number of Containers; Sample Type: A W S V B O DW; Air Water Soils/Solids Vegetation Bioassay Other DW - Drinking Water)	RCRA metals	VOCs, TCLP	SEE ATTACHED	Standard Turnaround (TAT)	RUSH
1 Pea Gravel	10/16/2016	1435	S	X			X	
2 Aggregate	10/18/2016	1250	S	X			↓	
3 Sand	10/18/2016	1255	S	X				
4 Martin's Cleaners	10/19/2016	1030	S		X			
5								
6								
7								
8								
9								
10								

Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments:

LABORATORY USE ONLY

Shipped by: handdel

Cooler ID(s): Y

Receipt Temp: 2.7 °C TB

On Ice: (Y) N

Custody Seal: On Bottle Y (N); On Cooler Y (N)

Intact Y (N)

Signature Match Y (N)

#16100367

Custody Record MUST be Signed

Relinquished by (print): Joel Riebl Date/Time: 10/19/2016 @ 1650 Signature:

Relinquished by (print): Date/Time: Signature:

Received by (print): Date/Time: Signature:

Received by (print): Date/Time: Signature:

Received by Laboratory: Wanda Date/Time: 10-19-16 16:50 Signature:

Sample Disposal: Return to Client: Lab Disposal:

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report. Visit our web site at www.energylab.com for additional information, downloadable fee schedule, forms, and links.

Tier II Data Validation Report Summary

Client: Montana Department of Environmental Quality (MDEQ)	Laboratory: Energy Laboratories
Project Name: Whitefish Solvent Site	Sample Matrix: Soil
Project Number: 776-033-001	Sample Start Date: 10/16/2016
Date Validated: 11/03/2016	Sample End Date: 10/19/2016
Parameters Included: ▪ Toxicity Characteristic Leaching Procedure (TCLP) Volatile Organic Compounds (VOC) by Environmental Protection Agency (EPA) Test Methods for Evaluating Solid Waste (SW-846) Methods 1311 and 8260B ▪ Total Metals by SW-846 Method 6020 ▪ Total Mercury by SW-846 Method 7471B ▪ Soil Moisture by ASTM International Method D2974	
Laboratory Project ID: H16100367	
Data Validator: Charles Ballek, Senior Chemist	
Reviewer: Kyle Power, Environmental Chemist	

DATA EVALUATION CRITERIA SUMMARY

A Tier II Data Validation was performed by Trihydro Corporation's Chemical Data Evaluation Services Group on the amended analytical data report package generated by Energy Laboratories in Helena, Montana with data from Energy Laboratories in Billings, Montana, evaluating samples from the MDEQ Whitefish Solvent Site, located in Whitefish, Montana.

Precision, accuracy, method compliance, and completeness of this data package were assessed during this data review. Precision was determined by evaluating the calculated relative percent difference (RPD) values from:

- Laboratory duplicate pairs
- Matrix spike (MS) and matrix spike duplicate (MSD) pairs

Laboratory accuracy was established by reviewing the demonstrated percent recoveries (%R) of the following items to verify that data are not biased.

- MS/MSD samples
- Laboratory control samples (LCS) and laboratory fortified blanks (LFB)
- Organic system monitoring compounds (surrogates)

Method compliance was established by reviewing sample integrity, holding times, detection limits, surrogate recoveries, laboratory blanks, initial and continuing calibrations (where applicable) percent recoveries, and LCS/LFB percent recoveries against method-specific requirements.

Completeness was evaluated by determining the overall ratio of the number of samples and analyses planned versus the number of samples with valid analyses. Determination of completeness included a review of the chain-of-custody (CoC), laboratory analytical methods, and other laboratory and field documents associated with this analytical data set.

Tier II Data Validation Report Summary

SAMPLE NUMBERS TABLE

Client Sample ID	Laboratory Sample Number
Pea Gravel	H16100367-001
Aggregate	H16100367-002
Sand	H16100367-003
Martin's Cleaners	H16100367-004

Tier II Data Validation Report Summary

The laboratory data were reviewed to evaluate compliance with the methods and the quality of the reported data. Assessment of CoC completeness is included in Item 3 of the Data Validation Checklist. A check mark (✓) indicates that the referenced validation criteria were deemed acceptable, whereas a crossed circle (⊗) indicates validation criteria for which the data have been qualified by the data validator. An empty circle (○) indicates that the specified criterion does not apply to the reviewed data. Details are noted in the tables below.

Validation Criteria

- ✓ Data Completeness
- ✓ CoC Documentation (Item 3)
- ✓ Holding Times and Preservation (Items 6 and 7)
- ✓ Initial and Continuing Calibrations (Item 9)
- ✓ Laboratory Blanks (Item 10)
- ✓ MS/MSD (Item 12)
- ✓ LCS/LFB (Item 14)
- ✓ System Monitoring Compounds (i.e., Surrogates) (Item 16)
- ○ Field, Equipment, and Trip Blanks (Item 17)
- ○ Field Duplicates (Item 19)
- ✓ Laboratory Duplicates (Item 21)

Guidance References

Chemical data validation was conducted in accordance with the United States Environmental Protection Agency (USEPA) Contract Laboratory Program (CLP) National Functional Guidelines for the analyses listed below, or by the appropriate method if not covered in the National Functional Guidelines.

- Data for organic analyses were evaluated according to validation criteria set forth in the USEPA CLP National Functional Guidelines for Superfund Organic Methods Data Review, document number EPA-540-R-014-002, August 2014 with additional reference to the USEPA CLP National Functional Guidelines for Organic Data Review, document number EPA 540/R-99/008, October 1999.
- Data for inorganic analyses were evaluated according to validation criteria set forth in the USEPA CLP National Functional Guidelines for Inorganic Superfund Data Review, document number EPA-540-R-013-001, August 2014 with additional reference to the USEPA CLP National Functional Guidelines for Inorganic Data Review, document number EPA 540-R-04-004, October 2004.
- Project-specific Quality Assurance Project Plans (QAPP) data validation requirements, as applicable.
- Trihydro Data Validation Variance Documentation, February 2016.

Tier II Data Validation Report Summary

OVERALL DATA PACKAGE ASSESSMENT

Based on a data validation review, the data are acceptable as delivered. Data qualified by the laboratory are discussed in Item 2 of the Validation Criteria Checklist.

The purpose of validating data and assigning qualifiers is to assist in proper data interpretation. Data that are not qualified meet the site data quality objectives

Text identified in **bold font** in the Validation Criteria Checklist indicates that further action and/or qualification of the data were required. Data validation qualifiers were added for the items noted with crossed circles in the Validation Criteria section above. Please see the Data Qualification Summary table at the end of this report for a complete list of samples and analytes qualified.

Data qualifiers were not applied as a result of this validation.

Data Completeness

The analyses were performed as requested on the CoC records. The associated samples were received by the laboratory and analyzed properly unless otherwise noted in the Criteria Checklist below. The complete data package consisted of 38 data points. No data points were rejected. The data completeness measure for this data package is calculated to be 100% and is acceptable.

VALIDATION CRITERIA CHECKLIST	
1. Was the report free of non-conformances identified by the laboratory?	Yes
Comments: The laboratory did not identify non-conformances related to the analytical data in the report.	
2. Were the data free of data qualification flags and/or notes used by the laboratory? If no, define.	No
Comments: The laboratory applied the following data qualifier to results reported for this data set. J – Estimated value. The analyte was present but less than the reporting limit. S – Spike recovery outside of advisory limits. A – The analyte level was greater than four times the spike level. In accordance with the method % recovery is not calculated. E – Estimated value. Result exceeds the instrument upper quantitation limit.	
3. Were sample CoC forms and procedures complete?	No
Comments: The CoC record from field to laboratory was complete and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt with the following exception. The laboratory noted that sample identifications on the sample labels did not match the information on the CoC exactly. The sample IDs from the CoC were used at log-in and the samples were reported with those IDs. No further action was required. Custody seals were not present nor required since the samples were delivered to the laboratory by project personnel and custody was maintained at all times.	
4. Were detection limits in accordance with the quality assurance project plan (QAPP), permit, or method, or indicated as acceptable?	Yes
Comments: The detection limits appeared to be acceptable. Dilutions were applied to the samples for the following analyses. <u>Method 6020:</u> Dilutions of 10 times were applied to samples Pea Gravel, Aggregate, and Sand for the analyses of total metals. <u>Method 8260B:</u> Sample Martin's Cleaners was diluted by a factor of 100 times for the analysis of TCLP VOCs. Final determination of the data quality based on detection limits will be established by the project team.	
5. Were the reported analytical methods and constituents in compliance with the QAPP, permit, or CoC?	Yes
Comments: The reported analytical methods were in compliance with the CoC and the laboratory reported the requested constituents in accordance with the CoC.	
6. Were samples received in good condition within method-specified requirements?	Yes
Comments: Samples were received in good condition as noted on the Sample Receipt Checklist. Samples were received on ice, in good condition, with the cooler temperature outside the recommended temperature range of 4°C ± 2°C at a temperature of 2.7°C as noted on the CoC and the Work Order Receipt Checklist. The laboratory indicated that the sample containers were intact and sufficient sample volume/mass was provided to complete the requested analyses.	
7. Were samples extracted/digested and analyzed within method-specified or technical holding times?	Yes
Comments: The samples were extracted/digested and analyzed within method-specific holding times.	

VALIDATION CRITERIA CHECKLIST

8. Were reported units appropriate for the sample matrix/matrices and analytical method(s)? Specify if wet or dry units were used for soil. — Yes

Comments: The analytical results for total metals in the submitted samples were reported in concentration units of milligrams per kilogram (mg/kg) and soil moisture was reported as percentage (%). These units were acceptable for the sample matrices and the analyses requested. The results for the total metals analyses were reported on a dry weight basis.

The results for the TCLP volatiles analyses were reported in units of milligrams per liter. These units were appropriate for the analysis.

9. Did the laboratory provide any specific initial and/or continuing calibration results? — Yes

Comments: Limited initial calibration verification and continuing calibration summary data for Methods 6020 and 7471B were included as part of this data set. Full calibration data was not available for review.

10. If initial and/or continuing calibration results were provided, were the results within acceptable limits? — Yes

Comments: The available continuing calibration data were within acceptable limits.

11. Was the total number of laboratory blank samples prepared equal to at least 5% of the total number of samples or analyzed as required by the method? — Yes

Comments: The total number of laboratory blank samples prepared was equal to at least 5% of the total number of samples. Method blanks are not required for moisture by Method D2974.

12. Were target analytes reported as not detected in the laboratory blanks? — No

Comments: Target analytes were not detected in the laboratory blanks, with the following exceptions.

Arsenic and silver were detected in the method blank for Method 6020 batch 34828 at concentrations of 0.06 mg/kg and 0.2 mg/kg, respectively. Arsenic was detected in the associated samples at concentrations above the reporting limit and greater than 10 times the blank level. Silver was not detected in the associated samples in batch 34828. Qualification of sample data was not required based on the method blank detections.

13. Was the total number of MS samples prepared equal to at least 5% of the total number of samples or analyzed as required by the method? — Yes

Comments: The total number of matrix spike samples prepared was equal to at least 5% of the total number of samples. The matrix spike sample source for each analytical batch in this sample set has been indicated below.

Method	Analytes	Batch	MS Sample Source
6020	Total Metals	34828	Not Associated
7471B	Total Mercury	34871	Not Associated
7471B	Total Mercury	34883	Not Associated
8260B	VOC	B_103879	Martin's Cleaners

Not Associated – The MS sample source was not associated with this project.

A post digestion spike was prepared for Method 6020 batch 34828 from a sample not associated with this project.

Matrix spike analyses were not prepared nor required for soil moisture analyses by Method D2974.

14. For MS/MSDs prepared from project samples, were percent recoveries and RPDs within data validation or laboratory quality control (QC) limits? — Yes

Comments: The recoveries for the MS prepared from a project sample were within laboratory QC limits.

The percent recoveries and RPD values for MS/MSDs prepared from non-project samples were evaluated and considered but data were not qualified based on those results since matrix similarity to project samples could not be guaranteed.

VALIDATION CRITERIA CHECKLIST	
15. Was the total number of LCSs analyzed equal to at least 5% of the total number of samples or analyzed as required by the method?	Yes
Comments: The total number of LCS and LFB samples analyzed was equal to at least 5% of the total number of samples. LCS were not prepared nor required for soil moisture analyses by Method D2974.	
16. Were LCS/LCSD percent recoveries and LCS/LCSD RPDs within data validation or laboratory QC limits?	Yes
Comments: The LCS and LFB percent recoveries were within laboratory QC limits. The laboratory did not analyze LCSDs for the batches reported in this data set.	
17. Were surrogate recoveries within laboratory QC limits?	Yes
Comments: Surrogates recoveries for the submitted and QC samples were within laboratory limits.	
18. Were the number of trip blank, field blank, and/or equipment blank samples collected equal to at least 10% of the total number of samples or as required by the project guidelines, QAPP, SAP, or permit?	No
Comments: Trip blank, field blank, and equipment blank samples were not submitted in this sample set.	
19. Were target analytes reported as not detected in the trip blank, field blank, and/or equipment blank samples?	N/A
Comments: Trip blank, field blank, and equipment blank samples were not submitted in this sample set.	
20. Was the number of field duplicates collected equal to at least 10% of the total number of samples or as required by the project guidelines, QAPP, SAP, or permit?	No
Comments: Field duplicate samples were not submitted in this sample set.	
21. Were field duplicate RPD values within data validation QC limits (soil 0-50%, water 0-30%, or air 0-25%)?	N/A
Comments: Field duplicate samples were not submitted in this sample set.	
22. For laboratory duplicates prepared from project samples, were RPDs within laboratory QC limits?	Yes
Comments: A laboratory duplicate was prepared for soil moisture by Method D2974 batch R119737 from a sample not associated with this project. The RPD value for the laboratory duplicate analysis was within the acceptance limits.	

DATA QUALIFICATION SUMMARY

Data qualifiers were not applied as a result of this validation.

ANALYTICAL SUMMARY REPORT

November 28, 2016

Trihydro-Laramie
1252 Commerce Dr
Laramie, WY 82070-7000

Work Order: H16110317 Quote ID: H1323 - 8260 TCLP/GW sampling

Project Name: Whitefish Solvent Site

Energy Laboratories Inc Helena MT received the following 1 sample for Trihydro-Laramie on 11/17/2016 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
H16110317-001	Stockpile - 01	11/16/16 12:15	11/17/16	Soil	Metals by ICP/ICPMS, Total Mercury in Solid By CVAA Percent Moisture Digestion, Total Metals Digestion, Mercury by CVAA Soil Preparation Volatile Organics, Methanol Extraction 8260-Volatile Organic Compounds - Short List

The analyses presented in this report were performed by Energy Laboratories, Inc., 3161 E. Lyndale Ave., Helena, MT 59604, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

The results as reported relate only to the item(s) submitted for testing.

If you have any questions regarding these test results, please call.

Report Approved By:

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: Whitefish Solvent Site
Lab ID: H16110317-001
Client Sample ID: Stockpile - 01

Report Date: 11/28/16
Collection Date: 11/16/16 12:15
DateReceived: 11/17/16
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL CHARACTERISTICS							
Moisture	24.0	wt%		0.2		D2974	11/17/16 15:31 / tjb
3050 EXTRACTABLE METALS							
Arsenic	11	mg/kg-dry		5		SW6020	11/22/16 21:15 / dck
Barium	320	mg/kg-dry		5		SW6020	11/22/16 21:15 / dck
Cadmium	ND	mg/kg-dry		1		SW6020	11/22/16 21:15 / dck
Chromium	26	mg/kg-dry		5		SW6020	11/22/16 21:15 / dck
Lead	45	mg/kg-dry		5		SW6020	11/22/16 21:15 / dck
Selenium	ND	mg/kg-dry		5		SW6020	11/22/16 21:15 / dck
Silver	ND	mg/kg-dry		5		SW6020	11/22/16 21:15 / dck
METALS, TOTAL							
Mercury	ND	mg/kg-dry		0.50		SW7471B	11/18/16 13:12 / dck
VOLATILE ORGANIC COMPOUNDS							
Bromoform	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
Benzene	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
Bromobenzene	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
Bromochloromethane	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
Bromodichloromethane	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
Bromomethane	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
Carbon tetrachloride	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
Chlorobenzene	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
Chloroethane	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
2-Chloroethyl vinyl ether	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
Chloroform	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
Chloromethane	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
2-Chlorotoluene	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
4-Chlorotoluene	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
Chlorodibromomethane	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
1,2-Dibromoethane	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
Dibromomethane	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
1,2-Dichlorobenzene	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
1,3-Dichlorobenzene	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
1,4-Dichlorobenzene	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
Dichlorodifluoromethane	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
1,1-Dichloroethane	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
1,2-Dichloroethane	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
cis-1,2-Dichloroethene	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
1,1-Dichloroethene	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
trans-1,2-Dichloroethene	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
1,2-Dichloropropane	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
1,3-Dichloropropane	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
2,2-Dichloropropane	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: Whitefish Solvent Site
Lab ID: H16110317-001
Client Sample ID: Stockpile - 01

Report Date: 11/28/16
Collection Date: 11/16/16 12:15
DateReceived: 11/17/16
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
1,1-Dichloropropene	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
cis-1,3-Dichloropropene	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
trans-1,3-Dichloropropene	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
Ethylbenzene	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
Methyl tert-butyl ether (MTBE)	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
Methylene chloride	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
Methyl ethyl ketone	ND	mg/kg-dry		4.0		SW8260B	11/19/16 23:05 / abc
Styrene	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
1,1,1,2-Tetrachloroethane	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
1,1,2,2-Tetrachloroethane	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
Tetrachloroethene	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
Toluene	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
1,1,1-Trichloroethane	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
1,1,2-Trichloroethane	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
Trichloroethene	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
Trichlorofluoromethane	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
1,2,3-Trichloropropane	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
Vinyl chloride	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
m+p-Xylenes	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
o-Xylene	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
Xylenes, Total	ND	mg/kg-dry		0.20		SW8260B	11/19/16 23:05 / abc
Surr: p-Bromofluorobenzene	106	%REC		60-143		SW8260B	11/19/16 23:05 / abc
Surr: Dibromofluoromethane	111	%REC		71-135		SW8260B	11/19/16 23:05 / abc
Surr: 1,2-Dichloroethane-d4	100	%REC		65-147		SW8260B	11/19/16 23:05 / abc
Surr: Toluene-d8	85.0	%REC		76-133		SW8260B	11/19/16 23:05 / abc

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 11/28/16

Project: Whitefish Solvent Site **Work Order:** H16110317

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method:	**D2974**									Batch: R120670
Lab ID:	**H16110281-001ADUP**	Sample Duplicate				Run: EXTRACT OV 2_161117A			11/17/16 15:31	
Moisture		13.2	wt%	0.20				9.4	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 11/28/16

Project: Whitefish Solvent Site **Work Order:** H16110317

Analyte		Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method:	**SW6020**								Analytical Run: ICPMS204-B_161122B		
Lab ID:	**ICV STD**	7	Initial Calibration Verification Standard							11/22/16 14:59	
Arsenic			0.0610	mg/L	0.0010	102	90	110			
Barium			0.0582	mg/L	0.0010	97	90	110			
Cadmium			0.0299	mg/L	0.0010	100	90	110			
Chromium			0.0598	mg/L	0.0010	100	90	110			
Lead			0.0586	mg/L	0.0010	98	90	110			
Selenium			0.0598	mg/L	0.0010	100	90	110			
Silver			0.0309	mg/L	0.0010	103	90	110			
Method:	**SW6020**									Batch: 35309	
Lab ID:	**MB-35309**	7	Method Blank				Run: ICPMS204-B_161122B			11/22/16 21:05	
Arsenic			0.2	mg/kg	0.05						
Barium			ND	mg/kg	0.4						
Cadmium			ND	mg/kg	0.2						
Chromium			ND	mg/kg	0.9						
Lead			0.3	mg/kg	0.10						
Selenium			ND	mg/kg	0.1						
Silver			0.10	mg/kg	0.05						
Lab ID:	**LCS-35309**	7	Laboratory Control Sample				Run: ICPMS204-B_161122B			11/22/16 21:08	
Arsenic			171	mg/kg	1.0	87	71.4	105.1			
Barium			175	mg/kg	1.0	94	78.6	112.8			
Cadmium			94.6	mg/kg	1.0	96	73.9	106.1			
Chromium			113	mg/kg	1.0	97	73.5	108.5			
Lead			103	mg/kg	1.0	98	74.4	108.6			
Selenium			193	mg/kg	1.0	94	71.2	110.2			
Silver			42.2	mg/kg	1.0	100	70.8	111.9			
Lab ID:	**LFB-35309**	7	Laboratory Fortified Blank				Run: ICPMS204-B_161122B			11/22/16 21:12	
Arsenic			51.8	mg/kg	1.0	101	80	120			
Barium			49.1	mg/kg	1.0	96	80	120			
Cadmium			24.9	mg/kg	1.0	98	80	120			
Chromium			51.5	mg/kg	1.0	101	80	120			
Lead			50.4	mg/kg	1.0	98	80	120			
Selenium			49.7	mg/kg	1.0	97	80	120			
Silver			26.1	mg/kg	1.0	102	80	120			
Lab ID:	**H16110317-001APDS**	7	Post Digestion/Distillation Spike				Run: ICPMS204-B_161122B			11/22/16 21:21	
Arsenic			642	mg/kg-dry	1.0	95	75	125			
Barium			964	mg/kg-dry	1.0	97	75	125			
Cadmium			304	mg/kg-dry	1.0	91	75	125			
Chromium			673	mg/kg-dry	1.1	97	75	125			
Lead			692	mg/kg-dry	1.0	97	75	125			
Selenium			582	mg/kg-dry	1.0	87	75	125			
Silver			271	mg/kg-dry	1.0	82	75	125			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 11/28/16

Project: Whitefish Solvent Site **Work Order:** H16110317

Analyte		Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method:	**SW6020**										Batch: 35309
Lab ID:	**H16110317-001AMS**	7	Sample Matrix Spike				Run: ICPMS204-B_161122B			11/22/16 21:25	
Arsenic			75.7	mg/kg-dry	1.0	98	75	125			
Barium			436	mg/kg-dry	1.0		75	125			A
Cadmium			32.6	mg/kg-dry	1.0	96	75	125			
Chromium			97.5	mg/kg-dry	1.1	108	75	125			
Lead			106	mg/kg-dry	1.0	91	75	125			
Selenium			61.6	mg/kg-dry	1.0	91	75	125			
Silver			35.0	mg/kg-dry	1.0	104	75	125			
Lab ID:	**H16110317-001AMSD**	7	Sample Matrix Spike Duplicate				Run: ICPMS204-B_161122B			11/22/16 21:28	
Arsenic			77.0	mg/kg-dry	1.0	100	75	125	1.7	20	
Barium			455	mg/kg-dry	1.0		75	125	4.4	20	A
Cadmium			32.3	mg/kg-dry	1.0	95	75	125	0.9	20	
Chromium			96.9	mg/kg-dry	1.1	107	75	125	0.6	20	
Lead			107	mg/kg-dry	1.0	93	75	125	1.2	20	
Selenium			59.8	mg/kg-dry	1.0	89	75	125	2.8	20	
Silver			34.5	mg/kg-dry	1.0	103	75	125	1.4	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

A - The analyte level was greater than four times the spike level. In accordance with the method % recovery is not calculated.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 11/28/16

Project: Whitefish Solvent Site **Work Order:** H16110317

Analyte		Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method:	**SW7471B**								Analytical Run: HGCV201-H_161118A		
Lab ID:	**ICV**		Initial Calibration Verification Standard							11/18/16 11:57	
Mercury			0.00097	mg/L	0.00010	97	90	110			
Lab ID:	**CCV**		Continuing Calibration Verification Standard							11/18/16 12:55	
Mercury			0.0024	mg/kg	0.50	97	90	110			
Method:	**SW7471B**									Batch: 35287	
Lab ID:	**MB-35287**		Method Blank				Run: HGCV201-H_161118A			11/18/16 12:17	
Mercury			ND	mg/kg	0.001						
Lab ID:	**LCS-35287**		Laboratory Control Sample				Run: HGCV201-H_161118A			11/18/16 12:20	
Mercury			5.5	mg/kg	0.50	110	71	126.4			
Lab ID:	**LFB-35287**		Laboratory Fortified Blank				Run: HGCV201-H_161118A			11/18/16 12:22	
Mercury			0.19	mg/kg	0.50	94	80	120			
Lab ID:	**H16110135-001ADIL**		Serial Dilution				Run: HGCV201-H_161118A			11/18/16 12:25	
Mercury			0.0059	mg/kg-dry	0.50		0	0		10	
Lab ID:	**H16110281-001ADIL**		Serial Dilution				Run: HGCV201-H_161118A			11/18/16 13:01	
Mercury			0.017	mg/kg-dry	0.50		0	0		10	
Lab ID:	**H16110281-001AMS**		Sample Matrix Spike				Run: HGCV201-H_161118A			11/18/16 13:03	
Mercury			0.22	mg/kg-dry	0.50	95	80	120			
Lab ID:	**H16110281-001AMSD**		Sample Matrix Spike Duplicate				Run: HGCV201-H_161118A			11/18/16 13:04	
Mercury			0.25	mg/kg-dry	0.50	108	80	120		20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 11/28/16

Project: Whitefish Solvent Site **Work Order:** H16110317

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B										Batch: 35286
Lab ID: LCS-35286	53	Laboratory Control Sample				Run: 1SATURN_161119C				11/19/16 21:25
Benzene		0.562	mg/kg	0.20	112	71	119			
Bromobenzene		0.527	mg/kg	0.20	105	77	134			
Bromochloromethane		0.455	mg/kg	0.20	91	61	129			
Bromodichloromethane		0.518	mg/kg	0.20	104	64	139			
Bromoform		0.486	mg/kg	0.20	97	52	141			
Bromomethane		0.735	mg/kg	0.20	147	40	121			S
Carbon tetrachloride		0.609	mg/kg	0.20	122	65	131			
Chlorobenzene		0.573	mg/kg	0.20	115	74	131			
Chlorodibromomethane		0.515	mg/kg	0.20	103	58	135			
Chloroethane		0.279	mg/kg	0.20	56	53	140			
2-Chloroethyl vinyl ether		0.494	mg/kg	0.20	99	67.2	113			
Chloroform		0.606	mg/kg	0.20	121	65	126			
Chloromethane		0.552	mg/kg	0.20	110	46	144			
2-Chlorotoluene		0.488	mg/kg	0.20	98	72	137			
4-Chlorotoluene		0.510	mg/kg	0.20	102	70	133			
1,2-Dibromoethane		0.557	mg/kg	0.20	111	54	131			
Dibromomethane		0.490	mg/kg	0.20	98	60	140			
1,2-Dichlorobenzene		0.541	mg/kg	0.20	108	61	137			
1,3-Dichlorobenzene		0.534	mg/kg	0.20	107	67	133			
1,4-Dichlorobenzene		0.533	mg/kg	0.20	107	62	137			
Dichlorodifluoromethane		0.423	mg/kg	0.20	85	38	132			
1,1-Dichloroethane		0.555	mg/kg	0.20	111	66	124			
1,2-Dichloroethane		0.582	mg/kg	0.20	116	54	125			
1,1-Dichloroethene		0.562	mg/kg	0.20	112	64	113			
cis-1,2-Dichloroethene		0.630	mg/kg	0.20	126	68	133			
trans-1,2-Dichloroethene		0.626	mg/kg	0.20	125	70	130			
1,2-Dichloropropane		0.518	mg/kg	0.20	104	78	143			
1,3-Dichloropropane		0.581	mg/kg	0.20	116	63	140			
2,2-Dichloropropane		0.506	mg/kg	0.20	101	71	137			
1,1-Dichloropropene		0.564	mg/kg	0.20	113	66	136			
cis-1,3-Dichloropropene		0.526	mg/kg	0.20	105	75	137			
trans-1,3-Dichloropropene		0.503	mg/kg	0.20	101	70	107			
Ethylbenzene		0.530	mg/kg	0.20	106	78	132			
Methyl tert-butyl ether (MTBE)		0.570	mg/kg	0.20	114	57	132			
Methyl ethyl ketone		5.44	mg/kg	4.0	109	50	150			
Methylene chloride		0.573	mg/kg	0.20	115	62	125			
Styrene		0.541	mg/kg	0.20	108	70	132			
1,1,1,2-Tetrachloroethane		0.554	mg/kg	0.20	111	73	127			
1,1,2,2-Tetrachloroethane		0.539	mg/kg	0.20	108	74	120			
Tetrachloroethene		0.467	mg/kg	0.20	93	84	108			
Toluene		0.483	mg/kg	0.20	97	78	125			
1,1,1-Trichloroethane		0.609	mg/kg	0.20	122	73	124			
1,1,2-Trichloroethane		0.541	mg/kg	0.20	108	78	114			
Trichloroethene		0.490	mg/kg	0.20	98	70	144			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

S - Spike recovery outside of advisory limits.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 11/28/16

Project: Whitefish Solvent Site **Work Order:** H16110317

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B										Batch: 35286
Lab ID: LCS-35286	53	Laboratory Control Sample				Run: 1SATURN_161119C				11/19/16 21:25
Trichlorofluoromethane		0.510	mg/kg	0.20	102	60	128			
1,2,3-Trichloropropane		0.507	mg/kg	0.20	101	63	148			
Vinyl chloride		0.599	mg/kg	0.20	120	64	124			
m+p-Xylenes		0.992	mg/kg	0.20	99	74	136			
o-Xylene		0.518	mg/kg	0.20	104	70	134			
Surr: 1,2-Dichloroethane-d4				0.20	128	65	147			
Surr: Dibromofluoromethane				0.20	120	71	135			
Surr: p-Bromofluorobenzene				0.20	104	60	143			
Surr: Toluene-d8				0.20	100	76	133			
Lab ID: MB-35286	53	Method Blank				Run: 1SATURN_161119C				11/19/16 22:32
Benzene		ND	mg/kg	0.20						
Bromobenzene		ND	mg/kg	0.20						
Bromochloromethane		ND	mg/kg	0.20						
Bromodichloromethane		ND	mg/kg	0.20						
Bromoform		ND	mg/kg	0.20						
Bromomethane		ND	mg/kg	0.20						
Carbon tetrachloride		ND	mg/kg	0.20						
Chlorobenzene		ND	mg/kg	0.20						
Chlorodibromomethane		ND	mg/kg	0.20						
Chloroethane		ND	mg/kg	0.20						
2-Chloroethyl vinyl ether		ND	mg/kg	0.20						
Chloroform		ND	mg/kg	0.20						
Chloromethane		ND	mg/kg	0.20						
2-Chlorotoluene		ND	mg/kg	0.20						
4-Chlorotoluene		ND	mg/kg	0.20						
1,2-Dibromoethane		ND	mg/kg	0.20						
Dibromomethane		ND	mg/kg	0.20						
1,2-Dichlorobenzene		ND	mg/kg	0.20						
1,3-Dichlorobenzene		ND	mg/kg	0.20						
1,4-Dichlorobenzene		ND	mg/kg	0.20						
Dichlorodifluoromethane		ND	mg/kg	0.20						
1,1-Dichloroethane		ND	mg/kg	0.20						
1,2-Dichloroethane		ND	mg/kg	0.20						
1,1-Dichloroethene		ND	mg/kg	0.20						
cis-1,2-Dichloroethene		ND	mg/kg	0.20						
trans-1,2-Dichloroethene		ND	mg/kg	0.20						
1,2-Dichloropropane		ND	mg/kg	0.20						
1,3-Dichloropropane		ND	mg/kg	0.20						
2,2-Dichloropropane		ND	mg/kg	0.20						
1,1-Dichloropropene		ND	mg/kg	0.20						
cis-1,3-Dichloropropene		ND	mg/kg	0.20						
trans-1,3-Dichloropropene		ND	mg/kg	0.20						
Ethylbenzene		ND	mg/kg	0.20						

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 11/28/16

Project: Whitefish Solvent Site **Work Order:** H16110317

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B										Batch: 35286
Lab ID: MB-35286	53	Method Blank				Run: 1SATURN_161119C				11/19/16 22:32
Methyl tert-butyl ether (MTBE)		ND	mg/kg	0.20						
Methyl ethyl ketone		ND	mg/kg	4.0						
Methylene chloride		ND	mg/kg	0.20						
Styrene		ND	mg/kg	0.20						
1,1,1,2-Tetrachloroethane		ND	mg/kg	0.20						
1,1,2,2-Tetrachloroethane		ND	mg/kg	0.20						
Tetrachloroethene		ND	mg/kg	0.20						
Toluene		ND	mg/kg	0.20						
1,1,1-Trichloroethane		ND	mg/kg	0.20						
1,1,2-Trichloroethane		ND	mg/kg	0.20						
Trichloroethene		ND	mg/kg	0.20						
Trichlorofluoromethane		ND	mg/kg	0.20						
1,2,3-Trichloropropane		ND	mg/kg	0.20						
Vinyl chloride		ND	mg/kg	0.20						
m+p-Xylenes		ND	mg/kg	0.20						
o-Xylene		ND	mg/kg	0.20						
Surr: 1,2-Dichloroethane-d4				0.20	111	65	147			
Surr: Dibromofluoromethane				0.20	116	71	135			
Surr: p-Bromofluorobenzene				0.20	115	60	143			
Surr: Toluene-d8				0.20	101	76	133			
Lab ID: H16110317-001AMS	53	Sample Matrix Spike				Run: 1SATURN_161119C				11/19/16 23:38
Benzene		0.658	mg/kg-dry	0.20	100	71	119			
Bromobenzene		0.619	mg/kg-dry	0.20	94	77	134			
Bromochloromethane		0.691	mg/kg-dry	0.20	105	61	129			
Bromodichloromethane		0.559	mg/kg-dry	0.20	85	64	139			
Bromoform		0.549	mg/kg-dry	0.20	84	52	141			
Bromomethane		0.862	mg/kg-dry	0.20	131	40	121			S
Carbon tetrachloride		0.737	mg/kg-dry	0.20	112	65	131			
Chlorobenzene		0.617	mg/kg-dry	0.20	94	74	131			
Chlorodibromomethane		0.561	mg/kg-dry	0.20	85	58	135			
Chloroethane		0.405	mg/kg-dry	0.20	62	53	140			
2-Chloroethyl vinyl ether		0.553	mg/kg-dry	0.20	84	67.2	113			
Chloroform		0.726	mg/kg-dry	0.20	110	65	126			
Chloromethane		0.695	mg/kg-dry	0.20	106	46	144			
2-Chlorotoluene		0.567	mg/kg-dry	0.20	86	72	137			
4-Chlorotoluene		0.574	mg/kg-dry	0.20	87	70	133			
1,2-Dibromoethane		0.560	mg/kg-dry	0.20	85	54	131			
Dibromomethane		0.536	mg/kg-dry	0.20	81	60	140			
1,2-Dichlorobenzene		0.632	mg/kg-dry	0.20	96	61	137			
1,3-Dichlorobenzene		0.620	mg/kg-dry	0.20	94	67	133			
1,4-Dichlorobenzene		0.599	mg/kg-dry	0.20	91	62	137			
Dichlorodifluoromethane		0.392	mg/kg-dry	0.20	60	38	132			
1,1-Dichloroethane		0.629	mg/kg-dry	0.20	96	66	124			

Qualifiers:

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S - Spike recovery outside of advisory limits.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 11/28/16

Project: Whitefish Solvent Site **Work Order:** H16110317

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B										Batch: 35286
Lab ID: H16110317-001AMS	53	Sample Matrix Spike				Run: 1SATURN_161119C			11/19/16 23:38	
1,2-Dichloroethane		0.669	mg/kg-dry	0.20	102	54	125			
1,1-Dichloroethene		0.644	mg/kg-dry	0.20	98	64	113			
cis-1,2-Dichloroethene		0.735	mg/kg-dry	0.20	112	68	133			
trans-1,2-Dichloroethene		0.734	mg/kg-dry	0.20	112	70	130			
1,2-Dichloropropane		0.597	mg/kg-dry	0.20	91	78	143			
1,3-Dichloropropane		0.613	mg/kg-dry	0.20	93	63	140			
2,2-Dichloropropane		0.569	mg/kg-dry	0.20	87	71	137			
1,1-Dichloropropene		0.698	mg/kg-dry	0.20	106	66	136			
cis-1,3-Dichloropropene		0.572	mg/kg-dry	0.20	87	75	137			
trans-1,3-Dichloropropene		0.497	mg/kg-dry	0.20	76	70	107			
Ethylbenzene		0.575	mg/kg-dry	0.20	87	78	132			
Methyl tert-butyl ether (MTBE)		0.653	mg/kg-dry	0.20	99	57	132			
Methyl ethyl ketone		6.13	mg/kg-dry	4.0	93	50	150			
Methylene chloride		0.622	mg/kg-dry	0.20	95	62	125			
Styrene		0.626	mg/kg-dry	0.20	95	70	132			
1,1,1,2-Tetrachloroethane		0.655	mg/kg-dry	0.20	100	73	127			
1,1,2,2-Tetrachloroethane		0.581	mg/kg-dry	0.20	88	74	120			
Tetrachloroethene		0.611	mg/kg-dry	0.20	71	84	108			S
Toluene		0.558	mg/kg-dry	0.20	85	78	125			
1,1,1-Trichloroethane		0.735	mg/kg-dry	0.20	112	73	124			
1,1,2-Trichloroethane		0.555	mg/kg-dry	0.20	84	78	114			
Trichloroethene		0.575	mg/kg-dry	0.20	87	70	144			
Trichlorofluoromethane		0.652	mg/kg-dry	0.20	99	60	128			
1,2,3-Trichloropropane		0.661	mg/kg-dry	0.20	100	63	148			
Vinyl chloride		0.677	mg/kg-dry	0.20	103	64	124			
m+p-Xylenes		1.15	mg/kg-dry	0.20	87	74	136			
o-Xylene		0.594	mg/kg-dry	0.20	90	70	134			
Surr: 1,2-Dichloroethane-d4				0.20	98	65	147			
Surr: Dibromofluoromethane				0.20	92	71	135			
Surr: p-Bromofluorobenzene				0.20	81	60	143			
Surr: Toluene-d8				0.20	76	76	133			
Lab ID: H16110317-001AMSD	53	Sample Matrix Spike Duplicate				Run: 1SATURN_161119C			11/20/16 00:11	
Benzene		0.695	mg/kg-dry	0.20	106	71	119	5.4	20	
Bromobenzene		0.627	mg/kg-dry	0.20	95	77	134	1.4	20	
Bromochloromethane		0.823	mg/kg-dry	0.20	125	61	129	18	20	
Bromodichloromethane		0.613	mg/kg-dry	0.20	93	64	139	9.2	20	
Bromoform		0.481	mg/kg-dry	0.20	73	52	141	13	20	
Bromomethane		0.831	mg/kg-dry	0.20	126	40	121	3.7	20	S
Carbon tetrachloride		0.758	mg/kg-dry	0.20	115	65	131	2.8	20	
Chlorobenzene		0.628	mg/kg-dry	0.20	96	74	131	1.9	20	
Chlorodibromomethane		0.573	mg/kg-dry	0.20	87	58	135	2.0	20	
Chloroethane		0.375	mg/kg-dry	0.20	57	53	140	7.8	20	
2-Chloroethyl vinyl ether		0.568	mg/kg-dry	0.20	86	67.2	113	2.8	20	

Qualifiers:

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ND - Not detected at the reporting limit.

S - Spike recovery outside of advisory limits.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 11/28/16

Project: Whitefish Solvent Site **Work Order:** H16110317

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B									Batch: 35286	
Lab ID: H16110317-001AMSD	53	Sample Matrix Spike Duplicate				Run: 1SATURN_161119C			11/20/16 00:11	
Chloroform		0.774	mg/kg-dry	0.20	118	65	126	6.3	20	
Chloromethane		0.577	mg/kg-dry	0.20	88	46	144	19	20	
2-Chlorotoluene		0.602	mg/kg-dry	0.20	92	72	137	5.9	20	
4-Chlorotoluene		0.607	mg/kg-dry	0.20	92	70	133	5.7	20	
1,2-Dibromoethane		0.586	mg/kg-dry	0.20	89	54	131	4.6	20	
Dibromomethane		0.563	mg/kg-dry	0.20	86	60	140	5.0	20	
1,2-Dichlorobenzene		0.673	mg/kg-dry	0.20	102	61	137	6.3	20	
1,3-Dichlorobenzene		0.640	mg/kg-dry	0.20	97	67	133	3.2	20	
1,4-Dichlorobenzene		0.611	mg/kg-dry	0.20	93	62	137	1.9	20	
Dichlorodifluoromethane		0.383	mg/kg-dry	0.20	58	38	132	2.2	20	
1,1-Dichloroethane		0.692	mg/kg-dry	0.20	105	66	124	9.4	20	
1,2-Dichloroethane		0.674	mg/kg-dry	0.20	102	54	125	0.6	20	
1,1-Dichloroethene		0.686	mg/kg-dry	0.20	104	64	113	6.3	20	
cis-1,2-Dichloroethene		0.812	mg/kg-dry	0.20	123	68	133	9.9	20	
trans-1,2-Dichloroethene		0.764	mg/kg-dry	0.20	116	70	130	4.1	20	
1,2-Dichloropropane		0.659	mg/kg-dry	0.20	100	78	143	9.9	20	
1,3-Dichloropropane		0.642	mg/kg-dry	0.20	98	63	140	4.7	20	
2,2-Dichloropropane		0.596	mg/kg-dry	0.20	91	71	137	4.5	20	
1,1-Dichloropropene		0.714	mg/kg-dry	0.20	108	66	136	2.2	20	
cis-1,3-Dichloropropene		0.599	mg/kg-dry	0.20	91	75	137	4.7	20	
trans-1,3-Dichloropropene		0.561	mg/kg-dry	0.20	85	70	107	12	20	
Ethylbenzene		0.574	mg/kg-dry	0.20	87	78	132	0.2	20	
Methyl tert-butyl ether (MTBE)		0.703	mg/kg-dry	0.20	107	57	132	7.5	20	
Methyl ethyl ketone		6.14	mg/kg-dry	4.0	93	50	150	0.2	20	
Methylene chloride		0.678	mg/kg-dry	0.20	103	62	125	8.6	20	
Styrene		0.658	mg/kg-dry	0.20	100	70	132	4.9	20	
1,1,1,2-Tetrachloroethane		0.659	mg/kg-dry	0.20	100	73	127	0.6	20	
1,1,2,2-Tetrachloroethane		0.659	mg/kg-dry	0.20	100	74	120	13	20	
Tetrachloroethene		0.652	mg/kg-dry	0.20	77	84	108	6.5	20	S
Toluene		0.572	mg/kg-dry	0.20	87	78	125	2.4	20	
1,1,1-Trichloroethane		0.846	mg/kg-dry	0.20	129	73	124	14	20	S
1,1,2-Trichloroethane		0.604	mg/kg-dry	0.20	92	78	114	8.5	20	
Trichloroethene		0.623	mg/kg-dry	0.20	95	70	144	8.1	20	
Trichlorofluoromethane		0.626	mg/kg-dry	0.20	95	60	128	4.0	20	
1,2,3-Trichloropropane		0.597	mg/kg-dry	0.20	91	63	148	10	20	
Vinyl chloride		0.631	mg/kg-dry	0.20	96	64	124	7.1	20	
m+p-Xylenes		1.16	mg/kg-dry	0.20	88	74	136	0.9	20	
o-Xylene		0.613	mg/kg-dry	0.20	93	70	134	3.1	20	
Surr: 1,2-Dichloroethane-d4				0.20	93	65	147			
Surr: Dibromofluoromethane				0.20	99	71	135			
Surr: p-Bromofluorobenzene				0.20	84	60	143			
Surr: Toluene-d8				0.20	81	76	133			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

S - Spike recovery outside of advisory limits.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 11/28/16

Project: Whitefish Solvent Site **Work Order:** H16110317

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B									Analytical Run: R120727	
Lab ID: 111916_CCV_25	53	Continuing Calibration Verification Standard							11/19/16 20:52	
Benzene		0.984	mg/kg	0.20	98	70	130			
Bromobenzene		1.00	mg/kg	0.20	100	70	130			
Bromochloromethane		0.944	mg/kg	0.20	94	70	130			
Bromodichloromethane		0.912	mg/kg	0.20	91	70	130			
Bromoform		0.936	mg/kg	0.20	94	70	130			
Bromomethane		1.18	mg/kg	0.20	118	70	130			
Carbon tetrachloride		0.984	mg/kg	0.20	98	70	130			
Chlorobenzene		0.992	mg/kg	0.20	99	70	130			
Chlorodibromomethane		0.920	mg/kg	0.20	92	70	130			
Chloroethane		0.888	mg/kg	0.20	89	70	130			
2-Chloroethyl vinyl ether		0.722	mg/kg	0.20	72	70	130			
Chloroform		1.02	mg/kg	0.20	102	80	120			
Chloromethane		0.960	mg/kg	0.20	96	70	130			
2-Chlorotoluene		0.904	mg/kg	0.20	90	70	130			
4-Chlorotoluene		0.944	mg/kg	0.20	94	70	130			
1,2-Dibromoethane		0.880	mg/kg	0.20	88	70	130			
Dibromomethane		0.880	mg/kg	0.20	88	70	130			
1,2-Dichlorobenzene		1.02	mg/kg	0.20	102	70	130			
1,3-Dichlorobenzene		0.992	mg/kg	0.20	99	70	130			
1,4-Dichlorobenzene		1.02	mg/kg	0.20	102	70	130			
Dichlorodifluoromethane		0.984	mg/kg	0.20	98	70	130			
1,1-Dichloroethane		1.08	mg/kg	0.20	108	70	130			
1,2-Dichloroethane		0.968	mg/kg	0.20	97	70	130			
1,1-Dichloroethene		1.02	mg/kg	0.20	102	80	120			
cis-1,2-Dichloroethene		1.07	mg/kg	0.20	107	70	130			
trans-1,2-Dichloroethene		1.06	mg/kg	0.20	106	70	130			
1,2-Dichloropropane		0.920	mg/kg	0.20	92	80	120			
1,3-Dichloropropane		0.920	mg/kg	0.20	92	70	130			
2,2-Dichloropropane		0.848	mg/kg	0.20	85	70	130			
1,1-Dichloropropene		0.968	mg/kg	0.20	97	70	130			
cis-1,3-Dichloropropene		0.904	mg/kg	0.20	90	70	130			
trans-1,3-Dichloropropene		0.976	mg/kg	0.20	98	70	130			
Ethylbenzene		0.952	mg/kg	0.20	95	80	120			
Methyl tert-butyl ether (MTBE)		0.968	mg/kg	0.20	97	70	130			
Methyl ethyl ketone		10.3	mg/kg	4.0	103	70	130			
Methylene chloride		1.10	mg/kg	0.20	110	70	130			
Styrene		1.01	mg/kg	0.20	101	70	130			
1,1,1,2-Tetrachloroethane		0.928	mg/kg	0.20	93	70	130			
1,1,2,2-Tetrachloroethane		0.928	mg/kg	0.20	93	70	130			
Tetrachloroethene		0.888	mg/kg	0.20	89	70	130			
Toluene		0.888	mg/kg	0.20	89	80	120			
1,1,1-Trichloroethane		1.06	mg/kg	0.20	106	70	130			
1,1,2-Trichloroethane		0.936	mg/kg	0.20	94	70	130			
Trichloroethene		0.928	mg/kg	0.20	93	70	130			

Qualifiers:

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QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 11/28/16

Project: Whitefish Solvent Site **Work Order:** H16110317

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B									Analytical Run: R120727	
Lab ID: 111916_CCV_25	53	Continuing Calibration Verification Standard							11/19/16 20:52	
Trichlorofluoromethane		0.976	mg/kg	0.20	98	70	130			
1,2,3-Trichloropropane		1.02	mg/kg	0.20	102	70	130			
Vinyl chloride		1.08	mg/kg	0.20	108	80	120			
m+p-Xylenes		1.84	mg/kg	0.20	92	70	130			
o-Xylene		0.952	mg/kg	0.20	95	70	130			
Surr: 1,2-Dichloroethane-d4				0.20	93	70	130			
Surr: Dibromofluoromethane				0.20	85	70	130			
Surr: p-Bromofluorobenzene				0.20	88	70	130			
Surr: Toluene-d8				0.20	79	70	130			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

Work Order Receipt Checklist

Trihydro-Laramie

H16110317

Login completed by: Tracy L. Lorash

Date Received: 11/17/2016

Reviewed by: BL2000\rwilliams

Received by: wjj

Reviewed Date: 11/20/2016

Carrier name: Hand Del

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	1.0°C On Ice		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	Not Applicable ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☐	Not Applicable ☑

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

Contact and Corrective Action Comments:

Samples left in locked entry. tl 11/17/16

ENERGY LABORATORIES

Chain of Custody and Analytical Request Record

PLEASE PRINT (Provide as much information as possible.)

Company Name: Trihydro

Report Mail Address (Required): cbullock@trihydro.com

☐ No Hard Copy Email: avann@trihydro.com

Invoice Address (Required):

☐ No Hard Copy Email: ap@trihydro.com

Project Name, PWS, Permit, Etc.: MDEQ Whitefish

Contact Name: Andrew Vann

Phone/Fax: 307 745 7474

Cell:

Invoice Contact & Phone:

Sample Origin State: MT

EPA/State Compliance: Yes ☐ No ☐

Sampler: (Please Print)

Purchase Order:

Quote/Bottle Order:

Special Report/Formats:

☐ DW
☐ POTW/WWTP
☐ State: _____
☐ Other: _____
☒ EDD/EDT (Electronic Data) Format: Trihydro
☐ LEVEL IV
☐ NELAC

ANALYSIS REQUESTED

Number of Containers
Sample Type: A W S V B O DW
Air Water Soils/Solids Vegetation Bioassay Other DW - Drinking Water

SEE ATTACHED

Standard Turnaround (TAT)

RUSH

Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments:

	SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	Total VOC Shortlist	Metals
1	Stockpile-01	11/10/16	1215	Soil	✓	✓
2						
3						
4						
5						
6						
7						
8						
9						
10						

LABORATORY USE ONLY

Shipped by: hand del left

Cooler ID(s): in bottle entry

Receipt Temp: 1.0 °C

On Ice: Y N

Custody Seal: On Bottle Y N; On Cooler Y N

Intact: Y N

Signature Match: Y N

H16110317

Custody Record MUST be Signed

Relinquished by (print): L Darnell Date/Time: 11/10/16 1000 Signature:

Relinquished by (print): Date/Time: Signature:

Received by (print): Date/Time: Signature:

Received by (print): Date/Time: Signature:

Received by Laboratory: Wanda Date/Time: 11-17-16 7:00 Signature:

Sample Disposal: Return to Client: _____ Lab Disposal: _____

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report.

Visit our web site at www.energylabs.com

Tier II Data Validation Report Summary

Client: Montana Department of Environmental Quality (MDEQ)	Laboratory: Energy Laboratories
Project Name: Whitefish Solvent Site	Sample Matrix: Soil
Project Number: 776-033-001	Sample Start Date: 11/16/2016
Date Validated: 11/29/2016	Sample End Date: 11/16/2016
Parameters Included: ▪ Volatile Organic Compounds (VOC) by Environmental Protection Agency (EPA) Test Methods for Evaluating Solid Waste (SW-846) Method 8260B ▪ Total Metals by SW-846 Method 6020 ▪ Total Mercury by SW-846 Method 7471B ▪ Soil Moisture by ASTM International Method D2974	
Laboratory Project ID: H16110317	
Data Validator: Charles Ballek, Senior Chemist	
Reviewer: Kyle Power, Environmental Chemist	

DATA EVALUATION CRITERIA SUMMARY

A Tier II Data Validation was performed by Trihydro Corporation's Chemical Data Evaluation Services Group on the analytical data report package generated by Energy Laboratories in Helena, Montana evaluating samples from the MDEQ Whitefish Solvent Site, located in Whitefish, Montana.

Precision, accuracy, method compliance, and completeness of this data package were assessed during this data review. Precision was determined by evaluating the calculated relative percent difference (RPD) values from:

- Laboratory duplicate pairs
- Matrix spike (MS) and matrix spike duplicate (MSD) pairs

Laboratory accuracy was established by reviewing the demonstrated percent recoveries (%R) of the following items to verify that data are not biased.

- MS/MSD samples
- Laboratory control samples (LCS) and laboratory fortified blanks (LFB)
- Organic system monitoring compounds (surrogates)

Method compliance was established by reviewing sample integrity, holding times, detection limits, surrogate recoveries, laboratory blanks, initial and continuing calibrations (where applicable) percent recoveries, and LCS/LFB percent recoveries against method-specific requirements.

Completeness was evaluated by determining the overall ratio of the number of samples and analyses planned versus the number of samples with valid analyses. Determination of completeness included a review of the chain-of-custody (CoC), laboratory analytical methods, and other laboratory and field documents associated with this analytical data set.

SAMPLE NUMBERS TABLE

Client Sample ID	Laboratory Sample Number
Stockpile - 01	H16110317-001

Tier II Data Validation Report Summary

The laboratory data were reviewed to evaluate compliance with the methods and the quality of the reported data. Assessment of CoC completeness is included in Item 3 of the Data Validation Checklist. A check mark (✓) indicates that the referenced validation criteria were deemed acceptable, whereas a crossed circle (⊗) indicates validation criteria for which the data have been qualified by the data validator. An empty circle (○) indicates that the specified criterion does not apply to the reviewed data. Details are noted in the tables below.

Validation Criteria

- ✓ Data Completeness
- ✓ CoC Documentation (Item 3)
- ✓ Holding Times and Preservation (Items 6 and 7)
- ✓ Initial and Continuing Calibrations (Item 9)
- ✓ Laboratory Blanks (Item 10)
- ⊗ MS/MSD (Item 12)
- ✓ LCS/LFB (Item 14)
- ✓ System Monitoring Compounds (i.e., Surrogates) (Item 16)
- ○ Field, Equipment, and Trip Blanks (Item 17)
- ○ Field Duplicates (Item 19)
- ✓ Laboratory Duplicates (Item 21)

Guidance References

Chemical data validation was conducted in accordance with the United States Environmental Protection Agency (USEPA) Contract Laboratory Program (CLP) National Functional Guidelines for the analyses listed below, or by the appropriate method if not covered in the National Functional Guidelines.

- Data for organic analyses were evaluated according to validation criteria set forth in the USEPA CLP National Functional Guidelines for Superfund Organic Methods Data Review, document number EPA-540-R-014-002, August 2014 with additional reference to the USEPA CLP National Functional Guidelines for Organic Data Review, document number EPA 540/R-99/008, October 1999.
- Data for inorganic analyses were evaluated according to validation criteria set forth in the USEPA CLP National Functional Guidelines for Inorganic Superfund Data Review, document number EPA-540-R-013-001, August 2014 with additional reference to the USEPA CLP National Functional Guidelines for Inorganic Data Review, document number EPA 540-R-04-004, October 2004.
- Project-specific Quality Assurance Project Plans (QAPP) data validation requirements, as applicable.
- Trihydro Data Validation Variance Documentation, February 2016.

Tier II Data Validation Report Summary

OVERALL DATA PACKAGE ASSESSMENT

Based on a data validation review, the data are acceptable as delivered. Data qualified by the laboratory are discussed in Item 2 of the Validation Criteria Checklist.

The purpose of validating data and assigning qualifiers is to assist in proper data interpretation. Data that are not qualified meet the site data quality objectives

Text identified in **bold font** in the Validation Criteria Checklist indicates that further action and/or qualification of the data were required. Data validation qualifiers were added for the items noted with crossed circles in the Validation Criteria section above. Please see the Data Qualification Summary table at the end of this report for a complete list of samples and analytes qualified.

Data qualifiers used during this validation are included in the following table.

Qualifier	Definition
UJ	Estimated reporting limit

Data Completeness

The analyses were performed as requested on the CoC records. The associated samples were received by the laboratory and analyzed properly unless otherwise noted in the Criteria Checklist below. The complete data package consisted of 59 data points. No data points were rejected. The data completeness measure for this data package is calculated to be 100% and is acceptable.

VALIDATION CRITERIA CHECKLIST	
1. Was the report free of non-conformances identified by the laboratory?	Yes
Comments: The laboratory did not identify non-conformances related to the analytical data in the report.	
2. Were the data free of data qualification flags and/or notes used by the laboratory? If no, define.	No
Comments: The laboratory applied the following data qualifier to results reported for this data set. S – Spike recovery outside of advisory limits. A – The analyte level was greater than four times the spike level. In accordance with the method % recovery is not calculated.	
3. Were sample CoC forms and procedures complete?	Yes
Comments: The CoC record from field to laboratory was complete and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. Custody seals were present and intact but not required since the samples were delivered to the laboratory by project personnel and custody was maintained at all times.	
4. Were detection limits in accordance with the quality assurance project plan (QAPP), permit, or method, or indicated as acceptable?	Yes
Comments: The detection limits appeared to be acceptable. Dilutions were applied to the samples for the following analyses. <u>Method 6020:</u> Dilutions of 10 times were applied to the sample Stockpile - 01 for the analyses of total metals. Final determination of the data quality based on detection limits will be established by the project team.	
5. Were the reported analytical methods and constituents in compliance with the QAPP, permit, or CoC?	Yes
Comments: The reported analytical methods were in compliance with the CoC and the laboratory reported the requested constituents in accordance with the CoC.	
6. Were samples received in good condition within method-specified requirements?	No
Comments: Samples were received in good condition as noted on the Sample Receipt Checklist. Samples were received on ice, in good condition, with the cooler temperature outside the recommended temperature range of 4°C ± 2°C at a temperature of 1.0°C as noted on the CoC and the *Work Order Receipt Checklist*. The cooler temperature below 2°C was judged as acceptable since the sample was not reported to be frozen upon receipt at the laboratory and the sample containers were reported to be intact. The laboratory indicated that the sample containers were intact and sufficient sample volume/mass was provided to complete the requested analyses.	
7. Were samples extracted/digested and analyzed within method-specified or technical holding times?	Yes
Comments: The samples were extracted/digested and analyzed within method-specific holding times.	
8. Were reported units appropriate for the sample matrix/matrices and analytical method(s)? Specify if wet or dry units were used for soil.	Yes
Comments: The analytical results for the submitted sample were reported in concentration units of milligrams per kilogram (mg/kg) and soil moisture was reported as percentage (%). These units were acceptable for the sample matrix and the analyses requested. The analytical results were reported on a dry weight basis.	

VALIDATION CRITERIA CHECKLIST

9. Did the laboratory provide any specific initial and/or continuing calibration results? Yes

Comments: Limited initial calibration verification and/or continuing calibration summary data for Methods 6020, 7471B, and 8260B were included as part of this data set. Full calibration data was not available for review.

10. If initial and/or continuing calibration results were provided, were the results within acceptable limits? Yes

Comments: The available initial and continuing calibration data were within acceptable limits.

11. Was the total number of laboratory blank samples prepared equal to at least 5% of the total number of samples or analyzed as required by the method? Yes

Comments: The total number of laboratory blank samples prepared was equal to at least 5% of the total number of samples. Method blanks are not required for moisture by Method D2974.

12. Were target analytes reported as not detected in the laboratory blanks? No

Comments: Target analytes were not detected in the laboratory blanks, with the following exceptions.

Arsenic, lead, and silver were detected in the method blank for Method 6020 batch 35309 at concentrations of 0.2 mg/kg, 0.3 mg/kg, and 0.10 mg/kg, respectively. Arsenic and lead were detected in the associated sample at concentrations above the reporting limit and greater than 10 times the blank level. Silver was not detected in the associated sample in batch 35309. Qualification of sample data was not required based on the method blank detections.

13. Was the total number of MS samples prepared equal to at least 5% of the total number of samples or analyzed as required by the method? Yes

Comments: The total number of matrix spike samples prepared was equal to at least 5% of the total number of samples. The matrix spike sample source for each analytical batch in this sample set has been indicated below. Matrix spike analyses were not prepared nor required for soil moisture analyses by Method D2974.

Method	Analytes	Batch	MS Sample Source
6020	Total Metals	35309	Stockpile - 01
7471B	Total Mercury	35287	Not Associated
8260B	VOC	35286	Stockpile - 01

Not Associated – The MS sample source was not associated with this project.

A post digestion spike was prepared for Method 6020 batch 35309 from sample Stockpile - 01. Serial dilutions were prepared for mercury by Method 7471B batch 35287 from samples not associated with this project.

VALIDATION CRITERIA CHECKLIST

14. For MS/MSDs prepared from project samples, were percent recoveries and RPDs within data validation or laboratory quality control (QC) limits? — No

Comments: The recoveries for the MS prepared from a project sample were within laboratory QC limits or the analyte concentration in the parent sample was greater than 4 times the spike added, with the following exceptions.

Method	Analyte	Batch	MS Recovery	MSD Recovery	MS/MSD QC Limits
8260B	Bromomethane	35286	131%	126%	40-121%
8260B	**Tetrachloroethene**	**35286**	**71%**	**77%**	**84-108%**
8260B	1,1,1-Trichloroethane	35286	Acceptable	129%	73-124%

Bromomethane and 1,1,1-trichloroethane were not detected in sample Stockpile - 01 and qualification of the results was not required based on the evidence of high bias.

Tetrachloroethene was not detected in sample Stockpile – 01 and the result was assigned a UJ qualifier due to evidence of potential low bias.

The percent recoveries and RPD values for MS/MSDs prepared from non-project samples were evaluated and considered but data were not qualified based on those results since matrix similarity to project samples could not be guaranteed.

15. Was the total number of LCSs analyzed equal to at least 5% of the total number of samples or analyzed as required by the method? — Yes

Comments: The total number of LCS and LFB samples analyzed was equal to at least 5% of the total number of samples. LCS were not prepared nor required for soil moisture analyses by Method D2974.

16. Were LCS/LCSD percent recoveries and LCS/LCSD RPDs within data validation or laboratory QC limits? — Yes

Comments: The LCS and LFB percent recoveries were within laboratory QC limits with the following exception.

The reported recovery for bromomethane in the LCS for batch 35286 was outside the laboratory acceptance limits of 40-121% at 147%. Bromomethane was not detected in sample Stockpile - 01 and qualification of the result was not required based on the evidence of high bias.

The laboratory did not analyze LCSDs for the batches reported in this data set.

17. Were surrogate recoveries within laboratory QC limits? — Yes

Comments: Surrogates recoveries for the submitted and QC samples were within laboratory limits.

18. Were the number of trip blank, field blank, and/or equipment blank samples collected equal to at least 10% of the total number of samples or as required by the project guidelines, QAPP, SAP, or permit? — No

Comments: Trip blank, field blank, and equipment blank samples were not submitted in this sample set.

19. Were target analytes reported as not detected in the trip blank, field blank, and/or equipment blank samples? — N/A

Comments: Trip blank, field blank, and equipment blank samples were not submitted in this sample set.

20. Was the number of field duplicates collected equal to at least 10% of the total number of samples or as required by the project guidelines, QAPP, SAP, or permit? — No

Comments: Field duplicate samples were not submitted in this sample set.

21. Were field duplicate RPD values within data validation QC limits (soil 0-50%, water 0-30%, or air 0-25%)? — N/A

Comments: Field duplicate samples were not submitted in this sample set.

VALIDATION CRITERIA CHECKLIST	
22. For laboratory duplicates prepared from project samples, were RPDs within laboratory QC limits?	N/A
Comments: A laboratory duplicate was prepared for soil moisture by Method D2974 batch R120670 from a sample not associated with this project. The RPD value for the laboratory duplicate sample prepared from the non-project sample was considered but data were not qualified based on this result since matrix similarity to project samples could not be guaranteed.	

DATA QUALIFICATION SUMMARY

Abbreviation	Reason
LR-MS	The MS and/or MSD percent recovery was less than the lower acceptable limit indicating possible matrix interference.

Analyte	Method	Field Sample ID	Lab Sample ID	Result	Limit	Units	Reviewer Qualifier	DV Flag Reasons
Tetrachloroethene	SW8260B	Stockpile - 01	H16110317-001	ND	0.2	mg/kg	UJ	LR-MS

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LABORATORY REPORT

January 19, 2017

Andrew Vann
Trihydro Corporation
2707 Broadwater Ave
Helena, MT 59601

RE: MDEQ Whitefish, Montana / 776033001

Dear Andrew:

Enclosed are the results of the samples submitted to our laboratory on December 30, 2016. For your reference, these analyses have been assigned our service request number P1606022.

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 Kelly Horiuchi at 10:56 am, Jan 19, 2017

Kelly Horiuchi
Laboratory Director

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: MDEQ Whitefish, Montana / 776033001

Service Request No: P1606022

CASE NARRATIVE

The samples were received intact under chain of custody on December 30, 2016 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.

Fixed Gases Analysis

The sample was analyzed for methane according to modified EPA Method 3C (single injection) using a gas chromatograph equipped with a thermal conductivity detector (TCD). This procedure is described in laboratory SOP VOA-EPA3C. This method is included on the laboratory's DoD-ELAP scope of accreditation, however it is not part of the NELAP accreditation.

Air-Phase Petroleum Hydrocarbons (APH) Analysis

The sample was also analyzed for total aliphatic and aromatic gasoline range hydrocarbons by gas chromatography/mass spectrometry according to the Method for the Determination of Air-Phase Petroleum Hydrocarbons (APH), Massachusetts Department of Environmental Protection, Revision 1, December, 2009. This method is included on the laboratory's NELAP scope of accreditation, however it is not part of the DoD-ELAP accreditation.

Significant non-petroleum related peaks (i.e. halogenated, oxygenated, terpenes, etc.) are subtracted from the hydrocarbon range areas when present. Any internal/tuning standards and target APH analytes eluting in the hydrocarbon ranges are also subtracted. Additionally, C_9-C_{10} Aromatic Hydrocarbons are excluded from the C_9-C_{12} Aliphatic Hydrocarbon range.

Volatile Organic Compound Analysis

The sample was also analyzed for volatile organic compounds in SIM and SCAN mode 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 spike recoveries of trans-1,2-dichloroethene and cis-1,2-dichloroethene in the Laboratory Control Sample (LCS) analyzed on January 9, 2017 were outside the Laboratory generated control criteria. The recovery errors equate to a potential high bias. However, the recoveries in question were within the method criteria, therefore the data quality is not significantly affected. No corrective action was taken.

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www.alsglobal.com

Client: Trihydro Corporation
Project: MDEQ Whitefish, Montana / 776033001

Service Request No: P1606022

The containers were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

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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	4068-003
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	T104704413-16-7
Utah DOH (NELAP)	http://health.utah.gov/lab/environmental-lab-certification/	CA016272016-6
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

Service Request: P1606022

Project ID: MDEQ Whitefish, Montana / 776033001

Date Received: 12/30/2016

Time Received: 08:55

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	2nd Pi (psig)	2nd Pf (psig)	3C Modified - Fxd Gases Can	MA APH 1.0 - MA VOC PH Can	TO-15 - VOC Cans	TO-15 - VOC SIM
MTN-PRE-STARTUP	P1606022-001	Air	12/22/2016	15:20	SC00311	-2.25	3.76	-0.94	5.37	X	X	X	X

ALS ENVIRONMENTAL
Sample Volume Correction for Helium Pressurization for SCAN Analysis

Sample ID	Pi	Pf	Sample Volume (L)	Adjusted Volume (L)
P1606022-001	-2.25	3.76	0.889	1.00

LH 1/11/17

ALS ENVIRONMENTAL
Sample Volume Correction for Helium Pressurization for SIM Analysis

Sample ID	Pi1	Pf1	Pi2	Pf2	DF	Sample Volume (L)	Adjusted Volume (L)
P1606022-001	-2.25	3.76	-0.94	5.37	2.16	0.834	1.00
P1606022-001DIL	-2.25	3.76	-0.94	5.37	2.16	0.083	0.100

Air - Chain of Custody Record & Analytical Service Request

Page 1 of 1

P1606022

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: 75553

Company Name & Address (Reporting Information): Trihydro Corporation, 1252 Commerce Drive, Laramie, WY 82070

Project Name: MDEQ Whitefish, Montana

Project Number: 77603300l

ALS Contact: Kelly Horiuchi

Project Manager: Andrew Vann

P.O. # / Billing Information: 16-385WO-2

Phone: (307) 745-7474

Fax:

Email Address for Result Reporting: AVann@trihydro.com

Sampler (Print & Sign): Joel Riebli (307) 760-2793

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	Analysis Method: TO-15: BTEX, MTBE, Naph MA APH HC's	Analysis Method: Sim-PCE, TCE, cis-Trans-1,2 DCE, VC	Comments e.g. Actual Preservative or specific instructions
(1) MTN-PRE-STARTUP		12/22/16	1520	SC00311	OA00964	-27.47	-2.65	6L	X		
(2) ~~MTN-PRE~~	~~AC01767~~	~~12/22/16~~	~~1614~~	~~AC01767~~	~~OA01148~~	~~-26.82~~	~~-0.74~~	~~6L~~	~~X~~		Do Not Analyze
(3) ~~MTN-POST~~	~~AC02180~~	~~12/22/16~~	~~1614~~	~~AC02180~~	~~OA00111~~	~~-26.88~~	~~-5.57~~	~~6L~~	~~X~~		Do not Analyze

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: Trihydro Units: ____

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date: 12/22/16	Time: 1750	Received by: (Signature)	Date: 12/30/16	Time: 0855
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank Temperature ____°C

ALS Environmental
Sample Acceptance Check Form

Client: Trihydro Corporation Work order: P1606022
Project: MDEQ Whitefish, Montana / 776033001
Sample(s) received on: 12/30/16 Date opened: 12/30/16 by: KKELPE

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
P1606022-001.01	6.0 L Source Can					
P1606022-002.01	6.0 L Ambient Can					
P1606022-003.01	6.0 L Ambient Can					

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Project ID: **MDEQ Whitefish, Montana / 776033001** ALS Project ID: P1606022

Methane

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD Date(s) Collected: 12/22/16
Analyst: Mike Conejo Date Received: 12/30/16
Sample Type: 6.0 L Summa Canister(s) Date Analyzed: 1/3/17
Test Notes:

Client Sample ID	ALS Sample ID	Canister Dilution Factor	Injection Volume ml(s)	**Result %, v/v**	MRL %, v/v	Data Qualifier
MTN-PRE-STARTUP	P1606022-001	1.48	0.10	ND	0.15	
Method Blank	P170103-MB	1.00	0.10	ND	0.10	

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

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Trihydro Corporation**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1606022
Client Project ID: **MDEQ Whitefish, Montana / 776033001** ALS Sample ID: P170103-LCS

Test Code: EPA Method 3C Modified Date Collected: NA
Instrument ID: HP5890 II/GC1/TCD Date Received: NA
Analyst: Mike Conejo Date Analyzed: 1/03/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	**Compound**	Spike Amount ppmV	**Result ppmV**	**% Recovery**	ALS Acceptance Limits	Data Qualifier
74-82-8	Methane	50,000	**50,300**	**101**	94-111	

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client:	**Trihydro Corporation**		
Client Sample ID:	**MTN-PRE-STARTUP**	ALS Project ID:	P1606022
Client Project ID:	**MDEQ Whitefish, Montana / 776033001**	ALS Sample ID:	P1606022-001
Test Code:	Massachusetts APH, Revision 1, December 2009	Date Collected:	12/22/16
Instrument ID:	Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16	Date Received:	12/30/16
Analyst:	Lusine Hakobyan	Date Analyzed:	1/4/17
Sample Type:	6.0 L Summa Canister	Volume(s) Analyzed:	1.00 Liter(s)
Test Notes:			
Container ID:	SC00311		

Initial Pressure (psig): -2.25 Final Pressure (psig): 3.76

Canister Dilution Factor: 1.48

Compound	**Result µg/m³**	MRL µg/m³	**Data Qualifier**
C_5 - C_8 Aliphatic Hydrocarbons[1,2]	**52**	30	
C_9 - C_{12} Aliphatic Hydrocarbons[1,3]	**16**	15	
C_9 - C_{10} Aromatic Hydrocarbons	**4.6**	3.7	

Significant non-petroleum related peaks (i.e. halogenated, oxygenated, terpenes, etc.) are subtracted from the hydrocarbon range areas when present.

[1]Hydrocarbon Range data from total ion chromatogram excluding any internal/tuning standards eluting in that range.

[2]C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target APH analytes eluting in that range.

[3]C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target APH Analytes eluting in that range and concentration of C_9-C_{10} Aromatic Hydrocarbons.

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client:	**Trihydro Corporation**		
Client Sample ID:	**Method Blank**	ALS Project ID:	P1606022
Client Project ID:	**MDEQ Whitefish, Montana / 776033001**	ALS Sample ID:	P170104-MB
Test Code:	Massachusetts APH, Revision 1, December 2009	Date Collected:	NA
Instrument ID:	Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16	Date Received:	NA
Analyst:	Lusine Hakobyan	Date Analyzed:	1/4/17
Sample Type:	6.0 L Summa Canister	Volume(s) Analyzed:	1.00 Liter(s)
Test Notes:			

Compound	**Result µg/m³**	MRL µg/m³	**Data Qualifier**
C_5 - C_8 Aliphatic Hydrocarbons[1,2]	ND	20	
C_9 - C_{12} Aliphatic Hydrocarbons[1,3]	ND	10	
C_9 - C_{10} Aromatic Hydrocarbons	ND	2.5	

Significant non-petroleum related peaks (i.e. halogenated, oxygenated, terpenes, etc.) are subtracted from the hydrocarbon range areas when present.

[1]Hydrocarbon Range data from total ion chromatogram excluding any internal/tuning standards eluting in that range.

[2]C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target APH analytes eluting in that range.

[3]C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target APH Analytes eluting in that range and concentration of C_9-C_{10} Aromatic Hydrocarbons.

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Trihydro Corporation**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1606022
Client Project ID: **MDEQ Whitefish, Montana / 776033001** ALS Sample ID: P170104-LCS

Test Code: Massachusetts APH, Revision 1, December 2009 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Lusine Hakobyan Date Analyzed: 1/4/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

Compound	Spike Amount µg/m³	**Result µg/m³**	**% Recovery**	ALS Acceptance Limits	**Data Qualifier**
C5 - C8 Aliphatic Hydrocarbons	213	**205**	**96**	70-130	
C9 - C12 Aliphatic Hydrocarbons	213	**226**	**106**	70-130	
C9 - C10 Aromatic Hydrocarbons	425	**390**	**92**	70-130	

ALS ENVIRONMENTAL

LABORATORY DUPLICATE SUMMARY RESULTS

Client: **Trihydro Corporation**
Client Sample ID: **MTN-PRE-STARTUP** ALS Project ID: P1606022
Client Project ID: **MDEQ Whitefish, Montana / 776033001** ALS Sample ID: P1606022-001DUP

Test Code: Massachusetts APH, Revision 1, December 2009 Date Collected: 12/22/16
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/30/16
Analyst: Lusine Hakobyan Date Analyzed: 1/4/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: SC00311

Initial Pressure (psig): -2.25 Final Pressure (psig): 3.76

Canister Dilution Factor: 1.48

Compound	Sample Result µg/m³	Duplicate Sample Result µg/m³	Average µg/m³	**% RPD**	RPD Limit	**Data Qualifier**
C_5 - C_8 Aliphatic Hydrocarbons[1,2]	51.7	53.4	52.55	**3**	30	
C_9 - C_{12} Aliphatic Hydrocarbons[1,3]	16.5	17.1	16.8	**4**	30	
C_9 - C_{10} Aromatic Hydrocarbons	4.59	4.59	4.59	**0**	30	

Significant non-petroleum related peaks (i.e. halogenated, oxygenated, terpenes, etc.) are subtracted from the hydrocarbon range areas when present.
[1]Hydrocarbon Range data from total ion chromatogram excluding any internal/tuning standards eluting in that range.
[2]C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target APH analytes eluting in that range.
[3]C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target APH Analytes eluting in that range and concentration of C_9-C_{10} Aromatic Hydrocarbons.
ND = Compound was analyzed for, but not detected.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **MTN-PRE-STARTUP** ALS Project ID: P1606022
Client Project ID: **MDEQ Whitefish, Montana / 776033001** ALS Sample ID: P1606022-001

Test Code: EPA TO-15 Modified Date Collected: 12/22/16
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/30/16
Analyst: Lusine Hakobyan Date Analyzed: 1/4/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: SC00311

Initial Pressure (psig): -2.25 Final Pressure (psig): 3.76

Canister Dilution Factor: 1.48

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.15	ND	0.041	
71-43-2	Benzene	**2.0**	0.15	**0.64**	0.046	
108-88-3	Toluene	**2.3**	0.74	**0.62**	0.20	
100-41-4	Ethylbenzene	ND	0.74	ND	0.17	
179601-23-1	m,p-Xylenes	**1.3**	0.74	**0.31**	0.17	
95-47-6	o-Xylene	ND	0.74	ND	0.17	
91-20-3	Naphthalene	**1.8**	0.74	**0.34**	0.14	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **Method Blank** ALS Project ID: P1606022
Client Project ID: **MDEQ Whitefish, Montana / 776033001** ALS Sample ID: P170104-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Lusine Hakobyan Date Analyzed: 1/4/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.10	ND	0.028	
71-43-2	Benzene	ND	0.10	ND	0.031	
108-88-3	Toluene	ND	0.50	ND	0.13	
100-41-4	Ethylbenzene	ND	0.50	ND	0.12	
179601-23-1	m,p-Xylenes	ND	0.50	ND	0.12	
95-47-6	o-Xylene	ND	0.50	ND	0.12	
91-20-3	Naphthalene	ND	0.50	ND	0.095	

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

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Client: **Trihydro Corporation**
Client Project ID: **MDEQ Whitefish, Montana / 776033001** ALS Project ID: P1606022

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date(s) Collected: 12/22/16
Analyst: Lusine Hakobyan Date(s) Received: 12/30/16
Sample Type: 6.0 L Summa Canister(s) Date(s) Analyzed: 1/4/17
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	P170104-MB	**105**	**100**	**91**	70-130	
Lab Control Sample	P170104-LCS	**102**	**97**	**94**	70-130	
MTN-PRE-STARTUP	P1606022-001	**104**	**97**	**96**	70-130	
MTN-PRE-STARTUP	P1606022-001DUP	**104**	**96**	**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 SUMMARY

Client: **Trihydro Corporation**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1606022
Client Project ID: **MDEQ Whitefish, Montana / 776033001** ALS Sample ID: P170104-LCS

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Lusine Hakobyan Date Analyzed: 1/4/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	213	**191**	**90**	69-113	
71-43-2	Benzene	212	**194**	**92**	65-107	
108-88-3	Toluene	212	**185**	**87**	59-118	
100-41-4	Ethylbenzene	212	**197**	**93**	68-122	
179601-23-1	m,p-Xylenes	424	**409**	**96**	68-123	
95-47-6	o-Xylene	212	**201**	**95**	68-122	
91-20-3	Naphthalene	214	**241**	**113**	62-136	

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: **MTN-PRE-STARTUP** ALS Project ID: P1606022
Client Project ID: **MDEQ Whitefish, Montana / 776033001** ALS Sample ID: P1606022-001DUP

Test Code: EPA TO-15 Modified Date Collected: 12/22/16
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/30/16
Analyst: Lusine Hakobyan Date Analyzed: 1/4/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: SC00311

Initial Pressure (psig): -2.25 Final Pressure (psig): 3.76

Canister Dilution Factor: 1.48

Compound	Sample Result µg/m³	Sample Result ppbV	**Duplicate Sample Result µg/m³**	**Duplicate Sample Result** ppbV	Average µg/m³	**% RPD**	RPD Limit	**Data Qualifier**
Methyl tert-Butyl Ether	ND	ND	ND	ND	-	-	25	
Benzene	2.03	0.635	2.06	0.645	2.045	**1**	25	
Toluene	2.34	0.621	2.34	0.620	2.34	**0**	25	
Ethylbenzene	ND	ND	ND	ND	-	-	25	
m,p-Xylenes	1.35	0.311	1.36	0.313	1.355	**0.7**	25	
o-Xylene	ND	ND	ND	ND	-	-	25	
Naphthalene	1.80	0.343	1.82	0.347	1.81	**1**	25	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation** ALS Project ID: P1606022

Client Project ID: **MDEQ Whitefish, Montana / 776033001**

Internal Standard Area and RT Summary

Test Code: EPA TO-15 Modified

Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Lab File ID: 01041702.D

Analyst: Lusine Hakobyan Date Analyzed: 1/4/17

Sample Type: 6.0 L Summa Canister(s) Time Analyzed: 05:05

Test Notes:

		IS1 (BCM)			IS2 (DFB)			IS3 (CBZ)		
		AREA	**#**	**RT**	**AREA**	**#**	**RT**	**AREA**	**#**	**RT**
	24 Hour Standard	294520		11.56	1466439		13.66	668502		17.93
	Upper Limit	412328		11.89	2053015		13.99	935903		18.26
	Lower Limit	176712		11.23	879863		13.33	401101		17.60
	Client Sample ID									
01	Method Blank	258999		11.55	1348669		13.66	584674		17.93
02	Lab Control Sample	282713		11.56	1409437		13.66	638264		17.93
03	MTN-PRE-STARTUP	280713		11.59	1396418		13.67	628973		17.93
04	MTN-PRE-STARTUP (Lab Duplicate)	285719		11.59	1413508		13.67	644281		17.93
05										
06										
07										
08										
09										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										

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

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **MTN-PRE-STARTUP** ALS Project ID: P1606022
Client Project ID: **MDEQ Whitefish, Montana / 776033001** ALS Sample ID: P1606022-001

Test Code: EPA TO-15 SIM Modified Date Collected: 12/22/16
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS19 Date Received: 12/30/16
Analyst: Cory Lewis Date Analyzed: 1/9/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes: 0.10 Liter(s)
Container ID: SC00311

Initial Pressure (psig): -2.25 Final Pressure (psig): 3.76
Initial Pressure 2 (psig): -0.94 Final Pressure 2 (psig): 5.37
Canister Dilution Factor: 2.16

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.054	ND	0.021	
156-60-5	trans-1,2-Dichloroethene	ND	0.054	ND	0.014	
156-59-2	cis-1,2-Dichloroethene	**2.3**	0.054	**0.57**	0.014	
79-01-6	Trichloroethene	**2.3**	0.054	**0.42**	0.010	
127-18-4	Tetrachloroethene	**340**	0.54	**51**	0.080	**D**

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **Method Blank** ALS Project ID: P1606022
Client Project ID: **MDEQ Whitefish, Montana / 776033001** ALS Sample ID: P170109-MB

Test Code: EPA TO-15 SIM Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS19 Date Received: NA
Analyst: Cory Lewis Date Analyzed: 1/9/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.025	ND	0.0098	
156-60-5	trans-1,2-Dichloroethene	ND	0.025	ND	0.0063	
156-59-2	cis-1,2-Dichloroethene	ND	0.025	ND	0.0063	
79-01-6	Trichloroethene	ND	0.025	ND	0.0047	
127-18-4	Tetrachloroethene	ND	0.025	ND	0.0037	

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

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Client: **Trihydro Corporation**
Client Project ID: **MDEQ Whitefish, Montana / 776033001** ALS Project ID: P1606022

Test Code: EPA TO-15 SIM Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS19 Date(s) Collected: 12/22/16
Analyst: Cory Lewis Date(s) Received: 12/30/16
Sample Type: 6.0 L Summa Canister(s) Date(s) Analyzed: 1/9/17
Test Notes:

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4 % Recovered	Toluene-d8 % Recovered	Bromofluorobenzene % Recovered	Acceptance Limits	Data Qualifier
Method Blank	P170109-MB	**107**	**103**	**97**	70-130	
Lab Control Sample	P170109-LCS	**107**	**105**	**105**	70-130	
MTN-PRE-STARTUP	P1606022-001	**111**	**109**	**102**	70-130	
MTN-PRE-STARTUP	P1606022-001DUP	**111**	**109**	**105**	70-130	

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

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Trihydro Corporation**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1606022
Client Project ID: **MDEQ Whitefish, Montana / 776033001** ALS Sample ID: P170109-LCS

Test Code: EPA TO-15 SIM Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS19 Date Received: NA
Analyst: Cory Lewis Date Analyzed: 1/9/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
75-01-4	Vinyl Chloride	4.20	**4.22**	**100**	58-117	
156-60-5	trans-1,2-Dichloroethene	4.27	**4.67**	**109**	72-107	**L**
156-59-2	cis-1,2-Dichloroethene	4.24	**4.61**	**109**	73-108	**L**
79-01-6	Trichloroethene	4.25	**4.24**	**100**	66-101	
127-18-4	Tetrachloroethene	4.25	**4.02**	**95**	66-105	

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.
L = Laboratory control sample recovery outside the specified limits; results may be biased high.

ALS ENVIRONMENTAL

LABORATORY DUPLICATE SUMMARY RESULTS

Client: **Trihydro Corporation**
Client Sample ID: **MTN-PRE-STARTUP** ALS Project ID: P1606022
Client Project ID: **MDEQ Whitefish, Montana / 776033001** ALS Sample ID: P1606022-001DUP

Test Code: EPA TO-15 SIM Modified Date Collected: 12/22/16
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS19 Date Received: 12/30/16
Analyst: Cory Lewis Date Analyzed: 1/9/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes: 0.10 Liter(s)
Container ID: SC00311

Initial Pressure (psig): -2.25 Final Pressure (psig): 3.76
Initial Pressure 2 (psig): -0.94 Final Pressure 2 (psig): 5.37
Canister Dilution Factor: 2.16

CAS #	Compound	Sample Result µg/m³	Sample Result ppbV	Duplicate Sample Result µg/m³	Duplicate Sample Result ppbV	Average µg/m³	% RPD	RPD Limit	Data Qualifier
75-01-4	Vinyl Chloride	ND	ND	ND	ND	-	-	25	
156-60-5	trans-1,2-Dichloroethene	ND	ND	ND	ND	-	-	25	
156-59-2	cis-1,2-Dichloroethene	2.27	0.573	2.31	0.584	2.29	**2**	25	
79-01-6	Trichloroethene	2.25	0.419	2.29	0.426	2.27	**2**	25	
127-18-4	Tetrachloroethene	344	50.7	349	51.4	346.5	**1**	25	**D**

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Project ID: **MDEQ Whitefish, Montana / 776033001** ALS Project ID: P1606022

Internal Standard Area and RT Summary

Test Code: EPA TO-15 SIM Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/7890A/MS19 Lab File ID: 01091703.D
Analyst: Cory Lewis Date Analyzed: 1/9/17
Sample Type: 6.0 L Summa Canister(s) Time Analyzed: 08:52
Test Notes:

		IS1 (BCM)			IS2 (DFB)			IS3 (CBZ)		
		AREA	#	RT	#	AREA	#	RT	#	AREA	#	RT	#
	24 Hour Standard	46523		9.76		239781		11.71		37085		16.05	
	Upper Limit	65132		10.09		335693		12.04		51919		16.38	
	Lower Limit	27914		9.43		143869		11.38		22251		15.72	
	Client Sample ID												
01	Method Blank	40475		9.79		200779		11.72		32822		16.06	
02	Lab Control Sample	40579		9.76		208791		11.71		33427		16.05	
03	MTN-PRE-STARTUP	41551		9.79		215442		11.73		35144		16.05	
04	MTN-PRE-STARTUP (Lab Duplicate)	42357		9.79		220293		11.73		36531		16.05	
05	MTN-PRE-STARTUP (Dilution)	38170		9.77		195968		11.72		31482		16.05	
06	MTN-PRE-STARTUP (Lab Duplicate - Dilution)	37258		9.77		188331		11.72		30681		16.06	
07													
08													
09													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													

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

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

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

Quantitation Report (QT Reviewed)

Data Path : I:\GC01\DATA\FXG\2017_01\03\
Data File : 01031707.D
Signal(s) : TCD1A.CH
Acq On : 3 Jan 2017 11:08 am
Operator : MC
Sample : 6022-001
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 04 10:55:05 2017
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 22:12:55 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.000	0	N.D.	ppm
2)	Oxygen	2.169	218327	144274.993	ppm
3)	Nitrogen	2.315	885595	505124.067	ppm
4)	Carbon Monoxide	0.000	0	N.D.	ppm
5)	Methane	0.000	0	N.D.	ppm
6)	Carbon Dioxide	6.722	685	337.407	ppm

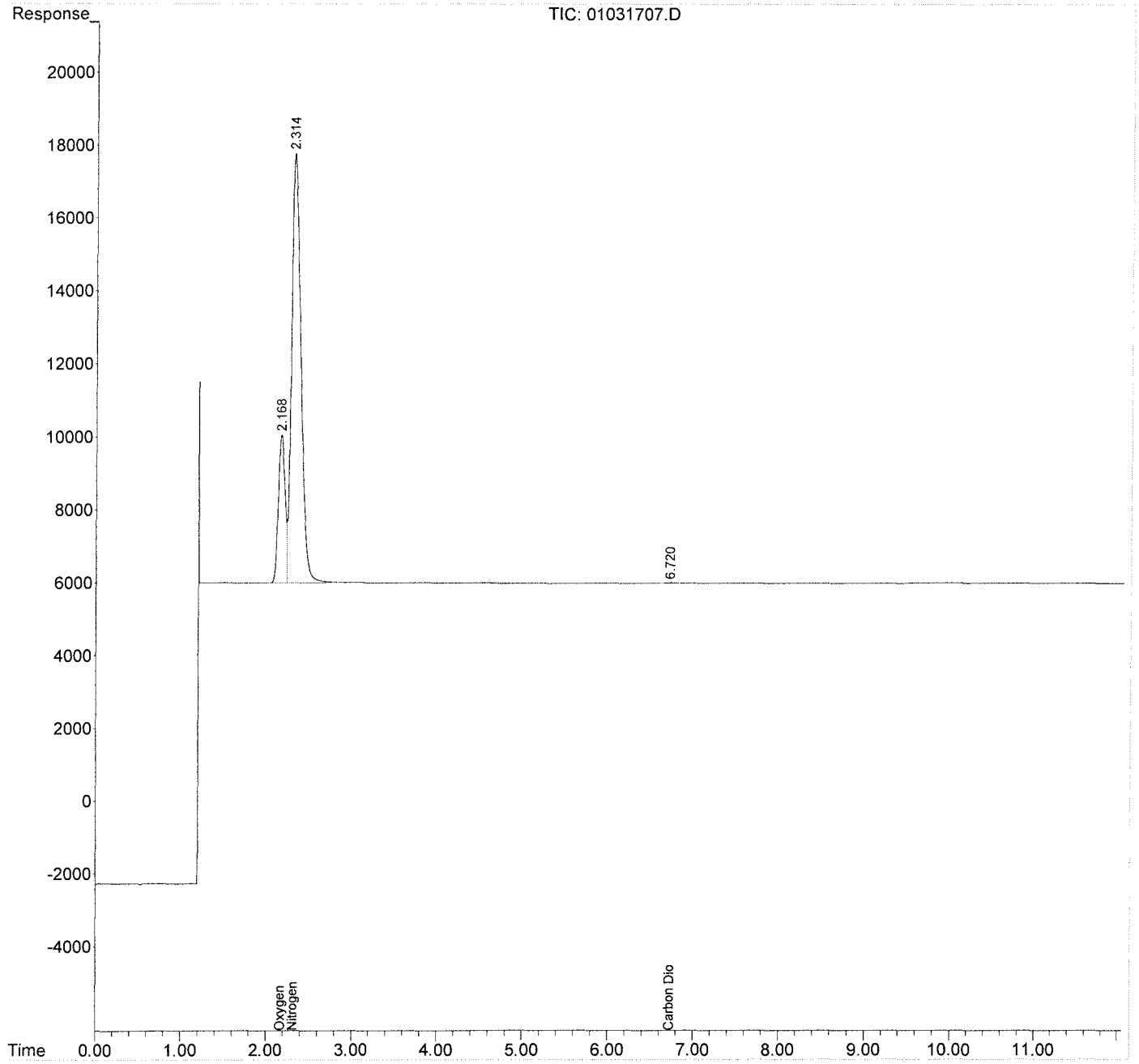
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : I:\GC01\DATA\FXG\2017_01\03\
Data File : 01031707.D
Signal(s) : TCD1A.CH
Acq On : 3 Jan 2017 11:08 am
Operator : MC
Sample : 6022-001
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 04 10:55:05 2017
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 22:12:55 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : I:\GC01\DATA\FXG\2017_01\03\
Data File : 01031703.D
Signal(s) : TCD1A.CH
Acq On : 3 Jan 2017 9:59 am
Operator : MC
Sample : mb
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 03 10:14:45 2017
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 22:12:55 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.000	0	N.D.	ppm
2)	Oxygen	0.000	0	N.D.	ppm
3)	Nitrogen	0.000	0	N.D.	ppm
4)	Carbon Monoxide	0.000	0	N.D.	ppm
5)	Methane	0.000	0	N.D.	ppm
6)	Carbon Dioxide	0.000	0	N.D.	ppm

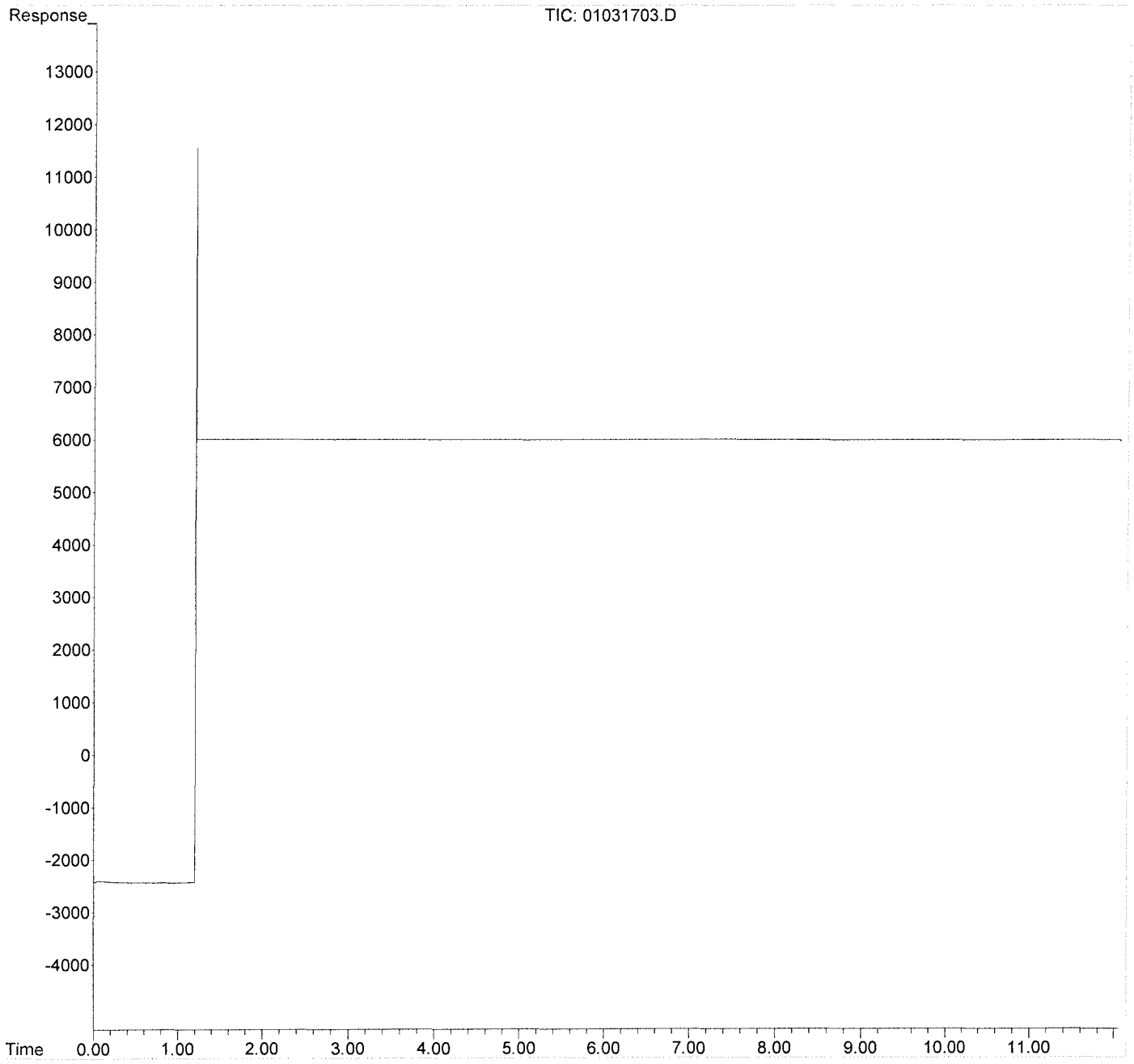
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : I:\GC01\DATA\FXG\2017_01\03\
Data File : 01031703.D
Signal(s) : TCD1A.CH
Acq On : 3 Jan 2017 9:59 am
Operator : MC
Sample : mb
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 03 10:14:45 2017
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 22:12:55 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : I:\GC01\DATA\FXG\2017_01\03\
Data File : 01031705.D
Signal(s) : TCD1A.CH
Acq On : 3 Jan 2017 10:32 am
Operator : MC
Sample : lcs s30-12201601
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 03 11:00:21 2017
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 22:12:55 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

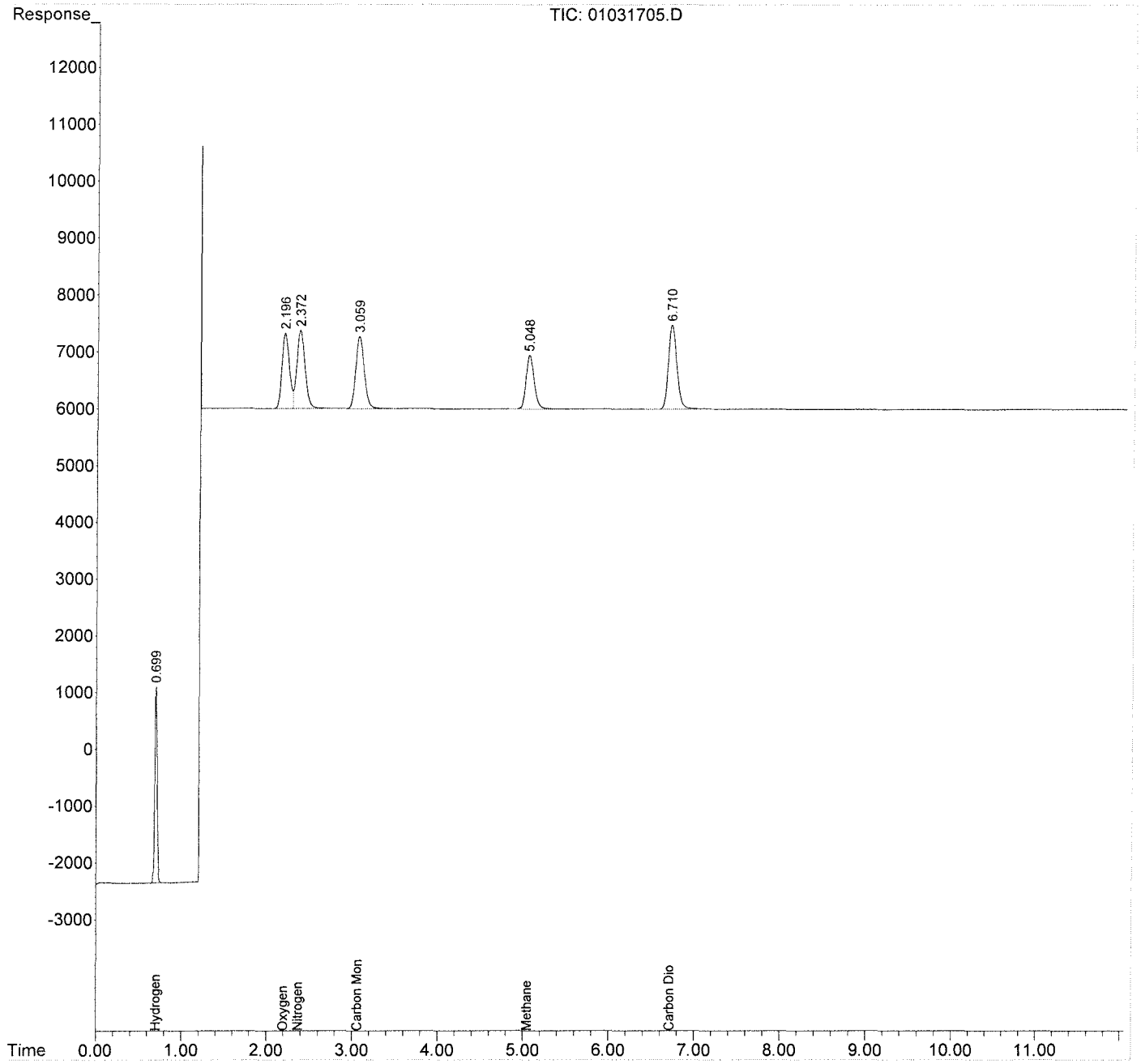
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.700	67210	51017.002	ppm
2)	Oxygen	2.198	80189	52990.239	ppm
3)	Nitrogen	2.373	92679	52862.031	ppm
4)	Carbon Monoxide	3.060	88531	52158.678	ppm
5)	Methane	5.050	63319	50299.208	ppm
6)	Carbon Dioxide	6.712	101778	50154.308	ppm

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

Data Path : I:\GC01\DATA\FXG\2017_01\03\
Data File : 01031705.D
Signal(s) : TCD1A.CH
Acq On : 3 Jan 2017 10:32 am
Operator : MC
Sample : lcs s30-12201601
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 03 11:00:21 2017
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 22:12:55 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Response Factor Report GC01_FXG

Method Path : I:\GC01\METHODS\
Method File : 3C012416.M
Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
Last Update : Sun Jan 24 22:12:55 2016
Response Via : Initial Calibration

Calibration Files

0.1	=01241627.D	0.5	=01241628.D	1	=01241629.D
4	=01241631.D	16	=01241632.D	CO2	=01241633.D

	Compound	0.1	0.5	1	4	16	CO2	Avg	%RSD
1)	Hydrogen	1.295	1.311	1.271	1.247	1.260		1.317 E1	7.72
2)	Oxygen	1.471	1.599	1.556	1.522	1.454		1.513 E1	3.72
3)	Nitrogen	1.968	1.935	1.742	1.703	1.632		1.753 E1	9.60
4)	Carbon Monoxide	1.656	1.801	1.725	1.689	1.616		1.697 E1	4.15
5)	Methane	1.200	1.368	1.293	1.263	1.198		1.259 E1	5.14
6)	Carbon Dioxide	2.060	2.178	2.092	2.038	1.929	1.879	2.029 E1	5.38

(#) = Out of Range ### Number of calibration levels exceeded format ###

Calibration Status Report GC01_FXG

Method Path : I:\GC01\METHODS\
Method File : 3C012416.M
Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
Last Update : Sun Jan 24 22:12:55 2016
Response Via : Initial Calibration

#	ID	Conc	ISTD Conc	Path\File
1	0.1	100	0	J:\GC01\DATA\FXG\2016_01\24\01241627.D
2	0.5	500	0	J:\GC01\DATA\FXG\2016_01\24\01241628.D
3	1	1000	0	J:\GC01\DATA\FXG\2016_01\24\01241629.D
4	4	4000	0	J:\GC01\DATA\FXG\2016_01\24\01241631.D
5	16	16667	0	J:\GC01\DATA\FXG\2016_01\24\01241632.D
6	CO2	99800	0	J:\GC01\DATA\FXG\2016_01\24\01241633.D
7	CH4	99000	0	J:\GC01\DATA\FXG\2016_01\24\01241634.D
8	H2	42020	0	J:\GC01\DATA\FXG\2016_01\24\01241635.D
9	n2	100000	0	J:\GC01\DATA\FXG\2016_01\24\01241637.D
10	o2	100000	0	J:\GC01\DATA\FXG\2016_01\24\01241639.D

#	ID	Update Time	Quant Time	Acquisition Time
1	0.1	Jan 24 19:51 2016	Jan 24 19:50 2016	24 Jan 2016 16:38
2	0.5	Jan 24 19:52 2016	Jan 24 19:51 2016	24 Jan 2016 17:24
3	1	Jan 24 19:53 2016	Jan 24 19:52 2016	24 Jan 2016 17:40
4	4	Jan 24 21:18 2016	Jan 24 19:55 2016	24 Jan 2016 18:16
5	16	Jan 24 19:57 2016	Jan 24 19:57 2016	24 Jan 2016 18:33
6	CO2	Jan 24 20:00 2016	Jan 24 19:58 2016	24 Jan 2016 19:02
7	CH4	Jan 24 20:36 2016	Jan 24 20:36 2016	24 Jan 2016 20:04
8	H2	Jan 24 20:56 2016	Jan 24 20:56 2016	24 Jan 2016 20:39
9	n2	Jan 24 21:35 2016	Jan 24 21:35 2016	24 Jan 2016 21:19
10	o2	Jan 24 22:12 2016	Jan 24 22:12 2016	24 Jan 2016 21:56

3C012416.M Sun Feb 07 17:55:16 2016

Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241627.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 16:38
Operator : WH
Sample : std 0.1% S11-12041504
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 19:50:44 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 19:47:27 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Hydrogen	0.712	1295	1008.184	ppm	
2)	Oxygen	2.227	1471	938.454	ppm	m
3)	Nitrogen	2.403	1968	997.840	ppm	m
4)	Carbon Monoxide	3.111	1656	1000.000	ppm	
5)	Methane	5.087	1200	1000.000	ppm	
6)	Carbon Dioxide	6.744	2060	1000.000	ppm	

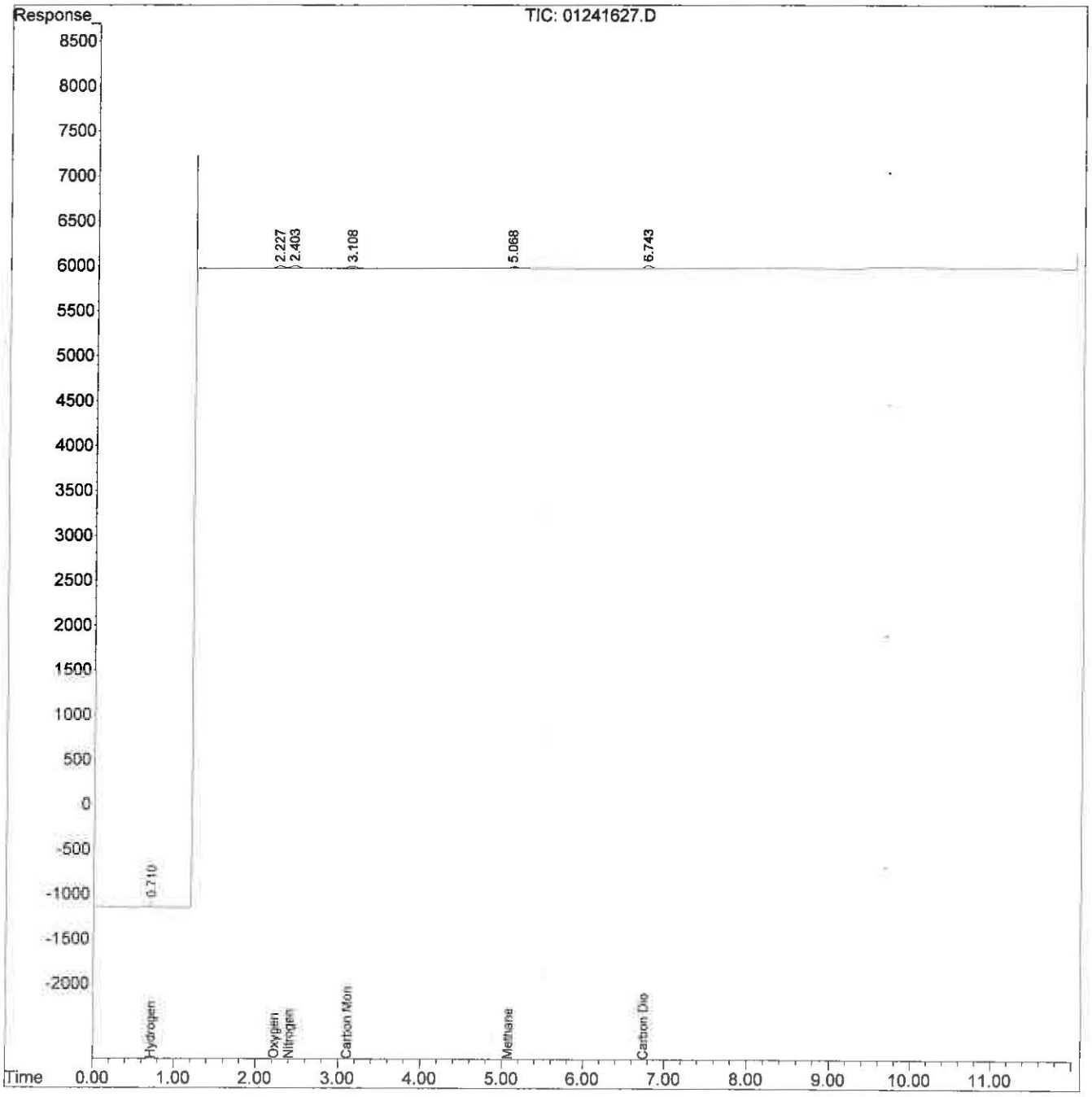
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241627.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 16:38
Operator : WH
Sample : std 0.1% S11-12041504
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autointl.e
Quant Time: Jan 24 19:50:44 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 19:47:27 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

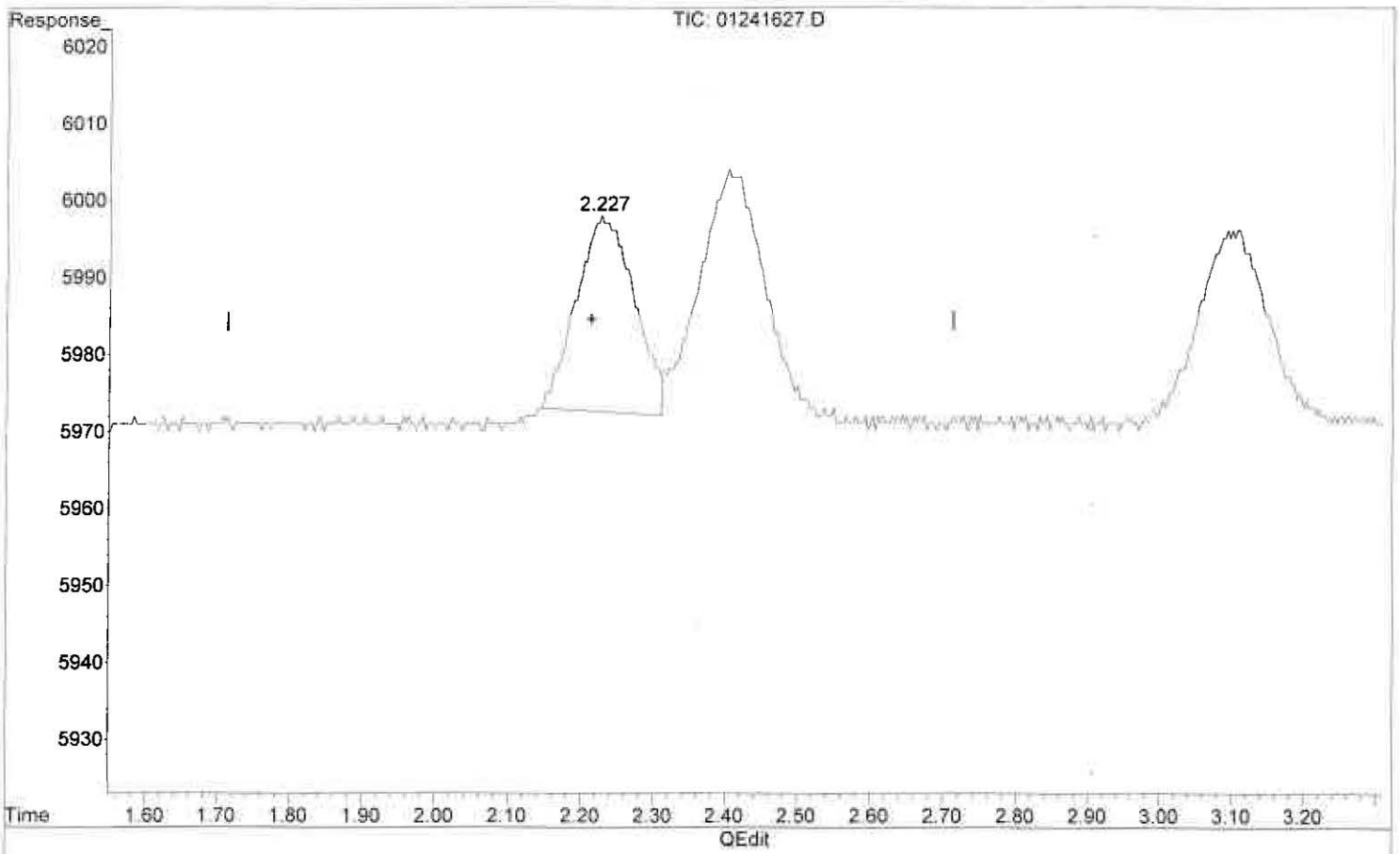


Quantitation Report (Qedit)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241627.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 16:38
Operator : WH
Sample : std 0.1% S11-12041504
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 19:49:57 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 19:47:27 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



(2) Oxygen

2.229min 876.764 ppm

response 1374

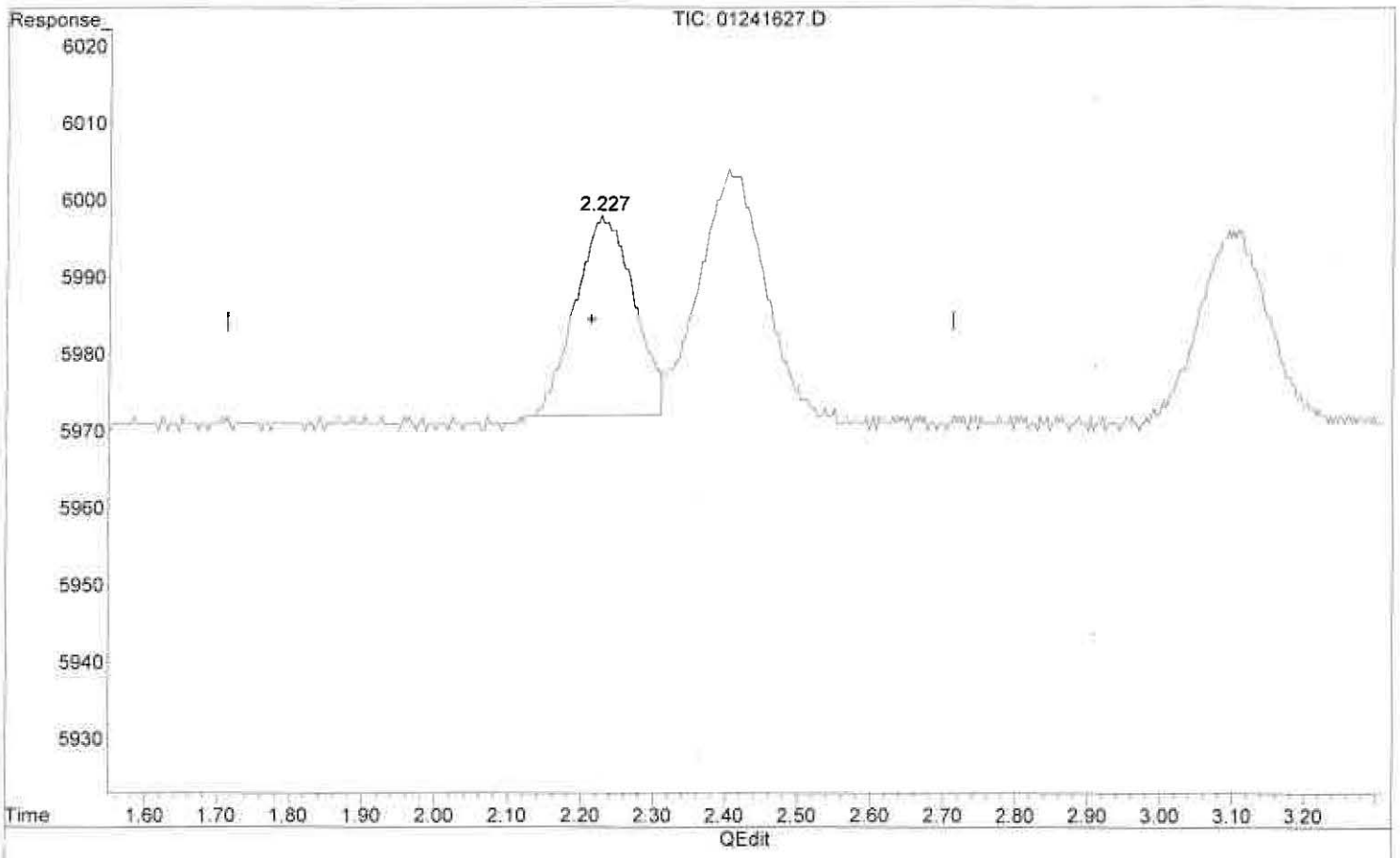
(+) = Expected Retention Time

Quantitation Report (Qedit)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241627.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 16:38
Operator : WH
Sample : std 0.1% S11-12041504
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 19:49:57 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 19:47:27 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



(2) Oxygen

2.227min 938.454 ppm m

response 1471

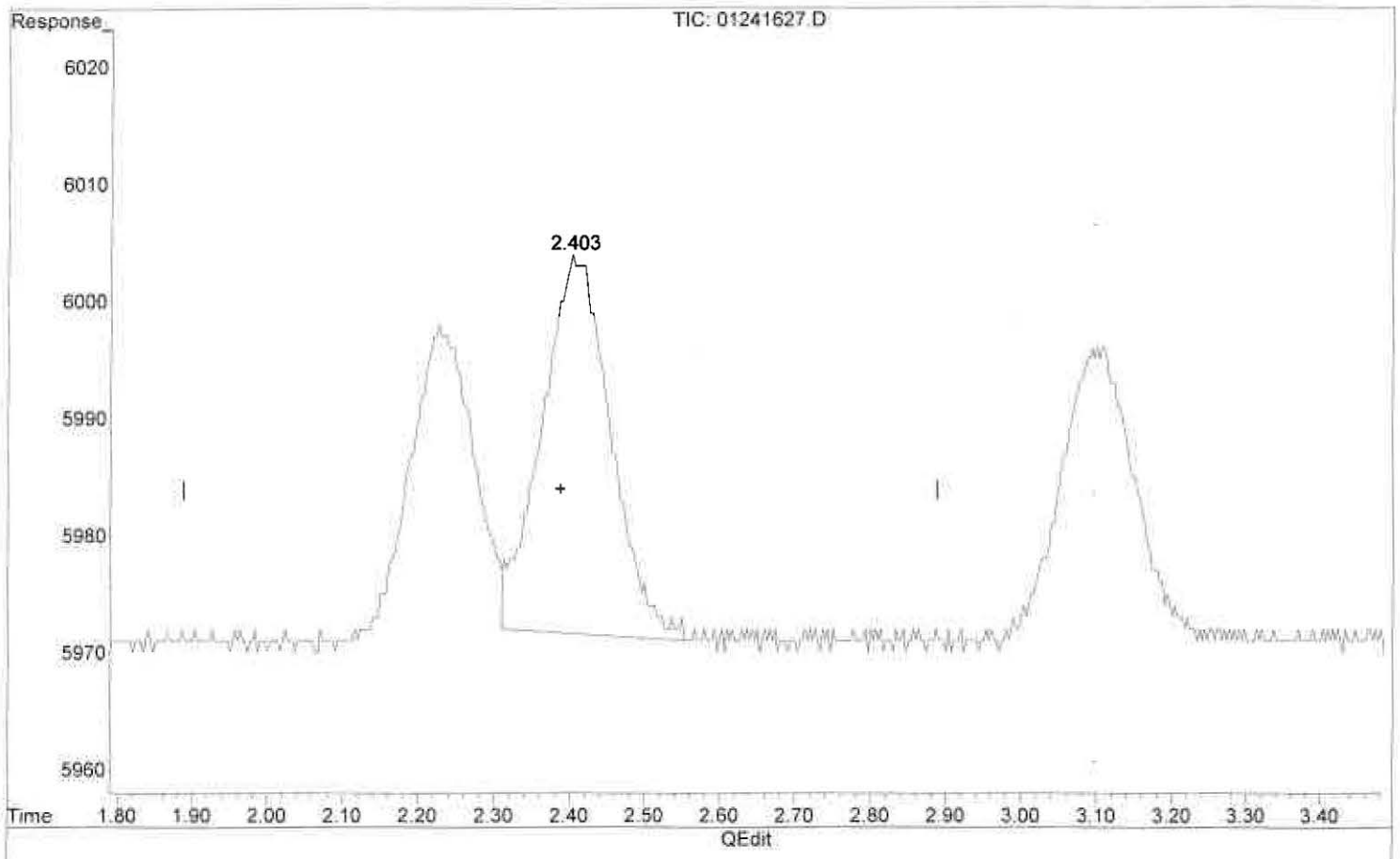
(+) = Expected Retention Time

Quantitation Report (Qedit)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241627.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 16:38
Operator : WH
Sample : std 0.1% S11-12041504
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autointl.e
Quant Time: Jan 24 19:49:57 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 19:47:27 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



(3) Nitrogen

2.417min 1033.747 ppm

response 2039

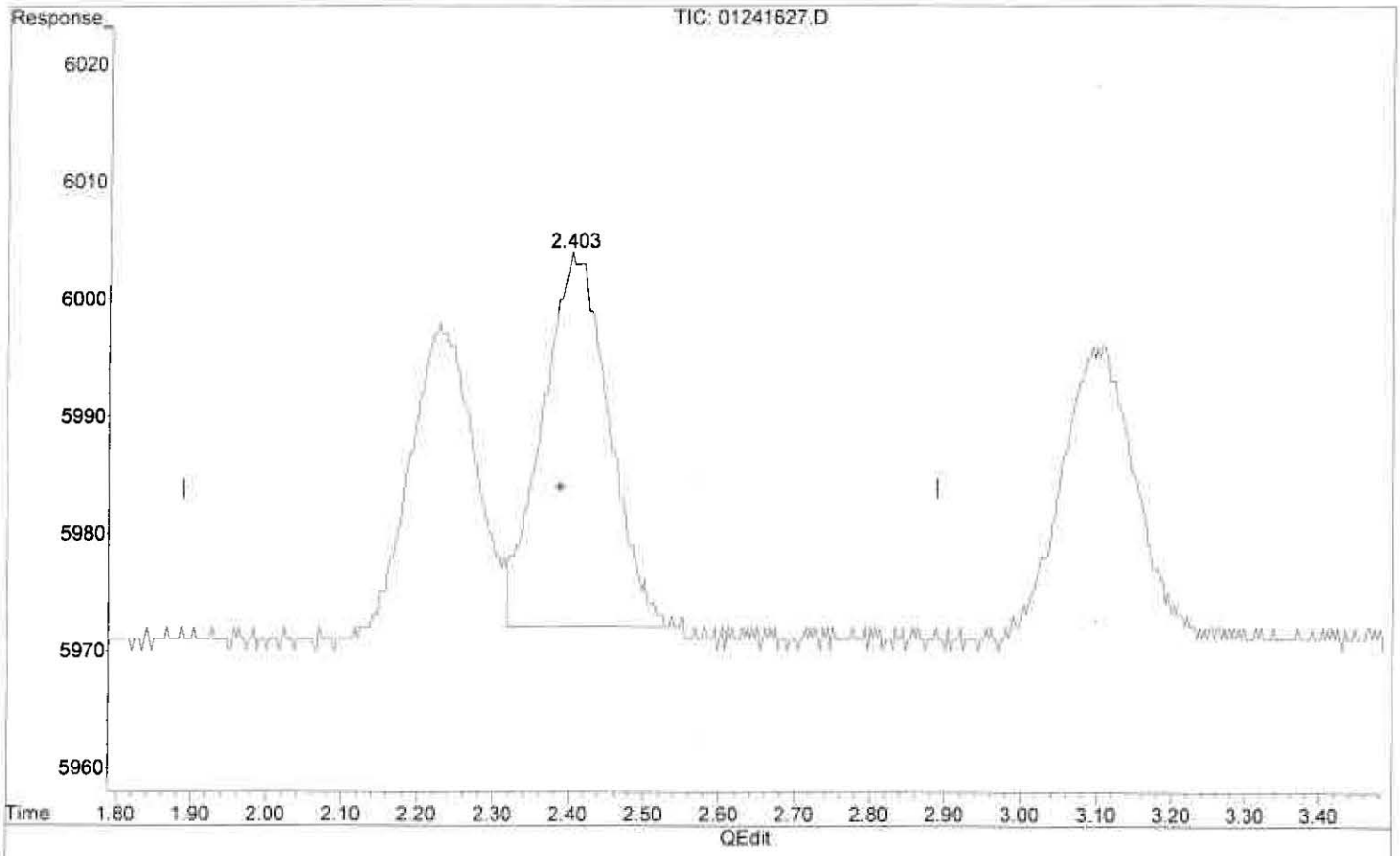
(+) = Expected Retention Time

Quantitation Report (Qedit)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241627.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 16:38
Operator : WH
Sample : std 0.1% S11-12041504
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 19:49:57 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 19:47:27 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



(3) Nitrogen

2.403min 997.840 ppm m

response 1968

2/6/6 1/24/15

(+) = Expected Retention Time

Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241628.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 17:24
Operator : WH
Sample : std 0.5% S11-12041503
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 19:51:53 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 19:51:09 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.702	6556	5060.912	ppm
2)	Oxygen	2.216	7996	5436.317	ppm
3)	Nitrogen	2.394	9673	4915.911	ppm
4)	Carbon Monoxide	3.085	9006	5437.603	ppm
5)	Methane	5.072	6838	5699.991	ppm
6)	Carbon Dioxide	6.739	10890	5286.885	ppm

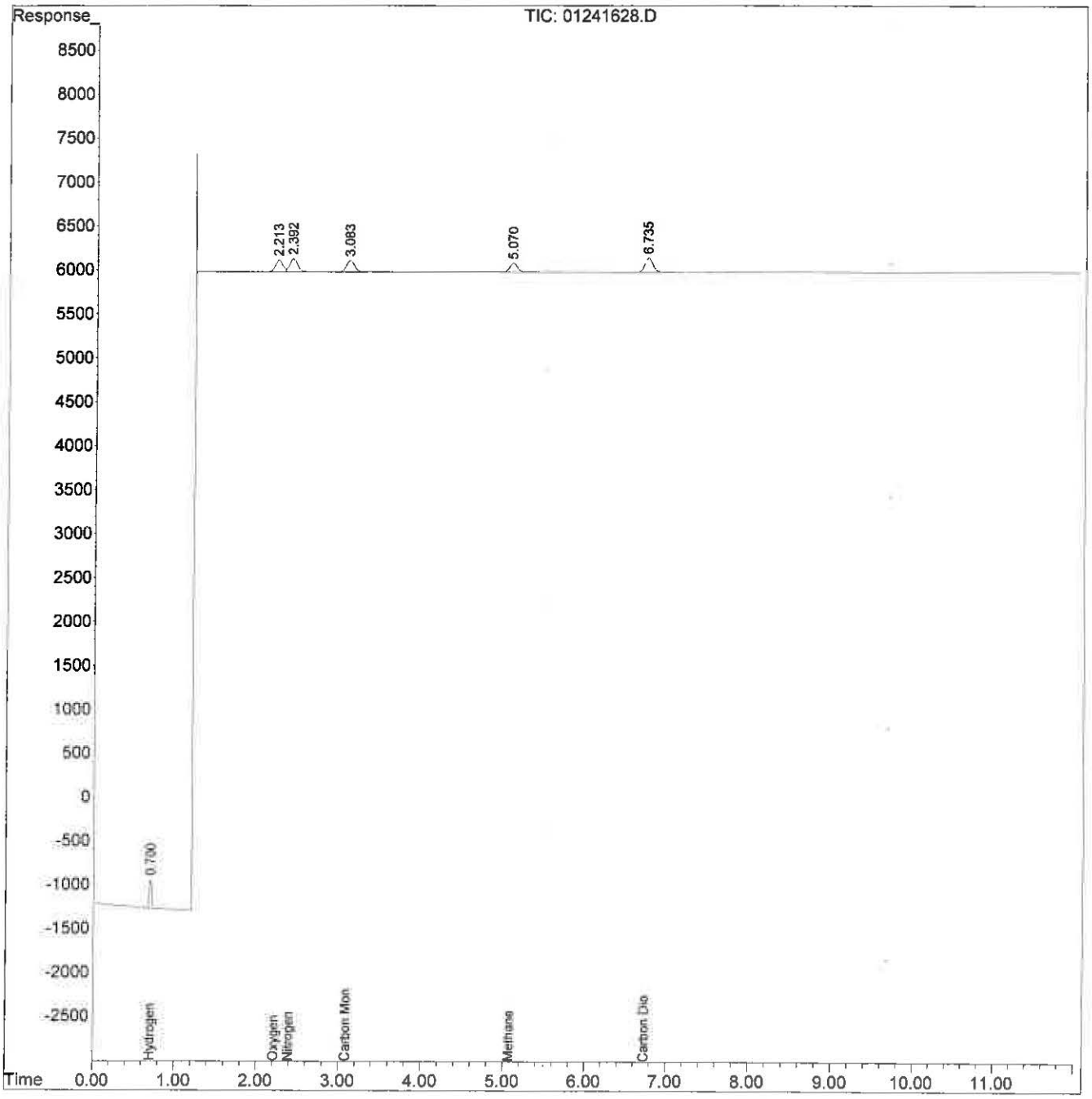
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241628.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 17:24
Operator : WH
Sample : std 0.5% S11-12041503
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 19:51:53 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 19:51:09 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241629.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 17:40
Operator : WH
Sample : std 1% S11-12041502
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 19:52:57 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 19:52:26 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc Units
Target Compounds				
1)	Hydrogen	0.702	12714	9754.784 ppm
2)	Oxygen	2.205	15559	10136.011 ppm
3)	Nitrogen	2.380	17417	8926.254 ppm
4)	Carbon Monoxide	3.070	17245	9976.228 ppm
5)	Methane	5.066	12928	10072.291 ppm
6)	Carbon Dioxide	6.734	20915	9870.566 ppm

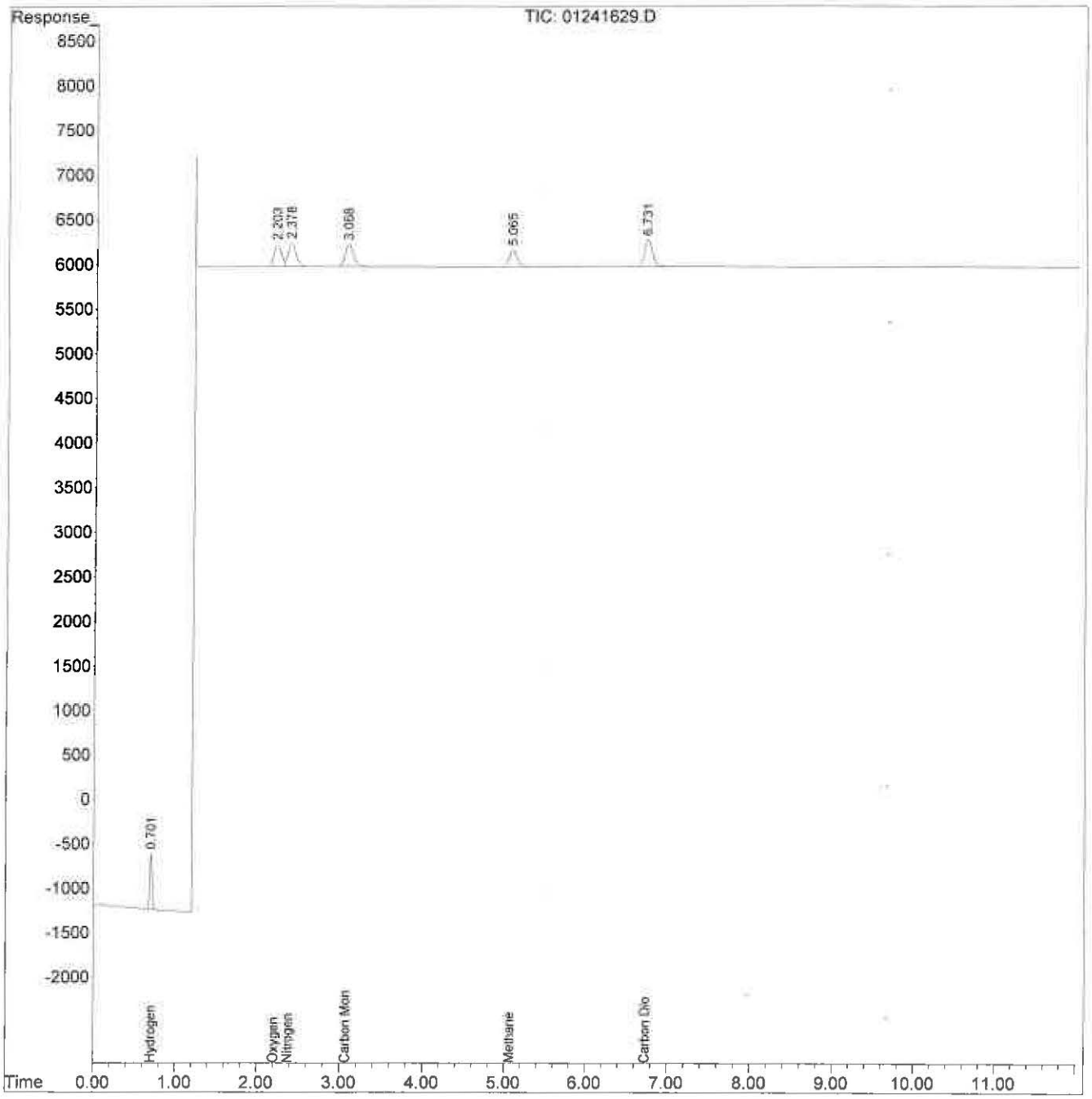
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241629.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 17:40
Operator : WH
Sample : std 1% S11-12041502
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autointl.e
Quant Time: Jan 24 19:52:57 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 19:52:26 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241631.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 18:16
Operator : WH
Sample : std 4% S11-12041501
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 19:55:30 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 19:54:31 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.710	49891	38867.951	ppm
2)	Oxygen	2.225	60887	39358.143	ppm
3)	Nitrogen	2.402	68113	36714.941	ppm
4)	Carbon Monoxide	3.089	67550	39160.311	ppm
5)	Methane	5.075	50534	39329.825	ppm
6)	Carbon Dioxide	6.737	81525	38955.184	ppm

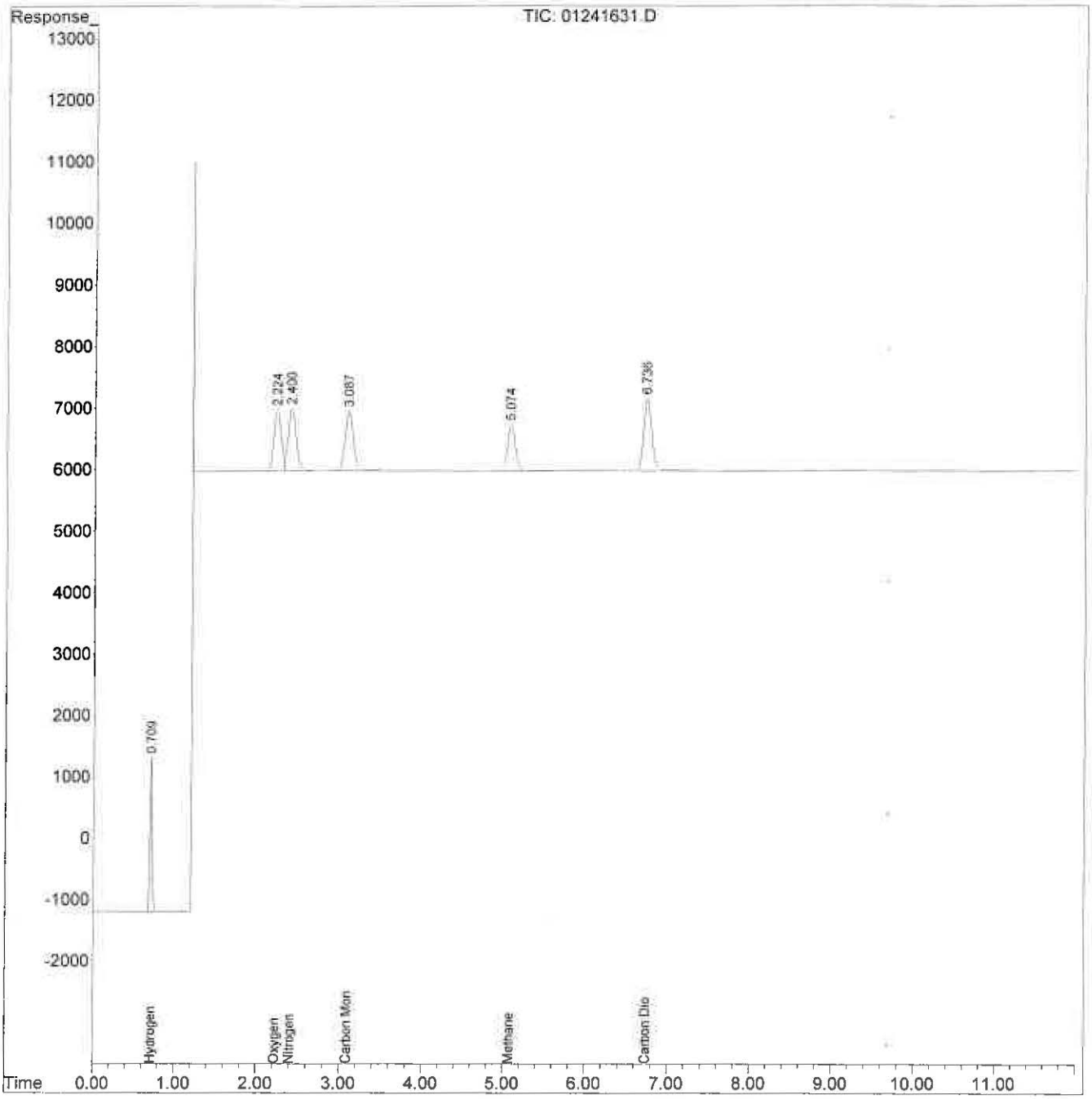
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241631.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 18:16
Operator : WH
Sample : std 4% S11-12041501
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 19:55:30 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 19:54:31 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Quantitation Report (Not Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241632.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 18:33
Operator : WH
Sample : std 16.66% S11-12031501
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 19:57:29 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 19:54:31 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.704	209940	163554.818	ppm
2)	Oxygen	2.201	242272	156607.855	ppm
3)	Nitrogen	2.379	271989	146611.136	ppm
4)	Carbon Monoxide	3.067	269360	156155.237	ppm
5)	Methane	5.058	199750	155461.848	ppm
6)	Carbon Dioxide	6.719	321532	153637.732	ppm

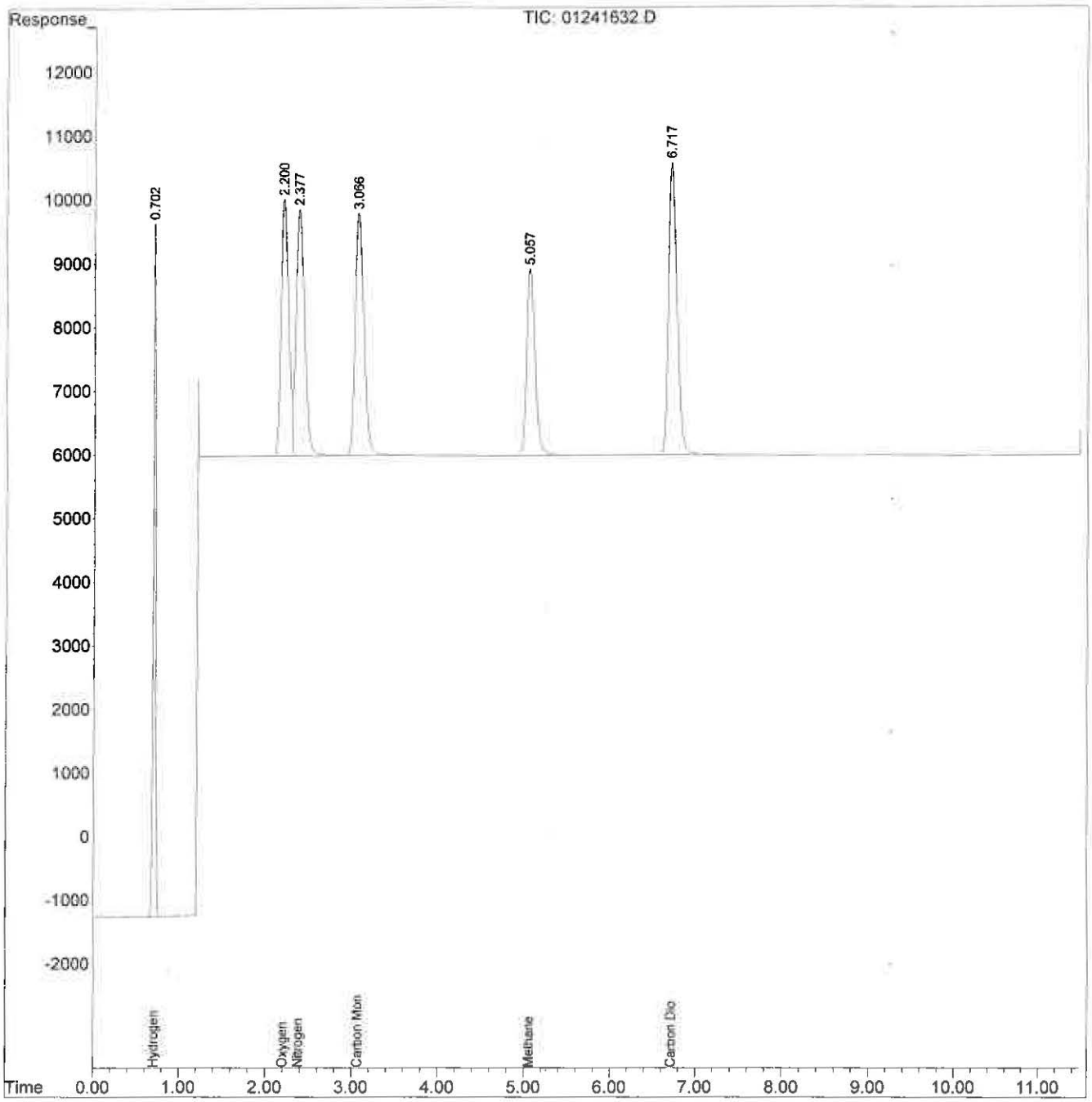
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (Not Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241632.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 18:33
Operator : WH
Sample : std 16.66% S11-12031501
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 19:57:29 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 19:54:31 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241633.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 19:02
Operator : WH
Sample : std co2
Misc : S17-02131201
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 19:58:39 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 19:57:50 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Hydrogen	0.000	0	N.D.	ppm	
2)	Oxygen	0.000	0	N.D.	ppm	d
3)	Nitrogen	0.000	0	N.D.	ppm	d
4)	Carbon Monoxide	0.000	0	N.D.	ppm	
5)	Methane	0.000	0	N.D.	ppm	
6)	Carbon Dioxide	6.651	1875387	910352.314	ppm	

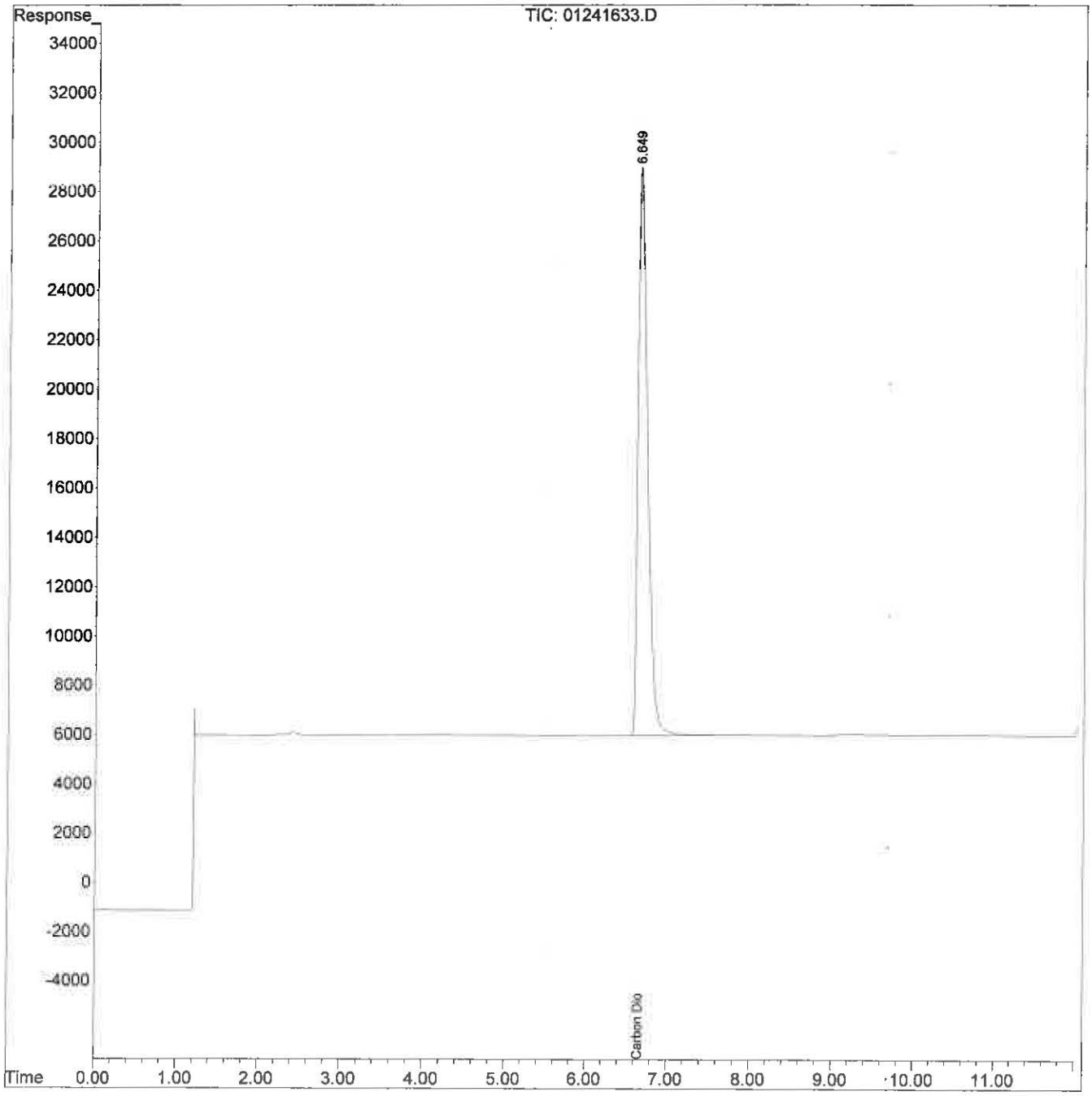
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241633.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 19:02
Operator : WH
Sample : std co2
Misc : S17-02131201
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 19:58:39 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 19:57:50 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241634.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 20:04
Operator : WH
Sample : std ch4
Misc : S30-11301401
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 20:36:02 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 20:00:56 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Hydrogen	0.000	0	N.D.	ppm	
2)	Oxygen	0.000	0	N.D.	ppm	
3)	Nitrogen	0.000	0	N.D.	ppm	
4)	Carbon Monoxide	0.000	0	N.D.	ppm	
5)	Methane	4.976	1219046	961698.203	ppm	
6)	Carbon Dioxide	0.000	0	N.D.	ppm	d

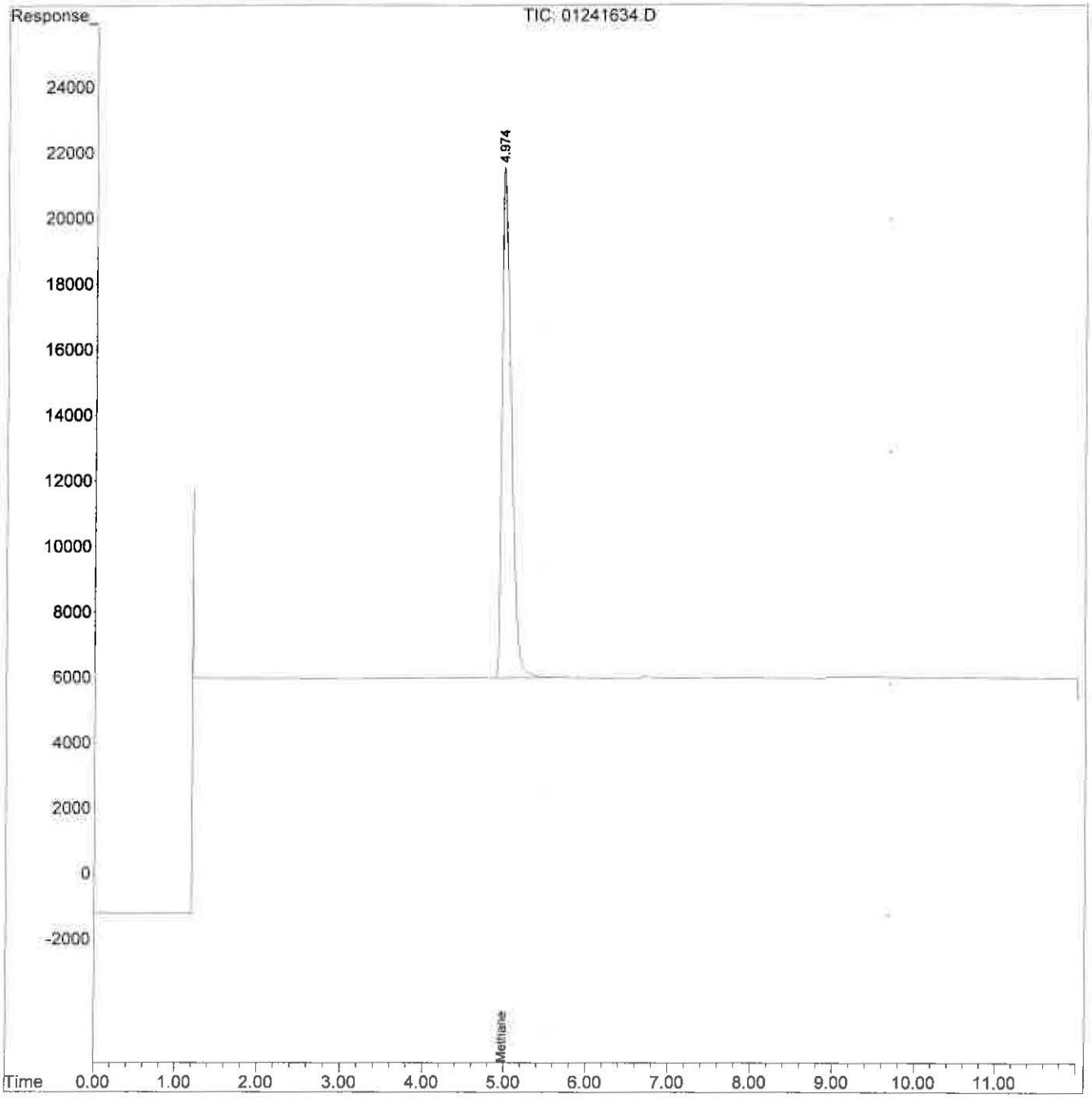
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241634.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 20:04
Operator : WH
Sample : std ch4
Misc : S30-11301401
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 20:36:02 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 20:00:56 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241635.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 20:39
Operator : WH
Sample : std h2
Misc : small loop of S11-12021501
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 20:56:25 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 20:37:18 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Hydrogen	0.686	638516	499304.194	ppm	
2)	Oxygen	0.000	0	N.D.	ppm	
3)	Nitrogen	0.000	0	N.D.	ppm	
4)	Carbon Monoxide	0.000	0	N.D.	ppm	
5)	Methane	0.000	0	N.D.	ppm	d
6)	Carbon Dioxide	0.000	0	N.D.	ppm	

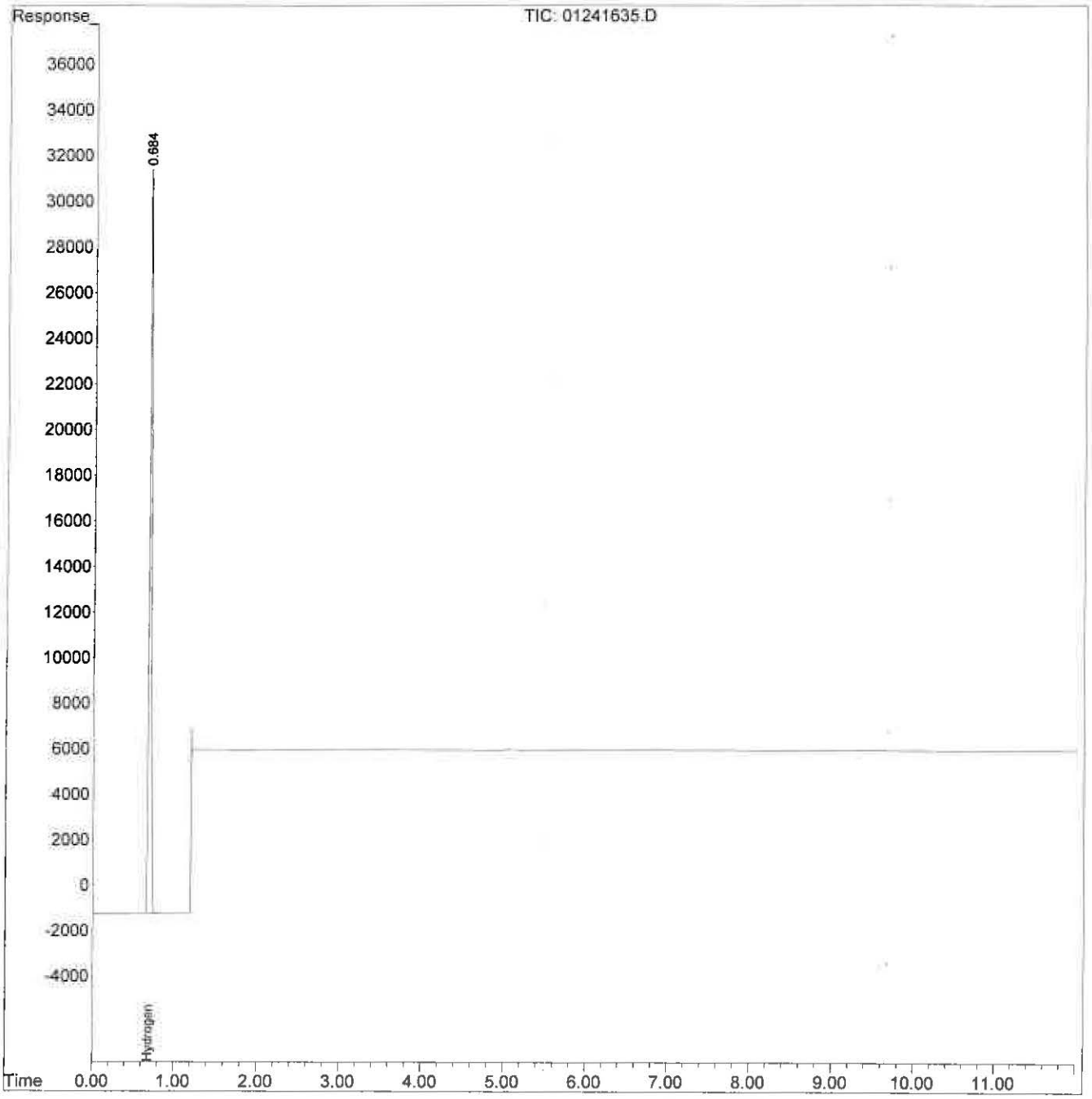
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241635.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 20:39
Operator : WH
Sample : std h2
Misc : small loop of S11-12021501
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 20:56:25 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 20:37:18 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241637.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 21:19
Operator : WH
Sample : STD N2
Misc : S11-12021502
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 21:35:15 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 21:18:19 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Hydrogen	0.000	0	N.D.	ppm	d
2)	Oxygen	0.000	0	N.D.	ppm	d
3)	Nitrogen	2.293	1540603	857917.729	ppm	
4)	Carbon Monoxide	0.000	0	N.D.	ppm	
5)	Methane	0.000	0	N.D.	ppm	d
6)	Carbon Dioxide	0.000	0	N.D.	ppm	

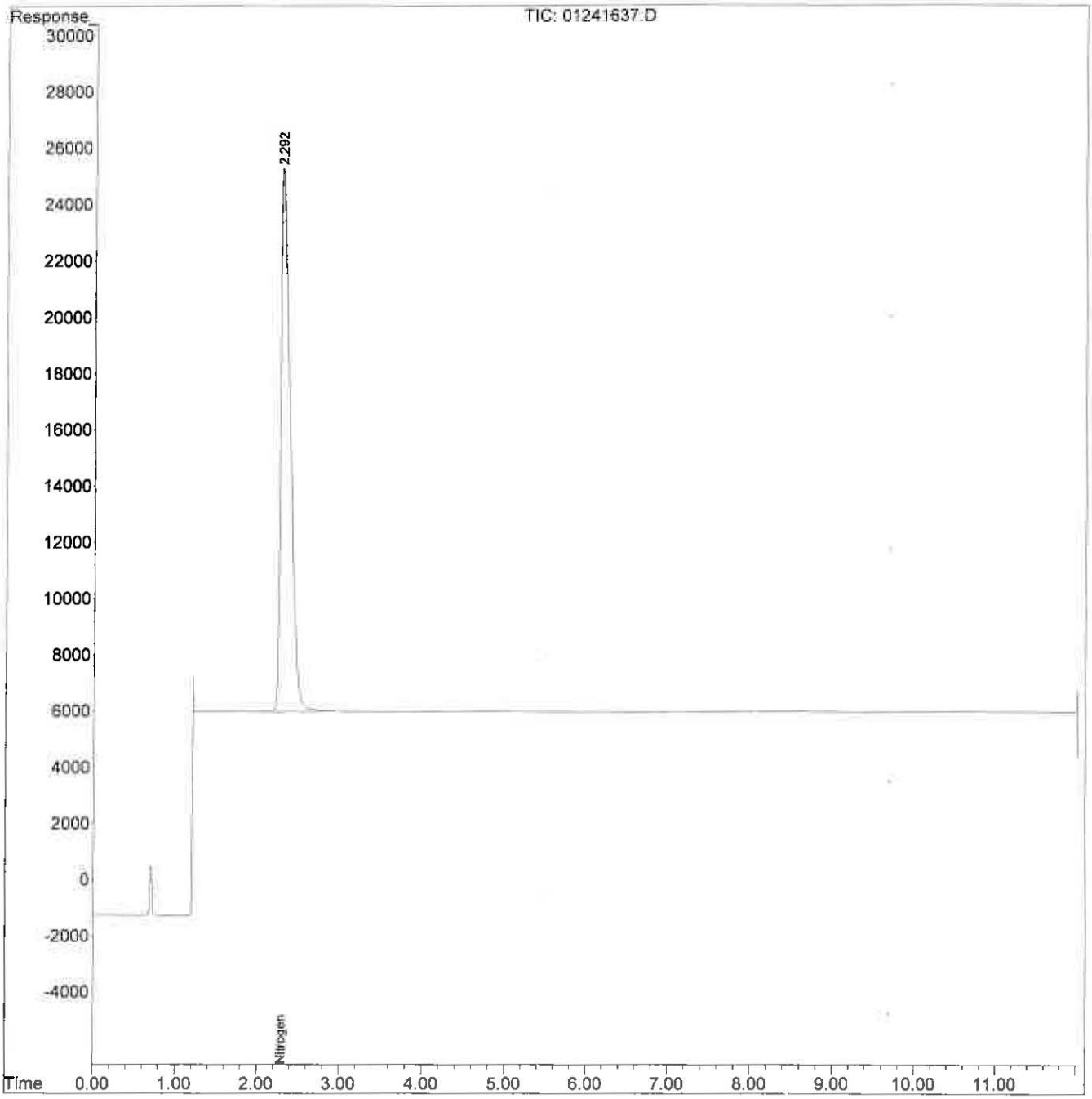
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241637.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 21:19
Operator : WH
Sample : STD N2
Misc : S11-12021502
ALS Vial : 1 Sample Multiplier: 10

Integration File: autointl.e
Quant Time: Jan 24 21:35:15 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 21:18:19 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241639.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 21:56
Operator : WH
Sample : STD O2
Misc : s11-12021503
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 22:12:05 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 21:54:52 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.000	0	N.D.	ppm
2)	Oxygen	2.117	1478054	974822.367	ppm
3)	Nitrogen	0.000	0	N.D.	ppm
4)	Carbon Monoxide	0.000	0	N.D.	ppm
5)	Methane	0.000	0	N.D.	ppm
6)	Carbon Dioxide	0.000	0	N.D.	ppm

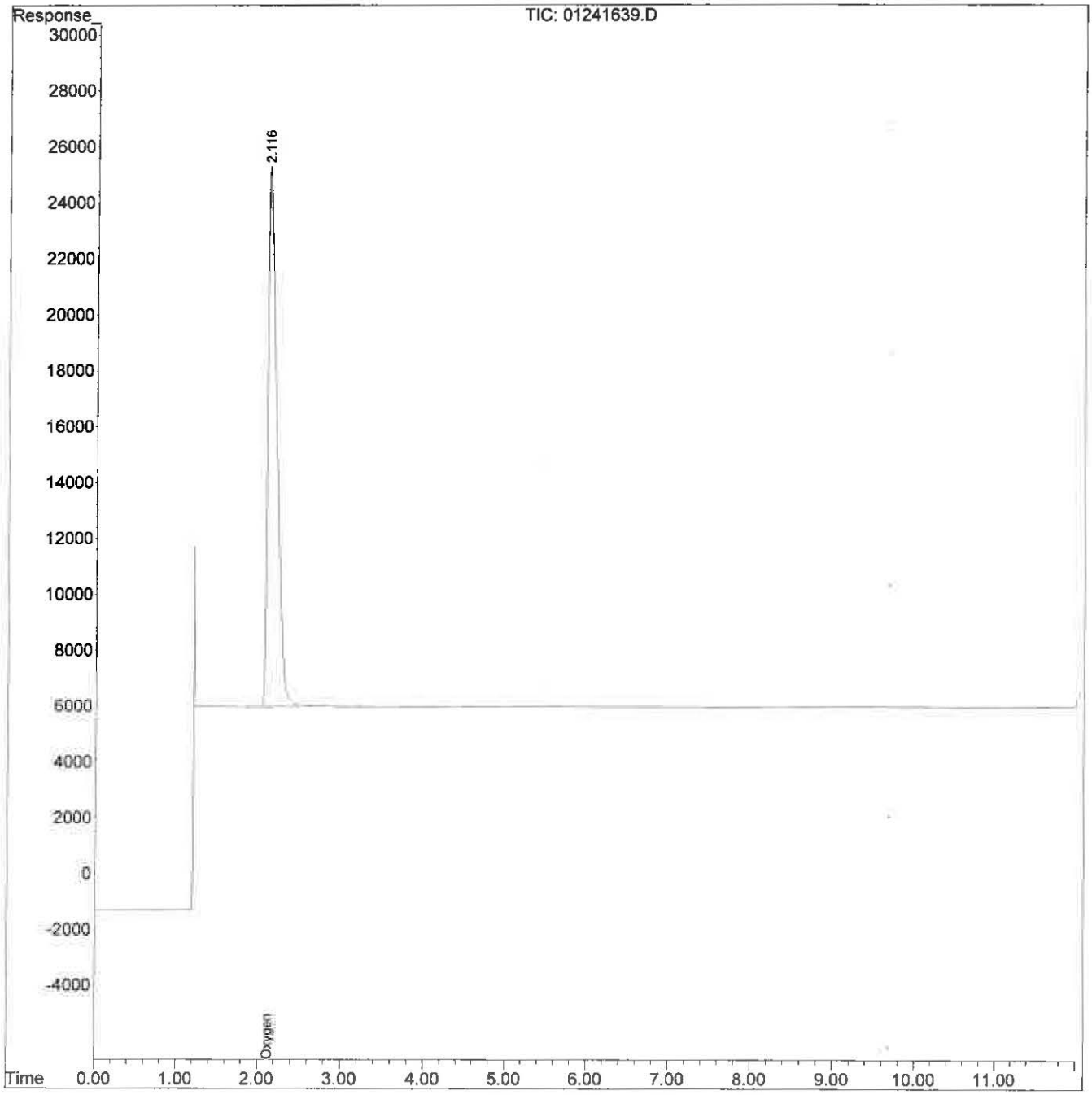
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241639.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 21:56
Operator : WH
Sample : STD O2
Misc : s11-12021503
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 22:12:05 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 21:54:52 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241640.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 22:13
Operator : WH
Sample : icv math
Misc : S30-01211601
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 22:32:48 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 22:12:55 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.702	49998	37951.830	ppm
2)	Oxygen	2.212	59532	39339.676	ppm
3)	Nitrogen	2.387	85443	48734.916	ppm
4)	Carbon Monoxide	3.074	82976	48885.688	ppm
5)	Methane	5.066	50003	39721.416	ppm
6)	Carbon Dioxide	6.728	95530	47075.322	ppm

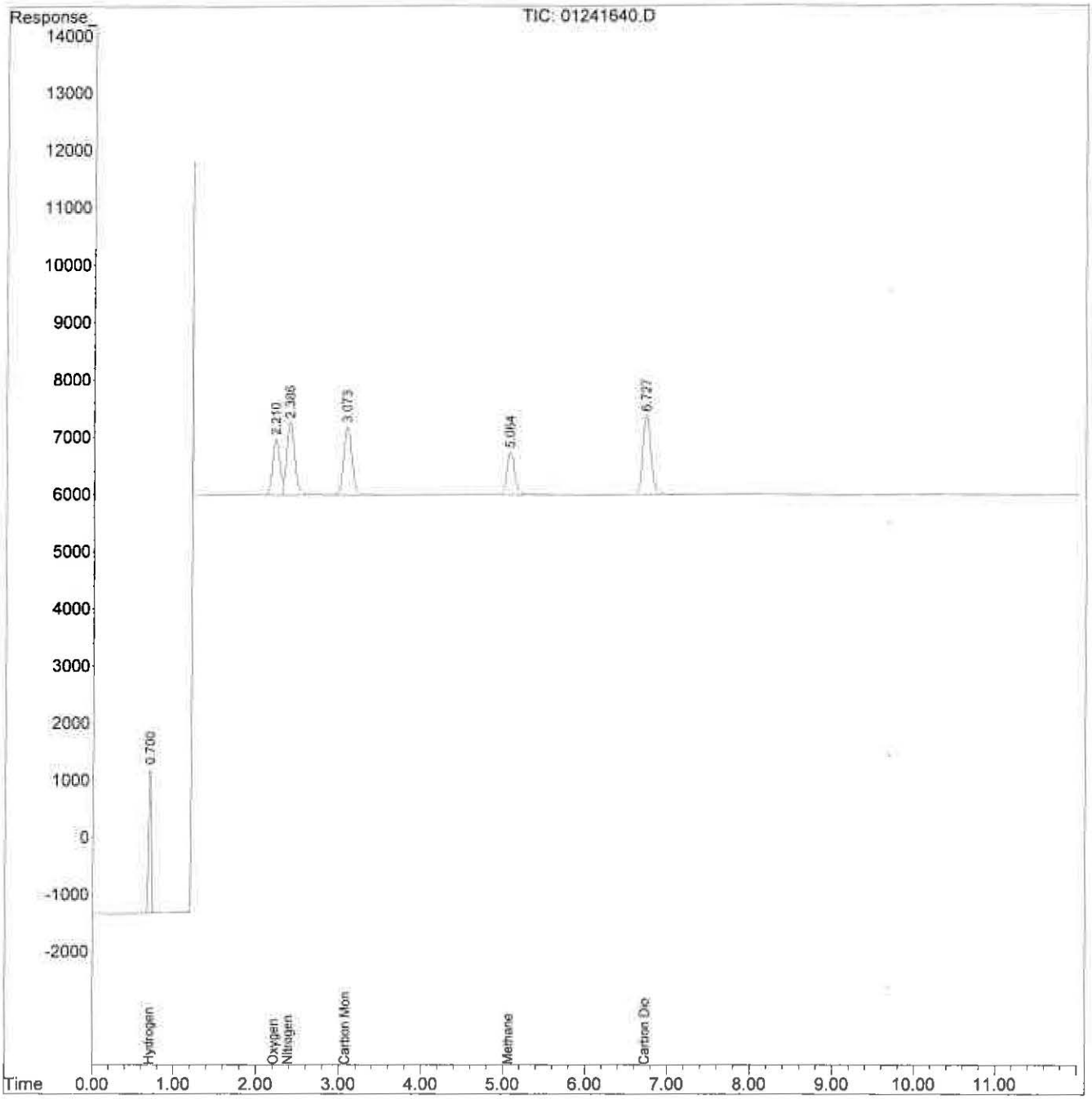
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241640.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 22:13
Operator : WH
Sample : icv math
Misc : S30-01211601
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 22:32:48 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 22:12:55 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241641.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 22:32
Operator : WH
Sample : icv scott
Misc : S30-12281502
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 22:48:42 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 22:12:55 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	Actual ppm	R.T.	Response	Conc	Units	% Recovery
Target Compounds							
1)	Hydrogen	39900	0.706	49672	37704.490	ppm	94.5 %
2)	Oxygen	24900	2.219	37333	24670.381	ppm	99.1 %
3)	Nitrogen	50000	2.393	84889	48418.601	ppm	96.8 %
4)	Carbon Monoxide	50000	3.079	83785	49362.383	ppm	98.7 %
5)	Methane	40100	5.068	50643	40229.211	ppm	100.3 %
6)	Carbon Dioxide	50000	6.729	97009	47803.956	ppm	95.6 %

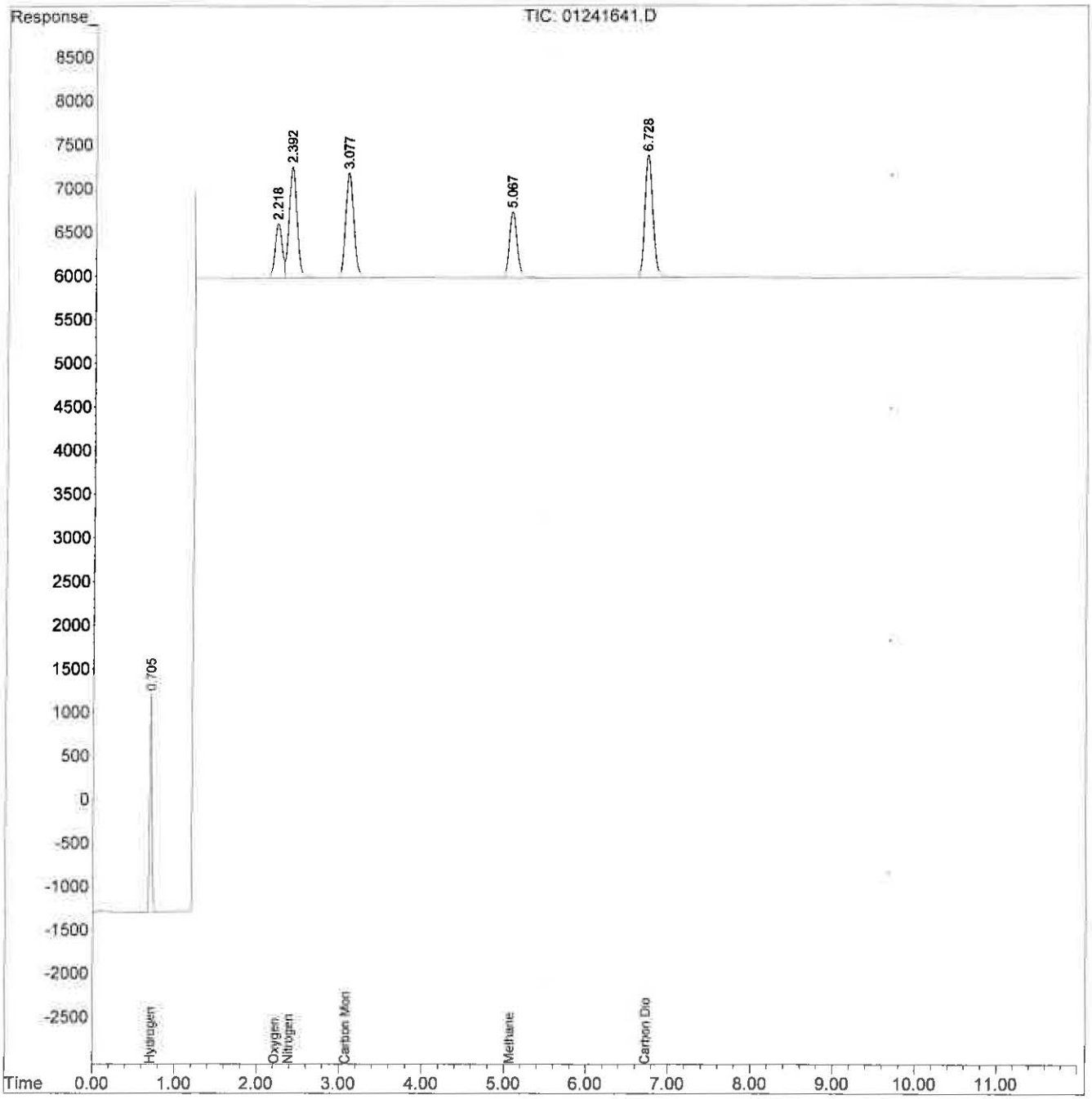
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241641.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 22:32
Operator : WH
Sample : icv scott
Misc : S30-12281502
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 22:48:42 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 22:12:55 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Modified EPA Method 3C Daily QC Summary

Client : Trihydro Corporation
Analyst : MC
Method Name : EPA 3C, ASTM D 1946-90, VOA-EPA3C

Instrument : GC 1
Date Analyzed : 1/3/17

RT Summaries and QC Check (minutes)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time
ICAL Mean RT	**0.708**	**2.188**	**2.368**	**3.076**	**5.045**	**6.707**		
RT Windows (+/- min)	**0.072**	**0.133**	**0.146**	**0.034**	**0.130**	**0.145**		
std s11-17191602	0.700	2.196	2.370	3.057	5.048	6.710	01031702.D	09:24
+/- 0.33min of ICAL Mean RT	Pass	Pass	Pass	Pass	Pass	Pass		
mb							01031703.D	09:59
lab air		2.140 Pass	2.278 Pass			6.717 Pass	01031704.D	10:15
lcs s30-12201601	0.700 Pass	2.198 Pass	2.373 Pass	3.060 Pass	5.050 Pass	6.712 Pass	01031705.D	10:32
lcsd s30-12201601	0.699 Pass	2.195 Pass	2.371 Pass	3.058 Pass	5.048 Pass	6.711 Pass	01031706.D	10:49
6022-001		2.169 Pass	2.315 Pass			6.722 Pass	01031707.D	11:08
std s30-12191603	0.692 Pass	2.190 Pass	2.365 Pass	3.053 Pass	5.048 Pass	6.712 Pass	01031715.D	15:58

Continuing Calibration Standards Summary (ppm)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time
ACTUAL	40000.0	40000.0	50000.0	50000.0	40000.0	50000.0		
CCV Criteria (+/- %D)	**15.0%**	**10.0%**	**10.0%**	**10.0%**	**10.0%**	**10.0%**		
std s11-17191602	42088.1 5.2%	42549.1 6.4%	51757.3 3.5%	53312.5 6.6%	43089.9 7.7%	51356.7 2.7%	01031702.D	09:24
std s30-12191603	42149.2 5.4%	42320.5 5.8%	51783.3 3.6%	53021.2 6.0%	42958.1 7.4%	51014.7 2.0%	01031715.D	15:58
	####	####	####	####	####	#####		
	####	####	####	####	####	#####		

Lab Dup Summary (ppm, without DF correction and nomalization)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time

LCS / LCS Dup Summary (ppm, without DF correction)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time
LCS Actual Conc. (ppm)	50000.0	50000.0	50000.0	50000.0	50000.0	50000.0		
LCS Criteria (% Range)	**94%-105%**	**97%-108%**	**89%-113%**	**98%-108%**	**94%-111%**	**94%-104%**		
lcs s30-12201601	51017.0	52990.2	52862.0	52158.7	50299.2	50154.3	01031705.D	10:32
LCS % Recovery	102% Pass	106% Pass	106% Pass	104% Pass	101% Pass	100% Pass		
lcsd s30-12201601	51358.4	52837.1	51492.1	52351.2	50298.4	50225.7	01031706.D	10:49
LCS % Recovery	103% Pass	106% Pass	103% Pass	105% Pass	101% Pass	100% Pass		
Duplicate % RPD	0.7%	0.3%	2.6%	0.4%	0.0%	0.1%		
Duplicate Criteria % RPD	**3%** Pass	**3%** Pass	**7%** Pass	**3%** Pass	**3%** Pass	**3%** Pass		

Lab Air QC Summary

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxid	Methane	Carbon Dioxide	Lab Air Criteria Total (90%-110%)
lab air		207716.9	743677.6			446.9	95.2% Pass
Lab Air Normalized (%)		21.82%	78.12%			0.05%	100.0%

KAH 1/4/17

Quantitation Report (QT Reviewed)

Data Path : I:\GC01\DATA\FXG\2017_01\03\
Data File : 01031702.D
Signal(s) : TCD1A.CH
Acq On : 3 Jan 2017 9:24 am
Operator : MC
Sample : std s11-17191602
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 03 09:42:06 2017
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 22:12:55 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.700	55447	42088.135	ppm
2)	Oxygen	2.196	64388	42549.063	ppm
3)	Nitrogen	2.370	90742	51757.278	ppm
4)	Carbon Monoxide	3.057	90490	53312.534	ppm
5)	Methane	5.048	54244	43089.886	ppm
6)	Carbon Dioxide	6.710	104218	51356.739	ppm

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

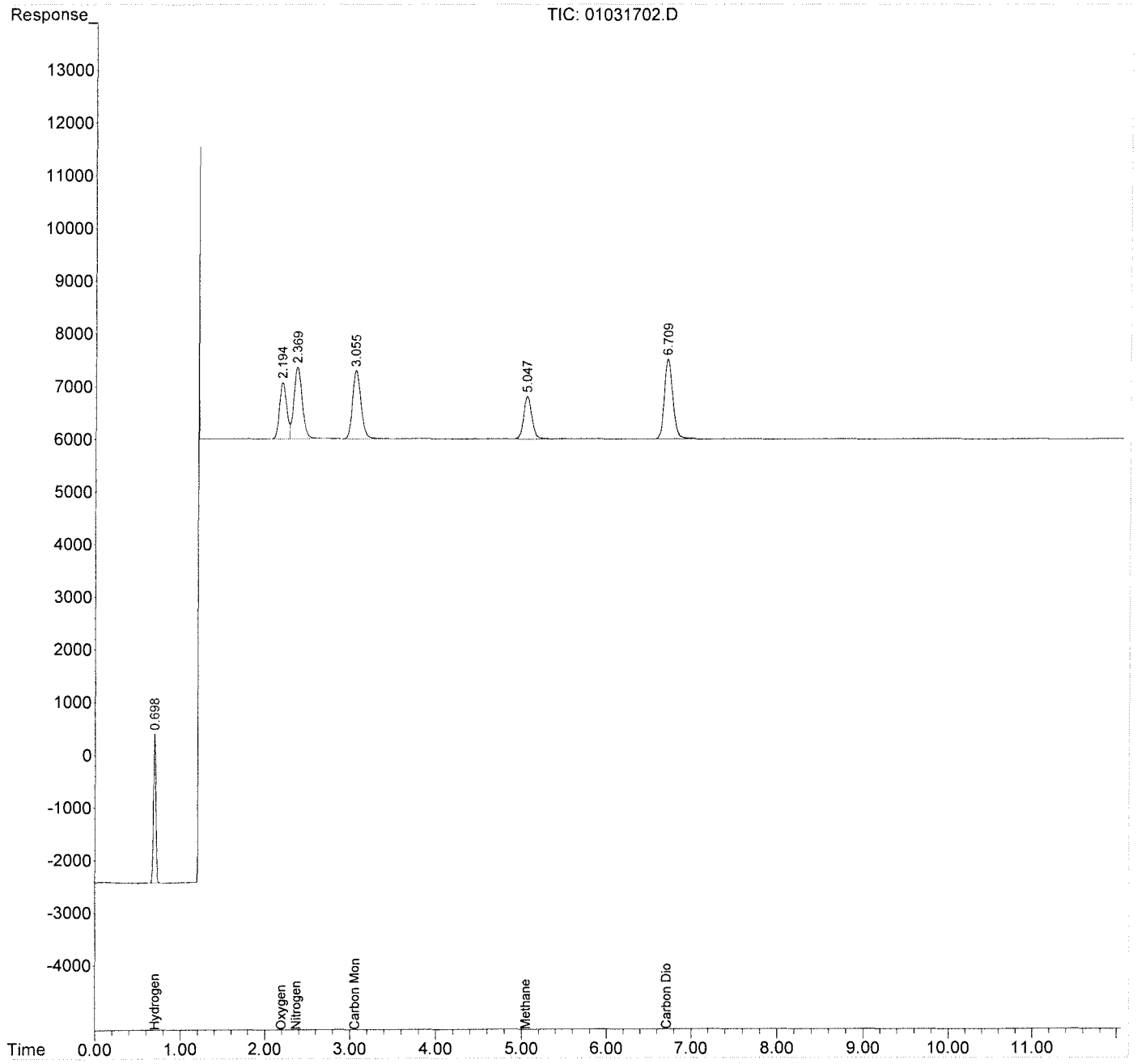
MAM 1/4/17

Quantitation Report (QT Reviewed)

Data Path : I:\GC01\DATA\FXG\2017_01\03\
Data File : 01031702.D
Signal(s) : TCD1A.CH
Acq On : 3 Jan 2017 9:24 am
Operator : MC
Sample : std s11-17191602
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 03 09:42:06 2017
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 22:12:55 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : I:\GC01\DATA\FXG\2017_01\03\
Data File : 01031715.D
Signal(s) : TCD1A.CH
Acq On : 3 Jan 2017 3:58 pm
Operator : MC
Sample : std s30-12191603
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 03 16:15:41 2017
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 22:12:55 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

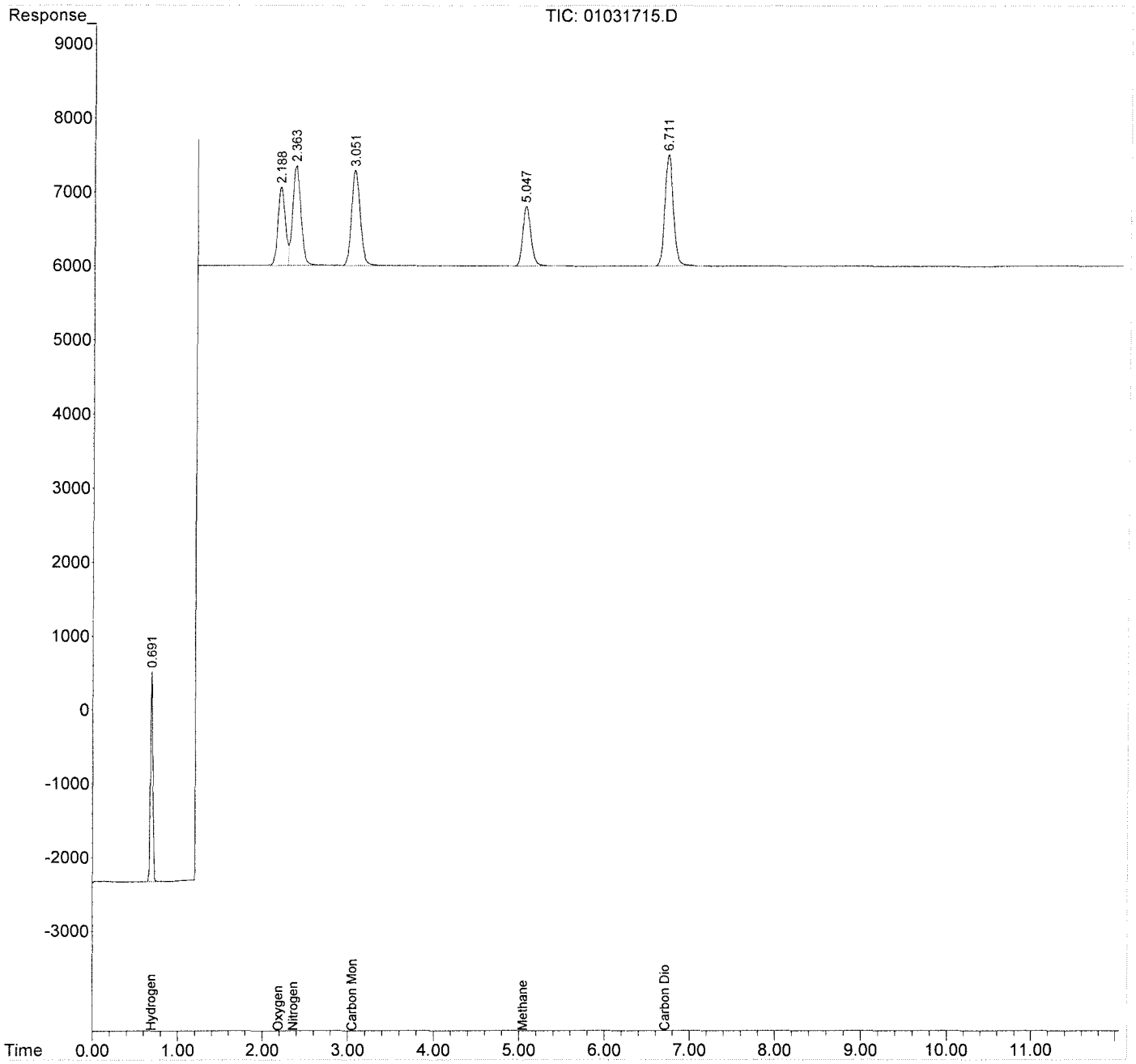
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.692	55528	42149.157	ppm
2)	Oxygen	2.190	64042	42320.461	ppm
3)	Nitrogen	2.365	90788	51783.335	ppm
4)	Carbon Monoxide	3.053	89995	53021.242	ppm
5)	Methane	5.048	54078	42958.110	ppm
6)	Carbon Dioxide	6.712	103524	51014.669	ppm

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

Data Path : I:\GC01\DATA\FXG\2017_01\03\
Data File : 01031715.D
Signal(s) : TCD1A.CH
Acq On : 3 Jan 2017 3:58 pm
Operator : MC
Sample : std s30-12191603
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 03 16:15:41 2017
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 22:12:55 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Injection Log

Directory: J:\GC01\DATA\FXG\2016_01\24

Line	Vial	FileName	Multiplier	SampleName	Misc Info	Injected
1	1	01241601.d	10.	std		24 Jan 2016 08:26
2	1	01241602.d	10.	mb		24 Jan 2016 08:41
3	1	01241603.d	10.	lab air		24 Jan 2016 08:57
4	1	01241604.d	10.	lcs		24 Jan 2016 09:14
5	1	01241605.d	10.	lcsd		24 Jan 2016 09:30
6	1	01241606.d	10.	0205-001		24 Jan 2016 09:46
7	1	01241607.d	10.	0205-002		24 Jan 2016 10:00
8	1	01241608.d	10.	0205-003		24 Jan 2016 10:16
9	1	01241609.d	10.	0205-004		24 Jan 2016 10:30
10	1	01241610.d	10.	0205-005		24 Jan 2016 10:45
11	1	01241611.d	10.	0205-006		24 Jan 2016 11:00
12	1	01241612.d	10.	0205-007		24 Jan 2016 11:22
13	1	01241613.d	10.	0205-008		24 Jan 2016 11:39
14	1	01241614.d	10.	0205-009		24 Jan 2016 11:55
15	1	01241615.d	10.	0205-010		24 Jan 2016 12:15
16	1	01241616.d	10.	std		24 Jan 2016 12:30
17	1	01241617.d	10.	0205-011		24 Jan 2016 12:46
18	1	01241618.d	10.	0205-012		24 Jan 2016 13:01
19	1	01241619.d	10.	0205-013		24 Jan 2016 13:16
20	1	01241620.d	10.	0205-014		24 Jan 2016 13:38
21	1	01241621.d	10.	std		24 Jan 2016 13:58
22	1	01241622.d	10.	wait		24 Jan 2016 14:32
23	1	01241623.d	10.	test		24 Jan 2016 15:15
24	1	01241624.d	10.	test		24 Jan 2016 15:35
25	1	01241625.d	10.	loq		24 Jan 2016 15:53
26	1	01241626.d	10.	loq		24 Jan 2016 16:08
27	1	01241627.d	10.	std 0.1% S11-12041504		24 Jan 2016 16:38
28	1	01241628.d	10.	std 0.5% S11-12041503		24 Jan 2016 17:24
29	1	01241629.d	10.	std 1% S11-12041502		24 Jan 2016 17:40
30	1	01241630.d	10.	std 4% S11-12041501		24 Jan 2016 17:57
31	1	01241631.d	10.	std 4% S11-12041501		24 Jan 2016 18:16
32	1	01241632.d	10.	std 16.66% S11-12031501		24 Jan 2016 18:33
33	1	01241633.d	10.	std co2	S17-02131201	24 Jan 2016 19:02
34	1	01241634.d	10.	std ch4	S30-11301401	24 Jan 2016 20:04
35	1	01241635.d	10.	std h2	small loop of S11...	24 Jan 2016 20:39
36	1	01241636.d	10.	lab air		24 Jan 2016 20:58
37	1	01241637.d	10.	STD N2	S11-12021502	24 Jan 2016 21:19
38	1	01241638.d	10.	o2		24 Jan 2016 21:38
39	1	01241639.d	10.	STD O2	s11-12021503	24 Jan 2016 21:56
40	1	01241640.d	10.	icv math	S30-01211601	24 Jan 2016 22:13
41	1	01241641.d	10.	icv scott	S30-12281502	24 Jan 2016 22:32
42	1	01241642.d	10.	mb		24 Jan 2016 22:48

Injection Log

Directory: I:\GC01\DATA\FXG\2017_01\03\

	Sample ID	Date/Time	Acquisition Method	File Name	Misc Info	Operator	Comments
1	xstd	3 Jan 117 8:32 am	MFXGS25C.M	01031701.D		MC	Fail
2	std s11-17191602	3 Jan 117 9:24 am	MF25VCH4.M	01031702.D		MC	Pass
	mb	3 Jan 117 9:59 am	MF25VCH4.M	01031703.D		MC	
	lab air	3 Jan 117 10:15 am	MF25VCH4.M	01031704.D		MC	
	lcs s30-12201601	3 Jan 117 10:32 am	MF25VCH4.M	01031705.D		MC	
	lcsd s30-12201601	3 Jan 117 10:49 am	MF25VCH4.M	01031706.D		MC	
	6022-001	3 Jan 117 11:08 am	MF25VCH4.M	01031707.D		MC	
	6000-001	3 Jan 117 11:25 am	MF25VCH4.M	01031708.D		MC	
	6000-002	3 Jan 117 11:41 am	MF25VCH4.M	01031709.D		MC	
	0001-001	3 Jan 117 3:08 pm	MF25VCH4.M	01031712.D		MC	
	0001-002	3 Jan 117 3:25 pm	MF25VCH4.M	01031713.D		MC	
	0001-003	3 Jan 117 3:41 pm	MF25VCH4.M	01031714.D		MC	
#VALUE!	std s30-12191603	3 Jan 117 3:58 pm	MF25VCH4.M	01031715.D		MC	Pass

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\04\01041713.D
Acq On : 4 Jan 2017 12:35 Operator: LH
Sample : P1606022-001 (1000mL)
Misc : S29-12281601
ALS Vial : 5 Sample Multiplier: 1

Quant Time: Jan 11 11:26:33 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016 LH 1/11/17
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.59	130	280713	12.500 ng	0.04
7) 1,4-Difluorobenzene (IS2)	13.67	114	1396418	12.500 ng	0.02
16) Chlorobenzene-d5 (IS3)	17.93	117	1081591	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.42	65	521699	13.008 ng	0.03
Spiked Amount 12.500				Recovery = 104.08%	
12) Toluene-d8 (SS2)	16.10	98	1459263	12.736 ng	0.00
Spiked Amount 12.500				Recovery = 101.92%	
20) p-Bromofluorobenzene (...	19.28	174	460059	12.125 ng	0.00
Spiked Amount 12.500				Recovery = 96.96%	

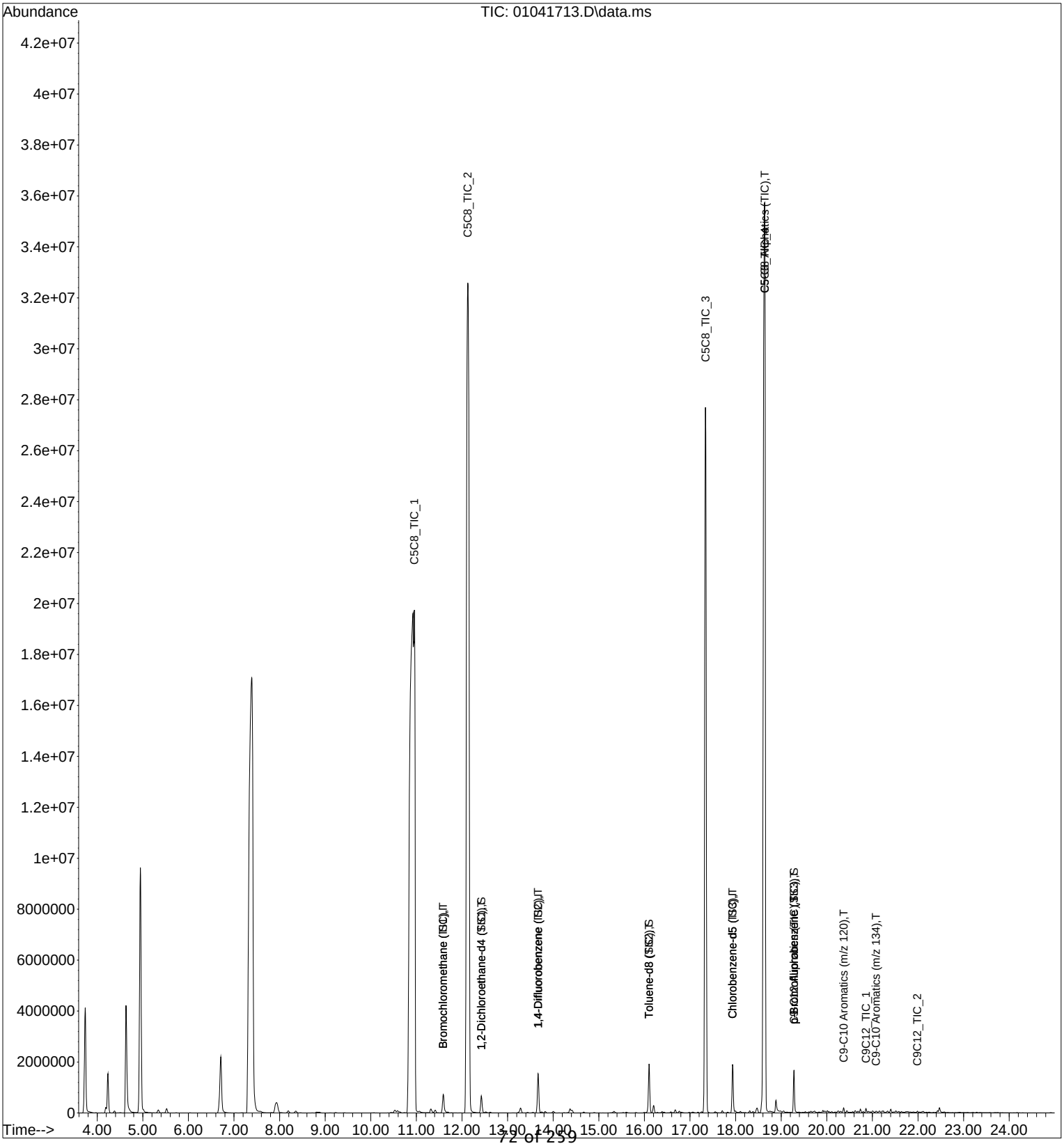
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.59	TIC	1841301	16.163 ng	100
3) Isopentane	7.39	TIC	99715755	No Calib #	
4) n-Hexane	11.69	TIC	79169	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.42	TIC	1501308	13.357 ng	100
8) 1,4-Difluorobenzene (TIC)	13.67	TIC	3366169	13.121 ng	100
9) Cyclohexane	13.55	TIC	53704	No Calib	
10) 2,3-Dimethylpentane	13.83	TIC	127691	No Calib	
11) n-Heptane	14.67	TIC	70279	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	4042730	13.329 ng	100
14) n-Octane	17.34	TIC	65027127	No Calib	
15) C5-C8 Aliphatics (TIC)	18.64	TIC	479873510m	1468.508 ng	
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3714262	13.437 ng	100
18) 2,3-Dimethylheptane	18.38	TIC	95552	No Calib	
19) n-Nonane	19.06	TIC	138554	No Calib #	
21) p-Bromofluorobenzene (...	19.28	TIC	2888926	13.432 ng	100
22) Isopropylbenzene	19.39	120	2679	No Calib	
23) 1-Methyl-3-ethylbenzene	19.92	120	13508	No Calib	
24) 1,3,5-Trimethylbenzene	20.02	120	13309	No Calib	
25) n-Decane	20.44	TIC	120413	No Calib	
26) p-Isopropyltoluene	20.73	134	7217	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	11961	No Calib	
28) Butylcyclohexane	20.95	TIC	34001	No Calib	
29) n-Undecane	21.51	TIC	85080	No Calib	
30) n-Dodecane	22.43	TIC	130416	No Calib	
31) C9-C12 Aliphatics-(TIC)	19.28	TIC	8564918m	123.339 ng	
32) C9-C10 Aromatics (m/z ...	20.37	120	110601m	7.717 ng	
33) C9-C10 Aromatics (m/z ...	21.08	134	61225m	7.608 ng	
34) C5C8_TIC_1	10.96	TIC	153816487m	73.907 ng	
35) C5C8 TIC 2	12.13	TIC	127605810m	61.313 ng	
36) C5C8 TIC 3	17.34	TIC	65036582m	31.250 ng	
37) C5C8 TIC 4	18.64	TIC	108067756m	51.926 ng	
38) C9C12 TIC 1	20.86	TIC	250948m	0.608 ng	
39) C9C12 TIC 2	21.99	TIC	82629m	0.200 ng	
40) C9C12 TIC 3	0.00	TIC	0	N.D. d	
41) C9C12 TIC 4	0.00	TIC	0	N.D. d	
42) C9C10 TIC 1	0.00	120	0	N.D. d	
43) C9C10 TIC 2	0.00	134	0	N.D. d	

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\04\01041713.D
Acq On : 4 Jan 2017 12:35 Operator: LH
Sample : P1606022-001 (1000mL)
Misc : S29-12281601
ALS Vial : 5 Sample Multiplier: 1

Quant Time: Jan 11 11:26:33 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\04\01041703.D
Acq On : 4 Jan 2017 5:39 Operator: CL
Sample : MB R16010417 1000mL
Misc : S29-12281601 AC00442
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Jan 04 14:14:52 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 1/4/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	258449	12.500 ng	0.00
7) 1,4-Difluorobenzene (IS2)	13.66	114	1348669	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1016438	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.40	65	488748	13.236 ng	0.00
Spiked Amount 12.500				Recovery = 105.92%	
12) Toluene-d8 (SS2)	16.10	98	1404593	12.693 ng	0.00
Spiked Amount 12.500				Recovery = 101.52%	
20) p-Bromofluorobenzene (...	19.28	174	406983	11.413 ng	0.00
Spiked Amount 12.500				Recovery = 91.28%	

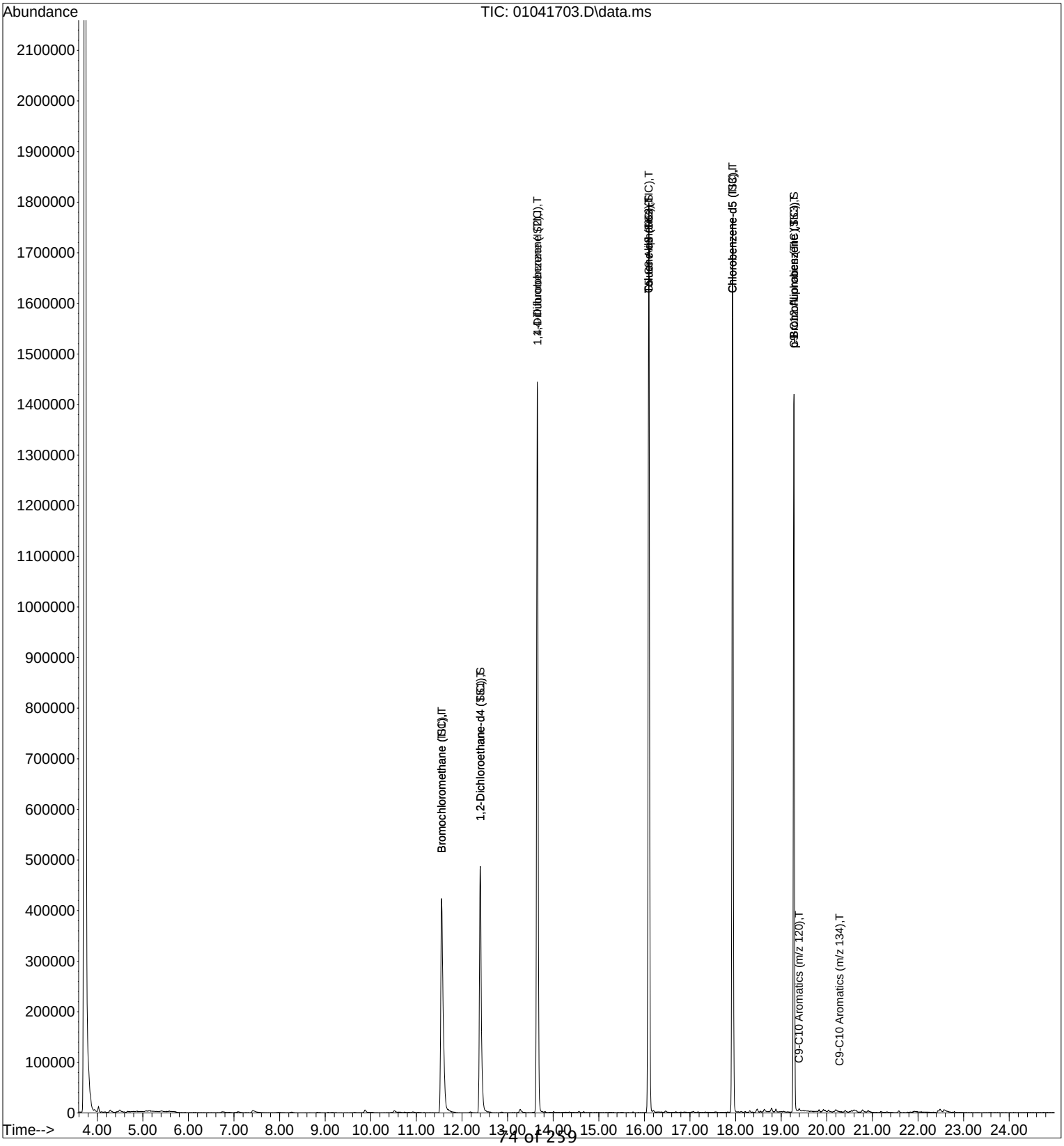
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.55	TIC	1581287	15.077 ng	100
3) Isopentane	7.41	TIC	27452	No Calib #	
4) n-Hexane	11.55	TIC	1587479	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.40	TIC	1400192	13.530 ng	100
8) 1,4-Difluorobenzene (TIC)	13.65	TIC	3227970	13.028 ng	100
9) Cyclohexane	13.65	TIC	3226752	No Calib	
10) 2,3-Dimethylpentane	13.65	TIC	3218967	No Calib	
11) n-Heptane	14.66	TIC	3375	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	3792444	12.946 ng	100
14) n-Octane	17.18	TIC	3305	No Calib	
15) C5-C8 Aliphatics (TIC)	16.10	TIC	13938363m	44.164 ng	
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3344583	12.875 ng	100
18) 2,3-Dimethylheptane	18.36	TIC	1783	No Calib	
19) n-Nonane	19.06	TIC	3858	No Calib #	
21) p-Bromofluorobenzene (...	19.28	TIC	2462372	12.183 ng	100
22) Isopropylbenzene	19.39	120	900	No Calib	
23) 1-Methyl-3-ethylbenzene	19.92	120	1569	No Calib #	
24) 1,3,5-Trimethylbenzene	19.92	120	1569	No Calib	
25) n-Decane	20.41	TIC	10052	No Calib #	
26) p-Isopropyltoluene	20.79	134	572	No Calib	
27) 1,2,3-Trimethylbenzene	20.78	120	1458	No Calib #	
28) Butylcyclohexane	20.90	TIC	12747	No Calib	
29) n-Undecane	21.54	TIC	429	No Calib	
30) n-Dodecane	22.44	TIC	7013	No Calib	
31) C9-C12 Aliphatics-(TIC)	19.28	TIC	2905945m	44.529 ng	
32) C9-C10 Aromatics (m/z ...	19.39	120	23203m	1.723 ng	
33) C9-C10 Aromatics (m/z ...	20.28	134	2150m	0.284 ng	
34) C5C8_TIC_1	0.00	TIC	0	N.D. d	
35) C5C8 TIC 2	0.00	TIC	0	N.D. d	
36) C5C8 TIC 3	0.00	TIC	0	N.D. d	
37) C5C8 TIC 4	0.00	TIC	0	N.D. d	
38) C9C12 TIC 1	0.00	TIC	0	N.D. d	
39) C9C12 TIC 2	0.00	TIC	0	N.D. d	
40) C9C12 TIC 3	0.00	TIC	0	N.D. d	
41) C9C12 TIC 4	0.00	TIC	0	N.D. d	
42) C9C10 TIC 1	0.00	120	0	N.D. d	
43) C9C10 TIC 2	0.00	134	0	N.D. d	

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\04\01041703.D
Acq On : 4 Jan 2017 5:39 Operator: CL
Sample : MB R16010417 1000mL
Misc : S29-12281601 AC00442
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Jan 04 14:14:52 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\04\01041704.D
Acq On : 4 Jan 2017 6:12 Operator: CL
Sample : LCS R16010417 25ng
Misc : S29-12281601/S29-12211611 (1/19)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Jan 04 14:15:15 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 1/4/17

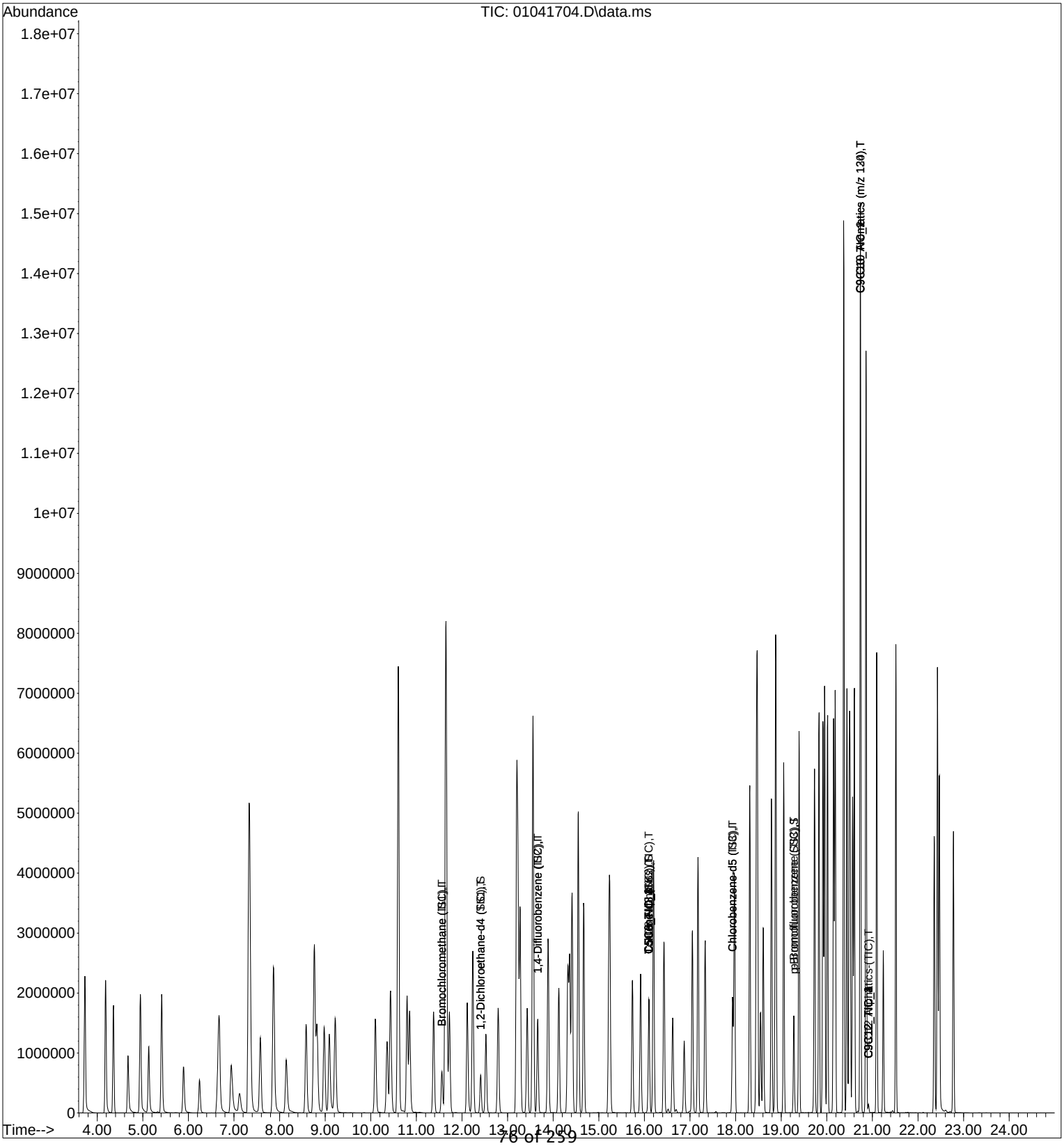
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.56	130	282713	12.500 ng	0.01
7) 1,4-Difluorobenzene (IS2)	13.66	114	1409437	12.500 ng	0.01
16) Chlorobenzene-d5 (IS3)	17.93	117	1106990	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.41	65	518689	12.842 ng	0.01
Spiked Amount 12.500				Recovery = 102.72%	
12) Toluene-d8 (SS2)	16.10	98	1492071	12.902 ng	0.00
Spiked Amount 12.500				Recovery = 103.20%	
20) p-Bromofluorobenzene (...	19.28	174	458082	11.795 ng	0.00
Spiked Amount 12.500				Recovery = 94.40%	
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.56	TIC	1709265	14.898 ng	100
3) Isopentane	7.33	TIC	18115924	No Calib #	
4) n-Hexane	11.65	TIC	23136400	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.41	TIC	1484693	13.116 ng	100
8) 1,4-Difluorobenzene (TIC)	13.66	TIC	3341905	12.906 ng	100
9) Cyclohexane	13.56	TIC	15003586	No Calib	
10) 2,3-Dimethylpentane	13.89	TIC	6588033	No Calib	
11) n-Heptane	14.67	TIC	7082145	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	4077094	13.318 ng	100
14) n-Octane	17.18	TIC	7936950	No Calib	
15) C5-C8 Aliphatics (TIC)	16.10	TIC	4078024	12.364 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3688759	13.038 ng	100
18) 2,3-Dimethylheptane	18.31	TIC	9622690	No Calib	
19) n-Nonane	19.06	TIC	8764497	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	2753823	12.510 ng	100
22) Isopropylbenzene	19.39	120	1055161	No Calib	
23) 1-Methyl-3-ethylbenzene	19.92	120	1298054	No Calib	
24) 1,3,5-Trimethylbenzene	20.02	120	1661059	No Calib	
25) n-Decane	20.44	TIC	9792620	No Calib	
26) p-Isopropyltoluene	20.74	134	1100245	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	1981143	No Calib	
28) Butylcyclohexane	20.91	TIC	184277	No Calib	
29) n-Undecane	21.51	TIC	10011860	No Calib	
30) n-Dodecane	22.43	TIC	10613787	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.91	TIC	184277	2.593 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	1981143	135.058 ng	100
33) C9-C10 Aromatics (m/z ...	20.74	134	1100245	133.579 ng	100
34) C5C8_TIC_1	16.10	TIC	4078024	1.914 ng	100
35) C5C8 TIC 2	16.10	TIC	4078024	1.914 ng	100
36) C5C8 TIC 3	16.10	TIC	4078024	1.914 ng	100
37) C5C8 TIC 4	16.10	TIC	4078024	1.914 ng	100
38) C9C12 TIC 1	20.91	TIC	184277	0.436 ng	100
39) C9C12 TIC 2	20.91	TIC	184277	0.436 ng	100
40) C9C12 TIC 3	20.91	TIC	184277	0.436 ng	100
41) C9C12 TIC 4	20.91	TIC	184277	0.436 ng	100
42) C9C10 TIC 1	20.74	120	1981143	27.507 ng	100
43) C9C10 TIC 2	20.74	134	1100245	27.205 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\04\01041704.D
Acq On : 4 Jan 2017 6:12 Operator: CL
Sample : LCS R16010417 25ng
Misc : S29-12281601/S29-12211611 (1/19)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Jan 04 14:15:15 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\04\01041714.D
Acq On : 4 Jan 2017 13:09 Operator: LH
Sample : P1606022-001dup (1000mL)
Misc : S29-12281601
ALS Vial : 5 Sample Multiplier: 1

Quant Time: Jan 11 11:29:31 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 1/11/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.59	130	285719	12.500 ng	0.04
7) 1,4-Difluorobenzene (IS2)	13.67	114	1413508	12.500 ng	0.02
16) Chlorobenzene-d5 (IS3)	17.93	117	1110683	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.42	65	531552	13.022 ng	0.03
Spiked Amount 12.500				Recovery = 104.16%	
12) Toluene-d8 (SS2)	16.10	98	1483367	12.790 ng	0.00
Spiked Amount 12.500				Recovery = 102.32%	
20) p-Bromofluorobenzene (...	19.28	174	474450	12.176 ng	0.00
Spiked Amount 12.500				Recovery = 97.44%	

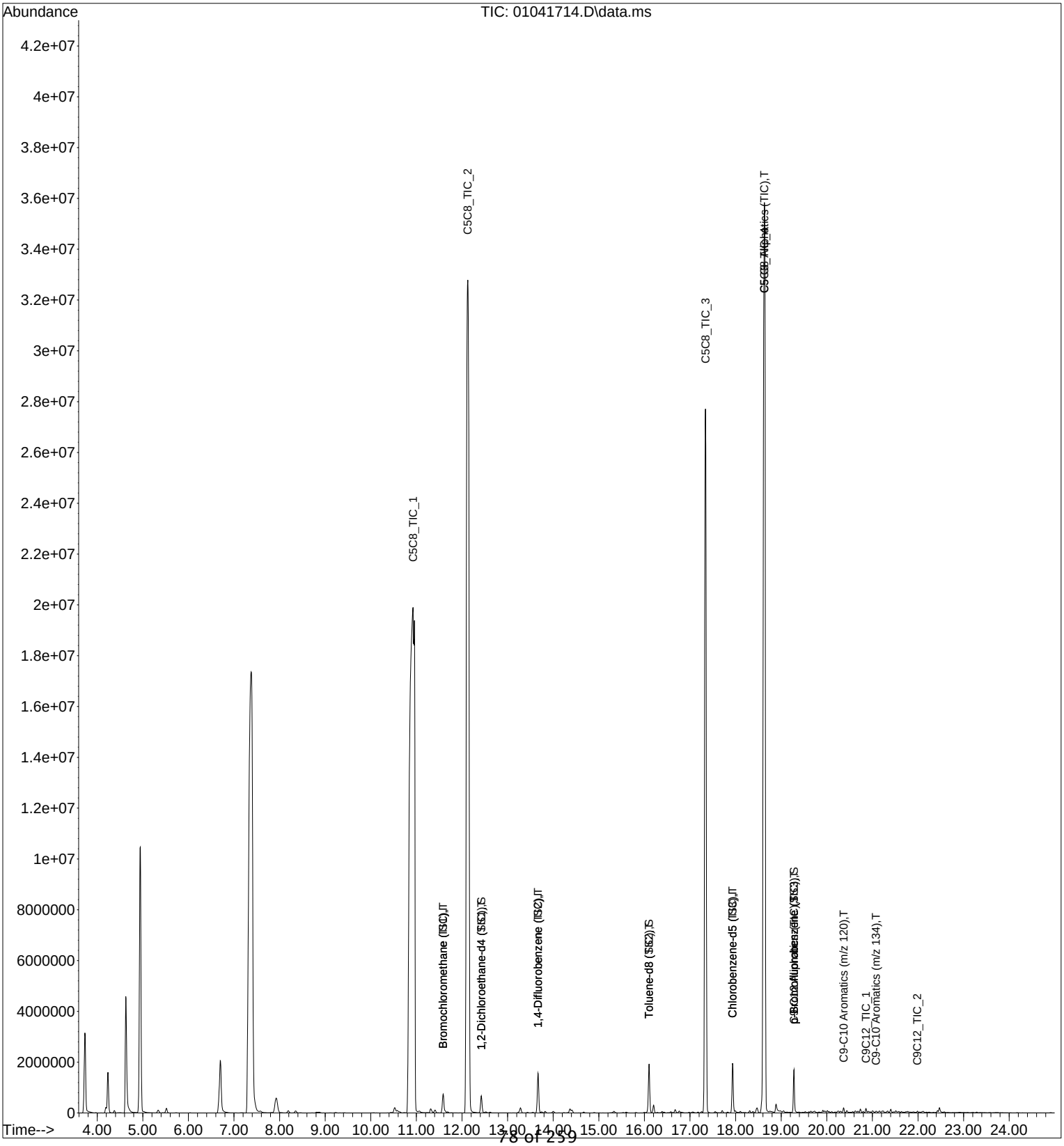
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.59	TIC	1893504	16.330 ng	100
3) Isopentane	7.38	TIC	99495822	No Calib #	
4) n-Hexane	11.68	TIC	84472	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.42	TIC	1520445	13.290 ng	100
8) 1,4-Difluorobenzene (TIC)	13.67	TIC	3412241	13.140 ng	100
9) Cyclohexane	13.56	TIC	55904	No Calib	
10) 2,3-Dimethylpentane	13.82	TIC	131453	No Calib	
11) n-Heptane	14.67	TIC	78461	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	4103612	13.366 ng	100
14) n-Octane	17.34	TIC	65418076	No Calib	
15) C5-C8 Aliphatics (TIC)	18.63	TIC	481631198m	1456.067 ng	
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3808507	13.417 ng	100
18) 2,3-Dimethylheptane	18.38	TIC	98998	No Calib	
19) n-Nonane	19.06	TIC	148498	No Calib #	
21) p-Bromofluorobenzene (...	19.28	TIC	2961399	13.408 ng	100
22) Isopropylbenzene	19.39	120	2579	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	13939	No Calib	
24) 1,3,5-Trimethylbenzene	20.01	120	13162	No Calib	
25) n-Decane	20.44	TIC	123743	No Calib	
26) p-Isopropyltoluene	20.74	134	7608	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	12642	No Calib	
28) Butylcyclohexane	20.95	TIC	35662	No Calib	
29) n-Undecane	21.51	TIC	91398	No Calib	
30) n-Dodecane	22.43	TIC	130668	No Calib	
31) C9-C12 Aliphatics-(TIC)	19.28	TIC	8937543m	125.334 ng	
32) C9-C10 Aromatics (m/z ...	20.37	120	113528m	7.714 ng	
33) C9-C10 Aromatics (m/z ...	21.08	134	62656m	7.582 ng	
34) C5C8_TIC_1	10.93	TIC	153682951m	71.909 ng	
35) C5C8 TIC 2	12.13	TIC	127942289m	59.865 ng	
36) C5C8 TIC 3	17.34	TIC	65482369m	30.640 ng	
37) C5C8 TIC 4	18.63	TIC	108439980m	50.740 ng	
38) C9C12 TIC 1	20.86	TIC	254110m	0.600 ng	
39) C9C12 TIC 2	21.99	TIC	73962m	0.175 ng	
40) C9C12 TIC 3	0.00	TIC	0	N.D. d	
41) C9C12 TIC 4	0.00	TIC	0	N.D. d	
42) C9C10 TIC 1	0.00	120	0	N.D. d	
43) C9C10 TIC 2	0.00	134	0	N.D. d	

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\04\01041714.D
Acq On : 4 Jan 2017 13:09 Operator: LH
Sample : P1606022-001dup (1000mL)
Misc : S29-12281601
ALS Vial : 5 Sample Multiplier: 1

Quant Time: Jan 11 11:29:31 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Massachusetts APH | ICAL Method: M16121916.M | ICAL Date: 12/19/16 | Instrument ID: MS16 | LH 12/21/16

Hydrocarbon Ranges

	areas							masses					
C5-C8 Aliphatics	0.5	1	5	25	50	100		0.5	1	5	25	50	100
Isopentane	145992	251075	1071839	5786983	11537839	24462071		0.520	1.04	5.20	26.00	52.00	104.00
n-Hexane	194294	317520	1251336	5985003	11728245	25181283		0.510	1.02	5.10	25.50	51.00	102.00
Cyclohexane	161369	280207	1234019	7028601	14143584	30151415		0.515	1.03	5.15	25.75	51.50	103.00
2,3-Dimethylpentane	165093	289518	1287102	7336654	14784784	31435664		0.555	1.11	5.55	27.75	55.50	111.00
n-Heptane	154577	265906	1179401	6689806	13558680	29444115		0.515	1.03	5.15	25.75	51.50	103.00
n-Octane	182574	306792	1342879	7876179	16113832	34704181		0.530	1.06	5.30	26.50	53.00	106.00
area sum:	1003899	1711018	7366576	40703226	81866964	175378729	sum:	3.145	6.290	31.45	157.25	314.50	629.00

C9-C12 Aliphatics	0.5	1	5	25	50	100		0.5	1	5	25	50	100
2,3-Dimethylheptane	190562	336375	1477001	8638505	17810606	37607727		0.510	1.02	5.10	25.50	51.0	102
n-Nonane	177815	310390	1406543	8346424	17334221	36388397		0.505	1.01	5.05	25.25	50.5	101
n-Decane	181143	315493	1452982	8968276	18673731	38060288		0.490	0.98	4.90	24.50	49.0	98
Butylcyclohexane	212287	378384	1704547	10241012	21367070	42699385		0.510	1.02	5.10	25.50	51.0	102
n-Undecane	161102	300459	1420417	8828047	18631052	38121852		0.480	0.96	4.80	24.00	48.0	96
n-Dodecane	449	249005	1259084	7461396	16096908	34899971		0.475	0.95	4.75	23.75	47.5	95
area sum:	923358	1890106	8720574	52483660	109913588	227777620	sum:	2.970	5.940	29.70	148.50	297.00	594.00

C9-C10 Aromatics	0.5	1	5	25	50	100		0.5	1	5	25	50	100
Isopropylbenzene	23988	40776	186003	1138777	2371392	4777654		0.505	1.01	5.05	25.25	50.5	101
3-Ethyltoluene	24891	43239	200071	1279486	2658644	5308282		0.480	0.96	4.80	24.00	48.0	96
1,3,5-Trimethylbenzene	34652	60385	275729	1732103	3561772	6986753		0.495	0.99	4.95	24.75	49.5	99
1,2,3-Trimethylbenzene	35087	62934	298908	2010849	3867319	6207230		0.485	0.97	4.85	24.25	48.5	97
p-Isopropyltoluene	19324	35427	170154	1125800	2171411	3516405		0.490	0.98	4.90	24.50	49.0	98
area sum:	137942	242761	1130865	7287015	14630538	26796324	sum:	2.455	4.910	24.55	122.75	245.50	491.00

Massachusetts APH | ICAL: M16121916.M | ICAL Date: 12/19/16 | Instrument ID: MS16

Hydrocarbon Ranges

areas

Internal Standards (TIC)	0.5	1	5	25	50	100
Bromochloromethane (IS1)	1576090	1538202	1320241	1316783	1283090	1345404
1,4-Difluorobenzene (IS2)	3309515	3276539	3118912	3066006	3082836	3132467
Chlorobenzene-d5 (IS3)	3464345	3446417	3298025	3304897	3323875	3455252

Internal Standards (EIC)						
Bromochloromethane (IS1)	284009	282839	267602	270737	268499	276134
1,4-Difluorobenzene (IS2)	1431810	1415627	1350648	1341426	1348020	1379188
Chlorobenzene-d5 (IS3)	1093970	1084403	1034748	1037530	1036571	1065075

LH 12/21/16

Surrogates (TIC)	0.5	1	5	25	50	100
1,2-Dichloroethane-d4	1418884	1410987	1354096	1340717	1346053	1386295
Toluene-d8	3859177	3834085	3658491	3636514	3675145	3780224
4-Bromofluorobenzene	2672493	2653301	2567540	2601878	2613704	2677175

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RRFs

C5-C8 Aliphatics	0.5	1	5	25	50	100	RRF_{avg}	%RSD
	2.7867	2.4020	2.1678	2.4120	2.4138	2.5270	2.452	8.24

C9-C12 Aliphatics	0.5	1	5	25	50	100	RRF_{avg}	%RSD
	3.5524	3.6679	3.5470	4.2580	4.4628	4.5004	3.998	11.45

C9-C10 Aromatics	0.5	1	5	25	50	100	RRF_{avg}	%RSD
	0.6420	0.5699	0.5565	0.7152	0.7187	0.6405	0.640	10.76

LH 12/21/16

AIR-PHASE PETROLEUM HYDROCARBONS (APH)

Primary Source Standards Concentrations

4ng/L Std. ID:
20ng/L Std. ID: S29-10281604
200ng/L Std. ID: S29-10281603

					ICAL Concentrations (Primary Source)					
Dilution Factors:		**5**	**50**	**Working STD Conc.(ng/L):**	**20**	**20**	**20**	**200**	**200**	**200**
	Source Std.	**Primary Working Standards**		**Injection (L):**	**0.025**	**0.050**	**0.25**	**0.125**	**0.25**	**0.50**
Compounds	**mg/m^3**	**200ng/L**	**20ng/L**	**ICAL Points:**	**0.5ng**	**1ng**	**5ng**	**25ng**	**50ng**	**100ng**
1-Methyl-3-ethylbenzene	0.96	192	19.2		0.480	0.96	4.80	24.00	48.0	96
1,3,5-Trimethylbenzene	0.99	198	19.8		0.495	0.99	4.95	24.75	49.5	99
n-Decane	0.98	196	19.6		0.490	0.98	4.90	24.50	49.0	98
1,2,3-Trimethylbenzene	0.97	194	19.4		0.485	0.97	4.85	24.25	48.5	97
p-Isopropyltoluene	0.98	196	19.6		0.490	0.98	4.90	24.50	49.0	98
n-Butylcyclohexane	1.02	204	20.4		0.510	1.02	5.10	25.50	51.0	102
n-Undecane	0.96	192	19.2		0.480	0.96	4.80	24.00	48.0	96
n-Dodecane	0.95	190	19.0		0.475	0.95	4.75	23.75	47.5	95
Isopentane	1.04	208	20.8		0.520	1.04	5.20	26.00	52.0	104
n-Hexane	1.02	204	20.4		0.510	1.02	5.10	25.50	51.0	102
Cyclohexane	1.03	206	20.6		0.515	1.03	5.15	25.75	51.5	103
2,3-Dimethylpentane	1.11	222	22.2		0.555	1.11	5.55	27.75	55.5	111
n-Heptane	1.03	206	20.6		0.515	1.03	5.15	25.75	51.5	103
n-Octane	1.06	212	21.2		0.530	1.06	5.30	26.50	53.0	106
2,3-Dimethylheptane	1.02	204	20.4		0.510	1.02	5.10	25.50	51.0	102
n-Nonane	1.01	202	20.2		0.505	1.01	5.05	25.25	50.5	101
Isopropylbenzene	1.01	202	20.2		0.505	1.01	5.05	25.25	50.5	101

Primary Source Standard:
Std. ID: S29-10281601
Spectra Gas Cyl. #: CC-302316
Expiration: 10/12/17

AIR-PHASE PETROLEUM HYDROCARBONS (APH)

Secondary Source Standards Concentrations

20ng/L Working Std. ID:
100ng/L Working Std. ID:
200ng/L Working Std. ID: S29-12011603
Dilution Factor: 5 | 10 | 50
Working Std. Conc. Utilized: 200

Working Std. Injection Amounts (L): 0.125

		Secondary Working Std. Conc.			ICV / LCS
Compounds	**mg/m^3**	**200ng/L**	**100ng/L**	**20ng/L**	**Actual Conc.(ng)**
1-Methyl-3-ethylbenzene	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	1.061	212.2	106.1	21.22	26.525
n-Decane	1.061	212.2	106.1	21.22	26.525
1,2,3-Trimethylbenzene	1.062	212.4	106.2	21.24	26.550
p-Isopropyltoluene	1.062	212.4	106.2	21.24	26.550
n-Butylcyclohexane	NA	NA	NA	NA	NA
n-Undecane	1.064	212.8	106.4	21.28	26.600
n-Dodecane	1.062	212.4	106.2	21.24	26.550
Isopentane	NA	NA	NA	NA	NA
n-Hexane	1.064	212.8	106.4	21.28	26.600
Cyclohexane	2.125	425.0	212.5	42.50	53.125
2,3-Dimethylpentane	NA	NA	NA	NA	NA
n-Heptane	1.064	212.8	106.4	21.28	26.600
n-Octane	1.060	212.0	106.0	21.20	26.500
2,3-Dimethylheptane	NA	NA	NA	NA	NA
n-Nonane	1.059	211.8	105.9	21.18	26.475
Isopropylbenzene	NA	NA	NA	NA	NA

Secondary Source Standard:
Std. ID: S29-10051602
Spectra Gas Cyl. #: CC-250189
Expiration: 09/23/17

Calibration Status Report GCMS-16

Method : I:\MS16\METHODS\M16121916.M (RTE Integrator)
Title : Massachusetts APH
Last Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration

#	ID	Conc	ISTD Conc	Path\File
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2	1	6	13	I:\MS16\DATA\2016_12\19\12191613.D
3	5	31	13	I:\MS16\DATA\2016_12\19\12191614.D
4	25	157	13	I:\MS16\DATA\2016_12\19\12191615.D
5	50	314	13	I:\MS16\DATA\2016_12\19\12191616.D
6	100	629	13	I:\MS16\DATA\2016_12\19\12191617.D

#	ID	Update Time	Quant Time	Acquisition Time
1	0.5	Dec 20 16:11 2016	Dec 20 16:06 2016	19 Dec 2016 19:32
2	1	Dec 20 16:11 2016	Dec 20 16:08 2016	19 Dec 2016 20:05
3	5	Dec 20 16:00 2016	Dec 20 16:00 2016	19 Dec 2016 20:39
4	25	Dec 20 16:00 2016	Dec 20 16:00 2016	19 Dec 2016 21:12
5	50	Dec 20 16:01 2016	Dec 20 16:00 2016	19 Dec 2016 21:45
6	100	Dec 20 16:01 2016	Dec 20 16:00 2016	19 Dec 2016 22:18

M16121916.M Wed Dec 21 16:01:40 2016

LH 12/21/16

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191612.D
Acq On : 19 Dec 2016 19:32 Operator: LH
Sample : 0.5ng MAPH ICAL STD
Misc : S29-12061601/S29-10281604 (12/25)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Dec 20 16:06:19 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	284009	12.500 ng	0.00
7) 1,4-Difluorobenzene (IS2)	13.65	114	1431810	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1093970	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.40	65	506203	13.038 ng	0.00
Spiked Amount 12.500				Recovery = 104.32%	
12) Toluene-d8 (SS2)	16.10	98	1456818	12.318 ng	0.00
Spiked Amount 12.500				Recovery = 98.56%	
20) p-Bromofluorobenzene (...	19.28	174	474949	12.434 ng	0.00
Spiked Amount 12.500				Recovery = 99.44%	

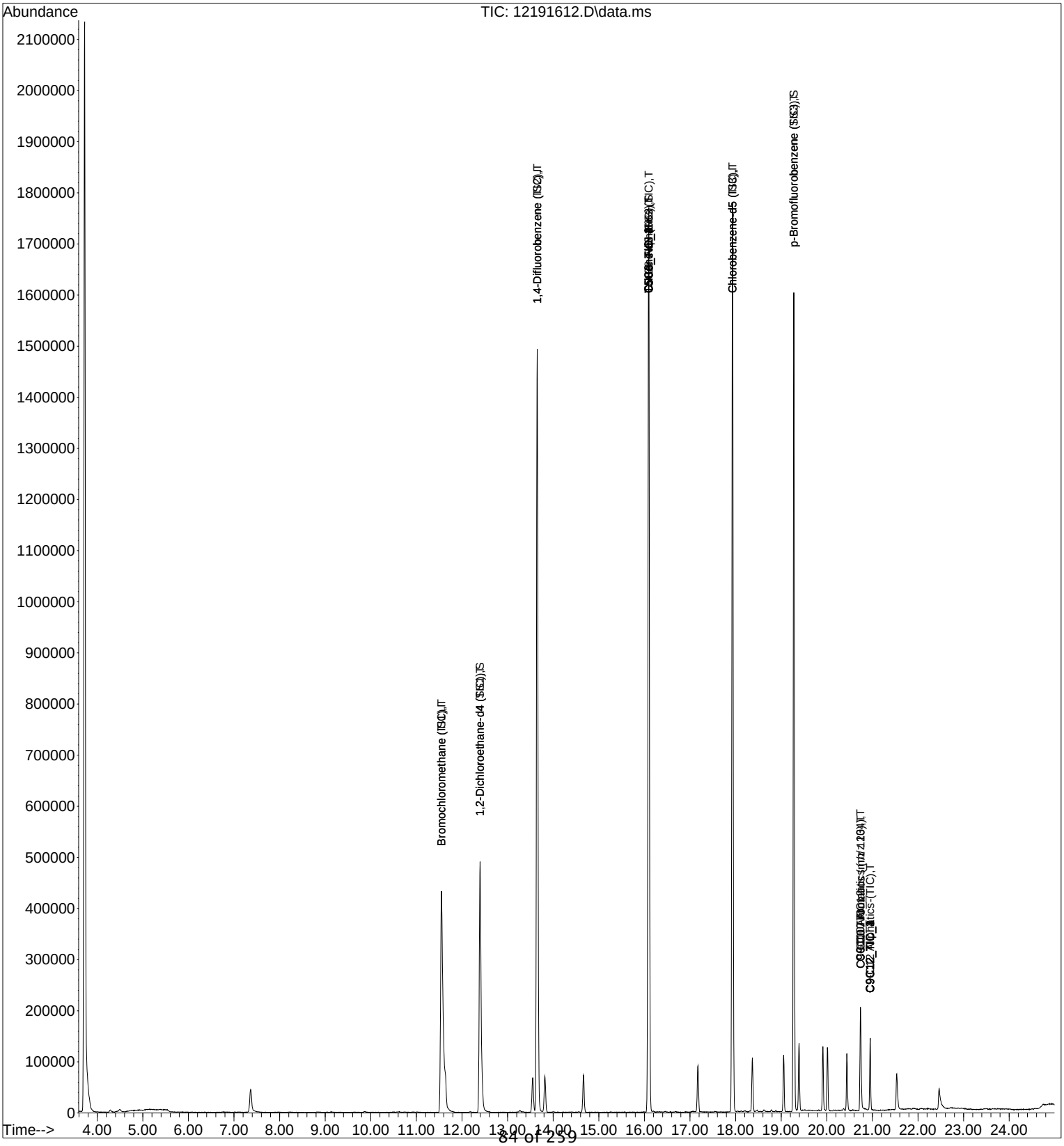
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.55	TIC	1576090m	12.721 ng	
3) Isopentane	7.36	TIC	145992	No Calib	
4) n-Hexane	11.62	TIC	194294	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.40	TIC	1418884	12.923 ng	100
8) 1,4-Difluorobenzene (TIC)	13.65	TIC	3309515	12.737 ng	100
9) Cyclohexane	13.55	TIC	161369	No Calib	
10) 2,3-Dimethylpentane	13.82	TIC	165093	No Calib	
11) n-Heptane	14.66	TIC	154577	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	3859177	12.530 ng	100
14) n-Octane	17.17	TIC	182574	No Calib	
15) C5-C8 Aliphatics (TIC)	16.10	TIC	3859177	11.572 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3464345	12.733 ng	100
18) 2,3-Dimethylheptane	18.37	TIC	190562	No Calib	
19) n-Nonane	19.06	TIC	177815	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	2672493	12.632 ng	100
22) Isopropylbenzene	19.39	120	23988	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	24891	No Calib	
24) 1,3,5-Trimethylbenzene	20.02	120	34652	No Calib	
25) n-Decane	20.44	TIC	181143	No Calib	
26) p-Isopropyltoluene	20.74	134	19324	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	35087	No Calib	
28) Butylcyclohexane	20.95	TIC	212287	No Calib	
29) n-Undecane	21.54	TIC	161102	No Calib	
30) n-Dodecane	22.41	TIC	449	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.95	TIC	218845	2.265 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	35087	2.831 ng	100
33) C9-C10 Aromatics (m/z ...	20.74	134	19324	2.793 ng	100
34) C5C8_TIC_1	16.10	TIC	3859177	1.885 ng	100
35) C5C8 TIC 2	16.10	TIC	3859177	1.885 ng	100
36) C5C8 TIC 3	16.10	TIC	3859177	1.885 ng	100
37) C5C8 TIC 4	16.10	TIC	3859177	1.885 ng	100
38) C9C12 TIC 1	20.95	TIC	218845	0.381 ng	100
39) C9C12 TIC 2	20.95	TIC	218845	0.381 ng	100
40) C9C12 TIC 3	20.95	TIC	218845	0.381 ng	100
41) C9C12 TIC 4	20.95	TIC	218845	0.381 ng	100
42) C9C10 TIC 1	20.74	120	35087	0.577 ng	100
43) C9C10 TIC 2	20.74	134	19324	0.569 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191612.D
Acq On : 19 Dec 2016 19:32 Operator: LH
Sample : 0.5ng MAPH ICAL STD
Misc : S29-12061601/S29-10281604 (12/25)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Dec 20 16:06:19 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191613.D
Acq On : 19 Dec 2016 20:05 Operator: LH
Sample : 1.0ng MAPH ICAL STD
Misc : S29-12061601/S29-10281604 (12/25)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Dec 20 16:08:28 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	282839	12.500 ng	0.00
7) 1,4-Difluorobenzene (IS2)	13.65	114	1415627	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1084403	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.40	65	503499	13.022 ng	0.00
Spiked Amount 12.500				Recovery = 104.16%	
12) Toluene-d8 (SS2)	16.10	98	1449112	12.393 ng	0.00
Spiked Amount 12.500				Recovery = 99.12%	
20) p-Bromofluorobenzene (...	19.28	174	467486	12.346 ng	0.00
Spiked Amount 12.500				Recovery = 98.80%	

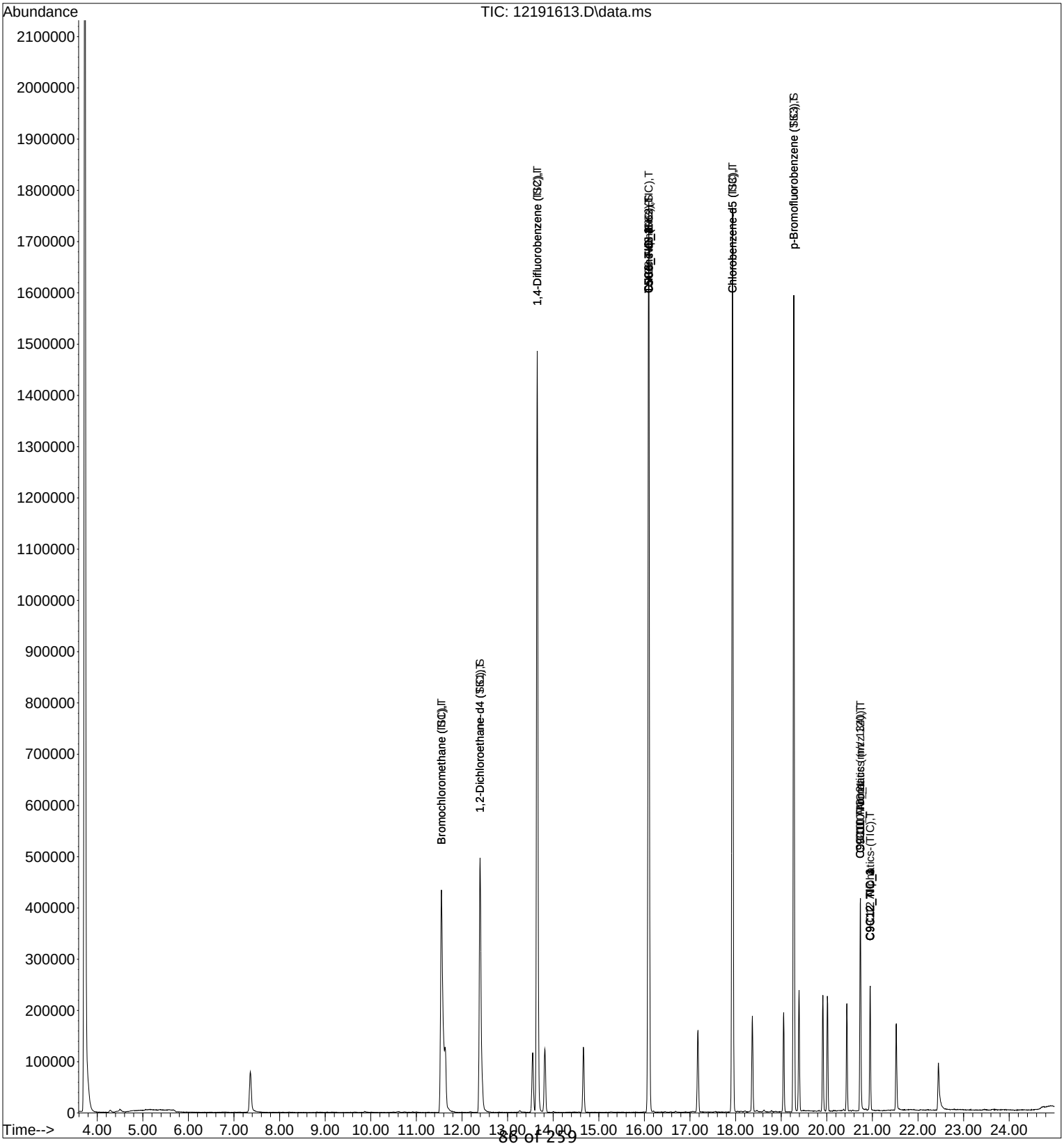
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.55	TIC	1538202m	12.467 ng	
3) Isopentane	7.36	TIC	251075	No Calib	
4) n-Hexane	11.63	TIC	317520	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.40	TIC	1410987	12.904 ng	100
8) 1,4-Difluorobenzene (TIC)	13.65	TIC	3276539	12.754 ng	100
9) Cyclohexane	13.55	TIC	280207	No Calib	
10) 2,3-Dimethylpentane	13.81	TIC	289518	No Calib	
11) n-Heptane	14.66	TIC	265906	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	3834085	12.591 ng	100
14) n-Octane	17.17	TIC	306792	No Calib	
15) C5-C8 Aliphatics (TIC)	16.10	TIC	3834625	11.629 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3446417	12.779 ng	100
18) 2,3-Dimethylheptane	18.37	TIC	336375	No Calib	
19) n-Nonane	19.06	TIC	310390	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	2653301	12.652 ng	100
22) Isopropylbenzene	19.39	120	40776	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	43239	No Calib	
24) 1,3,5-Trimethylbenzene	20.01	120	60385	No Calib	
25) n-Decane	20.44	TIC	315493	No Calib	
26) p-Isopropyltoluene	20.73	134	35427	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	62934	No Calib	
28) Butylcyclohexane	20.95	TIC	378384	No Calib	
29) n-Undecane	21.52	TIC	300459	No Calib	
30) n-Dodecane	22.45	TIC	249005	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.95	TIC	379243	3.960 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	62934	5.122 ng	100
33) C9-C10 Aromatics (m/z ...	20.73	134	35427	5.166 ng	100
34) C5C8_TIC_1	16.10	TIC	3834625	1.889 ng	100
35) C5C8 TIC 2	16.10	TIC	3834625	1.889 ng	100
36) C5C8 TIC 3	16.10	TIC	3834625	1.889 ng	100
37) C5C8 TIC 4	16.10	TIC	3834625	1.889 ng	100
38) C9C12 TIC 1	20.95	TIC	379243	0.667 ng	100
39) C9C12 TIC 2	20.95	TIC	379243	0.667 ng	100
40) C9C12 TIC 3	20.95	TIC	379243	0.667 ng	100
41) C9C12 TIC 4	20.95	TIC	379243	0.667 ng	100
42) C9C10 TIC 1	20.74	120	62934	1.043 ng	100
43) C9C10 TIC 2	20.73	134	35427	1.052 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191613.D
Acq On : 19 Dec 2016 20:05 Operator: LH
Sample : 1.0ng MAPH ICAL STD
Misc : S29-12061601/S29-10281604 (12/25)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Dec 20 16:08:28 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191614.D
Acq On : 19 Dec 2016 20:39 Operator: LH
Sample : 5.0ng MAPH ICAL STD
Misc : S29-12061601/S29-10281604 (12/25)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Dec 20 16:00:31 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016 LH 12/20/16
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	267602	12.500 ng	0.00
7) 1,4-Difluorobenzene (IS2)	13.65	114	1350648	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1034748	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.40	65	479851	13.117 ng	0.00
Spiked Amount 12.500				Recovery = 104.96%	
12) Toluene-d8 (SS2)	16.10	98	1382015	12.387 ng	0.00
Spiked Amount 12.500				Recovery = 99.12%	
20) p-Bromofluorobenzene (...	19.28	174	454232	12.572 ng	0.00
Spiked Amount 12.500				Recovery = 100.56%	

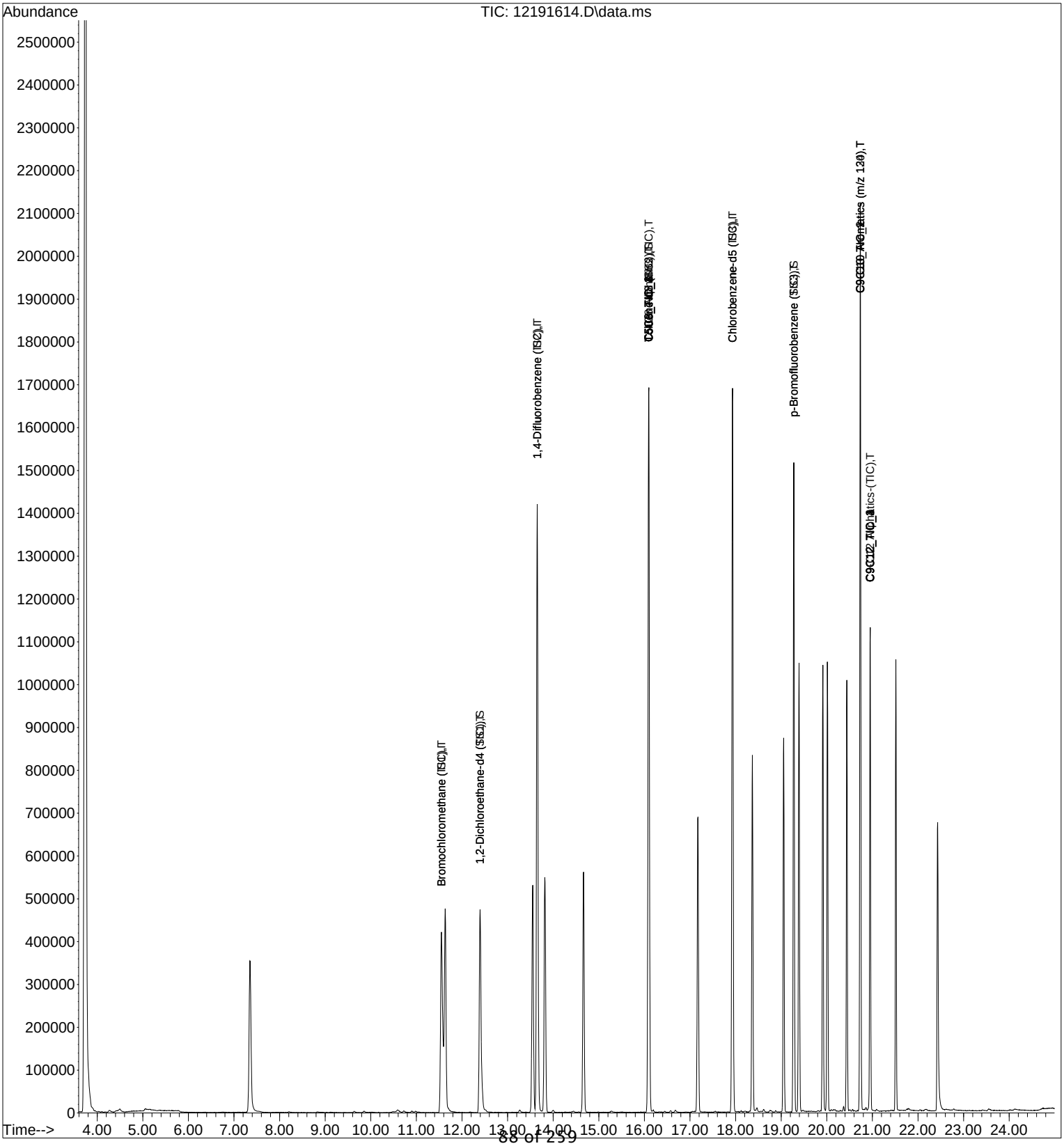
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.55	TIC	1320241	11.310 ng	100
3) Isopentane	7.35	TIC	1071839	No Calib	
4) n-Hexane	11.63	TIC	1251336	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.40	TIC	1354096	13.089 ng	100
8) 1,4-Difluorobenzene (TIC)	13.65	TIC	3118912	12.724 ng	100
9) Cyclohexane	13.55	TIC	1234019	No Calib	
10) 2,3-Dimethylpentane	13.81	TIC	1287102	No Calib	
11) n-Heptane	14.67	TIC	1179401	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	3658491	12.593 ng	100
14) n-Octane	17.17	TIC	1342879	No Calib	
15) C5-C8 Aliphatics (TIC)	16.10	TIC	3658491	11.629 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3298025	12.816 ng	100
18) 2,3-Dimethylheptane	18.37	TIC	1477001	No Calib	
19) n-Nonane	19.06	TIC	1406543	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	2567540	12.830 ng	100
22) Isopropylbenzene	19.39	120	186003	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	200071	No Calib	
24) 1,3,5-Trimethylbenzene	20.01	120	275729	No Calib	
25) n-Decane	20.44	TIC	1452982	No Calib	
26) p-Isopropyltoluene	20.73	134	170154	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	298908	No Calib	
28) Butylcyclohexane	20.95	TIC	1704547	No Calib	
29) n-Undecane	21.51	TIC	1420417	No Calib	
30) n-Dodecane	22.43	TIC	1259084	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.95	TIC	1709008	18.701 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	298908	25.495 ng	100
33) C9-C10 Aromatics (m/z ...	20.73	134	170154	26.001 ng	100
34) C5C8_TIC_1	16.10	TIC	3658491	1.889 ng	100
35) C5C8 TIC 2	16.10	TIC	3658491	1.889 ng	100
36) C5C8 TIC 3	16.10	TIC	3658491	1.889 ng	100
37) C5C8 TIC 4	16.10	TIC	3658491	1.889 ng	100
38) C9C12 TIC 1	20.95	TIC	1709008	3.148 ng	100
39) C9C12 TIC 2	20.95	TIC	1709008	3.148 ng	100
40) C9C12 TIC 3	20.95	TIC	1709008	3.148 ng	100
41) C9C12 TIC 4	20.95	TIC	1709008	3.148 ng	100
42) C9C10 TIC 1	20.74	120	298908	5.193 ng	100
43) C9C10 TIC 2	20.73	134	170154	5.296 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191614.D
Acq On : 19 Dec 2016 20:39 Operator: LH
Sample : 5.0ng MAPH ICAL STD
Misc : S29-12061601/S29-10281604 (12/25)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Dec 20 16:00:31 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191615.D
Acq On : 19 Dec 2016 21:12 Operator: LH
Sample : 25ng MAPH ICAL STD
Misc : S29-12061601/S29-10281603 (12/25)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Dec 20 16:00:32 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

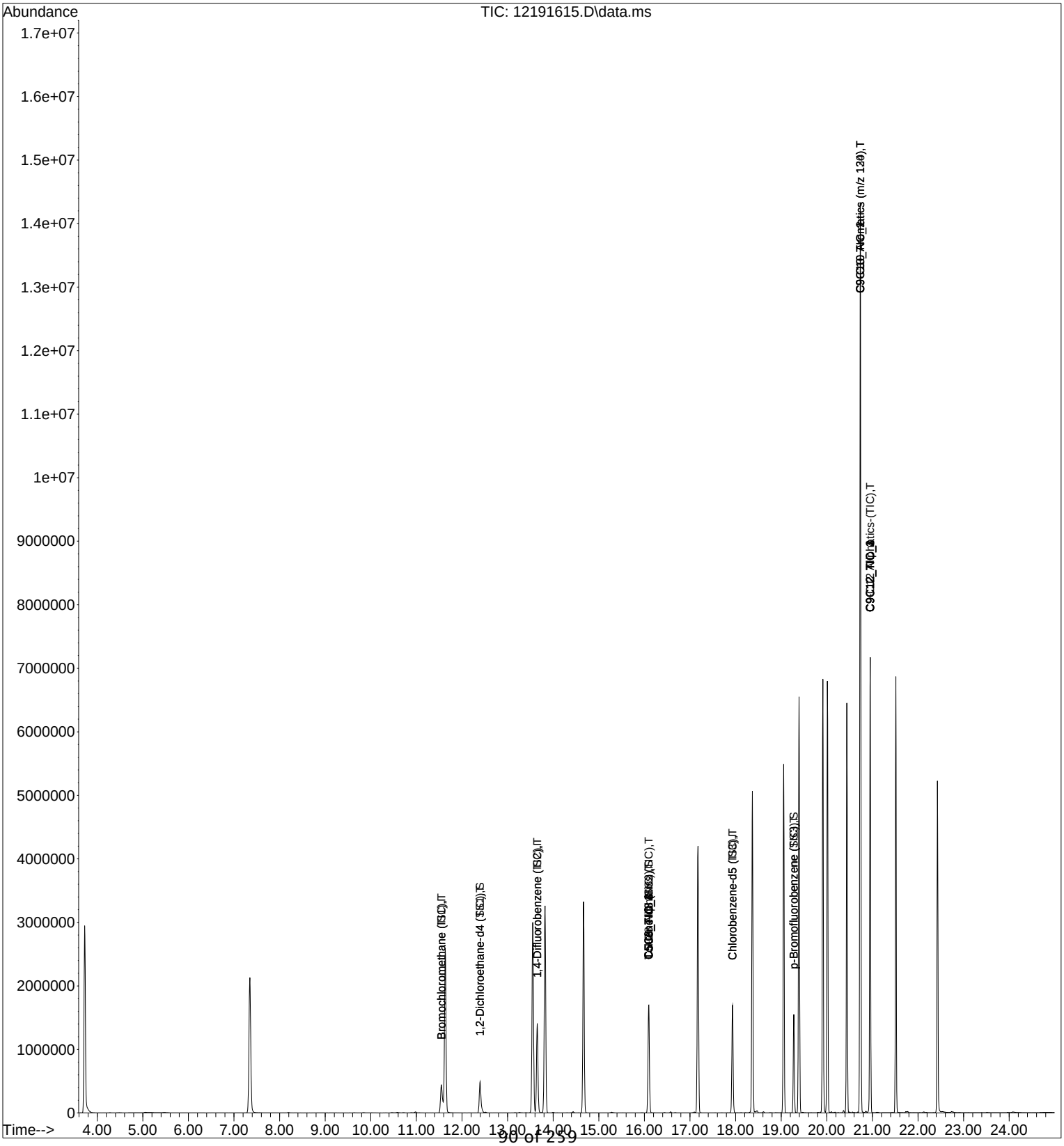
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	270737	12.500 ng	0.00
7) 1,4-Difluorobenzene (IS2)	13.65	114	1341426	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1037530	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.40	65	480900	12.994 ng	0.00
Spiked Amount 12.500				Recovery = 103.92%	
12) Toluene-d8 (SS2)	16.10	98	1377301	12.430 ng	0.00
Spiked Amount 12.500				Recovery = 99.44%	
20) p-Bromofluorobenzene (...	19.28	174	459253	12.677 ng	0.00
Spiked Amount 12.500				Recovery = 101.44%	
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.55	TIC	1316783	11.149 ng	100
3) Isopentane	7.35	TIC	5786983	No Calib	
4) n-Hexane	11.63	TIC	5985003	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.40	TIC	1340717	12.810 ng	100
8) 1,4-Difluorobenzene (TIC)	13.65	TIC	3066006	12.595 ng	100
9) Cyclohexane	13.55	TIC	7028601	No Calib	
10) 2,3-Dimethylpentane	13.82	TIC	7336654	No Calib	
11) n-Heptane	14.67	TIC	6689806	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	3636514	12.603 ng	100
14) n-Octane	17.17	TIC	7876179	No Calib	
15) C5-C8 Aliphatics (TIC)	16.10	TIC	3636514	11.639 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3304897	12.808 ng	100
18) 2,3-Dimethylheptane	18.37	TIC	8638505	No Calib	
19) n-Nonane	19.06	TIC	8346424	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	2601878	12.967 ng	100
22) Isopropylbenzene	19.39	120	1138777	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	1279486	No Calib	
24) 1,3,5-Trimethylbenzene	20.01	120	1732103	No Calib	
25) n-Decane	20.44	TIC	8968276	No Calib	
26) p-Isopropyltoluene	20.73	134	1125800	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	2010849	No Calib	
28) Butylcyclohexane	20.95	TIC	10241012	No Calib	
29) n-Undecane	21.51	TIC	8828047	No Calib	
30) n-Dodecane	22.43	TIC	7461396	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.95	TIC	10241012	111.765 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	2010849	171.055 ng	100
33) C9-C10 Aromatics (m/z ...	20.73	134	1125800	171.574 ng	100
34) C5C8_TIC_1	16.10	TIC	3636514	1.873 ng	100
35) C5C8 TIC 2	16.10	TIC	3636514	1.873 ng	100
36) C5C8 TIC 3	16.10	TIC	3636514	1.873 ng	100
37) C5C8 TIC 4	16.10	TIC	3636514	1.873 ng	100
38) C9C12 TIC 1	20.95	TIC	10241012	18.816 ng	100
39) C9C12 TIC 2	20.95	TIC	10241012	18.816 ng	100
40) C9C12 TIC 3	20.95	TIC	10241012	18.816 ng	100
41) C9C12 TIC 4	20.95	TIC	10241012	18.816 ng	100
42) C9C10 TIC 1	20.74	120	2010849	34.838 ng	100
43) C9C10 TIC 2	20.73	134	1125800	34.944 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191615.D
Acq On : 19 Dec 2016 21:12 Operator: LH
Sample : 25ng MAPH ICAL STD
Misc : S29-12061601/S29-10281603 (12/25)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Dec 20 16:00:32 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191616.D
Acq On : 19 Dec 2016 21:45 Operator: LH
Sample : 50ng MAPH ICAL STD
Misc : S29-12061601/S29-10281603 (12/25)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Dec 20 16:00:33 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

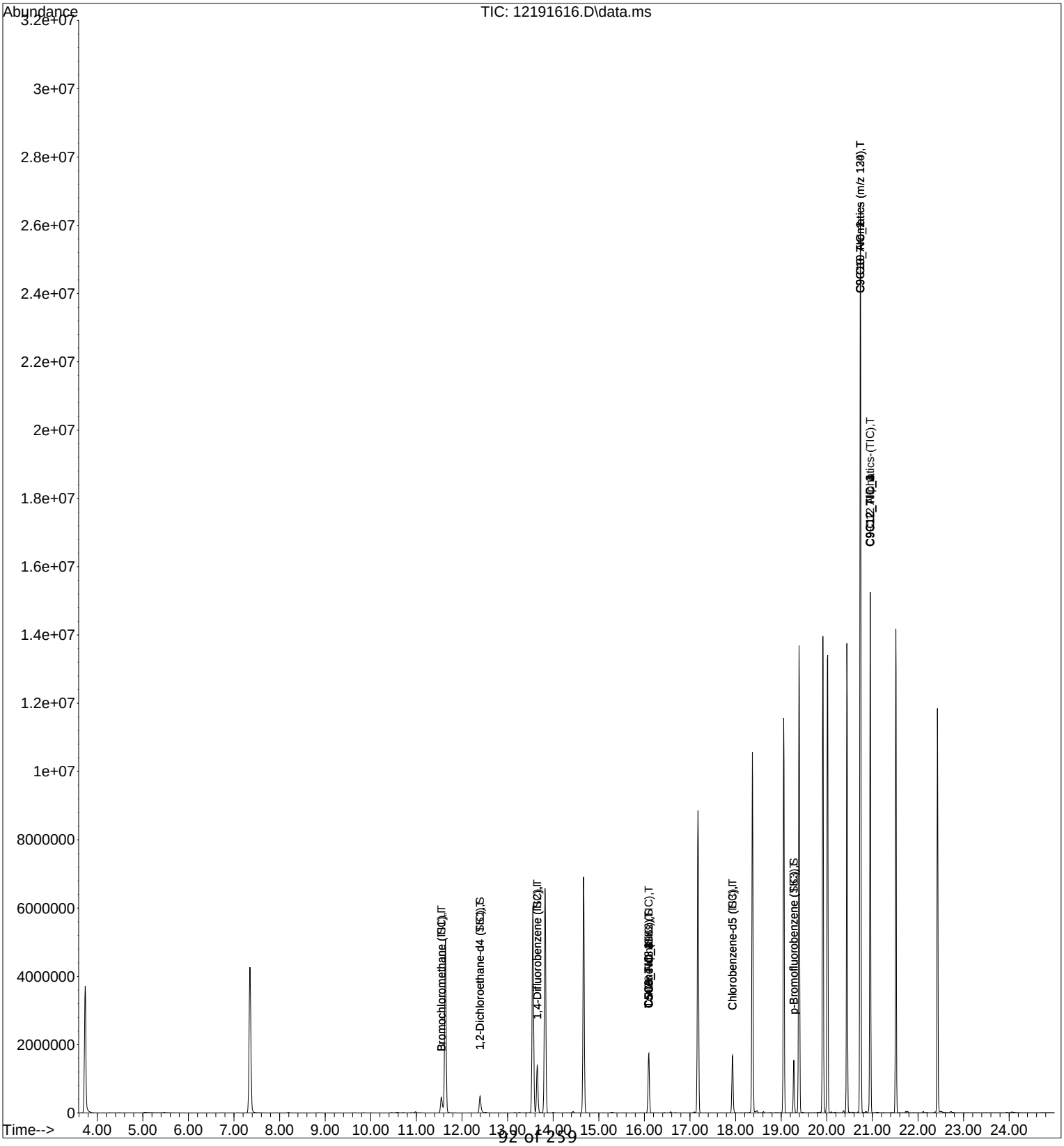
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	268499	12.500 ng	0.00
7) 1,4-Difluorobenzene (IS2)	13.65	114	1348020	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1036571	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.40	65	480798	13.099 ng	0.00
Spiked Amount 12.500				Recovery = 104.80%	
12) Toluene-d8 (SS2)	16.10	98	1388648	12.471 ng	0.00
Spiked Amount 12.500				Recovery = 99.76%	
20) p-Bromofluorobenzene (...	19.28	174	459998	12.709 ng	0.00
Spiked Amount 12.500				Recovery = 101.68%	
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.55	TIC	1283090	10.955 ng	100
3) Isopentane	7.35	TIC	11537839	No Calib	
4) n-Hexane	11.64	TIC	11728245	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.40	TIC	1346053	12.968 ng	100
8) 1,4-Difluorobenzene (TIC)	13.65	TIC	3082836	12.602 ng	100
9) Cyclohexane	13.56	TIC	14143584	No Calib	
10) 2,3-Dimethylpentane	13.82	TIC	14784784	No Calib	
11) n-Heptane	14.67	TIC	13558680	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	3675145	12.675 ng	100
14) n-Octane	17.17	TIC	16113832	No Calib	
15) C5-C8 Aliphatics (TIC)	16.10	TIC	3675145	11.705 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3323875	12.894 ng	100
18) 2,3-Dimethylheptane	18.37	TIC	17810606	No Calib	
19) n-Nonane	19.06	TIC	17334221	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	2613704	13.038 ng	100
22) Isopropylbenzene	19.39	120	2371392	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	2658644	No Calib	
24) 1,3,5-Trimethylbenzene	20.02	120	3561772	No Calib	
25) n-Decane	20.44	TIC	18673731	No Calib	
26) p-Isopropyltoluene	20.73	134	2171411	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	3867319	No Calib	
28) Butylcyclohexane	20.95	TIC	21367070	No Calib	
29) n-Undecane	21.51	TIC	18631052	No Calib	
30) n-Dodecane	22.43	TIC	16096908	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.95	TIC	21367070	233.406 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	3867319	329.283 ng	100
33) C9-C10 Aromatics (m/z ...	20.73	134	2171411	331.233 ng	100
34) C5C8_TIC_1	16.10	TIC	3675145	1.894 ng	100
35) C5C8 TIC 2	16.10	TIC	3675145	1.894 ng	100
36) C5C8 TIC 3	16.10	TIC	3675145	1.894 ng	100
37) C5C8 TIC 4	16.10	TIC	3675145	1.894 ng	100
38) C9C12 TIC 1	20.95	TIC	21367070	39.294 ng	100
39) C9C12 TIC 2	20.95	TIC	21367070	39.294 ng	100
40) C9C12 TIC 3	20.95	TIC	21367070	39.294 ng	100
41) C9C12 TIC 4	20.95	TIC	21367070	39.294 ng	100
42) C9C10 TIC 1	20.74	120	3867319	67.064 ng	100
43) C9C10 TIC 2	20.73	134	2171411	67.461 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191616.D
Acq On : 19 Dec 2016 21:45 Operator: LH
Sample : 50ng MAPH ICAL STD
Misc : S29-12061601/S29-10281603 (12/25)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Dec 20 16:00:33 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191617.D
Acq On : 19 Dec 2016 22:18 Operator: LH
Sample : 100ng MAPH ICAL STD
Misc : S29-12061601/S29-10281603 (12/25)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Dec 20 16:00:34 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

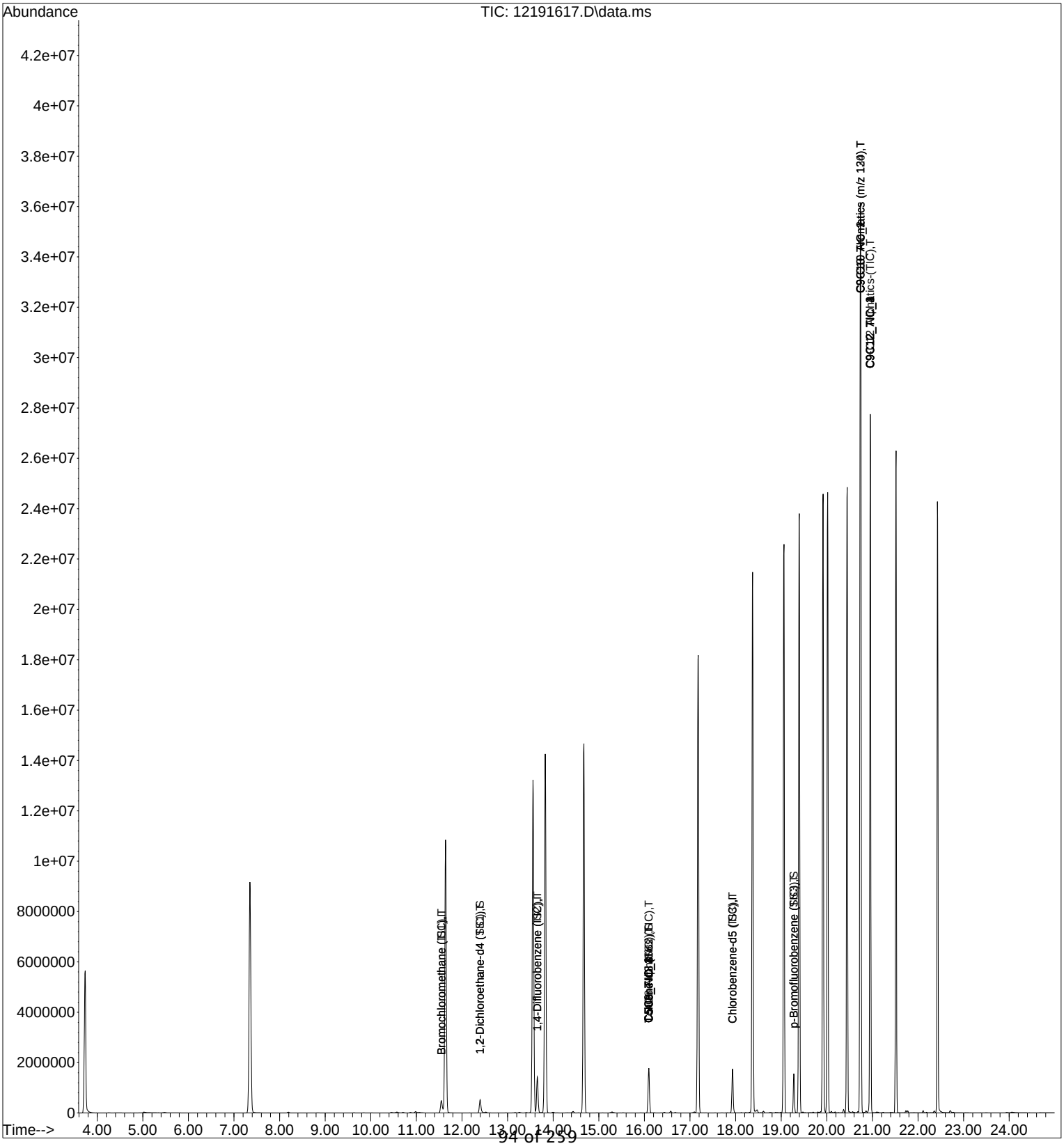
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	276134	12.500 ng	0.00
7) 1,4-Difluorobenzene (IS2)	13.65	114	1379188	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1065075	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.40	65	495029	13.114 ng	0.00
Spiked Amount 12.500				Recovery = 104.88%	
12) Toluene-d8 (SS2)	16.10	98	1423969	12.499 ng	0.00
Spiked Amount 12.500				Recovery = 100.00%	
20) p-Bromofluorobenzene (...	19.28	174	469178	12.616 ng	0.00
Spiked Amount 12.500				Recovery = 100.96%	
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.55	TIC	1345404	11.169 ng	100
3) Isopentane	7.35	TIC	24462071	No Calib	
4) n-Hexane	11.64	TIC	25181283	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.40	TIC	1386295	12.986 ng	100
8) 1,4-Difluorobenzene (TIC)	13.65	TIC	3132467	12.515 ng	100
9) Cyclohexane	13.56	TIC	30151415	No Calib	
10) 2,3-Dimethylpentane	13.83	TIC	31435664	No Calib	
11) n-Heptane	14.67	TIC	29444115	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	3780224	12.742 ng	100
14) n-Octane	17.18	TIC	34704181	No Calib	
15) C5-C8 Aliphatics (TIC)	16.10	TIC	3778521	11.762 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3455252	13.044 ng	100
18) 2,3-Dimethylheptane	18.37	TIC	37607727	No Calib	
19) n-Nonane	19.06	TIC	36388397	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	2677175	12.997 ng	100
22) Isopropylbenzene	19.40	120	4777654	No Calib	
23) 1-Methyl-3-ethylbenzene	19.92	120	5308282	No Calib	
24) 1,3,5-Trimethylbenzene	20.02	120	6986753	No Calib	
25) n-Decane	20.45	TIC	38060288	No Calib	
26) p-Isopropyltoluene	20.74	134	3516405	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	6207230	No Calib	
28) Butylcyclohexane	20.95	TIC	42699385	No Calib	
29) n-Undecane	21.52	TIC	38121852	No Calib	
30) n-Dodecane	22.43	TIC	34899971	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.95	TIC	42708354	454.044 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	6207230	514.370 ng	100
33) C9-C10 Aromatics (m/z ...	20.74	134	3516405	522.047 ng	100
34) C5C8_TIC_1	16.10	TIC	3778521	1.896 ng	100
35) C5C8 TIC 2	16.10	TIC	3778521	1.896 ng	100
36) C5C8 TIC 3	16.10	TIC	3778521	1.896 ng	100
37) C5C8 TIC 4	16.10	TIC	3778521	1.896 ng	100
38) C9C12 TIC 1	20.95	TIC	42708354	76.438 ng	100
39) C9C12 TIC 2	20.95	TIC	42708354	76.438 ng	100
40) C9C12 TIC 3	20.95	TIC	42708354	76.438 ng	100
41) C9C12 TIC 4	20.95	TIC	42708354	76.438 ng	100
42) C9C10 TIC 1	20.74	120	6207230	104.760 ng	100
43) C9C10 TIC 2	20.74	134	3516405	106.323 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191617.D
Acq On : 19 Dec 2016 22:18 Operator: LH
Sample : 100ng MAPH ICAL STD
Misc : S29-12061601/S29-10281603 (12/25)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Dec 20 16:00:34 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191618.D
Acq On : 19 Dec 2016 22:52 Operator: LH
Sample : 25ng MAPH ICV STD
Misc : S29-12061601/S29-12011603 (12/30)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 16:12:20 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.56	130	305732	12.500 ng	0.01
7) 1,4-Difluorobenzene (IS2)	13.66	114	1464517	12.500 ng	0.01
16) Chlorobenzene-d5 (IS3)	17.93	117	1154900	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.41	65	532142	12.183 ng	0.01
Spiked Amount 12.500				Recovery = 97.44%	
12) Toluene-d8 (SS2)	16.10	98	1504935	12.524 ng	0.00
Spiked Amount 12.500				Recovery = 100.16%	
20) p-Bromofluorobenzene (...	19.28	174	502213	12.395 ng	0.00
Spiked Amount 12.500				Recovery = 99.20%	

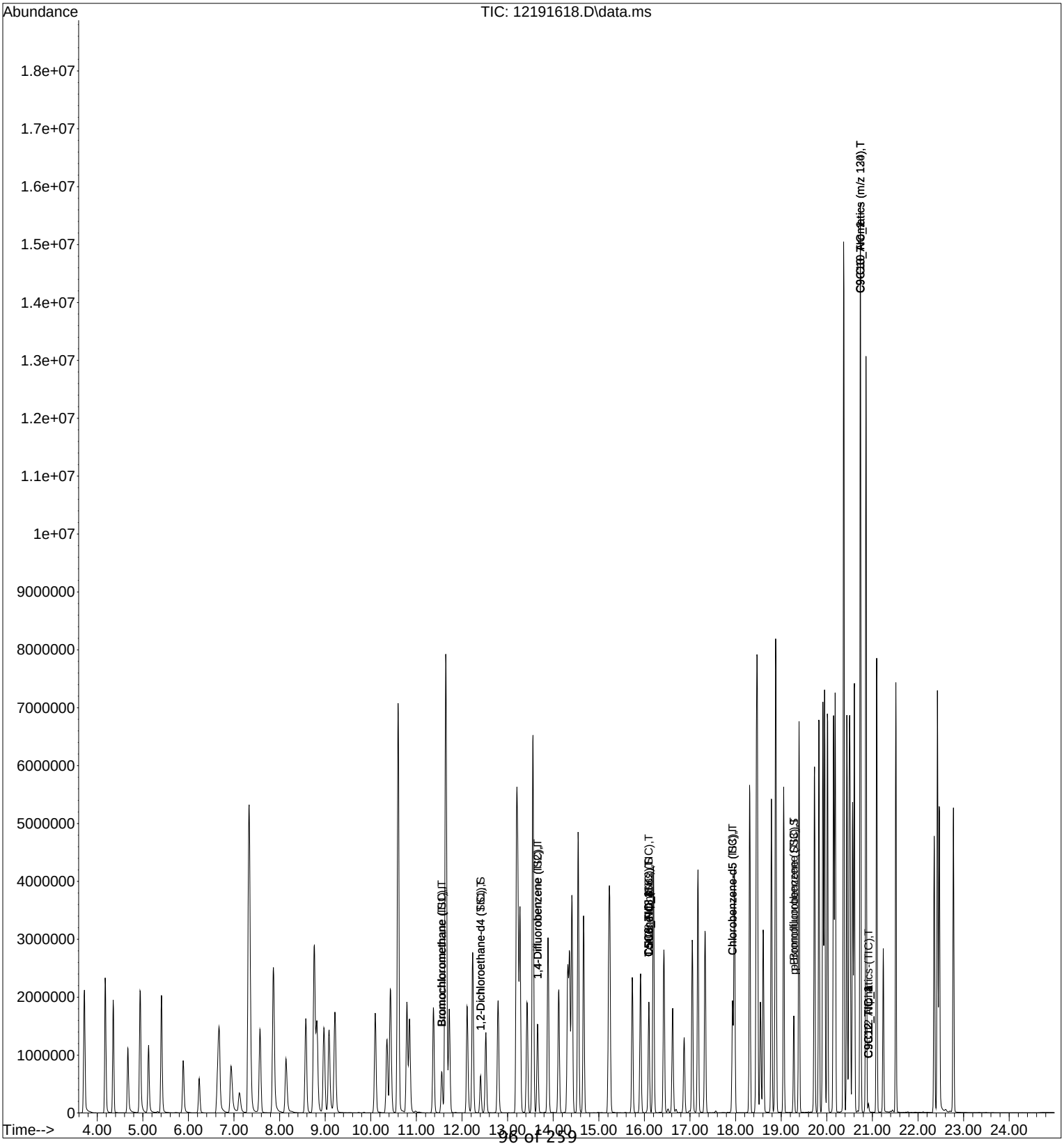
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.55	TIC	1715527	13.827 ng	100
3) Isopentane	7.33	TIC	18528219	No Calib #	
4) n-Hexane	11.64	TIC	21993235	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.41	TIC	1492336	12.191 ng	100
8) 1,4-Difluorobenzene (TIC)	13.66	TIC	3380530	12.564 ng	100
9) Cyclohexane	13.56	TIC	15138007	No Calib	
10) 2,3-Dimethylpentane	13.81	TIC	15647	No Calib	
11) n-Heptane	14.67	TIC	6882590	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	4043706	12.712 ng	100
14) n-Octane	17.17	TIC	7863461	No Calib	
15) C5-C8 Aliphatics (TIC)	16.10	TIC	4043706	11.799 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3852933	13.053 ng	100
18) 2,3-Dimethylheptane	18.31	TIC	10055348	No Calib	
19) n-Nonane	19.06	TIC	8692614	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	2858159	12.445 ng	100
22) Isopropylbenzene	19.39	120	1175762	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	1448006	No Calib	
24) 1,3,5-Trimethylbenzene	20.02	120	1828657	No Calib	
25) n-Decane	20.44	TIC	9456791	No Calib	
26) p-Isopropyltoluene	20.74	134	1216748	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	2172555	No Calib	
28) Butylcyclohexane	20.91	TIC	203268	No Calib	
29) n-Undecane	21.51	TIC	9918169	No Calib	
30) n-Dodecane	22.46	TIC	8664481	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.91	TIC	203268	2.741 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	2172555	141.963 ng	100
33) C9-C10 Aromatics (m/z ...	20.74	134	1216748	141.595 ng	100
34) C5C8_TIC_1	16.10	TIC	4043706	1.820 ng	100
35) C5C8 TIC 2	16.10	TIC	4043706	1.820 ng	100
36) C5C8 TIC 3	16.10	TIC	4043706	1.820 ng	100
37) C5C8 TIC 4	16.10	TIC	4043706	1.820 ng	100
38) C9C12 TIC 1	20.91	TIC	203268	0.462 ng	100
39) C9C12 TIC 2	20.91	TIC	203268	0.462 ng	100
40) C9C12 TIC 3	20.91	TIC	203268	0.462 ng	100
41) C9C12 TIC 4	20.91	TIC	203268	0.462 ng	100
42) C9C10 TIC 1	20.74	120	2172555	28.913 ng	100
43) C9C10 TIC 2	20.74	134	1216748	28.838 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191618.D
Acq On : 19 Dec 2016 22:52 Operator: LH
Sample : 25ng MAPH ICV STD
Misc : S29-12061601/S29-12011603 (12/30)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 16:12:20 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Massachusetts APH

Initial Calibration Verification/Laboratory Control Sample Check Sheet

Data File Name: **12191618.D**
Data File Path: **I:\MS16\DATA\2016_12\19**
Operator: **LH**
Date Acquired: **12/19/16 22:52**
Acq. Method File: **TO15.M**
Sample Name: **25ng MAPH ICV STD**
Misc Info: **S29-12061601/S29-12011603 (12/30)**
Instrument Name: **GCMS-16**

Enter RRFs from current ICAL!

	Internal Standards	**RT**	**Area**
7)	1,4-Difluorobenzene (IS2)	13.66	1464517
16)	Chlorobenzene-d5 (IS3)	17.93	1154900

	C5-C8 Aliphatics	**RT**	**Area**	**RRF**	**ng**	**% Rec.**	**LCL**	**UCL**	**Pass/Fail**
11)	n-Heptane	14.67	6882590	2.208	23.96	**90.1**	**70**	**130**	Pass

Spike Amt (ng)	**ICAL RRF**
26.600	2.452

	C9-C12 Aliphatics	**RT**	**Area**	**RRF**	**ng**	**% Rec.**			
29)	n-Undecane	21.51	9918169	4.036	26.85	**100.9**	**70**	**130**	Pass

Spike Amt (ng)	**ICAL RRF**
26.600	3.998

	C9-C10 Aromatics	**RT**	**Area**	**RRF**	**ng**	**% Rec.**			
24)	1,3,5-Trimethylbenzene	20.02	1828657	0.621	51.50	**97.0**	**70**	**130**	Pass
26)	p-Isopropyltoluene	20.74	1216748						
			3045405						

Spike Amt (ng)	**ICAL RRF**
53.075	0.640

LH ***12/20/16***

Massachusetts APH

Continuing Calibration Verification Check Sheet

Data File Name: **01041701.D**
Data File Path: **I:\MS16\DATA\2017_01\04**
Operator: **CL**
Date Acquired: **1/4/17 4:32**
Acq. Method File: **TO15.M**
Sample Name: **CCV M16010417_25ng**
Misc Info: **S29-12281601/S29-12271603 (2/23)**
Instrument Name: **GCMS-16**

Enter RRFs from current ICAL!

	Internal Standards	RT	Area
7)	1,4-Difluorobenzene (IS2)	13.66	1285128
16)	Chlorobenzene-d5 (IS3)	17.93	990013

	C5-C8 Aliphatics	RT	Area	RRF	ng	% D	LCL	UCL	Pass/Fai
3)	Isopentane	7.35	5421939	2.369	151.9	**-3.38**	**-30**	**30**	Pass
4)	n-Hexane	11.64	5847325						
9)	Cyclohexane	13.56	6458249						
10)	2,3-Dimethylpentane	13.82	6831172	**Spike**	**ICAL**				
11)	n-Heptane	14.67	6337491	**Amt (ng)**	**RRF**				
14)	n-Octane	17.18	7404497	157.25	2.452				
			38300673						

	C9-C12 Aliphatics	RT	Area	RRF	ng	% D			
18)	2,3-Dimethylheptane	18.37	8112999	4.440	164.9	**11.04**	**-30**	**30**	Pass
19)	n-Nonane	19.06	7894894						
25)	n-Decane	20.44	8716511						
28)	Butylcyclohexane	20.95	9633777	**Spike**	**ICAL**				
29)	n-Undecane	21.51	8990039	**Amt (ng)**	**RRF**				
30)	n-Dodecane	22.43	8866755	148.50	3.998				
			52214975						

	C9-C10 Aromatics	RT	Area	RRF	ng	% D			
22)	Isopropylbenzene	19.39	988454	0.663	127.1	**3.54**	**-30**	**30**	Pass
23)	1-Methyl-3-ethylbenzene	19.91	1110566						
24)	1,3,5-Trimethylbenzene	20.02	1531559						
26)	p-Isopropyltoluene	20.74	1003872	**Spike**	**ICAL**				
27)	1,2,3-Trimethylbenzene	20.74	1807972	**Amt (ng)**	**RRF**				
			6442423	122.75	0.640				

LH ***1/4/17***

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\04\01041701.D
Acq On : 4 Jan 2017 4:32 Operator: CL
Sample : CCV M16010417 25ng
Misc : S29-12281601/S29-12271603 (2/23)
ALS Vial : 3 Sample Multiplier: 1

Quant Time: Jan 04 11:42:52 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016 LH 1/4/17
Response via : Initial Calibration
DataAcq Meth:TO15.M

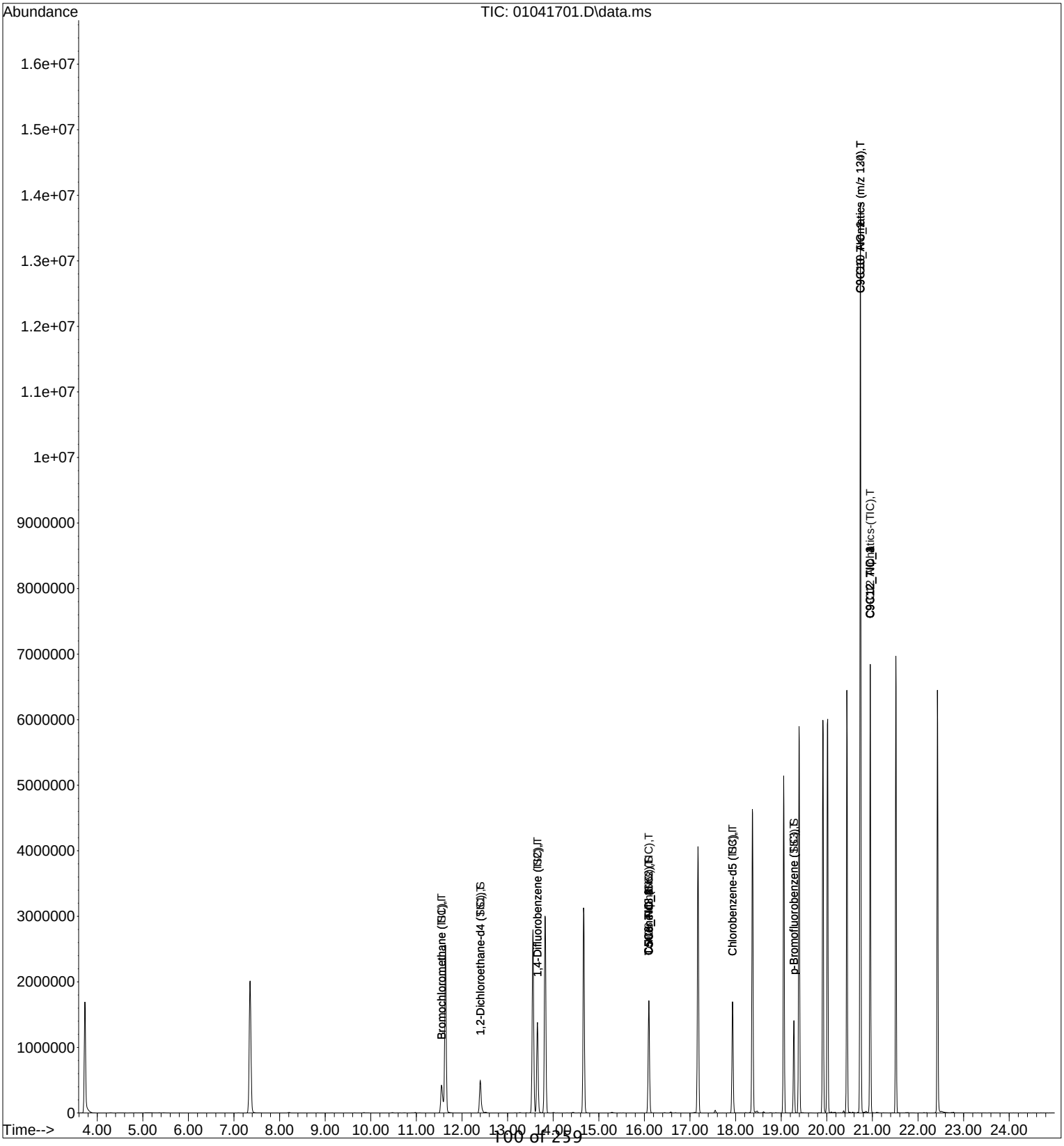
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	250836	12.500 ng	0.00
7) 1,4-Difluorobenzene (IS2)	13.66	114	1285128	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	990013	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.40	65	465204	12.981 ng	0.00
Spiked Amount 12.500				Recovery = 103.84%	
12) Toluene-d8 (SS2)	16.10	98	1344349	12.749 ng	0.00
Spiked Amount 12.500				Recovery = 102.00%	
20) p-Bromofluorobenzene (...	19.28	174	408229	11.754 ng	0.00
Spiked Amount 12.500				Recovery = 94.00%	
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.55	TIC	1294438	12.716 ng	100
3) Isopentane	7.35	TIC	5421939	No Calib	
4) n-Hexane	11.64	TIC	5847325	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.40	TIC	1327581	13.218 ng	100
8) 1,4-Difluorobenzene (TIC)	13.66	TIC	3036490	12.861 ng	100
9) Cyclohexane	13.56	TIC	6458249	No Calib	
10) 2,3-Dimethylpentane	13.82	TIC	6831172	No Calib	
11) n-Heptane	14.67	TIC	6337491	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	3618019	12.961 ng	100
14) n-Octane	17.18	TIC	7404497	No Calib	
15) C5-C8 Aliphatics (TIC)	16.10	TIC	3618019	12.031 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3245715	12.828 ng	100
18) 2,3-Dimethylheptane	18.37	TIC	8112999	No Calib	
19) n-Nonane	19.06	TIC	7894894	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	2440918	12.399 ng	100
22) Isopropylbenzene	19.39	120	988454	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	1110566	No Calib	
24) 1,3,5-Trimethylbenzene	20.02	120	1531559	No Calib	
25) n-Decane	20.44	TIC	8716511	No Calib	
26) p-Isopropyltoluene	20.74	134	1003872	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	1807972	No Calib	
28) Butylcyclohexane	20.95	TIC	9633777	No Calib	
29) n-Undecane	21.51	TIC	8990039	No Calib	
30) n-Dodecane	22.43	TIC	8866755	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.95	TIC	9638404	151.637 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	1807972	137.816 ng	100
33) C9-C10 Aromatics (m/z ...	20.74	134	1003872	136.279 ng	100
34) C5C8_TIC_1	16.10	TIC	3618019	1.899 ng	100
35) C5C8 TIC 2	16.10	TIC	3618019	1.899 ng	100
36) C5C8 TIC 3	16.10	TIC	3618019	1.899 ng	100
37) C5C8 TIC 4	16.10	TIC	3618019	1.899 ng	100
38) C9C12 TIC 1	20.95	TIC	9638404	25.528 ng	100
39) C9C12 TIC 2	20.95	TIC	9638404	25.528 ng	100
40) C9C12 TIC 3	20.95	TIC	9638404	25.528 ng	100
41) C9C12 TIC 4	20.95	TIC	9638404	25.528 ng	100
42) C9C10 TIC 1	20.74	120	1807972	28.068 ng	100
43) C9C10 TIC 2	20.74	134	1003872	27.755 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\04\01041701.D
Acq On : 4 Jan 2017 4:32 Operator: CL
Sample : CCV M16010417 25ng
Misc : S29-12281601/S29-12271603 (2/23)
ALS Vial : 3 Sample Multiplier: 1

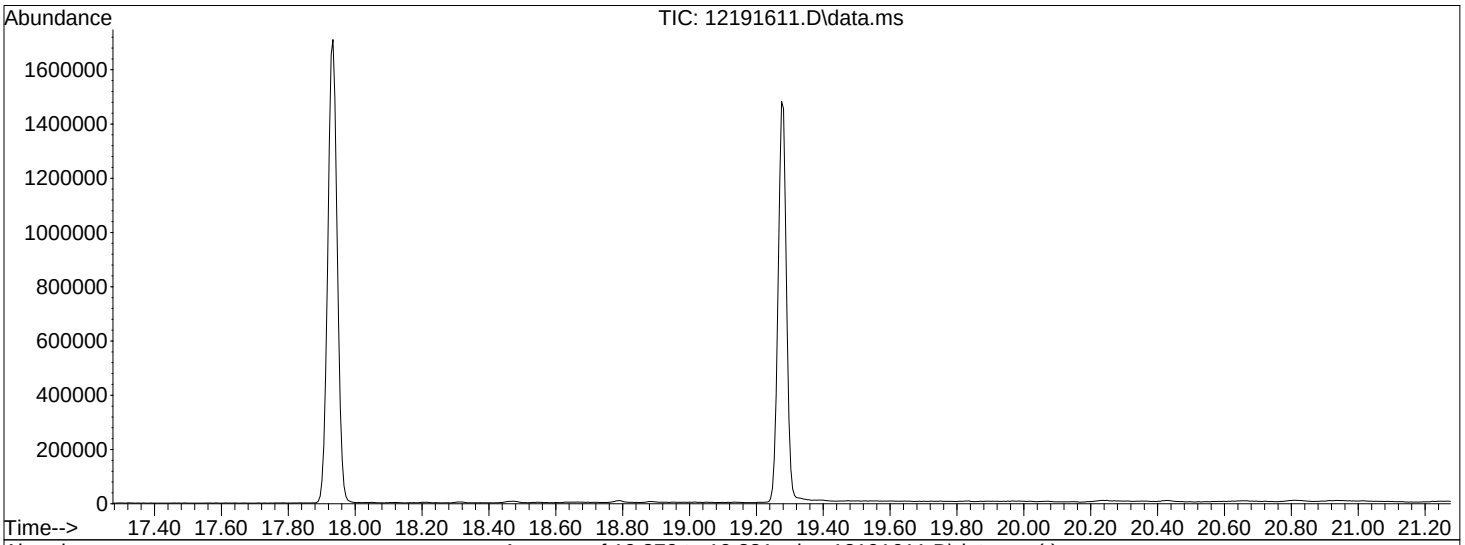
Quant Time: Jan 04 11:42:52 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

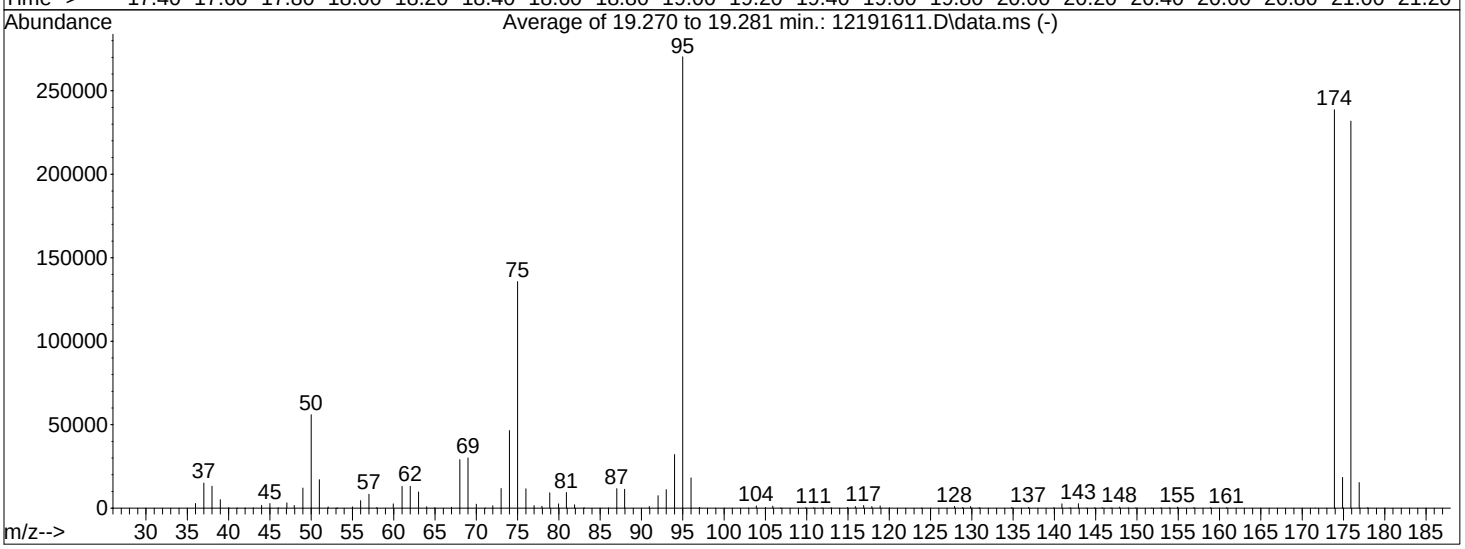


Data Path : I:\MS16\DATA\2016 12\19\
Data File : 12191611.D
Acq On : 19 Dec 2016 18:59
Operator : LH
Sample : 12.5ng TO-15 BFB
Misc : S29-12061601
ALS Vial : 2 Sample Multiplier: 1

Integration File: RTEINT.P

Method : I:\MS16\METHODS\M16121916.M
Title : Massachusetts APH
Last Update : Tue Dec 20 14:50:26 2016





AutoFind: Scans 2852, 2853, 2854; Background Corrected with Scan 2843

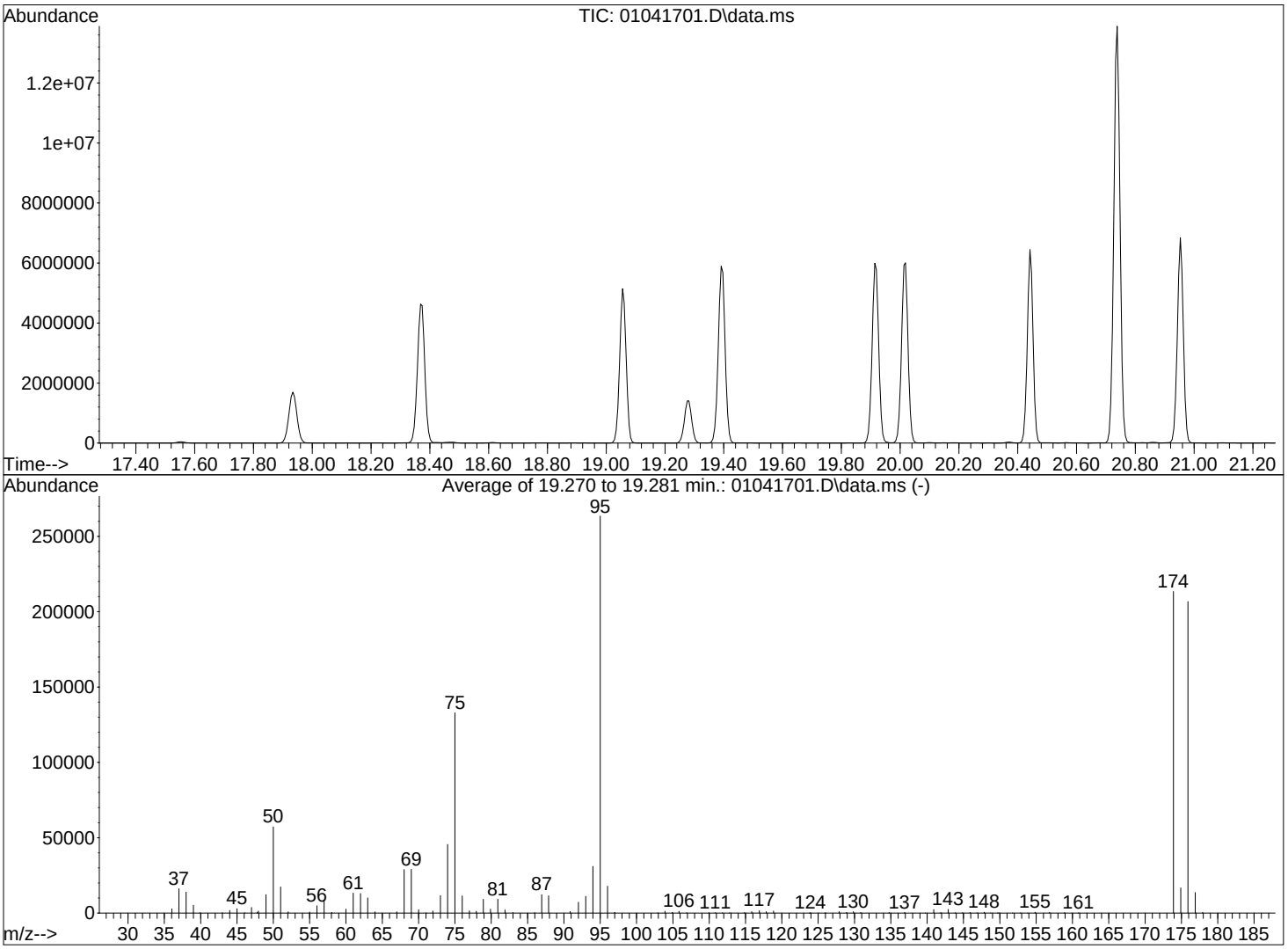
Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	20.7	56021	PASS
75	95	30	66	50.2	135707	PASS
95	95	100	100	100.0	270357	PASS
96	95	5	9	6.7	18099	PASS
173	174	0.00	2	0.0	0	PASS
174	95	50	120	88.3	238592	PASS
175	174	4	9	7.7	18392	PASS
176	174	93	101	97.2	231808	PASS
177	176	5	9	6.6	15296	PASS

LH 12/20/16

Data Path : I:\MS16\DATA\2017 01\04\
Data File : 01041701.D
Acq On : 4 Jan 2017 4:32
Operator : CL
Sample : CCV M16010417 25ng
Misc : S29-12281601/S29-12271603 (2/23)
ALS Vial : 3 Sample Multiplier: 1

Integration File: RTEINT.P

Method : I:\MS16\METHODS\M16121916.M
Title : Massachusetts APH
Last Update : Tue Dec 20 16:11:55 2016



AutoFind: Scans 2852, 2853, 2854; Background Corrected with Scan 2843

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	21.7	57269	PASS
75	95	30	66	50.4	132877	PASS
95	95	100	100	100.0	263445	PASS
96	95	5	9	6.8	17853	PASS
173	174	0.00	2	0.0	0	PASS
174	95	50	120	81.0	213355	PASS
175	174	4	9	7.8	16698	PASS
176	174	93	101	96.9	206805	PASS
177	176	5	9	6.6	13643	PASS

LH 1/4/17

Injection Log

Directory: J:\MS16\DATA\2016_12\19\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	12/19/16 8:58	12191601.D	Blank (100mL)	S29-12061601	LH	2	
2	12/19/16 10:27	12191602.D	Blank (100mL)	S29-12061601	LH	2	
3	12/19/16 11:01	12191603.D	0.1ng std check	S29-12061601/S29-11301611 (12/29)	LH	6	
4	12/19/16 12:03	12191604.D	Blank (100mL)	S29-12061601	LH	2	
5	12/19/16 12:36	12191605.D	Blank (100mL)	S29-12061601	LH	2	
6	12/19/16 13:09	12191606.D	Blank (100mL)	S29-12061601	LH	2	
7	12/19/16 13:43	12191607.D	Blank (100mL)	S29-12061601	LH	2	
8	12/19/16 17:19	12191608.D	1.0ng std check	S29-12061601/S29-12191607 (1/17)	LH	8	
9	12/19/16 17:52	12191609.D	5.0ng std check	S29-12061601/S29-12191605 (1/17)	LH	9	
10	12/19/16 18:26	12191610.D	25ng std check	S29-12061601/S29-12191605 (1/17)	LH	2	
11	12/19/16 18:59	12191611.D	12.5ng TO-15 BFB	S29-12061601	LH	2	
12	12/19/16 19:32	12191612.D	0.5ng MAPH ICAL STD	S29-12061601/S29-10281604 (12/25)	LH	7	
13	12/19/16 20:05	12191613.D	1.0ng MAPH ICAL STD	S29-12061601/S29-10281604 (12/25)	LH	7	
14	12/19/16 20:39	12191614.D	5.0ng MAPH ICAL STD	S29-12061601/S29-10281604 (12/25)	LH	7	
15	12/19/16 21:12	12191615.D	25ng MAPH ICAL STD	S29-12061601/S29-10281603 (12/25)	LH	4	
16	12/19/16 21:45	12191616.D	50ng MAPH ICAL STD	S29-12061601/S29-10281603 (12/25)	LH	4	
17	12/19/16 22:18	12191617.D	100ng MAPH ICAL STD	S29-12061601/S29-10281603 (12/25)	LH	4	
18	12/19/16 22:52	12191618.D	25ng MAPH ICV STD	S29-12061601/S29-12011603 (12/30)	LH	2	
19	12/19/16 23:25	12191619.D	12.5ng TO-15 BFB	S29-12061601	LH	2	
20	12/19/16 23:59	12191620.D	0.08ng TO-15 ICAL STD	S29-12061601/S29-12191607 (1/17)	LH	8	
21	12/20/16 0:33	12191621.D	0.1ng TO-15 ICAL STD	S29-12061601/S29-12191607 (1/17)	LH	8	
22	12/20/16 1:06	12191622.D	0.2ng TO-15 ICAL STD	S29-12061601/S29-12191607 (1/17)	LH	8	
23	12/20/16 1:39	12191623.D	0.4ng TO-15 ICAL STD	S29-12061601/S29-12191607 (1/17)	LH	8	
24	12/20/16 2:13	12191624.D	1.0ng TO-15 ICAL STD	S29-12061601/S29-12191605 (1/17)	LH	9	
25	12/20/16 2:46	12191625.D	5.0ng TO-15 ICAL STD	S29-12061601/S29-12191605 (1/17)	LH	9	
26	12/20/16 3:19	12191626.D	25ng TO-15 ICAL STD	S29-12061601/S29-12191603 (1/17)	LH	2	
27	12/20/16 3:52	12191627.D	50ng TO-15 ICAL STD	S29-12061601/S29-12191603 (1/17)	LH	2	
28	12/20/16 4:25	12191628.D	100ng TO-15 ICAL STD	S29-12061601/S29-12191603 (1/17)	LH	2	
29	12/20/16 4:58	12191629.D	25ng TO-15 ICV STD	S29-12061601/S29-12011603 (12/30)	LH	2	
30	12/20/16 5:32	12191630.D	Blank (100mL)	S29-12061601	LH	2	
	ICAL passed for all compounds 0.08ng-100ng, except: propene, methylene chloride 0.2ng-100ng, dichlorodifluoromethane,						
	chloromethane 0.1ng-100ng, acetonitrile, carbon disulfide, benzyl chloride, 1,2-dibromo-3-chloropropane, naphthalene 0.4ng-100ng,						
	vinyl chloride 2.0ng-500ng.						
				LH 12/21/16			
##							

Injection Log

Directory: I:\MS16\DATA\2017_01\04\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	1/4/17 4:32	01041701.D	CCV M16010417_25ng	S29-12281601/S29-12271603 (2/23)	CL	3	not needed
2	1/4/17 5:05	01041702.D	CCV R16010417_25ng	S29-12281601/S29-12191603 (1/17)	CL	2	passed
3	1/4/17 5:39	01041703.D	MB R16010417_1000mL	S29-12281601 AC00442	CL	2	passed
4	1/4/17 6:12	01041704.D	LCS R16010417_25ng	S29-12281601/S29-12211611 (1/19)	CL	2	passed
5	1/4/17 6:45	01041705.D	LCSD R16010417_25ng	S29-12281601/S29-12211611 (1/19)	CL	2	passed
6	1/4/17 7:51	01041706.D	J1609190-001 (1000mL)	S29-12281601	CL	4	
7	1/4/17 8:24	01041707.D	P1605971-022dil (40mL)	S29-12281601	CL	13	
8	1/4/17 8:57	01041708.D	P1605971-024dil (100mL)	S29-12281601	CL	15	
9	1/4/17 9:30	01041709.D	P1605971-025dil (100mL)	S29-12281601	CL	16	
10	1/4/17 10:03	01041710.D	P1605971-025dupdil (100mL)	S29-12281601	CL	16	
11	1/4/17 11:09	01041711.D	P1606021-001 (1.7mL)	S29-12281601	LH	1	
12	1/4/17 12:01	01041712.D	P1606021-002 (400mL)	S29-12281601	LH	4	
13	1/4/17 12:35	01041713.D	P1606022-001 (1000mL)	S29-12281601	LH	5	
14	1/4/17 13:09	01041714.D	P1606022-001dup (1000mL)	S29-12281601	LH	5	passed
15	1/4/17 13:52	01041715.D	P1700008-001 (200mL)	S29-12281601	LH	6	
16	1/4/17 14:25	01041716.D	P170000-002 (1000mL)	S29-12281601	LH	7	
17	1/4/17 14:59	01041717.D	P1700001-004 (5.0mL)	S29-12281601	LH	1	
18	1/4/17 15:32	01041718.D	P1700008-001dil (20mL)	S29-12281601	LH	6	
19	1/4/17 16:42	01041719.D	P1700001-001 (1000mL)	S29-12281601	LH	8	
20	1/4/17 17:17	01041720.D	P1700001-002 (100mL)	S29-12281601	LH	9	
21	1/4/17 17:50	01041721.D	P1700001-003 (70mL)	S29-12281601	LH	10	IS failed
22	1/4/17 18:24	01041722.D	P1700001-004 (30mL)	S29-12281601	LH	11	
23	1/4/17 18:57	01041723.D	P1700001-005 (150mL)	S29-12281601	LH	12	IS failed
24	1/4/17 19:31	01041724.D	P1606006-001 (80mL)	S29-12281601	LH	13	
25	1/4/17 20:04	01041725.D	P1606006-002 (230mL)	S29-12281601	LH	14	

LH 1/6/17

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\04\01041713.D
Acq On : 4 Jan 2017 12:35 Operator: LH
Sample : P1606022-001 (1000mL)
Misc : S29-12281601
ALS Vial : 5 Sample Multiplier: 1

Quant Time: Jan 11 10:21:48 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 1/11/17

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.59	130	280713	12.500	ng	0.01
37) 1,4-Difluorobenzene (IS2)	13.67	114	1396418	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	17.93	82	628973	12.500	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.42	65	522300	12.952	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 103.60%			
57) Toluene-d8 (SS2)	16.10	98	1459263	12.092	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.72%			
73) Bromofluorobenzene (SS3)	19.28	174	460059	11.943	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 95.52%			

Target Compounds							Qvalue
2) Propene	4.19	42	86457	2.228	ng		92
3) Dichlorodifluoromethan...	4.38	85	90274	1.273	ng		99
4) Chloromethane	4.69	50	10606	0.182	ng		98
5) 1,2-Dichloro-1,1,2,2-t...	4.96	135	2314	N.D.			
6) Vinyl Chloride	0.00	62	0	N.D.			
7) 1,3-Butadiene	5.43	54	7241	0.187	ng		89
8) Bromomethane	0.00	94	0	N.D.			
9) Chloroethane	0.00	64	0	N.D.			
10) Ethanol	6.71	45	3727679	140.418	ng		100
11) Acetonitrile	7.03	41	8458	0.139	ng		92
12) Acrolein	7.18	56	19367	0.830	ng		92
13) Acetone	7.39	58	25459699	955.125	ng	#	40
14) Trichlorofluoromethane	7.58	101	39546	0.650	ng		100
15) 2-Propanol (Isopropanol)	7.91	45	212272	2.332	ng		86
16) Acrylonitrile	8.19	53	1851	N.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	8.87	84	5878	0.176	ng		89
20) 3-Chloro-1-propene (Al...	0.00	41	0	N.D. d			
21) Trichlorotrifluoroethane	9.23	151	7267	0.244	ng		93
22) Carbon Disulfide	9.11	76	15753	0.134	ng		93
23) trans-1,2-Dichloroethene	10.13	61	1537	N.D.			
24) 1,1-Dichloroethane	0.00	63	0	N.D.			
25) Methyl tert-Butyl Ether	10.46	73	1261	N.D.			
26) Vinyl Acetate	0.00	86	0	N.D. d			
27) 2-Butanone (MEK)	10.94	72	35294052	1533.659	ng	#	7
28) cis-1,2-Dichloroethene	11.41	61	72527	1.487	ng		98
29) Diisopropyl Ether	0.00	87	0	N.D.			
30) Ethyl Acetate	11.69	61	6767	0.516	ng		98
31) n-Hexane	11.64	57	34411	0.578	ng		98
32) Chloroform	11.76	83	4578	N.D.			
34) Tetrahydrofuran (THF)	12.13	72	18004267	769.087	ng	#	79
35) Ethyl tert-Butyl Ether	12.25	87	503	N.D.			
36) 1,2-Dichloroethane	12.53	62	2088	N.D.			
38) 1,1,1-Trichloroethane	0.00	97	0	N.D.			
39) Isopropyl Acetate	13.29	61	1473	N.D.			
40) 1-Butanol	0.00	56	0	N.D. d			
41) Benzene	13.29	78	195429	1.371	ng		100
42) Carbon Tetrachloride	13.45	117	11223	0.237	ng		96
43) Cyclohexane	13.56	84	8060	0.152	ng		89
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.			
45) 1,2-Dichloropropane	14.13	63	1163	N.D.			
46) Bromodichloromethane	14.32	83	2307	N.D.			
47) Trichloroethene	14.37	130	53856	1.437	ng		99
48) 1,4-Dioxane	14.38	88	586	N.D.			
49) 2,2,4-Trimethylpentane...	0.00	57	0	N.D. d			

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\04\01041713.D
Acq On : 4 Jan 2017 12:35 Operator: LH
Sample : P1606022-001 (1000mL)
Misc : S29-12281601
ALS Vial : 5 Sample Multiplier: 1

Quant Time: Jan 11 10:21:48 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

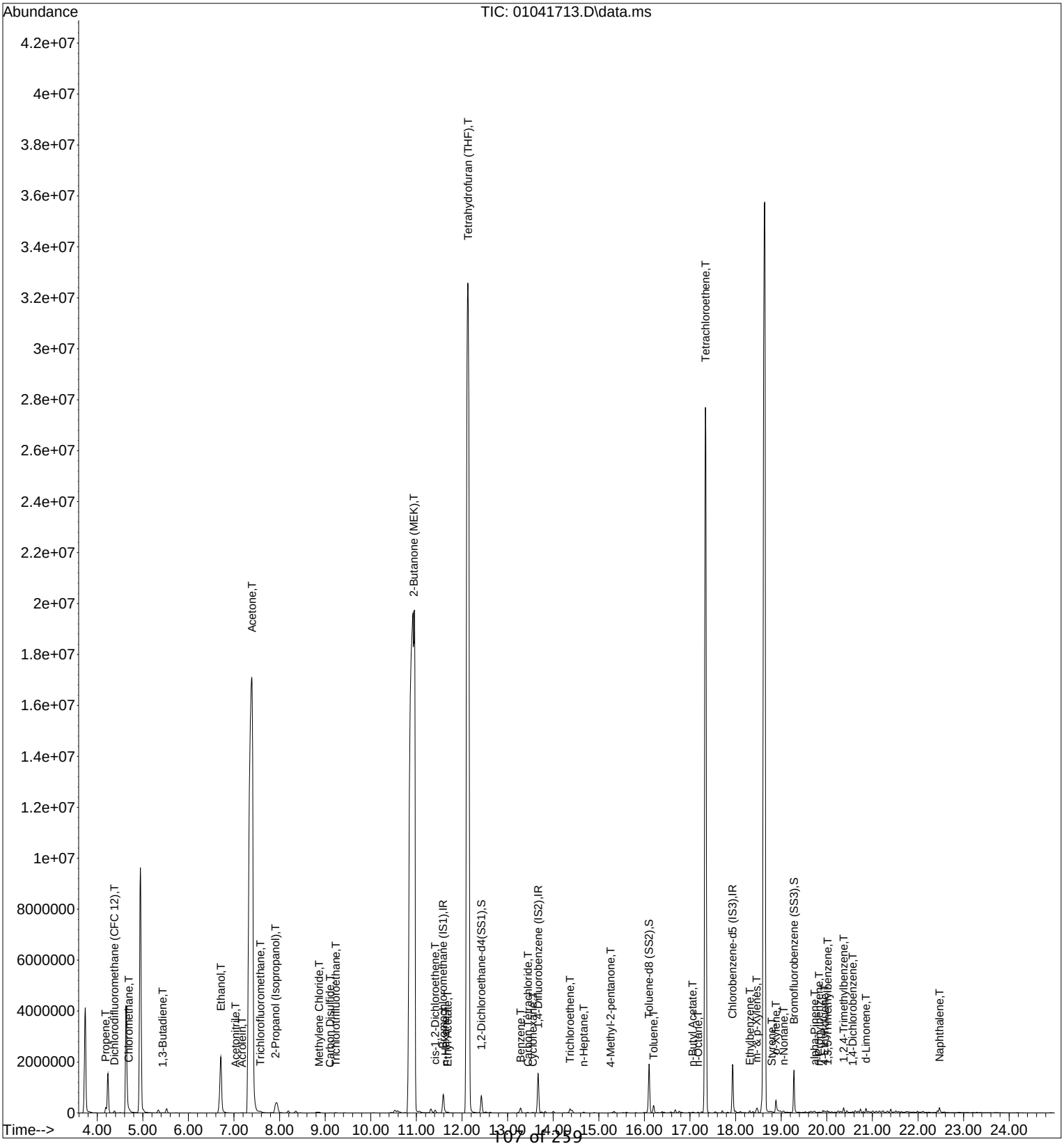
Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
50) Methyl Methacrylate	0.00	100	0	N.D. d		
51) n-Heptane	14.67	71	8537	0.248 ng		94
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.		
53) 4-Methyl-2-pentanone	15.26	58	3722	0.109 ng	#	62
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.		
55) 1,1,2-Trichloroethane	15.82	97	542	N.D.		
58) Toluene	16.20	91	232768	1.580 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	17.06	43	25011	0.256 ng		81
63) n-Octane	17.18	57	5789	0.179 ng		96
64) Tetrachloroethene	17.34	166	9713489	243.260 ng		97
65) Chlorobenzene	18.00	112	8086	N.D.		
66) Ethylbenzene	18.31	91	60898	0.367 ng		99
67) m- & p-Xylenes	18.46	91	117451	0.911 ng		98
68) Bromoform	0.00	173	0	N.D.		
69) Styrene	18.79	104	12373	0.124 ng		98
70) o-Xylene	18.88	91	46023	0.347 ng		97
71) n-Nonane	19.06	43	18175	0.227 ng	#	10
72) 1,1,2,2-Tetrachloroethane	18.92	83	5249	N.D.		
74) Cumene	19.39	105	9949	N.D.		
75) alpha-Pinene	19.73	93	20456	0.236 ng	#	8
76) n-Propylbenzene	19.83	91	21761	0.112 ng		96
77) 3-Ethyltoluene	0.00	105	0	N.D. d		
78) 4-Ethyltoluene	19.95	105	18947	0.129 ng		97
79) 1,3,5-Trimethylbenzene	20.02	105	27208	0.200 ng		99
80) alpha-Methylstyrene	20.14	118	1099	N.D.		
81) 2-Ethyltoluene	0.00	105	0	N.D. d		
82) 1,2,4-Trimethylbenzene	20.37	105	78255	0.582 ng		89
83) n-Decane	0.00	57	0	N.D. d		
84) Benzyl Chloride	20.49	91	1206	N.D.		
85) 1,3-Dichlorobenzene	0.00	146	0	N.D. d		
86) 1,4-Dichlorobenzene	20.57	146	7422	0.093 ng		99
87) sec-Butylbenzene	20.60	105	5780	N.D.		
88) 4-Isopropyltoluene (p-...	0.00	119	0	N.D. d		
89) 1,2,3-Trimethylbenzene	0.00	105	0	N.D. d		
90) 1,2-Dichlorobenzene	20.86	146	1112	N.D.		
91) d-Limonene	20.86	68	34817	0.604 ng		98
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	22.36	180	719	N.D.		
95) Naphthalene	22.47	128	178879	1.214 ng		98
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	20.37	119	10704	N.D.		
100) n-Butylbenzene	21.08	91	12251	N.D.		

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\04\01041713.D
Acq On : 4 Jan 2017 12:35 Operator: LH
Sample : P1606022-001 (1000mL)
Misc : S29-12281601
ALS Vial : 5 Sample Multiplier: 1

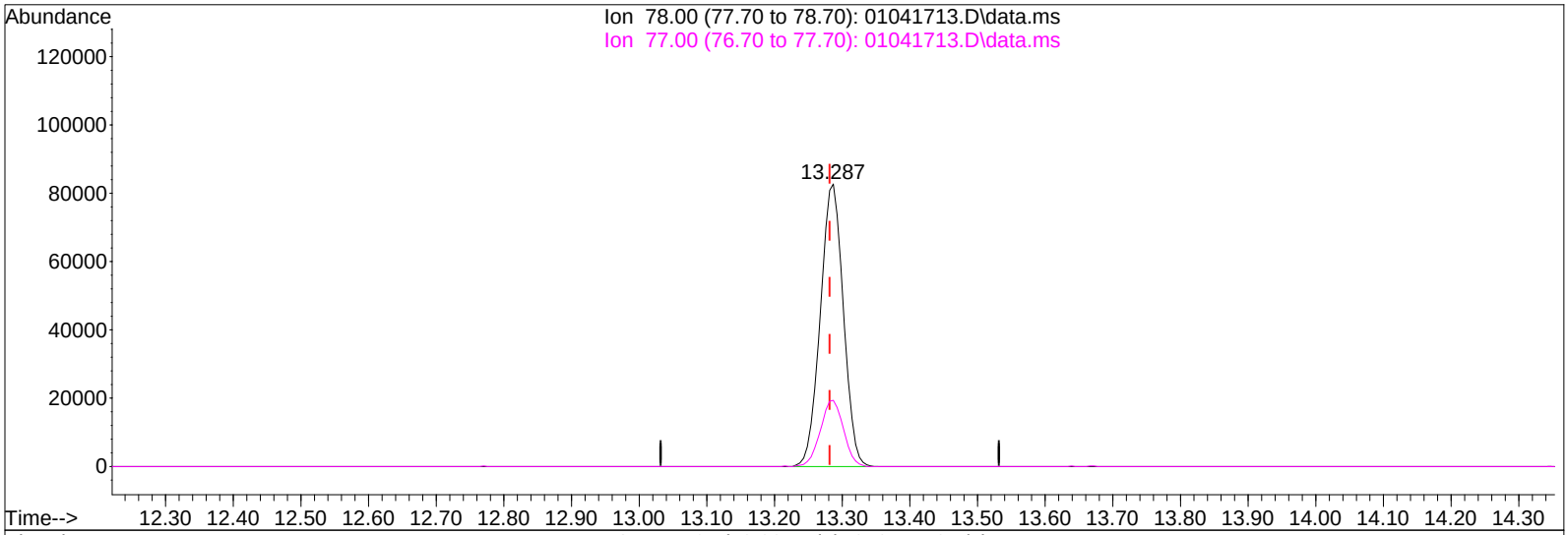
Quant Time: Jan 11 10:21:48 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

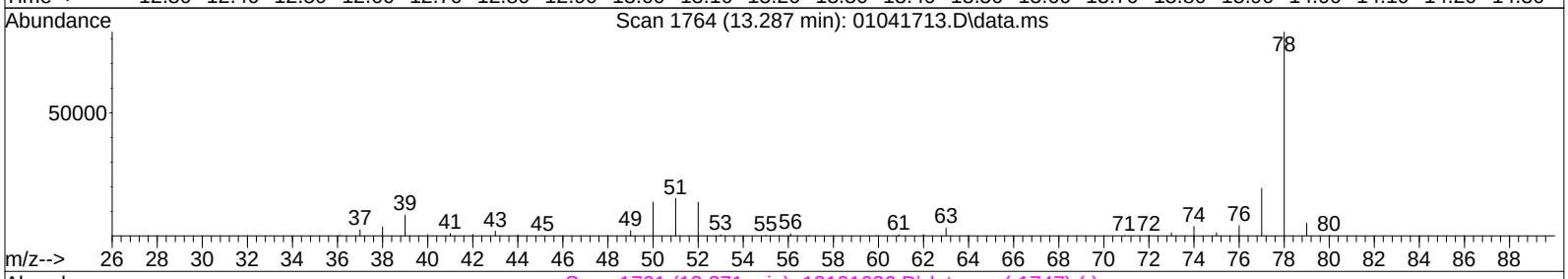


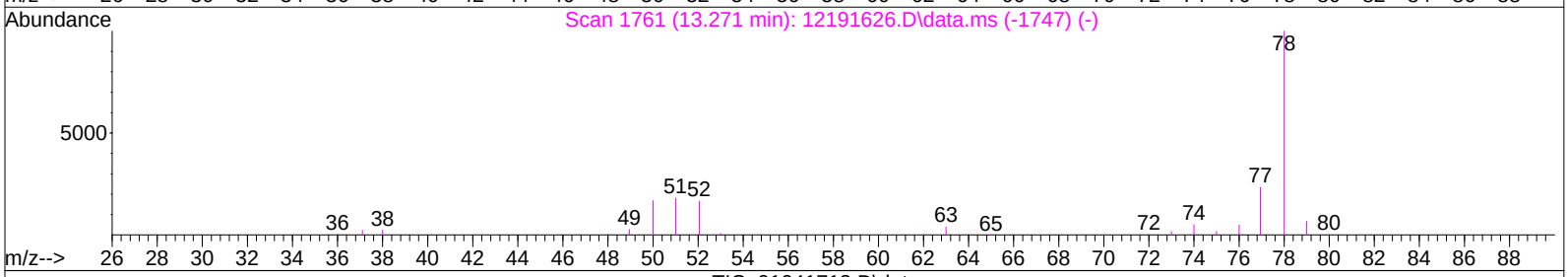
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 01\04\01041713.D
Acq On : 4 Jan 2017 12:35 Operator: LH
Sample : P1606022-001 (1000mL)
Misc : S29-12281601
ALS Vial : 5 Sample Multiplier: 1

Quant Time: Jan 05 08:33:12 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 01041713.D\data.ms

(41) Benzene (T)

13.287min (+0.005) 1.37ng

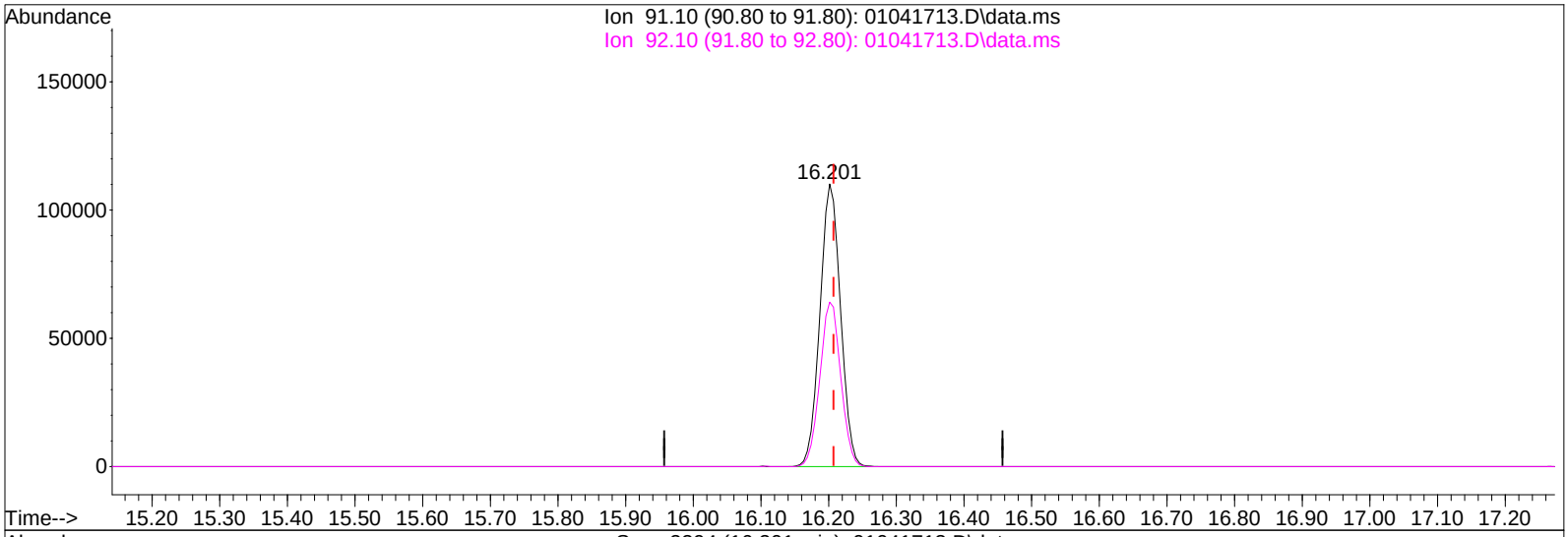
response 195429

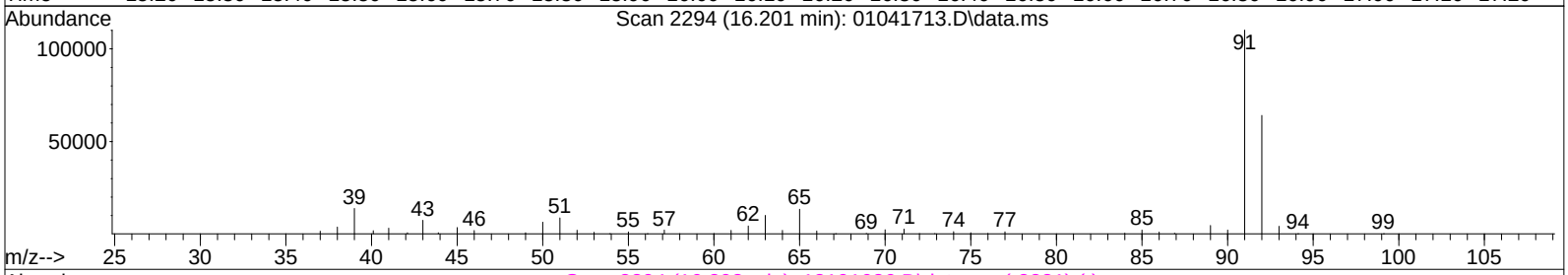
Ion	Exp%	Act%
78.00	100	100
77.00	23.50	23.59
0.00	0.00	0.00
0.00	0.00	0.00

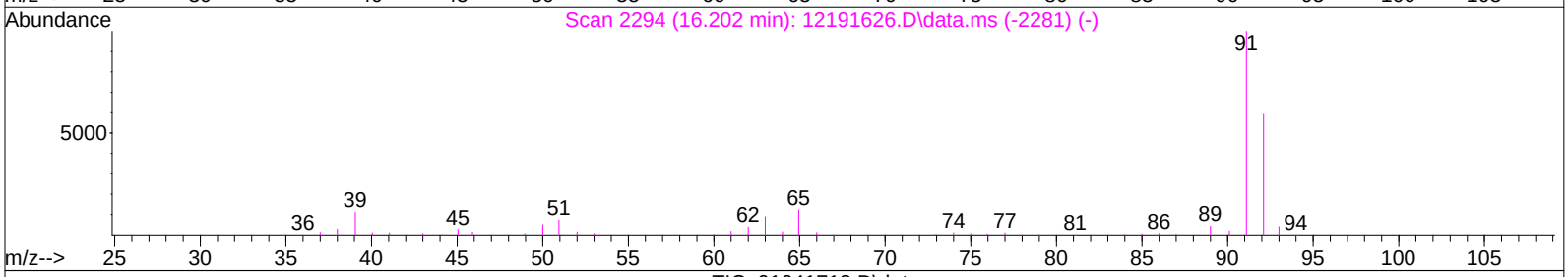
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 01\04\01041713.D
Acq On : 4 Jan 2017 12:35 Operator: LH
Sample : P1606022-001 (1000mL)
Misc : S29-12281601
ALS Vial : 5 Sample Multiplier: 1

Quant Time: Jan 05 08:33:12 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 01041713.D\data.ms

(58) Toluene (T)

16.201min (-0.006) 1.58ng

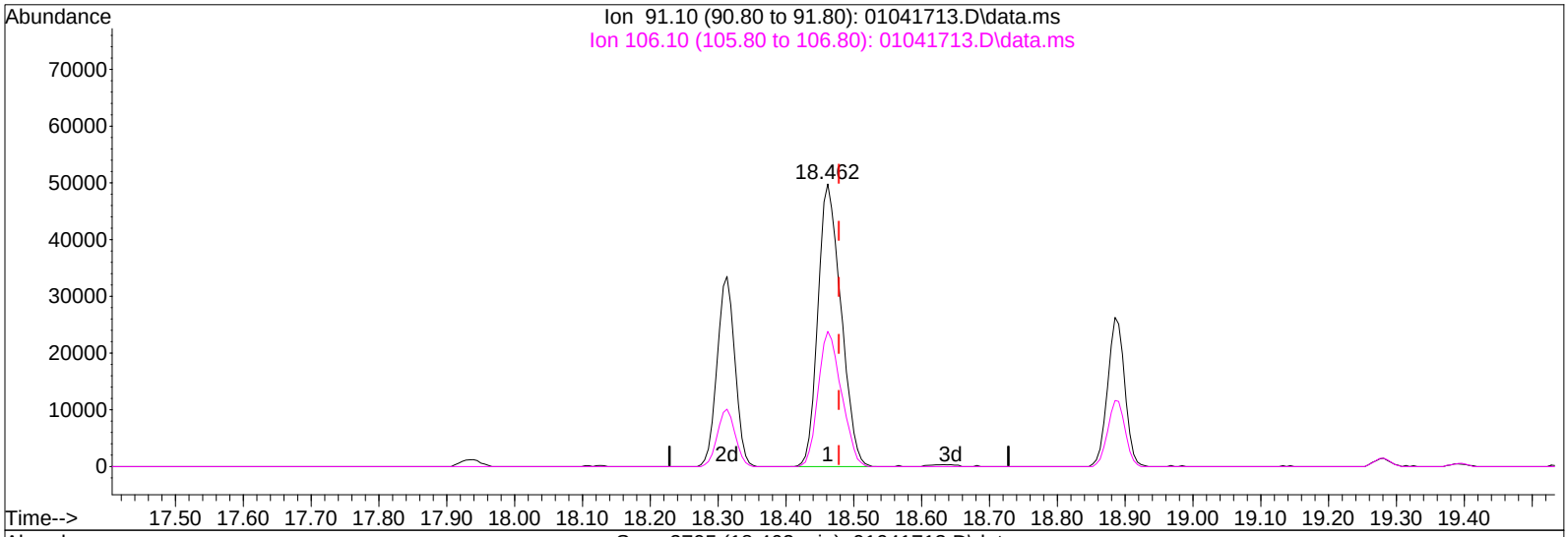
response 232768

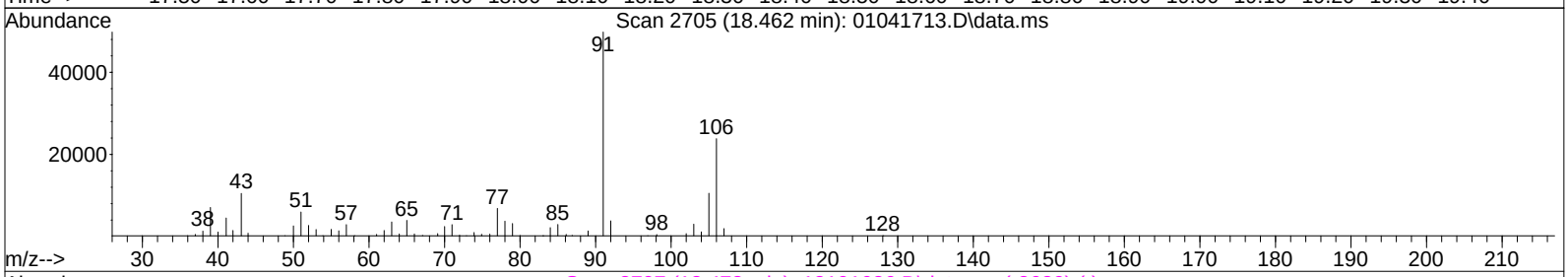
Ion	Exp%	Act%
91.10	100	100
92.10	59.10	58.94
0.00	0.00	0.00
0.00	0.00	0.00

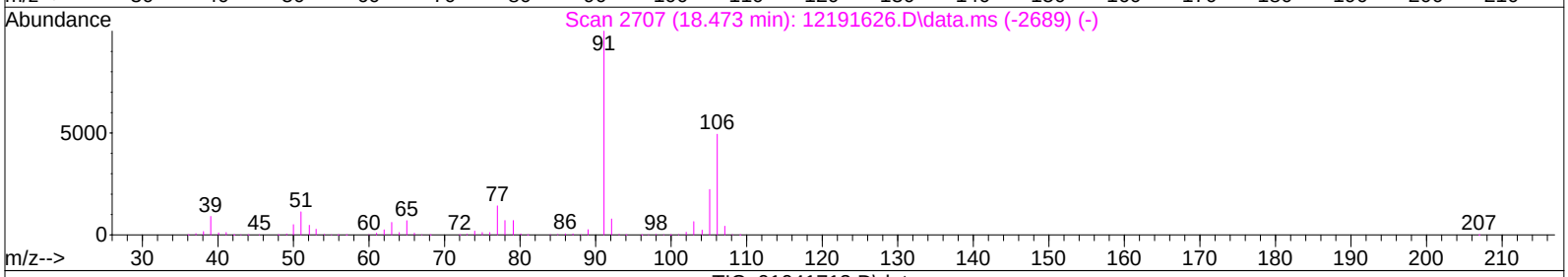
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 01\04\01041713.D
Acq On : 4 Jan 2017 12:35 Operator: LH
Sample : P1606022-001 (1000mL)
Misc : S29-12281601
ALS Vial : 5 Sample Multiplier: 1

Quant Time: Jan 05 08:33:12 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 01041713.D\data.ms

(67) m- & p-Xylenes (T)

18.462min (-0.017) 0.91ng

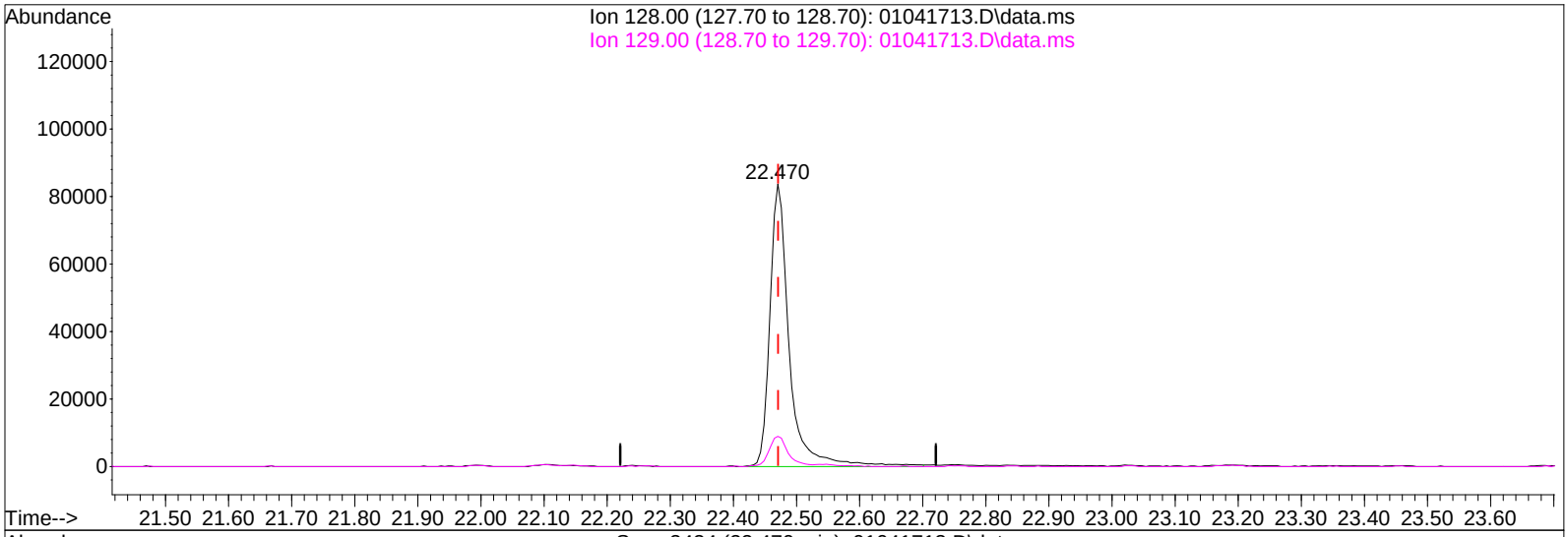
response 117451

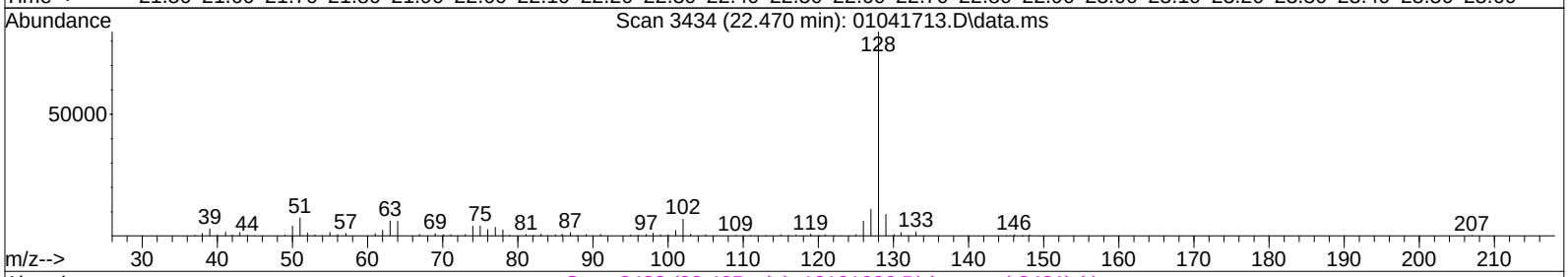
Ion	Exp%	Act%
91.10	100	100
106.10	49.30	48.14
0.00	0.00	0.00
0.00	0.00	0.00

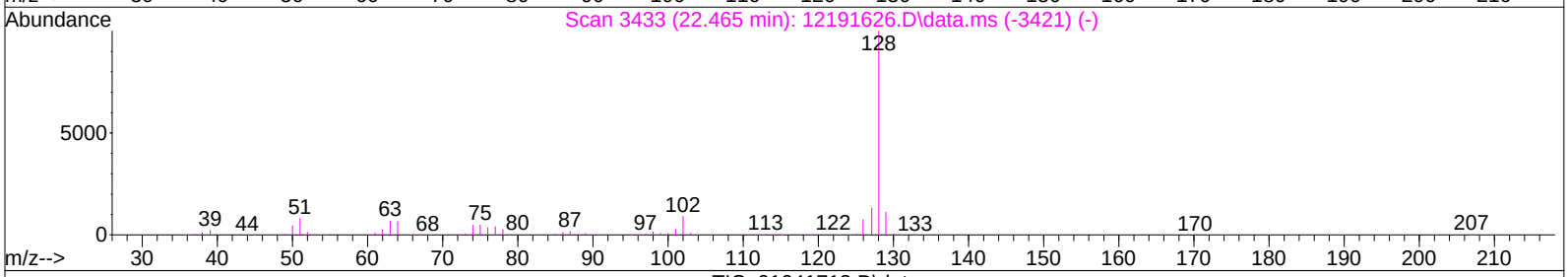
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 01\04\01041713.D
Acq On : 4 Jan 2017 12:35 Operator: LH
Sample : P1606022-001 (1000mL)
Misc : S29-12281601
ALS Vial : 5 Sample Multiplier: 1

Quant Time: Jan 05 08:33:12 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 01041713.D\data.ms

(95) Naphthalene (T)

22.470min (-0.001) 1.21ng

response 178879

Ion	Exp%	Act%
128.00	100	100
129.00	11.00	11.58
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\04\01041703.D
Acq On : 4 Jan 2017 5:39 Operator: CL
Sample : MB R16010417 1000mL
Misc : S29-12281601 AC00442
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Jan 04 07:13:32 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 1/4/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	258999	12.500 ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.66	114	1348669	12.500 ng	-0.02
56) Chlorobenzene-d5 (IS3)	17.93	82	584674	12.500 ng	0.00

System Monitoring Compounds					
33) 1,2-Dichloroethane-d4(...	12.40	65	488621	13.132 ng	-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 105.04%		
57) Toluene-d8 (SS2)	16.10	98	1404593	12.521 ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.16%		
73) Bromofluorobenzene (SS3)	19.28	174	408160	11.398 ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 91.20%		

Target Compounds						Qvalue
2) Propene	4.28	42	1395	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	6.75	45	6604	0.270 ng		84
11) Acetonitrile	6.91	41	52	N.D.		
12) Acrolein	7.25	56	118	N.D.		
13) Acetone	7.41	58	4811	0.196 ng	#	74
14) Trichlorofluoromethane	0.00	101	0	N.D.		
15) 2-Propanol (Isopropanol)	7.96	45	2552	N.D.		
16) Acrylonitrile	8.27	53	1908	N.D.		
17) 1,1-Dichloroethene	0.00	96	0	N.D.		
18) 2-Methyl-2-Propanol (t...	8.88	59	413	N.D.		
19) Methylene Chloride	8.82	84	610	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	9.13	76	3009	N.D.		
23) trans-1,2-Dichloroethene	0.00	61	0	N.D.		
24) 1,1-Dichloroethane	0.00	63	0	N.D.		
25) Methyl tert-Butyl Ether	0.00	73	0	N.D.		
26) Vinyl Acetate	0.00	86	0	N.D.		
27) 2-Butanone (MEK)	10.92	72	591	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	11.64	57	518	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	13.28	56	4296	0.119 ng		86
41) Benzene	13.27	78	2475	N.D.		
42) Carbon Tetrachloride	0.00	117	0	N.D.		
43) Cyclohexane	13.66	84	799	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.		

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\04\01041703.D
Acq On : 4 Jan 2017 5:39 Operator: CL
Sample : MB R16010417 1000mL
Misc : S29-12281601 AC00442
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Jan 04 07:13:32 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

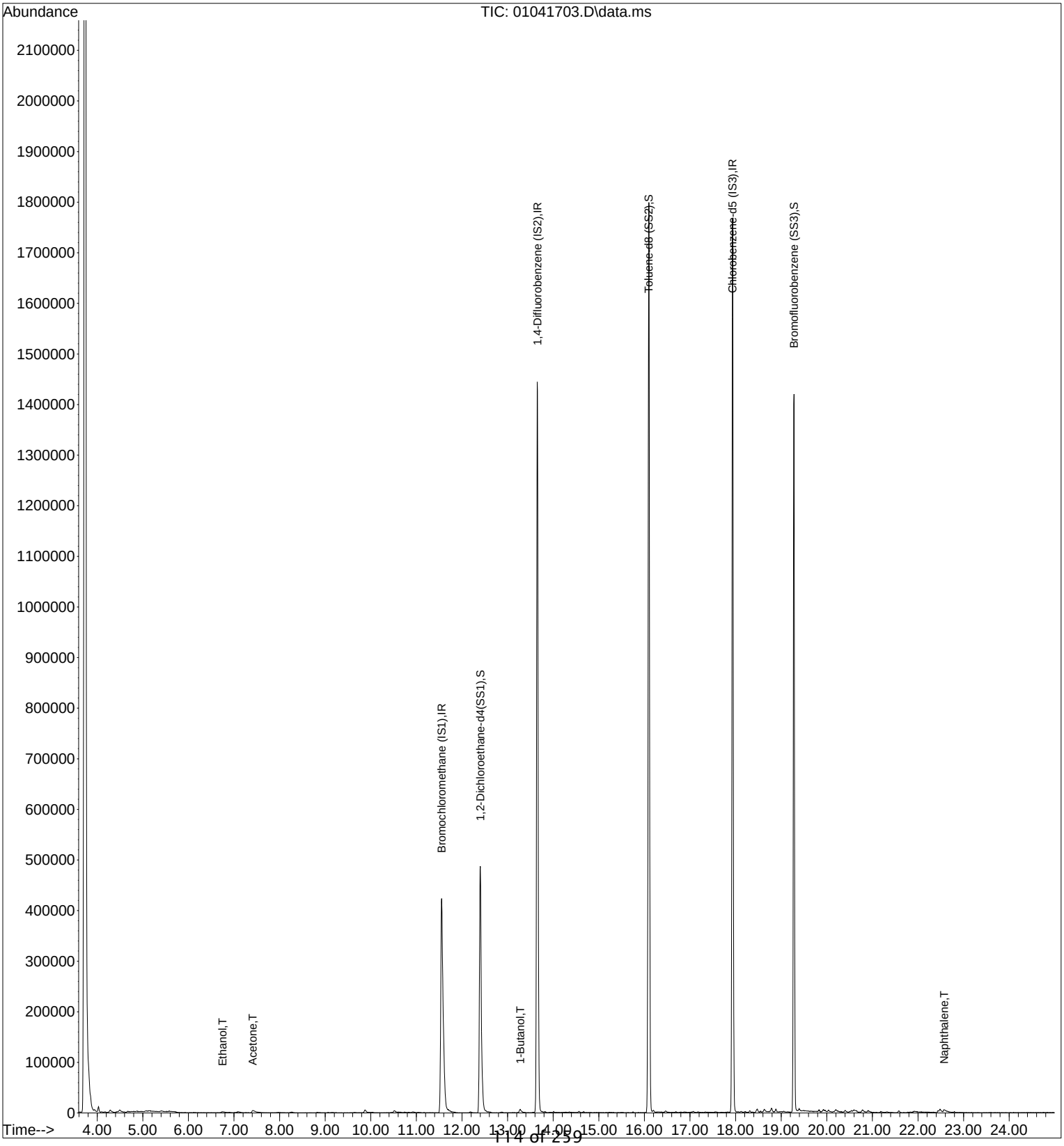
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	0.00	100	0	N.D.	
51) n-Heptane	0.00	71	0	N.D.	
52) cis-1,3-Dichloropropene	15.23	75	656	N.D.	
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.	
54) trans-1,3-Dichloropropene	15.75	75	1001	N.D.	
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.	
58) Toluene	16.20	91	6560	N.D.	
59) 2-Hexanone	16.46	43	2509	N.D.	
60) Dibromochloromethane	0.00	129	0	N.D.	
61) 1,2-Dibromoethane	16.88	107	824	N.D.	
62) n-Butyl Acetate	17.08	43	3398	N.D.	
63) n-Octane	17.33	57	1104	N.D.	
64) Tetrachloroethene	0.00	166	0	N.D.	
65) Chlorobenzene	17.97	112	2498	N.D.	
66) Ethylbenzene	18.31	91	3090	N.D.	
67) m- & p-Xylenes	18.48	91	7109	N.D.	
68) Bromoform	18.54	173	654	N.D.	
69) Styrene	18.79	104	3545	N.D.	
70) o-Xylene	18.89	91	2220	N.D.	
71) n-Nonane	19.06	43	974	N.D.	
72) 1,1,2,2-Tetrachloroethane	18.89	83	1242	N.D.	
74) Cumene	19.39	105	2734	N.D.	
75) alpha-Pinene	0.00	93	0	N.D.	
76) n-Propylbenzene	19.84	91	3275	N.D.	
77) 3-Ethyltoluene	19.93	105	6204	N.D.	
78) 4-Ethyltoluene	19.93	105	5980	N.D.	
79) 1,3,5-Trimethylbenzene	20.04	105	2851	N.D.	
80) alpha-Methylstyrene	20.18	118	1277	N.D.	
81) 2-Ethyltoluene	20.20	105	2304	N.D.	
82) 1,2,4-Trimethylbenzene	20.41	105	5559	N.D.	
83) n-Decane	20.50	57	849	N.D.	
84) Benzyl Chloride	20.39	91	932	N.D.	
85) 1,3-Dichlorobenzene	20.54	146	2073	N.D.	
86) 1,4-Dichlorobenzene	20.60	146	5388	N.D.	
87) sec-Butylbenzene	20.64	105	1807	N.D.	
88) 4-Isopropyltoluene (p-...	20.79	119	2666	N.D.	
89) 1,2,3-Trimethylbenzene	20.78	105	4046	N.D.	
90) 1,2-Dichlorobenzene	20.90	146	3093	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	21.57	57	2061	N.D.	
94) 1,2,4-Trichlorobenzene	22.44	180	3712	N.D.	
95) Naphthalene	22.57	128	15435	0.113 ng	90
96) n-Dodecane	22.49	57	4322	N.D.	
97) Hexachlorobutadiene	22.79	225	573	N.D.	
98) Cyclohexanone	18.63	55	2814	N.D.	
99) tert-Butylbenzene	20.40	119	2175	N.D.	
100) n-Butylbenzene	21.18	91	3218	N.D.	

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\04\01041703.D
Acq On : 4 Jan 2017 5:39 Operator: CL
Sample : MB R16010417 1000mL
Misc : S29-12281601 AC00442
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Jan 04 07:13:32 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File : I:\MS16\DATA\2017 01\04\01041704.D Vial: 2
Acq On : 4 Jan 2017 6:12 Operator: CL
Sample : LCS R16010417 25ng Inst : GCMS-16
Misc : S29-12281601/S29-12211611 (1/19)

Quant Time: Jan 04 07:13:34 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

CL 1/4/17

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.56	130	282713	12.500	ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.66	114	1409437	12.500	ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.93	82	638264	12.500	ng	0.00

System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...	12.41	65	518689	12.771	ng	-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 102.16%			
57) Toluene-d8 (SS2)	16.10	98	1492071	12.184	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 97.44%			
73) Bromofluorobenzene (SS3)	19.28	174	458082	11.718	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 93.76%			

Target Compounds

							Qvalue
2) Propene	4.19	42	935307	23.930	ng		99
3) Dichlorodifluoromethan...	4.36	85	1680065	23.524	ng		100
4) Chloromethane	4.68	50	1322958	22.520	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.95	135	880404	22.183	ng		100
6) Vinyl Chloride	5.13	62	1504580	26.930	ng		100
7) 1,3-Butadiene	5.41	54	1127262	28.898	ng		99
8) Bromomethane	5.90	94	714969	24.182	ng		100
9) Chloroethane	6.24	64	600446	25.790	ng		100
10) Ethanol	6.67	45	3516652	131.531	ng		100
11) Acetonitrile	6.94	41	1620309	26.459	ng		99
12) Acrolein	7.12	56	535164	22.780	ng		100
13) Acetone	7.33	58	3479014	129.592	ng		99
14) Trichlorofluoromethane	7.58	101	1397988	22.807	ng		100
15) 2-Propanol (Isopropanol)	7.87	45	4891490	53.348	ng		99
16) Acrylonitrile	8.15	53	1182284	26.083	ng		100
17) 1,1-Dichloroethene	8.58	96	764531	24.809	ng		97
18) 2-Methyl-2-Propanol (t...	8.76	59	4835968	50.277	ng		100
19) Methylene Chloride	8.82	84	837943	24.896	ng		95
20) 3-Chloro-1-propene (Al...	8.98	41	1378337	27.063	ng		98
21) Trichlorotrifluoroethane	9.22	151	676764	22.531	ng		95
22) Carbon Disulfide	9.09	76	3056900	25.746	ng		100
23) trans-1,2-Dichloroethene	10.10	61	1273831	25.548	ng		98
24) 1,1-Dichloroethane	10.36	63	1552220	24.843	ng		100
25) Methyl tert-Butyl Ether	10.43	73	2587998	23.910	ng		99
26) Vinyl Acetate	10.60	86	1170310	149.024	ng	#	87
27) 2-Butanone (MEK)	10.85	72	612719	26.437	ng		93
28) cis-1,2-Dichloroethene	11.38	61	1239797	25.241	ng		97
29) Diisopropyl Ether	11.64	87	763427	24.535	ng	#	82
30) Ethyl Acetate	11.66	61	789943	59.830	ng		98
31) n-Hexane	11.64	57	1704768	28.455	ng		99
32) Chloroform	11.73	83	1491871	23.956	ng		100
34) Tetrahydrofuran (THF)	12.12	72	573581	24.328	ng		97
35) Ethyl tert-Butyl Ether	12.24	87	1007541	24.514	ng		95
36) 1,2-Dichloroethane	12.52	62	1230816	24.123	ng		100
38) 1,1,1-Trichloroethane	12.79	97	1295862	23.470	ng		99
39) Isopropyl Acetate	13.20	61	1303454	55.129	ng		100
40) 1-Butanol	13.23	56	2191125	57.943	ng		98
41) Benzene	13.28	78	3495868	24.292	ng		100
42) Carbon Tetrachloride	13.43	117	1156029	24.186	ng		100
43) Cyclohexane	13.56	84	2732690	51.079	ng		96
44) tert-Amyl Methyl Ether	13.89	73	2563028	24.687	ng		99
45) 1,2-Dichloropropane	14.12	63	894378	24.992	ng		100
46) Bromodichloromethane	14.32	83	1288456	25.805	ng		100
47) Trichloroethene	14.36	130	885066	23.396	ng		100
48) 1,4-Dioxane	14.33	88	750251	26.006	ng		96
49) 2,2,4-Trimethylpentane...	14.41	57	3797210	25.044	ng		100
50) Methyl Methacrylate	14.55	100	739591	52.416	ng		91

Quantitation Report (QT Reviewed)

Data File : I:\MS16\DATA\2017 01\04\01041704.D Vial: 2
Acq On : 4 Jan 2017 6:12 Operator: CL
Sample : LCS R16010417 25ng Inst : GCMS-16
Misc : S29-12281601/S29-12211611 (1/19)

Quant Time: Jan 04 07:13:34 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

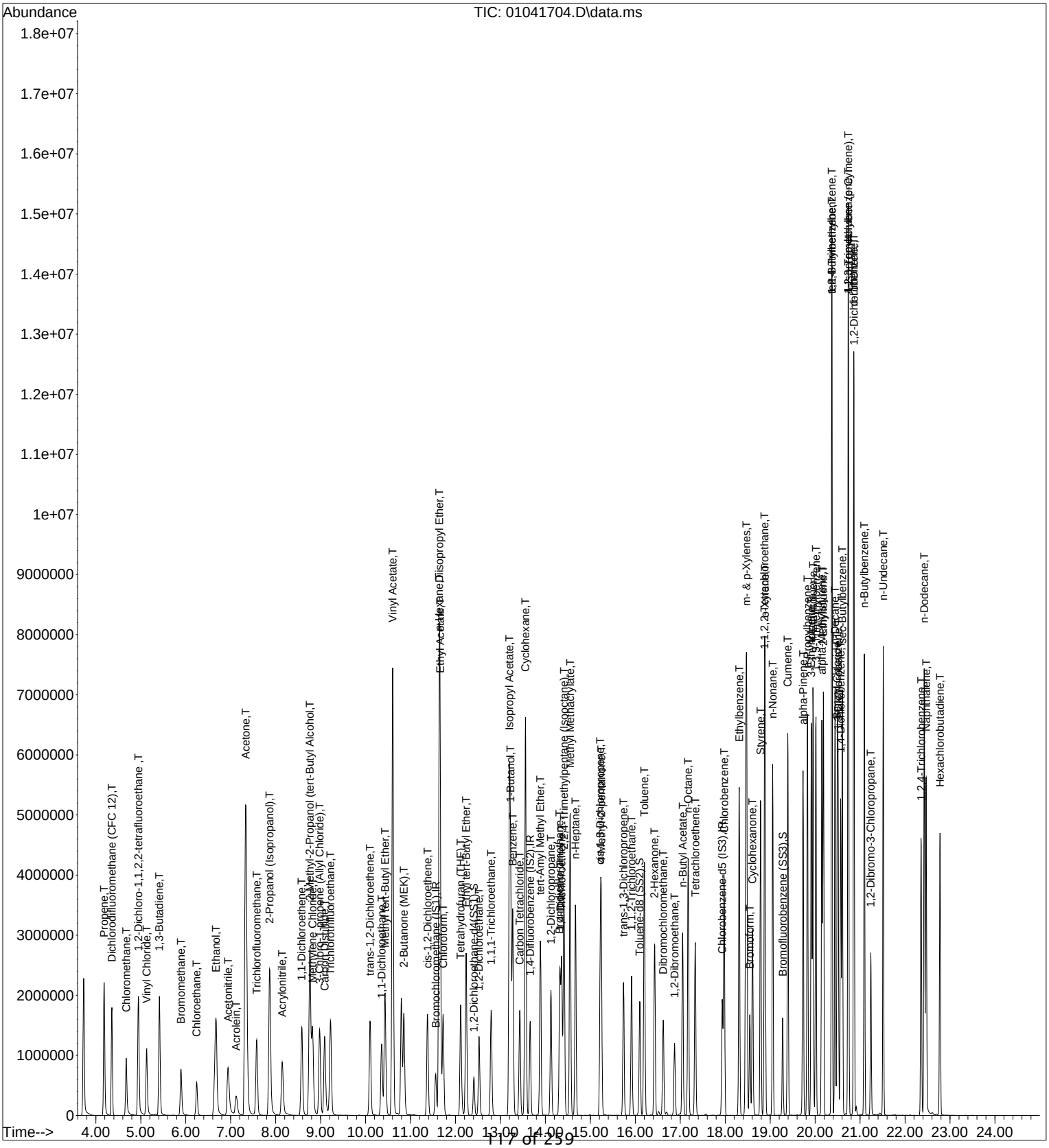
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
51) n-Heptane	14.67	71	887819	25.582 ng	98
52) cis-1,3-Dichloropropene	15.22	75	1540639	26.590 ng	100
53) 4-Methyl-2-pentanone	15.24	58	923361	26.718 ng	97
54) trans-1,3-Dichloropropene	15.74	75	1390335	26.914 ng	100
55) 1,1,2-Trichloroethane	15.92	97	829433	24.759 ng	99
58) Toluene	16.20	91	3458186	23.128 ng	100
59) 2-Hexanone	16.43	43	2392861	25.981 ng	99
60) Dibromochloromethane	16.62	129	992799	24.115 ng	100
61) 1,2-Dibromoethane	16.87	107	955963	23.745 ng	99
62) n-Butyl Acetate	17.05	43	2670124	26.933 ng	98
63) n-Octane	17.18	57	829806	25.260 ng	96
64) Tetrachloroethene	17.33	166	907290	22.391 ng	100
65) Chlorobenzene	17.98	112	2265078	22.986 ng	100
66) Ethylbenzene	18.31	91	4133770	24.578 ng	99
67) m- & p-Xylenes	18.47	91	6697248	51.180 ng	99
68) Bromoform	18.55	173	841212	25.105 ng	100
69) Styrene	18.79	104	2532025	24.935 ng	99
70) o-Xylene	18.89	91	3388162	25.164 ng	99
71) n-Nonane	19.06	43	2092141	25.803 ng	97
72) 1,1,2,2-Tetrachloroethane	18.87	83	1756020	27.822 ng	100
74) Cumene	19.39	105	4051702	24.187 ng	99
75) alpha-Pinene	19.73	93	2185704	24.859 ng	98
76) n-Propylbenzene	19.83	91	5128644	25.979 ng	98
77) 3-Ethyltoluene	19.91	105	4157312	24.504 ng	99
78) 4-Ethyltoluene	19.95	105	3984676	26.774 ng	99
79) 1,3,5-Trimethylbenzene	20.02	105	3387358	24.478 ng	99
80) alpha-Methylstyrene	20.15	118	1859457	27.002 ng	99
81) 2-Ethyltoluene	20.18	105	4091621	25.750 ng	99
82) 1,2,4-Trimethylbenzene	20.37	105	3869693	28.373 ng	99
83) n-Decane	20.44	57	2167245	27.494 ng	98
84) Benzyl Chloride	20.49	91	3394898	30.599 ng	99
85) 1,3-Dichlorobenzene	20.51	146	1992680	29.092 ng	99
86) 1,4-Dichlorobenzene	20.57	146	1946316	23.946 ng	100
87) sec-Butylbenzene	20.61	105	4579698	25.881 ng	99
88) 4-Isopropyltoluene (p-...	20.74	119	4519403	26.653 ng	98
89) 1,2,3-Trimethylbenzene	20.74	105	3961176	27.228 ng	98
90) 1,2-Dichlorobenzene	20.86	146	2016229	26.319 ng	100
91) d-Limonene	20.86	68	1741470	29.790 ng	96
92) 1,2-Dibromo-3-Chloropr...	21.24	157	675966	26.505 ng	93
93) n-Undecane	21.51	57	2276569	27.470 ng	97
94) 1,2,4-Trichlorobenzene	22.36	180	1423327	28.918 ng	100
95) Naphthalene	22.47	128	4510614	30.171 ng	100
96) n-Dodecane	22.43	57	2266405	30.624 ng	98
97) Hexachlorobutadiene	22.78	225	853742	24.822 ng	99
98) Cyclohexanone	18.60	55	1385695	24.500 ng	98
99) tert-Butylbenzene	20.37	119	3547386	26.473 ng	100
100) n-Butylbenzene	21.10	91	3906757	27.183 ng	99

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

Quantitation Report (QT Reviewed)

Data File : I:\MS16\DATA\2017 01\04\01041704.D Vial: 2
Acq On : 4 Jan 2017 6:12 Operator: CL
Sample : LCS R16010417 25ng Inst : GCMS-16
Misc : S29-12281601/S29-12211611 (1/19)

Quant Time: Jan 04 07:13:34 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\04\01041714.D
Acq On : 4 Jan 2017 13:09 Operator: LH
Sample : P1606022-001dup (1000mL)
Misc : S29-12281601
ALS Vial : 5 Sample Multiplier: 1

Quant Time: Jan 11 10:26:07 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 1/11/17

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.59	130	285719	12.500	ng		0.01
37) 1,4-Difluorobenzene (IS2)	13.67	114	1413508	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	17.93	82	644281	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.42	65	532078	12.963	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 103.68%				
57) Toluene-d8 (SS2)	16.10	98	1483367	12.000	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.00%				
73) Bromofluorobenzene (SS3)	19.28	174	474450	12.024	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.16%				
Target Compounds							Qvalue
2) Propene	4.19	42	87642	2.219	ng		91
3) Dichlorodifluoromethan...	4.37	85	96390	1.335	ng		100
4) Chloromethane	4.69	50	8473	0.143	ng		96
5) 1,2-Dichloro-1,1,2,2-t...	4.96	135	2406	N.D.			
6) Vinyl Chloride	0.00	62	0	N.D.			
7) 1,3-Butadiene	5.44	54	7603	0.193	ng		86
8) Bromomethane	0.00	94	0	N.D.			
9) Chloroethane	0.00	64	0	N.D.			
10) Ethanol	6.70	45	3769321	139.499	ng		100
11) Acetonitrile	7.02	41	10172	0.164	ng		79
12) Acrolein	7.18	56	20312	0.855	ng		91
13) Acetone	7.38	58	25771814	949.894	ng	#	37
14) Trichlorofluoromethane	7.58	101	41382	0.668	ng		99
15) 2-Propanol (Isopropanol)	7.90	45	220449	2.379	ng		87
16) Acrylonitrile	8.19	53	2057	N.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	8.86	84	6068	0.178	ng		90
20) 3-Chloro-1-propene (Al...	0.00	41	0	N.D. d			
21) Trichlorotrifluoroethane	9.22	151	7647	0.252	ng		93
22) Carbon Disulfide	9.11	76	16223	0.135	ng		95
23) trans-1,2-Dichloroethene	10.13	61	1483	N.D.			
24) 1,1-Dichloroethane	0.00	63	0	N.D.			
25) Methyl tert-Butyl Ether	10.46	73	1358	N.D.			
26) Vinyl Acetate	0.00	86	0	N.D. d			
27) 2-Butanone (MEK)	10.94	72	35341039	1508.794	ng	#	7
28) cis-1,2-Dichloroethene	11.41	61	74751	1.506	ng		97
29) Diisopropyl Ether	0.00	87	0	N.D.			
30) Ethyl Acetate	11.68	61	8164	0.612	ng		94
31) n-Hexane	11.64	57	36091	0.596	ng		99
32) Chloroform	11.76	83	4726	N.D.			
34) Tetrahydrofuran (THF)	12.13	72	18069535	758.351	ng	#	78
35) Ethyl tert-Butyl Ether	12.25	87	607	N.D.			
36) 1,2-Dichloroethane	12.54	62	1975	N.D.			
38) 1,1,1-Trichloroethane	0.00	97	0	N.D.			
39) Isopropyl Acetate	13.28	61	1354	N.D.			
40) 1-Butanol	0.00	56	0	N.D. d			
41) Benzene	13.28	78	200763	1.391	ng		100
42) Carbon Tetrachloride	13.44	117	11640	0.243	ng		96
43) Cyclohexane	13.56	84	8341	0.155	ng		86
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.			
45) 1,2-Dichloropropane	14.13	63	1119	N.D.			
46) Bromodichloromethane	14.33	83	1820	N.D.			
47) Trichloroethene	14.37	130	53863	1.420	ng		97
48) 1,4-Dioxane	14.37	88	588	N.D.			
49) 2,2,4-Trimethylpentane...	0.00	57	0	N.D. d			

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\04\01041714.D
Acq On : 4 Jan 2017 13:09 Operator: LH
Sample : P1606022-001dup (1000mL)
Misc : S29-12281601
ALS Vial : 5 Sample Multiplier: 1

Quant Time: Jan 11 10:26:07 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

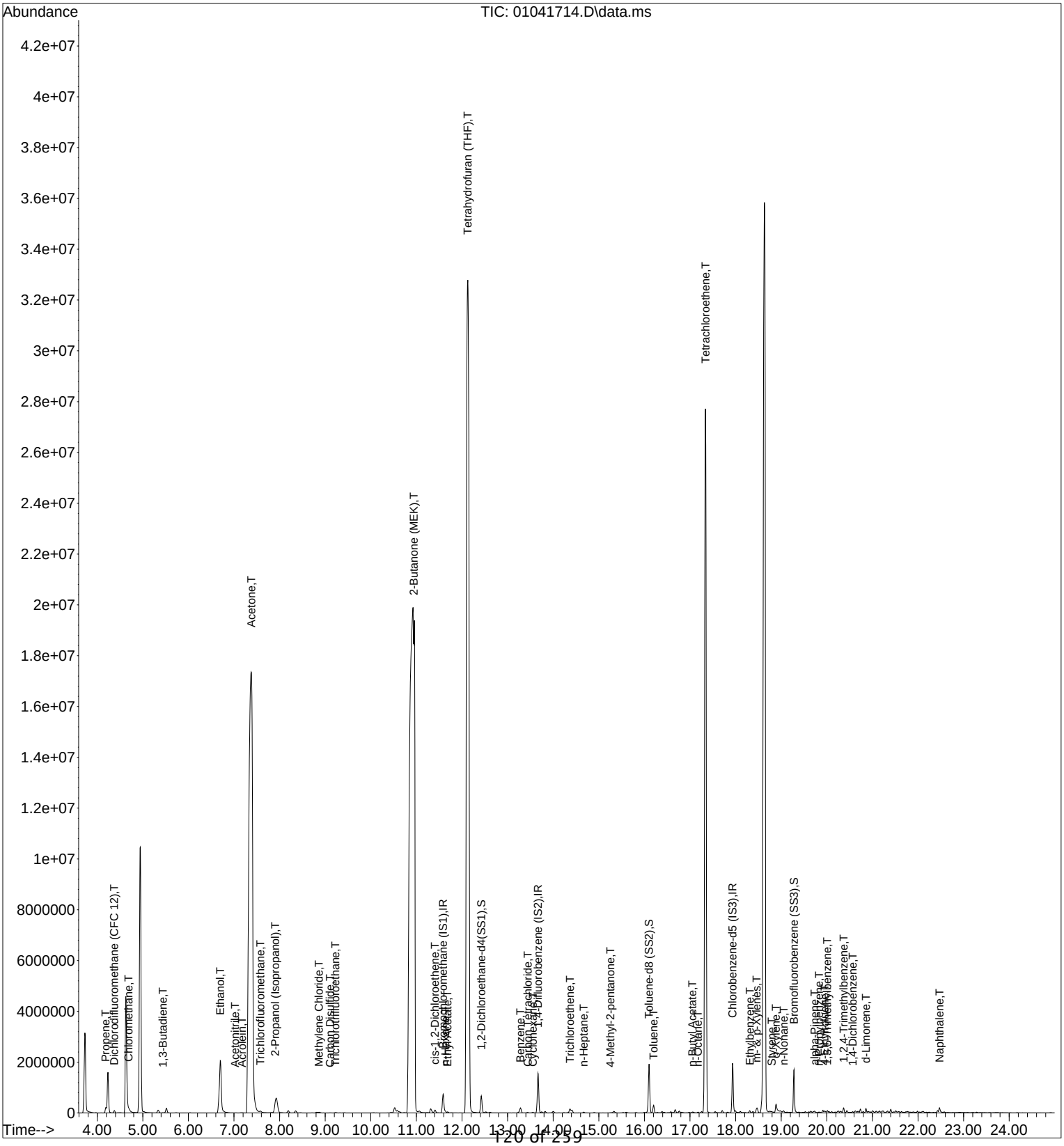
Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
50) Methyl Methacrylate	0.00	100	0	N.D. d		
51) n-Heptane	14.67	71	9021	0.259 ng		97
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.		
53) 4-Methyl-2-pentanone	15.26	58	3343	0.096 ng	#	78
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.		
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.		
58) Toluene	16.20	91	238287	1.579 ng		99
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	17.05	43	25742	0.257 ng		87
63) n-Octane	17.17	57	5875	0.177 ng		95
64) Tetrachloroethene	17.34	166	9787653	239.294 ng		97
65) Chlorobenzene	17.99	112	8142	N.D.		
66) Ethylbenzene	18.31	91	62999	0.371 ng		98
67) m- & p-Xylenes	18.46	91	121356	0.919 ng		99
68) Bromoform	0.00	173	0	N.D.		
69) Styrene	18.79	104	12701	0.124 ng		98
70) o-Xylene	18.89	91	46835	0.345 ng		98
71) n-Nonane	19.06	43	18973	0.232 ng	#	7
72) 1,1,2,2-Tetrachloroethane	18.93	83	5118	N.D.		
74) Cumene	19.39	105	10460	N.D.		
75) alpha-Pinene	19.73	93	20315	0.229 ng	#	17
76) n-Propylbenzene	19.83	91	22744	0.114 ng		95
77) 3-Ethyltoluene	0.00	105	0	N.D. d		
78) 4-Ethyltoluene	19.95	105	18817	0.125 ng		96
79) 1,3,5-Trimethylbenzene	20.01	105	28293	0.203 ng		95
80) alpha-Methylstyrene	20.15	118	1030	N.D.		
81) 2-Ethyltoluene	0.00	105	0	N.D. d		
82) 1,2,4-Trimethylbenzene	20.37	105	80412	0.584 ng		89
83) n-Decane	0.00	57	0	N.D. d		
84) Benzyl Chloride	20.49	91	1255	N.D.		
85) 1,3-Dichlorobenzene	0.00	146	0	N.D. d		
86) 1,4-Dichlorobenzene	20.57	146	7773	0.095 ng		97
87) sec-Butylbenzene	20.61	105	5938	N.D.		
88) 4-Isopropyltoluene (p-...	0.00	119	0	N.D. d		
89) 1,2,3-Trimethylbenzene	0.00	105	0	N.D. d		
90) 1,2-Dichlorobenzene	20.86	146	1057	N.D.		
91) d-Limonene	20.86	68	36705	0.622 ng		100
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	22.36	180	629	N.D.		
95) Naphthalene	22.47	128	185293	1.228 ng		99
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	20.37	119	10766	N.D.		
100) n-Butylbenzene	21.08	91	11724	N.D.		

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\04\01041714.D
Acq On : 4 Jan 2017 13:09 Operator: LH
Sample : P1606022-001dup (1000mL)
Misc : S29-12281601
ALS Vial : 5 Sample Multiplier: 1

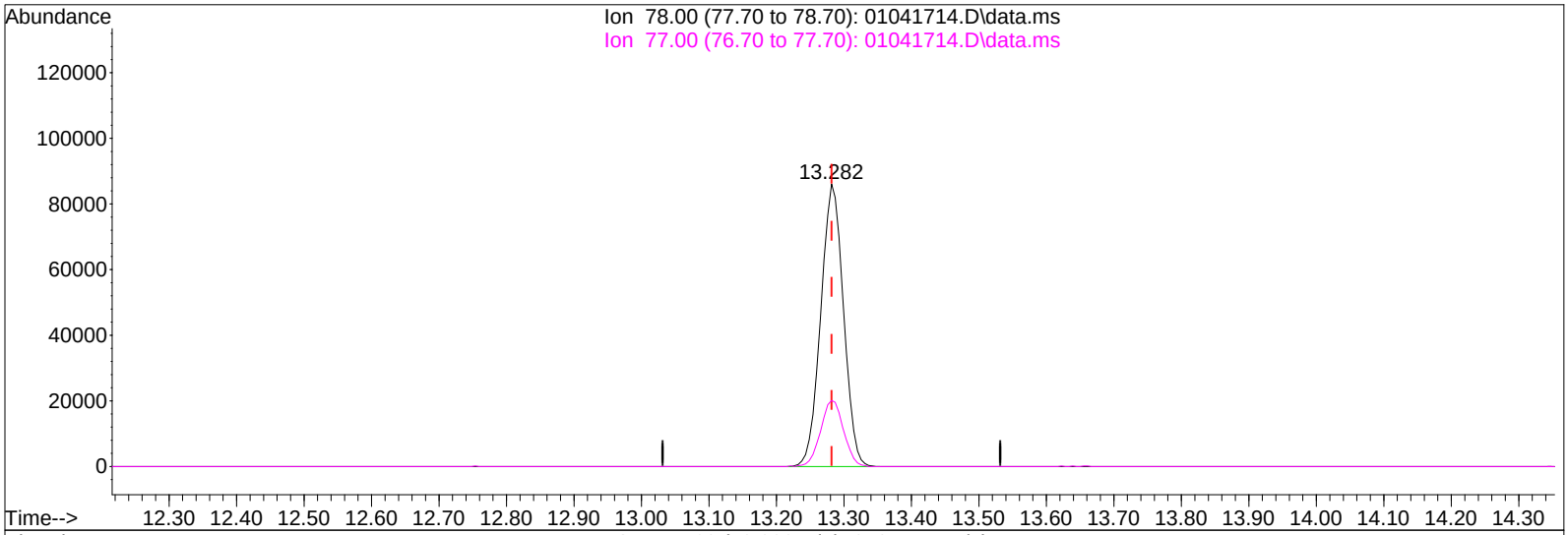
Quant Time: Jan 11 10:26:07 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

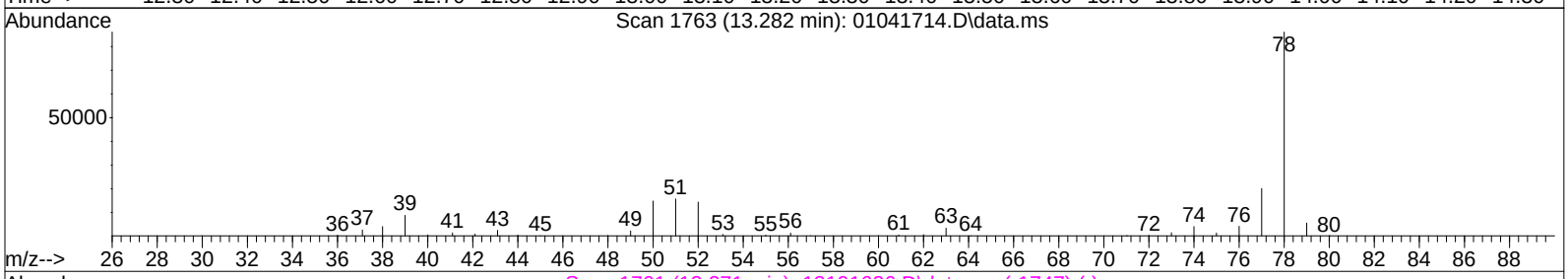


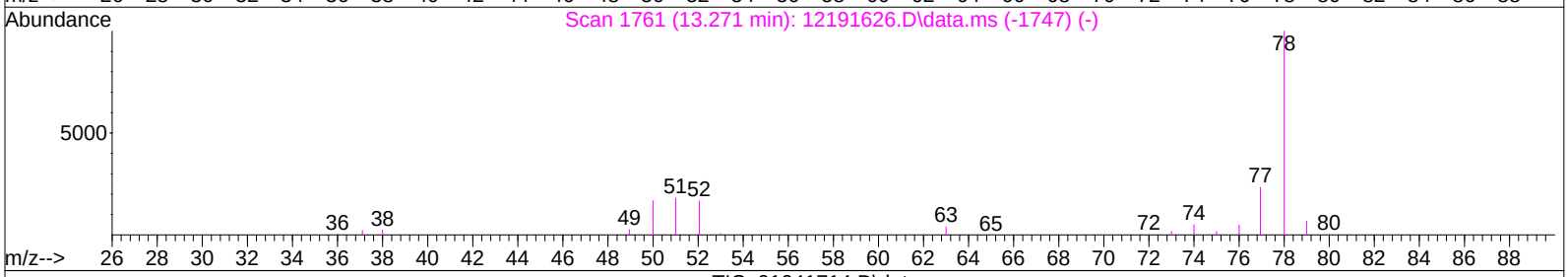
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 01\04\01041714.D
Acq On : 4 Jan 2017 13:09 Operator: LH
Sample : P1606022-001dup (1000mL)
Misc : S29-12281601
ALS Vial : 5 Sample Multiplier: 1

Quant Time: Jan 04 14:19:56 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 01041714.D\data.ms

(41) Benzene (T)

13.282min (-0.000) 1.39ng

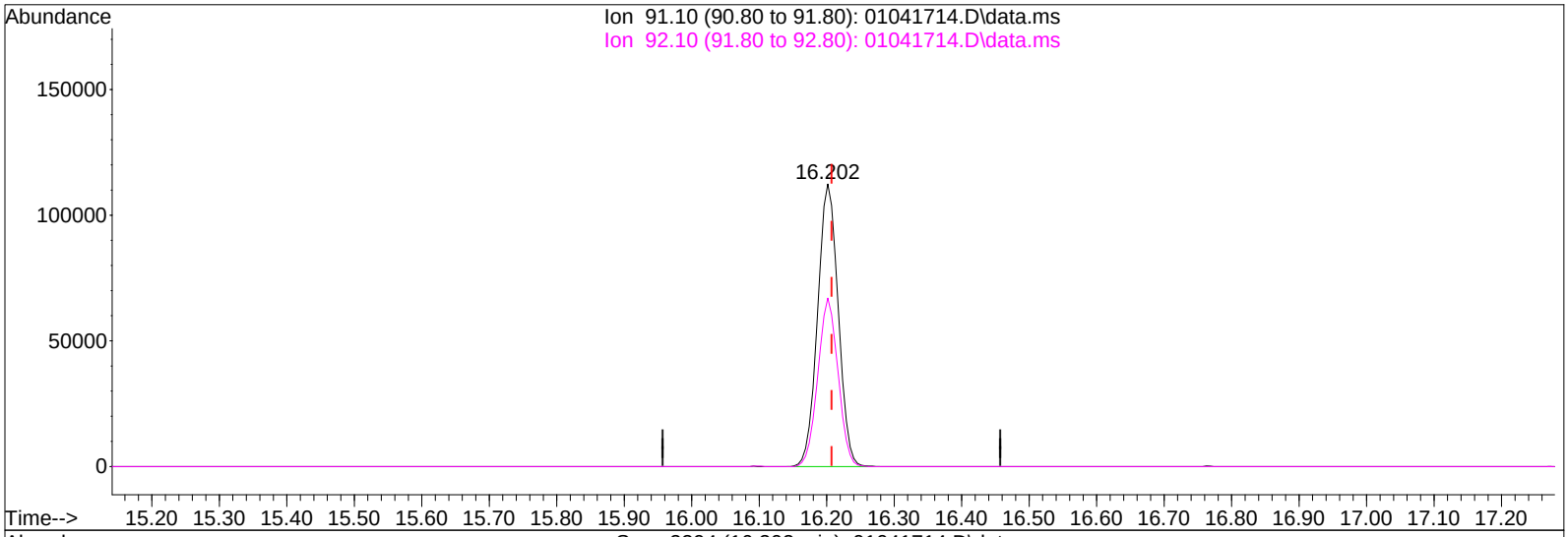
response 200763

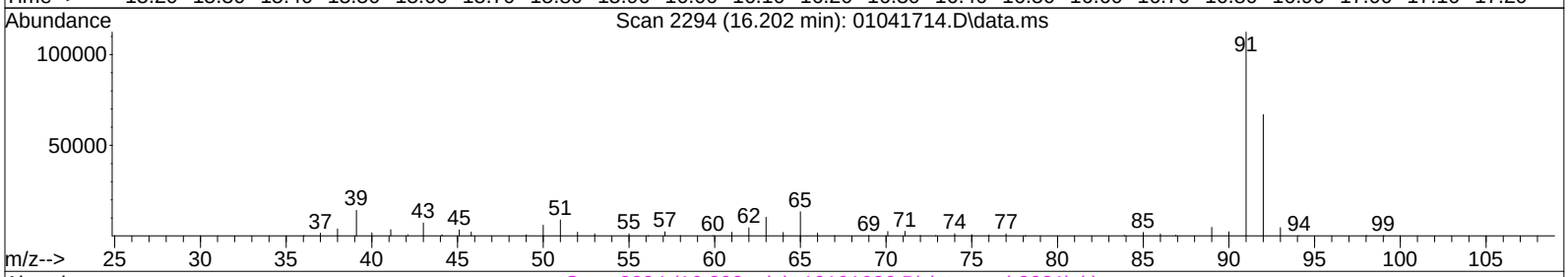
Ion	Exp%	Act%
78.00	100	100
77.00	23.50	23.64
0.00	0.00	0.00
0.00	0.00	0.00

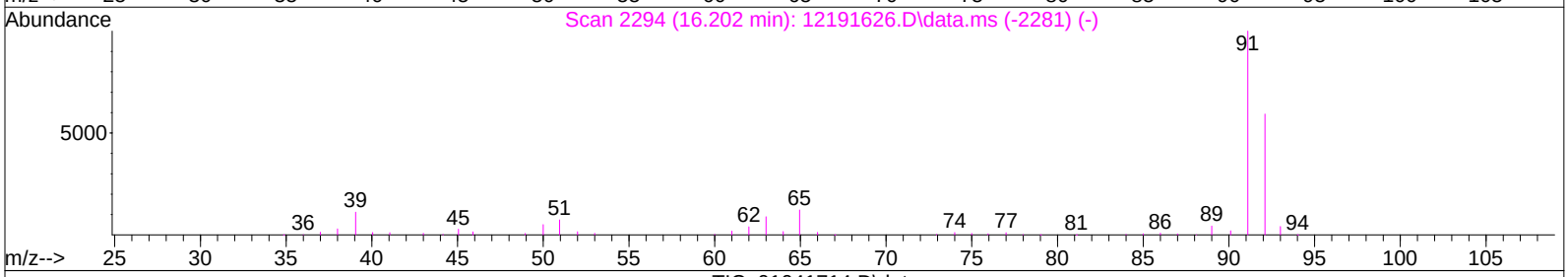
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 01\04\01041714.D
Acq On : 4 Jan 2017 13:09 Operator: LH
Sample : P1606022-001dup (1000mL)
Misc : S29-12281601
ALS Vial : 5 Sample Multiplier: 1

Quant Time: Jan 04 14:19:56 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 01041714.D\data.ms

(58) Toluene (T)

16.202min (-0.006) 1.58ng

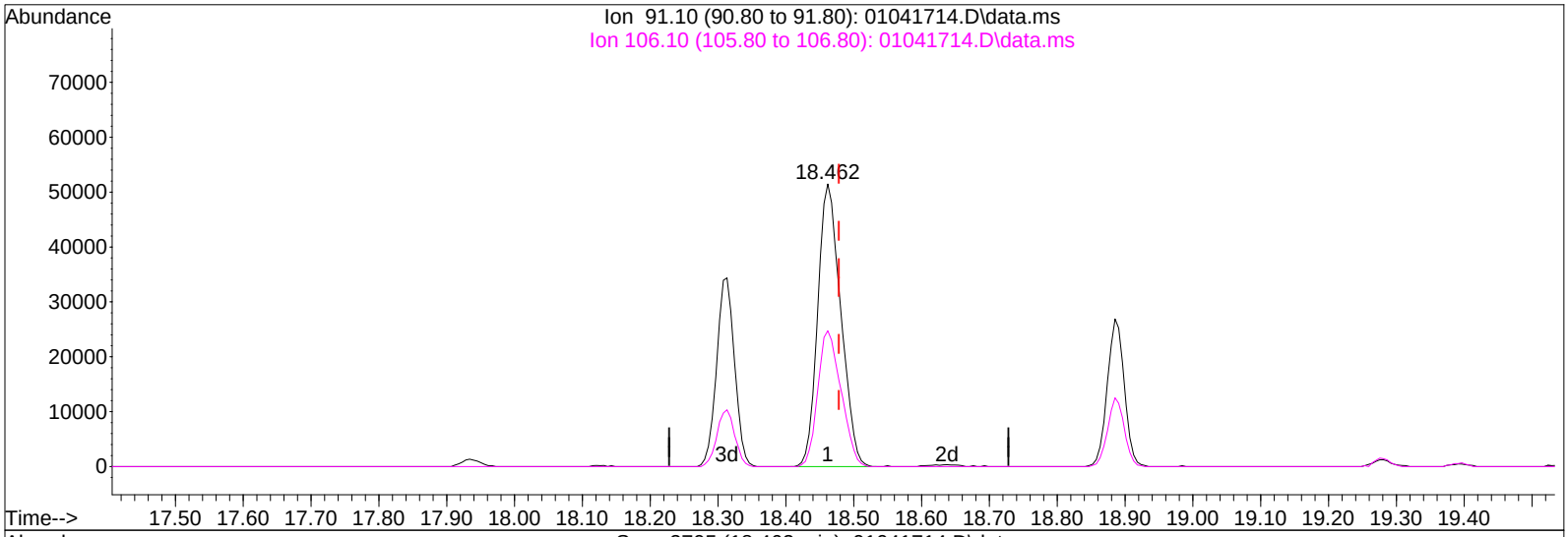
response 238287

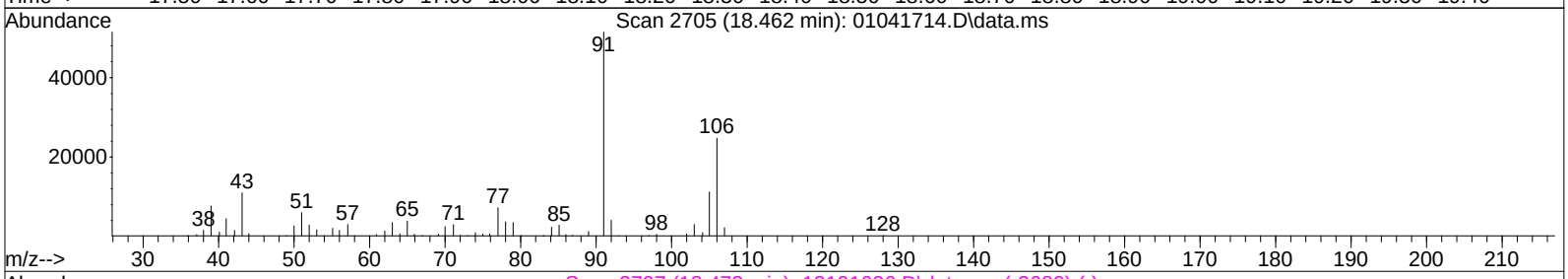
Ion	Exp%	Act%
91.10	100	100
92.10	59.10	58.35
0.00	0.00	0.00
0.00	0.00	0.00

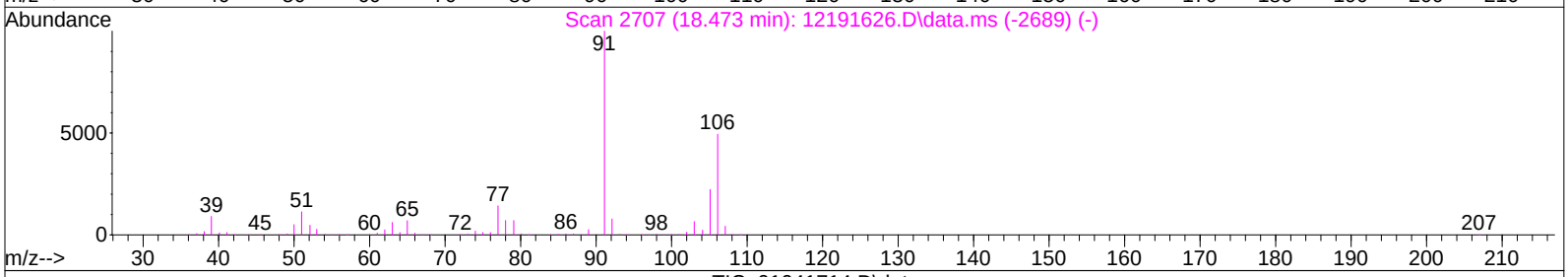
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 01\04\01041714.D
Acq On : 4 Jan 2017 13:09 Operator: LH
Sample : P1606022-001dup (1000mL)
Misc : S29-12281601
ALS Vial : 5 Sample Multiplier: 1

Quant Time: Jan 04 14:19:56 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 01041714.D\data.ms

(67) m- & p-Xylenes (T)

18.462min (-0.017) 0.92ng

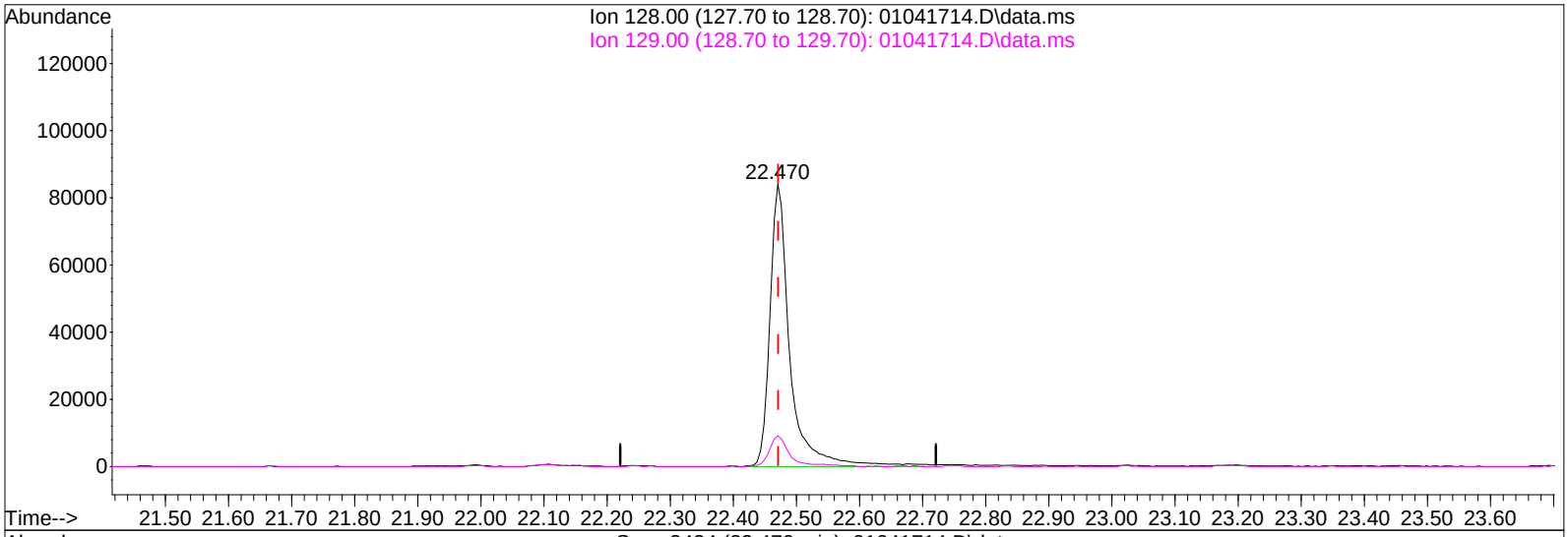
response 121356

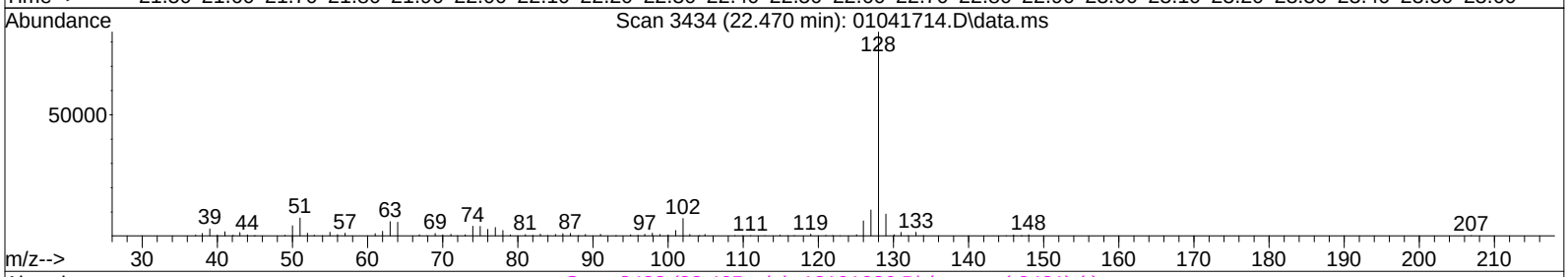
Ion	Exp%	Act%
91.10	100	100
106.10	49.30	48.61
0.00	0.00	0.00
0.00	0.00	0.00

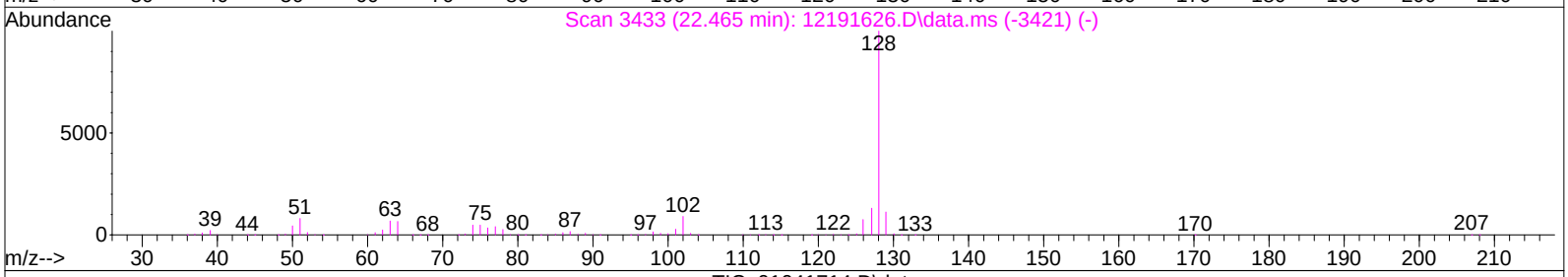
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 01\04\01041714.D
Acq On : 4 Jan 2017 13:09 Operator: LH
Sample : P1606022-001dup (1000mL)
Misc : S29-12281601
ALS Vial : 5 Sample Multiplier: 1

Quant Time: Jan 04 14:19:56 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 01041714.D\data.ms

(95) Naphthalene (T)

22.470min (-0.001) 1.23ng

response 185293

Ion	Exp%	Act%
128.00	100	100
129.00	11.00	11.32
0.00	0.00	0.00
0.00	0.00	0.00

Response Factor Report GCMS-16

Method Path : I:\MS16\METHODS\
Method File : R16121916.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue Dec 20 10:31:33 2016
Response Via : Initial Calibration

LH 12/21/16

Calibration Files
0.08=12191620.D 0.10=12191621.D 0.20=12191622.D 0.40=12191623.D 1.0 =12191624.D 5.0 =12191
50 =12191627.D 100 =12191628.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			1.789	1.704	1.575	1.520	1.621	1.686	2.202	1.728	13.12
3)	T	Dichlorodifluo...		3.833	3.235	3.320	3.072	2.817	3.126	2.942	2.916	3.158	10.14
4)	T	Chloromethane		3.246	2.823	2.750	2.593	2.294	2.574	2.389	2.111	2.597	13.55
5)	T	1,2-Dichloro-1...	2.195	2.011	1.833	1.734	1.662	1.541	1.690	1.593	1.534	1.755	12.74
6)	T	Vinyl Chloride	2.678	2.620	2.205	2.494	2.425	2.326	2.586	2.471	2.426	2.470	5.98
7)	T	1,3-Butadiene	1.670	1.706	1.491	1.469	1.740	1.655	1.945	1.907	1.939	1.725	10.37
8)	T	Bromomethane	1.399	1.359	1.243	1.328	1.261	1.211	1.346	1.281	1.337	1.307	4.70
9)	T	Chloroethane	1.078	1.040	1.018	1.028	0.993	0.948	1.081	1.032	1.046	1.029	4.00
10)	T	Ethanol	1.430	1.328	1.150	1.098	1.063	0.981	1.179	1.180	1.231	1.182	11.50
11)	T	Acetonitrile				2.985	2.732	2.442	2.767	2.656	2.664	2.708	6.52
12)	T	Acrolein	1.380	1.286	1.076	1.040	0.953	0.867	0.940	0.902	0.906	1.039	17.43
13)	T	Acetone	1.446	1.354	1.140	1.110	1.051	1.005	1.200	1.176	1.201	1.187	11.75
14)	T	Trichlorofluor...	3.376	3.171	2.763	2.697	2.471	2.362	2.593	2.488	2.471	2.710	12.77
15)	T	2-Propanol (Is...	4.996	4.728	3.968	3.994	3.862	3.506	4.277	3.994	3.160	4.054	13.90
16)	T	Acrylonitrile	2.429	2.238	1.931	1.901	1.845	1.766	2.020	1.946	1.961	2.004	10.26
17)	T	1,1-Dichloroet...	1.465	1.526	1.287	1.336	1.306	1.218	1.403	1.357	1.365	1.363	6.83
18)	T	2-Methyl-2-Pro...	4.972	4.780	4.178	4.055	3.810	3.612	4.356	4.308	4.204	4.253	10.06
19)	T	Methylene Chlo...			1.636	1.552	1.405	1.325	1.491	1.461	1.546	1.488	6.92
20)	T	3-Chloro-1-pro...	2.086	3.150	2.091	2.043	2.009	2.011	2.341	2.269	2.267	2.252	15.92
21)	T	Trichlorotrifl...	1.648	1.567	1.278	1.305	1.213	1.155	1.290	1.248	1.247	1.328	12.50
22)	T	Carbon Disulfide				5.713	5.316	4.812	5.401	5.141	5.116	5.250	5.80
23)	T	trans-1,2-Dich...	2.600	2.416	2.105	2.124	2.019	1.954	2.243	2.171	2.209	2.205	9.03
24)	T	1,1-Dichloroet...	3.165	3.064	2.805	2.832	2.577	2.444	2.736	2.615	2.625	2.763	8.46
25)	T	Methyl tert-Bu...	5.973	5.560	4.772	4.774	4.324	4.093	4.617	4.447	4.512	4.786	12.63
26)	T	Vinyl Acetate				0.291	0.282	0.306	0.404	0.415	0.385	0.347	17.42
27)	T	2-Butanone (MEK)	1.174	1.066	0.965	0.980	0.961	0.915	1.044	1.038	1.079	1.025	7.64
28)	T	cis-1,2-Dichlo...	2.563	2.424	2.073	2.070	2.007	1.927	2.201	2.123	2.157	2.172	9.32
29)	T	Diisopropyl Ether	1.823	1.738	1.429	1.219	1.102	1.082	1.329	1.340	1.321	1.376	18.64
30)	T	Ethyl Acetate	0.604	0.608	0.516	0.524	0.524	0.517	0.641	0.666	0.655	0.584	10.87
31)	T	n-Hexane	3.121	2.945	2.513	2.608	2.277	2.238	2.650	2.729	2.760	2.649	10.81
32)	T	Chloroform	3.306	3.168	2.774	2.754	2.550	2.408	2.691	2.588	2.542	2.753	10.85
33)	S	1,2-Dichloroet...	1.792	1.799	1.802	1.823	1.811	1.790	1.775	1.795	1.773	1.796	0.88
34)	T	Tetrahydrofura...	1.404	1.191	0.982	0.979	0.949	0.885	1.001	0.979	1.012	1.042	15.21
35)	T	Ethyl tert-But...	2.092	2.052	1.787	1.756	1.640	1.566	1.814	1.784	1.864	1.817	9.41
36)	T	1,2-Dichloroet...	2.780	2.549	2.219	2.212	2.073	1.963	2.219	2.148	2.139	2.256	11.18
37)	IR	1,4-Difluorobenzen...	----------ISTD----------										
38)	T	1,1,1-Trichlor...	0.573	0.556	0.489	0.475	0.451	0.423	0.487	0.472	0.481	0.490	9.71
39)	T	Isopropyl Acetate	0.231	0.223	0.189	0.193	0.185	0.180	0.222	0.228	0.238	0.210	10.83
40)	T	1-Butanol	0.352	0.319	0.279	0.271	0.293	0.295	0.395	0.400	0.415	0.335	16.74
41)	T	Benzene	1.616	1.536	1.269	1.197	1.134	1.067	1.226	1.217	1.227	1.276	14.18
42)	T	Carbon Tetrach...	0.479	0.461	0.399	0.407	0.394	0.375	0.440	0.426	0.434	0.424	7.89
43)	T	Cyclohexane	0.561	0.515	0.460	0.441	0.428	0.404	0.495	0.490	0.477	0.474	10.04
44)	T	tert-Amyl Meth...	1.101	1.038	0.894	0.863	0.823	0.784	0.933	0.910	0.940	0.921	10.78
45)	T	1,2-Dichloropr...	0.389	0.361	0.311	0.304	0.286	0.270	0.313	0.305	0.317	0.317	11.47
46)	T	Bromodichlorom...	0.493	0.477	0.425	0.416	0.393	0.386	0.463	0.460	0.472	0.443	8.71
47)	T	Trichloroethene	0.418	0.384	0.325	0.312	0.302	0.280	0.334	0.331	0.333	0.336	12.49
48)	T	1,4-Dioxane	0.283	0.267	0.231	0.223	0.236	0.224	0.273	0.275	0.290	0.256	10.54
49)	T	2,2,4-Trimethy...	1.639	1.552	1.336	1.317	1.218	1.142	1.338	1.289	1.270	1.345	11.64
50)	T	Methyl Methacr...	0.136	0.127	0.116	0.113	0.115	0.110	0.135	0.135	0.137	0.125	8.99
51)	T	n-Heptane	0.366	0.347	0.296	0.295	0.276	0.261	0.303	0.302	0.325	0.308	10.77
52)	T	cis-1,3-Dichlo...	0.578	0.527	0.459	0.455	0.458	0.454	0.557	0.556	0.581	0.514	11.03
53)	T	4-Methyl-2-pen...	0.345	0.315	0.288	0.273	0.277	0.265	0.325	0.324	0.348	0.307	10.26
54)	T	trans-1,3-Dich...	0.501	0.469	0.407	0.400	0.409	0.416	0.509	0.497	0.516	0.458	10.78

55)	T	1,1,2-Trichlor...	0.347	0.320	0.284	0.283	0.276	0.261	0.304	0.294	0.304	0.297	8.68
56)	IR	Chlorobenzene-d5 (...	----------ISTD----------										
57)	S	Toluene-d8 (SS2)	2.461	2.457	2.420	2.443	2.397	2.387	2.363	2.347	2.308	2.398	2.19
58)	T	Toluene	3.801	3.443	2.892	2.898	2.631	2.490	2.845	2.749	2.608	2.928	14.55
59)	T	2-Hexanone	2.305	1.961	1.678	1.583	1.647	1.617	1.861	1.791	1.790	1.804	12.46
60)	T	Dibromochlorom...	0.926	0.872	0.750	0.733	0.727	0.730	0.857	0.831	0.831	0.806	9.11
61)	T	1,2-Dibromoethane	0.946	0.854	0.747	0.742	0.732	0.714	0.813	0.777	0.770	0.788	9.28
62)	T	n-Butyl Acetate	2.301	2.112	1.794	1.732	1.806	1.775	2.051	1.966	1.938	1.942	9.68
63)	T	n-Octane			0.720	0.665	0.597	0.553	0.644	0.646	0.680	0.643	8.52
64)	T	Tetrachloroethene	0.965	0.927	0.784	0.768	0.714	0.682	0.786	0.763	0.752	0.794	11.73
65)	T	Chlorobenzene	2.384	2.255	1.863	1.847	1.754	1.644	1.933	1.876	1.813	1.930	12.32
66)	T	Ethylbenzene	4.013	3.789	3.199	3.156	3.086	2.901	3.409	3.295	2.797	3.294	11.99
67)	T	m- & p-Xylenes	3.255	2.878	2.446	2.422	2.364	2.246	2.747	2.648	2.058	2.563	14.12
68)	T	Bromoform	0.721	0.647	0.575	0.584	0.591	0.607	0.746	0.725	0.708	0.656	10.55
69)	T	Styrene	2.366	2.176	1.824	1.797	1.823	1.796	2.127	2.065	1.924	1.989	10.29
70)	T	o-Xylene	3.301	2.974	2.472	2.489	2.396	2.305	2.794	2.717	2.283	2.637	12.91
71)	T	n-Nonane	1.997	1.805	1.581	1.489	1.432	1.342	1.586	1.565	1.494	1.588	12.56
72)	T	1,1,2,2-Tetrac...	1.282	1.217	1.111	1.129	1.148	1.156	1.422	1.401	1.258	1.236	9.31
73)	S	Bromofluoroben...	0.764	0.762	0.760	0.768	0.774	0.776	0.776	0.761	0.749	0.766	1.16
74)	T	Cumene	4.124	3.865	3.201	3.128	3.021	2.875	3.412	3.262	2.640	3.281	14.22
75)	T	alpha-Pinene	1.993	1.853	1.629	1.613	1.550	1.502	1.837	1.823	1.698	1.722	9.48
76)	T	n-Propylbenzene	4.866	4.366	3.708	3.741	3.683	3.550	4.166	3.887	2.829	3.866	14.71
77)	T	3-Ethyltoluene	4.254	3.850	3.256	2.952	2.936	2.838	3.629	3.373	2.816	3.323	15.14
78)	T	4-Ethyltoluene	3.346	3.103	2.653	2.937	2.915	2.783	3.154	3.067	2.273	2.915	10.85
79)	T	1,3,5-Trimethy...	3.366	3.220	2.535	2.541	2.427	2.381	2.871	2.766	2.284	2.710	13.98
80)	T	alpha-Methylst...	1.395	1.264	1.168	1.214	1.285	1.298	1.595	1.544	1.375	1.349	10.69
81)	T	2-Ethyltoluene	3.661	3.470	3.176	2.901	2.892	2.809	3.383	3.187	2.527	3.112	11.59
82)	T	1,2,4-Trimethy...	2.944	2.744	2.597	2.561	2.495	2.473	3.236	2.883	2.107	2.671	12.20
83)	T	n-Decane	1.871	1.690	1.381	1.392	1.387	1.356	1.654	1.658	1.504	1.544	11.77
84)	T	Benzyl Chloride				1.166	1.842	2.140	2.818	2.798	2.272	2.173	28.68
85)	T	1,3-Dichlorobe...	1.047	1.083	1.185	1.284	1.406	1.389	1.708	1.615	1.356	1.341	16.63
86)	T	1,4-Dichlorobe...	2.030	2.067	1.348	1.386	1.399	1.406	1.673	1.611	1.406	1.592	17.67
87)	T	sec-Butylbenzene	4.046	3.828	3.459	3.408	3.329	3.208	3.793	3.501	2.619	3.465	12.00
88)	T	4-Isopropyltol...	4.215	3.795	3.231	3.124	3.091	3.054	3.834	3.260	2.283	3.321	16.97
89)	T	1,2,3-Trimethy...	4.094	3.109	2.593	2.601	2.539	2.499	3.240	2.886	2.081	2.849	20.41
90)	T	1,2-Dichlorobe...	1.855	1.685	1.403	1.345	1.386	1.364	1.713	1.552	1.200	1.500	14.20
91)	T	d-Limonene	1.240	1.161	1.013	1.037	1.045	1.060	1.355	1.359	1.034	1.145	12.27
92)	T	1,2-Dibromo-3-...				0.368	0.432	0.479	0.585	0.575	0.558	0.499	17.59
93)	T	n-Undecane	2.115	1.749	1.454	1.398	1.412	1.407	1.727	1.763	1.583	1.623	14.78
94)	T	1,2,4-Trichlor...	0.918	0.778	0.705	0.755	0.913	1.010	1.229	1.220	1.147	0.964	20.78
95)	T	Naphthalene				2.016	2.514	3.048	3.696	3.539	2.754	2.928	21.65
96)	T	n-Dodecane	1.816	1.497	1.118	1.065	1.353	1.376	1.599	1.649	1.573	1.449	17.02
97)	T	Hexachlorobuta...	0.731	0.682	0.587	0.590	0.600	0.616	0.764	0.764	0.728	0.674	11.28
98)	T	Cyclohexanone	1.459	1.213	0.989	0.966	1.006	0.965	1.142	1.100	1.129	1.108	14.30
99)	T	tert-Butylbenzene	3.101	3.169	2.550	2.496	2.422	2.360	2.992	2.598	1.932	2.624	15.19
100)	T	n-Butylbenzene	3.139	2.906	2.583	2.658	2.776	2.685	3.188	3.033	2.364	2.815	9.73

(#) = Out of Range

R16121916.M Wed Dec 21 14:52:14 2016

LH 12/21/16

Primary Source Standards Concentrations (Working & Initial Calibration)

1ng/L Std. ID:
4ng/L Std. ID: S29-12191607
20ng/L Std. ID: S29-12191605
200ng/L Std. ID: S29-12191603

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
Propene	1.036	207.2	20.72	4.144	1.036		0.08288	0.1036	0.2072	0.4144	1.036	5.180	25.900	51.80	103.6
Dichlorodifluoromethane	1.047	209.4	20.94	4.188	1.047		0.08376	0.1047	0.2094	0.4188	1.047	5.235	26.175	52.35	104.7
Chloromethane	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
Freon-114	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
Vinyl Chloride	1.023	204.6	20.46	4.092	1.023		0.08184	0.1023	0.2046	0.4092	1.023	5.115	25.575	51.15	102.3
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
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	1.009	201.8	20.18	4.036	1.009		0.08072	0.1009	0.2018	0.4036	1.009	5.045	25.225	50.45	100.9
Ethanol	5.207	1041.4	104.14	20.828	5.207		0.41656	0.5207	1.0414	2.0828	5.207	26.035	130.175	260.35	520.7
Acetonitrile	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
Acrolein	1.041	208.2	20.82	4.164	1.041		0.08328	0.1041	0.2082	0.4164	1.041	5.205	26.025	52.05	104.1
Acetone	5.313	1062.6	106.26	21.252	5.313		0.42504	0.5313	1.0626	2.1252	5.313	26.565	132.825	265.65	531.3
Trichlorofluoromethane	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
Isopropanol	2.105	421.0	42.10	8.420	2.105		0.16840	0.2105	0.4210	0.8420	2.105	10.525	52.625	105.25	210.5
Acrylonitrile	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-Dichloroethene	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
tert-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
Methylene Chloride	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
Allyl Chloride	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
Trichlorotrifluoroethane	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
Carbon Disulfide	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
trans-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
1,1-Dichloroethane	1.020	204.0	20.40	4.080	1.020		0.08160	0.1020	0.2040	0.4080	1.020	5.100	25.500	51.00	102.0
Methyl tert-Butyl Ether	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
Vinyl Acetate	5.265	1053.0	105.30	21.060	5.265		0.42120	0.5265	1.0530	2.1060	5.265	26.325	131.625	263.25	526.5
2-Butanone	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
cis-1,2-Dichloroethene	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
Diisopropyl Ether	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
Ethyl Acetate	2.129	425.8	42.58	8.516	2.129		0.17032	0.2129	0.4258	0.8516	2.129	10.645	53.225	106.45	212.9
n-Hexane	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
Chloroform	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
Tetrahydrofuran	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
Ethyl tert-Butyl 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-Dichloroethane	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
1,1,1-Trichloroethane	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
Isopropyl Acetate	2.104	420.8	42.08	8.416	2.104		0.16832	0.2104	0.4208	0.8416	2.104	10.520	52.600	105.20	210.4
1-Butanol	2.105	421.0	42.10	8.420	2.105		0.16840	0.2105	0.4210	0.8420	2.105	10.525	52.625	105.25	210.5
Benzene	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
Carbon Tetrachloride	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
Cyclohexane	2.130	426.0	42.60	8.520	2.130		0.17040	0.2130	0.4260	0.8520	2.130	10.650	53.250	106.50	213.0
tert-Amyl Methyl Ether	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
1,2-Dichloropropane	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
Bromodichloromethane	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
Trichloroethene	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
1,4-Dioxane	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
Isooctane	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
Methyl Methacrylate	2.110	422.0	42.20	8.440	2.110		0.16880	0.2110	0.4220	0.8440	2.110	10.550	52.750	105.50	211.0
n-Heptane	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
cis-1,3-Dichloropropene	1.116	223.2	22.32	4.464	1.116		0.08928	0.1116	0.2232	0.4464	1.116	5.580	27.900	55.80	111.6
4-Methyl-2-pentanone	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
trans-1,3-Dichloropropene	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
1,1,2-Trichloroethane	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
Toluene	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
2-Hexanone	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

Primary Source Standards Concentrations (Working & Initial Calibration)

1ng/L Std. ID:
4ng/L Std. ID: S29-12191607
20ng/L Std. ID: S29-12191605
200ng/L Std. ID: S29-12191603

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
Dibromochloromethane	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
1,2-Dibromoethane	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-Butyl Acetate	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-Octane	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
Tetrachloroethene	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
Chlorobenzene	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
Ethylbenzene	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
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	1.061	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
o-Xylene	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
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	1.056	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
Cumene	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
alpha-Pinene	1.044	208.8	20.88	4.176	1.044		0.08352	0.1044	0.2088	0.4176	1.044	5.220	26.100	52.20	104.4
n-Propylbenzene	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
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	1.050	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
2-Ethyltoluene	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
1,2,4-Trimethylbenzene	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
n-Decane	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
Benzyl Chloride	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
1,3-Dichlorobenzene	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
1,4-Dichlorobenzene	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
sec-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
p-Isopropyltoluene	1.027	205.4	20.54	4.108	1.027		0.08216	0.1027	0.2054	0.4108	1.027	5.135	25.675	51.35	102.7
1,2,3-Trimethylbenzene	1.027	205.4	20.54	4.108	1.027		0.08216	0.1027	0.2054	0.4108	1.027	5.135	25.675	51.35	102.7
1,2-Dichlorobenzene	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
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	1.053	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
n-Undecane	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
1,2,4-Trichlorobenzene	1.043	208.6	20.86	4.172	1.043		0.08344	0.1043	0.2086	0.4172	1.043	5.215	26.075	52.15	104.3
Naphthalene	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
n-Dodecane	1.045	209.0	20.90	4.180	1.045		0.08360	0.1045	0.2090	0.4180	1.045	5.225	26.125	52.25	104.5
Hexachloro-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
Methacrylonitrile	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
Cyclohexanone	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
tert-Butylbenzene	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-Butylbenzene	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

Calibration Status Report GCMS-16

Method : I:\MS16\METHODS\R16121916.M (RTE Integrator)
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration

#	ID	Conc	ISTD Conc	Path\File
1	0.08	0	13	I:\MS16\DATA\2016_12\19\12191620.D
2	0.10	0	13	I:\MS16\DATA\2016_12\19\12191621.D
3	0.20	0	13	I:\MS16\DATA\2016_12\19\12191622.D
4	0.40	0	13	I:\MS16\DATA\2016_12\19\12191623.D
5	1.0	1	13	I:\MS16\DATA\2016_12\19\12191624.D
6	5.0	5	13	I:\MS16\DATA\2016_12\19\12191625.D
7	25	26	13	I:\MS16\DATA\2016_12\19\12191626.D
8	50	52	13	I:\MS16\DATA\2016_12\19\12191627.D
9	100	104	13	I:\MS16\DATA\2016_12\19\12191628.D

#	ID	Update Time	Quant Time	Acquisition Time
1	0.08	Dec 20 10:30 2016	Dec 20 09:09 2016	19 Dec 2016 23:59
2	0.10	Dec 20 10:30 2016	Dec 20 09:39 2016	20 Dec 2016 00:33
3	0.20	Dec 20 10:30 2016	Dec 20 09:45 2016	20 Dec 2016 1:06
4	0.40	Dec 20 10:30 2016	Dec 20 09:52 2016	20 Dec 2016 1:39
5	1.0	Dec 20 10:30 2016	Dec 20 09:54 2016	20 Dec 2016 2:13
6	5.0	Dec 20 10:31 2016	Dec 20 08:57 2016	20 Dec 2016 2:46
7	25	Dec 20 10:31 2016	Dec 20 08:57 2016	20 Dec 2016 3:19
8	50	Dec 20 10:31 2016	Dec 20 08:57 2016	20 Dec 2016 3:52
9	100	Dec 20 10:31 2016	Dec 20 08:57 2016	20 Dec 2016 4:25

R16121916.M Wed Dec 21 14:53:49 2016

LH 12/21/16

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 09:45:07 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	280722	12.500	ng	-0.01
37) 1,4-Difluorobenzene (IS2)	13.66	114	1408357	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	17.93	82	601873	12.500	ng	0.00

System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.40	65	505835	13.774	ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 110.16%			
57) Toluene-d8 (SS2)	16.10	98	1456615	12.705	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 101.68%			
73) Bromofluorobenzene (SS3)	19.28	174	457156	12.419	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.36%			

Target Compounds							Qvalue
2) Propene	4.26	42	8324	0.229	ng		92
3) Dichlorodifluoromethan...	4.41	85	15213	0.258	ng		99
4) Chloromethane	4.76	50	12742	0.266	ng		98
5) 1,2-Dichloro-1,1,2,2-t...	4.99	135	8275	0.268	ng		98
6) Vinyl Chloride	5.21	62	10133	0.212	ng		99
7) 1,3-Butadiene	5.50	54	7078m	0.228	ng		
8) Bromomethane	5.97	94	5543	0.202	ng		94
9) Chloroethane	6.30	64	4615	0.206	ng		94
10) Ethanol	6.71	45	26891	1.087	ng		96
11) Acetonitrile	7.08	41	15593m	0.246	ng		
12) Acrolein	7.25	56	5029	0.211	ng		96
13) Acetone	7.37	58	27202	1.132	ng		88
14) Trichlorofluoromethane	7.60	101	13016	0.254	ng		99
15) 2-Propanol (Isopropanol)	7.89	45	37518	0.456	ng		80
16) Acrylonitrile	8.26	53	9148	0.213	ng		95
17) 1,1-Dichloroethene	8.61	96	6124	0.228	ng		92
18) 2-Methyl-2-Propanol (t...	8.82	59	39674	0.498	ng		93
19) Methylene Chloride	8.83	84	7768	0.241	ng		92
20) 3-Chloro-1-propene (Al...	8.99	41	9880m	0.202	ng		
21) Trichlorotrifluoroethane	9.23	151	6021	0.235	ng		91
22) Carbon Disulfide	9.14	76	29121	0.265	ng		97
23) trans-1,2-Dichloroethene	10.11	61	10089	0.227	ng		99
24) 1,1-Dichloroethane	10.35	63	12850	0.227	ng		95
25) Methyl tert-Butyl Ether	10.46	73	22850	0.250	ng		99
26) Vinyl Acetate	10.62	86	6065	0.901	ng	#	66
27) 2-Butanone (MEK)	10.88	72	4549	0.212	ng	#	91
28) cis-1,2-Dichloroethene	11.37	61	9909	0.228	ng		98
29) Diisopropyl Ether	11.65	87	6815	0.254	ng	#	72
30) Ethyl Acetate	11.68	61	4935	0.430	ng		97
31) n-Hexane	11.64	57	11998	0.231	ng		99
32) Chloroform	11.71	83	13181	0.247	ng		98
34) Tetrahydrofuran (THF)	12.15	72	4684	0.213	ng	#	82
35) Ethyl tert-Butyl Ether	12.24	87	8484	0.244	ng		99
36) 1,2-Dichloroethane	12.52	62	10487	0.259	ng		100
38) 1,1,1-Trichloroethane	12.79	97	11845	0.257	ng		98
39) Isopropyl Acetate	13.21	61	8966	0.427	ng	#	89
40) 1-Butanol	13.26	56	13251	0.403	ng	#	79
41) Benzene	13.27	78	30081	0.219	ng		100
42) Carbon Tetrachloride	13.42	117	9487	0.240	ng		97
43) Cyclohexane	13.55	84	22097	0.479	ng		99
44) tert-Amyl Methyl Ether	13.90	73	21242	0.237	ng		95
45) 1,2-Dichloropropane	14.12	63	7444	0.223	ng		96
46) Bromodichloromethane	14.31	83	10202	0.250	ng		96
47) Trichloroethene	14.36	130	7773	0.245	ng		100
48) 1,4-Dioxane	14.35	88	5535	0.208	ng	#	67
49) 2,2,4-Trimethylpentane...	14.41	57	31883	0.229	ng		98

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 09:45:07 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

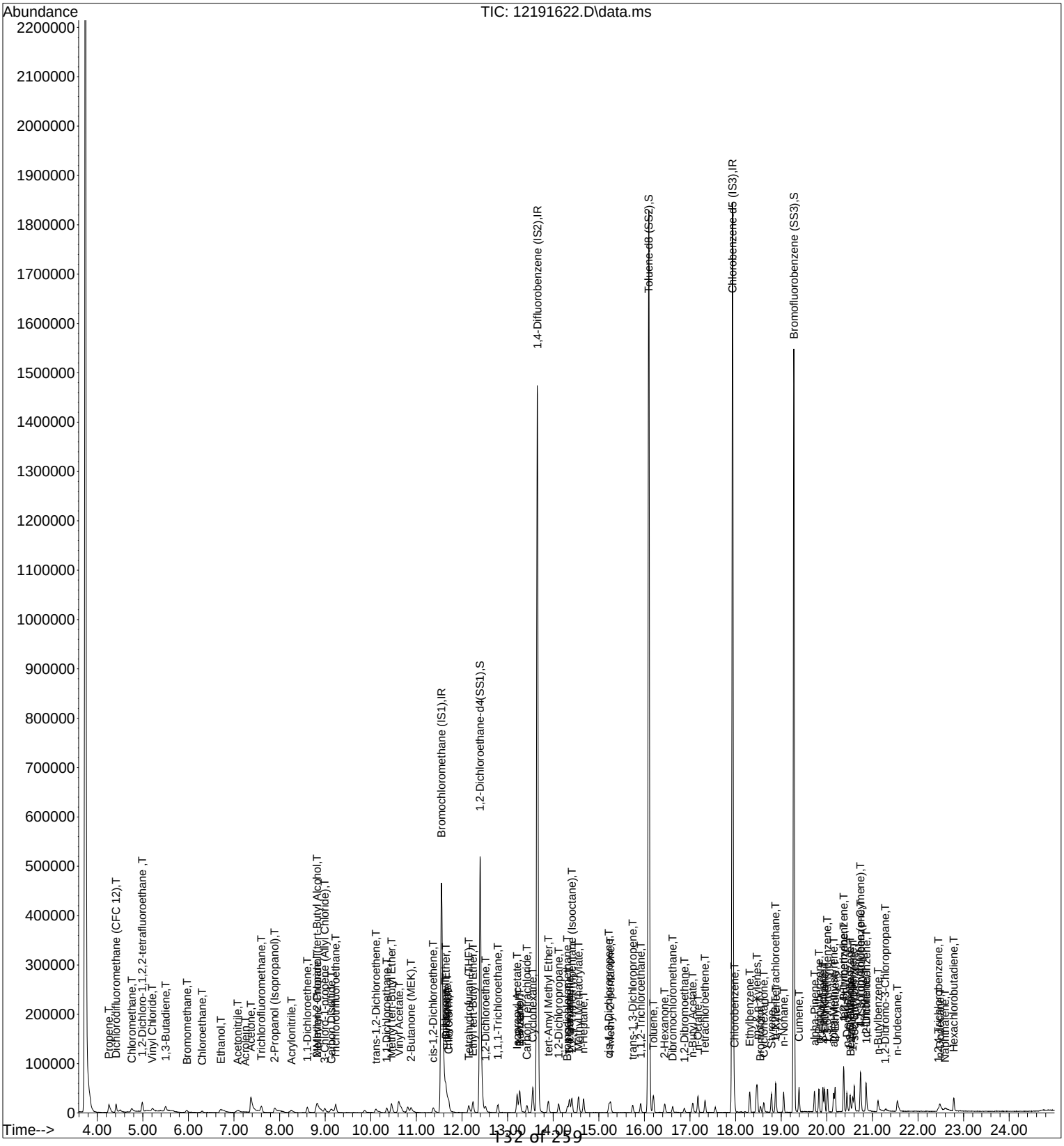
Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
50) Methyl Methacrylate	14.56	100	5538	0.466 ng		99
51) n-Heptane	14.67	71	7072	0.226 ng		98
52) cis-1,3-Dichloropropene	15.22	75	11545	0.233 ng		99
53) 4-Methyl-2-pentanone	15.26	58	6862	0.225 ng		89
54) trans-1,3-Dichloropropene	15.75	75	9755	0.222 ng		99
55) 1,1,2-Trichloroethane	15.92	97	6796	0.231 ng		99
58) Toluene	16.20	91	29322	0.247 ng		98
59) 2-Hexanone	16.44	43	17145	0.226 ng		92
60) Dibromochloromethane	16.62	129	7666	0.235 ng		100
61) 1,2-Dibromoethane	16.88	107	7595	0.227 ng		98
62) n-Butyl Acetate	17.06	43	18384	0.212 ng		96
63) n-Octane	17.17	57	7326	0.259 ng		86
64) Tetrachloroethene	17.33	166	8007	0.242 ng		99
65) Chlorobenzene	17.98	112	19036	0.234 ng		97
66) Ethylbenzene	18.31	91	32498	0.229 ng		99
67) m- & p-Xylenes	18.47	91	50000	0.464 ng		100
68) Bromoform	18.54	173	5890	0.226 ng		99
69) Styrene	18.79	104	18639	0.225 ng		99
70) o-Xylene	18.89	91	25091	0.232 ng		99
71) n-Nonane	19.06	43	16052	0.236 ng		91
72) 1,1,2,2-Tetrachloroethane	18.87	83	11297	0.216 ng		98
74) Cumene	19.39	105	32370	0.250 ng		99
75) alpha-Pinene	19.73	93	16376	0.231 ng		99
76) n-Propylbenzene	19.83	91	37956	0.232 ng		98
77) 3-Ethyltoluene	19.91	105	32919	0.238 ng		100
78) 4-Ethyltoluene	19.95	105	26804	0.219 ng		100
79) 1,3,5-Trimethylbenzene	20.01	105	25611	0.227 ng		99
80) alpha-Methylstyrene	20.15	118	11807	0.221 ng		96
81) 2-Ethyltoluene	20.18	105	32482	0.248 ng		95
82) 1,2,4-Trimethylbenzene	20.37	105	26310	0.237 ng		96
83) n-Decane	20.44	57	14003	0.212 ng		99
84) Benzyl Chloride	20.52	91	8139	0.095 ng		95
85) 1,3-Dichlorobenzene	20.51	146	12069	0.206 ng		98
86) 1,4-Dichlorobenzene	20.57	146	13734	0.206 ng		92
87) sec-Butylbenzene	20.61	105	35105	0.243 ng		87
88) 4-Isopropyltoluene (p-...	20.74	119	31956	0.240 ng		98
89) 1,2,3-Trimethylbenzene	20.74	105	25646	0.226 ng		100
90) 1,2-Dichlorobenzene	20.87	146	14293	0.239 ng		97
91) d-Limonene	20.86	68	9801	0.223 ng		98
92) 1,2-Dibromo-3-Chloropr...	21.28	157	3414	0.171 ng	#	63
93) n-Undecane	21.55	57	14754	0.216 ng		90
94) 1,2,4-Trichlorobenzene	22.45	180	7083	0.173 ng	#	94
95) Naphthalene	22.60	128	15149m	0.135 ng		
96) n-Dodecane	22.48	57	11247	0.181 ng		93
97) Hexachlorobutadiene	22.78	225	5982	0.216 ng		96
98) Cyclohexanone	18.62	55	10057	0.211 ng		92
99) tert-Butylbenzene	20.37	119	25807	0.248 ng		98
100) n-Butylbenzene	21.12	91	26263	0.220 ng		95

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

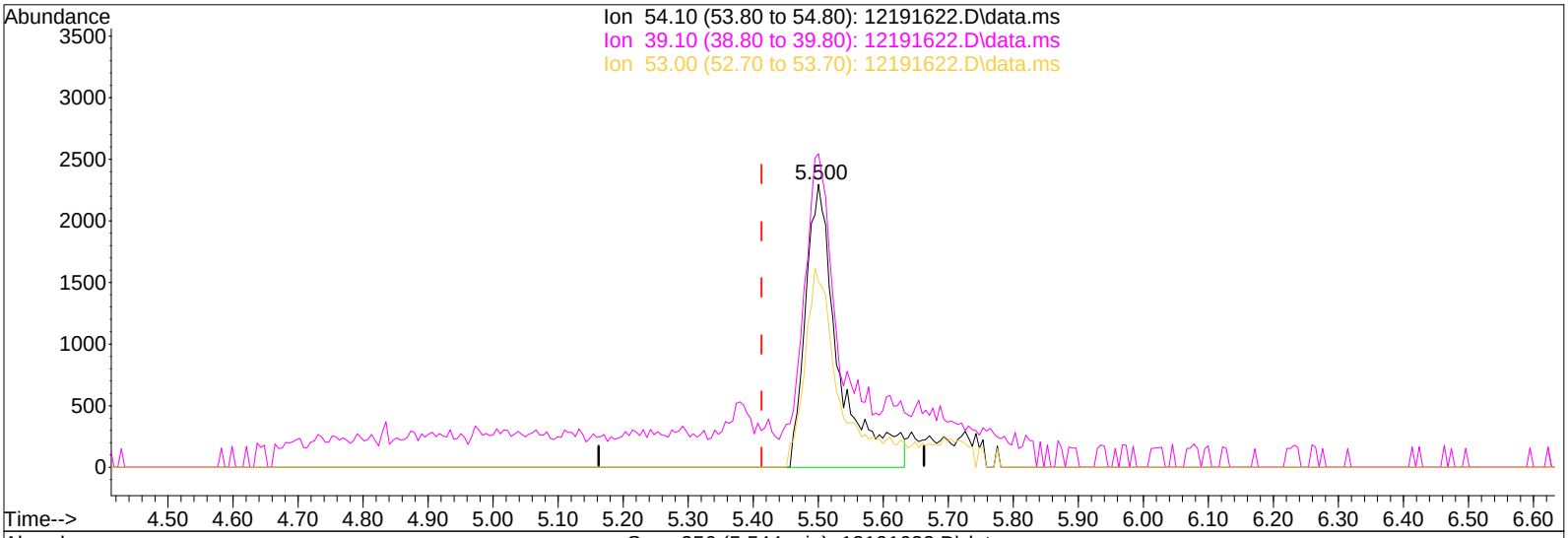
Quant Time: Dec 20 09:45:07 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

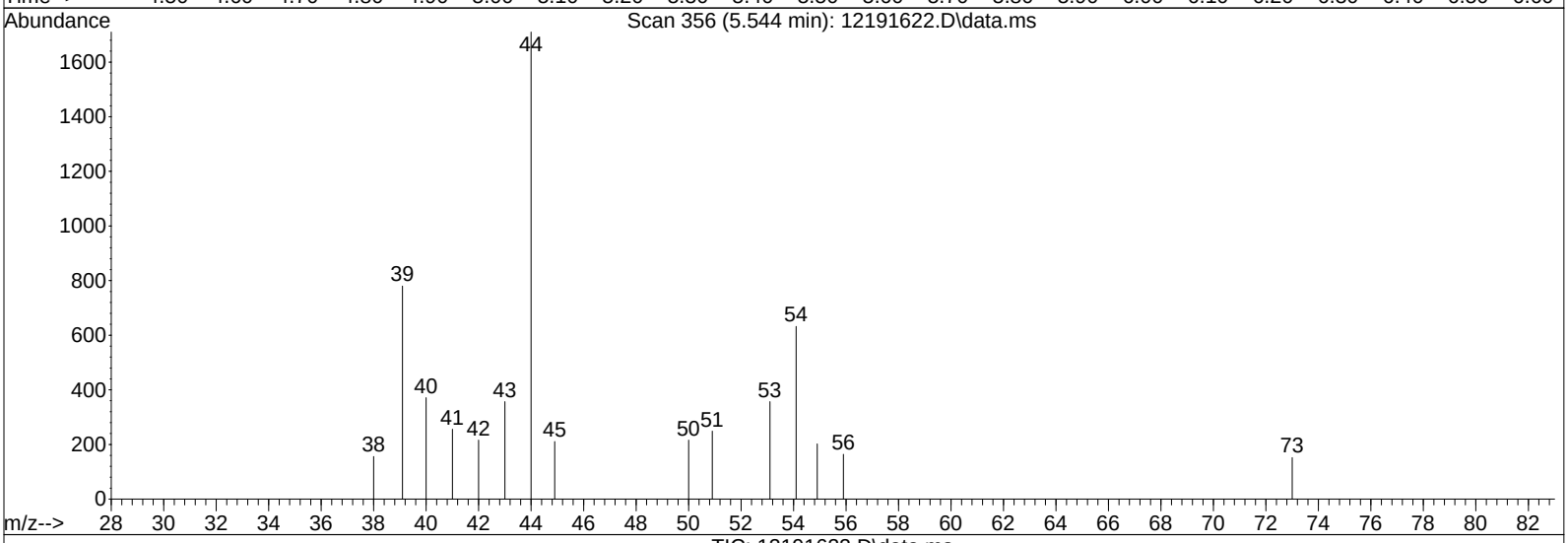


Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:35 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191622.D\data.ms

(7) 1,3-Butadiene (T)

5.500min (+0.088) 0.26ng

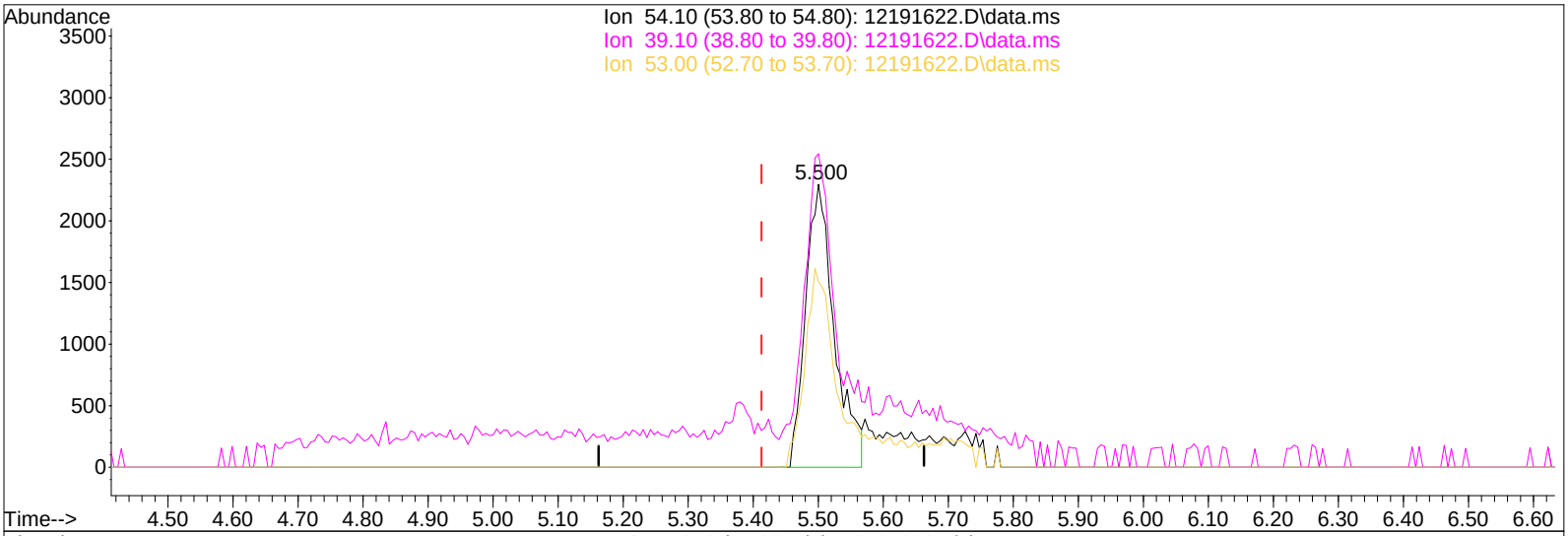
response 8163

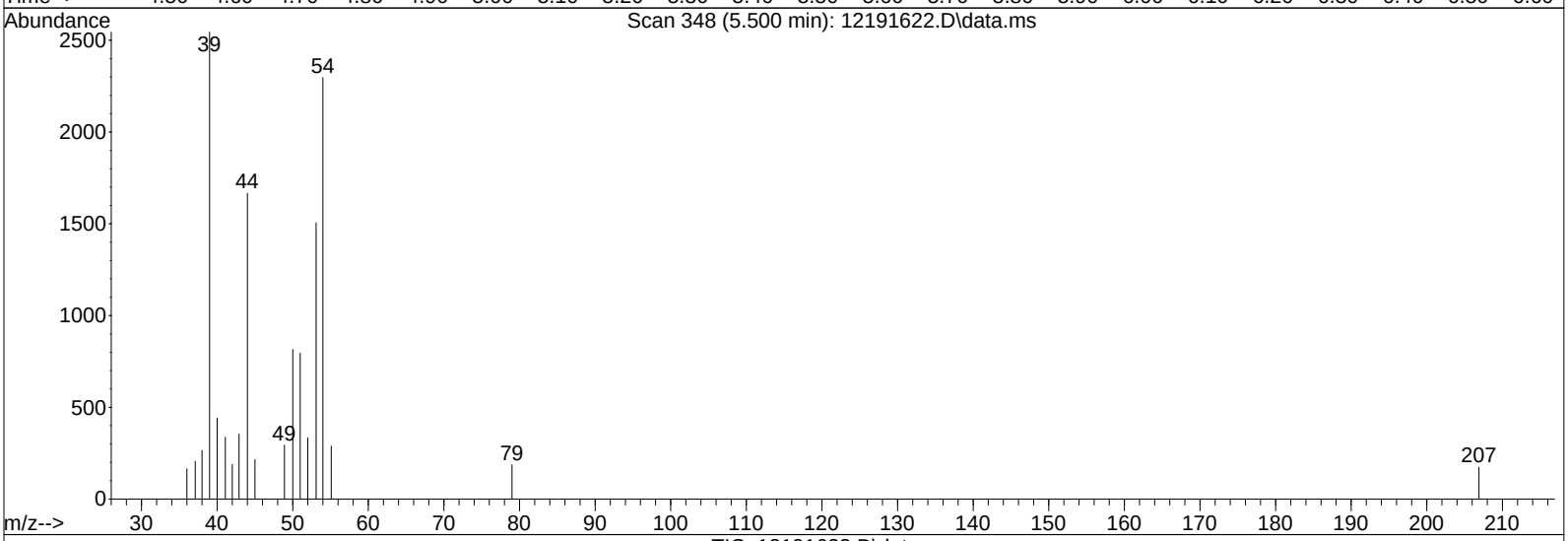
Ion	Exp%	Act%
54.10	100	100
39.10	104.80	94.25
53.00	70.30	74.07
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:35 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191622.D\data.ms

(7) 1,3-Butadiene (T)

5.500min (+0.088) 0.23ng m

response 7078

Ion	Exp%	Act%
54.10	100	100
39.10	104.80	108.70
53.00	70.30	85.42
0.00	0.00	0.00

IPC

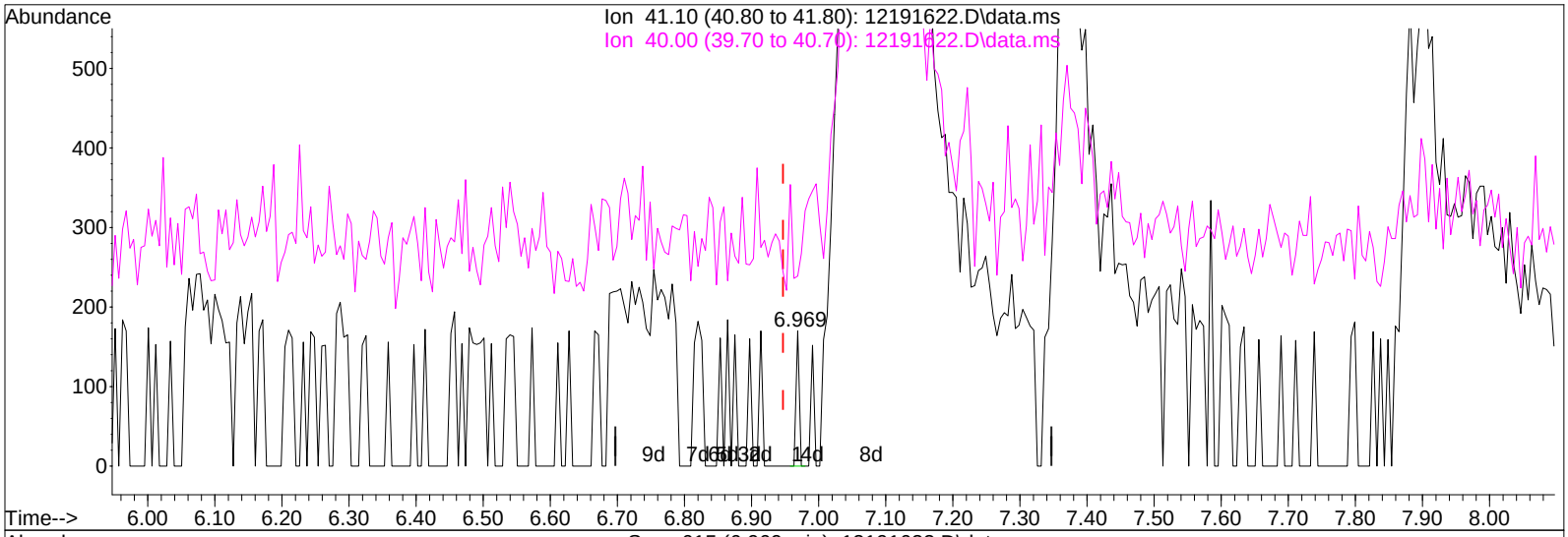
LH 12/20/16

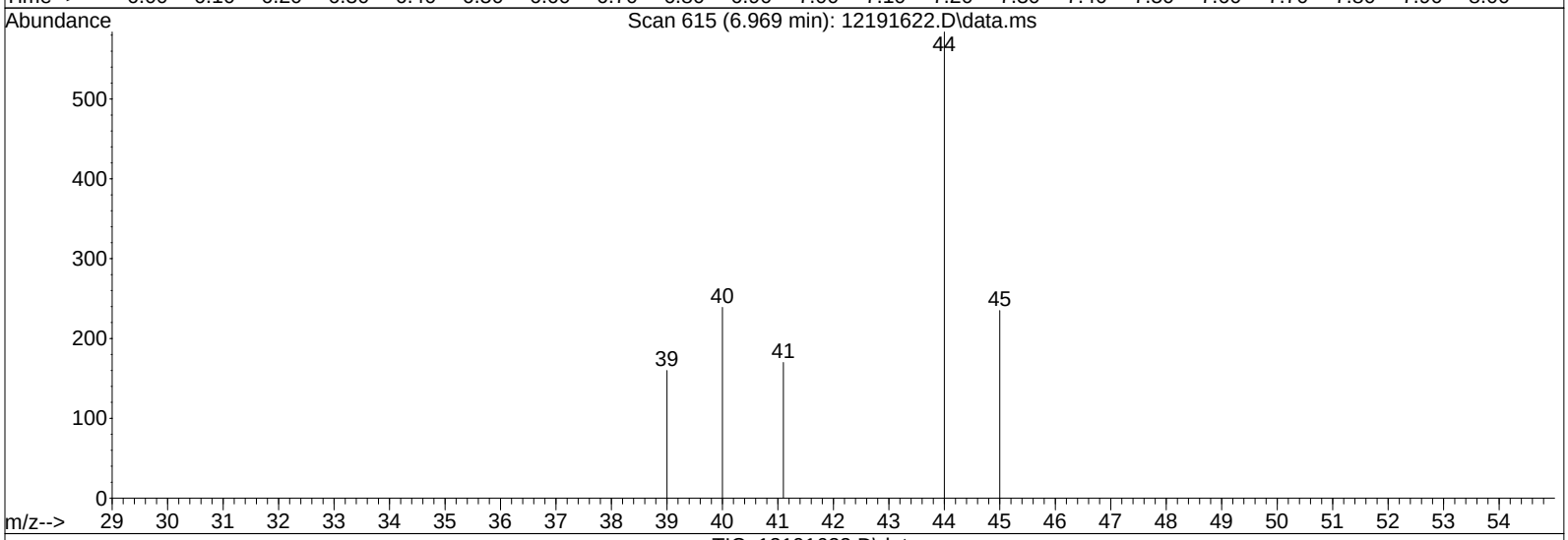
12/30/16

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:35 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





(11) Acetonitrile (T)

6.969min (+0.022) 0.00ng

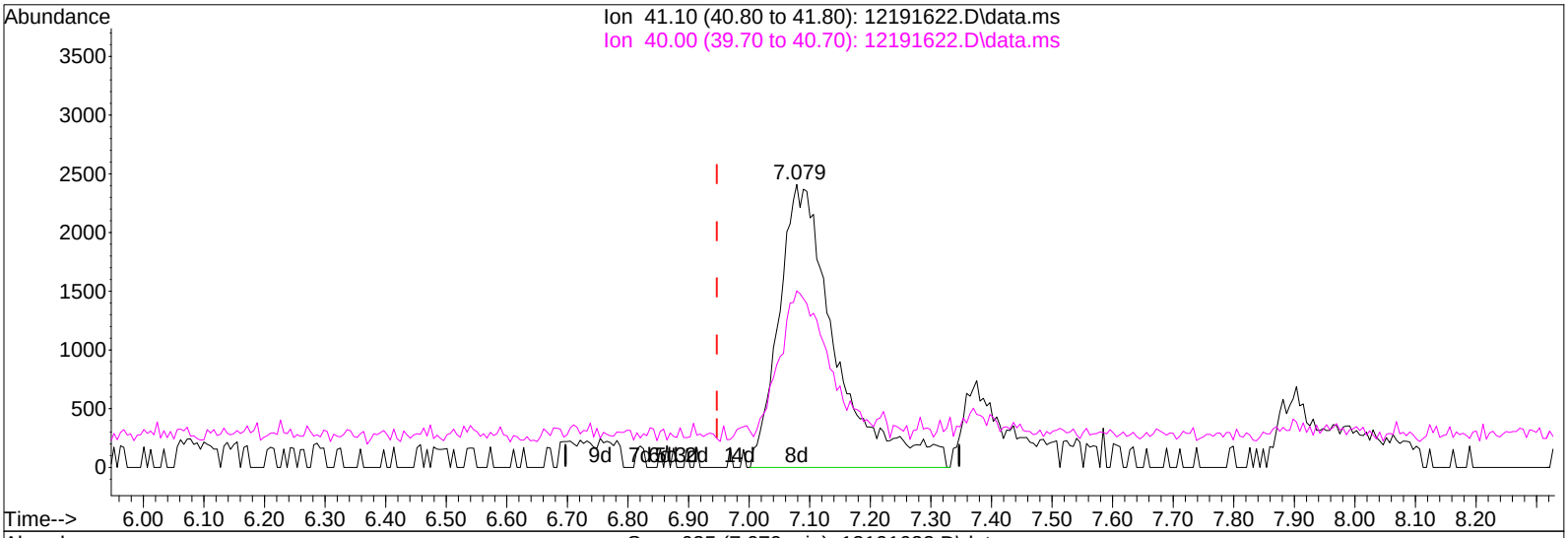
response 56

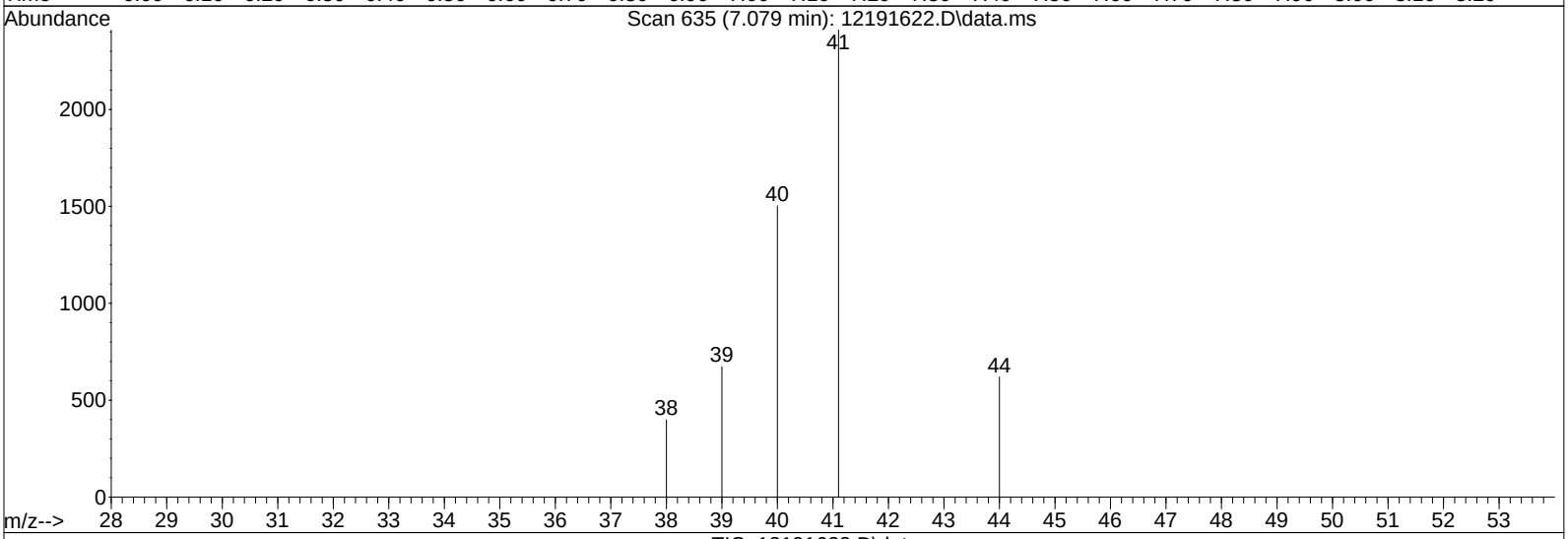
Ion	Exp%	Act%
41.10	100	100
40.00	54.30	98.21#
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:35 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191622.D\data.ms

(11) Acetonitrile (T)

7.079min (+0.132) 0.25ng m

response 15593

Ion	Exp%	Act%
41.10	100	100
40.00	54.30	0.35#
0.00	0.00	0.00
0.00	0.00	0.00

MP

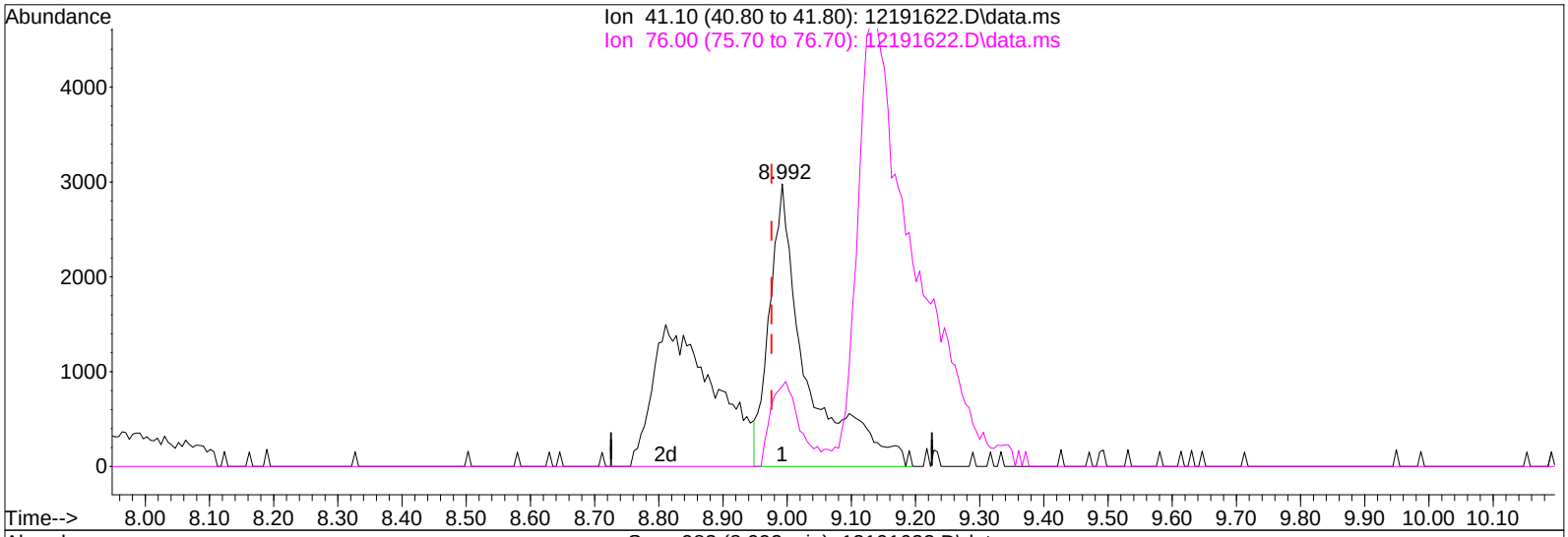
LH 12/20/16

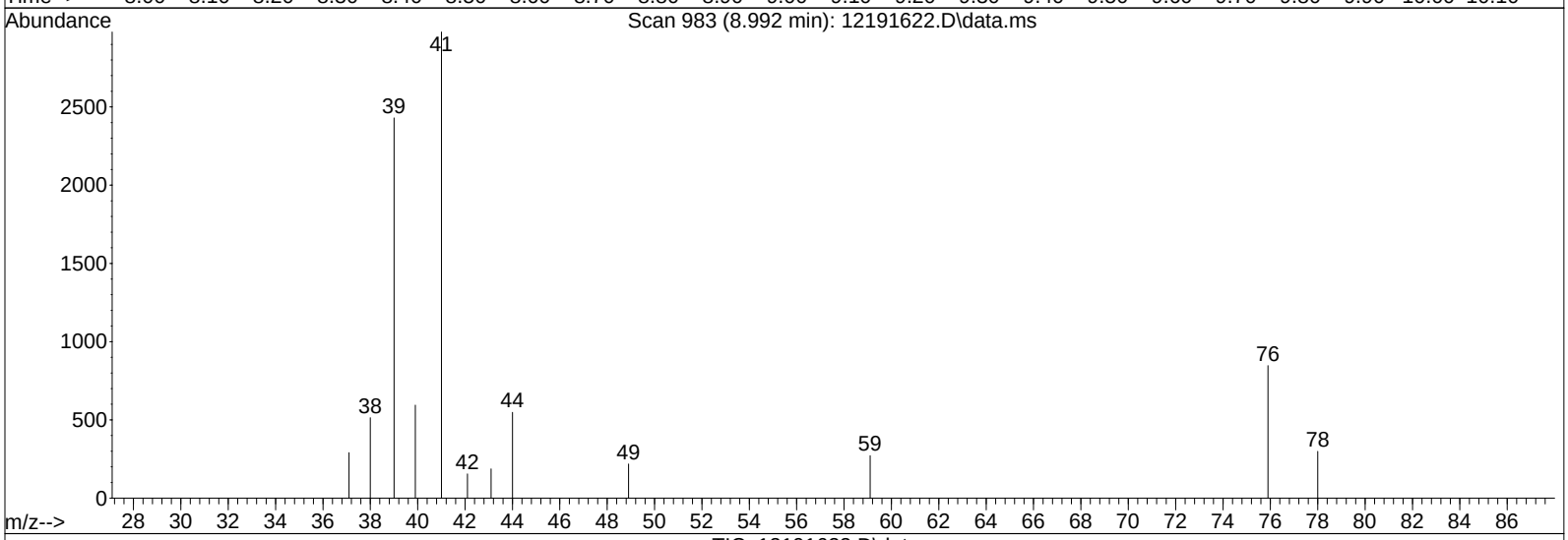
12/30/16

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:35 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191622.D\data.ms

(20) 3-Chloro-1-propene (Allyl Chloride) (T)

8.992min (+0.016) 0.25ng

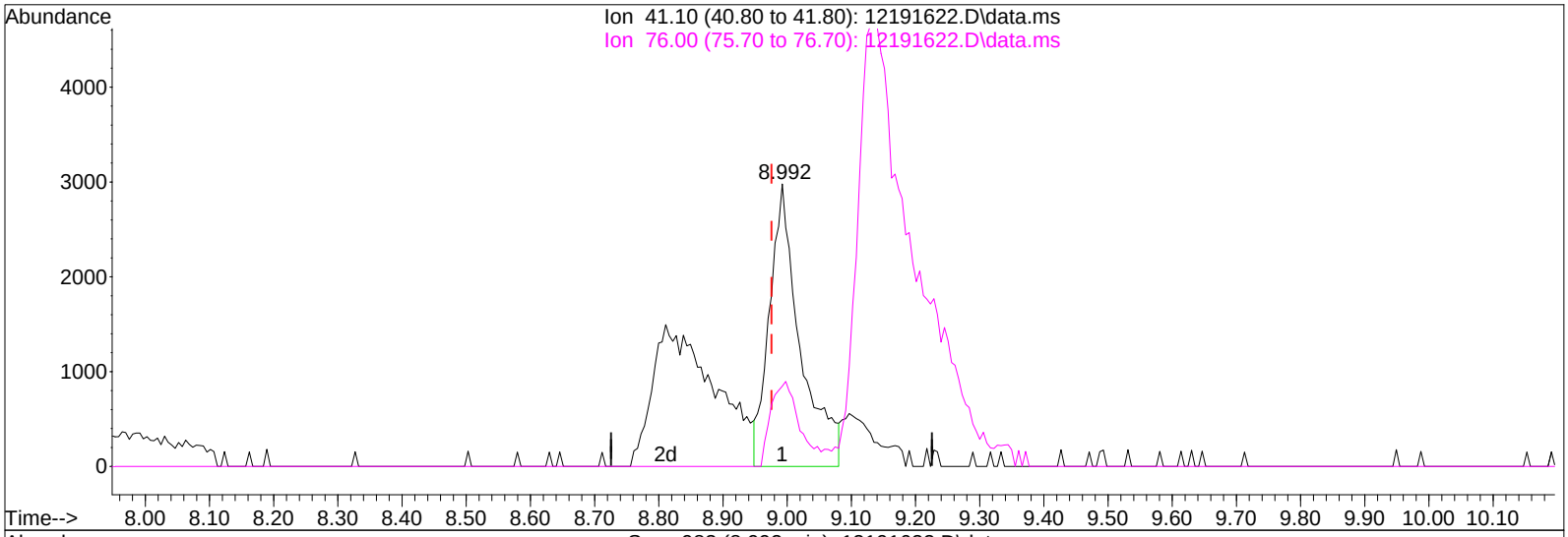
response 11986

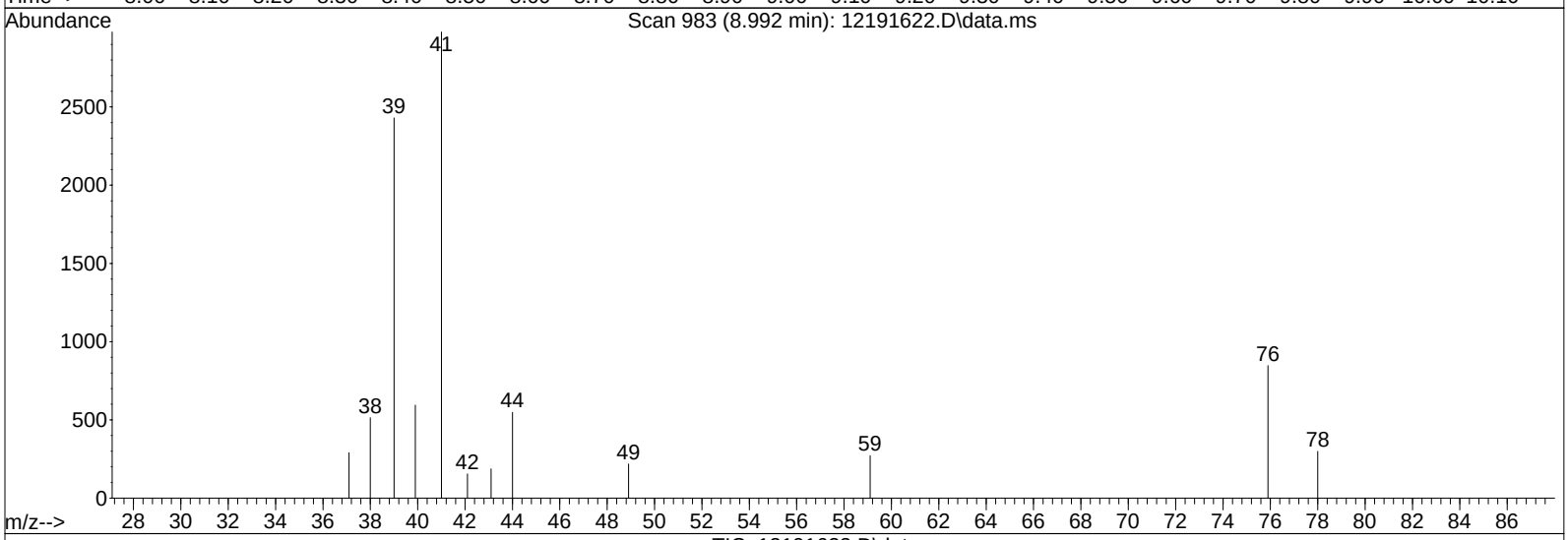
Ion	Exp%	Act%
41.10	100	100
76.00	34.90	24.80
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:35 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191622.D\data.ms

(20) 3-Chloro-1-propene (Allyl Chloride) (T)

8.992min (+0.016) 0.20ng m

response 9880

Ion	Exp%	Act%
41.10	100	100
76.00	34.90	30.08
0.00	0.00	0.00
0.00	0.00	0.00

IPC

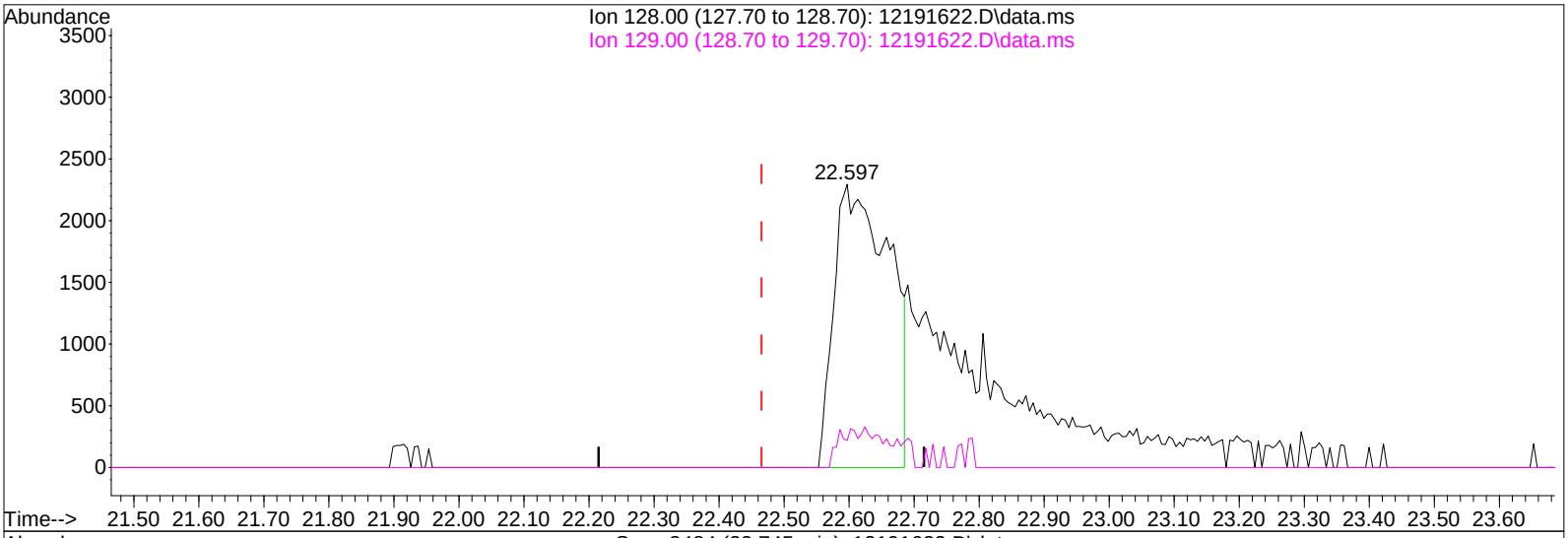
LH 12/20/16

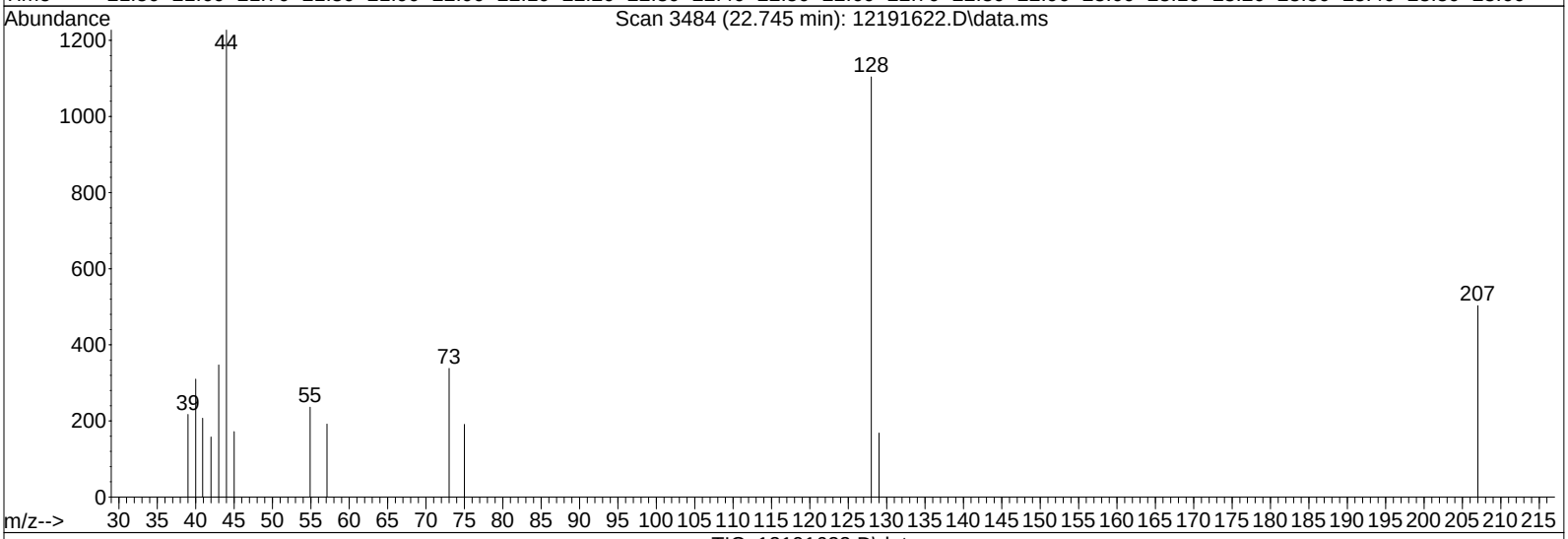
12/30/16

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:35 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191622.D\data.ms

(95) Naphthalene (T)

22.597min (+0.132) 0.12ng

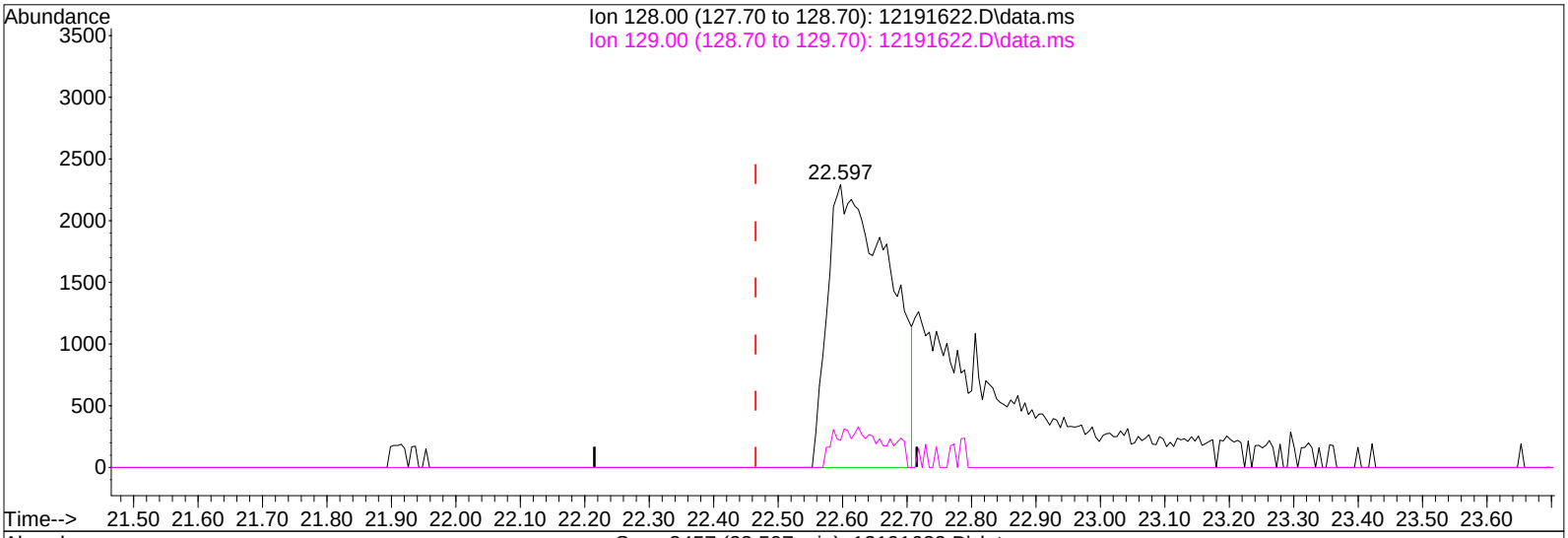
response 13470

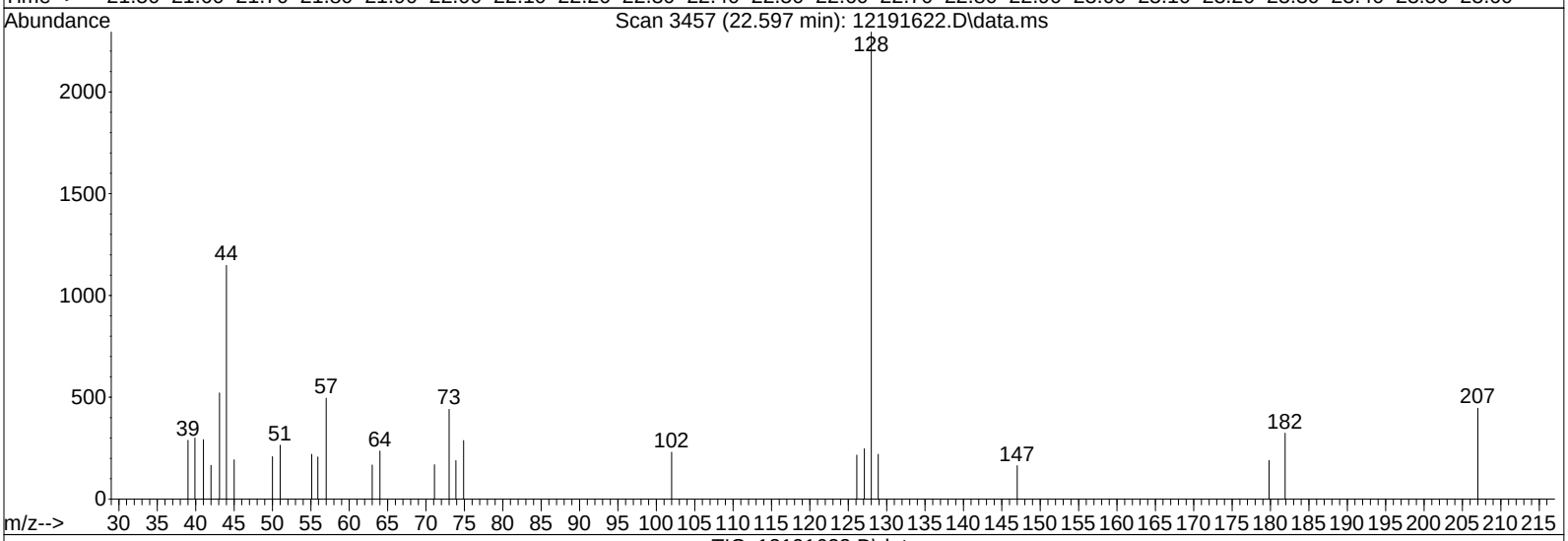
Ion	Exp%	Act%
128.00	100	100
129.00	11.00	12.09
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:35 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191622.D\data.ms

(95) Naphthalene (T)

22.597min (+0.132) 0.14ng m

response 15149

Ion	Exp%	Act%
128.00	100	100
129.00	11.00	10.75
0.00	0.00	0.00
0.00	0.00	0.00

BLC

LH 12/20/16

12/30/16

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 09:52:42 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	266024	12.500	ng	-0.01
37) 1,4-Difluorobenzene (IS2)	13.65	114	1350700	12.500	ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.93	82	571668	12.500	ng	0.00

System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...	12.40	65	484887	13.933	ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 111.44%			
57) Toluene-d8 (SS2)	16.10	98	1396735	12.826	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 102.64%			
73) Bromofluorobenzene (SS3)	19.28	174	439250	12.563	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.48%			

Target Compounds

							Qvalue
2) Propene	4.24	42	15026	0.437	ng		96
3) Dichlorodifluoromethan...	4.40	85	29589	0.530	ng		99
4) Chloromethane	4.74	50	23526	0.519	ng		97
5) 1,2-Dichloro-1,1,2,2-t...	4.98	135	14839	0.508	ng		99
6) Vinyl Chloride	5.20	62	21720	0.479	ng		97
7) 1,3-Butadiene	5.49	54	13222	0.449	ng		90
8) Bromomethane	5.95	94	11227	0.433	ng		96
9) Chloroethane	6.29	64	8828	0.415	ng		94
10) Ethanol	6.68	45	48653	2.075	ng		97
11) Acetonitrile	7.08	41	26579m	0.443	ng		
12) Acrolein	7.20	56	9212	0.408	ng		99
13) Acetone	7.35	58	50221	2.206	ng		88
14) Trichlorofluoromethane	7.60	101	24081	0.496	ng		99
15) 2-Propanol (Isopropanol)	7.86	45	71574	0.917	ng		87
16) Acrylonitrile	8.27	53	17077	0.419	ng		100
17) 1,1-Dichloroethene	8.60	96	12048	0.474	ng		98
18) 2-Methyl-2-Propanol (t...	8.77	59	72972	0.966	ng		94
19) Methylene Chloride	8.82	84	13969	0.458	ng		93
20) 3-Chloro-1-propene (Al...	8.99	41	18295m	0.395	ng		
21) Trichlorotrifluoroethane	9.23	151	11653	0.480	ng		99
22) Carbon Disulfide	9.13	76	51598	0.495	ng		96
23) trans-1,2-Dichloroethene	10.10	61	19294	0.457	ng		99
24) 1,1-Dichloroethane	10.35	63	24593	0.458	ng		98
25) Methyl tert-Butyl Ether	10.44	73	43325	0.501	ng		99
26) Vinyl Acetate	10.60	86	13036	2.045	ng	#	79
27) 2-Butanone (MEK)	10.87	72	8752	0.430	ng		95
28) cis-1,2-Dichloroethene	11.37	61	18751	0.455	ng		97
29) Diisopropyl Ether	11.64	87	11018	0.433	ng		98
30) Ethyl Acetate	11.66	61	9505	0.874	ng		99
31) n-Hexane	11.64	57	23598	0.479	ng		99
32) Chloroform	11.70	83	24803	0.491	ng		99
34) Tetrahydrofuran (THF)	12.14	72	8849	0.425	ng	#	89
35) Ethyl tert-Butyl Ether	12.24	87	15804	0.479	ng		100
36) 1,2-Dichloroethane	12.51	62	19810	0.516	ng		99
38) 1,1,1-Trichloroethane	12.79	97	22038	0.499	ng		99
39) Isopropyl Acetate	13.20	61	17510	0.869	ng		96
40) 1-Butanol	13.25	56	24650	0.781	ng	#	74
41) Benzene	13.27	78	54425	0.413	ng		98
42) Carbon Tetrachloride	13.42	117	18576	0.490	ng		99
43) Cyclohexane	13.55	84	40595	0.917	ng		99
44) tert-Amyl Methyl Ether	13.89	73	39324	0.458	ng		97
45) 1,2-Dichloropropane	14.12	63	13932	0.435	ng		100
46) Bromodichloromethane	14.31	83	19179	0.491	ng		99
47) Trichloroethene	14.35	130	14278	0.470	ng		98
48) 1,4-Dioxane	14.35	88	10215	0.401	ng	#	68
49) 2,2,4-Trimethylpentane...	14.41	57	60395	0.452	ng		99

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 09:52:42 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

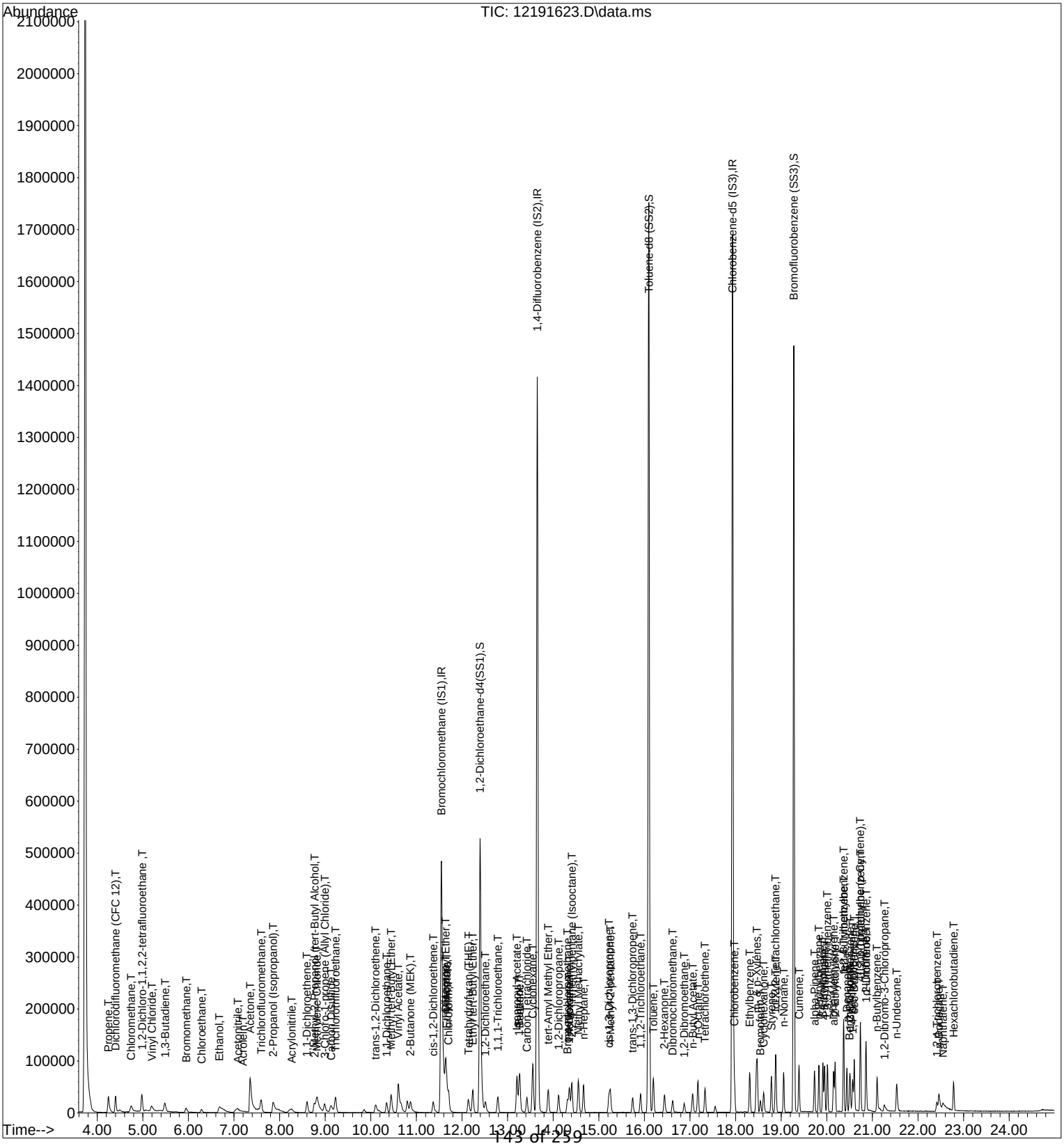
Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
50) Methyl Methacrylate	14.55	100	10335	0.907 ng		99
51) n-Heptane	14.67	71	13537	0.452 ng		98
52) cis-1,3-Dichloropropene	15.22	75	21948	0.461 ng		99
53) 4-Methyl-2-pentanone	15.26	58	12490	0.426 ng		87
54) trans-1,3-Dichloropropene	15.74	75	18415	0.436 ng		100
55) 1,1,2-Trichloroethane	15.92	97	12956	0.458 ng		98
58) Toluene	16.20	91	55819	0.494 ng		98
59) 2-Hexanone	16.44	43	30733	0.426 ng		96
60) Dibromochloromethane	16.62	129	14234	0.460 ng		97
61) 1,2-Dibromoethane	16.87	107	14329	0.450 ng		99
62) n-Butyl Acetate	17.06	43	33707	0.409 ng		97
63) n-Octane	17.18	57	12853	0.478 ng		93
64) Tetrachloroethene	17.33	166	14914	0.474 ng		99
65) Chlorobenzene	17.97	112	35858	0.464 ng		100
66) Ethylbenzene	18.31	91	60915	0.451 ng		99
67) m- & p-Xylenes	18.47	91	94072	0.919 ng		99
68) Bromoform	18.54	173	11360	0.459 ng		98
69) Styrene	18.79	104	34882	0.443 ng		99
70) o-Xylene	18.88	91	48000	0.467 ng		98
71) n-Nonane	19.06	43	28706	0.445 ng		96
72) 1,1,2,2-Tetrachloroethane	18.87	83	21812	0.440 ng		100
74) Cumene	19.39	105	60077	0.488 ng		99
75) alpha-Pinene	19.73	93	30805	0.458 ng		99
76) n-Propylbenzene	19.83	91	72745	0.468 ng		98
77) 3-Ethyltoluene	19.91	105	56699	0.432 ng		96
78) 4-Ethyltoluene	19.95	105	56365	0.485 ng		94
79) 1,3,5-Trimethylbenzene	20.01	105	48769	0.455 ng		99
80) alpha-Methylstyrene	20.15	118	23326	0.459 ng		96
81) 2-Ethyltoluene	20.18	105	56367	0.453 ng		100
82) 1,2,4-Trimethylbenzene	20.37	105	49281	0.468 ng		99
83) n-Decane	20.44	57	26815	0.427 ng		99
84) Benzyl Chloride	20.50	91	22636	0.280 ng		96
85) 1,3-Dichlorobenzene	20.51	146	24851	0.447 ng		98
86) 1,4-Dichlorobenzene	20.57	146	26829	0.424 ng		99
87) sec-Butylbenzene	20.60	105	65702	0.479 ng		90
88) 4-Isopropyltoluene (p-...	20.73	119	58694	0.465 ng		98
89) 1,2,3-Trimethylbenzene	20.74	105	48873	0.454 ng		100
90) 1,2-Dichlorobenzene	20.86	146	26031	0.458 ng		99
91) d-Limonene	20.86	68	19065	0.457 ng		99
92) 1,2-Dibromo-3-Chloropr...	21.27	157	7087	0.373 ng	#	75
93) n-Undecane	21.53	57	26959	0.416 ng		94
94) 1,2,4-Trichlorobenzene	22.42	180	14400	0.369 ng		97
95) Naphthalene	22.55	128	39950m	0.375 ng		
96) n-Dodecane	22.46	57	20350	0.344 ng		97
97) Hexachlorobutadiene	22.78	225	11426	0.434 ng		96
98) Cyclohexanone	18.62	55	18659	0.412 ng		97
99) tert-Butylbenzene	20.37	119	47988	0.485 ng		99
100) n-Butylbenzene	21.10	91	51353	0.453 ng		96

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

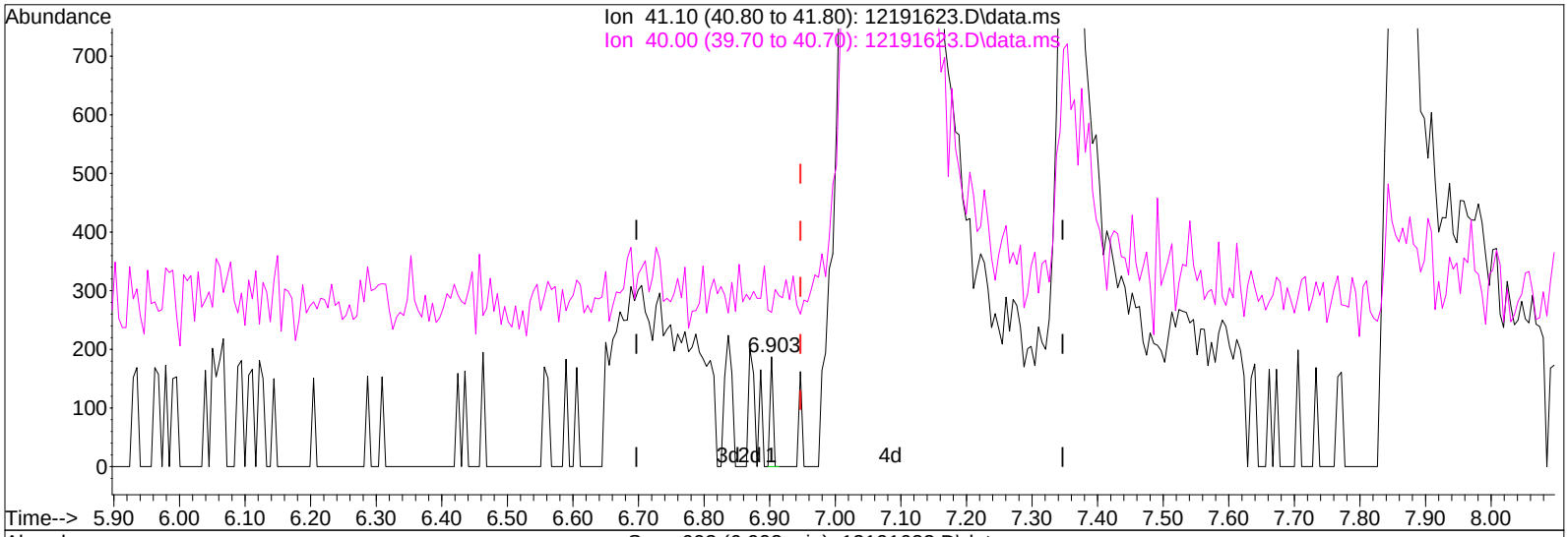
Quant Time: Dec 20 09:52:42 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

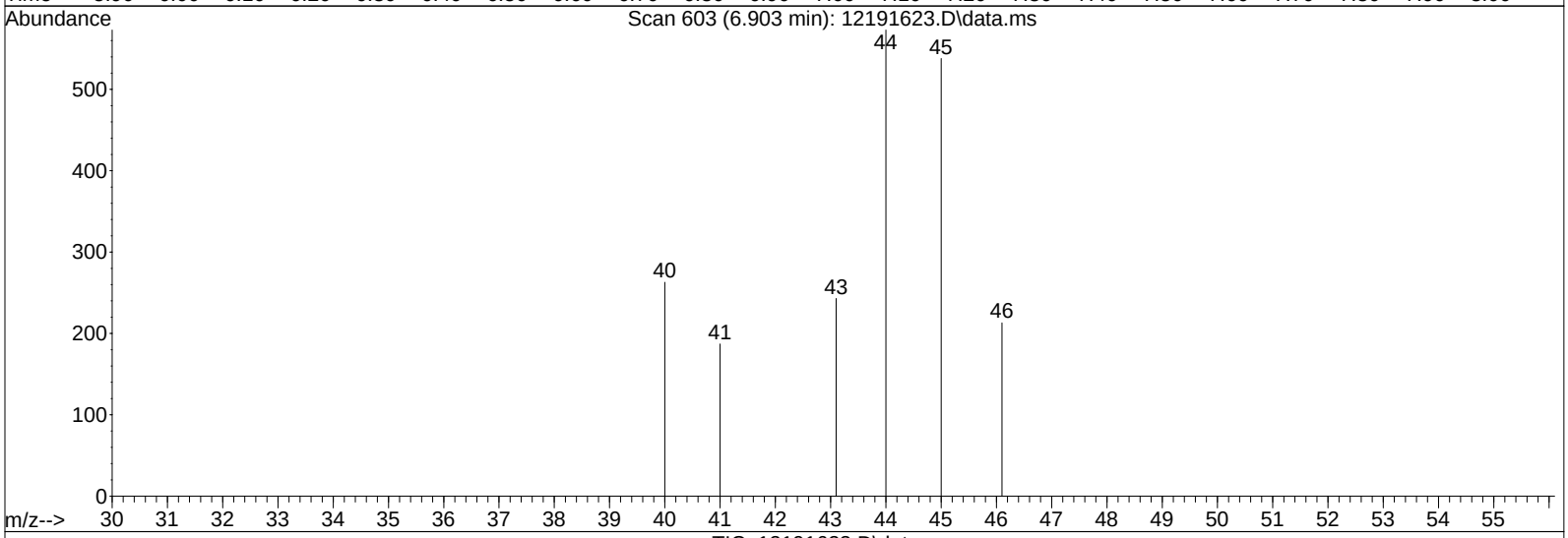


Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:37 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191623.D\data.ms

(11) Acetonitrile (T)

6.903min (-0.044) 0.00ng

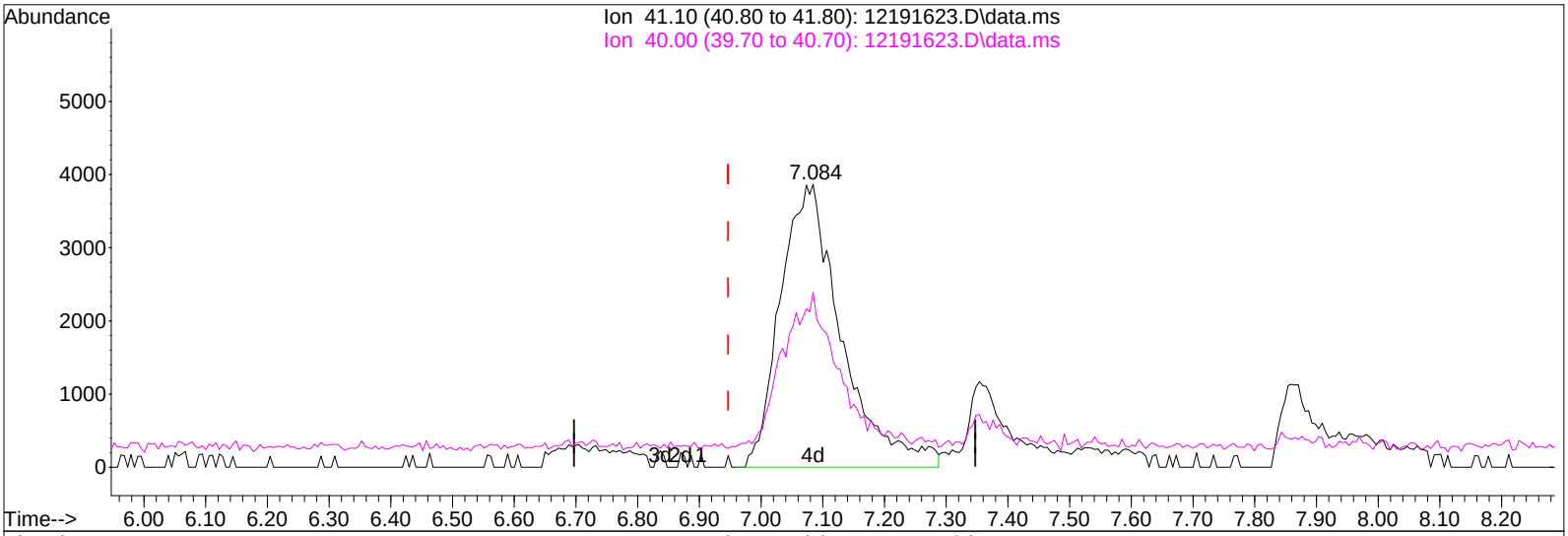
response 62

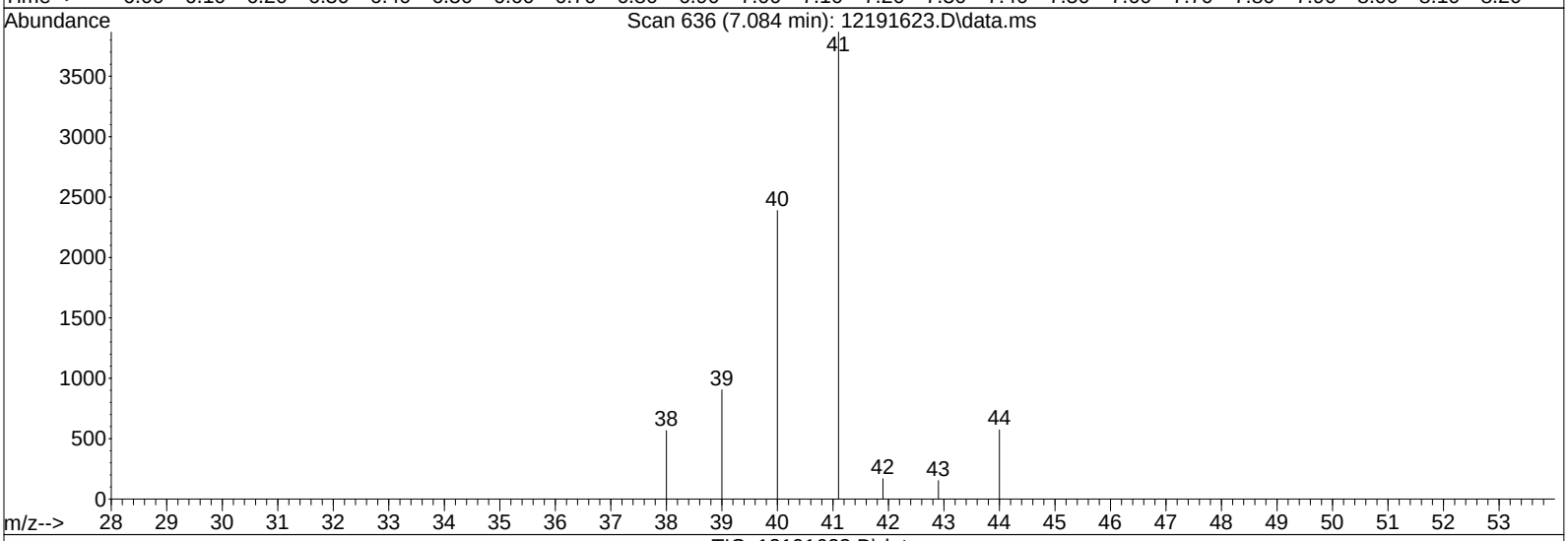
Ion	Exp%	Act%
41.10	100	100
40.00	54.30	322.58#
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:37 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191623.D\data.ms

(11) Acetonitrile (T)

7.084min (+0.137) 0.44ng m

response 26579

Ion	Exp%	Act%
41.10	100	100
40.00	54.30	0.75#
0.00	0.00	0.00
0.00	0.00	0.00

IPC

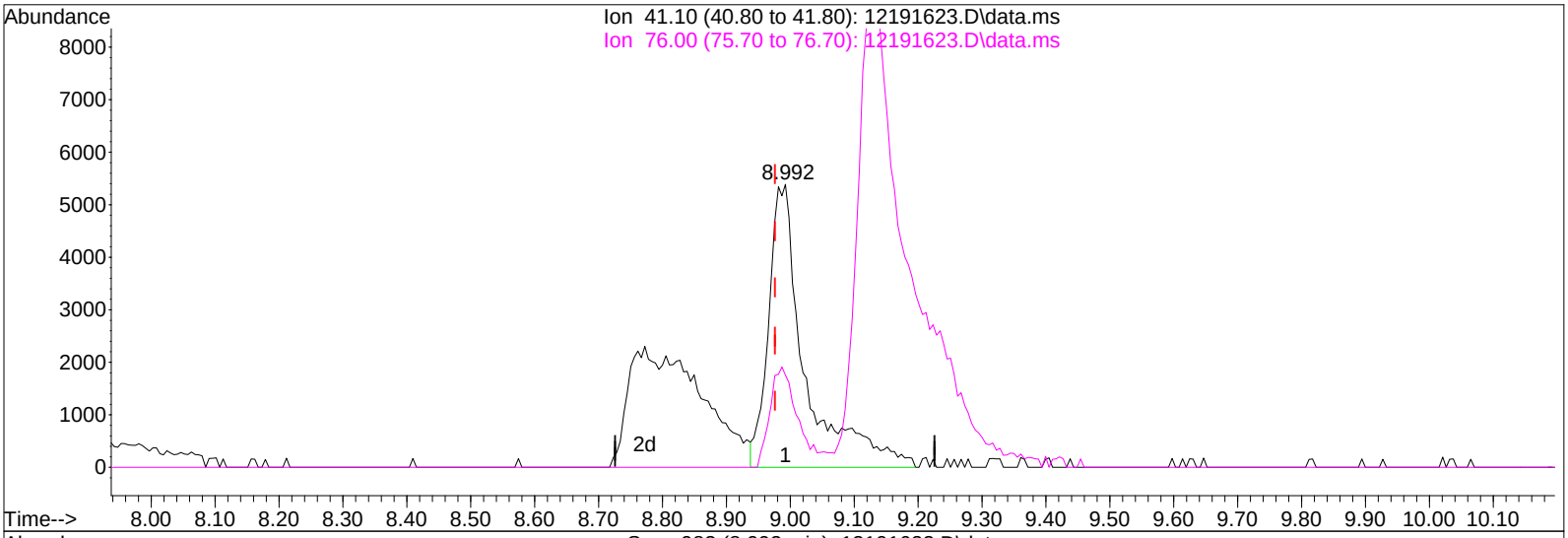
LH 12/20/16

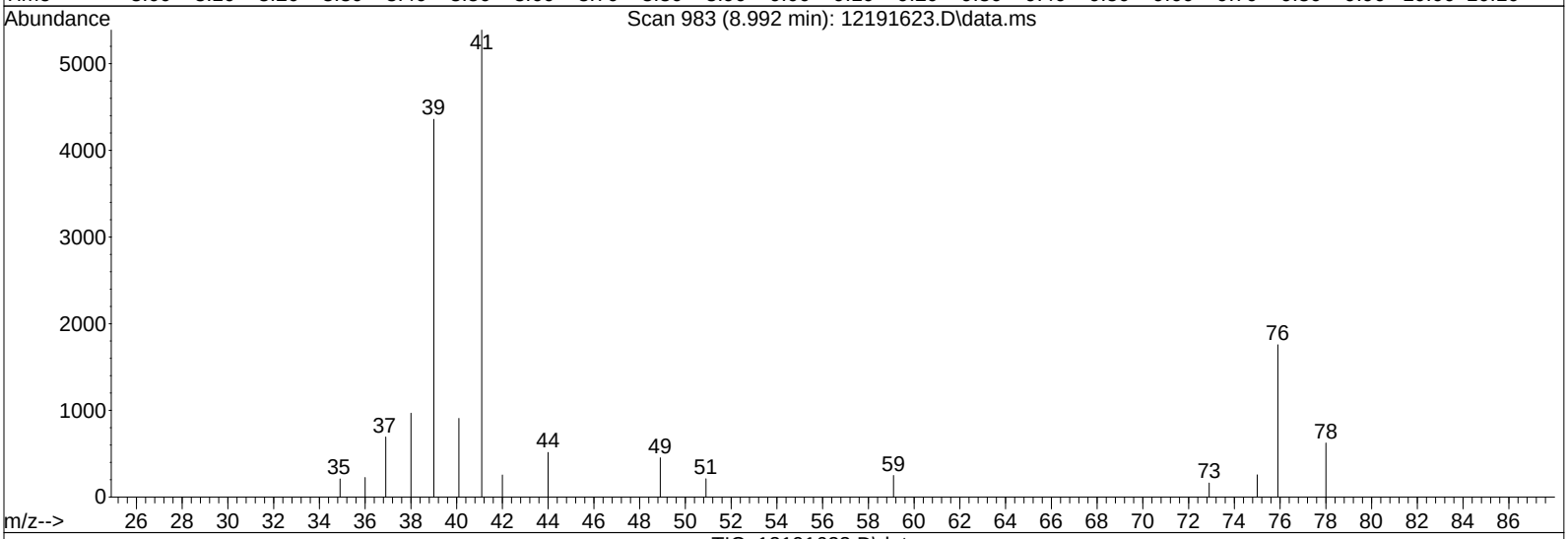
12/30/16

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:37 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191623.D\data.ms

(20) 3-Chloro-1-propene (Allyl Chloride) (T)

8.992min (+0.016) 0.46ng

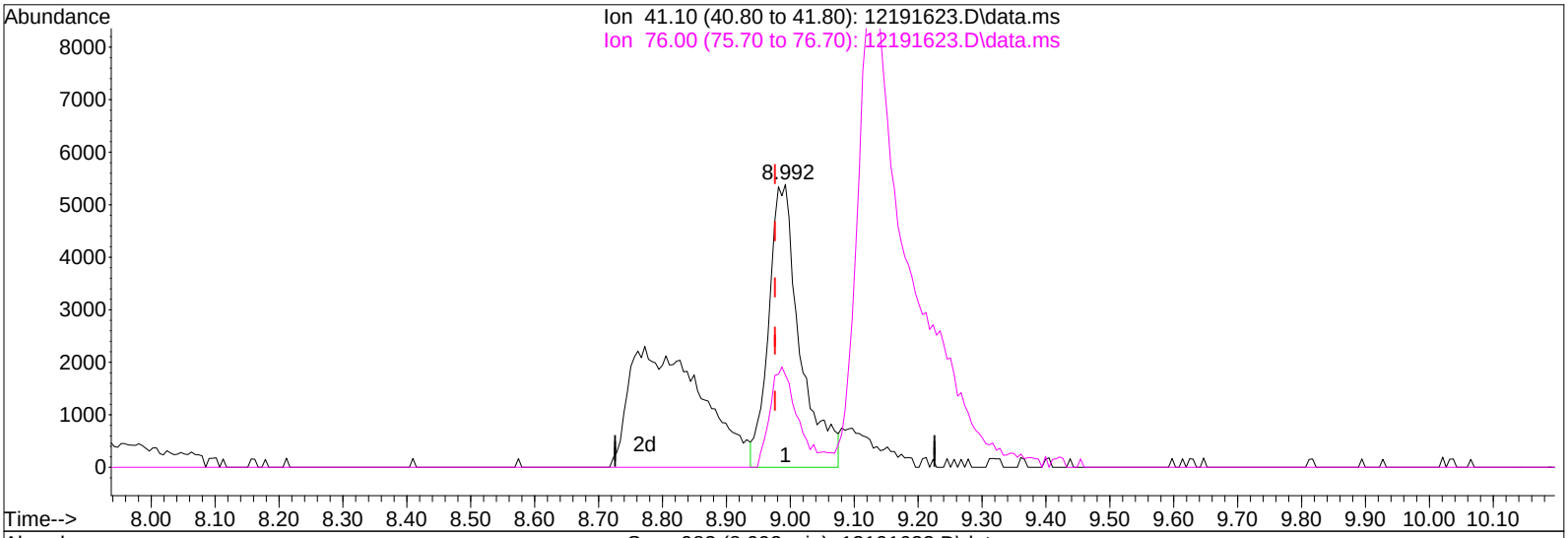
response 21371

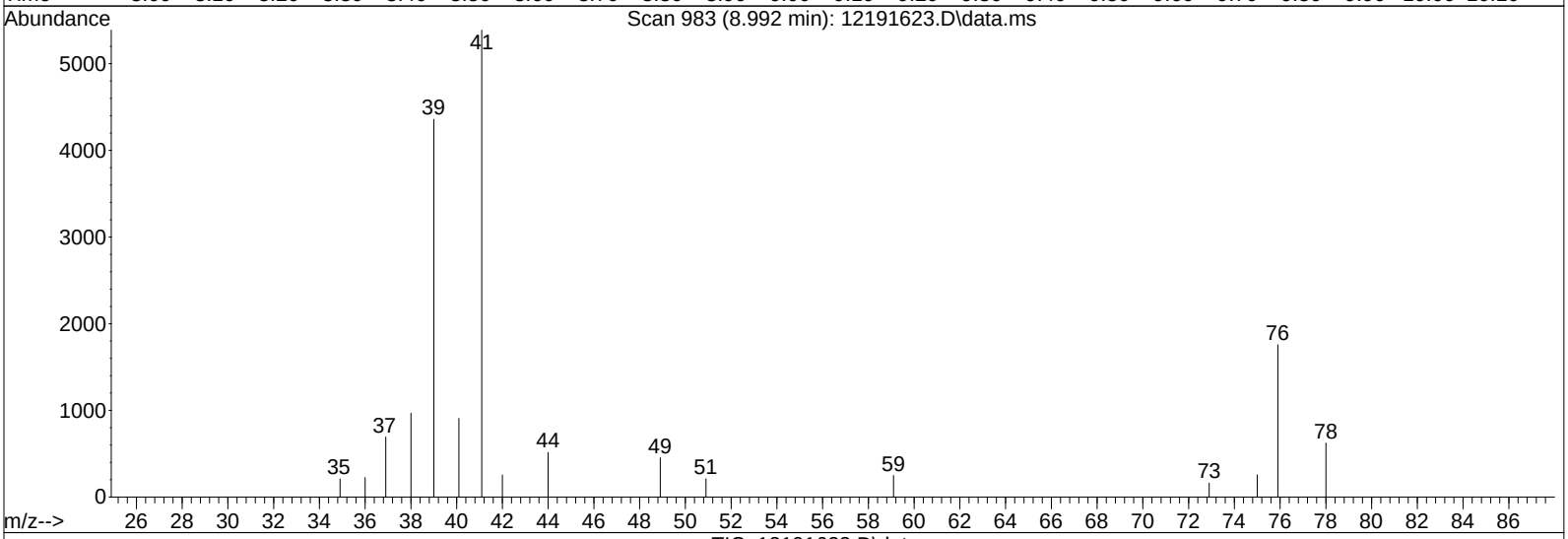
Ion	Exp%	Act%
41.10	100	100
76.00	34.90	28.45
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:37 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191623.D\data.ms

(20) 3-Chloro-1-propene (Allyl Chloride) (T)

8.992min (+0.016) 0.39ng m

response 18295

Ion	Exp%	Act%
41.10	100	100
76.00	34.90	33.24
0.00	0.00	0.00
0.00	0.00	0.00

IPC

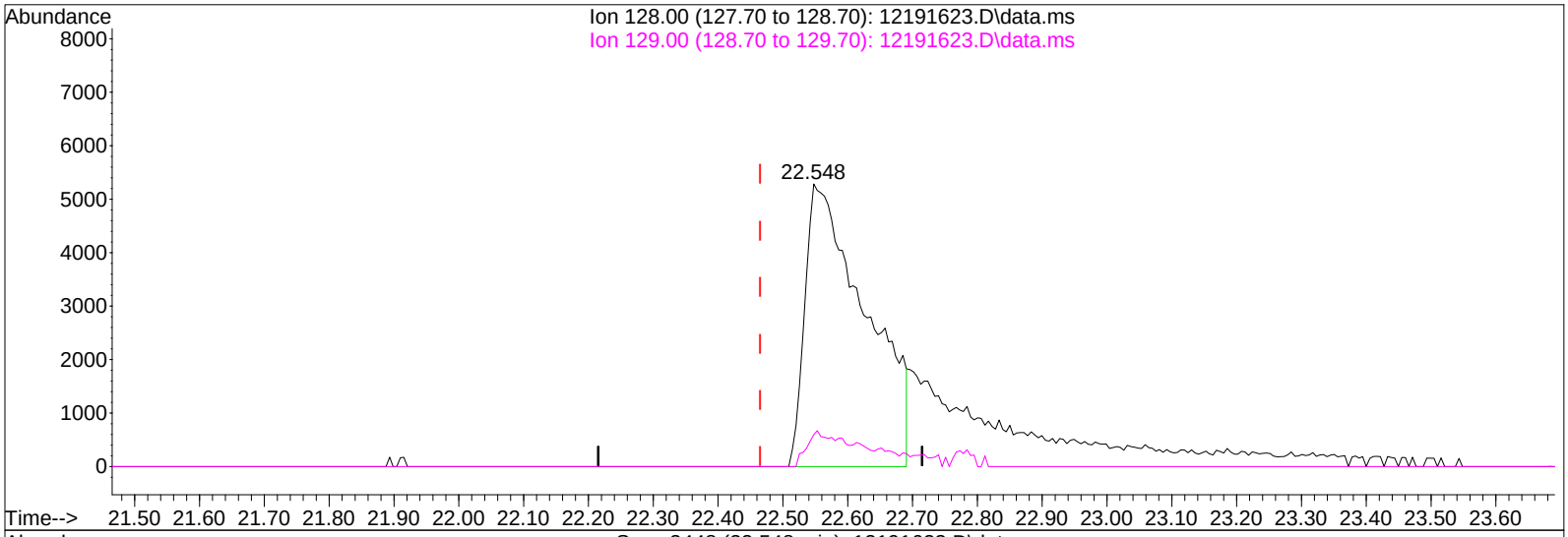
LH 12/20/16

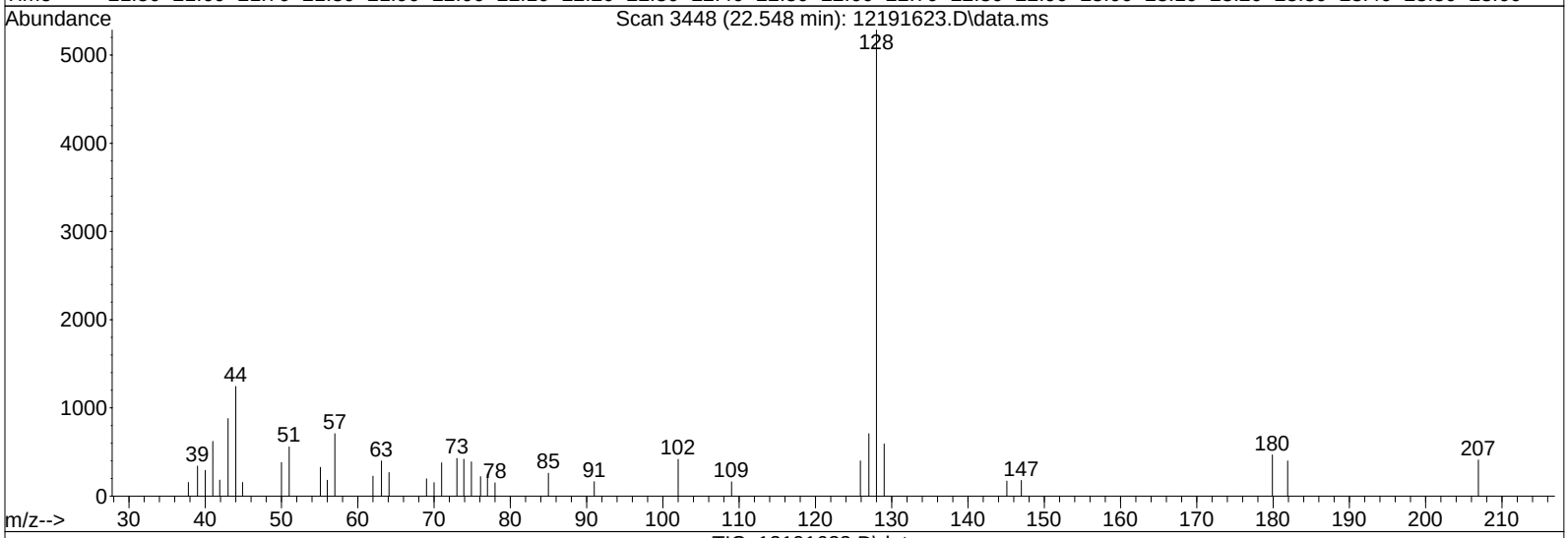
12/30/16

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:37 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191623.D\data.ms

(95) Naphthalene (T)

22.548min (+0.082) 0.32ng

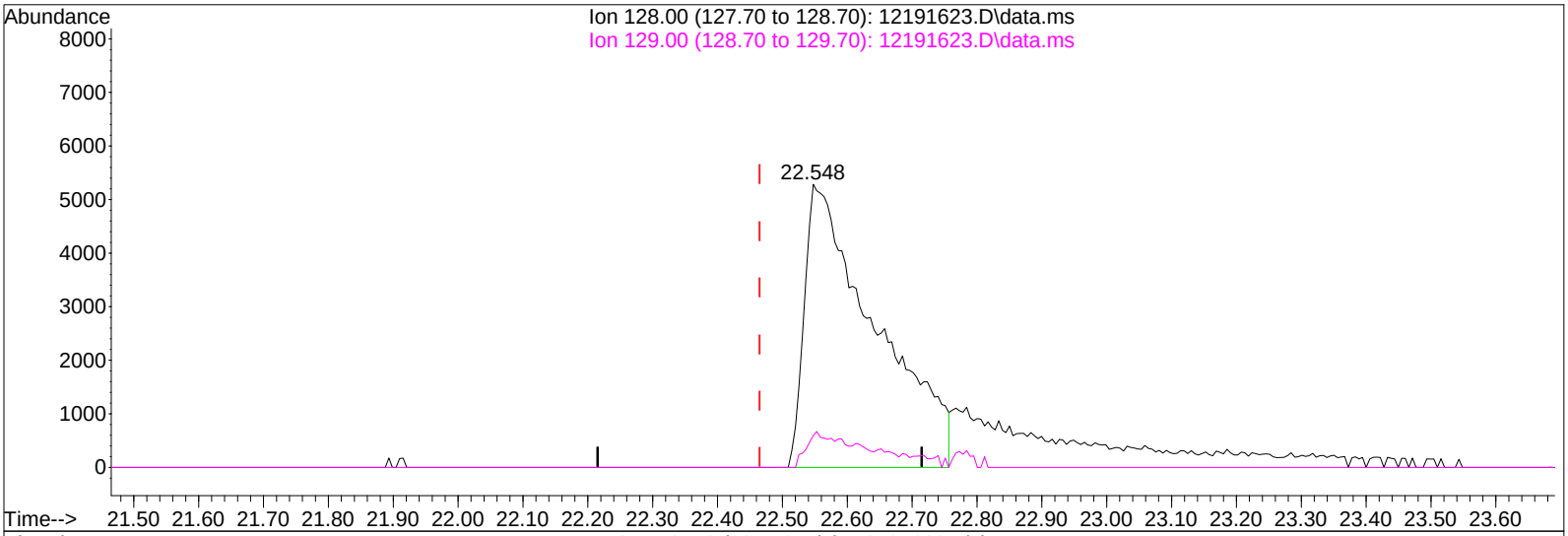
response 34200

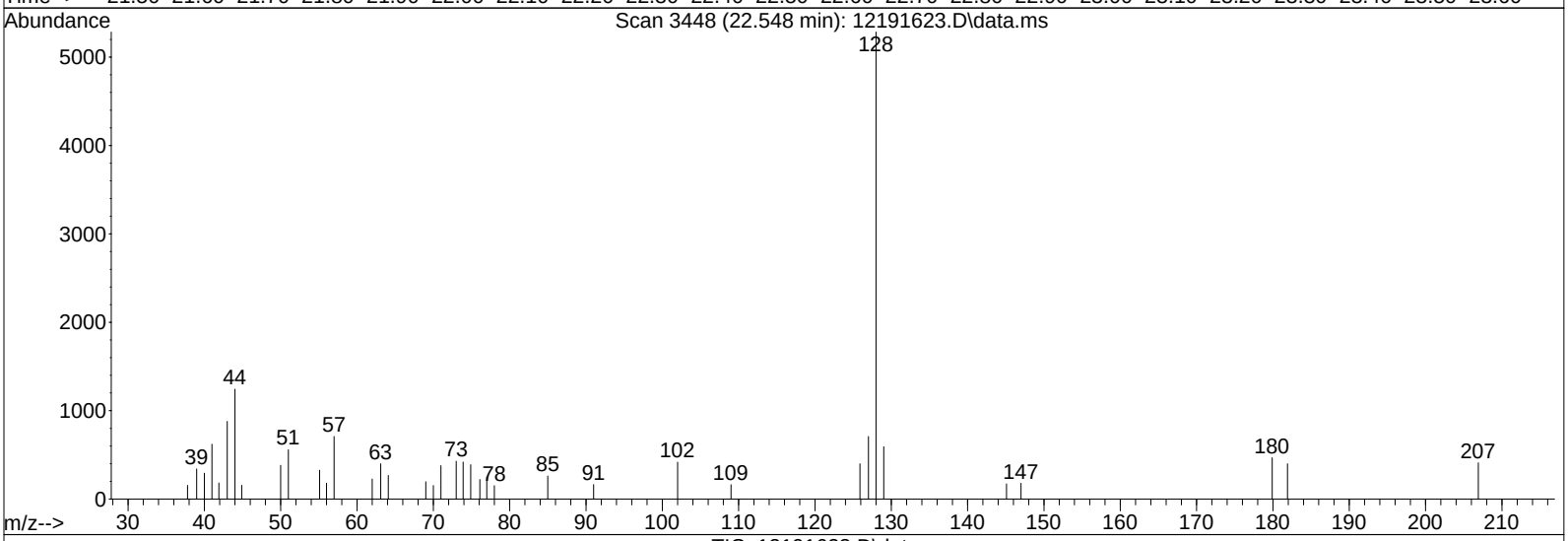
Ion	Exp%	Act%
128.00	100	100
129.00	11.00	11.75
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:37 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191623.D\data.ms

(95) Naphthalene (T)

22.548min (+0.082) 0.38ng m

response 39950

Ion	Exp%	Act%
128.00	100	100
129.00	11.00	10.06
0.00	0.00	0.00
0.00	0.00	0.00

BLC

LH 12/20/16

12/30/16

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191620.D
Acq On : 19 Dec 2016 23:59 Operator: LH
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 09:09:38 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	287891	12.500	ng	-0.01
37) 1,4-Difluorobenzene (IS2)	13.65	114	1442786	12.500	ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.93	82	606464	12.500	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.40	65	516035	13.702	ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 109.60%			
57) Toluene-d8 (SS2)	16.10	98	1492567	12.920	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 103.36%			
73) Bromofluorobenzene (SS3)	19.28	174	463606	12.499	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.00%			

Target Compounds							Qvalue
2) Propene	4.26	42	4455	0.120	ng		87
3) Dichlorodifluoromethan...	4.41	85	7720	0.128	ng	#	97
4) Chloromethane	4.76	50	6115	0.125	ng		99
5) 1,2-Dichloro-1,1,2,2-t...	4.99	135	4065	0.129	ng		98
6) Vinyl Chloride	5.23	62	5048	0.103	ng		85
7) 1,3-Butadiene	5.50	54	3252	0.102	ng		94
8) Bromomethane	5.97	94	2560	0.091	ng		100
9) Chloroethane	6.30	64	2005	0.087	ng		90
10) Ethanol	6.74	45	13717	0.541	ng		93
11) Acetonitrile	7.10	41	9474m	0.146	ng		
12) Acrolein	7.28	56	2647	0.108	ng		99
13) Acetone	7.39	58	14157	0.575	ng	#	81
14) Trichlorofluoromethane	7.61	101	6526	0.124	ng		96
15) 2-Propanol (Isopropanol)	7.91	45	19376	0.229	ng		73
16) Acrylonitrile	8.27	53	4721	0.107	ng		97
17) 1,1-Dichloroethene	8.61	96	2858	0.104	ng		94
18) 2-Methyl-2-Propanol (t...	8.83	59	19366	0.237	ng	#	72
19) Methylene Chloride	8.82	84	3788	0.115	ng		88
20) 3-Chloro-1-propene (Al...	8.99	41	4044	0.081	ng		89
21) Trichlorotrifluoroethane	9.23	151	3186	0.121	ng		98
22) Carbon Disulfide	9.13	76	15656	0.139	ng		93
23) trans-1,2-Dichloroethene	10.10	61	5111	0.112	ng		98
24) 1,1-Dichloroethane	10.35	63	5949	0.102	ng		99
25) Methyl tert-Butyl Ether	10.46	73	11732	0.125	ng		97
26) Vinyl Acetate	10.63	86	2997	0.434	ng	#	82
27) 2-Butanone (MEK)	10.89	72	2269	0.103	ng	#	55
28) cis-1,2-Dichloroethene	11.37	61	5025	0.113	ng		97
29) Diisopropyl Ether	11.65	87	3567	0.130	ng	#	68
30) Ethyl Acetate	11.68	61	2368	0.201	ng		98
31) n-Hexane	11.64	57	6112	0.115	ng		97
32) Chloroform	11.71	83	6444	0.118	ng		99
34) Tetrahydrofuran (THF)	12.15	72	2748	0.122	ng	#	84
35) Ethyl tert-Butyl Ether	12.24	87	4075	0.114	ng		95
36) 1,2-Dichloroethane	12.51	62	5388	0.130	ng		100
38) 1,1,1-Trichloroethane	12.78	97	5686	0.121	ng		97
39) Isopropyl Acetate	13.22	61	4479	0.208	ng	#	86
40) 1-Butanol	13.26	56	6847	0.203	ng		86
41) Benzene	13.26	78	15697	0.112	ng		97
42) Carbon Tetrachloride	13.42	117	4664	0.115	ng		96
43) Cyclohexane	13.55	84	11027	0.233	ng		99
44) tert-Amyl Methyl Ether	13.89	73	10713	0.117	ng		92
45) 1,2-Dichloropropane	14.12	63	3810	0.111	ng		95
46) Bromodichloromethane	14.32	83	4852	0.116	ng		100
47) Trichloroethene	14.35	130	4092	0.126	ng		99
48) 1,4-Dioxane	14.36	88	2774	0.102	ng	#	66
49) 2,2,4-Trimethylpentane...	14.41	57	16032	0.113	ng		90

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191620.D
Acq On : 19 Dec 2016 23:59 Operator: LH
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 09:09:38 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

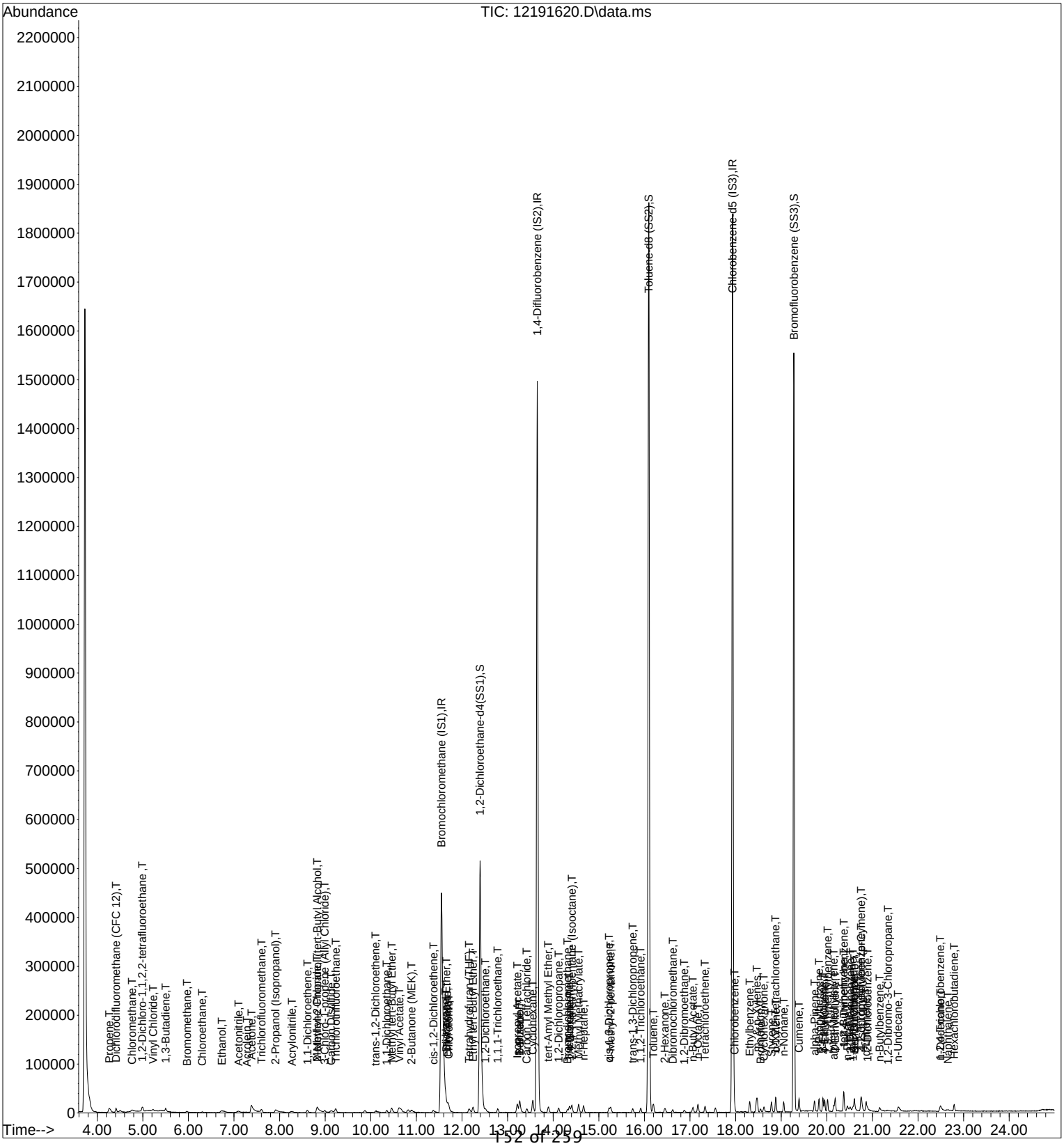
Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
50) Methyl Methacrylate	14.56	100	2657	0.218 ng		92
51) n-Heptane	14.67	71	3588	0.112 ng		95
52) cis-1,3-Dichloropropene	15.23	75	5961	0.117 ng		99
53) 4-Methyl-2-pentanone	15.26	58	3367	0.108 ng	#	73
54) trans-1,3-Dichloropropene	15.75	75	4924	0.109 ng		98
55) 1,1,2-Trichloroethane	15.92	97	3404	0.113 ng		99
58) Toluene	16.20	91	15536	0.130 ng		96
59) 2-Hexanone	16.45	43	9494	0.124 ng		85
60) Dibromochloromethane	16.62	129	3816	0.116 ng		98
61) 1,2-Dibromoethane	16.87	107	3878	0.115 ng		97
62) n-Butyl Acetate	17.06	43	9503	0.109 ng		94
63) n-Octane	17.17	57	3901	0.137 ng	#	81
64) Tetrachloroethene	17.33	166	3974	0.119 ng		99
65) Chlorobenzene	17.98	112	9816	0.120 ng		92
66) Ethylbenzene	18.31	91	16434	0.115 ng		99
67) m- & p-Xylenes	18.47	91	26820	0.247 ng		98
68) Bromoform	18.55	173	2976	0.113 ng		97
69) Styrene	18.79	104	9744	0.117 ng		99
70) o-Xylene	18.89	91	13504	0.124 ng		99
71) n-Nonane	19.06	43	8168	0.119 ng		91
72) 1,1,2,2-Tetrachloroethane	18.87	83	5256	0.100 ng		98
74) Cumene	19.39	105	16806	0.129 ng		96
75) alpha-Pinene	19.73	93	8077	0.113 ng		95
76) n-Propylbenzene	19.83	91	20076	0.122 ng		97
77) 3-Ethyltoluene	19.91	105	17336	0.125 ng		98
78) 4-Ethyltoluene	19.95	105	13624	0.111 ng		95
79) 1,3,5-Trimethylbenzene	20.02	105	13705	0.120 ng		94
80) alpha-Methylstyrene	20.15	118	5685	0.105 ng		90
81) 2-Ethyltoluene	20.18	105	15092	0.114 ng		99
82) 1,2,4-Trimethylbenzene	20.38	105	12020	0.108 ng		95
83) n-Decane	20.45	57	7645	0.115 ng		93
84) Benzyl Chloride	20.61	91	8398	0.098 ng	#	55
85) 1,3-Dichlorobenzene	20.52	146	4298	0.073 ng		99
86) 1,4-Dichlorobenzene	20.57	146	8335m	0.124 ng		
87) sec-Butylbenzene	20.61	105	16552	0.114 ng	#	64
88) 4-Isopropyltoluene (p-...	20.75	119	16800	0.125 ng		89
89) 1,2,3-Trimethylbenzene	20.75	105	16318	0.143 ng		88
90) 1,2-Dichlorobenzene	20.89	146	7618	0.126 ng		99
91) d-Limonene	20.86	68	4838	0.109 ng		97
92) 1,2-Dibromo-3-Chloropr...	21.34	157	1336	0.066 ng	#	57
93) n-Undecane	21.56	57	8653	0.126 ng		85
94) 1,2,4-Trichlorobenzene	22.49	180	3718	0.090 ng	#	95
95) Naphthalene	22.66	128	6128	0.054 ng	#	71
96) n-Dodecane	22.49	57	7367m	0.118 ng		
97) Hexachlorobutadiene	22.79	225	3006	0.108 ng		100
98) Cyclohexanone	18.62	55	5979	0.125 ng		92
99) tert-Butylbenzene	20.37	119	12649	0.121 ng		99
100) n-Butylbenzene	21.16	91	12866	0.107 ng		91

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191620.D
Acq On : 19 Dec 2016 23:59 Operator: LH
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

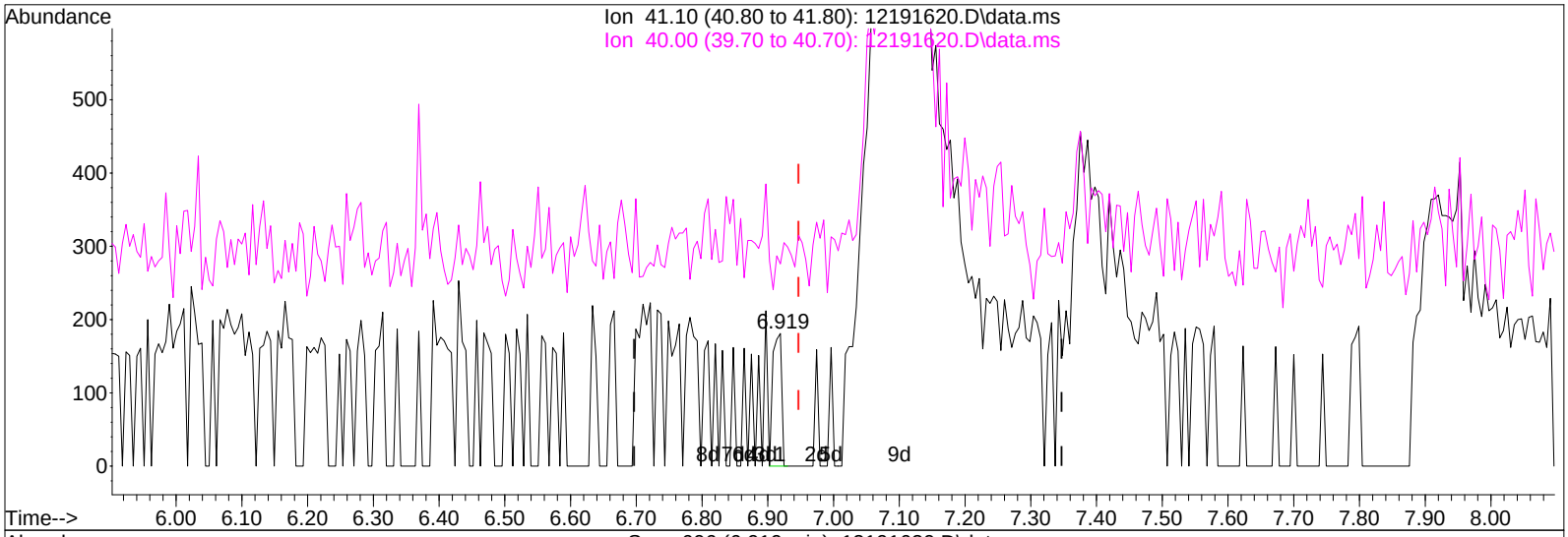
Quant Time: Dec 20 09:09:38 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

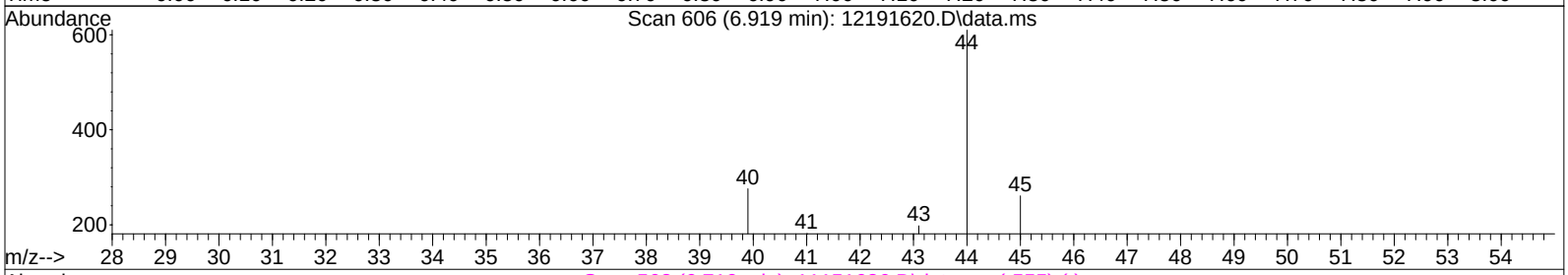


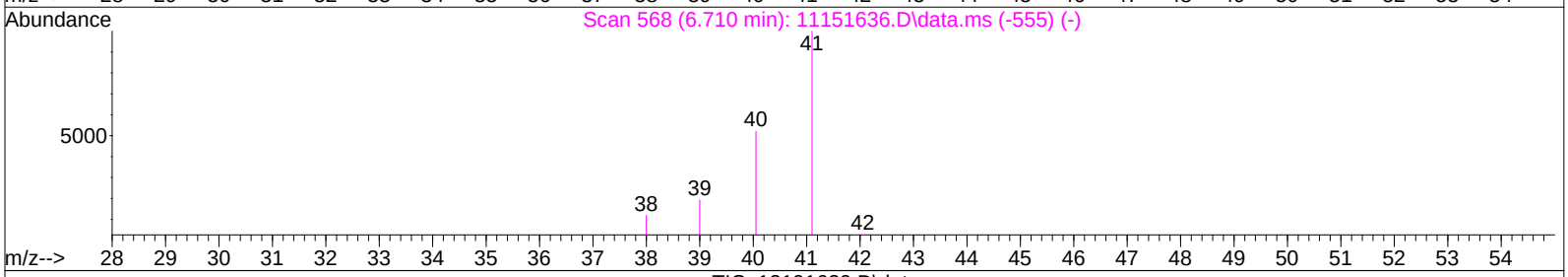
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191620.D
Acq On : 19 Dec 2016 23:59 Operator: LH
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:31 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 12191620.D\data.ms

(11) Acetonitrile (T)

6.919min (-0.028) 0.00ng

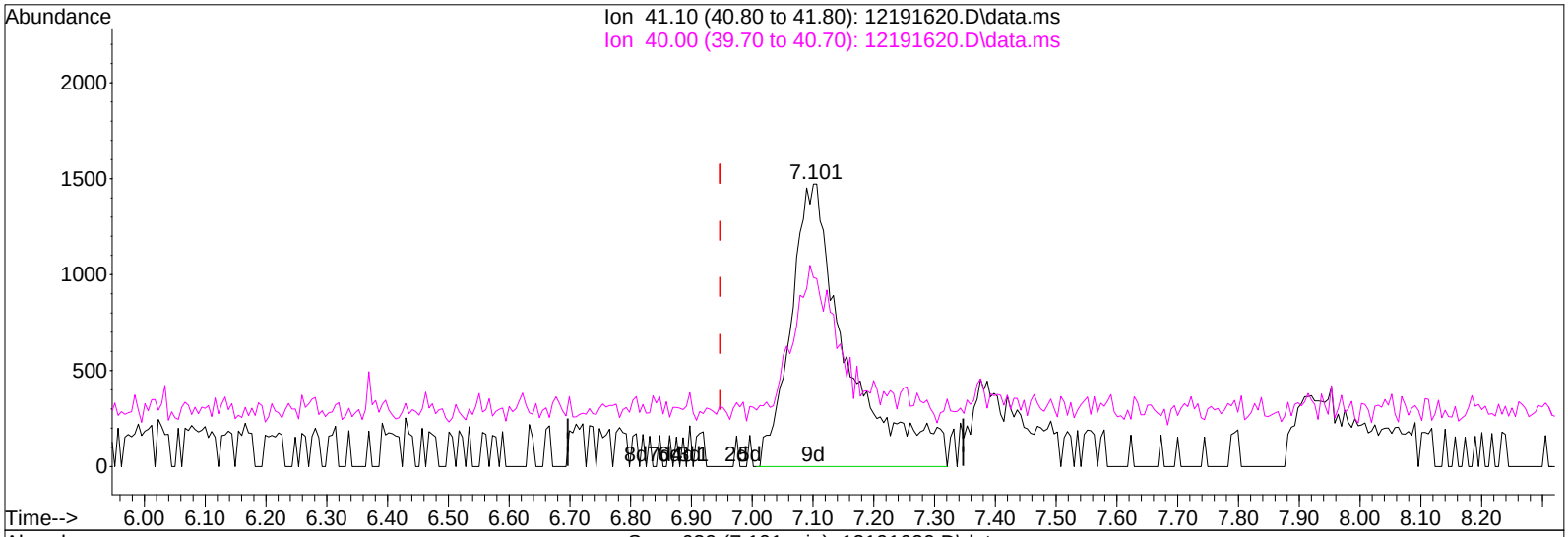
response 168

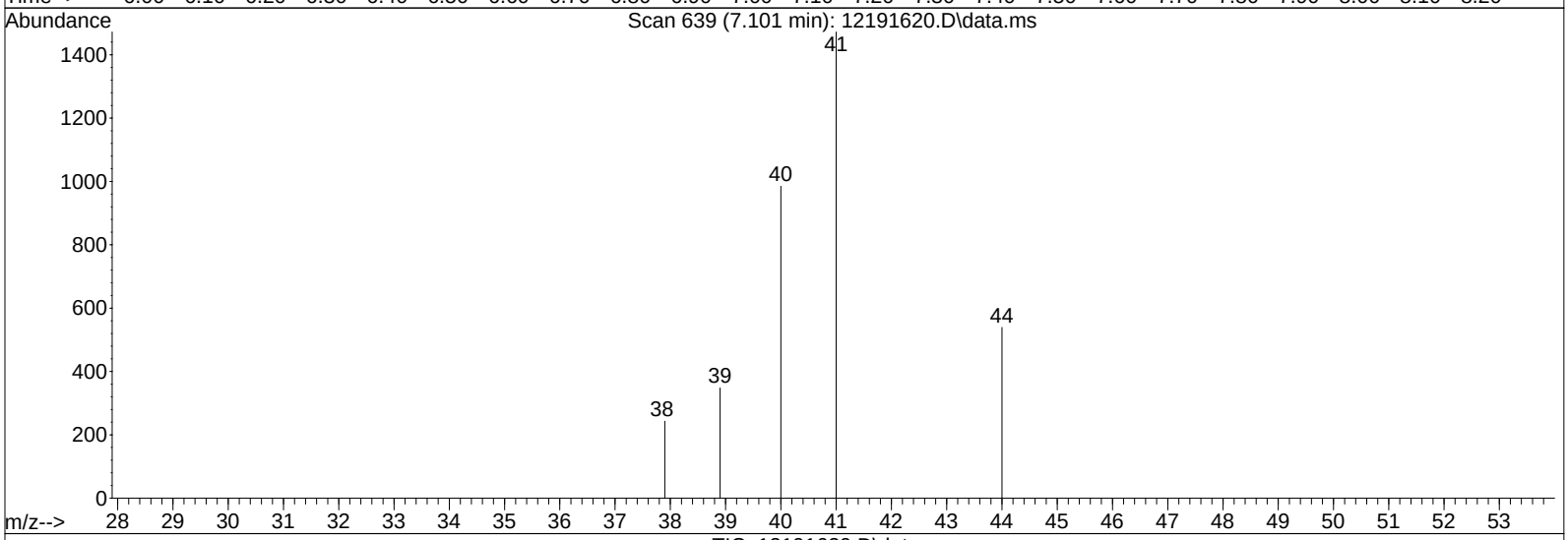
Ion	Exp%	Act%
41.10	100	100
40.00	54.30	91.07#
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191620.D
Acq On : 19 Dec 2016 23:59 Operator: LH
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:31 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191620.D\data.ms

(11) Acetonitrile (T)

7.101min (+0.154) 0.15ng m

response 9474

Ion	Exp%	Act%
41.10	100	100
40.00	54.30	1.61#
0.00	0.00	0.00
0.00	0.00	0.00

RTS

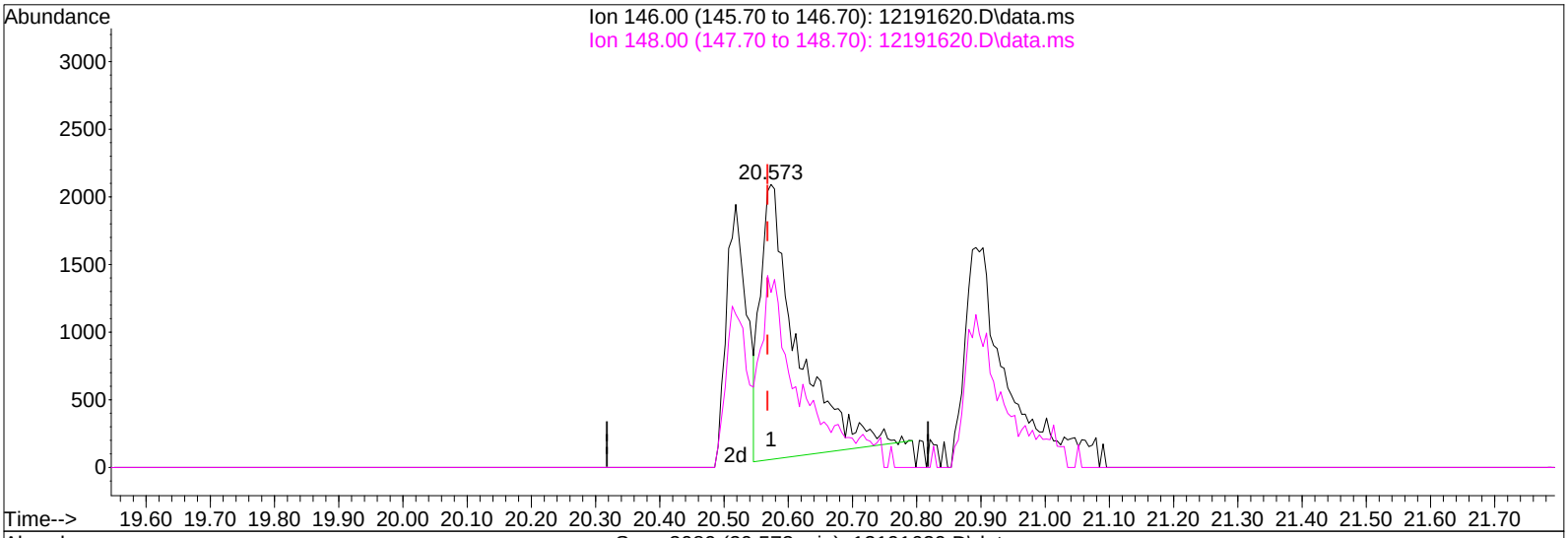
LH 12/20/16

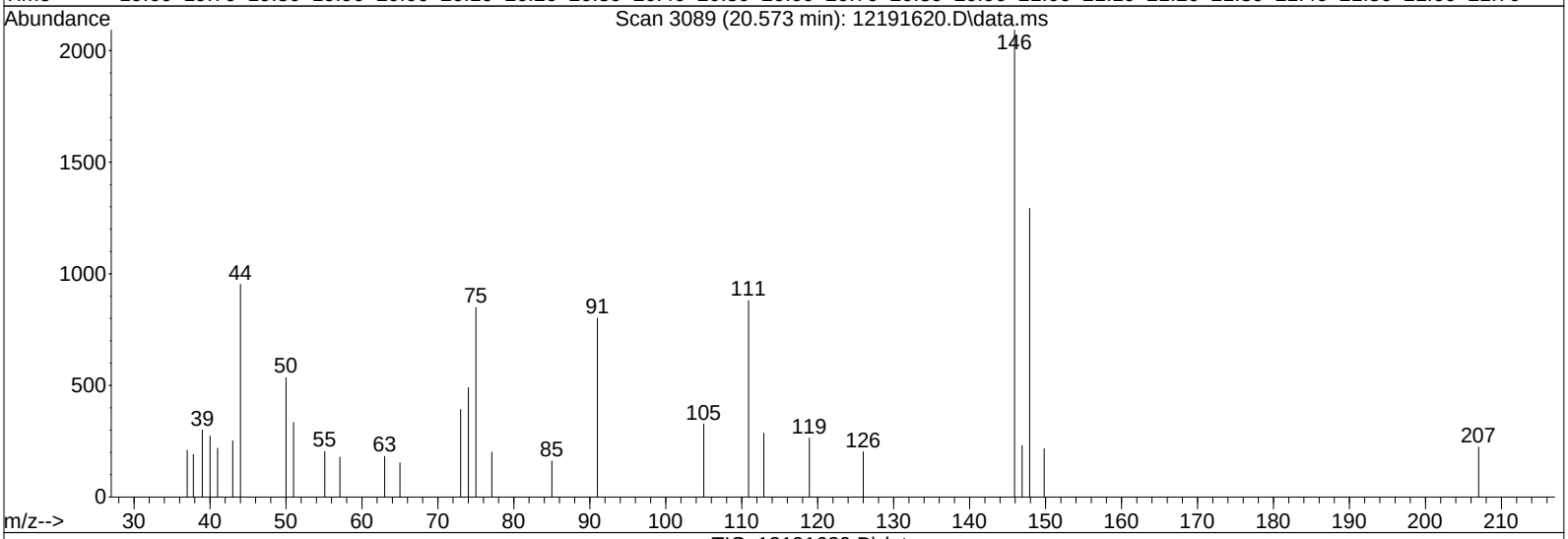
12/30/16

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191620.D
Acq On : 19 Dec 2016 23:59 Operator: LH
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:31 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191620.D\data.ms

(86) 1,4-Dichlorobenzene (T)

20.573min (+0.005) 0.12ng

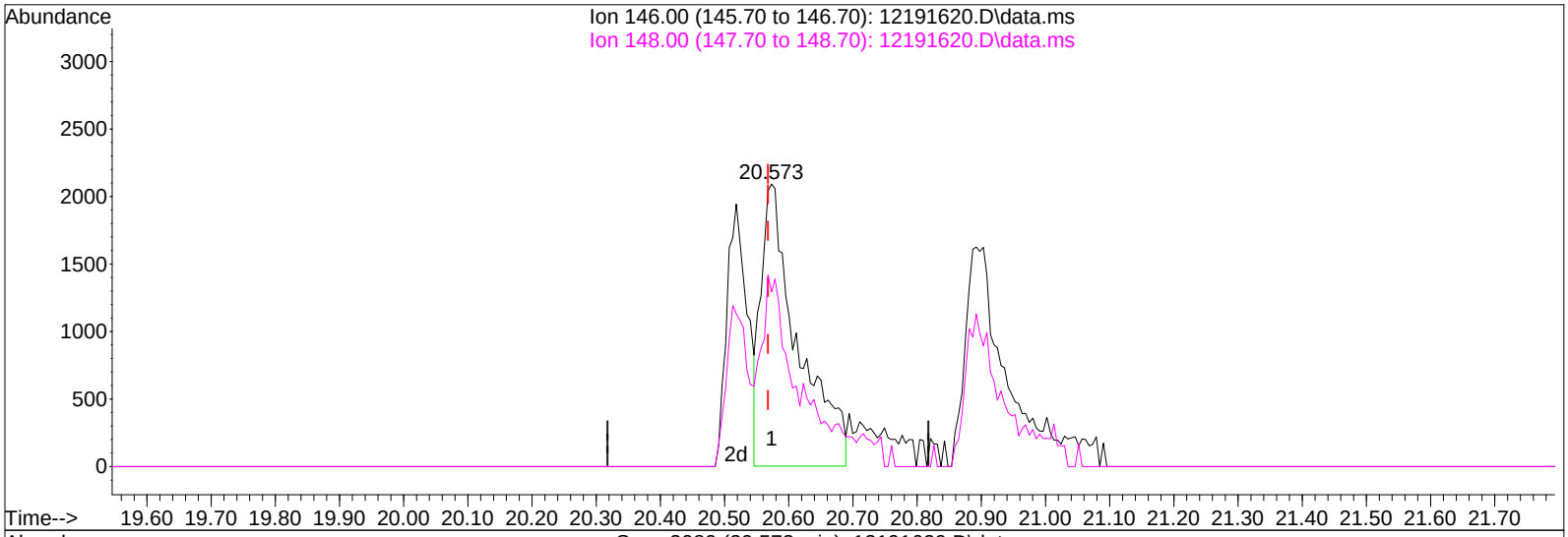
response 8112

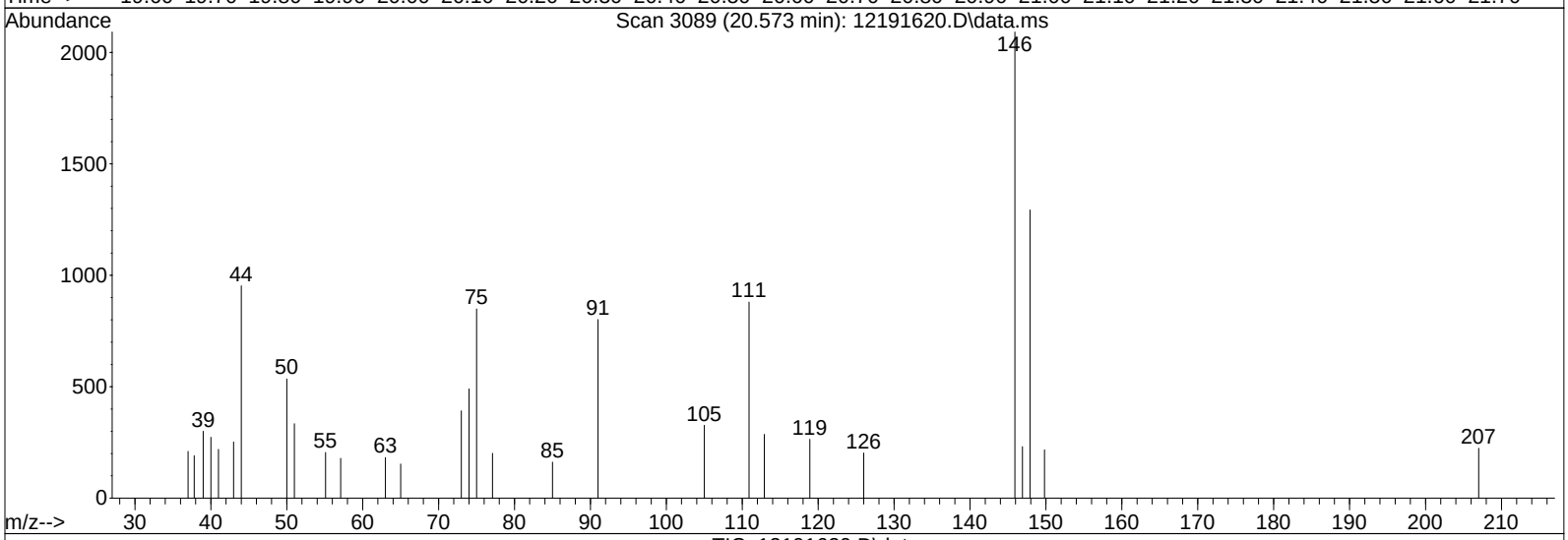
Ion	Exp%	Act%
146.00	100	100
148.00	63.90	76.43
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191620.D
Acq On : 19 Dec 2016 23:59 Operator: LH
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:31 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191620.D\data.ms

(86) 1,4-Dichlorobenzene (T)

20.573min (+0.005) 0.12ng m

response 8335

Ion	Exp%	Act%
146.00	100	100
148.00	63.90	74.39
0.00	0.00	0.00
0.00	0.00	0.00

BLC

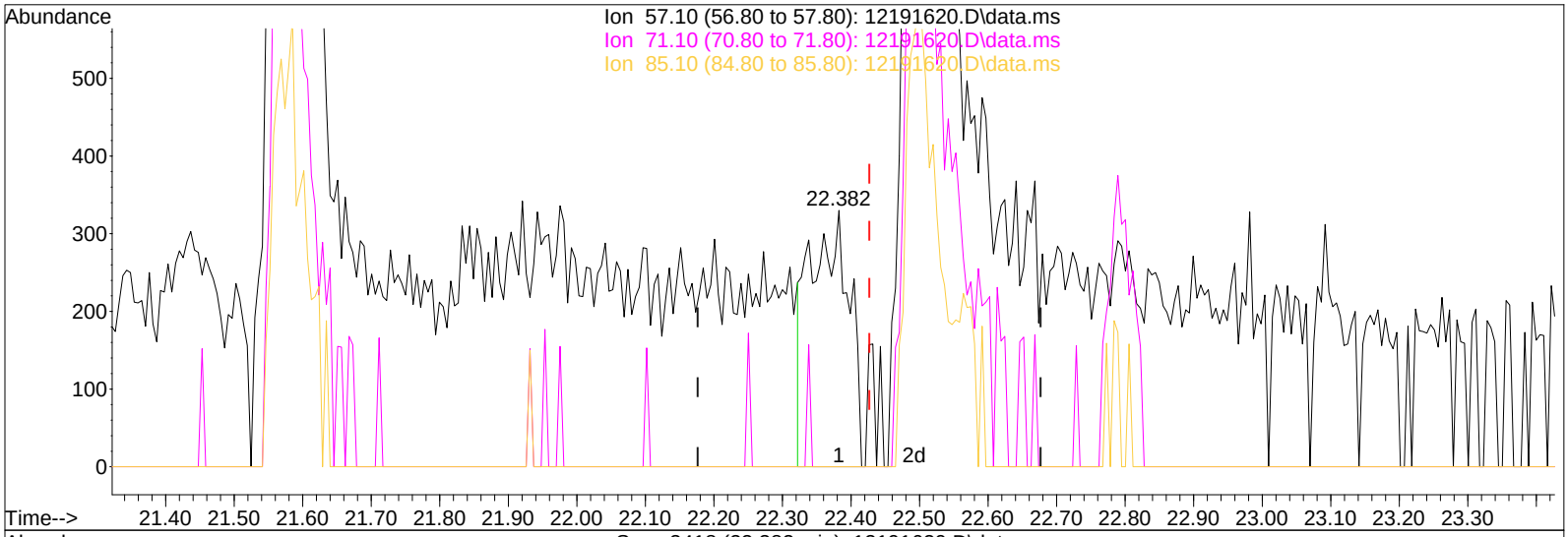
LH 12/20/16

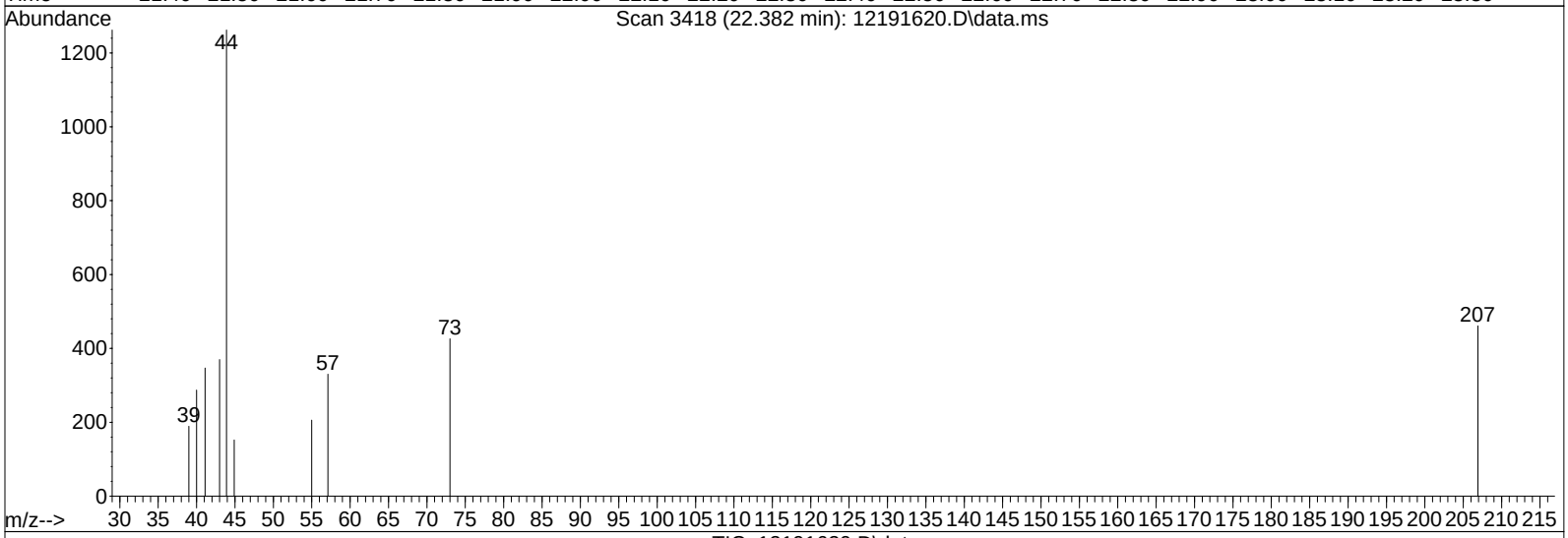
12/30/16

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191620.D
Acq On : 19 Dec 2016 23:59 Operator: LH
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:31 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191620.D\data.ms

(96) n-Dodecane (T)

22.382min (-0.044) 0.02ng

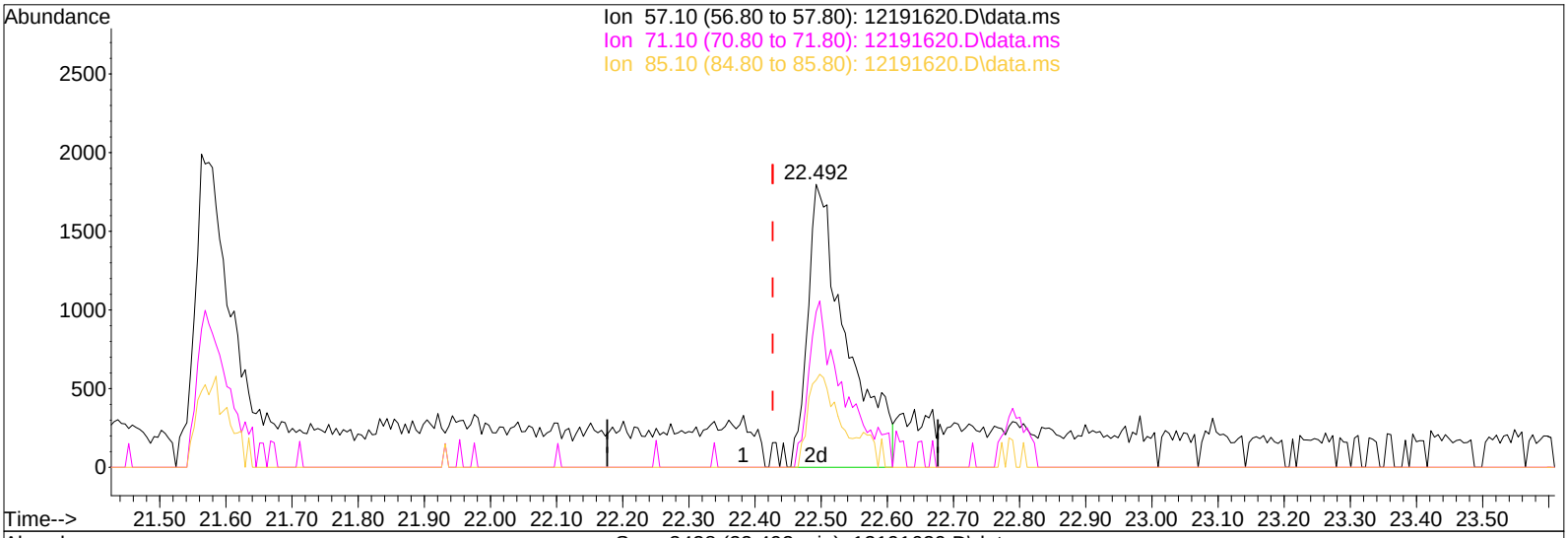
response 1319

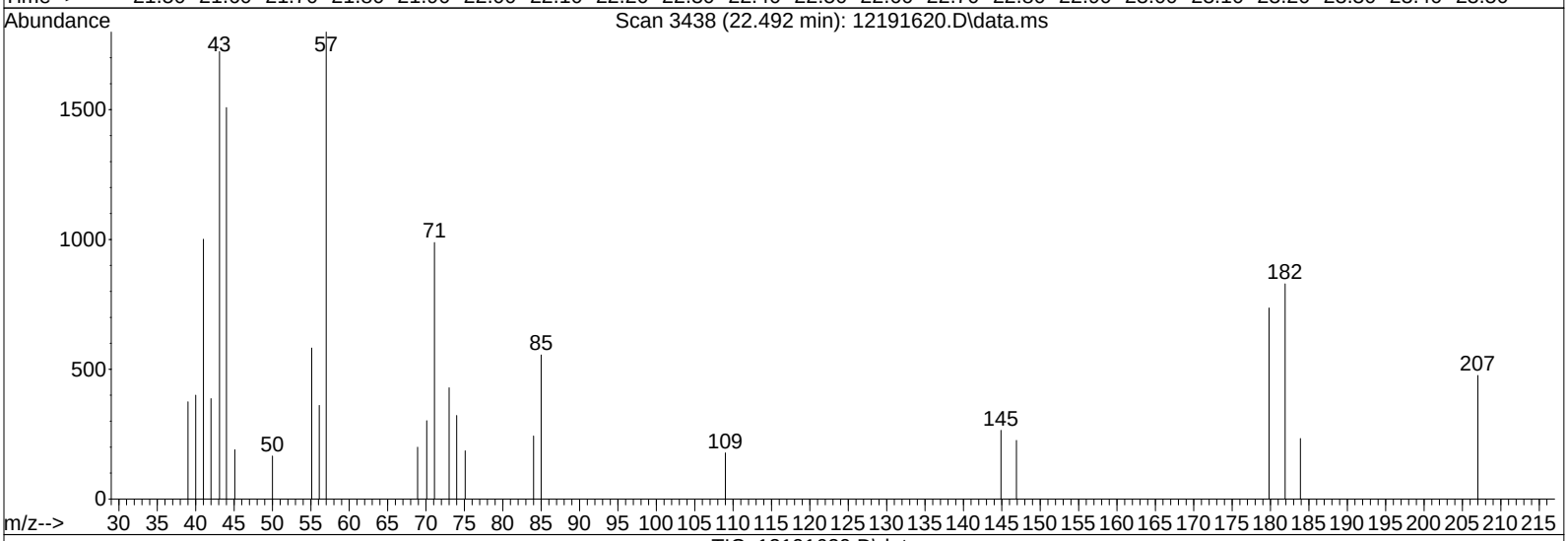
Ion	Exp%	Act%
57.10	100	100
71.10	54.10	0.00#
85.10	31.90	0.00#
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191620.D
Acq On : 19 Dec 2016 23:59 Operator: LH
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:31 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191620.D\data.ms

(96) n-Dodecane (T)

22.492min (+0.066) 0.12ng m

response 7367

Ion	Exp%	Act%
57.10	100	100
71.10	54.10	0.00#
85.10	31.90	0.00#
0.00	0.00	0.00

MP

LH 12/20/16

12/30/16

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191624.D
Acq On : 20 Dec 2016 2:13 Operator: LH
Sample : 1.0ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191605 (1/17)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Dec 20 09:54:12 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.54	130	281285	12.500	ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.65	114	1385694	12.500	ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.93	82	594876	12.500	ng	0.00

System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...	12.39	65	509536	13.847	ng	-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 110.80%			
57) Toluene-d8 (SS2)	16.10	98	1425991	12.584	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.64%			
73) Bromofluorobenzene (SS3)	19.28	174	460316	12.652	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 101.20%			

Target Compounds

							Qvalue
2) Propene	4.22	42	36719	1.010	ng		97
3) Dichlorodifluoromethan...	4.38	85	72389	1.226	ng		100
4) Chloromethane	4.70	50	58646	1.223	ng		99
5) 1,2-Dichloro-1,1,2,2-t...	4.96	135	37579	1.216	ng		99
6) Vinyl Chloride	5.15	62	55830	1.164	ng		98
7) 1,3-Butadiene	5.44	54	41386	1.330	ng		99
8) Bromomethane	5.92	94	28182	1.027	ng		96
9) Chloroethane	6.26	64	22541	1.003	ng		96
10) Ethanol	6.64	45	124549	5.023	ng		100
11) Acetonitrile	7.01	41	64313m	1.013	ng		
12) Acrolein	7.13	56	22314	0.935	ng		100
13) Acetone	7.33	58	125638	5.220	ng		91
14) Trichlorofluoromethane	7.58	101	58339	1.136	ng		100
15) 2-Propanol (Isopropanol)	7.83	45	182943	2.217	ng		90
16) Acrylonitrile	8.19	53	43804	1.016	ng		100
17) 1,1-Dichloroethene	8.59	96	31117	1.157	ng		99
18) 2-Methyl-2-Propanol (t...	8.73	59	181241	2.269	ng		97
19) Methylene Chloride	8.81	84	33421	1.037	ng		92
20) 3-Chloro-1-propene (Al...	8.98	41	47552	0.970	ng		94
21) Trichlorotrifluoroethane	9.22	151	28632	1.115	ng		99
22) Carbon Disulfide	9.11	76	126930	1.152	ng		98
23) trans-1,2-Dichloroethene	10.10	61	48489	1.087	ng		100
24) 1,1-Dichloroethane	10.34	63	59142	1.042	ng		99
25) Methyl tert-Butyl Ether	10.43	73	103720	1.133	ng		99
26) Vinyl Acetate	10.59	86	33468	4.965	ng	#	78
27) 2-Butanone (MEK)	10.85	72	22680	1.053	ng		96
28) cis-1,2-Dichloroethene	11.36	61	48058	1.102	ng		99
29) Diisopropyl Ether	11.64	87	26335	0.979	ng	#	89
30) Ethyl Acetate	11.66	61	25096	2.181	ng		99
31) n-Hexane	11.63	57	54461	1.045	ng		99
32) Chloroform	11.70	83	60704	1.137	ng		100
34) Tetrahydrofuran (THF)	12.12	72	22683	1.030	ng		97
35) Ethyl tert-Butyl Ether	12.23	87	39004	1.118	ng		99
36) 1,2-Dichloroethane	12.51	62	49084	1.209	ng		99
38) 1,1,1-Trichloroethane	12.78	97	53677	1.184	ng		100
39) Isopropyl Acetate	13.20	61	43070	2.082	ng		96
40) 1-Butanol	13.24	56	68319	2.111	ng		86
41) Benzene	13.27	78	132189	0.979	ng		100
42) Carbon Tetrachloride	13.42	117	46065	1.184	ng		100
43) Cyclohexane	13.55	84	101148	2.228	ng		100
44) tert-Amyl Methyl Ether	13.89	73	96200	1.092	ng		97
45) 1,2-Dichloropropane	14.12	63	33701	1.025	ng		99
46) Bromodichloromethane	14.31	83	46468	1.158	ng		99
47) Trichloroethene	14.35	130	35500	1.139	ng		99
48) 1,4-Dioxane	14.34	88	27794	1.063	ng		100
49) 2,2,4-Trimethylpentane...	14.40	57	142985	1.046	ng		99

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191624.D
Acq On : 20 Dec 2016 2:13 Operator: LH
Sample : 1.0ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191605 (1/17)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Dec 20 09:54:12 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

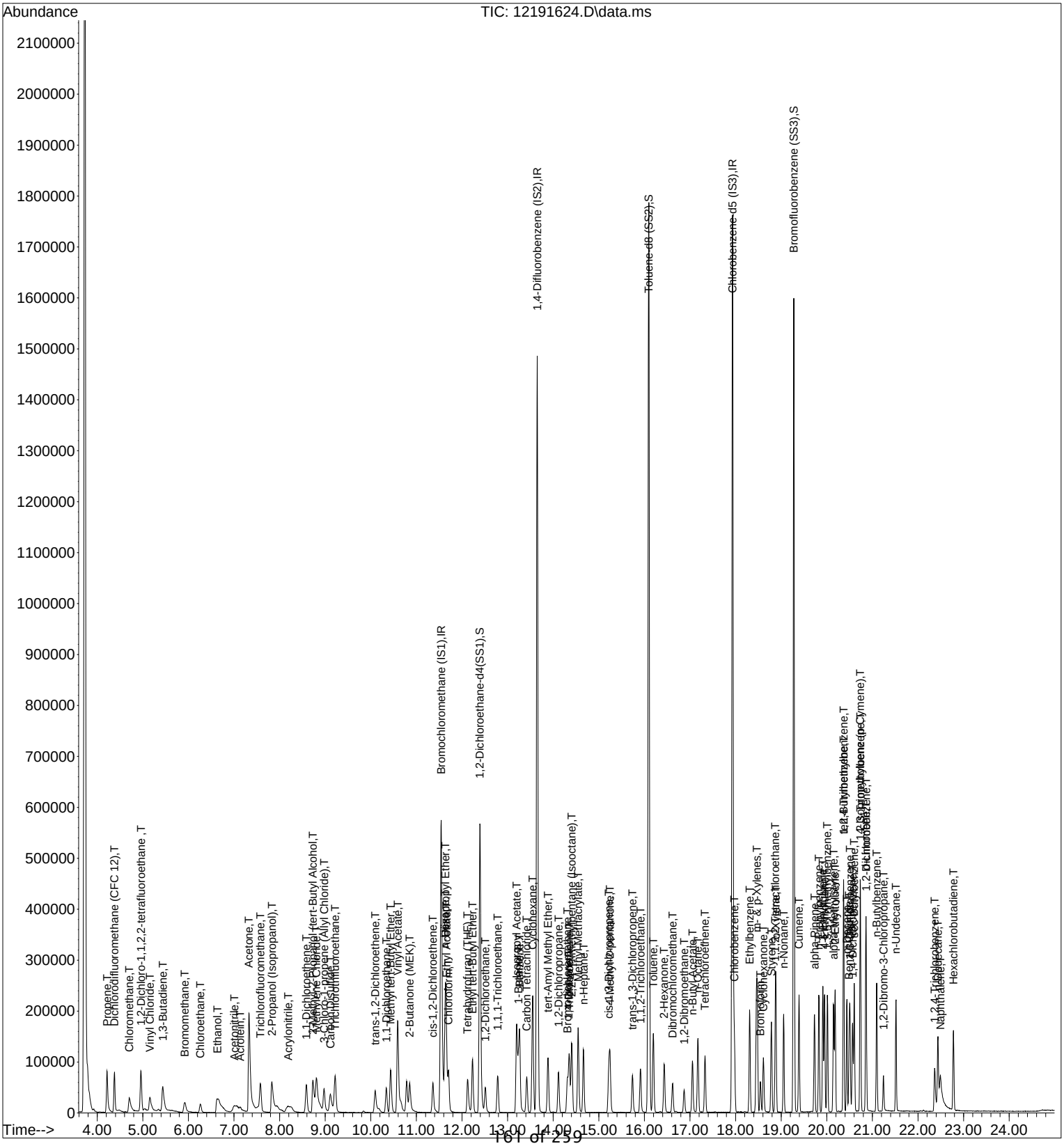
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	14.55	100	26894	2.300 ng	98
51) n-Heptane	14.67	71	32479	1.056 ng	100
52) cis-1,3-Dichloropropene	15.22	75	56609	1.159 ng	99
53) 4-Methyl-2-pentanone	15.24	58	32528	1.082 ng	91
54) trans-1,3-Dichloropropene	15.74	75	48271	1.114 ng	99
55) 1,1,2-Trichloroethane	15.92	97	32416	1.118 ng	98
58) Toluene	16.20	91	131845	1.122 ng	99
59) 2-Hexanone	16.43	43	83179	1.109 ng	99
60) Dibromochloromethane	16.62	129	36746	1.141 ng	100
61) 1,2-Dibromoethane	16.87	107	36801	1.111 ng	99
62) n-Butyl Acetate	17.05	43	91437	1.067 ng	99
63) n-Octane	17.17	57	30021	1.073 ng	98
64) Tetrachloroethene	17.33	166	36051	1.101 ng	98
65) Chlorobenzene	17.97	112	88550	1.101 ng	100
66) Ethylbenzene	18.31	91	154958	1.104 ng	99
67) m- & p-Xylenes	18.47	91	238842	2.243 ng	99
68) Bromoform	18.54	173	29895	1.160 ng	100
69) Styrene	18.79	104	92032	1.122 ng	100
70) o-Xylene	18.89	91	120193	1.123 ng	99
71) n-Nonane	19.06	43	71839	1.070 ng	96
72) 1,1,2,2-Tetrachloroethane	18.87	83	57693	1.119 ng	100
74) Cumene	19.39	105	150969	1.179 ng	99
75) alpha-Pinene	19.73	93	76994	1.101 ng	99
76) n-Propylbenzene	19.83	91	186295	1.151 ng	98
77) 3-Ethyltoluene	19.91	105	146689	1.075 ng	97
78) 4-Ethyltoluene	19.95	105	145514	1.204 ng	93
79) 1,3,5-Trimethylbenzene	20.01	105	121137	1.086 ng	99
80) alpha-Methylstyrene	20.15	118	64190	1.214 ng	99
81) 2-Ethyltoluene	20.18	105	146185	1.129 ng	100
82) 1,2,4-Trimethylbenzene	20.37	105	124924	1.140 ng	99
83) n-Decane	20.44	57	69520	1.064 ng	99
84) Benzyl Chloride	20.49	91	93026	1.104 ng	97
85) 1,3-Dichlorobenzene	20.51	146	70806	1.223 ng	100
86) 1,4-Dichlorobenzene	20.57	146	70454	1.071 ng	99
87) sec-Butylbenzene	20.60	105	166968	1.170 ng	99
88) 4-Isopropyltoluene (p-...	20.73	119	151070	1.150 ng	99
89) 1,2,3-Trimethylbenzene	20.74	105	124106	1.109 ng	98
90) 1,2-Dichlorobenzene	20.86	146	69762	1.181 ng	100
91) d-Limonene	20.86	68	49971	1.151 ng	98
92) 1,2-Dibromo-3-Chloropr...	21.24	157	21668	1.095 ng	90
93) n-Undecane	21.52	57	70840	1.050 ng	99
94) 1,2,4-Trichlorobenzene	22.37	180	45322	1.117 ng	100
95) Naphthalene	22.49	128	129578	1.169 ng	100
96) n-Dodecane	22.44	57	67309	1.095 ng	98
97) Hexachlorobutadiene	22.78	225	30228	1.104 ng	100
98) Cyclohexanone	18.61	55	50567	1.074 ng	99
99) tert-Butylbenzene	20.37	119	121153	1.177 ng	99
100) n-Butylbenzene	21.10	91	139532	1.182 ng	96

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191624.D
Acq On : 20 Dec 2016 2:13 Operator: LH
Sample : 1.0ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191605 (1/17)
ALS Vial : 9 Sample Multiplier: 1

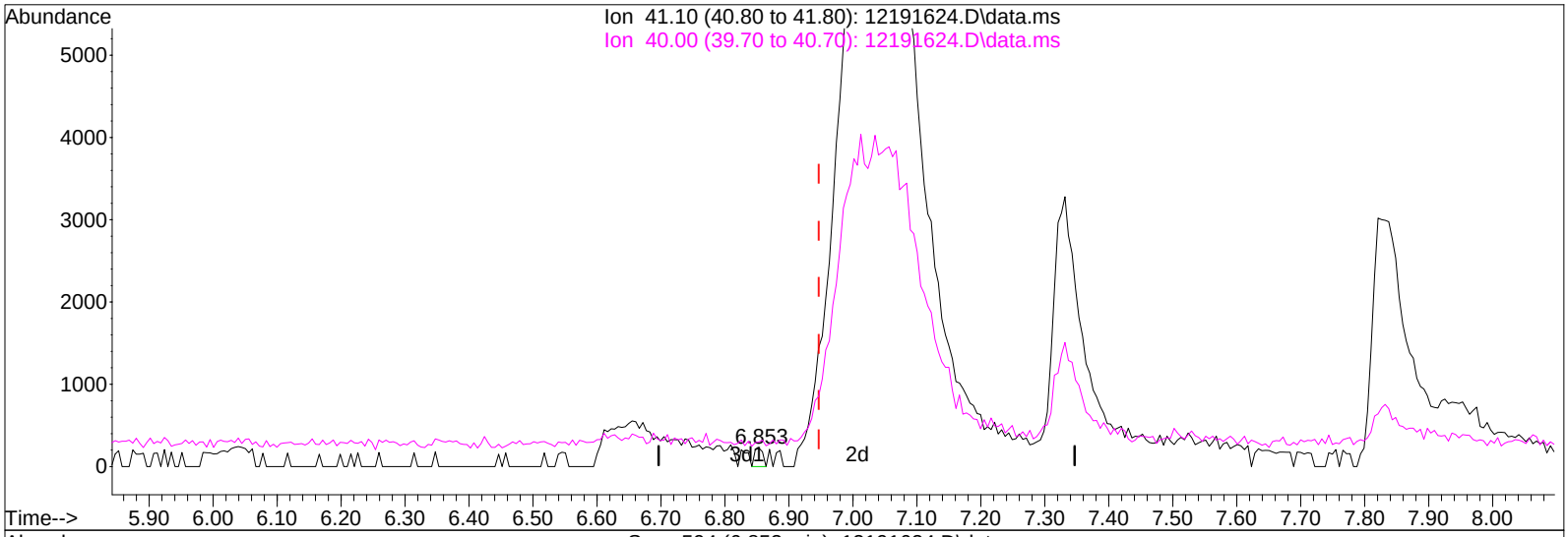
Quant Time: Dec 20 09:54:12 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

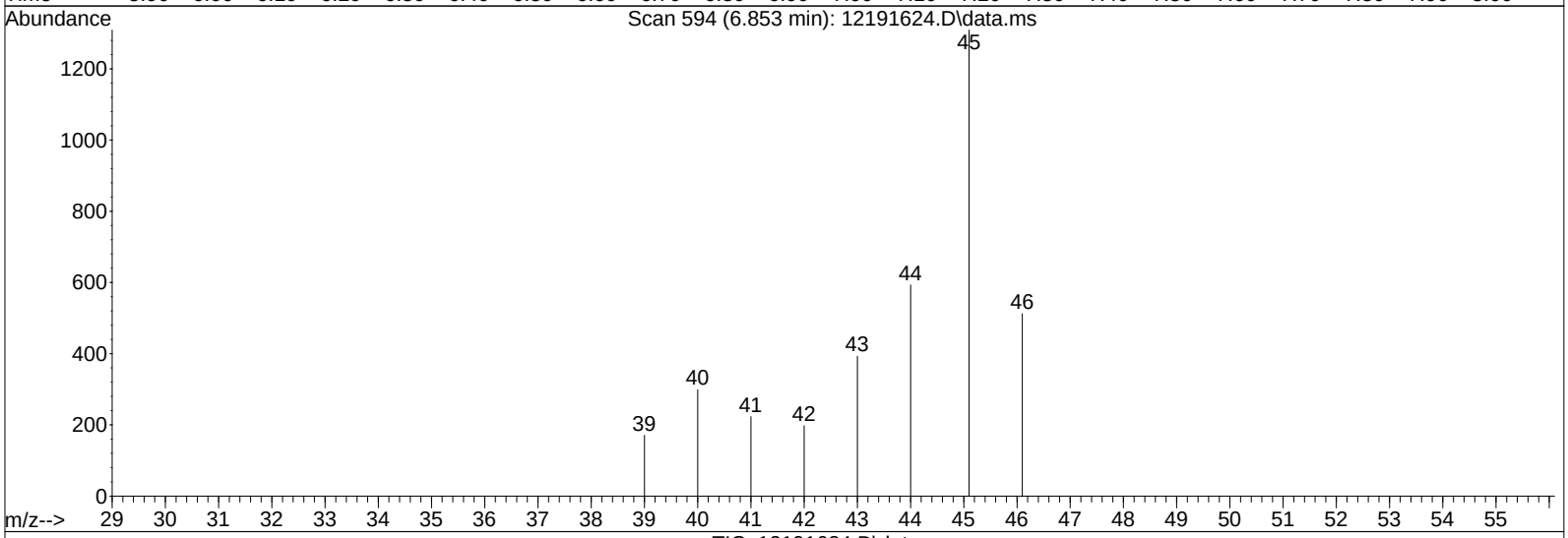


Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191624.D
Acq On : 20 Dec 2016 2:13 Operator: LH
Sample : 1.0ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191605 (1/17)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Dec 20 08:57:39 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191624.D\data.ms

(11) Acetonitrile (T)

6.853min (-0.094) 0.00ng

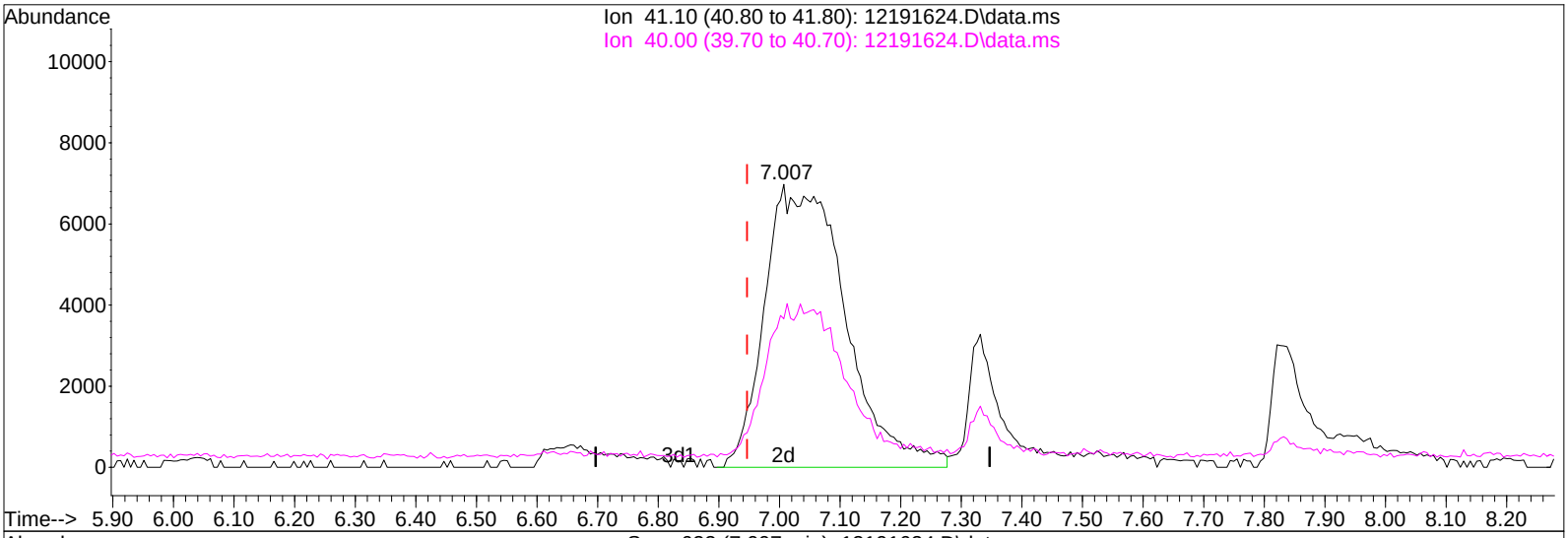
response 201

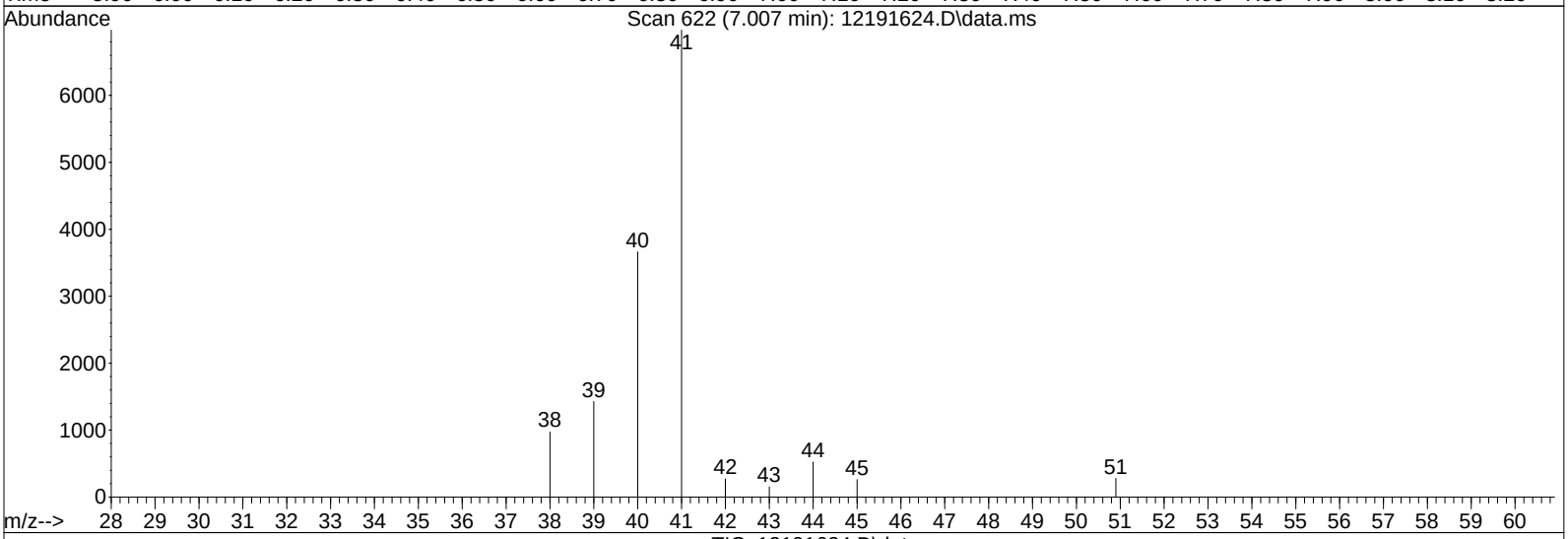
Ion	Exp%	Act%
41.10	100	100
40.00	54.30	42.79
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191624.D
Acq On : 20 Dec 2016 2:13 Operator: LH
Sample : 1.0ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191605 (1/17)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Dec 20 08:57:39 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191624.D\data.ms

(11) Acetonitrile (T)

7.007min (+0.060) 1.01ng m

response 64313

Ion	Exp%	Act%
41.10	100	100
40.00	54.30	0.13#
0.00	0.00	0.00
0.00	0.00	0.00

MP

LH 12/20/16

12/30/16

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191625.D
Acq On : 20 Dec 2016 2:46 Operator: LH
Sample : 5.0ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191605 (1/17)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Dec 20 08:57:41 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS) LH 12/20/16
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.54	130	274566	12.500	ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.65	114	1362305	12.500	ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.93	82	583787	12.500	ng	0.00

System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.40	65	491596	13.686	ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 109.52%			
57) Toluene-d8 (SS2)	16.10	98	1393526	12.531	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.24%			
73) Bromofluorobenzene (SS3)	19.28	174	453121	12.691	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 101.52%			

Target Compounds							Qvalue
2) Propene	4.19	42	172991	4.873	ng		99
3) Dichlorodifluoromethan...	4.36	85	323912	5.620	ng		100
4) Chloromethane	4.68	50	253241	5.411	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.95	135	170104	5.639	ng		100
6) Vinyl Chloride	5.13	62	261376	5.583	ng		99
7) 1,3-Butadiene	5.41	54	192137	6.324	ng		99
8) Bromomethane	5.89	94	132068	4.933	ng		98
9) Chloroethane	6.24	64	105067	4.789	ng		99
10) Ethanol	6.63	45	560933	23.176	ng		99
11) Acetonitrile	6.94	41	280547	4.528	ng		100
12) Acrolein	7.12	56	99123	4.257	ng		100
13) Acetone	7.32	58	586134	24.947	ng		92
14) Trichlorofluoromethane	7.57	101	272066	5.427	ng		100
15) 2-Propanol (Isopropanol)	7.83	45	810563	10.064	ng		97
16) Acrylonitrile	8.13	53	204653	4.862	ng		100
17) 1,1-Dichloroethene	8.57	96	141640	5.396	ng		100
18) 2-Methyl-2-Propanol (t...	8.73	59	838580	10.755	ng		99
19) Methylene Chloride	8.80	84	153828	4.889	ng		98
20) 3-Chloro-1-propene (Al...	8.96	41	232385	4.859	ng		98
21) Trichlorotrifluoroethane	9.21	151	133118	5.311	ng		100
22) Carbon Disulfide	9.10	76	560695	5.212	ng		96
23) trans-1,2-Dichloroethene	10.09	61	228955	5.258	ng		100
24) 1,1-Dichloroethane	10.34	63	273816	4.944	ng		99
25) Methyl tert-Butyl Ether	10.43	73	479196	5.364	ng		99
26) Vinyl Acetate	10.59	86	176958	26.892	ng	#	81
27) 2-Butanone (MEK)	10.85	72	105448	5.016	ng		99
28) cis-1,2-Dichloroethene	11.36	61	225138	5.289	ng		100
29) Diisopropyl Ether	11.64	87	126228	4.807	ng	#	93
30) Ethyl Acetate	11.65	61	120800	10.757	ng		99
31) n-Hexane	11.63	57	261332	5.138	ng		100
32) Chloroform	11.71	83	279846	5.369	ng		100
34) Tetrahydrofuran (THF)	12.12	72	103208	4.802	ng		99
35) Ethyl tert-Butyl Ether	12.23	87	181749	5.336	ng		99
36) 1,2-Dichloroethane	12.51	62	226792	5.724	ng		100
38) 1,1,1-Trichloroethane	12.79	97	247382	5.553	ng		100
39) Isopropyl Acetate	13.19	61	206147	10.138	ng		97
40) 1-Butanol	13.22	56	338395	10.634	ng		94
41) Benzene	13.27	78	611386	4.604	ng		100
42) Carbon Tetrachloride	13.42	117	215572	5.635	ng		100
43) Cyclohexane	13.55	84	468540	10.496	ng		100
44) tert-Amyl Methyl Ether	13.88	73	450516	5.203	ng		99
45) 1,2-Dichloropropane	14.12	63	156332	4.836	ng		100
46) Bromodichloromethane	14.31	83	224462	5.692	ng		99
47) Trichloroethene	14.35	130	161956	5.287	ng		99
48) 1,4-Dioxane	14.33	88	129682	5.047	ng		100
49) 2,2,4-Trimethylpentane...	14.41	57	659279	4.905	ng		99

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191625.D
Acq On : 20 Dec 2016 2:46 Operator: LH
Sample : 5.0ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191605 (1/17)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Dec 20 08:57:41 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

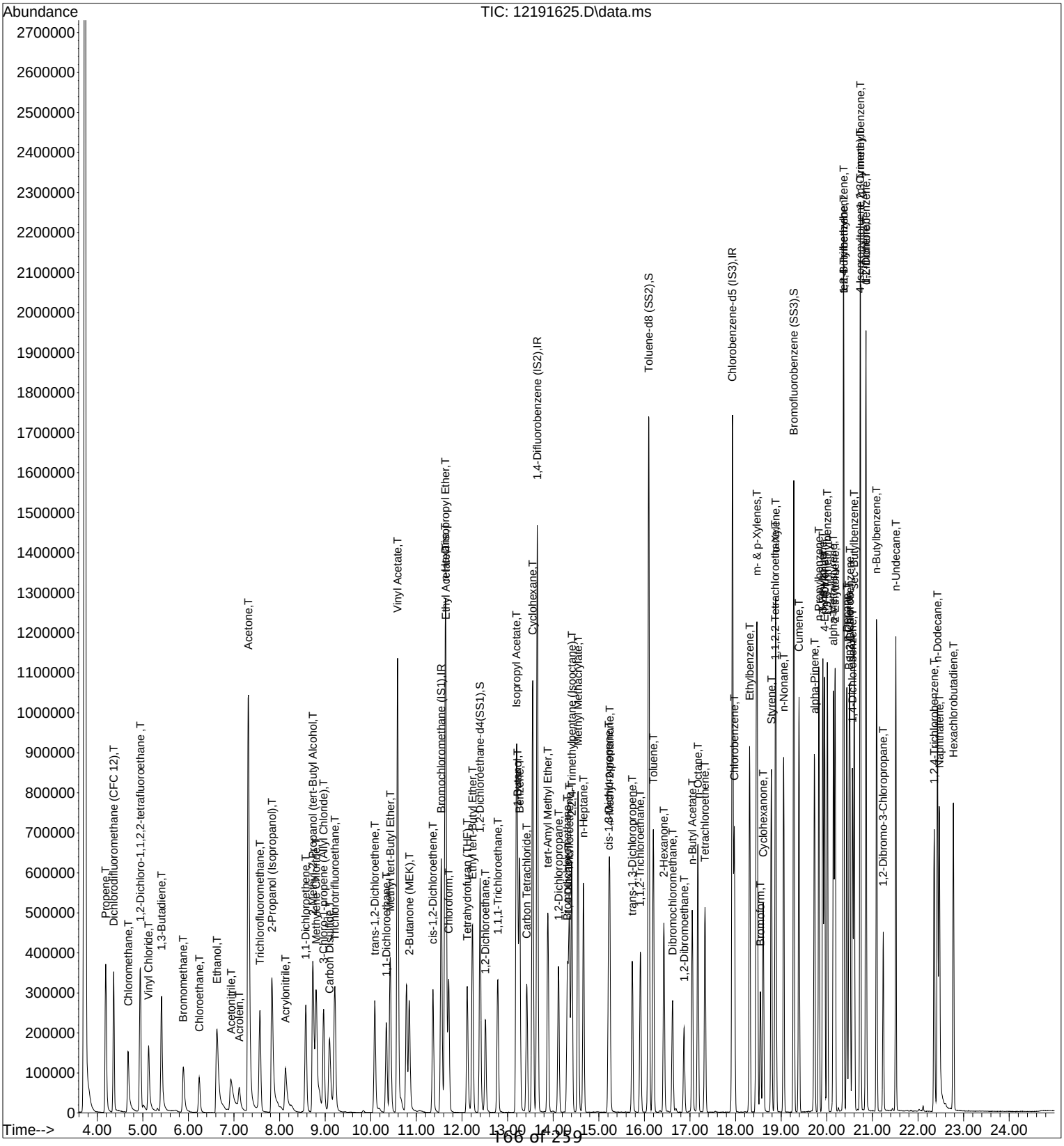
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
50) Methyl Methacrylate	14.55	100	126982	11.045	ng	99
51) n-Heptane	14.66	71	150996	4.994	ng	99
52) cis-1,3-Dichloropropene	15.22	75	275944	5.746	ng	100
53) 4-Methyl-2-pentanone	15.24	58	152598	5.164	ng	97
54) trans-1,3-Dichloropropene	15.73	75	240927	5.656	ng	100
55) 1,1,2-Trichloroethane	15.91	97	150862	5.293	ng	99
58) Toluene	16.20	91	612219	5.311	ng	100
59) 2-Hexanone	16.43	43	400582	5.441	ng	98
60) Dibromochloromethane	16.62	129	180990	5.725	ng	100
61) 1,2-Dibromoethane	16.87	107	176174	5.419	ng	100
62) n-Butyl Acetate	17.05	43	440951	5.244	ng	99
63) n-Octane	17.18	57	136383	4.968	ng	99
64) Tetrachloroethene	17.33	166	169034	5.260	ng	100
65) Chlorobenzene	17.97	112	407405	5.160	ng	100
66) Ethylbenzene	18.31	91	714615	5.186	ng	99
67) m- & p-Xylenes	18.47	91	1113508	10.657	ng	99
68) Bromoform	18.54	173	150697	5.958	ng	100
69) Styrene	18.79	104	445051	5.530	ng	100
70) o-Xylene	18.88	91	567381	5.401	ng	99
71) n-Nonane	19.06	43	330213	5.010	ng	98
72) 1,1,2,2-Tetrachloroethane	18.87	83	285183	5.634	ng	99
74) Cumene	19.39	105	704833	5.611	ng	99
75) alpha-Pinene	19.73	93	366284	5.335	ng	99
76) n-Propylbenzene	19.83	91	881174	5.550	ng	98
77) 3-Ethyltoluene	19.91	105	695890	5.194	ng	96
78) 4-Ethyltoluene	19.95	105	681706	5.748	ng	94
79) 1,3,5-Trimethylbenzene	20.01	105	583332	5.328	ng	99
80) alpha-Methylstyrene	20.14	118	318182	6.132	ng	99
81) 2-Ethyltoluene	20.18	105	696590	5.483	ng	99
82) 1,2,4-Trimethylbenzene	20.37	105	607523	5.647	ng	99
83) n-Decane	20.44	57	333533	5.202	ng	100
84) Benzyl Chloride	20.49	91	530116	6.412	ng	99
85) 1,3-Dichlorobenzene	20.51	146	343245	6.041	ng	100
86) 1,4-Dichlorobenzene	20.56	146	347364	5.379	ng	100
87) sec-Butylbenzene	20.60	105	789502	5.635	ng	99
88) 4-Isopropyltoluene (p-...	20.73	119	732453	5.681	ng	98
89) 1,2,3-Trimethylbenzene	20.74	105	599404	5.457	ng	98
90) 1,2-Dichlorobenzene	20.86	146	336998	5.812	ng	99
91) d-Limonene	20.86	68	248824	5.840	ng	98
92) 1,2-Dibromo-3-Chloropr...	21.24	157	117743	6.063	ng	95
93) n-Undecane	21.51	57	346298	5.229	ng	99
94) 1,2,4-Trichlorobenzene	22.36	180	246071	6.179	ng	100
95) Naphthalene	22.47	128	770737	7.086	ng	100
96) n-Dodecane	22.43	57	335656	5.564	ng	100
97) Hexachlorobutadiene	22.78	225	152374	5.669	ng	100
98) Cyclohexanone	18.60	55	237948	5.148	ng	100
99) tert-Butylbenzene	20.37	119	579259	5.735	ng	100
100) n-Butylbenzene	21.09	91	662158	5.716	ng	99

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191625.D
Acq On : 20 Dec 2016 2:46 Operator: LH
Sample : 5.0ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191605 (1/17)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Dec 20 08:57:41 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191626.D
Acq On : 20 Dec 2016 3:19 Operator: LH
Sample : 25ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:42 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.56	130	300261	12.500	ng	0.00
37) 1,4-Difluorobenzene (IS2)	13.66	114	1458864	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	17.93	82	643369	12.500	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.41	65	532918	13.567	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 108.56%			
57) Toluene-d8 (SS2)	16.10	98	1520400	12.406	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.28%			
73) Bromofluorobenzene (SS3)	19.28	174	499274	12.689	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 101.52%			

Target Compounds						Qvalue
2) Propene	4.18	42	1008395	25.973	ng	100
3) Dichlorodifluoromethan...	4.36	85	1965498	31.185	ng	100
4) Chloromethane	4.68	50	1553377	30.351	ng	100
5) 1,2-Dichloro-1,1,2,2-t...	4.95	135	1020133	30.922	ng	100
6) Vinyl Chloride	5.13	62	1588635	31.029	ng	100
7) 1,3-Butadiene	5.41	54	1234683	37.163	ng	100
8) Bromomethane	5.89	94	802417	27.407	ng	100
9) Chloroethane	6.24	64	654892	27.295	ng	100
10) Ethanol	6.68	45	3687842	139.329	ng	100
11) Acetonitrile	6.95	41	1737821	25.650	ng	100
12) Acrolein	7.13	56	587846	23.083	ng	100
13) Acetone	7.34	58	3827877	148.981	ng	100
14) Trichlorofluoromethane	7.57	101	1633337	29.791	ng	100
15) 2-Propanol (Isopropanol)	7.88	45	5406782	61.388	ng	100
16) Acrylonitrile	8.15	53	1279841	27.802	ng	100
17) 1,1-Dichloroethene	8.58	96	892434	31.092	ng	100
18) 2-Methyl-2-Propanol (t...	8.77	59	5529837	64.851	ng	100
19) Methylene Chloride	8.82	84	946475	27.507	ng	100
20) 3-Chloro-1-propene (Al...	8.98	41	1478909	28.275	ng	100
21) Trichlorotrifluoroethane	9.22	151	812915	29.655	ng	100
22) Carbon Disulfide	9.09	76	3441195	29.252	ng	100
23) trans-1,2-Dichloroethene	10.10	61	1437199	30.181	ng	100
24) 1,1-Dichloroethane	10.36	63	1675734	27.669	ng	100
25) Methyl tert-Butyl Ether	10.43	73	2955288	30.252	ng	100
26) Vinyl Acetate	10.60	86	1276200	177.348	ng	100
27) 2-Butanone (MEK)	10.85	72	657523	28.600	ng	100
28) cis-1,2-Dichloroethene	11.38	61	1406043	30.205	ng	100
29) Diisopropyl Ether	11.64	87	847497	29.514	ng	100
30) Ethyl Acetate	11.66	61	819350	66.716	ng	100
31) n-Hexane	11.64	57	1691828	30.416	ng	100
32) Chloroform	11.73	83	1710002	30.002	ng	100
34) Tetrahydrofuran (THF)	12.12	72	638254	27.154	ng	100
35) Ethyl tert-Butyl Ether	12.24	87	1151380	30.910	ng	100
36) 1,2-Dichloroethane	12.52	62	1402084	32.360	ng	100
38) 1,1,1-Trichloroethane	12.79	97	1525853	31.982	ng	100
39) Isopropyl Acetate	13.20	61	1362137	62.554	ng	100
40) 1-Butanol	13.23	56	2423188	71.110	ng	100
41) Benzene	13.27	78	3763293	26.464	ng	100
42) Carbon Tetrachloride	13.43	117	1353759	33.047	ng	100
43) Cyclohexane	13.56	84	3077226	64.372	ng	100
44) tert-Amyl Methyl Ether	13.89	73	2868398	30.932	ng	100
45) 1,2-Dichloropropane	14.12	63	970813	28.044	ng	100
46) Bromodichloromethane	14.32	83	1440290	34.106	ng	100
47) Trichloroethene	14.36	130	1033587	31.507	ng	100
48) 1,4-Dioxane	14.33	88	847041	30.783	ng	100
49) 2,2,4-Trimethylpentane...	14.41	57	4133269	28.714	ng	100

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191626.D
Acq On : 20 Dec 2016 3:19 Operator: LH
Sample : 25ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:42 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

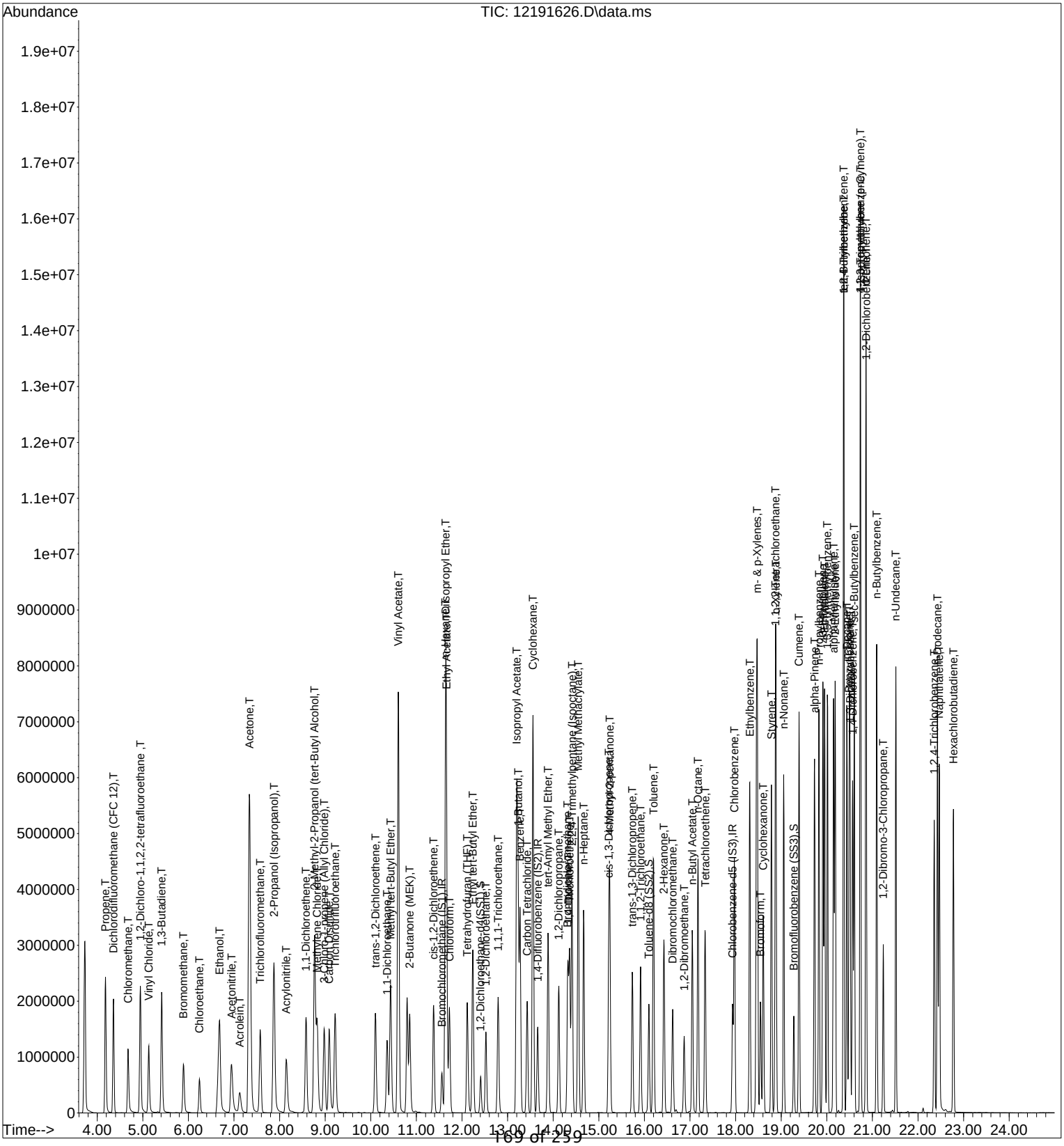
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	14.55	100	832320	67.607 ng	100
51) n-Heptane	14.67	71	937645	28.961 ng	100
52) cis-1,3-Dichloropropene	15.22	75	1815211	35.299 ng	100
53) 4-Methyl-2-pentanone	15.24	58	1001930	31.661 ng	100
54) trans-1,3-Dichloropropene	15.73	75	1579463	34.624 ng	100
55) 1,1,2-Trichloroethane	15.92	97	942337	30.872 ng	100
58) Toluene	16.20	91	3855230	30.346 ng	100
59) 2-Hexanone	16.43	43	2540913	31.318 ng	100
60) Dibromochloromethane	16.62	129	1171096	33.614 ng	100
61) 1,2-Dibromoethane	16.87	107	1105186	30.847 ng	100
62) n-Butyl Acetate	17.05	43	2807744	30.297 ng	100
63) n-Octane	17.18	57	876344	28.967 ng	100
64) Tetrachloroethene	17.33	166	1073124	30.301 ng	100
65) Chlorobenzene	17.97	112	2638707	30.326 ng	100
66) Ethylbenzene	18.31	91	4628156	30.478 ng	100
67) m- & p-Xylenes	18.47	91	7505389	65.178 ng	100
68) Bromoform	18.54	173	1020863	36.624 ng	100
69) Styrene	18.79	104	2903328	32.735 ng	100
70) o-Xylene	18.89	91	3789054	32.730 ng	100
71) n-Nonane	19.06	43	2151021	29.612 ng	100
72) 1,1,2,2-Tetrachloroethane	18.87	83	1931546	34.628 ng	100
74) Cumene	19.39	105	4609627	33.295 ng	100
75) alpha-Pinene	19.73	93	2467306	32.608 ng	100
76) n-Propylbenzene	19.83	91	5698324	32.564 ng	100
77) 3-Ethyltoluene	19.91	105	4902800	33.207 ng	100
78) 4-Ethyltoluene	19.95	105	4257540	32.574 ng	100
79) 1,3,5-Trimethylbenzene	20.01	105	3875045	32.116 ng	100
80) alpha-Methylstyrene	20.15	118	2154463	37.678 ng	100
81) 2-Ethyltoluene	20.18	105	4622691	33.016 ng	100
82) 1,2,4-Trimethylbenzene	20.37	105	4379832	36.943 ng	100
83) n-Decane	20.44	57	2241515	31.725 ng	100
84) Benzyl Chloride	20.49	91	3847795	42.232 ng	100
85) 1,3-Dichlorobenzene	20.51	146	2325406	37.134 ng	100
86) 1,4-Dichlorobenzene	20.57	146	2277699	32.003 ng	100
87) sec-Butylbenzene	20.60	105	5144001	33.317 ng	100
88) 4-Isopropyltoluene (p-...	20.74	119	5067027	35.658 ng	100
89) 1,2,3-Trimethylbenzene	20.74	105	4281623	35.373 ng	100
90) 1,2-Dichlorobenzene	20.86	146	2331718	36.491 ng	100
91) d-Limonene	20.86	68	1821853	38.801 ng	100
92) 1,2-Dibromo-3-Chloropr...	21.24	157	792241	37.019 ng	100
93) n-Undecane	21.51	57	2341676	32.086 ng	100
94) 1,2,4-Trichlorobenzene	22.36	180	1649154	37.578 ng	100
95) Naphthalene	22.47	128	5150243	42.964 ng	100
96) n-Dodecane	22.43	57	2149666	32.331 ng	100
97) Hexachlorobutadiene	22.78	225	1040984	35.143 ng	100
98) Cyclohexanone	18.60	55	1552070	30.471 ng	100
99) tert-Butylbenzene	20.37	119	4045821	36.344 ng	100
100) n-Butylbenzene	21.10	91	4331265	33.925 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191626.D
Acq On : 20 Dec 2016 3:19 Operator: LH
Sample : 25ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:42 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191627.D
Acq On : 20 Dec 2016 3:52 Operator: LH
Sample : 50ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:45 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS) LH 12/20/16
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.57	130	315445	12.500	ng		0.01
37) 1,4-Difluorobenzene (IS2)	13.67	114	1537731	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	17.93	82	682922	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.42	65	566318	13.723	ng		0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 109.76%				
57) Toluene-d8 (SS2)	16.10	98	1603043	12.323	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.56%				
73) Bromofluorobenzene (SS3)	19.28	174	519610	12.441	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.52%				
Target Compounds							Qvalue
2) Propene	4.19	42	2203767	54.029	ng		99
3) Dichlorodifluoromethan...	4.36	85	3887109	58.705	ng		100
4) Chloromethane	4.68	50	3029186	56.338	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.96	135	2019789	58.276	ng		100
6) Vinyl Chloride	5.14	62	3189329	59.295	ng		100
7) 1,3-Butadiene	5.42	54	2542966	72.858	ng		99
8) Bromomethane	5.90	94	1605423	52.194	ng		100
9) Chloroethane	6.25	64	1313374	52.105	ng		100
10) Ethanol	6.72	45	7753505	278.833	ng		100
11) Acetonitrile	6.96	41	3506029	49.258	ng		100
12) Acrolein	7.13	56	1184215	44.263	ng		100
13) Acetone	7.36	58	7882532	292.022	ng		90
14) Trichlorofluoromethane	7.58	101	3292962	57.170	ng		100
15) 2-Propanol (Isopropanol)	7.90	45	10609071	114.655	ng		99
16) Acrylonitrile	8.17	53	2590588	53.567	ng		100
17) 1,1-Dichloroethene	8.59	96	1812953	60.122	ng		100
18) 2-Methyl-2-Propanol (t...	8.79	59	11491299	128.277	ng		99
19) Methylene Chloride	8.83	84	1948502	53.903	ng		100
20) 3-Chloro-1-propene (Al...	8.98	41	3011770	54.810	ng		100
21) Trichlorotrifluoroethane	9.22	151	1651899	57.361	ng		100
22) Carbon Disulfide	9.09	76	6882703	55.690	ng		99
23) trans-1,2-Dichloroethene	10.11	61	2922284	58.414	ng		100
24) 1,1-Dichloroethane	10.37	63	3365912	52.901	ng		100
25) Methyl tert-Butyl Ether	10.44	73	5981263	58.280	ng		100
26) Vinyl Acetate	10.62	86	2757360	364.733	ng	#	53
27) 2-Butanone (MEK)	10.86	72	1374411	56.904	ng		98
28) cis-1,2-Dichloroethene	11.38	61	2849913	58.276	ng		100
29) Diisopropyl Ether	11.65	87	1795400	59.516	ng	#	94
30) Ethyl Acetate	11.67	61	1787842	138.569	ng		99
31) n-Hexane	11.64	57	3659839	62.631	ng		100
32) Chloroform	11.74	83	3455346	57.707	ng		100
34) Tetrahydrofuran (THF)	12.12	72	1311419	53.107	ng		99
35) Ethyl tert-Butyl Ether	12.24	87	2378967	60.791	ng		99
36) 1,2-Dichloroethane	12.53	62	2851613	62.647	ng		100
38) 1,1,1-Trichloroethane	12.80	97	3116416	61.970	ng		100
39) Isopropyl Acetate	13.20	61	2948766	128.473	ng	#	88
40) 1-Butanol	13.24	56	5173592	144.037	ng		96
41) Benzene	13.28	78	7871939	52.517	ng		100
42) Carbon Tetrachloride	13.44	117	2762864	63.987	ng		100
43) Cyclohexane	13.56	84	6416063	127.333	ng		99
44) tert-Amyl Methyl Ether	13.89	73	5901544	60.377	ng		99
45) 1,2-Dichloropropane	14.13	63	1991051	54.566	ng		100
46) Bromodichloromethane	14.32	83	3018808	67.818	ng		100
47) Trichloroethene	14.36	130	2155354	62.331	ng		100
48) 1,4-Dioxane	14.34	88	1799139	62.031	ng		98
49) 2,2,4-Trimethylpentane...	14.41	57	8398743	55.353	ng		99

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191627.D
Acq On : 20 Dec 2016 3:52 Operator: LH
Sample : 50ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:45 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

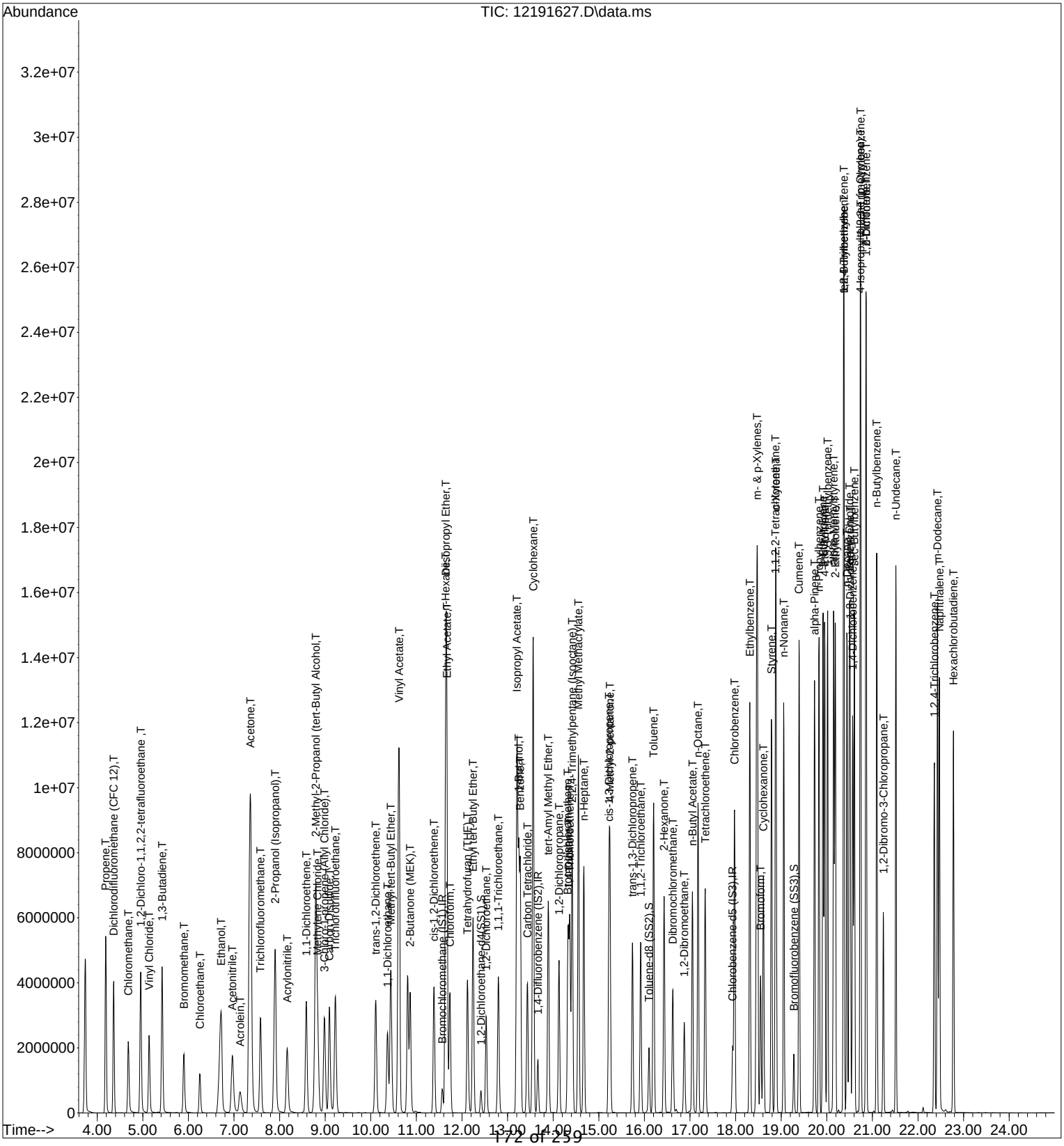
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
50) Methyl Methacrylate	14.55	100	1757607	135.443	ng	99
51) n-Heptane	14.67	71	1973639	57.833	ng	100
52) cis-1,3-Dichloropropene	15.22	75	3813352	70.353	ng	100
53) 4-Methyl-2-pentanone	15.24	58	2105888	63.134	ng	97
54) trans-1,3-Dichloropropene	15.74	75	3251354	67.618	ng	100
55) 1,1,2-Trichloroethane	15.92	97	1921774	59.730	ng	100
58) Toluene	16.20	91	7906025	58.627	ng	99
59) 2-Hexanone	16.43	43	5190566	60.270	ng	98
60) Dibromochloromethane	16.63	129	2411325	65.205	ng	100
61) 1,2-Dibromoethane	16.87	107	2240638	58.917	ng	100
62) n-Butyl Acetate	17.05	43	5713152	58.078	ng	99
63) n-Octane	17.17	57	1864618	58.064	ng	100
64) Tetrachloroethene	17.33	166	2211852	58.837	ng	100
65) Chlorobenzene	17.98	112	5437320	58.870	ng	100
66) Ethylbenzene	18.31	91	9496091	58.912	ng	99
67) m- & p-Xylenes	18.47	91	15358117	125.648	ng	99
68) Bromoform	18.55	173	2106676	71.201	ng	100
69) Styrene	18.79	104	5985604	63.579	ng	99
70) o-Xylene	18.89	91	7821769	63.652	ng	100
71) n-Nonane	19.06	43	4506167	58.442	ng	98
72) 1,1,2,2-Tetrachloroethane	18.87	83	4041761	68.262	ng	100
74) Cumene	19.39	105	9355302	63.660	ng	98
75) alpha-Pinene	19.73	93	5197572	64.713	ng	100
76) n-Propylbenzene	19.83	91	11288361	60.773	ng	98
77) 3-Ethyltoluene	19.92	105	9675999	61.740	ng	99
78) 4-Ethyltoluene	19.95	105	8789793	63.354	ng	99
79) 1,3,5-Trimethylbenzene	20.02	105	7926510	61.888	ng	100
80) alpha-Methylstyrene	20.15	118	4429813	72.984	ng	99
81) 2-Ethyltoluene	20.19	105	9246623	62.216	ng	99
82) 1,2,4-Trimethylbenzene	20.38	105	8285271	65.837	ng	98
83) n-Decane	20.44	57	4767841	63.573	ng	100
84) Benzyl Chloride	20.50	91	8110314	83.860	ng	100
85) 1,3-Dichlorobenzene	20.51	146	4668897	70.238	ng	100
86) 1,4-Dichlorobenzene	20.57	146	4657427	61.650	ng	100
87) sec-Butylbenzene	20.61	105	10080080	61.506	ng	98
88) 4-Isopropyltoluene (p-...	20.74	119	9147023	60.643	ng	97
89) 1,2,3-Trimethylbenzene	20.74	105	8096163	63.013	ng	98
90) 1,2-Dichlorobenzene	20.86	146	4485305	66.129	ng	100
91) d-Limonene	20.86	68	3730226	74.844	ng	99
92) 1,2-Dibromo-3-Chloropr...	21.24	157	1652550	72.746	ng	98
93) n-Undecane	21.51	57	5077136	65.538	ng	100
94) 1,2,4-Trichlorobenzene	22.36	180	3474797	74.591	ng	99
95) Naphthalene	22.47	128	10469752	82.282	ng	99
96) n-Dodecane	22.43	57	4706948	66.692	ng	99
97) Hexachlorobutadiene	22.78	225	2211494	70.334	ng	100
98) Cyclohexanone	18.61	55	3174201	58.707	ng	99
99) tert-Butylbenzene	20.38	119	7458368	63.119	ng	100
100) n-Butylbenzene	21.10	91	8750025	64.566	ng	98

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191627.D
Acq On : 20 Dec 2016 3:52 Operator: LH
Sample : 50ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:45 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191628.D
Acq On : 20 Dec 2016 4:25 Operator: LH
Sample : 100ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:47 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.58	130	329273	12.500	ng	0.02
37) 1,4-Difluorobenzene (IS2)	13.67	114	1591058	12.500	ng	0.01
56) Chlorobenzene-d5 (IS3)	17.93	82	721832	12.500	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.42	65	583840	13.554	ng	0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 108.40%			
57) Toluene-d8 (SS2)	16.10	98	1665906	12.116	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.96%			
73) Bromofluorobenzene (SS3)	19.28	174	540887	12.252	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.00%			

Target Compounds							Qvalue
2) Propene	4.19	42	6008959	141.134	ng		96
3) Dichlorodifluoromethan...	4.36	85	8043167	116.370	ng		99
4) Chloromethane	4.68	50	5589101	99.582	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.96	135	4060580	112.239	ng		100
6) Vinyl Chloride	5.14	62	6538231	116.451	ng		100
7) 1,3-Butadiene	5.42	54	5399660	148.207	ng		98
8) Bromomethane	5.90	94	3496795	108.911	ng		100
9) Chloroethane	6.25	64	2780718	105.686	ng		100
10) Ethanol	6.76	45	16883590	581.672	ng		99
11) Acetonitrile	6.99	41	7339130	98.782	ng		99
12) Acrolein	7.14	56	2483696	88.935	ng		100
13) Acetone	7.38	58	16812434	596.688	ng	#	61
14) Trichlorofluoromethane	7.58	101	6829163	113.583	ng		99
15) 2-Propanol (Isopropanol)	7.93	45	17522615	181.419	ng		99
16) Acrylonitrile	8.18	53	5449202	107.945	ng		100
17) 1,1-Dichloroethene	8.59	96	3806536	120.933	ng		99
18) 2-Methyl-2-Propanol (t...	8.82	59	23412841	250.381	ng		99
19) Methylene Chloride	8.84	84	4304984	114.092	ng		100
20) 3-Chloro-1-propene (Al...	8.99	41	6282009	109.522	ng		100
21) Trichlorotrifluoroethane	9.22	151	3445812	114.628	ng		99
22) Carbon Disulfide	9.10	76	14297695	110.829	ng		98
23) trans-1,2-Dichloroethene	10.11	61	6208655	118.894	ng		99
24) 1,1-Dichloroethane	10.37	63	7053876	106.207	ng		99
25) Methyl tert-Butyl Ether	10.44	73	12670326	118.271	ng		99
26) Vinyl Acetate	10.63	86	5343344	677.115	ng	#	1
27) 2-Butanone (MEK)	10.88	72	2982673	118.304	ng	#	92
28) cis-1,2-Dichloroethene	11.39	61	6046232	118.444	ng		100
29) Diisopropyl Ether	11.65	87	3695372	117.354	ng	#	73
30) Ethyl Acetate	11.68	61	3675126	272.883	ng		97
31) n-Hexane	11.64	57	7729185	126.715	ng		100
32) Chloroform	11.75	83	7083157	113.326	ng		100
34) Tetrahydrofuran (THF)	12.13	72	2830906	109.825	ng		98
35) Ethyl tert-Butyl Ether	12.25	87	5190600	127.069	ng		96
36) 1,2-Dichloroethane	12.54	62	5928544	124.774	ng		100
38) 1,1,1-Trichloroethane	12.80	97	6572961	126.324	ng		100
39) Isopropyl Acetate	13.21	61	6378183	268.573	ng	#	60
40) 1-Butanol	13.27	56	11112782	299.019	ng		92
41) Benzene	13.28	78	16424941	105.906	ng		98
42) Carbon Tetrachloride	13.44	117	5830576	130.508	ng		100
43) Cyclohexane	13.56	84	12926651	247.944	ng		97
44) tert-Amyl Methyl Ether	13.90	73	12610453	124.689	ng		98
45) 1,2-Dichloropropane	14.13	63	4291470	113.668	ng		100
46) Bromodichloromethane	14.33	83	6399081	138.938	ng		99
47) Trichloroethene	14.37	130	4493086	125.582	ng		100
48) 1,4-Dioxane	14.34	88	3917241	130.533	ng		93
49) 2,2,4-Trimethylpentane...	14.42	57	17120018	109.051	ng		99

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191628.D
Acq On : 20 Dec 2016 4:25 Operator: LH
Sample : 100ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:47 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

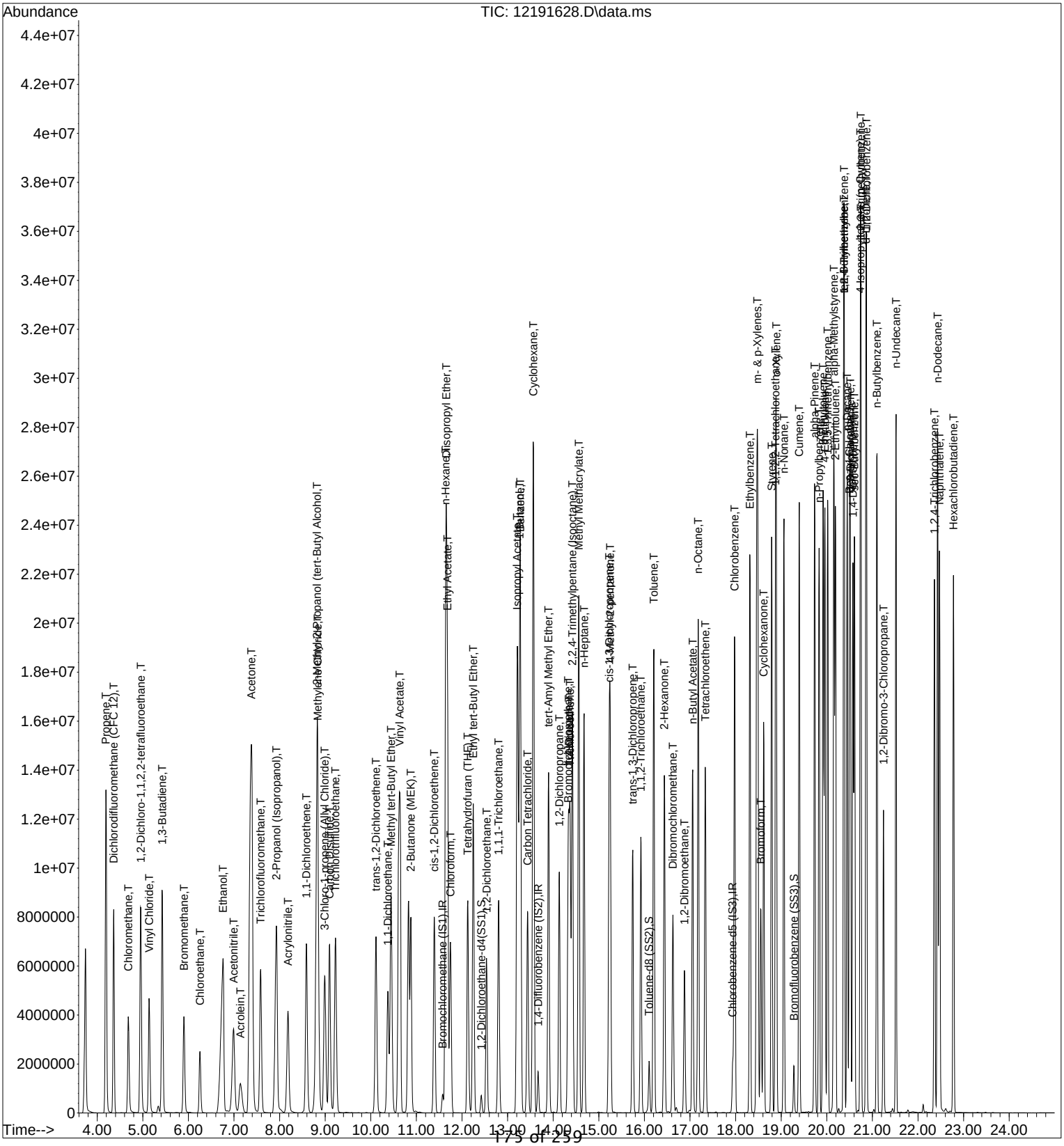
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
50) Methyl Methacrylate	14.56	100	3679489	274.042	ng	96
51) n-Heptane	14.68	71	4399434	124.594	ng	99
52) cis-1,3-Dichloropropene	15.23	75	8248548	147.077	ng	99
53) 4-Methyl-2-pentanone	15.25	58	4683120	135.693	ng	91
54) trans-1,3-Dichloropropene	15.75	75	6987802	140.453	ng	99
55) 1,1,2-Trichloroethane	15.92	97	4108624	123.418	ng	99
58) Toluene	16.21	91	15856097	111.243	ng	95
59) 2-Hexanone	16.44	43	10964453	120.451	ng	94
60) Dibromochloromethane	16.63	129	5097352	130.407	ng	99
61) 1,2-Dibromoethane	16.88	107	4696846	116.844	ng	100
62) n-Butyl Acetate	17.06	43	11910418	114.551	ng	96
63) n-Octane	17.18	57	4147708	122.196	ng	98
64) Tetrachloroethene	17.33	166	4609727	116.013	ng	99
65) Chlorobenzene	17.98	112	11107353	113.777	ng	98
66) Ethylbenzene	18.31	91	17038464	100.006	ng	90
67) m- & p-Xylenes	18.48	91	25235722	195.330	ng	91
68) Bromoform	18.56	173	4346874	138.996	ng	100
69) Styrene	18.79	104	11787997	118.463	ng	95
70) o-Xylene	18.89	91	13896416	106.991	ng	98
71) n-Nonane	19.06	43	9095628	111.605	ng	95
72) 1,1,2,2-Tetrachloroethane	18.87	83	7673756	122.617	ng	100
74) Cumene	19.40	105	16006089	103.045	ng	91
75) alpha-Pinene	19.73	93	10236511	120.580	ng	97
76) n-Propylbenzene	19.83	91	17367590	88.461	ng	85
77) 3-Ethyltoluene	19.92	105	17077463	103.093	ng	92
78) 4-Ethyltoluene	19.96	105	13768231	93.888	ng	91
79) 1,3,5-Trimethylbenzene	20.02	105	13834479	102.194	ng	96
80) alpha-Methylstyrene	20.16	118	8337402	129.960	ng	97
81) 2-Ethyltoluene	20.19	105	15494984	98.638	ng	93
82) 1,2,4-Trimethylbenzene	20.38	105	12799085	96.222	ng	100
83) n-Decane	20.45	57	9147243	115.392	ng	99
84) Benzyl Chloride	20.50	91	13922055	136.193	ng	96
85) 1,3-Dichlorobenzene	20.52	146	8283962	117.905	ng	99
86) 1,4-Dichlorobenzene	20.57	146	8587741	107.547	ng	99
87) sec-Butylbenzene	20.61	105	15937525	92.005	ng	91
88) 4-Isopropyltoluene (p-...	20.74	119	13537503	84.912	ng	93
89) 1,2,3-Trimethylbenzene	20.75	105	12341662	90.879	ng	99
90) 1,2-Dichlorobenzene	20.87	146	7334449	102.307	ng	99
91) d-Limonene	20.86	68	6001043	113.915	ng	100
92) 1,2-Dibromo-3-Chloropr...	21.24	157	3395976	141.434	ng	93
93) n-Undecane	21.52	57	9633509	117.651	ng	98
94) 1,2,4-Trichlorobenzene	22.36	180	6907903	140.295	ng	99
95) Naphthalene	22.47	128	17224604	128.072	ng	93
96) n-Dodecane	22.43	57	9492916	127.254	ng	98
97) Hexachlorobutadiene	22.78	225	4454502	134.033	ng	99
98) Cyclohexanone	18.62	55	6886299	120.498	ng	97
99) tert-Butylbenzene	20.38	119	11723693	93.867	ng	99
100) n-Butylbenzene	21.10	91	14415146	100.635	ng	90

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191628.D
Acq On : 20 Dec 2016 4:25 Operator: LH
Sample : 100ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:47 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191629.D
Acq On : 20 Dec 2016 4:58 Operator: LH
Sample : 25ng TO-15 ICV STD
Misc : S29-12061601/S29-12011603 (12/30)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 10:51:50 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/21/16

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.56	130	324263	12.500	ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.66	114	1591523	12.500	ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.93	82	692153	12.500	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.41	65	586813	12.597	ng	-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.80%			
57) Toluene-d8 (SS2)	16.10	98	1634742	12.310	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.48%			
73) Bromofluorobenzene (SS3)	19.28	174	523510	12.349	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.80%			
Target Compounds						Qvalue
2) Propene	4.19	42	1124028	25.074	ng	99
3) Dichlorodifluoromethan...	4.36	85	2046175	24.979	ng	100
4) Chloromethane	4.68	50	1694320	25.145	ng	100
5) 1,2-Dichloro-1,1,2,2-t...	4.95	135	1055579	23.189	ng	100
6) Vinyl Chloride	5.13	62	1693438	26.426	ng	100
7) 1,3-Butadiene	5.42	54	1289867	28.829	ng	100
8) Bromomethane	5.90	94	891470	26.288	ng	100
9) Chloroethane	6.24	64	710995	26.626	ng	100
10) Ethanol	6.67	45	3936175	128.358	ng	100
11) Acetonitrile	6.94	41	1869029	26.609	ng	100
12) Acrolein	7.12	56	633199	23.499	ng	100
13) Acetone	7.33	58	3999279	129.883	ng	99
14) Trichlorofluoromethane	7.57	101	1719917	24.463	ng	100
15) 2-Propanol (Isopropanol)	7.87	45	5628222	53.518	ng	99
16) Acrylonitrile	8.15	53	1361059	26.179	ng	100
17) 1,1-Dichloroethene	8.58	96	932075	26.370	ng	99
18) 2-Methyl-2-Propanol (t...	8.76	59	5717162	51.822	ng	99
19) Methylene Chloride	8.82	84	987850	25.589	ng	100
20) 3-Chloro-1-propene (Al...	8.98	41	1631080	27.922	ng	100
21) Trichlorotrifluoroethane	9.22	151	850278	24.680	ng	100
22) Carbon Disulfide	9.09	76	3636405	26.702	ng	100
23) trans-1,2-Dichloroethene	10.10	61	1500866	26.244	ng	99
24) 1,1-Dichloroethane	10.36	63	1808134	25.230	ng	100
25) Methyl tert-Butyl Ether	10.43	73	3070833	24.735	ng	100
26) Vinyl Acetate	10.60	86	1306597	145.059	ng	98
27) 2-Butanone (MEK)	10.85	72	699761	26.323	ng	100
28) cis-1,2-Dichloroethene	11.38	61	1442544	25.606	ng	99
29) Diisopropyl Ether	11.64	87	862033	24.154	ng	98
30) Ethyl Acetate	11.66	61	847035	55.934	ng	100
31) n-Hexane	11.64	57	1743220	25.368	ng	100
32) Chloroform	11.72	83	1774939	24.850	ng	100
34) Tetrahydrofuran (THF)	12.12	72	661555	24.464	ng	100
35) Ethyl tert-Butyl Ether	12.24	87	1195210	25.353	ng	99
36) 1,2-Dichloroethane	12.52	62	1464666	25.028	ng	100
38) 1,1,1-Trichloroethane	12.79	97	1562252	25.058	ng	100
39) Isopropyl Acetate	13.20	61	1413573	52.946	ng	97
40) 1-Butanol	13.23	56	2417638	56.618	ng	99
41) Benzene	13.27	78	3951203	24.315	ng	100
42) Carbon Tetrachloride	13.43	117	1398229	25.907	ng	100
43) Cyclohexane	13.56	84	3104966	51.398	ng	99
44) tert-Amyl Methyl Ether	13.89	73	2968989	25.325	ng	100
45) 1,2-Dichloropropane	14.12	63	1005086	24.872	ng	100
46) Bromodichloromethane	14.32	83	1494154	26.501	ng	100
47) Trichloroethene	14.36	130	1042656	24.408	ng	100
48) 1,4-Dioxane	14.33	88	858499	26.353	ng	98
49) 2,2,4-Trimethylpentane...	14.41	57	4258097	24.871	ng	99

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191629.D
Acq On : 20 Dec 2016 4:58 Operator: LH
Sample : 25ng TO-15 ICV STD
Misc : S29-12061601/S29-12011603 (12/30)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 10:51:50 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

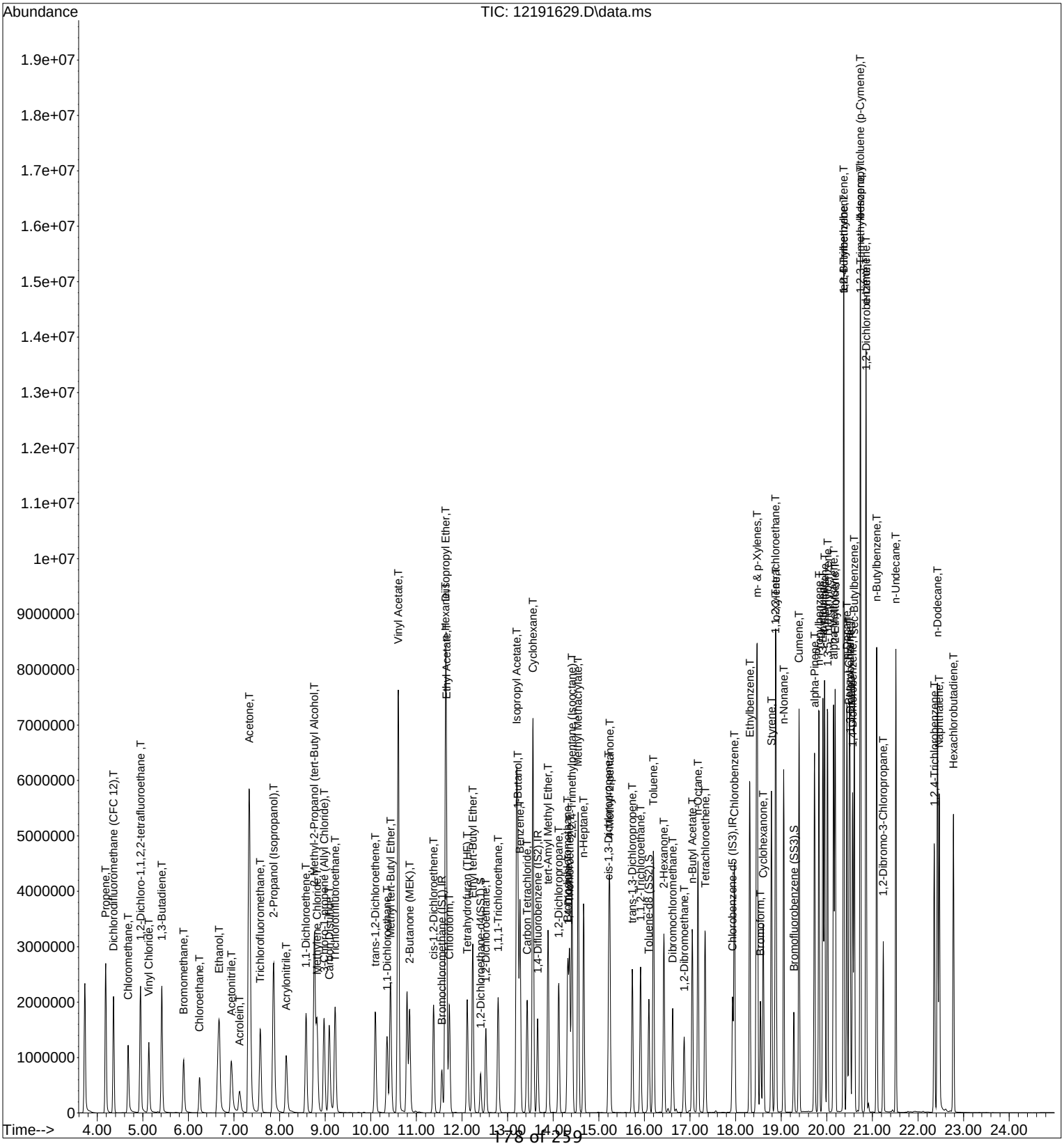
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	14.55	100	853414	53.563 ng	99
51) n-Heptane	14.67	71	972515	24.817 ng	100
52) cis-1,3-Dichloropropene	15.22	75	1748844	26.730 ng	100
53) 4-Methyl-2-pentanone	15.24	58	1026423	26.302 ng	100
54) trans-1,3-Dichloropropene	15.73	75	1611272	27.622 ng	100
55) 1,1,2-Trichloroethane	15.92	97	960805	25.399 ng	100
58) Toluene	16.20	91	3948316	24.350 ng	100
59) 2-Hexanone	16.43	43	2609129	26.123 ng	100
60) Dibromochloromethane	16.62	129	1186720	26.581 ng	100
61) 1,2-Dibromoethane	16.87	107	1117028	25.586 ng	100
62) n-Butyl Acetate	17.05	43	2902880	27.001 ng	99
63) n-Octane	17.17	57	898189	25.213 ng	100
64) Tetrachloroethene	17.33	166	1083122	24.649 ng	100
65) Chlorobenzene	17.97	112	2650579	24.804 ng	100
66) Ethylbenzene	18.31	91	4687446	25.700 ng	100
67) m- & p-Xylenes	18.47	91	7521675	53.005 ng	100
68) Bromoform	18.54	173	1016807	27.983 ng	100
69) Styrene	18.79	104	2887022	26.217 ng	100
70) o-Xylene	18.89	91	3814142	26.123 ng	100
71) n-Nonane	19.06	43	2207942	25.111 ng	100
72) 1,1,2,2-Tetrachloroethane	18.87	83	1920280	28.056 ng	100
74) Cumene	19.39	105	4669797	25.706 ng	100
75) alpha-Pinene	19.73	93	2516642	26.394 ng	100
76) n-Propylbenzene	19.83	91	5748335	26.851 ng	100
77) 3-Ethyltoluene	19.91	105	4824280	26.221 ng	99
78) 4-Ethyltoluene	19.95	105	4440812	27.516 ng	100
79) 1,3,5-Trimethylbenzene	20.02	105	3891708	25.933 ng	100
80) alpha-Methylstyrene	20.15	118	2133951	28.576 ng	100
81) 2-Ethyltoluene	20.18	105	4628604	26.862 ng	100
82) 1,2,4-Trimethylbenzene	20.37	105	4323279	29.231 ng	100
83) n-Decane	20.44	57	2317960	27.117 ng	99
84) Benzyl Chloride	20.49	91	3775432	31.379 ng	100
85) 1,3-Dichlorobenzene	20.51	146	2266889	30.518 ng	100
86) 1,4-Dichlorobenzene	20.57	146	2200963	24.970 ng	100
87) sec-Butylbenzene	20.60	105	5189431	27.044 ng	100
88) 4-Isopropyltoluene (p-...	20.73	119	5108284	27.780 ng	99
89) 1,2,3-Trimethylbenzene	20.74	105	4405266	27.923 ng	100
90) 1,2-Dichlorobenzene	20.86	146	2262220	27.231 ng	99
91) d-Limonene	20.86	68	1849244	29.170 ng	99
92) 1,2-Dibromo-3-Chloropr...	21.24	157	806286	29.153 ng	99
93) n-Undecane	21.51	57	2438089	27.128 ng	100
94) 1,2,4-Trichlorobenzene	22.36	180	1606384	30.096 ng	100
95) Naphthalene	22.46	128	4812376	29.684 ng	100
96) n-Dodecane	22.43	57	2427846	30.251 ng	100
97) Hexachlorobutadiene	22.78	225	1047435	28.082 ng	100
98) Cyclohexanone	18.60	55	1554818	25.350 ng	100
99) tert-Butylbenzene	20.37	119	4016249	27.638 ng	100
100) n-Butylbenzene	21.10	91	4360718	27.979 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191629.D
Acq On : 20 Dec 2016 4:58 Operator: LH
Sample : 25ng TO-15 ICV STD
Misc : S29-12061601/S29-12011603 (12/30)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 10:51:50 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Initial Calibration Verification/LABORATORY CONTROL SAMPLE CHECK SHEET

Data File Name: **12191629.D**
Data File Path: **I:\MS16\DATA\2016_12\19**
Operator: **LH**
Date Acquired: **12/20/16** **4:58**

Acq. Method File: **TO15.M**
Sample Name: **25ng TO-15 ICV STD**
Misc Info: **S29-12061601/S29-12011603 (**
Instrument Name: **GCMS-16**

#	Compound Name	Ret. Time	Amt. (ng)	Spike Amt.(ng)	% Rec.	Lower Limit	Upper Limit	* OR Fail	ICV/AZ 70-130%
2)	Propene	4.19	25.074	26.275	95	52	127	*	*
3)	Dichlorodifluoromethane (CFC 1	4.36	24.979	26.250	95	68	109	*	*
4)	Chloromethane	4.68	25.145	26.225	96	51	130	*	*
5)	1,2-Dichloro-1,1,2,2-tetrafluoroet	4.95	23.189	26.375	88	66	114	*	*
6)	Vinyl Chloride	5.13	26.426	26.250	101	61	125	*	*
7)	1,3-Butadiene	5.42	28.829	26.250	110	62	144	*	*
8)	Bromomethane	5.90	26.288	26.250	100	73	123	*	*
9)	Chloroethane	6.24	26.626	26.225	102	69	122	*	*
10)	Ethanol	6.67	128.358	132.650	97	62	124	*	*
11)	Acetonitrile	6.94	26.609	26.650	100	57	114	*	*
12)	Acrolein	7.12	23.499	26.525	89	62	116	*	*
13)	Acetone	7.33	129.883	133.050	98	57	117	*	*
14)	Trichlorofluoromethane	7.57	24.463	26.275	93	63	98	*	*
15)	2-Propanol (Isopropanol)	7.87	53.518	53.025	101	66	121	*	*
16)	Acrylonitrile	8.15	26.179	26.575	99	68	123	*	*
17)	1,1-Dichloroethene	8.58	26.370	26.575	99	76	118	*	*
18)	2-Methyl-2-Propanol (tert-Butyl Alc	8.76	51.822	53.275	97	74	126	*	*
19)	Methylene Chloride	8.82	25.589	26.550	96	60	118	*	*
20)	3-Chloro-1-propene (Allyl Chlori	8.98	27.922	26.500	105	65	126	*	*
21)	Trichlorotrifluoroethane	9.22	24.680	26.450	93	73	114	*	*
22)	Carbon Disulfide	9.09	26.702	26.675	100	57	102	*	*
23)	trans-1,2-Dichloroethene	10.10	26.244	26.675	98	74	123	*	*
24)	1,1-Dichloroethane	10.36	25.230	26.550	95	69	111	*	*
25)	Methyl tert-Butyl Ether	10.43	24.735	26.600	93	69	113	*	*
26)	Vinyl Acetate	10.60	145.059	132.550	109	76	128	*	*
27)	2-Butanone (MEK)	10.85	26.323	26.550	99	63	127	*	*
28)	cis-1,2-Dichloroethene	11.38	25.606	26.475	97	72	117	*	*
29)	Diisopropyl Ether	11.64	24.154	26.575	91	64	118	*	*
30)	Ethyl Acetate	11.66	55.934	53.275	105	68	127	*	*
31)	n-Hexane	11.64	25.368	26.600	95	55	116	*	*
32)	Chloroform	11.72	24.850	26.475	94	70	109	*	*
34)	Tetrahydrofuran (THF)	12.12	24.464	26.575	92	72	113	*	*
35)	Ethyl tert-Butyl Ether	12.24	25.353	26.525	96	73	117	*	*
36)	1,2-Dichloroethane	12.52	25.028	26.500	94	69	113	*	*
38)	1,1,1-Trichloroethane	12.79	25.058	26.475	95	72	115	*	*
39)	Isopropyl Acetate	13.20	52.946	53.050	100	68	122	*	*
40)	1-Butanol	13.23	56.618	53.075	107	75	141	*	*
41)	Benzene	13.27	24.315	26.525	92	65	107	*	*
42)	Carbon Tetrachloride	13.43	25.907	26.600	97	71	113	*	*
43)	Cyclohexane	13.56	51.398	53.125	97	71	115	*	*
44)	tert-Amyl Methyl Ether	13.89	25.325	26.525	95	73	115	*	*
45)	1,2-Dichloropropane	14.12	24.872	26.525	94	71	115	*	*
46)	Bromodichloromethane	14.32	26.501	26.700	99	75	118	*	*
47)	Trichloroethene	14.36	24.408	26.550	92	68	114	*	*
48)	1,4-Dioxane	14.33	26.353	26.600	99	81	131	*	*
49)	2,2,4-Trimethylpentane (Isooctane)	14.41	24.871	26.525	94	68	112	*	*

Initial Calibration Verification/LABORATORY CONTROL SAMPLE CHECK SHEET

Data File Name: **12191629.D** **TO15.M**
Data File Path: **I:\MS16\DATA\2016_12\19** Sample Name: **25ng TO-15 ICV STD**
Operator: **LH** Misc Info: **S29-12061601/S29-12011603 (**
Date Acquired: **12/20/16** **4:58** Instrument Name: **GCMS-16**

#	Compound Name	Ret. Time	Amt. (ng)	Spike Amt.(ng)	% Rec.	Lower Limit	Upper Limit	* OR Fail	ICV/AZ 70-130%
50)	**Methyl Methacrylate**	**14.55**	**53.563**	**53.000**	101	**72**	**130**	*	*
51)	**n-Heptane**	**14.67**	**24.817**	**26.600**	93	**68**	**116**	*	*
52)	**cis-1,3-Dichloropropene**	**15.22**	**26.730**	**26.275**	102	**77**	**126**	*	*
53)	**4-Methyl-2-pentanone**	**15.24**	**26.302**	**26.575**	99	**69**	**126**	*	*
54)	**trans-1,3-Dichloropropene**	**15.73**	**27.622**	**26.675**	104	**79**	**125**	*	*
55)	**1,1,2-Trichloroethane**	**15.92**	**25.399**	**26.525**	96	**75**	**119**	*	*
58)	**Toluene**	**16.20**	**24.350**	**26.450**	92	**59**	**118**	*	*
59)	**2-Hexanone**	**16.43**	**26.123**	**26.575**	98	**69**	**129**	*	*
60)	**Dibromochloromethane**	**16.62**	**26.581**	**26.600**	100	**74**	**136**	*	*
61)	**1,2-Dibromoethane**	**16.87**	**25.586**	**26.450**	97	**73**	**131**	*	*
62)	**n-Butyl Acetate**	**17.05**	**27.001**	**26.950**	100	**69**	**130**	*	*
63)	**n-Octane**	**17.17**	**25.213**	**26.500**	95	**66**	**120**	*	*
64)	**Tetrachloroethene**	**17.33**	**24.649**	**26.575**	93	**65**	**130**	*	*
65)	**Chlorobenzene**	**17.97**	**24.804**	**26.500**	94	**68**	**120**	*	*
66)	**Ethylbenzene**	**18.31**	**25.700**	**26.450**	97	**68**	**122**	*	*
67)	**m- & p-Xylenes**	**18.47**	**53.005**	**53.025**	100	**68**	**123**	*	*
68)	**Bromoform**	**18.54**	**27.983**	**26.550**	105	**69**	**130**	*	*
69)	**Styrene**	**18.79**	**26.217**	**26.475**	99	**71**	**133**	*	*
70)	**o-Xylene**	**18.89**	**26.123**	**26.450**	99	**68**	**122**	*	*
71)	**n-Nonane**	**19.06**	**25.111**	**26.475**	95	**65**	**120**	*	*
72)	**1,1,2,2-Tetrachloroethane**	**18.87**	**28.056**	**26.500**	106	**69**	**130**	*	*
74)	**Cumene**	**19.39**	**25.706**	**26.525**	97	**70**	**123**	*	*
75)	**alpha-Pinene**	**19.73**	**26.394**	**26.575**	99	**70**	**128**	*	*
76)	**n-Propylbenzene**	**19.83**	**26.851**	**26.725**	100	**69**	**125**	*	*
77)	3-Ethyltoluene	19.91	26.221	26.550	99	67	128	*	*
78)	**4-Ethyltoluene**	**19.95**	**27.516**	**26.525**	**104**	**67**	**130**	*	*
79)	**1,3,5-Trimethylbenzene**	**20.02**	**25.933**	**26.525**	**98**	**67**	**124**	*	*
80)	alpha-Methylstyrene	20.15	28.576	26.550	**108**	67	141	*	*
81)	2-Ethyltoluene	20.18	26.862	26.550	**101**	67	124	*	*
82)	**1,2,4-Trimethylbenzene**	**20.37**	**29.231**	**26.525**	**110**	**67**	**129**	*	*
83)	n-Decane	20.44	27.117	26.525	**102**	66	124	*	*
84)	**Benzyl Chloride**	**20.49**	**31.379**	**26.550**	**118**	**79**	**138**	*	*
85)	**1,3-Dichlorobenzene**	**20.51**	**30.518**	**26.475**	**115**	**65**	**136**	*	*
86)	**1,4-Dichlorobenzene**	**20.57**	**24.970**	**26.650**	**94**	**66**	**141**	*	*
87)	sec-Butylbenzene	20.60	27.044	26.550	**102**	68	125	*	*
88)	4-Isopropyltoluene (p-Cymene)	20.73	27.780	26.550	**105**	68	131	*	*
89)	1,2,3-Trimethylbenzene	20.74	27.923	26.500	**105**	68	132	*	*
90)	**1,2-Dichlorobenzene**	**20.86**	**27.231**	**26.550**	**103**	**67**	**136**	*	*
91)	**d-Limonene**	**20.86**	**29.170**	**26.550**	**110**	**71**	**134**	*	*
92)	**1,2-Dibromo-3-Chloropropane**	**21.24**	**29.153**	**26.475**	**110**	**73**	**136**	*	*
93)	n-Undecane	21.51	27.128	26.600	**102**	68	132	*	*
94)	**1,2,4-Trichlorobenzene**	**22.36**	**30.096**	**26.500**	**114**	**64**	**134**	*	*
95)	**Naphthalene**	**22.46**	**29.684**	**26.700**	**111**	**62**	**136**	*	*
96)	n-Dodecane	22.43	30.251	26.550	**114**	61	137	*	*
97)	**Hexachlorobutadiene**	**22.78**	**28.082**	**26.575**	**106**	60	133	*	*
98)	Cyclohexanone	18.61	25.350	26.575	95	64	131	*	*
99)	tert-Butylbenzene	20.37	27.638	26.500	104	67	128	*	*
100)	n-Butylbenzene	21.10	27.979	26.500	106	68	128	*	*

Bold = 75 Compound List
*** = Pass**

Evaluate Continuing Calibration Report

Data File : I:\MS16\DATA\2017 01\04\01041702.D Vial: 2
Acq On : 4 Jan 2017 5:05 Operator: CL
Sample : CCV R16010417 25ng Inst : GCMS-16
Misc : S29-12281601/S29-12191603 (1/17)

Quant Time: Jan 04 07:13:30 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

CL 1/4/17

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	98	-0.02
2	T	Propene	1.728	1.487	13.9	90	0.00
3	T	Dichlorodifluoromethane (CF	3.158	2.671	15.4	84	0.00
4	T	Chloromethane	2.597	2.059	20.7	78	0.00
5	T	1,2-Dichloro-1,1,2,2-tetraf	1.755	1.447	17.5	84	-0.01
6	T	Vinyl Chloride	2.470	2.394	3.1	91	0.00
7	T	1,3-Butadiene	1.725	1.581	8.3	80	-0.01
8	T	Bromomethane	1.307	1.154	11.7	84	0.00
9	T	Chloroethane	1.029	0.956	7.1	87	-0.01
10	T	Ethanol	1.182	1.099	7.0	91	-0.08
11	T	Acetonitrile	2.708	2.576	4.9	91	-0.05
12	T	Acrolein	1.039	0.842	19.0	88	-0.02
13	T	Acetone	1.187	1.100	7.3	90	-0.04
14	T	Trichlorofluoromethane	2.710	2.216	18.2	84	0.00
15	T	2-Propanol (Isopropanol)	4.054	3.911	3.5	90	-0.06
16	T	Acrylonitrile	2.004	1.860	7.2	90	-0.04
17	T	1,1-Dichloroethene	1.363	1.214	10.9	85	0.00
18	T	2-Methyl-2-Propanol (tert-B	4.253	3.945	7.2	89	-0.06
19	T	Methylene Chloride	1.488	1.316	11.6	87	-0.02
20	T	3-Chloro-1-propene (Allyl C	2.252	2.074	7.9	87	0.00
21	T	Trichlorotrifluoroethane	1.328	1.076	19.0	82	0.00
22	T	Carbon Disulfide	5.250	4.800	8.6	87	0.00
23	T	trans-1,2-Dichloroethene	2.205	1.985	10.0	87	-0.01
24	T	1,1-Dichloroethane	2.763	2.438	11.8	87	-0.02
25	T	Methyl tert-Butyl Ether	4.786	4.099	14.4	87	-0.01
26	T	Vinyl Acetate	0.347	0.366	-5.5	89	-0.03
27	T	2-Butanone (MEK)	1.025	0.969	5.5	91	-0.03
28	T	cis-1,2-Dichloroethene	2.172	1.946	10.4	87	-0.01
29	T	Diisopropyl Ether	1.376	1.207	12.3	89	-0.01
30	T	Ethyl Acetate	0.584	0.622	-6.5	95	-0.02
31	T	n-Hexane	2.649	2.677	-1.1	99	0.00
32	T	Chloroform	2.753	2.374	13.8	87	-0.02
33	S	1,2-Dichloroethane-d4(SS1)	1.796	1.828	-1.8	101	-0.02
34	T	Tetrahydrofuran (THF)	1.042	0.908	12.9	89	-0.01
35	T	Ethyl tert-Butyl Ether	1.817	1.605	11.7	87	-0.01
36	T	1,2-Dichloroethane	2.256	1.944	13.8	86	-0.02
37	IR	1,4-Difluorobenzene (IS2)	1.000	1.000	0.0	101	-0.01
38	T	1,1,1-Trichloroethane	0.490	0.413	15.7	85	-0.01
39	T	Isopropyl Acetate	0.210	0.209	0.5	95	-0.01
40	T	1-Butanol	0.335	0.354	-5.7	90	-0.04
41	T	Benzene	1.276	1.104	13.5	91	0.00
42	T	Carbon Tetrachloride	0.424	0.350	17.5	80	0.00
43	T	Cyclohexane	0.474	0.433	8.6	88	0.00
44	T	tert-Amyl Methyl Ether	0.921	0.819	11.1	88	0.00
45	T	1,2-Dichloropropane	0.317	0.282	11.0	91	-0.01
46	T	Bromodichloromethane	0.443	0.401	9.5	87	0.00
47	T	Trichloroethene	0.336	0.279	17.0	84	-0.01
48	T	1,4-Dioxane	0.256	0.239	6.6	88	-0.01
49	T	2,2,4-Trimethylpentane (Iso	1.345	1.197	11.0	90	0.00
50	T	Methyl Methacrylate	0.125	0.118	5.6	88	-0.01
51	T	n-Heptane	0.308	0.279	9.4	93	0.00
52	T	cis-1,3-Dichloropropene	0.514	0.489	4.9	88	0.00
53	T	4-Methyl-2-pentanone	0.307	0.298	2.9	92	0.00
54	T	trans-1,3-Dichloropropene	0.458	0.434	5.2	86	0.00
55	T	1,1,2-Trichloroethane	0.297	0.263	11.4	87	0.00

Evaluate Continuing Calibration Report

Data File : I:\MS16\DATA\2017 01\04\01041702.D Vial: 2
Acq On : 4 Jan 2017 5:05 Operator: CL
Sample : CCV R16010417 25ng Inst : GCMS-16
Misc : S29-12281601/S29-12191603 (1/17)

Quant Time: Jan 04 07:13:30 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
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	104	0.00
57	S	Toluene-d8 (SS2)	2.398	2.308	3.8	101	0.00
58	T	Toluene	2.928	2.425	17.2	89	0.00
59	T	2-Hexanone	1.804	1.680	6.9	94	-0.01
60	T	Dibromochloromethane	0.806	0.689	14.5	84	0.00
61	T	1,2-Dibromoethane	0.788	0.665	15.6	85	0.00
62	T	n-Butyl Acetate	1.942	1.849	4.8	94	0.00
63	T	n-Octane	0.643	0.574	10.7	92	0.00
64	T	Tetrachloroethene	0.794	0.632	20.4	84	0.00
65	T	Chlorobenzene	1.930	1.575	18.4	85	0.00
66	T	Ethylbenzene	3.294	2.888	12.3	88	0.00
67	T	m- & p-Xylenes	2.563	2.332	9.0	88	-0.01
68	T	Bromoform	0.656	0.585	10.8	81	0.00
69	T	Styrene	1.989	1.763	11.4	86	0.00
70	T	o-Xylene	2.637	2.367	10.2	88	0.00
71	T	n-Nonane	1.588	1.441	9.3	94	0.00
72	T	1,1,2,2-Tetrachloroethane	1.236	1.236	0.0	90	0.00
73	S	Bromofluorobenzene (SS3)	0.766	0.718	6.3	96	0.00
74	T	Cumene	3.281	2.826	13.9	86	0.00
75	T	alpha-Pinene	1.722	1.526	11.4	86	0.00
76	T	n-Propylbenzene	3.866	3.543	8.4	88	0.00
77	T	3-Ethyltoluene	3.323	2.973	10.5	85	0.00
78	T	4-Ethyltoluene	2.915	2.673	8.3	88	0.00
79	T	1,3,5-Trimethylbenzene	2.710	2.384	12.0	86	0.00
80	T	alpha-Methylstyrene	1.349	1.278	5.3	83	0.00
81	T	2-Ethyltoluene	3.112	2.821	9.4	87	0.00
82	T	1,2,4-Trimethylbenzene	2.671	2.688	-0.6	86	-0.01
83	T	n-Decane	1.544	1.481	4.1	93	0.00
84	T	Benzyl Chloride	2.173	2.328	-7.1	86	0.00
85	T	1,3-Dichlorobenzene	1.341	1.381	-3.0	84	0.00
86	T	1,4-Dichlorobenzene	1.592	1.348	15.3	84	0.00
87	T	sec-Butylbenzene	3.465	3.166	8.6	87	0.00
88	T	4-Isopropyltoluene (p-Cymen	3.321	3.162	4.8	86	0.00
89	T	1,2,3-Trimethylbenzene	2.849	2.713	4.8	87	-0.01
90	T	1,2-Dichlorobenzene	1.500	1.393	7.1	85	0.00
91	T	d-Limonene	1.145	1.176	-2.7	90	0.00
92	T	1,2-Dibromo-3-Chloropropane	0.499	0.455	8.8	81	0.00
93	T	n-Undecane	1.623	1.521	6.3	92	0.00
94	T	1,2,4-Trichlorobenzene	0.964	0.936	2.9	79	0.00
95	T	Naphthalene	2.928	2.923	0.2	82	0.00
96	T	n-Dodecane	1.449	1.401	3.3	91	0.00
97	T	Hexachlorobutadiene	0.674	0.577	14.4	78	0.00
98	T	Cyclohexanone	1.108	0.994	10.3	90	0.00
99	T	tert-Butylbenzene	2.624	2.455	6.4	85	0.00
100	T	n-Butylbenzene	2.815	2.688	4.5	88	0.00

(#) = Out of Range SPCC's out = 0 CCC's out = 0

Quantitation Report (QT Reviewed)

Data File : I:\MS16\DATA\2017 01\04\01041702.D Vial: 2
Acq On : 4 Jan 2017 5:05 Operator: CL
Sample : CCV R16010417 25ng Inst : GCMS-16
Misc : S29-12281601/S29-12191603 (1/17)

Quant Time: Jan 04 07:13:30 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

CL 1/4/17

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.56	130	294520	12.500	ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.66	114	1466439	12.500	ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.93	82	668502	12.500	ng	0.00

System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...	12.41	65	538310	12.723	ng	-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 101.76%			
57) Toluene-d8 (SS2)	16.10	98	1543198	12.032	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.24%			
73) Bromofluorobenzene (SS3)	19.28	174	480112	11.726	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 93.84%			

Target Compounds

							Qvalue
2) Propene	4.19	42	907568	22.290	ng		99
3) Dichlorodifluoromethan...	4.36	85	1647401	22.142	ng		100
4) Chloromethane	4.68	50	1218732	19.914	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.95	135	856517	20.716	ng		100
6) Vinyl Chloride	5.13	62	1442332	24.781	ng		100
7) 1,3-Butadiene	5.41	54	984235	24.220	ng		98
8) Bromomethane	5.90	94	675065	21.917	ng		100
9) Chloroethane	6.24	64	567921	23.416	ng		99
10) Ethanol	6.68	45	3371761	121.056	ng		100
11) Acetonitrile	6.94	41	1587460	24.883	ng		99
12) Acrolein	7.12	56	516126	21.089	ng		100
13) Acetone	7.34	58	3442573	123.094	ng		100
14) Trichlorofluoromethane	7.58	101	1369134	21.441	ng		100
15) 2-Propanol (Isopropanol)	7.87	45	4849127	50.766	ng		99
16) Acrylonitrile	8.15	53	1156089	24.483	ng		100
17) 1,1-Dichloroethene	8.58	96	757192	23.586	ng		98
18) 2-Methyl-2-Propanol (t...	8.76	59	4912469	49.025	ng		100
19) Methylene Chloride	8.82	84	819125	23.361	ng		96
20) 3-Chloro-1-propene (Al...	8.98	41	1285270	24.224	ng		98
21) Trichlorotrifluoroethane	9.22	151	664816	21.246	ng		96
22) Carbon Disulfide	9.09	76	3000039	24.254	ng		100
23) trans-1,2-Dichloroethene	10.10	61	1247513	24.017	ng		98
24) 1,1-Dichloroethane	10.36	63	1465035	22.507	ng		100
25) Methyl tert-Butyl Ether	10.43	73	2574134	22.828	ng		99
26) Vinyl Acetate	10.60	86	1134305	138.649	ng	#	85
27) 2-Butanone (MEK)	10.85	72	598908	24.805	ng		93
28) cis-1,2-Dichloroethene	11.38	61	1219574	23.834	ng		98
29) Diisopropyl Ether	11.64	87	755146	23.296	ng	#	84
30) Ethyl Acetate	11.66	61	779507	56.673	ng		98
31) n-Hexane	11.64	57	1676481	26.861	ng		99
32) Chloroform	11.73	83	1479715	22.809	ng		100
34) Tetrahydrofuran (THF)	12.12	72	568115	23.130	ng		98
35) Ethyl tert-Butyl Ether	12.24	87	999219	23.336	ng		96
36) 1,2-Dichloroethane	12.52	62	1204339	22.657	ng		100
38) 1,1,1-Trichloroethane	12.79	97	1302025	22.665	ng		99
39) Isopropyl Acetate	13.20	61	1289286	52.410	ng		99
40) 1-Butanol	13.23	56	2188236	55.617	ng		98
41) Benzene	13.28	78	3406761	22.753	ng		100
42) Carbon Tetrachloride	13.43	117	1081994	21.757	ng		100
43) Cyclohexane	13.56	84	2707113	48.634	ng		96
44) tert-Amyl Methyl Ether	13.89	73	2531214	23.433	ng		99
45) 1,2-Dichloropropane	14.12	63	879332	23.616	ng		100
46) Bromodichloromethane	14.32	83	1254565	24.150	ng		100
47) Trichloroethene	14.36	130	868767	22.073	ng		100
48) 1,4-Dioxane	14.33	88	744031	24.788	ng		97
49) 2,2,4-Trimethylpentane...	14.41	57	3719029	23.575	ng		100
50) Methyl Methacrylate	14.55	100	728403	49.616	ng		91

Quantitation Report (QT Reviewed)

Data File : I:\MS16\DATA\2017 01\04\01041702.D Vial: 2
Acq On : 4 Jan 2017 5:05 Operator: CL
Sample : CCV R16010417 25ng Inst : GCMS-16
Misc : S29-12281601/S29-12191603 (1/17)

Quant Time: Jan 04 07:13:30 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

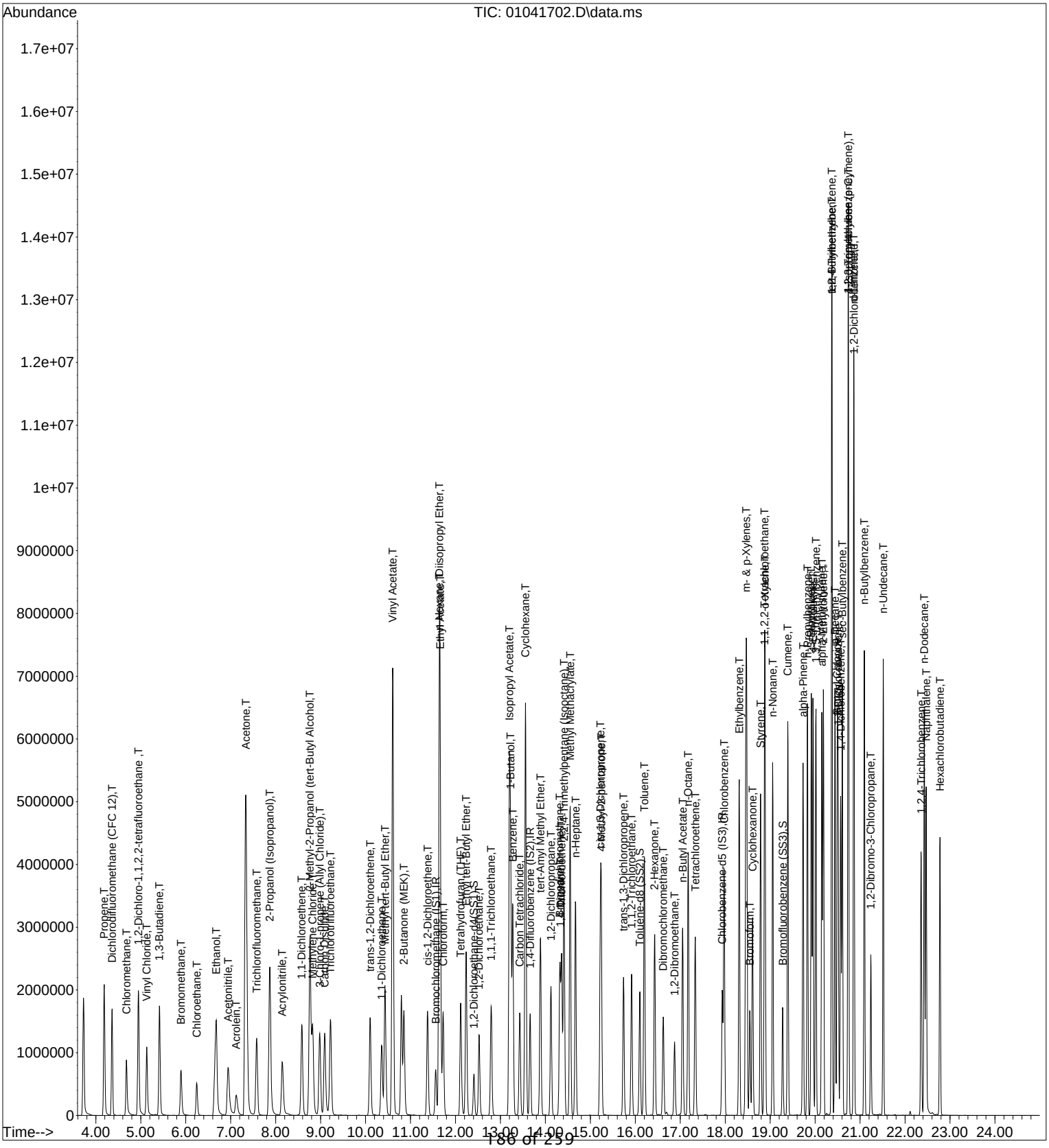
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.67	71	868581	24.055	ng	98
52) cis-1,3-Dichloropropene	15.22	75	1599192	26.528	ng	100
53) 4-Methyl-2-pentanone	15.24	58	924759	25.718	ng	97
54) trans-1,3-Dichloropropene	15.74	75	1353212	25.177	ng	100
55) 1,1,2-Trichloroethane	15.92	97	817059	23.441	ng	99
58) Toluene	16.20	91	3413796	21.798	ng	100
59) 2-Hexanone	16.43	43	2383845	24.712	ng	99
60) Dibromochloromethane	16.62	129	978424	22.691	ng	100
61) 1,2-Dibromoethane	16.87	107	938359	22.254	ng	100
62) n-Butyl Acetate	17.05	43	2629941	25.327	ng	98
63) n-Octane	17.17	57	810578	23.559	ng	96
64) Tetrachloroethene	17.33	166	896237	21.118	ng	100
65) Chlorobenzene	17.98	112	2233967	21.645	ng	100
66) Ethylbenzene	18.31	91	4074133	23.128	ng	99
67) m- & p-Xylenes	18.47	91	6618538	48.291	ng	99
68) Bromoform	18.55	173	831939	23.705	ng	100
69) Styrene	18.79	104	2501478	23.520	ng	99
70) o-Xylene	18.89	91	3335392	23.652	ng	99
71) n-Nonane	19.06	43	2031224	23.919	ng	97
72) 1,1,2,2-Tetrachloroethane	18.87	83	1745251	26.401	ng	100
74) Cumene	19.39	105	3966860	22.609	ng	99
75) alpha-Pinene	19.73	93	2129380	23.123	ng	98
76) n-Propylbenzene	19.83	91	5036045	24.356	ng	98
77) 3-Ethyltoluene	19.91	105	4173784	23.488	ng	99
78) 4-Ethyltoluene	19.95	105	3748301	24.047	ng	99
79) 1,3,5-Trimethylbenzene	20.02	105	3343298	23.067	ng	99
80) alpha-Methylstyrene	20.15	118	1794767	24.884	ng	99
81) 2-Ethyltoluene	20.18	105	4006165	24.072	ng	99
82) 1,2,4-Trimethylbenzene	20.37	105	3780882	26.468	ng	99
83) n-Decane	20.44	57	2085573	25.261	ng	98
84) Benzyl Chloride	20.49	91	3302906	28.423	ng	98
85) 1,3-Dichlorobenzene	20.51	146	1953040	27.223	ng	100
86) 1,4-Dichlorobenzene	20.57	146	1907121	22.402	ng	100
87) sec-Butylbenzene	20.61	105	4462086	24.076	ng	99
88) 4-Isopropyltoluene (p-...	20.74	119	4341712	24.446	ng	99
89) 1,2,3-Trimethylbenzene	20.74	105	3725275	24.448	ng	99
90) 1,2-Dichlorobenzene	20.86	146	1970931	24.564	ng	100
91) d-Limonene	20.86	68	1643540	26.843	ng	96
92) 1,2-Dibromo-3-Chloropr...	21.24	157	640510	23.978	ng	93
93) n-Undecane	21.51	57	2142943	24.688	ng	98
94) 1,2,4-Trichlorobenzene	22.36	180	1305862	25.331	ng	100
95) Naphthalene	22.47	128	4232824	27.032	ng	100
96) n-Dodecane	22.43	57	1957528	25.254	ng	98
97) Hexachlorobutadiene	22.78	225	816464	22.664	ng	100
98) Cyclohexanone	18.61	55	1402977	23.683	ng	99
99) tert-Butylbenzene	20.37	119	3450060	24.582	ng	100
100) n-Butylbenzene	21.10	91	3795188	25.212	ng	99

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

Quantitation Report (QT Reviewed)

Data File : I:\MS16\DATA\2017 01\04\01041702.D Vial: 2
Acq On : 4 Jan 2017 5:05 Operator: CL
Sample : CCV R16010417 25ng Inst : GCMS-16
Misc : S29-12281601/S29-12191603 (1/17)

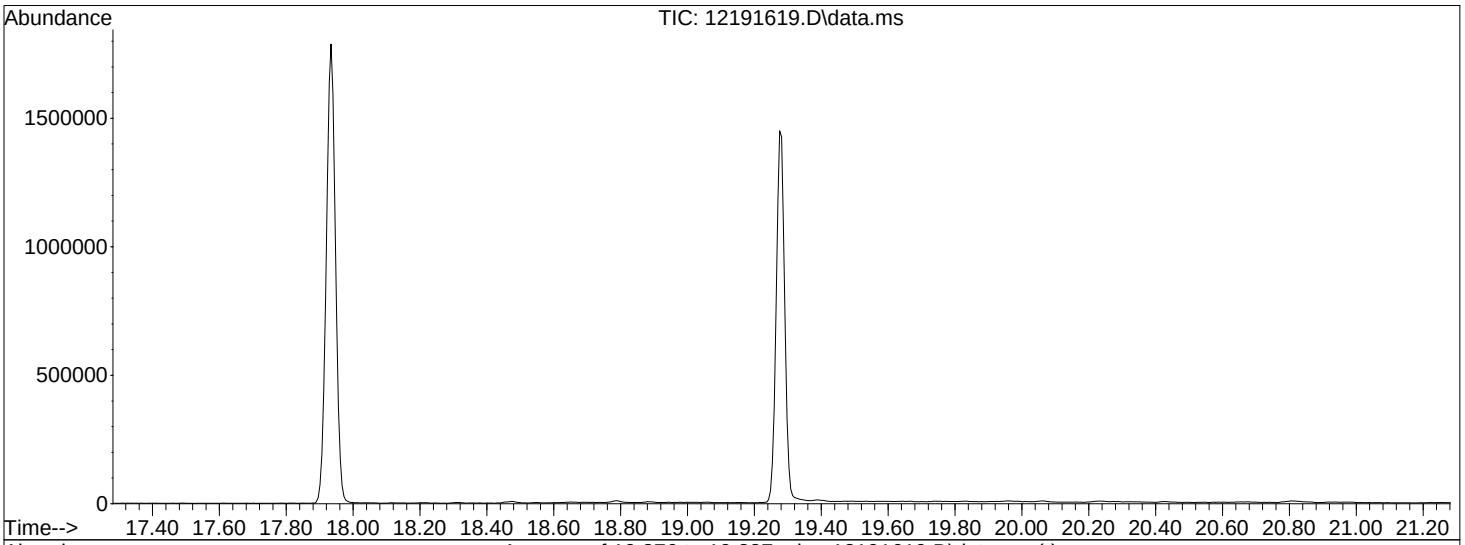
Quant Time: Jan 04 07:13:30 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

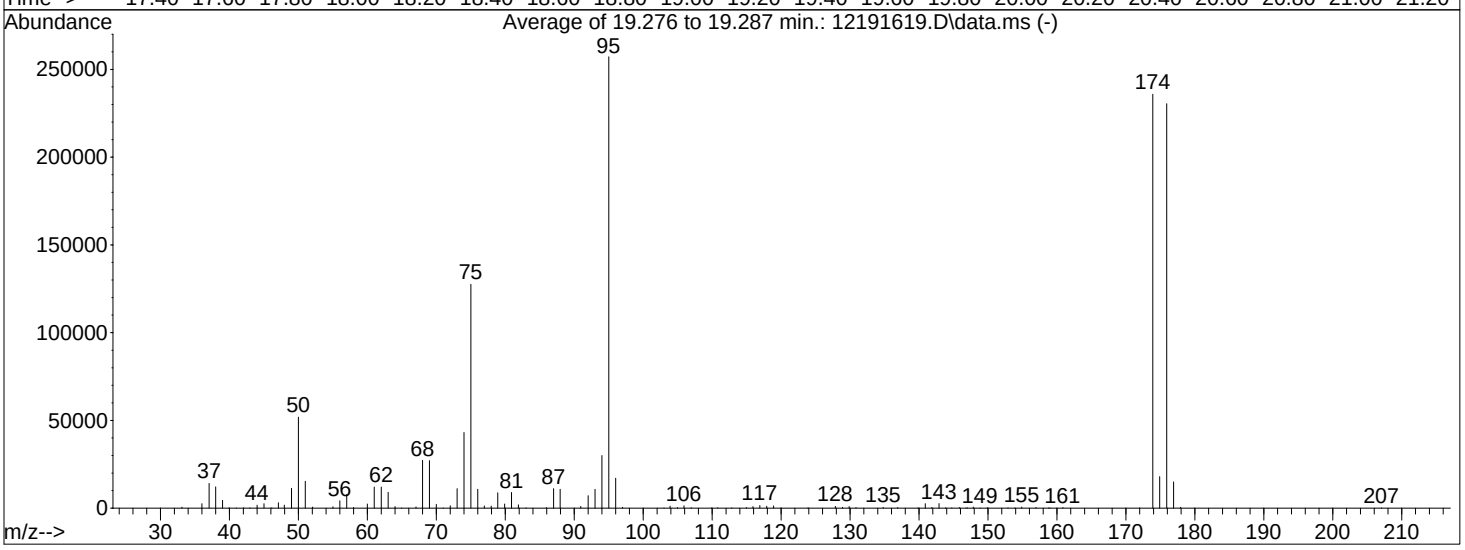


Data Path : I:\MS16\DATA\2016 12\19\
Data File : 12191619.D
Acq On : 19 Dec 2016 23:25
Operator : LH
Sample : 12.5ng TO-15 BFB
Misc : S29-12061601
ALS Vial : 2 Sample Multiplier: 1

Integration File: LSCINT.P

Method : I:\MS16\METHODS\R16121916.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue Dec 20 08:56:53 2016





AutoFind: Scans 2853, 2854, 2855; Background Corrected with Scan 2844

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	20.2	51872	PASS
75	95	30	66	49.6	127557	PASS
95	95	100	100	100.0	257173	PASS
96	95	5	9	6.6	17067	PASS
173	174	0.00	2	0.0	0	PASS
174	95	50	120	91.7	235883	PASS
175	174	4	9	7.6	17991	PASS
176	174	93	101	97.7	230443	PASS
177	176	5	9	6.5	15000	PASS

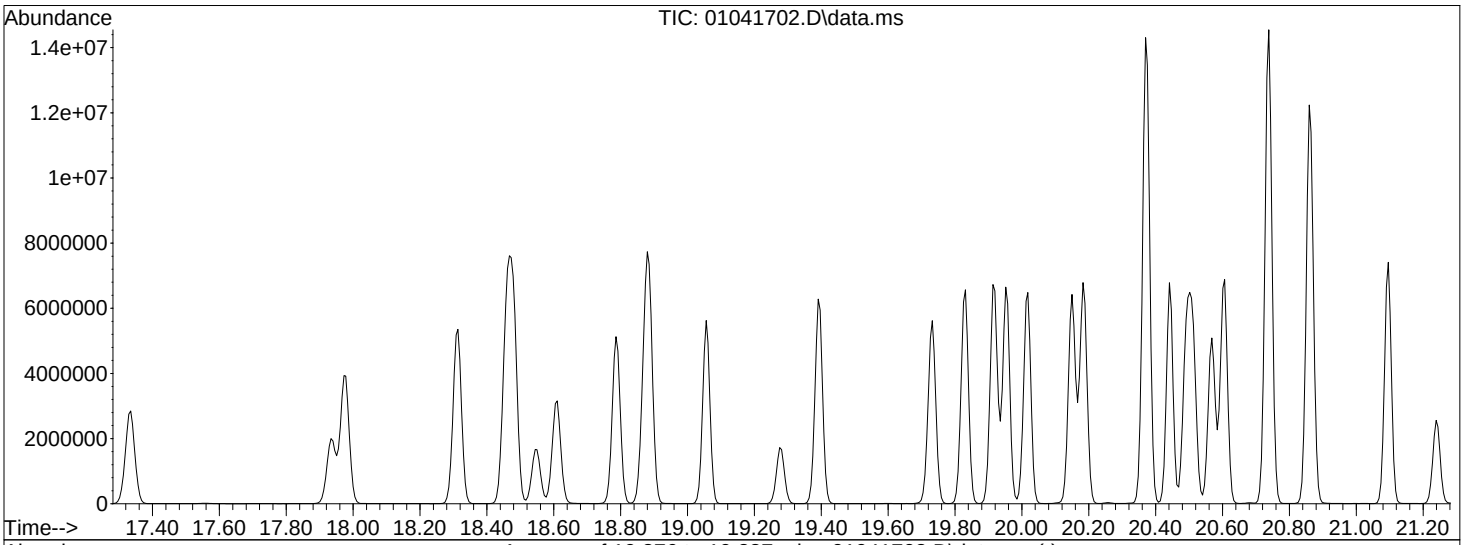
LH 12/20/16

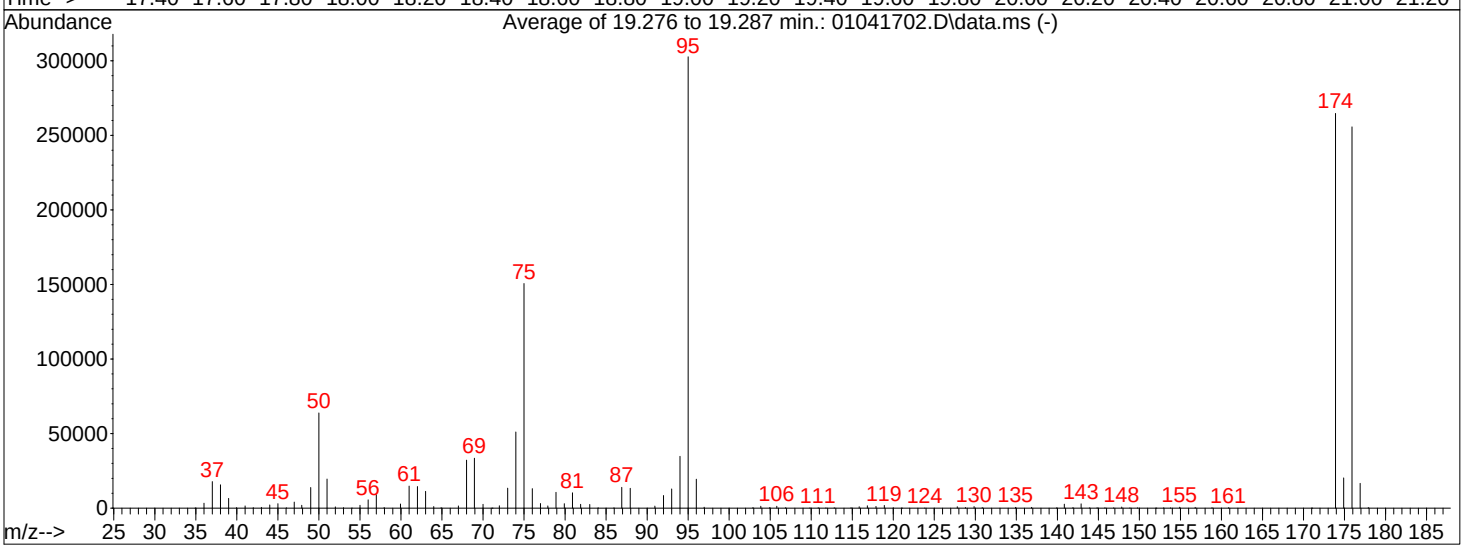
Data Path : I:\MS16\DATA\2017 01\04\
Data File : 01041702.D
Acq On : 4 Jan 2017 5:05
Operator : CL
Sample : CCV R16010417 25ng
Misc : S29-12281601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Integration File: LSCINT.P

Method : I:\MS16\METHODS\R16121916.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue Dec 20 10:31:33 2016

CL 1/4/17





AutoFind: Scans 2853, 2854, 2855; Background Corrected with Scan 2844

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	21.1	63832	PASS
75	95	30	66	49.8	150659	PASS
95	95	100	100	100.0	302677	PASS
96	95	5	9	6.4	19442	PASS
173	174	0.00	2	0.0	0	PASS
174	95	50	120	87.5	264704	PASS
175	174	4	9	7.6	20243	PASS
176	174	93	101	96.6	255680	PASS
177	176	5	9	6.5	16602	PASS

Injection Log

Directory: J:\MS16\DATA\2016_12\19\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	12/19/16 8:58	12191601.D	Blank (100mL)	S29-12061601	LH	2	
2	12/19/16 10:27	12191602.D	Blank (100mL)	S29-12061601	LH	2	
3	12/19/16 11:01	12191603.D	0.1ng std check	S29-12061601/S29-11301611 (12/29)	LH	6	
4	12/19/16 12:03	12191604.D	Blank (100mL)	S29-12061601	LH	2	
5	12/19/16 12:36	12191605.D	Blank (100mL)	S29-12061601	LH	2	
6	12/19/16 13:09	12191606.D	Blank (100mL)	S29-12061601	LH	2	
7	12/19/16 13:43	12191607.D	Blank (100mL)	S29-12061601	LH	2	
8	12/19/16 17:19	12191608.D	1.0ng std check	S29-12061601/S29-12191607 (1/17)	LH	8	
9	12/19/16 17:52	12191609.D	5.0ng std check	S29-12061601/S29-12191605 (1/17)	LH	9	
10	12/19/16 18:26	12191610.D	25ng std check	S29-12061601/S29-12191605 (1/17)	LH	2	
11	12/19/16 18:59	12191611.D	12.5ng TO-15 BFB	S29-12061601	LH	2	
12	12/19/16 19:32	12191612.D	0.5ng MAPH ICAL STD	S29-12061601/S29-10281604 (12/25)	LH	7	
13	12/19/16 20:05	12191613.D	1.0ng MAPH ICAL STD	S29-12061601/S29-10281604 (12/25)	LH	7	
14	12/19/16 20:39	12191614.D	5.0ng MAPH ICAL STD	S29-12061601/S29-10281604 (12/25)	LH	7	
15	12/19/16 21:12	12191615.D	25ng MAPH ICAL STD	S29-12061601/S29-10281603 (12/25)	LH	4	
16	12/19/16 21:45	12191616.D	50ng MAPH ICAL STD	S29-12061601/S29-10281603 (12/25)	LH	4	
17	12/19/16 22:18	12191617.D	100ng MAPH ICAL STD	S29-12061601/S29-10281603 (12/25)	LH	4	
18	12/19/16 22:52	12191618.D	25ng MAPH ICV STD	S29-12061601/S29-12011603 (12/30)	LH	2	
19	12/19/16 23:25	12191619.D	12.5ng TO-15 BFB	S29-12061601	LH	2	
20	12/19/16 23:59	12191620.D	0.08ng TO-15 ICAL STD	S29-12061601/S29-12191607 (1/17)	LH	8	
21	12/20/16 0:33	12191621.D	0.1ng TO-15 ICAL STD	S29-12061601/S29-12191607 (1/17)	LH	8	
22	12/20/16 1:06	12191622.D	0.2ng TO-15 ICAL STD	S29-12061601/S29-12191607 (1/17)	LH	8	
23	12/20/16 1:39	12191623.D	0.4ng TO-15 ICAL STD	S29-12061601/S29-12191607 (1/17)	LH	8	
24	12/20/16 2:13	12191624.D	1.0ng TO-15 ICAL STD	S29-12061601/S29-12191605 (1/17)	LH	9	
25	12/20/16 2:46	12191625.D	5.0ng TO-15 ICAL STD	S29-12061601/S29-12191605 (1/17)	LH	9	
26	12/20/16 3:19	12191626.D	25ng TO-15 ICAL STD	S29-12061601/S29-12191603 (1/17)	LH	2	
27	12/20/16 3:52	12191627.D	50ng TO-15 ICAL STD	S29-12061601/S29-12191603 (1/17)	LH	2	
28	12/20/16 4:25	12191628.D	100ng TO-15 ICAL STD	S29-12061601/S29-12191603 (1/17)	LH	2	
29	12/20/16 4:58	12191629.D	25ng TO-15 ICV STD	S29-12061601/S29-12011603 (12/30)	LH	2	
30	12/20/16 5:32	12191630.D	Blank (100mL)	S29-12061601	LH	2	
	ICAL passed for all compounds 0.08ng-100ng, except: propene, methylene chloride 0.2ng-100ng, dichlorodifluoromethane,						
	chloromethane 0.1ng-100ng, acetonitrile, carbon disulfide, benzyl chloride, 1,2-dibromo-3-chloropropane, naphthalene 0.4ng-100ng,						
	vinyl chloride 2.0ng-500ng.						
				LH 12/21/16			
##							

Injection Log

Directory: I:\MS16\DATA\2017_01\04\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	1/4/17 4:32	01041701.D	CCV M16010417_25ng	S29-12281601/S29-12271603 (2/23)	CL	3	not needed
2	1/4/17 5:05	01041702.D	CCV R16010417_25ng	S29-12281601/S29-12191603 (1/17)	CL	2	passed
3	1/4/17 5:39	01041703.D	MB R16010417_1000mL	S29-12281601 AC00442	CL	2	passed
4	1/4/17 6:12	01041704.D	LCS R16010417_25ng	S29-12281601/S29-12211611 (1/19)	CL	2	passed
5	1/4/17 6:45	01041705.D	LCSD R16010417_25ng	S29-12281601/S29-12211611 (1/19)	CL	2	passed
6	1/4/17 7:51	01041706.D	J1609190-001 (1000mL)	S29-12281601	CL	4	
7	1/4/17 8:24	01041707.D	P1605971-022dil (40mL)	S29-12281601	CL	13	
8	1/4/17 8:57	01041708.D	P1605971-024dil (100mL)	S29-12281601	CL	15	
9	1/4/17 9:30	01041709.D	P1605971-025dil (100mL)	S29-12281601	CL	16	
10	1/4/17 10:03	01041710.D	P1605971-025dupdil (100mL)	S29-12281601	CL	16	
11	1/4/17 11:09	01041711.D	P1606021-001 (1.7mL)	S29-12281601	LH	1	
12	1/4/17 12:01	01041712.D	P1606021-002 (400mL)	S29-12281601	LH	4	
13	1/4/17 12:35	01041713.D	P1606022-001 (1000mL)	S29-12281601	LH	5	
14	1/4/17 13:09	01041714.D	P1606022-001dup (1000mL)	S29-12281601	LH	5	passed
15	1/4/17 13:52	01041715.D	P1700008-001 (200mL)	S29-12281601	LH	6	
16	1/4/17 14:25	01041716.D	P170000-002 (1000mL)	S29-12281601	LH	7	
17	1/4/17 14:59	01041717.D	P1700001-004 (5.0mL)	S29-12281601	LH	1	
18	1/4/17 15:32	01041718.D	P1700008-001dil (20mL)	S29-12281601	LH	6	
19	1/4/17 16:42	01041719.D	P1700001-001 (1000mL)	S29-12281601	LH	8	
20	1/4/17 17:17	01041720.D	P1700001-002 (100mL)	S29-12281601	LH	9	
21	1/4/17 17:50	01041721.D	P1700001-003 (70mL)	S29-12281601	LH	10	IS failed
22	1/4/17 18:24	01041722.D	P1700001-004 (30mL)	S29-12281601	LH	11	
23	1/4/17 18:57	01041723.D	P1700001-005 (150mL)	S29-12281601	LH	12	IS failed
24	1/4/17 19:31	01041724.D	P1606006-001 (80mL)	S29-12281601	LH	13	
25	1/4/17 20:04	01041725.D	P1606006-002 (230mL)	S29-12281601	LH	14	

LH 1/6/17

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\09\01091709.D Vial: 1
Acq On : 9 Jan 2017 14:34 Operator: CL
Sample : P1606022-001 (1000mL) Inst : MS19
Misc : S29-12201602

Quant Time: Jan 10 08:09:47 2017
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Jan 09 14:50:02 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 1/10/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.79	130	41551	1000.000 pg	0.02
25) 1,4-Difluorobenzene (IS2)	11.73	114	215442	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.05	54	35144	1000.000 pg	0.00
System Monitoring Compounds					
20) 1,2-Dichloroethane-d4 ...	10.56	65	73650	1111.362 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery	= 111.14%	
33) Toluene-d8 (SS2)	14.15	98	222245	1093.316 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery	= 109.33%	
45) Bromofluorobenzene (SS3)	17.55	174	68651	1020.079 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery	= 102.01%	

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.41	85	107645	1057.525 pg	100
3) Chloromethane	4.62	52	10055	366.388 pg	90
4) 1,2-Dichloro,1,1,2,2-t...	4.80	85	4075	38.062 pg	100
5) Vinyl Chloride	4.93	62	246	N.D.	
6) 1,3-Butadiene	5.12	54	10504	198.122 pg #	80
7) Bromomethane	5.46	94	682	N.D.	
8) Chloroethane	5.68	64	334	N.D.	
9) Acrolein	6.29	56	19823	1044.967 pg	96
10) Acetone	6.43	58	14260952	543650.326 pg #	60
11) Trichlorofluoromethane	6.59	101	41324	551.702 pg	100
12) 1,1-Dichloroethene	7.33	96	104	N.D.	
13) Methylene Chloride	7.52	84	27434	558.172 pg	82
14) Trichlorotrifluoroethane	7.80	151	10044	218.781 pg	100
15) trans-1,2-Dichloroethene	8.55	96	1117	23.104 pg	98
16) 1,1-Dichloroethane	8.76	63	343	N.D.	
17) Methyl tert-Butyl Ether	8.80	73	1693	N.D.	
18) cis-1,2-Dichloroethene	9.63	96	54100	1051.533 pg	99
19) Chloroform	9.93	83	7858	89.015 pg	98
21) 1,2-Dichloroethane	10.67	62	2428	36.998 pg	100
22) 1,1,1-Trichloroethane	10.93	97	596	N.D.	
23) Benzene	11.39	78	219061	1054.130 pg	100
24) Carbon Tetrachloride	11.54	117	14953	215.741 pg	100
26) 1,2-Dichloropropane	12.19	63	1134	24.524 pg	98
27) Bromodichloromethane	0.00	83	0	N.D. d	
28) Trichloroethene	12.43	130	57443	1043.095 pg	100
29) 1,4-Dioxane	0.00	88	0	N.D. d	
30) cis-1,3-Dichloropropene	13.26	75	74	N.D.	
31) trans-1,3-Dichloropropene	13.77	75	174	N.D.	
32) 1,1,2-Trichloroethane	13.92	83	203	N.D.	
34) Toluene	14.25	91	295537	1462.997 pg	99
35) Dibromochloromethane	14.66	129	200	N.D.	
36) 1,2-Dibromoethane	14.92	107	70	N.D.	
37) Tetrachloroethene	15.41	166	8682572	146203.913 pg	95
39) Chlorobenzene	0.00	112	0	N.D. d	
40) Ethylbenzene	16.48	91	72469	291.919 pg	99
41) m,p-Xylene	16.65	91	146624	780.633 pg	99
42) Styrene	17.02	104	15031	108.956 pg	99
43) o-Xylene	17.12	106	27725	283.419 pg	97
44) 1,1,2,2-Tetrachloroethane	17.12	83	316	N.D.	
46) 1,3,5-Trimethylbenzene	18.38	105	31782	157.188 pg	99
47) 1,2,4-Trimethylbenzene	18.77	105	94530	452.412 pg	87
48) 1,3-Dichlorobenzene	18.92	146	560	N.D.	
49) 1,4-Dichlorobenzene	18.98	146	9149	74.077 pg	99
50) 1,2-Dichlorobenzene	19.31	146	1268	N.D.	
51) 1,2-Dibromo-3-chloropr...	19.72	157	107	N.D.	
52) 1,2,4-Trichlorobenzene	20.94	182	800	N.D.	
53) Naphthalene	21.05	128	236212	1069.011 pg	99

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\09\01091709.D Vial: 1
Acq On : 9 Jan 2017 14:34 Operator: CL
Sample : P1606022-001 (1000mL) Inst : MS19
Misc : S29-12201602

Quant Time: Jan 10 08:09:47 2017
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Jan 09 14:50:02 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

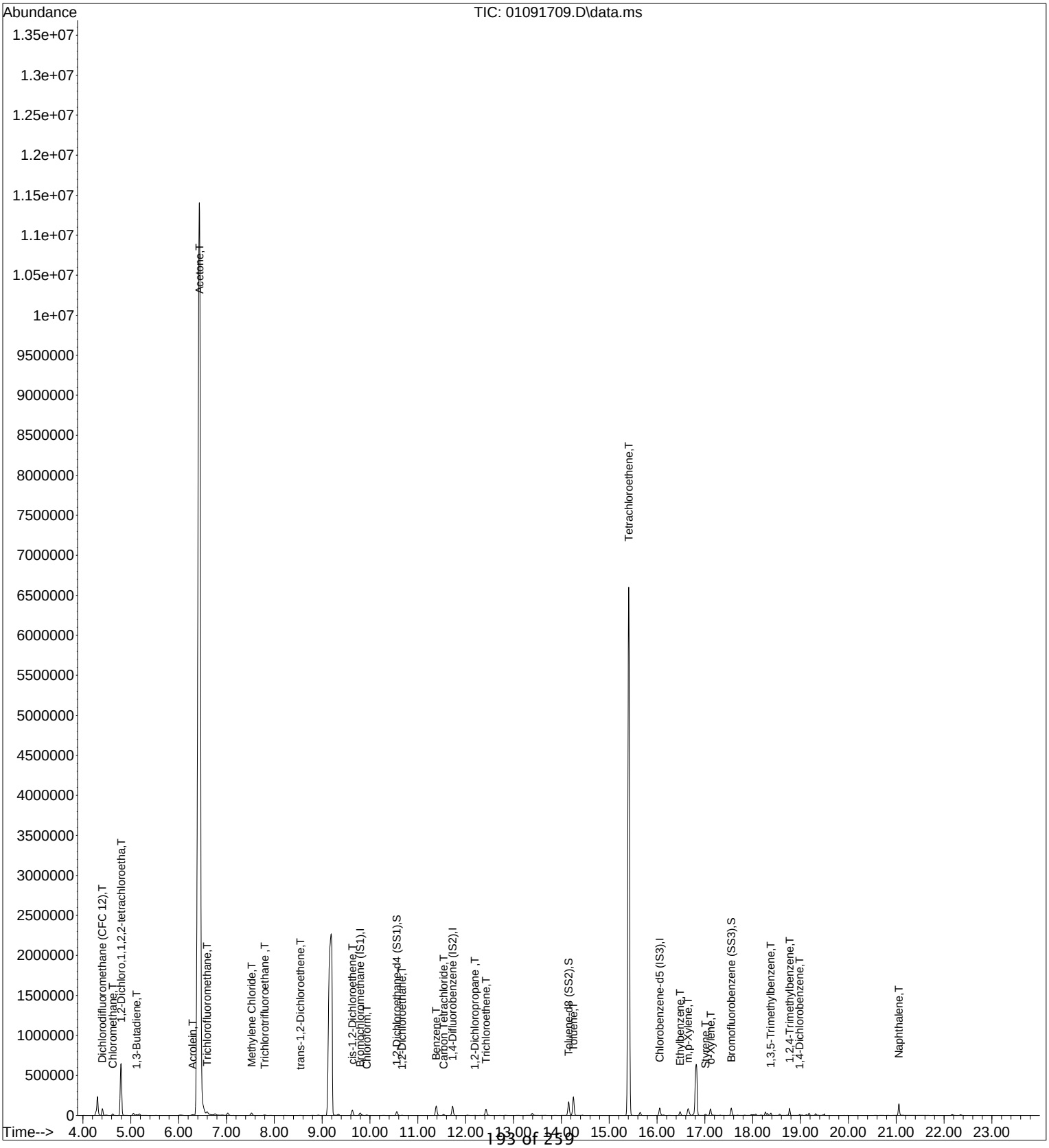
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	76	N.D.	

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\09\01091709.D Vial: 1
Acq On : 9 Jan 2017 14:34 Operator: CL
Sample : P1606022-001 (1000mL) Inst : MS19
Misc : S29-12201602

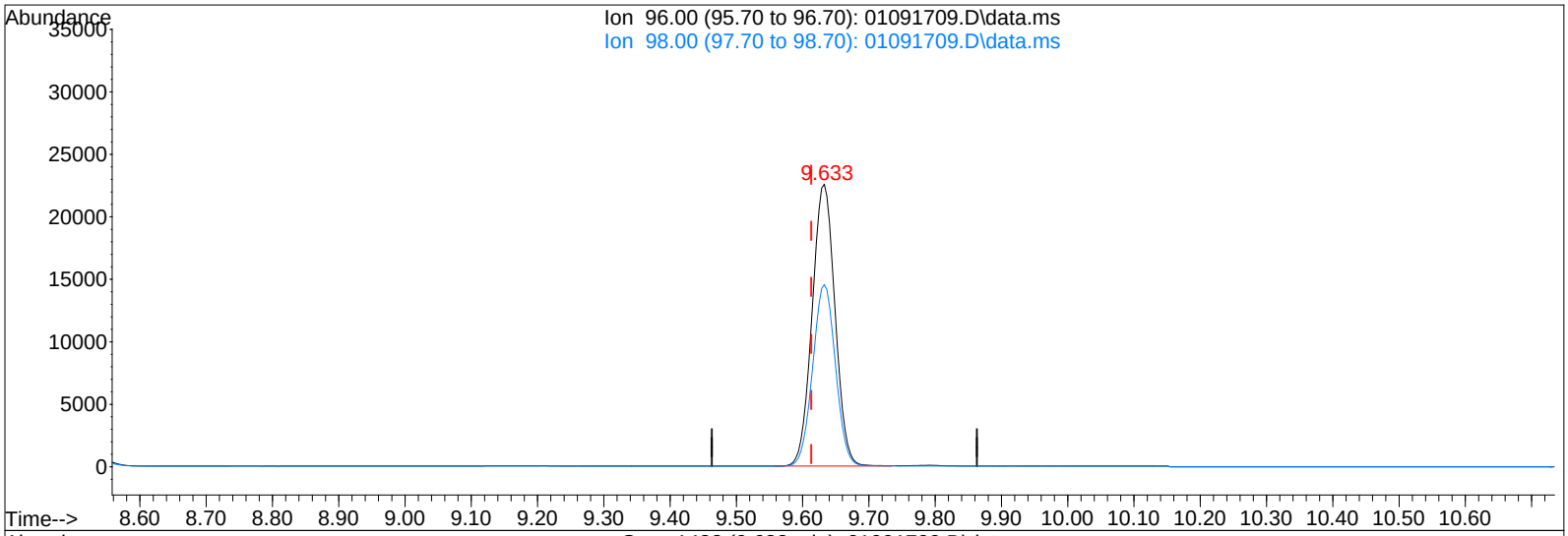
Quant Time: Jan 10 08:09:47 2017
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Jan 09 14:50:02 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

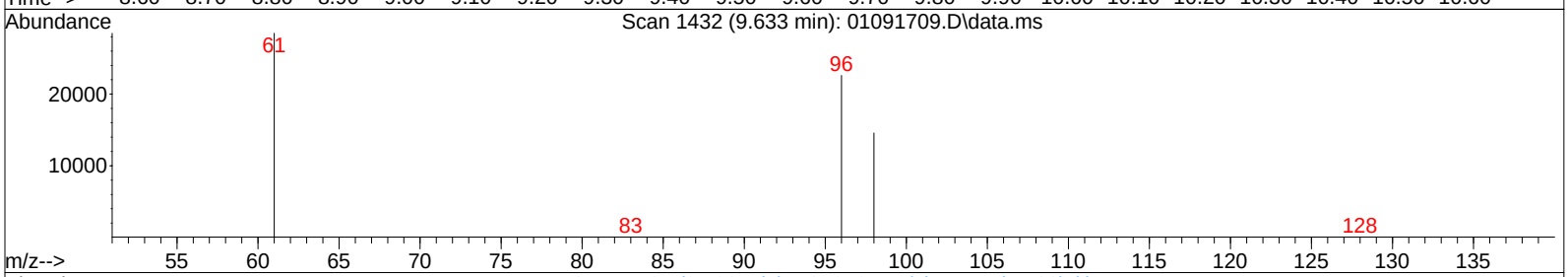


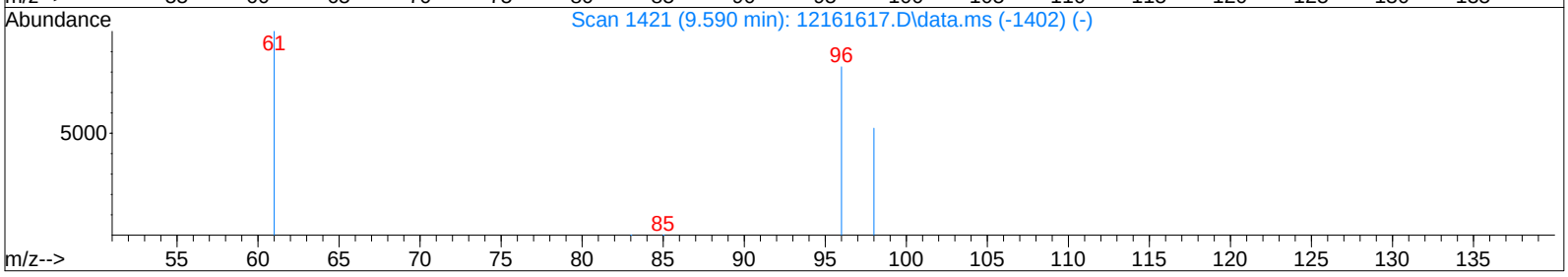
Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 01\09\01091709.D Vial: 1
Acq On : 9 Jan 2017 14:34 Operator: CL
Sample : P1606022-001 (1000mL) Inst : MS19
Misc : S29-12201602

Quant Time: Jan 09 14:59:19 2017
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Jan 09 14:50:02 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M







TIC: 01091709.D\data.ms

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

9.633min (+0.020) 1051.53pg

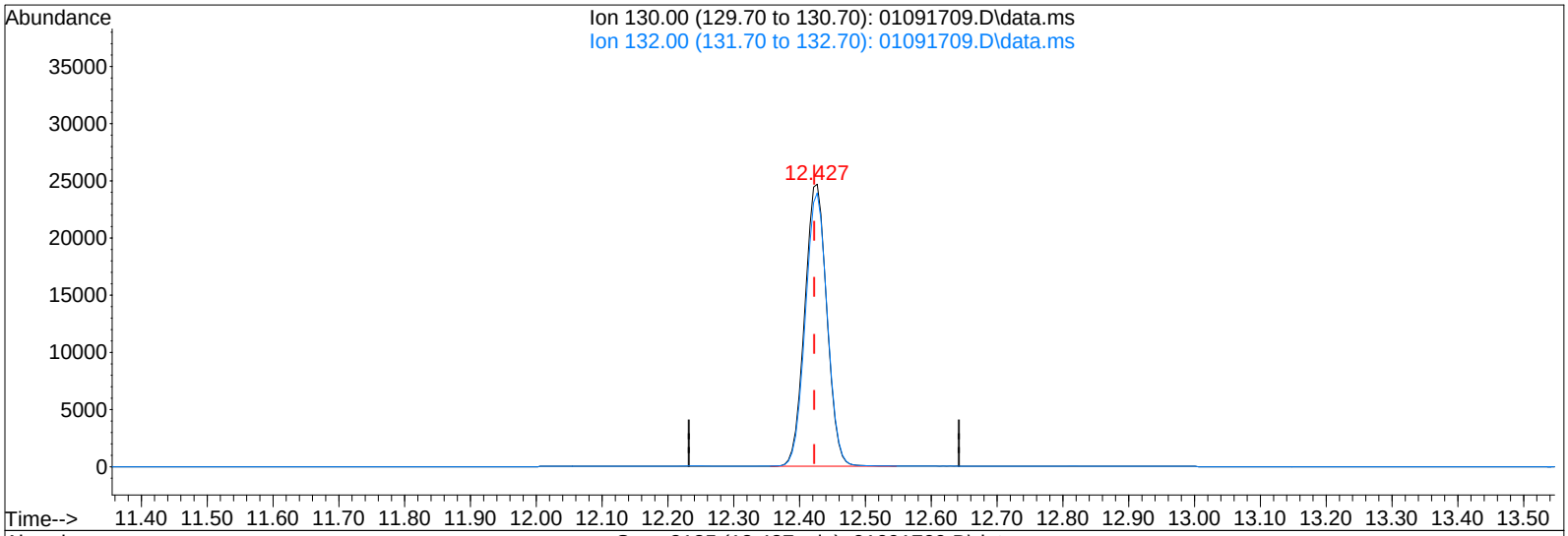
response 54100

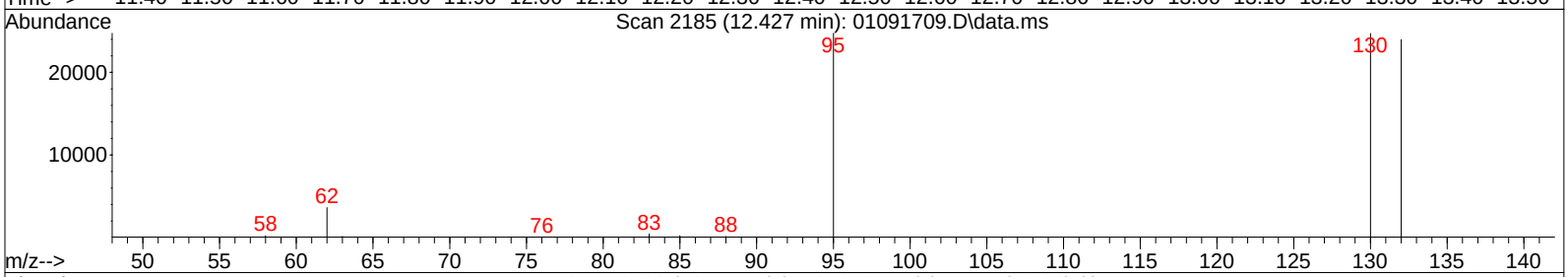
Ion	Exp%	Act%
96.00	100	100
98.00	63.70	64.39
0.00	0.00	0.00
0.00	0.00	0.00

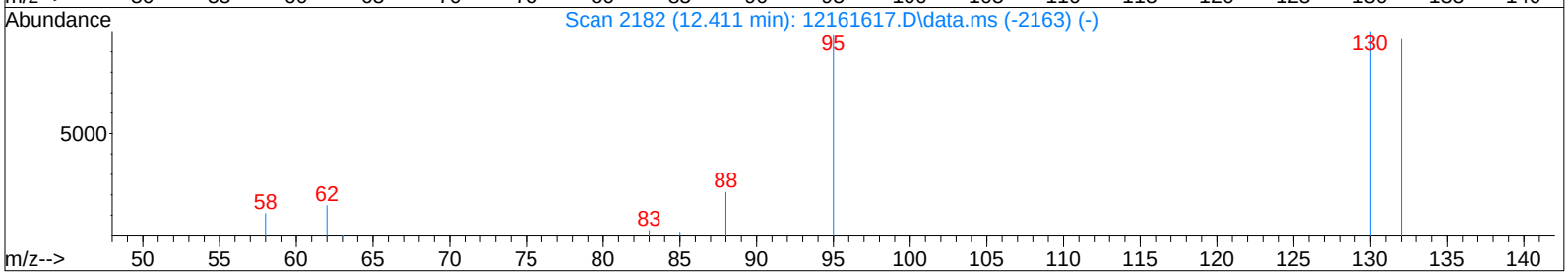
Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 01\09\01091709.D Vial: 1
Acq On : 9 Jan 2017 14:34 Operator: CL
Sample : P1606022-001 (1000mL) Inst : MS19
Misc : S29-12201602

Quant Time: Jan 09 14:59:19 2017
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Jan 09 14:50:02 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M







TIC: 01091709.D\data.ms

(28) Trichloroethene (T)

12.427min (+0.005) 1043.10pg

response 57443

Ion	Exp%	Act%
130.00	100	100
132.00	95.40	95.82
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\09\01091711.D Vial: 1
Acq On : 9 Jan 2017 15:36 Operator: CL
Sample : P1606022-001dil (100mL) Inst : MS19
Misc : S29-12201602

Quant Time: Jan 10 07:46:22 2017
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Jan 09 14:50:02 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 1/10/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.77	130	38170	1000.000 pg	0.00
25) 1,4-Difluorobenzene (IS2)	11.72	114	195968	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.05	54	31482	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.54	65	67367	1106.597 pg	-0.01
Spiked Amount 1000.000	Range 70 - 130		Recovery = 110.66%		
33) Toluene-d8 (SS2)	14.15	98	198788	1075.101 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 107.51%		
45) Bromofluorobenzene (SS3)	17.55	174	63185	1048.068 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 104.81%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.40	85	11693	125.049 pg	100
3) Chloromethane	4.63	52	1519	60.253 pg	98
4) 1,2-Dichloro,1,1,2,2-t...	4.82	85	437	N.D.	
5) Vinyl Chloride	0.00	62	0	N.D.	
6) 1,3-Butadiene	5.07	54	178	N.D.	
7) Bromomethane	5.49	94	106	N.D.	
8) Chloroethane	0.00	64	0	N.D.	
9) Acrolein	6.27	56	1916	109.948 pg	98
10) Acetone	6.39	58	1395741	57920.899 pg	100
11) Trichlorofluoromethane	6.62	101	4130	60.022 pg	100
12) 1,1-Dichloroethene	0.00	96	0	N.D.	
13) Methylene Chloride	7.49	84	2834	62.768 pg	83
14) Trichlorotrifluoroethane	7.80	151	1058	25.087 pg	99
15) trans-1,2-Dichloroethene	8.53	96	54	N.D.	
16) 1,1-Dichloroethane	0.00	63	0	N.D.	
17) Methyl tert-Butyl Ether	8.79	73	121	N.D.	
18) cis-1,2-Dichloroethene	9.61	96	5015	106.110 pg	100
19) Chloroform	9.90	83	1738	21.432 pg	99
21) 1,2-Dichloroethane	10.65	62	227	N.D.	
22) 1,1,1-Trichloroethane	0.00	97	0	N.D.	
23) Benzene	11.38	78	23089	120.947 pg	99
24) Carbon Tetrachloride	11.53	117	1506	23.653 pg	100
26) 1,2-Dichloropropane	12.19	63	114	N.D.	
27) Bromodichloromethane	12.38	83	189	N.D.	
28) Trichloroethene	12.42	130	5444	108.680 pg	100
29) 1,4-Dioxane	12.41	88	83	N.D.	
30) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
31) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
32) 1,1,2-Trichloroethane	13.88	83	54	N.D.	
34) Toluene	14.25	91	27851	151.571 pg	100
35) Dibromochloromethane	0.00	129	0	N.D.	
36) 1,2-Dibromoethane	0.00	107	0	N.D.	
37) Tetrachloroethene	15.40	166	860093	15922.132 pg	99
39) Chlorobenzene	16.14	112	963	N.D.	
40) Ethylbenzene	16.48	91	6435	28.937 pg	99
41) m,p-Xylene	16.65	91	12441	73.941 pg	99
42) Styrene	17.02	104	1296	N.D.	
43) o-Xylene	17.12	106	2371	27.057 pg	93
44) 1,1,2,2-Tetrachloroethane	17.17	83	283	N.D.	
46) 1,3,5-Trimethylbenzene	18.38	105	2564	N.D.	
47) 1,2,4-Trimethylbenzene	18.77	105	7340	39.215 pg	87
48) 1,3-Dichlorobenzene	18.93	146	64	N.D.	
49) 1,4-Dichlorobenzene	18.99	146	779	N.D.	
50) 1,2-Dichlorobenzene	19.32	146	112	N.D.	
51) 1,2-Dibromo-3-chloropr...	0.00	157	0	N.D.	
52) 1,2,4-Trichlorobenzene	20.96	182	60	N.D.	
53) Naphthalene	21.08	128	17690	89.371 pg	100

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\09\01091711.D Vial: 1
Acq On : 9 Jan 2017 15:36 Operator: CL
Sample : P1606022-001dil (100mL) Inst : MS19
Misc : S29-12201602

Quant Time: Jan 10 07:46:22 2017
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Jan 09 14:50:02 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

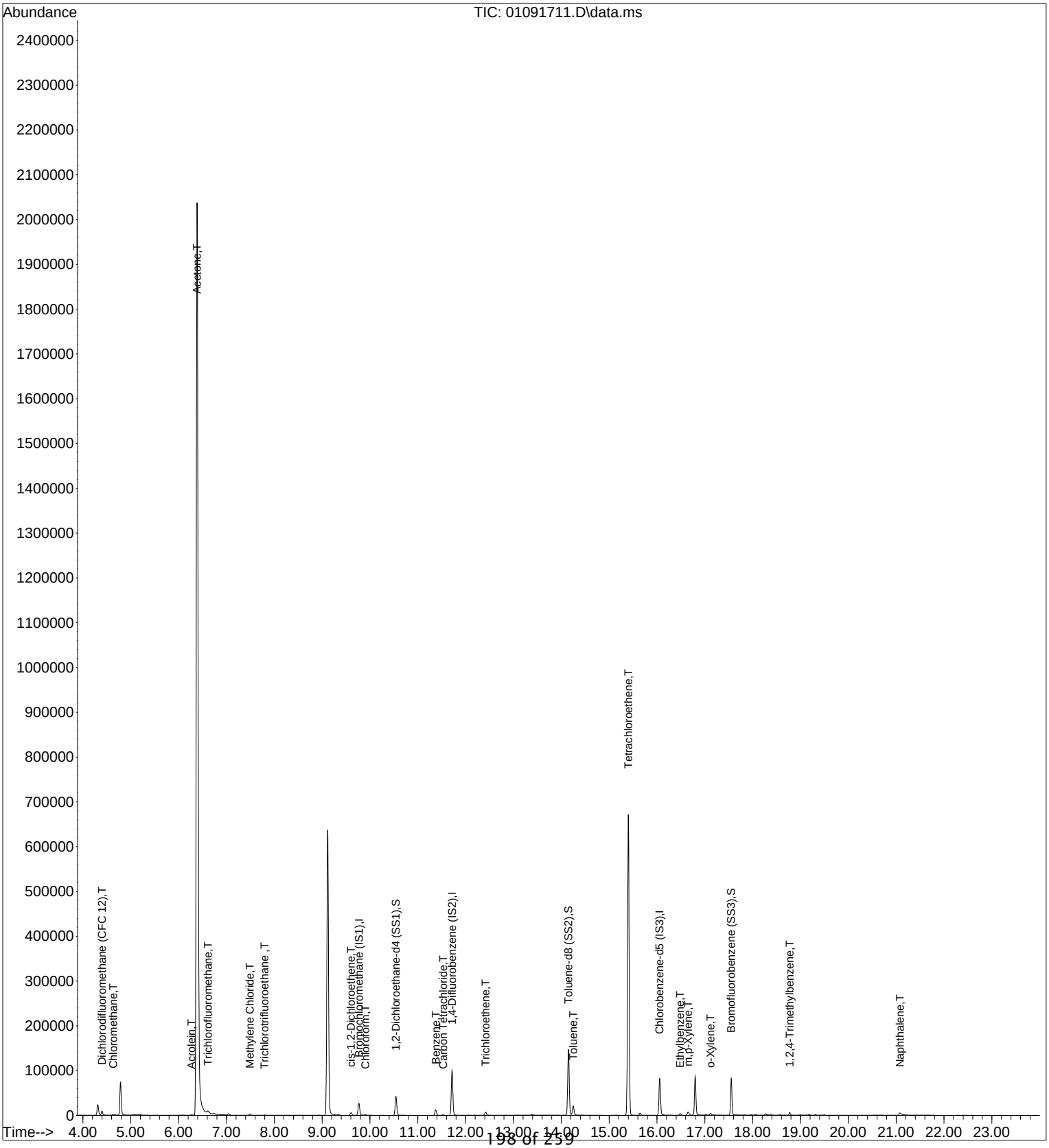
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	0.00	225	0	N.D.	

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\09\01091711.D Vial: 1
Acq On : 9 Jan 2017 15:36 Operator: CL
Sample : P1606022-001dil (100mL) Inst : MS19
Misc : S29-12201602

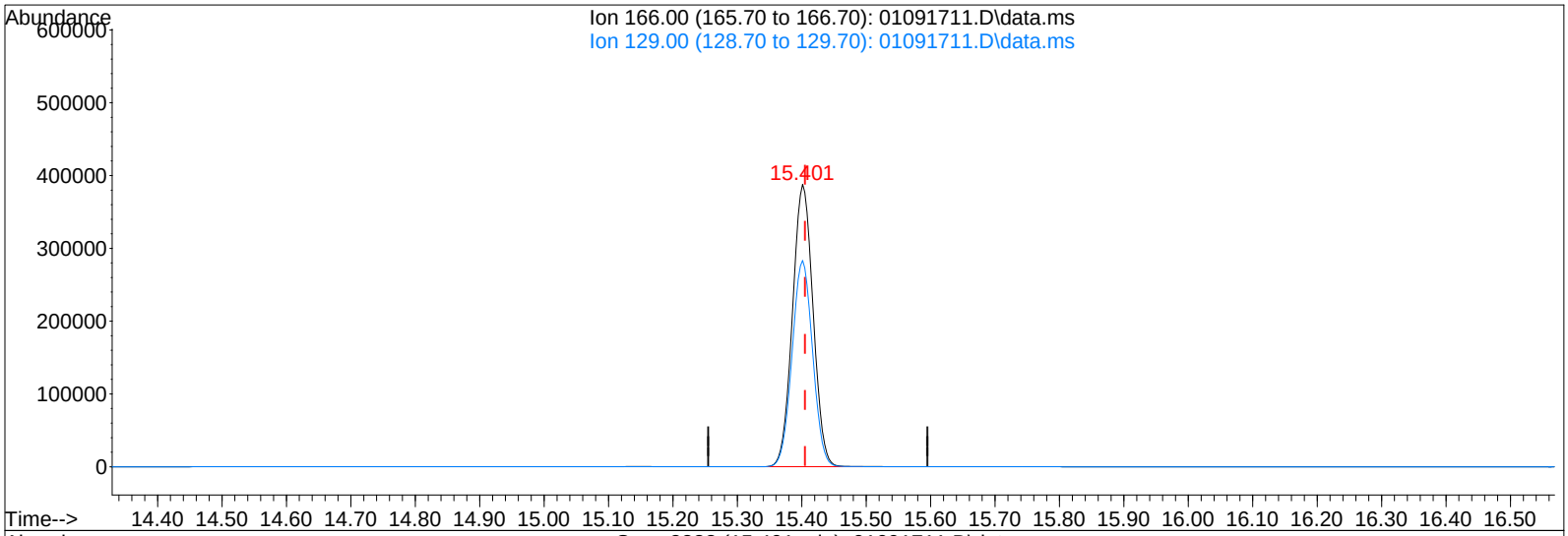
Quant Time: Jan 10 07:46:22 2017
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Jan 09 14:50:02 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

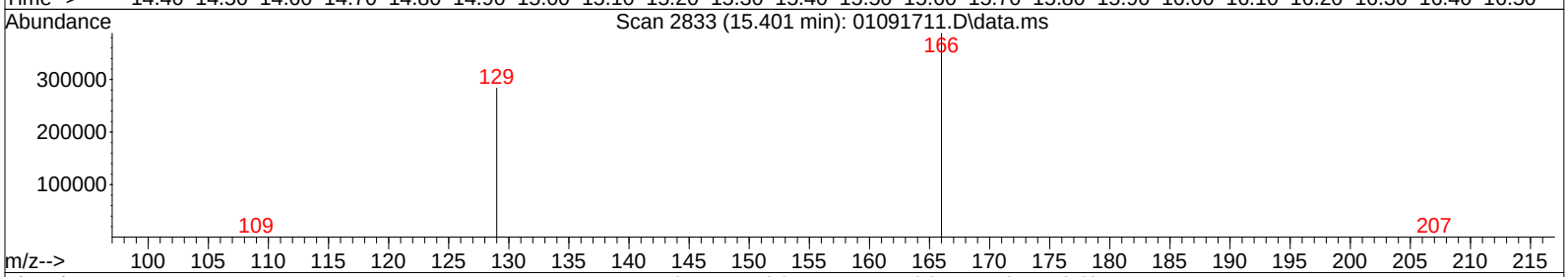


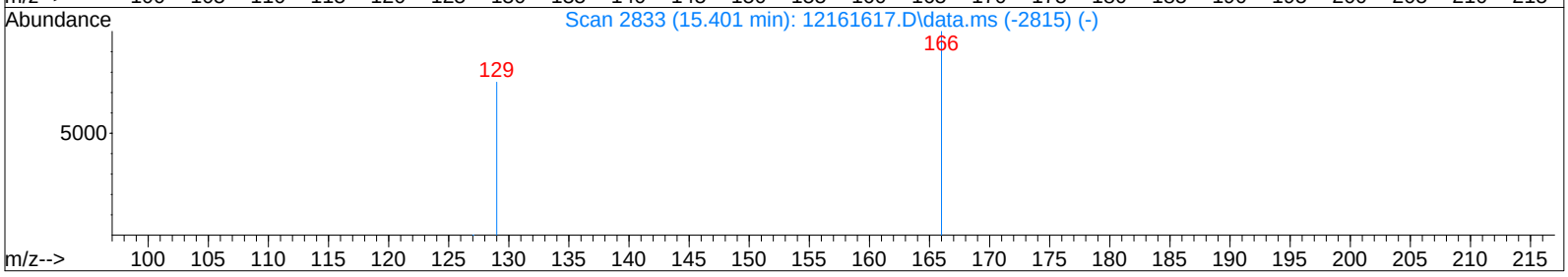
Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 01\09\01091711.D Vial: 1
Acq On : 9 Jan 2017 15:36 Operator: CL
Sample : P1606022-001dil (100mL) Inst : MS19
Misc : S29-12201602

Quant Time: Jan 10 07:46:22 2017
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Jan 09 14:50:02 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M







TIC: 01091711.D\data.ms

(37) Tetrachloroethene (T)

15.401min (-0.004) 15922.13pg

response 860093

Ion	Exp%	Act%
166.00	100	100
129.00	71.90	73.11
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\09\01091706.D Vial: 2
Acq On : 9 Jan 2017 12:06 Operator: CL
Sample : MB S19010917 1000mL Inst : MS19
Misc : S29-12201602/AC01205

Quant Time: Jan 09 13:49:45 2017
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Dec 28 07:38:07 2016
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 1/13/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.79	130	40475	1000.000 pg	0.00
25) 1,4-Difluorobenzene (IS2)	11.72	114	200779	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.06	54	32822	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.55	65	69373	1070.069 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 107.01%		
33) Toluene-d8 (SS2)	14.15	98	202091	1030.480 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 103.05%		
45) Bromofluorobenzene (SS3)	17.56	174	63049	969.313 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 96.93%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.45	85	94	N.D.	
3) Chloromethane	0.00	52	0	N.D.	
4) 1,2-Dichloro,1,1,2,2-t...	0.00	85	0	N.D.	
5) Vinyl Chloride	0.00	62	0	N.D.	
6) 1,3-Butadiene	0.00	54	0	N.D.	
7) Bromomethane	0.00	94	0	N.D.	
8) Chloroethane	0.00	64	0	N.D.	
9) Acrolein	0.00	56	0	N.D.	
10) Acetone	6.48	58	2444	101.011 pg	94
11) Trichlorofluoromethane	0.00	101	0	N.D.	
12) 1,1-Dichloroethene	0.00	96	0	N.D.	
13) Methylene Chloride	7.52	84	111	N.D.	
14) Trichlorotrifluoroethane	0.00	151	0	N.D.	
15) trans-1,2-Dichloroethene	0.00	96	0	N.D.	
16) 1,1-Dichloroethane	0.00	63	0	N.D.	
17) Methyl tert-Butyl Ether	8.75	73	74	N.D.	
18) cis-1,2-Dichloroethene	0.00	96	0	N.D.	
19) Chloroform	9.91	83	944	N.D.	
21) 1,2-Dichloroethane	0.00	62	0	N.D.	
22) 1,1,1-Trichloroethane	0.00	97	0	N.D.	
23) Benzene	11.38	78	2235	N.D.	
24) Carbon Tetrachloride	0.00	117	0	N.D.	
26) 1,2-Dichloropropane	0.00	63	0	N.D.	
27) Bromodichloromethane	0.00	83	0	N.D.	
28) Trichloroethene	0.00	130	0	N.D.	
29) 1,4-Dioxane	0.00	88	0	N.D.	
30) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
31) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
32) 1,1,2-Trichloroethane	0.00	83	0	N.D.	
34) Toluene	14.26	91	872	N.D.	
35) Dibromochloromethane	0.00	129	0	N.D.	
36) 1,2-Dibromoethane	0.00	107	0	N.D.	
37) Tetrachloroethene	0.00	166	0	N.D.	
39) Chlorobenzene	16.10	112	110	N.D.	
40) Ethylbenzene	16.49	91	208	N.D.	
41) m,p-Xylene	16.66	91	350	N.D.	
42) Styrene	17.03	104	130	N.D.	
43) o-Xylene	17.13	106	64	N.D.	
44) 1,1,2,2-Tetrachloroethane	17.13	83	71	N.D.	
46) 1,3,5-Trimethylbenzene	18.39	105	53	N.D.	
47) 1,2,4-Trimethylbenzene	18.78	105	74	N.D.	
48) 1,3-Dichlorobenzene	18.93	146	88	N.D.	
49) 1,4-Dichlorobenzene	19.00	146	138	N.D.	
50) 1,2-Dichlorobenzene	19.32	146	86	N.D.	
51) 1,2-Dibromo-3-chloropr...	0.00	157	0	N.D.	
52) 1,2,4-Trichlorobenzene	20.98	182	171	N.D.	
53) Naphthalene	21.13	128	874	N.D.	

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\09\01091706.D Vial: 2
Acq On : 9 Jan 2017 12:06 Operator: CL
Sample : MB S19010917 1000mL Inst : MS19
Misc : S29-12201602/AC01205

Quant Time: Jan 09 13:49:45 2017
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Dec 28 07:38:07 2016
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

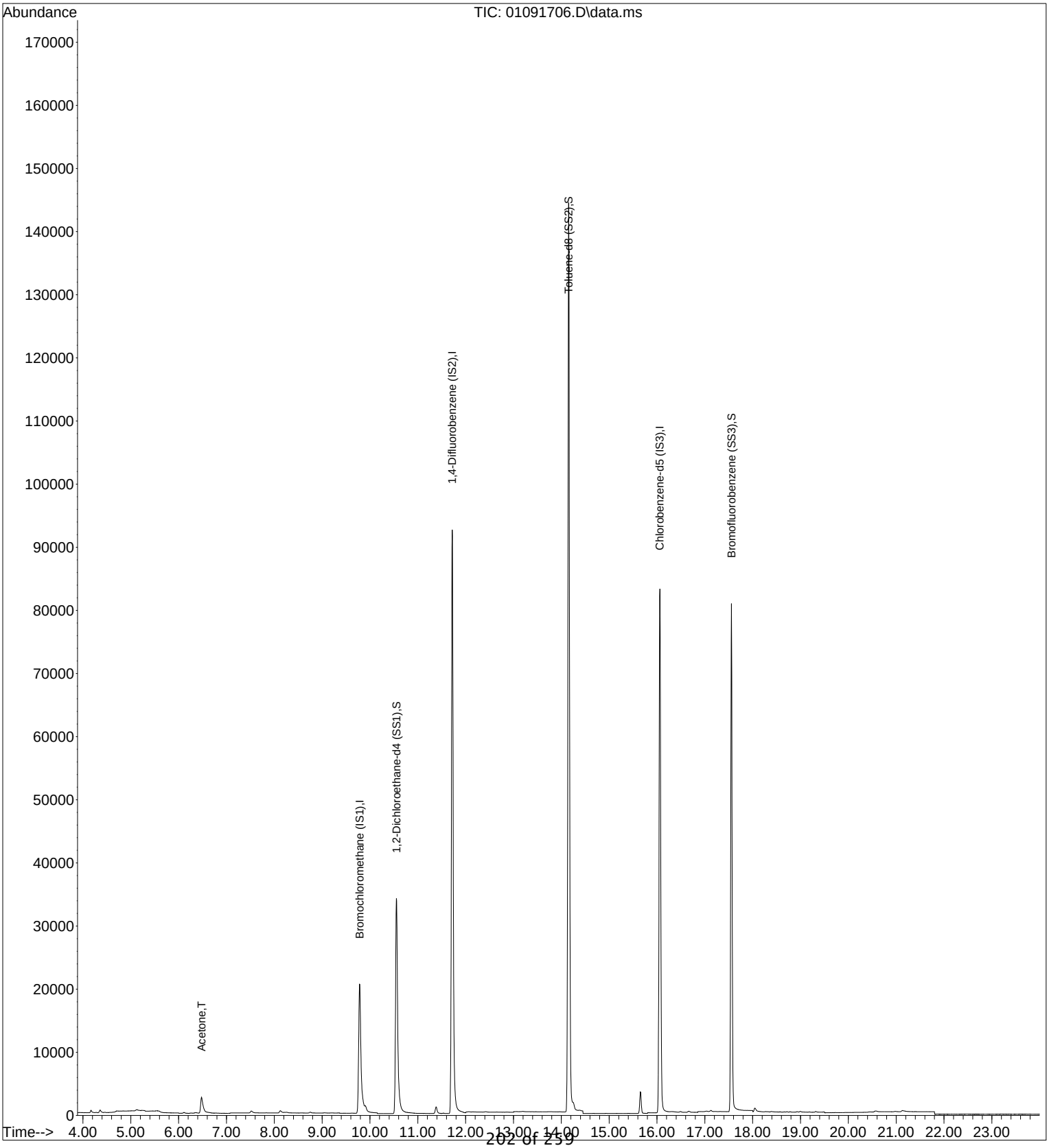
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	0.00	225	0	N.D.	

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\09\01091706.D Vial: 2
Acq On : 9 Jan 2017 12:06 Operator: CL
Sample : MB S19010917 1000mL Inst : MS19
Misc : S29-12201602/AC01205

Quant Time: Jan 09 13:49:45 2017
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Dec 28 07:38:07 2016
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\09\01091707.D Vial: 2
Acq On : 9 Jan 2017 12:37 Operator: CL
Sample : LCS S19010917 500pg Inst : MS19
Misc : S29-12201602/S29-12211613 (1/19)

Quant Time: Jan 09 14:54:32 2017
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Jan 09 14:50:02 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 1/9/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.76	130	40579	1000.000 pg	-0.02
25) 1,4-Difluorobenzene (IS2)	11.71	114	208791	1000.000 pg	-0.01
38) Chlorobenzene-d5 (IS3)	16.05	54	33427	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.53	65	68989	1065.965 pg	-0.02
Spiked Amount 1000.000	Range 70 - 130		Recovery = 106.60%		
33) Toluene-d8 (SS2)	14.15	98	207522	1053.408 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 105.34%		
45) Bromofluorobenzene (SS3)	17.56	174	66893	1045.012 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 104.50%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.42	85	57181	575.213 pg	100
3) Chloromethane	4.65	52	15646	583.771 pg	97
4) 1,2-Dichloro,1,1,2,2-t...	4.81	85	46116	441.063 pg	100
5) Vinyl Chloride	4.95	62	49894	527.416 pg	100
6) 1,3-Butadiene	5.14	54	33781	652.426 pg	95
7) Bromomethane	5.47	94	22389	591.797 pg	100
8) Chloroethane	5.70	64	16797	624.307 pg	100
9) Acrolein	6.27	56	8476	457.514 pg	99
10) Acetone	6.40	58	107977	4214.854 pg	99
11) Trichlorofluoromethane	6.61	101	40515	553.858 pg	100
12) 1,1-Dichloroethene	7.35	96	25266	573.849 pg	94
13) Methylene Chloride	7.48	84	27902	581.292 pg	92
14) Trichlorotrifluoroethane	7.80	151	24341	542.901 pg	100
15) trans-1,2-Dichloroethene	8.51	96	27537	583.229 pg	99
16) 1,1-Dichloroethane	8.72	63	48429	627.503 pg	99
17) Methyl tert-Butyl Ether	8.79	73	78220	605.952 pg	97
18) cis-1,2-Dichloroethene	9.59	96	28948	576.135 pg	100
19) Chloroform	9.89	83	49418	573.214 pg	99
21) 1,2-Dichloroethane	10.64	62	37333	582.502 pg	100
22) 1,1,1-Trichloroethane	10.91	97	43170	551.996 pg	100
23) Benzene	11.37	78	122349	602.850 pg	100
24) Carbon Tetrachloride	11.52	117	35509	524.594 pg	100
26) 1,2-Dichloropropane	12.18	63	26721	596.286 pg	99
27) Bromodichloromethane	12.36	83	36624	554.145 pg	100
28) Trichloroethene	12.41	130	28288	530.039 pg	100
29) 1,4-Dioxane	12.38	88	21508	543.853 pg	96
30) cis-1,3-Dichloropropene	13.26	75	39842	559.353 pg	100
31) trans-1,3-Dichloropropene	13.77	75	34932	565.302 pg	100
32) 1,1,2-Trichloroethane	13.95	83	22716	560.521 pg	99
34) Toluene	14.25	91	107782	550.549 pg	100
35) Dibromochloromethane	14.66	129	26654	500.983 pg	100
36) 1,2-Dibromoethane	14.92	107	27560	520.965 pg	100
37) Tetrachloroethene	15.40	166	28909	502.299 pg	99
39) Chlorobenzene	16.10	112	72064	466.693 pg	100
40) Ethylbenzene	16.48	91	116017	491.345 pg	99
41) m,p-Xylene	16.66	91	180702	1011.483 pg	99
42) Styrene	17.01	104	60082	457.890 pg	100
43) o-Xylene	17.12	106	45311	486.984 pg	99
44) 1,1,2,2-Tetrachloroethane	17.09	83	44820	479.095 pg	100
46) 1,3,5-Trimethylbenzene	18.38	105	96030	499.342 pg	99
47) 1,2,4-Trimethylbenzene	18.77	105	97188	489.024 pg	99
48) 1,3-Dichlorobenzene	18.92	146	56011	472.595 pg	99
49) 1,4-Dichlorobenzene	18.98	146	54772	466.254 pg	99
50) 1,2-Dichlorobenzene	19.31	146	53785	459.518 pg	100
51) 1,2-Dibromo-3-chloropr...	19.72	157	16014	437.517 pg	94
52) 1,2,4-Trichlorobenzene	20.94	182	30741	472.991 pg	97
53) Naphthalene	21.06	128	93571	445.221 pg	100

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\09\01091707.D Vial: 2
Acq On : 9 Jan 2017 12:37 Operator: CL
Sample : LCS S19010917 500pg Inst : MS19
Misc : S29-12201602/S29-12211613 (1/19)

Quant Time: Jan 09 14:54:32 2017
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Jan 09 14:50:02 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

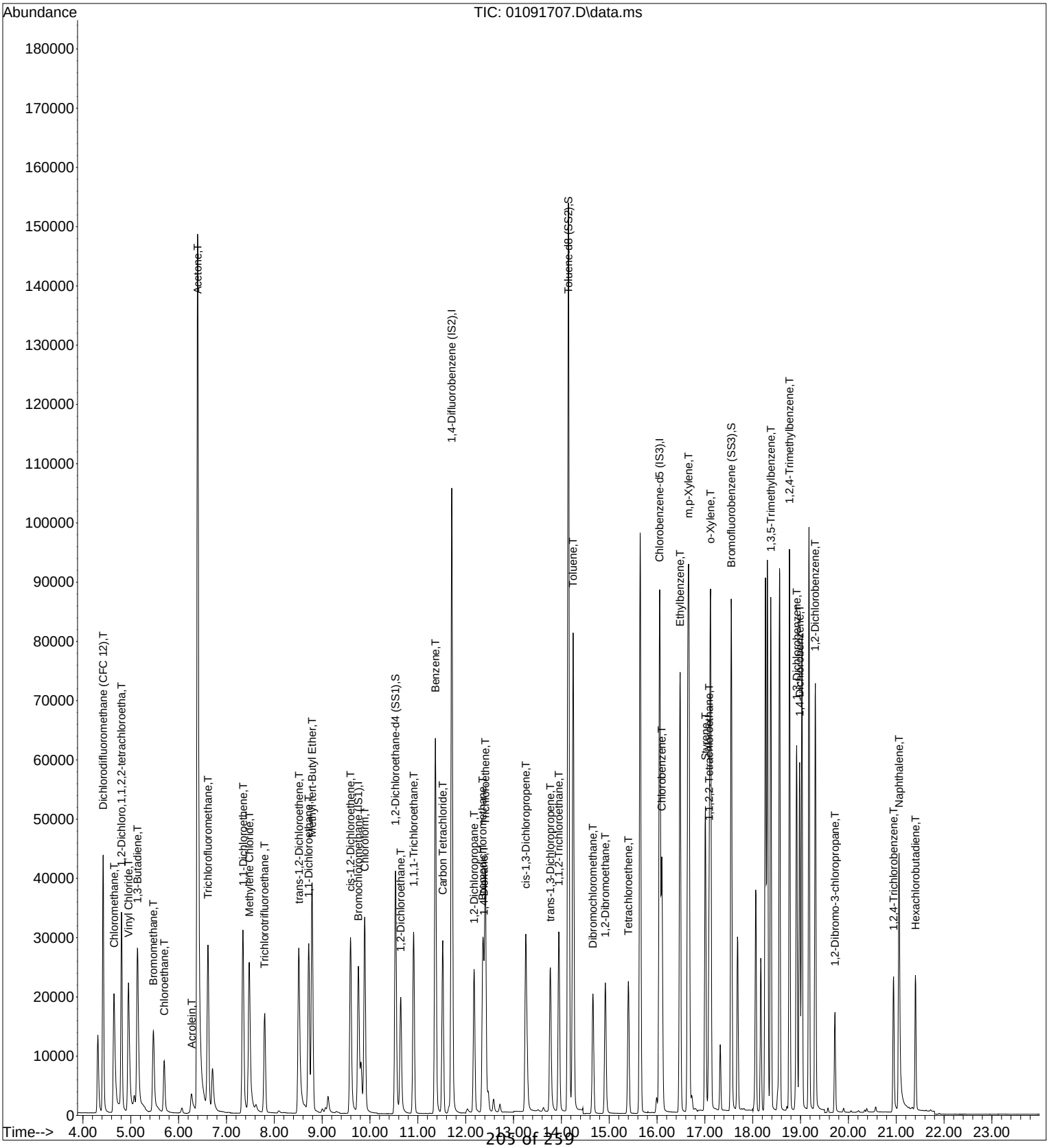
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	22418	470.683	pg	100

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\09\01091707.D Vial: 2
Acq On : 9 Jan 2017 12:37 Operator: CL
Sample : LCS S19010917 500pg Inst : MS19
Misc : S29-12201602/S29-12211613 (1/19)

Quant Time: Jan 09 14:54:32 2017
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Jan 09 14:50:02 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\09\01091710.D Vial: 1
Acq On : 9 Jan 2017 15:05 Operator: CL
Sample : P1606022-001dup (1000mL) Inst : MS19
Misc : S29-12201602

Quant Time: Jan 10 08:10:49 2017
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Jan 09 14:50:02 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 1/10/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.79	130	42357	1000.000 pg	0.02
25) 1,4-Difluorobenzene (IS2)	11.73	114	220293	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.05	54	36531	1000.000 pg	0.00
System Monitoring Compounds					
20) 1,2-Dichloroethane-d4 ...	10.56	65	74576	1103.922 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery	= 110.39%	
33) Toluene-d8 (SS2)	14.15	98	226741	1090.872 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery	= 109.09%	
45) Bromofluorobenzene (SS3)	17.55	174	73125	1045.303 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery	= 104.53%	

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.41	85	115844	1116.417 pg	100
3) Chloromethane	4.62	52	8263	295.361 pg	93
4) 1,2-Dichloro,1,1,2,2-t...	4.80	85	4130	37.842 pg	99
5) Vinyl Chloride	4.93	62	238	N.D.	
6) 1,3-Butadiene	5.12	54	10669	197.405 pg #	83
7) Bromomethane	5.47	94	676	N.D.	
8) Chloroethane	5.69	64	340	N.D.	
9) Acrolein	6.29	56	21966	1135.901 pg	97
10) Acetone	6.43	58	14465034	540937.240 pg #	59
11) Trichlorofluoromethane	6.60	101	43378	568.104 pg	100
12) 1,1-Dichloroethene	7.34	96	102	N.D.	
13) Methylene Chloride	7.53	84	29124	581.281 pg	83
14) Trichlorotrifluoroethane	7.80	151	10489	224.126 pg	100
15) trans-1,2-Dichloroethene	8.55	96	1162	23.578 pg	98
16) 1,1-Dichloroethane	8.76	63	343	N.D.	
17) Methyl tert-Butyl Ether	8.79	73	1621	N.D.	
18) cis-1,2-Dichloroethene	9.63	96	56200	1071.564 pg	99
19) Chloroform	9.94	83	6603	73.375 pg	100
21) 1,2-Dichloroethane	10.67	62	2475	36.996 pg	97
22) 1,1,1-Trichloroethane	10.93	97	603	N.D.	
23) Benzene	11.39	78	226943	1071.278 pg	100
24) Carbon Tetrachloride	11.54	117	15163	214.608 pg	100
26) 1,2-Dichloropropane	12.19	63	1189	25.148 pg	98
27) Bromodichloromethane	0.00	83	0	N.D. d	
28) Trichloroethene	12.43	130	59591	1058.272 pg	99
29) 1,4-Dioxane	0.00	88	0	N.D. d	
30) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
31) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
32) 1,1,2-Trichloroethane	13.93	83	223	N.D.	
34) Toluene	14.25	91	305590	1479.450 pg	99
35) Dibromochloromethane	14.67	129	206	N.D.	
36) 1,2-Dibromoethane	0.00	107	0	N.D.	
37) Tetrachloroethene	15.41	166	8746270	144033.382 pg	95
39) Chlorobenzene	0.00	112	0	N.D. d	
40) Ethylbenzene	16.48	91	76097	294.895 pg	99
41) m,p-Xylene	16.65	91	153046	783.887 pg	99
42) Styrene	17.01	104	15228	106.193 pg	99
43) o-Xylene	17.12	106	28479	280.073 pg	97
44) 1,1,2,2-Tetrachloroethane	17.12	83	323	N.D.	
46) 1,3,5-Trimethylbenzene	18.38	105	32831	156.211 pg	100
47) 1,2,4-Trimethylbenzene	18.77	105	97958	451.018 pg	87
48) 1,3-Dichlorobenzene	18.92	146	186	N.D.	
49) 1,4-Dichlorobenzene	18.98	146	8977	69.925 pg	100
50) 1,2-Dichlorobenzene	19.31	146	960	N.D.	
51) 1,2-Dibromo-3-chloropr...	0.00	157	0	N.D.	
52) 1,2,4-Trichlorobenzene	20.94	182	181	N.D.	
53) Naphthalene	21.06	128	240950	1049.052 pg	99

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\09\01091710.D Vial: 1
Acq On : 9 Jan 2017 15:05 Operator: CL
Sample : P1606022-001dup (1000mL) Inst : MS19
Misc : S29-12201602

Quant Time: Jan 10 08:10:49 2017
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Jan 09 14:50:02 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

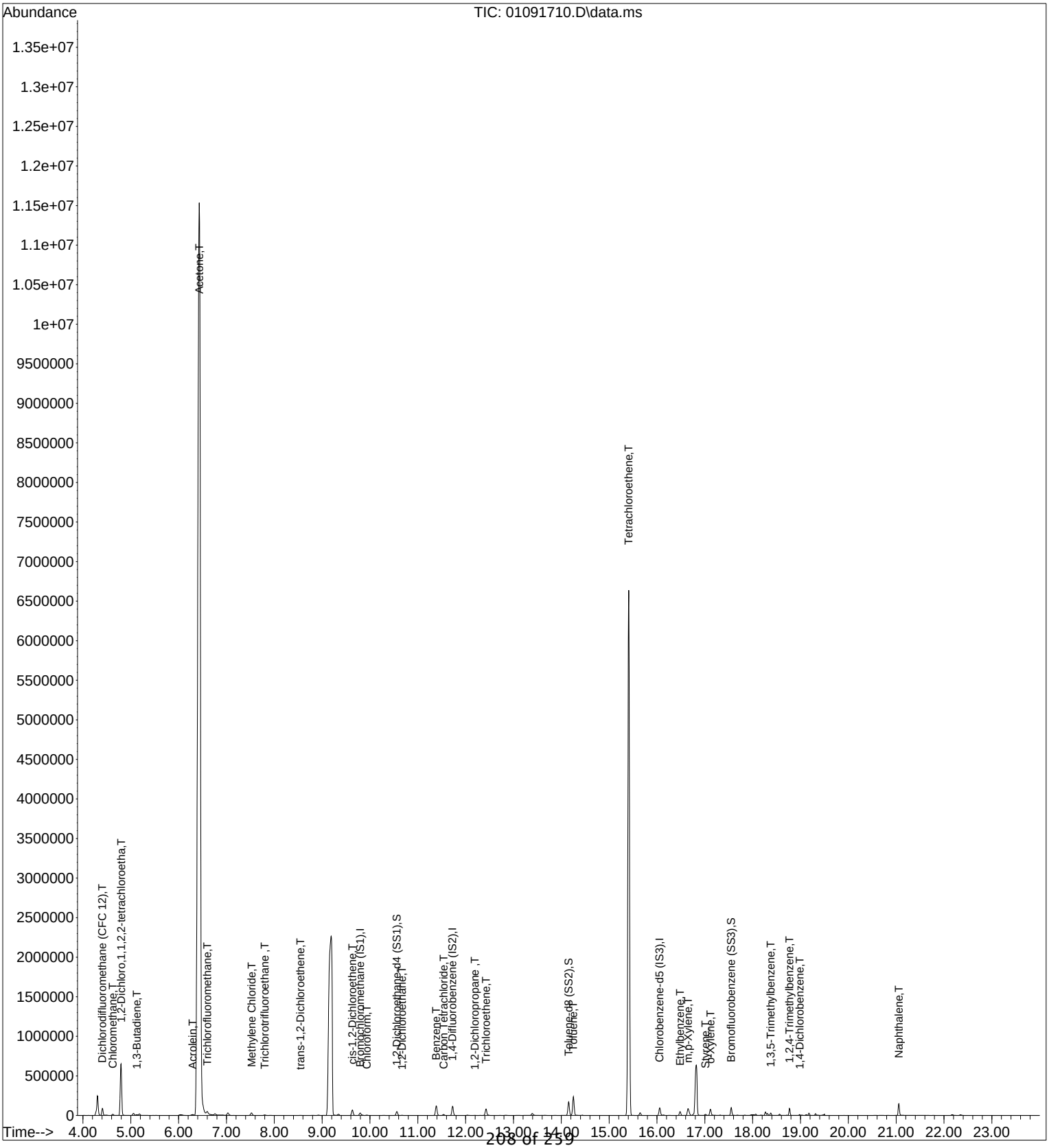
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	55	N.D.	

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\09\01091710.D Vial: 1
Acq On : 9 Jan 2017 15:05 Operator: CL
Sample : P1606022-001dup (1000mL) Inst : MS19
Misc : S29-12201602

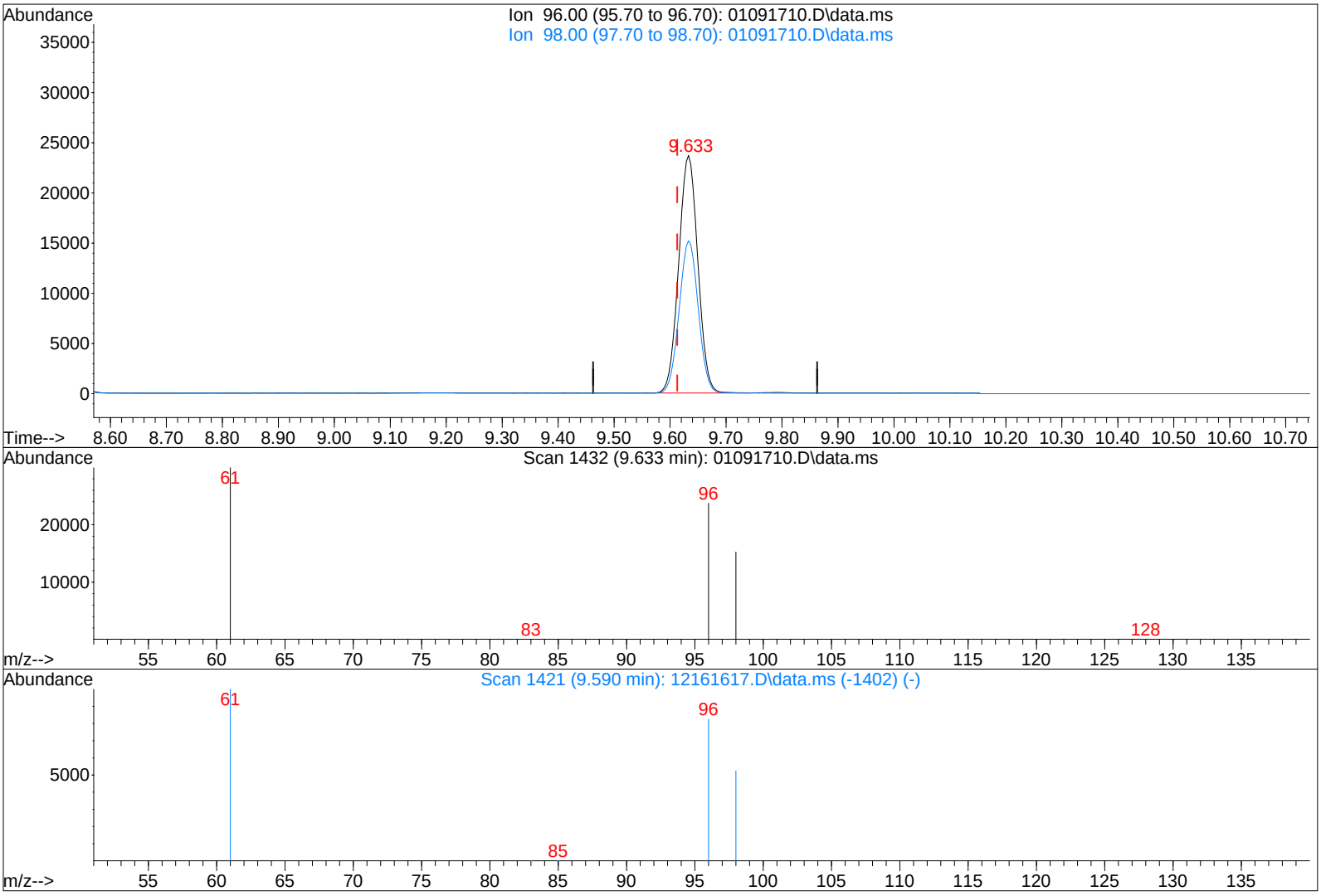
Quant Time: Jan 10 08:10:49 2017
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Jan 09 14:50:02 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 01\09\01091710.D Vial: 1
Acq On : 9 Jan 2017 15:05 Operator: CL
Sample : P1606022-001dup (1000mL) Inst : MS19
Misc : S29-12201602

Quant Time: Jan 09 15:39:29 2017
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Jan 09 14:50:02 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



TIC: 01091710.D\data.ms

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

9.633min (+0.020) 1071.56pg

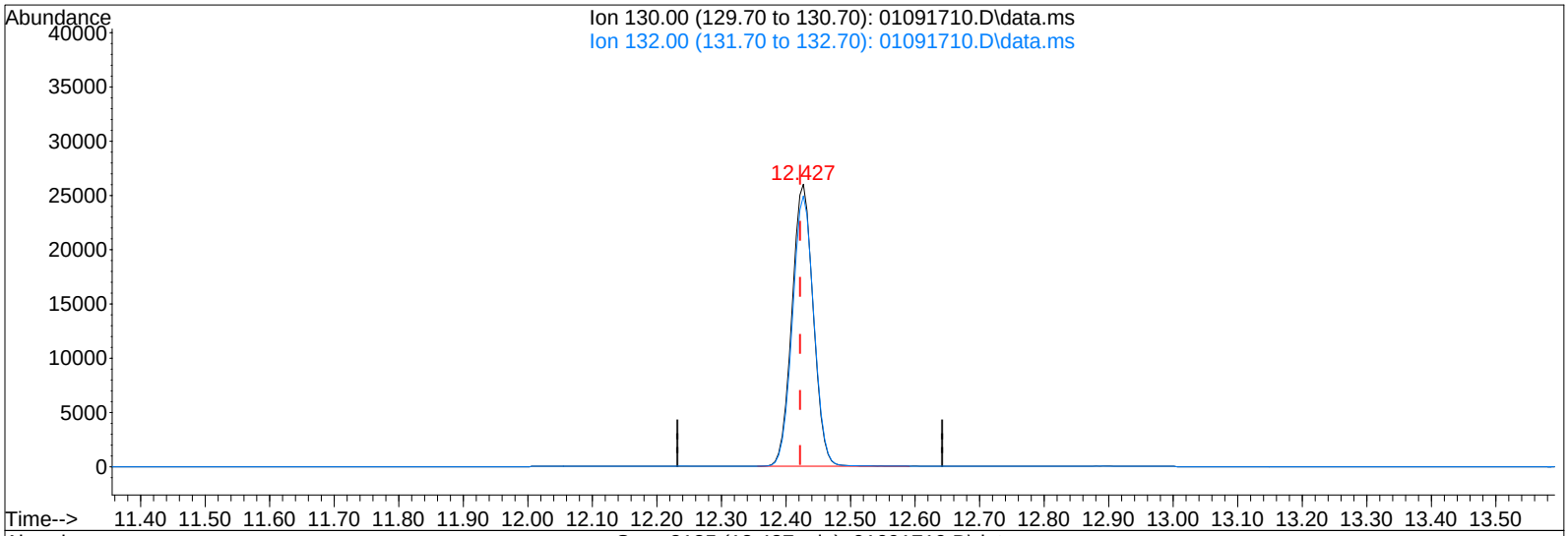
response 56200

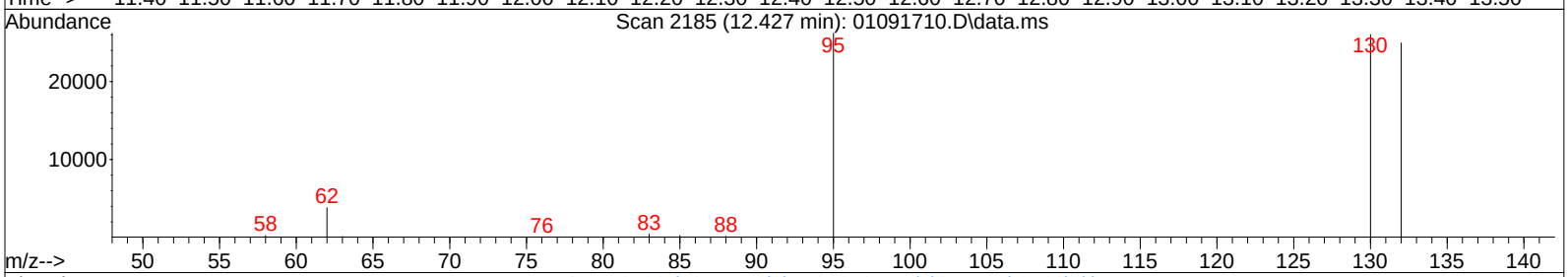
Ion	Exp%	Act%
96.00	100	100
98.00	63.70	64.29
0.00	0.00	0.00
0.00	0.00	0.00

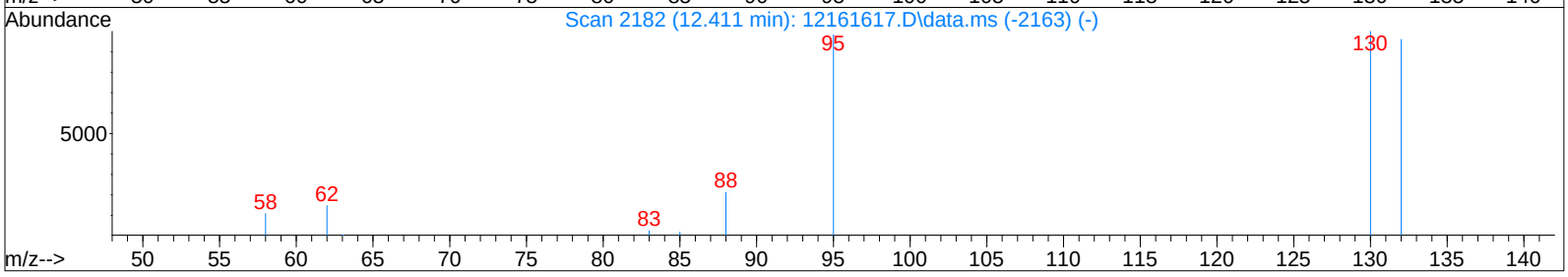
Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 01\09\01091710.D Vial: 1
Acq On : 9 Jan 2017 15:05 Operator: CL
Sample : P1606022-001dup (1000mL) Inst : MS19
Misc : S29-12201602

Quant Time: Jan 09 15:39:29 2017
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Jan 09 14:50:02 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M







TIC: 01091710.D\data.ms

(28) Trichloroethene (T)

12.427min (+0.005) 1058.27pg

response 59591

Ion	Exp%	Act%
130.00	100	100
132.00	95.40	96.10
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\09\01091712.D Vial: 1
Acq On : 9 Jan 2017 16:08 Operator: CL
Sample : P1606022-001dupdil (100mL) Inst : MS19
Misc : S29-12201602

Quant Time: Jan 10 07:46:24 2017
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Jan 09 14:50:02 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 1/10/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.77	130	37258	1000.000 pg	0.00
25) 1,4-Difluorobenzene (IS2)	11.72	114	188331	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.06	54	30681	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.55	65	65376	1100.179 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 110.02%		
33) Toluene-d8 (SS2)	14.15	98	190710	1073.238 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 107.32%		
45) Bromofluorobenzene (SS3)	17.56	174	61071	1039.450 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 103.94%		

Target Compounds

					Qvalue
2) Dichlorodifluoromethan...	4.41	85	11311	123.925 pg	100
3) Chloromethane	4.64	52	1572	63.881 pg	96
4) 1,2-Dichloro,1,1,2,2-t...	4.82	85	427	N.D.	
5) Vinyl Chloride	0.00	62	0	N.D.	
6) 1,3-Butadiene	5.08	54	195	N.D.	
7) Bromomethane	5.49	94	101	N.D.	
8) Chloroethane	0.00	64	0	N.D.	
9) Acrolein	6.28	56	1781	104.703 pg	96
10) Acetone	6.39	58	1337572	56865.681 pg	98
11) Trichlorofluoromethane	6.62	101	3976	59.198 pg	100
12) 1,1-Dichloroethene	0.00	96	0	N.D.	
13) Methylene Chloride	7.50	84	2705	61.377 pg	81
14) Trichlorotrifluoroethane	7.80	151	1028	24.972 pg	99
15) trans-1,2-Dichloroethene	8.53	96	106	N.D.	
16) 1,1-Dichloroethane	0.00	63	0	N.D.	
17) Methyl tert-Butyl Ether	8.80	73	147	N.D.	
18) cis-1,2-Dichloroethene	9.61	96	4907	106.366 pg	100
19) Chloroform	9.91	83	1652	20.870 pg	99
21) 1,2-Dichloroethane	10.65	62	209	N.D.	
22) 1,1,1-Trichloroethane	10.92	97	65	N.D.	
23) Benzene	11.38	78	21997	118.047 pg	99
24) Carbon Tetrachloride	11.53	117	1476	23.749 pg	99
26) 1,2-Dichloropropane	12.19	63	114	N.D.	
27) Bromodichloromethane	12.38	83	183	N.D.	
28) Trichloroethene	12.42	130	5282	109.722 pg	99
29) 1,4-Dioxane	12.41	88	78	N.D.	
30) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
31) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
32) 1,1,2-Trichloroethane	0.00	83	0	N.D.	
34) Toluene	14.25	91	26666	151.007 pg	100
35) Dibromochloromethane	0.00	129	0	N.D.	
36) 1,2-Dibromoethane	0.00	107	0	N.D.	
37) Tetrachloroethene	15.40	166	837591	16134.339 pg	99
39) Chlorobenzene	16.14	112	902	N.D.	
40) Ethylbenzene	16.49	91	5940	27.408 pg	100
41) m,p-Xylene	16.65	91	11613	70.822 pg	99
42) Styrene	17.02	104	1215	N.D.	
43) o-Xylene	17.12	106	2235	26.171 pg	92
44) 1,1,2,2-Tetrachloroethane	17.17	83	287	N.D.	
46) 1,3,5-Trimethylbenzene	18.38	105	2390	N.D.	
47) 1,2,4-Trimethylbenzene	18.77	105	6736	36.927 pg	87
48) 1,3-Dichlorobenzene	18.92	146	58	N.D.	
49) 1,4-Dichlorobenzene	18.99	146	731	N.D.	
50) 1,2-Dichlorobenzene	19.31	146	112	N.D.	
51) 1,2-Dibromo-3-chloropr...	0.00	157	0	N.D.	
52) 1,2,4-Trichlorobenzene	20.97	182	76	N.D.	
53) Naphthalene	21.08	128	16173	83.840 pg	100

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\09\01091712.D Vial: 1
Acq On : 9 Jan 2017 16:08 Operator: CL
Sample : P1606022-001dupdil (100mL) Inst : MS19
Misc : S29-12201602

Quant Time: Jan 10 07:46:24 2017
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Jan 09 14:50:02 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

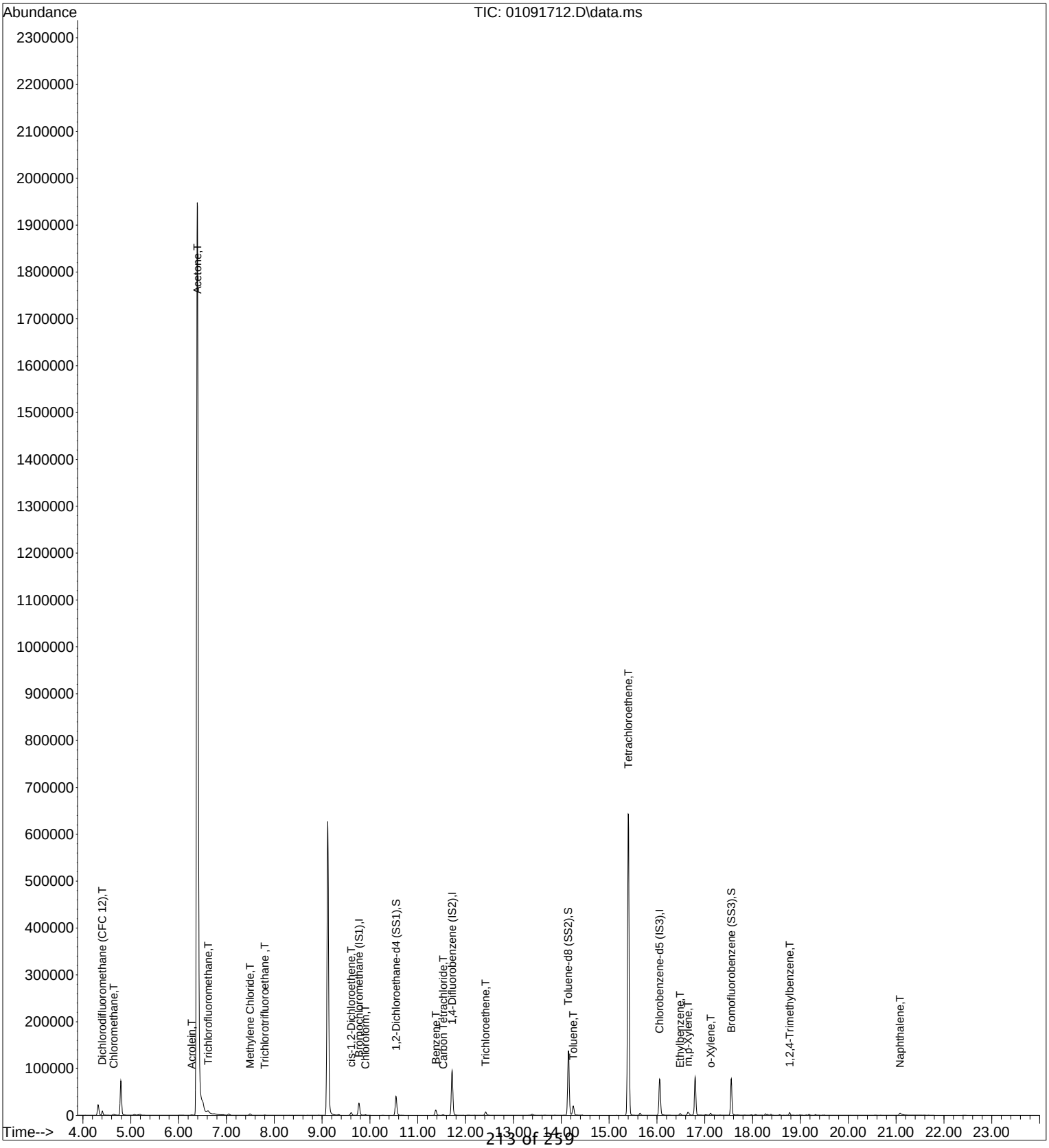
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	0.00	225	0	N.D.	

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\09\01091712.D Vial: 1
Acq On : 9 Jan 2017 16:08 Operator: CL
Sample : P1606022-001dupdil (100mL) Inst : MS19
Misc : S29-12201602

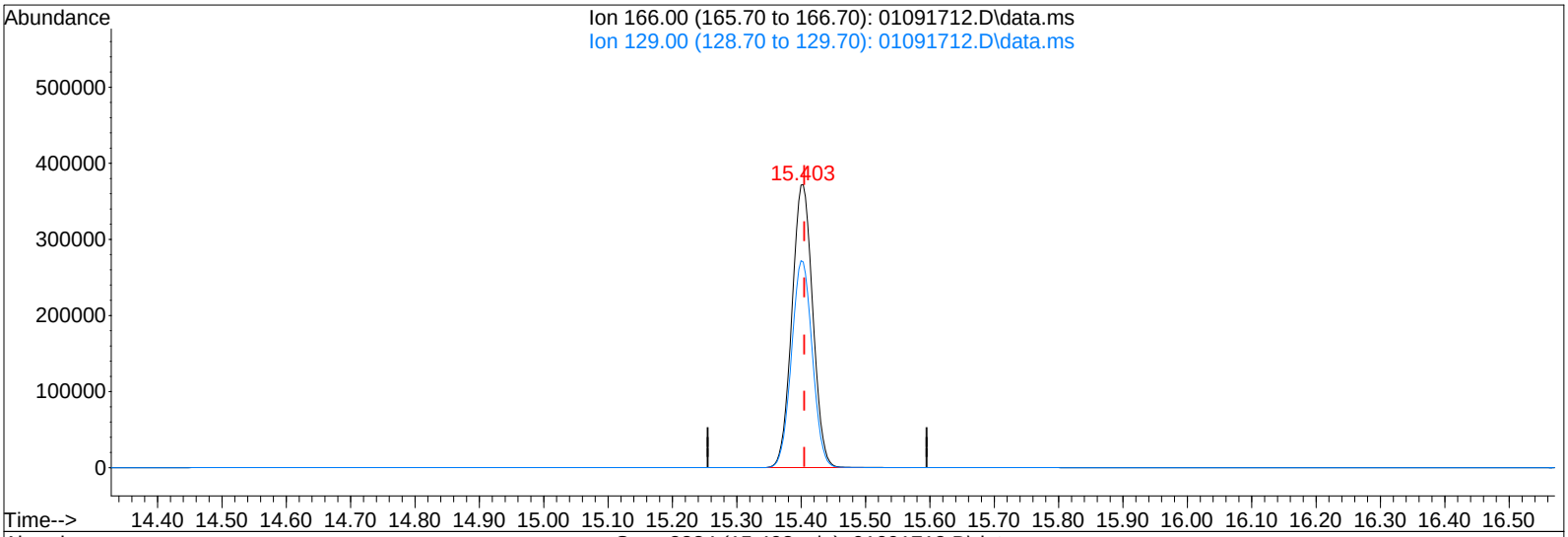
Quant Time: Jan 10 07:46:24 2017
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Jan 09 14:50:02 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

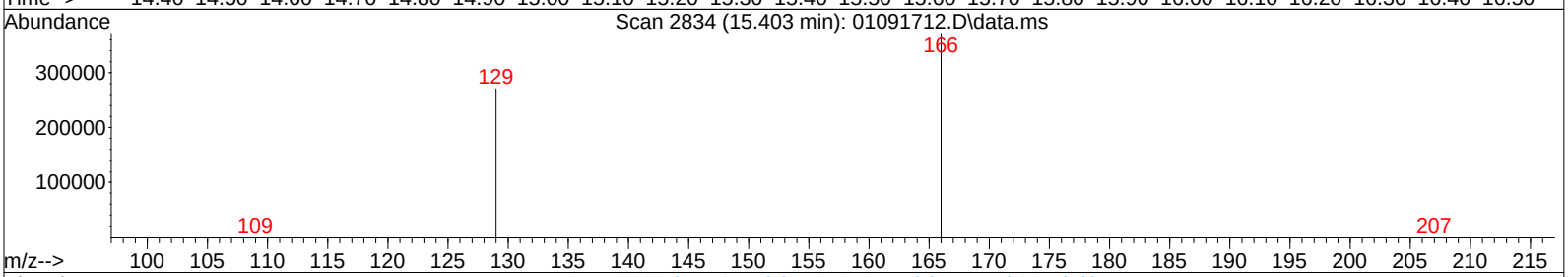


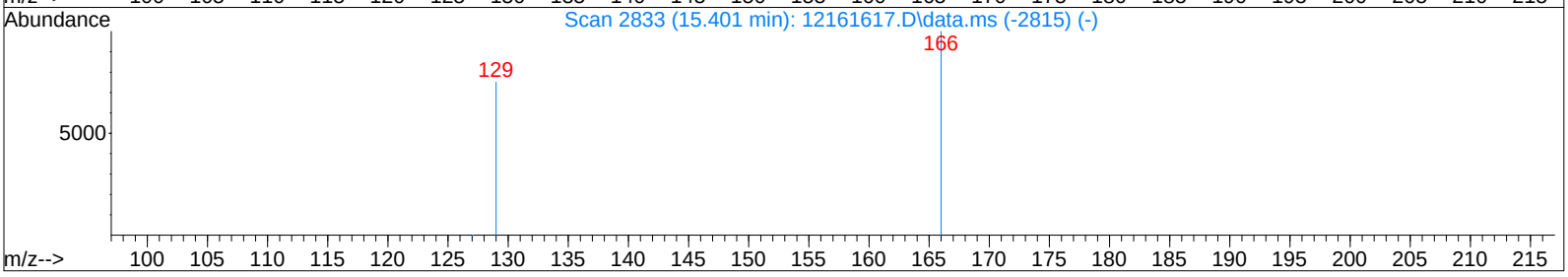
Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 01\09\01091712.D Vial: 1
Acq On : 9 Jan 2017 16:08 Operator: CL
Sample : P1606022-001dupdil (100mL) Inst : MS19
Misc : S29-12201602

Quant Time: Jan 10 07:46:24 2017
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Jan 09 14:50:02 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M







TIC: 01091712.D\data.ms

(37) Tetrachloroethene (T)

15.403min (-0.002) 16134.34pg

response 837591

Ion	Exp%	Act%
166.00	100	100
129.00	71.90	73.00
0.00	0.00	0.00
0.00	0.00	0.00

Response Factor Report MS19

Method Path : I:\MS19\METHODS\
Method File : S19122716.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Wed Dec 28 08:15:24 2016
Response Via : Initial Calibration

CL 12/28/16

Calibration Files
20 =12271604.D 50 =12271605.D 100 =12271606.D 500 =12271607.D 1000=12271608.D 2000=12271609.D 5000=12271610.D
10K =12271611.D 50K =12271620.D

		Compound	20	50	100	500	1000	2000	5000	10K	50K	Avg	%RSD
1)	I	Bromochloromethane...	----------ISTD----------										
2)	T	Dichlorodifluo...	2.687	2.750	2.513	2.468	2.711	2.257	2.243	1.932	2.487	2.450	10.88
3)	T	Chloromethane		0.935	0.822	0.688	0.707	0.556	0.533	0.414	0.627	0.660	25.18
4)	T	1,2-Dichloro,1...	2.909	2.944	2.682	2.607	2.825	2.331	2.291	1.976	2.625	2.577	12.45
5)	T	Vinyl Chloride	2.145	2.655	2.396	2.390	2.613	2.143	2.166	1.908	2.565	2.331	10.97
6)	T	1,3-Butadiene		1.046	1.008	1.063	1.221	1.016	1.586	1.415	2.045	1.300	28.23
7)	T	Bromomethane	1.034	1.017	0.958	0.914	1.007	0.840	0.845	0.745	1.030	0.932	11.04
8)	T	Chloroethane	0.689	0.716	0.658	0.646	0.712	0.599	0.615	0.553	0.781	0.663	10.48
9)	T	Acrolein	0.514	0.509	0.444	0.419	0.434	0.385	0.419	0.384	0.600	0.457	15.59
10)	T	Acetone			0.771	0.600	0.647	0.537	0.545	0.488	0.832	0.631	20.26
11)	T	Trichlorofluor...	2.014	2.033	1.851	1.771	1.920	1.591	1.605	1.429	2.011	1.803	12.12
12)	T	1,1-Dichloroet...	1.096	1.141	1.060	1.047	1.167	0.994	1.026	0.921	1.314	1.085	10.48
13)	T	Methylene Chlo...	1.369	1.330	1.201	1.134	1.239	1.036	1.050	0.934	1.353	1.183	13.11
14)	T	Trichlorotrifl...	1.223	1.230	1.091	1.046	1.161	0.958	0.984	0.879	1.372	1.105	14.14
15)	T	trans-1,2-Dich...	1.151	1.210	1.270	1.115	1.240	1.059	1.081	0.965	1.381	1.164	10.80
16)	T	1,1-Dichloroet...	1.921	2.095	2.121	1.832	2.015	1.688	1.719	1.526	2.199	1.902	11.93
17)	T	Methyl tert-Bu...	2.998	3.281	3.262	2.985	3.375	2.917	3.026	2.714	4.072	3.181	12.33
18)	T	cis-1,2-Dichlo...	1.299	1.260	1.156	1.183	1.317	1.178	1.160	1.107	1.484	1.238	9.36
19)	T	Chloroform		2.555	2.228	2.026	2.210	1.934	1.858	1.825	2.361	2.125	12.14
20)	S	1,2-Dichloroet...	1.545	1.536	1.549	1.554	1.565	1.476	1.700	1.857	1.573	1.595	7.18
21)	T	1,2-Dichloroet...	1.764	1.538	1.442	1.458	1.631	1.384	1.553	1.583	1.863	1.579	9.79
22)	T	1,1,1-Trichlor...	2.226	1.999	1.811	1.795	1.992	1.678	1.826	1.799	2.218	1.927	10.09
23)	T	Benzene	7.033	5.415	4.756	4.662	4.846	4.065	4.686	4.345	5.205	5.001	17.23
24)	T	Carbon Tetrach...	1.726	1.766	1.596	1.688	1.715	1.441	1.545	1.512	2.023	1.668	10.34
25)	I	1,4-Difluorobenzen...	----------ISTD----------										
26)	T	1,2-Dichloropr...	0.254	0.223	0.201	0.221	0.222	0.202	0.176	0.180	0.252	0.215	12.92
27)	T	Bromodichlorom...	0.365	0.329	0.292	0.316	0.326	0.298	0.261	0.268	0.394	0.317	13.69
28)	T	Trichloroethene	0.313	0.275	0.244	0.260	0.266	0.238	0.202	0.206	0.296	0.256	14.70
29)	T	1,4-Dioxane	0.219	0.180	0.166	0.189	0.197	0.182	0.160	0.164	0.248	0.189	15.16
30)	T	cis-1,3-Dichlo...	0.343	0.308	0.289	0.342	0.354	0.337	0.304	0.318	0.474	0.341	15.90
31)	T	trans-1,3-Dich...	0.278	0.254	0.240	0.292	0.311	0.300	0.278	0.292	0.419	0.296	17.26
32)	T	1,1,2-Trichlor...	0.235	0.201	0.183	0.200	0.203	0.183	0.157	0.160	0.226	0.194	13.63
33)	S	Toluene-d8 (SS2)	0.955	0.953	0.949	1.036	0.949	0.962	0.867	0.913	0.907	0.944	4.94
34)	T	Toluene	1.175	0.997	0.891	0.949	0.968	0.882	0.756	0.768	1.054	0.938	14.19
35)	T	Dibromochlorom...	0.275	0.261	0.223	0.245	0.258	0.241	0.215	0.225	0.352	0.255	16.27
36)	T	1,2-Dibromoethane	0.272	0.280	0.221	0.244	0.259	0.240	0.210	0.216	0.338	0.253	15.83
37)	T	Tetrachloroethene	0.322	0.308	0.248	0.269	0.288	0.265	0.210	0.218	0.353	0.276	17.12
38)	I	Chlorobenzene-d5 (...	----------ISTD----------										
39)	T	Chlorobenzene	5.783	4.971	4.502	4.168	4.908	4.440	4.047	3.801	4.955	4.619	13.08
40)	T	Ethylbenzene	8.177	7.043	6.489	6.512	7.813	6.541	6.712	6.298	7.989	7.064	10.35
41)	T	m,p-Xylene	5.942	5.042	4.720	5.031	6.088	4.998	5.083	4.819	6.377	5.344	11.50

Method Path : I:\MS19\METHODS\
Method File : S19122716.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

42)	T	Styrene	3.632	3.198	3.067	3.416	4.376	3.864	4.190	4.062	5.524	3.925	19.03
43)	T	o-Xylene	3.007	2.668	2.510	2.555	3.091	2.538	2.584	2.460	3.638	2.784	14.03
44)	T	1,1,2,2-Tetrac...	3.184	2.879	2.663	2.571	3.039	2.496	2.546	2.416	3.394	2.799	12.24
45)	S	Bromofluoroben...	1.970	1.972	1.962	1.969	2.004	1.898	2.067	2.080	1.312	1.915	12.15
46)	T	1,3,5-Trimethy...	5.862	5.296	5.622	4.742	6.653	5.494	5.647	5.398	7.064	5.753	12.28
47)	T	1,2,4-Trimethy...	5.747	5.505	5.674	4.700	6.806	5.703	5.945	5.778	7.651	5.945	14.07
48)	T	1,3-Dichlorobe...	3.597	3.517	3.772	2.697	3.921	3.243	3.338	3.184	4.642	3.546	15.39
49)	T	1,4-Dichlorobe...	3.845	3.526	3.729	2.625	3.871	3.185	3.270	3.128	4.450	3.514	15.15
50)	T	1,2-Dichlorobe...	3.729	3.470	3.703	2.637	3.821	3.161	3.265	3.158	4.570	3.502	15.56
51)	T	1,2-Dibromo-3-...	0.915	0.921	0.982	0.774	1.193	1.068	1.179	1.169	1.653	1.095	23.14
52)	T	1,2,4-Trichlor...	1.677	1.635	1.485	1.274	2.211	1.927	2.080	2.037	3.173	1.944	28.38
53)	T	Naphthalene			3.597	3.808	7.421	6.437	6.763	6.490	9.495	6.287	32.63
54)	T	Hexachlorobuta...	1.605	1.447	1.311	1.097	1.503	1.264	1.337	1.310	1.951	1.425	17.26

(#) = Out of Range

Primary Source Standards Concentrations (Working & Initial Calibration)

CL 12/28/16

0.2ng/L Std. ID: | 20ng/L Std. ID: S29-12211604
1ng/L Std. ID: S29-12211607 | 200ng/L Std. ID: S29-12211603
4ng/L Std. ID: S29-12211606

Dilution Factors:		5	50	250	1000	5000	Working STD Conc.(ng/L):	NA	1	1	1	4	20	20	20	20		200
	Source Std.	Primary Working Standards					Injection (L):	NA	0.020	0.050	0.100	0.125	0.050	0.100	0.250	0.500	NA	0.250
Compounds	mg/m^3	200ng/L	20ng/L	4ng/L	1ng/L	0.2ng/L	ICAL Points:	0.01ng	0.02ng	0.05ng	0.1ng	0.5ng	1ng	2ng	5ng	10ng	20ng	50ng
Propene	1.036	207.2	20.72	4.144	1.036	0.2072		NA	0.02072	0.05180	0.1036	0.5180	1.036	2.072	5.180	10.36	NA	51.80
Dichlorodifluoromethane	1.047	209.4	20.94	4.188	1.047	0.2094		NA	0.02094	0.05235	0.1047	0.5235	1.047	2.094	5.235	10.47	NA	52.35
Chloromethane	1.005	201.0	20.10	4.020	1.005	0.2010		NA	0.02010	0.05025	0.1005	0.5025	1.005	2.010	5.025	10.05	NA	50.25
Freon-114	1.005	201.0	20.10	4.020	1.005	0.2010		NA	0.02010	0.05025	0.1005	0.5025	1.005	2.010	5.025	10.05	NA	50.25
Vinyl Chloride	1.023	204.6	20.46	4.092	1.023	0.2046		NA	0.02046	0.05115	0.1023	0.5115	1.023	2.046	5.115	10.23	NA	51.15
1,3-Butadiene	1.057	211.4	21.14	4.228	1.057	0.2114		NA	0.02114	0.05285	0.1057	0.5285	1.057	2.114	5.285	10.57	NA	52.85
Bromomethane	0.993	198.6	19.86	3.972	0.993	0.1986		NA	0.01986	0.04965	0.0993	0.4965	0.993	1.986	4.965	9.93	NA	49.65
Chloroethane	1.009	201.8	20.18	4.036	1.009	0.2018		NA	0.02018	0.05045	0.1009	0.5045	1.009	2.018	5.045	10.09	NA	50.45
Ethanol	5.207	1041.4	104.14	20.828	5.207	1.0414		NA	0.10414	0.26035	0.5207	2.6035	5.207	10.414	26.035	52.07	NA	260.35
Acetonitrile	1.046	209.2	20.92	4.184	1.046	0.2092		NA	0.02092	0.05230	0.1046	0.5230	1.046	2.092	5.230	10.46	NA	52.30
Acrolein	1.041	208.2	20.82	4.164	1.041	0.2082		NA	0.02082	0.05205	0.1041	0.5205	1.041	2.082	5.205	10.41	NA	52.05
Acetone	5.313	1062.6	106.26	21.252	5.313	1.0626		NA	0.10626	0.26565	0.5313	2.6565	5.313	10.626	26.565	53.13	NA	265.65
Trichlorofluoromethane	1.049	209.8	20.98	4.196	1.049	0.2098		NA	0.02098	0.05245	0.1049	0.5245	1.049	2.098	5.245	10.49	NA	52.45
Isopropanol	2.105	421.0	42.10	8.420	2.105	0.4210		NA	0.04210	0.10525	0.2105	1.0525	2.105	4.210	10.525	21.05	NA	105.25
Acrylonitrile	1.055	211.0	21.10	4.220	1.055	0.2110		NA	0.02110	0.05275	0.1055	0.5275	1.055	2.110	5.275	10.55	NA	52.75
1,1-Dichloroethene	1.059	211.8	21.18	4.236	1.059	0.2118		NA	0.02118	0.05295	0.1059	0.5295	1.059	2.118	5.295	10.59	NA	52.95
tert-Butanol	2.114	422.8	42.28	8.456	2.114	0.4228		NA	0.04228	0.10570	0.2114	1.0570	2.114	4.228	10.570	21.14	NA	105.70
Methylene Chloride	1.057	211.4	21.14	4.228	1.057	0.2114		NA	0.02114	0.05285	0.1057	0.5285	1.057	2.114	5.285	10.57	NA	52.85
Allyl Chloride	1.052	210.4	21.04	4.208	1.052	0.2104		NA	0.02104	0.05260	0.1052	0.5260	1.052	2.104	5.260	10.52	NA	52.60
Trichlorotrifluoroethane	1.049	209.8	20.98	4.196	1.049	0.2098		NA	0.02098	0.05245	0.1049	0.5245	1.049	2.098	5.245	10.49	NA	52.45
Carbon Disulfide	1.061	212.2	21.22	4.244	1.061	0.2122		NA	0.02122	0.05305	0.1061	0.5305	1.061	2.122	5.305	10.61	NA	53.05
trans-1,2-Dichloroethene	1.067	213.4	21.34	4.268	1.067	0.2134		NA	0.02134	0.05335	0.1067	0.5335	1.067	2.134	5.335	10.67	NA	53.35
1,1-Dichloroethane	1.020	204.0	20.40	4.080	1.020	0.2040		NA	0.02040	0.05100	0.1020	0.5100	1.020	2.040	5.100	10.20	NA	51.00
Methyl tert-Butyl Ether	1.066	213.2	21.32	4.264	1.066	0.2132		NA	0.02132	0.05330	0.1066	0.5330	1.066	2.132	5.330	10.66	NA	53.30
Vinyl Acetate	5.265	1053.0	105.30	21.060	5.265	1.0530		NA	0.10530	0.26325	0.5265	2.6325	5.265	10.530	26.325	52.65	NA	263.25
2-Butanone	1.049	209.8	20.98	4.196	1.049	0.2098		NA	0.02098	0.05245	0.1049	0.5245	1.049	2.098	5.245	10.49	NA	52.45
cis-1,2-Dichloroethene	1.064	212.8	21.28	4.256	1.064	0.2128		NA	0.02128	0.05320	0.1064	0.5320	1.064	2.128	5.320	10.64	NA	53.20
Diisopropyl Ether	1.062	212.4	21.24	4.248	1.062	0.2124		NA	0.02124	0.05310	0.1062	0.5310	1.062	2.124	5.310	10.62	NA	53.10
Ethyl Acetate	2.129	425.8	42.58	8.516	2.129	0.4258		NA	0.04258	0.10645	0.2129	1.0645	2.129	4.258	10.645	21.29	NA	106.45
n-Hexane	1.063	212.6	21.26	4.252	1.063	0.2126		NA	0.02126	0.05315	0.1063	0.5315	1.063	2.126	5.315	10.63	NA	53.15
Chloroform	1.058	211.6	21.16	4.232	1.058	0.2116		NA	0.02116	0.05290	0.1058	0.5290	1.058	2.116	5.290	10.58	NA	52.90
Tetrahydrofuran	1.062	212.4	21.24	4.248	1.062	0.2124		NA	0.02124	0.05310	0.1062	0.5310	1.062	2.124	5.310	10.62	NA	53.10
Ethyl tert-Butyl Ether	1.057	211.4	21.14	4.228	1.057	0.2114		NA	0.02114	0.05285	0.1057	0.5285	1.057	2.114	5.285	10.57	NA	52.85
1,2-Dichloroethane	1.052	210.4	21.04	4.208	1.052	0.2104		NA	0.02104	0.05260	0.1052	0.5260	1.052	2.104	5.260	10.52	NA	52.60
1,1,1-Trichloroethane	1.074	214.8	21.48	4.296	1.074	0.2148		NA	0.02148	0.05370	0.1074	0.5370	1.074	2.148	5.370	10.74	NA	53.70
Isopropyl Acetate	2.104	420.8	42.08	8.416	2.104	0.4208		NA	0.04208	0.10520	0.2104	1.0520	2.104	4.208	10.520	21.04	NA	105.20
1-Butanol	2.105	421.0	42.10	8.420	2.105	0.4210		NA	0.04210	0.10525	0.2105	1.0525	2.105	4.210	10.525	21.05	NA	105.25
Benzene	1.052	210.4	21.04	4.208	1.052	0.2104		NA	0.02104	0.05260	0.1052	0.5260	1.052	2.104	5.260	10.52	NA	52.60
Carbon Tetrachloride	1.055	211.0	21.10	4.220	1.055	0.2110		NA	0.02110	0.05275	0.1055	0.5275	1.055	2.110	5.275	10.55	NA	52.75
Cyclohexane	2.130	426.0	42.60	8.520	2.130	0.4260		NA	0.04260	0.10650	0.2130	1.0650	2.130	4.260	10.650	21.30	NA	106.50
tert-Amyl Methyl Ether	1.054	210.8	21.08	4.216	1.054	0.2108		NA	0.02108	0.05270	0.1054	0.5270	1.054	2.108	5.270	10.54	NA	52.70
1,2-Dichloropropane	1.062	212.4	21.24	4.248	1.062	0.2124		NA	0.02124	0.05310	0.1062	0.5310	1.062	2.124	5.310	10.62	NA	53.10
Bromodichloromethane	1.066	213.2	21.32	4.264	1.066	0.2132		NA	0.02132	0.05330	0.1066	0.5330	1.066	2.132	5.330	10.66	NA	53.30
Trichloroethene	1.060	212.0	21.20	4.240	1.060	0.2120		NA	0.02120	0.05300	0.1060	0.5300	1.060	2.120	5.300	10.60	NA	53.00
1,4-Dioxane	1.062	212.4	21.24	4.248	1.062	0.2124		NA	0.02124	0.05310	0.1062	0.5310	1.062	2.124	5.310	10.62	NA	53.10
Isooctane	1.059	211.8	21.18	4.236	1.059	0.2118		NA	0.02118	0.05295	0.1059	0.5295	1.059	2.118	5.295	10.59	NA	52.95
Methyl Methacrylate	2.110	422.0	42.20	8.440	2.110	0.4220		NA	0.04220	0.10550	0.2110	1.0550	2.110	4.220	10.550	21.10	NA	105.50
n-Heptane	1.062	212.4	21.24	4.248	1.062	0.2124		NA	0.02124	0.05310	0.1062	0.5310	1.062	2.124	5.310	10.62	NA	53.10
cis-1,3-Dichloropropene	1.116	223.2	22.32	4.464	1.116	0.2232		NA	0.02232	0.05580	0.1116	0.5580	1.116	2.232	5.580	11.16	NA	55.80

Primary Source Standards Concentrations (Working & Initial Calibration)

0.2ng/L Std. ID: | 20ng/L Std. ID: S29-12211604
1ng/L Std. ID: S29-12211607 | 200ng/L Std. ID: S29-12211603
4ng/L Std. ID: S29-12211606

Dilution Factors:		5	50	250	1000	5000	Working STD Conc.(ng/L):	NA	1	1	1	4	20	20	20	20		200
	Source Std.	Primary Working Standards					Injection (L):	NA	0.020	0.050	0.100	0.125	0.050	0.100	0.250	0.500	NA	0.250
Compounds	mg/m^3	200ng/L	20ng/L	4ng/L	1ng/L	0.2ng/L	ICAL Points:	0.01ng	0.02ng	0.05ng	0.1ng	0.5ng	1ng	2ng	5ng	10ng	20ng	50ng
4-Methyl-2-pentanone	1.058	211.6	21.16	4.232	1.058	0.2116		NA	0.02116	0.05290	0.1058	0.5290	1.058	2.116	5.290	10.58	NA	52.90
trans-1,3-Dichloropropene	1.064	212.8	21.28	4.256	1.064	0.2128		NA	0.02128	0.05320	0.1064	0.5320	1.064	2.128	5.320	10.64	NA	53.20
1,1,2-Trichloroethane	1.061	212.2	21.22	4.244	1.061	0.2122		NA	0.02122	0.05305	0.1061	0.5305	1.061	2.122	5.305	10.61	NA	53.05
Toluene	1.053	210.6	21.06	4.212	1.053	0.2106		NA	0.02106	0.05265	0.1053	0.5265	1.053	2.106	5.265	10.53	NA	52.65
2-Hexanone	1.061	212.2	21.22	4.244	1.061	0.2122		NA	0.02122	0.05305	0.1061	0.5305	1.061	2.122	5.305	10.61	NA	53.05
Dibromochloromethane	1.062	212.4	21.24	4.248	1.062	0.2124		NA	0.02124	0.05310	0.1062	0.5310	1.062	2.124	5.310	10.62	NA	53.10
1,2-Dibromoethane	1.056	211.2	21.12	4.224	1.056	0.2112		NA	0.02112	0.05280	0.1056	0.5280	1.056	2.112	5.280	10.56	NA	52.80
n-Butyl Acetate	1.064	212.8	21.28	4.256	1.064	0.2128		NA	0.02128	0.05320	0.1064	0.5320	1.064	2.128	5.320	10.64	NA	53.20
n-Octane	1.057	211.4	21.14	4.228	1.057	0.2114		NA	0.02114	0.05285	0.1057	0.5285	1.057	2.114	5.285	10.57	NA	52.85
Tetrachloroethene	1.061	212.2	21.22	4.244	1.061	0.2122		NA	0.02122	0.05305	0.1061	0.5305	1.061	2.122	5.305	10.61	NA	53.05
Chlorobenzene	1.061	212.2	21.22	4.244	1.061	0.2122		NA	0.02122	0.05305	0.1061	0.5305	1.061	2.122	5.305	10.61	NA	53.05
Ethylbenzene	1.055	211.0	21.10	4.220	1.055	0.2110		NA	0.02110	0.05275	0.1055	0.5275	1.055	2.110	5.275	10.55	NA	52.75
m-&p-Xylene	2.123	424.6	42.46	8.492	2.123	0.4246		NA	0.04246	0.10615	0.2123	1.0615	2.123	4.246	10.615	21.23	NA	106.15
Bromoform	1.063	212.6	21.26	4.252	1.063	0.2126		NA	0.02126	0.05315	0.1063	0.5315	1.063	2.126	5.315	10.63	NA	53.15
Styrene	1.061	212.2	21.22	4.244	1.061	0.2122		NA	0.02122	0.05305	0.1061	0.5305	1.061	2.122	5.305	10.61	NA	53.05
o-Xylene	1.054	210.8	21.08	4.216	1.054	0.2108		NA	0.02108	0.05270	0.1054	0.5270	1.054	2.108	5.270	10.54	NA	52.70
n-Nonane	1.054	210.8	21.08	4.216	1.054	0.2108		NA	0.02108	0.05270	0.1054	0.5270	1.054	2.108	5.270	10.54	NA	52.70
1,1,2,2-Tetrachloroethane	1.056	211.2	21.12	4.224	1.056	0.2112		NA	0.02112	0.05280	0.1056	0.5280	1.056	2.112	5.280	10.56	NA	52.80
Cumene	1.050	210.0	21.00	4.200	1.050	0.2100		NA	0.02100	0.05250	0.1050	0.5250	1.050	2.100	5.250	10.50	NA	52.50
alpha-Pinene	1.044	208.8	20.88	4.176	1.044	0.2088		NA	0.02088	0.05220	0.1044	0.5220	1.044	2.088	5.220	10.44	NA	52.20
n-Propylbenzene	1.063	212.6	21.26	4.252	1.063	0.2126		NA	0.02126	0.05315	0.1063	0.5315	1.063	2.126	5.315	10.63	NA	53.15
3-Ethyltoluene	1.050	210.0	21.00	4.200	1.050	0.2100		NA	0.02100	0.05250	0.1050	0.5250	1.050	2.100	5.250	10.50	NA	52.50
4-Ethyltoluene	1.049	209.8	20.98	4.196	1.049	0.2098		NA	0.02098	0.05245	0.1049	0.5245	1.049	2.098	5.245	10.49	NA	52.45
1,3,5-Trimethylbenzene	1.049	209.8	20.98	4.196	1.049	0.2098		NA	0.02098	0.05245	0.1049	0.5245	1.049	2.098	5.245	10.49	NA	52.45
alpha-Methylstyrene	1.050	210.0	21.00	4.200	1.050	0.2100		NA	0.02100	0.05250	0.1050	0.5250	1.050	2.100	5.250	10.50	NA	52.50
2-Ethyltoluene	1.062	212.4	21.24	4.248	1.062	0.2124		NA	0.02124	0.05310	0.1062	0.5310	1.062	2.124	5.310	10.62	NA	53.10
1,2,4-Trimethylbenzene	1.052	210.4	21.04	4.208	1.052	0.2104		NA	0.02104	0.05260	0.1052	0.5260	1.052	2.104	5.260	10.52	NA	52.60
n-Decane	1.053	210.6	21.06	4.212	1.053	0.2106		NA	0.02106	0.05265	0.1053	0.5265	1.053	2.106	5.265	10.53	NA	52.65
Benzyl Chloride	1.061	212.2	21.22	4.244	1.061	0.2122		NA	0.02122	0.05305	0.1061	0.5305	1.061	2.122	5.305	10.61	NA	53.05
1,3-Dichlorobenzene	1.058	211.6	21.16	4.232	1.058	0.2116		NA	0.02116	0.05290	0.1058	0.5290	1.058	2.116	5.290	10.58	NA	52.90
1,4-Dichlorobenzene	1.058	211.6	21.16	4.232	1.058	0.2116		NA	0.02116	0.05290	0.1058	0.5290	1.058	2.116	5.290	10.58	NA	52.90
sec-Butylbenzene	1.054	210.8	21.08	4.216	1.054	0.2108		NA	0.02108	0.05270	0.1054	0.5270	1.054	2.108	5.270	10.54	NA	52.70
p-Isopropyltoluene	1.027	205.4	20.54	4.108	1.027	0.2054		NA	0.02054	0.05135	0.1027	0.5135	1.027	2.054	5.135	10.27	NA	51.35
1,2,3-Trimethylbenzene	1.027	205.4	20.54	4.108	1.027	0.2054		NA	0.02054	0.05135	0.1027	0.5135	1.027	2.054	5.135	10.27	NA	51.35
1,2-Dichlorobenzene	1.058	211.6	21.16	4.232	1.058	0.2116		NA	0.02116	0.05290	0.1058	0.5290	1.058	2.116	5.290	10.58	NA	52.90
d-Limonene	1.005	201.0	20.10	4.020	1.005	0.2010		NA	0.02010	0.05025	0.1005	0.5025	1.005	2.010	5.025	10.05	NA	50.25
1,2-Dibromo-3-chloropropane	1.053	210.6	21.06	4.212	1.053	0.2106		NA	0.02106	0.05265	0.1053	0.5265	1.053	2.106	5.265	10.53	NA	52.65
n-Undecane	1.054	210.8	21.08	4.216	1.054	0.2108		NA	0.02108	0.05270	0.1054	0.5270	1.054	2.108	5.270	10.54	NA	52.70
1,2,4-Trichlorobenzene	1.043	208.6	20.86	4.172	1.043	0.2086		NA	0.02086	0.05215	0.1043	0.5215	1.043	2.086	5.215	10.43	NA	52.15
Naphthalene	1.083	216.6	21.66	4.332	1.083	0.2166		NA	0.02166	0.05415	0.1083	0.5415	1.083	2.166	5.415	10.83	NA	54.15
n-Dodecane	1.045	209.0	20.90	4.180	1.045	0.2090		NA	0.02090	0.05225	0.1045	0.5225	1.045	2.090	5.225	10.45	NA	52.25
Hexachloro-1,3-butadiene	1.059	211.8	21.18	4.236	1.059	0.2118		NA	0.02118	0.05295	0.1059	0.5295	1.059	2.118	5.295	10.59	NA	52.95
Methacrylonitrile	1.065	213.0	21.30	4.260	1.065	0.2130		NA	0.02130	0.05325	0.1065	0.5325	1.065	2.130	5.325	10.65	NA	53.25
Cyclohexanone	1.056	211.2	21.12	4.224	1.056	0.2112		NA	0.02112	0.05280	0.1056	0.5280	1.056	2.112	5.280	10.56	NA	52.80
tert-Butylbenzene	1.051	210.2	21.02	4.204	1.051	0.2102		NA	0.02102	0.05255	0.1051	0.5255	1.051	2.102	5.255	10.51	NA	52.55
n-Butylbenzene	1.056	211.2	21.12	4.224	1.056	0.2112		NA	0.02112	0.05280	0.1056	0.5280	1.056	2.112	5.280	10.56	NA	52.80

Calibration Status Report MS19

Method : I:\MS19\METHODS\S19122716.M (RTE Integrator)
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Wed Dec 28 07:38:07 2016
Response via : Initial Calibration

CL 12/30/16

#	ID	Conc	ISTD Conc	Path\File
1	20	1000	1000	I:\MS19\DATA\2016_12\27\12271604.D
2	50	1000	1000	I:\MS19\DATA\2016_12\27\12271605.D
3	100	1000	1000	I:\MS19\DATA\2016_12\27\12271606.D
4	500	1000	1000	I:\MS19\DATA\2016_12\27\12271607.D
5	1000	1000	1000	I:\MS19\DATA\2016_12\27\12271608.D
6	2000	1000	1000	I:\MS19\DATA\2016_12\27\12271609.D
7	5000	1000	1000	I:\MS19\DATA\2016_12\27\12271610.D
8	10K	1000	1000	I:\MS19\DATA\2016_12\27\12271611.D
9	50K	1000	1000	I:\MS19\DATA\2016_12\27\12271620.D

#	ID	Update Time	Quant Time	Acquisition Time
1	20	Dec 28 08:14 2016	Dec 27 11:48 2016	27 Dec 2016 9:12
2	50	Dec 28 08:14 2016	Dec 27 11:48 2016	27 Dec 2016 9:43
3	100	Dec 28 08:14 2016	Dec 27 11:48 2016	27 Dec 2016 10:14
4	500	Dec 28 08:14 2016	Dec 27 11:48 2016	27 Dec 2016 10:45
5	1000	Dec 28 08:15 2016	Dec 27 11:48 2016	27 Dec 2016 11:16
6	2000	Dec 28 08:15 2016	Dec 27 12:12 2016	27 Dec 2016 11:47
7	5000	Dec 28 08:15 2016	Dec 27 14:02 2016	27 Dec 2016 12:19
8	10K	Dec 28 08:15 2016	Dec 27 14:03 2016	27 Dec 2016 12:50
9	50K	Dec 28 08:15 2016	Dec 28 08:01 2016	28 Dec 2016 7:36

S19122716.M Fri Dec 30 11:24:34 2016

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2016 12\27\12271604.D Vial: 9
Acq On : 27 Dec 2016 9:12 Operator: CL
Sample : 20pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-12211607 (1/19)

Quant Time: Dec 27 11:48:46 2016
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 27 11:48:19 2016
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 12/27/16

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.77	130	47741	1000.000 pg	0.02
25) 1,4-Difluorobenzene (IS2)	11.71	114	193322	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.05	54	26158	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.55	65	73751	939.366 pg	0.02
Spiked Amount 1000.000	Range 70 - 130		Recovery = 93.94%		
33) Toluene-d8 (SS2)	14.15	98	184601	988.176 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 98.82%		
45) Bromofluorobenzene (SS3)	17.55	174	51538	1120.974 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 112.10%		

Target Compounds						Qvalue
2) Dichlorodifluoromethan...	4.44	85	2686	43.066 pg		100
3) Chloromethane	4.69	52	998	58.925 pg		90
4) 1,2-Dichloro,1,1,2,2-t...	4.83	85	2791	43.480 pg		100
5) Vinyl Chloride	5.00	62	2095	34.174 pg		81
6) 1,3-Butadiene	5.20	54	1095	29.775 pg	#	65
7) Bromomethane	5.52	94	980	42.329 pg		99
8) Chloroethane	5.74	64	664	38.539 pg		98
9) Acrolein	6.34	56	511	42.490 pg		100
10) Acetone	6.47	58	4841	278.231 pg		92
11) Trichlorofluoromethane	6.64	101	2017	45.012 pg		100
12) 1,1-Dichloroethene	7.37	96	1108	41.468 pg		96
13) Methylene Chloride	7.51	84	1382	45.596 pg		99
14) Trichlorotrifluoroethane	7.81	151	1225	45.911 pg		99
15) trans-1,2-Dichloroethene	8.55	96	1173	41.722 pg		99
16) 1,1-Dichloroethane	8.74	63	1871	38.879 pg		100
17) Methyl tert-Butyl Ether	8.82	73	3051	39.082 pg		99
18) cis-1,2-Dichloroethene	9.62	96	1320	44.438 pg		97
19) Chloroform	9.90	83	3536	65.259 pg		99
21) 1,2-Dichloroethane	10.65	62	1772	46.426 pg		100
22) 1,1,1-Trichloroethane	10.92	97	2283	49.767 pg		99
23) Benzene	11.38	78	7064	57.111 pg		100
24) Carbon Tetrachloride	11.53	117	1739	42.883 pg		100
26) 1,2-Dichloropropane	12.19	63	1044	48.084 pg		98
27) Bromodichloromethane	12.37	83	1505	47.794 pg		98
28) Trichloroethene	12.42	130	1283	52.119 pg		97
29) 1,4-Dioxane	12.41	88	899	49.086 pg		96
30) cis-1,3-Dichloropropene	13.26	75	1481	43.982 pg		100
31) trans-1,3-Dichloropropene	13.79	75	1142	39.395 pg		98
32) 1,1,2-Trichloroethane	13.95	83	963	50.145 pg		98
34) Toluene	14.25	91	4785	51.571 pg		99
35) Dibromochloromethane	14.67	129	1130	46.807 pg		97
36) 1,2-Dibromoethane	14.93	107	1109	46.620 pg		98
37) Tetrachloroethene	15.40	166	1320	53.054 pg		98
39) Chlorobenzene	16.10	112	3210	58.055 pg		100
40) Ethylbenzene	16.48	91	4513	52.516 pg		100
41) m,p-Xylene	16.66	91	6600	100.856 pg		99
42) Styrene	17.02	104	2016	41.873 pg		98
43) o-Xylene	17.12	106	1658	49.448 pg		95
44) 1,1,2,2-Tetrachloroethane	17.10	83	1759	51.034 pg		99
46) 1,3,5-Trimethylbenzene	18.38	105	3217	45.734 pg		99
47) 1,2,4-Trimethylbenzene	18.77	105	3163	44.295 pg		99
48) 1,3-Dichlorobenzene	18.93	146	1991	47.589 pg		97
49) 1,4-Dichlorobenzene	18.99	146	2128	50.710 pg		97
50) 1,2-Dichlorobenzene	19.32	146	2064	49.748 pg		99
51) 1,2-Dibromo-3-chloropr...	19.73	157	504	36.489 pg		99
52) 1,2,4-Trichlorobenzene	20.96	182	915	35.664 pg		98
53) Naphthalene	21.10	128	2091	23.272 pg		95

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2016 12\27\12271604.D Vial: 9
Acq On : 27 Dec 2016 9:12 Operator: CL
Sample : 20pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-12211607 (1/19)

Quant Time: Dec 27 11:48:46 2016
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 27 11:48:19 2016
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

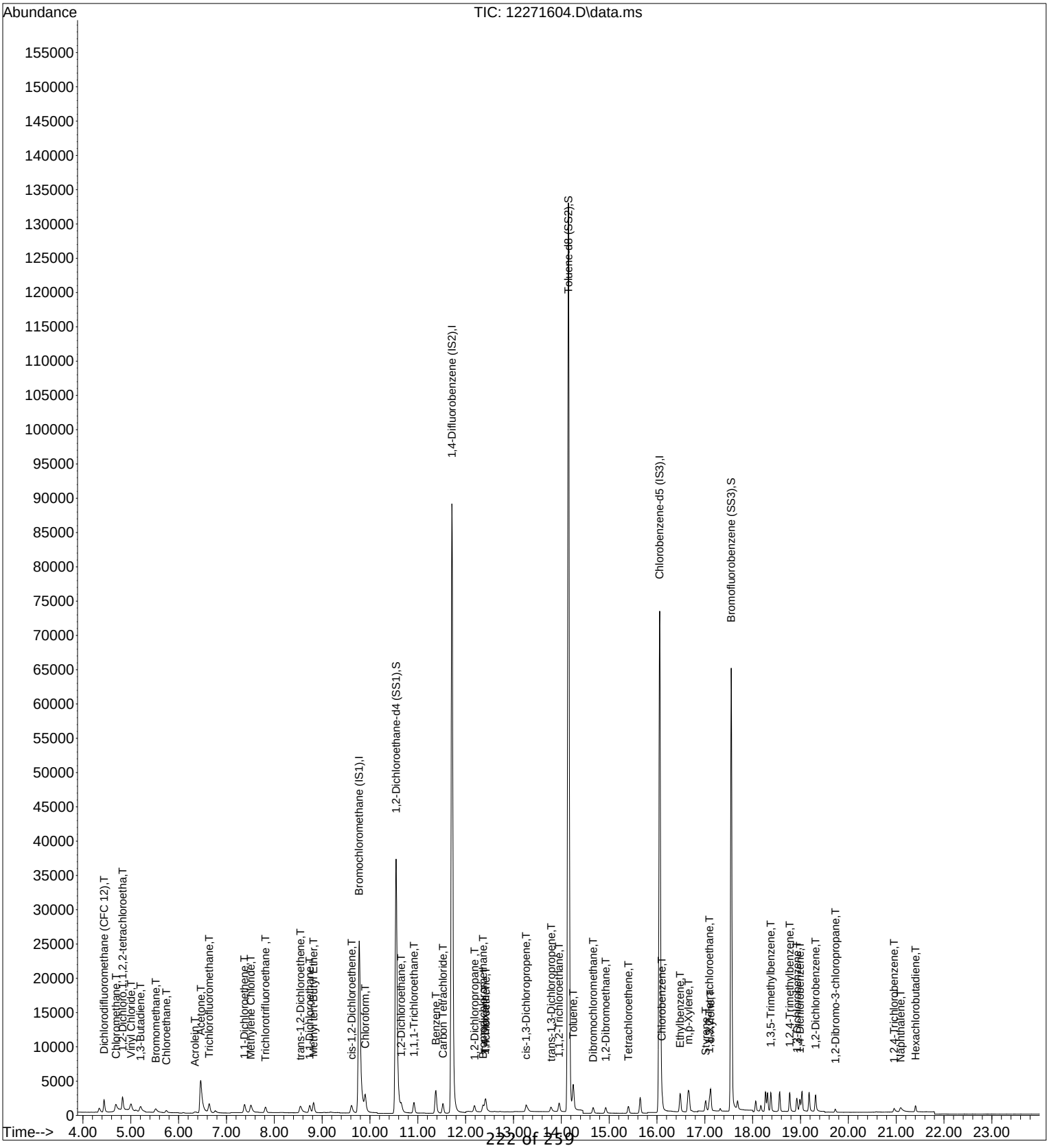
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	889	51.820	pg	100

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2016 12\27\12271604.D Vial: 9
Acq On : 27 Dec 2016 9:12 Operator: CL
Sample : 20pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-12211607 (1/19)

Quant Time: Dec 27 11:48:46 2016
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 27 11:48:19 2016
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2016 12\27\12271605.D Vial: 9
Acq On : 27 Dec 2016 9:43 Operator: CL
Sample : 50pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-12211607 (1/19)

Quant Time: Dec 27 11:48:48 2016
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 27 11:48:19 2016
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 12/27/16

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.77	130	40012	1000.000 pg	0.02
25) 1,4-Difluorobenzene (IS2)	11.72	114	191566	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.05	54	25962	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.55	65	61475	934.258 pg	0.02
Spiked Amount 1000.000	Range 70 - 130		Recovery = 93.43%		
33) Toluene-d8 (SS2)	14.15	98	182620	986.533 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 98.65%		
45) Bromofluorobenzene (SS3)	17.55	174	51202	1122.073 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 112.21%		

Target Compounds

						Qvalue
2) Dichlorodifluoromethan...	4.44	85	5760	110.192 pg		100
3) Chloromethane	4.69	52	1880	132.442 pg		93
4) 1,2-Dichloro,1,1,2,2-t...	4.83	85	5919	110.021 pg		99
5) Vinyl Chloride	5.00	62	5433	105.744 pg		89
6) 1,3-Butadiene	5.20	54	2211	71.734 pg	#	75
7) Bromomethane	5.51	94	2021	104.154 pg		99
8) Chloroethane	5.74	64	1445	100.069 pg		99
9) Acrolein	6.34	56	1060	105.166 pg		99
10) Acetone	6.45	58	9491	650.855 pg	#	89
11) Trichlorofluoromethane	6.64	101	4266	113.591 pg		99
12) 1,1-Dichloroethene	7.37	96	2418	107.977 pg		99
13) Methylene Chloride	7.51	84	2812	110.696 pg		97
14) Trichlorotrifluoroethane	7.81	151	2582	115.462 pg		99
15) trans-1,2-Dichloroethene	8.54	96	2582	109.579 pg		98
16) 1,1-Dichloroethane	8.74	63	4276	106.018 pg		98
17) Methyl tert-Butyl Ether	8.82	73	6998	106.956 pg		100
18) cis-1,2-Dichloroethene	9.61	96	2683	107.771 pg		100
19) Chloroform	9.90	83	5408	119.087 pg		100
21) 1,2-Dichloroethane	10.65	62	3236	101.161 pg		99
22) 1,1,1-Trichloroethane	10.92	97	4296	111.738 pg		100
23) Benzene	11.38	78	11396	109.931 pg		99
24) Carbon Tetrachloride	11.53	117	3727	109.660 pg		99
26) 1,2-Dichloropropane	12.18	63	2267	105.370 pg		99
27) Bromodichloromethane	12.37	83	3357	107.584 pg		99
28) Trichloroethene	12.42	130	2793	114.500 pg		100
29) 1,4-Dioxane	12.40	88	1827	100.669 pg		99
30) cis-1,3-Dichloropropene	13.26	75	3296	98.779 pg		99
31) trans-1,3-Dichloropropene	13.78	75	2592	90.234 pg		98
32) 1,1,2-Trichloroethane	13.96	83	2041	107.253 pg		99
34) Toluene	14.25	91	10054	109.351 pg		99
35) Dibromochloromethane	14.67	129	2655	110.983 pg		99
36) 1,2-Dibromoethane	14.93	107	2831	120.100 pg		99
37) Tetrachloroethene	15.40	166	3132	127.036 pg		99
39) Chlorobenzene	16.10	112	6846	124.750 pg		99
40) Ethylbenzene	16.48	91	9646	113.093 pg		100
41) m,p-Xylene	16.66	91	13894	213.921 pg		98
42) Styrene	17.01	104	4404	92.163 pg		98
43) o-Xylene	17.12	106	3650	109.680 pg		99
44) 1,1,2,2-Tetrachloroethane	17.10	83	3947	115.378 pg		98
46) 1,3,5-Trimethylbenzene	18.38	105	7212	103.302 pg		98
47) 1,2,4-Trimethylbenzene	18.77	105	7518	106.079 pg		100
48) 1,3-Dichlorobenzene	18.92	146	4830	116.319 pg		99
49) 1,4-Dichlorobenzene	18.98	146	4843	116.279 pg		99
50) 1,2-Dichlorobenzene	19.31	146	4766	115.741 pg		100
51) 1,2-Dibromo-3-chloropr...	19.72	157	1259	91.837 pg		99
52) 1,2,4-Trichlorobenzene	20.95	182	2214	86.947 pg		95
53) Naphthalene	21.07	128	5581	62.584 pg		97

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2016 12\27\12271605.D Vial: 9
Acq On : 27 Dec 2016 9:43 Operator: CL
Sample : 50pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-12211607 (1/19)

Quant Time: Dec 27 11:48:48 2016
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 27 11:48:19 2016
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

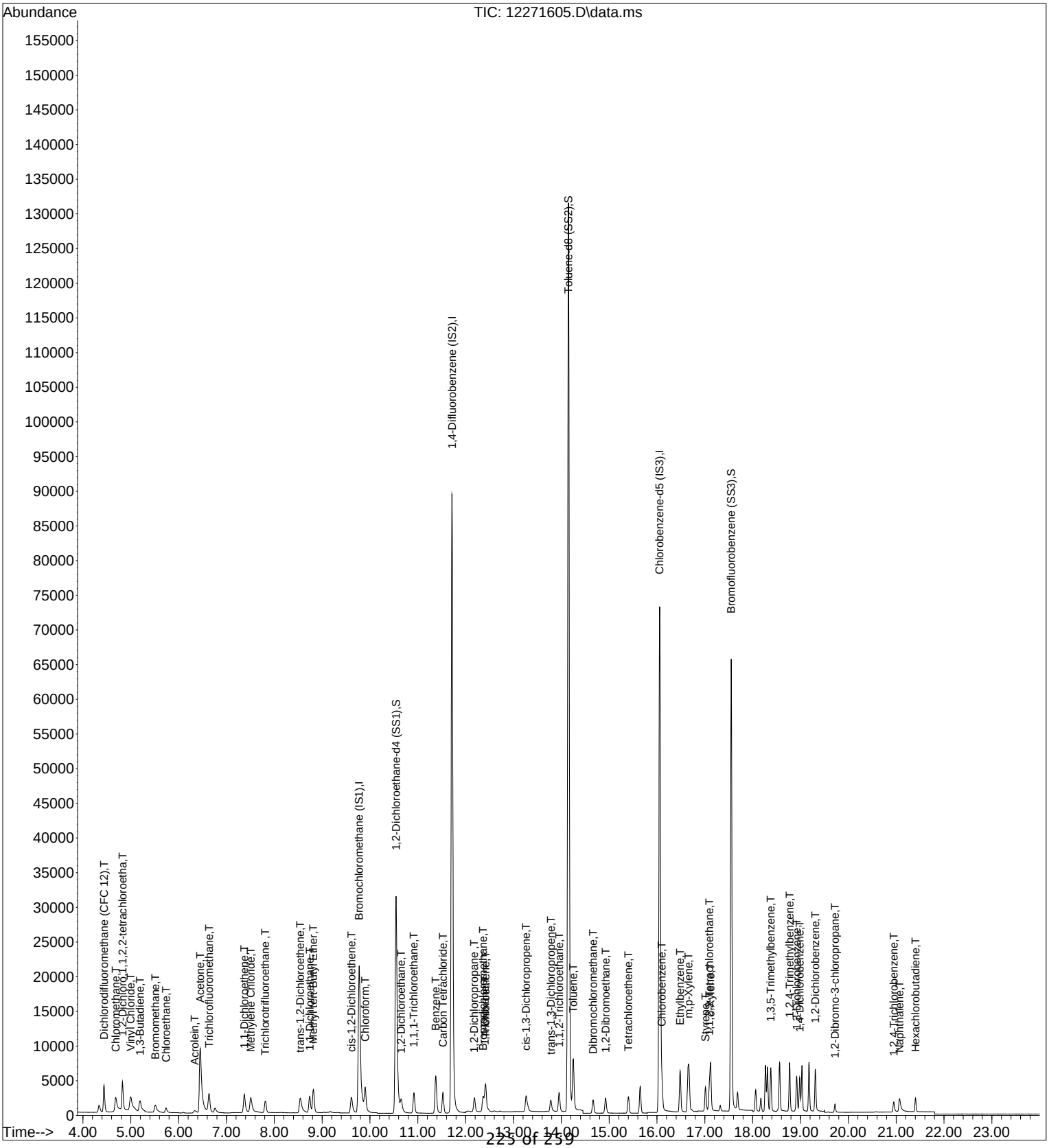
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	1989	116.814	pg	100

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2016 12\27\12271605.D Vial: 9
Acq On : 27 Dec 2016 9:43 Operator: CL
Sample : 50pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-12211607 (1/19)

Quant Time: Dec 27 11:48:48 2016
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 27 11:48:19 2016
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2016 12\27\12271606.D Vial: 9
Acq On : 27 Dec 2016 10:14 Operator: CL
Sample : 100pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-12211607 (1/19)

Quant Time: Dec 27 11:48:49 2016
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 27 11:48:19 2016
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 12/27/16

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.77	130	42499	1000.000 pg	0.02
25) 1,4-Difluorobenzene (IS2)	11.71	114	207001	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.05	54	27752	1000.000 pg	0.00

System Monitoring Compounds					
20) 1,2-Dichloroethane-d4 ...	10.54	65	65840	942.040 pg	0.01
Spiked Amount 1000.000	Range 70 - 130		Recovery = 94.20%		
33) Toluene-d8 (SS2)	14.15	98	196430	982.012 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 98.20%		
45) Bromofluorobenzene (SS3)	17.55	174	54443	1116.144 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 111.61%		

Target Compounds						Qvalue
2) Dichlorodifluoromethan...	4.43	85	11180	201.364 pg		100
3) Chloromethane	4.68	52	3512	232.935 pg		91
4) 1,2-Dichloro,1,1,2,2-t...	4.82	85	11457	200.499 pg		100
5) Vinyl Chloride	4.98	62	10416	190.866 pg		99
6) 1,3-Butadiene	5.18	54	4526	138.250 pg	#	86
7) Bromomethane	5.50	94	4043	196.167 pg		98
8) Chloroethane	5.73	64	2821	183.927 pg		99
9) Acrolein	6.32	56	1966	183.638 pg		100
10) Acetone	6.43	58	17409	1123.977 pg		91
11) Trichlorofluoromethane	6.63	101	8252	206.868 pg		100
12) 1,1-Dichloroethene	7.37	96	4771	200.583 pg		100
13) Methylene Chloride	7.50	84	5394	199.913 pg		98
14) Trichlorotrifluoroethane	7.81	151	4864	204.780 pg		99
15) trans-1,2-Dichloroethene	8.53	96	5757	230.027 pg		99
16) 1,1-Dichloroethane	8.73	63	9194	214.613 pg		99
17) Methyl tert-Butyl Ether	8.81	73	14780	212.676 pg		99
18) cis-1,2-Dichloroethene	9.61	96	5226	197.635 pg		99
19) Chloroform	9.90	83	10016	207.651 pg		100
21) 1,2-Dichloroethane	10.65	62	6447	189.746 pg		99
22) 1,1,1-Trichloroethane	10.91	97	8267	202.440 pg		100
23) Benzene	11.37	78	21263	193.109 pg		99
24) Carbon Tetrachloride	11.52	117	7158	198.285 pg		100
26) 1,2-Dichloropropane	12.18	63	4426	190.381 pg		99
27) Bromodichloromethane	12.36	83	6451	191.324 pg		99
28) Trichloroethene	12.42	130	5361	203.388 pg		99
29) 1,4-Dioxane	12.39	88	3649	186.071 pg		96
30) cis-1,3-Dichloropropene	13.26	75	6685	185.407 pg		100
31) trans-1,3-Dichloropropene	13.78	75	5296	170.621 pg		99
32) 1,1,2-Trichloroethane	13.95	83	4014	195.205 pg		99
34) Toluene	14.25	91	19415	195.419 pg		100
35) Dibromochloromethane	14.66	129	4894	189.322 pg		99
36) 1,2-Dibromoethane	14.92	107	4832	189.703 pg		99
37) Tetrachloroethene	15.40	166	5456	204.798 pg		98
39) Chlorobenzene	16.10	112	13257	225.992 pg		99
40) Ethylbenzene	16.48	91	19000	208.395 pg		100
41) m,p-Xylene	16.66	91	27810	400.563 pg		99
42) Styrene	17.01	104	9031	176.803 pg		99
43) o-Xylene	17.12	106	7341	206.363 pg		100
44) 1,1,2,2-Tetrachloroethane	17.09	83	7803	213.384 pg		99
46) 1,3,5-Trimethylbenzene	18.38	105	16368	219.327 pg		100
47) 1,2,4-Trimethylbenzene	18.77	105	16564	218.642 pg		100
48) 1,3-Dichlorobenzene	18.92	146	11074	249.489 pg		99
49) 1,4-Dichlorobenzene	18.98	146	10950	245.949 pg		99
50) 1,2-Dichlorobenzene	19.31	146	10872	246.995 pg		99
51) 1,2-Dibromo-3-chloropr...	19.72	157	2871	195.916 pg		99
52) 1,2,4-Trichlorobenzene	20.95	182	4297	157.865 pg		99
53) Naphthalene	21.07	128	10811	113.413 pg		97

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2016 12\27\12271606.D Vial: 9
Acq On : 27 Dec 2016 10:14 Operator: CL
Sample : 100pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-12211607 (1/19)

Quant Time: Dec 27 11:48:49 2016
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 27 11:48:19 2016
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

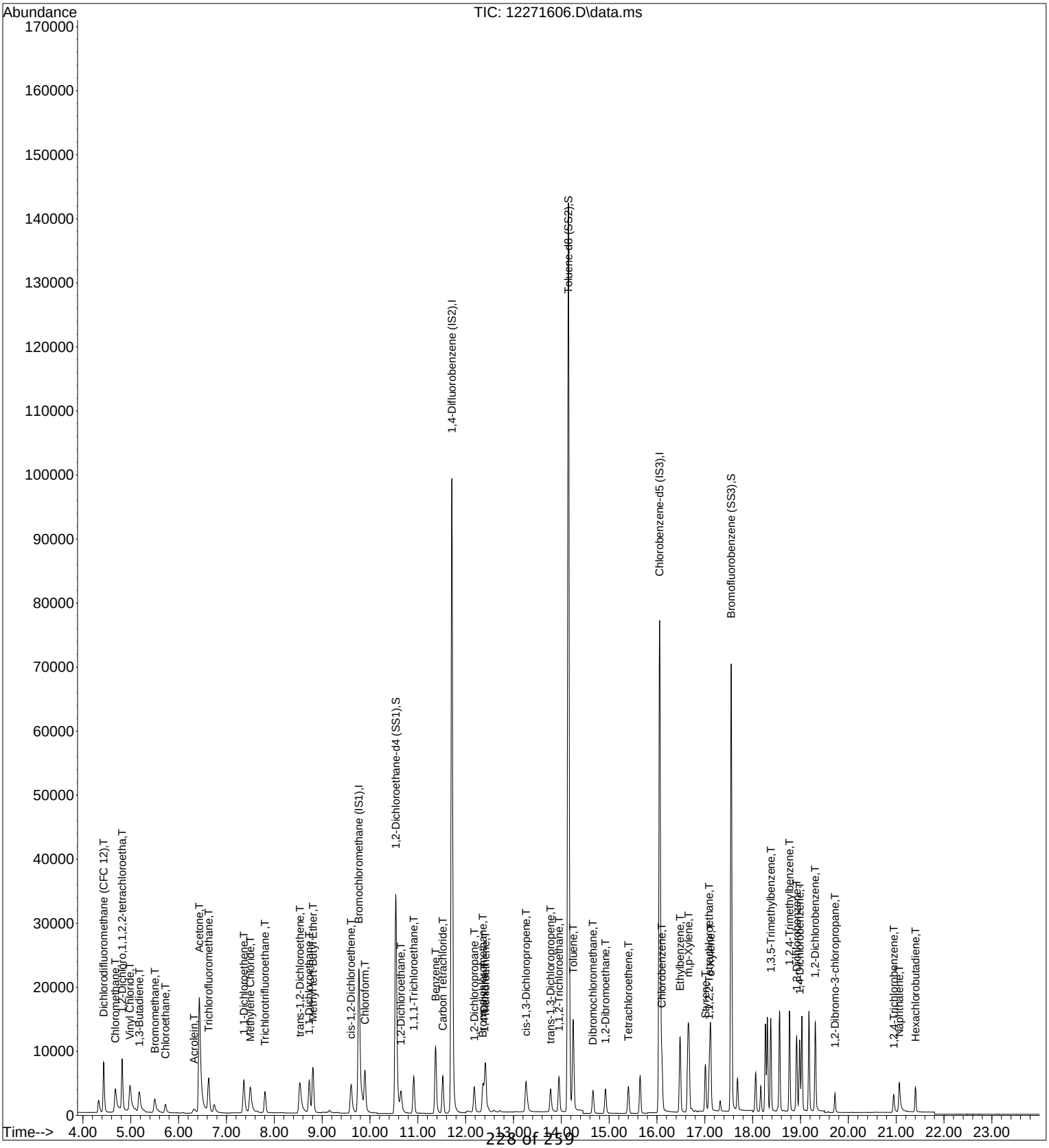
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	3853	211.691	pg	99

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2016 12\27\12271606.D Vial: 9
Acq On : 27 Dec 2016 10:14 Operator: CL
Sample : 100pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-12211607 (1/19)

Quant Time: Dec 27 11:48:49 2016
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 27 11:48:19 2016
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2016 12\27\12271607.D Vial: 10
Acq On : 27 Dec 2016 10:45 Operator: CL
Sample : 500pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-12211606 (1/19)

Quant Time: Dec 27 11:48:50 2016
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 27 11:48:19 2016
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 12/27/16

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.75	130	42071	1000.000 pg	0.00
25) 1,4-Difluorobenzene (IS2)	11.71	114	227790	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.05	54	34361	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.53	65	65382	945.004 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 94.50%		
33) Toluene-d8 (SS2)	14.14	98	236052	1072.394 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 107.24%		
45) Bromofluorobenzene (SS3)	17.55	174	67661	1120.328 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 112.03%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.42	85	54356	988.972 pg	100
3) Chloromethane	4.65	52	14554	975.123 pg	96
4) 1,2-Dichloro,1,1,2,2-t...	4.81	85	55115	974.331 pg	100
5) Vinyl Chloride	4.96	62	51436	952.118 pg	100
6) 1,3-Butadiene	5.14	54	23628	729.077 pg	98
7) Bromomethane	5.48	94	19086	935.478 pg	100
8) Chloroethane	5.70	64	13704	902.580 pg	100
9) Acrolein	6.27	56	9173	865.540 pg	97
10) Acetone	6.40	58	67024	4371.292 pg	100
11) Trichlorofluoromethane	6.62	101	39081	989.681 pg	100
12) 1,1-Dichloroethene	7.35	96	23315	990.186 pg	100
13) Methylene Chloride	7.48	84	25205	943.652 pg	100
14) Trichlorotrifluoroethane	7.80	151	23090	982.004 pg	100
15) trans-1,2-Dichloroethene	8.51	96	25033	1010.396 pg	100
16) 1,1-Dichloroethane	8.72	63	39313	927.009 pg	100
17) Methyl tert-Butyl Ether	8.79	73	66936	972.970 pg	100
18) cis-1,2-Dichloroethene	9.59	96	26482	1011.674 pg	100
19) Chloroform	9.89	83	45098	944.482 pg	100
21) 1,2-Dichloroethane	10.64	62	32258	959.065 pg	100
22) 1,1,1-Trichloroethane	10.91	97	40560	1003.328 pg	100
23) Benzene	11.36	78	103163	946.453 pg	100
24) Carbon Tetrachloride	11.52	117	37454	1048.076 pg	100
26) 1,2-Dichloropropane	12.18	63	26765	1046.204 pg	100
27) Bromodichloromethane	12.36	83	38370	1034.122 pg	100
28) Trichloroethene	12.41	130	31376	1081.719 pg	100
29) 1,4-Dioxane	12.38	88	22882	1060.320 pg	100
30) cis-1,3-Dichloropropene	13.25	75	43513	1096.686 pg	100
31) trans-1,3-Dichloropropene	13.77	75	35407	1036.598 pg	100
32) 1,1,2-Trichloroethane	13.95	83	24125	1066.152 pg	100
34) Toluene	14.25	91	113793	1040.837 pg	100
35) Dibromochloromethane	14.66	129	29594	1040.350 pg	100
36) 1,2-Dibromoethane	14.92	107	29307	1045.580 pg	100
37) Tetrachloroethene	15.40	166	32448	1106.820 pg	100
39) Chlorobenzene	16.10	112	75981	1046.118 pg	100
40) Ethylbenzene	16.48	91	118024	1045.521 pg	100
41) m,p-Xylene	16.66	91	183497	2134.651 pg	100
42) Styrene	17.01	104	62274	984.668 pg	100
43) o-Xylene	17.12	106	46275	1050.635 pg	100
44) 1,1,2,2-Tetrachloroethane	17.09	83	46643	1030.186 pg	100
46) 1,3,5-Trimethylbenzene	18.38	105	85461	924.894 pg	100
47) 1,2,4-Trimethylbenzene	18.77	105	84947	905.619 pg	100
48) 1,3-Dichlorobenzene	18.92	146	49024	892.038 pg	100
49) 1,4-Dichlorobenzene	18.98	146	47706	865.430 pg	100
50) 1,2-Dichlorobenzene	19.31	146	47932	879.493 pg	100
51) 1,2-Dibromo-3-chloropr...	19.72	157	13997	771.435 pg	100
52) 1,2,4-Trichlorobenzene	20.95	182	22833	677.506 pg	100
53) Naphthalene	21.06	128	70850	600.294 pg	100

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2016 12\27\12271607.D Vial: 10
Acq On : 27 Dec 2016 10:45 Operator: CL
Sample : 500pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-12211606 (1/19)

Quant Time: Dec 27 11:48:50 2016
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 27 11:48:19 2016
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

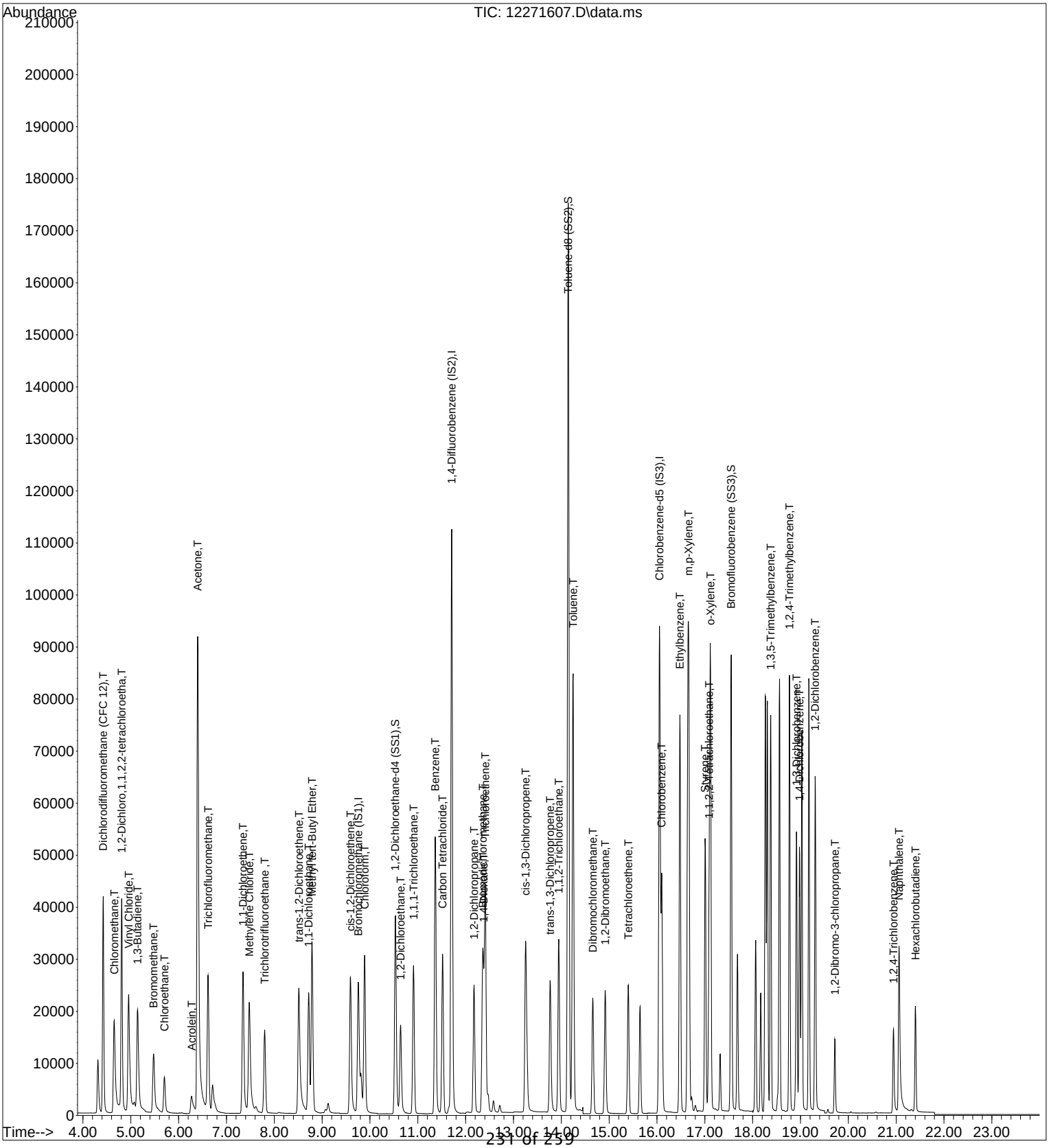
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	19952	885.355	pg	100

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2016 12\27\12271607.D Vial: 10
Acq On : 27 Dec 2016 10:45 Operator: CL
Sample : 500pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-12211606 (1/19)

Quant Time: Dec 27 11:48:50 2016
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 27 11:48:19 2016
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2016 12\27\12271608.D Vial: 11
Acq On : 27 Dec 2016 11:16 Operator: CL
Sample : 1000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-12211604 (1/19)

Quant Time: Dec 27 11:48:51 2016
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 27 11:48:19 2016
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 12/27/16

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.75	130	37568	1000.000 pg	0.00
25) 1,4-Difluorobenzene (IS2)	11.71	114	189985	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.05	54	25853	1000.000 pg	0.00

System Monitoring Compounds					
20) 1,2-Dichloroethane-d4 ...	10.53	65	58778	951.383 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 95.14%		
33) Toluene-d8 (SS2)	14.14	98	180332	982.279 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 98.23%		
45) Bromofluorobenzene (SS3)	17.55	174	51812	1140.228 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 114.02%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.41	85	106645	2172.911 pg	100
3) Chloromethane	4.64	52	26706	2003.782 pg	97
4) 1,2-Dichloro,1,1,2,2-t...	4.81	85	106653	2111.419 pg	100
5) Vinyl Chloride	4.94	62	100438	2082.027 pg	100
6) 1,3-Butadiene	5.13	54	48487	1675.470 pg	97
7) Bromomethane	5.46	94	37566	2061.952 pg	100
8) Chloroethane	5.69	64	26972	1989.374 pg	100
9) Acrolein	6.26	56	16990	1795.287 pg	97
10) Acetone	6.39	58	129055	9425.819 pg	100
11) Trichlorofluoromethane	6.61	101	75660	2145.658 pg	100
12) 1,1-Dichloroethene	7.34	96	46412	2207.377 pg	100
13) Methylene Chloride	7.47	84	49186	2062.204 pg	98
14) Trichlorotrifluoroethane	7.80	151	45766	2179.701 pg	100
15) trans-1,2-Dichloroethene	8.51	96	49713	2247.055 pg	100
16) 1,1-Dichloroethane	8.72	63	77217	2039.038 pg	100
17) Methyl tert-Butyl Ether	8.78	73	135149	2199.973 pg	100
18) cis-1,2-Dichloroethene	9.59	96	52653	2252.567 pg	100
19) Chloroform	9.89	83	87832	2059.936 pg	100
21) 1,2-Dichloroethane	10.64	62	64446	2145.712 pg	100
22) 1,1,1-Trichloroethane	10.91	97	80357	2226.043 pg	100
23) Benzene	11.36	78	191528	1967.759 pg	100
24) Carbon Tetrachloride	11.52	117	67971	2130.016 pg	100
26) 1,2-Dichloropropane	12.17	63	44790	2099.160 pg	100
27) Bromodichloromethane	12.35	83	65944	2130.937 pg	100
28) Trichloroethene	12.41	130	53585	2215.009 pg	100
29) 1,4-Dioxane	12.38	88	39797	2211.101 pg	97
30) cis-1,3-Dichloropropene	13.25	75	75091	2269.166 pg	100
31) trans-1,3-Dichloropropene	13.76	75	62811	2204.815 pg	100
32) 1,1,2-Trichloroethane	13.95	83	40860	2165.038 pg	99
34) Toluene	14.25	91	193668	2123.930 pg	100
35) Dibromochloromethane	14.66	129	52019	2192.569 pg	100
36) 1,2-Dibromoethane	14.91	107	51989	2223.887 pg	100
37) Tetrachloroethene	15.40	166	58149	2378.191 pg	100
39) Chlorobenzene	16.10	112	134635	2463.705 pg	100
40) Ethylbenzene	16.48	91	213106	2509.071 pg	100
41) m,p-Xylene	16.65	91	334158	5166.598 pg	100
42) Styrene	17.01	104	120023	2522.333 pg	100
43) o-Xylene	17.12	106	84240	2542.019 pg	99
44) 1,1,2,2-Tetrachloroethane	17.09	83	82979	2435.860 pg	100
46) 1,3,5-Trimethylbenzene	18.38	105	180423	2595.200 pg	100
47) 1,2,4-Trimethylbenzene	18.77	105	185092	2622.648 pg	99
48) 1,3-Dichlorobenzene	18.92	146	107238	2593.452 pg	100
49) 1,4-Dichlorobenzene	18.98	146	105876	2552.769 pg	100
50) 1,2-Dichlorobenzene	19.31	146	104514	2548.803 pg	100
51) 1,2-Dibromo-3-chloropr...	19.72	157	32482	2379.371 pg	98
52) 1,2,4-Trichlorobenzene	20.94	182	59623	2351.357 pg	99
53) Naphthalene	21.06	128	207768	2339.687 pg	100

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2016 12\27\12271608.D Vial: 11
Acq On : 27 Dec 2016 11:16 Operator: CL
Sample : 1000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-12211604 (1/19)

Quant Time: Dec 27 11:48:51 2016
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 27 11:48:19 2016
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

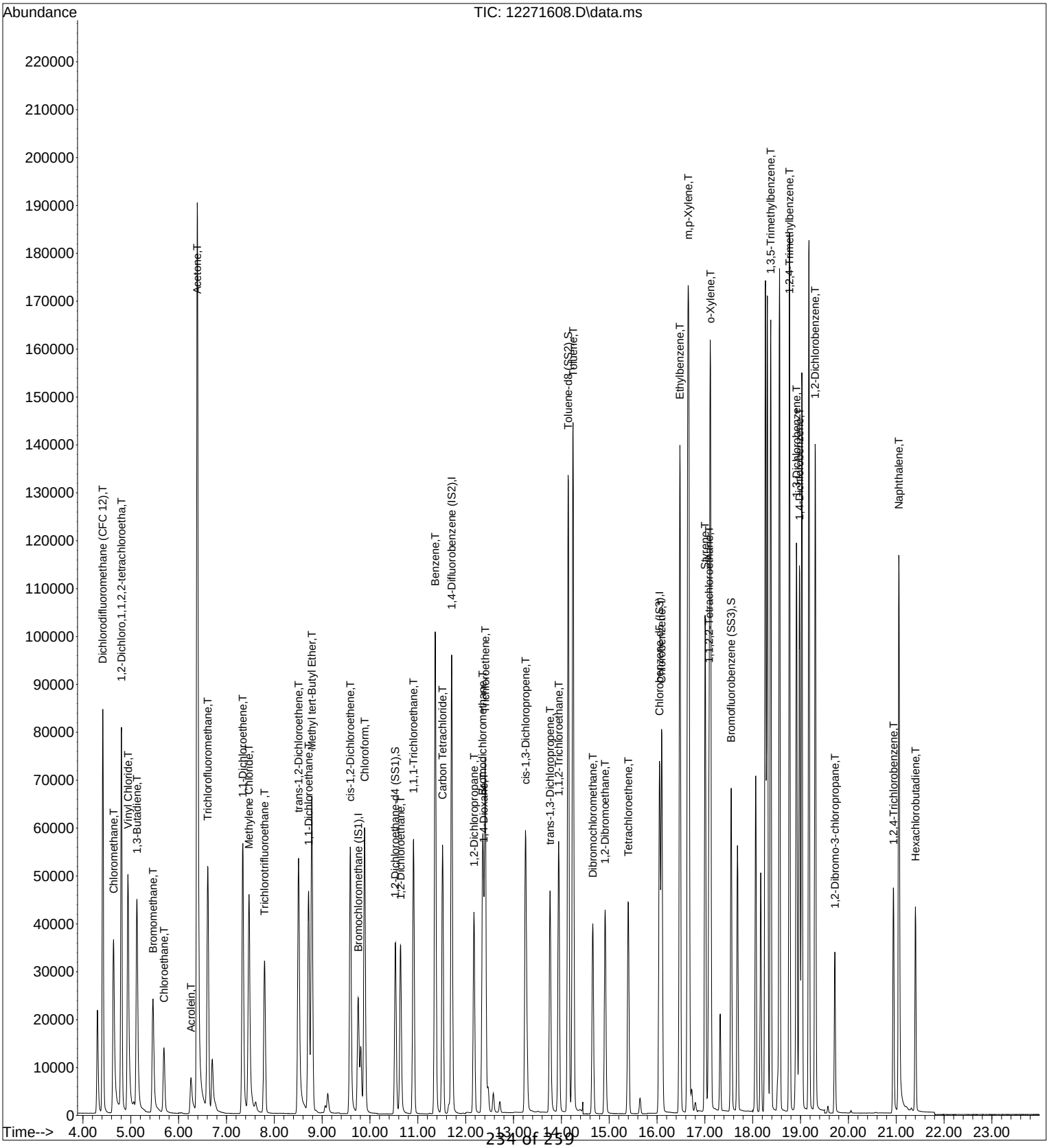
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	41147	2426.745	pg	100

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2016 12\27\12271608.D Vial: 11
Acq On : 27 Dec 2016 11:16 Operator: CL
Sample : 1000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-12211604 (1/19)

Quant Time: Dec 27 11:48:51 2016
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 27 11:48:19 2016
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2016 12\27\12271609.D Vial: 11
Acq On : 27 Dec 2016 11:47 Operator: CL
Sample : 2000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-12211604 (1/19)

Quant Time: Dec 27 12:12:47 2016
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 27 11:48:19 2016
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 12/27/16

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.75	130	45005	1000.000 pg	0.00
25) 1,4-Difluorobenzene (IS2)	11.71	114	213985	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.05	54	32539	1000.000 pg	0.00
System Monitoring Compounds					
20) 1,2-Dichloroethane-d4 ...	10.53	65	66409	897.273 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 89.73%		
33) Toluene-d8 (SS2)	14.14	98	205933	995.919 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 99.59%		
45) Bromofluorobenzene (SS3)	17.55	174	61760	1079.880 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 107.99%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.41	85	212722	3618.021 pg	100
3) Chloromethane	4.63	52	50328	3152.162 pg	99
4) 1,2-Dichloro,1,1,2,2-t...	4.80	85	210853	3484.484 pg	100
5) Vinyl Chloride	4.93	62	197349	3414.920 pg	100
6) 1,3-Butadiene	5.12	54	96709	2789.559 pg	95
7) Bromomethane	5.45	94	75116	3441.703 pg	100
8) Chloroethane	5.68	64	54391	3348.788 pg	100
9) Acrolein	6.25	56	36078	3182.293 pg	99
10) Acetone	6.38	58	256686	15649.618 pg	99
11) Trichlorofluoromethane	6.60	101	150224	3556.238 pg	100
12) 1,1-Dichloroethene	7.34	96	94711	3760.140 pg	99
13) Methylene Chloride	7.47	84	98613	3451.290 pg	97
14) Trichlorotrifluoroethane	7.79	151	90434	3595.365 pg	100
15) trans-1,2-Dichloroethene	8.50	96	101715	3837.832 pg	100
16) 1,1-Dichloroethane	8.72	63	155000	3416.657 pg	100
17) Methyl tert-Butyl Ether	8.78	73	279858	3802.766 pg	100
18) cis-1,2-Dichloroethene	9.59	96	112807	4028.543 pg	99
19) Chloroform	9.89	83	184189	3605.969 pg	100
21) 1,2-Dichloroethane	10.64	62	131076	3642.973 pg	100
22) 1,1,1-Trichloroethane	10.91	97	162252	3751.951 pg	100
23) Benzene	11.36	78	384930	3301.252 pg	100
24) Carbon Tetrachloride	11.52	117	136820	3579.037 pg	100
26) 1,2-Dichloropropane	12.17	63	91786	3819.240 pg	100
27) Bromodichloromethane	12.35	83	136127	3905.491 pg	100
28) Trichloroethene	12.41	130	108127	3968.281 pg	100
29) 1,4-Dioxane	12.37	88	82911	4089.840 pg	97
30) cis-1,3-Dichloropropene	13.25	75	160766	4313.290 pg	100
31) trans-1,3-Dichloropropene	13.76	75	136667	4259.279 pg	99
32) 1,1,2-Trichloroethane	13.95	83	83291	3918.331 pg	99
34) Toluene	14.25	91	397336	3868.800 pg	100
35) Dibromochloromethane	14.66	129	109325	4091.162 pg	100
36) 1,2-Dibromoethane	14.92	107	108438	4118.307 pg	100
37) Tetrachloroethene	15.40	166	120347	4369.943 pg	100
39) Chlorobenzene	16.10	112	306604	4457.745 pg	100
40) Ethylbenzene	16.48	91	449070	4200.858 pg	99
41) m,p-Xylene	16.66	91	690463	8482.033 pg	99
42) Styrene	17.01	104	266803	4454.873 pg	100
43) o-Xylene	17.12	106	174091	4173.914 pg	99
44) 1,1,2,2-Tetrachloroethane	17.09	83	171500	3999.953 pg	100
46) 1,3,5-Trimethylbenzene	18.38	105	375067	4286.419 pg	99
47) 1,2,4-Trimethylbenzene	18.77	105	390424	4395.372 pg	100
48) 1,3-Dichlorobenzene	18.92	146	223310	4290.862 pg	99
49) 1,4-Dichlorobenzene	18.98	146	219273	4200.548 pg	99
50) 1,2-Dichlorobenzene	19.31	146	217616	4216.571 pg	100
51) 1,2-Dibromo-3-chloropr...	19.72	157	73157	4257.768 pg	96
52) 1,2,4-Trichlorobenzene	20.94	182	130789	4098.101 pg	99
53) Naphthalene	21.06	128	453669	4059.054 pg	100

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2016 12\27\12271609.D Vial: 11
Acq On : 27 Dec 2016 11:47 Operator: CL
Sample : 2000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-12211604 (1/19)

Quant Time: Dec 27 12:12:47 2016
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 27 11:48:19 2016
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

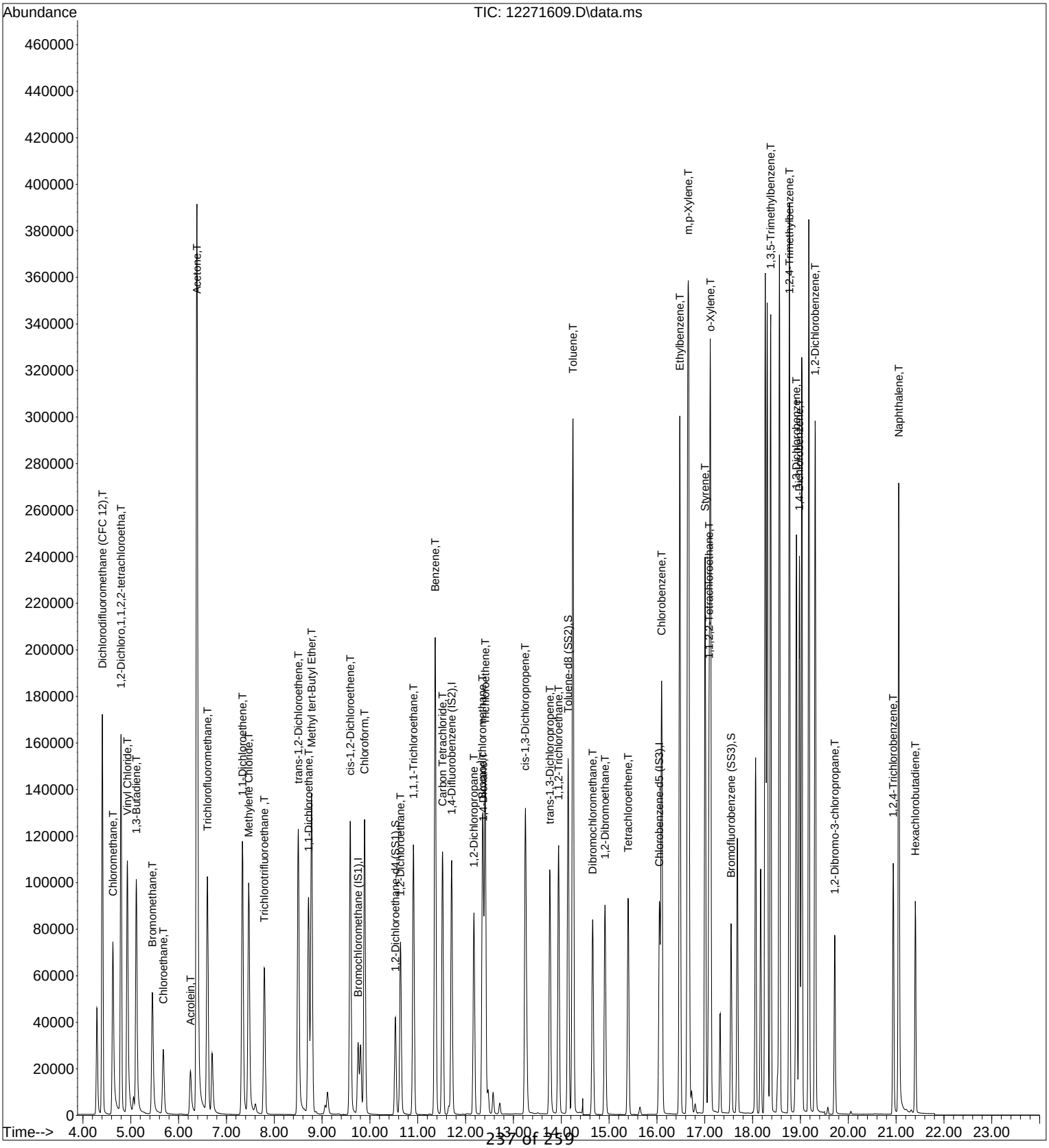
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	87118	4082.259 pg	100

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2016 12\27\12271609.D Vial: 11
Acq On : 27 Dec 2016 11:47 Operator: CL
Sample : 2000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-12211604 (1/19)

Quant Time: Dec 27 12:12:47 2016
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 27 11:48:19 2016
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2016 12\27\12271610.D Vial: 11
Acq On : 27 Dec 2016 12:19 Operator: CL
Sample : 5000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-12211604 (1/19)

Quant Time: Dec 27 14:02:48 2016
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 27 11:48:19 2016
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 12/27/16

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.76	130	43456	1000.000 pg	0.00
25) 1,4-Difluorobenzene (IS2)	11.71	114	247592	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.05	54	32144	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.54	65	73880	1033.798 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 103.38%		
33) Toluene-d8 (SS2)	14.14	98	214691	897.344 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 89.73%		
45) Bromofluorobenzene (SS3)	17.55	174	66455	1176.251 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 117.63%		

Target Compounds

					Qvalue
2) Dichlorodifluoromethan...	4.40	85	510345	8989.459 pg	100
3) Chloromethane	4.62	52	116447	7553.325 pg	99
4) 1,2-Dichloro,1,1,2,2-t...	4.79	85	500237	8561.414 pg	100
5) Vinyl Chloride	4.92	62	481513	8629.084 pg	100
6) 1,3-Butadiene	5.11	54	364225	10880.513 pg	96
7) Bromomethane	5.44	94	182343	8652.488 pg	100
8) Chloroethane	5.67	64	134772	8593.525 pg	100
9) Acrolein	6.25	56	94739	8654.412 pg	99
10) Acetone	6.39	58	628605	39690.850 pg	99
11) Trichlorofluoromethane	6.60	101	365711	8966.037 pg	99
12) 1,1-Dichloroethene	7.33	96	236056	9705.763 pg	99
13) Methylene Chloride	7.47	84	241205	8742.681 pg	95
14) Trichlorotrifluoroethane	7.79	151	224170	9229.958 pg	100
15) trans-1,2-Dichloroethene	8.50	96	250595	9792.293 pg	99
16) 1,1-Dichloroethane	8.72	63	381063	8699.164 pg	100
17) Methyl tert-Butyl Ether	8.78	73	700936	9863.959 pg	100
18) cis-1,2-Dichloroethene	9.59	96	268140	9917.097 pg	99
19) Chloroform	9.89	83	427052	8658.649 pg	100
21) 1,2-Dichloroethane	10.64	62	354934	10216.248 pg	99
22) 1,1,1-Trichloroethane	10.91	97	426177	10206.296 pg	100
23) Benzene	11.37	78	1071116	9513.591 pg	100
24) Carbon Tetrachloride	11.52	117	354250	9597.043 pg	100
26) 1,2-Dichloropropane	12.18	63	231147	8312.574 pg	100
27) Bromodichloromethane	12.36	83	343848	8525.985 pg	100
28) Trichloroethene	12.41	130	264910	8402.593 pg	100
29) 1,4-Dioxane	12.37	88	209996	8952.657 pg	97
30) cis-1,3-Dichloropropene	13.25	75	420117	9741.625 pg	99
31) trans-1,3-Dichloropropene	13.76	75	365543	9845.951 pg	99
32) 1,1,2-Trichloroethane	13.94	83	206543	8397.698 pg	99
34) Toluene	14.24	91	985971	8297.156 pg	99
35) Dibromochloromethane	14.66	129	282619	9140.611 pg	100
36) 1,2-Dibromoethane	14.91	107	275021	9027.131 pg	100
37) Tetrachloroethene	15.40	166	276194	8667.652 pg	99
39) Chlorobenzene	16.10	112	690074	10156.343 pg	100
40) Ethylbenzene	16.48	91	1138087	10777.146 pg	99
41) m,p-Xylene	16.65	91	1734391	21568.048 pg	99
42) Styrene	17.01	104	714557	12077.743 pg	100
43) o-Xylene	17.11	106	437784	10625.058 pg	98
44) 1,1,2,2-Tetrachloroethane	17.09	83	432163	10203.347 pg	99
46) 1,3,5-Trimethylbenzene	18.37	105	952030	11013.888 pg	98
47) 1,2,4-Trimethylbenzene	18.77	105	1005179	11455.309 pg	100
48) 1,3-Dichlorobenzene	18.92	146	567552	11039.420 pg	99
49) 1,4-Dichlorobenzene	18.98	146	555977	10781.567 pg	99
50) 1,2-Dichlorobenzene	19.31	146	555271	10891.254 pg	100
51) 1,2-Dibromo-3-chloropr...	19.72	157	199601	11759.615 pg	95
52) 1,2,4-Trichlorobenzene	20.94	182	348646	11058.608 pg	99
53) Naphthalene	21.05	128	1177249	10662.484 pg	99

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2016 12\27\12271610.D Vial: 11
Acq On : 27 Dec 2016 12:19 Operator: CL
Sample : 5000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-12211604 (1/19)

Quant Time: Dec 27 14:02:48 2016
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 27 11:48:19 2016
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

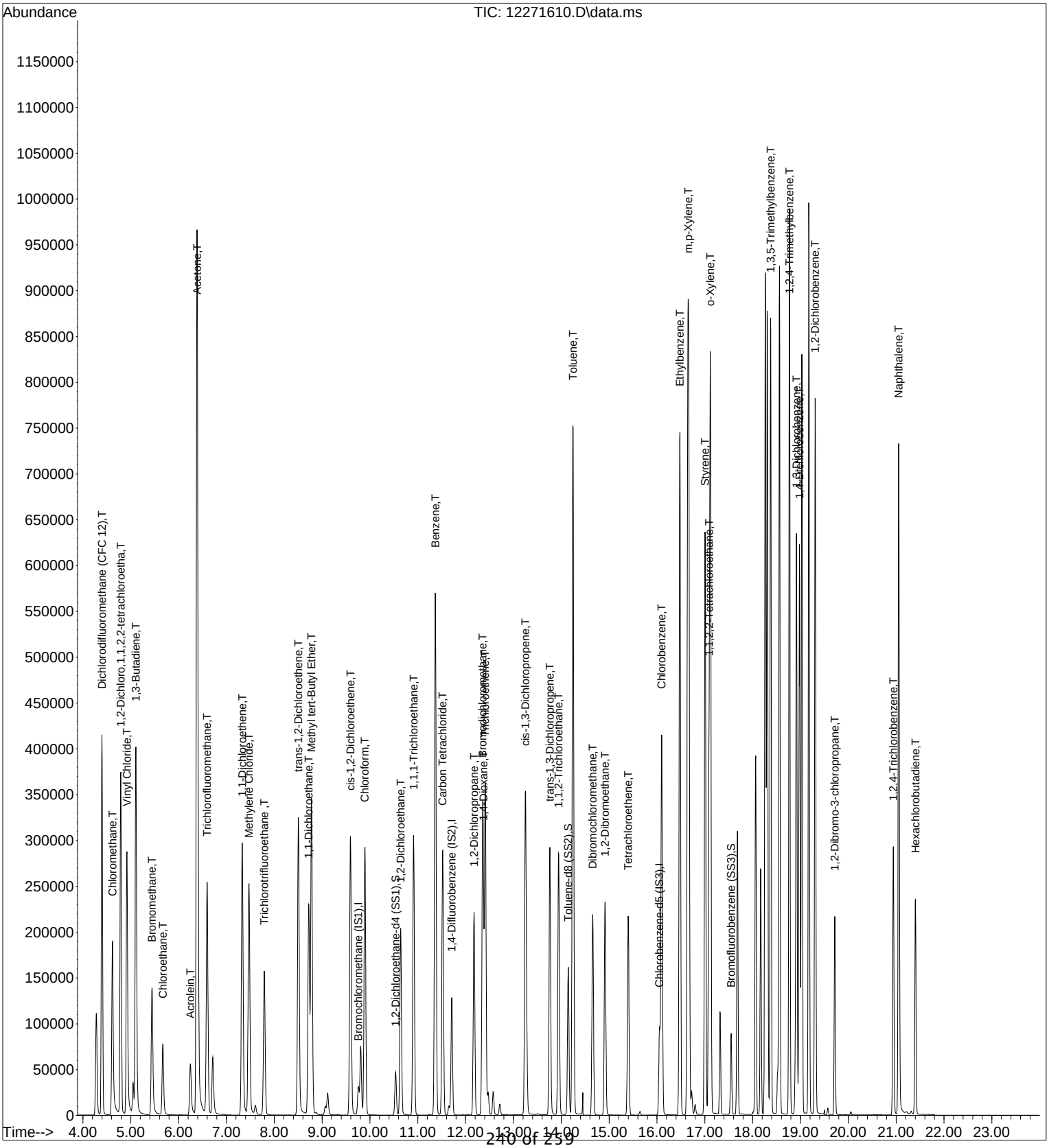
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	227480	10790.466	pg	100

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2016 12\27\12271610.D Vial: 11
Acq On : 27 Dec 2016 12:19 Operator: CL
Sample : 5000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-12211604 (1/19)

Quant Time: Dec 27 14:02:48 2016
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 27 11:48:19 2016
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2016 12\27\12271611.D Vial: 11
Acq On : 27 Dec 2016 12:50 Operator: CL
Sample : 10000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-12211604 (1/19)

Quant Time: Dec 27 14:03:27 2016
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 27 11:48:19 2016
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 12/27/16

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.76	130	49099	1000.000 pg	0.00
25) 1,4-Difluorobenzene (IS2)	11.71	114	246128	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.05	54	34674	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.54	65	91170	1129.114 pg	0.01
Spiked Amount 1000.000	Range 70 - 130		Recovery = 112.91%		
33) Toluene-d8 (SS2)	14.15	98	224725	944.870 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 94.49%		
45) Bromofluorobenzene (SS3)	17.55	174	72109	1183.199 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 118.32%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.39	85	993173	15483.592 pg	99
3) Chloromethane	4.61	52	204145	11719.950 pg	98
4) 1,2-Dichloro,1,1,2,2-t...	4.79	85	975253	14772.843 pg	100
5) Vinyl Chloride	4.92	62	958274	15199.296 pg	99
6) 1,3-Butadiene	5.11	54	734303	19414.760 pg	97
7) Bromomethane	5.44	94	363276	15256.880 pg	99
8) Chloroethane	5.67	64	273798	15451.798 pg	99
9) Acrolein	6.25	56	196283	15869.694 pg	98
10) Acetone	6.39	58	1273473	71167.124 pg	100
11) Trichlorofluoromethane	6.60	101	736032	15971.155 pg	99
12) 1,1-Dichloroethene	7.33	96	478897	17427.451 pg	99
13) Methylene Chloride	7.48	84	484561	15544.756 pg	94
14) Trichlorotrifluoroethane	7.79	151	452528	16490.917 pg	100
15) trans-1,2-Dichloroethene	8.51	96	505320	17476.546 pg	99
16) 1,1-Dichloroethane	8.73	63	764139	15439.392 pg	100
17) Methyl tert-Butyl Ether	8.78	73	1420740	17695.573 pg	100
18) cis-1,2-Dichloroethene	9.60	96	578175	18926.024 pg	99
19) Chloroform	9.90	83	947943	17010.955 pg	100
21) 1,2-Dichloroethane	10.65	62	817694	20831.077 pg	99
22) 1,1,1-Trichloroethane	10.91	97	948897	20112.884 pg	100
23) Benzene	11.37	78	2244439	17643.831 pg	100
24) Carbon Tetrachloride	11.52	117	783032	18775.184 pg	100
26) 1,2-Dichloropropane	12.18	63	471150	17044.412 pg	100
27) Bromodichloromethane	12.36	83	702990	17534.879 pg	100
28) Trichloroethene	12.42	130	536154	17107.246 pg	100
29) 1,4-Dioxane	12.37	88	427757	18344.827 pg	97
30) cis-1,3-Dichloropropene	13.25	75	873593	20377.264 pg	99
31) trans-1,3-Dichloropropene	13.76	75	764160	20705.183 pg	99
32) 1,1,2-Trichloroethane	13.95	83	416855	17049.451 pg	99
34) Toluene	14.25	91	1989213	16839.221 pg	98
35) Dibromochloromethane	14.66	129	586999	19097.953 pg	100
36) 1,2-Dibromoethane	14.92	107	561902	18553.253 pg	100
37) Tetrachloroethene	15.40	166	568269	17939.766 pg	99
39) Chlorobenzene	16.10	112	1398223	19077.177 pg	99
40) Ethylbenzene	16.48	91	2303910	20225.058 pg	98
41) m,p-Xylene	16.66	91	3547623	40897.548 pg	98
42) Styrene	17.01	104	1494346	23415.101 pg	100
43) o-Xylene	17.12	106	898888	20224.277 pg	97
44) 1,1,2,2-Tetrachloroethane	17.09	83	884806	19365.963 pg	99
46) 1,3,5-Trimethylbenzene	18.38	105	1963472	21057.689 pg	98
47) 1,2,4-Trimethylbenzene	18.77	105	2107743	22267.786 pg	99
48) 1,3-Dichlorobenzene	18.92	146	1168166	21064.015 pg	100
49) 1,4-Dichlorobenzene	18.98	146	1147637	20631.252 pg	98
50) 1,2-Dichlorobenzene	19.31	146	1158492	21065.022 pg	99
51) 1,2-Dibromo-3-chloropr...	19.72	157	426894	23315.590 pg	95
52) 1,2,4-Trichlorobenzene	20.94	182	736696	21662.075 pg	98
53) Naphthalene	21.05	128	2437293	20464.152 pg	99

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2016 12\27\12271611.D Vial: 11
Acq On : 27 Dec 2016 12:50 Operator: CL
Sample : 10000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-12211604 (1/19)

Quant Time: Dec 27 14:03:27 2016
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 27 11:48:19 2016
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

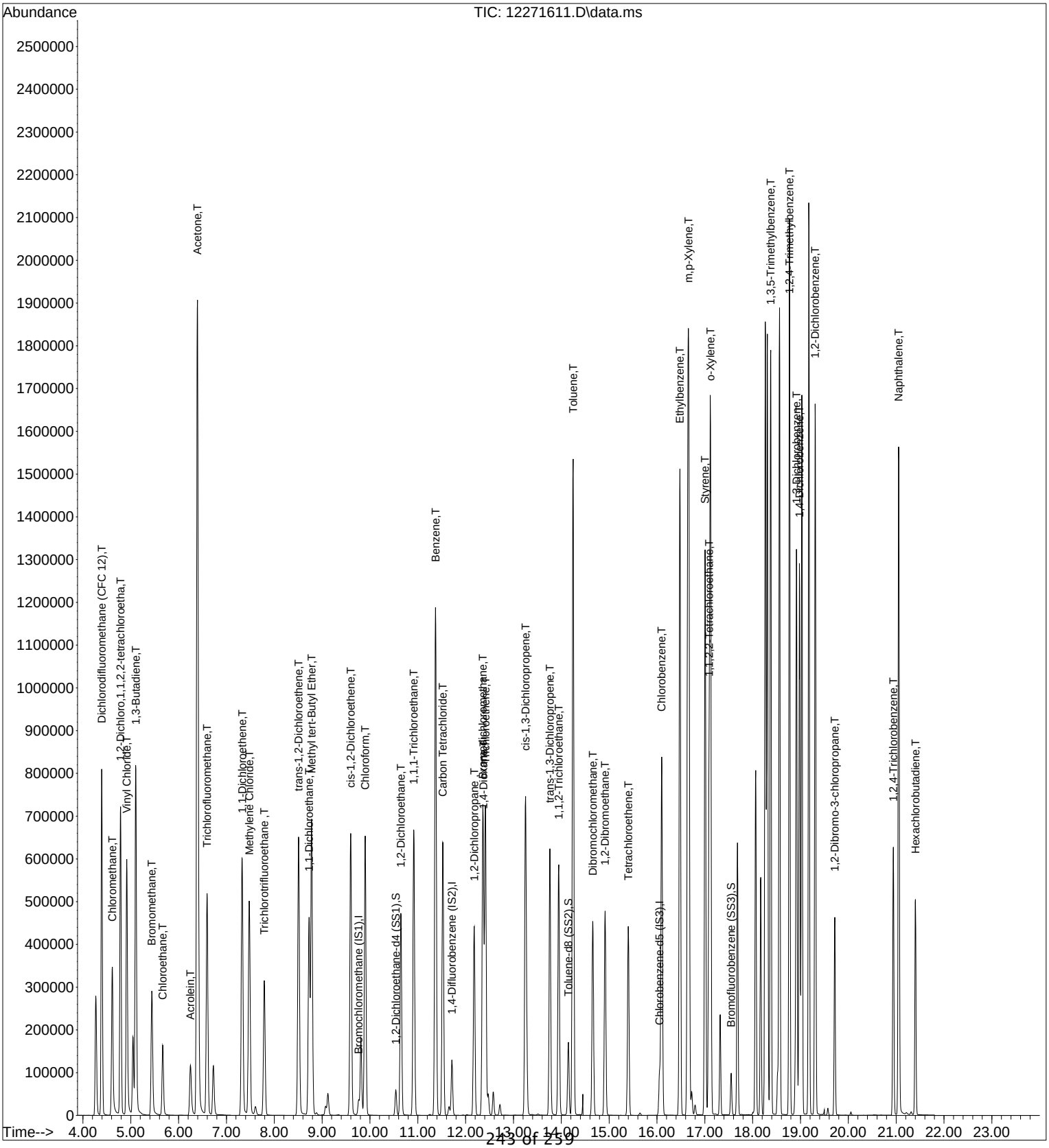
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	480929	21148.225 pg	100

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2016 12\27\12271611.D Vial: 11
Acq On : 27 Dec 2016 12:50 Operator: CL
Sample : 10000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-12211604 (1/19)

Quant Time: Dec 27 14:03:27 2016
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 27 11:48:19 2016
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2016 12\27\12271620.D Vial: 12
Acq On : 28 Dec 2016 7:36 Operator: CL
Sample : 50000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-12211603 (1/19)

Quant Time: Dec 28 08:01:11 2016
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Dec 28 07:38:07 2016
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 12/28/16

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.78	130	37184	1000.000 pg	0.00
25) 1,4-Difluorobenzene (IS2)	11.72	114	198616	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.05	54	29713	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.55	65	58472	981.748 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 98.17%		
33) Toluene-d8 (SS2)	14.15	98	180077	928.229 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 92.82%		
45) Bromofluorobenzene (SS3)	17.55	174	38990	662.152 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 66.22%#		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.39	85	4840398	53647.332 pg	97
3) Chloromethane	4.61	52	1172356	48542.016 pg	99
4) 1,2-Dichloro,1,1,2,2-t...	4.78	85	4904231	51950.068 pg	97
5) Vinyl Chloride	4.92	62	4879173	57098.698 pg	97
6) 1,3-Butadiene	5.11	54	4018057	90730.430 pg	99
7) Bromomethane	5.44	94	1902488	55913.608 pg	99
8) Chloroethane	5.67	64	1464796	60696.304 pg	99
9) Acrolein	6.26	56	1161693	69727.841 pg	96
10) Acetone	6.42	58	8223251	369947.351 pg #	78
11) Trichlorofluoromethane	6.59	101	3922049	59380.271 pg	98
12) 1,1-Dichloroethene	7.33	96	2587738	65169.119 pg	99
13) Methylene Chloride	7.49	84	2659533	61231.203 pg	90
14) Trichlorotrifluoroethane	7.79	151	2675689	66223.615 pg	99
15) trans-1,2-Dichloroethene	8.52	96	2739981	64293.366 pg	98
16) 1,1-Dichloroethane	8.74	63	4169839	60106.973 pg	98
17) Methyl tert-Butyl Ether	8.78	73	8069384	69472.301 pg	98
18) cis-1,2-Dichloroethene	9.61	96	2934667	64726.597 pg	98
19) Chloroform	9.91	83	4644196	59764.689 pg	98
21) 1,2-Dichloroethane	10.65	62	3642855	63039.866 pg	98
22) 1,1,1-Trichloroethane	10.92	97	4428085	62723.184 pg	98
23) Benzene	11.38	78	10179996	55497.024 pg	99
24) Carbon Tetrachloride	11.53	117	3968983	65264.580 pg	99
26) 1,2-Dichloropropane	12.19	63	2656889	63093.585 pg	99
27) Bromodichloromethane	12.37	83	4171839	67551.685 pg	98
28) Trichloroethene	12.42	130	3119572	62484.536 pg	99
29) 1,4-Dioxane	12.38	88	2615035	71063.574 pg	100
30) cis-1,3-Dichloropropene	13.26	75	5255019	76550.467 pg	97
31) trans-1,3-Dichloropropene	13.76	75	4426261	74003.359 pg	97
32) 1,1,2-Trichloroethane	13.95	83	2380379	61010.995 pg	99
34) Toluene	14.25	91	11016631	58441.585 pg	92
35) Dibromochloromethane	14.66	129	3712008	73828.119 pg	99
36) 1,2-Dibromoethane	14.92	107	3549609	70939.796 pg	98
37) Tetrachloroethene	15.40	166	3714800	68663.699 pg	99
39) Chlorobenzene	16.10	112	7809733	58376.116 pg	96
40) Ethylbenzene	16.48	91	12521491	61079.483 pg	91
41) m,p-Xylene	16.66	91	20114275	117353.990 pg	89
42) Styrene	17.01	104	8707167	77178.311 pg	99
43) o-Xylene	17.12	106	5697137	71753.253 pg	88
44) 1,1,2,2-Tetrachloroethane	17.09	83	5323925	66186.112 pg	97
46) 1,3,5-Trimethylbenzene	18.38	105	11009554	66286.029 pg	90
47) 1,2,4-Trimethylbenzene	18.78	105	11958558	69978.001 pg	93
48) 1,3-Dichlorobenzene	18.92	146	7295930	72285.686 pg	98
49) 1,4-Dichlorobenzene	18.99	146	6995228	70106.667 pg	95
50) 1,2-Dichlorobenzene	19.31	146	7183160	72908.136 pg	97
51) 1,2-Dibromo-3-chloropr...	19.72	157	2586575	84816.870 pg	98
52) 1,2,4-Trichlorobenzene	20.94	182	4916801	91495.099 pg	99
53) Naphthalene	21.06	128	15277495	94344.235 pg	91

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2016 12\27\12271620.D Vial: 12
Acq On : 28 Dec 2016 7:36 Operator: CL
Sample : 50000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-12211603 (1/19)

Quant Time: Dec 28 08:01:11 2016
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Dec 28 07:38:07 2016
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

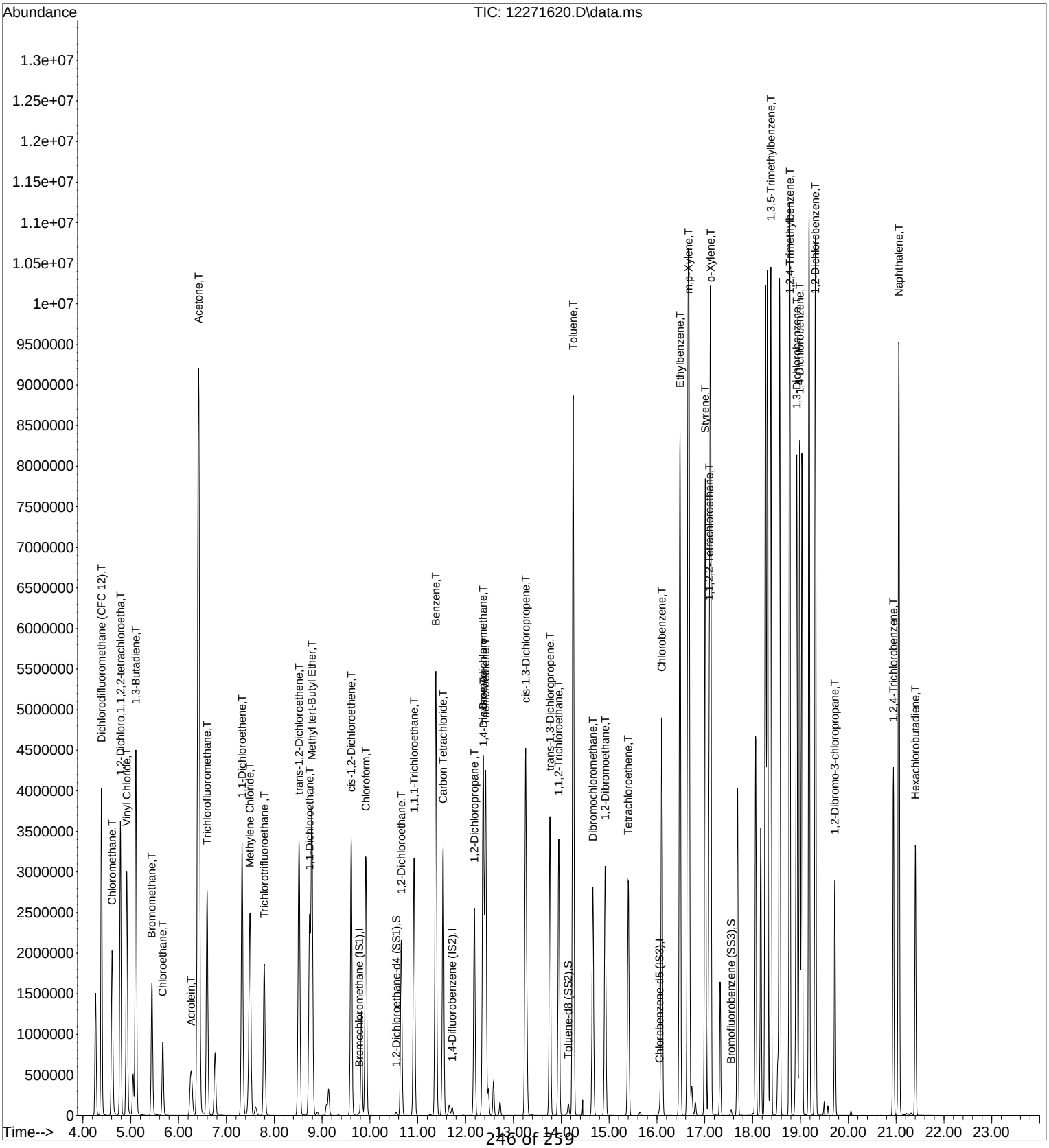
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	3070023	77147.227 pg	98

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2016 12\27\12271620.D Vial: 12
Acq On : 28 Dec 2016 7:36 Operator: CL
Sample : 50000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-12211603 (1/19)

Quant Time: Dec 28 08:01:11 2016
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Dec 28 07:38:07 2016
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2016 12\27\12271621.D Vial: 14
Acq On : 28 Dec 2016 8:07 Operator: CL
Sample : 500pg TO15SIM ICV Inst : MS19
Misc : S29-12201602/S29-12211613 (1/19)

Quant Time: Dec 28 08:32:01 2016
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Dec 28 08:15:24 2016
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 12/28/16

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.76	130	43059	1000.000 pg	-0.02
25) 1,4-Difluorobenzene (IS2)	11.71	114	217092	1000.000 pg	-0.01
38) Chlorobenzene-d5 (IS3)	16.05	54	31410	1000.000 pg	0.00

System Monitoring Compounds					
20) 1,2-Dichloroethane-d4 ...	10.53	65	69498	1011.982 pg	-0.02
Spiked Amount 1000.000	Range 70 - 130		Recovery = 101.20%		
33) Toluene-d8 (SS2)	14.14	98	207097	1011.054 pg	-0.01
Spiked Amount 1000.000	Range 70 - 130		Recovery = 101.11%		
45) Bromofluorobenzene (SS3)	17.55	174	63551	1056.556 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 105.66%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.42	85	57749	547.468 pg	100
3) Chloromethane	4.65	52	15107	531.196 pg	100
4) 1,2-Dichloro,1,1,2,2-t...	4.81	85	53215	479.646 pg	100
5) Vinyl Chloride	4.96	62	52819	526.178 pg	100
6) 1,3-Butadiene	5.14	54	28263	504.967 pg	95
7) Bromomethane	5.48	94	21444	534.172 pg	99
8) Chloroethane	5.70	64	15450	541.169 pg	100
9) Acrolein	6.27	56	8986	457.106 pg	100
10) Acetone	6.40	58	87659	3224.669 pg	99
11) Trichlorofluoromethane	6.62	101	40955	527.626 pg	100
12) 1,1-Dichloroethene	7.35	96	24965	534.355 pg	96
13) Methylene Chloride	7.48	84	26824	526.647 pg	95
14) Trichlorotrifluoroethane	7.80	151	24997	525.421 pg	100
15) trans-1,2-Dichloroethene	8.51	96	27128	541.474 pg	99
16) 1,1-Dichloroethane	8.72	63	43799	534.825 pg	100
17) Methyl tert-Butyl Ether	8.79	73	77425	565.248 pg	99
18) cis-1,2-Dichloroethene	9.59	96	28262	530.085 pg	100
19) Chloroform	9.89	83	48239	527.312 pg	99
21) 1,2-Dichloroethane	10.64	62	35706	525.029 pg	99
22) 1,1,1-Trichloroethane	10.91	97	42162	508.057 pg	100
23) Benzene	11.36	78	107065	497.158 pg	100
24) Carbon Tetrachloride	11.52	117	36227	504.376 pg	100
26) 1,2-Dichloropropane	12.18	63	24216	519.723 pg	100
27) Bromodichloromethane	12.36	83	34538	502.600 pg	100
28) Trichloroethene	12.41	130	28445	512.601 pg	100
29) 1,4-Dioxane	12.38	88	21424	521.015 pg	99
30) cis-1,3-Dichloropropene	13.25	75	38306	517.225 pg	100
31) trans-1,3-Dichloropropene	13.77	75	34578	538.177 pg	99
32) 1,1,2-Trichloroethane	13.95	83	21440	508.806 pg	100
34) Toluene	14.25	91	105178	516.705 pg	99
35) Dibromochloromethane	14.66	129	26063	471.143 pg	100
36) 1,2-Dibromoethane	14.92	107	27030	491.409 pg	100
37) Tetrachloroethene	15.40	166	29354	490.529 pg	100
39) Chlorobenzene	16.10	112	71976	496.055 pg	100
40) Ethylbenzene	16.48	91	116718	526.056 pg	100
41) m,p-Xylene	16.66	91	178410	1062.783 pg	100
42) Styrene	17.01	104	60795	493.076 pg	99
43) o-Xylene	17.12	106	44981	514.482 pg	100
44) 1,1,2,2-Tetrachloroethane	17.09	83	41416	471.137 pg	100
46) 1,3,5-Trimethylbenzene	18.38	105	95560	528.807 pg	100
47) 1,2,4-Trimethylbenzene	18.77	105	97214	520.566 pg	98
48) 1,3-Dichlorobenzene	18.92	146	56997	511.796 pg	100
49) 1,4-Dichlorobenzene	18.98	146	58419	529.234 pg	100
50) 1,2-Dichlorobenzene	19.31	146	55140	501.346 pg	100
51) 1,2-Dibromo-3-chloropr...	19.72	157	16609	482.912 pg	99
52) 1,2,4-Trichlorobenzene	20.94	182	37352	611.616 pg	99
53) Naphthalene	21.06	128	131587	666.310 pg	100

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2016 12\27\12271621.D Vial: 14
Acq On : 28 Dec 2016 8:07 Operator: CL
Sample : 500pg TO15SIM ICV Inst : MS19
Misc : S29-12201602/S29-12211613 (1/19)

Quant Time: Dec 28 08:32:01 2016
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Dec 28 08:15:24 2016
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

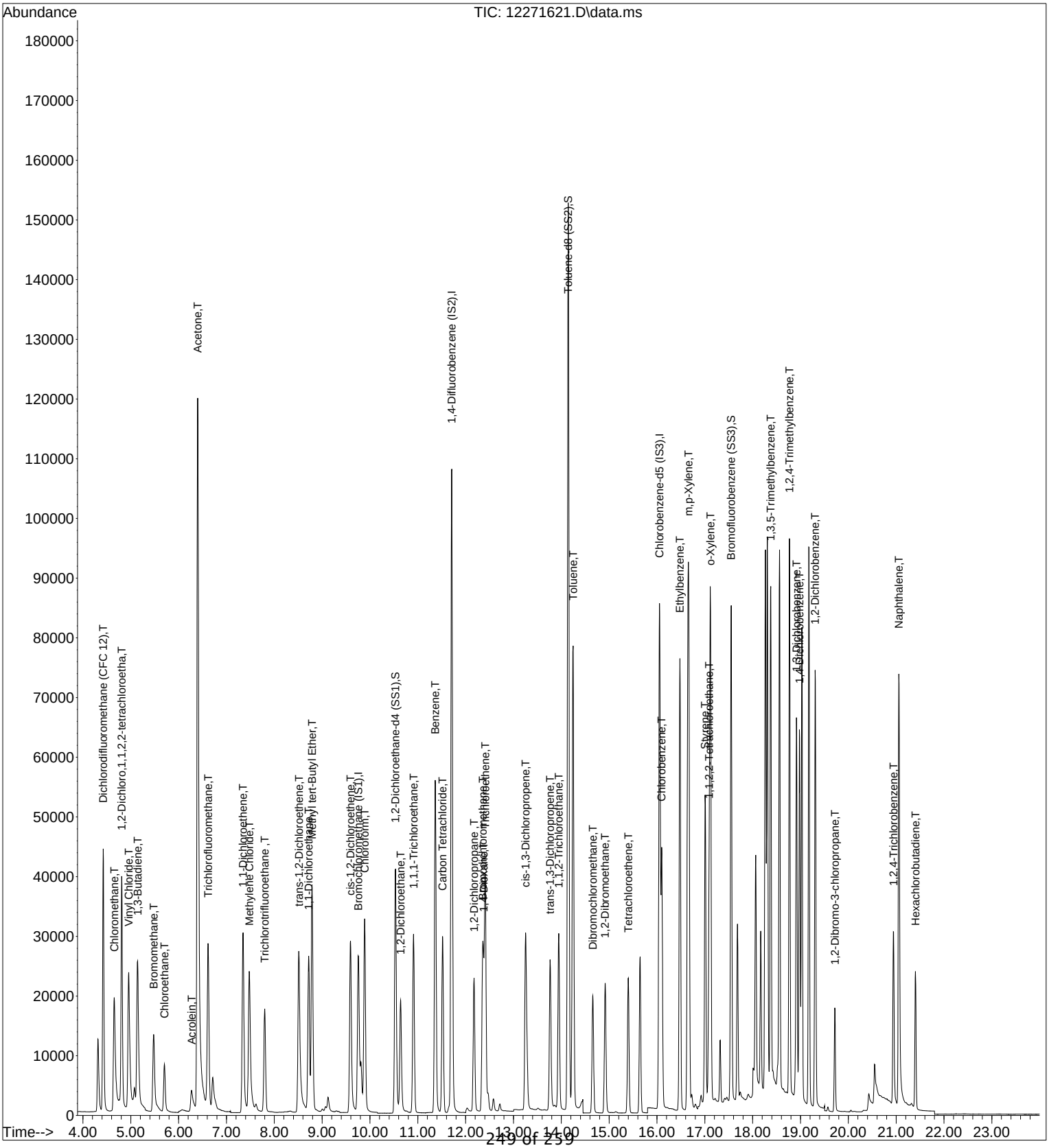
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	22862	510.829 pg	100

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2016 12\27\12271621.D Vial: 14
Acq On : 28 Dec 2016 8:07 Operator: CL
Sample : 500pg TO15SIM ICV Inst : MS19
Misc : S29-12201602/S29-12211613 (1/19)

Quant Time: Dec 28 08:32:01 2016
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Dec 28 08:15:24 2016
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Data File Name:	**12271621.D**
Data File Path:	**I:\MS19\DATA\2016_12\27**
Operator:	**CL**
Instrument Name:	**MS19**
Sample Name:	**500pg TO15SIM ICV**
Misc Info:	**S29-12201602/S29-12211613 (1/19)**
Date Acquired:	**12/28/16 8:07**
Acq. Method File:	**TO15SIM.M**

CL 12/28/16

#	Compound Name	Ret. Time	Amount Spiked (pg)	Amount Found (pg)	Percent Recovery	Lower Limit	Upper Limit	Flag
2)	Dichlorodifluoromethane (CFC 12)	4.42	525	547.5	104.3	70	130	*
3)	Chloromethane	4.65	524.5	531.2	101.3	70	130	*
4)	*1,2-Dichloro,1,1,2,2-tetrachloroetha*	4.81	527.5	479.6	90.9	70	130	*
5)	Vinyl Chloride	4.96	525	526.2	100.2	70	130	*
6)	*1,3-Butadiene*	5.14	525	505.0	96.2	70	130	*
7)	Bromomethane	5.48	525	534.2	101.7	70	130	*
8)	Chloroethane	5.70	524.5	541.2	103.2	70	130	*
9)	*Acrolein*	6.27	530.5	457.1	86.2	70	130	*
10)	Acetone	6.40	2661	3224.7	121.2	70	130	*
11)	Trichlorofluoromethane	6.62	525.5	527.6	100.4	70	130	*
12)	1,1-Dichloroethene	7.35	531.5	534.4	100.5	70	130	*
13)	Methylene Chloride	7.48	531	526.6	99.2	70	130	*
14)	Trichlorotrifluoroethane	7.80	529	525.4	99.3	70	130	*
15)	trans-1,2-Dichloroethene	8.51	533.5	541.5	101.5	70	130	*
16)	1,1-Dichloroethane	8.72	531	534.8	100.7	70	130	*
17)	Methyl tert-Butyl Ether	8.79	532	565.2	106.2	70	130	*
18)	cis-1,2-Dichloroethene	9.59	529.5	530.1	100.1	70	130	*
19)	Chloroform	9.89	529.5	527.3	99.6	70	130	*
21)	1,2-Dichloroethane	10.64	530	525.0	99.1	70	130	*
22)	1,1,1-Trichloroethane	10.91	529.5	508.1	96.0	70	130	*
25)	Benzene	11.36	530.5	497.2	93.7	70	130	*
24)	Carbon Tetrachloride	11.52	532	504.4	94.8	70	130	*
26)	1,2-Dichloropropane	12.18	530.5	519.7	98.0	70	130	*
27)	Bromodichloromethane	12.36	534	502.6	94.1	70	130	*
28)	Trichloroethene	12.41	531	512.6	96.5	70	130	*
29)	1,4-Dioxane	12.38	532	521.0	97.9	70	130	*
30)	cis-1,3-Dichloropropene	13.25	525.5	517.2	98.4	70	130	*
31)	trans-1,3-Dichloropropene	13.77	533.5	538.2	100.9	70	130	*
32)	1,1,2-Trichloroethane	13.95	530.5	508.8	95.9	70	130	*
34)	Toluene	14.14	529	516.7	97.7	70	130	*
35)	*Dibromochloromethane*	14.66	532	471.1	88.6	70	130	*
36)	1,2-Dibromoethane	14.92	529	491.4	92.9	70	130	*
37)	Tetrachloroethene	15.40	531.5	495.0	93.1	70	130	*
39)	Chlorobenzene	16.10	530	496.1	93.6	70	130	*
40)	Ethylbenzene	16.48	529	526.1	99.4	70	130	*
41)	m,p-Xylene	16.66	1060.5	1062.8	100.2	70	130	*
42)	*Styrene*	17.01	529.5	493.1	93.1	70	130	*
43)	o-Xylene	17.12	529	514.5	97.3	70	130	*
44)	1,1,2,2-Tetrachloroethane	17.09	530	471.1	88.9	70	130	*
46)	*1,3,5-Trimethylbenzene*	18.38	530.5	528.8	99.7	70	130	*
47)	*1,2,4-Trimethylbenzene*	18.77	530.5	520.6	98.1	70	130	*
48)	1,3-Dichlorobenzene	18.92	529.5	511.8	96.7	70	130	*
49)	1,4-Dichlorobenzene	18.98	533	529.2	99.3	70	130	*
50)	1,2-Dichlorobenzene	19.31	531	501.3	94.4	70	130	*
51)	*1,2-Dibromo-3-chloropropane*	19.72	529.5	482.9	91.2	70	130	*
52)	1,2,4-Trichlorobenzene	20.94	530	611.6	115.4	70	130	*
53)	Naphthalene	19.31	534	666.3	124.8	70	130	*
54)	Hexachlorobutadiene	21.40	531.5	510.8	96.1	70	130	*

Evaluate Continuing Calibration Report

Data File : I:\MS19\DATA\2017 01\09\01091703.D Vial: 16
Acq On : 9 Jan 2017 8:52 Operator: CL
Sample : CCV S19010917 500pg Inst : MS19
Misc : S29-12201602/S29-12191608 (1/17)

Quant Time: Jan 09 14:54:08 2017
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Jan 09 14:50:02 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 1/9/17

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	I	Bromochloromethane (IS1)	1.000	1.000	0.0	111	-0.02
2	T	Dichlorodifluoromethane (CF	2.450	2.269	7.4	102	0.03
3	T	Chloromethane	0.660	0.585	11.4	94	0.04
4	T	1,2-Dichloro,1,1,2,2-tetrac	2.577	1.888	26.7	80	0.03
5	T	Vinyl Chloride	2.331	1.842	21.0	85	0.04
6	T	1,3-Butadiene	1.276	1.246	2.4	130	0.04
7	T	Bromomethane	0.932	0.889	4.6	108	0.03
8	T	Chloroethane	0.663	0.674	-1.7	115	0.03
9	T	Acrolein	0.457	0.467	-2.2	123	0.01
10	T	Acetone	0.631	0.714	-13.2	132	-0.02
11	T	Trichlorofluoromethane	1.803	1.638	9.2	102	0.01
12	T	1,1-Dichloroethene	1.085	1.019	6.1	108	0.01
13	T	Methylene Chloride	1.183	1.107	6.4	108	-0.02
14	T	Trichlorotrifluoroethane	1.105	0.985	10.9	104	0.00
15	T	trans-1,2-Dichloroethene	1.164	1.108	4.8	110	0.00
16	T	1,1-Dichloroethane	1.902	1.872	1.6	113	-0.02
17	T	Methyl tert-Butyl Ether	3.181	3.243	-1.9	120	0.00
18	T	cis-1,2-Dichloroethene	1.238	1.172	5.3	110	-0.02
19	T	Chloroform	2.125	1.978	6.9	108	-0.03
20	S	1,2-Dichloroethane-d4 (SS1)	1.595	1.652	-3.6	118	-0.02
21	T	1,2-Dichloroethane	1.579	1.453	8.0	110	-0.02
22	T	1,1,1-Trichloroethane	1.927	1.717	10.9	106	-0.01
23	T	Benzene	5.001	4.472	10.6	106	-0.01
24	T	Carbon Tetrachloride	1.668	1.454	12.8	95	-0.01
25	I	1,4-Difluorobenzene (IS2)	1.000	1.000	0.0	105	-0.01
26	T	1,2-Dichloropropane	0.215	0.204	5.1	97	-0.01
27	T	Bromodichloromethane	0.317	0.274	13.6	91	-0.01
28	T	Trichloroethene	0.256	0.222	13.3	90	-0.01
29	T	1,4-Dioxane	0.189	0.174	7.9	97	0.00
30	T	cis-1,3-Dichloropropene	0.341	0.318	6.7	98	0.00
31	T	trans-1,3-Dichloropropene	0.296	0.279	5.7	100	0.00
32	T	1,1,2-Trichloroethane	0.194	0.174	10.3	92	0.00
33	S	Toluene-d8 (SS2)	0.944	0.997	-5.6	101	0.00
34	T	Toluene	0.938	0.852	9.2	95	0.00
35	T	Dibromochloromethane	0.255	0.206	19.2	89	0.00
36	T	1,2-Dibromoethane	0.253	0.215	15.0	93	0.00
37	T	Tetrachloroethene	0.276	0.226	18.1	89	0.00
38	I	Chlorobenzene-d5 (IS3)	1.000	1.000	0.0	108	0.00
39	T	Chlorobenzene	4.619	3.653	20.9	95	0.00
40	T	Ethylbenzene	7.064	6.052	14.3	100	0.00
41	T	m,p-Xylene	5.344	4.643	13.1	100	0.00
42	T	Styrene	3.925	3.268	16.7	103	0.00
43	T	o-Xylene	2.784	2.332	16.2	98	0.00
44	T	1,1,2,2-Tetrachloroethane	2.799	2.255	19.4	95	0.00
45	S	Bromofluorobenzene (SS3)	1.915	2.045	-6.8	112	0.00
46	T	1,3,5-Trimethylbenzene	5.753	5.006	13.0	114	0.00
47	T	1,2,4-Trimethylbenzene	5.945	5.031	15.4	116	0.00
48	T	1,3-Dichlorobenzene	3.546	2.850	19.6	114	0.00
49	T	1,4-Dichlorobenzene	3.514	2.824	19.6	116	0.00
50	T	1,2-Dichlorobenzene	3.502	2.755	21.3	113	0.00
51	T	1,2-Dibromo-3-chloropropane	1.095	0.856	21.8	119	0.00
52	T	1,2,4-Trichlorobenzene	1.944	1.771	8.9	150	0.00
53	T	Naphthalene	6.287	5.792	7.9	164	0.00
54	T	Hexachlorobutadiene	1.425	1.216	14.7	120	0.00

Evaluate Continuing Calibration Report

Data File : I:\MS19\DATA\2017 01\09\01091703.D Vial: 16
Acq On : 9 Jan 2017 8:52 Operator: CL
Sample : CCV S19010917 500pg Inst : MS19
Misc : S29-12201602/S29-12191608 (1/17)

Quant Time: Jan 09 14:54:08 2017
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Jan 09 14:50:02 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.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)

(#) = Out of Range SPCC's out = 0 CCC's out = 0

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\09\01091703.D Vial: 16
Acq On : 9 Jan 2017 8:52 Operator: CL
Sample : CCV S19010917 500pg Inst : MS19
Misc : S29-12201602/S29-12191608 (1/17)

Quant Time: Jan 09 14:54:08 2017
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Jan 09 14:50:02 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 1/9/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.76	130	46523	1000.000 pg	-0.02
25) 1,4-Difluorobenzene (IS2)	11.71	114	239781	1000.000 pg	-0.01
38) Chlorobenzene-d5 (IS3)	16.05	54	37085	1000.000 pg	0.00

System Monitoring Compounds					
20) 1,2-Dichloroethane-d4 ...	10.53	65	76862	1035.877 pg	-0.02
Spiked Amount 1000.000	Range 70 - 130		Recovery = 103.59%		
33) Toluene-d8 (SS2)	14.15	98	238950	1056.177 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 105.62%		
45) Bromofluorobenzene (SS3)	17.55	174	75843	1067.961 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 106.80%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.42	85	55262	484.883 pg	100
3) Chloromethane	4.66	52	13671	444.911 pg	98
4) 1,2-Dichloro,1,1,2,2-t...	4.81	85	44136	368.193 pg	100
5) Vinyl Chloride	4.96	62	43839	404.202 pg	100
6) 1,3-Butadiene	5.15	54	30635	516.072 pg	93
7) Bromomethane	5.48	94	20531	473.349 pg	100
8) Chloroethane	5.71	64	15825	513.032 pg	100
9) Acrolein	6.27	56	11298	531.923 pg	98
10) Acetone	6.40	58	88192	3002.715 pg	99
11) Trichlorofluoromethane	6.62	101	39979	476.703 pg	100
12) 1,1-Dichloroethene	7.35	96	25096	497.163 pg	95
13) Methylene Chloride	7.48	84	27212	494.485 pg	95
14) Trichlorotrifluoroethane	7.80	151	24025	467.390 pg	100
15) trans-1,2-Dichloroethene	8.52	96	27501	508.047 pg	99
16) 1,1-Dichloroethane	8.72	63	44428	502.112 pg	100
17) Methyl tert-Butyl Ether	8.79	73	80406	543.303 pg	99
18) cis-1,2-Dichloroethene	9.59	96	29001	503.445 pg	100
19) Chloroform	9.89	83	48691	492.622 pg	100
21) 1,2-Dichloroethane	10.64	62	35561	483.963 pg	100
22) 1,1,1-Trichloroethane	10.91	97	42892	478.369 pg	100
23) Benzene	11.37	78	109426	470.287 pg	100
24) Carbon Tetrachloride	11.52	117	35675	459.708 pg	100
26) 1,2-Dichloropropane	12.18	63	25928	503.811 pg	98
27) Bromodichloromethane	12.36	83	34955	460.536 pg	100
28) Trichloroethene	12.41	130	28273	461.290 pg	100
29) 1,4-Dioxane	12.38	88	22138	487.435 pg	97
30) cis-1,3-Dichloropropene	13.26	75	42542	520.067 pg	100
31) trans-1,3-Dichloropropene	13.77	75	35551	500.963 pg	100
32) 1,1,2-Trichloroethane	13.95	83	22144	475.787 pg	99
34) Toluene	14.25	91	107547	478.350 pg	100
35) Dibromochloromethane	14.66	129	26211	428.984 pg	100
36) 1,2-Dibromoethane	14.92	107	27210	447.873 pg	99
37) Tetrachloroethene	15.40	166	28777	435.383 pg	99
39) Chlorobenzene	16.10	112	71874	419.550 pg	100
40) Ethylbenzene	16.48	91	118395	451.957 pg	99
41) m,p-Xylene	16.66	91	182784	922.217 pg	99
42) Styrene	17.01	104	64286	441.603 pg	100
43) o-Xylene	17.12	106	45576	441.516 pg	100
44) 1,1,2,2-Tetrachloroethane	17.09	83	44158	425.459 pg	100
46) 1,3,5-Trimethylbenzene	18.38	105	97379	456.411 pg	100
47) 1,2,4-Trimethylbenzene	18.77	105	98138	445.096 pg	99
48) 1,3-Dichlorobenzene	18.92	146	55913	425.233 pg	99
49) 1,4-Dichlorobenzene	18.98	146	55406	425.128 pg	99
50) 1,2-Dichlorobenzene	19.31	146	54054	416.264 pg	100
51) 1,2-Dibromo-3-chloropr...	19.72	157	16709	411.476 pg	94
52) 1,2,4-Trichlorobenzene	20.95	182	34255	475.071 pg	98
53) Naphthalene	21.06	128	116320	498.870 pg	100

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\09\01091703.D Vial: 16
Acq On : 9 Jan 2017 8:52 Operator: CL
Sample : CCV S19010917 500pg Inst : MS19
Misc : S29-12201602/S29-12191608 (1/17)

Quant Time: Jan 09 14:54:08 2017
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Jan 09 14:50:02 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

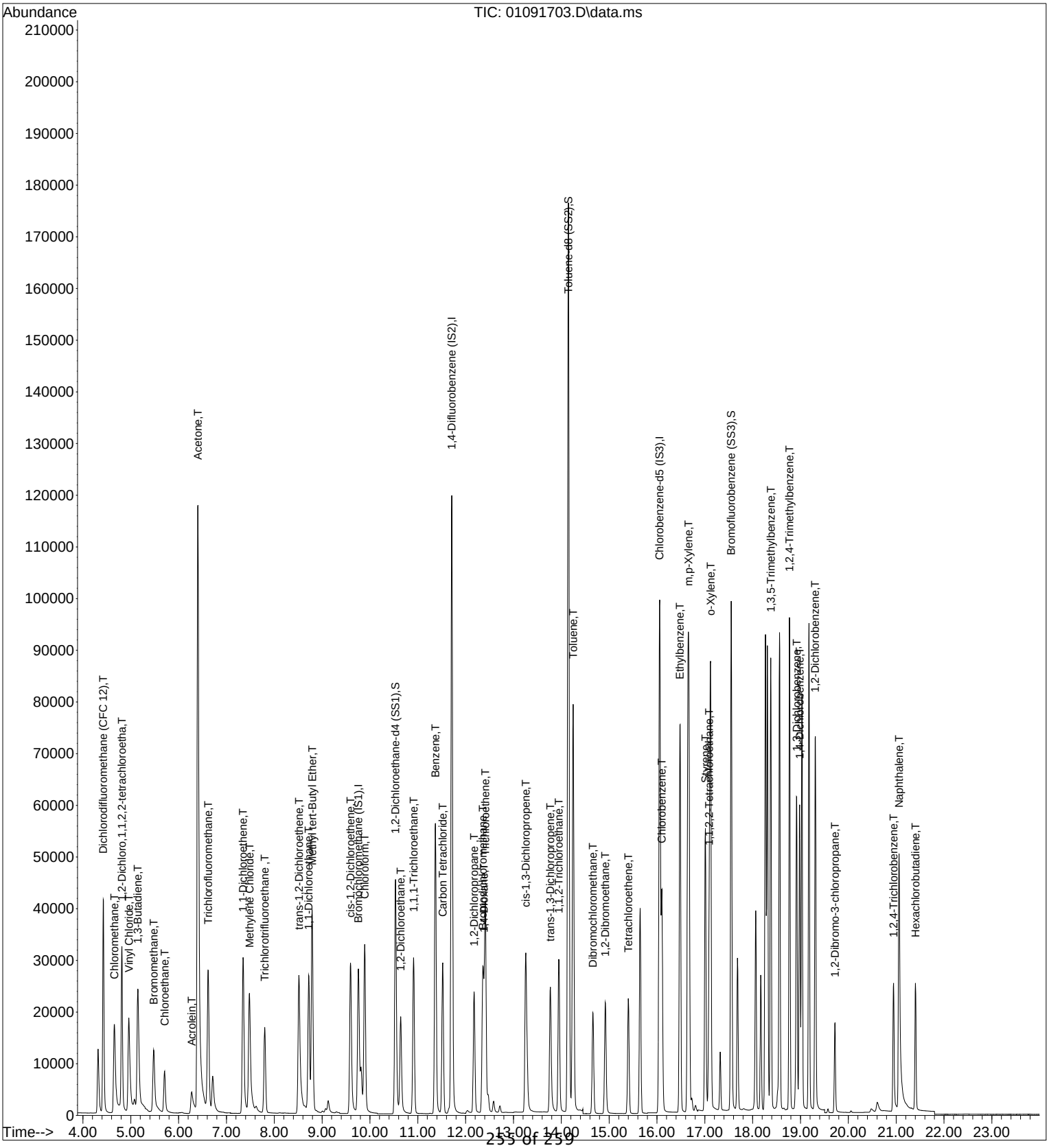
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	23881	451.943	pg	99

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\09\01091703.D Vial: 16
Acq On : 9 Jan 2017 8:52 Operator: CL
Sample : CCV S19010917 500pg Inst : MS19
Misc : S29-12201602/S29-12191608 (1/17)

Quant Time: Jan 09 14:54:08 2017
Quant Method : I:\MS19\METHODS\S19122716.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Jan 09 14:50:02 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

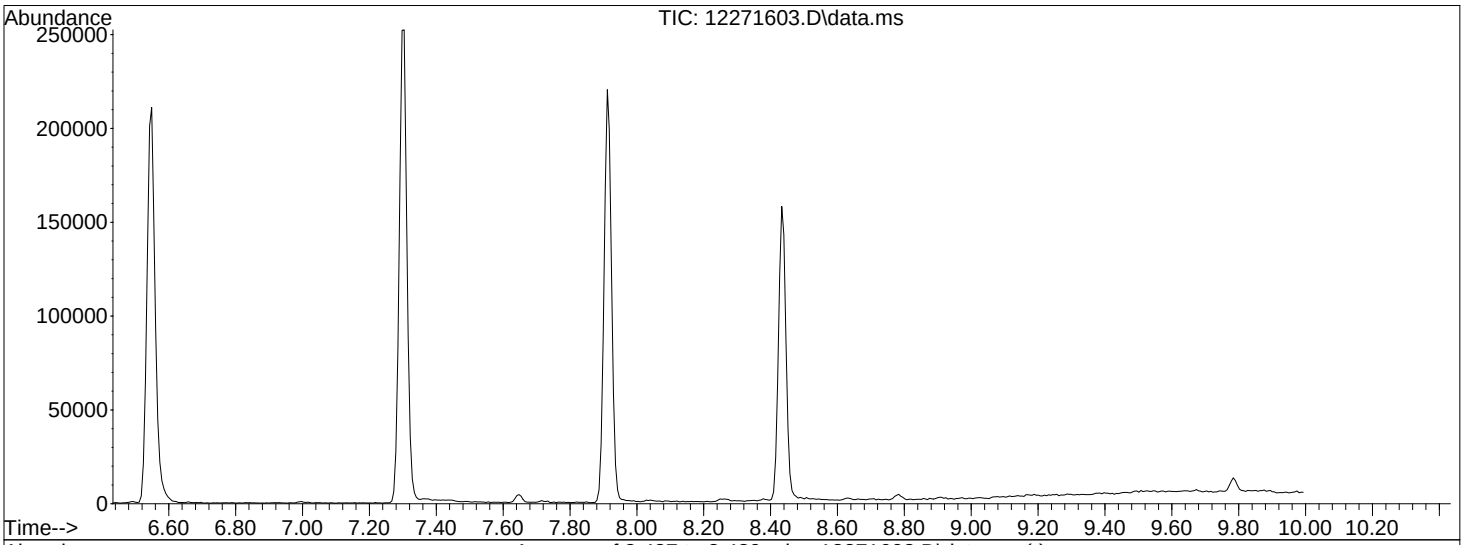


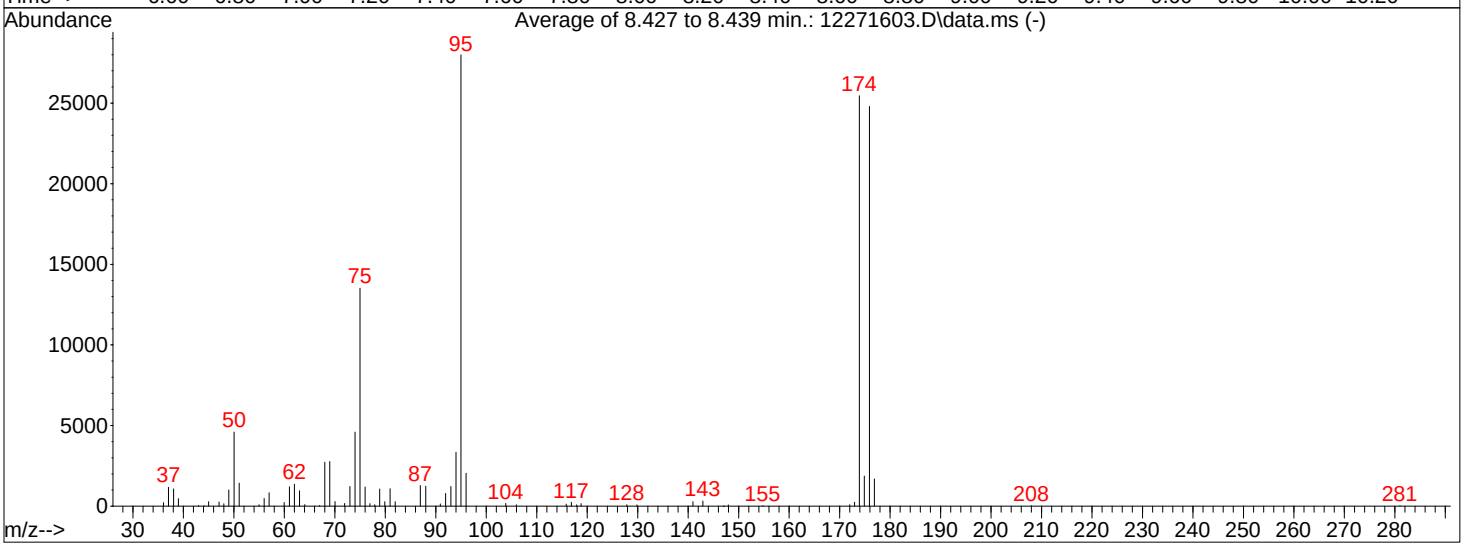
Data Path : I:\MS19\DATA\2016 12\27\
Data File : 12271603.D
Acq On : 27 Dec 2016 8:53
Operator : CL
Sample : BFB S19122716
Misc : S29-12201602
ALS Vial : 2 Sample Multiplier: 1

Integration File: rteint.p

Method : I:\MS19\METHODS\S19122716.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Wed Dec 28 07:38:07 2016

CL 12/30/16





AutoFind: Scans 707, 708, 709; Background Corrected with Scan 701

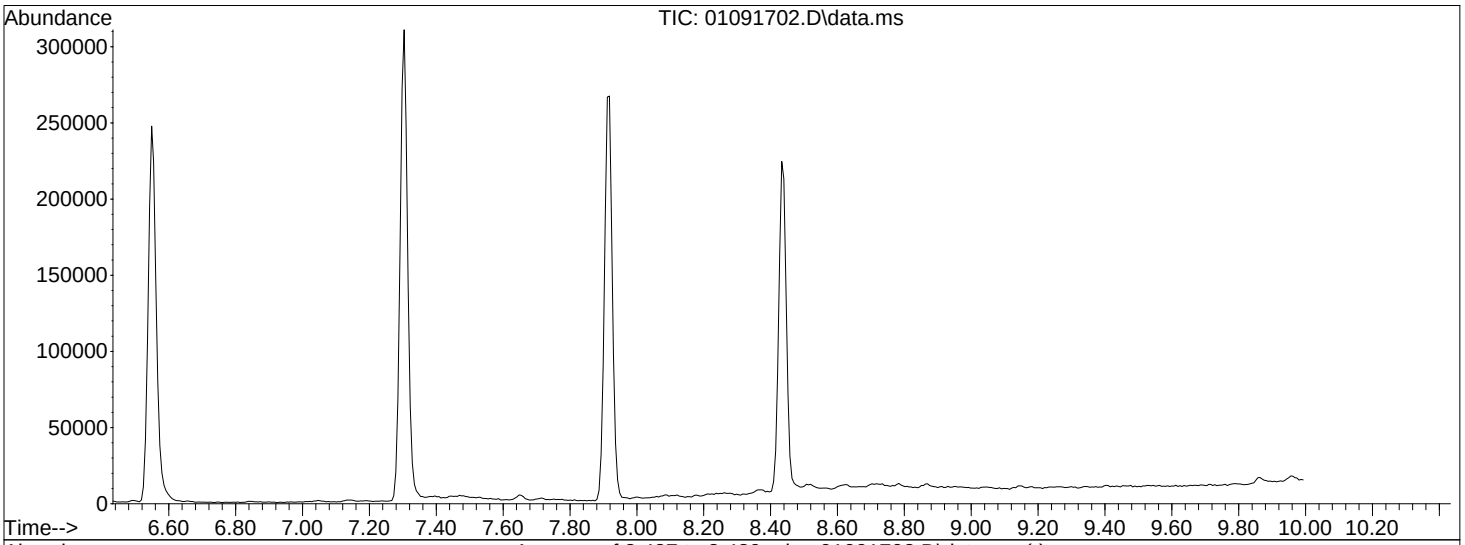
Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	16.4	4596	PASS
75	95	30	66	48.3	13515	PASS
95	95	100	100	100.0	27995	PASS
96	95	5	9	7.3	2042	PASS
173	174	0.00	2	1.0	248	PASS
174	95	50	120	90.9	25456	PASS
175	174	4	9	7.3	1866	PASS
176	174	93	101	97.4	24787	PASS
177	176	5	9	6.8	1689	PASS

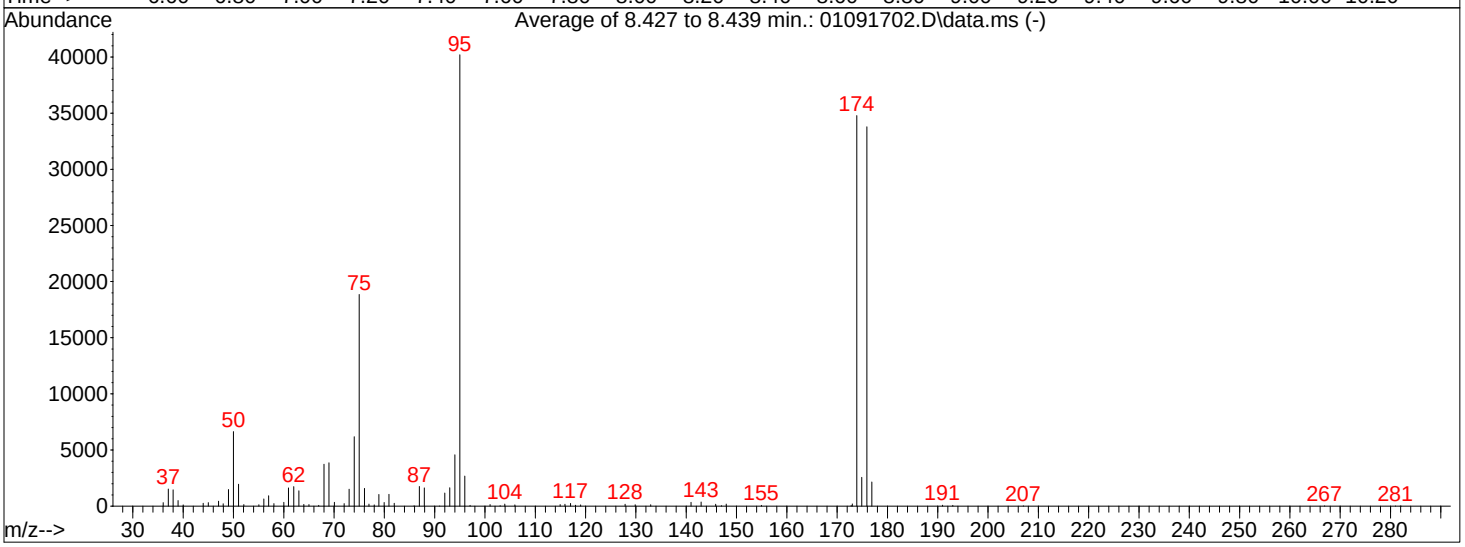
Data Path : I:\MS19\DATA\2017 01\09\
Data File : 01091702.D
Acq On : 9 Jan 2017 8:34
Operator : CL
Sample : BFB S19010917
Misc : S29-12201602
ALS Vial : 2 Sample Multiplier: 1

Integration File: rteint.p

Method : I:\MS19\METHODS\S19122716.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Wed Dec 28 07:38:07 2016

CL 1/9/17





AutoFind: Scans 707, 708, 709; Background Corrected with Scan 701

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	16.5	6645	PASS
75	95	30	66	46.9	18856	PASS
95	95	100	100	100.0	40197	PASS
96	95	5	9	6.7	2678	PASS
173	174	0.00	2	0.6	195	PASS
174	95	50	120	86.5	34787	PASS
175	174	4	9	7.4	2564	PASS
176	174	93	101	97.1	33789	PASS
177	176	5	9	6.4	2156	PASS

Injection Log

Directory: I:\MS19\DATA\2016_12\27\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	12/27/16 8:53	12271603.D	BFB S19122716	S29-12201602	CL	2	Pass
2	12/27/16 9:12	12271604.D	20pg TO15SIM ICAL STD	S29-12201602/S29-12211607 (1/19)	CL	9	
3	12/27/16 9:43	12271605.D	50pg TO15SIM ICAL STD	S29-12201602/S29-12211607 (1/19)	CL	9	
4	12/27/16 10:14	12271606.D	100pg TO15SIM ICAL STD	S29-12201602/S29-12211607 (1/19)	CL	9	
5	12/27/16 10:45	12271607.D	500pg TO15SIM ICAL STD	S29-12201602/S29-12211606 (1/19)	CL	10	
6	12/27/16 11:16	12271608.D	1000pg TO15SIM ICAL STD	S29-12201602/S29-12211604 (1/19)	CL	11	
7	12/27/16 11:47	12271609.D	2000pg TO15SIM ICAL STD	S29-12201602/S29-12211604 (1/19)	CL	11	
8	12/27/16 12:19	12271610.D	5000pg TO15SIM ICAL STD	S29-12201602/S29-12211604 (1/19)	CL	11	
9	12/27/16 12:50	12271611.D	10000pg TO15SIM ICAL STD	S29-12201602/S29-12211604 (1/19)	CL	11	
10	12/27/16 13:21	12271612.D	50000pg TO15SIM ICAL STD	S29-12201602/S29-12211603 (1/19)	CL	12	IS3 Failed
11	12/27/16 13:52	12271613.D	blank	S29-12201602	CL	2	
12	12/27/16 14:23	12271614.D	500pg TO15SIM ICV	S29-12201602/S29-12211612 (1/19)	CL	13	
13	12/27/16 14:55	12271615.D	500pg TO15SIM ICV	S29-12201602/S29-12211613 (1/19)	CL	14	
14	12/27/16 15:40	12271616.D	blank	S29-12201602	CL	2	
15	12/27/16 16:11	12271617.D	20000pg TO15SIM ICAL STD	S29-12201602/S29-12211603 (1/19)	CL	12	IS3 Failed
16	12/27/16 16:43	12271618.D	blank	S29-12201602	CL	2	
17	12/27/16 17:14	12271619.D	500pg TO15SIM ICV	S29-12201602/S29-12211613 (1/19)	CL	14	
18	12/28/16 7:36	12271620.D	50000pg TO15SIM ICAL STD	S29-12201602/S29-12211603 (1/19)	CL	12	
19	12/28/16 8:07	12271621.D	500pg TO15SIM ICV	S29-12201602/S29-12211613 (1/19)	CL	14	Pass

CL 12/28/16

Injection Log

Directory: I:\MS19\DATA\2017_01\09\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	1/9/17 8:03	01091701.D	system	S29-12201602	CL	2	
2	1/9/17 8:34	01091702.D	BFB S19010917	S29-12201602	CL	2	Pass
3	1/9/17 8:52	01091703.D	CCV S19010917_500pg	S29-12201602/S29-12191608 (1/17)	CL	16	Pass
4	1/9/17 10:58	01091704.D	xxMB S19010917_1000mLxx	S29-12201602/AC01205	CL	2	Autocan error
5	1/9/17 11:35	01091705.D	blank	S29-12201602/AC01205	CL	2	
6	1/9/17 12:06	01091706.D	MB S19010917_1000mL	S29-12201602/AC01205	CL	2	Pass
7	1/9/17 12:37	01091707.D	LCS S19010917_500pg	S29-12201602/S29-12211613 (1/19)	CL	2	Pass
8	1/9/17 13:09	01091708.D	LCSD S19010917_500pg	S29-12201602/S29-12211613 (1/19)	CL	2	Pass
9	1/9/17 14:34	01091709.D	P1606022-001 (1000mL)	S29-12201602	CL	1	
10	1/9/17 15:05	01091710.D	P1606022-001dup (1000mL)	S29-12201602	CL	1	Pass
11	1/9/17 15:36	01091711.D	P1606022-001dil (100mL)	S29-12201602	CL	1	
12	1/9/17 16:08	01091712.D	P1606022-001dupdil (100mL)	S29-12201602	CL	1	
13	1/9/17 16:39	01091713.D	AC02204_FCR00151	75130	CL	2	
14	1/9/17 17:10	01091714.D	SC01710_FCR00281	75130	CL	3	
15	1/9/17 17:41	01091715.D	SC01834_FCR00200	FAIL	CL	4	
16	1/9/17 18:12	01091716.D	SC01846_FCR00016	75130	CL	5	
17	1/9/17 18:44	01091717.D	SSC00109_FCR00063	FAIL	CL	6	
18	1/9/17 19:15	01091718.D	system	S29-12201602	CL	2	
19	1/9/17 19:46	01091719.D	SSC00081_FCR00279	75130	CL	7	

CL 1/10/17

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LABORATORY REPORT

January 30, 2017

Andrew Vann
Trihydro Corporation
2707 Broadwater Ave
Helena, MT 59601

RE: MDEQ Whitefish Solvent Site / 776-033-001

Dear Andrew:

Enclosed are the results of the sample submitted to our laboratory on January 18, 2017. For your reference, these analyses have been assigned our service request number P1700214.

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 Kelly Horiuchi at 3:40 pm, Jan 30, 2017

Kelly Horiuchi
Laboratory Director

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www.alsglobal.com

Client: Trihydro Corporation
Project: MDEQ Whitefish Solvent Site / 776-033-001

Service Request No: P1700214

CASE NARRATIVE

The sample was received intact under chain of custody on January 18, 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 sample at the time of sample receipt.

Methane Analysis

The sample was analyzed for methane according to modified EPA Method 3C (single injection) using a gas chromatograph equipped with a thermal conductivity detector (TCD). This procedure is described in laboratory SOP VOA-EPA3C. This method is included on the laboratory's DoD-ELAP scope of accreditation, however it is not part of the NELAP accreditation.

Air-Phase Petroleum Hydrocarbons (APH) Analysis

The sample was also analyzed for total aliphatic and aromatic gasoline range hydrocarbons by gas chromatography/mass spectrometry according to the Method for the Determination of Air-Phase Petroleum Hydrocarbons (APH), Massachusetts Department of Environmental Protection, Revision 1, December, 2009. This method is included on the laboratory's NELAP scope of accreditation, however it is not part of the DoD-ELAP accreditation.

Significant non-petroleum related peaks (i.e. halogenated, oxygenated, terpenes, etc.) are subtracted from the hydrocarbon range areas when present. Any internal/tuning standards and target APH analytes eluting in the hydrocarbon ranges are also subtracted. Additionally, C_9-C_{10} Aromatic Hydrocarbons are excluded from the C_9-C_{12} Aliphatic Hydrocarbon range.

Volatile Organic Compound Analysis

The sample was also analyzed in scan and SIM mode 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. The method was modified to include the use of helium as a diluent gas in place of zero-grade air for container pressurization. When necessary, analytical sample volumes were adjusted by a correction factor for containers pressurized with helium. A summary sheet has been included listing the affected samples. 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.

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Client: Trihydro Corporation
Project: MDEQ Whitefish Solvent Site / 776-033-001

Service Request No: P1700214

The containers were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

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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	4068-003
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	T104704413-16-7
Utah DOH (NELAP)	http://health.utah.gov/lab/environmental-lab-certification/	CA016272016-6
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

Service Request: P1700214

Project ID: MDEQ Whitefish Solvent Site / 776-033-001

Date Received: 1/18/2017

Time Received: 09:30

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	3C Modified - Fxd Gases Can	MA APH 1.0 - MA VOC PH Can	TO-15 - VOC Cans	TO-15 - VOC SIM
MTN-POST	P1700214-001	Air	1/12/2017	08:40	AS00206	-2.57	4.29	X	X	X	X

ALS ENVIRONMENTAL
Sample Volume Correction for Helium Pressurization for SCAN Analysis

Sample ID	Pi	Pf	Sample Volume (L)	Adjusted Volume (L)
P1700214-001	-2.57	4.29	0.880	1.00

LH 1/26/17

ALS ENVIRONMENTAL
Sample Volume Correction for Helium Pressurization for SIM Analysis

Sample ID	Pi	Pf	Sample Volume (L)	Adjusted Volume (L)
P1700214-001	-2.57	4.29	0.440	0.500
P1700214-001DIL	-2.57	4.29	0.044	0.0500

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: P700214

Company Name & Address (Reporting Information): Trihydro Corporation. 1252 Commerce Drive Laramie WY 82070

Project Name: MDEQ Whitefish Solvent Site

Project Number: 776-033-001

Project Manager: Andrew Vann

P.O. # / Billing Information: SAME

Phone: 307-745-7474

Fax:

Email Address for Result Reporting: AVann@Trihydro.com

Sampler (Print & Sign): Joel Riebli

ALS Contact: Kelly Horiuchi

Analysis Method: Methane, BTEX, MTBE; Naph; MA APH HCs; Sim 1,2DCE, TCE, cis trans

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	Analysis Method		Comments e.g. Actual Preservative or specific instructions
MTN-POST	1	1/12/17	0840	AS00206	OA00074	-27.1	-3.8	6L			
—		—	—	AS00918							No vacuum on arrival

8 of 243

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 ____

EDD required (YES) No
Type: Trihydro Units: ____

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Joel Riebli	01/12/17	1500			
				01/18/17	0930

Cooler / Blank Temperature ____ °C

ALS Environmental
Sample Acceptance Check Form

Client: Trihydro Corporation Work order: P1700214
Project: MDEQ Whitefish Solvent Site / 776-033-001
Sample(s) received on: 1/18/17 Date opened: 1/18/17 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
P1700214-001.01	6.0 L Silonite Can					
P1700214-002.01	6.0 L Silonite Can					

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Project ID: **MDEQ Whitefish Solvent Site / 776-033-001** ALS Project ID: P1700214

Methane

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD Date(s) Collected: 1/12/17
Analyst: Mike Conejo Date Received: 1/18/17
Sample Type: 6.0 L Silonite Canister(s) Date Analyzed: 1/23/17
Test Notes:

Client Sample ID	ALS Sample ID	Canister Dilution Factor	Injection Volume ml(s)	**Result %, v/v**	MRL %, v/v	Data Qualifier
MTN-POST	P1700214-001	1.57	0.10	ND	0.16	
Method Blank	P170123-MB	1.00	0.10	ND	0.10	

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

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Trihydro Corporation**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1700214
Client Project ID: **MDEQ Whitefish Solvent Site / 776-033-001** ALS Sample ID: P170123-LCS

Test Code: EPA Method 3C Modified Date Collected: NA
Instrument ID: HP5890 II/GC1/TCD Date Received: NA
Analyst: Mike Conejo Date Analyzed: 1/23/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	**Compound**	Spike Amount ppmV	**Result ppmV**	**% Recovery**	ALS Acceptance Limits	Data Qualifier
74-82-8	Methane	50,000	**49,500**	**99**	94-111	

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client:	**Trihydro Corporation**		
Client Sample ID:	**MTN-POST**	ALS Project ID:	P1700214
Client Project ID:	**MDEQ Whitefish Solvent Site / 776-033-001**	ALS Sample ID:	P1700214-001
Test Code:	Massachusetts APH, Revision 1, December 2009	Date Collected:	1/12/17
Instrument ID:	Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16	Date Received:	1/18/17
Analyst:	Lusine Hakobyan	Date Analyzed:	1/25/17
Sample Type:	6.0 L Silonite Canister	Volume(s) Analyzed:	1.00 Liter(s)
Test Notes:			
Container ID:	AS00206		

Initial Pressure (psig): -2.57 Final Pressure (psig): 4.29

Canister Dilution Factor: 1.57

Compound	**Result µg/m³**	MRL µg/m³	**Data Qualifier**
C_5 - C_8 Aliphatic Hydrocarbons[1,2]	ND	31	
C_9 - C_{12} Aliphatic Hydrocarbons[1,3]	ND	16	
C_9 - C_{10} Aromatic Hydrocarbons	ND	3.9	

Significant non-petroleum related peaks (i.e. halogenated, oxygenated, terpenes, etc.) are subtracted from the hydrocarbon range areas when present.

[1]Hydrocarbon Range data from total ion chromatogram excluding any internal/tuning standards eluting in that range.

[2]C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target APH analytes eluting in that range.

[3]C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target APH Analytes eluting in that range and concentration of C_9-C_{10} Aromatic Hydrocarbons.

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client:	**Trihydro Corporation**		
Client Sample ID:	**Method Blank**	ALS Project ID:	P1700214
Client Project ID:	**MDEQ Whitefish Solvent Site / 776-033-001**	ALS Sample ID:	P170125-MB
Test Code:	Massachusetts APH, Revision 1, December 2009	Date Collected:	NA
Instrument ID:	Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16	Date Received:	NA
Analyst:	Lusine Hakobyan	Date Analyzed:	1/25/17
Sample Type:	6.0 L Silonite Canister	Volume(s) Analyzed:	1.00 Liter(s)
Test Notes:			

Compound	**Result µg/m³**	MRL µg/m³	**Data Qualifier**
C_5 - C_8 Aliphatic Hydrocarbons[1,2]	ND	20	
C_9 - C_{12} Aliphatic Hydrocarbons[1,3]	ND	10	
C_9 - C_{10} Aromatic Hydrocarbons	ND	2.5	

Significant non-petroleum related peaks (i.e. halogenated, oxygenated, terpenes, etc.) are subtracted from the hydrocarbon range areas when present.

[1]Hydrocarbon Range data from total ion chromatogram excluding any internal/tuning standards eluting in that range.

[2]C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target APH analytes eluting in that range.

[3]C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target APH Analytes eluting in that range and concentration of C_9-C_{10} Aromatic Hydrocarbons.

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Trihydro Corporation**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1700214
Client Project ID: **MDEQ Whitefish Solvent Site / 776-033-001** ALS Sample ID: P170125-LCS

Test Code: Massachusetts APH, Revision 1, December 2009 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Lusine Hakobyan Date Analyzed: 1/25/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

Compound	Spike Amount µg/m³	**Result µg/m³**	**% Recovery**	ALS Acceptance Limits	**Data Qualifier**
C5 - C8 Aliphatic Hydrocarbons	213	**208**	**98**	70-130	
C9 - C12 Aliphatic Hydrocarbons	213	**230**	**108**	70-130	
C9 - C10 Aromatic Hydrocarbons	425	**416**	**98**	70-130	

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **MTN-POST** ALS Project ID: P1700214
Client Project ID: **MDEQ Whitefish Solvent Site / 776-033-001** ALS Sample ID: P1700214-001

Test Code: EPA TO-15 Modified Date Collected: 1/12/17
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 1/18/17
Analyst: Lusine Hakobyan Date Analyzed: 1/25/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS00206

Initial Pressure (psig): -2.57 Final Pressure (psig): 4.29

Canister Dilution Factor: 1.57

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.16	ND	0.044	
71-43-2	Benzene	ND	0.16	ND	0.049	
108-88-3	Toluene	ND	0.79	ND	0.21	
100-41-4	Ethylbenzene	ND	0.79	ND	0.18	
179601-23-1	m,p-Xylenes	ND	0.79	ND	0.18	
95-47-6	o-Xylene	ND	0.79	ND	0.18	
91-20-3	Naphthalene	ND	0.79	ND	0.15	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **Method Blank** ALS Project ID: P1700214
Client Project ID: **MDEQ Whitefish Solvent Site / 776-033-001** ALS Sample ID: P170125-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Lusine Hakobyan Date Analyzed: 1/25/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.10	ND	0.028	
71-43-2	Benzene	ND	0.10	ND	0.031	
108-88-3	Toluene	ND	0.50	ND	0.13	
100-41-4	Ethylbenzene	ND	0.50	ND	0.12	
179601-23-1	m,p-Xylenes	ND	0.50	ND	0.12	
95-47-6	o-Xylene	ND	0.50	ND	0.12	
91-20-3	Naphthalene	ND	0.50	ND	0.095	

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

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Client: **Trihydro Corporation**
Client Project ID: **MDEQ Whitefish Solvent Site / 776-033-001** ALS Project ID: P1700214

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date(s) Collected: 1/12/17
Analyst: Lusine Hakobyan Date(s) Received: 1/18/17
Sample Type: 6.0 L Silonite Canister(s) Date(s) Analyzed: 1/25/17
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	P170125-MB	**101**	**103**	**94**	70-130	
Lab Control Sample	P170125-LCS	**98**	**100**	**97**	70-130	
MTN-POST	P1700214-001	**100**	**101**	**97**	70-130	

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

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Trihydro Corporation**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1700214
Client Project ID: **MDEQ Whitefish Solvent Site / 776-033-001** ALS Sample ID: P170125-LCS

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Lusine Hakobyan Date Analyzed: 1/25/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	213	**198**	**93**	69-113	
71-43-2	Benzene	212	**201**	**95**	65-107	
108-88-3	Toluene	212	**201**	**95**	59-118	
100-41-4	Ethylbenzene	212	**214**	**101**	68-122	
179601-23-1	m,p-Xylenes	424	**441**	**104**	68-123	
95-47-6	o-Xylene	212	**218**	**103**	68-122	
91-20-3	Naphthalene	214	**263**	**123**	62-136	

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

RESULTS OF ANALYSIS

Client: **Trihydro Corporation** ALS Project ID: P1700214

Client Project ID: **MDEQ Whitefish Solvent Site / 776-033-001**

Internal Standard Area and RT Summary

Test Code: EPA TO-15 Modified

Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Lab File ID: 01251702.D

Analyst: Lusine Hakobyan Date Analyzed: 1/25/17

Sample Type: 6.0 L Silonite Canister(s) Time Analyzed: 06:04

Test Notes:

		IS1 (BCM)			IS2 (DFB)			IS3 (CBZ)		
		AREA	#	RT	#	AREA	#	RT	#	AREA	#	RT	#
	24 Hour Standard	281220		11.56		1381278		13.66		590137		17.93	
	Upper Limit	393708		11.89		1933789		13.99		826192		18.26	
	Lower Limit	168732		11.23		828767		13.33		354082		17.60	
	Client Sample ID												
01	Method Blank	253636		11.54		1268607		13.65		537764		17.93	
02	Lab Control Sample	273522		11.56		1342826		13.66		581086		17.93	
03	MTN-POST	278976		11.54		1383321		13.65		597886		17.93	
04													
05													
06													
07													
08													
09													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													

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

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **MTN-POST** ALS Project ID: P1700214
Client Project ID: **MDEQ Whitefish Solvent Site / 776-033-001** ALS Sample ID: P1700214-001

Test Code: EPA TO-15 SIM Modified Date Collected: 1/12/17
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS19 Date Received: 1/18/17
Analyst: Cory Lewis Date Analyzed: 1/26/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.50 Liter(s)
Test Notes: 0.050 Liter(s)
Container ID: AS00206

Initial Pressure (psig): -2.57 Final Pressure (psig): 4.29

Canister Dilution Factor: 1.57

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.079	ND	0.031	
156-60-5	trans-1,2-Dichloroethene	ND	0.079	ND	0.020	
156-59-2	cis-1,2-Dichloroethene	**0.31**	0.079	**0.077**	0.020	
79-01-6	Trichloroethene	**0.53**	0.079	**0.099**	0.015	
127-18-4	Tetrachloroethene	**320**	0.79	**48**	0.12	**D**

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **Method Blank** ALS Project ID: P1700214
Client Project ID: **MDEQ Whitefish Solvent Site / 776-033-001** ALS Sample ID: P170125-MB

Test Code: EPA TO-15 SIM Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS19 Date Received: NA
Analyst: Cory Lewis Date Analyzed: 1/25/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.025	ND	0.0098	
156-60-5	trans-1,2-Dichloroethene	ND	0.025	ND	0.0063	
156-59-2	cis-1,2-Dichloroethene	ND	0.025	ND	0.0063	
79-01-6	Trichloroethene	ND	0.025	ND	0.0047	
127-18-4	Tetrachloroethene	ND	0.025	ND	0.0037	

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

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Client: **Trihydro Corporation**
Client Project ID: **MDEQ Whitefish Solvent Site / 776-033-001** ALS Project ID: P1700214

Test Code: EPA TO-15 SIM Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS19 Date(s) Collected: 1/12/17
Analyst: Cory Lewis Date(s) Received: 1/18/17
Sample Type: 6.0 L Summa Canister(s) Date(s) Analyzed: 1/25 - 1/26/17
Test Notes:

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4 % Recovered	Toluene-d8 % Recovered	Bromofluorobenzene % Recovered	Acceptance Limits	Data Qualifier
Method Blank	P170125-MB	**91**	**101**	**106**	70-130	
Lab Control Sample	P170125-LCS	**90**	**96**	**117**	70-130	
MTN-POST	P1700214-001	**90**	**101**	**103**	70-130	

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

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Trihydro Corporation**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1700214
Client Project ID: **MDEQ Whitefish Solvent Site / 776-033-001** ALS Sample ID: P170125-LCS

Test Code: EPA TO-15 SIM Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS19 Date Received: NA
Analyst: Cory Lewis Date Analyzed: 1/25/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
75-01-4	Vinyl Chloride	4.20	**3.42**	**81**	58-117	
156-60-5	trans-1,2-Dichloroethene	4.27	**3.58**	**84**	72-107	
156-59-2	cis-1,2-Dichloroethene	4.24	**3.59**	**85**	73-108	
79-01-6	Trichloroethene	4.25	**3.56**	**84**	66-101	
127-18-4	Tetrachloroethene	4.25	**3.42**	**80**	66-105	

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

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Project ID: **MDEQ Whitefish Solvent Site / 776-033-001** ALS Project ID: P1700214

Internal Standard Area and RT Summary

Test Code: EPA TO-15 SIM Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/7890A/MS19 Lab File ID: 01251702.D
Analyst: Cory Lewis Date Analyzed: 1/25/17
Sample Type: 6.0 L Summa Canister(s) Time Analyzed: 15:36
Test Notes:

		IS1 (BCM)			IS2 (DFB)			IS3 (CBZ)		
		AREA	#	RT	AREA	#	RT	AREA	#	RT
	24 Hour Standard	44323		9.76	218293		11.71	31623		16.05
	Upper Limit	62052		10.09	305610		12.04	44272		16.38
	Lower Limit	26594		9.43	130976		11.38	18974		15.72
	Client Sample ID									
01	Method Blank	42360		9.79	187253		11.72	28915		16.06
02	Lab Control Sample	43243		9.76	212725		11.71	30868		16.05
03	MTN-POST	40918		9.77	179140		11.71	28477		16.05
04	MTN-POST (Dilution)	37650		9.79	159314		11.72	24820		16.06
05										
06										
07										
08										
09										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										

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

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

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

Quantitation Report (QT Reviewed)

Data Path : I:\GC01\DATA\FXG\2017_01\23\
Data File : 01231706.D
Signal(s) : TCD1A.CH
Acq On : 23 Jan 2017 9:17 am
Operator : MC
Sample : 0214-001
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 23 10:26:21 2017
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 22:12:55 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.000	0	N.D.	ppm
2)	Oxygen	2.176	201600	133221.555	ppm
3)	Nitrogen	2.324	820590	468046.623	ppm
4)	Carbon Monoxide	0.000	0	N.D.	ppm
5)	Methane	0.000	0	N.D.	ppm
6)	Carbon Dioxide	6.731	761	374.896	ppm

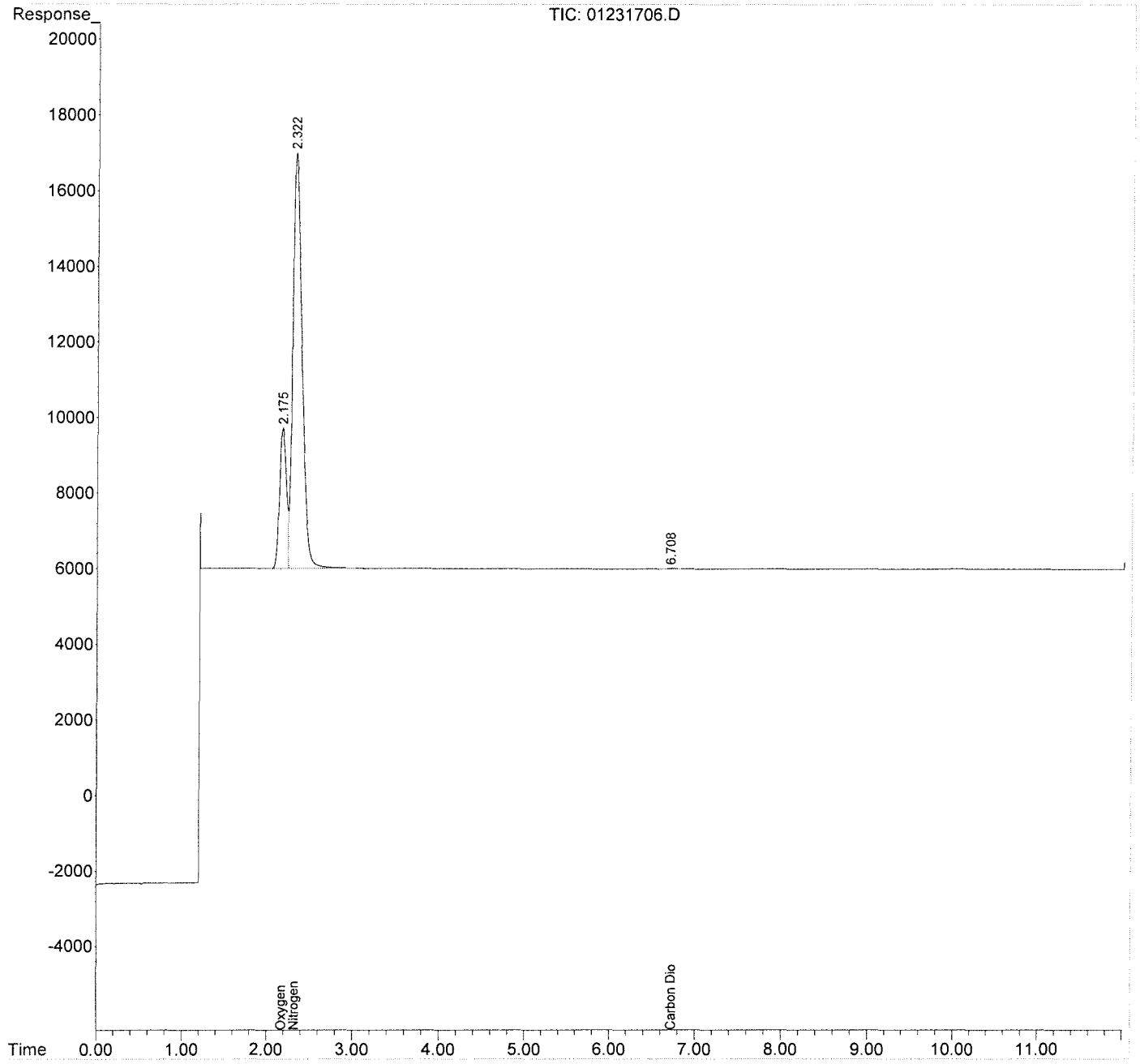
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : I:\GC01\DATA\FXG\2017_01\23\
Data File : 01231706.D
Signal(s) : TCD1A.CH
Acq On : 23 Jan 2017 9:17 am
Operator : MC
Sample : 0214-001
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 23 10:26:21 2017
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 22:12:55 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : I:\GC01\DATA\FXG\2017_01\23\
Data File : 01231702.D
Signal(s) : TCD1A.CH
Acq On : 23 Jan 2017 8:07 am
Operator : MC
Sample : mb
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 23 08:26:00 2017
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 22:12:55 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.000	0	N.D.	ppm
2)	Oxygen	0.000	0	N.D.	ppm
3)	Nitrogen	0.000	0	N.D.	ppm
4)	Carbon Monoxide	0.000	0	N.D.	ppm
5)	Methane	0.000	0	N.D.	ppm
6)	Carbon Dioxide	0.000	0	N.D.	ppm

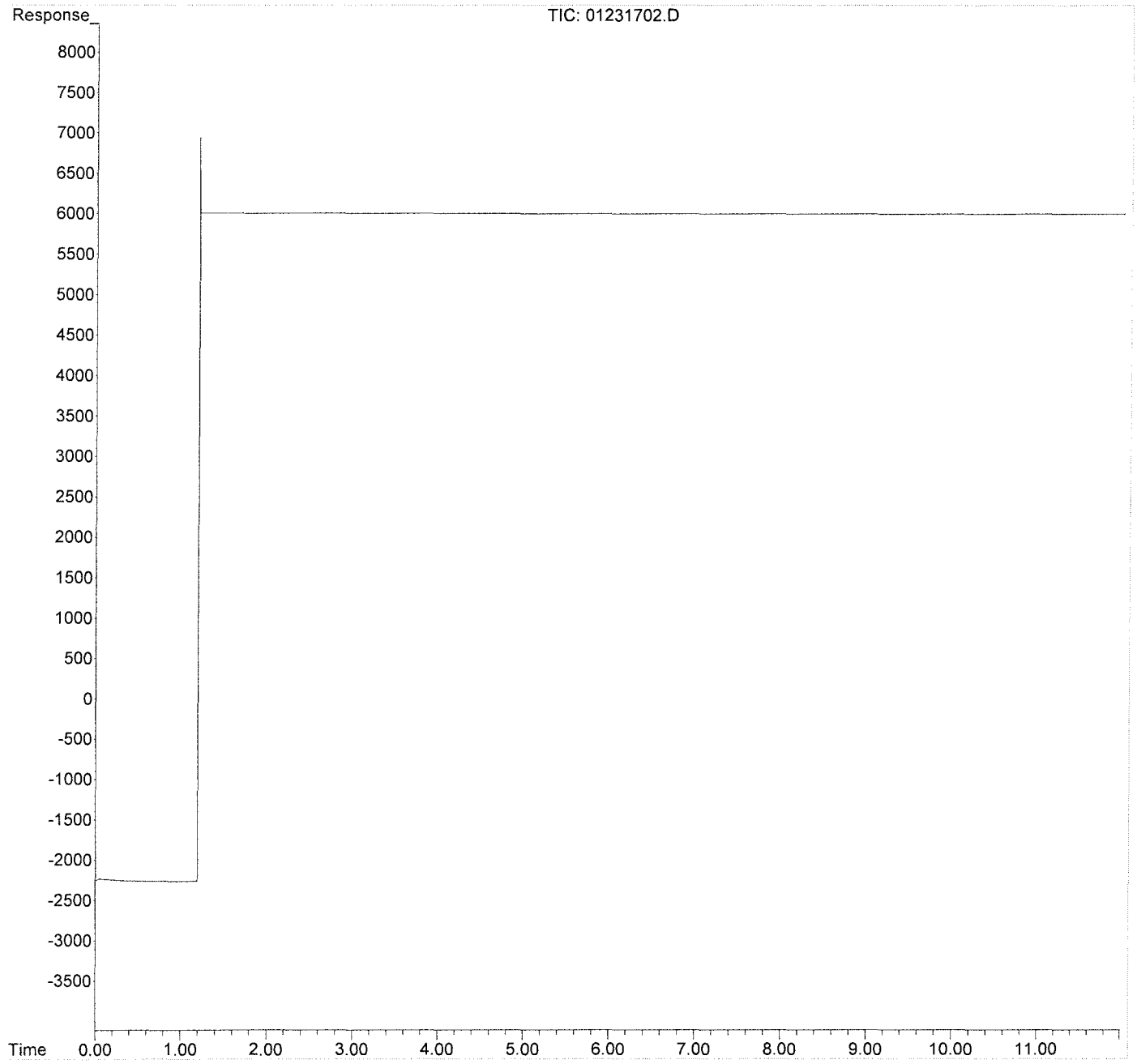
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : I:\GC01\DATA\FXG\2017_01\23\
Data File : 01231702.D
Signal(s) : TCD1A.CH
Acq On : 23 Jan 2017 8:07 am
Operator : MC
Sample : mb
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 23 08:26:00 2017
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 22:12:55 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : I:\GC01\DATA\FXG\2017_01\23\
Data File : 01231704.D
Signal(s) : TCD1A.CH
Acq On : 23 Jan 2017 8:44 am
Operator : MC
Sample : lcs s30-12201601
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 23 09:18:50 2017
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 22:12:55 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.703	67821	51480.491	ppm
2)	Oxygen	2.205	78203	51678.420	ppm
3)	Nitrogen	2.381	88433	50440.098	ppm
4)	Carbon Monoxide	3.068	87467	51531.756	ppm
5)	Methane	5.058	62349	49528.167	ppm
6)	Carbon Dioxide	6.719	100400	49475.217	ppm

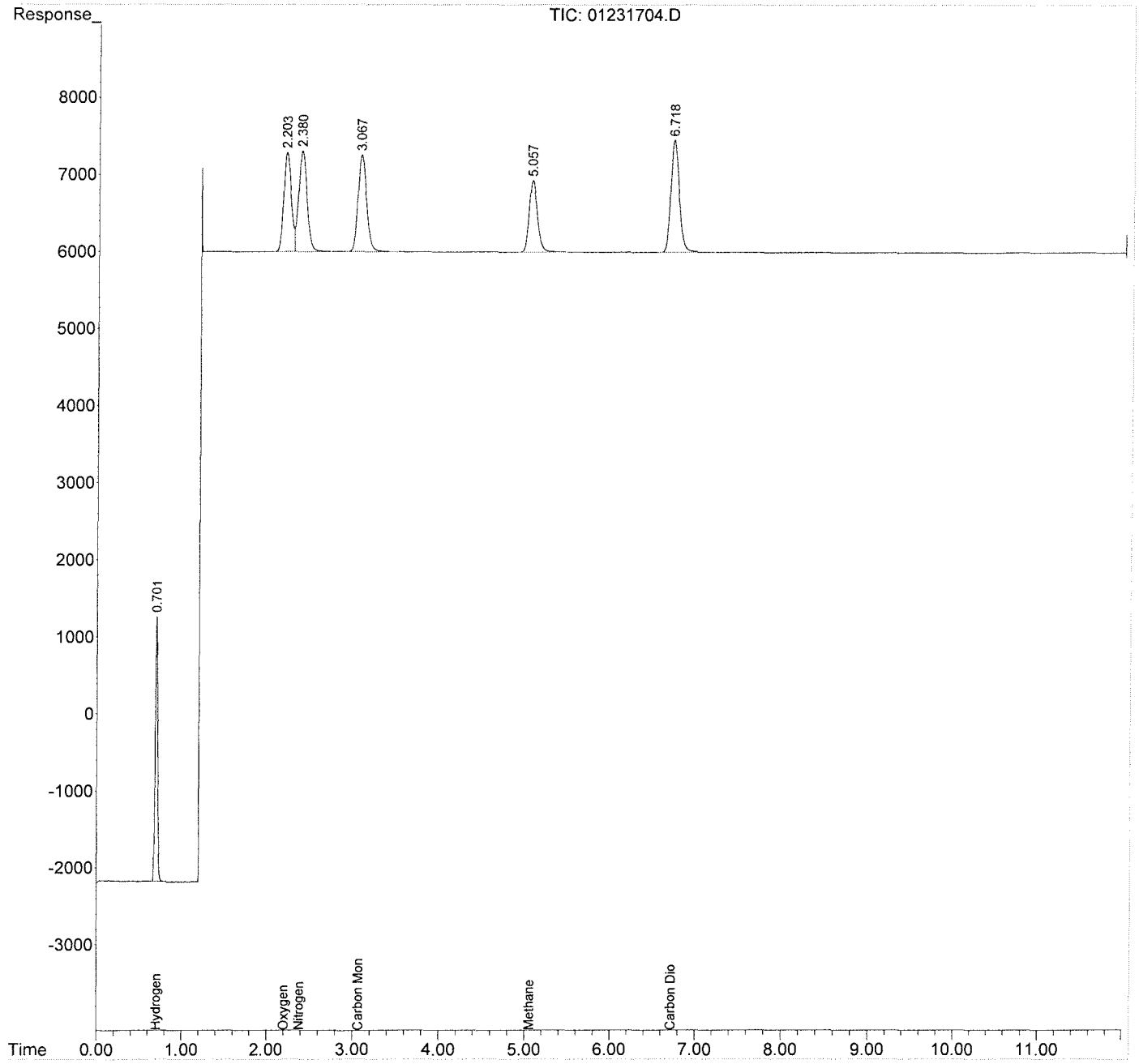
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : I:\GC01\DATA\FXG\2017_01\23\
Data File : 01231704.D
Signal(s) : TCD1A.CH
Acq On : 23 Jan 2017 8:44 am
Operator : MC
Sample : lcs s30-12201601
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 23 09:18:50 2017
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 22:12:55 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Response Factor Report GC01_FXG

Method Path : I:\GC01\METHODS\
Method File : 3C012416.M
Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
Last Update : Sun Jan 24 22:12:55 2016
Response Via : Initial Calibration

Calibration Files

0.1	=01241627.D	0.5	=01241628.D	1	=01241629.D
4	=01241631.D	16	=01241632.D	CO2	=01241633.D

	Compound	0.1	0.5	1	4	16	CO2	Avg	%RSD
1)	Hydrogen	1.295	1.311	1.271	1.247	1.260		1.317 E1	7.72
2)	Oxygen	1.471	1.599	1.556	1.522	1.454		1.513 E1	3.72
3)	Nitrogen	1.968	1.935	1.742	1.703	1.632		1.753 E1	9.60
4)	Carbon Monoxide	1.656	1.801	1.725	1.689	1.616		1.697 E1	4.15
5)	Methane	1.200	1.368	1.293	1.263	1.198		1.259 E1	5.14
6)	Carbon Dioxide	2.060	2.178	2.092	2.038	1.929	1.879	2.029 E1	5.38

(#) = Out of Range ### Number of calibration levels exceeded format ###

Calibration Status Report GC01_FXG

Method Path : I:\GC01\METHODS\
Method File : 3C012416.M
Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
Last Update : Sun Jan 24 22:12:55 2016
Response Via : Initial Calibration

#	ID	Conc	ISTD Conc	Path\File
1	0.1	100	0	J:\GC01\DATA\FXG\2016_01\24\01241627.D
2	0.5	500	0	J:\GC01\DATA\FXG\2016_01\24\01241628.D
3	1	1000	0	J:\GC01\DATA\FXG\2016_01\24\01241629.D
4	4	4000	0	J:\GC01\DATA\FXG\2016_01\24\01241631.D
5	16	16667	0	J:\GC01\DATA\FXG\2016_01\24\01241632.D
6	CO2	99800	0	J:\GC01\DATA\FXG\2016_01\24\01241633.D
7	CH4	99000	0	J:\GC01\DATA\FXG\2016_01\24\01241634.D
8	H2	42020	0	J:\GC01\DATA\FXG\2016_01\24\01241635.D
9	n2	100000	0	J:\GC01\DATA\FXG\2016_01\24\01241637.D
10	o2	100000	0	J:\GC01\DATA\FXG\2016_01\24\01241639.D

#	ID	Update Time	Quant Time	Acquisition Time
1	0.1	Jan 24 19:51 2016	Jan 24 19:50 2016	24 Jan 2016 16:38
2	0.5	Jan 24 19:52 2016	Jan 24 19:51 2016	24 Jan 2016 17:24
3	1	Jan 24 19:53 2016	Jan 24 19:52 2016	24 Jan 2016 17:40
4	4	Jan 24 21:18 2016	Jan 24 19:55 2016	24 Jan 2016 18:16
5	16	Jan 24 19:57 2016	Jan 24 19:57 2016	24 Jan 2016 18:33
6	CO2	Jan 24 20:00 2016	Jan 24 19:58 2016	24 Jan 2016 19:02
7	CH4	Jan 24 20:36 2016	Jan 24 20:36 2016	24 Jan 2016 20:04
8	H2	Jan 24 20:56 2016	Jan 24 20:56 2016	24 Jan 2016 20:39
9	n2	Jan 24 21:35 2016	Jan 24 21:35 2016	24 Jan 2016 21:19
10	o2	Jan 24 22:12 2016	Jan 24 22:12 2016	24 Jan 2016 21:56

3C012416.M Sun Feb 07 17:55:16 2016

Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241627.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 16:38
Operator : WH
Sample : std 0.1% S11-12041504
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 19:50:44 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 19:47:27 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Hydrogen	0.712	1295	1008.184	ppm	
2)	Oxygen	2.227	1471	938.454	ppm	m
3)	Nitrogen	2.403	1968	997.840	ppm	m
4)	Carbon Monoxide	3.111	1656	1000.000	ppm	
5)	Methane	5.087	1200	1000.000	ppm	
6)	Carbon Dioxide	6.744	2060	1000.000	ppm	

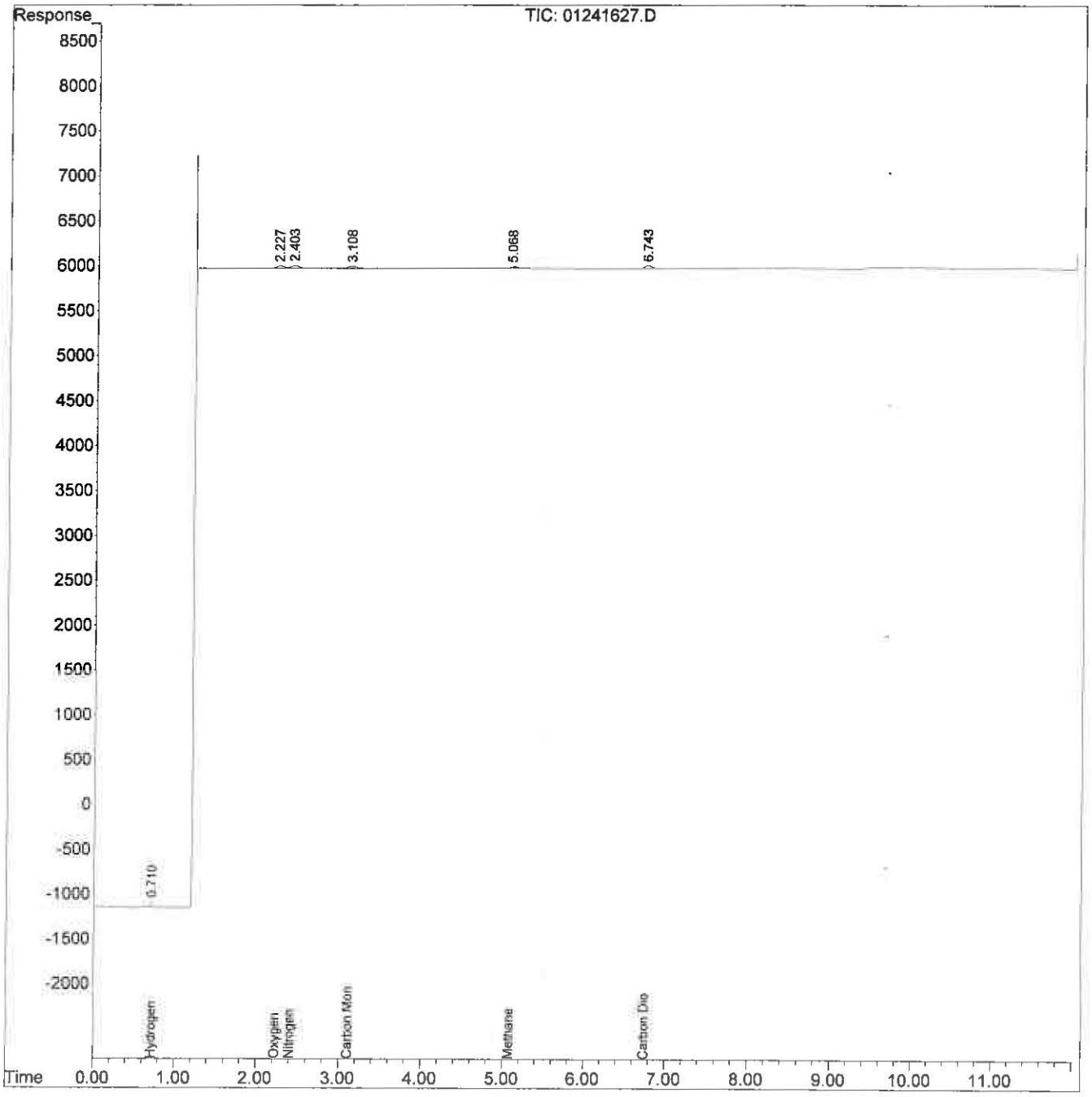
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241627.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 16:38
Operator : WH
Sample : std 0.1% S11-12041504
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autointl.e
Quant Time: Jan 24 19:50:44 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 19:47:27 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

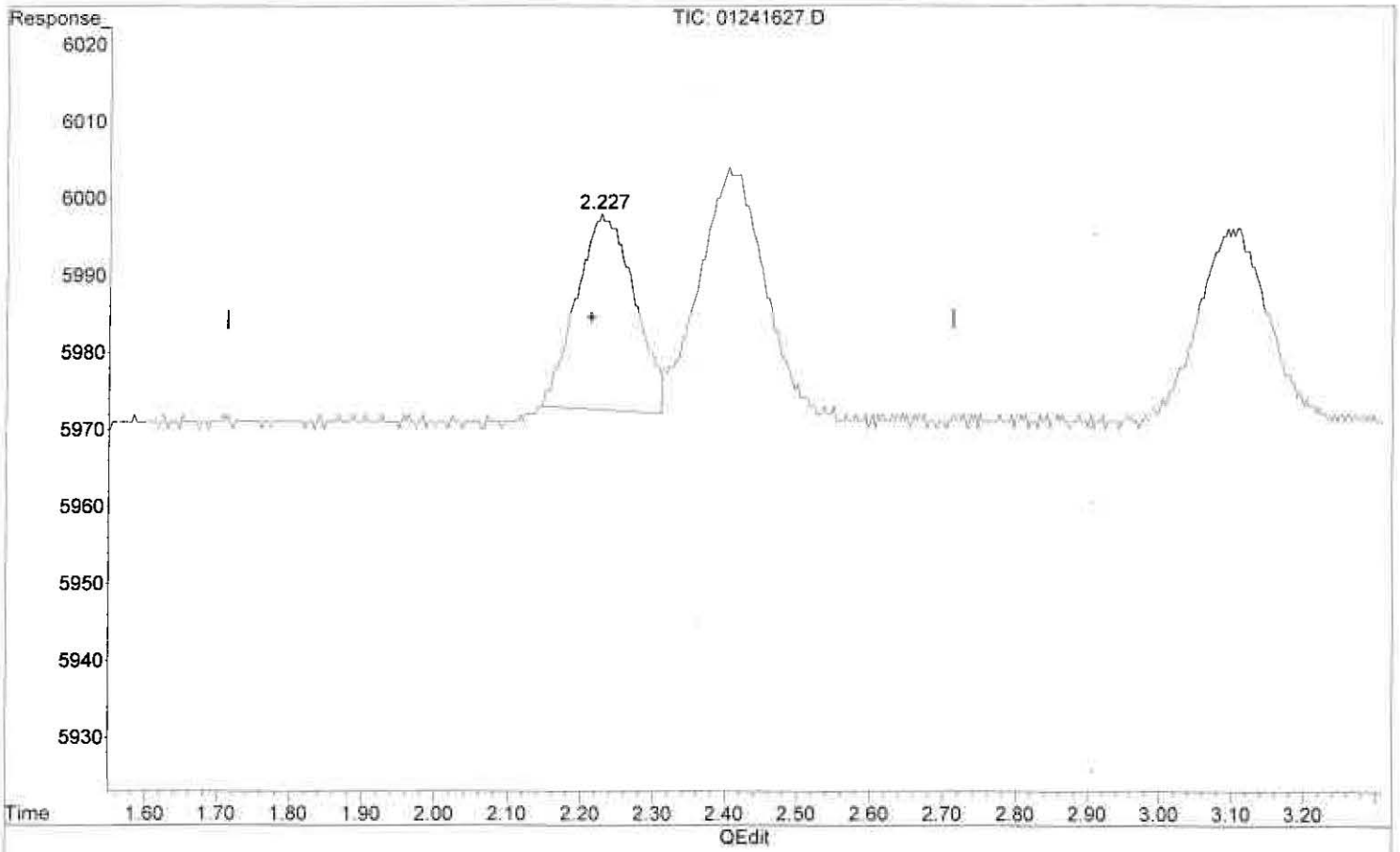


Quantitation Report (Qedit)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241627.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 16:38
Operator : WH
Sample : std 0.1% S11-12041504
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autointl.e
Quant Time: Jan 24 19:49:57 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 19:47:27 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



(2) Oxygen

2.229min 876.764 ppm

response 1374

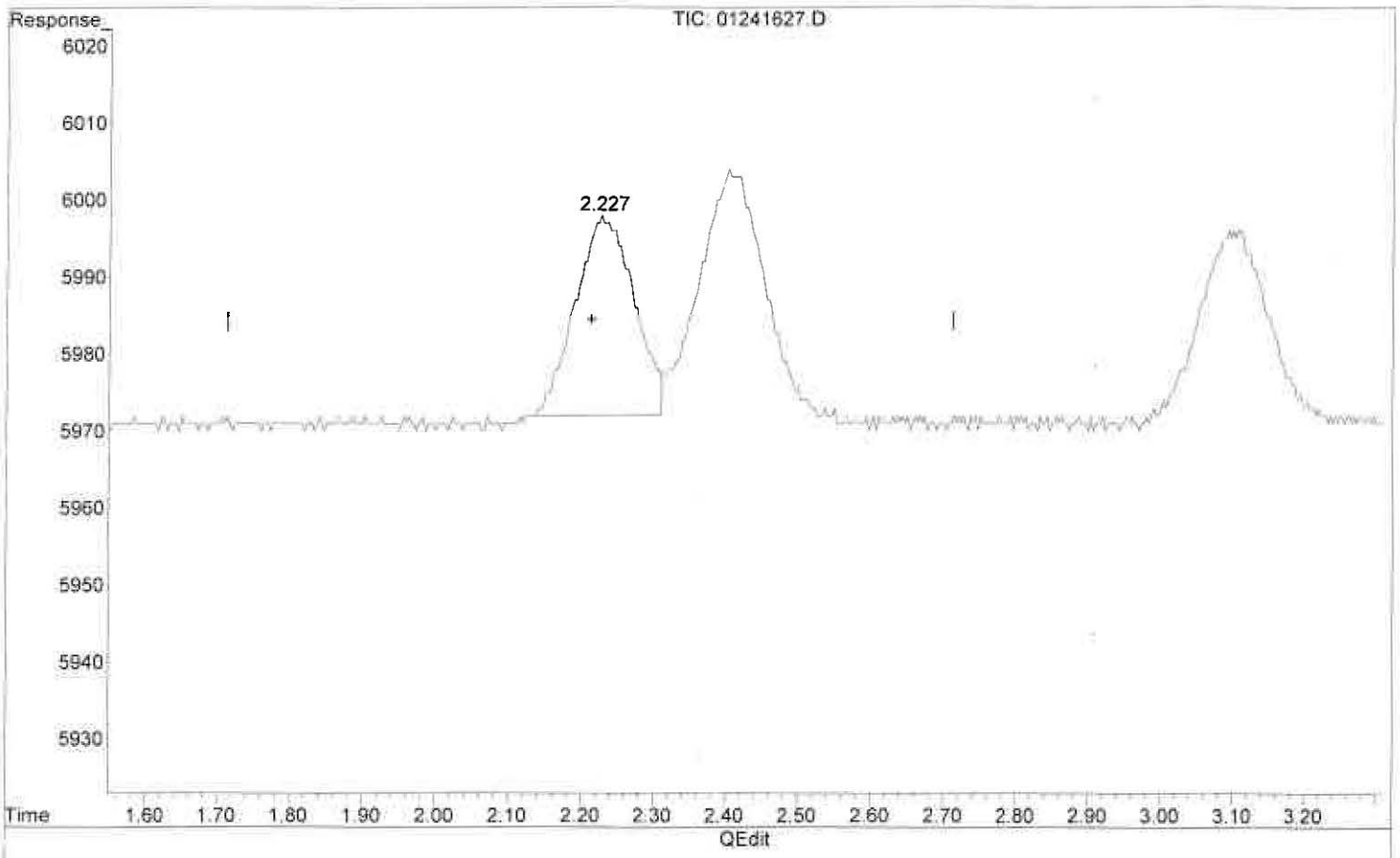
(+) = Expected Retention Time

Quantitation Report (Qedit)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241627.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 16:38
Operator : WH
Sample : std 0.1% S11-12041504
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 19:49:57 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 19:47:27 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



(2) Oxygen

2.227min 938.454 ppm m

response 1471

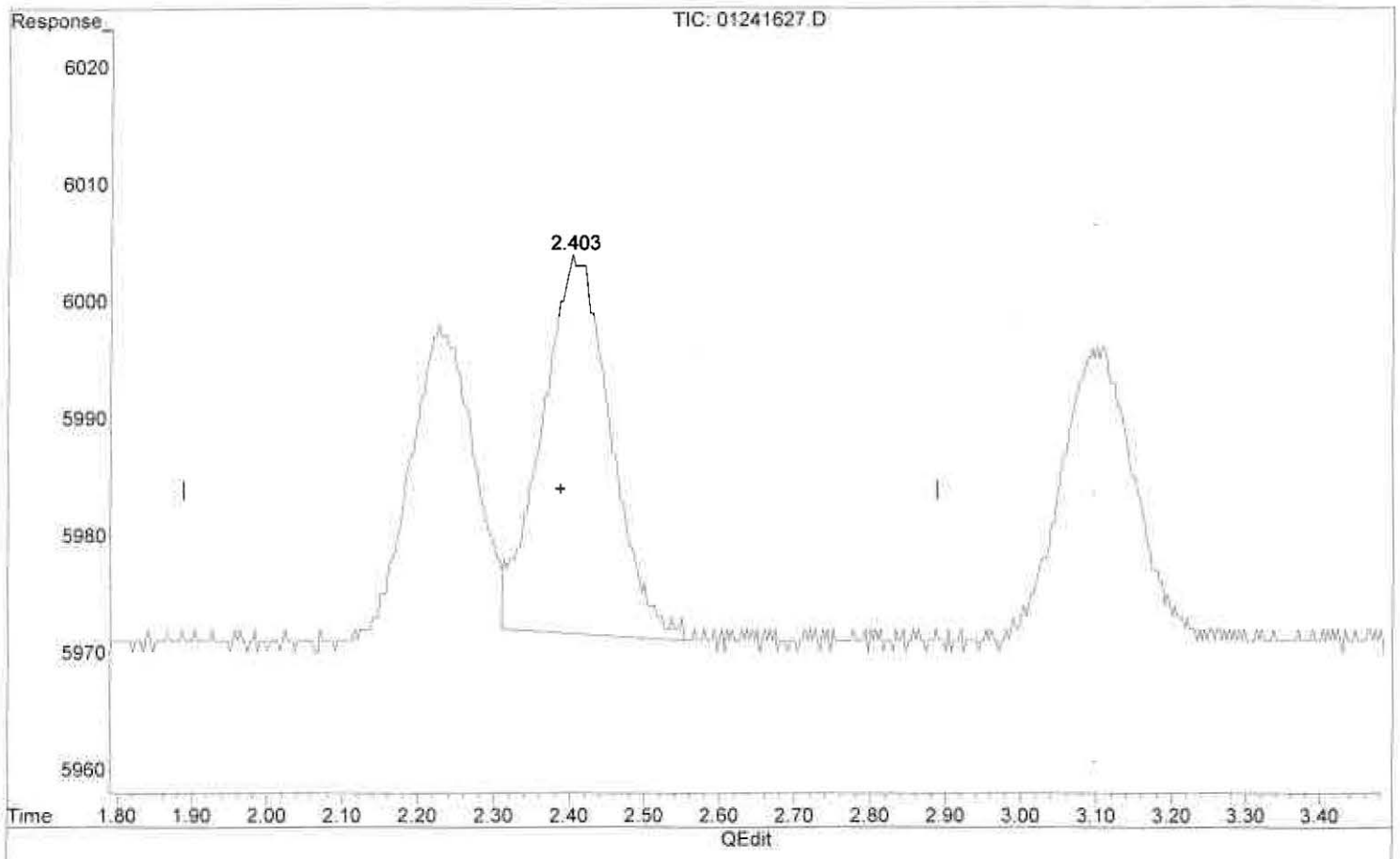
(+) = Expected Retention Time

Quantitation Report (Qedit)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241627.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 16:38
Operator : WH
Sample : std 0.1% S11-12041504
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autointl.e
Quant Time: Jan 24 19:49:57 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 19:47:27 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



(3) Nitrogen

2.417min 1033.747 ppm

response 2039

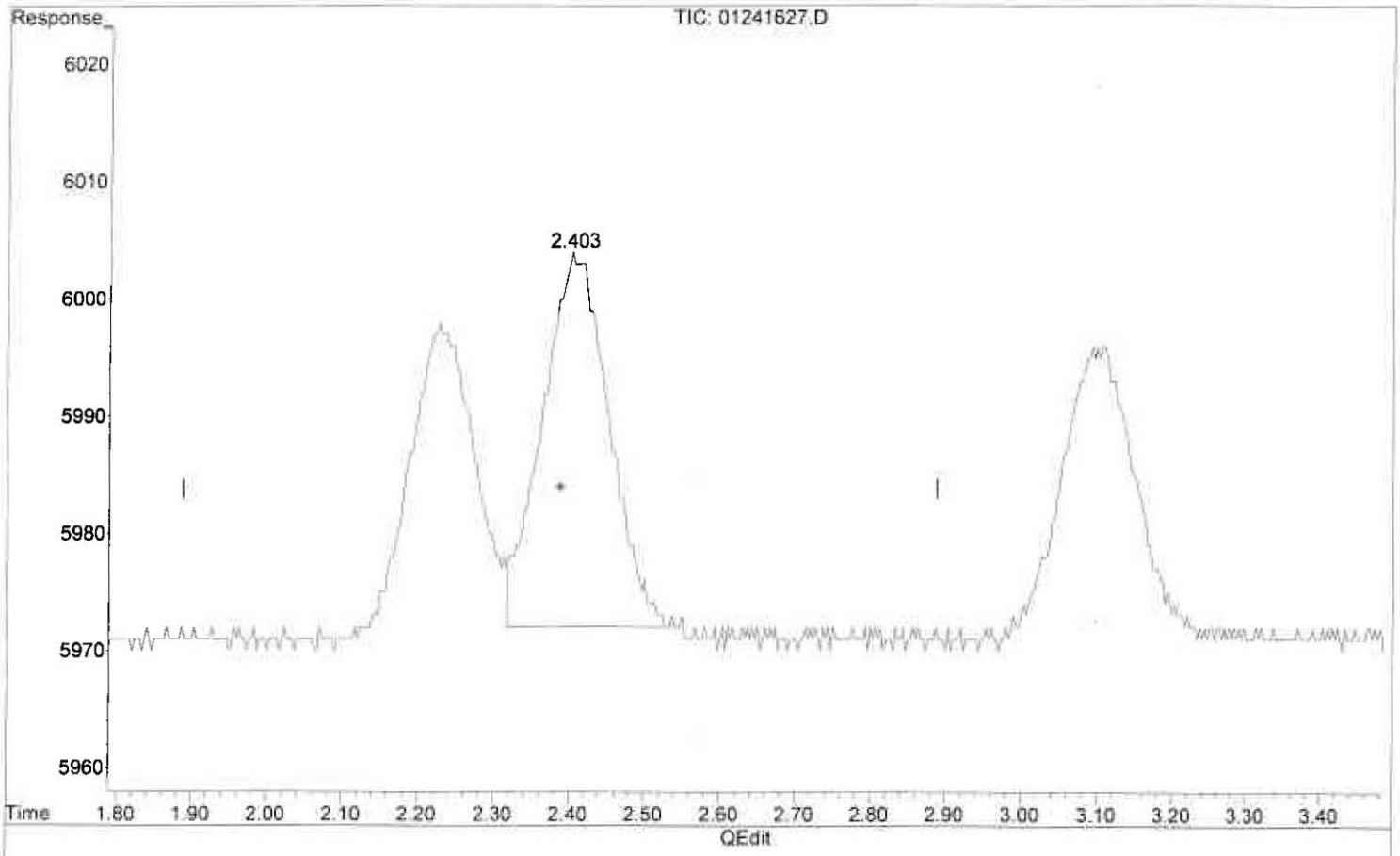
(+) = Expected Retention Time

Quantitation Report (Qedit)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241627.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 16:38
Operator : WH
Sample : std 0.1% S11-12041504
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 19:49:57 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 19:47:27 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



(3) Nitrogen

2.403min 997.840 ppm m

response 1968

2/6b 1/24/15

(+) = Expected Retention Time

Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241628.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 17:24
Operator : WH
Sample : std 0.5% S11-12041503
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 19:51:53 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 19:51:09 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.702	6556	5060.912	ppm
2)	Oxygen	2.216	7996	5436.317	ppm
3)	Nitrogen	2.394	9673	4915.911	ppm
4)	Carbon Monoxide	3.085	9006	5437.603	ppm
5)	Methane	5.072	6838	5699.991	ppm
6)	Carbon Dioxide	6.739	10890	5286.885	ppm

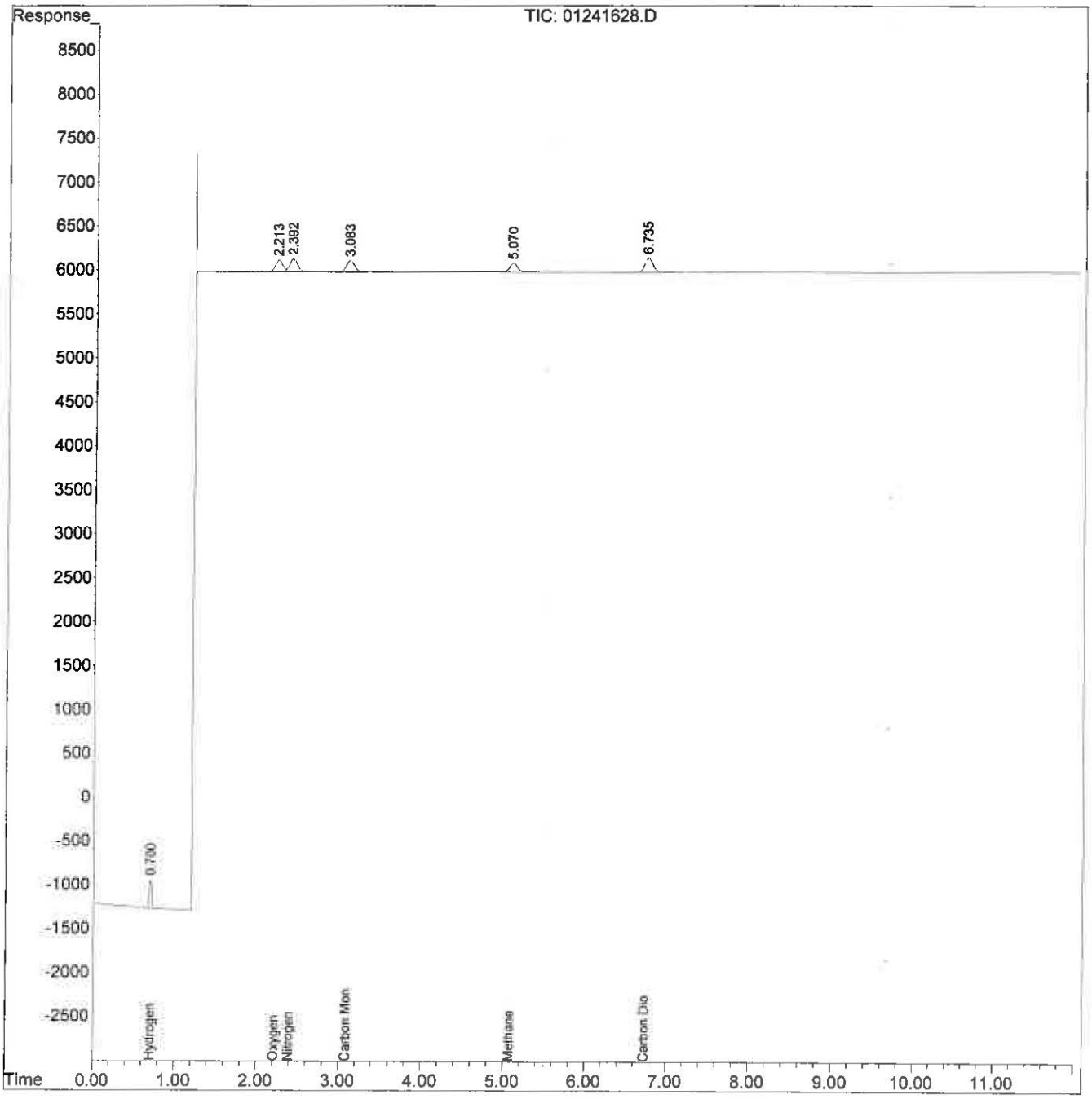
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241628.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 17:24
Operator : WH
Sample : std 0.5% S11-12041503
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 19:51:53 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 19:51:09 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241629.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 17:40
Operator : WH
Sample : std 1% S11-12041502
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 19:52:57 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 19:52:26 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc Units
Target Compounds				
1)	Hydrogen	0.702	12714	9754.784 ppm
2)	Oxygen	2.205	15559	10136.011 ppm
3)	Nitrogen	2.380	17417	8926.254 ppm
4)	Carbon Monoxide	3.070	17245	9976.228 ppm
5)	Methane	5.066	12928	10072.291 ppm
6)	Carbon Dioxide	6.734	20915	9870.566 ppm

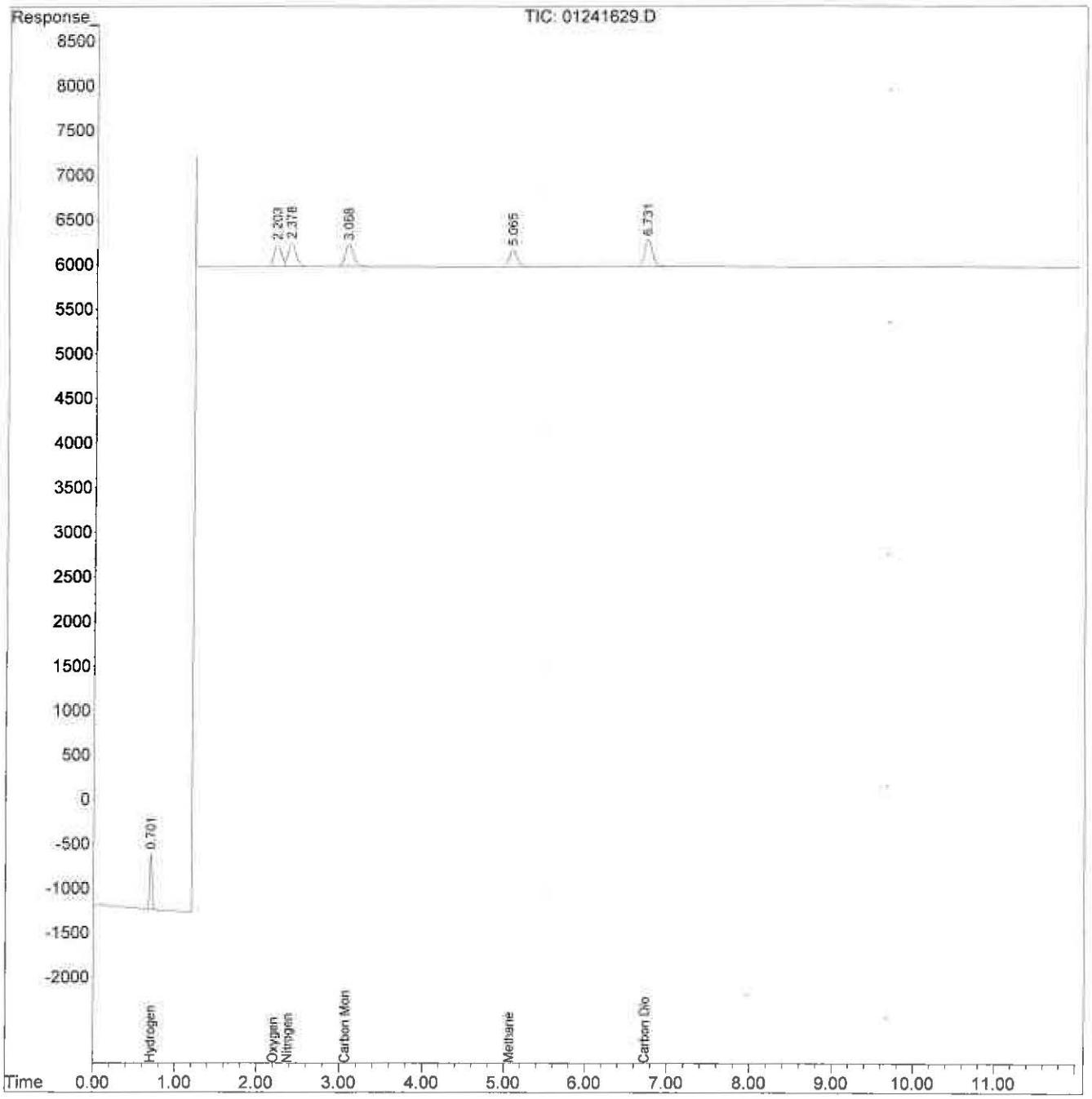
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241629.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 17:40
Operator : WH
Sample : std 1% S11-12041502
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autointl.e
Quant Time: Jan 24 19:52:57 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 19:52:26 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241631.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 18:16
Operator : WH
Sample : std 4% S11-12041501
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 19:55:30 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 19:54:31 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.710	49891	38867.951	ppm
2)	Oxygen	2.225	60887	39358.143	ppm
3)	Nitrogen	2.402	68113	36714.941	ppm
4)	Carbon Monoxide	3.089	67550	39160.311	ppm
5)	Methane	5.075	50534	39329.825	ppm
6)	Carbon Dioxide	6.737	81525	38955.184	ppm

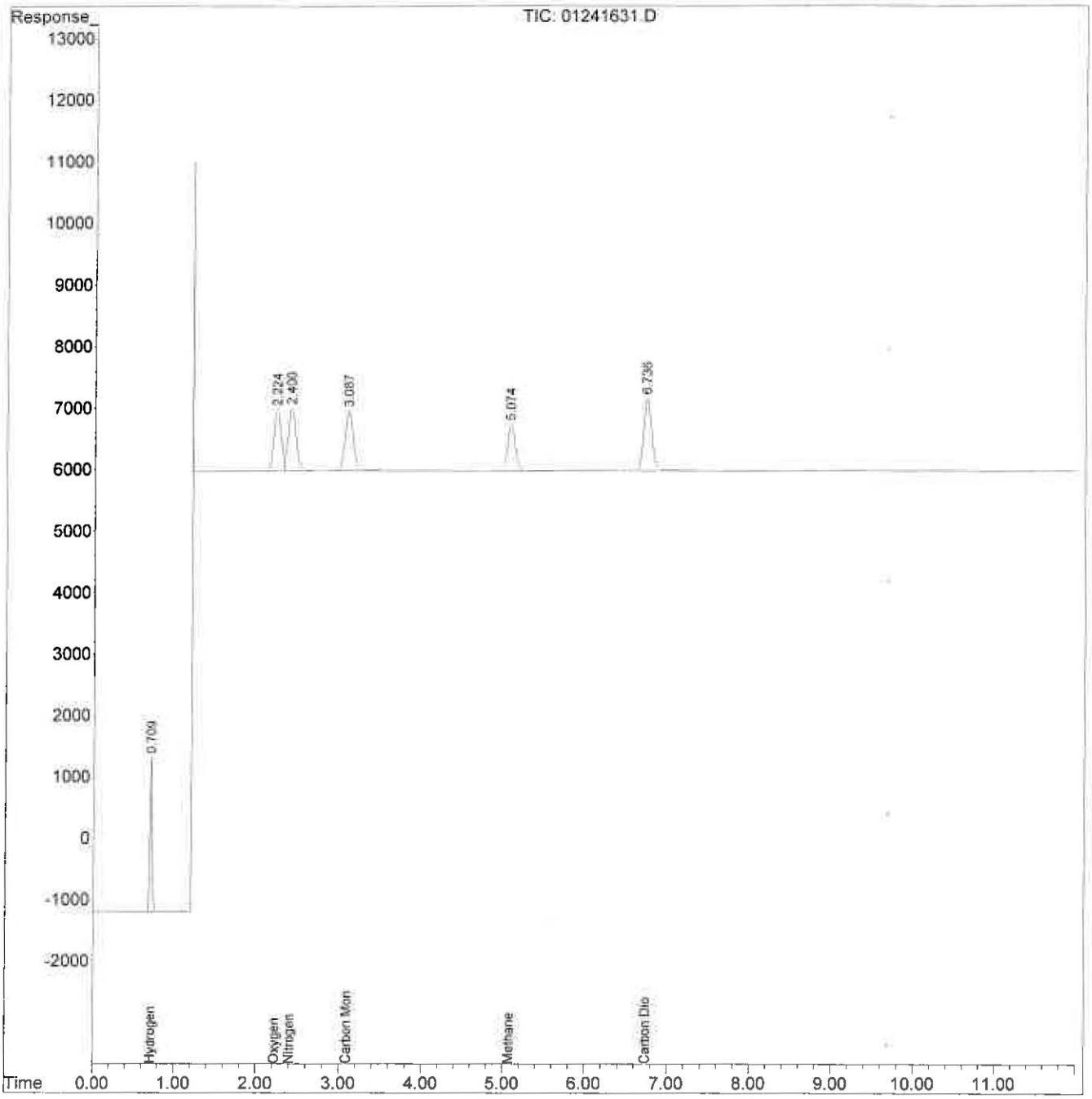
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241631.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 18:16
Operator : WH
Sample : std 4% S11-12041501
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 19:55:30 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 19:54:31 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Quantitation Report (Not Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241632.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 18:33
Operator : WH
Sample : std 16.66% S11-12031501
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 19:57:29 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 19:54:31 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.704	209940	163554.818	ppm
2)	Oxygen	2.201	242272	156607.855	ppm
3)	Nitrogen	2.379	271989	146611.136	ppm
4)	Carbon Monoxide	3.067	269360	156155.237	ppm
5)	Methane	5.058	199750	155461.848	ppm
6)	Carbon Dioxide	6.719	321532	153637.732	ppm

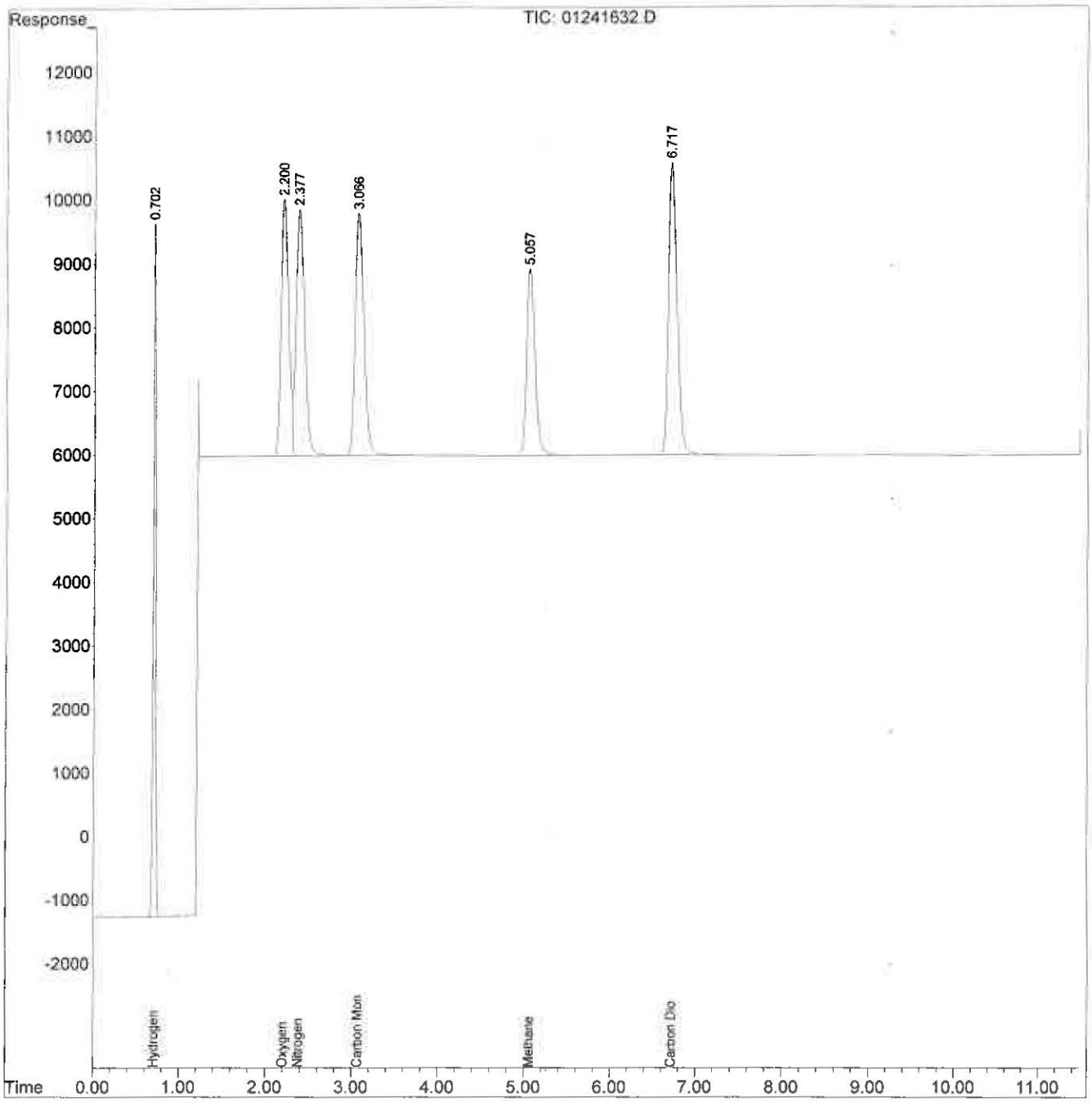
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (Not Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241632.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 18:33
Operator : WH
Sample : std 16.66% S11-12031501
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 19:57:29 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 19:54:31 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241633.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 19:02
Operator : WH
Sample : std co2
Misc : S17-02131201
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 19:58:39 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 19:57:50 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Hydrogen	0.000	0	N.D.	ppm	
2)	Oxygen	0.000	0	N.D.	ppm	d
3)	Nitrogen	0.000	0	N.D.	ppm	d
4)	Carbon Monoxide	0.000	0	N.D.	ppm	
5)	Methane	0.000	0	N.D.	ppm	
6)	Carbon Dioxide	6.651	1875387	910352.314	ppm	

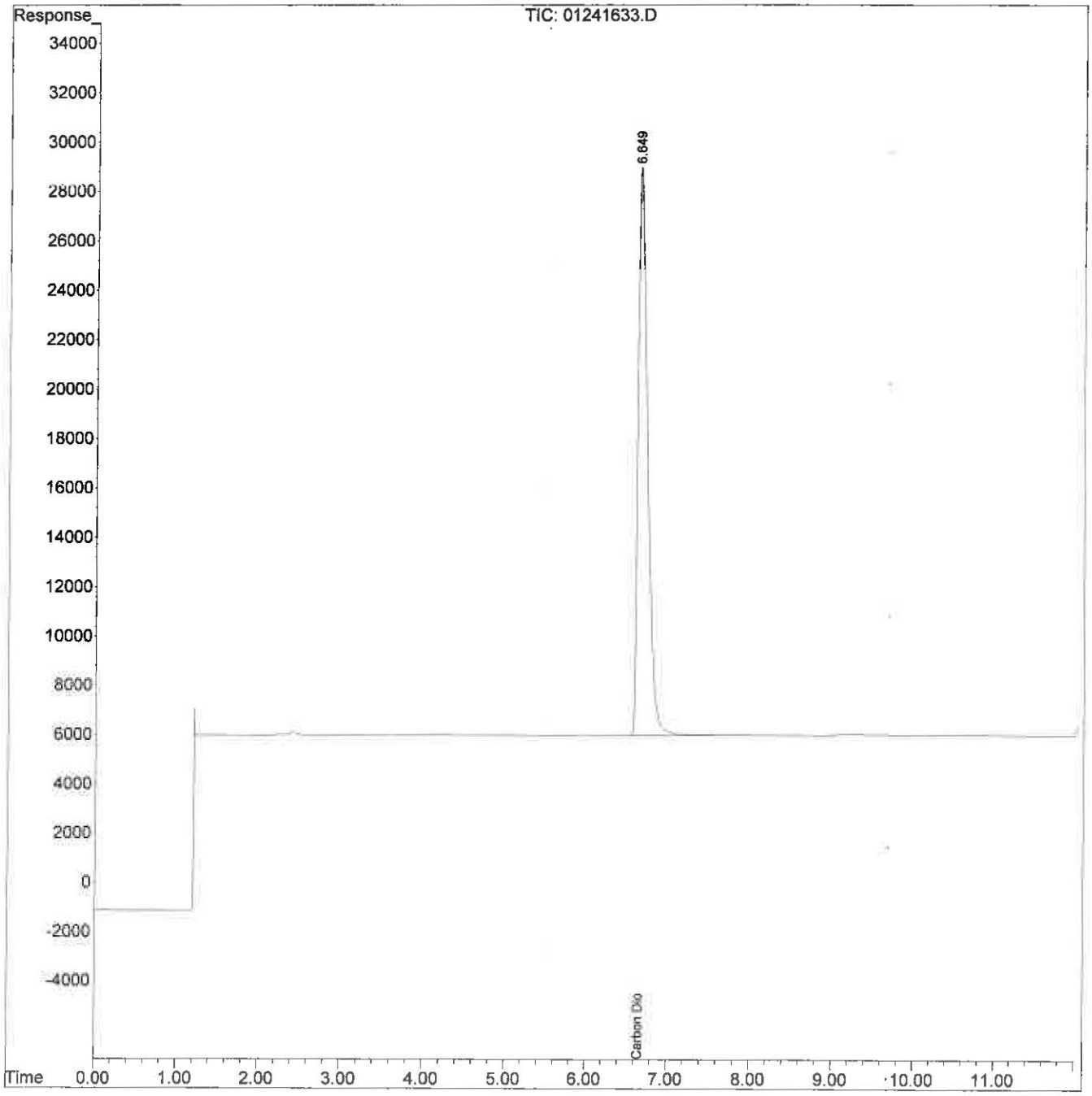
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241633.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 19:02
Operator : WH
Sample : std co2
Misc : S17-02131201
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 19:58:39 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 19:57:50 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241634.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 20:04
Operator : WH
Sample : std ch4
Misc : S30-11301401
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 20:36:02 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 20:00:56 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Hydrogen	0.000	0	N.D.	ppm	
2)	Oxygen	0.000	0	N.D.	ppm	
3)	Nitrogen	0.000	0	N.D.	ppm	
4)	Carbon Monoxide	0.000	0	N.D.	ppm	
5)	Methane	4.976	1219046	961698.203	ppm	
6)	Carbon Dioxide	0.000	0	N.D.	ppm	d

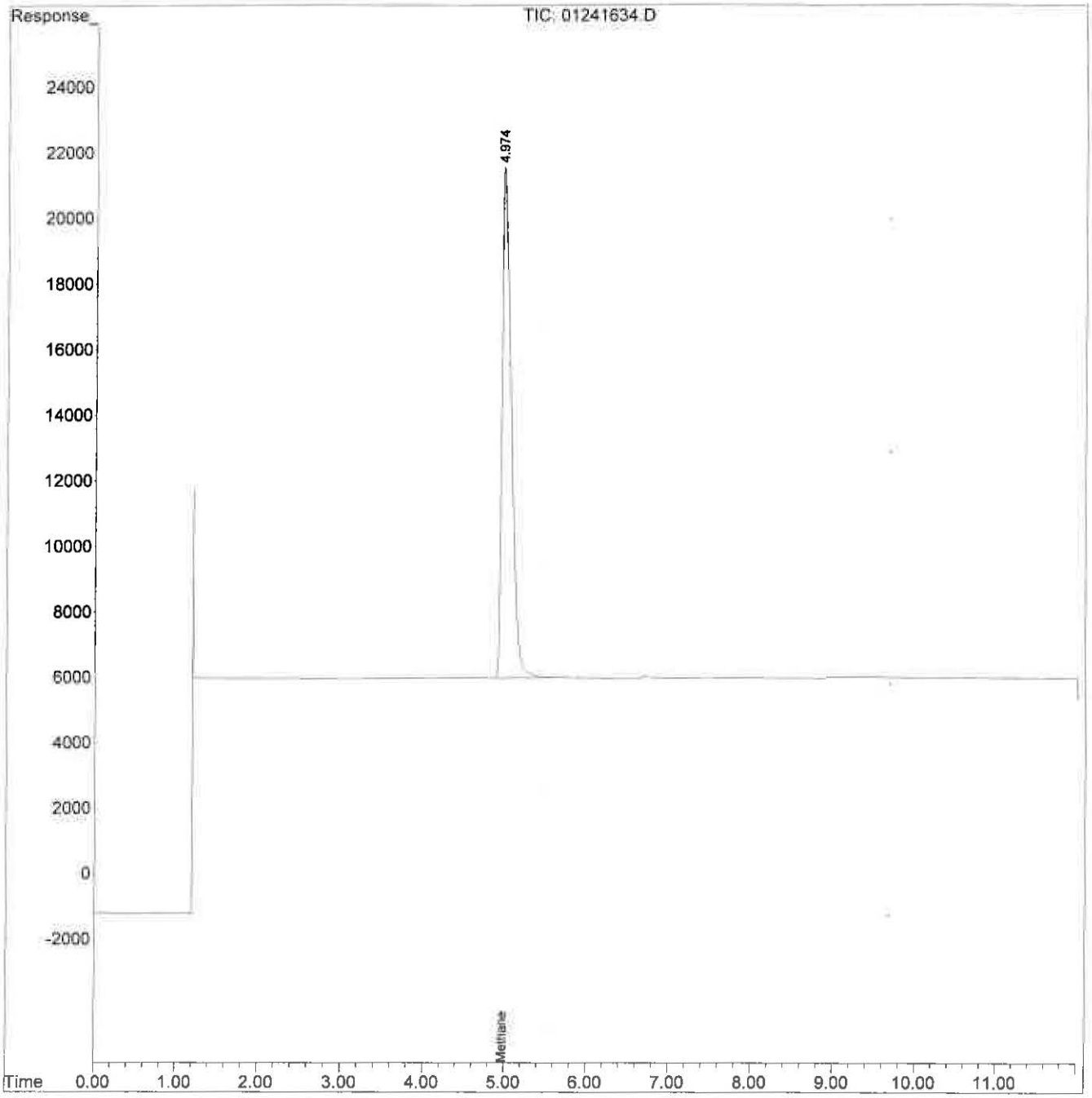
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241634.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 20:04
Operator : WH
Sample : std ch4
Misc : S30-11301401
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 20:36:02 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 20:00:56 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241635.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 20:39
Operator : WH
Sample : std h2
Misc : small loop of S11-12021501
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 20:56:25 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 20:37:18 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Hydrogen	0.686	638516	499304.194	ppm	
2)	Oxygen	0.000	0	N.D.	ppm	
3)	Nitrogen	0.000	0	N.D.	ppm	
4)	Carbon Monoxide	0.000	0	N.D.	ppm	
5)	Methane	0.000	0	N.D.	ppm	d
6)	Carbon Dioxide	0.000	0	N.D.	ppm	

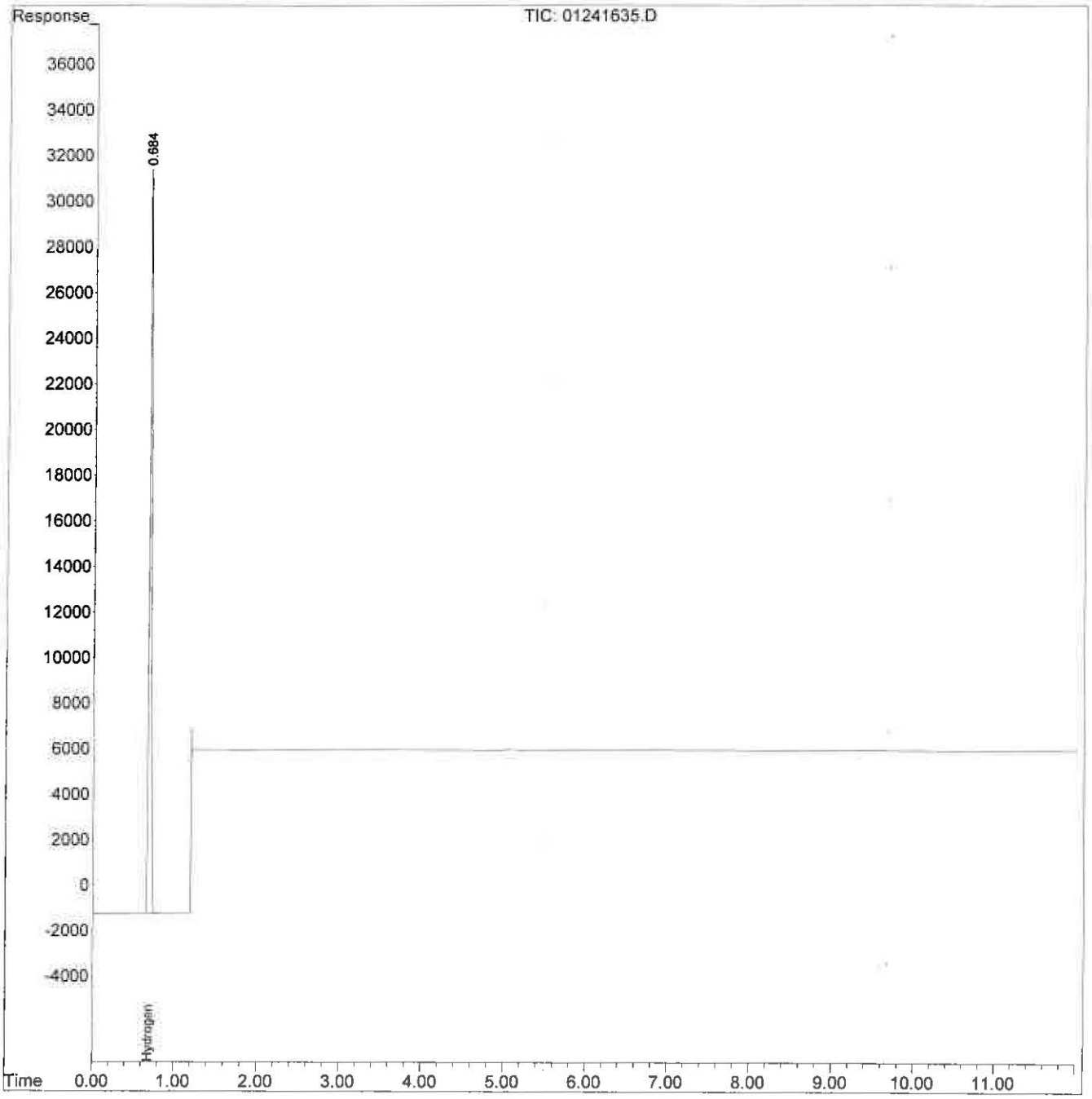
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241635.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 20:39
Operator : WH
Sample : std h2
Misc : small loop of S11-12021501
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 20:56:25 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 20:37:18 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241637.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 21:19
Operator : WH
Sample : STD N2
Misc : S11-12021502
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 21:35:15 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 21:18:19 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Hydrogen	0.000	0	N.D.	ppm	d
2)	Oxygen	0.000	0	N.D.	ppm	d
3)	Nitrogen	2.293	1540603	857917.729	ppm	
4)	Carbon Monoxide	0.000	0	N.D.	ppm	
5)	Methane	0.000	0	N.D.	ppm	d
6)	Carbon Dioxide	0.000	0	N.D.	ppm	

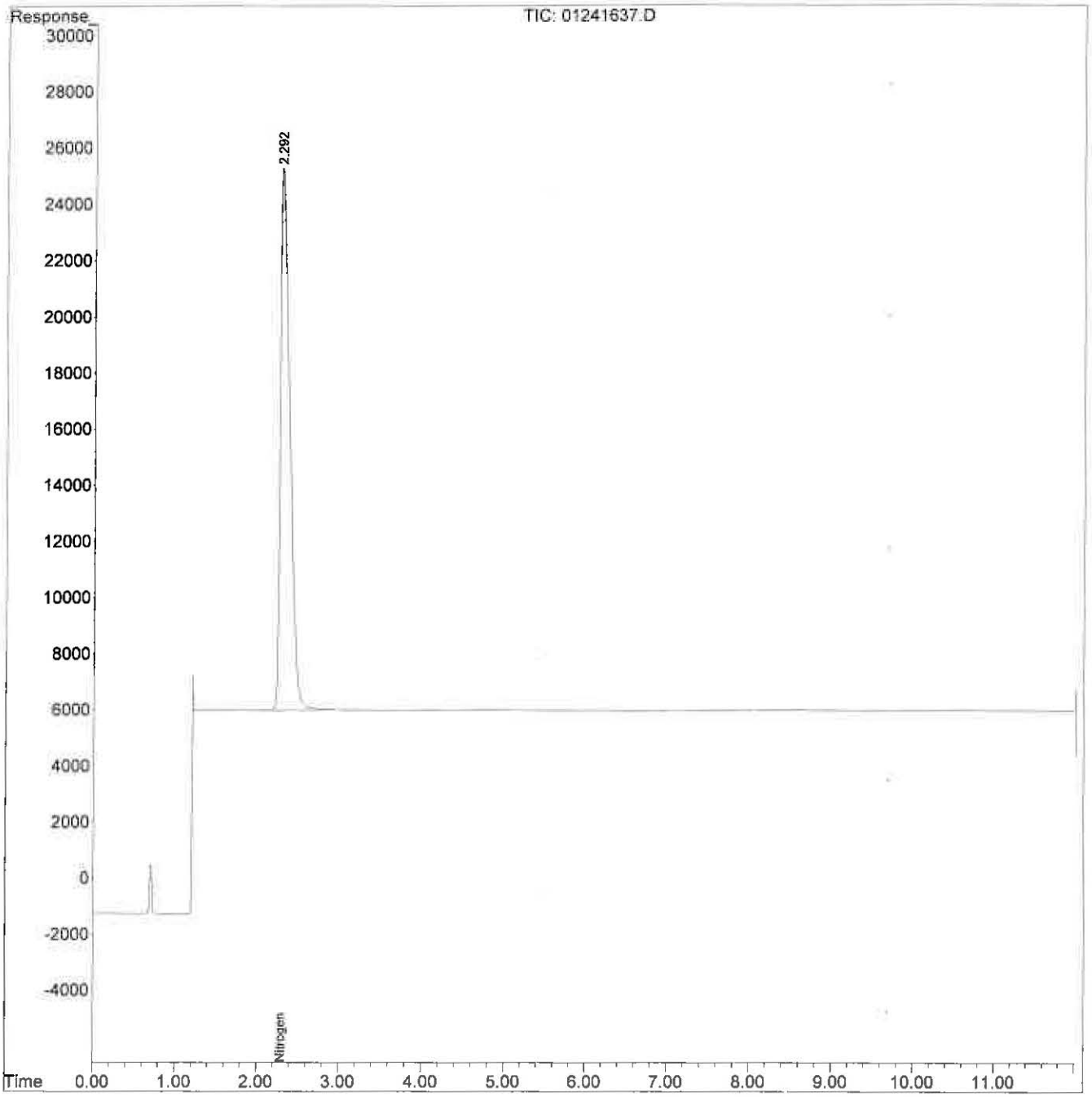
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241637.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 21:19
Operator : WH
Sample : STD N2
Misc : S11-12021502
ALS Vial : 1 Sample Multiplier: 10

Integration File: autointl.e
Quant Time: Jan 24 21:35:15 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 21:18:19 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241639.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 21:56
Operator : WH
Sample : STD O2
Misc : s11-12021503
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 22:12:05 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 21:54:52 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.000	0	N.D.	ppm
2)	Oxygen	2.117	1478054	974822.367	ppm
3)	Nitrogen	0.000	0	N.D.	ppm
4)	Carbon Monoxide	0.000	0	N.D.	ppm
5)	Methane	0.000	0	N.D.	ppm
6)	Carbon Dioxide	0.000	0	N.D.	ppm

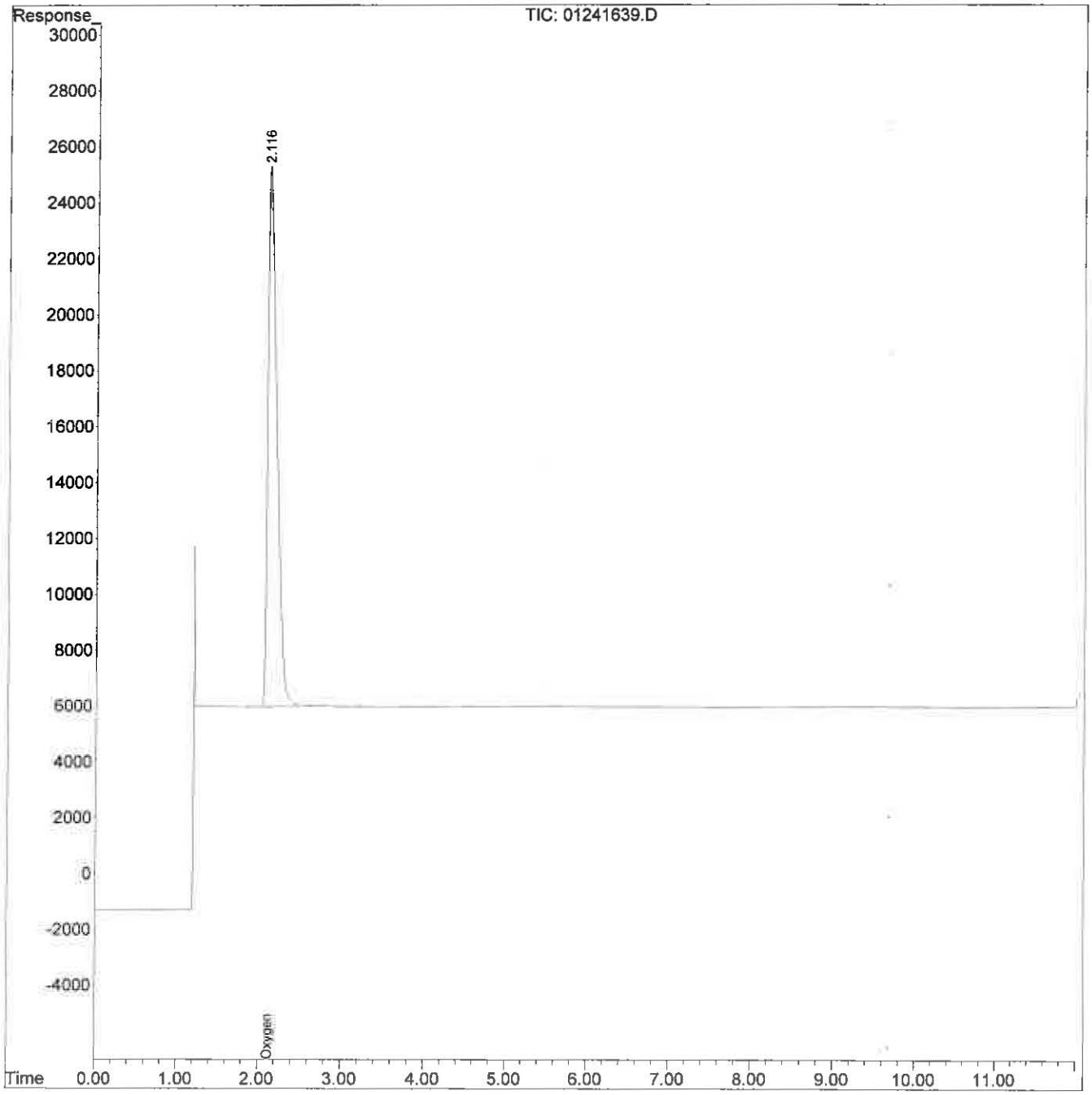
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241639.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 21:56
Operator : WH
Sample : STD O2
Misc : s11-12021503
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 22:12:05 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 21:54:52 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241640.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 22:13
Operator : WH
Sample : icv math
Misc : S30-01211601
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 22:32:48 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 22:12:55 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.702	49998	37951.830	ppm
2)	Oxygen	2.212	59532	39339.676	ppm
3)	Nitrogen	2.387	85443	48734.916	ppm
4)	Carbon Monoxide	3.074	82976	48885.688	ppm
5)	Methane	5.066	50003	39721.416	ppm
6)	Carbon Dioxide	6.728	95530	47075.322	ppm

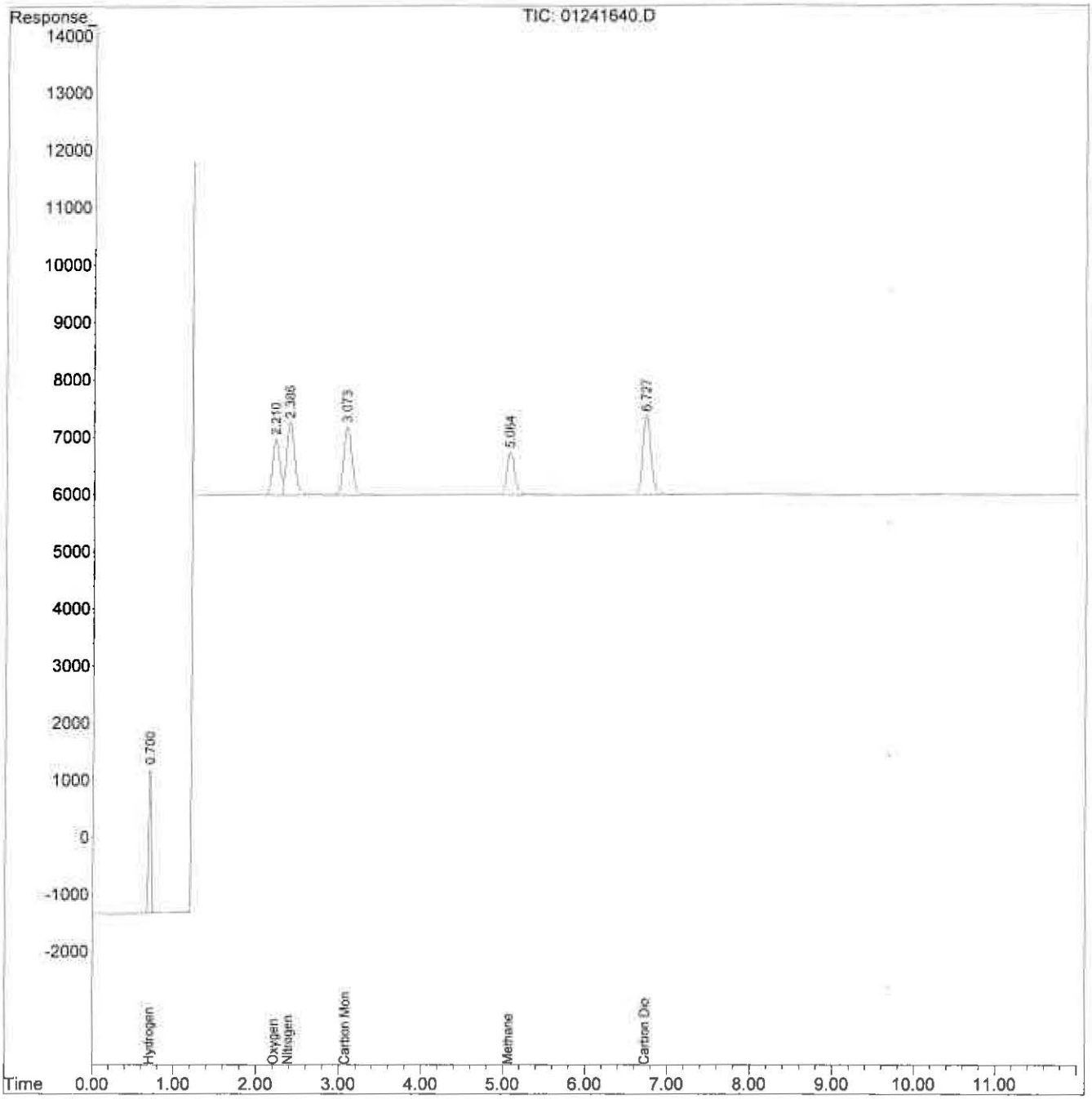
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241640.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 22:13
Operator : WH
Sample : icv math
Misc : S30-01211601
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 22:32:48 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 22:12:55 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241641.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 22:32
Operator : WH
Sample : icv scott
Misc : S30-12281502
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 22:48:42 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 22:12:55 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	Actual ppm	R.T.	Response	Conc	Units	% Recovery
Target Compounds							
1)	Hydrogen	39900	0.706	49672	37704.490	ppm	94.5 %
2)	Oxygen	24900	2.219	37333	24670.381	ppm	99.1 %
3)	Nitrogen	50000	2.393	84889	48418.601	ppm	96.8 %
4)	Carbon Monoxide	50000	3.079	83785	49362.383	ppm	98.7 %
5)	Methane	40100	5.068	50643	40229.211	ppm	100.3 %
6)	Carbon Dioxide	50000	6.729	97009	47803.956	ppm	95.6 %

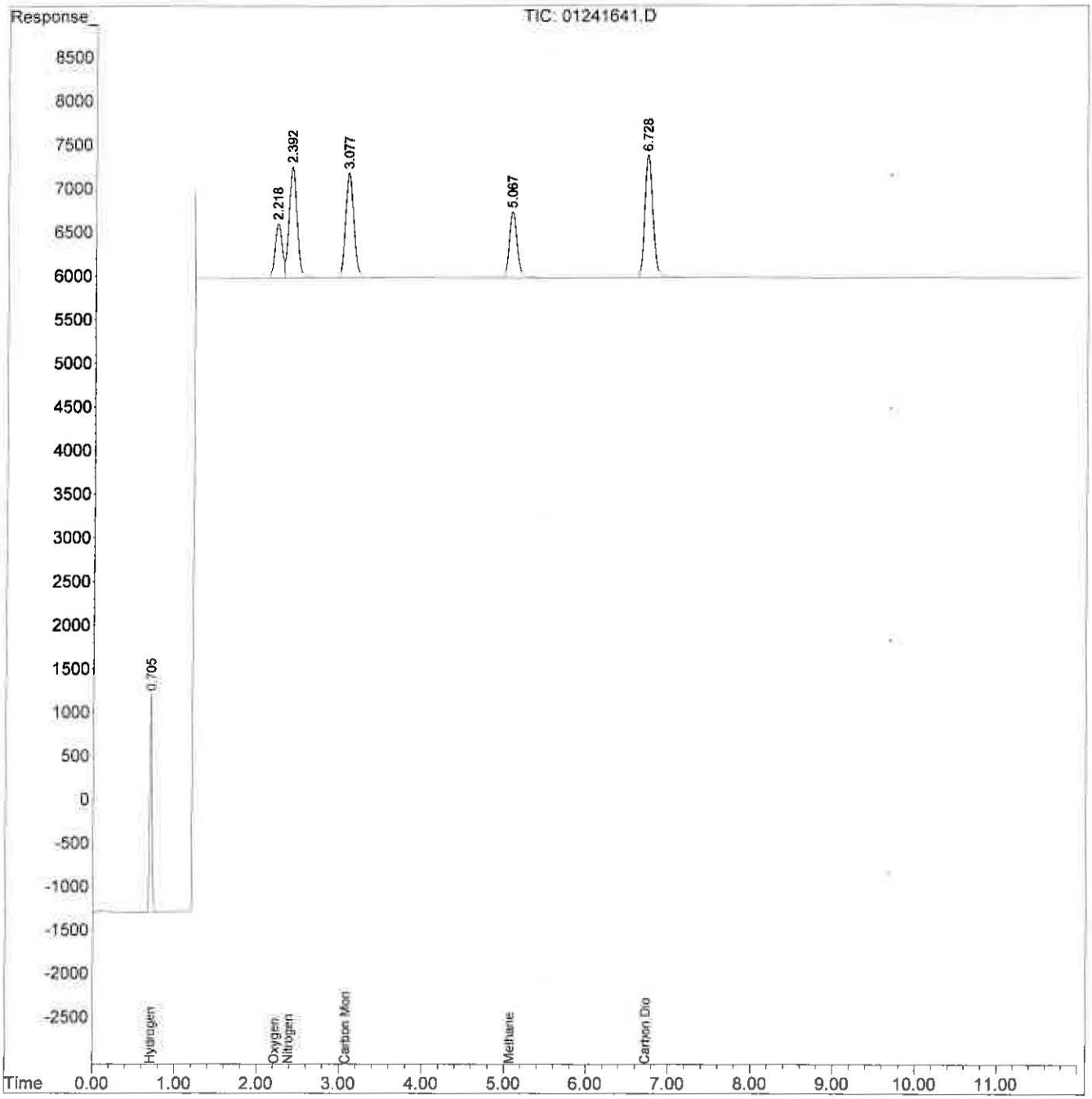
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : J:\GC01\DATA\FXG\2016_01\24\
Data File : 01241641.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2016 22:32
Operator : WH
Sample : icv scott
Misc : S30-12281502
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 22:48:42 2016
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 22:12:55 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Modified EPA Method 3C Daily QC Summary

Client : Trihydro Corporation
Analyst : MC
Method Name : EPA 3C, ASTM D 1946-90, VOA-EPA3C

Instrument : GC 1
Date Analyzed : 1/23/17

RT Summaries and QC Check (minutes)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time
ICAL Mean RT	0.708	2.188	2.368	3.076	5.045	6.707		
RT Windows (+/- min)	0.072	0.133	0.146	0.034	0.130	0.145		
std s30-12091603	0.693	2.191	2.365	3.054	5.051	6.714	01231701.D	07:50
+/- 0.33min of ICAL Mean RT	Pass	Pass	Pass	Pass	Pass	Pass		
mb							01231702.D	08:07
lab air		2.149 Pass	2.287 Pass			6.727 Pass	01231703.D	08:23
lcs s30-12201601	0.703 Pass	2.205 Pass	2.381 Pass	3.068 Pass	5.058 Pass	6.719 Pass	01231704.D	08:44
lcsd s30-12201601	0.701 Pass	2.197 Pass	2.373 Pass	3.060 Pass	5.052 Pass	6.715 Pass	01231705.D	09:01
0214-001		2.176 Pass	2.324 Pass			6.731 Pass	01231706.D	09:17
std s30-12091603	0.701 Pass	2.201 Pass	2.376 Pass	3.062 Pass	5.053 Pass	6.714 Pass	01231709.D	10:06

Continuing Calibration Standards Summary (ppm)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time
ACTUAL	40000.0	40000.0	50000.0	50000.0	40000.0	50000.0		
CCV Criteria (+/- %D)	15.0%	10.0%	10.0%	10.0%	10.0%	10.0%		
std s30-12091603	40388.4 1.0%	40728.8 1.8%	51418.8 2.8%	50689.0 1.4%	40943.5 2.4%	48829.6 2.3%	01231701.D	07:50
std s30-12091603	39837.0 0.4%	39313.6 1.7%	48791.8 2.4%	49707.8 0.6%	40293.0 0.7%	47927.0 4.1%	01231709.D	10:06
	####	####	####	####	####	#####		
	####	####	####	####	####	#####		

Lab Dup Summary (ppm, without DF correction and nomalization)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time

LCS / LCS Dup Summary (ppm, without DF correction)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time
LCS Actual Conc. (ppm)	50000.0	50000.0	50000.0	50000.0	50000.0	50000.0		
LCS Criteria (% Range)	94%-105%	97%-108%	89%-113%	98%-108%	94%-111%	94%-104%		
lcs s30-12201601	51480.5	51678.4	50440.1	51531.8	49528.2	49475.2	01231704.D	08:44
LCS % Recovery	103% Pass	103% Pass	101% Pass	103% Pass	99% Pass	99% Pass		
lcsd s30-12201601	51661.3	52089.1	50812.1	51874.6	49905.7	49922.3	01231705.D	09:01
LCS % Recovery	103% Pass	104% Pass	102% Pass	104% Pass	100% Pass	100% Pass		
Duplicate % RPD	0.4%	0.8%	0.7%	0.7%	0.8%	0.9%		
Duplicate Criteria % RPD	3% Pass	3% Pass	7% Pass	3% Pass	3% Pass	3% Pass		

Lab Air QC Summary

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxid	Methane	Carbon Dioxide	Lab Air Criteria Total (90%-110%)
lab air		202110.7	719806.8			391.5	92.2% Pass
Lab Air Normalized (%)		21.91%	78.04%			0.04%	100.0%

KAH 1/23/17

Quantitation Report (QT Reviewed)

Data Path : I:\GC01\DATA\FXG\2017_01\23\
Data File : 01231701.D
Signal(s) : TCD1A.CH
Acq On : 23 Jan 2017 7:50 am
Operator : MC
Sample : std s30-12091603
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 23 08:17:48 2017
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 22:12:55 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.693	53208	40388.390	ppm
2)	Oxygen	2.191	61634	40728.808	ppm
3)	Nitrogen	2.365	90149	51418.820	ppm
4)	Carbon Monoxide	3.054	86037	50688.994	ppm
5)	Methane	5.051	51542	40943.495	ppm
6)	Carbon Dioxide	6.714	99090	48829.618	ppm

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

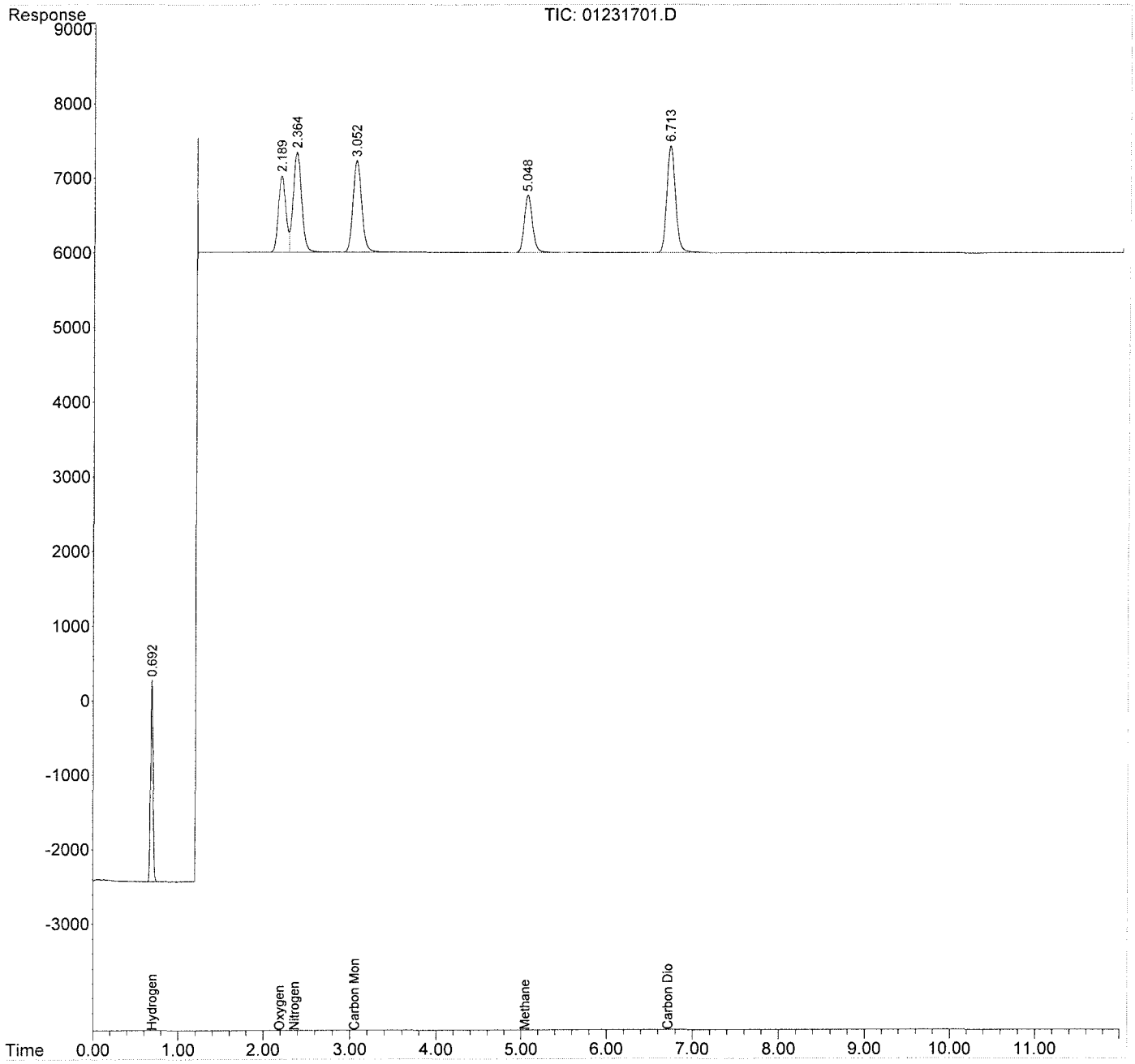
MAM 1/23/17

Quantitation Report (QT Reviewed)

Data Path : I:\GC01\DATA\FXG\2017_01\23\
Data File : 01231701.D
Signal(s) : TCD1A.CH
Acq On : 23 Jan 2017 7:50 am
Operator : MC
Sample : std s30-12091603
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 23 08:17:48 2017
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 22:12:55 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : I:\GC01\DATA\FXG\2017_01\23\
Data File : 01231709.D
Signal(s) : TCD1A.CH
Acq On : 23 Jan 2017 10:06 am
Operator : MC
Sample : std s30-12091603
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 23 10:24:53 2017
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 22:12:55 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.701	52482	39837.020	ppm
2)	Oxygen	2.201	59492	39313.586	ppm
3)	Nitrogen	2.376	85543	48791.786	ppm
4)	Carbon Monoxide	3.062	84371	49707.810	ppm
5)	Methane	5.053	50723	40293.009	ppm
6)	Carbon Dioxide	6.714	97258	47926.976	ppm

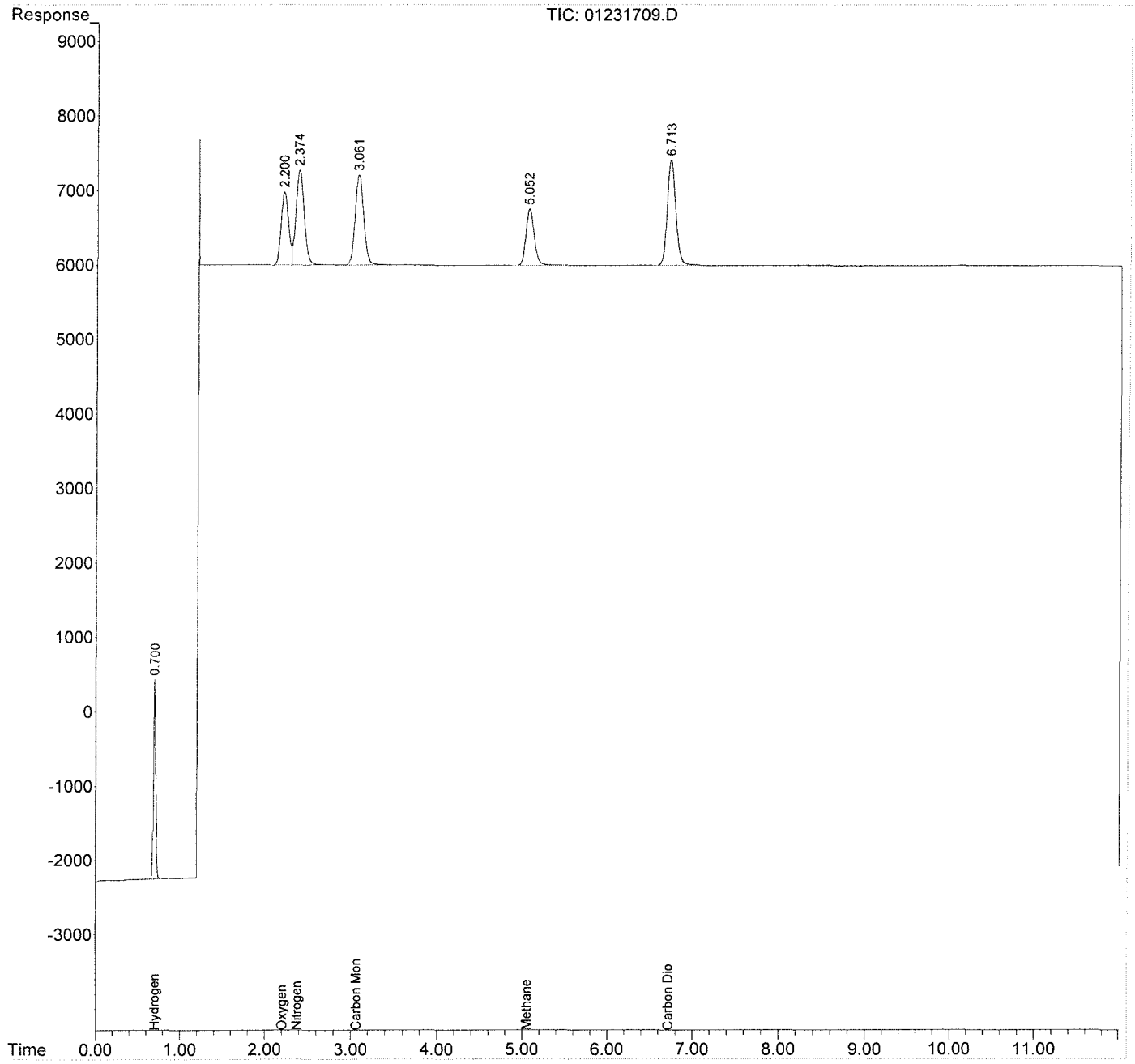
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : I:\GC01\DATA\FXG\2017_01\23\
Data File : 01231709.D
Signal(s) : TCD1A.CH
Acq On : 23 Jan 2017 10:06 am
Operator : MC
Sample : std s30-12091603
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 23 10:24:53 2017
Quant Method : I:\GC01\METHODS\3C012416.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Sun Jan 24 22:12:55 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Injection Log

Directory: J:\GC01\DATA\FXG\2016_01\24

Line	Vial	FileName	Multiplier	SampleName	Misc Info	Injected
1	1	01241601.d	10.	std		24 Jan 2016 08:26
2	1	01241602.d	10.	mb		24 Jan 2016 08:41
3	1	01241603.d	10.	lab air		24 Jan 2016 08:57
4	1	01241604.d	10.	lcs		24 Jan 2016 09:14
5	1	01241605.d	10.	lcsd		24 Jan 2016 09:30
6	1	01241606.d	10.	0205-001		24 Jan 2016 09:46
7	1	01241607.d	10.	0205-002		24 Jan 2016 10:00
8	1	01241608.d	10.	0205-003		24 Jan 2016 10:16
9	1	01241609.d	10.	0205-004		24 Jan 2016 10:30
10	1	01241610.d	10.	0205-005		24 Jan 2016 10:45
11	1	01241611.d	10.	0205-006		24 Jan 2016 11:00
12	1	01241612.d	10.	0205-007		24 Jan 2016 11:22
13	1	01241613.d	10.	0205-008		24 Jan 2016 11:39
14	1	01241614.d	10.	0205-009		24 Jan 2016 11:55
15	1	01241615.d	10.	0205-010		24 Jan 2016 12:15
16	1	01241616.d	10.	std		24 Jan 2016 12:30
17	1	01241617.d	10.	0205-011		24 Jan 2016 12:46
18	1	01241618.d	10.	0205-012		24 Jan 2016 13:01
19	1	01241619.d	10.	0205-013		24 Jan 2016 13:16
20	1	01241620.d	10.	0205-014		24 Jan 2016 13:38
21	1	01241621.d	10.	std		24 Jan 2016 13:58
22	1	01241622.d	10.	wait		24 Jan 2016 14:32
23	1	01241623.d	10.	test		24 Jan 2016 15:15
24	1	01241624.d	10.	test		24 Jan 2016 15:35
25	1	01241625.d	10.	loq		24 Jan 2016 15:53
26	1	01241626.d	10.	loq		24 Jan 2016 16:08
27	1	01241627.d	10.	std 0.1% S11-12041504		24 Jan 2016 16:38
28	1	01241628.d	10.	std 0.5% S11-12041503		24 Jan 2016 17:24
29	1	01241629.d	10.	std 1% S11-12041502		24 Jan 2016 17:40
30	1	01241630.d	10.	std 4% S11-12041501		24 Jan 2016 17:57
31	1	01241631.d	10.	std 4% S11-12041501		24 Jan 2016 18:16
32	1	01241632.d	10.	std 16.66% S11-12031501		24 Jan 2016 18:33
33	1	01241633.d	10.	std co2	S17-02131201	24 Jan 2016 19:02
34	1	01241634.d	10.	std ch4	S30-11301401	24 Jan 2016 20:04
35	1	01241635.d	10.	std h2	small loop of S11...	24 Jan 2016 20:39
36	1	01241636.d	10.	lab air		24 Jan 2016 20:58
37	1	01241637.d	10.	STD N2	S11-12021502	24 Jan 2016 21:19
38	1	01241638.d	10.	o2		24 Jan 2016 21:38
39	1	01241639.d	10.	STD O2	s11-12021503	24 Jan 2016 21:56
40	1	01241640.d	10.	icv math	S30-01211601	24 Jan 2016 22:13
41	1	01241641.d	10.	icv scott	S30-12281502	24 Jan 2016 22:32
42	1	01241642.d	10.	mb		24 Jan 2016 22:48

Injection Log

Directory: I:\GC01\DATA\FXG\2017_01\23\

	Sample ID	Date/Time	Acquisition Method	File Name	Misc Info	Operator	Comments
1	std s30-12091603	23 Jan 117 7:50 am	MFXGS25C.M	01231701.D		MC	Pass
	mb	23 Jan 117 8:07 am	MFXGS25C.M	01231702.D		MC	
	lab air	23 Jan 117 8:23 am	MFXGS25C.M	01231703.D		MC	
	lcs s30-12201601	23 Jan 117 8:44 am	MFXGS25C.M	01231704.D		MC	
	lcsd s30-12201601	23 Jan 117 9:01 am	MFXGS25C.M	01231705.D		MC	
	0214-001	23 Jan 117 9:17 am	MFXGS25C.M	01231706.D		MC	
	0224-001	23 Jan 117 9:33 am	MFXGS25C.M	01231707.D		MC	
	0245-001	23 Jan 117 9:49 am	MFXGS25C.M	01231708.D		MC	
#VALUE!	std s30-12091603	23 Jan 117 10:06 am	MFXGS25C.M	01231709.D		MC	Pass

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\25\01251707.D
Acq On : 25 Jan 2017 9:35 Operator: LH
Sample : P1700214-001 (1000mL)
Misc : S29-01191701
ALS Vial : 10 Sample Multiplier: 1

Quant Time: Jan 26 14:27:10 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 1/26/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.54	130	278976	12.500 ng	-0.01
7) 1,4-Difluorobenzene (IS2)	13.65	114	1383321	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1064174	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.40	65	503224	12.626 ng	0.00
Spiked Amount 12.500				Recovery = 101.04%	
12) Toluene-d8 (SS2)	16.10	98	1444208	12.724 ng	0.00
Spiked Amount 12.500				Recovery = 101.76%	
20) p-Bromofluorobenzene (...	19.28	174	441777	11.833 ng	0.00
Spiked Amount 12.500				Recovery = 94.64%	

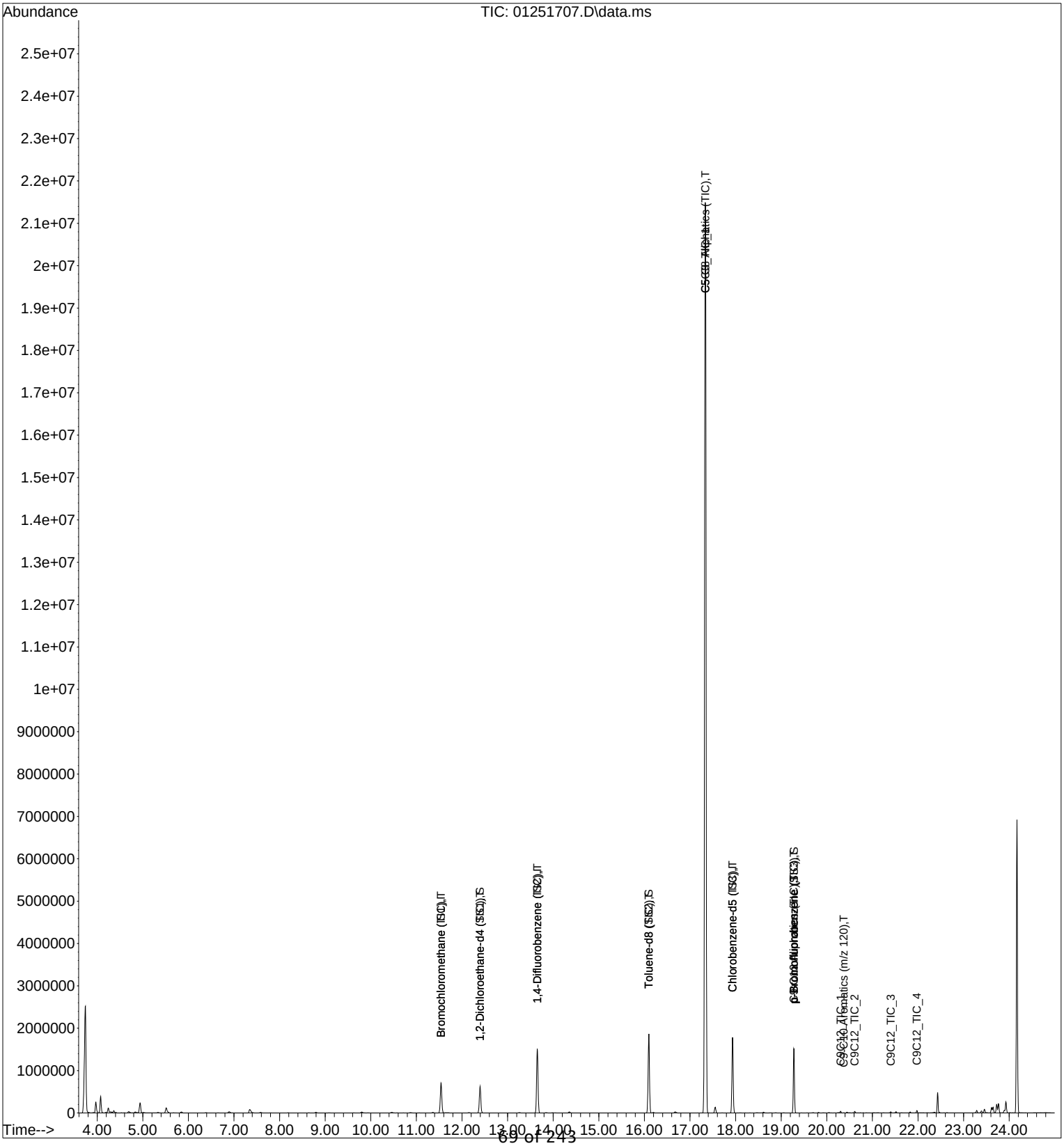
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.54	TIC	1653148	14.602 ng	100
3) Isopentane	7.34	TIC	243795	No Calib #	
4) n-Hexane	11.66	TIC	31235	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.40	TIC	1436057	12.856 ng	100
8) 1,4-Difluorobenzene (TIC)	13.65	TIC	3260399	12.829 ng	100
9) Cyclohexane	13.65	TIC	3260399	No Calib	
10) 2,3-Dimethylpentane	13.84	TIC	22454	No Calib	
11) n-Heptane	14.66	TIC	2045	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	3870727	12.882 ng	100
14) n-Octane	17.33	TIC	47702078	No Calib	
15) C5-C8 Aliphatics (TIC)	17.33	TIC	62606938m	193.404 ng	
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3437865	12.640 ng	100
18) 2,3-Dimethylheptane	18.37	TIC	1669	No Calib	
19) n-Nonane	19.06	TIC	8360	No Calib #	
21) p-Bromofluorobenzene (...	19.28	TIC	2610880	12.338 ng	100
22) Isopropylbenzene	19.39	120	113	No Calib #	
23) 1-Methyl-3-ethylbenzene	19.92	120	505	No Calib	
24) 1,3,5-Trimethylbenzene	20.01	120	323	No Calib #	
25) n-Decane	20.44	TIC	35496	No Calib	
26) p-Isopropyltoluene	20.74	134	52	No Calib #	
27) 1,2,3-Trimethylbenzene	20.74	120	388	No Calib #	
28) Butylcyclohexane	20.94	TIC	3002	No Calib	
29) n-Undecane	21.52	TIC	46975	No Calib	
30) n-Dodecane	22.43	TIC	706162	No Calib	
31) C9-C12 Aliphatics-(TIC)	19.28	TIC	4197878m	61.441 ng	
32) C9-C10 Aromatics (m/z ...	20.37	120	3148m	0.223 ng	
33) C9-C10 Aromatics (m/z ...	21.10	134	670	N.D.	
34) C5C8_TIC_1	17.33	TIC	48089875m	23.485 ng	
35) C5C8 TIC 2	0.00	TIC	0	N.D. d	
36) C5C8 TIC 3	0.00	TIC	0	N.D. d	
37) C5C8 TIC 4	0.00	TIC	0	N.D. d	
38) C9C12 TIC 1	20.30	TIC	80445m	0.198 ng	
39) C9C12 TIC 2	20.61	TIC	62401m	0.154 ng	
40) C9C12 TIC 3	21.40	TIC	48567m	0.120 ng	
41) C9C12 TIC 4	21.98	TIC	224412m	0.553 ng	
42) C9C10 TIC 1	21.04	120	544	N.D.	
43) C9C10 TIC 2	20.28	134	124	N.D.	

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\25\01251707.D
Acq On : 25 Jan 2017 9:35 Operator: LH
Sample : P1700214-001 (1000mL)
Misc : S29-01191701
ALS Vial : 10 Sample Multiplier: 1

Quant Time: Jan 26 14:27:10 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\25\01251704.D
Acq On : 25 Jan 2017 7:12 Operator: LH
Sample : MB R16012417 1000mL
Misc : S29-01191701 AC00442
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Jan 25 14:54:25 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 1/25/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.54	130	253636	12.500 ng	-0.01
7) 1,4-Difluorobenzene (IS2)	13.65	114	1268607	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	952170	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.39	65	461927	12.747 ng	0.00
Spiked Amount 12.500				Recovery = 102.00%	
12) Toluene-d8 (SS2)	16.09	98	1323043	12.711 ng	0.00
Spiked Amount 12.500				Recovery = 101.68%	
20) p-Bromofluorobenzene (...	19.28	174	386634	11.574 ng	0.00
Spiked Amount 12.500				Recovery = 92.56%	

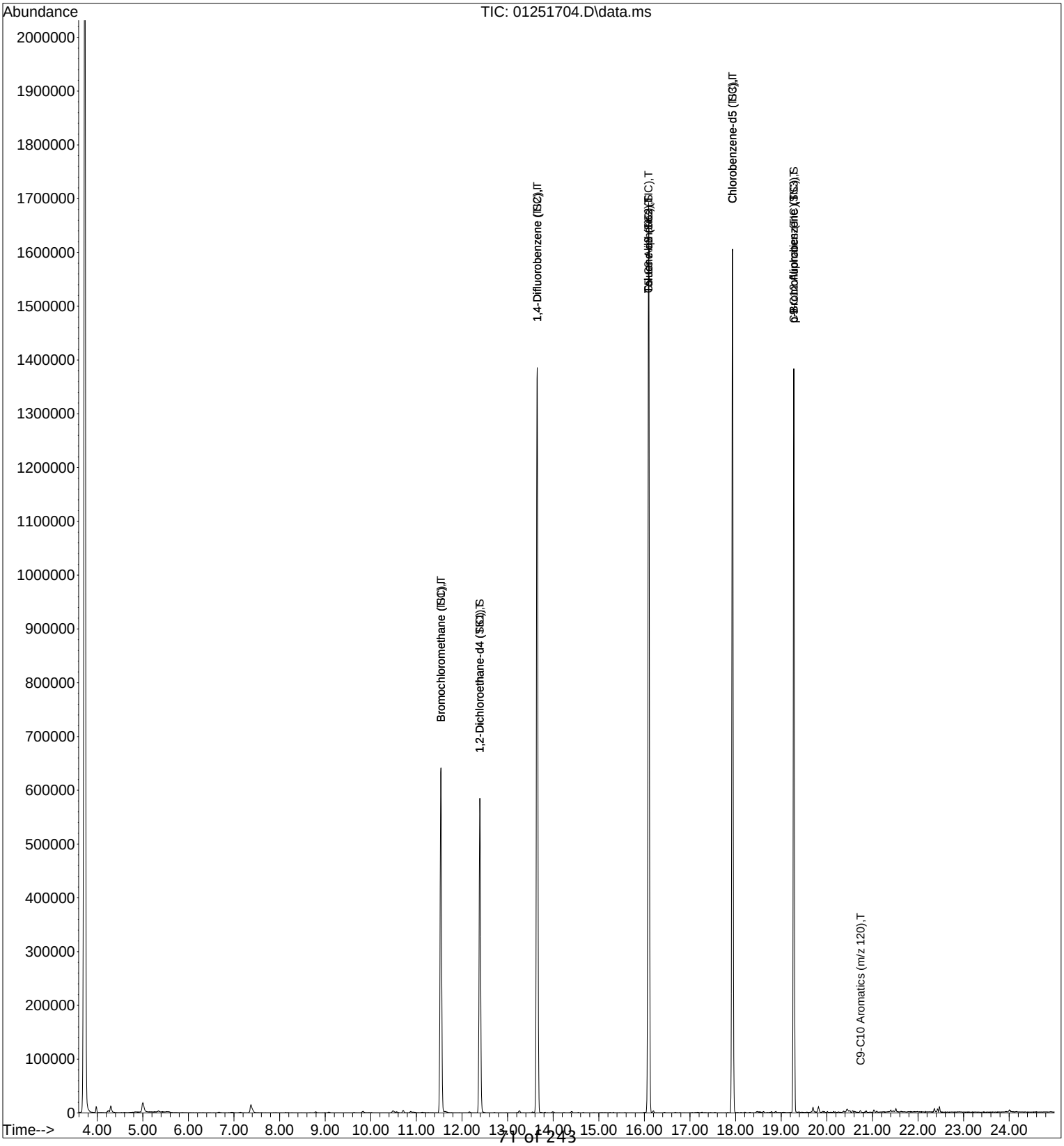
Target Compounds						Qvalue
2) Bromochloromethane (TIC)	11.54	TIC	1501990	14.592 ng		100
3) Isopentane	7.37	TIC	50278	No Calib	#	
4) n-Hexane	11.54	TIC	1501990	No Calib		
6) 1,2-Dichloroethane-d4 ...	12.39	TIC	1318460	12.982 ng		100
8) 1,4-Difluorobenzene (TIC)	13.65	TIC	2988610	12.823 ng		100
9) Cyclohexane	13.65	TIC	2988610	No Calib		
10) 2,3-Dimethylpentane	13.65	TIC	2987996	No Calib		
11) n-Heptane	14.66	TIC	1137	No Calib		
13) Toluene-d8 (TIC)	16.09	TIC	3533642	12.824 ng		100
14) n-Octane	17.16	TIC	2405	No Calib		
15) C5-C8 Aliphatics (TIC)	16.09	TIC	12799242m	43.114 ng		
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3093246	12.711 ng		100
18) 2,3-Dimethylheptane	18.37	TIC	483	No Calib		
19) n-Nonane	18.89	TIC	5487	No Calib	#	
21) p-Bromofluorobenzene (...	19.28	TIC	2306266	12.181 ng		100
22) Isopropylbenzene	19.39	120	305	No Calib		
23) 1-Methyl-3-ethylbenzene	19.91	120	543	No Calib		
24) 1,3,5-Trimethylbenzene	20.02	120	448	No Calib	#	
25) n-Decane	20.45	TIC	17799	No Calib	#	
26) p-Isopropyltoluene	20.74	134	109	No Calib	#	
27) 1,2,3-Trimethylbenzene	20.74	120	611	No Calib		
28) Butylcyclohexane	20.95	TIC	1156	No Calib		
29) n-Undecane	21.51	TIC	11007	No Calib		
30) n-Dodecane	22.43	TIC	9006	No Calib		
31) C9-C12 Aliphatics-(TIC)	19.28	TIC	2633381m	43.076 ng		
32) C9-C10 Aromatics (m/z ...	20.74	120	3874m	0.307 ng		
33) C9-C10 Aromatics (m/z ...	21.10	134	309	N.D.		
34) C5C8_TIC_1	0.00	TIC	0	N.D. d		
35) C5C8 TIC 2	0.00	TIC	0	N.D. d		
36) C5C8 TIC 3	0.00	TIC	0	N.D. d		
37) C5C8 TIC 4	0.00	TIC	0	N.D. d		
38) C9C12 TIC 1	0.00	TIC	0	N.D. d		
39) C9C12 TIC 2	0.00	TIC	0	N.D. d		
40) C9C12 TIC 3	0.00	TIC	0	N.D. d		
41) C9C12 TIC 4	0.00	TIC	0	N.D. d		
42) C9C10 TIC 1	0.00	120	0	N.D. d		
43) C9C10 TIC 2	0.00	134	0	N.D. d		

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\25\01251704.D
Acq On : 25 Jan 2017 7:12 Operator: LH
Sample : MB R16012417 1000mL
Misc : S29-01191701 AC00442
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Jan 25 14:54:25 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\25\01251705.D
Acq On : 25 Jan 2017 7:44 Operator: LH
Sample : LCS R16012417 25ng
Misc : S29-01191701/S29-01171713 (2/15)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Jan 25 14:54:48 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 1/25/17

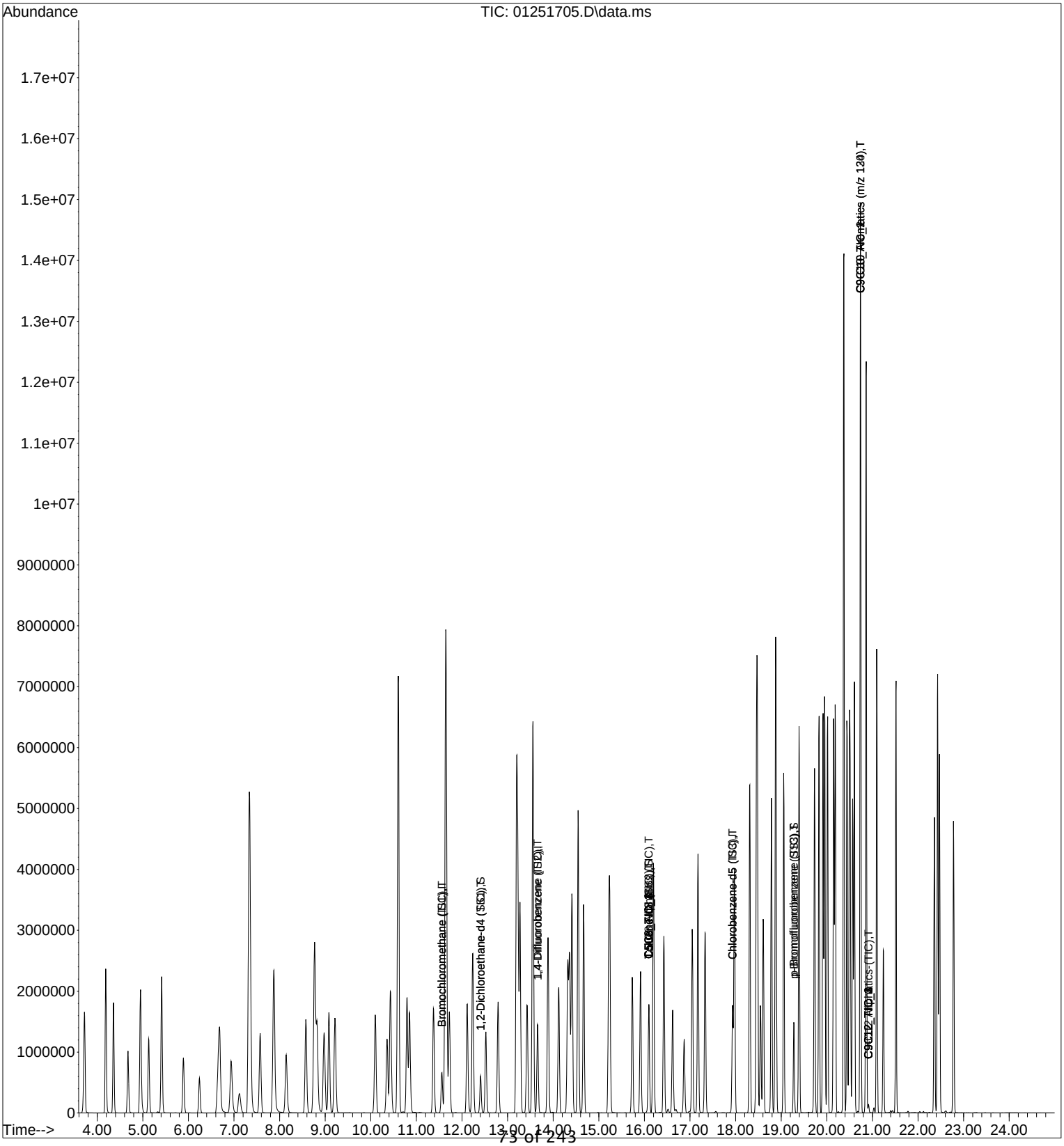
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.56	130	273522	12.500 ng	0.01
7) 1,4-Difluorobenzene (IS2)	13.66	114	1342826	12.500 ng	0.01
16) Chlorobenzene-d5 (IS3)	17.93	117	1034475	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.41	65	482571	12.349 ng	0.01
Spiked Amount 12.500				Recovery = 98.80%	
12) Toluene-d8 (SS2)	16.10	98	1392830	12.642 ng	0.00
Spiked Amount 12.500				Recovery = 101.12%	
20) p-Bromofluorobenzene (...	19.28	174	432827	11.926 ng	0.00
Spiked Amount 12.500				Recovery = 95.44%	
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.56	TIC	1593845	14.359 ng	100
3) Isopentane	7.34	TIC	17787897	No Calib #	
4) n-Hexane	11.64	TIC	22202561	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.41	TIC	1383083	12.629 ng	100
8) 1,4-Difluorobenzene (TIC)	13.66	TIC	3128817	12.682 ng	100
9) Cyclohexane	13.56	TIC	14618872	No Calib	
10) 2,3-Dimethylpentane	13.89	TIC	6459923	No Calib	
11) n-Heptane	14.67	TIC	6841092	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	3770874	12.928 ng	100
14) n-Octane	17.17	TIC	7692471	No Calib	
15) C5-C8 Aliphatics (TIC)	16.10	TIC	3775423	12.015 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3495537	13.221 ng	100
18) 2,3-Dimethylheptane	18.31	TIC	9511108	No Calib	
19) n-Nonane	19.06	TIC	8396854	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	2515141	12.227 ng	100
22) Isopropylbenzene	19.39	120	1066464	No Calib	
23) 1-Methyl-3-ethylbenzene	19.92	120	1281828	No Calib	
24) 1,3,5-Trimethylbenzene	20.02	120	1658193	No Calib	
25) n-Decane	20.44	TIC	9144052	No Calib	
26) p-Isopropyltoluene	20.74	134	1097951	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	1956197	No Calib	
28) Butylcyclohexane	20.91	TIC	186274	No Calib	
29) n-Undecane	21.52	TIC	9497445	No Calib	
30) n-Dodecane	22.43	TIC	10036102	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.91	TIC	186613	2.810 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	1956197	142.705 ng	100
33) C9-C10 Aromatics (m/z ...	20.74	134	1097951	142.644 ng	100
34) C5C8_TIC_1	16.10	TIC	3775423	1.897 ng	100
35) C5C8 TIC 2	16.10	TIC	3775423	1.897 ng	100
36) C5C8 TIC 3	16.10	TIC	3775423	1.897 ng	100
37) C5C8 TIC 4	16.10	TIC	3775423	1.897 ng	100
38) C9C12 TIC 1	20.91	TIC	186613	0.473 ng	100
39) C9C12 TIC 2	20.91	TIC	186613	0.473 ng	100
40) C9C12 TIC 3	20.91	TIC	186613	0.473 ng	100
41) C9C12 TIC 4	20.91	TIC	186613	0.473 ng	100
42) C9C10 TIC 1	20.74	120	1956197	29.064 ng	100
43) C9C10 TIC 2	20.74	134	1097951	29.052 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\25\01251705.D
Acq On : 25 Jan 2017 7:44 Operator: LH
Sample : LCS R16012417 25ng
Misc : S29-01191701/S29-01171713 (2/15)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Jan 25 14:54:48 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Massachusetts APH | ICAL Method: M16121916.M | ICAL Date: 12/19/16 | Instrument ID: MS16 | LH 12/21/16

Hydrocarbon Ranges

	areas							masses					
C5-C8 Aliphatics	0.5	1	5	25	50	100		0.5	1	5	25	50	100
Isopentane	145992	251075	1071839	5786983	11537839	24462071		0.520	1.04	5.20	26.00	52.00	104.00
n-Hexane	194294	317520	1251336	5985003	11728245	25181283		0.510	1.02	5.10	25.50	51.00	102.00
Cyclohexane	161369	280207	1234019	7028601	14143584	30151415		0.515	1.03	5.15	25.75	51.50	103.00
2,3-Dimethylpentane	165093	289518	1287102	7336654	14784784	31435664		0.555	1.11	5.55	27.75	55.50	111.00
n-Heptane	154577	265906	1179401	6689806	13558680	29444115		0.515	1.03	5.15	25.75	51.50	103.00
n-Octane	182574	306792	1342879	7876179	16113832	34704181		0.530	1.06	5.30	26.50	53.00	106.00
area sum:	1003899	1711018	7366576	40703226	81866964	175378729	sum:	3.145	6.290	31.45	157.25	314.50	629.00

C9-C12 Aliphatics	0.5	1	5	25	50	100		0.5	1	5	25	50	100
2,3-Dimethylheptane	190562	336375	1477001	8638505	17810606	37607727		0.510	1.02	5.10	25.50	51.0	102
n-Nonane	177815	310390	1406543	8346424	17334221	36388397		0.505	1.01	5.05	25.25	50.5	101
n-Decane	181143	315493	1452982	8968276	18673731	38060288		0.490	0.98	4.90	24.50	49.0	98
Butylcyclohexane	212287	378384	1704547	10241012	21367070	42699385		0.510	1.02	5.10	25.50	51.0	102
n-Undecane	161102	300459	1420417	8828047	18631052	38121852		0.480	0.96	4.80	24.00	48.0	96
n-Dodecane	449	249005	1259084	7461396	16096908	34899971		0.475	0.95	4.75	23.75	47.5	95
area sum:	923358	1890106	8720574	52483660	109913588	227777620	sum:	2.970	5.940	29.70	148.50	297.00	594.00

C9-C10 Aromatics	0.5	1	5	25	50	100		0.5	1	5	25	50	100
Isopropylbenzene	23988	40776	186003	1138777	2371392	4777654		0.505	1.01	5.05	25.25	50.5	101
3-Ethyltoluene	24891	43239	200071	1279486	2658644	5308282		0.480	0.96	4.80	24.00	48.0	96
1,3,5-Trimethylbenzene	34652	60385	275729	1732103	3561772	6986753		0.495	0.99	4.95	24.75	49.5	99
1,2,3-Trimethylbenzene	35087	62934	298908	2010849	3867319	6207230		0.485	0.97	4.85	24.25	48.5	97
p-Isopropyltoluene	19324	35427	170154	1125800	2171411	3516405		0.490	0.98	4.90	24.50	49.0	98
area sum:	137942	242761	1130865	7287015	14630538	26796324	sum:	2.455	4.910	24.55	122.75	245.50	491.00

Massachusetts APH | ICAL: M16121916.M | ICAL Date: 12/19/16 | Instrument ID: MS16

Hydrocarbon Ranges

areas

Internal Standards (TIC)	0.5	1	5	25	50	100
Bromochloromethane (IS1)	1576090	1538202	1320241	1316783	1283090	1345404
1,4-Difluorobenzene (IS2)	3309515	3276539	3118912	3066006	3082836	3132467
Chlorobenzene-d5 (IS3)	3464345	3446417	3298025	3304897	3323875	3455252

Internal Standards (EIC)						
Bromochloromethane (IS1)	284009	282839	267602	270737	268499	276134
1,4-Difluorobenzene (IS2)	1431810	1415627	1350648	1341426	1348020	1379188
Chlorobenzene-d5 (IS3)	1093970	1084403	1034748	1037530	1036571	1065075

LH 12/21/16

Surrogates (TIC)	0.5	1	5	25	50	100
1,2-Dichloroethane-d4	1418884	1410987	1354096	1340717	1346053	1386295
Toluene-d8	3859177	3834085	3658491	3636514	3675145	3780224
4-Bromofluorobenzene	2672493	2653301	2567540	2601878	2613704	2677175

7.5 of 2.43

RRFs

C5-C8 Aliphatics	0.5	1	5	25	50	100	RRF_{avg}	%RSD
	2.7867	2.4020	2.1678	2.4120	2.4138	2.5270	2.452	8.24

C9-C12 Aliphatics	0.5	1	5	25	50	100	RRF_{avg}	%RSD
	3.5524	3.6679	3.5470	4.2580	4.4628	4.5004	3.998	11.45

C9-C10 Aromatics	0.5	1	5	25	50	100	RRF_{avg}	%RSD
	0.6420	0.5699	0.5565	0.7152	0.7187	0.6405	0.640	10.76

LH 12/21/16

AIR-PHASE PETROLEUM HYDROCARBONS (APH)

Primary Source Standards Concentrations

4ng/L Std. ID:
20ng/L Std. ID: S29-10281604
200ng/L Std. ID: S29-10281603

					ICAL Concentrations (Primary Source)					
Dilution Factors:		**5**	**50**	**Working STD Conc.(ng/L):**	**20**	**20**	**20**	**200**	**200**	**200**
	Source Std.	**Primary Working Standards**		**Injection (L):**	**0.025**	**0.050**	**0.25**	**0.125**	**0.25**	**0.50**
Compounds	**mg/m^3**	**200ng/L**	**20ng/L**	**ICAL Points:**	**0.5ng**	**1ng**	**5ng**	**25ng**	**50ng**	**100ng**
1-Methyl-3-ethylbenzene	0.96	192	19.2		0.480	0.96	4.80	24.00	48.0	96
1,3,5-Trimethylbenzene	0.99	198	19.8		0.495	0.99	4.95	24.75	49.5	99
n-Decane	0.98	196	19.6		0.490	0.98	4.90	24.50	49.0	98
1,2,3-Trimethylbenzene	0.97	194	19.4		0.485	0.97	4.85	24.25	48.5	97
p-Isopropyltoluene	0.98	196	19.6		0.490	0.98	4.90	24.50	49.0	98
n-Butylcyclohexane	1.02	204	20.4		0.510	1.02	5.10	25.50	51.0	102
n-Undecane	0.96	192	19.2		0.480	0.96	4.80	24.00	48.0	96
n-Dodecane	0.95	190	19.0		0.475	0.95	4.75	23.75	47.5	95
Isopentane	1.04	208	20.8		0.520	1.04	5.20	26.00	52.0	104
n-Hexane	1.02	204	20.4		0.510	1.02	5.10	25.50	51.0	102
Cyclohexane	1.03	206	20.6		0.515	1.03	5.15	25.75	51.5	103
2,3-Dimethylpentane	1.11	222	22.2		0.555	1.11	5.55	27.75	55.5	111
n-Heptane	1.03	206	20.6		0.515	1.03	5.15	25.75	51.5	103
n-Octane	1.06	212	21.2		0.530	1.06	5.30	26.50	53.0	106
2,3-Dimethylheptane	1.02	204	20.4		0.510	1.02	5.10	25.50	51.0	102
n-Nonane	1.01	202	20.2		0.505	1.01	5.05	25.25	50.5	101
Isopropylbenzene	1.01	202	20.2		0.505	1.01	5.05	25.25	50.5	101

Primary Source Standard:
Std. ID: S29-10281601
Spectra Gas Cyl. #: CC-302316
Expiration: 10/12/17

AIR-PHASE PETROLEUM HYDROCARBONS (APH)

Secondary Source Standards Concentrations

20ng/L Working Std. ID:
100ng/L Working Std. ID:
200ng/L Working Std. ID: S29-12011603
Dilution Factor: 5 | 10 | 50
Working Std. Conc. Utilized: 200

Working Std. Injection Amounts (L): 0.125

		Secondary Working Std. Conc.			ICV / LCS
Compounds	**mg/m^3**	**200ng/L**	**100ng/L**	**20ng/L**	**Actual Conc.(ng)**
1-Methyl-3-ethylbenzene	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	1.061	212.2	106.1	21.22	26.525
n-Decane	1.061	212.2	106.1	21.22	26.525
1,2,3-Trimethylbenzene	1.062	212.4	106.2	21.24	26.550
p-Isopropyltoluene	1.062	212.4	106.2	21.24	26.550
n-Butylcyclohexane	NA	NA	NA	NA	NA
n-Undecane	1.064	212.8	106.4	21.28	26.600
n-Dodecane	1.062	212.4	106.2	21.24	26.550
Isopentane	NA	NA	NA	NA	NA
n-Hexane	1.064	212.8	106.4	21.28	26.600
Cyclohexane	2.125	425.0	212.5	42.50	53.125
2,3-Dimethylpentane	NA	NA	NA	NA	NA
n-Heptane	1.064	212.8	106.4	21.28	26.600
n-Octane	1.060	212.0	106.0	21.20	26.500
2,3-Dimethylheptane	NA	NA	NA	NA	NA
n-Nonane	1.059	211.8	105.9	21.18	26.475
Isopropylbenzene	NA	NA	NA	NA	NA

Secondary Source Standard:
Std. ID: S29-10051602
Spectra Gas Cyl. #: CC-250189
Expiration: 09/23/17

Calibration Status Report GCMS-16

Method : I:\MS16\METHODS\M16121916.M (RTE Integrator)
Title : Massachusetts APH
Last Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration

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1	0.5	3	13	I:\MS16\DATA\2016_12\19\12191612.D
2	1	6	13	I:\MS16\DATA\2016_12\19\12191613.D
3	5	31	13	I:\MS16\DATA\2016_12\19\12191614.D
4	25	157	13	I:\MS16\DATA\2016_12\19\12191615.D
5	50	314	13	I:\MS16\DATA\2016_12\19\12191616.D
6	100	629	13	I:\MS16\DATA\2016_12\19\12191617.D

#	ID	Update Time	Quant Time	Acquisition Time
1	0.5	Dec 20 16:11 2016	Dec 20 16:06 2016	19 Dec 2016 19:32
2	1	Dec 20 16:11 2016	Dec 20 16:08 2016	19 Dec 2016 20:05
3	5	Dec 20 16:00 2016	Dec 20 16:00 2016	19 Dec 2016 20:39
4	25	Dec 20 16:00 2016	Dec 20 16:00 2016	19 Dec 2016 21:12
5	50	Dec 20 16:01 2016	Dec 20 16:00 2016	19 Dec 2016 21:45
6	100	Dec 20 16:01 2016	Dec 20 16:00 2016	19 Dec 2016 22:18

M16121916.M Wed Dec 21 16:01:40 2016

LH 12/21/16

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191612.D
Acq On : 19 Dec 2016 19:32 Operator: LH
Sample : 0.5ng MAPH ICAL STD
Misc : S29-12061601/S29-10281604 (12/25)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Dec 20 16:06:19 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	284009	12.500 ng	0.00
7) 1,4-Difluorobenzene (IS2)	13.65	114	1431810	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1093970	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.40	65	506203	13.038 ng	0.00
Spiked Amount 12.500				Recovery = 104.32%	
12) Toluene-d8 (SS2)	16.10	98	1456818	12.318 ng	0.00
Spiked Amount 12.500				Recovery = 98.56%	
20) p-Bromofluorobenzene (...	19.28	174	474949	12.434 ng	0.00
Spiked Amount 12.500				Recovery = 99.44%	

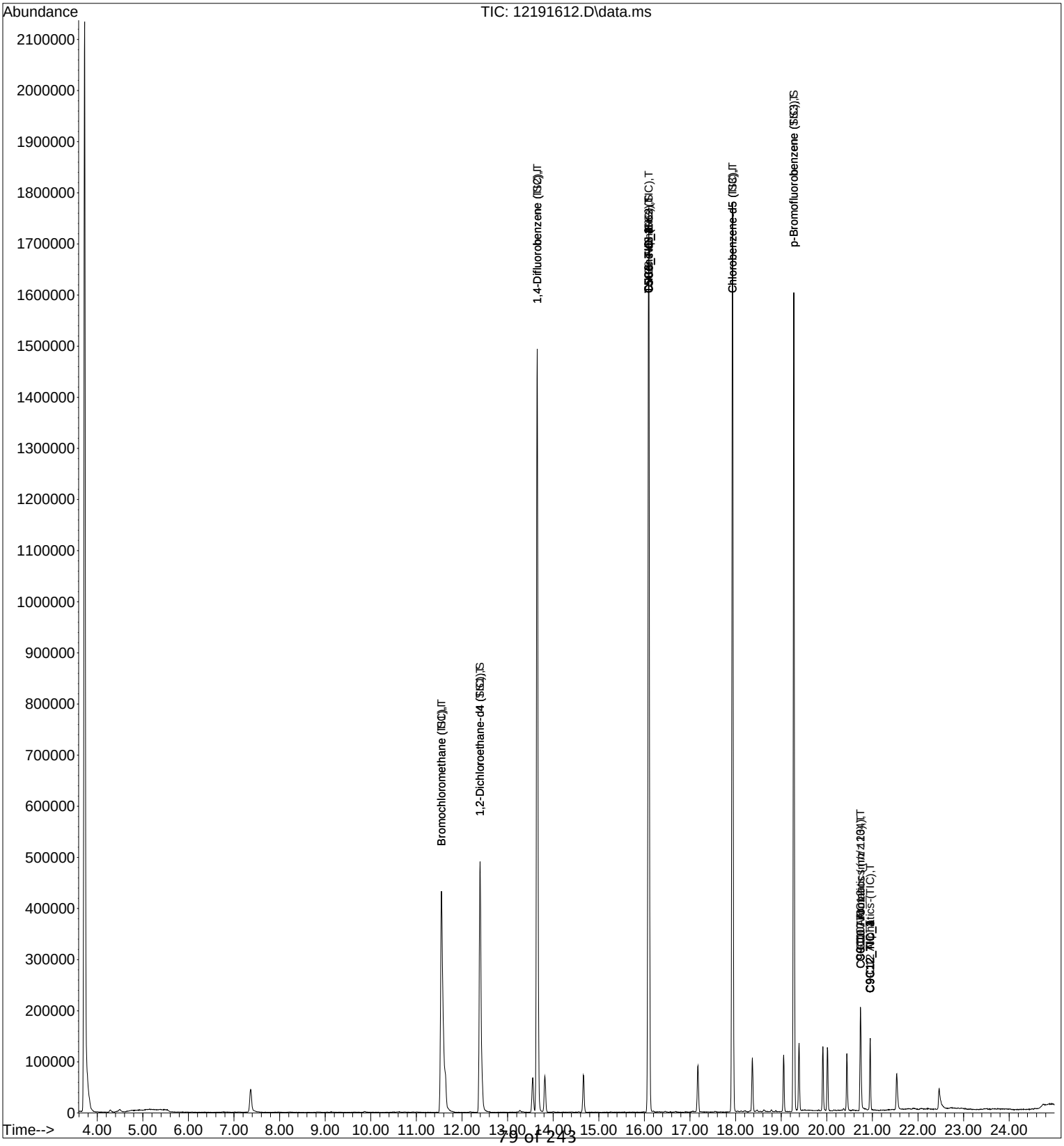
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.55	TIC	1576090m	12.721 ng	
3) Isopentane	7.36	TIC	145992	No Calib	
4) n-Hexane	11.62	TIC	194294	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.40	TIC	1418884	12.923 ng	100
8) 1,4-Difluorobenzene (TIC)	13.65	TIC	3309515	12.737 ng	100
9) Cyclohexane	13.55	TIC	161369	No Calib	
10) 2,3-Dimethylpentane	13.82	TIC	165093	No Calib	
11) n-Heptane	14.66	TIC	154577	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	3859177	12.530 ng	100
14) n-Octane	17.17	TIC	182574	No Calib	
15) C5-C8 Aliphatics (TIC)	16.10	TIC	3859177	11.572 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3464345	12.733 ng	100
18) 2,3-Dimethylheptane	18.37	TIC	190562	No Calib	
19) n-Nonane	19.06	TIC	177815	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	2672493	12.632 ng	100
22) Isopropylbenzene	19.39	120	23988	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	24891	No Calib	
24) 1,3,5-Trimethylbenzene	20.02	120	34652	No Calib	
25) n-Decane	20.44	TIC	181143	No Calib	
26) p-Isopropyltoluene	20.74	134	19324	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	35087	No Calib	
28) Butylcyclohexane	20.95	TIC	212287	No Calib	
29) n-Undecane	21.54	TIC	161102	No Calib	
30) n-Dodecane	22.41	TIC	449	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.95	TIC	218845	2.265 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	35087	2.831 ng	100
33) C9-C10 Aromatics (m/z ...	20.74	134	19324	2.793 ng	100
34) C5C8_TIC_1	16.10	TIC	3859177	1.885 ng	100
35) C5C8 TIC 2	16.10	TIC	3859177	1.885 ng	100
36) C5C8 TIC 3	16.10	TIC	3859177	1.885 ng	100
37) C5C8 TIC 4	16.10	TIC	3859177	1.885 ng	100
38) C9C12 TIC 1	20.95	TIC	218845	0.381 ng	100
39) C9C12 TIC 2	20.95	TIC	218845	0.381 ng	100
40) C9C12 TIC 3	20.95	TIC	218845	0.381 ng	100
41) C9C12 TIC 4	20.95	TIC	218845	0.381 ng	100
42) C9C10 TIC 1	20.74	120	35087	0.577 ng	100
43) C9C10 TIC 2	20.74	134	19324	0.569 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191612.D
Acq On : 19 Dec 2016 19:32 Operator: LH
Sample : 0.5ng MAPH ICAL STD
Misc : S29-12061601/S29-10281604 (12/25)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Dec 20 16:06:19 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191613.D
Acq On : 19 Dec 2016 20:05 Operator: LH
Sample : 1.0ng MAPH ICAL STD
Misc : S29-12061601/S29-10281604 (12/25)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Dec 20 16:08:28 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	282839	12.500 ng	0.00
7) 1,4-Difluorobenzene (IS2)	13.65	114	1415627	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1084403	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.40	65	503499	13.022 ng	0.00
Spiked Amount 12.500				Recovery = 104.16%	
12) Toluene-d8 (SS2)	16.10	98	1449112	12.393 ng	0.00
Spiked Amount 12.500				Recovery = 99.12%	
20) p-Bromofluorobenzene (...	19.28	174	467486	12.346 ng	0.00
Spiked Amount 12.500				Recovery = 98.80%	

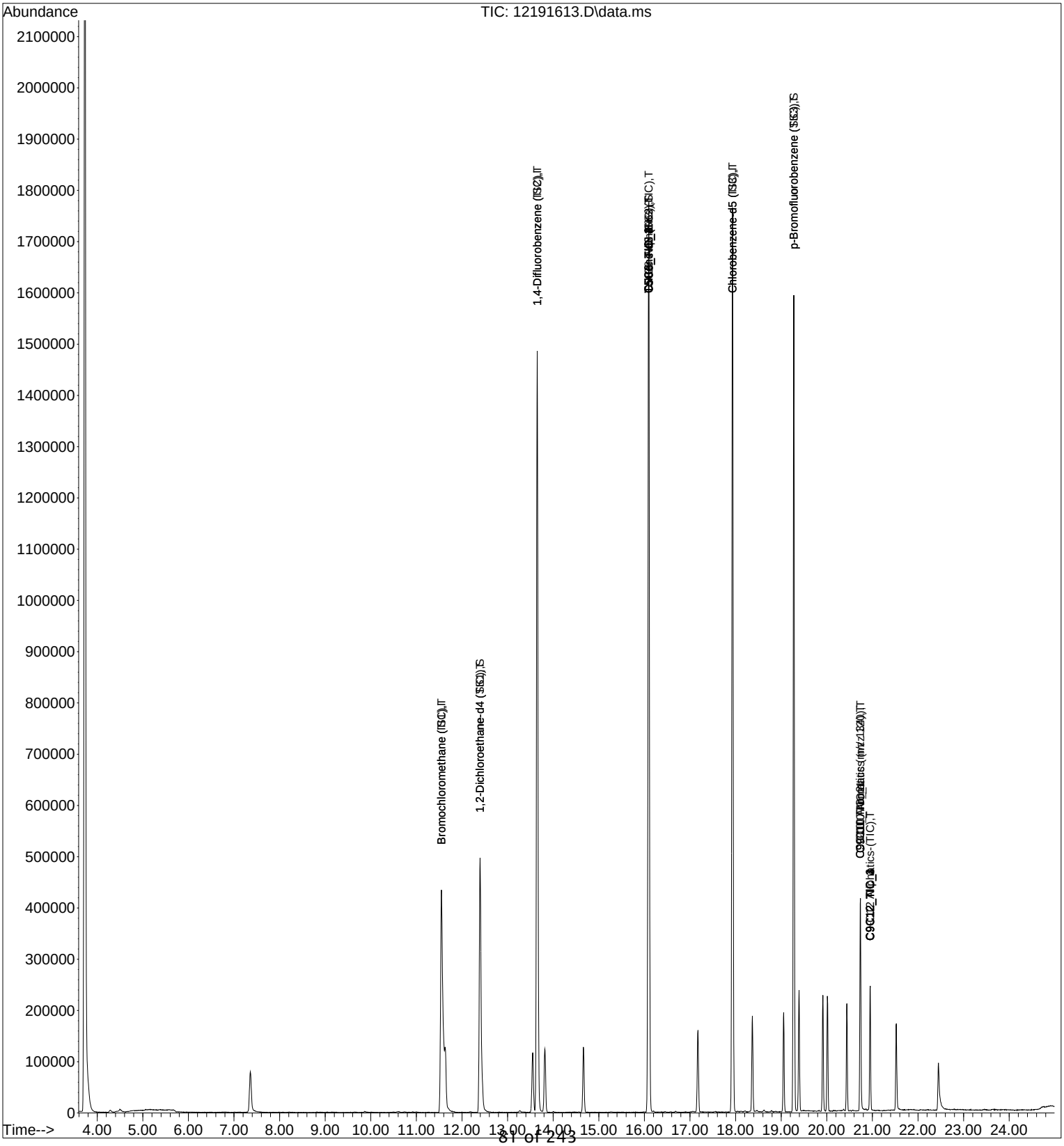
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.55	TIC	1538202m	12.467 ng	
3) Isopentane	7.36	TIC	251075	No Calib	
4) n-Hexane	11.63	TIC	317520	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.40	TIC	1410987	12.904 ng	100
8) 1,4-Difluorobenzene (TIC)	13.65	TIC	3276539	12.754 ng	100
9) Cyclohexane	13.55	TIC	280207	No Calib	
10) 2,3-Dimethylpentane	13.81	TIC	289518	No Calib	
11) n-Heptane	14.66	TIC	265906	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	3834085	12.591 ng	100
14) n-Octane	17.17	TIC	306792	No Calib	
15) C5-C8 Aliphatics (TIC)	16.10	TIC	3834625	11.629 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3446417	12.779 ng	100
18) 2,3-Dimethylheptane	18.37	TIC	336375	No Calib	
19) n-Nonane	19.06	TIC	310390	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	2653301	12.652 ng	100
22) Isopropylbenzene	19.39	120	40776	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	43239	No Calib	
24) 1,3,5-Trimethylbenzene	20.01	120	60385	No Calib	
25) n-Decane	20.44	TIC	315493	No Calib	
26) p-Isopropyltoluene	20.73	134	35427	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	62934	No Calib	
28) Butylcyclohexane	20.95	TIC	378384	No Calib	
29) n-Undecane	21.52	TIC	300459	No Calib	
30) n-Dodecane	22.45	TIC	249005	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.95	TIC	379243	3.960 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	62934	5.122 ng	100
33) C9-C10 Aromatics (m/z ...	20.73	134	35427	5.166 ng	100
34) C5C8_TIC_1	16.10	TIC	3834625	1.889 ng	100
35) C5C8 TIC 2	16.10	TIC	3834625	1.889 ng	100
36) C5C8 TIC 3	16.10	TIC	3834625	1.889 ng	100
37) C5C8 TIC 4	16.10	TIC	3834625	1.889 ng	100
38) C9C12 TIC 1	20.95	TIC	379243	0.667 ng	100
39) C9C12 TIC 2	20.95	TIC	379243	0.667 ng	100
40) C9C12 TIC 3	20.95	TIC	379243	0.667 ng	100
41) C9C12 TIC 4	20.95	TIC	379243	0.667 ng	100
42) C9C10 TIC 1	20.74	120	62934	1.043 ng	100
43) C9C10 TIC 2	20.73	134	35427	1.052 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191613.D
Acq On : 19 Dec 2016 20:05 Operator: LH
Sample : 1.0ng MAPH ICAL STD
Misc : S29-12061601/S29-10281604 (12/25)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Dec 20 16:08:28 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191614.D
Acq On : 19 Dec 2016 20:39 Operator: LH
Sample : 5.0ng MAPH ICAL STD
Misc : S29-12061601/S29-10281604 (12/25)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Dec 20 16:00:31 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016 LH 12/20/16
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	267602	12.500 ng	0.00
7) 1,4-Difluorobenzene (IS2)	13.65	114	1350648	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1034748	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.40	65	479851	13.117 ng	0.00
Spiked Amount 12.500				Recovery = 104.96%	
12) Toluene-d8 (SS2)	16.10	98	1382015	12.387 ng	0.00
Spiked Amount 12.500				Recovery = 99.12%	
20) p-Bromofluorobenzene (...	19.28	174	454232	12.572 ng	0.00
Spiked Amount 12.500				Recovery = 100.56%	

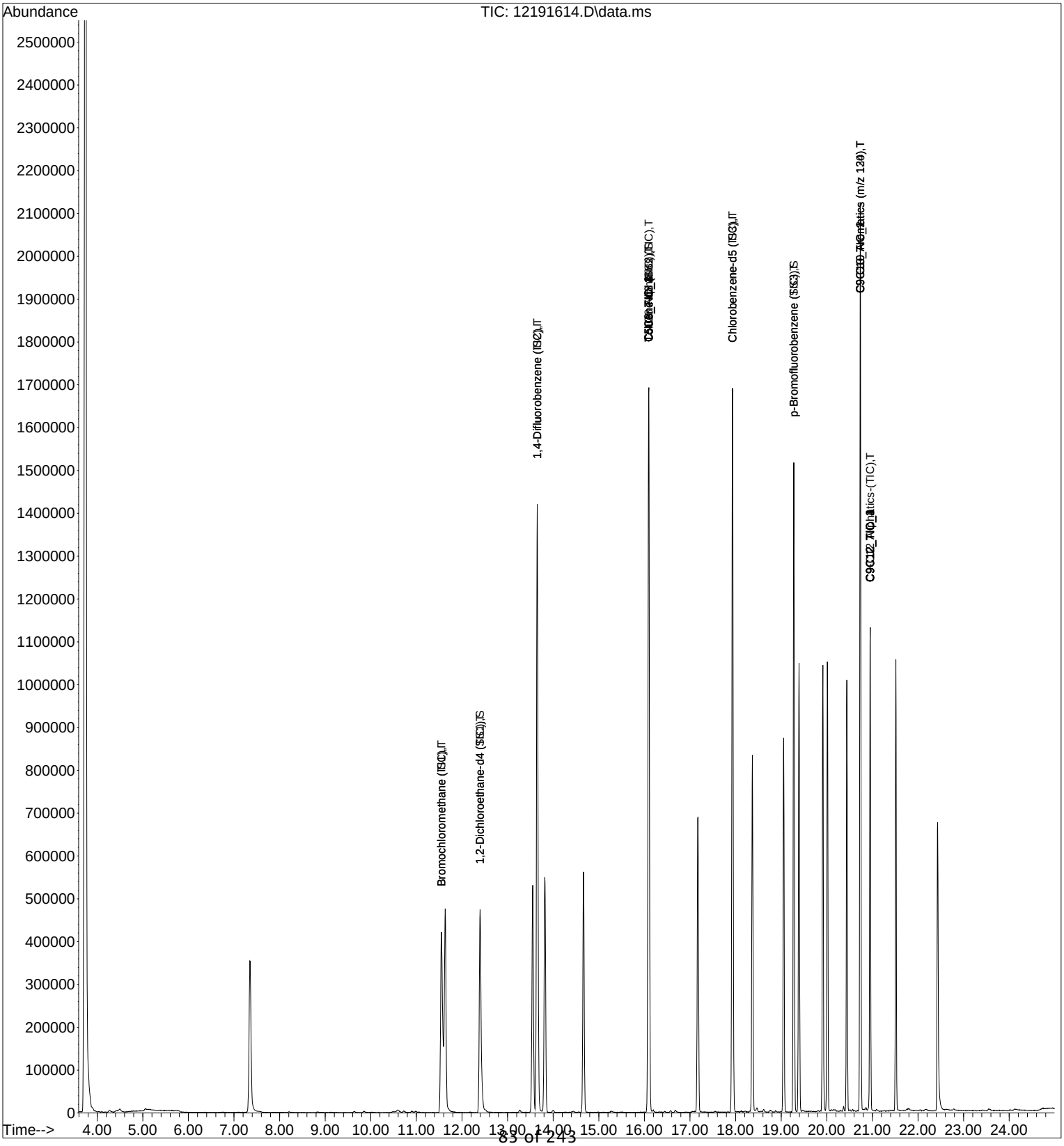
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.55	TIC	1320241	11.310 ng	100
3) Isopentane	7.35	TIC	1071839	No Calib	
4) n-Hexane	11.63	TIC	1251336	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.40	TIC	1354096	13.089 ng	100
8) 1,4-Difluorobenzene (TIC)	13.65	TIC	3118912	12.724 ng	100
9) Cyclohexane	13.55	TIC	1234019	No Calib	
10) 2,3-Dimethylpentane	13.81	TIC	1287102	No Calib	
11) n-Heptane	14.67	TIC	1179401	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	3658491	12.593 ng	100
14) n-Octane	17.17	TIC	1342879	No Calib	
15) C5-C8 Aliphatics (TIC)	16.10	TIC	3658491	11.629 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3298025	12.816 ng	100
18) 2,3-Dimethylheptane	18.37	TIC	1477001	No Calib	
19) n-Nonane	19.06	TIC	1406543	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	2567540	12.830 ng	100
22) Isopropylbenzene	19.39	120	186003	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	200071	No Calib	
24) 1,3,5-Trimethylbenzene	20.01	120	275729	No Calib	
25) n-Decane	20.44	TIC	1452982	No Calib	
26) p-Isopropyltoluene	20.73	134	170154	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	298908	No Calib	
28) Butylcyclohexane	20.95	TIC	1704547	No Calib	
29) n-Undecane	21.51	TIC	1420417	No Calib	
30) n-Dodecane	22.43	TIC	1259084	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.95	TIC	1709008	18.701 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	298908	25.495 ng	100
33) C9-C10 Aromatics (m/z ...	20.73	134	170154	26.001 ng	100
34) C5C8_TIC_1	16.10	TIC	3658491	1.889 ng	100
35) C5C8 TIC 2	16.10	TIC	3658491	1.889 ng	100
36) C5C8 TIC 3	16.10	TIC	3658491	1.889 ng	100
37) C5C8 TIC 4	16.10	TIC	3658491	1.889 ng	100
38) C9C12 TIC 1	20.95	TIC	1709008	3.148 ng	100
39) C9C12 TIC 2	20.95	TIC	1709008	3.148 ng	100
40) C9C12 TIC 3	20.95	TIC	1709008	3.148 ng	100
41) C9C12 TIC 4	20.95	TIC	1709008	3.148 ng	100
42) C9C10 TIC 1	20.74	120	298908	5.193 ng	100
43) C9C10 TIC 2	20.73	134	170154	5.296 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191614.D
Acq On : 19 Dec 2016 20:39 Operator: LH
Sample : 5.0ng MAPH ICAL STD
Misc : S29-12061601/S29-10281604 (12/25)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Dec 20 16:00:31 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191615.D
Acq On : 19 Dec 2016 21:12 Operator: LH
Sample : 25ng MAPH ICAL STD
Misc : S29-12061601/S29-10281603 (12/25)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Dec 20 16:00:32 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

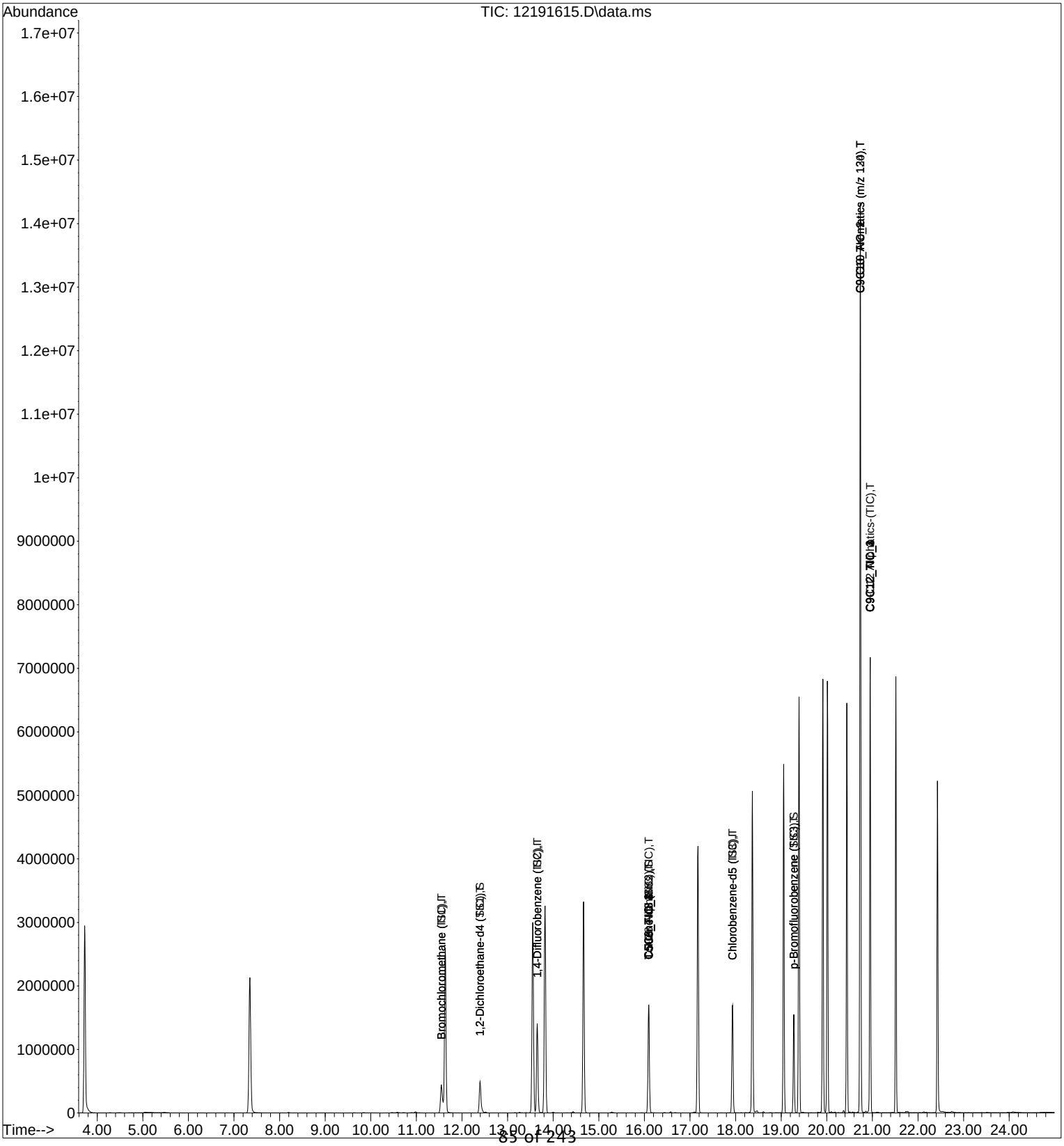
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	270737	12.500 ng	0.00
7) 1,4-Difluorobenzene (IS2)	13.65	114	1341426	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1037530	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.40	65	480900	12.994 ng	0.00
Spiked Amount 12.500				Recovery = 103.92%	
12) Toluene-d8 (SS2)	16.10	98	1377301	12.430 ng	0.00
Spiked Amount 12.500				Recovery = 99.44%	
20) p-Bromofluorobenzene (...	19.28	174	459253	12.677 ng	0.00
Spiked Amount 12.500				Recovery = 101.44%	
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.55	TIC	1316783	11.149 ng	100
3) Isopentane	7.35	TIC	5786983	No Calib	
4) n-Hexane	11.63	TIC	5985003	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.40	TIC	1340717	12.810 ng	100
8) 1,4-Difluorobenzene (TIC)	13.65	TIC	3066006	12.595 ng	100
9) Cyclohexane	13.55	TIC	7028601	No Calib	
10) 2,3-Dimethylpentane	13.82	TIC	7336654	No Calib	
11) n-Heptane	14.67	TIC	6689806	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	3636514	12.603 ng	100
14) n-Octane	17.17	TIC	7876179	No Calib	
15) C5-C8 Aliphatics (TIC)	16.10	TIC	3636514	11.639 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3304897	12.808 ng	100
18) 2,3-Dimethylheptane	18.37	TIC	8638505	No Calib	
19) n-Nonane	19.06	TIC	8346424	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	2601878	12.967 ng	100
22) Isopropylbenzene	19.39	120	1138777	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	1279486	No Calib	
24) 1,3,5-Trimethylbenzene	20.01	120	1732103	No Calib	
25) n-Decane	20.44	TIC	8968276	No Calib	
26) p-Isopropyltoluene	20.73	134	1125800	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	2010849	No Calib	
28) Butylcyclohexane	20.95	TIC	10241012	No Calib	
29) n-Undecane	21.51	TIC	8828047	No Calib	
30) n-Dodecane	22.43	TIC	7461396	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.95	TIC	10241012	111.765 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	2010849	171.055 ng	100
33) C9-C10 Aromatics (m/z ...	20.73	134	1125800	171.574 ng	100
34) C5C8_TIC_1	16.10	TIC	3636514	1.873 ng	100
35) C5C8 TIC 2	16.10	TIC	3636514	1.873 ng	100
36) C5C8 TIC 3	16.10	TIC	3636514	1.873 ng	100
37) C5C8 TIC 4	16.10	TIC	3636514	1.873 ng	100
38) C9C12 TIC 1	20.95	TIC	10241012	18.816 ng	100
39) C9C12 TIC 2	20.95	TIC	10241012	18.816 ng	100
40) C9C12 TIC 3	20.95	TIC	10241012	18.816 ng	100
41) C9C12 TIC 4	20.95	TIC	10241012	18.816 ng	100
42) C9C10 TIC 1	20.74	120	2010849	34.838 ng	100
43) C9C10 TIC 2	20.73	134	1125800	34.944 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191615.D
Acq On : 19 Dec 2016 21:12 Operator: LH
Sample : 25ng MAPH ICAL STD
Misc : S29-12061601/S29-10281603 (12/25)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Dec 20 16:00:32 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191616.D
Acq On : 19 Dec 2016 21:45 Operator: LH
Sample : 50ng MAPH ICAL STD
Misc : S29-12061601/S29-10281603 (12/25)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Dec 20 16:00:33 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

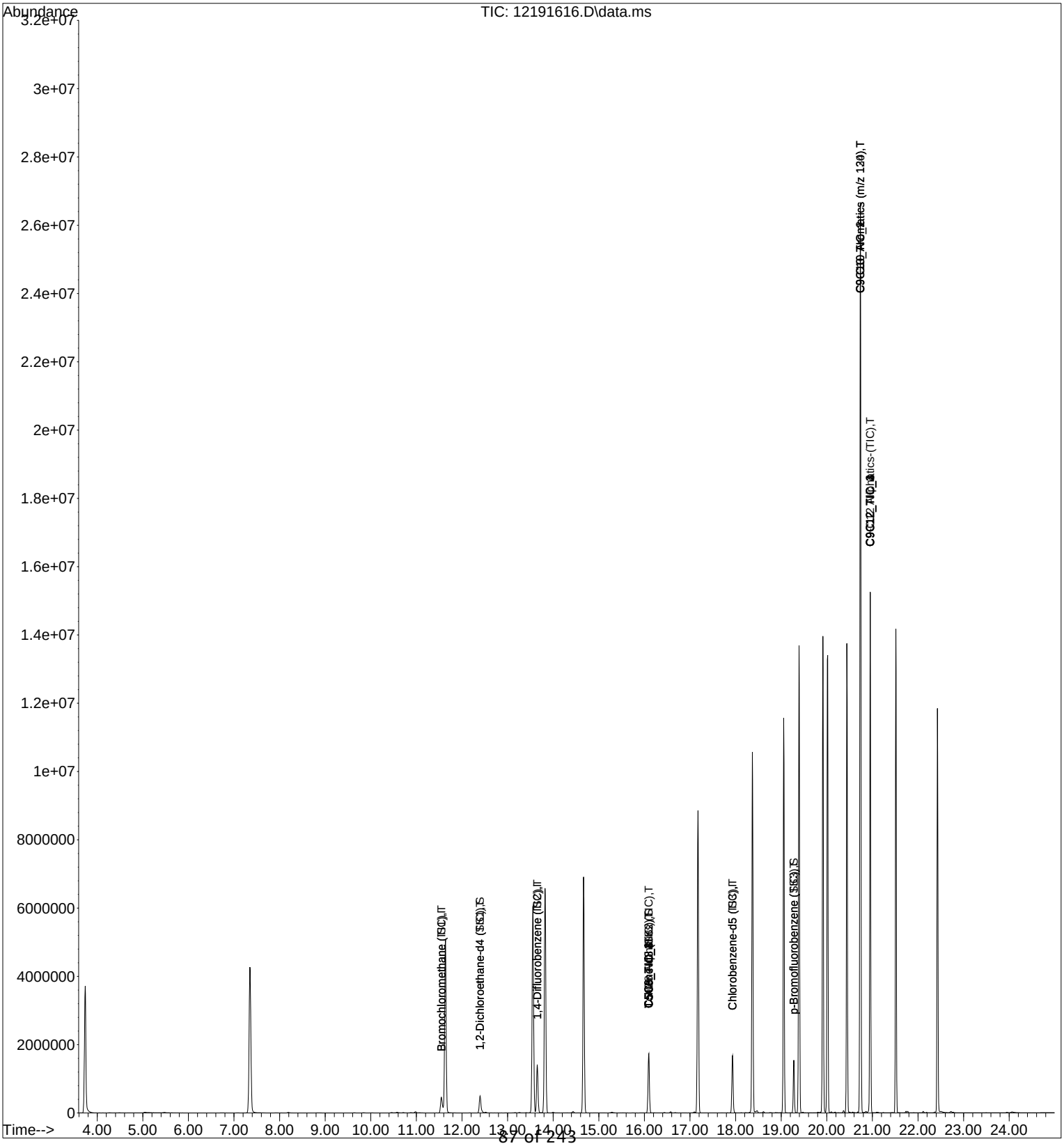
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	268499	12.500 ng	0.00
7) 1,4-Difluorobenzene (IS2)	13.65	114	1348020	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1036571	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.40	65	480798	13.099 ng	0.00
Spiked Amount 12.500				Recovery = 104.80%	
12) Toluene-d8 (SS2)	16.10	98	1388648	12.471 ng	0.00
Spiked Amount 12.500				Recovery = 99.76%	
20) p-Bromofluorobenzene (...	19.28	174	459998	12.709 ng	0.00
Spiked Amount 12.500				Recovery = 101.68%	
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.55	TIC	1283090	10.955 ng	100
3) Isopentane	7.35	TIC	11537839	No Calib	
4) n-Hexane	11.64	TIC	11728245	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.40	TIC	1346053	12.968 ng	100
8) 1,4-Difluorobenzene (TIC)	13.65	TIC	3082836	12.602 ng	100
9) Cyclohexane	13.56	TIC	14143584	No Calib	
10) 2,3-Dimethylpentane	13.82	TIC	14784784	No Calib	
11) n-Heptane	14.67	TIC	13558680	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	3675145	12.675 ng	100
14) n-Octane	17.17	TIC	16113832	No Calib	
15) C5-C8 Aliphatics (TIC)	16.10	TIC	3675145	11.705 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3323875	12.894 ng	100
18) 2,3-Dimethylheptane	18.37	TIC	17810606	No Calib	
19) n-Nonane	19.06	TIC	17334221	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	2613704	13.038 ng	100
22) Isopropylbenzene	19.39	120	2371392	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	2658644	No Calib	
24) 1,3,5-Trimethylbenzene	20.02	120	3561772	No Calib	
25) n-Decane	20.44	TIC	18673731	No Calib	
26) p-Isopropyltoluene	20.73	134	2171411	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	3867319	No Calib	
28) Butylcyclohexane	20.95	TIC	21367070	No Calib	
29) n-Undecane	21.51	TIC	18631052	No Calib	
30) n-Dodecane	22.43	TIC	16096908	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.95	TIC	21367070	233.406 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	3867319	329.283 ng	100
33) C9-C10 Aromatics (m/z ...	20.73	134	2171411	331.233 ng	100
34) C5C8_TIC_1	16.10	TIC	3675145	1.894 ng	100
35) C5C8 TIC 2	16.10	TIC	3675145	1.894 ng	100
36) C5C8 TIC 3	16.10	TIC	3675145	1.894 ng	100
37) C5C8 TIC 4	16.10	TIC	3675145	1.894 ng	100
38) C9C12 TIC 1	20.95	TIC	21367070	39.294 ng	100
39) C9C12 TIC 2	20.95	TIC	21367070	39.294 ng	100
40) C9C12 TIC 3	20.95	TIC	21367070	39.294 ng	100
41) C9C12 TIC 4	20.95	TIC	21367070	39.294 ng	100
42) C9C10 TIC 1	20.74	120	3867319	67.064 ng	100
43) C9C10 TIC 2	20.73	134	2171411	67.461 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191616.D
Acq On : 19 Dec 2016 21:45 Operator: LH
Sample : 50ng MAPH ICAL STD
Misc : S29-12061601/S29-10281603 (12/25)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Dec 20 16:00:33 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191617.D
Acq On : 19 Dec 2016 22:18 Operator: LH
Sample : 100ng MAPH ICAL STD
Misc : S29-12061601/S29-10281603 (12/25)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Dec 20 16:00:34 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

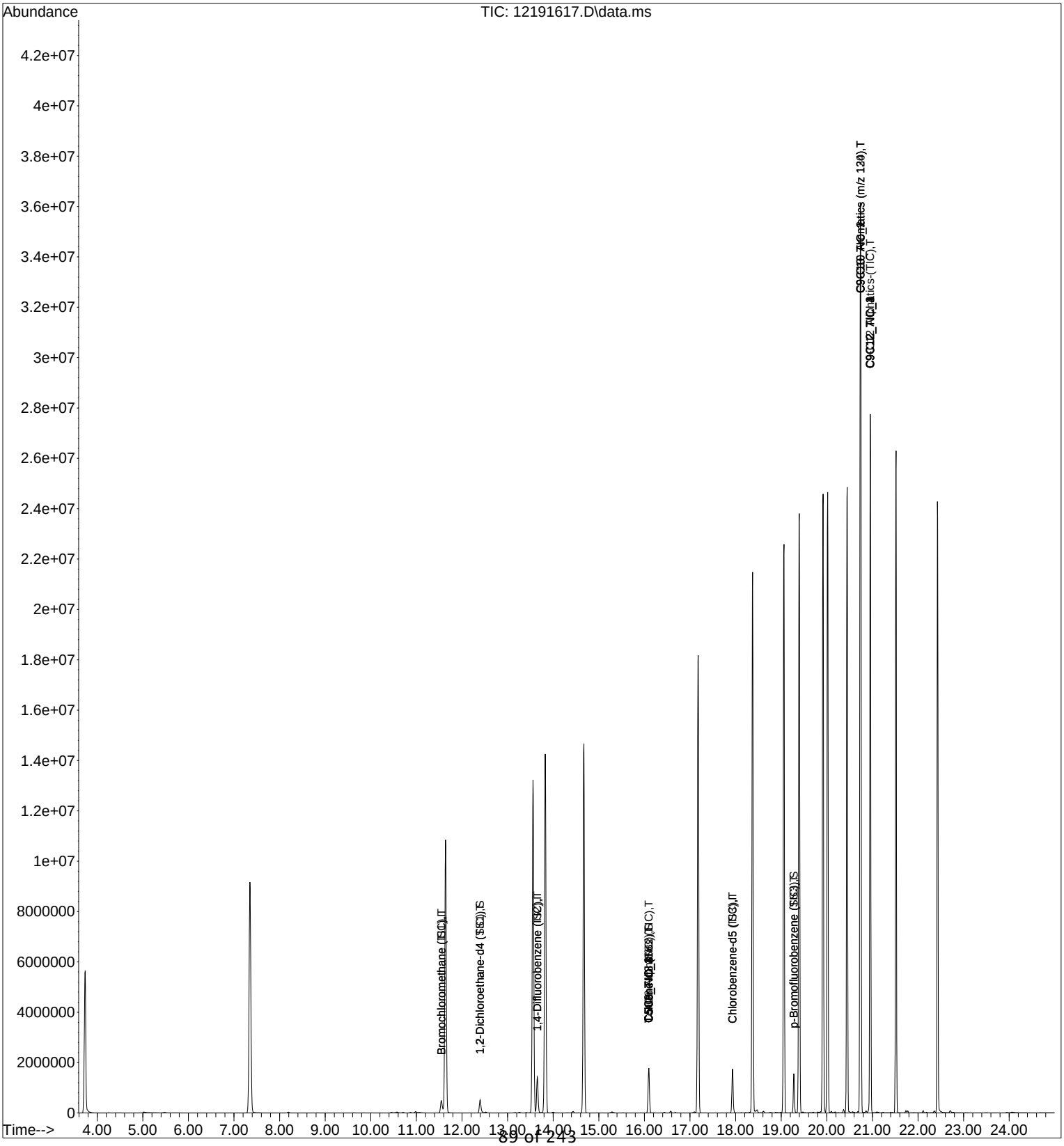
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	276134	12.500 ng	0.00
7) 1,4-Difluorobenzene (IS2)	13.65	114	1379188	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1065075	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.40	65	495029	13.114 ng	0.00
Spiked Amount 12.500				Recovery = 104.88%	
12) Toluene-d8 (SS2)	16.10	98	1423969	12.499 ng	0.00
Spiked Amount 12.500				Recovery = 100.00%	
20) p-Bromofluorobenzene (...	19.28	174	469178	12.616 ng	0.00
Spiked Amount 12.500				Recovery = 100.96%	
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.55	TIC	1345404	11.169 ng	100
3) Isopentane	7.35	TIC	24462071	No Calib	
4) n-Hexane	11.64	TIC	25181283	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.40	TIC	1386295	12.986 ng	100
8) 1,4-Difluorobenzene (TIC)	13.65	TIC	3132467	12.515 ng	100
9) Cyclohexane	13.56	TIC	30151415	No Calib	
10) 2,3-Dimethylpentane	13.83	TIC	31435664	No Calib	
11) n-Heptane	14.67	TIC	29444115	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	3780224	12.742 ng	100
14) n-Octane	17.18	TIC	34704181	No Calib	
15) C5-C8 Aliphatics (TIC)	16.10	TIC	3778521	11.762 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3455252	13.044 ng	100
18) 2,3-Dimethylheptane	18.37	TIC	37607727	No Calib	
19) n-Nonane	19.06	TIC	36388397	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	2677175	12.997 ng	100
22) Isopropylbenzene	19.40	120	4777654	No Calib	
23) 1-Methyl-3-ethylbenzene	19.92	120	5308282	No Calib	
24) 1,3,5-Trimethylbenzene	20.02	120	6986753	No Calib	
25) n-Decane	20.45	TIC	38060288	No Calib	
26) p-Isopropyltoluene	20.74	134	3516405	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	6207230	No Calib	
28) Butylcyclohexane	20.95	TIC	42699385	No Calib	
29) n-Undecane	21.52	TIC	38121852	No Calib	
30) n-Dodecane	22.43	TIC	34899971	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.95	TIC	42708354	454.044 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	6207230	514.370 ng	100
33) C9-C10 Aromatics (m/z ...	20.74	134	3516405	522.047 ng	100
34) C5C8_TIC_1	16.10	TIC	3778521	1.896 ng	100
35) C5C8 TIC 2	16.10	TIC	3778521	1.896 ng	100
36) C5C8 TIC 3	16.10	TIC	3778521	1.896 ng	100
37) C5C8 TIC 4	16.10	TIC	3778521	1.896 ng	100
38) C9C12 TIC 1	20.95	TIC	42708354	76.438 ng	100
39) C9C12 TIC 2	20.95	TIC	42708354	76.438 ng	100
40) C9C12 TIC 3	20.95	TIC	42708354	76.438 ng	100
41) C9C12 TIC 4	20.95	TIC	42708354	76.438 ng	100
42) C9C10 TIC 1	20.74	120	6207230	104.760 ng	100
43) C9C10 TIC 2	20.74	134	3516405	106.323 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191617.D
Acq On : 19 Dec 2016 22:18 Operator: LH
Sample : 100ng MAPH ICAL STD
Misc : S29-12061601/S29-10281603 (12/25)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Dec 20 16:00:34 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191618.D
Acq On : 19 Dec 2016 22:52 Operator: LH
Sample : 25ng MAPH ICV STD
Misc : S29-12061601/S29-12011603 (12/30)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 16:12:20 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.56	130	305732	12.500 ng	0.01
7) 1,4-Difluorobenzene (IS2)	13.66	114	1464517	12.500 ng	0.01
16) Chlorobenzene-d5 (IS3)	17.93	117	1154900	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.41	65	532142	12.183 ng	0.01
Spiked Amount 12.500				Recovery = 97.44%	
12) Toluene-d8 (SS2)	16.10	98	1504935	12.524 ng	0.00
Spiked Amount 12.500				Recovery = 100.16%	
20) p-Bromofluorobenzene (...	19.28	174	502213	12.395 ng	0.00
Spiked Amount 12.500				Recovery = 99.20%	

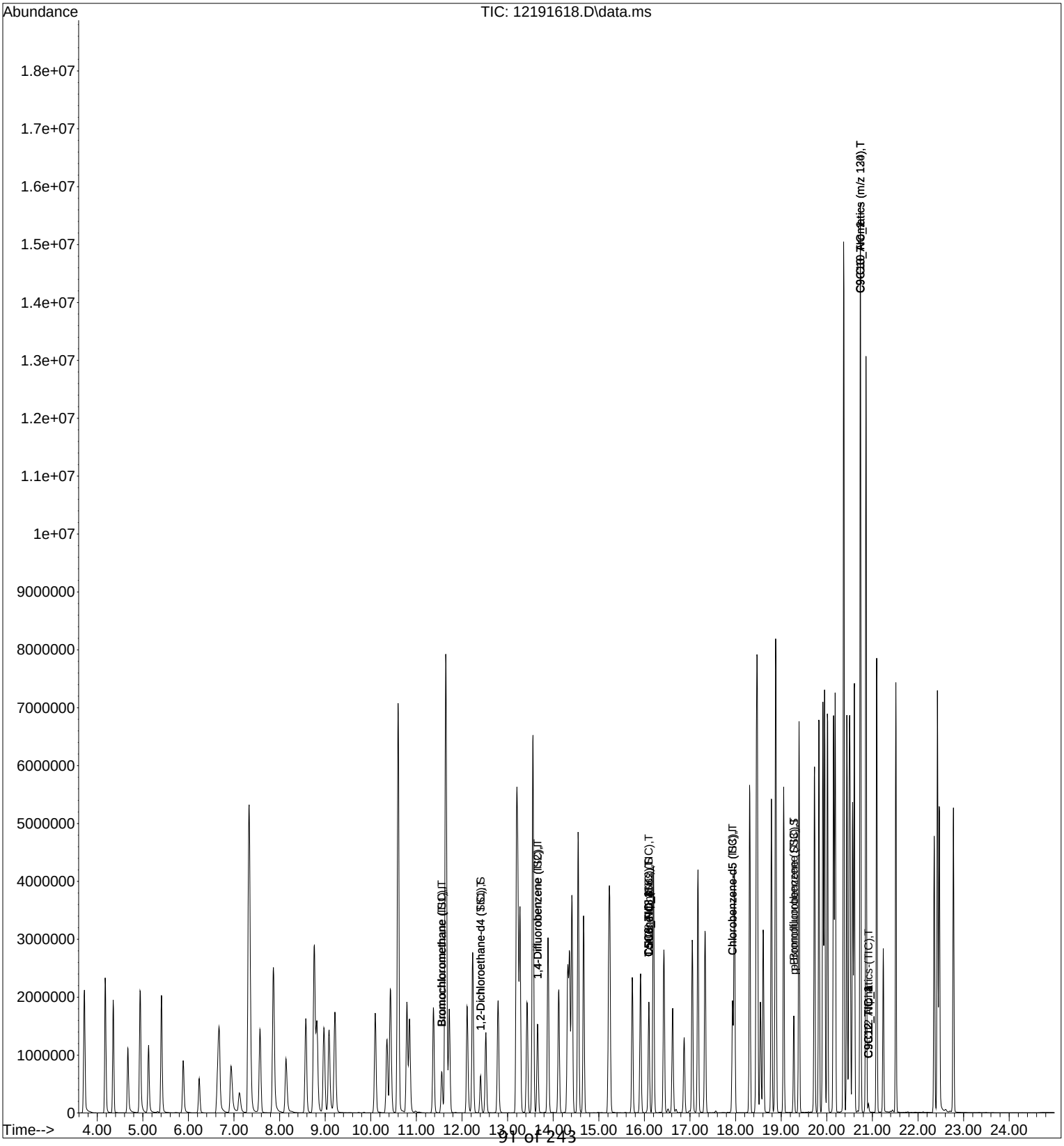
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.55	TIC	1715527	13.827 ng	100
3) Isopentane	7.33	TIC	18528219	No Calib #	
4) n-Hexane	11.64	TIC	21993235	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.41	TIC	1492336	12.191 ng	100
8) 1,4-Difluorobenzene (TIC)	13.66	TIC	3380530	12.564 ng	100
9) Cyclohexane	13.56	TIC	15138007	No Calib	
10) 2,3-Dimethylpentane	13.81	TIC	15647	No Calib	
11) n-Heptane	14.67	TIC	6882590	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	4043706	12.712 ng	100
14) n-Octane	17.17	TIC	7863461	No Calib	
15) C5-C8 Aliphatics (TIC)	16.10	TIC	4043706	11.799 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3852933	13.053 ng	100
18) 2,3-Dimethylheptane	18.31	TIC	10055348	No Calib	
19) n-Nonane	19.06	TIC	8692614	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	2858159	12.445 ng	100
22) Isopropylbenzene	19.39	120	1175762	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	1448006	No Calib	
24) 1,3,5-Trimethylbenzene	20.02	120	1828657	No Calib	
25) n-Decane	20.44	TIC	9456791	No Calib	
26) p-Isopropyltoluene	20.74	134	1216748	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	2172555	No Calib	
28) Butylcyclohexane	20.91	TIC	203268	No Calib	
29) n-Undecane	21.51	TIC	9918169	No Calib	
30) n-Dodecane	22.46	TIC	8664481	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.91	TIC	203268	2.741 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	2172555	141.963 ng	100
33) C9-C10 Aromatics (m/z ...	20.74	134	1216748	141.595 ng	100
34) C5C8_TIC_1	16.10	TIC	4043706	1.820 ng	100
35) C5C8 TIC 2	16.10	TIC	4043706	1.820 ng	100
36) C5C8 TIC 3	16.10	TIC	4043706	1.820 ng	100
37) C5C8 TIC 4	16.10	TIC	4043706	1.820 ng	100
38) C9C12 TIC 1	20.91	TIC	203268	0.462 ng	100
39) C9C12 TIC 2	20.91	TIC	203268	0.462 ng	100
40) C9C12 TIC 3	20.91	TIC	203268	0.462 ng	100
41) C9C12 TIC 4	20.91	TIC	203268	0.462 ng	100
42) C9C10 TIC 1	20.74	120	2172555	28.913 ng	100
43) C9C10 TIC 2	20.74	134	1216748	28.838 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191618.D
Acq On : 19 Dec 2016 22:52 Operator: LH
Sample : 25ng MAPH ICV STD
Misc : S29-12061601/S29-12011603 (12/30)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 16:12:20 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Massachusetts APH

Initial Calibration Verification/Laboratory Control Sample Check Sheet

Data File Name: **12191618.D**
Data File Path: **I:\MS16\DATA\2016_12\19**
Operator: **LH**
Date Acquired: **12/19/16 22:52**
Acq. Method File: **TO15.M**
Sample Name: **25ng MAPH ICV STD**
Misc Info: **S29-12061601/S29-12011603 (12/30)**
Instrument Name: **GCMS-16**

Enter RRFs from current ICAL!

	Internal Standards	**RT**	**Area**
7)	1,4-Difluorobenzene (IS2)	13.66	1464517
16)	Chlorobenzene-d5 (IS3)	17.93	1154900

	C5-C8 Aliphatics	**RT**	**Area**	**RRF**	**ng**	**% Rec.**	**LCL**	**UCL**	**Pass/Fail**
11)	n-Heptane	14.67	6882590	2.208	23.96	**90.1**	**70**	**130**	Pass

Spike Amt (ng)	**ICAL RRF**
26.600	2.452

	C9-C12 Aliphatics	**RT**	**Area**	**RRF**	**ng**	**% Rec.**			
29)	n-Undecane	21.51	9918169	4.036	26.85	**100.9**	**70**	**130**	Pass

Spike Amt (ng)	**ICAL RRF**
26.600	3.998

	C9-C10 Aromatics	**RT**	**Area**	**RRF**	**ng**	**% Rec.**			
24)	1,3,5-Trimethylbenzene	20.02	1828657	0.621	51.50	**97.0**	**70**	**130**	Pass
26)	p-Isopropyltoluene	20.74	1216748						
			3045405						

Spike Amt (ng)	**ICAL RRF**
53.075	0.640

LH ***12/20/16***

Massachusetts APH

Continuing Calibration Verification Check Sheet

Data File Name: **01251701.D**
Data File Path: **I:\MS16\DATA\2017_01\25**
Operator: **LH**
Date Acquired: **1/25/17 5:31**
Acq. Method File: **TO15.M**
Sample Name: **CCV M16012417_25ng**
Misc Info: **S29-01191701/S29-12271603 (2/23)**
Instrument Name: **GCMS-16**

Enter RRFs from current ICAL!

	Internal Standards	RT	Area
7)	1,4-Difluorobenzene (IS2)	13.65	1215322
16)	Chlorobenzene-d5 (IS3)	17.93	912947

	C5-C8 Aliphatics	RT	Area	RRF	ng	% D	LCL	UCL	Pass/Fai
3)	Isopentane	7.35	5005430	2.318	148.6	**-5.48**	**-30**	**30**	Pass
4)	n-Hexane	11.63	5194788						
9)	Cyclohexane	13.55	5993737						
10)	2,3-Dimethylpentane	13.82	6344363	**Spike**	**ICAL**				
11)	n-Heptane	14.67	6003694	**Amt (ng)**	**RRF**				
14)	n-Octane	17.17	6892778	157.25	2.452				
			35434790						

	C9-C12 Aliphatics	RT	Area	RRF	ng	% D			
18)	2,3-Dimethylheptane	18.37	7569234	4.456	165.5	**11.46**	**-30**	**30**	Pass
19)	n-Nonane	19.06	7352052						
25)	n-Decane	20.44	7977759						
28)	Butylcyclohexane	20.95	8962575	**Spike**	**ICAL**				
29)	n-Undecane	21.52	8187628	**Amt (ng)**	**RRF**				
30)	n-Dodecane	22.43	8281891	148.50	3.998				
			48331139						

	C9-C10 Aromatics	RT	Area	RRF	ng	% D			
22)	Isopropylbenzene	19.39	958735	0.692	132.7	**8.10**	**-30**	**30**	Pass
23)	1-Methyl-3-ethylbenzene	19.91	1074879						
24)	1,3,5-Trimethylbenzene	20.02	1465964						
26)	p-Isopropyltoluene	20.74	971992	**Spike**	**ICAL**				
27)	1,2,3-Trimethylbenzene	20.74	1730835	**Amt (ng)**	**RRF**				
			6202405	122.75	0.640				

LH ***1/25/17***

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\25\01251701.D
Acq On : 25 Jan 2017 5:31 Operator: LH
Sample : CCV M16012417 25ng
Misc : S29-01191701/S29-12271603 (2/23)
ALS Vial : 3 Sample Multiplier: 1

Quant Time: Jan 25 09:08:29 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 1/25/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.54	130	241377	12.500 ng	-0.01
7) 1,4-Difluorobenzene (IS2)	13.65	114	1215322	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	912947	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.39	65	439194	12.736 ng	0.00
Spiked Amount 12.500				Recovery = 101.92%	
12) Toluene-d8 (SS2)	16.09	98	1257592	12.612 ng	0.00
Spiked Amount 12.500				Recovery = 100.88%	
20) p-Bromofluorobenzene (...	19.28	174	380701	11.886 ng	0.00
Spiked Amount 12.500				Recovery = 95.12%	

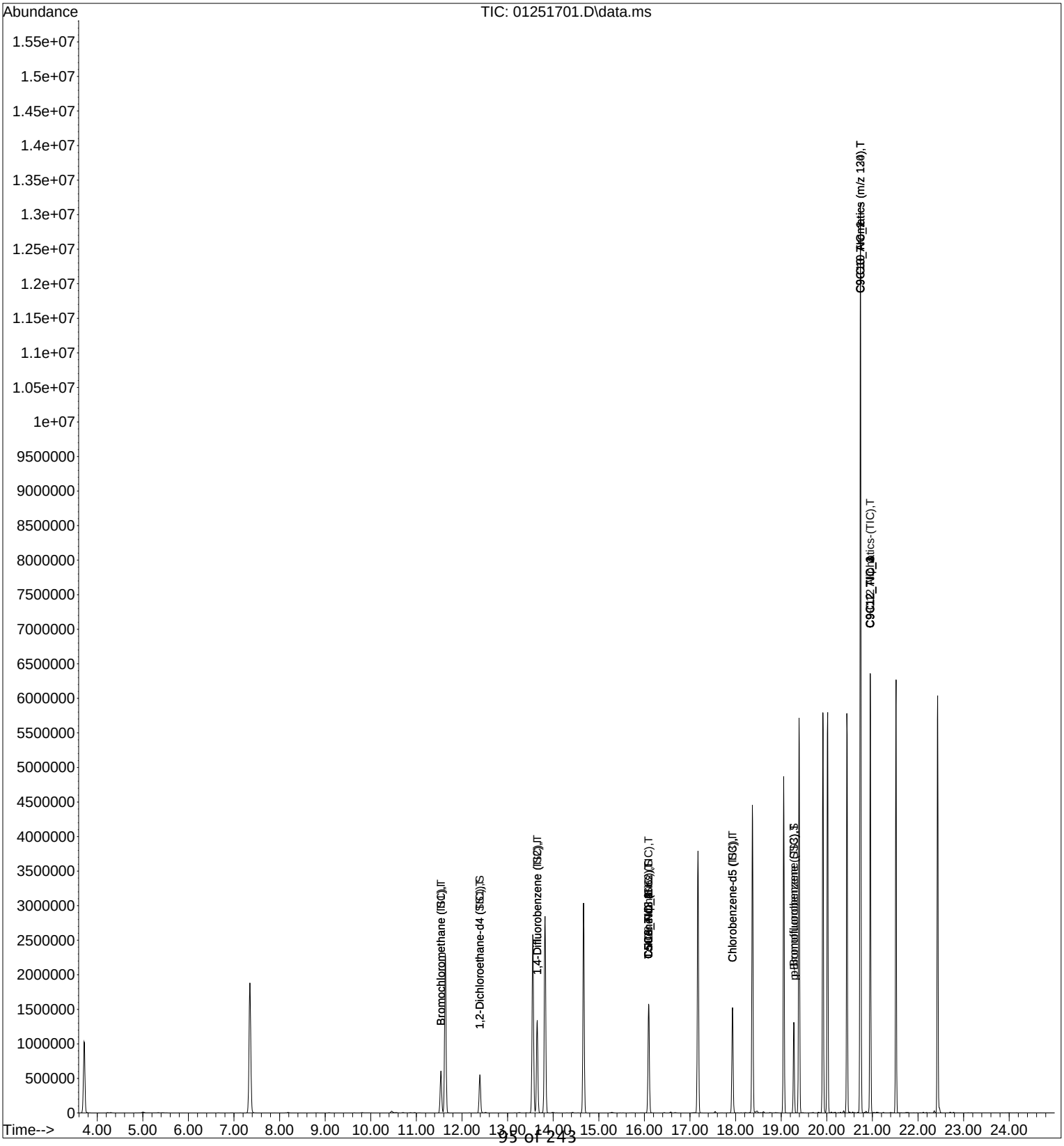
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.54	TIC	1419498	14.491 ng	100
3) Isopentane	7.35	TIC	5005430	No Calib	
4) n-Hexane	11.63	TIC	5194788	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.39	TIC	1255488	12.990 ng	100
8) 1,4-Difluorobenzene (TIC)	13.65	TIC	2843961	12.737 ng	100
9) Cyclohexane	13.55	TIC	5993737	No Calib	
10) 2,3-Dimethylpentane	13.82	TIC	6344363	No Calib	
11) n-Heptane	14.67	TIC	6003694	No Calib	
13) Toluene-d8 (TIC)	16.09	TIC	3360548	12.730 ng	100
14) n-Octane	17.17	TIC	6892778	No Calib	
15) C5-C8 Aliphatics (TIC)	16.09	TIC	3360548	11.816 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	2957392	12.675 ng	100
18) 2,3-Dimethylheptane	18.37	TIC	7569234	No Calib	
19) n-Nonane	19.06	TIC	7352052	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	2222401	12.242 ng	100
22) Isopropylbenzene	19.39	120	958735	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	1074879	No Calib	
24) 1,3,5-Trimethylbenzene	20.02	120	1465964	No Calib	
25) n-Decane	20.44	TIC	7977759	No Calib	
26) p-Isopropyltoluene	20.74	134	971992	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	1730835	No Calib	
28) Butylcyclohexane	20.95	TIC	8962575	No Calib	
29) n-Undecane	21.52	TIC	8187628	No Calib	
30) n-Dodecane	22.43	TIC	8281891	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.95	TIC	8962575	152.907 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	1730835	143.073 ng	100
33) C9-C10 Aromatics (m/z ...	20.74	134	971992	143.090 ng	100
34) C5C8_TIC_1	16.09	TIC	3360548	1.913 ng	100
35) C5C8 TIC 2	16.09	TIC	3360548	1.913 ng	100
36) C5C8 TIC 3	16.09	TIC	3360548	1.913 ng	100
37) C5C8 TIC 4	16.09	TIC	3360548	1.913 ng	100
38) C9C12 TIC 1	20.95	TIC	8962575	25.742 ng	100
39) C9C12 TIC 2	20.95	TIC	8962575	25.742 ng	100
40) C9C12 TIC 3	20.95	TIC	8962575	25.742 ng	100
41) C9C12 TIC 4	20.95	TIC	8962575	25.742 ng	100
42) C9C10 TIC 1	20.74	120	1730835	29.139 ng	100
43) C9C10 TIC 2	20.74	134	971992	29.143 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\25\01251701.D
Acq On : 25 Jan 2017 5:31 Operator: LH
Sample : CCV M16012417 25ng
Misc : S29-01191701/S29-12271603 (2/23)
ALS Vial : 3 Sample Multiplier: 1

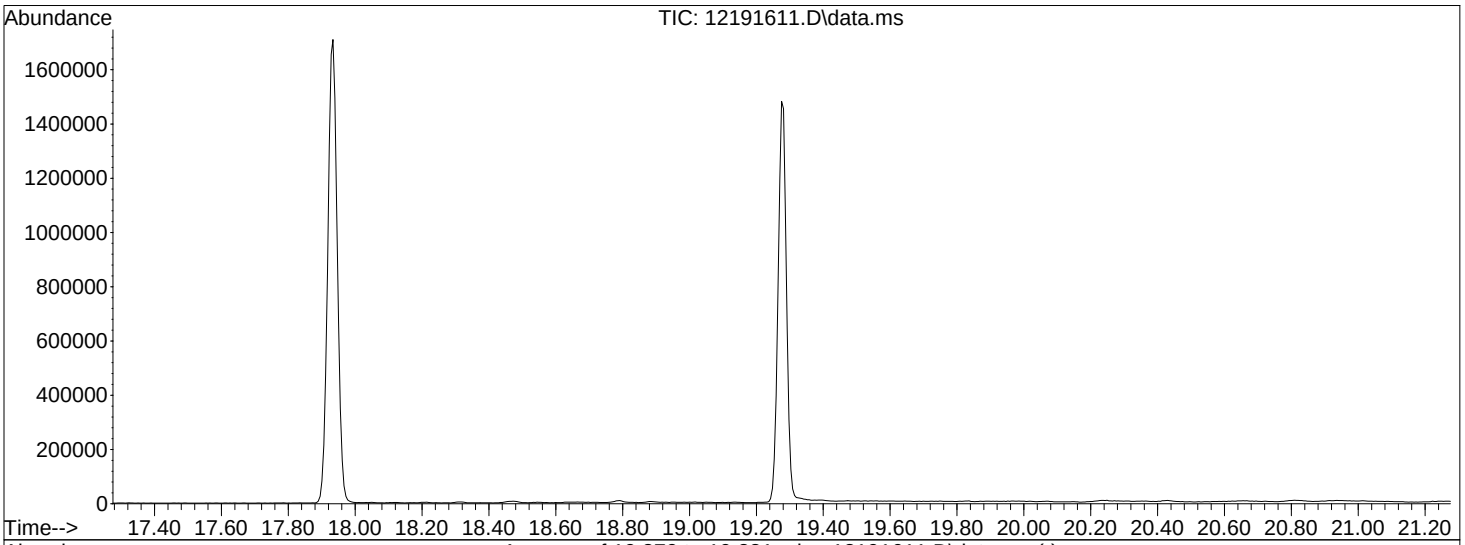
Quant Time: Jan 25 09:08:29 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

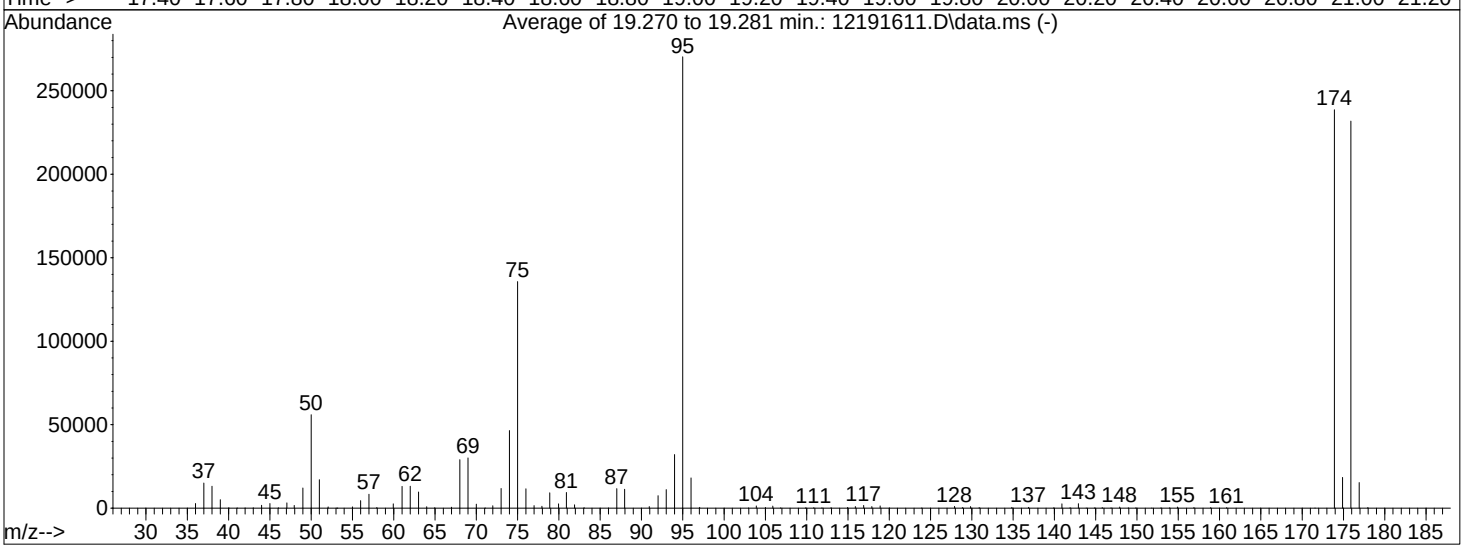


Data Path : I:\MS16\DATA\2016 12\19\
Data File : 12191611.D
Acq On : 19 Dec 2016 18:59
Operator : LH
Sample : 12.5ng TO-15 BFB
Misc : S29-12061601
ALS Vial : 2 Sample Multiplier: 1

Integration File: RTEINT.P

Method : I:\MS16\METHODS\M16121916.M
Title : Massachusetts APH
Last Update : Tue Dec 20 14:50:26 2016





AutoFind: Scans 2852, 2853, 2854; Background Corrected with Scan 2843

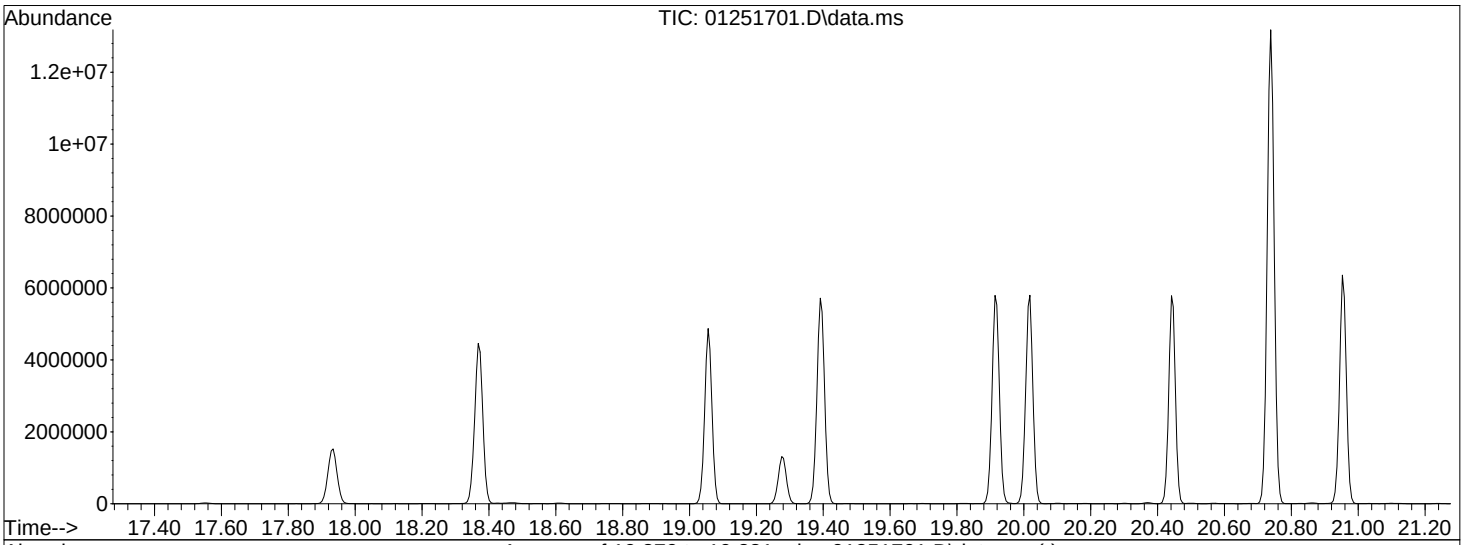
Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	20.7	56021	PASS
75	95	30	66	50.2	135707	PASS
95	95	100	100	100.0	270357	PASS
96	95	5	9	6.7	18099	PASS
173	174	0.00	2	0.0	0	PASS
174	95	50	120	88.3	238592	PASS
175	174	4	9	7.7	18392	PASS
176	174	93	101	97.2	231808	PASS
177	176	5	9	6.6	15296	PASS

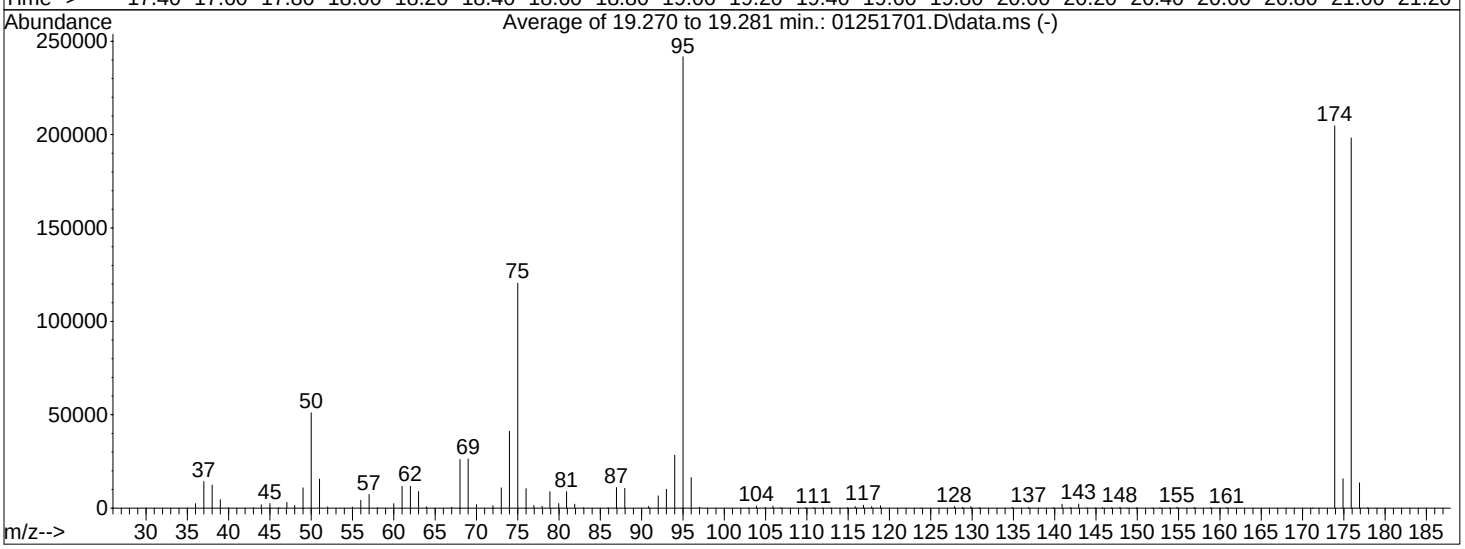
LH 12/20/16

Data Path : I:\MS16\DATA\2017 01\25\
Data File : 01251701.D
Acq On : 25 Jan 2017 5:31
Operator : LH
Sample : CCV M16012417 25ng
Misc : S29-01191701/S29-12271603 (2/23)
ALS Vial : 3 Sample Multiplier: 1

Integration File: RTEINT.P

Method : I:\MS16\METHODS\M16121916.M
Title : Massachusetts APH
Last Update : Tue Dec 20 16:11:55 2016





AutoFind: Scans 2852, 2853, 2854; Background Corrected with Scan 2842

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	21.1	51051	PASS
75	95	30	66	49.8	120451	PASS
95	95	100	100	100.0	241664	PASS
96	95	5	9	6.8	16367	PASS
173	174	0.00	2	0.0	0	PASS
174	95	50	120	84.7	204629	PASS
175	174	4	9	7.7	15767	PASS
176	174	93	101	96.9	198251	PASS
177	176	5	9	6.8	13579	PASS

LH 1/25/17

Injection Log

Directory: J:\MS16\DATA\2016_12\19\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	12/19/16 8:58	12191601.D	Blank (100mL)	S29-12061601	LH	2	
2	12/19/16 10:27	12191602.D	Blank (100mL)	S29-12061601	LH	2	
3	12/19/16 11:01	12191603.D	0.1ng std check	S29-12061601/S29-11301611 (12/29)	LH	6	
4	12/19/16 12:03	12191604.D	Blank (100mL)	S29-12061601	LH	2	
5	12/19/16 12:36	12191605.D	Blank (100mL)	S29-12061601	LH	2	
6	12/19/16 13:09	12191606.D	Blank (100mL)	S29-12061601	LH	2	
7	12/19/16 13:43	12191607.D	Blank (100mL)	S29-12061601	LH	2	
8	12/19/16 17:19	12191608.D	1.0ng std check	S29-12061601/S29-12191607 (1/17)	LH	8	
9	12/19/16 17:52	12191609.D	5.0ng std check	S29-12061601/S29-12191605 (1/17)	LH	9	
10	12/19/16 18:26	12191610.D	25ng std check	S29-12061601/S29-12191605 (1/17)	LH	2	
11	12/19/16 18:59	12191611.D	12.5ng TO-15 BFB	S29-12061601	LH	2	
12	12/19/16 19:32	12191612.D	0.5ng MAPH ICAL STD	S29-12061601/S29-10281604 (12/25)	LH	7	
13	12/19/16 20:05	12191613.D	1.0ng MAPH ICAL STD	S29-12061601/S29-10281604 (12/25)	LH	7	
14	12/19/16 20:39	12191614.D	5.0ng MAPH ICAL STD	S29-12061601/S29-10281604 (12/25)	LH	7	
15	12/19/16 21:12	12191615.D	25ng MAPH ICAL STD	S29-12061601/S29-10281603 (12/25)	LH	4	
16	12/19/16 21:45	12191616.D	50ng MAPH ICAL STD	S29-12061601/S29-10281603 (12/25)	LH	4	
17	12/19/16 22:18	12191617.D	100ng MAPH ICAL STD	S29-12061601/S29-10281603 (12/25)	LH	4	
18	12/19/16 22:52	12191618.D	25ng MAPH ICV STD	S29-12061601/S29-12011603 (12/30)	LH	2	
19	12/19/16 23:25	12191619.D	12.5ng TO-15 BFB	S29-12061601	LH	2	
20	12/19/16 23:59	12191620.D	0.08ng TO-15 ICAL STD	S29-12061601/S29-12191607 (1/17)	LH	8	
21	12/20/16 0:33	12191621.D	0.1ng TO-15 ICAL STD	S29-12061601/S29-12191607 (1/17)	LH	8	
22	12/20/16 1:06	12191622.D	0.2ng TO-15 ICAL STD	S29-12061601/S29-12191607 (1/17)	LH	8	
23	12/20/16 1:39	12191623.D	0.4ng TO-15 ICAL STD	S29-12061601/S29-12191607 (1/17)	LH	8	
24	12/20/16 2:13	12191624.D	1.0ng TO-15 ICAL STD	S29-12061601/S29-12191605 (1/17)	LH	9	
25	12/20/16 2:46	12191625.D	5.0ng TO-15 ICAL STD	S29-12061601/S29-12191605 (1/17)	LH	9	
26	12/20/16 3:19	12191626.D	25ng TO-15 ICAL STD	S29-12061601/S29-12191603 (1/17)	LH	2	
27	12/20/16 3:52	12191627.D	50ng TO-15 ICAL STD	S29-12061601/S29-12191603 (1/17)	LH	2	
28	12/20/16 4:25	12191628.D	100ng TO-15 ICAL STD	S29-12061601/S29-12191603 (1/17)	LH	2	
29	12/20/16 4:58	12191629.D	25ng TO-15 ICV STD	S29-12061601/S29-12011603 (12/30)	LH	2	
30	12/20/16 5:32	12191630.D	Blank (100mL)	S29-12061601	LH	2	
	ICAL passed for all compounds 0.08ng-100ng, except: propene, methylene chloride 0.2ng-100ng, dichlorodifluoromethane,						
	chloromethane 0.1ng-100ng, acetonitrile, carbon disulfide, benzyl chloride, 1,2-dibromo-3-chloropropane, naphthalene 0.4ng-100ng,						
	vinyl chloride 2.0ng-500ng.						
				LH 12/21/16			
##							

Injection Log

Directory: I:\MS16\DATA\2017_01\25\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	1/25/17 5:31	01251701.D	CCV M16012517_25ng	S29-01191701/S29-12271603 (2/23)	LH	3	passed
2	1/25/17 6:04	01251702.D	CCV R16012517_25ng	S29-01191701/S29-12301605 (1/28)	LH	2	passed
3	1/25/17 6:38	01251703.D	Lab air_012517 (1000mL)	S29-01191701	LH	6	
4	1/25/17 7:12	01251704.D	MB R16012517_1000mL	S29-01191701 AC00442	LH	2	passed
5	1/25/17 7:44	01251705.D	LCS R16012517_25ng	S29-01191701/S29-01171713 (2/15)	LH	2	passed
6	1/25/17 8:18	01251706.D	LCSD R16012517_25ng	S29-01191701/S29-01171713 (2/15)	LH	2	passed
7	1/25/17 9:35	01251707.D	P1700214-001 (1000mL)	S29-01191701	LH	10	
8	1/25/17 11:16	01251708.D	P1700297-001 (400mL)	S29-01191701	LH	11	
9	1/25/17 11:49	01251709.D	P1700297-002 (400mL)	S29-01191701	LH	12	
10	1/25/17 12:27	01251710.D	P1700320-001 (0.2mL)	S29-01191701	LH	1	over diluted
11	1/25/17 13:06	01251711.D	P1700320-001 (0.35mL)	S29-01191701	LH	1	
12	1/25/17 13:40	01251712.D	P1700320-002 (0.3mL)	S29-01191701	LH	1	
13	1/25/17 14:14	01251713.D	P1700320-003 (0.4mL)	S29-01191701	LH	1	
14	1/25/17 14:47	01251714.D	P1700320-004 (0.8mL)	S29-01191701	LH	1	
15	1/25/17 15:20	01251715.D	P1700320-005 (0.4mL)	S29-01191701	LH	1	
16	1/25/17 16:23	01251716.D	P1700308-001 (20mL)	S29-01191701	LH	8	over diluted
17	1/25/17 17:12	01251717.D	P1700324-001 (1000mL)	S29-01191701	LH	4	
18	1/25/17 17:46	01251718.D	P1700324-002 (1000mL)	S29-01191701	LH	5	
19	1/25/17 18:20	01251719.D	P1700324-002dup (1000mL)	S29-01191701	LH	5	passed
20	1/25/17 18:53	01251720.D	P1700324-003 (1000mL)	S29-01191701	LH	6	
21	1/25/17 19:27	01251721.D	P1700324-004 (1000mL)	S29-01191701	LH	7	
22	1/25/17 20:01	01251722.D	P1700308-001 (400mL)	S29-01191701	LH	8	
23	1/25/17 20:34	01251723.D	P1700311-001 (400mL)	S29-01191701	LH	9	
24	1/25/17 21:07	01251724.D	P1700311-002 (400mL)	S29-01191701	LH	10	

LH 1/26/17

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\25\01251707.D
Acq On : 25 Jan 2017 9:35 Operator: LH
Sample : P1700214-001 (1000mL)
Misc : S29-01191701
ALS Vial : 10 Sample Multiplier: 1

Quant Time: Jan 26 14:05:14 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 1/26/17

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.54	130	278976	12.500	ng	-0.04
37) 1,4-Difluorobenzene (IS2)	13.65	114	1383321	12.500	ng	-0.02
56) Chlorobenzene-d5 (IS3)	17.93	82	597886	12.500	ng	0.00

System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...	12.40	65	503224	12.556	ng	-0.03
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.48%			
57) Toluene-d8 (SS2)	16.10	98	1444208	12.590	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.72%			
73) Bromofluorobenzene (SS3)	19.28	174	441777	12.064	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.48%			

Target Compounds

							Qvalue
2) Propene	0.00	42	0	N.D. d			
3) Dichlorodifluoromethan...	4.36	85	46559	0.661	ng		99
4) Chloromethane	4.70	50	6650	0.115	ng		96
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	6.78	45	226	N.D.			
11) Acetonitrile	6.95	41	5151	N.D.			
12) Acrolein	7.13	56	675	N.D.			
13) Acetone	7.35	58	43805	1.654	ng		97
14) Trichlorofluoromethane	7.57	101	5702	0.094	ng		97
15) 2-Propanol (Isopropanol)	7.88	45	4914	N.D.			
16) Acrylonitrile	8.13	53	890	N.D.			
17) 1,1-Dichloroethene	0.00	96	0	N.D.			
18) 2-Methyl-2-Propanol (t...	8.85	59	2298	N.D.			
19) Methylene Chloride	8.79	84	7957	0.240	ng		96
20) 3-Chloro-1-propene (Al...	9.04	41	1556	N.D.			
21) Trichlorotrifluoroethane	0.00	151	0	N.D.			
22) Carbon Disulfide	9.08	76	6363	N.D.			
23) trans-1,2-Dichloroethene	0.00	61	0	N.D.			
24) 1,1-Dichloroethane	0.00	63	0	N.D.			
25) Methyl tert-Butyl Ether	0.00	73	0	N.D.			
26) Vinyl Acetate	0.00	86	0	N.D.			
27) 2-Butanone (MEK)	10.86	72	3541	0.155	ng	#	64
28) cis-1,2-Dichloroethene	11.36	61	9612	0.198	ng		98
29) Diisopropyl Ether	0.00	87	0	N.D.			
30) Ethyl Acetate	11.68	61	854	N.D.			
31) n-Hexane	11.64	57	3666	N.D.			
32) Chloroform	11.70	83	3550	N.D.			
34) Tetrahydrofuran (THF)	12.15	72	2545	0.109	ng	#	86
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	13.24	56	3033	N.D.			
41) Benzene	13.27	78	4745	N.D.			
42) Carbon Tetrachloride	0.00	117	0	N.D.			
43) Cyclohexane	13.66	84	755	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	14.35	130	9811	0.264	ng		99
48) 1,4-Dioxane	0.00	88	0	N.D.			
49) 2,2,4-Trimethylpentane...	14.41	57	1705	N.D.			

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\25\01251707.D
Acq On : 25 Jan 2017 9:35 Operator: LH
Sample : P1700214-001 (1000mL)
Misc : S29-01191701
ALS Vial : 10 Sample Multiplier: 1

Quant Time: Jan 26 14:05:14 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

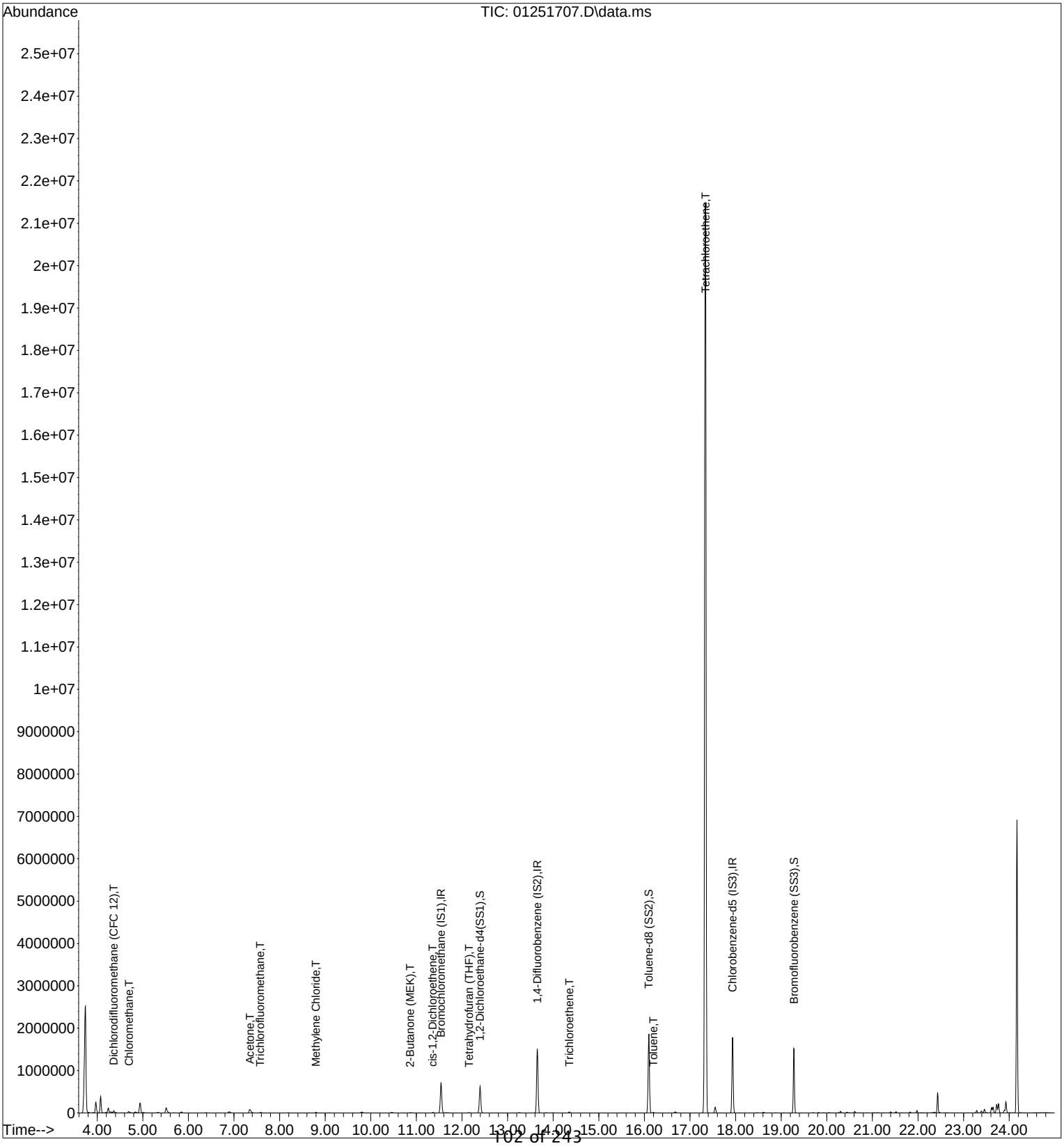
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	0.00	100	0	N.D.	
51) n-Heptane	0.00	71	0	N.D.	
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.	
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.	
58) Toluene	16.20	91	13253	0.095 ng	92
59) 2-Hexanone	16.44	43	2282	N.D.	
60) Dibromochloromethane	0.00	129	0	N.D.	
61) 1,2-Dibromoethane	0.00	107	0	N.D.	
62) n-Butyl Acetate	17.05	43	999	N.D.	
63) n-Octane	0.00	57	0	N.D.	
64) Tetrachloroethene	17.34	166	7296398	192.229 ng	97
65) Chlorobenzene	17.97	112	727	N.D.	
66) Ethylbenzene	18.31	91	2048	N.D.	
67) m- & p-Xylenes	18.46	91	4117	N.D.	
68) Bromoform	0.00	173	0	N.D.	
69) Styrene	18.79	104	1105	N.D.	
70) o-Xylene	18.89	91	1657	N.D.	
71) n-Nonane	19.06	43	2129	N.D.	
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.	
74) Cumene	19.39	105	1447	N.D.	
75) alpha-Pinene	19.57	93	727	N.D.	
76) n-Propylbenzene	19.83	91	1302	N.D.	
77) 3-Ethyltoluene	19.91	105	2294	N.D.	
78) 4-Ethyltoluene	19.95	105	1447	N.D.	
79) 1,3,5-Trimethylbenzene	20.02	105	962	N.D.	
80) alpha-Methylstyrene	0.00	118	0	N.D.	
81) 2-Ethyltoluene	20.18	105	686	N.D.	
82) 1,2,4-Trimethylbenzene	20.38	105	1834	N.D.	
83) n-Decane	0.00	57	0	N.D. d	
84) Benzyl Chloride	20.49	91	4022	N.D.	
85) 1,3-Dichlorobenzene	20.51	146	1382	N.D.	
86) 1,4-Dichlorobenzene	20.57	146	1610	N.D.	
87) sec-Butylbenzene	20.74	105	934	N.D.	
88) 4-Isopropyltoluene (p-...	20.74	119	777	N.D.	
89) 1,2,3-Trimethylbenzene	20.74	105	934	N.D.	
90) 1,2-Dichlorobenzene	20.87	146	946	N.D.	
91) d-Limonene	20.86	68	851	N.D.	
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	22.36	180	1975	N.D.	
95) Naphthalene	22.47	128	11800	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	20.30	119	1151	N.D.	
100) n-Butylbenzene	21.10	91	1526	N.D.	

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\25\01251707.D
Acq On : 25 Jan 2017 9:35 Operator: LH
Sample : P1700214-001 (1000mL)
Misc : S29-01191701
ALS Vial : 10 Sample Multiplier: 1

Quant Time: Jan 26 14:05:14 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\25\01251704.D
Acq On : 25 Jan 2017 7:12 Operator: LH
Sample : MB R16012417 1000mL
Misc : S29-01191701 AC00442
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Jan 25 09:08:07 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 1/25/17

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.54	130	253636	12.500	ng	-0.04
37) 1,4-Difluorobenzene (IS2)	13.65	114	1268607	12.500	ng	-0.02
56) Chlorobenzene-d5 (IS3)	17.93	82	537764	12.500	ng	0.00

System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.39	65	461927	12.677	ng	-0.03
Spiked Amount 12.500	Range 70 - 130		Recovery = 101.44%			
57) Toluene-d8 (SS2)	16.09	98	1323043	12.823	ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 102.56%			
73) Bromofluorobenzene (SS3)	19.28	174	386634	11.739	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 93.92%			

Target Compounds						Qvalue
2) Propene	4.23	42	908	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	6.72	45	164	N.D.		
11) Acetonitrile	6.95	41	1773	N.D.		
12) Acrolein	7.13	56	1396	N.D.		
13) Acetone	7.37	58	10809	0.449	ng #	64
14) Trichlorofluoromethane	0.00	101	0	N.D.		
15) 2-Propanol (Isopropanol)	7.91	45	542	N.D.		
16) Acrylonitrile	8.13	53	448	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	8.79	84	1074	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	9.08	76	2799	N.D.		
23) trans-1,2-Dichloroethene	0.00	61	0	N.D.		
24) 1,1-Dichloroethane	0.00	63	0	N.D.		
25) Methyl tert-Butyl Ether	0.00	73	0	N.D.		
26) Vinyl Acetate	0.00	86	0	N.D.		
27) 2-Butanone (MEK)	10.88	72	844	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	11.63	57	746	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	13.25	56	1360	N.D.		
41) Benzene	13.27	78	2115	N.D.		
42) Carbon Tetrachloride	0.00	117	0	N.D.		
43) Cyclohexane	13.54	84	680	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...	14.41	57	2460	N.D.		

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\25\01251704.D
Acq On : 25 Jan 2017 7:12 Operator: LH
Sample : MB R16012417 1000mL
Misc : S29-01191701 AC00442
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Jan 25 09:08:07 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

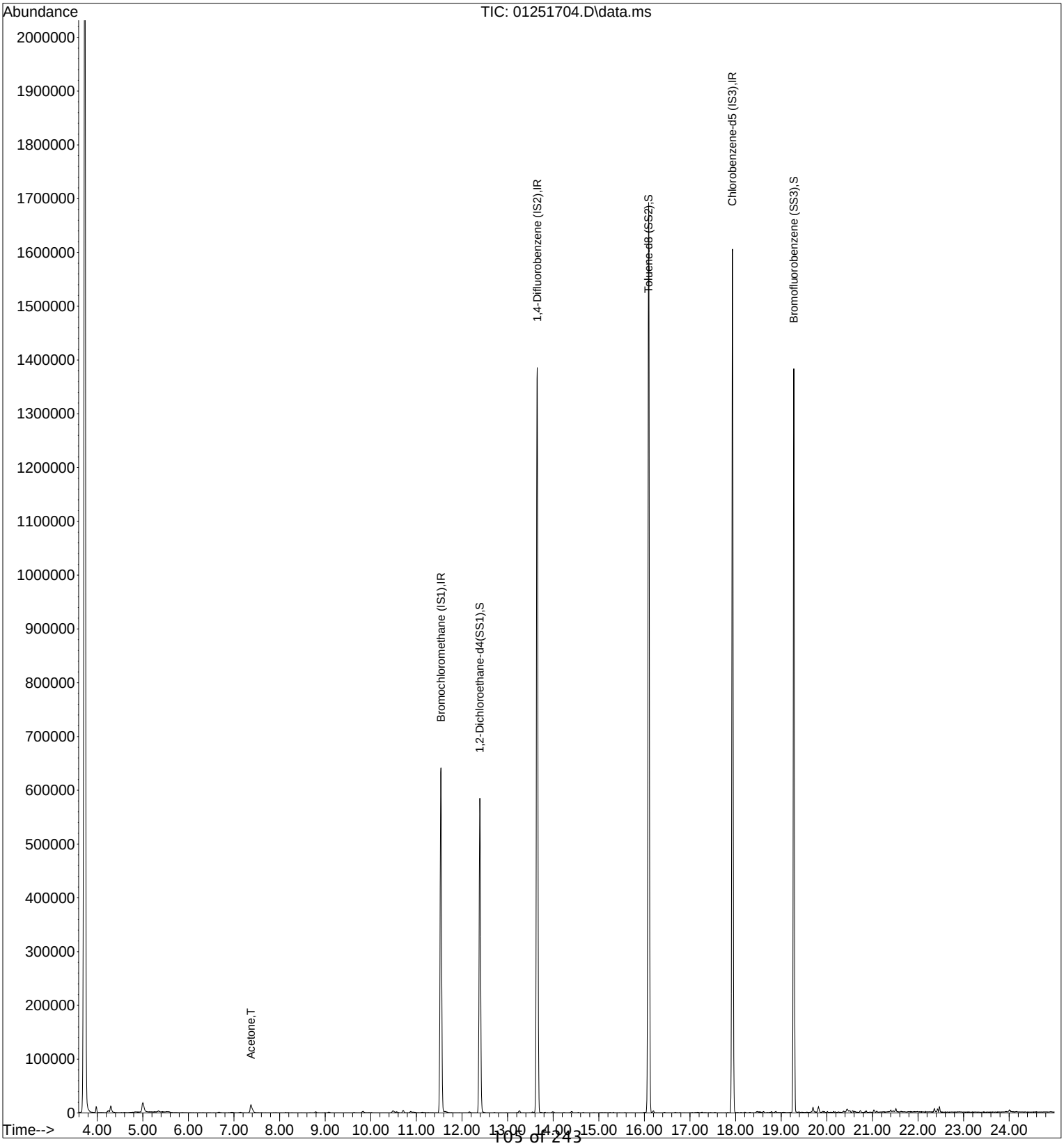
Internal Standards	R.T.	QIon	Response	Conc Units Dev(Min)
50) Methyl Methacrylate	0.00	100	0	N.D.
51) n-Heptane	0.00	71	0	N.D.
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.
58) Toluene	16.20	91	1824	N.D.
59) 2-Hexanone	16.44	43	914	N.D.
60) Dibromochloromethane	0.00	129	0	N.D.
61) 1,2-Dibromoethane	0.00	107	0	N.D.
62) n-Butyl Acetate	17.05	43	659	N.D.
63) n-Octane	17.16	57	1722	N.D.
64) Tetrachloroethene	0.00	166	0	N.D.
65) Chlorobenzene	17.97	112	911	N.D.
66) Ethylbenzene	18.31	91	960	N.D.
67) m- & p-Xylenes	18.46	91	1825	N.D.
68) Bromoform	0.00	173	0	N.D.
69) Styrene	18.78	104	1004	N.D.
70) o-Xylene	18.88	91	956	N.D.
71) n-Nonane	19.06	43	636	N.D.
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.
74) Cumene	19.39	105	1947	N.D.
75) alpha-Pinene	0.00	93	0	N.D.
76) n-Propylbenzene	19.83	91	1592	N.D.
77) 3-Ethyltoluene	19.92	105	1878	N.D.
78) 4-Ethyltoluene	19.95	105	1129	N.D.
79) 1,3,5-Trimethylbenzene	20.01	105	1443	N.D.
80) alpha-Methylstyrene	0.00	118	0	N.D.
81) 2-Ethyltoluene	20.18	105	1428	N.D.
82) 1,2,4-Trimethylbenzene	20.37	105	1390	N.D.
83) n-Decane	20.44	57	3933	N.D.
84) Benzyl Chloride	20.49	91	1978	N.D.
85) 1,3-Dichlorobenzene	20.51	146	1267	N.D.
86) 1,4-Dichlorobenzene	20.57	146	1527	N.D.
87) sec-Butylbenzene	20.60	105	815	N.D.
88) 4-Isopropyltoluene (p-...	20.73	119	1012	N.D.
89) 1,2,3-Trimethylbenzene	20.74	105	1314	N.D.
90) 1,2-Dichlorobenzene	20.86	146	963	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	21.51	57	1711	N.D.
94) 1,2,4-Trichlorobenzene	22.36	180	1699	N.D.
95) Naphthalene	22.47	128	8265	N.D.
96) n-Dodecane	22.43	57	1683	N.D.
97) Hexachlorobutadiene	0.00	225	0	N.D.
98) Cyclohexanone	18.61	55	1048	N.D.
99) tert-Butylbenzene	0.00	119	0	N.D.
100) n-Butylbenzene	21.10	91	1235	N.D.

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\25\01251704.D
Acq On : 25 Jan 2017 7:12 Operator: LH
Sample : MB R16012417 1000mL
Misc : S29-01191701 AC00442
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Jan 25 09:08:07 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\25\01251705.D
Acq On : 25 Jan 2017 7:44 Operator: LH
Sample : LCS R16012417 25ng
Misc : S29-01191701/S29-01171713 (2/15)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Jan 25 09:08:11 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 1/25/17

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.56	130	273522	12.500	ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.66	114	1342826	12.500	ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.93	82	581086	12.500	ng	0.00

System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.41	65	482571	12.281	ng	-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.24%			
57) Toluene-d8 (SS2)	16.10	98	1392830	12.493	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.92%			
73) Bromofluorobenzene (SS3)	19.28	174	432827	12.162	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 97.28%			

Target Compounds							Qvalue
2) Propene	4.19	42	916334	24.233	ng		99
3) Dichlorodifluoromethan...	4.36	85	1666312	24.115	ng		100
4) Chloromethane	4.68	50	1230983	21.658	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.95	135	919812	23.954	ng		100
6) Vinyl Chloride	5.13	62	1492135	27.604	ng		100
7) 1,3-Butadiene	5.41	54	1186876	31.449	ng		100
8) Bromomethane	5.89	94	726840	25.410	ng		100
9) Chloroethane	6.24	64	585335	25.986	ng		100
10) Ethanol	6.68	45	3335541	128.950	ng		100
11) Acetonitrile	6.94	41	1527094	25.774	ng		99
12) Acrolein	7.12	56	527708	23.217	ng		93
13) Acetone	7.34	58	3430067	132.063	ng		98
14) Trichlorofluoromethane	7.57	101	1432322	24.152	ng		100
15) 2-Propanol (Isopropanol)	7.88	45	4700667	52.990	ng		100
16) Acrylonitrile	8.15	53	1142236	26.046	ng		100
17) 1,1-Dichloroethene	8.57	96	783441	26.277	ng		100
18) 2-Methyl-2-Propanol (t...	8.77	59	4882669	52.468	ng		99
19) Methylene Chloride	8.82	84	846038	25.981	ng		99
20) 3-Chloro-1-propene (Al...	8.98	41	1313310	26.653	ng		99
21) Trichlorotrifluoroethane	9.21	151	707026	24.330	ng		99
22) Carbon Disulfide	9.08	76	3104745	27.027	ng		99
23) trans-1,2-Dichloroethene	10.10	61	1263523	26.193	ng		100
24) 1,1-Dichloroethane	10.36	63	1527231	25.264	ng		100
25) Methyl tert-Butyl Ether	10.43	73	2585935	24.693	ng		100
26) Vinyl Acetate	10.60	86	1163039	153.075	ng		99
27) 2-Butanone (MEK)	10.85	72	597380	26.641	ng		98
28) cis-1,2-Dichloroethene	11.37	61	1225060	25.779	ng		100
29) Diisopropyl Ether	11.64	87	774820	25.738	ng	#	96
30) Ethyl Acetate	11.65	61	772078	60.442	ng		99
31) n-Hexane	11.64	57	1656030	28.570	ng		99
32) Chloroform	11.73	83	1495612	24.824	ng		100
34) Tetrahydrofuran (THF)	12.12	72	569639	24.973	ng		100
35) Ethyl tert-Butyl Ether	12.24	87	1017662	25.592	ng		99
36) 1,2-Dichloroethane	12.52	62	1227019	24.856	ng		100
38) 1,1,1-Trichloroethane	12.79	97	1320096	25.095	ng		100
39) Isopropyl Acetate	13.20	61	1287742	57.166	ng		97
40) 1-Butanol	13.23	56	2230684	61.915	ng		100
41) Benzene	13.27	78	3444092	25.119	ng		100
42) Carbon Tetrachloride	13.43	117	1187148	26.070	ng		100
43) Cyclohexane	13.56	84	2738685	53.731	ng		99
44) tert-Amyl Methyl Ether	13.89	73	2557589	25.856	ng		99
45) 1,2-Dichloropropane	14.12	63	880242	25.817	ng		100
46) Bromodichloromethane	14.32	83	1299931	27.326	ng		99
47) Trichloroethene	14.36	130	917677	25.461	ng		100
48) 1,4-Dioxane	14.33	88	757118	27.546	ng		99
49) 2,2,4-Trimethylpentane...	14.41	57	3683140	25.497	ng		99

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\25\01251705.D
Acq On : 25 Jan 2017 7:44 Operator: LH
Sample : LCS R16012417 25ng
Misc : S29-01191701/S29-01171713 (2/15)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Jan 25 09:08:11 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

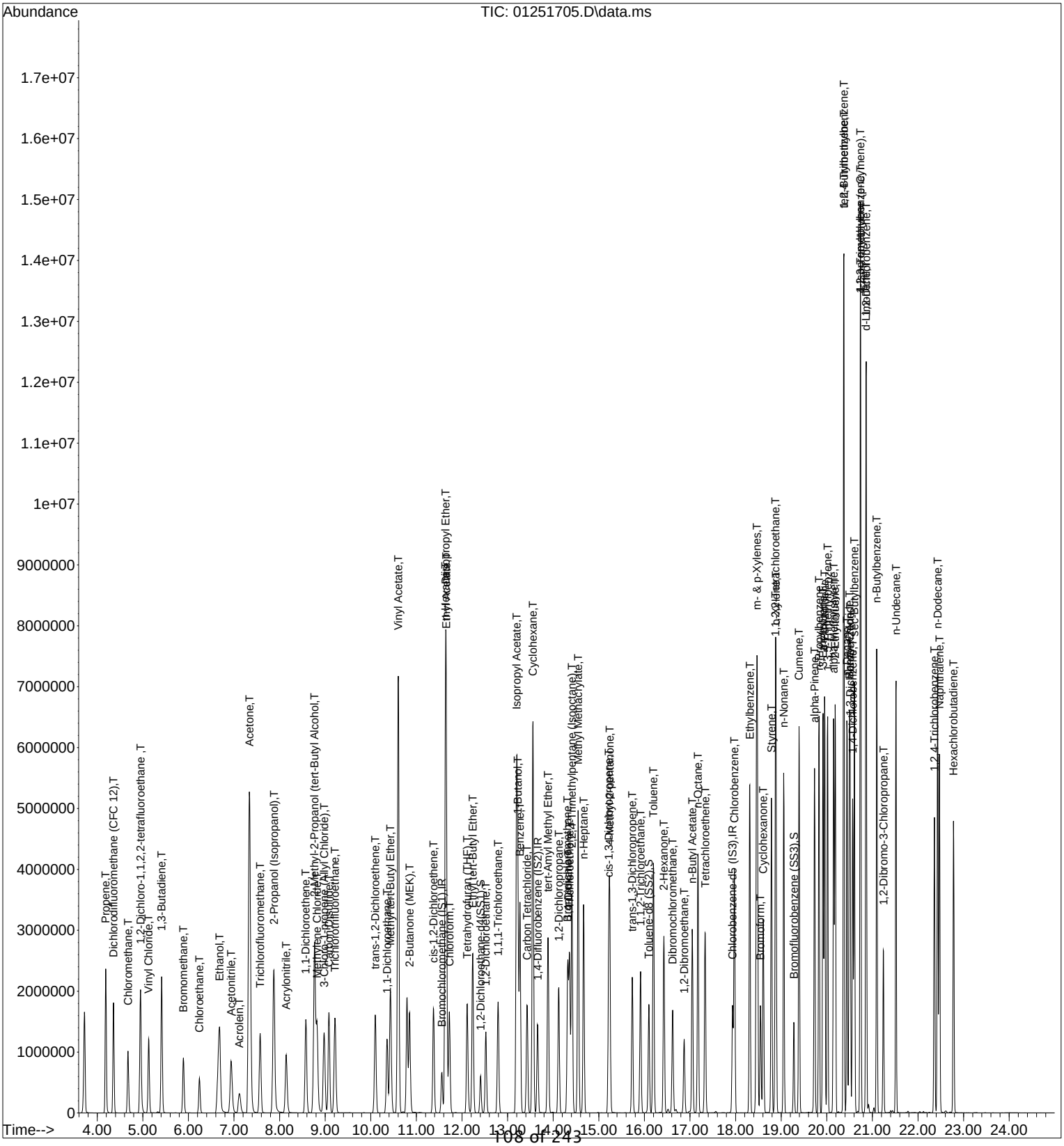
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	14.55	100	751793	55.924 ng	97
51) n-Heptane	14.67	71	877324	26.534 ng	100
52) cis-1,3-Dichloropropene	15.22	75	1528907	27.696 ng	100
53) 4-Methyl-2-pentanone	15.24	58	913547	27.745 ng	100
54) trans-1,3-Dichloropropene	15.73	75	1377821	27.995 ng	100
55) 1,1,2-Trichloroethane	15.92	97	837172	26.230 ng	99
58) Toluene	16.20	91	3418426	25.111 ng	100
59) 2-Hexanone	16.43	43	2324113	27.717 ng	100
60) Dibromochloromethane	16.62	129	1027333	27.409 ng	100
61) 1,2-Dibromoethane	16.87	107	968126	26.413 ng	100
62) n-Butyl Acetate	17.05	43	2600538	28.812 ng	99
63) n-Octane	17.17	57	806189	26.956 ng	98
64) Tetrachloroethene	17.33	166	950887	25.776 ng	100
65) Chlorobenzene	17.97	112	2305883	25.703 ng	100
66) Ethylbenzene	18.31	91	4088344	26.700 ng	100
67) m- & p-Xylenes	18.47	91	6573135	55.175 ng	100
68) Bromoform	18.54	173	884417	28.991 ng	100
69) Styrene	18.79	104	2500432	27.047 ng	100
70) o-Xylene	18.88	91	3341872	27.263 ng	100
71) n-Nonane	19.06	43	1958225	26.528 ng	99
72) 1,1,2,2-Tetrachloroethane	18.87	83	1724397	30.009 ng	100
74) Cumene	19.39	105	4042090	26.504 ng	100
75) alpha-Pinene	19.73	93	2164627	27.041 ng	99
76) n-Propylbenzene	19.83	91	5012187	27.888 ng	99
77) 3-Ethyltoluene	19.92	105	4065359	26.320 ng	100
78) 4-Ethyltoluene	19.95	105	3951329	29.163 ng	100
79) 1,3,5-Trimethylbenzene	20.02	105	3342396	26.530 ng	100
80) alpha-Methylstyrene	20.15	118	1833884	29.251 ng	99
81) 2-Ethyltoluene	20.18	105	3997606	27.634 ng	100
82) 1,2,4-Trimethylbenzene	20.38	105	3817758	30.747 ng	99
83) n-Decane	20.44	57	2015360	28.083 ng	99
84) Benzyl Chloride	20.50	91	3316399	32.832 ng	100
85) 1,3-Dichlorobenzene	20.51	146	1983426	31.806 ng	100
86) 1,4-Dichlorobenzene	20.57	146	1929865	26.080 ng	100
87) sec-Butylbenzene	20.61	105	4487225	27.854 ng	100
88) 4-Isopropyltoluene (p-...	20.74	119	4479365	29.016 ng	99
89) 1,2,3-Trimethylbenzene	20.74	105	3899892	29.444 ng	99
90) 1,2-Dichlorobenzene	20.86	146	2020666	28.973 ng	100
91) d-Limonene	20.86	68	1658090	31.154 ng	98
92) 1,2-Dibromo-3-Chloropr...	21.24	157	698867	30.099 ng	99
93) n-Undecane	21.52	57	2142516	28.396 ng	99
94) 1,2,4-Trichlorobenzene	22.36	180	1449418	32.346 ng	100
95) Naphthalene	22.47	128	4471895	32.856 ng	100
96) n-Dodecane	22.43	57	2162196	32.091 ng	99
97) Hexachlorobutadiene	22.78	225	887237	28.334 ng	99
98) Cyclohexanone	18.60	55	1426877	27.710 ng	99
99) tert-Butylbenzene	20.38	119	3513671	28.801 ng	100
100) n-Butylbenzene	21.10	91	3809510	29.114 ng	99

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\25\01251705.D
Acq On : 25 Jan 2017 7:44 Operator: LH
Sample : LCS R16012417 25ng
Misc : S29-01191701/S29-01171713 (2/15)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Jan 25 09:08:11 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Response Factor Report GCMS-16

Method Path : I:\MS16\METHODS\
Method File : R16121916.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue Dec 20 10:31:33 2016
Response Via : Initial Calibration

LH 12/21/16

Calibration Files
0.08=12191620.D 0.10=12191621.D 0.20=12191622.D 0.40=12191623.D 1.0 =12191624.D 5.0 =12191
50 =12191627.D 100 =12191628.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			1.789	1.704	1.575	1.520	1.621	1.686	2.202	1.728	13.12
3)	T	Dichlorodifluo...		3.833	3.235	3.320	3.072	2.817	3.126	2.942	2.916	3.158	10.14
4)	T	Chloromethane		3.246	2.823	2.750	2.593	2.294	2.574	2.389	2.111	2.597	13.55
5)	T	1,2-Dichloro-1...	2.195	2.011	1.833	1.734	1.662	1.541	1.690	1.593	1.534	1.755	12.74
6)	T	Vinyl Chloride	2.678	2.620	2.205	2.494	2.425	2.326	2.586	2.471	2.426	2.470	5.98
7)	T	1,3-Butadiene	1.670	1.706	1.491	1.469	1.740	1.655	1.945	1.907	1.939	1.725	10.37
8)	T	Bromomethane	1.399	1.359	1.243	1.328	1.261	1.211	1.346	1.281	1.337	1.307	4.70
9)	T	Chloroethane	1.078	1.040	1.018	1.028	0.993	0.948	1.081	1.032	1.046	1.029	4.00
10)	T	Ethanol	1.430	1.328	1.150	1.098	1.063	0.981	1.179	1.180	1.231	1.182	11.50
11)	T	Acetonitrile				2.985	2.732	2.442	2.767	2.656	2.664	2.708	6.52
12)	T	Acrolein	1.380	1.286	1.076	1.040	0.953	0.867	0.940	0.902	0.906	1.039	17.43
13)	T	Acetone	1.446	1.354	1.140	1.110	1.051	1.005	1.200	1.176	1.201	1.187	11.75
14)	T	Trichlorofluor...	3.376	3.171	2.763	2.697	2.471	2.362	2.593	2.488	2.471	2.710	12.77
15)	T	2-Propanol (Is...	4.996	4.728	3.968	3.994	3.862	3.506	4.277	3.994	3.160	4.054	13.90
16)	T	Acrylonitrile	2.429	2.238	1.931	1.901	1.845	1.766	2.020	1.946	1.961	2.004	10.26
17)	T	1,1-Dichloroet...	1.465	1.526	1.287	1.336	1.306	1.218	1.403	1.357	1.365	1.363	6.83
18)	T	2-Methyl-2-Pro...	4.972	4.780	4.178	4.055	3.810	3.612	4.356	4.308	4.204	4.253	10.06
19)	T	Methylene Chlo...			1.636	1.552	1.405	1.325	1.491	1.461	1.546	1.488	6.92
20)	T	3-Chloro-1-pro...	2.086	3.150	2.091	2.043	2.009	2.011	2.341	2.269	2.267	2.252	15.92
21)	T	Trichlorotrifl...	1.648	1.567	1.278	1.305	1.213	1.155	1.290	1.248	1.247	1.328	12.50
22)	T	Carbon Disulfide				5.713	5.316	4.812	5.401	5.141	5.116	5.250	5.80
23)	T	trans-1,2-Dich...	2.600	2.416	2.105	2.124	2.019	1.954	2.243	2.171	2.209	2.205	9.03
24)	T	1,1-Dichloroet...	3.165	3.064	2.805	2.832	2.577	2.444	2.736	2.615	2.625	2.763	8.46
25)	T	Methyl tert-Bu...	5.973	5.560	4.772	4.774	4.324	4.093	4.617	4.447	4.512	4.786	12.63
26)	T	Vinyl Acetate				0.291	0.282	0.306	0.404	0.415	0.385	0.347	17.42
27)	T	2-Butanone (MEK)	1.174	1.066	0.965	0.980	0.961	0.915	1.044	1.038	1.079	1.025	7.64
28)	T	cis-1,2-Dichlo...	2.563	2.424	2.073	2.070	2.007	1.927	2.201	2.123	2.157	2.172	9.32
29)	T	Diisopropyl Ether	1.823	1.738	1.429	1.219	1.102	1.082	1.329	1.340	1.321	1.376	18.64
30)	T	Ethyl Acetate	0.604	0.608	0.516	0.524	0.524	0.517	0.641	0.666	0.655	0.584	10.87
31)	T	n-Hexane	3.121	2.945	2.513	2.608	2.277	2.238	2.650	2.729	2.760	2.649	10.81
32)	T	Chloroform	3.306	3.168	2.774	2.754	2.550	2.408	2.691	2.588	2.542	2.753	10.85
33)	S	1,2-Dichloroet...	1.792	1.799	1.802	1.823	1.811	1.790	1.775	1.795	1.773	1.796	0.88
34)	T	Tetrahydrofura...	1.404	1.191	0.982	0.979	0.949	0.885	1.001	0.979	1.012	1.042	15.21
35)	T	Ethyl tert-But...	2.092	2.052	1.787	1.756	1.640	1.566	1.814	1.784	1.864	1.817	9.41
36)	T	1,2-Dichloroet...	2.780	2.549	2.219	2.212	2.073	1.963	2.219	2.148	2.139	2.256	11.18
37)	IR	1,4-Difluorobenzen...	----------ISTD----------										
38)	T	1,1,1-Trichlor...	0.573	0.556	0.489	0.475	0.451	0.423	0.487	0.472	0.481	0.490	9.71
39)	T	Isopropyl Acetate	0.231	0.223	0.189	0.193	0.185	0.180	0.222	0.228	0.238	0.210	10.83
40)	T	1-Butanol	0.352	0.319	0.279	0.271	0.293	0.295	0.395	0.400	0.415	0.335	16.74
41)	T	Benzene	1.616	1.536	1.269	1.197	1.134	1.067	1.226	1.217	1.227	1.276	14.18
42)	T	Carbon Tetrach...	0.479	0.461	0.399	0.407	0.394	0.375	0.440	0.426	0.434	0.424	7.89
43)	T	Cyclohexane	0.561	0.515	0.460	0.441	0.428	0.404	0.495	0.490	0.477	0.474	10.04
44)	T	tert-Amyl Meth...	1.101	1.038	0.894	0.863	0.823	0.784	0.933	0.910	0.940	0.921	10.78
45)	T	1,2-Dichloropr...	0.389	0.361	0.311	0.304	0.286	0.270	0.313	0.305	0.317	0.317	11.47
46)	T	Bromodichlorom...	0.493	0.477	0.425	0.416	0.393	0.386	0.463	0.460	0.472	0.443	8.71
47)	T	Trichloroethene	0.418	0.384	0.325	0.312	0.302	0.280	0.334	0.331	0.333	0.336	12.49
48)	T	1,4-Dioxane	0.283	0.267	0.231	0.223	0.236	0.224	0.273	0.275	0.290	0.256	10.54
49)	T	2,2,4-Trimethy...	1.639	1.552	1.336	1.317	1.218	1.142	1.338	1.289	1.270	1.345	11.64
50)	T	Methyl Methacr...	0.136	0.127	0.116	0.113	0.115	0.110	0.135	0.135	0.137	0.125	8.99
51)	T	n-Heptane	0.366	0.347	0.296	0.295	0.276	0.261	0.303	0.302	0.325	0.308	10.77
52)	T	cis-1,3-Dichlo...	0.578	0.527	0.459	0.455	0.458	0.454	0.557	0.556	0.581	0.514	11.03
53)	T	4-Methyl-2-pen...	0.345	0.315	0.288	0.273	0.277	0.265	0.325	0.324	0.348	0.307	10.26
54)	T	trans-1,3-Dich...	0.501	0.469	0.407	0.400	0.409	0.416	0.509	0.497	0.516	0.458	10.78

55)	T	1,1,2-Trichlor...	0.347	0.320	0.284	0.283	0.276	0.261	0.304	0.294	0.304	0.297	8.68
56)	IR	Chlorobenzene-d5 (...	----------ISTD----------										
57)	S	Toluene-d8 (SS2)	2.461	2.457	2.420	2.443	2.397	2.387	2.363	2.347	2.308	2.398	2.19
58)	T	Toluene	3.801	3.443	2.892	2.898	2.631	2.490	2.845	2.749	2.608	2.928	14.55
59)	T	2-Hexanone	2.305	1.961	1.678	1.583	1.647	1.617	1.861	1.791	1.790	1.804	12.46
60)	T	Dibromochlorom...	0.926	0.872	0.750	0.733	0.727	0.730	0.857	0.831	0.831	0.806	9.11
61)	T	1,2-Dibromoethane	0.946	0.854	0.747	0.742	0.732	0.714	0.813	0.777	0.770	0.788	9.28
62)	T	n-Butyl Acetate	2.301	2.112	1.794	1.732	1.806	1.775	2.051	1.966	1.938	1.942	9.68
63)	T	n-Octane			0.720	0.665	0.597	0.553	0.644	0.646	0.680	0.643	8.52
64)	T	Tetrachloroethene	0.965	0.927	0.784	0.768	0.714	0.682	0.786	0.763	0.752	0.794	11.73
65)	T	Chlorobenzene	2.384	2.255	1.863	1.847	1.754	1.644	1.933	1.876	1.813	1.930	12.32
66)	T	Ethylbenzene	4.013	3.789	3.199	3.156	3.086	2.901	3.409	3.295	2.797	3.294	11.99
67)	T	m- & p-Xylenes	3.255	2.878	2.446	2.422	2.364	2.246	2.747	2.648	2.058	2.563	14.12
68)	T	Bromoform	0.721	0.647	0.575	0.584	0.591	0.607	0.746	0.725	0.708	0.656	10.55
69)	T	Styrene	2.366	2.176	1.824	1.797	1.823	1.796	2.127	2.065	1.924	1.989	10.29
70)	T	o-Xylene	3.301	2.974	2.472	2.489	2.396	2.305	2.794	2.717	2.283	2.637	12.91
71)	T	n-Nonane	1.997	1.805	1.581	1.489	1.432	1.342	1.586	1.565	1.494	1.588	12.56
72)	T	1,1,2,2-Tetrac...	1.282	1.217	1.111	1.129	1.148	1.156	1.422	1.401	1.258	1.236	9.31
73)	S	Bromofluoroben...	0.764	0.762	0.760	0.768	0.774	0.776	0.776	0.761	0.749	0.766	1.16
74)	T	Cumene	4.124	3.865	3.201	3.128	3.021	2.875	3.412	3.262	2.640	3.281	14.22
75)	T	alpha-Pinene	1.993	1.853	1.629	1.613	1.550	1.502	1.837	1.823	1.698	1.722	9.48
76)	T	n-Propylbenzene	4.866	4.366	3.708	3.741	3.683	3.550	4.166	3.887	2.829	3.866	14.71
77)	T	3-Ethyltoluene	4.254	3.850	3.256	2.952	2.936	2.838	3.629	3.373	2.816	3.323	15.14
78)	T	4-Ethyltoluene	3.346	3.103	2.653	2.937	2.915	2.783	3.154	3.067	2.273	2.915	10.85
79)	T	1,3,5-Trimethy...	3.366	3.220	2.535	2.541	2.427	2.381	2.871	2.766	2.284	2.710	13.98
80)	T	alpha-Methylst...	1.395	1.264	1.168	1.214	1.285	1.298	1.595	1.544	1.375	1.349	10.69
81)	T	2-Ethyltoluene	3.661	3.470	3.176	2.901	2.892	2.809	3.383	3.187	2.527	3.112	11.59
82)	T	1,2,4-Trimethy...	2.944	2.744	2.597	2.561	2.495	2.473	3.236	2.883	2.107	2.671	12.20
83)	T	n-Decane	1.871	1.690	1.381	1.392	1.387	1.356	1.654	1.658	1.504	1.544	11.77
84)	T	Benzyl Chloride				1.166	1.842	2.140	2.818	2.798	2.272	2.173	28.68
85)	T	1,3-Dichlorobe...	1.047	1.083	1.185	1.284	1.406	1.389	1.708	1.615	1.356	1.341	16.63
86)	T	1,4-Dichlorobe...	2.030	2.067	1.348	1.386	1.399	1.406	1.673	1.611	1.406	1.592	17.67
87)	T	sec-Butylbenzene	4.046	3.828	3.459	3.408	3.329	3.208	3.793	3.501	2.619	3.465	12.00
88)	T	4-Isopropyltol...	4.215	3.795	3.231	3.124	3.091	3.054	3.834	3.260	2.283	3.321	16.97
89)	T	1,2,3-Trimethy...	4.094	3.109	2.593	2.601	2.539	2.499	3.240	2.886	2.081	2.849	20.41
90)	T	1,2-Dichlorobe...	1.855	1.685	1.403	1.345	1.386	1.364	1.713	1.552	1.200	1.500	14.20
91)	T	d-Limonene	1.240	1.161	1.013	1.037	1.045	1.060	1.355	1.359	1.034	1.145	12.27
92)	T	1,2-Dibromo-3-...				0.368	0.432	0.479	0.585	0.575	0.558	0.499	17.59
93)	T	n-Undecane	2.115	1.749	1.454	1.398	1.412	1.407	1.727	1.763	1.583	1.623	14.78
94)	T	1,2,4-Trichlor...	0.918	0.778	0.705	0.755	0.913	1.010	1.229	1.220	1.147	0.964	20.78
95)	T	Naphthalene				2.016	2.514	3.048	3.696	3.539	2.754	2.928	21.65
96)	T	n-Dodecane	1.816	1.497	1.118	1.065	1.353	1.376	1.599	1.649	1.573	1.449	17.02
97)	T	Hexachlorobuta...	0.731	0.682	0.587	0.590	0.600	0.616	0.764	0.764	0.728	0.674	11.28
98)	T	Cyclohexanone	1.459	1.213	0.989	0.966	1.006	0.965	1.142	1.100	1.129	1.108	14.30
99)	T	tert-Butylbenzene	3.101	3.169	2.550	2.496	2.422	2.360	2.992	2.598	1.932	2.624	15.19
100)	T	n-Butylbenzene	3.139	2.906	2.583	2.658	2.776	2.685	3.188	3.033	2.364	2.815	9.73

(#) = Out of Range

R16121916.M Wed Dec 21 14:52:14 2016

LH 12/21/16

Primary Source Standards Concentrations (Working & Initial Calibration)

1ng/L Std. ID:
4ng/L Std. ID: S29-12191607
20ng/L Std. ID: S29-12191605
200ng/L Std. ID: S29-12191603

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
Propene	1.036	207.2	20.72	4.144	1.036		0.08288	0.1036	0.2072	0.4144	1.036	5.180	25.900	51.80	103.6
Dichlorodifluoromethane	1.047	209.4	20.94	4.188	1.047		0.08376	0.1047	0.2094	0.4188	1.047	5.235	26.175	52.35	104.7
Chloromethane	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
Freon-114	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
Vinyl Chloride	1.023	204.6	20.46	4.092	1.023		0.08184	0.1023	0.2046	0.4092	1.023	5.115	25.575	51.15	102.3
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
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	1.009	201.8	20.18	4.036	1.009		0.08072	0.1009	0.2018	0.4036	1.009	5.045	25.225	50.45	100.9
Ethanol	5.207	1041.4	104.14	20.828	5.207		0.41656	0.5207	1.0414	2.0828	5.207	26.035	130.175	260.35	520.7
Acetonitrile	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
Acrolein	1.041	208.2	20.82	4.164	1.041		0.08328	0.1041	0.2082	0.4164	1.041	5.205	26.025	52.05	104.1
Acetone	5.313	1062.6	106.26	21.252	5.313		0.42504	0.5313	1.0626	2.1252	5.313	26.565	132.825	265.65	531.3
Trichlorofluoromethane	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
Isopropanol	2.105	421.0	42.10	8.420	2.105		0.16840	0.2105	0.4210	0.8420	2.105	10.525	52.625	105.25	210.5
Acrylonitrile	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-Dichloroethene	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
tert-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
Methylene Chloride	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
Allyl Chloride	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
Trichlorotrifluoroethane	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
Carbon Disulfide	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
trans-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
1,1-Dichloroethane	1.020	204.0	20.40	4.080	1.020		0.08160	0.1020	0.2040	0.4080	1.020	5.100	25.500	51.00	102.0
Methyl tert-Butyl Ether	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
Vinyl Acetate	5.265	1053.0	105.30	21.060	5.265		0.42120	0.5265	1.0530	2.1060	5.265	26.325	131.625	263.25	526.5
2-Butanone	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
cis-1,2-Dichloroethene	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
Diisopropyl Ether	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
Ethyl Acetate	2.129	425.8	42.58	8.516	2.129		0.17032	0.2129	0.4258	0.8516	2.129	10.645	53.225	106.45	212.9
n-Hexane	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
Chloroform	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
Tetrahydrofuran	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
Ethyl tert-Butyl 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-Dichloroethane	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
1,1,1-Trichloroethane	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
Isopropyl Acetate	2.104	420.8	42.08	8.416	2.104		0.16832	0.2104	0.4208	0.8416	2.104	10.520	52.600	105.20	210.4
1-Butanol	2.105	421.0	42.10	8.420	2.105		0.16840	0.2105	0.4210	0.8420	2.105	10.525	52.625	105.25	210.5
Benzene	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
Carbon Tetrachloride	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
Cyclohexane	2.130	426.0	42.60	8.520	2.130		0.17040	0.2130	0.4260	0.8520	2.130	10.650	53.250	106.50	213.0
tert-Amyl Methyl Ether	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
1,2-Dichloropropane	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
Bromodichloromethane	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
Trichloroethene	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
1,4-Dioxane	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
Isooctane	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
Methyl Methacrylate	2.110	422.0	42.20	8.440	2.110		0.16880	0.2110	0.4220	0.8440	2.110	10.550	52.750	105.50	211.0
n-Heptane	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
cis-1,3-Dichloropropene	1.116	223.2	22.32	4.464	1.116		0.08928	0.1116	0.2232	0.4464	1.116	5.580	27.900	55.80	111.6
4-Methyl-2-pentanone	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
trans-1,3-Dichloropropene	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
1,1,2-Trichloroethane	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
Toluene	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
2-Hexanone	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

Primary Source Standards Concentrations (Working & Initial Calibration)

1ng/L Std. ID:
4ng/L Std. ID: S29-12191607
20ng/L Std. ID: S29-12191605
200ng/L Std. ID: S29-12191603

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
Dibromochloromethane	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
1,2-Dibromoethane	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-Butyl Acetate	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-Octane	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
Tetrachloroethene	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
Chlorobenzene	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
Ethylbenzene	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
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	1.061	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
o-Xylene	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
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	1.056	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
Cumene	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
alpha-Pinene	1.044	208.8	20.88	4.176	1.044		0.08352	0.1044	0.2088	0.4176	1.044	5.220	26.100	52.20	104.4
n-Propylbenzene	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
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	1.050	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
2-Ethyltoluene	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
1,2,4-Trimethylbenzene	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
n-Decane	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
Benzyl Chloride	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
1,3-Dichlorobenzene	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
1,4-Dichlorobenzene	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
sec-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
p-Isopropyltoluene	1.027	205.4	20.54	4.108	1.027		0.08216	0.1027	0.2054	0.4108	1.027	5.135	25.675	51.35	102.7
1,2,3-Trimethylbenzene	1.027	205.4	20.54	4.108	1.027		0.08216	0.1027	0.2054	0.4108	1.027	5.135	25.675	51.35	102.7
1,2-Dichlorobenzene	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
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	1.053	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
n-Undecane	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
1,2,4-Trichlorobenzene	1.043	208.6	20.86	4.172	1.043		0.08344	0.1043	0.2086	0.4172	1.043	5.215	26.075	52.15	104.3
Naphthalene	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
n-Dodecane	1.045	209.0	20.90	4.180	1.045		0.08360	0.1045	0.2090	0.4180	1.045	5.225	26.125	52.25	104.5
Hexachloro-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
Methacrylonitrile	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
Cyclohexanone	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
tert-Butylbenzene	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-Butylbenzene	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

Calibration Status Report GCMS-16

Method : I:\MS16\METHODS\R16121916.M (RTE Integrator)
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration

#	ID	Conc	ISTD Conc	Path\File
1	0.08	0	13	I:\MS16\DATA\2016_12\19\12191620.D
2	0.10	0	13	I:\MS16\DATA\2016_12\19\12191621.D
3	0.20	0	13	I:\MS16\DATA\2016_12\19\12191622.D
4	0.40	0	13	I:\MS16\DATA\2016_12\19\12191623.D
5	1.0	1	13	I:\MS16\DATA\2016_12\19\12191624.D
6	5.0	5	13	I:\MS16\DATA\2016_12\19\12191625.D
7	25	26	13	I:\MS16\DATA\2016_12\19\12191626.D
8	50	52	13	I:\MS16\DATA\2016_12\19\12191627.D
9	100	104	13	I:\MS16\DATA\2016_12\19\12191628.D

#	ID	Update Time	Quant Time	Acquisition Time
1	0.08	Dec 20 10:30 2016	Dec 20 09:09 2016	19 Dec 2016 23:59
2	0.10	Dec 20 10:30 2016	Dec 20 09:39 2016	20 Dec 2016 00:33
3	0.20	Dec 20 10:30 2016	Dec 20 09:45 2016	20 Dec 2016 1:06
4	0.40	Dec 20 10:30 2016	Dec 20 09:52 2016	20 Dec 2016 1:39
5	1.0	Dec 20 10:30 2016	Dec 20 09:54 2016	20 Dec 2016 2:13
6	5.0	Dec 20 10:31 2016	Dec 20 08:57 2016	20 Dec 2016 2:46
7	25	Dec 20 10:31 2016	Dec 20 08:57 2016	20 Dec 2016 3:19
8	50	Dec 20 10:31 2016	Dec 20 08:57 2016	20 Dec 2016 3:52
9	100	Dec 20 10:31 2016	Dec 20 08:57 2016	20 Dec 2016 4:25

R16121916.M Wed Dec 21 14:53:49 2016

LH 12/21/16

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 09:45:07 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	280722	12.500	ng	-0.01
37) 1,4-Difluorobenzene (IS2)	13.66	114	1408357	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	17.93	82	601873	12.500	ng	0.00

System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.40	65	505835	13.774	ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 110.16%			
57) Toluene-d8 (SS2)	16.10	98	1456615	12.705	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 101.68%			
73) Bromofluorobenzene (SS3)	19.28	174	457156	12.419	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.36%			

Target Compounds							Qvalue
2) Propene	4.26	42	8324	0.229	ng		92
3) Dichlorodifluoromethan...	4.41	85	15213	0.258	ng		99
4) Chloromethane	4.76	50	12742	0.266	ng		98
5) 1,2-Dichloro-1,1,2,2-t...	4.99	135	8275	0.268	ng		98
6) Vinyl Chloride	5.21	62	10133	0.212	ng		99
7) 1,3-Butadiene	5.50	54	7078m	0.228	ng		
8) Bromomethane	5.97	94	5543	0.202	ng		94
9) Chloroethane	6.30	64	4615	0.206	ng		94
10) Ethanol	6.71	45	26891	1.087	ng		96
11) Acetonitrile	7.08	41	15593m	0.246	ng		
12) Acrolein	7.25	56	5029	0.211	ng		96
13) Acetone	7.37	58	27202	1.132	ng		88
14) Trichlorofluoromethane	7.60	101	13016	0.254	ng		99
15) 2-Propanol (Isopropanol)	7.89	45	37518	0.456	ng		80
16) Acrylonitrile	8.26	53	9148	0.213	ng		95
17) 1,1-Dichloroethene	8.61	96	6124	0.228	ng		92
18) 2-Methyl-2-Propanol (t...	8.82	59	39674	0.498	ng		93
19) Methylene Chloride	8.83	84	7768	0.241	ng		92
20) 3-Chloro-1-propene (Al...	8.99	41	9880m	0.202	ng		
21) Trichlorotrifluoroethane	9.23	151	6021	0.235	ng		91
22) Carbon Disulfide	9.14	76	29121	0.265	ng		97
23) trans-1,2-Dichloroethene	10.11	61	10089	0.227	ng		99
24) 1,1-Dichloroethane	10.35	63	12850	0.227	ng		95
25) Methyl tert-Butyl Ether	10.46	73	22850	0.250	ng		99
26) Vinyl Acetate	10.62	86	6065	0.901	ng	#	66
27) 2-Butanone (MEK)	10.88	72	4549	0.212	ng	#	91
28) cis-1,2-Dichloroethene	11.37	61	9909	0.228	ng		98
29) Diisopropyl Ether	11.65	87	6815	0.254	ng	#	72
30) Ethyl Acetate	11.68	61	4935	0.430	ng		97
31) n-Hexane	11.64	57	11998	0.231	ng		99
32) Chloroform	11.71	83	13181	0.247	ng		98
34) Tetrahydrofuran (THF)	12.15	72	4684	0.213	ng	#	82
35) Ethyl tert-Butyl Ether	12.24	87	8484	0.244	ng		99
36) 1,2-Dichloroethane	12.52	62	10487	0.259	ng		100
38) 1,1,1-Trichloroethane	12.79	97	11845	0.257	ng		98
39) Isopropyl Acetate	13.21	61	8966	0.427	ng	#	89
40) 1-Butanol	13.26	56	13251	0.403	ng	#	79
41) Benzene	13.27	78	30081	0.219	ng		100
42) Carbon Tetrachloride	13.42	117	9487	0.240	ng		97
43) Cyclohexane	13.55	84	22097	0.479	ng		99
44) tert-Amyl Methyl Ether	13.90	73	21242	0.237	ng		95
45) 1,2-Dichloropropane	14.12	63	7444	0.223	ng		96
46) Bromodichloromethane	14.31	83	10202	0.250	ng		96
47) Trichloroethene	14.36	130	7773	0.245	ng		100
48) 1,4-Dioxane	14.35	88	5535	0.208	ng	#	67
49) 2,2,4-Trimethylpentane...	14.41	57	31883	0.229	ng		98

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 09:45:07 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

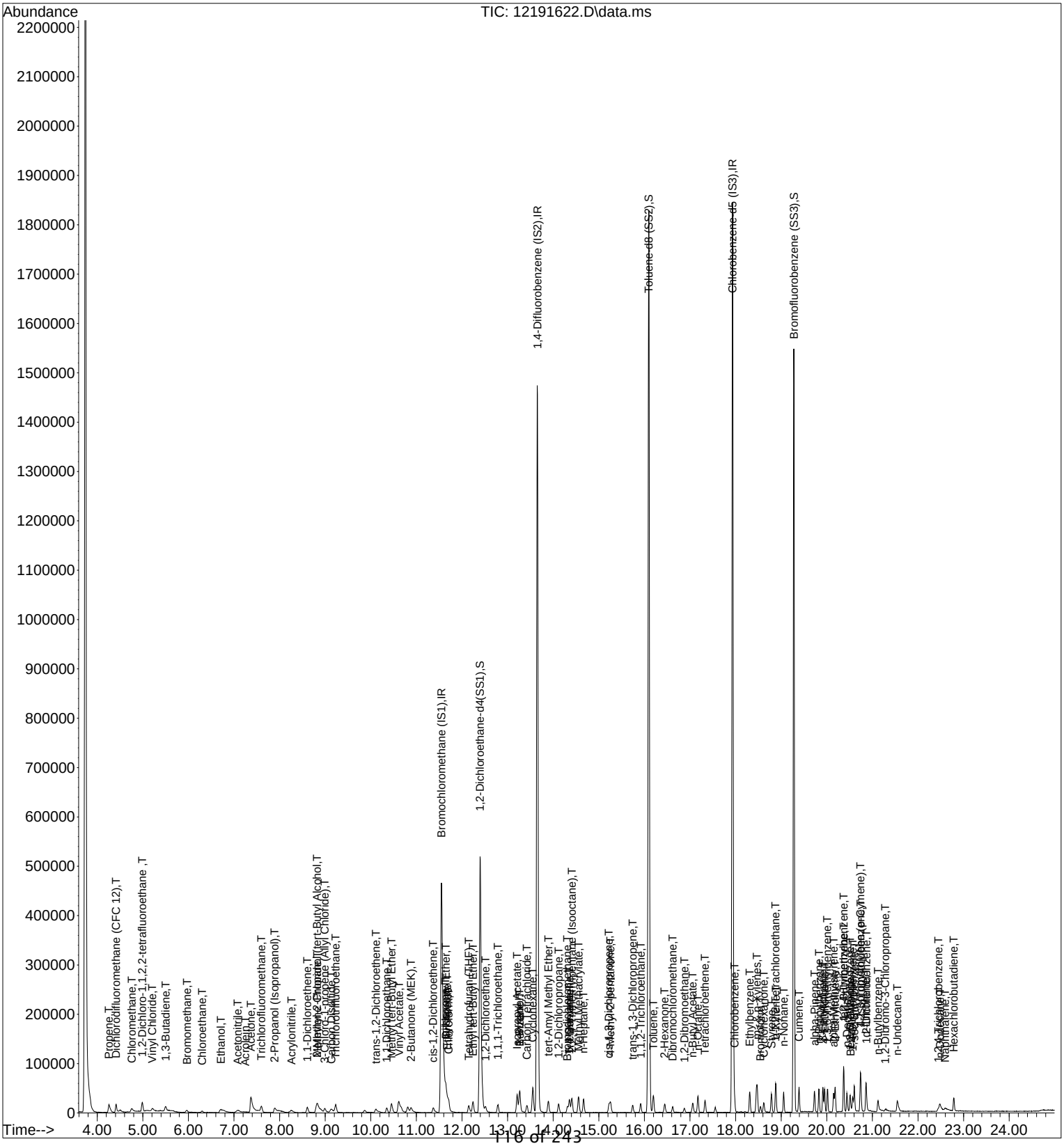
Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
50) Methyl Methacrylate	14.56	100	5538	0.466 ng		99
51) n-Heptane	14.67	71	7072	0.226 ng		98
52) cis-1,3-Dichloropropene	15.22	75	11545	0.233 ng		99
53) 4-Methyl-2-pentanone	15.26	58	6862	0.225 ng		89
54) trans-1,3-Dichloropropene	15.75	75	9755	0.222 ng		99
55) 1,1,2-Trichloroethane	15.92	97	6796	0.231 ng		99
58) Toluene	16.20	91	29322	0.247 ng		98
59) 2-Hexanone	16.44	43	17145	0.226 ng		92
60) Dibromochloromethane	16.62	129	7666	0.235 ng		100
61) 1,2-Dibromoethane	16.88	107	7595	0.227 ng		98
62) n-Butyl Acetate	17.06	43	18384	0.212 ng		96
63) n-Octane	17.17	57	7326	0.259 ng		86
64) Tetrachloroethene	17.33	166	8007	0.242 ng		99
65) Chlorobenzene	17.98	112	19036	0.234 ng		97
66) Ethylbenzene	18.31	91	32498	0.229 ng		99
67) m- & p-Xylenes	18.47	91	50000	0.464 ng		100
68) Bromoform	18.54	173	5890	0.226 ng		99
69) Styrene	18.79	104	18639	0.225 ng		99
70) o-Xylene	18.89	91	25091	0.232 ng		99
71) n-Nonane	19.06	43	16052	0.236 ng		91
72) 1,1,2,2-Tetrachloroethane	18.87	83	11297	0.216 ng		98
74) Cumene	19.39	105	32370	0.250 ng		99
75) alpha-Pinene	19.73	93	16376	0.231 ng		99
76) n-Propylbenzene	19.83	91	37956	0.232 ng		98
77) 3-Ethyltoluene	19.91	105	32919	0.238 ng		100
78) 4-Ethyltoluene	19.95	105	26804	0.219 ng		100
79) 1,3,5-Trimethylbenzene	20.01	105	25611	0.227 ng		99
80) alpha-Methylstyrene	20.15	118	11807	0.221 ng		96
81) 2-Ethyltoluene	20.18	105	32482	0.248 ng		95
82) 1,2,4-Trimethylbenzene	20.37	105	26310	0.237 ng		96
83) n-Decane	20.44	57	14003	0.212 ng		99
84) Benzyl Chloride	20.52	91	8139	0.095 ng		95
85) 1,3-Dichlorobenzene	20.51	146	12069	0.206 ng		98
86) 1,4-Dichlorobenzene	20.57	146	13734	0.206 ng		92
87) sec-Butylbenzene	20.61	105	35105	0.243 ng		87
88) 4-Isopropyltoluene (p-...	20.74	119	31956	0.240 ng		98
89) 1,2,3-Trimethylbenzene	20.74	105	25646	0.226 ng		100
90) 1,2-Dichlorobenzene	20.87	146	14293	0.239 ng		97
91) d-Limonene	20.86	68	9801	0.223 ng		98
92) 1,2-Dibromo-3-Chloropr...	21.28	157	3414	0.171 ng	#	63
93) n-Undecane	21.55	57	14754	0.216 ng		90
94) 1,2,4-Trichlorobenzene	22.45	180	7083	0.173 ng	#	94
95) Naphthalene	22.60	128	15149m	0.135 ng		
96) n-Dodecane	22.48	57	11247	0.181 ng		93
97) Hexachlorobutadiene	22.78	225	5982	0.216 ng		96
98) Cyclohexanone	18.62	55	10057	0.211 ng		92
99) tert-Butylbenzene	20.37	119	25807	0.248 ng		98
100) n-Butylbenzene	21.12	91	26263	0.220 ng		95

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

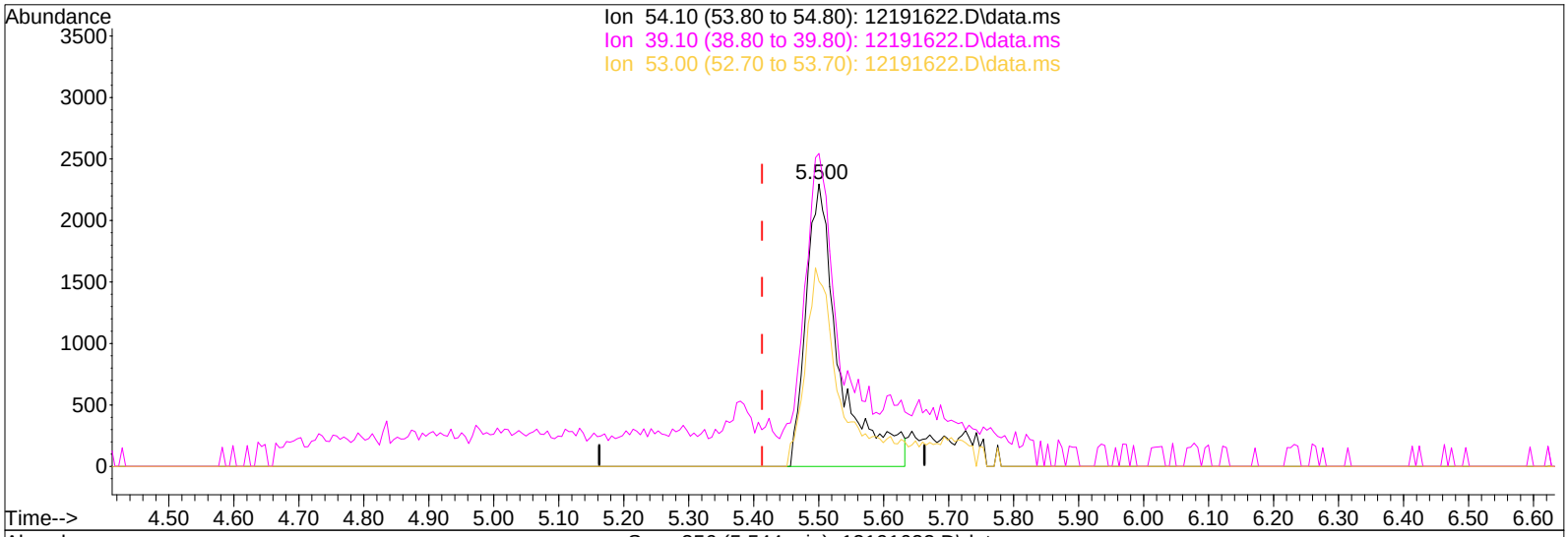
Quant Time: Dec 20 09:45:07 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

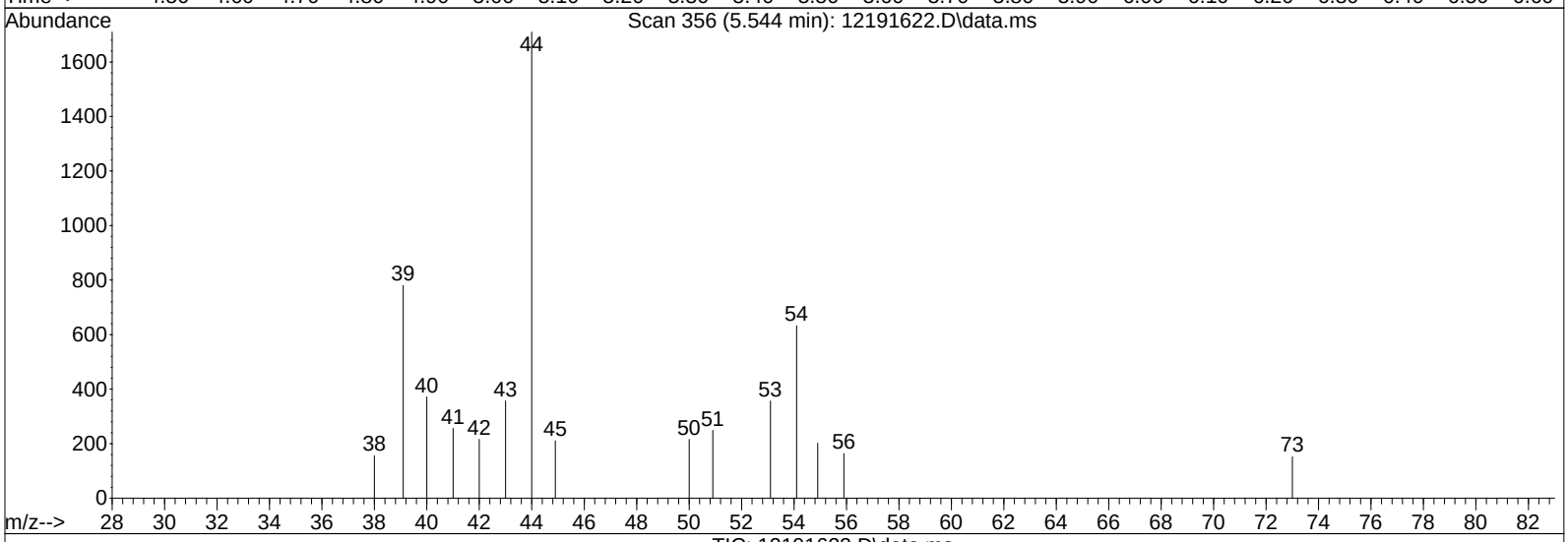


Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:35 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191622.D\data.ms

(7) 1,3-Butadiene (T)

5.500min (+0.088) 0.26ng

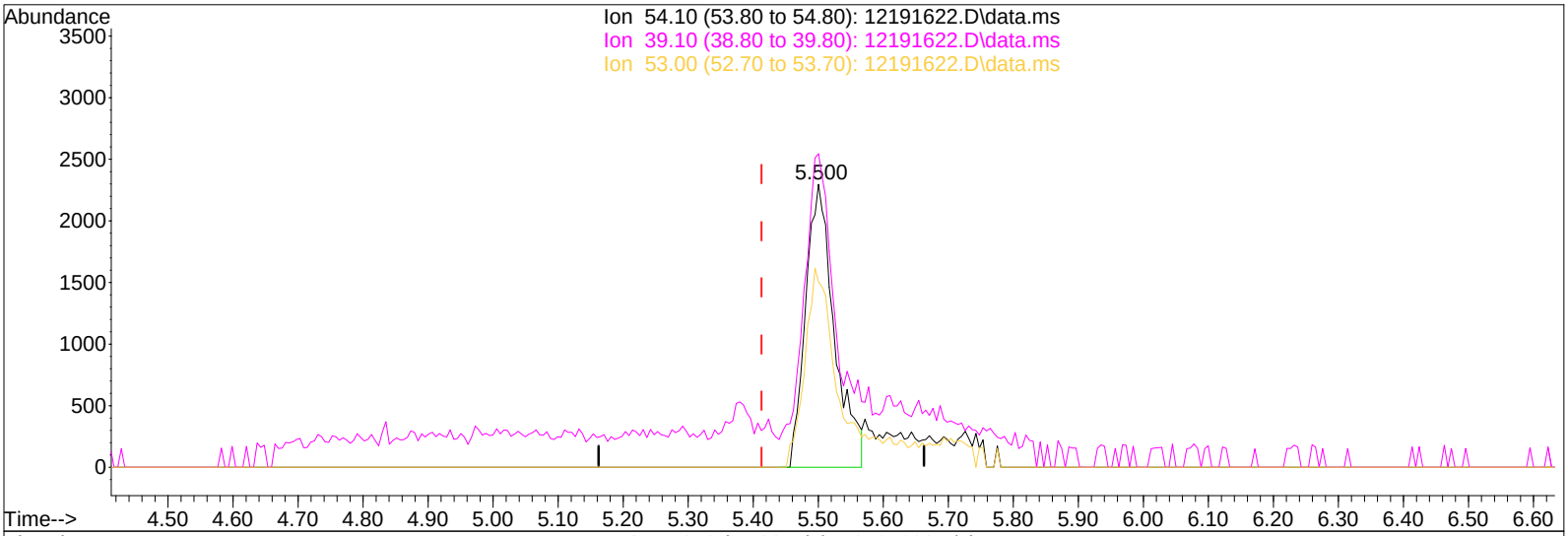
response 8163

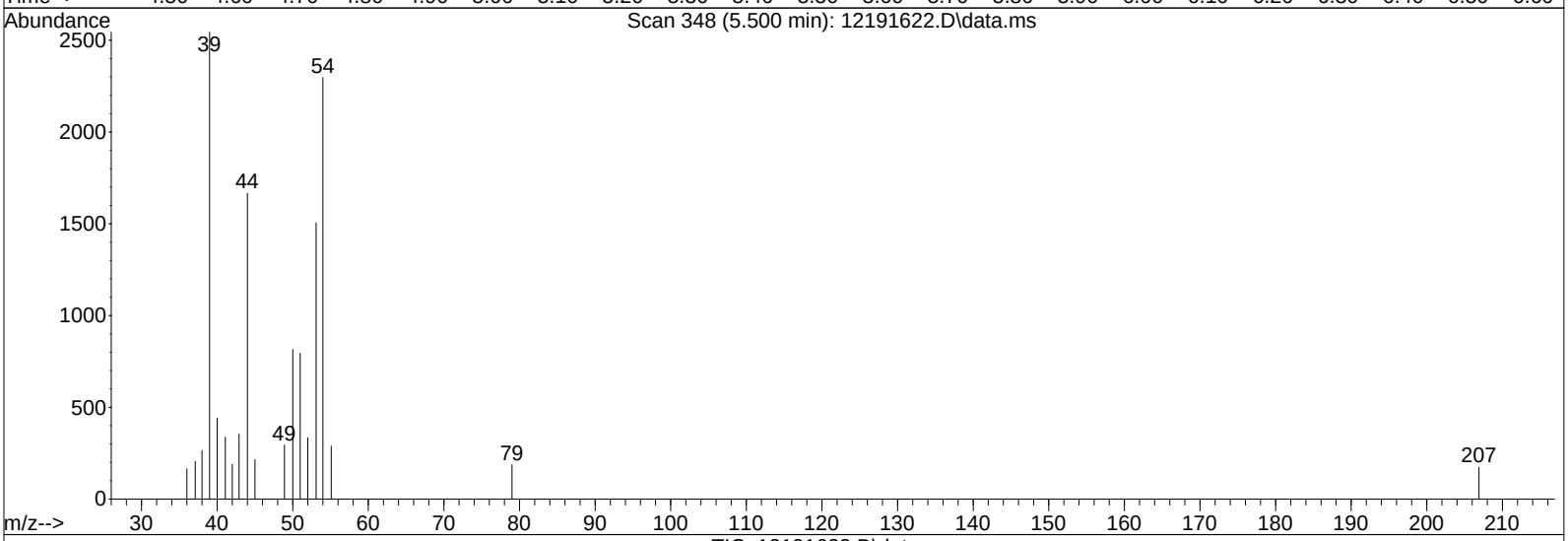
Ion	Exp%	Act%
54.10	100	100
39.10	104.80	94.25
53.00	70.30	74.07
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:35 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191622.D\data.ms

(7) 1,3-Butadiene (T)

5.500min (+0.088) 0.23ng m

response 7078

Ion	Exp%	Act%
54.10	100	100
39.10	104.80	108.70
53.00	70.30	85.42
0.00	0.00	0.00

IPC

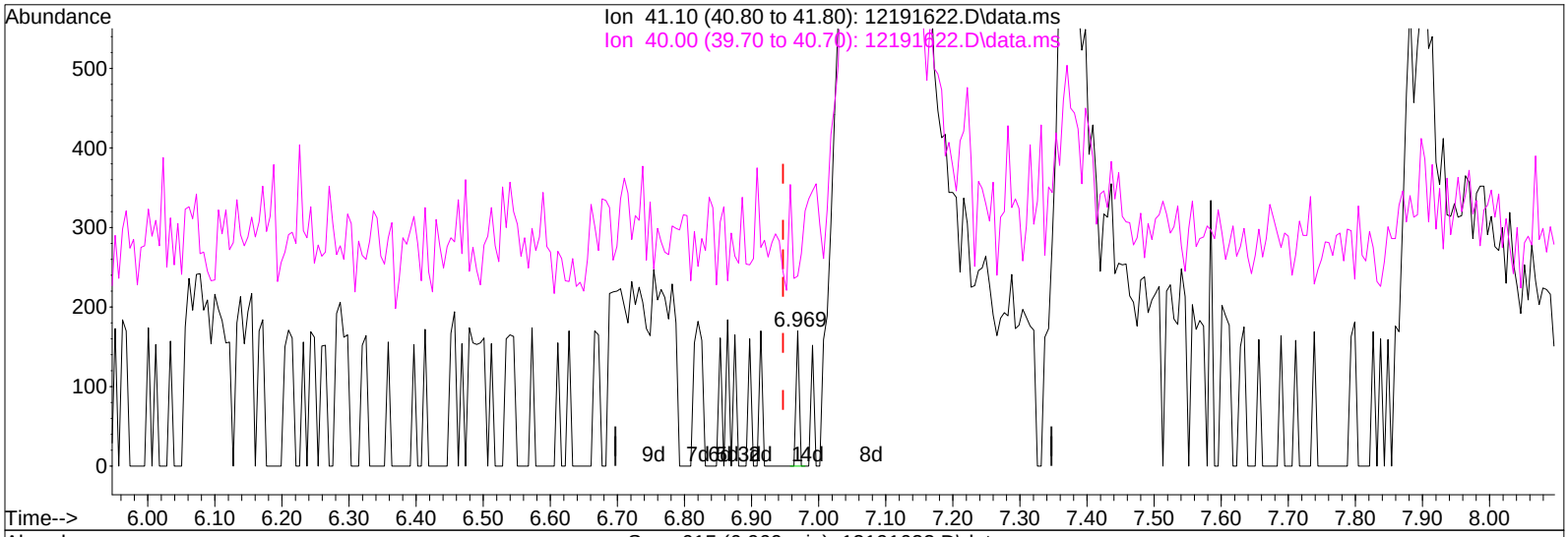
LH 12/20/16

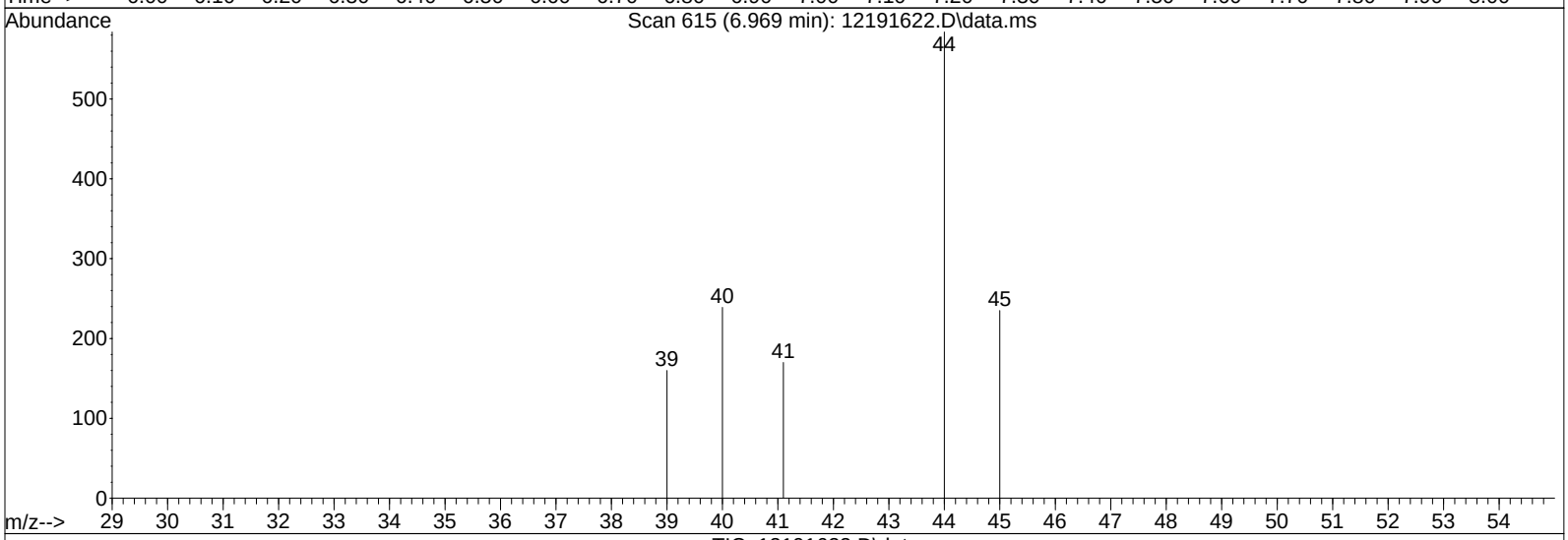
12/30/16

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:35 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





(11) Acetonitrile (T)

6.969min (+0.022) 0.00ng

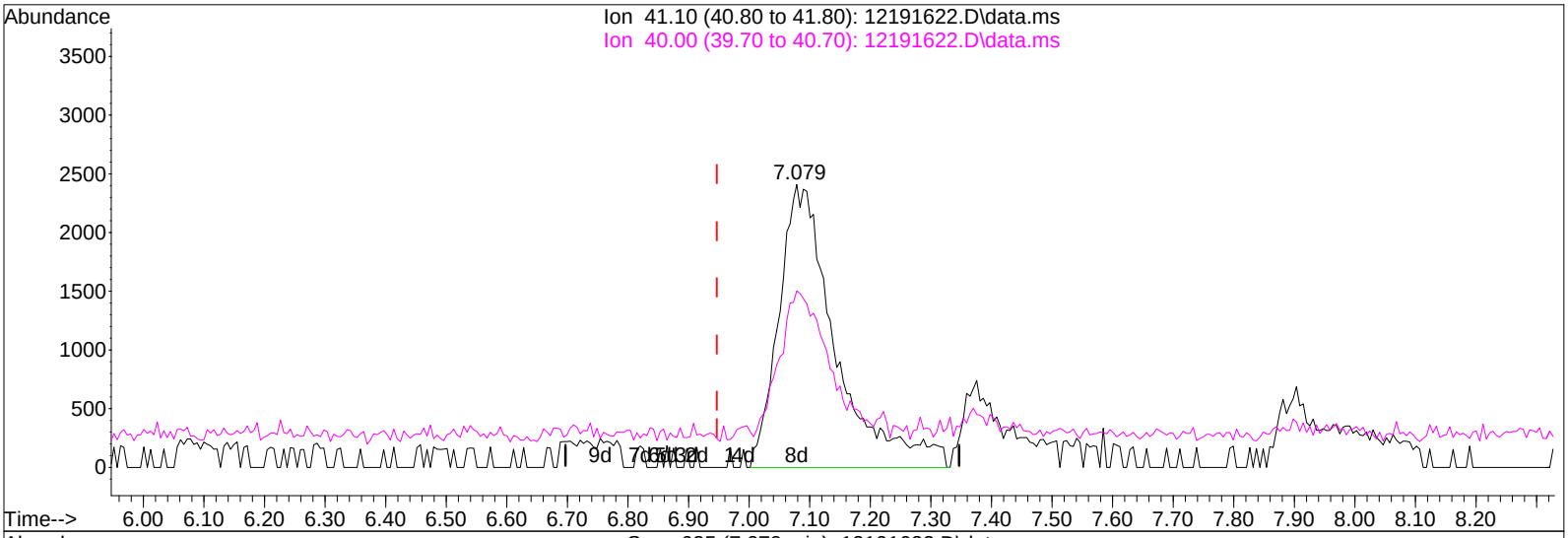
response 56

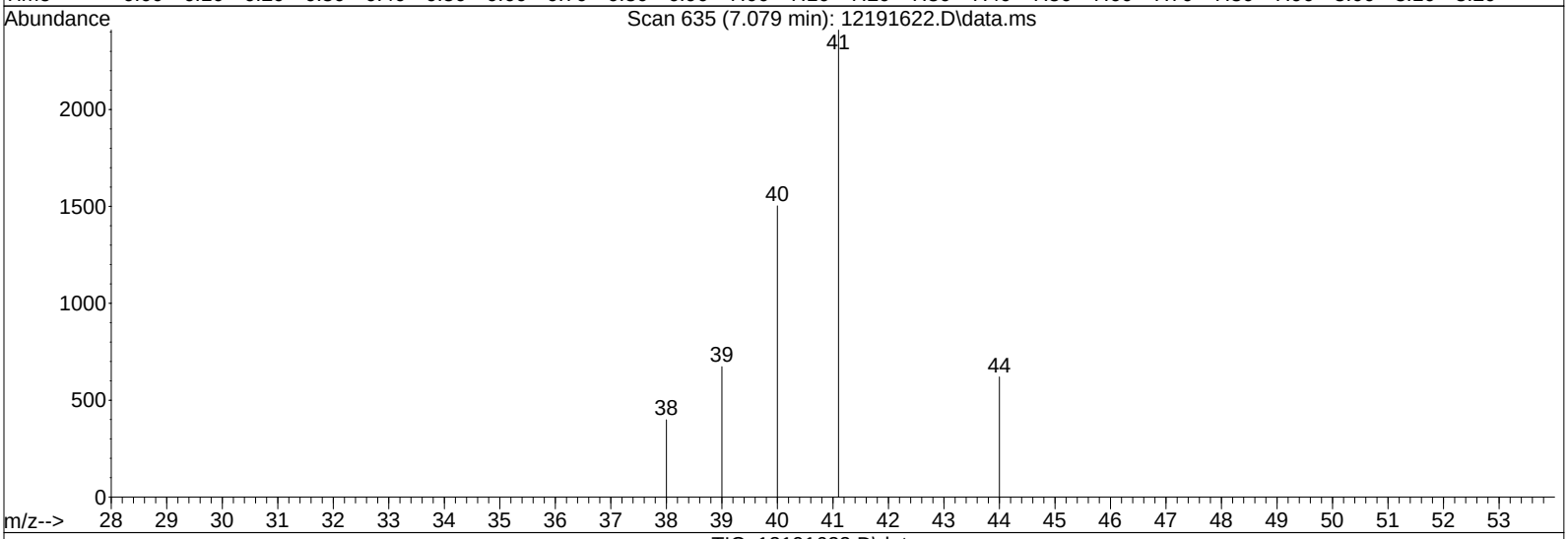
Ion	Exp%	Act%
41.10	100	100
40.00	54.30	98.21#
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:35 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191622.D\data.ms

(11) Acetonitrile (T)

7.079min (+0.132) 0.25ng m

response 15593

Ion	Exp%	Act%
41.10	100	100
40.00	54.30	0.35#
0.00	0.00	0.00
0.00	0.00	0.00

MP

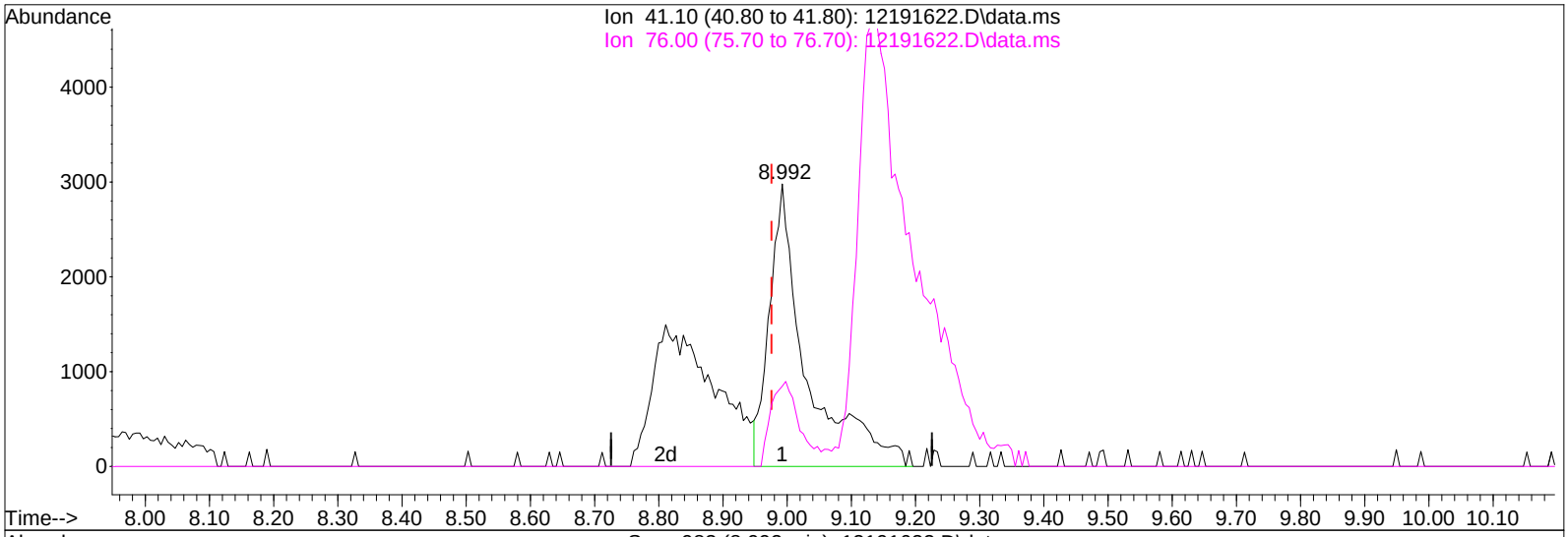
LH 12/20/16

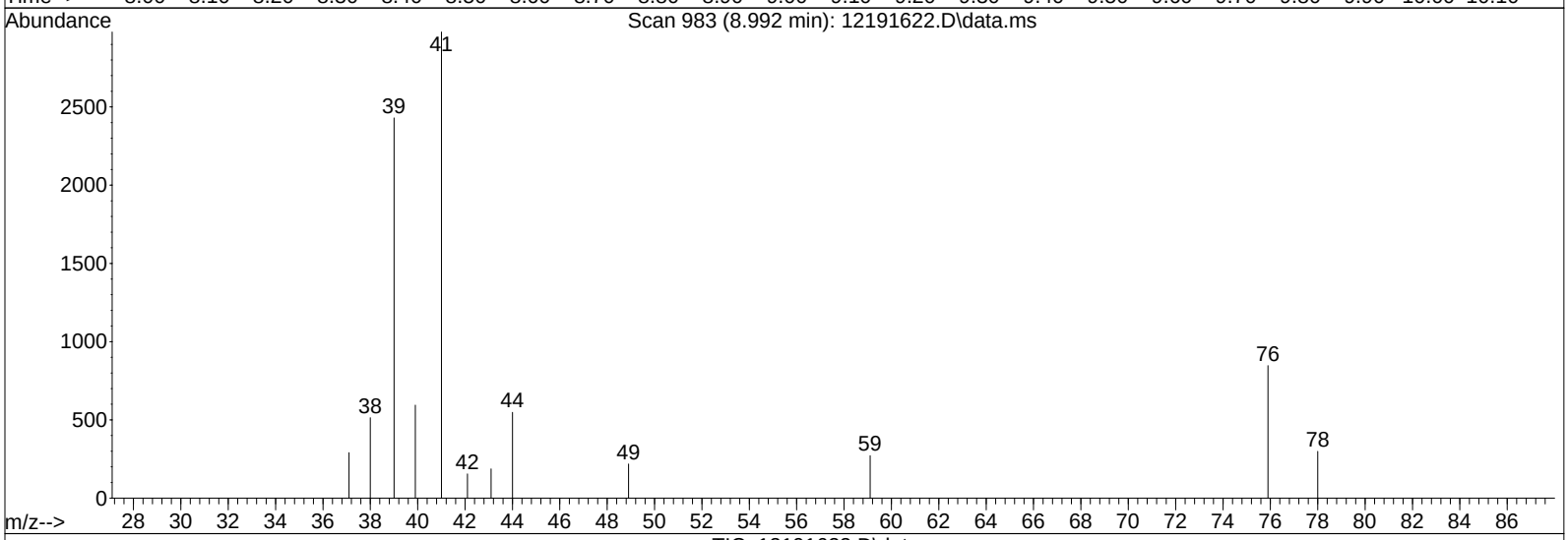
12/30/16

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:35 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191622.D\data.ms

(20) 3-Chloro-1-propene (Allyl Chloride) (T)

8.992min (+0.016) 0.25ng

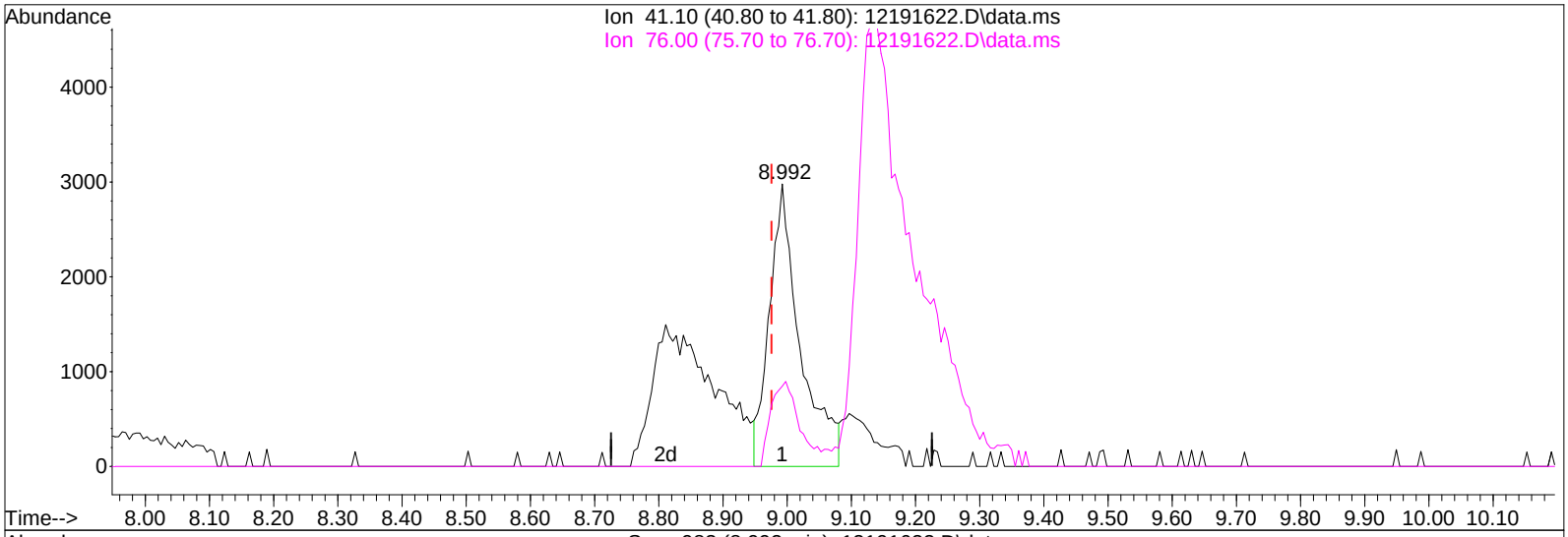
response 11986

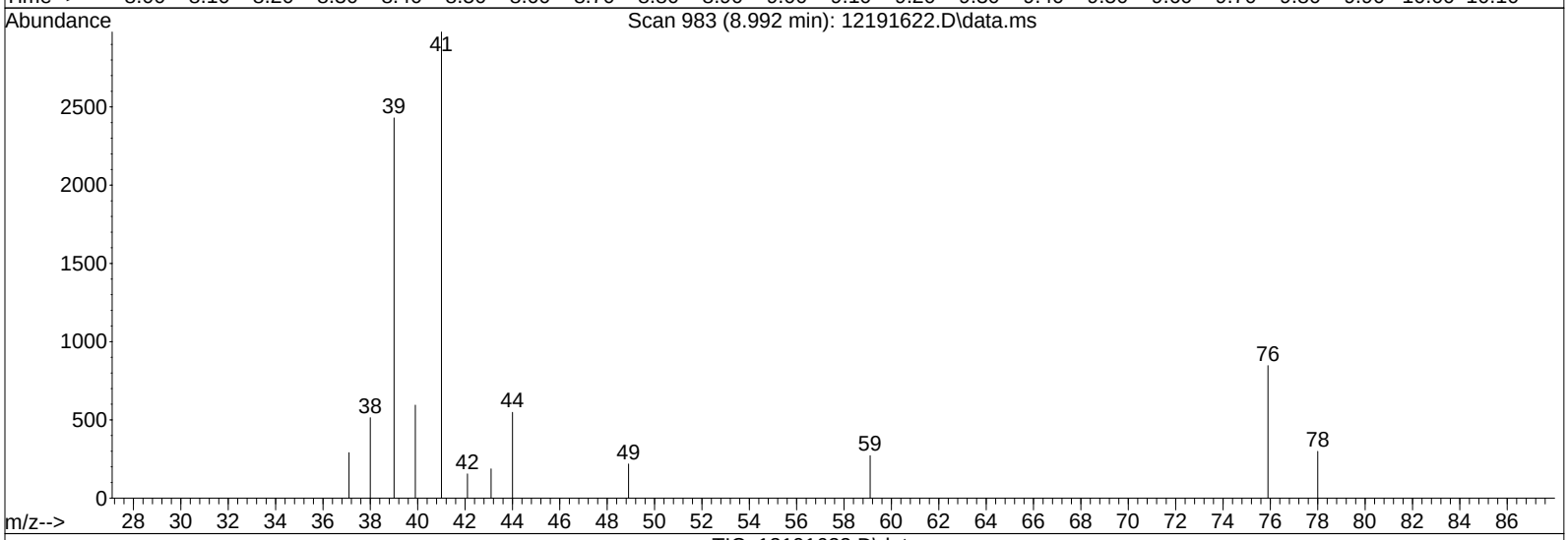
Ion	Exp%	Act%
41.10	100	100
76.00	34.90	24.80
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:35 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191622.D\data.ms

(20) 3-Chloro-1-propene (Allyl Chloride) (T)

8.992min (+0.016) 0.20ng m

response 9880

Ion	Exp%	Act%
41.10	100	100
76.00	34.90	30.08
0.00	0.00	0.00
0.00	0.00	0.00

IPC

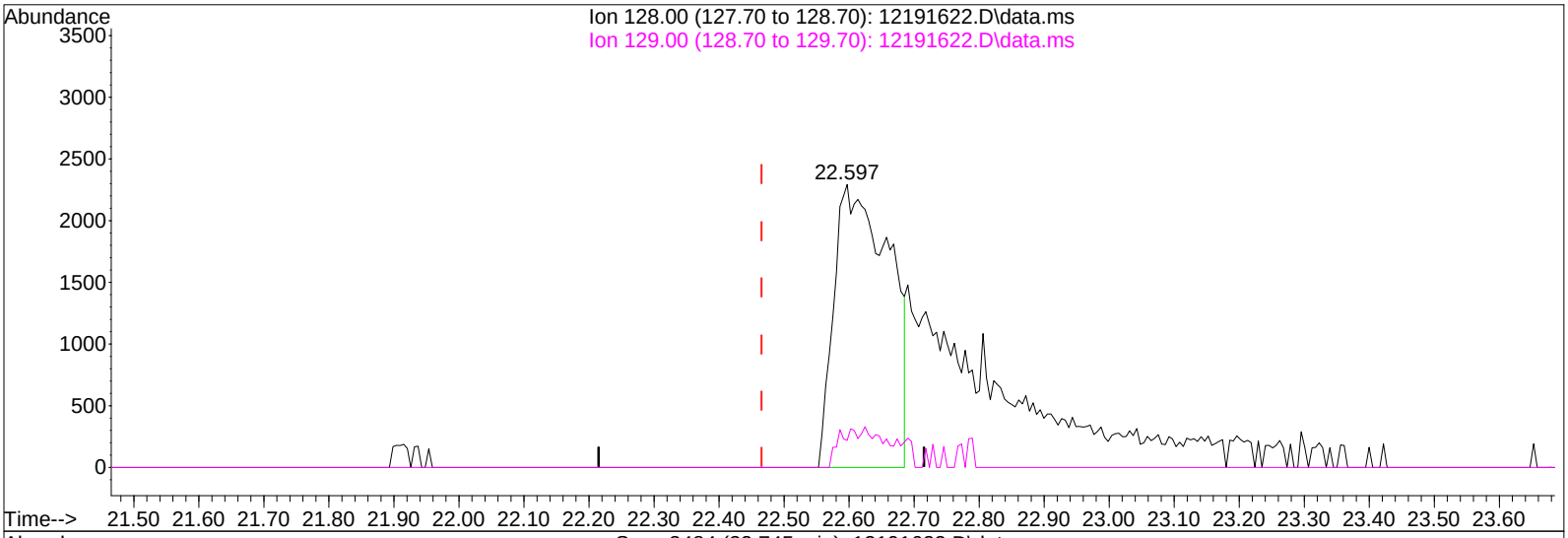
LH 12/20/16

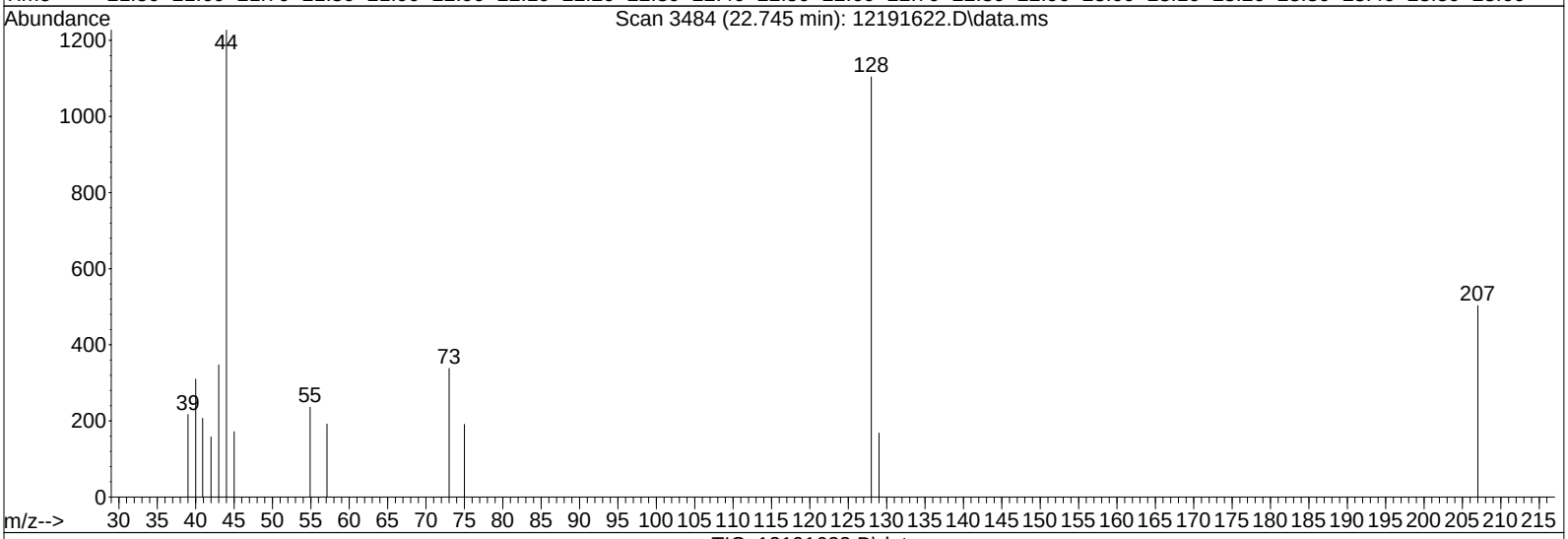
12/30/16

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:35 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191622.D\data.ms

(95) Naphthalene (T)

22.597min (+0.132) 0.12ng

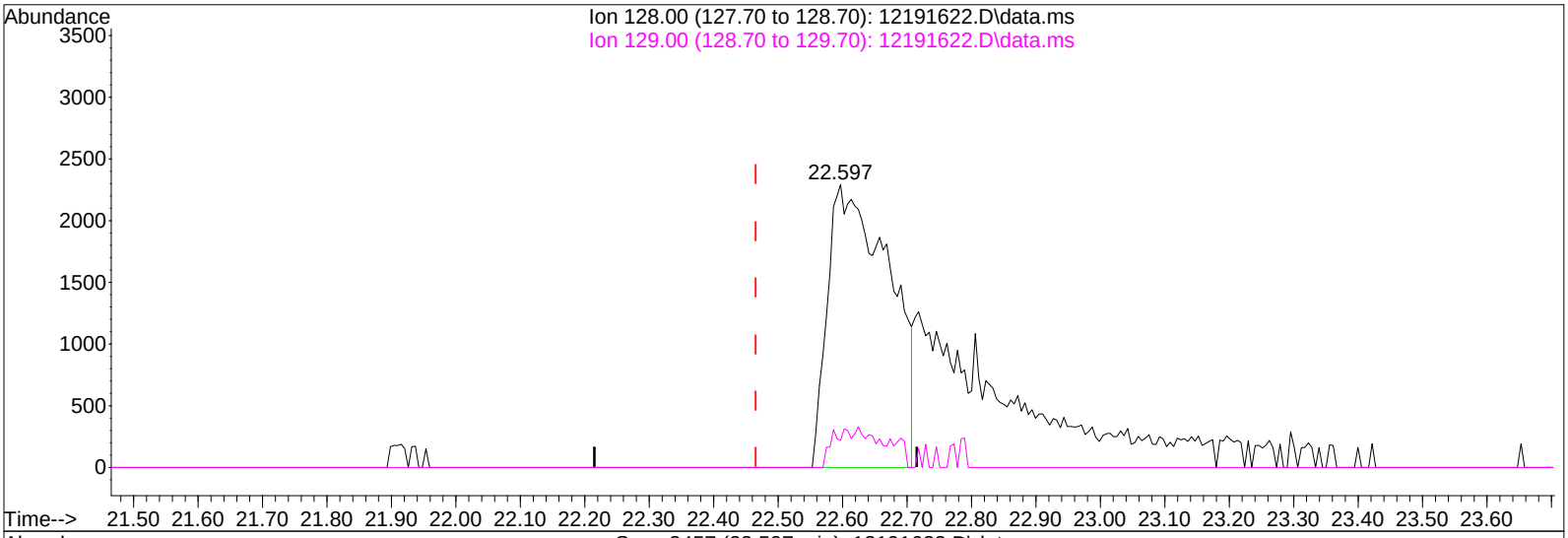
response 13470

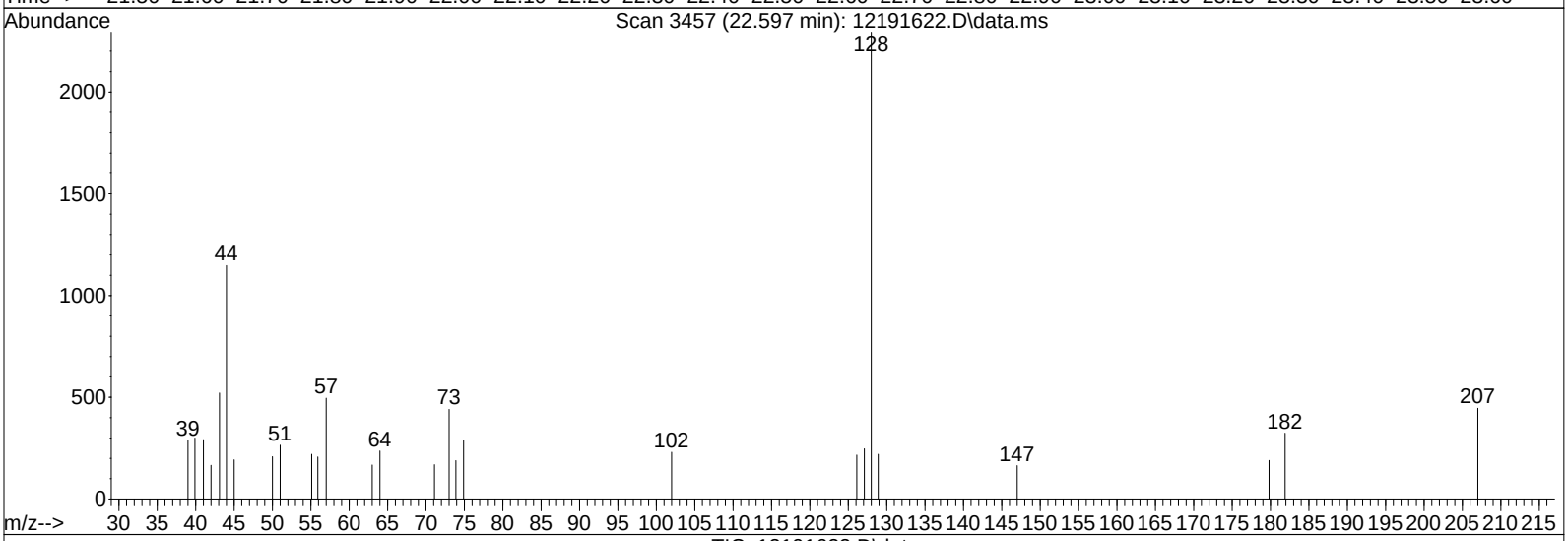
Ion	Exp%	Act%
128.00	100	100
129.00	11.00	12.09
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:35 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191622.D\data.ms

(95) Naphthalene (T)

22.597min (+0.132) 0.14ng m

response 15149

Ion	Exp%	Act%
128.00	100	100
129.00	11.00	10.75
0.00	0.00	0.00
0.00	0.00	0.00

BLC

LH 12/20/16

12/30/16

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 09:52:42 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	266024	12.500	ng	-0.01
37) 1,4-Difluorobenzene (IS2)	13.65	114	1350700	12.500	ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.93	82	571668	12.500	ng	0.00

System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...	12.40	65	484887	13.933	ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 111.44%			
57) Toluene-d8 (SS2)	16.10	98	1396735	12.826	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 102.64%			
73) Bromofluorobenzene (SS3)	19.28	174	439250	12.563	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.48%			

Target Compounds

							Qvalue
2) Propene	4.24	42	15026	0.437	ng		96
3) Dichlorodifluoromethan...	4.40	85	29589	0.530	ng		99
4) Chloromethane	4.74	50	23526	0.519	ng		97
5) 1,2-Dichloro-1,1,2,2-t...	4.98	135	14839	0.508	ng		99
6) Vinyl Chloride	5.20	62	21720	0.479	ng		97
7) 1,3-Butadiene	5.49	54	13222	0.449	ng		90
8) Bromomethane	5.95	94	11227	0.433	ng		96
9) Chloroethane	6.29	64	8828	0.415	ng		94
10) Ethanol	6.68	45	48653	2.075	ng		97
11) Acetonitrile	7.08	41	26579m	0.443	ng		
12) Acrolein	7.20	56	9212	0.408	ng		99
13) Acetone	7.35	58	50221	2.206	ng		88
14) Trichlorofluoromethane	7.60	101	24081	0.496	ng		99
15) 2-Propanol (Isopropanol)	7.86	45	71574	0.917	ng		87
16) Acrylonitrile	8.27	53	17077	0.419	ng		100
17) 1,1-Dichloroethene	8.60	96	12048	0.474	ng		98
18) 2-Methyl-2-Propanol (t...	8.77	59	72972	0.966	ng		94
19) Methylene Chloride	8.82	84	13969	0.458	ng		93
20) 3-Chloro-1-propene (Al...	8.99	41	18295m	0.395	ng		
21) Trichlorotrifluoroethane	9.23	151	11653	0.480	ng		99
22) Carbon Disulfide	9.13	76	51598	0.495	ng		96
23) trans-1,2-Dichloroethene	10.10	61	19294	0.457	ng		99
24) 1,1-Dichloroethane	10.35	63	24593	0.458	ng		98
25) Methyl tert-Butyl Ether	10.44	73	43325	0.501	ng		99
26) Vinyl Acetate	10.60	86	13036	2.045	ng	#	79
27) 2-Butanone (MEK)	10.87	72	8752	0.430	ng		95
28) cis-1,2-Dichloroethene	11.37	61	18751	0.455	ng		97
29) Diisopropyl Ether	11.64	87	11018	0.433	ng		98
30) Ethyl Acetate	11.66	61	9505	0.874	ng		99
31) n-Hexane	11.64	57	23598	0.479	ng		99
32) Chloroform	11.70	83	24803	0.491	ng		99
34) Tetrahydrofuran (THF)	12.14	72	8849	0.425	ng	#	89
35) Ethyl tert-Butyl Ether	12.24	87	15804	0.479	ng		100
36) 1,2-Dichloroethane	12.51	62	19810	0.516	ng		99
38) 1,1,1-Trichloroethane	12.79	97	22038	0.499	ng		99
39) Isopropyl Acetate	13.20	61	17510	0.869	ng		96
40) 1-Butanol	13.25	56	24650	0.781	ng	#	74
41) Benzene	13.27	78	54425	0.413	ng		98
42) Carbon Tetrachloride	13.42	117	18576	0.490	ng		99
43) Cyclohexane	13.55	84	40595	0.917	ng		99
44) tert-Amyl Methyl Ether	13.89	73	39324	0.458	ng		97
45) 1,2-Dichloropropane	14.12	63	13932	0.435	ng		100
46) Bromodichloromethane	14.31	83	19179	0.491	ng		99
47) Trichloroethene	14.35	130	14278	0.470	ng		98
48) 1,4-Dioxane	14.35	88	10215	0.401	ng	#	68
49) 2,2,4-Trimethylpentane...	14.41	57	60395	0.452	ng		99

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 09:52:42 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

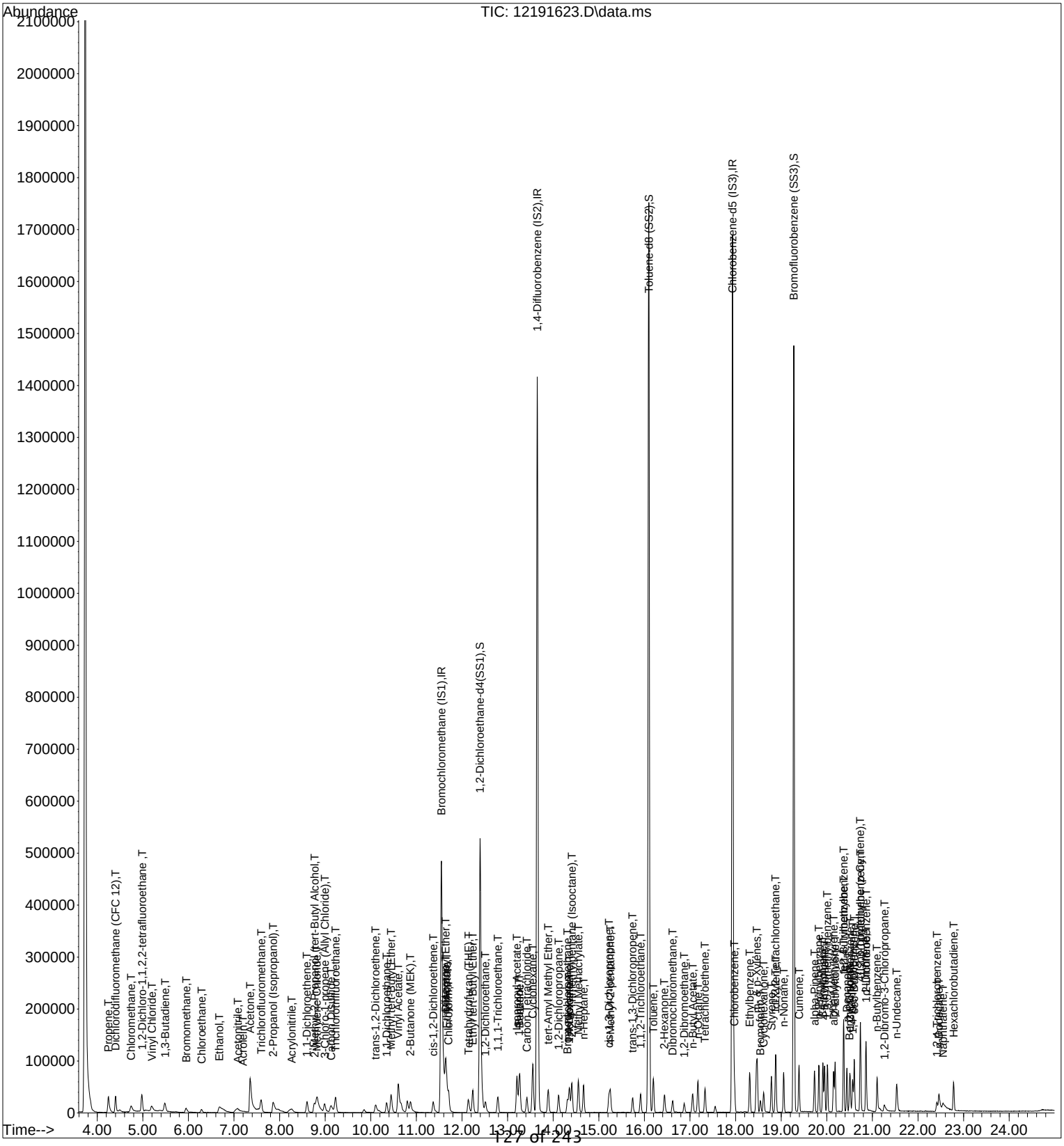
Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
50) Methyl Methacrylate	14.55	100	10335	0.907 ng		99
51) n-Heptane	14.67	71	13537	0.452 ng		98
52) cis-1,3-Dichloropropene	15.22	75	21948	0.461 ng		99
53) 4-Methyl-2-pentanone	15.26	58	12490	0.426 ng		87
54) trans-1,3-Dichloropropene	15.74	75	18415	0.436 ng		100
55) 1,1,2-Trichloroethane	15.92	97	12956	0.458 ng		98
58) Toluene	16.20	91	55819	0.494 ng		98
59) 2-Hexanone	16.44	43	30733	0.426 ng		96
60) Dibromochloromethane	16.62	129	14234	0.460 ng		97
61) 1,2-Dibromoethane	16.87	107	14329	0.450 ng		99
62) n-Butyl Acetate	17.06	43	33707	0.409 ng		97
63) n-Octane	17.18	57	12853	0.478 ng		93
64) Tetrachloroethene	17.33	166	14914	0.474 ng		99
65) Chlorobenzene	17.97	112	35858	0.464 ng		100
66) Ethylbenzene	18.31	91	60915	0.451 ng		99
67) m- & p-Xylenes	18.47	91	94072	0.919 ng		99
68) Bromoform	18.54	173	11360	0.459 ng		98
69) Styrene	18.79	104	34882	0.443 ng		99
70) o-Xylene	18.88	91	48000	0.467 ng		98
71) n-Nonane	19.06	43	28706	0.445 ng		96
72) 1,1,2,2-Tetrachloroethane	18.87	83	21812	0.440 ng		100
74) Cumene	19.39	105	60077	0.488 ng		99
75) alpha-Pinene	19.73	93	30805	0.458 ng		99
76) n-Propylbenzene	19.83	91	72745	0.468 ng		98
77) 3-Ethyltoluene	19.91	105	56699	0.432 ng		96
78) 4-Ethyltoluene	19.95	105	56365	0.485 ng		94
79) 1,3,5-Trimethylbenzene	20.01	105	48769	0.455 ng		99
80) alpha-Methylstyrene	20.15	118	23326	0.459 ng		96
81) 2-Ethyltoluene	20.18	105	56367	0.453 ng		100
82) 1,2,4-Trimethylbenzene	20.37	105	49281	0.468 ng		99
83) n-Decane	20.44	57	26815	0.427 ng		99
84) Benzyl Chloride	20.50	91	22636	0.280 ng		96
85) 1,3-Dichlorobenzene	20.51	146	24851	0.447 ng		98
86) 1,4-Dichlorobenzene	20.57	146	26829	0.424 ng		99
87) sec-Butylbenzene	20.60	105	65702	0.479 ng		90
88) 4-Isopropyltoluene (p-...	20.73	119	58694	0.465 ng		98
89) 1,2,3-Trimethylbenzene	20.74	105	48873	0.454 ng		100
90) 1,2-Dichlorobenzene	20.86	146	26031	0.458 ng		99
91) d-Limonene	20.86	68	19065	0.457 ng		99
92) 1,2-Dibromo-3-Chloropr...	21.27	157	7087	0.373 ng	#	75
93) n-Undecane	21.53	57	26959	0.416 ng		94
94) 1,2,4-Trichlorobenzene	22.42	180	14400	0.369 ng		97
95) Naphthalene	22.55	128	39950m	0.375 ng		
96) n-Dodecane	22.46	57	20350	0.344 ng		97
97) Hexachlorobutadiene	22.78	225	11426	0.434 ng		96
98) Cyclohexanone	18.62	55	18659	0.412 ng		97
99) tert-Butylbenzene	20.37	119	47988	0.485 ng		99
100) n-Butylbenzene	21.10	91	51353	0.453 ng		96

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

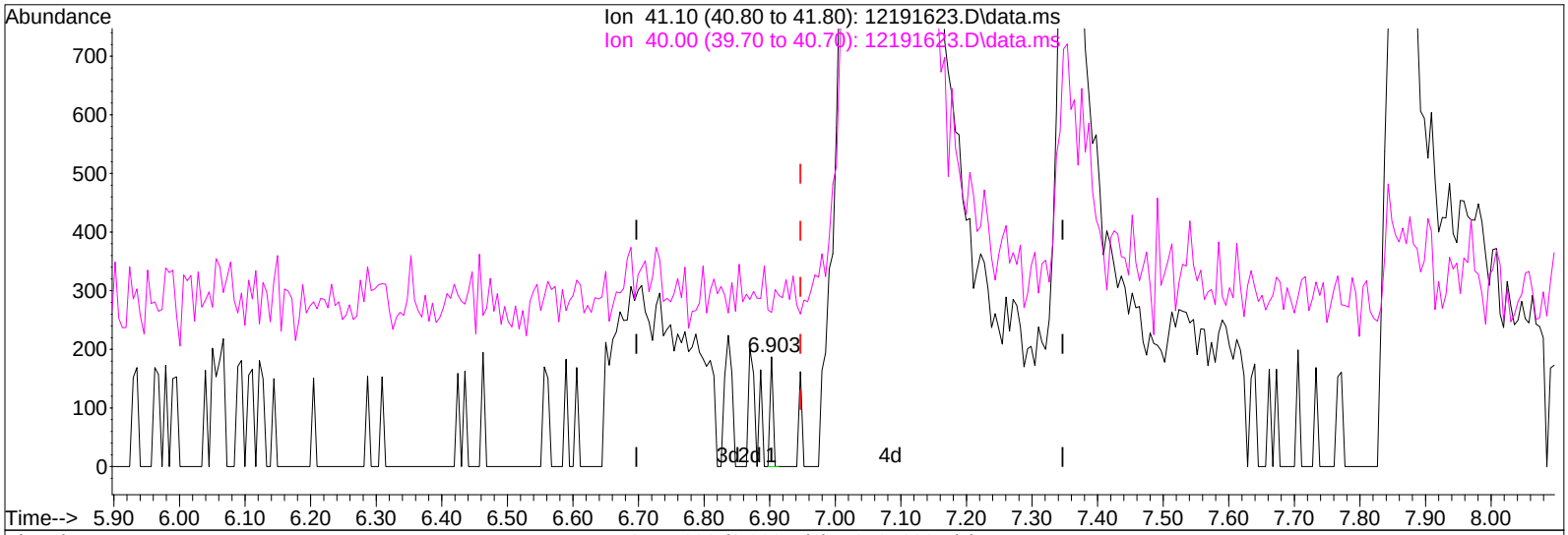
Quant Time: Dec 20 09:52:42 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

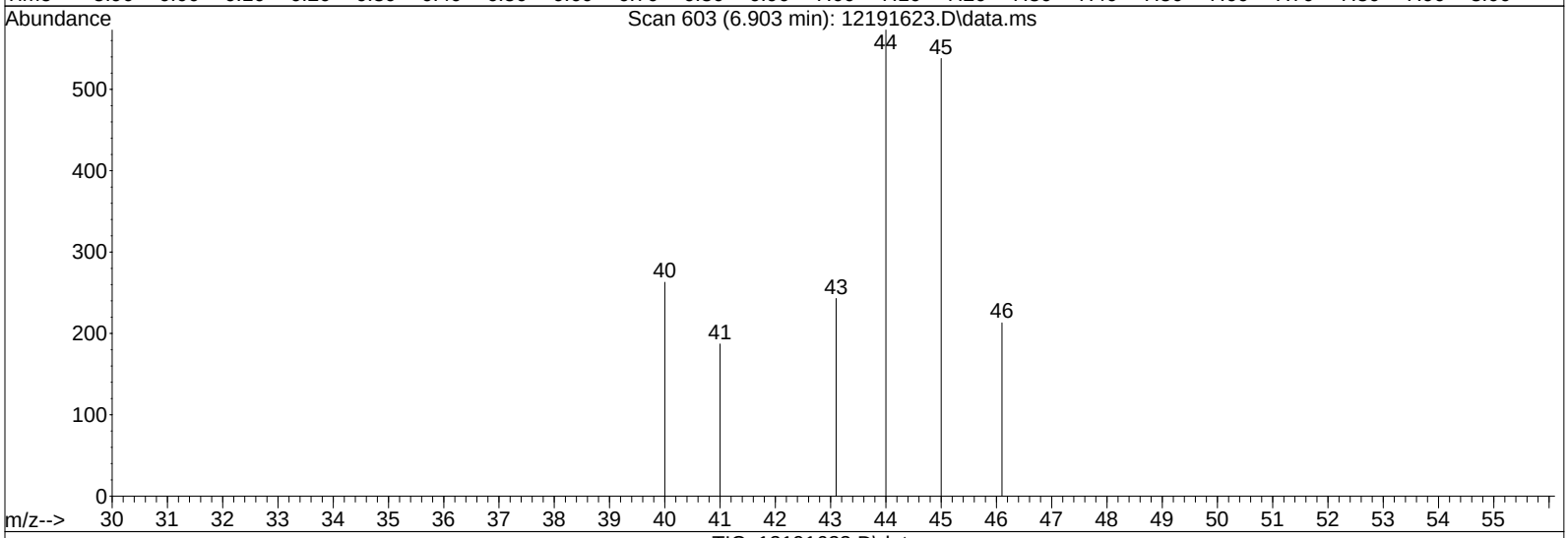


Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:37 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191623.D\data.ms

(11) Acetonitrile (T)

6.903min (-0.044) 0.00ng

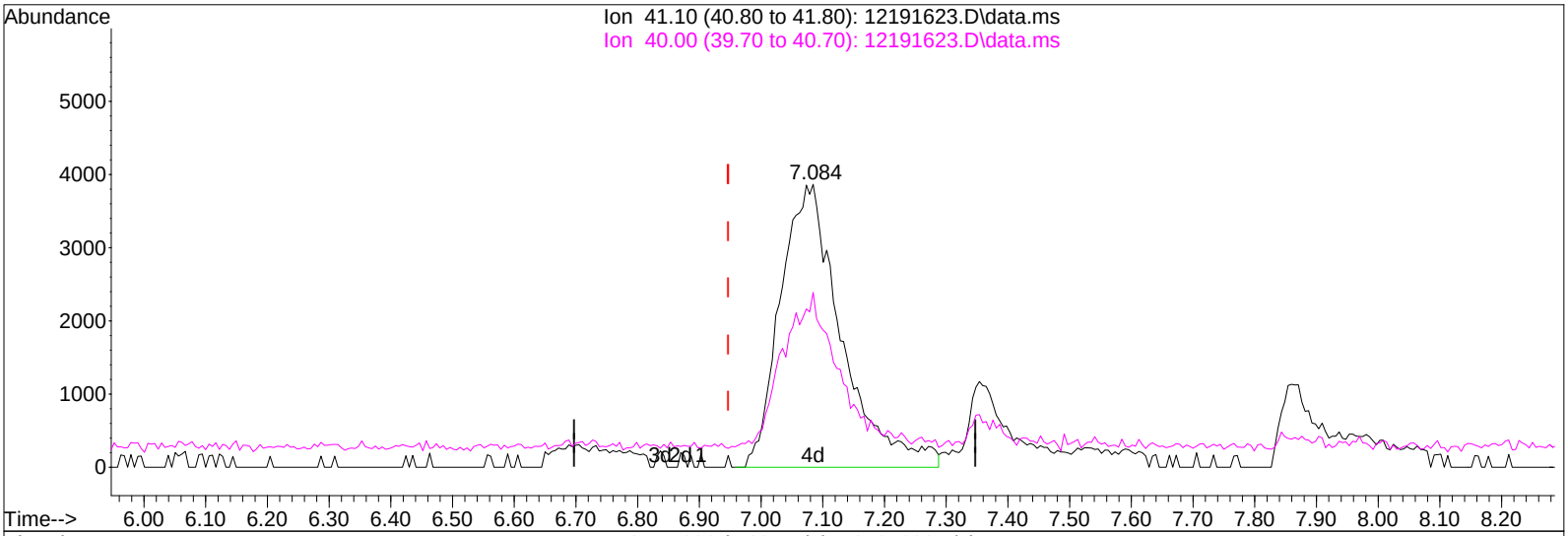
response 62

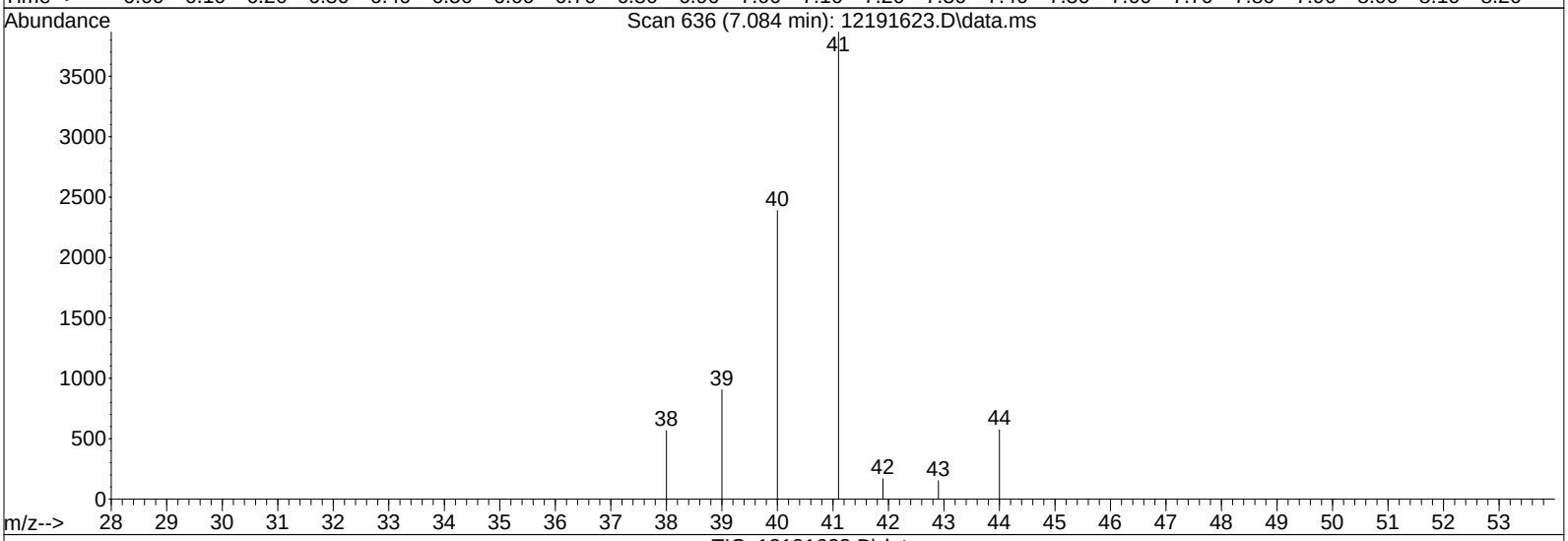
Ion	Exp%	Act%
41.10	100	100
40.00	54.30	322.58#
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:37 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191623.D\data.ms

(11) Acetonitrile (T)

7.084min (+0.137) 0.44ng m

response 26579

Ion	Exp%	Act%
41.10	100	100
40.00	54.30	0.75#
0.00	0.00	0.00
0.00	0.00	0.00

IPC

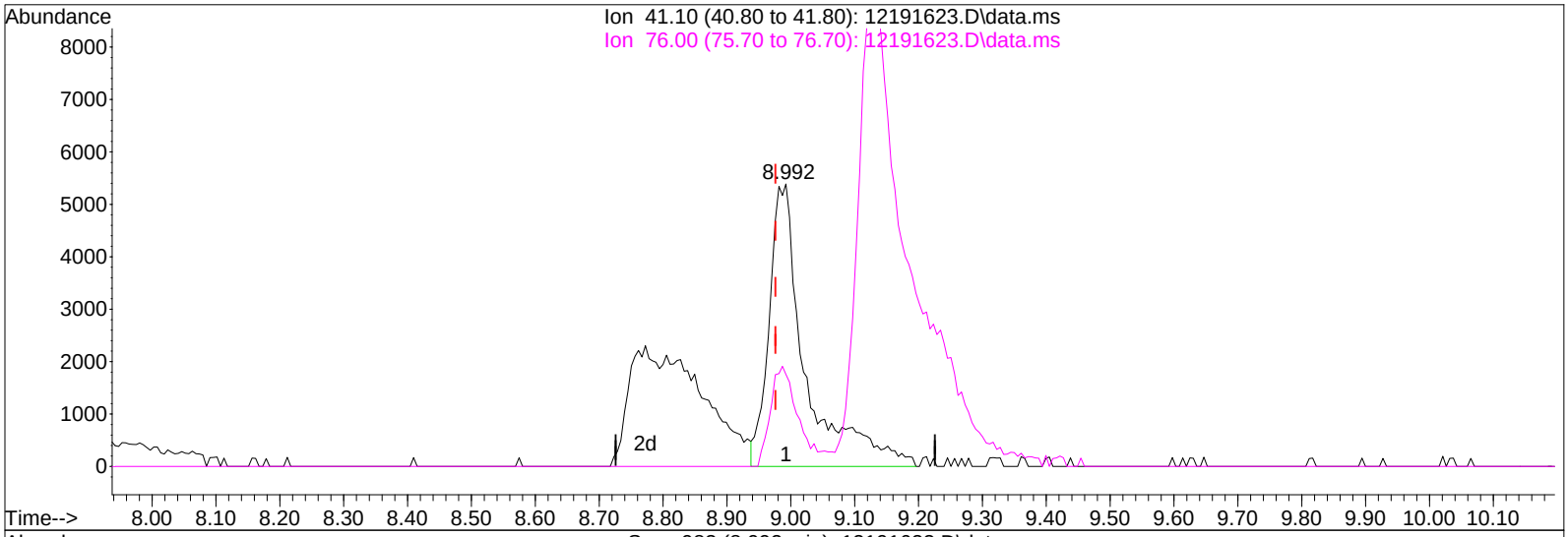
LH 12/20/16

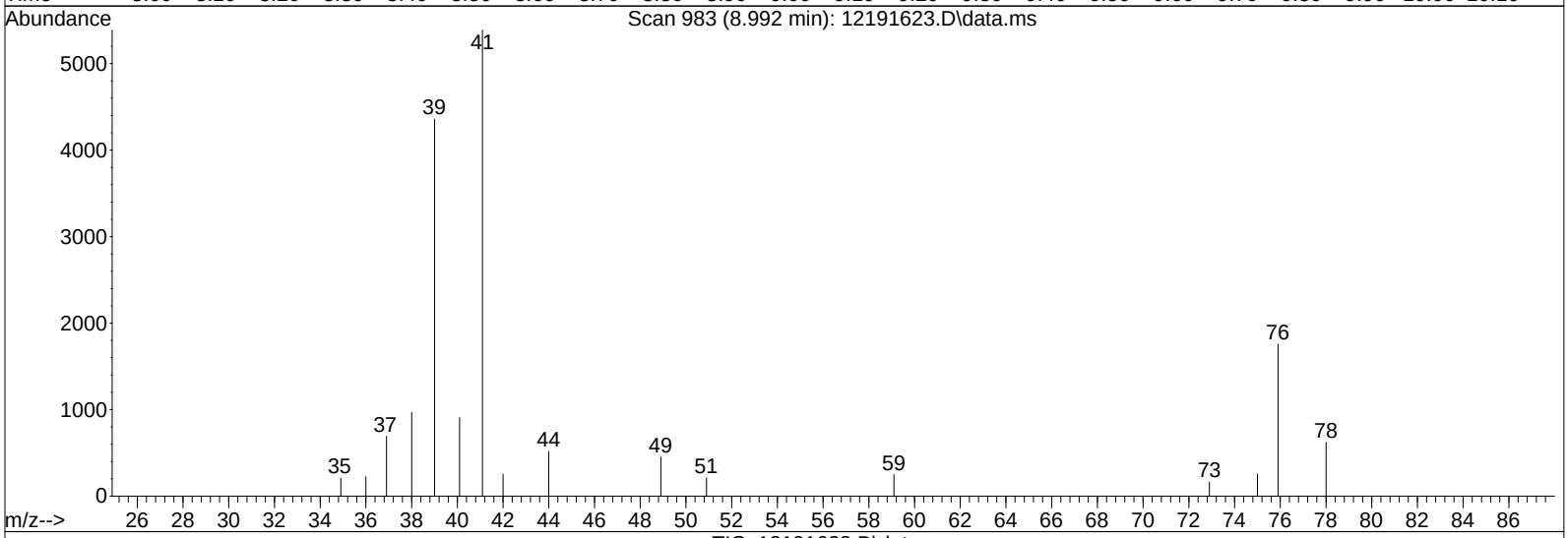
12/30/16

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:37 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191623.D\data.ms

(20) 3-Chloro-1-propene (Allyl Chloride) (T)

8.992min (+0.016) 0.46ng

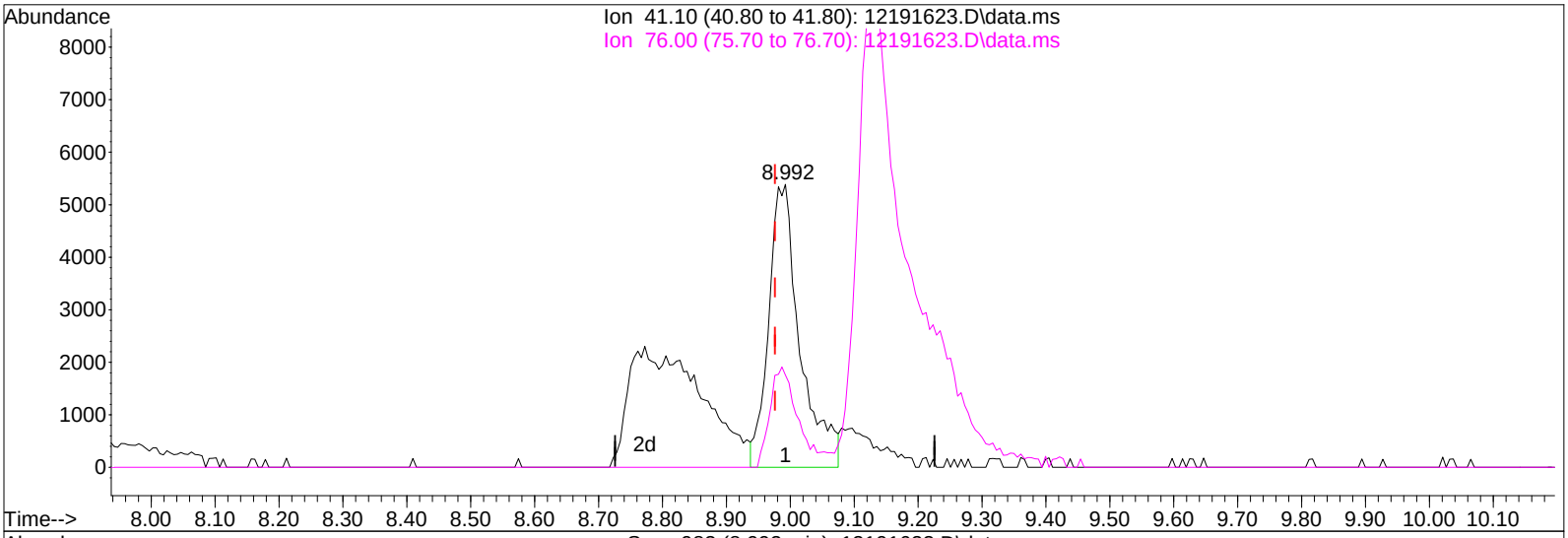
response 21371

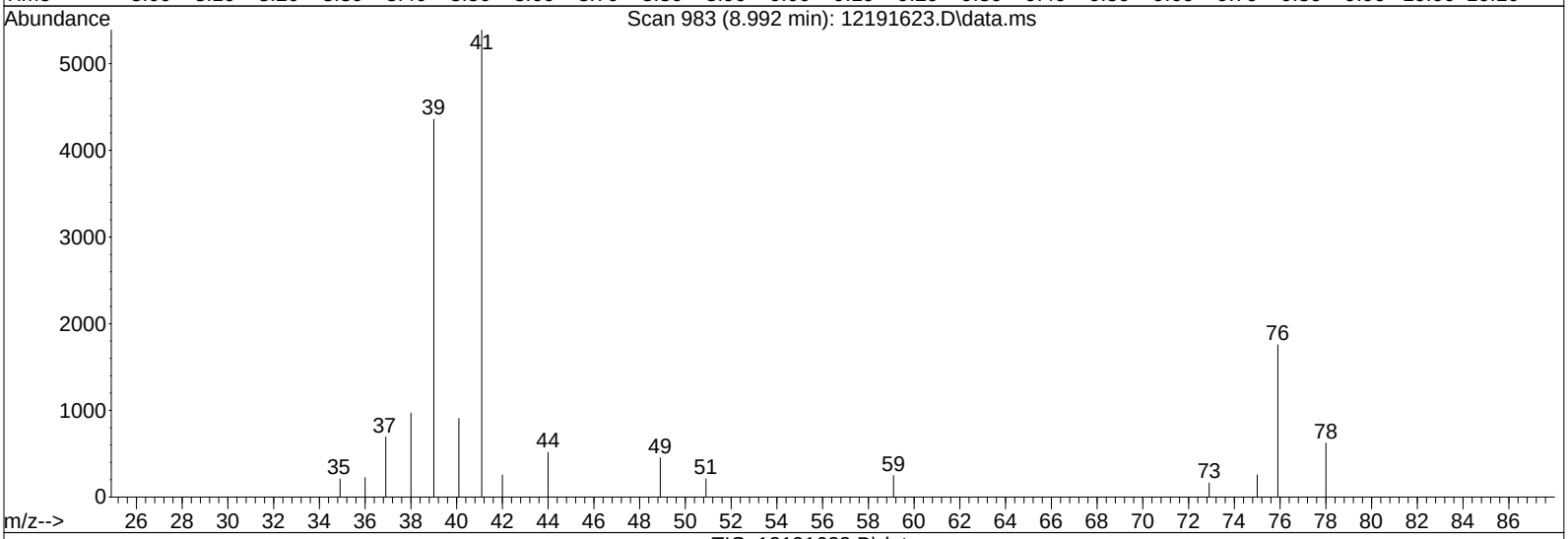
Ion	Exp%	Act%
41.10	100	100
76.00	34.90	28.45
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:37 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191623.D\data.ms

(20) 3-Chloro-1-propene (Allyl Chloride) (T)

8.992min (+0.016) 0.39ng m

response 18295

Ion	Exp%	Act%
41.10	100	100
76.00	34.90	33.24
0.00	0.00	0.00
0.00	0.00	0.00

IPC

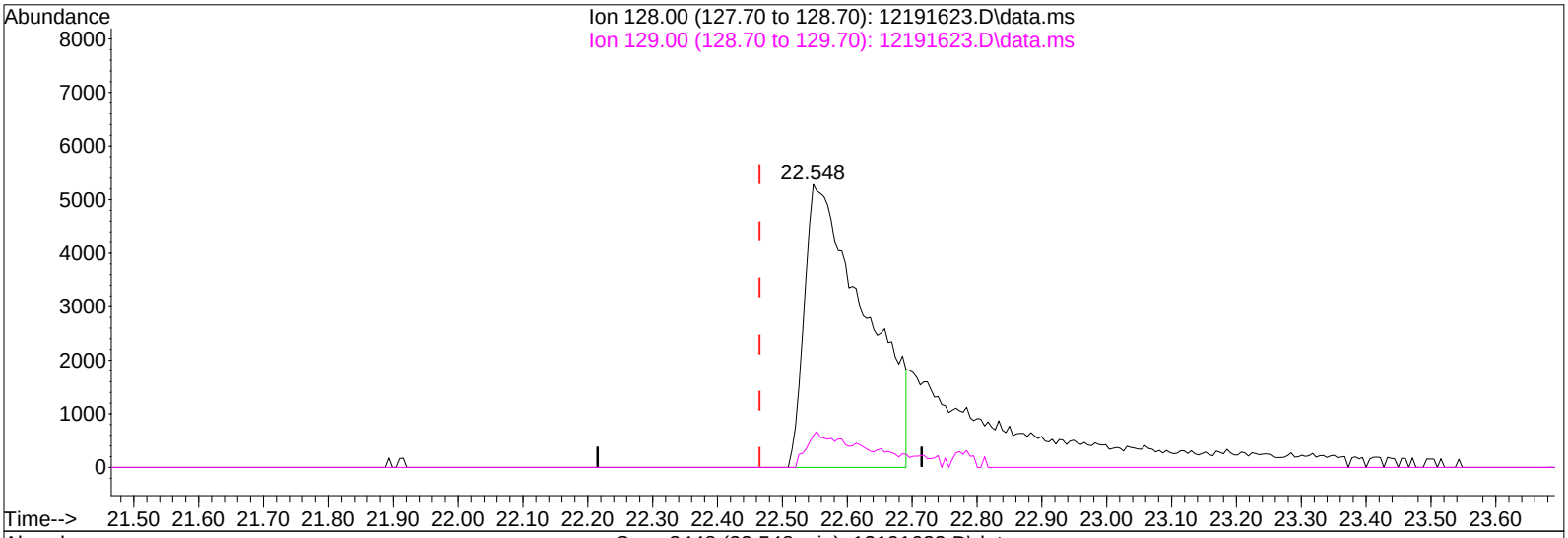
LH 12/20/16

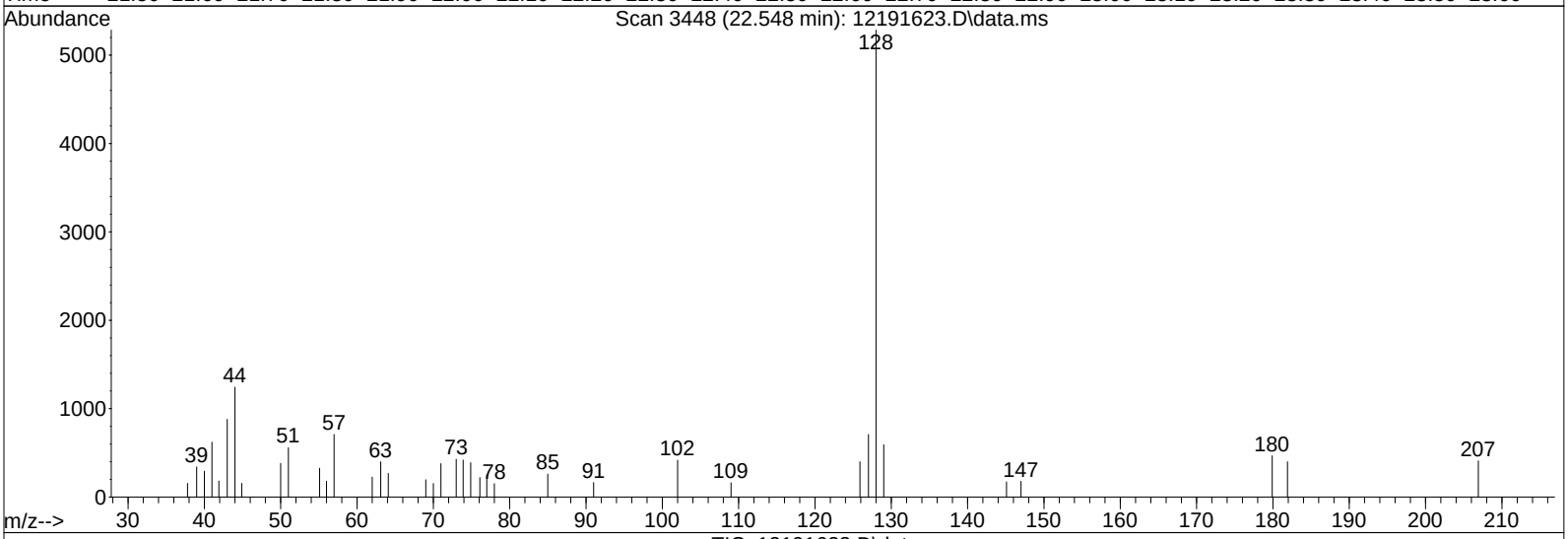
12/30/16

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:37 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191623.D\data.ms

(95) Naphthalene (T)

22.548min (+0.082) 0.32ng

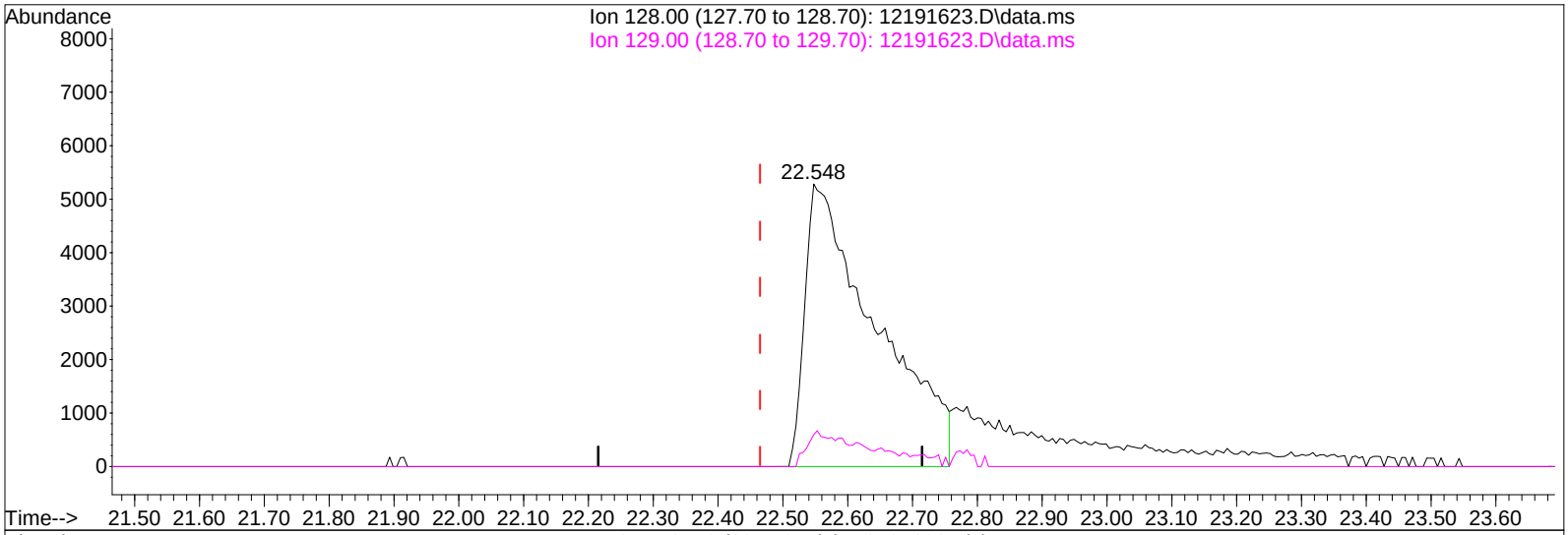
response 34200

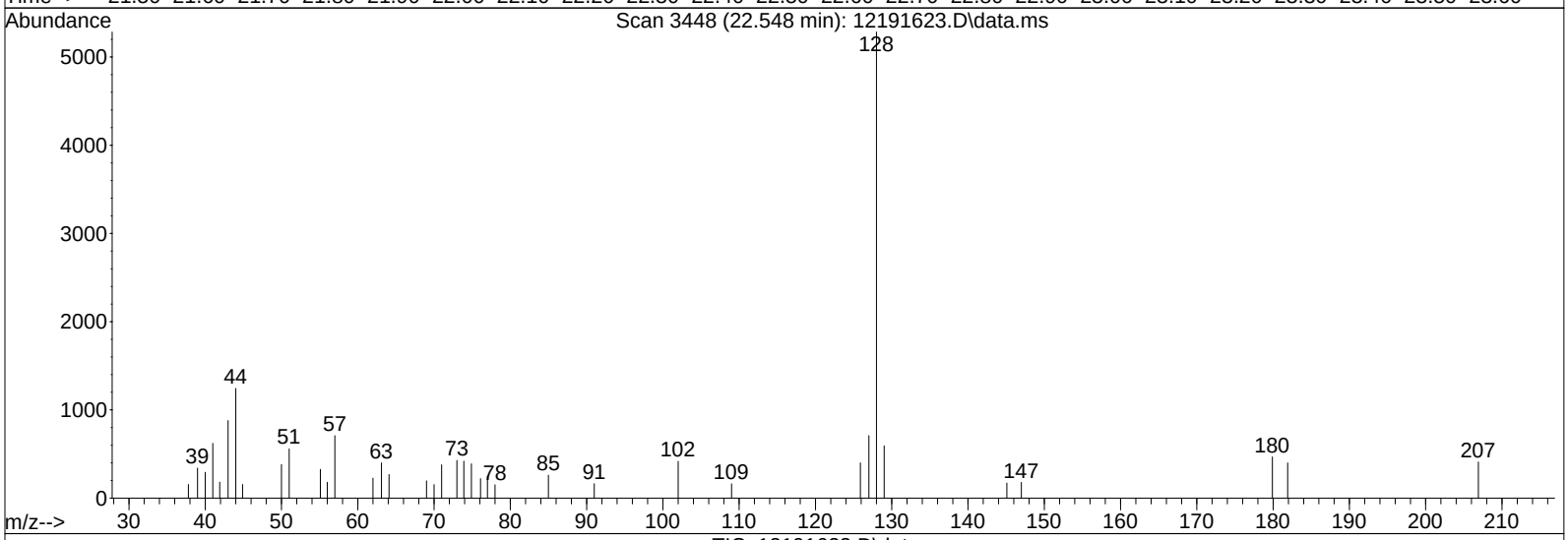
Ion	Exp%	Act%
128.00	100	100
129.00	11.00	11.75
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:37 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191623.D\data.ms

(95) Naphthalene (T)

22.548min (+0.082) 0.38ng m

response 39950

Ion	Exp%	Act%
128.00	100	100
129.00	11.00	10.06
0.00	0.00	0.00
0.00	0.00	0.00

BLC

LH 12/20/16

12/30/16

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191620.D
Acq On : 19 Dec 2016 23:59 Operator: LH
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 09:09:38 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	287891	12.500	ng	-0.01
37) 1,4-Difluorobenzene (IS2)	13.65	114	1442786	12.500	ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.93	82	606464	12.500	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.40	65	516035	13.702	ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 109.60%			
57) Toluene-d8 (SS2)	16.10	98	1492567	12.920	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 103.36%			
73) Bromofluorobenzene (SS3)	19.28	174	463606	12.499	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.00%			

Target Compounds							Qvalue
2) Propene	4.26	42	4455	0.120	ng		87
3) Dichlorodifluoromethan...	4.41	85	7720	0.128	ng	#	97
4) Chloromethane	4.76	50	6115	0.125	ng		99
5) 1,2-Dichloro-1,1,2,2-t...	4.99	135	4065	0.129	ng		98
6) Vinyl Chloride	5.23	62	5048	0.103	ng		85
7) 1,3-Butadiene	5.50	54	3252	0.102	ng		94
8) Bromomethane	5.97	94	2560	0.091	ng		100
9) Chloroethane	6.30	64	2005	0.087	ng		90
10) Ethanol	6.74	45	13717	0.541	ng		93
11) Acetonitrile	7.10	41	9474m	0.146	ng		
12) Acrolein	7.28	56	2647	0.108	ng		99
13) Acetone	7.39	58	14157	0.575	ng	#	81
14) Trichlorofluoromethane	7.61	101	6526	0.124	ng		96
15) 2-Propanol (Isopropanol)	7.91	45	19376	0.229	ng		73
16) Acrylonitrile	8.27	53	4721	0.107	ng		97
17) 1,1-Dichloroethene	8.61	96	2858	0.104	ng		94
18) 2-Methyl-2-Propanol (t...	8.83	59	19366	0.237	ng	#	72
19) Methylene Chloride	8.82	84	3788	0.115	ng		88
20) 3-Chloro-1-propene (Al...	8.99	41	4044	0.081	ng		89
21) Trichlorotrifluoroethane	9.23	151	3186	0.121	ng		98
22) Carbon Disulfide	9.13	76	15656	0.139	ng		93
23) trans-1,2-Dichloroethene	10.10	61	5111	0.112	ng		98
24) 1,1-Dichloroethane	10.35	63	5949	0.102	ng		99
25) Methyl tert-Butyl Ether	10.46	73	11732	0.125	ng		97
26) Vinyl Acetate	10.63	86	2997	0.434	ng	#	82
27) 2-Butanone (MEK)	10.89	72	2269	0.103	ng	#	55
28) cis-1,2-Dichloroethene	11.37	61	5025	0.113	ng		97
29) Diisopropyl Ether	11.65	87	3567	0.130	ng	#	68
30) Ethyl Acetate	11.68	61	2368	0.201	ng		98
31) n-Hexane	11.64	57	6112	0.115	ng		97
32) Chloroform	11.71	83	6444	0.118	ng		99
34) Tetrahydrofuran (THF)	12.15	72	2748	0.122	ng	#	84
35) Ethyl tert-Butyl Ether	12.24	87	4075	0.114	ng		95
36) 1,2-Dichloroethane	12.51	62	5388	0.130	ng		100
38) 1,1,1-Trichloroethane	12.78	97	5686	0.121	ng		97
39) Isopropyl Acetate	13.22	61	4479	0.208	ng	#	86
40) 1-Butanol	13.26	56	6847	0.203	ng		86
41) Benzene	13.26	78	15697	0.112	ng		97
42) Carbon Tetrachloride	13.42	117	4664	0.115	ng		96
43) Cyclohexane	13.55	84	11027	0.233	ng		99
44) tert-Amyl Methyl Ether	13.89	73	10713	0.117	ng		92
45) 1,2-Dichloropropane	14.12	63	3810	0.111	ng		95
46) Bromodichloromethane	14.32	83	4852	0.116	ng		100
47) Trichloroethene	14.35	130	4092	0.126	ng		99
48) 1,4-Dioxane	14.36	88	2774	0.102	ng	#	66
49) 2,2,4-Trimethylpentane...	14.41	57	16032	0.113	ng		90

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191620.D
Acq On : 19 Dec 2016 23:59 Operator: LH
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 09:09:38 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

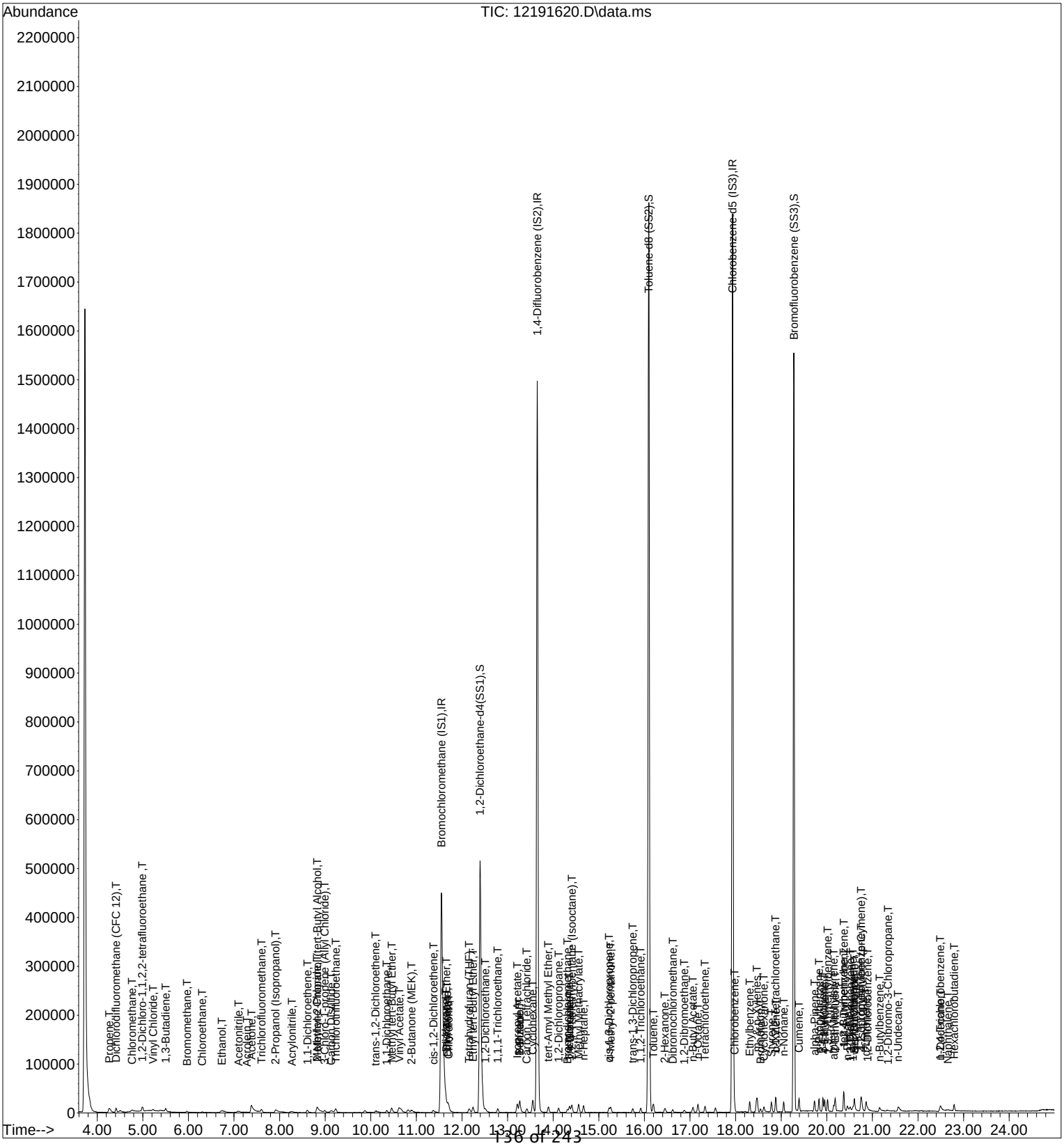
Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
50) Methyl Methacrylate	14.56	100	2657	0.218 ng		92
51) n-Heptane	14.67	71	3588	0.112 ng		95
52) cis-1,3-Dichloropropene	15.23	75	5961	0.117 ng		99
53) 4-Methyl-2-pentanone	15.26	58	3367	0.108 ng	#	73
54) trans-1,3-Dichloropropene	15.75	75	4924	0.109 ng		98
55) 1,1,2-Trichloroethane	15.92	97	3404	0.113 ng		99
58) Toluene	16.20	91	15536	0.130 ng		96
59) 2-Hexanone	16.45	43	9494	0.124 ng		85
60) Dibromochloromethane	16.62	129	3816	0.116 ng		98
61) 1,2-Dibromoethane	16.87	107	3878	0.115 ng		97
62) n-Butyl Acetate	17.06	43	9503	0.109 ng		94
63) n-Octane	17.17	57	3901	0.137 ng	#	81
64) Tetrachloroethene	17.33	166	3974	0.119 ng		99
65) Chlorobenzene	17.98	112	9816	0.120 ng		92
66) Ethylbenzene	18.31	91	16434	0.115 ng		99
67) m- & p-Xylenes	18.47	91	26820	0.247 ng		98
68) Bromoform	18.55	173	2976	0.113 ng		97
69) Styrene	18.79	104	9744	0.117 ng		99
70) o-Xylene	18.89	91	13504	0.124 ng		99
71) n-Nonane	19.06	43	8168	0.119 ng		91
72) 1,1,2,2-Tetrachloroethane	18.87	83	5256	0.100 ng		98
74) Cumene	19.39	105	16806	0.129 ng		96
75) alpha-Pinene	19.73	93	8077	0.113 ng		95
76) n-Propylbenzene	19.83	91	20076	0.122 ng		97
77) 3-Ethyltoluene	19.91	105	17336	0.125 ng		98
78) 4-Ethyltoluene	19.95	105	13624	0.111 ng		95
79) 1,3,5-Trimethylbenzene	20.02	105	13705	0.120 ng		94
80) alpha-Methylstyrene	20.15	118	5685	0.105 ng		90
81) 2-Ethyltoluene	20.18	105	15092	0.114 ng		99
82) 1,2,4-Trimethylbenzene	20.38	105	12020	0.108 ng		95
83) n-Decane	20.45	57	7645	0.115 ng		93
84) Benzyl Chloride	20.61	91	8398	0.098 ng	#	55
85) 1,3-Dichlorobenzene	20.52	146	4298	0.073 ng		99
86) 1,4-Dichlorobenzene	20.57	146	8335m	0.124 ng		
87) sec-Butylbenzene	20.61	105	16552	0.114 ng	#	64
88) 4-Isopropyltoluene (p-...	20.75	119	16800	0.125 ng		89
89) 1,2,3-Trimethylbenzene	20.75	105	16318	0.143 ng		88
90) 1,2-Dichlorobenzene	20.89	146	7618	0.126 ng		99
91) d-Limonene	20.86	68	4838	0.109 ng		97
92) 1,2-Dibromo-3-Chloropr...	21.34	157	1336	0.066 ng	#	57
93) n-Undecane	21.56	57	8653	0.126 ng		85
94) 1,2,4-Trichlorobenzene	22.49	180	3718	0.090 ng	#	95
95) Naphthalene	22.66	128	6128	0.054 ng	#	71
96) n-Dodecane	22.49	57	7367m	0.118 ng		
97) Hexachlorobutadiene	22.79	225	3006	0.108 ng		100
98) Cyclohexanone	18.62	55	5979	0.125 ng		92
99) tert-Butylbenzene	20.37	119	12649	0.121 ng		99
100) n-Butylbenzene	21.16	91	12866	0.107 ng		91

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191620.D
Acq On : 19 Dec 2016 23:59 Operator: LH
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

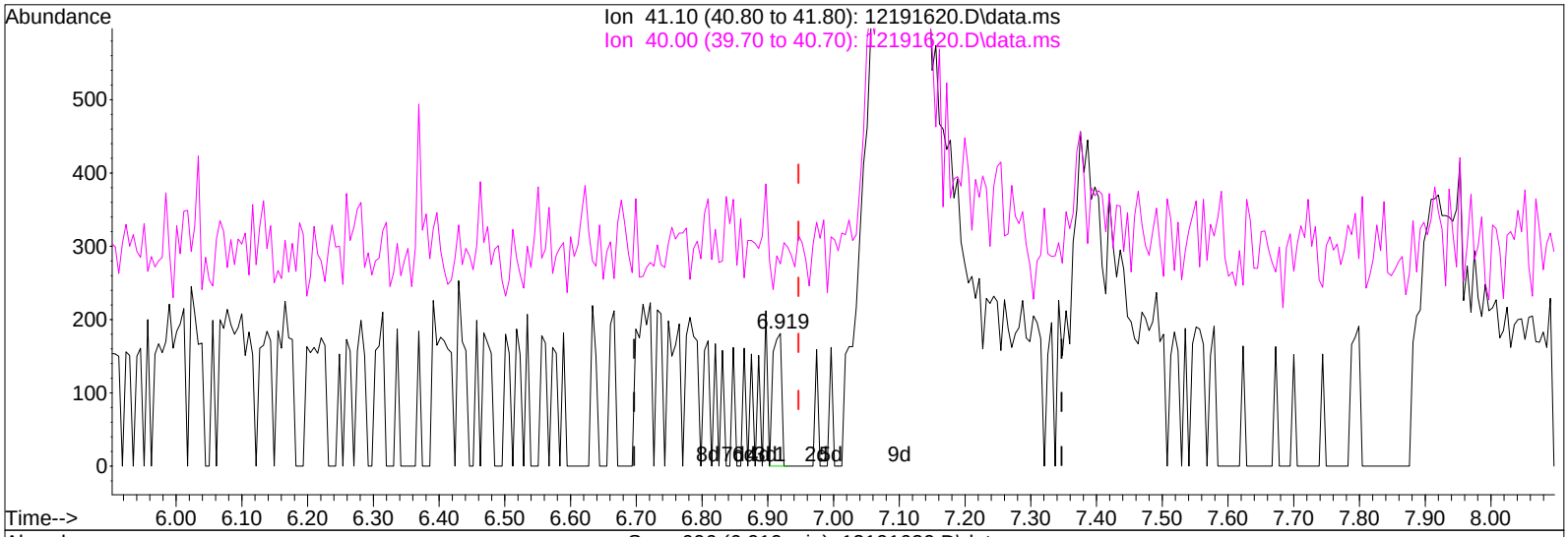
Quant Time: Dec 20 09:09:38 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

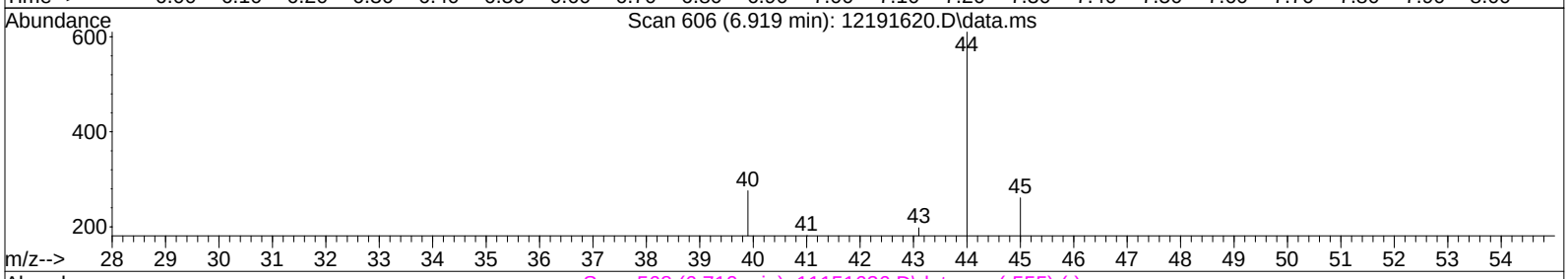


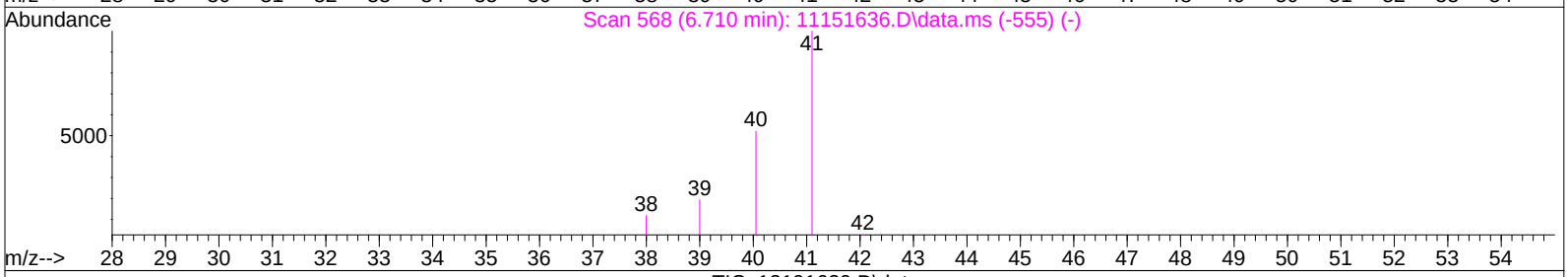
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191620.D
Acq On : 19 Dec 2016 23:59 Operator: LH
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:31 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 12191620.D\data.ms

(11) Acetonitrile (T)

6.919min (-0.028) 0.00ng

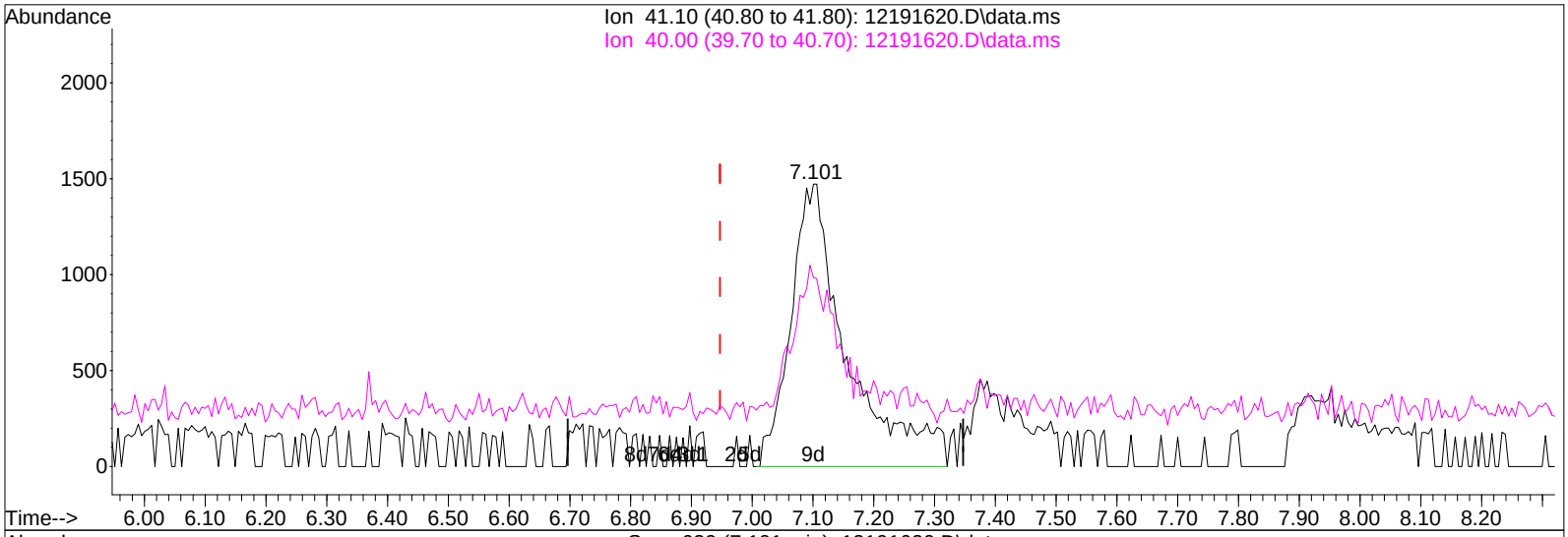
response 168

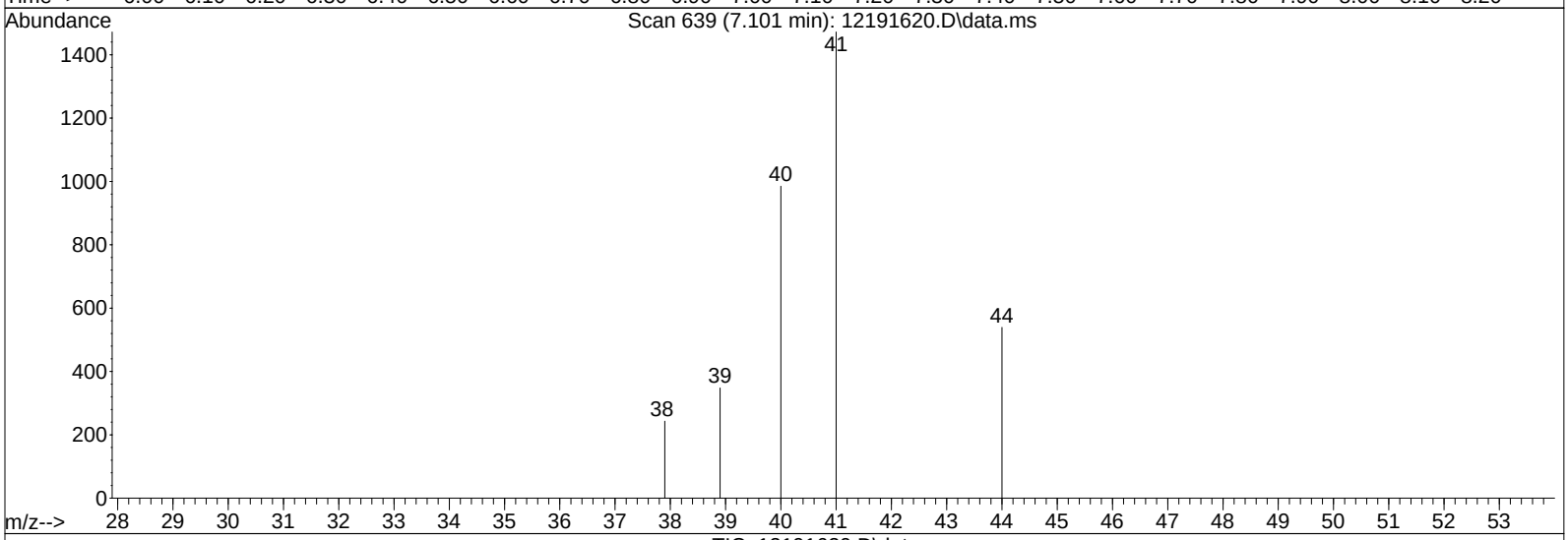
Ion	Exp%	Act%
41.10	100	100
40.00	54.30	91.07#
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191620.D
Acq On : 19 Dec 2016 23:59 Operator: LH
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:31 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191620.D\data.ms

(11) Acetonitrile (T)

7.101min (+0.154) 0.15ng m

response 9474

Ion	Exp%	Act%
41.10	100	100
40.00	54.30	1.61#
0.00	0.00	0.00
0.00	0.00	0.00

RTS

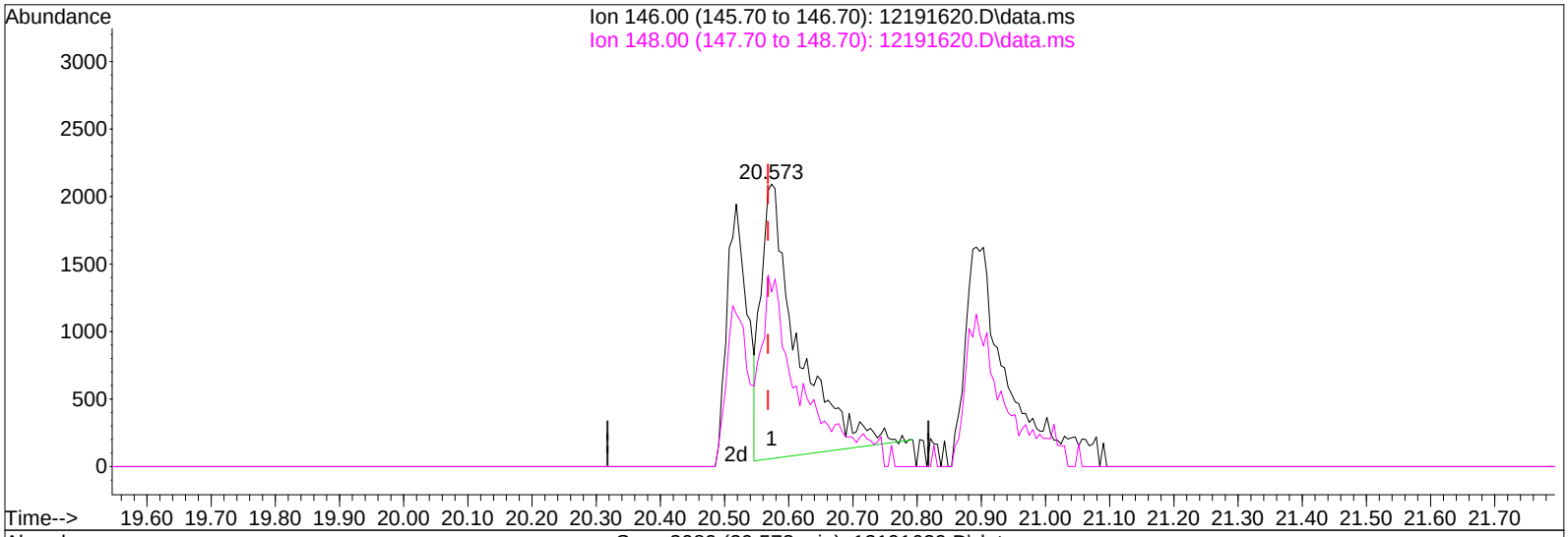
LH 12/20/16

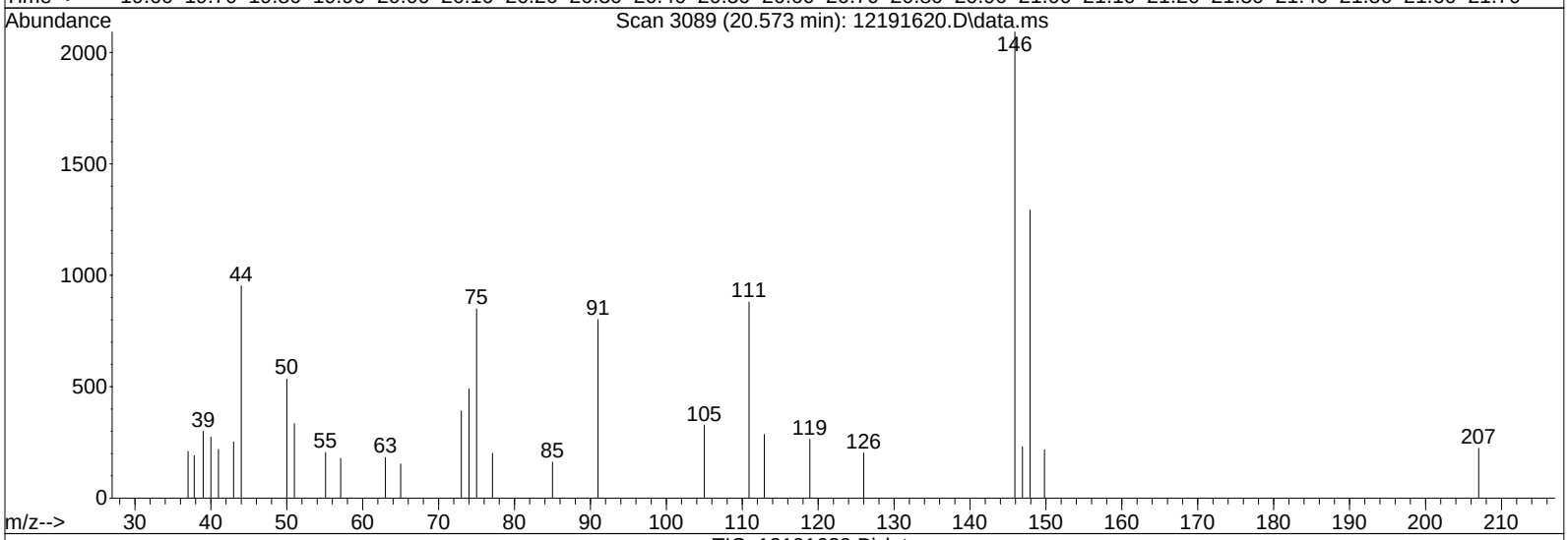
12/30/16

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191620.D
Acq On : 19 Dec 2016 23:59 Operator: LH
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:31 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191620.D\data.ms

(86) 1,4-Dichlorobenzene (T)

20.573min (+0.005) 0.12ng

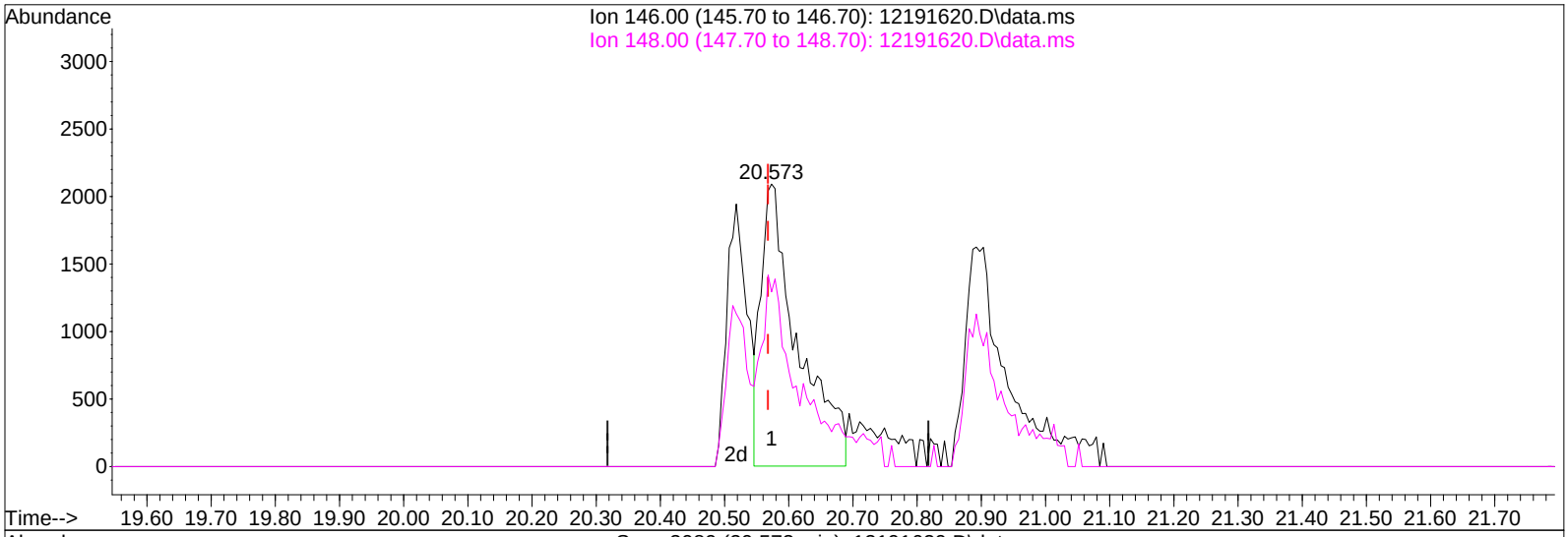
response 8112

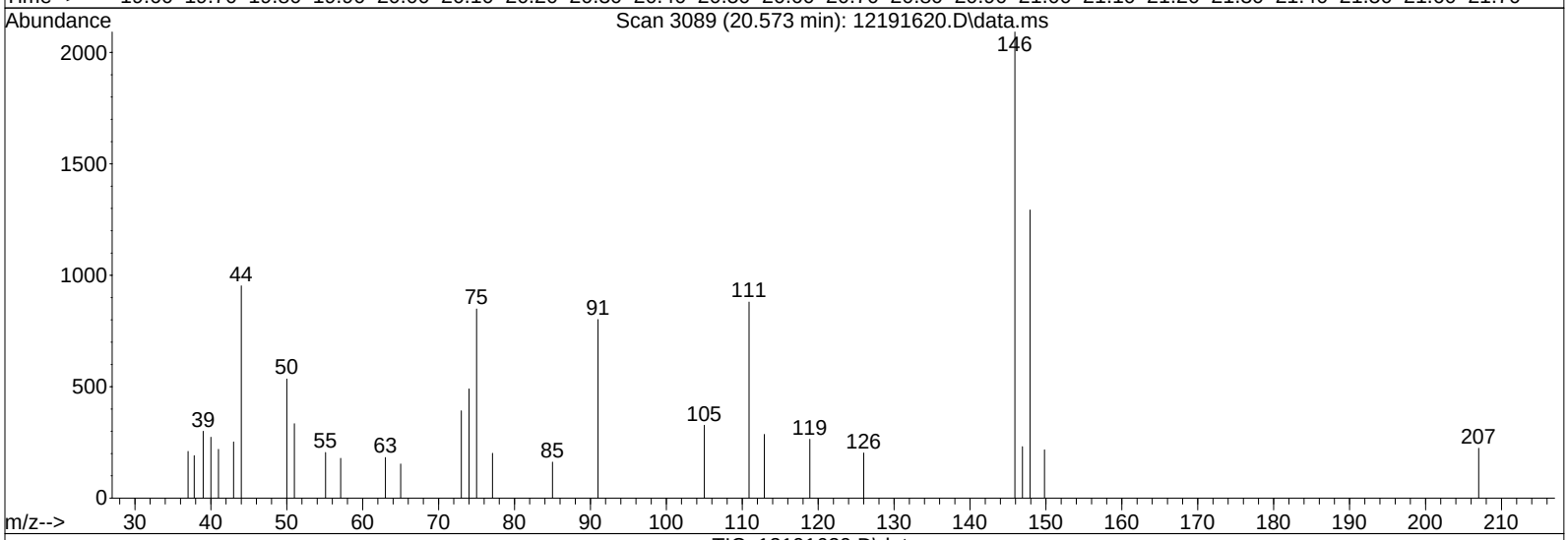
Ion	Exp%	Act%
146.00	100	100
148.00	63.90	76.43
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191620.D
Acq On : 19 Dec 2016 23:59 Operator: LH
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:31 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191620.D\data.ms

(86) 1,4-Dichlorobenzene (T)

20.573min (+0.005) 0.12ng m

response 8335

Ion	Exp%	Act%
146.00	100	100
148.00	63.90	74.39
0.00	0.00	0.00
0.00	0.00	0.00

BLC

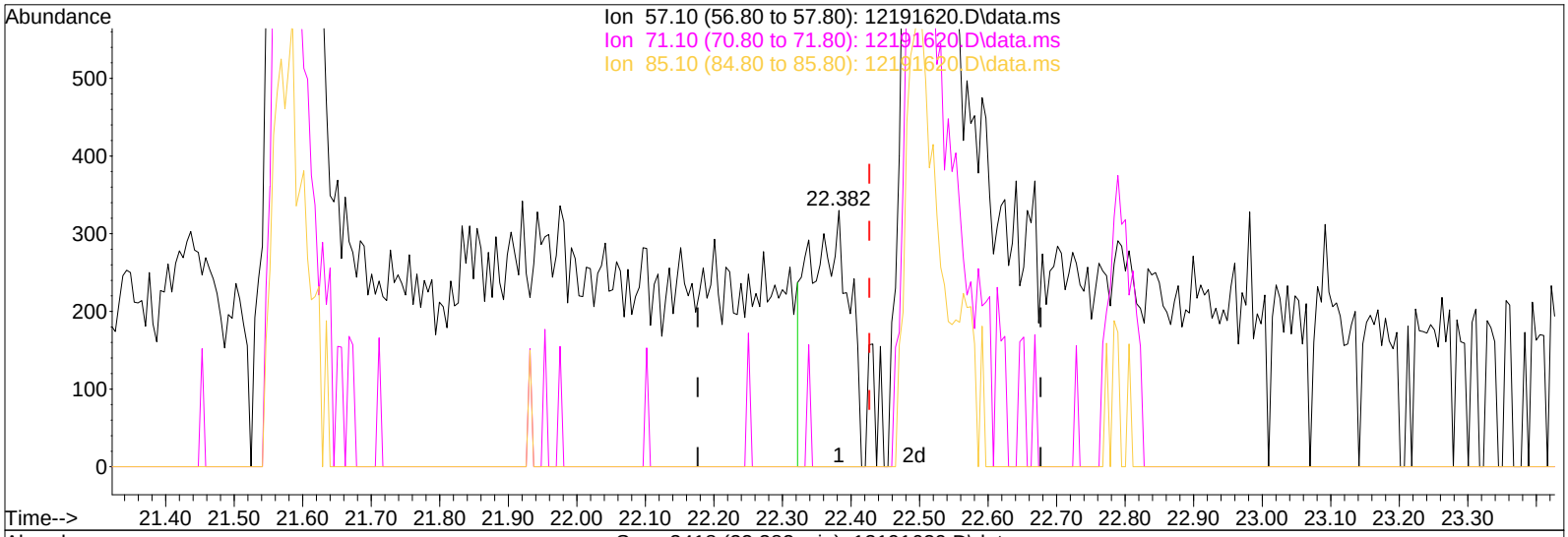
LH 12/20/16

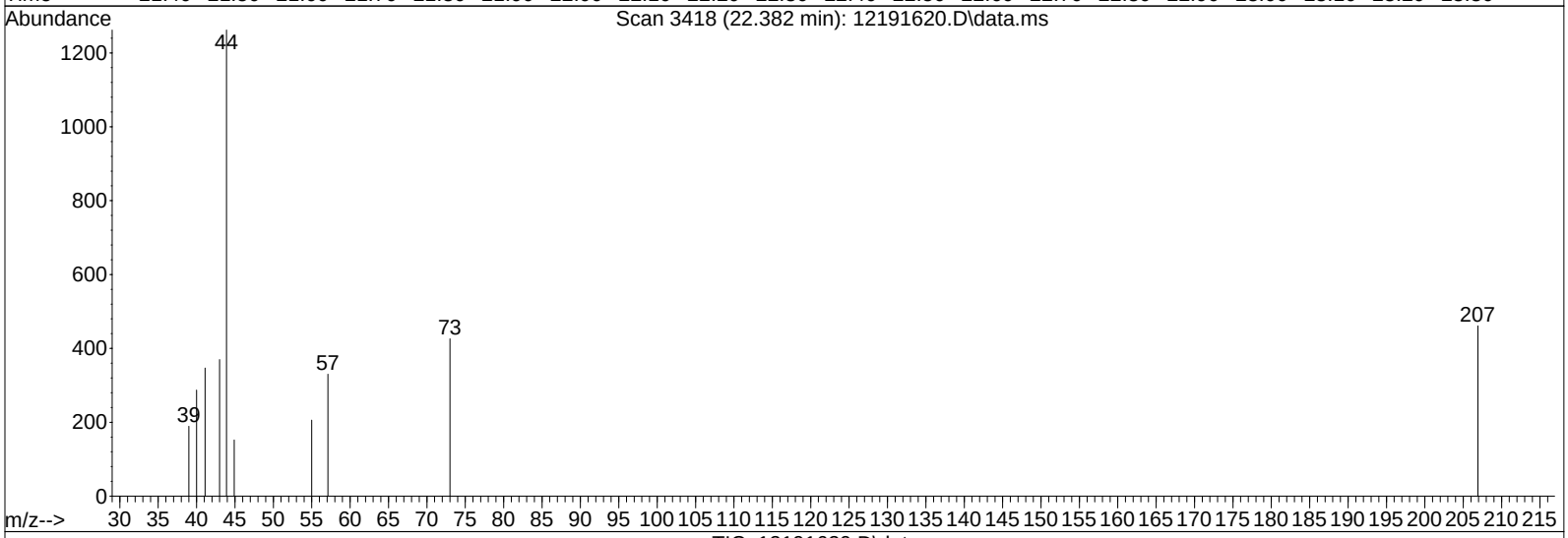
12/30/16

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191620.D
Acq On : 19 Dec 2016 23:59 Operator: LH
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:31 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191620.D\data.ms

(96) n-Dodecane (T)

22.382min (-0.044) 0.02ng

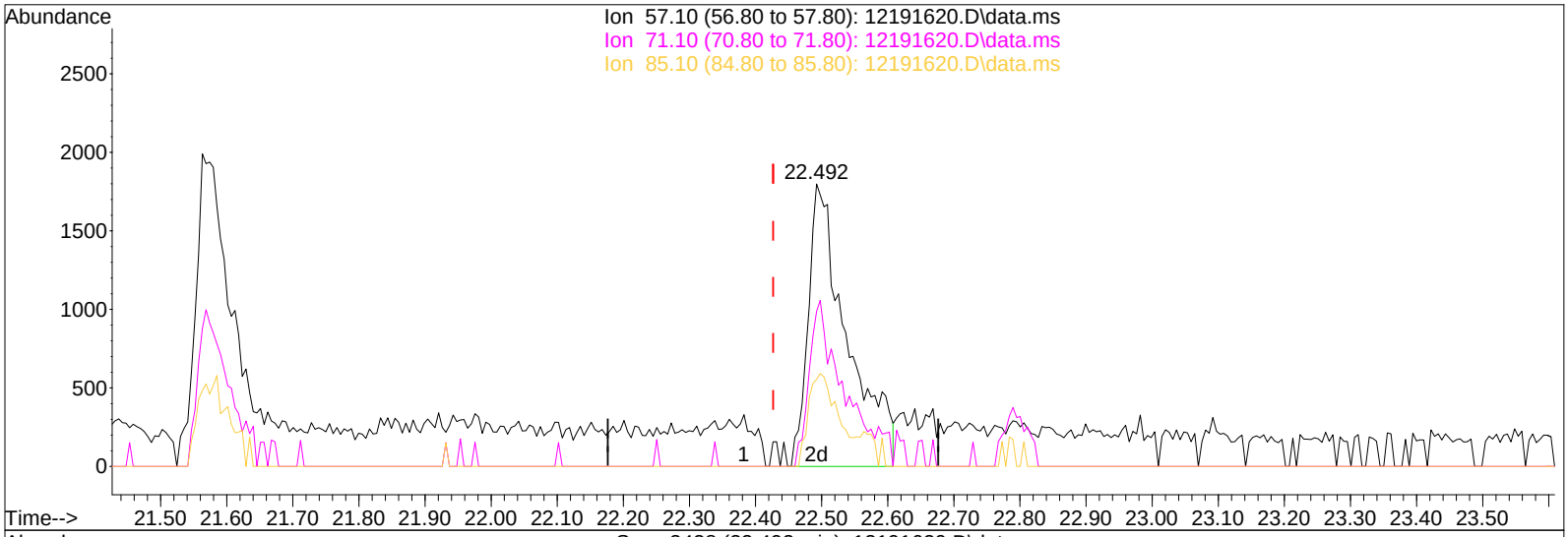
response 1319

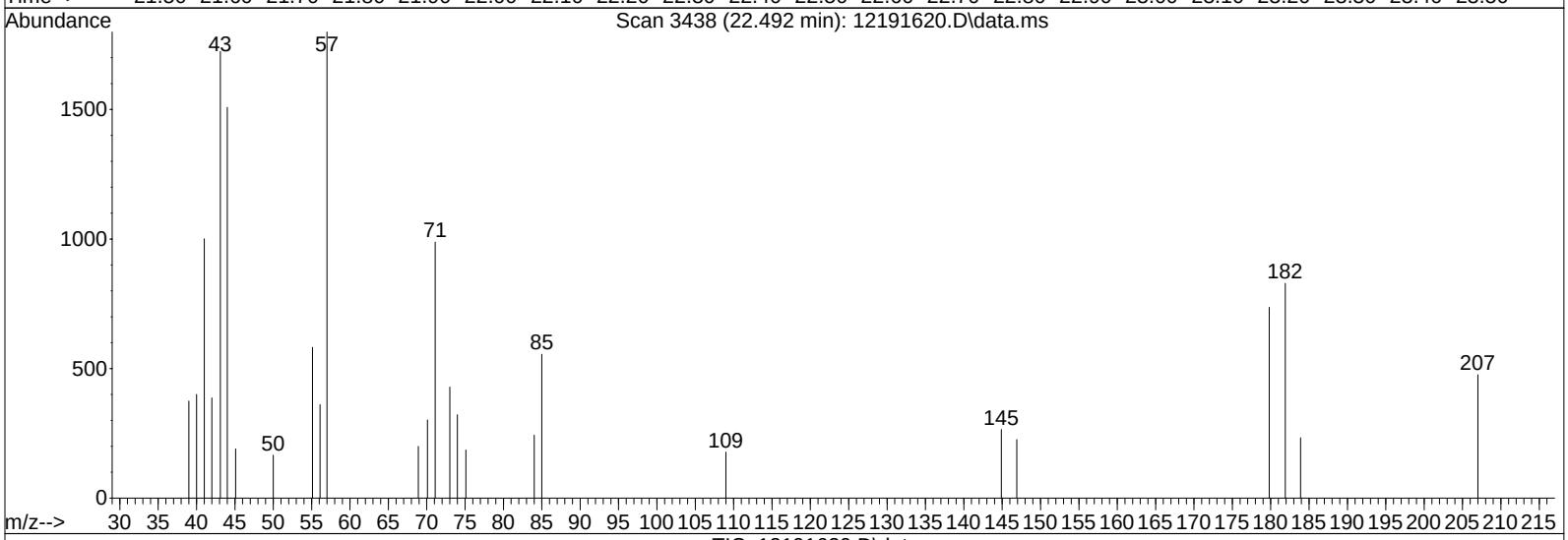
Ion	Exp%	Act%
57.10	100	100
71.10	54.10	0.00#
85.10	31.90	0.00#
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191620.D
Acq On : 19 Dec 2016 23:59 Operator: LH
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:31 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191620.D\data.ms

(96) n-Dodecane (T)

22.492min (+0.066) 0.12ng m

response 7367

Ion	Exp%	Act%
57.10	100	100
71.10	54.10	0.00#
85.10	31.90	0.00#
0.00	0.00	0.00

MP

LH 12/20/16

12/30/16

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191624.D
Acq On : 20 Dec 2016 2:13 Operator: LH
Sample : 1.0ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191605 (1/17)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Dec 20 09:54:12 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.54	130	281285	12.500	ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.65	114	1385694	12.500	ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.93	82	594876	12.500	ng	0.00

System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...	12.39	65	509536	13.847	ng	-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 110.80%			
57) Toluene-d8 (SS2)	16.10	98	1425991	12.584	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.64%			
73) Bromofluorobenzene (SS3)	19.28	174	460316	12.652	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 101.20%			

Target Compounds

							Qvalue
2) Propene	4.22	42	36719	1.010	ng		97
3) Dichlorodifluoromethan...	4.38	85	72389	1.226	ng		100
4) Chloromethane	4.70	50	58646	1.223	ng		99
5) 1,2-Dichloro-1,1,2,2-t...	4.96	135	37579	1.216	ng		99
6) Vinyl Chloride	5.15	62	55830	1.164	ng		98
7) 1,3-Butadiene	5.44	54	41386	1.330	ng		99
8) Bromomethane	5.92	94	28182	1.027	ng		96
9) Chloroethane	6.26	64	22541	1.003	ng		96
10) Ethanol	6.64	45	124549	5.023	ng		100
11) Acetonitrile	7.01	41	64313m	1.013	ng		
12) Acrolein	7.13	56	22314	0.935	ng		100
13) Acetone	7.33	58	125638	5.220	ng		91
14) Trichlorofluoromethane	7.58	101	58339	1.136	ng		100
15) 2-Propanol (Isopropanol)	7.83	45	182943	2.217	ng		90
16) Acrylonitrile	8.19	53	43804	1.016	ng		100
17) 1,1-Dichloroethene	8.59	96	31117	1.157	ng		99
18) 2-Methyl-2-Propanol (t...	8.73	59	181241	2.269	ng		97
19) Methylene Chloride	8.81	84	33421	1.037	ng		92
20) 3-Chloro-1-propene (Al...	8.98	41	47552	0.970	ng		94
21) Trichlorotrifluoroethane	9.22	151	28632	1.115	ng		99
22) Carbon Disulfide	9.11	76	126930	1.152	ng		98
23) trans-1,2-Dichloroethene	10.10	61	48489	1.087	ng		100
24) 1,1-Dichloroethane	10.34	63	59142	1.042	ng		99
25) Methyl tert-Butyl Ether	10.43	73	103720	1.133	ng		99
26) Vinyl Acetate	10.59	86	33468	4.965	ng	#	78
27) 2-Butanone (MEK)	10.85	72	22680	1.053	ng		96
28) cis-1,2-Dichloroethene	11.36	61	48058	1.102	ng		99
29) Diisopropyl Ether	11.64	87	26335	0.979	ng	#	89
30) Ethyl Acetate	11.66	61	25096	2.181	ng		99
31) n-Hexane	11.63	57	54461	1.045	ng		99
32) Chloroform	11.70	83	60704	1.137	ng		100
34) Tetrahydrofuran (THF)	12.12	72	22683	1.030	ng		97
35) Ethyl tert-Butyl Ether	12.23	87	39004	1.118	ng		99
36) 1,2-Dichloroethane	12.51	62	49084	1.209	ng		99
38) 1,1,1-Trichloroethane	12.78	97	53677	1.184	ng		100
39) Isopropyl Acetate	13.20	61	43070	2.082	ng		96
40) 1-Butanol	13.24	56	68319	2.111	ng		86
41) Benzene	13.27	78	132189	0.979	ng		100
42) Carbon Tetrachloride	13.42	117	46065	1.184	ng		100
43) Cyclohexane	13.55	84	101148	2.228	ng		100
44) tert-Amyl Methyl Ether	13.89	73	96200	1.092	ng		97
45) 1,2-Dichloropropane	14.12	63	33701	1.025	ng		99
46) Bromodichloromethane	14.31	83	46468	1.158	ng		99
47) Trichloroethene	14.35	130	35500	1.139	ng		99
48) 1,4-Dioxane	14.34	88	27794	1.063	ng		100
49) 2,2,4-Trimethylpentane...	14.40	57	142985	1.046	ng		99

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191624.D
Acq On : 20 Dec 2016 2:13 Operator: LH
Sample : 1.0ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191605 (1/17)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Dec 20 09:54:12 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

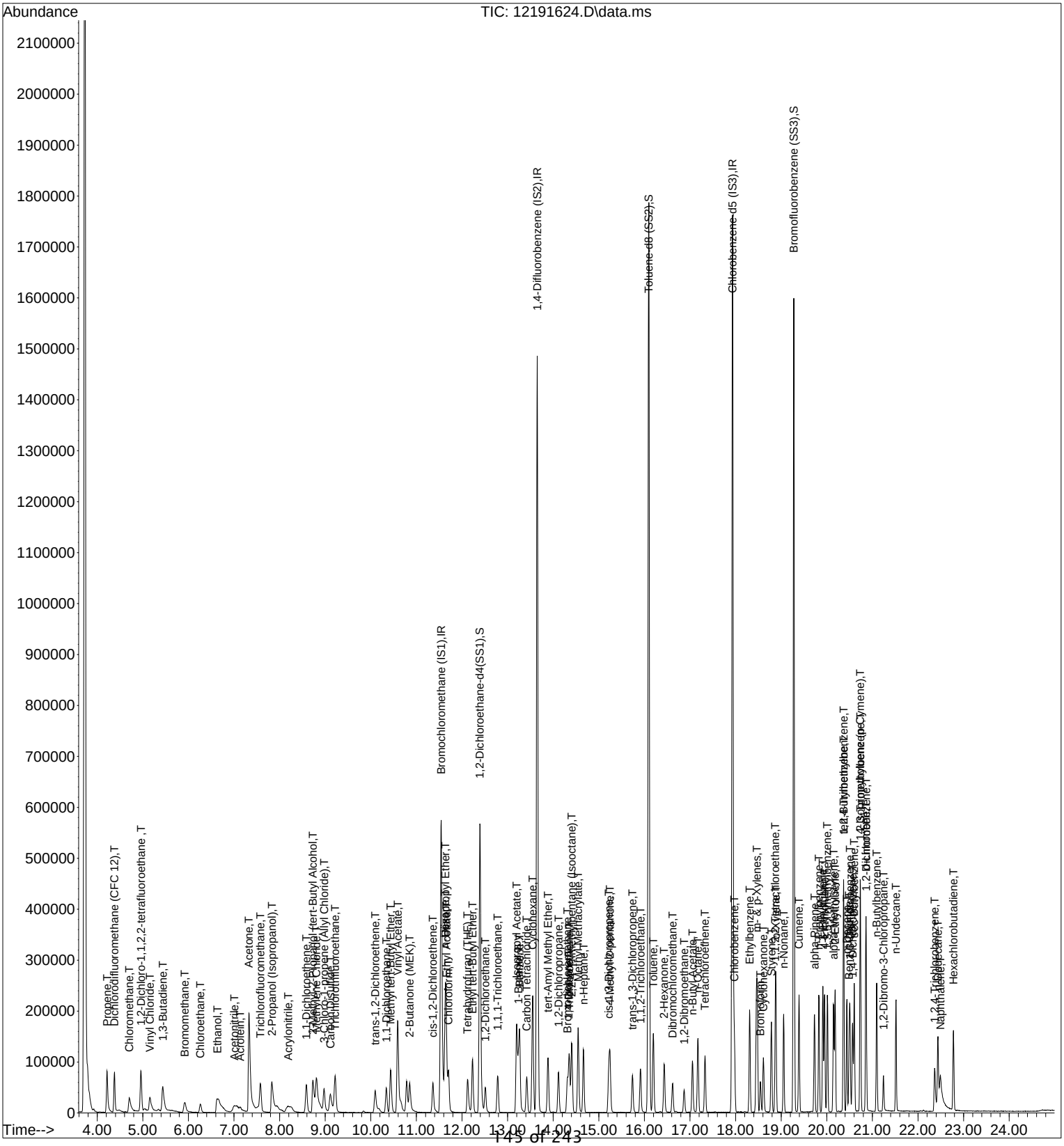
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	14.55	100	26894	2.300 ng	98
51) n-Heptane	14.67	71	32479	1.056 ng	100
52) cis-1,3-Dichloropropene	15.22	75	56609	1.159 ng	99
53) 4-Methyl-2-pentanone	15.24	58	32528	1.082 ng	91
54) trans-1,3-Dichloropropene	15.74	75	48271	1.114 ng	99
55) 1,1,2-Trichloroethane	15.92	97	32416	1.118 ng	98
58) Toluene	16.20	91	131845	1.122 ng	99
59) 2-Hexanone	16.43	43	83179	1.109 ng	99
60) Dibromochloromethane	16.62	129	36746	1.141 ng	100
61) 1,2-Dibromoethane	16.87	107	36801	1.111 ng	99
62) n-Butyl Acetate	17.05	43	91437	1.067 ng	99
63) n-Octane	17.17	57	30021	1.073 ng	98
64) Tetrachloroethene	17.33	166	36051	1.101 ng	98
65) Chlorobenzene	17.97	112	88550	1.101 ng	100
66) Ethylbenzene	18.31	91	154958	1.104 ng	99
67) m- & p-Xylenes	18.47	91	238842	2.243 ng	99
68) Bromoform	18.54	173	29895	1.160 ng	100
69) Styrene	18.79	104	92032	1.122 ng	100
70) o-Xylene	18.89	91	120193	1.123 ng	99
71) n-Nonane	19.06	43	71839	1.070 ng	96
72) 1,1,2,2-Tetrachloroethane	18.87	83	57693	1.119 ng	100
74) Cumene	19.39	105	150969	1.179 ng	99
75) alpha-Pinene	19.73	93	76994	1.101 ng	99
76) n-Propylbenzene	19.83	91	186295	1.151 ng	98
77) 3-Ethyltoluene	19.91	105	146689	1.075 ng	97
78) 4-Ethyltoluene	19.95	105	145514	1.204 ng	93
79) 1,3,5-Trimethylbenzene	20.01	105	121137	1.086 ng	99
80) alpha-Methylstyrene	20.15	118	64190	1.214 ng	99
81) 2-Ethyltoluene	20.18	105	146185	1.129 ng	100
82) 1,2,4-Trimethylbenzene	20.37	105	124924	1.140 ng	99
83) n-Decane	20.44	57	69520	1.064 ng	99
84) Benzyl Chloride	20.49	91	93026	1.104 ng	97
85) 1,3-Dichlorobenzene	20.51	146	70806	1.223 ng	100
86) 1,4-Dichlorobenzene	20.57	146	70454	1.071 ng	99
87) sec-Butylbenzene	20.60	105	166968	1.170 ng	99
88) 4-Isopropyltoluene (p-...	20.73	119	151070	1.150 ng	99
89) 1,2,3-Trimethylbenzene	20.74	105	124106	1.109 ng	98
90) 1,2-Dichlorobenzene	20.86	146	69762	1.181 ng	100
91) d-Limonene	20.86	68	49971	1.151 ng	98
92) 1,2-Dibromo-3-Chloropr...	21.24	157	21668	1.095 ng	90
93) n-Undecane	21.52	57	70840	1.050 ng	99
94) 1,2,4-Trichlorobenzene	22.37	180	45322	1.117 ng	100
95) Naphthalene	22.49	128	129578	1.169 ng	100
96) n-Dodecane	22.44	57	67309	1.095 ng	98
97) Hexachlorobutadiene	22.78	225	30228	1.104 ng	100
98) Cyclohexanone	18.61	55	50567	1.074 ng	99
99) tert-Butylbenzene	20.37	119	121153	1.177 ng	99
100) n-Butylbenzene	21.10	91	139532	1.182 ng	96

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191624.D
Acq On : 20 Dec 2016 2:13 Operator: LH
Sample : 1.0ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191605 (1/17)
ALS Vial : 9 Sample Multiplier: 1

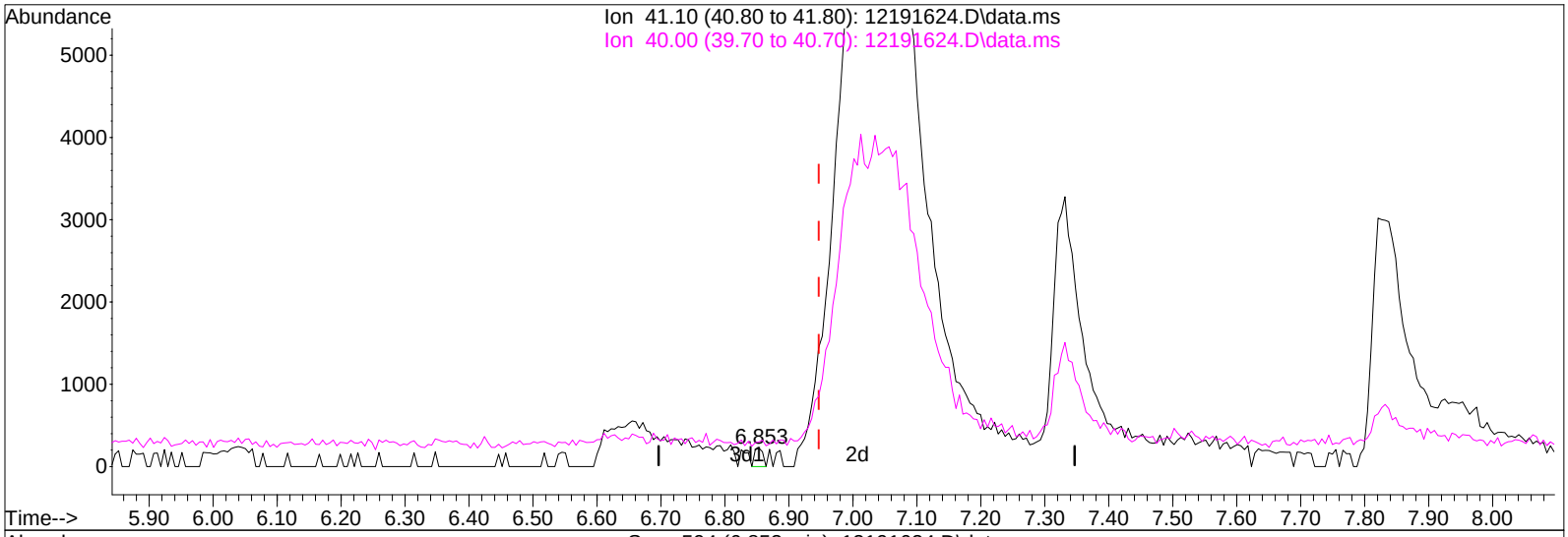
Quant Time: Dec 20 09:54:12 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

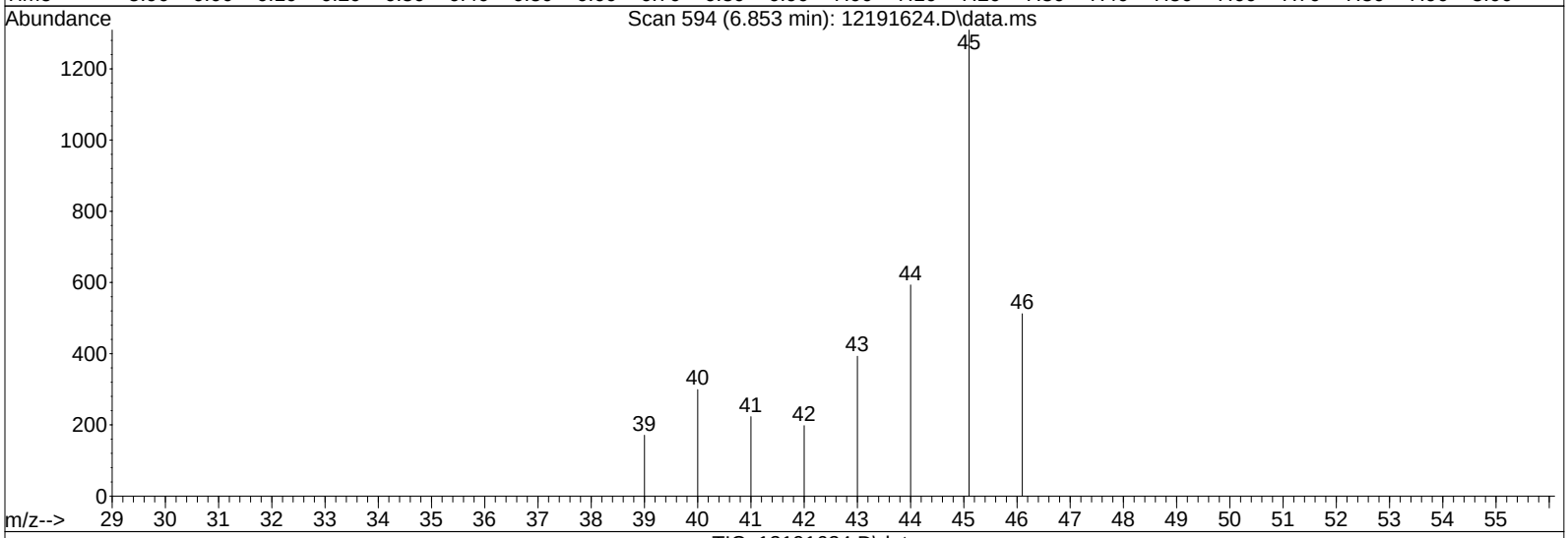


Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191624.D
Acq On : 20 Dec 2016 2:13 Operator: LH
Sample : 1.0ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191605 (1/17)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Dec 20 08:57:39 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191624.D\data.ms

(11) Acetonitrile (T)

6.853min (-0.094) 0.00ng

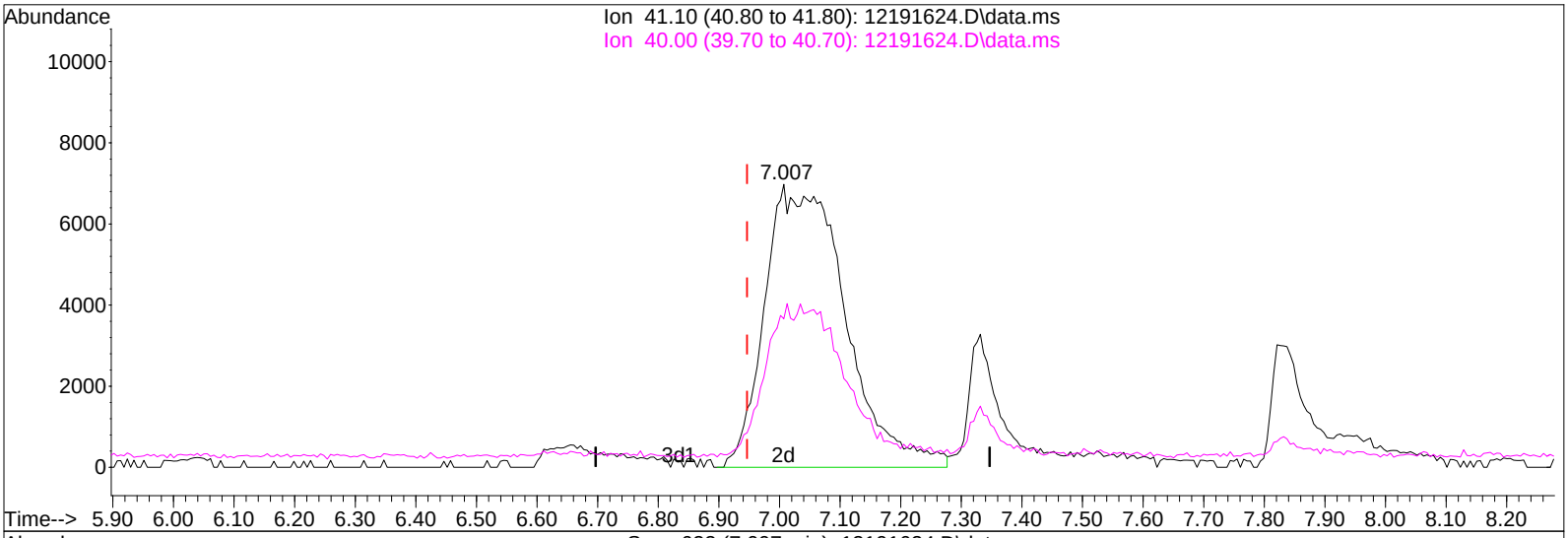
response 201

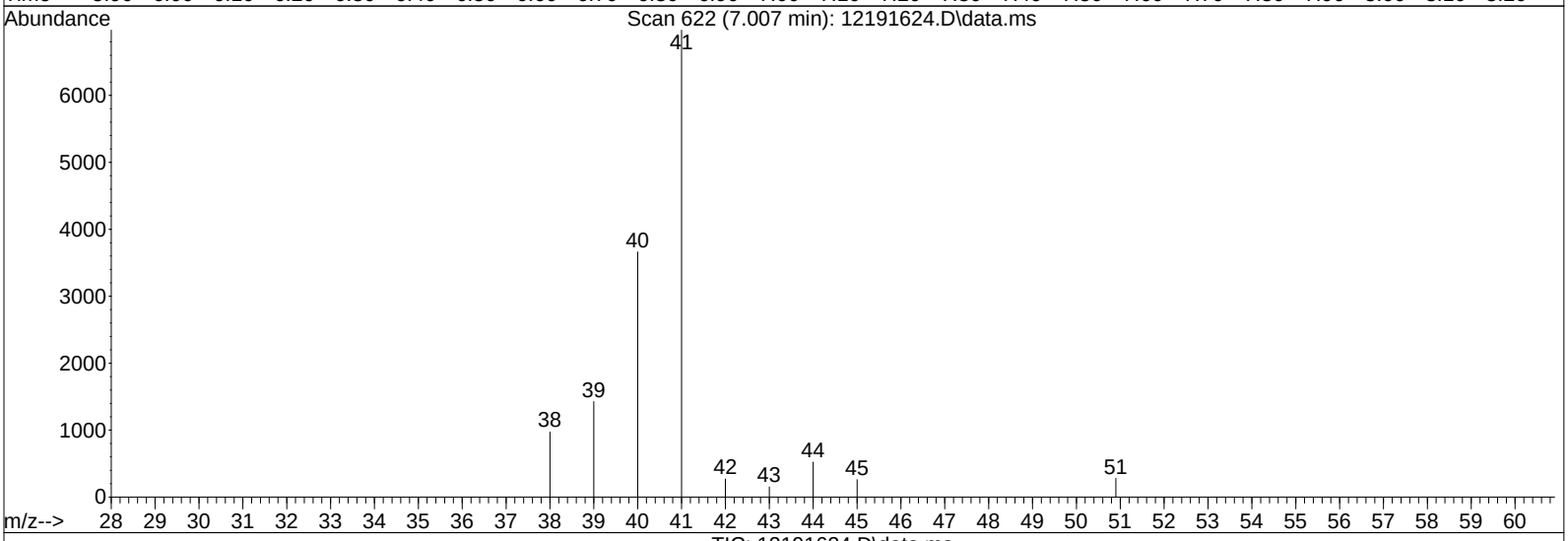
Ion	Exp%	Act%
41.10	100	100
40.00	54.30	42.79
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191624.D
Acq On : 20 Dec 2016 2:13 Operator: LH
Sample : 1.0ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191605 (1/17)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Dec 20 08:57:39 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





(11) Acetonitrile (T)

7.007min (+0.060) 1.01ng m

response 64313

Ion	Exp%	Act%
41.10	100	100
40.00	54.30	0.13#
0.00	0.00	0.00
0.00	0.00	0.00

MP

LH 12/20/16

12/30/16

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191625.D
Acq On : 20 Dec 2016 2:46 Operator: LH
Sample : 5.0ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191605 (1/17)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Dec 20 08:57:41 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS) LH 12/20/16
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.54	130	274566	12.500	ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.65	114	1362305	12.500	ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.93	82	583787	12.500	ng	0.00

System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.40	65	491596	13.686	ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 109.52%			
57) Toluene-d8 (SS2)	16.10	98	1393526	12.531	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.24%			
73) Bromofluorobenzene (SS3)	19.28	174	453121	12.691	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 101.52%			

Target Compounds							Qvalue
2) Propene	4.19	42	172991	4.873	ng		99
3) Dichlorodifluoromethan...	4.36	85	323912	5.620	ng		100
4) Chloromethane	4.68	50	253241	5.411	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.95	135	170104	5.639	ng		100
6) Vinyl Chloride	5.13	62	261376	5.583	ng		99
7) 1,3-Butadiene	5.41	54	192137	6.324	ng		99
8) Bromomethane	5.89	94	132068	4.933	ng		98
9) Chloroethane	6.24	64	105067	4.789	ng		99
10) Ethanol	6.63	45	560933	23.176	ng		99
11) Acetonitrile	6.94	41	280547	4.528	ng		100
12) Acrolein	7.12	56	99123	4.257	ng		100
13) Acetone	7.32	58	586134	24.947	ng		92
14) Trichlorofluoromethane	7.57	101	272066	5.427	ng		100
15) 2-Propanol (Isopropanol)	7.83	45	810563	10.064	ng		97
16) Acrylonitrile	8.13	53	204653	4.862	ng		100
17) 1,1-Dichloroethene	8.57	96	141640	5.396	ng		100
18) 2-Methyl-2-Propanol (t...	8.73	59	838580	10.755	ng		99
19) Methylene Chloride	8.80	84	153828	4.889	ng		98
20) 3-Chloro-1-propene (Al...	8.96	41	232385	4.859	ng		98
21) Trichlorotrifluoroethane	9.21	151	133118	5.311	ng		100
22) Carbon Disulfide	9.10	76	560695	5.212	ng		96
23) trans-1,2-Dichloroethene	10.09	61	228955	5.258	ng		100
24) 1,1-Dichloroethane	10.34	63	273816	4.944	ng		99
25) Methyl tert-Butyl Ether	10.43	73	479196	5.364	ng		99
26) Vinyl Acetate	10.59	86	176958	26.892	ng	#	81
27) 2-Butanone (MEK)	10.85	72	105448	5.016	ng		99
28) cis-1,2-Dichloroethene	11.36	61	225138	5.289	ng		100
29) Diisopropyl Ether	11.64	87	126228	4.807	ng	#	93
30) Ethyl Acetate	11.65	61	120800	10.757	ng		99
31) n-Hexane	11.63	57	261332	5.138	ng		100
32) Chloroform	11.71	83	279846	5.369	ng		100
34) Tetrahydrofuran (THF)	12.12	72	103208	4.802	ng		99
35) Ethyl tert-Butyl Ether	12.23	87	181749	5.336	ng		99
36) 1,2-Dichloroethane	12.51	62	226792	5.724	ng		100
38) 1,1,1-Trichloroethane	12.79	97	247382	5.553	ng		100
39) Isopropyl Acetate	13.19	61	206147	10.138	ng		97
40) 1-Butanol	13.22	56	338395	10.634	ng		94
41) Benzene	13.27	78	611386	4.604	ng		100
42) Carbon Tetrachloride	13.42	117	215572	5.635	ng		100
43) Cyclohexane	13.55	84	468540	10.496	ng		100
44) tert-Amyl Methyl Ether	13.88	73	450516	5.203	ng		99
45) 1,2-Dichloropropane	14.12	63	156332	4.836	ng		100
46) Bromodichloromethane	14.31	83	224462	5.692	ng		99
47) Trichloroethene	14.35	130	161956	5.287	ng		99
48) 1,4-Dioxane	14.33	88	129682	5.047	ng		100
49) 2,2,4-Trimethylpentane...	14.41	57	659279	4.905	ng		99

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191625.D
Acq On : 20 Dec 2016 2:46 Operator: LH
Sample : 5.0ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191605 (1/17)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Dec 20 08:57:41 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

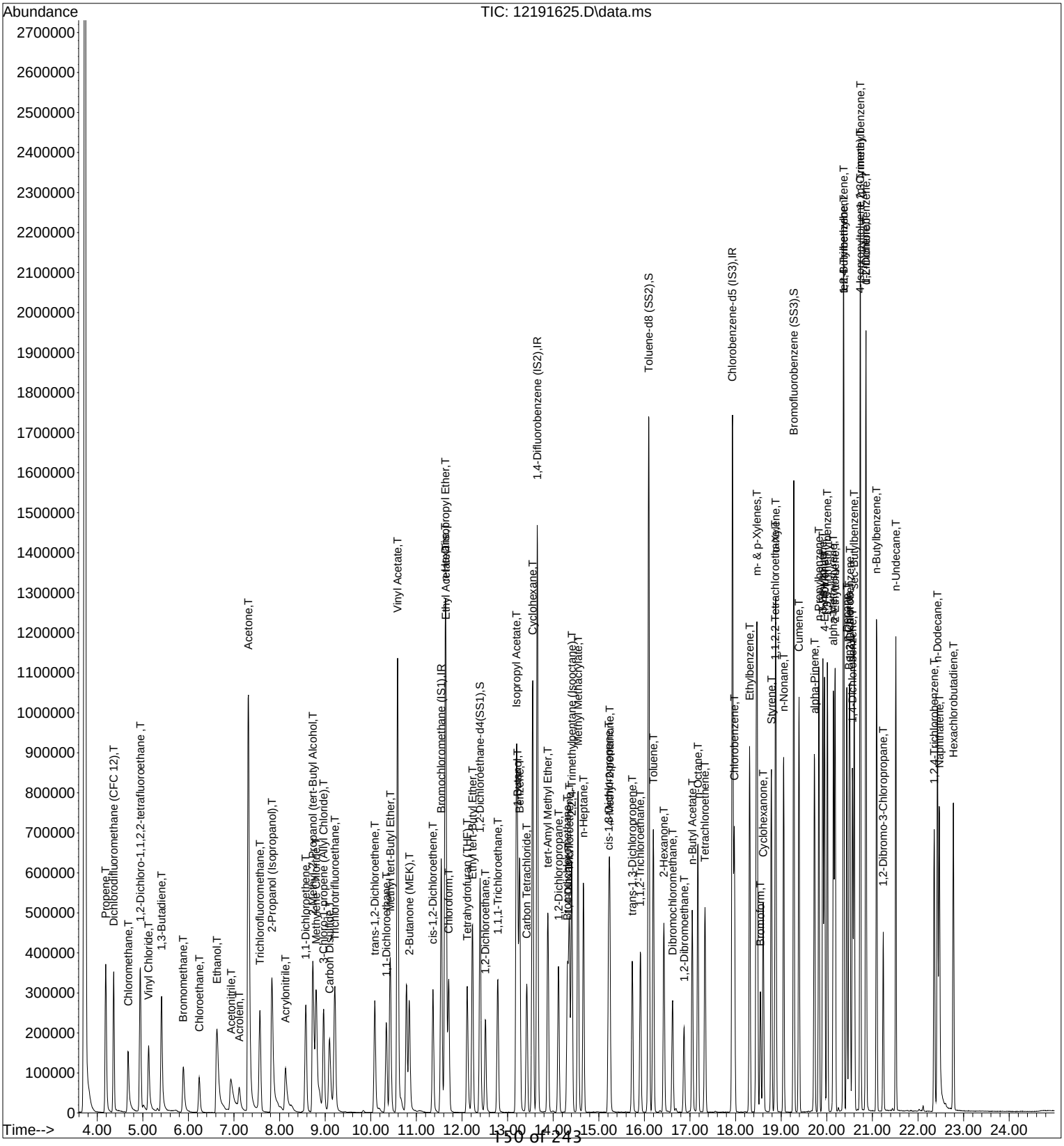
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	14.55	100	126982	11.045 ng	99
51) n-Heptane	14.66	71	150996	4.994 ng	99
52) cis-1,3-Dichloropropene	15.22	75	275944	5.746 ng	100
53) 4-Methyl-2-pentanone	15.24	58	152598	5.164 ng	97
54) trans-1,3-Dichloropropene	15.73	75	240927	5.656 ng	100
55) 1,1,2-Trichloroethane	15.91	97	150862	5.293 ng	99
58) Toluene	16.20	91	612219	5.311 ng	100
59) 2-Hexanone	16.43	43	400582	5.441 ng	98
60) Dibromochloromethane	16.62	129	180990	5.725 ng	100
61) 1,2-Dibromoethane	16.87	107	176174	5.419 ng	100
62) n-Butyl Acetate	17.05	43	440951	5.244 ng	99
63) n-Octane	17.18	57	136383	4.968 ng	99
64) Tetrachloroethene	17.33	166	169034	5.260 ng	100
65) Chlorobenzene	17.97	112	407405	5.160 ng	100
66) Ethylbenzene	18.31	91	714615	5.186 ng	99
67) m- & p-Xylenes	18.47	91	1113508	10.657 ng	99
68) Bromoform	18.54	173	150697	5.958 ng	100
69) Styrene	18.79	104	445051	5.530 ng	100
70) o-Xylene	18.88	91	567381	5.401 ng	99
71) n-Nonane	19.06	43	330213	5.010 ng	98
72) 1,1,2,2-Tetrachloroethane	18.87	83	285183	5.634 ng	99
74) Cumene	19.39	105	704833	5.611 ng	99
75) alpha-Pinene	19.73	93	366284	5.335 ng	99
76) n-Propylbenzene	19.83	91	881174	5.550 ng	98
77) 3-Ethyltoluene	19.91	105	695890	5.194 ng	96
78) 4-Ethyltoluene	19.95	105	681706	5.748 ng	94
79) 1,3,5-Trimethylbenzene	20.01	105	583332	5.328 ng	99
80) alpha-Methylstyrene	20.14	118	318182	6.132 ng	99
81) 2-Ethyltoluene	20.18	105	696590	5.483 ng	99
82) 1,2,4-Trimethylbenzene	20.37	105	607523	5.647 ng	99
83) n-Decane	20.44	57	333533	5.202 ng	100
84) Benzyl Chloride	20.49	91	530116	6.412 ng	99
85) 1,3-Dichlorobenzene	20.51	146	343245	6.041 ng	100
86) 1,4-Dichlorobenzene	20.56	146	347364	5.379 ng	100
87) sec-Butylbenzene	20.60	105	789502	5.635 ng	99
88) 4-Isopropyltoluene (p-...	20.73	119	732453	5.681 ng	98
89) 1,2,3-Trimethylbenzene	20.74	105	599404	5.457 ng	98
90) 1,2-Dichlorobenzene	20.86	146	336998	5.812 ng	99
91) d-Limonene	20.86	68	248824	5.840 ng	98
92) 1,2-Dibromo-3-Chloropr...	21.24	157	117743	6.063 ng	95
93) n-Undecane	21.51	57	346298	5.229 ng	99
94) 1,2,4-Trichlorobenzene	22.36	180	246071	6.179 ng	100
95) Naphthalene	22.47	128	770737	7.086 ng	100
96) n-Dodecane	22.43	57	335656	5.564 ng	100
97) Hexachlorobutadiene	22.78	225	152374	5.669 ng	100
98) Cyclohexanone	18.60	55	237948	5.148 ng	100
99) tert-Butylbenzene	20.37	119	579259	5.735 ng	100
100) n-Butylbenzene	21.09	91	662158	5.716 ng	99

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191625.D
Acq On : 20 Dec 2016 2:46 Operator: LH
Sample : 5.0ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191605 (1/17)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Dec 20 08:57:41 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191626.D
Acq On : 20 Dec 2016 3:19 Operator: LH
Sample : 25ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:42 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.56	130	300261	12.500	ng	0.00
37) 1,4-Difluorobenzene (IS2)	13.66	114	1458864	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	17.93	82	643369	12.500	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.41	65	532918	13.567	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 108.56%			
57) Toluene-d8 (SS2)	16.10	98	1520400	12.406	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.28%			
73) Bromofluorobenzene (SS3)	19.28	174	499274	12.689	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 101.52%			

Target Compounds						Qvalue
2) Propene	4.18	42	1008395	25.973	ng	100
3) Dichlorodifluoromethan...	4.36	85	1965498	31.185	ng	100
4) Chloromethane	4.68	50	1553377	30.351	ng	100
5) 1,2-Dichloro-1,1,2,2-t...	4.95	135	1020133	30.922	ng	100
6) Vinyl Chloride	5.13	62	1588635	31.029	ng	100
7) 1,3-Butadiene	5.41	54	1234683	37.163	ng	100
8) Bromomethane	5.89	94	802417	27.407	ng	100
9) Chloroethane	6.24	64	654892	27.295	ng	100
10) Ethanol	6.68	45	3687842	139.329	ng	100
11) Acetonitrile	6.95	41	1737821	25.650	ng	100
12) Acrolein	7.13	56	587846	23.083	ng	100
13) Acetone	7.34	58	3827877	148.981	ng	100
14) Trichlorofluoromethane	7.57	101	1633337	29.791	ng	100
15) 2-Propanol (Isopropanol)	7.88	45	5406782	61.388	ng	100
16) Acrylonitrile	8.15	53	1279841	27.802	ng	100
17) 1,1-Dichloroethene	8.58	96	892434	31.092	ng	100
18) 2-Methyl-2-Propanol (t...	8.77	59	5529837	64.851	ng	100
19) Methylene Chloride	8.82	84	946475	27.507	ng	100
20) 3-Chloro-1-propene (Al...	8.98	41	1478909	28.275	ng	100
21) Trichlorotrifluoroethane	9.22	151	812915	29.655	ng	100
22) Carbon Disulfide	9.09	76	3441195	29.252	ng	100
23) trans-1,2-Dichloroethene	10.10	61	1437199	30.181	ng	100
24) 1,1-Dichloroethane	10.36	63	1675734	27.669	ng	100
25) Methyl tert-Butyl Ether	10.43	73	2955288	30.252	ng	100
26) Vinyl Acetate	10.60	86	1276200	177.348	ng	100
27) 2-Butanone (MEK)	10.85	72	657523	28.600	ng	100
28) cis-1,2-Dichloroethene	11.38	61	1406043	30.205	ng	100
29) Diisopropyl Ether	11.64	87	847497	29.514	ng	100
30) Ethyl Acetate	11.66	61	819350	66.716	ng	100
31) n-Hexane	11.64	57	1691828	30.416	ng	100
32) Chloroform	11.73	83	1710002	30.002	ng	100
34) Tetrahydrofuran (THF)	12.12	72	638254	27.154	ng	100
35) Ethyl tert-Butyl Ether	12.24	87	1151380	30.910	ng	100
36) 1,2-Dichloroethane	12.52	62	1402084	32.360	ng	100
38) 1,1,1-Trichloroethane	12.79	97	1525853	31.982	ng	100
39) Isopropyl Acetate	13.20	61	1362137	62.554	ng	100
40) 1-Butanol	13.23	56	2423188	71.110	ng	100
41) Benzene	13.27	78	3763293	26.464	ng	100
42) Carbon Tetrachloride	13.43	117	1353759	33.047	ng	100
43) Cyclohexane	13.56	84	3077226	64.372	ng	100
44) tert-Amyl Methyl Ether	13.89	73	2868398	30.932	ng	100
45) 1,2-Dichloropropane	14.12	63	970813	28.044	ng	100
46) Bromodichloromethane	14.32	83	1440290	34.106	ng	100
47) Trichloroethene	14.36	130	1033587	31.507	ng	100
48) 1,4-Dioxane	14.33	88	847041	30.783	ng	100
49) 2,2,4-Trimethylpentane...	14.41	57	4133269	28.714	ng	100

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191626.D
Acq On : 20 Dec 2016 3:19 Operator: LH
Sample : 25ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:42 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

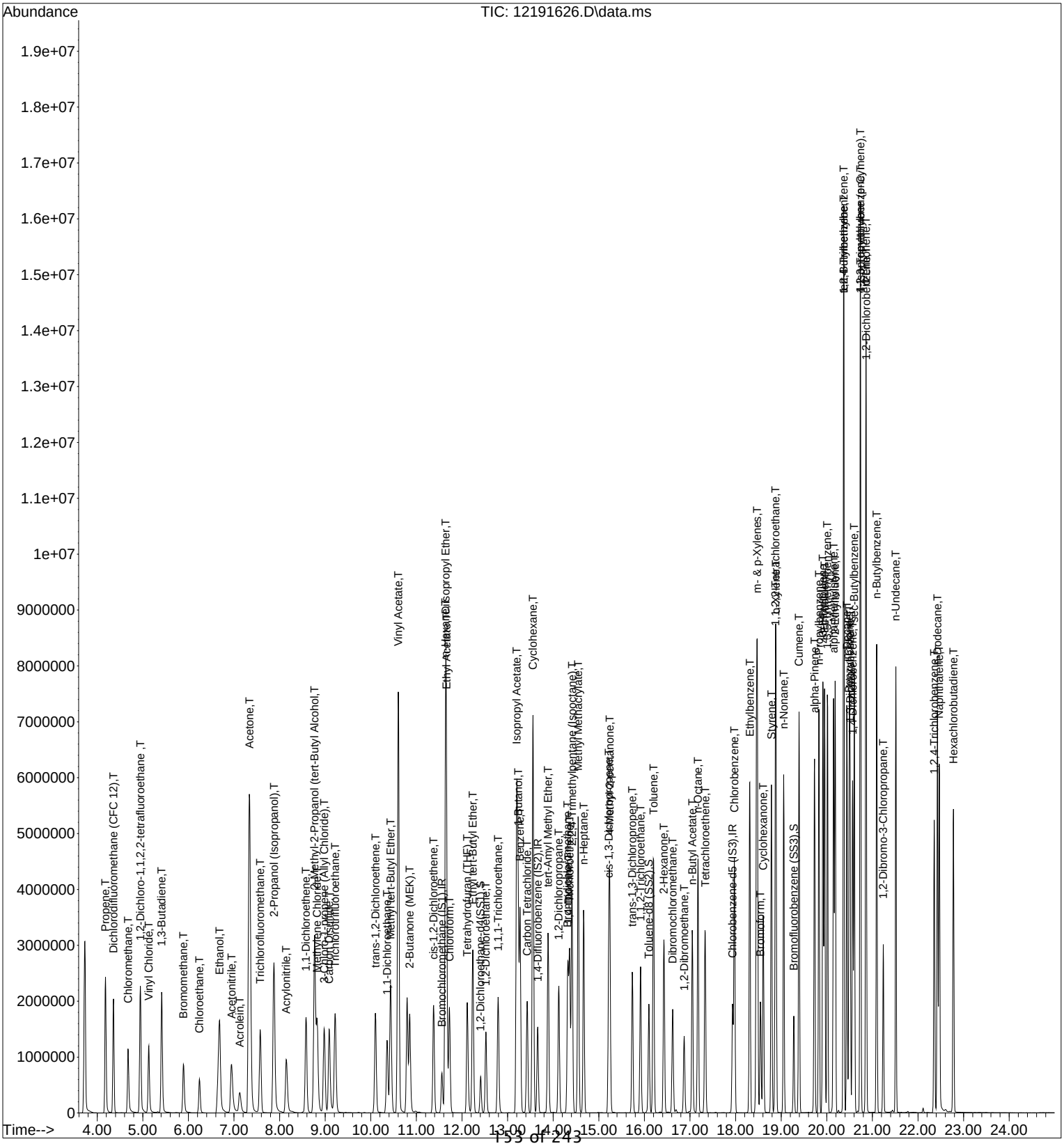
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	14.55	100	832320	67.607 ng	100
51) n-Heptane	14.67	71	937645	28.961 ng	100
52) cis-1,3-Dichloropropene	15.22	75	1815211	35.299 ng	100
53) 4-Methyl-2-pentanone	15.24	58	1001930	31.661 ng	100
54) trans-1,3-Dichloropropene	15.73	75	1579463	34.624 ng	100
55) 1,1,2-Trichloroethane	15.92	97	942337	30.872 ng	100
58) Toluene	16.20	91	3855230	30.346 ng	100
59) 2-Hexanone	16.43	43	2540913	31.318 ng	100
60) Dibromochloromethane	16.62	129	1171096	33.614 ng	100
61) 1,2-Dibromoethane	16.87	107	1105186	30.847 ng	100
62) n-Butyl Acetate	17.05	43	2807744	30.297 ng	100
63) n-Octane	17.18	57	876344	28.967 ng	100
64) Tetrachloroethene	17.33	166	1073124	30.301 ng	100
65) Chlorobenzene	17.97	112	2638707	30.326 ng	100
66) Ethylbenzene	18.31	91	4628156	30.478 ng	100
67) m- & p-Xylenes	18.47	91	7505389	65.178 ng	100
68) Bromoform	18.54	173	1020863	36.624 ng	100
69) Styrene	18.79	104	2903328	32.735 ng	100
70) o-Xylene	18.89	91	3789054	32.730 ng	100
71) n-Nonane	19.06	43	2151021	29.612 ng	100
72) 1,1,2,2-Tetrachloroethane	18.87	83	1931546	34.628 ng	100
74) Cumene	19.39	105	4609627	33.295 ng	100
75) alpha-Pinene	19.73	93	2467306	32.608 ng	100
76) n-Propylbenzene	19.83	91	5698324	32.564 ng	100
77) 3-Ethyltoluene	19.91	105	4902800	33.207 ng	100
78) 4-Ethyltoluene	19.95	105	4257540	32.574 ng	100
79) 1,3,5-Trimethylbenzene	20.01	105	3875045	32.116 ng	100
80) alpha-Methylstyrene	20.15	118	2154463	37.678 ng	100
81) 2-Ethyltoluene	20.18	105	4622691	33.016 ng	100
82) 1,2,4-Trimethylbenzene	20.37	105	4379832	36.943 ng	100
83) n-Decane	20.44	57	2241515	31.725 ng	100
84) Benzyl Chloride	20.49	91	3847795	42.232 ng	100
85) 1,3-Dichlorobenzene	20.51	146	2325406	37.134 ng	100
86) 1,4-Dichlorobenzene	20.57	146	2277699	32.003 ng	100
87) sec-Butylbenzene	20.60	105	5144001	33.317 ng	100
88) 4-Isopropyltoluene (p-...	20.74	119	5067027	35.658 ng	100
89) 1,2,3-Trimethylbenzene	20.74	105	4281623	35.373 ng	100
90) 1,2-Dichlorobenzene	20.86	146	2331718	36.491 ng	100
91) d-Limonene	20.86	68	1821853	38.801 ng	100
92) 1,2-Dibromo-3-Chloropr...	21.24	157	792241	37.019 ng	100
93) n-Undecane	21.51	57	2341676	32.086 ng	100
94) 1,2,4-Trichlorobenzene	22.36	180	1649154	37.578 ng	100
95) Naphthalene	22.47	128	5150243	42.964 ng	100
96) n-Dodecane	22.43	57	2149666	32.331 ng	100
97) Hexachlorobutadiene	22.78	225	1040984	35.143 ng	100
98) Cyclohexanone	18.60	55	1552070	30.471 ng	100
99) tert-Butylbenzene	20.37	119	4045821	36.344 ng	100
100) n-Butylbenzene	21.10	91	4331265	33.925 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191626.D
Acq On : 20 Dec 2016 3:19 Operator: LH
Sample : 25ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:42 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191627.D
Acq On : 20 Dec 2016 3:52 Operator: LH
Sample : 50ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:45 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS) LH 12/20/16
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.57	130	315445	12.500	ng		0.01
37) 1,4-Difluorobenzene (IS2)	13.67	114	1537731	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	17.93	82	682922	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.42	65	566318	13.723	ng		0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 109.76%				
57) Toluene-d8 (SS2)	16.10	98	1603043	12.323	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.56%				
73) Bromofluorobenzene (SS3)	19.28	174	519610	12.441	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.52%				
Target Compounds							Qvalue
2) Propene	4.19	42	2203767	54.029	ng		99
3) Dichlorodifluoromethan...	4.36	85	3887109	58.705	ng		100
4) Chloromethane	4.68	50	3029186	56.338	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.96	135	2019789	58.276	ng		100
6) Vinyl Chloride	5.14	62	3189329	59.295	ng		100
7) 1,3-Butadiene	5.42	54	2542966	72.858	ng		99
8) Bromomethane	5.90	94	1605423	52.194	ng		100
9) Chloroethane	6.25	64	1313374	52.105	ng		100
10) Ethanol	6.72	45	7753505	278.833	ng		100
11) Acetonitrile	6.96	41	3506029	49.258	ng		100
12) Acrolein	7.13	56	1184215	44.263	ng		100
13) Acetone	7.36	58	7882532	292.022	ng		90
14) Trichlorofluoromethane	7.58	101	3292962	57.170	ng		100
15) 2-Propanol (Isopropanol)	7.90	45	10609071	114.655	ng		99
16) Acrylonitrile	8.17	53	2590588	53.567	ng		100
17) 1,1-Dichloroethene	8.59	96	1812953	60.122	ng		100
18) 2-Methyl-2-Propanol (t...	8.79	59	11491299	128.277	ng		99
19) Methylene Chloride	8.83	84	1948502	53.903	ng		100
20) 3-Chloro-1-propene (Al...	8.98	41	3011770	54.810	ng		100
21) Trichlorotrifluoroethane	9.22	151	1651899	57.361	ng		100
22) Carbon Disulfide	9.09	76	6882703	55.690	ng		99
23) trans-1,2-Dichloroethene	10.11	61	2922284	58.414	ng		100
24) 1,1-Dichloroethane	10.37	63	3365912	52.901	ng		100
25) Methyl tert-Butyl Ether	10.44	73	5981263	58.280	ng		100
26) Vinyl Acetate	10.62	86	2757360	364.733	ng	#	53
27) 2-Butanone (MEK)	10.86	72	1374411	56.904	ng		98
28) cis-1,2-Dichloroethene	11.38	61	2849913	58.276	ng		100
29) Diisopropyl Ether	11.65	87	1795400	59.516	ng	#	94
30) Ethyl Acetate	11.67	61	1787842	138.569	ng		99
31) n-Hexane	11.64	57	3659839	62.631	ng		100
32) Chloroform	11.74	83	3455346	57.707	ng		100
34) Tetrahydrofuran (THF)	12.12	72	1311419	53.107	ng		99
35) Ethyl tert-Butyl Ether	12.24	87	2378967	60.791	ng		99
36) 1,2-Dichloroethane	12.53	62	2851613	62.647	ng		100
38) 1,1,1-Trichloroethane	12.80	97	3116416	61.970	ng		100
39) Isopropyl Acetate	13.20	61	2948766	128.473	ng	#	88
40) 1-Butanol	13.24	56	5173592	144.037	ng		96
41) Benzene	13.28	78	7871939	52.517	ng		100
42) Carbon Tetrachloride	13.44	117	2762864	63.987	ng		100
43) Cyclohexane	13.56	84	6416063	127.333	ng		99
44) tert-Amyl Methyl Ether	13.89	73	5901544	60.377	ng		99
45) 1,2-Dichloropropane	14.13	63	1991051	54.566	ng		100
46) Bromodichloromethane	14.32	83	3018808	67.818	ng		100
47) Trichloroethene	14.36	130	2155354	62.331	ng		100
48) 1,4-Dioxane	14.34	88	1799139	62.031	ng		98
49) 2,2,4-Trimethylpentane...	14.41	57	8398743	55.353	ng		99

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191627.D
Acq On : 20 Dec 2016 3:52 Operator: LH
Sample : 50ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:45 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

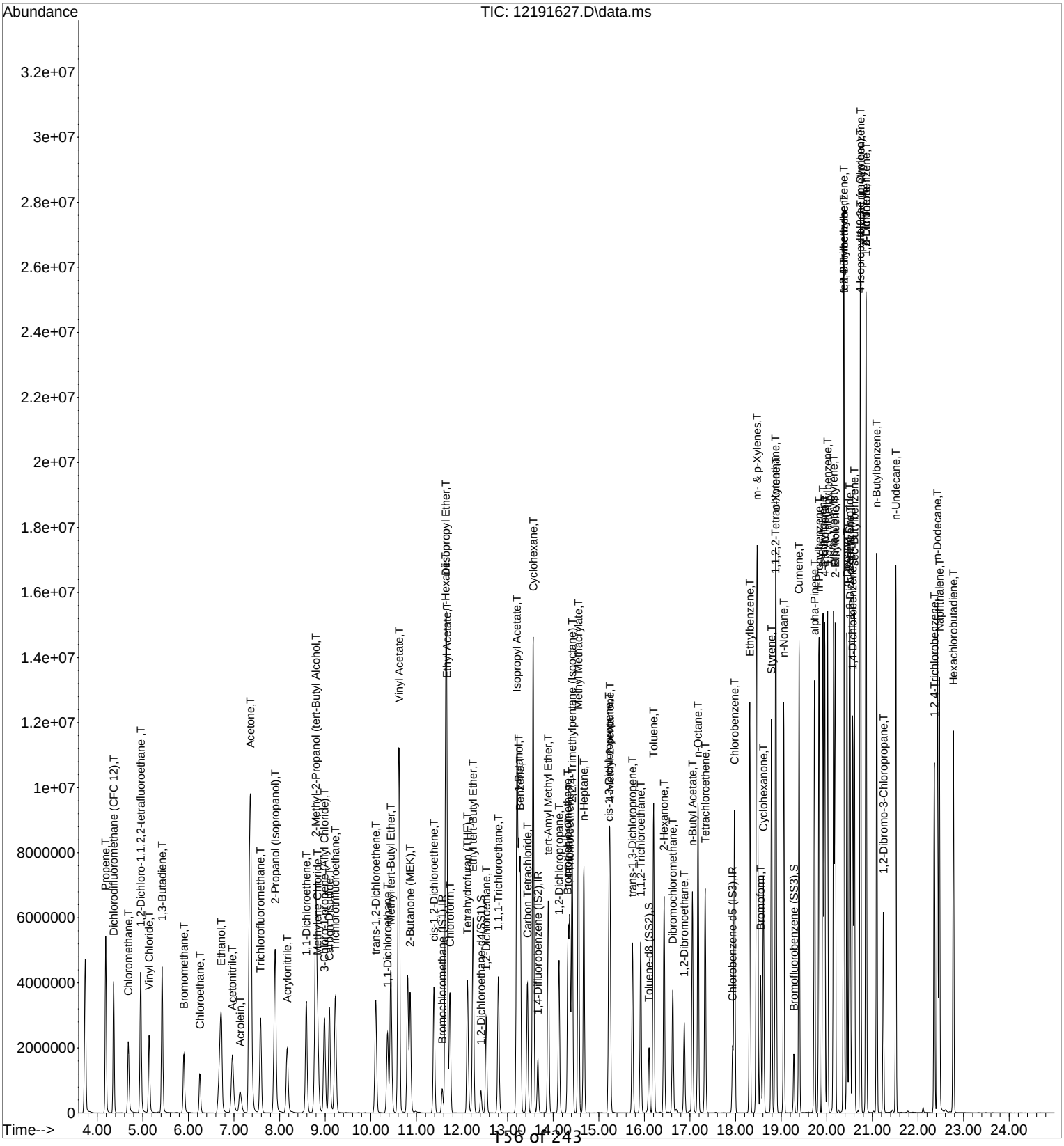
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
50) Methyl Methacrylate	14.55	100	1757607	135.443	ng	99
51) n-Heptane	14.67	71	1973639	57.833	ng	100
52) cis-1,3-Dichloropropene	15.22	75	3813352	70.353	ng	100
53) 4-Methyl-2-pentanone	15.24	58	2105888	63.134	ng	97
54) trans-1,3-Dichloropropene	15.74	75	3251354	67.618	ng	100
55) 1,1,2-Trichloroethane	15.92	97	1921774	59.730	ng	100
58) Toluene	16.20	91	7906025	58.627	ng	99
59) 2-Hexanone	16.43	43	5190566	60.270	ng	98
60) Dibromochloromethane	16.63	129	2411325	65.205	ng	100
61) 1,2-Dibromoethane	16.87	107	2240638	58.917	ng	100
62) n-Butyl Acetate	17.05	43	5713152	58.078	ng	99
63) n-Octane	17.17	57	1864618	58.064	ng	100
64) Tetrachloroethene	17.33	166	2211852	58.837	ng	100
65) Chlorobenzene	17.98	112	5437320	58.870	ng	100
66) Ethylbenzene	18.31	91	9496091	58.912	ng	99
67) m- & p-Xylenes	18.47	91	15358117	125.648	ng	99
68) Bromoform	18.55	173	2106676	71.201	ng	100
69) Styrene	18.79	104	5985604	63.579	ng	99
70) o-Xylene	18.89	91	7821769	63.652	ng	100
71) n-Nonane	19.06	43	4506167	58.442	ng	98
72) 1,1,2,2-Tetrachloroethane	18.87	83	4041761	68.262	ng	100
74) Cumene	19.39	105	9355302	63.660	ng	98
75) alpha-Pinene	19.73	93	5197572	64.713	ng	100
76) n-Propylbenzene	19.83	91	11288361	60.773	ng	98
77) 3-Ethyltoluene	19.92	105	9675999	61.740	ng	99
78) 4-Ethyltoluene	19.95	105	8789793	63.354	ng	99
79) 1,3,5-Trimethylbenzene	20.02	105	7926510	61.888	ng	100
80) alpha-Methylstyrene	20.15	118	4429813	72.984	ng	99
81) 2-Ethyltoluene	20.19	105	9246623	62.216	ng	99
82) 1,2,4-Trimethylbenzene	20.38	105	8285271	65.837	ng	98
83) n-Decane	20.44	57	4767841	63.573	ng	100
84) Benzyl Chloride	20.50	91	8110314	83.860	ng	100
85) 1,3-Dichlorobenzene	20.51	146	4668897	70.238	ng	100
86) 1,4-Dichlorobenzene	20.57	146	4657427	61.650	ng	100
87) sec-Butylbenzene	20.61	105	10080080	61.506	ng	98
88) 4-Isopropyltoluene (p-...	20.74	119	9147023	60.643	ng	97
89) 1,2,3-Trimethylbenzene	20.74	105	8096163	63.013	ng	98
90) 1,2-Dichlorobenzene	20.86	146	4485305	66.129	ng	100
91) d-Limonene	20.86	68	3730226	74.844	ng	99
92) 1,2-Dibromo-3-Chloropr...	21.24	157	1652550	72.746	ng	98
93) n-Undecane	21.51	57	5077136	65.538	ng	100
94) 1,2,4-Trichlorobenzene	22.36	180	3474797	74.591	ng	99
95) Naphthalene	22.47	128	10469752	82.282	ng	99
96) n-Dodecane	22.43	57	4706948	66.692	ng	99
97) Hexachlorobutadiene	22.78	225	2211494	70.334	ng	100
98) Cyclohexanone	18.61	55	3174201	58.707	ng	99
99) tert-Butylbenzene	20.38	119	7458368	63.119	ng	100
100) n-Butylbenzene	21.10	91	8750025	64.566	ng	98

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191627.D
Acq On : 20 Dec 2016 3:52 Operator: LH
Sample : 50ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:45 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191628.D
Acq On : 20 Dec 2016 4:25 Operator: LH
Sample : 100ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:47 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.58	130	329273	12.500	ng	0.02
37) 1,4-Difluorobenzene (IS2)	13.67	114	1591058	12.500	ng	0.01
56) Chlorobenzene-d5 (IS3)	17.93	82	721832	12.500	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.42	65	583840	13.554	ng	0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 108.40%			
57) Toluene-d8 (SS2)	16.10	98	1665906	12.116	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.96%			
73) Bromofluorobenzene (SS3)	19.28	174	540887	12.252	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.00%			

Target Compounds							Qvalue
2) Propene	4.19	42	6008959	141.134	ng		96
3) Dichlorodifluoromethan...	4.36	85	8043167	116.370	ng		99
4) Chloromethane	4.68	50	5589101	99.582	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.96	135	4060580	112.239	ng		100
6) Vinyl Chloride	5.14	62	6538231	116.451	ng		100
7) 1,3-Butadiene	5.42	54	5399660	148.207	ng		98
8) Bromomethane	5.90	94	3496795	108.911	ng		100
9) Chloroethane	6.25	64	2780718	105.686	ng		100
10) Ethanol	6.76	45	16883590	581.672	ng		99
11) Acetonitrile	6.99	41	7339130	98.782	ng		99
12) Acrolein	7.14	56	2483696	88.935	ng		100
13) Acetone	7.38	58	16812434	596.688	ng	#	61
14) Trichlorofluoromethane	7.58	101	6829163	113.583	ng		99
15) 2-Propanol (Isopropanol)	7.93	45	17522615	181.419	ng		99
16) Acrylonitrile	8.18	53	5449202	107.945	ng		100
17) 1,1-Dichloroethene	8.59	96	3806536	120.933	ng		99
18) 2-Methyl-2-Propanol (t...	8.82	59	23412841	250.381	ng		99
19) Methylene Chloride	8.84	84	4304984	114.092	ng		100
20) 3-Chloro-1-propene (Al...	8.99	41	6282009	109.522	ng		100
21) Trichlorotrifluoroethane	9.22	151	3445812	114.628	ng		99
22) Carbon Disulfide	9.10	76	14297695	110.829	ng		98
23) trans-1,2-Dichloroethene	10.11	61	6208655	118.894	ng		99
24) 1,1-Dichloroethane	10.37	63	7053876	106.207	ng		99
25) Methyl tert-Butyl Ether	10.44	73	12670326	118.271	ng		99
26) Vinyl Acetate	10.63	86	5343344	677.115	ng	#	1
27) 2-Butanone (MEK)	10.88	72	2982673	118.304	ng	#	92
28) cis-1,2-Dichloroethene	11.39	61	6046232	118.444	ng		100
29) Diisopropyl Ether	11.65	87	3695372	117.354	ng	#	73
30) Ethyl Acetate	11.68	61	3675126	272.883	ng		97
31) n-Hexane	11.64	57	7729185	126.715	ng		100
32) Chloroform	11.75	83	7083157	113.326	ng		100
34) Tetrahydrofuran (THF)	12.13	72	2830906	109.825	ng		98
35) Ethyl tert-Butyl Ether	12.25	87	5190600	127.069	ng		96
36) 1,2-Dichloroethane	12.54	62	5928544	124.774	ng		100
38) 1,1,1-Trichloroethane	12.80	97	6572961	126.324	ng		100
39) Isopropyl Acetate	13.21	61	6378183	268.573	ng	#	60
40) 1-Butanol	13.27	56	11112782	299.019	ng		92
41) Benzene	13.28	78	16424941	105.906	ng		98
42) Carbon Tetrachloride	13.44	117	5830576	130.508	ng		100
43) Cyclohexane	13.56	84	12926651	247.944	ng		97
44) tert-Amyl Methyl Ether	13.90	73	12610453	124.689	ng		98
45) 1,2-Dichloropropane	14.13	63	4291470	113.668	ng		100
46) Bromodichloromethane	14.33	83	6399081	138.938	ng		99
47) Trichloroethene	14.37	130	4493086	125.582	ng		100
48) 1,4-Dioxane	14.34	88	3917241	130.533	ng		93
49) 2,2,4-Trimethylpentane...	14.42	57	17120018	109.051	ng		99

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191628.D
Acq On : 20 Dec 2016 4:25 Operator: LH
Sample : 100ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:47 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

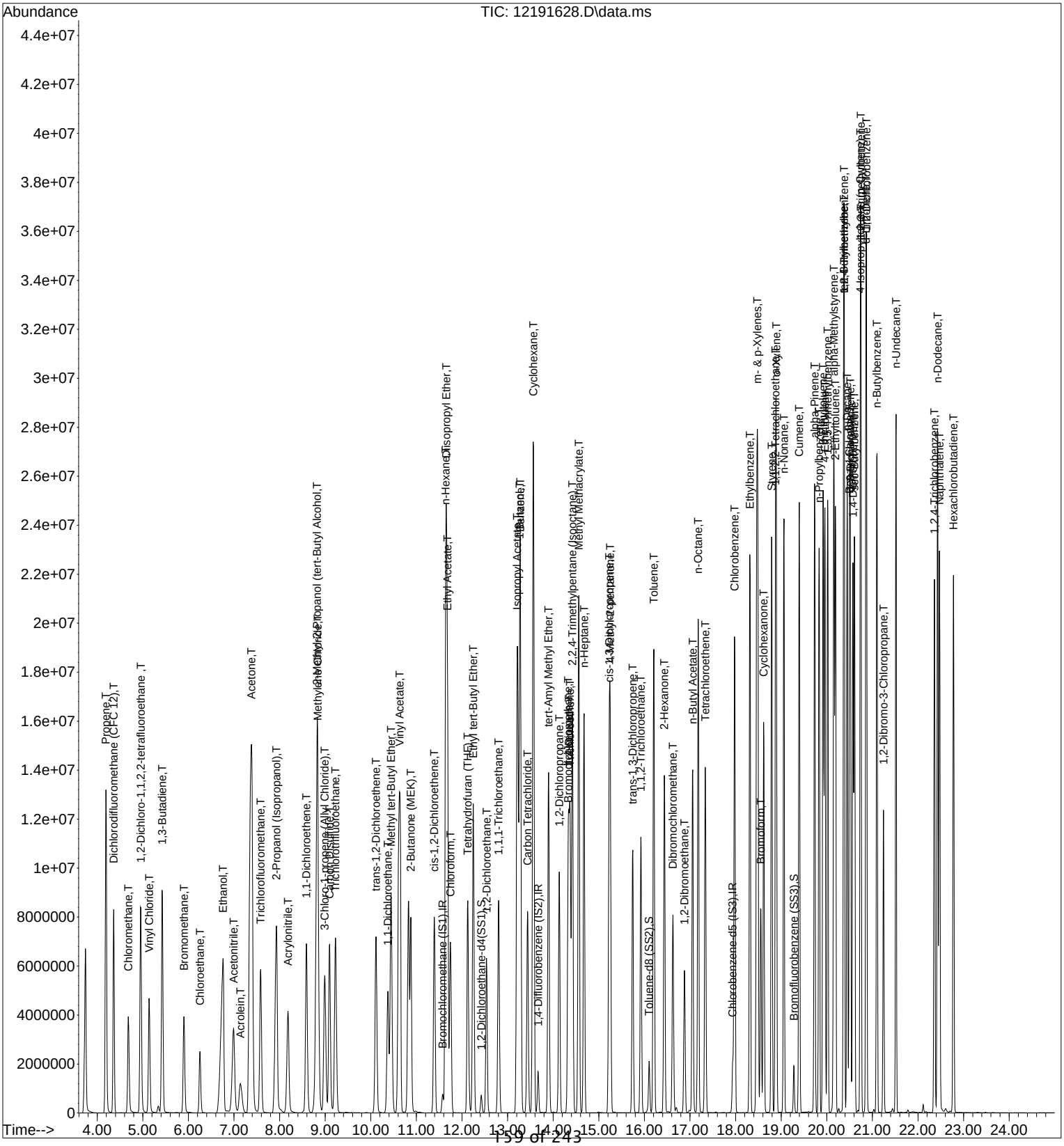
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
50) Methyl Methacrylate	14.56	100	3679489	274.042	ng	96
51) n-Heptane	14.68	71	4399434	124.594	ng	99
52) cis-1,3-Dichloropropene	15.23	75	8248548	147.077	ng	99
53) 4-Methyl-2-pentanone	15.25	58	4683120	135.693	ng	91
54) trans-1,3-Dichloropropene	15.75	75	6987802	140.453	ng	99
55) 1,1,2-Trichloroethane	15.92	97	4108624	123.418	ng	99
58) Toluene	16.21	91	15856097	111.243	ng	95
59) 2-Hexanone	16.44	43	10964453	120.451	ng	94
60) Dibromochloromethane	16.63	129	5097352	130.407	ng	99
61) 1,2-Dibromoethane	16.88	107	4696846	116.844	ng	100
62) n-Butyl Acetate	17.06	43	11910418	114.551	ng	96
63) n-Octane	17.18	57	4147708	122.196	ng	98
64) Tetrachloroethene	17.33	166	4609727	116.013	ng	99
65) Chlorobenzene	17.98	112	11107353	113.777	ng	98
66) Ethylbenzene	18.31	91	17038464	100.006	ng	90
67) m- & p-Xylenes	18.48	91	25235722	195.330	ng	91
68) Bromoform	18.56	173	4346874	138.996	ng	100
69) Styrene	18.79	104	11787997	118.463	ng	95
70) o-Xylene	18.89	91	13896416	106.991	ng	98
71) n-Nonane	19.06	43	9095628	111.605	ng	95
72) 1,1,2,2-Tetrachloroethane	18.87	83	7673756	122.617	ng	100
74) Cumene	19.40	105	16006089	103.045	ng	91
75) alpha-Pinene	19.73	93	10236511	120.580	ng	97
76) n-Propylbenzene	19.83	91	17367590	88.461	ng	85
77) 3-Ethyltoluene	19.92	105	17077463	103.093	ng	92
78) 4-Ethyltoluene	19.96	105	13768231	93.888	ng	91
79) 1,3,5-Trimethylbenzene	20.02	105	13834479	102.194	ng	96
80) alpha-Methylstyrene	20.16	118	8337402	129.960	ng	97
81) 2-Ethyltoluene	20.19	105	15494984	98.638	ng	93
82) 1,2,4-Trimethylbenzene	20.38	105	12799085	96.222	ng	100
83) n-Decane	20.45	57	9147243	115.392	ng	99
84) Benzyl Chloride	20.50	91	13922055	136.193	ng	96
85) 1,3-Dichlorobenzene	20.52	146	8283962	117.905	ng	99
86) 1,4-Dichlorobenzene	20.57	146	8587741	107.547	ng	99
87) sec-Butylbenzene	20.61	105	15937525	92.005	ng	91
88) 4-Isopropyltoluene (p-...	20.74	119	13537503	84.912	ng	93
89) 1,2,3-Trimethylbenzene	20.75	105	12341662	90.879	ng	99
90) 1,2-Dichlorobenzene	20.87	146	7334449	102.307	ng	99
91) d-Limonene	20.86	68	6001043	113.915	ng	100
92) 1,2-Dibromo-3-Chloropr...	21.24	157	3395976	141.434	ng	93
93) n-Undecane	21.52	57	9633509	117.651	ng	98
94) 1,2,4-Trichlorobenzene	22.36	180	6907903	140.295	ng	99
95) Naphthalene	22.47	128	17224604	128.072	ng	93
96) n-Dodecane	22.43	57	9492916	127.254	ng	98
97) Hexachlorobutadiene	22.78	225	4454502	134.033	ng	99
98) Cyclohexanone	18.62	55	6886299	120.498	ng	97
99) tert-Butylbenzene	20.38	119	11723693	93.867	ng	99
100) n-Butylbenzene	21.10	91	14415146	100.635	ng	90

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191628.D
Acq On : 20 Dec 2016 4:25 Operator: LH
Sample : 100ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:47 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191629.D
Acq On : 20 Dec 2016 4:58 Operator: LH
Sample : 25ng TO-15 ICV STD
Misc : S29-12061601/S29-12011603 (12/30)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 10:51:50 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/21/16

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.56	130	324263	12.500	ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.66	114	1591523	12.500	ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.93	82	692153	12.500	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.41	65	586813	12.597	ng	-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.80%			
57) Toluene-d8 (SS2)	16.10	98	1634742	12.310	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.48%			
73) Bromofluorobenzene (SS3)	19.28	174	523510	12.349	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.80%			
Target Compounds						Qvalue
2) Propene	4.19	42	1124028	25.074	ng	99
3) Dichlorodifluoromethan...	4.36	85	2046175	24.979	ng	100
4) Chloromethane	4.68	50	1694320	25.145	ng	100
5) 1,2-Dichloro-1,1,2,2-t...	4.95	135	1055579	23.189	ng	100
6) Vinyl Chloride	5.13	62	1693438	26.426	ng	100
7) 1,3-Butadiene	5.42	54	1289867	28.829	ng	100
8) Bromomethane	5.90	94	891470	26.288	ng	100
9) Chloroethane	6.24	64	710995	26.626	ng	100
10) Ethanol	6.67	45	3936175	128.358	ng	100
11) Acetonitrile	6.94	41	1869029	26.609	ng	100
12) Acrolein	7.12	56	633199	23.499	ng	100
13) Acetone	7.33	58	3999279	129.883	ng	99
14) Trichlorofluoromethane	7.57	101	1719917	24.463	ng	100
15) 2-Propanol (Isopropanol)	7.87	45	5628222	53.518	ng	99
16) Acrylonitrile	8.15	53	1361059	26.179	ng	100
17) 1,1-Dichloroethene	8.58	96	932075	26.370	ng	99
18) 2-Methyl-2-Propanol (t...	8.76	59	5717162	51.822	ng	99
19) Methylene Chloride	8.82	84	987850	25.589	ng	100
20) 3-Chloro-1-propene (Al...	8.98	41	1631080	27.922	ng	100
21) Trichlorotrifluoroethane	9.22	151	850278	24.680	ng	100
22) Carbon Disulfide	9.09	76	3636405	26.702	ng	100
23) trans-1,2-Dichloroethene	10.10	61	1500866	26.244	ng	99
24) 1,1-Dichloroethane	10.36	63	1808134	25.230	ng	100
25) Methyl tert-Butyl Ether	10.43	73	3070833	24.735	ng	100
26) Vinyl Acetate	10.60	86	1306597	145.059	ng	98
27) 2-Butanone (MEK)	10.85	72	699761	26.323	ng	100
28) cis-1,2-Dichloroethene	11.38	61	1442544	25.606	ng	99
29) Diisopropyl Ether	11.64	87	862033	24.154	ng	98
30) Ethyl Acetate	11.66	61	847035	55.934	ng	100
31) n-Hexane	11.64	57	1743220	25.368	ng	100
32) Chloroform	11.72	83	1774939	24.850	ng	100
34) Tetrahydrofuran (THF)	12.12	72	661555	24.464	ng	100
35) Ethyl tert-Butyl Ether	12.24	87	1195210	25.353	ng	99
36) 1,2-Dichloroethane	12.52	62	1464666	25.028	ng	100
38) 1,1,1-Trichloroethane	12.79	97	1562252	25.058	ng	100
39) Isopropyl Acetate	13.20	61	1413573	52.946	ng	97
40) 1-Butanol	13.23	56	2417638	56.618	ng	99
41) Benzene	13.27	78	3951203	24.315	ng	100
42) Carbon Tetrachloride	13.43	117	1398229	25.907	ng	100
43) Cyclohexane	13.56	84	3104966	51.398	ng	99
44) tert-Amyl Methyl Ether	13.89	73	2968989	25.325	ng	100
45) 1,2-Dichloropropane	14.12	63	1005086	24.872	ng	100
46) Bromodichloromethane	14.32	83	1494154	26.501	ng	100
47) Trichloroethene	14.36	130	1042656	24.408	ng	100
48) 1,4-Dioxane	14.33	88	858499	26.353	ng	98
49) 2,2,4-Trimethylpentane...	14.41	57	4258097	24.871	ng	99

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191629.D
Acq On : 20 Dec 2016 4:58 Operator: LH
Sample : 25ng TO-15 ICV STD
Misc : S29-12061601/S29-12011603 (12/30)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 10:51:50 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

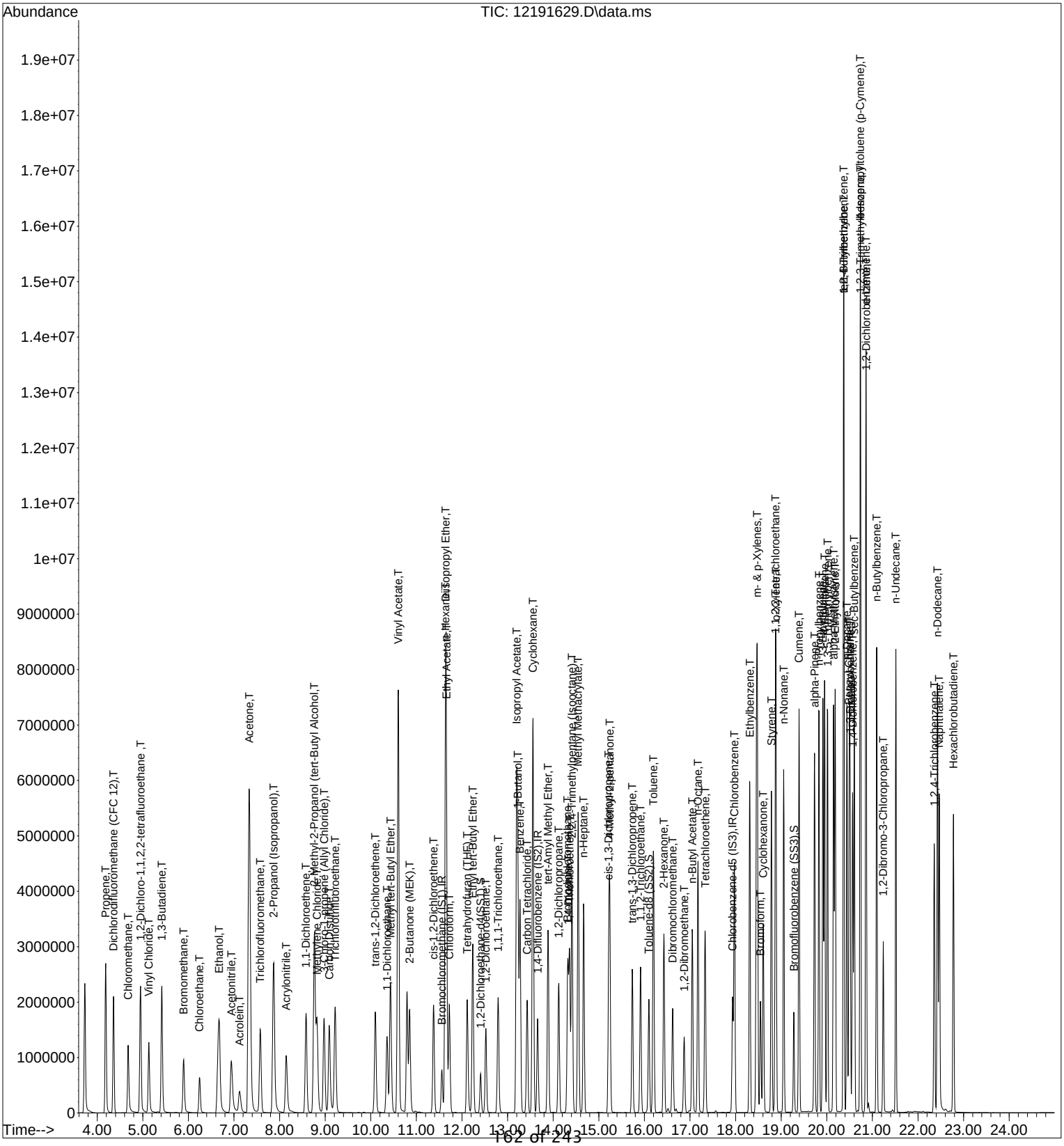
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	14.55	100	853414	53.563 ng	99
51) n-Heptane	14.67	71	972515	24.817 ng	100
52) cis-1,3-Dichloropropene	15.22	75	1748844	26.730 ng	100
53) 4-Methyl-2-pentanone	15.24	58	1026423	26.302 ng	100
54) trans-1,3-Dichloropropene	15.73	75	1611272	27.622 ng	100
55) 1,1,2-Trichloroethane	15.92	97	960805	25.399 ng	100
58) Toluene	16.20	91	3948316	24.350 ng	100
59) 2-Hexanone	16.43	43	2609129	26.123 ng	100
60) Dibromochloromethane	16.62	129	1186720	26.581 ng	100
61) 1,2-Dibromoethane	16.87	107	1117028	25.586 ng	100
62) n-Butyl Acetate	17.05	43	2902880	27.001 ng	99
63) n-Octane	17.17	57	898189	25.213 ng	100
64) Tetrachloroethene	17.33	166	1083122	24.649 ng	100
65) Chlorobenzene	17.97	112	2650579	24.804 ng	100
66) Ethylbenzene	18.31	91	4687446	25.700 ng	100
67) m- & p-Xylenes	18.47	91	7521675	53.005 ng	100
68) Bromoform	18.54	173	1016807	27.983 ng	100
69) Styrene	18.79	104	2887022	26.217 ng	100
70) o-Xylene	18.89	91	3814142	26.123 ng	100
71) n-Nonane	19.06	43	2207942	25.111 ng	100
72) 1,1,2,2-Tetrachloroethane	18.87	83	1920280	28.056 ng	100
74) Cumene	19.39	105	4669797	25.706 ng	100
75) alpha-Pinene	19.73	93	2516642	26.394 ng	100
76) n-Propylbenzene	19.83	91	5748335	26.851 ng	100
77) 3-Ethyltoluene	19.91	105	4824280	26.221 ng	99
78) 4-Ethyltoluene	19.95	105	4440812	27.516 ng	100
79) 1,3,5-Trimethylbenzene	20.02	105	3891708	25.933 ng	100
80) alpha-Methylstyrene	20.15	118	2133951	28.576 ng	100
81) 2-Ethyltoluene	20.18	105	4628604	26.862 ng	100
82) 1,2,4-Trimethylbenzene	20.37	105	4323279	29.231 ng	100
83) n-Decane	20.44	57	2317960	27.117 ng	99
84) Benzyl Chloride	20.49	91	3775432	31.379 ng	100
85) 1,3-Dichlorobenzene	20.51	146	2266889	30.518 ng	100
86) 1,4-Dichlorobenzene	20.57	146	2200963	24.970 ng	100
87) sec-Butylbenzene	20.60	105	5189431	27.044 ng	100
88) 4-Isopropyltoluene (p-...	20.73	119	5108284	27.780 ng	99
89) 1,2,3-Trimethylbenzene	20.74	105	4405266	27.923 ng	100
90) 1,2-Dichlorobenzene	20.86	146	2262220	27.231 ng	99
91) d-Limonene	20.86	68	1849244	29.170 ng	99
92) 1,2-Dibromo-3-Chloropr...	21.24	157	806286	29.153 ng	99
93) n-Undecane	21.51	57	2438089	27.128 ng	100
94) 1,2,4-Trichlorobenzene	22.36	180	1606384	30.096 ng	100
95) Naphthalene	22.46	128	4812376	29.684 ng	100
96) n-Dodecane	22.43	57	2427846	30.251 ng	100
97) Hexachlorobutadiene	22.78	225	1047435	28.082 ng	100
98) Cyclohexanone	18.60	55	1554818	25.350 ng	100
99) tert-Butylbenzene	20.37	119	4016249	27.638 ng	100
100) n-Butylbenzene	21.10	91	4360718	27.979 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191629.D
Acq On : 20 Dec 2016 4:58 Operator: LH
Sample : 25ng TO-15 ICV STD
Misc : S29-12061601/S29-12011603 (12/30)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 10:51:50 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



LH 12/21/16

Initial Calibration Verification/LABORATORY CONTROL SAMPLE CHECK SHEET

Data File Name: **12191629.D**
Data File Path: **I:\MS16\DATA\2016_12\19**
Operator: **LH**
Date Acquired: **12/20/16** **4:58**

Acq. Method File: **TO15.M**
Sample Name: **25ng TO-15 ICV STD**
Misc Info: **S29-12061601/S29-12011603 (**
Instrument Name: **GCMS-16**

#	Compound Name	Ret. Time	Amt. (ng)	Spike Amt.(ng)	% Rec.	Lower Limit	Upper Limit	* OR Fail	ICV/AZ 70-130%
2)	Propene	4.19	25.074	26.275	95	52	127	*	*
3)	Dichlorodifluoromethane (CFC 1	4.36	24.979	26.250	95	68	109	*	*
4)	Chloromethane	4.68	25.145	26.225	96	51	130	*	*
5)	1,2-Dichloro-1,1,2,2-tetrafluoroet	4.95	23.189	26.375	88	66	114	*	*
6)	Vinyl Chloride	5.13	26.426	26.250	101	61	125	*	*
7)	1,3-Butadiene	5.42	28.829	26.250	110	62	144	*	*
8)	Bromomethane	5.90	26.288	26.250	100	73	123	*	*
9)	Chloroethane	6.24	26.626	26.225	102	69	122	*	*
10)	Ethanol	6.67	128.358	132.650	97	62	124	*	*
11)	Acetonitrile	6.94	26.609	26.650	100	57	114	*	*
12)	Acrolein	7.12	23.499	26.525	89	62	116	*	*
13)	Acetone	7.33	129.883	133.050	98	57	117	*	*
14)	Trichlorofluoromethane	7.57	24.463	26.275	93	63	98	*	*
15)	2-Propanol (Isopropanol)	7.87	53.518	53.025	101	66	121	*	*
16)	Acrylonitrile	8.15	26.179	26.575	99	68	123	*	*
17)	1,1-Dichloroethene	8.58	26.370	26.575	99	76	118	*	*
18)	2-Methyl-2-Propanol (tert-Butyl Alc	8.76	51.822	53.275	97	74	126	*	*
19)	Methylene Chloride	8.82	25.589	26.550	96	60	118	*	*
20)	3-Chloro-1-propene (Allyl Chlori	8.98	27.922	26.500	105	65	126	*	*
21)	Trichlorotrifluoroethane	9.22	24.680	26.450	93	73	114	*	*
22)	Carbon Disulfide	9.09	26.702	26.675	100	57	102	*	*
23)	trans-1,2-Dichloroethene	10.10	26.244	26.675	98	74	123	*	*
24)	1,1-Dichloroethane	10.36	25.230	26.550	95	69	111	*	*
25)	Methyl tert-Butyl Ether	10.43	24.735	26.600	93	69	113	*	*
26)	Vinyl Acetate	10.60	145.059	132.550	109	76	128	*	*
27)	2-Butanone (MEK)	10.85	26.323	26.550	99	63	127	*	*
28)	cis-1,2-Dichloroethene	11.38	25.606	26.475	97	72	117	*	*
29)	Diisopropyl Ether	11.64	24.154	26.575	91	64	118	*	*
30)	Ethyl Acetate	11.66	55.934	53.275	105	68	127	*	*
31)	n-Hexane	11.64	25.368	26.600	95	55	116	*	*
32)	Chloroform	11.72	24.850	26.475	94	70	109	*	*
34)	Tetrahydrofuran (THF)	12.12	24.464	26.575	92	72	113	*	*
35)	Ethyl tert-Butyl Ether	12.24	25.353	26.525	96	73	117	*	*
36)	1,2-Dichloroethane	12.52	25.028	26.500	94	69	113	*	*
38)	1,1,1-Trichloroethane	12.79	25.058	26.475	95	72	115	*	*
39)	Isopropyl Acetate	13.20	52.946	53.050	100	68	122	*	*
40)	1-Butanol	13.23	56.618	53.075	107	75	141	*	*
41)	Benzene	13.27	24.315	26.525	92	65	107	*	*
42)	Carbon Tetrachloride	13.43	25.907	26.600	97	71	113	*	*
43)	Cyclohexane	13.56	51.398	53.125	97	71	115	*	*
44)	tert-Amyl Methyl Ether	13.89	25.325	26.525	95	73	115	*	*
45)	1,2-Dichloropropane	14.12	24.872	26.525	94	71	115	*	*
46)	Bromodichloromethane	14.32	26.501	26.700	99	75	118	*	*
47)	Trichloroethene	14.36	24.408	26.550	92	68	114	*	*
48)	1,4-Dioxane	14.33	26.353	26.600	99	81	131	*	*
49)	2,2,4-Trimethylpentane (Isooctane)	14.41	24.871	26.525	94	68	112	*	*

Initial Calibration Verification/LABORATORY CONTROL SAMPLE CHECK SHEET

Data File Name: **12191629.D** **TO15.M**
Data File Path: **I:\MS16\DATA\2016_12\19** Sample Name: **25ng TO-15 ICV STD**
Operator: **LH** Misc Info: **S29-12061601/S29-12011603 (**
Date Acquired: **12/20/16** **4:58** Instrument Name: **GCMS-16**

#	Compound Name	Ret. Time	Amt. (ng)	Spike Amt.(ng)	% Rec.	Lower Limit	Upper Limit	* OR Fail	ICV/AZ 70-130%
50)	**Methyl Methacrylate**	**14.55**	**53.563**	**53.000**	101	**72**	**130**	*	*
51)	**n-Heptane**	**14.67**	**24.817**	**26.600**	93	**68**	**116**	*	*
52)	**cis-1,3-Dichloropropene**	**15.22**	**26.730**	**26.275**	102	**77**	**126**	*	*
53)	**4-Methyl-2-pentanone**	**15.24**	**26.302**	**26.575**	99	**69**	**126**	*	*
54)	**trans-1,3-Dichloropropene**	**15.73**	**27.622**	**26.675**	104	**79**	**125**	*	*
55)	**1,1,2-Trichloroethane**	**15.92**	**25.399**	**26.525**	96	**75**	**119**	*	*
58)	**Toluene**	**16.20**	**24.350**	**26.450**	92	**59**	**118**	*	*
59)	**2-Hexanone**	**16.43**	**26.123**	**26.575**	98	**69**	**129**	*	*
60)	**Dibromochloromethane**	**16.62**	**26.581**	**26.600**	100	**74**	**136**	*	*
61)	**1,2-Dibromoethane**	**16.87**	**25.586**	**26.450**	97	**73**	**131**	*	*
62)	**n-Butyl Acetate**	**17.05**	**27.001**	**26.950**	100	**69**	**130**	*	*
63)	**n-Octane**	**17.17**	**25.213**	**26.500**	95	**66**	**120**	*	*
64)	**Tetrachloroethene**	**17.33**	**24.649**	**26.575**	93	**65**	**130**	*	*
65)	**Chlorobenzene**	**17.97**	**24.804**	**26.500**	94	**68**	**120**	*	*
66)	**Ethylbenzene**	**18.31**	**25.700**	**26.450**	97	**68**	**122**	*	*
67)	**m- & p-Xylenes**	**18.47**	**53.005**	**53.025**	100	**68**	**123**	*	*
68)	**Bromoform**	**18.54**	**27.983**	**26.550**	105	**69**	**130**	*	*
69)	**Styrene**	**18.79**	**26.217**	**26.475**	99	**71**	**133**	*	*
70)	**o-Xylene**	**18.89**	**26.123**	**26.450**	99	**68**	**122**	*	*
71)	**n-Nonane**	**19.06**	**25.111**	**26.475**	95	**65**	**120**	*	*
72)	**1,1,2,2-Tetrachloroethane**	**18.87**	**28.056**	**26.500**	106	**69**	**130**	*	*
74)	**Cumene**	**19.39**	**25.706**	**26.525**	97	**70**	**123**	*	*
75)	**alpha-Pinene**	**19.73**	**26.394**	**26.575**	99	**70**	**128**	*	*
76)	**n-Propylbenzene**	**19.83**	**26.851**	**26.725**	100	**69**	**125**	*	*
77)	3-Ethyltoluene	19.91	26.221	26.550	99	67	128	*	*
78)	**4-Ethyltoluene**	**19.95**	**27.516**	**26.525**	**104**	**67**	**130**	*	*
79)	**1,3,5-Trimethylbenzene**	**20.02**	**25.933**	**26.525**	**98**	**67**	**124**	*	*
80)	alpha-Methylstyrene	20.15	28.576	26.550	**108**	67	141	*	*
81)	2-Ethyltoluene	20.18	26.862	26.550	**101**	67	124	*	*
82)	**1,2,4-Trimethylbenzene**	**20.37**	**29.231**	**26.525**	**110**	**67**	**129**	*	*
83)	n-Decane	20.44	27.117	26.525	**102**	66	124	*	*
84)	**Benzyl Chloride**	**20.49**	**31.379**	**26.550**	**118**	**79**	**138**	*	*
85)	**1,3-Dichlorobenzene**	**20.51**	**30.518**	**26.475**	**115**	**65**	**136**	*	*
86)	**1,4-Dichlorobenzene**	**20.57**	**24.970**	**26.650**	**94**	**66**	**141**	*	*
87)	sec-Butylbenzene	20.60	27.044	26.550	**102**	68	125	*	*
88)	4-Isopropyltoluene (p-Cymene)	20.73	27.780	26.550	**105**	68	131	*	*
89)	1,2,3-Trimethylbenzene	20.74	27.923	26.500	**105**	68	132	*	*
90)	**1,2-Dichlorobenzene**	**20.86**	**27.231**	**26.550**	**103**	**67**	**136**	*	*
91)	**d-Limonene**	**20.86**	**29.170**	**26.550**	**110**	**71**	**134**	*	*
92)	**1,2-Dibromo-3-Chloropropane**	**21.24**	**29.153**	**26.475**	**110**	**73**	**136**	*	*
93)	n-Undecane	21.51	27.128	26.600	**102**	68	132	*	*
94)	**1,2,4-Trichlorobenzene**	**22.36**	**30.096**	**26.500**	**114**	**64**	**134**	*	*
95)	**Naphthalene**	**22.46**	**29.684**	**26.700**	**111**	**62**	**136**	*	*
96)	n-Dodecane	22.43	30.251	26.550	**114**	61	137	*	*
97)	**Hexachlorobutadiene**	**22.78**	**28.082**	**26.575**	**106**	60	133	*	*
98)	Cyclohexanone	18.61	25.350	26.575	95	64	131	*	*
99)	tert-Butylbenzene	20.37	27.638	26.500	104	67	128	*	*
100)	n-Butylbenzene	21.10	27.979	26.500	106	68	128	*	*

Bold = 75 Compound List
*** = Pass**

Evaluate Continuing Calibration Report

Data File: I:\MS16\DATA\2017 01\25\01251702.D
Acq On : 25 Jan 2017 6:04 Operator: LH
Sample : CCV R16012417 25ng
Misc : S29-01191701/S29-12301605 (1/28)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Jan 25 09:07:40 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 1/25/17

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	94	-0.02
2	T	Propene	1.728	1.573	9.0	91	0.00
3	T	Dichlorodifluoromethane (CF	3.158	2.846	9.9	85	0.00
4	T	Chloromethane	2.597	2.177	16.2	79	0.00
5	T	1,2-Dichloro-1,1,2,2-tetraf	1.755	1.621	7.6	90	0.00
6	T	Vinyl Chloride	2.470	2.564	-3.8	93	0.00
7	T	1,3-Butadiene	1.725	2.063	-19.6	99	0.00
8	T	Bromomethane	1.307	1.274	2.5	89	0.00
9	T	Chloroethane	1.029	1.012	1.7	88	0.00
10	T	Ethanol	1.182	1.150	2.7	91	-0.08
11	T	Acetonitrile	2.708	2.649	2.2	90	-0.05
12	T	Acrolein	1.039	0.896	13.8	89	-0.02
13	T	Acetone	1.187	1.173	1.2	92	-0.04
14	T	Trichlorofluoromethane	2.710	2.454	9.4	89	0.00
15	T	2-Propanol (Isopropanol)	4.054	4.015	1.0	88	-0.06
16	T	Acrylonitrile	2.004	1.948	2.8	90	-0.04
17	T	1,1-Dichloroethene	1.363	1.341	1.6	90	0.00
18	T	2-Methyl-2-Propanol (tert-B	4.253	4.165	2.1	90	-0.06
19	T	Methylene Chloride	1.488	1.429	4.0	90	-0.02
20	T	3-Chloro-1-propene (Allyl C	2.252	2.158	4.2	86	-0.01
21	T	Trichlorotrifluoroethane	1.328	1.220	8.1	89	0.00
22	T	Carbon Disulfide	5.250	5.268	-0.3	91	-0.01
23	T	trans-1,2-Dichloroethene	2.205	2.135	3.2	89	-0.01
24	T	1,1-Dichloroethane	2.763	2.603	5.8	89	-0.02
25	T	Methyl tert-Butyl Ether	4.786	4.392	8.2	89	-0.01
26	T	Vinyl Acetate	0.347	0.395	-13.8	92	-0.03
27	T	2-Butanone (MEK)	1.025	1.020	0.5	92	-0.03
28	T	cis-1,2-Dichloroethene	2.172	2.101	3.3	89	-0.02
29	T	Diisopropyl Ether	1.376	1.336	2.9	94	-0.01
30	T	Ethyl Acetate	0.584	0.657	-12.5	96	-0.02
31	T	n-Hexane	2.649	2.833	-6.9	100	0.00
32	T	Chloroform	2.753	2.574	6.5	90	-0.02
33	S	1,2-Dichloroethane-d4(SS1)	1.796	1.752	2.4	92	-0.02
34	T	Tetrahydrofuran (THF)	1.042	0.973	6.6	91	-0.01
35	T	Ethyl tert-Butyl Ether	1.817	1.753	3.5	90	-0.01
36	T	1,2-Dichloroethane	2.256	2.108	6.6	89	-0.02
37	IR	1,4-Difluorobenzene (IS2)	1.000	1.000	0.0	95	-0.01
38	T	1,1,1-Trichloroethane	0.490	0.461	5.9	90	-0.01
39	T	Isopropyl Acetate	0.210	0.226	-7.6	97	-0.01
40	T	1-Butanol	0.335	0.385	-14.9	92	-0.04
41	T	Benzene	1.276	1.189	6.8	92	-0.01
42	T	Carbon Tetrachloride	0.424	0.415	2.1	89	0.00
43	T	Cyclohexane	0.474	0.476	-0.4	91	0.00
44	T	tert-Amyl Methyl Ether	0.921	0.899	2.4	91	-0.01
45	T	1,2-Dichloropropane	0.317	0.306	3.5	92	-0.01
46	T	Bromodichloromethane	0.443	0.447	-0.9	91	-0.01
47	T	Trichloroethene	0.336	0.324	3.6	92	-0.01
48	T	1,4-Dioxane	0.256	0.263	-2.7	91	-0.01
49	T	2,2,4-Trimethylpentane (Iso	1.345	1.281	4.8	91	-0.01
50	T	Methyl Methacrylate	0.125	0.131	-4.8	92	-0.02
51	T	n-Heptane	0.308	0.304	1.3	95	-0.01
52	T	cis-1,3-Dichloropropene	0.514	0.541	-5.3	92	-0.01
53	T	4-Methyl-2-pentanone	0.307	0.316	-2.9	92	-0.01
54	T	trans-1,3-Dichloropropene	0.458	0.480	-4.8	89	-0.01

Evaluate Continuing Calibration Report

Data File: I:\MS16\DATA\2017 01\25\01251702.D
Acq On : 25 Jan 2017 6:04 Operator: LH
Sample : CCV R16012417 25ng
Misc : S29-01191701/S29-12301605 (1/28)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Jan 25 09:07:40 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
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)
55	T	1,1,2-Trichloroethane	0.297	0.290	2.4	90	0.00
56	IR	Chlorobenzene-d5 (IS3)	1.000	1.000	0.0	92	0.00
57	S	Toluene-d8 (SS2)	2.398	2.428	-1.3	94	0.00
58	T	Toluene	2.928	2.815	3.9	91	-0.01
59	T	2-Hexanone	1.804	1.863	-3.3	92	-0.01
60	T	Dibromochloromethane	0.806	0.841	-4.3	90	0.00
61	T	1,2-Dibromoethane	0.788	0.794	-0.8	90	0.00
62	T	n-Butyl Acetate	1.942	2.051	-5.6	92	-0.01
63	T	n-Octane	0.643	0.656	-2.0	93	0.00
64	T	Tetrachloroethene	0.794	0.777	2.1	91	0.00
65	T	Chlorobenzene	1.930	1.895	1.8	90	0.00
66	T	Ethylbenzene	3.294	3.358	-1.9	90	0.00
67	T	m- & p-Xylenes	2.563	2.708	-5.7	90	-0.01
68	T	Bromoform	0.656	0.732	-11.6	90	0.00
69	T	Styrene	1.989	2.057	-3.4	89	0.00
70	T	o-Xylene	2.637	2.751	-4.3	90	0.00
71	T	n-Nonane	1.588	1.597	-0.6	92	0.00
72	T	1,1,2,2-Tetrachloroethane	1.236	1.428	-15.5	92	0.00
73	S	Bromofluorobenzene (SS3)	0.766	0.745	2.7	88	0.00
74	T	Cumene	3.281	3.320	-1.2	89	0.00
75	T	alpha-Pinene	1.722	1.787	-3.8	89	0.00
76	T	n-Propylbenzene	3.866	4.083	-5.6	90	0.00
77	T	3-Ethyltoluene	3.323	3.438	-3.5	87	0.00
78	T	4-Ethyltoluene	2.915	3.143	-7.8	91	0.00
79	T	1,3,5-Trimethylbenzene	2.710	2.777	-2.5	89	0.00
80	T	alpha-Methylstyrene	1.349	1.500	-11.2	86	0.00
81	T	2-Ethyltoluene	3.112	3.266	-4.9	89	0.00
82	T	1,2,4-Trimethylbenzene	2.671	3.158	-18.2	90	0.00
83	T	n-Decane	1.544	1.640	-6.2	91	0.00
84	T	Benzyl Chloride	2.173	2.716	-25.0	88	0.00
85	T	1,3-Dichlorobenzene	1.341	1.641	-22.4	88	0.00
86	T	1,4-Dichlorobenzene	1.592	1.609	-1.1	88	0.00
87	T	sec-Butylbenzene	3.465	3.690	-6.5	89	0.00
88	T	4-Isopropyltoluene (p-Cymen	3.321	3.708	-11.7	89	0.00
89	T	1,2,3-Trimethylbenzene	2.849	3.171	-11.3	90	0.00
90	T	1,2-Dichlorobenzene	1.500	1.672	-11.5	90	0.00
91	T	d-Limonene	1.145	1.330	-16.2	90	0.00
92	T	1,2-Dibromo-3-Chloropropane	0.499	0.571	-14.4	90	0.00
93	T	n-Undecane	1.623	1.743	-7.4	93	0.00
94	T	1,2,4-Trichlorobenzene	0.964	1.206	-25.1	90	0.00
95	T	Naphthalene	2.928	3.688	-26.0	92	0.00
96	T	n-Dodecane	1.449	1.730	-19.4	99	0.00
97	T	Hexachlorobutadiene	0.674	0.726	-7.7	87	0.00
98	T	Cyclohexanone	1.108	1.115	-0.6	90	-0.01
99	T	tert-Butylbenzene	2.624	2.897	-10.4	89	0.00
100	T	n-Butylbenzene	2.815	3.122	-10.9	90	0.00

(#) = Out of Range SPCC's out = 0 CCC's out = 0

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\25\01251702.D
Acq On : 25 Jan 2017 6:04 Operator: LH
Sample : CCV R16012417 25ng
Misc : S29-01191701/S29-12301605 (1/28)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Jan 25 09:07:40 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 1/25/17

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.56	130	281220	12.500	ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.66	114	1381278	12.500	ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.93	82	590137	12.500	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.41	65	492707	12.196	ng	-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 97.60%			
57) Toluene-d8 (SS2)	16.10	98	1432667	12.653	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 101.20%			
73) Bromofluorobenzene (SS3)	19.28	174	439806	12.168	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 97.36%			
Target Compounds						Qvalue
2) Propene	4.19	42	916694	23.579	ng	99
3) Dichlorodifluoromethan...	4.36	85	1676208	23.594	ng	100
4) Chloromethane	4.68	50	1230824	21.062	ng	100
5) 1,2-Dichloro-1,1,2,2-t...	4.95	135	916398	23.212	ng	100
6) Vinyl Chloride	5.13	62	1475451	26.548	ng	100
7) 1,3-Butadiene	5.42	54	1226592	31.611	ng	99
8) Bromomethane	5.90	94	711368	24.188	ng	100
9) Chloroethane	6.25	64	574573	24.810	ng	100
10) Ethanol	6.68	45	3368724	126.667	ng	100
11) Acetonitrile	6.94	41	1558487	25.584	ng	99
12) Acrolein	7.12	56	524388	22.439	ng	93
13) Acetone	7.34	58	3505620	131.277	ng	97
14) Trichlorofluoromethane	7.58	101	1447676	23.743	ng	100
15) 2-Propanol (Isopropanol)	7.88	45	4753337	52.117	ng	100
16) Acrylonitrile	8.15	53	1155998	25.638	ng	100
17) 1,1-Dichloroethene	8.58	96	798965	26.064	ng	100
18) 2-Methyl-2-Propanol (t...	8.77	59	4952165	51.758	ng	99
19) Methylene Chloride	8.82	84	849575	25.376	ng	99
20) 3-Chloro-1-propene (Al...	8.98	41	1277016	25.207	ng	99
21) Trichlorotrifluoroethane	9.22	151	719582	24.084	ng	99
22) Carbon Disulfide	9.09	76	3143640	26.617	ng	99
23) trans-1,2-Dichloroethene	10.10	61	1281306	25.834	ng	100
24) 1,1-Dichloroethane	10.36	63	1493200	24.025	ng	100
25) Methyl tert-Butyl Ether	10.43	73	2633045	24.455	ng	99
26) Vinyl Acetate	10.60	86	1170813	149.880	ng	99
27) 2-Butanone (MEK)	10.85	72	601993	26.112	ng	99
28) cis-1,2-Dichloroethene	11.37	61	1257156	25.730	ng	100
29) Diisopropyl Ether	11.64	87	797765	25.774	ng	97
30) Ethyl Acetate	11.66	61	786292	59.870	ng	100
31) n-Hexane	11.64	57	1693547	28.418	ng	100
32) Chloroform	11.73	83	1531504	24.723	ng	100
34) Tetrahydrofuran (THF)	12.12	72	581303	24.787	ng	100
35) Ethyl tert-Butyl Ether	12.24	87	1041905	25.484	ng	100
36) 1,2-Dichloroethane	12.52	62	1247558	24.581	ng	100
38) 1,1,1-Trichloroethane	12.79	97	1368380	25.289	ng	100
39) Isopropyl Acetate	13.20	61	1314677	56.737	ng	97
40) 1-Butanol	13.23	56	2239809	60.437	ng	100
41) Benzene	13.27	78	3455815	24.503	ng	100
42) Carbon Tetrachloride	13.43	117	1208608	25.802	ng	100
43) Cyclohexane	13.56	84	2803159	53.465	ng	99
44) tert-Amyl Methyl Ether	13.89	73	2617604	25.726	ng	99
45) 1,2-Dichloropropane	14.12	63	897254	25.583	ng	100
46) Bromodichloromethane	14.32	83	1315850	26.891	ng	100
47) Trichloroethene	14.36	130	947980	25.570	ng	100
48) 1,4-Dioxane	14.33	88	770667	27.258	ng	99
49) 2,2,4-Trimethylpentane...	14.41	57	3747669	25.221	ng	99

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\25\01251702.D
Acq On : 25 Jan 2017 6:04 Operator: LH
Sample : CCV R16012417 25ng
Misc : S29-01191701/S29-12301605 (1/28)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Jan 25 09:07:40 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

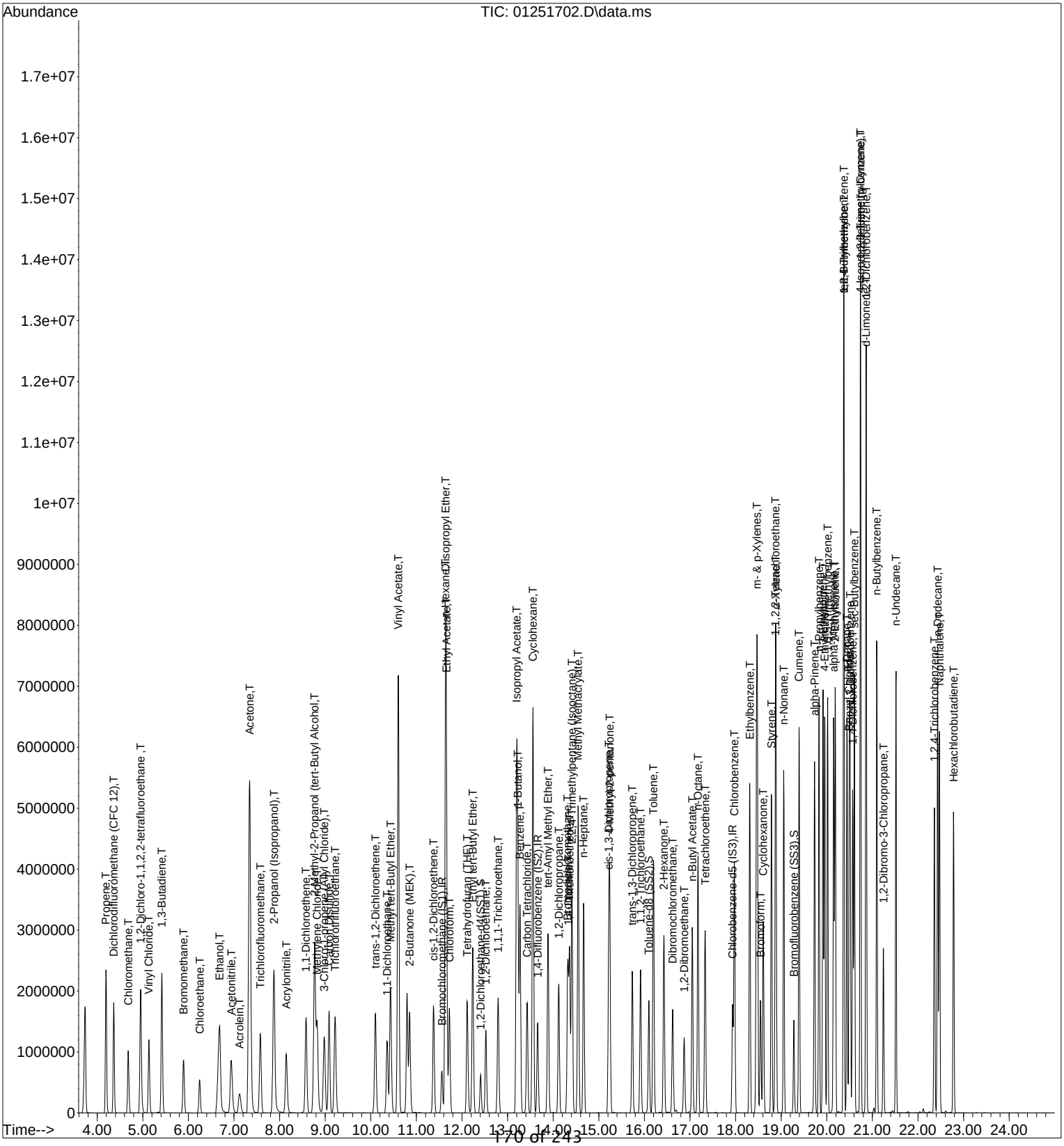
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	14.55	100	762796	55.163 ng	97
51) n-Heptane	14.67	71	892701	26.247 ng	99
52) cis-1,3-Dichloropropene	15.22	75	1666374	29.346 ng	100
53) 4-Methyl-2-pentanone	15.24	58	923930	27.279 ng	100
54) trans-1,3-Dichloropropene	15.73	75	1410774	27.866 ng	100
55) 1,1,2-Trichloroethane	15.92	97	851361	25.932 ng	99
58) Toluene	16.20	91	3497955	25.301 ng	100
59) 2-Hexanone	16.43	43	2332843	27.395 ng	99
60) Dibromochloromethane	16.62	129	1054646	27.706 ng	100
61) 1,2-Dibromoethane	16.87	107	990001	26.596 ng	100
62) n-Butyl Acetate	17.05	43	2575658	28.098 ng	100
63) n-Octane	17.17	57	818678	26.954 ng	99
64) Tetrachloroethene	17.33	166	973423	25.982 ng	100
65) Chlorobenzene	17.97	112	2373079	26.046 ng	99
66) Ethylbenzene	18.31	91	4181560	26.890 ng	100
67) m- & p-Xylenes	18.47	91	6785509	56.084 ng	100
68) Bromoform	18.55	173	918875	29.659 ng	100
69) Styrene	18.79	104	2575942	27.436 ng	100
70) o-Xylene	18.89	91	3421667	27.486 ng	100
71) n-Nonane	19.06	43	1986351	26.496 ng	99
72) 1,1,2,2-Tetrachloroethane	18.87	83	1779582	30.495 ng	100
74) Cumene	19.39	105	4114340	26.564 ng	100
75) alpha-Pinene	19.73	93	2201668	27.082 ng	99
76) n-Propylbenzene	19.83	91	5122473	28.064 ng	100
77) 3-Ethyltoluene	19.92	105	4260730	27.161 ng	100
78) 4-Ethyltoluene	19.95	105	3891474	28.280 ng	100
79) 1,3,5-Trimethylbenzene	20.02	105	3438317	26.873 ng	100
80) alpha-Methylstyrene	20.15	118	1858602	29.191 ng	99
81) 2-Ethyltoluene	20.18	105	4093169	27.861 ng	100
82) 1,2,4-Trimethylbenzene	20.38	105	3920678	31.091 ng	99
83) n-Decane	20.44	57	2038340	27.968 ng	99
84) Benzyl Chloride	20.49	91	3401239	33.156 ng	100
85) 1,3-Dichlorobenzene	20.51	146	2048902	32.352 ng	100
86) 1,4-Dichlorobenzene	20.57	146	2009665	26.741 ng	100
87) sec-Butylbenzene	20.61	105	4590708	28.059 ng	100
88) 4-Isopropyltoluene (p-...	20.74	119	4494701	28.669 ng	99
89) 1,2,3-Trimethylbenzene	20.74	105	3843550	28.574 ng	99
90) 1,2-Dichlorobenzene	20.86	146	2088132	29.481 ng	100
91) d-Limonene	20.86	68	1640146	30.345 ng	99
92) 1,2-Dibromo-3-Chloropr...	21.24	157	709212	30.076 ng	99
93) n-Undecane	21.52	57	2168133	28.295 ng	99
94) 1,2,4-Trichlorobenzene	22.36	180	1484008	32.609 ng	100
95) Naphthalene	22.47	128	4714440	34.106 ng	100
96) n-Dodecane	22.43	57	2134232	31.190 ng	99
97) Hexachlorobutadiene	22.78	225	907474	28.536 ng	100
98) Cyclohexanone	18.60	55	1389869	26.578 ng	99
99) tert-Butylbenzene	20.38	119	3594120	29.009 ng	100
100) n-Butylbenzene	21.10	91	3891779	29.287 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 01\25\01251702.D
Acq On : 25 Jan 2017 6:04 Operator: LH
Sample : CCV R16012417 25ng
Misc : S29-01191701/S29-12301605 (1/28)
ALS Vial : 2 Sample Multiplier: 1

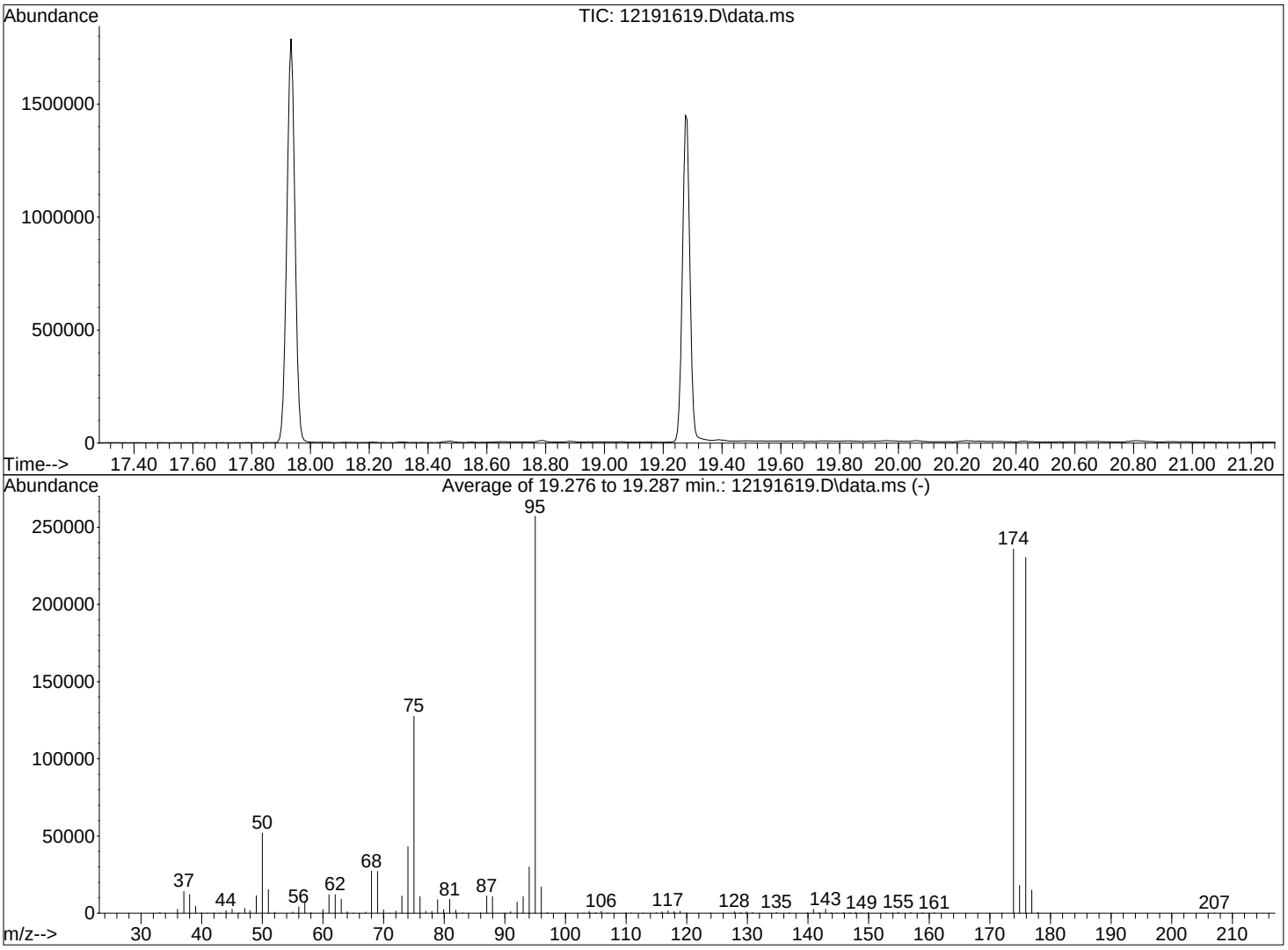
Quant Time: Jan 25 09:07:40 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Data Path : I:\MS16\DATA\2016 12\19\
Data File : 12191619.D
Acq On : 19 Dec 2016 23:25
Operator : LH
Sample : 12.5ng TO-15 BFB
Misc : S29-12061601
ALS Vial : 2 Sample Multiplier: 1

Integration File: LSCINT.P

Method : I:\MS16\METHODS\R16121916.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue Dec 20 08:56:53 2016



AutoFind: Scans 2853, 2854, 2855; Background Corrected with Scan 2844

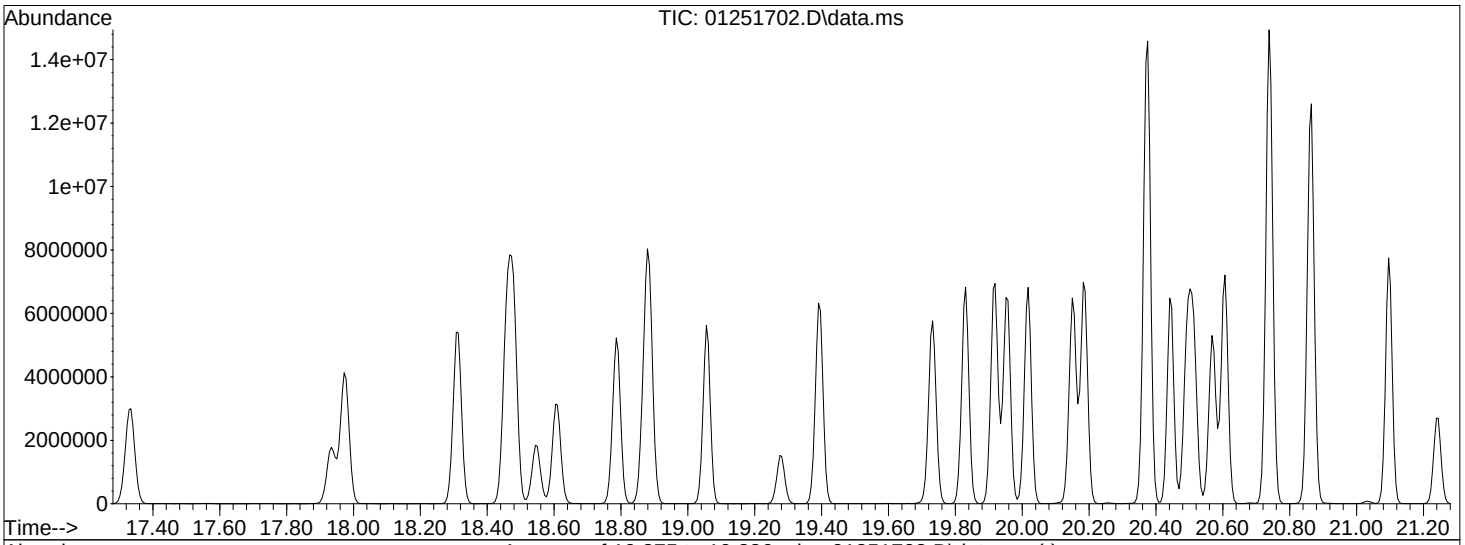
Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	20.2	51872	PASS
75	95	30	66	49.6	127557	PASS
95	95	100	100	100.0	257173	PASS
96	95	5	9	6.6	17067	PASS
173	174	0.00	2	0.0	0	PASS
174	95	50	120	91.7	235883	PASS
175	174	4	9	7.6	17991	PASS
176	174	93	101	97.7	230443	PASS
177	176	5	9	6.5	15000	PASS

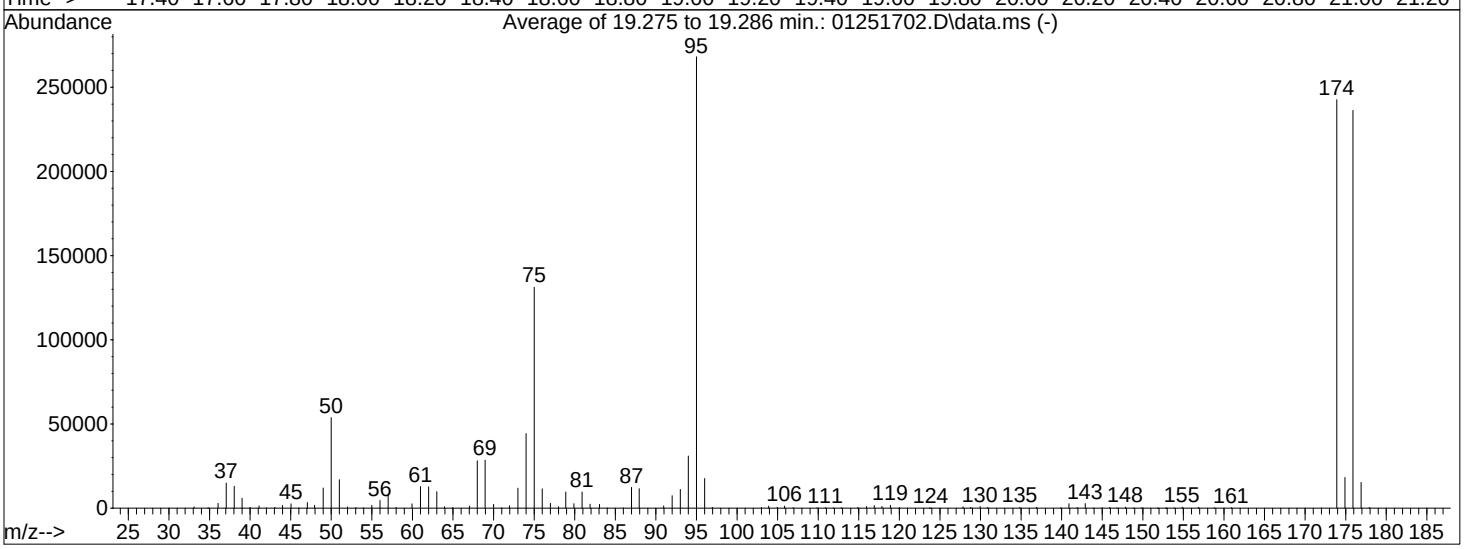
LH 12/20/16

Data Path : I:\MS16\DATA\2017 01\25\
Data File : 01251702.D
Acq On : 25 Jan 2017 6:04
Operator : LH
Sample : CCV R16012417 25ng
Misc : S29-01191701/S29-12301605 (1/28)
ALS Vial : 2 Sample Multiplier: 1

Integration File: LSCINT.P

Method : I:\MS16\METHODS\R16121916.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue Dec 20 10:31:33 2016





AutoFind: Scans 2853, 2854, 2855; Background Corrected with Scan 2844

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	20.1	53771	PASS
75	95	30	66	49.0	131240	PASS
95	95	100	100	100.0	268096	PASS
96	95	5	9	6.6	17613	PASS
173	174	0.00	2	0.0	0	PASS
174	95	50	120	90.5	242603	PASS
175	174	4	9	7.5	18278	PASS
176	174	93	101	97.4	236224	PASS
177	176	5	9	6.5	15293	PASS

LH 1/25/17

Injection Log

Directory: J:\MS16\DATA\2016_12\19\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	12/19/16 8:58	12191601.D	Blank (100mL)	S29-12061601	LH	2	
2	12/19/16 10:27	12191602.D	Blank (100mL)	S29-12061601	LH	2	
3	12/19/16 11:01	12191603.D	0.1ng std check	S29-12061601/S29-11301611 (12/29)	LH	6	
4	12/19/16 12:03	12191604.D	Blank (100mL)	S29-12061601	LH	2	
5	12/19/16 12:36	12191605.D	Blank (100mL)	S29-12061601	LH	2	
6	12/19/16 13:09	12191606.D	Blank (100mL)	S29-12061601	LH	2	
7	12/19/16 13:43	12191607.D	Blank (100mL)	S29-12061601	LH	2	
8	12/19/16 17:19	12191608.D	1.0ng std check	S29-12061601/S29-12191607 (1/17)	LH	8	
9	12/19/16 17:52	12191609.D	5.0ng std check	S29-12061601/S29-12191605 (1/17)	LH	9	
10	12/19/16 18:26	12191610.D	25ng std check	S29-12061601/S29-12191605 (1/17)	LH	2	
11	12/19/16 18:59	12191611.D	12.5ng TO-15 BFB	S29-12061601	LH	2	
12	12/19/16 19:32	12191612.D	0.5ng MAPH ICAL STD	S29-12061601/S29-10281604 (12/25)	LH	7	
13	12/19/16 20:05	12191613.D	1.0ng MAPH ICAL STD	S29-12061601/S29-10281604 (12/25)	LH	7	
14	12/19/16 20:39	12191614.D	5.0ng MAPH ICAL STD	S29-12061601/S29-10281604 (12/25)	LH	7	
15	12/19/16 21:12	12191615.D	25ng MAPH ICAL STD	S29-12061601/S29-10281603 (12/25)	LH	4	
16	12/19/16 21:45	12191616.D	50ng MAPH ICAL STD	S29-12061601/S29-10281603 (12/25)	LH	4	
17	12/19/16 22:18	12191617.D	100ng MAPH ICAL STD	S29-12061601/S29-10281603 (12/25)	LH	4	
18	12/19/16 22:52	12191618.D	25ng MAPH ICV STD	S29-12061601/S29-12011603 (12/30)	LH	2	
19	12/19/16 23:25	12191619.D	12.5ng TO-15 BFB	S29-12061601	LH	2	
20	12/19/16 23:59	12191620.D	0.08ng TO-15 ICAL STD	S29-12061601/S29-12191607 (1/17)	LH	8	
21	12/20/16 0:33	12191621.D	0.1ng TO-15 ICAL STD	S29-12061601/S29-12191607 (1/17)	LH	8	
22	12/20/16 1:06	12191622.D	0.2ng TO-15 ICAL STD	S29-12061601/S29-12191607 (1/17)	LH	8	
23	12/20/16 1:39	12191623.D	0.4ng TO-15 ICAL STD	S29-12061601/S29-12191607 (1/17)	LH	8	
24	12/20/16 2:13	12191624.D	1.0ng TO-15 ICAL STD	S29-12061601/S29-12191605 (1/17)	LH	9	
25	12/20/16 2:46	12191625.D	5.0ng TO-15 ICAL STD	S29-12061601/S29-12191605 (1/17)	LH	9	
26	12/20/16 3:19	12191626.D	25ng TO-15 ICAL STD	S29-12061601/S29-12191603 (1/17)	LH	2	
27	12/20/16 3:52	12191627.D	50ng TO-15 ICAL STD	S29-12061601/S29-12191603 (1/17)	LH	2	
28	12/20/16 4:25	12191628.D	100ng TO-15 ICAL STD	S29-12061601/S29-12191603 (1/17)	LH	2	
29	12/20/16 4:58	12191629.D	25ng TO-15 ICV STD	S29-12061601/S29-12011603 (12/30)	LH	2	
30	12/20/16 5:32	12191630.D	Blank (100mL)	S29-12061601	LH	2	
	ICAL passed for all compounds 0.08ng-100ng, except: propene, methylene chloride 0.2ng-100ng, dichlorodifluoromethane,						
	chloromethane 0.1ng-100ng, acetonitrile, carbon disulfide, benzyl chloride, 1,2-dibromo-3-chloropropane, naphthalene 0.4ng-100ng,						
	vinyl chloride 2.0ng-500ng.						
				LH 12/21/16			
##							

Injection Log

Directory: I:\MS16\DATA\2017_01\25\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	1/25/17 5:31	01251701.D	CCV M16012517_25ng	S29-01191701/S29-12271603 (2/23)	LH	3	passed
2	1/25/17 6:04	01251702.D	CCV R16012517_25ng	S29-01191701/S29-12301605 (1/28)	LH	2	passed
3	1/25/17 6:38	01251703.D	Lab air_012517 (1000mL)	S29-01191701	LH	6	
4	1/25/17 7:12	01251704.D	MB R16012517_1000mL	S29-01191701 AC00442	LH	2	passed
5	1/25/17 7:44	01251705.D	LCS R16012517_25ng	S29-01191701/S29-01171713 (2/15)	LH	2	passed
6	1/25/17 8:18	01251706.D	LCSD R16012517_25ng	S29-01191701/S29-01171713 (2/15)	LH	2	passed
7	1/25/17 9:35	01251707.D	P1700214-001 (1000mL)	S29-01191701	LH	10	
8	1/25/17 11:16	01251708.D	P1700297-001 (400mL)	S29-01191701	LH	11	
9	1/25/17 11:49	01251709.D	P1700297-002 (400mL)	S29-01191701	LH	12	
10	1/25/17 12:27	01251710.D	P1700320-001 (0.2mL)	S29-01191701	LH	1	over diluted
11	1/25/17 13:06	01251711.D	P1700320-001 (0.35mL)	S29-01191701	LH	1	
12	1/25/17 13:40	01251712.D	P1700320-002 (0.3mL)	S29-01191701	LH	1	
13	1/25/17 14:14	01251713.D	P1700320-003 (0.4mL)	S29-01191701	LH	1	
14	1/25/17 14:47	01251714.D	P1700320-004 (0.8mL)	S29-01191701	LH	1	
15	1/25/17 15:20	01251715.D	P1700320-005 (0.4mL)	S29-01191701	LH	1	
16	1/25/17 16:23	01251716.D	P1700308-001 (20mL)	S29-01191701	LH	8	over diluted
17	1/25/17 17:12	01251717.D	P1700324-001 (1000mL)	S29-01191701	LH	4	
18	1/25/17 17:46	01251718.D	P1700324-002 (1000mL)	S29-01191701	LH	5	
19	1/25/17 18:20	01251719.D	P1700324-002dup (1000mL)	S29-01191701	LH	5	passed
20	1/25/17 18:53	01251720.D	P1700324-003 (1000mL)	S29-01191701	LH	6	
21	1/25/17 19:27	01251721.D	P1700324-004 (1000mL)	S29-01191701	LH	7	
22	1/25/17 20:01	01251722.D	P1700308-001 (400mL)	S29-01191701	LH	8	
23	1/25/17 20:34	01251723.D	P1700311-001 (400mL)	S29-01191701	LH	9	
24	1/25/17 21:07	01251724.D	P1700311-002 (400mL)	S29-01191701	LH	10	

LH 1/26/17

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\25\01251723.D Vial: 5
Acq On : 26 Jan 2017 2:34 Operator: CL
Sample : P1700214-001 (500mL) Inst : MS19
Misc : S29-12201602

Quant Time: Jan 26 07:20:05 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:47:58 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 1/26/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.77	130	40918	1000.000 pg	-0.01
25) 1,4-Difluorobenzene (IS2)	11.71	114	179140	1000.000 pg	-0.01
38) Chlorobenzene-d5 (IS3)	16.05	54	28477	1000.000 pg	0.00

System Monitoring Compounds					
20) 1,2-Dichloroethane-d4 ...	10.54	65	63413	894.851 pg	-0.01
Spiked Amount 1000.000	Range 70 - 130		Recovery = 89.48%		
33) Toluene-d8 (SS2)	14.15	98	179037	1006.127 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 100.61%		
45) Bromofluorobenzene (SS3)	17.56	174	53755	1031.843 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 103.18%		

Target Compounds						Qvalue
2) Dichlorodifluoromethan...	4.40	85	38502	372.465 pg		100
3) Chloromethane	4.66	52	3012	97.802 pg		93
4) 1,2-Dichloro,1,1,2,2-t...	4.81	85	804	N.D.		
5) Vinyl Chloride	0.00	62	0	N.D.		
6) 1,3-Butadiene	0.00	54	0	N.D.		
7) Bromomethane	0.00	94	0	N.D.		
8) Chloroethane	5.73	64	82	N.D.		
9) Acrolein	0.00	56	0	N.D.		
10) Acetone	6.43	58	23669	847.580 pg	#	88
11) Trichlorofluoromethane	6.63	101	4070	57.566 pg		98
12) 1,1-Dichloroethene	7.36	96	226	N.D.		
13) Methylene Chloride	7.50	84	5739	119.395 pg		97
14) Trichlorotrifluoroethane	7.81	151	218	N.D.		
15) trans-1,2-Dichloroethene	0.00	96	0	N.D.		
16) 1,1-Dichloroethane	0.00	63	0	N.D.		
17) Methyl tert-Butyl Ether	8.74	73	120	N.D.		
18) cis-1,2-Dichloroethene	9.61	96	4895	97.685 pg		97
19) Chloroform	9.90	83	3672	41.217 pg		98
21) 1,2-Dichloroethane	0.00	62	0	N.D.		
22) 1,1,1-Trichloroethane	0.00	97	0	N.D.		
23) Benzene	11.37	78	4140	21.092 pg		98
24) Carbon Tetrachloride	11.53	117	355	N.D.		
26) 1,2-Dichloropropane	0.00	63	0	N.D.		
27) Bromodichloromethane	12.42	83	70	N.D.		
28) Trichloroethene	12.42	130	7865	168.869 pg		99
29) 1,4-Dioxane	0.00	88	0	N.D.		
30) cis-1,3-Dichloropropene	0.00	75	0	N.D.		
31) trans-1,3-Dichloropropene	0.00	75	0	N.D.		
32) 1,1,2-Trichloroethane	0.00	83	0	N.D.		
34) Toluene	14.25	91	7949	47.827 pg		99
35) Dibromochloromethane	0.00	129	0	N.D.		
36) 1,2-Dibromoethane	0.00	107	0	N.D.		
37) Tetrachloroethene	15.40	166	5929936	122795.420 pg		99
39) Chlorobenzene	16.10	112	145	N.D.		
40) Ethylbenzene	16.49	91	537	N.D.		
41) m,p-Xylene	16.66	91	1346	N.D.		
42) Styrene	17.03	104	205	N.D.		
43) o-Xylene	17.13	106	252	N.D.		
44) 1,1,2,2-Tetrachloroethane	17.12	83	139	N.D.		
46) 1,3,5-Trimethylbenzene	18.38	105	172	N.D.		
47) 1,2,4-Trimethylbenzene	18.78	105	565	N.D.		
48) 1,3-Dichlorobenzene	18.93	146	70	N.D.		
49) 1,4-Dichlorobenzene	18.99	146	111	N.D.		
50) 1,2-Dichlorobenzene	19.32	146	159	N.D.		
51) 1,2-Dibromo-3-chloropr...	0.00	157	0	N.D.		
52) 1,2,4-Trichlorobenzene	20.96	182	109	N.D.		
53) Naphthalene	21.05	128	216	N.D.		

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\25\01251723.D Vial: 5
Acq On : 26 Jan 2017 2:34 Operator: CL
Sample : P1700214-001 (500mL) Inst : MS19
Misc : S29-12201602

Quant Time: Jan 26 07:20:05 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:47:58 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

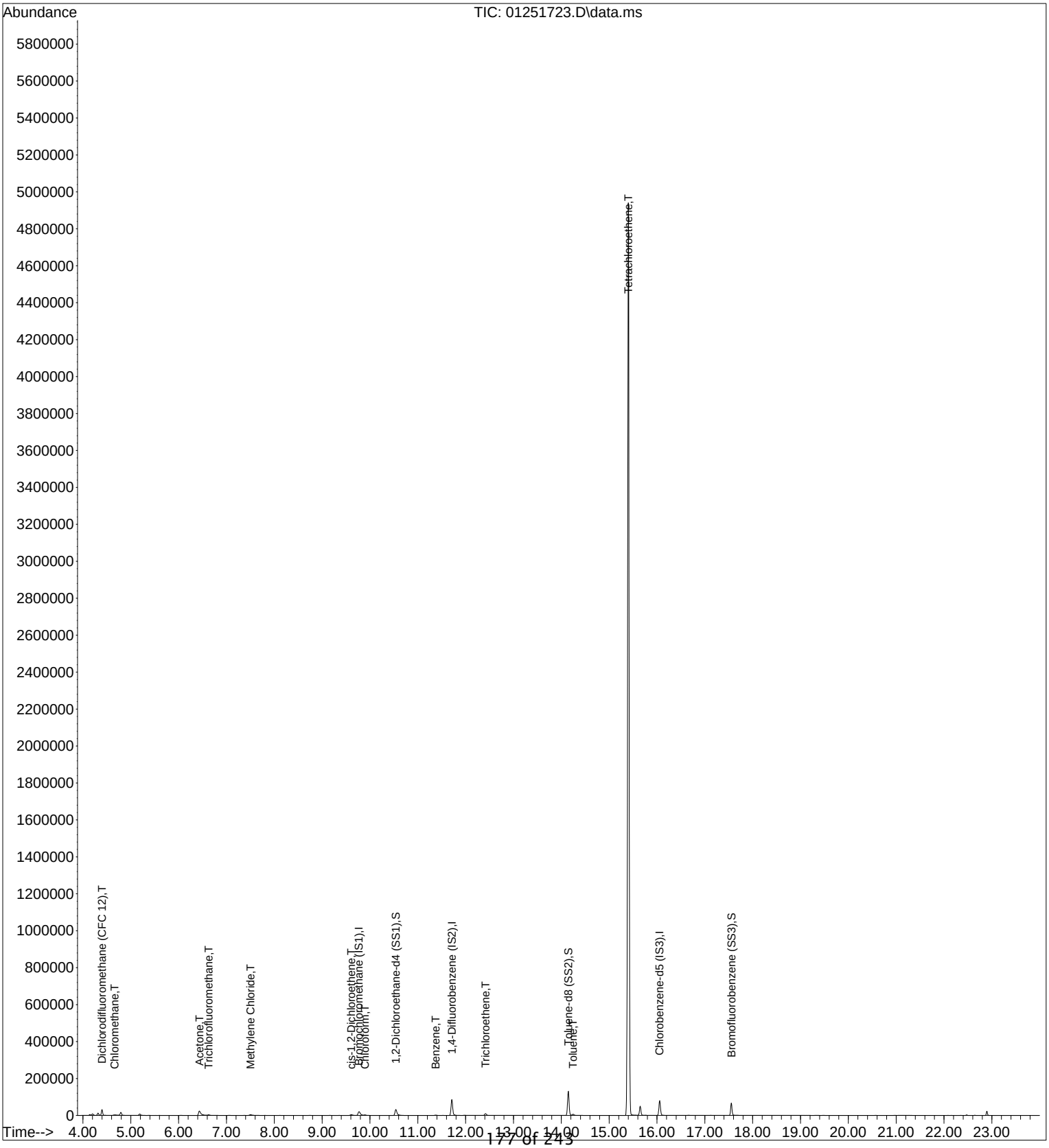
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	0.00	225	0	N.D.	

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\25\01251723.D Vial: 5
Acq On : 26 Jan 2017 2:34 Operator: CL
Sample : P1700214-001 (500mL) Inst : MS19
Misc : S29-12201602

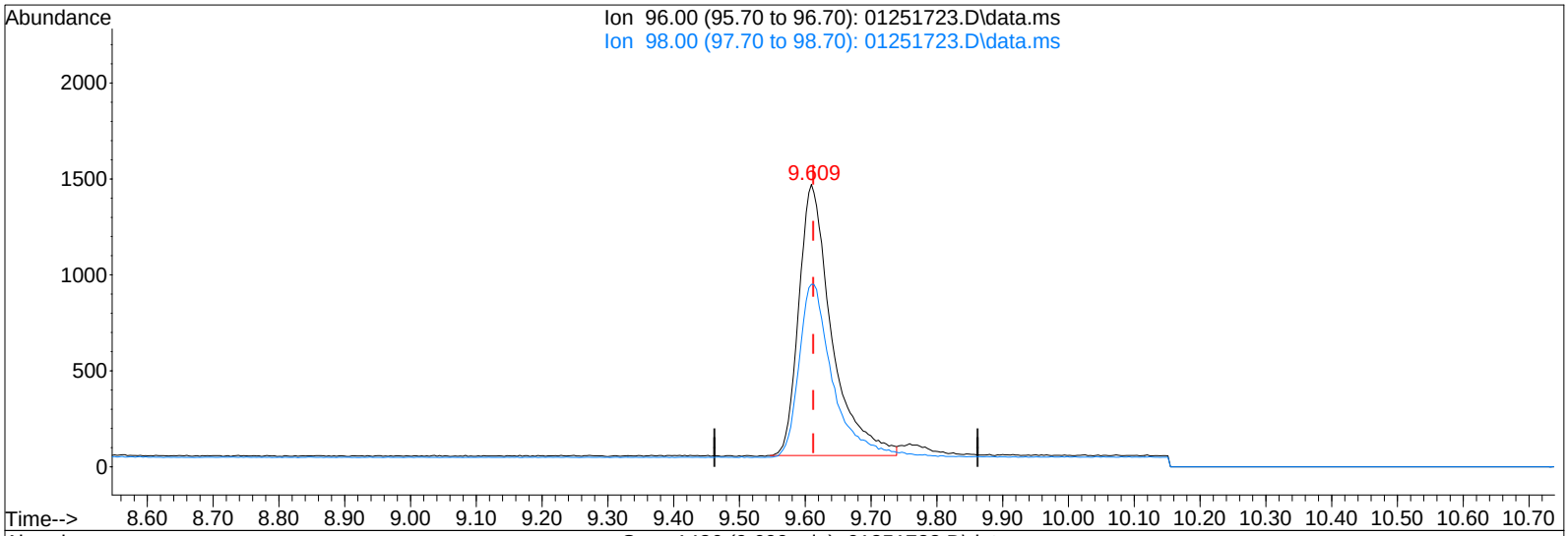
Quant Time: Jan 26 07:20:05 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:47:58 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

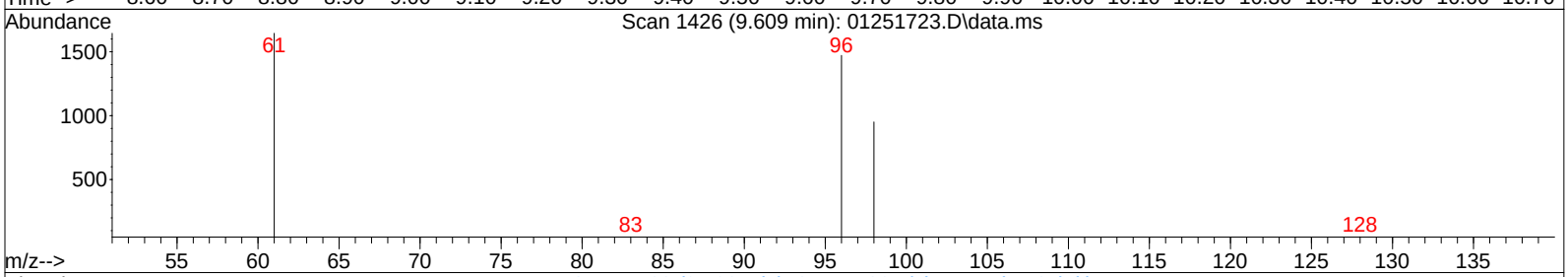


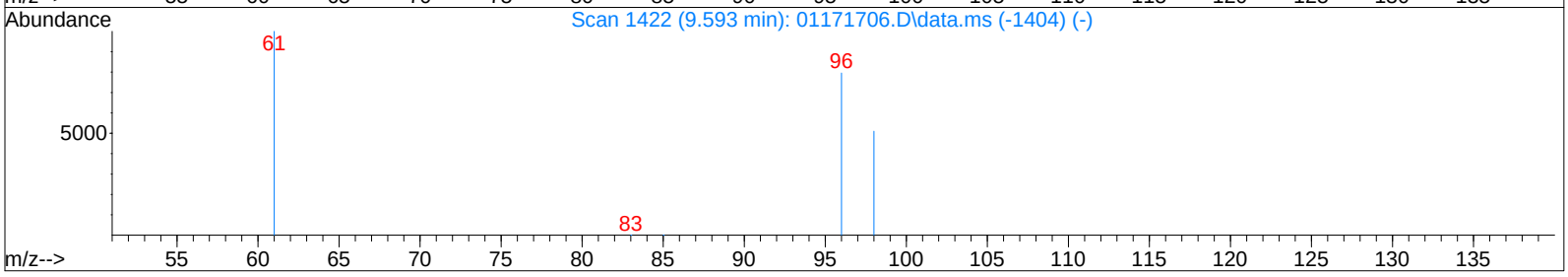
Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 01\25\01251723.D Vial: 5
Acq On : 26 Jan 2017 2:34 Operator: CL
Sample : P1700214-001 (500mL) Inst : MS19
Misc : S29-12201602

Quant Time: Jan 26 07:20:05 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:47:58 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M







TIC: 01251723.D\data.ms

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

9.609min (-0.003) 97.68pg

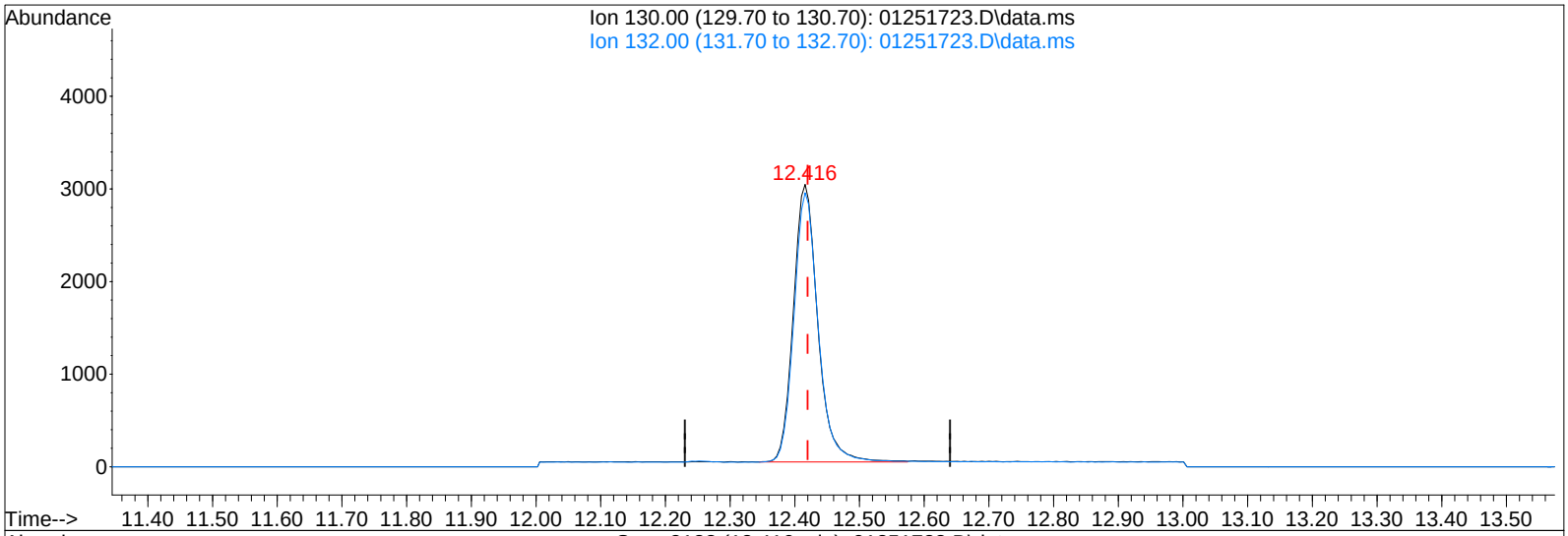
response 4895

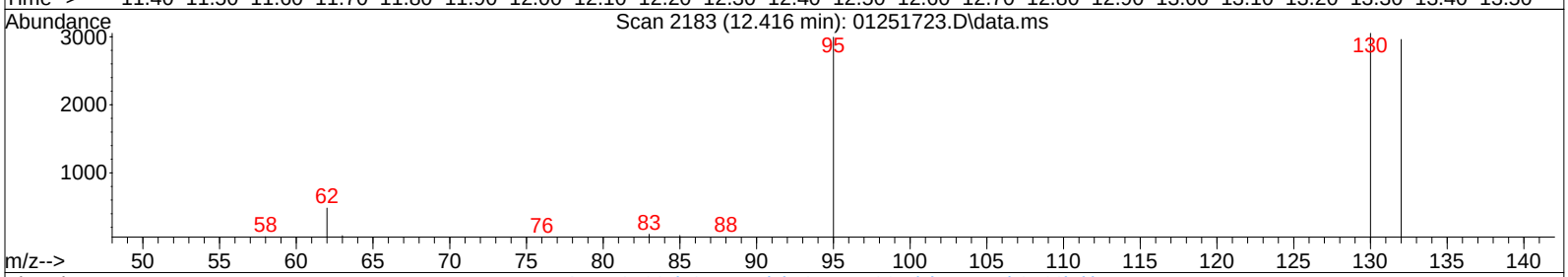
Ion	Exp%	Act%
96.00	100	100
98.00	63.80	66.15
0.00	0.00	0.00
0.00	0.00	0.00

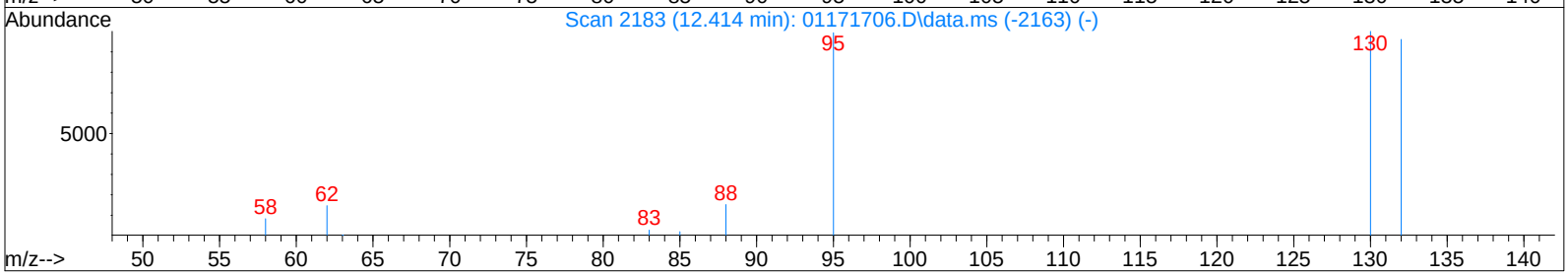
Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 01\25\01251723.D Vial: 5
Acq On : 26 Jan 2017 2:34 Operator: CL
Sample : P1700214-001 (500mL) Inst : MS19
Misc : S29-12201602

Quant Time: Jan 26 07:20:05 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:47:58 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M







TIC: 01251723.D\data.ms

(28) Trichloroethene (T)

12.416min (-0.004) 168.87pg

response 7865

Ion	Exp%	Act%
130.00	100	100
132.00	95.40	96.43
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\25\01251724.D Vial: 5
Acq On : 26 Jan 2017 3:05 Operator: CL
Sample : P1700214-001dil (50mL) Inst : MS19
Misc : S29-12201602

Quant Time: Jan 26 07:20:06 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:47:58 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 1/26/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.79	130	37650	1000.000 pg	0.00
25) 1,4-Difluorobenzene (IS2)	11.72	114	159314	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.06	54	24820	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.55	65	58266	893.587 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 89.36%		
33) Toluene-d8 (SS2)	14.15	98	159790	1009.714 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 100.97%		
45) Bromofluorobenzene (SS3)	17.56	174	42562	937.367 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 93.74%		

Target Compounds

						Qvalue
2) Dichlorodifluoromethan...	4.45	85	3521	37.018 pg		100
3) Chloromethane	0.00	52	0	N.D.		
4) 1,2-Dichloro,1,1,2,2-t...	4.84	85	161	N.D.		
5) Vinyl Chloride	0.00	62	0	N.D.		
6) 1,3-Butadiene	0.00	54	0	N.D.		
7) Bromomethane	0.00	94	0	N.D.		
8) Chloroethane	0.00	64	0	N.D.		
9) Acrolein	0.00	56	0	N.D.		
10) Acetone	6.49	58	3136	122.047 pg	#	78
11) Trichlorofluoromethane	6.66	101	387	N.D.		
12) 1,1-Dichloroethene	0.00	96	0	N.D.		
13) Methylene Chloride	7.53	84	623	N.D.		
14) Trichlorotrifluoroethane	0.00	151	0	N.D.		
15) trans-1,2-Dichloroethene	0.00	96	0	N.D.		
16) 1,1-Dichloroethane	0.00	63	0	N.D.		
17) Methyl tert-Butyl Ether	0.00	73	0	N.D.		
18) cis-1,2-Dichloroethene	9.62	96	431	N.D.		
19) Chloroform	9.91	83	1066	N.D.		
21) 1,2-Dichloroethane	0.00	62	0	N.D.		
22) 1,1,1-Trichloroethane	0.00	97	0	N.D.		
23) Benzene	11.38	78	1492	N.D.		
24) Carbon Tetrachloride	11.54	117	66	N.D.		
26) 1,2-Dichloropropane	0.00	63	0	N.D.		
27) Bromodichloromethane	0.00	83	0	N.D.		
28) Trichloroethene	12.42	130	678	N.D.		
29) 1,4-Dioxane	0.00	88	0	N.D.		
30) cis-1,3-Dichloropropene	0.00	75	0	N.D.		
31) trans-1,3-Dichloropropene	0.00	75	0	N.D.		
32) 1,1,2-Trichloroethane	0.00	83	0	N.D.		
34) Toluene	14.25	91	815	N.D.		
35) Dibromochloromethane	0.00	129	0	N.D.		
36) 1,2-Dibromoethane	0.00	107	0	N.D.		
37) Tetrachloroethene	15.40	166	440845	10264.947 pg		98
39) Chlorobenzene	16.11	112	50	N.D.		
40) Ethylbenzene	0.00	91	0	N.D.		
41) m,p-Xylene	16.67	91	134	N.D.		
42) Styrene	0.00	104	0	N.D.		
43) o-Xylene	0.00	106	0	N.D.		
44) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.		
46) 1,3,5-Trimethylbenzene	0.00	105	0	N.D.		
47) 1,2,4-Trimethylbenzene	0.00	105	0	N.D.		
48) 1,3-Dichlorobenzene	0.00	146	0	N.D.		
49) 1,4-Dichlorobenzene	0.00	146	0	N.D.		
50) 1,2-Dichlorobenzene	0.00	146	0	N.D.		
51) 1,2-Dibromo-3-chloropr...	0.00	157	0	N.D.		
52) 1,2,4-Trichlorobenzene	0.00	182	0	N.D.		
53) Naphthalene	0.00	128	0	N.D.		

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\25\01251724.D Vial: 5
Acq On : 26 Jan 2017 3:05 Operator: CL
Sample : P1700214-001dil (50mL) Inst : MS19
Misc : S29-12201602

Quant Time: Jan 26 07:20:06 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:47:58 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

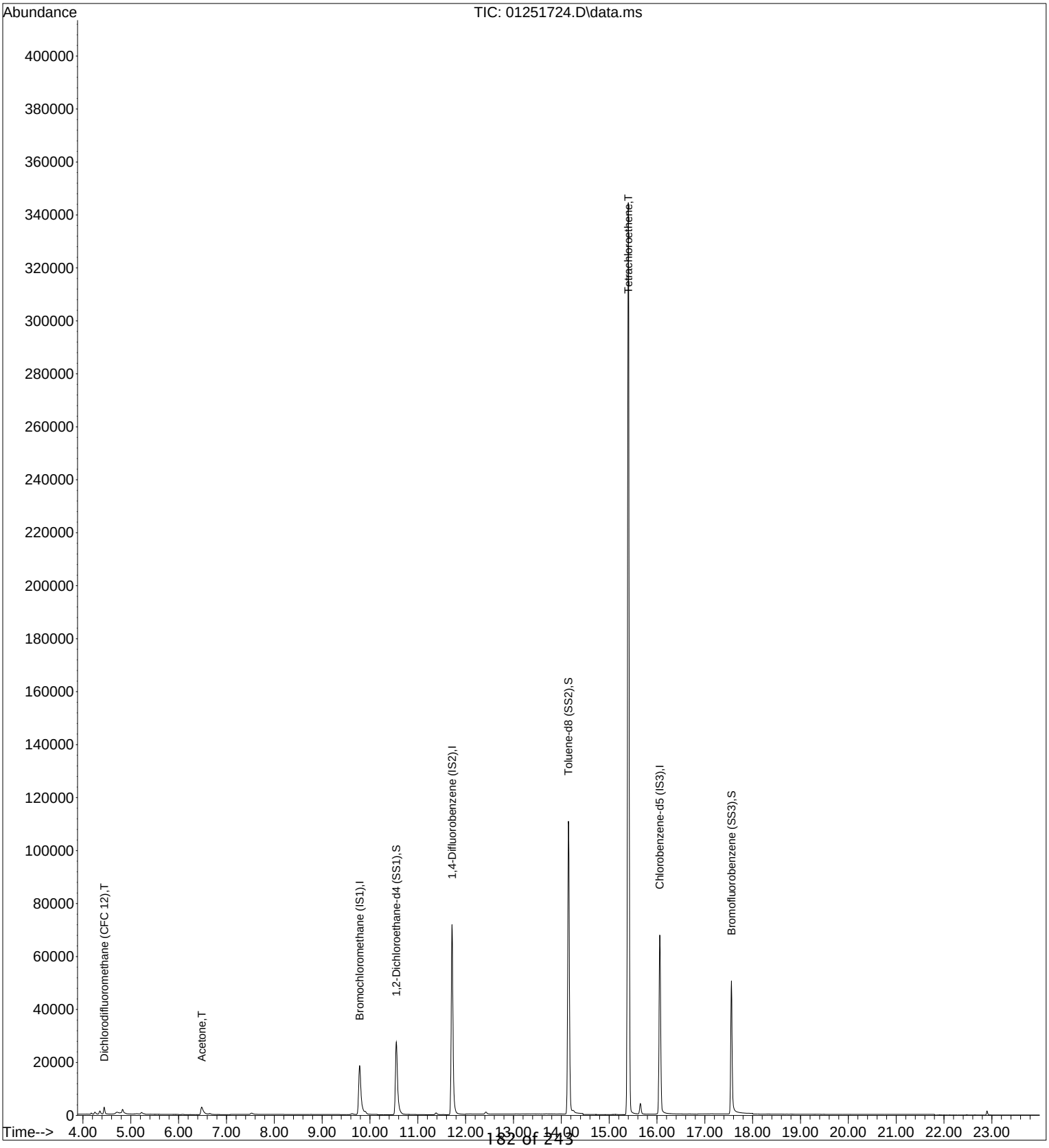
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	0.00	225	0	N.D.	

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\25\01251724.D Vial: 5
Acq On : 26 Jan 2017 3:05 Operator: CL
Sample : P1700214-001dil (50mL) Inst : MS19
Misc : S29-12201602

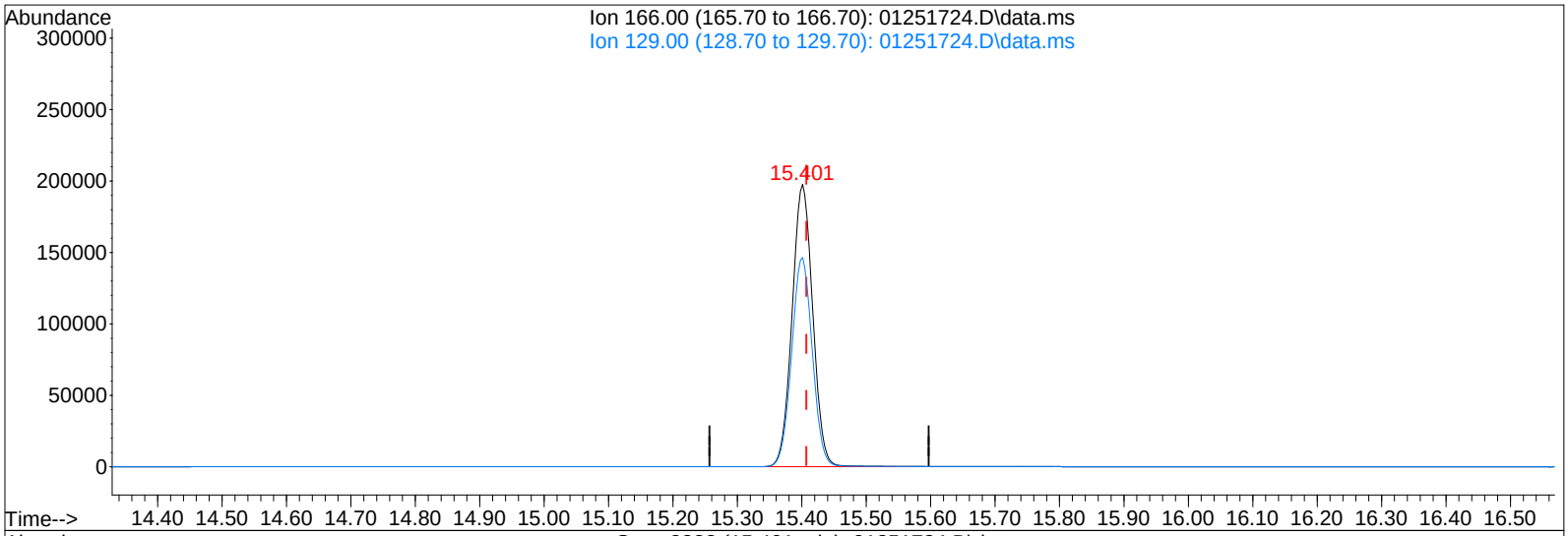
Quant Time: Jan 26 07:20:06 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:47:58 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

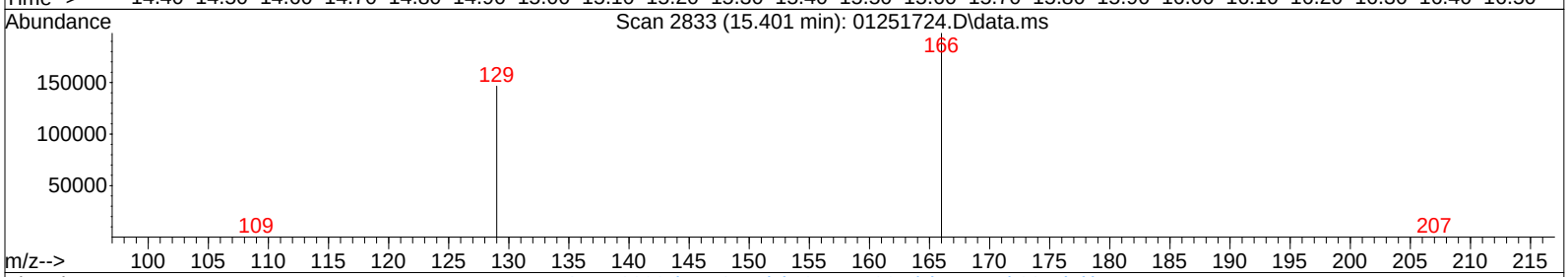


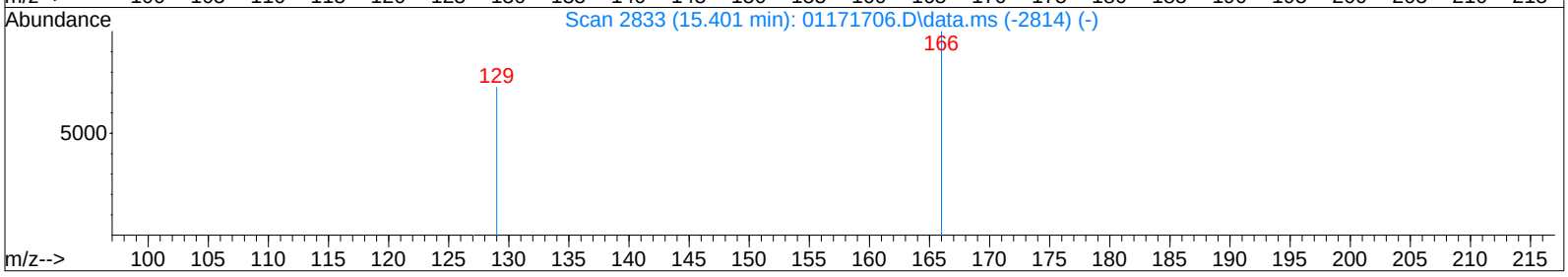
Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 01\25\01251724.D Vial: 5
Acq On : 26 Jan 2017 3:05 Operator: CL
Sample : P1700214-001dil (50mL) Inst : MS19
Misc : S29-12201602

Quant Time: Jan 26 07:20:06 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:47:58 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M







TIC: 01251724.D\data.ms

(37) Tetrachloroethene (T)

15.401min (-0.006) 10264.95pg

response 440845

Ion	Exp%	Act%
166.00	100	100
129.00	72.80	74.35
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\25\01251703.D Vial: 2
Acq On : 25 Jan 2017 16:08 Operator: CL
Sample : MB S19012517 1000mL Inst : MS19
Misc : S29-12201602/AC01205

Quant Time: Jan 26 07:19:45 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:47:58 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 1/26/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.79	130	42360	1000.000 pg	0.00
25) 1,4-Difluorobenzene (IS2)	11.72	114	187253	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.06	54	28915	1000.000 pg	0.00

System Monitoring Compounds					
20) 1,2-Dichloroethane-d4 ...	10.55	65	66552	907.177 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 90.72%		
33) Toluene-d8 (SS2)	14.15	98	187865	1009.996 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 101.00%		
45) Bromofluorobenzene (SS3)	17.56	174	56201	1062.454 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 106.25%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.46	85	75	N.D.	
3) Chloromethane	0.00	52	0	N.D.	
4) 1,2-Dichloro,1,1,2,2-t...	0.00	85	0	N.D.	
5) Vinyl Chloride	0.00	62	0	N.D.	
6) 1,3-Butadiene	0.00	54	0	N.D.	
7) Bromomethane	0.00	94	0	N.D.	
8) Chloroethane	0.00	64	0	N.D.	
9) Acrolein	0.00	56	0	N.D.	
10) Acetone	6.48	58	2943	101.800 pg	93
11) Trichlorofluoromethane	0.00	101	0	N.D.	
12) 1,1-Dichloroethene	0.00	96	0	N.D.	
13) Methylene Chloride	7.53	84	233	N.D.	
14) Trichlorotrifluoroethane	0.00	151	0	N.D.	
15) trans-1,2-Dichloroethene	0.00	96	0	N.D.	
16) 1,1-Dichloroethane	0.00	63	0	N.D.	
17) Methyl tert-Butyl Ether	0.00	73	0	N.D.	
18) cis-1,2-Dichloroethene	0.00	96	0	N.D.	
19) Chloroform	9.91	83	617	N.D.	
21) 1,2-Dichloroethane	0.00	62	0	N.D.	
22) 1,1,1-Trichloroethane	0.00	97	0	N.D.	
23) Benzene	11.39	78	3326	N.D.	
24) Carbon Tetrachloride	0.00	117	0	N.D.	
26) 1,2-Dichloropropane	0.00	63	0	N.D.	
27) Bromodichloromethane	0.00	83	0	N.D.	
28) Trichloroethene	0.00	130	0	N.D.	
29) 1,4-Dioxane	0.00	88	0	N.D.	
30) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
31) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
32) 1,1,2-Trichloroethane	0.00	83	0	N.D.	
34) Toluene	14.26	91	476	N.D.	
35) Dibromochloromethane	0.00	129	0	N.D.	
36) 1,2-Dibromoethane	0.00	107	0	N.D.	
37) Tetrachloroethene	0.00	166	0	N.D.	
39) Chlorobenzene	16.10	112	85	N.D.	
40) Ethylbenzene	16.50	91	91	N.D.	
41) m,p-Xylene	16.67	91	141	N.D.	
42) Styrene	17.04	104	92	N.D.	
43) o-Xylene	0.00	106	0	N.D.	
44) 1,1,2,2-Tetrachloroethane	17.13	83	163	N.D.	
46) 1,3,5-Trimethylbenzene	0.00	105	0	N.D.	
47) 1,2,4-Trimethylbenzene	0.00	105	0	N.D.	
48) 1,3-Dichlorobenzene	18.93	146	68	N.D.	
49) 1,4-Dichlorobenzene	18.99	146	81	N.D.	
50) 1,2-Dichlorobenzene	19.32	146	81	N.D.	
51) 1,2-Dibromo-3-chloropr...	0.00	157	0	N.D.	
52) 1,2,4-Trichlorobenzene	20.98	182	120	N.D.	
53) Naphthalene	21.13	128	572	N.D.	

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\25\01251703.D Vial: 2
Acq On : 25 Jan 2017 16:08 Operator: CL
Sample : MB S19012517 1000mL Inst : MS19
Misc : S29-12201602/AC01205

Quant Time: Jan 26 07:19:45 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:47:58 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

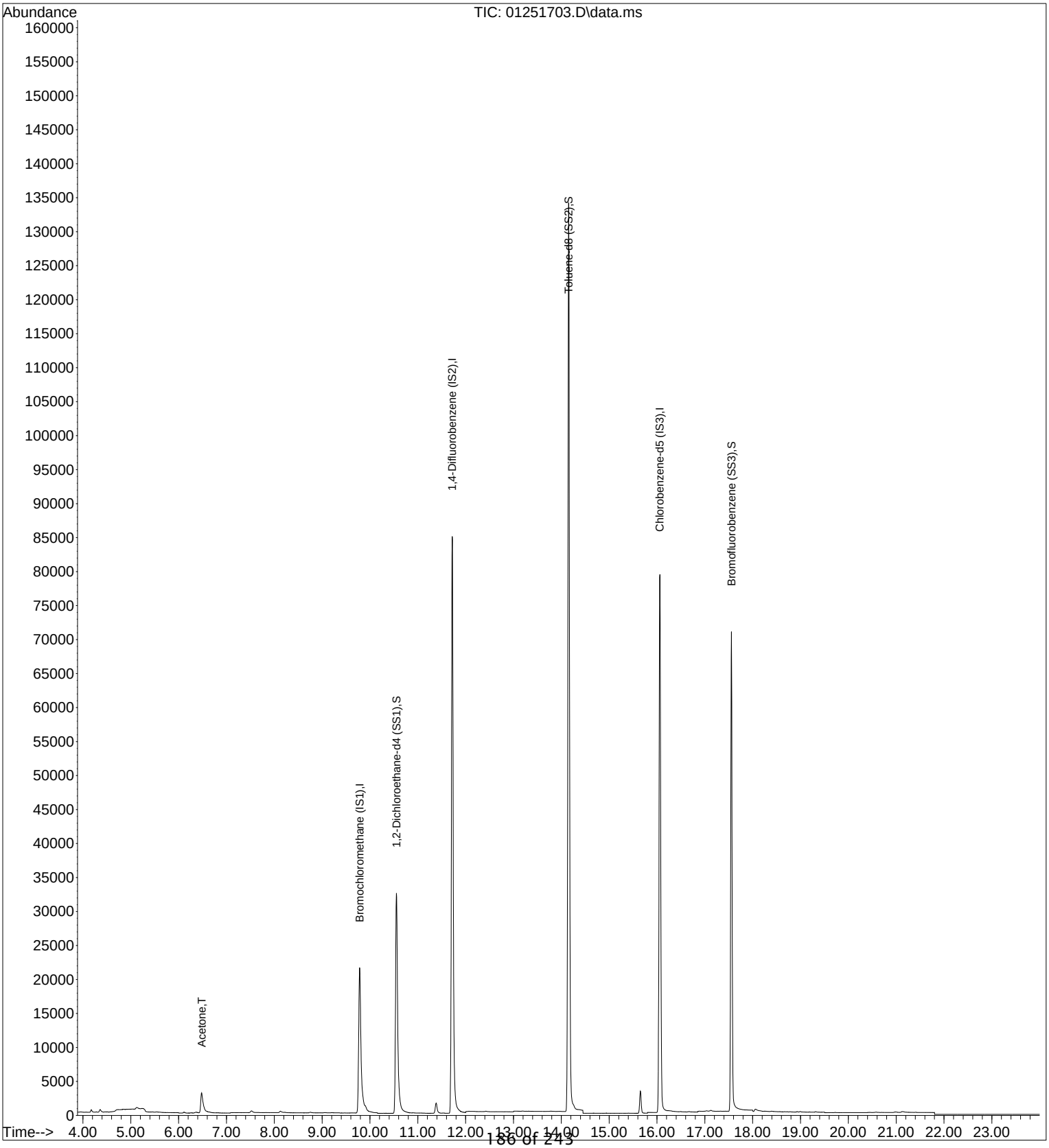
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	0.00	225	0	N.D.	

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\25\01251703.D Vial: 2
Acq On : 25 Jan 2017 16:08 Operator: CL
Sample : MB S19012517 1000mL Inst : MS19
Misc : S29-12201602/AC01205

Quant Time: Jan 26 07:19:45 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:47:58 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\25\01251704.D Vial: 2
Acq On : 25 Jan 2017 16:39 Operator: CL
Sample : LCS S19012517 500pg Inst : MS19
Misc : S29-12201602/S29-01171715 (2/17)

Quant Time: Jan 26 07:19:46 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:47:58 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 1/26/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.76	130	43243	1000.000 pg	-0.02
25) 1,4-Difluorobenzene (IS2)	11.71	114	212725	1000.000 pg	-0.02
38) Chlorobenzene-d5 (IS3)	16.05	54	30868	1000.000 pg	0.00

System Monitoring Compounds					
20) 1,2-Dichloroethane-d4 ...	10.53	65	67145	896.571 pg	-0.02
Spiked Amount 1000.000	Range 70 - 130		Recovery = 89.66%		
33) Toluene-d8 (SS2)	14.15	98	201850	955.241 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 95.52%		
45) Bromofluorobenzene (SS3)	17.55	174	66047	1169.590 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 116.96%		

Target Compounds						Qvalue
2) Dichlorodifluoromethan...	4.42	85	50628	463.438 pg		100
3) Chloromethane	4.65	52	11989	368.363 pg		98
4) 1,2-Dichloro,1,1,2,2-t...	4.81	85	48184	448.306 pg		100
5) Vinyl Chloride	4.96	62	44624	427.282 pg		99
6) 1,3-Butadiene	5.14	54	18868	303.869 pg		96
7) Bromomethane	5.48	94	18498	440.301 pg		100
8) Chloroethane	5.70	64	12815	398.829 pg		99
9) Acrolein	6.27	56	8022	351.446 pg		99
10) Acetone	6.40	58	66491	2253.004 pg	#	88
11) Trichlorofluoromethane	6.62	101	36646	490.450 pg		100
12) 1,1-Dichloroethene	7.35	96	20723	442.694 pg		93
13) Methylene Chloride	7.48	84	23806	468.634 pg		89
14) Trichlorotrifluoroethane	7.80	151	21278	455.611 pg		99
15) trans-1,2-Dichloroethene	8.51	96	22589	447.615 pg		100
16) 1,1-Dichloroethane	8.72	63	37154	414.977 pg		99
17) Methyl tert-Butyl Ether	8.79	73	56513	422.996 pg		97
18) cis-1,2-Dichloroethene	9.59	96	23732	448.133 pg		100
19) Chloroform	9.89	83	41956	445.623 pg		100
21) 1,2-Dichloroethane	10.64	62	29823	411.487 pg		99
22) 1,1,1-Trichloroethane	10.91	97	37038	423.782 pg		99
23) Benzene	11.37	78	98159	473.198 pg		100
24) Carbon Tetrachloride	11.52	117	32818	467.636 pg		100
26) 1,2-Dichloropropane	12.18	63	20382	376.162 pg		98
27) Bromodichloromethane	12.36	83	31020	414.576 pg		100
28) Trichloroethene	12.41	130	24589	444.597 pg		100
29) 1,4-Dioxane	12.38	88	16443	404.891 pg		92
30) cis-1,3-Dichloropropene	13.26	75	30457	417.909 pg		100
31) trans-1,3-Dichloropropene	13.77	75	26043	439.104 pg		100
32) 1,1,2-Trichloroethane	13.95	83	18866	411.634 pg		97
34) Toluene	14.25	91	86416	437.851 pg		100
35) Dibromochloromethane	14.66	129	24022	439.537 pg		100
36) 1,2-Dibromoethane	14.92	107	23467	453.996 pg		100
37) Tetrachloroethene	15.40	166	24539	427.920 pg		98
39) Chlorobenzene	16.10	112	60764	510.645 pg		100
40) Ethylbenzene	16.48	91	85715	488.473 pg		99
41) m,p-Xylene	16.66	91	137131	1041.898 pg		99
42) Styrene	17.01	104	46944	509.095 pg		100
43) o-Xylene	17.12	106	35875	530.583 pg		98
44) 1,1,2,2-Tetrachloroethane	17.09	83	37270	479.728 pg		99
46) 1,3,5-Trimethylbenzene	18.38	105	72386	519.550 pg		100
47) 1,2,4-Trimethylbenzene	18.77	105	71871	525.558 pg		99
48) 1,3-Dichlorobenzene	18.92	146	45469	540.974 pg		100
49) 1,4-Dichlorobenzene	18.98	146	43870	501.328 pg		100
50) 1,2-Dichlorobenzene	19.31	146	43259	505.044 pg		100
51) 1,2-Dibromo-3-chloropr...	19.72	157	11400	440.282 pg		94
52) 1,2,4-Trichlorobenzene	20.95	182	14738	290.691 pg		97
53) Naphthalene	21.07	128	43519	270.320 pg		100

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\25\01251704.D Vial: 2
Acq On : 25 Jan 2017 16:39 Operator: CL
Sample : LCS S19012517 500pg Inst : MS19
Misc : S29-12201602/S29-01171715 (2/17)

Quant Time: Jan 26 07:19:46 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:47:58 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

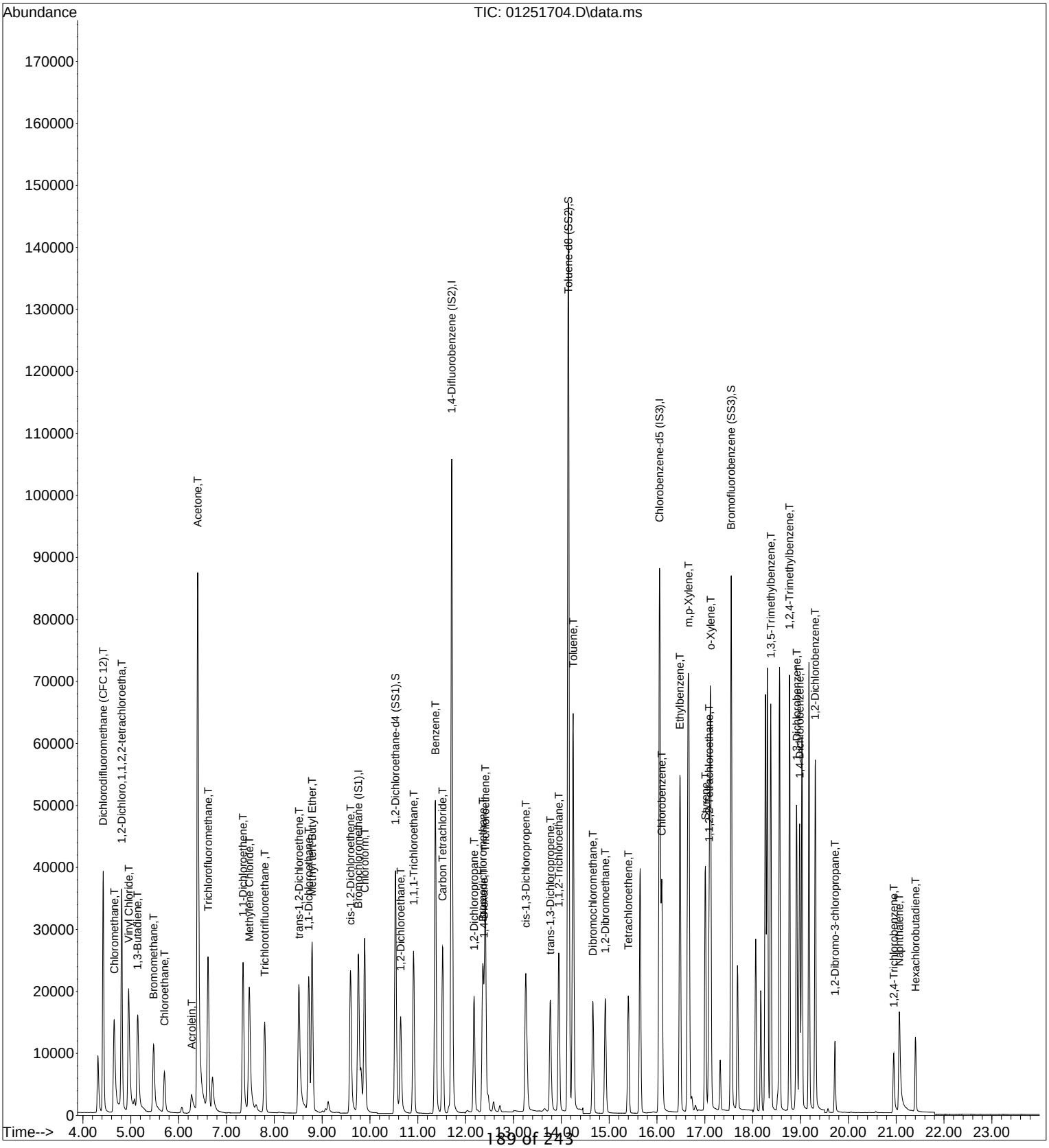
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	11870	295.932	pg	100

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\25\01251704.D Vial: 2
Acq On : 25 Jan 2017 16:39 Operator: CL
Sample : LCS S19012517 500pg Inst : MS19
Misc : S29-12201602/S29-01171715 (2/17)

Quant Time: Jan 26 07:19:46 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:47:58 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Response Factor Report MS19

Method Path : I:\MS19\METHODS\
Method File : S19011717.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Wed Jan 18 09:41:20 2017
Response Via : Initial Calibration

CL 1/18/17

Calibration Files
10 =01171702.D 20 =01171703.D 50 =01171704.D 100 =01171705.D 500 =01171706.D 1000=01171707.D 2000=01171708.D
5000=01171709.D 10K =01171710.D 50K =01171715.D

		Compound	10	20	50	100	500	1000	2000	5000	10K	50K	Avg	%RSD
1)	I	Bromochloromethane...	----------ISTD----------											
2)	T	Dichlorodifluo...		3.556	2.824	2.483	2.470	2.778	2.368	2.270	2.073	2.426	2.583	16.73
3)	T	Chloromethane			1.155	0.889	0.785	0.843	0.683	0.629	0.512	0.675	0.771	25.52
4)	T	1,2-Dichloro,1...		3.609	2.884	2.522	2.484	2.765	2.279	2.080	1.983	2.303	2.545	19.45
5)	T	Vinyl Chloride			2.959	2.551	2.502	2.811	2.337	2.185	2.089	2.468	2.488	11.82
6)	T	1,3-Butadiene	1.935	1.424	1.294	1.019	1.137	1.486	1.309	1.645	1.596	1.964	1.481	21.10
7)	T	Bromomethane		1.329	1.062	0.924	0.926	1.076	0.929	0.872	0.813	1.048	0.998	15.36
8)	T	Chloroethane		0.978	0.790	0.701	0.703	0.813	0.712	0.691	0.650	0.826	0.763	13.24
9)	T	Acrolein		0.667	0.527	0.461	0.448	0.542	0.517	0.523	0.513	0.685	0.543	15.08
10)	T	Acetone				0.851	0.661	0.748	0.651	0.613	0.588	0.850	0.709	15.32
11)	T	Trichlorofluor...			2.033	1.778	1.730	1.942	1.689	1.591	1.530	1.979	1.784	10.36
12)	T	1,1-Dichloroet...		1.353	1.102	0.978	1.002	1.173	1.062	1.030	1.003	1.348	1.117	12.98
13)	T	Methylene Chlo...			1.375	1.133	1.169	1.317	1.162	1.094	1.049	1.429	1.216	11.44
14)	T	Trichlorotrifl...		1.499	1.179	1.020	1.007	1.160	1.009	0.951	0.929	1.279	1.115	16.61
15)	T	trans-1,2-Dich...	1.519	1.317	1.126	1.027	1.079	1.244	1.133	1.080	1.049	1.428	1.200	14.20
16)	T	1,1-Dichloroet...		2.678	2.200	1.950	1.978	2.258	2.020	1.898	1.807	2.375	2.129	12.93
17)	T	Methyl tert-Bu...		3.518	2.828	2.523	2.783	3.410	3.225	3.173	3.093	4.212	3.196	15.46
18)	T	cis-1,2-Dichlo...	1.504	1.370	1.164	1.061	1.139	1.307	1.211	1.167	1.141	1.546	1.261	13.06
19)	T	Chloroform			2.963	2.329	2.105	2.314	2.071	1.920	1.852	2.445	2.250	15.73
20)	S	1,2-Dichloroet...	1.693	1.709	1.716	1.724	1.705	1.712	1.769	1.770	1.775	1.719	1.729	1.76
21)	T	1,2-Dichloroet...	2.196	1.923	1.656	1.502	1.564	1.768	1.637	1.536	1.494	1.945	1.722	13.52
22)	T	1,1,1-Trichlor...	3.341	2.501	1.989	1.764	1.779	1.992	1.815	1.690	1.651	2.225	2.075	24.89
23)	T	Benzene			6.330	4.775	4.641	5.183	4.741	4.314	4.220	5.429	4.954	13.85
24)	T	Carbon Tetrach...		2.175	1.735	1.527	1.537	1.714	1.545	1.443	1.435	1.988	1.678	15.24
25)	I	1,4-Difluorobenzen...	----------ISTD----------											
26)	T	1,2-Dichloropr...	0.416	0.324	0.258	0.222	0.217	0.245	0.227	0.212	0.208	0.280	0.261	25.01
27)	T	Bromodichlorom...	0.542	0.446	0.364	0.318	0.305	0.344	0.314	0.293	0.288	0.394	0.361	22.41
28)	T	Trichloroethene	0.381	0.335	0.277	0.237	0.232	0.261	0.232	0.213	0.208	0.293	0.267	20.95
29)	T	1,4-Dioxane	0.275	0.213	0.174	0.155	0.162	0.194	0.185	0.178	0.177	0.256	0.197	20.15
30)	T	cis-1,3-Dichlo...	0.402	0.345	0.312	0.283	0.300	0.359	0.351	0.345	0.351	0.488	0.354	16.40
31)	T	trans-1,3-Dich...	0.231	0.260	0.238	0.226	0.252	0.305	0.306	0.308	0.319	0.447	0.289	22.67
32)	T	1,1,2-Trichlor...	0.338	0.268	0.222	0.195	0.188	0.212	0.193	0.177	0.175	0.241	0.221	22.89
33)	S	Toluene-d8 (SS2)	1.014	1.013	1.003	0.991	0.960	0.970	0.991	0.976	0.999	1.007	0.992	1.89
34)	T	Toluene		1.263	1.008	0.871	0.851	0.979	0.905	0.839	0.831	1.031	0.953	14.53
35)	T	Dibromochlorom...	0.350	0.307	0.258	0.229	0.226	0.260	0.238	0.226	0.229	0.320	0.265	17.08
36)	T	1,2-Dibromoethane	0.280	0.279	0.247	0.221	0.223	0.255	0.239	0.224	0.226	0.307	0.250	11.95
37)	T	Tetrachloroethene	0.432	0.340	0.275	0.241	0.236	0.265	0.237	0.220	0.220	0.303	0.277	24.02
38)	I	Chlorobenzene-d5 (...	----------ISTD----------											
39)	T	Chlorobenzene	5.542	4.754	3.999	3.583	3.610	4.033	3.590	3.379	3.236	3.692	3.942	17.88
40)	T	Ethylbenzene	7.875	6.117	5.024	4.549	5.174	6.282	5.979	5.756	5.547	5.867	5.817	15.48
41)	T	m,p-Xylene	5.437	4.268	3.605	3.210	4.170	5.088	4.676	4.420	4.293	4.457	4.362	14.78

Method Path : I:\MS19\METHODS\
Method File : S19011717.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

42)	T	Styrene	2.707	2.326	2.182	2.128	2.890	3.627	3.590	3.646	3.605	4.125	3.083	23.46
43)	T	o-Xylene	2.782	2.139	1.782	1.701	2.157	2.570	2.342	2.236	2.180	2.638	2.253	15.46
44)	T	1,1,2,2-Tetrac...	3.735	2.841	2.404	2.250	2.407	2.685	2.422	2.279	2.196	2.543	2.576	17.58
45)	S	Bromofluoroben...	1.715	1.714	1.728	1.784	1.904	1.930	1.926	1.976	1.954	1.490	1.812	8.49
46)	T	1,3,5-Trimethy...	5.122	3.974	3.524	3.438	4.709	5.600	5.127	4.977	4.810	4.956	4.624	15.74
47)	T	1,2,4-Trimethy...	4.312	3.595	3.159	3.272	4.681	5.683	5.325	5.251	5.075	5.018	4.537	20.02
48)	T	1,3-Dichlorobe...	2.415	2.282	2.599	2.594	2.942	3.327	2.992	2.896	2.768	3.118	2.793	11.61
49)	T	1,4-Dichlorobe...	3.057	2.917	2.700	2.694	2.870	3.237	2.914	2.866	2.717	3.112	2.908	6.29
50)	T	1,2-Dichlorobe...	2.963	2.718	2.683	2.601	2.825	3.222	2.898	2.831	2.699	2.990	2.843	6.46
51)	T	1,2-Dibromo-3-...	0.826	0.675	0.621	0.624	0.823	0.981	0.952	1.005	0.993	1.170	0.867	21.30
52)	T	1,2,4-Trichlor...	1.755	1.631	1.384	1.351	1.582	1.775	1.715	1.813	1.758	2.167	1.693	13.67
53)	T	Naphthalene	5.658	4.561	3.758	3.901	5.665	6.055	5.882	6.021	5.773	6.159	5.343	17.10
54)	T	Hexachlorobuta...	1.874	1.579	1.316	1.189	1.196	1.330	1.211	1.183	1.126	1.304	1.331	17.24

(#) = Out of Range

Primary Source Standards Concentrations (Working & Initial Calibration)

CL 1/18/17

0.2ng/L Std. ID: S29-01171711 | 20ng/L Std. ID: S29-01171704
1ng/L Std. ID: S29-01171716 | 200ng/L Std. ID: S29-01171703
4ng/L Std. ID: S29-01171706

Dilution Factors:		5	50	250	1000	5000	Working STD Conc.(ng/L):	0.2	1	1	1	4	20	20	20	20		200
	Source Std.	Primary Working Standards					Injection (L):	0.050	0.020	0.050	0.100	0.125	0.050	0.100	0.250	0.500	NA	0.250
Compounds	mg/m^3	200ng/L	20ng/L	4ng/L	1ng/L	0.2ng/L	ICAL Points:	0.01ng	0.02ng	0.05ng	0.1ng	0.5ng	1ng	2ng	5ng	10ng	20ng	50ng
Propene	1.036	207.2	20.72	4.144	1.036	0.2072		0.01036	0.02072	0.05180	0.1036	0.5180	1.036	2.072	5.180	10.36	NA	51.80
Dichlorodifluoromethane	1.047	209.4	20.94	4.188	1.047	0.2094		0.01047	0.02094	0.05235	0.1047	0.5235	1.047	2.094	5.235	10.47	NA	52.35
Chloromethane	1.005	201.0	20.10	4.020	1.005	0.2010		0.01005	0.02010	0.05025	0.1005	0.5025	1.005	2.010	5.025	10.05	NA	50.25
Freon-114	1.005	201.0	20.10	4.020	1.005	0.2010		0.01005	0.02010	0.05025	0.1005	0.5025	1.005	2.010	5.025	10.05	NA	50.25
Vinyl Chloride	1.023	204.6	20.46	4.092	1.023	0.2046		0.01023	0.02046	0.05115	0.1023	0.5115	1.023	2.046	5.115	10.23	NA	51.15
1,3-Butadiene	1.057	211.4	21.14	4.228	1.057	0.2114		0.01057	0.02114	0.05285	0.1057	0.5285	1.057	2.114	5.285	10.57	NA	52.85
Bromomethane	0.993	198.6	19.86	3.972	0.993	0.1986		0.00993	0.01986	0.04965	0.0993	0.4965	0.993	1.986	4.965	9.93	NA	49.65
Chloroethane	1.009	201.8	20.18	4.036	1.009	0.2018		0.01009	0.02018	0.05045	0.1009	0.5045	1.009	2.018	5.045	10.09	NA	50.45
Ethanol	5.207	1041.4	104.14	20.828	5.207	1.0414		0.05207	0.10414	0.26035	0.5207	2.6035	5.207	10.414	26.035	52.07	NA	260.35
Acetonitrile	1.046	209.2	20.92	4.184	1.046	0.2092		0.01046	0.02092	0.05230	0.1046	0.5230	1.046	2.092	5.230	10.46	NA	52.30
Acrolein	1.041	208.2	20.82	4.164	1.041	0.2082		0.01041	0.02082	0.05205	0.1041	0.5205	1.041	2.082	5.205	10.41	NA	52.05
Acetone	5.313	1062.6	106.26	21.252	5.313	1.0626		0.05313	0.10626	0.26565	0.5313	2.6565	5.313	10.626	26.565	53.13	NA	265.65
Trichlorofluoromethane	1.049	209.8	20.98	4.196	1.049	0.2098		0.01049	0.02098	0.05245	0.1049	0.5245	1.049	2.098	5.245	10.49	NA	52.45
Isopropanol	2.105	421.0	42.10	8.420	2.105	0.4210		0.02105	0.04210	0.10525	0.2105	1.0525	2.105	4.210	10.525	21.05	NA	105.25
Acrylonitrile	1.055	211.0	21.10	4.220	1.055	0.2110		0.01055	0.02110	0.05275	0.1055	0.5275	1.055	2.110	5.275	10.55	NA	52.75
1,1-Dichloroethene	1.059	211.8	21.18	4.236	1.059	0.2118		0.01059	0.02118	0.05295	0.1059	0.5295	1.059	2.118	5.295	10.59	NA	52.95
tert-Butanol	2.114	422.8	42.28	8.456	2.114	0.4228		0.02114	0.04228	0.10570	0.2114	1.0570	2.114	4.228	10.570	21.14	NA	105.70
Methylene Chloride	1.057	211.4	21.14	4.228	1.057	0.2114		0.01057	0.02114	0.05285	0.1057	0.5285	1.057	2.114	5.285	10.57	NA	52.85
Allyl Chloride	1.052	210.4	21.04	4.208	1.052	0.2104		0.01052	0.02104	0.05260	0.1052	0.5260	1.052	2.104	5.260	10.52	NA	52.60
Trichlorotrifluoroethane	1.049	209.8	20.98	4.196	1.049	0.2098		0.01049	0.02098	0.05245	0.1049	0.5245	1.049	2.098	5.245	10.49	NA	52.45
Carbon Disulfide	1.061	212.2	21.22	4.244	1.061	0.2122		0.01061	0.02122	0.05305	0.1061	0.5305	1.061	2.122	5.305	10.61	NA	53.05
trans-1,2-Dichloroethene	1.067	213.4	21.34	4.268	1.067	0.2134		0.01067	0.02134	0.05335	0.1067	0.5335	1.067	2.134	5.335	10.67	NA	53.35
1,1-Dichloroethane	1.020	204.0	20.40	4.080	1.020	0.2040		0.01020	0.02040	0.05100	0.1020	0.5100	1.020	2.040	5.100	10.20	NA	51.00
Methyl tert-Butyl Ether	1.066	213.2	21.32	4.264	1.066	0.2132		0.01066	0.02132	0.05330	0.1066	0.5330	1.066	2.132	5.330	10.66	NA	53.30
Vinyl Acetate	5.265	1053.0	105.30	21.060	5.265	1.0530		0.05265	0.10530	0.26325	0.5265	2.6325	5.265	10.530	26.325	52.65	NA	263.25
2-Butanone	1.049	209.8	20.98	4.196	1.049	0.2098		0.01049	0.02098	0.05245	0.1049	0.5245	1.049	2.098	5.245	10.49	NA	52.45
cis-1,2-Dichloroethene	1.064	212.8	21.28	4.256	1.064	0.2128		0.01064	0.02128	0.05320	0.1064	0.5320	1.064	2.128	5.320	10.64	NA	53.20
Diisopropyl Ether	1.062	212.4	21.24	4.248	1.062	0.2124		0.01062	0.02124	0.05310	0.1062	0.5310	1.062	2.124	5.310	10.62	NA	53.10
Ethyl Acetate	2.129	425.8	42.58	8.516	2.129	0.4258		0.02129	0.04258	0.10645	0.2129	1.0645	2.129	4.258	10.645	21.29	NA	106.45
n-Hexane	1.063	212.6	21.26	4.252	1.063	0.2126		0.01063	0.02126	0.05315	0.1063	0.5315	1.063	2.126	5.315	10.63	NA	53.15
Chloroform	1.058	211.6	21.16	4.232	1.058	0.2116		0.01058	0.02116	0.05290	0.1058	0.5290	1.058	2.116	5.290	10.58	NA	52.90
Tetrahydrofuran	1.062	212.4	21.24	4.248	1.062	0.2124		0.01062	0.02124	0.05310	0.1062	0.5310	1.062	2.124	5.310	10.62	NA	53.10
Ethyl tert-Butyl Ether	1.057	211.4	21.14	4.228	1.057	0.2114		0.01057	0.02114	0.05285	0.1057	0.5285	1.057	2.114	5.285	10.57	NA	52.85
1,2-Dichloroethane	1.052	210.4	21.04	4.208	1.052	0.2104		0.01052	0.02104	0.05260	0.1052	0.5260	1.052	2.104	5.260	10.52	NA	52.60
1,1,1-Trichloroethane	1.074	214.8	21.48	4.296	1.074	0.2148		0.01074	0.02148	0.05370	0.1074	0.5370	1.074	2.148	5.370	10.74	NA	53.70
Isopropyl Acetate	2.104	420.8	42.08	8.416	2.104	0.4208		0.02104	0.04208	0.10520	0.2104	1.0520	2.104	4.208	10.520	21.04	NA	105.20
1-Butanol	2.105	421.0	42.10	8.420	2.105	0.4210		0.02105	0.04210	0.10525	0.2105	1.0525	2.105	4.210	10.525	21.05	NA	105.25
Benzene	1.052	210.4	21.04	4.208	1.052	0.2104		0.01052	0.02104	0.05260	0.1052	0.5260	1.052	2.104	5.260	10.52	NA	52.60
Carbon Tetrachloride	1.055	211.0	21.10	4.220	1.055	0.2110		0.01055	0.02110	0.05275	0.1055	0.5275	1.055	2.110	5.275	10.55	NA	52.75
Cyclohexane	2.130	426.0	42.60	8.520	2.130	0.4260		0.02130	0.04260	0.10650	0.2130	1.0650	2.130	4.260	10.650	21.30	NA	106.50
tert-Amyl Methyl Ether	1.054	210.8	21.08	4.216	1.054	0.2108		0.01054	0.02108	0.05270	0.1054	0.5270	1.054	2.108	5.270	10.54	NA	52.70
1,2-Dichloropropane	1.062	212.4	21.24	4.248	1.062	0.2124		0.01062	0.02124	0.05310	0.1062	0.5310	1.062	2.124	5.310	10.62	NA	53.10
Bromodichloromethane	1.066	213.2	21.32	4.264	1.066	0.2132		0.01066	0.02132	0.05330	0.1066	0.5330	1.066	2.132	5.330	10.66	NA	53.30
Trichloroethene	1.060	212.0	21.20	4.240	1.060	0.2120		0.01060	0.02120	0.05300	0.1060	0.5300	1.060	2.120	5.300	10.60	NA	53.00
1,4-Dioxane	1.062	212.4	21.24	4.248	1.062	0.2124		0.01062	0.02124	0.05310	0.1062	0.5310	1.062	2.124	5.310	10.62	NA	53.10
Isooctane	1.059	211.8	21.18	4.236	1.059	0.2118		0.01059	0.02118	0.05295	0.1059	0.5295	1.059	2.118	5.295	10.59	NA	52.95
Methyl Methacrylate	2.110	422.0	42.20	8.440	2.110	0.4220		0.02110	0.04220	0.10550	0.2110	1.0550	2.110	4.220	10.550	21.10	NA	105.50
n-Heptane	1.062	212.4	21.24	4.248	1.062	0.2124		0.01062	0.02124	0.05310	0.1062	0.5310	1.062	2.124	5.310	10.62	NA	53.10
cis-1,3-Dichloropropene	1.116	223.2	22.32	4.464	1.116	0.2232		0.01116	0.02232	0.05580	0.1116	0.5580	1.116	2.232	5.580	11.16	NA	55.80

Primary Source Standards Concentrations (Working & Initial Calibration)

0.2ng/L Std. ID: S29-01171711 20ng/L Std. ID: S29-01171704
1ng/L Std. ID: S29-01171716 200ng/L Std. ID: S29-01171703
4ng/L Std. ID: S29-01171706

Dilution Factors:		5	50	250	1000	5000	Working STD Conc.(ng/L):	0.2	1	1	1	4	20	20	20	20		200
	Source Std.	Primary Working Standards					Injection (L):	0.050	0.020	0.050	0.100	0.125	0.050	0.100	0.250	0.500	NA	0.250
Compounds	mg/m^3	200ng/L	20ng/L	4ng/L	1ng/L	0.2ng/L	ICAL Points:	0.01ng	0.02ng	0.05ng	0.1ng	0.5ng	1ng	2ng	5ng	10ng	20ng	50ng
4-Methyl-2-pentanone	1.058	211.6	21.16	4.232	1.058	0.2116		0.01058	0.02116	0.05290	0.1058	0.5290	1.058	2.116	5.290	10.58	NA	52.90
trans-1,3-Dichloropropene	1.064	212.8	21.28	4.256	1.064	0.2128		0.01064	0.02128	0.05320	0.1064	0.5320	1.064	2.128	5.320	10.64	NA	53.20
1,1,2-Trichloroethane	1.061	212.2	21.22	4.244	1.061	0.2122		0.01061	0.02122	0.05305	0.1061	0.5305	1.061	2.122	5.305	10.61	NA	53.05
Toluene	1.053	210.6	21.06	4.212	1.053	0.2106		0.01053	0.02106	0.05265	0.1053	0.5265	1.053	2.106	5.265	10.53	NA	52.65
2-Hexanone	1.061	212.2	21.22	4.244	1.061	0.2122		0.01061	0.02122	0.05305	0.1061	0.5305	1.061	2.122	5.305	10.61	NA	53.05
Dibromochloromethane	1.062	212.4	21.24	4.248	1.062	0.2124		0.01062	0.02124	0.05310	0.1062	0.5310	1.062	2.124	5.310	10.62	NA	53.10
1,2-Dibromoethane	1.056	211.2	21.12	4.224	1.056	0.2112		0.01056	0.02112	0.05280	0.1056	0.5280	1.056	2.112	5.280	10.56	NA	52.80
n-Butyl Acetate	1.064	212.8	21.28	4.256	1.064	0.2128		0.01064	0.02128	0.05320	0.1064	0.5320	1.064	2.128	5.320	10.64	NA	53.20
n-Octane	1.057	211.4	21.14	4.228	1.057	0.2114		0.01057	0.02114	0.05285	0.1057	0.5285	1.057	2.114	5.285	10.57	NA	52.85
Tetrachloroethene	1.061	212.2	21.22	4.244	1.061	0.2122		0.01061	0.02122	0.05305	0.1061	0.5305	1.061	2.122	5.305	10.61	NA	53.05
Chlorobenzene	1.061	212.2	21.22	4.244	1.061	0.2122		0.01061	0.02122	0.05305	0.1061	0.5305	1.061	2.122	5.305	10.61	NA	53.05
Ethylbenzene	1.055	211.0	21.10	4.220	1.055	0.2110		0.01055	0.02110	0.05275	0.1055	0.5275	1.055	2.110	5.275	10.55	NA	52.75
m-&p-Xylene	2.123	424.6	42.46	8.492	2.123	0.4246		0.02123	0.04246	0.10615	0.2123	1.0615	2.123	4.246	10.615	21.23	NA	106.15
Bromoform	1.063	212.6	21.26	4.252	1.063	0.2126		0.01063	0.02126	0.05315	0.1063	0.5315	1.063	2.126	5.315	10.63	NA	53.15
Styrene	1.061	212.2	21.22	4.244	1.061	0.2122		0.01061	0.02122	0.05305	0.1061	0.5305	1.061	2.122	5.305	10.61	NA	53.05
o-Xylene	1.054	210.8	21.08	4.216	1.054	0.2108		0.01054	0.02108	0.05270	0.1054	0.5270	1.054	2.108	5.270	10.54	NA	52.70
n-Nonane	1.054	210.8	21.08	4.216	1.054	0.2108		0.01054	0.02108	0.05270	0.1054	0.5270	1.054	2.108	5.270	10.54	NA	52.70
1,1,2,2-Tetrachloroethane	1.056	211.2	21.12	4.224	1.056	0.2112		0.01056	0.02112	0.05280	0.1056	0.5280	1.056	2.112	5.280	10.56	NA	52.80
Cumene	1.050	210.0	21.00	4.200	1.050	0.2100		0.01050	0.02100	0.05250	0.1050	0.5250	1.050	2.100	5.250	10.50	NA	52.50
alpha-Pinene	1.044	208.8	20.88	4.176	1.044	0.2088		0.01044	0.02088	0.05220	0.1044	0.5220	1.044	2.088	5.220	10.44	NA	52.20
n-Propylbenzene	1.063	212.6	21.26	4.252	1.063	0.2126		0.01063	0.02126	0.05315	0.1063	0.5315	1.063	2.126	5.315	10.63	NA	53.15
3-Ethyltoluene	1.050	210.0	21.00	4.200	1.050	0.2100		0.01050	0.02100	0.05250	0.1050	0.5250	1.050	2.100	5.250	10.50	NA	52.50
4-Ethyltoluene	1.049	209.8	20.98	4.196	1.049	0.2098		0.01049	0.02098	0.05245	0.1049	0.5245	1.049	2.098	5.245	10.49	NA	52.45
1,3,5-Trimethylbenzene	1.049	209.8	20.98	4.196	1.049	0.2098		0.01049	0.02098	0.05245	0.1049	0.5245	1.049	2.098	5.245	10.49	NA	52.45
alpha-Methylstyrene	1.050	210.0	21.00	4.200	1.050	0.2100		0.01050	0.02100	0.05250	0.1050	0.5250	1.050	2.100	5.250	10.50	NA	52.50
2-Ethyltoluene	1.062	212.4	21.24	4.248	1.062	0.2124		0.01062	0.02124	0.05310	0.1062	0.5310	1.062	2.124	5.310	10.62	NA	53.10
1,2,4-Trimethylbenzene	1.052	210.4	21.04	4.208	1.052	0.2104		0.01052	0.02104	0.05260	0.1052	0.5260	1.052	2.104	5.260	10.52	NA	52.60
n-Decane	1.053	210.6	21.06	4.212	1.053	0.2106		0.01053	0.02106	0.05265	0.1053	0.5265	1.053	2.106	5.265	10.53	NA	52.65
Benzyl Chloride	1.061	212.2	21.22	4.244	1.061	0.2122		0.01061	0.02122	0.05305	0.1061	0.5305	1.061	2.122	5.305	10.61	NA	53.05
1,3-Dichlorobenzene	1.058	211.6	21.16	4.232	1.058	0.2116		0.01058	0.02116	0.05290	0.1058	0.5290	1.058	2.116	5.290	10.58	NA	52.90
1,4-Dichlorobenzene	1.058	211.6	21.16	4.232	1.058	0.2116		0.01058	0.02116	0.05290	0.1058	0.5290	1.058	2.116	5.290	10.58	NA	52.90
sec-Butylbenzene	1.054	210.8	21.08	4.216	1.054	0.2108		0.01054	0.02108	0.05270	0.1054	0.5270	1.054	2.108	5.270	10.54	NA	52.70
p-Isopropyltoluene	1.027	205.4	20.54	4.108	1.027	0.2054		0.01027	0.02054	0.05135	0.1027	0.5135	1.027	2.054	5.135	10.27	NA	51.35
1,2,3-Trimethylbenzene	1.027	205.4	20.54	4.108	1.027	0.2054		0.01027	0.02054	0.05135	0.1027	0.5135	1.027	2.054	5.135	10.27	NA	51.35
1,2-Dichlorobenzene	1.058	211.6	21.16	4.232	1.058	0.2116		0.01058	0.02116	0.05290	0.1058	0.5290	1.058	2.116	5.290	10.58	NA	52.90
d-Limonene	1.005	201.0	20.10	4.020	1.005	0.2010		0.01005	0.02010	0.05025	0.1005	0.5025	1.005	2.010	5.025	10.05	NA	50.25
1,2-Dibromo-3-chloropropane	1.053	210.6	21.06	4.212	1.053	0.2106		0.01053	0.02106	0.05265	0.1053	0.5265	1.053	2.106	5.265	10.53	NA	52.65
n-Undecane	1.054	210.8	21.08	4.216	1.054	0.2108		0.01054	0.02108	0.05270	0.1054	0.5270	1.054	2.108	5.270	10.54	NA	52.70
1,2,4-Trichlorobenzene	1.043	208.6	20.86	4.172	1.043	0.2086		0.01043	0.02086	0.05215	0.1043	0.5215	1.043	2.086	5.215	10.43	NA	52.15
Naphthalene	1.083	216.6	21.66	4.332	1.083	0.2166		0.01083	0.02166	0.05415	0.1083	0.5415	1.083	2.166	5.415	10.83	NA	54.15
n-Dodecane	1.045	209.0	20.90	4.180	1.045	0.2090		0.01045	0.02090	0.05225	0.1045	0.5225	1.045	2.090	5.225	10.45	NA	52.25
Hexachloro-1,3-butadiene	1.059	211.8	21.18	4.236	1.059	0.2118		0.01059	0.02118	0.05295	0.1059	0.5295	1.059	2.118	5.295	10.59	NA	52.95
Methacrylonitrile	1.065	213.0	21.30	4.260	1.065	0.2130		0.01065	0.02130	0.05325	0.1065	0.5325	1.065	2.130	5.325	10.65	NA	53.25
Cyclohexanone	1.056	211.2	21.12	4.224	1.056	0.2112		0.01056	0.02112	0.05280	0.1056	0.5280	1.056	2.112	5.280	10.56	NA	52.80
tert-Butylbenzene	1.051	210.2	21.02	4.204	1.051	0.2102		0.01051	0.02102	0.05255	0.1051	0.5255	1.051	2.102	5.255	10.51	NA	52.55
n-Butylbenzene	1.056	211.2	21.12	4.224	1.056	0.2112		0.01056	0.02112	0.05280	0.1056	0.5280	1.056	2.112	5.280	10.56	NA	52.80

Calibration Status Report MS19

Method : I:\MS19\METHODS\S19011717.M (RTE Integrator)
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Wed Jan 18 09:41:20 2017
Response via : Initial Calibration

CL 1/18/17

#	ID	Conc	ISTD Conc	Path\File
1	10	10	1000	I:\MS19\DATA\2017_01\17\01171702.D
2	20	21	1000	I:\MS19\DATA\2017_01\17\01171703.D
3	50	52	1000	I:\MS19\DATA\2017_01\17\01171704.D
4	100	105	1000	I:\MS19\DATA\2017_01\17\01171705.D
5	500	524	1000	I:\MS19\DATA\2017_01\17\01171706.D
6	1000	1047	1000	I:\MS19\DATA\2017_01\17\01171707.D
7	2000	2094	1000	I:\MS19\DATA\2017_01\17\01171708.D
8	5000	5235	1000	I:\MS19\DATA\2017_01\17\01171709.D
9	10K	10470	1000	I:\MS19\DATA\2017_01\17\01171710.D
10	50K	52350	1000	I:\MS19\DATA\2017_01\17\01171715.D

#	ID	Update Time	Quant Time	Acquisition Time
1	10	Jan 18 09:39 2017	Jan 18 07:27 2017	17 Jan 2017 16:28
2	20	Jan 18 09:39 2017	Jan 18 07:24 2017	17 Jan 2017 17:00
3	50	Jan 18 09:39 2017	Jan 18 07:24 2017	17 Jan 2017 17:31
4	100	Jan 18 09:40 2017	Jan 18 07:24 2017	17 Jan 2017 18:03
5	500	Jan 18 09:40 2017	Jan 18 07:24 2017	17 Jan 2017 18:34
6	1000	Jan 18 09:40 2017	Jan 18 07:24 2017	17 Jan 2017 19:05
7	2000	Jan 18 09:40 2017	Jan 18 07:24 2017	17 Jan 2017 19:37
8	5000	Jan 18 09:40 2017	Jan 18 07:24 2017	17 Jan 2017 20:08
9	10K	Jan 18 09:40 2017	Jan 18 07:24 2017	17 Jan 2017 20:40
10	50K	Jan 18 09:41 2017	Jan 18 09:38 2017	18 Jan 2017 8:36

S19011717.M Wed Jan 18 11:10:13 2017

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\17\01171702.D Vial: 11
Acq On : 17 Jan 2017 16:28 Operator: CL
Sample : 10pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171711 (2/15)

Quant Time: Jan 18 07:27:12 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:23:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 1/18/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.78	130	43810	1000.000 pg	0.02
25) 1,4-Difluorobenzene (IS2)	11.72	114	194571	1000.000 pg	0.01
38) Chlorobenzene-d5 (IS3)	16.06	54	33113	1000.000 pg	0.00

System Monitoring Compounds					
20) 1,2-Dichloroethane-d4 ...	10.55	65	74154	1061.270 pg	0.02
Spiked Amount 1000.000	Range 70 - 130		Recovery = 106.13%		
33) Toluene-d8 (SS2)	14.15	98	197376	1075.129 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 107.51%		
45) Bromofluorobenzene (SS3)	17.56	174	56798	895.720 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 89.57%		

Target Compounds						Qvalue
2) Dichlorodifluoromethan...	4.45	85	2301	21.440 pg		99
3) Chloromethane	4.69	52	1022	35.320 pg	#	82
4) 1,2-Dichloro,1,1,2,2-t...	4.84	85	2147	19.020 pg		100
5) Vinyl Chloride	5.02	62	2253	22.059 pg	#	1
6) 1,3-Butadiene	5.22	54	896m	16.029 pg		
7) Bromomethane	5.53	94	807	19.758 pg		97
8) Chloroethane	5.76	64	575	19.795 pg		100
9) Acrolein	6.37	56	510m	25.498 pg		
10) Acetone	6.48	58	5437	196.580 pg	#	85
11) Trichlorofluoromethane	6.65	101	1615	20.450 pg		99
12) 1,1-Dichloroethene	7.39	96	828	17.419 pg		97
13) Methylene Chloride	7.52	84	1141	22.018 pg		95
14) Trichlorotrifluoroethane	7.82	151	916	18.924 pg		100
15) trans-1,2-Dichloroethene	8.56	96	710	13.929 pg		99
16) 1,1-Dichloroethane	8.75	63	1616	19.395 pg		99
17) Methyl tert-Butyl Ether	8.83	73	2202	15.800 pg		99
18) cis-1,2-Dichloroethene	9.62	96	701	12.923 pg		98
19) Chloroform	9.90	83	2904	31.200 pg		100
21) 1,2-Dichloroethane	10.66	62	1012	14.626 pg		98
22) 1,1,1-Trichloroethane	10.93	97	1572	18.618 pg		100
23) Benzene	11.38	78	5937	27.096 pg		99
24) Carbon Tetrachloride	11.53	117	1361	18.624 pg		99
26) 1,2-Dichloropropane	12.19	63	859	20.570 pg		99
27) Bromodichloromethane	12.37	83	1125	18.266 pg		100
28) Trichloroethene	12.42	130	786	15.804 pg		100
29) 1,4-Dioxane	12.41	88	568	15.412 pg		96
30) cis-1,3-Dichloropropene	13.28	75	873	13.152 pg		96
31) trans-1,3-Dichloropropene	13.80	75	479	8.318 pg		96
32) 1,1,2-Trichloroethane	13.96	83	698	18.482 pg		97
34) Toluene	14.25	91	3486	19.108 pg		99
35) Dibromochloromethane	14.67	129	723	14.583 pg		98
36) 1,2-Dibromoethane	14.94	107	576	11.684 pg		99
37) Tetrachloroethene	15.40	166	891	16.613 pg		99
39) Chlorobenzene	16.11	112	1947	12.729 pg		98
40) Ethylbenzene	16.49	91	2751	11.761 pg		99
41) m,p-Xylene	16.67	91	3822	21.597 pg		97
42) Styrene	17.03	104	951	7.316 pg		99
43) o-Xylene	17.13	106	971	10.535 pg		98
44) 1,1,2,2-Tetrachloroethane	17.10	83	1306	14.093 pg		99
46) 1,3,5-Trimethylbenzene	18.38	105	1779	9.338 pg		92
47) 1,2,4-Trimethylbenzene	18.78	105	1502	7.629 pg		96
48) 1,3-Dichlorobenzene	18.93	146	846	7.206 pg		97
49) 1,4-Dichlorobenzene	19.00	146	1071	9.203 pg		81
50) 1,2-Dichlorobenzene	19.33	146	1038	8.952 pg		99
51) 1,2-Dibromo-3-chloropr...	19.76	157	288	7.943 pg		100
52) 1,2,4-Trichlorobenzene	21.01	182	606	9.413 pg		99
53) Naphthalene	21.15	128	2029m	9.746 pg		

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\17\01171702.D Vial: 11
Acq On : 17 Jan 2017 16:28 Operator: CL
Sample : 10pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171711 (2/15)

Quant Time: Jan 18 07:27:12 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:23:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

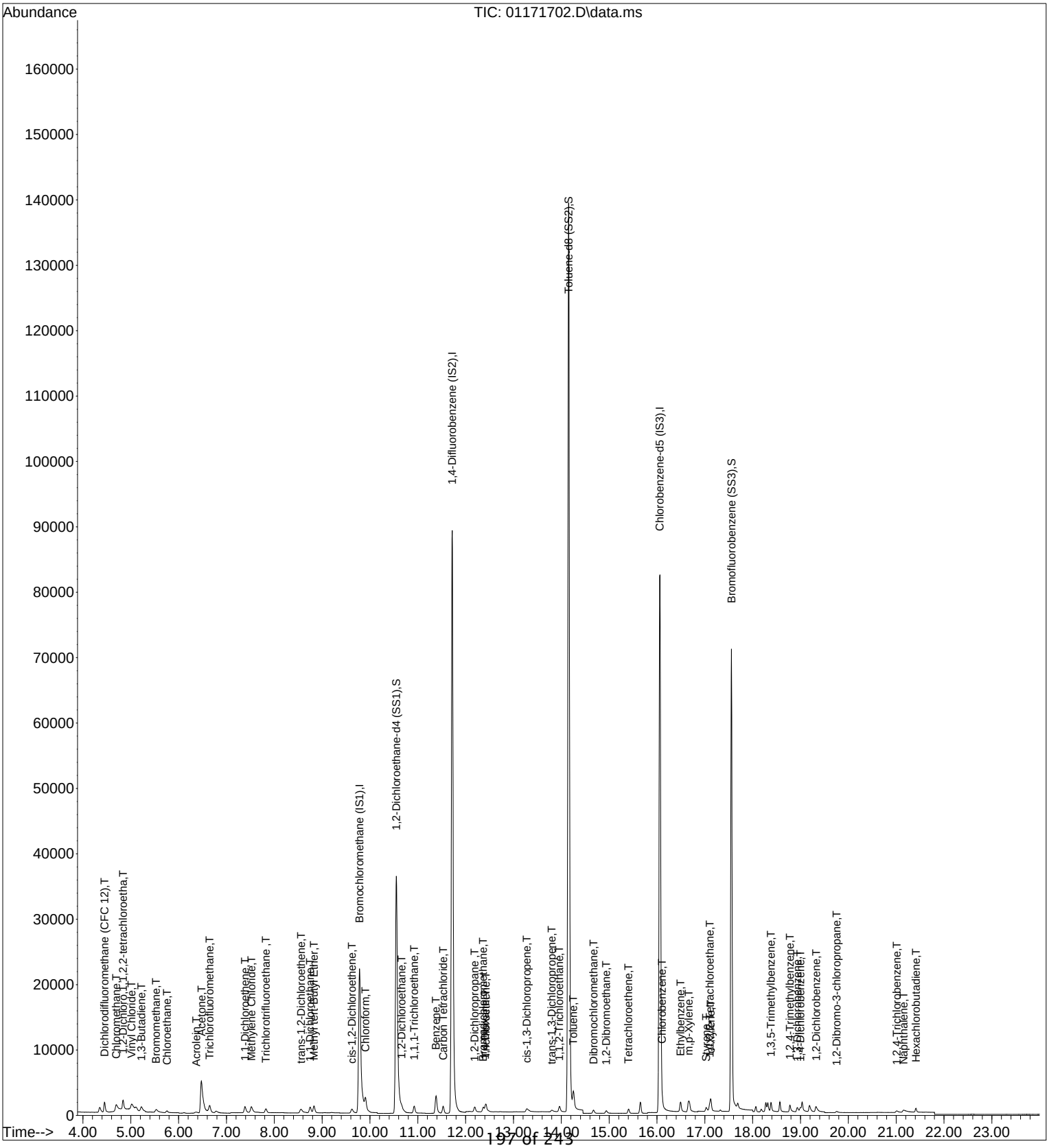
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
54) Hexachlorobutadiene	21.41	225	657	13.925	pg	99

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\17\01171702.D Vial: 11
Acq On : 17 Jan 2017 16:28 Operator: CL
Sample : 10pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171711 (2/15)

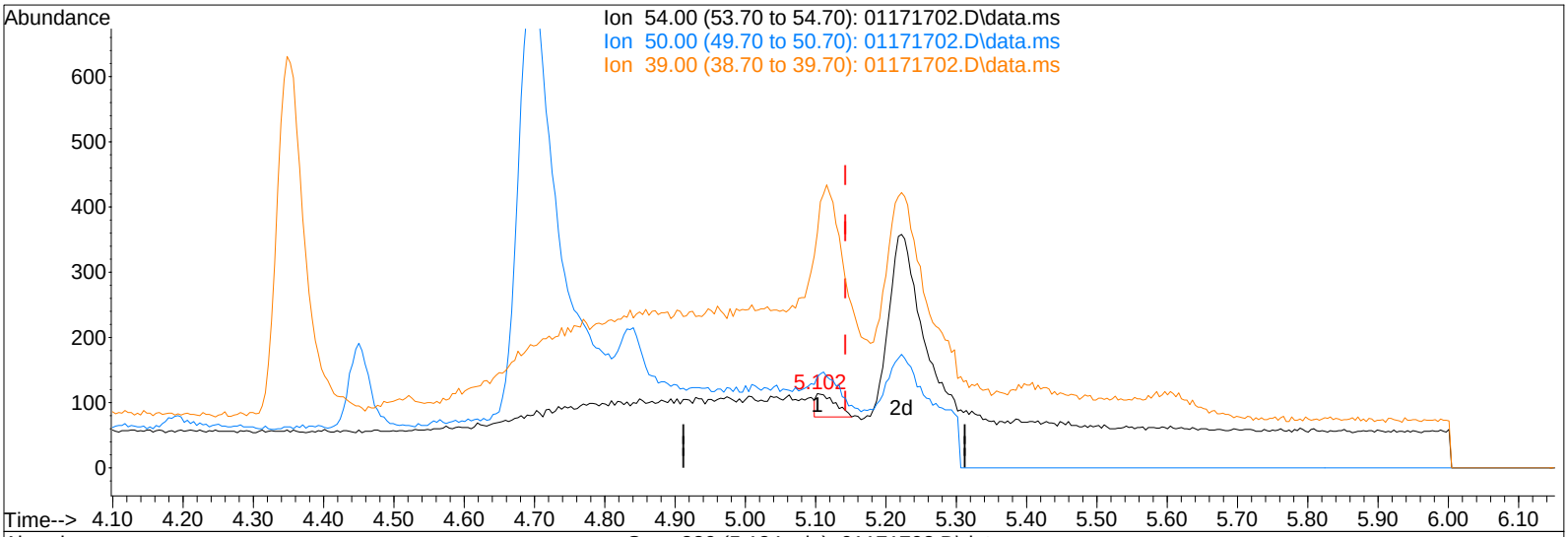
Quant Time: Jan 18 07:27:12 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:23:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

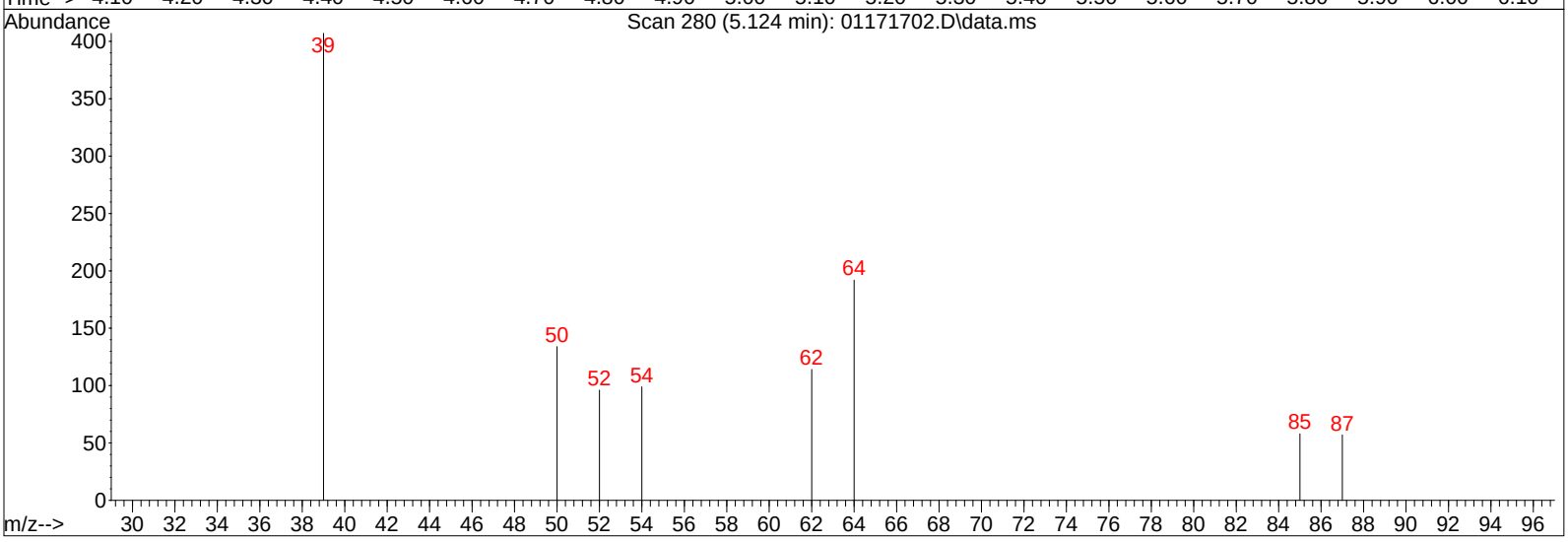


Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 01\17\01171702.D Vial: 11
Acq On : 17 Jan 2017 16:28 Operator: CL
Sample : 10pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171711 (2/15)

Quant Time: Jan 18 07:24:22 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:23:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M





TIC: 01171702.D\data.ms

(6) 1,3-Butadiene (T)

5.102min (-0.040) 1.20pg

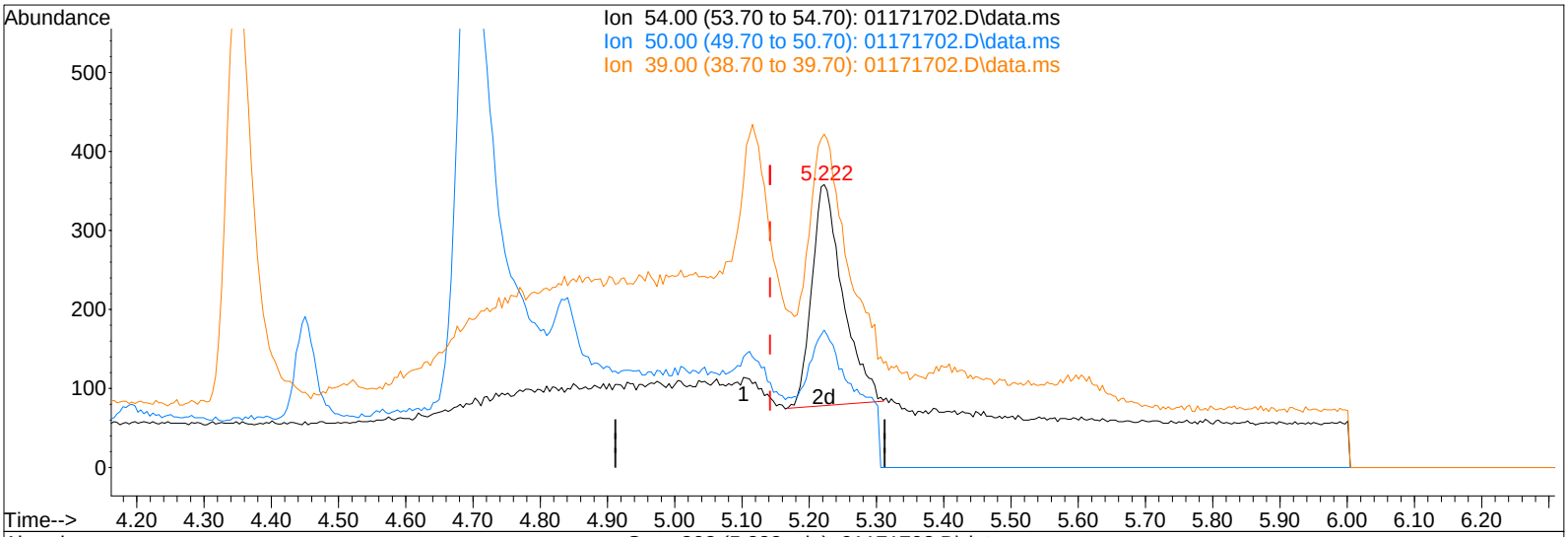
response 67

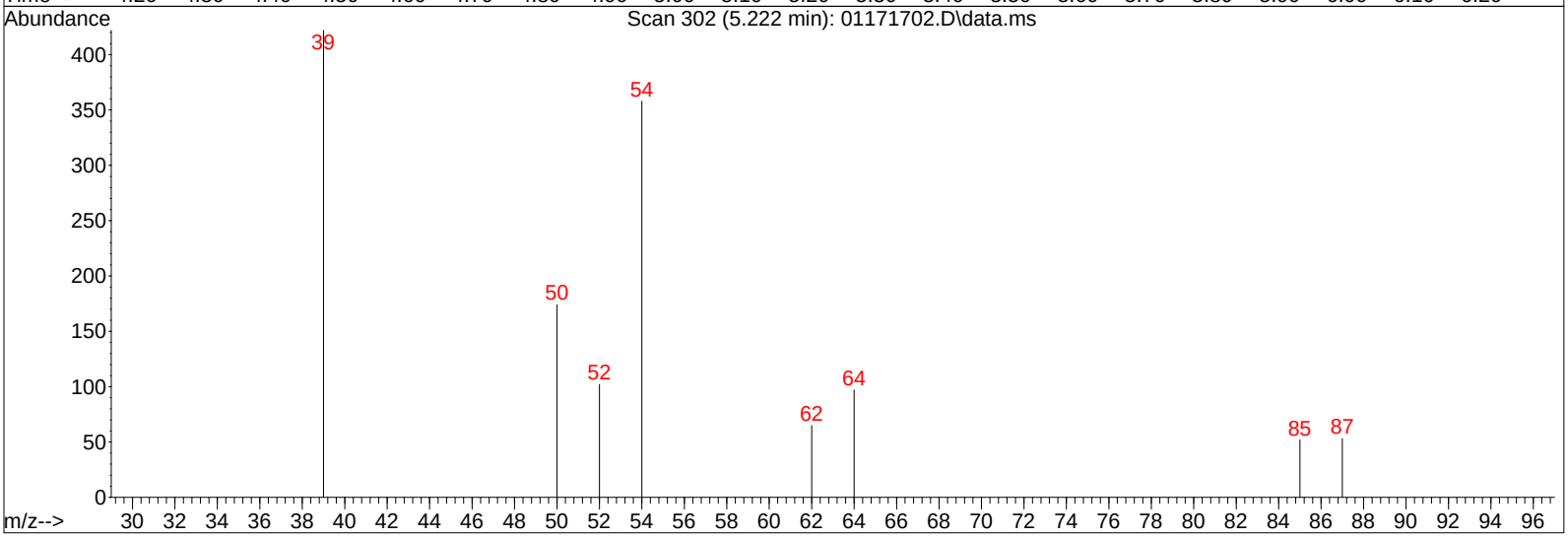
Ion	Exp%	Act%
54.00	100	100
50.00	31.00	222.39#
39.00	89.80	967.16#
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 01\17\01171702.D Vial: 11
Acq On : 17 Jan 2017 16:28 Operator: CL
Sample : 10pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171711 (2/15)

Quant Time: Jan 18 07:24:22 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:23:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M





TIC: 01171702.D\data.ms

(6) 1,3-Butadiene (T)

5.222min (+0.080) 16.03pg m

response 896

Ion	Exp%	Act%
54.00	100	100
50.00	31.00	16.63#
39.00	89.80	72.32
0.00	0.00	0.00

WP

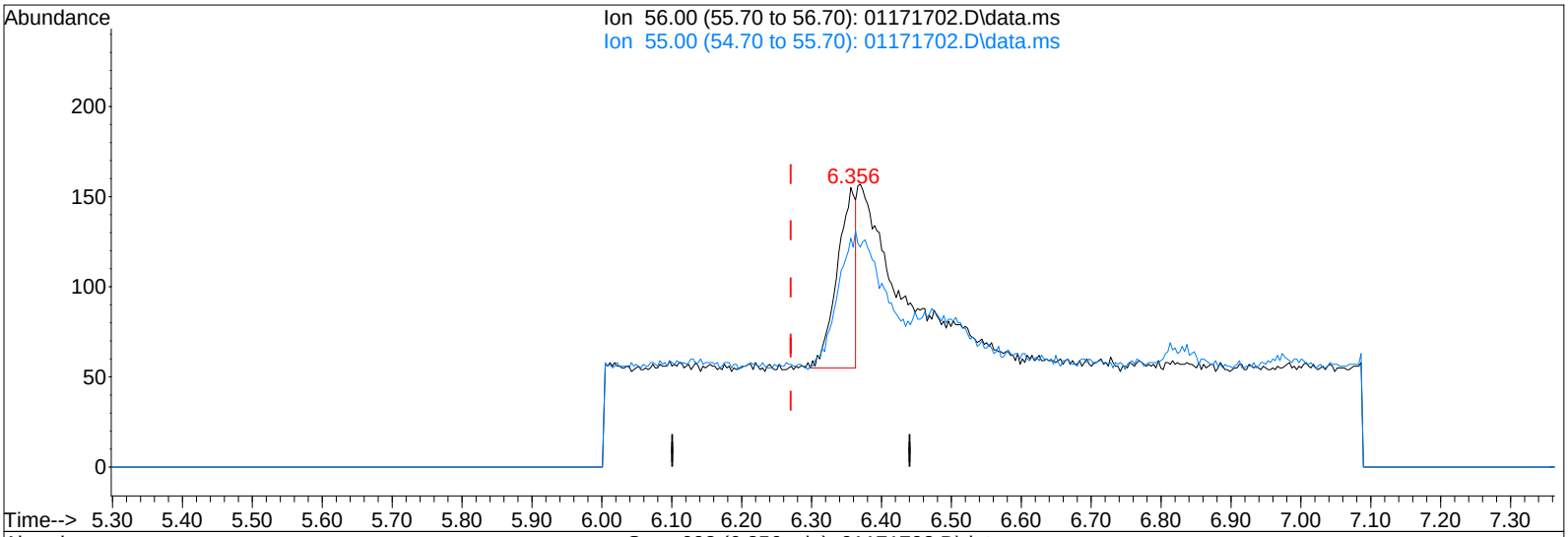
CL 1/18/17

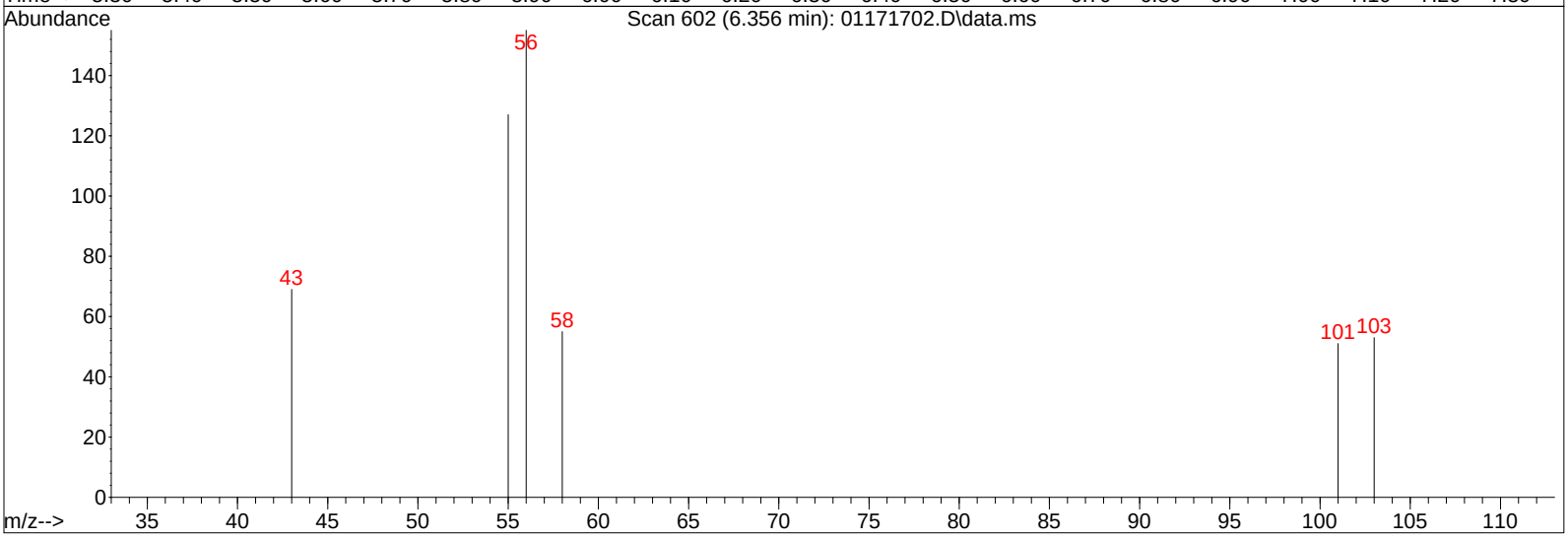
LH 1/19/17

Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 01\17\01171702.D Vial: 11
Acq On : 17 Jan 2017 16:28 Operator: CL
Sample : 10pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171711 (2/15)

Quant Time: Jan 18 07:24:22 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:23:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M





TIC: 01171702.D\data.ms

(9) Acrolein (T)

6.356min (+0.085) 9.15pg

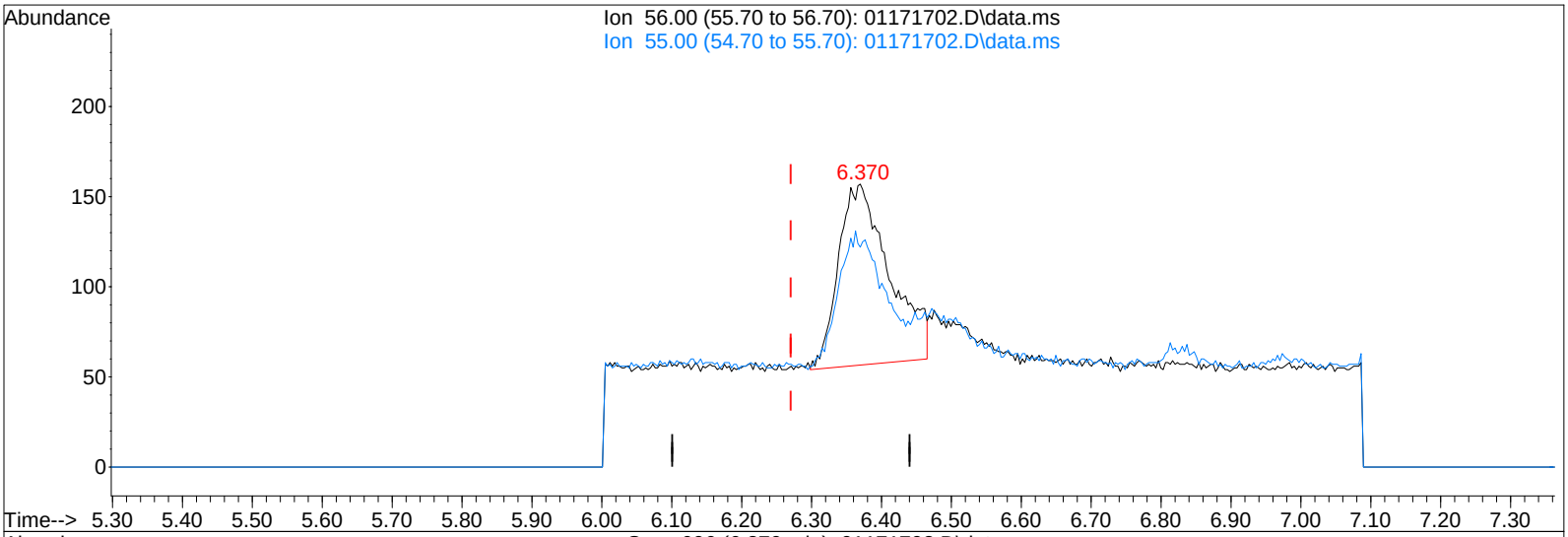
response 183

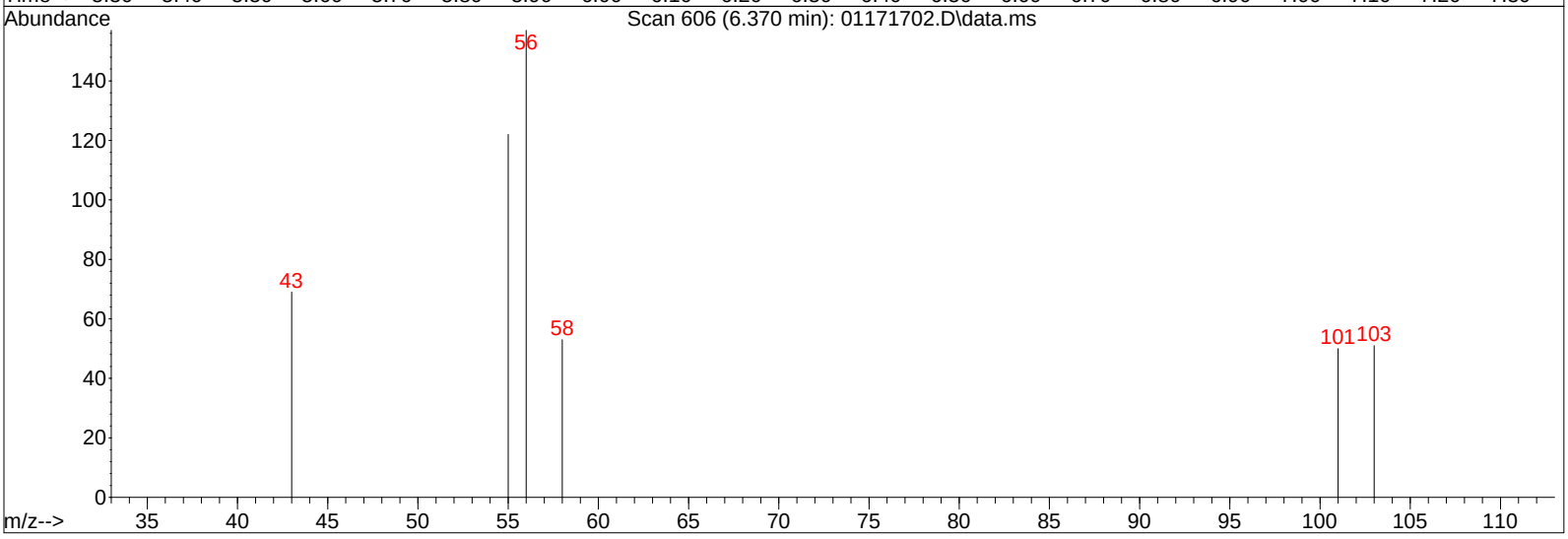
Ion	Exp%	Act%
56.00	100	100
55.00	66.60	0.00#
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 01\17\01171702.D Vial: 11
Acq On : 17 Jan 2017 16:28 Operator: CL
Sample : 10pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171711 (2/15)

Quant Time: Jan 18 07:24:22 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:23:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M





TIC: 01171702.D\data.ms

(9) Acrolein (T)

6.370min (+0.099) 25.50pg m

response 510

Ion	Exp%	Act%
56.00	100	100
55.00	66.60	0.00#
0.00	0.00	0.00
0.00	0.00	0.00

BLC

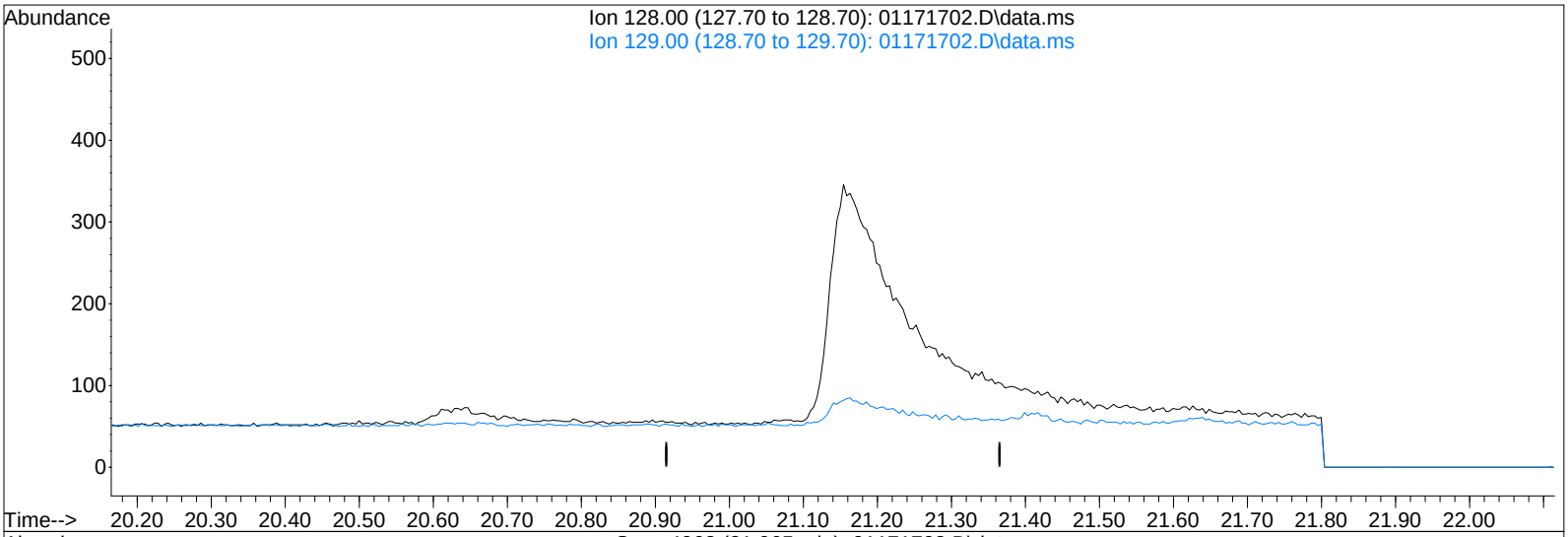
CL 1/18/17

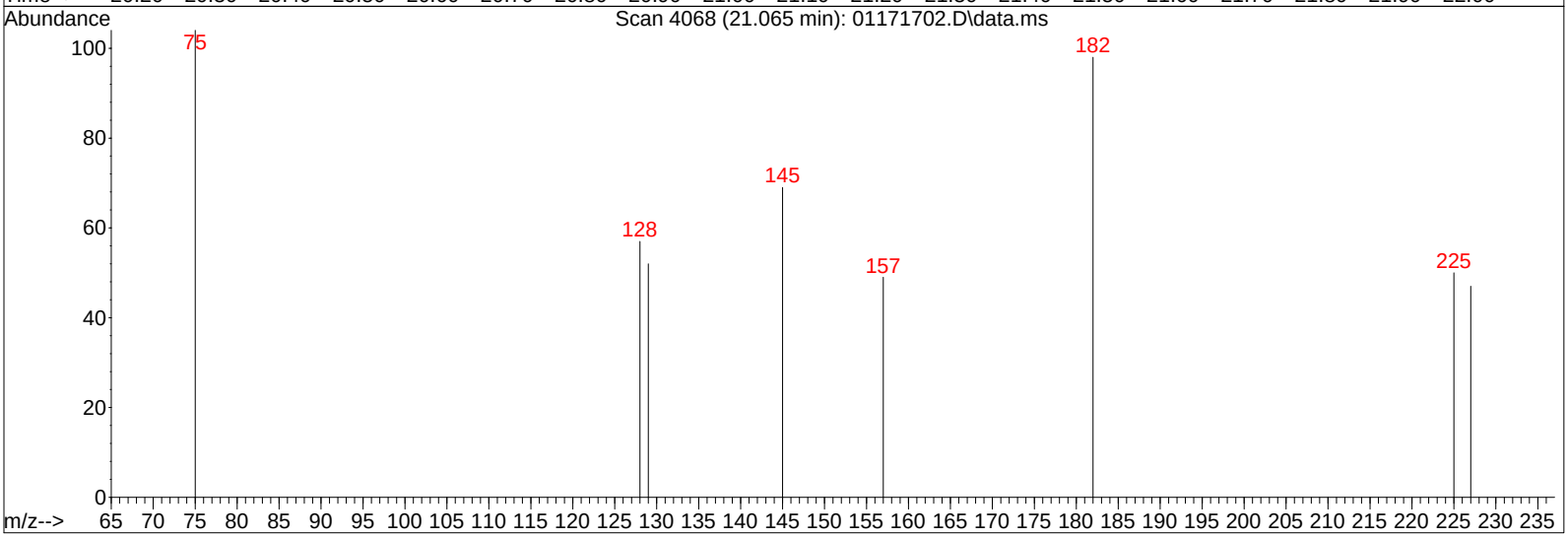
LH 1/19/17

Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 01\17\01171702.D Vial: 11
Acq On : 17 Jan 2017 16:28 Operator: CL
Sample : 10pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171711 (2/15)

Quant Time: Jan 18 07:24:22 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:23:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M





TIC: 01171702.D\data.ms

(53) Naphthalene (T)

21.065min (-21.065) 0.00pg

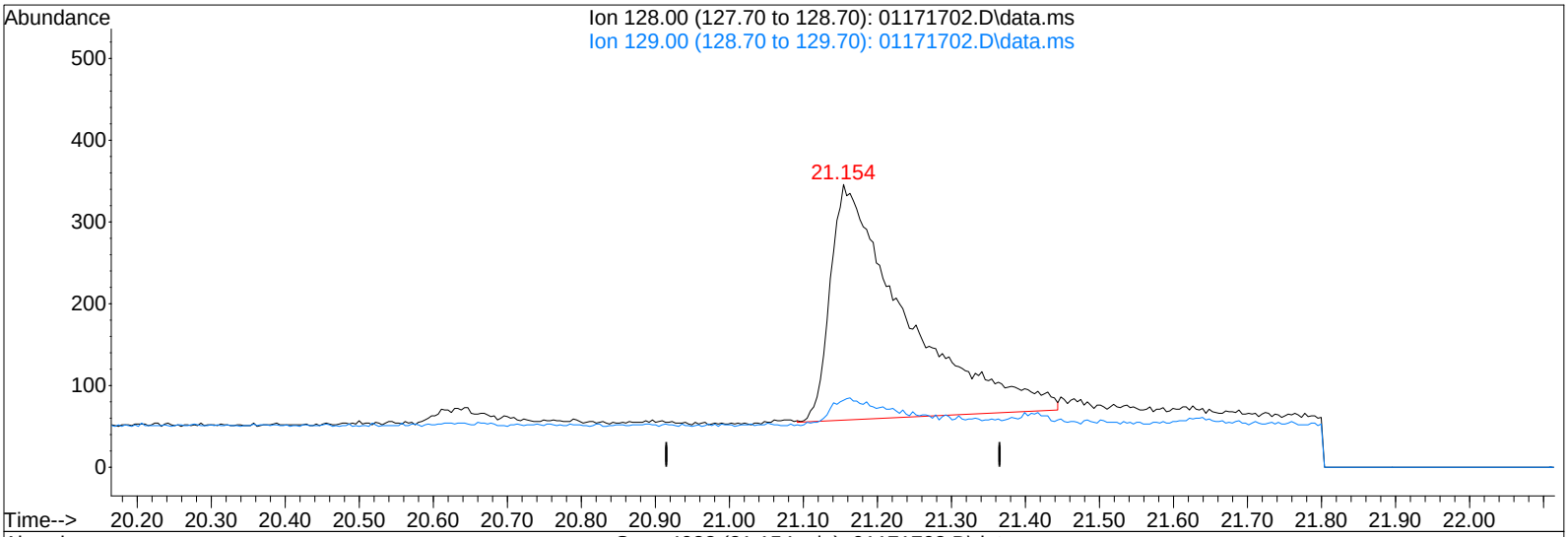
response 0

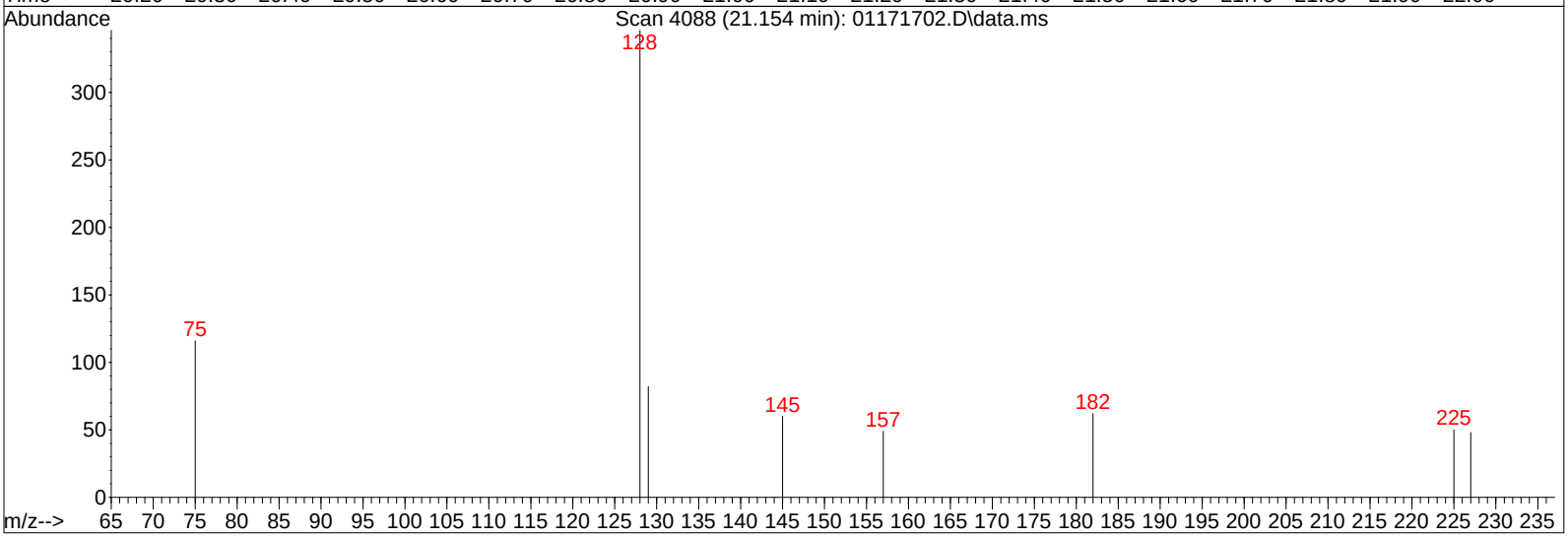
Ion	Exp%	Act%
128.00	100	0.00
129.00	10.90	0.00
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 01\17\01171702.D Vial: 11
Acq On : 17 Jan 2017 16:28 Operator: CL
Sample : 10pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171711 (2/15)

Quant Time: Jan 18 07:24:22 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:23:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M





TIC: 01171702.D\data.ms

(53) Naphthalene (T)

21.154min (+0.089) 9.75pg m

response 2029

Ion	Exp%	Act%
128.00	100	100
129.00	10.90	0.00
0.00	0.00	0.00
0.00	0.00	0.00

MP

CL 1/18/17

LH 1/19/17

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\17\01171703.D Vial: 12
Acq On : 17 Jan 2017 17:00 Operator: CL
Sample : 20pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171716 (2/15)

Quant Time: Jan 18 07:24:24 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:23:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 1/18/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.78	130	43076	1000.000 pg	0.02
25) 1,4-Difluorobenzene (IS2)	11.72	114	191402	1000.000 pg	0.01
38) Chlorobenzene-d5 (IS3)	16.06	54	32562	1000.000 pg	0.00

System Monitoring Compounds					
20) 1,2-Dichloroethane-d4 ...	10.55	65	73612	1071.464 pg	0.02
Spiked Amount 1000.000	Range 70 - 130		Recovery = 107.15%		
33) Toluene-d8 (SS2)	14.15	98	193948	1073.948 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 107.40%		
45) Bromofluorobenzene (SS3)	17.56	174	55805	894.953 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 89.50%		

Target Compounds						Qvalue
2) Dichlorodifluoromethan...	4.45	85	3208	30.400 pg		100
3) Chloromethane	4.69	52	1359	47.767 pg	#	84
4) 1,2-Dichloro,1,1,2,2-t...	4.84	85	3125	28.156 pg		100
5) Vinyl Chloride	5.01	62	3081	30.680 pg	#	56
6) 1,3-Butadiene	5.22	54	1297	23.597 pg	#	67
7) Bromomethane	5.52	94	1137	28.312 pg		97
8) Chloroethane	5.75	64	850	29.761 pg		99
9) Acrolein	6.36	56	598	30.407 pg		91
10) Acetone	6.47	58	6813	250.528 pg		90
11) Trichlorofluoromethane	6.65	101	2302	29.645 pg		100
12) 1,1-Dichloroethene	7.39	96	1234	26.402 pg		99
13) Methylene Chloride	7.52	84	1599	31.381 pg		98
14) Trichlorotrifluoroethane	7.82	151	1355	28.470 pg		99
15) trans-1,2-Dichloroethene	8.56	96	1211	24.162 pg		97
16) 1,1-Dichloroethane	8.75	63	2353	28.721 pg		99
17) Methyl tert-Butyl Ether	8.83	73	3231	23.579 pg		100
18) cis-1,2-Dichloroethene	9.63	96	1256	23.548 pg		100
19) Chloroform	9.91	83	3649	39.872 pg		100
21) 1,2-Dichloroethane	10.66	62	1743	25.619 pg		97
22) 1,1,1-Trichloroethane	10.93	97	2314	27.873 pg		99
23) Benzene	11.38	78	7406	34.376 pg		99
24) Carbon Tetrachloride	11.53	117	1977	27.514 pg		100
26) 1,2-Dichloropropane	12.19	63	1318	32.084 pg		99
27) Bromodichloromethane	12.37	83	1822	30.073 pg		100
28) Trichloroethene	12.42	130	1358	27.757 pg		99
29) 1,4-Dioxane	12.41	88	865	23.860 pg		93
30) cis-1,3-Dichloropropene	13.28	75	1472	22.543 pg		99
31) trans-1,3-Dichloropropene	13.80	75	1061	18.730 pg		94
32) 1,1,2-Trichloroethane	13.96	83	1090	29.339 pg		99
34) Toluene	14.25	91	5092	28.373 pg		99
35) Dibromochloromethane	14.67	129	1250	25.629 pg		97
36) 1,2-Dibromoethane	14.94	107	1128	23.260 pg		97
37) Tetrachloroethene	15.40	166	1381	26.175 pg		100
39) Chlorobenzene	16.11	112	3285	21.839 pg		98
40) Ethylbenzene	16.49	91	4203	18.273 pg		99
41) m,p-Xylene	16.67	91	5901	33.908 pg		98
42) Styrene	17.03	104	1607	12.572 pg		100
43) o-Xylene	17.13	106	1468	16.197 pg		100
44) 1,1,2,2-Tetrachloroethane	17.10	83	1954	21.442 pg		99
46) 1,3,5-Trimethylbenzene	18.38	105	2715	14.493 pg		97
47) 1,2,4-Trimethylbenzene	18.78	105	2463	12.722 pg		99
48) 1,3-Dichlorobenzene	18.93	146	1572	13.616 pg		96
49) 1,4-Dichlorobenzene	18.99	146	2010	17.565 pg		99
50) 1,2-Dichlorobenzene	19.32	146	1873	16.427 pg		99
51) 1,2-Dibromo-3-chloropr...	19.76	157	463	12.986 pg		93
52) 1,2,4-Trichlorobenzene	21.00	182	1108	17.501 pg		99
53) Naphthalene	21.15	128	3217	15.713 pg		97

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\17\01171703.D Vial: 12
Acq On : 17 Jan 2017 17:00 Operator: CL
Sample : 20pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171716 (2/15)

Quant Time: Jan 18 07:24:24 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:23:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

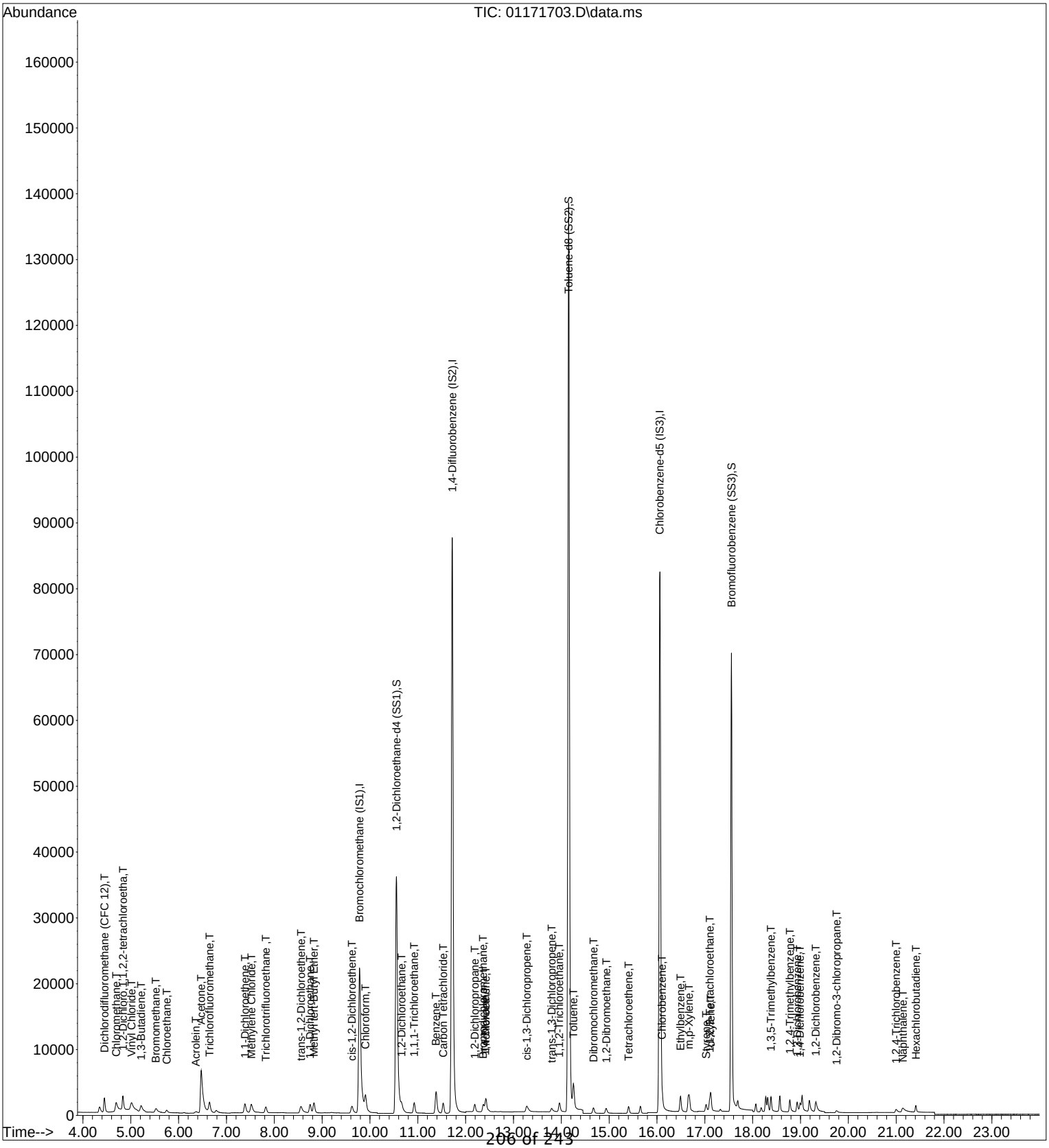
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
54) Hexachlorobutadiene	21.41	225	1089	23.472	pg	100

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\17\01171703.D Vial: 12
Acq On : 17 Jan 2017 17:00 Operator: CL
Sample : 20pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171716 (2/15)

Quant Time: Jan 18 07:24:24 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:23:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\17\01171704.D Vial: 12
Acq On : 17 Jan 2017 17:31 Operator: CL
Sample : 50pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171716 (2/15)

Quant Time: Jan 18 07:24:25 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:23:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 1/18/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.78	130	42312	1000.000 pg	0.02
25) 1,4-Difluorobenzene (IS2)	11.72	114	190926	1000.000 pg	0.01
38) Chlorobenzene-d5 (IS3)	16.06	54	32305	1000.000 pg	0.00

System Monitoring Compounds					
20) 1,2-Dichloroethane-d4 ...	10.55	65	72602	1075.844 pg	0.01
Spiked Amount 1000.000	Range 70 - 130		Recovery = 107.58%		
33) Toluene-d8 (SS2)	14.15	98	191549	1063.308 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 106.33%		
45) Bromofluorobenzene (SS3)	17.56	174	55825	902.396 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 90.24%		

Target Compounds						Qvalue
2) Dichlorodifluoromethan...	4.44	85	6255	60.345 pg		100
3) Chloromethane	4.68	52	2456	87.883 pg		90
4) 1,2-Dichloro,1,1,2,2-t...	4.83	85	6131	56.237 pg		100
5) Vinyl Chloride	5.00	62	6403	64.912 pg		69
6) 1,3-Butadiene	5.20	54	2893	53.585 pg	#	69
7) Bromomethane	5.51	94	2232	56.581 pg		99
8) Chloroethane	5.74	64	1686	60.098 pg		100
9) Acrolein	6.34	56	1161	60.101 pg		92
10) Acetone	6.46	58	11915	446.050 pg		92
11) Trichlorofluoromethane	6.64	101	4512	59.155 pg		99
12) 1,1-Dichloroethene	7.38	96	2470	53.802 pg		98
13) Methylene Chloride	7.51	84	3074	61.419 pg		98
14) Trichlorotrifluoroethane	7.81	151	2616	55.957 pg		100
15) trans-1,2-Dichloroethene	8.55	96	2542	51.634 pg		98
16) 1,1-Dichloroethane	8.74	63	4748	59.001 pg		100
17) Methyl tert-Butyl Ether	8.82	73	6377	47.378 pg		99
18) cis-1,2-Dichloroethene	9.62	96	2621	50.028 pg		100
19) Chloroform	9.90	83	6631	73.765 pg		100
21) 1,2-Dichloroethane	10.66	62	3686	55.157 pg		95
22) 1,1,1-Trichloroethane	10.92	97	4520	55.428 pg		99
23) Benzene	11.38	78	14088	66.573 pg		100
24) Carbon Tetrachloride	11.53	117	3873	54.874 pg		100
26) 1,2-Dichloropropane	12.19	63	2612	63.741 pg		98
27) Bromodichloromethane	12.37	83	3707	61.338 pg		100
28) Trichloroethene	12.42	130	2805	57.476 pg		99
29) 1,4-Dioxane	12.40	88	1764	48.778 pg		96
30) cis-1,3-Dichloropropene	13.27	75	3325	51.049 pg		99
31) trans-1,3-Dichloropropene	13.79	75	2419	42.809 pg		98
32) 1,1,2-Trichloroethane	13.96	83	2252	60.768 pg		100
34) Toluene	14.25	91	10128	56.574 pg		99
35) Dibromochloromethane	14.67	129	2614	53.729 pg		100
36) 1,2-Dibromoethane	14.93	107	2485	51.369 pg		96
37) Tetrachloroethene	15.40	166	2790	53.013 pg		100
39) Chlorobenzene	16.11	112	6853	45.922 pg		99
40) Ethylbenzene	16.49	91	8561	37.516 pg		99
41) m,p-Xylene	16.66	91	12362	71.600 pg		98
42) Styrene	17.02	104	3739	29.485 pg		100
43) o-Xylene	17.13	106	3033	33.730 pg		100
44) 1,1,2,2-Tetrachloroethane	17.10	83	4100	45.348 pg		99
46) 1,3,5-Trimethylbenzene	18.38	105	5971	32.127 pg		99
47) 1,2,4-Trimethylbenzene	18.77	105	5368	27.948 pg		96
48) 1,3-Dichlorobenzene	18.93	146	4441	38.773 pg		100
49) 1,4-Dichlorobenzene	18.99	146	4614	40.641 pg		98
50) 1,2-Dichlorobenzene	19.31	146	4585	40.533 pg		100
51) 1,2-Dibromo-3-chloropr...	19.73	157	1057	29.881 pg		97
52) 1,2,4-Trichlorobenzene	20.99	182	2332	37.127 pg		100
53) Naphthalene	21.12	128	6574	32.366 pg		94

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\17\01171704.D Vial: 12
Acq On : 17 Jan 2017 17:31 Operator: CL
Sample : 50pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171716 (2/15)

Quant Time: Jan 18 07:24:25 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:23:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

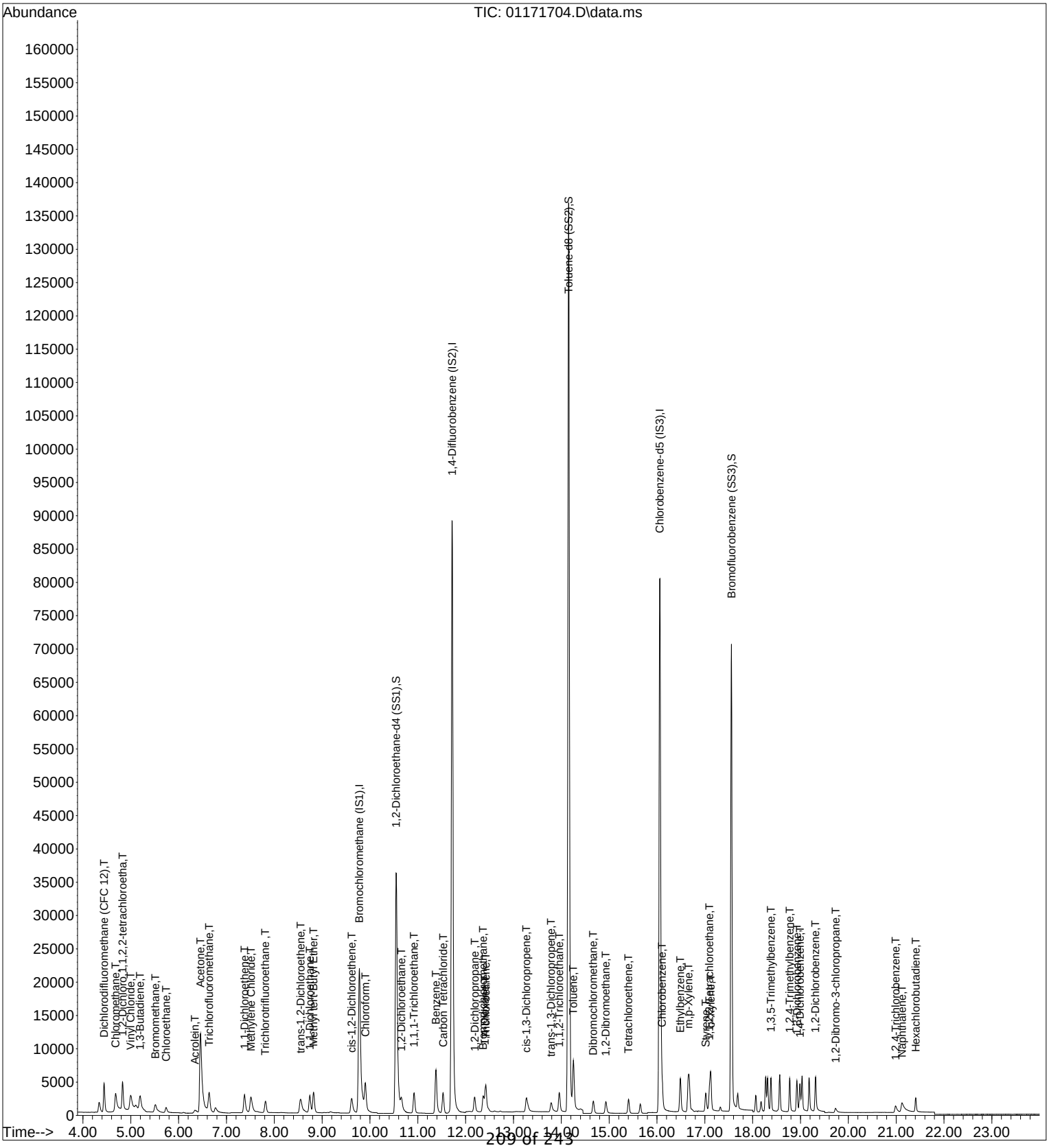
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
54) Hexachlorobutadiene	21.41	225	2251	48.903	pg	98

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\17\01171704.D Vial: 12
Acq On : 17 Jan 2017 17:31 Operator: CL
Sample : 50pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171716 (2/15)

Quant Time: Jan 18 07:24:25 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:23:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\17\01171705.D Vial: 12
Acq On : 17 Jan 2017 18:03 Operator: CL
Sample : 100pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171716 (2/15)

Quant Time: Jan 18 07:24:26 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:23:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 1/18/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.77	130	45005	1000.000 pg	0.02
25) 1,4-Difluorobenzene (IS2)	11.71	114	208640	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.06	54	34806	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.54	65	77609	1081.224 pg	0.01
Spiked Amount 1000.000	Range 70 - 130		Recovery = 108.12%		
33) Toluene-d8 (SS2)	14.15	98	206701	1050.000 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 105.00%		
45) Bromofluorobenzene (SS3)	17.56	174	62097	931.654 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 93.16%		

Target Compounds						Qvalue
2) Dichlorodifluoromethan...	4.44	85	11702	106.140 pg		100
3) Chloromethane	4.68	52	4022	135.307 pg		95
4) 1,2-Dichloro,1,1,2,2-t...	4.82	85	11405	98.352 pg		100
5) Vinyl Chloride	4.99	62	11745	111.943 pg		98
6) 1,3-Butadiene	5.19	54	4849	84.441 pg	#	88
7) Bromomethane	5.50	94	4128	98.383 pg		100
8) Chloroethane	5.73	64	3182	106.637 pg		100
9) Acrolein	6.33	56	2159	105.077 pg		97
10) Acetone	6.44	58	20346	716.095 pg		94
11) Trichlorofluoromethane	6.63	101	8394	103.465 pg		100
12) 1,1-Dichloroethene	7.37	96	4661	95.451 pg		99
13) Methylene Chloride	7.50	84	5391	101.267 pg		96
14) Trichlorotrifluoroethane	7.81	151	4817	96.872 pg		100
15) trans-1,2-Dichloroethene	8.54	96	4931	94.167 pg		98
16) 1,1-Dichloroethane	8.73	63	8953	104.597 pg		100
17) Methyl tert-Butyl Ether	8.81	73	12102	84.531 pg		100
18) cis-1,2-Dichloroethene	9.61	96	5082	91.197 pg		100
19) Chloroform	9.90	83	11091	115.996 pg		100
21) 1,2-Dichloroethane	10.65	62	7112	100.055 pg		99
22) 1,1,1-Trichloroethane	10.92	97	8527	98.308 pg		100
23) Benzene	11.38	78	22606	100.432 pg		100
24) Carbon Tetrachloride	11.53	117	7250	96.575 pg		100
26) 1,2-Dichloropropane	12.18	63	4916	109.781 pg		99
27) Bromodichloromethane	12.36	83	7064	106.960 pg		100
28) Trichloroethene	12.42	130	5234	98.142 pg		99
29) 1,4-Dioxane	12.40	88	3443	87.123 pg		99
30) cis-1,3-Dichloropropene	13.26	75	6586	92.530 pg		100
31) trans-1,3-Dichloropropene	13.78	75	5019	81.281 pg		98
32) 1,1,2-Trichloroethane	13.95	83	4311	106.452 pg		99
34) Toluene	14.25	91	19131	97.792 pg		100
35) Dibromochloromethane	14.67	129	5077	95.495 pg		99
36) 1,2-Dibromoethane	14.93	107	4870	92.124 pg		99
37) Tetrachloroethene	15.40	166	5324	92.572 pg		100
39) Chlorobenzene	16.11	112	13233	82.303 pg		100
40) Ethylbenzene	16.48	91	16705	67.945 pg		100
41) m,p-Xylene	16.66	91	23722	127.524 pg		100
42) Styrene	17.02	104	7858	57.514 pg		100
43) o-Xylene	17.12	106	6242	64.429 pg		100
44) 1,1,2,2-Tetrachloroethane	17.10	83	8269	84.888 pg		100
46) 1,3,5-Trimethylbenzene	18.38	105	12552	62.683 pg		99
47) 1,2,4-Trimethylbenzene	18.77	105	11979	57.887 pg		98
48) 1,3-Dichlorobenzene	18.92	146	9551	77.394 pg		99
49) 1,4-Dichlorobenzene	18.98	146	9921	81.108 pg		99
50) 1,2-Dichlorobenzene	19.31	146	9578	78.589 pg		99
51) 1,2-Dibromo-3-chloropr...	19.73	157	2286	59.981 pg		94
52) 1,2,4-Trichlorobenzene	20.97	182	4905	72.480 pg		99
53) Naphthalene	21.10	128	14706	67.200 pg		96

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\17\01171705.D Vial: 12
Acq On : 17 Jan 2017 18:03 Operator: CL
Sample : 100pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171716 (2/15)

Quant Time: Jan 18 07:24:26 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:23:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

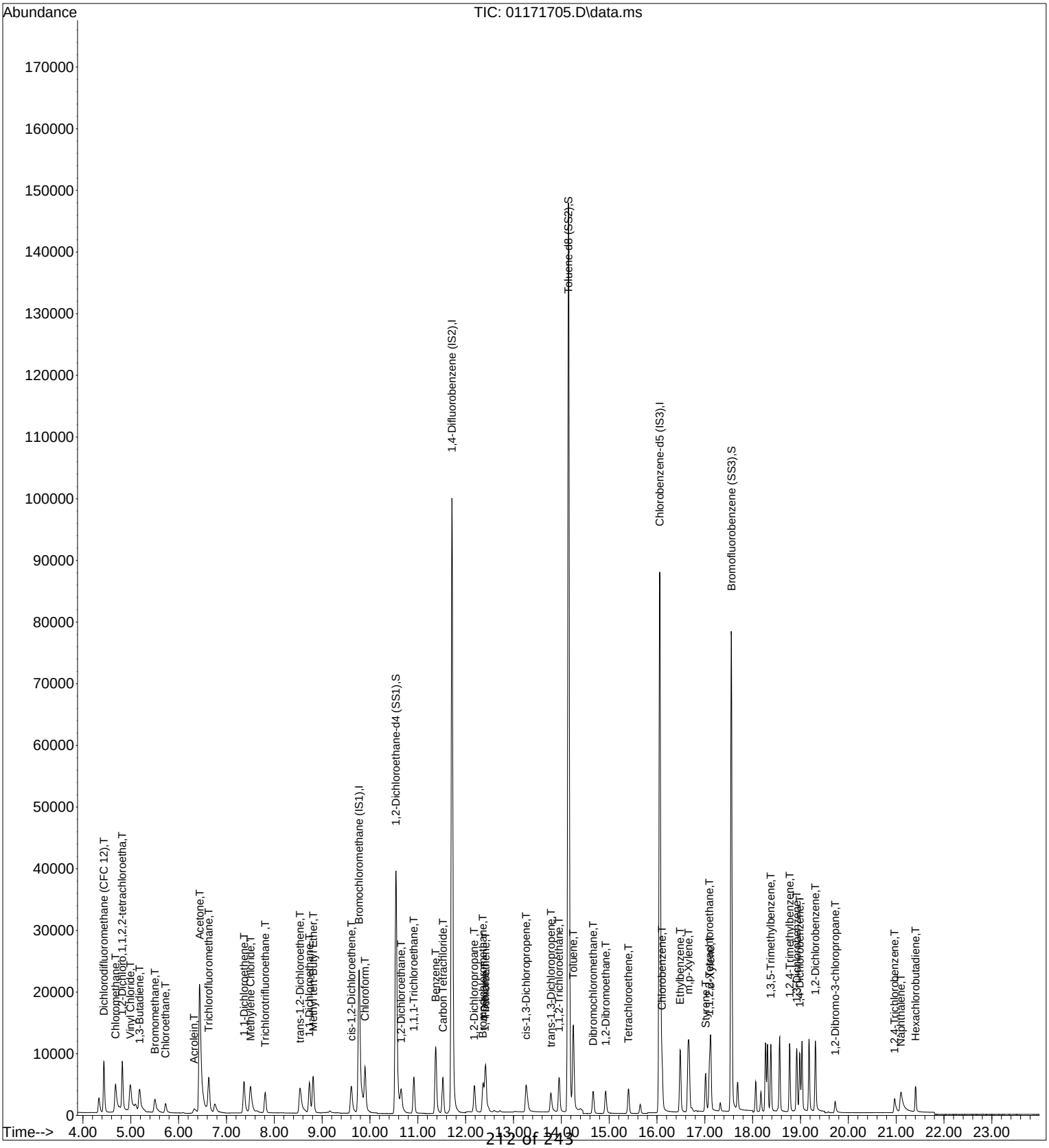
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	4381	88.338	pg	99

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\17\01171705.D Vial: 12
Acq On : 17 Jan 2017 18:03 Operator: CL
Sample : 100pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171716 (2/15)

Quant Time: Jan 18 07:24:26 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:23:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\17\01171706.D Vial: 13
Acq On : 17 Jan 2017 18:34 Operator: CL
Sample : 500pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171706 (2/15)

Quant Time: Jan 18 07:24:27 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:23:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 1/18/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.76	130	44783	1000.000 pg	0.00
25) 1,4-Difluorobenzene (IS2)	11.71	114	223857	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.05	54	35971	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.53	65	76373	1069.279 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 106.93%		
33) Toluene-d8 (SS2)	14.15	98	214856	1017.234 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 101.72%		
45) Bromofluorobenzene (SS3)	17.55	174	68493	994.333 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 99.43%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.42	85	57903	527.796 pg	100
3) Chloromethane	4.65	52	17671	597.432 pg	96
4) 1,2-Dichloro,1,1,2,2-t...	4.81	85	55908	484.520 pg	100
5) Vinyl Chloride	4.96	62	57304	548.880 pg	98
6) 1,3-Butadiene	5.14	54	26914	471.005 pg	98
7) Bromomethane	5.47	94	20583	492.986 pg	99
8) Chloroethane	5.70	64	15883	534.918 pg	100
9) Acrolein	6.27	56	10449	511.065 pg	97
10) Acetone	6.40	58	78599	2780.075 pg	100
11) Trichlorofluoromethane	6.62	101	40646	503.487 pg	100
12) 1,1-Dichloroethene	7.35	96	23761	489.006 pg	100
13) Methylene Chloride	7.48	84	27670	522.344 pg	100
14) Trichlorotrifluoroethane	7.80	151	23647	477.910 pg	100
15) trans-1,2-Dichloroethene	8.51	96	25773	494.624 pg	100
16) 1,1-Dichloroethane	8.72	63	45178	530.427 pg	100
17) Methyl tert-Butyl Ether	8.79	73	66425	466.273 pg	100
18) cis-1,2-Dichloroethene	9.59	96	27137	489.391 pg	100
19) Chloroform	9.89	83	49859	524.039 pg	100
21) 1,2-Dichloroethane	10.64	62	36835	520.779 pg	100
22) 1,1,1-Trichloroethane	10.91	97	42781	495.670 pg	100
23) Benzene	11.37	78	109329	488.127 pg	100
24) Carbon Tetrachloride	11.52	117	36299	485.923 pg	100
26) 1,2-Dichloropropane	12.18	63	25842	537.860 pg	100
27) Bromodichloromethane	12.35	83	36426	514.056 pg	100
28) Trichloroethene	12.41	130	27480	480.245 pg	100
29) 1,4-Dioxane	12.38	88	19294	455.035 pg	100
30) cis-1,3-Dichloropropene	13.26	75	37513	491.210 pg	100
31) trans-1,3-Dichloropropene	13.77	75	29982	452.542 pg	100
32) 1,1,2-Trichloroethane	13.95	83	22333	513.982 pg	100
34) Toluene	14.24	91	100318	477.936 pg	100
35) Dibromochloromethane	14.66	129	26901	471.596 pg	100
36) 1,2-Dibromoethane	14.92	107	26301	463.706 pg	100
37) Tetrachloroethene	15.40	166	28001	453.778 pg	100
39) Chlorobenzene	16.10	112	68884	414.549 pg	100
40) Ethylbenzene	16.48	91	98170	386.357 pg	100
41) m,p-Xylene	16.66	91	159206	828.133 pg	100
42) Styrene	17.01	104	55147	390.556 pg	100
43) o-Xylene	17.12	106	40898	408.468 pg	100
44) 1,1,2,2-Tetrachloroethane	17.09	83	45719	454.141 pg	100
46) 1,3,5-Trimethylbenzene	18.38	105	88844	429.303 pg	100
47) 1,2,4-Trimethylbenzene	18.77	105	88573	414.156 pg	100
48) 1,3-Dichlorobenzene	18.92	146	55988	438.991 pg	100
49) 1,4-Dichlorobenzene	18.98	146	54609	431.989 pg	100
50) 1,2-Dichlorobenzene	19.31	146	53756	426.789 pg	100
51) 1,2-Dibromo-3-chloropr...	19.72	157	15593	395.886 pg	100
52) 1,2,4-Trichlorobenzene	20.94	182	29680	424.369 pg	100
53) Naphthalene	21.06	128	110354	487.941 pg	100

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\17\01171706.D Vial: 13
Acq On : 17 Jan 2017 18:34 Operator: CL
Sample : 500pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171706 (2/15)

Quant Time: Jan 18 07:24:27 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:23:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

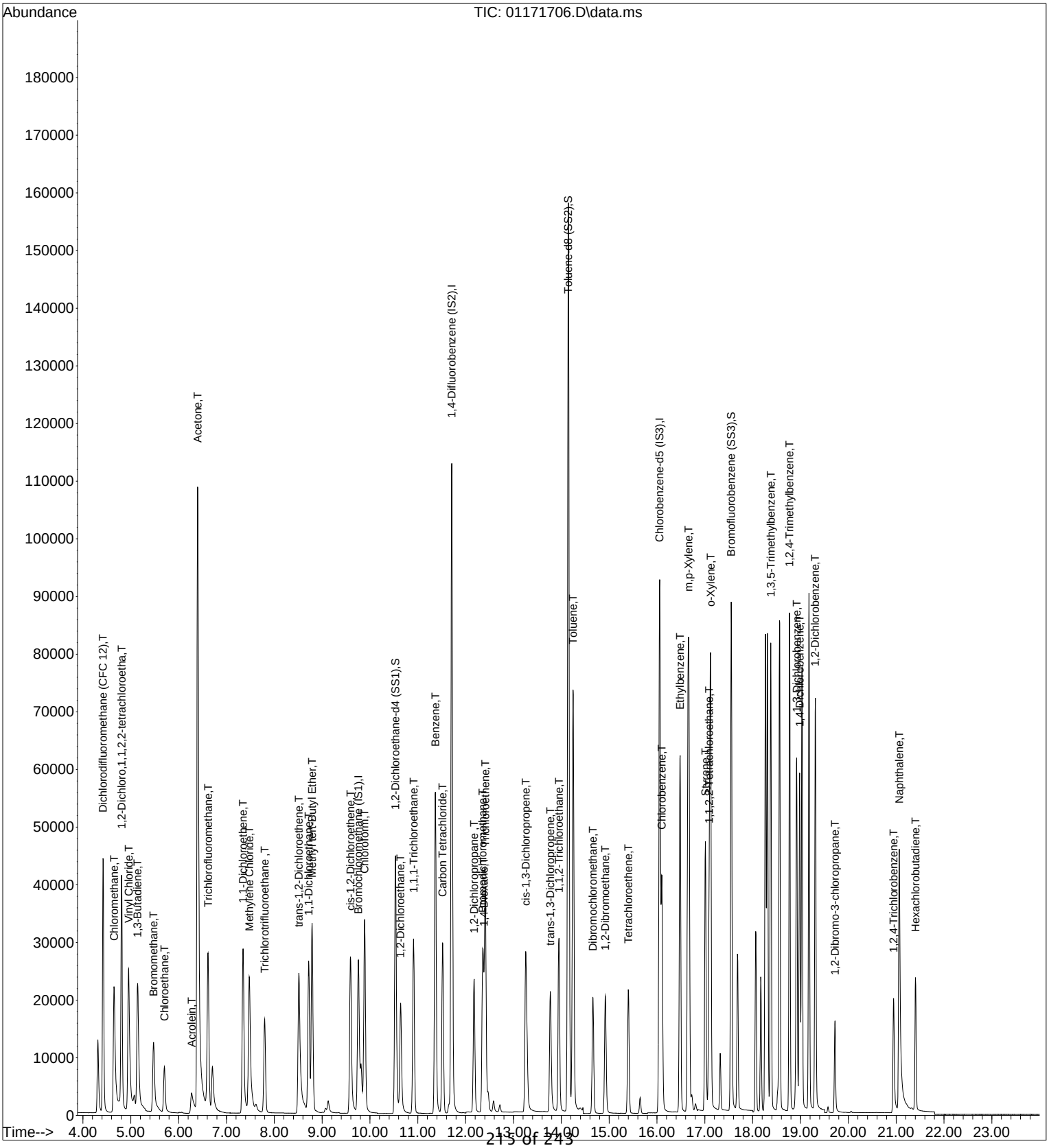
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	22781	444.477	pg	100

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\17\01171706.D Vial: 13
Acq On : 17 Jan 2017 18:34 Operator: CL
Sample : 500pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171706 (2/15)

Quant Time: Jan 18 07:24:27 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:23:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\17\01171707.D Vial: 14
Acq On : 17 Jan 2017 19:05 Operator: CL
Sample : 1000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171704 (2/15)

Quant Time: Jan 18 07:24:28 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:23:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 1/18/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.75	130	41854	1000.000 pg	0.00
25) 1,4-Difluorobenzene (IS2)	11.71	114	211388	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.05	54	34552	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.53	65	71659	1073.490 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 107.35%		
33) Toluene-d8 (SS2)	14.15	98	204946	1027.551 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 102.76%		
45) Bromofluorobenzene (SS3)	17.55	174	66677	1007.722 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 100.77%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.41	85	121731	1187.250 pg	100
3) Chloromethane	4.64	52	35441	1282.063 pg	98
4) 1,2-Dichloro,1,1,2,2-t...	4.80	85	116305	1078.480 pg	100
5) Vinyl Chloride	4.94	62	120378	1233.719 pg	100
6) 1,3-Butadiene	5.12	54	65737	1230.929 pg	95
7) Bromomethane	5.46	94	44725	1146.180 pg	99
8) Chloroethane	5.69	64	34327	1236.992 pg	100
9) Acrolein	6.26	56	23627	1236.477 pg	97
10) Acetone	6.39	58	166227	6290.964 pg	99
11) Trichlorofluoromethane	6.61	101	85251	1129.916 pg	100
12) 1,1-Dichloroethene	7.34	96	51989	1144.819 pg	99
13) Methylene Chloride	7.47	84	58254	1176.655 pg	98
14) Trichlorotrifluoroethane	7.80	151	50943	1101.618 pg	99
15) trans-1,2-Dichloroethene	8.51	96	55543	1140.554 pg	100
16) 1,1-Dichloroethane	8.72	63	96395	1210.958 pg	100
17) Methyl tert-Butyl Ether	8.78	73	152126	1142.583 pg	100
18) cis-1,2-Dichloroethene	9.59	96	58195	1122.938 pg	100
19) Chloroform	9.89	83	102450	1152.147 pg	100
21) 1,2-Dichloroethane	10.64	62	77861	1177.847 pg	100
22) 1,1,1-Trichloroethane	10.91	97	89539	1110.018 pg	100
23) Benzene	11.36	78	228212	1090.215 pg	100
24) Carbon Tetrachloride	11.52	117	75686	1084.088 pg	100
26) 1,2-Dichloropropane	12.17	63	55087	1214.178 pg	100
27) Bromodichloromethane	12.35	83	77510	1158.369 pg	100
28) Trichloroethene	12.41	130	58583	1084.198 pg	100
29) 1,4-Dioxane	12.38	88	43626	1089.578 pg	99
30) cis-1,3-Dichloropropene	13.25	75	84776	1175.571 pg	100
31) trans-1,3-Dichloropropene	13.76	75	68577	1096.142 pg	100
32) 1,1,2-Trichloroethane	13.95	83	47633	1160.911 pg	100
34) Toluene	14.25	91	217931	1099.513 pg	100
35) Dibromochloromethane	14.66	129	58454	1085.190 pg	100
36) 1,2-Dibromoethane	14.92	107	56919	1062.718 pg	100
37) Tetrachloroethene	15.40	166	59431	1019.938 pg	100
39) Chlorobenzene	16.10	112	147852	926.327 pg	100
40) Ethylbenzene	16.48	91	229006	938.287 pg	100
41) m,p-Xylene	16.66	91	373197	2020.962 pg	100
42) Styrene	17.01	104	132963	980.329 pg	100
43) o-Xylene	17.12	106	93607	973.294 pg	100
44) 1,1,2,2-Tetrachloroethane	17.09	83	97982	1013.258 pg	100
46) 1,3,5-Trimethylbenzene	18.38	105	202965	1021.026 pg	100
47) 1,2,4-Trimethylbenzene	18.77	105	206583	1005.626 pg	100
48) 1,3-Dichlorobenzene	18.92	146	121633	992.867 pg	100
49) 1,4-Dichlorobenzene	18.98	146	118331	974.511 pg	100
50) 1,2-Dichlorobenzene	19.31	146	117767	973.396 pg	100
51) 1,2-Dibromo-3-chloropr...	19.72	157	35678	943.018 pg	99
52) 1,2,4-Trichlorobenzene	20.94	182	63949	951.904 pg	100
53) Naphthalene	21.06	128	226576	1042.971 pg	100

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\17\01171707.D Vial: 14
Acq On : 17 Jan 2017 19:05 Operator: CL
Sample : 1000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171704 (2/15)

Quant Time: Jan 18 07:24:28 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:23:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

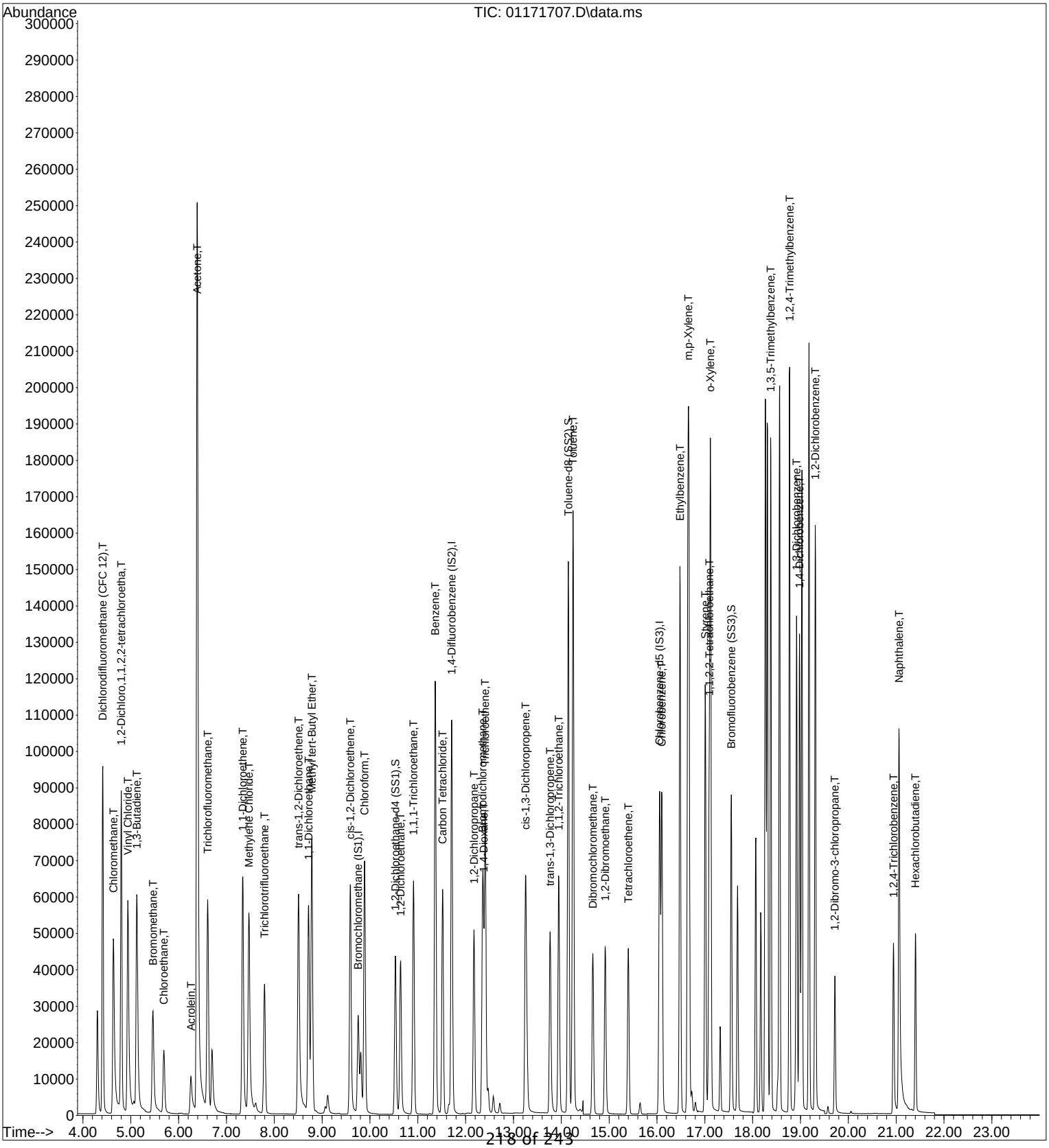
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	48651	988.207	pg	99

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\17\01171707.D Vial: 14
Acq On : 17 Jan 2017 19:05 Operator: CL
Sample : 1000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171704 (2/15)

Quant Time: Jan 18 07:24:28 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:23:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\17\01171708.D Vial: 14
Acq On : 17 Jan 2017 19:37 Operator: CL
Sample : 2000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171704 (2/15)

Quant Time: Jan 18 07:24:29 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:23:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 1/18/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.75	130	49899	1000.000 pg	0.00
25) 1,4-Difluorobenzene (IS2)	11.71	114	257639	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.05	54	43299	1000.000 pg	0.00
System Monitoring Compounds					
20) 1,2-Dichloroethane-d4 ...	10.53	65	88262	1109.038 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery	= 110.90%	
33) Toluene-d8 (SS2)	14.15	98	255288	1050.178 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery	= 105.02%	
45) Bromofluorobenzene (SS3)	17.55	174	83405	1005.894 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery	= 100.59%	

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.40	85	247453	2024.319 pg	100
3) Chloromethane	4.62	52	68490	2078.144 pg	100
4) 1,2-Dichloro,1,1,2,2-t...	4.79	85	228623	1778.193 pg	100
5) Vinyl Chloride	4.92	62	238576	2050.883 pg	100
6) 1,3-Butadiene	5.11	54	138108	2169.137 pg	96
7) Bromomethane	5.45	94	92015	1977.908 pg	99
8) Chloroethane	5.68	64	71654	2165.791 pg	100
9) Acrolein	6.24	56	53675	2356.106 pg	98
10) Acetone	6.38	58	345329	10962.102 pg	99
11) Trichlorofluoromethane	6.60	101	176787	1965.360 pg	100
12) 1,1-Dichloroethene	7.33	96	112198	2072.314 pg	99
13) Methylene Chloride	7.46	84	122524	2075.820 pg	96
14) Trichlorotrifluoroethane	7.79	151	105633	1915.981 pg	100
15) trans-1,2-Dichloroethene	8.50	96	120597	2077.152 pg	100
16) 1,1-Dichloroethane	8.71	63	205600	2166.421 pg	100
17) Methyl tert-Butyl Ether	8.78	73	343119	2161.595 pg	100
18) cis-1,2-Dichloroethene	9.59	96	128614	2081.629 pg	100
19) Chloroform	9.89	83	218678	2062.749 pg	100
21) 1,2-Dichloroethane	10.64	62	171849	2180.525 pg	99
22) 1,1,1-Trichloroethane	10.91	97	194583	2023.336 pg	100
23) Benzene	11.36	78	497703	1994.293 pg	100
24) Carbon Tetrachloride	11.52	117	162647	1954.070 pg	100
26) 1,2-Dichloropropane	12.17	63	124072	2243.757 pg	99
27) Bromodichloromethane	12.36	83	172250	2112.113 pg	100
28) Trichloroethene	12.41	130	126555	1921.697 pg	100
29) 1,4-Dioxane	12.37	88	101211	2074.002 pg	100
30) cis-1,3-Dichloropropene	13.25	75	201886	2296.947 pg	100
31) trans-1,3-Dichloropropene	13.77	75	167726	2199.670 pg	100
32) 1,1,2-Trichloroethane	13.95	83	105668	2113.019 pg	99
34) Toluene	14.25	91	491292	2033.714 pg	99
35) Dibromochloromethane	14.66	129	130445	1986.954 pg	100
36) 1,2-Dibromoethane	14.92	107	129865	1989.398 pg	100
37) Tetrachloroethene	15.40	166	129671	1825.880 pg	99
39) Chlorobenzene	16.10	112	329882	1649.268 pg	100
40) Ethylbenzene	16.48	91	546206	1785.832 pg	100
41) m,p-Xylene	16.65	91	859634	3714.745 pg	100
42) Styrene	17.01	104	329876	1940.828 pg	100
43) o-Xylene	17.12	106	213725	1773.316 pg	99
44) 1,1,2,2-Tetrachloroethane	17.09	83	221503	1827.884 pg	100
46) 1,3,5-Trimethylbenzene	18.38	105	465772	1869.753 pg	100
47) 1,2,4-Trimethylbenzene	18.77	105	485157	1884.602 pg	100
48) 1,3-Dichlorobenzene	18.92	146	274169	1785.884 pg	100
49) 1,4-Dichlorobenzene	18.98	146	266980	1754.536 pg	100
50) 1,2-Dichlorobenzene	19.31	146	265562	1751.568 pg	100
51) 1,2-Dibromo-3-chloropr...	19.72	157	86836	1831.532 pg	99
52) 1,2,4-Trichlorobenzene	20.94	182	154909	1840.057 pg	100
53) Naphthalene	21.05	128	551610	2026.216 pg	100

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\17\01171708.D Vial: 14
Acq On : 17 Jan 2017 19:37 Operator: CL
Sample : 2000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171704 (2/15)

Quant Time: Jan 18 07:24:29 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:23:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

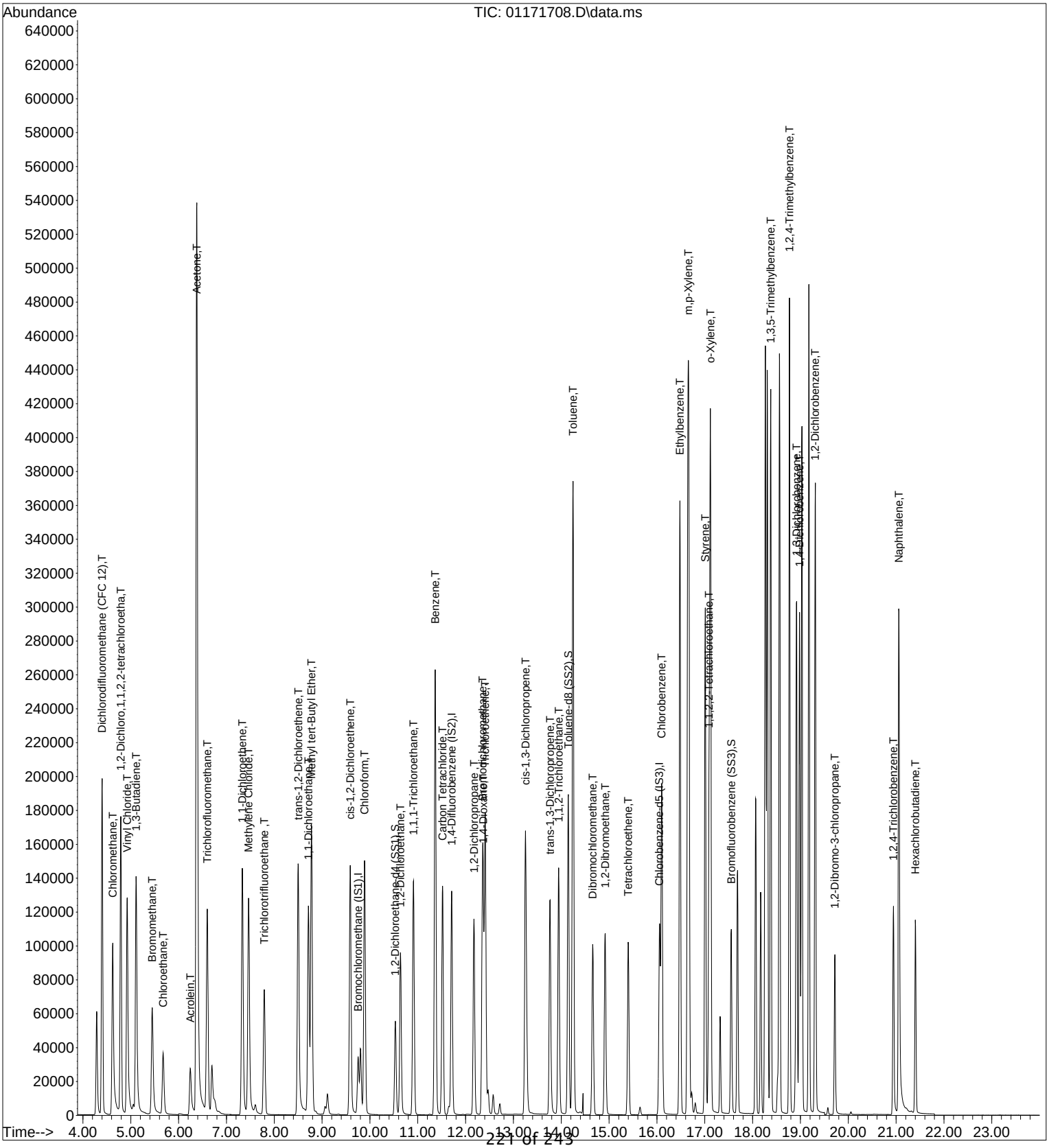
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	111017	1799.455	pg	100

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\17\01171708.D Vial: 14
Acq On : 17 Jan 2017 19:37 Operator: CL
Sample : 2000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171704 (2/15)

Quant Time: Jan 18 07:24:29 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:23:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\17\01171709.D Vial: 14
Acq On : 17 Jan 2017 20:08 Operator: CL
Sample : 5000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171704 (2/15)

Quant Time: Jan 18 07:24:31 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:23:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 1/18/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.75	130	51471	1000.000 pg	0.00
25) 1,4-Difluorobenzene (IS2)	11.71	114	264394	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.05	54	44009	1000.000 pg	0.00

System Monitoring Compounds					
20) 1,2-Dichloroethane-d4 ...	10.53	65	91124	1110.030 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 111.00%		
33) Toluene-d8 (SS2)	14.14	98	257959	1034.054 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 103.40%		
45) Bromofluorobenzene (SS3)	17.55	174	86940	1031.611 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 103.16%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.39	85	611787	4851.944 pg	100
3) Chloromethane	4.61	52	162688	4785.564 pg	99
4) 1,2-Dichloro,1,1,2,2-t...	4.78	85	538033	4056.926 pg	100
5) Vinyl Chloride	4.91	62	575174	4793.389 pg	100
6) 1,3-Butadiene	5.10	54	447352	6811.564 pg	99
7) Bromomethane	5.44	94	222851	4643.991 pg	100
8) Chloroethane	5.66	64	179461	5258.665 pg	100
9) Acrolein	6.24	56	140240	5967.932 pg	99
10) Acetone	6.38	58	838814	25814.022 pg	100
11) Trichlorofluoromethane	6.59	101	429622	4630.282 pg	100
12) 1,1-Dichloroethene	7.33	96	280850	5028.913 pg	99
13) Methylene Chloride	7.47	84	297672	4889.177 pg	95
14) Trichlorotrifluoroethane	7.79	151	256794	4515.498 pg	100
15) trans-1,2-Dichloroethene	8.50	96	296591	4952.436 pg	98
16) 1,1-Dichloroethane	8.72	63	498199	5089.227 pg	100
17) Methyl tert-Butyl Ether	8.77	73	870563	5316.907 pg	100
18) cis-1,2-Dichloroethene	9.59	96	319642	5015.430 pg	100
19) Chloroform	9.89	83	522733	4780.247 pg	100
21) 1,2-Dichloroethane	10.64	62	415972	5116.905 pg	99
22) 1,1,1-Trichloroethane	10.91	97	467116	4708.873 pg	100
23) Benzene	11.36	78	1167900	4536.841 pg	100
24) Carbon Tetrachloride	11.52	117	391780	4563.159 pg	100
26) 1,2-Dichloropropane	12.18	63	298095	5253.114 pg	99
27) Bromodichloromethane	12.36	83	413069	4935.606 pg	100
28) Trichloroethene	12.41	130	299094	4425.611 pg	100
29) 1,4-Dioxane	12.37	88	249371	4979.520 pg	98
30) cis-1,3-Dichloropropene	13.25	75	509471	5648.385 pg	100
31) trans-1,3-Dichloropropene	13.76	75	433329	5537.769 pg	99
32) 1,1,2-Trichloroethane	13.95	83	248128	4834.991 pg	99
34) Toluene	14.25	91	1167322	4708.699 pg	99
35) Dibromochloromethane	14.66	129	317694	4715.519 pg	100
36) 1,2-Dibromoethane	14.92	107	312953	4671.632 pg	100
37) Tetrachloroethene	15.40	166	308906	4238.535 pg	100
39) Chlorobenzene	16.10	112	788966	3880.853 pg	100
40) Ethylbenzene	16.48	91	1336188	4298.214 pg	99
41) m,p-Xylene	16.66	91	2064784	8778.622 pg	100
42) Styrene	17.01	104	851189	4927.183 pg	99
43) o-Xylene	17.12	106	518661	4234.000 pg	100
44) 1,1,2,2-Tetrachloroethane	17.09	83	529607	4299.908 pg	99
46) 1,3,5-Trimethylbenzene	18.38	105	1148790	4537.200 pg	99
47) 1,2,4-Trimethylbenzene	18.77	105	1215602	4645.849 pg	100
48) 1,3-Dichlorobenzene	18.92	146	674217	4320.868 pg	99
49) 1,4-Dichlorobenzene	18.98	146	667180	4313.829 pg	100
50) 1,2-Dichlorobenzene	19.31	146	659140	4277.354 pg	100
51) 1,2-Dibromo-3-chloropr...	19.72	157	232958	4834.246 pg	97
52) 1,2,4-Trichlorobenzene	20.94	182	416069	4862.465 pg	100
53) Naphthalene	21.06	128	1434819	5185.458 pg	100

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\17\01171709.D Vial: 14
Acq On : 17 Jan 2017 20:08 Operator: CL
Sample : 5000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171704 (2/15)

Quant Time: Jan 18 07:24:31 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:23:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

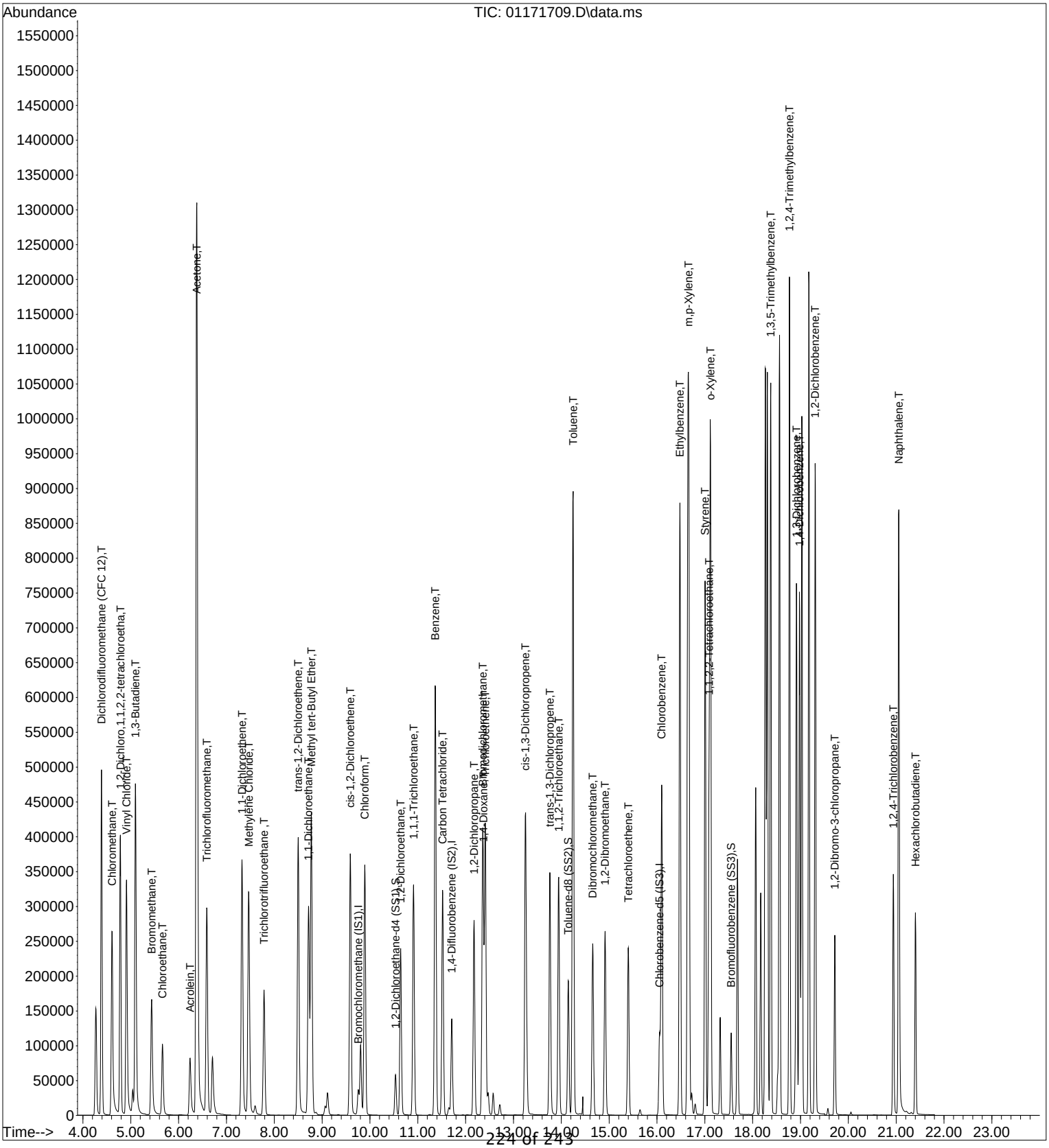
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	275708	4396.805 pg	100

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\17\01171709.D Vial: 14
Acq On : 17 Jan 2017 20:08 Operator: CL
Sample : 5000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171704 (2/15)

Quant Time: Jan 18 07:24:31 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:23:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\17\01171710.D Vial: 14
Acq On : 17 Jan 2017 20:40 Operator: CL
Sample : 10000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171704 (2/15)

Quant Time: Jan 18 07:24:32 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:23:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 1/18/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.77	130	53379	1000.000 pg	0.00
25) 1,4-Difluorobenzene (IS2)	11.72	114	279881	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.05	54	48593	1000.000 pg	0.00
System Monitoring Compounds					
20) 1,2-Dichloroethane-d4 ...	10.54	65	94759	1113.049 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery	= 111.30%	
33) Toluene-d8 (SS2)	14.15	98	279681	1059.092 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery	= 105.91%	
45) Bromofluorobenzene (SS3)	17.55	174	94952	1020.395 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery	= 102.04%	

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.39	85	1158767	8861.430 pg	99
3) Chloromethane	4.61	52	274485	7785.534 pg	98
4) 1,2-Dichloro,1,1,2,2-t...	4.79	85	1063755	7734.316 pg	99
5) Vinyl Chloride	4.92	62	1140580	9165.610 pg	99
6) 1,3-Butadiene	5.10	54	900496	13221.217 pg	100
7) Bromomethane	5.44	94	431171	8664.001 pg	100
8) Chloroethane	5.67	64	349873	9885.714 pg	100
9) Acrolein	6.25	56	284896	11690.431 pg	98
10) Acetone	6.39	58	1668142	49501.140 pg	97
11) Trichlorofluoromethane	6.60	101	856479	8900.816 pg	100
12) 1,1-Dichloroethene	7.33	96	567179	9792.915 pg	100
13) Methylene Chloride	7.48	84	591936	9374.858 pg	95
14) Trichlorotrifluoroethane	7.79	151	519911	8815.399 pg	100
15) trans-1,2-Dichloroethene	8.51	96	597200	9615.523 pg	98
16) 1,1-Dichloroethane	8.73	63	984096	9693.455 pg	99
17) Methyl tert-Butyl Ether	8.78	73	1759796	10363.665 pg	99
18) cis-1,2-Dichloroethene	9.60	96	647815	9801.386 pg	99
19) Chloroform	9.90	83	1045644	9220.330 pg	100
21) 1,2-Dichloroethane	10.64	62	839148	9953.459 pg	99
22) 1,1,1-Trichloroethane	10.92	97	946619	9201.522 pg	100
23) Benzene	11.37	78	2369768	8876.584 pg	100
24) Carbon Tetrachloride	11.52	117	807906	9073.532 pg	100
26) 1,2-Dichloropropane	12.18	63	618002	10287.981 pg	99
27) Bromodichloromethane	12.35	83	857971	9684.309 pg	100
28) Trichloroethene	12.42	130	618303	8642.613 pg	100
29) 1,4-Dioxane	12.37	88	524841	9900.280 pg	98
30) cis-1,3-Dichloropropene	13.25	75	1095423	11472.680 pg	100
31) trans-1,3-Dichloropropene	13.76	75	948476	11450.426 pg	99
32) 1,1,2-Trichloroethane	13.95	83	519685	9566.173 pg	98
34) Toluene	14.25	91	2448345	9329.557 pg	97
35) Dibromochloromethane	14.66	129	682022	9563.063 pg	99
36) 1,2-Dibromoethane	14.92	107	669068	9434.914 pg	100
37) Tetrachloroethene	15.40	166	652501	8457.631 pg	100
39) Chlorobenzene	16.10	112	1668556	7433.228 pg	99
40) Ethylbenzene	16.48	91	2843791	8284.875 pg	98
41) m,p-Xylene	16.66	91	4428786	17053.134 pg	99
42) Styrene	17.01	104	1858705	9744.306 pg	99
43) o-Xylene	17.12	106	1116713	8256.132 pg	98
44) 1,1,2,2-Tetrachloroethane	17.09	83	1127006	8287.040 pg	99
46) 1,3,5-Trimethylbenzene	18.38	105	2451635	8769.420 pg	98
47) 1,2,4-Trimethylbenzene	18.77	105	2594315	8979.749 pg	99
48) 1,3-Dichlorobenzene	18.92	146	1422881	8258.624 pg	99
49) 1,4-Dichlorobenzene	18.98	146	1396602	8178.249 pg	99
50) 1,2-Dichlorobenzene	19.31	146	1387349	8153.630 pg	99
51) 1,2-Dibromo-3-chloropr...	19.72	157	507964	9546.668 pg	96
52) 1,2,4-Trichlorobenzene	20.94	182	890866	9429.122 pg	100
53) Naphthalene	21.06	128	3037991	9943.615 pg	99

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\17\01171710.D Vial: 14
Acq On : 17 Jan 2017 20:40 Operator: CL
Sample : 10000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171704 (2/15)

Quant Time: Jan 18 07:24:32 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:23:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

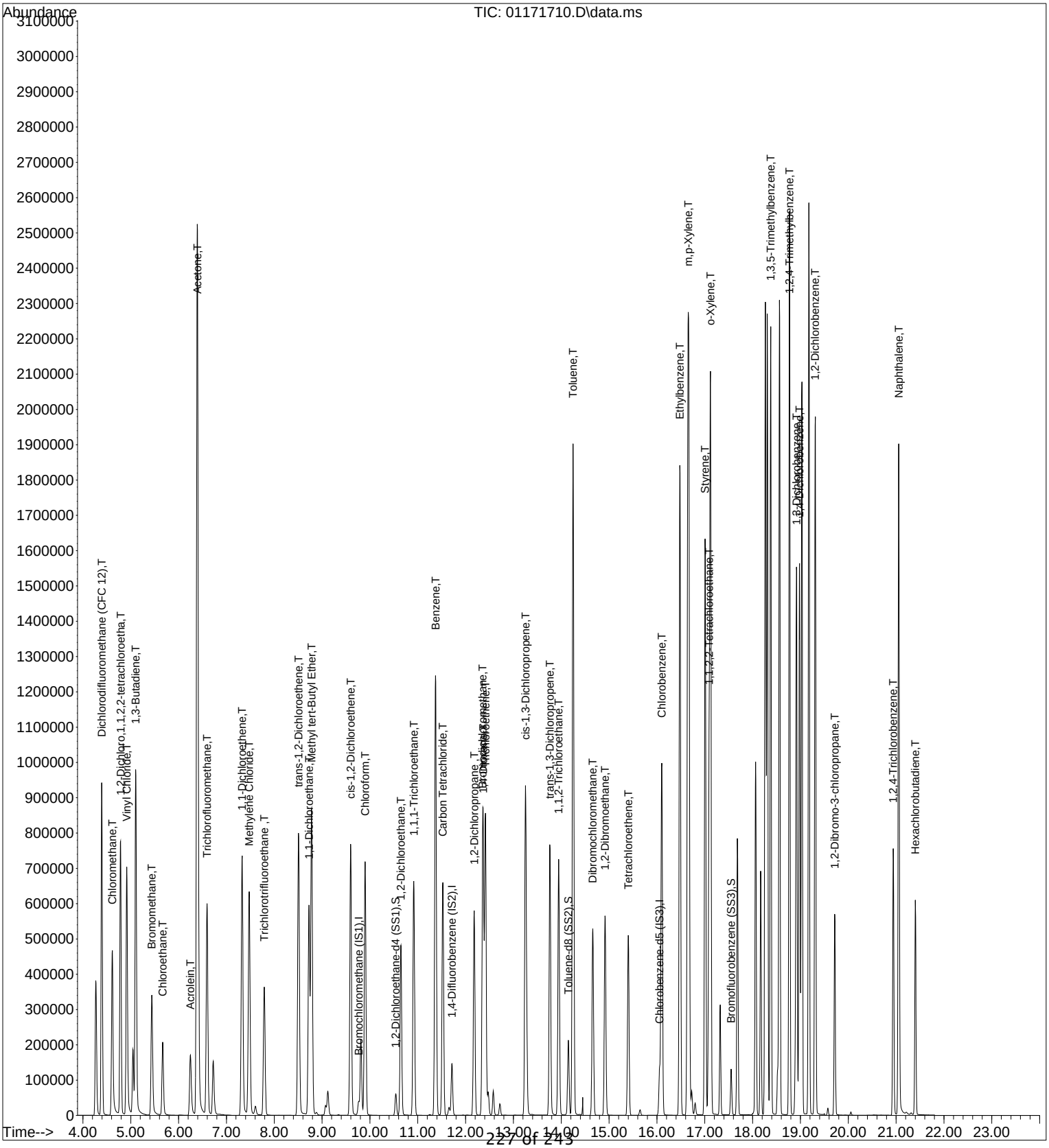
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	579610	8371.273 pg	100

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\17\01171710.D Vial: 14
Acq On : 17 Jan 2017 20:40 Operator: CL
Sample : 10000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171704 (2/15)

Quant Time: Jan 18 07:24:32 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:23:41 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\17\01171715.D Vial: 15
Acq On : 18 Jan 2017 8:36 Operator: CL
Sample : 50000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171703 (2/15)

Quant Time: Jan 18 09:38:41 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:59:36 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 1/18/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.78	130	48994	1000.000 pg	0.00
25) 1,4-Difluorobenzene (IS2)	11.72	114	259610	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.05	54	51950	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.55	65	84223	992.600 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 99.26%		
33) Toluene-d8 (SS2)	14.15	98	261389	1013.605 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 101.36%		
45) Bromofluorobenzene (SS3)	17.55	174	77405	814.465 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 81.45%		

Target Compounds

						Qvalue
2) Dichlorodifluoromethan...	4.39	85	6222820	50276.018 pg		96
3) Chloromethane	4.61	52	1662075	45073.048 pg		99
4) 1,2-Dichloro,1,1,2,2-t...	4.79	85	5669332	46556.083 pg		97
5) Vinyl Chloride	4.92	62	6184642	52267.677 pg		97
6) 1,3-Butadiene	5.12	54	5086663	72304.786 pg		96
7) Bromomethane	5.45	94	2549125	53553.608 pg		99
8) Chloroethane	5.68	64	2042004	56091.573 pg		98
9) Acrolein	6.27	56	1747738	67581.094 pg		97
10) Acetone	6.42	58	11057699	330702.026 pg	#	65
11) Trichlorofluoromethane	6.60	101	5086782	60087.511 pg		98
12) 1,1-Dichloroethene	7.33	96	3496273	65921.805 pg		96
13) Methylene Chloride	7.50	84	3700171	64289.836 pg		96
14) Trichlorotrifluoroethane	7.79	151	3286834	62117.553 pg		99
15) trans-1,2-Dichloroethene	8.52	96	3732175	65274.350 pg		97
16) 1,1-Dichloroethane	8.74	63	5933631	58494.039 pg		97
17) Methyl tert-Butyl Ether	8.79	73	10999461	72666.236 pg		98
18) cis-1,2-Dichloroethene	9.61	96	4030033	67166.715 pg		98
19) Chloroform	9.92	83	6335999	59396.627 pg		97
21) 1,2-Dichloroethane	10.66	62	5012880	61047.099 pg		97
22) 1,1,1-Trichloroethane	10.93	97	5852926	59107.330 pg		98
23) Benzene	11.38	78	13991141	59530.393 pg		98
24) Carbon Tetrachloride	11.53	117	5137103	64608.175 pg		99
26) 1,2-Dichloropropane	12.19	63	3853612	58276.449 pg		99
27) Bromodichloromethane	12.37	83	5446581	59646.331 pg		98
28) Trichloroethene	12.42	130	4035166	59783.930 pg		99
29) 1,4-Dioxane	12.38	88	3524162	71106.670 pg		99
30) cis-1,3-Dichloropropene	13.26	75	7075457	79551.009 pg		96
31) trans-1,3-Dichloropropene	13.77	75	6168468	85221.866 pg		96
32) 1,1,2-Trichloroethane	13.95	83	3319226	59342.367 pg		97
34) Toluene	14.25	91	14094915	58518.318 pg		90
35) Dibromochloromethane	14.66	129	4412882	66161.605 pg		99
36) 1,2-Dibromoethane	14.92	107	4212936	66784.684 pg		97
37) Tetrachloroethene	15.40	166	4173932	59641.517 pg		99
39) Chlorobenzene	16.10	112	10175088	50808.203 pg		95
40) Ethylbenzene	16.48	91	16076899	54438.811 pg		88
41) m,p-Xylene	16.67	91	24577992	110958.064 pg		88
42) Styrene	17.01	104	11369546	73263.041 pg		99
43) o-Xylene	17.13	106	7223082	63475.652 pg	#	86
44) 1,1,2,2-Tetrachloroethane	17.10	83	6976652	53358.799 pg		96
46) 1,3,5-Trimethylbenzene	18.38	105	13504870	57595.146 pg		89
47) 1,2,4-Trimethylbenzene	18.77	105	13712903	59582.631 pg		93
48) 1,3-Dichlorobenzene	18.93	146	8569906	60584.241 pg		95
49) 1,4-Dichlorobenzene	18.98	146	8550972	58062.079 pg		97
50) 1,2-Dichlorobenzene	19.31	146	8216491	56998.294 pg		97
51) 1,2-Dibromo-3-chloropr...	19.72	157	3200974	73456.615 pg		95
52) 1,2,4-Trichlorobenzene	20.94	182	5870013	68794.795 pg		97
53) Naphthalene	21.06	128	17325529	63945.198 pg		91

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\17\01171715.D Vial: 15
Acq On : 18 Jan 2017 8:36 Operator: CL
Sample : 50000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171703 (2/15)

Quant Time: Jan 18 09:38:41 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:59:36 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

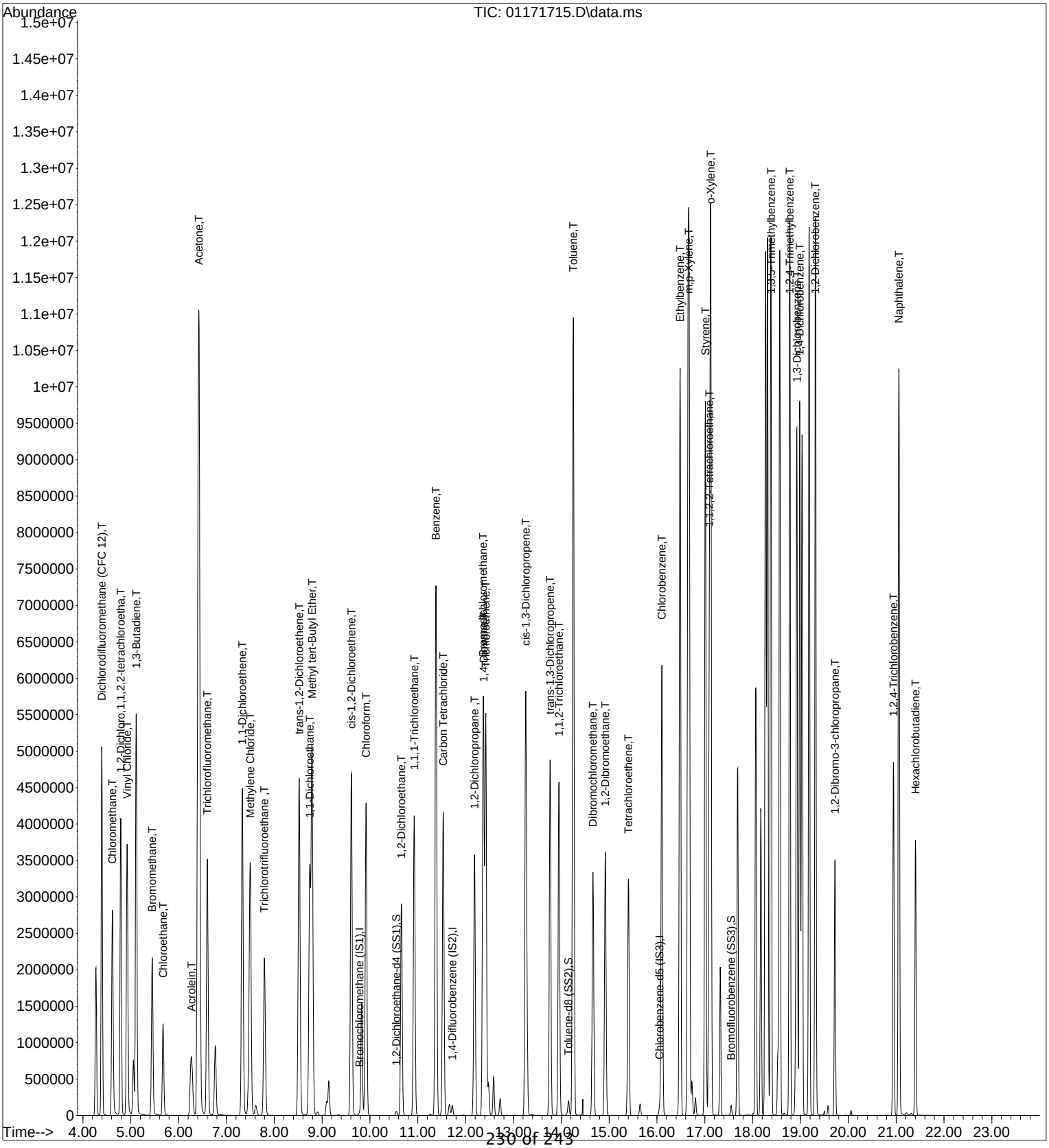
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	3585940	53121.132 pg	99

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\17\01171715.D Vial: 15
Acq On : 18 Jan 2017 8:36 Operator: CL
Sample : 50000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-12201602/S29-01171703 (2/15)

Quant Time: Jan 18 09:38:41 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:59:36 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\17\01171717.D Vial: 9
Acq On : 18 Jan 2017 10:23 Operator: CL
Sample : 500pg TO15SIM ICV Inst : MS19
Misc : S29-12201602/S29-01171714 (2/15)

Quant Time: Jan 18 10:48:25 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 09:41:20 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 1/18/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.76	130	56871	1000.000 pg	-0.02
25) 1,4-Difluorobenzene (IS2)	11.71	114	293517	1000.000 pg	-0.01
38) Chlorobenzene-d5 (IS3)	16.05	54	48017	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.53	65	98896	1005.592 pg	-0.02
Spiked Amount 1000.000	Range 70 - 130		Recovery = 100.56%		
33) Toluene-d8 (SS2)	14.14	98	290339	996.780 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 99.68%		
45) Bromofluorobenzene (SS3)	17.55	174	90799	1043.534 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 104.35%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.42	85	69338	471.957 pg	100
3) Chloromethane	4.65	52	17844	406.769 pg	98
4) 1,2-Dichloro,1,1,2,2-t...	4.81	85	56555	390.672 pg	100
5) Vinyl Chloride	4.96	62	61652	435.788 pg	99
6) 1,3-Butadiene	5.14	54	37733	448.010 pg	99
7) Bromomethane	5.48	94	26516	467.340 pg	99
8) Chloroethane	5.70	64	19726	454.881 pg	99
9) Acrolein	6.27	56	13399	434.203 pg	90
10) Acetone	6.40	58	96846	2402.494 pg	98
11) Trichlorofluoromethane	6.62	101	49134	484.265 pg	100
12) 1,1-Dichloroethene	7.35	96	29796	469.131 pg	100
13) Methylene Chloride	7.48	84	33858	489.608 pg	99
14) Trichlorotrifluoroethane	7.80	151	28980	457.096 pg	100
15) trans-1,2-Dichloroethene	8.51	96	32477	475.859 pg	100
16) 1,1-Dichloroethane	8.72	63	57248	472.741 pg	100
17) Methyl tert-Butyl Ether	8.79	73	91659	504.283 pg	99
18) cis-1,2-Dichloroethene	9.59	96	34339	478.798 pg	100
19) Chloroform	9.89	83	59448	464.658 pg	100
21) 1,2-Dichloroethane	10.64	62	45246	461.957 pg	99
22) 1,1,1-Trichloroethane	10.91	97	51296	434.739 pg	100
23) Benzene	11.37	78	136420	484.201 pg	100
24) Carbon Tetrachloride	11.52	117	43769	458.771 pg	100
26) 1,2-Dichloropropane	12.18	63	31806	415.382 pg	100
27) Bromodichloromethane	12.36	83	43667	412.346 pg	100
28) Trichloroethene	12.41	130	33704	430.145 pg	100
29) 1,4-Dioxane	12.38	88	26461	457.975 pg	98
30) cis-1,3-Dichloropropene	13.26	75	48404	466.274 pg	100
31) trans-1,3-Dichloropropene	13.77	75	41760	491.977 pg	99
32) 1,1,2-Trichloroethane	13.95	83	27236	419.834 pg	99
34) Toluene	14.25	91	129232	461.961 pg	99
35) Dibromochloromethane	14.66	129	31679	408.009 pg	100
36) 1,2-Dibromoethane	14.92	107	32956	448.940 pg	99
37) Tetrachloroethene	15.40	166	34244	421.401 pg	99
39) Chlorobenzene	16.10	112	87017	459.730 pg	100
40) Ethylbenzene	16.48	91	136951	490.315 pg	100
41) m,p-Xylene	16.66	91	215620	1029.387 pg	99
42) Styrene	17.01	104	74141	500.898 pg	100
43) o-Xylene	17.12	106	53980	499.013 pg	99
44) 1,1,2,2-Tetrachloroethane	17.09	83	53699	434.078 pg	100
46) 1,3,5-Trimethylbenzene	18.38	105	115462	520.067 pg	100
47) 1,2,4-Trimethylbenzene	18.77	105	118789	545.246 pg	99
48) 1,3-Dichlorobenzene	18.92	146	69325	516.869 pg	100
49) 1,4-Dichlorobenzene	18.98	146	68725	492.131 pg	100
50) 1,2-Dichlorobenzene	19.31	146	66421	486.560 pg	100
51) 1,2-Dibromo-3-chloropr...	19.72	157	19760	474.596 pg	98
52) 1,2,4-Trichlorobenzene	20.94	182	40364	496.517 pg	100
53) Naphthalene	21.07	128	139369	543.202 pg	100

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\17\01171717.D Vial: 9
Acq On : 18 Jan 2017 10:23 Operator: CL
Sample : 500pg TO15SIM ICV Inst : MS19
Misc : S29-12201602/S29-01171714 (2/15)

Quant Time: Jan 18 10:48:25 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 09:41:20 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

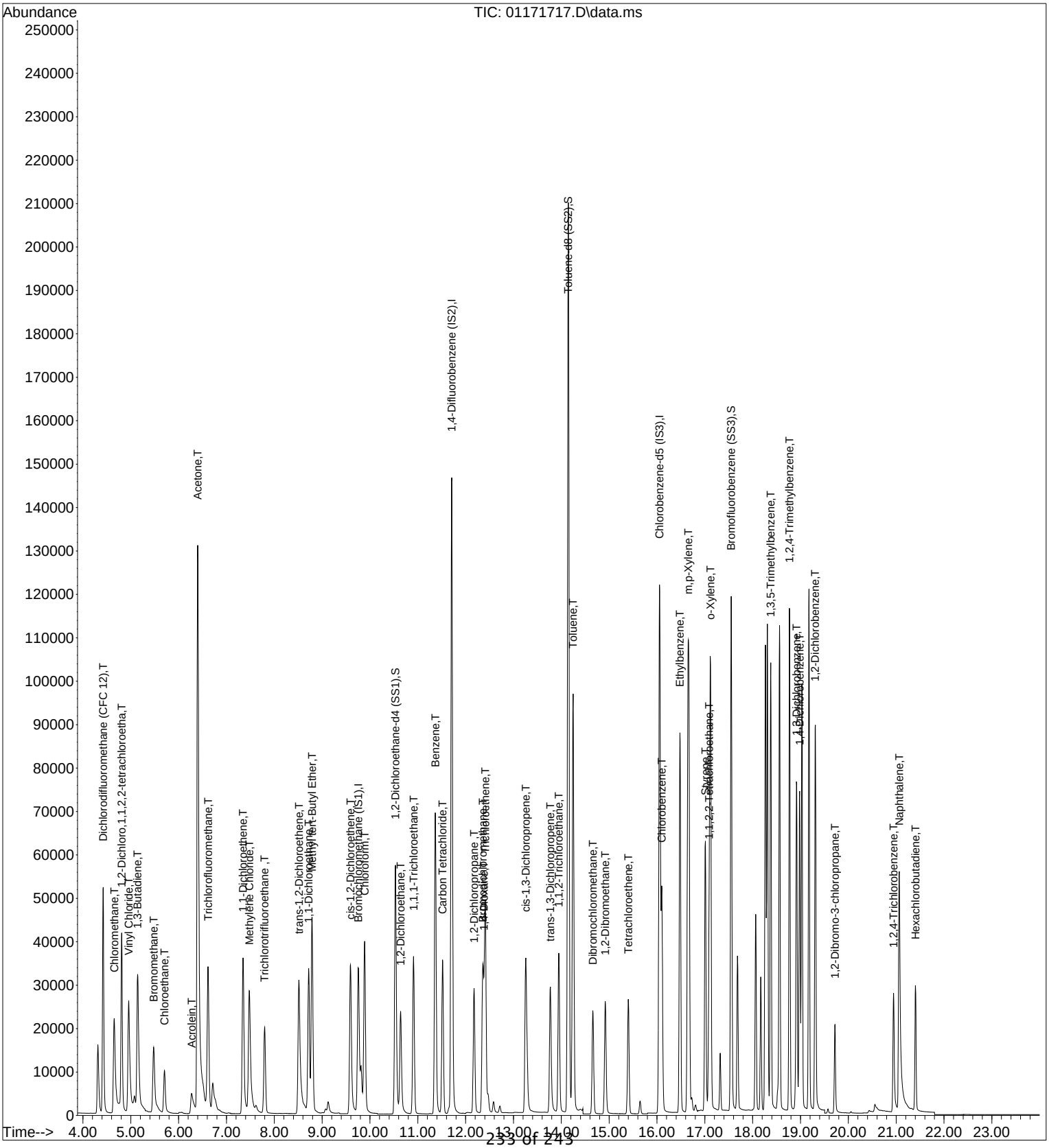
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	28497	446.007 pg	99

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\17\01171717.D Vial: 9
Acq On : 18 Jan 2017 10:23 Operator: CL
Sample : 500pg TO15SIM ICV Inst : MS19
Misc : S29-12201602/S29-01171714 (2/15)

Quant Time: Jan 18 10:48:25 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 09:41:20 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Data File Name:	**01171717.D**
Data File Path:	**I:\MS19\DATA\2017_01\17**
Operator:	**CL**
Instrument Name:	**MS19**
Sample Name:	**500pg TO15SIM ICV**
Misc Info:	**S29-12201602/S29-01171714 (2/15)**
Date Acquired:	**1/18/17 10:23**
Acq. Method File:	**TO15SIM.M**

CL 1/18/17

#	Compound Name	Ret. Time	Amount Spiked (pg)	Amount Found (pg)	Percent Recovery	Lower Limit	Upper Limit	Flag
2)	Dichlorodifluoromethane (CFC 12)	4.42	525	472.0	89.9	70	130	*
3)	Chloromethane	4.65	524.5	406.8	77.6	70	130	*
4)	*1,2-Dichloro,1,1,2,2-tetrachloroetha*	4.81	527.5	390.7	74.1	70	130	*
5)	Vinyl Chloride	4.96	525	435.8	83.0	70	130	*
6)	*1,3-Butadiene*	5.14	525	448.0	85.3	70	130	*
7)	Bromomethane	5.48	525	467.3	89.0	70	130	*
8)	Chloroethane	5.70	524.5	454.9	86.7	70	130	*
9)	*Acrolein*	6.27	530.5	434.2	81.8	70	130	*
10)	Acetone	6.40	2661	2402.5	90.3	70	130	*
11)	Trichlorofluoromethane	6.62	525.5	484.3	92.2	70	130	*
12)	1,1-Dichloroethene	7.35	531.5	469.1	88.3	70	130	*
13)	Methylene Chloride	7.48	531	489.6	92.2	70	130	*
14)	Trichlorotrifluoroethane	7.80	529	457.1	86.4	70	130	*
15)	trans-1,2-Dichloroethene	8.51	533.5	475.9	89.2	70	130	*
16)	1,1-Dichloroethane	8.72	531	472.7	89.0	70	130	*
17)	Methyl tert-Butyl Ether	8.79	532	504.3	94.8	70	130	*
18)	cis-1,2-Dichloroethene	9.59	529.5	478.8	90.4	70	130	*
19)	Chloroform	9.89	529.5	464.7	87.8	70	130	*
21)	1,2-Dichloroethane	10.64	530	462.0	87.2	70	130	*
22)	1,1,1-Trichloroethane	10.91	529.5	434.7	82.1	70	130	*
25)	Benzene	11.37	530.5	484.2	91.3	70	130	*
24)	Carbon Tetrachloride	11.52	532	458.8	86.2	70	130	*
26)	1,2-Dichloropropane	12.18	530.5	415.4	78.3	70	130	*
27)	Bromodichloromethane	12.36	534	412.3	77.2	70	130	*
28)	Trichloroethene	12.41	531	430.1	81.0	70	130	*
29)	1,4-Dioxane	12.38	532	458.0	86.1	70	130	*
30)	cis-1,3-Dichloropropene	13.26	525.5	466.3	88.7	70	130	*
31)	trans-1,3-Dichloropropene	13.77	533.5	492.0	92.2	70	130	*
32)	1,1,2-Trichloroethane	13.95	530.5	419.8	79.1	70	130	*
34)	Toluene	14.14	529	462.0	87.3	70	130	*
35)	*Dibromochloromethane*	14.66	532	408.0	76.7	70	130	*
36)	1,2-Dibromoethane	14.92	529	448.9	84.9	70	130	*
37)	Tetrachloroethene	15.40	531.5	495.0	93.1	70	130	*
39)	Chlorobenzene	16.10	530	459.7	86.7	70	130	*
40)	Ethylbenzene	16.48	529	490.3	92.7	70	130	*
41)	m,p-Xylene	16.66	1060.5	1029.4	97.1	70	130	*
42)	*Styrene*	17.01	529.5	500.9	94.6	70	130	*
43)	o-Xylene	17.12	529	499.0	94.3	70	130	*
44)	1,1,2,2-Tetrachloroethane	17.09	530	434.1	81.9	70	130	*
46)	*1,3,5-Trimethylbenzene*	18.38	530.5	520.1	98.0	70	130	*
47)	*1,2,4-Trimethylbenzene*	18.77	530.5	545.2	102.8	70	130	*
48)	1,3-Dichlorobenzene	18.92	529.5	516.9	97.6	70	130	*
49)	1,4-Dichlorobenzene	18.98	533	492.1	92.3	70	130	*
50)	1,2-Dichlorobenzene	19.31	531	486.6	91.6	70	130	*
51)	*1,2-Dibromo-3-chloropropane*	19.72	529.5	474.6	89.6	70	130	*
52)	1,2,4-Trichlorobenzene	20.94	530	496.5	93.7	70	130	*
53)	Naphthalene	19.31	534	543.2	101.7	70	130	*
54)	Hexachlorobutadiene	21.40	531.5	446.0	83.9	70	130	*

Evaluate Continuing Calibration Report

Data File : I:\MS19\DATA\2017 01\25\01251702.D Vial: 16
Acq On : 25 Jan 2017 15:36 Operator: CL
Sample : CCV S19012517 500pg Inst : MS19
Misc : S29-12201602/S29-01051708 (2/3)

Quant Time: Jan 26 07:19:43 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:47:58 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 1/26/17

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	I	Bromochloromethane (IS1)	1.000	1.000	0.0	99	-0.02
2	T	Dichlorodifluoromethane (CF	2.526	2.370	6.2	95	0.03
3	T	Chloromethane	0.753	0.553	26.6	70	0.04
4	T	1,2-Dichloro,1,1,2,2-tetrac	2.485	2.447	1.5	97	0.02
5	T	Vinyl Chloride	2.415	2.080	13.9	82	0.03
6	T	1,3-Butadiene	1.436	0.903	37.1#	79	0.03
7	T	Bromomethane	0.972	0.866	10.9	93	0.03
8	T	Chloroethane	0.743	0.603	18.8	85	0.03
9	T	Acrolein	0.528	0.367	30.5#	81	0.00
10	T	Acetone	0.682	0.645	5.4	97	-0.02
11	T	Trichlorofluoromethane	1.728	1.700	1.6	97	0.01
12	T	1,1-Dichloroethene	1.083	0.967	10.7	96	0.01
13	T	Methylene Chloride	1.175	1.083	7.8	92	-0.02
14	T	Trichlorotrifluoroethane	1.080	0.982	9.1	97	0.00
15	T	trans-1,2-Dichloroethene	1.167	1.043	10.6	96	0.00
16	T	1,1-Dichloroethane	2.070	1.725	16.7	86	-0.02
17	T	Methyl tert-Butyl Ether	3.090	2.638	14.6	94	0.00
18	T	cis-1,2-Dichloroethene	1.225	1.100	10.2	96	-0.02
19	T	Chloroform	2.177	1.923	11.7	90	-0.03
20	S	1,2-Dichloroethane-d4 (SS1)	1.732	1.545	10.8	90	-0.02
21	T	1,2-Dichloroethane	1.676	1.374	18.0	87	-0.02
22	T	1,1,1-Trichloroethane	2.021	1.723	14.7	96	-0.02
23	T	Benzene	4.797	4.151	13.5	89	-0.02
24	T	Carbon Tetrachloride	1.623	1.521	6.3	98	-0.02
25	I	1,4-Difluorobenzene (IS2)	1.000	1.000	0.0	98	-0.02
26	T	1,2-Dichloropropane	0.255	0.190	25.5	85	-0.01
27	T	Bromodichloromethane	0.352	0.284	19.3	91	-0.01
28	T	Trichloroethene	0.260	0.231	11.2	97	-0.01
29	T	1,4-Dioxane	0.191	0.152	20.4	92	0.00
30	T	cis-1,3-Dichloropropene	0.343	0.285	16.9	92	0.00
31	T	trans-1,3-Dichloropropene	0.279	0.242	13.3	94	0.00
32	T	1,1,2-Trichloroethane	0.215	0.174	19.1	90	0.00
33	S	Toluene-d8 (SS2)	0.993	0.951	4.2	97	0.00
34	T	Toluene	0.928	0.813	12.4	93	0.00
35	T	Dibromochloromethane	0.257	0.221	14.0	95	0.00
36	T	1,2-Dibromoethane	0.243	0.218	10.3	96	0.00
37	T	Tetrachloroethene	0.270	0.230	14.8	95	0.00
38	I	Chlorobenzene-d5 (IS3)	1.000	1.000	0.0	88	0.00
39	T	Chlorobenzene	3.855	3.895	-1.0	95	0.00
40	T	Ethylbenzene	5.685	5.650	0.6	96	0.00
41	T	m,p-Xylene	4.264	4.505	-5.7	95	0.00
42	T	Styrene	2.987	3.084	-3.2	94	0.00
43	T	o-Xylene	2.190	2.354	-7.5	96	0.00
44	T	1,1,2,2-Tetrachloroethane	2.517	2.387	5.2	87	0.00
45	S	Bromofluorobenzene (SS3)	1.829	2.164	-18.3	100	0.00
46	T	1,3,5-Trimethylbenzene	4.514	5.020	-11.2	94	0.00
47	T	1,2,4-Trimethylbenzene	4.430	4.997	-12.8	94	0.00
48	T	1,3-Dichlorobenzene	2.723	3.033	-11.4	91	0.00
49	T	1,4-Dichlorobenzene	2.835	2.969	-4.7	91	0.00
50	T	1,2-Dichlorobenzene	2.775	2.898	-4.4	90	0.00
51	T	1,2-Dibromo-3-chloropropane	0.839	0.799	4.8	85	0.00
52	T	1,2,4-Trichlorobenzene	1.642	1.363	17.0	76	0.00
53	T	Naphthalene	5.215	4.531	13.1	70	0.00
54	T	Hexachlorobutadiene	1.299	1.103	15.1	81	0.00

Evaluate Continuing Calibration Report

Data File : I:\MS19\DATA\2017 01\25\01251702.D Vial: 16
Acq On : 25 Jan 2017 15:36 Operator: CL
Sample : CCV S19012517 500pg Inst : MS19
Misc : S29-12201602/S29-01051708 (2/3)

Quant Time: Jan 26 07:19:43 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:47:58 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.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)

(#) = Out of Range SPCC's out = 0 CCC's out = 0

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\25\01251702.D Vial: 16
Acq On : 25 Jan 2017 15:36 Operator: CL
Sample : CCV S19012517 500pg Inst : MS19
Misc : S29-12201602/S29-01051708 (2/3)

Quant Time: Jan 26 07:19:43 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:47:58 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 1/26/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.76	130	44323	1000.000 pg	-0.02
25) 1,4-Difluorobenzene (IS2)	11.71	114	218293	1000.000 pg	-0.02
38) Chlorobenzene-d5 (IS3)	16.05	54	31623	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.53	65	68482	892.142 pg	-0.02
Spiked Amount 1000.000	Range 70 - 130		Recovery = 89.21%		
33) Toluene-d8 (SS2)	14.15	98	207631	957.536 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 95.75%		
45) Bromofluorobenzene (SS3)	17.55	174	68423	1182.737 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 118.27%		

Target Compounds

						Qvalue
2) Dichlorodifluoromethan...	4.42	85	54988	491.083 pg		100
3) Chloromethane	4.65	52	12323	369.400 pg		97
4) 1,2-Dichloro,1,1,2,2-t...	4.81	85	54509	494.796 pg		99
5) Vinyl Chloride	4.95	62	47153	440.496 pg		100
6) 1,3-Butadiene	5.14	54	21153	332.368 pg		96
7) Bromomethane	5.48	94	19067	442.786 pg		100
8) Chloroethane	5.70	64	13492	409.667 pg		99
9) Acrolein	6.27	56	8475	362.245 pg		100
10) Acetone	6.40	58	75934	2510.280 pg	#	86
11) Trichlorofluoromethane	6.61	101	39518	516.000 pg		100
12) 1,1-Dichloroethene	7.35	96	22700	473.111 pg		93
13) Methylene Chloride	7.48	84	25362	487.100 pg		89
14) Trichlorotrifluoroethane	7.80	151	22820	476.723 pg		100
15) trans-1,2-Dichloroethene	8.51	96	24659	476.727 pg		100
16) 1,1-Dichloroethane	8.72	63	38992	424.894 pg		100
17) Methyl tert-Butyl Ether	8.79	73	62317	455.074 pg		97
18) cis-1,2-Dichloroethene	9.59	96	25936	477.818 pg		100
19) Chloroform	9.89	83	45085	467.189 pg		100
21) 1,2-Dichloroethane	10.64	62	32038	431.278 pg		99
22) 1,1,1-Trichloroethane	10.91	97	41000	457.684 pg		100
23) Benzene	11.37	78	96787	455.215 pg		100
24) Carbon Tetrachloride	11.52	117	35573	494.542 pg		100
26) 1,2-Dichloropropane	12.17	63	22047	396.512 pg		98
27) Bromodichloromethane	12.35	83	33101	431.104 pg		100
28) Trichloroethene	12.41	130	26689	470.259 pg		100
29) 1,4-Dioxane	12.38	88	17663	423.839 pg		91
30) cis-1,3-Dichloropropene	13.26	75	34686	463.796 pg		100
31) trans-1,3-Dichloropropene	13.77	75	28149	462.507 pg		100
32) 1,1,2-Trichloroethane	13.95	83	20191	429.307 pg		97
34) Toluene	14.25	91	93405	461.191 pg		100
35) Dibromochloromethane	14.66	129	25636	457.105 pg		100
36) 1,2-Dibromoethane	14.92	107	25127	473.712 pg		100
37) Tetrachloroethene	15.40	166	26679	453.372 pg		98
39) Chlorobenzene	16.10	112	65348	536.056 pg		100
40) Ethylbenzene	16.48	91	94254	524.311 pg		99
41) m,p-Xylene	16.66	91	151221	1121.520 pg		99
42) Styrene	17.01	104	51732	547.625 pg		100
43) o-Xylene	17.12	106	39222	566.235 pg		98
44) 1,1,2,2-Tetrachloroethane	17.09	83	39856	500.766 pg		99
46) 1,3,5-Trimethylbenzene	18.38	105	83260	583.330 pg		99
47) 1,2,4-Trimethylbenzene	18.77	105	83111	593.241 pg		100
48) 1,3-Dichlorobenzene	18.92	146	50741	589.285 pg		100
49) 1,4-Dichlorobenzene	18.98	146	49661	553.956 pg		100
50) 1,2-Dichlorobenzene	19.31	146	48480	552.485 pg		100
51) 1,2-Dibromo-3-chloropr...	19.72	157	13305	501.587 pg		95
52) 1,2,4-Trichlorobenzene	20.95	182	22486	432.924 pg		98
53) Naphthalene	21.07	128	77580	470.385 pg		100

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\25\01251702.D Vial: 16
Acq On : 25 Jan 2017 15:36 Operator: CL
Sample : CCV S19012517 500pg Inst : MS19
Misc : S29-12201602/S29-01051708 (2/3)

Quant Time: Jan 26 07:19:43 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:47:58 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

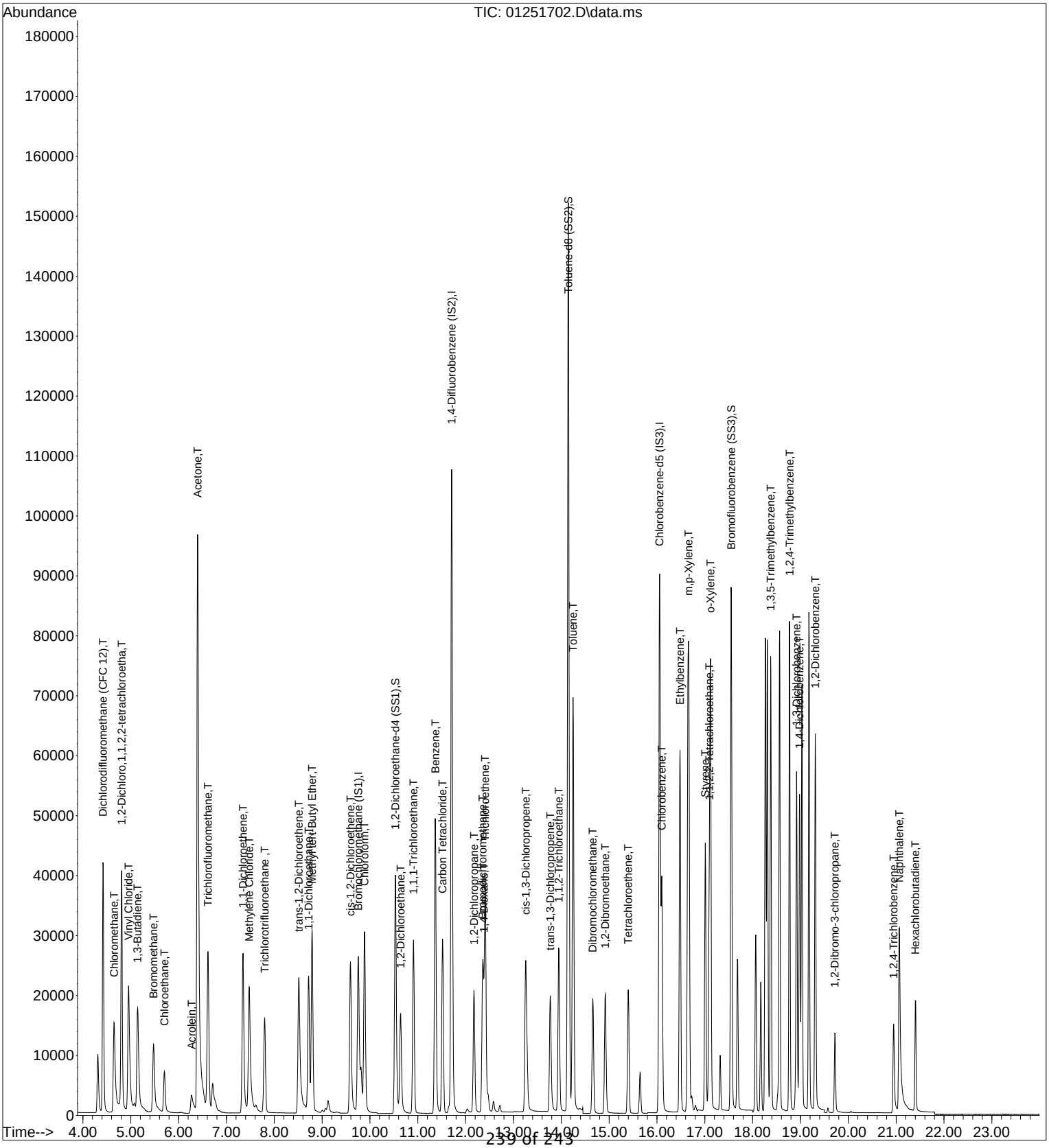
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	18471	449.508 pg	99

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 01\25\01251702.D Vial: 16
Acq On : 25 Jan 2017 15:36 Operator: CL
Sample : CCV S19012517 500pg Inst : MS19
Misc : S29-12201602/S29-01051708 (2/3)

Quant Time: Jan 26 07:19:43 2017
Quant Method : I:\MS19\METHODS\S19011717.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 18 07:47:58 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

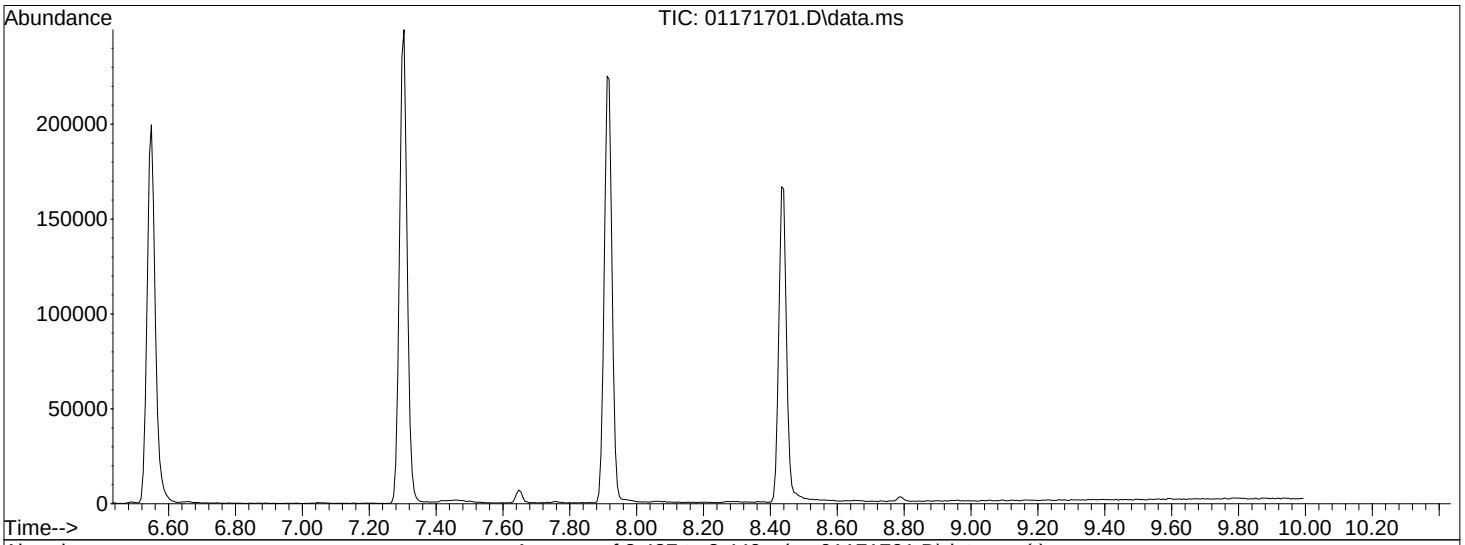


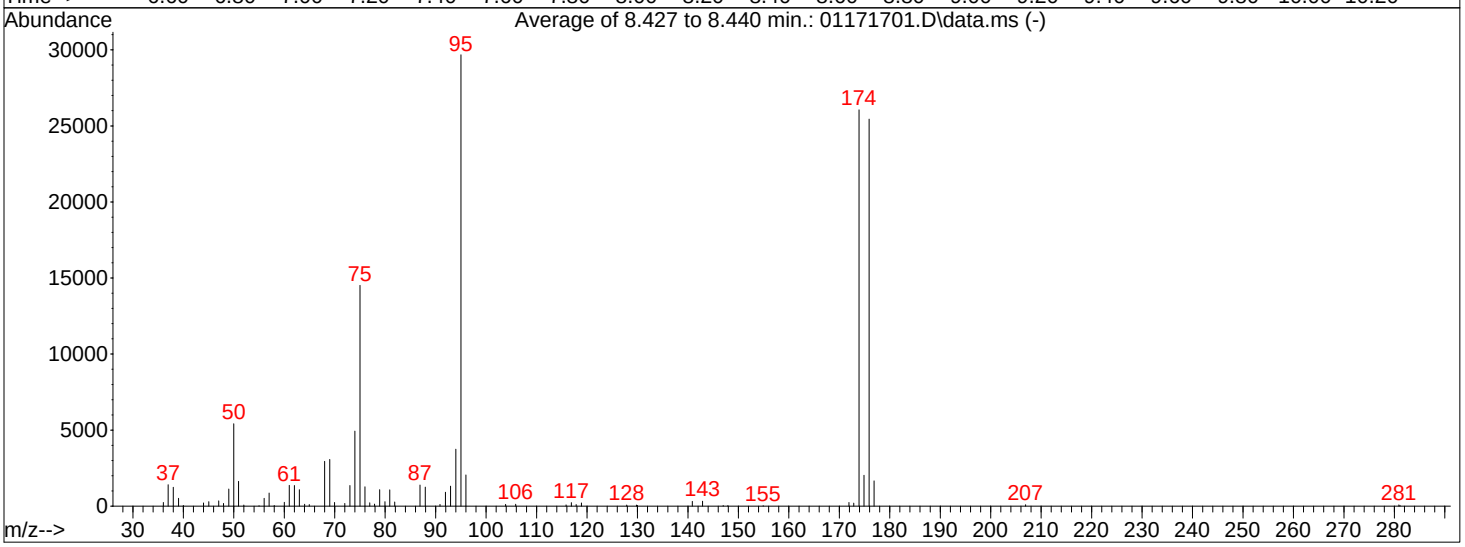
Data Path : I:\MS19\DATA\2017 01\16\
Data File : 01171701.D
Acq On : 17 Jan 2017 16:06
Operator : CL
Sample : BFB S19011617
Misc : S29-12201602
ALS Vial : 2 Sample Multiplier: 1

Integration File: rteint.p

Method : I:\MS19\METHODS\S19122716.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Mon Jan 09 14:50:02 2017

CL 1/18/17





AutoFind: Scans 707, 708, 709; Background Corrected with Scan 701

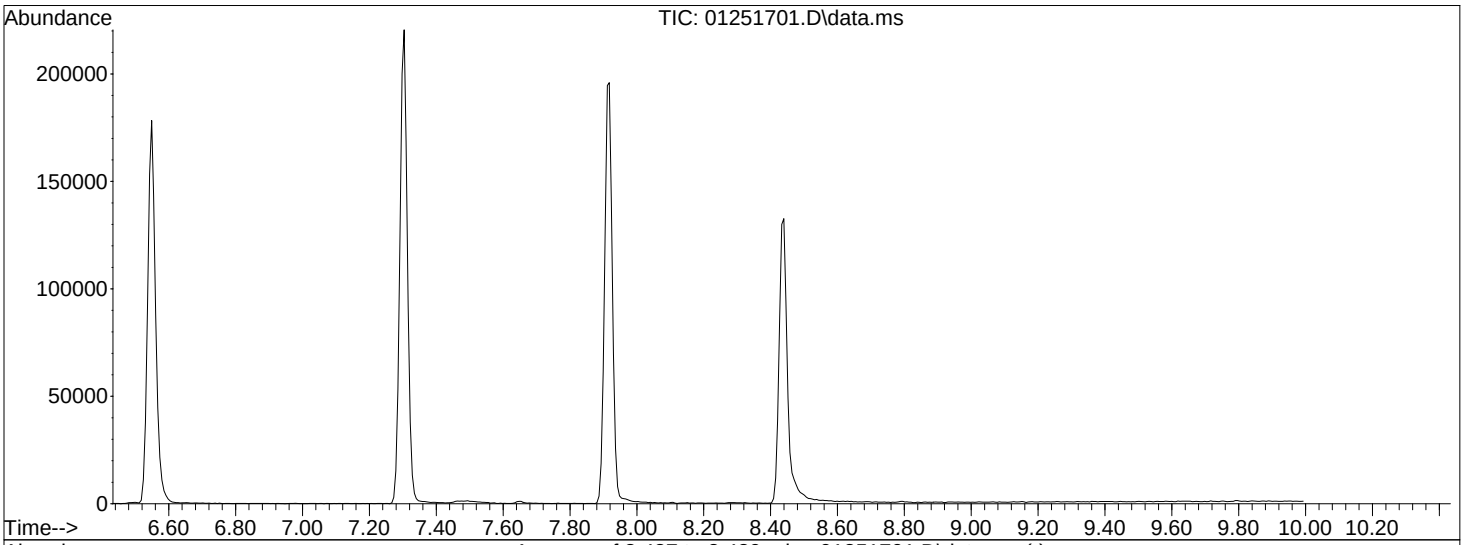
Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	18.2	5414	PASS
75	95	30	66	48.9	14516	PASS
95	95	100	100	100.0	29675	PASS
96	95	5	9	6.9	2047	PASS
173	174	0.00	2	0.8	202	PASS
174	95	50	120	87.8	26061	PASS
175	174	4	9	7.8	2026	PASS
176	174	93	101	97.6	25443	PASS
177	176	5	9	6.5	1664	PASS

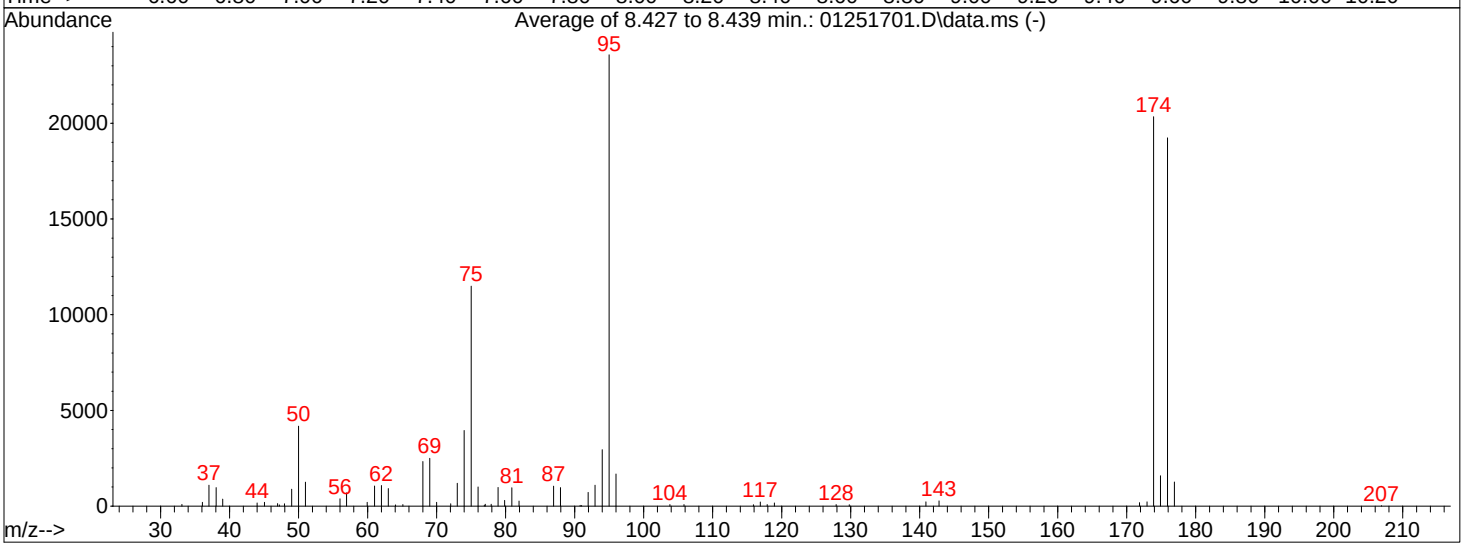
Data Path : I:\MS19\DATA\2017 01\25\
Data File : 01251701.D
Acq On : 25 Jan 2017 15:18
Operator : CL
Sample : BFB S19012517
Misc : S29-12201602
ALS Vial : 2 Sample Multiplier: 1

Integration File: rteint.p

Method : I:\MS19\METHODS\S19011717.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Wed Jan 18 07:47:58 2017

CL 1/25/17





AutoFind: Scans 707, 708, 709; Background Corrected with Scan 702

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	17.7	4177	PASS
75	95	30	66	48.7	11487	PASS
95	95	100	100	100.0	23573	PASS
96	95	5	9	7.1	1681	PASS
173	174	0.00	2	1.1	225	PASS
174	95	50	120	86.3	20339	PASS
175	174	4	9	7.8	1592	PASS
176	174	93	101	94.6	19241	PASS
177	176	5	9	6.5	1260	PASS

Injection Log

Directory: I:\MS19\DATA\2017_01\17\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	1/17/17 16:06	01171701.D	BFB S19011717	S29-12201602	CL	2	Pass
2	1/17/17 16:28	01171702.D	10pg TO15SIM ICAL STD	S29-12201602/S29-01171711 (2/15)	CL	11	
3	1/17/17 17:00	01171703.D	20pg TO15SIM ICAL STD	S29-12201602/S29-01171716 (2/15)	CL	12	
4	1/17/17 17:31	01171704.D	50pg TO15SIM ICAL STD	S29-12201602/S29-01171716 (2/15)	CL	12	
5	1/17/17 18:03	01171705.D	100pg TO15SIM ICAL STD	S29-12201602/S29-01171716 (2/15)	CL	12	
6	1/17/17 18:34	01171706.D	500pg TO15SIM ICAL STD	S29-12201602/S29-01171706 (2/15)	CL	13	
7	1/17/17 19:05	01171707.D	1000pg TO15SIM ICAL STD	S29-12201602/S29-01171704 (2/15)	CL	14	
8	1/17/17 19:37	01171708.D	2000pg TO15SIM ICAL STD	S29-12201602/S29-01171704 (2/15)	CL	14	
9	1/17/17 20:08	01171709.D	5000pg TO15SIM ICAL STD	S29-12201602/S29-01171704 (2/15)	CL	14	
10	1/17/17 20:40	01171710.D	10000pg TO15SIM ICAL STD	S29-12201602/S29-01171704 (2/15)	CL	14	
11	1/17/17 21:12	01171711.D	xx50000pg TO15SIM ICAL STDxx	S29-12201602/S29-01171703 (2/15)	CL	15	IS3 Fail
12	1/17/17 21:43	01171712.D	blank	S29-12201602	CL	2	
13	1/17/17 22:15	01171713.D	500pg TO15SIM ICV	S29-12201602/S29-12211612 (1/19)	CL	10	
14	1/17/17 22:47	01171714.D	500pg TO15SIM ICV	S29-12201602/S29-01171714 (2/15)	CL	9	
15	1/18/17 8:36	01171715.D	50000pg TO15SIM ICAL STD	S29-12201602/S29-01171703 (2/15)	CL	15	
16	1/18/17 9:52	01171716.D	blank	S29-12201602	CL	2	
17	1/18/17 10:23	01171717.D	500pg TO15SIM ICV	S29-12201602/S29-01171714 (2/15)	CL	9	Pass

CL 1/18/17

Injection Log

Directory: I:\MS19\DATA\2017_01\25\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	1/25/17 15:18	01251701.D	BFB S19012517	S29-12201602	CL	2	Pass
2	1/25/17 15:36	01251702.D	CCV S19012517_500pg	S29-12201602/S29-01051708 (2/3)	CL	16	Pass
3	1/25/17 16:08	01251703.D	MB S19012517_1000mL	S29-12201602/AC01205	CL	2	Pass
4	1/25/17 16:39	01251704.D	LCS S19012517_500pg	S29-12201602/S29-01171715 (2/17)	CL	2	Pass
5	1/25/17 17:10	01251705.D	LCSD S19012517_500pg	S29-12201602/S29-01171715 (2/17)	CL	2	Pass
6	1/25/17 17:42	01251706.D	P1700260-016 (1000mL)	S29-12201602	CL	10	
7	1/25/17 18:14	01251707.D	P1700260-017 (1000mL)	S29-12201602	CL	11	
8	1/25/17 18:45	01251708.D	P1700260-018 (1000mL)	S29-12201602	CL	12	
9	1/25/17 19:16	01251709.D	P1700260-019 (1000mL)	S29-12201602	CL	13	
10	1/25/17 19:48	01251710.D	P1700260-020 (1000mL)	S29-12201602	CL	14	
11	1/25/17 20:19	01251711.D	P1700260-021 (1000mL)	S29-12201602	CL	15	
12	1/25/17 20:50	01251712.D	blank	S29-12201602	CL	2	No IS
13	1/25/17 21:21	01251713.D	P1700260-022 (1000mL)	S29-12201602	CL	1	
14	1/25/17 21:52	01251714.D	P1700260-023 (1000mL)	S29-12201602	CL	3	
15	1/25/17 22:23	01251715.D	P1700260-024 (1000mL)	S29-12201602	CL	4	
16	1/25/17 22:54	01251716.D	P1700261-001 (1000mL)	S29-12201602	CL	6	
17	1/25/17 23:25	01251717.D	P1700261-002 (1000mL)	S29-12201602	CL	7	
18	1/25/17 23:57	01251718.D	P1700261-002dup (1000mL)	S29-12201602	CL	7	Pass for Dup
19	1/26/17 0:28	01251719.D	P1700261-003 (1000mL)	S29-12201602	CL	8	
20	1/26/17 0:59	01251720.D	P1700261-004 (1000mL)	S29-12201602	CL	9	
21	1/26/17 1:31	01251721.D	blank	S29-12201602	CL	2	No IS
22	1/26/17 2:02	01251722.D	CCV S19012517_500pg_End	S29-12201602/S29-01051708 (2/3)	CL	16	
23	1/26/17 2:34	01251723.D	P1700214-001 (500mL)	S29-12201602	CL	5	
24	1/26/17 3:05	01251724.D	P1700214-001dil (50mL)	S29-12201602	CL	5	
25	1/26/17 3:36	01251725.D	blank	S29-12201602	CL	2	No IS

CL 1/26/17

Tier III Data Validation Report Summary

Client: Montana Department of Environmental Quality (MDEQ)	Laboratory: ALS Environmental
Project Name: Whitefish Solvent Site	Sample Matrix: Air
Project Number: 776-033-001	Sample Start Date: 12/22/2016
Date Validated: 02/10/2017	Sample End Date: 01/12/2017
Parameters Included: ▪ Volatile Organic Compounds (VOC) by Environmental Protection Agency (EPA) Modified Method TO-15 and TO-15 with Selective Ion Monitoring (SIM) ▪ Methane by EPA Modified Method 3C ▪ Air-Phase Petroleum Hydrocarbons (APH) by Massachusetts (MA) Method	
Laboratory Project ID: P1606022 and P1700214	
Data Validator: Kyle Power, Environmental Chemist	
Draft Reviewer: Charles Ballek, Senior Chemist	Final Reviewer: Mike Phillips, Senior Chemist

DATA EVALUATION CRITERIA SUMMARY

A Tier III Data Validation was performed by Trihydro Corporation's Chemical Data Evaluation Services Group on the analytical data report package generated by ALS Environmental evaluating samples from the MDEQ Whitefish Solvent Site, located in Whitefish, Montana.

Precision, accuracy, method compliance, and completeness of this data package were assessed during this data review. Precision was determined by evaluating the calculated relative percent difference (RPD) values from:

- Laboratory duplicate pairs

Laboratory accuracy was established by reviewing the demonstrated percent recoveries (%R) of the following items to verify that data are not biased.

- Laboratory control sample (LCS)
- Organic system monitoring compounds (surrogates)

Method compliance was established by reviewing sample integrity, holding times, detection limits, surrogate recoveries, laboratory blanks, initial and continuing calibrations (where applicable), and the LCS percent recoveries against method-specific requirements.

Completeness was evaluated by determining the overall ratio of the number of samples and analyses planned versus the number of samples with valid analyses. Determination of completeness included a review of the chain-of-custody (CoC), laboratory analytical methods, and other laboratory and field documents associated with this analytical data set.

SAMPLE NUMBERS TABLE

Data Set	Client Sample ID	Laboratory Sample Number
P1606022	MTN-PRE-STARTUP	P1606022-001
P1700214	MTN-POST	P1700214-001

Tier III Data Validation Report Summary

The laboratory data were reviewed to evaluate compliance with the methods and the quality of the reported data. Assessment of CoC completeness is included in Item 3 of the Data Validation Checklist. A check mark (✓) indicates that the referenced validation criteria were deemed acceptable, whereas a crossed circle (⊗) indicates validation criteria for which the data have been qualified by the data validator. An empty circle (○) indicates that the specified criterion does not apply to the reviewed data. Details are noted in the tables below.

Validation Criteria

- ✓ Data Completeness
- ✓ CoC Documentation
- ✓ Holding Times and Preservation
- ○ Field Duplicates
- ○ Equipment, Field, and Trip Blanks
- ✓ Initial and Continuing Calibrations
- ✓ Instrument Tunes
- ✓ Internal Standards
- ✓ System Performance Checks
- ✓ Laboratory Blanks
- ⊗ LCS
- ○ Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
- ✓ System Monitoring Compounds (i.e. Surrogates)
- ✓ Laboratory Duplicates

Guidance References

Chemical data validation was conducted in accordance with the United States Environmental Protection Agency (USEPA) Contract Laboratory Program (CLP) National Functional Guidelines for the analyses listed below, or by the appropriate method if not covered in the National Functional Guidelines.

- Data for organic analyses were evaluated according to validation criteria set forth in the USEPA CLP National Functional Guidelines for Superfund Organic Methods Data Review, document number EPA-540-R-014-002, August 2014 with additional reference to the USEPA CLP National Functional Guidelines for Organic Data Review, document number EPA 540/R-99/008, October 1999.
- Air and vapor data for samples collected in canisters and analyzed by EPA organics Method TO-15 were reviewed with reference to the USEPA Hazardous Waste Support Branch Validating Air Samples Volatile Organic Analysis of Ambient Air in Canister by Method TO-15, standard operating procedure number HW-31 revision 4, October 2006.
- Trihydro Data Validation Variance Documentation, February 2016.
- Project-specific Quality Assurance Project Plans (QAPP) data validation requirements, as applicable.

Tier III Data Validation Report Summary

OVERALL DATA PACKAGE ASSESSMENT

Based on a data validation review, the data are acceptable as delivered. Data qualified by the laboratory are discussed in Item 2 of the Validation Criteria Checklist.

The purpose of validating data and assigning qualifiers is to assist in proper data interpretation. Data that are not qualified meet the site data quality objectives. If values are assigned qualifiers other than an R (rejected, data not usable), the data may be used for site evaluation; however, consideration should be given to the reasons for qualification when interpreting sample concentrations. Data points that are assigned an R qualifier should not be used for site evaluation purposes.

Text identified in **bold font** in the Validation Criteria Checklist indicates that further action and/or qualification of the data were required. Data validation qualifiers were added for the items noted with crossed circles in the Validation Criteria section above. Please see the Data Qualification Summary table at the end of this report for a complete list of samples and analytes qualified.

Data qualifiers used during this validation are included in the following table.

Qualifier	Definition
J+	The result is an estimated concentration, but may be biased high

Data Completeness

The analyses were performed as requested on the CoC records. The samples were received by the laboratory and analyzed properly unless otherwise noted in the Criteria Checklist below. The complete data package consisted of 32 data points. No data points were rejected. The data completeness measure for this data package is calculated to be 100% and is acceptable.

TABLE 1. GENERAL VALIDATION CRITERIA CHECKLIST	
1. Was the report free of non-conformances identified by the laboratory?	No
Comments: The laboratory noted the following non-conformances regarding the analytical data. Method TO-15: In data set P1606022, the spike recoveries of trans-1,2-dichloroethene and cis-1,2-dichloroethene in the LCS analyzed on January 9, 2017 were outside the laboratory generated control criteria. The recovery errors equate to a potential high bias. However, the recoveries in question were within the method criteria, therefore the data quality is not significantly affected. No corrective action was taken. In data set P1700214, the method was modified to include the use of helium as a diluent gas in place of zero-grade air for container pressurization. When necessary, analytical sample volumes were adjusted by a correction factor for containers pressurized with helium.	
2. Were the data free of data qualification flags and/or notes used by the laboratory? If no, define.	No
Comments: The laboratory used the following data qualification flags with this data set. D – The reported result is from a dilution. L – Laboratory control sample recovery outside the specified limits; results may be biased high.	
3. Were sample CoC forms and procedures complete?	Yes
Comments: The CoC records from field to laboratory were complete and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt.	
4. Were detection limits in accordance with the quality assurance project plan (QAPP), permit, or method, or indicated as acceptable?	Yes
Comments: The detection limits appeared to be acceptable. The following dilutions were applied. Method TO-15: Dilutions of 1.48 and 1.57 times were applied for the VOC analyses of samples MTN-PRE-STARTUP and MTN-POST, respectively. Method TO-15 SIM: Dilutions of 2.16 and 3.14 times were applied for the VOC analyses of samples MTN-PRE-STARTUP and MTN-POST, respectively. Dilutions of 21.6 and 31.4 times were applied for the tetrachloroethene analyses of samples MTN-PRE-STARTUP and MTN-POST, respectively. Method 3C: Dilutions of 1.48 and 1.57 times were applied for the methane analyses of samples MTN-PRE-STARTUP and MTN-POST, respectively. Method MA APH: Dilutions of 1.48 and 1.57 times were applied for the APH analyses of samples MTN-PRE-STARTUP and MTN-POST, respectively.	
5. Were the reported analytical methods and constituents in compliance with the QAPP, permit, or CoC? Specify if any analytes reported by more than one method?	Yes
Comments: The reported analytical methods were in compliance with the CoC and the laboratory reported the requested constituents in accordance with the CoC.	
6. Were samples received in good condition within method-specified requirements?	Yes
Comments: Samples were received intact and in good condition. The final vacuums from the field and receipt vacuums measured by the laboratory were compared by the project team and the vacuums appeared to be acceptable. The canister certification results were reviewed and found to be acceptable. No target analytes were detected at concentrations greater than the reporting limits in the canisters used for sampling. Helium was not used as a tracer gas during the sampling collection process.	

TABLE 1. GENERAL VALIDATION CRITERIA CHECKLIST	
7. Were samples extracted/digested and analyzed within method-specified or technical holding times? Comments: The samples were analyzed within method-specific holding times.	Yes
8. Were reported units appropriate for the sample matrix/matrices and analytical method(s)? Specify if wet or dry units were used for soil. Comments: The results were reported in concentration units of micrograms per cubic meters (µg/m^3), parts per billion by volume (ppbV), parts per million by volume (ppmV), and percent volume per volume (%V/V), which were acceptable for the sample matrix and the analyses requested.	Yes
9. Was the number of field duplicates collected equal to at least 10% of the total number of samples or as required by the project guidelines, QAPP, SAP, or permit? Comments: Field duplicate samples were not collected as part of these sample sets.	No
10. Were field duplicate RPD values within data validation QC limits (soil 0-50%, water 0-30%, or air 0-25%)? Comments: Field duplicate samples were not collected as part of these sample sets.	N/A
11. Were the number of trip blank, field blank, and/or equipment blank samples collected equal to at least 10% of the total number of samples or as required by the project guidelines, QAPP, SAP, or permit? Comments: Trip, field, and equipment blank samples were not collected for these sample sets.	No
12. Were target analytes reported as not detected in the trip blank, field blank, and/or equipment blank samples? Comments: Trip, field, and equipment blank samples were not collected for these sample sets.	N/A

TABLE 2. VALIDATION CRITERIA CHECKLIST FOR VOC ANALYSES (TO-15/TO-15 SIM)	
1. Were instrument calibrations within data validation QC limits and analyzed at the appropriate frequency?	Yes
Comments: Initial and continuing calibrations for target analytes were within data validation QC limits. <u>Data set P1606022:</u> The relative standard deviation (RSD) for naphthalene in the Method TO-15 SIM initial calibration (ICAL) analyzed on 12/28/2016 exceeded the data validation limit of 30% at 32.63%. However, naphthalene was reported from the Method TO-15 analysis and not from analyses associated with this ICAL. Qualification of sample data was not required. <u>Data set P1700214:</u> The percent deviation (%D) for 1,3-butadiene and acrolein in the Method TO-15 SIM continuing calibration verification (CCV) were outside the data validation limits of ±30%. However, these compounds were not target analytes for the Method TO-15 SIM analysis of the submitted sample and qualification of sample data was not required.	
2. Were the instrument tunes within data validation control limits and analyzed at the appropriate frequency?	Yes
Comments: The instrument tunes were within method control limits.	
3. Were the internal standards within data validation control limits?	Yes
Comments: The area counts and retention times for the internal standards were within method control limits.	
4. Was the total number of laboratory blank samples prepared equal to at least 5% of the total number of samples or analyzed as required by the method?	Yes
Comments: The total number of laboratory blank samples prepared was equal to at least 5% of the total number of samples.	
5. Were target analytes reported as not detected in the laboratory blanks?	Yes
Comments: Target analytes were reported as not detected in the laboratory blanks.	
6. Was the total number of LCSs analyzed equal to at least 5% of the total number of samples or analyzed as required by the method?	Yes
Comments: The total number of LCS samples analyzed was equal to at least 5% of the total number of samples.	
7. Were LCS/LCSD percent recoveries and LCS/LCSD RPDs within data validation or laboratory QC limits?	No
Comments: The LCS percent recoveries were within laboratory QC limits, with the following exception. **<u>Method TO-15 SIM</u>: In data set P1606022, the LCS percent recoveries for trans-1,2-dichloroethene and cis-1,2-dichloroethene from batch MS19010917 were outside laboratory QC limits of 72-107% and 73-108% both at 109%. cis-1,2-Dichloroethene was detected in associated sample MTN-PRE-STARTUP and was qualified as J+ to indicate an estimated concentration that may be biased high.** Qualification was not required for trans-1,2-dichloroethene as it was not detected in associated sample MTN-PRE-STARTUP.	
8. Was the total number of MS samples prepared equal to at least 5% of the total number of samples or analyzed as required by the method?	No
Comments: Analysis of matrix spike samples is not required by Method TO-15.	
9. Were MS/MSD percent recoveries and MS/MSD RPDs within data validation or laboratory QC limits?	N/A
Comments: Analysis of matrix spike samples is not required by Method TO-15.	

TABLE 2. VALIDATION CRITERIA CHECKLIST FOR VOC ANALYSES (TO-15/TO-15 SIM)	
10. Were surrogate recoveries within laboratory QC limits?	Yes
Comments: Surrogate recoveries were within laboratory QC limits.	
11. Were laboratory duplicates prepared?	Yes
Comments: Laboratory duplicates were prepared for data set P1606022 Method TO-15 batch MS16010417 and Method TO-15 SIM batch MS19010917 from sample MTN-PRE-STARTUP.	
12. Were laboratory duplicates RPD values within the laboratory acceptance limits?	Yes
Comments: Laboratory duplicate RPDs were within laboratory QC limits.	

TABLE 3. VALIDATION CRITERIA CHECKLIST FOR METHANE ANALYSES (3C)	
1. Were instrument calibrations within data validation QC limits and analyzed at the appropriate frequency? Comments: Instrument calibrations were within data validation QC limits.	Yes
2. Was the total number of laboratory blank samples prepared equal to at least 5% of the total number of samples or analyzed as required by the method? Comments: The total number of laboratory blank samples prepared was equal to at least 5% of the total number of samples.	Yes
3. Were target analytes reported as not detected in the laboratory blanks? Comments: The target analyte was reported as not detected in the laboratory blanks.	Yes
4. Was the total number of LCSs analyzed equal to at least 5% of the total number of samples or analyzed as required by the method? Comments: The total number of LCS samples analyzed was equal to at least 5% of the total number of samples.	Yes
5. Were LCS/LCSD percent recoveries and LCS/LCSD RPDs within data validation or laboratory QC limits? Comments: The LCS percent recoveries were within laboratory QC limits.	Yes
6. Was the total number of MS samples prepared equal to at least 5% of the total number of samples or analyzed as required by the method? Comments: Analysis of matrix spike samples is not required by Method 3C.	No
7. Were MS/MSD percent recoveries and MS/MSD RPDs within data validation or laboratory QC limits? Comments: Analysis of matrix spike samples is not required by Method 3C.	N/A
8. Were surrogate recoveries within laboratory QC limits? Comments: Analysis of surrogates is not required by Method 3C.	N/A
9. Were laboratory duplicates prepared? Comments: Laboratory duplicate samples were not prepared for these sample sets.	No
10. Were laboratory duplicates RPD values within the laboratory acceptance limits? Comments: Laboratory duplicate samples were not prepared for these sample sets.	N/A

TABLE 4. VALIDATION CRITERIA CHECKLIST FOR APH ANALYSES (MA APH)	
1. Were instrument calibrations within data validation QC limits and analyzed at the appropriate frequency? Comments: Instrument calibrations were within data validation QC limits.	Yes
2. Was the total number of laboratory blank samples prepared equal to at least 5% of the total number of samples or analyzed as required by the method? Comments: The total number of laboratory blank samples prepared was equal to at least 5% of the total number of samples.	Yes
3. Were target analytes reported as not detected in the laboratory blanks? Comments: Target analytes were reported as not detected in the laboratory blanks.	Yes
4. Was the total number of LCSs analyzed equal to at least 5% of the total number of samples or analyzed as required by the method? Comments: The total number of LCS samples analyzed was equal to at least 5% of the total number of samples.	Yes
5. Were LCS/LCSD percent recoveries and LCS/LCSD RPDs within data validation or laboratory QC limits? Comments: The LCS percent recoveries were within laboratory QC limits.	Yes
6. Was the total number of MS samples prepared equal to at least 5% of the total number of samples or analyzed as required by the method? Comments: Analysis of matrix spike samples is not required by MA APH Method.	No
7. Were MS/MSD percent recoveries and MS/MSD RPDs within data validation or laboratory QC limits? Comments: Analysis of matrix spike samples is not required by MA APH Method.	N/A
8. Were surrogate recoveries within laboratory QC limits? Comments: Analysis of surrogates is not required by MA APH Method.	N/A
9. Were laboratory duplicates prepared? Comments: A laboratory duplicate was prepared for data set P1606022 batch MS16010417 from sample MTN-PRE-STARTUP.	Yes
10. Were laboratory duplicates RPD values within the laboratory acceptance limits? Comments: Laboratory duplicate RPDs were within laboratory QC limits.	Yes

ATTACHMENT A

BATCH MATCH TABLE

BATCH MATCH TABLE

Data Set	Field Sample ID	Lab Sample ID	TO-15	TO-15 SIM	3C	MA APH
P1606022	MTN-PRE-STARTUP	P1606022-001	MS16010417	MS19010917	TD1010317	MS16010417
P1700214	MTN-POST	P1700214-001	MS16012517	MS19012517	TD1012317	MS16012517

ATTACHMENT B

DATA QUALIFICATION SUMMARY

DATA QUALIFICATION SUMMARY

Abbreviation	Reason
HR-LCS	The LCS and/or LCSD percent recovery was greater than the upper acceptable limit indicating a possible high bias.

Analyte	Method	Field Sample ID	Lab Sample ID	Result	Limit	Units	Reviewer Qualifier	DV Flag Reasons
cis-1,2-Dichloroethene	TO-15 SIM	MTN-PRE-STARTUP	P1606022-001	2.3	0.054	$\mu g/m^3$	J+	HR-LCS

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LABORATORY REPORT

March 21, 2017

Andrew Vann
Trihydro Corporation
2707 Broadwater Ave
Helena, MT 59601

RE: Whitefish Solvent Site / 776-033-001

Dear Andrew:

Enclosed are the results of the samples submitted to our laboratory on February 28, 2017. For your reference, these analyses have been assigned our service request number P1700971.

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 3:15 pm, Mar 21, 2017

For Kelly Horiuchi
Laboratory Director

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www.alsglobal.com

Client: Trihydro Corporation
Project: Whitefish Solvent Site / 776-033-001

Service Request No: P1700971

CASE NARRATIVE

The samples were received intact under chain of custody on February 28, 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

Sample MTN-SS-1 (P1700971-003) was 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.

Methane Analysis

Sample MTN-SS-1 (P1700971-003) was also analyzed for methane according to modified EPA Method 3C (single injection) using a gas chromatograph equipped with a thermal conductivity detector (TCD). This procedure is described in laboratory SOP VOA-EPA3C. This method is included on the laboratory's DoD-ELAP scope of accreditation, however it is not part of the NELAP accreditation.

Air-Phase Petroleum Hydrocarbons (APH) Analysis

All the samples were analyzed for total aliphatic and aromatic gasoline range hydrocarbons by gas chromatography/mass spectrometry according to the Method for the Determination of Air-Phase Petroleum Hydrocarbons (APH), Massachusetts Department of Environmental Protection, Revision 1, December, 2009. This method is included on the laboratory's NELAP scope of accreditation, however it is not part of the DoD-ELAP accreditation.

Significant non-petroleum related peaks (i.e. halogenated, oxygenated, terpenes, etc.) are subtracted from the hydrocarbon range areas when present. Any internal/tuning standards and target APH analytes eluting in the hydrocarbon ranges are also subtracted. Additionally, C_9-C_{10} Aromatic Hydrocarbons are excluded from the C_9-C_{12} Aliphatic Hydrocarbon range.

Volatile Organic Compound Analysis

The samples were also analyzed for selected volatile organic compounds in SCAN and SIM mode 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 method was modified for sample MTN-SS-1 (P1700971-003) to include the use of nitrogen as a diluent gas in place of zero-grade air for container pressurization.

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Client: Trihydro Corporation
Project: Whitefish Solvent Site / 776-033-001

Service Request No: P1700971

CASE NARRATIVE

The surrogate spike recovery for bromofluorobenzene was exceeded in MTN-VI-1 (P1700971-002) in SIM mode due to matrix interference. The target analytes and surrogate recoveries for the associated QC were acceptable. The data has been flagged with the appropriate qualifier. No further corrective action was taken.

The spike recoveries in the Laboratory Control Samples (LCS) analyzed in SIM mode were outside the laboratory generated control criteria. The recovery errors equate to a potential high bias. However, these recoveries were within the method criteria, therefore, the data quality has not been significantly affected. No corrective action was taken.

The containers were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

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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	T104704413-16-7
Utah DOH (NELAP)	http://health.utah.gov/lab/environmental-lab-certification/	CA016272016-6
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

Service Request: P1700971

Project ID: Whitefish Solvent Site / 776-033-001

Date Received: 2/28/2017

Time Received: 09:37

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	MA APH 1.0 - MA VOC PH Can	TO-15 - VOC Cans	TO-15 - VOC SIM	3C Modified - Fxd Gases Can	3C Modified - Helium Can
MTN-AA-1	P1700971-001	Air	2/22/2017	10:00	SSC00144	-0.56	3.67	X	X	X		
MTN-VI-1	P1700971-002	Air	2/22/2017	10:06	SSC00326	-3.66	3.77	X	X	X		
MTN-SS-1	P1700971-003	Air	2/22/2017	11:18	SC01772	-3.07	4.08	X	X		X	X
MTN-BD-1	P1700971-004	Air	2/22/2017	00:00	AS00150	-3.83	3.84	X	X	X		
MTN-POST	P1700971-005	Air	2/22/2017	13:45	AC01989	-3.22	3.80	X	X	X		
MTN-PRE	P1700971-006	Air	2/22/2017	13:45	SC02200	-3.21	5.05	X	X			

Air - Chain of Custody Record & Analytical Service Request

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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 P1700971

Company Name & Address (Reporting Information): Trihydro, 1252 Commerce Dr, Laramie WY 82070

Project Name: Whitefish Solvent Site

Project Number: 776-033-001

Project Manager: Andrew Vann

P.O. # / Billing Information: Same as reporting

Phone: 307-745-7474

Fax:

Email Address for Result Reporting: avann@trihydro.com / cballek@trihydro.com

Sampler (Print & Sign): Sarah Seitz

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	TO-15 SIM, APH (low level DL)	TO-15, APH	TO-15, APH, Helium, CH4	Comments e.g. Actual Preservative or specific instructions
MTN-AA-1	1	2/22/17	10:00	SSC00144	FCA00975	-27.22	-0.11	6L	X			5 hr 15min sample
MTN-V1-1	2	2/22/17	10:06	SSC00326	FCA00549	-27.05	-5.34	6L	X			8 hr sample
MTN-SS-1	3	2/22/17	11:18	SC01772	OA001161	-26.99	-3.89	5,200 mL			X	26 min sample
MTN-BD-1	4	2/22/17	—	AS00150	CS00036	-27.03	-5.96	6L	X			8 hr sample
MTN-POST	5	2/22/17	13:45	AC01989	OA01234	-27.00	-4.79	6L	X			30 min sample
MTN-PRE	6	2/22/17	13:45	SC02200	OA01764	-26.97	-4.51	6L		X		30 min sample

Report Tier Levels - please select

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

EDD required YES / No
Type: ____ Units: ____

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
	2/23/17	12:45		2/28/17	0937
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank Temperature ____ °C

ALS Environmental
Sample Acceptance Check Form

Client: Trihydro Corporation Work order: P1700971
Project: Whitefish Solvent Site / 776-033-001
Sample(s) received on: 2/28/17 Date opened: 2/28/17 by: KKELPE

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 OUTER AND INNER BOXES 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
P1700971-001.01	6.0 L Silonite Can					
P1700971-002.01	6.0 L Silonite Can					
P1700971-003.01	6.0 L Source Can					
P1700971-004.01	6.0 L Silonite Can					
P1700971-005.01	6.0 L Ambient Can					
P1700971-006.01	6.0 L Source Can					

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client:	**Trihydro Corporation**		
Client Sample ID:	**MTN-AA-1**	ALS Project ID:	P1700971
Client Project ID:	**Whitefish Solvent Site / 776-033-001**	ALS Sample ID:	P1700971-001
Test Code:	Massachusetts APH, Revision 1, December 2009	Date Collected:	2/22/17
Instrument ID:	Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16	Date Received:	2/28/17
Analyst:	Lusine Hakobyan	Date Analyzed:	3/9/17
Sample Type:	6.0 L Silonite Canister	Volume(s) Analyzed:	1.00 Liter(s)
Test Notes:			
Container ID:	SSC00144		

Initial Pressure (psig): -0.56 Final Pressure (psig): 3.67

Canister Dilution Factor: 1.30

Compound	**Result µg/m³**	MRL µg/m³	**Data Qualifier**
C_5 - C_8 Aliphatic Hydrocarbons[1,2]	ND	26	
C_9 - C_{12} Aliphatic Hydrocarbons[1,3]	**110**	13	
C_9 - C_{10} Aromatic Hydrocarbons	ND	3.3	

Significant non-petroleum related peaks (i.e. halogenated, oxygenated, terpenes, etc.) are subtracted from the hydrocarbon range areas when present.

[1]Hydrocarbon Range data from total ion chromatogram excluding any internal/tuning standards eluting in that range.

[2]C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target APH analytes eluting in that range.

[3]C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target APH Analytes eluting in that range and concentration of C_9-C_{10} Aromatic Hydrocarbons.

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client:	**Trihydro Corporation**		
Client Sample ID:	**MTN-VI-1**	ALS Project ID:	P1700971
Client Project ID:	**Whitefish Solvent Site / 776-033-001**	ALS Sample ID:	P1700971-002
Test Code:	Massachusetts APH, Revision 1, December 2009	Date Collected:	2/22/17
Instrument ID:	Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16	Date Received:	2/28/17
Analyst:	Lusine Hakobyan	Date Analyzed:	3/9/17
Sample Type:	6.0 L Silonite Canister	Volume(s) Analyzed:	1.00 Liter(s)
Test Notes:			
Container ID:	SSC00326		

Initial Pressure (psig): -3.66 Final Pressure (psig): 3.77

Canister Dilution Factor: 1.67

Compound	**Result µg/m³**	MRL µg/m³	**Data Qualifier**
C_5 - C_8 Aliphatic Hydrocarbons[1,2]	**44**	33	
C_9 - C_{12} Aliphatic Hydrocarbons[1,3]	**60**	17	
C_9 - C_{10} Aromatic Hydrocarbons	**5.5**	4.2	

Significant non-petroleum related peaks (i.e. halogenated, oxygenated, terpenes, etc.) are subtracted from the hydrocarbon range areas when present.

[1]Hydrocarbon Range data from total ion chromatogram excluding any internal/tuning standards eluting in that range.

[2]C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target APH analytes eluting in that range.

[3]C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target APH Analytes eluting in that range and concentration of C_9-C_{10} Aromatic Hydrocarbons.

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client:	**Trihydro Corporation**		
Client Sample ID:	**MTN-SS-1**	ALS Project ID:	P1700971
Client Project ID:	**Whitefish Solvent Site / 776-033-001**	ALS Sample ID:	P1700971-003
Test Code:	Massachusetts APH, Revision 1, December 2009	Date Collected:	2/22/17
Instrument ID:	Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16	Date Received:	2/28/17
Analyst:	Lusine Hakobyan	Date Analyzed:	3/9/17
Sample Type:	6.0 L Summa Canister	Volume(s) Analyzed:	0.12 Liter(s)
Test Notes:			
Container ID:	SC01772		

Initial Pressure (psig): -3.07 Final Pressure (psig): 4.08

Canister Dilution Factor: 1.61

Compound	**Result µg/m³**	MRL µg/m³	**Data Qualifier**
C_5 - C_8 Aliphatic Hydrocarbons[1,2]	ND	270	
C_9 - C_{12} Aliphatic Hydrocarbons[1,3]	ND	130	
C_9 - C_{10} Aromatic Hydrocarbons	ND	34	

Significant non-petroleum related peaks (i.e. halogenated, oxygenated, terpenes, etc.) are subtracted from the hydrocarbon range areas when present.

[1]Hydrocarbon Range data from total ion chromatogram excluding any internal/tuning standards eluting in that range.

[2]C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target APH analytes eluting in that range.

[3]C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target APH Analytes eluting in that range and concentration of C_9-C_{10} Aromatic Hydrocarbons.

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client:	**Trihydro Corporation**		
Client Sample ID:	**MTN-BD-1**	ALS Project ID:	P1700971
Client Project ID:	**Whitefish Solvent Site / 776-033-001**	ALS Sample ID:	P1700971-004
Test Code:	Massachusetts APH, Revision 1, December 2009	Date Collected:	2/22/17
Instrument ID:	Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16	Date Received:	2/28/17
Analyst:	Lusine Hakobyan	Date Analyzed:	3/9/17
Sample Type:	6.0 L Silonite Canister	Volume(s) Analyzed:	1.00 Liter(s)
Test Notes:			
Container ID:	AS00150		

Initial Pressure (psig): -3.83 Final Pressure (psig): 3.84

Canister Dilution Factor: 1.71

Compound	**Result µg/m³**	MRL µg/m³	**Data Qualifier**
C_5 - C_8 Aliphatic Hydrocarbons[1,2]	**55**	34	
C_9 - C_{12} Aliphatic Hydrocarbons[1,3]	**66**	17	
C_9 - C_{10} Aromatic Hydrocarbons	**6.0**	4.3	

Significant non-petroleum related peaks (i.e. halogenated, oxygenated, terpenes, etc.) are subtracted from the hydrocarbon range areas when present.

[1]Hydrocarbon Range data from total ion chromatogram excluding any internal/tuning standards eluting in that range.

[2]C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target APH analytes eluting in that range.

[3]C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target APH Analytes eluting in that range and concentration of C_9-C_{10} Aromatic Hydrocarbons.

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client:	**Trihydro Corporation**		
Client Sample ID:	**MTN-POST**	ALS Project ID:	P1700971
Client Project ID:	**Whitefish Solvent Site / 776-033-001**	ALS Sample ID:	P1700971-005
Test Code:	Massachusetts APH, Revision 1, December 2009	Date Collected:	2/22/17
Instrument ID:	Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16	Date Received:	2/28/17
Analyst:	Lusine Hakobyan	Date Analyzed:	3/9/17
Sample Type:	6.0 L Summa Canister	Volume(s) Analyzed:	1.00 Liter(s)
Test Notes:			
Container ID:	AC01989		

Initial Pressure (psig): -3.22 Final Pressure (psig): 3.80

Canister Dilution Factor: 1.61

Compound	**Result µg/m³**	MRL µg/m³	**Data Qualifier**
C_5 - C_8 Aliphatic Hydrocarbons[1,2]	ND	32	
C_9 - C_{12} Aliphatic Hydrocarbons[1,3]	ND	16	
C_9 - C_{10} Aromatic Hydrocarbons	ND	4.0	

Significant non-petroleum related peaks (i.e. halogenated, oxygenated, terpenes, etc.) are subtracted from the hydrocarbon range areas when present.

[1]Hydrocarbon Range data from total ion chromatogram excluding any internal/tuning standards eluting in that range.

[2]C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target APH analytes eluting in that range.

[3]C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target APH Analytes eluting in that range and concentration of C_9-C_{10} Aromatic Hydrocarbons.

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client:	**Trihydro Corporation**		
Client Sample ID:	**MTN-PRE**	ALS Project ID:	P1700971
Client Project ID:	**Whitefish Solvent Site / 776-033-001**	ALS Sample ID:	P1700971-006
Test Code:	Massachusetts APH, Revision 1, December 2009	Date Collected:	2/22/17
Instrument ID:	Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16	Date Received:	2/28/17
Analyst:	Lusine Hakobyan	Date Analyzed:	3/9/17
Sample Type:	6.0 L Summa Canister	Volume(s) Analyzed:	0.035 Liter(s)
Test Notes:			
Container ID:	SC02200		

Initial Pressure (psig): -3.21 Final Pressure (psig): 5.05

Canister Dilution Factor: 1.72

Compound	**Result µg/m³**	MRL µg/m³	**Data Qualifier**
C_5 - C_8 Aliphatic Hydrocarbons[1,2]	ND	980	
C_9 - C_{12} Aliphatic Hydrocarbons[1,3]	ND	490	
C_9 - C_{10} Aromatic Hydrocarbons	ND	120	

Significant non-petroleum related peaks (i.e. halogenated, oxygenated, terpenes, etc.) are subtracted from the hydrocarbon range areas when present.

[1]Hydrocarbon Range data from total ion chromatogram excluding any internal/tuning standards eluting in that range.

[2]C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target APH analytes eluting in that range.

[3]C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target APH Analytes eluting in that range and concentration of C_9-C_{10} Aromatic Hydrocarbons.

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client:	**Trihydro Corporation**		
Client Sample ID:	**Method Blank**	ALS Project ID:	P1700971
Client Project ID:	**Whitefish Solvent Site / 776-033-001**	ALS Sample ID:	P170309-MB
Test Code:	Massachusetts APH, Revision 1, December 2009	Date Collected:	NA
Instrument ID:	Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16	Date Received:	NA
Analyst:	Lusine Hakobyan	Date Analyzed:	3/9/17
Sample Type:	6.0 L Silonite Canister	Volume(s) Analyzed:	1.00 Liter(s)
Test Notes:			

Compound	**Result µg/m³**	MRL µg/m³	**Data Qualifier**
C_5 - C_8 Aliphatic Hydrocarbons[1,2]	ND	20	
C_9 - C_{12} Aliphatic Hydrocarbons[1,3]	ND	10	
C_9 - C_{10} Aromatic Hydrocarbons	ND	2.5	

Significant non-petroleum related peaks (i.e. halogenated, oxygenated, terpenes, etc.) are subtracted from the hydrocarbon range areas when present.

[1]Hydrocarbon Range data from total ion chromatogram excluding any internal/tuning standards eluting in that range.

[2]C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target APH analytes eluting in that range.

[3]C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target APH Analytes eluting in that range and concentration of C_9-C_{10} Aromatic Hydrocarbons.

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Trihydro Corporation**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P170309-LCS

Test Code: Massachusetts APH, Revision 1, December 2009 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Lusine Hakobyan Date Analyzed: 3/9/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

Compound	Spike Amount µg/m³	**Result µg/m³**	**% Recovery**	ALS Acceptance Limits	**Data Qualifier**
C5 - C8 Aliphatic Hydrocarbons	213	**230**	**108**	70-130	
C9 - C12 Aliphatic Hydrocarbons	213	**241**	**113**	70-130	
C9 - C10 Aromatic Hydrocarbons	425	**382**	**90**	70-130	

ALS ENVIRONMENTAL

LABORATORY DUPLICATE SUMMARY RESULTS

Client: **Trihydro Corporation**
Client Sample ID: **MTN-PRE** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P1700971-006DUP

Test Code: Massachusetts APH, Revision 1, December 2009 Date Collected: 2/22/17
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 2/28/17
Analyst: Lusine Hakobyan Date Analyzed: 3/9/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.035 Liter(s)
Test Notes:
Container ID: SC02200

Initial Pressure (psig): -3.21 Final Pressure (psig): 5.05

Canister Dilution Factor: 1.72

Compound	Sample Result µg/m³	Duplicate Sample Result µg/m³	Average µg/m³	**% RPD**	RPD Limit	**Data Qualifier**
C_5 - C_8 Aliphatic Hydrocarbons[1,2]	ND	ND	-	-	30	
C_9 - C_{12} Aliphatic Hydrocarbons[1,3]	ND	ND	-	-	30	
C_9 - C_{10} Aromatic Hydrocarbons	ND	ND	-	-	30	

Significant non-petroleum related peaks (i.e. halogenated, oxygenated, terpenes, etc.) are subtracted from the hydrocarbon range areas when present.
[1]Hydrocarbon Range data from total ion chromatogram excluding any internal/tuning standards eluting in that range.
[2]C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target APH analytes eluting in that range.
[3]C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target APH Analytes eluting in that range and concentration of C_9-C_{10} Aromatic Hydrocarbons.
ND = Compound was analyzed for, but not detected.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Project ID: P1700971

Helium

Test Code: EPA 3C Modified
Instrument ID: HP5890 II/GC8/TCD Date(s) Collected: 2/22/17
Analyst: Mike Conejo Date Received: 2/28/17
Sample Type: 6.0 L Summa Canister(s) Date Analyzed: 3/6/17
Test Notes:

Client Sample ID	ALS Sample ID	Injection Volume ml(s)	Canister Dilution Factor	**Result ppmV**	MRL ppmV	Data Qualifier
MTN-SS-1	P1700971-003	1.00	1.26	**4,200**	32	
Method Blank	P170306-MB	1.00	1.00	ND	25	

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

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Trihydro Corporation**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P170306-LCS

Test Code: EPA 3C Modified Date Collected: NA
Instrument ID: HP5890 II/GC8/TCD Date Received: NA
Analyst: Mike Conejo Date Analyzed: 3/06/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	Compound	Spike Amount ppmV	Result ppmV	% Recovery	ALS Acceptance Limits	Data Qualifier
7440-59-7	Helium	10,000	**10,800**	**108**	75-124	

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Project ID: P1700971

Methane

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD Date(s) Collected: 2/22/17
Analyst: Mike Conejo Date Received: 2/28/17
Sample Type: 6.0 L Summa Canister(s) Date Analyzed: 3/6/17
Test Notes:

Client Sample ID	ALS Sample ID	Canister Dilution Factor	Injection Volume ml(s)	**Result %, v/v**	MRL %, v/v	Data Qualifier
MTN-SS-1	P1700971-003	1.61	0.10	ND	0.16	
Method Blank	P170306-MB	1.00	0.10	ND	0.10	

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

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Trihydro Corporation**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P170306-LCS

Test Code: EPA Method 3C Modified Date Collected: NA
Instrument ID: HP5890 II/GC1/TCD Date Received: NA
Analyst: Mike Conejo Date Analyzed: 3/06/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	**Compound**	Spike Amount ppmV	**Result ppmV**	**% Recovery**	ALS Acceptance Limits	Data Qualifier
74-82-8	Methane	25,000	**25,800**	**103**	94-111	

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **MTN-AA-1** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P1700971-001

Test Code: EPA TO-15 Date Collected: 2/22/17
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 2/28/17
Analyst: Lusine Hakobyan Date Analyzed: 3/9/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: SSC00144

Initial Pressure (psig): -0.56 Final Pressure (psig): 3.67

Canister Dilution Factor: 1.30

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.13	ND	0.036	
71-43-2	Benzene	**0.66**	0.13	**0.21**	0.041	
108-88-3	Toluene	**1.3**	0.65	**0.36**	0.17	
100-41-4	Ethylbenzene	ND	0.65	ND	0.15	
179601-23-1	m,p-Xylenes	ND	0.65	ND	0.15	
95-47-6	o-Xylene	ND	0.65	ND	0.15	
91-20-3	Naphthalene	ND	0.65	ND	0.12	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **MTN-VI-1** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P1700971-002

Test Code: EPA TO-15 Date Collected: 2/22/17
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 2/28/17
Analyst: Lusine Hakobyan Date Analyzed: 3/9/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: SSC00326

Initial Pressure (psig): -3.66 Final Pressure (psig): 3.77

Canister Dilution Factor: 1.67

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.17	ND	0.046	
71-43-2	Benzene	**1.3**	0.17	**0.39**	0.052	
108-88-3	Toluene	**2.9**	0.84	**0.77**	0.22	
100-41-4	Ethylbenzene	ND	0.84	ND	0.19	
179601-23-1	m,p-Xylenes	**2.4**	0.84	**0.56**	0.19	
95-47-6	o-Xylene	**0.90**	0.84	**0.21**	0.19	
91-20-3	Naphthalene	ND	0.84	ND	0.16	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **MTN-SS-1** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P1700971-003

Test Code: EPA TO-15 Modified Date Collected: 2/22/17
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 2/28/17
Analyst: Lusine Hakobyan Date Analyzed: 3/9/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.12 Liter(s)
Test Notes:
Container ID: SC01772

Initial Pressure (psig): -3.07 Final Pressure (psig): 4.08

Canister Dilution Factor: 1.61

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	1.3	ND	0.53	
156-60-5	trans-1,2-Dichloroethene	ND	1.3	ND	0.34	
1634-04-4	Methyl tert-Butyl Ether	ND	1.3	ND	0.37	
156-59-2	cis-1,2-Dichloroethene	ND	1.3	ND	0.34	
71-43-2	Benzene	**1.6**	1.3	**0.50**	0.42	
79-01-6	Trichloroethene	ND	1.3	ND	0.25	
108-88-3	Toluene	ND	6.7	ND	1.8	
127-18-4	Tetrachloroethene	**1,300**	1.3	**190**	0.20	
100-41-4	Ethylbenzene	ND	6.7	ND	1.5	
179601-23-1	m,p-Xylenes	ND	6.7	ND	1.5	
95-47-6	o-Xylene	ND	6.7	ND	1.5	
91-20-3	Naphthalene	ND	6.7	ND	1.3	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **MTN-BD-1** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P1700971-004

Test Code: EPA TO-15 Date Collected: 2/22/17
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 2/28/17
Analyst: Lusine Hakobyan Date Analyzed: 3/9/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS00150

Initial Pressure (psig): -3.83 Final Pressure (psig): 3.84

Canister Dilution Factor: 1.71

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.17	ND	0.047	
71-43-2	Benzene	**1.3**	0.17	**0.42**	0.054	
108-88-3	Toluene	**3.1**	0.86	**0.83**	0.23	
100-41-4	Ethylbenzene	ND	0.86	ND	0.20	
179601-23-1	m,p-Xylenes	**2.6**	0.86	**0.60**	0.20	
95-47-6	o-Xylene	**0.95**	0.86	**0.22**	0.20	
91-20-3	Naphthalene	ND	0.86	ND	0.16	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **MTN-POST** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P1700971-005

Test Code: EPA TO-15 Date Collected: 2/22/17
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 2/28/17
Analyst: Lusine Hakobyan Date Analyzed: 3/9/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC01989

Initial Pressure (psig): -3.22 Final Pressure (psig): 3.80

Canister Dilution Factor: 1.61

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.16	ND	0.045	
71-43-2	Benzene	ND	0.16	ND	0.050	
108-88-3	Toluene	ND	0.81	ND	0.21	
100-41-4	Ethylbenzene	ND	0.81	ND	0.19	
179601-23-1	m,p-Xylenes	ND	0.81	ND	0.19	
95-47-6	o-Xylene	ND	0.81	ND	0.19	
91-20-3	Naphthalene	ND	0.81	ND	0.15	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **MTN-PRE** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P1700971-006

Test Code: EPA TO-15 Date Collected: 2/22/17
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 2/28/17
Analyst: Lusine Hakobyan Date Analyzed: 3/9/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.035 Liter(s)
Test Notes:
Container ID: SC02200

Initial Pressure (psig): -3.21 Final Pressure (psig): 5.05

Canister Dilution Factor: 1.72

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	4.9	ND	1.9	
156-60-5	trans-1,2-Dichloroethene	ND	4.9	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	4.9	ND	1.4	
156-59-2	cis-1,2-Dichloroethene	**57**	4.9	**14**	1.2	
71-43-2	Benzene	ND	4.9	ND	1.5	
79-01-6	Trichloroethene	**36**	4.9	**6.7**	0.91	
108-88-3	Toluene	ND	25	ND	6.5	
127-18-4	Tetrachloroethene	**4,700**	4.9	**700**	0.72	
100-41-4	Ethylbenzene	ND	25	ND	5.7	
179601-23-1	m,p-Xylenes	ND	25	ND	5.7	
95-47-6	o-Xylene	ND	25	ND	5.7	
91-20-3	Naphthalene	ND	25	ND	4.7	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **Method Blank** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P170309-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Lusine Hakobyan Date Analyzed: 3/9/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.10	ND	0.039	
156-60-5	trans-1,2-Dichloroethene	ND	0.10	ND	0.025	
1634-04-4	Methyl tert-Butyl Ether	ND	0.10	ND	0.028	
156-59-2	cis-1,2-Dichloroethene	ND	0.10	ND	0.025	
71-43-2	Benzene	ND	0.10	ND	0.031	
79-01-6	Trichloroethene	ND	0.10	ND	0.019	
108-88-3	Toluene	ND	0.50	ND	0.13	
127-18-4	Tetrachloroethene	ND	0.10	ND	0.015	
100-41-4	Ethylbenzene	ND	0.50	ND	0.12	
179601-23-1	m,p-Xylenes	ND	0.50	ND	0.12	
95-47-6	o-Xylene	ND	0.50	ND	0.12	
91-20-3	Naphthalene	ND	0.50	ND	0.095	

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

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Client: **Trihydro Corporation**
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Project ID: P1700971

Test Code: EPA TO-15 / EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date(s) Collected: 2/22/17
Analyst: Lusine Hakobyan Date(s) Received: 2/28/17
Sample Type: 6.0 L Silonite Canister(s) / 6.0 L Summa Canister(s) Date(s) Analyzed: 3/9/17
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	P170309-MB	**105**	**98**	**82**	70-130	
Lab Control Sample	P170309-LCS	**101**	**96**	**85**	70-130	
MTN-AA-1	P1700971-001	**104**	**96**	**85**	70-130	
MTN-VI-1	P1700971-002	**104**	**96**	**84**	70-130	
MTN-SS-1	P1700971-003	**105**	**97**	**84**	70-130	
MTN-BD-1	P1700971-004	**104**	**96**	**84**	70-130	
MTN-POST	P1700971-005	**104**	**96**	**84**	70-130	
MTN-PRE	P1700971-006	**105**	**97**	**85**	70-130	
MTN-PRE	P1700971-006DUP	**104**	**96**	**84**	70-130	

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

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Trihydro Corporation**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P170309-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Lusine Hakobyan Date Analyzed: 3/9/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
75-01-4	Vinyl Chloride	210	**245**	**117**	61-125	
156-60-5	trans-1,2-Dichloroethene	213	**238**	**112**	74-123	
1634-04-4	Methyl tert-Butyl Ether	213	**215**	**101**	69-113	
156-59-2	cis-1,2-Dichloroethene	212	**233**	**110**	72-117	
71-43-2	Benzene	212	**216**	**102**	65-107	
79-01-6	Trichloroethene	212	**199**	**94**	68-114	
108-88-3	Toluene	212	**197**	**93**	59-118	
127-18-4	Tetrachloroethene	213	**175**	**82**	65-130	
100-41-4	Ethylbenzene	212	**205**	**97**	68-122	
179601-23-1	m,p-Xylenes	424	**414**	**98**	68-123	
95-47-6	o-Xylene	212	**204**	**96**	68-122	
91-20-3	Naphthalene	214	**245**	**114**	62-136	

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: **MTN-PRE** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P1700971-006DUP

Test Code: EPA TO-15 Date Collected: 2/22/17
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 2/28/17
Analyst: Lusine Hakobyan Date Analyzed: 3/9/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.035 Liter(s)
Test Notes:
Container ID: SC02200

Initial Pressure (psig): -3.21 Final Pressure (psig): 5.05

Canister Dilution Factor: 1.72

Compound	Sample Result µg/m³	Sample Result ppbV	**Duplicate Sample Result µg/m³**	**Duplicate Sample Result** ppbV	Average µg/m³	**% RPD**	RPD Limit	**Data Qualifier**
Vinyl Chloride	ND	ND	ND	ND	-	-	25	
trans-1,2-Dichloroethene	ND	ND	ND	ND	-	-	25	
Methyl tert-Butyl Ether	ND	ND	ND	ND	-	-	25	
cis-1,2-Dichloroethene	56.6	14.3	56.8	14.3	56.7	**0.4**	25	
Benzene	ND	ND	ND	ND	-	-	25	
Trichloroethene	36.1	6.71	37.2	6.92	36.65	**3**	25	
Toluene	ND	ND	ND	ND	-	-	25	
Tetrachloroethene	4,720	696	4,790	707	4755	**1**	25	
Ethylbenzene	ND	ND	ND	ND	-	-	25	
m,p-Xylenes	ND	ND	ND	ND	-	-	25	
o-Xylene	ND	ND	ND	ND	-	-	25	
Naphthalene	ND	ND	ND	ND	-	-	25	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation** ALS Project ID: P1700971

Client Project ID: **Whitefish Solvent Site / 776-033-001**

Internal Standard Area and RT Summary

Test Code: EPA TO-15 / EPA TO-15 Modified

Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Lab File ID: 03091701.D

Analyst: Lusine Hakobyan Date Analyzed: 3/9/17

Sample Type: 6.0 L Silonite Canister(s) Time Analyzed: 02:20

Test Notes:

		IS1 (BCM)			IS2 (DFB)			IS3 (CBZ)		
		AREA	#	RT	#	AREA	#	RT	#	AREA	#	RT	#
	24 Hour Standard	394642		11.55		1981191		13.66		925551		17.93	
	Upper Limit	552499		11.88		2773667		13.99		1295771		18.26	
	Lower Limit	236785		11.22		1188715		13.33		555331		17.60	
	Client Sample ID												
01	Method Blank	355025		11.53		1829503		13.64		815907		17.93	
02	Lab Control Sample	383773		11.55		1920844		13.66		891332		17.93	
03	MTN-AA-1	378501		11.54		1931078		13.65		894613		17.93	
04	MTN-VI-1	392230		11.54		2008469		13.65		929151		17.93	
05	MTN-SS-1	372078		11.53		1915899		13.64		875118		17.93	
06	MTN-BD-1	378958		11.54		1943924		13.65		901232		17.93	
07	MTN-POST	375411		11.53		1927332		13.64		885425		17.93	
08	MTN-PRE	375988		11.53		1932334		13.64		886426		17.93	
09	MTN-PRE (Lab Duplicate)	369831		11.53		1884462		13.64		873352		17.93	
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													

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

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **MTN-AA-1** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P1700971-001

Test Code: EPA TO-15 SIM Date Collected: 2/22/17
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS19 Date Received: 2/28/17
Analyst: Cory Lewis Date Analyzed: 3/7/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: SSC00144

Initial Pressure (psig): -0.56 Final Pressure (psig): 3.67

Canister Dilution Factor: 1.30

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.033	ND	0.013	
156-60-5	trans-1,2-Dichloroethene	ND	0.033	ND	0.0082	
156-59-2	cis-1,2-Dichloroethene	ND	0.033	ND	0.0082	
79-01-6	Trichloroethene	**0.033**	0.033	**0.0061**	0.0060	
127-18-4	Tetrachloroethene	**0.85**	0.033	**0.13**	0.0048	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **MTN-VI-1** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P1700971-002

Test Code: EPA TO-15 SIM Date Collected: 2/22/17
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS19 Date Received: 2/28/17
Analyst: Cory Lewis Date Analyzed: 3/7 - 3/8/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes: 0.10 Liter(s)
Container ID: SSC00326

Initial Pressure (psig): -3.66 Final Pressure (psig): 3.77

Canister Dilution Factor: 1.67

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.042	ND	0.016	
156-60-5	trans-1,2-Dichloroethene	ND	0.042	ND	0.011	
156-59-2	cis-1,2-Dichloroethene	ND	0.042	ND	0.011	
79-01-6	Trichloroethene	**0.16**	0.042	**0.030**	0.0078	
127-18-4	Tetrachloroethene	**99**	0.42	**15**	0.062	**D**

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **MTN-BD-1** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P1700971-004

Test Code: EPA TO-15 SIM Date Collected: 2/22/17
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS19 Date Received: 2/28/17
Analyst: Cory Lewis Date Analyzed: 3/7 - 3/8/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes: 0.10 Liter(s)
Container ID: AS00150

Initial Pressure (psig): -3.83 Final Pressure (psig): 3.84

Canister Dilution Factor: 1.71

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.043	ND	0.017	
156-60-5	trans-1,2-Dichloroethene	ND	0.043	ND	0.011	
156-59-2	cis-1,2-Dichloroethene	ND	0.043	ND	0.011	
79-01-6	Trichloroethene	**0.16**	0.043	**0.030**	0.0080	
127-18-4	Tetrachloroethene	**100**	0.43	**15**	0.063	**D**

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **MTN-POST** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P1700971-005

Test Code: EPA TO-15 SIM Date Collected: 2/22/17
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS19 Date Received: 2/28/17
Analyst: Cory Lewis Date Analyzed: 3/8/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC01989

Initial Pressure (psig): -3.22 Final Pressure (psig): 3.80

Canister Dilution Factor: 1.61

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.040	ND	0.016	
156-60-5	trans-1,2-Dichloroethene	ND	0.040	ND	0.010	
156-59-2	cis-1,2-Dichloroethene	ND	0.040	ND	0.010	
79-01-6	Trichloroethene	ND	0.040	ND	0.0075	
127-18-4	Tetrachloroethene	**2.6**	0.040	**0.38**	0.0059	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **Method Blank** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P170307-MB

Test Code: EPA TO-15 SIM Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS19 Date Received: NA
Analyst: Cory Lewis Date Analyzed: 3/7/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.025	ND	0.0098	
156-60-5	trans-1,2-Dichloroethene	ND	0.025	ND	0.0063	
156-59-2	cis-1,2-Dichloroethene	ND	0.025	ND	0.0063	
79-01-6	Trichloroethene	ND	0.025	ND	0.0047	
127-18-4	Tetrachloroethene	ND	0.025	ND	0.0037	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **Method Blank** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P170308-MB

Test Code: EPA TO-15 SIM Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS19 Date Received: NA
Analyst: Cory Lewis Date Analyzed: 3/8/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.025	ND	0.0098	
156-60-5	trans-1,2-Dichloroethene	ND	0.025	ND	0.0063	
156-59-2	cis-1,2-Dichloroethene	ND	0.025	ND	0.0063	
79-01-6	Trichloroethene	ND	0.025	ND	0.0047	
127-18-4	Tetrachloroethene	ND	0.025	ND	0.0037	

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

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Client: **Trihydro Corporation**
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Project ID: P1700971

Test Code: EPA TO-15 SIM
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS19 Date(s) Collected: 2/22/17
Analyst: Cory Lewis Date(s) Received: 2/28/17
Sample Type: 6.0 L Summa Canister(s) Date(s) Analyzed: 3/7 - 3/8/17
Test Notes:

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4 % Recovered	Toluene-d8 % Recovered	Bromofluorobenzene % Recovered	Acceptance Limits	Data Qualifier
Method Blank	P170307-MB	**105**	**100**	**84**	70-130	
Method Blank	P170308-MB	**101**	**99**	**86**	70-130	
Lab Control Sample	P170307-LCS	**103**	**100**	**91**	70-130	
Lab Control Sample	P170308-LCS	**99**	**99**	**92**	70-130	
MTN-AA-1	P1700971-001	**101**	**102**	**92**	70-130	
MTN-VI-1	P1700971-002	**98**	**101**	**132**	70-130	**S**
MTN-BD-1	P1700971-004	**96**	**101**	**96**	70-130	
MTN-POST	P1700971-005	**103**	**100**	**89**	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.
S = Surrogate recovery not within specified limits.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Trihydro Corporation**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P170307-LCS

Test Code: EPA TO-15 SIM Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS19 Date Received: NA
Analyst: Cory Lewis Date Analyzed: 3/7/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
75-01-4	Vinyl Chloride	4.20	**5.02**	**120**	58-117	**L**
156-60-5	trans-1,2-Dichloroethene	4.27	**4.84**	**113**	72-107	**L**
156-59-2	cis-1,2-Dichloroethene	4.24	**4.81**	**113**	73-108	**L**
79-01-6	Trichloroethene	4.25	**4.62**	**109**	66-101	**L**
127-18-4	Tetrachloroethene	4.25	**4.50**	**106**	66-105	**L**

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.
L = Laboratory control sample recovery outside the specified limits; results may be biased high.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Trihydro Corporation**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P170308-LCS

Test Code: EPA TO-15 SIM Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS19 Date Received: NA
Analyst: Cory Lewis Date Analyzed: 3/8/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
75-01-4	Vinyl Chloride	4.20	**5.26**	**125**	58-117	**L**
156-60-5	trans-1,2-Dichloroethene	4.27	**5.09**	**119**	72-107	**L**
156-59-2	cis-1,2-Dichloroethene	4.24	**5.08**	**120**	73-108	**L**
79-01-6	Trichloroethene	4.25	**5.04**	**119**	66-101	**L**
127-18-4	Tetrachloroethene	4.25	**4.88**	**115**	66-105	**L**

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.
L = Laboratory control sample recovery outside the specified limits; results may be biased high.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Project ID: P1700971

Internal Standard Area and RT Summary

Test Code: EPA TO-15 SIM
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/7890A/MS19 Lab File ID: 03071702.D
Analyst: Cory Lewis Date Analyzed: 3/7/17
Sample Type: 6.0 L Silonite Canister(s) Time Analyzed: 10:20
Test Notes:

		IS1 (BCM)			IS2 (DFB)			IS3 (CBZ)		
		AREA	#	RT	#	AREA	#	RT	#	AREA	#	RT	#
	24 Hour Standard	41816		9.75		207762		11.71		42091		16.05	
	Upper Limit	58542		10.08		290867		12.04		58927		16.38	
	Lower Limit	25090		9.42		124657		11.38		25255		15.72	
	Client Sample ID												
01	Method Blank	40001		9.79		193105		11.72		39786		16.06	
02	Lab Control Sample	38667		9.76		190496		11.71		39422		16.05	
03	MTN-AA-1	43836		9.76		216994		11.71		46497		16.05	
04	MTN-VI-1	48594		9.75		238501		11.71		49561		16.05	
05	MTN-BD-1	52244		9.75		255575		11.71		52212		16.05	
06													
07													
08													
09													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													

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

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Project ID: P1700971

Internal Standard Area and RT Summary

Test Code: EPA TO-15 SIM
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/7890A/MS19 Lab File ID: 03081702.D
Analyst: Cory Lewis Date Analyzed: 3/8/17
Sample Type: 6.0 L Summa Canister(s) Time Analyzed: 04:54
Test Notes:

		IS1 (BCM)			IS2 (DFB)			IS3 (CBZ)		
		AREA	#	RT	AREA	#	RT	AREA	#	RT
	24 Hour Standard	38524		9.75	190769		11.71	38163		16.05
	Upper Limit	53934		10.08	267077		12.04	53428		16.38
	Lower Limit	23114		9.42	114461		11.38	22898		15.72
	Client Sample ID									
01	Method Blank	35866		9.79	174009		11.72	35012		16.06
02	Lab Control Sample	36066		9.76	176331		11.71	35327		16.05
03	MTN-VI-1 (Dilution)	34734		9.77	168274		11.71	33582		16.05
04	MTN-BD-1 (Dilution)	34296		9.77	165446		11.71	33130		16.06
05	MTN-POST	34810		9.78	169604		11.72	34813		16.06
06										
07										
08										
09										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										

IS1 (BCM) = Bromochloromethane
IS2 (DFB) = 1,4-Difluorobenzene
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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. See case narrative.

Quantitation Report (QT Reviewed)

Data Path : J:\GC08\DATA\H2_He\2017_03\06\
Data File : 03061742.D
Signal(s) : TCD1A.CH
Acq On : 06-Mar-2017, 14:40
Operator : MC
Sample : 0971-003 1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Mar 06 14:47:32 2017
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Helium	0.771	143412	3333.191	ppm
2)	Hydrogen	0.000	0	N.D.	ppm

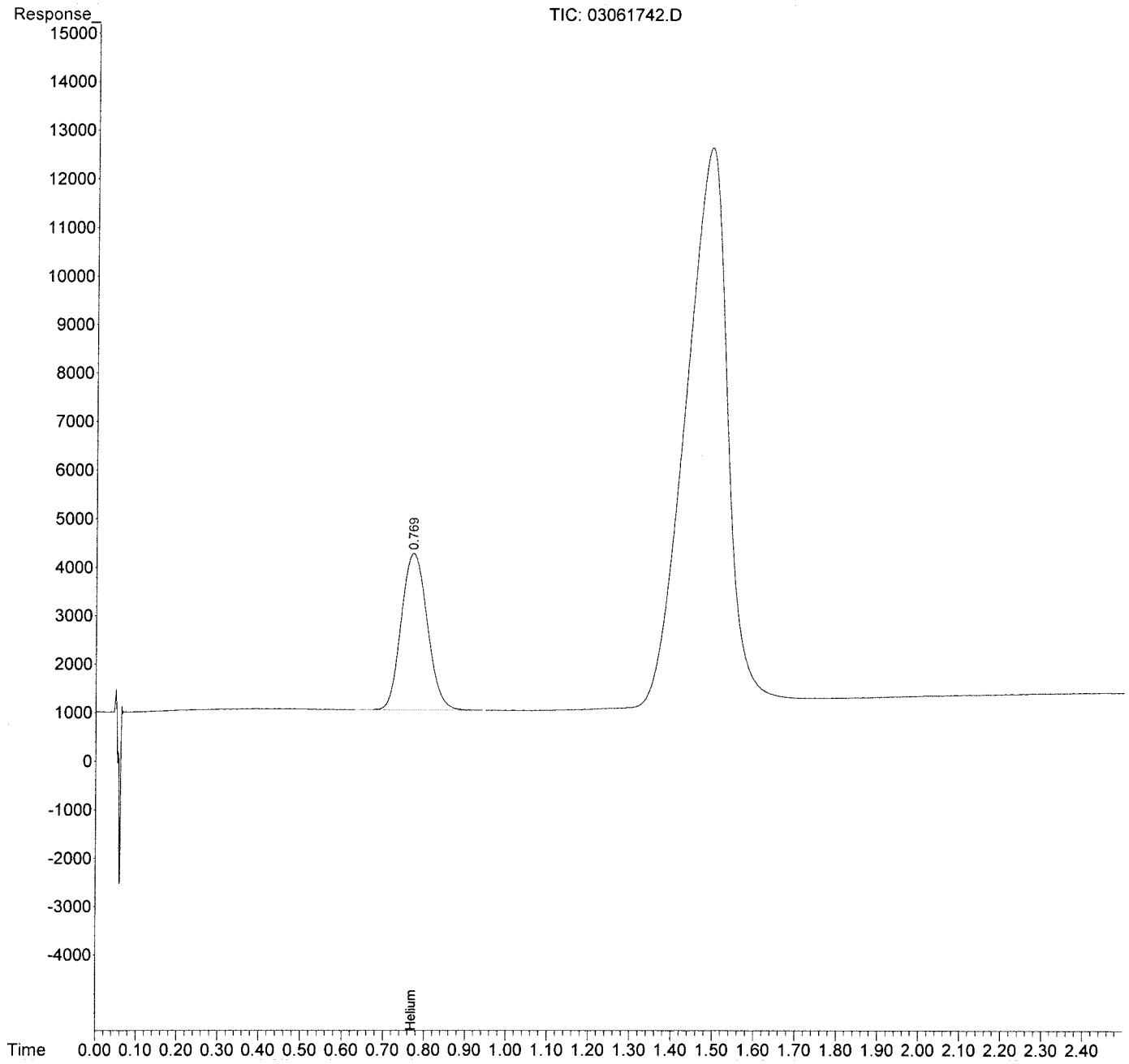
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : J:\GC08\DATA\H2_He\2017_03\06\
Data File : 03061742.D
Signal(s) : TCD1A.CH
Acq On : 06-Mar-2017, 14:40
Operator : MC
Sample : 0971-003 1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Mar 06 14:47:32 2017
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : J:\GC08\DATA\H2_He\2017_03\06\
Data File : 03061726.D
Signal(s) : TCD1A.CH
Acq On : 06-Mar-2017, 11:48
Operator : MC
Sample : mb 1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Mar 07 15:02:34 2017
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
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

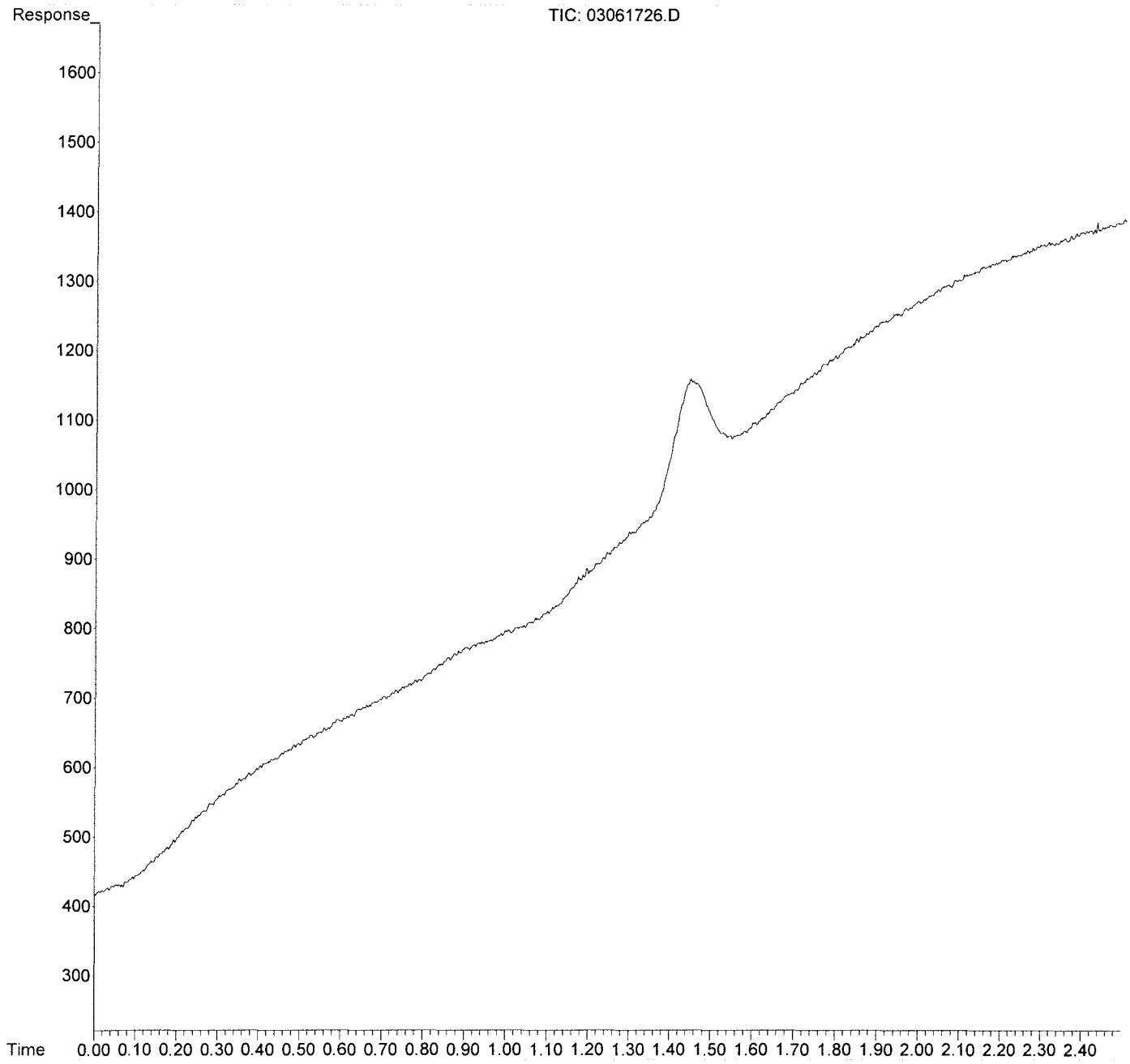
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : J:\GC08\DATA\H2_He\2017_03\06\
Data File : 03061726.D
Signal(s) : TCD1A.CH
Acq On : 06-Mar-2017, 11:48
Operator : MC
Sample : mb 1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Mar 07 15:02:34 2017
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : J:\GC08\DATA\H2_He\2017_03\06\
Data File : 03061743.D
Signal(s) : TCD1A.CH
Acq On : 06-Mar-2017, 14:49
Operator : MC
Sample : lcs s30-03061702
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Mar 06 15:04:27 2017
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Helium	0.785	46328	1076.761	ppm
2)	Hydrogen	0.000	0	N.D.	ppm

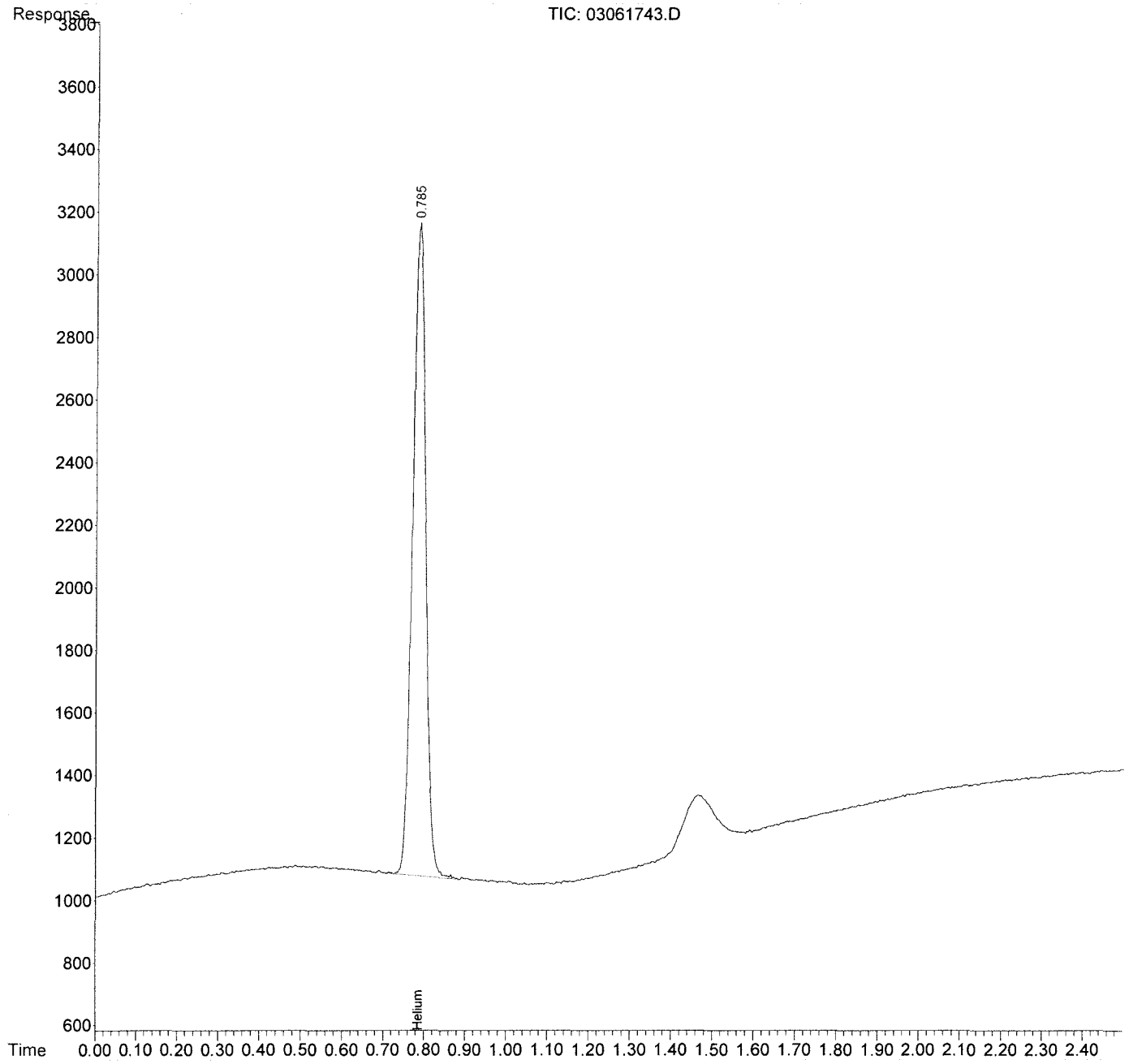
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : J:\GC08\DATA\H2_He\2017_03\06\
Data File : 03061743.D
Signal(s) : TCD1A.CH
Acq On : 06-Mar-2017, 14:49
Operator : MC
Sample : lcs s30-03061702
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Mar 06 15:04:27 2017
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Response Factor Report HP5890

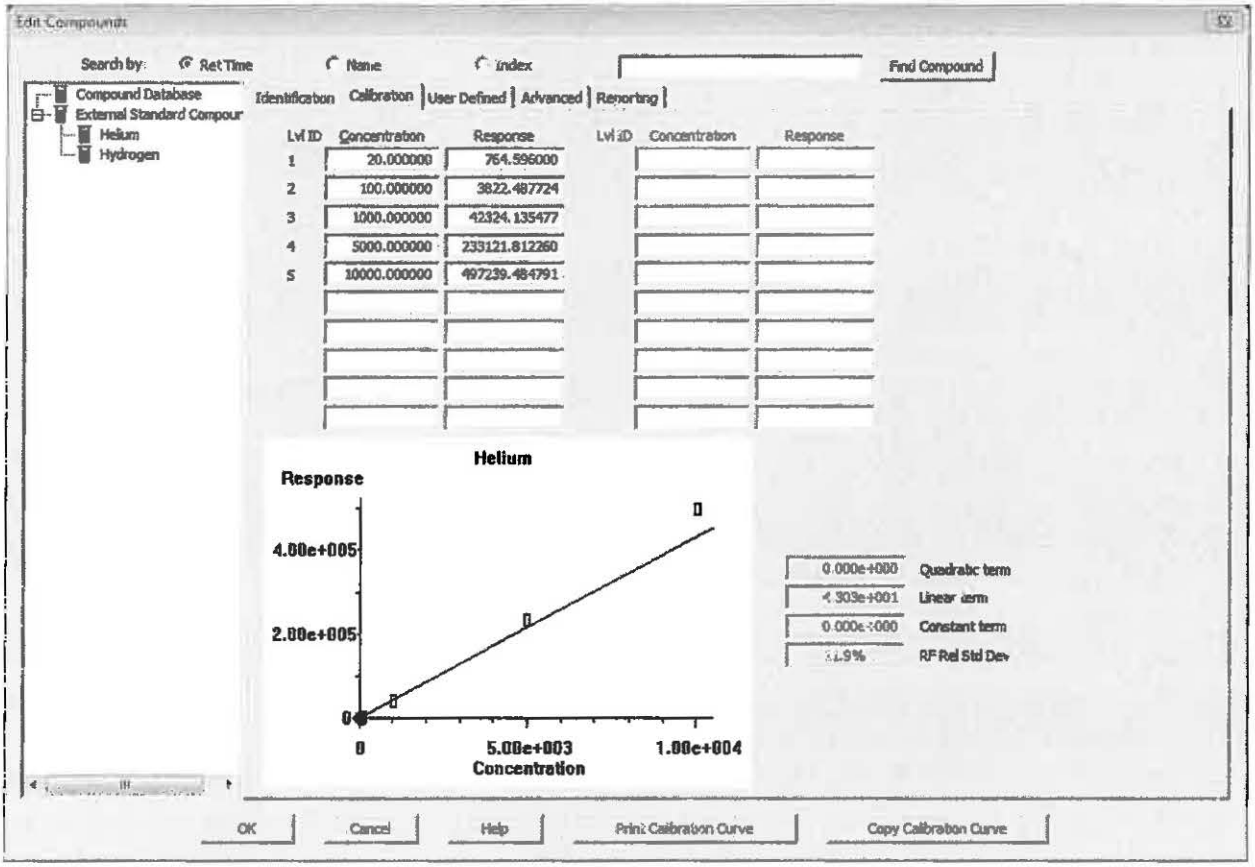
Method Path : I:\GC08\METHODS\
Method File : H2HE092316.M
Title : Hydrogen and Helium by EPA Method 3C
Last Update : Fri Sep 23 17:05:35 2016
Response Via : Initial Calibration

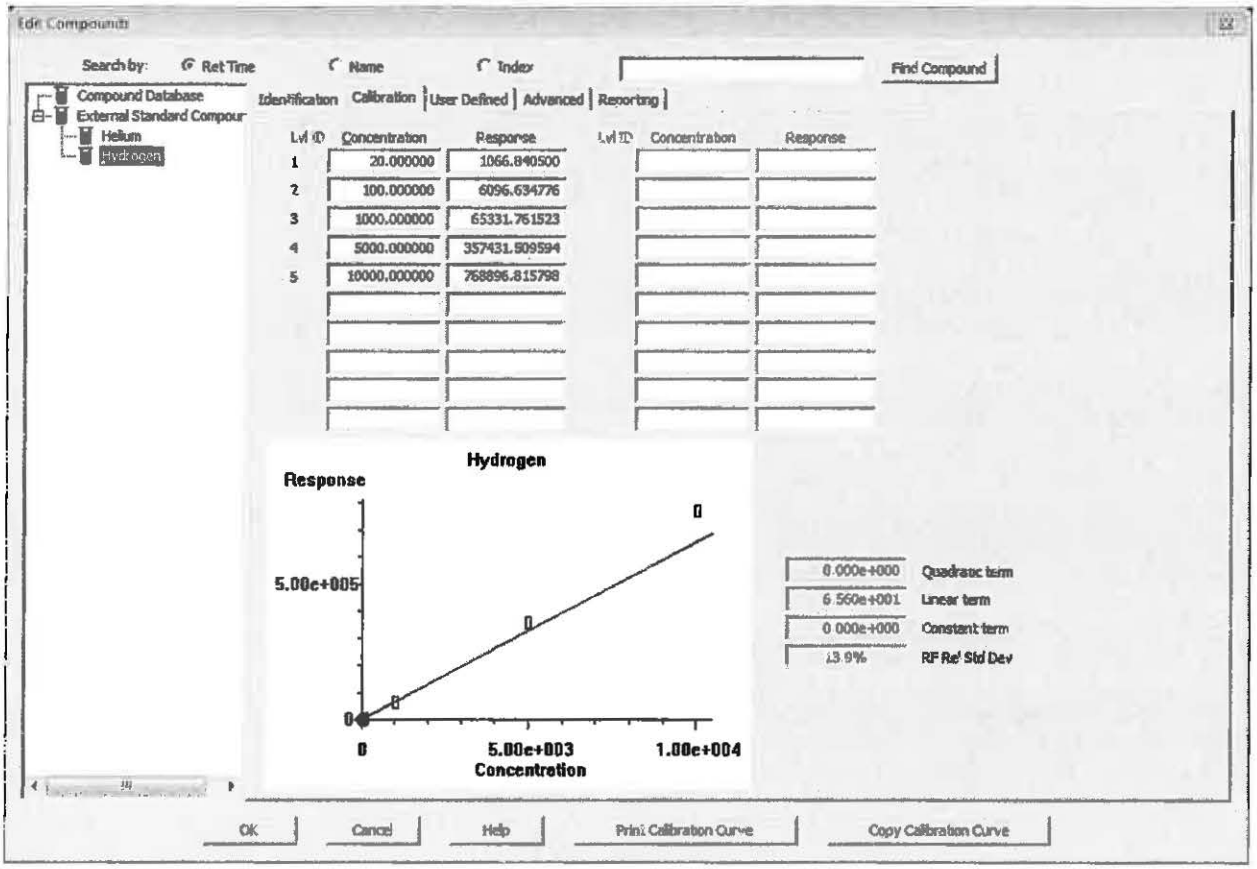
Calibration Files
1 =09231603.D 2 =09231604.D 3 =09231605.D
4 =09231606.D 5 =09231607.D

	Compound	1	2	3	4	5	Avg		%RSD
1)	Helium	3.823	3.822	4.232	4.662	4.972	4.303	E1	11.87
2)	Hydrogen	5.334	6.097	6.533	7.149	7.689	6.560	E1	13.93

(#) = Out of Range

H2HE092316.M Fri Sep 23 17:15:48 2016


Edit Compounds
Search by:
Ret Time
Name
Index
Find Compound
Compound Database
External Standard Compour
Helium
Hydrogen
Identification
Calibration
User Defined
Advanced
Reporting
Lvl ID
Concentration
Response
1 20.000000 764.596000
2 100.000000 3822.487724
3 1000.000000 42324.135477
4 5000.000000 233121.812260
5 10000.000000 497239.484791
Helium
Response
4.00e+005
2.00e+005
0
0
5.00e+003
1.00e+004
Concentration
0.000e+000 Quadratic term
4.303e+001 Linear term
0.000e+000 Constant term
RF Rel Std Dev
OK
Cancel
Help
Print Calibration Curve
Copy Calibration Curve


Edit Compounds
Search by:
Ret Time
Name
Index
Find Compound
Compound Database
External Standard Compour
Helium
Hydrogen
Identification
Calibration
User Defined
Advanced
Reporting
Lvl ID
Concentration
Response
1 20.000000 1066.840500
2 100.000000 6096.634776
3 1000.000000 65331.761523
4 5000.000000 357431.509594
5 10000.000000 768896.815798
Hydrogen
Response
5.00e+005
0
5.00e+003
1.00e+004
Concentration
0.000e+000 Quadratic term
6.560e+001 Linear term
0.000e+000 Constant term
13.9% RF Rel Std Dev
OK
Cancel
Help
Print Calibration Curve
Copy Calibration Curve

Calibration Status Report HP5890

Method Path : I:\GC08\METHODS\
Method File : H2HE092316.M
Title : Hydrogen and Helium by EPA Method 3C
Last Update : Fri Sep 23 17:05:35 2016
Response Via : Initial Calibration

#	ID	Conc	ISTD Conc	Path\File
1	1	20	0	I:\GC08\DATA\TO_3M\2016_09\23HE\09231603.D
2	2	100	0	I:\GC08\DATA\TO_3M\2016_09\23HE\09231604.D
3	3	1000	0	I:\GC08\DATA\TO_3M\2016_09\23HE\09231605.D
4	4	5000	0	I:\GC08\DATA\TO_3M\2016_09\23HE\09231606.D
5	5	10000	0	I:\GC08\DATA\TO_3M\2016_09\23HE\09231607.D

#	ID	Update Time	Quant Time	Acquisition Time
1	1	Sep 23 15:14 2016	Sep 23 15:13 2016	23-Sep-2016, 15:05:31
2	2	Sep 23 15:22 2016	Sep 23 15:22 2016	23-Sep-2016, 15:16:08
3	3	Sep 23 16:56 2016	Sep 23 16:55 2016	23-Sep-2016, 16:53:58
4	4	Sep 23 17:02 2016	Sep 23 17:02 2016	23-Sep-2016, 17:00:18
5	5	Sep 23 17:05 2016	Sep 23 17:05 2016	23-Sep-2016, 17:03:41

H2HE092316.M Fri Sep 30 13:59:08 2016

Quantitation Report (QT Reviewed)

Data Path : I:\GC08\DATA\H2_He\2016_09\23\
Data File : 09231603.D
Signal(s) : TCD1A.CH
Acq On : 23-Sep-2016, 15:05:31
Operator : amf
Sample : s30-09231601 20ppm
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 23 17:14:45 2016
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

	Compound	R.T.	Response	Conc Units
Target Compounds				
1)	Helium	0.789	951	22.104 ppm
2)	Hydrogen	0.937	1246	18.995 ppm

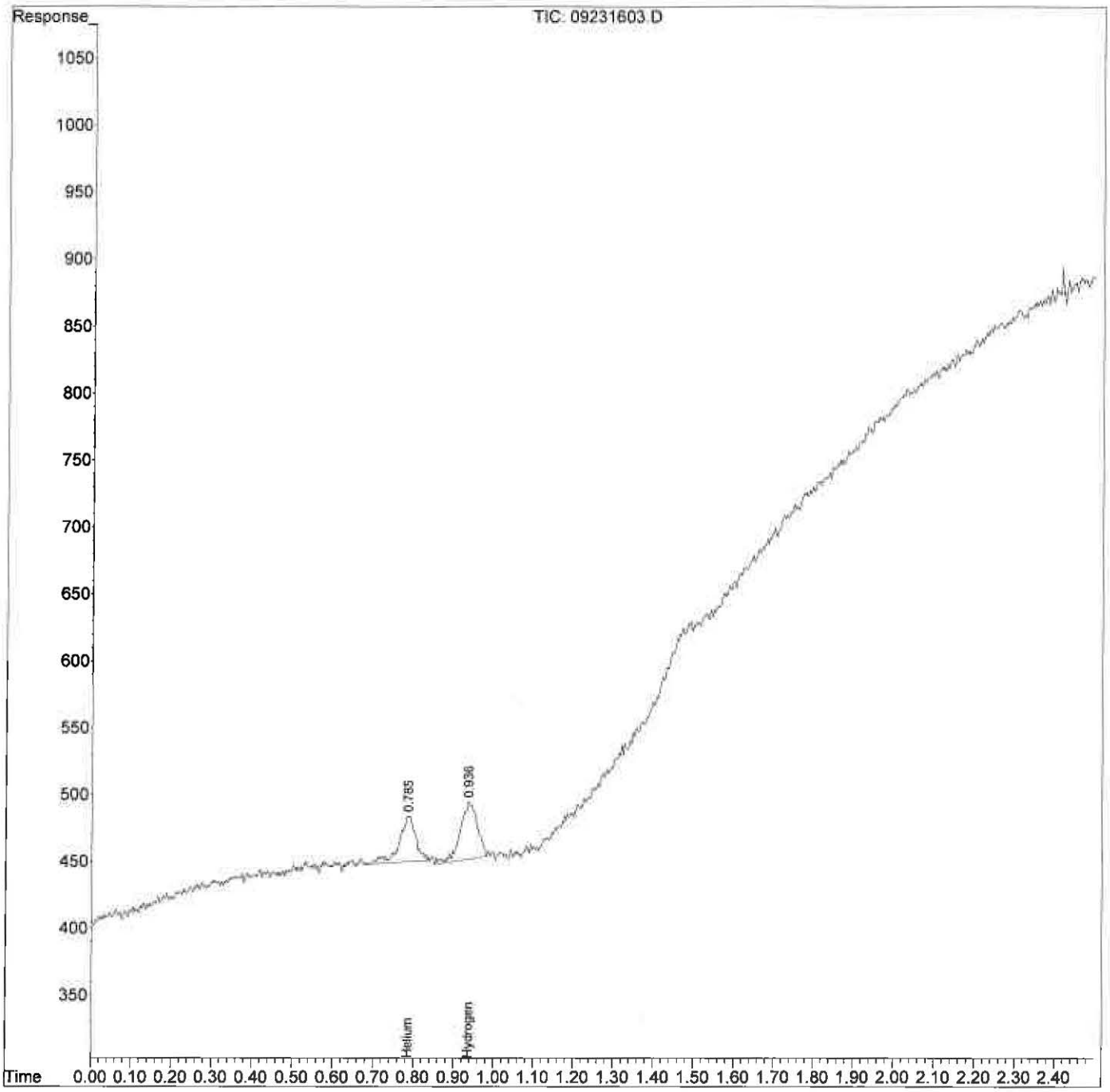
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : I:\GC08\DATA\H2_He\2016_09\23\
Data File : 09231603.D
Signal(s) : TCD1A.CH
Acq On : 23-Sep-2016, 15:05:31
Operator : amf
Sample : s30-09231601 20ppm
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 23 17:14:45 2016
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : I:\GC08\DATA\H2_He\2016_09\23\
Data File : 09231604.D
Signal(s) : TCD1A.CH
Acq On : 23-Sep-2016, 15:16:08
Operator : amf
Sample : s30-09231601 100ppm
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 23 17:14:54 2016
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Compound	R.T.	Response	Conc Units
Target Compounds			
1) Helium	0.773	3822	88.843 ppm
2) Hydrogen	0.928	6097	92.932 ppm

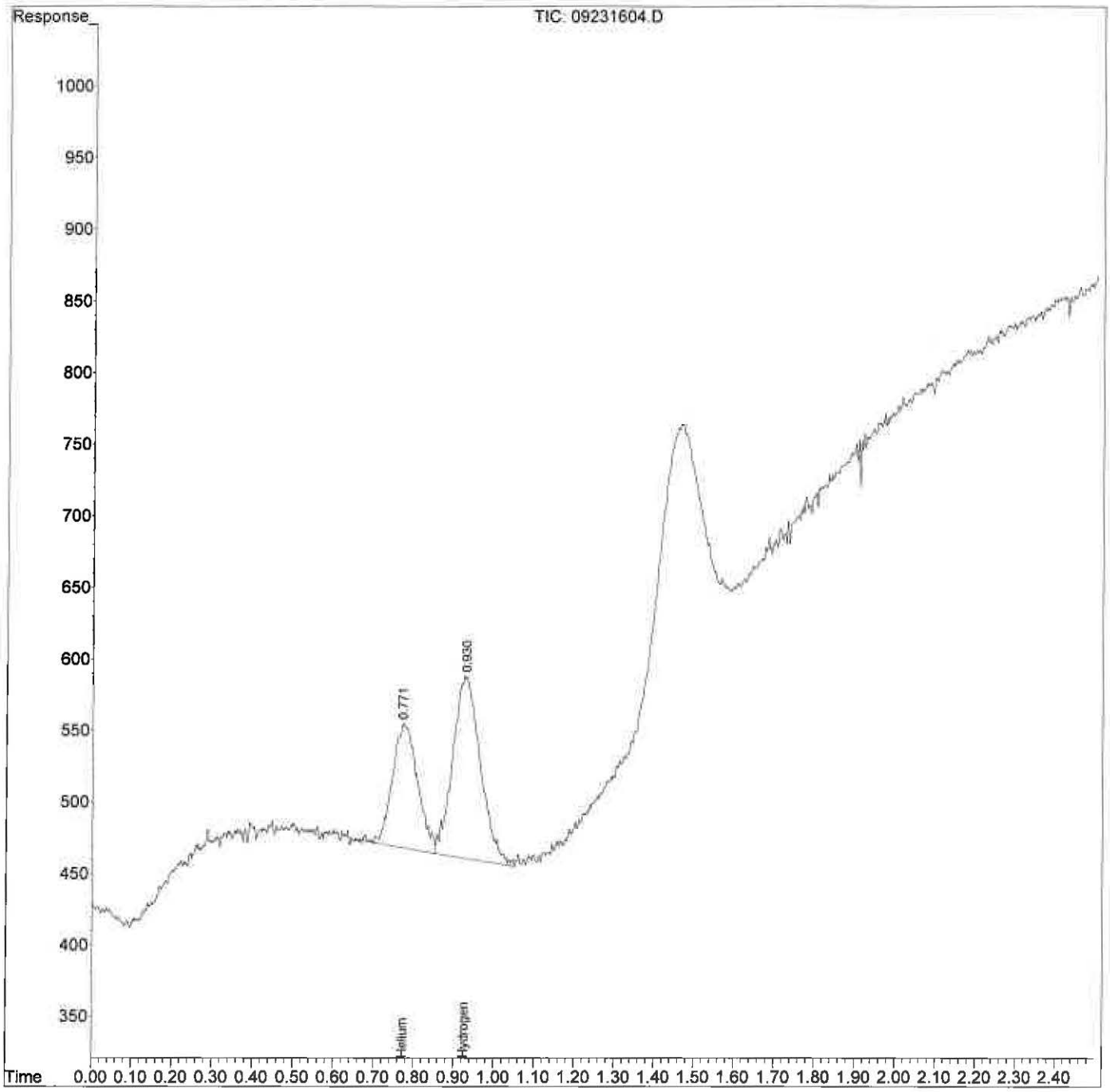
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : I:\GC08\DATA\H2_He\2016_09\23\
Data File : 09231604.D
Signal(s) : TCD1A.CH
Acq On : 23-Sep-2016, 15:16:08
Operator : amf
Sample : s30-09231601 100ppm
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 23 17:14:54 2016
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : I:\GC08\DATA\H2_He\2016_09\23\
Data File : 09231605.D
Signal(s) : TCD1A.CH
Acq On : 23-Sep-2016, 16:53:58
Operator : amf
Sample : s30-09231601 1000ppm
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 23 17:15:03 2016
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

	Compound	R.T.	Response	Conc Units
Target Compounds				
1)	Helium	0.787	42324	983.701 ppm
2)	Hydrogen	0.939	65332	995.862 ppm

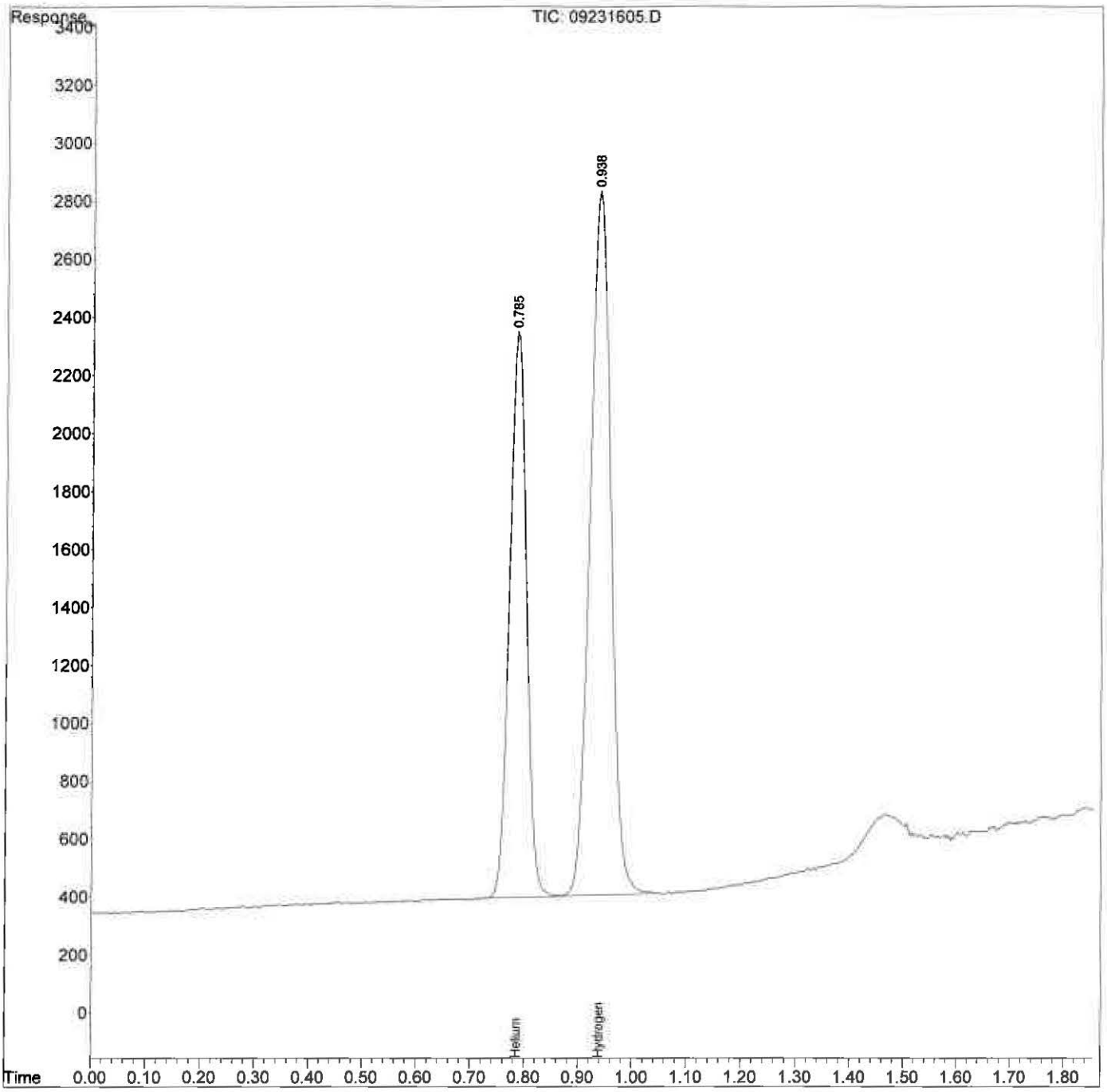
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : I:\GC08\DATA\H2_He\2016_09\23\
Data File : 09231605.D
Signal(s) : TCD1A.CH
Acq On : 23-Sep-2016, 16:53:58
Operator : amf
Sample : s30-09231601 1000ppm
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 23 17:15:03 2016
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : I:\GC08\DATA\H2_He\2016_09\23\
Data File : 09231606.D
Signal(s) : TCD1A.CH
Acq On : 23-Sep-2016, 17:00:18
Operator : amf
Sample : s30-09231601 5000ppm
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 23 17:15:12 2016
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Helium	0.786	233122	5418.234	ppm
2)	Hydrogen	0.937	357432	5448.383	ppm

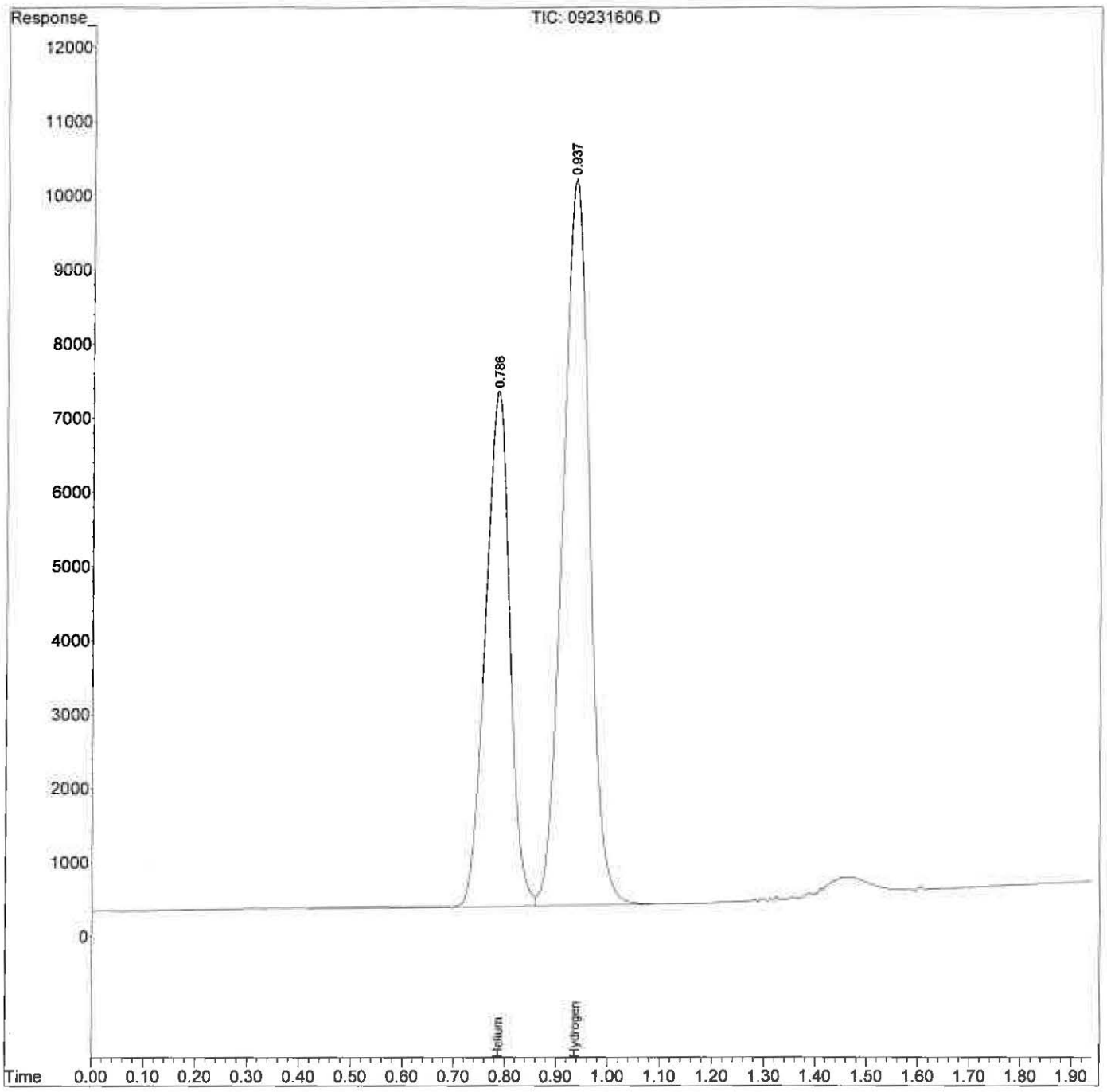
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : I:\GC08\DATA\H2_He\2016_09\23\
Data File : 09231606.D
Signal(s) : TCD1A.CH
Acq On : 23-Sep-2016, 17:00:18
Operator : amf
Sample : s30-09231601 5000ppm
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 23 17:15:12 2016
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : I:\GC08\DATA\H2_He\2016_09\23\
Data File : 09231607.D
Signal(s) : TCD1A.CH
Acq On : 23-Sep-2016, 17:03:41
Operator : amf
Sample : s30-09231601 10000ppm
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 27 11:16:57 2016
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

	Compound	R.T.	Response	Conc Units
Target Compounds				
1)	Helium	0.786	482958	11224.942 ppm
2)	Hydrogen	0.937	755585	11517.503 ppm

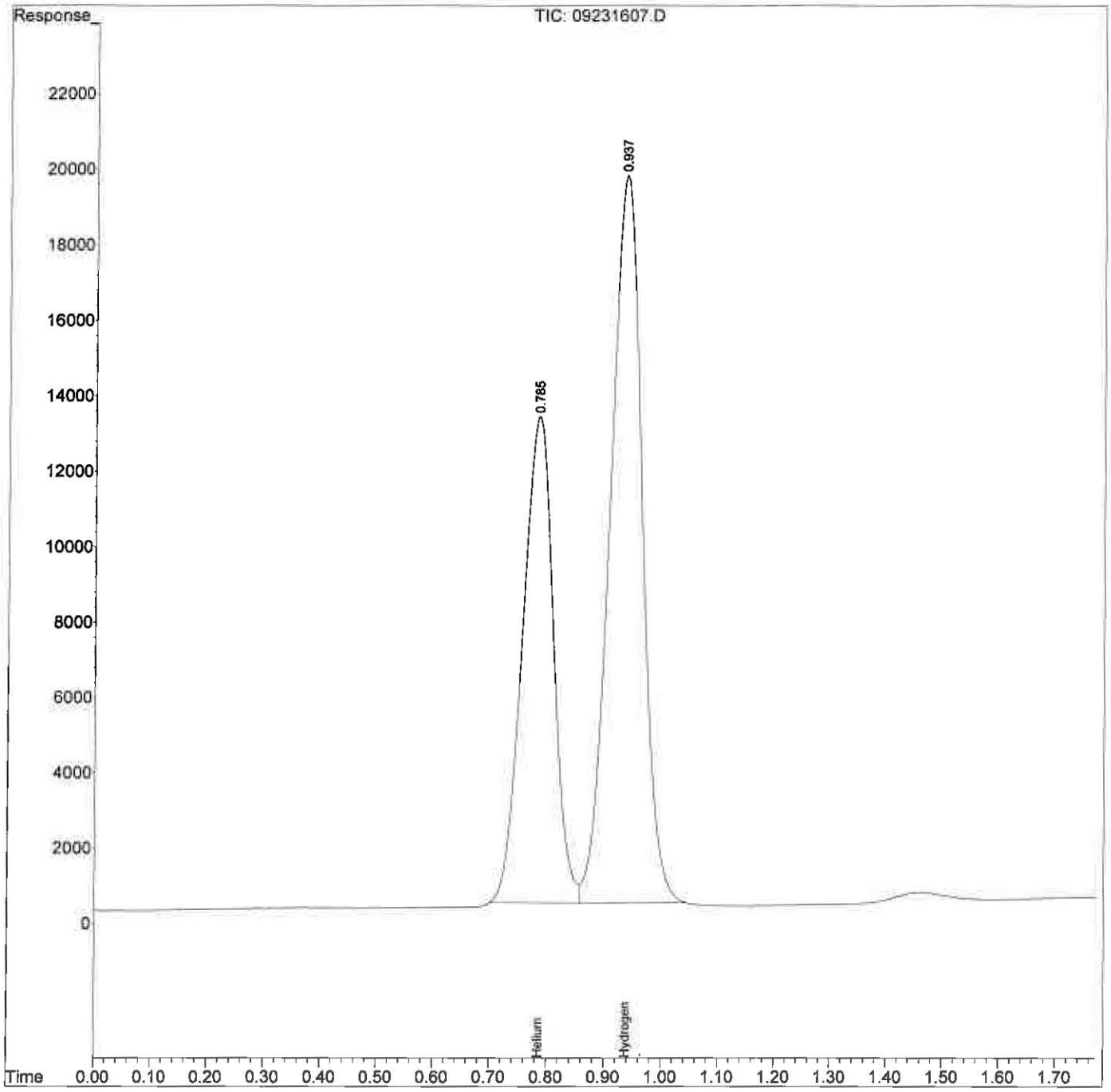
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : I:\GC08\DATA\H2_He\2016_09\23\
Data File : 09231607.D
Signal(s) : TCD1A.CH
Acq On : 23-Sep-2016, 17:03:41
Operator : amf
Sample : s30-09231601 10000ppm
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 27 11:16:57 2016
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : I:\GC08\DATA\H2_He\2016_09\23\
Data File : 09231609.D
Signal(s) : TCD1A.CH
Acq On : 23-Sep-2016, 17:12:27
Operator : amf
Sample : ICV s30-09231602
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 23 17:15:39 2016
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Helium	0.786	50814	1181.027	ppm
2)	Hydrogen	0.937	78129	1190.932	ppm

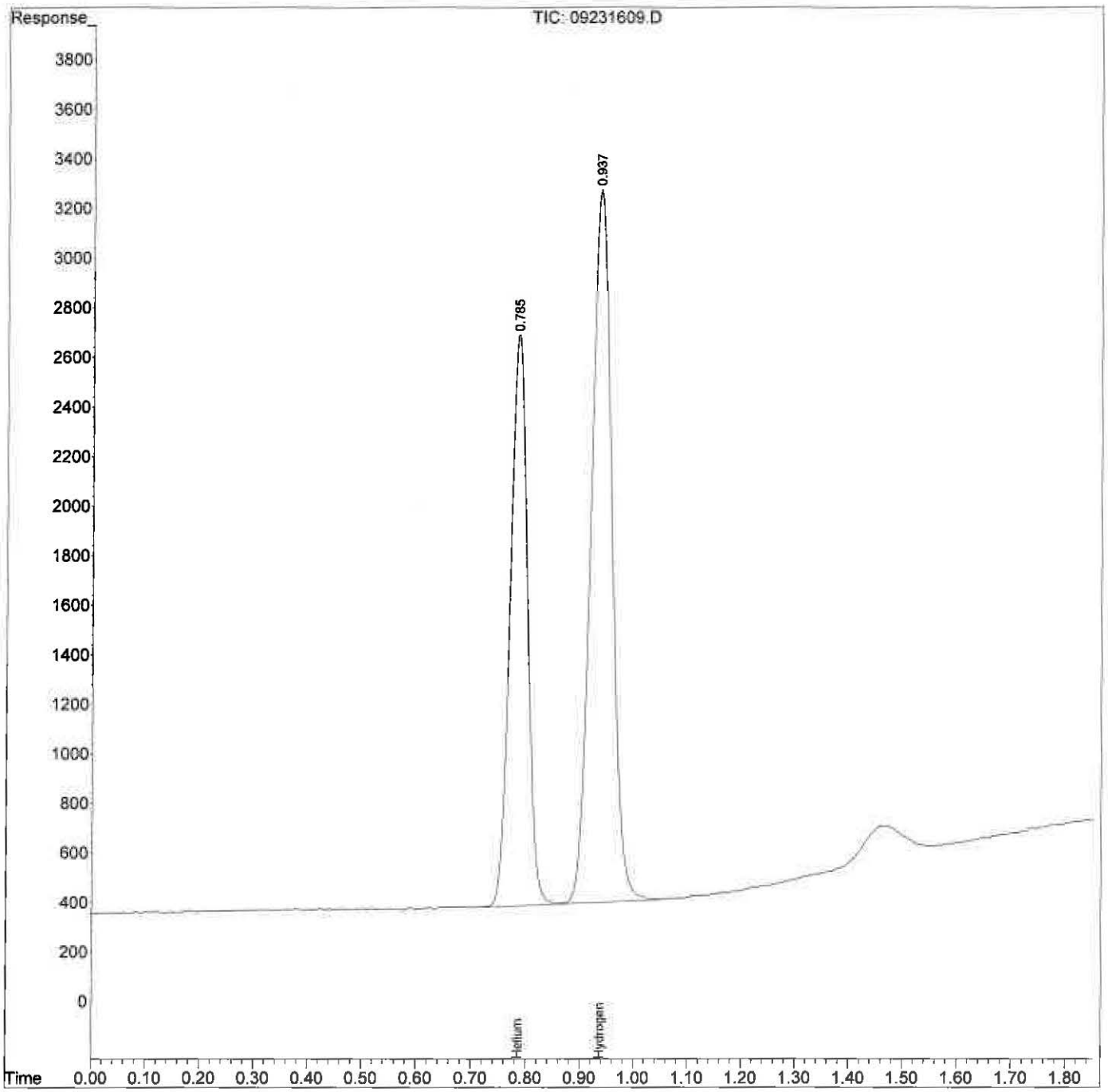
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : I:\GC08\DATA\H2_He\2016_09\23\
Data File : 09231609.D
Signal(s) : TCD1A.CH
Acq On : 23-Sep-2016, 17:12:27
Operator : amf
Sample : ICV s30-09231602
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 23 17:15:39 2016
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
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

Instrument : Instrument #8 / TCD #8
Date Acquired : 3/6/2017
Sample Amount : 1 mL

Opening CCV[1]

std s30-03061701		He
Sample result (ppm)	**inj vol.**	10190.14
ACTUAL	0.10	10000.00
%Difference		1.90%

Opening CCV[1]

std s30-03061701		He
Sample result (ppm)	**inj vol.**	11186.38
ACTUAL	0.10	10000.00
%Difference		11.86%

Laboratory Control Spike[2]

lcs s30-03061702	He
sample result ppm	10767.61
spike amount	10000
% recovery	107.68%

Closing CCV[1]

std s30-03061701		He
Sample result (ppm)	**inj vol.**	10139.67
ACTUAL	0.10	10000.00
%Difference		1.40%

Laboratory Control Spike[2]

lcsd s30-03061702	He
sample result ppm	10851.72
spike amount	10000
% recovery	108.52%
% RPD	0.78%

FINAL SAMPLE RESULT SUMMARIES

Sample ID	Inject. Vol(ml)	Dilution DF	Pi	Pf	PiPf DF	He Result (ppm)	FINAL HELIUM RESULT ppm	FINAL HELIUM RESULT mg/M3	File ID	Acq time
Reporting Limit							25.0	4.09		
mb 1ml	1.000	1.0			1.00	0.00	**ND**	**ND**		
0971-003 1ml	1.00	1.0	-3.07	0.00	1.26	3333.19	**4213.062**	**689.419**	03061742.D	14:40

M 3/7/17

1. 15% difference allowed for the opening and closing standards.
2. 75-124% helium recovery for the lab control spike.
3. 15% helium RPD allowed between duplicate samples.

Quantitation Report (QT Reviewed)

Data Path : J:\GC08\DATA\H2_He\2017_03\06\
Data File : 03061725.D
Signal(s) : TCD1A.CH
Acq On : 06-Mar-2017, 11:41
Operator : MC
Sample : std s30-03061701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Mar 06 11:47:25 2017
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Helium	0.782	43844	1019.014	ppm
2)	Hydrogen	0.000	0	N.D.	ppm

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

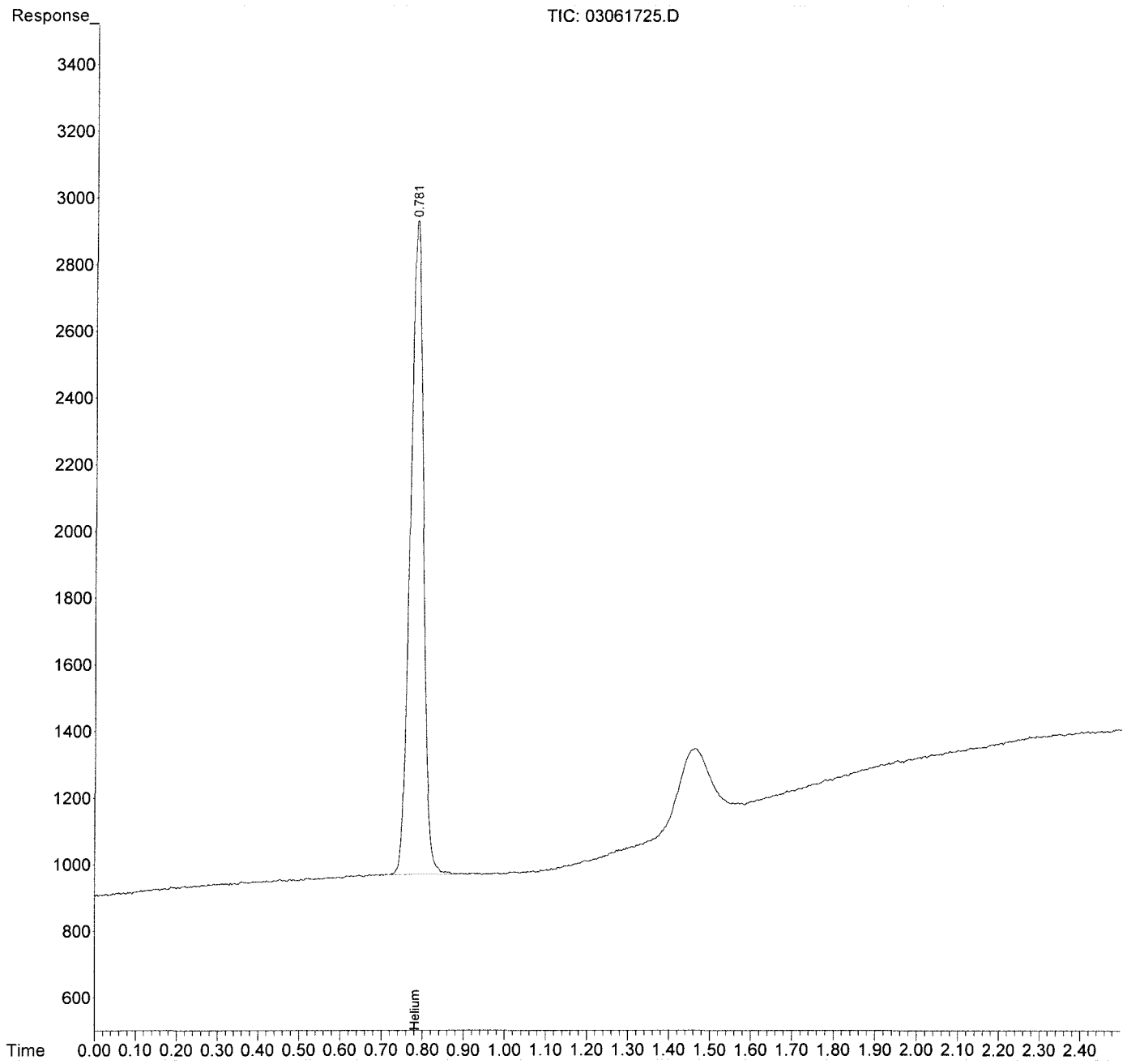
M 3/7/17

Quantitation Report (QT Reviewed)

Data Path : J:\GC08\DATA\H2_He\2017_03\06\
Data File : 03061725.D
Signal(s) : TCD1A.CH
Acq On : 06-Mar-2017, 11:41
Operator : MC
Sample : std s30-03061701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Mar 06 11:47:25 2017
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : J:\GC08\DATA\H2_He\2017_03\06\
Data File : 03061737.D
Signal(s) : TCD1A.CH
Acq On : 06-Mar-2017, 13:45
Operator : MC
Sample : std s30-03061701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Mar 06 13:58:57 2017
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Helium	0.781	43626	1013.967	ppm
2)	Hydrogen	0.000	0	N.D.	ppm

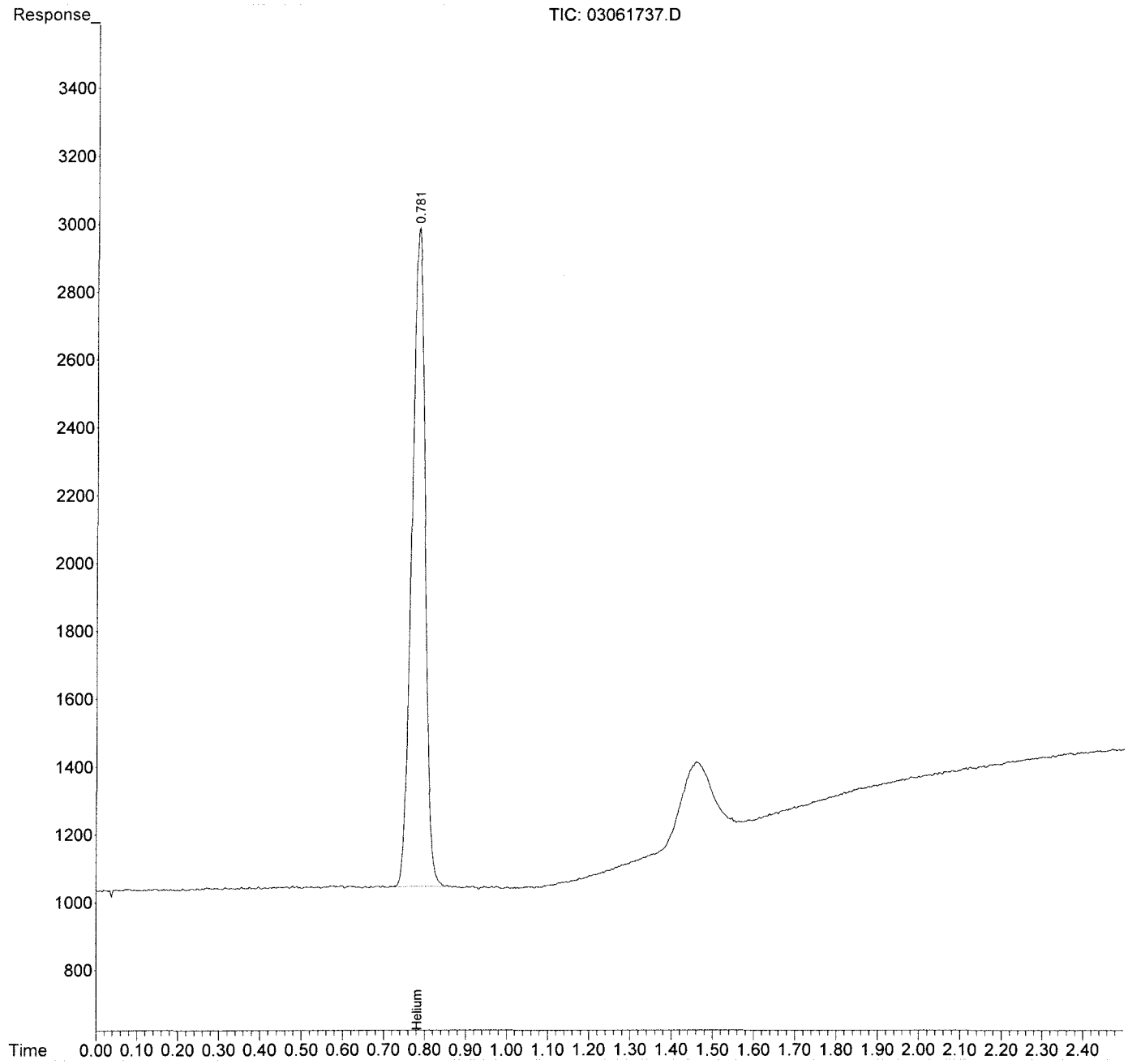
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : J:\GC08\DATA\H2_He\2017_03\06\
Data File : 03061737.D
Signal(s) : TCD1A.CH
Acq On : 06-Mar-2017, 13:45
Operator : MC
Sample : std s30-03061701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Mar 06 13:58:57 2017
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : J:\GC08\DATA\H2_He\2017_03\06\
Data File : 03061745.D
Signal(s) : TCD1A.CH
Acq On : 06-Mar-2017, 15:12
Operator : MC
Sample : std s30-03061701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Mar 06 15:18:29 2017
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Helium	0.790	48130	1118.638	ppm	m
2)	Hydrogen	0.000	0	N.D.	ppm	

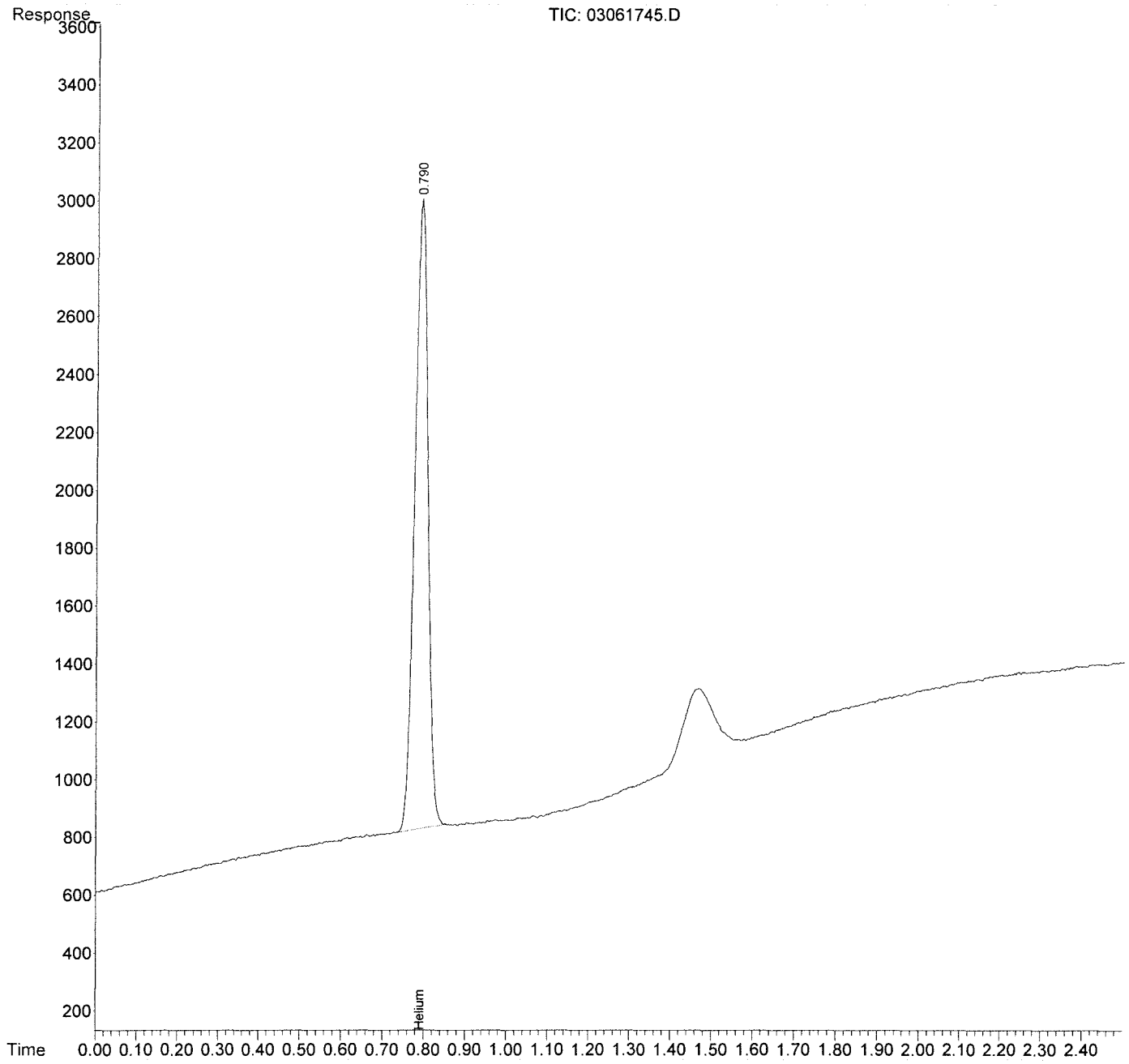
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : J:\GC08\DATA\H2_He\2017_03\06\
Data File : 03061745.D
Signal(s) : TCD1A.CH
Acq On : 06-Mar-2017, 15:12
Operator : MC
Sample : std s30-03061701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Mar 06 15:18:29 2017
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

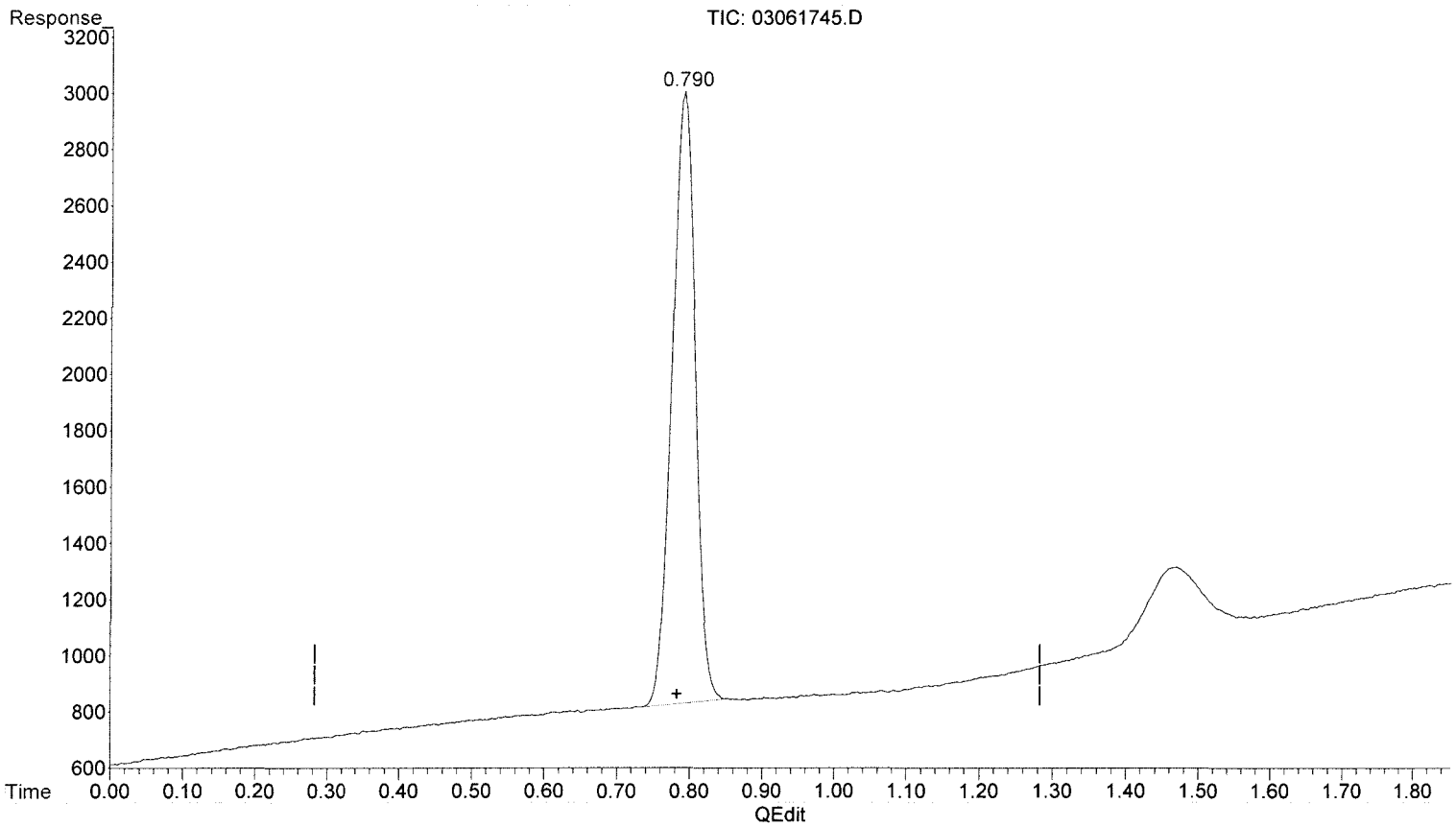


Quantitation Report (Qedit)

Data Path : J:\GC08\DATA\H2_He\2017_03\06\
Data File : 03061745.D
Signal(s) : TCD1A.CH
Acq On : 06-Mar-2017, 15:12
Operator : MC
Sample : std s30-03061701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Mar 06 15:18:29 2017
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



(1) Helium

0.790min 1118.638 ppm m

response 48130

3/9/17

3/9/17

BLC

no previous

(+) = Expected Retention Time

H2HE092316.M Tue Mar 07 15:04:17 2017

Page: 1

Injection Log

Directory: I:\GC08\DATA\H2_HE\2016_09\23\

	Sample ID	Date/Time	Acquisition Method	File Name	Misc Info	Operator
	ccv s30-09231601	23-Sep-16, 14:46:59	H2_HE.M	09231601.D		amf
	mb 1ml	23-Sep-16, 14:56:46	H2_HE.M	09231602.D		amf
	s30-09231601 20ppm	23-Sep-16, 15:05:31	H2_HE.M	09231603.D		amf
	s30-09231601 100ppm	23-Sep-16, 15:16:08	H2_HE.M	09231604.D		amf
	s30-09231601 1000ppm	23-Sep-16, 16:53:58	H2_HE.M	09231605.D		amf
	s30-09231601 5000ppm	23-Sep-16, 17:00:18	H2_HE.M	09231606.D		amf
	s30-09231601 10000ppm	23-Sep-16, 17:03:41	H2_HE.M	09231607.D		amf
	mb 1ml	23-Sep-16, 17:09:40	H2_HE.M	09231608.D		amf
	ICV s30-09231602	23-Sep-16, 17:12:27	H2_HE.M	09231609.D		amf

Injection Log

Directory: I:\GC08\DATA\H2_HE\2017_03\06\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Acquisition Method	Comments
1	06-Mar-17, 07:46:08	03061701.D	std s30-03061701		MC	H2_HE.M	Pass
2	06-Mar-17, 07:56:59	03061702.D	mb 1ml		MC	H2_HE.M	Pass
3	06-Mar-17, 08:07:19	03061703.D	1029-001 1ml		MC	H2_HE.M	
4	06-Mar-17, 08:13:50	03061704.D	1029-002 1ml		MC	H2_HE.M	
5	06-Mar-17, 08:19:49	03061705.D	1029-003 1ml		MC	H2_HE.M	
6	06-Mar-17, 08:28:30	03061706.D	1029-004 1ml		MC	H2_HE.M	
7	06-Mar-17, 08:39:03	03061707.D	1029-005 1ml		MC	H2_HE.M	
8	06-Mar-17, 08:47:28	03061708.D	1029-006 1ml		MC	H2_HE.M	
9	06-Mar-17, 08:56:02	03061709.D	x1029-007 1ml		MC	H2_HE.M	
10	06-Mar-17, 09:03:45	03061710.D	1029-008 1ml		MC	H2_HE.M	
11	06-Mar-17, 09:10:31	03061711.D	0947-008 1ml		MC	H2_HE.M	
12	06-Mar-17, 09:21:37	03061712.D	0947-009 1ml		MC	H2_HE.M	
13	06-Mar-17, 09:32:15	03061713.D	std s30-03061701		MC	H2_HE.M	Pass
14	06-Mar-17, 09:41:19	03061714.D	1029-007 0.5ml		MC	H2_HE.M	
15	06-Mar-17, 09:49:44	03061715.D	0947-010 1ml		MC	H2_HE.M	
16	06-Mar-17, 09:58:16	03061716.D	0947-011 1ml		MC	H2_HE.M	
17	06-Mar-17, 10:30:37	03061717.D	0947-012 1ml		MC	H2_HE.M	
18	06-Mar-17, 10:38:21	03061718.D	0947-013 1ml		MC	H2_HE.M	
19	06-Mar-17, 10:45:35	03061719.D	0947-014 1ml		MC	H2_HE.M	
20	06-Mar-17, 10:53:16	03061720.D	0947-015 1ml		MC	H2_HE.M	
21	06-Mar-17, 11:12:48	03061721.D	0947-016 1ml		MC	H2_HE.M	
22	06-Mar-17, 11:18:46	03061722.D	0947-017 1ml		MC	H2_HE.M	
23	06-Mar-17, 11:26:26	03061723.D	lcs s30-03061702		MC	H2_HE.M	Pass
24	06-Mar-17, 11:33:17	03061724.D	lcsd s30-03061702		MC	H2_HE.M	Pass
25	06-Mar-17, 11:41:44	03061725.D	std s30-03061701		MC	H2_HE.M	Pass
26	06-Mar-17, 11:48:13	03061726.D	mb 1ml		MC	H2_HE.M	Pass
27	06-Mar-17, 11:58:05	03061727.D	1046-001 1ml		MC	H2_HE.M	
28	06-Mar-17, 12:06:38	03061728.D	1046-002 1ml		MC	H2_HE.M	
29	06-Mar-17, 12:14:38	03061729.D	1047-001 1ml		MC	H2_HE.M	
30	06-Mar-17, 12:21:25	03061730.D	1014-001 1ml		MC	H2_HE.M	
31	06-Mar-17, 12:27:45	03061731.D	1014-002 1ml		MC	H2_HE.M	
32	06-Mar-17, 12:35:08	03061732.D	1014-003 1ml		MC	H2_HE.M	
33	06-Mar-17, 12:41:39	03061733.D	1015-001 1ml		MC	H2_HE.M	
34	06-Mar-17, 12:48:25	03061734.D	1015-002 1ml		MC	H2_HE.M	
35	06-Mar-17, 12:58:08	03061735.D	1015-003 1ml		MC	H2_HE.M	
36	06-Mar-17, 13:05:40	03061736.D	1042-001 1ml		MC	H2_HE.M	
37	06-Mar-17, 13:45:20	03061737.D	std s30-03061701		MC	H2_HE.M	Pass
38	06-Mar-17, 14:00:37	03061738.D	1042-002 1ml		MC	H2_HE.M	

Injection Log

Directory: I:\GC08\DATA\H2_HE\2017_03\06\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Acquisition Method	Comments
39	06-Mar-17, 14:07:49	03061739.D	1042-003 1ml		MC	H2_HE.M	
40	06-Mar-17, 14:13:48	03061740.D	1042-004 1ml		MC	H2_HE.M	
41	06-Mar-17, 14:22:40	03061741.D	1042-001 1ml		MC	H2_HE.M	
42	06-Mar-17, 14:40:13	03061742.D	0971-003 1ml		MC	H2_HE.M	
43	06-Mar-17, 14:49:56	03061743.D	lcs s30-03061702		MC	H2_HE.M	Pass
44	06-Mar-17, 15:05:23	03061744.D	lcsd s30-03061702		MC	H2_HE.M	Pass
45	06-Mar-17, 15:12:24	03061745.D	std s30-03061701		MC	H2_HE.M	Pass

Quantitation Report (QT Reviewed)

Data Path : I:\GC01\DATA\FXG\2017_03\06\
Data File : 03061727.D
Signal(s) : TCD1A.CH
Acq On : 6 Mar 2017 3:58 pm
Operator : MC
Sample : 0971-003
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Mar 06 16:18:46 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 17:15:32 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.000	0	N.D.	ppm
2)	Oxygen	2.195	198659	129983.081	ppm
3)	Nitrogen	2.319	1455704	818895.332	ppm
4)	Carbon Monoxide	0.000	0	N.D.	ppm
5)	Methane	0.000	0	N.D.	ppm
6)	Carbon Dioxide	6.766	844	414.624	ppm

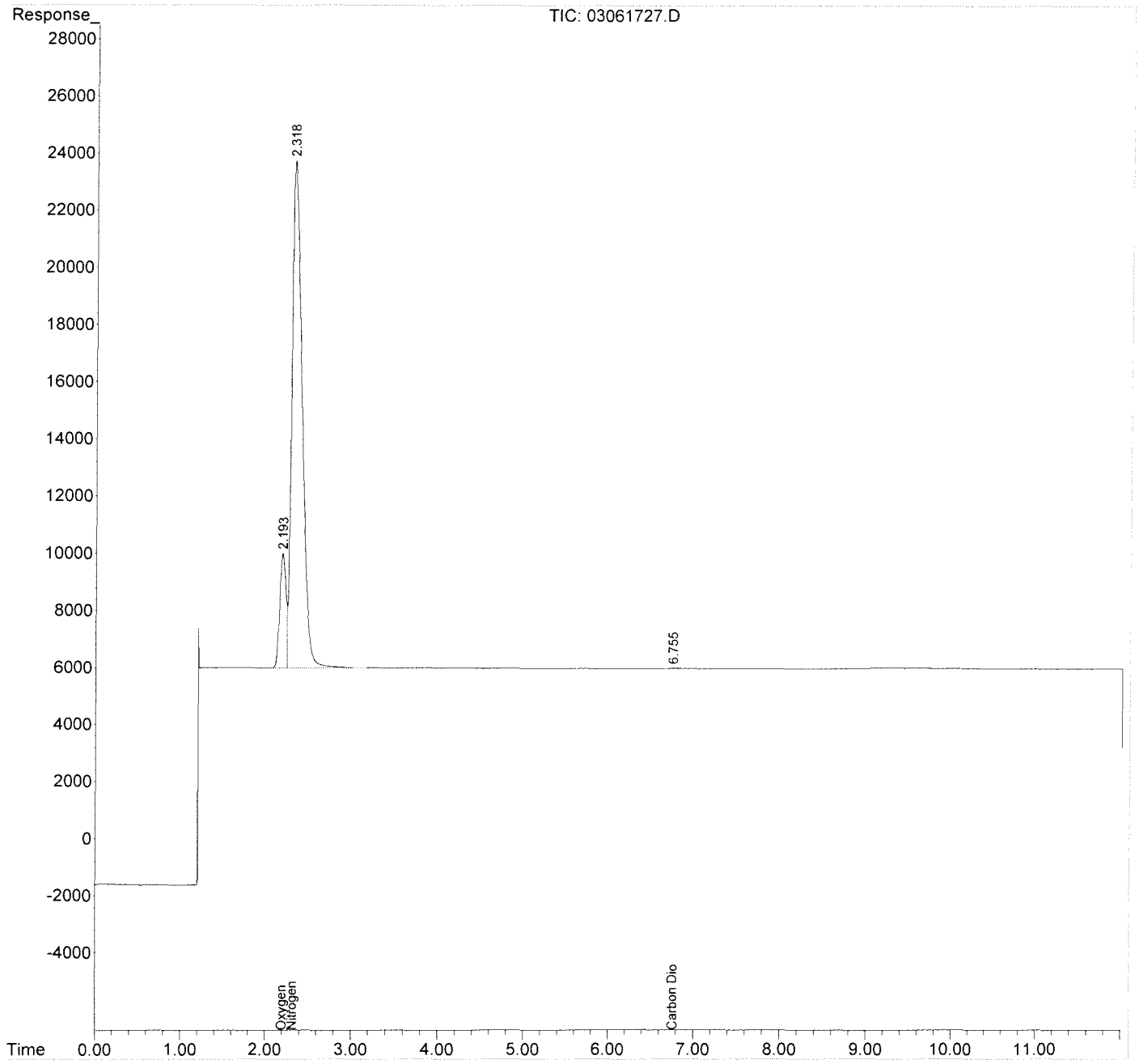
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : I:\GC01\DATA\FXG\2017_03\06\
Data File : 03061727.D
Signal(s) : TCD1A.CH
Acq On : 6 Mar 2017 3:58 pm
Operator : MC
Sample : 0971-003
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Mar 06 16:18:46 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 17:15:32 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : I:\GC01\DATA\FXG\2017_03\06\
Data File : 03061702.D
Signal(s) : TCD1A.CH
Acq On : 6 Mar 2017 8:14 am
Operator : MC
Sample : mb
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Mar 06 16:10:23 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 17:15:32 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

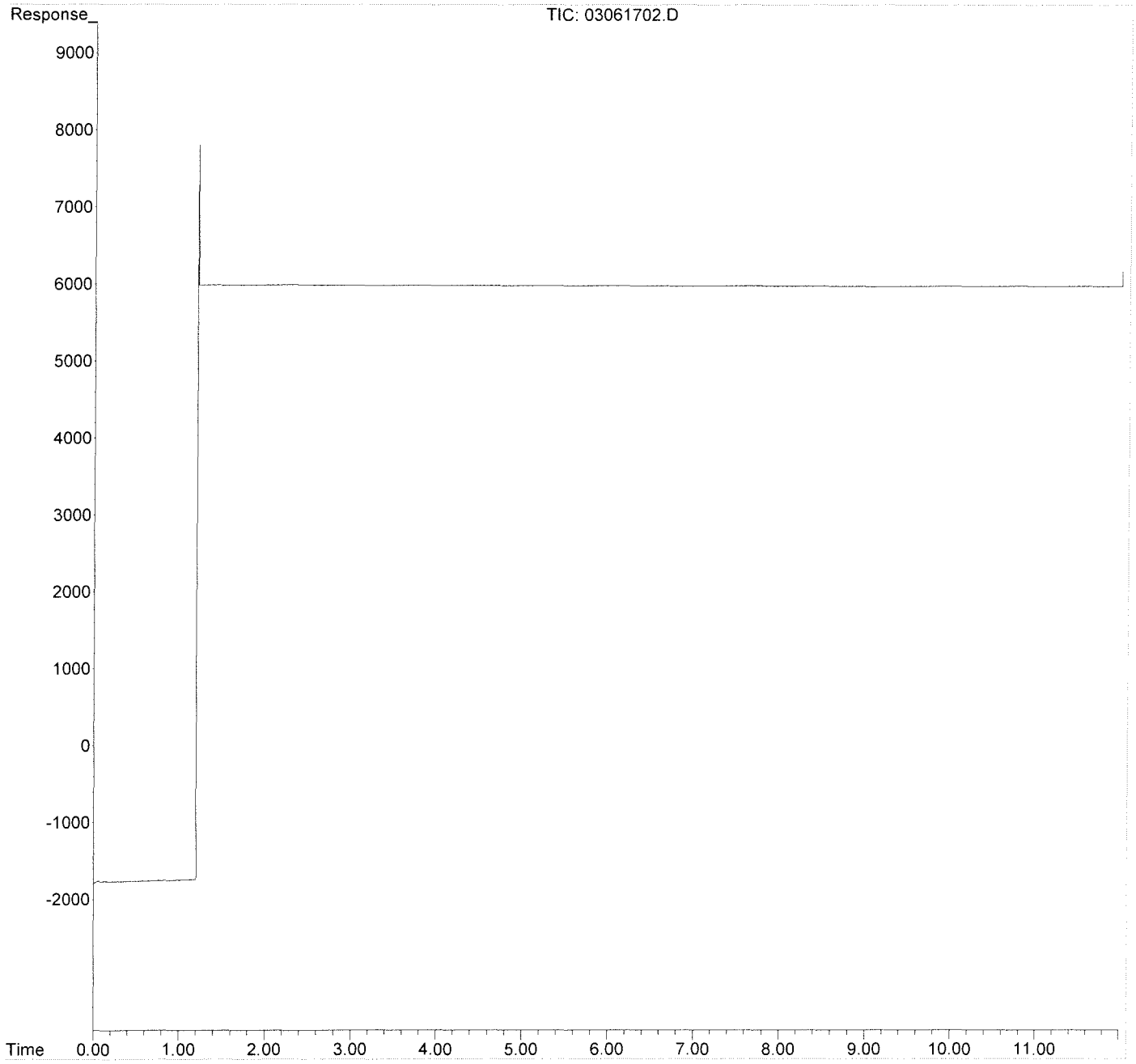
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.000	0	N.D.	ppm
2)	Oxygen	0.000	0	N.D.	ppm
3)	Nitrogen	0.000	0	N.D.	ppm
4)	Carbon Monoxide	0.000	0	N.D.	ppm
5)	Methane	0.000	0	N.D.	ppm
6)	Carbon Dioxide	0.000	0	N.D.	ppm

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

Data Path : I:\GC01\DATA\FXG\2017_03\06\
Data File : 03061702.D
Signal(s) : TCD1A.CH
Acq On : 6 Mar 2017 8:14 am
Operator : MC
Sample : mb
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Mar 06 16:10:23 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 17:15:32 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : I:\GC01\DATA\FXG\2017_03\06\
Data File : 03061707.D
Signal(s) : TCD1A.CH
Acq On : 6 Mar 2017 9:42 am
Operator : MC
Sample : lcs s30-02211703
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Mar 06 10:00:46 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 17:15:32 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

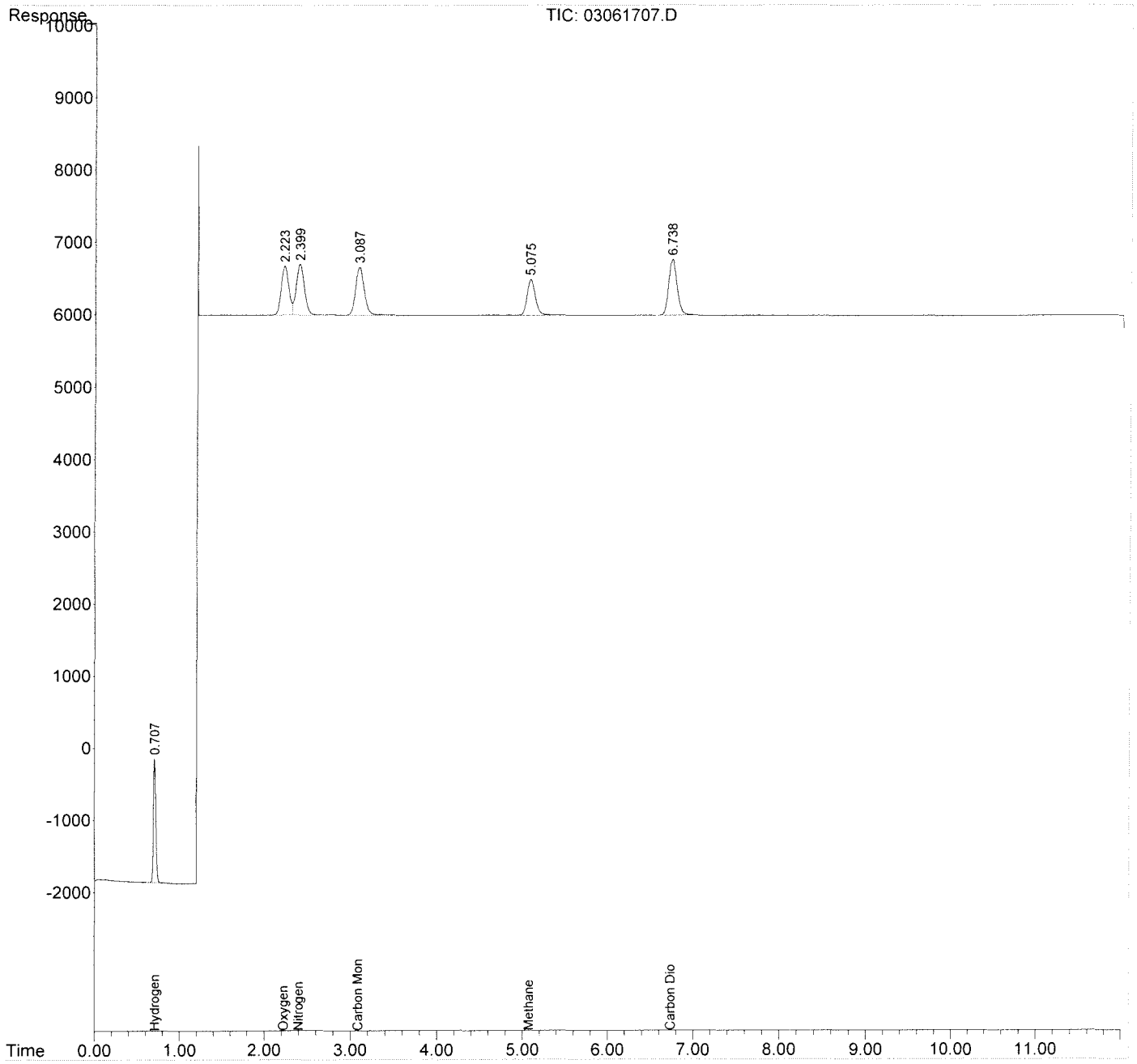
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.709	34362	25329.365	ppm
2)	Oxygen	2.225	41180	26944.063	ppm
3)	Nitrogen	2.401	47174	26537.600	ppm
4)	Carbon Monoxide	3.088	46101	26886.100	ppm
5)	Methane	5.077	32925	25766.053	ppm
6)	Carbon Dioxide	6.739	52920	25998.356	ppm

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

Data Path : I:\GC01\DATA\FXG\2017_03\06\
Data File : 03061707.D
Signal(s) : TCD1A.CH
Acq On : 6 Mar 2017 9:42 am
Operator : MC
Sample : lcs s30-02211703
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Mar 06 10:00:46 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 17:15:32 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



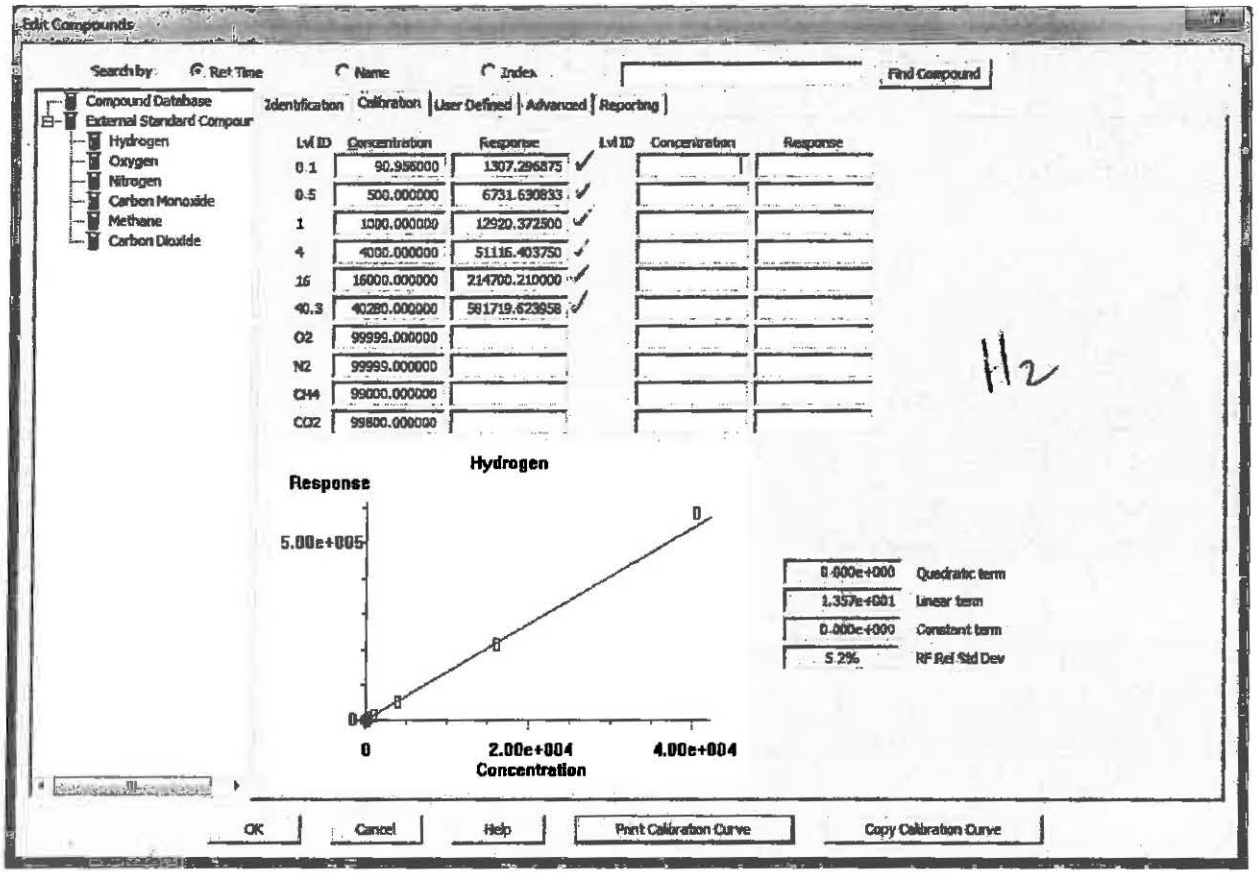
Method Path : I:\GC01\METHODS\
Method File : 3C012417.M
Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
Last Update : Tue Jan 24 17:15:32 2017
Response Via : Initial Calibration

Calibration Files

0.1	=01241708.D	0.5	=01241710.D	1	=01241711.D
4	=01241712.D	16	=01241713.D	40.3	=01241727.D

	Compound	0.1	0.5	1	4	16	40.3	Avg		%RSD
1)	Hydrogen	1.437	1.346	1.292	1.278	1.342	1.444	1.357	E1	5.20
2)	Oxygen	1.567	1.611	1.539	1.520	1.496	1.473	1.528	E1	3.15
3)	Nitrogen	1.858	1.875	1.740	1.695	1.671	1.668	1.778	E1	6.22
4)	Carbon Monoxide	1.736	1.818	1.718	1.684	1.670	1.662	1.715	E1	3.39
5)	Methane	1.322	1.367	1.266	1.252	1.241	1.228	1.278	E1	3.87
6)	Carbon Dioxide	2.083	2.165	2.077	2.020	2.008	1.978	2.036	E1	3.97

(#) = Out of Range ### Number of calibration levels exceeded format ###


Edit Compounds
Search by: Ret Time
Name
Index
Find Compound
Compound Database
External Standard Compour
Hydrogen
Oxygen
Nitrogen
Carbon Monoxide
Methane
Carbon Dioxide
Identification
Calibration
User Defined
Advanced
Reporting
Lvl ID Concentration Response
0.1 90.956000 1307.296875
0.5 500.000000 6731.630833
1 1000.000000 12920.372500
4 4000.000000 51116.403750
16 16000.000000 214700.210000
40.3 40280.000000 581719.623958
O2 99999.000000
N2 99999.000000
CH4 99000.000000
CO2 99800.000000
Lvl ID Concentration Response
Hydrogen
Response
5.00e+005
0
2.00e+004
4.00e+004
Concentration
0.000e+000 Quadratic term
1.357e+001 Linear term
0.000e+000 Constant term
5.2% RF Rel Std Dev
OK
Cancel
Help
Print Calibration Curve
Copy Calibration Curve

H2

WS 1/26/12

Edit Compounds

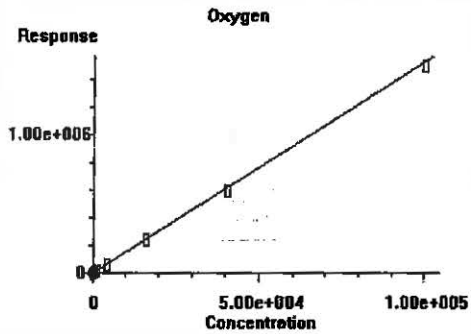
Search by: Ret Time | Name | Index | Find Compound

- Compound Database
  - External Standard Compour
    - Hydrogen
    - Oxygen
    - Nitrogen
    - Carbon Monoxide
    - Methane
    - Carbon Dioxide

Identification | Calibration | User Defined | Advanced | Reporting

Lvl ID	Concentration	Response	Lvl ID	Concentration	Response
0.1	99.957000	1566.340000			
0.5	500.000000	8055.157518			
1	1000.000000	15390.027874			
4	4000.000000	60782.564471			
16	16000.000000	239369.990034			
40.3	40280.000000	593437.071076			
O2	99999.000000	1492463.135000			
N2	99999.000000				
CH4	99000.000000				
CO2	99800.000000				

O2



0.000e+000	Quadratic term
1.528e+001	Linear term
0.000e+000	Constant term
3.1%	RF Rel Std Dev

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

W 1/21/17

Edit Compounds

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

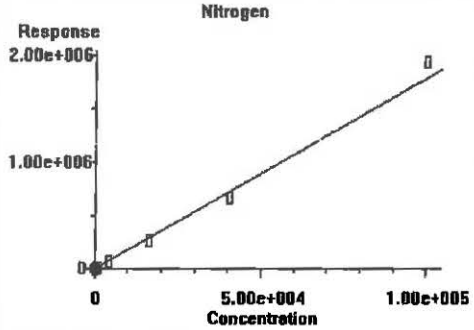
- Compound Database
- External Standard Compour
  - Hydrogen
  - Oxygen
  - Nitrogen
  - Carbon Monoxide
  - Methane
  - Carbon Dioxide

Identification | Calibration | User Defined | Advanced | Reporting

Lvl ID	Concentration	Response	Lvl ID	Concentration	Response
0.1	109.154000	2027.677794			
0.5	500.000000	9372.544982			
1	1000.000000	17396.560251			
4	4000.000000	67800.338029			
16	16000.000000	267290.892466			
40.3	40280.000000	671823.641725			
O2	99999.000000				
N2	99999.000000	1938226.562917			
CH4	99000.000000				
CO2	99800.000000				

N2

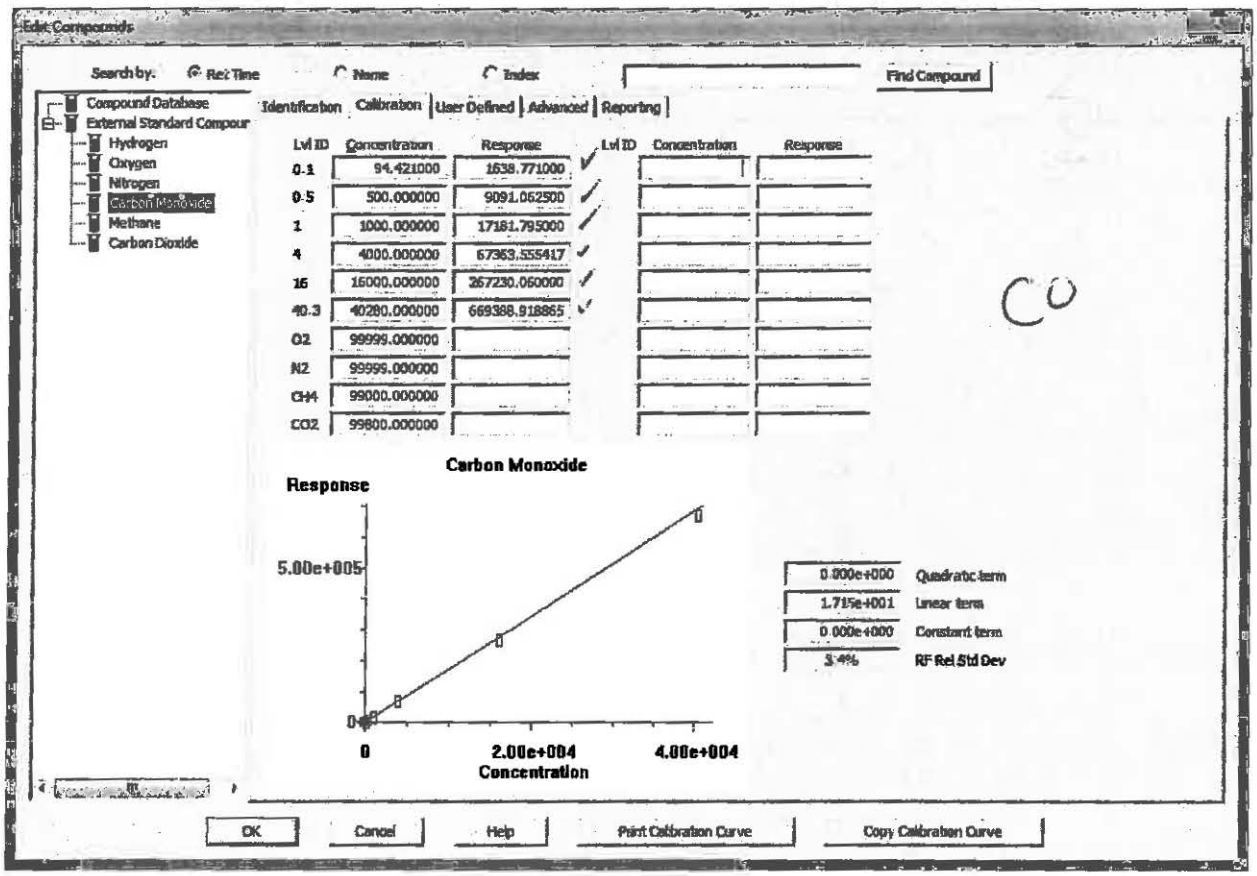
Nitrogen



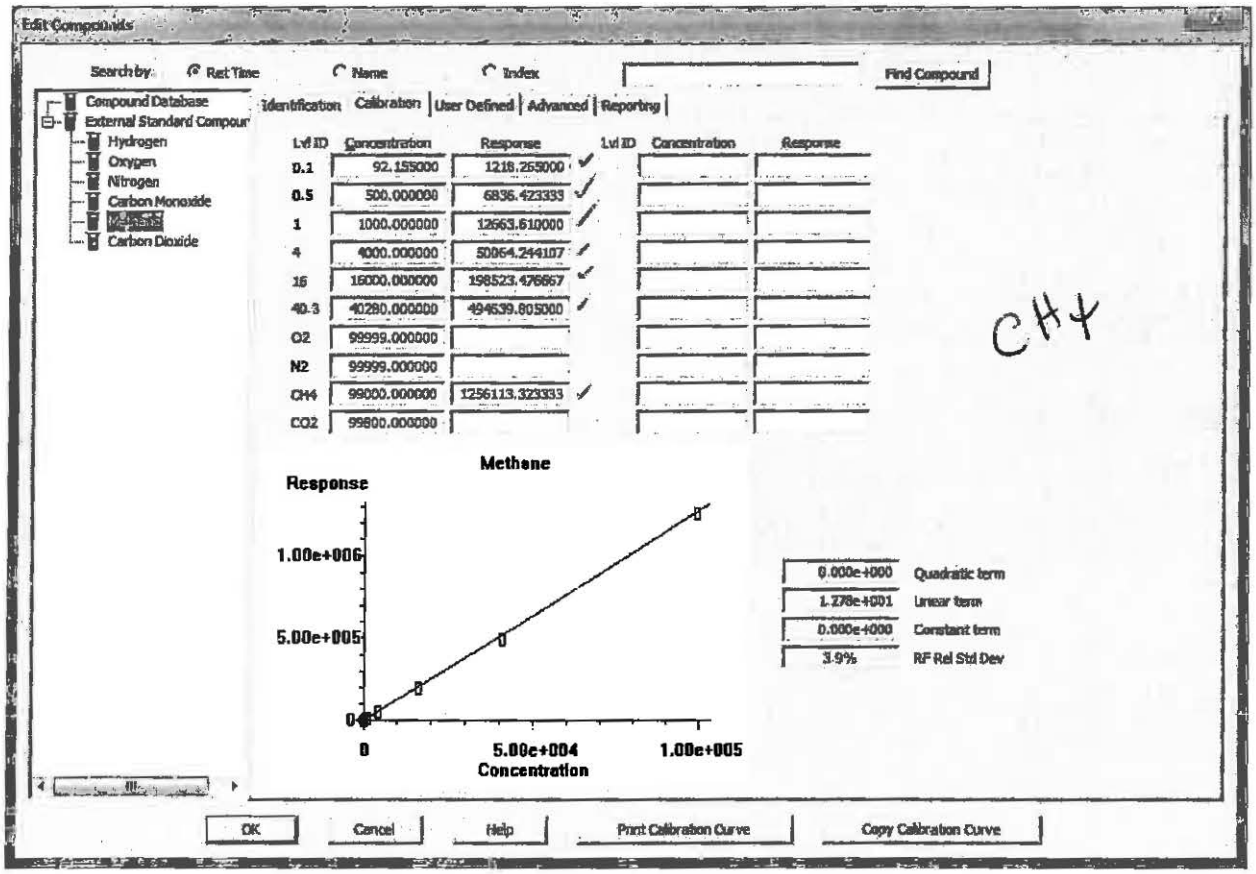
0.000e+000	Quadratic term
1.778e+001	Linear term
0.000e+000	Constant term
6.2%	RF Rel Std Dev

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

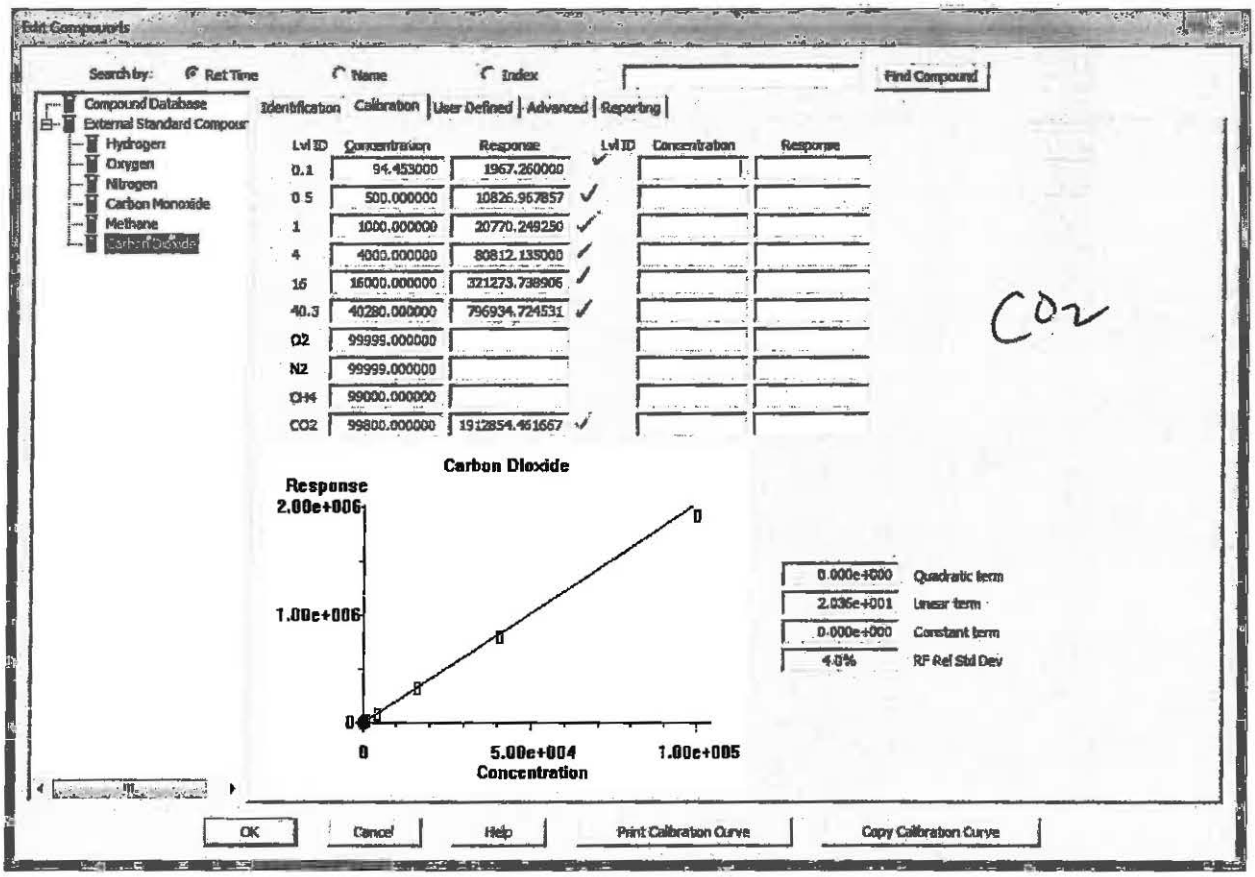
WW 1/26/17


Edit Compounds
Search by: Ret Time Name Index
Find Compound
Compound Database
External Standard Compour
Hydrogen
Oxygen
Nitrogen
Carbon Monoxide
Methane
Carbon Dioxide
Identification Calibration User Defined Advanced Reporting
Lvl ID Concentration Response
0.1 94.421000 1638.771000
0.5 500.000000 9091.062500
1 1000.000000 17181.795000
4 4000.000000 67363.555417
16 16000.000000 267230.060000
40.3 40280.000000 669388.918865
O2 99999.000000
N2 99999.000000
CH4 99000.000000
CO2 99800.000000
Lvl ID Concentration Response
CO
Carbon Monoxide
Response
5.00e+005
0
0
2.00e+004
4.00e+004
Concentration
0.000e+000 Quadratic term
1.715e+001 Linear term
0.000e+000 Constant term
3.4% RF Rel Std Dev
OK
Cancel
Help
Print Calibration Curve
Copy Calibration Curve

1/26/17


Edit Compounds
Search by: Ret Time
Name
Index
Find Compound
Compound Database
External Standard Compour
Hydrogen
Oxygen
Nitrogen
Carbon Monoxide
Methane
Carbon Dioxide
Identification
Calibration
User Defined
Advanced
Reporting
Lvl ID Concentration Response
0.1 92.155000 1218.265000
0.5 500.000000 6836.423333
1 1000.000000 12663.610000
4 4000.000000 50864.244107
16 16000.000000 198523.476667
40.3 40280.000000 494539.805000
O2 99999.000000
N2 99999.000000
CH4 99000.000000 1256113.323333
CO2 99800.000000
Methane
Response
1.00e+006
5.00e+005
0
5.00e+004
1.00e+005
Concentration
0.000e+000 Quadratic term
1.278e+001 Linear term
0.000e+000 Constant term
3.9% RF Rel Std Dev
OK
Cancel
Help
Print Calibration Curve
Copy Calibration Curve
CH4

1/26/17


Edit Compounds
Search by: Ret Time Name Index
Find Compound
Compound Database
External Standard Compour
Hydrogen
Oxygen
Nitrogen
Carbon Monoxide
Methane
Carbon Dioxide
Identification Calibration User Defined Advanced Reporting
Lvl ID Concentration Response Lvl ID Concentration Response
0.1 94.453000 1967.260000
0.5 500.000000 10826.957857
1 1000.000000 20770.249250
4 4000.000000 80812.135000
16 16000.000000 321273.738906
40.3 40280.000000 796934.724531
O2 99999.000000
N2 99999.000000
CH4 99000.000000
CO2 99800.000000 1912854.461667
CO2
Carbon Dioxide
Response
2.00e+006
1.00e+006
0
0
5.00e+004
1.00e+005
Concentration
0.000e+000 Quadratic term
2.036e+001 Linear term
0.000e+000 Constant term
4.0% RF Rel Std Dev
OK
Cancel
Help
Print Calibration Curve
Copy Calibration Curve

WL 11/16/05

Method Path : I:\GC01\METHODS\
Method File : 3C012417.M
Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
Last Update : Tue Jan 24 17:15:32 2017
Response Via : Initial Calibration

#	ID	Conc	ISTD Conc	Path\File
1	0.1	94	0	I:\GC01\DATA\FXG\2017_01\24\01241708.D
2	0.5	500	0	I:\GC01\DATA\FXG\2017_01\24\01241710.D
3	1	1000	0	I:\GC01\DATA\FXG\2017_01\24\01241711.D
4	4	4000	0	I:\GC01\DATA\FXG\2017_01\24\01241712.D
5	16	16000	0	I:\GC01\DATA\FXG\2017_01\24\01241713.D
6	40.3	40280	0	I:\GC01\DATA\FXG\2017_01\24\01241726.D
7	O2	99999	0	I:\GC01\DATA\FXG\2017_01\24\01241714.D
8	N2	99999	0	I:\GC01\DATA\FXG\2017_01\24\01241724.D
9	CH4	99000	0	I:\GC01\DATA\FXG\2017_01\24\01241716.D
10	CO2	99800	0	I:\GC01\DATA\FXG\2017_01\24\01241728.D

#	ID	Update Time	Quant Time	Acquisition Time
1	0.1	Jan 24 17:11 2017	Jan 24 17:11 2017	24 Jan 2017 9:54 am
2	0.5	Jan 24 17:09 2017	Jan 24 17:07 2017	24 Jan 2017 10:28 am
3	1	Jan 24 16:02 2017	Jan 24 11:06 2017	24 Jan 2017 10:46 am
4	4	Jan 24 16:02 2017	Jan 24 11:29 2017	24 Jan 2017 11:04 am
5	16	Jan 24 16:02 2017	Jan 24 11:44 2017	24 Jan 2017 11:28 am
6	40.3	Jan 24 16:58 2017	Jan 24 16:13 2017	24 Jan 2017 3:39 pm
7	O2	Jan 24 16:47 2017	Jan 24 12:03 2017	24 Jan 2017 11:45 am
8	N2	Jan 24 16:50 2017	Jan 24 15:54 2017	24 Jan 2017 3:08 pm
9	CH4	Jan 24 16:49 2017	Jan 24 15:50 2017	24 Jan 2017 12:21 pm
10	CO2	Jan 24 17:15 2017	Jan 24 17:14 2017	24 Jan 2017 4:51 pm

3C012417.M Thu Jan 26 10:32:03 2017

Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241708.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 9:54 am
Operator : MC
Sample : std s30-12301601 0.1%
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 17:11:21 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 16:58:22 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

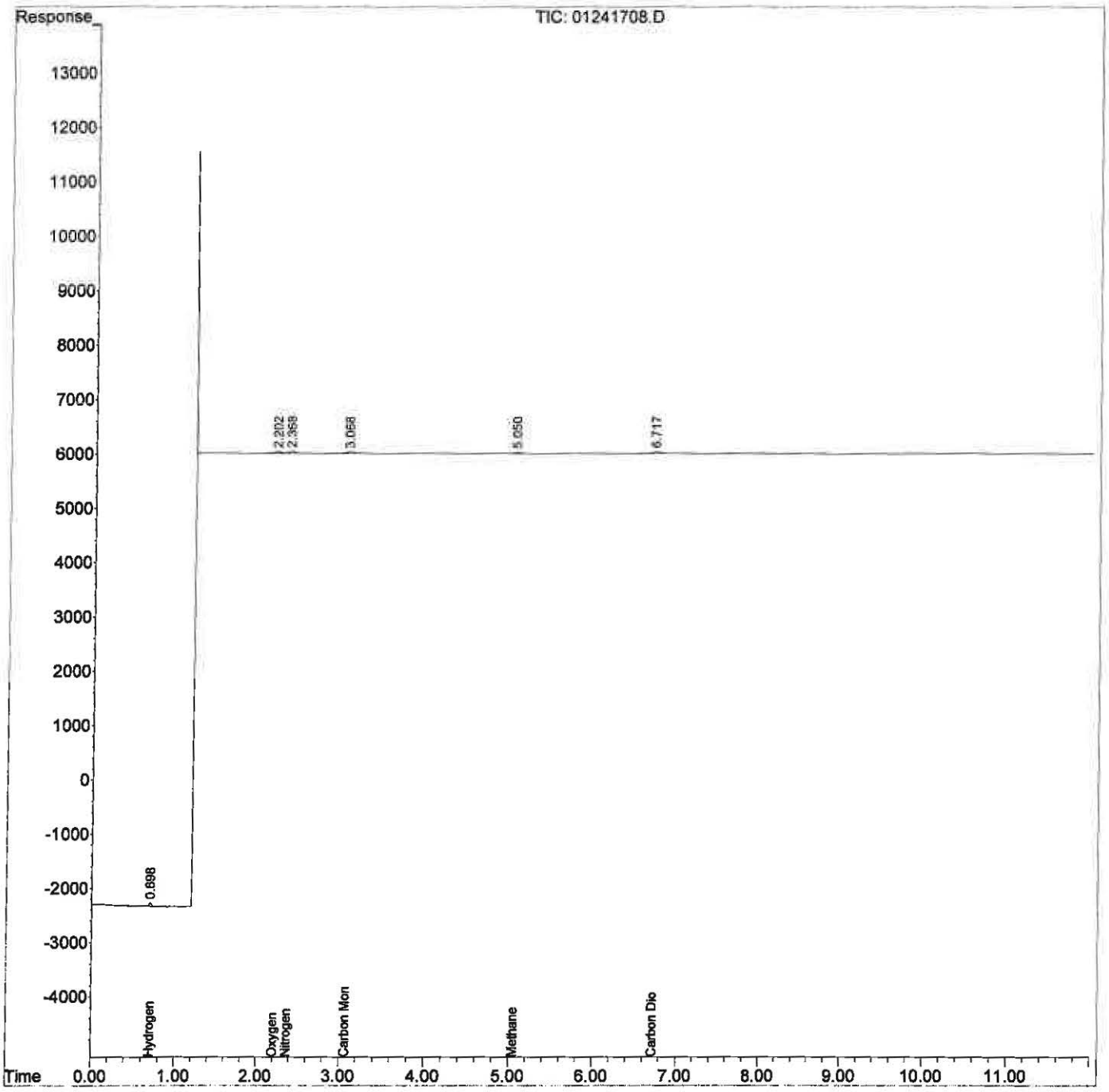
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Hydrogen	0.699	1307	963.654	ppm	
2)	Oxygen	2.202	1566	1022.329	ppm	m
3)	Nitrogen	2.368	2028	1155.333	ppm	m
4)	Carbon Monoxide	3.071	1639	955.727	ppm	
5)	Methane	5.052	1218	953.387	ppm	
6)	Carbon Dioxide	6.719	1967	957.152	ppm	

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

Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241708.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 9:54 am
Operator : MC
Sample : std s30-12301601 0.1%
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 17:11:21 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 16:58:22 2017
Response via : Initial Calibration
Integrator: ChemStation

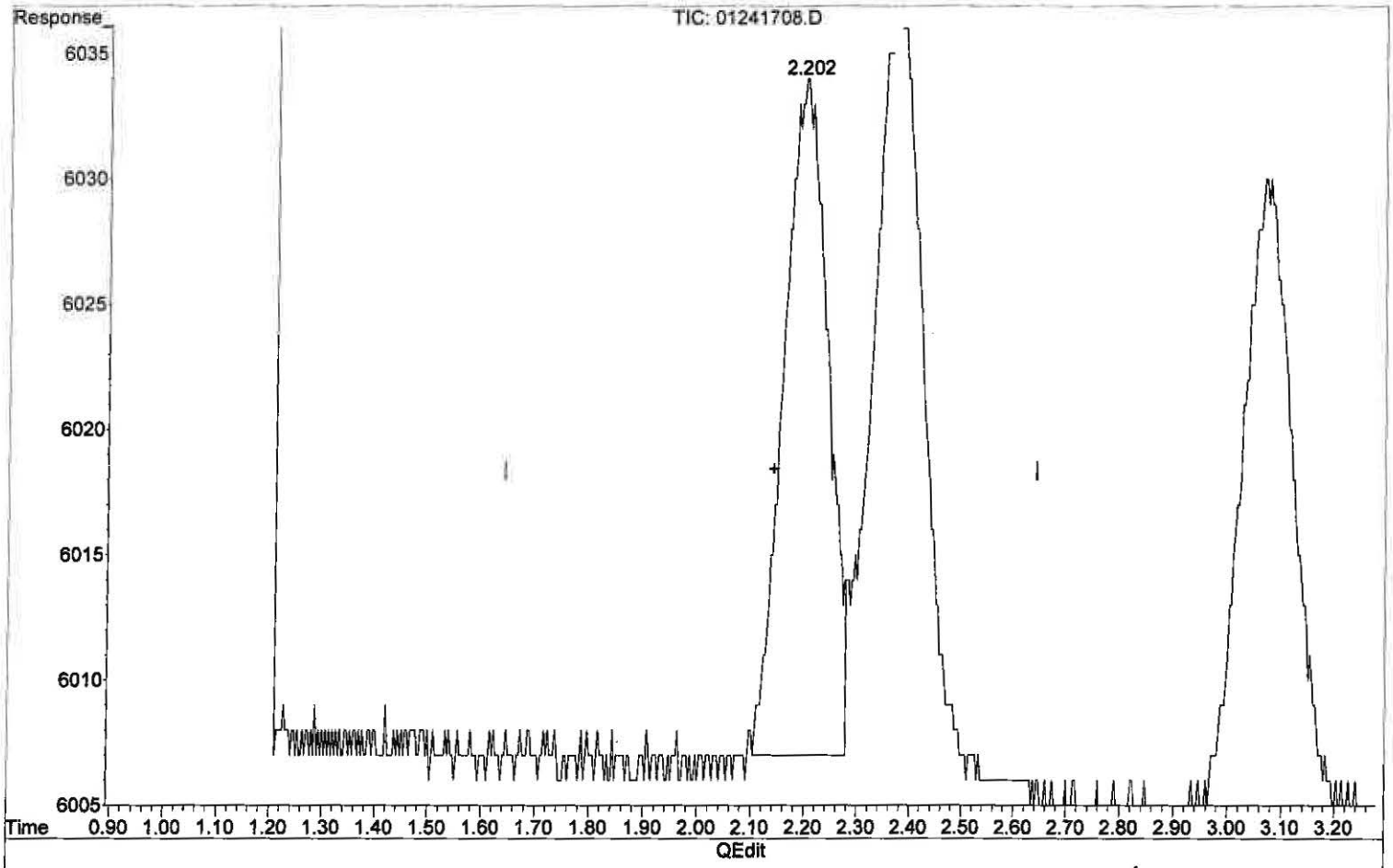
Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241708.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 9:54 am
Operator : MC
Sample : std s30-12301601 0.1%
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 17:11:21 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 16:58:22 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



(2) Oxygen

2.202min 1022.329 ppm m

response 1566

M 1/26/17

W 1/26/17

no previous

BLC

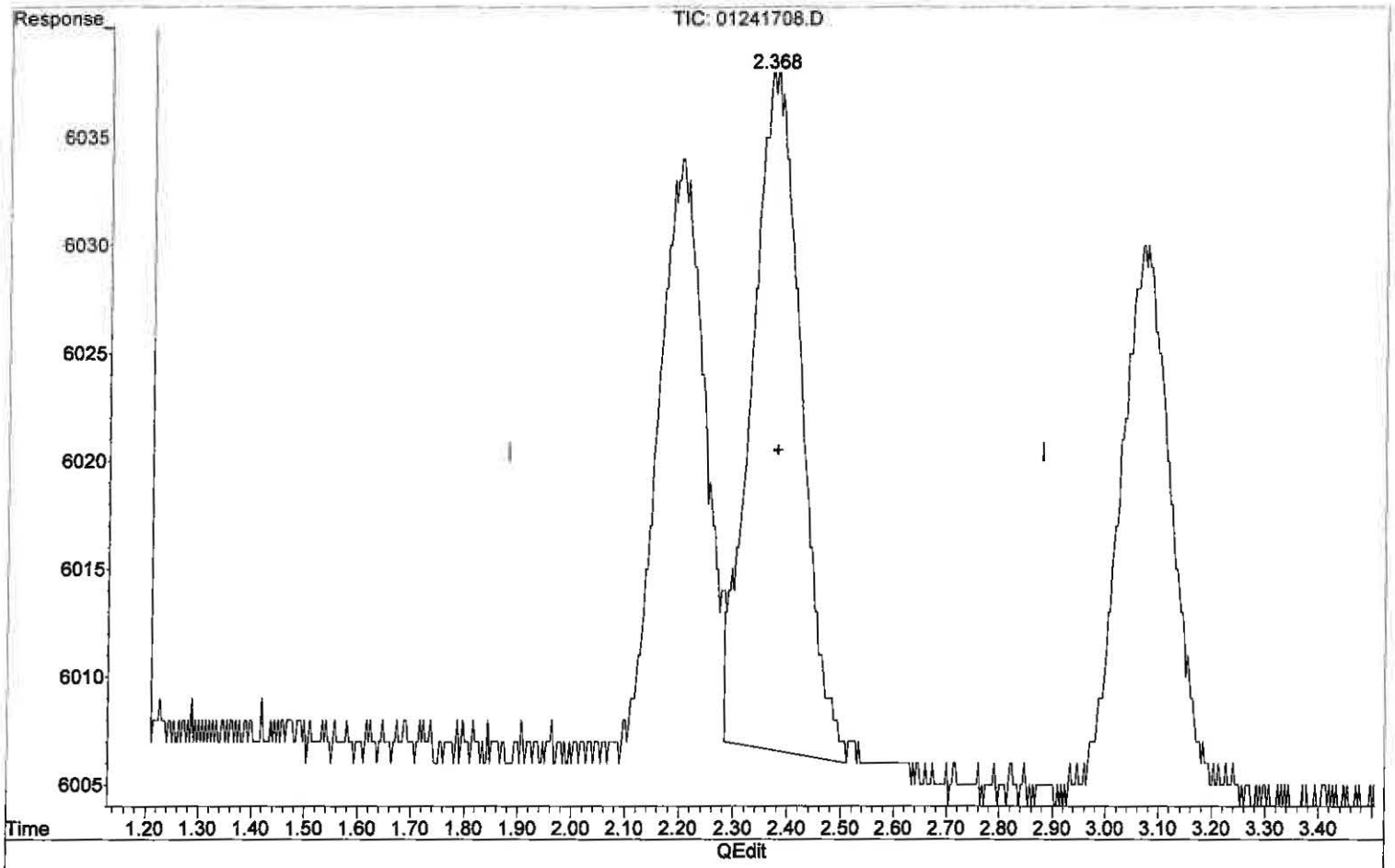
(+) = Expected Retention Time

3C012417.M Thu Jan 26 12:02:14 2017

Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241708.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 9:54 am
Operator : MC
Sample : std s30-12301601 0.1%
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 17:11:21 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 16:58:22 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



(3) Nitrogen

2.368min 1155.333 ppm m

response 2028

M 1/26/17

1/26/17
no previous
BL

(+) = Expected Retention Time

Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241710.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 10:28 am
Operator : MC
Sample : std s30-1231702 0.5%
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 17:07:30 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 16:58:22 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

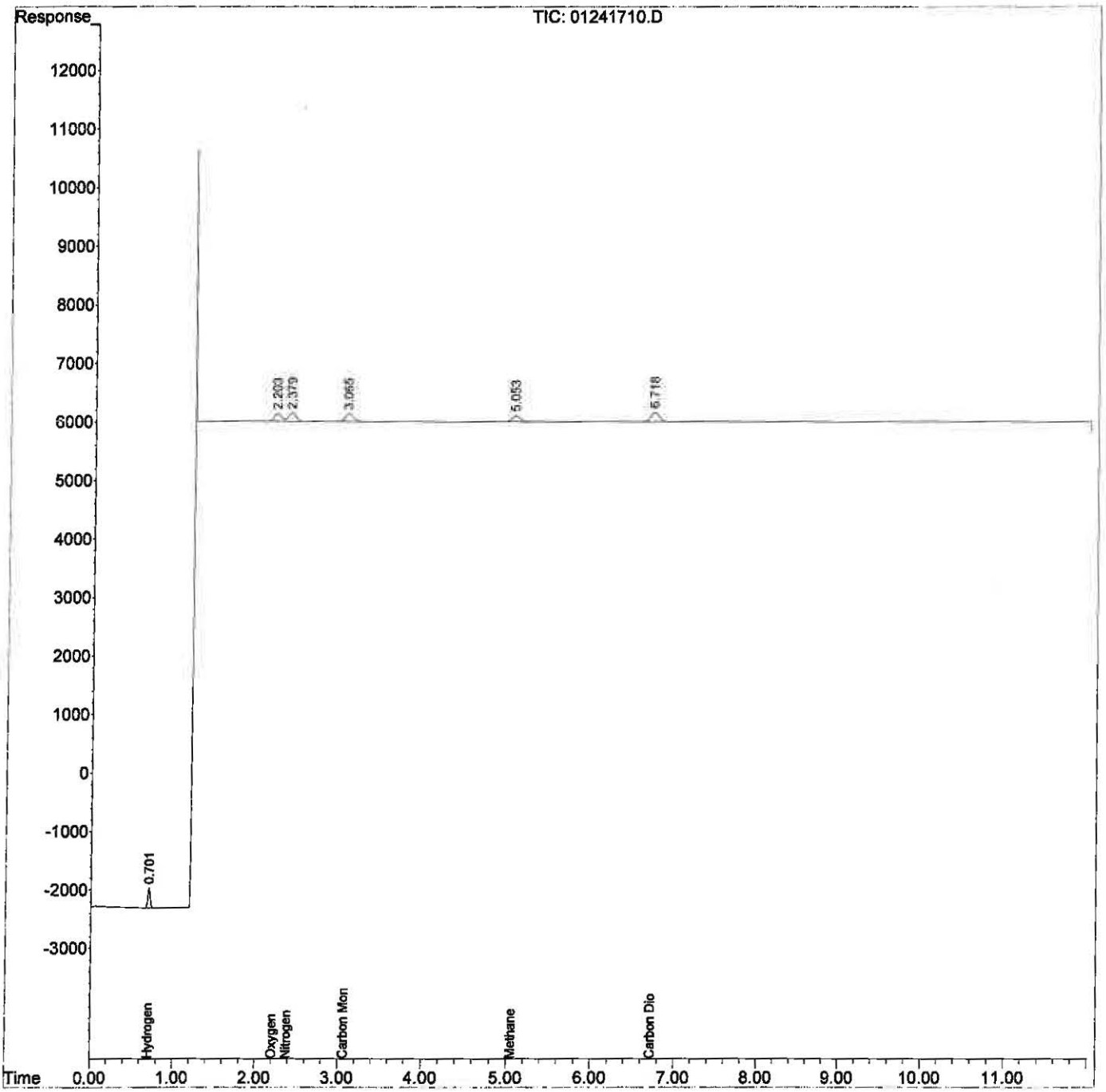
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.702	6732	4962.119	ppm
2)	Oxygen	2.204	8055	5257.492	ppm
3)	Nitrogen	2.380	9373	5340.301	ppm
4)	Carbon Monoxide	3.070	9091	5301.886	ppm
5)	Methane	5.056	6836	5350.030	ppm
6)	Carbon Dioxide	6.719	10827	5267.759	ppm

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

Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241710.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 10:28 am
Operator : MC
Sample : std s30-1231702 0.5%
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 17:07:30 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 16:58:22 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241711.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 10:46 am
Operator : MC
Sample : std s30-01231701 1%
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 11:06:38 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 11:05:53 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

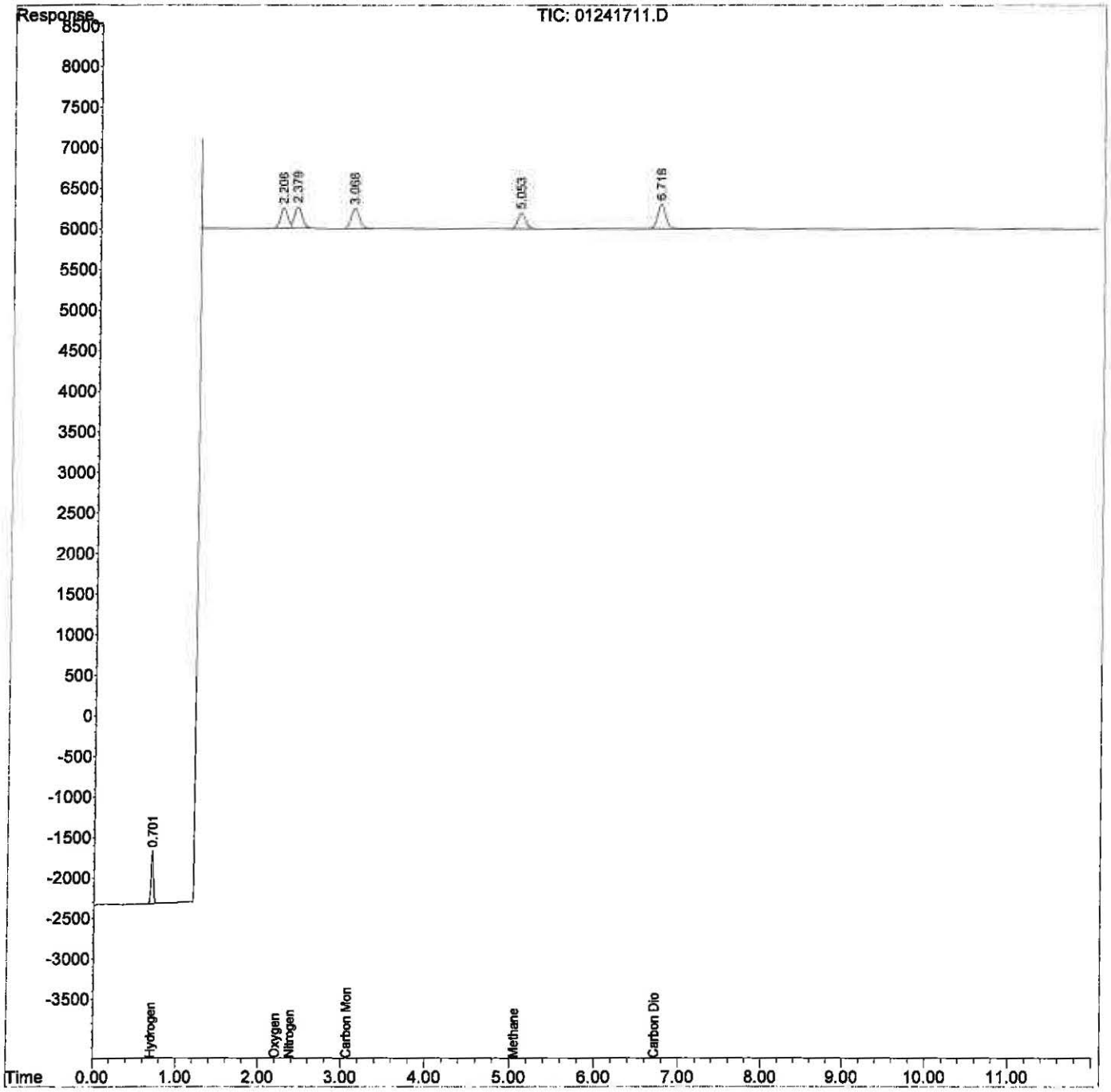
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.703	12920	9749.462	ppm
2)	Oxygen	2.207	15390	10022.255	ppm
3)	Nitrogen	2.381	17397	10088.258	ppm
4)	Carbon Monoxide	3.070	17182	10123.136	ppm
5)	Methane	5.056	12664	10035.134	ppm
6)	Carbon Dioxide	6.720	20770	10324.389	ppm

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

Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241711.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 10:46 am
Operator : MC
Sample : std s30-01231701 1%
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 11:06:38 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 11:05:53 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241712.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 11:04 am
Operator : MC
Sample : std s30-12191601 4%
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 11:29:02 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 11:06:54 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

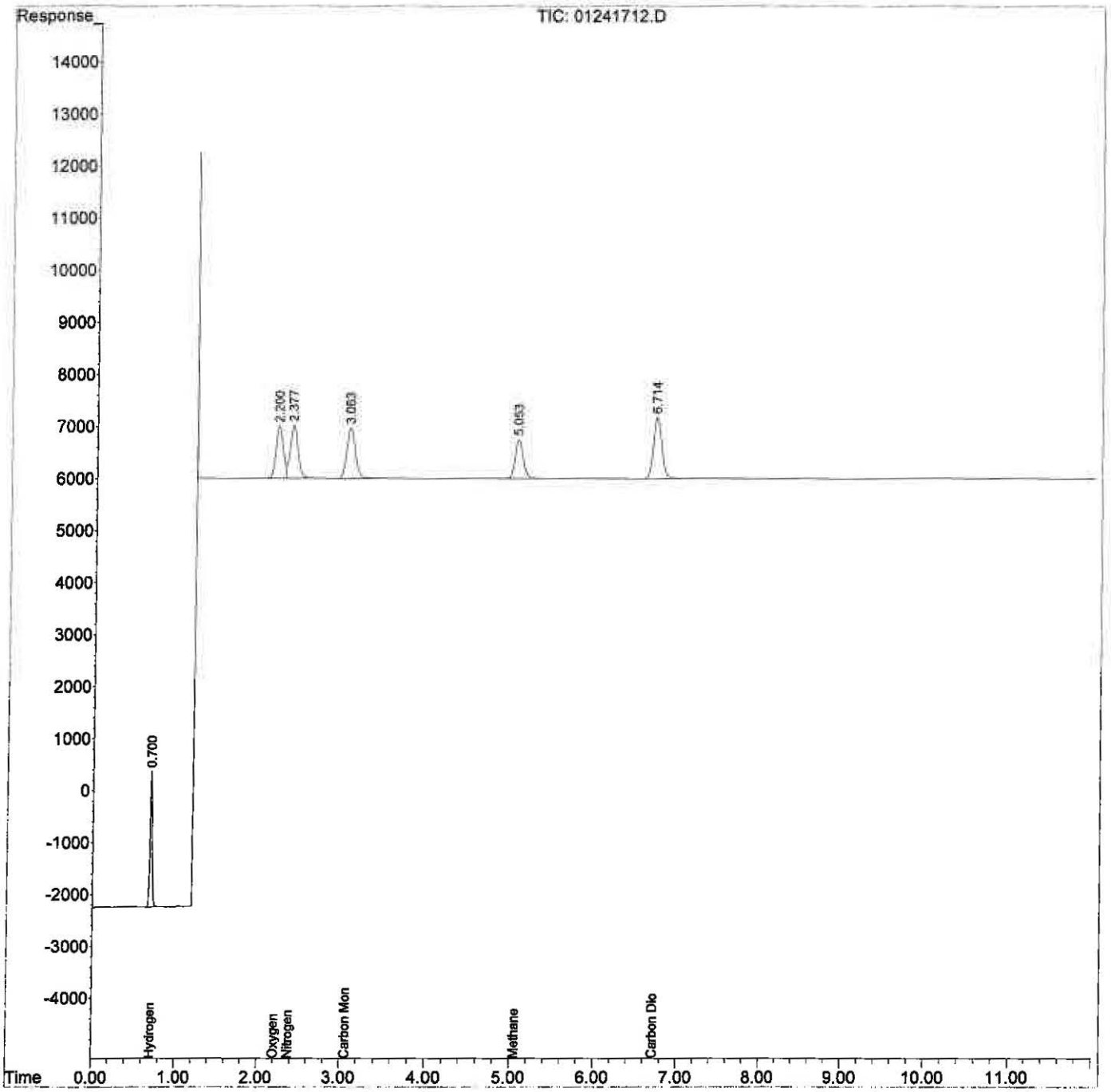
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.701	51116	38471.422	ppm
2)	Oxygen	2.202	60783	39655.182	ppm
3)	Nitrogen	2.378	67800	39325.034	ppm
4)	Carbon Monoxide	3.065	67364	39718.927	ppm
5)	Methane	5.054	50064	39812.023	ppm
6)	Carbon Dioxide	6.716	80812	40218.015	ppm

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

Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241712.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 11:04 am
Operator : MC
Sample : std s30-12191601 4%
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 11:29:02 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 11:06:54 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241713.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 11:28 am
Operator : MC
Sample : std s30-01231703 16%
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 11:44:36 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 11:30:32 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

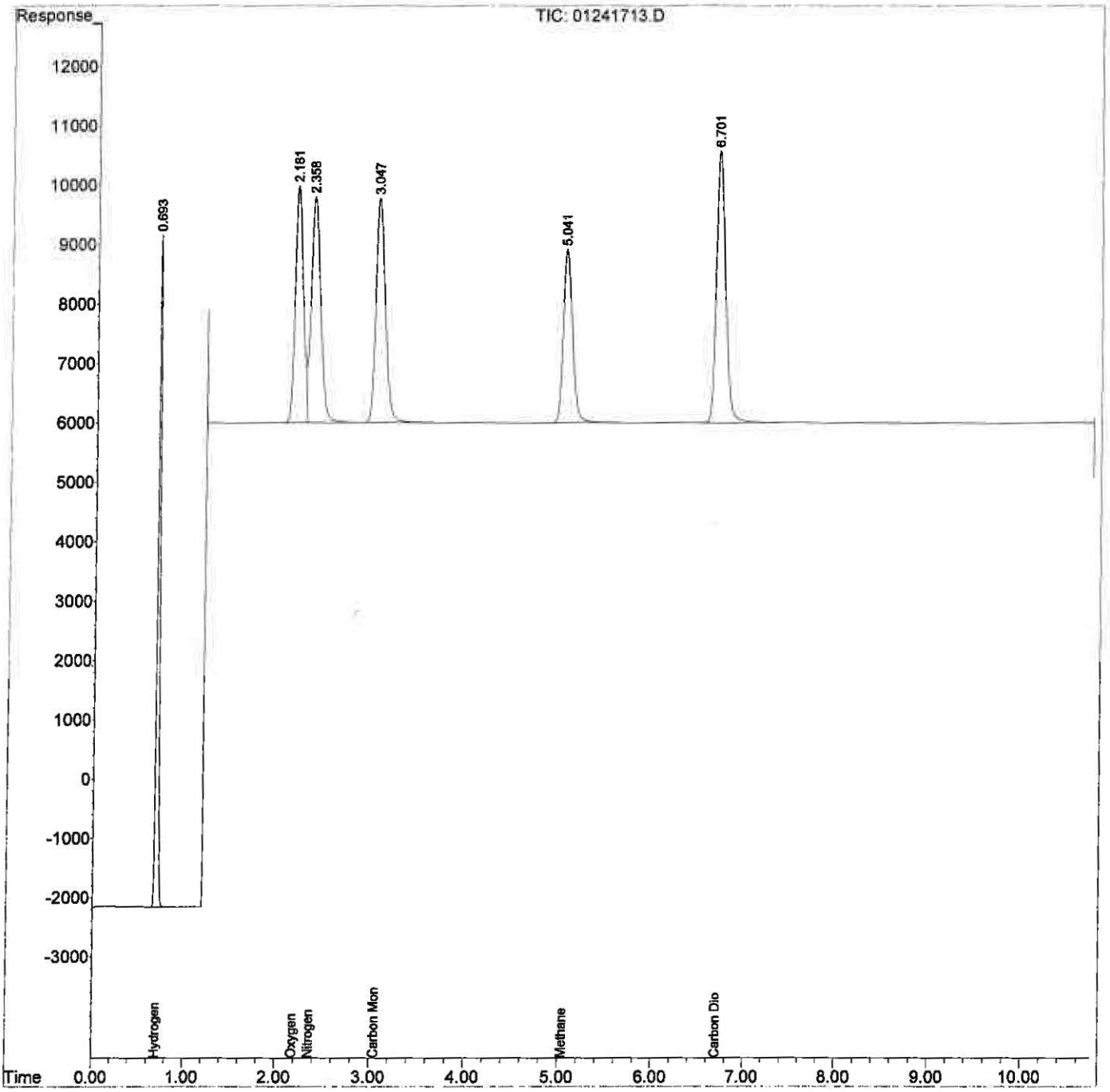
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.695	214700	160970.040	ppm
2)	Oxygen	2.182	239370	156211.792	ppm
3)	Nitrogen	2.360	267291	155149.115	ppm
4)	Carbon Monoxide	3.048	267230	157650.776	ppm
5)	Methane	5.043	198523	158115.703	ppm
6)	Carbon Dioxide	6.703	321274	160126.033	ppm

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

Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241713.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 11:28 am
Operator : MC
Sample : std s30-01231703 16%
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 11:44:36 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 11:30:32 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241714.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 11:45 am
Operator : MC
Sample : s11-12021503 O2
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 12:03:07 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 11:45:03 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

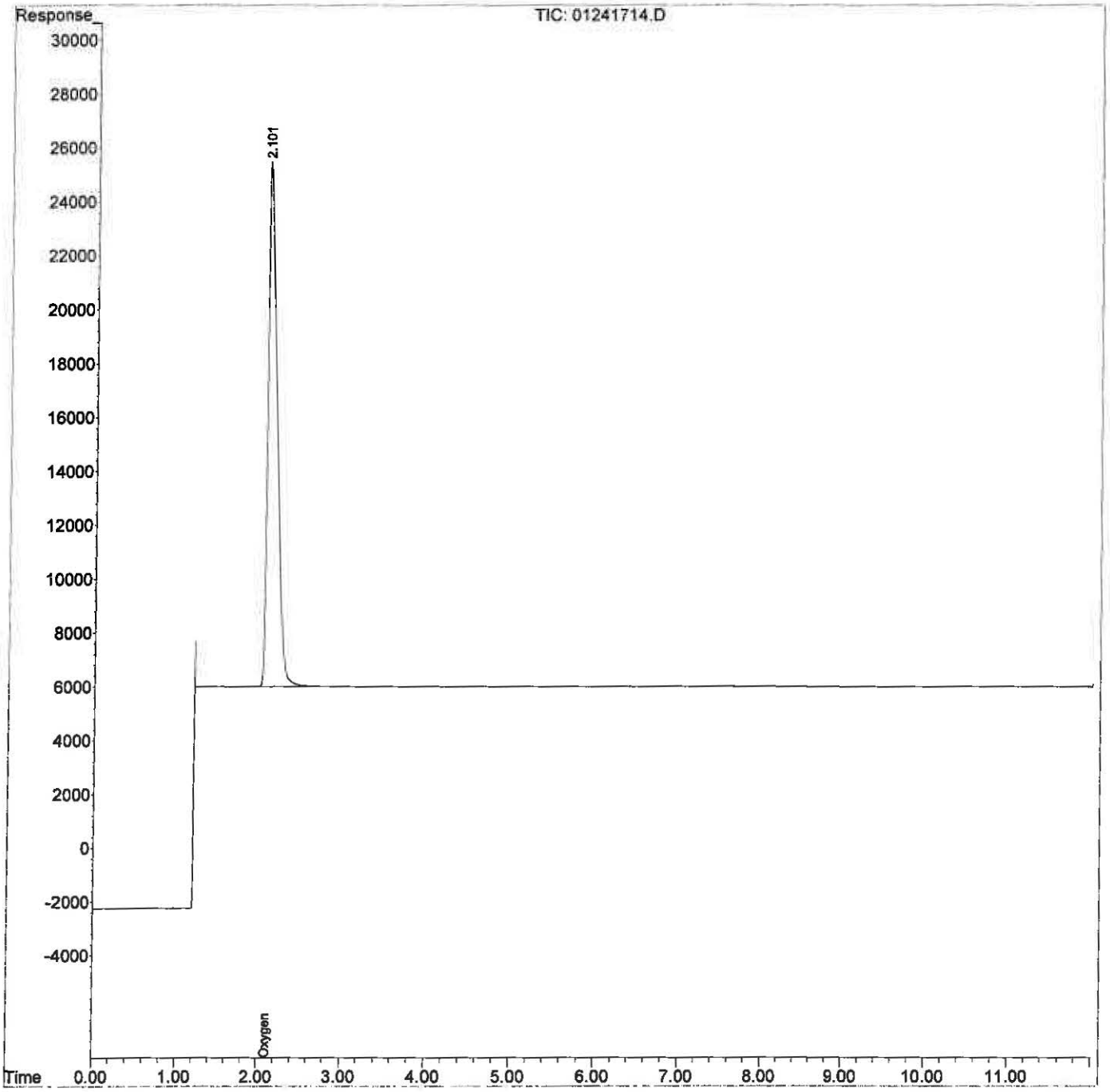
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.000	0	N.D.	ppm
2)	Oxygen	2.102	1492463	975822.655	ppm
3)	Nitrogen	0.000	0	N.D.	ppm
4)	Carbon Monoxide	0.000	0	N.D.	ppm
5)	Methane	0.000	0	N.D.	ppm
6)	Carbon Dioxide	0.000	0	N.D.	ppm

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

Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241714.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 11:45 am
Operator : MC
Sample : s11-12021503 O2
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 12:03:07 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 11:45:03 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241716.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 12:21 pm
Operator : MC
Sample : s30-01241701 CH4
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 15:50:33 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 12:21:02 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

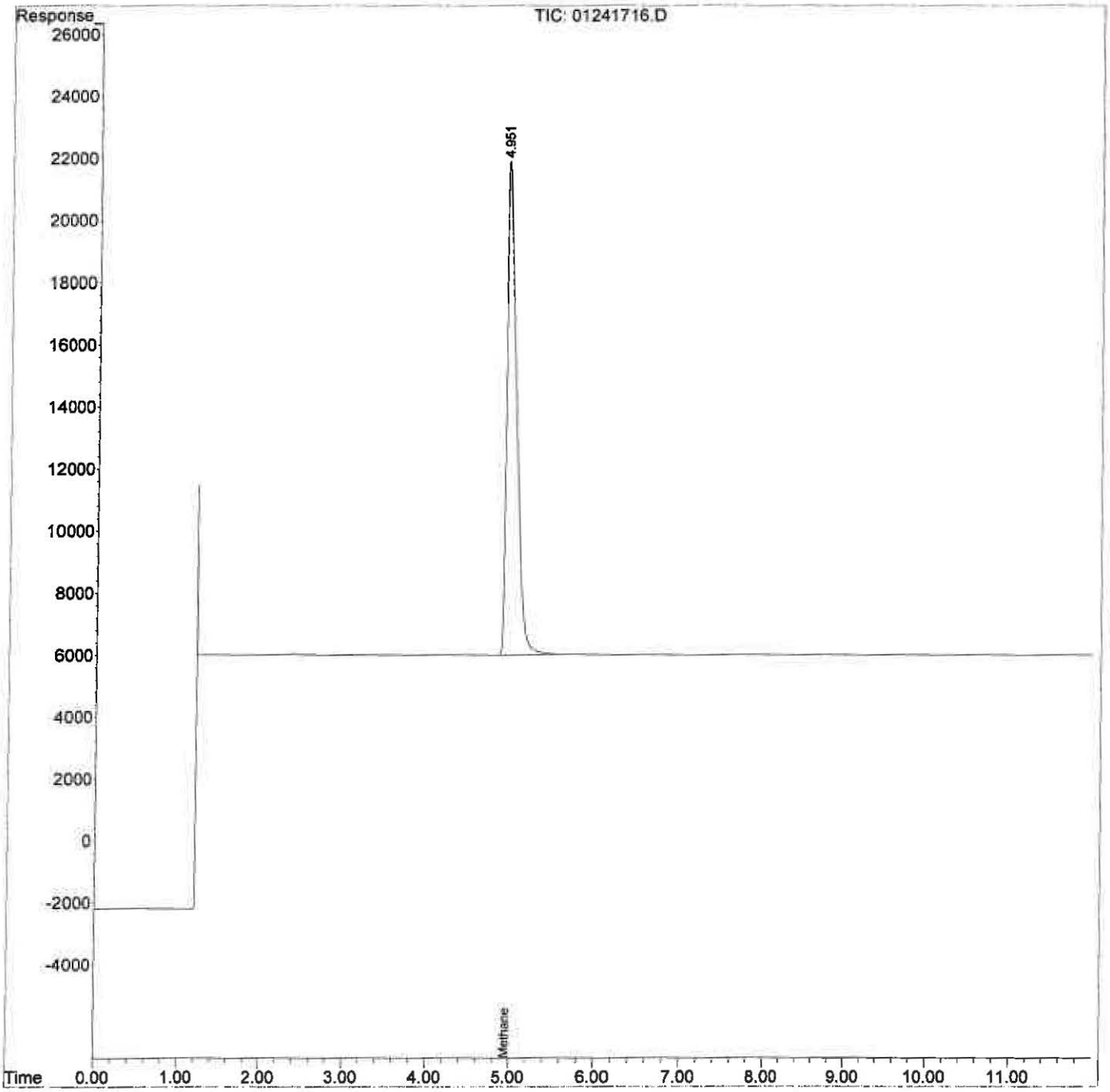
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Hydrogen	0.000	0	N.D.	ppm	
2)	Oxygen	0.000	0	N.D.	ppm	d
3)	Nitrogen	0.000	0	N.D.	ppm	d
4)	Carbon Monoxide	0.000	0	N.D.	ppm	
5)	Methane	4.953	1256113	1001419.959	ppm	
6)	Carbon Dioxide	0.000	0	N.D.	ppm	

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

Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241716.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 12:21 pm
Operator : MC
Sample : s30-01241701 CH4
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 15:50:33 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 12:21:02 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241724.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 3:08 pm
Operator : MC
Sample : s11-12021502 N2
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 15:54:48 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 13:54:15 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

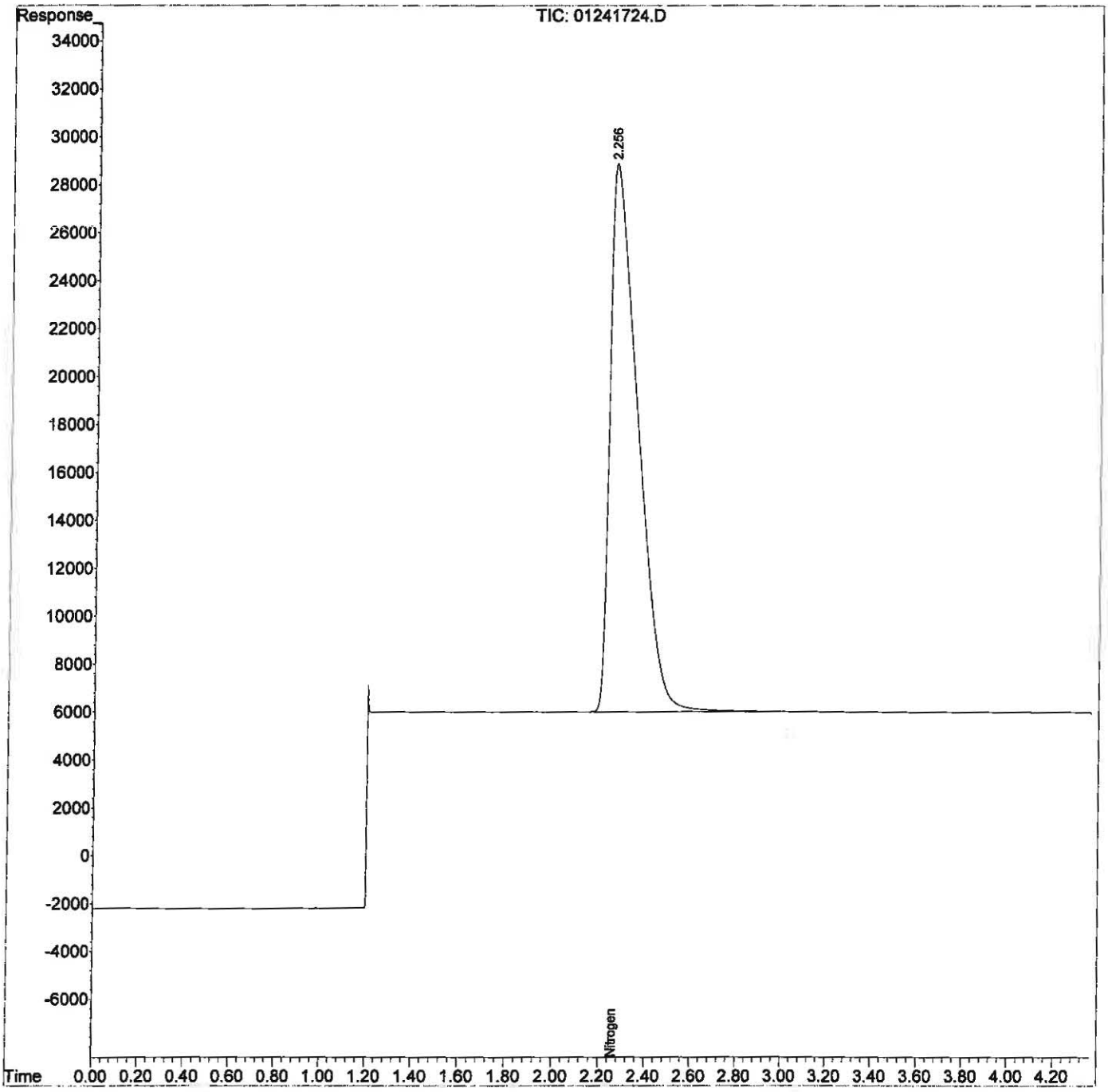
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Hydrogen	0.000	0	N.D.	ppm	
2)	Oxygen	0.000	0	N.D.	ppm	d
3)	Nitrogen	2.258	1938227	1101353.052	ppm	
4)	Carbon Monoxide	0.000	0	N.D.	ppm	
5)	Methane	0.000	0	N.D.	ppm	
6)	Carbon Dioxide	0.000	0	N.D.	ppm	

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

Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241724.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 3:08 pm
Operator : MC
Sample : s11-12021502 N2
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 15:54:48 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 13:54:15 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241727.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 4:13 pm
Operator : MC
Sample : 1g loop S30-12191601 40.28%
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 16:40:16 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 16:07:39 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

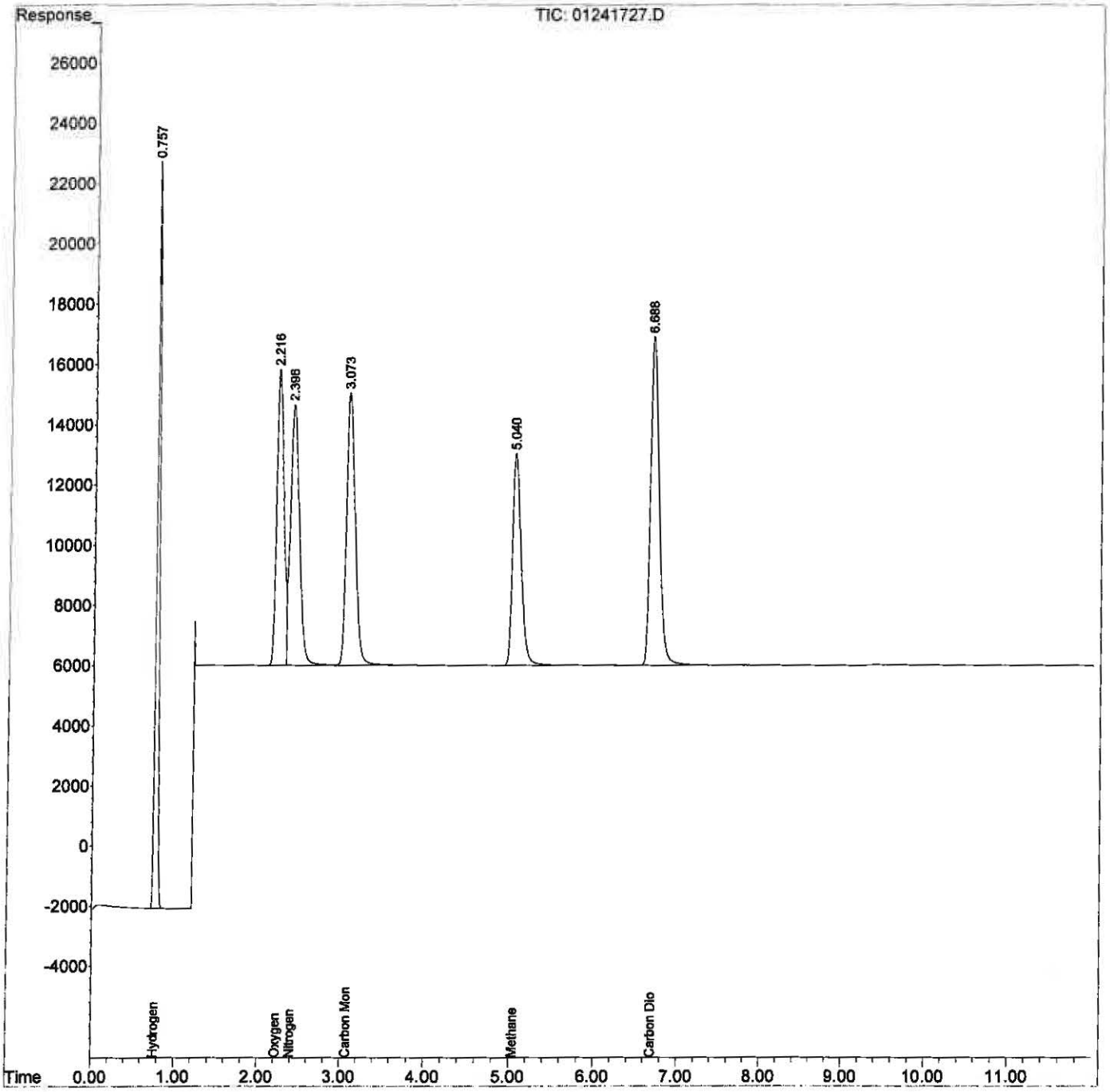
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.759	581720	434415.125	ppm
2)	Oxygen	2.218	593437	384865.128	ppm
3)	Nitrogen	2.397	671824	379650.320	ppm
4)	Carbon Monoxide	3.075	669389	387994.466	ppm
5)	Methane	5.042	494640	384594.565	ppm
6)	Carbon Dioxide	6.690	796935	384863.394	ppm

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

Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241727.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 4:13 pm
Operator : MC
Sample : lg loop S30-12191601 40.28%
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 16:40:16 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 16:07:39 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241728.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 4:51 pm
Operator : MC
Sample : S30-01241702 CO2
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 17:14:40 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 17:11:31 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

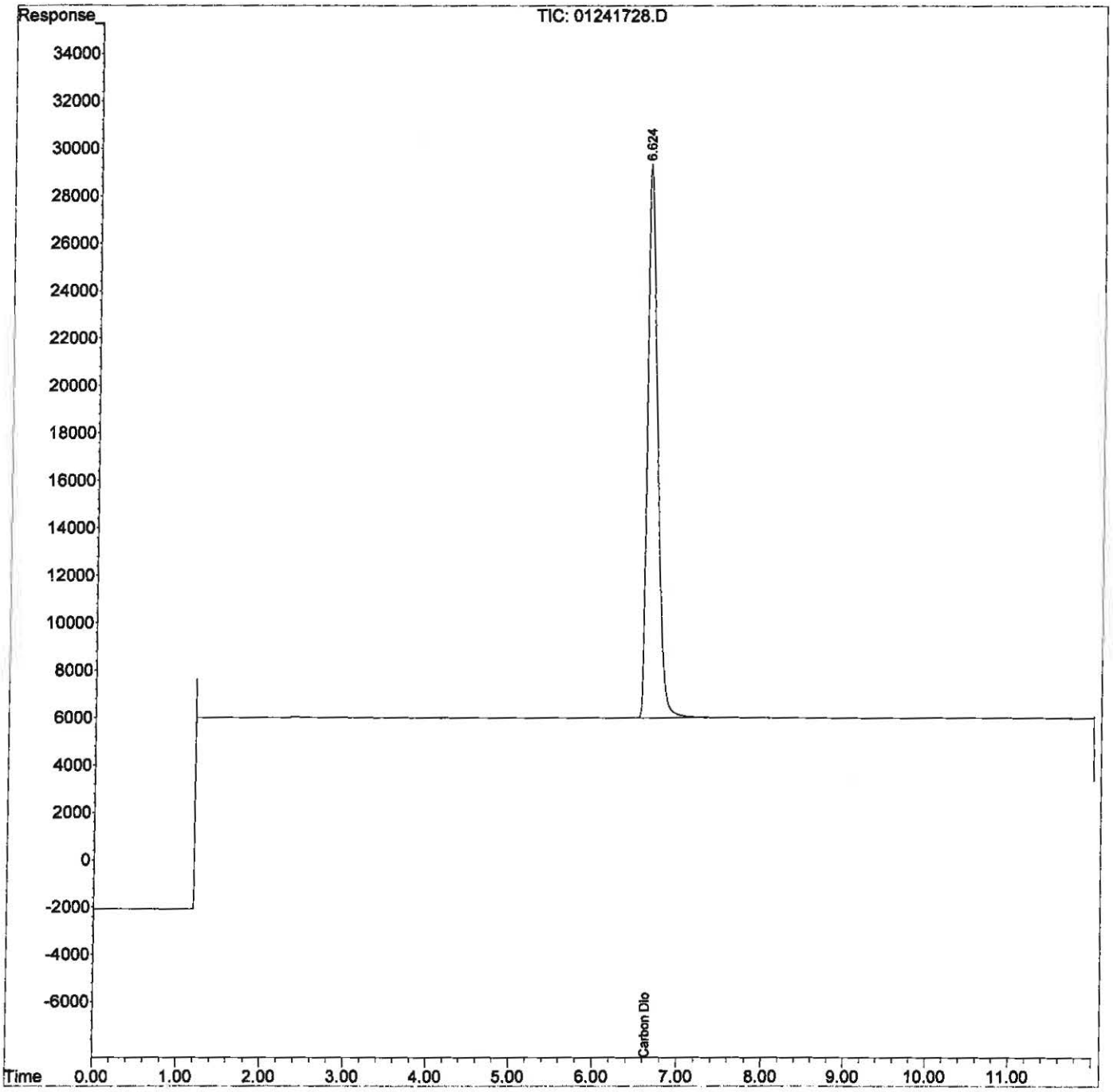
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Hydrogen	0.000	0	N.D.	ppm	
2)	Oxygen	0.000	0	N.D.	ppm	
3)	Nitrogen	0.000	0	N.D.	ppm	d
4)	Carbon Monoxide	0.000	0	N.D.	ppm	
5)	Methane	0.000	0	N.D.	ppm	
6)	Carbon Dioxide	6.625	1912854	930681.280	ppm	

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

Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241728.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 4:51 pm
Operator : MC
Sample : S30-01241702 CO2
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 17:14:40 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 17:11:31 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241729.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 5:13 pm
Operator : MC
Sample : icv S30-12091603
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 26 11:43:57 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 17:15:32 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

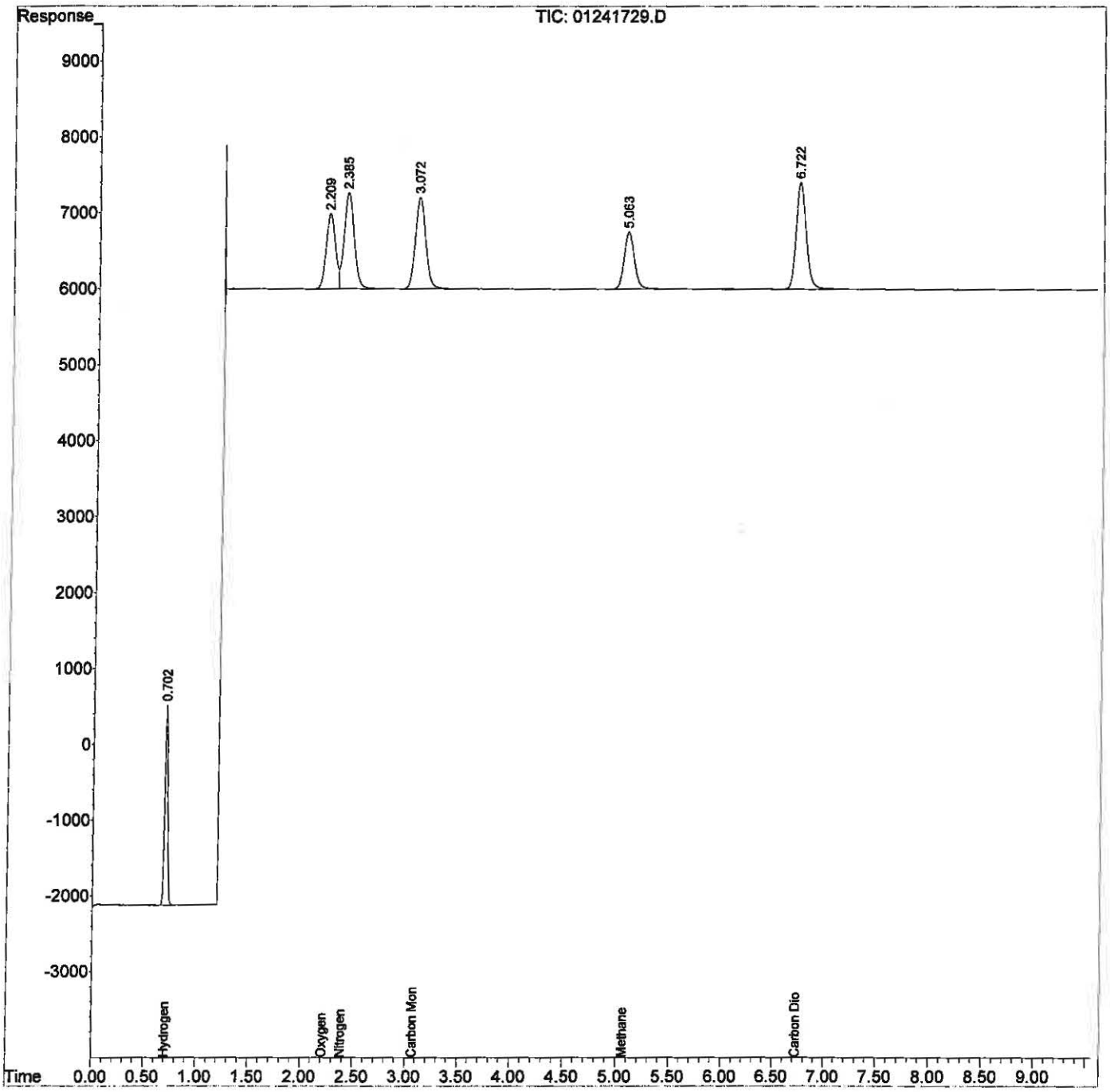
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.704	52203	38480.504	ppm
2)	Oxygen	2.211	60261	39428.995	ppm
3)	Nitrogen	2.386	85544	48121.904	ppm
4)	Carbon Monoxide	3.073	84807	49459.452	ppm
5)	Methane	5.064	50827	39776.144	ppm
6)	Carbon Dioxide	6.724	97748	48020.992	ppm

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

Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241729.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 5:13 pm
Operator : MC
Sample : icv S30-12091603
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 26 11:43:57 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 17:15:32 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Modified EPA Method 3C Daily QC Summary

Client : Trihydro Corporation
Analyst : MC
Method Name : EPA 3C, ASTM D 1946-90, VOA-EPA3C

Instrument : GC 1
Date Analyzed : 3/6/17

RT Summaries and QC Check (minutes)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time
ICAL Mean RT	**0.708**	**2.188**	**2.368**	**3.076**	**5.045**	**6.707**		
RT Windows (+/- min)	**0.072**	**0.133**	**0.146**	**0.034**	**0.130**	**0.145**		
std s30-01301701	0.712	2.231	2.407	3.094	5.084	6.742	03061701.D	07:56
+/- 0.33min of ICAL Mean RT	Pass	Pass	Pass	Pass	Pass	Pass		
mb							03061702.D	08:14
lab air		2.182 Pass	2.321 Pass			6.766 Pass	03061703.D	08:30
lcs s30-02211703	0.709 Pass	2.225 Pass	2.401 Pass	3.088 Pass	5.077 Pass	6.739 Pass	03061707.D	09:42
lcsd s30-02211703	0.711 Pass	2.229 Pass	2.406 Pass	3.094 Pass	5.081 Pass	6.742 Pass	03061708.D	09:59
0971-003		2.195 Pass	2.319 Pass			6.766 Pass	03061727.D	15:58
std s30-01301701	0.714 Pass	2.238 Pass	2.415 Pass	3.102 Pass	5.095 Pass	6.753 Pass	03061728.D	16:14

Continuing Calibration Standards Summary (ppm)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time
ACTUAL	40000.0	40000.0	50000.0	50000.0	40000.0	50000.0		
CCV Criteria (+/- %D)	**15.0%**	**10.0%**	**10.0%**	**10.0%**	**10.0%**	**10.0%**		
std s30-01301701	40836.9 2.1%	42439.9 6.1%	51887.1 3.8%	53197.6 6.4%	42978.6 7.4%	51664.8 3.3%	03061701.D	07:56
std s30-01301701	41192.2 3.0%	42702.1 6.8%	51968.7 3.9%	53392.4 6.8%	43026.3 7.6%	51813.8 3.6%	03061728.D	16:14
	####	####	####	####	####	#####		
	####	####	####	####	####	#####		

Lab Dup Summary (ppm, without DF correction and nomalization)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time

LCS / LCS Dup Summary (ppm, without DF correction)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time
LCS Actual Conc. (ppm)	25000.0	25000.0	25000.0	25000.0	25000.0	25000.0		
LCS Criteria (% Range)	**94%-105%**	**97%-108%**	**89%-113%**	**98%-108%**	**94%-111%**	**94%-104%**		
lcs s30-02211703	25329.4	26944.1	26537.6	26886.1	25766.1	25998.4	03061707.D	09:42
LCS % Recovery	101% Pass	108% Pass	106% Pass	108% Pass	103% Pass	104% Pass		
lcsd s30-02211703	25229.7	26977.0	26345.7	26697.9	25575.3	25860.8	03061708.D	09:59
LCS % Recovery	101% Pass	108% Pass	105% Pass	107% Pass	102% Pass	103% Pass		
Duplicate % RPD	0.4%	0.1%	0.7%	0.7%	0.7%	0.5%		
Duplicate Criteria % RPD	**3%** Pass	**3%** Pass	**7%** Pass	**3%** Pass	**3%** Pass	**3%** Pass		

Lab Air QC Summary

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxid	Methane	Carbon Dioxide	Lab Air Criteria Total (90%-110%)
lab air		209808.1	740775.0			417.9	95.1% Pass
Lab Air Normalized (%)		22.06%	77.89%			0.04%	100.0%

KAH 3/7/17

Quantitation Report (QT Reviewed)

Data Path : I:\GC01\DATA\FXG\2017_03\06\
Data File : 03061701.D
Signal(s) : TCD1A.CH
Acq On : 6 Mar 2017 7:56 am
Operator : MC
Sample : std s30-01301701
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Mar 06 08:28:31 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 17:15:32 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.712	55400	40836.923	ppm
2)	Oxygen	2.231	64863	42439.868	ppm
3)	Nitrogen	2.407	92237	51887.063	ppm
4)	Carbon Monoxide	3.094	91217	53197.576	ppm
5)	Methane	5.084	54919	42978.592	ppm
6)	Carbon Dioxide	6.742	105165	51664.780	ppm

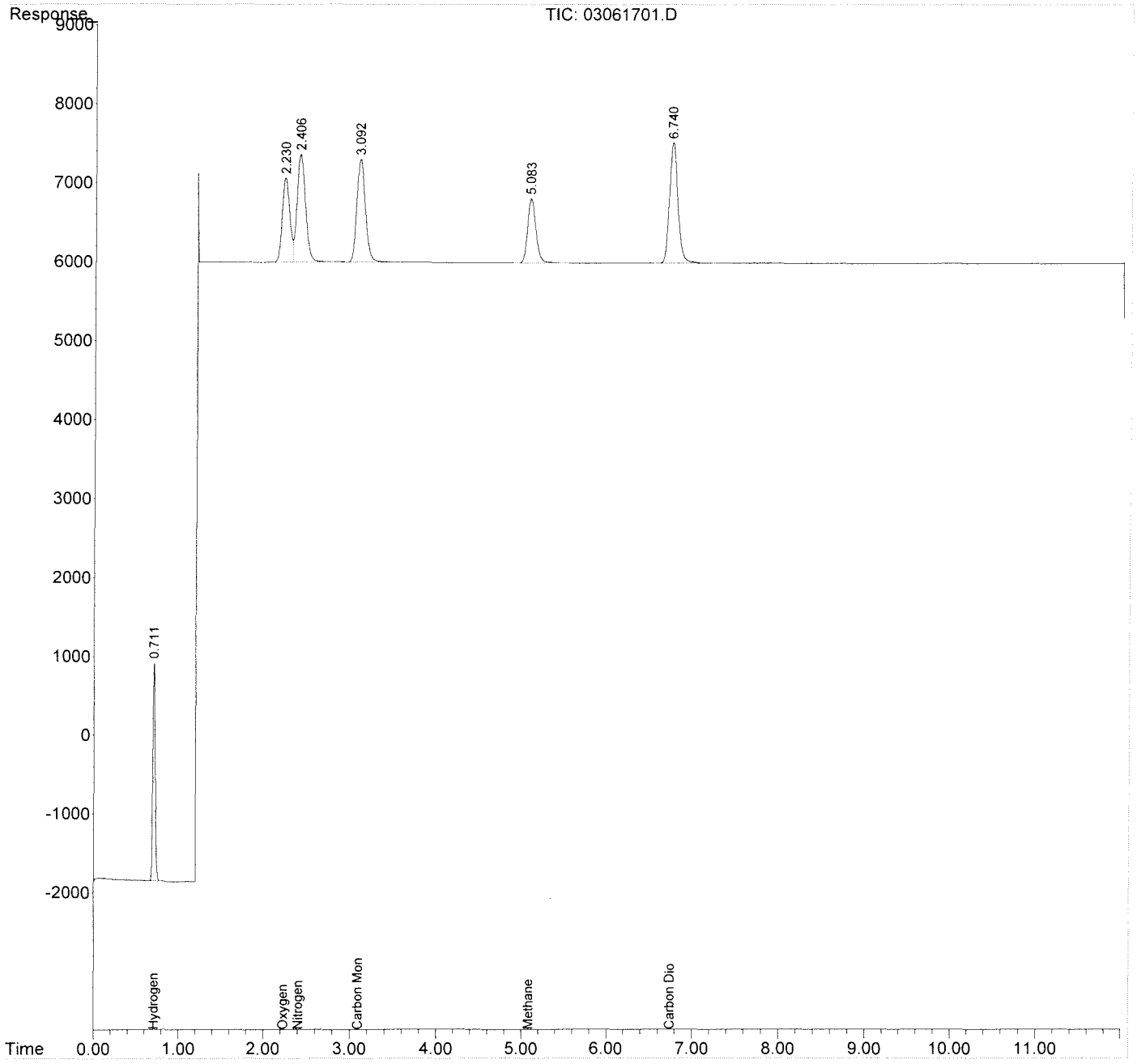
(f)=RT Delta > 1/2 Window (m)=manual int.

KAM 3/7/17

Data Path : I:\GC01\DATA\FXG\2017_03\06\
Data File : 03061701.D
Signal(s) : TCD1A.CH
Acq On : 6 Mar 2017 7:56 am
Operator : MC
Sample : std s30-01301701
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Mar 06 08:28:31 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 17:15:32 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : I:\GC01\DATA\FXG\2017_03\06\
Data File : 03061728.D
Signal(s) : TCD1A.CH
Acq On : 6 Mar 2017 4:14 pm
Operator : MC
Sample : std s30-01301701
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Mar 06 16:24:01 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 17:15:32 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.714	55882	41192.225	ppm
2)	Oxygen	2.238	65264	42702.130	ppm
3)	Nitrogen	2.415	92382	51968.700	ppm
4)	Carbon Monoxide	3.102	91551	53392.364	ppm
5)	Methane	5.095	54980	43026.322	ppm
6)	Carbon Dioxide	6.753	105468	51813.756	ppm

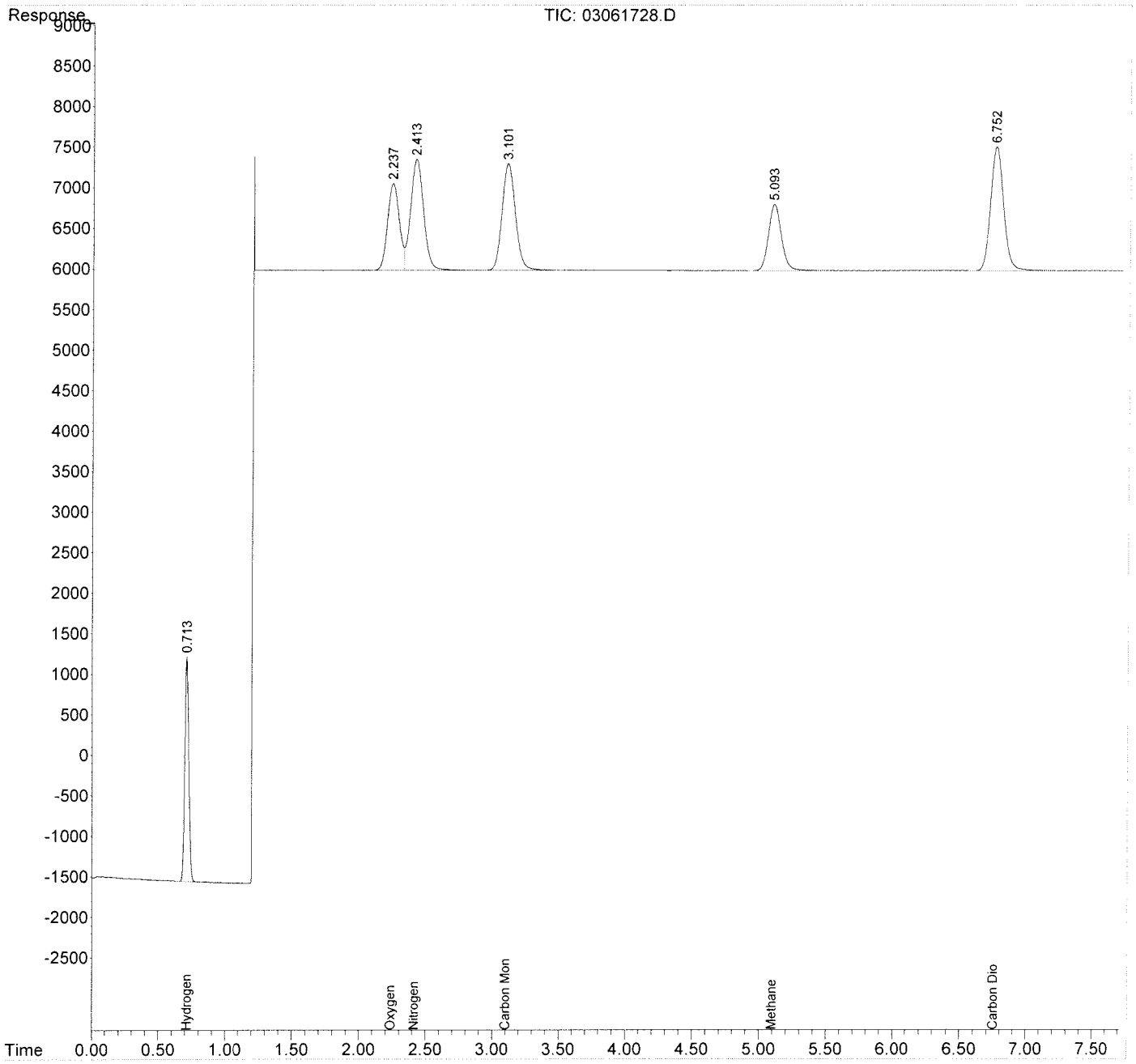
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : I:\GC01\DATA\FXG\2017_03\06\
Data File : 03061728.D
Signal(s) : TCD1A.CH
Acq On : 6 Mar 2017 4:14 pm
Operator : MC
Sample : std s30-01301701
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Mar 06 16:24:01 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 17:15:32 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Injection Log

Directory: I:\GC01\DATA\FXG\2017_01\24\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Acquisition Method	Comments
1	24 Jan 117 8:04 am	01241701.D	X		MC	MFXGS25C.M	
2	24 Jan 117 8:19 am	01241702.D	xstd s30-01231703		MC	MFXGS25C.M	
3	24 Jan 117 8:32 am	01241703.D	std 30-12091603		MC	MFXGS25C.M	
4	24 Jan 117 8:48 am	01241704.D	mb		MC	MFXGS25C.M	
5	24 Jan 117 9:04 am	01241705.D	lab air		MC	MFXGS25C.M	
6	24 Jan 117 9:22 am	01241706.D	0285-001		MC	MFXGS25C.M	
7	24 Jan 117 9:38 am	01241707.D	0285-002		MC	MFXGS25C.M	
8	24 Jan 117 9:54 am	01241708.D	std s30-12301601 0.1%		MC	MFXGS25C.M	
9	24 Jan 117 10:12 am	01241709.D	pressure check		MC	MFXGS25C.M	
10	24 Jan 117 10:28 am	01241710.D	std s30-1231702 0.5%		MC	MFXGS25C.M	
11	24 Jan 117 10:46 am	01241711.D	std s30-01231701 1%		MC	MFXGS25C.M	
12	24 Jan 117 11:04 am	01241712.D	std s30-12191601 4%		MC	MFXGS25C.M	
13	24 Jan 117 11:28 am	01241713.D	std s30-01231703 16%		MC	MFXGS25C.M	
14	24 Jan 117 11:45 am	01241714.D	s11-12021503 O2		MC	MFXGS25C.M	
15	24 Jan 117 12:02 pm	01241715.D	pressure check		MC	MFXGS25C.M	
16	24 Jan 117 12:21 pm	01241716.D	s30-01241701 CH4		MC	MFXGS25C.M	
17	24 Jan 117 12:38 pm	01241717.D	pressure check		MC	MFXGS25C.M	
18	24 Jan 117 1:55 pm	01241718.D	pressure check		MC	MFXGS25C.M	
19	24 Jan 117 2:11 pm	01241719.D	pressure check		MC	MFXGS25C.M	
20	24 Jan 117 2:32 pm	01241720.D	pressure check		MC	MFXGS25C.M	
21	24 Jan 117 2:42 pm	01241721.D	pressure check		MC	MFXGS25C.M	
22	24 Jan 117 2:54 pm	01241722.D	pressure check		MC	MFXGS25C.M	
23	24 Jan 117 3:01 pm	01241723.D	pressure check		MC	MFXGS25C.M	
24	24 Jan 117 3:08 pm	01241724.D	s11-12021502 N2		MC	MFXGS25C.M	
25	24 Jan 117 3:17 pm	01241725.D	mb		MC	MFXGS25C.M	
26	24 Jan 117 3:39 pm	01241726.D	pressure check		MC	MFXGS25C.M	
27	24 Jan 117 4:13 pm	01241727.D	lg loop S30-12191601 40.28%		MC	MFXGS25C.M	
28	24 Jan 117 4:51 pm	01241728.D	S30-01241702 CO2		MC	MFXGS25C.M	
29	24 Jan 117 5:13 pm	01241729.D	icv S30-12091603		MC	MFXGS25C.M	

Injection Log

Directory: I:\GC01\DATA\FXG\2017_03\06\

	Sample ID	Date/Time	Acquisition Method	File Name	Misc Info	Operator	Comments
1	std s30-01301701	3/6/17 7:56	MFXGS25C.M	03061701.D		MC	pass
2	mb	3/6/17 8:14	MFXGS25C.M	03061702.D		MC	pass
3	lab air	3/6/17 8:30	MFXGS25C.M	03061703.D		MC	pass
4	lcs	3/6/17 8:46	MFXGS25C.M	03061704.D		MC	fail
5	lcs	3/6/17 9:08	MFXGS25C.M	03061705.D		MC	fail
6	lcs	3/6/17 9:26	MFXGS25C.M	03061706.D		MC	fail
7	lcs s30-02211703	3/6/17 9:42	MFXGS25C.M	03061707.D		MC	pass
8	lcsd s30-02211703	3/6/17 9:59	MFXGS25C.M	03061708.D		MC	pass
	1014-001	3/6/17 10:20	MFXGS25C.M	03061709.D		MC	
	1014-002	3/6/17 10:38	MFXGS25C.M	03061710.D		MC	
	1014-003	3/6/17 10:54	MFXGS25C.M	03061711.D		MC	
	1015-001	3/6/17 11:11	MFXGS25C.M	03061712.D		MC	
	1015-002	3/6/17 11:27	MFXGS25C.M	03061713.D		MC	
	1015-003	3/6/17 11:44	MFXGS25C.M	03061714.D		MC	
	1042-001	3/6/17 11:59	MFXGS25C.M	03061715.D		MC	
	1042-002	3/6/17 12:15	MFXGS25C.M	03061716.D		MC	
	1042-003	3/6/17 12:32	MFXGS25C.M	03061717.D		MC	
	1042-004	3/6/17 12:48	MFXGS25C.M	03061718.D		MC	
#VALUE!	std s30-01301701	3/6/17 13:04	MFXGS25C.M	03061719.D		MC	pass
	1086-014	3/6/17 13:21	MFXGS25C.M	03061720.D		MC	
	1086-015	3/6/17 14:00	MFXGS25C.M	03061721.D		MC	
	1086-016	3/6/17 14:17	MFXGS25C.M	03061722.D		MC	
	1047-001	3/6/17 14:33	MFXGS25C.M	03061723.D		MC	
	1046-001	3/6/17 14:48	MFXGS25C.M	03061724.D		MC	
	1046-002	3/6/17 15:24	MFXGS25C.M	03061725.D		MC	
	1067-001	3/6/17 15:41	MFXGS25C.M	03061726.D		MC	
	0971-003	3/6/17 15:58	MFXGS25C.M	03061727.D		MC	
#VALUE!	std s30-01301701	3/6/17 16:14	MFXGS25C.M	03061728.D		MC	pass

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091717.D
Acq On : 9 Mar 2017 15:48 Operator: LH
Sample : P1700971-001 (1000mL)
Misc : S29-03071701
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Mar 10 17:10:35 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/10/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.54	130	377341	12.500 ng	-0.01
7) 1,4-Difluorobenzene (IS2)	13.65	114	1931085	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1503587	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.39	65	707972	13.132 ng	0.00
Spiked Amount 12.500				Recovery = 105.04%	
12) Toluene-d8 (SS2)	16.10	98	2061524	13.011 ng	0.00
Spiked Amount 12.500				Recovery = 104.08%	
20) p-Bromofluorobenzene (...	19.28	174	584579	11.082 ng	0.00
Spiked Amount 12.500				Recovery = 88.64%	

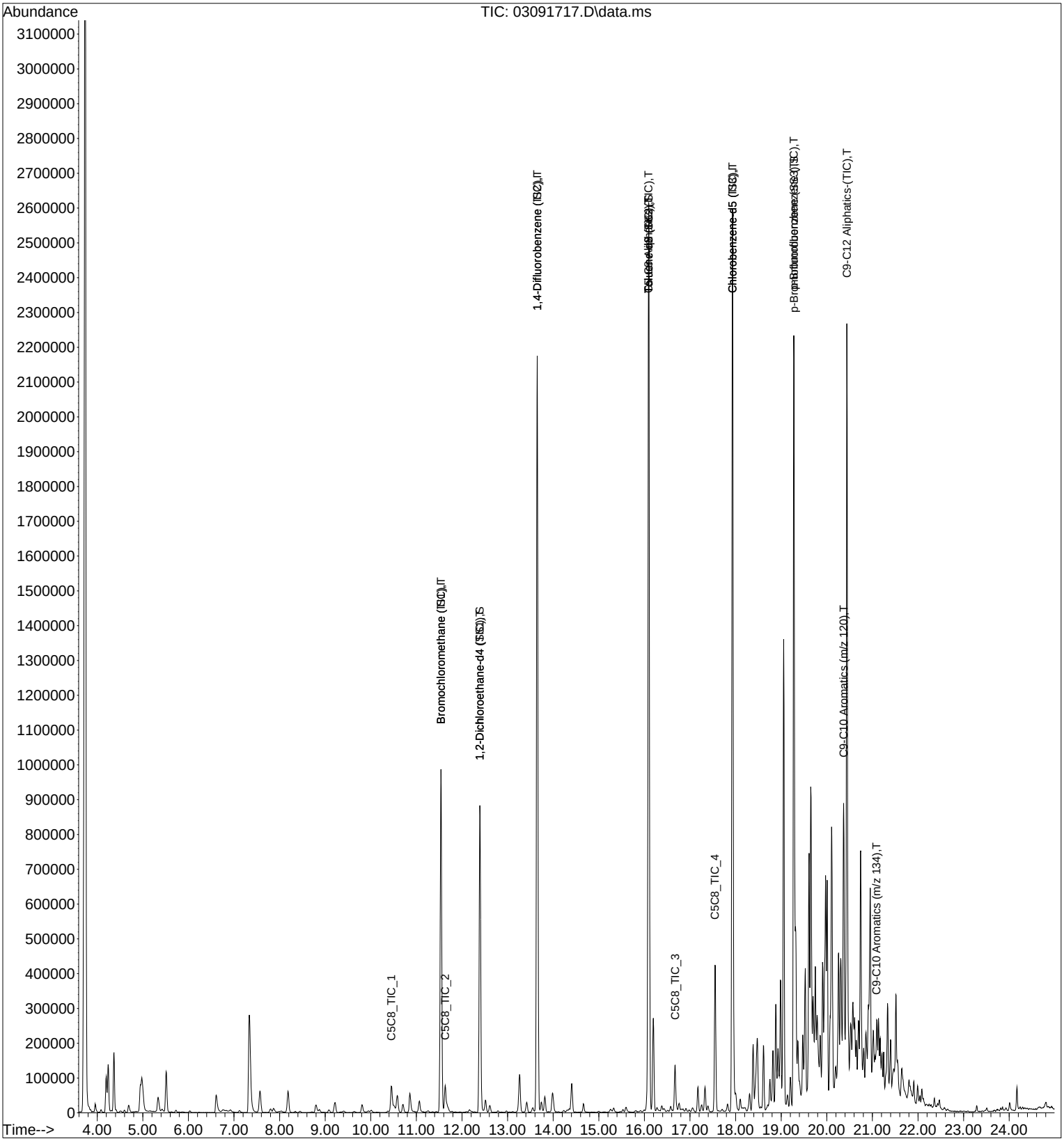
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.54	TIC	2311921	15.098 ng	100
3) Isopentane	7.34	TIC	895662	No Calib #	
4) n-Hexane	11.63	TIC	245251	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.39	TIC	2032297	13.451 ng	100
8) 1,4-Difluorobenzene (TIC)	13.65	TIC	4625590	13.038 ng	100
9) Cyclohexane	13.55	TIC	35292	No Calib	
10) 2,3-Dimethylpentane	13.81	TIC	98394	No Calib	
11) n-Heptane	14.66	TIC	49180	No Calib	
13) Toluene-d8 (TIC)	16.09	TIC	5581491	13.307 ng	100
14) n-Octane	17.17	TIC	140560	No Calib	
15) C5-C8 Aliphatics (TIC)	16.09	TIC	30251784m	66.944 ng	
17) Chlorobenzene-d5 (TIC)	17.93	TIC	5326706	13.861 ng	100
18) 2,3-Dimethylheptane	18.38	TIC	378784	No Calib	
19) n-Nonane	19.06	TIC	2322107	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	4212577m	14.089 ng	
22) Isopropylbenzene	19.39	120	1707	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	17236	No Calib	
24) 1,3,5-Trimethylbenzene	20.02	120	10900	No Calib	
25) n-Decane	20.44	TIC	3515930	No Calib #	
26) p-Isopropyltoluene	20.73	134	3648	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	10542	No Calib	
28) Butylcyclohexane	20.95	TIC	1316094	No Calib	
29) n-Undecane	21.51	TIC	748517	No Calib	
30) n-Dodecane	22.43	TIC	21647	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.44	TIC	44914188m	465.259 ng	
32) C9-C10 Aromatics (m/z ...	20.37	120	120028m	6.024 ng	
33) C9-C10 Aromatics (m/z ...	21.08	134	47434m	4.240 ng	
34) C5C8_TIC_1	10.45	TIC	605483m	0.209 ng	
35) C5C8 TIC 2	11.63	TIC	354977m	0.123 ng	
36) C5C8 TIC 3	16.67	TIC	325010m	0.112 ng	
37) C5C8 TIC 4	17.55	TIC	1126710m	0.389 ng	
38) C9C12 TIC 1	0.00	TIC	0	N.D. d	
39) C9C12 TIC 2	0.00	TIC	0	N.D. d	
40) C9C12 TIC 3	0.00	TIC	0	N.D. d	
41) C9C12 TIC 4	0.00	TIC	0	N.D. d	
42) C9C10 TIC 1	0.00	120	0	N.D. d	
43) C9C10 TIC 2	20.30	134	2699	N.D.	

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091717.D
Acq On : 9 Mar 2017 15:48 Operator: LH
Sample : P1700971-001 (1000mL)
Misc : S29-03071701
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Mar 10 17:10:35 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091718.D
Acq On : 9 Mar 2017 16:35 Operator: LH
Sample : P1700971-002 (1000mL)
Misc : S29-03071701
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Mar 13 10:26:29 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/13/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.54	130	390963	12.500 ng	0.00
7) 1,4-Difluorobenzene (IS2)	13.65	114	2007859	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1554528	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.40	65	734889	13.157 ng	0.00
Spiked Amount 12.500				Recovery = 105.28%	
12) Toluene-d8 (SS2)	16.10	98	2141087	12.996 ng	0.00
Spiked Amount 12.500				Recovery = 104.00%	
20) p-Bromofluorobenzene (...	19.28	174	598869	10.981 ng	0.00
Spiked Amount 12.500				Recovery = 87.84%	

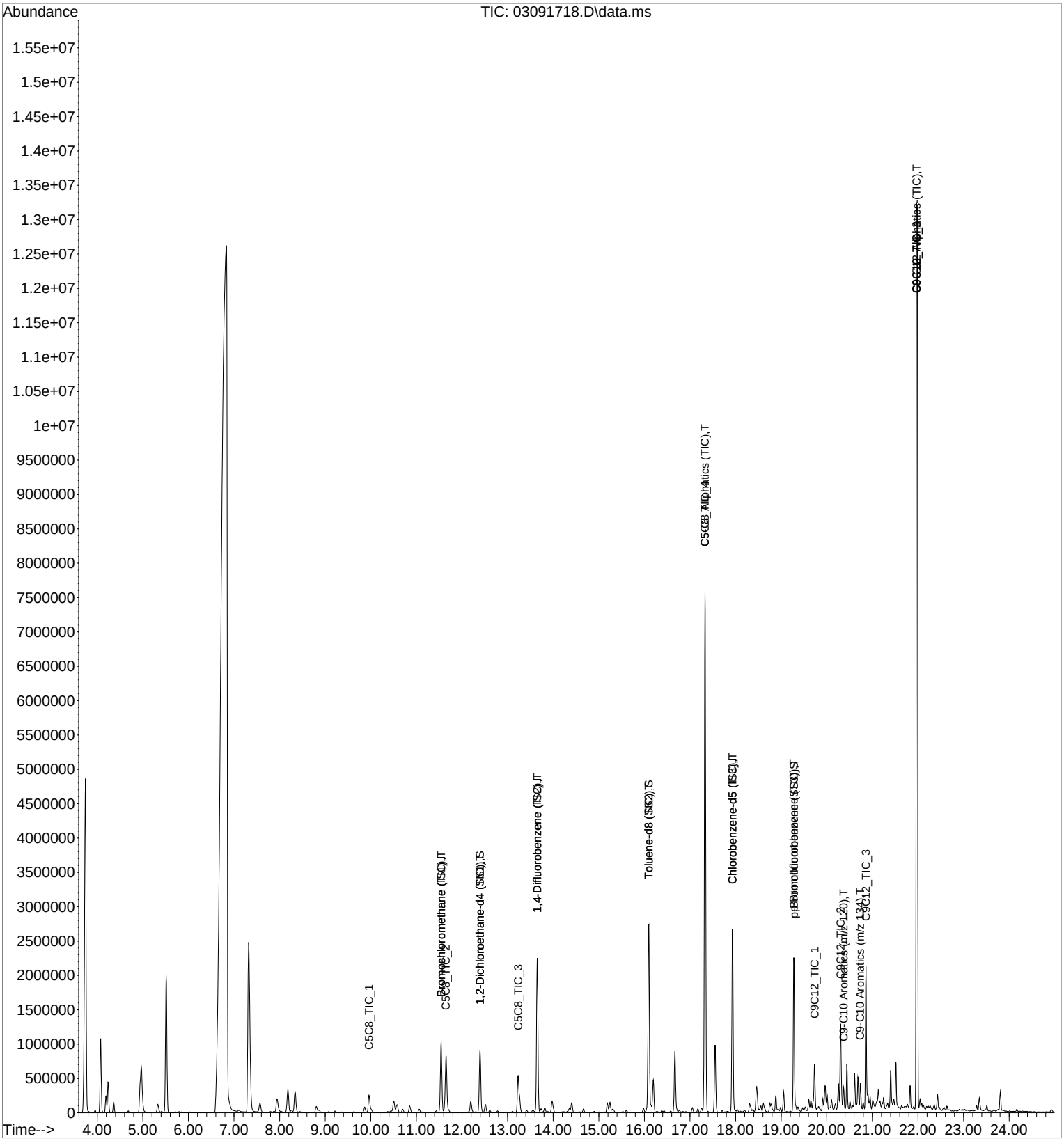
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.54	TIC	2409225	15.185 ng	100
3) Isopentane	7.32	TIC	7673494	No Calib #	
4) n-Hexane	11.65	TIC	2202069	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.40	TIC	2115020	13.511 ng	100
8) 1,4-Difluorobenzene (TIC)	13.65	TIC	4832761	13.101 ng	100
9) Cyclohexane	13.56	TIC	111587	No Calib	
10) 2,3-Dimethylpentane	13.82	TIC	140770	No Calib	
11) n-Heptane	14.67	TIC	124437	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	6061178	13.898 ng	100
14) n-Octane	17.18	TIC	103205	No Calib	
15) C5-C8 Aliphatics (TIC)	17.33	TIC	59898955m	127.483 ng	
17) Chlorobenzene-d5 (TIC)	17.93	TIC	5252485	13.220 ng	100
18) 2,3-Dimethylheptane	18.38	TIC	52367	No Calib	
19) n-Nonane	19.06	TIC	514694	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	4064633	13.149 ng	100
22) Isopropylbenzene	19.40	120	2946	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	23129	No Calib	
24) 1,3,5-Trimethylbenzene	20.02	120	16350	No Calib	
25) n-Decane	20.44	TIC	973919	No Calib	
26) p-Isopropyltoluene	20.73	134	20850	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	21128	No Calib #	
28) Butylcyclohexane	20.95	TIC	270643	No Calib	
29) n-Undecane	21.51	TIC	1159171	No Calib	
30) n-Dodecane	22.43	TIC	496713	No Calib	
31) C9-C12 Aliphatics-(TIC)	21.97	TIC	60417928m	605.351 ng	
32) C9-C10 Aromatics (m/z ...	20.37	120	176583m	8.572 ng	
33) C9-C10 Aromatics (m/z ...	20.73	134	113079m	9.776 ng	
34) C5C8_TIC_1	9.96	TIC	2420036m	0.809 ng	
35) C5C8 TIC 2	11.65	TIC	2813392m	0.941 ng	
36) C5C8 TIC 3	13.23	TIC	1852041m	0.619 ng	
37) C5C8 TIC 4	17.33	TIC	19745466m	6.601 ng	
38) C9C12 TIC 1	19.73	TIC	1267997m	2.139 ng	
39) C9C12 TIC 2	20.30	TIC	3037298m	5.123 ng	
40) C9C12 TIC 3	20.86	TIC	3240200m	5.465 ng	
41) C9C12 TIC 4	21.97	TIC	29182288m	49.224 ng	
42) C9C10 TIC 1	21.98	120	9628	N.D.	
43) C9C10 TIC 2	21.97	134	19326m	0.340 ng	

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091718.D
Acq On : 9 Mar 2017 16:35 Operator: LH
Sample : P1700971-002 (1000mL)
Misc : S29-03071701
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Mar 13 10:26:29 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091719.D
Acq On : 9 Mar 2017 17:09 Operator: LH
Sample : P1700971-003 (120mL)
Misc : S29-03071701
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Mar 13 10:29:32 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/13/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.53	130	371656	12.500 ng	-0.02
7) 1,4-Difluorobenzene (IS2)	13.64	114	1915899	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1480155	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.39	65	701233	13.206 ng	0.00
Spiked Amount 12.500				Recovery = 105.68%	
12) Toluene-d8 (SS2)	16.09	98	2026356	12.890 ng	0.00
Spiked Amount 12.500				Recovery = 103.12%	
20) p-Bromofluorobenzene (...	19.28	174	563863	10.859 ng	0.00
Spiked Amount 12.500				Recovery = 86.88%	

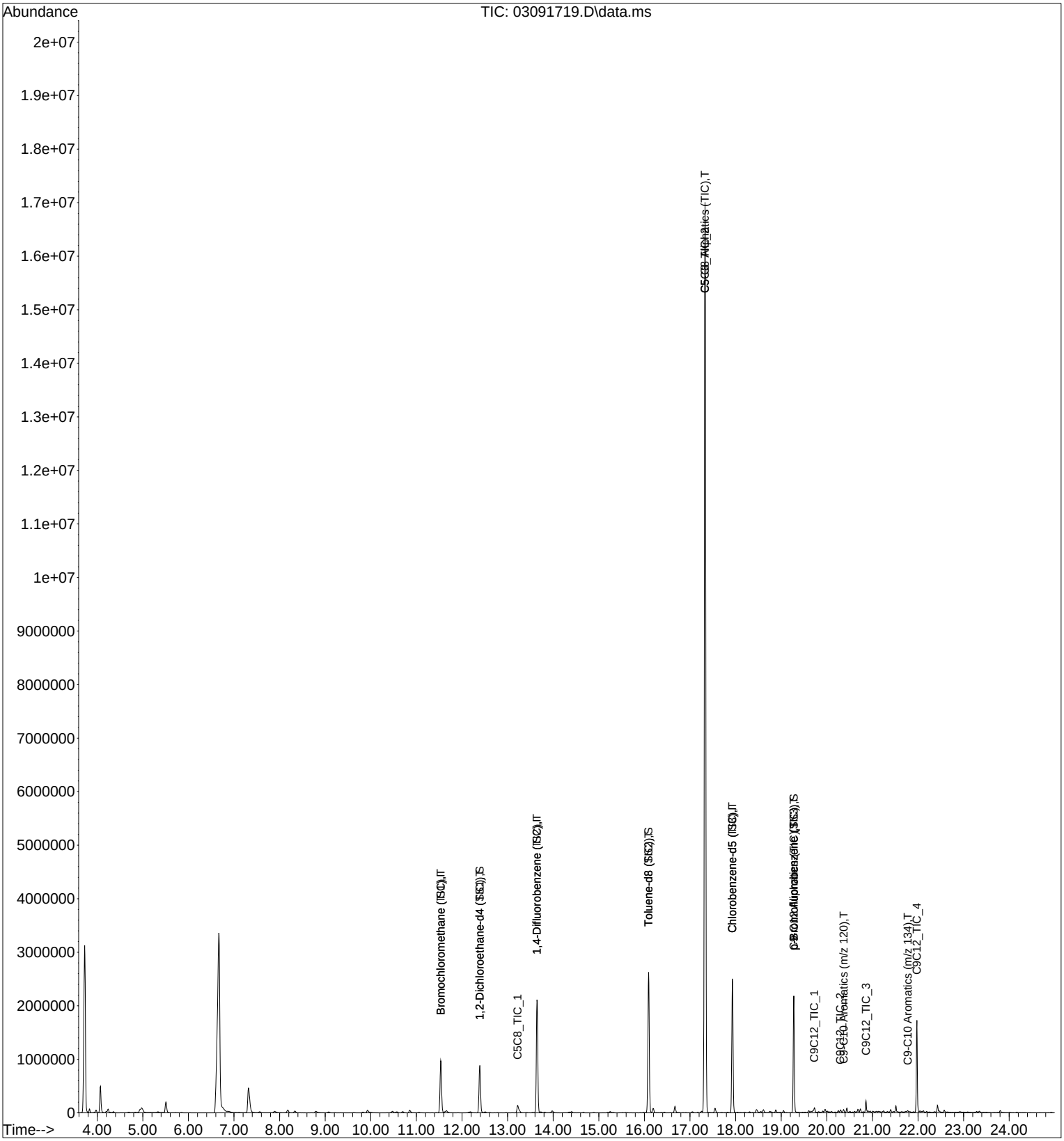
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.53	TIC	2287886	15.169 ng	100
3) Isopentane	7.32	TIC	1447819	No Calib #	
4) n-Hexane	11.66	TIC	146538	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.39	TIC	2021456	13.584 ng	100
8) 1,4-Difluorobenzene (TIC)	13.64	TIC	4589346	13.038 ng	100
9) Cyclohexane	13.55	TIC	15449	No Calib	
10) 2,3-Dimethylpentane	13.82	TIC	25289	No Calib	
11) n-Heptane	14.66	TIC	19783	No Calib	
13) Toluene-d8 (TIC)	16.09	TIC	5472696	13.151 ng	100
14) n-Octane	17.33	TIC	35698131	No Calib	
15) C5-C8 Aliphatics (TIC)	17.33	TIC	59529989m	132.779 ng	
17) Chlorobenzene-d5 (TIC)	17.93	TIC	4870826	12.876 ng	100
18) 2,3-Dimethylheptane	18.37	TIC	9256	No Calib	
19) n-Nonane	19.05	TIC	66786	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	3633454	12.345 ng	100
22) Isopropylbenzene	19.39	120	454	No Calib #	
23) 1-Methyl-3-ethylbenzene	19.92	120	3677	No Calib	
24) 1,3,5-Trimethylbenzene	20.01	120	3564	No Calib	
25) n-Decane	20.44	TIC	126554	No Calib	
26) p-Isopropyltoluene	20.73	134	3618	No Calib	
27) 1,2,3-Trimethylbenzene	20.73	120	3849	No Calib	
28) Butylcyclohexane	20.95	TIC	36021	No Calib	
29) n-Undecane	21.51	TIC	210474	No Calib	
30) n-Dodecane	22.43	TIC	253335	No Calib	
31) C9-C12 Aliphatics-(TIC)	19.28	TIC	10067071m	105.934 ng	
32) C9-C10 Aromatics (m/z ...	20.37	120	33417m	1.704 ng	
33) C9-C10 Aromatics (m/z ...	21.78	134	30836m	2.800 ng	
34) C5C8_TIC_1	13.22	TIC	420615m	0.148 ng	
35) C5C8 TIC 2	17.33	TIC	36440546m	12.795 ng	
36) C5C8 TIC 3	0.00	TIC	0	N.D. d	
37) C5C8 TIC 4	0.00	TIC	0	N.D. d	
38) C9C12 TIC 1	19.73	TIC	200378m	0.355 ng	
39) C9C12 TIC 2	20.30	TIC	152888m	0.271 ng	
40) C9C12 TIC 3	20.86	TIC	338610m	0.600 ng	
41) C9C12 TIC 4	21.98	TIC	2502293m	4.433 ng	
42) C9C10 TIC 1	21.98	120	818	N.D.	
43) C9C10 TIC 2	21.98	134	1849	N.D.	

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091719.D
Acq On : 9 Mar 2017 17:09 Operator: LH
Sample : P1700971-003 (120mL)
Misc : S29-03071701
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Mar 13 10:29:32 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091720.D
Acq On : 9 Mar 2017 17:43 Operator: LH
Sample : P1700971-004 (1000mL)
Misc : S29-03071701
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Mar 13 10:35:07 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/13/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.54	130	377727	12.500 ng	-0.01
7) 1,4-Difluorobenzene (IS2)	13.65	114	1943924	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1504373	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.39	65	707649	13.113 ng	0.00
Spiked Amount 12.500				Recovery = 104.88%	
12) Toluene-d8 (SS2)	16.09	98	2070565	12.982 ng	0.00
Spiked Amount 12.500				Recovery = 103.84%	
20) p-Bromofluorobenzene (...	19.28	174	582974	11.046 ng	0.00
Spiked Amount 12.500				Recovery = 88.40%	

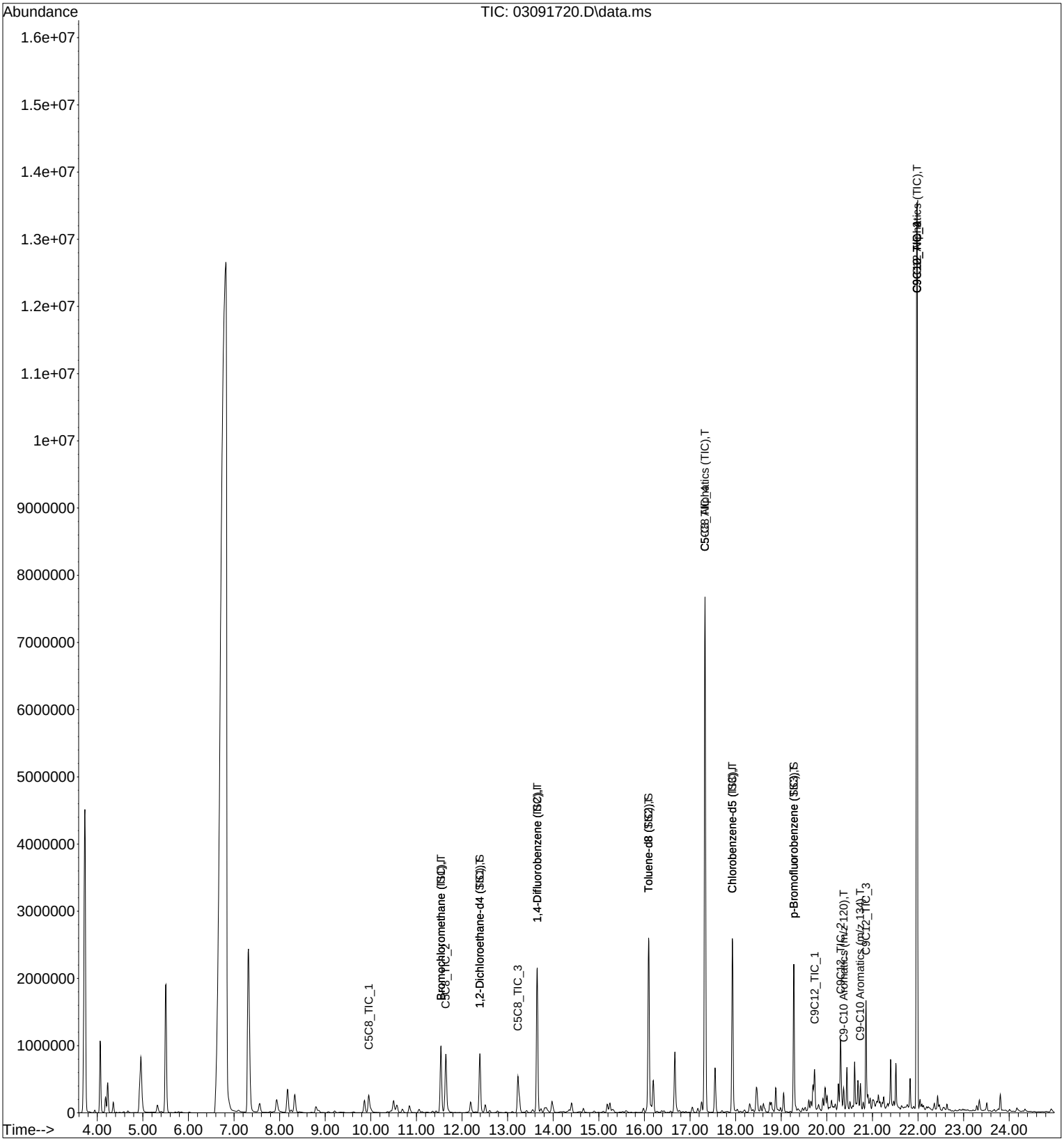
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.54	TIC	2323049	15.155 ng	100
3) Isopentane	7.31	TIC	7472055	No Calib #	
4) n-Hexane	11.64	TIC	2318774	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.39	TIC	2030587	13.426 ng	100
8) 1,4-Difluorobenzene (TIC)	13.65	TIC	4621806	12.941 ng	100
9) Cyclohexane	13.55	TIC	122332	No Calib	
10) 2,3-Dimethylpentane	13.84	TIC	323971	No Calib	
11) n-Heptane	14.66	TIC	144069	No Calib	
13) Toluene-d8 (TIC)	16.09	TIC	5840497	13.832 ng	100
14) n-Octane	17.17	TIC	127615	No Calib	
15) C5-C8 Aliphatics (TIC)	17.33	TIC	59849515m	131.567 ng	
17) Chlorobenzene-d5 (TIC)	17.93	TIC	5099477	13.263 ng	100
18) 2,3-Dimethylheptane	18.38	TIC	55334	No Calib	
19) n-Nonane	19.06	TIC	503643	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	3927401	13.129 ng	100
22) Isopropylbenzene	19.39	120	2528	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	24079	No Calib	
24) 1,3,5-Trimethylbenzene	20.01	120	15440	No Calib	
25) n-Decane	20.44	TIC	929984	No Calib	
26) p-Isopropyltoluene	20.73	134	20869	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	20603	No Calib #	
28) Butylcyclohexane	20.95	TIC	245099	No Calib	
29) n-Undecane	21.51	TIC	1134182	No Calib	
30) n-Dodecane	22.43	TIC	348661	No Calib	
31) C9-C12 Aliphatics-(TIC)	21.98	TIC	59108105m	611.972 ng	
32) C9-C10 Aromatics (m/z ...	20.37	120	186379m	9.350 ng	
33) C9-C10 Aromatics (m/z ...	20.73	134	112808m	10.078 ng	
34) C5C8_TIC_1	9.95	TIC	1520843m	0.525 ng	
35) C5C8 TIC 2	11.64	TIC	2871220m	0.992 ng	
36) C5C8 TIC 3	13.23	TIC	1889860m	0.653 ng	
37) C5C8 TIC 4	17.33	TIC	19410054m	6.705 ng	
38) C9C12 TIC 1	19.73	TIC	1801605m	3.140 ng	
39) C9C12 TIC 2	20.30	TIC	2739479m	4.775 ng	
40) C9C12 TIC 3	20.86	TIC	2530608m	4.411 ng	
41) C9C12 TIC 4	21.98	TIC	27845894m	48.535 ng	
42) C9C10 TIC 1	21.98	120	9412	N.D.	
43) C9C10 TIC 2	21.98	134	18588m	0.338 ng	

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091720.D
Acq On : 9 Mar 2017 17:43 Operator: LH
Sample : P1700971-004 (1000mL)
Misc : S29-03071701
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Mar 13 10:35:07 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091721.D
Acq On : 9 Mar 2017 18:17 Operator: LH
Sample : P1700971-005 (1000mL)
Misc : S29-03071701
ALS Vial : 10 Sample Multiplier: 1

Quant Time: Mar 13 10:37:18 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/13/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.53	130	374333	12.500 ng	-0.02
7) 1,4-Difluorobenzene (IS2)	13.64	114	1927332	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1486235	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.39	65	701487	13.116 ng	-0.01
Spiked Amount 12.500				Recovery = 104.96%	
12) Toluene-d8 (SS2)	16.09	98	2043361	12.922 ng	0.00
Spiked Amount 12.500				Recovery = 103.36%	
20) p-Bromofluorobenzene (...	19.28	174	567877	10.891 ng	0.00
Spiked Amount 12.500				Recovery = 87.12%	

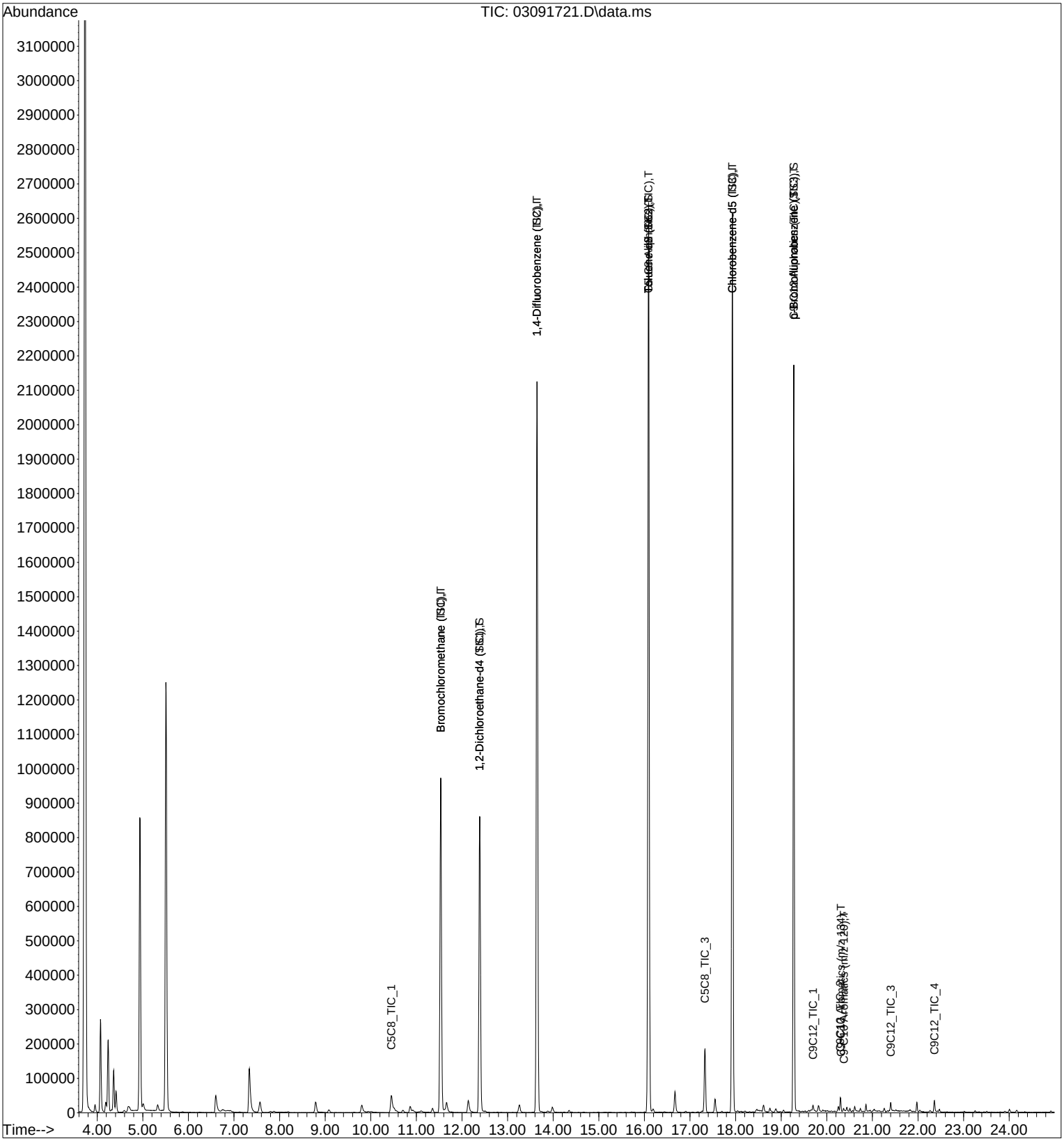
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.53	TIC	2287071	15.055 ng	100
3) Isopentane	7.34	TIC	365512	No Calib #	
4) n-Hexane	11.66	TIC	92205	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.39	TIC	2011879	13.423 ng	100
8) 1,4-Difluorobenzene (TIC)	13.64	TIC	4593492	12.973 ng	100
9) Cyclohexane	13.64	TIC	4593492	No Calib	
10) 2,3-Dimethylpentane	13.88	TIC	11105	No Calib	
11) n-Heptane	14.67	TIC	3835	No Calib	
13) Toluene-d8 (TIC)	16.09	TIC	5482435	13.096 ng	100
14) n-Octane	17.18	TIC	4139	No Calib	
15) C5-C8 Aliphatics (TIC)	16.09	TIC	21445200m	47.549 ng	
17) Chlorobenzene-d5 (TIC)	17.93	TIC	4900620	12.902 ng	100
18) 2,3-Dimethylheptane	18.38	TIC	2171	No Calib	
19) n-Nonane	19.05	TIC	10667	No Calib #	
21) p-Bromofluorobenzene (...	19.28	TIC	3615442	12.233 ng	100
22) Isopropylbenzene	0.00	120	0	N.D.	
23) 1-Methyl-3-ethylbenzene	19.91	120	577	No Calib	
24) 1,3,5-Trimethylbenzene	20.01	120	341	No Calib #	
25) n-Decane	20.44	TIC	20752	No Calib #	
26) p-Isopropyltoluene	20.73	134	544	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	689	No Calib	
28) Butylcyclohexane	20.95	TIC	8949	No Calib	
29) n-Undecane	21.51	TIC	12854	No Calib	
30) n-Dodecane	22.43	TIC	4318	No Calib	
31) C9-C12 Aliphatics-(TIC)	19.28	TIC	4581755m	48.016 ng	
32) C9-C10 Aromatics (m/z ...	20.38	120	4096m	0.208 ng	
33) C9-C10 Aromatics (m/z ...	20.31	134	1564m	0.141 ng	
34) C5C8_TIC_1	10.45	TIC	525827m	0.184 ng	
35) C5C8 TIC 2	12.14	TIC	220766	N.D.	
36) C5C8 TIC 3	17.33	TIC	659838m	0.231 ng	
37) C5C8 TIC 4	18.62	TIC	53807	N.D.	
38) C9C12 TIC 1	19.70	TIC	95586m	0.169 ng	
39) C9C12 TIC 2	20.30	TIC	108487m	0.191 ng	
40) C9C12 TIC 3	21.40	TIC	80807m	0.143 ng	
41) C9C12 TIC 4	22.36	TIC	150228m	0.265 ng	
42) C9C10 TIC 1	21.04	120	569	N.D.	
43) C9C10 TIC 2	20.31	134	470	N.D.	

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091721.D
Acq On : 9 Mar 2017 18:17 Operator: LH
Sample : P1700971-005 (1000mL)
Misc : S29-03071701
ALS Vial : 10 Sample Multiplier: 1

Quant Time: Mar 13 10:37:18 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091722.D
Acq On : 9 Mar 2017 18:50 Operator: LH
Sample : P1700971-006 (35mL)
Misc : S29-03071701
ALS Vial : 11 Sample Multiplier: 1

Quant Time: Mar 13 10:44:40 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/13/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.53	130	374950	12.500 ng	-0.02
7) 1,4-Difluorobenzene (IS2)	13.64	114	1932334	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1504309	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.39	65	709518	13.245 ng	-0.01
Spiked Amount 12.500				Recovery = 105.92%	
12) Toluene-d8 (SS2)	16.09	98	2051930	12.942 ng	0.00
Spiked Amount 12.500				Recovery = 103.52%	
20) p-Bromofluorobenzene (...	19.28	174	573391	10.865 ng	0.00
Spiked Amount 12.500				Recovery = 86.88%	

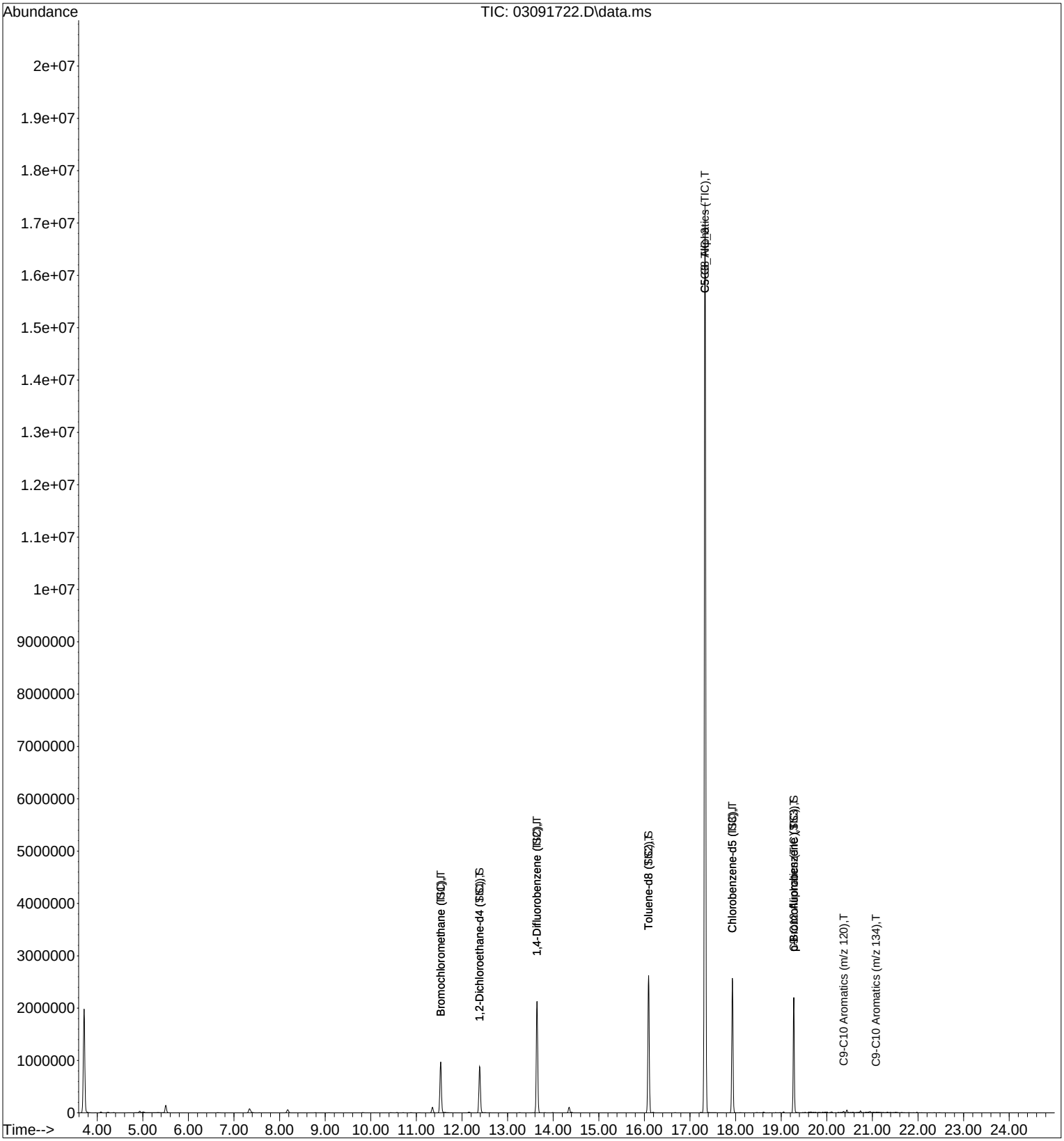
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.53	TIC	2295708	15.087 ng	100
3) Isopentane	7.34	TIC	251326	No Calib	
4) n-Hexane	11.53	TIC	2295708	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.39	TIC	2031838	13.534 ng	100
8) 1,4-Difluorobenzene (TIC)	13.64	TIC	4615613	13.001 ng	100
9) Cyclohexane	13.64	TIC	4613391	No Calib	
10) 2,3-Dimethylpentane	13.82	TIC	11066	No Calib	
11) n-Heptane	14.66	TIC	2114	No Calib	
13) Toluene-d8 (TIC)	16.09	TIC	5510946	13.130 ng	100
14) n-Octane	17.33	TIC	36379931	No Calib	
15) C5-C8 Aliphatics (TIC)	17.33	TIC	57455088m	127.061 ng	
17) Chlorobenzene-d5 (TIC)	17.93	TIC	4924588	12.809 ng	100
18) 2,3-Dimethylheptane	18.38	TIC	6319	No Calib	
19) n-Nonane	19.06	TIC	32876	No Calib #	
21) p-Bromofluorobenzene (...	19.28	TIC	3670769	12.271 ng	100
22) Isopropylbenzene	0.00	120	0	N.D.	
23) 1-Methyl-3-ethylbenzene	19.91	120	1037	No Calib	
24) 1,3,5-Trimethylbenzene	20.02	120	779	No Calib	
25) n-Decane	20.44	TIC	86418	No Calib #	
26) p-Isopropyltoluene	20.73	134	52	No Calib #	
27) 1,2,3-Trimethylbenzene	20.74	120	1150	No Calib	
28) Butylcyclohexane	20.95	TIC	51220	No Calib	
29) n-Undecane	21.52	TIC	28859	No Calib	
30) n-Dodecane	22.43	TIC	3404	No Calib	
31) C9-C12 Aliphatics-(TIC)	19.28	TIC	5114135m	52.951 ng	
32) C9-C10 Aromatics (m/z ...	20.37	120	6102m	0.306 ng	
33) C9-C10 Aromatics (m/z ...	21.08	134	1663m	0.149 ng	
34) C5C8_TIC_1	11.35	TIC	246264	N.D.	
35) C5C8 TIC 2	14.35	TIC	262686	N.D.	
36) C5C8 TIC 3	17.33	TIC	36411541m	12.579 ng	
37) C5C8 TIC 4	0.00	TIC	0	N.D. d	
38) C9C12 TIC 1	21.98	TIC	17474	N.D.	
39) C9C12 TIC 2	0.00	TIC	0	N.D. d	
40) C9C12 TIC 3	0.00	TIC	0	N.D. d	
41) C9C12 TIC 4	0.00	TIC	0	N.D. d	
42) C9C10 TIC 1	0.00	120	0	N.D. d	
43) C9C10 TIC 2	0.00	134	0	N.D. d	

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091722.D
Acq On : 9 Mar 2017 18:50 Operator: LH
Sample : P1700971-006 (35mL)
Misc : S29-03071701
ALS Vial : 11 Sample Multiplier: 1

Quant Time: Mar 13 10:44:40 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091704.D
Acq On : 9 Mar 2017 4:02 Operator: LH
Sample : MB R16030917 1000mL
Misc : S29-03071701 AC00442
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Mar 09 08:06:41 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/9/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.53	130	355025	12.500 ng	-0.02
7) 1,4-Difluorobenzene (IS2)	13.64	114	1829503	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1366204	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.39	65	670977	13.228 ng	-0.01
Spiked Amount 12.500			Recovery	= 105.84%	
12) Toluene-d8 (SS2)	16.09	98	1921761	12.802 ng	0.00
Spiked Amount 12.500			Recovery	= 102.40%	
20) p-Bromofluorobenzene (...	19.28	174	511186	10.665 ng	0.00
Spiked Amount 12.500			Recovery	= 85.36%	

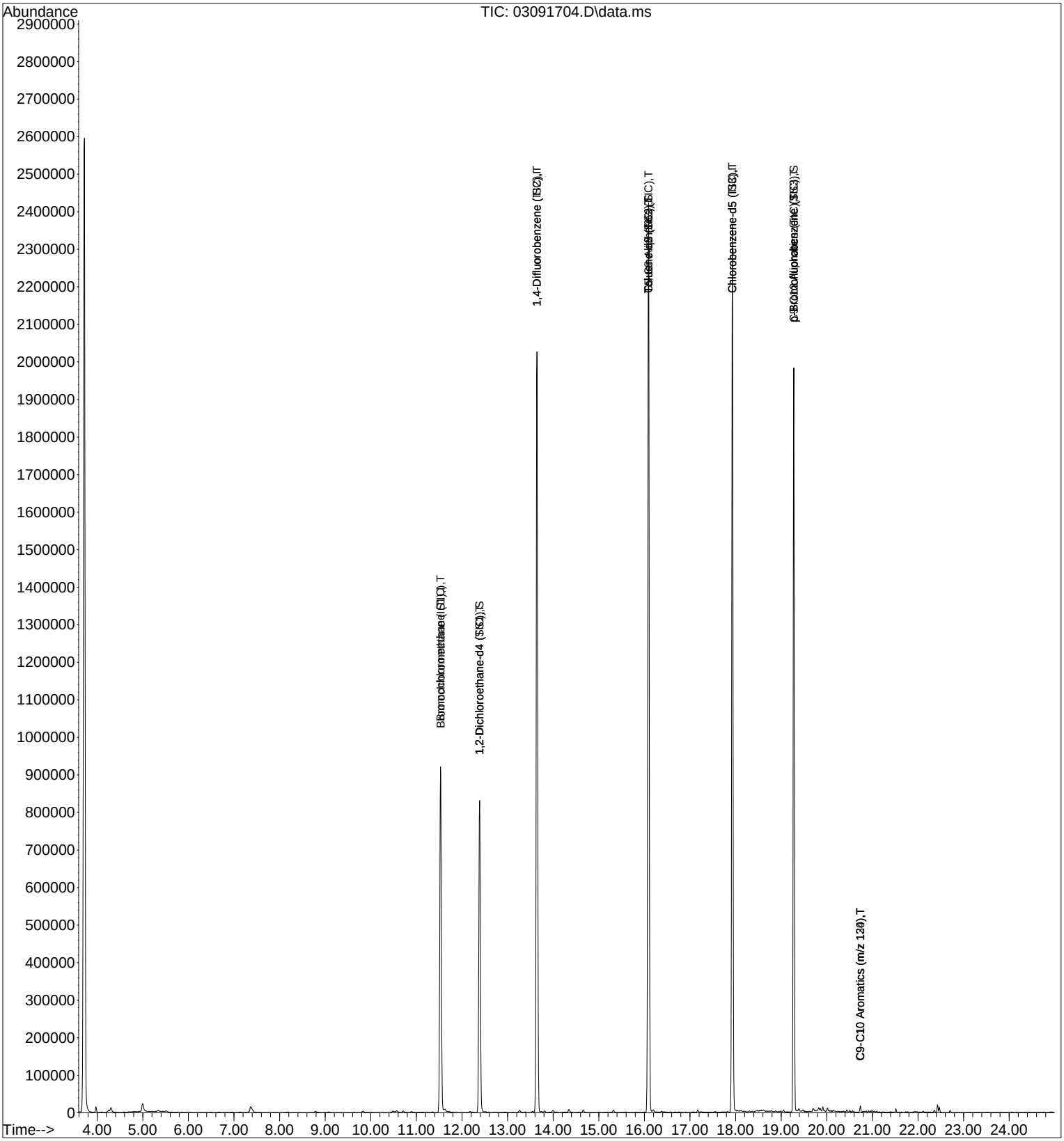
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.53	TIC	2178435	15.120 ng	100
3) Isopentane	7.36	TIC	60077	No Calib #	
4) n-Hexane	11.53	TIC	2178435	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.39	TIC	1928148	13.564 ng	100
8) 1,4-Difluorobenzene (TIC)	13.64	TIC	4374506	13.015 ng	100
9) Cyclohexane	13.64	TIC	4374506	No Calib	
10) 2,3-Dimethylpentane	13.82	TIC	10629	No Calib	
11) n-Heptane	14.66	TIC	14502	No Calib	
13) Toluene-d8 (TIC)	16.09	TIC	5163489	12.994 ng	100
14) n-Octane	17.17	TIC	13757	No Calib	
15) C5-C8 Aliphatics (TIC)	16.09	TIC	18983326m	44.341 ng	
17) Chlorobenzene-d5 (TIC)	17.93	TIC	4521457	12.949 ng	100
18) 2,3-Dimethylheptane	18.36	TIC	3667	No Calib	
19) n-Nonane	19.05	TIC	7982	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	3295015	12.129 ng	100
22) Isopropylbenzene	19.40	120	973	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	3220	No Calib #	
24) 1,3,5-Trimethylbenzene	19.91	120	3220	No Calib	
25) n-Decane	20.44	TIC	8545	No Calib #	
26) p-Isopropyltoluene	20.73	134	903	No Calib #	
27) 1,2,3-Trimethylbenzene	20.74	120	2729	No Calib	
28) Butylcyclohexane	20.95	TIC	4909	No Calib	
29) n-Undecane	21.51	TIC	14618	No Calib	
30) n-Dodecane	22.43	TIC	29871	No Calib	
31) C9-C12 Aliphatics-(TIC)	19.28	TIC	3905706m	44.527 ng	
32) C9-C10 Aromatics (m/z ...	20.74	120	26956m	1.489 ng	
33) C9-C10 Aromatics (m/z ...	20.73	134	4870m	0.479 ng	
34) C5C8_TIC_1	0.00	TIC	0	N.D. d	
35) C5C8 TIC 2	0.00	TIC	0	N.D. d	
36) C5C8 TIC 3	0.00	TIC	0	N.D. d	
37) C5C8 TIC 4	0.00	TIC	0	N.D. d	
38) C9C12 TIC 1	0.00	TIC	0	N.D. d	
39) C9C12 TIC 2	0.00	TIC	0	N.D. d	
40) C9C12 TIC 3	0.00	TIC	0	N.D. d	
41) C9C12 TIC 4	0.00	TIC	0	N.D. d	
42) C9C10 TIC 1	0.00	120	0	N.D. d	
43) C9C10 TIC 2	0.00	134	0	N.D. d	

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091704.D
Acq On : 9 Mar 2017 4:02 Operator: LH
Sample : MB R16030917 1000mL
Misc : S29-03071701 AC00442
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Mar 09 08:06:41 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091705.D
Acq On : 9 Mar 2017 4:35 Operator: LH
Sample : LCS R16030917 25ng
Misc : S29-03071701/S29-03031707 (1/1)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Mar 09 08:07:00 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/9/17

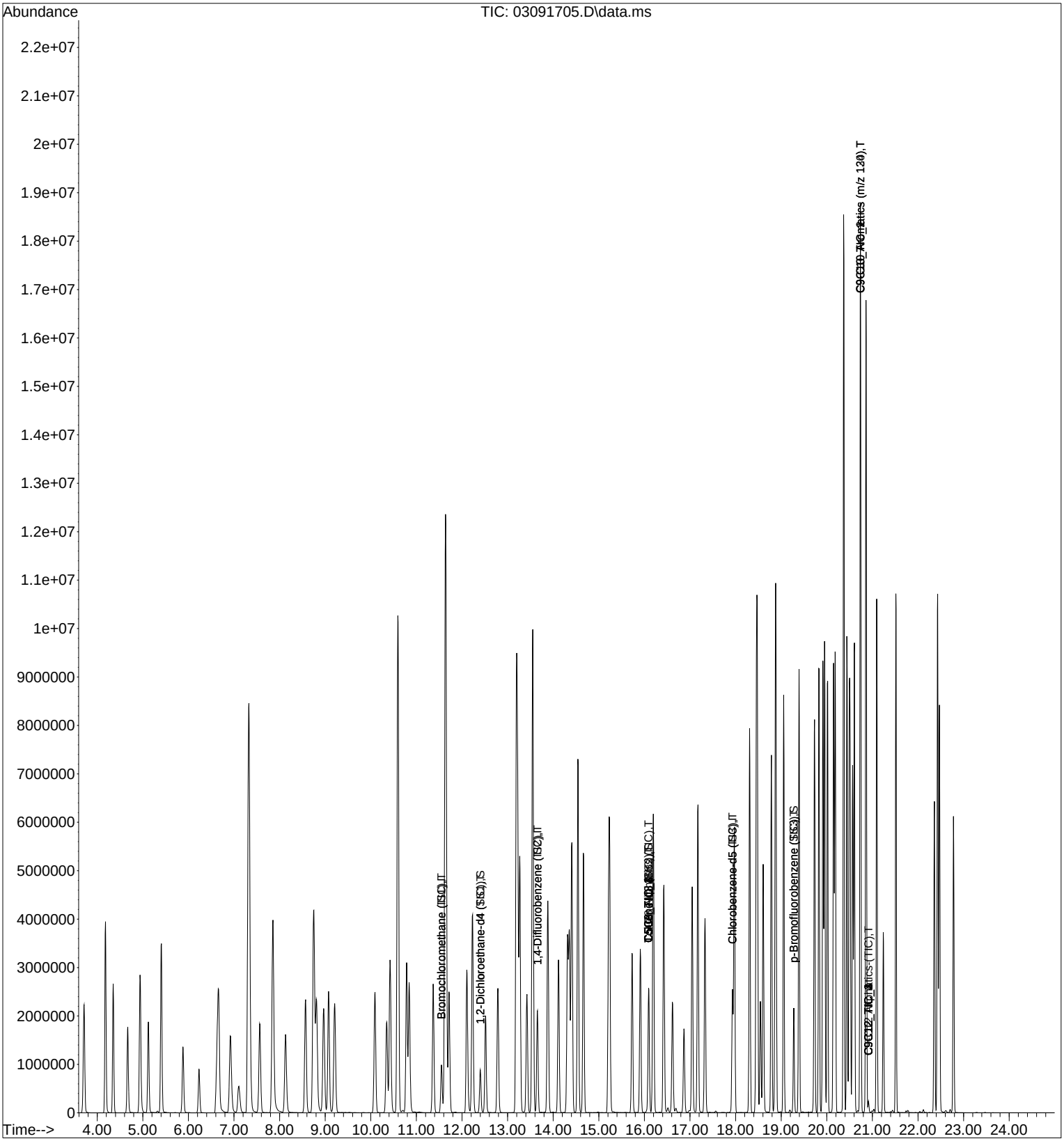
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	383773	12.500 ng	0.00
7) 1,4-Difluorobenzene (IS2)	13.66	114	1920844	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1501252	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.40	65	698010	12.730 ng	0.00
Spiked Amount 12.500				Recovery = 101.84%	
12) Toluene-d8 (SS2)	16.09	98	2048520	12.998 ng	0.00
Spiked Amount 12.500				Recovery = 104.00%	
20) p-Bromofluorobenzene (...	19.28	174	577988	10.974 ng	0.00
Spiked Amount 12.500				Recovery = 87.76%	
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.55	TIC	2339061	15.019 ng	100
3) Isopentane	7.33	TIC	27971338	No Calib #	
4) n-Hexane	11.64	TIC	34574126	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.40	TIC	2031884	13.223 ng	100
8) 1,4-Difluorobenzene (TIC)	13.66	TIC	4555723	12.910 ng	100
9) Cyclohexane	13.55	TIC	22827882	No Calib	
10) 2,3-Dimethylpentane	13.88	TIC	9902083	No Calib	
11) n-Heptane	14.66	TIC	10837533	No Calib	
13) Toluene-d8 (TIC)	16.09	TIC	5563354	13.334 ng	100
14) n-Octane	17.17	TIC	12088056	No Calib	
15) C5-C8 Aliphatics (TIC)	16.09	TIC	5574329	12.401 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	4750030	12.380 ng	100
18) 2,3-Dimethylheptane	18.31	TIC	14020234	No Calib	
19) n-Nonane	19.06	TIC	13004742	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	3617280	12.117 ng	100
22) Isopropylbenzene	19.39	120	1511870	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	1830997	No Calib	
24) 1,3,5-Trimethylbenzene	20.02	120	2301702	No Calib	
25) n-Decane	20.44	TIC	13966655	No Calib	
26) p-Isopropyltoluene	20.74	134	1370859	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	2493237	No Calib	
28) Butylcyclohexane	20.91	TIC	295780	No Calib	
29) n-Undecane	21.51	TIC	14447177	No Calib	
30) n-Dodecane	22.43	TIC	15469806	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.91	TIC	301990	3.133 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	2493237	125.331 ng	100
33) C9-C10 Aromatics (m/z ...	20.74	134	1370859	122.724 ng	100
34) C5C8_TIC_1	16.09	TIC	5574329	1.930 ng	100
35) C5C8 TIC 2	16.09	TIC	5574329	1.930 ng	100
36) C5C8 TIC 3	16.09	TIC	5574329	1.930 ng	100
37) C5C8 TIC 4	16.09	TIC	5574329	1.930 ng	100
38) C9C12 TIC 1	20.91	TIC	301990	0.527 ng	100
39) C9C12 TIC 2	20.91	TIC	301990	0.527 ng	100
40) C9C12 TIC 3	20.91	TIC	301990	0.527 ng	100
41) C9C12 TIC 4	20.91	TIC	301990	0.527 ng	100
42) C9C10 TIC 1	20.74	120	2493237	25.526 ng	100
43) C9C10 TIC 2	20.74	134	1370859	24.995 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091705.D
Acq On : 9 Mar 2017 4:35 Operator: LH
Sample : LCS R16030917 25ng
Misc : S29-03071701/S29-03031707 (1/1)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Mar 09 08:07:00 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091723.D
Acq On : 9 Mar 2017 19:24 Operator: LH
Sample : P1700971-006dup (35mL)
Misc : S29-03071701
ALS Vial : 11 Sample Multiplier: 1

Quant Time: Mar 13 10:40:56 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/13/17

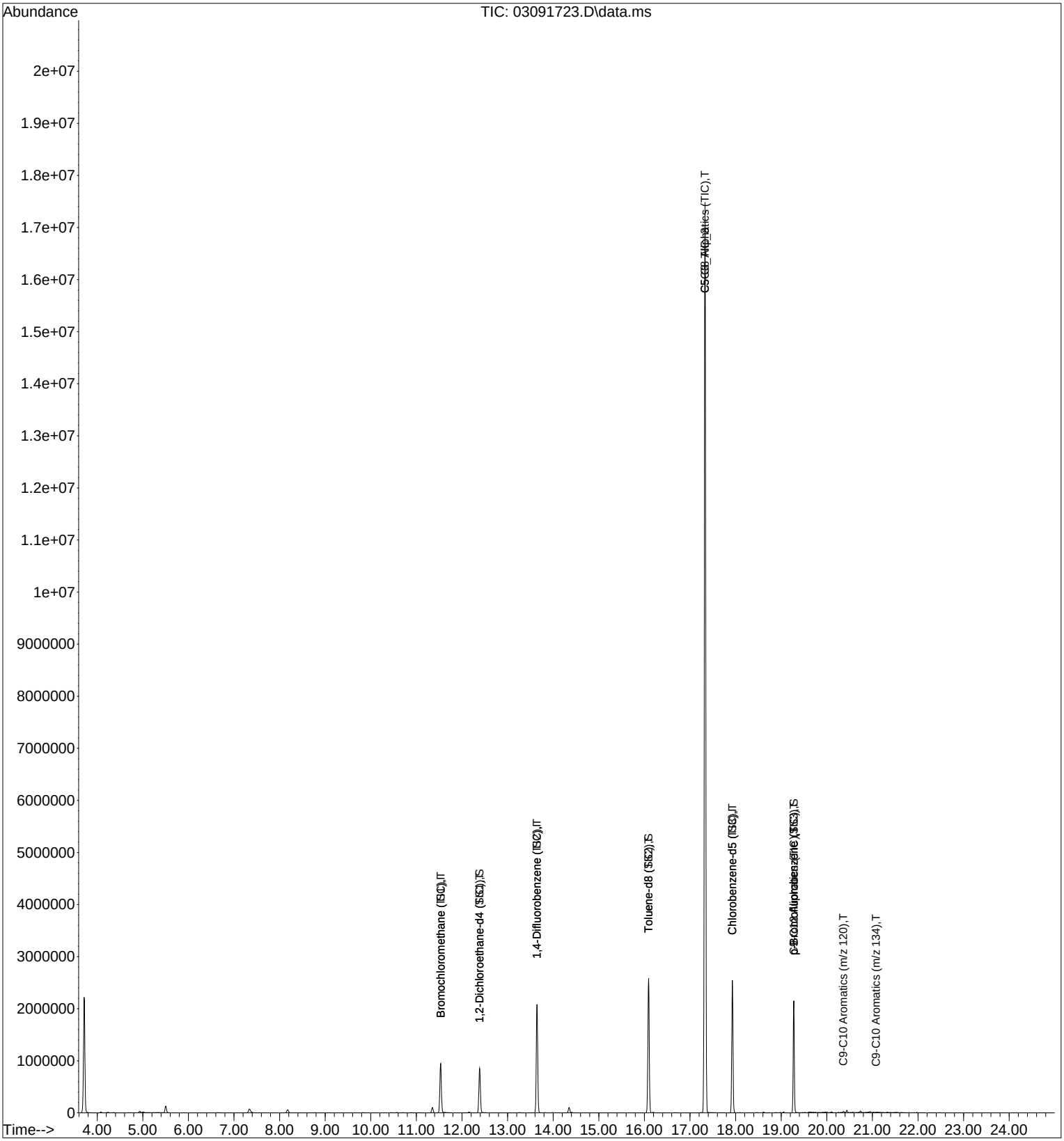
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.53	130	369240	12.500 ng	-0.02
7) 1,4-Difluorobenzene (IS2)	13.64	114	1884462	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1479445	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.39	65	688586	13.053 ng	-0.01
Spiked Amount 12.500				Recovery = 104.40%	
12) Toluene-d8 (SS2)	16.09	98	2012162	13.014 ng	0.00
Spiked Amount 12.500				Recovery = 104.08%	
20) p-Bromofluorobenzene (...	19.28	174	561729	10.823 ng	0.00
Spiked Amount 12.500				Recovery = 86.56%	
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.53	TIC	2247415	14.998 ng	100
3) Isopentane	7.34	TIC	243696	No Calib	
4) n-Hexane	11.53	TIC	2247415	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.39	TIC	1969000	13.318 ng	100
8) 1,4-Difluorobenzene (TIC)	13.64	TIC	4488448	12.964 ng	100
9) Cyclohexane	13.64	TIC	4486979	No Calib	
10) 2,3-Dimethylpentane	13.82	TIC	11756	No Calib	
11) n-Heptane	14.66	TIC	1651	No Calib	
13) Toluene-d8 (TIC)	16.09	TIC	5401967	13.197 ng	100
14) n-Octane	17.33	TIC	36297138	No Calib	
15) C5-C8 Aliphatics (TIC)	17.33	TIC	56869957m	128.962 ng	
17) Chlorobenzene-d5 (TIC)	17.93	TIC	4851719	12.831 ng	100
18) 2,3-Dimethylheptane	18.38	TIC	6375	No Calib	
19) n-Nonane	19.06	TIC	31912	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	3597270	12.228 ng	100
22) Isopropylbenzene	0.00	120	0	N.D.	
23) 1-Methyl-3-ethylbenzene	19.91	120	806	No Calib	
24) 1,3,5-Trimethylbenzene	20.01	120	583	No Calib	
25) n-Decane	20.44	TIC	83721	No Calib #	
26) p-Isopropyltoluene	20.74	134	60	No Calib #	
27) 1,2,3-Trimethylbenzene	20.74	120	1024	No Calib	
28) Butylcyclohexane	20.95	TIC	50160	No Calib	
29) n-Undecane	21.51	TIC	31432	No Calib	
30) n-Dodecane	22.43	TIC	1377	No Calib	
31) C9-C12 Aliphatics-(TIC)	19.28	TIC	4959646m	52.215 ng	
32) C9-C10 Aromatics (m/z ...	20.36	120	5403m	0.276 ng	
33) C9-C10 Aromatics (m/z ...	21.08	134	1374m	0.125 ng	
34) C5C8_TIC_1	11.35	TIC	239798	N.D.	
35) C5C8 TIC 2	14.35	TIC	263898	N.D.	
36) C5C8 TIC 3	17.33	TIC	36331936m	12.763 ng	
37) C5C8 TIC 4	0.00	TIC	0	N.D. d	
38) C9C12 TIC 1	21.98	TIC	13412	N.D.	
39) C9C12 TIC 2	0.00	TIC	0	N.D. d	
40) C9C12 TIC 3	0.00	TIC	0	N.D. d	
41) C9C12 TIC 4	0.00	TIC	0	N.D. d	
42) C9C10 TIC 1	0.00	120	0	N.D. d	
43) C9C10 TIC 2	0.00	134	0	N.D. d	

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091723.D
Acq On : 9 Mar 2017 19:24 Operator: LH
Sample : P1700971-006dup (35mL)
Misc : S29-03071701
ALS Vial : 11 Sample Multiplier: 1

Quant Time: Mar 13 10:40:56 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Massachusetts APH | ICAL Method: M16121916.M | ICAL Date: 12/19/16 | Instrument ID: MS16 | LH 12/21/16

Hydrocarbon Ranges

	areas							masses					
C5-C8 Aliphatics	0.5	1	5	25	50	100		0.5	1	5	25	50	100
Isopentane	145992	251075	1071839	5786983	11537839	24462071		0.520	1.04	5.20	26.00	52.00	104.00
n-Hexane	194294	317520	1251336	5985003	11728245	25181283		0.510	1.02	5.10	25.50	51.00	102.00
Cyclohexane	161369	280207	1234019	7028601	14143584	30151415		0.515	1.03	5.15	25.75	51.50	103.00
2,3-Dimethylpentane	165093	289518	1287102	7336654	14784784	31435664		0.555	1.11	5.55	27.75	55.50	111.00
n-Heptane	154577	265906	1179401	6689806	13558680	29444115		0.515	1.03	5.15	25.75	51.50	103.00
n-Octane	182574	306792	1342879	7876179	16113832	34704181		0.530	1.06	5.30	26.50	53.00	106.00
area sum:	1003899	1711018	7366576	40703226	81866964	175378729	sum:	3.145	6.290	31.45	157.25	314.50	629.00
C9-C12 Aliphatics	0.5	1	5	25	50	100		0.5	1	5	25	50	100
2,3-Dimethylheptane	190562	336375	1477001	8638505	17810606	37607727		0.510	1.02	5.10	25.50	51.0	102
n-Nonane	177815	310390	1406543	8346424	17334221	36388397		0.505	1.01	5.05	25.25	50.5	101
n-Decane	181143	315493	1452982	8968276	18673731	38060288		0.490	0.98	4.90	24.50	49.0	98
Butylcyclohexane	212287	378384	1704547	10241012	21367070	42699385		0.510	1.02	5.10	25.50	51.0	102
n-Undecane	161102	300459	1420417	8828047	18631052	38121852		0.480	0.96	4.80	24.00	48.0	96
n-Dodecane	449	249005	1259084	7461396	16096908	34899971		0.475	0.95	4.75	23.75	47.5	95
area sum:	923358	1890106	8720574	52483660	109913588	227777620	sum:	2.970	5.940	29.70	148.50	297.00	594.00
C9-C10 Aromatics	0.5	1	5	25	50	100		0.5	1	5	25	50	100
Isopropylbenzene	23988	40776	186003	1138777	2371392	4777654		0.505	1.01	5.05	25.25	50.5	101
3-Ethyltoluene	24891	43239	200071	1279486	2658644	5308282		0.480	0.96	4.80	24.00	48.0	96
1,3,5-Trimethylbenzene	34652	60385	275729	1732103	3561772	6986753		0.495	0.99	4.95	24.75	49.5	99
1,2,3-Trimethylbenzene	35087	62934	298908	2010849	3867319	6207230		0.485	0.97	4.85	24.25	48.5	97
p-Isopropyltoluene	19324	35427	170154	1125800	2171411	3516405		0.490	0.98	4.90	24.50	49.0	98
area sum:	137942	242761	1130865	7287015	14630538	26796324	sum:	2.455	4.910	24.55	122.75	245.50	491.00

Massachusetts APH | ICAL: M16121916.M | ICAL Date: 12/19/16 | Instrument ID: MS16

Hydrocarbon Ranges

areas

Internal Standards (TIC)	0.5	1	5	25	50	100
Bromochloromethane (IS1)	1576090	1538202	1320241	1316783	1283090	1345404
1,4-Difluorobenzene (IS2)	3309515	3276539	3118912	3066006	3082836	3132467
Chlorobenzene-d5 (IS3)	3464345	3446417	3298025	3304897	3323875	3455252

Internal Standards (EIC)						
Bromochloromethane (IS1)	284009	282839	267602	270737	268499	276134
1,4-Difluorobenzene (IS2)	1431810	1415627	1350648	1341426	1348020	1379188
Chlorobenzene-d5 (IS3)	1093970	1084403	1034748	1037530	1036571	1065075

LH 12/21/16

Surrogates (TIC)	0.5	1	5	25	50	100
1,2-Dichloroethane-d4	1418884	1410987	1354096	1340717	1346053	1386295
Toluene-d8	3859177	3834085	3658491	3636514	3675145	3780224
p-Bromofluorobenzene	2672493	2653301	2567540	2601878	2613704	2677175

RRFs

C5-C8 Aliphatics	0.5	1	5	25	50	100	RRF_{avg}	%RSD
	2.7867	2.4020	2.1678	2.4120	2.4138	2.5270	2.452	8.24

C9-C12 Aliphatics	0.5	1	5	25	50	100	RRF_{avg}	%RSD
	3.5524	3.6679	3.5470	4.2580	4.4628	4.5004	3.998	11.45

C9-C10 Aromatics	0.5	1	5	25	50	100	RRF_{avg}	%RSD
	0.6420	0.5699	0.5565	0.7152	0.7187	0.6405	0.640	10.76

LH 12/21/16

AIR-PHASE PETROLEUM HYDROCARBONS (APH)

Primary Source Standards Concentrations

4ng/L Std. ID:
20ng/L Std. ID: S29-10281604
200ng/L Std. ID: S29-10281603

					ICAL Concentrations (Primary Source)					
Dilution Factors:		**5**	**50**	**Working STD Conc.(ng/L):**	**20**	**20**	**20**	**200**	**200**	**200**
	Source Std.	**Primary Working Standards**		**Injection (L):**	**0.025**	**0.050**	**0.25**	**0.125**	**0.25**	**0.50**
Compounds	**mg/m^3**	**200ng/L**	**20ng/L**	**ICAL Points:**	**0.5ng**	**1ng**	**5ng**	**25ng**	**50ng**	**100ng**
1-Methyl-3-ethylbenzene	0.96	192	19.2		0.480	0.96	4.80	24.00	48.0	96
1,3,5-Trimethylbenzene	0.99	198	19.8		0.495	0.99	4.95	24.75	49.5	99
n-Decane	0.98	196	19.6		0.490	0.98	4.90	24.50	49.0	98
1,2,3-Trimethylbenzene	0.97	194	19.4		0.485	0.97	4.85	24.25	48.5	97
p-Isopropyltoluene	0.98	196	19.6		0.490	0.98	4.90	24.50	49.0	98
n-Butylcyclohexane	1.02	204	20.4		0.510	1.02	5.10	25.50	51.0	102
n-Undecane	0.96	192	19.2		0.480	0.96	4.80	24.00	48.0	96
n-Dodecane	0.95	190	19.0		0.475	0.95	4.75	23.75	47.5	95
Isopentane	1.04	208	20.8		0.520	1.04	5.20	26.00	52.0	104
n-Hexane	1.02	204	20.4		0.510	1.02	5.10	25.50	51.0	102
Cyclohexane	1.03	206	20.6		0.515	1.03	5.15	25.75	51.5	103
2,3-Dimethylpentane	1.11	222	22.2		0.555	1.11	5.55	27.75	55.5	111
n-Heptane	1.03	206	20.6		0.515	1.03	5.15	25.75	51.5	103
n-Octane	1.06	212	21.2		0.530	1.06	5.30	26.50	53.0	106
2,3-Dimethylheptane	1.02	204	20.4		0.510	1.02	5.10	25.50	51.0	102
n-Nonane	1.01	202	20.2		0.505	1.01	5.05	25.25	50.5	101
Isopropylbenzene	1.01	202	20.2		0.505	1.01	5.05	25.25	50.5	101

Primary Source Standard:
Std. ID: S29-10281601
Spectra Gas Cyl. #: CC-302316
Expiration: 10/12/17

AIR-PHASE PETROLEUM HYDROCARBONS (APH)

Secondary Source Standards Concentrations

20ng/L Working Std. ID:
100ng/L Working Std. ID:
200ng/L Working Std. ID: S29-12011603
Dilution Factor: 5 | 10 | 50
Working Std. Conc. Utilized: 200

Working Std. Injection Amounts (L): 0.125

		Secondary Working Std. Conc.			ICV / LCS
Compounds	**mg/m^3**	**200ng/L**	**100ng/L**	**20ng/L**	**Actual Conc.(ng)**
1-Methyl-3-ethylbenzene	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	1.061	212.2	106.1	21.22	26.525
n-Decane	1.061	212.2	106.1	21.22	26.525
1,2,3-Trimethylbenzene	1.062	212.4	106.2	21.24	26.550
p-Isopropyltoluene	1.062	212.4	106.2	21.24	26.550
n-Butylcyclohexane	NA	NA	NA	NA	NA
n-Undecane	1.064	212.8	106.4	21.28	26.600
n-Dodecane	1.062	212.4	106.2	21.24	26.550
Isopentane	NA	NA	NA	NA	NA
n-Hexane	1.064	212.8	106.4	21.28	26.600
Cyclohexane	2.125	425.0	212.5	42.50	53.125
2,3-Dimethylpentane	NA	NA	NA	NA	NA
n-Heptane	1.064	212.8	106.4	21.28	26.600
n-Octane	1.060	212.0	106.0	21.20	26.500
2,3-Dimethylheptane	NA	NA	NA	NA	NA
n-Nonane	1.059	211.8	105.9	21.18	26.475
Isopropylbenzene	NA	NA	NA	NA	NA

Secondary Source Standard:
Std. ID: S29-10051602
Spectra Gas Cyl. #: CC-250189
Expiration: 09/23/17

Calibration Status Report GCMS-16

Method : I:\MS16\METHODS\M16121916.M (RTE Integrator)
Title : Massachusetts APH
Last Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration

#	ID	Conc	ISTD Conc	Path\File
1	0.5	3	13	I:\MS16\DATA\2016_12\19\12191612.D
2	1	6	13	I:\MS16\DATA\2016_12\19\12191613.D
3	5	31	13	I:\MS16\DATA\2016_12\19\12191614.D
4	25	157	13	I:\MS16\DATA\2016_12\19\12191615.D
5	50	314	13	I:\MS16\DATA\2016_12\19\12191616.D
6	100	629	13	I:\MS16\DATA\2016_12\19\12191617.D

#	ID	Update Time	Quant Time	Acquisition Time
1	0.5	Dec 20 16:11 2016	Dec 20 16:06 2016	19 Dec 2016 19:32
2	1	Dec 20 16:11 2016	Dec 20 16:08 2016	19 Dec 2016 20:05
3	5	Dec 20 16:00 2016	Dec 20 16:00 2016	19 Dec 2016 20:39
4	25	Dec 20 16:00 2016	Dec 20 16:00 2016	19 Dec 2016 21:12
5	50	Dec 20 16:01 2016	Dec 20 16:00 2016	19 Dec 2016 21:45
6	100	Dec 20 16:01 2016	Dec 20 16:00 2016	19 Dec 2016 22:18

M16121916.M Wed Dec 21 16:01:40 2016

LH 12/21/16

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191612.D
Acq On : 19 Dec 2016 19:32 Operator: LH
Sample : 0.5ng MAPH ICAL STD
Misc : S29-12061601/S29-10281604 (12/25)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Dec 20 16:06:19 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	284009	12.500 ng	0.00
7) 1,4-Difluorobenzene (IS2)	13.65	114	1431810	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1093970	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.40	65	506203	13.038 ng	0.00
Spiked Amount 12.500				Recovery = 104.32%	
12) Toluene-d8 (SS2)	16.10	98	1456818	12.318 ng	0.00
Spiked Amount 12.500				Recovery = 98.56%	
20) p-Bromofluorobenzene (...	19.28	174	474949	12.434 ng	0.00
Spiked Amount 12.500				Recovery = 99.44%	

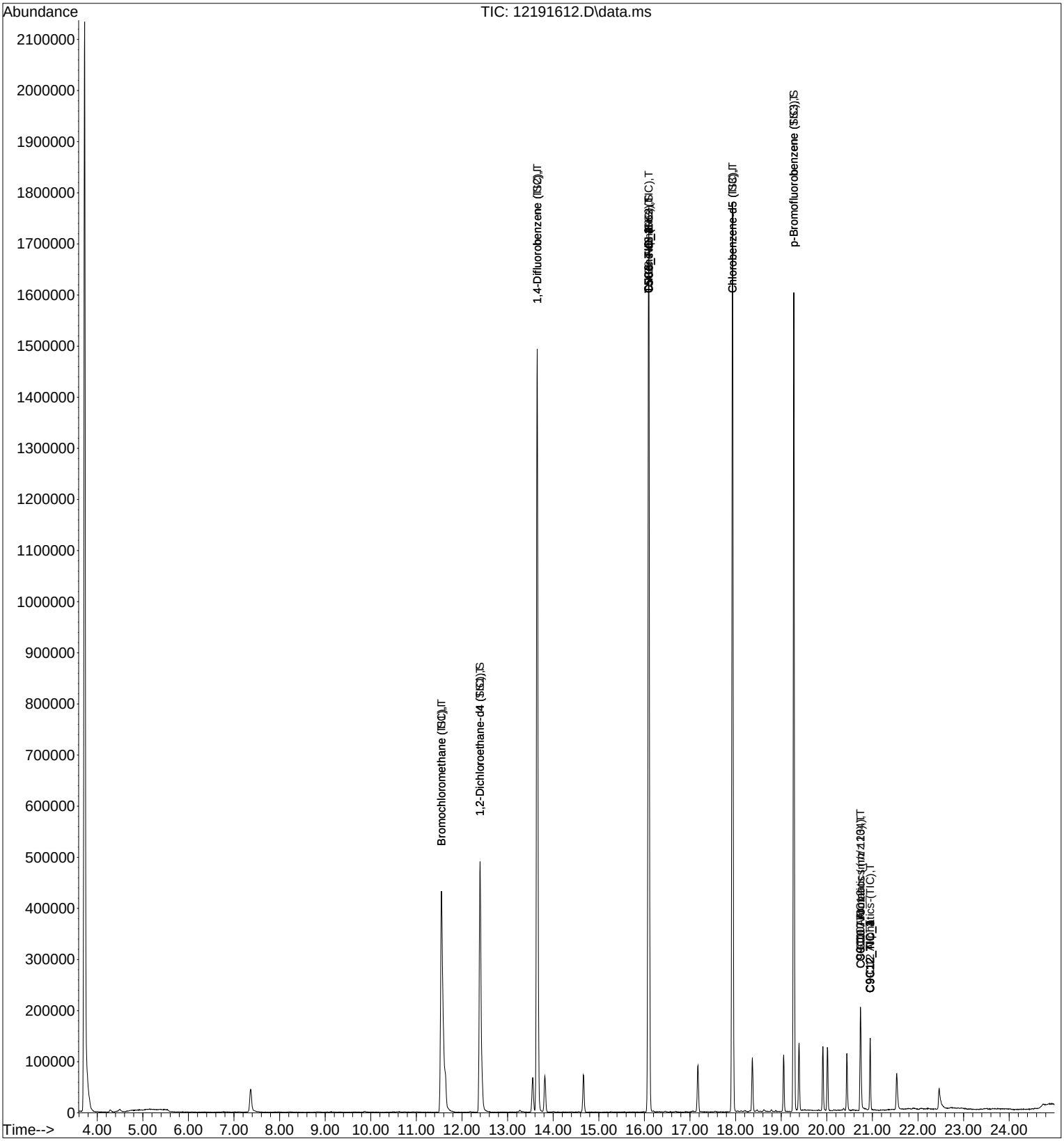
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.55	TIC	1576090m	12.721 ng	
3) Isopentane	7.36	TIC	145992	No Calib	
4) n-Hexane	11.62	TIC	194294	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.40	TIC	1418884	12.923 ng	100
8) 1,4-Difluorobenzene (TIC)	13.65	TIC	3309515	12.737 ng	100
9) Cyclohexane	13.55	TIC	161369	No Calib	
10) 2,3-Dimethylpentane	13.82	TIC	165093	No Calib	
11) n-Heptane	14.66	TIC	154577	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	3859177	12.530 ng	100
14) n-Octane	17.17	TIC	182574	No Calib	
15) C5-C8 Aliphatics (TIC)	16.10	TIC	3859177	11.572 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3464345	12.733 ng	100
18) 2,3-Dimethylheptane	18.37	TIC	190562	No Calib	
19) n-Nonane	19.06	TIC	177815	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	2672493	12.632 ng	100
22) Isopropylbenzene	19.39	120	23988	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	24891	No Calib	
24) 1,3,5-Trimethylbenzene	20.02	120	34652	No Calib	
25) n-Decane	20.44	TIC	181143	No Calib	
26) p-Isopropyltoluene	20.74	134	19324	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	35087	No Calib	
28) Butylcyclohexane	20.95	TIC	212287	No Calib	
29) n-Undecane	21.54	TIC	161102	No Calib	
30) n-Dodecane	22.41	TIC	449	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.95	TIC	218845	2.265 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	35087	2.831 ng	100
33) C9-C10 Aromatics (m/z ...	20.74	134	19324	2.793 ng	100
34) C5C8_TIC_1	16.10	TIC	3859177	1.885 ng	100
35) C5C8 TIC 2	16.10	TIC	3859177	1.885 ng	100
36) C5C8 TIC 3	16.10	TIC	3859177	1.885 ng	100
37) C5C8 TIC 4	16.10	TIC	3859177	1.885 ng	100
38) C9C12 TIC 1	20.95	TIC	218845	0.381 ng	100
39) C9C12 TIC 2	20.95	TIC	218845	0.381 ng	100
40) C9C12 TIC 3	20.95	TIC	218845	0.381 ng	100
41) C9C12 TIC 4	20.95	TIC	218845	0.381 ng	100
42) C9C10 TIC 1	20.74	120	35087	0.577 ng	100
43) C9C10 TIC 2	20.74	134	19324	0.569 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191612.D
Acq On : 19 Dec 2016 19:32 Operator: LH
Sample : 0.5ng MAPH ICAL STD
Misc : S29-12061601/S29-10281604 (12/25)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Dec 20 16:06:19 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191613.D
Acq On : 19 Dec 2016 20:05 Operator: LH
Sample : 1.0ng MAPH ICAL STD
Misc : S29-12061601/S29-10281604 (12/25)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Dec 20 16:08:28 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	282839	12.500 ng	0.00
7) 1,4-Difluorobenzene (IS2)	13.65	114	1415627	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1084403	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.40	65	503499	13.022 ng	0.00
Spiked Amount 12.500				Recovery = 104.16%	
12) Toluene-d8 (SS2)	16.10	98	1449112	12.393 ng	0.00
Spiked Amount 12.500				Recovery = 99.12%	
20) p-Bromofluorobenzene (...	19.28	174	467486	12.346 ng	0.00
Spiked Amount 12.500				Recovery = 98.80%	

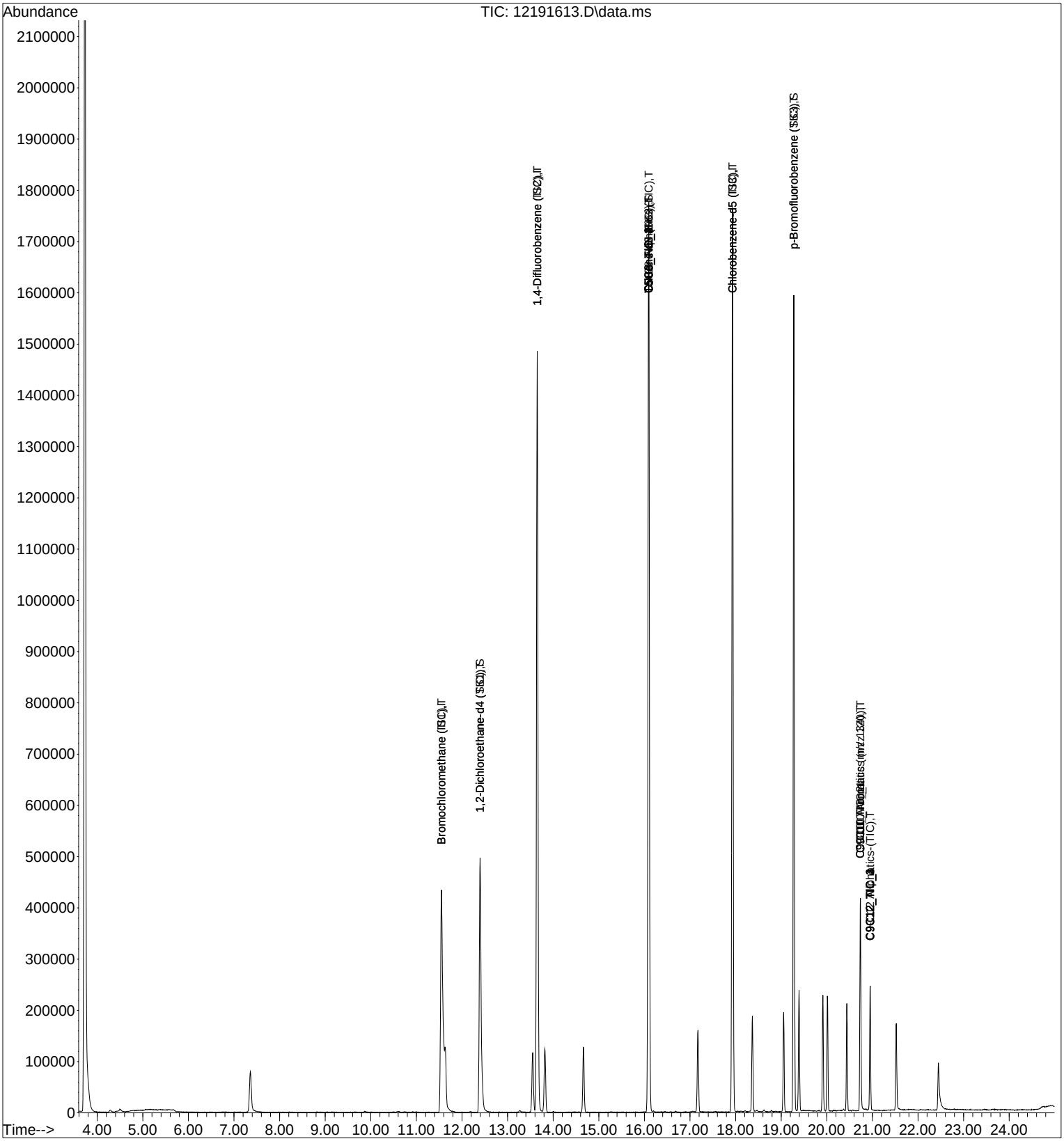
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.55	TIC	1538202m	12.467 ng	
3) Isopentane	7.36	TIC	251075	No Calib	
4) n-Hexane	11.63	TIC	317520	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.40	TIC	1410987	12.904 ng	100
8) 1,4-Difluorobenzene (TIC)	13.65	TIC	3276539	12.754 ng	100
9) Cyclohexane	13.55	TIC	280207	No Calib	
10) 2,3-Dimethylpentane	13.81	TIC	289518	No Calib	
11) n-Heptane	14.66	TIC	265906	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	3834085	12.591 ng	100
14) n-Octane	17.17	TIC	306792	No Calib	
15) C5-C8 Aliphatics (TIC)	16.10	TIC	3834625	11.629 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3446417	12.779 ng	100
18) 2,3-Dimethylheptane	18.37	TIC	336375	No Calib	
19) n-Nonane	19.06	TIC	310390	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	2653301	12.652 ng	100
22) Isopropylbenzene	19.39	120	40776	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	43239	No Calib	
24) 1,3,5-Trimethylbenzene	20.01	120	60385	No Calib	
25) n-Decane	20.44	TIC	315493	No Calib	
26) p-Isopropyltoluene	20.73	134	35427	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	62934	No Calib	
28) Butylcyclohexane	20.95	TIC	378384	No Calib	
29) n-Undecane	21.52	TIC	300459	No Calib	
30) n-Dodecane	22.45	TIC	249005	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.95	TIC	379243	3.960 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	62934	5.122 ng	100
33) C9-C10 Aromatics (m/z ...	20.73	134	35427	5.166 ng	100
34) C5C8_TIC_1	16.10	TIC	3834625	1.889 ng	100
35) C5C8 TIC 2	16.10	TIC	3834625	1.889 ng	100
36) C5C8 TIC 3	16.10	TIC	3834625	1.889 ng	100
37) C5C8 TIC 4	16.10	TIC	3834625	1.889 ng	100
38) C9C12 TIC 1	20.95	TIC	379243	0.667 ng	100
39) C9C12 TIC 2	20.95	TIC	379243	0.667 ng	100
40) C9C12 TIC 3	20.95	TIC	379243	0.667 ng	100
41) C9C12 TIC 4	20.95	TIC	379243	0.667 ng	100
42) C9C10 TIC 1	20.74	120	62934	1.043 ng	100
43) C9C10 TIC 2	20.73	134	35427	1.052 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191613.D
Acq On : 19 Dec 2016 20:05 Operator: LH
Sample : 1.0ng MAPH ICAL STD
Misc : S29-12061601/S29-10281604 (12/25)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Dec 20 16:08:28 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191614.D
Acq On : 19 Dec 2016 20:39 Operator: LH
Sample : 5.0ng MAPH ICAL STD
Misc : S29-12061601/S29-10281604 (12/25)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Dec 20 16:00:31 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016 LH 12/20/16
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	267602	12.500 ng	0.00
7) 1,4-Difluorobenzene (IS2)	13.65	114	1350648	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1034748	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.40	65	479851	13.117 ng	0.00
Spiked Amount 12.500				Recovery = 104.96%	
12) Toluene-d8 (SS2)	16.10	98	1382015	12.387 ng	0.00
Spiked Amount 12.500				Recovery = 99.12%	
20) p-Bromofluorobenzene (...	19.28	174	454232	12.572 ng	0.00
Spiked Amount 12.500				Recovery = 100.56%	

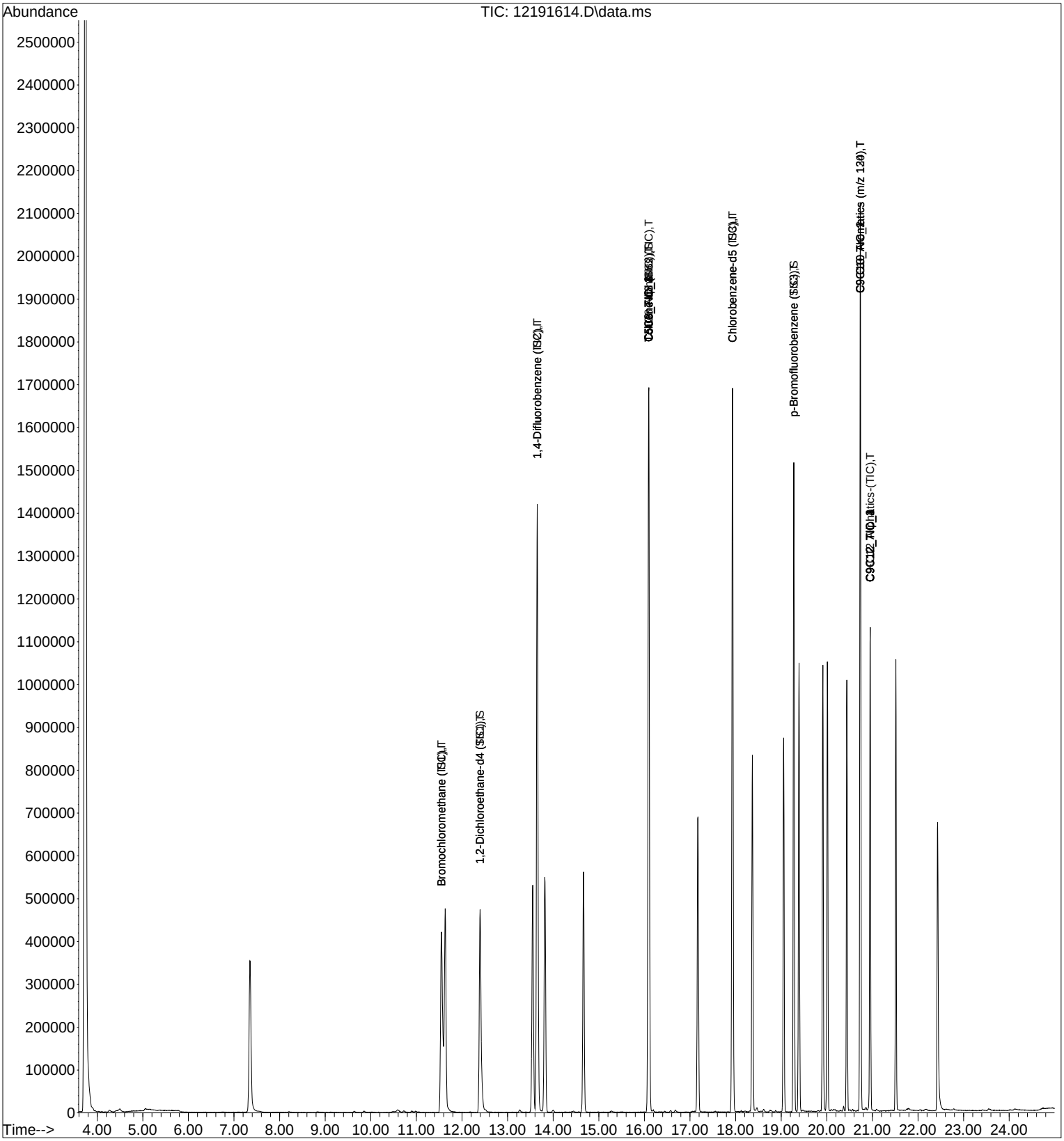
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.55	TIC	1320241	11.310 ng	100
3) Isopentane	7.35	TIC	1071839	No Calib	
4) n-Hexane	11.63	TIC	1251336	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.40	TIC	1354096	13.089 ng	100
8) 1,4-Difluorobenzene (TIC)	13.65	TIC	3118912	12.724 ng	100
9) Cyclohexane	13.55	TIC	1234019	No Calib	
10) 2,3-Dimethylpentane	13.81	TIC	1287102	No Calib	
11) n-Heptane	14.67	TIC	1179401	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	3658491	12.593 ng	100
14) n-Octane	17.17	TIC	1342879	No Calib	
15) C5-C8 Aliphatics (TIC)	16.10	TIC	3658491	11.629 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3298025	12.816 ng	100
18) 2,3-Dimethylheptane	18.37	TIC	1477001	No Calib	
19) n-Nonane	19.06	TIC	1406543	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	2567540	12.830 ng	100
22) Isopropylbenzene	19.39	120	186003	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	200071	No Calib	
24) 1,3,5-Trimethylbenzene	20.01	120	275729	No Calib	
25) n-Decane	20.44	TIC	1452982	No Calib	
26) p-Isopropyltoluene	20.73	134	170154	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	298908	No Calib	
28) Butylcyclohexane	20.95	TIC	1704547	No Calib	
29) n-Undecane	21.51	TIC	1420417	No Calib	
30) n-Dodecane	22.43	TIC	1259084	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.95	TIC	1709008	18.701 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	298908	25.495 ng	100
33) C9-C10 Aromatics (m/z ...	20.73	134	170154	26.001 ng	100
34) C5C8_TIC_1	16.10	TIC	3658491	1.889 ng	100
35) C5C8 TIC 2	16.10	TIC	3658491	1.889 ng	100
36) C5C8 TIC 3	16.10	TIC	3658491	1.889 ng	100
37) C5C8 TIC 4	16.10	TIC	3658491	1.889 ng	100
38) C9C12 TIC 1	20.95	TIC	1709008	3.148 ng	100
39) C9C12 TIC 2	20.95	TIC	1709008	3.148 ng	100
40) C9C12 TIC 3	20.95	TIC	1709008	3.148 ng	100
41) C9C12 TIC 4	20.95	TIC	1709008	3.148 ng	100
42) C9C10 TIC 1	20.74	120	298908	5.193 ng	100
43) C9C10 TIC 2	20.73	134	170154	5.296 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191614.D
Acq On : 19 Dec 2016 20:39 Operator: LH
Sample : 5.0ng MAPH ICAL STD
Misc : S29-12061601/S29-10281604 (12/25)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Dec 20 16:00:31 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191615.D
Acq On : 19 Dec 2016 21:12 Operator: LH
Sample : 25ng MAPH ICAL STD
Misc : S29-12061601/S29-10281603 (12/25)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Dec 20 16:00:32 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

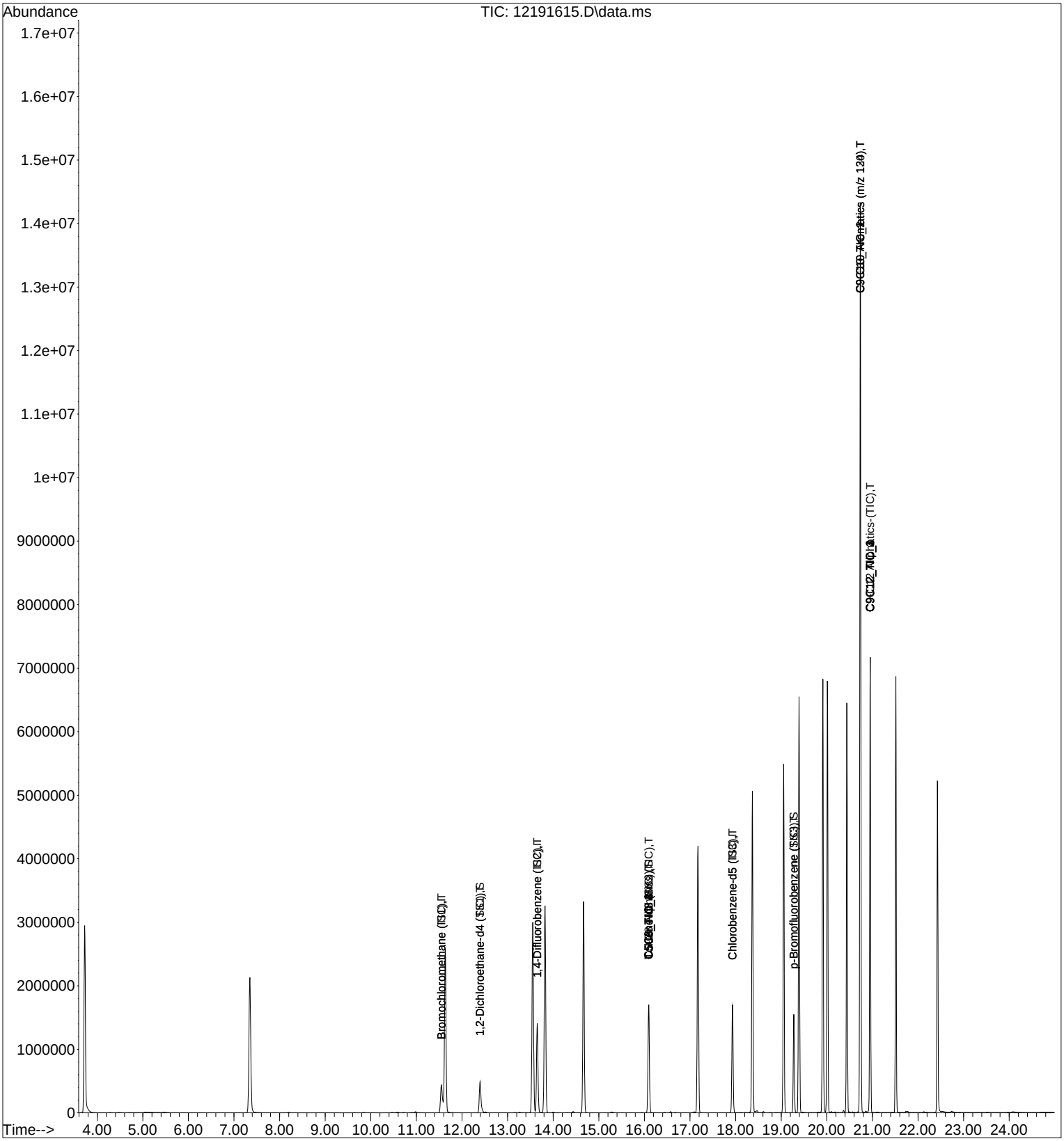
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	270737	12.500 ng	0.00
7) 1,4-Difluorobenzene (IS2)	13.65	114	1341426	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1037530	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.40	65	480900	12.994 ng	0.00
Spiked Amount 12.500				Recovery = 103.92%	
12) Toluene-d8 (SS2)	16.10	98	1377301	12.430 ng	0.00
Spiked Amount 12.500				Recovery = 99.44%	
20) p-Bromofluorobenzene (...	19.28	174	459253	12.677 ng	0.00
Spiked Amount 12.500				Recovery = 101.44%	
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.55	TIC	1316783	11.149 ng	100
3) Isopentane	7.35	TIC	5786983	No Calib	
4) n-Hexane	11.63	TIC	5985003	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.40	TIC	1340717	12.810 ng	100
8) 1,4-Difluorobenzene (TIC)	13.65	TIC	3066006	12.595 ng	100
9) Cyclohexane	13.55	TIC	7028601	No Calib	
10) 2,3-Dimethylpentane	13.82	TIC	7336654	No Calib	
11) n-Heptane	14.67	TIC	6689806	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	3636514	12.603 ng	100
14) n-Octane	17.17	TIC	7876179	No Calib	
15) C5-C8 Aliphatics (TIC)	16.10	TIC	3636514	11.639 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3304897	12.808 ng	100
18) 2,3-Dimethylheptane	18.37	TIC	8638505	No Calib	
19) n-Nonane	19.06	TIC	8346424	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	2601878	12.967 ng	100
22) Isopropylbenzene	19.39	120	1138777	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	1279486	No Calib	
24) 1,3,5-Trimethylbenzene	20.01	120	1732103	No Calib	
25) n-Decane	20.44	TIC	8968276	No Calib	
26) p-Isopropyltoluene	20.73	134	1125800	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	2010849	No Calib	
28) Butylcyclohexane	20.95	TIC	10241012	No Calib	
29) n-Undecane	21.51	TIC	8828047	No Calib	
30) n-Dodecane	22.43	TIC	7461396	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.95	TIC	10241012	111.765 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	2010849	171.055 ng	100
33) C9-C10 Aromatics (m/z ...	20.73	134	1125800	171.574 ng	100
34) C5C8_TIC_1	16.10	TIC	3636514	1.873 ng	100
35) C5C8 TIC 2	16.10	TIC	3636514	1.873 ng	100
36) C5C8 TIC 3	16.10	TIC	3636514	1.873 ng	100
37) C5C8 TIC 4	16.10	TIC	3636514	1.873 ng	100
38) C9C12 TIC 1	20.95	TIC	10241012	18.816 ng	100
39) C9C12 TIC 2	20.95	TIC	10241012	18.816 ng	100
40) C9C12 TIC 3	20.95	TIC	10241012	18.816 ng	100
41) C9C12 TIC 4	20.95	TIC	10241012	18.816 ng	100
42) C9C10 TIC 1	20.74	120	2010849	34.838 ng	100
43) C9C10 TIC 2	20.73	134	1125800	34.944 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191615.D
Acq On : 19 Dec 2016 21:12 Operator: LH
Sample : 25ng MAPH ICAL STD
Misc : S29-12061601/S29-10281603 (12/25)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Dec 20 16:00:32 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191616.D
Acq On : 19 Dec 2016 21:45 Operator: LH
Sample : 50ng MAPH ICAL STD
Misc : S29-12061601/S29-10281603 (12/25)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Dec 20 16:00:33 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

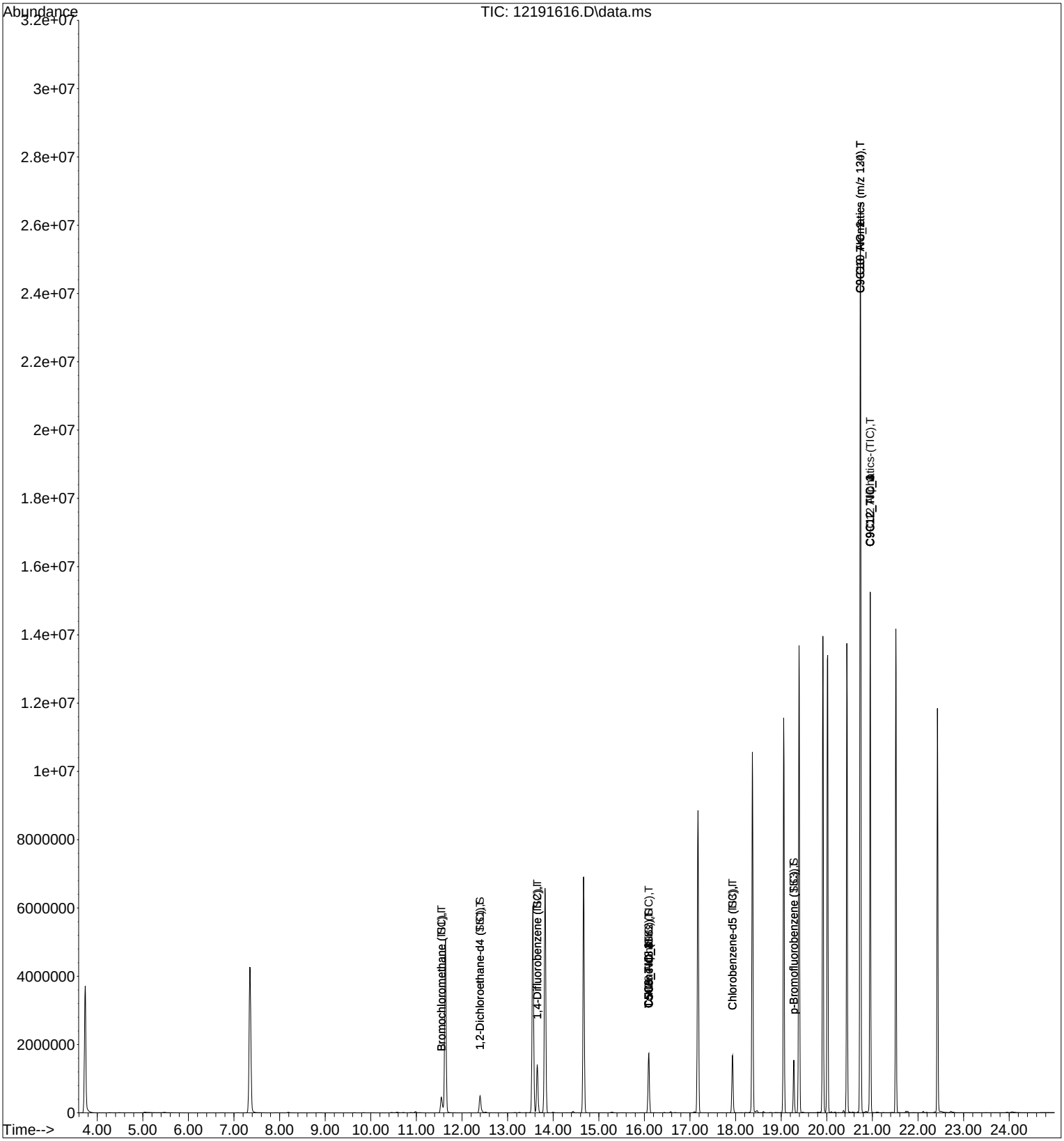
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	268499	12.500 ng	0.00
7) 1,4-Difluorobenzene (IS2)	13.65	114	1348020	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1036571	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.40	65	480798	13.099 ng	0.00
Spiked Amount 12.500				Recovery = 104.80%	
12) Toluene-d8 (SS2)	16.10	98	1388648	12.471 ng	0.00
Spiked Amount 12.500				Recovery = 99.76%	
20) p-Bromofluorobenzene (...	19.28	174	459998	12.709 ng	0.00
Spiked Amount 12.500				Recovery = 101.68%	
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.55	TIC	1283090	10.955 ng	100
3) Isopentane	7.35	TIC	11537839	No Calib	
4) n-Hexane	11.64	TIC	11728245	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.40	TIC	1346053	12.968 ng	100
8) 1,4-Difluorobenzene (TIC)	13.65	TIC	3082836	12.602 ng	100
9) Cyclohexane	13.56	TIC	14143584	No Calib	
10) 2,3-Dimethylpentane	13.82	TIC	14784784	No Calib	
11) n-Heptane	14.67	TIC	13558680	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	3675145	12.675 ng	100
14) n-Octane	17.17	TIC	16113832	No Calib	
15) C5-C8 Aliphatics (TIC)	16.10	TIC	3675145	11.705 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3323875	12.894 ng	100
18) 2,3-Dimethylheptane	18.37	TIC	17810606	No Calib	
19) n-Nonane	19.06	TIC	17334221	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	2613704	13.038 ng	100
22) Isopropylbenzene	19.39	120	2371392	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	2658644	No Calib	
24) 1,3,5-Trimethylbenzene	20.02	120	3561772	No Calib	
25) n-Decane	20.44	TIC	18673731	No Calib	
26) p-Isopropyltoluene	20.73	134	2171411	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	3867319	No Calib	
28) Butylcyclohexane	20.95	TIC	21367070	No Calib	
29) n-Undecane	21.51	TIC	18631052	No Calib	
30) n-Dodecane	22.43	TIC	16096908	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.95	TIC	21367070	233.406 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	3867319	329.283 ng	100
33) C9-C10 Aromatics (m/z ...	20.73	134	2171411	331.233 ng	100
34) C5C8_TIC_1	16.10	TIC	3675145	1.894 ng	100
35) C5C8 TIC 2	16.10	TIC	3675145	1.894 ng	100
36) C5C8 TIC 3	16.10	TIC	3675145	1.894 ng	100
37) C5C8 TIC 4	16.10	TIC	3675145	1.894 ng	100
38) C9C12 TIC 1	20.95	TIC	21367070	39.294 ng	100
39) C9C12 TIC 2	20.95	TIC	21367070	39.294 ng	100
40) C9C12 TIC 3	20.95	TIC	21367070	39.294 ng	100
41) C9C12 TIC 4	20.95	TIC	21367070	39.294 ng	100
42) C9C10 TIC 1	20.74	120	3867319	67.064 ng	100
43) C9C10 TIC 2	20.73	134	2171411	67.461 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191616.D
Acq On : 19 Dec 2016 21:45 Operator: LH
Sample : 50ng MAPH ICAL STD
Misc : S29-12061601/S29-10281603 (12/25)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Dec 20 16:00:33 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191617.D
Acq On : 19 Dec 2016 22:18 Operator: LH
Sample : 100ng MAPH ICAL STD
Misc : S29-12061601/S29-10281603 (12/25)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Dec 20 16:00:34 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

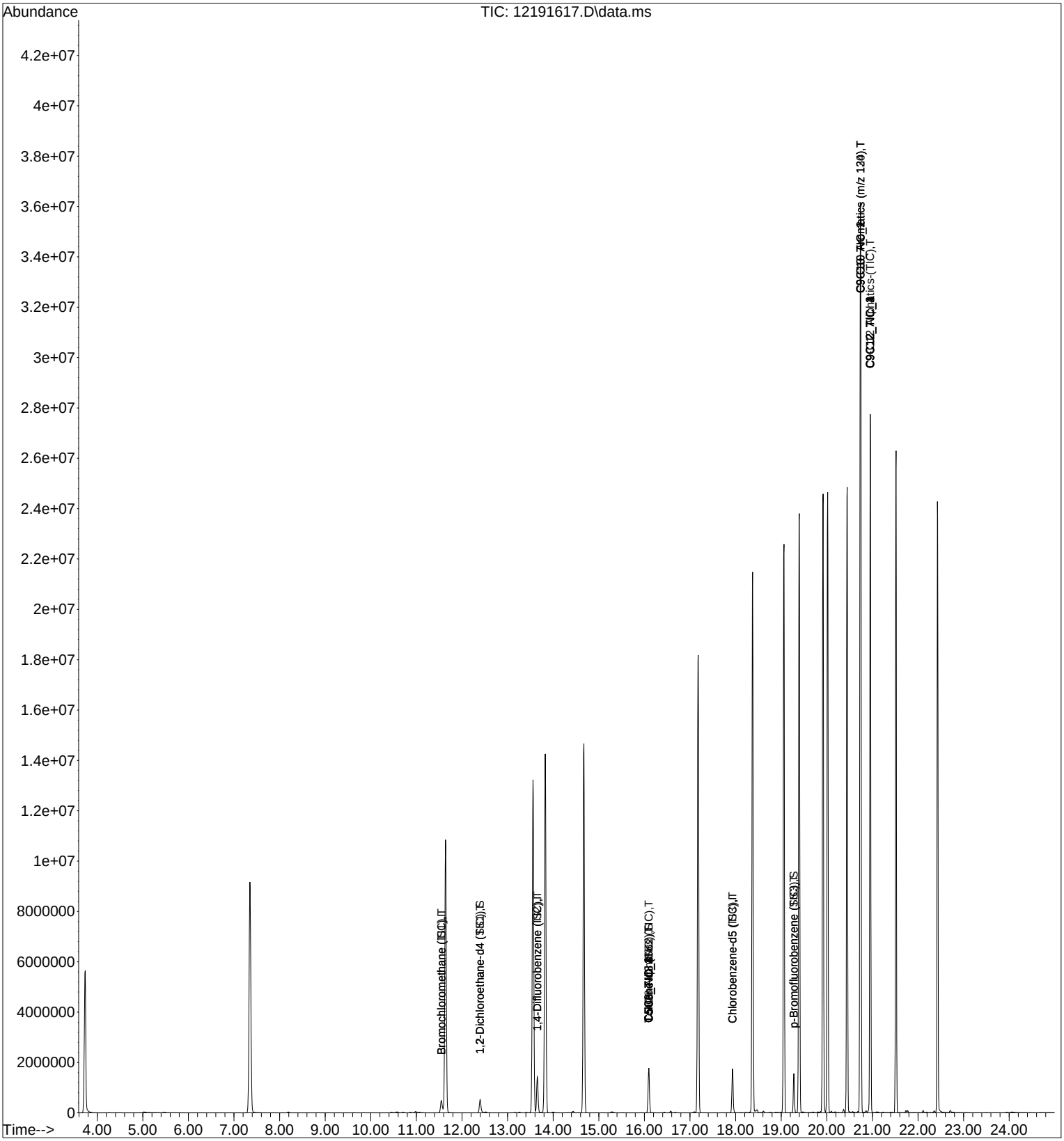
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	276134	12.500 ng	0.00
7) 1,4-Difluorobenzene (IS2)	13.65	114	1379188	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1065075	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.40	65	495029	13.114 ng	0.00
Spiked Amount 12.500				Recovery = 104.88%	
12) Toluene-d8 (SS2)	16.10	98	1423969	12.499 ng	0.00
Spiked Amount 12.500				Recovery = 100.00%	
20) p-Bromofluorobenzene (...	19.28	174	469178	12.616 ng	0.00
Spiked Amount 12.500				Recovery = 100.96%	
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.55	TIC	1345404	11.169 ng	100
3) Isopentane	7.35	TIC	24462071	No Calib	
4) n-Hexane	11.64	TIC	25181283	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.40	TIC	1386295	12.986 ng	100
8) 1,4-Difluorobenzene (TIC)	13.65	TIC	3132467	12.515 ng	100
9) Cyclohexane	13.56	TIC	30151415	No Calib	
10) 2,3-Dimethylpentane	13.83	TIC	31435664	No Calib	
11) n-Heptane	14.67	TIC	29444115	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	3780224	12.742 ng	100
14) n-Octane	17.18	TIC	34704181	No Calib	
15) C5-C8 Aliphatics (TIC)	16.10	TIC	3778521	11.762 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3455252	13.044 ng	100
18) 2,3-Dimethylheptane	18.37	TIC	37607727	No Calib	
19) n-Nonane	19.06	TIC	36388397	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	2677175	12.997 ng	100
22) Isopropylbenzene	19.40	120	4777654	No Calib	
23) 1-Methyl-3-ethylbenzene	19.92	120	5308282	No Calib	
24) 1,3,5-Trimethylbenzene	20.02	120	6986753	No Calib	
25) n-Decane	20.45	TIC	38060288	No Calib	
26) p-Isopropyltoluene	20.74	134	3516405	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	6207230	No Calib	
28) Butylcyclohexane	20.95	TIC	42699385	No Calib	
29) n-Undecane	21.52	TIC	38121852	No Calib	
30) n-Dodecane	22.43	TIC	34899971	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.95	TIC	42708354	454.044 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	6207230	514.370 ng	100
33) C9-C10 Aromatics (m/z ...	20.74	134	3516405	522.047 ng	100
34) C5C8_TIC_1	16.10	TIC	3778521	1.896 ng	100
35) C5C8 TIC 2	16.10	TIC	3778521	1.896 ng	100
36) C5C8 TIC 3	16.10	TIC	3778521	1.896 ng	100
37) C5C8 TIC 4	16.10	TIC	3778521	1.896 ng	100
38) C9C12 TIC 1	20.95	TIC	42708354	76.438 ng	100
39) C9C12 TIC 2	20.95	TIC	42708354	76.438 ng	100
40) C9C12 TIC 3	20.95	TIC	42708354	76.438 ng	100
41) C9C12 TIC 4	20.95	TIC	42708354	76.438 ng	100
42) C9C10 TIC 1	20.74	120	6207230	104.760 ng	100
43) C9C10 TIC 2	20.74	134	3516405	106.323 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191617.D
Acq On : 19 Dec 2016 22:18 Operator: LH
Sample : 100ng MAPH ICAL STD
Misc : S29-12061601/S29-10281603 (12/25)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Dec 20 16:00:34 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191618.D
Acq On : 19 Dec 2016 22:52 Operator: LH
Sample : 25ng MAPH ICV STD
Misc : S29-12061601/S29-12011603 (12/30)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 16:12:20 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.56	130	305732	12.500 ng	0.01
7) 1,4-Difluorobenzene (IS2)	13.66	114	1464517	12.500 ng	0.01
16) Chlorobenzene-d5 (IS3)	17.93	117	1154900	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.41	65	532142	12.183 ng	0.01
Spiked Amount 12.500				Recovery = 97.44%	
12) Toluene-d8 (SS2)	16.10	98	1504935	12.524 ng	0.00
Spiked Amount 12.500				Recovery = 100.16%	
20) p-Bromofluorobenzene (...	19.28	174	502213	12.395 ng	0.00
Spiked Amount 12.500				Recovery = 99.20%	

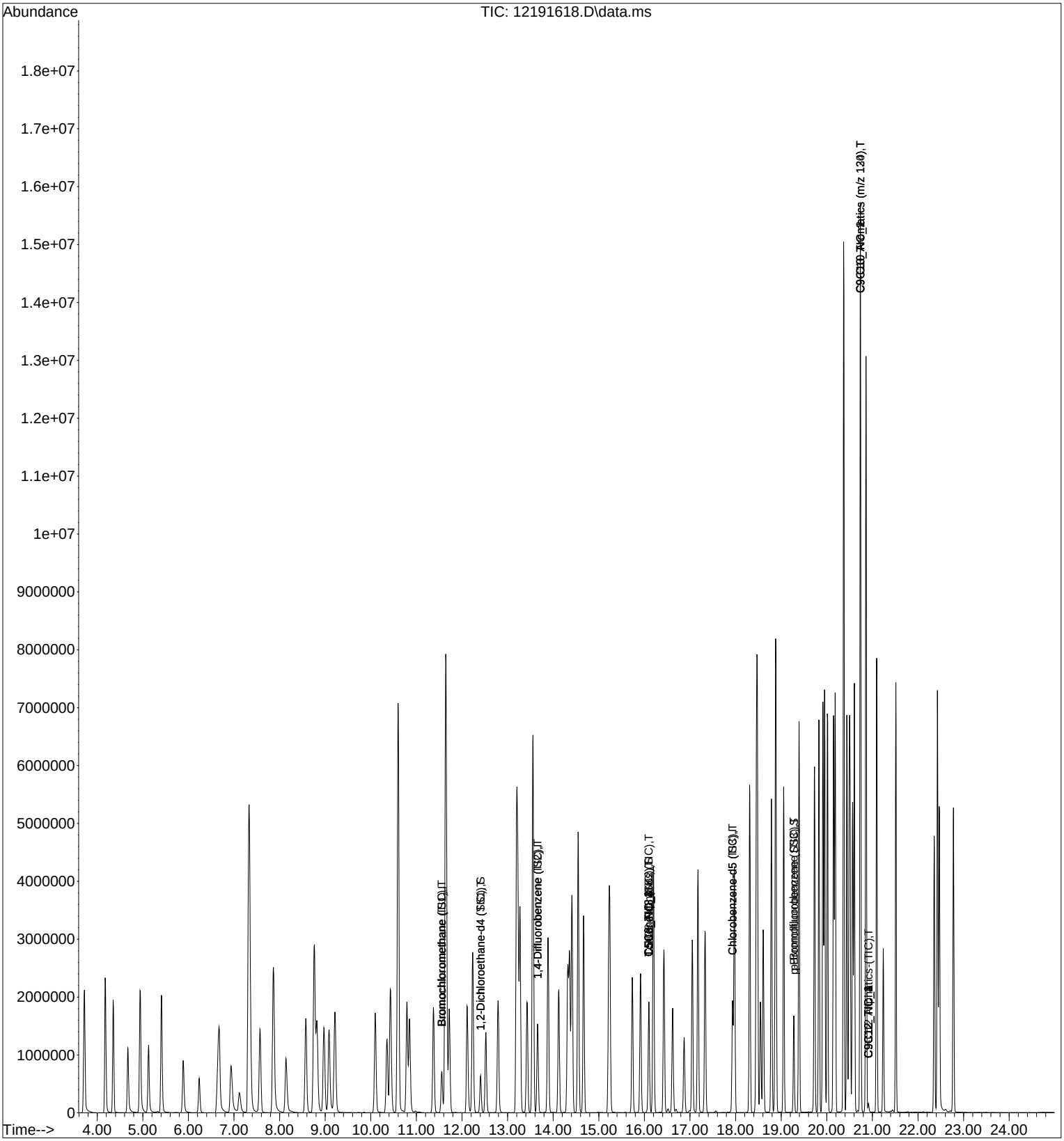
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.55	TIC	1715527	13.827 ng	100
3) Isopentane	7.33	TIC	18528219	No Calib #	
4) n-Hexane	11.64	TIC	21993235	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.41	TIC	1492336	12.191 ng	100
8) 1,4-Difluorobenzene (TIC)	13.66	TIC	3380530	12.564 ng	100
9) Cyclohexane	13.56	TIC	15138007	No Calib	
10) 2,3-Dimethylpentane	13.81	TIC	15647	No Calib	
11) n-Heptane	14.67	TIC	6882590	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	4043706	12.712 ng	100
14) n-Octane	17.17	TIC	7863461	No Calib	
15) C5-C8 Aliphatics (TIC)	16.10	TIC	4043706	11.799 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3852933	13.053 ng	100
18) 2,3-Dimethylheptane	18.31	TIC	10055348	No Calib	
19) n-Nonane	19.06	TIC	8692614	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	2858159	12.445 ng	100
22) Isopropylbenzene	19.39	120	1175762	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	1448006	No Calib	
24) 1,3,5-Trimethylbenzene	20.02	120	1828657	No Calib	
25) n-Decane	20.44	TIC	9456791	No Calib	
26) p-Isopropyltoluene	20.74	134	1216748	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	2172555	No Calib	
28) Butylcyclohexane	20.91	TIC	203268	No Calib	
29) n-Undecane	21.51	TIC	9918169	No Calib	
30) n-Dodecane	22.46	TIC	8664481	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.91	TIC	203268	2.741 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	2172555	141.963 ng	100
33) C9-C10 Aromatics (m/z ...	20.74	134	1216748	141.595 ng	100
34) C5C8_TIC_1	16.10	TIC	4043706	1.820 ng	100
35) C5C8 TIC 2	16.10	TIC	4043706	1.820 ng	100
36) C5C8 TIC 3	16.10	TIC	4043706	1.820 ng	100
37) C5C8 TIC 4	16.10	TIC	4043706	1.820 ng	100
38) C9C12 TIC 1	20.91	TIC	203268	0.462 ng	100
39) C9C12 TIC 2	20.91	TIC	203268	0.462 ng	100
40) C9C12 TIC 3	20.91	TIC	203268	0.462 ng	100
41) C9C12 TIC 4	20.91	TIC	203268	0.462 ng	100
42) C9C10 TIC 1	20.74	120	2172555	28.913 ng	100
43) C9C10 TIC 2	20.74	134	1216748	28.838 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191618.D
Acq On : 19 Dec 2016 22:52 Operator: LH
Sample : 25ng MAPH ICV STD
Misc : S29-12061601/S29-12011603 (12/30)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 16:12:20 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Massachusetts APH

Initial Calibration Verification/Laboratory Control Sample Check Sheet

Data File Name: **12191618.D**
Data File Path: **I:\MS16\DATA\2016_12\19**
Operator: **LH**
Date Acquired: **12/19/16 22:52**
Acq. Method File: **TO15.M**
Sample Name: **25ng MAPH ICV STD**
Misc Info: **S29-12061601/S29-12011603 (12/30)**
Instrument Name: **GCMS-16**

Enter RRFs from current ICAL!

	Internal Standards	**RT**	**Area**
7)	1,4-Difluorobenzene (IS2)	13.66	1464517
16)	Chlorobenzene-d5 (IS3)	17.93	1154900

	C5-C8 Aliphatics	**RT**	**Area**	**RRF**	**ng**	**% Rec.**	**LCL**	**UCL**	**Pass/Fail**
11)	n-Heptane	14.67	6882590	2.208	23.96	**90.1**	**70**	**130**	Pass

Spike Amt (ng)	**ICAL RRF**
26.600	2.452

	C9-C12 Aliphatics	**RT**	**Area**	**RRF**	**ng**	**% Rec.**			
29)	n-Undecane	21.51	9918169	4.036	26.85	**100.9**	**70**	**130**	Pass

Spike Amt (ng)	**ICAL RRF**
26.600	3.998

	C9-C10 Aromatics	**RT**	**Area**	**RRF**	**ng**	**% Rec.**			
24)	1,3,5-Trimethylbenzene	20.02	1828657	0.621	51.50	**97.0**	**70**	**130**	Pass
26)	p-Isopropyltoluene	20.74	1216748						
			3045405						

Spike Amt (ng)	**ICAL RRF**
53.075	0.640

LH ***12/20/16***

Massachusetts APH

Continuing Calibration Verification Check Sheet

Data File Name: **03091703.D**
Data File Path: **I:\MS16\DATA\2017_03\09**
Operator: **LH**
Date Acquired: **3/9/17 3:28**
Acq. Method File: **TO15.M**
Sample Name: **CCV M16030917_25ng**
Misc Info: **S29-03071701/S29-02221702 (4/21)**
Instrument Name: **GCMS-16**

Enter RRFs from current ICAL!

	Internal Standards	RT	Area
7)	1,4-Difluorobenzene (IS2)	13.64	1855213
16)	Chlorobenzene-d5 (IS3)	17.93	1420897

	C5-C8 Aliphatics	RT	Area	RRF	ng	% D	LCL	UCL	Pass/Fai
3)	Isopentane	7.34	9330034	2.724	174.7	**11.08**	**-30**	**30**	Pass
4)	n-Hexane	11.63	9475488						
9)	Cyclohexane	13.55	10690897						
10)	2,3-Dimethylpentane	13.82	11308239	**Spike**	**ICAL**				
11)	n-Heptane	14.66	10645310	**Amt (ng)**	**RRF**				
14)	n-Octane	17.18	12119428	157.25	2.452				
			63569396						

	C9-C12 Aliphatics	RT	Area	RRF	ng	% D			
18)	2,3-Dimethylheptane	18.37	13097134	4.868	180.8	**21.77**	**-30**	**30**	Pass
19)	n-Nonane	19.06	12746743						
25)	n-Decane	20.44	13516214						
28)	Butylcyclohexane	20.95	14813078	**Spike**	**ICAL**				
29)	n-Undecane	21.51	13852813	**Amt (ng)**	**RRF**				
30)	n-Dodecane	22.43	14151868	148.50	3.998				
			82177850						

	C9-C10 Aromatics	RT	Area	RRF	ng	% D			
22)	Isopropylbenzene	19.39	1477427	0.653	125.2	**2.01**	**-30**	**30**	Pass
23)	1-Methyl-3-ethylbenzene	19.91	1654895						
24)	1,3,5-Trimethylbenzene	20.01	2236428						
26)	p-Isopropyltoluene	20.73	1324631	**Spike**	**ICAL**				
27)	1,2,3-Trimethylbenzene	20.74	2416183	**Amt (ng)**	**RRF**				
			9109564	122.75	0.640				

LH *3/9/17*

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091703.D
Acq On : 9 Mar 2017 3:28 Operator: LH
Sample : CCV M16030917 25ng
Misc : S29-03071701/S29-02221702 (4/21)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Mar 09 07:14:37 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/9/17

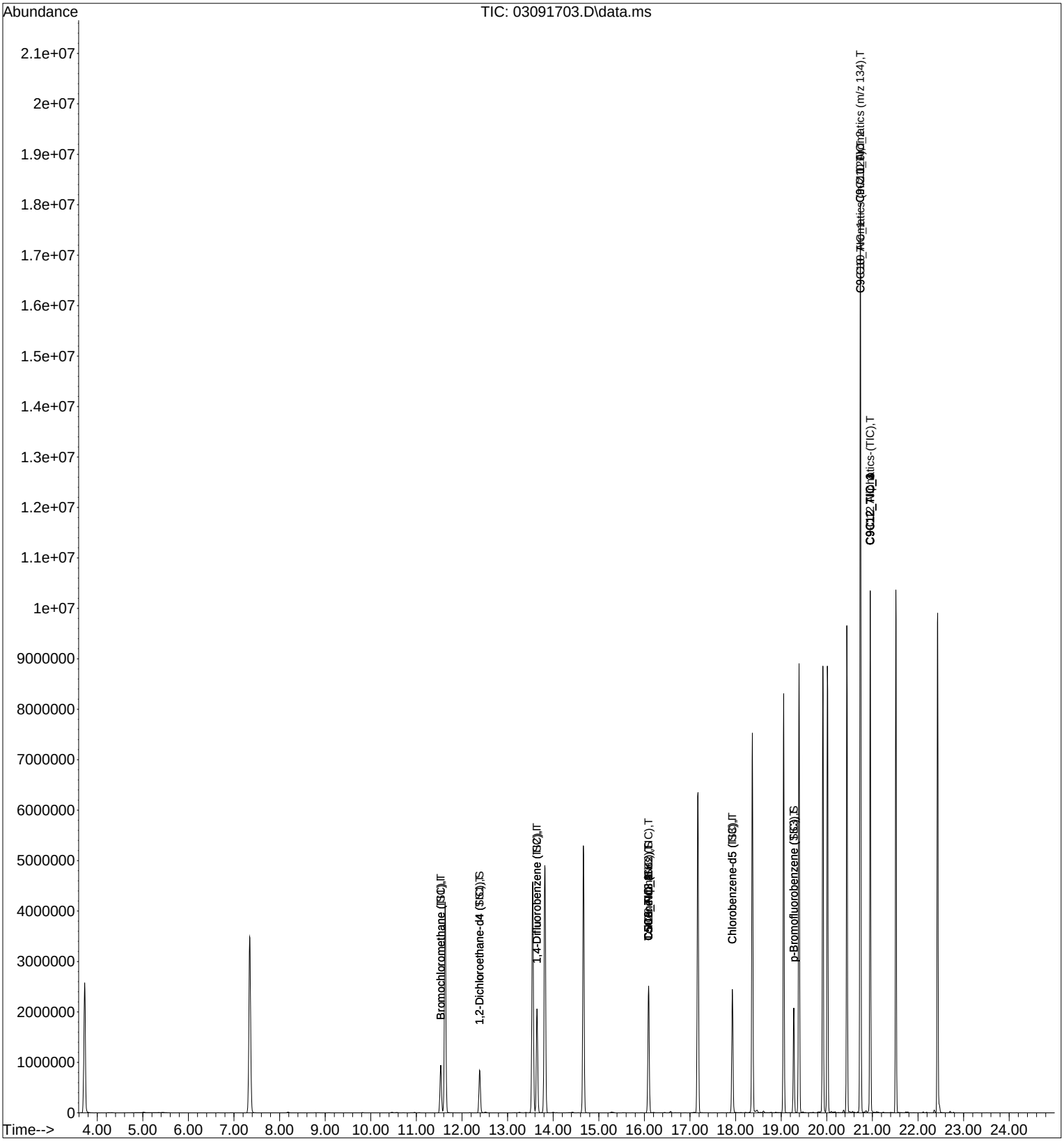
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.53	130	357166	12.500 ng	-0.02
7) 1,4-Difluorobenzene (IS2)	13.64	114	1855213	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1420897	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.39	65	679800	13.322 ng	-0.01
Spiked Amount 12.500				Recovery = 106.56%	
12) Toluene-d8 (SS2)	16.09	98	1964470	12.906 ng	0.00
Spiked Amount 12.500				Recovery = 103.28%	
20) p-Bromofluorobenzene (...	19.28	174	546127	10.956 ng	0.00
Spiked Amount 12.500				Recovery = 87.68%	
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.53	TIC	2191395	15.119 ng	100
3) Isopentane	7.34	TIC	9330034	No Calib	
4) n-Hexane	11.63	TIC	9475488	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.39	TIC	1951194	13.644 ng	100
8) 1,4-Difluorobenzene (TIC)	13.64	TIC	4409684	12.938 ng	100
9) Cyclohexane	13.55	TIC	10690897	No Calib	
10) 2,3-Dimethylpentane	13.82	TIC	11308239	No Calib	
11) n-Heptane	14.66	TIC	10645310	No Calib	
13) Toluene-d8 (TIC)	16.09	TIC	5286863	13.120 ng	100
14) n-Octane	17.18	TIC	12119428	No Calib	
15) C5-C8 Aliphatics (TIC)	16.09	TIC	5286863	12.178 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	4732720	13.032 ng	100
18) 2,3-Dimethylheptane	18.37	TIC	13097134	No Calib	
19) n-Nonane	19.06	TIC	12746743	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	3486594	12.340 ng	100
22) Isopropylbenzene	19.39	120	1477427	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	1654895	No Calib	
24) 1,3,5-Trimethylbenzene	20.01	120	2236428	No Calib	
25) n-Decane	20.44	TIC	13516214	No Calib	
26) p-Isopropyltoluene	20.73	134	1324631	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	2416183	No Calib	
28) Butylcyclohexane	20.95	TIC	14813078	No Calib	
29) n-Undecane	21.51	TIC	13852813	No Calib	
30) n-Dodecane	22.43	TIC	14151868	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.95	TIC	14813078	162.376 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	2416183	128.326 ng	100
33) C9-C10 Aromatics (m/z ...	20.73	134	1324631	125.292 ng	100
34) C5C8_TIC_1	16.09	TIC	5286863	1.934 ng	100
35) C5C8 TIC 2	16.09	TIC	5286863	1.934 ng	100
36) C5C8 TIC 3	16.09	TIC	5286863	1.934 ng	100
37) C5C8 TIC 4	16.09	TIC	5286863	1.934 ng	100
38) C9C12 TIC 1	20.95	TIC	14813078	27.336 ng	100
39) C9C12 TIC 2	20.95	TIC	14813078	27.336 ng	100
40) C9C12 TIC 3	20.95	TIC	14813078	27.336 ng	100
41) C9C12 TIC 4	20.95	TIC	14813078	27.336 ng	100
42) C9C10 TIC 1	20.74	120	2416183	26.136 ng	100
43) C9C10 TIC 2	20.73	134	1324631	25.518 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091703.D
Acq On : 9 Mar 2017 3:28 Operator: LH
Sample : CCV M16030917 25ng
Misc : S29-03071701/S29-02221702 (4/21)
ALS Vial : 4 Sample Multiplier: 1

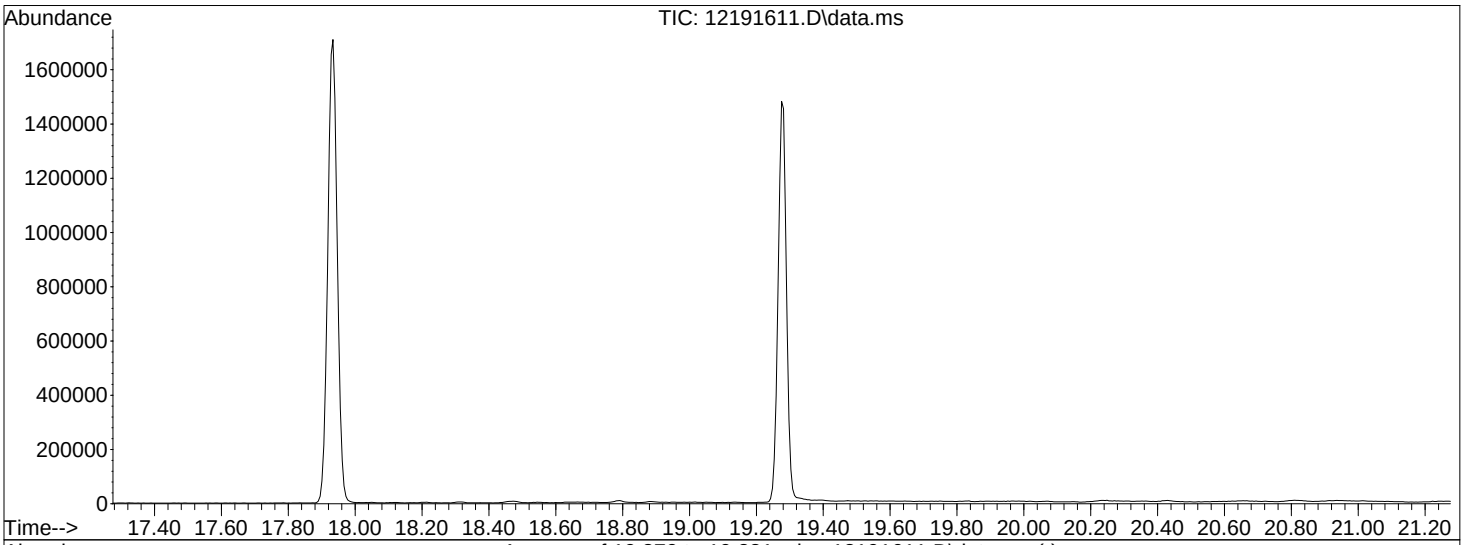
Quant Time: Mar 09 07:14:37 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

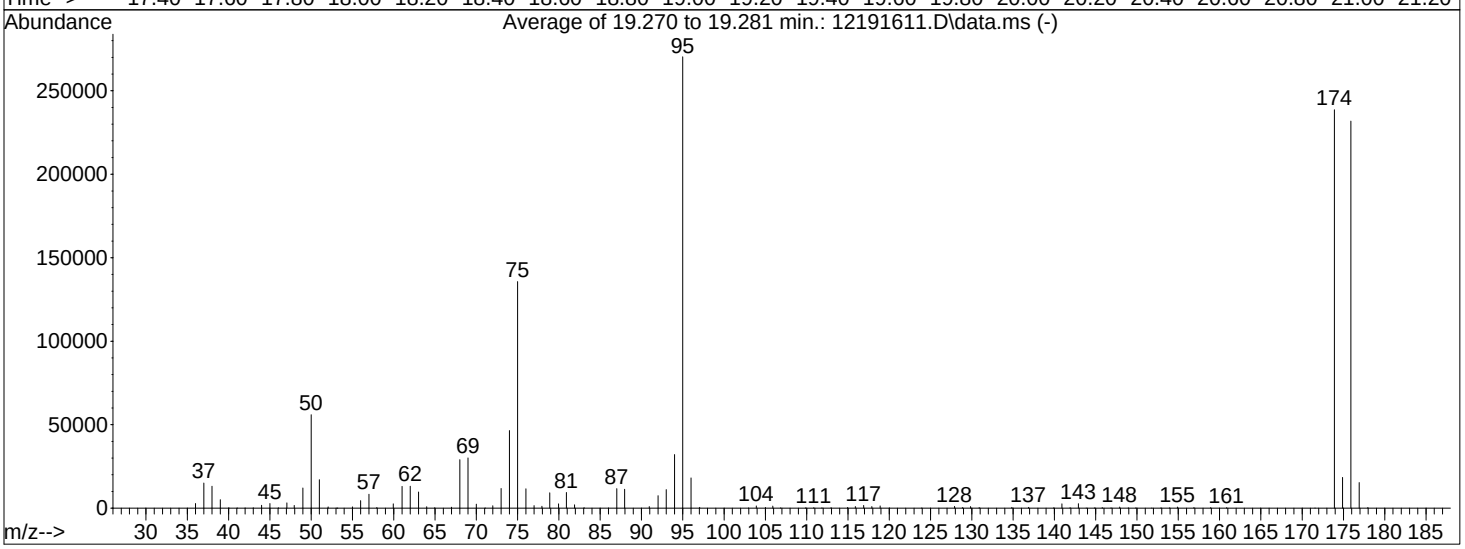


Data Path : I:\MS16\DATA\2016 12\19\
Data File : 12191611.D
Acq On : 19 Dec 2016 18:59
Operator : LH
Sample : 12.5ng TO-15 BFB
Misc : S29-12061601
ALS Vial : 2 Sample Multiplier: 1

Integration File: RTEINT.P

Method : I:\MS16\METHODS\M16121916.M
Title : Massachusetts APH
Last Update : Tue Dec 20 14:50:26 2016





AutoFind: Scans 2852, 2853, 2854; Background Corrected with Scan 2843

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	20.7	56021	PASS
75	95	30	66	50.2	135707	PASS
95	95	100	100	100.0	270357	PASS
96	95	5	9	6.7	18099	PASS
173	174	0.00	2	0.0	0	PASS
174	95	50	120	88.3	238592	PASS
175	174	4	9	7.7	18392	PASS
176	174	93	101	97.2	231808	PASS
177	176	5	9	6.6	15296	PASS

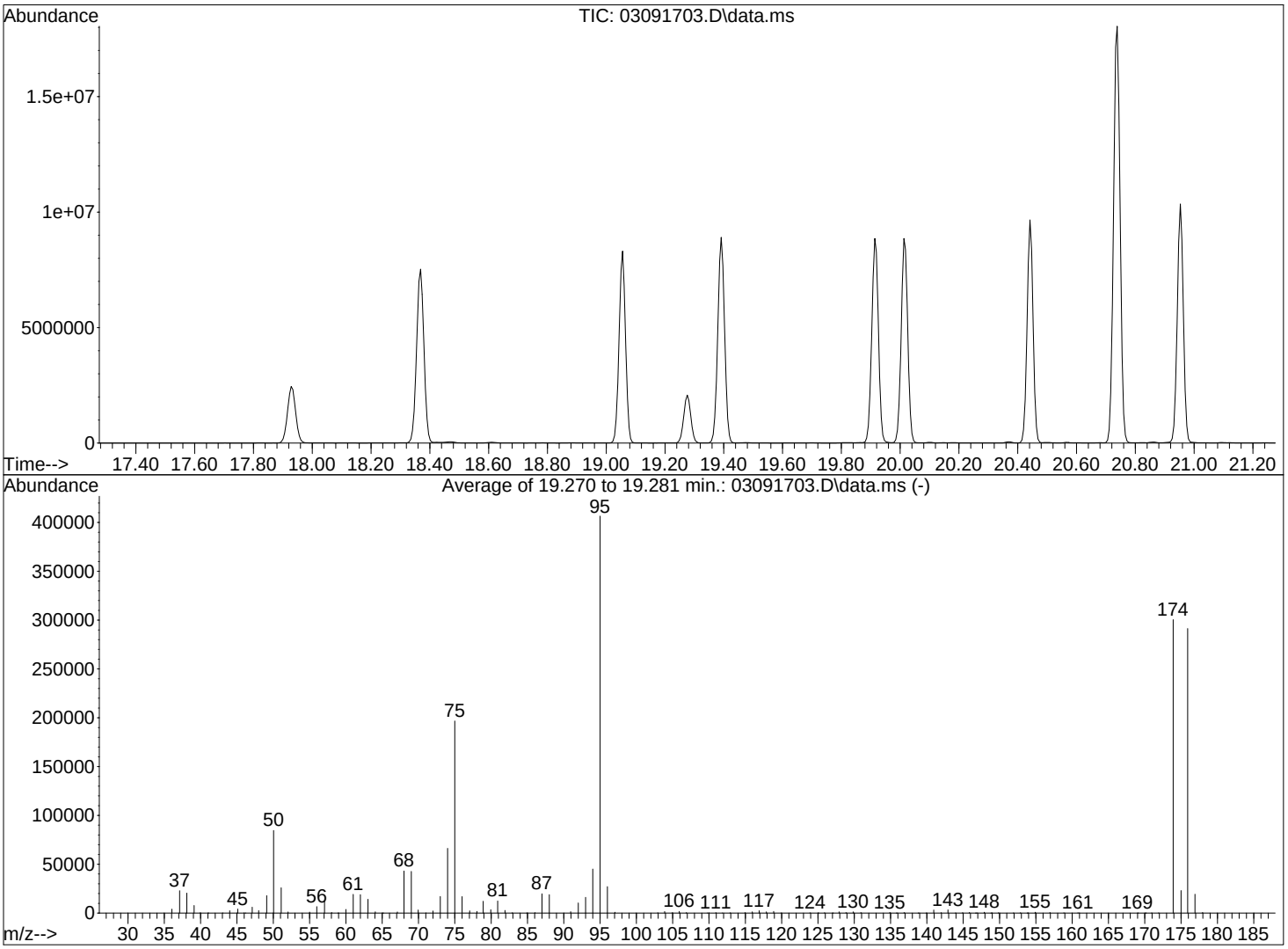
LH 12/20/16

BFB

Data Path : I:\MS16\DATA\2017 03\09\
Data File : 03091703.D
Acq On : 9 Mar 2017 3:28
Operator : LH
Sample : CCV M16030917 25ng
Misc : S29-03071701/S29-02221702 (4/21)
ALS Vial : 4 Sample Multiplier: 1

Integration File: RTEINT.P

Method : I:\MS16\METHODS\M16121916.M
Title : Massachusetts APH
Last Update : Tue Dec 20 16:11:55 2016



AutoFind: Scans 2852, 2853, 2854; Background Corrected with Scan 2842

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	20.8	84627	PASS
75	95	30	66	48.4	196736	PASS
95	95	100	100	100.0	406528	PASS
96	95	5	9	6.7	27139	PASS
173	174	0.00	2	0.0	0	PASS
174	95	50	120	73.9	300416	PASS
175	174	4	9	7.7	23021	PASS
176	174	93	101	97.0	291371	PASS
177	176	5	9	6.7	19381	PASS

LH 3/9/17

Injection Log

Directory: J:\MS16\DATA\2016_12\19\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	12/19/16 8:58	12191601.D	Blank (100mL)	S29-12061601	LH	2	
2	12/19/16 10:27	12191602.D	Blank (100mL)	S29-12061601	LH	2	
3	12/19/16 11:01	12191603.D	0.1ng std check	S29-12061601/S29-11301611 (12/29)	LH	6	
4	12/19/16 12:03	12191604.D	Blank (100mL)	S29-12061601	LH	2	
5	12/19/16 12:36	12191605.D	Blank (100mL)	S29-12061601	LH	2	
6	12/19/16 13:09	12191606.D	Blank (100mL)	S29-12061601	LH	2	
7	12/19/16 13:43	12191607.D	Blank (100mL)	S29-12061601	LH	2	
8	12/19/16 17:19	12191608.D	1.0ng std check	S29-12061601/S29-12191607 (1/17)	LH	8	
9	12/19/16 17:52	12191609.D	5.0ng std check	S29-12061601/S29-12191605 (1/17)	LH	9	
10	12/19/16 18:26	12191610.D	25ng std check	S29-12061601/S29-12191605 (1/17)	LH	2	
11	12/19/16 18:59	12191611.D	12.5ng TO-15 BFB	S29-12061601	LH	2	
12	12/19/16 19:32	12191612.D	0.5ng MAPH ICAL STD	S29-12061601/S29-10281604 (12/25)	LH	7	
13	12/19/16 20:05	12191613.D	1.0ng MAPH ICAL STD	S29-12061601/S29-10281604 (12/25)	LH	7	
14	12/19/16 20:39	12191614.D	5.0ng MAPH ICAL STD	S29-12061601/S29-10281604 (12/25)	LH	7	
15	12/19/16 21:12	12191615.D	25ng MAPH ICAL STD	S29-12061601/S29-10281603 (12/25)	LH	4	
16	12/19/16 21:45	12191616.D	50ng MAPH ICAL STD	S29-12061601/S29-10281603 (12/25)	LH	4	
17	12/19/16 22:18	12191617.D	100ng MAPH ICAL STD	S29-12061601/S29-10281603 (12/25)	LH	4	
18	12/19/16 22:52	12191618.D	25ng MAPH ICV STD	S29-12061601/S29-12011603 (12/30)	LH	2	
19	12/19/16 23:25	12191619.D	12.5ng TO-15 BFB	S29-12061601	LH	2	
20	12/19/16 23:59	12191620.D	0.08ng TO-15 ICAL STD	S29-12061601/S29-12191607 (1/17)	LH	8	
21	12/20/16 0:33	12191621.D	0.1ng TO-15 ICAL STD	S29-12061601/S29-12191607 (1/17)	LH	8	
22	12/20/16 1:06	12191622.D	0.2ng TO-15 ICAL STD	S29-12061601/S29-12191607 (1/17)	LH	8	
23	12/20/16 1:39	12191623.D	0.4ng TO-15 ICAL STD	S29-12061601/S29-12191607 (1/17)	LH	8	
24	12/20/16 2:13	12191624.D	1.0ng TO-15 ICAL STD	S29-12061601/S29-12191605 (1/17)	LH	9	
25	12/20/16 2:46	12191625.D	5.0ng TO-15 ICAL STD	S29-12061601/S29-12191605 (1/17)	LH	9	
26	12/20/16 3:19	12191626.D	25ng TO-15 ICAL STD	S29-12061601/S29-12191603 (1/17)	LH	2	
27	12/20/16 3:52	12191627.D	50ng TO-15 ICAL STD	S29-12061601/S29-12191603 (1/17)	LH	2	
28	12/20/16 4:25	12191628.D	100ng TO-15 ICAL STD	S29-12061601/S29-12191603 (1/17)	LH	2	
29	12/20/16 4:58	12191629.D	25ng TO-15 ICV STD	S29-12061601/S29-12011603 (12/30)	LH	2	
30	12/20/16 5:32	12191630.D	Blank (100mL)	S29-12061601	LH	2	
	ICAL passed for all compounds 0.08ng-100ng, except: propene, methylene chloride 0.2ng-100ng, dichlorodifluoromethane,						
	chloromethane 0.1ng-100ng, acetonitrile, carbon disulfide, benzyl chloride, 1,2-dibromo-3-chloropropane, naphthalene 0.4ng-100ng,						
	vinyl chloride 2.0ng-500ng.						
				LH 12/21/16			
##							

Injection Log

Directory: I:\MS16\DATA\2017_03\09\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	3/9/17 2:20	03091701.D	CCV R16030917_25ng	S29-03071701/S29-02171704 (3/18)	LH	2	passed
2	3/9/17 2:54	03091702.D	CCV C16030917_25ng	S29-03071701/S29-03031405 (4/1)	LH	3	passed
3	3/9/17 3:28	03091703.D	CCV M16030917_25ng	S29-03071701/S29-02221702 (4/21)	LH	4	passed
4	3/9/17 4:02	03091704.D	MB R16030917_1000mL	S29-03071701 AC00442	LH	2	passed
5	3/9/17 4:35	03091705.D	LCS R16030917_25ng	S29-03071701/S29-03031707 (1/1)	LH	2	passed
6	3/9/17 5:09	03091706.D	LCSD R16030917_25ng	S29-03071701/S29-03031707 (1/1)	LH	2	passed
7	3/9/17 8:05	03091707.D	P1701055-003dil (5.0mL)	S29-03071701	LH	1	
8	3/9/17 8:38	03091708.D	P1701055-011dil (15mL)	S29-03071701	LH	12	
9	3/9/17 9:11	03091709.D	P1701055-012dil (15mL)	S29-03071701	LH	13	
10	3/9/17 9:45	03091710.D	P1701055-013dil (5.0mL)	S29-03071701	LH	1	
11	3/9/17 10:20	03091711.D	P1700972-004dil (25mL)	S29-03071701	LH	6	
12	3/9/17 10:54	03091712.D	P1701055-014dil (20mL)	S29-03071701	LH	15	
13	3/9/17 11:27	03091713.D	P1701055-016dil (5.0mL)	S29-03071701	LH	1	
14	3/9/17 12:03	03091714.D	P1701057-001 (4.0mL)	S29-03071701	LH	1	
15	3/9/17 13:53	03091715.D	P1700971-003 (20mL)	S29-03071701	LH	8	over diluted
16	3/9/17 14:59	03091716.D	P1701057-002 (1000mL)	S29-03071701	LH	16	
17	3/9/17 15:48	03091717.D	P1700971-001 (1000mL)	S29-03071701	LH	6	
18	3/9/17 16:35	03091718.D	P1700971-002 (1000mL)	S29-03071701	LH	7	
19	3/9/17 17:09	03091719.D	P1700971-003 (120mL)	S29-03071701	LH	8	
20	3/9/17 17:43	03091720.D	P1700971-004 (1000mL)	S29-03071701	LH	9	
21	3/9/17 18:17	03091721.D	P1700971-005 (1000mL)	S29-03071701	LH	10	
22	3/9/17 18:50	03091722.D	P1700971-006 (35mL)	S29-03071701	LH	11	
23	3/9/17 19:24	03091723.D	P1700971-006dup (35mL)	S29-03071701	LH	11	passed
24	3/9/17 19:58	03091724.D	Blank (100mL)	S29-03071701	LH	2	
25	3/9/17 20:32	03091725.D	P1701095-001 (400mL)	S29-03071701	LH	12	
26	3/9/17 21:06	03091726.D	P1701120-001 (400mL)	S29-03071701	LH	13	
27	3/9/17 21:39	03091727.D	P1701137-001 (400mL)	S29-03071701	LH	14	

LH 3/10/17

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091717.D
Acq On : 9 Mar 2017 15:48 Operator: LH
Sample : P1700971-001 (1000mL)
Misc : S29-03071701
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Mar 10 16:11:44 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/10/17

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.54	130	378501	12.500	ng	-0.04
37) 1,4-Difluorobenzene (IS2)	13.65	114	1931078	12.500	ng	-0.02
56) Chlorobenzene-d5 (IS3)	17.93	82	894613	12.500	ng	0.00

System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...	12.39	65	707972	13.020	ng	-0.03
Spiked Amount 12.500	Range 70 - 130		Recovery = 104.16%			
57) Toluene-d8 (SS2)	16.10	98	2062680	12.017	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.16%			
73) Bromofluorobenzene (SS3)	19.28	174	585217	10.681	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 85.44%			

Target Compounds

							Qvalue
2) Propene	4.20	42	30434m	0.582	ng		
3) Dichlorodifluoromethan...	4.37	85	171024	1.789	ng		99
4) Chloromethane	4.69	50	17583	0.224	ng		99
5) 1,2-Dichloro-1,1,2,2-t...	4.96	135	3440	N.D.			
6) Vinyl Chloride	0.00	62	0	N.D.			
7) 1,3-Butadiene	5.42	54	3391	N.D.			
8) Bromomethane	5.90	94	987	N.D.			
9) Chloroethane	0.00	64	0	N.D.			
10) Ethanol	6.61	45	120049	3.354	ng		100
11) Acetonitrile	6.92	41	9702	0.118	ng		94
12) Acrolein	7.12	56	6656	0.212	ng		92
13) Acetone	7.33	58	131291	3.653	ng		93
14) Trichlorofluoromethane	7.57	101	67666	0.825	ng		99
15) 2-Propanol (Isopropanol)	7.87	45	28581	0.233	ng		94
16) Acrylonitrile	8.18	53	1889	N.D.			
17) 1,1-Dichloroethene	0.00	96	0	N.D.			
18) 2-Methyl-2-Propanol (t...	8.82	59	4746	N.D.			
19) Methylene Chloride	8.80	84	11579	0.257	ng		98
20) 3-Chloro-1-propene (Al...	8.87	41	3744	N.D.			
21) Trichlorotrifluoroethane	9.22	151	12231	0.304	ng		86
22) Carbon Disulfide	9.09	76	15481	0.097	ng		97
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	10.46	73	1469	N.D.			
26) Vinyl Acetate	0.00	86	0	N.D. d			
27) 2-Butanone (MEK)	10.86	72	20848	0.672	ng	#	88
28) cis-1,2-Dichloroethene	11.36	61	895	N.D.			
29) Diisopropyl Ether	0.00	87	0	N.D.			
30) Ethyl Acetate	11.68	61	3864	0.219	ng		94
31) n-Hexane	11.63	57	39670	0.495	ng		97
32) Chloroform	11.70	83	4792	N.D.			
34) Tetrahydrofuran (THF)	12.17	72	2387	N.D.			
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.			
36) 1,2-Dichloroethane	12.51	62	2806	N.D.			
38) 1,1,1-Trichloroethane	12.78	97	507	N.D.			
39) Isopropyl Acetate	13.26	61	649	N.D.			
40) 1-Butanol	0.00	56	0	N.D. d			
41) Benzene	13.27	78	100028	0.507	ng		100
42) Carbon Tetrachloride	13.42	117	17623	0.269	ng		100
43) Cyclohexane	13.55	84	5066	N.D.			
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.			
45) 1,2-Dichloropropane	14.12	63	979	N.D.			
46) Bromodichloromethane	14.31	83	650	N.D.			
47) Trichloroethene	14.35	130	1726	N.D.			
48) 1,4-Dioxane	14.38	88	638	N.D.			
49) 2,2,4-Trimethylpentane...	0.00	57	0	N.D. d			

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091717.D
Acq On : 9 Mar 2017 15:48 Operator: LH
Sample : P1700971-001 (1000mL)
Misc : S29-03071701
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Mar 10 16:11:44 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

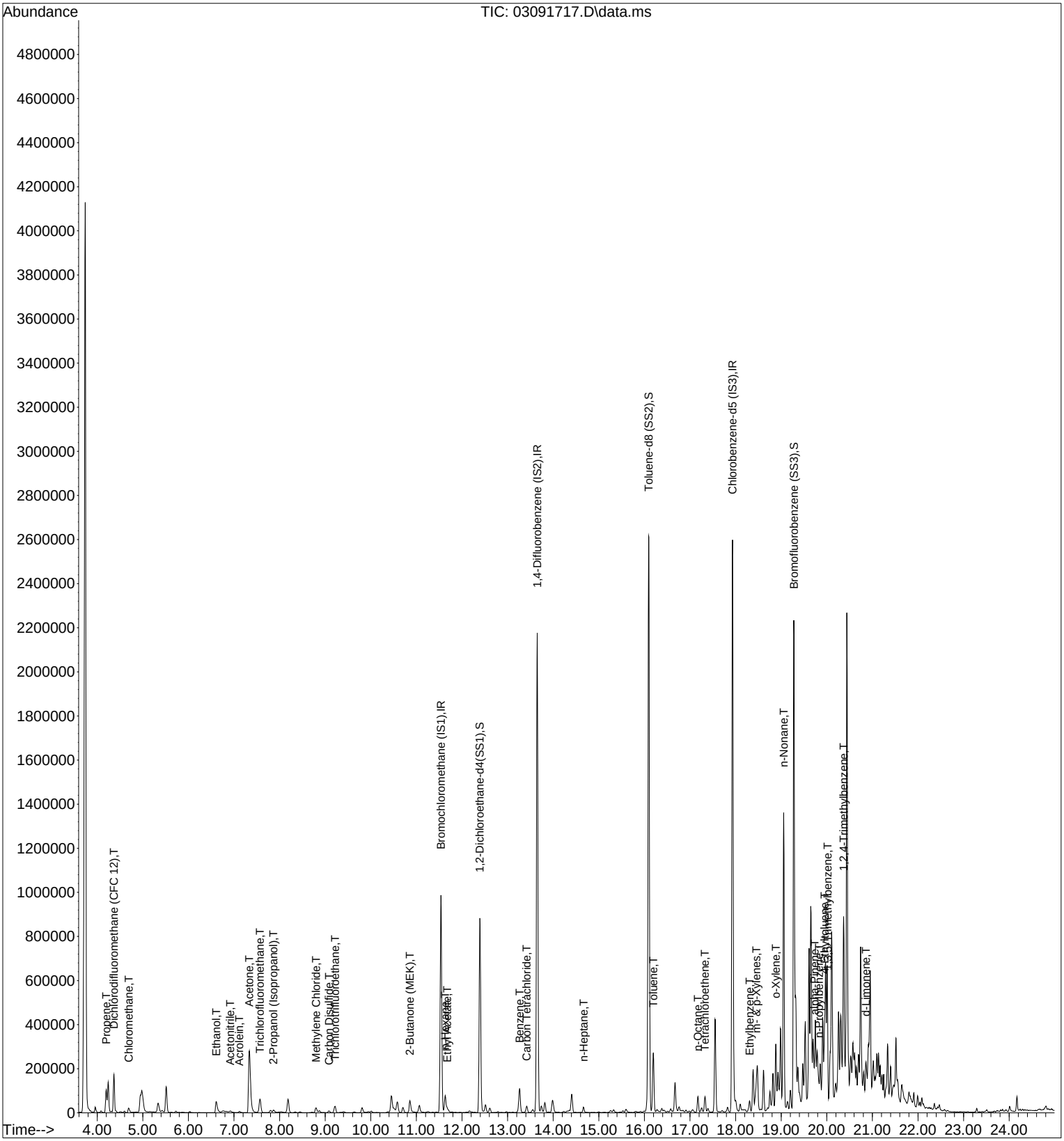
Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
50) Methyl Methacrylate	14.67	100	1563	N.D.		
51) n-Heptane	14.67	71	6174	0.130 ng		91
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.		
53) 4-Methyl-2-pentanone	15.26	58	2752	N.D.		
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.		
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.		
58) Toluene	16.20	91	216776	1.034 ng		99
59) 2-Hexanone	16.43	43	5788	N.D.		
60) Dibromochloromethane	0.00	129	0	N.D.		
61) 1,2-Dibromoethane	0.00	107	0	N.D.		
62) n-Butyl Acetate	17.06	43	7907	N.D.		
63) n-Octane	17.17	57	14558	0.316 ng		94
64) Tetrachloroethene	17.33	166	21509	0.379 ng		100
65) Chlorobenzene	17.99	112	8813	N.D.		
66) Ethylbenzene	18.31	91	36673	0.156 ng		99
67) m- & p-Xylenes	18.46	91	88658	0.483 ng		98
68) Bromoform	0.00	173	0	N.D.		
69) Styrene	18.78	104	4778	N.D.		
70) o-Xylene	18.89	91	38164	0.202 ng		99
71) n-Nonane	19.06	43	492201	4.331 ng		95
72) 1,1,2,2-Tetrachloroethane	18.89	83	5672	N.D.		
74) Cumene	19.39	105	6872	N.D.		
75) alpha-Pinene	19.73	93	15640	0.127 ng	#	1
76) n-Propylbenzene	19.83	91	25582	0.092 ng	#	77
77) 3-Ethyltoluene	0.00	105	0	N.D. d		
78) 4-Ethyltoluene	19.95	105	20491	0.098 ng		99
79) 1,3,5-Trimethylbenzene	20.02	105	20654	0.106 ng		96
80) alpha-Methylstyrene	20.15	118	596	N.D.		
81) 2-Ethyltoluene	0.00	105	0	N.D. d		
82) 1,2,4-Trimethylbenzene	20.37	105	65139	0.341 ng		89
83) n-Decane	0.00	57	0	N.D. d		
84) Benzyl Chloride	20.52	91	943	N.D.		
85) 1,3-Dichlorobenzene	20.57	146	1478	N.D.		
86) 1,4-Dichlorobenzene	20.57	146	1478	N.D.		
87) sec-Butylbenzene	20.60	105	5924	N.D.		
88) 4-Isopropyltoluene (p-...	20.74	119	14708	N.D.		
89) 1,2,3-Trimethylbenzene	0.00	105	0	N.D. d		
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.		
91) d-Limonene	20.86	68	10358	0.126 ng	#	72
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	22.35	180	579	N.D.		
95) Naphthalene	22.47	128	16659	N.D.		
96) n-Dodecane	22.43	57	5443	N.D.		
97) Hexachlorobutadiene	0.00	225	0	N.D.		
98) Cyclohexanone	0.00	55	0	N.D. d		
99) tert-Butylbenzene	20.37	119	8296	N.D.		
100) n-Butylbenzene	21.10	91	16007	N.D.		

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091717.D
Acq On : 9 Mar 2017 15:48 Operator: LH
Sample : P1700971-001 (1000mL)
Misc : S29-03071701
ALS Vial : 6 Sample Multiplier: 1

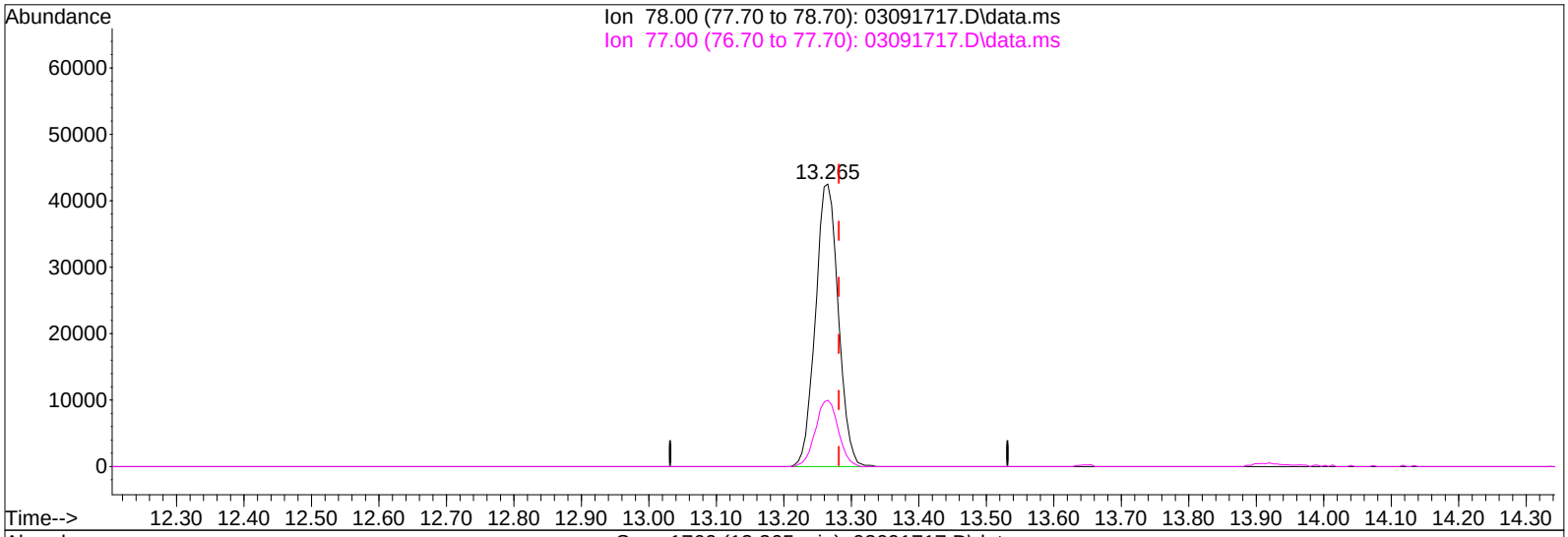
Quant Time: Mar 10 16:11:44 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

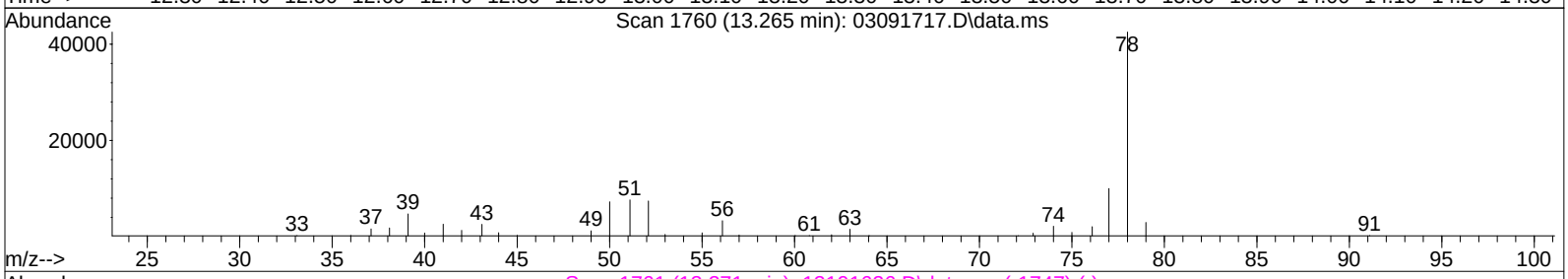


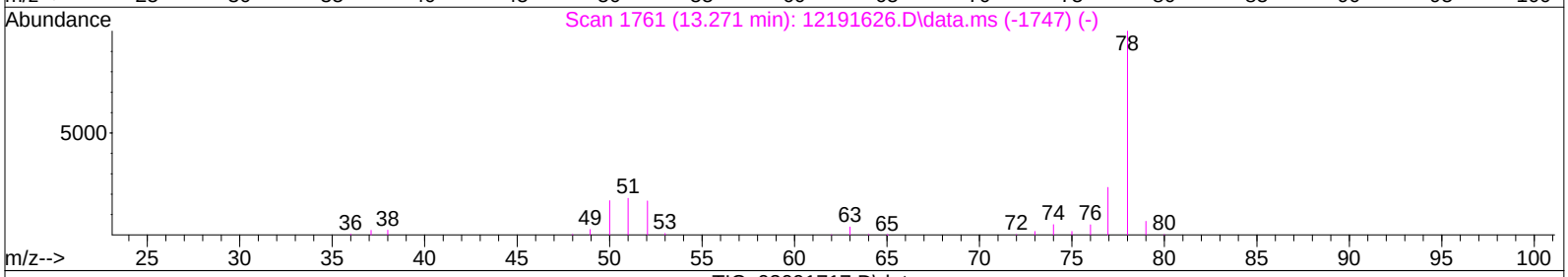
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091717.D
Acq On : 9 Mar 2017 15:48 Operator: LH
Sample : P1700971-001 (1000mL)
Misc : S29-03071701
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Mar 10 16:11:44 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 03091717.D\data.ms

(41) Benzene (T)

13.265min (-0.017) 0.51ng

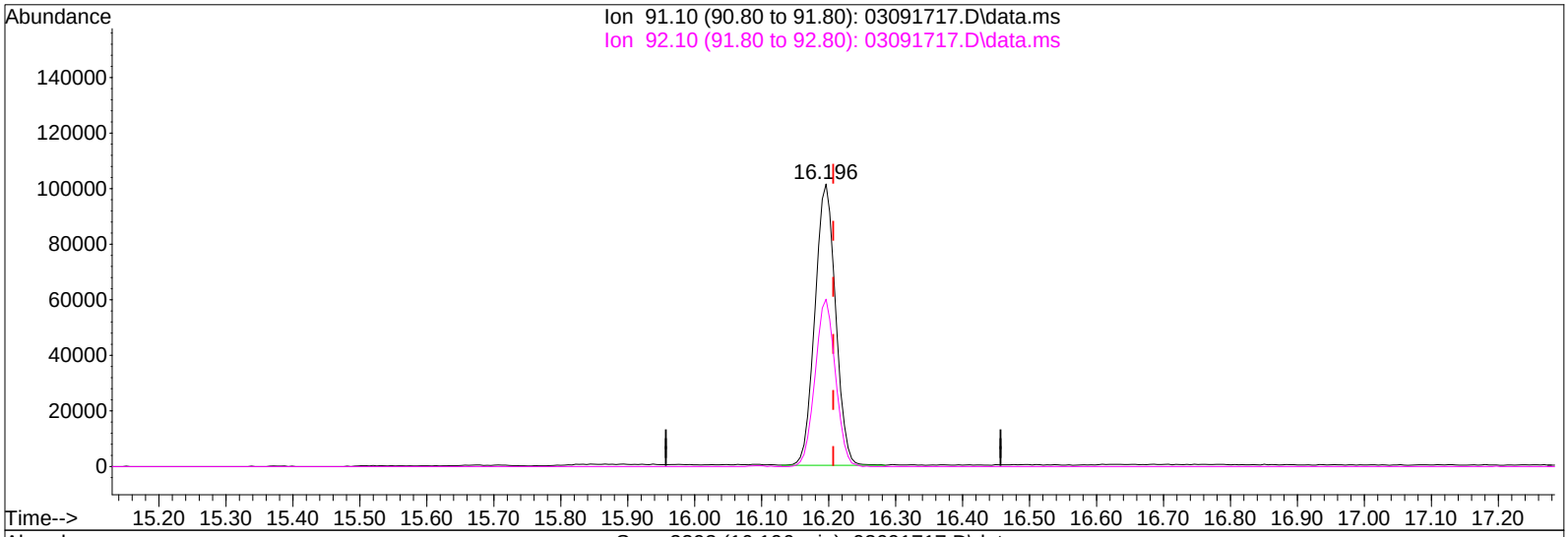
response 100028

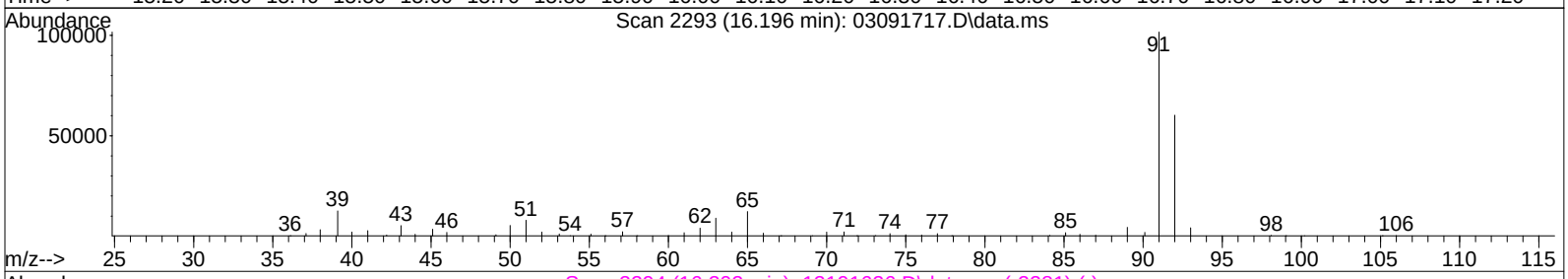
Ion	Exp%	Act%
78.00	100	100
77.00	23.50	23.52
0.00	0.00	0.00
0.00	0.00	0.00

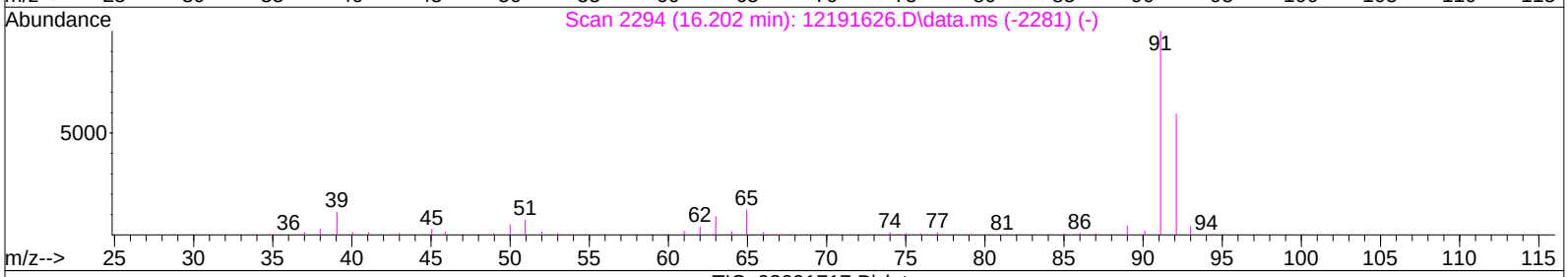
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091717.D
Acq On : 9 Mar 2017 15:48 Operator: LH
Sample : P1700971-001 (1000mL)
Misc : S29-03071701
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Mar 10 16:11:44 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 03091717.D\data.ms

(58) Toluene (T)

16.196min (-0.011) 1.03ng

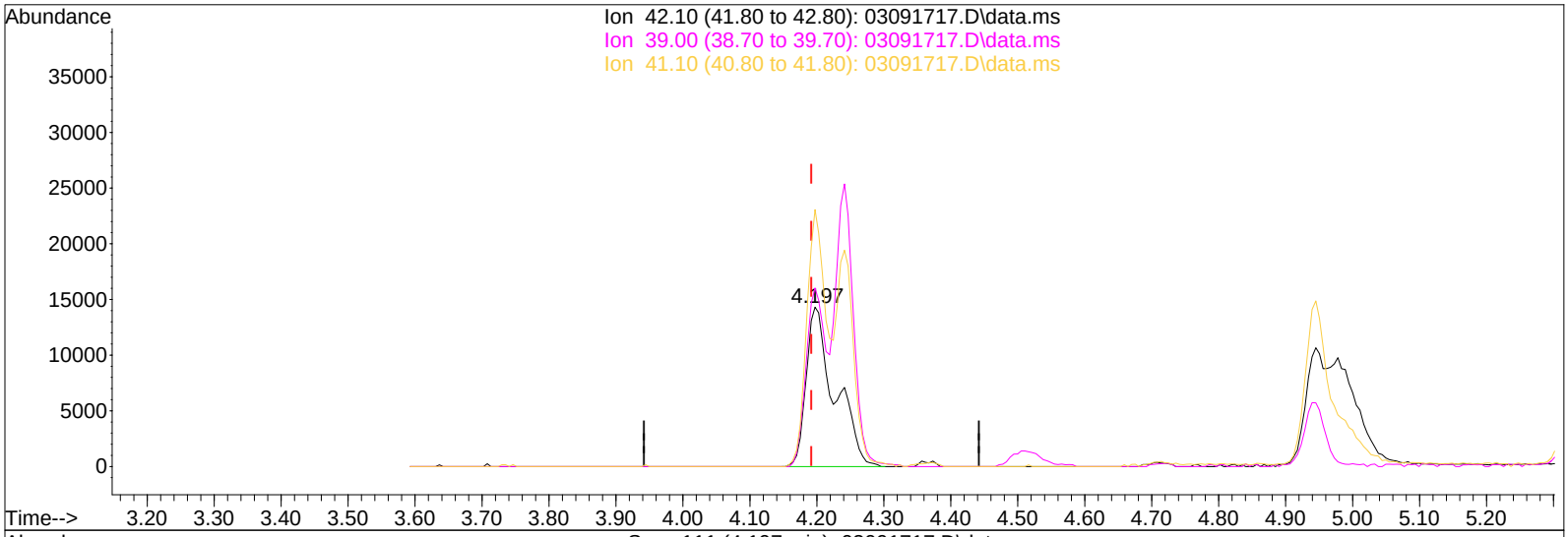
response 216776

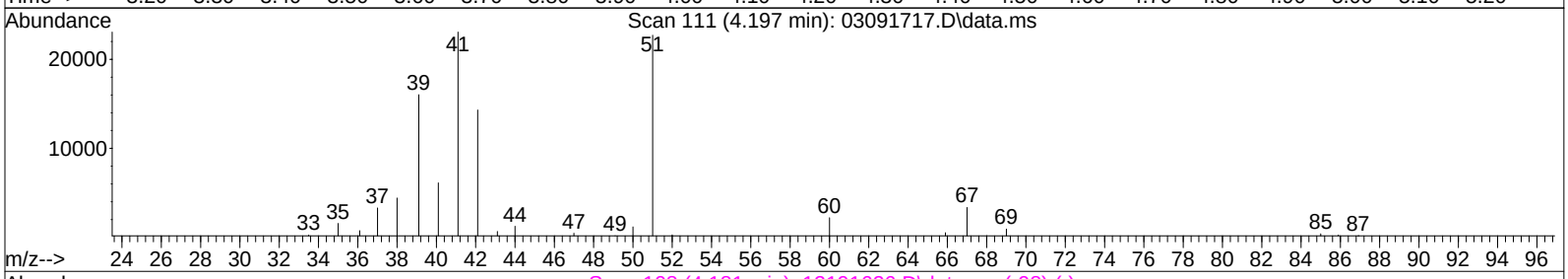
Ion	Exp%	Act%
91.10	100	100
92.10	59.10	58.62
0.00	0.00	0.00
0.00	0.00	0.00

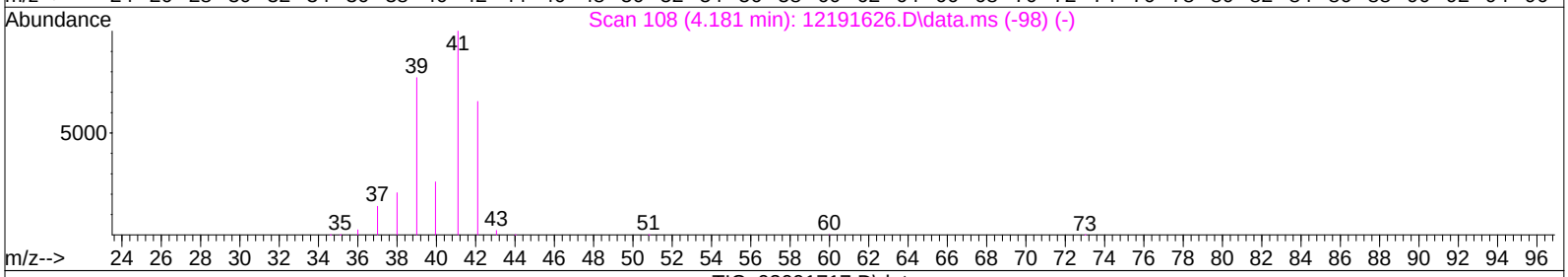
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091717.D
Acq On : 9 Mar 2017 15:48 Operator: LH
Sample : P1700971-001 (1000mL)
Misc : S29-03071701
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Mar 10 08:39:00 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 03091717.D\data.ms

(2) Propene (T)

4.197min (+0.005) 0.81ng

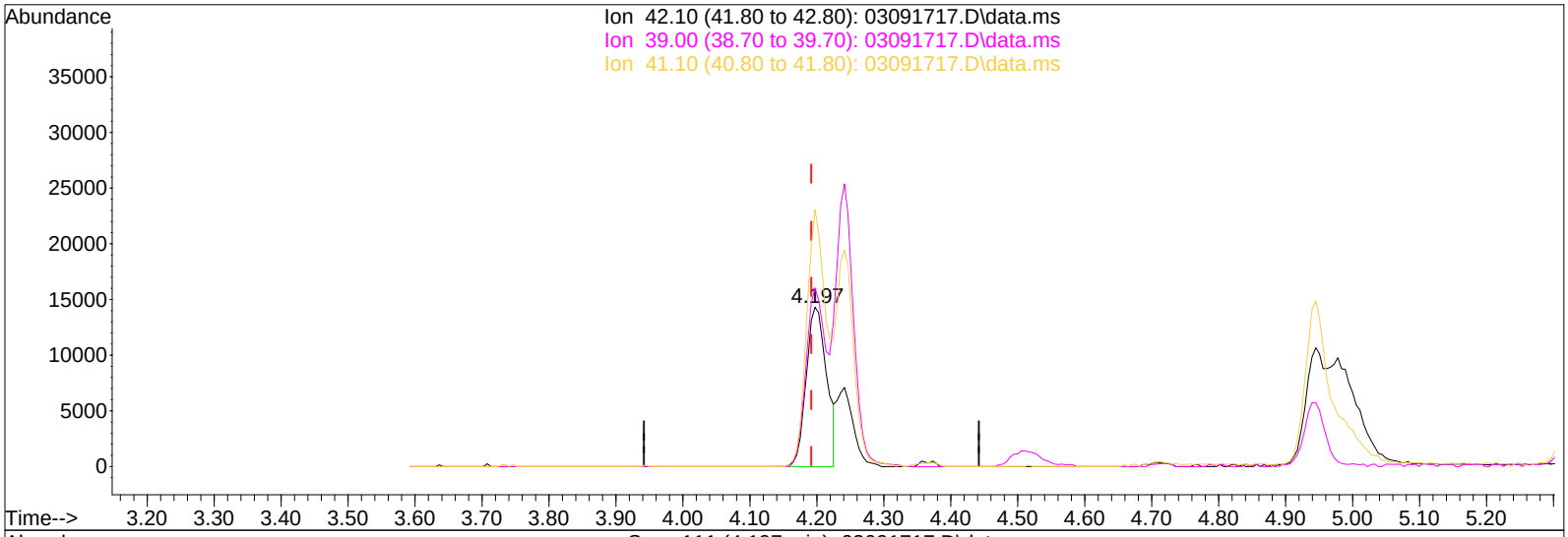
response 42508

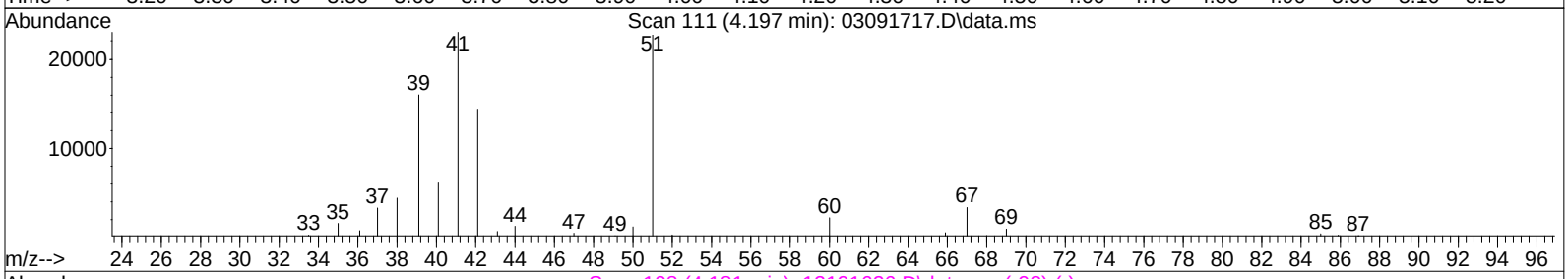
Ion	Exp%	Act%
42.10	100	100
39.00	118.20	78.62#
41.10	152.40	113.78#
0.00	0.00	0.00

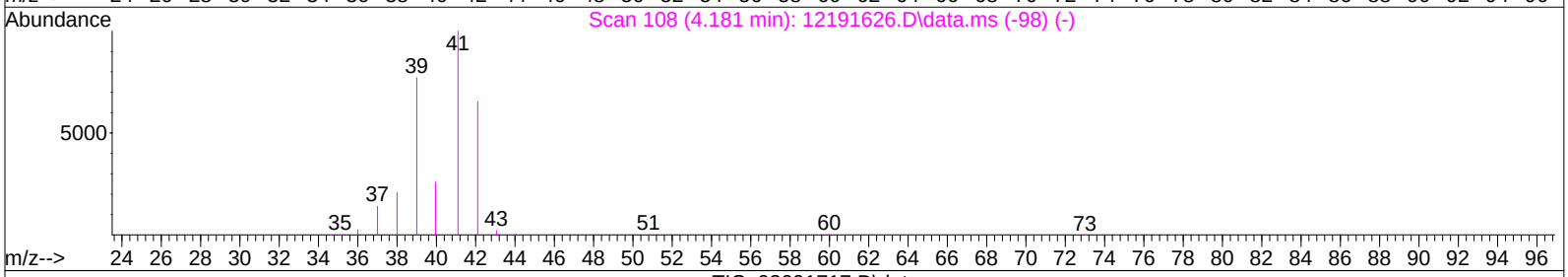
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091717.D
Acq On : 9 Mar 2017 15:48 Operator: LH
Sample : P1700971-001 (1000mL)
Misc : S29-03071701
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Mar 10 08:39:00 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 03091717.D\data.ms

(2) Propene (T)

4.197min (+0.005) 0.58ng m

response 30434

Ion	Exp%	Act%
42.10	100	100
39.00	118.20	109.81
41.10	152.40	158.92
0.00	0.00	0.00

IPC

LH 3/10/17

WA 03/13/17

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091718.D
Acq On : 9 Mar 2017 16:35 Operator: LH
Sample : P1700971-002 (1000mL)
Misc : S29-03071701
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Mar 10 16:16:53 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/10/17

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.54	130	392230	12.500	ng	-0.03
37) 1,4-Difluorobenzene (IS2)	13.65	114	2008469	12.500	ng	-0.02
56) Chlorobenzene-d5 (IS3)	17.93	82	929151	12.500	ng	0.00

System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...	12.40	65	734889	13.042	ng	-0.03
Spiked Amount 12.500	Range 70 - 130		Recovery = 104.32%			
57) Toluene-d8 (SS2)	16.10	98	2141087	12.010	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.08%			
73) Bromofluorobenzene (SS3)	19.28	174	599159	10.529	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 84.24%			

Target Compounds

							Qvalue
2) Propene	4.19	42	84730	1.563	ng		95
3) Dichlorodifluoromethan...	4.36	85	145675	1.470	ng		99
4) Chloromethane	4.68	50	15214	0.187	ng		96
5) 1,2-Dichloro-1,1,2,2-t...	4.95	135	2718	N.D.			
6) Vinyl Chloride	0.00	62	0	N.D.			
7) 1,3-Butadiene	5.41	54	7974	0.147	ng		95
8) Bromomethane	5.90	94	761	N.D.			
9) Chloroethane	6.24	64	545	N.D.			
10) Ethanol	6.83	45	63821999	1720.582	ng		97
11) Acetonitrile	6.91	41	42038	0.495	ng		95
12) Acrolein	7.11	56	23098	0.709	ng		94
13) Acetone	7.32	58	1255623	33.712	ng		93
14) Trichlorofluoromethane	7.57	101	143319	1.685	ng		99
15) 2-Propanol (Isopropanol)	7.94	45	422698	3.323	ng		99
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	8.80	84	17653	0.378	ng		96
20) 3-Chloro-1-propene (Al...	8.95	41	1374	N.D.			
21) Trichlorotrifluoroethane	9.22	151	9872	0.237	ng		90
22) Carbon Disulfide	9.07	76	26137	0.159	ng		98
23) trans-1,2-Dichloroethene	10.09	61	986	N.D.			
24) 1,1-Dichloroethane	0.00	63	0	N.D.			
25) Methyl tert-Butyl Ether	10.46	73	768	N.D.			
26) Vinyl Acetate	10.56	86	13936	1.279	ng	#	94
27) 2-Butanone (MEK)	10.85	72	36028	1.120	ng	#	90
28) cis-1,2-Dichloroethene	11.36	61	1106	N.D.			
29) Diisopropyl Ether	11.65	87	2681	N.D.			
30) Ethyl Acetate	11.65	61	163058	8.902	ng		91
31) n-Hexane	11.63	57	49559	0.596	ng		98
32) Chloroform	11.71	83	21133	0.245	ng		99
34) Tetrahydrofuran (THF)	12.15	72	6196	0.189	ng	#	1
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.			
36) 1,2-Dichloroethane	12.51	62	66863	0.945	ng		99
38) 1,1,1-Trichloroethane	12.78	97	571	N.D.			
39) Isopropyl Acetate	13.22	61	760	N.D.			
40) 1-Butanol	0.00	56	0	N.D. d			
41) Benzene	13.27	78	154620	0.754	ng		100
42) Carbon Tetrachloride	13.42	117	17230	0.253	ng		99
43) Cyclohexane	13.55	84	7598	0.100	ng		89
44) tert-Amyl Methyl Ether	13.85	73	513	N.D.			
45) 1,2-Dichloropropane	14.11	63	1369	N.D.			
46) Bromodichloromethane	14.31	83	2017	N.D.			
47) Trichloroethene	14.35	130	18627	0.346	ng		99
48) 1,4-Dioxane	14.37	88	1069	N.D.			
49) 2,2,4-Trimethylpentane...	0.00	57	0	N.D. d			

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091718.D
Acq On : 9 Mar 2017 16:35 Operator: LH
Sample : P1700971-002 (1000mL)
Misc : S29-03071701
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Mar 10 16:16:53 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

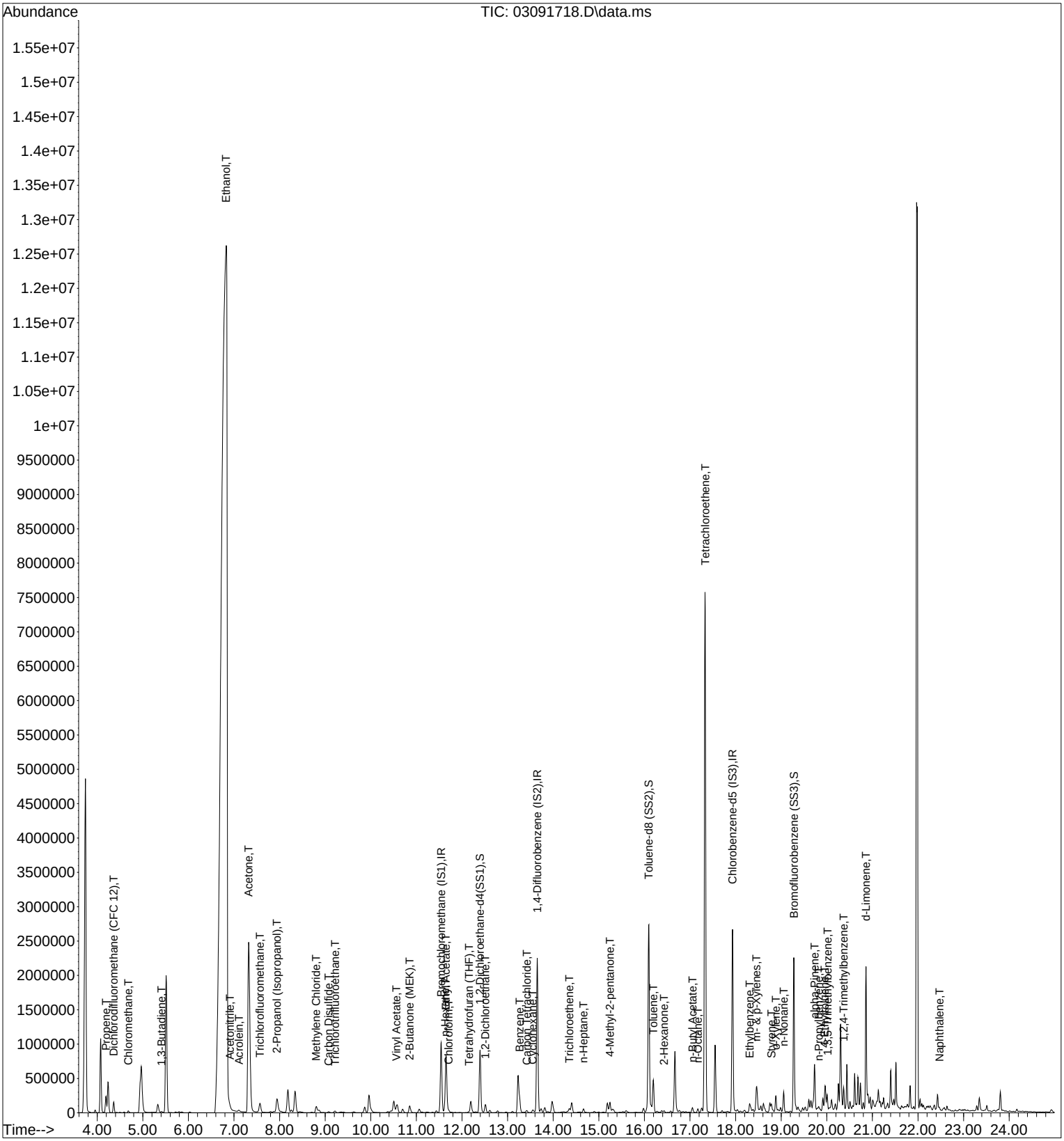
Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
50) Methyl Methacrylate	14.55	100	598	N.D.		
51) n-Heptane	14.66	71	13686	0.277 ng		93
52) cis-1,3-Dichloropropene	15.11	75	2242	N.D.		
53) 4-Methyl-2-pentanone	15.24	58	50677	1.029 ng		96
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.		
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.		
58) Toluene	16.20	91	379880	1.745 ng		99
59) 2-Hexanone	16.43	43	17583	0.131 ng	#	68
60) Dibromochloromethane	0.00	129	0	N.D.		
61) 1,2-Dibromoethane	0.00	107	0	N.D.		
62) n-Butyl Acetate	17.05	43	59334	0.411 ng		98
63) n-Octane	17.18	57	10811	0.226 ng		95
64) Tetrachloroethene	17.33	166	2272054	38.518 ng		99
65) Chlorobenzene	17.99	112	3307	N.D.		
66) Ethylbenzene	18.31	91	93308	0.381 ng		99
67) m- & p-Xylenes	18.46	91	276834	1.453 ng		98
68) Bromoform	0.00	173	0	N.D.		
69) Styrene	18.79	104	57479	0.389 ng		100
70) o-Xylene	18.89	91	105874	0.540 ng		96
71) n-Nonane	19.06	43	109059	0.924 ng		95
72) 1,1,2,2-Tetrachloroethane	18.87	83	1348	N.D.		
74) Cumene	19.39	105	9615	N.D.		
75) alpha-Pinene	19.73	93	258454	2.019 ng		97
76) n-Propylbenzene	19.83	91	28662	0.100 ng		87
77) 3-Ethyltoluene	0.00	105	0	N.D. d		
78) 4-Ethyltoluene	19.95	105	30238	0.140 ng		92
79) 1,3,5-Trimethylbenzene	20.02	105	34336	0.170 ng		97
80) alpha-Methylstyrene	20.14	118	2522	N.D.		
81) 2-Ethyltoluene	0.00	105	0	N.D. d		
82) 1,2,4-Trimethylbenzene	20.37	105	102320	0.515 ng		88
83) n-Decane	0.00	57	0	N.D. d		
84) Benzyl Chloride	20.50	91	652	N.D.		
85) 1,3-Dichlorobenzene	20.57	146	1983	N.D.		
86) 1,4-Dichlorobenzene	20.57	146	1983	N.D.		
87) sec-Butylbenzene	20.61	105	6652	N.D.		
88) 4-Isopropyltoluene (p-...	0.00	119	0	N.D. d		
89) 1,2,3-Trimethylbenzene	0.00	105	0	N.D. d		
90) 1,2-Dichlorobenzene	20.86	146	536	N.D.		
91) d-Limonene	20.86	68	492797	5.791 ng		96
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	22.36	180	560	N.D.		
95) Naphthalene	22.47	128	21896	0.101 ng		91
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	20.37	119	12978	N.D.		
100) n-Butylbenzene	21.09	91	18373	N.D.		

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091718.D
Acq On : 9 Mar 2017 16:35 Operator: LH
Sample : P1700971-002 (1000mL)
Misc : S29-03071701
ALS Vial : 7 Sample Multiplier: 1

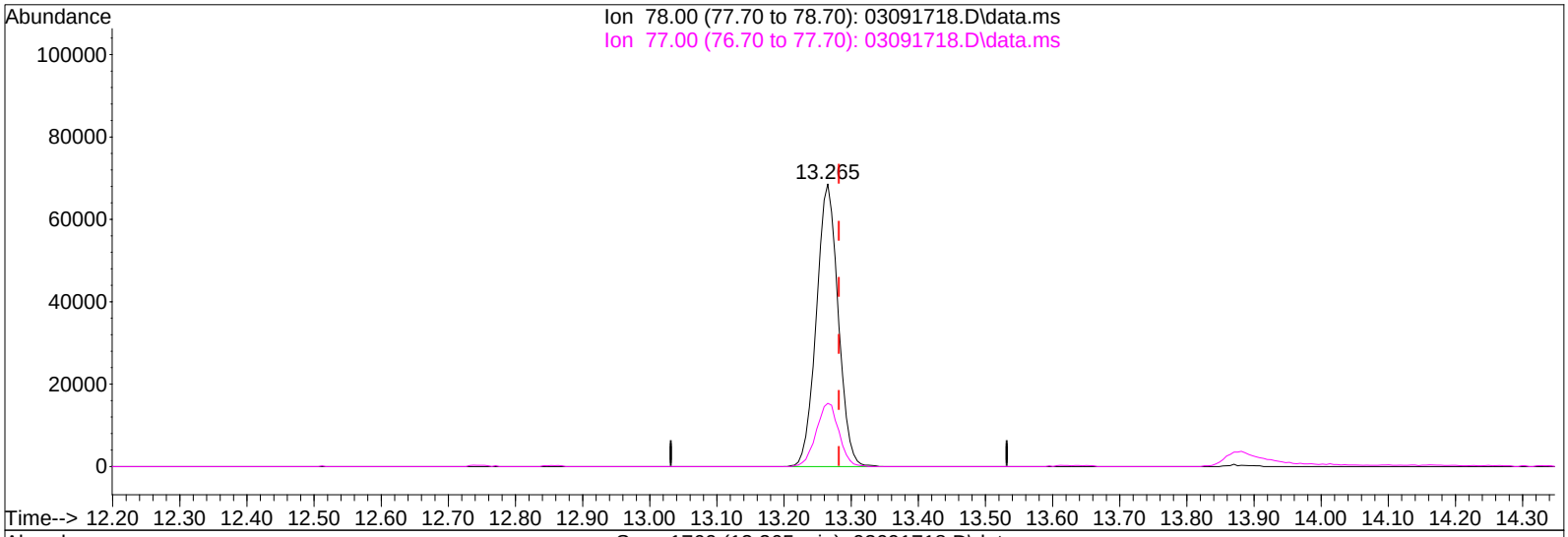
Quant Time: Mar 10 16:16:53 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

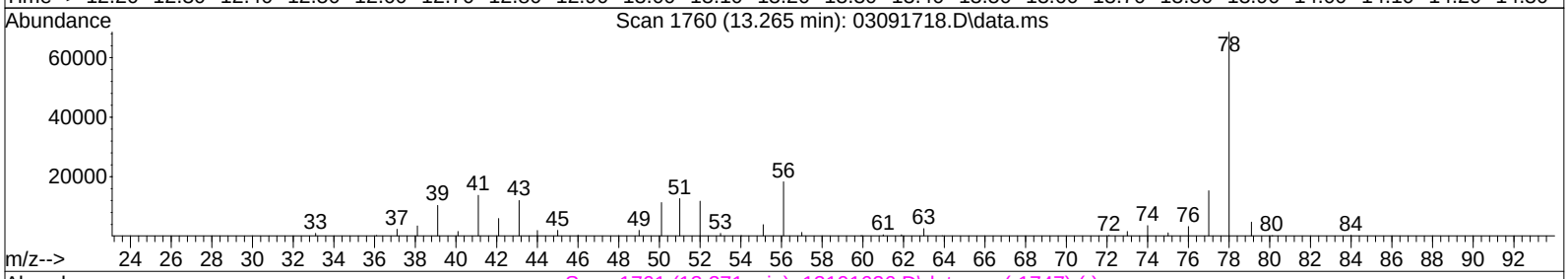


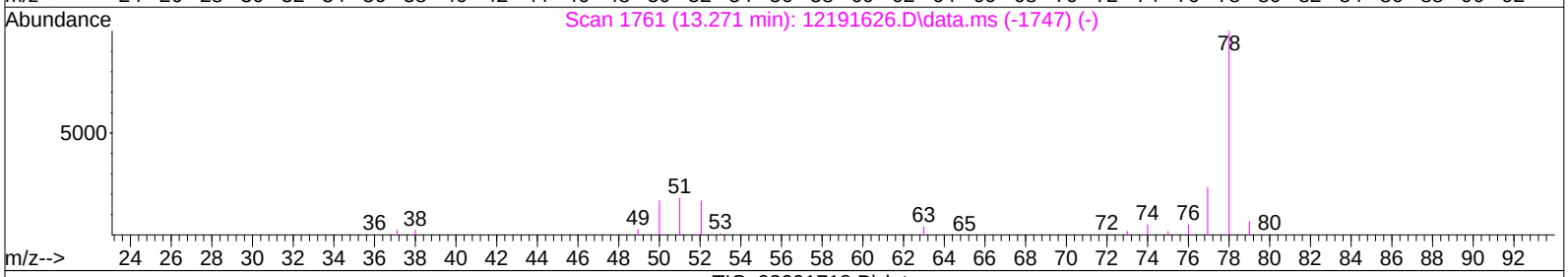
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091718.D
Acq On : 9 Mar 2017 16:35 Operator: LH
Sample : P1700971-002 (1000mL)
Misc : S29-03071701
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Mar 10 08:39:11 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 03091718.D\data.ms

(41) Benzene (T)

13.265min (-0.016) 0.75ng

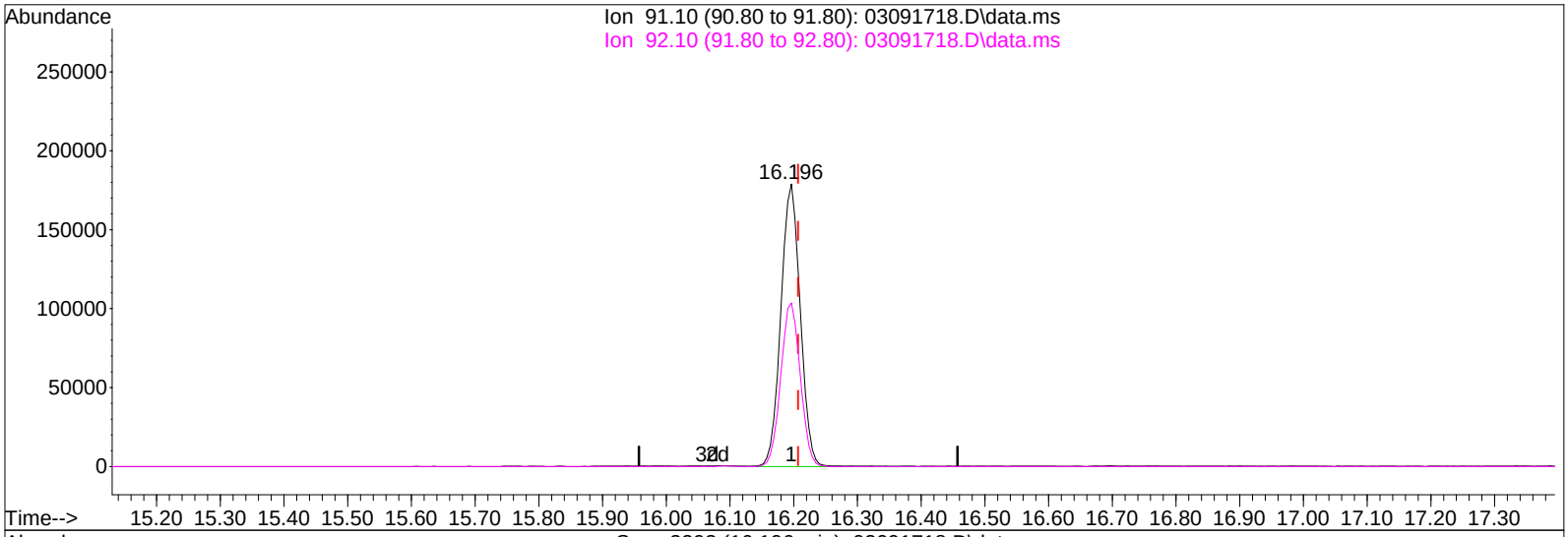
response 154620

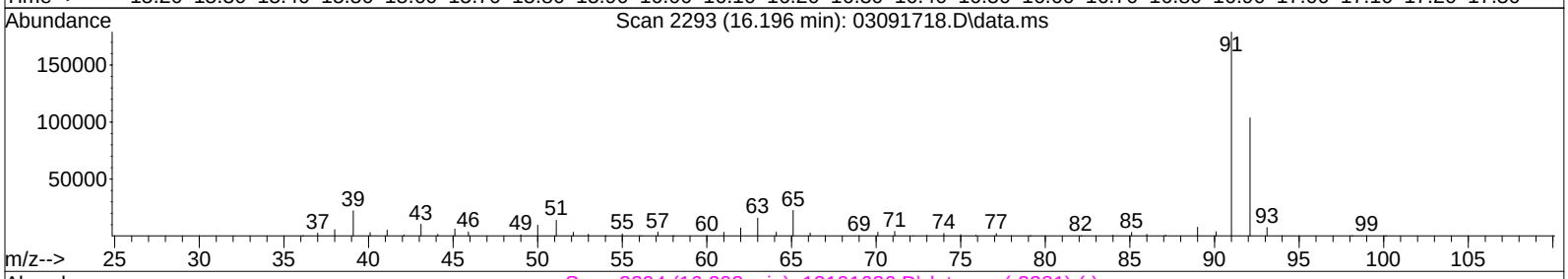
Ion	Exp%	Act%
78.00	100	100
77.00	23.50	23.26
0.00	0.00	0.00
0.00	0.00	0.00

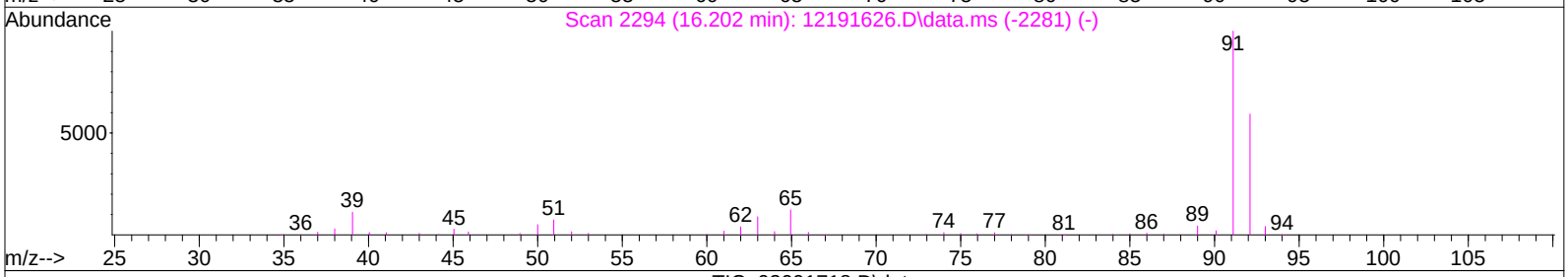
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091718.D
Acq On : 9 Mar 2017 16:35 Operator: LH
Sample : P1700971-002 (1000mL)
Misc : S29-03071701
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Mar 10 08:39:11 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 03091718.D\data.ms

(58) Toluene (T)

16.196min (-0.011) 1.75ng

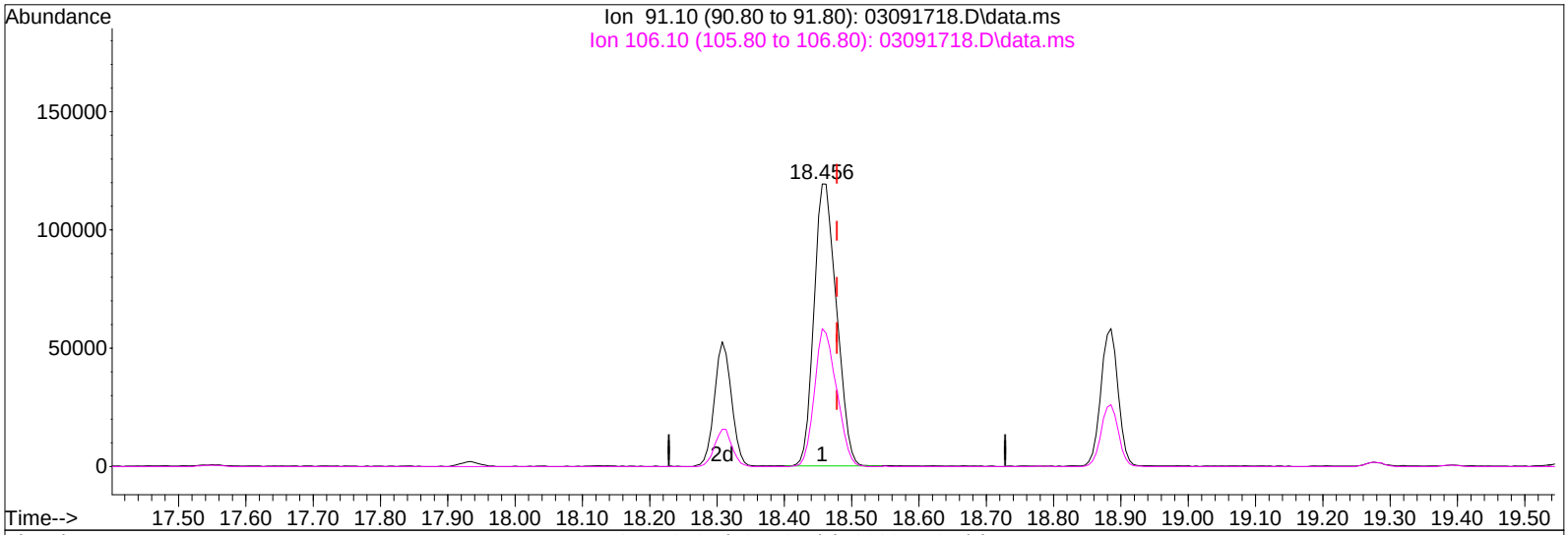
response 379880

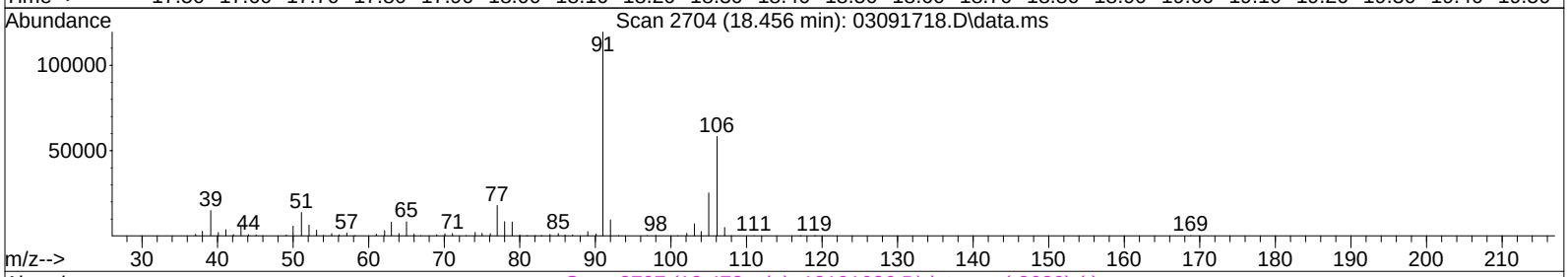
Ion	Exp%	Act%
91.10	100	100
92.10	59.10	57.98
0.00	0.00	0.00
0.00	0.00	0.00

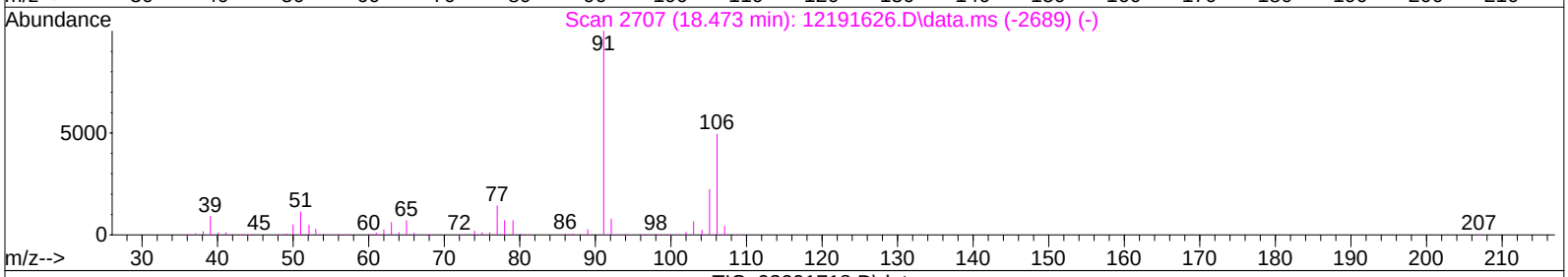
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091718.D
Acq On : 9 Mar 2017 16:35 Operator: LH
Sample : P1700971-002 (1000mL)
Misc : S29-03071701
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Mar 10 08:39:11 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 03091718.D\data.ms

(67) m- & p-Xylenes (T)

18.456min (-0.022) 1.45ng

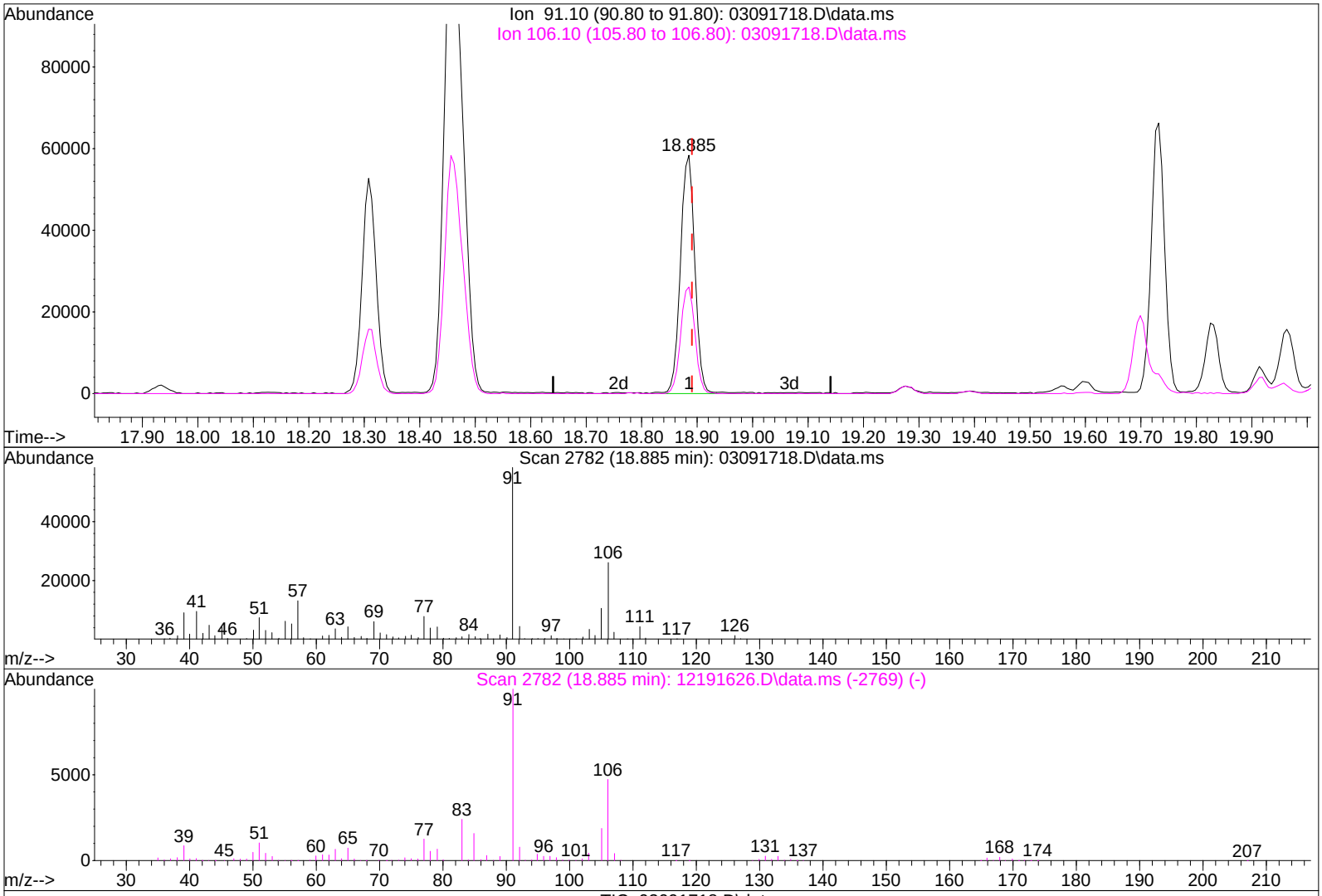
response 276834

Ion	Exp%	Act%
91.10	100	100
106.10	49.30	47.96
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091718.D
Acq On : 9 Mar 2017 16:35 Operator: LH
Sample : P1700971-002 (1000mL)
Misc : S29-03071701
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Mar 10 08:39:11 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



(70) o-Xylene (T)

18.885min (-0.005) 0.54ng

response 105874

Ion	Exp%	Act%
91.10	100	100
106.10	46.90	44.14
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091719.D
Acq On : 9 Mar 2017 17:09 Operator: LH
Sample : P1700971-003 (120mL)
Misc : S29-03071701
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Mar 10 16:18:50 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/10/17

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.53	130	372078	12.500	ng	-0.04
37) 1,4-Difluorobenzene (IS2)	13.64	114	1915899	12.500	ng	-0.03
56) Chlorobenzene-d5 (IS3)	17.93	82	875118	12.500	ng	0.00

System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.39	65	704213	13.175	ng	-0.03
Spiked Amount 12.500	Range 70 - 130		Recovery = 105.36%			
57) Toluene-d8 (SS2)	16.09	98	2027764	12.077	ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.64%			
73) Bromofluorobenzene (SS3)	19.28	174	564449	10.531	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 84.24%			

Target Compounds						Qvalue
2) Propene	4.20	42	7921	0.154	ng #	86
3) Dichlorodifluoromethan...	4.36	85	20487	0.218	ng	98
4) Chloromethane	4.69	50	7978	0.103	ng	96
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	5.42	54	1183	N.D.		
8) Bromomethane	0.00	94	0	N.D.		
9) Chloroethane	0.00	64	0	N.D.		
10) Ethanol	6.67	45	7739389	219.947	ng	100
11) Acetonitrile	6.91	41	11426	0.142	ng	93
12) Acrolein	7.11	56	4284	0.139	ng	89
13) Acetone	7.32	58	250879	7.101	ng	99
14) Trichlorofluoromethane	7.57	101	20373	0.253	ng	98
15) 2-Propanol (Isopropanol)	7.89	45	62883	0.521	ng	98
16) Acrylonitrile	8.18	53	926	N.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	8.79	84	11069	0.250	ng	96
20) 3-Chloro-1-propene (Al...	8.86	41	3069	N.D.		
21) Trichlorotrifluoroethane	9.21	151	1272	N.D.		
22) Carbon Disulfide	9.07	76	33411	0.214	ng	100
23) trans-1,2-Dichloroethene	0.00	61	0	N.D.		
24) 1,1-Dichloroethane	0.00	63	0	N.D.		
25) Methyl tert-Butyl Ether	0.00	73	0	N.D.		
26) Vinyl Acetate	10.55	86	2630	0.254	ng #	90
27) 2-Butanone (MEK)	10.86	72	17330	0.568	ng #	90
28) cis-1,2-Dichloroethene	0.00	61	0	N.D.		
29) Diisopropyl Ether	0.00	87	0	N.D.		
30) Ethyl Acetate	11.66	61	6967	0.401	ng	94
31) n-Hexane	11.63	57	7250	0.092	ng	95
32) Chloroform	11.70	83	3574	N.D.		
34) Tetrahydrofuran (THF)	12.15	72	3986	0.128	ng #	5
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.		
36) 1,2-Dichloroethane	12.51	62	9303	0.139	ng	97
38) 1,1,1-Trichloroethane	0.00	97	0	N.D.		
39) Isopropyl Acetate	0.00	61	0	N.D.		
40) 1-Butanol	0.00	56	0	N.D. d		
41) Benzene	13.26	78	23457	0.120	ng	98
42) Carbon Tetrachloride	13.42	117	2304	N.D.		
43) Cyclohexane	13.55	84	1207	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	14.34	130	3323	N.D.		
48) 1,4-Dioxane	14.36	88	4721	0.120	ng #	64
49) 2,2,4-Trimethylpentane...	0.00	57	0	N.D. d		

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091719.D
Acq On : 9 Mar 2017 17:09 Operator: LH
Sample : P1700971-003 (120mL)
Misc : S29-03071701
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Mar 10 16:18:50 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

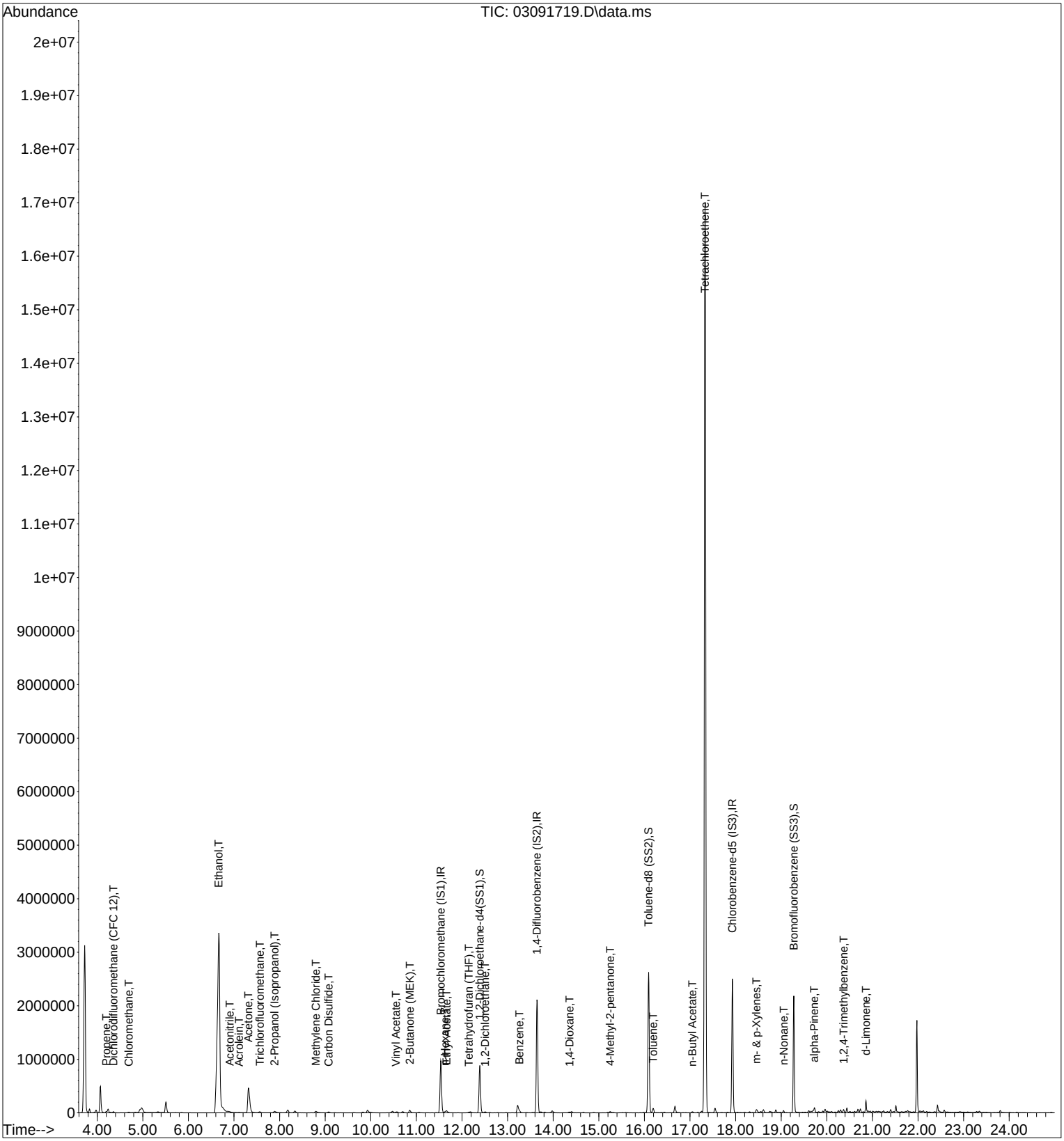
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	14.66	100	507	N.D.	
51) n-Heptane	14.67	71	1992	N.D.	
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
53) 4-Methyl-2-pentanone	15.25	58	7698	0.164 ng	90
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.	
58) Toluene	16.19	91	66036	0.322 ng	98
59) 2-Hexanone	16.43	43	7885	N.D.	
60) Dibromochloromethane	0.00	129	0	N.D.	
61) 1,2-Dibromoethane	0.00	107	0	N.D.	
62) n-Butyl Acetate	17.05	43	18660	0.137 ng	97
63) n-Octane	17.18	57	2165	N.D.	
64) Tetrachloroethene	17.33	166	5285075	95.129 ng	98
65) Chlorobenzene	17.98	112	1051	N.D.	
66) Ethylbenzene	18.31	91	14382	N.D.	
67) m- & p-Xylenes	18.46	91	42055	0.234 ng	97
68) Bromoform	0.00	173	0	N.D.	
69) Styrene	18.79	104	7248	N.D.	
70) o-Xylene	18.88	91	15912	N.D.	
71) n-Nonane	19.06	43	14308	0.129 ng	94
72) 1,1,2,2-Tetrachloroethane	18.81	83	503	N.D.	
74) Cumene	19.39	105	2363	N.D.	
75) alpha-Pinene	19.73	93	33310	0.276 ng	95
76) n-Propylbenzene	19.83	91	5500	N.D.	
77) 3-Ethyltoluene	19.91	105	12341	N.D.	
78) 4-Ethyltoluene	19.95	105	5928	N.D.	
79) 1,3,5-Trimethylbenzene	20.02	105	7281	N.D.	
80) alpha-Methylstyrene	20.30	118	639	N.D.	
81) 2-Ethyltoluene	20.18	105	6051	N.D.	
82) 1,2,4-Trimethylbenzene	20.37	105	18530	0.099 ng	88
83) n-Decane	0.00	57	0	N.D. d	
84) Benzyl Chloride	20.50	91	694	N.D.	
85) 1,3-Dichlorobenzene	20.56	146	868	N.D.	
86) 1,4-Dichlorobenzene	20.56	146	868	N.D.	
87) sec-Butylbenzene	20.60	105	1534	N.D.	
88) 4-Isopropyltoluene (p-...	20.73	119	15188	N.D.	
89) 1,2,3-Trimethylbenzene	20.74	105	6680	N.D.	
90) 1,2-Dichlorobenzene	20.86	146	618	N.D.	
91) d-Limonene	20.86	68	49972	0.623 ng	99
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	22.36	180	569	N.D.	
95) Naphthalene	22.47	128	10888	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	20.37	119	2831	N.D.	
100) n-Butylbenzene	21.08	91	4256	N.D.	

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091719.D
Acq On : 9 Mar 2017 17:09 Operator: LH
Sample : P1700971-003 (120mL)
Misc : S29-03071701
ALS Vial : 8 Sample Multiplier: 1

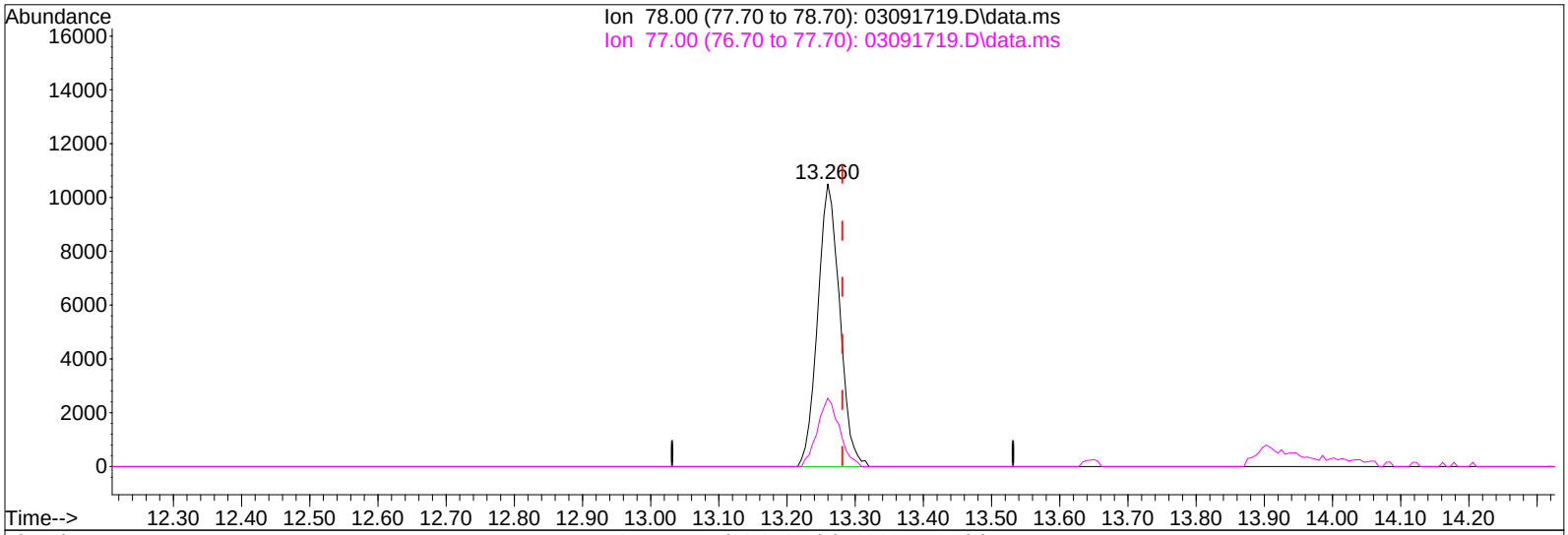
Quant Time: Mar 10 16:18:50 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

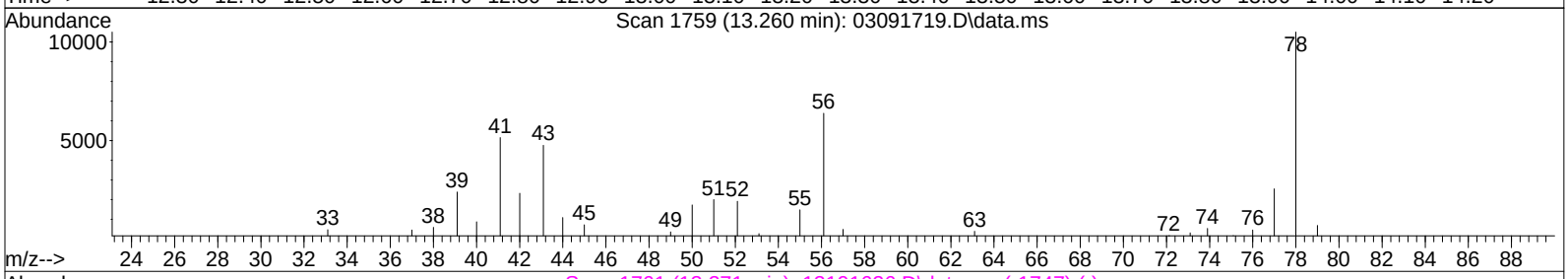


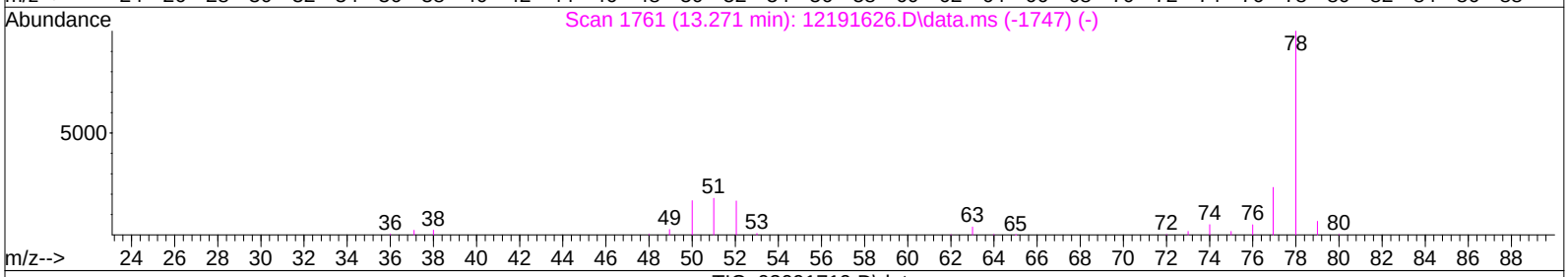
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091719.D
Acq On : 9 Mar 2017 17:09 Operator: LH
Sample : P1700971-003 (120mL)
Misc : S29-03071701
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Mar 10 08:39:27 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 03091719.D\data.ms

(41) Benzene (T)

13.260min (-0.022) 0.12ng

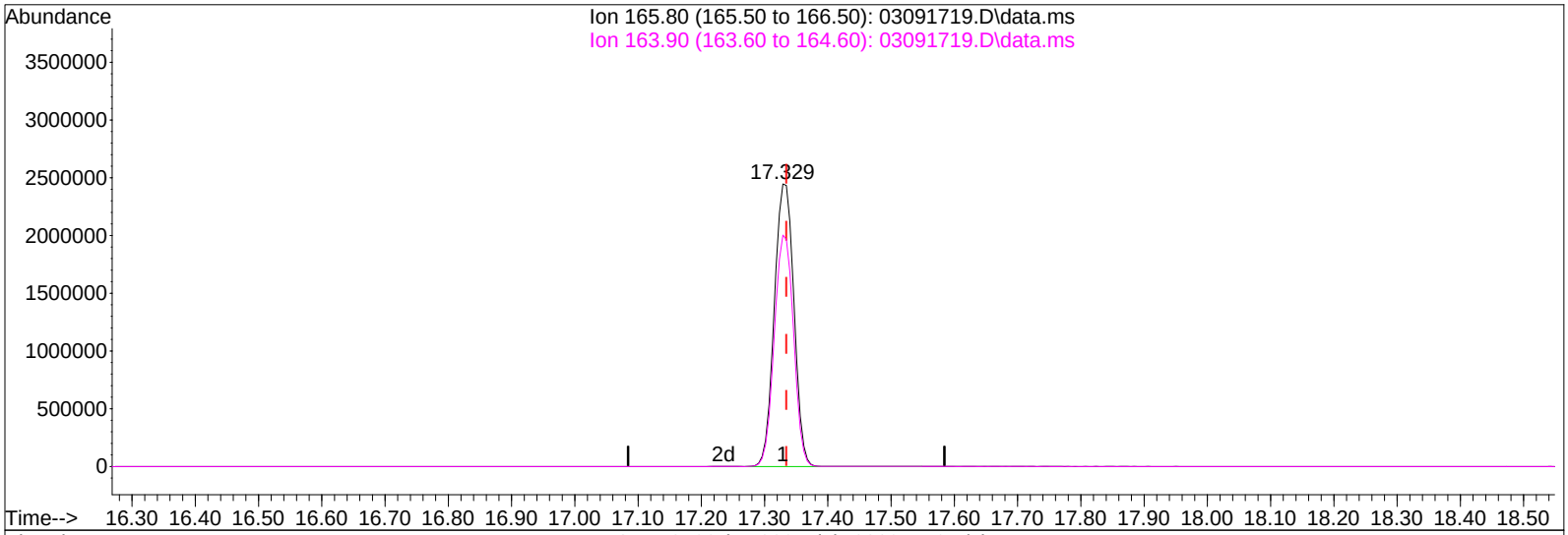
response 23457

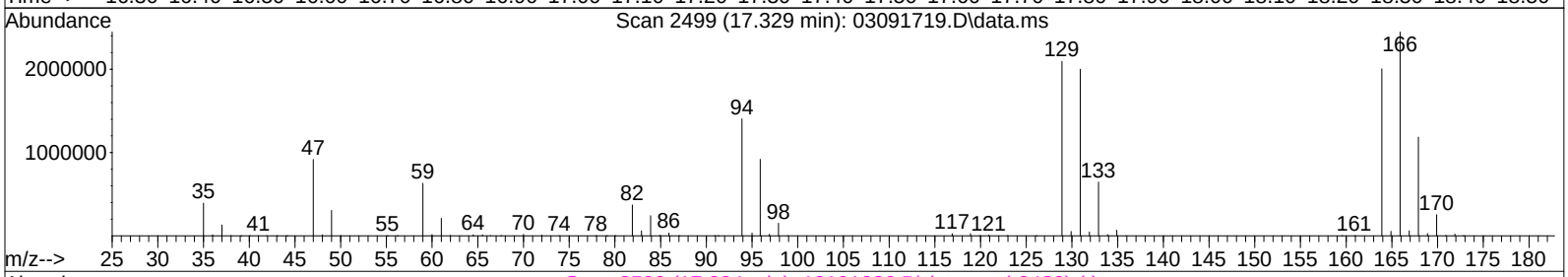
Ion	Exp%	Act%
78.00	100	100
77.00	23.50	24.30
0.00	0.00	0.00
0.00	0.00	0.00

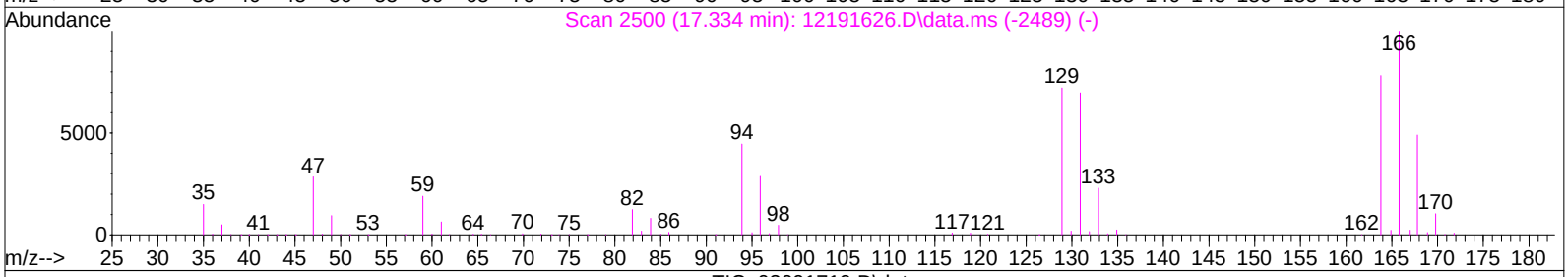
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091719.D
Acq On : 9 Mar 2017 17:09 Operator: LH
Sample : P1700971-003 (120mL)
Misc : S29-03071701
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Mar 10 08:39:27 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 03091719.D\data.ms

(64) Tetrachloroethene (T)

17.329min (-0.005) 95.13ng

response 5285075

Ion	Exp%	Act%
165.80	100	100
163.90	78.50	80.58
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091720.D
Acq On : 9 Mar 2017 17:43 Operator: LH
Sample : P1700971-004 (1000mL)
Misc : S29-03071701
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Mar 10 16:21:19 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/10/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.54	130	378958	12.500 ng	-0.04
37) 1,4-Difluorobenzene (IS2)	13.65	114	1943924	12.500 ng	-0.02
56) Chlorobenzene-d5 (IS3)	17.93	82	901232	12.500 ng	0.00
System Monitoring Compounds					
33) 1,2-Dichloroethane-d4(...	12.39	65	707649	12.999 ng	-0.03
Spiked Amount 12.500	Range 70 - 130		Recovery = 104.00%		
57) Toluene-d8 (SS2)	16.09	98	2071226	11.979 ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 95.84%		
73) Bromofluorobenzene (SS3)	19.28	174	582974	10.562 ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 84.48%		

Target Compounds					Qvalue
2) Propene	4.18	42	84093	1.605 ng	93
3) Dichlorodifluoromethan...	4.35	85	142409	1.488 ng	99
4) Chloromethane	4.68	50	15181	0.193 ng	98
5) 1,2-Dichloro-1,1,2,2-t...	4.94	135	2775	N.D.	
6) Vinyl Chloride	5.13	62	1772	N.D.	
7) 1,3-Butadiene	5.40	54	7463	0.143 ng	92
8) Bromomethane	5.88	94	715	N.D.	
9) Chloroethane	6.23	64	729	N.D.	
10) Ethanol	6.83	45	63290704	1766.016 ng	97
11) Acetonitrile	6.90	41	40417	0.492 ng	86
12) Acrolein	7.10	56	24249	0.770 ng	93
13) Acetone	7.31	58	1223339	33.996 ng	94
14) Trichlorofluoromethane	7.56	101	142106	1.730 ng	100
15) 2-Propanol (Isopropanol)	7.94	45	413431	3.364 ng	99
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	8.79	84	16738	0.371 ng	93
20) 3-Chloro-1-propene (Al...	0.00	41	0	N.D. d	
21) Trichlorotrifluoroethane	9.21	151	9972	0.248 ng	87
22) Carbon Disulfide	9.06	76	28239	0.177 ng	99
23) trans-1,2-Dichloroethene	10.09	61	834	N.D.	
24) 1,1-Dichloroethane	0.00	63	0	N.D.	
25) Methyl tert-Butyl Ether	10.50	73	2532	N.D.	
26) Vinyl Acetate	0.00	86	0	N.D. d	
27) 2-Butanone (MEK)	10.85	72	37579	1.210 ng	93
28) cis-1,2-Dichloroethene	11.36	61	13426	0.204 ng	93
29) Diisopropyl Ether	11.65	87	2735	N.D.	
30) Ethyl Acetate	11.65	61	173394	9.797 ng	91
31) n-Hexane	11.63	57	53705	0.669 ng	97
32) Chloroform	11.70	83	20589	0.247 ng	99
34) Tetrahydrofuran (THF)	12.14	72	6332	0.200 ng #	1
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.	
36) 1,2-Dichloroethane	12.51	62	66868	0.978 ng	99
38) 1,1,1-Trichloroethane	0.00	97	0	N.D.	
39) Isopropyl Acetate	13.21	61	834	N.D.	
40) 1-Butanol	0.00	56	0	N.D. d	
41) Benzene	13.26	78	154033	0.776 ng	100
42) Carbon Tetrachloride	13.42	117	17549	0.266 ng	100
43) Cyclohexane	13.54	84	8454	0.115 ng	97
44) tert-Amyl Methyl Ether	13.87	73	515	N.D.	
45) 1,2-Dichloropropane	14.12	63	1316	N.D.	
46) Bromodichloromethane	14.30	83	1560	N.D.	
47) Trichloroethene	14.35	130	12371	0.237 ng	95
48) 1,4-Dioxane	14.36	88	970	N.D.	
49) 2,2,4-Trimethylpentane...	0.00	57	0	N.D. d	

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091720.D
Acq On : 9 Mar 2017 17:43 Operator: LH
Sample : P1700971-004 (1000mL)
Misc : S29-03071701
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Mar 10 16:21:19 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

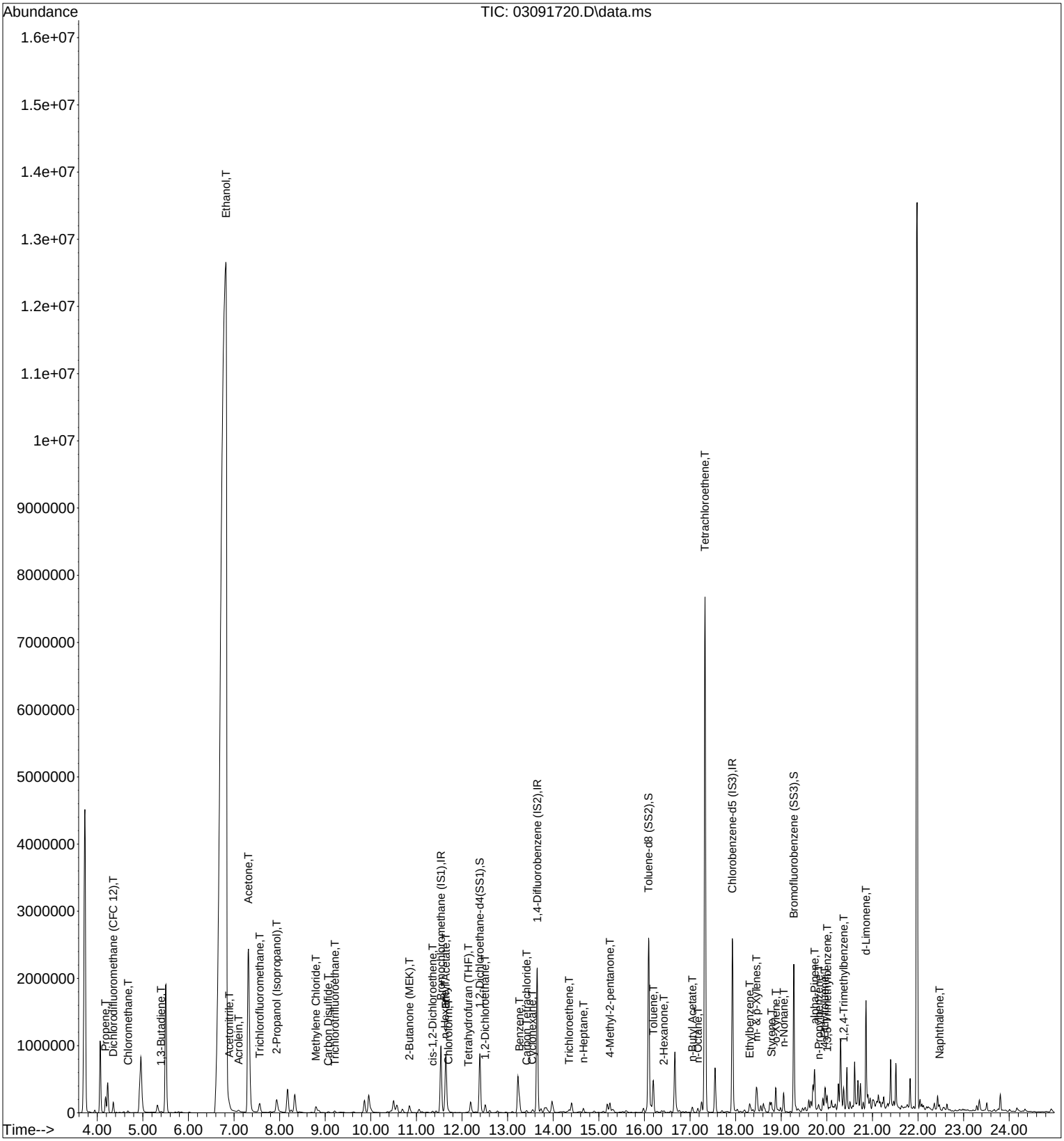
Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
50) Methyl Methacrylate	14.55	100	699	N.D.		
51) n-Heptane	14.66	71	15708	0.328 ng		94
52) cis-1,3-Dichloropropene	15.22	75	505	N.D.		
53) 4-Methyl-2-pentanone	15.24	58	48418	1.016 ng		95
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.		
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.		
58) Toluene	16.20	91	385321	1.825 ng		99
59) 2-Hexanone	16.43	43	17220	0.132 ng		74
60) Dibromochloromethane	0.00	129	0	N.D.		
61) 1,2-Dibromoethane	0.00	107	0	N.D.		
62) n-Butyl Acetate	17.05	43	68628	0.490 ng		99
63) n-Octane	17.17	57	14639	0.316 ng	#	81
64) Tetrachloroethene	17.33	166	2278494	39.823 ng		99
65) Chlorobenzene	17.99	112	3538	N.D.		
66) Ethylbenzene	18.31	91	96525	0.406 ng		98
67) m- & p-Xylenes	18.46	91	282768	1.530 ng		97
68) Bromoform	0.00	173	0	N.D.		
69) Styrene	18.79	104	70103	0.489 ng		99
70) o-Xylene	18.88	91	106156	0.558 ng		97
71) n-Nonane	19.06	43	108849	0.951 ng		94
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D. d		
74) Cumene	19.39	105	9979	N.D.		
75) alpha-Pinene	19.73	93	241998	1.949 ng	#	1
76) n-Propylbenzene	19.83	91	30565	0.110 ng	#	71
77) 3-Ethyltoluene	0.00	105	0	N.D. d		
78) 4-Ethyltoluene	19.95	105	35461	0.169 ng		86
79) 1,3,5-Trimethylbenzene	20.01	105	31527	0.161 ng		99
80) alpha-Methylstyrene	20.15	118	3354	N.D.		
81) 2-Ethyltoluene	0.00	105	0	N.D. d		
82) 1,2,4-Trimethylbenzene	20.37	105	101786	0.529 ng		90
83) n-Decane	0.00	57	0	N.D. d		
84) Benzyl Chloride	20.49	91	653	N.D.		
85) 1,3-Dichlorobenzene	20.52	146	644	N.D.		
86) 1,4-Dichlorobenzene	20.57	146	3131	N.D.		
87) sec-Butylbenzene	20.61	105	7094	N.D.		
88) 4-Isopropyltoluene (p-...	0.00	119	0	N.D. d		
89) 1,2,3-Trimethylbenzene	0.00	105	0	N.D. d		
90) 1,2-Dichlorobenzene	20.86	146	692	N.D.		
91) d-Limonene	20.86	68	385899	4.675 ng		95
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	22.36	180	740	N.D.		
95) Naphthalene	22.47	128	52078	0.247 ng		97
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	20.37	119	13121	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:\MS16\DATA\2017 03\09\03091720.D
Acq On : 9 Mar 2017 17:43 Operator: LH
Sample : P1700971-004 (1000mL)
Misc : S29-03071701
ALS Vial : 9 Sample Multiplier: 1

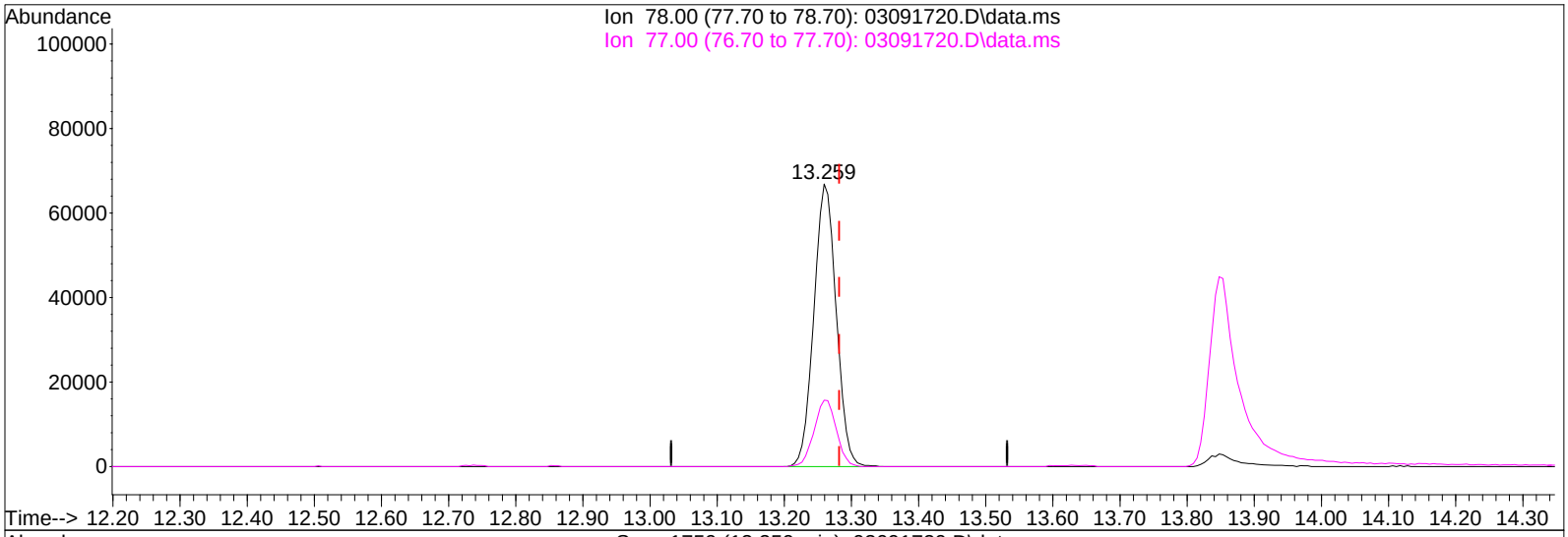
Quant Time: Mar 10 16:21:19 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

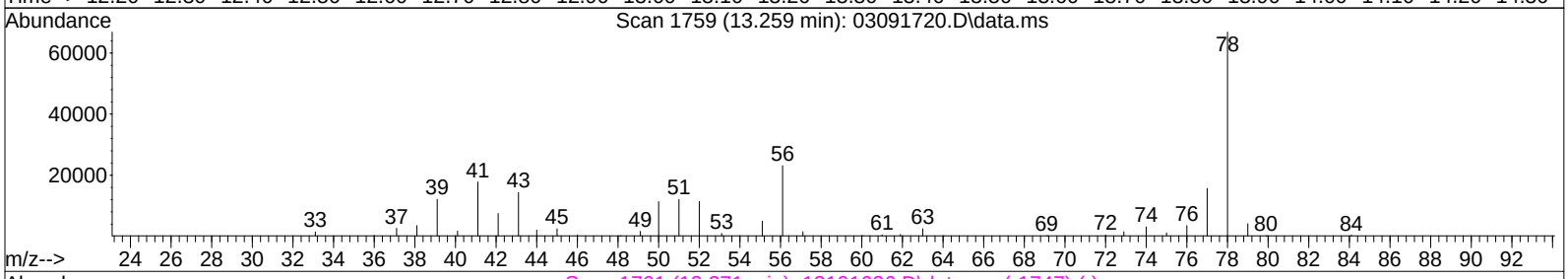


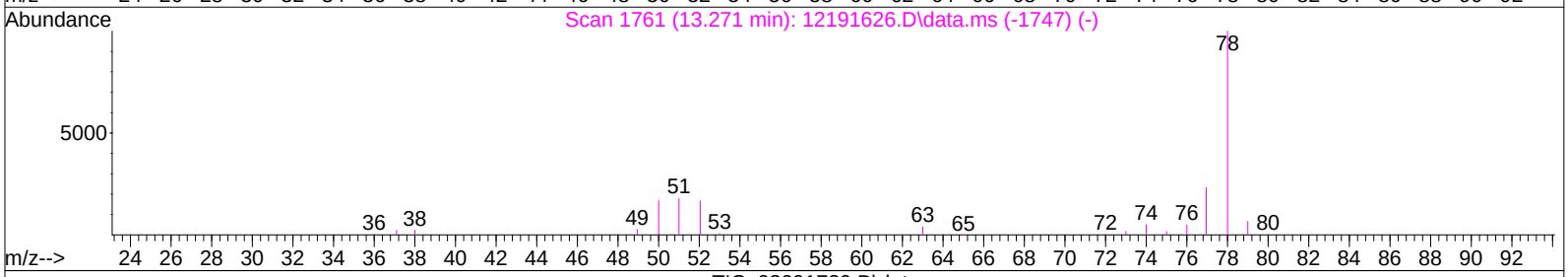
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091720.D
Acq On : 9 Mar 2017 17:43 Operator: LH
Sample : P1700971-004 (1000mL)
Misc : S29-03071701
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Mar 10 08:39:38 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 03091720.D\data.ms

(41) Benzene (T)

13.259min (-0.022) 0.78ng

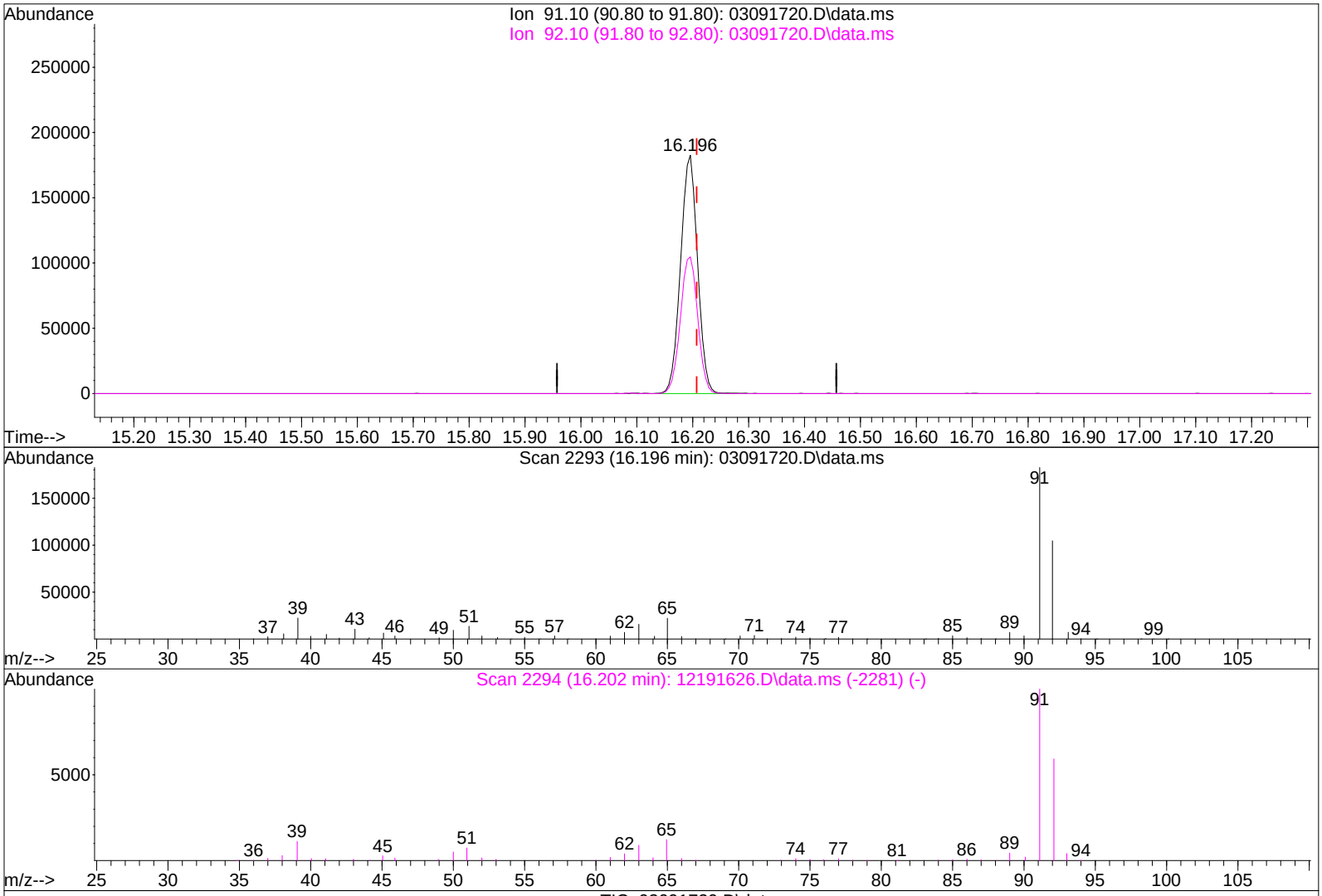
response 154033

Ion	Exp%	Act%
78.00	100	100
77.00	23.50	23.46
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091720.D
Acq On : 9 Mar 2017 17:43 Operator: LH
Sample : P1700971-004 (1000mL)
Misc : S29-03071701
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Mar 10 08:39:38 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



(58) Toluene (T)

16.196min (-0.011) 1.83ng

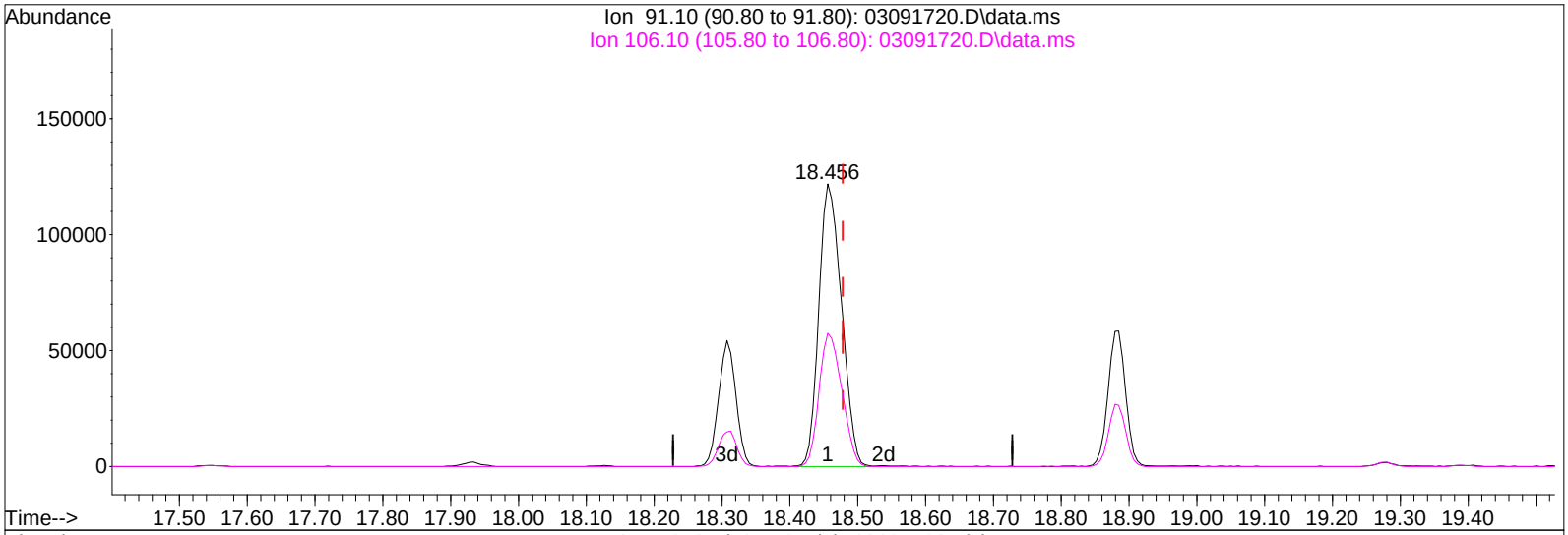
response 385321

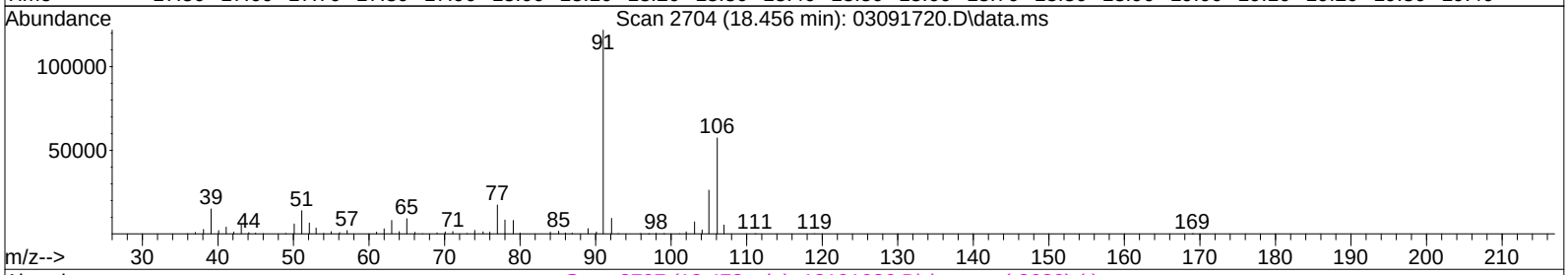
Ion	Exp%	Act%
91.10	100	100
92.10	59.10	58.65
0.00	0.00	0.00
0.00	0.00	0.00

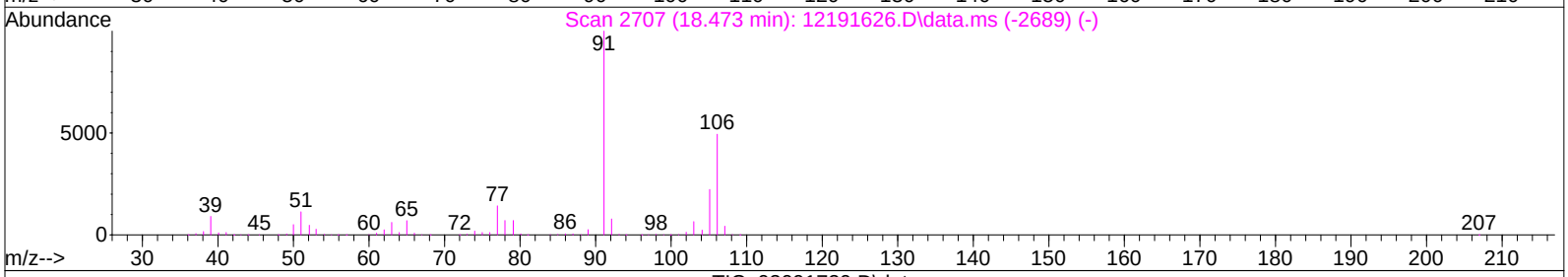
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091720.D
Acq On : 9 Mar 2017 17:43 Operator: LH
Sample : P1700971-004 (1000mL)
Misc : S29-03071701
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Mar 10 08:39:38 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 03091720.D\data.ms

(67) m- & p-Xylenes (T)

18.456min (-0.022) 1.53ng

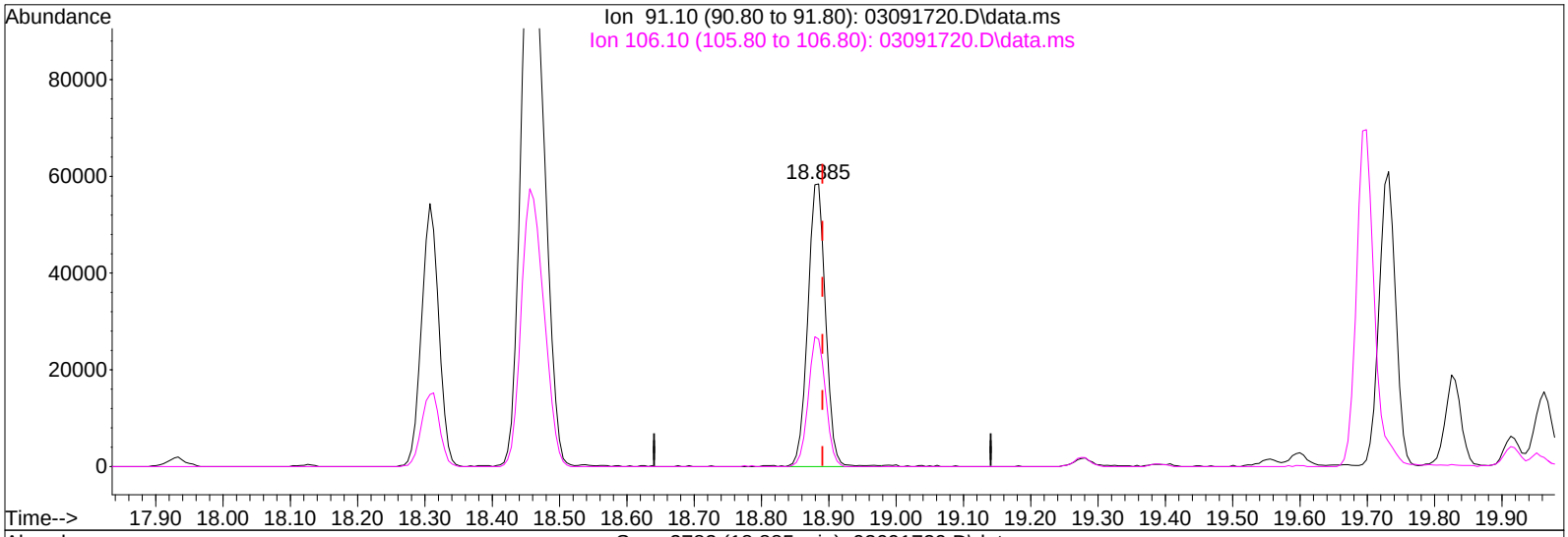
response 282768

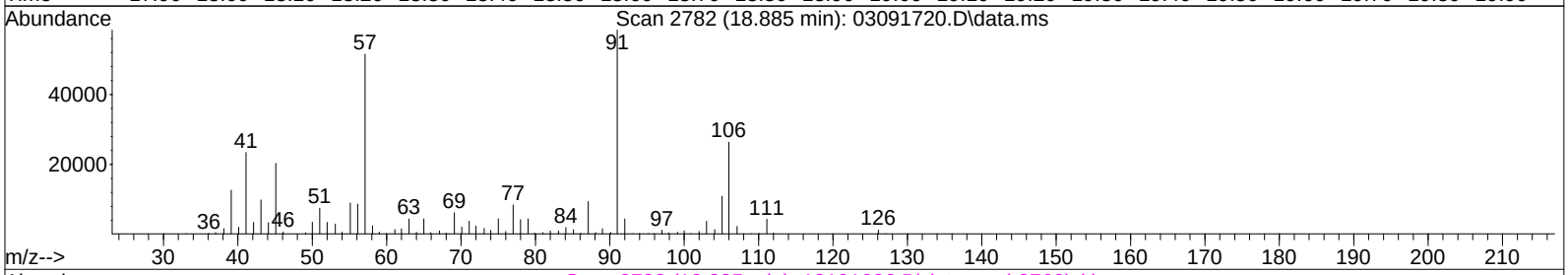
Ion	Exp%	Act%
91.10	100	100
106.10	49.30	47.41
0.00	0.00	0.00
0.00	0.00	0.00

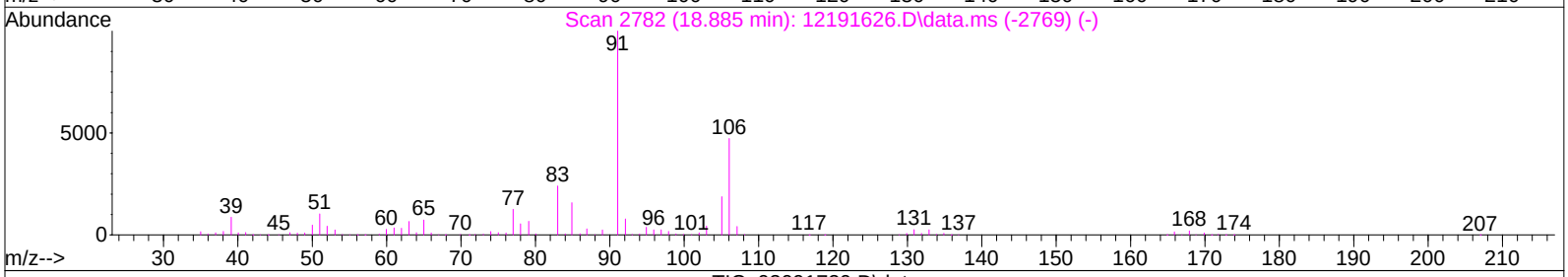
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091720.D
Acq On : 9 Mar 2017 17:43 Operator: LH
Sample : P1700971-004 (1000mL)
Misc : S29-03071701
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Mar 10 08:39:38 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 03091720.D\data.ms

(70) o-Xylene (T)

18.885min (-0.006) 0.56ng

response 106156

Ion	Exp%	Act%
91.10	100	100
106.10	46.90	44.68
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091721.D
Acq On : 9 Mar 2017 18:17 Operator: LH
Sample : P1700971-005 (1000mL)
Misc : S29-03071701
ALS Vial : 10 Sample Multiplier: 1

Quant Time: Mar 10 16:22:47 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/10/17

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.53	130	375411	12.500	ng	-0.04
37) 1,4-Difluorobenzene (IS2)	13.64	114	1927332	12.500	ng	-0.03
56) Chlorobenzene-d5 (IS3)	17.93	82	885425	12.500	ng	0.00

System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...	12.39	65	702268	13.022	ng	-0.04
Spiked Amount 12.500	Range 70 - 130		Recovery = 104.16%			
57) Toluene-d8 (SS2)	16.09	98	2044158	12.033	ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.24%			
73) Bromofluorobenzene (SS3)	19.28	174	568851	10.490	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 83.92%			

Target Compounds

							Qvalue
2) Propene	0.00	42	0	N.D. d			
3) Dichlorodifluoromethan...	4.36	85	116095	1.224	ng		99
4) Chloromethane	4.69	50	9986	0.128	ng		99
5) 1,2-Dichloro-1,1,2,2-t...	4.95	135	2289	N.D.			
6) Vinyl Chloride	0.00	62	0	N.D.			
7) 1,3-Butadiene	5.51	54	3452	N.D.			
8) Bromomethane	0.00	94	0	N.D.			
9) Chloroethane	6.25	64	881	N.D.			
10) Ethanol	6.60	45	128865	3.630	ng		99
11) Acetonitrile	6.92	41	5710	N.D.			
12) Acrolein	7.12	56	1507	N.D.			
13) Acetone	7.34	58	71295	2.000	ng		98
14) Trichlorofluoromethane	7.57	101	33509	0.412	ng		99
15) 2-Propanol (Isopropanol)	7.88	45	12312	0.101	ng	#	57
16) Acrylonitrile	8.12	53	973	N.D.			
17) 1,1-Dichloroethene	0.00	96	0	N.D.			
18) 2-Methyl-2-Propanol (t...	8.87	59	6551	N.D.			
19) Methylene Chloride	8.79	84	16455	0.368	ng		95
20) 3-Chloro-1-propene (Al...	8.93	41	847	N.D.			
21) Trichlorotrifluoroethane	0.00	151	0	N.D.			
22) Carbon Disulfide	9.09	76	15786	0.100	ng		100
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	10.46	73	791	N.D.			
26) Vinyl Acetate	10.57	86	557	N.D.			
27) 2-Butanone (MEK)	10.87	72	6937	0.225	ng	#	35
28) cis-1,2-Dichloroethene	11.36	61	8608	0.132	ng		95
29) Diisopropyl Ether	0.00	87	0	N.D.			
30) Ethyl Acetate	11.66	61	5152	0.294	ng		93
31) n-Hexane	11.63	57	1872	N.D.			
32) Chloroform	0.00	83	0	N.D.			
34) Tetrahydrofuran (THF)	12.14	72	12082	0.386	ng	#	86
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. d			
41) Benzene	13.26	78	12230	N.D.			
42) Carbon Tetrachloride	0.00	117	0	N.D.			
43) Cyclohexane	13.64	84	1496	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	14.35	130	1911	N.D.			
48) 1,4-Dioxane	0.00	88	0	N.D.			
49) 2,2,4-Trimethylpentane...	14.41	57	1383	N.D.			

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091721.D
Acq On : 9 Mar 2017 18:17 Operator: LH
Sample : P1700971-005 (1000mL)
Misc : S29-03071701
ALS Vial : 10 Sample Multiplier: 1

Quant Time: Mar 10 16:22:47 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

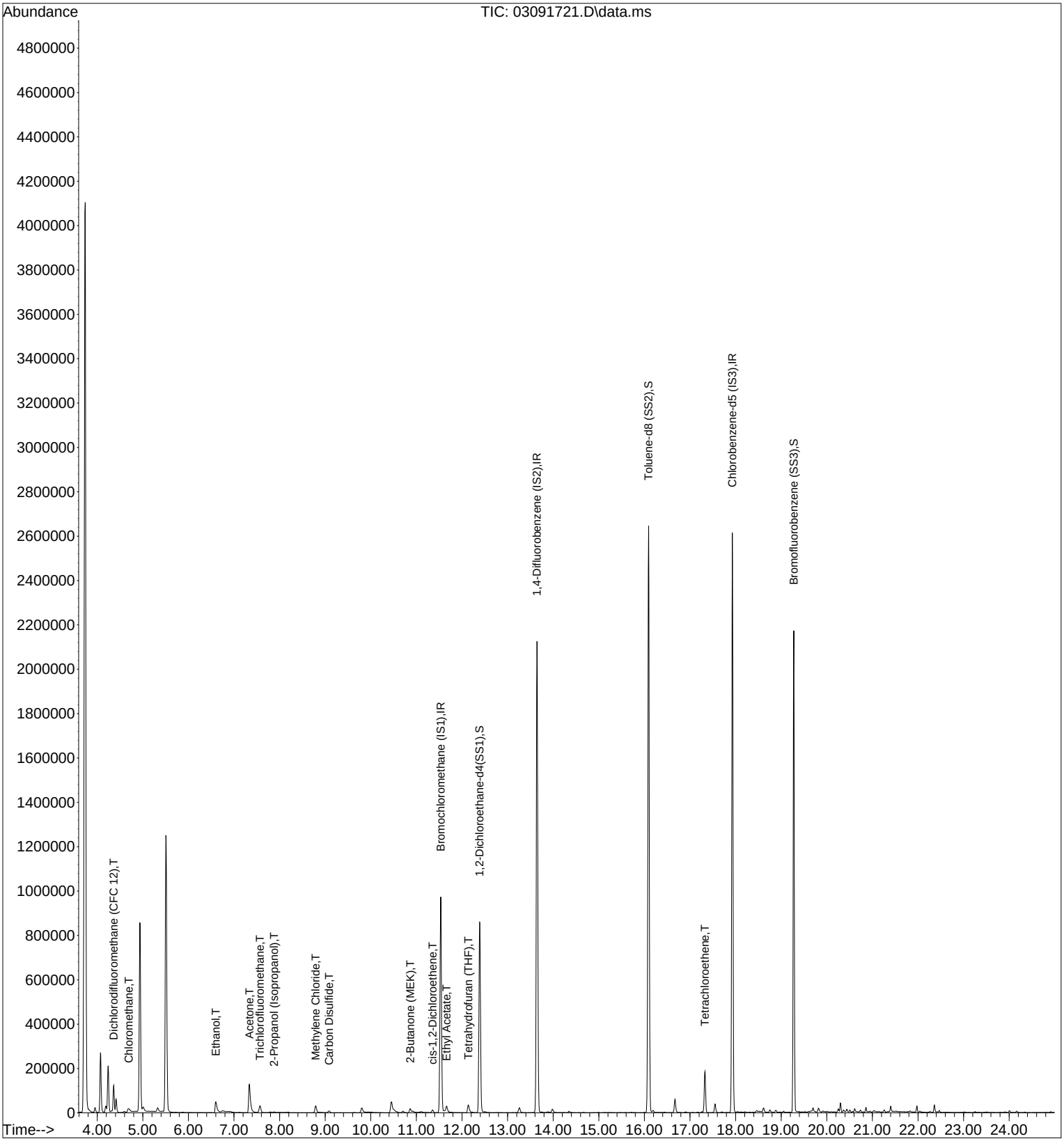
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	0.00	100	0	N.D.	
51) n-Heptane	0.00	71	0	N.D.	
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.	
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.	
58) Toluene	16.19	91	7899	N.D.	
59) 2-Hexanone	16.43	43	2177	N.D.	
60) Dibromochloromethane	0.00	129	0	N.D.	
61) 1,2-Dibromoethane	0.00	107	0	N.D.	
62) n-Butyl Acetate	17.05	43	2066	N.D.	
63) n-Octane	17.18	57	513	N.D.	
64) Tetrachloroethene	17.33	166	58242	1.036 ng	99
65) Chlorobenzene	17.97	112	805	N.D.	
66) Ethylbenzene	18.31	91	1845	N.D.	
67) m- & p-Xylenes	18.45	91	5425	N.D.	
68) Bromoform	0.00	173	0	N.D.	
69) Styrene	18.79	104	1536	N.D.	
70) o-Xylene	18.88	91	2099	N.D.	
71) n-Nonane	19.05	43	2514	N.D.	
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.	
74) Cumene	19.39	105	694	N.D.	
75) alpha-Pinene	19.73	93	802	N.D.	
76) n-Propylbenzene	19.83	91	1882	N.D.	
77) 3-Ethyltoluene	19.91	105	2328	N.D.	
78) 4-Ethyltoluene	19.95	105	993	N.D.	
79) 1,3,5-Trimethylbenzene	20.01	105	1008	N.D.	
80) alpha-Methylstyrene	20.30	118	638	N.D.	
81) 2-Ethyltoluene	20.18	105	907	N.D.	
82) 1,2,4-Trimethylbenzene	20.37	105	3017	N.D.	
83) n-Decane	20.44	57	3731	N.D.	
84) Benzyl Chloride	20.49	91	885	N.D.	
85) 1,3-Dichlorobenzene	20.51	146	740	N.D.	
86) 1,4-Dichlorobenzene	20.56	146	1088	N.D.	
87) sec-Butylbenzene	20.61	105	579	N.D.	
88) 4-Isopropyltoluene (p-...	20.73	119	2609	N.D.	
89) 1,2,3-Trimethylbenzene	20.74	105	1152	N.D.	
90) 1,2-Dichlorobenzene	20.86	146	522	N.D.	
91) d-Limonene	20.86	68	4692	N.D.	
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.	
93) n-Undecane	21.51	57	950	N.D.	
94) 1,2,4-Trichlorobenzene	22.36	180	906	N.D.	
95) Naphthalene	22.47	128	6128	N.D.	
96) n-Dodecane	22.43	57	1222	N.D.	
97) Hexachlorobutadiene	0.00	225	0	N.D.	
98) Cyclohexanone	0.00	55	0	N.D. d	
99) tert-Butylbenzene	20.37	119	502	N.D.	
100) n-Butylbenzene	21.09	91	1788	N.D.	

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091721.D
Acq On : 9 Mar 2017 18:17 Operator: LH
Sample : P1700971-005 (1000mL)
Misc : S29-03071701
ALS Vial : 10 Sample Multiplier: 1

Quant Time: Mar 10 16:22:47 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091722.D
Acq On : 9 Mar 2017 18:50 Operator: LH
Sample : P1700971-006 (35mL)
Misc : S29-03071701
ALS Vial : 11 Sample Multiplier: 1

Quant Time: Mar 10 16:23:54 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/10/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.53	130	375988	12.500 ng	-0.04
37) 1,4-Difluorobenzene (IS2)	13.64	114	1932334	12.500 ng	-0.03
56) Chlorobenzene-d5 (IS3)	17.93	82	886426	12.500 ng	0.00

System Monitoring Compounds					
33) 1,2-Dichloroethane-d4(...	12.39	65	710339	13.151 ng	-0.04
Spiked Amount 12.500	Range 70 - 130		Recovery = 105.20%		
57) Toluene-d8 (SS2)	16.09	98	2051930	12.065 ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.56%		
73) Bromofluorobenzene (SS3)	19.28	174	575292	10.597 ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 84.80%		

Target Compounds						Qvalue
2) Propene	4.21	42	2204	N.D.		
3) Dichlorodifluoromethan...	4.37	85	5066	N.D.		
4) Chloromethane	4.70	50	1862	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	6.63	45	11788	0.332 ng		89
11) Acetonitrile	6.93	41	914	N.D.		
12) Acrolein	7.13	56	605	N.D.		
13) Acetone	7.38	58	12771	0.358 ng	#	1
14) Trichlorofluoromethane	7.56	101	2418	N.D.		
15) 2-Propanol (Isopropanol)	7.91	45	1044	N.D.		
16) Acrylonitrile	8.18	53	982	N.D.		
17) 1,1-Dichloroethene	0.00	96	0	N.D.		
18) 2-Methyl-2-Propanol (t...	8.86	59	494	N.D.		
19) Methylene Chloride	8.79	84	2197	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	9.09	76	4138	N.D.		
23) trans-1,2-Dichloroethene	10.08	61	863	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)	10.88	72	1896	N.D.		
28) cis-1,2-Dichloroethene	11.35	61	75169	1.151 ng		96
29) Diisopropyl Ether	0.00	87	0	N.D.		
30) Ethyl Acetate	0.00	61	0	N.D.		
31) n-Hexane	11.63	57	1864	N.D.		
32) Chloroform	11.70	83	520	N.D.		
34) Tetrahydrofuran (THF)	12.15	72	4503	0.144 ng	#	84
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	13.26	56	680	N.D.		
41) Benzene	13.26	78	4501	N.D.		
42) Carbon Tetrachloride	0.00	117	0	N.D.		
43) Cyclohexane	13.55	84	502	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	14.35	130	38086	0.734 ng		99
48) 1,4-Dioxane	0.00	88	0	N.D.		
49) 2,2,4-Trimethylpentane...	14.41	57	10593	N.D.		

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091722.D
Acq On : 9 Mar 2017 18:50 Operator: LH
Sample : P1700971-006 (35mL)
Misc : S29-03071701
ALS Vial : 11 Sample Multiplier: 1

Quant Time: Mar 10 16:23:54 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

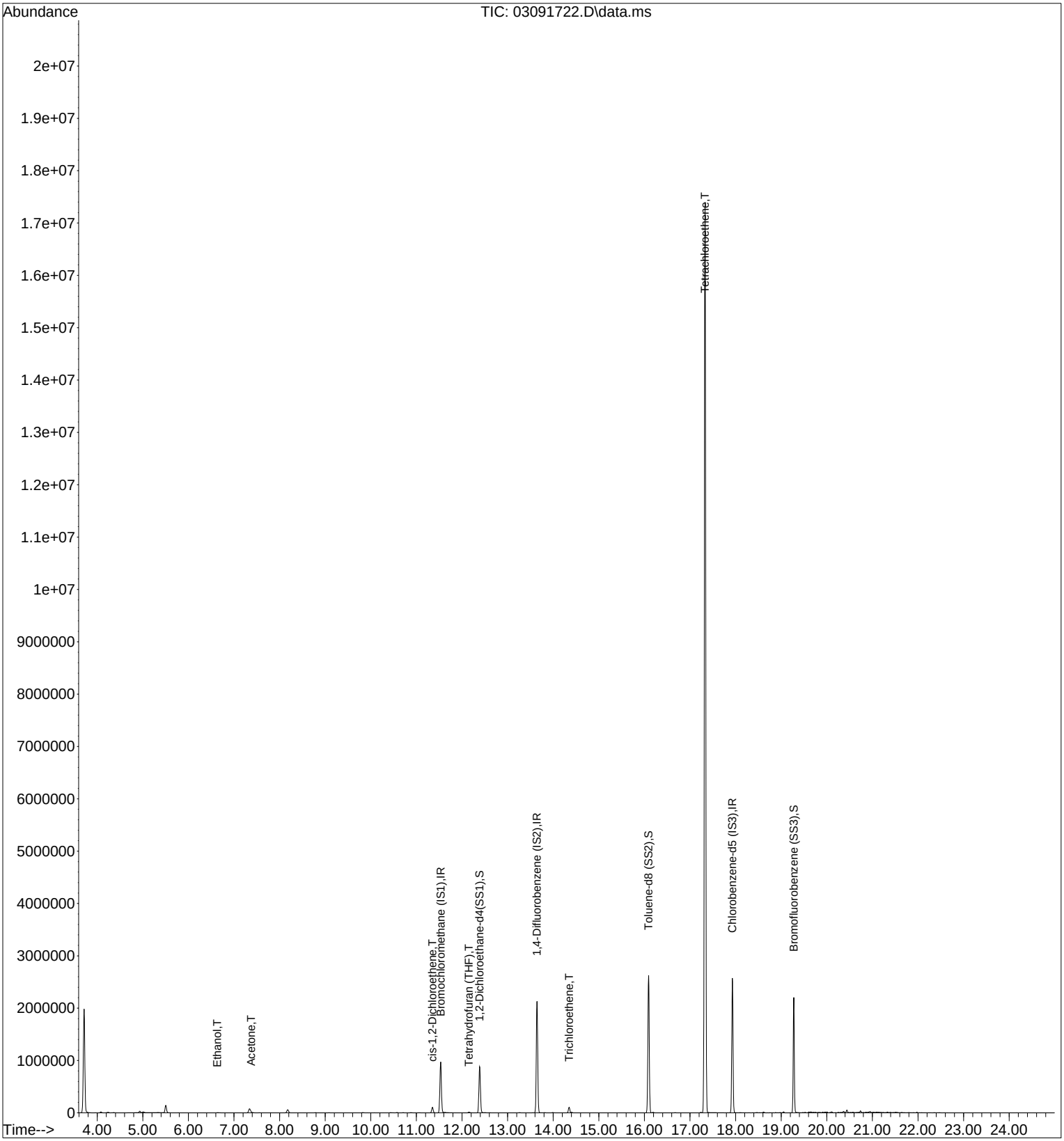
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	0.00	100	0	N.D.	
51) n-Heptane	0.00	71	0	N.D.	
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.	
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.	
58) Toluene	16.19	91	6748	N.D.	
59) 2-Hexanone	16.45	43	722	N.D.	
60) Dibromochloromethane	0.00	129	0	N.D.	
61) 1,2-Dibromoethane	0.00	107	0	N.D.	
62) n-Butyl Acetate	17.17	43	792	N.D.	
63) n-Octane	0.00	57	0	N.D.	
64) Tetrachloroethene	17.33	166	5400177	95.961 ng	98
65) Chlorobenzene	17.96	112	677	N.D.	
66) Ethylbenzene	18.31	91	1551	N.D.	
67) m- & p-Xylenes	18.46	91	3759	N.D.	
68) Bromoform	0.00	173	0	N.D.	
69) Styrene	0.00	104	0	N.D.	
70) o-Xylene	18.88	91	2357	N.D.	
71) n-Nonane	19.06	43	7798	N.D.	
72) 1,1,2,2-Tetrachloroethane	18.93	83	888	N.D.	
74) Cumene	19.40	105	550	N.D.	
75) alpha-Pinene	0.00	93	0	N.D.	
76) n-Propylbenzene	19.83	91	1469	N.D.	
77) 3-Ethyltoluene	19.91	105	3056	N.D.	
78) 4-Ethyltoluene	19.95	105	1418	N.D.	
79) 1,3,5-Trimethylbenzene	20.01	105	1439	N.D.	
80) alpha-Methylstyrene	0.00	118	0	N.D.	
81) 2-Ethyltoluene	20.18	105	1861	N.D.	
82) 1,2,4-Trimethylbenzene	20.37	105	4410	N.D.	
83) n-Decane	0.00	57	0	N.D. d	
84) Benzyl Chloride	20.37	91	571	N.D.	
85) 1,3-Dichlorobenzene	20.56	146	534	N.D.	
86) 1,4-Dichlorobenzene	20.56	146	534	N.D.	
87) sec-Butylbenzene	20.61	105	600	N.D.	
88) 4-Isopropyltoluene (p-...	20.73	119	1140	N.D.	
89) 1,2,3-Trimethylbenzene	20.74	105	2405	N.D.	
90) 1,2-Dichlorobenzene	20.86	146	528	N.D.	
91) d-Limonene	20.86	68	1139	N.D.	
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.	
93) n-Undecane	21.52	57	2476	N.D.	
94) 1,2,4-Trichlorobenzene	0.00	180	0	N.D.	
95) Naphthalene	22.47	128	3225	N.D.	
96) n-Dodecane	22.42	57	836	N.D.	
97) Hexachlorobutadiene	0.00	225	0	N.D.	
98) Cyclohexanone	18.62	55	5585	N.D.	
99) tert-Butylbenzene	20.37	119	752	N.D.	
100) n-Butylbenzene	21.10	91	1150	N.D.	

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091722.D
Acq On : 9 Mar 2017 18:50 Operator: LH
Sample : P1700971-006 (35mL)
Misc : S29-03071701
ALS Vial : 11 Sample Multiplier: 1

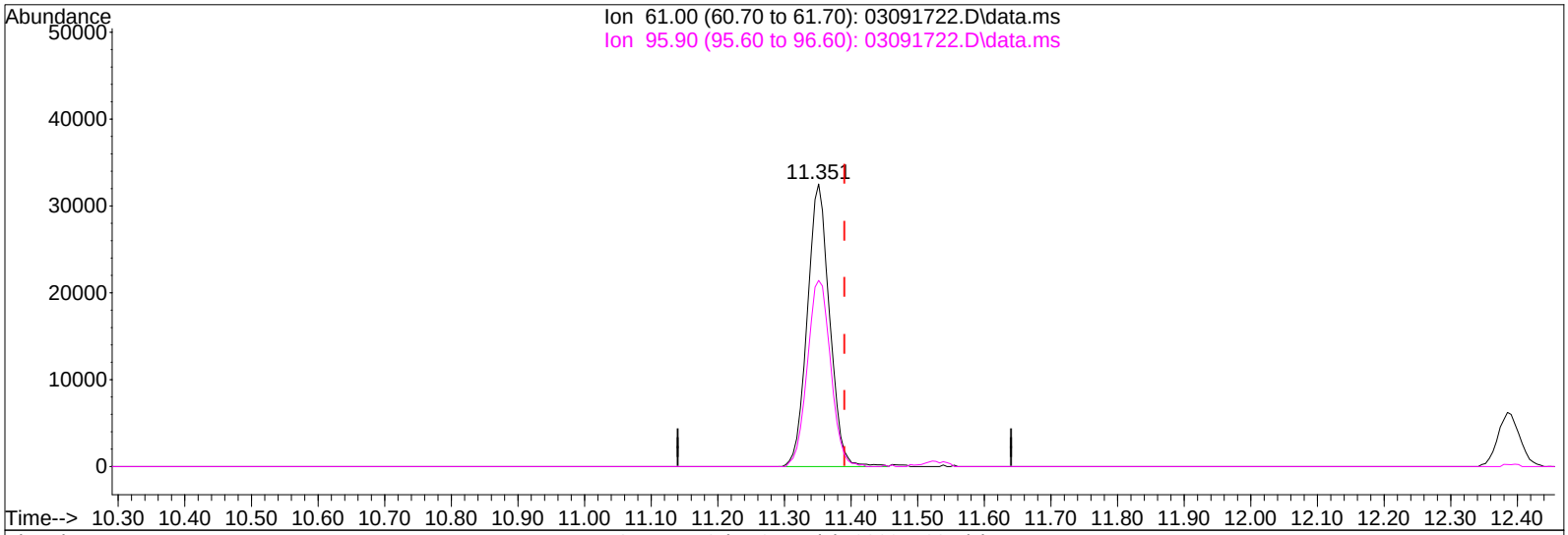
Quant Time: Mar 10 16:23:54 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

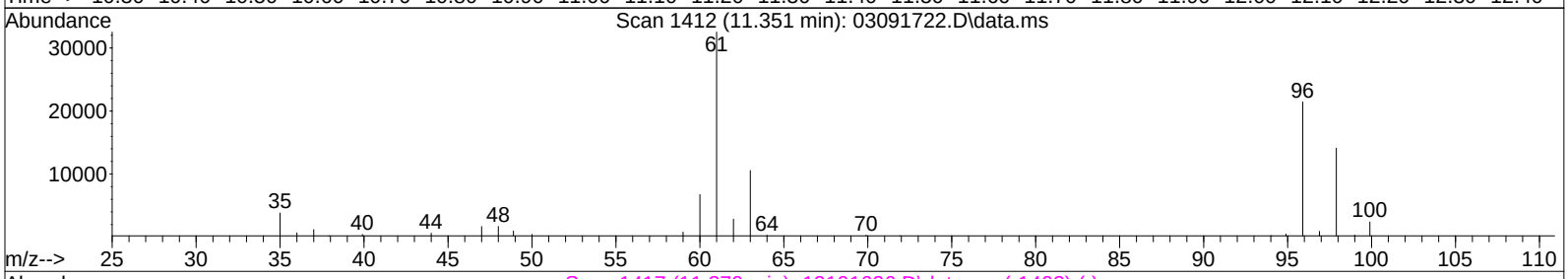


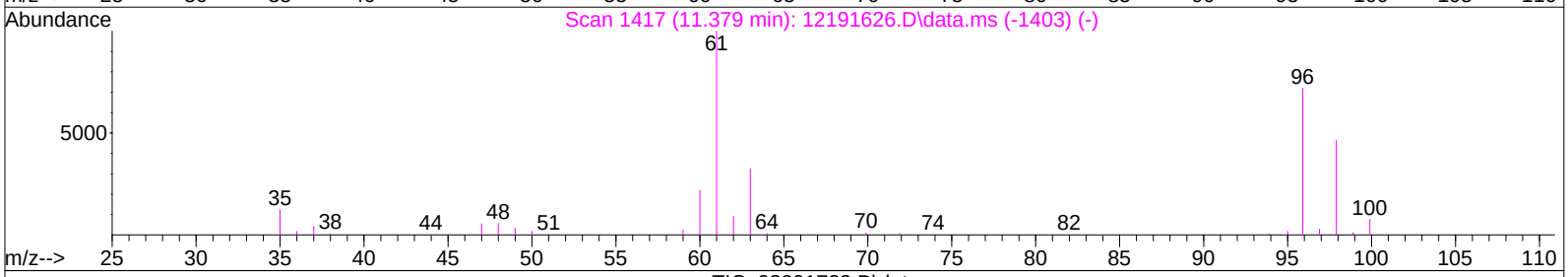
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091722.D
Acq On : 9 Mar 2017 18:50 Operator: LH
Sample : P1700971-006 (35mL)
Misc : S29-03071701
ALS Vial : 11 Sample Multiplier: 1

Quant Time: Mar 10 08:39:53 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 03091722.D\data.ms

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

11.351min (-0.039) 1.15ng

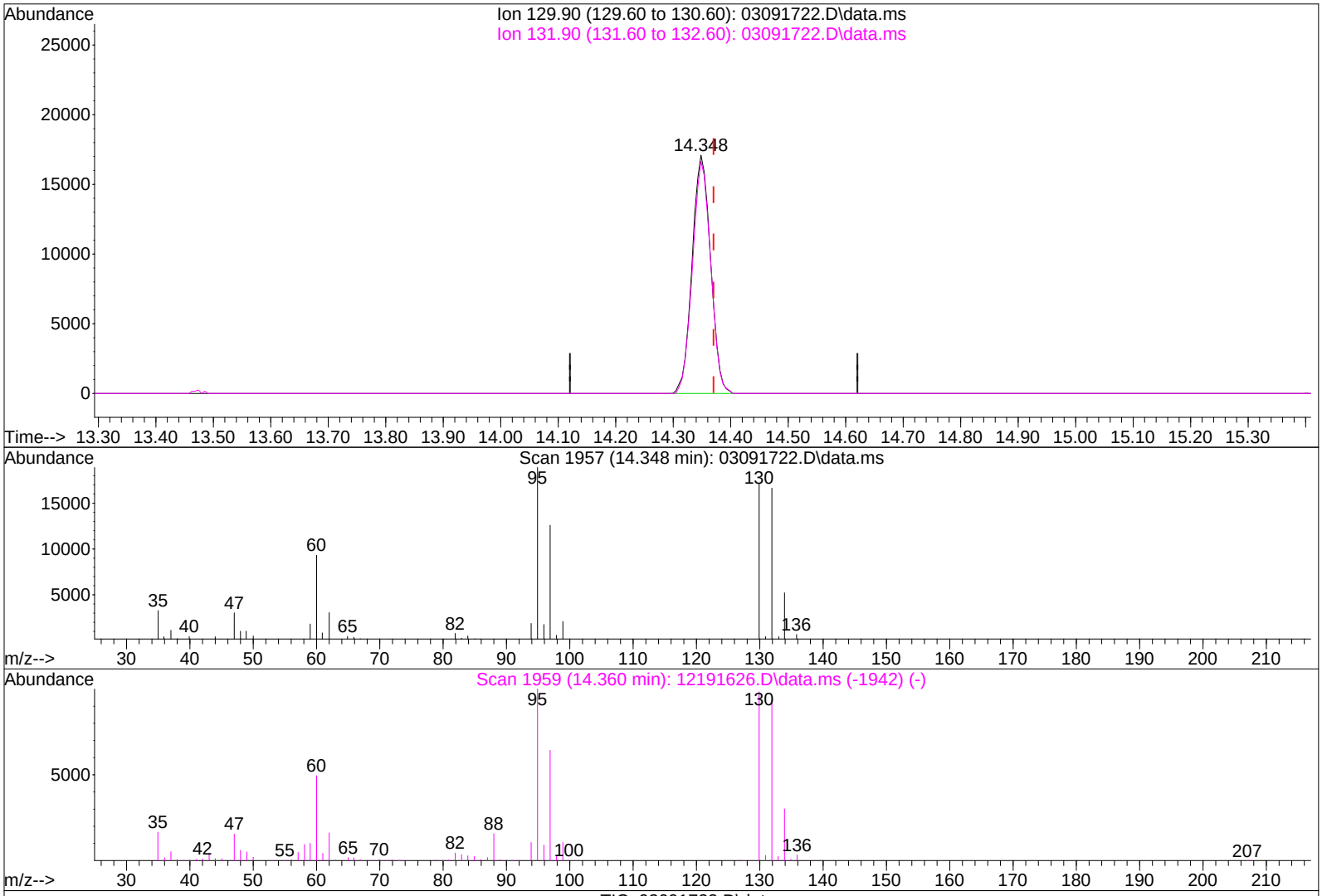
response 75169

Ion	Exp%	Act%
61.00	100	100
95.90	72.00	69.08
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091722.D
Acq On : 9 Mar 2017 18:50 Operator: LH
Sample : P1700971-006 (35mL)
Misc : S29-03071701
ALS Vial : 11 Sample Multiplier: 1

Quant Time: Mar 10 08:39:53 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 03091722.D\data.ms

(47) Trichloroethene (T)

14.348min (-0.022) 0.73ng

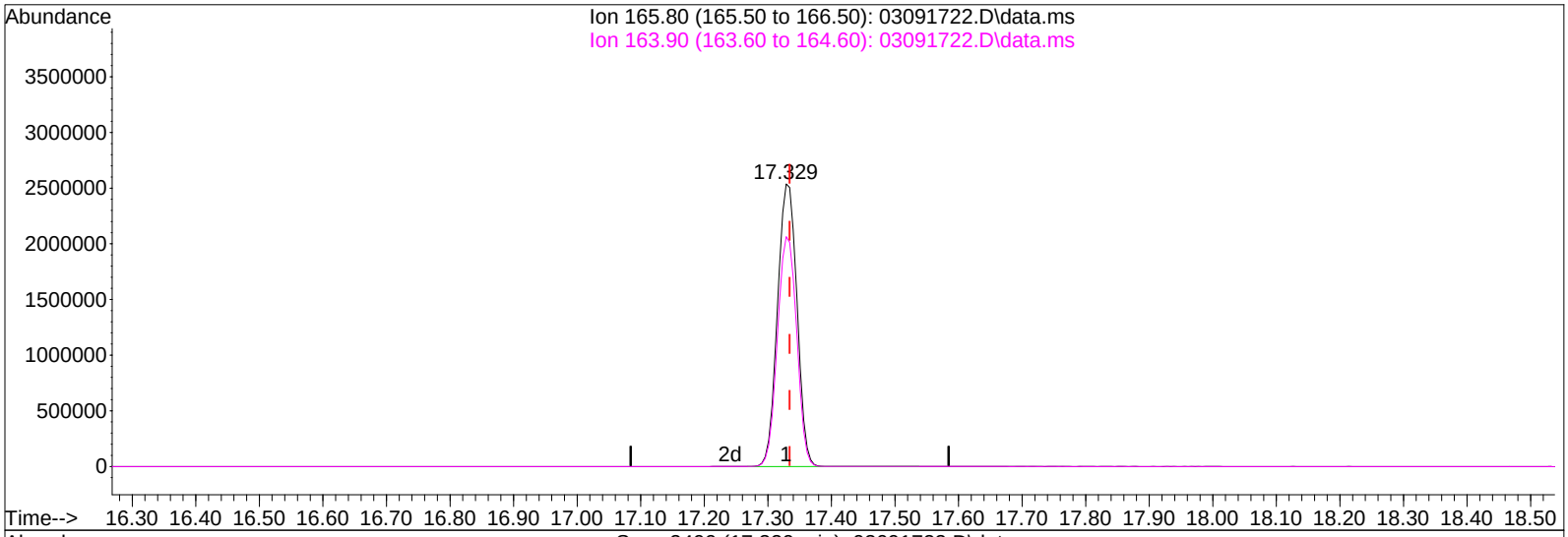
response 38086

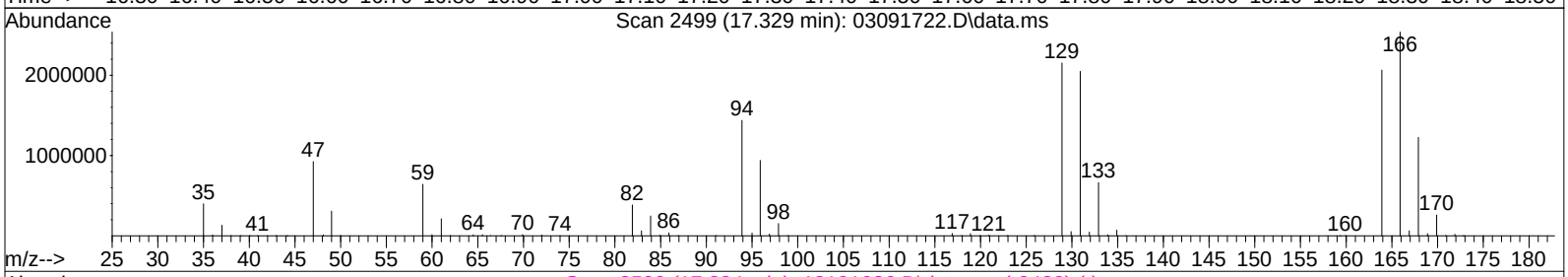
Ion	Exp%	Act%
129.90	100	100
131.90	95.40	96.11
0.00	0.00	0.00
0.00	0.00	0.00

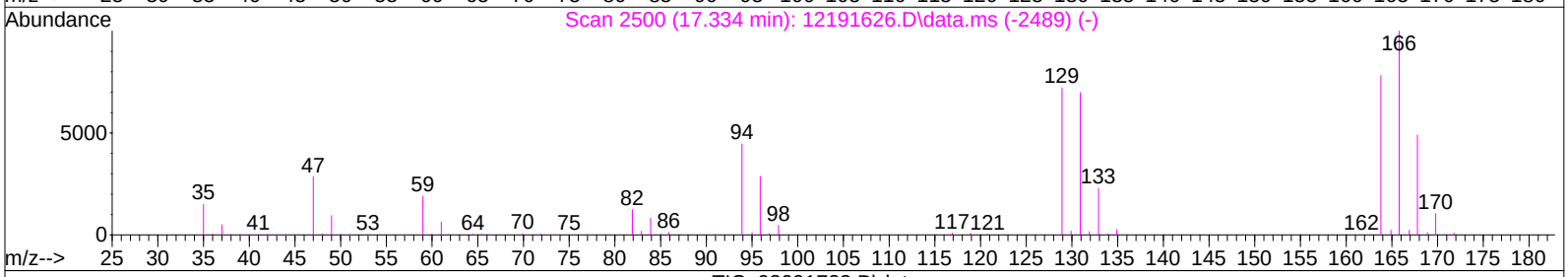
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091722.D
Acq On : 9 Mar 2017 18:50 Operator: LH
Sample : P1700971-006 (35mL)
Misc : S29-03071701
ALS Vial : 11 Sample Multiplier: 1

Quant Time: Mar 10 08:39:53 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 03091722.D\data.ms

(64) Tetrachloroethene (T)

17.329min (-0.006) 95.96ng

response 5400177

Ion	Exp%	Act%
165.80	100	100
163.90	78.50	80.60
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091704.D
Acq On : 9 Mar 2017 4:02 Operator: LH
Sample : MB R16030917 1000mL
Misc : S29-03071701 AC00442
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Mar 09 07:55:55 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/9/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.53	130	355025	12.500 ng	-0.04
37) 1,4-Difluorobenzene (IS2)	13.64	114	1829503	12.500 ng	-0.03
56) Chlorobenzene-d5 (IS3)	17.93	82	815907	12.500 ng	0.00

System Monitoring Compounds					
33) 1,2-Dichloroethane-d4(...	12.39	65	671028	13.157 ng	-0.04
Spiked Amount 12.500	Range 70 - 130		Recovery = 105.28%		
57) Toluene-d8 (SS2)	16.09	98	1921761	12.276 ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.24%		
73) Bromofluorobenzene (SS3)	19.28	174	511697	10.240 ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 81.92%		

Target Compounds					Qvalue
2) Propene	4.25	42	1373	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	6.77	45	263	N.D.	
11) Acetonitrile	6.93	41	1756	N.D.	
12) Acrolein	7.13	56	1514	N.D.	
13) Acetone	7.37	58	11631	0.345 ng	# 79
14) Trichlorofluoromethane	0.00	101	0	N.D.	
15) 2-Propanol (Isopropanol)	7.92	45	140	N.D.	
16) Acrylonitrile	8.12	53	752	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	8.79	84	1768	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	9.09	76	3452	N.D.	
23) trans-1,2-Dichloroethene	0.00	61	0	N.D.	
24) 1,1-Dichloroethane	0.00	63	0	N.D.	
25) Methyl tert-Butyl Ether	0.00	73	0	N.D.	
26) Vinyl Acetate	0.00	86	0	N.D.	
27) 2-Butanone (MEK)	10.90	72	1001	N.D.	
28) cis-1,2-Dichloroethene	11.35	61	1262	N.D.	
29) Diisopropyl Ether	0.00	87	0	N.D.	
30) Ethyl Acetate	0.00	61	0	N.D.	
31) n-Hexane	11.63	57	2247	N.D.	
32) Chloroform	0.00	83	0	N.D.	
34) Tetrahydrofuran (THF)	12.17	72	703	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	13.27	56	2299	N.D.	
41) Benzene	13.26	78	3586	N.D.	
42) Carbon Tetrachloride	0.00	117	0	N.D.	
43) Cyclohexane	13.55	84	1216	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	14.35	130	2963	N.D.	
48) 1,4-Dioxane	0.00	88	0	N.D.	
49) 2,2,4-Trimethylpentane...	0.00	57	0	N.D.	

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091704.D
Acq On : 9 Mar 2017 4:02 Operator: LH
Sample : MB R16030917 1000mL
Misc : S29-03071701 AC00442
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Mar 09 07:55:55 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

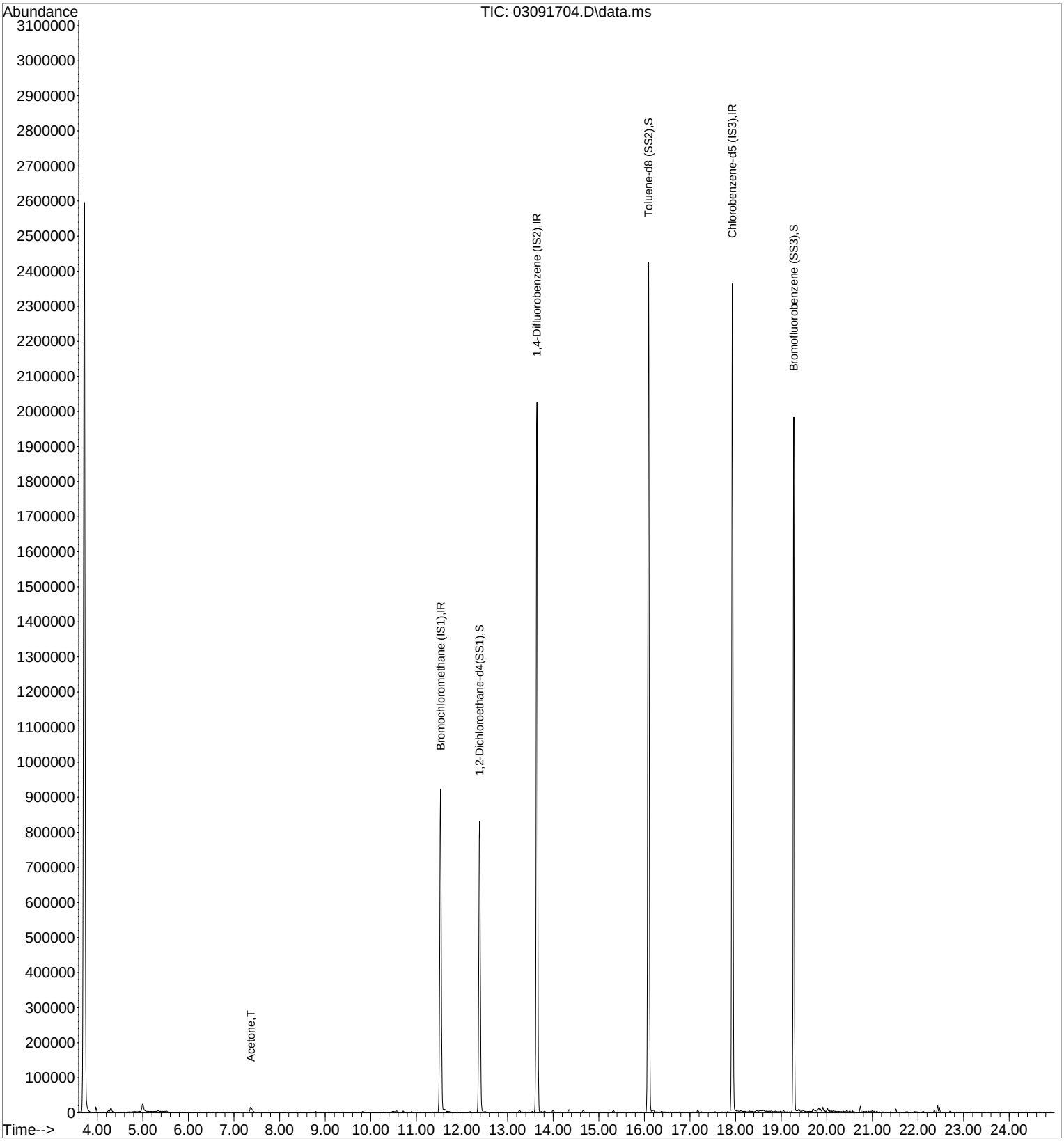
Internal Standards	R.T.	QIon	Response	Conc Units Dev(Min)
50) Methyl Methacrylate	0.00	100	0	N.D.
51) n-Heptane	14.66	71	1722	N.D.
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.
58) Toluene	16.19	91	5140	N.D.
59) 2-Hexanone	16.46	43	1248	N.D.
60) Dibromochloromethane	0.00	129	0	N.D.
61) 1,2-Dibromoethane	0.00	107	0	N.D.
62) n-Butyl Acetate	17.07	43	2714	N.D.
63) n-Octane	17.16	57	1821	N.D.
64) Tetrachloroethene	0.00	166	0	N.D.
65) Chlorobenzene	17.98	112	1153	N.D.
66) Ethylbenzene	18.31	91	2937	N.D.
67) m- & p-Xylenes	18.46	91	5500	N.D.
68) Bromoform	0.00	173	0	N.D.
69) Styrene	18.79	104	937	N.D.
70) o-Xylene	18.88	91	1112	N.D.
71) n-Nonane	19.05	43	2071	N.D.
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.
74) Cumene	19.39	105	4371	N.D.
75) alpha-Pinene	0.00	93	0	N.D.
76) n-Propylbenzene	19.81	91	3060	N.D.
77) 3-Ethyltoluene	19.91	105	7142	N.D.
78) 4-Ethyltoluene	19.91	105	7142	N.D.
79) 1,3,5-Trimethylbenzene	20.02	105	4585	N.D.
80) alpha-Methylstyrene	20.14	118	699	N.D.
81) 2-Ethyltoluene	20.18	105	699	N.D.
82) 1,2,4-Trimethylbenzene	20.36	105	3458	N.D.
83) n-Decane	20.44	57	1810	N.D.
84) Benzyl Chloride	20.49	91	1673	N.D.
85) 1,3-Dichlorobenzene	20.51	146	1253	N.D.
86) 1,4-Dichlorobenzene	20.56	146	1657	N.D.
87) sec-Butylbenzene	20.74	105	5617	N.D.
88) 4-Isopropyltoluene (p-...	20.74	119	4562	N.D.
89) 1,2,3-Trimethylbenzene	20.74	105	5617	N.D.
90) 1,2-Dichlorobenzene	20.86	146	960	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	21.52	57	3218	N.D.
94) 1,2,4-Trichlorobenzene	22.36	180	1990	N.D.
95) Naphthalene	22.47	128	10814	N.D.
96) n-Dodecane	22.43	57	6695	N.D.
97) Hexachlorobutadiene	0.00	225	0	N.D.
98) Cyclohexanone	18.62	55	1172	N.D.
99) tert-Butylbenzene	20.37	119	821	N.D.
100) n-Butylbenzene	21.10	91	1263	N.D.

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091704.D
Acq On : 9 Mar 2017 4:02 Operator: LH
Sample : MB R16030917 1000mL
Misc : S29-03071701 AC00442
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Mar 09 07:55:55 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091705.D
Acq On : 9 Mar 2017 4:35 Operator: LH
Sample : LCS R16030917 25ng
Misc : S29-03071701/S29-03031707 (1/1)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Mar 09 07:56:23 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/9/17

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	383773	12.500	ng	-0.03
37) 1,4-Difluorobenzene (IS2)	13.66	114	1920844	12.500	ng	-0.02
56) Chlorobenzene-d5 (IS3)	17.93	82	891332	12.500	ng	0.00

System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.40	65	698010	12.661	ng	-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 101.28%			
57) Toluene-d8 (SS2)	16.09	98	2048520	11.979	ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 95.84%			
73) Bromofluorobenzene (SS3)	19.28	174	577988	10.588	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 84.72%			

Target Compounds							Qvalue
2) Propene	4.18	42	1589690	29.963	ng		97
3) Dichlorodifluoromethan...	4.35	85	2524634	26.041	ng		99
4) Chloromethane	4.67	50	2202074	27.613	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.94	135	1203563	22.340	ng		100
6) Vinyl Chloride	5.12	62	2318415	30.569	ng		100
7) 1,3-Butadiene	5.41	54	1883699	35.573	ng		98
8) Bromomethane	5.88	94	1128431	28.116	ng		99
9) Chloroethane	6.23	64	962748	30.463	ng		100
10) Ethanol	6.66	45	5806273	159.981	ng		100
11) Acetonitrile	6.92	41	2726124	32.793	ng		99
12) Acrolein	7.11	56	882328	27.667	ng		92
13) Acetone	7.33	58	5565533	152.722	ng		93
14) Trichlorofluoromethane	7.56	101	2033892	24.443	ng		100
15) 2-Propanol (Isopropanol)	7.85	45	8038167	64.581	ng		99
16) Acrylonitrile	8.13	53	1895730	30.809	ng		99
17) 1,1-Dichloroethene	8.57	96	1179451	28.195	ng		95
18) 2-Methyl-2-Propanol (t...	8.75	59	7237703	55.432	ng		97
19) Methylene Chloride	8.81	84	1306635	28.598	ng		94
20) 3-Chloro-1-propene (Al...	8.96	41	2242511	32.436	ng		97
21) Trichlorotrifluoroethane	9.21	151	968560	23.754	ng		89
22) Carbon Disulfide	9.07	76	4781219	29.664	ng		99
23) trans-1,2-Dichloroethene	10.09	61	2013318	29.746	ng		95
24) 1,1-Dichloroethane	10.35	63	2420533	28.538	ng		100
25) Methyl tert-Butyl Ether	10.42	73	3943646	26.840	ng		97
26) Vinyl Acetate	10.60	86	1690691	158.595	ng	#	91
27) 2-Butanone (MEK)	10.84	72	961840	30.572	ng		94
28) cis-1,2-Dichloroethene	11.37	61	1942077	29.127	ng		96
29) Diisopropyl Ether	11.64	87	1121429	26.550	ng	#	76
30) Ethyl Acetate	11.65	61	1180430	65.862	ng		100
31) n-Hexane	11.63	57	2563059	31.515	ng		99
32) Chloroform	11.71	83	2227563	26.351	ng		100
34) Tetrahydrofuran (THF)	12.10	72	930865	29.085	ng		94
35) Ethyl tert-Butyl Ether	12.23	87	1519311	27.231	ng		92
36) 1,2-Dichloroethane	12.52	62	1834891	26.492	ng		100
38) 1,1,1-Trichloroethane	12.79	97	1870882	24.863	ng		98
39) Isopropyl Acetate	13.19	61	1991406	61.801	ng		97
40) 1-Butanol	13.22	56	3741414	72.597	ng		99
41) Benzene	13.27	78	5289955	26.972	ng		100
42) Carbon Tetrachloride	13.42	117	1638051	25.147	ng		100
43) Cyclohexane	13.55	84	4089125	56.084	ng		93
44) tert-Amyl Methyl Ether	13.88	73	3821381	27.007	ng		98
45) 1,2-Dichloropropane	14.12	63	1404298	28.793	ng		100
46) Bromodichloromethane	14.31	83	1883421	27.678	ng		100
47) Trichloroethene	14.35	130	1283703	24.899	ng		99
48) 1,4-Dioxane	14.33	88	1177133	29.939	ng		92
49) 2,2,4-Trimethylpentane...	14.41	57	5887747	28.494	ng		98

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091705.D
Acq On : 9 Mar 2017 4:35 Operator: LH
Sample : LCS R16030917 25ng
Misc : S29-03071701/S29-03031707 (1/1)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Mar 09 07:56:23 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

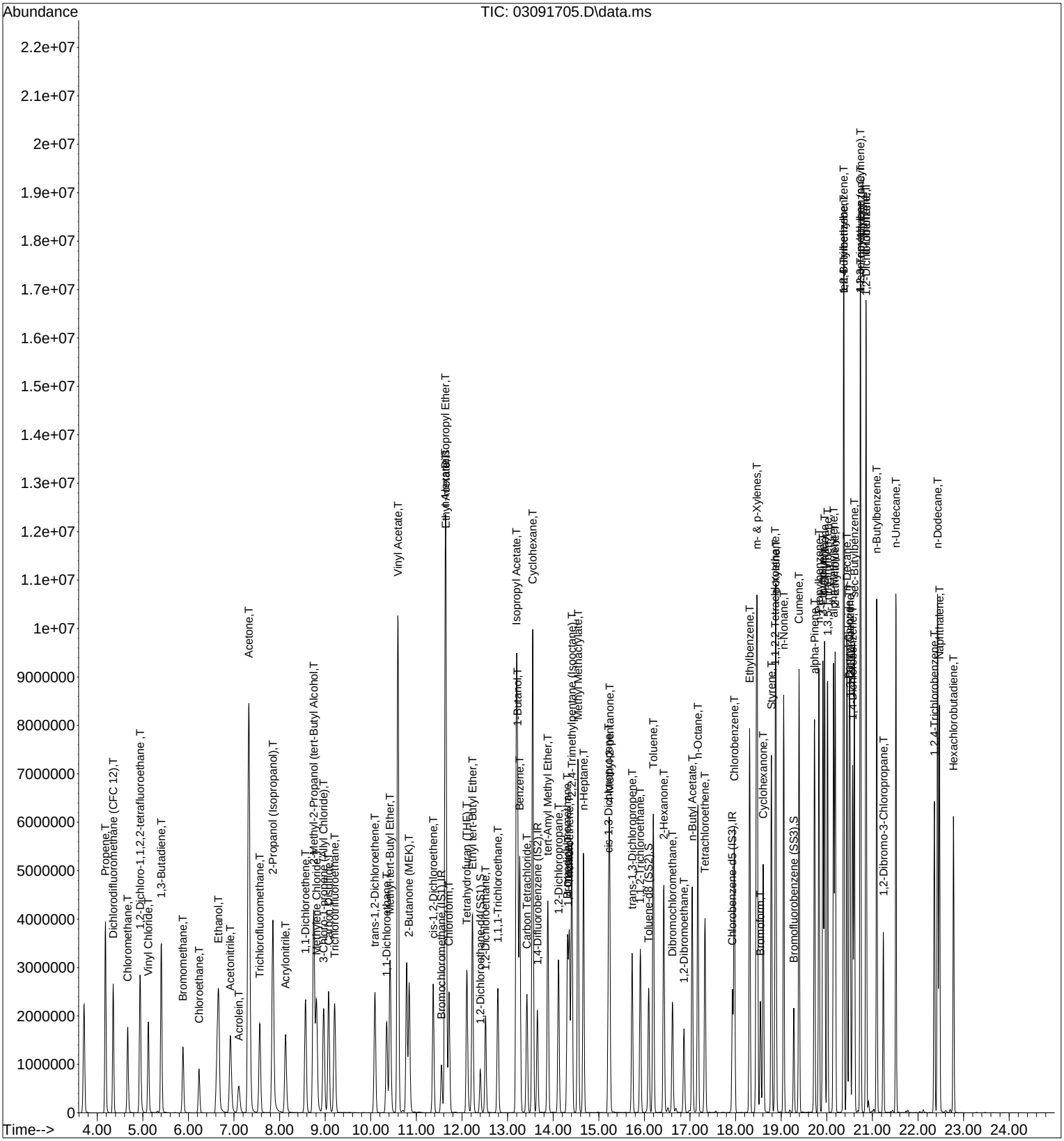
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	14.55	100	1071364	55.714 ng #	87
51) n-Heptane	14.67	71	1368026	28.924 ng	97
52) cis-1,3-Dichloropropene	15.21	75	2312491	29.285 ng	100
53) 4-Methyl-2-pentanone	15.24	58	1535504	32.601 ng	96
54) trans-1,3-Dichloropropene	15.73	75	2080288	29.549 ng	100
55) 1,1,2-Trichloroethane	15.91	97	1250523	27.390 ng	97
58) Toluene	16.20	91	5138177	24.607 ng	100
59) 2-Hexanone	16.43	43	3935626	30.599 ng	100
60) Dibromochloromethane	16.61	129	1428830	24.852 ng	99
61) 1,2-Dibromoethane	16.87	107	1419572	25.249 ng	99
62) n-Butyl Acetate	17.05	43	4135094	29.867 ng	99
63) n-Octane	17.17	57	1281438	27.933 ng	95
64) Tetrachloroethene	17.33	166	1240645	21.925 ng	100
65) Chlorobenzene	17.97	112	3339702	24.269 ng	100
66) Ethylbenzene	18.31	91	6014422	25.607 ng	99
67) m- & p-Xylenes	18.47	91	9454022	51.735 ng	98
68) Bromoform	18.54	173	1115887	23.847 ng	100
69) Styrene	18.79	104	3637532	25.651 ng	99
70) o-Xylene	18.89	91	4802555	25.542 ng	99
71) n-Nonane	19.06	43	3167734	27.976 ng	96
72) 1,1,2,2-Tetrachloroethane	18.87	83	2546459	28.891 ng	99
74) Cumene	19.39	105	5770366	24.666 ng	99
75) alpha-Pinene	19.73	93	3183492	25.927 ng	99
76) n-Propylbenzene	19.83	91	7327393	26.579 ng	98
77) 3-Ethyltoluene	19.91	105	5907031	24.932 ng	99
78) 4-Ethyltoluene	19.95	105	5478270	26.359 ng	99
79) 1,3,5-Trimethylbenzene	20.02	105	4745976	24.559 ng	98
80) alpha-Methylstyrene	20.15	118	2629473	27.343 ng	99
81) 2-Ethyltoluene	20.18	105	5647340	25.450 ng	99
82) 1,2,4-Trimethylbenzene	20.37	105	5029839	26.409 ng	97
83) n-Decane	20.44	57	3126305	28.401 ng	97
84) Benzyl Chloride	20.49	91	4642238	29.962 ng	98
85) 1,3-Dichlorobenzene	20.51	146	2655282	27.759 ng	100
86) 1,4-Dichlorobenzene	20.57	146	2641375	23.270 ng	99
87) sec-Butylbenzene	20.61	105	6329651	25.615 ng	99
88) 4-Isopropyltoluene (p-...	20.74	119	5672440	23.955 ng	96
89) 1,2,3-Trimethylbenzene	20.74	105	5116904	25.186 ng	97
90) 1,2-Dichlorobenzene	20.86	146	2567648	24.001 ng	100
91) d-Limonene	20.86	68	2375139	29.094 ng	95
92) 1,2-Dibromo-3-Chloropr...	21.24	157	941417	26.433 ng	91
93) n-Undecane	21.51	57	3304122	28.549 ng	98
94) 1,2,4-Trichlorobenzene	22.36	180	1904034	27.701 ng	100
95) Naphthalene	22.47	128	6392658	30.620 ng	100
96) n-Dodecane	22.43	57	3395661	32.855 ng	97
97) Hexachlorobutadiene	22.78	225	1055552	21.976 ng	100
98) Cyclohexanone	18.60	55	2305992	29.195 ng	98
99) tert-Butylbenzene	20.37	119	4506543	24.082 ng	99
100) n-Butylbenzene	21.10	91	5467320	27.241 ng	99

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091705.D
Acq On : 9 Mar 2017 4:35 Operator: LH
Sample : LCS R16030917 25ng
Misc : S29-03071701/S29-03031707 (1/1)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Mar 09 07:56:23 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091723.D
Acq On : 9 Mar 2017 19:24 Operator: LH
Sample : P1700971-006dup (35mL)
Misc : S29-03071701
ALS Vial : 11 Sample Multiplier: 1

Quant Time: Mar 10 16:30:07 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/10/17

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.53	130	369831	12.500	ng	-0.04
37) 1,4-Difluorobenzene (IS2)	13.64	114	1884462	12.500	ng	-0.03
56) Chlorobenzene-d5 (IS3)	17.93	82	873352	12.500	ng	0.00

System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...	12.39	65	688586	12.960	ng	-0.04
Spiked Amount 12.500	Range 70 - 130		Recovery = 103.68%			
57) Toluene-d8 (SS2)	16.09	98	2012162	12.008	ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.08%			
73) Bromofluorobenzene (SS3)	19.28	174	563046	10.526	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 84.24%			

Target Compounds

						Qvalue
2) Propene	4.21	42	2122	N.D.		
3) Dichlorodifluoromethan...	4.37	85	5094	N.D.		
4) Chloromethane	4.70	50	1667	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	6.64	45	9403	0.269	ng	84
11) Acetonitrile	6.94	41	765	N.D.		
12) Acrolein	7.14	56	724	N.D.		
13) Acetone	7.36	58	12245	0.349	ng #	1
14) Trichlorofluoromethane	7.57	101	2461	N.D.		
15) 2-Propanol (Isopropanol)	7.94	45	1117	N.D.		
16) Acrylonitrile	8.17	53	872	N.D.		
17) 1,1-Dichloroethene	0.00	96	0	N.D.		
18) 2-Methyl-2-Propanol (t...	8.85	59	186	N.D.		
19) Methylene Chloride	8.78	84	2216	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	9.08	76	3880	N.D.		
23) trans-1,2-Dichloroethene	10.07	61	819	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)	10.88	72	1786	N.D.		
28) cis-1,2-Dichloroethene	11.35	61	74275	1.156	ng	95
29) Diisopropyl Ether	0.00	87	0	N.D.		
30) Ethyl Acetate	0.00	61	0	N.D.		
31) n-Hexane	11.62	57	1819	N.D.		
32) Chloroform	0.00	83	0	N.D.		
34) Tetrahydrofuran (THF)	12.15	72	4604	0.149	ng #	88
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	13.29	56	703	N.D.		
41) Benzene	13.26	78	4776	N.D.		
42) Carbon Tetrachloride	0.00	117	0	N.D.		
43) Cyclohexane	13.55	84	575	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	14.35	83	522	N.D.		
47) Trichloroethene	14.35	130	38293	0.757	ng	97
48) 1,4-Dioxane	0.00	88	0	N.D.		
49) 2,2,4-Trimethylpentane...	14.40	57	10449	N.D.		

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Quant Time: Mar 10 16:30:07 2017
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Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	0.00	100	0	N.D.	
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	16.20	91	6593	N.D.	
59) 2-Hexanone	16.44	43	778	N.D.	
60) Dibromochloromethane	0.00	129	0	N.D.	
61) 1,2-Dibromoethane	0.00	107	0	N.D.	
62) n-Butyl Acetate	17.17	43	618	N.D.	
63) n-Octane	0.00	57	0	N.D.	
64) Tetrachloroethene	17.33	166	5404563	97.476 ng	98
65) Chlorobenzene	17.97	112	524	N.D.	
66) Ethylbenzene	18.31	91	1419	N.D.	
67) m- & p-Xylenes	18.46	91	3445	N.D.	
68) Bromoform	0.00	173	0	N.D.	
69) Styrene	0.00	104	0	N.D.	
70) o-Xylene	18.89	91	2161	N.D.	
71) n-Nonane	19.06	43	6774	N.D.	
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.	
74) Cumene	19.39	105	537	N.D.	
75) alpha-Pinene	0.00	93	0	N.D.	
76) n-Propylbenzene	19.83	91	1405	N.D.	
77) 3-Ethyltoluene	19.91	105	2742	N.D.	
78) 4-Ethyltoluene	19.95	105	1567	N.D.	
79) 1,3,5-Trimethylbenzene	20.02	105	1365	N.D.	
80) alpha-Methylstyrene	0.00	118	0	N.D.	
81) 2-Ethyltoluene	20.18	105	1777	N.D.	
82) 1,2,4-Trimethylbenzene	20.36	105	4294	N.D.	
83) n-Decane	0.00	57	0	N.D. d	
84) Benzyl Chloride	20.36	91	592	N.D.	
85) 1,3-Dichlorobenzene	20.57	146	552	N.D.	
86) 1,4-Dichlorobenzene	20.57	146	552	N.D.	
87) sec-Butylbenzene	20.61	105	564	N.D.	
88) 4-Isopropyltoluene (p-...	20.74	119	1036	N.D.	
89) 1,2,3-Trimethylbenzene	20.74	105	2334	N.D.	
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.	
91) d-Limonene	20.86	68	896	N.D.	
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.	
93) n-Undecane	21.51	57	2673	N.D.	
94) 1,2,4-Trichlorobenzene	0.00	180	0	N.D.	
95) Naphthalene	22.47	128	2984	N.D.	
96) n-Dodecane	22.43	57	717	N.D.	
97) Hexachlorobutadiene	0.00	225	0	N.D.	
98) Cyclohexanone	18.61	55	5403	N.D.	
99) tert-Butylbenzene	20.38	119	637	N.D.	
100) n-Butylbenzene	21.09	91	1178	N.D.	

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

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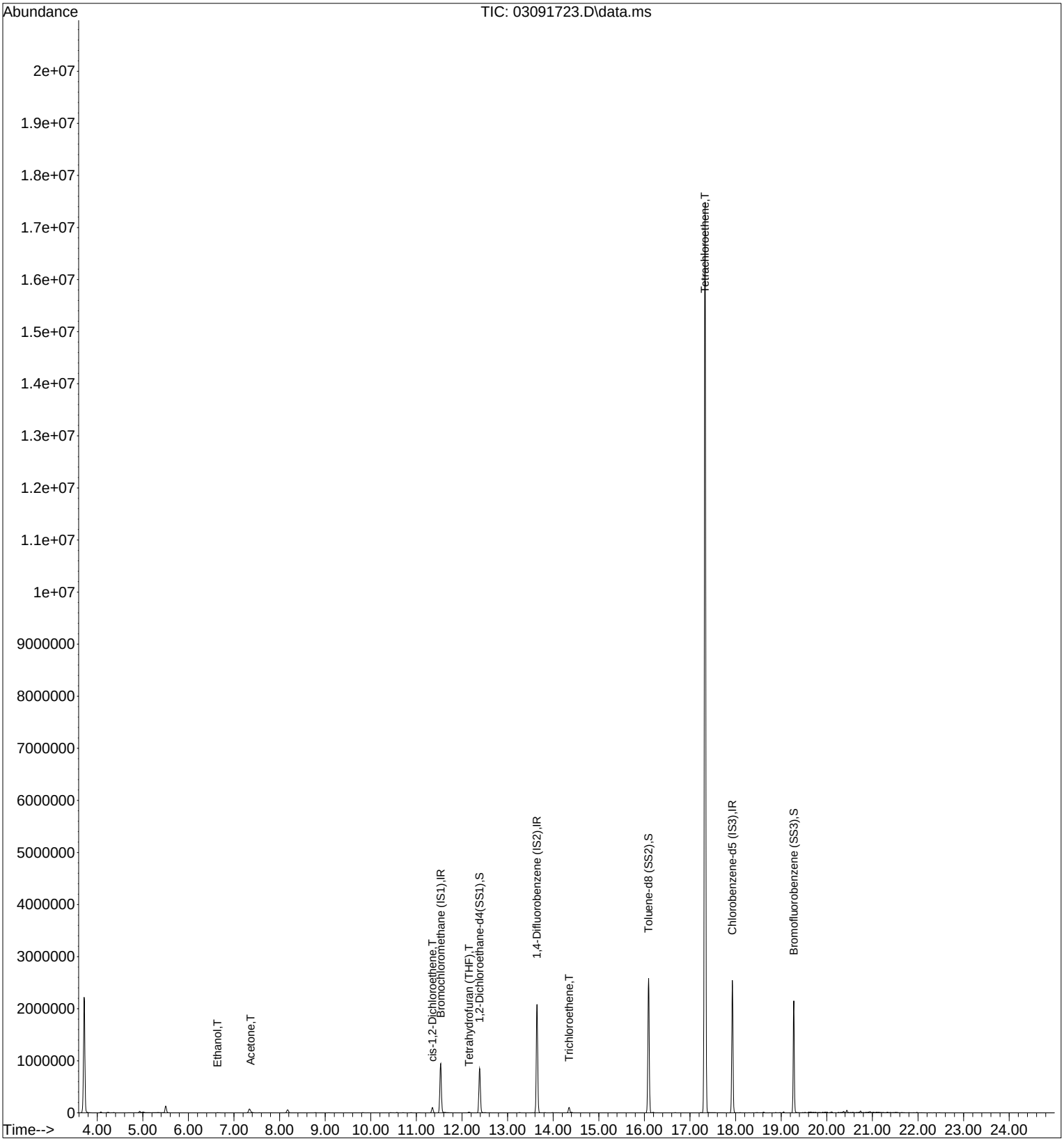

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091723.D
Acq On : 9 Mar 2017 19:24 Operator: LH
Sample : P1700971-006dup (35mL)
Misc : S29-03071701
ALS Vial : 11 Sample Multiplier: 1

Quant Time: Mar 10 08:40:05 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
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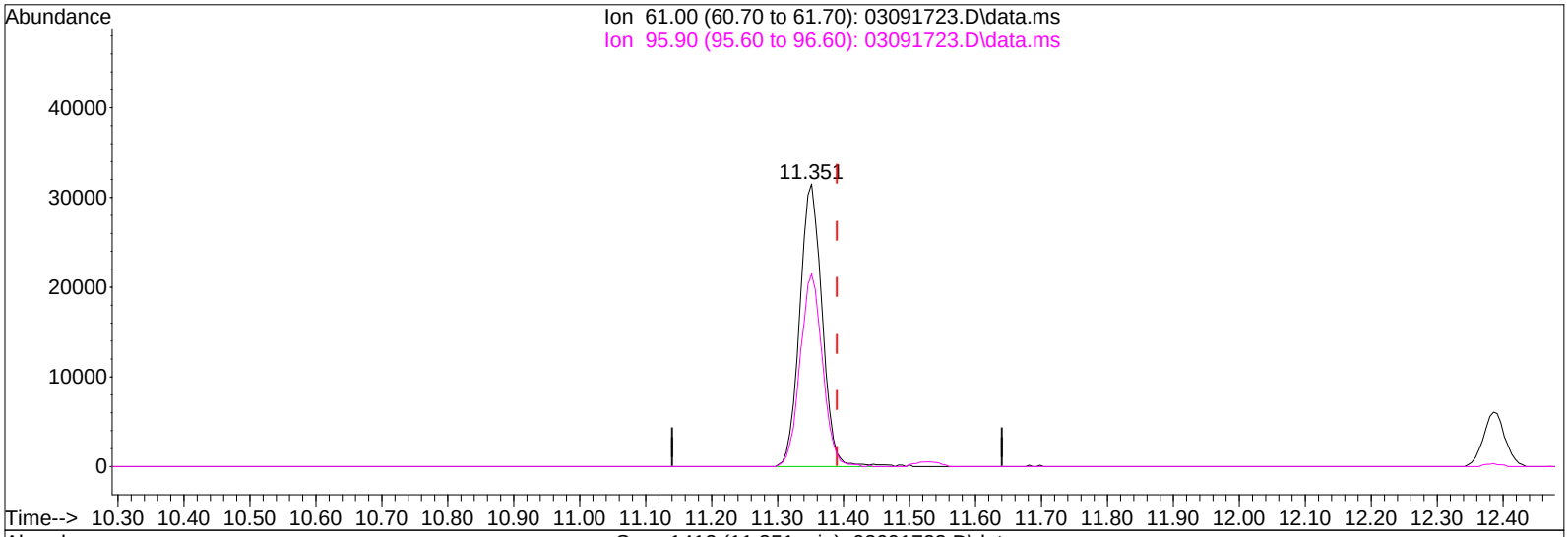
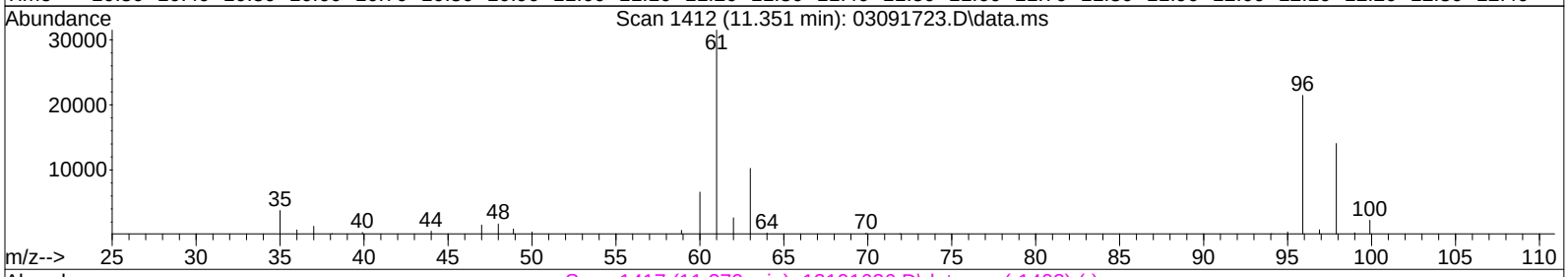
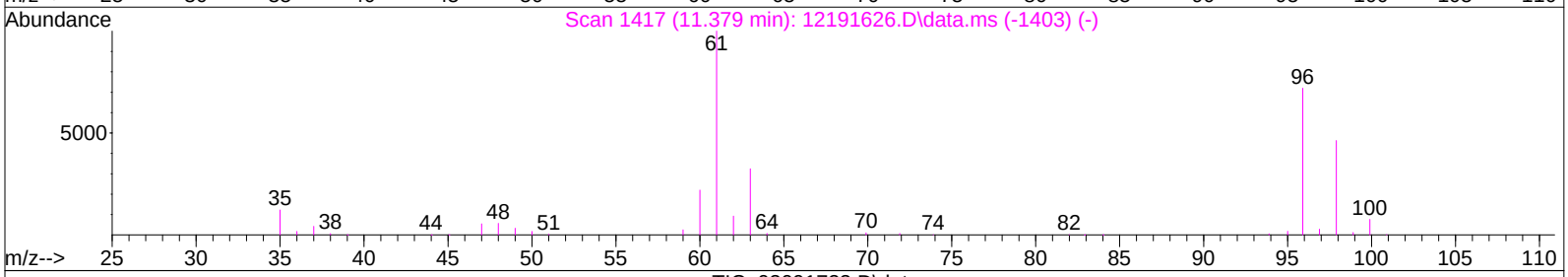
DataAcq Meth:TO15.M







TIC: 03091723.D\data.ms

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

11.351min (-0.039) 1.16ng

response 74275

Ion	Exp%	Act%
61.00	100	100
95.90	72.00	68.19
0.00	0.00	0.00
0.00	0.00	0.00

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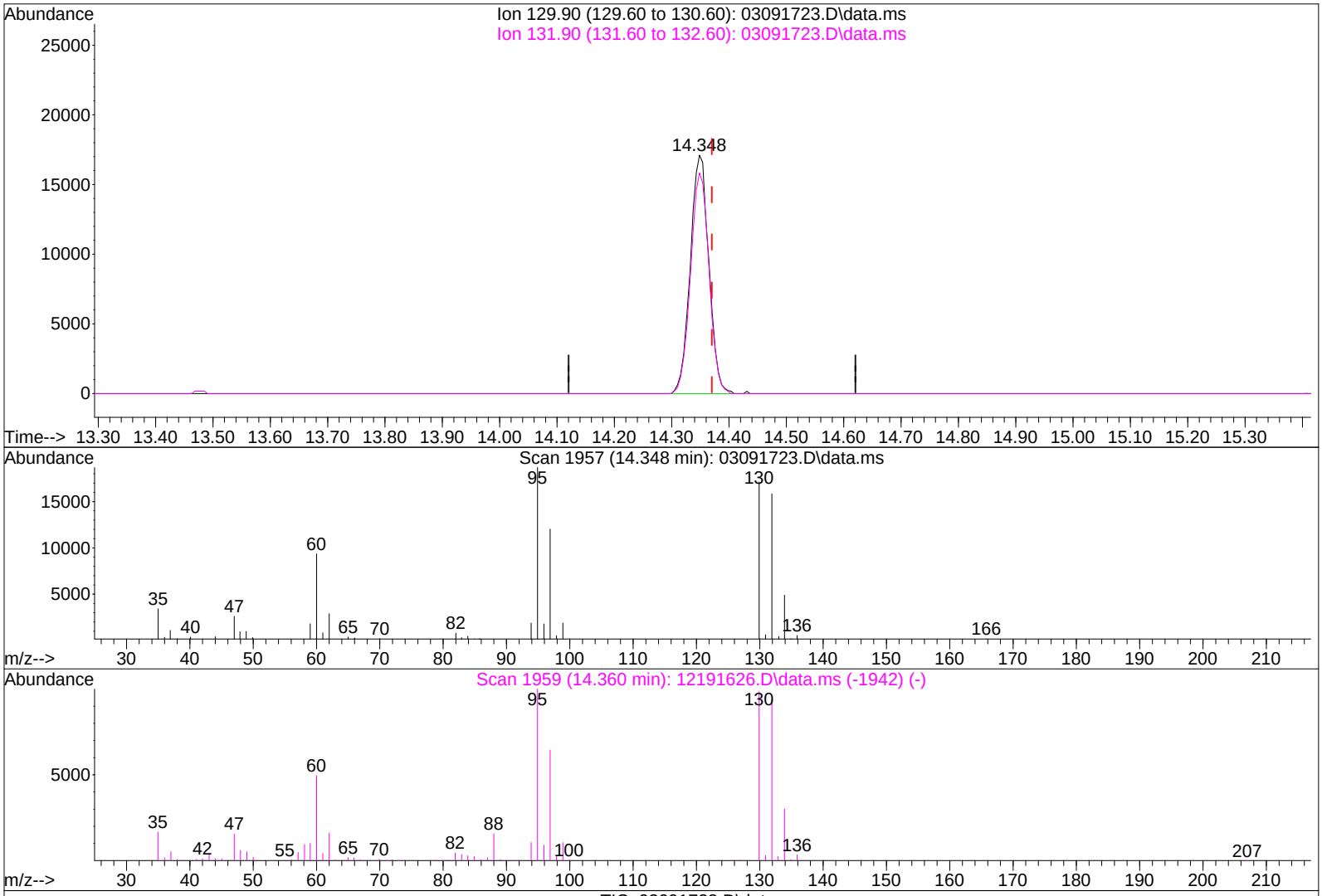
DataAcq Meth:TO15.M



TIC: 03091723.D\data.ms

(47) Trichloroethene (T)

14.348min (-0.022) 0.76ng

response 38293

Ion	Exp%	Act%
129.90	100	100
131.90	95.40	92.33
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091723.D
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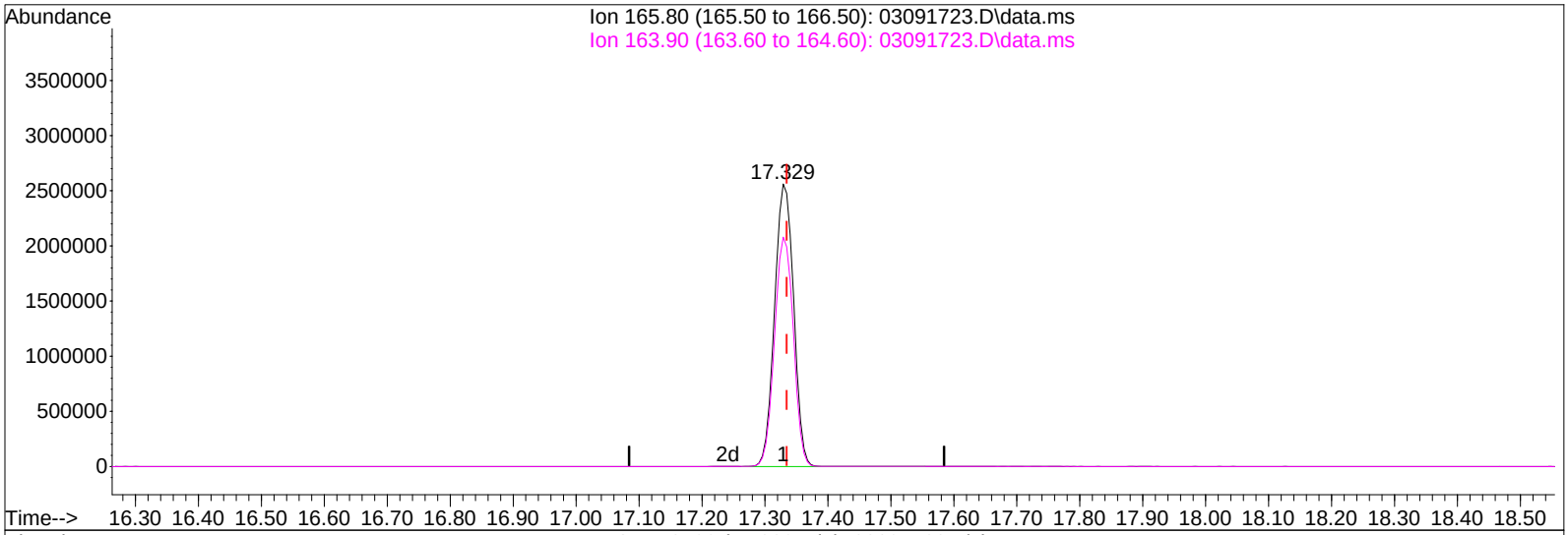
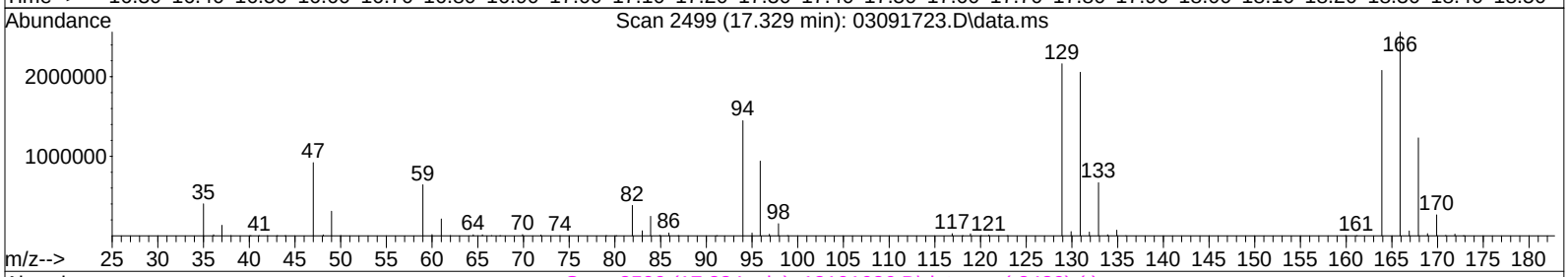
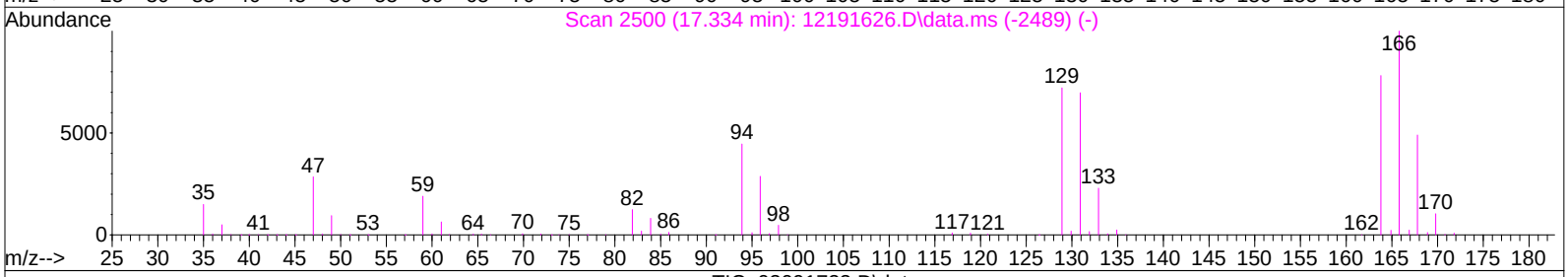
DataAcq Meth:TO15.M







TIC: 03091723.D\data.ms

(64) Tetrachloroethene (T)

17.329min (-0.006) 97.48ng

response 5404563

Ion	Exp%	Act%
165.80	100	100
163.90	78.50	80.35
0.00	0.00	0.00
0.00	0.00	0.00

Response Factor Report GCMS-16

Method Path : I:\MS16\METHODS\
Method File : R16121916.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue Dec 20 10:31:33 2016
Response Via : Initial Calibration

LH 12/21/16

Calibration Files
0.08=12191620.D 0.10=12191621.D 0.20=12191622.D 0.40=12191623.D 1.0 =12191624.D 5.0 =12191
50 =12191627.D 100 =12191628.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			1.789	1.704	1.575	1.520	1.621	1.686	2.202	1.728	13.12
3)	T	Dichlorodifluo...		3.833	3.235	3.320	3.072	2.817	3.126	2.942	2.916	3.158	10.14
4)	T	Chloromethane		3.246	2.823	2.750	2.593	2.294	2.574	2.389	2.111	2.597	13.55
5)	T	1,2-Dichloro-1...	2.195	2.011	1.833	1.734	1.662	1.541	1.690	1.593	1.534	1.755	12.74
6)	T	Vinyl Chloride	2.678	2.620	2.205	2.494	2.425	2.326	2.586	2.471	2.426	2.470	5.98
7)	T	1,3-Butadiene	1.670	1.706	1.491	1.469	1.740	1.655	1.945	1.907	1.939	1.725	10.37
8)	T	Bromomethane	1.399	1.359	1.243	1.328	1.261	1.211	1.346	1.281	1.337	1.307	4.70
9)	T	Chloroethane	1.078	1.040	1.018	1.028	0.993	0.948	1.081	1.032	1.046	1.029	4.00
10)	T	Ethanol	1.430	1.328	1.150	1.098	1.063	0.981	1.179	1.180	1.231	1.182	11.50
11)	T	Acetonitrile				2.985	2.732	2.442	2.767	2.656	2.664	2.708	6.52
12)	T	Acrolein	1.380	1.286	1.076	1.040	0.953	0.867	0.940	0.902	0.906	1.039	17.43
13)	T	Acetone	1.446	1.354	1.140	1.110	1.051	1.005	1.200	1.176	1.201	1.187	11.75
14)	T	Trichlorofluor...	3.376	3.171	2.763	2.697	2.471	2.362	2.593	2.488	2.471	2.710	12.77
15)	T	2-Propanol (Is...	4.996	4.728	3.968	3.994	3.862	3.506	4.277	3.994	3.160	4.054	13.90
16)	T	Acrylonitrile	2.429	2.238	1.931	1.901	1.845	1.766	2.020	1.946	1.961	2.004	10.26
17)	T	1,1-Dichloroet...	1.465	1.526	1.287	1.336	1.306	1.218	1.403	1.357	1.365	1.363	6.83
18)	T	2-Methyl-2-Pro...	4.972	4.780	4.178	4.055	3.810	3.612	4.356	4.308	4.204	4.253	10.06
19)	T	Methylene Chlo...			1.636	1.552	1.405	1.325	1.491	1.461	1.546	1.488	6.92
20)	T	3-Chloro-1-pro...	2.086	3.150	2.091	2.043	2.009	2.011	2.341	2.269	2.267	2.252	15.92
21)	T	Trichlorotrifl...	1.648	1.567	1.278	1.305	1.213	1.155	1.290	1.248	1.247	1.328	12.50
22)	T	Carbon Disulfide				5.713	5.316	4.812	5.401	5.141	5.116	5.250	5.80
23)	T	trans-1,2-Dich...	2.600	2.416	2.105	2.124	2.019	1.954	2.243	2.171	2.209	2.205	9.03
24)	T	1,1-Dichloroet...	3.165	3.064	2.805	2.832	2.577	2.444	2.736	2.615	2.625	2.763	8.46
25)	T	Methyl tert-Bu...	5.973	5.560	4.772	4.774	4.324	4.093	4.617	4.447	4.512	4.786	12.63
26)	T	Vinyl Acetate				0.291	0.282	0.306	0.404	0.415	0.385	0.347	17.42
27)	T	2-Butanone (MEK)	1.174	1.066	0.965	0.980	0.961	0.915	1.044	1.038	1.079	1.025	7.64
28)	T	cis-1,2-Dichlo...	2.563	2.424	2.073	2.070	2.007	1.927	2.201	2.123	2.157	2.172	9.32
29)	T	Diisopropyl Ether	1.823	1.738	1.429	1.219	1.102	1.082	1.329	1.340	1.321	1.376	18.64
30)	T	Ethyl Acetate	0.604	0.608	0.516	0.524	0.524	0.517	0.641	0.666	0.655	0.584	10.87
31)	T	n-Hexane	3.121	2.945	2.513	2.608	2.277	2.238	2.650	2.729	2.760	2.649	10.81
32)	T	Chloroform	3.306	3.168	2.774	2.754	2.550	2.408	2.691	2.588	2.542	2.753	10.85
33)	S	1,2-Dichloroet...	1.792	1.799	1.802	1.823	1.811	1.790	1.775	1.795	1.773	1.796	0.88
34)	T	Tetrahydrofura...	1.404	1.191	0.982	0.979	0.949	0.885	1.001	0.979	1.012	1.042	15.21
35)	T	Ethyl tert-But...	2.092	2.052	1.787	1.756	1.640	1.566	1.814	1.784	1.864	1.817	9.41
36)	T	1,2-Dichloroet...	2.780	2.549	2.219	2.212	2.073	1.963	2.219	2.148	2.139	2.256	11.18
37)	IR	1,4-Difluorobenzen...	----------ISTD----------										
38)	T	1,1,1-Trichlor...	0.573	0.556	0.489	0.475	0.451	0.423	0.487	0.472	0.481	0.490	9.71
39)	T	Isopropyl Acetate	0.231	0.223	0.189	0.193	0.185	0.180	0.222	0.228	0.238	0.210	10.83
40)	T	1-Butanol	0.352	0.319	0.279	0.271	0.293	0.295	0.395	0.400	0.415	0.335	16.74
41)	T	Benzene	1.616	1.536	1.269	1.197	1.134	1.067	1.226	1.217	1.227	1.276	14.18
42)	T	Carbon Tetrach...	0.479	0.461	0.399	0.407	0.394	0.375	0.440	0.426	0.434	0.424	7.89
43)	T	Cyclohexane	0.561	0.515	0.460	0.441	0.428	0.404	0.495	0.490	0.477	0.474	10.04
44)	T	tert-Amyl Meth...	1.101	1.038	0.894	0.863	0.823	0.784	0.933	0.910	0.940	0.921	10.78
45)	T	1,2-Dichloropr...	0.389	0.361	0.311	0.304	0.286	0.270	0.313	0.305	0.317	0.317	11.47
46)	T	Bromodichlorom...	0.493	0.477	0.425	0.416	0.393	0.386	0.463	0.460	0.472	0.443	8.71
47)	T	Trichloroethene	0.418	0.384	0.325	0.312	0.302	0.280	0.334	0.331	0.333	0.336	12.49
48)	T	1,4-Dioxane	0.283	0.267	0.231	0.223	0.236	0.224	0.273	0.275	0.290	0.256	10.54
49)	T	2,2,4-Trimethy...	1.639	1.552	1.336	1.317	1.218	1.142	1.338	1.289	1.270	1.345	11.64
50)	T	Methyl Methacr...	0.136	0.127	0.116	0.113	0.115	0.110	0.135	0.135	0.137	0.125	8.99
51)	T	n-Heptane	0.366	0.347	0.296	0.295	0.276	0.261	0.303	0.302	0.325	0.308	10.77
52)	T	cis-1,3-Dichlo...	0.578	0.527	0.459	0.455	0.458	0.454	0.557	0.556	0.581	0.514	11.03
53)	T	4-Methyl-2-pen...	0.345	0.315	0.288	0.273	0.277	0.265	0.325	0.324	0.348	0.307	10.26
54)	T	trans-1,3-Dich...	0.501	0.469	0.407	0.400	0.409	0.416	0.509	0.497	0.516	0.458	10.78

55)	T	1,1,2-Trichlor...	0.347	0.320	0.284	0.283	0.276	0.261	0.304	0.294	0.304	0.297	8.68
56)	IR	Chlorobenzene-d5 (...	----------ISTD----------										
57)	S	Toluene-d8 (SS2)	2.461	2.457	2.420	2.443	2.397	2.387	2.363	2.347	2.308	2.398	2.19
58)	T	Toluene	3.801	3.443	2.892	2.898	2.631	2.490	2.845	2.749	2.608	2.928	14.55
59)	T	2-Hexanone	2.305	1.961	1.678	1.583	1.647	1.617	1.861	1.791	1.790	1.804	12.46
60)	T	Dibromochlorom...	0.926	0.872	0.750	0.733	0.727	0.730	0.857	0.831	0.831	0.806	9.11
61)	T	1,2-Dibromoethane	0.946	0.854	0.747	0.742	0.732	0.714	0.813	0.777	0.770	0.788	9.28
62)	T	n-Butyl Acetate	2.301	2.112	1.794	1.732	1.806	1.775	2.051	1.966	1.938	1.942	9.68
63)	T	n-Octane			0.720	0.665	0.597	0.553	0.644	0.646	0.680	0.643	8.52
64)	T	Tetrachloroethene	0.965	0.927	0.784	0.768	0.714	0.682	0.786	0.763	0.752	0.794	11.73
65)	T	Chlorobenzene	2.384	2.255	1.863	1.847	1.754	1.644	1.933	1.876	1.813	1.930	12.32
66)	T	Ethylbenzene	4.013	3.789	3.199	3.156	3.086	2.901	3.409	3.295	2.797	3.294	11.99
67)	T	m- & p-Xylenes	3.255	2.878	2.446	2.422	2.364	2.246	2.747	2.648	2.058	2.563	14.12
68)	T	Bromoform	0.721	0.647	0.575	0.584	0.591	0.607	0.746	0.725	0.708	0.656	10.55
69)	T	Styrene	2.366	2.176	1.824	1.797	1.823	1.796	2.127	2.065	1.924	1.989	10.29
70)	T	o-Xylene	3.301	2.974	2.472	2.489	2.396	2.305	2.794	2.717	2.283	2.637	12.91
71)	T	n-Nonane	1.997	1.805	1.581	1.489	1.432	1.342	1.586	1.565	1.494	1.588	12.56
72)	T	1,1,2,2-Tetrac...	1.282	1.217	1.111	1.129	1.148	1.156	1.422	1.401	1.258	1.236	9.31
73)	S	Bromofluoroben...	0.764	0.762	0.760	0.768	0.774	0.776	0.776	0.761	0.749	0.766	1.16
74)	T	Cumene	4.124	3.865	3.201	3.128	3.021	2.875	3.412	3.262	2.640	3.281	14.22
75)	T	alpha-Pinene	1.993	1.853	1.629	1.613	1.550	1.502	1.837	1.823	1.698	1.722	9.48
76)	T	n-Propylbenzene	4.866	4.366	3.708	3.741	3.683	3.550	4.166	3.887	2.829	3.866	14.71
77)	T	3-Ethyltoluene	4.254	3.850	3.256	2.952	2.936	2.838	3.629	3.373	2.816	3.323	15.14
78)	T	4-Ethyltoluene	3.346	3.103	2.653	2.937	2.915	2.783	3.154	3.067	2.273	2.915	10.85
79)	T	1,3,5-Trimethy...	3.366	3.220	2.535	2.541	2.427	2.381	2.871	2.766	2.284	2.710	13.98
80)	T	alpha-Methylst...	1.395	1.264	1.168	1.214	1.285	1.298	1.595	1.544	1.375	1.349	10.69
81)	T	2-Ethyltoluene	3.661	3.470	3.176	2.901	2.892	2.809	3.383	3.187	2.527	3.112	11.59
82)	T	1,2,4-Trimethy...	2.944	2.744	2.597	2.561	2.495	2.473	3.236	2.883	2.107	2.671	12.20
83)	T	n-Decane	1.871	1.690	1.381	1.392	1.387	1.356	1.654	1.658	1.504	1.544	11.77
84)	T	Benzyl Chloride				1.166	1.842	2.140	2.818	2.798	2.272	2.173	28.68
85)	T	1,3-Dichlorobe...	1.047	1.083	1.185	1.284	1.406	1.389	1.708	1.615	1.356	1.341	16.63
86)	T	1,4-Dichlorobe...	2.030	2.067	1.348	1.386	1.399	1.406	1.673	1.611	1.406	1.592	17.67
87)	T	sec-Butylbenzene	4.046	3.828	3.459	3.408	3.329	3.208	3.793	3.501	2.619	3.465	12.00
88)	T	4-Isopropyltol...	4.215	3.795	3.231	3.124	3.091	3.054	3.834	3.260	2.283	3.321	16.97
89)	T	1,2,3-Trimethy...	4.094	3.109	2.593	2.601	2.539	2.499	3.240	2.886	2.081	2.849	20.41
90)	T	1,2-Dichlorobe...	1.855	1.685	1.403	1.345	1.386	1.364	1.713	1.552	1.200	1.500	14.20
91)	T	d-Limonene	1.240	1.161	1.013	1.037	1.045	1.060	1.355	1.359	1.034	1.145	12.27
92)	T	1,2-Dibromo-3-...				0.368	0.432	0.479	0.585	0.575	0.558	0.499	17.59
93)	T	n-Undecane	2.115	1.749	1.454	1.398	1.412	1.407	1.727	1.763	1.583	1.623	14.78
94)	T	1,2,4-Trichlor...	0.918	0.778	0.705	0.755	0.913	1.010	1.229	1.220	1.147	0.964	20.78
95)	T	Naphthalene				2.016	2.514	3.048	3.696	3.539	2.754	2.928	21.65
96)	T	n-Dodecane	1.816	1.497	1.118	1.065	1.353	1.376	1.599	1.649	1.573	1.449	17.02
97)	T	Hexachlorobuta...	0.731	0.682	0.587	0.590	0.600	0.616	0.764	0.764	0.728	0.674	11.28
98)	T	Cyclohexanone	1.459	1.213	0.989	0.966	1.006	0.965	1.142	1.100	1.129	1.108	14.30
99)	T	tert-Butylbenzene	3.101	3.169	2.550	2.496	2.422	2.360	2.992	2.598	1.932	2.624	15.19
100)	T	n-Butylbenzene	3.139	2.906	2.583	2.658	2.776	2.685	3.188	3.033	2.364	2.815	9.73

(#) = Out of Range

R16121916.M Wed Dec 21 14:52:14 2016

LH 12/21/16

Primary Source Standards Concentrations (Working & Initial Calibration)

1ng/L Std. ID:
4ng/L Std. ID: S29-12191607
20ng/L Std. ID: S29-12191605
200ng/L Std. ID: S29-12191603

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
Propene	1.036	207.2	20.72	4.144	1.036		0.08288	0.1036	0.2072	0.4144	1.036	5.180	25.900	51.80	103.6
Dichlorodifluoromethane	1.047	209.4	20.94	4.188	1.047		0.08376	0.1047	0.2094	0.4188	1.047	5.235	26.175	52.35	104.7
Chloromethane	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
Freon-114	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
Vinyl Chloride	1.023	204.6	20.46	4.092	1.023		0.08184	0.1023	0.2046	0.4092	1.023	5.115	25.575	51.15	102.3
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
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	1.009	201.8	20.18	4.036	1.009		0.08072	0.1009	0.2018	0.4036	1.009	5.045	25.225	50.45	100.9
Ethanol	5.207	1041.4	104.14	20.828	5.207		0.41656	0.5207	1.0414	2.0828	5.207	26.035	130.175	260.35	520.7
Acetonitrile	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
Acrolein	1.041	208.2	20.82	4.164	1.041		0.08328	0.1041	0.2082	0.4164	1.041	5.205	26.025	52.05	104.1
Acetone	5.313	1062.6	106.26	21.252	5.313		0.42504	0.5313	1.0626	2.1252	5.313	26.565	132.825	265.65	531.3
Trichlorofluoromethane	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
Isopropanol	2.105	421.0	42.10	8.420	2.105		0.16840	0.2105	0.4210	0.8420	2.105	10.525	52.625	105.25	210.5
Acrylonitrile	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-Dichloroethene	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
tert-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
Methylene Chloride	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
Allyl Chloride	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
Trichlorotrifluoroethane	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
Carbon Disulfide	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
trans-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
1,1-Dichloroethane	1.020	204.0	20.40	4.080	1.020		0.08160	0.1020	0.2040	0.4080	1.020	5.100	25.500	51.00	102.0
Methyl tert-Butyl Ether	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
Vinyl Acetate	5.265	1053.0	105.30	21.060	5.265		0.42120	0.5265	1.0530	2.1060	5.265	26.325	131.625	263.25	526.5
2-Butanone	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
cis-1,2-Dichloroethene	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
Diisopropyl Ether	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
Ethyl Acetate	2.129	425.8	42.58	8.516	2.129		0.17032	0.2129	0.4258	0.8516	2.129	10.645	53.225	106.45	212.9
n-Hexane	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
Chloroform	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
Tetrahydrofuran	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
Ethyl tert-Butyl 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-Dichloroethane	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
1,1,1-Trichloroethane	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
Isopropyl Acetate	2.104	420.8	42.08	8.416	2.104		0.16832	0.2104	0.4208	0.8416	2.104	10.520	52.600	105.20	210.4
1-Butanol	2.105	421.0	42.10	8.420	2.105		0.16840	0.2105	0.4210	0.8420	2.105	10.525	52.625	105.25	210.5
Benzene	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
Carbon Tetrachloride	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
Cyclohexane	2.130	426.0	42.60	8.520	2.130		0.17040	0.2130	0.4260	0.8520	2.130	10.650	53.250	106.50	213.0
tert-Amyl Methyl Ether	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
1,2-Dichloropropane	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
Bromodichloromethane	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
Trichloroethene	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
1,4-Dioxane	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
Isooctane	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
Methyl Methacrylate	2.110	422.0	42.20	8.440	2.110		0.16880	0.2110	0.4220	0.8440	2.110	10.550	52.750	105.50	211.0
n-Heptane	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
cis-1,3-Dichloropropene	1.116	223.2	22.32	4.464	1.116		0.08928	0.1116	0.2232	0.4464	1.116	5.580	27.900	55.80	111.6
4-Methyl-2-pentanone	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
trans-1,3-Dichloropropene	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
1,1,2-Trichloroethane	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
Toluene	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
2-Hexanone	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

Primary Source Standards Concentrations (Working & Initial Calibration)

1ng/L Std. ID:
4ng/L Std. ID: S29-12191607
20ng/L Std. ID: S29-12191605
200ng/L Std. ID: S29-12191603

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
Dibromochloromethane	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
1,2-Dibromoethane	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-Butyl Acetate	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-Octane	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
Tetrachloroethene	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
Chlorobenzene	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
Ethylbenzene	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
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	1.061	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
o-Xylene	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
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	1.056	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
Cumene	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
alpha-Pinene	1.044	208.8	20.88	4.176	1.044		0.08352	0.1044	0.2088	0.4176	1.044	5.220	26.100	52.20	104.4
n-Propylbenzene	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
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	1.050	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
2-Ethyltoluene	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
1,2,4-Trimethylbenzene	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
n-Decane	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
Benzyl Chloride	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
1,3-Dichlorobenzene	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
1,4-Dichlorobenzene	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
sec-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
p-Isopropyltoluene	1.027	205.4	20.54	4.108	1.027		0.08216	0.1027	0.2054	0.4108	1.027	5.135	25.675	51.35	102.7
1,2,3-Trimethylbenzene	1.027	205.4	20.54	4.108	1.027		0.08216	0.1027	0.2054	0.4108	1.027	5.135	25.675	51.35	102.7
1,2-Dichlorobenzene	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
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	1.053	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
n-Undecane	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
1,2,4-Trichlorobenzene	1.043	208.6	20.86	4.172	1.043		0.08344	0.1043	0.2086	0.4172	1.043	5.215	26.075	52.15	104.3
Naphthalene	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
n-Dodecane	1.045	209.0	20.90	4.180	1.045		0.08360	0.1045	0.2090	0.4180	1.045	5.225	26.125	52.25	104.5
Hexachloro-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
Methacrylonitrile	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
Cyclohexanone	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
tert-Butylbenzene	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-Butylbenzene	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

Calibration Status Report GCMS-16

Method : I:\MS16\METHODS\R16121916.M (RTE Integrator)
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration

#	ID	Conc	ISTD Conc	Path\File
1	0.08	0	13	I:\MS16\DATA\2016_12\19\12191620.D
2	0.10	0	13	I:\MS16\DATA\2016_12\19\12191621.D
3	0.20	0	13	I:\MS16\DATA\2016_12\19\12191622.D
4	0.40	0	13	I:\MS16\DATA\2016_12\19\12191623.D
5	1.0	1	13	I:\MS16\DATA\2016_12\19\12191624.D
6	5.0	5	13	I:\MS16\DATA\2016_12\19\12191625.D
7	25	26	13	I:\MS16\DATA\2016_12\19\12191626.D
8	50	52	13	I:\MS16\DATA\2016_12\19\12191627.D
9	100	104	13	I:\MS16\DATA\2016_12\19\12191628.D

#	ID	Update Time	Quant Time	Acquisition Time
1	0.08	Dec 20 10:30 2016	Dec 20 09:09 2016	19 Dec 2016 23:59
2	0.10	Dec 20 10:30 2016	Dec 20 09:39 2016	20 Dec 2016 00:33
3	0.20	Dec 20 10:30 2016	Dec 20 09:45 2016	20 Dec 2016 1:06
4	0.40	Dec 20 10:30 2016	Dec 20 09:52 2016	20 Dec 2016 1:39
5	1.0	Dec 20 10:30 2016	Dec 20 09:54 2016	20 Dec 2016 2:13
6	5.0	Dec 20 10:31 2016	Dec 20 08:57 2016	20 Dec 2016 2:46
7	25	Dec 20 10:31 2016	Dec 20 08:57 2016	20 Dec 2016 3:19
8	50	Dec 20 10:31 2016	Dec 20 08:57 2016	20 Dec 2016 3:52
9	100	Dec 20 10:31 2016	Dec 20 08:57 2016	20 Dec 2016 4:25

R16121916.M Wed Dec 21 14:53:49 2016

LH 12/21/16

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191621.D
Acq On : 20 Dec 2016 00:33 Operator: LH
Sample : 0.1ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 09:39:14 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	282571	12.500	ng		-0.01
37) 1,4-Difluorobenzene (IS2)	13.65	114	1423235	12.500	ng		-0.01
56) Chlorobenzene-d5 (IS3)	17.93	82	599403	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.40	65	508455	13.755	ng		-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 110.00%				
57) Toluene-d8 (SS2)	16.10	98	1472932	12.900	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 103.20%				
73) Bromofluorobenzene (SS3)	19.28	174	456549	12.454	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.60%				
Target Compounds							Qvalue
2) Propene	4.25	42	5006	0.137	ng		90
3) Dichlorodifluoromethan...	4.41	85	9073	0.153	ng	#	97
4) Chloromethane	4.75	50	7374	0.153	ng		96
5) 1,2-Dichloro-1,1,2,2-t...	4.98	135	4568	0.147	ng		95
6) Vinyl Chloride	5.22	62	6060	0.126	ng		91
7) 1,3-Butadiene	5.50	54	4077	0.130	ng		97
8) Bromomethane	5.96	94	3051	0.111	ng		99
9) Chloroethane	6.30	64	2373	0.105	ng		96
10) Ethanol	6.72	45	15628	0.627	ng		96
11) Acetonitrile	7.11	41	9093m	0.143	ng		
12) Acrolein	7.28	56	3027m	0.126	ng		
13) Acetone	7.38	58	16263	0.673	ng	#	83
14) Trichlorofluoromethane	7.60	101	7520	0.146	ng		99
15) 2-Propanol (Isopropanol)	7.91	45	22499	0.271	ng		79
16) Acrylonitrile	8.26	53	5338	0.123	ng		95
17) 1,1-Dichloroethene	8.61	96	3653	0.135	ng		87
18) 2-Methyl-2-Propanol (t...	8.82	59	22844	0.285	ng		89
19) Methylene Chloride	8.82	84	4843	0.150	ng		94
20) 3-Chloro-1-propene (Al...	8.99	41	7490	0.152	ng		74
21) Trichlorotrifluoroethane	9.22	151	3717	0.144	ng		98
22) Carbon Disulfide	9.14	76	18060	0.163	ng		95
23) trans-1,2-Dichloroethene	10.11	61	5828	0.130	ng		95
24) 1,1-Dichloroethane	10.35	63	7064	0.124	ng		96
25) Methyl tert-Butyl Ether	10.46	73	13398	0.146	ng		98
26) Vinyl Acetate	10.63	86	3164	0.467	ng	#	45
27) 2-Butanone (MEK)	10.89	72	2527	0.117	ng	#	53
28) cis-1,2-Dichloroethene	11.37	61	5831	0.133	ng		98
29) Diisopropyl Ether	11.65	87	4172	0.154	ng	#	66
30) Ethyl Acetate	11.69	61	2924	0.253	ng		99
31) n-Hexane	11.64	57	7076	0.135	ng		98
32) Chloroform	11.71	83	7577	0.141	ng		98
34) Tetrahydrofuran (THF)	12.15	72	2860	0.129	ng	#	77
35) Ethyl tert-Butyl Ether	12.24	87	4904	0.140	ng		100
36) 1,2-Dichloroethane	12.51	62	6062	0.149	ng		97
38) 1,1,1-Trichloroethane	12.79	97	6805	0.146	ng		99
39) Isopropyl Acetate	13.21	61	5334	0.251	ng		95
40) 1-Butanol	13.27	56	7650	0.230	ng		82
41) Benzene	13.27	78	18395	0.133	ng		99
42) Carbon Tetrachloride	13.42	117	5541	0.139	ng		97
43) Cyclohexane	13.56	84	12479	0.268	ng		98
44) tert-Amyl Methyl Ether	13.89	73	12456	0.138	ng		93
45) 1,2-Dichloropropane	14.12	63	4370	0.129	ng		96
46) Bromodichloromethane	14.32	83	5787	0.140	ng		98
47) Trichloroethene	14.36	130	4636	0.145	ng		99
48) 1,4-Dioxane	14.36	88	3232	0.120	ng	#	65
49) 2,2,4-Trimethylpentane...	14.41	57	18708	0.133	ng		96

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191621.D
Acq On : 20 Dec 2016 00:33 Operator: LH
Sample : 0.1ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 09:39:14 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

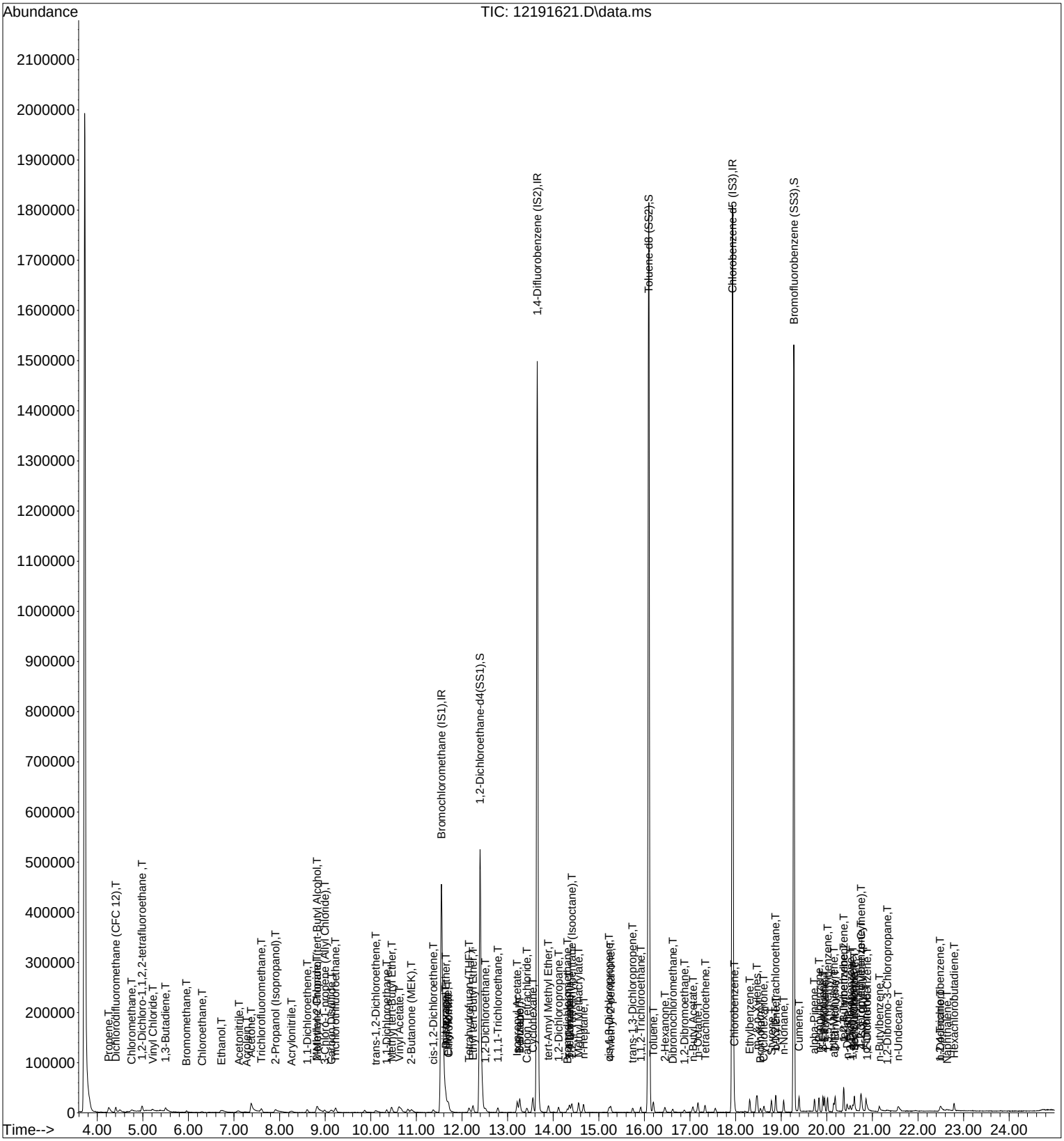
Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
50) Methyl Methacrylate	14.56	100	3052	0.254 ng		97
51) n-Heptane	14.67	71	4193	0.133 ng		96
52) cis-1,3-Dichloropropene	15.23	75	6699	0.134 ng		98
53) 4-Methyl-2-pentanone	15.26	58	3794	0.123 ng		81
54) trans-1,3-Dichloropropene	15.74	75	5676	0.128 ng		98
55) 1,1,2-Trichloroethane	15.92	97	3867	0.130 ng		98
58) Toluene	16.20	91	17383	0.147 ng		99
59) 2-Hexanone	16.45	43	9978	0.132 ng		90
60) Dibromochloromethane	16.63	129	4442	0.137 ng		100
61) 1,2-Dibromoethane	16.88	107	4326	0.130 ng		100
62) n-Butyl Acetate	17.06	43	10776	0.125 ng		94
63) n-Octane	17.17	57	4789	0.170 ng	#	78
64) Tetrachloroethene	17.33	166	4716	0.143 ng		99
65) Chlorobenzene	17.97	112	11472	0.142 ng		96
66) Ethylbenzene	18.31	91	19166	0.135 ng		98
67) m- & p-Xylenes	18.47	91	29295	0.273 ng		98
68) Bromoform	18.54	173	3299	0.127 ng		99
69) Styrene	18.79	104	11071	0.134 ng		99
70) o-Xylene	18.89	91	15032	0.139 ng		98
71) n-Nonane	19.06	43	9123	0.135 ng		95
72) 1,1,2,2-Tetrachloroethane	18.87	83	6162	0.119 ng		100
74) Cumene	19.39	105	19458	0.151 ng		99
75) alpha-Pinene	19.73	93	9278	0.132 ng		97
76) n-Propylbenzene	19.83	91	22255	0.137 ng		98
77) 3-Ethyltoluene	19.91	105	19387	0.141 ng		98
78) 4-Ethyltoluene	19.95	105	15607	0.128 ng		100
79) 1,3,5-Trimethylbenzene	20.02	105	16196	0.144 ng		96
80) alpha-Methylstyrene	20.16	118	6366	0.119 ng		90
81) 2-Ethyltoluene	20.18	105	17670	0.135 ng		99
82) 1,2,4-Trimethylbenzene	20.37	105	13841	0.125 ng		98
83) n-Decane	20.45	57	8535	0.130 ng		96
84) Benzyl Chloride	20.60	91	9758	0.115 ng	#	55
85) 1,3-Dichlorobenzene	20.52	146	5494	0.094 ng		96
86) 1,4-Dichlorobenzene	20.57	146	10487	0.158 ng		99
87) sec-Butylbenzene	20.61	105	19347	0.135 ng	#	63
88) 4-Isopropyltoluene (p-...	20.75	119	18691	0.141 ng		93
89) 1,2,3-Trimethylbenzene	20.75	105	15310	0.136 ng		99
90) 1,2-Dichlorobenzene	20.89	146	8548	0.144 ng		92
91) d-Limonene	20.86	68	5596	0.128 ng		99
92) 1,2-Dibromo-3-Chloropr...	21.33	157	1622	0.081 ng	#	13
93) n-Undecane	21.57	57	8838	0.130 ng		90
94) 1,2,4-Trichlorobenzene	22.48	180	3893	0.095 ng	#	92
95) Naphthalene	22.64	128	6149	0.055 ng	#	71
96) n-Dodecane	22.49	57	7499m	0.121 ng		
97) Hexachlorobutadiene	22.79	225	3463	0.125 ng		93
98) Cyclohexanone	18.62	55	6140	0.129 ng		94
99) tert-Butylbenzene	20.37	119	15970	0.154 ng		95
100) n-Butylbenzene	21.16	91	14714	0.124 ng	#	90

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191621.D
Acq On : 20 Dec 2016 00:33 Operator: LH
Sample : 0.1ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

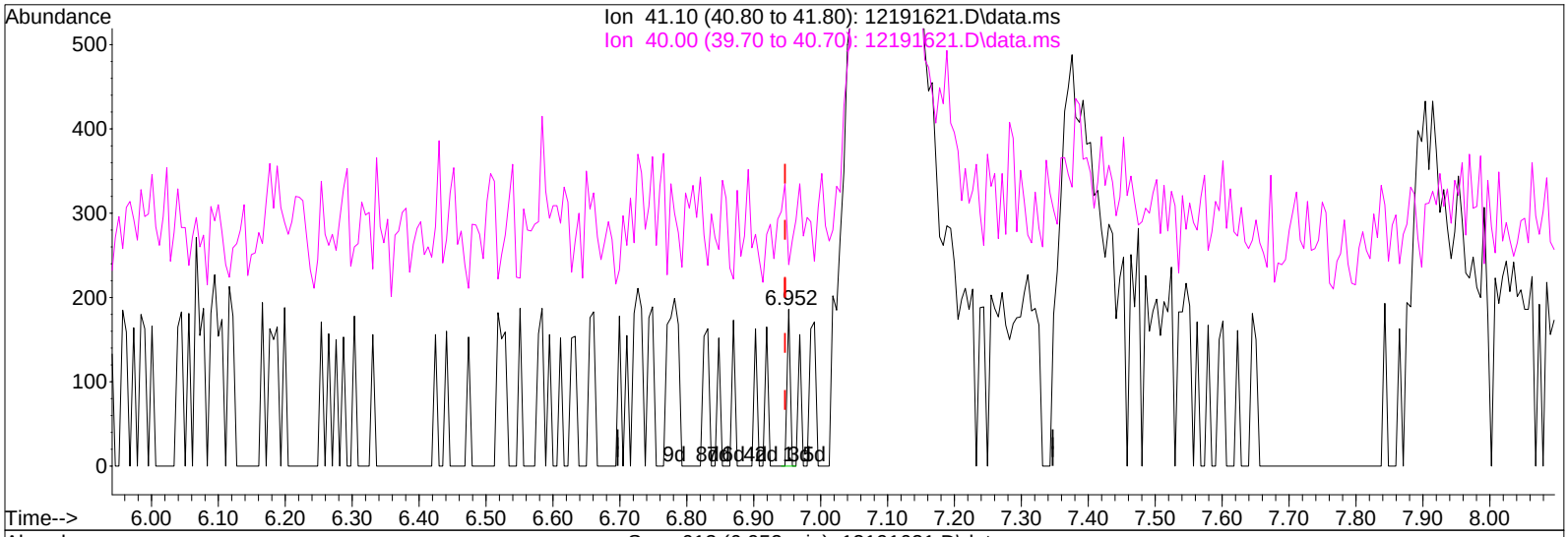
Quant Time: Dec 20 09:39:14 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

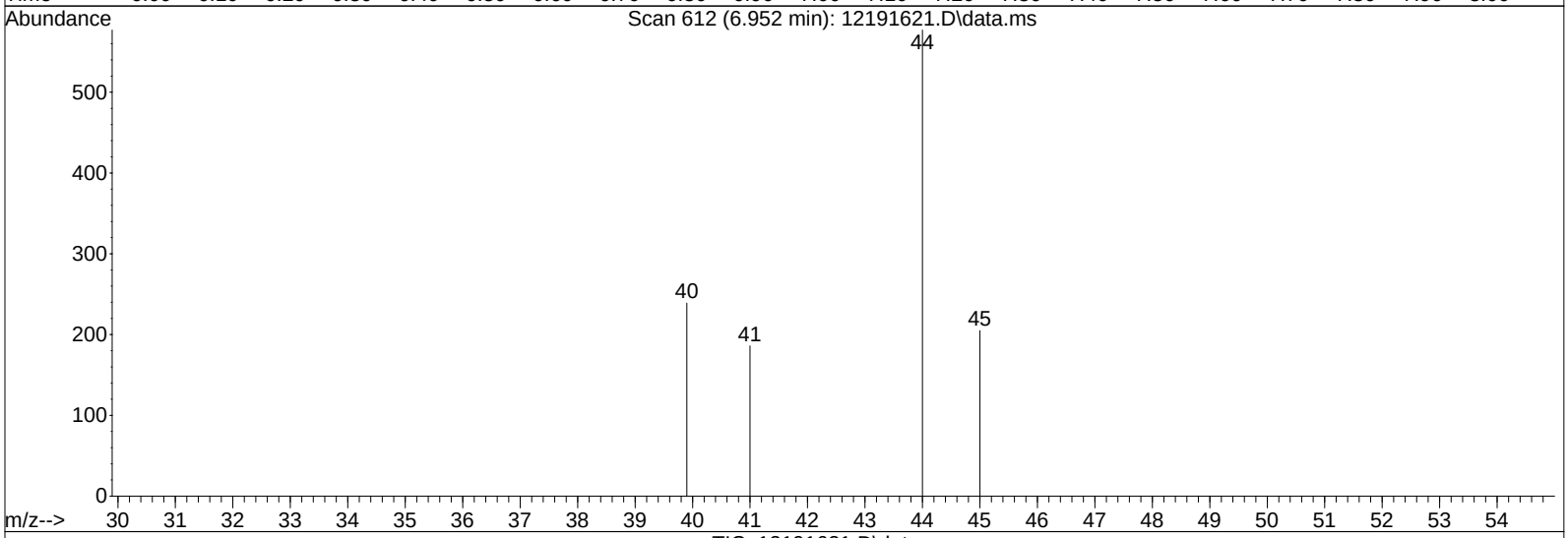


Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191621.D
Acq On : 20 Dec 2016 00:33 Operator: LH
Sample : 0.1ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:33 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





(11) Acetonitrile (T)

6.952min (+0.005) 0.00ng

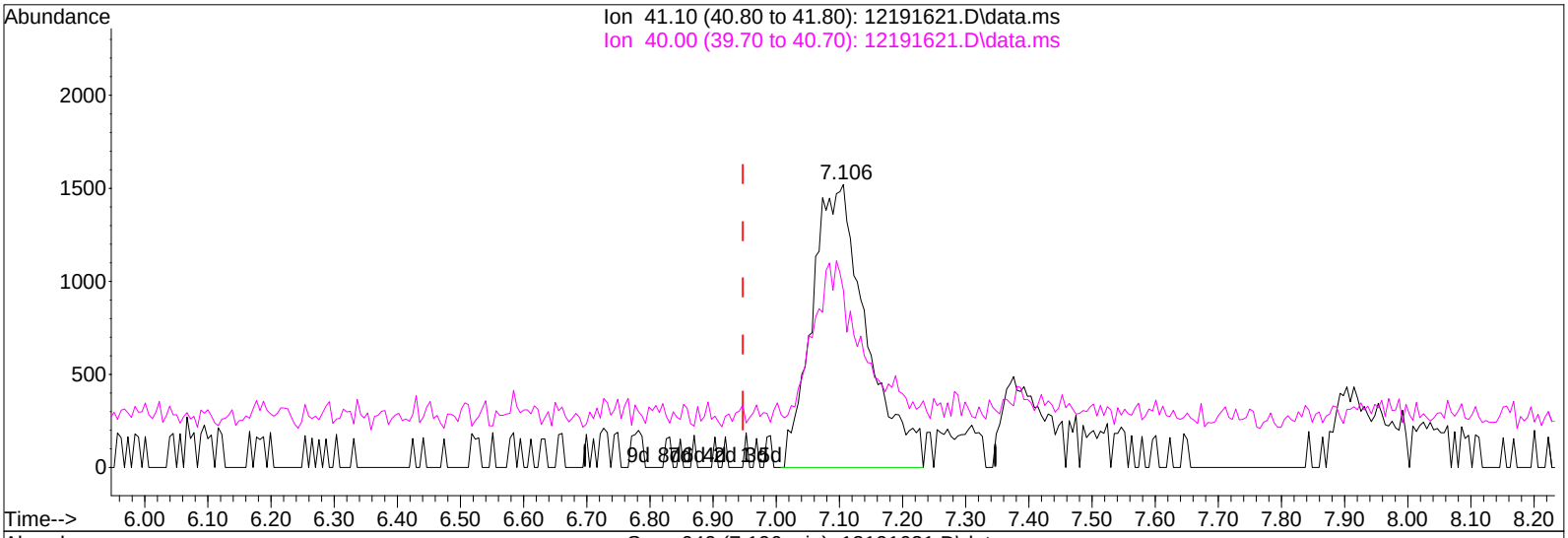
response 61

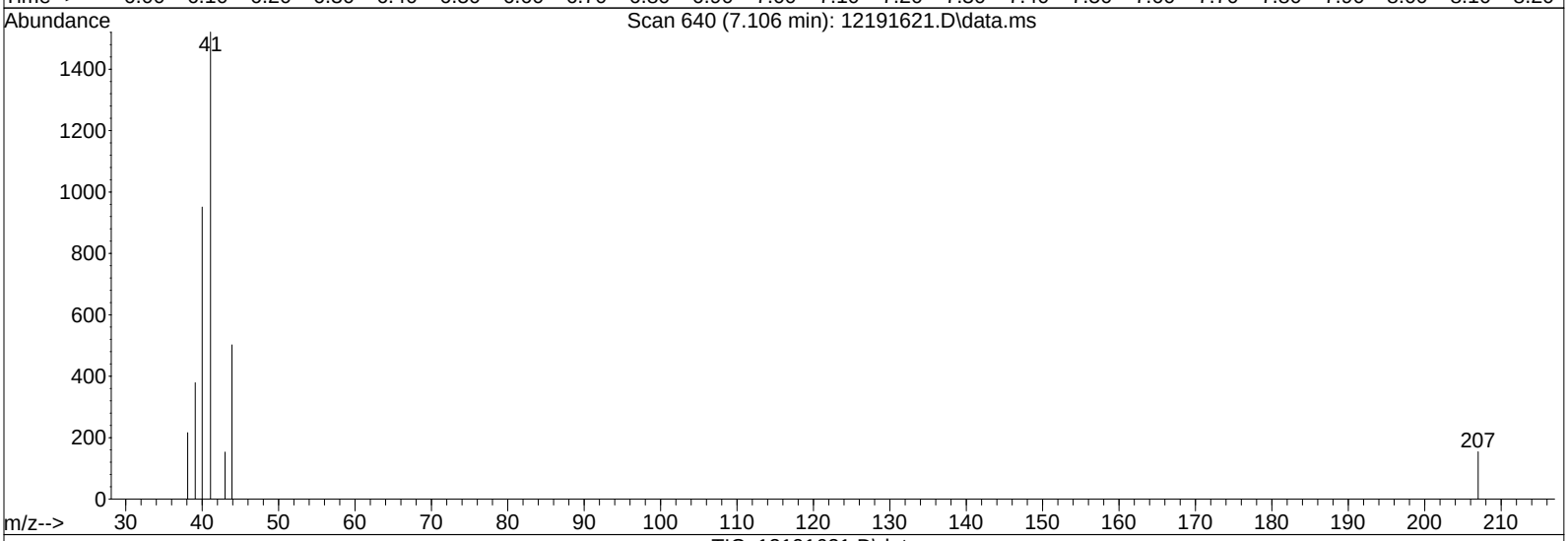
Ion	Exp%	Act%
41.10	100	100
40.00	54.30	122.95#
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191621.D
Acq On : 20 Dec 2016 00:33 Operator: LH
Sample : 0.1ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:33 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191621.D\data.ms

(11) Acetonitrile (T)

7.106min (+0.159) 0.14ng m

response 9093

Ion	Exp%	Act%
41.10	100	100
40.00	54.30	0.82#
0.00	0.00	0.00
0.00	0.00	0.00

IPC

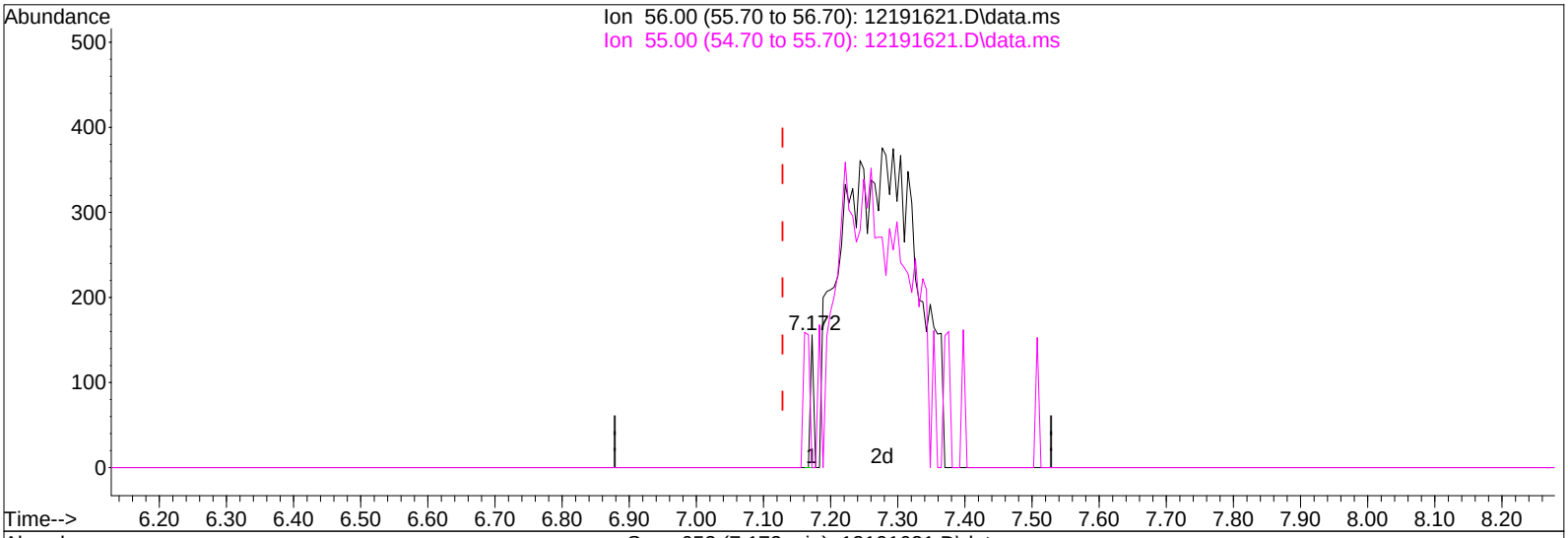
LH 12/20/16

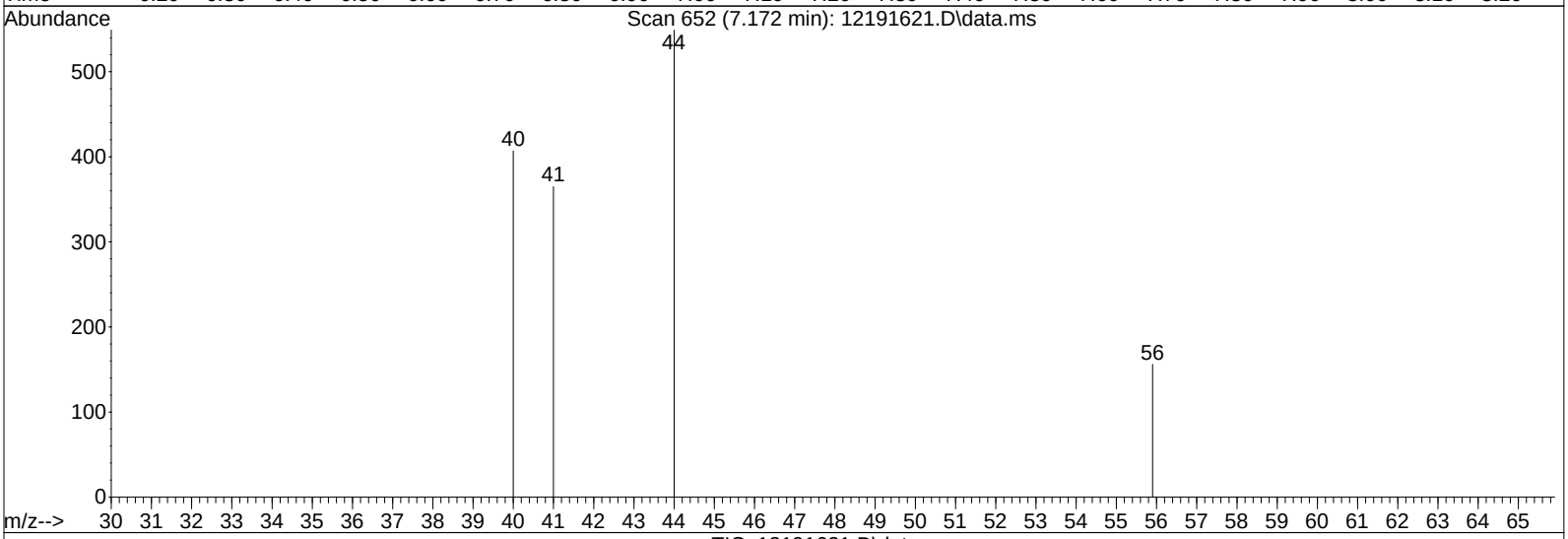
12/30/16

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191621.D
Acq On : 20 Dec 2016 00:33 Operator: LH
Sample : 0.1ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:33 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191621.D\data.ms

(12) Acrolein (T)

7.172min (+0.044) 0.00ng

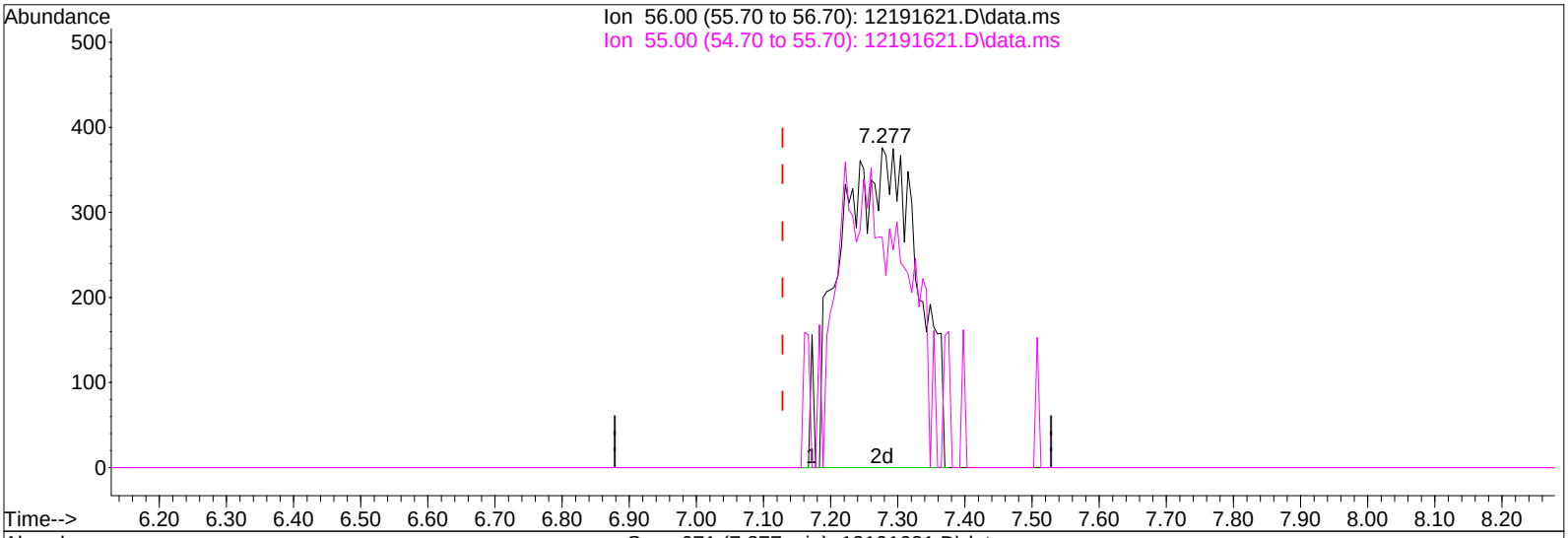
response 51

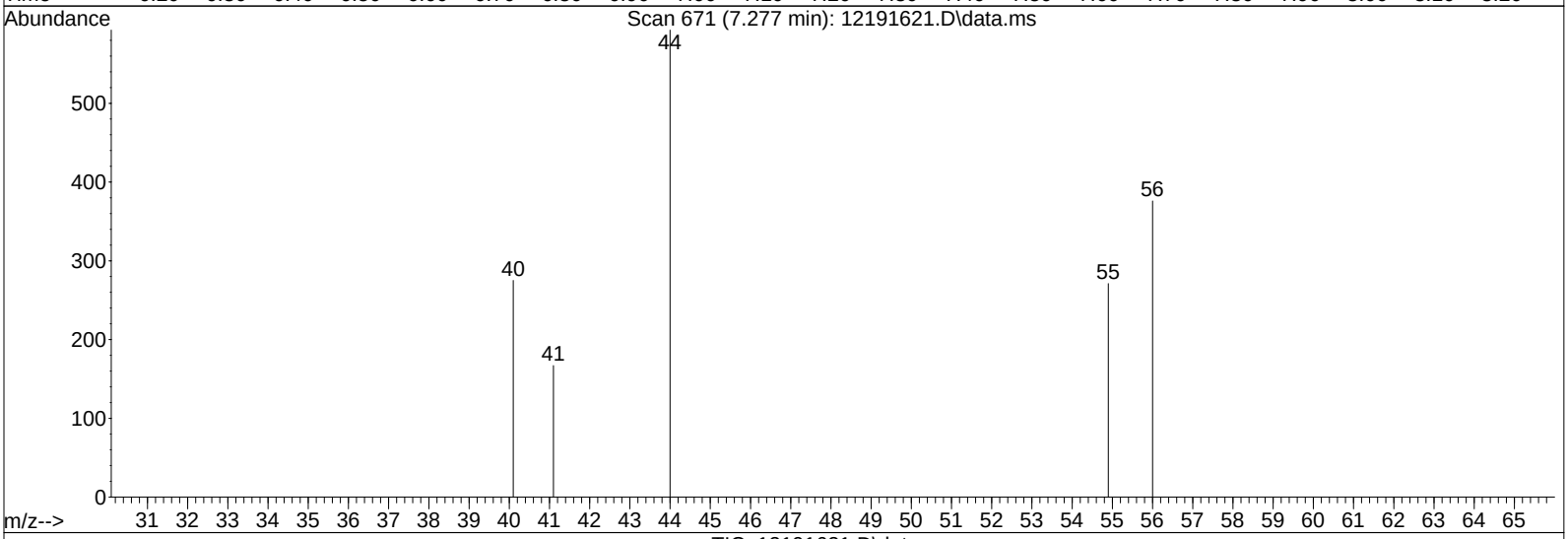
Ion	Exp%	Act%
56.00	100	100
55.00	76.80	203.92#
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191621.D
Acq On : 20 Dec 2016 00:33 Operator: LH
Sample : 0.1ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:33 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191621.D\data.ms

(12) Acrolein (T)

7.277min (+0.148) 0.13ng m

response 3027

Ion	Exp%	Act%
56.00	100	100
55.00	76.80	3.44#
0.00	0.00	0.00
0.00	0.00	0.00

MP

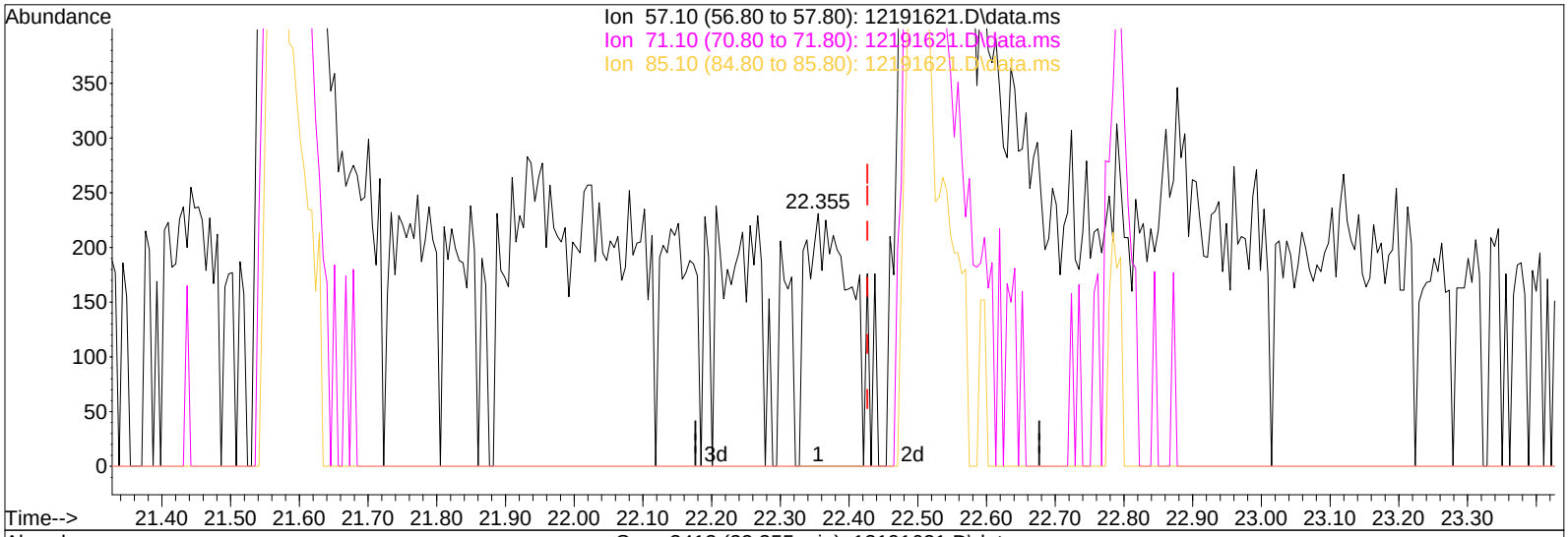
LH 12/20/16

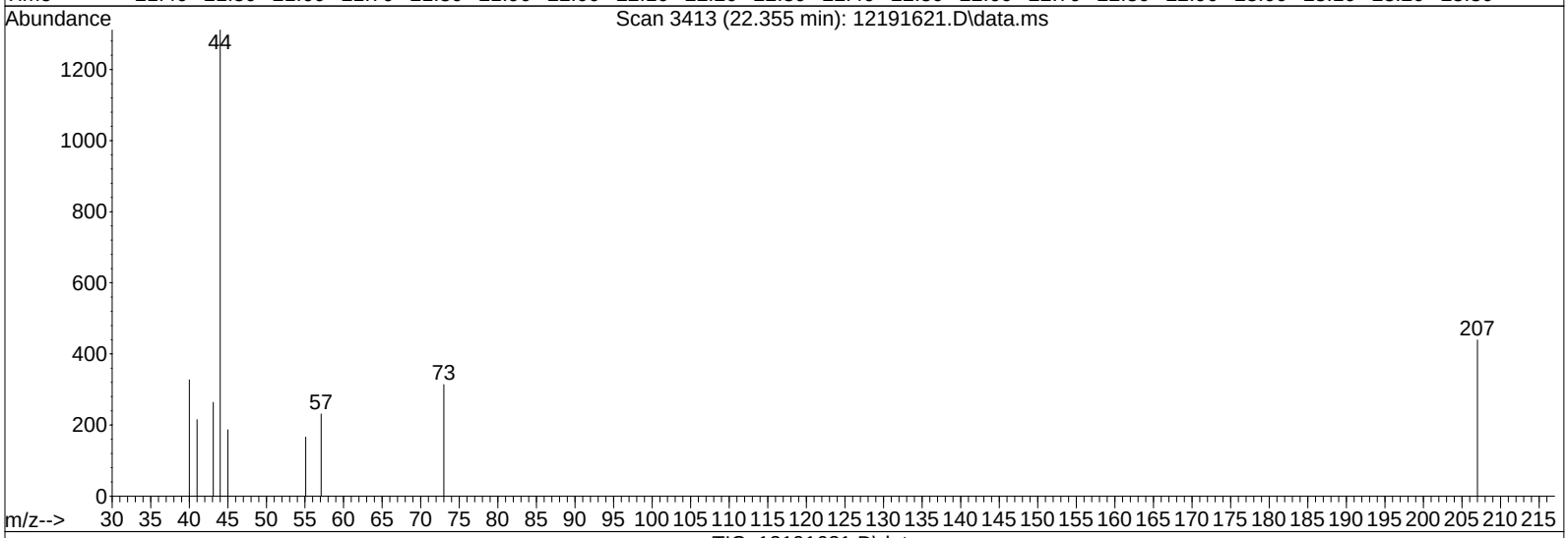
12/30/16

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191621.D
Acq On : 20 Dec 2016 00:33 Operator: LH
Sample : 0.1ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:33 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191621.D\data.ms

(96) n-Dodecane (T)

22.355min (-0.072) 0.02ng

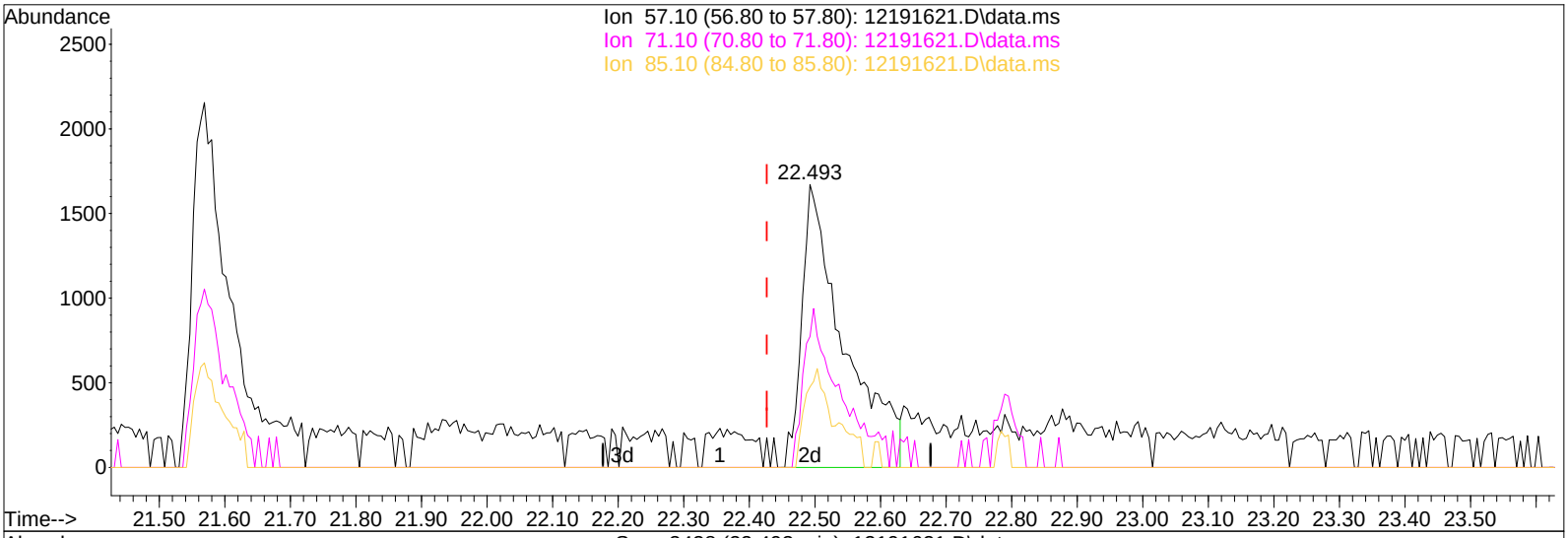
response 997

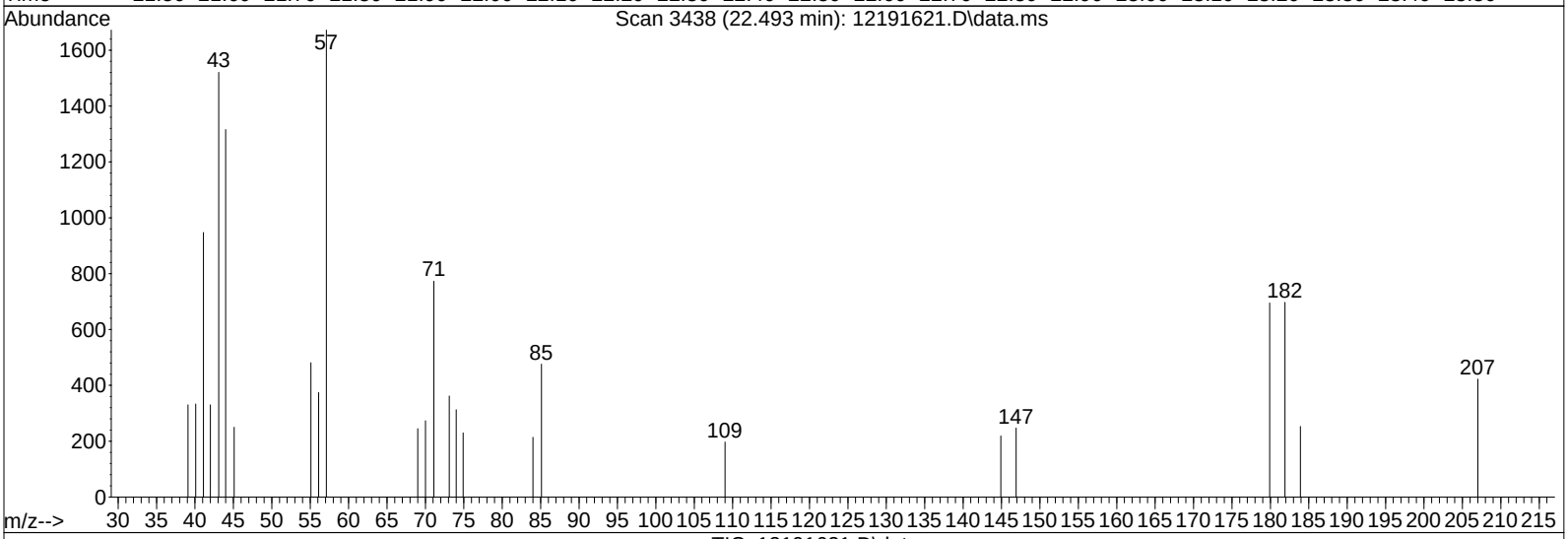
Ion	Exp%	Act%
57.10	100	100
71.10	54.10	0.00#
85.10	31.90	0.00#
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191621.D
Acq On : 20 Dec 2016 00:33 Operator: LH
Sample : 0.1ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:33 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191621.D\data.ms

(96) n-Dodecane (T)

22.493min (+0.066) 0.12ng m

response 7499

Ion	Exp%	Act%
57.10	100	100
71.10	54.10	0.00#
85.10	31.90	0.00#
0.00	0.00	0.00

MP

LH 12/20/16

12/30/16

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 09:45:07 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	280722	12.500	ng	-0.01
37) 1,4-Difluorobenzene (IS2)	13.66	114	1408357	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	17.93	82	601873	12.500	ng	0.00

System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.40	65	505835	13.774	ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 110.16%			
57) Toluene-d8 (SS2)	16.10	98	1456615	12.705	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 101.68%			
73) Bromofluorobenzene (SS3)	19.28	174	457156	12.419	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.36%			

Target Compounds							Qvalue
2) Propene	4.26	42	8324	0.229	ng		92
3) Dichlorodifluoromethan...	4.41	85	15213	0.258	ng		99
4) Chloromethane	4.76	50	12742	0.266	ng		98
5) 1,2-Dichloro-1,1,2,2-t...	4.99	135	8275	0.268	ng		98
6) Vinyl Chloride	5.21	62	10133	0.212	ng		99
7) 1,3-Butadiene	5.50	54	7078m	0.228	ng		
8) Bromomethane	5.97	94	5543	0.202	ng		94
9) Chloroethane	6.30	64	4615	0.206	ng		94
10) Ethanol	6.71	45	26891	1.087	ng		96
11) Acetonitrile	7.08	41	15593m	0.246	ng		
12) Acrolein	7.25	56	5029	0.211	ng		96
13) Acetone	7.37	58	27202	1.132	ng		88
14) Trichlorofluoromethane	7.60	101	13016	0.254	ng		99
15) 2-Propanol (Isopropanol)	7.89	45	37518	0.456	ng		80
16) Acrylonitrile	8.26	53	9148	0.213	ng		95
17) 1,1-Dichloroethene	8.61	96	6124	0.228	ng		92
18) 2-Methyl-2-Propanol (t...	8.82	59	39674	0.498	ng		93
19) Methylene Chloride	8.83	84	7768	0.241	ng		92
20) 3-Chloro-1-propene (Al...	8.99	41	9880m	0.202	ng		
21) Trichlorotrifluoroethane	9.23	151	6021	0.235	ng		91
22) Carbon Disulfide	9.14	76	29121	0.265	ng		97
23) trans-1,2-Dichloroethene	10.11	61	10089	0.227	ng		99
24) 1,1-Dichloroethane	10.35	63	12850	0.227	ng		95
25) Methyl tert-Butyl Ether	10.46	73	22850	0.250	ng		99
26) Vinyl Acetate	10.62	86	6065	0.901	ng	#	66
27) 2-Butanone (MEK)	10.88	72	4549	0.212	ng	#	91
28) cis-1,2-Dichloroethene	11.37	61	9909	0.228	ng		98
29) Diisopropyl Ether	11.65	87	6815	0.254	ng	#	72
30) Ethyl Acetate	11.68	61	4935	0.430	ng		97
31) n-Hexane	11.64	57	11998	0.231	ng		99
32) Chloroform	11.71	83	13181	0.247	ng		98
34) Tetrahydrofuran (THF)	12.15	72	4684	0.213	ng	#	82
35) Ethyl tert-Butyl Ether	12.24	87	8484	0.244	ng		99
36) 1,2-Dichloroethane	12.52	62	10487	0.259	ng		100
38) 1,1,1-Trichloroethane	12.79	97	11845	0.257	ng		98
39) Isopropyl Acetate	13.21	61	8966	0.427	ng	#	89
40) 1-Butanol	13.26	56	13251	0.403	ng	#	79
41) Benzene	13.27	78	30081	0.219	ng		100
42) Carbon Tetrachloride	13.42	117	9487	0.240	ng		97
43) Cyclohexane	13.55	84	22097	0.479	ng		99
44) tert-Amyl Methyl Ether	13.90	73	21242	0.237	ng		95
45) 1,2-Dichloropropane	14.12	63	7444	0.223	ng		96
46) Bromodichloromethane	14.31	83	10202	0.250	ng		96
47) Trichloroethene	14.36	130	7773	0.245	ng		100
48) 1,4-Dioxane	14.35	88	5535	0.208	ng	#	67
49) 2,2,4-Trimethylpentane...	14.41	57	31883	0.229	ng		98

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 09:45:07 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

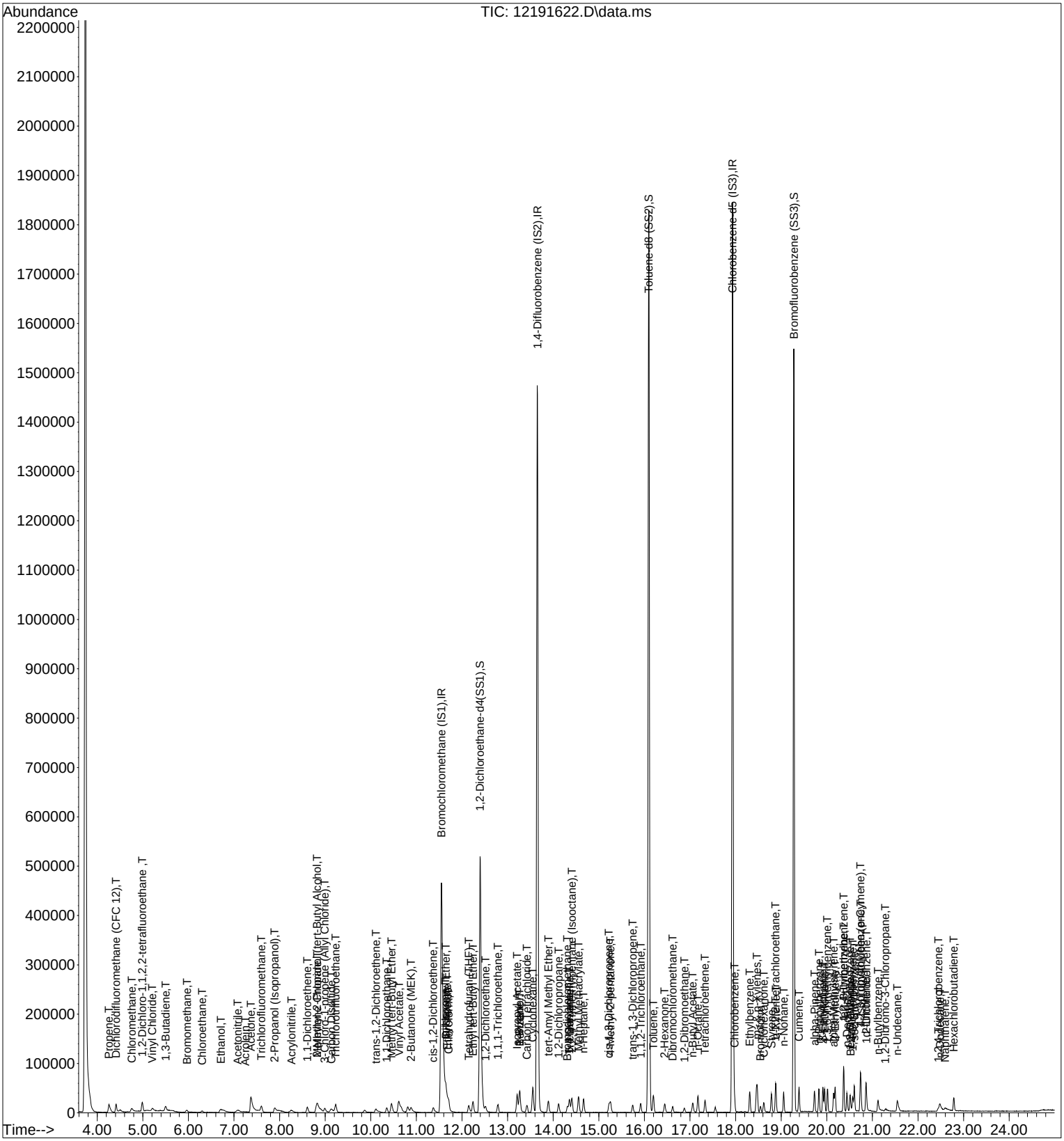
Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
50) Methyl Methacrylate	14.56	100	5538	0.466 ng		99
51) n-Heptane	14.67	71	7072	0.226 ng		98
52) cis-1,3-Dichloropropene	15.22	75	11545	0.233 ng		99
53) 4-Methyl-2-pentanone	15.26	58	6862	0.225 ng		89
54) trans-1,3-Dichloropropene	15.75	75	9755	0.222 ng		99
55) 1,1,2-Trichloroethane	15.92	97	6796	0.231 ng		99
58) Toluene	16.20	91	29322	0.247 ng		98
59) 2-Hexanone	16.44	43	17145	0.226 ng		92
60) Dibromochloromethane	16.62	129	7666	0.235 ng		100
61) 1,2-Dibromoethane	16.88	107	7595	0.227 ng		98
62) n-Butyl Acetate	17.06	43	18384	0.212 ng		96
63) n-Octane	17.17	57	7326	0.259 ng		86
64) Tetrachloroethene	17.33	166	8007	0.242 ng		99
65) Chlorobenzene	17.98	112	19036	0.234 ng		97
66) Ethylbenzene	18.31	91	32498	0.229 ng		99
67) m- & p-Xylenes	18.47	91	50000	0.464 ng		100
68) Bromoform	18.54	173	5890	0.226 ng		99
69) Styrene	18.79	104	18639	0.225 ng		99
70) o-Xylene	18.89	91	25091	0.232 ng		99
71) n-Nonane	19.06	43	16052	0.236 ng		91
72) 1,1,2,2-Tetrachloroethane	18.87	83	11297	0.216 ng		98
74) Cumene	19.39	105	32370	0.250 ng		99
75) alpha-Pinene	19.73	93	16376	0.231 ng		99
76) n-Propylbenzene	19.83	91	37956	0.232 ng		98
77) 3-Ethyltoluene	19.91	105	32919	0.238 ng		100
78) 4-Ethyltoluene	19.95	105	26804	0.219 ng		100
79) 1,3,5-Trimethylbenzene	20.01	105	25611	0.227 ng		99
80) alpha-Methylstyrene	20.15	118	11807	0.221 ng		96
81) 2-Ethyltoluene	20.18	105	32482	0.248 ng		95
82) 1,2,4-Trimethylbenzene	20.37	105	26310	0.237 ng		96
83) n-Decane	20.44	57	14003	0.212 ng		99
84) Benzyl Chloride	20.52	91	8139	0.095 ng		95
85) 1,3-Dichlorobenzene	20.51	146	12069	0.206 ng		98
86) 1,4-Dichlorobenzene	20.57	146	13734	0.206 ng		92
87) sec-Butylbenzene	20.61	105	35105	0.243 ng		87
88) 4-Isopropyltoluene (p-...	20.74	119	31956	0.240 ng		98
89) 1,2,3-Trimethylbenzene	20.74	105	25646	0.226 ng		100
90) 1,2-Dichlorobenzene	20.87	146	14293	0.239 ng		97
91) d-Limonene	20.86	68	9801	0.223 ng		98
92) 1,2-Dibromo-3-Chloropr...	21.28	157	3414	0.171 ng	#	63
93) n-Undecane	21.55	57	14754	0.216 ng		90
94) 1,2,4-Trichlorobenzene	22.45	180	7083	0.173 ng	#	94
95) Naphthalene	22.60	128	15149m	0.135 ng		
96) n-Dodecane	22.48	57	11247	0.181 ng		93
97) Hexachlorobutadiene	22.78	225	5982	0.216 ng		96
98) Cyclohexanone	18.62	55	10057	0.211 ng		92
99) tert-Butylbenzene	20.37	119	25807	0.248 ng		98
100) n-Butylbenzene	21.12	91	26263	0.220 ng		95

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

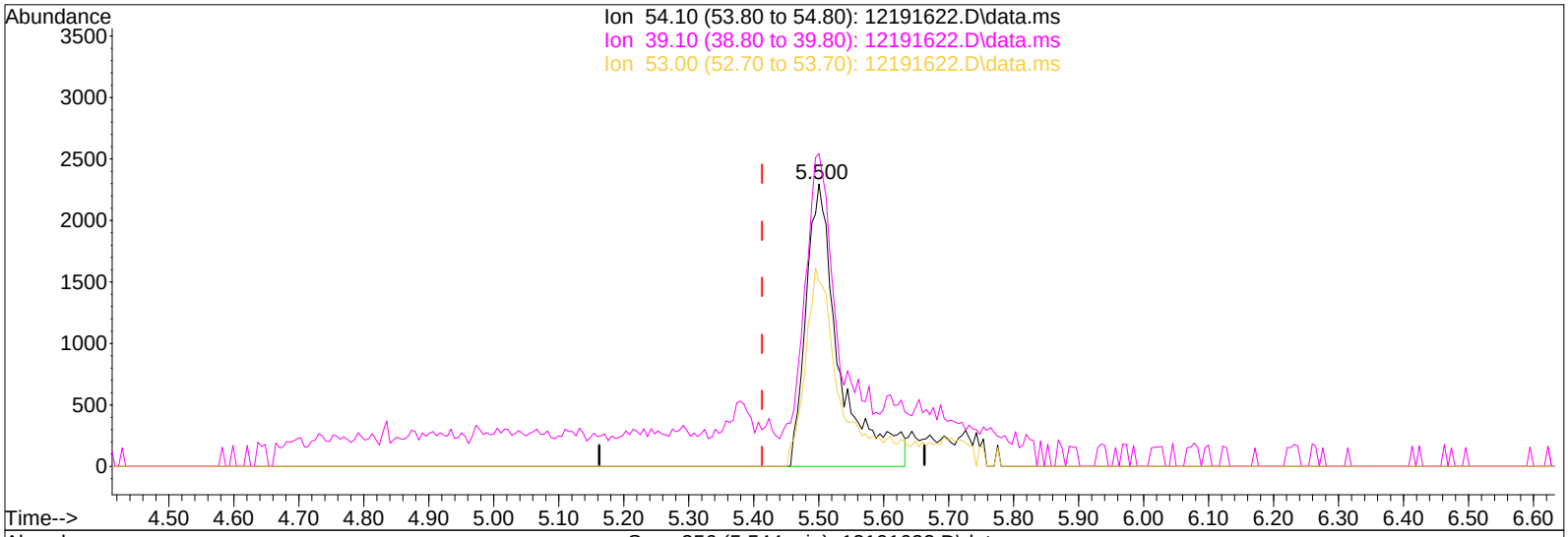
Quant Time: Dec 20 09:45:07 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

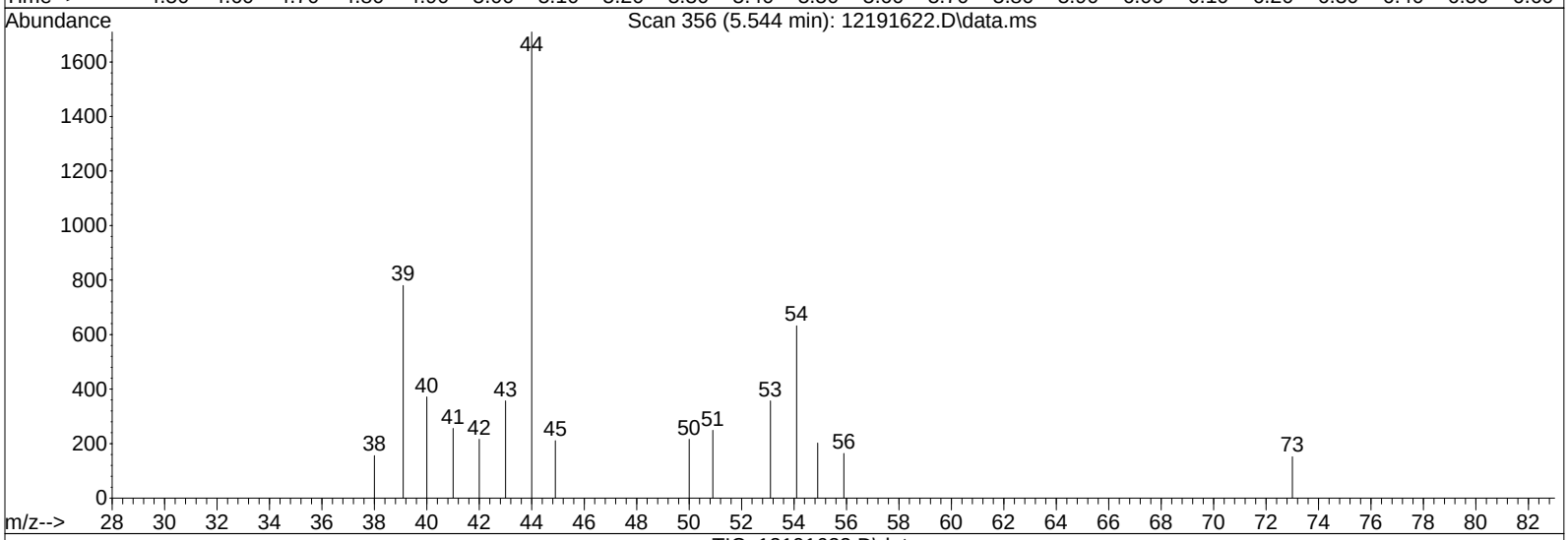


Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:35 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191622.D\data.ms

(7) 1,3-Butadiene (T)

5.500min (+0.088) 0.26ng

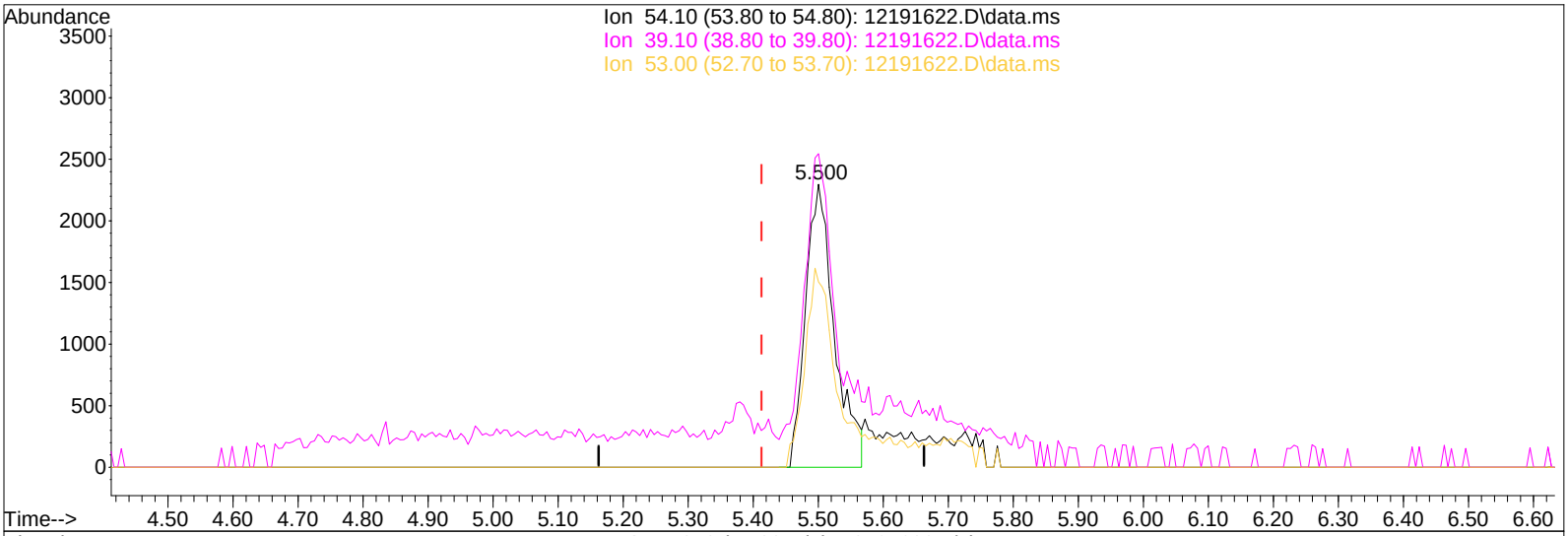
response 8163

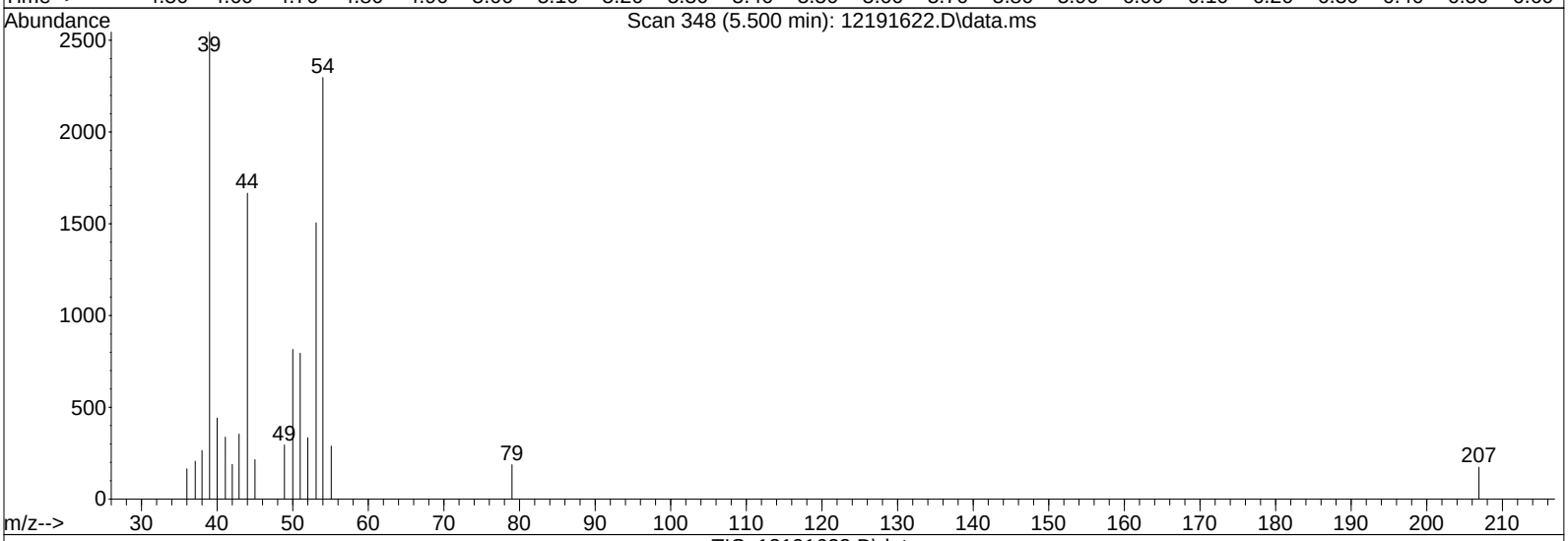
Ion	Exp%	Act%
54.10	100	100
39.10	104.80	94.25
53.00	70.30	74.07
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:35 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191622.D\data.ms

(7) 1,3-Butadiene (T)

5.500min (+0.088) 0.23ng m

response 7078

Ion	Exp%	Act%
54.10	100	100
39.10	104.80	108.70
53.00	70.30	85.42
0.00	0.00	0.00

IPC

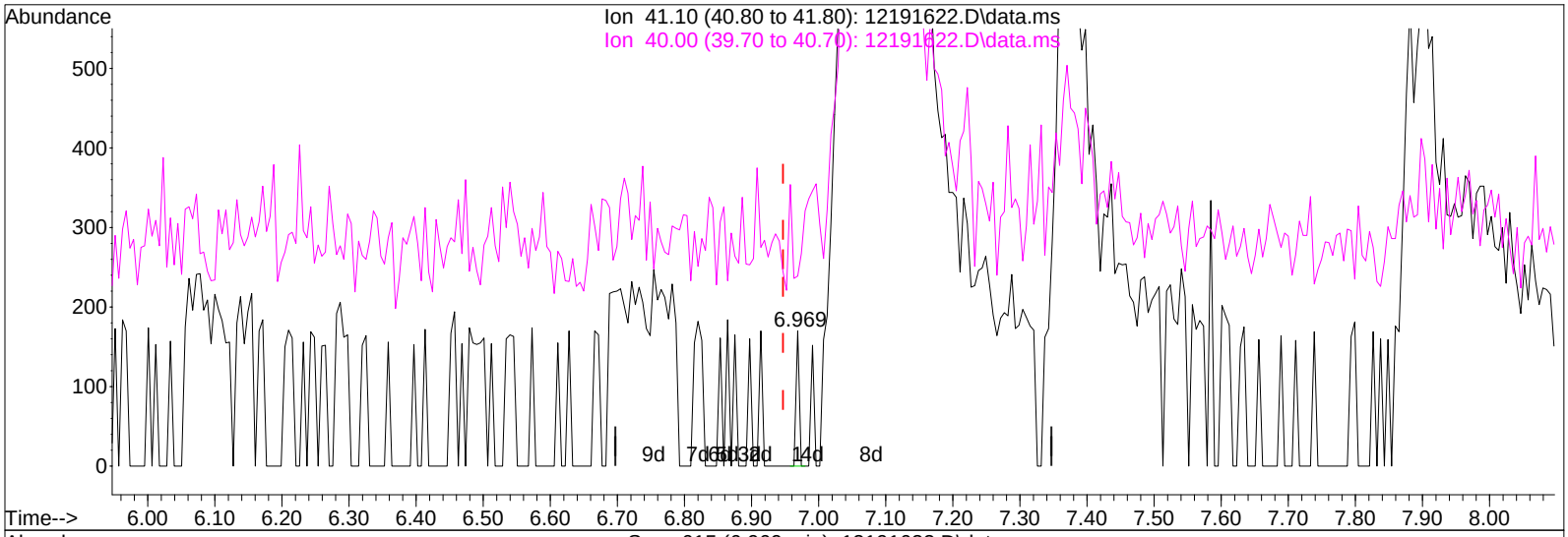
LH 12/20/16

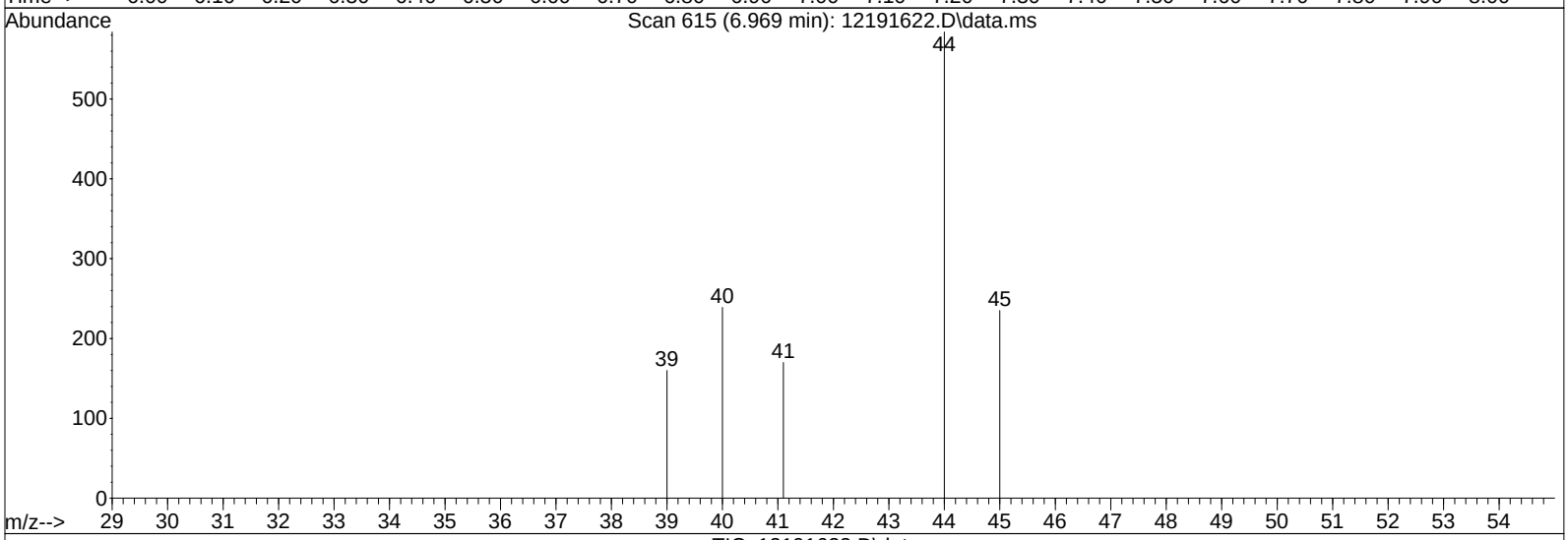
12/30/16

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:35 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





(11) Acetonitrile (T)

6.969min (+0.022) 0.00ng

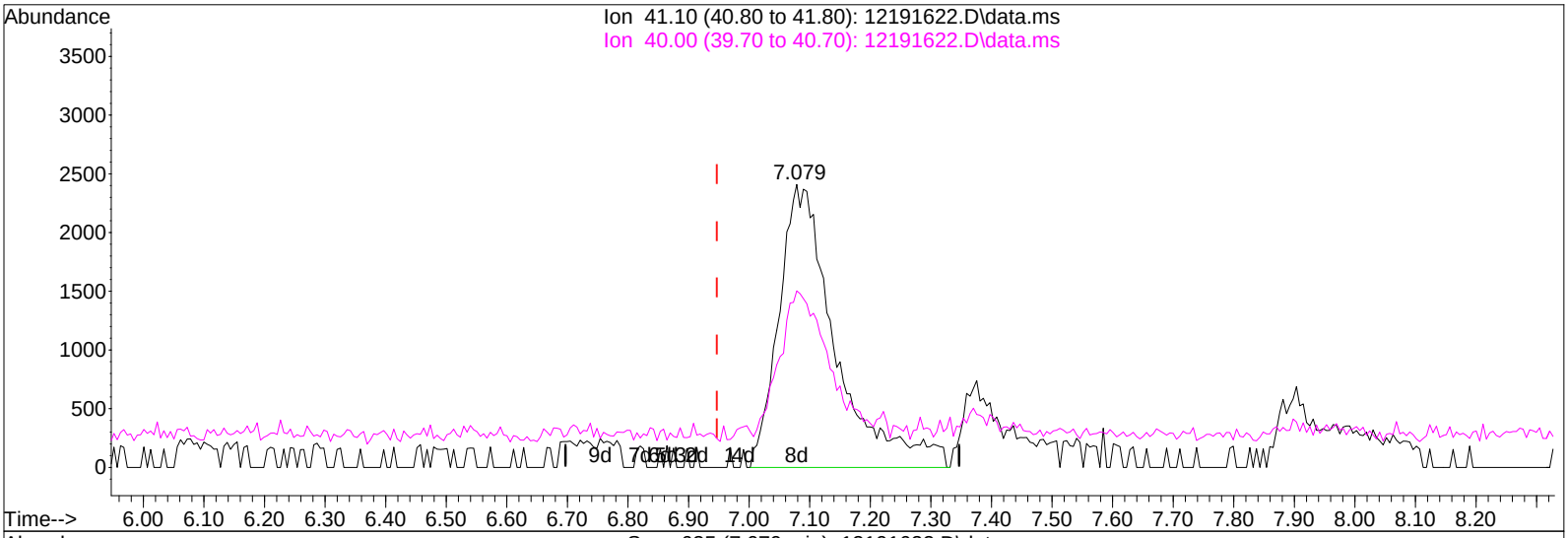
response 56

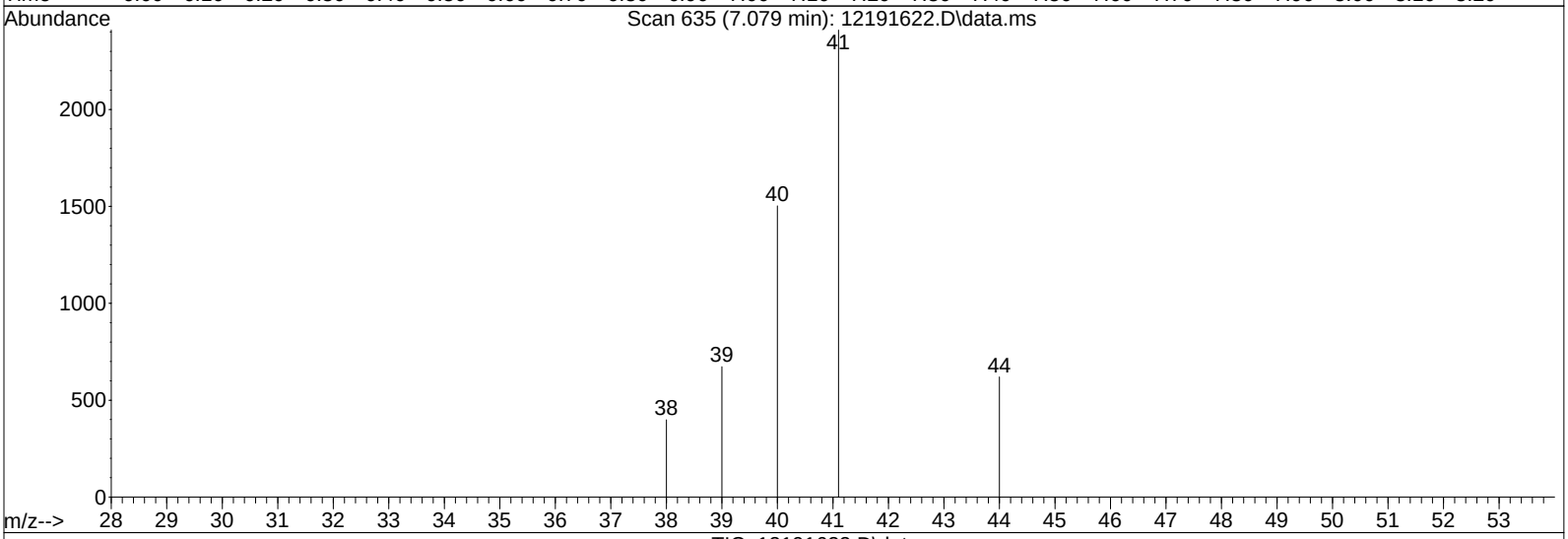
Ion	Exp%	Act%
41.10	100	100
40.00	54.30	98.21#
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:35 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





(11) Acetonitrile (T)

7.079min (+0.132) 0.25ng m

response 15593

Ion	Exp%	Act%
41.10	100	100
40.00	54.30	0.35#
0.00	0.00	0.00
0.00	0.00	0.00

MP

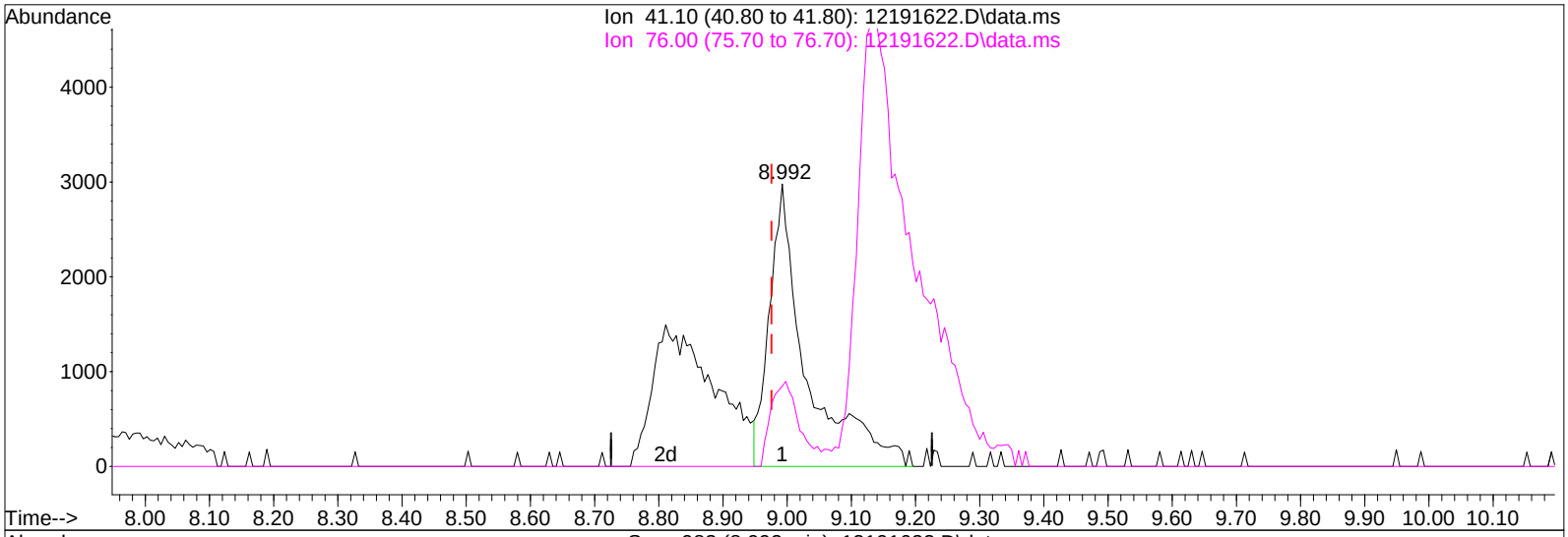
LH 12/20/16

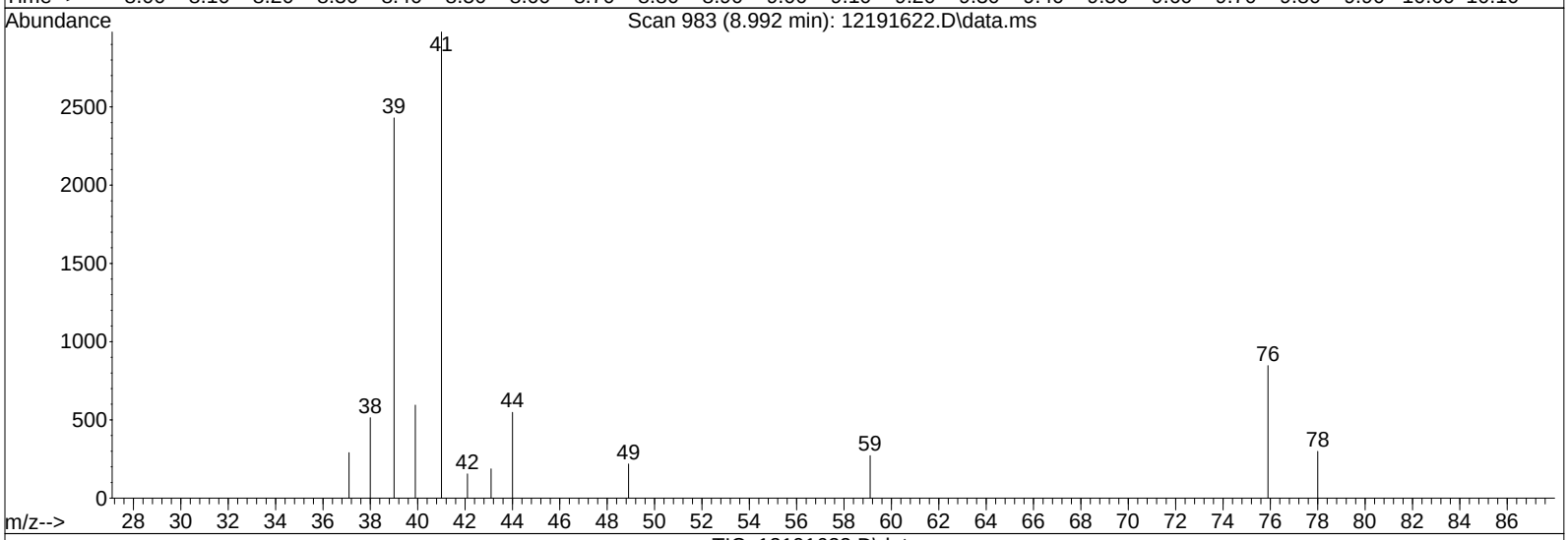
12/30/16

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:35 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191622.D\data.ms

(20) 3-Chloro-1-propene (Allyl Chloride) (T)

8.992min (+0.016) 0.25ng

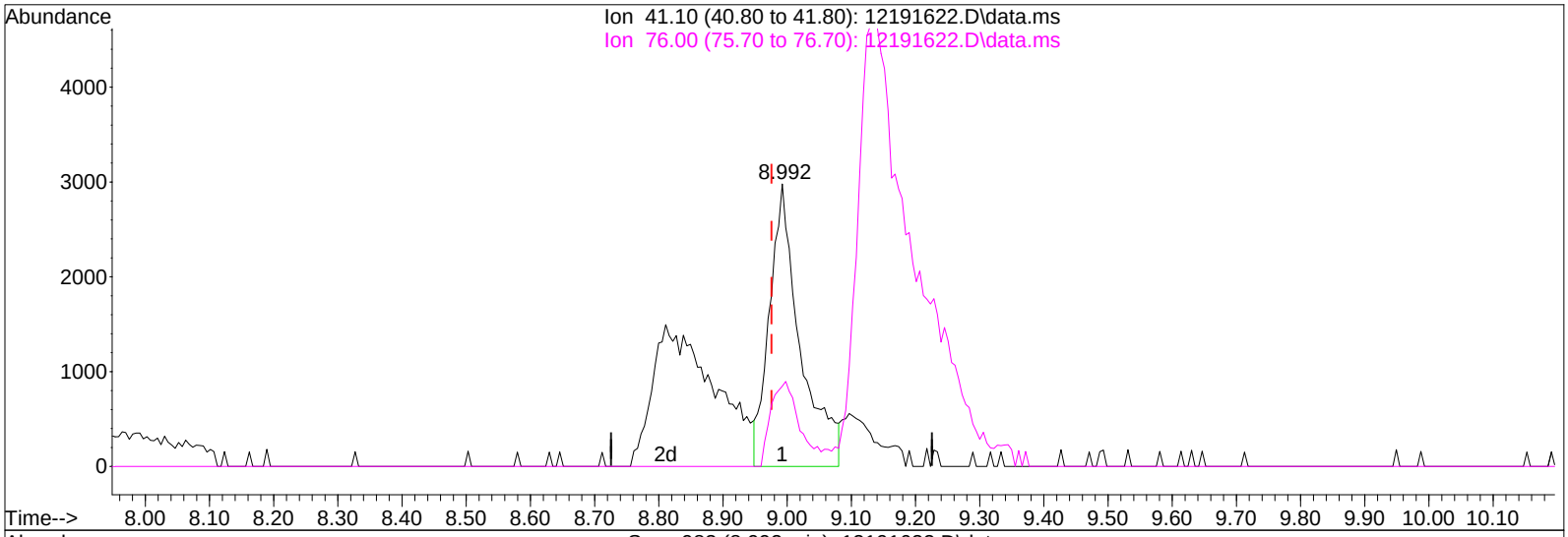
response 11986

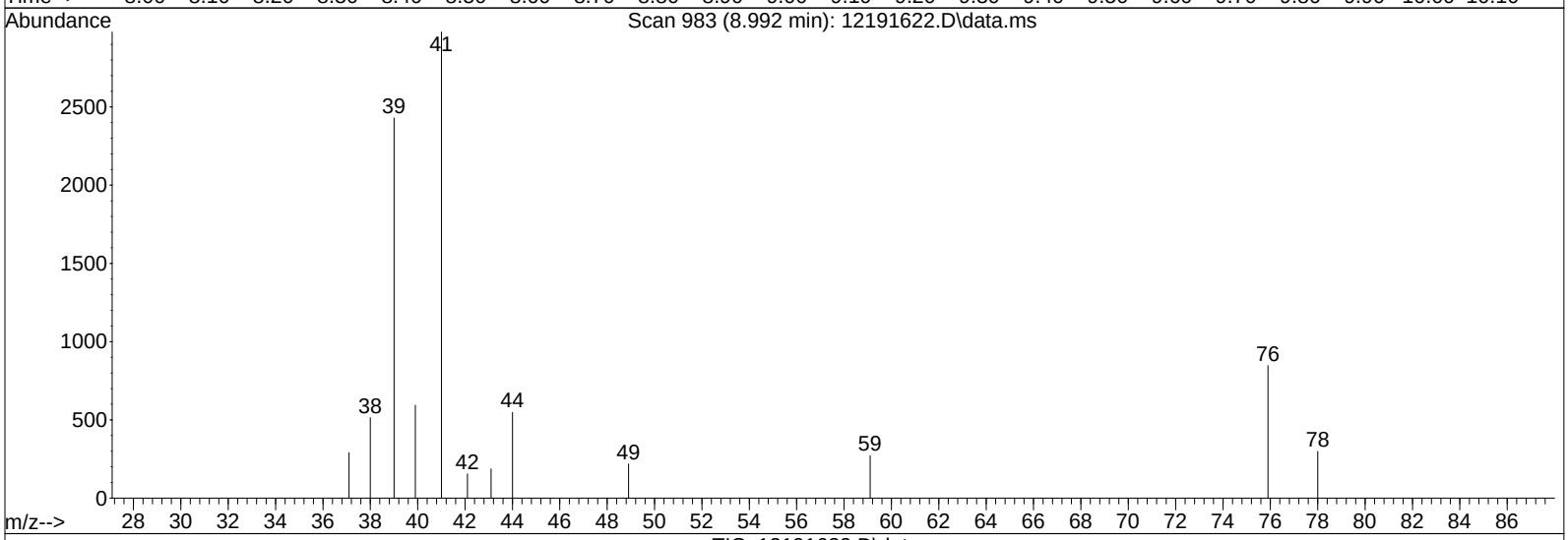
Ion	Exp%	Act%
41.10	100	100
76.00	34.90	24.80
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:35 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191622.D\data.ms

(20) 3-Chloro-1-propene (Allyl Chloride) (T)

8.992min (+0.016) 0.20ng m

response 9880

Ion	Exp%	Act%
41.10	100	100
76.00	34.90	30.08
0.00	0.00	0.00
0.00	0.00	0.00

IPC

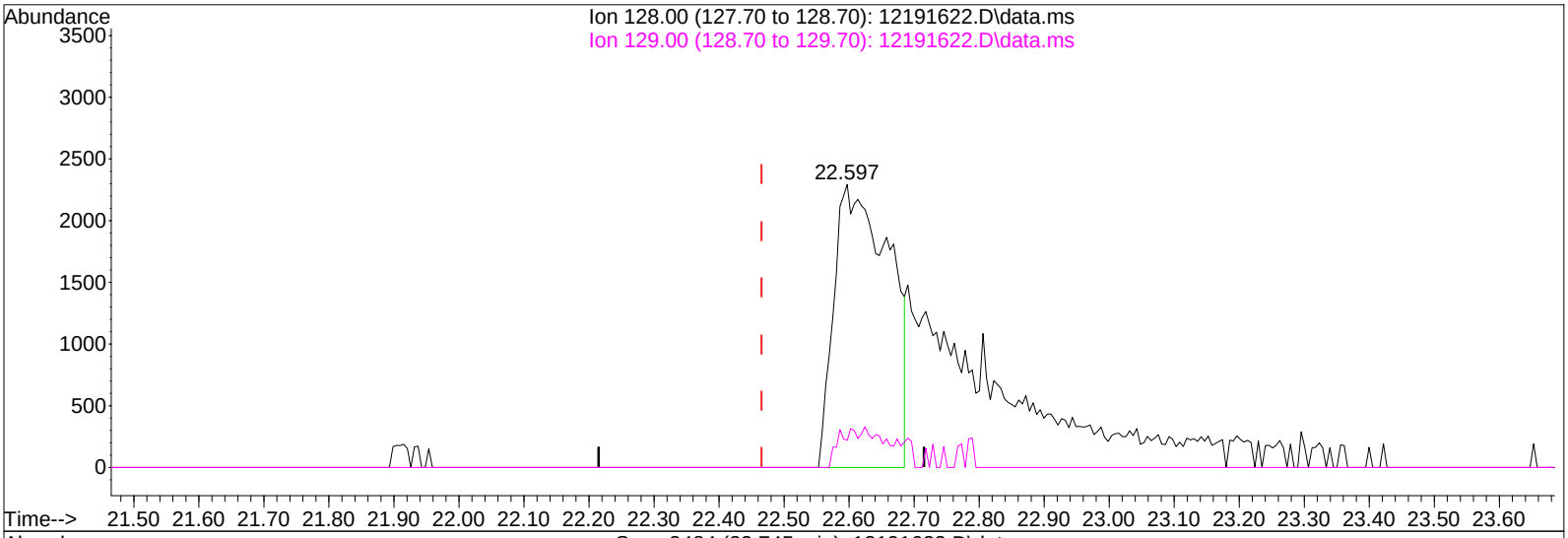
LH 12/20/16

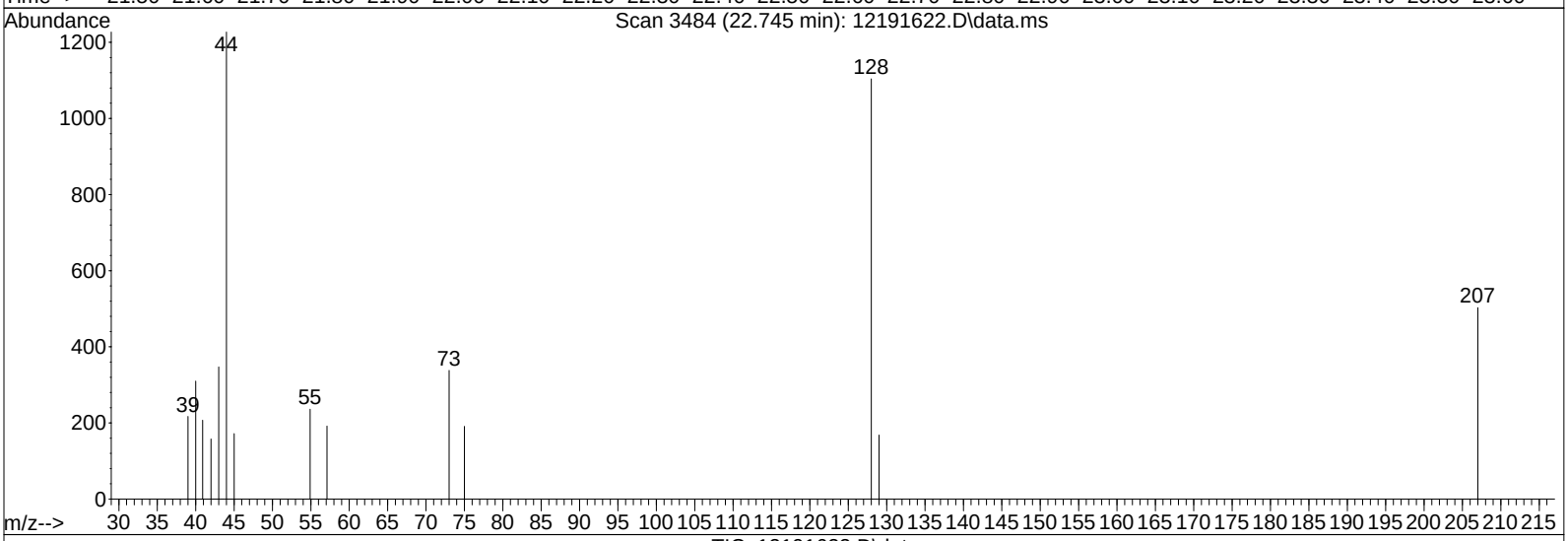
12/30/16

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:35 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191622.D\data.ms

(95) Naphthalene (T)

22.597min (+0.132) 0.12ng

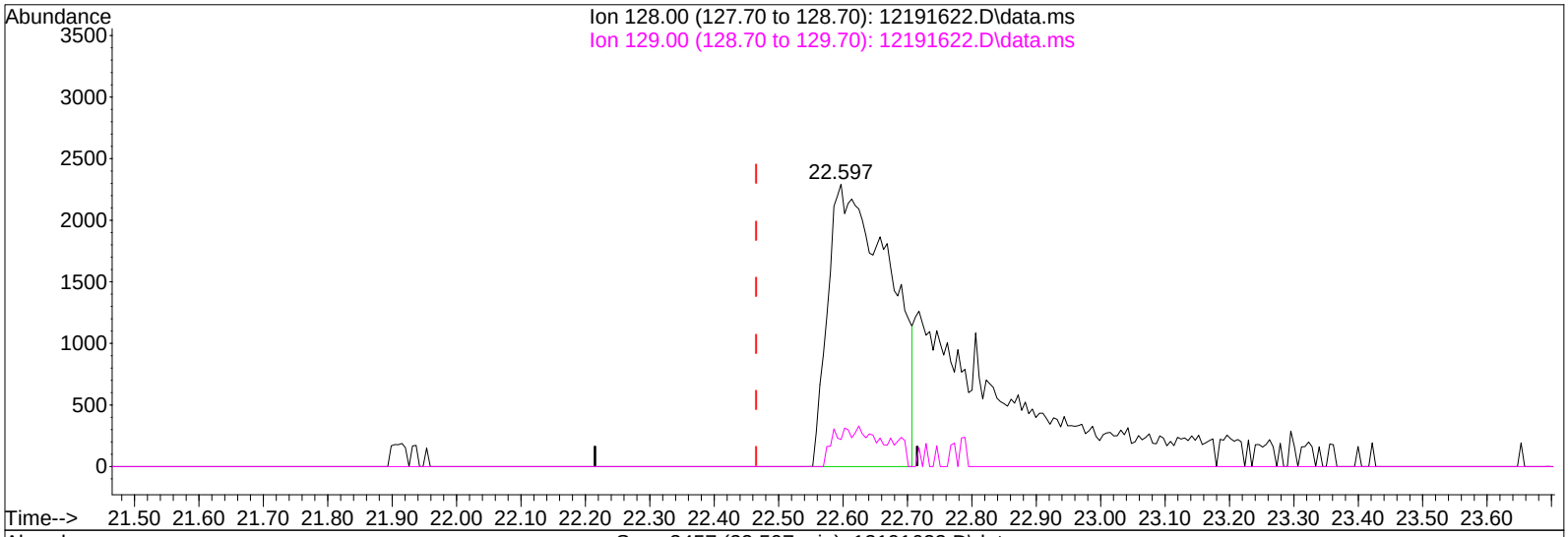
response 13470

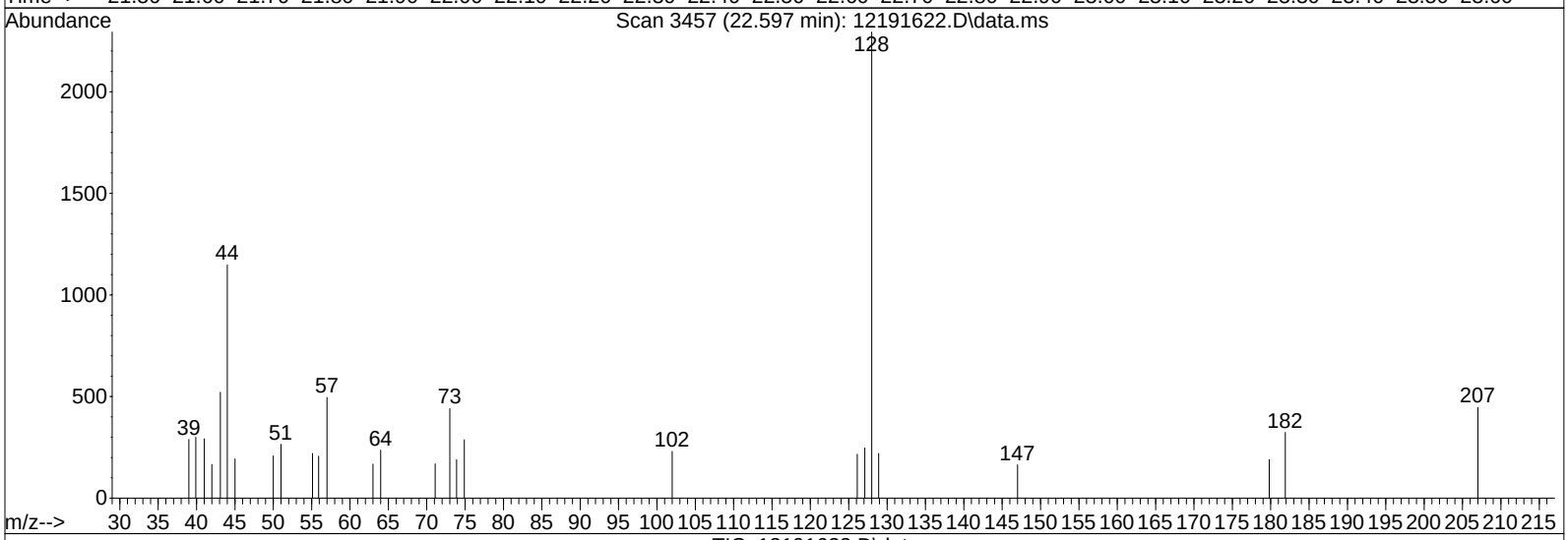
Ion	Exp%	Act%
128.00	100	100
129.00	11.00	12.09
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:35 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191622.D\data.ms

(95) Naphthalene (T)

22.597min (+0.132) 0.14ng m

response 15149

Ion	Exp%	Act%
128.00	100	100
129.00	11.00	10.75
0.00	0.00	0.00
0.00	0.00	0.00

BLC

LH 12/20/16

12/30/16

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 09:52:42 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	266024	12.500	ng		-0.01
37) 1,4-Difluorobenzene (IS2)	13.65	114	1350700	12.500	ng		-0.01
56) Chlorobenzene-d5 (IS3)	17.93	82	571668	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.40	65	484887	13.933	ng		-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 111.44%				
57) Toluene-d8 (SS2)	16.10	98	1396735	12.826	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 102.64%				
73) Bromofluorobenzene (SS3)	19.28	174	439250	12.563	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.48%				
Target Compounds							Qvalue
2) Propene	4.24	42	15026	0.437	ng		96
3) Dichlorodifluoromethan...	4.40	85	29589	0.530	ng		99
4) Chloromethane	4.74	50	23526	0.519	ng		97
5) 1,2-Dichloro-1,1,2,2-t...	4.98	135	14839	0.508	ng		99
6) Vinyl Chloride	5.20	62	21720	0.479	ng		97
7) 1,3-Butadiene	5.49	54	13222	0.449	ng		90
8) Bromomethane	5.95	94	11227	0.433	ng		96
9) Chloroethane	6.29	64	8828	0.415	ng		94
10) Ethanol	6.68	45	48653	2.075	ng		97
11) Acetonitrile	7.08	41	26579m	0.443	ng		
12) Acrolein	7.20	56	9212	0.408	ng		99
13) Acetone	7.35	58	50221	2.206	ng		88
14) Trichlorofluoromethane	7.60	101	24081	0.496	ng		99
15) 2-Propanol (Isopropanol)	7.86	45	71574	0.917	ng		87
16) Acrylonitrile	8.27	53	17077	0.419	ng		100
17) 1,1-Dichloroethene	8.60	96	12048	0.474	ng		98
18) 2-Methyl-2-Propanol (t...	8.77	59	72972	0.966	ng		94
19) Methylene Chloride	8.82	84	13969	0.458	ng		93
20) 3-Chloro-1-propene (Al...	8.99	41	18295m	0.395	ng		
21) Trichlorotrifluoroethane	9.23	151	11653	0.480	ng		99
22) Carbon Disulfide	9.13	76	51598	0.495	ng		96
23) trans-1,2-Dichloroethene	10.10	61	19294	0.457	ng		99
24) 1,1-Dichloroethane	10.35	63	24593	0.458	ng		98
25) Methyl tert-Butyl Ether	10.44	73	43325	0.501	ng		99
26) Vinyl Acetate	10.60	86	13036	2.045	ng	#	79
27) 2-Butanone (MEK)	10.87	72	8752	0.430	ng		95
28) cis-1,2-Dichloroethene	11.37	61	18751	0.455	ng		97
29) Diisopropyl Ether	11.64	87	11018	0.433	ng		98
30) Ethyl Acetate	11.66	61	9505	0.874	ng		99
31) n-Hexane	11.64	57	23598	0.479	ng		99
32) Chloroform	11.70	83	24803	0.491	ng		99
34) Tetrahydrofuran (THF)	12.14	72	8849	0.425	ng	#	89
35) Ethyl tert-Butyl Ether	12.24	87	15804	0.479	ng		100
36) 1,2-Dichloroethane	12.51	62	19810	0.516	ng		99
38) 1,1,1-Trichloroethane	12.79	97	22038	0.499	ng		99
39) Isopropyl Acetate	13.20	61	17510	0.869	ng		96
40) 1-Butanol	13.25	56	24650	0.781	ng	#	74
41) Benzene	13.27	78	54425	0.413	ng		98
42) Carbon Tetrachloride	13.42	117	18576	0.490	ng		99
43) Cyclohexane	13.55	84	40595	0.917	ng		99
44) tert-Amyl Methyl Ether	13.89	73	39324	0.458	ng		97
45) 1,2-Dichloropropane	14.12	63	13932	0.435	ng		100
46) Bromodichloromethane	14.31	83	19179	0.491	ng		99
47) Trichloroethene	14.35	130	14278	0.470	ng		98
48) 1,4-Dioxane	14.35	88	10215	0.401	ng	#	68
49) 2,2,4-Trimethylpentane...	14.41	57	60305	0.452	ng		99

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 09:52:42 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

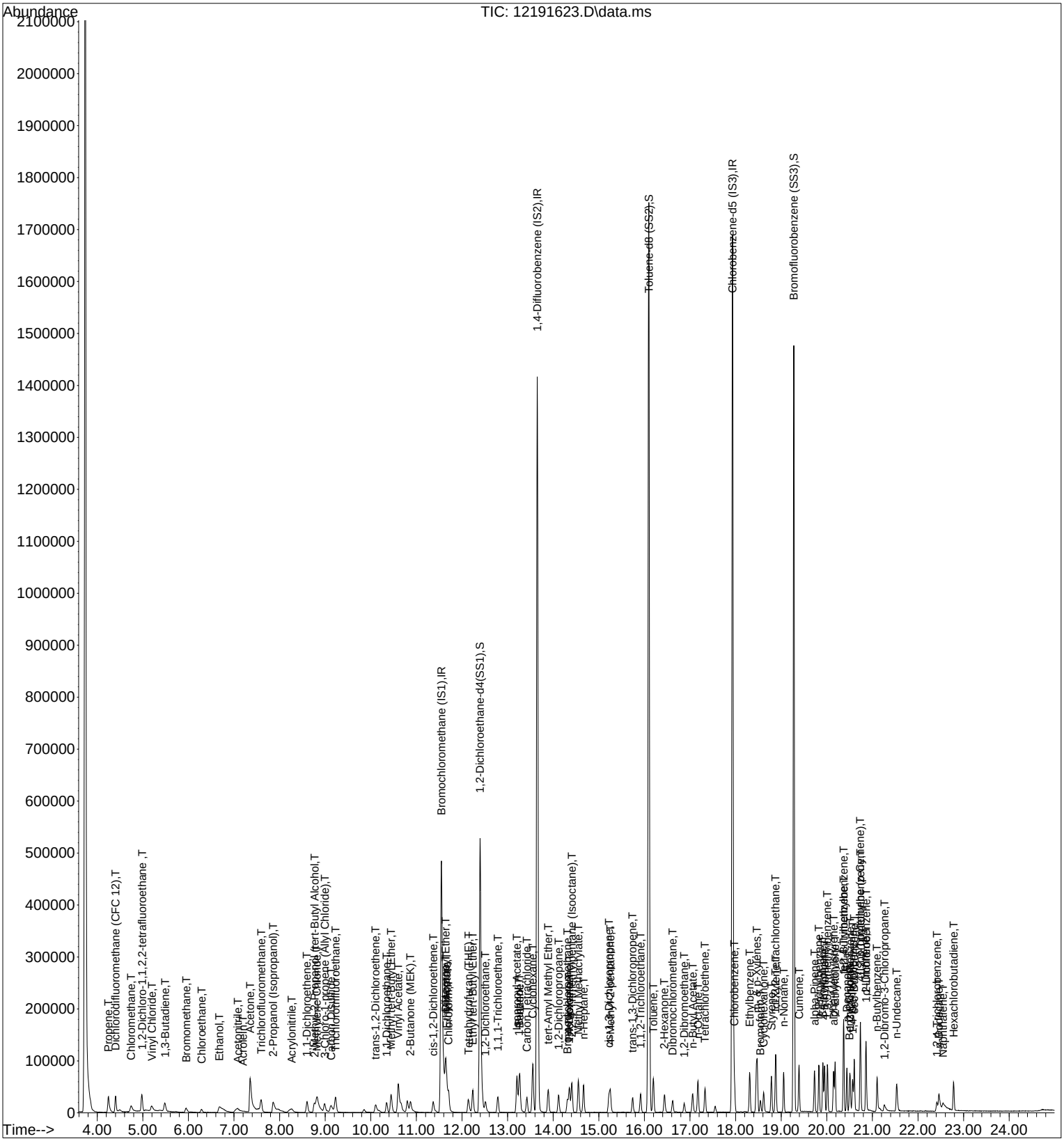
Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
50) Methyl Methacrylate	14.55	100	10335	0.907 ng		99
51) n-Heptane	14.67	71	13537	0.452 ng		98
52) cis-1,3-Dichloropropene	15.22	75	21948	0.461 ng		99
53) 4-Methyl-2-pentanone	15.26	58	12490	0.426 ng		87
54) trans-1,3-Dichloropropene	15.74	75	18415	0.436 ng		100
55) 1,1,2-Trichloroethane	15.92	97	12956	0.458 ng		98
58) Toluene	16.20	91	55819	0.494 ng		98
59) 2-Hexanone	16.44	43	30733	0.426 ng		96
60) Dibromochloromethane	16.62	129	14234	0.460 ng		97
61) 1,2-Dibromoethane	16.87	107	14329	0.450 ng		99
62) n-Butyl Acetate	17.06	43	33707	0.409 ng		97
63) n-Octane	17.18	57	12853	0.478 ng		93
64) Tetrachloroethene	17.33	166	14914	0.474 ng		99
65) Chlorobenzene	17.97	112	35858	0.464 ng		100
66) Ethylbenzene	18.31	91	60915	0.451 ng		99
67) m- & p-Xylenes	18.47	91	94072	0.919 ng		99
68) Bromoform	18.54	173	11360	0.459 ng		98
69) Styrene	18.79	104	34882	0.443 ng		99
70) o-Xylene	18.88	91	48000	0.467 ng		98
71) n-Nonane	19.06	43	28706	0.445 ng		96
72) 1,1,2,2-Tetrachloroethane	18.87	83	21812	0.440 ng		100
74) Cumene	19.39	105	60077	0.488 ng		99
75) alpha-Pinene	19.73	93	30805	0.458 ng		99
76) n-Propylbenzene	19.83	91	72745	0.468 ng		98
77) 3-Ethyltoluene	19.91	105	56699	0.432 ng		96
78) 4-Ethyltoluene	19.95	105	56365	0.485 ng		94
79) 1,3,5-Trimethylbenzene	20.01	105	48769	0.455 ng		99
80) alpha-Methylstyrene	20.15	118	23326	0.459 ng		96
81) 2-Ethyltoluene	20.18	105	56367	0.453 ng		100
82) 1,2,4-Trimethylbenzene	20.37	105	49281	0.468 ng		99
83) n-Decane	20.44	57	26815	0.427 ng		99
84) Benzyl Chloride	20.50	91	22636	0.280 ng		96
85) 1,3-Dichlorobenzene	20.51	146	24851	0.447 ng		98
86) 1,4-Dichlorobenzene	20.57	146	26829	0.424 ng		99
87) sec-Butylbenzene	20.60	105	65702	0.479 ng		90
88) 4-Isopropyltoluene (p-...	20.73	119	58694	0.465 ng		98
89) 1,2,3-Trimethylbenzene	20.74	105	48873	0.454 ng		100
90) 1,2-Dichlorobenzene	20.86	146	26031	0.458 ng		99
91) d-Limonene	20.86	68	19065	0.457 ng		99
92) 1,2-Dibromo-3-Chloropr...	21.27	157	7087	0.373 ng	#	75
93) n-Undecane	21.53	57	26959	0.416 ng		94
94) 1,2,4-Trichlorobenzene	22.42	180	14400	0.369 ng		97
95) Naphthalene	22.55	128	39950m	0.375 ng		
96) n-Dodecane	22.46	57	20350	0.344 ng		97
97) Hexachlorobutadiene	22.78	225	11426	0.434 ng		96
98) Cyclohexanone	18.62	55	18659	0.412 ng		97
99) tert-Butylbenzene	20.37	119	47988	0.485 ng		99
100) n-Butylbenzene	21.10	91	51353	0.453 ng		96

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

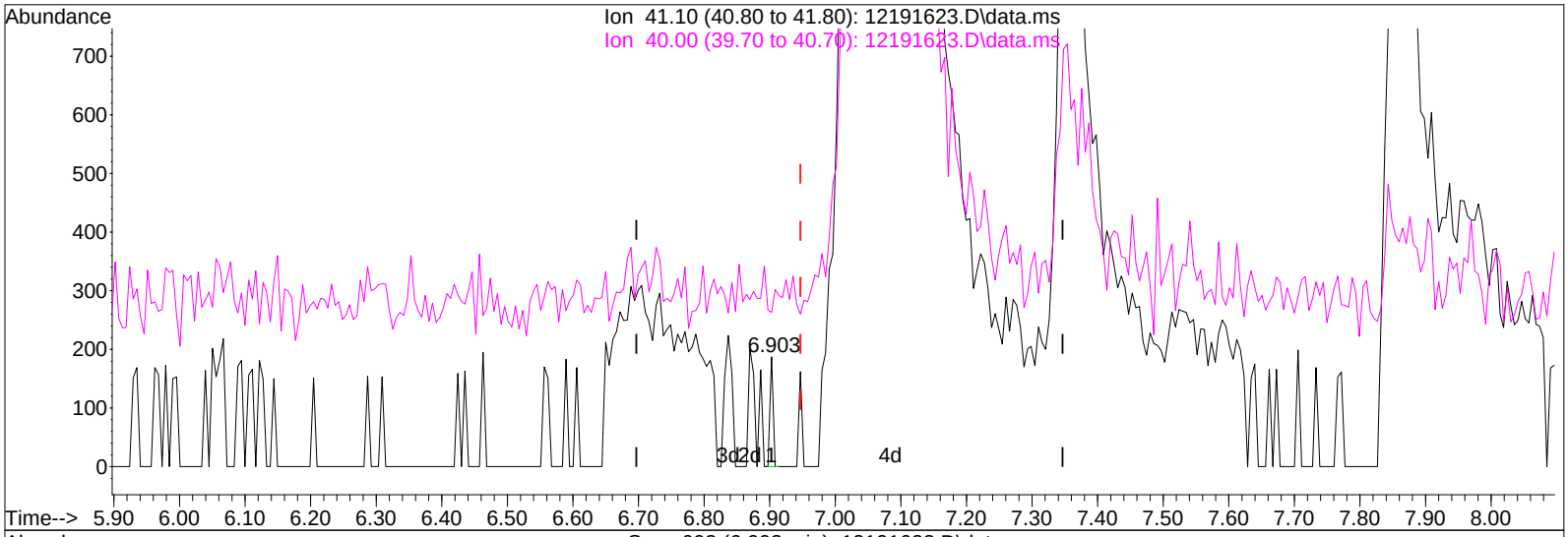
Quant Time: Dec 20 09:52:42 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

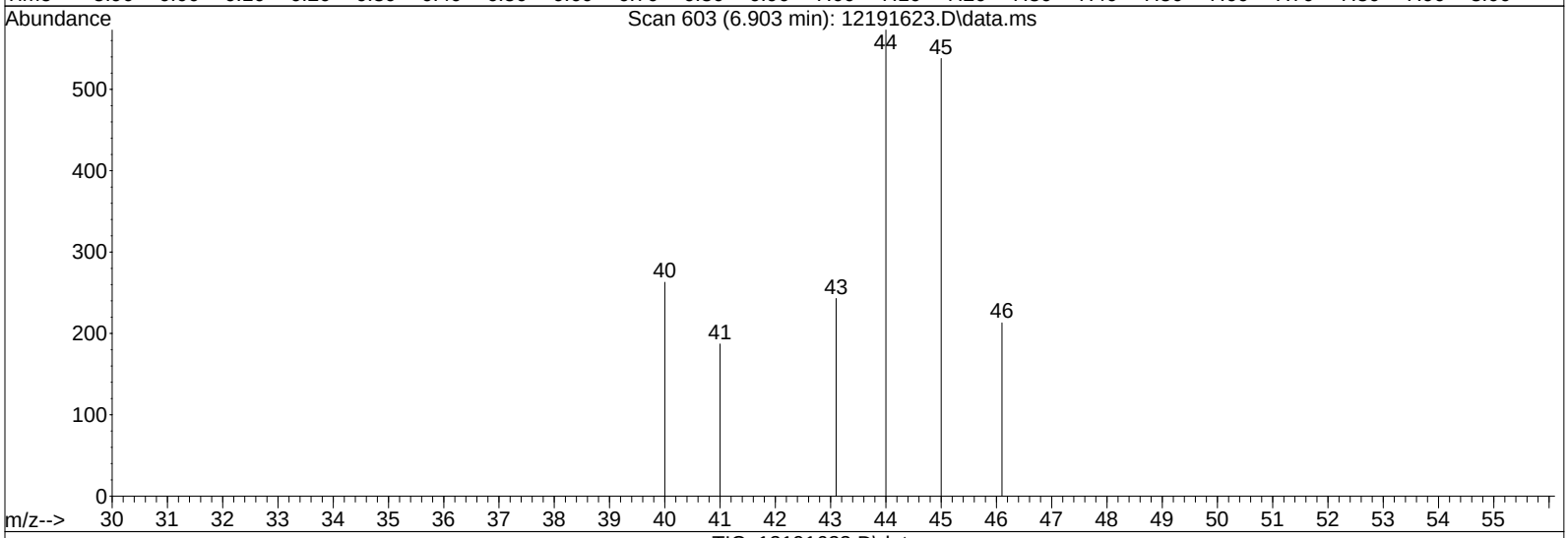


Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:37 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191623.D\data.ms

(11) Acetonitrile (T)

6.903min (-0.044) 0.00ng

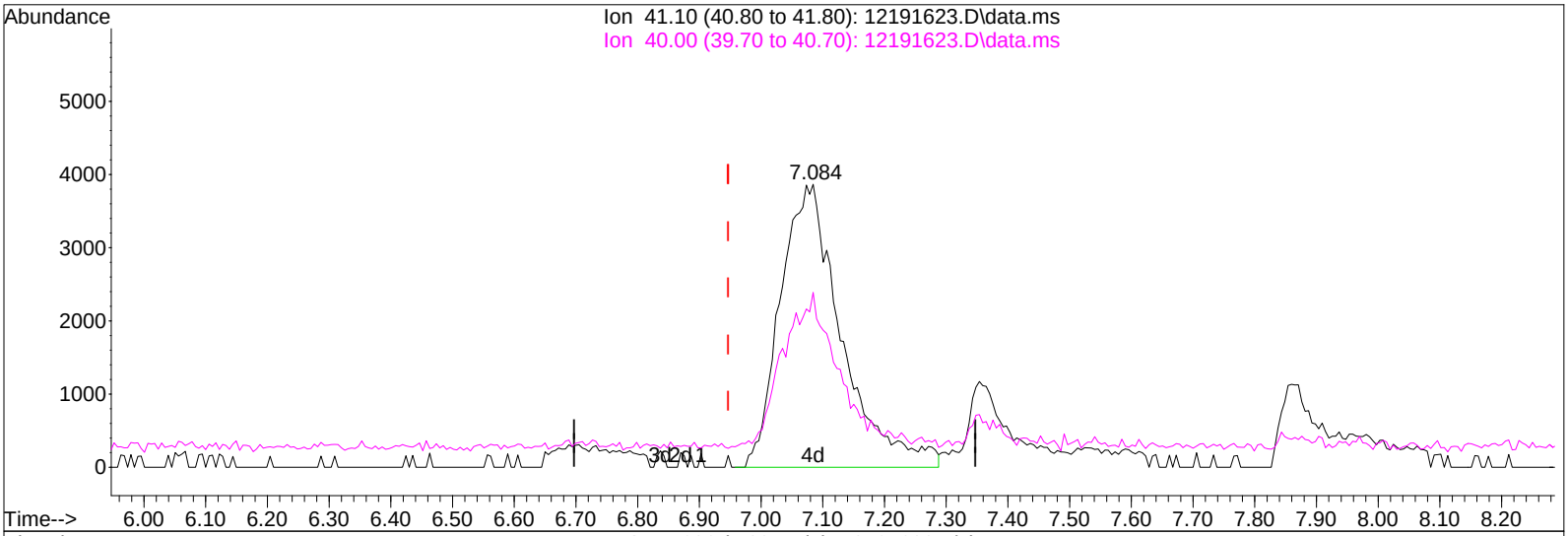
response 62

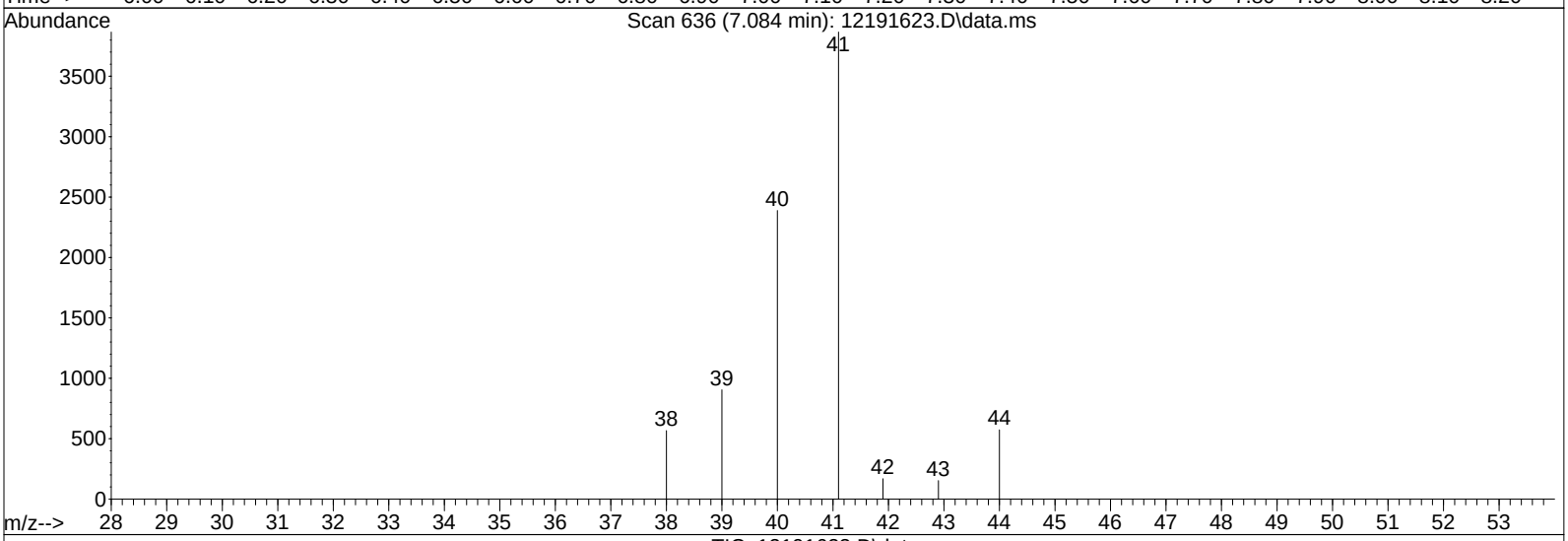
Ion	Exp%	Act%
41.10	100	100
40.00	54.30	322.58#
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:37 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191623.D\data.ms

(11) Acetonitrile (T)

7.084min (+0.137) 0.44ng m

response 26579

Ion	Exp%	Act%
41.10	100	100
40.00	54.30	0.75#
0.00	0.00	0.00
0.00	0.00	0.00

IPC

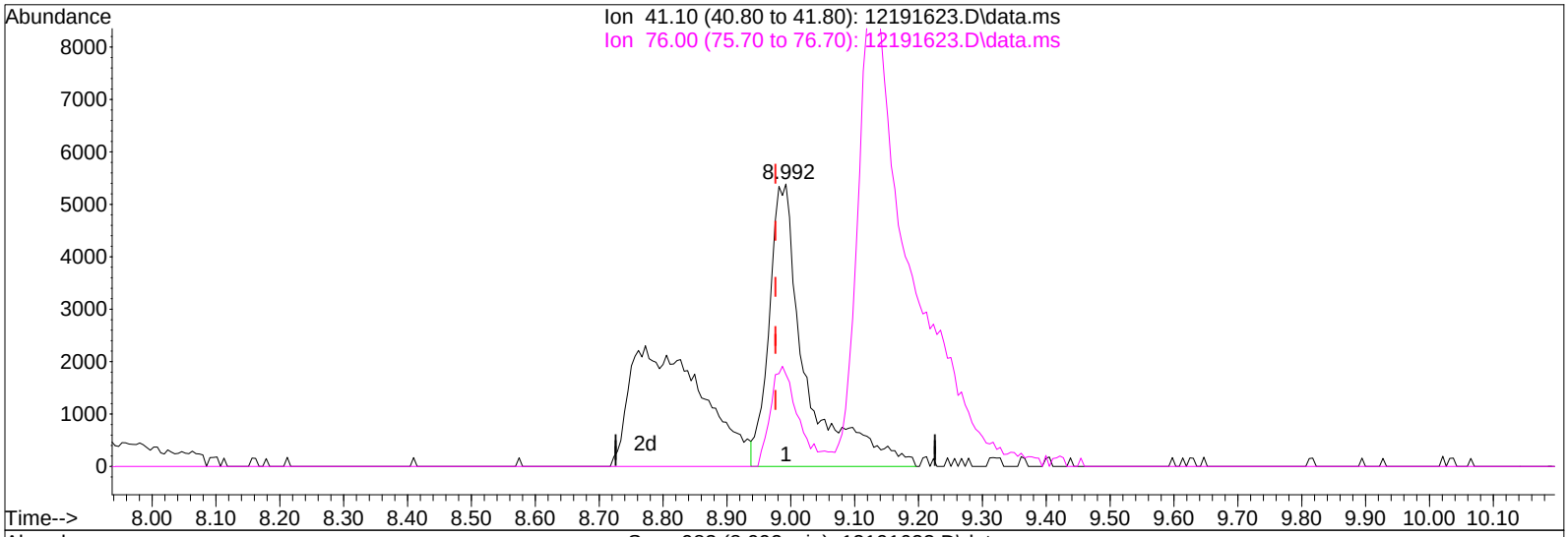
LH 12/20/16

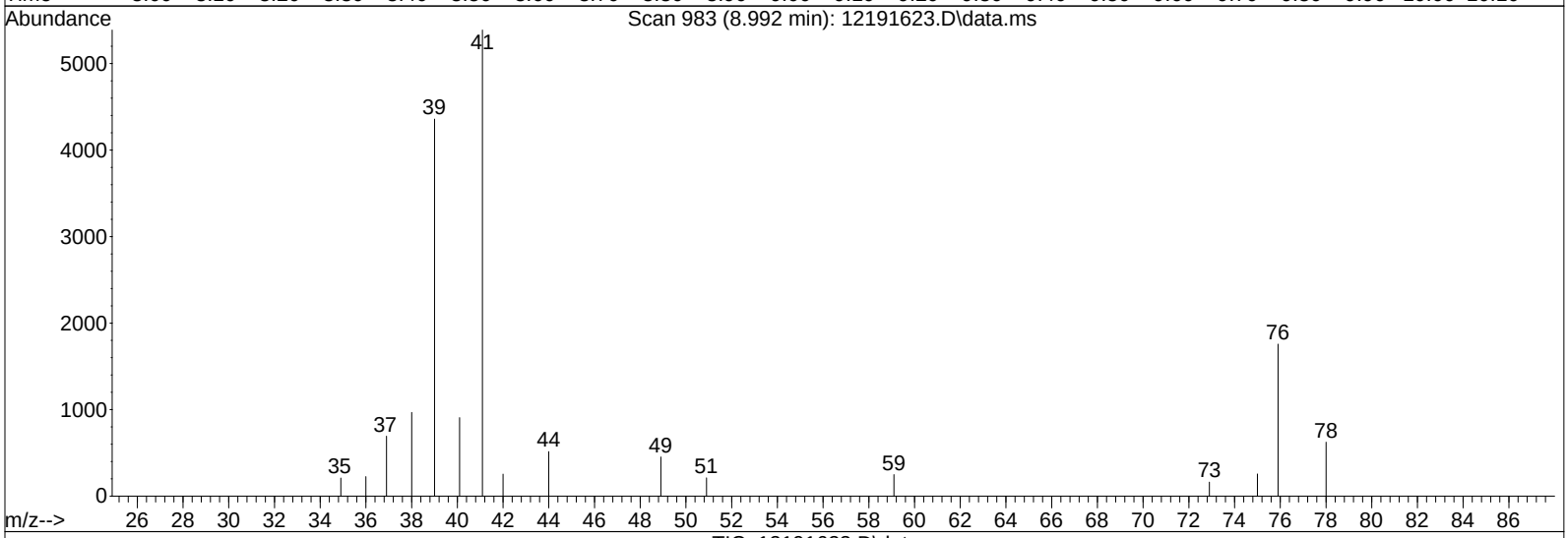
12/30/16

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:37 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191623.D\data.ms

(20) 3-Chloro-1-propene (Allyl Chloride) (T)

8.992min (+0.016) 0.46ng

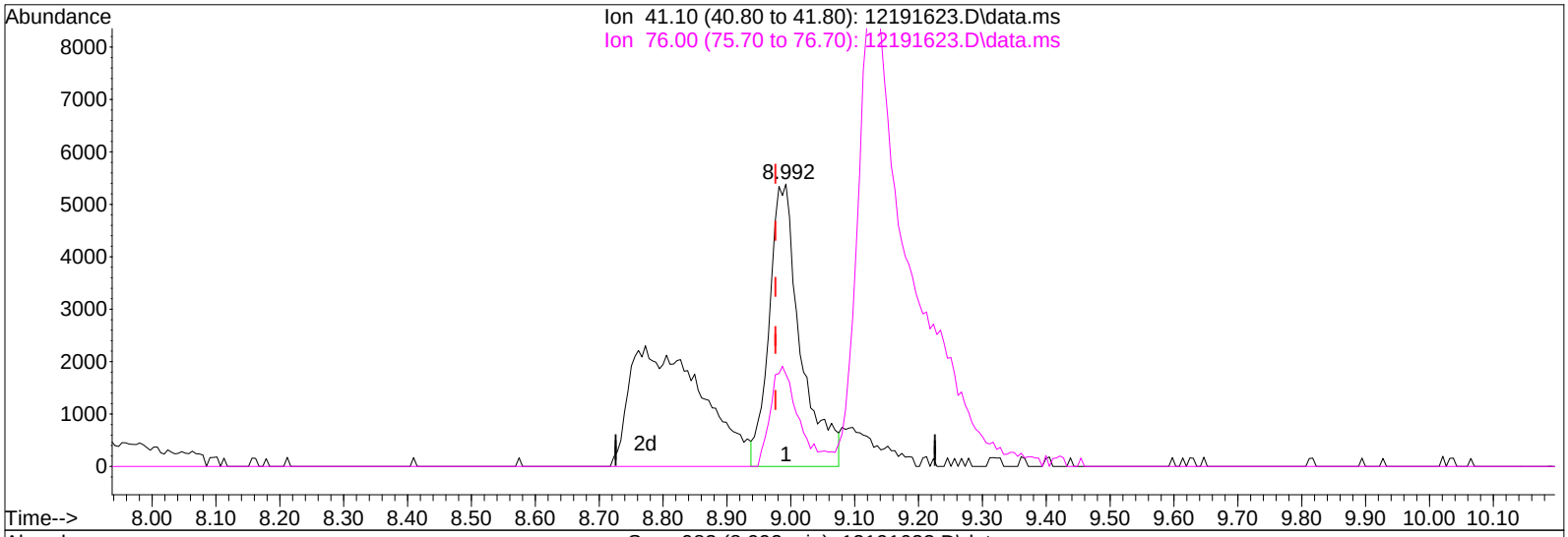
response 21371

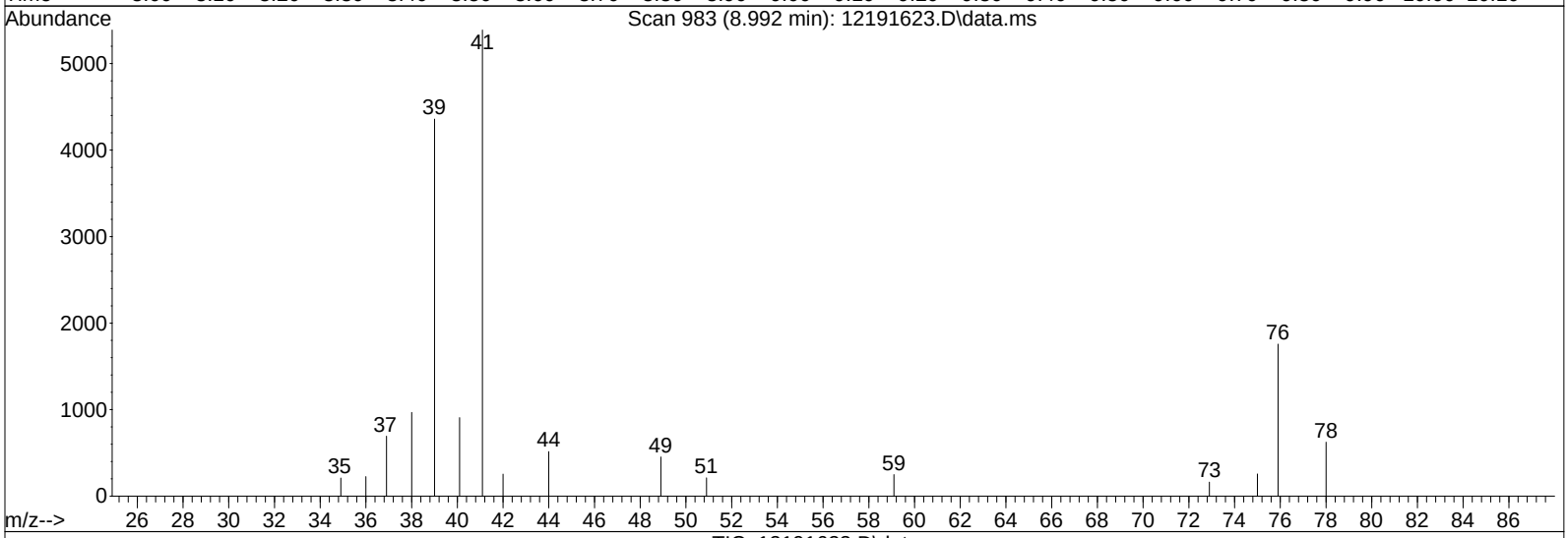
Ion	Exp%	Act%
41.10	100	100
76.00	34.90	28.45
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:37 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191623.D\data.ms

(20) 3-Chloro-1-propene (Allyl Chloride) (T)

8.992min (+0.016) 0.39ng m

response 18295

Ion	Exp%	Act%
41.10	100	100
76.00	34.90	33.24
0.00	0.00	0.00
0.00	0.00	0.00

IPC

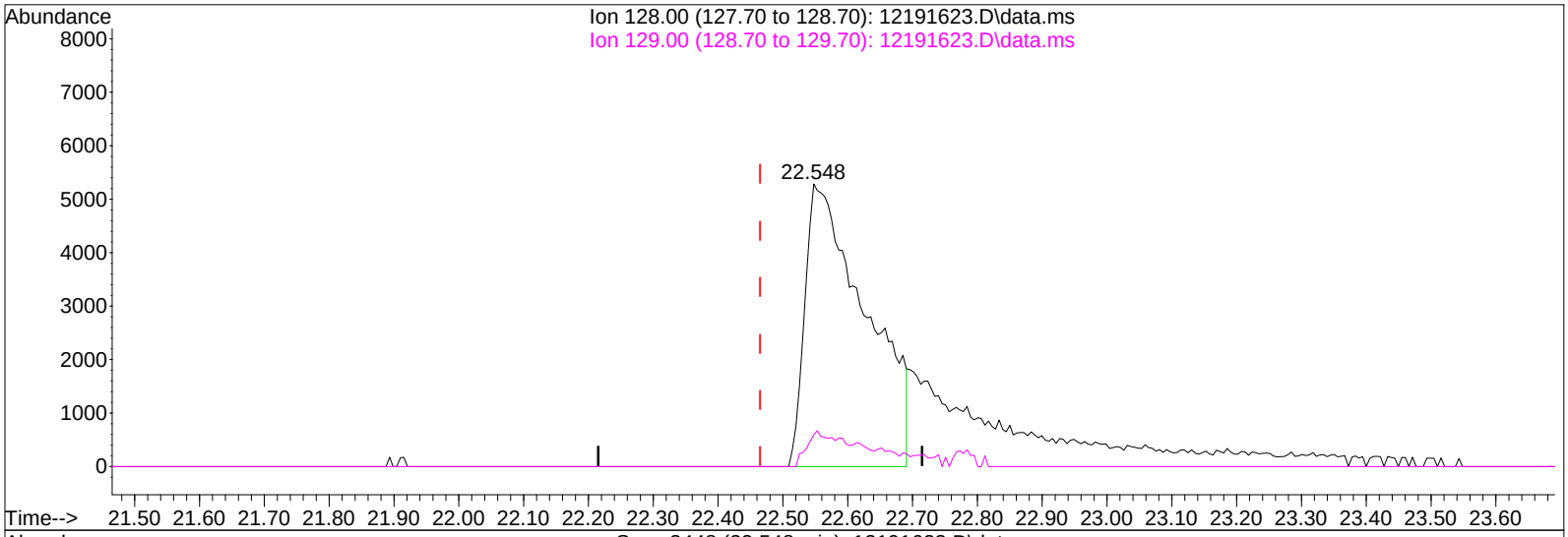
LH 12/20/16

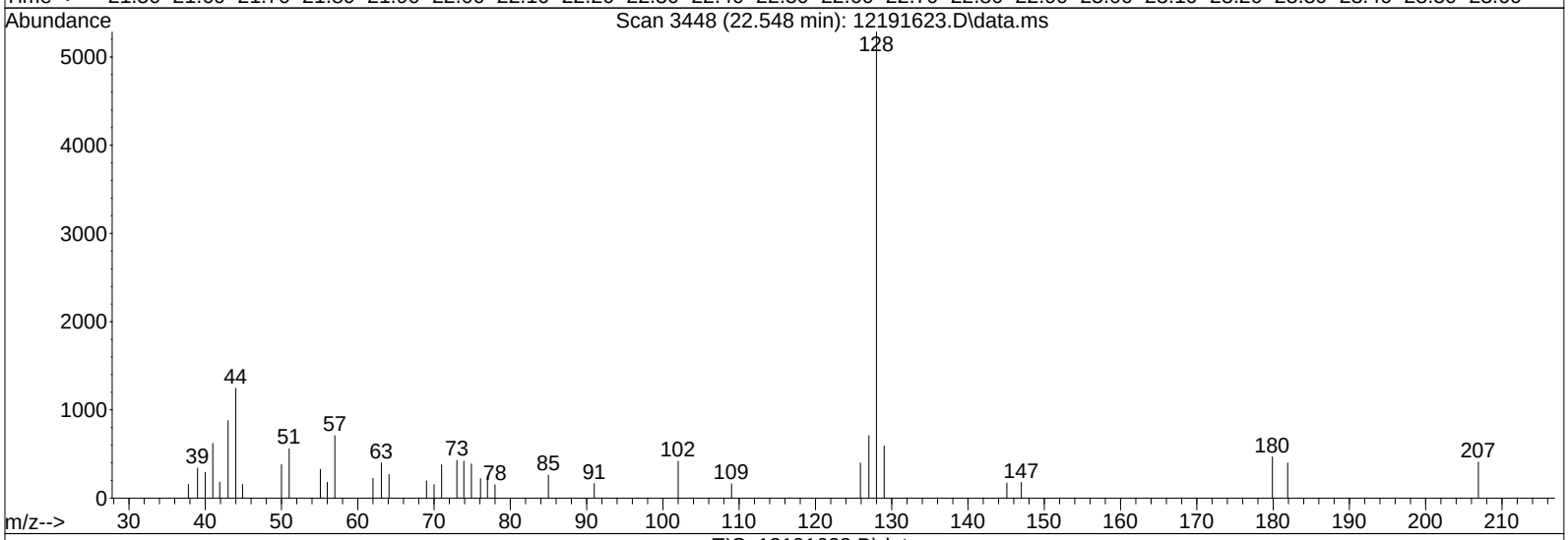
12/30/16

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:37 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191623.D\data.ms

(95) Naphthalene (T)

22.548min (+0.082) 0.32ng

response 34200

Ion	Exp%	Act%
128.00	100	100
129.00	11.00	11.75
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

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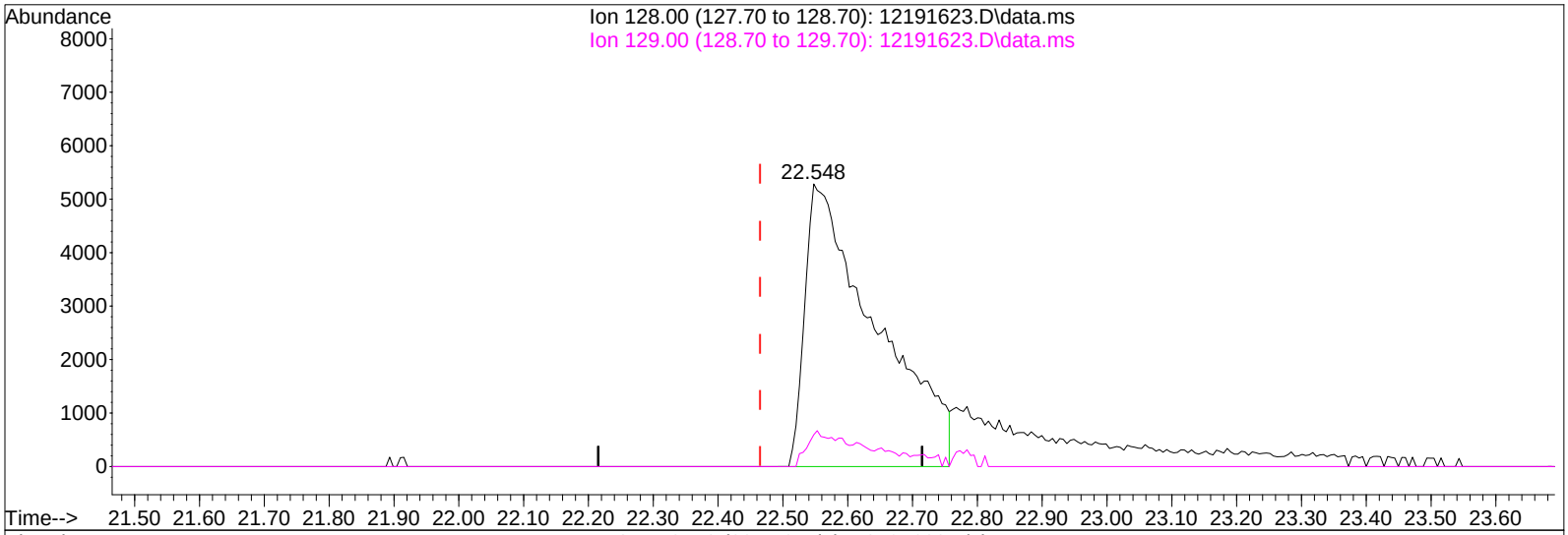
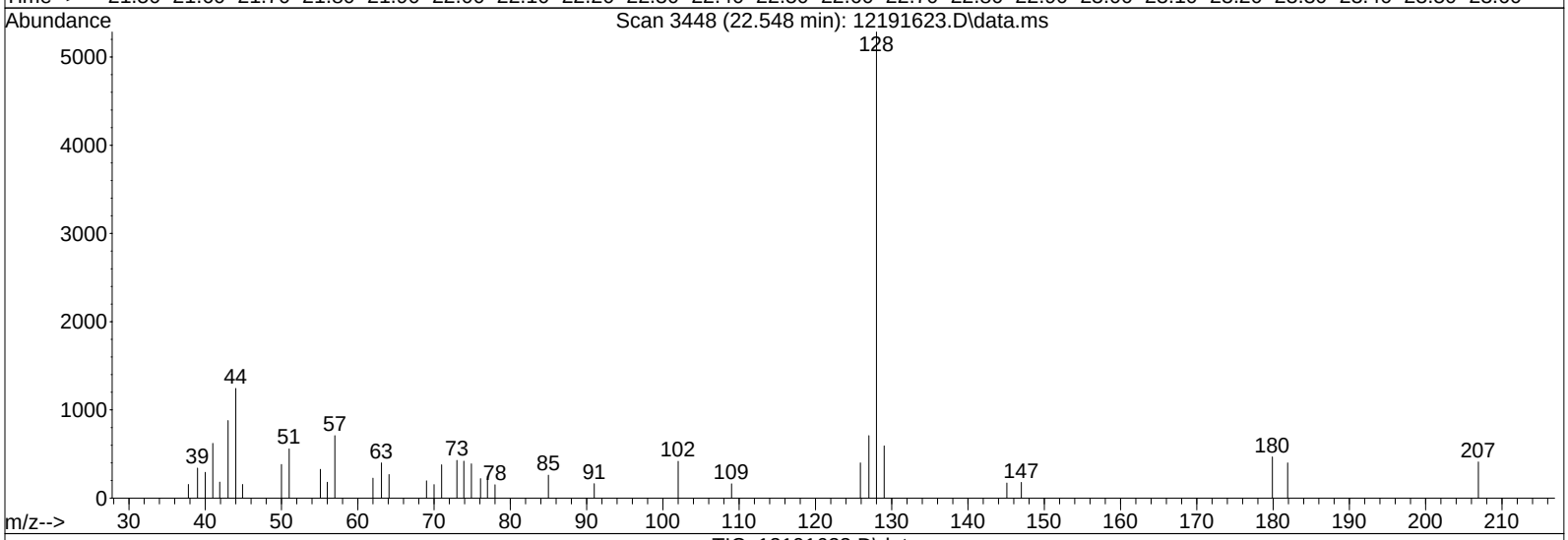
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191623.D\data.ms

(95) Naphthalene (T)

22.548min (+0.082) 0.38ng m

response 39950

Ion	Exp%	Act%
128.00	100	100
129.00	11.00	10.06
0.00	0.00	0.00
0.00	0.00	0.00

BLC

LH 12/20/16

12/30/16

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191620.D
Acq On : 19 Dec 2016 23:59 Operator: LH
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 09:09:38 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	287891	12.500	ng	-0.01
37) 1,4-Difluorobenzene (IS2)	13.65	114	1442786	12.500	ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.93	82	606464	12.500	ng	0.00

System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.40	65	516035	13.702	ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 109.60%			
57) Toluene-d8 (SS2)	16.10	98	1492567	12.920	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 103.36%			
73) Bromofluorobenzene (SS3)	19.28	174	463606	12.499	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.00%			

Target Compounds							Qvalue
2) Propene	4.26	42	4455	0.120	ng		87
3) Dichlorodifluoromethan...	4.41	85	7720	0.128	ng	#	97
4) Chloromethane	4.76	50	6115	0.125	ng		99
5) 1,2-Dichloro-1,1,2,2-t...	4.99	135	4065	0.129	ng		98
6) Vinyl Chloride	5.23	62	5048	0.103	ng		85
7) 1,3-Butadiene	5.50	54	3252	0.102	ng		94
8) Bromomethane	5.97	94	2560	0.091	ng		100
9) Chloroethane	6.30	64	2005	0.087	ng		90
10) Ethanol	6.74	45	13717	0.541	ng		93
11) Acetonitrile	7.10	41	9474m	0.146	ng		
12) Acrolein	7.28	56	2647	0.108	ng		99
13) Acetone	7.39	58	14157	0.575	ng	#	81
14) Trichlorofluoromethane	7.61	101	6526	0.124	ng		96
15) 2-Propanol (Isopropanol)	7.91	45	19376	0.229	ng		73
16) Acrylonitrile	8.27	53	4721	0.107	ng		97
17) 1,1-Dichloroethene	8.61	96	2858	0.104	ng		94
18) 2-Methyl-2-Propanol (t...	8.83	59	19366	0.237	ng	#	72
19) Methylene Chloride	8.82	84	3788	0.115	ng		88
20) 3-Chloro-1-propene (Al...	8.99	41	4044	0.081	ng		89
21) Trichlorotrifluoroethane	9.23	151	3186	0.121	ng		98
22) Carbon Disulfide	9.13	76	15656	0.139	ng		93
23) trans-1,2-Dichloroethene	10.10	61	5111	0.112	ng		98
24) 1,1-Dichloroethane	10.35	63	5949	0.102	ng		99
25) Methyl tert-Butyl Ether	10.46	73	11732	0.125	ng		97
26) Vinyl Acetate	10.63	86	2997	0.434	ng	#	82
27) 2-Butanone (MEK)	10.89	72	2269	0.103	ng	#	55
28) cis-1,2-Dichloroethene	11.37	61	5025	0.113	ng		97
29) Diisopropyl Ether	11.65	87	3567	0.130	ng	#	68
30) Ethyl Acetate	11.68	61	2368	0.201	ng		98
31) n-Hexane	11.64	57	6112	0.115	ng		97
32) Chloroform	11.71	83	6444	0.118	ng		99
34) Tetrahydrofuran (THF)	12.15	72	2748	0.122	ng	#	84
35) Ethyl tert-Butyl Ether	12.24	87	4075	0.114	ng		95
36) 1,2-Dichloroethane	12.51	62	5388	0.130	ng		100
38) 1,1,1-Trichloroethane	12.78	97	5686	0.121	ng		97
39) Isopropyl Acetate	13.22	61	4479	0.208	ng	#	86
40) 1-Butanol	13.26	56	6847	0.203	ng		86
41) Benzene	13.26	78	15697	0.112	ng		97
42) Carbon Tetrachloride	13.42	117	4664	0.115	ng		96
43) Cyclohexane	13.55	84	11027	0.233	ng		99
44) tert-Amyl Methyl Ether	13.89	73	10713	0.117	ng		92
45) 1,2-Dichloropropane	14.12	63	3810	0.111	ng		95
46) Bromodichloromethane	14.32	83	4852	0.116	ng		100
47) Trichloroethene	14.35	130	4092	0.126	ng		99
48) 1,4-Dioxane	14.36	88	2774	0.102	ng	#	66
49) 2,2,4-Trimethylpentane...	14.41	57	16032	0.113	ng		90

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191620.D
Acq On : 19 Dec 2016 23:59 Operator: LH
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 09:09:38 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
50) Methyl Methacrylate	14.56	100	2657	0.218 ng		92
51) n-Heptane	14.67	71	3588	0.112 ng		95
52) cis-1,3-Dichloropropene	15.23	75	5961	0.117 ng		99
53) 4-Methyl-2-pentanone	15.26	58	3367	0.108 ng	#	73
54) trans-1,3-Dichloropropene	15.75	75	4924	0.109 ng		98
55) 1,1,2-Trichloroethane	15.92	97	3404	0.113 ng		99
58) Toluene	16.20	91	15536	0.130 ng		96
59) 2-Hexanone	16.45	43	9494	0.124 ng		85
60) Dibromochloromethane	16.62	129	3816	0.116 ng		98
61) 1,2-Dibromoethane	16.87	107	3878	0.115 ng		97
62) n-Butyl Acetate	17.06	43	9503	0.109 ng		94
63) n-Octane	17.17	57	3901	0.137 ng	#	81
64) Tetrachloroethene	17.33	166	3974	0.119 ng		99
65) Chlorobenzene	17.98	112	9816	0.120 ng		92
66) Ethylbenzene	18.31	91	16434	0.115 ng		99
67) m- & p-Xylenes	18.47	91	26820	0.247 ng		98
68) Bromoform	18.55	173	2976	0.113 ng		97
69) Styrene	18.79	104	9744	0.117 ng		99
70) o-Xylene	18.89	91	13504	0.124 ng		99
71) n-Nonane	19.06	43	8168	0.119 ng		91
72) 1,1,2,2-Tetrachloroethane	18.87	83	5256	0.100 ng		98
74) Cumene	19.39	105	16806	0.129 ng		96
75) alpha-Pinene	19.73	93	8077	0.113 ng		95
76) n-Propylbenzene	19.83	91	20076	0.122 ng		97
77) 3-Ethyltoluene	19.91	105	17336	0.125 ng		98
78) 4-Ethyltoluene	19.95	105	13624	0.111 ng		95
79) 1,3,5-Trimethylbenzene	20.02	105	13705	0.120 ng		94
80) alpha-Methylstyrene	20.15	118	5685	0.105 ng		90
81) 2-Ethyltoluene	20.18	105	15092	0.114 ng		99
82) 1,2,4-Trimethylbenzene	20.38	105	12020	0.108 ng		95
83) n-Decane	20.45	57	7645	0.115 ng		93
84) Benzyl Chloride	20.61	91	8398	0.098 ng	#	55
85) 1,3-Dichlorobenzene	20.52	146	4298	0.073 ng		99
86) 1,4-Dichlorobenzene	20.57	146	8335m	0.124 ng		
87) sec-Butylbenzene	20.61	105	16552	0.114 ng	#	64
88) 4-Isopropyltoluene (p-...	20.75	119	16800	0.125 ng		89
89) 1,2,3-Trimethylbenzene	20.75	105	16318	0.143 ng		88
90) 1,2-Dichlorobenzene	20.89	146	7618	0.126 ng		99
91) d-Limonene	20.86	68	4838	0.109 ng		97
92) 1,2-Dibromo-3-Chloropr...	21.34	157	1336	0.066 ng	#	57
93) n-Undecane	21.56	57	8653	0.126 ng		85
94) 1,2,4-Trichlorobenzene	22.49	180	3718	0.090 ng	#	95
95) Naphthalene	22.66	128	6128	0.054 ng	#	71
96) n-Dodecane	22.49	57	7367m	0.118 ng		
97) Hexachlorobutadiene	22.79	225	3006	0.108 ng		100
98) Cyclohexanone	18.62	55	5979	0.125 ng		92
99) tert-Butylbenzene	20.37	119	12649	0.121 ng		99
100) n-Butylbenzene	21.16	91	12866	0.107 ng		91

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

Quantitation Report (QT Reviewed)

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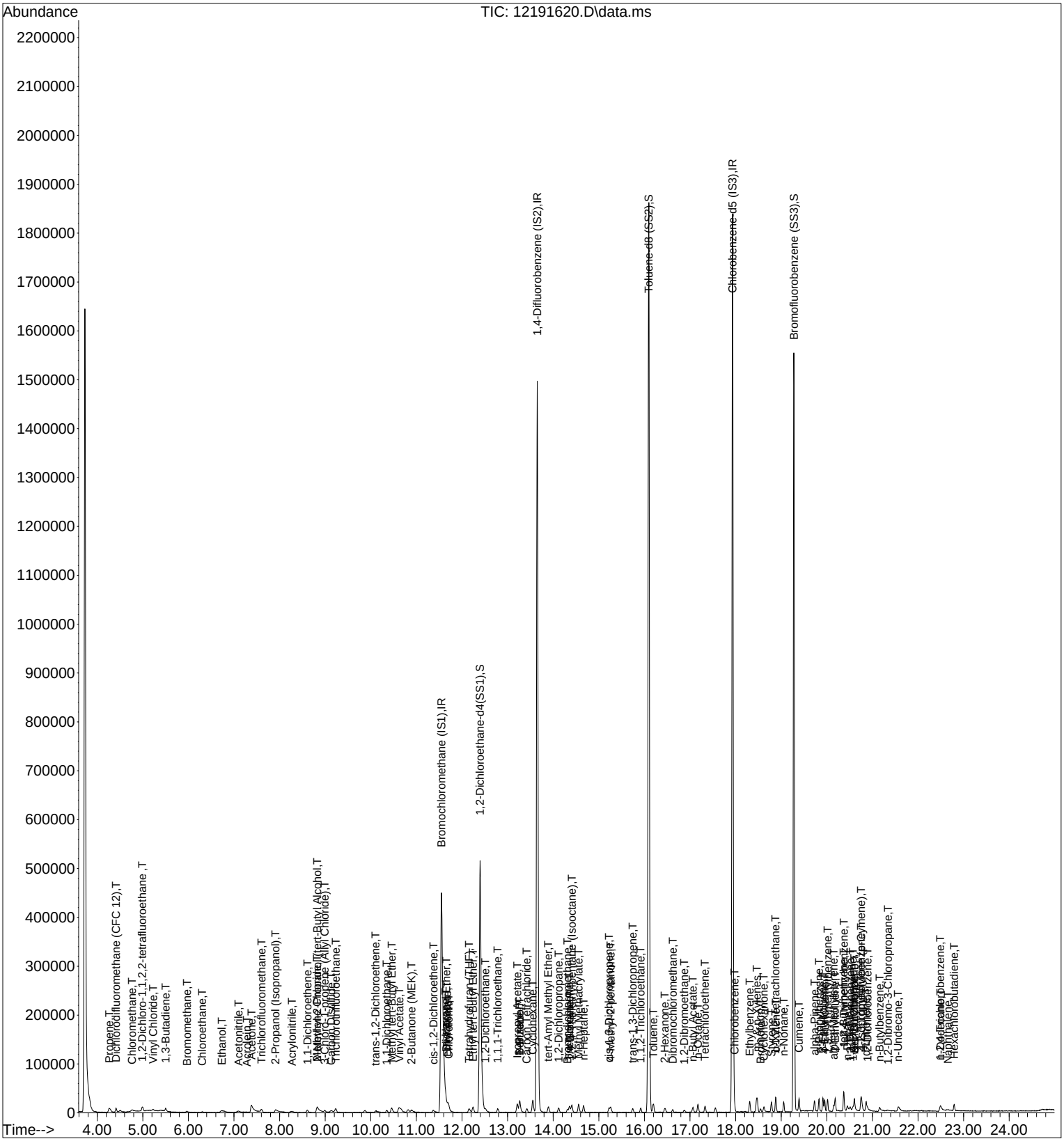
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 09:09:38 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191620.D
Acq On : 19 Dec 2016 23:59 Operator: LH
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
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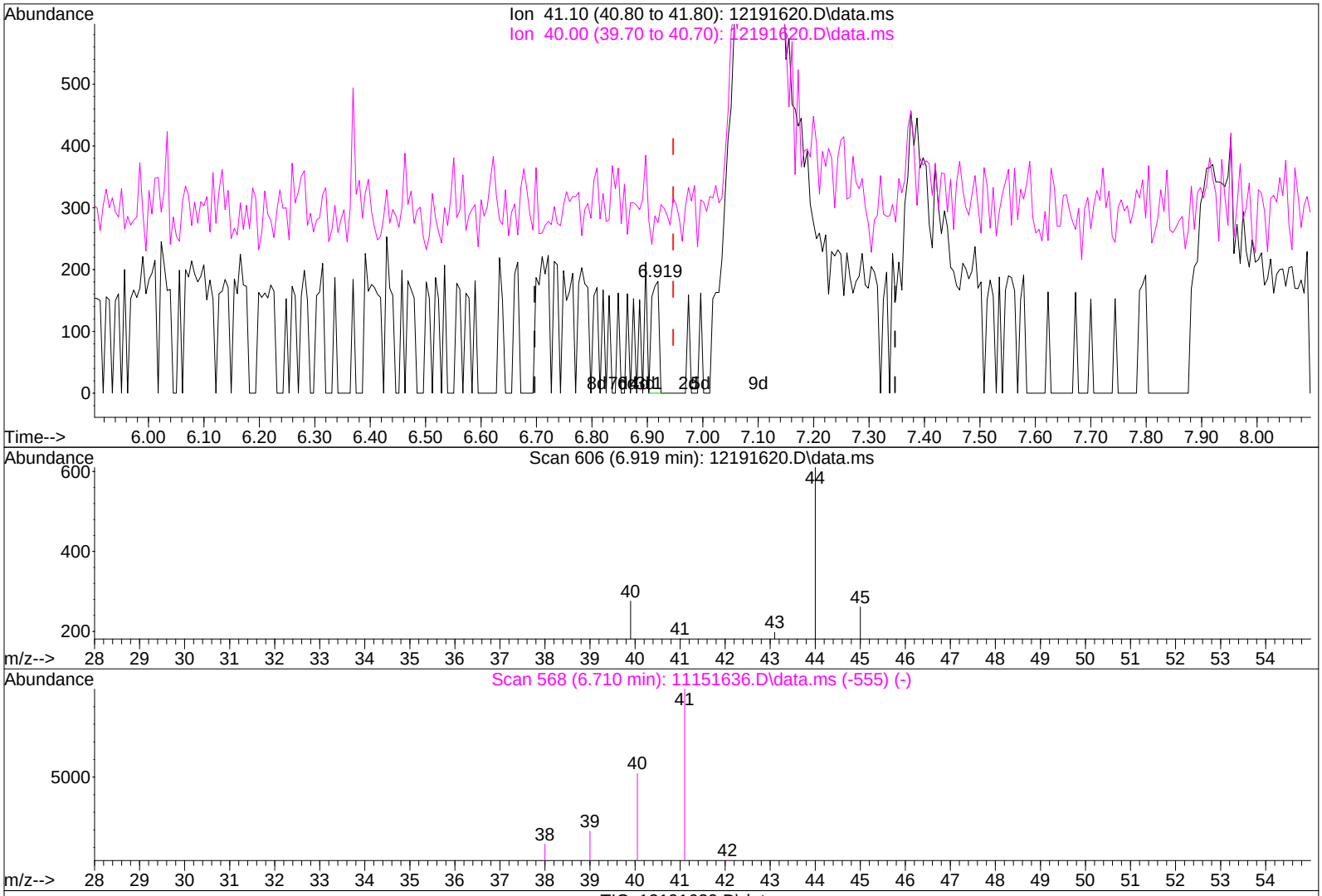
DataAcq Meth:TO15.M



TIC: 12191620.D\data.ms

(11) Acetonitrile (T)

6.919min (-0.028) 0.00ng

response 168

Ion	Exp%	Act%
41.10	100	100
40.00	54.30	91.07#
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

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Sample : 0.08ng TO-15 ICAL STD
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Quant Method : I:\MS16\METHODS\R16121916.M
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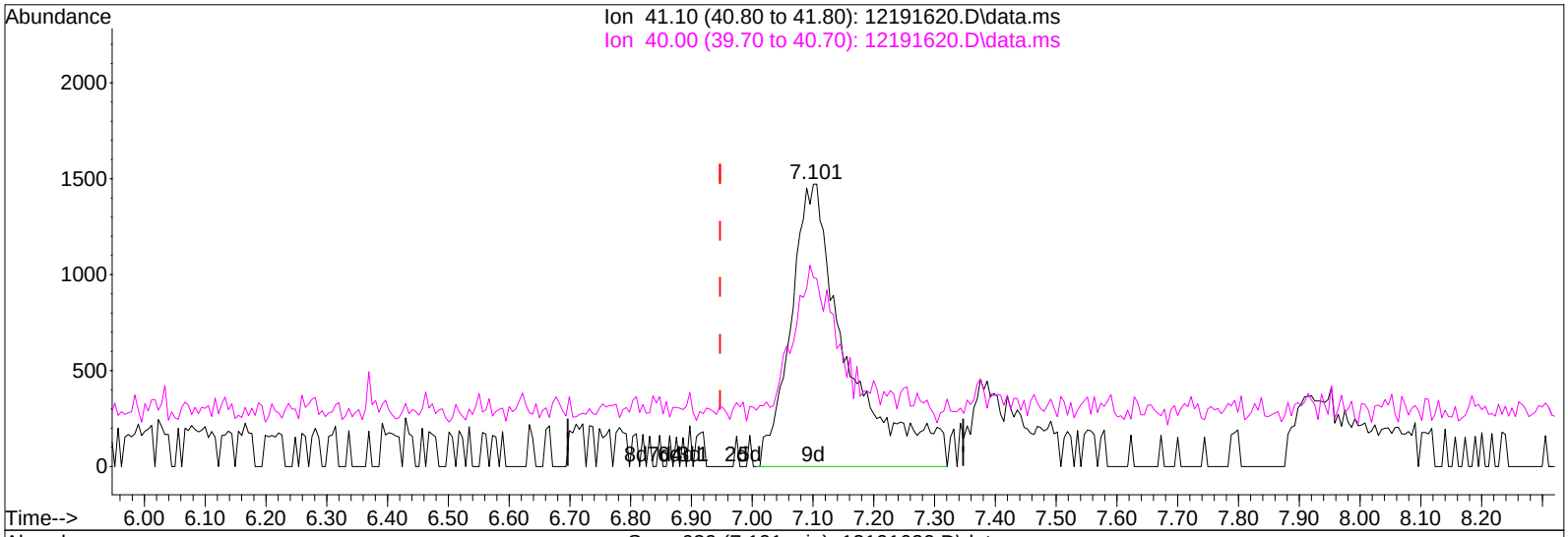
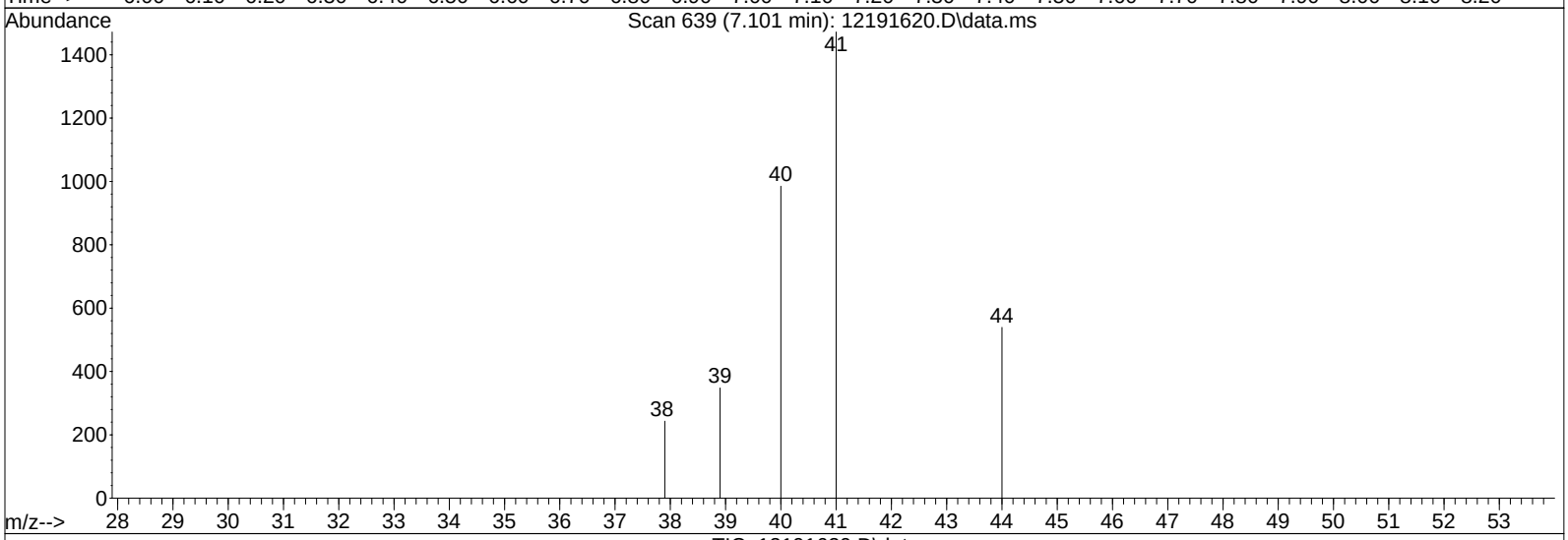
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191620.D\data.ms

(11) Acetonitrile (T)

7.101min (+0.154) 0.15ng m

response 9474

Ion	Exp%	Act%
41.10	100	100
40.00	54.30	1.61#
0.00	0.00	0.00
0.00	0.00	0.00

RTS

LH 12/20/16

12/30/16

Quantitation Report (Qedit)

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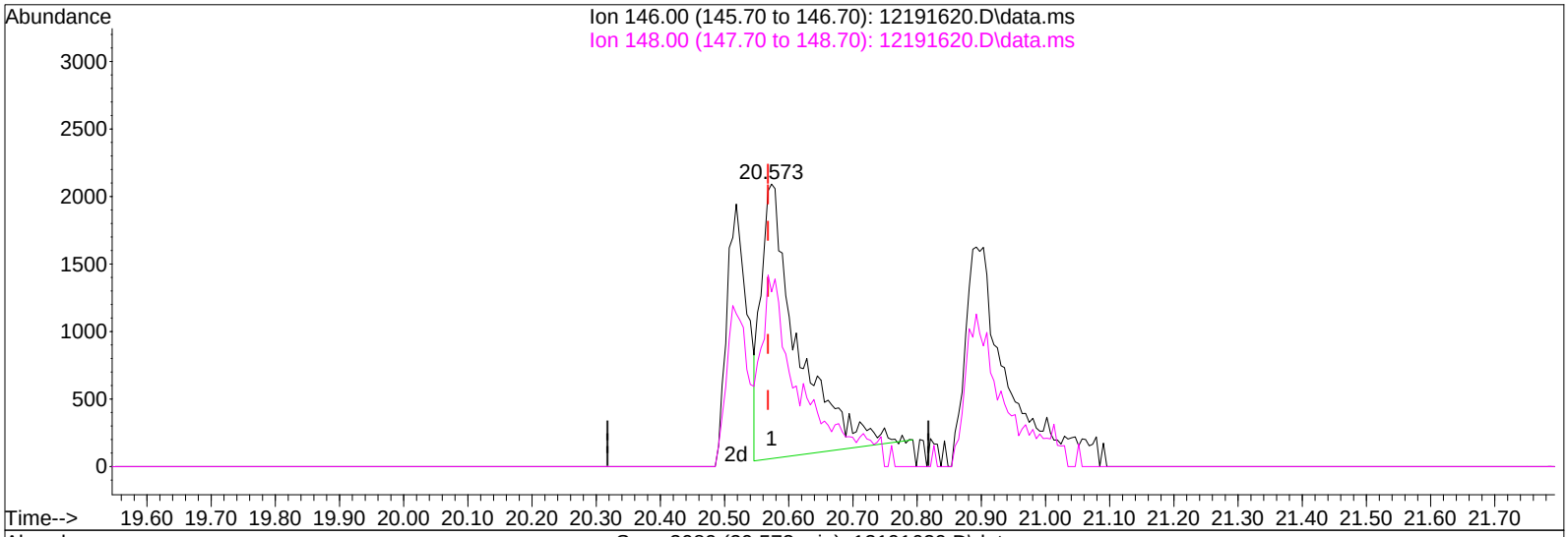

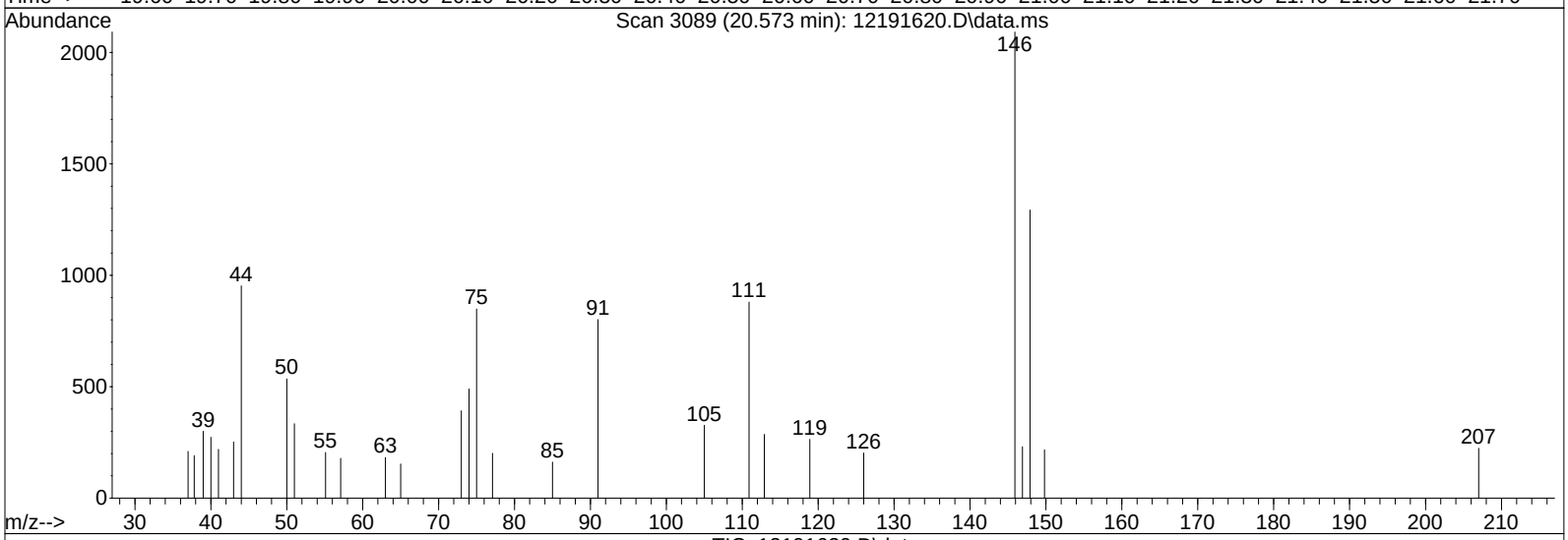

TIC: 12191620.D\data.ms

(86) 1,4-Dichlorobenzene (T)

20.573min (+0.005) 0.12ng

response 8112

Ion	Exp%	Act%
146.00	100	100
148.00	63.90	76.43
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

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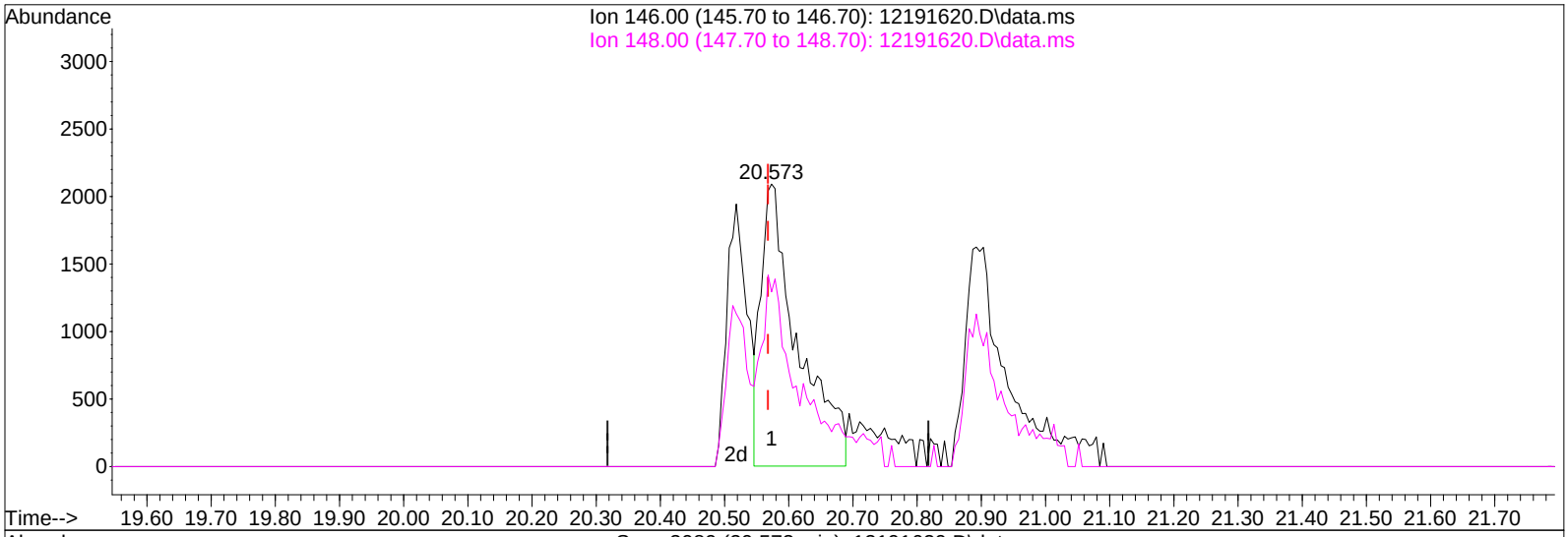
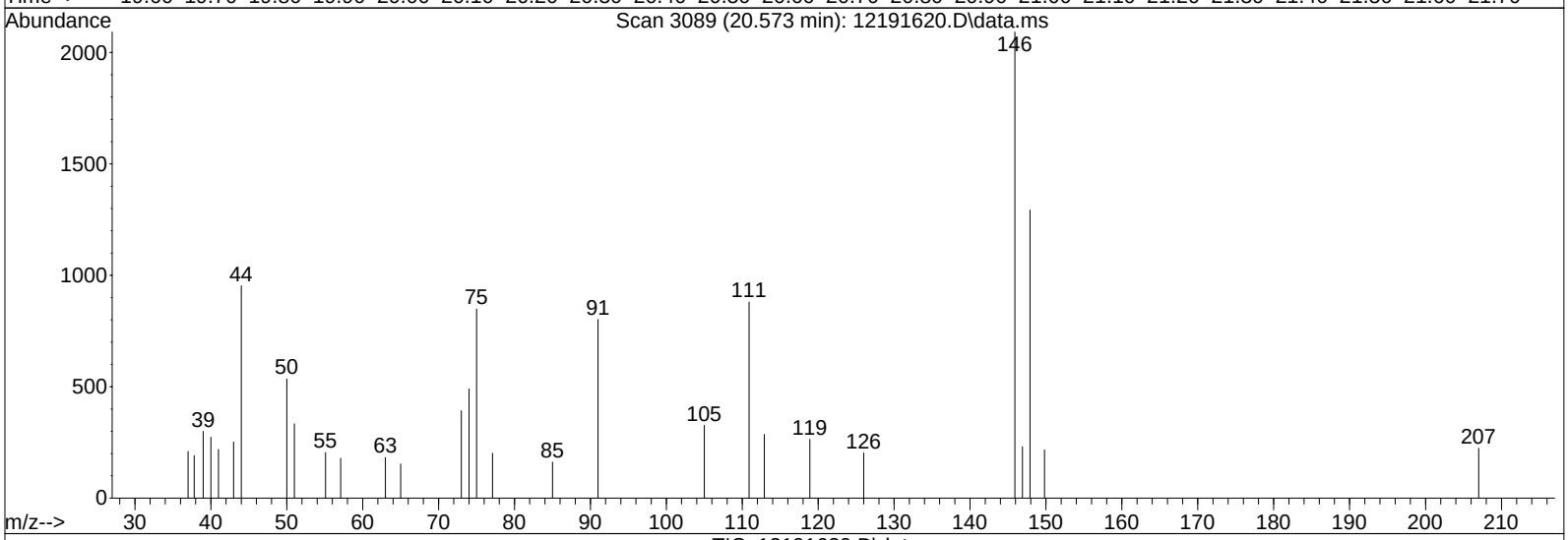
DataAcq Meth:TO15.M





TIC: 12191620.D\data.ms

(86) 1,4-Dichlorobenzene (T)

20.573min (+0.005) 0.12ng m

response 8335

Ion	Exp%	Act%
146.00	100	100
148.00	63.90	74.39
0.00	0.00	0.00
0.00	0.00	0.00

BLC

LH 12/20/16

12/30/16

Quantitation Report (Qedit)

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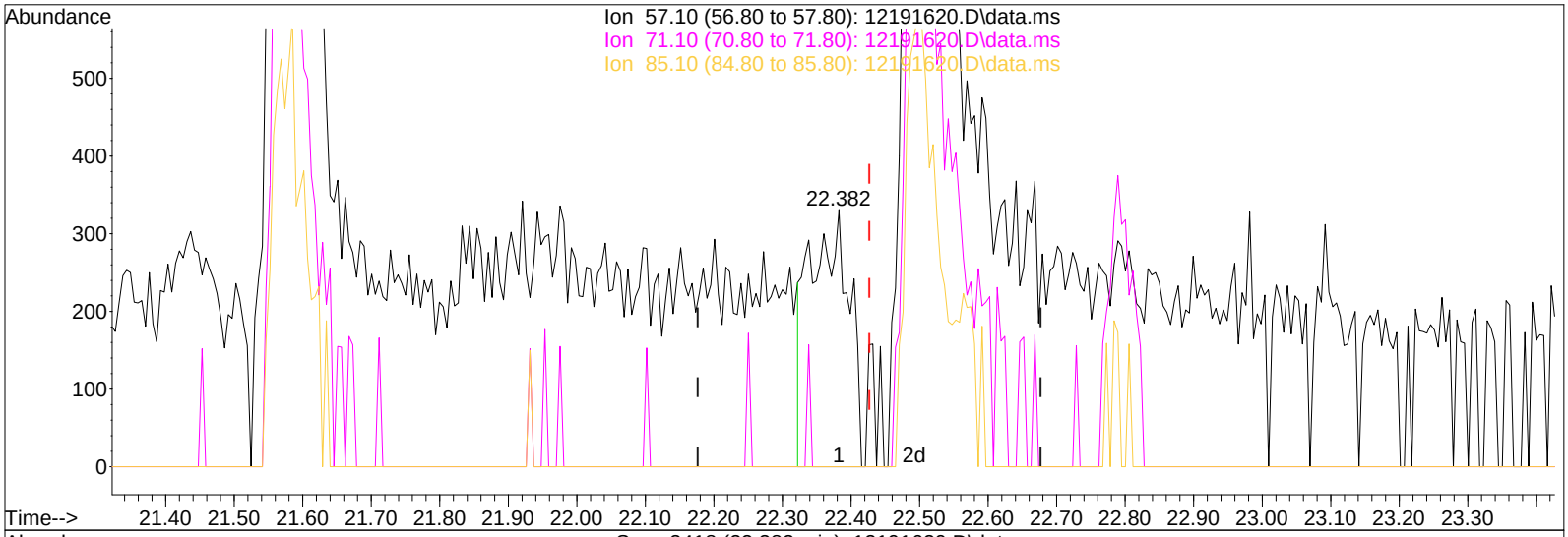
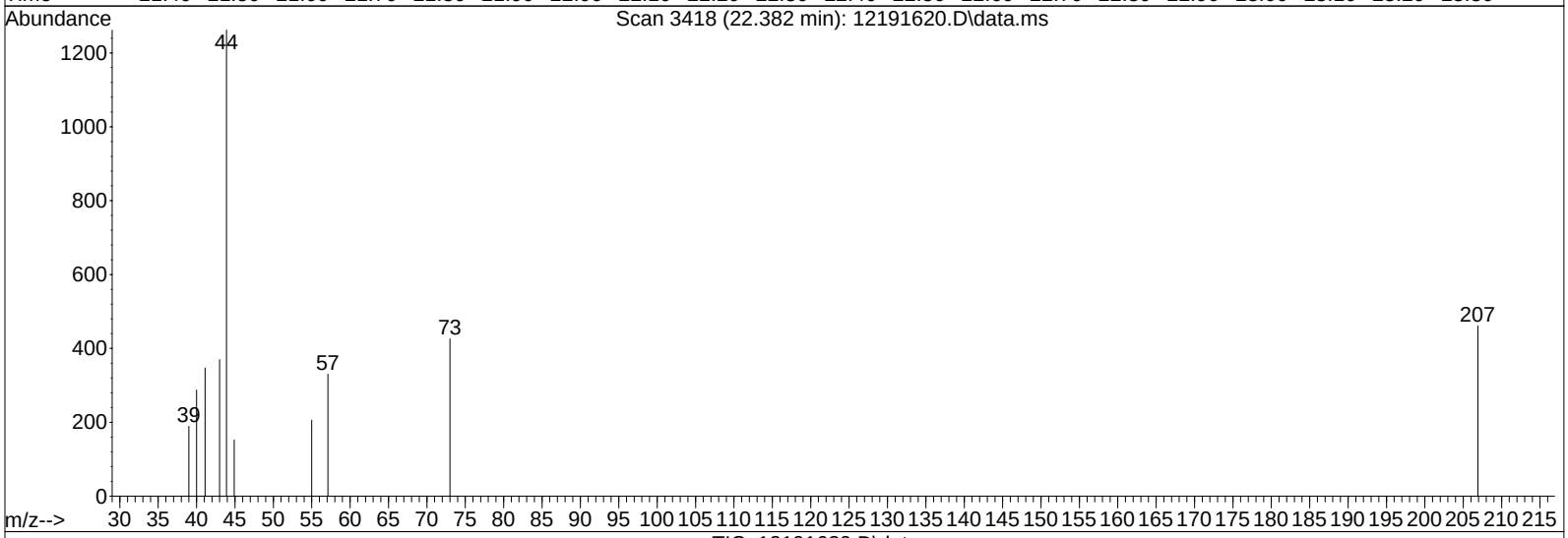
DataAcq Meth:TO15.M





TIC: 12191620.D\data.ms

(96) n-Dodecane (T)

22.382min (-0.044) 0.02ng

response 1319

Ion	Exp%	Act%
57.10	100	100
71.10	54.10	0.00#
85.10	31.90	0.00#
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191620.D
Acq On : 19 Dec 2016 23:59 Operator: LH
Sample : 0.08ng TO-15 ICAL STD
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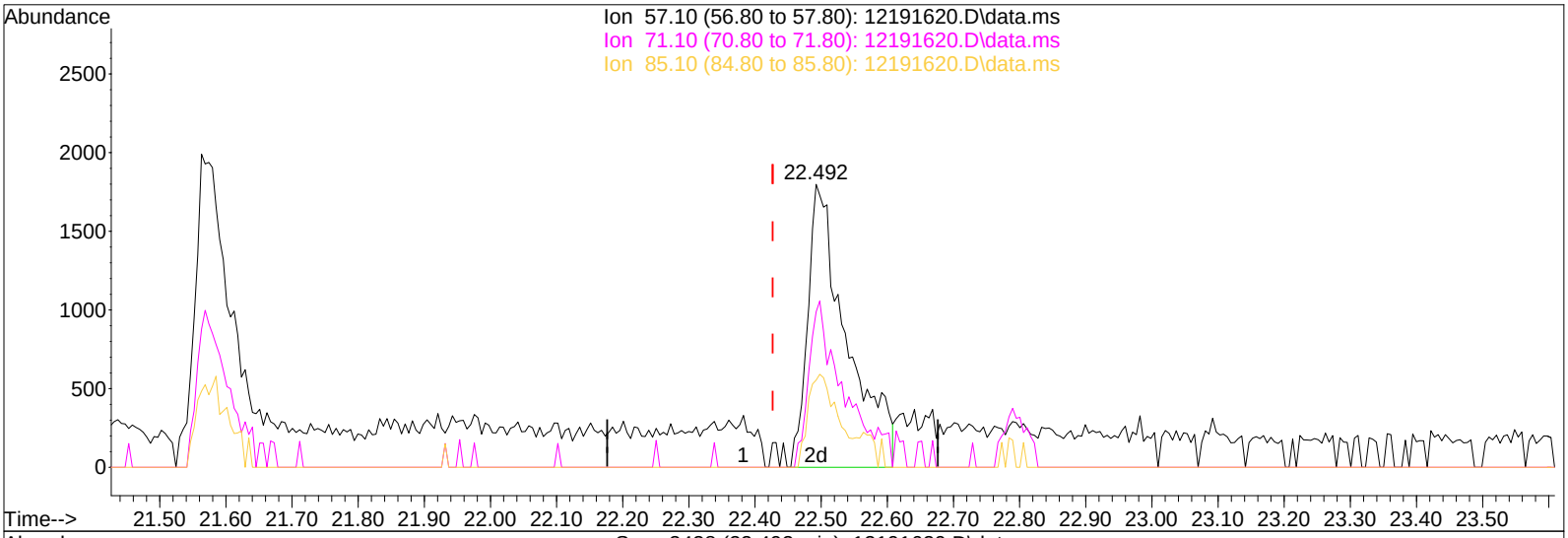
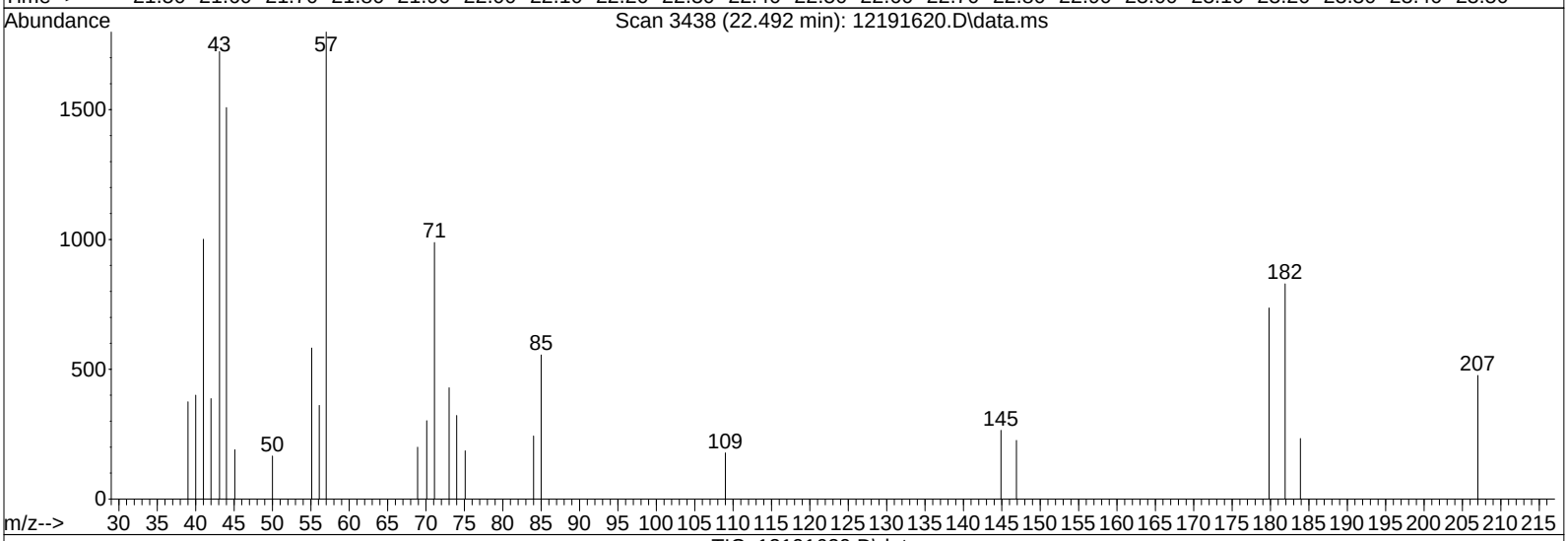
DataAcq Meth:TO15.M





TIC: 12191620.D\data.ms

(96) n-Dodecane (T)

22.492min (+0.066) 0.12ng m

response 7367

Ion	Exp%	Act%
57.10	100	100
71.10	54.10	0.00#
85.10	31.90	0.00#
0.00	0.00	0.00

MP

LH 12/20/16

12/30/16

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191624.D
Acq On : 20 Dec 2016 2:13 Operator: LH
Sample : 1.0ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191605 (1/17)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Dec 20 09:54:12 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.54	130	281285	12.500	ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.65	114	1385694	12.500	ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.93	82	594876	12.500	ng	0.00

System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...	12.39	65	509536	13.847	ng	-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 110.80%			
57) Toluene-d8 (SS2)	16.10	98	1425991	12.584	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.64%			
73) Bromofluorobenzene (SS3)	19.28	174	460316	12.652	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 101.20%			

Target Compounds

							Qvalue
2) Propene	4.22	42	36719	1.010	ng		97
3) Dichlorodifluoromethan...	4.38	85	72389	1.226	ng		100
4) Chloromethane	4.70	50	58646	1.223	ng		99
5) 1,2-Dichloro-1,1,2,2-t...	4.96	135	37579	1.216	ng		99
6) Vinyl Chloride	5.15	62	55830	1.164	ng		98
7) 1,3-Butadiene	5.44	54	41386	1.330	ng		99
8) Bromomethane	5.92	94	28182	1.027	ng		96
9) Chloroethane	6.26	64	22541	1.003	ng		96
10) Ethanol	6.64	45	124549	5.023	ng		100
11) Acetonitrile	7.01	41	64313m	1.013	ng		
12) Acrolein	7.13	56	22314	0.935	ng		100
13) Acetone	7.33	58	125638	5.220	ng		91
14) Trichlorofluoromethane	7.58	101	58339	1.136	ng		100
15) 2-Propanol (Isopropanol)	7.83	45	182943	2.217	ng		90
16) Acrylonitrile	8.19	53	43804	1.016	ng		100
17) 1,1-Dichloroethene	8.59	96	31117	1.157	ng		99
18) 2-Methyl-2-Propanol (t...	8.73	59	181241	2.269	ng		97
19) Methylene Chloride	8.81	84	33421	1.037	ng		92
20) 3-Chloro-1-propene (Al...	8.98	41	47552	0.970	ng		94
21) Trichlorotrifluoroethane	9.22	151	28632	1.115	ng		99
22) Carbon Disulfide	9.11	76	126930	1.152	ng		98
23) trans-1,2-Dichloroethene	10.10	61	48489	1.087	ng		100
24) 1,1-Dichloroethane	10.34	63	59142	1.042	ng		99
25) Methyl tert-Butyl Ether	10.43	73	103720	1.133	ng		99
26) Vinyl Acetate	10.59	86	33468	4.965	ng	#	78
27) 2-Butanone (MEK)	10.85	72	22680	1.053	ng		96
28) cis-1,2-Dichloroethene	11.36	61	48058	1.102	ng		99
29) Diisopropyl Ether	11.64	87	26335	0.979	ng	#	89
30) Ethyl Acetate	11.66	61	25096	2.181	ng		99
31) n-Hexane	11.63	57	54461	1.045	ng		99
32) Chloroform	11.70	83	60704	1.137	ng		100
34) Tetrahydrofuran (THF)	12.12	72	22683	1.030	ng		97
35) Ethyl tert-Butyl Ether	12.23	87	39004	1.118	ng		99
36) 1,2-Dichloroethane	12.51	62	49084	1.209	ng		99
38) 1,1,1-Trichloroethane	12.78	97	53677	1.184	ng		100
39) Isopropyl Acetate	13.20	61	43070	2.082	ng		96
40) 1-Butanol	13.24	56	68319	2.111	ng		86
41) Benzene	13.27	78	132189	0.979	ng		100
42) Carbon Tetrachloride	13.42	117	46065	1.184	ng		100
43) Cyclohexane	13.55	84	101148	2.228	ng		100
44) tert-Amyl Methyl Ether	13.89	73	96200	1.092	ng		97
45) 1,2-Dichloropropane	14.12	63	33701	1.025	ng		99
46) Bromodichloromethane	14.31	83	46468	1.158	ng		99
47) Trichloroethene	14.35	130	35500	1.139	ng		99
48) 1,4-Dioxane	14.34	88	27794	1.063	ng		100
49) 2,2,4-Trimethylpentane...	14.40	57	142985	1.046	ng		99

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191624.D
Acq On : 20 Dec 2016 2:13 Operator: LH
Sample : 1.0ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191605 (1/17)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Dec 20 09:54:12 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

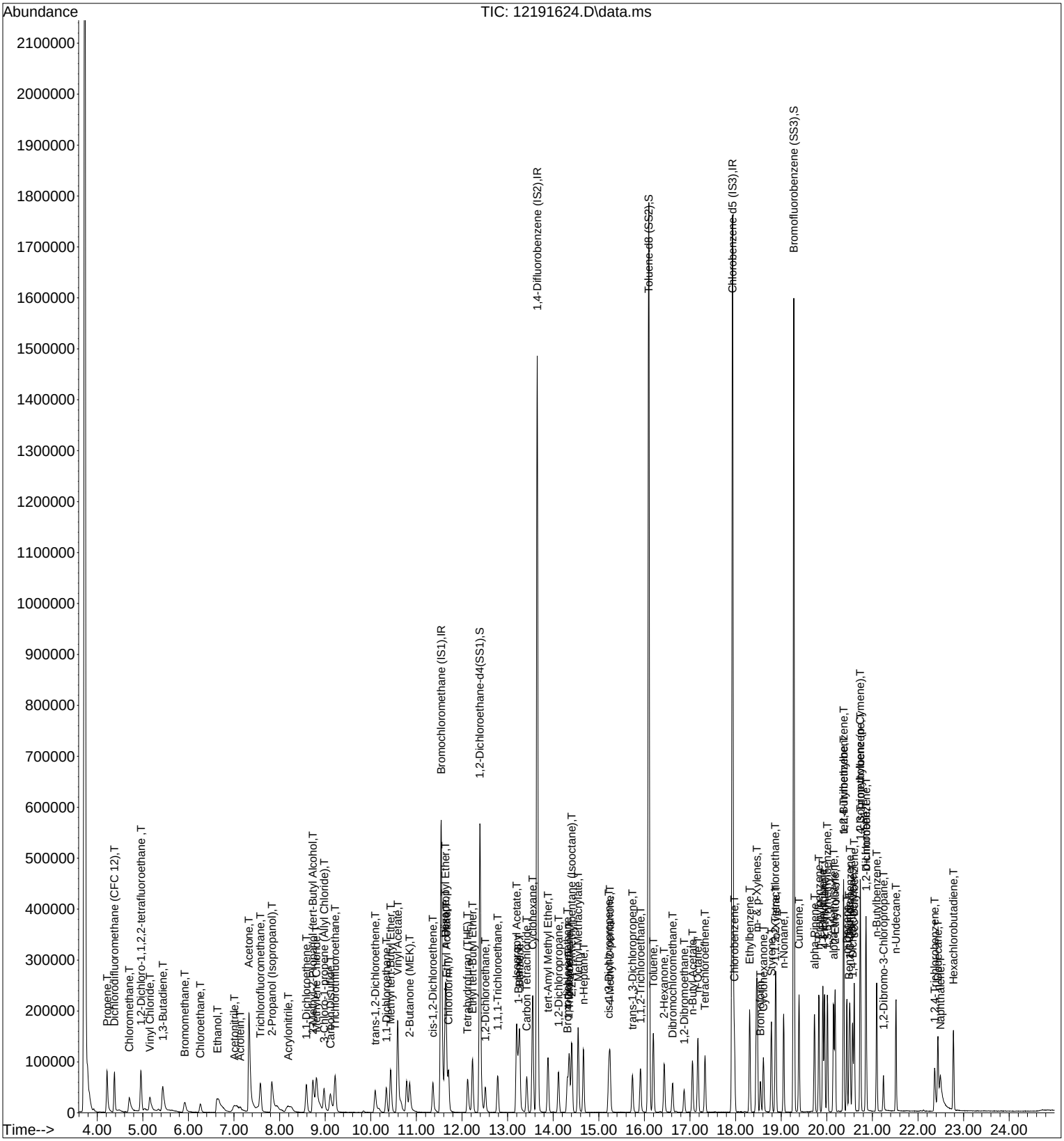
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	14.55	100	26894	2.300 ng	98
51) n-Heptane	14.67	71	32479	1.056 ng	100
52) cis-1,3-Dichloropropene	15.22	75	56609	1.159 ng	99
53) 4-Methyl-2-pentanone	15.24	58	32528	1.082 ng	91
54) trans-1,3-Dichloropropene	15.74	75	48271	1.114 ng	99
55) 1,1,2-Trichloroethane	15.92	97	32416	1.118 ng	98
58) Toluene	16.20	91	131845	1.122 ng	99
59) 2-Hexanone	16.43	43	83179	1.109 ng	99
60) Dibromochloromethane	16.62	129	36746	1.141 ng	100
61) 1,2-Dibromoethane	16.87	107	36801	1.111 ng	99
62) n-Butyl Acetate	17.05	43	91437	1.067 ng	99
63) n-Octane	17.17	57	30021	1.073 ng	98
64) Tetrachloroethene	17.33	166	36051	1.101 ng	98
65) Chlorobenzene	17.97	112	88550	1.101 ng	100
66) Ethylbenzene	18.31	91	154958	1.104 ng	99
67) m- & p-Xylenes	18.47	91	238842	2.243 ng	99
68) Bromoform	18.54	173	29895	1.160 ng	100
69) Styrene	18.79	104	92032	1.122 ng	100
70) o-Xylene	18.89	91	120193	1.123 ng	99
71) n-Nonane	19.06	43	71839	1.070 ng	96
72) 1,1,2,2-Tetrachloroethane	18.87	83	57693	1.119 ng	100
74) Cumene	19.39	105	150969	1.179 ng	99
75) alpha-Pinene	19.73	93	76994	1.101 ng	99
76) n-Propylbenzene	19.83	91	186295	1.151 ng	98
77) 3-Ethyltoluene	19.91	105	146689	1.075 ng	97
78) 4-Ethyltoluene	19.95	105	145514	1.204 ng	93
79) 1,3,5-Trimethylbenzene	20.01	105	121137	1.086 ng	99
80) alpha-Methylstyrene	20.15	118	64190	1.214 ng	99
81) 2-Ethyltoluene	20.18	105	146185	1.129 ng	100
82) 1,2,4-Trimethylbenzene	20.37	105	124924	1.140 ng	99
83) n-Decane	20.44	57	69520	1.064 ng	99
84) Benzyl Chloride	20.49	91	93026	1.104 ng	97
85) 1,3-Dichlorobenzene	20.51	146	70806	1.223 ng	100
86) 1,4-Dichlorobenzene	20.57	146	70454	1.071 ng	99
87) sec-Butylbenzene	20.60	105	166968	1.170 ng	99
88) 4-Isopropyltoluene (p-...	20.73	119	151070	1.150 ng	99
89) 1,2,3-Trimethylbenzene	20.74	105	124106	1.109 ng	98
90) 1,2-Dichlorobenzene	20.86	146	69762	1.181 ng	100
91) d-Limonene	20.86	68	49971	1.151 ng	98
92) 1,2-Dibromo-3-Chloropr...	21.24	157	21668	1.095 ng	90
93) n-Undecane	21.52	57	70840	1.050 ng	99
94) 1,2,4-Trichlorobenzene	22.37	180	45322	1.117 ng	100
95) Naphthalene	22.49	128	129578	1.169 ng	100
96) n-Dodecane	22.44	57	67309	1.095 ng	98
97) Hexachlorobutadiene	22.78	225	30228	1.104 ng	100
98) Cyclohexanone	18.61	55	50567	1.074 ng	99
99) tert-Butylbenzene	20.37	119	121153	1.177 ng	99
100) n-Butylbenzene	21.10	91	139532	1.182 ng	96

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191624.D
Acq On : 20 Dec 2016 2:13 Operator: LH
Sample : 1.0ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191605 (1/17)
ALS Vial : 9 Sample Multiplier: 1

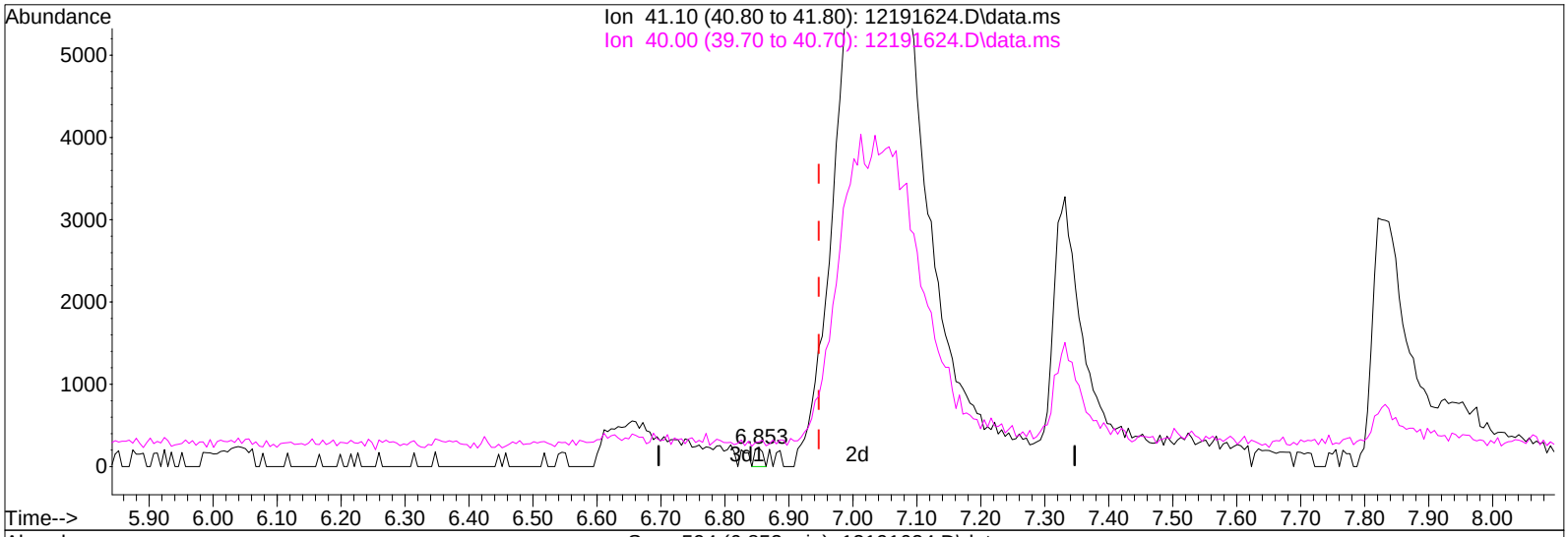
Quant Time: Dec 20 09:54:12 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

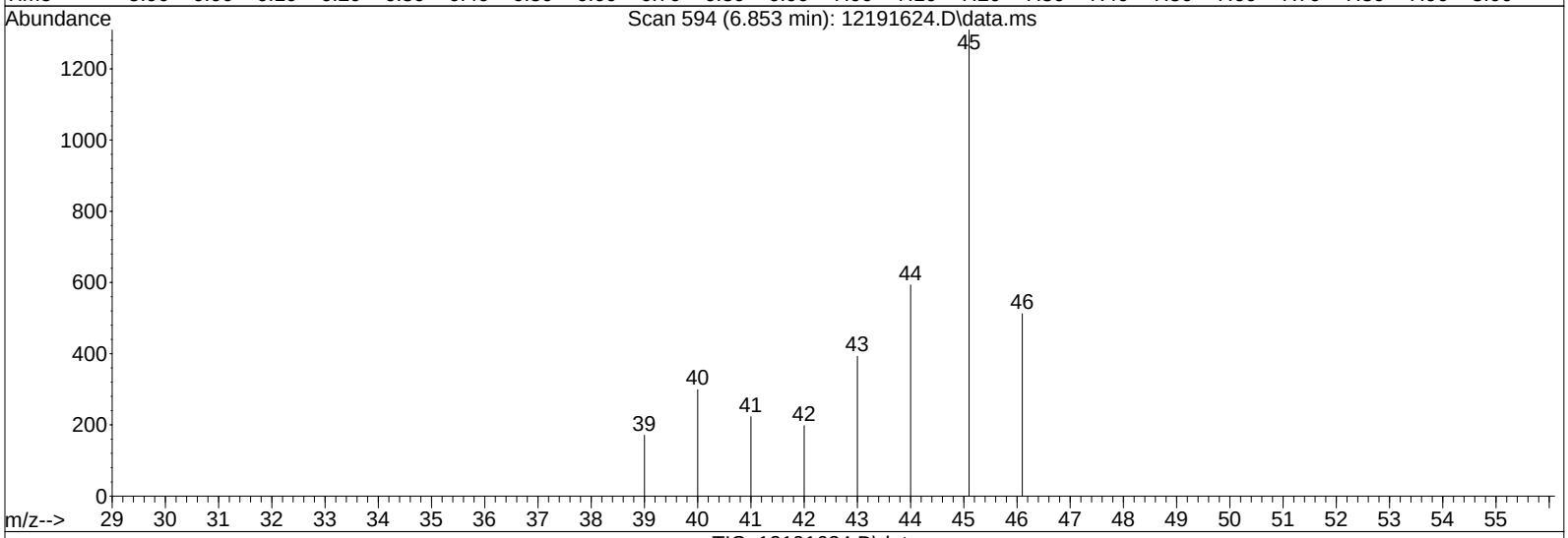


Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191624.D
Acq On : 20 Dec 2016 2:13 Operator: LH
Sample : 1.0ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191605 (1/17)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Dec 20 08:57:39 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191624.D\data.ms

(11) Acetonitrile (T)

6.853min (-0.094) 0.00ng

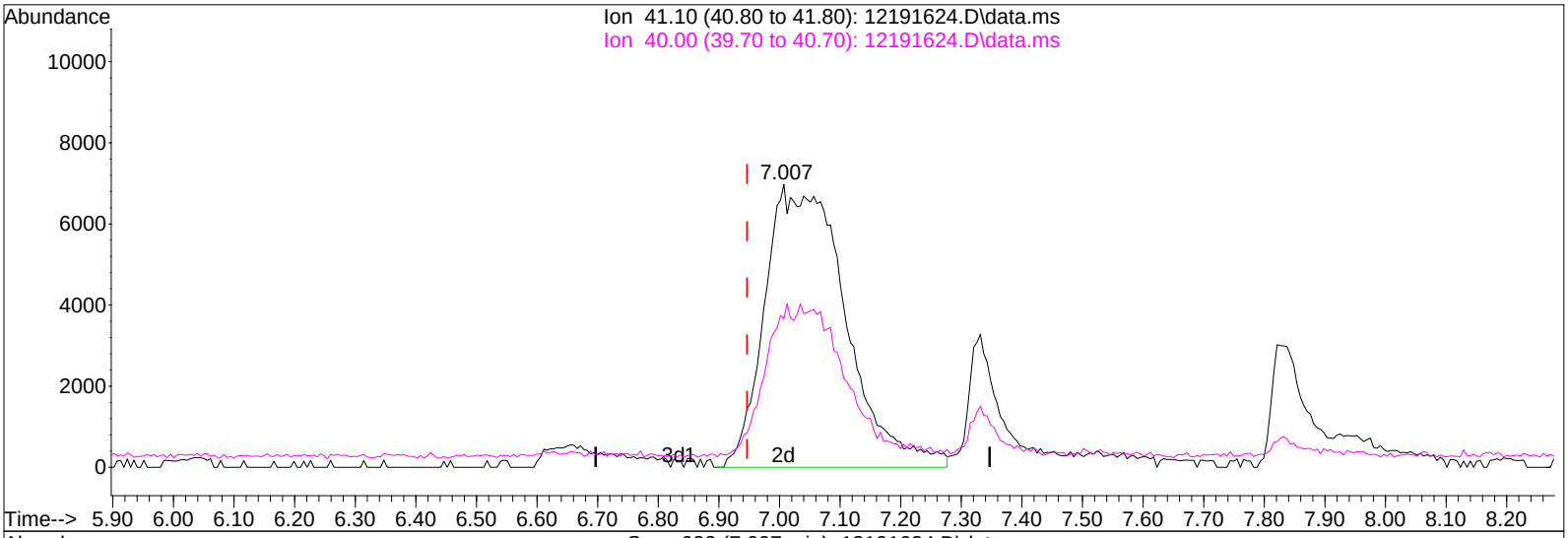
response 201

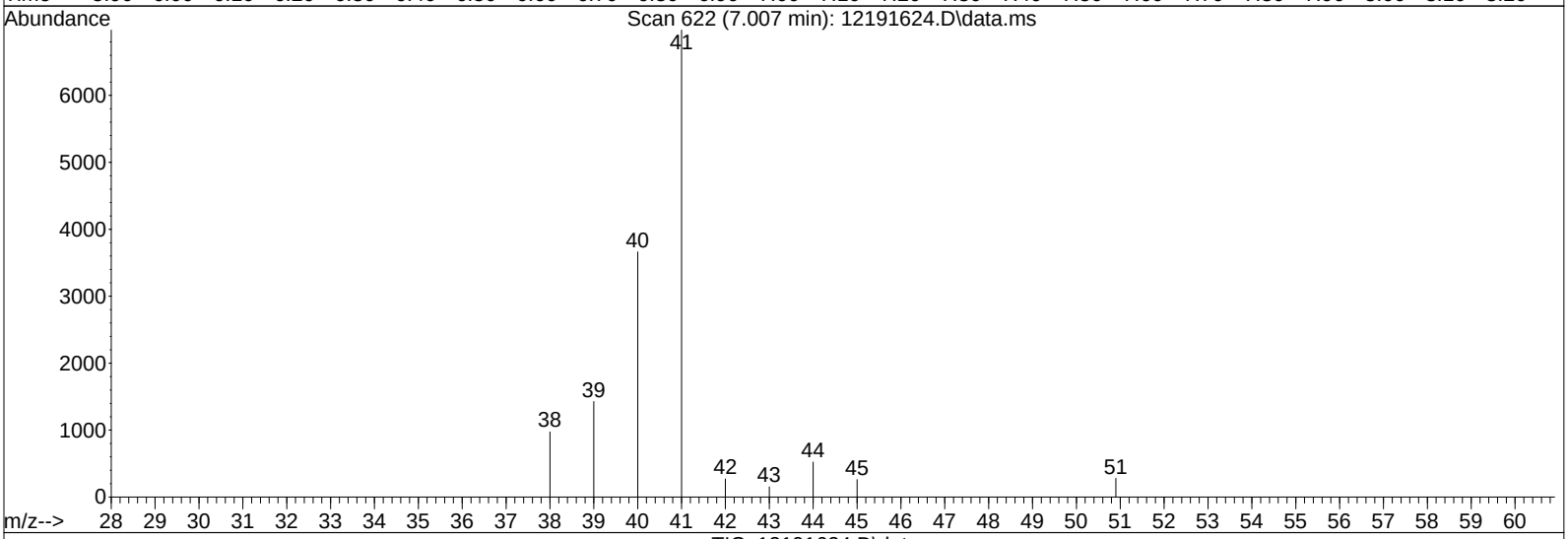
Ion	Exp%	Act%
41.10	100	100
40.00	54.30	42.79
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191624.D
Acq On : 20 Dec 2016 2:13 Operator: LH
Sample : 1.0ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191605 (1/17)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Dec 20 08:57:39 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191624.D\data.ms

(11) Acetonitrile (T)

7.007min (+0.060) 1.01ng m

response 64313

Ion	Exp%	Act%
41.10	100	100
40.00	54.30	0.13#
0.00	0.00	0.00
0.00	0.00	0.00

MP

LH 12/20/16

12/30/16

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191625.D
Acq On : 20 Dec 2016 2:46 Operator: LH
Sample : 5.0ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191605 (1/17)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Dec 20 08:57:41 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS) LH 12/20/16
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.54	130	274566	12.500	ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.65	114	1362305	12.500	ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.93	82	583787	12.500	ng	0.00

System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.40	65	491596	13.686	ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 109.52%			
57) Toluene-d8 (SS2)	16.10	98	1393526	12.531	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.24%			
73) Bromofluorobenzene (SS3)	19.28	174	453121	12.691	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 101.52%			

Target Compounds							Qvalue
2) Propene	4.19	42	172991	4.873	ng		99
3) Dichlorodifluoromethan...	4.36	85	323912	5.620	ng		100
4) Chloromethane	4.68	50	253241	5.411	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.95	135	170104	5.639	ng		100
6) Vinyl Chloride	5.13	62	261376	5.583	ng		99
7) 1,3-Butadiene	5.41	54	192137	6.324	ng		99
8) Bromomethane	5.89	94	132068	4.933	ng		98
9) Chloroethane	6.24	64	105067	4.789	ng		99
10) Ethanol	6.63	45	560933	23.176	ng		99
11) Acetonitrile	6.94	41	280547	4.528	ng		100
12) Acrolein	7.12	56	99123	4.257	ng		100
13) Acetone	7.32	58	586134	24.947	ng		92
14) Trichlorofluoromethane	7.57	101	272066	5.427	ng		100
15) 2-Propanol (Isopropanol)	7.83	45	810563	10.064	ng		97
16) Acrylonitrile	8.13	53	204653	4.862	ng		100
17) 1,1-Dichloroethene	8.57	96	141640	5.396	ng		100
18) 2-Methyl-2-Propanol (t...	8.73	59	838580	10.755	ng		99
19) Methylene Chloride	8.80	84	153828	4.889	ng		98
20) 3-Chloro-1-propene (Al...	8.96	41	232385	4.859	ng		98
21) Trichlorotrifluoroethane	9.21	151	133118	5.311	ng		100
22) Carbon Disulfide	9.10	76	560695	5.212	ng		96
23) trans-1,2-Dichloroethene	10.09	61	228955	5.258	ng		100
24) 1,1-Dichloroethane	10.34	63	273816	4.944	ng		99
25) Methyl tert-Butyl Ether	10.43	73	479196	5.364	ng		99
26) Vinyl Acetate	10.59	86	176958	26.892	ng	#	81
27) 2-Butanone (MEK)	10.85	72	105448	5.016	ng		99
28) cis-1,2-Dichloroethene	11.36	61	225138	5.289	ng		100
29) Diisopropyl Ether	11.64	87	126228	4.807	ng	#	93
30) Ethyl Acetate	11.65	61	120800	10.757	ng		99
31) n-Hexane	11.63	57	261332	5.138	ng		100
32) Chloroform	11.71	83	279846	5.369	ng		100
34) Tetrahydrofuran (THF)	12.12	72	103208	4.802	ng		99
35) Ethyl tert-Butyl Ether	12.23	87	181749	5.336	ng		99
36) 1,2-Dichloroethane	12.51	62	226792	5.724	ng		100
38) 1,1,1-Trichloroethane	12.79	97	247382	5.553	ng		100
39) Isopropyl Acetate	13.19	61	206147	10.138	ng		97
40) 1-Butanol	13.22	56	338395	10.634	ng		94
41) Benzene	13.27	78	611386	4.604	ng		100
42) Carbon Tetrachloride	13.42	117	215572	5.635	ng		100
43) Cyclohexane	13.55	84	468540	10.496	ng		100
44) tert-Amyl Methyl Ether	13.88	73	450516	5.203	ng		99
45) 1,2-Dichloropropane	14.12	63	156332	4.836	ng		100
46) Bromodichloromethane	14.31	83	224462	5.692	ng		99
47) Trichloroethene	14.35	130	161956	5.287	ng		99
48) 1,4-Dioxane	14.33	88	129682	5.047	ng		100
49) 2,2,4-Trimethylpentane...	14.41	57	659279	4.905	ng		99

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191625.D
Acq On : 20 Dec 2016 2:46 Operator: LH
Sample : 5.0ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191605 (1/17)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Dec 20 08:57:41 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

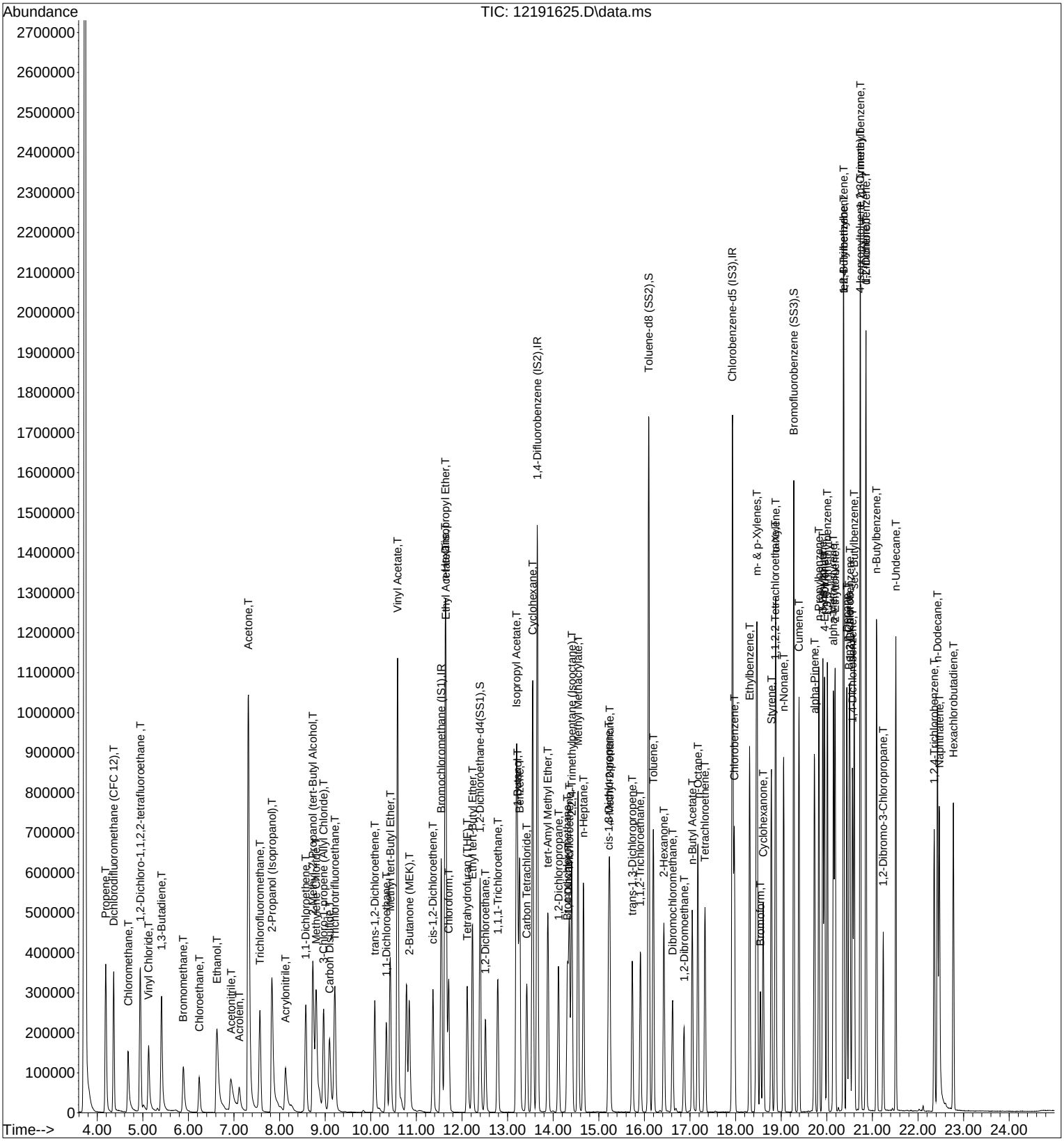
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	14.55	100	126982	11.045 ng	99
51) n-Heptane	14.66	71	150996	4.994 ng	99
52) cis-1,3-Dichloropropene	15.22	75	275944	5.746 ng	100
53) 4-Methyl-2-pentanone	15.24	58	152598	5.164 ng	97
54) trans-1,3-Dichloropropene	15.73	75	240927	5.656 ng	100
55) 1,1,2-Trichloroethane	15.91	97	150862	5.293 ng	99
58) Toluene	16.20	91	612219	5.311 ng	100
59) 2-Hexanone	16.43	43	400582	5.441 ng	98
60) Dibromochloromethane	16.62	129	180990	5.725 ng	100
61) 1,2-Dibromoethane	16.87	107	176174	5.419 ng	100
62) n-Butyl Acetate	17.05	43	440951	5.244 ng	99
63) n-Octane	17.18	57	136383	4.968 ng	99
64) Tetrachloroethene	17.33	166	169034	5.260 ng	100
65) Chlorobenzene	17.97	112	407405	5.160 ng	100
66) Ethylbenzene	18.31	91	714615	5.186 ng	99
67) m- & p-Xylenes	18.47	91	1113508	10.657 ng	99
68) Bromoform	18.54	173	150697	5.958 ng	100
69) Styrene	18.79	104	445051	5.530 ng	100
70) o-Xylene	18.88	91	567381	5.401 ng	99
71) n-Nonane	19.06	43	330213	5.010 ng	98
72) 1,1,2,2-Tetrachloroethane	18.87	83	285183	5.634 ng	99
74) Cumene	19.39	105	704833	5.611 ng	99
75) alpha-Pinene	19.73	93	366284	5.335 ng	99
76) n-Propylbenzene	19.83	91	881174	5.550 ng	98
77) 3-Ethyltoluene	19.91	105	695890	5.194 ng	96
78) 4-Ethyltoluene	19.95	105	681706	5.748 ng	94
79) 1,3,5-Trimethylbenzene	20.01	105	583332	5.328 ng	99
80) alpha-Methylstyrene	20.14	118	318182	6.132 ng	99
81) 2-Ethyltoluene	20.18	105	696590	5.483 ng	99
82) 1,2,4-Trimethylbenzene	20.37	105	607523	5.647 ng	99
83) n-Decane	20.44	57	333533	5.202 ng	100
84) Benzyl Chloride	20.49	91	530116	6.412 ng	99
85) 1,3-Dichlorobenzene	20.51	146	343245	6.041 ng	100
86) 1,4-Dichlorobenzene	20.56	146	347364	5.379 ng	100
87) sec-Butylbenzene	20.60	105	789502	5.635 ng	99
88) 4-Isopropyltoluene (p-...	20.73	119	732453	5.681 ng	98
89) 1,2,3-Trimethylbenzene	20.74	105	599404	5.457 ng	98
90) 1,2-Dichlorobenzene	20.86	146	336998	5.812 ng	99
91) d-Limonene	20.86	68	248824	5.840 ng	98
92) 1,2-Dibromo-3-Chloropr...	21.24	157	117743	6.063 ng	95
93) n-Undecane	21.51	57	346298	5.229 ng	99
94) 1,2,4-Trichlorobenzene	22.36	180	246071	6.179 ng	100
95) Naphthalene	22.47	128	770737	7.086 ng	100
96) n-Dodecane	22.43	57	335656	5.564 ng	100
97) Hexachlorobutadiene	22.78	225	152374	5.669 ng	100
98) Cyclohexanone	18.60	55	237948	5.148 ng	100
99) tert-Butylbenzene	20.37	119	579259	5.735 ng	100
100) n-Butylbenzene	21.09	91	662158	5.716 ng	99

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191625.D
Acq On : 20 Dec 2016 2:46 Operator: LH
Sample : 5.0ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191605 (1/17)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Dec 20 08:57:41 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191626.D
Acq On : 20 Dec 2016 3:19 Operator: LH
Sample : 25ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:42 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.56	130	300261	12.500	ng	0.00
37) 1,4-Difluorobenzene (IS2)	13.66	114	1458864	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	17.93	82	643369	12.500	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.41	65	532918	13.567	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 108.56%			
57) Toluene-d8 (SS2)	16.10	98	1520400	12.406	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.28%			
73) Bromofluorobenzene (SS3)	19.28	174	499274	12.689	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 101.52%			
Target Compounds						Qvalue
2) Propene	4.18	42	1008395	25.973	ng	100
3) Dichlorodifluoromethan...	4.36	85	1965498	31.185	ng	100
4) Chloromethane	4.68	50	1553377	30.351	ng	100
5) 1,2-Dichloro-1,1,2,2-t...	4.95	135	1020133	30.922	ng	100
6) Vinyl Chloride	5.13	62	1588635	31.029	ng	100
7) 1,3-Butadiene	5.41	54	1234683	37.163	ng	100
8) Bromomethane	5.89	94	802417	27.407	ng	100
9) Chloroethane	6.24	64	654892	27.295	ng	100
10) Ethanol	6.68	45	3687842	139.329	ng	100
11) Acetonitrile	6.95	41	1737821	25.650	ng	100
12) Acrolein	7.13	56	587846	23.083	ng	100
13) Acetone	7.34	58	3827877	148.981	ng	100
14) Trichlorofluoromethane	7.57	101	1633337	29.791	ng	100
15) 2-Propanol (Isopropanol)	7.88	45	5406782	61.388	ng	100
16) Acrylonitrile	8.15	53	1279841	27.802	ng	100
17) 1,1-Dichloroethene	8.58	96	892434	31.092	ng	100
18) 2-Methyl-2-Propanol (t...	8.77	59	5529837	64.851	ng	100
19) Methylene Chloride	8.82	84	946475	27.507	ng	100
20) 3-Chloro-1-propene (Al...	8.98	41	1478909	28.275	ng	100
21) Trichlorotrifluoroethane	9.22	151	812915	29.655	ng	100
22) Carbon Disulfide	9.09	76	3441195	29.252	ng	100
23) trans-1,2-Dichloroethene	10.10	61	1437199	30.181	ng	100
24) 1,1-Dichloroethane	10.36	63	1675734	27.669	ng	100
25) Methyl tert-Butyl Ether	10.43	73	2955288	30.252	ng	100
26) Vinyl Acetate	10.60	86	1276200	177.348	ng	100
27) 2-Butanone (MEK)	10.85	72	657523	28.600	ng	100
28) cis-1,2-Dichloroethene	11.38	61	1406043	30.205	ng	100
29) Diisopropyl Ether	11.64	87	847497	29.514	ng	100
30) Ethyl Acetate	11.66	61	819350	66.716	ng	100
31) n-Hexane	11.64	57	1691828	30.416	ng	100
32) Chloroform	11.73	83	1710002	30.002	ng	100
34) Tetrahydrofuran (THF)	12.12	72	638254	27.154	ng	100
35) Ethyl tert-Butyl Ether	12.24	87	1151380	30.910	ng	100
36) 1,2-Dichloroethane	12.52	62	1402084	32.360	ng	100
38) 1,1,1-Trichloroethane	12.79	97	1525853	31.982	ng	100
39) Isopropyl Acetate	13.20	61	1362137	62.554	ng	100
40) 1-Butanol	13.23	56	2423188	71.110	ng	100
41) Benzene	13.27	78	3763293	26.464	ng	100
42) Carbon Tetrachloride	13.43	117	1353759	33.047	ng	100
43) Cyclohexane	13.56	84	3077226	64.372	ng	100
44) tert-Amyl Methyl Ether	13.89	73	2868398	30.932	ng	100
45) 1,2-Dichloropropane	14.12	63	970813	28.044	ng	100
46) Bromodichloromethane	14.32	83	1440290	34.106	ng	100
47) Trichloroethene	14.36	130	1033587	31.507	ng	100
48) 1,4-Dioxane	14.33	88	847041	30.783	ng	100
49) 2,2,4-Trimethylpentane...	14.41	57	4133269	28.714	ng	100

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191626.D
Acq On : 20 Dec 2016 3:19 Operator: LH
Sample : 25ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:42 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

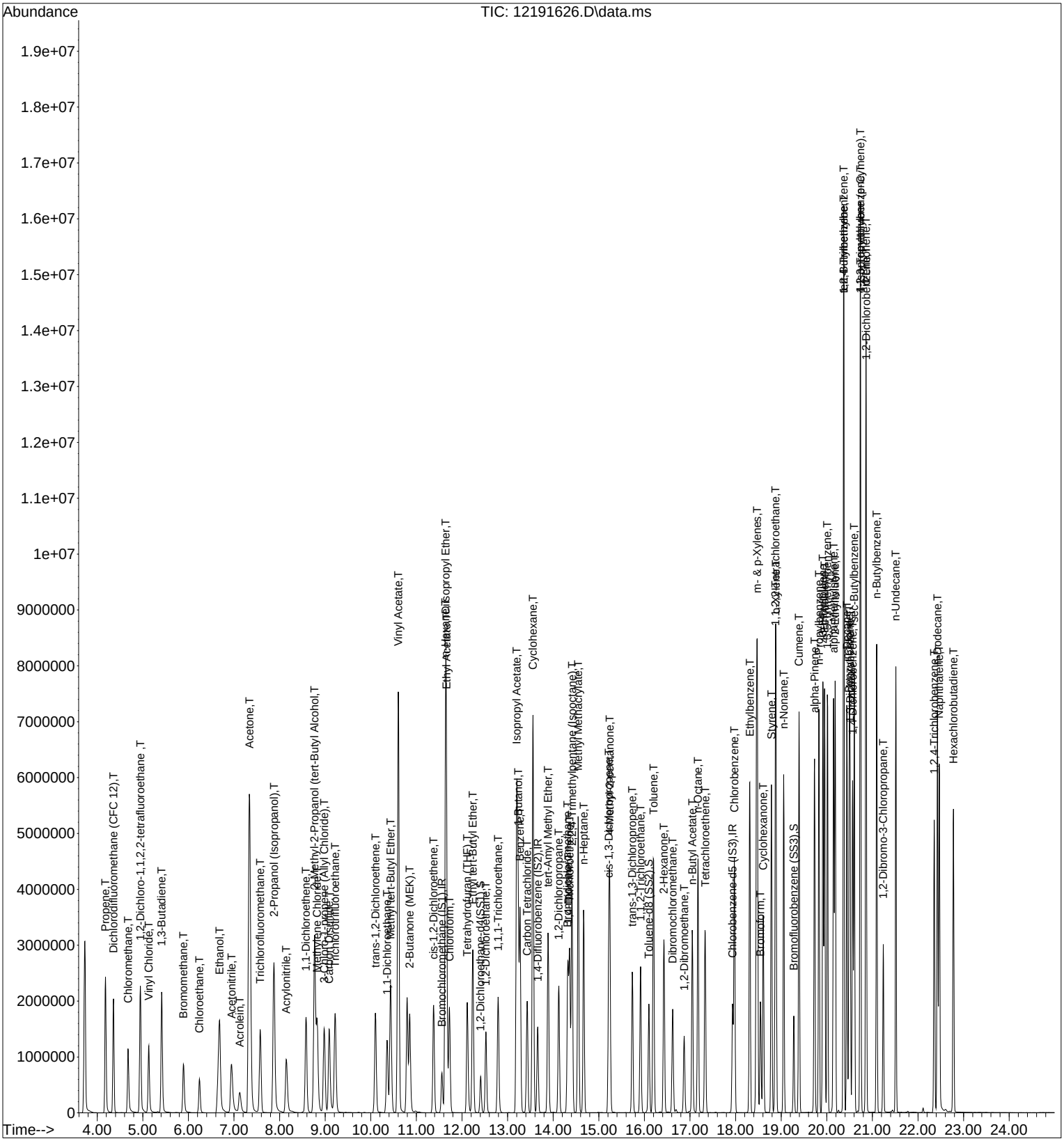
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	14.55	100	832320	67.607 ng	100
51) n-Heptane	14.67	71	937645	28.961 ng	100
52) cis-1,3-Dichloropropene	15.22	75	1815211	35.299 ng	100
53) 4-Methyl-2-pentanone	15.24	58	1001930	31.661 ng	100
54) trans-1,3-Dichloropropene	15.73	75	1579463	34.624 ng	100
55) 1,1,2-Trichloroethane	15.92	97	942337	30.872 ng	100
58) Toluene	16.20	91	3855230	30.346 ng	100
59) 2-Hexanone	16.43	43	2540913	31.318 ng	100
60) Dibromochloromethane	16.62	129	1171096	33.614 ng	100
61) 1,2-Dibromoethane	16.87	107	1105186	30.847 ng	100
62) n-Butyl Acetate	17.05	43	2807744	30.297 ng	100
63) n-Octane	17.18	57	876344	28.967 ng	100
64) Tetrachloroethene	17.33	166	1073124	30.301 ng	100
65) Chlorobenzene	17.97	112	2638707	30.326 ng	100
66) Ethylbenzene	18.31	91	4628156	30.478 ng	100
67) m- & p-Xylenes	18.47	91	7505389	65.178 ng	100
68) Bromoform	18.54	173	1020863	36.624 ng	100
69) Styrene	18.79	104	2903328	32.735 ng	100
70) o-Xylene	18.89	91	3789054	32.730 ng	100
71) n-Nonane	19.06	43	2151021	29.612 ng	100
72) 1,1,2,2-Tetrachloroethane	18.87	83	1931546	34.628 ng	100
74) Cumene	19.39	105	4609627	33.295 ng	100
75) alpha-Pinene	19.73	93	2467306	32.608 ng	100
76) n-Propylbenzene	19.83	91	5698324	32.564 ng	100
77) 3-Ethyltoluene	19.91	105	4902800	33.207 ng	100
78) 4-Ethyltoluene	19.95	105	4257540	32.574 ng	100
79) 1,3,5-Trimethylbenzene	20.01	105	3875045	32.116 ng	100
80) alpha-Methylstyrene	20.15	118	2154463	37.678 ng	100
81) 2-Ethyltoluene	20.18	105	4622691	33.016 ng	100
82) 1,2,4-Trimethylbenzene	20.37	105	4379832	36.943 ng	100
83) n-Decane	20.44	57	2241515	31.725 ng	100
84) Benzyl Chloride	20.49	91	3847795	42.232 ng	100
85) 1,3-Dichlorobenzene	20.51	146	2325406	37.134 ng	100
86) 1,4-Dichlorobenzene	20.57	146	2277699	32.003 ng	100
87) sec-Butylbenzene	20.60	105	5144001	33.317 ng	100
88) 4-Isopropyltoluene (p-...	20.74	119	5067027	35.658 ng	100
89) 1,2,3-Trimethylbenzene	20.74	105	4281623	35.373 ng	100
90) 1,2-Dichlorobenzene	20.86	146	2331718	36.491 ng	100
91) d-Limonene	20.86	68	1821853	38.801 ng	100
92) 1,2-Dibromo-3-Chloropr...	21.24	157	792241	37.019 ng	100
93) n-Undecane	21.51	57	2341676	32.086 ng	100
94) 1,2,4-Trichlorobenzene	22.36	180	1649154	37.578 ng	100
95) Naphthalene	22.47	128	5150243	42.964 ng	100
96) n-Dodecane	22.43	57	2149666	32.331 ng	100
97) Hexachlorobutadiene	22.78	225	1040984	35.143 ng	100
98) Cyclohexanone	18.60	55	1552070	30.471 ng	100
99) tert-Butylbenzene	20.37	119	4045821	36.344 ng	100
100) n-Butylbenzene	21.10	91	4331265	33.925 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191626.D
Acq On : 20 Dec 2016 3:19 Operator: LH
Sample : 25ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:42 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191627.D
Acq On : 20 Dec 2016 3:52 Operator: LH
Sample : 50ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:45 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS) LH 12/20/16
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.57	130	315445	12.500	ng		0.01
37) 1,4-Difluorobenzene (IS2)	13.67	114	1537731	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	17.93	82	682922	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.42	65	566318	13.723	ng		0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 109.76%				
57) Toluene-d8 (SS2)	16.10	98	1603043	12.323	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.56%				
73) Bromofluorobenzene (SS3)	19.28	174	519610	12.441	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.52%				
Target Compounds							Qvalue
2) Propene	4.19	42	2203767	54.029	ng		99
3) Dichlorodifluoromethan...	4.36	85	3887109	58.705	ng		100
4) Chloromethane	4.68	50	3029186	56.338	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.96	135	2019789	58.276	ng		100
6) Vinyl Chloride	5.14	62	3189329	59.295	ng		100
7) 1,3-Butadiene	5.42	54	2542966	72.858	ng		99
8) Bromomethane	5.90	94	1605423	52.194	ng		100
9) Chloroethane	6.25	64	1313374	52.105	ng		100
10) Ethanol	6.72	45	7753505	278.833	ng		100
11) Acetonitrile	6.96	41	3506029	49.258	ng		100
12) Acrolein	7.13	56	1184215	44.263	ng		100
13) Acetone	7.36	58	7882532	292.022	ng		90
14) Trichlorofluoromethane	7.58	101	3292962	57.170	ng		100
15) 2-Propanol (Isopropanol)	7.90	45	10609071	114.655	ng		99
16) Acrylonitrile	8.17	53	2590588	53.567	ng		100
17) 1,1-Dichloroethene	8.59	96	1812953	60.122	ng		100
18) 2-Methyl-2-Propanol (t...	8.79	59	11491299	128.277	ng		99
19) Methylene Chloride	8.83	84	1948502	53.903	ng		100
20) 3-Chloro-1-propene (Al...	8.98	41	3011770	54.810	ng		100
21) Trichlorotrifluoroethane	9.22	151	1651899	57.361	ng		100
22) Carbon Disulfide	9.09	76	6882703	55.690	ng		99
23) trans-1,2-Dichloroethene	10.11	61	2922284	58.414	ng		100
24) 1,1-Dichloroethane	10.37	63	3365912	52.901	ng		100
25) Methyl tert-Butyl Ether	10.44	73	5981263	58.280	ng		100
26) Vinyl Acetate	10.62	86	2757360	364.733	ng	#	53
27) 2-Butanone (MEK)	10.86	72	1374411	56.904	ng		98
28) cis-1,2-Dichloroethene	11.38	61	2849913	58.276	ng		100
29) Diisopropyl Ether	11.65	87	1795400	59.516	ng	#	94
30) Ethyl Acetate	11.67	61	1787842	138.569	ng		99
31) n-Hexane	11.64	57	3659839	62.631	ng		100
32) Chloroform	11.74	83	3455346	57.707	ng		100
34) Tetrahydrofuran (THF)	12.12	72	1311419	53.107	ng		99
35) Ethyl tert-Butyl Ether	12.24	87	2378967	60.791	ng		99
36) 1,2-Dichloroethane	12.53	62	2851613	62.647	ng		100
38) 1,1,1-Trichloroethane	12.80	97	3116416	61.970	ng		100
39) Isopropyl Acetate	13.20	61	2948766	128.473	ng	#	88
40) 1-Butanol	13.24	56	5173592	144.037	ng		96
41) Benzene	13.28	78	7871939	52.517	ng		100
42) Carbon Tetrachloride	13.44	117	2762864	63.987	ng		100
43) Cyclohexane	13.56	84	6416063	127.333	ng		99
44) tert-Amyl Methyl Ether	13.89	73	5901544	60.377	ng		99
45) 1,2-Dichloropropane	14.13	63	1991051	54.566	ng		100
46) Bromodichloromethane	14.32	83	3018808	67.818	ng		100
47) Trichloroethene	14.36	130	2155354	62.331	ng		100
48) 1,4-Dioxane	14.34	88	1799139	62.031	ng		98
49) 2,2,4-Trimethylpentane...	14.41	57	8398743	55.353	ng		99

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191627.D
Acq On : 20 Dec 2016 3:52 Operator: LH
Sample : 50ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:45 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

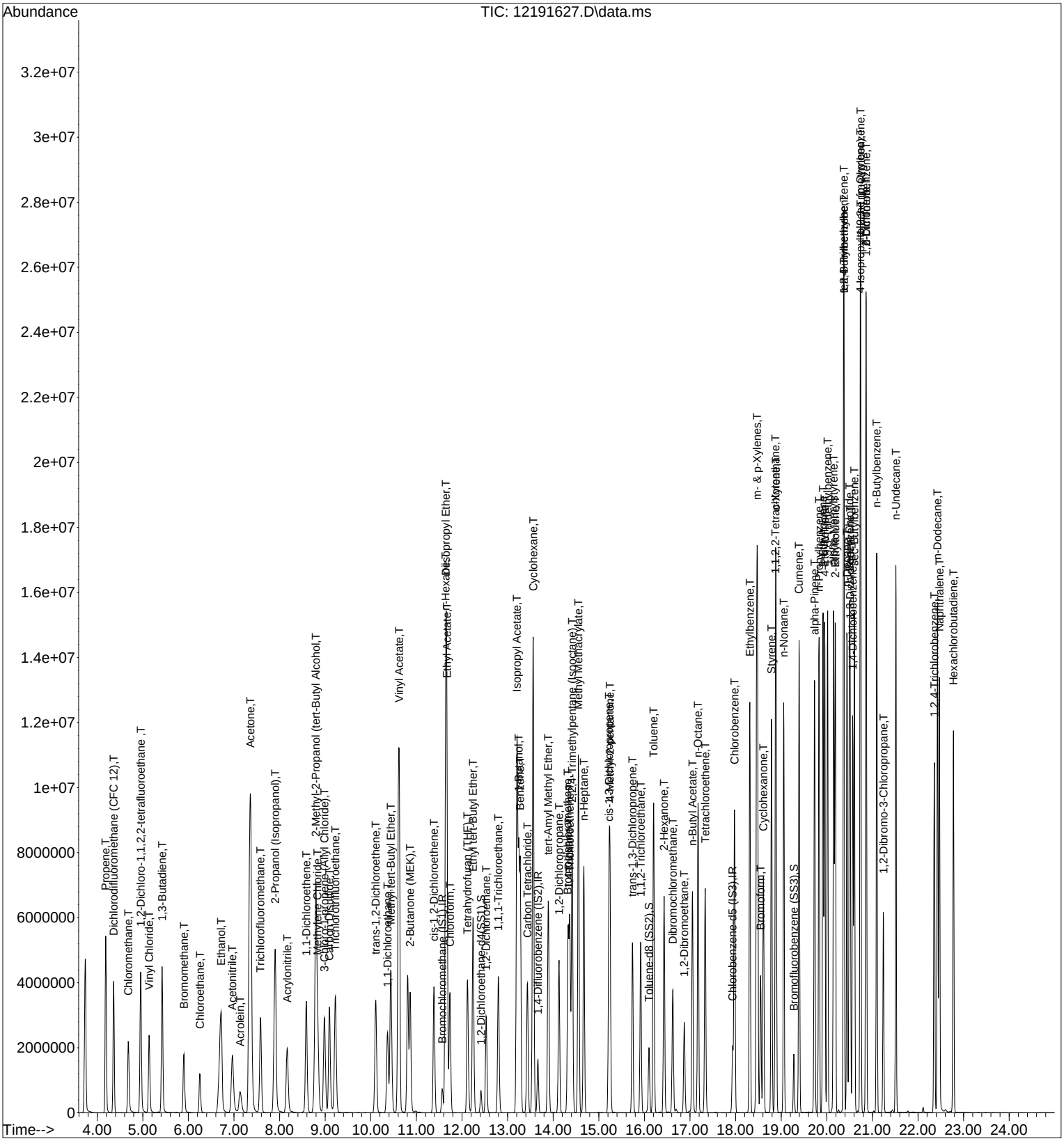
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
50) Methyl Methacrylate	14.55	100	1757607	135.443	ng	99
51) n-Heptane	14.67	71	1973639	57.833	ng	100
52) cis-1,3-Dichloropropene	15.22	75	3813352	70.353	ng	100
53) 4-Methyl-2-pentanone	15.24	58	2105888	63.134	ng	97
54) trans-1,3-Dichloropropene	15.74	75	3251354	67.618	ng	100
55) 1,1,2-Trichloroethane	15.92	97	1921774	59.730	ng	100
58) Toluene	16.20	91	7906025	58.627	ng	99
59) 2-Hexanone	16.43	43	5190566	60.270	ng	98
60) Dibromochloromethane	16.63	129	2411325	65.205	ng	100
61) 1,2-Dibromoethane	16.87	107	2240638	58.917	ng	100
62) n-Butyl Acetate	17.05	43	5713152	58.078	ng	99
63) n-Octane	17.17	57	1864618	58.064	ng	100
64) Tetrachloroethene	17.33	166	2211852	58.837	ng	100
65) Chlorobenzene	17.98	112	5437320	58.870	ng	100
66) Ethylbenzene	18.31	91	9496091	58.912	ng	99
67) m- & p-Xylenes	18.47	91	15358117	125.648	ng	99
68) Bromoform	18.55	173	2106676	71.201	ng	100
69) Styrene	18.79	104	5985604	63.579	ng	99
70) o-Xylene	18.89	91	7821769	63.652	ng	100
71) n-Nonane	19.06	43	4506167	58.442	ng	98
72) 1,1,2,2-Tetrachloroethane	18.87	83	4041761	68.262	ng	100
74) Cumene	19.39	105	9355302	63.660	ng	98
75) alpha-Pinene	19.73	93	5197572	64.713	ng	100
76) n-Propylbenzene	19.83	91	11288361	60.773	ng	98
77) 3-Ethyltoluene	19.92	105	9675999	61.740	ng	99
78) 4-Ethyltoluene	19.95	105	8789793	63.354	ng	99
79) 1,3,5-Trimethylbenzene	20.02	105	7926510	61.888	ng	100
80) alpha-Methylstyrene	20.15	118	4429813	72.984	ng	99
81) 2-Ethyltoluene	20.19	105	9246623	62.216	ng	99
82) 1,2,4-Trimethylbenzene	20.38	105	8285271	65.837	ng	98
83) n-Decane	20.44	57	4767841	63.573	ng	100
84) Benzyl Chloride	20.50	91	8110314	83.860	ng	100
85) 1,3-Dichlorobenzene	20.51	146	4668897	70.238	ng	100
86) 1,4-Dichlorobenzene	20.57	146	4657427	61.650	ng	100
87) sec-Butylbenzene	20.61	105	10080080	61.506	ng	98
88) 4-Isopropyltoluene (p-...	20.74	119	9147023	60.643	ng	97
89) 1,2,3-Trimethylbenzene	20.74	105	8096163	63.013	ng	98
90) 1,2-Dichlorobenzene	20.86	146	4485305	66.129	ng	100
91) d-Limonene	20.86	68	3730226	74.844	ng	99
92) 1,2-Dibromo-3-Chloropr...	21.24	157	1652550	72.746	ng	98
93) n-Undecane	21.51	57	5077136	65.538	ng	100
94) 1,2,4-Trichlorobenzene	22.36	180	3474797	74.591	ng	99
95) Naphthalene	22.47	128	10469752	82.282	ng	99
96) n-Dodecane	22.43	57	4706948	66.692	ng	99
97) Hexachlorobutadiene	22.78	225	2211494	70.334	ng	100
98) Cyclohexanone	18.61	55	3174201	58.707	ng	99
99) tert-Butylbenzene	20.38	119	7458368	63.119	ng	100
100) n-Butylbenzene	21.10	91	8750025	64.566	ng	98

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191627.D
Acq On : 20 Dec 2016 3:52 Operator: LH
Sample : 50ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:45 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191628.D
Acq On : 20 Dec 2016 4:25 Operator: LH
Sample : 100ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:47 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.58	130	329273	12.500	ng		0.02
37) 1,4-Difluorobenzene (IS2)	13.67	114	1591058	12.500	ng		0.01
56) Chlorobenzene-d5 (IS3)	17.93	82	721832	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.42	65	583840	13.554	ng		0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 108.40%				
57) Toluene-d8 (SS2)	16.10	98	1665906	12.116	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.96%				
73) Bromofluorobenzene (SS3)	19.28	174	540887	12.252	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.00%				
Target Compounds							Qvalue
2) Propene	4.19	42	6008959	141.134	ng		96
3) Dichlorodifluoromethan...	4.36	85	8043167	116.370	ng		99
4) Chloromethane	4.68	50	5589101	99.582	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.96	135	4060580	112.239	ng		100
6) Vinyl Chloride	5.14	62	6538231	116.451	ng		100
7) 1,3-Butadiene	5.42	54	5399660	148.207	ng		98
8) Bromomethane	5.90	94	3496795	108.911	ng		100
9) Chloroethane	6.25	64	2780718	105.686	ng		100
10) Ethanol	6.76	45	16883590	581.672	ng		99
11) Acetonitrile	6.99	41	7339130	98.782	ng		99
12) Acrolein	7.14	56	2483696	88.935	ng		100
13) Acetone	7.38	58	16812434	596.688	ng	#	61
14) Trichlorofluoromethane	7.58	101	6829163	113.583	ng		99
15) 2-Propanol (Isopropanol)	7.93	45	17522615	181.419	ng		99
16) Acrylonitrile	8.18	53	5449202	107.945	ng		100
17) 1,1-Dichloroethene	8.59	96	3806536	120.933	ng		99
18) 2-Methyl-2-Propanol (t...	8.82	59	23412841	250.381	ng		99
19) Methylene Chloride	8.84	84	4304984	114.092	ng		100
20) 3-Chloro-1-propene (Al...	8.99	41	6282009	109.522	ng		100
21) Trichlorotrifluoroethane	9.22	151	3445812	114.628	ng		99
22) Carbon Disulfide	9.10	76	14297695	110.829	ng		98
23) trans-1,2-Dichloroethene	10.11	61	6208655	118.894	ng		99
24) 1,1-Dichloroethane	10.37	63	7053876	106.207	ng		99
25) Methyl tert-Butyl Ether	10.44	73	12670326	118.271	ng		99
26) Vinyl Acetate	10.63	86	5343344	677.115	ng	#	1
27) 2-Butanone (MEK)	10.88	72	2982673	118.304	ng	#	92
28) cis-1,2-Dichloroethene	11.39	61	6046232	118.444	ng		100
29) Diisopropyl Ether	11.65	87	3695372	117.354	ng	#	73
30) Ethyl Acetate	11.68	61	3675126	272.883	ng		97
31) n-Hexane	11.64	57	7729185	126.715	ng		100
32) Chloroform	11.75	83	7083157	113.326	ng		100
34) Tetrahydrofuran (THF)	12.13	72	2830906	109.825	ng		98
35) Ethyl tert-Butyl Ether	12.25	87	5190600	127.069	ng		96
36) 1,2-Dichloroethane	12.54	62	5928544	124.774	ng		100
38) 1,1,1-Trichloroethane	12.80	97	6572961	126.324	ng		100
39) Isopropyl Acetate	13.21	61	6378183	268.573	ng	#	60
40) 1-Butanol	13.27	56	11112782	299.019	ng		92
41) Benzene	13.28	78	16424941	105.906	ng		98
42) Carbon Tetrachloride	13.44	117	5830576	130.508	ng		100
43) Cyclohexane	13.56	84	12926651	247.944	ng		97
44) tert-Amyl Methyl Ether	13.90	73	12610453	124.689	ng		98
45) 1,2-Dichloropropane	14.13	63	4291470	113.668	ng		100
46) Bromodichloromethane	14.33	83	6399081	138.938	ng		99
47) Trichloroethene	14.37	130	4493086	125.582	ng		100
48) 1,4-Dioxane	14.34	88	3917241	130.533	ng		93
49) 2,2,4-Trimethylpentane...	14.42	57	17120018	109.051	ng		99

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191628.D
Acq On : 20 Dec 2016 4:25 Operator: LH
Sample : 100ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:47 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

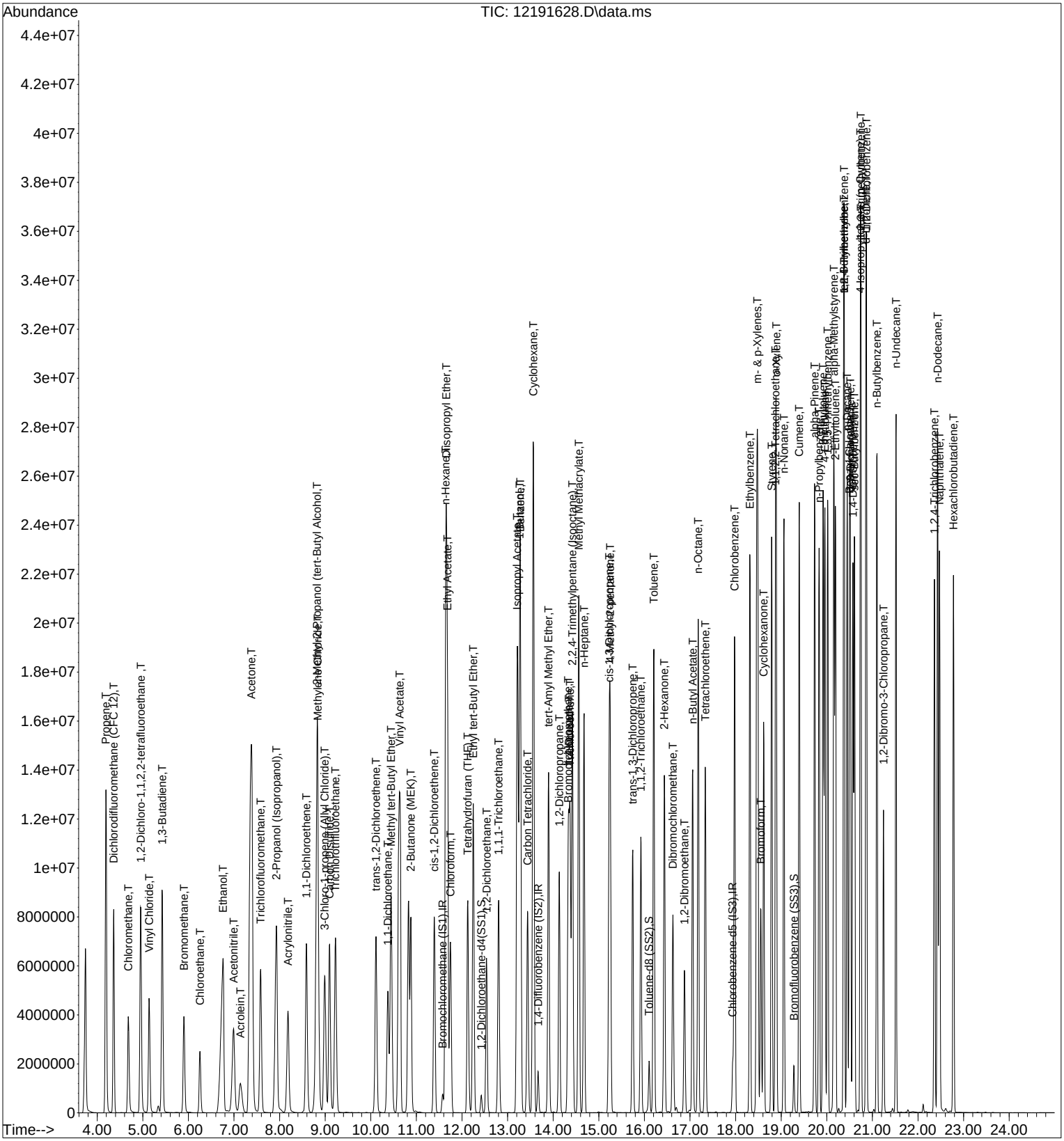
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	14.56	100	3679489	274.042 ng	96
51) n-Heptane	14.68	71	4399434	124.594 ng	99
52) cis-1,3-Dichloropropene	15.23	75	8248548	147.077 ng	99
53) 4-Methyl-2-pentanone	15.25	58	4683120	135.693 ng	91
54) trans-1,3-Dichloropropene	15.75	75	6987802	140.453 ng	99
55) 1,1,2-Trichloroethane	15.92	97	4108624	123.418 ng	99
58) Toluene	16.21	91	15856097	111.243 ng	95
59) 2-Hexanone	16.44	43	10964453	120.451 ng	94
60) Dibromochloromethane	16.63	129	5097352	130.407 ng	99
61) 1,2-Dibromoethane	16.88	107	4696846	116.844 ng	100
62) n-Butyl Acetate	17.06	43	11910418	114.551 ng	96
63) n-Octane	17.18	57	4147708	122.196 ng	98
64) Tetrachloroethene	17.33	166	4609727	116.013 ng	99
65) Chlorobenzene	17.98	112	11107353	113.777 ng	98
66) Ethylbenzene	18.31	91	17038464	100.006 ng	90
67) m- & p-Xylenes	18.48	91	25235722	195.330 ng	91
68) Bromoform	18.56	173	4346874	138.996 ng	100
69) Styrene	18.79	104	11787997	118.463 ng	95
70) o-Xylene	18.89	91	13896416	106.991 ng	98
71) n-Nonane	19.06	43	9095628	111.605 ng	95
72) 1,1,2,2-Tetrachloroethane	18.87	83	7673756	122.617 ng	100
74) Cumene	19.40	105	16006089	103.045 ng	91
75) alpha-Pinene	19.73	93	10236511	120.580 ng	97
76) n-Propylbenzene	19.83	91	17367590	88.461 ng	85
77) 3-Ethyltoluene	19.92	105	17077463	103.093 ng	92
78) 4-Ethyltoluene	19.96	105	13768231	93.888 ng	91
79) 1,3,5-Trimethylbenzene	20.02	105	13834479	102.194 ng	96
80) alpha-Methylstyrene	20.16	118	8337402	129.960 ng	97
81) 2-Ethyltoluene	20.19	105	15494984	98.638 ng	93
82) 1,2,4-Trimethylbenzene	20.38	105	12799085	96.222 ng	100
83) n-Decane	20.45	57	9147243	115.392 ng	99
84) Benzyl Chloride	20.50	91	13922055	136.193 ng	96
85) 1,3-Dichlorobenzene	20.52	146	8283962	117.905 ng	99
86) 1,4-Dichlorobenzene	20.57	146	8587741	107.547 ng	99
87) sec-Butylbenzene	20.61	105	15937525	92.005 ng	91
88) 4-Isopropyltoluene (p-...	20.74	119	13537503	84.912 ng	93
89) 1,2,3-Trimethylbenzene	20.75	105	12341662	90.879 ng	99
90) 1,2-Dichlorobenzene	20.87	146	7334449	102.307 ng	99
91) d-Limonene	20.86	68	6001043	113.915 ng	100
92) 1,2-Dibromo-3-Chloropr...	21.24	157	3395976	141.434 ng	93
93) n-Undecane	21.52	57	9633509	117.651 ng	98
94) 1,2,4-Trichlorobenzene	22.36	180	6907903	140.295 ng	99
95) Naphthalene	22.47	128	17224604	128.072 ng	93
96) n-Dodecane	22.43	57	9492916	127.254 ng	98
97) Hexachlorobutadiene	22.78	225	4454502	134.033 ng	99
98) Cyclohexanone	18.62	55	6886299	120.498 ng	97
99) tert-Butylbenzene	20.38	119	11723693	93.867 ng	99
100) n-Butylbenzene	21.10	91	14415146	100.635 ng	90

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191628.D
Acq On : 20 Dec 2016 4:25 Operator: LH
Sample : 100ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:47 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191629.D
Acq On : 20 Dec 2016 4:58 Operator: LH
Sample : 25ng TO-15 ICV STD
Misc : S29-12061601/S29-12011603 (12/30)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 10:51:50 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/21/16

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.56	130	324263	12.500	ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.66	114	1591523	12.500	ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.93	82	692153	12.500	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.41	65	586813	12.597	ng	-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.80%			
57) Toluene-d8 (SS2)	16.10	98	1634742	12.310	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.48%			
73) Bromofluorobenzene (SS3)	19.28	174	523510	12.349	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.80%			
Target Compounds						Qvalue
2) Propene	4.19	42	1124028	25.074	ng	99
3) Dichlorodifluoromethan...	4.36	85	2046175	24.979	ng	100
4) Chloromethane	4.68	50	1694320	25.145	ng	100
5) 1,2-Dichloro-1,1,2,2-t...	4.95	135	1055579	23.189	ng	100
6) Vinyl Chloride	5.13	62	1693438	26.426	ng	100
7) 1,3-Butadiene	5.42	54	1289867	28.829	ng	100
8) Bromomethane	5.90	94	891470	26.288	ng	100
9) Chloroethane	6.24	64	710995	26.626	ng	100
10) Ethanol	6.67	45	3936175	128.358	ng	100
11) Acetonitrile	6.94	41	1869029	26.609	ng	100
12) Acrolein	7.12	56	633199	23.499	ng	100
13) Acetone	7.33	58	3999279	129.883	ng	99
14) Trichlorofluoromethane	7.57	101	1719917	24.463	ng	100
15) 2-Propanol (Isopropanol)	7.87	45	5628222	53.518	ng	99
16) Acrylonitrile	8.15	53	1361059	26.179	ng	100
17) 1,1-Dichloroethene	8.58	96	932075	26.370	ng	99
18) 2-Methyl-2-Propanol (t...	8.76	59	5717162	51.822	ng	99
19) Methylene Chloride	8.82	84	987850	25.589	ng	100
20) 3-Chloro-1-propene (Al...	8.98	41	1631080	27.922	ng	100
21) Trichlorotrifluoroethane	9.22	151	850278	24.680	ng	100
22) Carbon Disulfide	9.09	76	3636405	26.702	ng	100
23) trans-1,2-Dichloroethene	10.10	61	1500866	26.244	ng	99
24) 1,1-Dichloroethane	10.36	63	1808134	25.230	ng	100
25) Methyl tert-Butyl Ether	10.43	73	3070833	24.735	ng	100
26) Vinyl Acetate	10.60	86	1306597	145.059	ng	98
27) 2-Butanone (MEK)	10.85	72	699761	26.323	ng	100
28) cis-1,2-Dichloroethene	11.38	61	1442544	25.606	ng	99
29) Diisopropyl Ether	11.64	87	862033	24.154	ng	98
30) Ethyl Acetate	11.66	61	847035	55.934	ng	100
31) n-Hexane	11.64	57	1743220	25.368	ng	100
32) Chloroform	11.72	83	1774939	24.850	ng	100
34) Tetrahydrofuran (THF)	12.12	72	661555	24.464	ng	100
35) Ethyl tert-Butyl Ether	12.24	87	1195210	25.353	ng	99
36) 1,2-Dichloroethane	12.52	62	1464666	25.028	ng	100
38) 1,1,1-Trichloroethane	12.79	97	1562252	25.058	ng	100
39) Isopropyl Acetate	13.20	61	1413573	52.946	ng	97
40) 1-Butanol	13.23	56	2417638	56.618	ng	99
41) Benzene	13.27	78	3951203	24.315	ng	100
42) Carbon Tetrachloride	13.43	117	1398229	25.907	ng	100
43) Cyclohexane	13.56	84	3104966	51.398	ng	99
44) tert-Amyl Methyl Ether	13.89	73	2968989	25.325	ng	100
45) 1,2-Dichloropropane	14.12	63	1005086	24.872	ng	100
46) Bromodichloromethane	14.32	83	1494154	26.501	ng	100
47) Trichloroethene	14.36	130	1042656	24.408	ng	100
48) 1,4-Dioxane	14.33	88	858499	26.353	ng	98
49) 2,2,4-Trimethylpentane...	14.41	57	4258097	24.871	ng	99

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191629.D
Acq On : 20 Dec 2016 4:58 Operator: LH
Sample : 25ng TO-15 ICV STD
Misc : S29-12061601/S29-12011603 (12/30)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 10:51:50 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

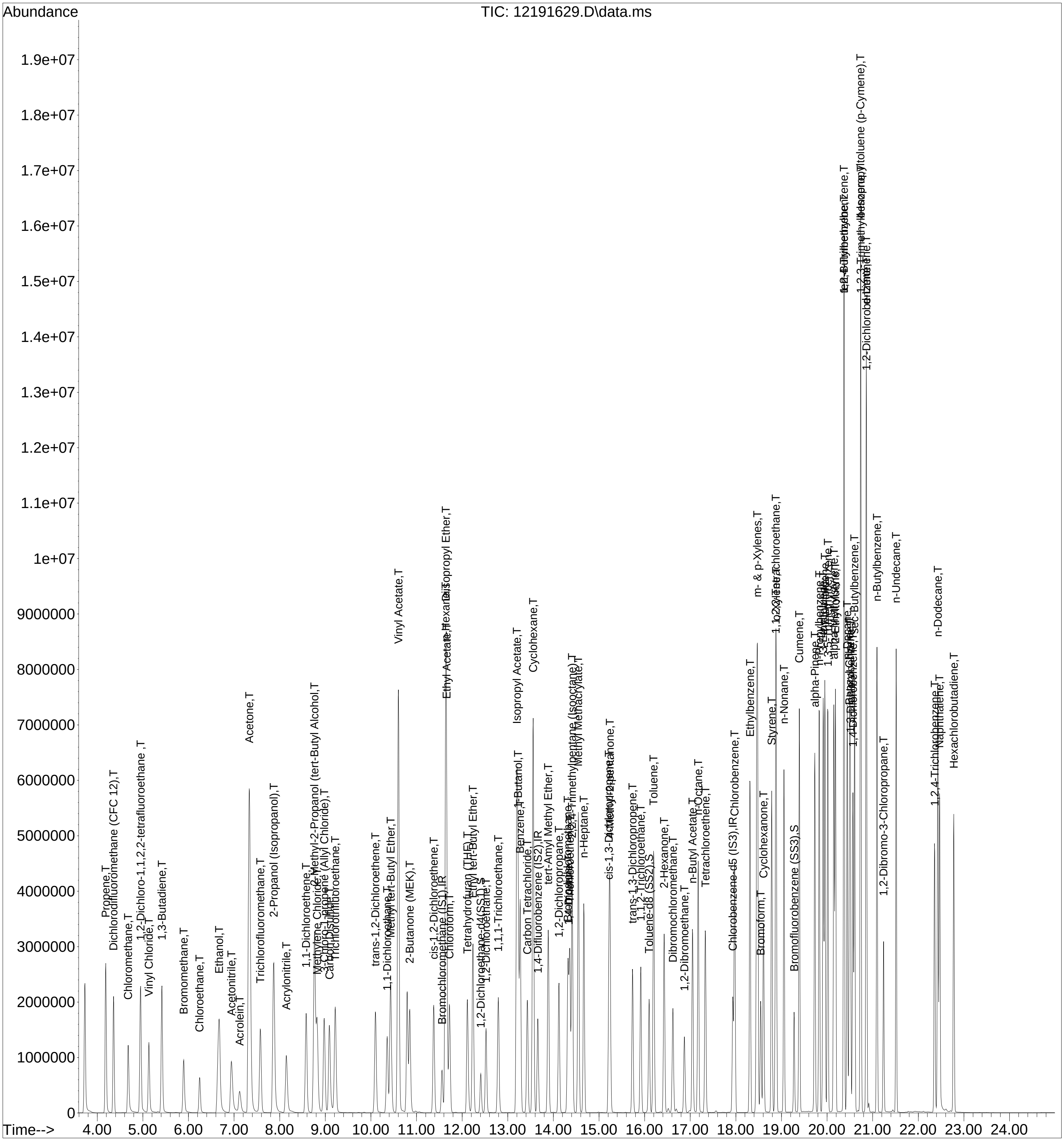
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	14.55	100	853414	53.563 ng	99
51) n-Heptane	14.67	71	972515	24.817 ng	100
52) cis-1,3-Dichloropropene	15.22	75	1748844	26.730 ng	100
53) 4-Methyl-2-pentanone	15.24	58	1026423	26.302 ng	100
54) trans-1,3-Dichloropropene	15.73	75	1611272	27.622 ng	100
55) 1,1,2-Trichloroethane	15.92	97	960805	25.399 ng	100
58) Toluene	16.20	91	3948316	24.350 ng	100
59) 2-Hexanone	16.43	43	2609129	26.123 ng	100
60) Dibromochloromethane	16.62	129	1186720	26.581 ng	100
61) 1,2-Dibromoethane	16.87	107	1117028	25.586 ng	100
62) n-Butyl Acetate	17.05	43	2902880	27.001 ng	99
63) n-Octane	17.17	57	898189	25.213 ng	100
64) Tetrachloroethene	17.33	166	1083122	24.649 ng	100
65) Chlorobenzene	17.97	112	2650579	24.804 ng	100
66) Ethylbenzene	18.31	91	4687446	25.700 ng	100
67) m- & p-Xylenes	18.47	91	7521675	53.005 ng	100
68) Bromoform	18.54	173	1016807	27.983 ng	100
69) Styrene	18.79	104	2887022	26.217 ng	100
70) o-Xylene	18.89	91	3814142	26.123 ng	100
71) n-Nonane	19.06	43	2207942	25.111 ng	100
72) 1,1,2,2-Tetrachloroethane	18.87	83	1920280	28.056 ng	100
74) Cumene	19.39	105	4669797	25.706 ng	100
75) alpha-Pinene	19.73	93	2516642	26.394 ng	100
76) n-Propylbenzene	19.83	91	5748335	26.851 ng	100
77) 3-Ethyltoluene	19.91	105	4824280	26.221 ng	99
78) 4-Ethyltoluene	19.95	105	4440812	27.516 ng	100
79) 1,3,5-Trimethylbenzene	20.02	105	3891708	25.933 ng	100
80) alpha-Methylstyrene	20.15	118	2133951	28.576 ng	100
81) 2-Ethyltoluene	20.18	105	4628604	26.862 ng	100
82) 1,2,4-Trimethylbenzene	20.37	105	4323279	29.231 ng	100
83) n-Decane	20.44	57	2317960	27.117 ng	99
84) Benzyl Chloride	20.49	91	3775432	31.379 ng	100
85) 1,3-Dichlorobenzene	20.51	146	2266889	30.518 ng	100
86) 1,4-Dichlorobenzene	20.57	146	2200963	24.970 ng	100
87) sec-Butylbenzene	20.60	105	5189431	27.044 ng	100
88) 4-Isopropyltoluene (p-...	20.73	119	5108284	27.780 ng	99
89) 1,2,3-Trimethylbenzene	20.74	105	4405266	27.923 ng	100
90) 1,2-Dichlorobenzene	20.86	146	2262220	27.231 ng	99
91) d-Limonene	20.86	68	1849244	29.170 ng	99
92) 1,2-Dibromo-3-Chloropr...	21.24	157	806286	29.153 ng	99
93) n-Undecane	21.51	57	2438089	27.128 ng	100
94) 1,2,4-Trichlorobenzene	22.36	180	1606384	30.096 ng	100
95) Naphthalene	22.46	128	4812376	29.684 ng	100
96) n-Dodecane	22.43	57	2427846	30.251 ng	100
97) Hexachlorobutadiene	22.78	225	1047435	28.082 ng	100
98) Cyclohexanone	18.60	55	1554818	25.350 ng	100
99) tert-Butylbenzene	20.37	119	4016249	27.638 ng	100
100) n-Butylbenzene	21.10	91	4360718	27.979 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191629.D
Acq On : 20 Dec 2016 4:58 Operator: LH
Sample : 25ng TO-15 ICV STD
Misc : S29-12061601/S29-12011603 (12/30)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 10:51:50 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Initial Calibration Verification/LABORATORY CONTROL SAMPLE CHECK SHEET

Data File Name: **12191629.D**
Data File Path: **I:\MS16\DATA\2016_12\19**
Operator: **LH**
Date Acquired: **12/20/16** **4:58**

Acq. Method File: **TO15.M**
Sample Name: **25ng TO-15 ICV STD**
Misc Info: **S29-12061601/S29-12011603 (**
Instrument Name: **GCMS-16**

#	Compound Name	Ret. Time	Amt. (ng)	Spike Amt.(ng)	% Rec.	Lower Limit	Upper Limit	* OR Fail	ICV/AZ 70-130%
2)	Propene	4.19	25.074	26.275	95	52	127	*	*
3)	Dichlorodifluoromethane (CFC 1	4.36	24.979	26.250	95	68	109	*	*
4)	Chloromethane	4.68	25.145	26.225	96	51	130	*	*
5)	1,2-Dichloro-1,1,2,2-tetrafluoroet	4.95	23.189	26.375	88	66	114	*	*
6)	Vinyl Chloride	5.13	26.426	26.250	101	61	125	*	*
7)	1,3-Butadiene	5.42	28.829	26.250	110	62	144	*	*
8)	Bromomethane	5.90	26.288	26.250	100	73	123	*	*
9)	Chloroethane	6.24	26.626	26.225	102	69	122	*	*
10)	Ethanol	6.67	128.358	132.650	97	62	124	*	*
11)	Acetonitrile	6.94	26.609	26.650	100	57	114	*	*
12)	Acrolein	7.12	23.499	26.525	89	62	116	*	*
13)	Acetone	7.33	129.883	133.050	98	57	117	*	*
14)	Trichlorofluoromethane	7.57	24.463	26.275	93	63	98	*	*
15)	2-Propanol (Isopropanol)	7.87	53.518	53.025	101	66	121	*	*
16)	Acrylonitrile	8.15	26.179	26.575	99	68	123	*	*
17)	1,1-Dichloroethene	8.58	26.370	26.575	99	76	118	*	*
18)	2-Methyl-2-Propanol (tert-Butyl Alc	8.76	51.822	53.275	97	74	126	*	*
19)	Methylene Chloride	8.82	25.589	26.550	96	60	118	*	*
20)	3-Chloro-1-propene (Allyl Chlori	8.98	27.922	26.500	105	65	126	*	*
21)	Trichlorotrifluoroethane	9.22	24.680	26.450	93	73	114	*	*
22)	Carbon Disulfide	9.09	26.702	26.675	100	57	102	*	*
23)	trans-1,2-Dichloroethene	10.10	26.244	26.675	98	74	123	*	*
24)	1,1-Dichloroethane	10.36	25.230	26.550	95	69	111	*	*
25)	Methyl tert-Butyl Ether	10.43	24.735	26.600	93	69	113	*	*
26)	Vinyl Acetate	10.60	145.059	132.550	109	76	128	*	*
27)	2-Butanone (MEK)	10.85	26.323	26.550	99	63	127	*	*
28)	cis-1,2-Dichloroethene	11.38	25.606	26.475	97	72	117	*	*
29)	Diisopropyl Ether	11.64	24.154	26.575	91	64	118	*	*
30)	Ethyl Acetate	11.66	55.934	53.275	105	68	127	*	*
31)	n-Hexane	11.64	25.368	26.600	95	55	116	*	*
32)	Chloroform	11.72	24.850	26.475	94	70	109	*	*
34)	Tetrahydrofuran (THF)	12.12	24.464	26.575	92	72	113	*	*
35)	Ethyl tert-Butyl Ether	12.24	25.353	26.525	96	73	117	*	*
36)	1,2-Dichloroethane	12.52	25.028	26.500	94	69	113	*	*
38)	1,1,1-Trichloroethane	12.79	25.058	26.475	95	72	115	*	*
39)	Isopropyl Acetate	13.20	52.946	53.050	100	68	122	*	*
40)	1-Butanol	13.23	56.618	53.075	107	75	141	*	*
41)	Benzene	13.27	24.315	26.525	92	65	107	*	*
42)	Carbon Tetrachloride	13.43	25.907	26.600	97	71	113	*	*
43)	Cyclohexane	13.56	51.398	53.125	97	71	115	*	*
44)	tert-Amyl Methyl Ether	13.89	25.325	26.525	95	73	115	*	*
45)	1,2-Dichloropropane	14.12	24.872	26.525	94	71	115	*	*
46)	Bromodichloromethane	14.32	26.501	26.700	99	75	118	*	*
47)	Trichloroethene	14.36	24.408	26.550	92	68	114	*	*
48)	1,4-Dioxane	14.33	26.353	26.600	99	81	131	*	*
49)	2,2,4-Trimethylpentane (Isooctane)	14.41	24.871	26.525	94	68	112	*	*

Initial Calibration Verification/LABORATORY CONTROL SAMPLE CHECK SHEET

Data File Name: **12191629.D** **TO15.M**
Data File Path: **I:\MS16\DATA\2016_12\19** Sample Name: **25ng TO-15 ICV STD**
Operator: **LH** Misc Info: **S29-12061601/S29-12011603 (**
Date Acquired: **12/20/16** **4:58** Instrument Name: **GCMS-16**

#	Compound Name	Ret. Time	Amt. (ng)	Spike Amt.(ng)	% Rec.	Lower Limit	Upper Limit	* OR Fail	ICV/AZ 70-130%
50)	**Methyl Methacrylate**	**14.55**	**53.563**	**53.000**	101	**72**	**130**	*	*
51)	**n-Heptane**	**14.67**	**24.817**	**26.600**	93	**68**	**116**	*	*
52)	**cis-1,3-Dichloropropene**	**15.22**	**26.730**	**26.275**	102	**77**	**126**	*	*
53)	**4-Methyl-2-pentanone**	**15.24**	**26.302**	**26.575**	99	**69**	**126**	*	*
54)	**trans-1,3-Dichloropropene**	**15.73**	**27.622**	**26.675**	104	**79**	**125**	*	*
55)	**1,1,2-Trichloroethane**	**15.92**	**25.399**	**26.525**	96	**75**	**119**	*	*
58)	**Toluene**	**16.20**	**24.350**	**26.450**	92	**59**	**118**	*	*
59)	**2-Hexanone**	**16.43**	**26.123**	**26.575**	98	**69**	**129**	*	*
60)	**Dibromochloromethane**	**16.62**	**26.581**	**26.600**	100	**74**	**136**	*	*
61)	**1,2-Dibromoethane**	**16.87**	**25.586**	**26.450**	97	**73**	**131**	*	*
62)	**n-Butyl Acetate**	**17.05**	**27.001**	**26.950**	100	**69**	**130**	*	*
63)	**n-Octane**	**17.17**	**25.213**	**26.500**	95	**66**	**120**	*	*
64)	**Tetrachloroethene**	**17.33**	**24.649**	**26.575**	93	**65**	**130**	*	*
65)	**Chlorobenzene**	**17.97**	**24.804**	**26.500**	94	**68**	**120**	*	*
66)	**Ethylbenzene**	**18.31**	**25.700**	**26.450**	97	**68**	**122**	*	*
67)	**m- & p-Xylenes**	**18.47**	**53.005**	**53.025**	100	**68**	**123**	*	*
68)	**Bromoform**	**18.54**	**27.983**	**26.550**	105	**69**	**130**	*	*
69)	**Styrene**	**18.79**	**26.217**	**26.475**	99	**71**	**133**	*	*
70)	**o-Xylene**	**18.89**	**26.123**	**26.450**	99	**68**	**122**	*	*
71)	**n-Nonane**	**19.06**	**25.111**	**26.475**	95	**65**	**120**	*	*
72)	**1,1,2,2-Tetrachloroethane**	**18.87**	**28.056**	**26.500**	106	**69**	**130**	*	*
74)	**Cumene**	**19.39**	**25.706**	**26.525**	97	**70**	**123**	*	*
75)	**alpha-Pinene**	**19.73**	**26.394**	**26.575**	99	**70**	**128**	*	*
76)	**n-Propylbenzene**	**19.83**	**26.851**	**26.725**	100	**69**	**125**	*	*
77)	3-Ethyltoluene	19.91	26.221	26.550	99	67	128	*	*
78)	**4-Ethyltoluene**	**19.95**	**27.516**	**26.525**	**104**	**67**	**130**	*	*
79)	**1,3,5-Trimethylbenzene**	**20.02**	**25.933**	**26.525**	**98**	**67**	**124**	*	*
80)	alpha-Methylstyrene	20.15	28.576	26.550	**108**	67	141	*	*
81)	2-Ethyltoluene	20.18	26.862	26.550	**101**	67	124	*	*
82)	**1,2,4-Trimethylbenzene**	**20.37**	**29.231**	**26.525**	**110**	**67**	**129**	*	*
83)	n-Decane	20.44	27.117	26.525	**102**	66	124	*	*
84)	**Benzyl Chloride**	**20.49**	**31.379**	**26.550**	**118**	**79**	**138**	*	*
85)	**1,3-Dichlorobenzene**	**20.51**	**30.518**	**26.475**	**115**	**65**	**136**	*	*
86)	**1,4-Dichlorobenzene**	**20.57**	**24.970**	**26.650**	**94**	**66**	**141**	*	*
87)	sec-Butylbenzene	20.60	27.044	26.550	**102**	68	125	*	*
88)	4-Isopropyltoluene (p-Cymene)	20.73	27.780	26.550	**105**	68	131	*	*
89)	1,2,3-Trimethylbenzene	20.74	27.923	26.500	**105**	68	132	*	*
90)	**1,2-Dichlorobenzene**	**20.86**	**27.231**	**26.550**	**103**	**67**	**136**	*	*
91)	**d-Limonene**	**20.86**	**29.170**	**26.550**	**110**	**71**	**134**	*	*
92)	**1,2-Dibromo-3-Chloropropane**	**21.24**	**29.153**	**26.475**	**110**	**73**	**136**	*	*
93)	n-Undecane	21.51	27.128	26.600	**102**	68	132	*	*
94)	**1,2,4-Trichlorobenzene**	**22.36**	**30.096**	**26.500**	**114**	**64**	**134**	*	*
95)	**Naphthalene**	**22.46**	**29.684**	**26.700**	**111**	**62**	**136**	*	*
96)	n-Dodecane	22.43	30.251	26.550	**114**	61	137	*	*
97)	**Hexachlorobutadiene**	**22.78**	**28.082**	**26.575**	**106**	60	133	*	*
98)	Cyclohexanone	18.61	25.350	26.575	95	64	131	*	*
99)	tert-Butylbenzene	20.37	27.638	26.500	104	67	128	*	*
100)	n-Butylbenzene	21.10	27.979	26.500	106	68	128	*	*

Bold = 75 Compound List
*** = Pass**

Evaluate Continuing Calibration Report

Data File: I:\MS16\DATA\2017 03\09\03091701.D
Acq On : 9 Mar 2017 2:20 Operator: LH
Sample : CCV R16030917 25ng
Misc : S29-03071701/S29-02171704 (3/18)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Mar 09 07:13:57 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/9/17

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	131	-0.02
2	T	Propene	1.728	2.012	-16.4	163	0.00
3	T	Dichlorodifluoromethane (CF	3.158	3.047	3.5	128	0.00
4	T	Chloromethane	2.597	2.752	-6.0	141	0.00
5	T	1,2-Dichloro-1,1,2,2-tetraf	1.755	1.489	15.2	116	-0.01
6	T	Vinyl Chloride	2.470	2.882	-16.7	146	-0.01
7	T	1,3-Butadiene	1.725	2.345	-35.9#	158	-0.02
8	T	Bromomethane	1.307	1.406	-7.6	137	-0.02
9	T	Chloroethane	1.029	1.203	-16.9	146	-0.02
10	T	Ethanol	1.182	1.424	-20.5	159	-0.10
11	T	Acetonitrile	2.708	3.405	-25.7	162	-0.07
12	T	Acrolein	1.039	1.081	-4.0	151	-0.03
13	T	Acetone	1.187	1.352	-13.9	148	-0.05
14	T	Trichlorofluoromethane	2.710	2.500	7.7	127	-0.02
15	T	2-Propanol (Isopropanol)	4.054	4.694	-15.8	144	-0.07
16	T	Acrylonitrile	2.004	2.324	-16.0	151	-0.05
17	T	1,1-Dichloroethene	1.363	1.427	-4.7	134	-0.02
18	T	2-Methyl-2-Propanol (tert-B	4.253	4.449	-4.6	134	-0.07
19	T	Methylene Chloride	1.488	1.566	-5.2	138	-0.03
20	T	3-Chloro-1-propene (Allyl C	2.252	2.651	-17.7	149	-0.02
21	T	Trichlorotrifluoroethane	1.328	1.156	13.0	118	-0.01
22	T	Carbon Disulfide	5.250	5.849	-11.4	142	-0.02
23	T	trans-1,2-Dichloroethene	2.205	2.417	-9.6	142	-0.02
24	T	1,1-Dichloroethane	2.763	2.922	-5.8	140	-0.02
25	T	Methyl tert-Butyl Ether	4.786	4.752	0.7	135	-0.02
26	T	Vinyl Acetate	0.347	0.408	-17.6	133	-0.03
27	T	2-Butanone (MEK)	1.025	1.157	-12.9	146	-0.04
28	T	cis-1,2-Dichloroethene	2.172	2.351	-8.2	140	-0.02
29	T	Diisopropyl Ether	1.376	1.343	2.4	133	-0.02
30	T	Ethyl Acetate	0.584	0.715	-22.4	147	-0.03
31	T	n-Hexane	2.649	3.077	-16.2	153	-0.01
32	T	Chloroform	2.753	2.683	2.5	131	-0.03
33	S	1,2-Dichloroethane-d4(SS1)	1.796	1.833	-2.1	136	-0.02
34	T	Tetrahydrofuran (THF)	1.042	1.103	-5.9	145	-0.02
35	T	Ethyl tert-Butyl Ether	1.817	1.833	-0.9	133	-0.02
36	T	1,2-Dichloroethane	2.256	2.213	1.9	131	-0.02
37	IR	1,4-Difluorobenzene (IS2)	1.000	1.000	0.0	136	-0.02
38	T	1,1,1-Trichloroethane	0.490	0.448	8.6	125	-0.02
39	T	Isopropyl Acetate	0.210	0.241	-14.8	147	-0.02
40	T	1-Butanol	0.335	0.410	-22.4	141	-0.04
41	T	Benzene	1.276	1.251	2.0	139	-0.02
42	T	Carbon Tetrachloride	0.424	0.389	8.3	120	-0.01
43	T	Cyclohexane	0.474	0.486	-2.5	133	-0.01
44	T	tert-Amyl Methyl Ether	0.921	0.925	-0.4	135	-0.02
45	T	1,2-Dichloropropane	0.317	0.337	-6.3	146	-0.02
46	T	Bromodichloromethane	0.443	0.441	0.5	129	-0.02
47	T	Trichloroethene	0.336	0.302	10.1	123	-0.02
48	T	1,4-Dioxane	0.256	0.271	-5.9	135	-0.02
49	T	2,2,4-Trimethylpentane (Iso	1.345	1.415	-5.2	144	-0.01
50	T	Methyl Methacrylate	0.125	0.128	-2.4	128	-0.02
51	T	n-Heptane	0.308	0.326	-5.8	146	-0.01
52	T	cis-1,3-Dichloropropene	0.514	0.554	-7.8	135	-0.01
53	T	4-Methyl-2-pentanone	0.307	0.349	-13.7	146	-0.01
54	T	trans-1,3-Dichloropropene	0.458	0.492	-7.4	131	-0.01

Evaluate Continuing Calibration Report

Data File: I:\MS16\DATA\2017 03\09\03091701.D
Acq On : 9 Mar 2017 2:20 Operator: LH
Sample : CCV R16030917 25ng
Misc : S29-03071701/S29-02171704 (3/18)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Mar 09 07:13:57 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
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)
55	T	1,1,2-Trichloroethane	0.297	0.296	0.3	132	-0.01
56	IR	Chlorobenzene-d5 (IS3)	1.000	1.000	0.0	144	0.00
57	S	Toluene-d8 (SS2)	2.398	2.282	4.8	139	0.00
58	T	Toluene	2.928	2.636	10.0	133	-0.01
59	T	2-Hexanone	1.804	1.909	-5.8	148	-0.01
60	T	Dibromochloromethane	0.806	0.724	10.2	121	0.00
61	T	1,2-Dibromoethane	0.788	0.719	8.8	127	-0.01
62	T	n-Butyl Acetate	1.942	2.124	-9.4	149	-0.01
63	T	n-Octane	0.643	0.654	-1.7	146	0.00
64	T	Tetrachloroethene	0.794	0.625	21.3	114	0.00
65	T	Chlorobenzene	1.930	1.699	12.0	126	0.00
66	T	Ethylbenzene	3.294	3.088	6.3	130	0.00
67	T	m- & p-Xylenes	2.563	2.421	5.5	127	-0.01
68	T	Bromoform	0.656	0.571	13.0	110	-0.01
69	T	Styrene	1.989	1.842	7.4	125	0.00
70	T	o-Xylene	2.637	2.472	6.3	127	0.00
71	T	n-Nonane	1.588	1.643	-3.5	149	0.00
72	T	1,1,2,2-Tetrachloroethane	1.236	1.321	-6.9	134	0.00
73	S	Bromofluorobenzene (SS3)	0.766	0.642	16.2	119	0.00
74	T	Cumene	3.281	2.944	10.3	124	0.00
75	T	alpha-Pinene	1.722	1.600	7.1	125	0.00
76	T	n-Propylbenzene	3.866	3.712	4.0	128	0.00
77	T	3-Ethyltoluene	3.323	3.068	7.7	122	0.00
78	T	4-Ethyltoluene	2.915	2.714	6.9	124	0.00
79	T	1,3,5-Trimethylbenzene	2.710	2.437	10.1	122	0.00
80	T	alpha-Methylstyrene	1.349	1.248	7.5	113	0.00
81	T	2-Ethyltoluene	3.112	2.861	8.1	122	0.00
82	T	1,2,4-Trimethylbenzene	2.671	2.571	3.7	114	-0.01
83	T	n-Decane	1.544	1.590	-3.0	138	0.00
84	T	Benzyl Chloride	2.173	2.345	-7.9	120	0.00
85	T	1,3-Dichlorobenzene	1.341	1.340	0.1	113	0.00
86	T	1,4-Dichlorobenzene	1.592	1.339	15.9	115	0.00
87	T	sec-Butylbenzene	3.465	3.214	7.2	122	0.00
88	T	4-Isopropyltoluene (p-Cymen	3.321	2.927	11.9	110	0.00
89	T	1,2,3-Trimethylbenzene	2.849	2.581	9.4	115	-0.01
90	T	1,2-Dichlorobenzene	1.500	1.303	13.1	109	0.00
91	T	d-Limonene	1.145	1.129	1.4	120	0.00
92	T	1,2-Dibromo-3-Chloropropane	0.499	0.469	6.0	115	0.00
93	T	n-Undecane	1.623	1.636	-0.8	136	0.00
94	T	1,2,4-Trichlorobenzene	0.964	0.922	4.4	108	0.00
95	T	Naphthalene	2.928	3.023	-3.2	118	0.00
96	T	n-Dodecane	1.449	1.496	-3.2	135	0.00
97	T	Hexachlorobutadiene	0.674	0.522	22.6	98	0.00
98	T	Cyclohexanone	1.108	1.131	-2.1	142	-0.01
99	T	tert-Butylbenzene	2.624	2.299	12.4	111	0.00
100	T	n-Butylbenzene	2.815	2.782	1.2	126	0.00

(#) = Out of Range SPCC's out = 0 CCC's out = 0

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091701.D
Acq On : 9 Mar 2017 2:20 Operator: LH
Sample : CCV R16030917 25ng
Misc : S29-03071701/S29-02171704 (3/18)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Mar 09 07:13:57 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/9/17

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	394642	12.500	ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.66	114	1981191	12.500	ng	-0.02
56) Chlorobenzene-d5 (IS3)	17.93	82	925551	12.500	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.40	65	723450	12.761	ng	-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 102.08%			
57) Toluene-d8 (SS2)	16.10	98	2112370	11.895	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 95.20%			
73) Bromofluorobenzene (SS3)	19.28	174	594392	10.486	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 83.92%			

Target Compounds							Qvalue
2) Propene	4.19	42	1645467	30.160	ng		98
3) Dichlorodifluoromethan...	4.36	85	2517748	25.254	ng		99
4) Chloromethane	4.68	50	2183040	26.621	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.95	135	1181065	21.318	ng		100
6) Vinyl Chloride	5.13	62	2327056	29.838	ng		100
7) 1,3-Butadiene	5.41	54	1956414	35.929	ng		98
8) Bromomethane	5.89	94	1102254	26.707	ng		99
9) Chloroethane	6.24	64	958066	29.480	ng		100
10) Ethanol	6.66	45	5853832	156.849	ng		100
11) Acetonitrile	6.92	41	2811538	32.889	ng		98
12) Acrolein	7.11	56	888372	27.089	ng		91
13) Acetone	7.33	58	5668020	151.251	ng		93
14) Trichlorofluoromethane	7.57	101	2070076	24.193	ng		100
15) 2-Propanol (Isopropanol)	7.86	45	7798718	60.932	ng		98
16) Acrylonitrile	8.13	53	1934926	30.580	ng		99
17) 1,1-Dichloroethene	8.57	96	1192452	27.720	ng		95
18) 2-Methyl-2-Propanol (t...	8.75	59	7423595	55.289	ng		98
19) Methylene Chloride	8.81	84	1306872	27.816	ng		94
20) 3-Chloro-1-propene (Al...	8.97	41	2201222	30.962	ng		96
21) Trichlorotrifluoroethane	9.21	151	957001	22.824	ng		88
22) Carbon Disulfide	9.07	76	4897790	29.551	ng		99
23) trans-1,2-Dichloroethene	10.09	61	2035340	29.243	ng		95
24) 1,1-Dichloroethane	10.35	63	2352505	26.972	ng		100
25) Methyl tert-Butyl Ether	10.42	73	3998486	26.464	ng		97
26) Vinyl Acetate	10.60	86	1696877	154.792	ng	#	87
27) 2-Butanone (MEK)	10.84	72	958173	29.616	ng		93
28) cis-1,2-Dichloroethene	11.37	61	1974734	28.801	ng		95
29) Diisopropyl Ether	11.64	87	1125481	25.912	ng	#	73
30) Ethyl Acetate	11.65	61	1202171	65.228	ng		100
31) n-Hexane	11.63	57	2581644	30.870	ng		99
32) Chloroform	11.72	83	2240117	25.769	ng		100
34) Tetrahydrofuran (THF)	12.11	72	924742	28.098	ng		94
35) Ethyl tert-Butyl Ether	12.23	87	1528959	26.649	ng		92
36) 1,2-Dichloroethane	12.52	62	1837516	25.799	ng		100
38) 1,1,1-Trichloroethane	12.79	97	1906447	24.564	ng		98
39) Isopropyl Acetate	13.19	61	2005328	60.338	ng		99
40) 1-Butanol	13.22	56	3418502	64.311	ng		98
41) Benzene	13.27	78	5215591	25.783	ng		100
42) Carbon Tetrachloride	13.42	117	1625627	24.196	ng		100
43) Cyclohexane	13.55	84	4101506	54.540	ng		92
44) tert-Amyl Methyl Ether	13.88	73	3864822	26.482	ng		98
45) 1,2-Dichloropropane	14.12	63	1420090	28.230	ng		100
46) Bromodichloromethane	14.31	83	1861703	26.526	ng		100
47) Trichloroethene	14.35	130	1270471	23.892	ng		100
48) 1,4-Dioxane	14.33	88	1139640	28.103	ng		92
49) 2,2,4-Trimethylpentane...	14.41	57	5938177	27.862	ng		98

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091701.D
Acq On : 9 Mar 2017 2:20 Operator: LH
Sample : CCV R16030917 25ng
Misc : S29-03071701/S29-02171704 (3/18)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Mar 09 07:13:57 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

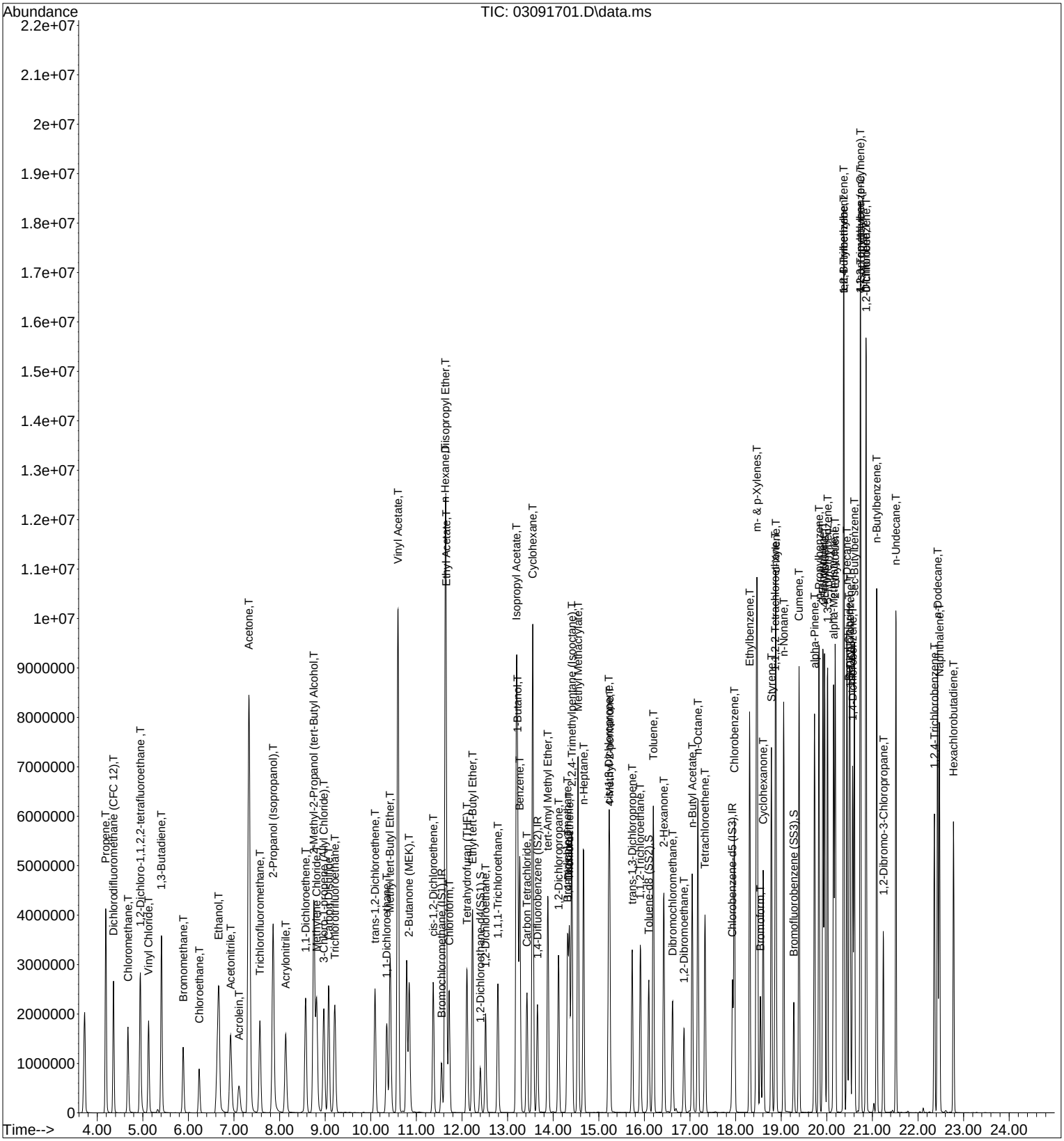
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
50) Methyl Methacrylate	14.55	100	1066841	53.789	ng #	86
51) n-Heptane	14.67	71	1373466	28.155	ng	96
52) cis-1,3-Dichloropropene	15.22	75	2450406	30.087	ng	100
53) 4-Methyl-2-pentanone	15.24	58	1461463	30.084	ng	96
54) trans-1,3-Dichloropropene	15.73	75	2073963	28.561	ng	100
55) 1,1,2-Trichloroethane	15.91	97	1245553	26.450	ng	97
58) Toluene	16.20	91	5137805	23.695	ng	100
59) 2-Hexanone	16.43	43	3749705	28.076	ng	100
60) Dibromochloromethane	16.62	129	1422430	23.826	ng	100
61) 1,2-Dibromoethane	16.87	107	1405131	24.068	ng	100
62) n-Butyl Acetate	17.05	43	4183249	29.098	ng	98
63) n-Octane	17.17	57	1280106	26.873	ng	95
64) Tetrachloroethene	17.33	166	1226947	20.881	ng	99
65) Chlorobenzene	17.97	112	3336754	23.351	ng	100
66) Ethylbenzene	18.31	91	6030122	24.724	ng	99
67) m- & p-Xylenes	18.47	91	9515189	50.145	ng	98
68) Bromoform	18.54	173	1122703	23.106	ng	100
69) Styrene	18.79	104	3618228	24.572	ng	99
70) o-Xylene	18.89	91	4822706	24.701	ng	98
71) n-Nonane	19.06	43	3205786	27.266	ng	96
72) 1,1,2,2-Tetrachloroethane	18.87	83	2581580	28.206	ng	99
74) Cumene	19.39	105	5722696	23.558	ng	99
75) alpha-Pinene	19.73	93	3092823	24.257	ng	99
76) n-Propylbenzene	19.83	91	7303313	25.512	ng	97
77) 3-Ethyltoluene	19.91	105	5963708	24.240	ng	99
78) 4-Ethyltoluene	19.95	105	5269426	24.417	ng	99
79) 1,3,5-Trimethylbenzene	20.02	105	4732295	23.583	ng	98
80) alpha-Methylstyrene	20.15	118	2425868	24.293	ng	99
81) 2-Ethyltoluene	20.18	105	5624691	24.411	ng	99
82) 1,2,4-Trimethylbenzene	20.37	105	5006154	25.313	ng	97
83) n-Decane	20.44	57	3099336	27.115	ng	97
84) Benzyl Chloride	20.49	91	4604807	28.621	ng	98
85) 1,3-Dichlorobenzene	20.51	146	2624779	26.425	ng	100
86) 1,4-Dichlorobenzene	20.57	146	2621749	22.244	ng	99
87) sec-Butylbenzene	20.61	105	6271581	24.442	ng	99
88) 4-Isopropyltoluene (p-...	20.74	119	5564754	22.631	ng	97
89) 1,2,3-Trimethylbenzene	20.74	105	4905913	23.255	ng	97
90) 1,2-Dichlorobenzene	20.86	146	2551692	22.970	ng	100
91) d-Limonene	20.86	68	2184055	25.764	ng	95
92) 1,2-Dibromo-3-Chloropr...	21.24	157	914210	24.720	ng	90
93) n-Undecane	21.51	57	3191459	26.556	ng	97
94) 1,2,4-Trichlorobenzene	22.36	180	1780782	24.950	ng	100
95) Naphthalene	22.47	128	6059480	27.951	ng	100
96) n-Dodecane	22.43	57	2893502	26.962	ng	97
97) Hexachlorobutadiene	22.78	225	1023591	20.523	ng	99
98) Cyclohexanone	18.60	55	2210269	26.949	ng	97
99) tert-Butylbenzene	20.37	119	4471830	23.013	ng	99
100) n-Butylbenzene	21.10	91	5437574	26.091	ng	99

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091701.D
Acq On : 9 Mar 2017 2:20 Operator: LH
Sample : CCV R16030917 25ng
Misc : S29-03071701/S29-02171704 (3/18)
ALS Vial : 2 Sample Multiplier: 1

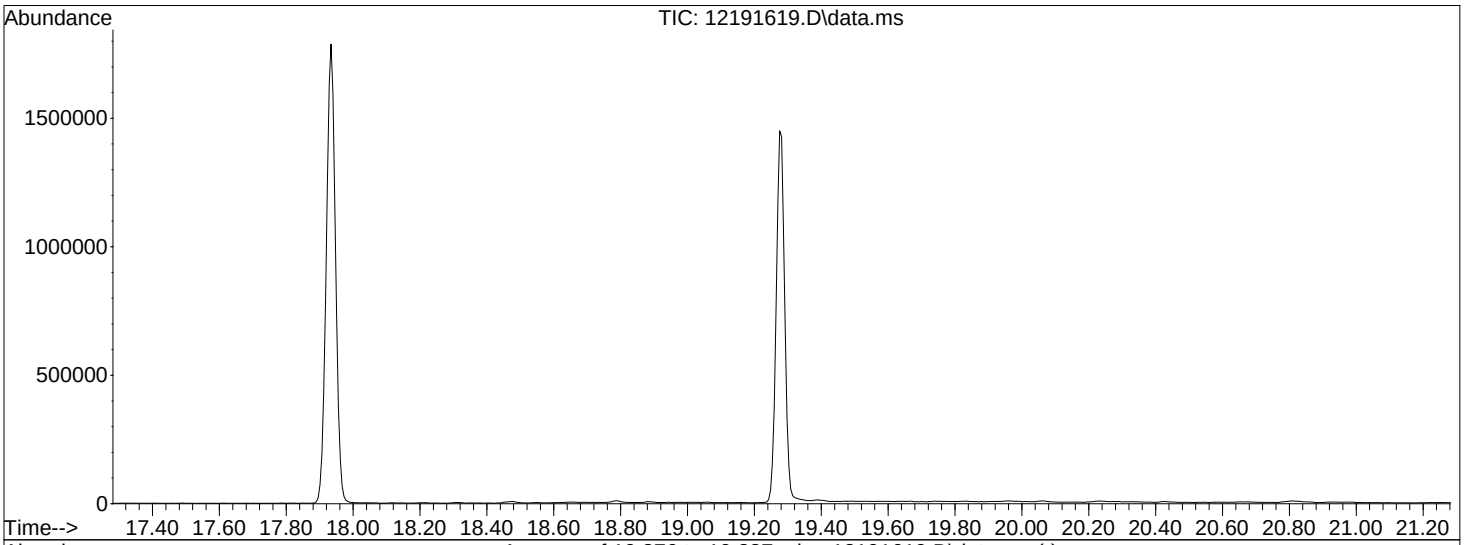
Quant Time: Mar 09 07:13:57 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

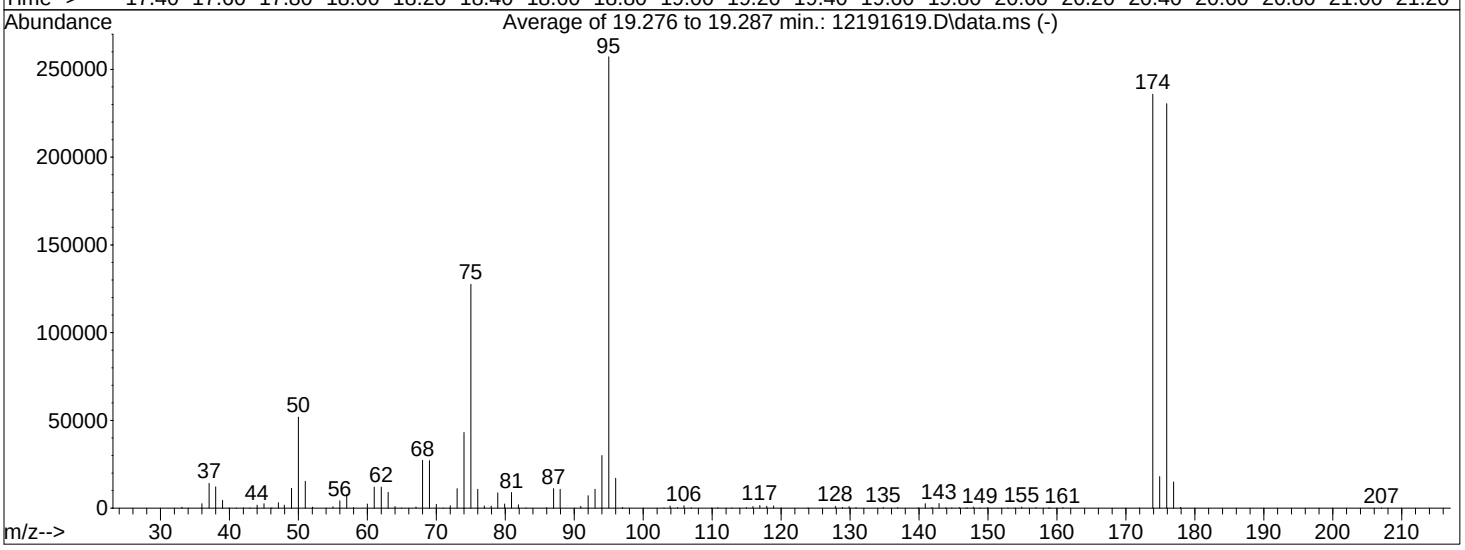


Data Path : I:\MS16\DATA\2016 12\19\
Data File : 12191619.D
Acq On : 19 Dec 2016 23:25
Operator : LH
Sample : 12.5ng TO-15 BFB
Misc : S29-12061601
ALS Vial : 2 Sample Multiplier: 1

Integration File: LSCINT.P

Method : I:\MS16\METHODS\R16121916.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue Dec 20 08:56:53 2016





AutoFind: Scans 2853, 2854, 2855; Background Corrected with Scan 2844

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	20.2	51872	PASS
75	95	30	66	49.6	127557	PASS
95	95	100	100	100.0	257173	PASS
96	95	5	9	6.6	17067	PASS
173	174	0.00	2	0.0	0	PASS
174	95	50	120	91.7	235883	PASS
175	174	4	9	7.6	17991	PASS
176	174	93	101	97.7	230443	PASS
177	176	5	9	6.5	15000	PASS

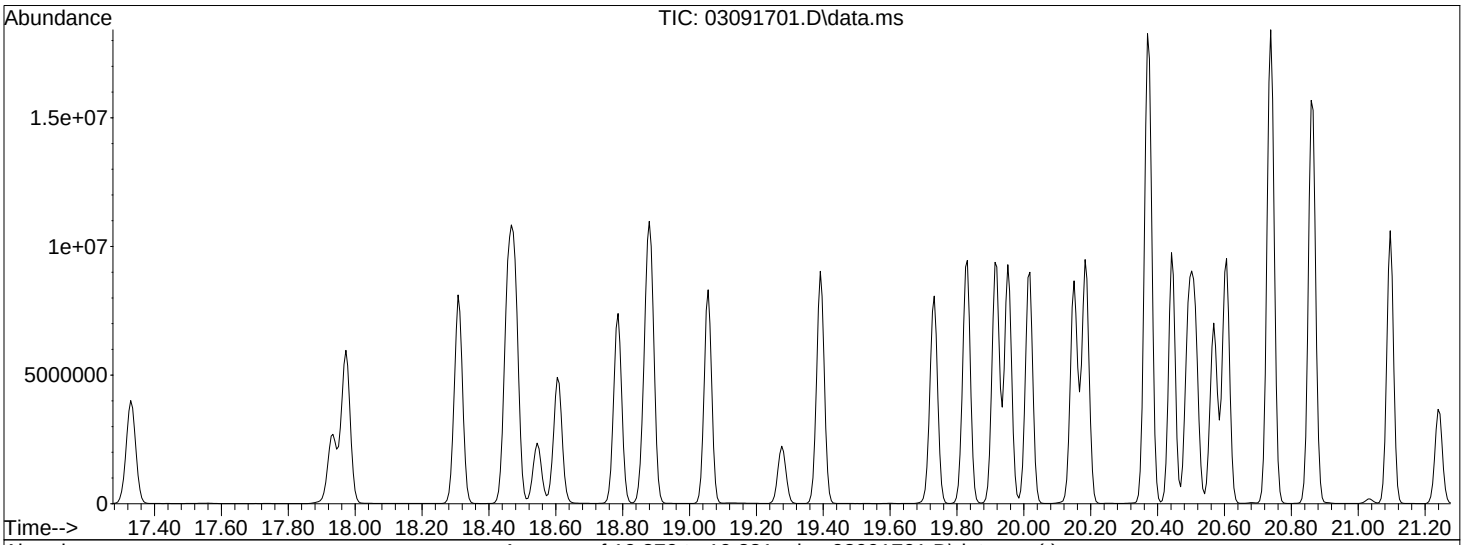
LH 12/20/16

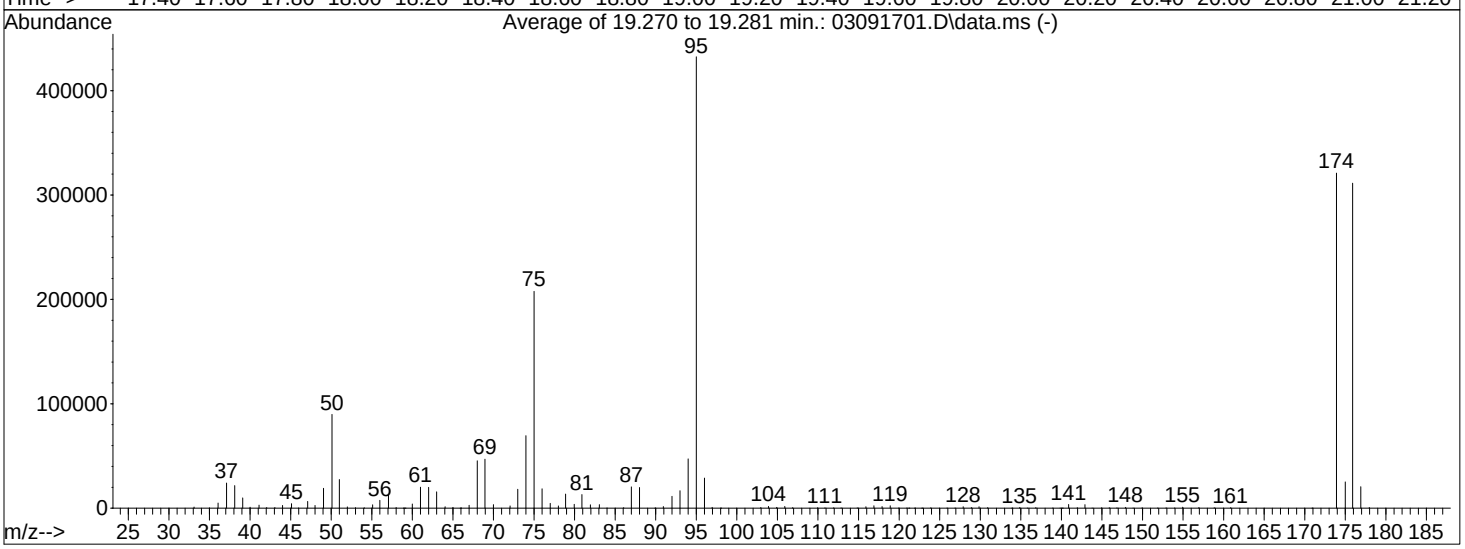
BFB

Data Path : I:\MS16\DATA\2017 03\09\
Data File : 03091701.D
Acq On : 9 Mar 2017 2:20
Operator : LH
Sample : CCV R16030917 25ng
Misc : S29-03071701/S29-02171704 (3/18)
ALS Vial : 2 Sample Multiplier: 1

Integration File: LSCINT.P

Method : I:\MS16\METHODS\R16121916.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue Dec 20 10:31:33 2016





AutoFind: Scans 2852, 2853, 2854; Background Corrected with Scan 2844

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	20.8	89819	PASS
75	95	30	66	48.1	207787	PASS
95	95	100	100	100.0	432423	PASS
96	95	5	9	6.7	28797	PASS
173	174	0.00	2	0.0	0	PASS
174	95	50	120	74.2	320981	PASS
175	174	4	9	7.8	25093	PASS
176	174	93	101	97.0	311339	PASS
177	176	5	9	6.6	20480	PASS

LH 3/9/17

Injection Log

Directory: J:\MS16\DATA\2016_12\19\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	12/19/16 8:58	12191601.D	Blank (100mL)	S29-12061601	LH	2	
2	12/19/16 10:27	12191602.D	Blank (100mL)	S29-12061601	LH	2	
3	12/19/16 11:01	12191603.D	0.1ng std check	S29-12061601/S29-11301611 (12/29)	LH	6	
4	12/19/16 12:03	12191604.D	Blank (100mL)	S29-12061601	LH	2	
5	12/19/16 12:36	12191605.D	Blank (100mL)	S29-12061601	LH	2	
6	12/19/16 13:09	12191606.D	Blank (100mL)	S29-12061601	LH	2	
7	12/19/16 13:43	12191607.D	Blank (100mL)	S29-12061601	LH	2	
8	12/19/16 17:19	12191608.D	1.0ng std check	S29-12061601/S29-12191607 (1/17)	LH	8	
9	12/19/16 17:52	12191609.D	5.0ng std check	S29-12061601/S29-12191605 (1/17)	LH	9	
10	12/19/16 18:26	12191610.D	25ng std check	S29-12061601/S29-12191605 (1/17)	LH	2	
11	12/19/16 18:59	12191611.D	12.5ng TO-15 BFB	S29-12061601	LH	2	
12	12/19/16 19:32	12191612.D	0.5ng MAPH ICAL STD	S29-12061601/S29-10281604 (12/25)	LH	7	
13	12/19/16 20:05	12191613.D	1.0ng MAPH ICAL STD	S29-12061601/S29-10281604 (12/25)	LH	7	
14	12/19/16 20:39	12191614.D	5.0ng MAPH ICAL STD	S29-12061601/S29-10281604 (12/25)	LH	7	
15	12/19/16 21:12	12191615.D	25ng MAPH ICAL STD	S29-12061601/S29-10281603 (12/25)	LH	4	
16	12/19/16 21:45	12191616.D	50ng MAPH ICAL STD	S29-12061601/S29-10281603 (12/25)	LH	4	
17	12/19/16 22:18	12191617.D	100ng MAPH ICAL STD	S29-12061601/S29-10281603 (12/25)	LH	4	
18	12/19/16 22:52	12191618.D	25ng MAPH ICV STD	S29-12061601/S29-12011603 (12/30)	LH	2	
19	12/19/16 23:25	12191619.D	12.5ng TO-15 BFB	S29-12061601	LH	2	
20	12/19/16 23:59	12191620.D	0.08ng TO-15 ICAL STD	S29-12061601/S29-12191607 (1/17)	LH	8	
21	12/20/16 0:33	12191621.D	0.1ng TO-15 ICAL STD	S29-12061601/S29-12191607 (1/17)	LH	8	
22	12/20/16 1:06	12191622.D	0.2ng TO-15 ICAL STD	S29-12061601/S29-12191607 (1/17)	LH	8	
23	12/20/16 1:39	12191623.D	0.4ng TO-15 ICAL STD	S29-12061601/S29-12191607 (1/17)	LH	8	
24	12/20/16 2:13	12191624.D	1.0ng TO-15 ICAL STD	S29-12061601/S29-12191605 (1/17)	LH	9	
25	12/20/16 2:46	12191625.D	5.0ng TO-15 ICAL STD	S29-12061601/S29-12191605 (1/17)	LH	9	
26	12/20/16 3:19	12191626.D	25ng TO-15 ICAL STD	S29-12061601/S29-12191603 (1/17)	LH	2	
27	12/20/16 3:52	12191627.D	50ng TO-15 ICAL STD	S29-12061601/S29-12191603 (1/17)	LH	2	
28	12/20/16 4:25	12191628.D	100ng TO-15 ICAL STD	S29-12061601/S29-12191603 (1/17)	LH	2	
29	12/20/16 4:58	12191629.D	25ng TO-15 ICV STD	S29-12061601/S29-12011603 (12/30)	LH	2	
30	12/20/16 5:32	12191630.D	Blank (100mL)	S29-12061601	LH	2	
	ICAL passed for all compounds 0.08ng-100ng, except: propene, methylene chloride 0.2ng-100ng, dichlorodifluoromethane,						
	chloromethane 0.1ng-100ng, acetonitrile, carbon disulfide, benzyl chloride, 1,2-dibromo-3-chloropropane, naphthalene 0.4ng-100ng,						
	vinyl chloride 2.0ng-500ng.						
				LH 12/21/16			
##							

Injection Log

Directory: I:\MS16\DATA\2017_03\09\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	3/9/17 2:20	03091701.D	CCV R16030917_25ng	S29-03071701/S29-02171704 (3/18)	LH	2	passed
2	3/9/17 2:54	03091702.D	CCV C16030917_25ng	S29-03071701/S29-03031405 (4/1)	LH	3	passed
3	3/9/17 3:28	03091703.D	CCV M16030917_25ng	S29-03071701/S29-02221702 (4/21)	LH	4	passed
4	3/9/17 4:02	03091704.D	MB R16030917_1000mL	S29-03071701 AC00442	LH	2	passed
5	3/9/17 4:35	03091705.D	LCS R16030917_25ng	S29-03071701/S29-03031707 (1/1)	LH	2	passed
6	3/9/17 5:09	03091706.D	LCSD R16030917_25ng	S29-03071701/S29-03031707 (1/1)	LH	2	passed
7	3/9/17 8:05	03091707.D	P1701055-003dil (5.0mL)	S29-03071701	LH	1	
8	3/9/17 8:38	03091708.D	P1701055-011dil (15mL)	S29-03071701	LH	12	
9	3/9/17 9:11	03091709.D	P1701055-012dil (15mL)	S29-03071701	LH	13	
10	3/9/17 9:45	03091710.D	P1701055-013dil (5.0mL)	S29-03071701	LH	1	
11	3/9/17 10:20	03091711.D	P1700972-004dil (25mL)	S29-03071701	LH	6	
12	3/9/17 10:54	03091712.D	P1701055-014dil (20mL)	S29-03071701	LH	15	
13	3/9/17 11:27	03091713.D	P1701055-016dil (5.0mL)	S29-03071701	LH	1	
14	3/9/17 12:03	03091714.D	P1701057-001 (4.0mL)	S29-03071701	LH	1	
15	3/9/17 13:53	03091715.D	P1700971-003 (20mL)	S29-03071701	LH	8	over diluted
16	3/9/17 14:59	03091716.D	P1701057-002 (1000mL)	S29-03071701	LH	16	
17	3/9/17 15:48	03091717.D	P1700971-001 (1000mL)	S29-03071701	LH	6	
18	3/9/17 16:35	03091718.D	P1700971-002 (1000mL)	S29-03071701	LH	7	
19	3/9/17 17:09	03091719.D	P1700971-003 (120mL)	S29-03071701	LH	8	
20	3/9/17 17:43	03091720.D	P1700971-004 (1000mL)	S29-03071701	LH	9	
21	3/9/17 18:17	03091721.D	P1700971-005 (1000mL)	S29-03071701	LH	10	
22	3/9/17 18:50	03091722.D	P1700971-006 (35mL)	S29-03071701	LH	11	
23	3/9/17 19:24	03091723.D	P1700971-006dup (35mL)	S29-03071701	LH	11	passed
24	3/9/17 19:58	03091724.D	Blank (100mL)	S29-03071701	LH	2	
25	3/9/17 20:32	03091725.D	P1701095-001 (400mL)	S29-03071701	LH	12	
26	3/9/17 21:06	03091726.D	P1701120-001 (400mL)	S29-03071701	LH	13	
27	3/9/17 21:39	03091727.D	P1701137-001 (400mL)	S29-03071701	LH	14	

LH 3/10/17

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071718.D Vial: 10
Acq On : 7 Mar 2017 19:23 Operator: CL
Sample : P1700971-001 (1000mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 09 14:17:14 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/9/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.76	130	43836	1000.000 pg	-0.02
25) 1,4-Difluorobenzene (IS2)	11.71	114	216994	1000.000 pg	-0.01
38) Chlorobenzene-d5 (IS3)	16.05	54	46497	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.54	65	85741	1009.116 pg	-0.02
Spiked Amount 1000.000	Range 70 - 130		Recovery = 100.91%		
33) Toluene-d8 (SS2)	14.15	98	224939	1020.800 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 102.08%		
45) Bromofluorobenzene (SS3)	17.55	174	78602	920.611 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 92.06%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.40	85	326181	2403.634 pg	100
3) Chloromethane	4.64	52	19521	533.121 pg	97
4) 1,2-Dichloro,1,1,2,2-t...	4.80	85	14939	97.548 pg	99
5) Vinyl Chloride	4.95	62	351	N.D.	
6) 1,3-Butadiene	0.00	54	0	N.D. d	
7) Bromomethane	5.47	94	1272	28.554 pg	90
8) Chloroethane	5.68	64	580	N.D.	
9) Acrolein	6.27	56	6563	235.352 pg	98
10) Acetone	6.40	58	156926	4080.348 pg	100
11) Trichlorofluoromethane	6.59	101	122329	1173.497 pg	100
12) 1,1-Dichloroethene	0.00	96	0	N.D.	
13) Methylene Chloride	7.48	84	17469	277.623 pg	96
14) Trichlorotrifluoroethane	7.79	151	25791	468.712 pg	99
15) trans-1,2-Dichloroethene	8.51	96	192	N.D.	
16) 1,1-Dichloroethane	8.72	63	594	N.D.	
17) Methyl tert-Butyl Ether	8.80	73	699	N.D.	
18) cis-1,2-Dichloroethene	9.60	96	759	N.D.	
19) Chloroform	9.89	83	11213	90.652 pg	99
21) 1,2-Dichloroethane	10.65	62	5535	56.064 pg	97
22) 1,1,1-Trichloroethane	10.91	97	1290	N.D.	
23) Benzene	11.37	78	173662	682.801 pg	100
24) Carbon Tetrachloride	11.52	117	40680	418.752 pg	100
26) 1,2-Dichloropropane	12.17	63	1194	N.D.	
27) Bromodichloromethane	12.38	83	1098	N.D.	
28) Trichloroethene	12.41	130	1651	25.001 pg	100
29) 1,4-Dioxane	12.39	88	1455	29.179 pg	95
30) cis-1,3-Dichloropropene	13.26	75	166	N.D.	
31) trans-1,3-Dichloropropene	13.73	75	164	N.D.	
32) 1,1,2-Trichloroethane	13.95	83	262	N.D.	
34) Toluene	14.25	91	379278	1472.910 pg	99
35) Dibromochloromethane	14.66	129	125	N.D.	
36) 1,2-Dibromoethane	14.92	107	85	N.D.	
37) Tetrachloroethene	15.40	166	45160	652.173 pg	99
39) Chlorobenzene	0.00	112	0	N.D. d	
40) Ethylbenzene	16.48	91	65655	223.191 pg	100
41) m,p-Xylene	16.65	91	164460	733.852 pg	100
42) Styrene	17.02	104	7813	50.027 pg	96
43) o-Xylene	17.12	106	32112	286.057 pg	100
44) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D. d	
46) 1,3,5-Trimethylbenzene	18.38	105	42369	169.799 pg	100
47) 1,2,4-Trimethylbenzene	18.77	105	135579	547.704 pg	89
48) 1,3-Dichlorobenzene	18.92	146	293	N.D.	
49) 1,4-Dichlorobenzene	18.98	146	1916	N.D.	
50) 1,2-Dichlorobenzene	19.31	146	504	N.D.	
51) 1,2-Dibromo-3-chloropr...	19.76	157	63	N.D.	
52) 1,2,4-Trichlorobenzene	20.95	182	292	N.D.	
53) Naphthalene	21.06	128	22661	92.166 pg	97

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071718.D Vial: 10
Acq On : 7 Mar 2017 19:23 Operator: CL
Sample : P1700971-001 (1000mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 09 14:17:14 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

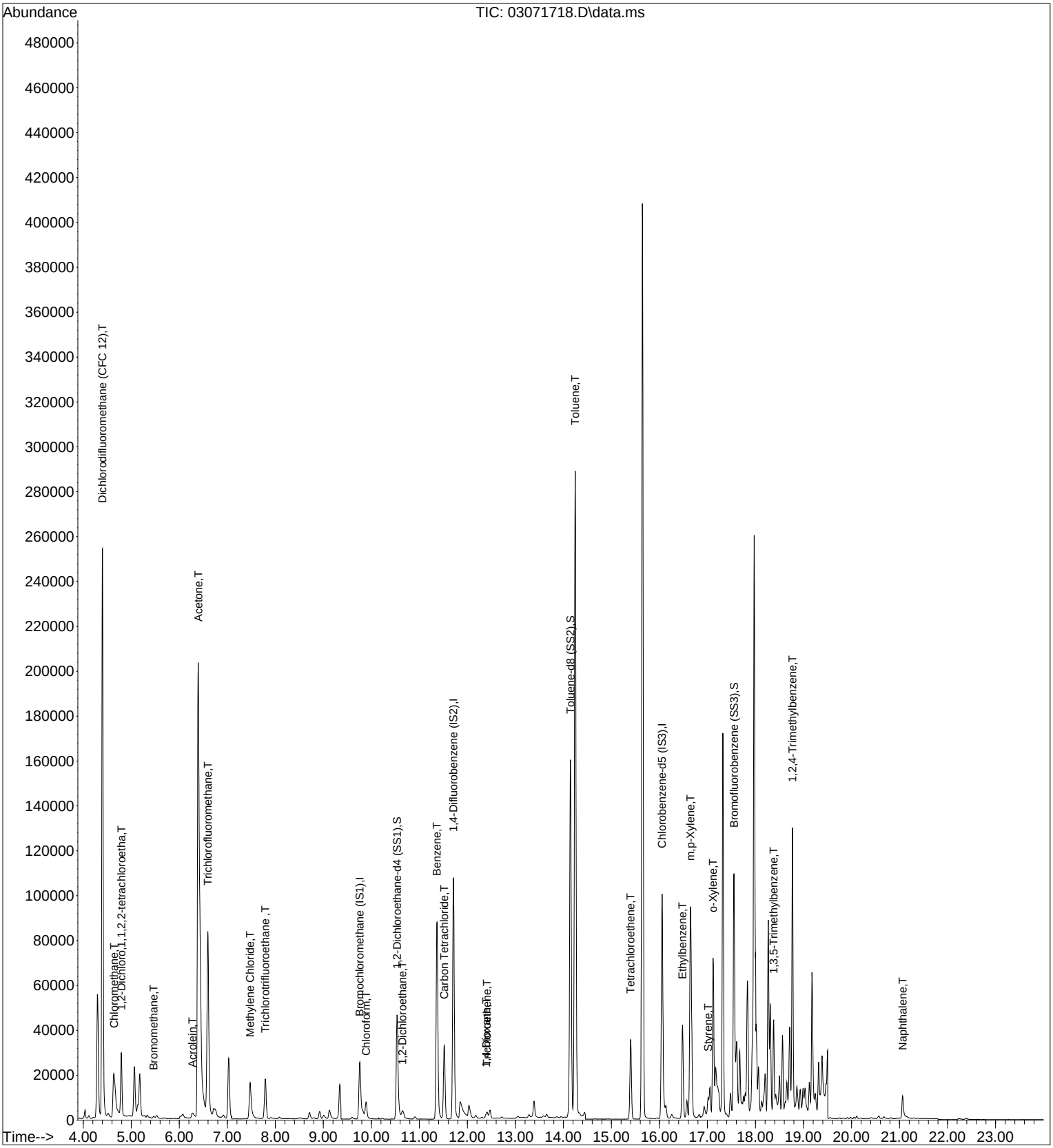
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	0.00	225	0	N.D.	

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071718.D Vial: 10
Acq On : 7 Mar 2017 19:23 Operator: CL
Sample : P1700971-001 (1000mL) Inst : MS19
Misc : S29-01241701

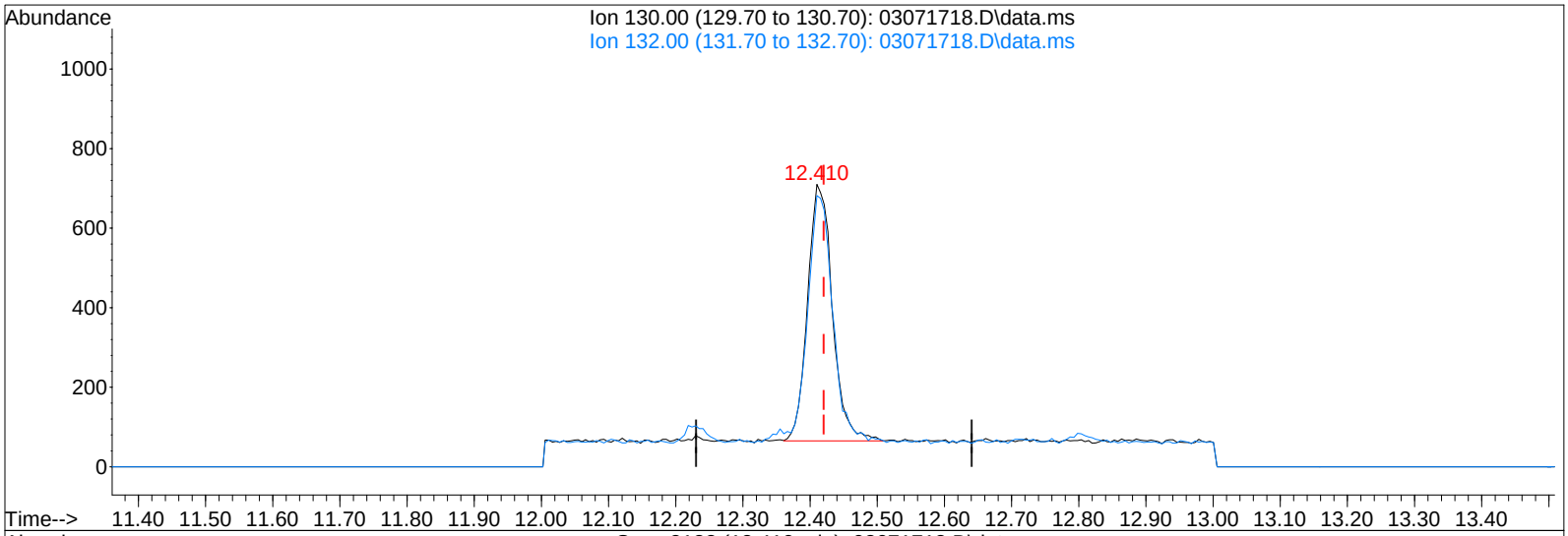
Quant Time: Mar 09 14:17:14 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

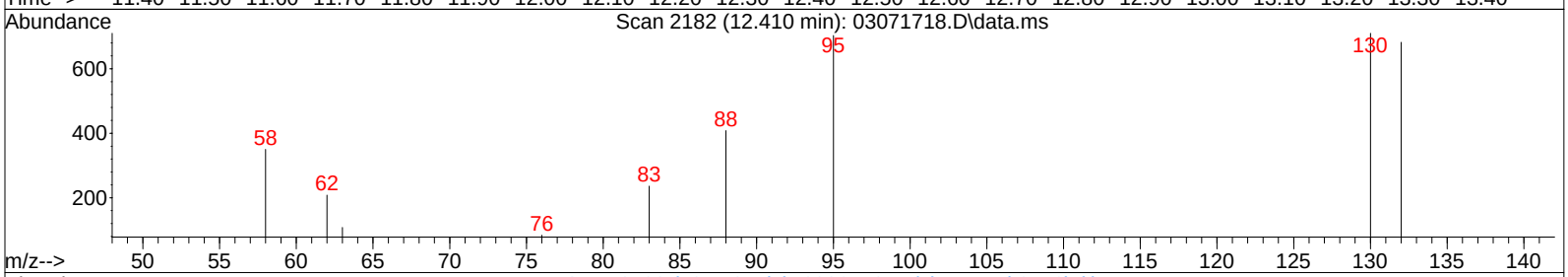


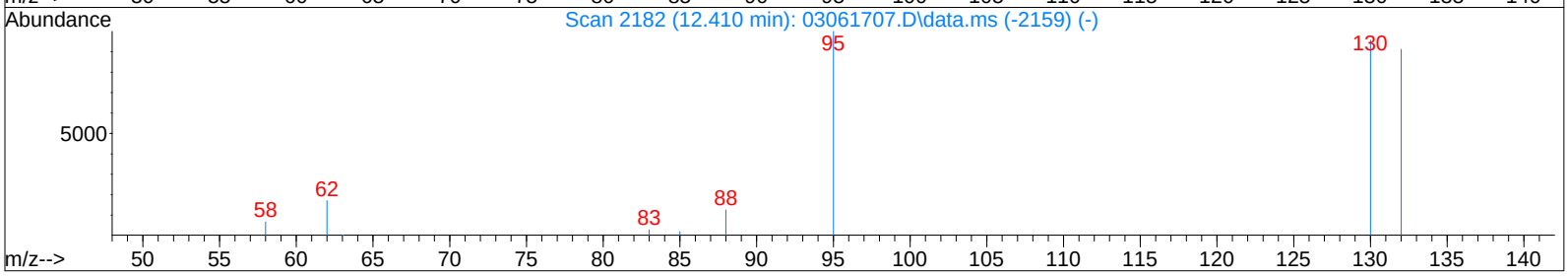
Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\07\03071718.D Vial: 10
Acq On : 7 Mar 2017 19:23 Operator: CL
Sample : P1700971-001 (1000mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 08 07:15:51 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M







TIC: 03071718.D\data.ms

(28) Trichloroethene (T)

12.410min (-0.010) 25.00pg

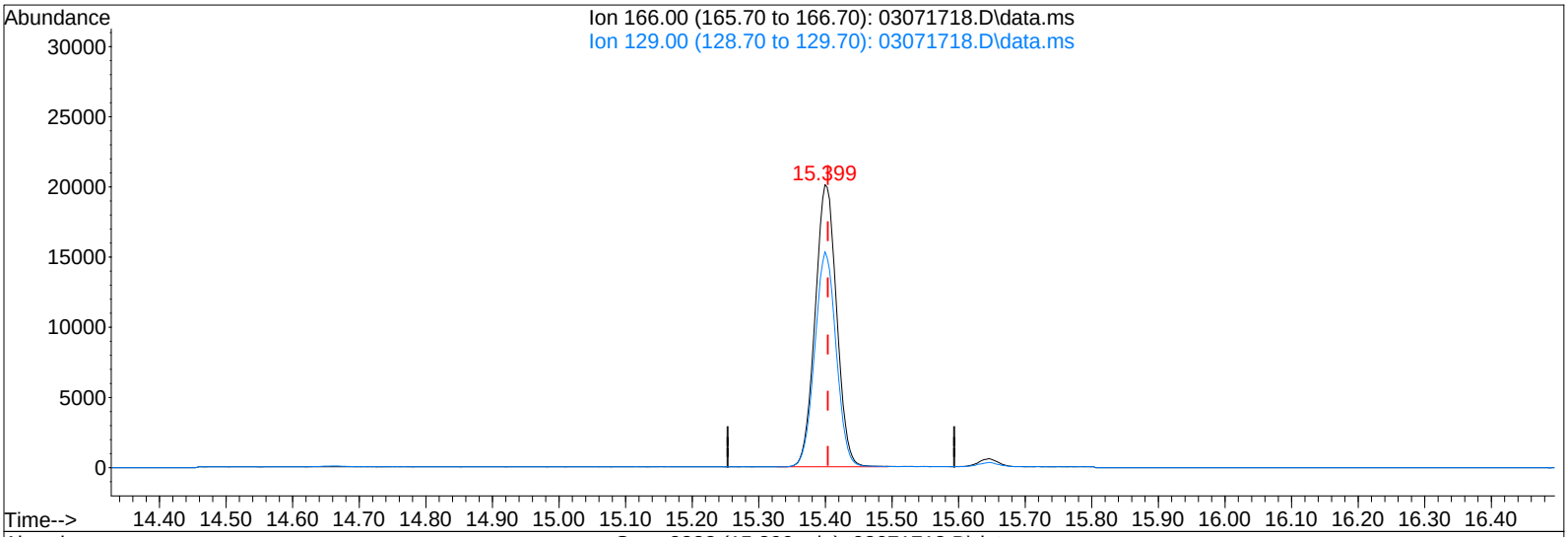
response 1651

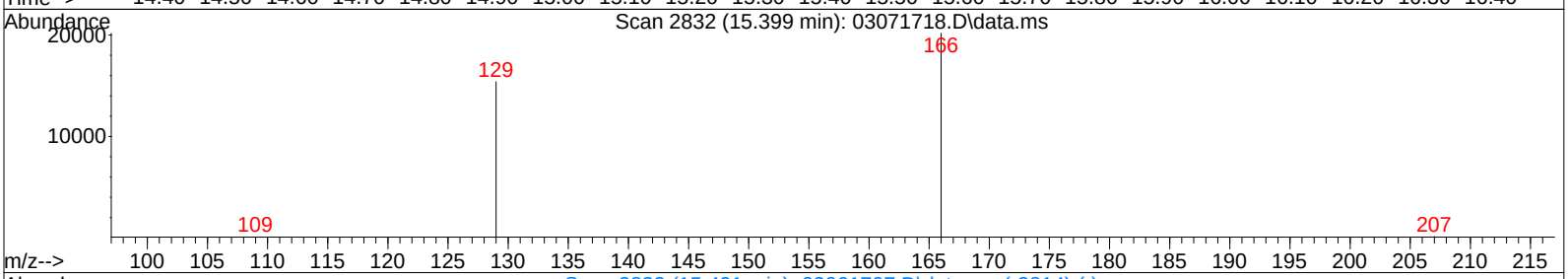
Ion	Exp%	Act%
130.00	100	100
132.00	95.00	95.03
0.00	0.00	0.00
0.00	0.00	0.00

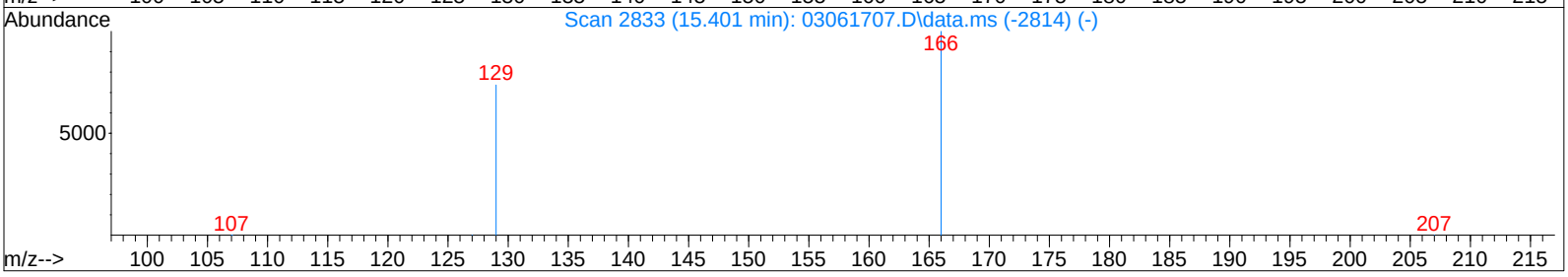
Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\07\03071718.D Vial: 10
Acq On : 7 Mar 2017 19:23 Operator: CL
Sample : P1700971-001 (1000mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 08 07:15:51 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M







TIC: 03071718.D\data.ms

(37) Tetrachloroethene (T)

15.399min (-0.004) 652.17pg

response 45160

Ion	Exp%	Act%
166.00	100	100
129.00	74.90	75.85
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071719.D Vial: 11
Acq On : 7 Mar 2017 19:54 Operator: CL
Sample : P1700971-002 (1000mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 09 14:18:16 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/9/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.75	130	48594	1000.000 pg	-0.02
25) 1,4-Difluorobenzene (IS2)	11.71	114	238501	1000.000 pg	-0.02
38) Chlorobenzene-d5 (IS3)	16.05	54	49561	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.53	65	92227	979.172 pg	-0.02
Spiked Amount 1000.000	Range 70 - 130		Recovery = 97.92%		
33) Toluene-d8 (SS2)	14.14	98	245012	1011.628 pg	-0.01
Spiked Amount 1000.000	Range 70 - 130		Recovery = 101.16%		
45) Bromofluorobenzene (SS3)	17.55	174	119717	1315.477 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 131.55%#		

Target Compounds

						Qvalue
2) Dichlorodifluoromethan...	4.38	85	281804	1873.290 pg		99
3) Chloromethane	4.61	52	16651	410.216 pg	#	88
4) 1,2-Dichloro,1,1,2,2-t...	4.78	85	11613	68.405 pg		99
5) Vinyl Chloride	4.92	62	103	N.D.		
6) 1,3-Butadiene	5.11	54	14473	194.468 pg		86
7) Bromomethane	5.44	94	1109	22.457 pg		95
8) Chloroethane	5.66	64	660	N.D.		
9) Acrolein	6.24	56	30784	995.840 pg		94
10) Acetone	6.38	58	1577209	36994.722 pg		97
11) Trichlorofluoromethane	6.58	101	282166	2441.775 pg		100
12) 1,1-Dichloroethene	7.32	96	201	N.D.		
13) Methylene Chloride	7.47	84	29257	419.436 pg		95
14) Trichlorotrifluoroethane	7.79	151	22135	362.882 pg		99
15) trans-1,2-Dichloroethene	8.50	96	1054	N.D.		
16) 1,1-Dichloroethane	8.75	63	1151	N.D.		
17) Methyl tert-Butyl Ether	0.00	73	0	N.D. d		
18) cis-1,2-Dichloroethene	9.59	96	205	N.D.		
19) Chloroform	9.89	83	42231	307.989 pg		100
21) 1,2-Dichloroethane	10.64	62	131963	1205.770 pg		99
22) 1,1,1-Trichloroethane	10.91	97	1154	N.D.		
23) Benzene	11.36	78	274124	972.265 pg		100
24) Carbon Tetrachloride	11.52	117	41107	381.715 pg		99
26) 1,2-Dichloropropane	12.18	63	2023	28.860 pg		98
27) Bromodichloromethane	0.00	83	0	N.D. d		
28) Trichloroethene	12.41	130	6964	95.945 pg		96
29) 1,4-Dioxane	12.38	88	1989	36.291 pg		99
30) cis-1,3-Dichloropropene	13.24	75	811	N.D.		
31) trans-1,3-Dichloropropene	13.77	75	113	N.D.		
32) 1,1,2-Trichloroethane	13.92	83	218	N.D.		
34) Toluene	14.24	91	690718	2440.489 pg		99
35) Dibromochloromethane	14.66	129	174	N.D.		
36) 1,2-Dibromoethane	0.00	107	0	N.D.		
37) Tetrachloroethene	15.40	166	4583925	60228.753 pg		98
39) Chlorobenzene	0.00	112	0	N.D. d		
40) Ethylbenzene	16.48	91	188314	600.587 pg		99
41) m,p-Xylene	16.64	91	558544	2338.248 pg		99
42) Styrene	17.01	104	113447	681.498 pg		100
43) o-Xylene	17.12	106	96704	808.193 pg		99
44) 1,1,2,2-Tetrachloroethane	17.12	83	2076	N.D.		
46) 1,3,5-Trimethylbenzene	18.38	105	89110	335.042 pg		98
47) 1,2,4-Trimethylbenzene	18.77	105	264973	1004.246 pg		90
48) 1,3-Dichlorobenzene	18.92	146	388	N.D.		
49) 1,4-Dichlorobenzene	18.98	146	4490	30.122 pg		99
50) 1,2-Dichlorobenzene	19.31	146	719	N.D.		
51) 1,2-Dibromo-3-chloropr...	19.75	157	50	N.D.		
52) 1,2,4-Trichlorobenzene	20.94	182	370	N.D.		
53) Naphthalene	21.06	128	40457	154.372 pg		91

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071719.D Vial: 11
Acq On : 7 Mar 2017 19:54 Operator: CL
Sample : P1700971-002 (1000mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 09 14:18:16 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

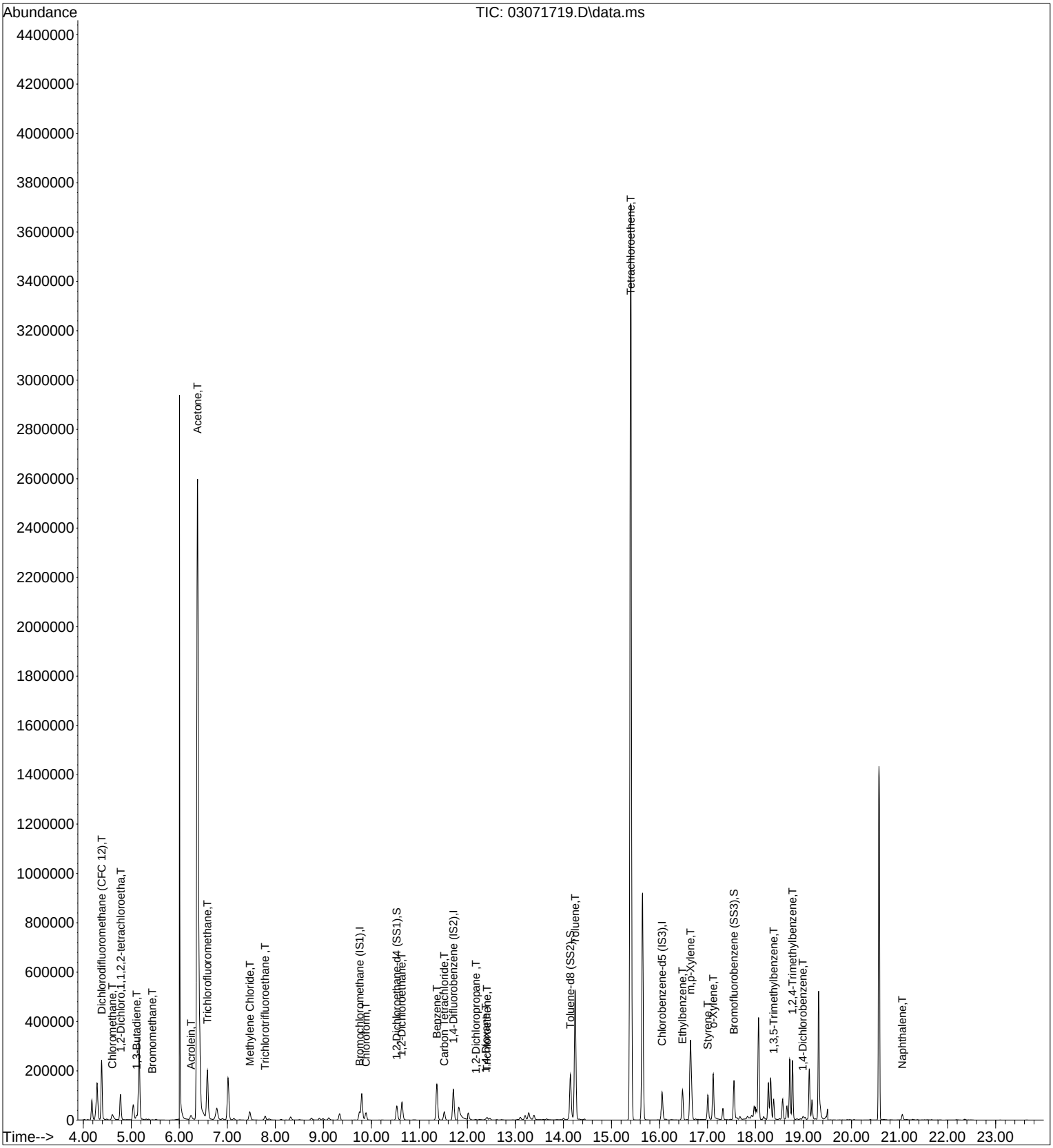
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	21.41	225	83	N.D.	

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071719.D Vial: 11
Acq On : 7 Mar 2017 19:54 Operator: CL
Sample : P1700971-002 (1000mL) Inst : MS19
Misc : S29-01241701

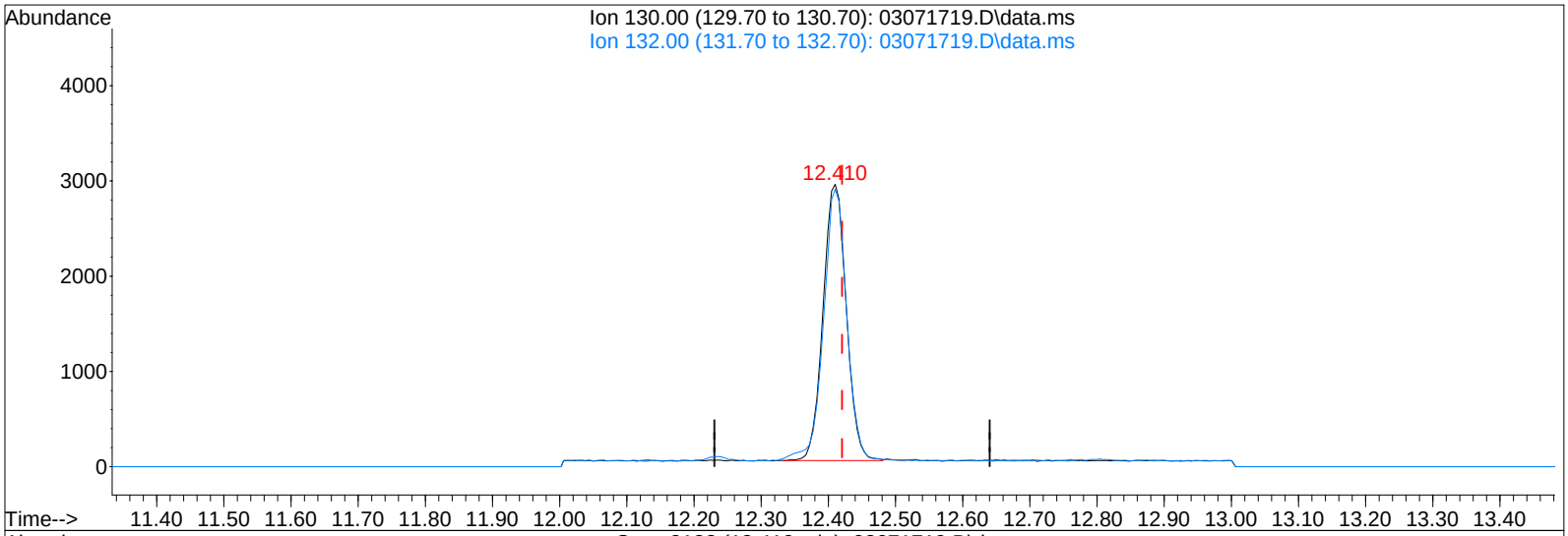
Quant Time: Mar 09 14:18:16 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

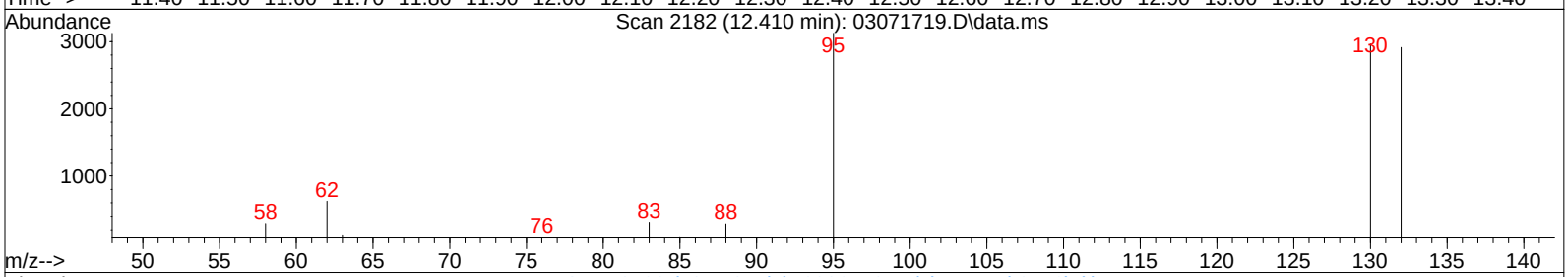


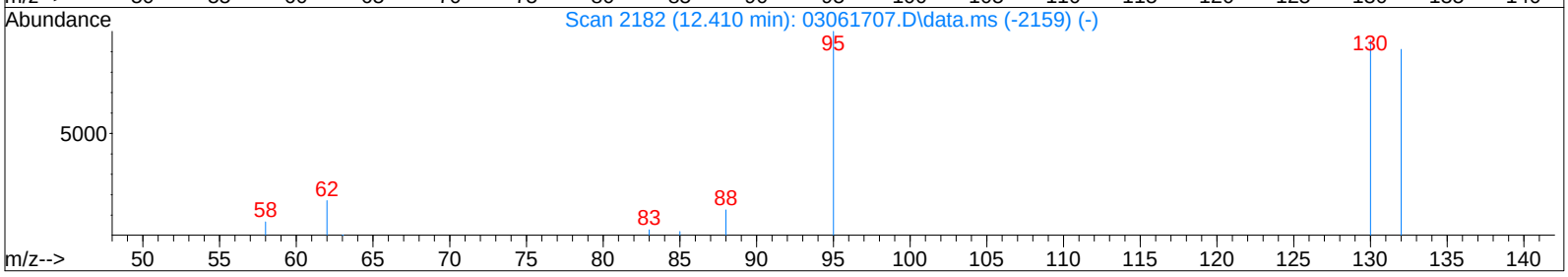
Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\07\03071719.D Vial: 11
Acq On : 7 Mar 2017 19:54 Operator: CL
Sample : P1700971-002 (1000mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 08 07:15:53 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M







TIC: 03071719.D\data.ms

(28) Trichloroethene (T)

12.410min (-0.010) 95.94pg

response 6964

Ion	Exp%	Act%
130.00	100	100
132.00	95.00	99.05
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081714.D Vial: 11
Acq On : 8 Mar 2017 11:57 Operator: CL
Sample : P1700971-002dil (100mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 08 13:01:32 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/9/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.77	130	34734	1000.000 pg	-0.01
25) 1,4-Difluorobenzene (IS2)	11.71	114	168274	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.05	54	33582	1000.000 pg	0.00

System Monitoring Compounds					
20) 1,2-Dichloroethane-d4 ...	10.54	65	68474	1017.079 pg	-0.01
Spiked Amount 1000.000	Range 70 - 130		Recovery = 101.71%		
33) Toluene-d8 (SS2)	14.14	98	194388	1137.565 pg	-0.01
Spiked Amount 1000.000	Range 70 - 130		Recovery = 113.76%		
45) Bromofluorobenzene (SS3)	17.55	174	54559	884.764 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 88.48%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.41	85	23562	219.128 pg	99
3) Chloromethane	4.67	52	3547	122.253 pg	95
4) 1,2-Dichloro,1,1,2,2-t...	4.81	85	990	N.D.	
5) Vinyl Chloride	4.97	62	54	N.D.	
6) 1,3-Butadiene	5.09	54	211	N.D.	
7) Bromomethane	5.49	94	126	N.D.	
8) Chloroethane	0.00	64	0	N.D.	
9) Acrolein	6.29	56	2414	109.252 pg	97
10) Acetone	6.41	58	125955	4133.270 pg	97
11) Trichlorofluoromethane	6.62	101	21061	254.981 pg	100
12) 1,1-Dichloroethene	0.00	96	0	N.D.	
13) Methylene Chloride	7.49	84	2455	49.240 pg	92
14) Trichlorotrifluoroethane	7.80	151	1656	37.982 pg	99
15) trans-1,2-Dichloroethene	0.00	96	0	N.D.	
16) 1,1-Dichloroethane	0.00	63	0	N.D.	
17) Methyl tert-Butyl Ether	8.75	73	82	N.D.	
18) cis-1,2-Dichloroethene	0.00	96	0	N.D.	
19) Chloroform	9.90	83	4976	50.771 pg	99
21) 1,2-Dichloroethane	10.65	62	10044	128.395 pg	95
22) 1,1,1-Trichloroethane	10.91	97	102	N.D.	
23) Benzene	11.37	78	22849	113.379 pg	98
24) Carbon Tetrachloride	11.52	117	3246	42.170 pg	99
26) 1,2-Dichloropropane	12.18	63	144	N.D.	
27) Bromodichloromethane	12.38	83	202	N.D.	
28) Trichloroethene	12.42	130	559	N.D.	
29) 1,4-Dioxane	12.40	88	127	N.D.	
30) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
31) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
32) 1,1,2-Trichloroethane	0.00	83	0	N.D.	
34) Toluene	14.25	91	60968	305.317 pg	100
35) Dibromochloromethane	0.00	129	0	N.D.	
36) 1,2-Dibromoethane	0.00	107	0	N.D.	
37) Tetrachloroethene	15.40	166	317784	5917.954 pg	99
39) Chlorobenzene	16.10	112	220	N.D.	
40) Ethylbenzene	16.48	91	12475	58.717 pg	100
41) m,p-Xylene	16.65	91	36441	225.142 pg	100
42) Styrene	17.01	104	5894	52.253 pg	97
43) o-Xylene	17.12	106	6321	77.963 pg	100
44) 1,1,2,2-Tetrachloroethane	17.12	83	132	N.D.	
46) 1,3,5-Trimethylbenzene	18.38	105	4432	24.593 pg	99
47) 1,2,4-Trimethylbenzene	18.77	105	13363	74.744 pg	88
48) 1,3-Dichlorobenzene	18.99	146	260	N.D.	
49) 1,4-Dichlorobenzene	18.99	146	260	N.D.	
50) 1,2-Dichlorobenzene	19.31	146	74	N.D.	
51) 1,2-Dibromo-3-chloropr...	0.00	157	0	N.D.	
52) 1,2,4-Trichlorobenzene	0.00	182	0	N.D.	
53) Naphthalene	21.13	128	1872	N.D.	

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081714.D Vial: 11
Acq On : 8 Mar 2017 11:57 Operator: CL
Sample : P1700971-002dil (100mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 08 13:01:32 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

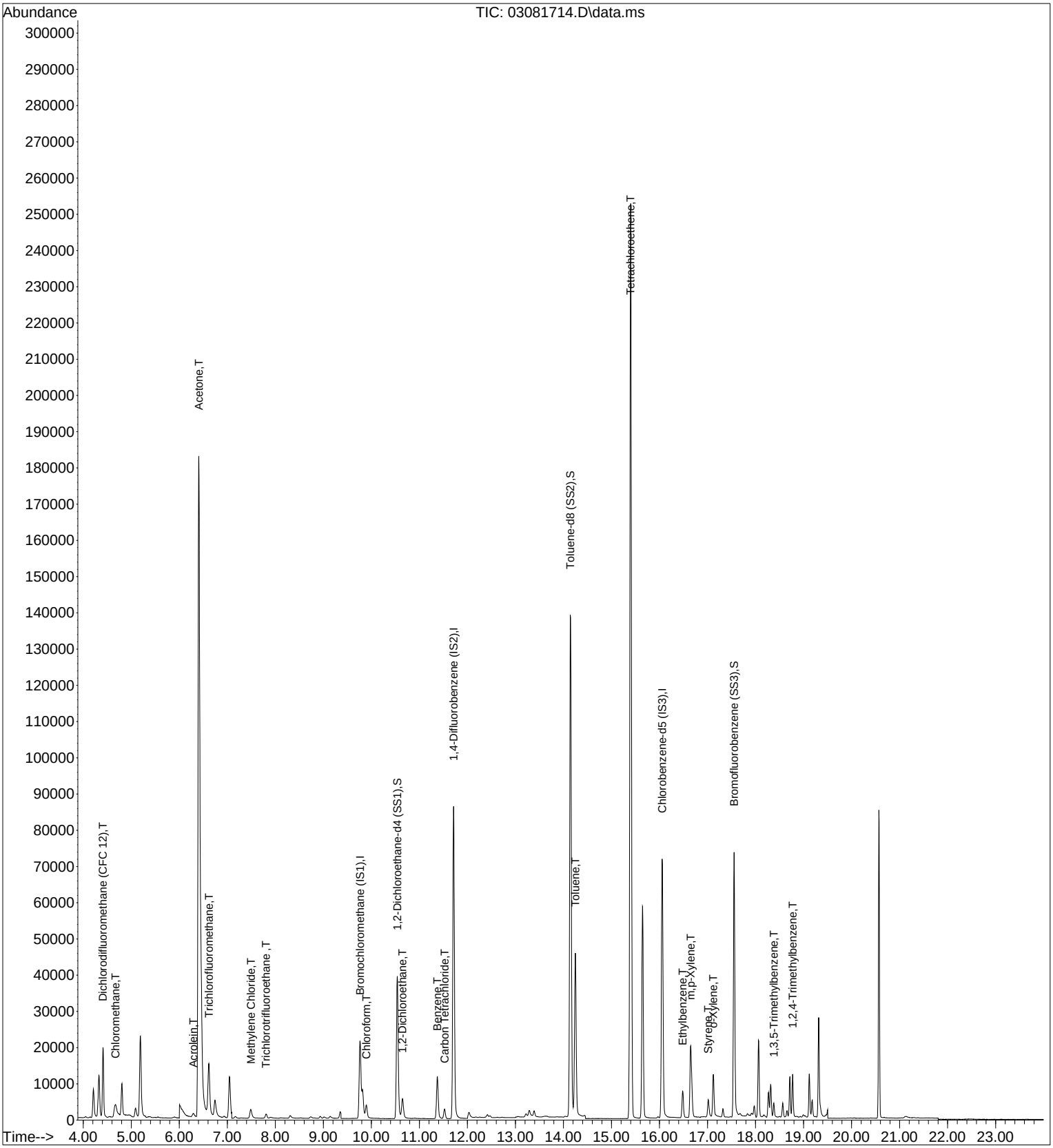
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	0.00	225	0	N.D.	

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081714.D Vial: 11
Acq On : 8 Mar 2017 11:57 Operator: CL
Sample : P1700971-002dil (100mL) Inst : MS19
Misc : S29-01241701

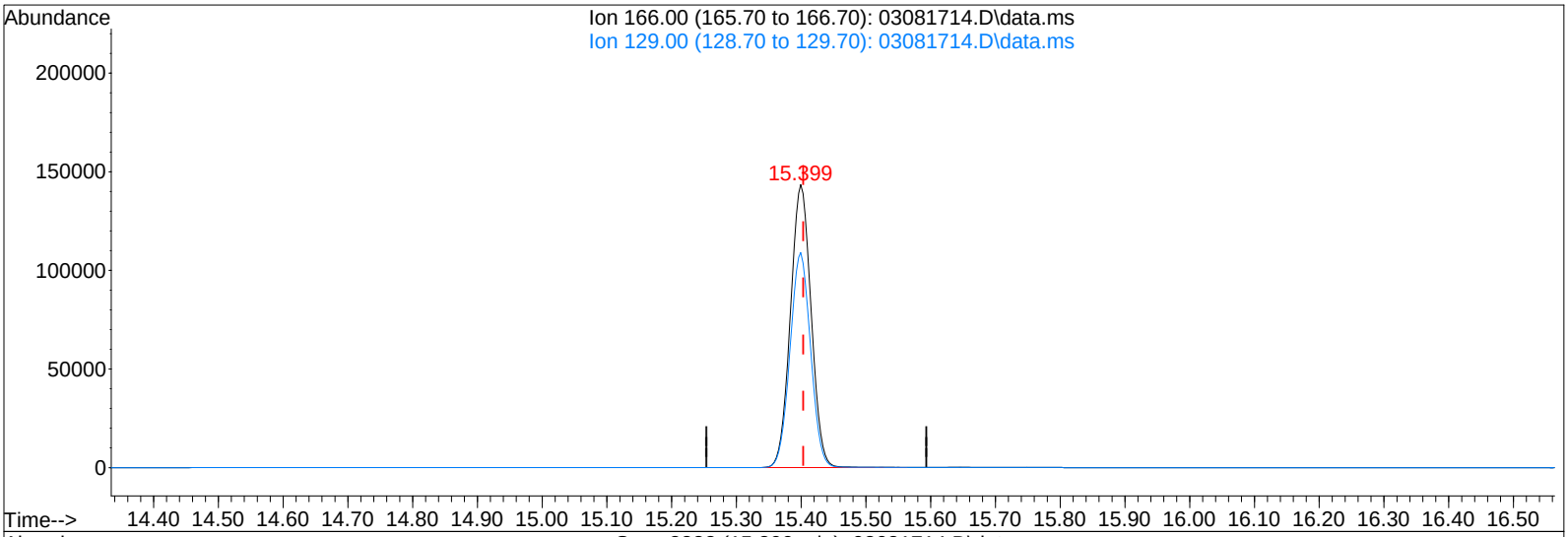
Quant Time: Mar 08 13:01:32 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

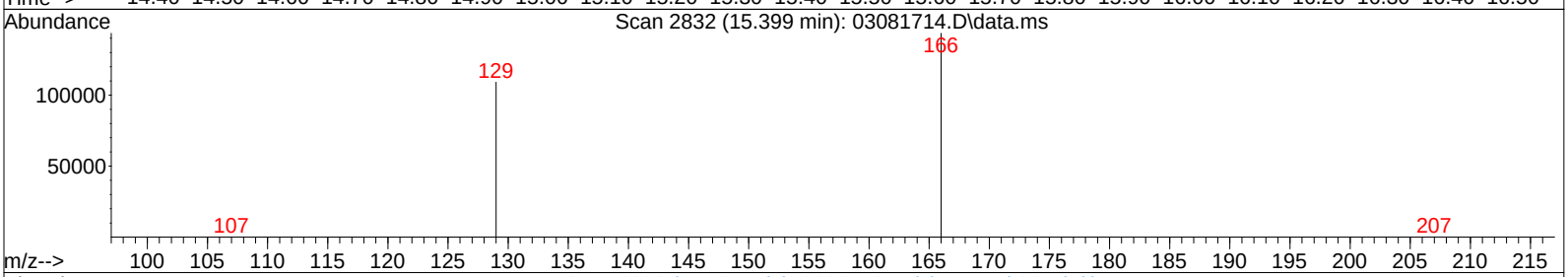


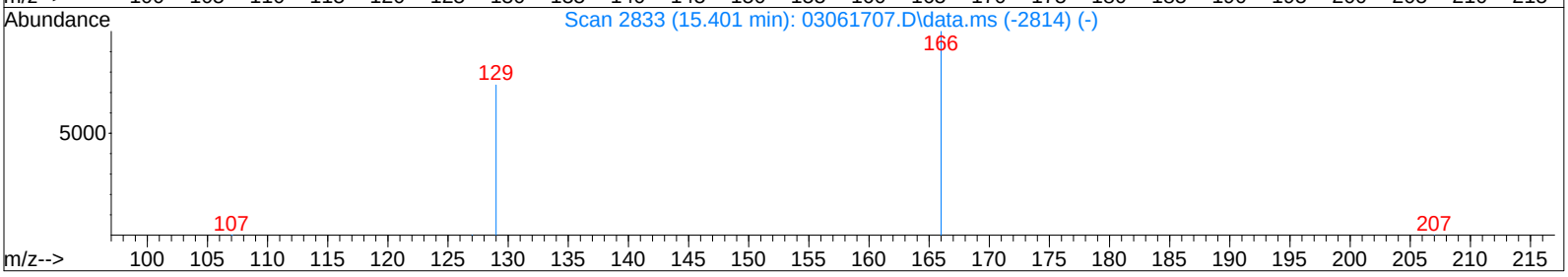
Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\08\03081714.D Vial: 11
Acq On : 8 Mar 2017 11:57 Operator: CL
Sample : P1700971-002dil (100mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 08 13:01:32 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M







TIC: 03081714.D\data.ms

(37) Tetrachloroethene (T)

15.399min (-0.004) 5917.95pg

response 317784

Ion	Exp%	Act%
166.00	100	100
129.00	74.90	75.81
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071720.D Vial: 12
Acq On : 7 Mar 2017 20:25 Operator: CL
Sample : P1700971-004 (1000mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 09 14:19:28 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/9/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.75	130	52244	1000.000 pg	-0.02
25) 1,4-Difluorobenzene (IS2)	11.71	114	255575	1000.000 pg	-0.01
38) Chlorobenzene-d5 (IS3)	16.05	54	52212	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.53	65	97361	961.462 pg	-0.02
Spiked Amount 1000.000	Range 70 - 130		Recovery = 96.15%		
33) Toluene-d8 (SS2)	14.14	98	261873	1009.011 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 100.90%		
45) Bromofluorobenzene (SS3)	17.55	174	91895	958.493 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 95.85%		

Target Compounds

						Qvalue
2) Dichlorodifluoromethan...	4.39	85	303814	1878.503 pg		100
3) Chloromethane	4.61	52	17685	405.250 pg	#	88
4) 1,2-Dichloro,1,1,2,2-t...	4.79	85	12172	66.689 pg		99
5) Vinyl Chloride	4.94	62	227	N.D.		
6) 1,3-Butadiene	5.12	54	14420	180.219 pg	#	75
7) Bromomethane	5.45	94	1220	22.979 pg		99
8) Chloroethane	5.67	64	718	N.D.		
9) Acrolein	6.25	56	33590	1010.697 pg		95
10) Acetone	6.39	58	1617536	35289.922 pg		96
11) Trichlorofluoromethane	6.59	101	291661	2347.608 pg		100
12) 1,1-Dichloroethene	7.33	96	144	N.D.		
13) Methylene Chloride	7.47	84	30045	400.640 pg		96
14) Trichlorotrifluoroethane	7.79	151	23131	352.717 pg		100
15) trans-1,2-Dichloroethene	8.51	96	1079	N.D.		
16) 1,1-Dichloroethane	8.73	63	525	N.D.		
17) Methyl tert-Butyl Ether	0.00	73	0	N.D. d		
18) cis-1,2-Dichloroethene	9.59	96	182	N.D.		
19) Chloroform	9.89	83	43315	293.824 pg		98
21) 1,2-Dichloroethane	10.64	62	137789	1171.044 pg		100
22) 1,1,1-Trichloroethane	10.91	97	1188	N.D.		
23) Benzene	11.36	78	285035	940.334 pg		100
24) Carbon Tetrachloride	11.52	117	42758	369.307 pg		100
26) 1,2-Dichloropropane	12.18	63	2059	27.411 pg		92
27) Bromodichloromethane	0.00	83	0	N.D. d		
28) Trichloroethene	12.41	130	7295	93.791 pg		97
29) 1,4-Dioxane	12.38	88	2144	36.505 pg		97
30) cis-1,3-Dichloropropene	13.24	75	910	N.D.		
31) trans-1,3-Dichloropropene	13.73	75	734	N.D.		
32) 1,1,2-Trichloroethane	13.92	83	560	N.D.		
34) Toluene	14.24	91	742693	2448.823 pg		99
35) Dibromochloromethane	14.67	129	122	N.D.		
36) 1,2-Dibromoethane	14.91	107	60	N.D.		
37) Tetrachloroethene	15.40	166	4752785	58275.549 pg		98
39) Chlorobenzene	0.00	112	0	N.D. d		
40) Ethylbenzene	16.48	91	201982	611.471 pg		100
41) m,p-Xylene	16.64	91	594256	2361.438 pg		99
42) Styrene	17.01	104	149340	851.565 pg		99
43) o-Xylene	17.12	106	102370	812.106 pg		98
44) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D. d		
46) 1,3,5-Trimethylbenzene	18.38	105	72481	258.682 pg		99
47) 1,2,4-Trimethylbenzene	18.77	105	233142	838.743 pg		88
48) 1,3-Dichlorobenzene	18.92	146	383	N.D.		
49) 1,4-Dichlorobenzene	18.98	146	5593	35.617 pg		100
50) 1,2-Dichlorobenzene	19.31	146	846	N.D.		
51) 1,2-Dibromo-3-chloropr...	19.76	157	76	N.D.		
52) 1,2,4-Trichlorobenzene	20.94	182	475	N.D.		
53) Naphthalene	21.06	128	106300	385.016 pg		97

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071720.D Vial: 12
Acq On : 7 Mar 2017 20:25 Operator: CL
Sample : P1700971-004 (1000mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 09 14:19:28 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

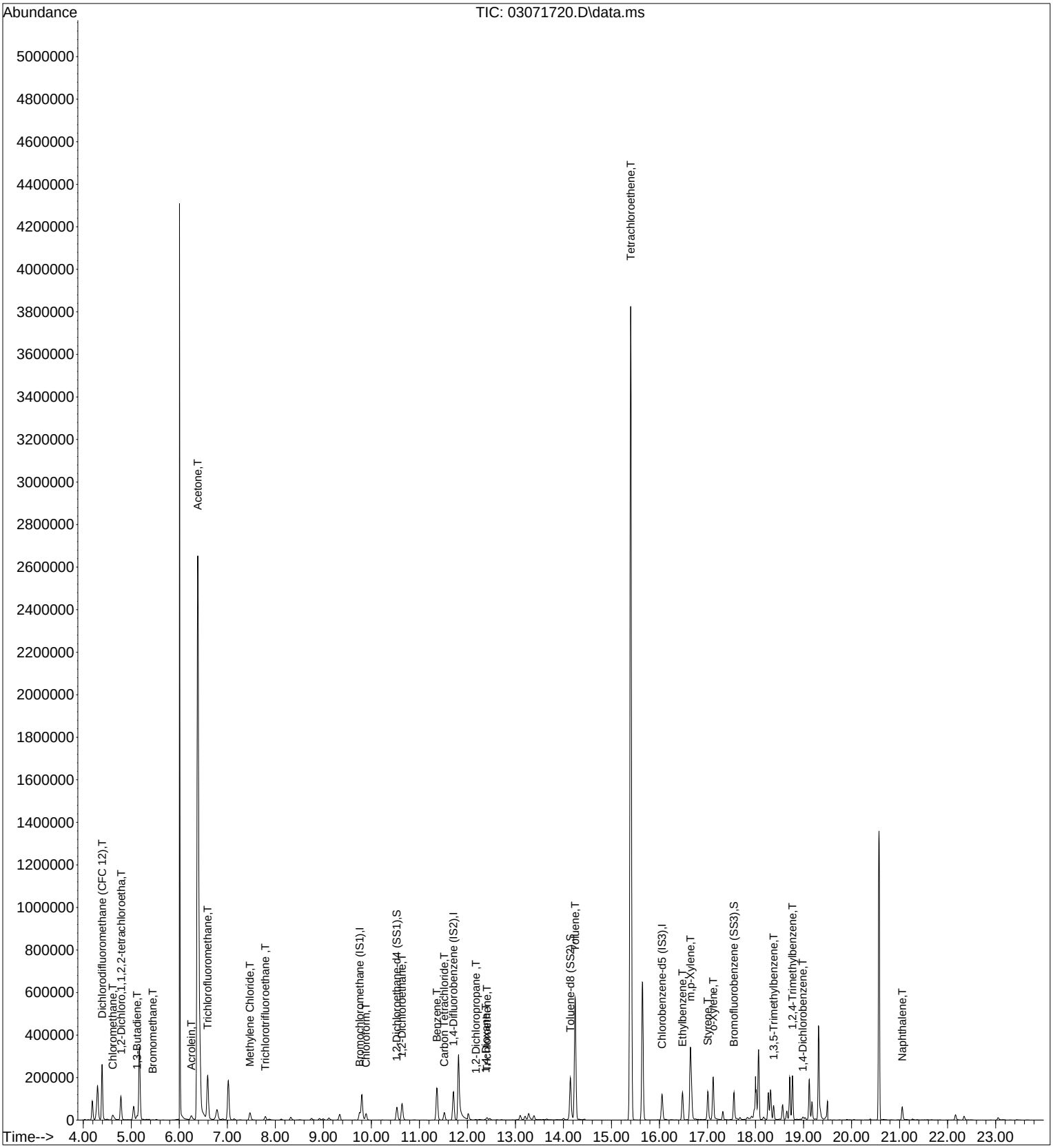
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	121	N.D.	

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071720.D Vial: 12
Acq On : 7 Mar 2017 20:25 Operator: CL
Sample : P1700971-004 (1000mL) Inst : MS19
Misc : S29-01241701

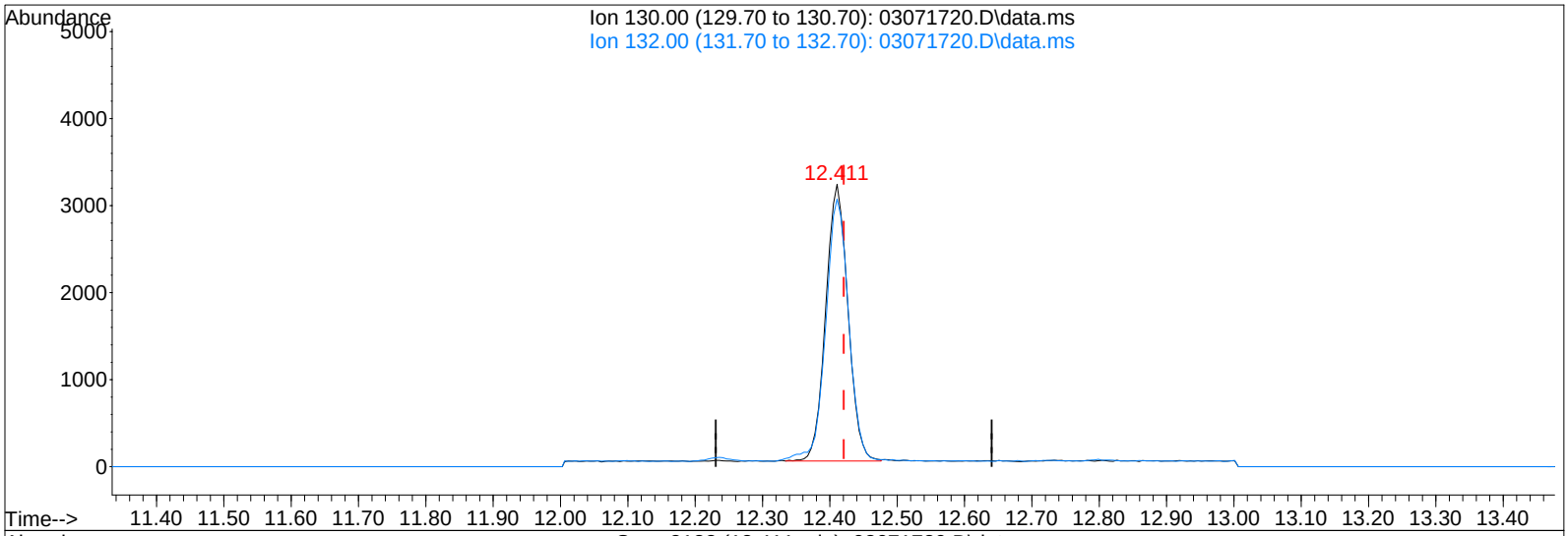
Quant Time: Mar 09 14:19:28 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

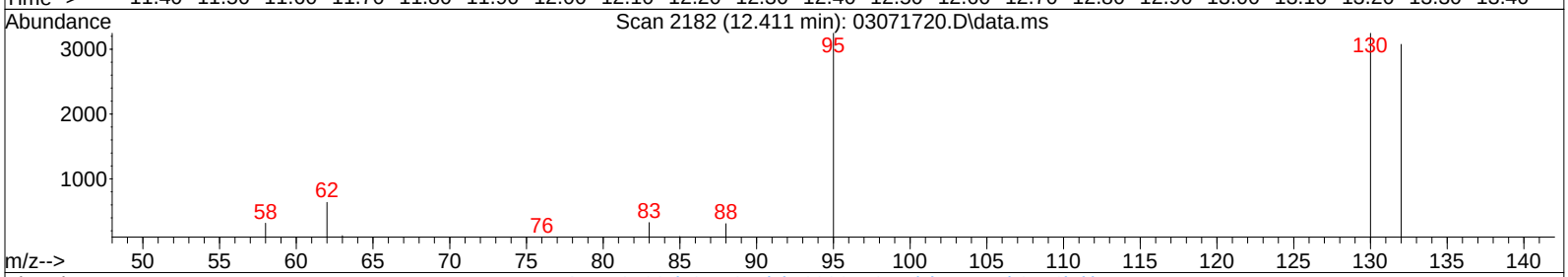


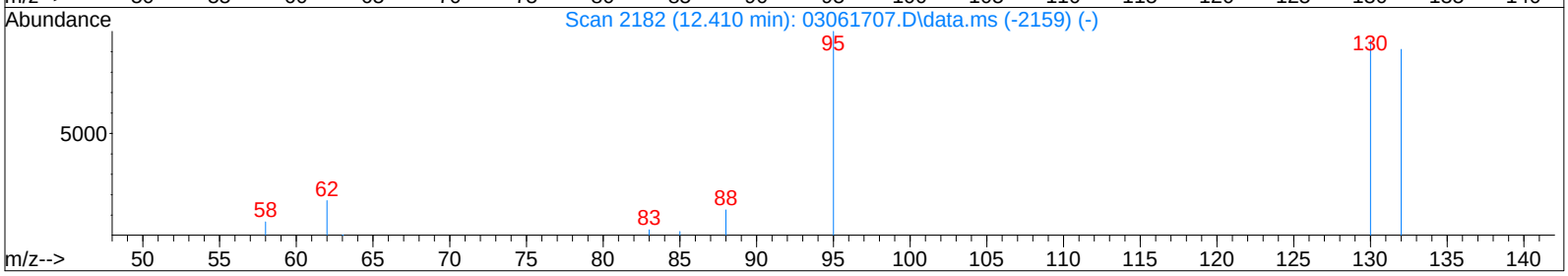
Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\07\03071720.D Vial: 12
Acq On : 7 Mar 2017 20:25 Operator: CL
Sample : P1700971-004 (1000mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 08 07:15:55 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M







TIC: 03071720.D\data.ms

(28) Trichloroethene (T)

12.411min (-0.010) 93.79pg

response 7295

Ion	Exp%	Act%
130.00	100	100
132.00	95.00	98.33
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081715.D Vial: 12
Acq On : 8 Mar 2017 12:29 Operator: CL
Sample : P1700971-004dil (100mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 08 13:01:43 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/9/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.77	130	34296	1000.000 pg	-0.01
25) 1,4-Difluorobenzene (IS2)	11.71	114	165446	1000.000 pg	-0.01
38) Chlorobenzene-d5 (IS3)	16.06	54	33130	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.54	65	67715	1018.650 pg	-0.01
Spiked Amount 1000.000	Range 70 - 130		Recovery = 101.87%		
33) Toluene-d8 (SS2)	14.15	98	167041	994.238 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 99.42%		
45) Bromofluorobenzene (SS3)	17.56	174	54176	890.539 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 89.05%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.41	85	23135	217.905 pg	100
3) Chloromethane	4.67	52	3321	115.926 pg	93
4) 1,2-Dichloro,1,1,2,2-t...	4.82	85	995	N.D.	
5) Vinyl Chloride	0.00	62	0	N.D.	
6) 1,3-Butadiene	5.09	54	191	N.D.	
7) Bromomethane	0.00	94	0	N.D.	
8) Chloroethane	0.00	64	0	N.D.	
9) Acrolein	6.29	56	2415	110.693 pg	99
10) Acetone	6.41	58	122484	4070.700 pg	97
11) Trichlorofluoromethane	6.62	101	20514	251.530 pg	100
12) 1,1-Dichloroethene	0.00	96	0	N.D.	
13) Methylene Chloride	7.49	84	2262	45.948 pg	88
14) Trichlorotrifluoroethane	7.81	151	1653	38.397 pg	99
15) trans-1,2-Dichloroethene	0.00	96	0	N.D.	
16) 1,1-Dichloroethane	0.00	63	0	N.D.	
17) Methyl tert-Butyl Ether	8.80	73	100	N.D.	
18) cis-1,2-Dichloroethene	0.00	96	0	N.D.	
19) Chloroform	9.90	83	4872	50.344 pg	98
21) 1,2-Dichloroethane	10.65	62	9903	128.209 pg	99
22) 1,1,1-Trichloroethane	0.00	97	0	N.D.	
23) Benzene	11.37	78	21938	110.249 pg	99
24) Carbon Tetrachloride	11.52	117	3120	41.050 pg	99
26) 1,2-Dichloropropane	12.17	63	176	N.D.	
27) Bromodichloromethane	12.38	83	68	N.D.	
28) Trichloroethene	12.42	130	515	N.D.	
29) 1,4-Dioxane	12.40	88	128	N.D.	
30) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
31) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
32) 1,1,2-Trichloroethane	0.00	83	0	N.D.	
34) Toluene	14.25	91	51997	264.843 pg	100
35) Dibromochloromethane	0.00	129	0	N.D.	
36) 1,2-Dibromoethane	0.00	107	0	N.D.	
37) Tetrachloroethene	15.40	166	311200	5894.404 pg	99
39) Chlorobenzene	16.11	112	176	N.D.	
40) Ethylbenzene	16.48	91	12538	59.819 pg	100
41) m,p-Xylene	16.65	91	36756	230.187 pg	100
42) Styrene	17.02	104	7374	66.266 pg	99
43) o-Xylene	17.13	106	6269	78.377 pg	100
44) 1,1,2,2-Tetrachloroethane	17.13	83	182	N.D.	
46) 1,3,5-Trimethylbenzene	18.38	105	4313	24.259 pg	94
47) 1,2,4-Trimethylbenzene	18.77	105	13304	75.429 pg	89
48) 1,3-Dichlorobenzene	18.92	146	59	N.D.	
49) 1,4-Dichlorobenzene	18.99	146	365	N.D.	
50) 1,2-Dichlorobenzene	19.31	146	76	N.D.	
51) 1,2-Dibromo-3-chloropr...	0.00	157	0	N.D.	
52) 1,2,4-Trichlorobenzene	20.96	182	84	N.D.	
53) Naphthalene	21.08	128	5098	29.100 pg	93

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081715.D Vial: 12
Acq On : 8 Mar 2017 12:29 Operator: CL
Sample : P1700971-004dil (100mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 08 13:01:43 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

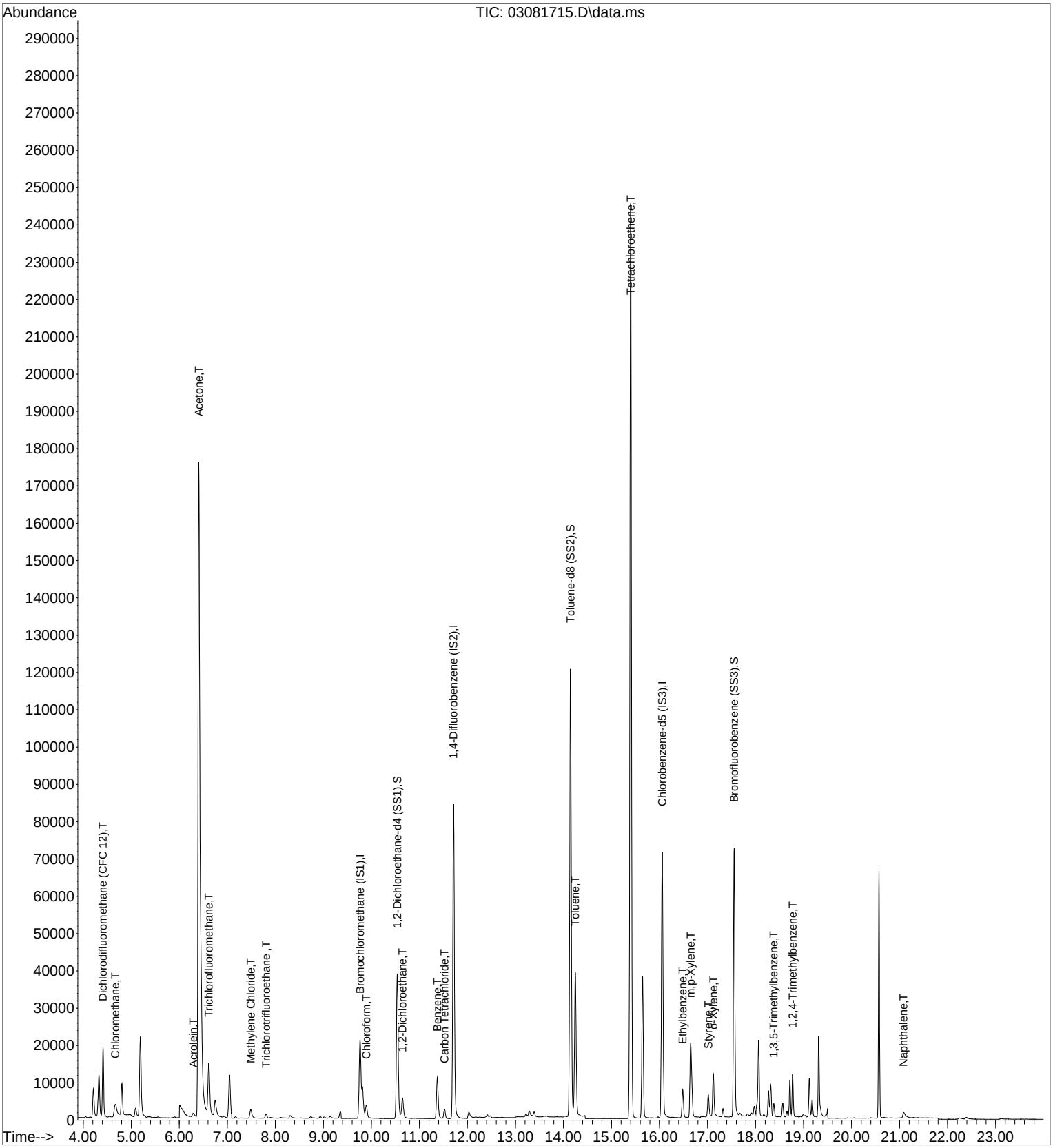
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	0.00	225	0	N.D.	

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081715.D Vial: 12
Acq On : 8 Mar 2017 12:29 Operator: CL
Sample : P1700971-004dil (100mL) Inst : MS19
Misc : S29-01241701

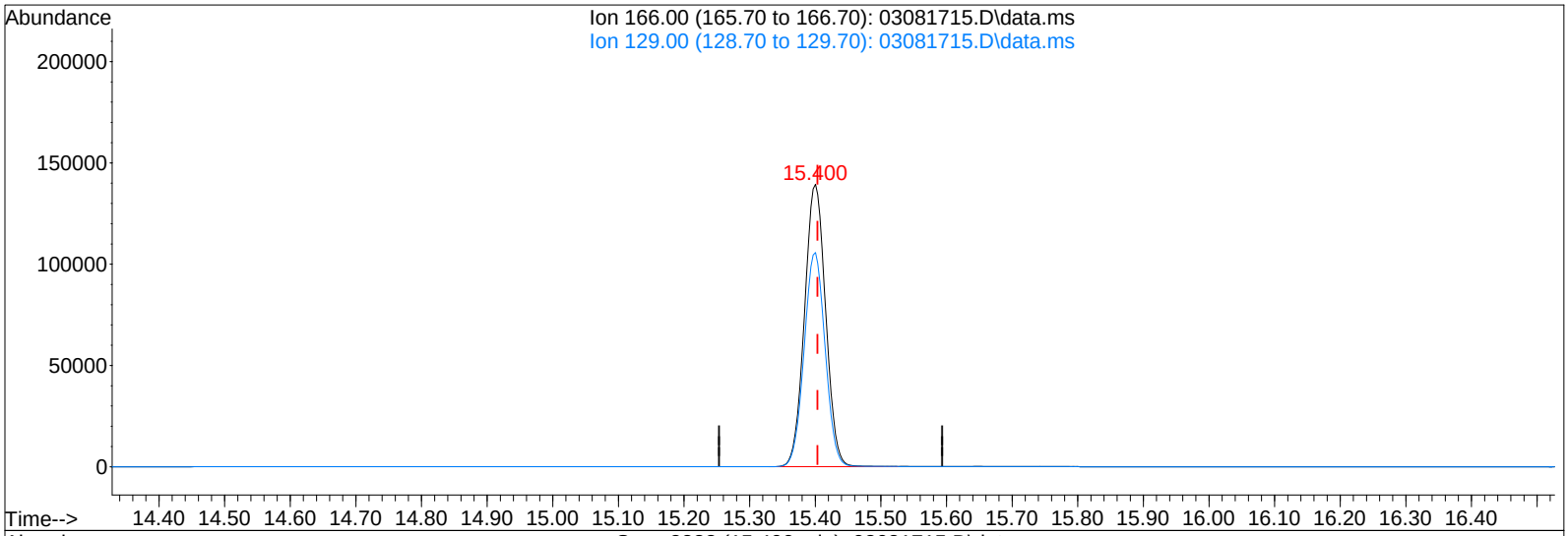
Quant Time: Mar 08 13:01:43 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\08\03081715.D Vial: 12
Acq On : 8 Mar 2017 12:29 Operator: CL
Sample : P1700971-004dil (100mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 08 13:01:43 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



TIC: 03081715.D\data.ms

(37) Tetrachloroethene (T)

15.400min (-0.003) 5894.40pg

response 311200

Ion	Exp%	Act%
166.00	100	100
129.00	74.90	75.80
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081717.D Vial: 1
Acq On : 8 Mar 2017 13:32 Operator: CL
Sample : P1700971-005 (1000mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 08 14:10:27 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/9/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.78	130	34810	1000.000 pg	0.00
25) 1,4-Difluorobenzene (IS2)	11.72	114	169604	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.06	54	34813	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.55	65	69498	1030.035 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 103.00%		
33) Toluene-d8 (SS2)	14.15	98	171166	993.814 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 99.38%		
45) Bromofluorobenzene (SS3)	17.56	174	56745	887.674 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 88.77%		

Target Compounds

						Qvalue
2) Dichlorodifluoromethan...	4.40	85	173167	1606.947 pg		99
3) Chloromethane	4.65	52	8149	280.256 pg	#	88
4) 1,2-Dichloro,1,1,2,2-t...	4.81	85	7535	61.959 pg		99
5) Vinyl Chloride	0.00	62	0	N.D.		
6) 1,3-Butadiene	5.10	54	491	N.D.		
7) Bromomethane	5.50	94	69	N.D.		
8) Chloroethane	5.73	64	842	31.178 pg		95
9) Acrolein	6.34	56	1251	56.494 pg	#	67
10) Acetone	6.43	58	70063	2294.129 pg		97
11) Trichlorofluoromethane	6.63	101	46140	557.387 pg		100
12) 1,1-Dichloroethene	0.00	96	0	N.D.		
13) Methylene Chloride	7.50	84	20455	409.368 pg		94
14) Trichlorotrifluoroethane	7.82	151	76	N.D.		
15) trans-1,2-Dichloroethene	0.00	96	0	N.D.		
16) 1,1-Dichloroethane	8.73	63	138	N.D.		
17) Methyl tert-Butyl Ether	8.73	73	1091	N.D.		
18) cis-1,2-Dichloroethene	0.00	96	0	N.D.		
19) Chloroform	9.90	83	2334	23.762 pg		96
21) 1,2-Dichloroethane	0.00	62	0	N.D.		
22) 1,1,1-Trichloroethane	0.00	97	0	N.D.		
23) Benzene	11.38	78	15421	76.353 pg		100
24) Carbon Tetrachloride	11.53	117	267	N.D.		
26) 1,2-Dichloropropane	0.00	63	0	N.D.		
27) Bromodichloromethane	0.00	83	0	N.D.		
28) Trichloroethene	12.42	130	138	N.D.		
29) 1,4-Dioxane	12.42	88	175	N.D.		
30) cis-1,3-Dichloropropene	0.00	75	0	N.D.		
31) trans-1,3-Dichloropropene	0.00	75	0	N.D.		
32) 1,1,2-Trichloroethane	0.00	83	0	N.D.		
34) Toluene	14.25	91	9888	49.129 pg		99
35) Dibromochloromethane	0.00	129	0	N.D.		
36) 1,2-Dibromoethane	0.00	107	0	N.D.		
37) Tetrachloroethene	15.40	166	87435	1615.496 pg		99
39) Chlorobenzene	16.11	112	225	N.D.		
40) Ethylbenzene	16.49	91	1733	N.D.		
41) m,p-Xylene	16.65	91	5341	31.831 pg		99
42) Styrene	17.02	104	1125	N.D.		
43) o-Xylene	17.13	106	867	N.D.		
44) 1,1,2,2-Tetrachloroethane	17.12	83	377	N.D.		
46) 1,3,5-Trimethylbenzene	18.38	105	683	N.D.		
47) 1,2,4-Trimethylbenzene	18.77	105	2386	N.D.		
48) 1,3-Dichlorobenzene	18.93	146	150	N.D.		
49) 1,4-Dichlorobenzene	18.99	146	342	N.D.		
50) 1,2-Dichlorobenzene	19.31	146	236	N.D.		
51) 1,2-Dibromo-3-chloropr...	0.00	157	0	N.D.		
52) 1,2,4-Trichlorobenzene	20.97	182	277	N.D.		
53) Naphthalene	21.11	128	1968	N.D.		

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081717.D Vial: 1
Acq On : 8 Mar 2017 13:32 Operator: CL
Sample : P1700971-005 (1000mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 08 14:10:27 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

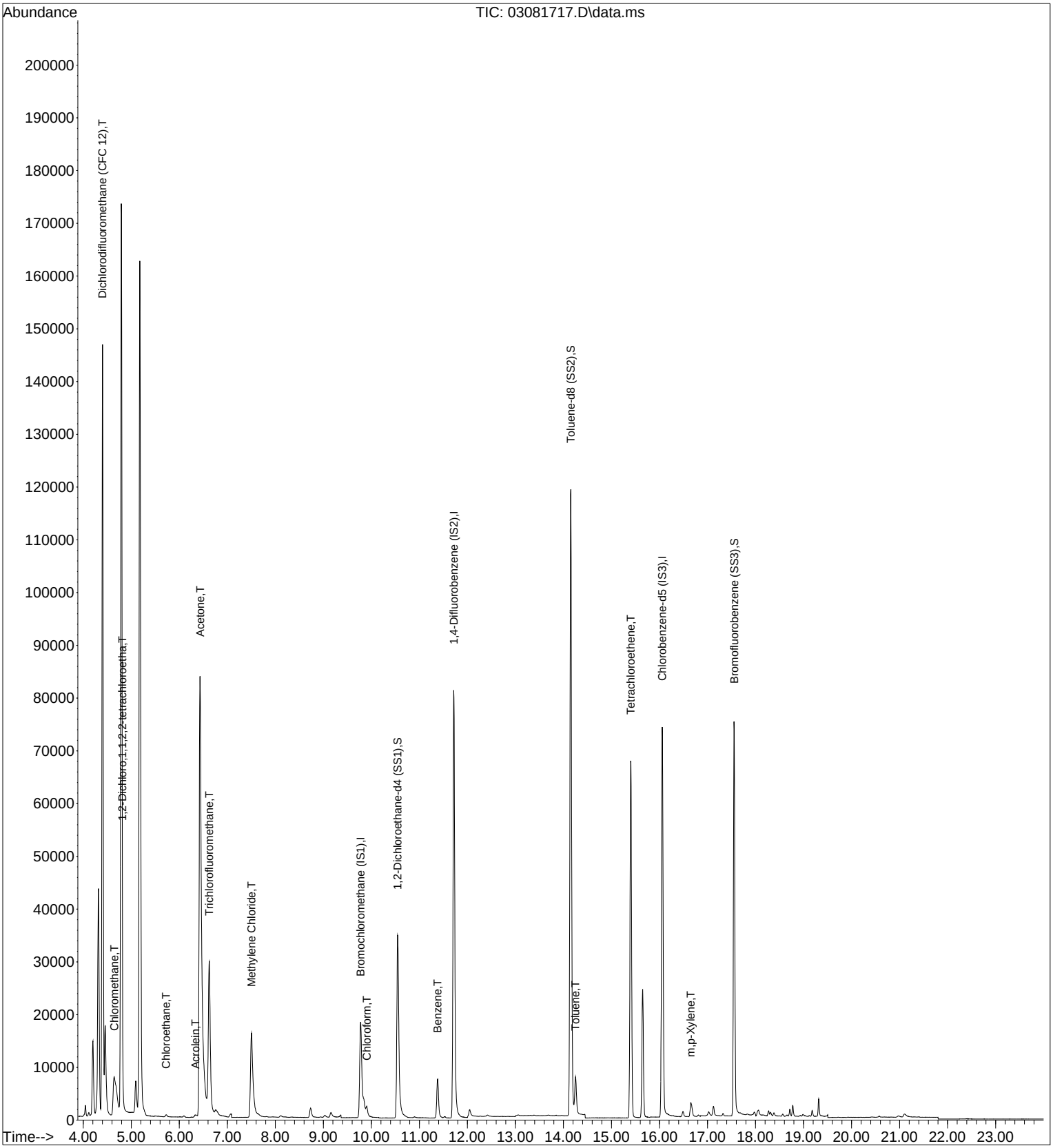
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	0.00	225	0	N.D.	

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081717.D Vial: 1
Acq On : 8 Mar 2017 13:32 Operator: CL
Sample : P1700971-005 (1000mL) Inst : MS19
Misc : S29-01241701

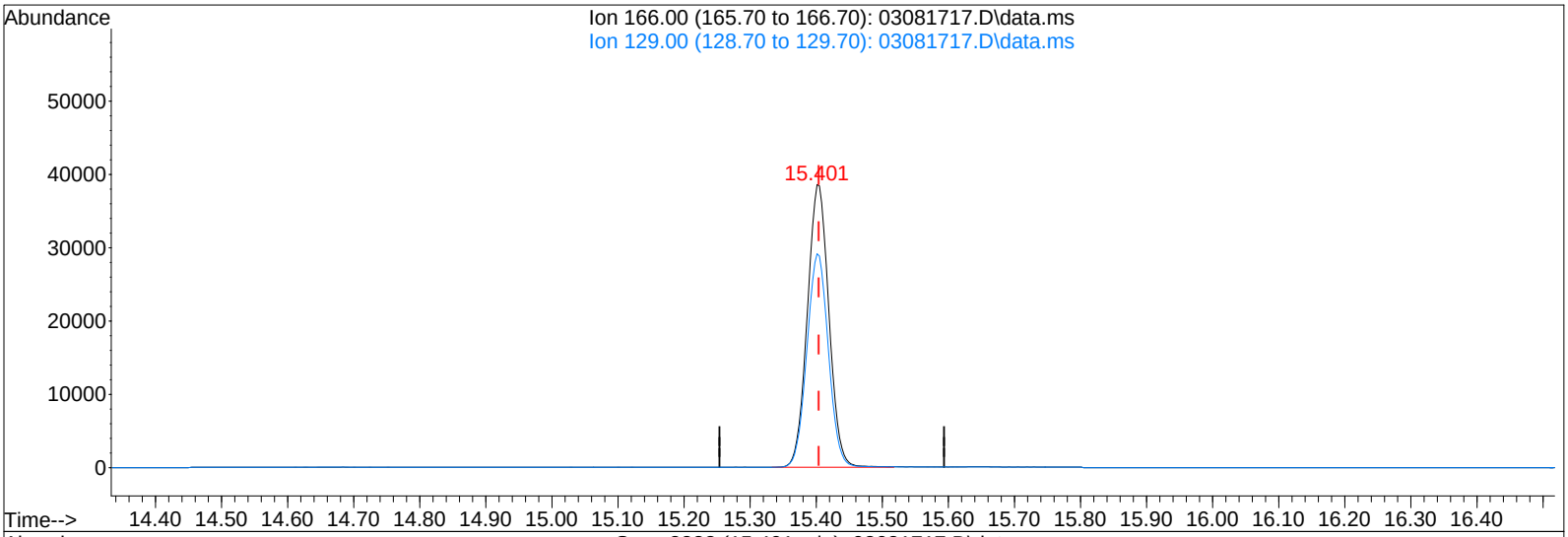
Quant Time: Mar 08 14:10:27 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

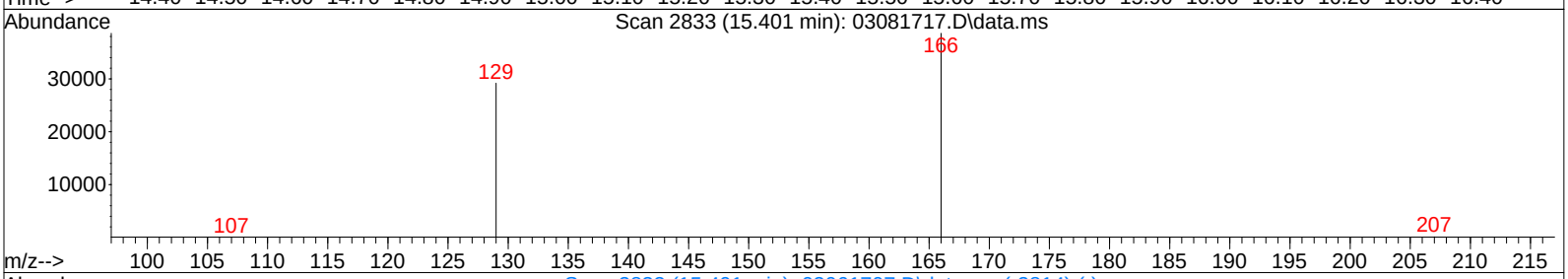


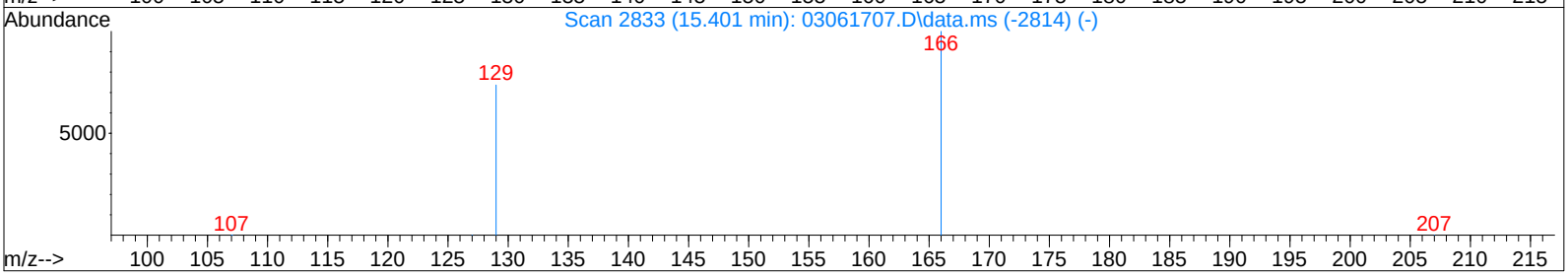
Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\08\03081717.D Vial: 1
Acq On : 8 Mar 2017 13:32 Operator: CL
Sample : P1700971-005 (1000mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 08 14:10:27 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M







TIC: 03081717.D\data.ms

(37) Tetrachloroethene (T)

15.401min (-0.002) 1615.50pg

response 87435

Ion	Exp%	Act%
166.00	100	100
129.00	74.90	75.48
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071703.D Vial: 2
Acq On : 7 Mar 2017 10:51 Operator: CL
Sample : MB S19030717 1000mL Inst : MS19
Misc : S29-01241701/AC01205

Quant Time: Mar 07 11:40:56 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/7/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.79	130	40001	1000.000 pg	0.00
25) 1,4-Difluorobenzene (IS2)	11.72	114	193105	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.06	54	39786	1000.000 pg	0.00

System Monitoring Compounds					
20) 1,2-Dichloroethane-d4 ...	10.55	65	80946	1044.018 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 104.40%		
33) Toluene-d8 (SS2)	14.15	98	195015	994.485 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 99.45%		
45) Bromofluorobenzene (SS3)	17.56	174	61152	837.043 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 83.70%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.45	85	366	N.D.	
3) Chloromethane	0.00	52	0	N.D.	
4) 1,2-Dichloro,1,1,2,2-t...	4.83	85	100	N.D.	
5) Vinyl Chloride	0.00	62	0	N.D.	
6) 1,3-Butadiene	0.00	54	0	N.D.	
7) Bromomethane	0.00	94	0	N.D.	
8) Chloroethane	0.00	64	0	N.D.	
9) Acrolein	0.00	56	0	N.D.	
10) Acetone	6.47	58	10843	308.967 pg	96
11) Trichlorofluoromethane	6.65	101	101	N.D.	
12) 1,1-Dichloroethene	0.00	96	0	N.D.	
13) Methylene Chloride	7.52	84	350	N.D.	
14) Trichlorotrifluoroethane	0.00	151	0	N.D.	
15) trans-1,2-Dichloroethene	0.00	96	0	N.D.	
16) 1,1-Dichloroethane	0.00	63	0	N.D.	
17) Methyl tert-Butyl Ether	0.00	73	0	N.D.	
18) cis-1,2-Dichloroethene	0.00	96	0	N.D.	
19) Chloroform	9.91	83	1545	N.D.	
21) 1,2-Dichloroethane	0.00	62	0	N.D.	
22) 1,1,1-Trichloroethane	0.00	97	0	N.D.	
23) Benzene	11.38	78	4767	20.540 pg	95
24) Carbon Tetrachloride	11.53	117	50	N.D.	
26) 1,2-Dichloropropane	0.00	63	0	N.D.	
27) Bromodichloromethane	0.00	83	0	N.D.	
28) Trichloroethene	0.00	130	0	N.D.	
29) 1,4-Dioxane	12.42	88	169	N.D.	
30) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
31) trans-1,3-Dichloropropene	13.81	75	50	N.D.	
32) 1,1,2-Trichloroethane	0.00	83	0	N.D.	
34) Toluene	14.26	91	1368	N.D.	
35) Dibromochloromethane	0.00	129	0	N.D.	
36) 1,2-Dibromoethane	0.00	107	0	N.D.	
37) Tetrachloroethene	0.00	166	0	N.D.	
39) Chlorobenzene	16.11	112	333	N.D.	
40) Ethylbenzene	16.50	91	612	N.D.	
41) m,p-Xylene	16.67	91	1084	N.D.	
42) Styrene	17.04	104	387	N.D.	
43) o-Xylene	17.13	106	178	N.D.	
44) 1,1,2,2-Tetrachloroethane	17.12	83	577	N.D.	
46) 1,3,5-Trimethylbenzene	18.38	105	227	N.D.	
47) 1,2,4-Trimethylbenzene	18.78	105	342	N.D.	
48) 1,3-Dichlorobenzene	18.93	146	432	N.D.	
49) 1,4-Dichlorobenzene	18.99	146	548	N.D.	
50) 1,2-Dichlorobenzene	19.32	146	406	N.D.	
51) 1,2-Dibromo-3-chloropr...	19.72	157	111	N.D.	
52) 1,2,4-Trichlorobenzene	20.98	182	807	N.D.	
53) Naphthalene	21.00	128	73	N.D.	

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071703.D Vial: 2
Acq On : 7 Mar 2017 10:51 Operator: CL
Sample : MB S19030717 1000mL Inst : MS19
Misc : S29-01241701/AC01205

Quant Time: Mar 07 11:40:56 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

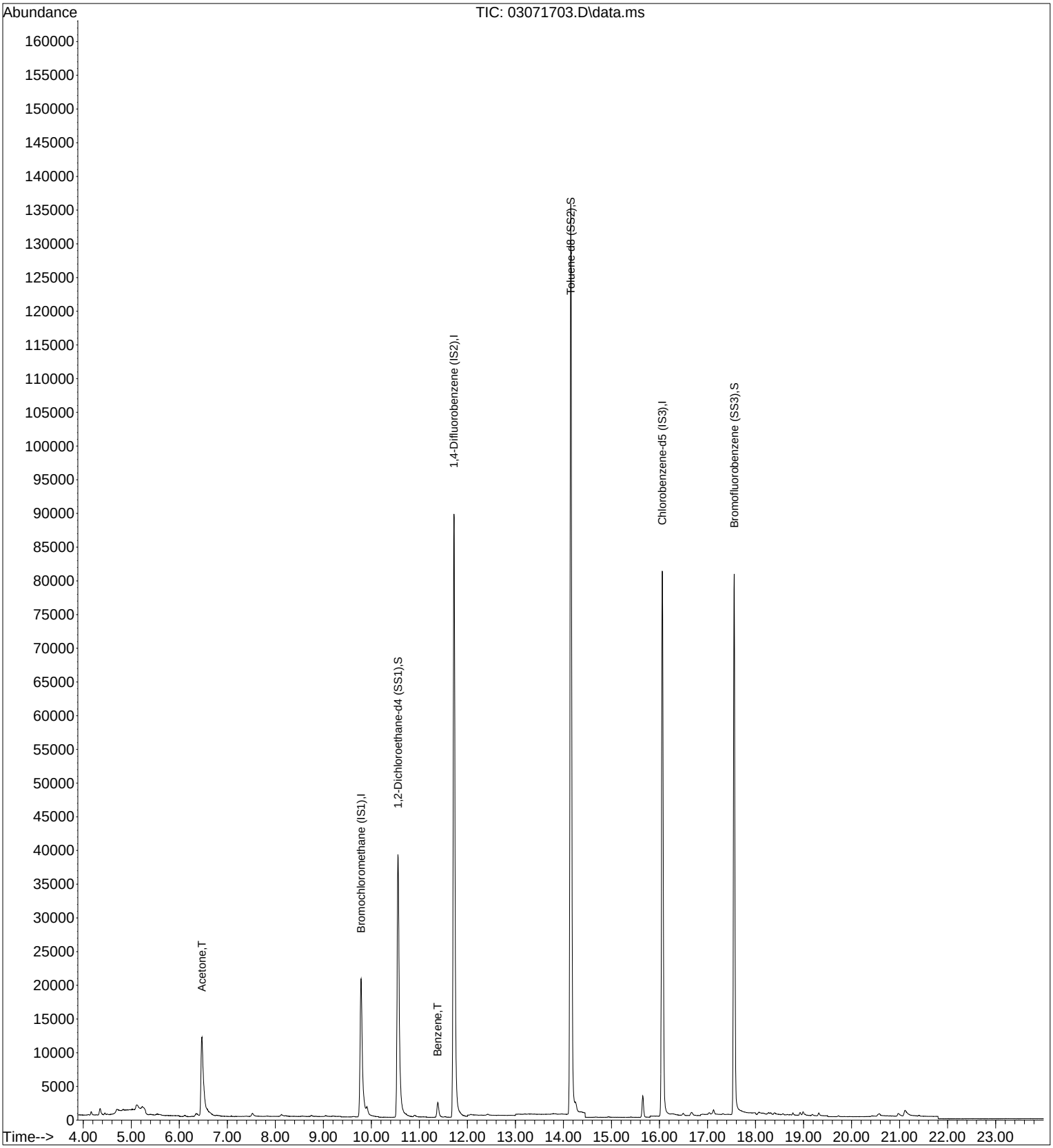
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	120	N.D.	

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071703.D Vial: 2
Acq On : 7 Mar 2017 10:51 Operator: CL
Sample : MB S19030717 1000mL Inst : MS19
Misc : S29-01241701/AC01205

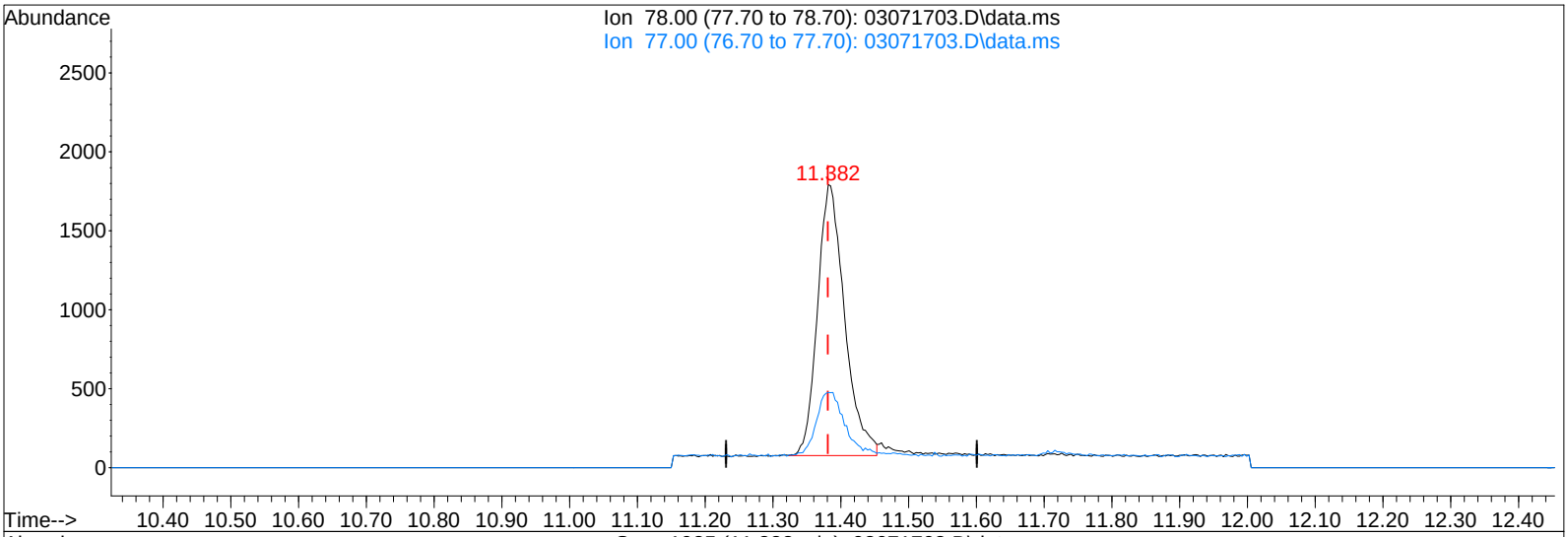
Quant Time: Mar 07 11:40:56 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

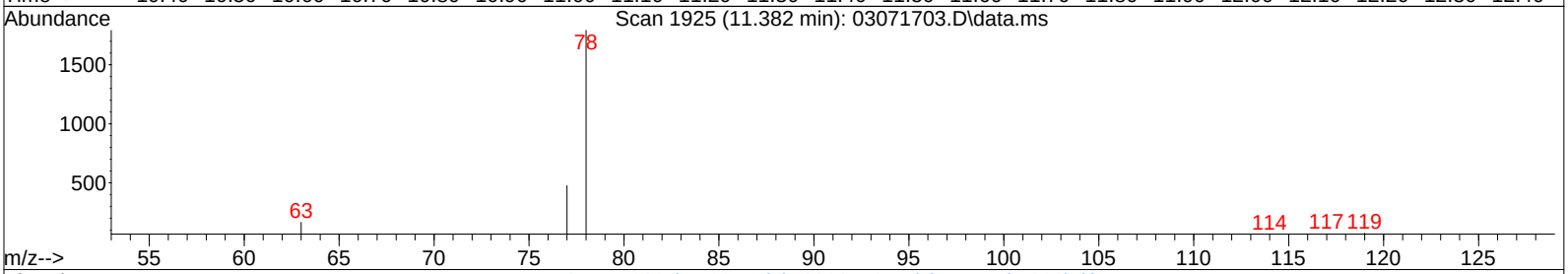


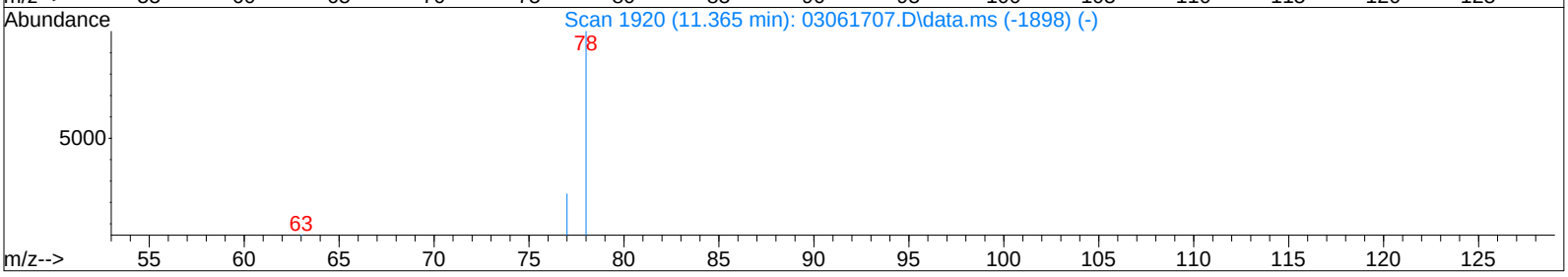
Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\07\03071703.D Vial: 2
Acq On : 7 Mar 2017 10:51 Operator: CL
Sample : MB S19030717 1000mL Inst : MS19
Misc : S29-01241701/AC01205

Quant Time: Mar 07 11:40:56 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M







TIC: 03071703.D\data.ms

(23) Benzene (T)

11.382min (+0.001) 20.54pg

response 4767

Ion	Exp%	Act%
78.00	100	100
77.00	23.80	21.42
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081703.D Vial: 2
Acq On : 8 Mar 2017 5:25 Operator: CL
Sample : MB S19030817 1000mL Inst : MS19
Misc : S29-01241701/AC01205

Quant Time: Mar 08 07:16:14 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/8/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.79	130	35866	1000.000 pg	0.00
25) 1,4-Difluorobenzene (IS2)	11.72	114	174009	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.06	54	35012	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.56	65	69924	1005.835 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 100.58%		
33) Toluene-d8 (SS2)	14.15	98	175156	991.236 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 99.12%		
45) Bromofluorobenzene (SS3)	17.56	174	55444	862.393 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 86.24%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.45	85	211	N.D.	
3) Chloromethane	0.00	52	0	N.D.	
4) 1,2-Dichloro,1,1,2,2-t...	0.00	85	0	N.D.	
5) Vinyl Chloride	0.00	62	0	N.D.	
6) 1,3-Butadiene	0.00	54	0	N.D.	
7) Bromomethane	0.00	94	0	N.D.	
8) Chloroethane	0.00	64	0	N.D.	
9) Acrolein	0.00	56	0	N.D.	
10) Acetone	6.48	58	5616	178.475 pg	92
11) Trichlorofluoromethane	0.00	101	0	N.D.	
12) 1,1-Dichloroethene	0.00	96	0	N.D.	
13) Methylene Chloride	7.52	84	124	N.D.	
14) Trichlorotrifluoroethane	0.00	151	0	N.D.	
15) trans-1,2-Dichloroethene	0.00	96	0	N.D.	
16) 1,1-Dichloroethane	0.00	63	0	N.D.	
17) Methyl tert-Butyl Ether	0.00	73	0	N.D.	
18) cis-1,2-Dichloroethene	0.00	96	0	N.D.	
19) Chloroform	9.91	83	1537	N.D.	
21) 1,2-Dichloroethane	0.00	62	0	N.D.	
22) 1,1,1-Trichloroethane	0.00	97	0	N.D.	
23) Benzene	11.39	78	3849	N.D.	
24) Carbon Tetrachloride	0.00	117	0	N.D.	
26) 1,2-Dichloropropane	0.00	63	0	N.D.	
27) Bromodichloromethane	0.00	83	0	N.D.	
28) Trichloroethene	0.00	130	0	N.D.	
29) 1,4-Dioxane	0.00	88	0	N.D.	
30) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
31) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
32) 1,1,2-Trichloroethane	0.00	83	0	N.D.	
34) Toluene	14.26	91	1315	N.D.	
35) Dibromochloromethane	0.00	129	0	N.D.	
36) 1,2-Dibromoethane	0.00	107	0	N.D.	
37) Tetrachloroethene	0.00	166	0	N.D.	
39) Chlorobenzene	16.11	112	162	N.D.	
40) Ethylbenzene	16.50	91	465	N.D.	
41) m,p-Xylene	16.66	91	900	N.D.	
42) Styrene	17.04	104	237	N.D.	
43) o-Xylene	17.13	106	163	N.D.	
44) 1,1,2,2-Tetrachloroethane	17.13	83	280	N.D.	
46) 1,3,5-Trimethylbenzene	18.32	105	102	N.D.	
47) 1,2,4-Trimethylbenzene	18.80	105	192	N.D.	
48) 1,3-Dichlorobenzene	18.94	146	85	N.D.	
49) 1,4-Dichlorobenzene	19.00	146	120	N.D.	
50) 1,2-Dichlorobenzene	19.33	146	153	N.D.	
51) 1,2-Dibromo-3-chloropr...	19.73	157	68	N.D.	
52) 1,2,4-Trichlorobenzene	20.99	182	341	N.D.	
53) Naphthalene	21.13	128	1707	N.D.	

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081703.D Vial: 2
Acq On : 8 Mar 2017 5:25 Operator: CL
Sample : MB S19030817 1000mL Inst : MS19
Misc : S29-01241701/AC01205

Quant Time: Mar 08 07:16:14 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

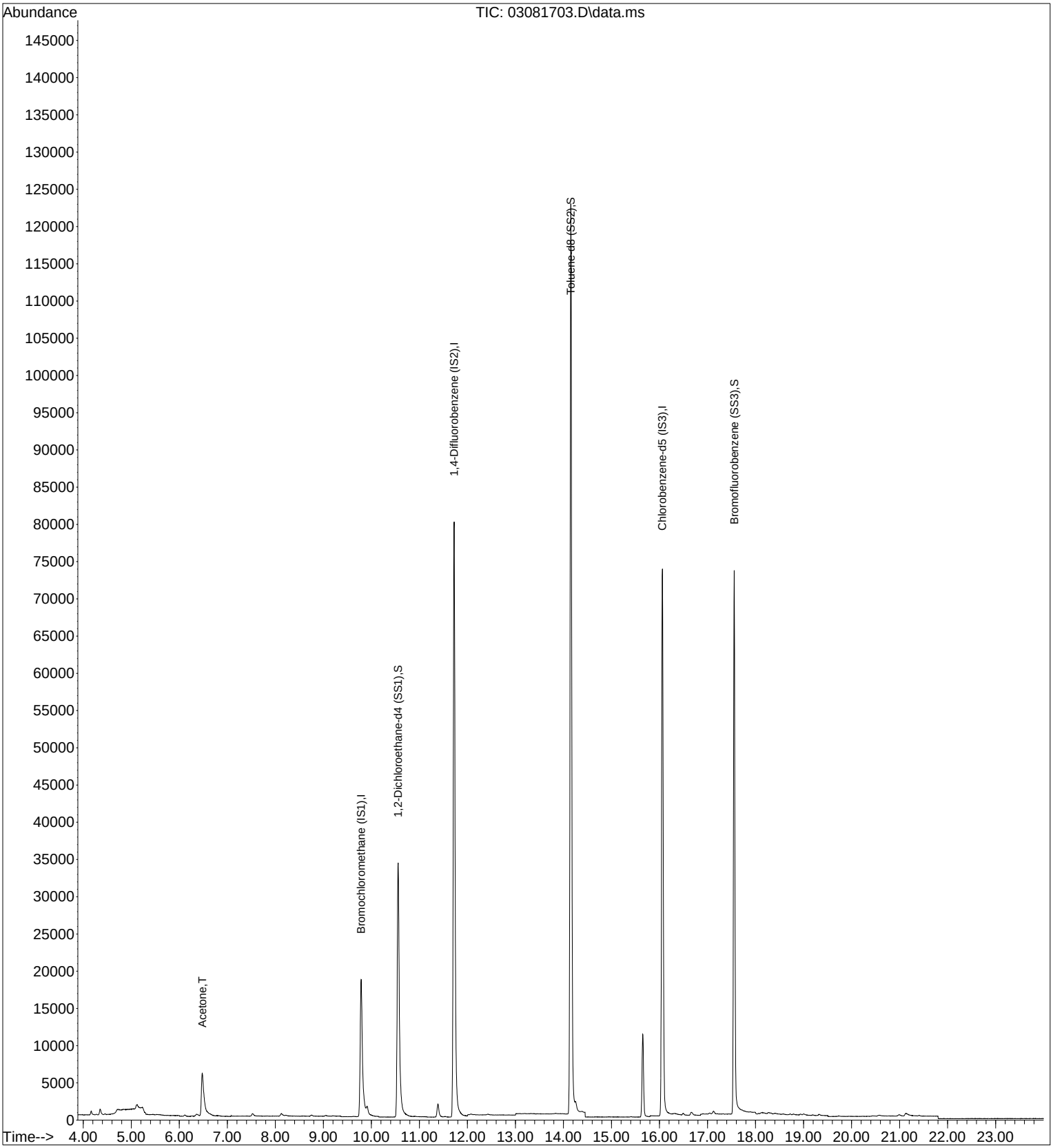
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	90	N.D.	

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081703.D Vial: 2
Acq On : 8 Mar 2017 5:25 Operator: CL
Sample : MB S19030817 1000mL Inst : MS19
Misc : S29-01241701/AC01205

Quant Time: Mar 08 07:16:14 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071705.D Vial: 2
Acq On : 7 Mar 2017 11:53 Operator: CL
Sample : LCS S19030717 500pg Inst : MS19
Misc : S29-01241701/S29-03031708 (4/1)

Quant Time: Mar 07 12:18:15 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/7/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.76	130	38667	1000.000 pg	-0.02
25) 1,4-Difluorobenzene (IS2)	11.71	114	190496	1000.000 pg	-0.01
38) Chlorobenzene-d5 (IS3)	16.05	54	39422	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.53	65	77000	1027.387 pg	-0.02
Spiked Amount 1000.000	Range 70 - 130		Recovery = 102.74%		
33) Toluene-d8 (SS2)	14.15	98	192810	996.707 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 99.67%		
45) Bromofluorobenzene (SS3)	17.55	174	65960	911.191 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 91.12%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.42	85	75278	628.880 pg	99
3) Chloromethane	4.65	52	20898	647.022 pg	97
4) 1,2-Dichloro,1,1,2,2-t...	4.81	85	76907	569.313 pg	100
5) Vinyl Chloride	4.95	62	73662	627.242 pg	99
6) 1,3-Butadiene	5.14	54	35576	600.744 pg	97
7) Bromomethane	5.47	94	23852	607.010 pg	100
8) Chloroethane	5.70	64	18294	609.821 pg	99
9) Acrolein	6.27	56	13989	568.713 pg	97
10) Acetone	6.40	58	104382	3076.935 pg	99
11) Trichlorofluoromethane	6.61	101	55200	600.319 pg	100
12) 1,1-Dichloroethene	7.35	96	29762	590.085 pg	99
13) Methylene Chloride	7.48	84	35047	631.435 pg	99
14) Trichlorotrifluoroethane	7.80	151	28309	583.247 pg	99
15) trans-1,2-Dichloroethene	8.51	96	32671	605.286 pg	99
16) 1,1-Dichloroethane	8.72	63	60541	610.211 pg	100
17) Methyl tert-Butyl Ether	8.79	73	98202	607.255 pg	100
18) cis-1,2-Dichloroethene	9.59	96	34680	601.565 pg	99
19) Chloroform	9.89	83	64657	592.599 pg	100
21) 1,2-Dichloroethane	10.64	62	52800	606.301 pg	100
22) 1,1,1-Trichloroethane	10.91	97	56325	583.267 pg	100
23) Benzene	11.37	78	134094	597.708 pg	100
24) Carbon Tetrachloride	11.52	117	48785	569.314 pg	100
26) 1,2-Dichloropropane	12.18	63	32914	587.868 pg	100
27) Bromodichloromethane	12.36	83	46003	570.454 pg	100
28) Trichloroethene	12.41	130	33513	578.070 pg	100
29) 1,4-Dioxane	12.38	88	25846	590.415 pg	99
30) cis-1,3-Dichloropropene	13.26	75	46306	558.685 pg	100
31) trans-1,3-Dichloropropene	13.77	75	40546	570.981 pg	100
32) 1,1,2-Trichloroethane	13.95	83	27587	585.007 pg	99
34) Toluene	14.25	91	127597	564.444 pg	100
35) Dibromochloromethane	14.66	129	31167	528.691 pg	100
36) 1,2-Dibromoethane	14.92	107	32826	567.201 pg	100
37) Tetrachloroethene	15.40	166	34158	561.905 pg	100
39) Chlorobenzene	16.10	112	84092	563.052 pg	100
40) Ethylbenzene	16.48	91	143445	575.149 pg	100
41) m,p-Xylene	16.66	91	222061	1168.710 pg	100
42) Styrene	17.01	104	72278	545.857 pg	100
43) o-Xylene	17.12	106	52168	548.121 pg	99
44) 1,1,2,2-Tetrachloroethane	17.09	83	55283	547.559 pg	100
46) 1,3,5-Trimethylbenzene	18.38	105	115348	545.235 pg	100
47) 1,2,4-Trimethylbenzene	18.77	105	117301	558.910 pg	100
48) 1,3-Dichlorobenzene	18.92	146	65045	565.095 pg	99
49) 1,4-Dichlorobenzene	18.98	146	64419	543.325 pg	99
50) 1,2-Dichlorobenzene	19.31	146	63174	545.856 pg	100
51) 1,2-Dibromo-3-chloropr...	19.72	157	17980	517.900 pg	98
52) 1,2,4-Trichlorobenzene	20.94	182	38773	575.222 pg	100
53) Naphthalene	21.06	128	123002	590.051 pg	99

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071705.D Vial: 2
Acq On : 7 Mar 2017 11:53 Operator: CL
Sample : LCS S19030717 500pg Inst : MS19
Misc : S29-01241701/S29-03031708 (4/1)

Quant Time: Mar 07 12:18:15 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

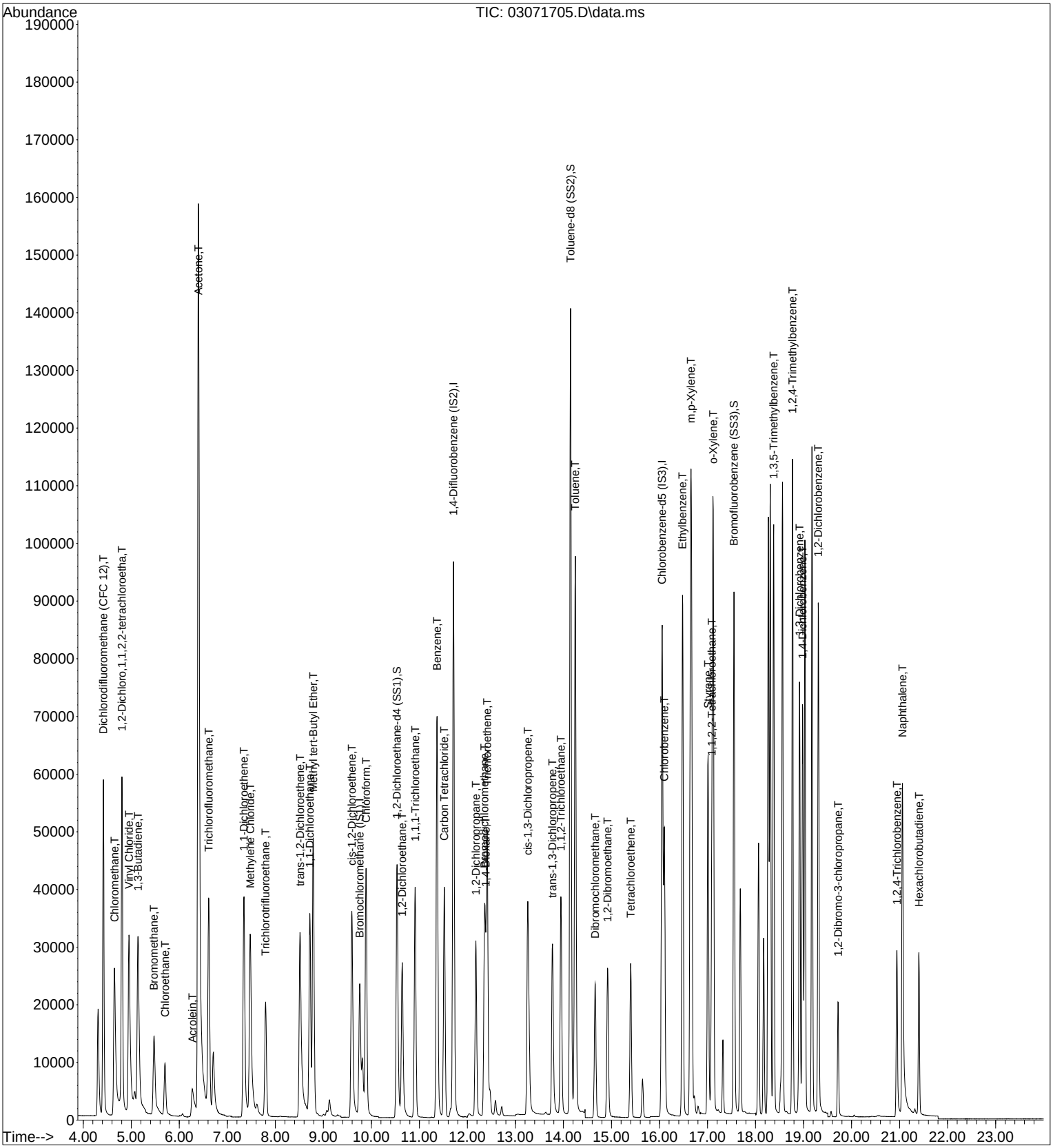
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	27235	557.933	pg	100

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071705.D Vial: 2
Acq On : 7 Mar 2017 11:53 Operator: CL
Sample : LCS S19030717 500pg Inst : MS19
Misc : S29-01241701/S29-03031708 (4/1)

Quant Time: Mar 07 12:18:15 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081705.D Vial: 2
Acq On : 8 Mar 2017 6:28 Operator: CL
Sample : LCS S19030817 500pg Inst : MS19
Misc : S29-01241701/S29-03031708 (4/1)

Quant Time: Mar 08 07:16:16 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/8/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.76	130	36066	1000.000 pg	-0.02
25) 1,4-Difluorobenzene (IS2)	11.71	114	176331	1000.000 pg	-0.01
38) Chlorobenzene-d5 (IS3)	16.05	54	35327	1000.000 pg	0.00

System Monitoring Compounds					
20) 1,2-Dichloroethane-d4 ...	10.53	65	69317	991.575 pg	-0.02
Spiked Amount 1000.000	Range 70 - 130		Recovery = 99.16%		
33) Toluene-d8 (SS2)	14.15	98	176822	987.487 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 98.75%		
45) Bromofluorobenzene (SS3)	17.55	174	59417	915.949 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 91.59%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.42	85	75811	679.008 pg	99
3) Chloromethane	4.65	52	20263	672.606 pg	95
4) 1,2-Dichloro,1,1,2,2-t...	4.81	85	74863	594.148 pg	100
5) Vinyl Chloride	4.96	62	71960	656.940 pg	99
6) 1,3-Butadiene	5.14	54	37308	675.425 pg	96
7) Bromomethane	5.48	94	24596	671.086 pg	99
8) Chloroethane	5.71	64	18539	662.555 pg	99
9) Acrolein	6.27	56	13850	603.669 pg	95
10) Acetone	6.40	58	103809	3280.728 pg	96
11) Trichlorofluoromethane	6.62	101	55484	646.924 pg	100
12) 1,1-Dichloroethene	7.35	96	30020	638.125 pg	99
13) Methylene Chloride	7.48	84	32943	636.332 pg	98
14) Trichlorotrifluoroethane	7.80	151	28429	627.960 pg	100
15) trans-1,2-Dichloroethene	8.52	96	32037	636.345 pg	99
16) 1,1-Dichloroethane	8.72	63	59681	644.925 pg	100
17) Methyl tert-Butyl Ether	8.79	73	98643	653.973 pg	100
18) cis-1,2-Dichloroethene	9.59	96	34130	634.720 pg	99
19) Chloroform	9.89	83	63466	623.633 pg	100
21) 1,2-Dichloroethane	10.64	62	51512	634.170 pg	99
22) 1,1,1-Trichloroethane	10.91	97	56762	630.183 pg	100
23) Benzene	11.37	78	133254	636.799 pg	100
24) Carbon Tetrachloride	11.52	117	49157	615.026 pg	100
26) 1,2-Dichloropropane	12.18	63	32444	626.024 pg	100
27) Bromodichloromethane	12.36	83	45346	607.478 pg	100
28) Trichloroethene	12.41	130	33810	630.042 pg	100
29) 1,4-Dioxane	12.38	88	25883	638.758 pg	99
30) cis-1,3-Dichloropropene	13.26	75	46485	605.899 pg	100
31) trans-1,3-Dichloropropene	13.77	75	40453	615.434 pg	100
32) 1,1,2-Trichloroethane	13.95	83	27230	623.823 pg	100
34) Toluene	14.25	91	126848	606.208 pg	100
35) Dibromochloromethane	14.66	129	31266	572.976 pg	100
36) 1,2-Dibromoethane	14.92	107	32932	614.744 pg	99
37) Tetrachloroethene	15.40	166	34357	610.581 pg	100
39) Chlorobenzene	16.10	112	83845	626.474 pg	100
40) Ethylbenzene	16.48	91	142242	636.436 pg	100
41) m,p-Xylene	16.66	91	220003	1292.097 pg	100
42) Styrene	17.01	104	71074	598.985 pg	100
43) o-Xylene	17.12	106	52256	612.689 pg	100
44) 1,1,2,2-Tetrachloroethane	17.09	83	54097	597.922 pg	100
46) 1,3,5-Trimethylbenzene	18.38	105	114056	601.622 pg	100
47) 1,2,4-Trimethylbenzene	18.77	105	114977	611.340 pg	100
48) 1,3-Dichlorobenzene	18.92	146	63042	611.180 pg	100
49) 1,4-Dichlorobenzene	18.98	146	63597	598.569 pg	99
50) 1,2-Dichlorobenzene	19.31	146	61980	597.617 pg	100
51) 1,2-Dibromo-3-chloropr...	19.72	157	17154	551.384 pg	95
52) 1,2,4-Trichlorobenzene	20.95	182	37328	617.978 pg	99
53) Naphthalene	21.06	128	117439	628.668 pg	100

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081705.D Vial: 2
Acq On : 8 Mar 2017 6:28 Operator: CL
Sample : LCS S19030817 500pg Inst : MS19
Misc : S29-01241701/S29-03031708 (4/1)

Quant Time: Mar 08 07:16:16 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

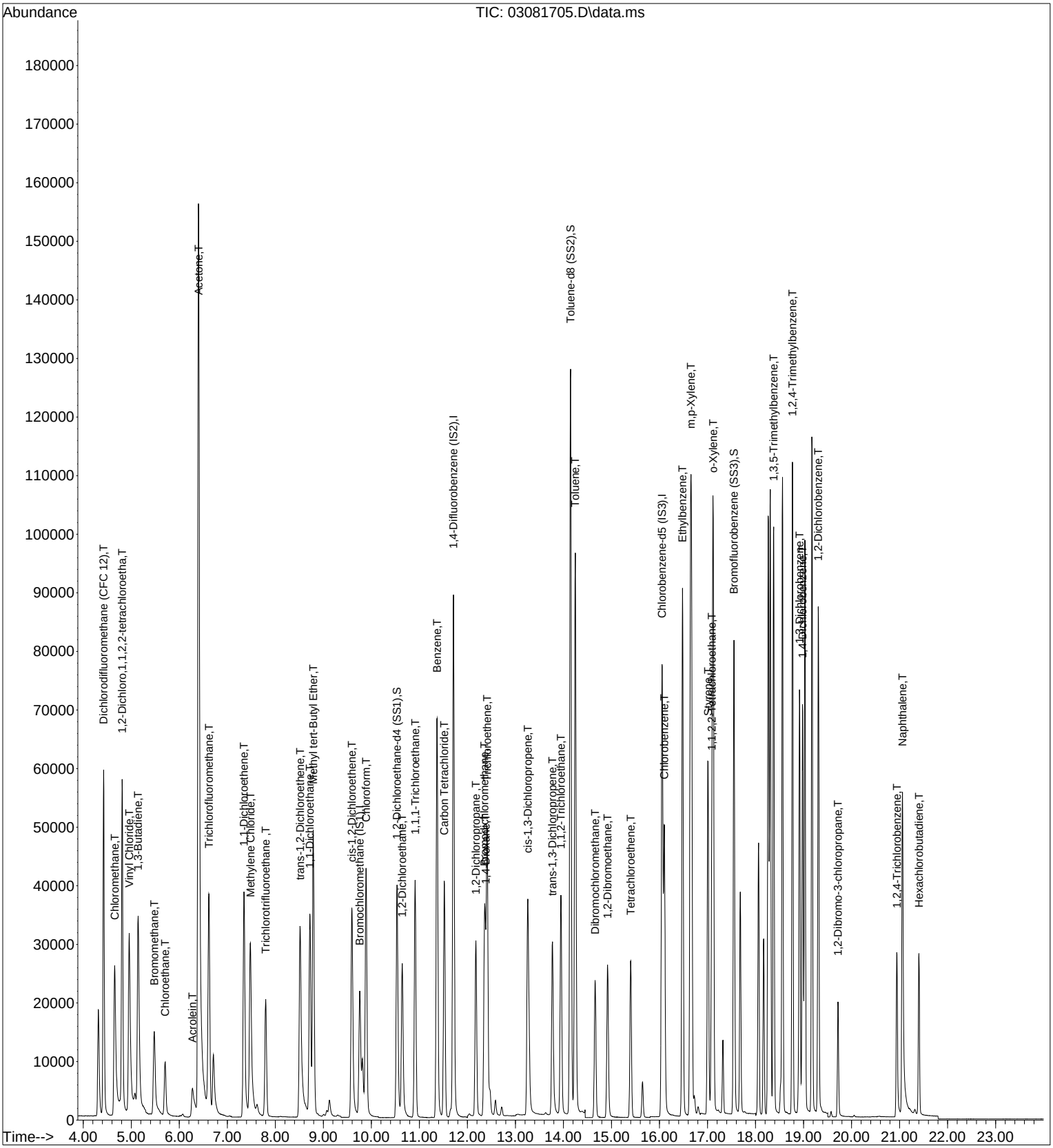
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	26926	615.543 pg	100

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081705.D Vial: 2
Acq On : 8 Mar 2017 6:28 Operator: CL
Sample : LCS S19030817 500pg Inst : MS19
Misc : S29-01241701/S29-03031708 (4/1)

Quant Time: Mar 08 07:16:16 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Response Factor Report MS19

Method Path : I:\MS19\METHODS\
Method File : S19030617.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue Mar 07 08:48:37 2017
Response Via : Initial Calibration

CL 3/7/17

Calibration Files
20 =03061703.D 50 =03061704.D 100 =03061705.D 500 =03061706.D 1000=03061707.D 2000=03061708.D 5000=03061709.D
10K =03061710.D 50K =03061717.D

		Compound	20	50	100	500	1000	2000	5000	10K	50K	Avg	%RSD
1)	I	Bromochloromethane...	----------ISTD----------										
2)	T	Dichlorodifluo...	3.949	3.647	3.375	3.274	3.017	2.891	2.765	2.729	2.214	3.096	16.98
3)	T	Chloromethane		1.366	1.152	0.949	0.824	0.725	0.638	0.433	0.595	0.835	36.91
4)	T	1,2-Dichloro,1...	4.734	4.170	3.779	3.717	3.339	3.144	3.004	2.865	2.691	3.494	19.07
5)	T	Vinyl Chloride	3.440	3.658	3.310	3.283	2.932	2.823	2.723	2.659	2.505	3.037	13.09
6)	T	1,3-Butadiene	1.533	1.376	1.336	1.453	1.355	1.338	1.436	1.805	2.150	1.532	17.94
7)	T	Bromomethane	1.325	1.094	1.052	1.040	0.960	0.928	0.938	0.934	0.874	1.016	13.35
8)	T	Chloroethane	0.874	0.893	0.796	0.803	0.737	0.722	0.742	0.750	0.665	0.776	9.45
9)	T	Acrolein		0.833	0.625	0.591	0.540	0.567	0.617	0.649	0.667	0.636	14.12
10)	T	Acetone		1.229	0.975	0.842	0.773	0.766	0.764	0.792		0.877	19.64
11)	T	Trichlorofluor...	2.833	2.659	2.461	2.409	2.235	2.212	2.253	2.202	2.138	2.378	9.93
12)	T	1,1-Dichloroet...	1.453	1.387	1.307	1.316	1.238	1.258	1.285	1.253	1.243	1.304	5.58
13)	T	Methylene Chlo...		1.797	1.565	1.450	1.337	1.339	1.351	1.306	1.339	1.435	11.77
14)	T	Trichlorotrifl...	1.536	1.384	1.263	1.261	1.192	1.165	1.141	1.137	1.219	1.255	10.39
15)	T	trans-1,2-Dich...	1.644	1.476	1.337	1.428	1.334	1.363	1.359	1.309	1.313	1.396	7.73
16)	T	1,1-Dichloroet...	3.035	2.763	2.580	2.665	2.503	2.477	2.451	2.326	2.294	2.566	8.99
17)	T	Methyl tert-Bu...	4.966	4.451	4.139	4.287	4.037	4.050	4.051	3.563	4.096	4.182	9.05
18)	T	cis-1,2-Dichlo...	1.633	1.575	1.450	1.526	1.446	1.468	1.456	1.428	1.437	1.491	4.80
19)	T	Chloroform		3.743	3.209	2.894	2.673	2.612	2.528	2.448	2.467	2.822	15.97
20)	S	1,2-Dichloroet...	1.973	1.979	1.990	1.963	1.955	1.955	1.946	1.883	1.801	1.938	3.10
21)	T	1,2-Dichloroet...	2.623	2.423	2.287	2.365	2.210	2.185	2.135	2.039	2.004	2.252	8.70
22)	T	1,1,1-Trichlor...	3.069	2.633	2.467	2.551	2.400	2.387	2.360	2.279	2.332	2.497	9.65
23)	T	Benzene		7.344	6.297	5.971	5.512	5.387	5.334	5.240	5.330	5.802	12.47
24)	T	Carbon Tetrach...	2.683	2.340	2.160	2.217	2.084	2.083	2.114	2.093	2.172	2.216	8.73
25)	I	1,4-Difluorobenzen...	----------ISTD----------										
26)	T	1,2-Dichloropr...	0.339	0.313	0.297	0.301	0.284	0.284	0.279	0.271	0.276	0.294	7.31
27)	T	Bromodichlorom...	0.493	0.444	0.403	0.423	0.402	0.408	0.408	0.400	0.429	0.423	7.09
28)	T	Trichloroethene	0.362	0.325	0.301	0.311	0.290	0.286	0.280	0.276	0.308	0.304	8.82
29)	T	1,4-Dioxane	0.236	0.226	0.212	0.239	0.224	0.227	0.226	0.223	0.253	0.230	5.09
30)	T	cis-1,3-Dichlo...	0.427	0.403	0.383	0.428	0.416	0.439	0.457	0.455	0.508	0.435	8.29
31)	T	trans-1,3-Dich...	0.328	0.310	0.290	0.365	0.361	0.393	0.419	0.425	0.464	0.373	15.44
32)	T	1,1,2-Trichlor...	0.285	0.259	0.243	0.251	0.238	0.239	0.235	0.230	0.246	0.248	6.68
33)	S	Toluene-d8 (SS2)	1.020	1.014	1.019	1.012	1.010	1.017	1.018	1.012	1.018	1.015	0.36
34)	T	Toluene	1.516	1.271	1.160	1.175	1.108	1.106	1.116	1.097	1.132	1.187	11.34
35)	T	Dibromochlorom...	0.329	0.283	0.275	0.296	0.286	0.301	0.320	0.328	0.368	0.309	9.50
36)	T	1,2-Dibromoethane	0.315	0.297	0.279	0.306	0.288	0.301	0.308	0.309	0.331	0.304	4.95
37)	T	Tetrachloroethene	0.376	0.340	0.313	0.317	0.296	0.294	0.299	0.297	0.340	0.319	8.68
38)	I	Chlorobenzene-d5 (...	----------ISTD----------										
39)	T	Chlorobenzene	4.486	4.012	3.704	3.777	3.548	3.538	3.625	3.618		3.789	8.47
40)	T	Ethylbenzene	6.863	6.308	5.901	6.386	6.145	6.193	6.433	6.385		6.327	4.38
41)	T	m,p-Xylene	4.995	4.617	4.415	4.945	4.755	4.724	5.037	5.071		4.820	4.80

Method Path : I:\MS19\METHODS\
Method File : S19030617.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

42)	T	Styrene	2.873	2.700	3.365	3.338	3.212	3.452	3.908	4.023		3.359	13.52
43)	T	o-Xylene	2.468	2.238	2.845	2.348	2.256	2.259	2.434	2.467		2.414	8.23
44)	T	1,1,2,2-Tetrac...	2.603	2.436	2.905	2.526	2.423	2.447	2.578	2.571		2.561	6.07
45)	S	Bromofluoroben...	1.594	1.628	2.178	1.675	1.699	1.725	2.132	1.861	2.033	1.836	12.21
46)	T	1,3,5-Trimethy...	4.330	4.643	5.687	5.206	5.055	5.221	7.004	5.785		5.366	15.27
47)	T	1,2,4-Trimethy...	4.693	4.493	4.372	5.252	5.148	5.459	7.132	6.041		5.324	17.15
48)	T	1,3-Dichlorobe...	2.364	2.678	2.620	2.938	2.731	2.887	3.951	3.188		2.920	16.53
49)	T	1,4-Dichlorobe...	2.969	2.915	2.816	2.922	2.701	2.797	3.835	3.106		3.008	11.84
50)	T	1,2-Dichlorobe...	2.762	2.731	2.592	2.858	2.717	2.875	3.813	3.138		2.936	13.24
51)	T	1,2-Dibromo-3-...		0.643	0.625	0.833	0.837	0.961	1.117	1.149		0.881	23.67
52)	T	1,2,4-Trichlor...	1.670	1.698	1.571	1.696	1.572	1.719	1.891	1.862		1.710	6.86
53)	T	Naphthalene	5.045	5.034	4.625	5.202	4.858	5.406	5.990	6.142		5.288	10.08
54)	T	Hexachlorobuta...	1.368	1.283	1.171	1.227	1.155	1.200	1.262	1.239		1.238	5.50

(#) = Out of Range

Primary Source Standards Concentrations (Working & Initial Calibration)

CL 3/7/17

0.2ng/L Std. ID: | 20ng/L Std. ID: S29-02171708
1ng/L Std. ID: S29-03061701 | 200ng/L Std. ID: S29-03021703
4ng/L Std. ID: S29-03021708

Dilution Factors:		5	50	250	1000	5000	Working STD Conc.(ng/L):	NA	1	1	1	4	20	20	20	20		200
	Source Std.	Primary Working Standards					Injection (L):	NA	0.020	0.050	0.100	0.125	0.050	0.100	0.250	0.500	NA	0.250
Compounds	mg/m^3	200ng/L	20ng/L	4ng/L	1ng/L	0.2ng/L	ICAL Points:	0.01ng	0.02ng	0.05ng	0.1ng	0.5ng	1ng	2ng	5ng	10ng	20ng	50ng
Propene	1.036	207.2	20.72	4.144	1.036	0.2072		NA	0.02072	0.05180	0.1036	0.5180	1.036	2.072	5.180	10.36	NA	51.80
Dichlorodifluoromethane	1.047	209.4	20.94	4.188	1.047	0.2094		NA	0.02094	0.05235	0.1047	0.5235	1.047	2.094	5.235	10.47	NA	52.35
Chloromethane	1.005	201.0	20.10	4.020	1.005	0.2010		NA	0.02010	0.05025	0.1005	0.5025	1.005	2.010	5.025	10.05	NA	50.25
Freon-114	1.005	201.0	20.10	4.020	1.005	0.2010		NA	0.02010	0.05025	0.1005	0.5025	1.005	2.010	5.025	10.05	NA	50.25
Vinyl Chloride	1.023	204.6	20.46	4.092	1.023	0.2046		NA	0.02046	0.05115	0.1023	0.5115	1.023	2.046	5.115	10.23	NA	51.15
1,3-Butadiene	1.057	211.4	21.14	4.228	1.057	0.2114		NA	0.02114	0.05285	0.1057	0.5285	1.057	2.114	5.285	10.57	NA	52.85
Bromomethane	0.993	198.6	19.86	3.972	0.993	0.1986		NA	0.01986	0.04965	0.0993	0.4965	0.993	1.986	4.965	9.93	NA	49.65
Chloroethane	1.009	201.8	20.18	4.036	1.009	0.2018		NA	0.02018	0.05045	0.1009	0.5045	1.009	2.018	5.045	10.09	NA	50.45
Ethanol	5.207	1041.4	104.14	20.828	5.207	1.0414		NA	0.10414	0.26035	0.5207	2.6035	5.207	10.414	26.035	52.07	NA	260.35
Acetonitrile	1.046	209.2	20.92	4.184	1.046	0.2092		NA	0.02092	0.05230	0.1046	0.5230	1.046	2.092	5.230	10.46	NA	52.30
Acrolein	1.041	208.2	20.82	4.164	1.041	0.2082		NA	0.02082	0.05205	0.1041	0.5205	1.041	2.082	5.205	10.41	NA	52.05
Acetone	5.313	1062.6	106.26	21.252	5.313	1.0626		NA	0.10626	0.26565	0.5313	2.6565	5.313	10.626	26.565	53.13	NA	265.65
Trichlorofluoromethane	1.049	209.8	20.98	4.196	1.049	0.2098		NA	0.02098	0.05245	0.1049	0.5245	1.049	2.098	5.245	10.49	NA	52.45
Isopropanol	2.105	421.0	42.10	8.420	2.105	0.4210		NA	0.04210	0.10525	0.2105	1.0525	2.105	4.210	10.525	21.05	NA	105.25
Acrylonitrile	1.055	211.0	21.10	4.220	1.055	0.2110		NA	0.02110	0.05275	0.1055	0.5275	1.055	2.110	5.275	10.55	NA	52.75
1,1-Dichloroethene	1.059	211.8	21.18	4.236	1.059	0.2118		NA	0.02118	0.05295	0.1059	0.5295	1.059	2.118	5.295	10.59	NA	52.95
tert-Butanol	2.114	422.8	42.28	8.456	2.114	0.4228		NA	0.04228	0.10570	0.2114	1.0570	2.114	4.228	10.570	21.14	NA	105.70
Methylene Chloride	1.057	211.4	21.14	4.228	1.057	0.2114		NA	0.02114	0.05285	0.1057	0.5285	1.057	2.114	5.285	10.57	NA	52.85
Allyl Chloride	1.052	210.4	21.04	4.208	1.052	0.2104		NA	0.02104	0.05260	0.1052	0.5260	1.052	2.104	5.260	10.52	NA	52.60
Trichlorotrifluoroethane	1.049	209.8	20.98	4.196	1.049	0.2098		NA	0.02098	0.05245	0.1049	0.5245	1.049	2.098	5.245	10.49	NA	52.45
Carbon Disulfide	1.061	212.2	21.22	4.244	1.061	0.2122		NA	0.02122	0.05305	0.1061	0.5305	1.061	2.122	5.305	10.61	NA	53.05
trans-1,2-Dichloroethene	1.067	213.4	21.34	4.268	1.067	0.2134		NA	0.02134	0.05335	0.1067	0.5335	1.067	2.134	5.335	10.67	NA	53.35
1,1-Dichloroethane	1.020	204.0	20.40	4.080	1.020	0.2040		NA	0.02040	0.05100	0.1020	0.5100	1.020	2.040	5.100	10.20	NA	51.00
Methyl tert-Butyl Ether	1.066	213.2	21.32	4.264	1.066	0.2132		NA	0.02132	0.05330	0.1066	0.5330	1.066	2.132	5.330	10.66	NA	53.30
Vinyl Acetate	5.265	1053.0	105.30	21.060	5.265	1.0530		NA	0.10530	0.26325	0.5265	2.6325	5.265	10.530	26.325	52.65	NA	263.25
2-Butanone	1.049	209.8	20.98	4.196	1.049	0.2098		NA	0.02098	0.05245	0.1049	0.5245	1.049	2.098	5.245	10.49	NA	52.45
cis-1,2-Dichloroethene	1.064	212.8	21.28	4.256	1.064	0.2128		NA	0.02128	0.05320	0.1064	0.5320	1.064	2.128	5.320	10.64	NA	53.20
Diisopropyl Ether	1.062	212.4	21.24	4.248	1.062	0.2124		NA	0.02124	0.05310	0.1062	0.5310	1.062	2.124	5.310	10.62	NA	53.10
Ethyl Acetate	2.129	425.8	42.58	8.516	2.129	0.4258		NA	0.04258	0.10645	0.2129	1.0645	2.129	4.258	10.645	21.29	NA	106.45
n-Hexane	1.063	212.6	21.26	4.252	1.063	0.2126		NA	0.02126	0.05315	0.1063	0.5315	1.063	2.126	5.315	10.63	NA	53.15
Chloroform	1.058	211.6	21.16	4.232	1.058	0.2116		NA	0.02116	0.05290	0.1058	0.5290	1.058	2.116	5.290	10.58	NA	52.90
Tetrahydrofuran	1.062	212.4	21.24	4.248	1.062	0.2124		NA	0.02124	0.05310	0.1062	0.5310	1.062	2.124	5.310	10.62	NA	53.10
Ethyl tert-Butyl Ether	1.057	211.4	21.14	4.228	1.057	0.2114		NA	0.02114	0.05285	0.1057	0.5285	1.057	2.114	5.285	10.57	NA	52.85
1,2-Dichloroethane	1.052	210.4	21.04	4.208	1.052	0.2104		NA	0.02104	0.05260	0.1052	0.5260	1.052	2.104	5.260	10.52	NA	52.60
1,1,1-Trichloroethane	1.074	214.8	21.48	4.296	1.074	0.2148		NA	0.02148	0.05370	0.1074	0.5370	1.074	2.148	5.370	10.74	NA	53.70
Isopropyl Acetate	2.104	420.8	42.08	8.416	2.104	0.4208		NA	0.04208	0.10520	0.2104	1.0520	2.104	4.208	10.520	21.04	NA	105.20
1-Butanol	2.105	421.0	42.10	8.420	2.105	0.4210		NA	0.04210	0.10525	0.2105	1.0525	2.105	4.210	10.525	21.05	NA	105.25
Benzene	1.052	210.4	21.04	4.208	1.052	0.2104		NA	0.02104	0.05260	0.1052	0.5260	1.052	2.104	5.260	10.52	NA	52.60
Carbon Tetrachloride	1.055	211.0	21.10	4.220	1.055	0.2110		NA	0.02110	0.05275	0.1055	0.5275	1.055	2.110	5.275	10.55	NA	52.75
Cyclohexane	2.130	426.0	42.60	8.520	2.130	0.4260		NA	0.04260	0.10650	0.2130	1.0650	2.130	4.260	10.650	21.30	NA	106.50
tert-Amyl Methyl Ether	1.054	210.8	21.08	4.216	1.054	0.2108		NA	0.02108	0.05270	0.1054	0.5270	1.054	2.108	5.270	10.54	NA	52.70
1,2-Dichloropropane	1.062	212.4	21.24	4.248	1.062	0.2124		NA	0.02124	0.05310	0.1062	0.5310	1.062	2.124	5.310	10.62	NA	53.10
Bromodichloromethane	1.066	213.2	21.32	4.264	1.066	0.2132		NA	0.02132	0.05330	0.1066	0.5330	1.066	2.132	5.330	10.66	NA	53.30
Trichloroethene	1.060	212.0	21.20	4.240	1.060	0.2120		NA	0.02120	0.05300	0.1060	0.5300	1.060	2.120	5.300	10.60	NA	53.00
1,4-Dioxane	1.062	212.4	21.24	4.248	1.062	0.2124		NA	0.02124	0.05310	0.1062	0.5310	1.062	2.124	5.310	10.62	NA	53.10
Isooctane	1.059	211.8	21.18	4.236	1.059	0.2118		NA	0.02118	0.05295	0.1059	0.5295	1.059	2.118	5.295	10.59	NA	52.95
Methyl Methacrylate	2.110	422.0	42.20	8.440	2.110	0.4220		NA	0.04220	0.10550	0.2110	1.0550	2.110	4.220	10.550	21.10	NA	105.50
n-Heptane	1.062	212.4	21.24	4.248	1.062	0.2124		NA	0.02124	0.05310	0.1062	0.5310	1.062	2.124	5.310	10.62	NA	53.10
cis-1,3-Dichloropropene	1.116	223.2	22.32	4.464	1.116	0.2232		NA	0.02232	0.05580	0.1116	0.5580	1.116	2.232	5.580	11.16	NA	55.80

Primary Source Standards Concentrations (Working & Initial Calibration)

0.2ng/L Std. ID: | 20ng/L Std. ID: S29-02171708
1ng/L Std. ID: S29-03061701 | 200ng/L Std. ID: S29-03021703
4ng/L Std. ID: S29-03021708

Dilution Factors:		5	50	250	1000	5000	Working STD Conc.(ng/L):	NA	1	1	1	4	20	20	20	20		200
	Source Std.	Primary Working Standards					Injection (L):	NA	0.020	0.050	0.100	0.125	0.050	0.100	0.250	0.500	NA	0.250
Compounds	mg/m^3	200ng/L	20ng/L	4ng/L	1ng/L	0.2ng/L	ICAL Points:	0.01ng	0.02ng	0.05ng	0.1ng	0.5ng	1ng	2ng	5ng	10ng	20ng	50ng
4-Methyl-2-pentanone	1.058	211.6	21.16	4.232	1.058	0.2116		NA	0.02116	0.05290	0.1058	0.5290	1.058	2.116	5.290	10.58	NA	52.90
trans-1,3-Dichloropropene	1.064	212.8	21.28	4.256	1.064	0.2128		NA	0.02128	0.05320	0.1064	0.5320	1.064	2.128	5.320	10.64	NA	53.20
1,1,2-Trichloroethane	1.061	212.2	21.22	4.244	1.061	0.2122		NA	0.02122	0.05305	0.1061	0.5305	1.061	2.122	5.305	10.61	NA	53.05
Toluene	1.053	210.6	21.06	4.212	1.053	0.2106		NA	0.02106	0.05265	0.1053	0.5265	1.053	2.106	5.265	10.53	NA	52.65
2-Hexanone	1.061	212.2	21.22	4.244	1.061	0.2122		NA	0.02122	0.05305	0.1061	0.5305	1.061	2.122	5.305	10.61	NA	53.05
Dibromochloromethane	1.062	212.4	21.24	4.248	1.062	0.2124		NA	0.02124	0.05310	0.1062	0.5310	1.062	2.124	5.310	10.62	NA	53.10
1,2-Dibromoethane	1.056	211.2	21.12	4.224	1.056	0.2112		NA	0.02112	0.05280	0.1056	0.5280	1.056	2.112	5.280	10.56	NA	52.80
n-Butyl Acetate	1.064	212.8	21.28	4.256	1.064	0.2128		NA	0.02128	0.05320	0.1064	0.5320	1.064	2.128	5.320	10.64	NA	53.20
n-Octane	1.057	211.4	21.14	4.228	1.057	0.2114		NA	0.02114	0.05285	0.1057	0.5285	1.057	2.114	5.285	10.57	NA	52.85
Tetrachloroethene	1.061	212.2	21.22	4.244	1.061	0.2122		NA	0.02122	0.05305	0.1061	0.5305	1.061	2.122	5.305	10.61	NA	53.05
Chlorobenzene	1.061	212.2	21.22	4.244	1.061	0.2122		NA	0.02122	0.05305	0.1061	0.5305	1.061	2.122	5.305	10.61	NA	53.05
Ethylbenzene	1.055	211.0	21.10	4.220	1.055	0.2110		NA	0.02110	0.05275	0.1055	0.5275	1.055	2.110	5.275	10.55	NA	52.75
m-&p-Xylene	2.123	424.6	42.46	8.492	2.123	0.4246		NA	0.04246	0.10615	0.2123	1.0615	2.123	4.246	10.615	21.23	NA	106.15
Bromoform	1.063	212.6	21.26	4.252	1.063	0.2126		NA	0.02126	0.05315	0.1063	0.5315	1.063	2.126	5.315	10.63	NA	53.15
Styrene	1.061	212.2	21.22	4.244	1.061	0.2122		NA	0.02122	0.05305	0.1061	0.5305	1.061	2.122	5.305	10.61	NA	53.05
o-Xylene	1.054	210.8	21.08	4.216	1.054	0.2108		NA	0.02108	0.05270	0.1054	0.5270	1.054	2.108	5.270	10.54	NA	52.70
n-Nonane	1.054	210.8	21.08	4.216	1.054	0.2108		NA	0.02108	0.05270	0.1054	0.5270	1.054	2.108	5.270	10.54	NA	52.70
1,1,2,2-Tetrachloroethane	1.056	211.2	21.12	4.224	1.056	0.2112		NA	0.02112	0.05280	0.1056	0.5280	1.056	2.112	5.280	10.56	NA	52.80
Cumene	1.050	210.0	21.00	4.200	1.050	0.2100		NA	0.02100	0.05250	0.1050	0.5250	1.050	2.100	5.250	10.50	NA	52.50
alpha-Pinene	1.044	208.8	20.88	4.176	1.044	0.2088		NA	0.02088	0.05220	0.1044	0.5220	1.044	2.088	5.220	10.44	NA	52.20
n-Propylbenzene	1.063	212.6	21.26	4.252	1.063	0.2126		NA	0.02126	0.05315	0.1063	0.5315	1.063	2.126	5.315	10.63	NA	53.15
3-Ethyltoluene	1.050	210.0	21.00	4.200	1.050	0.2100		NA	0.02100	0.05250	0.1050	0.5250	1.050	2.100	5.250	10.50	NA	52.50
4-Ethyltoluene	1.049	209.8	20.98	4.196	1.049	0.2098		NA	0.02098	0.05245	0.1049	0.5245	1.049	2.098	5.245	10.49	NA	52.45
1,3,5-Trimethylbenzene	1.049	209.8	20.98	4.196	1.049	0.2098		NA	0.02098	0.05245	0.1049	0.5245	1.049	2.098	5.245	10.49	NA	52.45
alpha-Methylstyrene	1.050	210.0	21.00	4.200	1.050	0.2100		NA	0.02100	0.05250	0.1050	0.5250	1.050	2.100	5.250	10.50	NA	52.50
2-Ethyltoluene	1.062	212.4	21.24	4.248	1.062	0.2124		NA	0.02124	0.05310	0.1062	0.5310	1.062	2.124	5.310	10.62	NA	53.10
1,2,4-Trimethylbenzene	1.052	210.4	21.04	4.208	1.052	0.2104		NA	0.02104	0.05260	0.1052	0.5260	1.052	2.104	5.260	10.52	NA	52.60
n-Decane	1.053	210.6	21.06	4.212	1.053	0.2106		NA	0.02106	0.05265	0.1053	0.5265	1.053	2.106	5.265	10.53	NA	52.65
Benzyl Chloride	1.061	212.2	21.22	4.244	1.061	0.2122		NA	0.02122	0.05305	0.1061	0.5305	1.061	2.122	5.305	10.61	NA	53.05
1,3-Dichlorobenzene	1.058	211.6	21.16	4.232	1.058	0.2116		NA	0.02116	0.05290	0.1058	0.5290	1.058	2.116	5.290	10.58	NA	52.90
1,4-Dichlorobenzene	1.058	211.6	21.16	4.232	1.058	0.2116		NA	0.02116	0.05290	0.1058	0.5290	1.058	2.116	5.290	10.58	NA	52.90
sec-Butylbenzene	1.054	210.8	21.08	4.216	1.054	0.2108		NA	0.02108	0.05270	0.1054	0.5270	1.054	2.108	5.270	10.54	NA	52.70
p-Isopropyltoluene	1.027	205.4	20.54	4.108	1.027	0.2054		NA	0.02054	0.05135	0.1027	0.5135	1.027	2.054	5.135	10.27	NA	51.35
1,2,3-Trimethylbenzene	1.027	205.4	20.54	4.108	1.027	0.2054		NA	0.02054	0.05135	0.1027	0.5135	1.027	2.054	5.135	10.27	NA	51.35
1,2-Dichlorobenzene	1.058	211.6	21.16	4.232	1.058	0.2116		NA	0.02116	0.05290	0.1058	0.5290	1.058	2.116	5.290	10.58	NA	52.90
d-Limonene	1.005	201.0	20.10	4.020	1.005	0.2010		NA	0.02010	0.05025	0.1005	0.5025	1.005	2.010	5.025	10.05	NA	50.25
1,2-Dibromo-3-chloropropane	1.053	210.6	21.06	4.212	1.053	0.2106		NA	0.02106	0.05265	0.1053	0.5265	1.053	2.106	5.265	10.53	NA	52.65
n-Undecane	1.054	210.8	21.08	4.216	1.054	0.2108		NA	0.02108	0.05270	0.1054	0.5270	1.054	2.108	5.270	10.54	NA	52.70
1,2,4-Trichlorobenzene	1.043	208.6	20.86	4.172	1.043	0.2086		NA	0.02086	0.05215	0.1043	0.5215	1.043	2.086	5.215	10.43	NA	52.15
Naphthalene	1.083	216.6	21.66	4.332	1.083	0.2166		NA	0.02166	0.05415	0.1083	0.5415	1.083	2.166	5.415	10.83	NA	54.15
n-Dodecane	1.045	209.0	20.90	4.180	1.045	0.2090		NA	0.02090	0.05225	0.1045	0.5225	1.045	2.090	5.225	10.45	NA	52.25
Hexachloro-1,3-butadiene	1.059	211.8	21.18	4.236	1.059	0.2118		NA	0.02118	0.05295	0.1059	0.5295	1.059	2.118	5.295	10.59	NA	52.95
Methacrylonitrile	1.065	213.0	21.30	4.260	1.065	0.2130		NA	0.02130	0.05325	0.1065	0.5325	1.065	2.130	5.325	10.65	NA	53.25
Cyclohexanone	1.056	211.2	21.12	4.224	1.056	0.2112		NA	0.02112	0.05280	0.1056	0.5280	1.056	2.112	5.280	10.56	NA	52.80
tert-Butylbenzene	1.051	210.2	21.02	4.204	1.051	0.2102		NA	0.02102	0.05255	0.1051	0.5255	1.051	2.102	5.255	10.51	NA	52.55
n-Butylbenzene	1.056	211.2	21.12	4.224	1.056	0.2112		NA	0.02112	0.05280	0.1056	0.5280	1.056	2.112	5.280	10.56	NA	52.80

Calibration Status Report MS19

Method : I:\MS19\METHODS\S19030617.M (RTE Integrator)
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration

CL 3/7/17

#	ID	Conc	ISTD Conc	Path\File
1	20	1000	1000	I:\MS19\DATA\2017_03\06\03061703.D
2	50	1000	1000	I:\MS19\DATA\2017_03\06\03061704.D
3	100	1000	1000	I:\MS19\DATA\2017_03\06\03061705.D
4	500	1000	1000	I:\MS19\DATA\2017_03\06\03061706.D
5	1000	1000	1000	I:\MS19\DATA\2017_03\06\03061707.D
6	2000	1000	1000	I:\MS19\DATA\2017_03\06\03061708.D
7	5000	1000	1000	I:\MS19\DATA\2017_03\06\03061709.D
8	10K	1000	1000	I:\MS19\DATA\2017_03\06\03061710.D
9	50K	1000	1000	I:\MS19\DATA\2017_03\06\03061717.D

#	ID	Update Time	Quant Time	Acquisition Time
1	20	Mar 07 08:39 2017	Mar 07 07:18 2017	6 Mar 2017 16:03
2	50	Mar 07 08:40 2017	Mar 07 07:21 2017	6 Mar 2017 16:35
3	100	Mar 07 08:40 2017	Mar 07 07:11 2017	6 Mar 2017 17:06
4	500	Mar 07 08:40 2017	Mar 07 07:11 2017	6 Mar 2017 17:37
5	1000	Mar 07 08:40 2017	Mar 07 07:11 2017	6 Mar 2017 18:09
6	2000	Mar 07 08:40 2017	Mar 07 07:11 2017	6 Mar 2017 18:40
7	5000	Mar 07 08:40 2017	Mar 07 07:11 2017	6 Mar 2017 19:11
8	10K	Mar 07 08:40 2017	Mar 07 07:11 2017	6 Mar 2017 19:42
9	50K	Mar 07 08:40 2017	Mar 07 08:36 2017	7 Mar 2017 08:11

S19030617.M Tue Mar 07 14:05:32 2017

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061703.D Vial: 12
Acq On : 6 Mar 2017 16:03 Operator: CL
Sample : 20pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

Quant Time: Mar 07 07:18:52 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/7/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.78	130	41369	1000.000 pg	0.02
25) 1,4-Difluorobenzene (IS2)	11.72	114	197738	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.06	54	40957	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.55	65	81631	1029.919 pg	0.02
Spiked Amount 1000.000	Range 70 - 130		Recovery = 102.99%		
33) Toluene-d8 (SS2)	14.15	98	201615	988.764 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 98.88%		
45) Bromofluorobenzene (SS3)	17.56	174	65298	955.190 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 95.52%		

Target Compounds

						Qvalue
2) Dichlorodifluoromethan...	4.45	85	3421	32.810 pg		99
3) Chloromethane	4.70	52	1370	51.553 pg		98
4) 1,2-Dichloro,1,1,2,2-t...	4.83	85	3936	36.500 pg		99
5) Vinyl Chloride	5.01	62	2912	30.280 pg		82
6) 1,3-Butadiene	5.21	54	1341	24.263 pg		88
7) Bromomethane	5.52	94	1089m	32.169 pg		
8) Chloroethane	5.74	64	730	27.164 pg		97
9) Acrolein	6.37	56	971m	44.165 pg		
10) Acetone	6.47	58	7295	254.698 pg		95
11) Trichlorofluoromethane	6.64	101	2459	30.452 pg		94
12) 1,1-Dichloroethene	7.39	96	1273	28.824 pg		94
13) Methylene Chloride	7.51	84	2434	50.735 pg		96
14) Trichlorotrifluoroethane	7.82	151	1333	32.665 pg		98
15) trans-1,2-Dichloroethene	8.55	96	1451m	30.973 pg		
16) 1,1-Dichloroethane	8.75	63	2561	30.755 pg		99
17) Methyl tert-Butyl Ether	8.82	73	4380	30.963 pg		98
18) cis-1,2-Dichloroethene	9.62	96	1438	28.853 pg		100
19) Chloroform	9.91	83	4897	53.722 pg		99
21) 1,2-Dichloroethane	10.66	62	2283	31.450 pg		98
22) 1,1,1-Trichloroethane	10.92	97	2727	33.486 pg		97
23) Benzene	11.38	78	9765	50.255 pg		99
24) Carbon Tetrachloride	11.53	117	2342	33.225 pg		98
26) 1,2-Dichloropropane	12.19	63	1424	31.273 pg		98
27) Bromodichloromethane	12.37	83	2079	32.033 pg		99
28) Trichloroethene	12.42	130	1518	31.820 pg		99
29) 1,4-Dioxane	12.42	88	993	26.395 pg		98
30) cis-1,3-Dichloropropene	13.27	75	1885	27.660 pg		96
31) trans-1,3-Dichloropropene	13.80	75	1380	23.511 pg	#	67
32) 1,1,2-Trichloroethane	13.96	83	1196	31.128 pg		99
34) Toluene	14.25	91	6312	33.212 pg		100
35) Dibromochloromethane	14.67	129	1381	28.784 pg		100
36) 1,2-Dibromoethane	14.94	107	1314	27.356 pg		99
37) Tetrachloroethene	15.41	166	1576	32.023 pg		99
39) Chlorobenzene	16.11	112	3899	30.554 pg		99
40) Ethylbenzene	16.49	91	5931	27.228 pg		99
41) m,p-Xylene	16.67	91	8687	51.072 pg		97
42) Styrene	17.02	104	2497	20.951 pg		99
43) o-Xylene	17.13	106	2131	26.172 pg		96
44) 1,1,2,2-Tetrachloroethane	17.10	83	2252	27.047 pg		99
46) 1,3,5-Trimethylbenzene	18.38	105	3721	20.805 pg		93
47) 1,2,4-Trimethylbenzene	18.78	105	4044	21.914 pg		100
48) 1,3-Dichlorobenzene	18.93	146	2049	20.523 pg		99
49) 1,4-Dichlorobenzene	18.99	146	2573	25.170 pg		96
50) 1,2-Dichlorobenzene	19.32	146	2394	23.785 pg		99
51) 1,2-Dibromo-3-chloropr...	19.74	157	513	16.098 pg		99
52) 1,2,4-Trichlorobenzene	20.99	182	1427	23.828 pg		86
53) Naphthalene	21.13	128	4476	23.348 pg		88

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061703.D Vial: 12
Acq On : 6 Mar 2017 16:03 Operator: CL
Sample : 20pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

Quant Time: Mar 07 07:18:52 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

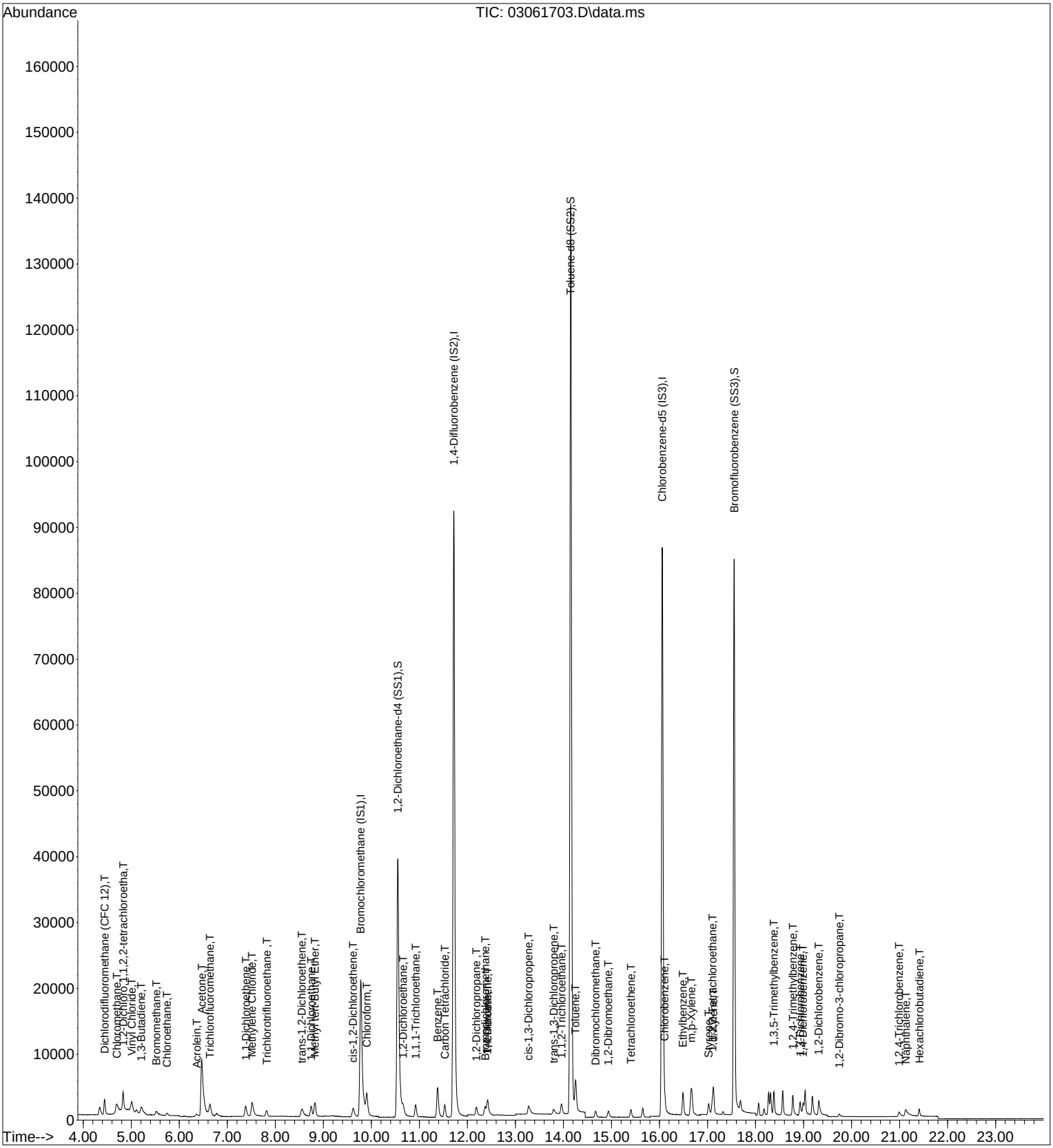
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
54) Hexachlorobutadiene	21.41	225	1187	29.101	pg	99

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061703.D Vial: 12
Acq On : 6 Mar 2017 16:03 Operator: CL
Sample : 20pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

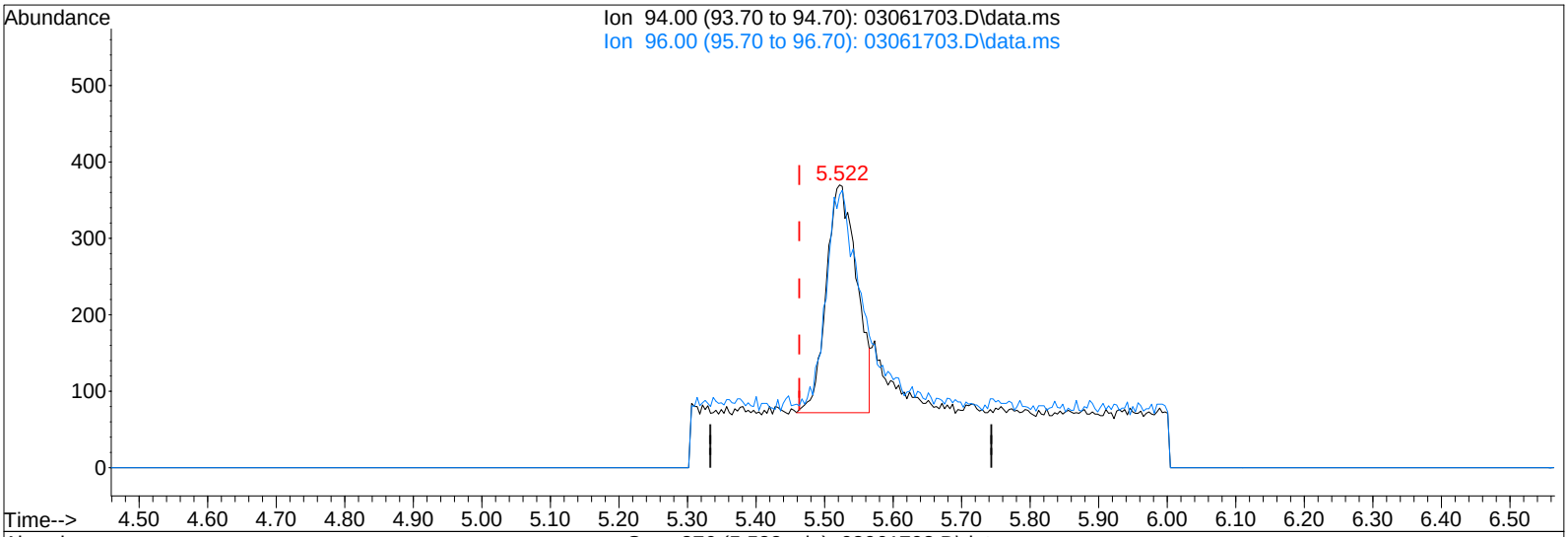
Quant Time: Mar 07 07:18:52 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

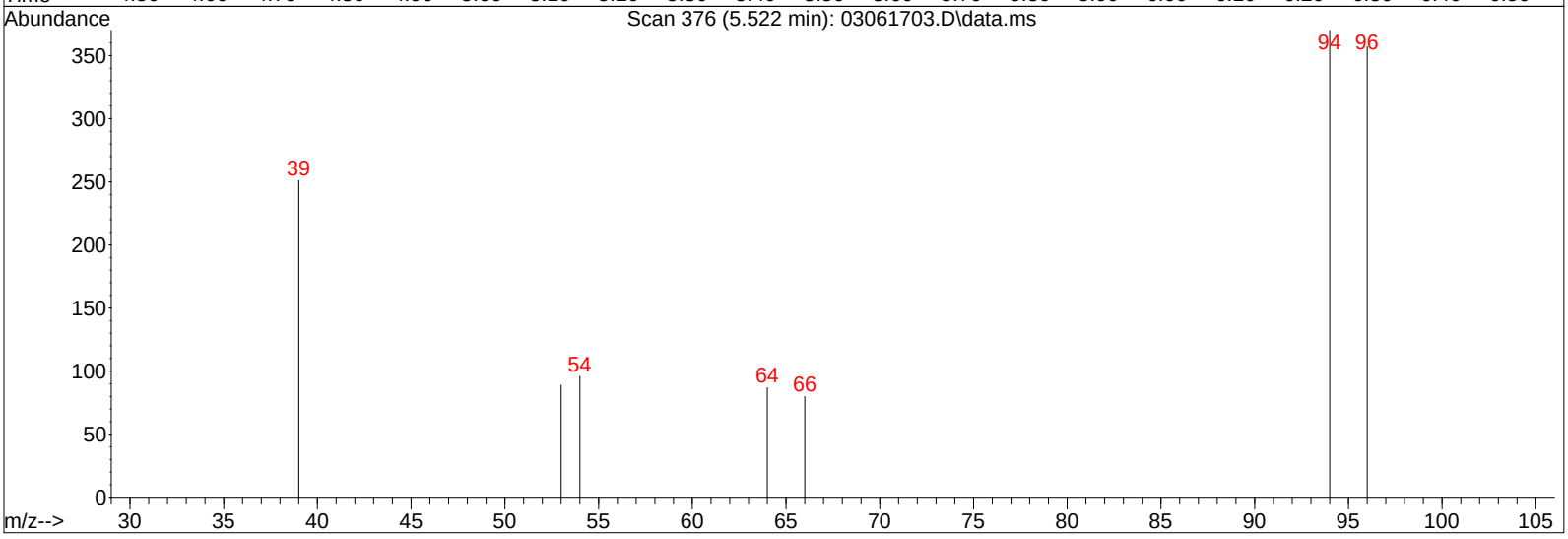


Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\06\03061703.D Vial: 12
Acq On : 6 Mar 2017 16:03 Operator: CL
Sample : 20pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

Quant Time: Mar 07 07:11:27 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M





TIC: 03061703.D\data.ms

(7) Bromomethane (T)

5.522min (+0.059) 27.27pg

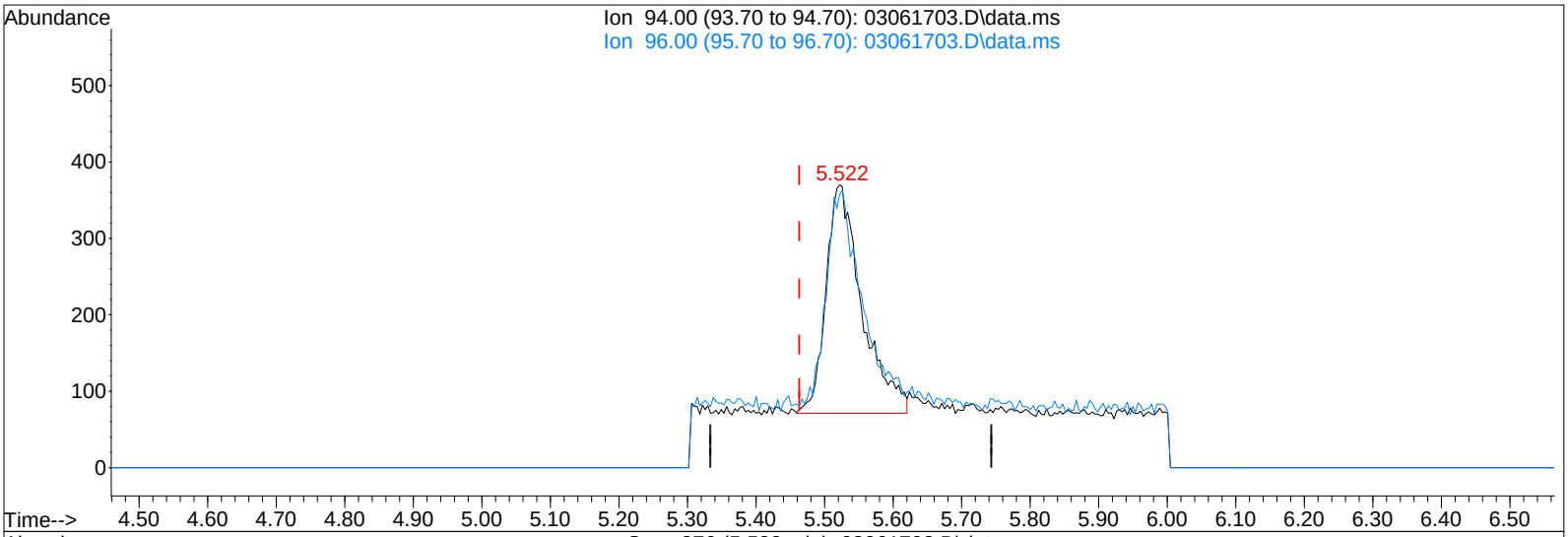
response 923

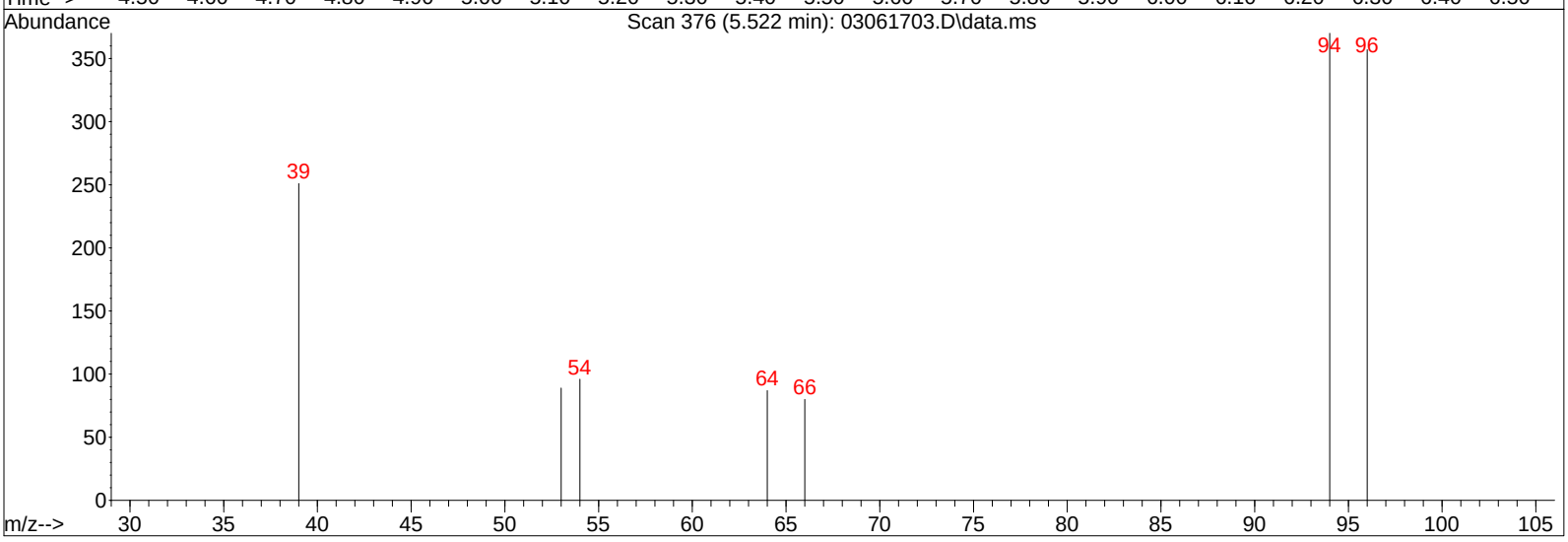
Ion	Exp%	Act%
94.00	100	100
96.00	93.80	53.09#
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\06\03061703.D Vial: 12
Acq On : 6 Mar 2017 16:03 Operator: CL
Sample : 20pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

Quant Time: Mar 07 07:11:27 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M





TIC: 03061703.D\data.ms

(7) Bromomethane (T)

5.522min (+0.059) 32.17pg m

response 1089

Ion	Exp%	Act%
94.00	100	100
96.00	93.80	45.00#
0.00	0.00	0.00
0.00	0.00	0.00

BLC

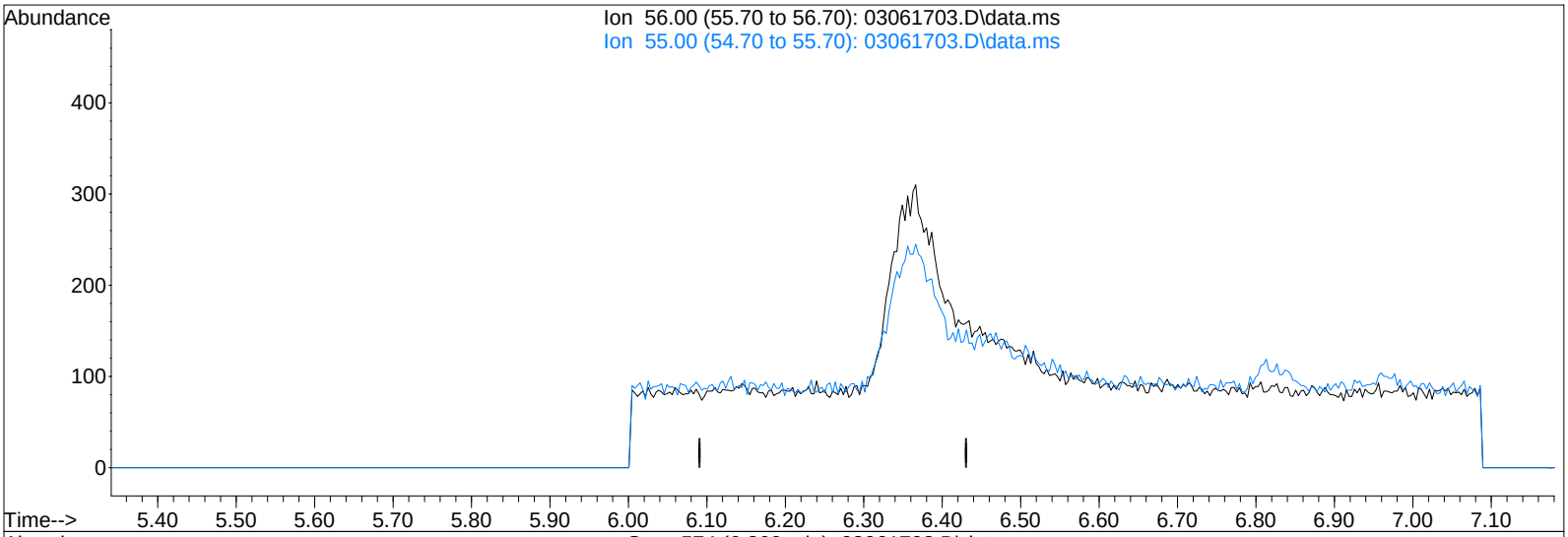
CL 3/7/17

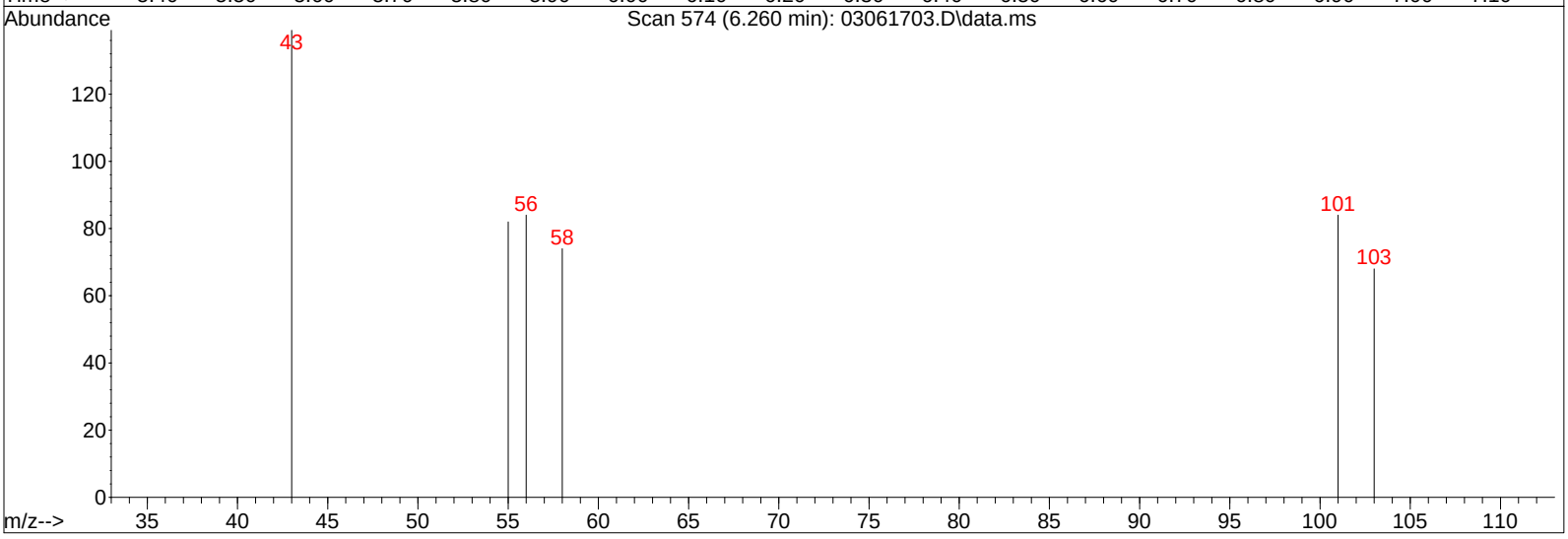
LH 3/8/17

Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\06\03061703.D Vial: 12
Acq On : 6 Mar 2017 16:03 Operator: CL
Sample : 20pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

Quant Time: Mar 07 07:11:27 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M





TIC: 03061703.D\data.ms

(9) Acrolein (T)

6.261min (-6.261) 0.00pg

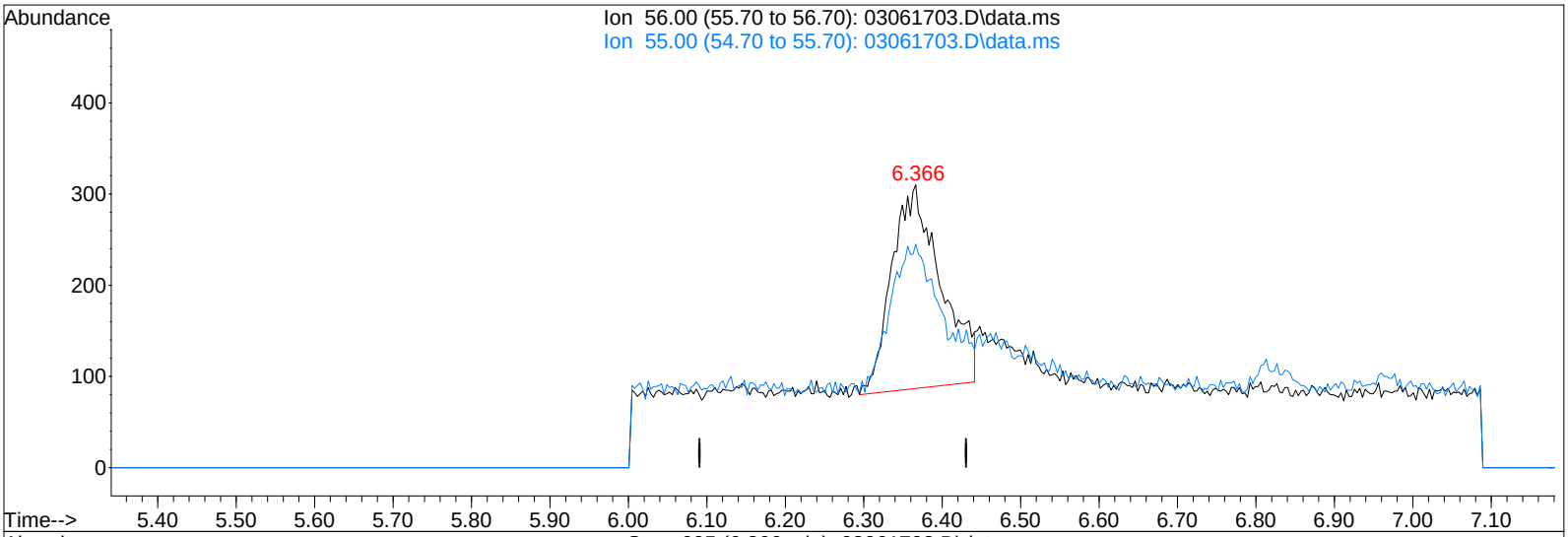
response 0

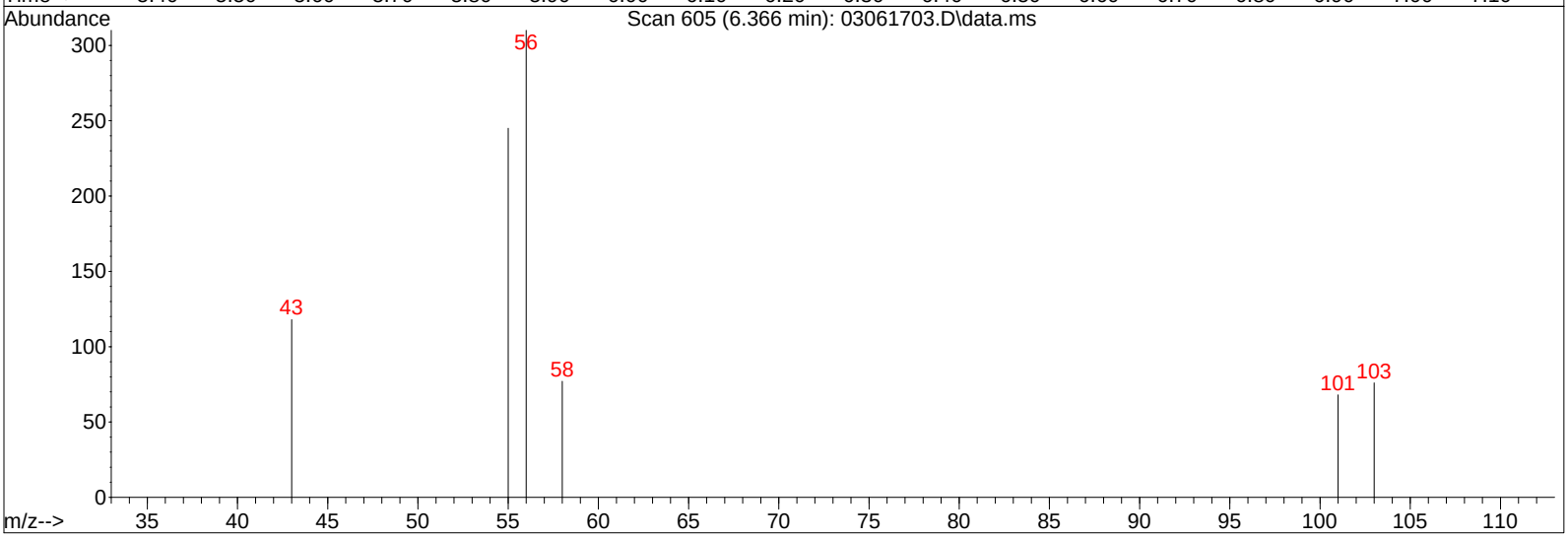
Ion	Exp%	Act%
56.00	100	0.00
55.00	64.20	0.00#
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\06\03061703.D Vial: 12
Acq On : 6 Mar 2017 16:03 Operator: CL
Sample : 20pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

Quant Time: Mar 07 07:11:27 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M





TIC: 03061703.D\data.ms

(9) Acrolein (T)

6.366min (+0.106) 44.17pg m

response 971

Ion	Exp%	Act%
56.00	100	100
55.00	64.20	0.00#
0.00	0.00	0.00
0.00	0.00	0.00

MP

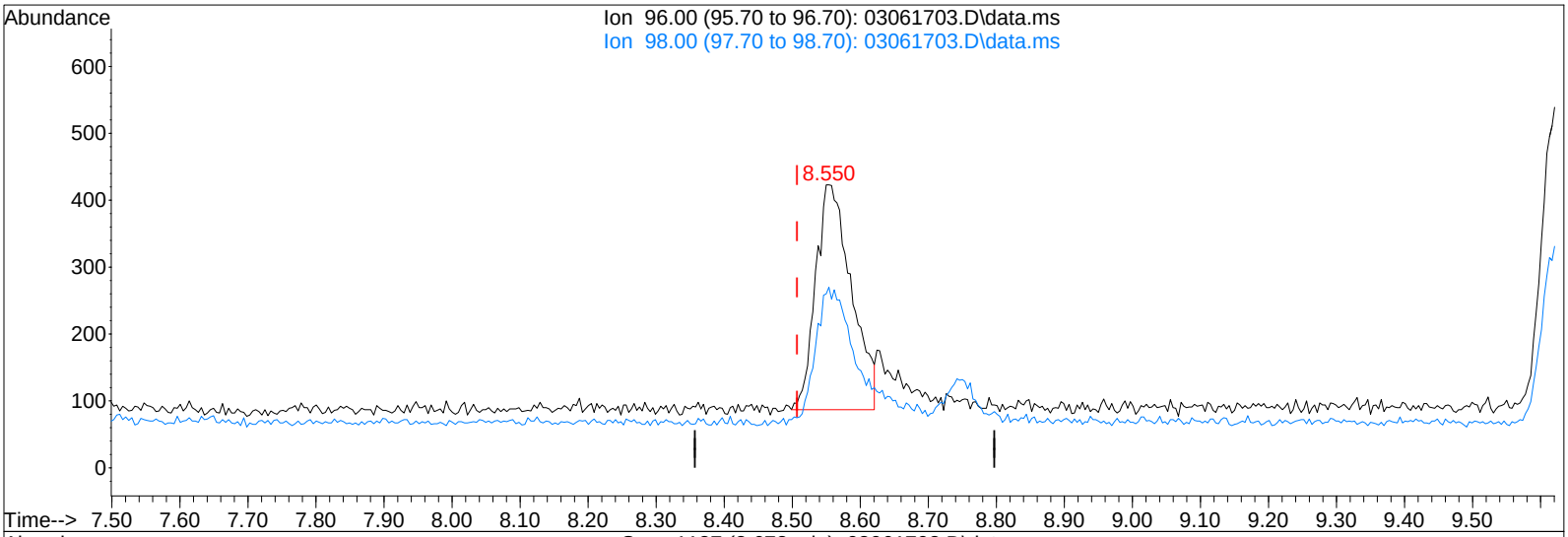
CL 3/7/17

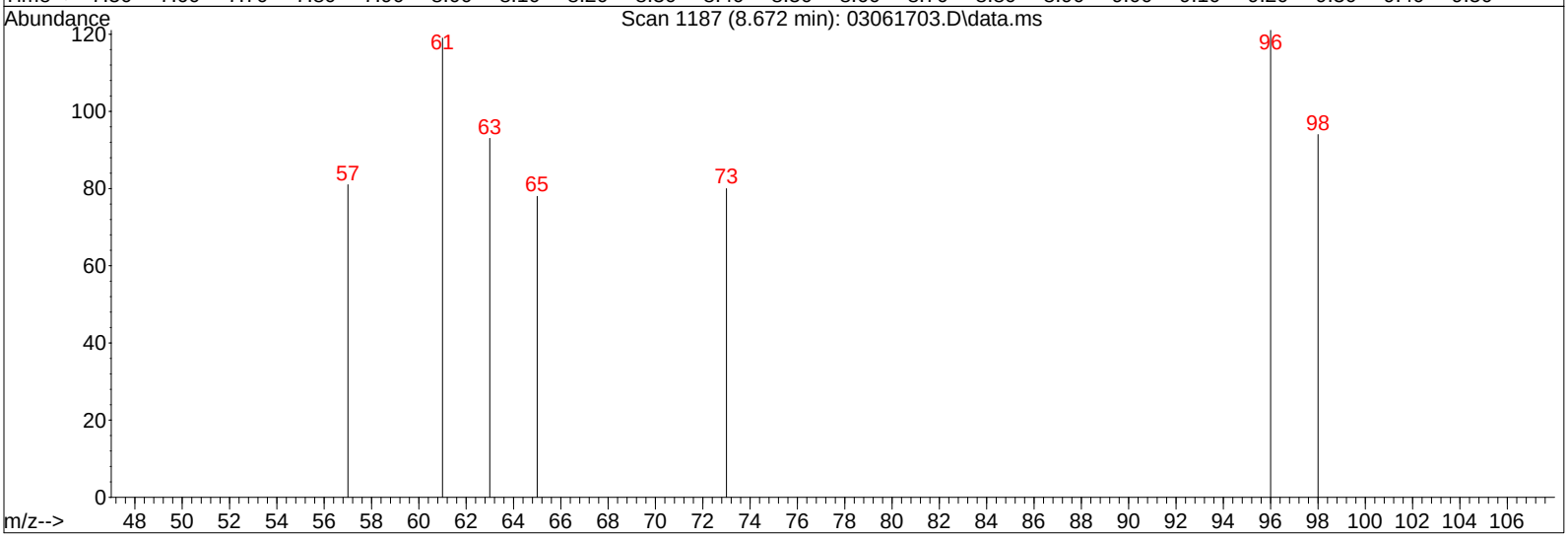
LH 3/8/17

Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\06\03061703.D Vial: 12
Acq On : 6 Mar 2017 16:03 Operator: CL
Sample : 20pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

Quant Time: Mar 07 07:11:27 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M





TIC: 03061703.D\data.ms

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

8.550min (+0.043) 26.19pg

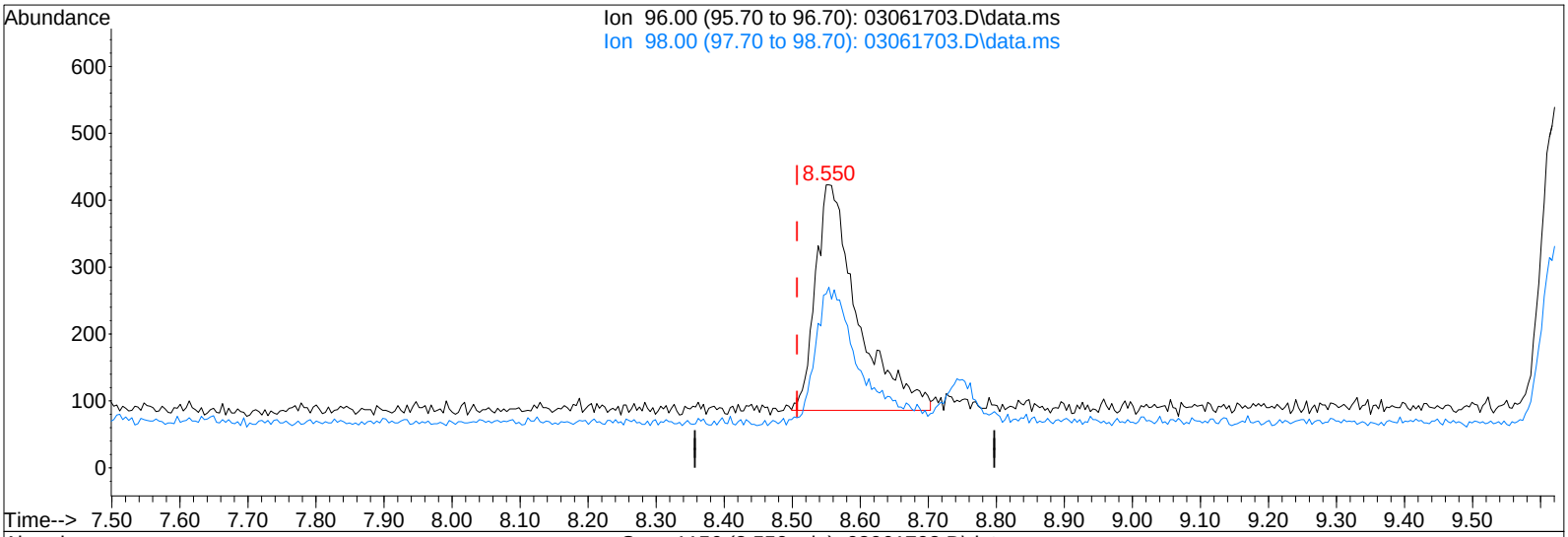
response 1227

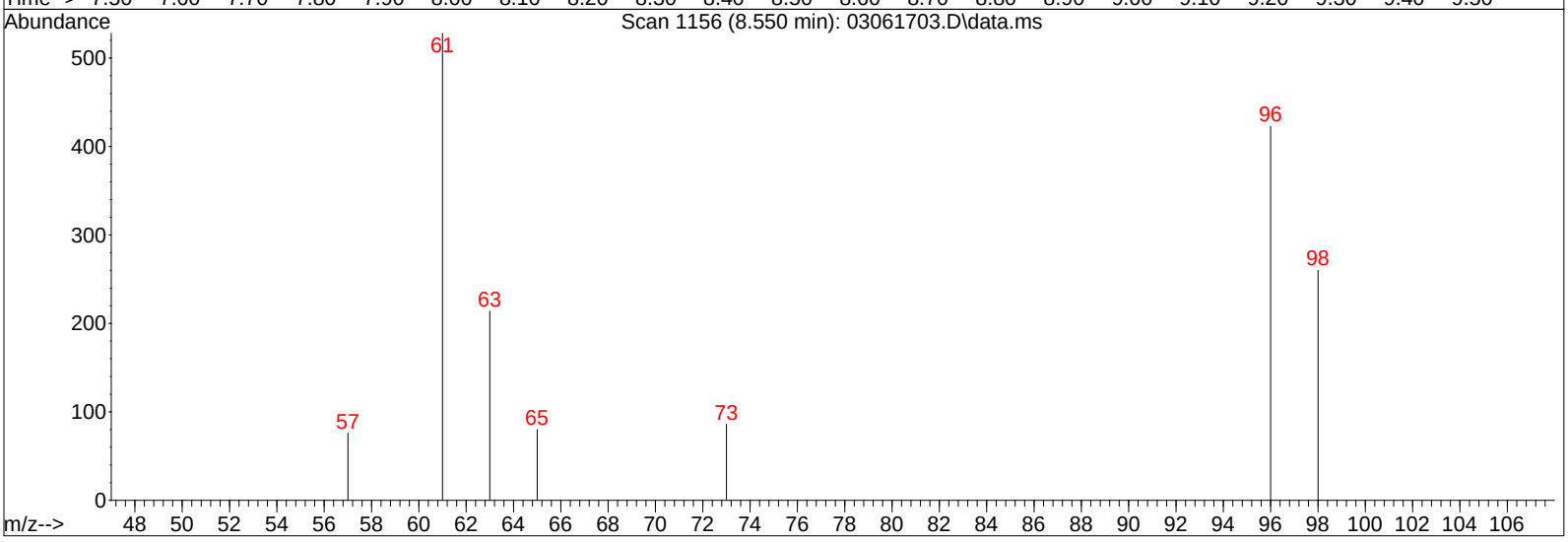
Ion	Exp%	Act%
96.00	100	100
98.00	62.50	59.09
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\06\03061703.D Vial: 12
Acq On : 6 Mar 2017 16:03 Operator: CL
Sample : 20pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

Quant Time: Mar 07 07:11:27 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M





TIC: 03061703.D\data.ms

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

8.550min (+0.043) 30.97pg m

response 1451

Ion	Exp%	Act%
96.00	100	100
98.00	62.50	49.97
0.00	0.00	0.00
0.00	0.00	0.00

BLC

CL 3/7/17

LH 3/8/17

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061704.D Vial: 12
Acq On : 6 Mar 2017 16:35 Operator: CL
Sample : 50pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

Quant Time: Mar 07 07:21:29 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/7/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.78	130	40257	1000.000 pg	0.02
25) 1,4-Difluorobenzene (IS2)	11.72	114	191669	1000.000 pg	0.01
38) Chlorobenzene-d5 (IS3)	16.06	54	39355	1000.000 pg	0.00
System Monitoring Compounds					
20) 1,2-Dichloroethane-d4 ...	10.55	65	79650	1032.683 pg	0.02
Spiked Amount 1000.000	Range 70 - 130		Recovery = 103.27%		
33) Toluene-d8 (SS2)	14.15	98	194279	982.956 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 98.30%		
45) Bromofluorobenzene (SS3)	17.56	174	64089	975.667 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 97.57%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.44	85	7686	75.751 pg	99
3) Chloromethane	4.69	52	2763	106.843 pg	93
4) 1,2-Dichloro,1,1,2,2-t...	4.82	85	8435	80.382 pg	99
5) Vinyl Chloride	5.00	62	7532	80.484 pg	95
6) 1,3-Butadiene	5.20	54	2928	54.441 pg	93
7) Bromomethane	5.51	94	2186	66.359 pg	100
8) Chloroethane	5.74	64	1814	69.366 pg	98
9) Acrolein	6.35	56	1746m	81.609 pg	
10) Acetone	6.46	58	13146	471.658 pg	94
11) Trichlorofluoromethane	6.63	101	5615	71.456 pg	99
12) 1,1-Dichloroethene	7.38	96	2956	68.780 pg	99
13) Methylene Chloride	7.51	84	3823	81.889 pg	99
14) Trichlorotrifluoroethane	7.81	151	2923	73.606 pg	99
15) trans-1,2-Dichloroethene	8.55	96	3171	69.559 pg	98
16) 1,1-Dichloroethane	8.74	63	5673	70.010 pg	99
17) Methyl tert-Butyl Ether	8.82	73	9551	69.384 pg	100
18) cis-1,2-Dichloroethene	9.62	96	3373	69.546 pg	92
19) Chloroform	9.90	83	7971	89.860 pg	99
21) 1,2-Dichloroethane	10.66	62	5130	72.622 pg	89
22) 1,1,1-Trichloroethane	10.92	97	5691	71.813 pg	98
23) Benzene	11.38	78	15552	82.248 pg	100
24) Carbon Tetrachloride	11.53	117	4969	72.441 pg	100
26) 1,2-Dichloropropane	12.19	63	3185	72.162 pg	98
27) Bromodichloromethane	12.37	83	4532	72.040 pg	99
28) Trichloroethene	12.42	130	3301	71.385 pg	99
29) 1,4-Dioxane	12.40	88	2304	63.183 pg	99
30) cis-1,3-Dichloropropene	13.27	75	4315	65.323 pg	100
31) trans-1,3-Dichloropropene	13.79	75	3161	55.559 pg	95
32) 1,1,2-Trichloroethane	13.96	83	2638	70.832 pg	98
34) Toluene	14.25	91	12826	69.624 pg	99
35) Dibromochloromethane	14.67	129	2884	62.015 pg	99
36) 1,2-Dibromoethane	14.93	107	3005	64.542 pg	99
37) Tetrachloroethene	15.40	166	3456	72.446 pg	100
39) Chlorobenzene	16.11	112	8377	68.317 pg	97
40) Ethylbenzene	16.49	91	13095	62.563 pg	100
41) m,p-Xylene	16.67	91	19287m	118.007 pg	
42) Styrene	17.02	104	5637	49.223 pg	99
43) o-Xylene	17.12	106	4641	59.319 pg	100
44) 1,1,2,2-Tetrachloroethane	17.10	83	5062	63.270 pg	99
46) 1,3,5-Trimethylbenzene	18.38	105	9583	55.761 pg	100
47) 1,2,4-Trimethylbenzene	18.77	105	9300	52.447 pg	99
48) 1,3-Dichlorobenzene	18.93	146	5576	58.124 pg	99
49) 1,4-Dichlorobenzene	18.99	146	6068	61.775 pg	97
50) 1,2-Dichlorobenzene	19.31	146	5686	58.791 pg	99
51) 1,2-Dibromo-3-chloropr...	19.73	157	1333	43.533 pg	96
52) 1,2,4-Trichlorobenzene	20.98	182	3485	60.561 pg	99
53) Naphthalene	21.11	128	10728	58.239 pg	93

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061704.D Vial: 12
Acq On : 6 Mar 2017 16:35 Operator: CL
Sample : 50pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

Quant Time: Mar 07 07:21:29 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

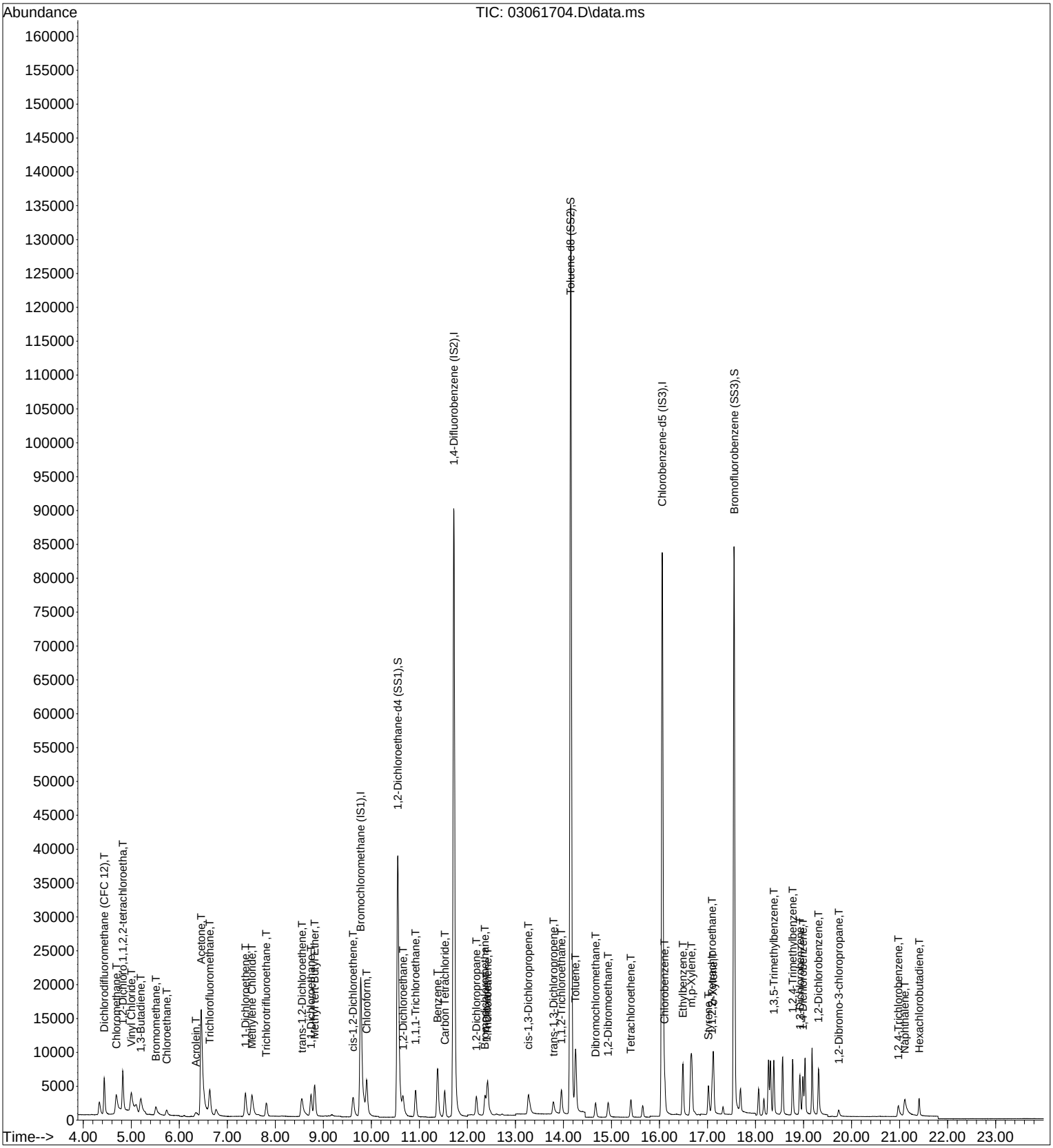
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
54) Hexachlorobutadiene	21.41	225	2673	68.201	pg	99

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061704.D Vial: 12
Acq On : 6 Mar 2017 16:35 Operator: CL
Sample : 50pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

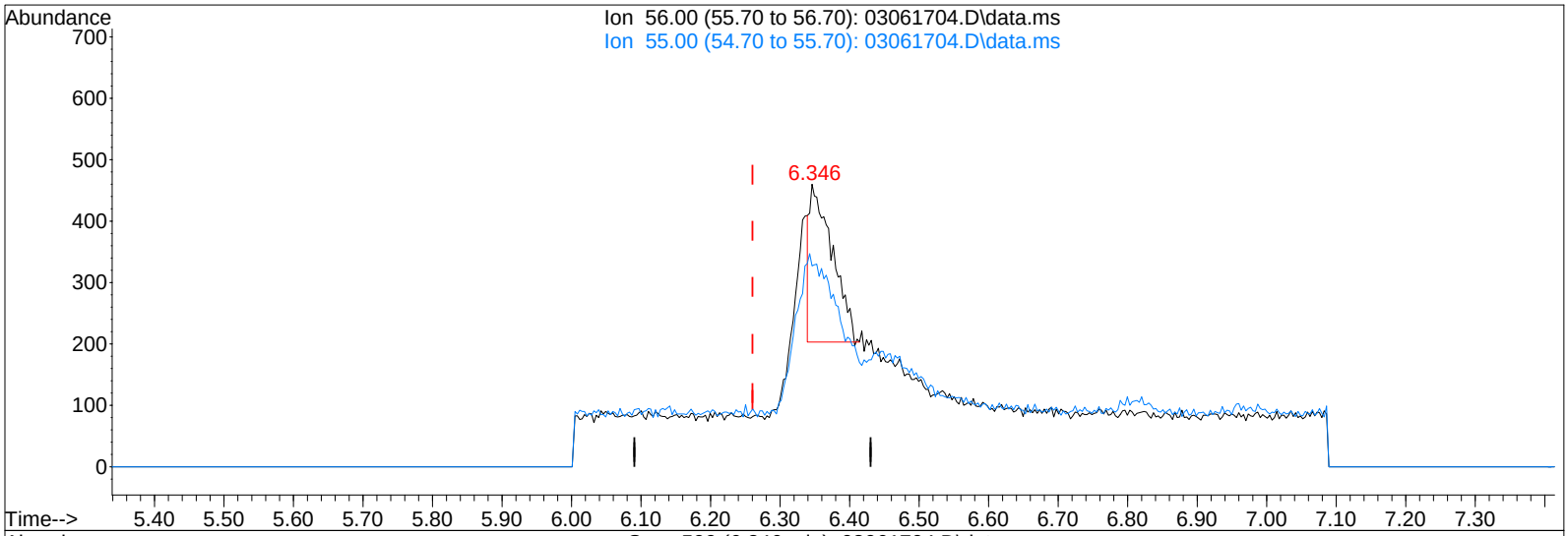
Quant Time: Mar 07 07:21:29 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

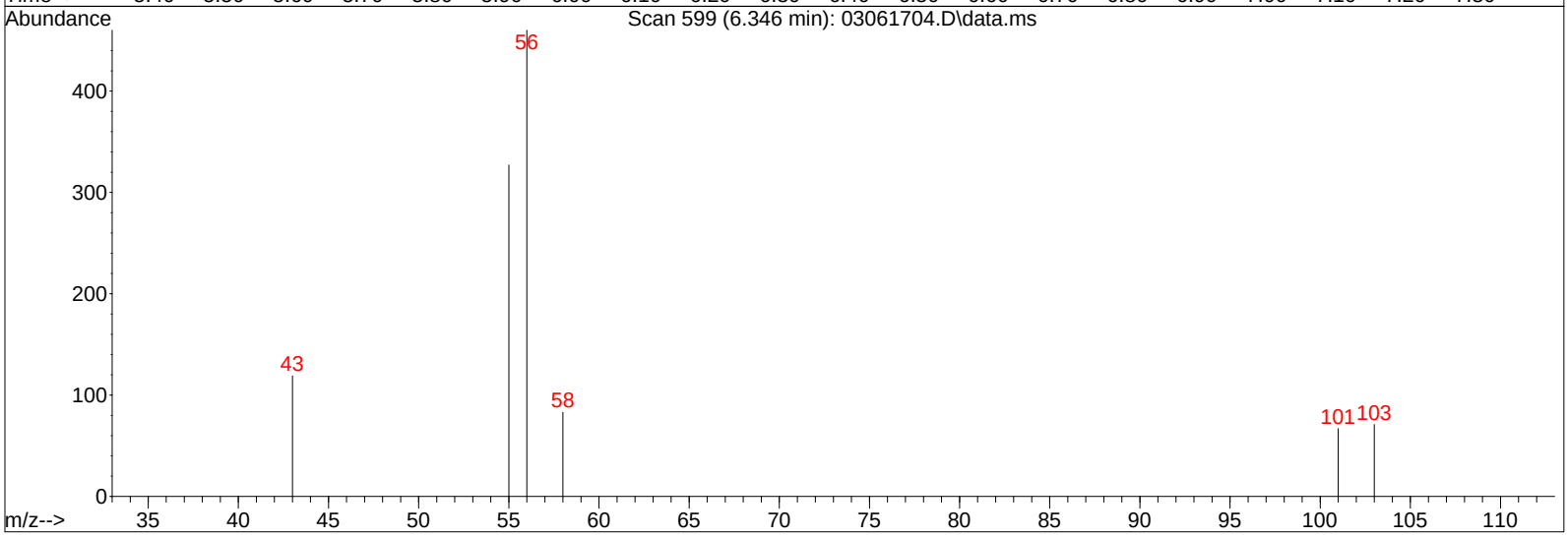


Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\06\03061704.D Vial: 12
Acq On : 6 Mar 2017 16:35 Operator: CL
Sample : 50pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

Quant Time: Mar 07 07:11:28 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M





TIC: 03061704.D\data.ms

(9) Acrolein (T)

6.346min (+0.085) 27.16pg

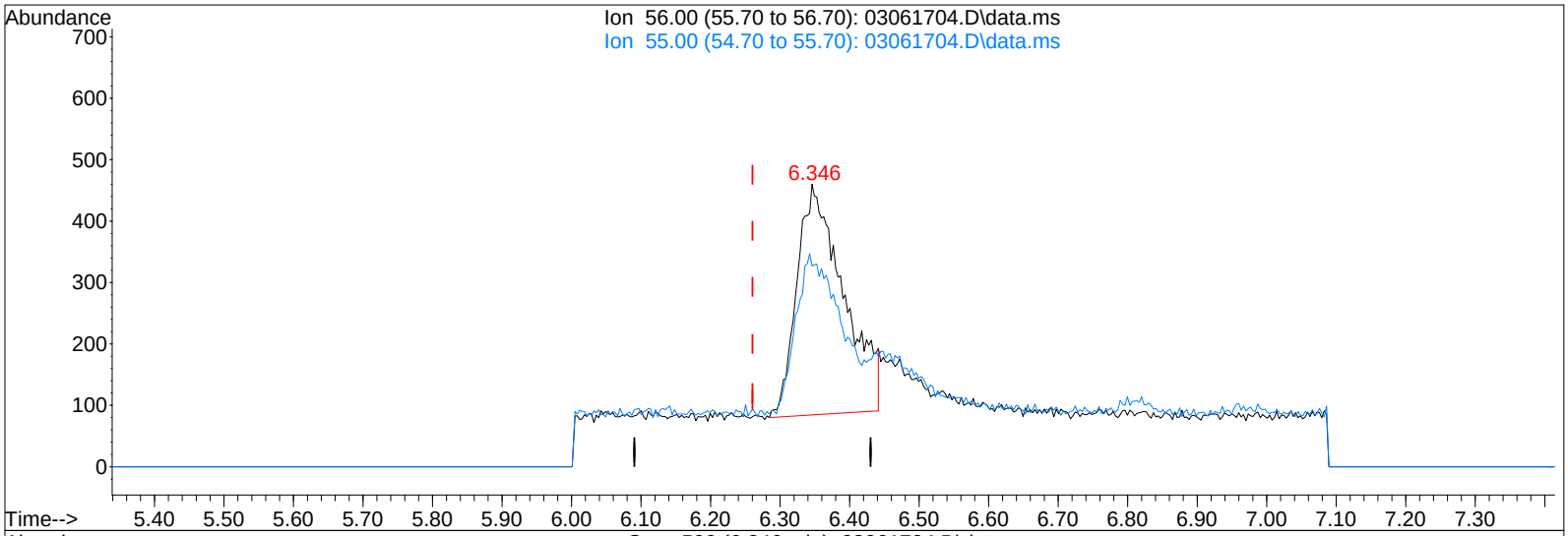
response 581

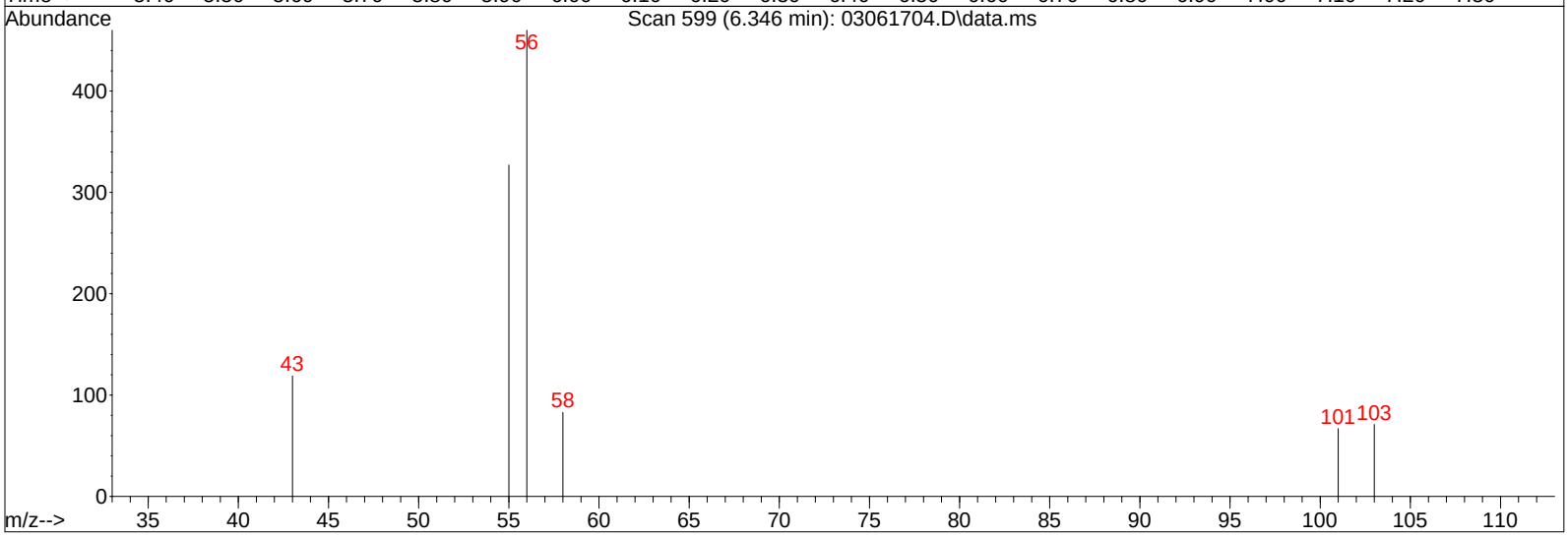
Ion	Exp%	Act%
56.00	100	100
55.00	64.20	206.88#
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\06\03061704.D Vial: 12
Acq On : 6 Mar 2017 16:35 Operator: CL
Sample : 50pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

Quant Time: Mar 07 07:11:28 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M





TIC: 03061704.D\data.ms

(9) Acrolein (T)

6.346min (+0.085) 81.61pg m

response 1746

Ion	Exp%	Act%
56.00	100	100
55.00	64.20	68.84
0.00	0.00	0.00
0.00	0.00	0.00

SP

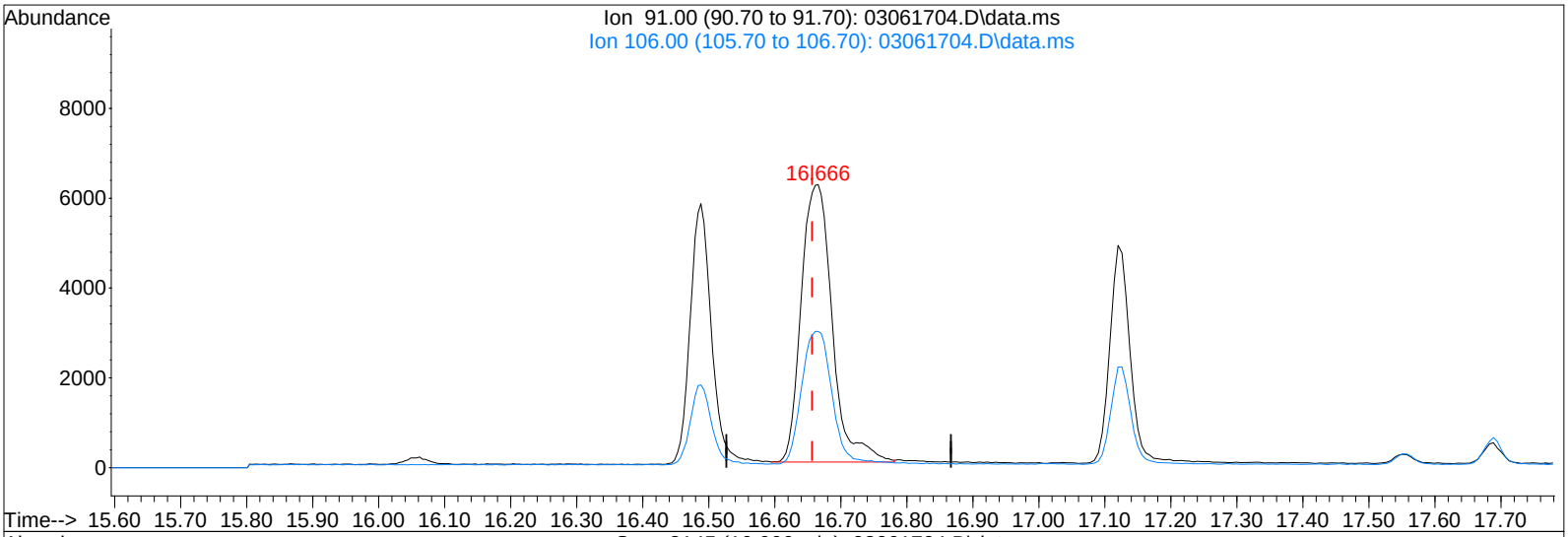
CL 3/7/17

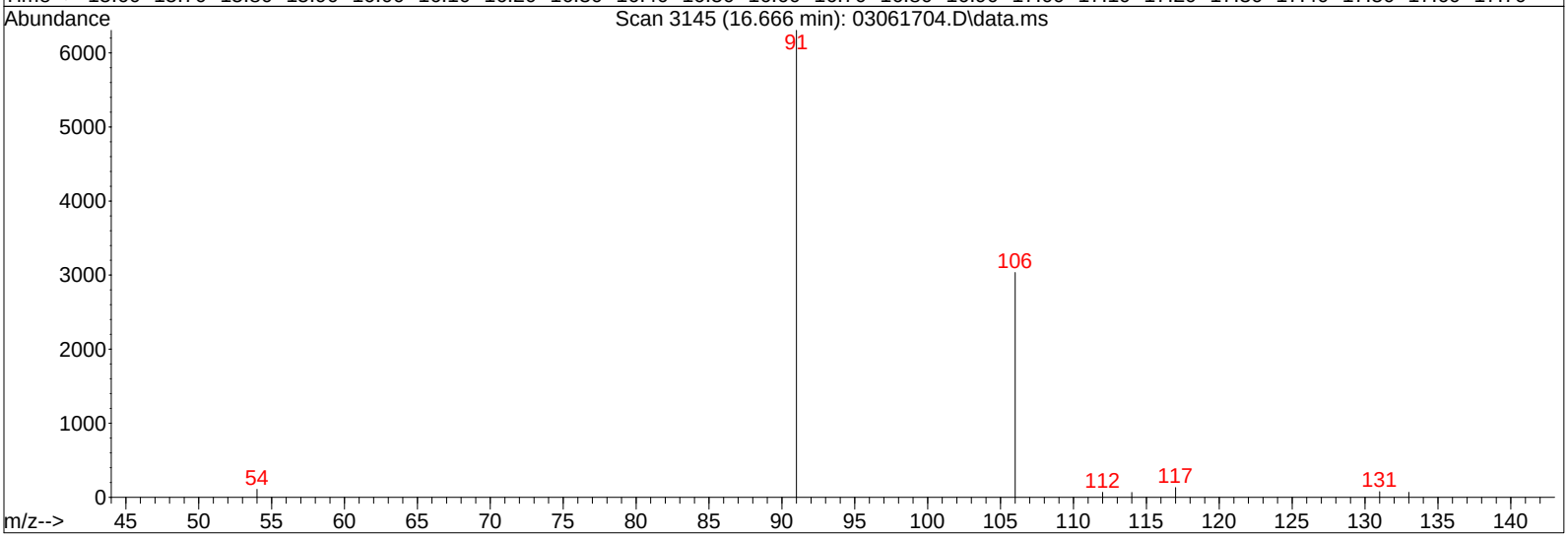
LH 3/8/17

Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\06\03061704.D Vial: 12
Acq On : 6 Mar 2017 16:35 Operator: CL
Sample : 50pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

Quant Time: Mar 07 07:11:28 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M





TIC: 03061704.D\data.ms

(41) m,p-Xylene (T)

16.666min (+0.009) 123.26pg

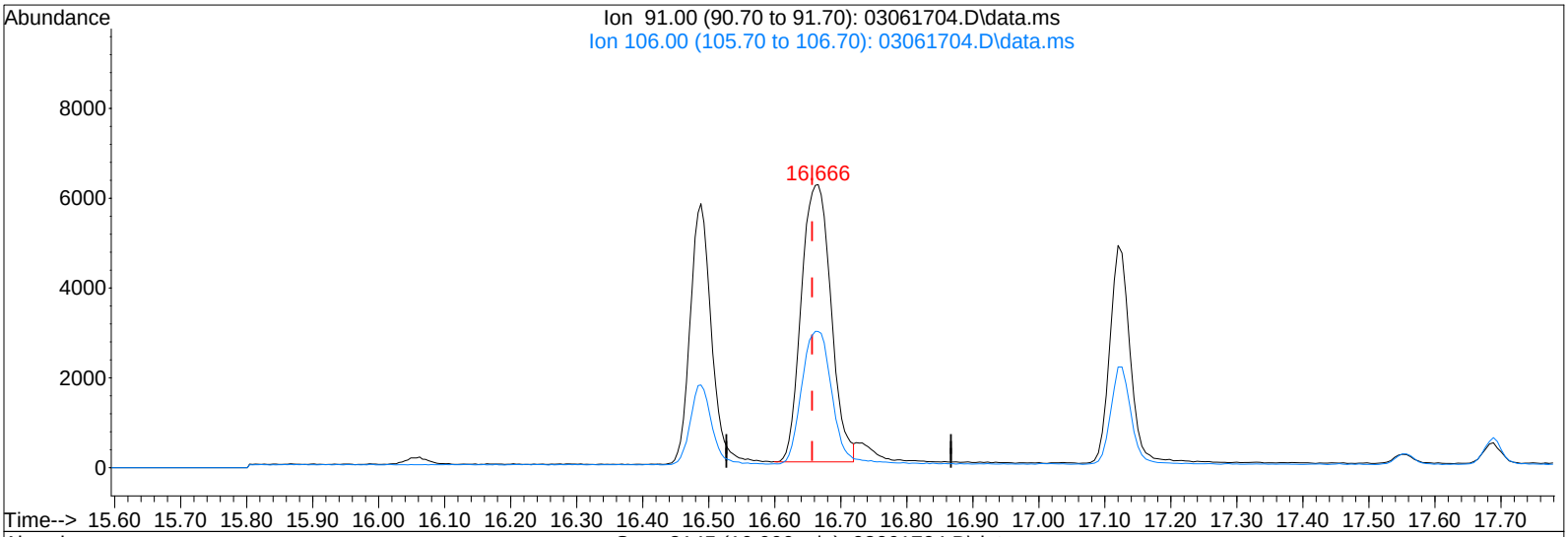
response 20146

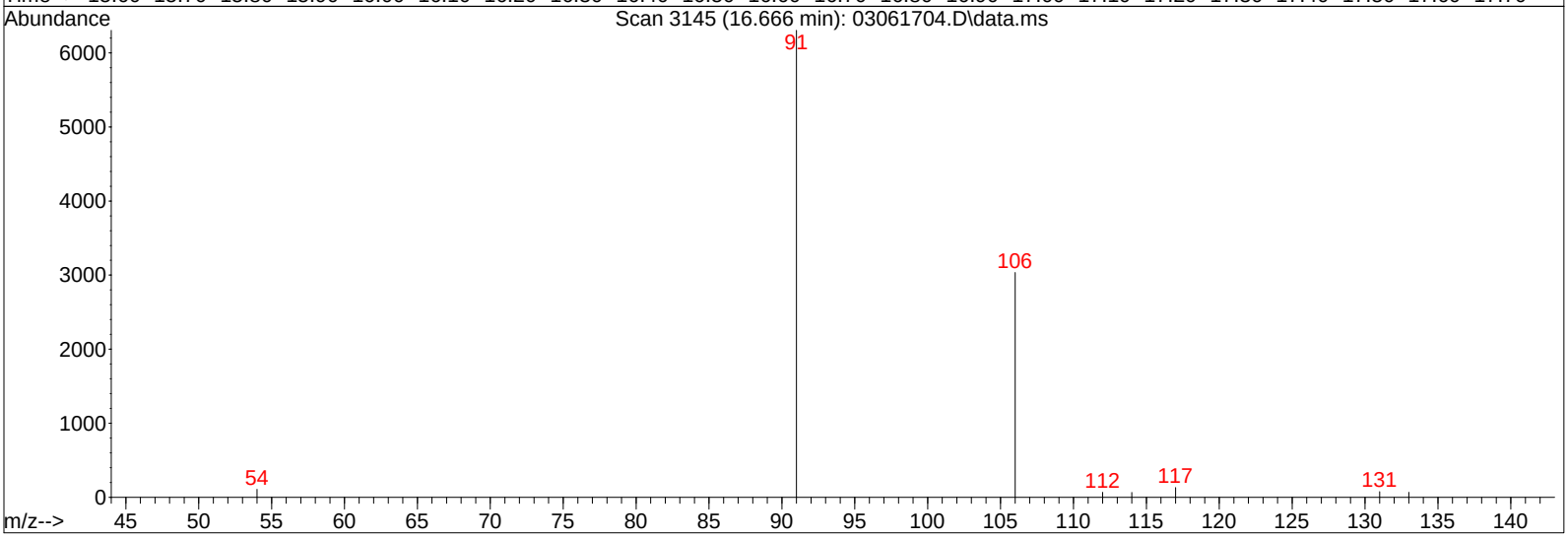
Ion	Exp%	Act%
91.00	100	100
106.00	48.10	46.64
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\06\03061704.D Vial: 12
Acq On : 6 Mar 2017 16:35 Operator: CL
Sample : 50pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

Quant Time: Mar 07 07:11:28 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M





TIC: 03061704.D\data.ms

(41) m,p-Xylene (T)

16.666min (+0.009) 118.01pg m

response 19287

Ion	Exp%	Act%
91.00	100	100
106.00	48.10	48.72
0.00	0.00	0.00
0.00	0.00	0.00

IPC

CL 3/7/17

LH 3/8/17

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061705.D Vial: 12
Acq On : 6 Mar 2017 17:06 Operator: CL
Sample : 100pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

Quant Time: Mar 07 07:11:29 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/7/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.77	130	42976	1000.000 pg	0.02
25) 1,4-Difluorobenzene (IS2)	11.72	114	205885	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.06	54	42673	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.55	65	85538	1038.857 pg	0.02
Spiked Amount 1000.000	Range 70 - 130		Recovery = 103.89%		
33) Toluene-d8 (SS2)	14.15	98	209871	988.525 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 98.85%		
45) Bromofluorobenzene (SS3)	17.56	174	92933	1304.773 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 130.48%#		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.43	85	15186	140.200 pg	100
3) Chloromethane	4.68	52	4976	180.244 pg	97
4) 1,2-Dichloro,1,1,2,2-t...	4.82	85	16323	145.710 pg	100
5) Vinyl Chloride	4.99	62	14554	145.679 pg	97
6) 1,3-Butadiene	5.18	54	6069	105.703 pg	91
7) Bromomethane	5.50	94	4489	127.648 pg	98
8) Chloroethane	5.72	64	3451	123.615 pg	98
9) Acrolein	6.33	56	2797	122.463 pg	92
10) Acetone	6.44	58	22270	748.460 pg	94
11) Trichlorofluoromethane	6.63	101	11093	132.236 pg	100
12) 1,1-Dichloroethene	7.36	96	5949	129.663 pg	99
13) Methylene Chloride	7.50	84	7109	142.642 pg	96
14) Trichlorotrifluoroethane	7.80	151	5692	134.266 pg	99
15) trans-1,2-Dichloroethene	8.54	96	6129	125.939 pg	96
16) 1,1-Dichloroethane	8.73	63	11308	130.721 pg	99
17) Methyl tert-Butyl Ether	8.81	73	18962	129.035 pg	100
18) cis-1,2-Dichloroethene	9.61	96	6632	128.091 pg	99
19) Chloroform	9.90	83	14589	154.062 pg	100
21) 1,2-Dichloroethane	10.66	62	10338	137.088 pg	92
22) 1,1,1-Trichloroethane	10.91	97	11389	134.621 pg	100
23) Benzene	11.37	78	28469	141.036 pg	100
24) Carbon Tetrachloride	11.52	117	9792	133.721 pg	99
26) 1,2-Dichloropropane	12.18	63	6485	136.784 pg	100
27) Bromodichloromethane	12.37	83	8850	130.964 pg	100
28) Trichloroethene	12.42	130	6564	132.147 pg	98
29) 1,4-Dioxane	12.39	88	4643	118.534 pg	99
30) cis-1,3-Dichloropropene	13.26	75	8792	123.908 pg	98
31) trans-1,3-Dichloropropene	13.78	75	6362	104.100 pg	98
32) 1,1,2-Trichloroethane	13.95	83	5312	132.783 pg	98
34) Toluene	14.25	91	25139	127.041 pg	100
35) Dibromochloromethane	14.67	129	6007	120.250 pg	100
36) 1,2-Dibromoethane	14.93	107	6066	121.290 pg	100
37) Tetrachloroethene	15.40	166	6842	133.522 pg	100
39) Chlorobenzene	16.10	112	16770	126.131 pg	100
40) Ethylbenzene	16.48	91	26567	117.057 pg	100
41) m,p-Xylene	16.66	91	39997	225.692 pg	99
42) Styrene	17.02	104	15234	122.682 pg	100
43) o-Xylene	17.12	106	12794	150.812 pg	97
44) 1,1,2,2-Tetrachloroethane	17.10	83	13089	150.880 pg	99
46) 1,3,5-Trimethylbenzene	18.38	105	25457	136.611 pg	99
47) 1,2,4-Trimethylbenzene	18.77	105	19628	102.085 pg	99
48) 1,3-Dichlorobenzene	18.92	146	11828	113.708 pg	100
49) 1,4-Dichlorobenzene	18.98	146	12712	119.351 pg	98
50) 1,2-Dichlorobenzene	19.31	146	11703	111.596 pg	100
51) 1,2-Dibromo-3-chloropr...	19.72	157	2807	84.544 pg	94
52) 1,2,4-Trichlorobenzene	20.96	182	6993	112.074 pg	99
53) Naphthalene	21.09	128	21376	107.020 pg	98

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061705.D Vial: 12
Acq On : 6 Mar 2017 17:06 Operator: CL
Sample : 100pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

Quant Time: Mar 07 07:11:29 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

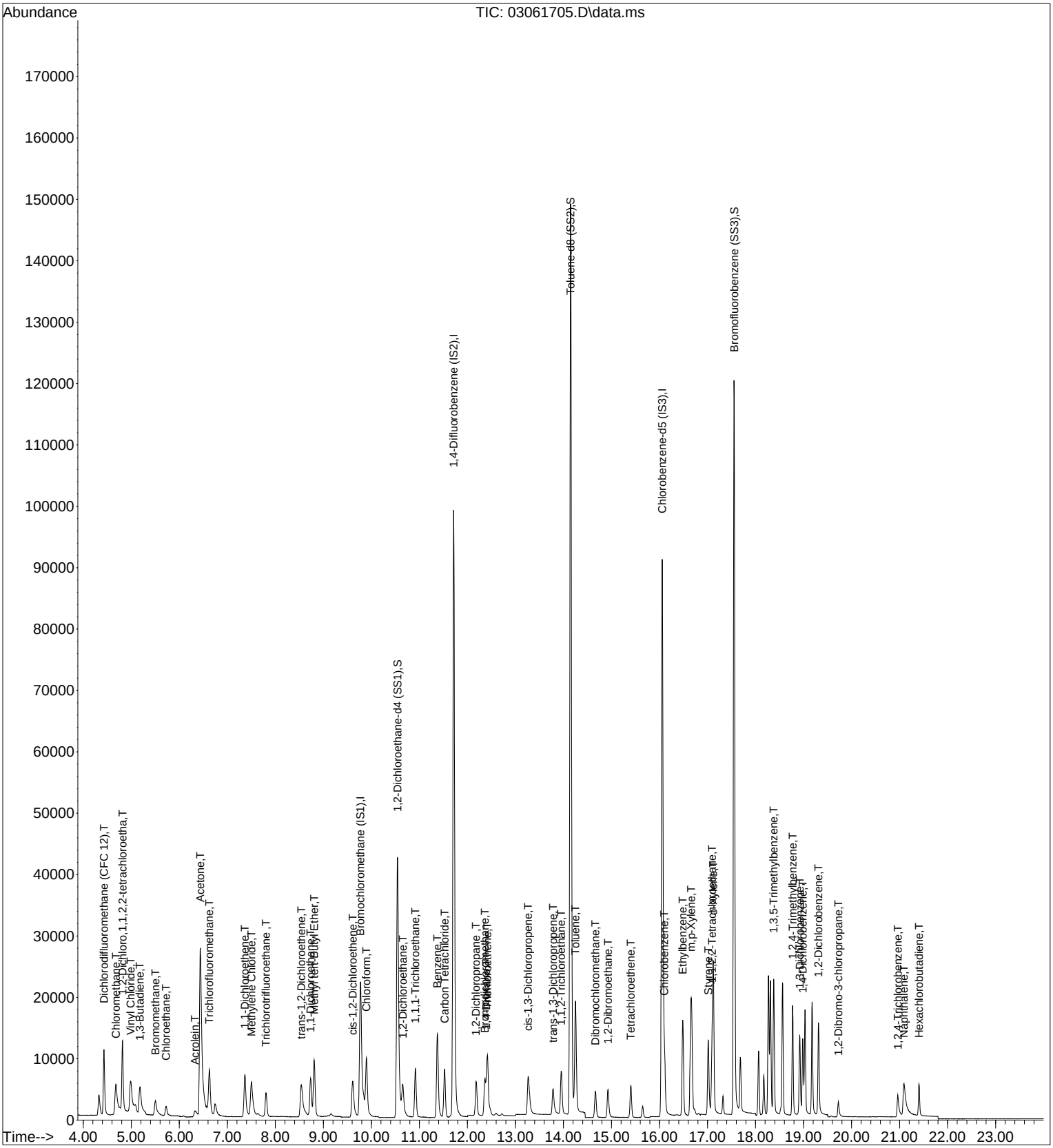
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	5291	124.502	pg	100

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061705.D Vial: 12
Acq On : 6 Mar 2017 17:06 Operator: CL
Sample : 100pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

Quant Time: Mar 07 07:11:29 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061706.D Vial: 13
Acq On : 6 Mar 2017 17:37 Operator: CL
Sample : 500pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03021708 (3/31)

Quant Time: Mar 07 07:11:30 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/7/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.76	130	43230	1000.000 pg	0.00
25) 1,4-Difluorobenzene (IS2)	11.71	114	211696	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.05	54	43642	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.53	65	84872	1024.713 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 102.47%		
33) Toluene-d8 (SS2)	14.15	98	214176	981.111 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 98.11%		
45) Bromofluorobenzene (SS3)	17.55	174	73116	1003.751 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 100.37%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.42	85	74090	679.993 pg	100
3) Chloromethane	4.65	52	20617	742.413 pg	100
4) 1,2-Dichloro,1,1,2,2-t...	4.81	85	80748	716.577 pg	100
5) Vinyl Chloride	4.95	62	72596	722.381 pg	100
6) 1,3-Butadiene	5.14	54	33207	574.963 pg	99
7) Bromomethane	5.48	94	22317	630.873 pg	99
8) Chloroethane	5.70	64	17506	623.380 pg	99
9) Acrolein	6.27	56	13303	579.031 pg	99
10) Acetone	6.40	58	96710	3231.177 pg	99
11) Trichlorofluoromethane	6.61	101	54627	647.366 pg	100
12) 1,1-Dichloroethene	7.35	96	30123	652.699 pg	100
13) Methylene Chloride	7.48	84	33117	660.587 pg	99
14) Trichlorotrifluoroethane	7.80	151	28597	670.600 pg	100
15) trans-1,2-Dichloroethene	8.51	96	32942	672.917 pg	95
16) 1,1-Dichloroethane	8.72	63	58759	675.266 pg	100
17) Methyl tert-Butyl Ether	8.79	73	98781	668.249 pg	100
18) cis-1,2-Dichloroethene	9.59	96	35085	673.653 pg	99
19) Chloroform	9.89	83	66189	694.858 pg	99
21) 1,2-Dichloroethane	10.64	62	53769	708.821 pg	100
22) 1,1,1-Trichloroethane	10.91	97	59231	696.014 pg	100
23) Benzene	11.37	78	135776	668.683 pg	100
24) Carbon Tetrachloride	11.52	117	50550	686.263 pg	100
26) 1,2-Dichloropropane	12.17	63	33865	694.686 pg	100
27) Bromodichloromethane	12.35	83	47769	687.491 pg	100
28) Trichloroethene	12.41	130	34917	683.658 pg	100
29) 1,4-Dioxane	12.38	88	26908	668.095 pg	99
30) cis-1,3-Dichloropropene	13.26	75	50520	692.450 pg	100
31) trans-1,3-Dichloropropene	13.77	75	41142	654.718 pg	99
32) 1,1,2-Trichloroethane	13.95	83	28234	686.385 pg	99
34) Toluene	14.25	91	130939	643.542 pg	100
35) Dibromochloromethane	14.66	129	33255	647.434 pg	100
36) 1,2-Dibromoethane	14.92	107	34229	665.624 pg	99
37) Tetrachloroethene	15.40	166	35578	675.246 pg	100
39) Chlorobenzene	16.10	112	87434	643.012 pg	100
40) Ethylbenzene	16.48	91	147002	633.327 pg	100
41) m,p-Xylene	16.66	91	229072	1263.892 pg	100
42) Styrene	17.01	104	77272	608.468 pg	100
43) o-Xylene	17.12	106	53996	622.358 pg	100
44) 1,1,2,2-Tetrachloroethane	17.09	83	58204	656.034 pg	100
46) 1,3,5-Trimethylbenzene	18.38	105	119166	625.289 pg	100
47) 1,2,4-Trimethylbenzene	18.77	105	120573	613.177 pg	100
48) 1,3-Dichlorobenzene	18.92	146	67835	637.650 pg	99
49) 1,4-Dichlorobenzene	18.98	146	67465	619.356 pg	100
50) 1,2-Dichlorobenzene	19.31	146	65988	615.268 pg	100
51) 1,2-Dibromo-3-chloropr...	19.72	157	19132	563.441 pg	100
52) 1,2,4-Trichlorobenzene	20.94	182	38589	604.717 pg	100
53) Naphthalene	21.06	128	122935	601.815 pg	100

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061706.D Vial: 13
Acq On : 6 Mar 2017 17:37 Operator: CL
Sample : 500pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03021708 (3/31)

Quant Time: Mar 07 07:11:30 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

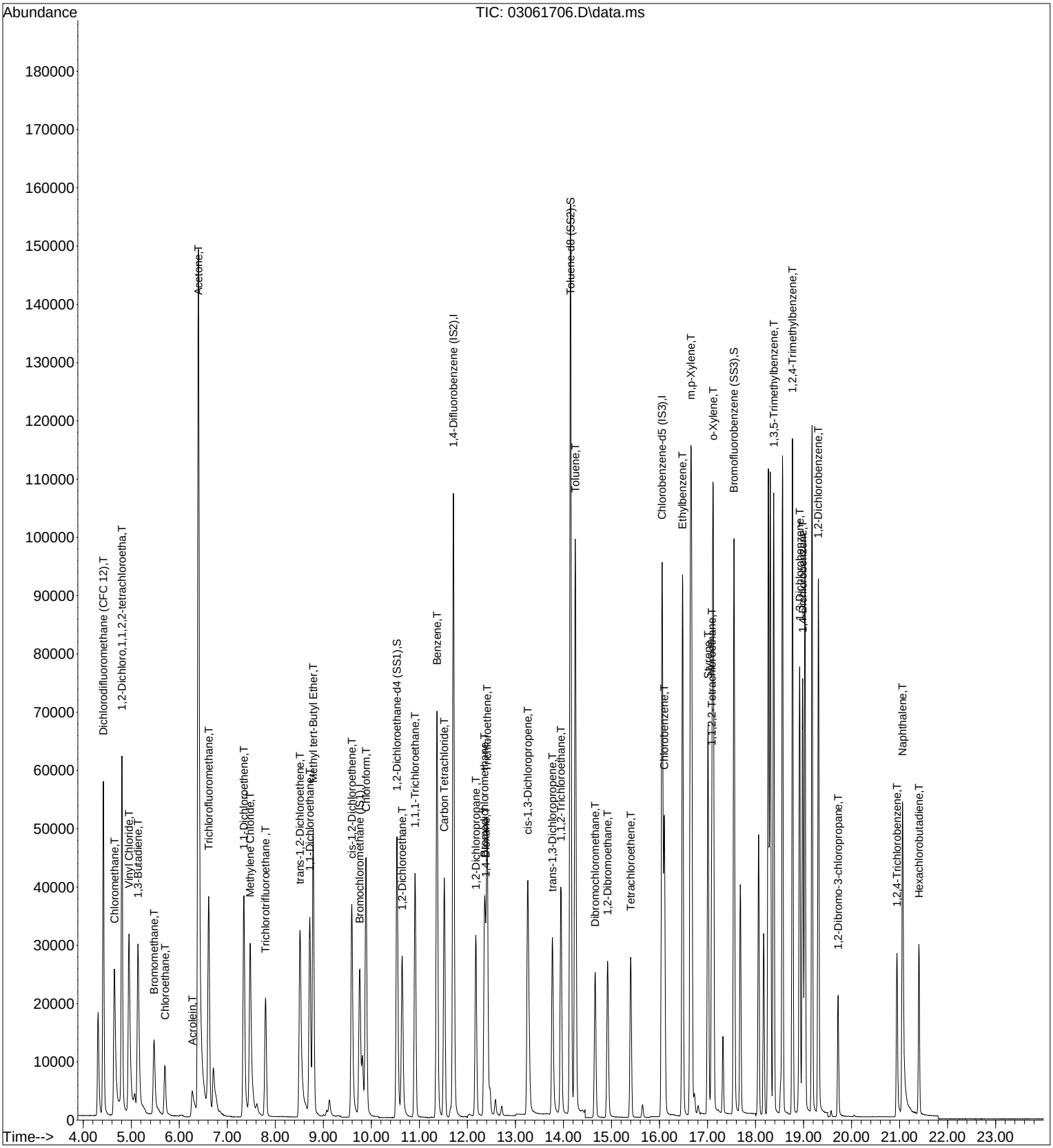
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	28356	652.426 pg	100

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061706.D Vial: 13
Acq On : 6 Mar 2017 17:37 Operator: CL
Sample : 500pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03021708 (3/31)

Quant Time: Mar 07 07:11:30 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061707.D Vial: 14
Acq On : 6 Mar 2017 18:09 Operator: CL
Sample : 1000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 07 07:11:33 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/7/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.75	130	43515	1000.000 pg	0.00
25) 1,4-Difluorobenzene (IS2)	11.71	114	214340	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.05	54	43809	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.53	65	85059	1020.244 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 102.02%		
33) Toluene-d8 (SS2)	14.14	98	216526	979.641 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 97.96%		
45) Bromofluorobenzene (SS3)	17.55	174	74451	1018.182 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 101.82%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.41	85	137467	1253.399 pg	100
3) Chloromethane	4.64	52	36026	1288.791 pg	99
4) 1,2-Dichloro,1,1,2,2-t...	4.80	85	146021	1287.338 pg	100
5) Vinyl Chloride	4.94	62	130530	1290.359 pg	100
6) 1,3-Butadiene	5.13	54	62332	1072.179 pg	99
7) Bromomethane	5.46	94	41493	1165.272 pg	100
8) Chloroethane	5.69	64	32339	1144.033 pg	100
9) Acrolein	6.26	56	24463	1057.812 pg	99
10) Acetone	6.39	58	178606	5928.321 pg	100
11) Trichlorofluoromethane	6.61	101	102027	1201.169 pg	100
12) 1,1-Dichloroethene	7.34	96	57070	1228.481 pg	100
13) Methylene Chloride	7.47	84	61517	1219.047 pg	100
14) Trichlorotrifluoroethane	7.79	151	54395	1267.208 pg	100
15) trans-1,2-Dichloroethene	8.51	96	61928	1256.738 pg	100
16) 1,1-Dichloroethane	8.71	63	111095	1268.357 pg	100
17) Methyl tert-Butyl Ether	8.78	73	187256	1258.482 pg	100
18) cis-1,2-Dichloroethene	9.59	96	66958	1277.214 pg	100
19) Chloroform	9.88	83	123044	1283.266 pg	100
21) 1,2-Dichloroethane	10.64	62	101162	1324.855 pg	100
22) 1,1,1-Trichloroethane	10.91	97	112148	1309.201 pg	100
23) Benzene	11.36	78	252349	1234.653 pg	100
24) Carbon Tetrachloride	11.52	117	95675	1290.369 pg	100
26) 1,2-Dichloropropane	12.18	63	64745	1311.756 pg	100
27) Bromodichloromethane	12.36	83	91774	1304.517 pg	100
28) Trichloroethene	12.41	130	65902	1274.413 pg	100
29) 1,4-Dioxane	12.38	88	51042	1251.682 pg	100
30) cis-1,3-Dichloropropene	13.25	75	99483	1346.739 pg	100
31) trans-1,3-Dichloropropene	13.77	75	82230	1292.435 pg	100
32) 1,1,2-Trichloroethane	13.95	83	54198	1301.332 pg	100
34) Toluene	14.25	91	250097	1214.019 pg	100
35) Dibromochloromethane	14.66	129	65133	1252.418 pg	100
36) 1,2-Dibromoethane	14.92	107	65231	1252.848 pg	100
37) Tetrachloroethene	15.40	166	67297	1261.494 pg	100
39) Chlorobenzene	16.10	112	164924	1208.270 pg	100
40) Ethylbenzene	16.48	91	283995	1218.868 pg	100
41) m,p-Xylene	16.66	91	442235	2430.705 pg	100
42) Styrene	17.01	104	149283	1171.028 pg	100
43) o-Xylene	17.12	106	104182	1196.224 pg	100
44) 1,1,2,2-Tetrachloroethane	17.09	83	112084	1258.516 pg	100
46) 1,3,5-Trimethylbenzene	18.37	105	232299	1214.274 pg	100
47) 1,2,4-Trimethylbenzene	18.77	105	237277	1202.078 pg	100
48) 1,3-Dichlorobenzene	18.92	146	126585	1185.365 pg	100
49) 1,4-Dichlorobenzene	18.98	146	125182	1144.841 pg	100
50) 1,2-Dichlorobenzene	19.31	146	125938	1169.761 pg	100
51) 1,2-Dibromo-3-chloropr...	19.72	157	38596	1132.326 pg	100
52) 1,2,4-Trichlorobenzene	20.94	182	71820	1121.179 pg	100
53) Naphthalene	21.06	128	230504	1124.106 pg	100

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061707.D Vial: 14
Acq On : 6 Mar 2017 18:09 Operator: CL
Sample : 1000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 07 07:11:33 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

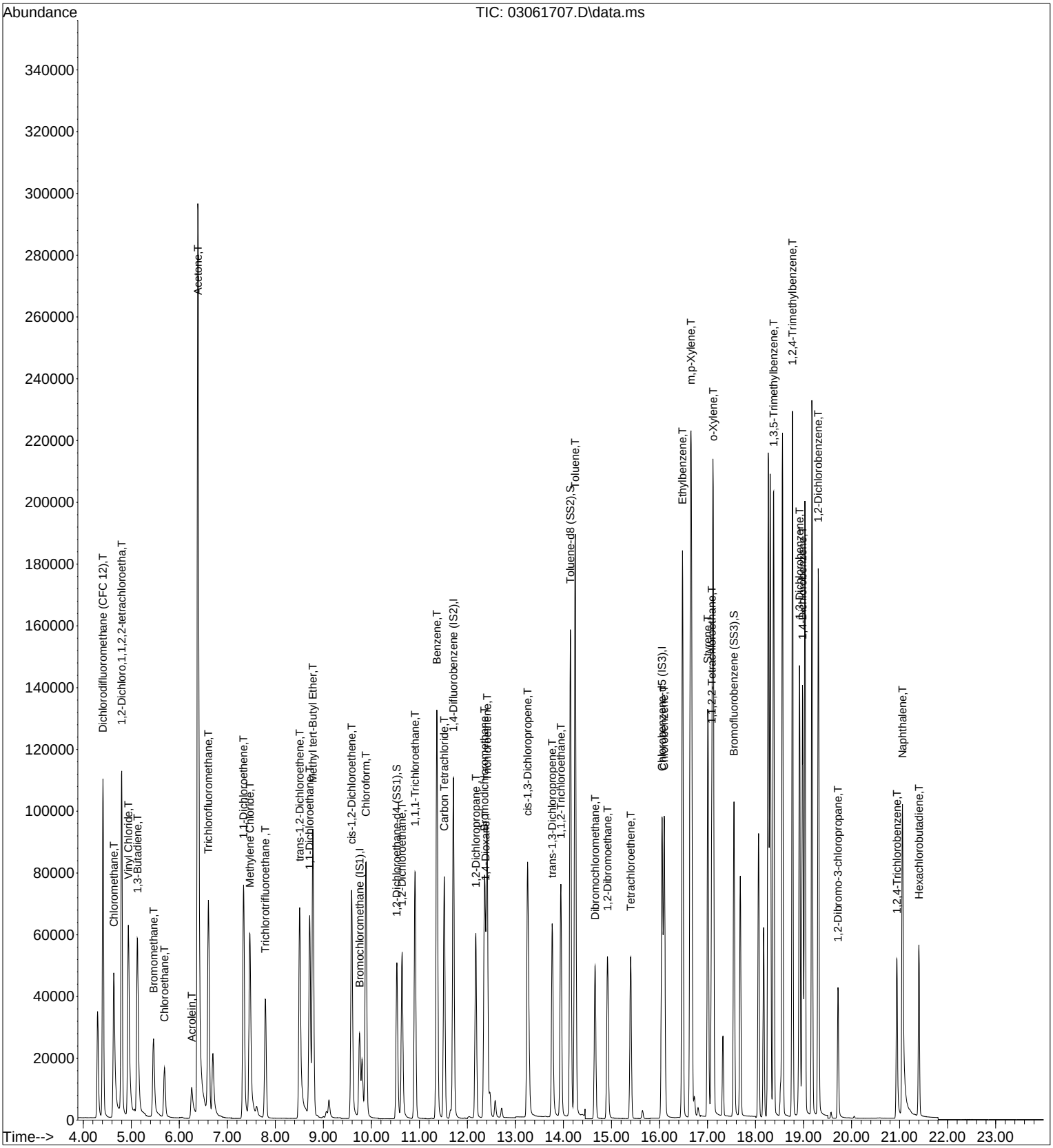
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	53606	1228.687 pg	100

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061707.D Vial: 14
Acq On : 6 Mar 2017 18:09 Operator: CL
Sample : 1000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 07 07:11:33 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061708.D Vial: 14
Acq On : 6 Mar 2017 18:40 Operator: CL
Sample : 2000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 07 07:11:34 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/7/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.75	130	47497	1000.000 pg	0.00
25) 1,4-Difluorobenzene (IS2)	11.71	114	234465	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.05	54	48103	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.53	65	92871	1020.556 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 102.06%		
33) Toluene-d8 (SS2)	14.14	98	238439	986.187 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 98.62%		
45) Bromofluorobenzene (SS3)	17.55	174	82970	1033.397 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 103.34%		

Target Compounds						Qvalue
2) Dichlorodifluoromethan...	4.41	85	287561	2402.115 pg		100
3) Chloromethane	4.63	52	69252	2269.717 pg	#	89
4) 1,2-Dichloro,1,1,2,2-t...	4.79	85	300127	2424.126 pg		100
5) Vinyl Chloride	4.93	62	274344	2484.668 pg		99
6) 1,3-Butadiene	5.12	54	134326	2116.846 pg		98
7) Bromomethane	5.45	94	87567	2253.023 pg		100
8) Chloroethane	5.68	64	69241	2244.130 pg		100
9) Acrolein	6.25	56	56073	2221.393 pg		98
10) Acetone	6.38	58	386808	11762.616 pg		99
11) Trichlorofluoromethane	6.60	101	220419	2377.447 pg		100
12) 1,1-Dichloroethene	7.34	96	126550	2495.719 pg		99
13) Methylene Chloride	7.47	84	134484	2441.567 pg		99
14) Trichlorotrifluoroethane	7.79	151	116127	2478.535 pg		100
15) trans-1,2-Dichloroethene	8.50	96	138177	2569.013 pg		99
16) 1,1-Dichloroethane	8.71	63	239964	2509.955 pg		100
17) Methyl tert-Butyl Ether	8.78	73	410158	2525.429 pg		100
18) cis-1,2-Dichloroethene	9.59	96	148333	2592.220 pg		99
19) Chloroform	9.89	83	262494	2508.121 pg		99
21) 1,2-Dichloroethane	10.64	62	218366	2620.044 pg		99
22) 1,1,1-Trichloroethane	10.91	97	243498	2604.252 pg		100
23) Benzene	11.36	78	538293	2412.875 pg		100
24) Carbon Tetrachloride	11.52	117	208755	2579.438 pg		100
26) 1,2-Dichloropropane	12.17	63	141585	2622.341 pg		100
27) Bromodichloromethane	12.35	83	203904	2649.604 pg		100
28) Trichloroethene	12.41	130	142360	2516.661 pg		100
29) 1,4-Dioxane	12.37	88	113182	2537.283 pg		100
30) cis-1,3-Dichloropropene	13.25	75	229778	2843.598 pg		100
31) trans-1,3-Dichloropropene	13.76	75	195925	2815.097 pg		99
32) 1,1,2-Trichloroethane	13.95	83	119118	2614.613 pg		99
34) Toluene	14.25	91	546014	2422.959 pg		99
35) Dibromochloromethane	14.66	129	149880	2634.614 pg		100
36) 1,2-Dibromoethane	14.91	107	149017	2616.408 pg		99
37) Tetrachloroethene	15.40	166	146439	2509.410 pg		100
39) Chlorobenzene	16.10	112	361180	2409.877 pg		100
40) Ethylbenzene	16.48	91	628524	2456.739 pg		100
41) m,p-Xylene	16.66	91	964756	4829.340 pg		99
42) Styrene	17.01	104	352379	2517.435 pg		100
43) o-Xylene	17.12	106	229019	2394.873 pg		99
44) 1,1,2,2-Tetrachloroethane	17.09	83	248571	2541.889 pg		100
46) 1,3,5-Trimethylbenzene	18.38	105	526949	2508.587 pg		100
47) 1,2,4-Trimethylbenzene	18.77	105	552506	2549.207 pg		100
48) 1,3-Dichlorobenzene	18.92	146	293877	2506.263 pg		99
49) 1,4-Dichlorobenzene	18.98	146	284658	2370.925 pg		99
50) 1,2-Dichlorobenzene	19.31	146	292603	2475.201 pg		100
51) 1,2-Dibromo-3-chloropr...	19.72	157	97336	2600.722 pg		99
52) 1,2,4-Trichlorobenzene	20.94	182	172505	2452.576 pg		99
53) Naphthalene	21.05	128	563286	2501.780 pg		99

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061708.D Vial: 14
Acq On : 6 Mar 2017 18:40 Operator: CL
Sample : 2000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 07 07:11:34 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

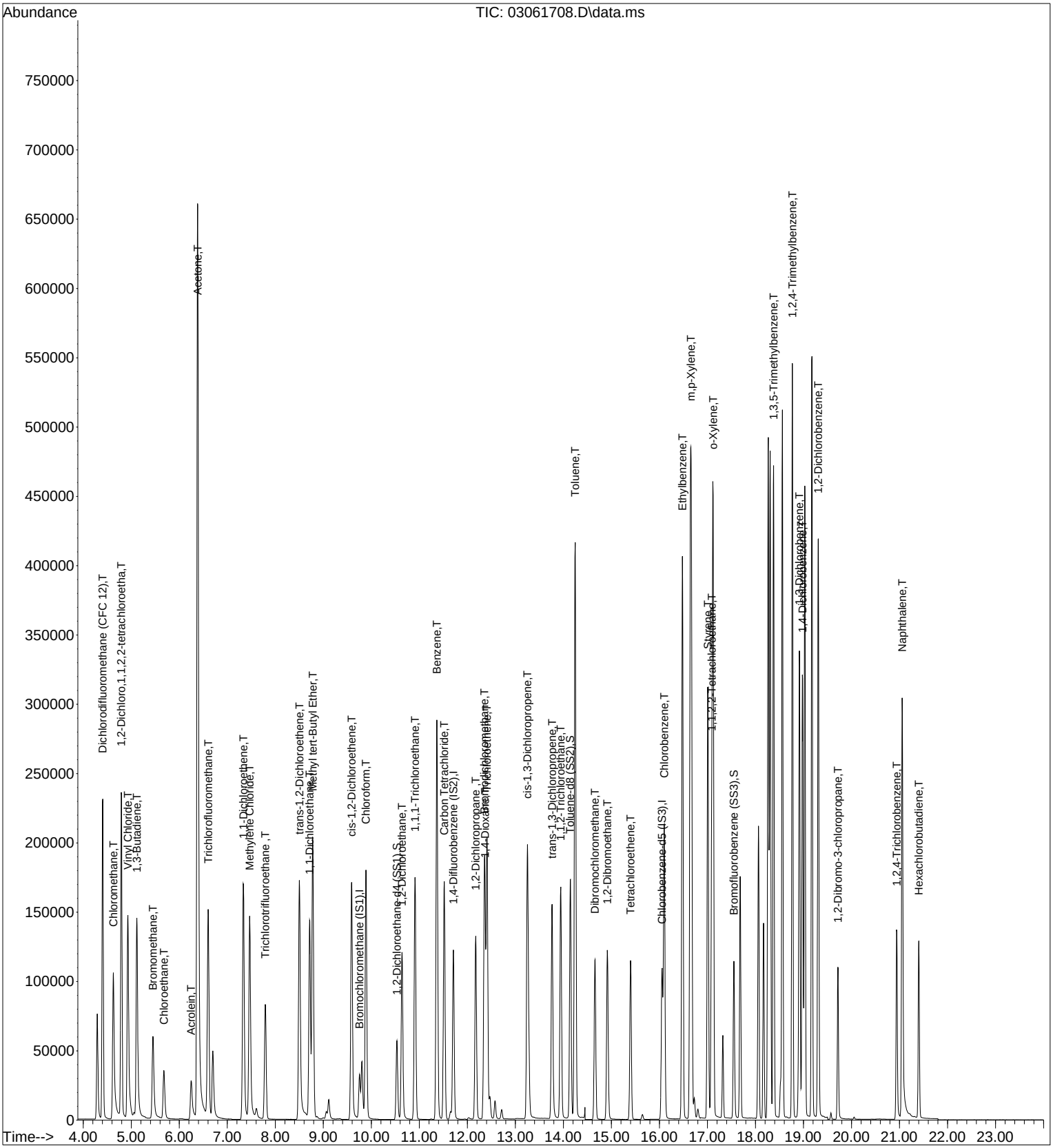
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	122232	2551.549	pg	100

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061708.D Vial: 14
Acq On : 6 Mar 2017 18:40 Operator: CL
Sample : 2000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 07 07:11:34 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061709.D Vial: 14
Acq On : 6 Mar 2017 19:11 Operator: CL
Sample : 5000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 07 07:11:36 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/7/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.76	130	50795	1000.000 pg	0.00
25) 1,4-Difluorobenzene (IS2)	11.71	114	254359	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.05	54	51792	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.53	65	98835	1015.577 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 101.56%		
33) Toluene-d8 (SS2)	14.14	98	258985	987.387 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 98.74%		
45) Bromofluorobenzene (SS3)	17.55	174	110412	1277.238 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 127.72%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.39	85	735357	5743.904 pg	99
3) Chloromethane	4.61	52	162922	4993.031 pg	94
4) 1,2-Dichloro,1,1,2,2-t...	4.78	85	766808	5791.379 pg	100
5) Vinyl Chloride	4.91	62	707568	5992.200 pg	99
6) 1,3-Butadiene	5.10	54	385621	5682.443 pg	98
7) Bromomethane	5.44	94	236569	5691.519 pg	100
8) Chloroethane	5.67	64	190097	5761.098 pg	100
9) Acrolein	6.24	56	163133	6043.084 pg	95
10) Acetone	6.38	58	1030298	29296.555 pg	95
11) Trichlorofluoromethane	6.59	101	600164	6053.087 pg	100
12) 1,1-Dichloroethene	7.33	96	345533	6371.890 pg	98
13) Methylene Chloride	7.47	84	362679	6156.952 pg	99
14) Trichlorotrifluoroethane	7.79	151	303990	6066.894 pg	100
15) trans-1,2-Dichloroethene	8.50	96	368156	6400.406 pg	99
16) 1,1-Dichloroethane	8.71	63	634905	6209.744 pg	100
17) Methyl tert-Butyl Ether	8.77	73	1096731	6314.359 pg	100
18) cis-1,2-Dichloroethene	9.59	96	393337	6427.529 pg	100
19) Chloroform	9.89	83	679388	6070.050 pg	99
21) 1,2-Dichloroethane	10.64	62	570339	6398.850 pg	99
22) 1,1,1-Trichloroethane	10.91	97	643631	6436.797 pg	100
23) Benzene	11.36	78	1425231	5973.743 pg	100
24) Carbon Tetrachloride	11.52	117	566375	6543.913 pg	100
26) 1,2-Dichloropropane	12.18	63	377371	6442.751 pg	100
27) Bromodichloromethane	12.36	83	553129	6625.407 pg	100
28) Trichloroethene	12.41	130	377860	6157.417 pg	100
29) 1,4-Dioxane	12.37	88	305275	6308.321 pg	99
30) cis-1,3-Dichloropropene	13.25	75	648948	7402.878 pg	100
31) trans-1,3-Dichloropropene	13.76	75	566979	7509.335 pg	99
32) 1,1,2-Trichloroethane	13.94	83	317749	6429.025 pg	98
34) Toluene	14.25	91	1494690	6113.983 pg	99
35) Dibromochloromethane	14.66	129	431595	6993.276 pg	100
36) 1,2-Dibromoethane	14.91	107	414248	6704.415 pg	100
37) Tetrachloroethene	15.40	166	404085	6382.906 pg	100
39) Chlorobenzene	16.10	112	995944	6171.853 pg	99
40) Ethylbenzene	16.48	91	1757507	6380.339 pg	99
41) m,p-Xylene	16.65	91	2769240	12874.796 pg	98
42) Styrene	17.01	104	1073784	7124.832 pg	100
43) o-Xylene	17.12	106	664424	6453.062 pg	97
44) 1,1,2,2-Tetrachloroethane	17.09	83	705118	6696.956 pg	99
46) 1,3,5-Trimethylbenzene	18.37	105	1902734	8412.947 pg	95
47) 1,2,4-Trimethylbenzene	18.77	105	1942947	8326.040 pg	96
48) 1,3-Dichlorobenzene	18.92	146	1082568	8574.833 pg	100
49) 1,4-Dichlorobenzene	18.98	146	1050831	8128.993 pg	99
50) 1,2-Dichlorobenzene	19.31	146	1044619	8207.275 pg	99
51) 1,2-Dibromo-3-chloropr...	19.72	157	304634	7559.764 pg	94
52) 1,2,4-Trichlorobenzene	20.94	182	510741	6744.209 pg	99
53) Naphthalene	21.05	128	1679935	6929.822 pg	99

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061709.D Vial: 14
Acq On : 6 Mar 2017 19:11 Operator: CL
Sample : 5000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 07 07:11:36 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

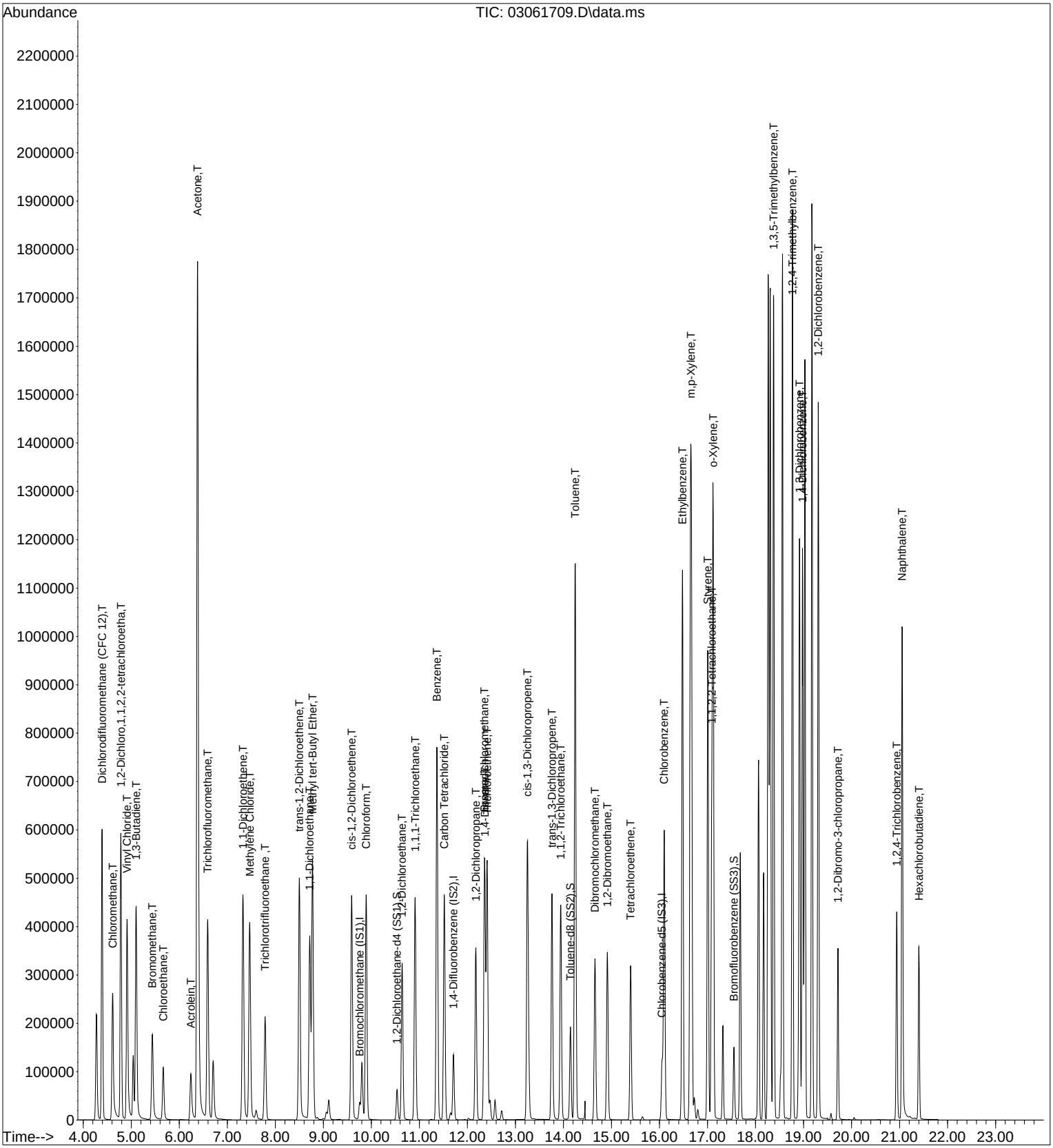
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	346209	6712.231	pg	100

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061709.D Vial: 14
Acq On : 6 Mar 2017 19:11 Operator: CL
Sample : 5000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 07 07:11:36 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061710.D Vial: 14
Acq On : 6 Mar 2017 19:42 Operator: CL
Sample : 10000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 07 07:11:37 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/7/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.76	130	55632	1000.000 pg	0.00
25) 1,4-Difluorobenzene (IS2)	11.71	114	280338	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.05	54	56561	1000.000 pg	0.00

System Monitoring Compounds					
20) 1,2-Dichloroethane-d4 ...	10.54	65	104744	982.714 pg	0.01
Spiked Amount 1000.000	Range 70 - 130		Recovery = 98.27%		
33) Toluene-d8 (SS2)	14.15	98	283620	981.104 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 98.11%		
45) Bromofluorobenzene (SS3)	17.55	174	105285	1115.238 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 111.52%		

Target Compounds						Qvalue
2) Dichlorodifluoromethan...	4.39	85	1589289	11334.650 pg		99
3) Chloromethane	4.61	52	242221	6777.861 pg		93
4) 1,2-Dichloro,1,1,2,2-t...	4.78	85	1602060	11047.662 pg		99
5) Vinyl Chloride	4.92	62	1513211	11700.755 pg		99
6) 1,3-Butadiene	5.10	54	1061408	14280.817 pg		99
7) Bromomethane	5.44	94	516216	11339.610 pg		100
8) Chloroethane	5.67	64	421075	11651.604 pg		99
9) Acrolein	6.25	56	375598	12703.880 pg		94
10) Acetone	6.39	58	2341429	60789.837 pg	#	88
11) Trichlorofluoromethane	6.59	101	1284954	11832.891 pg		99
12) 1,1-Dichloroethene	7.32	96	738236	12429.975 pg		96
13) Methylene Chloride	7.48	84	767766	11900.590 pg		100
14) Trichlorotrifluoroethane	7.79	151	663285	12086.583 pg		100
15) trans-1,2-Dichloroethene	8.51	96	777161	12336.244 pg		99
16) 1,1-Dichloroethane	8.72	63	1319913	11787.089 pg		99
17) Methyl tert-Butyl Ether	8.78	73	2112730	11106.301 pg		100
18) cis-1,2-Dichloroethene	9.60	96	845067	12608.594 pg		100
19) Chloroform	9.90	83	1441097	11756.117 pg		99
21) 1,2-Dichloroethane	10.65	62	1193519	12226.284 pg		99
22) 1,1,1-Trichloroethane	10.91	97	1361614	12433.207 pg		99
23) Benzene	11.37	78	3066938	11737.148 pg		100
24) Carbon Tetrachloride	11.52	117	1228377	12958.699 pg		99
26) 1,2-Dichloropropane	12.18	63	807904	12514.909 pg		100
27) Bromodichloromethane	12.36	83	1195347	12991.079 pg		100
28) Trichloroethene	12.42	130	818795	12106.203 pg		100
29) 1,4-Dioxane	12.37	88	663908	12447.885 pg		99
30) cis-1,3-Dichloropropene	13.25	75	1424188	14740.872 pg		99
31) trans-1,3-Dichloropropene	13.76	75	1267759	15234.785 pg		99
32) 1,1,2-Trichloroethane	13.95	83	684326	12562.877 pg		97
34) Toluene	14.25	91	3237461	12015.526 pg		98
35) Dibromochloromethane	14.66	129	976436	14355.331 pg		100
36) 1,2-Dibromoethane	14.92	107	915223	13439.792 pg		100
37) Tetrachloroethene	15.40	166	882483	12647.865 pg		100
39) Chlorobenzene	16.10	112	2170950	12319.018 pg		99
40) Ethylbenzene	16.48	91	3809836	12664.806 pg		98
41) m,p-Xylene	16.66	91	6089052	25922.390 pg		96
42) Styrene	17.01	104	2414459	14669.765 pg		99
43) o-Xylene	17.12	106	1470736	13079.793 pg		94
44) 1,1,2,2-Tetrachloroethane	17.09	83	1535368	13352.843 pg		99
46) 1,3,5-Trimethylbenzene	18.38	105	3432462	13897.011 pg		96
47) 1,2,4-Trimethylbenzene	18.77	105	3594324	14103.937 pg		97
48) 1,3-Dichlorobenzene	18.92	146	1907852	13837.601 pg		99
49) 1,4-Dichlorobenzene	18.98	146	1858803	13166.880 pg		99
50) 1,2-Dichlorobenzene	19.31	146	1877604	13507.989 pg		99
51) 1,2-Dibromo-3-chloropr...	19.72	157	684490	15554.016 pg		91
52) 1,2,4-Trichlorobenzene	20.94	182	1098323	13280.242 pg		99
53) Naphthalene	21.06	128	3762123	14210.462 pg		98

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061710.D Vial: 14
Acq On : 6 Mar 2017 19:42 Operator: CL
Sample : 10000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 07 07:11:37 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

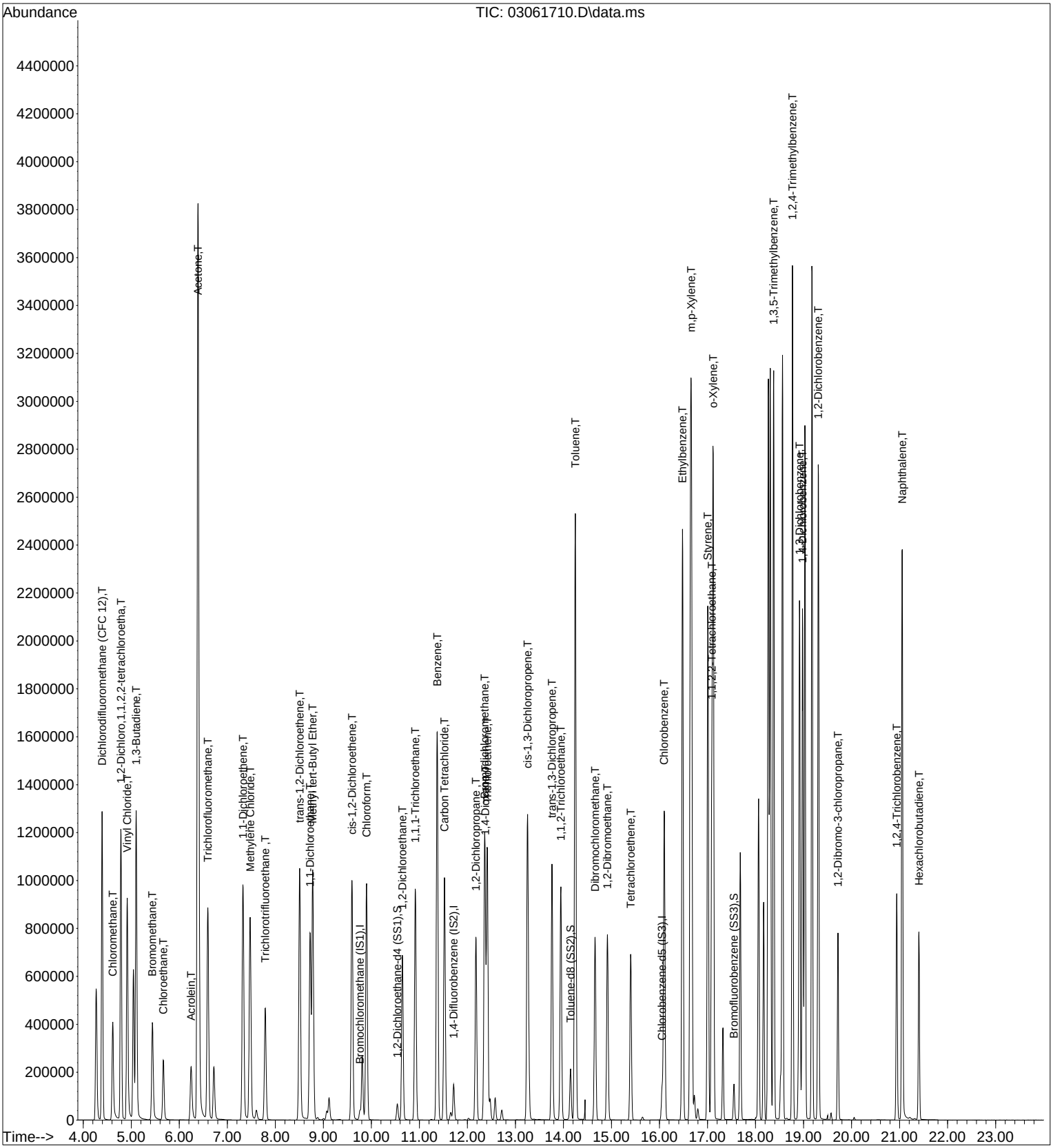
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	742354	13179.083 pg	99

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061710.D Vial: 14
Acq On : 6 Mar 2017 19:42 Operator: CL
Sample : 10000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 07 07:11:37 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061717.D Vial: 15
Acq On : 7 Mar 2017 8:11 Operator: CL
Sample : 50000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03021703 (3/31)

Quant Time: Mar 07 08:36:11 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/7/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.78	130	59122	1000.000 pg	0.02
25) 1,4-Difluorobenzene (IS2)	11.72	114	295429	1000.000 pg	0.01
38) Chlorobenzene-d5 (IS3)	16.05	54	69357	1000.000 pg	0.00

System Monitoring Compounds					
20) 1,2-Dichloroethane-d4 ...	10.55	65	106451	939.774 pg	0.02
Spiked Amount 1000.000	Range 70 - 130		Recovery = 93.98%		
33) Toluene-d8 (SS2)	14.15	98	300771	987.286 pg	0.01
Spiked Amount 1000.000	Range 70 - 130		Recovery = 98.73%		
45) Bromofluorobenzene (SS3)	17.55	174	140987	1217.887 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 121.79%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.39	85	6851954	45982.782 pg	97
3) Chloromethane	4.61	52	1766832	46521.282 pg	95
4) 1,2-Dichloro,1,1,2,2-t...	4.79	85	7993216	51866.712 pg	97
5) Vinyl Chloride	4.92	62	7575931	55122.129 pg	96
6) 1,3-Butadiene	5.11	54	6718815	85062.654 pg	97
7) Bromomethane	5.45	94	2565902	53037.408 pg	99
8) Chloroethane	5.68	64	1984833	51680.390 pg	99
9) Acrolein	6.26	56	2051967	65306.894 pg	92
10) Acetone	6.42	58	14231399	347674.737 pg #	44
11) Trichlorofluoromethane	6.60	101	6630642	57455.871 pg	98
12) 1,1-Dichloroethene	7.33	96	3889927	61629.982 pg	94
13) Methylene Chloride	7.49	84	4182527	61003.384 pg	99
14) Trichlorotrifluoroethane	7.80	151	3779061	64798.184 pg	99
15) trans-1,2-Dichloroethene	8.52	96	4142942	61880.865 pg	98
16) 1,1-Dichloroethane	8.74	63	6915559	58111.772 pg	98
17) Methyl tert-Butyl Ether	8.79	73	12907382	63846.803 pg	98
18) cis-1,2-Dichloroethene	9.61	96	4519918	63457.304 pg	99
19) Chloroform	9.92	83	7714820	59220.495 pg	97
21) 1,2-Dichloroethane	10.66	62	6231922	60070.700 pg	97
22) 1,1,1-Trichloroethane	10.92	97	7402735	63605.831 pg	98
23) Benzene	11.38	78	16575510	59689.790 pg	98
24) Carbon Tetrachloride	11.53	117	6773517	67238.729 pg	98
26) 1,2-Dichloropropane	12.19	63	4327231	63607.287 pg	99
27) Bromodichloromethane	12.37	83	6756090	69674.765 pg	98
28) Trichloroethene	12.42	130	4817016	67583.349 pg	99
29) 1,4-Dioxane	12.38	88	3971132	70653.036 pg	97
30) cis-1,3-Dichloropropene	13.26	75	8367265	82180.395 pg	96
31) trans-1,3-Dichloropropene	13.77	75	7292207	83154.828 pg	96
32) 1,1,2-Trichloroethane	13.95	83	3848851	67048.030 pg	97
34) Toluene	14.25	91	17613314	62030.913 pg	90
35) Dibromochloromethane	14.66	129	5769680	80491.496 pg	98
36) 1,2-Dibromoethane	14.92	107	5158662	71883.885 pg	97
37) Tetrachloroethene	15.40	166	5330304	72492.269 pg	97
39) Chlorobenzene	16.10	112	12428506	57513.786 pg	94
40) Ethylbenzene	16.47	91	20140329	54599.116 pg	81
41) m,p-Xylene	16.64	91	30557766	106089.828 pg #	64
42) Styrene	17.01	104	16139729	79969.859 pg	98
43) o-Xylene	17.13	106	10710644	77679.871 pg #	71
44) 1,1,2,2-Tetrachloroethane	17.10	83	9902348	70230.576 pg	96
46) 1,3,5-Trimethylbenzene	18.37	105	17852832	58945.352 pg #	71
47) 1,2,4-Trimethylbenzene	18.76	105	18373814	58796.196 pg #	62
48) 1,3-Dichlorobenzene	18.92	146	13043221	77148.545 pg	96
49) 1,4-Dichlorobenzene	18.98	146	12372050	71469.040 pg	96
50) 1,2-Dichlorobenzene	19.31	146	14051571	82440.071 pg	93
51) 1,2-Dibromo-3-chloropr...	19.72	157	4400740	81550.745 pg	86
52) 1,2,4-Trichlorobenzene	20.94	182	8346892	82305.241 pg	99
53) Naphthalene	21.05	128	20752767	63926.067 pg	64

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061717.D Vial: 15
Acq On : 7 Mar 2017 8:11 Operator: CL
Sample : 50000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03021703 (3/31)

Quant Time: Mar 07 08:36:11 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

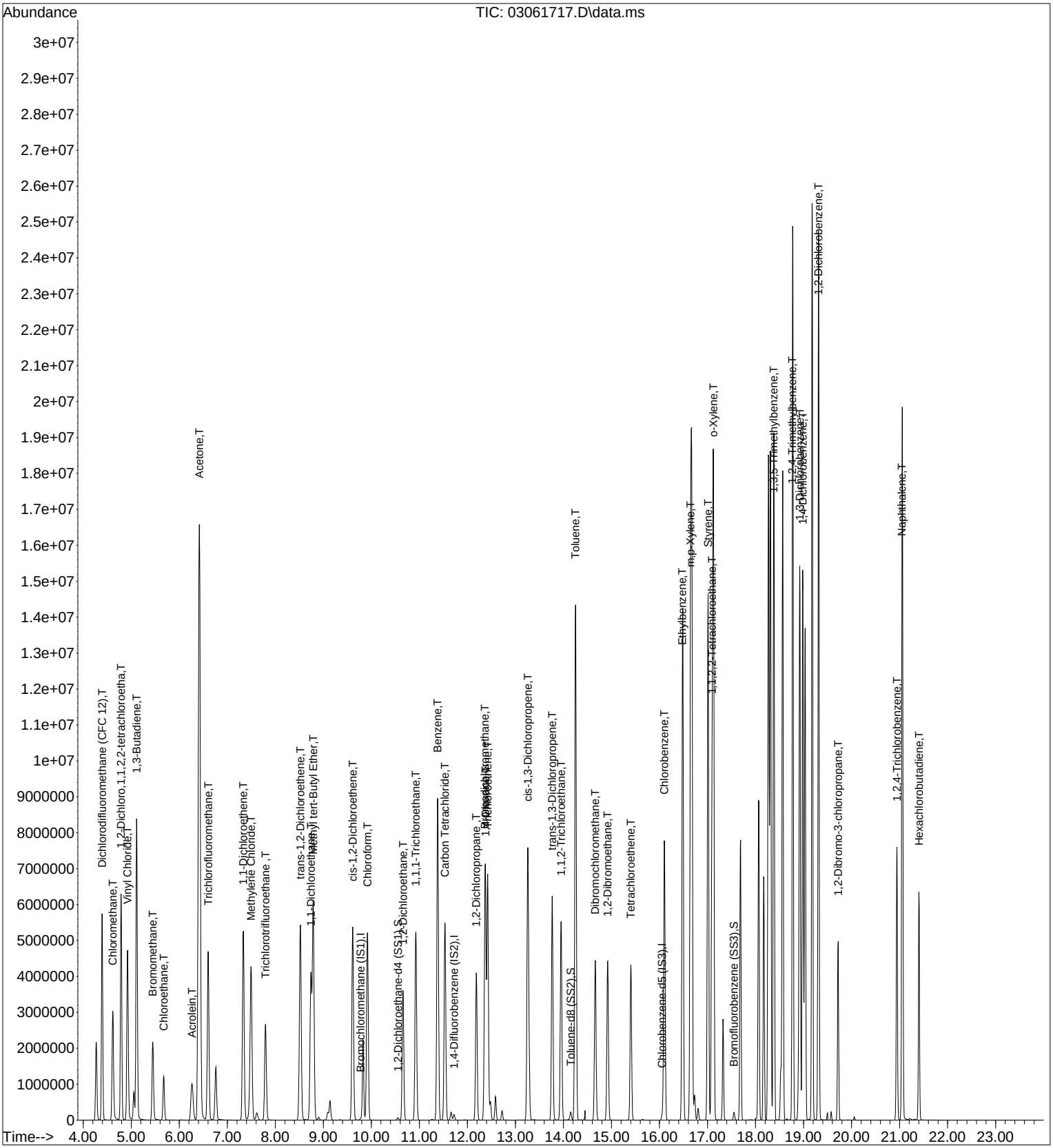
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	5365894	77686.042 pg	98

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061717.D Vial: 15
Acq On : 7 Mar 2017 8:11 Operator: CL
Sample : 50000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03021703 (3/31)

Quant Time: Mar 07 08:36:11 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061719.D Vial: 11
Acq On : 7 Mar 2017 9:14 Operator: CL
Sample : 500pg TO15SIM ICV Inst : MS19
Misc : S29-01241701/S29-03031708 (4/1)

Quant Time: Mar 07 09:48:43 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration CL 3/7/17
DataAcq Meth:TO15SIM.M

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.76	130	44480	1000.000 pg	-0.02
25) 1,4-Difluorobenzene (IS2)	11.71	114	219757	1000.000 pg	-0.01
38) Chlorobenzene-d5 (IS3)	16.05	54	44710	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.53	65	86949	1008.518 pg	-0.02
Spiked Amount 1000.000	Range 70 - 130		Recovery = 100.85%		
33) Toluene-d8 (SS2)	14.15	98	221893	994.316 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 99.43%		
45) Bromofluorobenzene (SS3)	17.55	174	74117	902.777 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 90.28%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.42	85	86317	626.862 pg	100
3) Chloromethane	4.65	52	21932	590.294 pg	97
4) 1,2-Dichloro,1,1,2,2-t...	4.81	85	85227	548.451 pg	100
5) Vinyl Chloride	4.96	62	82416	610.069 pg	99
6) 1,3-Butadiene	5.14	54	43004	631.273 pg	97
7) Bromomethane	5.48	94	28343	627.036 pg	100
8) Chloroethane	5.71	64	20790	602.454 pg	99
9) Acrolein	6.27	56	15978	564.683 pg	96
10) Acetone	6.40	58	119768	3069.087 pg	97
11) Trichlorofluoromethane	6.62	101	62883	594.500 pg	100
12) 1,1-Dichloroethene	7.35	96	34285	590.925 pg	99
13) Methylene Chloride	7.48	84	39181	613.662 pg	98
14) Trichlorotrifluoroethane	7.80	151	32553	583.035 pg	100
15) trans-1,2-Dichloroethene	8.51	96	37217	599.398 pg	100
16) 1,1-Dichloroethane	8.72	63	68182	597.415 pg	99
17) Methyl tert-Butyl Ether	8.79	73	112628	605.443 pg	100
18) cis-1,2-Dichloroethene	9.59	96	39278	592.282 pg	99
19) Chloroform	9.89	83	72576	578.248 pg	100
21) 1,2-Dichloroethane	10.64	62	58859	587.548 pg	100
22) 1,1,1-Trichloroethane	10.91	97	63718	573.593 pg	100
23) Benzene	11.37	78	150412	582.825 pg	100
24) Carbon Tetrachloride	11.52	117	54936	557.312 pg	100
26) 1,2-Dichloropropane	12.18	63	37142	575.053 pg	100
27) Bromodichloromethane	12.36	83	50929	547.448 pg	100
28) Trichloroethene	12.41	130	38208	571.301 pg	100
29) 1,4-Dioxane	12.38	88	29833	590.751 pg	99
30) cis-1,3-Dichloropropene	13.26	75	52583	549.944 pg	100
31) trans-1,3-Dichloropropene	13.77	75	46377	566.134 pg	99
32) 1,1,2-Trichloroethane	13.95	83	30799	566.156 pg	100
34) Toluene	14.25	91	145517	558.004 pg	100
35) Dibromochloromethane	14.66	129	34803	511.760 pg	100
36) 1,2-Dibromoethane	14.92	107	37055	555.020 pg	100
37) Tetrachloroethene	15.40	166	38475	548.646 pg	99
39) Chlorobenzene	16.10	112	95814	565.662 pg	100
40) Ethylbenzene	16.48	91	164246	580.662 pg	100
41) m,p-Xylene	16.65	91	253667	1177.152 pg	100
42) Styrene	17.01	104	81938	545.623 pg	100
43) o-Xylene	17.12	106	59485	551.078 pg	99
44) 1,1,2,2-Tetrachloroethane	17.09	83	61300	535.345 pg	100
46) 1,3,5-Trimethylbenzene	18.38	105	131640	548.650 pg	99
47) 1,2,4-Trimethylbenzene	18.77	105	131235	551.345 pg	99
48) 1,3-Dichlorobenzene	18.92	146	72225	553.259 pg	99
49) 1,4-Dichlorobenzene	18.98	146	73007	542.931 pg	99
50) 1,2-Dichlorobenzene	19.31	146	70577	537.696 pg	100
51) 1,2-Dibromo-3-chloropr...	19.72	157	19480	494.743 pg	96
52) 1,2,4-Trichlorobenzene	20.94	182	43024	562.796 pg	99
53) Naphthalene	21.06	128	138979	587.841 pg	100

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061719.D Vial: 11
Acq On : 7 Mar 2017 9:14 Operator: CL
Sample : 500pg TO15SIM ICV Inst : MS19
Misc : S29-01241701/S29-03031708 (4/1)

Quant Time: Mar 07 09:48:43 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

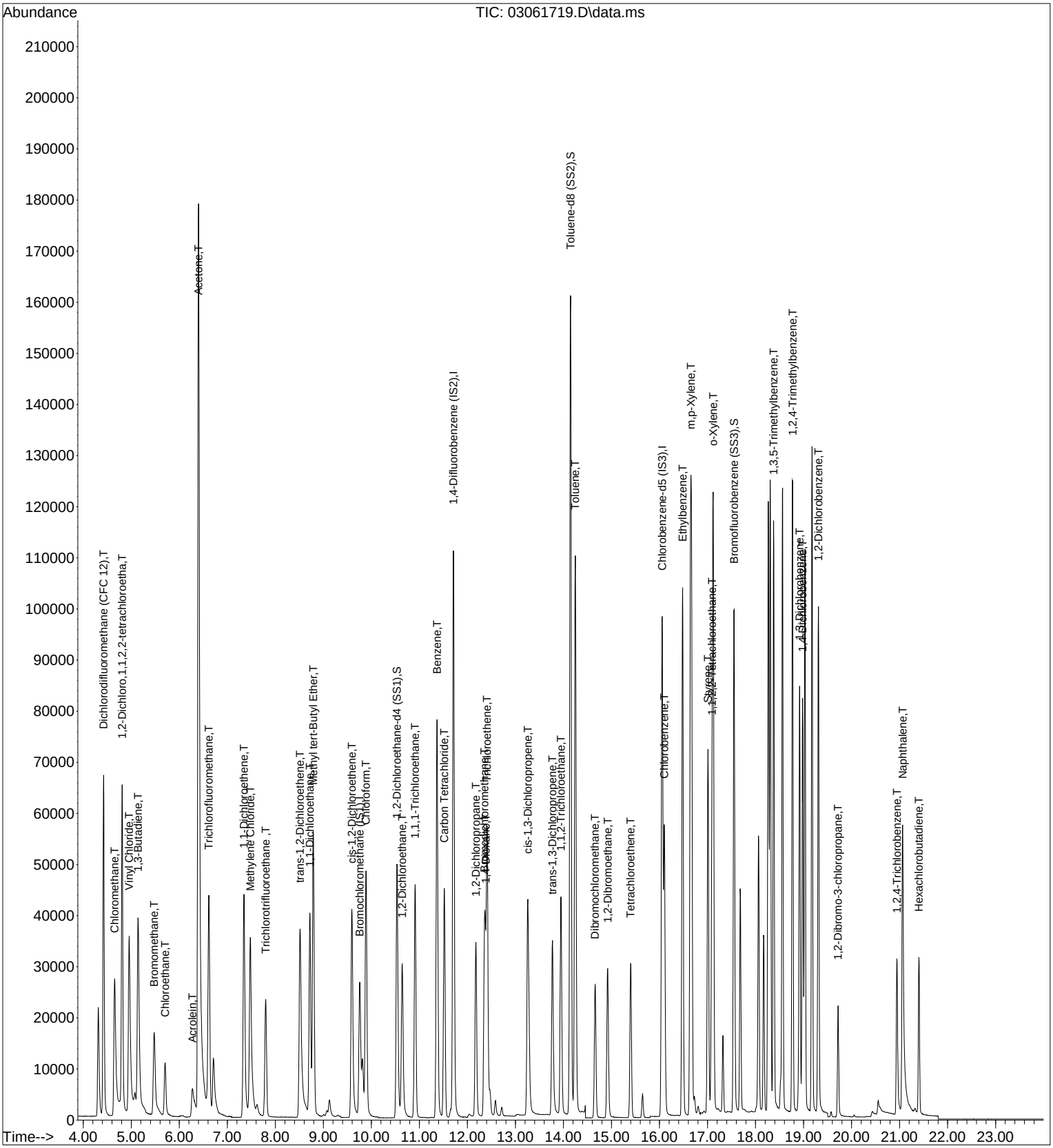
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	29369	530.490 pg	100

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061719.D Vial: 11
Acq On : 7 Mar 2017 9:14 Operator: CL
Sample : 500pg TO15SIM ICV Inst : MS19
Misc : S29-01241701/S29-03031708 (4/1)

Quant Time: Mar 07 09:48:43 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Data File Name:	**03061719.D**
Data File Path:	**I:\MS19\DATA\2017_03\06**
Operator:	**CL**
Instrument Name:	**MS19**
Sample Name:	**500pg TO15SIM ICV**
Misc Info:	**S29-01241701/S29-03031708 (4/1)**
Date Acquired:	**3/7/17 9:14**
Acq. Method File:	**TO15SIM.M**

CL 3/7/17

#	Compound Name	Ret. Time	Amount Spiked (pg)	Amount Found (pg)	Percent Recovery	Lower Limit	Upper Limit	Flag
2)	Dichlorodifluoromethane (CFC 12)	4.42	525	626.9	119.4	70	130	*
3)	Chloromethane	4.65	524.5	590.3	112.5	70	130	*
4)	*1,2-Dichloro,1,1,2,2-tetrachloroetha*	4.81	527.5	548.5	104.0	70	130	*
5)	Vinyl Chloride	4.96	525	610.1	116.2	70	130	*
6)	*1,3-Butadiene*	5.14	525	631.3	120.2	70	130	*
7)	Bromomethane	5.48	525	627.0	119.4	70	130	*
8)	Chloroethane	5.71	524.5	602.5	114.9	70	130	*
9)	*Acrolein*	6.27	530.5	564.7	106.4	70	130	*
10)	Acetone	6.40	2661	3069.1	115.3	70	130	*
11)	Trichlorofluoromethane	6.62	525.5	594.5	113.1	70	130	*
12)	1,1-Dichloroethene	7.35	531.5	590.9	111.2	70	130	*
13)	Methylene Chloride	7.48	531	613.7	115.6	70	130	*
14)	Trichlorotrifluoroethane	7.80	529	583.0	110.2	70	130	*
15)	trans-1,2-Dichloroethene	8.51	533.5	599.4	112.4	70	130	*
16)	1,1-Dichloroethane	8.72	531	597.4	112.5	70	130	*
17)	Methyl tert-Butyl Ether	8.79	532	605.4	113.8	70	130	*
18)	cis-1,2-Dichloroethene	9.59	529.5	592.3	111.9	70	130	*
19)	Chloroform	9.89	529.5	578.2	109.2	70	130	*
21)	1,2-Dichloroethane	10.64	530	587.5	110.9	70	130	*
22)	1,1,1-Trichloroethane	10.91	529.5	573.6	108.3	70	130	*
25)	Benzene	11.37	530.5	582.8	109.9	70	130	*
24)	Carbon Tetrachloride	11.52	532	557.3	104.8	70	130	*
26)	1,2-Dichloropropane	12.18	530.5	575.1	108.4	70	130	*
27)	Bromodichloromethane	12.36	534	547.4	102.5	70	130	*
28)	Trichloroethene	12.41	531	571.3	107.6	70	130	*
29)	1,4-Dioxane	12.38	532	590.8	111.0	70	130	*
30)	cis-1,3-Dichloropropene	13.26	525.5	549.9	104.7	70	130	*
31)	trans-1,3-Dichloropropene	13.77	533.5	566.1	106.1	70	130	*
32)	1,1,2-Trichloroethane	13.95	530.5	566.2	106.7	70	130	*
34)	Toluene	14.15	529	558.0	105.5	70	130	*
35)	*Dibromochloromethane*	14.66	532	511.8	96.2	70	130	*
36)	1,2-Dibromoethane	14.92	529	555.0	104.9	70	130	*
37)	Tetrachloroethene	15.40	531.5	495.0	93.1	70	130	*
39)	Chlorobenzene	16.10	530	565.7	106.7	70	130	*
40)	Ethylbenzene	16.48	529	580.7	109.8	70	130	*
41)	m,p-Xylene	16.65	1060.5	1177.2	111.0	70	130	*
42)	*Styrene*	17.01	529.5	545.6	103.0	70	130	*
43)	o-Xylene	17.12	529	551.1	104.2	70	130	*
44)	1,1,2,2-Tetrachloroethane	17.09	530	535.3	101.0	70	130	*
46)	*1,3,5-Trimethylbenzene*	18.38	530.5	548.7	103.4	70	130	*
47)	*1,2,4-Trimethylbenzene*	18.77	530.5	551.3	103.9	70	130	*
48)	1,3-Dichlorobenzene	18.92	529.5	553.3	104.5	70	130	*
49)	1,4-Dichlorobenzene	18.98	533	542.9	101.9	70	130	*
50)	1,2-Dichlorobenzene	19.31	531	537.7	101.3	70	130	*
51)	*1,2-Dibromo-3-chloropropane*	19.72	529.5	494.7	93.4	70	130	*
52)	1,2,4-Trichlorobenzene	20.94	530	562.8	106.2	70	130	*
53)	Naphthalene	19.31	534	587.8	110.1	70	130	*
54)	Hexachlorobutadiene	21.40	531.5	530.5	99.8	70	130	*

Evaluate Continuing Calibration Report

Data File : I:\MS19\DATA\2017 03\07\03071702.D Vial: 16
Acq On : 7 Mar 2017 10:20 Operator: CL
Sample : CCV S19030717 1000pg Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 07 10:59:36 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/7/17

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	I	Bromochloromethane (IS1)	1.000	1.000	0.0	96	-0.02
2	T	Dichlorodifluoromethane (CF	3.096	3.023	2.4	96	0.02
3	T	Chloromethane	0.835	0.808	3.2	94	0.03
4	T	1,2-Dichloro,1,1,2,2-tetrac	3.494	3.353	4.0	96	0.02
5	T	Vinyl Chloride	3.037	2.876	5.3	94	0.02
6	T	1,3-Butadiene	1.532	1.430	6.7	101	0.02
7	T	Bromomethane	1.016	1.009	0.7	101	0.02
8	T	Chloroethane	0.776	0.734	5.4	96	0.02
9	T	Acrolein	0.636	0.550	13.5	98	0.00
10	T	Acetone	0.877	0.786	10.4	98	-0.02
11	T	Trichlorofluoromethane	2.378	2.272	4.5	98	0.00
12	T	1,1-Dichloroethene	1.304	1.249	4.2	97	0.00
13	T	Methylene Chloride	1.435	1.312	8.6	94	-0.02
14	T	Trichlorotrifluoroethane	1.255	1.180	6.0	95	0.00
15	T	trans-1,2-Dichloroethene	1.396	1.364	2.3	98	-0.01
16	T	1,1-Dichloroethane	2.566	2.482	3.3	95	-0.03
17	T	Methyl tert-Butyl Ether	4.182	4.106	1.8	98	0.00
18	T	cis-1,2-Dichloroethene	1.491	1.458	2.2	97	-0.02
19	T	Chloroform	2.822	2.642	6.4	95	-0.03
20	S	1,2-Dichloroethane-d4 (SS1)	1.938	1.965	-1.4	97	-0.02
21	T	1,2-Dichloroethane	2.252	2.196	2.5	96	-0.02
22	T	1,1,1-Trichloroethane	2.497	2.395	4.1	96	-0.02
23	T	Benzene	5.802	5.441	6.2	95	-0.02
24	T	Carbon Tetrachloride	2.216	2.080	6.1	96	-0.02
25	I	1,4-Difluorobenzene (IS2)	1.000	1.000	0.0	97	-0.01
26	T	1,2-Dichloropropane	0.294	0.279	5.1	95	0.00
27	T	Bromodichloromethane	0.423	0.392	7.3	95	0.00
28	T	Trichloroethene	0.304	0.286	5.9	96	0.00
29	T	1,4-Dioxane	0.230	0.223	3.0	96	0.00
30	T	cis-1,3-Dichloropropene	0.435	0.412	5.3	96	0.00
31	T	trans-1,3-Dichloropropene	0.373	0.362	2.9	97	0.00
32	T	1,1,2-Trichloroethane	0.248	0.235	5.2	95	0.00
33	S	Toluene-d8 (SS2)	1.015	1.007	0.8	97	0.00
34	T	Toluene	1.187	1.093	7.9	96	0.00
35	T	Dibromochloromethane	0.309	0.281	9.1	95	0.00
36	T	1,2-Dibromoethane	0.304	0.287	5.6	96	0.00
37	T	Tetrachloroethene	0.319	0.290	9.1	95	0.00
38	I	Chlorobenzene-d5 (IS3)	1.000	1.000	0.0	96	0.00
39	T	Chlorobenzene	3.789	3.538	6.6	96	0.00
40	T	Ethylbenzene	6.327	6.170	2.5	96	0.00
41	T	m,p-Xylene	4.820	4.769	1.1	96	0.00
42	T	Styrene	3.359	3.223	4.0	96	0.00
43	T	o-Xylene	2.414	2.242	7.1	95	0.00
44	T	1,1,2,2-Tetrachloroethane	2.561	2.400	6.3	95	0.00
45	S	Bromofluorobenzene (SS3)	1.836	1.662	9.5	94	0.00
46	T	1,3,5-Trimethylbenzene	5.366	5.058	5.7	96	0.00
47	T	1,2,4-Trimethylbenzene	5.324	5.159	3.1	96	0.00
48	T	1,3-Dichlorobenzene	2.920	2.711	7.2	95	0.00
49	T	1,4-Dichlorobenzene	3.008	2.686	10.7	96	0.00
50	T	1,2-Dichlorobenzene	2.936	2.709	7.7	96	0.00
51	T	1,2-Dibromo-3-chloropropane	0.881	0.831	5.7	95	0.00
52	T	1,2,4-Trichlorobenzene	1.710	1.589	7.1	97	0.00
53	T	Naphthalene	5.288	5.010	5.3	99	0.01
54	T	Hexachlorobutadiene	1.238	1.168	5.7	97	0.00

Evaluate Continuing Calibration Report

Data File : I:\MS19\DATA\2017 03\07\03071702.D Vial: 16
Acq On : 7 Mar 2017 10:20 Operator: CL
Sample : CCV S19030717 1000pg Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 07 10:59:36 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.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)

(#) = Out of Range SPCC's out = 0 CCC's out = 0

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071702.D Vial: 16
Acq On : 7 Mar 2017 10:20 Operator: CL
Sample : CCV S19030717 1000pg Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 07 10:59:36 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/7/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.75	130	41816	1000.000 pg	-0.02
25) 1,4-Difluorobenzene (IS2)	11.71	114	207762	1000.000 pg	-0.01
38) Chlorobenzene-d5 (IS3)	16.05	54	42091	1000.000 pg	0.00

System Monitoring Compounds					
20) 1,2-Dichloroethane-d4 ...	10.53	65	82148	1013.534 pg	-0.02
Spiked Amount 1000.000	Range 70 - 130		Recovery = 101.35%		
33) Toluene-d8 (SS2)	14.14	98	209283	991.954 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 99.19%		
45) Bromofluorobenzene (SS3)	17.55	174	69944	904.959 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 90.50%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.41	85	132352	1022.418 pg	100
3) Chloromethane	4.64	52	33950	971.968 pg	96
4) 1,2-Dichloro,1,1,2,2-t...	4.81	85	140895	964.448 pg	100
5) Vinyl Chloride	4.94	62	123020	968.647 pg	99
6) 1,3-Butadiene	5.13	54	63215	987.076 pg	100
7) Bromomethane	5.47	94	41889	985.756 pg	99
8) Chloroethane	5.69	64	30952	954.070 pg	99
9) Acrolein	6.26	56	23933	899.709 pg	99
10) Acetone	6.39	58	174684	4761.500 pg	100
11) Trichlorofluoromethane	6.61	101	99641	1002.026 pg	100
12) 1,1-Dichloroethene	7.34	96	55291	1013.690 pg	100
13) Methylene Chloride	7.47	84	57976	965.882 pg	96
14) Trichlorotrifluoroethane	7.80	151	51748	985.870 pg	100
15) trans-1,2-Dichloroethene	8.51	96	60880	1042.967 pg	99
16) 1,1-Dichloroethane	8.71	63	105866	986.700 pg	99
17) Methyl tert-Butyl Ether	8.78	73	183049	1046.686 pg	100
18) cis-1,2-Dichloroethene	9.59	96	64852	1040.218 pg	99
19) Chloroform	9.88	83	116904	990.770 pg	99
21) 1,2-Dichloroethane	10.64	62	96619	1025.924 pg	99
22) 1,1,1-Trichloroethane	10.91	97	107549	1029.842 pg	100
23) Benzene	11.36	78	239333	986.462 pg	100
24) Carbon Tetrachloride	11.51	117	91770	990.295 pg	100
26) 1,2-Dichloropropane	12.18	63	61510	1007.314 pg	100
27) Bromodichloromethane	12.36	83	86798	986.879 pg	100
28) Trichloroethene	12.41	130	62938	995.406 pg	100
29) 1,4-Dioxane	12.38	88	49175	1029.979 pg	99
30) cis-1,3-Dichloropropene	13.25	75	95614	1057.721 pg	100
31) trans-1,3-Dichloropropene	13.77	75	80001	1032.972 pg	100
32) 1,1,2-Trichloroethane	13.95	83	51713	1005.486 pg	100
34) Toluene	14.24	91	239179	970.115 pg	100
35) Dibromochloromethane	14.66	129	61896	962.696 pg	100
36) 1,2-Dibromoethane	14.92	107	62899	996.511 pg	99
37) Tetrachloroethene	15.40	166	64009	965.454 pg	99
39) Chlorobenzene	16.10	112	158017	990.939 pg	100
40) Ethylbenzene	16.48	91	273974	1028.854 pg	100
41) m,p-Xylene	16.65	91	426163	2100.679 pg	100
42) Styrene	17.01	104	143931	1018.068 pg	100
43) o-Xylene	17.12	106	99475	978.893 pg	100
44) 1,1,2,2-Tetrachloroethane	17.09	83	106679	989.618 pg	100
46) 1,3,5-Trimethylbenzene	18.37	105	223349	988.797 pg	100
47) 1,2,4-Trimethylbenzene	18.77	105	228454	1019.502 pg	100
48) 1,3-Dichlorobenzene	18.92	146	120739	982.436 pg	100
49) 1,4-Dichlorobenzene	18.98	146	119600	944.771 pg	100
50) 1,2-Dichlorobenzene	19.31	146	120649	976.366 pg	100
51) 1,2-Dibromo-3-chloropr...	19.72	157	36837	993.780 pg	97
52) 1,2,4-Trichlorobenzene	20.95	182	69770	969.448 pg	99
53) Naphthalene	21.06	128	228388	1026.124 pg	100

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071702.D Vial: 16
Acq On : 7 Mar 2017 10:20 Operator: CL
Sample : CCV S19030717 1000pg Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 07 10:59:36 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

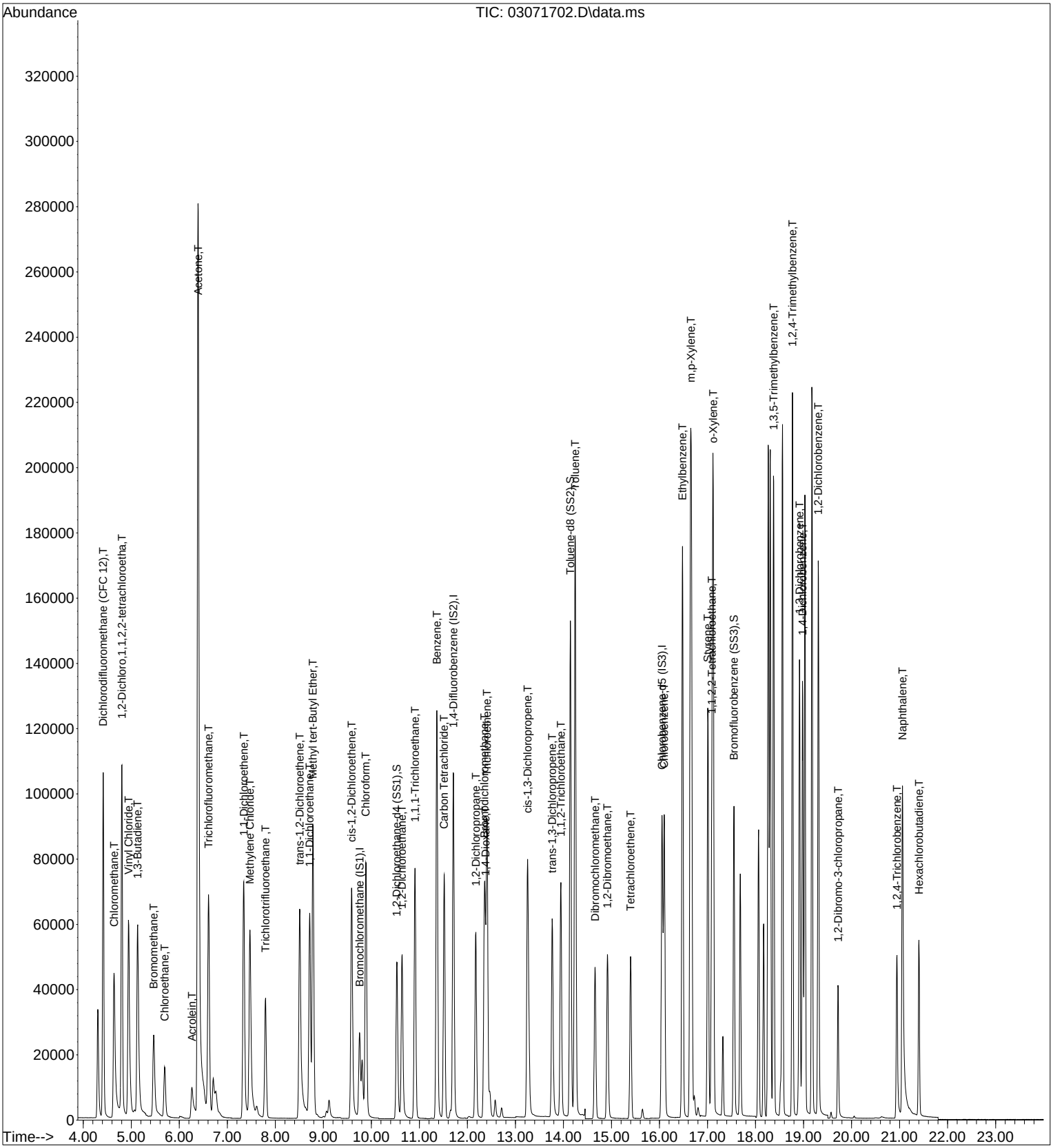
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	52046	998.599	pg	99

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071702.D Vial: 16
Acq On : 7 Mar 2017 10:20 Operator: CL
Sample : CCV S19030717 1000pg Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 07 10:59:36 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Evaluate Continuing Calibration Report

Data File : I:\MS19\DATA\2017 03\08\03081702.D Vial: 16
Acq On : 8 Mar 2017 4:54 Operator: CL
Sample : CCV S19030817 1000pg Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 08 07:16:13 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/8/17

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	I	Bromochloromethane (IS1)	1.000	1.000	0.0	89	-0.03
2	T	Dichlorodifluoromethane (CF	3.096	3.342	-7.9	98	0.02
3	T	Chloromethane	0.835	0.846	-1.3	91	0.02
4	T	1,2-Dichloro,1,1,2,2-tetrac	3.494	3.648	-4.4	97	0.00
5	T	Vinyl Chloride	3.037	3.182	-4.8	96	0.02
6	T	1,3-Butadiene	1.532	1.590	-3.8	104	0.01
7	T	Bromomethane	1.016	1.115	-9.7	103	0.01
8	T	Chloroethane	0.776	0.834	-7.5	100	0.02
9	T	Acrolein	0.636	0.603	5.2	99	0.00
10	T	Acetone	0.877	0.852	2.9	98	-0.03
11	T	Trichlorofluoromethane	2.378	2.504	-5.3	99	0.00
12	T	1,1-Dichloroethene	1.304	1.381	-5.9	99	0.00
13	T	Methylene Chloride	1.435	1.470	-2.4	97	-0.03
14	T	Trichlorotrifluoroethane	1.255	1.316	-4.9	98	0.00
15	T	trans-1,2-Dichloroethene	1.396	1.514	-8.5	100	-0.02
16	T	1,1-Dichloroethane	2.566	2.745	-7.0	97	-0.03
17	T	Methyl tert-Butyl Ether	4.182	4.566	-9.2	100	0.00
18	T	cis-1,2-Dichloroethene	1.491	1.623	-8.9	99	-0.02
19	T	Chloroform	2.822	2.915	-3.3	97	-0.03
20	S	1,2-Dichloroethane-d4 (SS1)	1.938	1.906	1.7	86	-0.02
21	T	1,2-Dichloroethane	2.252	2.393	-6.3	96	-0.02
22	T	1,1,1-Trichloroethane	2.497	2.694	-7.9	99	-0.02
23	T	Benzene	5.802	5.994	-3.3	96	-0.02
24	T	Carbon Tetrachloride	2.216	2.346	-5.9	100	-0.02
25	I	1,4-Difluorobenzene (IS2)	1.000	1.000	0.0	89	-0.02
26	T	1,2-Dichloropropane	0.294	0.309	-5.1	97	-0.02
27	T	Bromodichloromethane	0.423	0.437	-3.3	97	-0.02
28	T	Trichloroethene	0.304	0.323	-6.3	99	-0.01
29	T	1,4-Dioxane	0.230	0.251	-9.1	100	0.00
30	T	cis-1,3-Dichloropropene	0.435	0.470	-8.0	101	0.00
31	T	trans-1,3-Dichloropropene	0.373	0.411	-10.2	101	0.00
32	T	1,1,2-Trichloroethane	0.248	0.261	-5.2	98	0.00
33	S	Toluene-d8 (SS2)	1.015	1.015	0.0	89	-0.01
34	T	Toluene	1.187	1.232	-3.8	99	-0.01
35	T	Dibromochloromethane	0.309	0.317	-2.6	99	0.00
36	T	1,2-Dibromoethane	0.304	0.324	-6.6	100	0.00
37	T	Tetrachloroethene	0.319	0.330	-3.4	99	0.00
38	I	Chlorobenzene-d5 (IS3)	1.000	1.000	0.0	87	0.00
39	T	Chlorobenzene	3.789	4.053	-7.0	100	0.00
40	T	Ethylbenzene	6.327	8.082	-27.7	115	0.00
41	T	m,p-Xylene	4.820	6.442	-33.7#	118	0.00
42	T	Styrene	3.359	4.700	-39.9#	127	0.00
43	T	o-Xylene	2.414	3.354	-38.9#	130	0.00
44	T	1,1,2,2-Tetrachloroethane	2.561	3.267	-27.6	117	0.00
45	S	Bromofluorobenzene (SS3)	1.836	2.337	-27.3	120	0.00
46	T	1,3,5-Trimethylbenzene	5.366	5.748	-7.1	99	0.00
47	T	1,2,4-Trimethylbenzene	5.324	5.791	-8.8	98	0.00
48	T	1,3-Dichlorobenzene	2.920	3.061	-4.8	98	0.00
49	T	1,4-Dichlorobenzene	3.008	3.031	-0.8	98	0.00
50	T	1,2-Dichlorobenzene	2.936	3.012	-2.6	97	0.00
51	T	1,2-Dibromo-3-chloropropane	0.881	0.934	-6.0	97	0.00
52	T	1,2,4-Trichlorobenzene	1.710	1.772	-3.6	98	0.00
53	T	Naphthalene	5.288	5.567	-5.3	100	0.01
54	T	Hexachlorobutadiene	1.238	1.282	-3.6	97	0.00

Evaluate Continuing Calibration Report

Data File : I:\MS19\DATA\2017 03\08\03081702.D Vial: 16
Acq On : 8 Mar 2017 4:54 Operator: CL
Sample : CCV S19030817 1000pg Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 08 07:16:13 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.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)

(#) = Out of Range SPCC's out = 0 CCC's out = 0

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081702.D Vial: 16
Acq On : 8 Mar 2017 4:54 Operator: CL
Sample : CCV S19030817 1000pg Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 08 07:16:13 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/8/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.75	130	38524	1000.000 pg	-0.03
25) 1,4-Difluorobenzene (IS2)	11.71	114	190769	1000.000 pg	-0.02
38) Chlorobenzene-d5 (IS3)	16.05	54	38163	1000.000 pg	0.00

System Monitoring Compounds					
20) 1,2-Dichloroethane-d4 ...	10.53	65	73425	983.323 pg	-0.02
Spiked Amount 1000.000	Range 70 - 130		Recovery = 98.33%		
33) Toluene-d8 (SS2)	14.14	98	193656	999.647 pg	-0.01
Spiked Amount 1000.000	Range 70 - 130		Recovery = 99.96%		
45) Bromofluorobenzene (SS3)	17.55	174	89180	1272.601 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 127.26%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.41	85	134787	1130.205 pg	100
3) Chloromethane	4.64	52	32764	1018.170 pg	97
4) 1,2-Dichloro,1,1,2,2-t...	4.80	85	141239	1049.419 pg	100
5) Vinyl Chloride	4.94	62	125394	1071.711 pg	100
6) 1,3-Butadiene	5.12	54	64731	1097.119 pg	98
7) Bromomethane	5.46	94	42638	1089.124 pg	99
8) Chloroethane	5.69	64	32425	1084.882 pg	100
9) Acrolein	6.26	56	24186	986.915 pg	97
10) Acetone	6.39	58	174423	5160.664 pg	99
11) Trichlorofluoromethane	6.61	101	101198	1104.649 pg	100
12) 1,1-Dichloroethene	7.34	96	56334	1121.069 pg	98
13) Methylene Chloride	7.47	84	59861	1082.508 pg	99
14) Trichlorotrifluoroethane	7.79	151	53167	1099.460 pg	100
15) trans-1,2-Dichloroethene	8.50	96	62224	1157.085 pg	98
16) 1,1-Dichloroethane	8.71	63	107875	1091.341 pg	100
17) Methyl tert-Butyl Ether	8.78	73	187497	1163.736 pg	99
18) cis-1,2-Dichloroethene	9.59	96	66516	1158.080 pg	99
19) Chloroform	9.88	83	118819	1093.051 pg	100
21) 1,2-Dichloroethane	10.64	62	96978	1117.730 pg	99
22) 1,1,1-Trichloroethane	10.91	97	111481	1158.714 pg	100
23) Benzene	11.36	78	242914	1086.779 pg	100
24) Carbon Tetrachloride	11.51	117	95366	1117.040 pg	100
26) 1,2-Dichloropropane	12.17	63	62675	1117.820 pg	100
27) Bromodichloromethane	12.35	83	88853	1100.233 pg	100
28) Trichloroethene	12.41	130	65345	1125.532 pg	100
29) 1,4-Dioxane	12.37	88	50938	1161.942 pg	98
30) cis-1,3-Dichloropropene	13.25	75	100109	1206.094 pg	100
31) trans-1,3-Dichloropropene	13.77	75	83367	1172.319 pg	99
32) 1,1,2-Trichloroethane	13.95	83	52851	1119.148 pg	99
34) Toluene	14.24	91	247398	1092.835 pg	100
35) Dibromochloromethane	14.66	129	64245	1088.239 pg	100
36) 1,2-Dibromoethane	14.92	107	65285	1126.446 pg	100
37) Tetrachloroethene	15.40	166	66842	1097.990 pg	99
39) Chlorobenzene	16.10	112	164120	1135.145 pg	100
40) Ethylbenzene	16.48	91	325410	1347.789 pg	98
41) m,p-Xylene	16.65	91	521901	2837.389 pg	97
42) Styrene	17.01	104	190321	1484.759 pg	99
43) o-Xylene	17.12	106	134920	1464.348 pg	93
44) 1,1,2,2-Tetrachloroethane	17.09	83	131680	1347.272 pg	99
46) 1,3,5-Trimethylbenzene	18.37	105	230104	1123.554 pg	100
47) 1,2,4-Trimethylbenzene	18.77	105	232503	1144.366 pg	100
48) 1,3-Dichlorobenzene	18.92	146	123578	1109.033 pg	100
49) 1,4-Dichlorobenzene	18.98	146	122382	1066.252 pg	100
50) 1,2-Dichlorobenzene	19.31	146	121620	1085.527 pg	100
51) 1,2-Dibromo-3-chloropr...	19.72	157	37549	1117.252 pg	99
52) 1,2,4-Trichlorobenzene	20.94	182	70535	1080.954 pg	99
53) Naphthalene	21.06	128	230096	1140.203 pg	100

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081702.D Vial: 16
Acq On : 8 Mar 2017 4:54 Operator: CL
Sample : CCV S19030817 1000pg Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 08 07:16:13 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

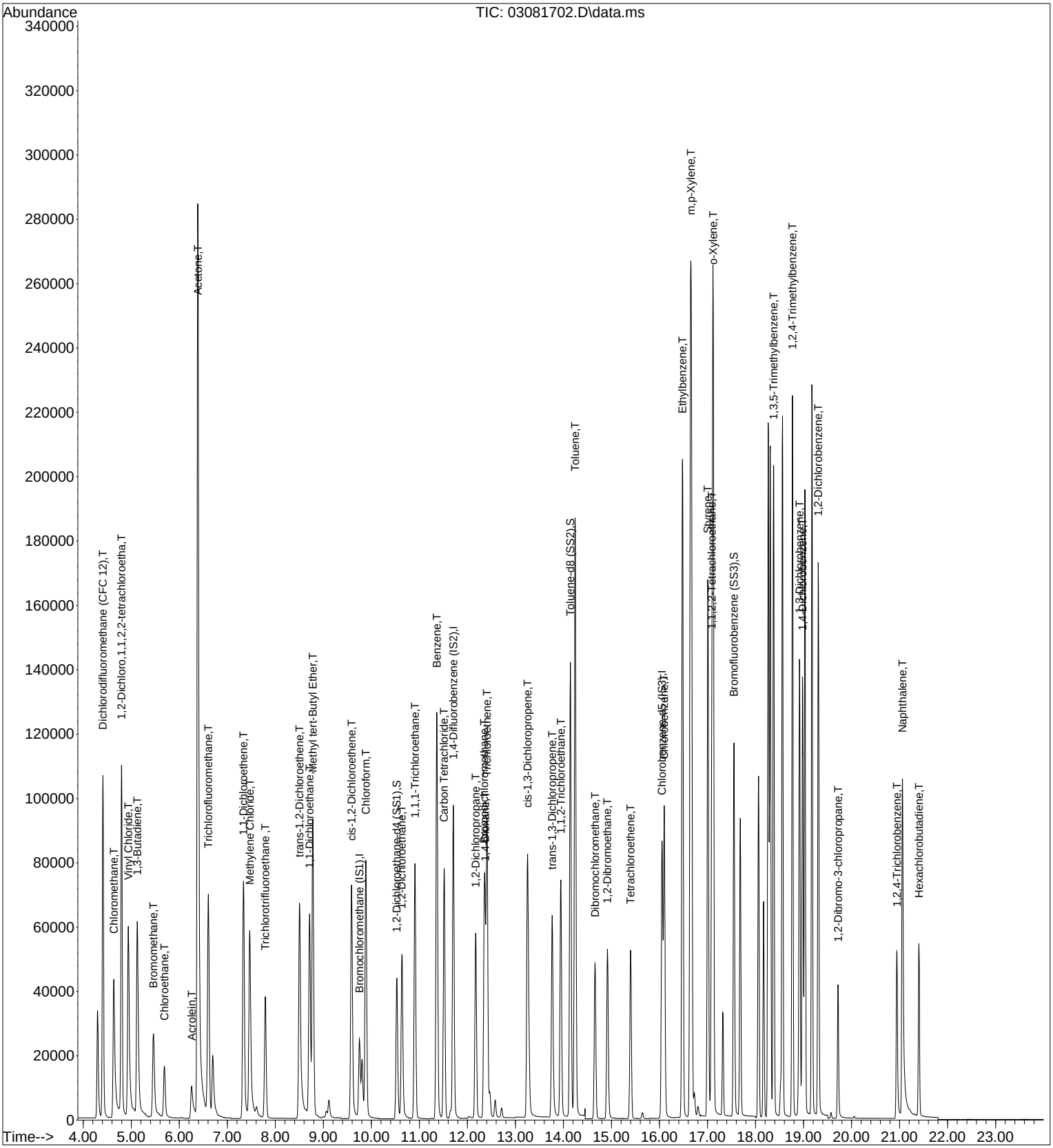
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	51814	1096.472 pg	100

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081702.D Vial: 16
Acq On : 8 Mar 2017 4:54 Operator: CL
Sample : CCV S19030817 1000pg Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 08 07:16:13 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

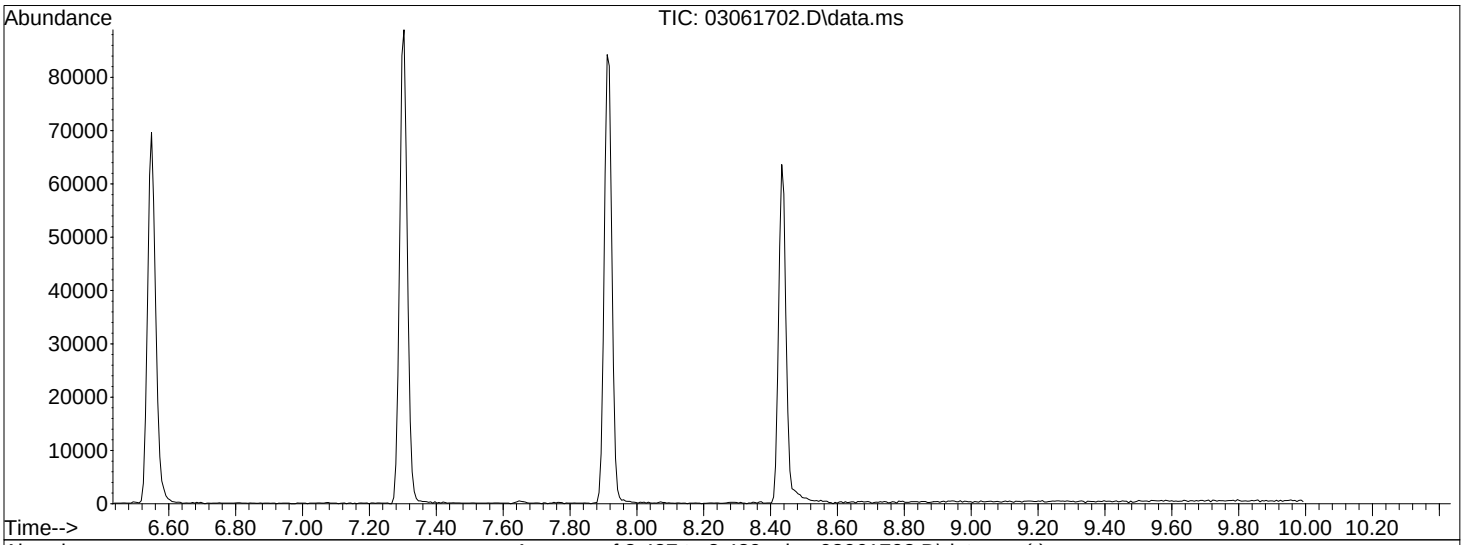


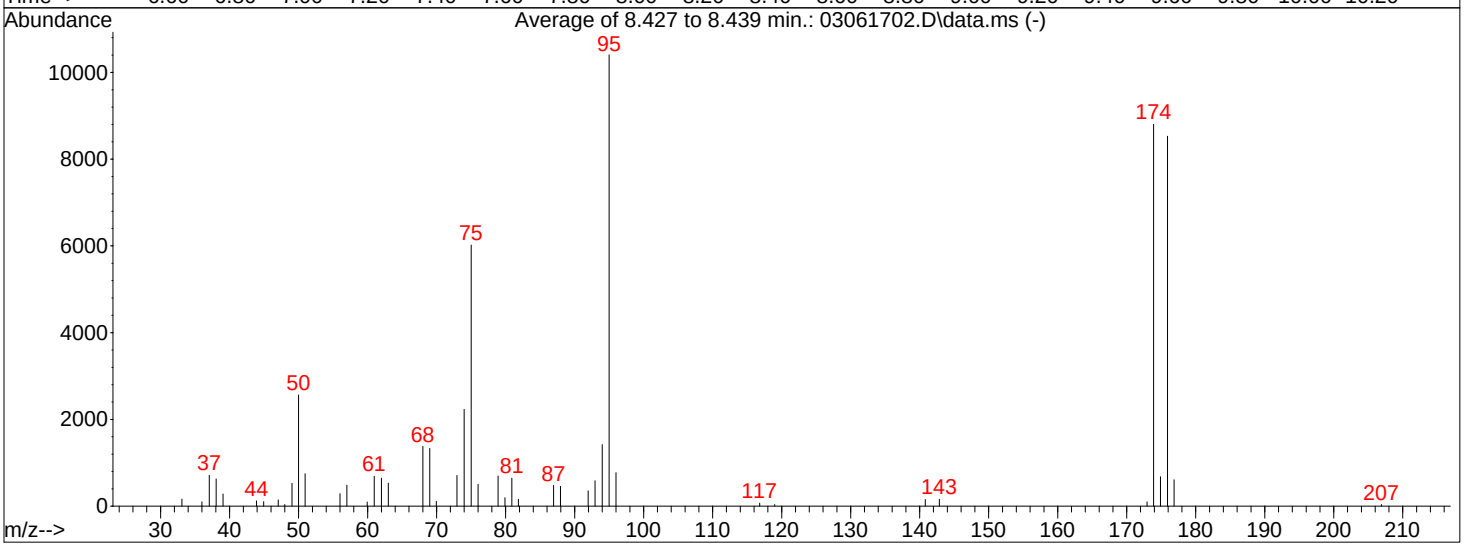
Data Path : I:\MS19\DATA\2017 03\06\
Data File : 03061702.D
Acq On : 6 Mar 2017 15:33
Operator : CL
Sample : BFB S19030617
Misc : S29-01241701
ALS Vial : 2 Sample Multiplier: 1

Integration File: rteint.p

Method : I:\MS19\METHODS\S19030617.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue Mar 07 08:48:37 2017

CL 3/7/17





AutoFind: Scans 707, 708, 709; Background Corrected with Scan 702

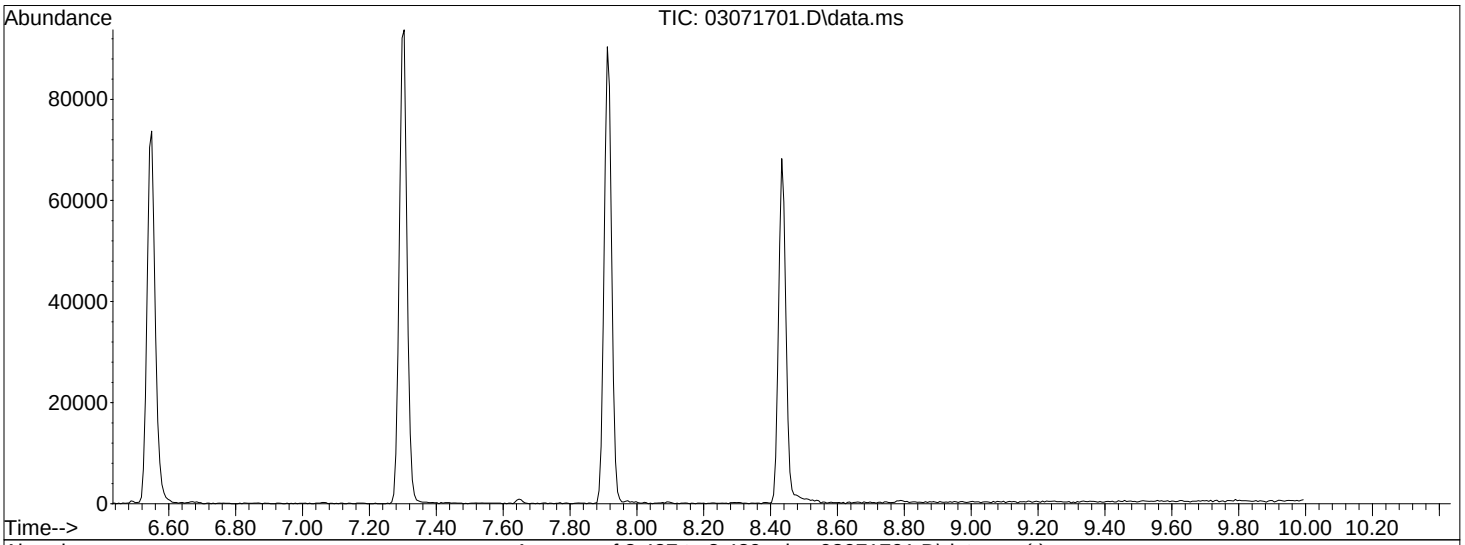
Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	24.6	2562	PASS
75	95	30	66	57.9	6021	PASS
95	95	100	100	100.0	10406	PASS
96	95	5	9	7.4	772	PASS
173	174	0.00	2	1.1	100	PASS
174	95	50	120	84.6	8805	PASS
175	174	4	9	7.7	680	PASS
176	174	93	101	96.9	8529	PASS
177	176	5	9	7.1	607	PASS

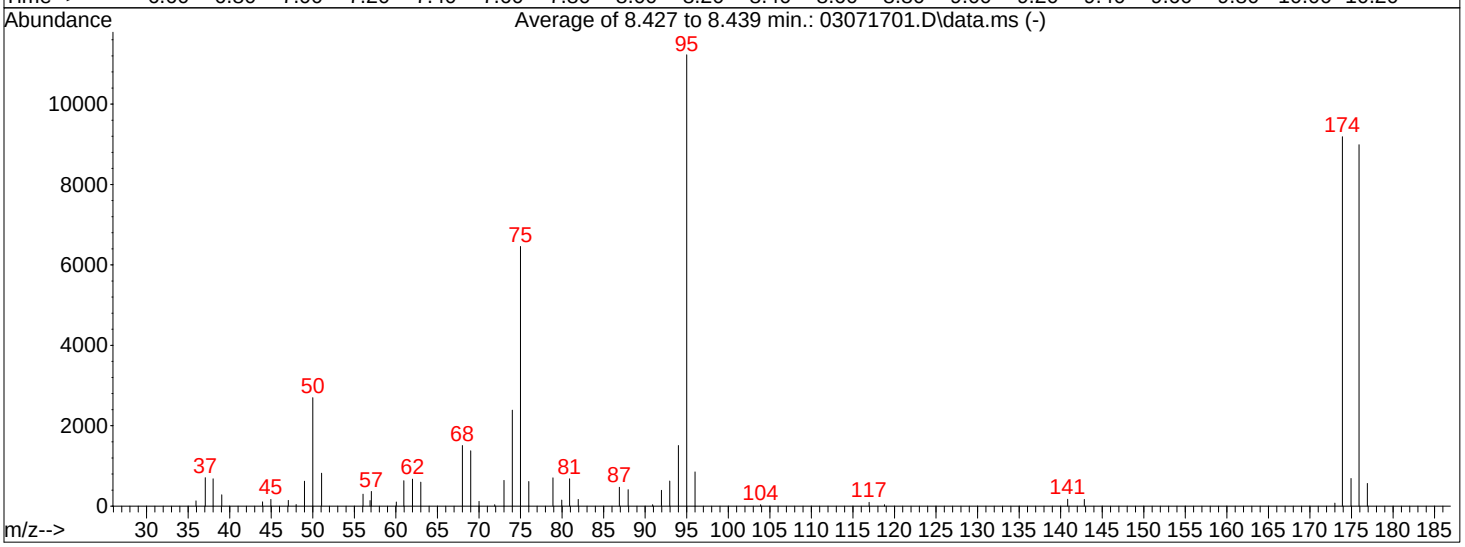
Data Path : I:\MS19\DATA\2017 03\07\
Data File : 03071701.D
Acq On : 7 Mar 2017 10:00
Operator : CL
Sample : BFB S19030717
Misc : S29-01241701
ALS Vial : 2 Sample Multiplier: 1

Integration File: rteint.p

Method : I:\MS19\METHODS\S19030617.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue Mar 07 08:48:37 2017

CL 3/7/17





AutoFind: Scans 707, 708, 709; Background Corrected with Scan 702

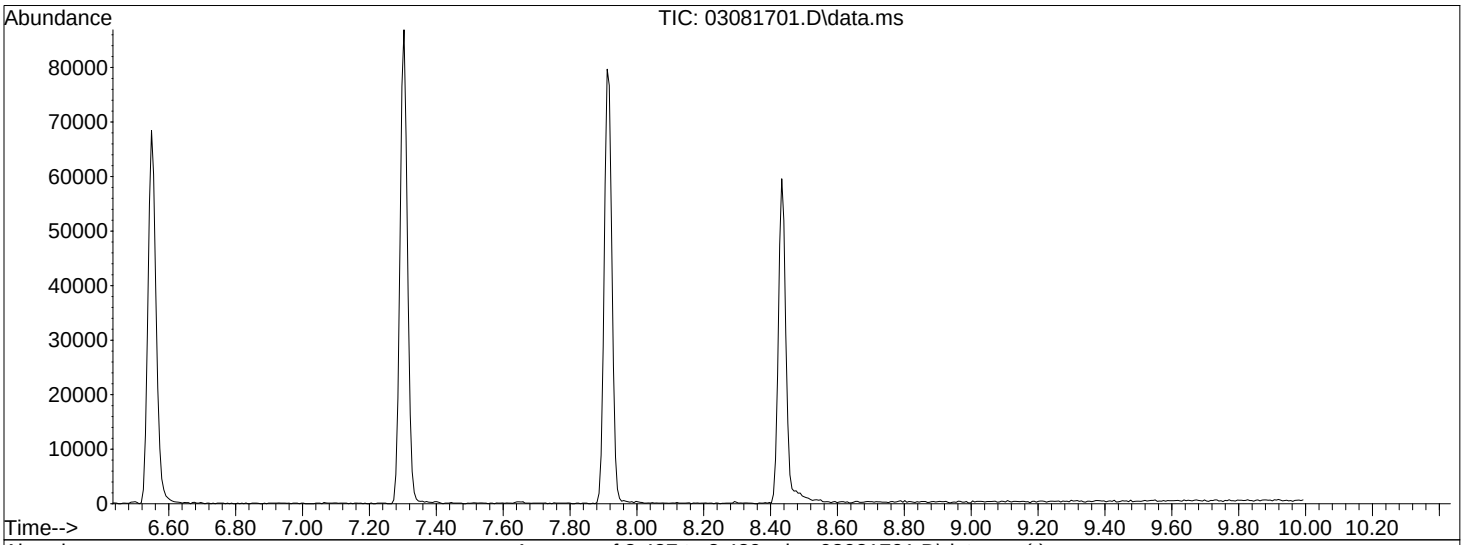
Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	24.0	2700	PASS
75	95	30	66	57.5	6458	PASS
95	95	100	100	100.0	11227	PASS
96	95	5	9	7.6	852	PASS
173	174	0.00	2	0.8	77	PASS
174	95	50	120	81.8	9189	PASS
175	174	4	9	7.5	688	PASS
176	174	93	101	97.8	8990	PASS
177	176	5	9	6.3	567	PASS

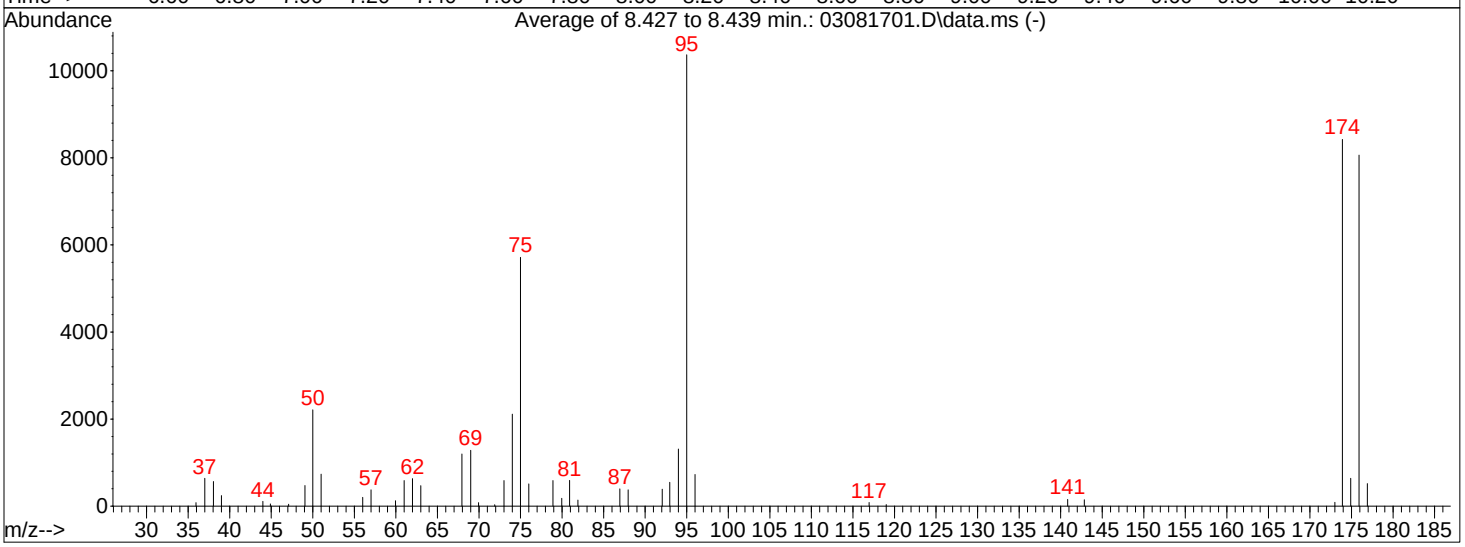
Data Path : I:\MS19\DATA\2017 03\08\
Data File : 03081701.D
Acq On : 8 Mar 2017 4:35
Operator : CL
Sample : BFB S19030817
Misc : S29-01241701
ALS Vial : 2 Sample Multiplier: 1

Integration File: rteint.p

Method : I:\MS19\METHODS\S19030617.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue Mar 07 08:48:37 2017

CL 3/8/17





AutoFind: Scans 707, 708, 709; Background Corrected with Scan 702

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	21.3	2211	PASS
75	95	30	66	55.1	5716	PASS
95	95	100	100	100.0	10368	PASS
96	95	5	9	7.0	729	PASS
173	174	0.00	2	1.0	87	PASS
174	95	50	120	81.3	8424	PASS
175	174	4	9	7.6	640	PASS
176	174	93	101	95.7	8064	PASS
177	176	5	9	6.4	519	PASS

Injection Log

Directory: I:\MS19\DATA\2017_03\06\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	3/6/17 15:33	03061702.D	BFB S19030617	S29-01241701	CL	2	Pass
2	3/6/17 16:03	03061703.D	20pg TO15SIM ICAL STD	S29-01241701/S29-03061701 (4/4)	CL	12	
3	3/6/17 16:35	03061704.D	50pg TO15SIM ICAL STD	S29-01241701/S29-03061701 (4/4)	CL	12	
4	3/6/17 17:06	03061705.D	100pg TO15SIM ICAL STD	S29-01241701/S29-03061701 (4/4)	CL	12	
5	3/6/17 17:37	03061706.D	500pg TO15SIM ICAL STD	S29-01241701/S29-03021708 (3/31)	CL	13	
6	3/6/17 18:09	03061707.D	1000pg TO15SIM ICAL STD	S29-01241701/S29-02171708 (3/18)	CL	14	
7	3/6/17 18:40	03061708.D	2000pg TO15SIM ICAL STD	S29-01241701/S29-02171708 (3/18)	CL	14	
8	3/6/17 19:11	03061709.D	5000pg TO15SIM ICAL STD	S29-01241701/S29-02171708 (3/18)	CL	14	
9	3/6/17 19:42	03061710.D	10000pg TO15SIM ICAL STD	S29-01241701/S29-02171708 (3/18)	CL	14	
10	3/6/17 20:13	03061711.D	blank	S29-01241701	CL	2	
11	3/6/17 20:45	03061712.D	50000pg TO15SIM ICAL STD	S29-01241701/S29-03021703 (3/31)	CL	15	Not Used
12	3/6/17 21:16	03061713.D	blank	S29-01241701	CL	2	
13	3/6/17 21:48	03061714.D	500pg TO15SIM ICV	S29-01241701/S29-03031708 (4/1)	CL	11	Not Used
14	3/6/17 22:18	03061715.D	500pg TO15SIM ICV	S29-01241701/S29-03031708 (4/1)	CL	11	Not Used
15	3/7/17 7:40	03061716.D	blank	S29-01241701	CL	2	
16	3/7/17 8:11	03061717.D	50000pg TO15SIM ICAL STD	S29-01241701/S29-03021703 (3/31)	CL	15	
17	3/7/17 8:43	03061718.D	blank	S29-01241701	CL	2	
18	3/7/17 9:14	03061719.D	500pg TO15SIM ICV	S29-01241701/S29-03031708 (4/1)	CL	11	Pass

CL 3/7/17

Injection Log

Directory: I:\MS19\DATA\2017_03\07\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	3/7/17 10:00	03071701.D	BFB S19030717	S29-01241701	CL	2	Pass
2	3/7/17 10:20	03071702.D	CCV S19030717_1000pg	S29-01241701/S29-02171708 (3/18)	CL	16	Pass
3	3/7/17 10:51	03071703.D	MB S19030717_1000mL	S29-01241701/AC01205	CL	2	Pass
4	3/7/17 11:22	03071704.D	xxLCS S19030717_500pgxx	S29-01241701/S29-03031708 (4/1)	CL	2	
5	3/7/17 11:53	03071705.D	LCS S19030717_500pg	S29-01241701/S29-03031708 (4/1)	CL	2	Pass
6	3/7/17 13:01	03071706.D	xxP1700939-013 (500mL)xx	S29-01241701	CL	1	IS3 Fail, RR
7	3/7/17 13:32	03071707.D	P1700939-016 (500mL)	S29-01241701	CL	3	
8	3/7/17 14:03	03071708.D	P1700947-018 (1000mL)	S29-01241701	CL	4	
9	3/7/17 14:34	03071709.D	P1700939-013 (250mL)	S29-01241701	CL	1	
10	3/7/17 15:05	03071710.D	P1700947-019 (1000mL)	S29-01241701	CL	5	
11	3/7/17 15:45	03071711.D	blank	S29-01241701	CL	2	
12	3/7/17 16:16	03071712.D	P1700947-021 (1000mL) PF2	S29-01241701	CL	7	
13	3/7/17 16:47	03071713.D	P1700947-020 (1000mL)	S29-01241701	CL	6	
14	3/7/17 17:19	03071714.D	P1700947-020dup (1000mL)	S29-01241701	CL	6	Pass for Dup
15	3/7/17 17:50	03071715.D	P1700947-022 (1000mL)	S29-01241701	CL	8	
16	3/7/17 18:21	03071716.D	P1700947-024 (1000mL)	S29-01241701	CL	9	
17	3/7/17 18:52	03071717.D	blank	S29-01241701	CL	2	
18	3/7/17 19:23	03071718.D	P1700971-001 (1000mL)	S29-01241701	CL	10	IS3 Fail, RR
19	3/7/17 19:54	03071719.D	P1700971-002 (1000mL)	S29-01241701	CL	11	Surr3 Fail
20	3/7/17 20:25	03071720.D	P1700971-004 (1000mL)	S29-01241701	CL	12	
21	3/7/17 20:57	03071721.D	P1700992-001 (1000mL)	S29-01241701	CL	1	
22	3/7/17 21:28	03071722.D	P1700992-003 (1000mL)	S29-01241701	CL	3	
23	3/7/17 21:59	03071723.D	P1700992-004 (1000mL)	S29-01241701	CL	4	
24	3/7/17 22:30	03071724.D	blank	S29-01241701	CL	2	
25	3/7/17 23:02	03071725.D	P1700992-006 (1000mL)	S29-01241701	CL	5	IS3 Fail, RR
26	3/7/17 23:33	03071726.D	P1700992-008 (1000mL)	S29-01241701	CL	13	
27	3/8/17 0:04	03071727.D	P1700992-014 (1000mL)	S29-01241701	CL	14	
28	3/8/17 0:36	03071728.D	P1700992-016 (1000mL)	S29-01241701	CL	15	
29	3/8/17 1:07	03071729.D	blank	S29-01241701	CL	2	
30	3/8/17 4:04	03071730.D	blank	S29-01241701	CL	2	

CL 3/8/17

Injection Log

Directory: I:\MS19\DATA\2017_03\08\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	3/8/17 4:35	03081701.D	BFB S19030817	S29-01241701	CL	2	Pass
2	3/8/17 4:54	03081702.D	CCV S19030817_1000pg	S29-01241701/S29-02171708 (3/18)	CL	16	Pass
3	3/8/17 5:25	03081703.D	MB S19030817_1000mL	S29-01241701/AC01205	CL	2	Pass
4	3/8/17 5:57	03081704.D	xxLCS S19030817_500pgxx	S29-01241701/S29-03031708 (4/1)	CL	2	
5	3/8/17 6:28	03081705.D	LCS S19030817_500pg	S29-01241701/S29-03031708 (4/1)	CL	2	Pass
6	3/8/17 7:47	03081706.D	xxP1700992-001 (500mL)xx	S29-01241701	CL	1	IS failed
7	3/8/17 8:18	03081707.D	xxP1700992-003dil (100mL)xx	S29-01241701	CL	3	IS failed
8	3/8/17 8:49	03081708.D	xxP1700992-001 (250mL)xx	S29-01241701	CL	1	IS failed
9	3/8/17 9:20	03081709.D	blank	S29-01241701	CL	2	
10	3/8/17 9:52	03081710.D	P1700992-003dil (100mL)	S29-01241701	CL	3	
11	3/8/17 10:23	03081711.D	P1700992-004dil (100mL)	S29-01241701	CL	4	
12	3/8/17 10:54	03081712.D	xxP1700992-006 (500mL)xx	S29-01241701	CL	5	IS failed
13	3/8/17 11:26	03081713.D	blank	S29-01241701	CL	2	
14	3/8/17 11:57	03081714.D	P1700971-002dil (100mL)	S29-01241701	CL	11	
15	3/8/17 12:29	03081715.D	P1700971-004dil (100mL)	S29-01241701	CL	12	
16	3/8/17 13:01	03081716.D	CCV Test_500pg	S29-01241701/S29-02171709 (3/15)	CL	16	
17	3/8/17 13:32	03081717.D	P1700971-005 (1000mL)	S29-01241701	CL	1	
18	3/8/17 14:04	03081718.D	CCV Test_500pg	S29-01241701/S29-02171710 (3/15)	CL	16	
19	3/8/17 15:19	03081719.D	blank	S29-01241701	CL	2	
20	3/8/17 15:50	03081720.D	P1701033-001 (1000mL)	S29-01241701	CL	1	
21	3/8/17 16:22	03081721.D	P1701033-002 (1000mL)	S29-01241701	CL	3	
22	3/8/17 16:53	03081722.D	P1701033-002dup (1000mL)	S29-01241701	CL	3	Pass for Dup
23	3/8/17 17:24	03081723.D	P1701021-009 (500mL)	S29-01241701	CL	4	
24	3/8/17 17:55	03081724.D	P1701021-010 (500mL)	S29-01241701	CL	5	
25	3/8/17 18:27	03081725.D	blank	S29-01241701	CL	2	
26	3/8/17 18:58	03081726.D	P1700938-009 (1000mL)	S29-01241701	CL	6	IS failed
27	3/8/17 19:30	03081727.D	P1700938-012 (1000mL)	S29-01241701	CL	7	IS failed
28	3/8/17 20:01	03081728.D	P1700938-013 (1000mL)	S29-01241701	CL	8	
29	3/8/17 20:33	03081729.D	P1700938-014 (1000mL)	S29-01241701	CL	9	IS failed
30	3/8/17 21:04	03081730.D	P1700938-015 (1000mL)	S29-01241701	CL	10	IS failed
31	3/8/17 21:36	03081731.D	P1700938-016 (1000mL)	S29-01241701	CL	11	
32	3/8/17 22:07	03081732.D	blank	S29-01241701	CL	2	
33	3/8/17 22:41	03081733.D	P1700936-013 (1000mL)	S29-01241701	CL	12	
34	3/8/17 23:12	03081734.D	P1700936-015 (1000mL)	S29-01241701	CL	13	
35	3/8/17 23:44	03081735.D	blank	S29-01241701	CL	2	
36	3/9/17 5:04	03081736.D	blank	S29-01241701	CL	2	

CL 3/9/17

Tier III Data Validation Report Summary

Client: Montana Department of Environmental Quality (MDEQ)	Laboratory: ALS Environmental
Project Name: Whitefish Solvent Site	Sample Matrix: Air
Project Number: 776-033-001	Sample Start Date: 02/22/2017
Date Validated: 03/24/2017	Sample End Date: 02/22/2017
Parameters Included: ▪ Volatile Organic Compounds (VOC) by Environmental Protection Agency (EPA) Modified Method TO-15 and Method TO-15 with Selective Ion Monitoring (SIM) ▪ Methane by EPA Method 3C ▪ Helium by EPA Modified Method 3C ▪ Air-Phase Petroleum Hydrocarbons (APH) by Massachusetts (MA) Method	
Laboratory Project ID: P1700971	
Data Validator: Charles Ballek, Senior Chemist	
Draft Reviewer: Kyle Power, Environmental Chemist	Final Reviewer: Mike Phillips, Senior Chemist

DATA EVALUATION CRITERIA SUMMARY

A Tier III Data Validation was performed by Trihydro Corporation's Chemical Data Evaluation Services Group on the analytical data report package generated by ALS Environmental evaluating samples from the MDEQ Whitefish Solvent Site, located in Whitefish, Montana.

Precision, accuracy, method compliance, and completeness of this data package were assessed during this data review. Precision was determined by evaluating the calculated relative percent difference (RPD) values from:

- Field duplicate pairs
- Laboratory duplicate pairs

Laboratory accuracy was established by reviewing the demonstrated percent recoveries (%R) of the following items to verify that data are not biased.

- Laboratory control sample (LCS)
- Organic system monitoring compounds (surrogates)

Method compliance was established by reviewing sample integrity, holding times, detection limits, surrogate recoveries, laboratory blanks, initial and continuing calibrations (where applicable), and the LCS percent recoveries against method-specific requirements.

Completeness was evaluated by determining the overall ratio of the number of samples and analyses planned versus the number of samples with valid analyses. Determination of completeness included a review of the chain-of-custody (CoC), laboratory analytical methods, and other laboratory and field documents associated with this analytical data set.

Tier III Data Validation Report Summary

SAMPLE NUMBERS TABLE

Client Sample ID	Laboratory Sample Number
MTN-AA-1	P1700971-001
MTN-VI-1	P1700971-002
MTN-SS-1	P1700971-003
MTN-BD-1	P1700971-004
MTN-POST	P1700971-005
MTN-PRE	P1700971-006

Tier III Data Validation Report Summary

The laboratory data were reviewed to evaluate compliance with the methods and the quality of the reported data. Assessment of CoC completeness is included in Item 3 of the Data Validation Checklist. A check mark (✓) indicates that the referenced validation criteria were deemed acceptable, whereas a crossed circle (⊗) indicates validation criteria for which the data have been qualified by the data validator. An empty circle (○) indicates that the specified criterion does not apply to the reviewed data. Details are noted in the tables below.

Validation Criteria

- ✓ Data Completeness
- ✓ CoC Documentation
- ✓ Holding Times and Preservation
- ✓ Field Duplicates
- ○ Field, Equipment, and Trip Blanks
- ✓ Initial and Continuing Calibrations
- ✓ Instrument Tunes
- ✓ Internal Standards
- ✓ System Performance Checks
- ✓ Laboratory Blanks
- ⊗ LCS
- ○ Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
- ✓ System Monitoring Compounds (i.e. Surrogates)
- ✓ Laboratory Duplicates

Guidance References

Chemical data validation was conducted in accordance with the United States Environmental Protection Agency (USEPA) Contract Laboratory Program (CLP) National Functional Guidelines for the analyses listed below, or by the appropriate method if not covered in the National Functional Guidelines.

- Air and vapor data for samples collected in canisters and analyzed by EPA organics Method TO-15 were reviewed with reference to the USEPA Hazardous Waste Support Branch Validating Air Samples Volatile Organic Analysis of Ambient Air in Canister by Method TO-15, standard operating procedure number HW-31 revision 4, October 2006.
- Data for organic analyses were evaluated according to validation criteria set forth in the USEPA CLP National Functional Guidelines for Superfund Organic Methods Data Review, document number EPA-540-R-2016-002, September 2016 with additional reference to the USEPA CLP National Functional Guidelines for Organic Data Review, document number EPA 540/R-99/008, October 1999.
- Review of field duplicates was conducted according to the USEPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures, EQADR-Supplement0, April 2013.
- Trihydro Data Validation Variance Documentation, February 2017.
- Project-specific Quality Assurance Project Plans (QAPP) data validation requirements, as applicable.

Tier III Data Validation Report Summary

OVERALL DATA PACKAGE ASSESSMENT

Based on a data validation review, the data are acceptable as delivered. Data qualified by the laboratory are discussed in Item 2 of the Validation Criteria Checklist.

The purpose of validating data and assigning qualifiers is to assist in proper data interpretation. Data that are not qualified meet the site data quality objectives. If values are assigned qualifiers other than an R (rejected, data not usable), the data may be used for site evaluation; however, consideration should be given to the reasons for qualification when interpreting sample concentrations. Data points that are assigned an R qualifier should not be used for site evaluation purposes.

Text identified in **bold font** in the Validation Criteria Checklist indicates that further action and/or qualification of the data were required. Data validation qualifiers were added for the items noted with crossed circles in the Validation Criteria section above. Please see the Data Qualification Summary table at the end of this report for a complete list of samples and analytes qualified.

Data qualifiers used during this validation are included in the following table.

Qualifier	Definition
J+	The result is an estimated concentration, but may be biased high

Data Completeness

The analyses were performed as requested on the CoC records. The samples were received by the laboratory and analyzed properly unless otherwise noted in the Criteria Checklist below. The complete data package consisted of 92 data points. No data points were rejected. The data completeness measure for this data package is calculated to be 100% and is acceptable.

TABLE 1. GENERAL VALIDATION CRITERIA CHECKLIST	
1. Was the report free of non-conformances identified by the laboratory?	No
Comments: The laboratory noted the following non-conformances as related to this data set. The surrogate spike recovery for bromofluorobenzene was exceeded in MTN-VI-1 (P1700971-002) in SIM mode due to matrix interference. The target analytes and surrogate recoveries for the associated QC were acceptable. The data has been flagged with the appropriate qualifier. No further corrective action was taken. The spike recoveries in the Laboratory Control Samples (LCS) analyzed in SIM mode were outside the laboratory generated control criteria. The recovery errors equate to a potential high bias. However, these recoveries were within the method criteria, therefore, the data quality has not been significantly affected. No corrective action was taken.	
2. Were the data free of data qualification flags or other notes used by the laboratory? If no, define.	No
Comments: The laboratory used the following data qualification flags with this data set. D – The reported result is from a dilution. L – Laboratory control sample recovery outside the specified limits; results may be biased high. S – Surrogate recovery not within specified limits.	
3. Were sample CoC forms and procedures complete?	Yes
Comments: The CoC record from the field to the laboratory was complete and custody was maintained as evidenced by the field and laboratory personnel signatures, dates, and times of receipt.	
4. Were detection limits in accordance with the quality assurance project plan (QAPP), permit, or method, or indicated as acceptable?	Yes
Comments: The detection limits appeared to be acceptable. The following dilutions were applied. Method TO-15: Dilutions of 1.3 to 49.1 times were applied for the VOC analyses of the submitted samples. Method TO-15 SIM: Dilutions of 1.3 to 17.1 times were applied for the VOC analyses of the submitted samples. Method 3C: Sample MTN-SS-1 was diluted by a factor of 1.61 times for the analysis of methane. Method 3C Modified: Sample MTN-SS-1 was diluted by a factor of 1.26 times for the analysis of helium. Method MA APH: Dilutions of 1.3 to 49.1 times were applied for the APH analyses of the submitted samples.	
5. Were the reported analytical methods and constituents in compliance with the QAPP, permit, or CoC?	Yes
Comments: The reported analytical methods were in compliance with the CoC and the laboratory reported the requested constituents in accordance with the CoC.	
6. Were samples received in good condition within method-specified requirements?	Yes
Comments: Samples were received intact and in good condition. The final vacuums from the field and receipt vacuums measured by the laboratory were compared by the project team and the vacuums appeared to be acceptable. The laboratory indicated that the sample containers were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. The canister certification results were not available for review. Helium was used as a tracer gas during the sampling for MTN-SS-1 and the leak check calculation indicated leakage of less than 10%, within the guidance limits for this project.	
7. Were samples extracted/digested and analyzed within method-specified or technical holding times?	Yes
Comments: The samples were analyzed within method-specific holding times.	

TABLE 1. GENERAL VALIDATION CRITERIA CHECKLIST	
8. Were reported units appropriate for the sample matrix/matrices and analytical method(s)? Specify if wet or dry units were used for soil.	Yes
Comments: The results were reported in concentration units of micrograms per cubic meters (µg/m^3), parts per billion by volume (ppbV), parts per million by volume (ppmV), and percent volume per volume (%V/V), which were acceptable for the sample matrix and the analyses requested.	
9. Was the number of field duplicate samples collected equal to at least 10% of the total number of samples or as required by the project guidelines, QAPP, SAP, or permit?	Yes
Comments: The number of field duplicates collected was equal to at least 10% of the number of samples. Sample MTN-BD-1 was collected as a field duplicate of sample MTN-VI-1.	
10. Were field duplicate RPD values within data validation quality control (QC) limits (soil 0-50%, water 0-30%, or air 0-25%)?	Yes
Comments: As indicated in the Field Duplicate Summary Table at the end of this report, field duplicate RPD values were within the data validation QC limits of 0-25% for air samples. Qualification of data was not required.	
11. Were the number of trip blank, field blank, and/or equipment blank samples collected equal to at least 10% of the total number of samples or as required by the project guidelines, QAPP, SAP, or permit?	No
Comments: Trip, field, and equipment blank samples were not collected for this sample set.	
12. Were target analytes reported as not detected in the trip blank, field blank, and/or equipment blank samples?	N/A
Comments: Trip, field, and equipment blank samples were not collected for this sample set.	

TABLE 2. VALIDATION CRITERIA CHECKLIST FOR VOC ANALYSES (TO-15 and TO-15 SIM)	
1. Were instrument calibrations within data validation QC limits and analyzed at the appropriate frequency?	Yes
Comments: The initial and continuing calibrations were analyzed at appropriate frequencies and the results were within data validation limits. Non-compliant calibration results were noted for analytes that were not reported for the submitted samples. No further validation action was required based on those results.	
2. Were the instrument tunes within data validation control limits and analyzed at the appropriate frequency?	Yes
Comments: Instrument tunes were performed at the required frequency and the results were within data validation limits.	
3. Were the internal standards within data validation control limits?	Yes
Comments: The area counts and retention times for the internal standards were within method control limits.	
4. Was the total number of laboratory blank samples prepared equal to at least 5% of the total number of samples or analyzed as required by the method?	Yes
Comments: The total number of laboratory blank samples prepared was equal to at least 5% of the total number of samples.	
5. Were target analytes reported as not detected in the laboratory blanks?	Yes
Comments: Target analytes were reported as not detected in the laboratory blanks.	
6. Was the total number of LCSs analyzed equal to at least 5% of the total number of samples or analyzed as required by the method?	Yes
Comments: The total number of LCS samples analyzed was equal to at least 5% of the total number of samples.	
7. Were LCS/LCSD percent recoveries and LCS/LCSD RPDs within data validation or laboratory QC limits?	No
Comments: The LCS percent recoveries were within laboratory QC limits, with the following exceptions. **<u>Method TO-15 SIM</u>: The LCS percent recoveries for batches MS19030717 and MS19030817 were outside laboratory QC limits for the target analytes indicating high biases. Trichloroethene and tetrachloroethene were detected in associated samples MTN-AA-1, MTN-VI-1, and MTN-BD-1; and tetrachloroethene was detected in sample MTN-POST. These results were assigned J+ qualifiers to indicate estimated concentrations that may be biased high.** Qualification was not required for the non-detected results in the associated samples.	
8. Was the total number of MS samples prepared equal to at least 5% of the total number of samples or analyzed as required by the method?	No
Comments: Analysis of matrix spike samples is not required by Method TO-15 or Method TO-15 SIM.	
9. For MS/MSDs prepared from project samples, were percent recoveries and RPDs within data validation or laboratory QC limits?	N/A
Comments: Analysis of matrix spike samples is not required by Method TO-15 or Method TO-15 SIM.	
10. Were surrogate recoveries within laboratory QC limits?	No
Comments: Surrogate recoveries were within laboratory QC limits, with the following exception. In sample MTN-VI-1, the Method TO-15 SIM surrogate bromofluorobenzene was recovered outside the acceptance limits of 70-130% at 132%. The target analytes reported by this method were not associated with this surrogate and qualification of the results was not required.	

TABLE 2. VALIDATION CRITERIA CHECKLIST FOR VOC ANALYSES (TO-15 and TO-15 SIM)	
11. Were laboratory duplicates prepared?	Yes
Comments: A laboratory duplicate was prepared for Method TO-15 batch MS16030917 from sample MTN-PRE.	
12. Were laboratory duplicates RPD values within the laboratory acceptance limits?	Yes
Comments: Laboratory duplicate RPDs were within laboratory acceptance limits.	

TABLE 3. VALIDATION CRITERIA CHECKLIST FOR METHANE and HELIUM ANALYSES (3C and 3C MODIFIED)	
1. Were instrument calibrations within data validation QC limits and analyzed at the appropriate frequency?	Yes
Comments: The initial and continuing calibrations were analyzed at appropriate frequencies and the results were within data validation limits.	
2. Was the total number of laboratory blank samples prepared equal to at least 5% of the total number of samples or analyzed as required by the method?	Yes
Comments: The total number of laboratory blank samples prepared was equal to at least 5% of the total number of samples.	
3. Were target analytes reported as not detected in the laboratory blanks?	Yes
Comments: Target analytes were reported as not detected in the laboratory blanks.	
4. Was the total number of LCSs analyzed equal to at least 5% of the total number of samples or analyzed as required by the method?	Yes
Comments: The total number of LCS samples analyzed was equal to at least 5% of the total number of samples.	
5. Were LCS/LCSD percent recoveries and LCS/LCSD RPDs within data validation or laboratory QC limits?	Yes
Comments: The LCS percent recoveries were within laboratory QC limits.	
6. Was the total number of MS samples prepared equal to at least 5% of the total number of samples or analyzed as required by the method?	No
Comments: Analysis of matrix spike samples is not required by Method 3C or 3C modified.	
7. For MS/MSDs prepared from project samples, were percent recoveries and RPDs within data validation or laboratory QC limits?	N/A
Comments: Analysis of matrix spike samples is not required by Method 3C or 3C modified.	
8. Were surrogate recoveries within laboratory QC limits?	N/A
Comments: Analysis of surrogates is not required by Method 3C or 3C modified.	
9. Were laboratory duplicates prepared?	No
Comments: Laboratory duplicates were not analyzed for Method 3C or 3C modified.	
10. Were laboratory duplicates RPD values within the laboratory acceptance limits?	N/A
Comments: Laboratory duplicates were not analyzed for Method 3C or 3C modified.	

TABLE 4. VALIDATION CRITERIA CHECKLIST FOR APH ANALYSES (MA APH)	
1. Were instrument calibrations within data validation QC limits and analyzed at the appropriate frequency?	Yes
Comments: The initial and continuing calibrations were analyzed at appropriate frequencies and the results were within data validation limits.	
2. Was the total number of laboratory blank samples prepared equal to at least 5% of the total number of samples or analyzed as required by the method?	Yes
Comments: The total number of laboratory blank samples prepared was equal to at least 5% of the total number of samples.	
3. Were target analytes reported as not detected in the laboratory blanks?	Yes
Comments: Target analytes were reported as not detected in the laboratory blanks.	
4. Was the total number of LCSs analyzed equal to at least 5% of the total number of samples or analyzed as required by the method?	Yes
Comments: The total number of LCS samples analyzed was equal to at least 5% of the total number of samples.	
5. Were LCS/LCSD percent recoveries and LCS/LCSD RPDs within data validation or laboratory QC limits?	Yes
Comments: The LCS percent recoveries were within laboratory QC limits.	
6. Was the total number of MS samples prepared equal to at least 5% of the total number of samples or analyzed as required by the method?	No
Comments: Analysis of matrix spike samples is not required by MA APH Method.	
7. Were MS/MSD percent recoveries and MS/MSD RPDs within data validation or laboratory QC limits?	N/A
Comments: Analysis of matrix spike samples is not required by MA APH Method.	
8. Were surrogate recoveries within laboratory QC limits?	N/A
Comments: Analysis of surrogates is not required by MA APH Method.	
9. Were laboratory duplicates prepared?	Yes
Comments: A laboratory duplicate was prepared for batch MS16030917 from sample MTN-PRE.	
10. Were laboratory duplicates RPD values within the laboratory acceptance limits?	Yes
Comments: Laboratory duplicate RPDs were within laboratory QC limits.	

TABLE 5. FIELD DUPLICATE SUMMARY

Client Sample ID: MTN-VI-1 Field Duplicate Sample ID: MTN-BD-1				
Analyte	**Method**	**Laboratory Result ($\mu g/m^3$)**	**Duplicate Result ($\mu g/m^3$)**	**Relative Percent Difference (RPD)**
C5-C8, Aliphatic, Adjusted	MADEP APH 1.0	44	55	22.2% +/-RL
C9-C10, Aromatic, Adjusted	MADEP APH 1.0	5.5	6.0	8.7% +/-RL
C9-C12, Aliphatic, Adjusted	MADEP APH 1.0	60	66	9.5%
Benzene	TO-15	1.3	1.3	0.0%
m,p-Xylene	TO-15	2.4	2.6	8.0%
o-Xylene	TO-15	0.90	0.95	5.4% +/-RL
Toluene	TO-15	2.9	3.1	6.7%
Tetrachloroethene	TO-15 SIM	99	100	1.0%
Trichloroethene	TO-15 SIM	0.16	0.16	0.0%

Field duplicate RPD control limits are not to exceed 25% for air or vapor as established by USEPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures, EQADR-Supplement0, April 2013.

+/-RL – Indicates that the detections in both of the samples were within two times the reporting limit. Qualification of data was not required.

ATTACHMENT A

BATCH MATCH TABLE

BATCH MATCH TABLE

Field Sample ID	Lab Sample ID	TO-15	TO-15 SIM	MADEP APH	3C	3C Modified
MTN-AA-1	P1700971-001	MS16030917	MS19030717	MS16030917	--	--
MTN-VI-1	P1700971-002	MS16030917	MS19030717, MS19030817	MS16030917	--	--
MTN-SS-1	P1700971-003	MS16030917	--	MS16030917	TD1030617	TD8030617
MTN-BD-1	P1700971-004	MS16030917	MS19030717, MS19030817	MS16030917	--	--
MTN-POST	P1700971-005	MS16030917	MS19030817	MS16030917	--	--
MTN-PRE	P1700971-006	MS16030917	--	MS16030917	--	--

ATTACHMENT B

DATA QUALIFICATION SUMMARY

DATA QUALIFICATION SUMMARY

Abbreviation	Reason
HR-LCS	The LCS and/or LCSD percent recovery was greater than the upper acceptable limit indicating a possible high bias.

Analyte	Method	Field Sample ID	Lab Sample ID	Result	Limit	Units	Reviewer Qualifier	DV Flag Reasons
Tetrachloroethene	TO-15 SIM	MTN-AA-1	P1700971-001	0.85	0.033	µg/m^3	J+	HR-LCS
Tetrachloroethene	TO-15 SIM	MTN-VI-1	P1700971-002	99	0.42	µg/m^3	J+	HR-LCS
Tetrachloroethene	TO-15 SIM	MTN-BD-1	P1700971-004	100	0.43	µg/m^3	J+	HR-LCS
Tetrachloroethene	TO-15 SIM	MTN-POST	P1700971-005	2.6	0.04	µg/m^3	J+	HR-LCS
Trichloroethene	TO-15 SIM	MTN-AA-1	P1700971-001	0.033	0.033	µg/m^3	J+	HR-LCS
Trichloroethene	TO-15 SIM	MTN-VI-1	P1700971-002	0.16	0.042	µg/m^3	J+	HR-LCS
Trichloroethene	TO-15 SIM	MTN-BD-1	P1700971-004	0.16	0.043	µg/m^3	J+	HR-LCS

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LABORATORY REPORT

March 21, 2017

Andrew Vann
Trihydro Corporation
2707 Broadwater Ave
Helena, MT 59601

RE: Whitefish Solvent Site / 776-033-001

Dear Andrew:

Enclosed are the results of the samples submitted to our laboratory on February 28, 2017. For your reference, these analyses have been assigned our service request number P1700971.

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 3:15 pm, Mar 21, 2017

For Kelly Horiuchi
Laboratory Director

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www.alsglobal.com

Client: Trihydro Corporation
Project: Whitefish Solvent Site / 776-033-001

Service Request No: P1700971

CASE NARRATIVE

The samples were received intact under chain of custody on February 28, 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

Sample MTN-SS-1 (P1700971-003) was 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.

Methane Analysis

Sample MTN-SS-1 (P1700971-003) was also analyzed for methane according to modified EPA Method 3C (single injection) using a gas chromatograph equipped with a thermal conductivity detector (TCD). This procedure is described in laboratory SOP VOA-EPA3C. This method is included on the laboratory's DoD-ELAP scope of accreditation, however it is not part of the NELAP accreditation.

Air-Phase Petroleum Hydrocarbons (APH) Analysis

All the samples were analyzed for total aliphatic and aromatic gasoline range hydrocarbons by gas chromatography/mass spectrometry according to the Method for the Determination of Air-Phase Petroleum Hydrocarbons (APH), Massachusetts Department of Environmental Protection, Revision 1, December, 2009. This method is included on the laboratory's NELAP scope of accreditation, however it is not part of the DoD-ELAP accreditation.

Significant non-petroleum related peaks (i.e. halogenated, oxygenated, terpenes, etc.) are subtracted from the hydrocarbon range areas when present. Any internal/tuning standards and target APH analytes eluting in the hydrocarbon ranges are also subtracted. Additionally, C_9-C_{10} Aromatic Hydrocarbons are excluded from the C_9-C_{12} Aliphatic Hydrocarbon range.

Volatile Organic Compound Analysis

The samples were also analyzed for selected volatile organic compounds in SCAN and SIM mode 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 method was modified for sample MTN-SS-1 (P1700971-003) to include the use of nitrogen as a diluent gas in place of zero-grade air for container pressurization.

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Client: Trihydro Corporation
Project: Whitefish Solvent Site / 776-033-001

Service Request No: P1700971

CASE NARRATIVE

The surrogate spike recovery for bromofluorobenzene was exceeded in MTN-VI-1 (P1700971-002) in SIM mode due to matrix interference. The target analytes and surrogate recoveries for the associated QC were acceptable. The data has been flagged with the appropriate qualifier. No further corrective action was taken.

The spike recoveries in the Laboratory Control Samples (LCS) analyzed in SIM mode were outside the laboratory generated control criteria. The recovery errors equate to a potential high bias. However, these recoveries were within the method criteria, therefore, the data quality has not been significantly affected. No corrective action was taken.

The containers were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

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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	T104704413-16-7
Utah DOH (NELAP)	http://health.utah.gov/lab/environmental-lab-certification/	CA016272016-6
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

Service Request: P1700971

Project ID: Whitefish Solvent Site / 776-033-001

Date Received: 2/28/2017

Time Received: 09:37

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	MA APH 1.0 - MA VOC PH Can	TO-15 - VOC Cans	TO-15 - VOC SIM	3C Modified - Fxd Gases Can	3C Modified - Helium Can
MTN-AA-1	P1700971-001	Air	2/22/2017	10:00	SSC00144	-0.56	3.67	X	X	X		
MTN-VI-1	P1700971-002	Air	2/22/2017	10:06	SSC00326	-3.66	3.77	X	X	X		
MTN-SS-1	P1700971-003	Air	2/22/2017	11:18	SC01772	-3.07	4.08	X	X		X	X
MTN-BD-1	P1700971-004	Air	2/22/2017	00:00	AS00150	-3.83	3.84	X	X	X		
MTN-POST	P1700971-005	Air	2/22/2017	13:45	AC01989	-3.22	3.80	X	X	X		
MTN-PRE	P1700971-006	Air	2/22/2017	13:45	SC02200	-3.21	5.05	X	X			

Air - Chain of Custody Record & Analytical Service Request

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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 P1700971

Company Name & Address (Reporting Information): Trihydro, 1252 Commerce Dr, Laramie WY 82070

Project Name: Whitefish Solvent Site

Project Number: 776-033-001

Project Manager: Andrew Vann

P.O. # / Billing Information: Same as reporting

Phone: 307-745-7474

Fax:

Email Address for Result Reporting: avann@trihydro.com / cballek@trihydro.com

Sampler (Print & Sign): Sarah Seitz

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	TO-15 SIM, APH (low level DL)	TO-15, APH	TO-15, APH, Helium, CH4	Comments e.g. Actual Preservative or specific instructions
MTN-AA-1	1	2/22/17	10:00	SSC00144	FCA00975	-27.22	-0.11	6L	X			5 hr 15min sample
MTN-V1-1	2	2/22/17	10:06	SSC00326	FCA00549	-27.05	-5.34	6L	X			8 hr sample
MTN-SS-1	3	2/22/17	11:18	SC01772	OA001161	-26.99	-3.89	5,200 mL			X	26 min sample
MTN-BD-1	4	2/22/17	—	AS00150	CS00036	-27.03	-5.96	6L	X			8 hr sample
MTN-POST	5	2/22/17	13:45	AC01989	OA01234	-27.00	-4.79	6L	X			30 min sample
MTN-PRE	6	2/22/17	13:45	SC02200	OA01764	-26.97	-4.51	6L		X		30 min sample

Report Tier Levels - please select

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

EDD required YES / No
Type: ____ Units: ____

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
	2/23/17	12:45		2/28/17	0937
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank Temperature ____ °C

ALS Environmental
Sample Acceptance Check Form

Client: Trihydro Corporation Work order: P1700971
Project: Whitefish Solvent Site / 776-033-001
Sample(s) received on: 2/28/17 Date opened: 2/28/17 by: KKELPE

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 OUTER AND INNER BOXES 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
P1700971-001.01	6.0 L Silonite Can					
P1700971-002.01	6.0 L Silonite Can					
P1700971-003.01	6.0 L Source Can					
P1700971-004.01	6.0 L Silonite Can					
P1700971-005.01	6.0 L Ambient Can					
P1700971-006.01	6.0 L Source Can					

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client:	**Trihydro Corporation**		
Client Sample ID:	**MTN-AA-1**	ALS Project ID:	P1700971
Client Project ID:	**Whitefish Solvent Site / 776-033-001**	ALS Sample ID:	P1700971-001
Test Code:	Massachusetts APH, Revision 1, December 2009	Date Collected:	2/22/17
Instrument ID:	Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16	Date Received:	2/28/17
Analyst:	Lusine Hakobyan	Date Analyzed:	3/9/17
Sample Type:	6.0 L Silonite Canister	Volume(s) Analyzed:	1.00 Liter(s)
Test Notes:			
Container ID:	SSC00144		

Initial Pressure (psig): -0.56 Final Pressure (psig): 3.67

Canister Dilution Factor: 1.30

Compound	**Result µg/m³**	MRL µg/m³	**Data Qualifier**
C_5 - C_8 Aliphatic Hydrocarbons[1,2]	ND	26	
C_9 - C_{12} Aliphatic Hydrocarbons[1,3]	**110**	13	
C_9 - C_{10} Aromatic Hydrocarbons	ND	3.3	

Significant non-petroleum related peaks (i.e. halogenated, oxygenated, terpenes, etc.) are subtracted from the hydrocarbon range areas when present.

[1]Hydrocarbon Range data from total ion chromatogram excluding any internal/tuning standards eluting in that range.

[2]C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target APH analytes eluting in that range.

[3]C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target APH Analytes eluting in that range and concentration of C_9-C_{10} Aromatic Hydrocarbons.

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client:	**Trihydro Corporation**		
Client Sample ID:	**MTN-VI-1**	ALS Project ID:	P1700971
Client Project ID:	**Whitefish Solvent Site / 776-033-001**	ALS Sample ID:	P1700971-002
Test Code:	Massachusetts APH, Revision 1, December 2009	Date Collected:	2/22/17
Instrument ID:	Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16	Date Received:	2/28/17
Analyst:	Lusine Hakobyan	Date Analyzed:	3/9/17
Sample Type:	6.0 L Silonite Canister	Volume(s) Analyzed:	1.00 Liter(s)
Test Notes:			
Container ID:	SSC00326		

Initial Pressure (psig): -3.66 Final Pressure (psig): 3.77

Canister Dilution Factor: 1.67

Compound	**Result µg/m³**	MRL µg/m³	**Data Qualifier**
C_5 - C_8 Aliphatic Hydrocarbons[1,2]	**44**	33	
C_9 - C_{12} Aliphatic Hydrocarbons[1,3]	**60**	17	
C_9 - C_{10} Aromatic Hydrocarbons	**5.5**	4.2	

Significant non-petroleum related peaks (i.e. halogenated, oxygenated, terpenes, etc.) are subtracted from the hydrocarbon range areas when present.

[1]Hydrocarbon Range data from total ion chromatogram excluding any internal/tuning standards eluting in that range.

[2]C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target APH analytes eluting in that range.

[3]C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target APH Analytes eluting in that range and concentration of C_9-C_{10} Aromatic Hydrocarbons.

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client:	**Trihydro Corporation**		
Client Sample ID:	**MTN-SS-1**	ALS Project ID:	P1700971
Client Project ID:	**Whitefish Solvent Site / 776-033-001**	ALS Sample ID:	P1700971-003
Test Code:	Massachusetts APH, Revision 1, December 2009	Date Collected:	2/22/17
Instrument ID:	Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16	Date Received:	2/28/17
Analyst:	Lusine Hakobyan	Date Analyzed:	3/9/17
Sample Type:	6.0 L Summa Canister	Volume(s) Analyzed:	0.12 Liter(s)
Test Notes:			
Container ID:	SC01772		

Initial Pressure (psig): -3.07 Final Pressure (psig): 4.08

Canister Dilution Factor: 1.61

Compound	**Result µg/m³**	MRL µg/m³	**Data Qualifier**
C_5 - C_8 Aliphatic Hydrocarbons[1,2]	ND	270	
C_9 - C_{12} Aliphatic Hydrocarbons[1,3]	ND	130	
C_9 - C_{10} Aromatic Hydrocarbons	ND	34	

Significant non-petroleum related peaks (i.e. halogenated, oxygenated, terpenes, etc.) are subtracted from the hydrocarbon range areas when present.

[1]Hydrocarbon Range data from total ion chromatogram excluding any internal/tuning standards eluting in that range.

[2]C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target APH analytes eluting in that range.

[3]C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target APH Analytes eluting in that range and concentration of C_9-C_{10} Aromatic Hydrocarbons.

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client:	**Trihydro Corporation**		
Client Sample ID:	**MTN-BD-1**	ALS Project ID:	P1700971
Client Project ID:	**Whitefish Solvent Site / 776-033-001**	ALS Sample ID:	P1700971-004
Test Code:	Massachusetts APH, Revision 1, December 2009	Date Collected:	2/22/17
Instrument ID:	Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16	Date Received:	2/28/17
Analyst:	Lusine Hakobyan	Date Analyzed:	3/9/17
Sample Type:	6.0 L Silonite Canister	Volume(s) Analyzed:	1.00 Liter(s)
Test Notes:			
Container ID:	AS00150		

Initial Pressure (psig): -3.83 Final Pressure (psig): 3.84

Canister Dilution Factor: 1.71

Compound	**Result µg/m³**	MRL µg/m³	**Data Qualifier**
C_5 - C_8 Aliphatic Hydrocarbons[1,2]	**55**	34	
C_9 - C_{12} Aliphatic Hydrocarbons[1,3]	**66**	17	
C_9 - C_{10} Aromatic Hydrocarbons	**6.0**	4.3	

Significant non-petroleum related peaks (i.e. halogenated, oxygenated, terpenes, etc.) are subtracted from the hydrocarbon range areas when present.

[1]Hydrocarbon Range data from total ion chromatogram excluding any internal/tuning standards eluting in that range.

[2]C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target APH analytes eluting in that range.

[3]C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target APH Analytes eluting in that range and concentration of C_9-C_{10} Aromatic Hydrocarbons.

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client:	**Trihydro Corporation**		
Client Sample ID:	**MTN-POST**	ALS Project ID:	P1700971
Client Project ID:	**Whitefish Solvent Site / 776-033-001**	ALS Sample ID:	P1700971-005
Test Code:	Massachusetts APH, Revision 1, December 2009	Date Collected:	2/22/17
Instrument ID:	Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16	Date Received:	2/28/17
Analyst:	Lusine Hakobyan	Date Analyzed:	3/9/17
Sample Type:	6.0 L Summa Canister	Volume(s) Analyzed:	1.00 Liter(s)
Test Notes:			
Container ID:	AC01989		

Initial Pressure (psig): -3.22 Final Pressure (psig): 3.80

Canister Dilution Factor: 1.61

Compound	**Result µg/m³**	MRL µg/m³	**Data Qualifier**
C_5 - C_8 Aliphatic Hydrocarbons[1,2]	ND	32	
C_9 - C_{12} Aliphatic Hydrocarbons[1,3]	ND	16	
C_9 - C_{10} Aromatic Hydrocarbons	ND	4.0	

Significant non-petroleum related peaks (i.e. halogenated, oxygenated, terpenes, etc.) are subtracted from the hydrocarbon range areas when present.

[1]Hydrocarbon Range data from total ion chromatogram excluding any internal/tuning standards eluting in that range.

[2]C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target APH analytes eluting in that range.

[3]C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target APH Analytes eluting in that range and concentration of C_9-C_{10} Aromatic Hydrocarbons.

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client:	**Trihydro Corporation**		
Client Sample ID:	**MTN-PRE**	ALS Project ID:	P1700971
Client Project ID:	**Whitefish Solvent Site / 776-033-001**	ALS Sample ID:	P1700971-006
Test Code:	Massachusetts APH, Revision 1, December 2009	Date Collected:	2/22/17
Instrument ID:	Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16	Date Received:	2/28/17
Analyst:	Lusine Hakobyan	Date Analyzed:	3/9/17
Sample Type:	6.0 L Summa Canister	Volume(s) Analyzed:	0.035 Liter(s)
Test Notes:			
Container ID:	SC02200		

Initial Pressure (psig): -3.21 Final Pressure (psig): 5.05

Canister Dilution Factor: 1.72

Compound	**Result µg/m³**	MRL µg/m³	**Data Qualifier**
C_5 - C_8 Aliphatic Hydrocarbons[1,2]	ND	980	
C_9 - C_{12} Aliphatic Hydrocarbons[1,3]	ND	490	
C_9 - C_{10} Aromatic Hydrocarbons	ND	120	

Significant non-petroleum related peaks (i.e. halogenated, oxygenated, terpenes, etc.) are subtracted from the hydrocarbon range areas when present.

[1]Hydrocarbon Range data from total ion chromatogram excluding any internal/tuning standards eluting in that range.

[2]C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target APH analytes eluting in that range.

[3]C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target APH Analytes eluting in that range and concentration of C_9-C_{10} Aromatic Hydrocarbons.

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client:	**Trihydro Corporation**		
Client Sample ID:	**Method Blank**	ALS Project ID:	P1700971
Client Project ID:	**Whitefish Solvent Site / 776-033-001**	ALS Sample ID:	P170309-MB
Test Code:	Massachusetts APH, Revision 1, December 2009	Date Collected:	NA
Instrument ID:	Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16	Date Received:	NA
Analyst:	Lusine Hakobyan	Date Analyzed:	3/9/17
Sample Type:	6.0 L Silonite Canister	Volume(s) Analyzed:	1.00 Liter(s)
Test Notes:			

Compound	**Result µg/m³**	MRL µg/m³	**Data Qualifier**
C_5 - C_8 Aliphatic Hydrocarbons[1,2]	ND	20	
C_9 - C_{12} Aliphatic Hydrocarbons[1,3]	ND	10	
C_9 - C_{10} Aromatic Hydrocarbons	ND	2.5	

Significant non-petroleum related peaks (i.e. halogenated, oxygenated, terpenes, etc.) are subtracted from the hydrocarbon range areas when present.

[1]Hydrocarbon Range data from total ion chromatogram excluding any internal/tuning standards eluting in that range.

[2]C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target APH analytes eluting in that range.

[3]C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target APH Analytes eluting in that range and concentration of C_9-C_{10} Aromatic Hydrocarbons.

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Trihydro Corporation**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P170309-LCS

Test Code: Massachusetts APH, Revision 1, December 2009 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Lusine Hakobyan Date Analyzed: 3/9/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

Compound	Spike Amount µg/m³	**Result µg/m³**	**% Recovery**	ALS Acceptance Limits	**Data Qualifier**
C5 - C8 Aliphatic Hydrocarbons	213	**230**	**108**	70-130	
C9 - C12 Aliphatic Hydrocarbons	213	**241**	**113**	70-130	
C9 - C10 Aromatic Hydrocarbons	425	**382**	**90**	70-130	

ALS ENVIRONMENTAL

LABORATORY DUPLICATE SUMMARY RESULTS

Client: **Trihydro Corporation**
Client Sample ID: **MTN-PRE** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P1700971-006DUP

Test Code: Massachusetts APH, Revision 1, December 2009 Date Collected: 2/22/17
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 2/28/17
Analyst: Lusine Hakobyan Date Analyzed: 3/9/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.035 Liter(s)
Test Notes:
Container ID: SC02200

Initial Pressure (psig): -3.21 Final Pressure (psig): 5.05

Canister Dilution Factor: 1.72

Compound	Sample Result µg/m³	Duplicate Sample Result µg/m³	Average µg/m³	**% RPD**	RPD Limit	**Data Qualifier**
C_5 - C_8 Aliphatic Hydrocarbons[1,2]	ND	ND	-	-	30	
C_9 - C_{12} Aliphatic Hydrocarbons[1,3]	ND	ND	-	-	30	
C_9 - C_{10} Aromatic Hydrocarbons	ND	ND	-	-	30	

Significant non-petroleum related peaks (i.e. halogenated, oxygenated, terpenes, etc.) are subtracted from the hydrocarbon range areas when present.
[1]Hydrocarbon Range data from total ion chromatogram excluding any internal/tuning standards eluting in that range.
[2]C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target APH analytes eluting in that range.
[3]C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target APH Analytes eluting in that range and concentration of C_9-C_{10} Aromatic Hydrocarbons.
ND = Compound was analyzed for, but not detected.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Project ID: P1700971

Helium

Test Code: EPA 3C Modified
Instrument ID: HP5890 II/GC8/TCD Date(s) Collected: 2/22/17
Analyst: Mike Conejo Date Received: 2/28/17
Sample Type: 6.0 L Summa Canister(s) Date Analyzed: 3/6/17
Test Notes:

Client Sample ID	ALS Sample ID	Injection Volume ml(s)	Canister Dilution Factor	**Result ppmV**	MRL ppmV	Data Qualifier
MTN-SS-1	P1700971-003	1.00	1.26	**4,200**	32	
Method Blank	P170306-MB	1.00	1.00	ND	25	

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

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Trihydro Corporation**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P170306-LCS

Test Code: EPA 3C Modified Date Collected: NA
Instrument ID: HP5890 II/GC8/TCD Date Received: NA
Analyst: Mike Conejo Date Analyzed: 3/06/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	Compound	Spike Amount ppmV	Result ppmV	% Recovery	ALS Acceptance Limits	Data Qualifier
7440-59-7	Helium	10,000	**10,800**	**108**	75-124	

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Project ID: P1700971

Methane

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD Date(s) Collected: 2/22/17
Analyst: Mike Conejo Date Received: 2/28/17
Sample Type: 6.0 L Summa Canister(s) Date Analyzed: 3/6/17
Test Notes:

Client Sample ID	ALS Sample ID	Canister Dilution Factor	Injection Volume ml(s)	**Result %, v/v**	MRL %, v/v	Data Qualifier
MTN-SS-1	P1700971-003	1.61	0.10	ND	0.16	
Method Blank	P170306-MB	1.00	0.10	ND	0.10	

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

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Trihydro Corporation**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P170306-LCS

Test Code: EPA Method 3C Modified Date Collected: NA
Instrument ID: HP5890 II/GC1/TCD Date Received: NA
Analyst: Mike Conejo Date Analyzed: 3/06/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	**Compound**	Spike Amount ppmV	**Result ppmV**	**% Recovery**	ALS Acceptance Limits	Data Qualifier
74-82-8	Methane	25,000	**25,800**	**103**	94-111	

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **MTN-AA-1** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P1700971-001

Test Code: EPA TO-15 Date Collected: 2/22/17
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 2/28/17
Analyst: Lusine Hakobyan Date Analyzed: 3/9/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: SSC00144

Initial Pressure (psig): -0.56 Final Pressure (psig): 3.67

Canister Dilution Factor: 1.30

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.13	ND	0.036	
71-43-2	Benzene	**0.66**	0.13	**0.21**	0.041	
108-88-3	Toluene	**1.3**	0.65	**0.36**	0.17	
100-41-4	Ethylbenzene	ND	0.65	ND	0.15	
179601-23-1	m,p-Xylenes	ND	0.65	ND	0.15	
95-47-6	o-Xylene	ND	0.65	ND	0.15	
91-20-3	Naphthalene	ND	0.65	ND	0.12	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **MTN-VI-1** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P1700971-002

Test Code: EPA TO-15 Date Collected: 2/22/17
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 2/28/17
Analyst: Lusine Hakobyan Date Analyzed: 3/9/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: SSC00326

Initial Pressure (psig): -3.66 Final Pressure (psig): 3.77

Canister Dilution Factor: 1.67

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.17	ND	0.046	
71-43-2	Benzene	**1.3**	0.17	**0.39**	0.052	
108-88-3	Toluene	**2.9**	0.84	**0.77**	0.22	
100-41-4	Ethylbenzene	ND	0.84	ND	0.19	
179601-23-1	m,p-Xylenes	**2.4**	0.84	**0.56**	0.19	
95-47-6	o-Xylene	**0.90**	0.84	**0.21**	0.19	
91-20-3	Naphthalene	ND	0.84	ND	0.16	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **MTN-SS-1** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P1700971-003

Test Code: EPA TO-15 Modified Date Collected: 2/22/17
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 2/28/17
Analyst: Lusine Hakobyan Date Analyzed: 3/9/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.12 Liter(s)
Test Notes:
Container ID: SC01772

Initial Pressure (psig): -3.07 Final Pressure (psig): 4.08

Canister Dilution Factor: 1.61

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	1.3	ND	0.53	
156-60-5	trans-1,2-Dichloroethene	ND	1.3	ND	0.34	
1634-04-4	Methyl tert-Butyl Ether	ND	1.3	ND	0.37	
156-59-2	cis-1,2-Dichloroethene	ND	1.3	ND	0.34	
71-43-2	Benzene	**1.6**	1.3	**0.50**	0.42	
79-01-6	Trichloroethene	ND	1.3	ND	0.25	
108-88-3	Toluene	ND	6.7	ND	1.8	
127-18-4	Tetrachloroethene	**1,300**	1.3	**190**	0.20	
100-41-4	Ethylbenzene	ND	6.7	ND	1.5	
179601-23-1	m,p-Xylenes	ND	6.7	ND	1.5	
95-47-6	o-Xylene	ND	6.7	ND	1.5	
91-20-3	Naphthalene	ND	6.7	ND	1.3	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **MTN-BD-1** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P1700971-004

Test Code: EPA TO-15 Date Collected: 2/22/17
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 2/28/17
Analyst: Lusine Hakobyan Date Analyzed: 3/9/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS00150

Initial Pressure (psig): -3.83 Final Pressure (psig): 3.84

Canister Dilution Factor: 1.71

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.17	ND	0.047	
71-43-2	Benzene	**1.3**	0.17	**0.42**	0.054	
108-88-3	Toluene	**3.1**	0.86	**0.83**	0.23	
100-41-4	Ethylbenzene	ND	0.86	ND	0.20	
179601-23-1	m,p-Xylenes	**2.6**	0.86	**0.60**	0.20	
95-47-6	o-Xylene	**0.95**	0.86	**0.22**	0.20	
91-20-3	Naphthalene	ND	0.86	ND	0.16	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **MTN-POST** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P1700971-005

Test Code: EPA TO-15 Date Collected: 2/22/17
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 2/28/17
Analyst: Lusine Hakobyan Date Analyzed: 3/9/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC01989

Initial Pressure (psig): -3.22 Final Pressure (psig): 3.80

Canister Dilution Factor: 1.61

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
1634-04-4	Methyl tert-Butyl Ether	ND	0.16	ND	0.045	
71-43-2	Benzene	ND	0.16	ND	0.050	
108-88-3	Toluene	ND	0.81	ND	0.21	
100-41-4	Ethylbenzene	ND	0.81	ND	0.19	
179601-23-1	m,p-Xylenes	ND	0.81	ND	0.19	
95-47-6	o-Xylene	ND	0.81	ND	0.19	
91-20-3	Naphthalene	ND	0.81	ND	0.15	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **MTN-PRE** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P1700971-006

Test Code: EPA TO-15 Date Collected: 2/22/17
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 2/28/17
Analyst: Lusine Hakobyan Date Analyzed: 3/9/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.035 Liter(s)
Test Notes:
Container ID: SC02200

Initial Pressure (psig): -3.21 Final Pressure (psig): 5.05

Canister Dilution Factor: 1.72

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	4.9	ND	1.9	
156-60-5	trans-1,2-Dichloroethene	ND	4.9	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	4.9	ND	1.4	
156-59-2	cis-1,2-Dichloroethene	**57**	4.9	**14**	1.2	
71-43-2	Benzene	ND	4.9	ND	1.5	
79-01-6	Trichloroethene	**36**	4.9	**6.7**	0.91	
108-88-3	Toluene	ND	25	ND	6.5	
127-18-4	Tetrachloroethene	**4,700**	4.9	**700**	0.72	
100-41-4	Ethylbenzene	ND	25	ND	5.7	
179601-23-1	m,p-Xylenes	ND	25	ND	5.7	
95-47-6	o-Xylene	ND	25	ND	5.7	
91-20-3	Naphthalene	ND	25	ND	4.7	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **Method Blank** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P170309-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Lusine Hakobyan Date Analyzed: 3/9/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.10	ND	0.039	
156-60-5	trans-1,2-Dichloroethene	ND	0.10	ND	0.025	
1634-04-4	Methyl tert-Butyl Ether	ND	0.10	ND	0.028	
156-59-2	cis-1,2-Dichloroethene	ND	0.10	ND	0.025	
71-43-2	Benzene	ND	0.10	ND	0.031	
79-01-6	Trichloroethene	ND	0.10	ND	0.019	
108-88-3	Toluene	ND	0.50	ND	0.13	
127-18-4	Tetrachloroethene	ND	0.10	ND	0.015	
100-41-4	Ethylbenzene	ND	0.50	ND	0.12	
179601-23-1	m,p-Xylenes	ND	0.50	ND	0.12	
95-47-6	o-Xylene	ND	0.50	ND	0.12	
91-20-3	Naphthalene	ND	0.50	ND	0.095	

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

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Client: **Trihydro Corporation**
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Project ID: P1700971

Test Code: EPA TO-15 / EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date(s) Collected: 2/22/17
Analyst: Lusine Hakobyan Date(s) Received: 2/28/17
Sample Type: 6.0 L Silonite Canister(s) / 6.0 L Summa Canister(s) Date(s) Analyzed: 3/9/17
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	P170309-MB	**105**	**98**	**82**	70-130	
Lab Control Sample	P170309-LCS	**101**	**96**	**85**	70-130	
MTN-AA-1	P1700971-001	**104**	**96**	**85**	70-130	
MTN-VI-1	P1700971-002	**104**	**96**	**84**	70-130	
MTN-SS-1	P1700971-003	**105**	**97**	**84**	70-130	
MTN-BD-1	P1700971-004	**104**	**96**	**84**	70-130	
MTN-POST	P1700971-005	**104**	**96**	**84**	70-130	
MTN-PRE	P1700971-006	**105**	**97**	**85**	70-130	
MTN-PRE	P1700971-006DUP	**104**	**96**	**84**	70-130	

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

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Trihydro Corporation**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P170309-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Lusine Hakobyan Date Analyzed: 3/9/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
75-01-4	Vinyl Chloride	210	**245**	**117**	61-125	
156-60-5	trans-1,2-Dichloroethene	213	**238**	**112**	74-123	
1634-04-4	Methyl tert-Butyl Ether	213	**215**	**101**	69-113	
156-59-2	cis-1,2-Dichloroethene	212	**233**	**110**	72-117	
71-43-2	Benzene	212	**216**	**102**	65-107	
79-01-6	Trichloroethene	212	**199**	**94**	68-114	
108-88-3	Toluene	212	**197**	**93**	59-118	
127-18-4	Tetrachloroethene	213	**175**	**82**	65-130	
100-41-4	Ethylbenzene	212	**205**	**97**	68-122	
179601-23-1	m,p-Xylenes	424	**414**	**98**	68-123	
95-47-6	o-Xylene	212	**204**	**96**	68-122	
91-20-3	Naphthalene	214	**245**	**114**	62-136	

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: **MTN-PRE** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P1700971-006DUP

Test Code: EPA TO-15 Date Collected: 2/22/17
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 2/28/17
Analyst: Lusine Hakobyan Date Analyzed: 3/9/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.035 Liter(s)
Test Notes:
Container ID: SC02200

Initial Pressure (psig): -3.21 Final Pressure (psig): 5.05

Canister Dilution Factor: 1.72

Compound	Sample Result µg/m³	Sample Result ppbV	**Duplicate Sample Result µg/m³**	**Duplicate Sample Result** ppbV	Average µg/m³	**% RPD**	RPD Limit	**Data Qualifier**
Vinyl Chloride	ND	ND	ND	ND	-	-	25	
trans-1,2-Dichloroethene	ND	ND	ND	ND	-	-	25	
Methyl tert-Butyl Ether	ND	ND	ND	ND	-	-	25	
cis-1,2-Dichloroethene	56.6	14.3	56.8	14.3	56.7	**0.4**	25	
Benzene	ND	ND	ND	ND	-	-	25	
Trichloroethene	36.1	6.71	37.2	6.92	36.65	**3**	25	
Toluene	ND	ND	ND	ND	-	-	25	
Tetrachloroethene	4,720	696	4,790	707	4755	**1**	25	
Ethylbenzene	ND	ND	ND	ND	-	-	25	
m,p-Xylenes	ND	ND	ND	ND	-	-	25	
o-Xylene	ND	ND	ND	ND	-	-	25	
Naphthalene	ND	ND	ND	ND	-	-	25	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation** ALS Project ID: P1700971

Client Project ID: **Whitefish Solvent Site / 776-033-001**

Internal Standard Area and RT Summary

Test Code: EPA TO-15 / EPA TO-15 Modified

Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Lab File ID: 03091701.D

Analyst: Lusine Hakobyan Date Analyzed: 3/9/17

Sample Type: 6.0 L Silonite Canister(s) Time Analyzed: 02:20

Test Notes:

		IS1 (BCM)			IS2 (DFB)			IS3 (CBZ)		
		AREA	#	RT	#	AREA	#	RT	#	AREA	#	RT	#
	24 Hour Standard	394642		11.55		1981191		13.66		925551		17.93	
	Upper Limit	552499		11.88		2773667		13.99		1295771		18.26	
	Lower Limit	236785		11.22		1188715		13.33		555331		17.60	
	Client Sample ID												
01	Method Blank	355025		11.53		1829503		13.64		815907		17.93	
02	Lab Control Sample	383773		11.55		1920844		13.66		891332		17.93	
03	MTN-AA-1	378501		11.54		1931078		13.65		894613		17.93	
04	MTN-VI-1	392230		11.54		2008469		13.65		929151		17.93	
05	MTN-SS-1	372078		11.53		1915899		13.64		875118		17.93	
06	MTN-BD-1	378958		11.54		1943924		13.65		901232		17.93	
07	MTN-POST	375411		11.53		1927332		13.64		885425		17.93	
08	MTN-PRE	375988		11.53		1932334		13.64		886426		17.93	
09	MTN-PRE (Lab Duplicate)	369831		11.53		1884462		13.64		873352		17.93	
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													

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

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **MTN-AA-1** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P1700971-001

Test Code: EPA TO-15 SIM Date Collected: 2/22/17
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS19 Date Received: 2/28/17
Analyst: Cory Lewis Date Analyzed: 3/7/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: SSC00144

Initial Pressure (psig): -0.56 Final Pressure (psig): 3.67

Canister Dilution Factor: 1.30

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.033	ND	0.013	
156-60-5	trans-1,2-Dichloroethene	ND	0.033	ND	0.0082	
156-59-2	cis-1,2-Dichloroethene	ND	0.033	ND	0.0082	
79-01-6	Trichloroethene	**0.033**	0.033	**0.0061**	0.0060	
127-18-4	Tetrachloroethene	**0.85**	0.033	**0.13**	0.0048	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **MTN-VI-1** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P1700971-002

Test Code: EPA TO-15 SIM Date Collected: 2/22/17
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS19 Date Received: 2/28/17
Analyst: Cory Lewis Date Analyzed: 3/7 - 3/8/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes: 0.10 Liter(s)
Container ID: SSC00326

Initial Pressure (psig): -3.66 Final Pressure (psig): 3.77

Canister Dilution Factor: 1.67

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.042	ND	0.016	
156-60-5	trans-1,2-Dichloroethene	ND	0.042	ND	0.011	
156-59-2	cis-1,2-Dichloroethene	ND	0.042	ND	0.011	
79-01-6	Trichloroethene	**0.16**	0.042	**0.030**	0.0078	
127-18-4	Tetrachloroethene	**99**	0.42	**15**	0.062	**D**

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **MTN-BD-1** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P1700971-004

Test Code: EPA TO-15 SIM Date Collected: 2/22/17
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS19 Date Received: 2/28/17
Analyst: Cory Lewis Date Analyzed: 3/7 - 3/8/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes: 0.10 Liter(s)
Container ID: AS00150

Initial Pressure (psig): -3.83 Final Pressure (psig): 3.84

Canister Dilution Factor: 1.71

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.043	ND	0.017	
156-60-5	trans-1,2-Dichloroethene	ND	0.043	ND	0.011	
156-59-2	cis-1,2-Dichloroethene	ND	0.043	ND	0.011	
79-01-6	Trichloroethene	**0.16**	0.043	**0.030**	0.0080	
127-18-4	Tetrachloroethene	**100**	0.43	**15**	0.063	**D**

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **MTN-POST** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P1700971-005

Test Code: EPA TO-15 SIM Date Collected: 2/22/17
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS19 Date Received: 2/28/17
Analyst: Cory Lewis Date Analyzed: 3/8/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC01989

Initial Pressure (psig): -3.22 Final Pressure (psig): 3.80

Canister Dilution Factor: 1.61

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.040	ND	0.016	
156-60-5	trans-1,2-Dichloroethene	ND	0.040	ND	0.010	
156-59-2	cis-1,2-Dichloroethene	ND	0.040	ND	0.010	
79-01-6	Trichloroethene	ND	0.040	ND	0.0075	
127-18-4	Tetrachloroethene	**2.6**	0.040	**0.38**	0.0059	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **Method Blank** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P170307-MB

Test Code: EPA TO-15 SIM Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS19 Date Received: NA
Analyst: Cory Lewis Date Analyzed: 3/7/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.025	ND	0.0098	
156-60-5	trans-1,2-Dichloroethene	ND	0.025	ND	0.0063	
156-59-2	cis-1,2-Dichloroethene	ND	0.025	ND	0.0063	
79-01-6	Trichloroethene	ND	0.025	ND	0.0047	
127-18-4	Tetrachloroethene	ND	0.025	ND	0.0037	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **Method Blank** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P170308-MB

Test Code: EPA TO-15 SIM Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS19 Date Received: NA
Analyst: Cory Lewis Date Analyzed: 3/8/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.025	ND	0.0098	
156-60-5	trans-1,2-Dichloroethene	ND	0.025	ND	0.0063	
156-59-2	cis-1,2-Dichloroethene	ND	0.025	ND	0.0063	
79-01-6	Trichloroethene	ND	0.025	ND	0.0047	
127-18-4	Tetrachloroethene	ND	0.025	ND	0.0037	

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

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Client: **Trihydro Corporation**
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Project ID: P1700971

Test Code: EPA TO-15 SIM
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS19 Date(s) Collected: 2/22/17
Analyst: Cory Lewis Date(s) Received: 2/28/17
Sample Type: 6.0 L Summa Canister(s) Date(s) Analyzed: 3/7 - 3/8/17
Test Notes:

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4 % Recovered	Toluene-d8 % Recovered	Bromofluorobenzene % Recovered	Acceptance Limits	Data Qualifier
Method Blank	P170307-MB	**105**	**100**	**84**	70-130	
Method Blank	P170308-MB	**101**	**99**	**86**	70-130	
Lab Control Sample	P170307-LCS	**103**	**100**	**91**	70-130	
Lab Control Sample	P170308-LCS	**99**	**99**	**92**	70-130	
MTN-AA-1	P1700971-001	**101**	**102**	**92**	70-130	
MTN-VI-1	P1700971-002	**98**	**101**	**132**	70-130	**S**
MTN-BD-1	P1700971-004	**96**	**101**	**96**	70-130	
MTN-POST	P1700971-005	**103**	**100**	**89**	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.
S = Surrogate recovery not within specified limits.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Trihydro Corporation**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P170307-LCS

Test Code: EPA TO-15 SIM Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS19 Date Received: NA
Analyst: Cory Lewis Date Analyzed: 3/7/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
75-01-4	Vinyl Chloride	4.20	**5.02**	**120**	58-117	**L**
156-60-5	trans-1,2-Dichloroethene	4.27	**4.84**	**113**	72-107	**L**
156-59-2	cis-1,2-Dichloroethene	4.24	**4.81**	**113**	73-108	**L**
79-01-6	Trichloroethene	4.25	**4.62**	**109**	66-101	**L**
127-18-4	Tetrachloroethene	4.25	**4.50**	**106**	66-105	**L**

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.
L = Laboratory control sample recovery outside the specified limits; results may be biased high.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Trihydro Corporation**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1700971
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Sample ID: P170308-LCS

Test Code: EPA TO-15 SIM Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973N/HP6890A/MS19 Date Received: NA
Analyst: Cory Lewis Date Analyzed: 3/8/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
75-01-4	Vinyl Chloride	4.20	**5.26**	**125**	58-117	**L**
156-60-5	trans-1,2-Dichloroethene	4.27	**5.09**	**119**	72-107	**L**
156-59-2	cis-1,2-Dichloroethene	4.24	**5.08**	**120**	73-108	**L**
79-01-6	Trichloroethene	4.25	**5.04**	**119**	66-101	**L**
127-18-4	Tetrachloroethene	4.25	**4.88**	**115**	66-105	**L**

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.
L = Laboratory control sample recovery outside the specified limits; results may be biased high.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Project ID: P1700971

Internal Standard Area and RT Summary

Test Code: EPA TO-15 SIM
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/7890A/MS19 Lab File ID: 03071702.D
Analyst: Cory Lewis Date Analyzed: 3/7/17
Sample Type: 6.0 L Silonite Canister(s) Time Analyzed: 10:20
Test Notes:

		IS1 (BCM)			IS2 (DFB)			IS3 (CBZ)		
		AREA	#	RT	#	AREA	#	RT	#	AREA	#	RT	#
	24 Hour Standard	41816		9.75		207762		11.71		42091		16.05	
	Upper Limit	58542		10.08		290867		12.04		58927		16.38	
	Lower Limit	25090		9.42		124657		11.38		25255		15.72	
	Client Sample ID												
01	Method Blank	40001		9.79		193105		11.72		39786		16.06	
02	Lab Control Sample	38667		9.76		190496		11.71		39422		16.05	
03	MTN-AA-1	43836		9.76		216994		11.71		46497		16.05	
04	MTN-VI-1	48594		9.75		238501		11.71		49561		16.05	
05	MTN-BD-1	52244		9.75		255575		11.71		52212		16.05	
06													
07													
08													
09													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													

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

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Project ID: **Whitefish Solvent Site / 776-033-001** ALS Project ID: P1700971

Internal Standard Area and RT Summary

Test Code: EPA TO-15 SIM
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/7890A/MS19 Lab File ID: 03081702.D
Analyst: Cory Lewis Date Analyzed: 3/8/17
Sample Type: 6.0 L Summa Canister(s) Time Analyzed: 04:54
Test Notes:

		IS1 (BCM)			IS2 (DFB)			IS3 (CBZ)		
		AREA	#	RT	AREA	#	RT	AREA	#	RT
	24 Hour Standard	38524		9.75	190769		11.71	38163		16.05
	Upper Limit	53934		10.08	267077		12.04	53428		16.38
	Lower Limit	23114		9.42	114461		11.38	22898		15.72
	Client Sample ID									
01	Method Blank	35866		9.79	174009		11.72	35012		16.06
02	Lab Control Sample	36066		9.76	176331		11.71	35327		16.05
03	MTN-VI-1 (Dilution)	34734		9.77	168274		11.71	33582		16.05
04	MTN-BD-1 (Dilution)	34296		9.77	165446		11.71	33130		16.06
05	MTN-POST	34810		9.78	169604		11.72	34813		16.06
06										
07										
08										
09										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										

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

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

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

Quantitation Report (QT Reviewed)

Data Path : J:\GC08\DATA\H2_He\2017_03\06\
Data File : 03061742.D
Signal(s) : TCD1A.CH
Acq On : 06-Mar-2017, 14:40
Operator : MC
Sample : 0971-003 1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Mar 06 14:47:32 2017
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Helium	0.771	143412	3333.191	ppm
2)	Hydrogen	0.000	0	N.D.	ppm

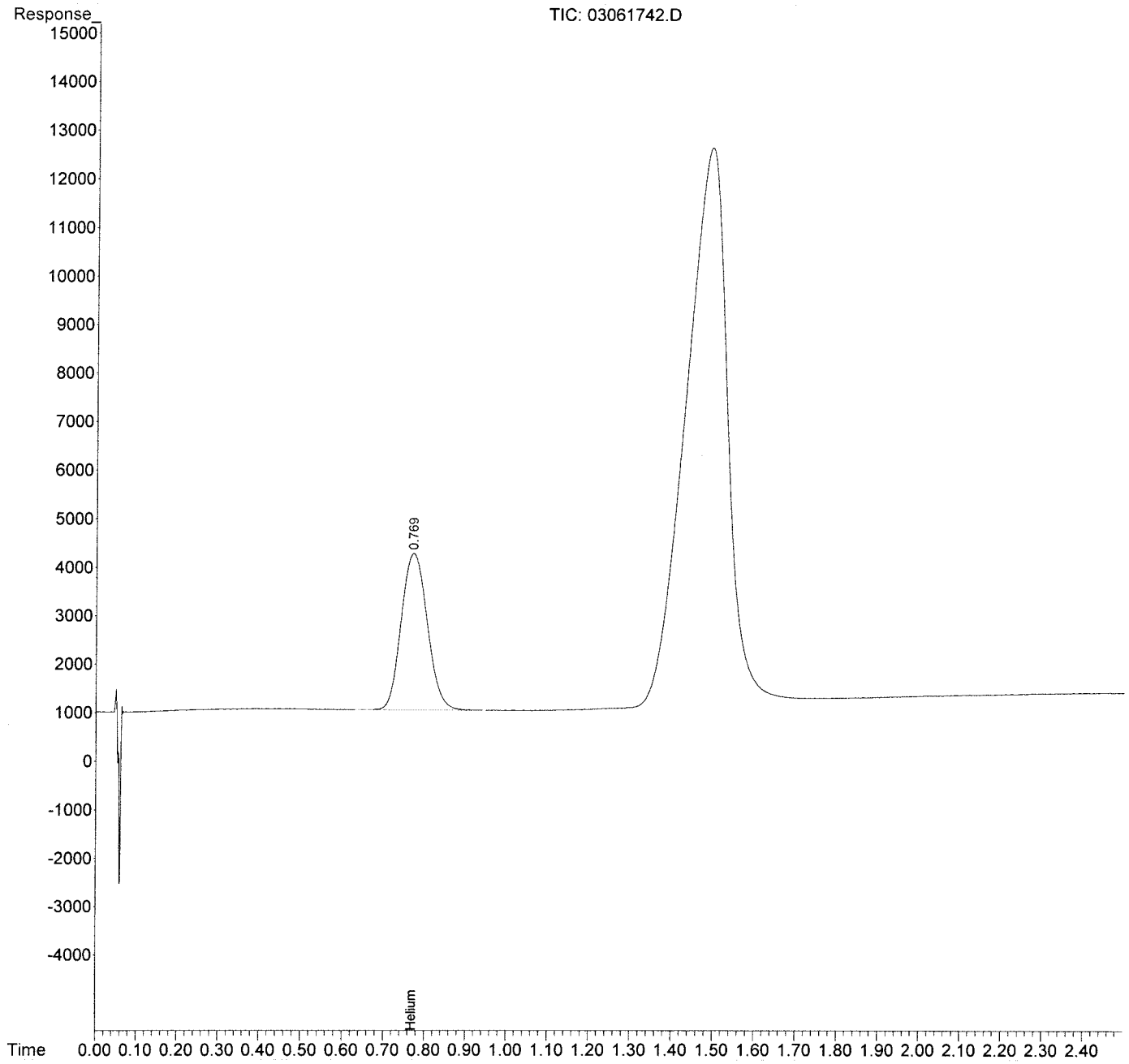
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : J:\GC08\DATA\H2_He\2017_03\06\
Data File : 03061742.D
Signal(s) : TCD1A.CH
Acq On : 06-Mar-2017, 14:40
Operator : MC
Sample : 0971-003 1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Mar 06 14:47:32 2017
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : J:\GC08\DATA\H2_He\2017_03\06\
Data File : 03061726.D
Signal(s) : TCD1A.CH
Acq On : 06-Mar-2017, 11:48
Operator : MC
Sample : mb 1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Mar 07 15:02:34 2017
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
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

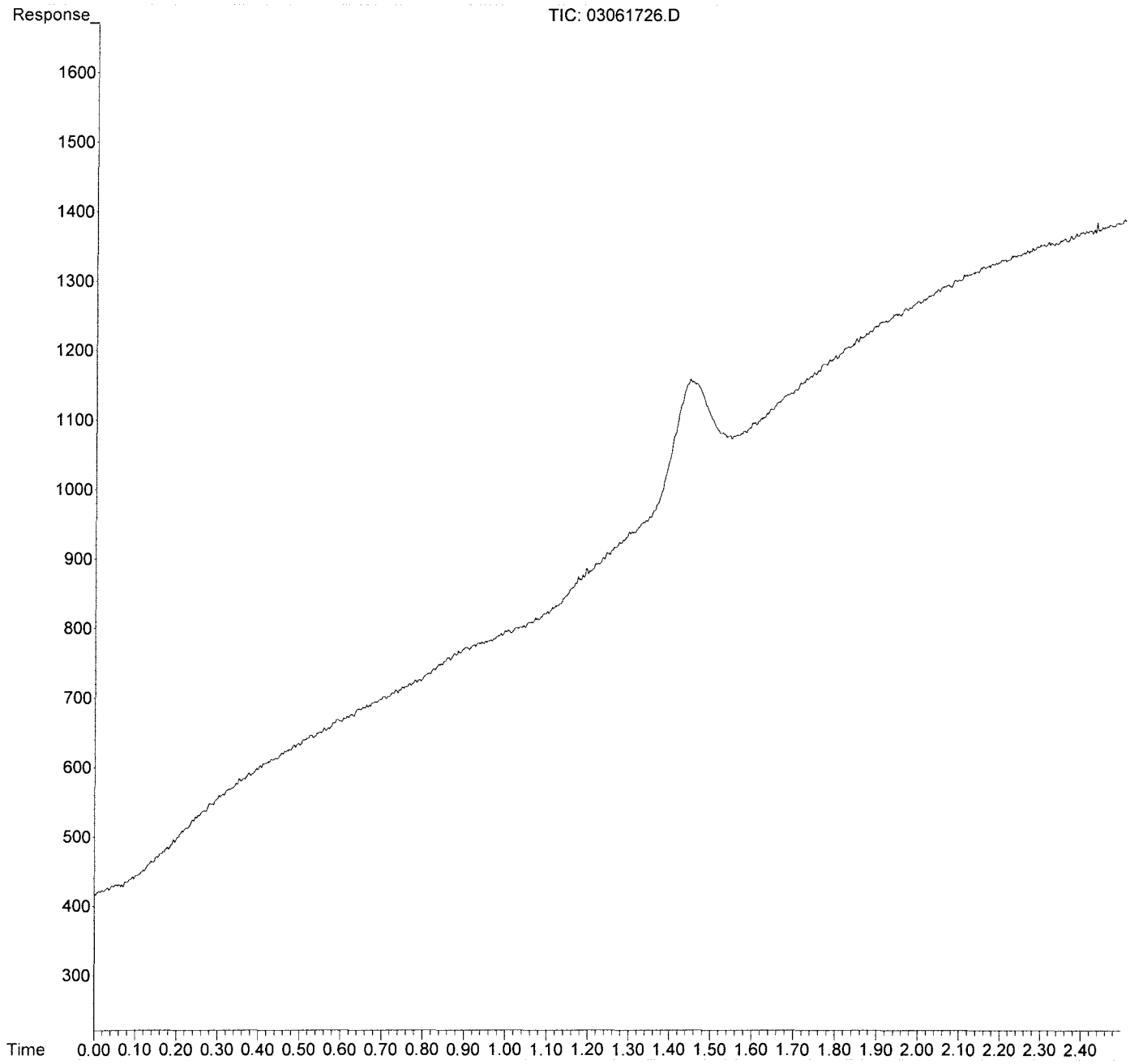
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : J:\GC08\DATA\H2_He\2017_03\06\
Data File : 03061726.D
Signal(s) : TCD1A.CH
Acq On : 06-Mar-2017, 11:48
Operator : MC
Sample : mb 1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Mar 07 15:02:34 2017
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : J:\GC08\DATA\H2_He\2017_03\06\
Data File : 03061743.D
Signal(s) : TCD1A.CH
Acq On : 06-Mar-2017, 14:49
Operator : MC
Sample : lcs s30-03061702
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Mar 06 15:04:27 2017
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Helium	0.785	46328	1076.761	ppm
2)	Hydrogen	0.000	0	N.D.	ppm

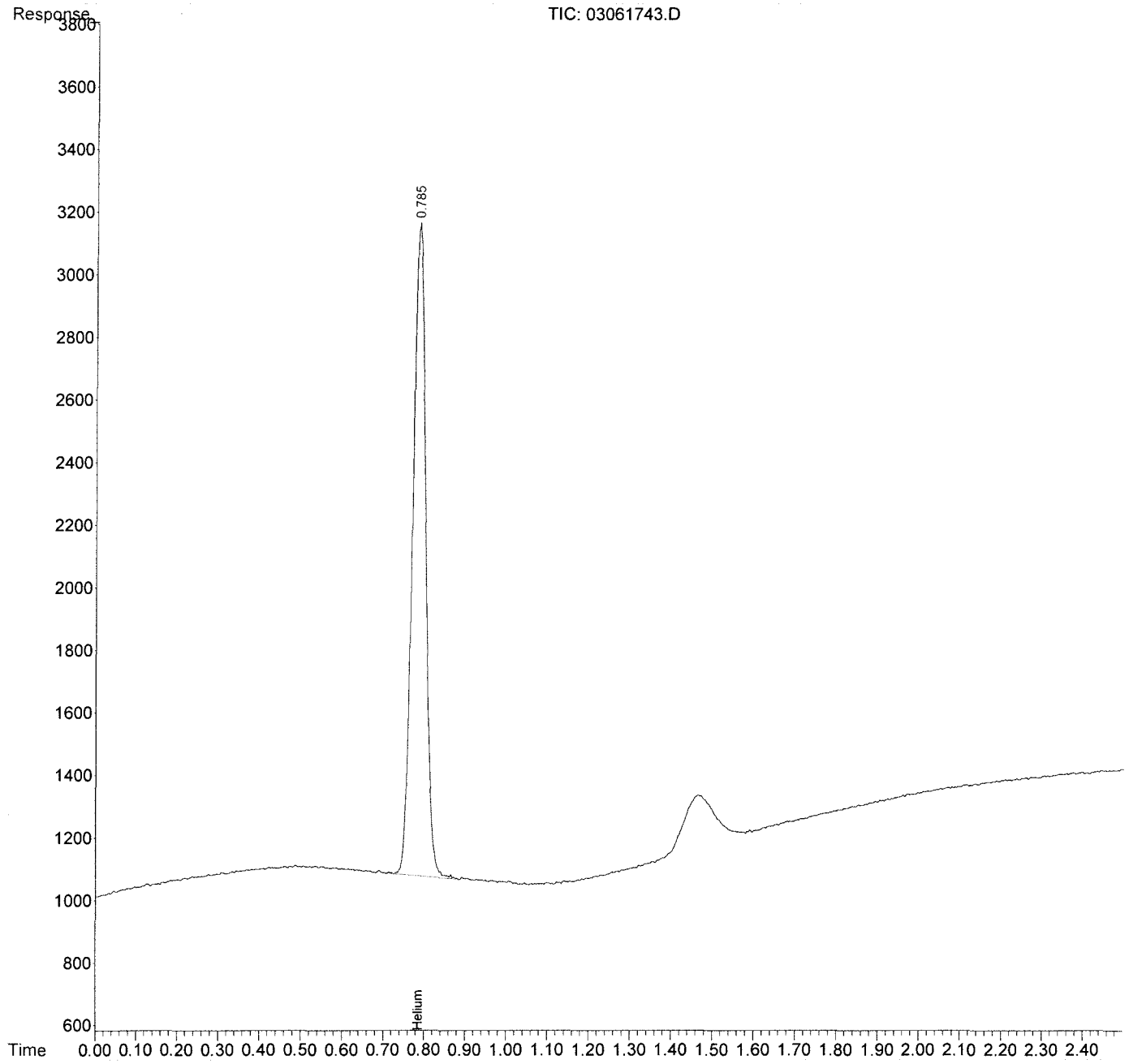
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : J:\GC08\DATA\H2_He\2017_03\06\
Data File : 03061743.D
Signal(s) : TCD1A.CH
Acq On : 06-Mar-2017, 14:49
Operator : MC
Sample : lcs s30-03061702
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Mar 06 15:04:27 2017
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Response Factor Report HP5890

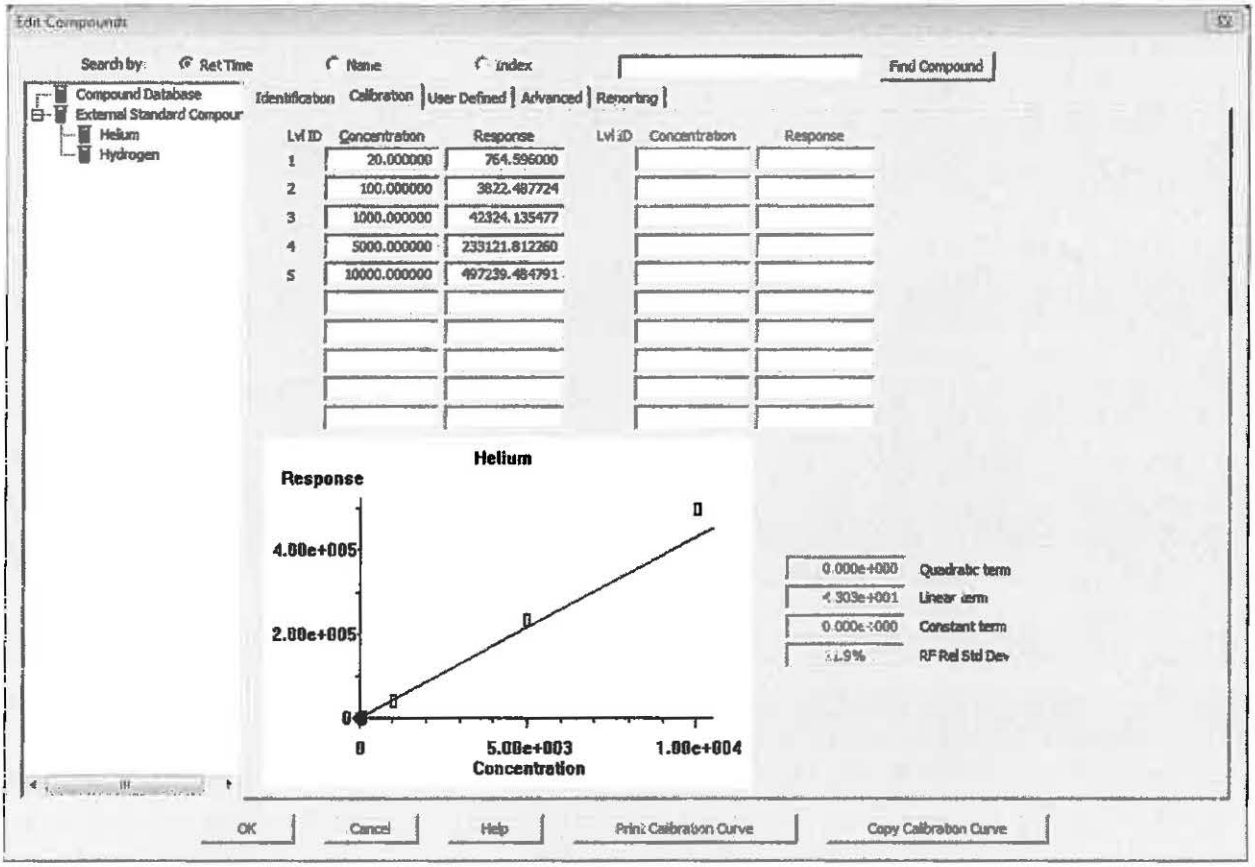
Method Path : I:\GC08\METHODS\
Method File : H2HE092316.M
Title : Hydrogen and Helium by EPA Method 3C
Last Update : Fri Sep 23 17:05:35 2016
Response Via : Initial Calibration

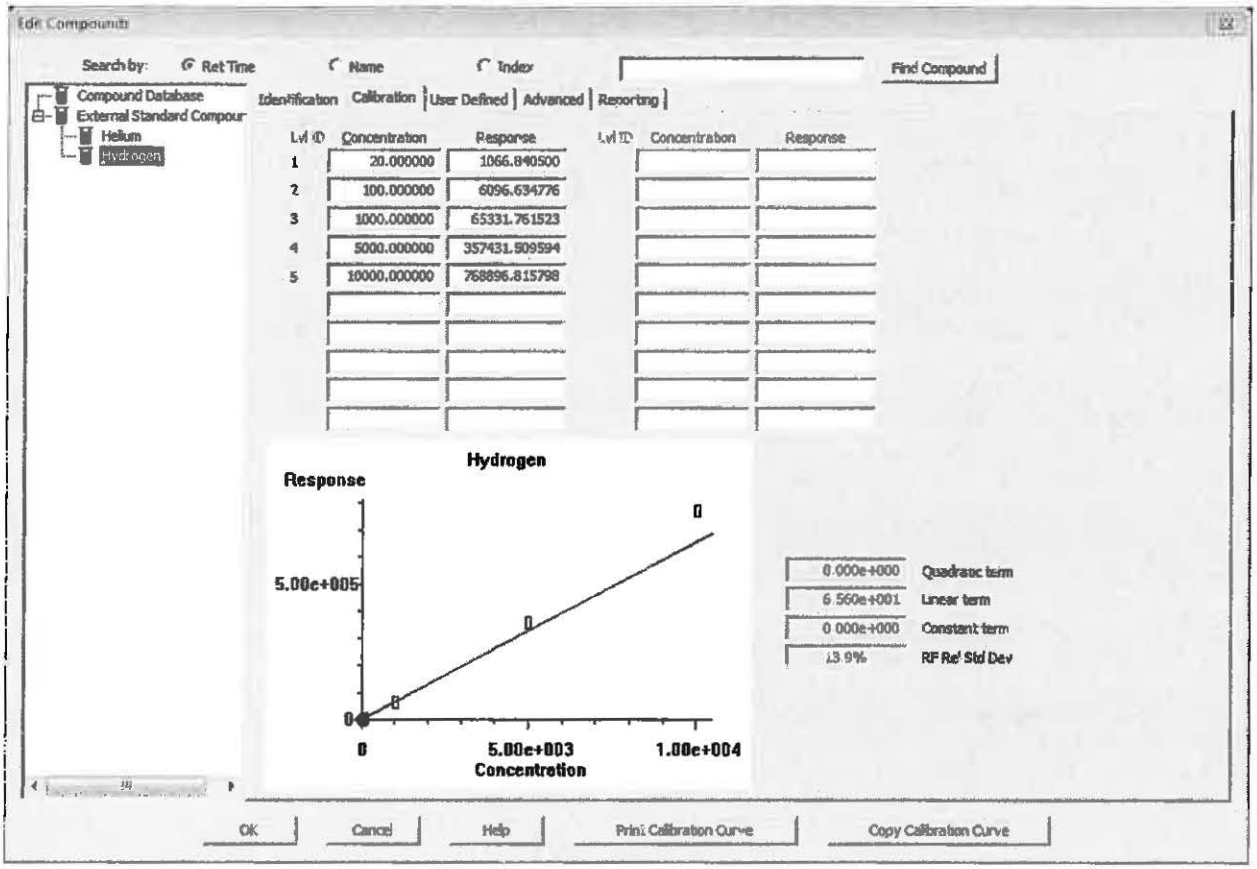
Calibration Files
1 =09231603.D 2 =09231604.D 3 =09231605.D
4 =09231606.D 5 =09231607.D

	Compound	1	2	3	4	5	Avg		%RSD
1)	Helium	3.823	3.822	4.232	4.662	4.972	4.303	E1	11.87
2)	Hydrogen	5.334	6.097	6.533	7.149	7.689	6.560	E1	13.93

(#) = Out of Range

H2HE092316.M Fri Sep 23 17:15:48 2016


Edit Compounds
Search by:
Ret Time
Name
Index
Find Compound
Compound Database
External Standard Compour
Helium
Hydrogen
Identification
Calibration
User Defined
Advanced
Reporting
Lvl ID
Concentration
Response
1 20.000000 764.596000
2 100.000000 3822.487724
3 1000.000000 42324.135477
4 5000.000000 233121.812260
5 10000.000000 497239.484791
Helium
Response
4.00e+005
2.00e+005
0
0
5.00e+003
1.00e+004
Concentration
0.000e+000 Quadratic term
4.303e+001 Linear term
0.000e+000 Constant term
RF Rel Std Dev
OK
Cancel
Help
Print Calibration Curve
Copy Calibration Curve


Edit Compounds
Search by:
Ret Time
Name
Index
Find Compound
Compound Database
External Standard Compour
Helium
Hydrogen
Identification
Calibration
User Defined
Advanced
Reporting
Lvl ID
Concentration
Response
1 20.000000 1066.840500
2 100.000000 6096.634776
3 1000.000000 65331.761523
4 5000.000000 357431.509594
5 10000.000000 768896.815798
Hydrogen
Response
5.00e+005
0
5.00e+003
1.00e+004
Concentration
0.000e+000 Quadratic term
6.560e+001 Linear term
0.000e+000 Constant term
13.9% RF Rel Std Dev
OK
Cancel
Help
Print Calibration Curve
Copy Calibration Curve

Calibration Status Report HP5890

Method Path : I:\GC08\METHODS\
Method File : H2HE092316.M
Title : Hydrogen and Helium by EPA Method 3C
Last Update : Fri Sep 23 17:05:35 2016
Response Via : Initial Calibration

#	ID	Conc	ISTD Conc	Path\File
1	1	20	0	I:\GC08\DATA\TO_3M\2016_09\23HE\09231603.D
2	2	100	0	I:\GC08\DATA\TO_3M\2016_09\23HE\09231604.D
3	3	1000	0	I:\GC08\DATA\TO_3M\2016_09\23HE\09231605.D
4	4	5000	0	I:\GC08\DATA\TO_3M\2016_09\23HE\09231606.D
5	5	10000	0	I:\GC08\DATA\TO_3M\2016_09\23HE\09231607.D

#	ID	Update Time	Quant Time	Acquisition Time
1	1	Sep 23 15:14 2016	Sep 23 15:13 2016	23-Sep-2016, 15:05:31
2	2	Sep 23 15:22 2016	Sep 23 15:22 2016	23-Sep-2016, 15:16:08
3	3	Sep 23 16:56 2016	Sep 23 16:55 2016	23-Sep-2016, 16:53:58
4	4	Sep 23 17:02 2016	Sep 23 17:02 2016	23-Sep-2016, 17:00:18
5	5	Sep 23 17:05 2016	Sep 23 17:05 2016	23-Sep-2016, 17:03:41

H2HE092316.M Fri Sep 30 13:59:08 2016

Quantitation Report (QT Reviewed)

Data Path : I:\GC08\DATA\H2_He\2016_09\23\
Data File : 09231603.D
Signal(s) : TCD1A.CH
Acq On : 23-Sep-2016, 15:05:31
Operator : amf
Sample : s30-09231601 20ppm
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 23 17:14:45 2016
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

	Compound	R.T.	Response	Conc Units
Target Compounds				
1)	Helium	0.789	951	22.104 ppm
2)	Hydrogen	0.937	1246	18.995 ppm

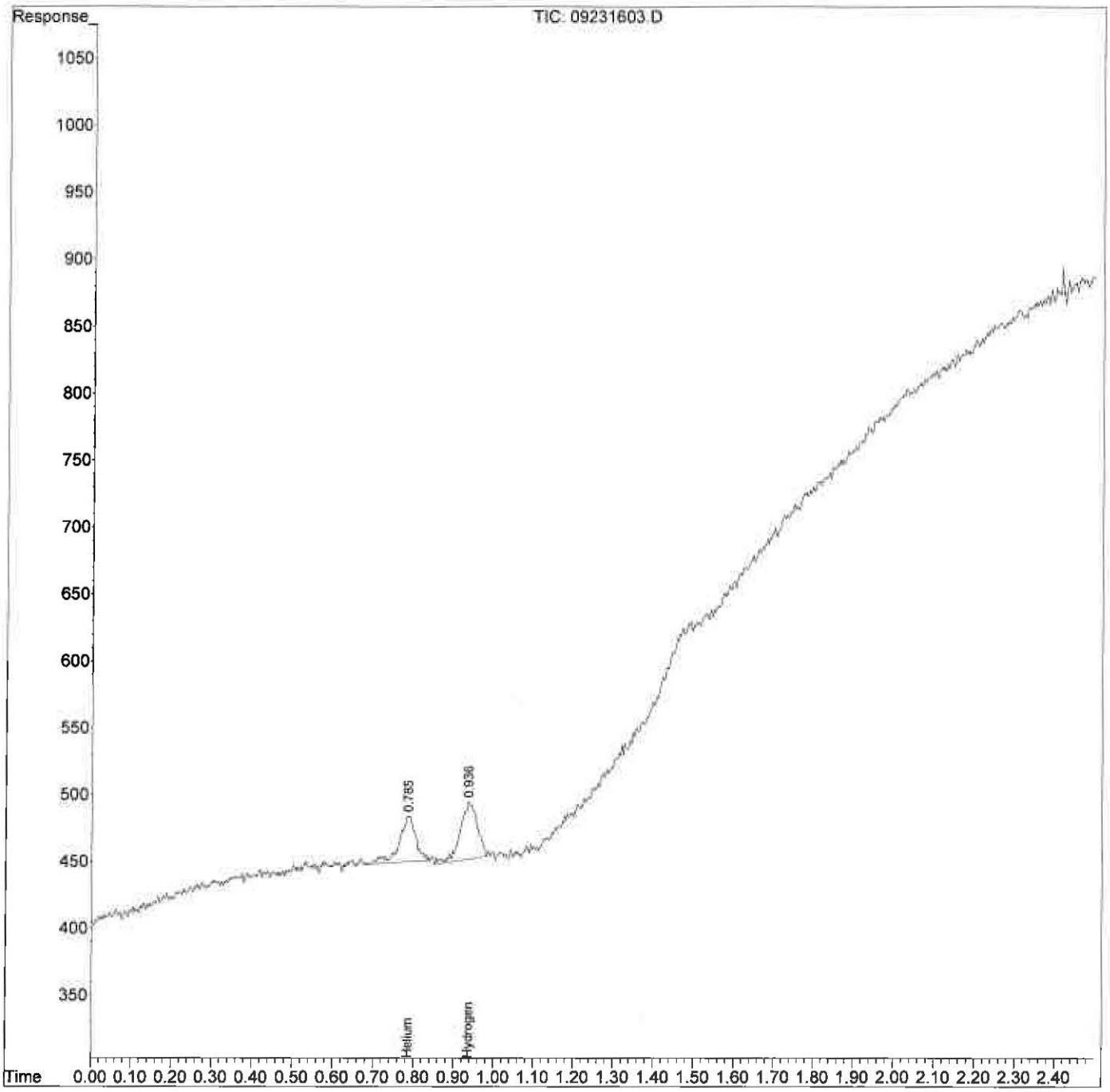
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : I:\GC08\DATA\H2_He\2016_09\23\
Data File : 09231603.D
Signal(s) : TCD1A.CH
Acq On : 23-Sep-2016, 15:05:31
Operator : amf
Sample : s30-09231601 20ppm
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 23 17:14:45 2016
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : I:\GC08\DATA\H2_He\2016_09\23\
Data File : 09231604.D
Signal(s) : TCD1A.CH
Acq On : 23-Sep-2016, 15:16:08
Operator : amf
Sample : s30-09231601 100ppm
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 23 17:14:54 2016
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Compound	R.T.	Response	Conc Units
Target Compounds			
1) Helium	0.773	3822	88.843 ppm
2) Hydrogen	0.928	6097	92.932 ppm

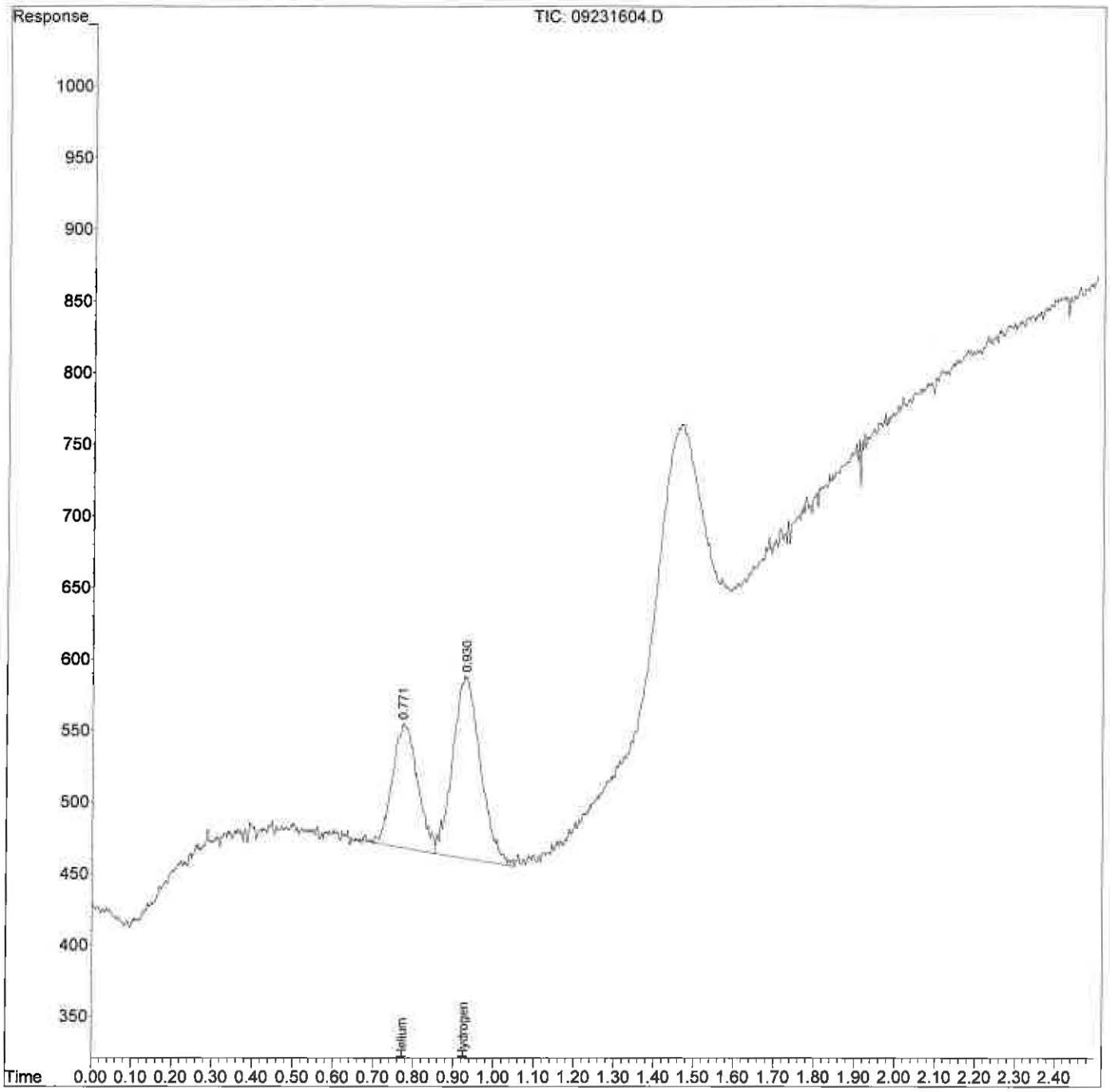
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : I:\GC08\DATA\H2_He\2016_09\23\
Data File : 09231604.D
Signal(s) : TCD1A.CH
Acq On : 23-Sep-2016, 15:16:08
Operator : amf
Sample : s30-09231601 100ppm
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 23 17:14:54 2016
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : I:\GC08\DATA\H2_He\2016_09\23\
Data File : 09231605.D
Signal(s) : TCD1A.CH
Acq On : 23-Sep-2016, 16:53:58
Operator : amf
Sample : s30-09231601 1000ppm
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 23 17:15:03 2016
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

	Compound	R.T.	Response	Conc Units
Target Compounds				
1)	Helium	0.787	42324	983.701 ppm
2)	Hydrogen	0.939	65332	995.862 ppm

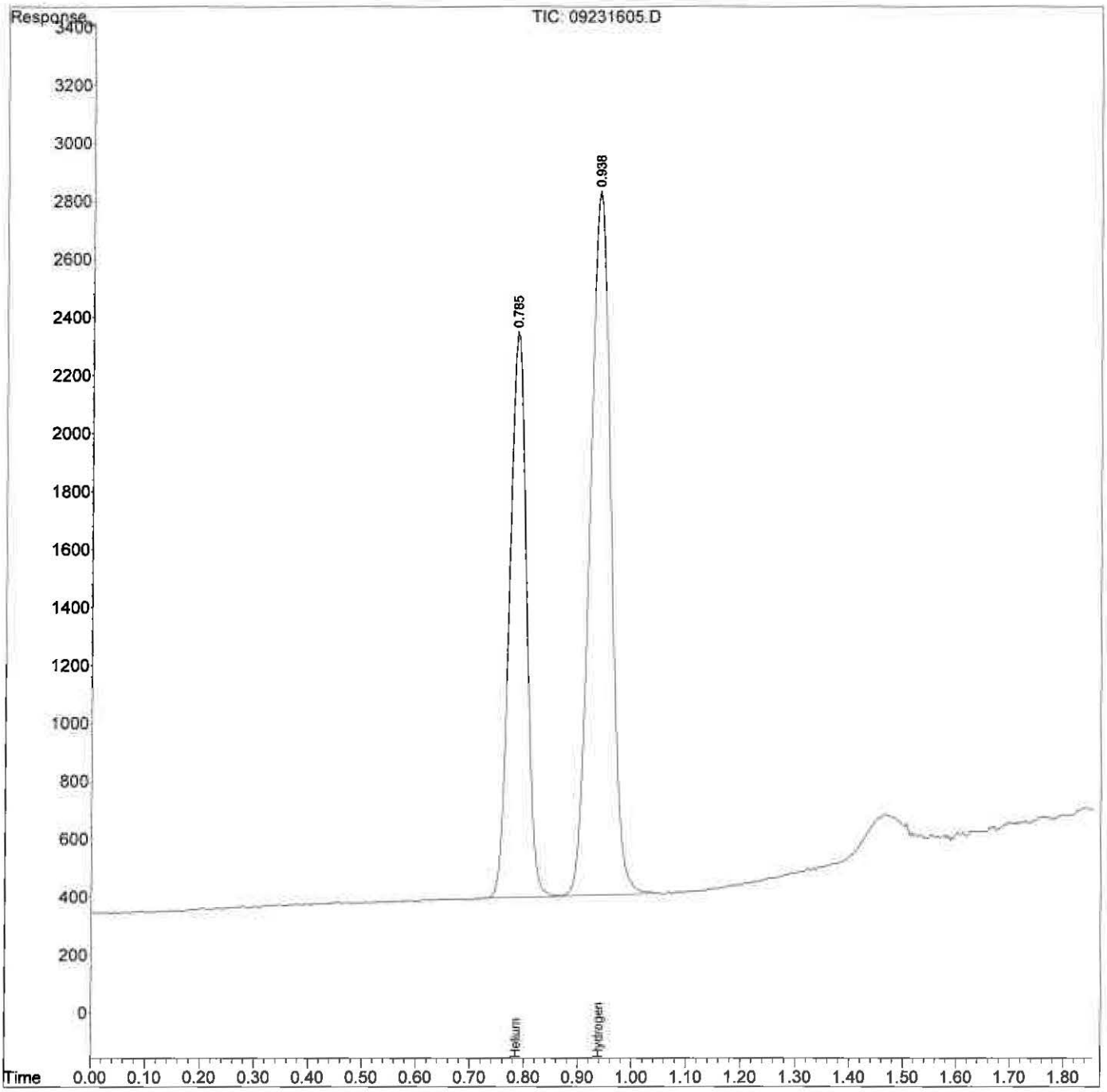
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : I:\GC08\DATA\H2_He\2016_09\23\
Data File : 09231605.D
Signal(s) : TCD1A.CH
Acq On : 23-Sep-2016, 16:53:58
Operator : amf
Sample : s30-09231601 1000ppm
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 23 17:15:03 2016
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : I:\GC08\DATA\H2_He\2016_09\23\
Data File : 09231606.D
Signal(s) : TCD1A.CH
Acq On : 23-Sep-2016, 17:00:18
Operator : amf
Sample : s30-09231601 5000ppm
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 23 17:15:12 2016
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Helium	0.786	233122	5418.234	ppm
2)	Hydrogen	0.937	357432	5448.383	ppm

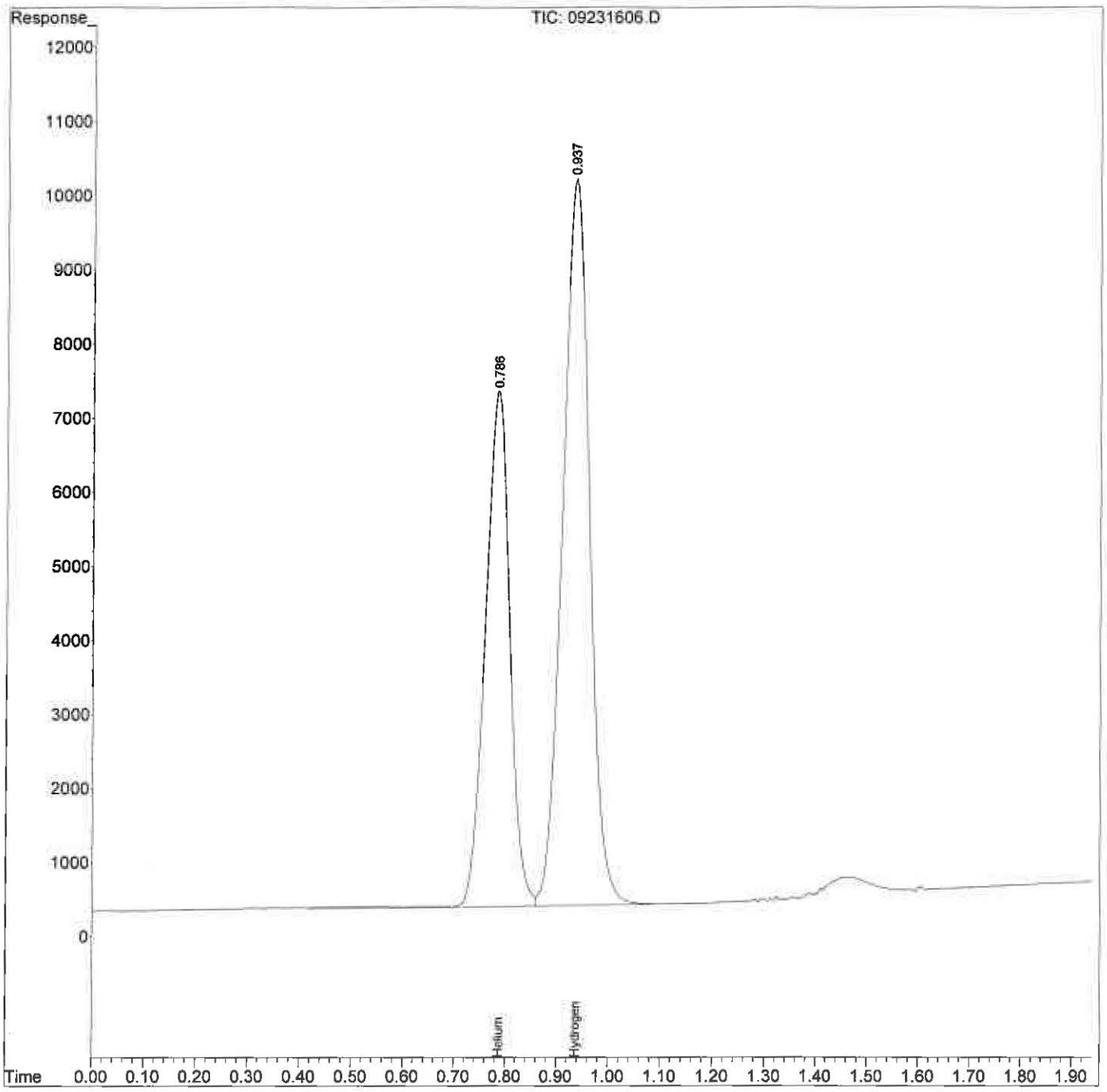
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : I:\GC08\DATA\H2_He\2016_09\23\
Data File : 09231606.D
Signal(s) : TCD1A.CH
Acq On : 23-Sep-2016, 17:00:18
Operator : amf
Sample : s30-09231601 5000ppm
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 23 17:15:12 2016
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : I:\GC08\DATA\H2_He\2016_09\23\
Data File : 09231607.D
Signal(s) : TCD1A.CH
Acq On : 23-Sep-2016, 17:03:41
Operator : amf
Sample : s30-09231601 10000ppm
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 27 11:16:57 2016
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

	Compound	R.T.	Response	Conc Units
Target Compounds				
1)	Helium	0.786	482958	11224.942 ppm
2)	Hydrogen	0.937	755585	11517.503 ppm

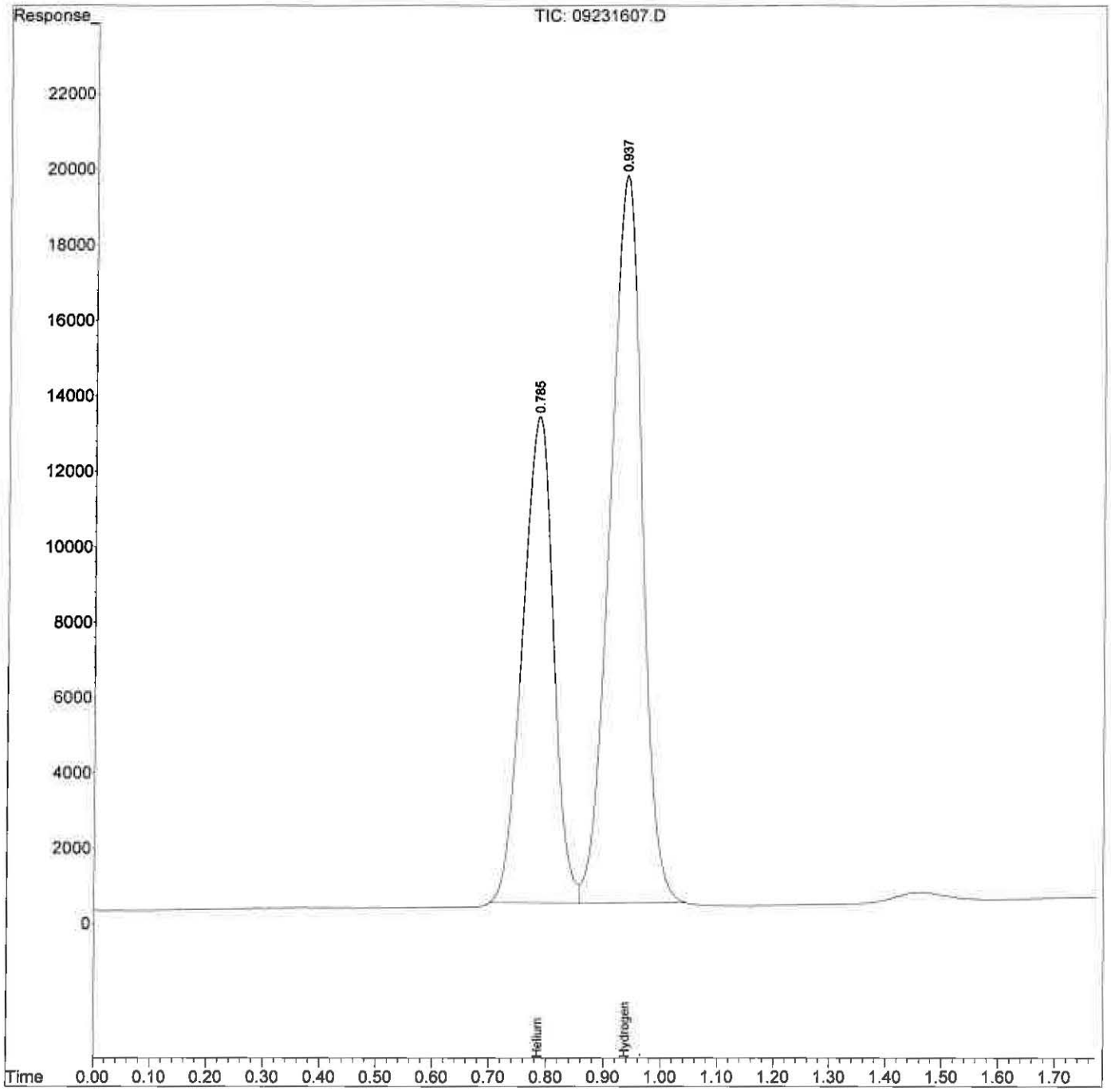
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : I:\GC08\DATA\H2_He\2016_09\23\
Data File : 09231607.D
Signal(s) : TCD1A.CH
Acq On : 23-Sep-2016, 17:03:41
Operator : amf
Sample : s30-09231601 10000ppm
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 27 11:16:57 2016
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : I:\GC08\DATA\H2_He\2016_09\23\
Data File : 09231609.D
Signal(s) : TCD1A.CH
Acq On : 23-Sep-2016, 17:12:27
Operator : amf
Sample : ICV s30-09231602
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 23 17:15:39 2016
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Helium	0.786	50814	1181.027	ppm
2)	Hydrogen	0.937	78129	1190.932	ppm

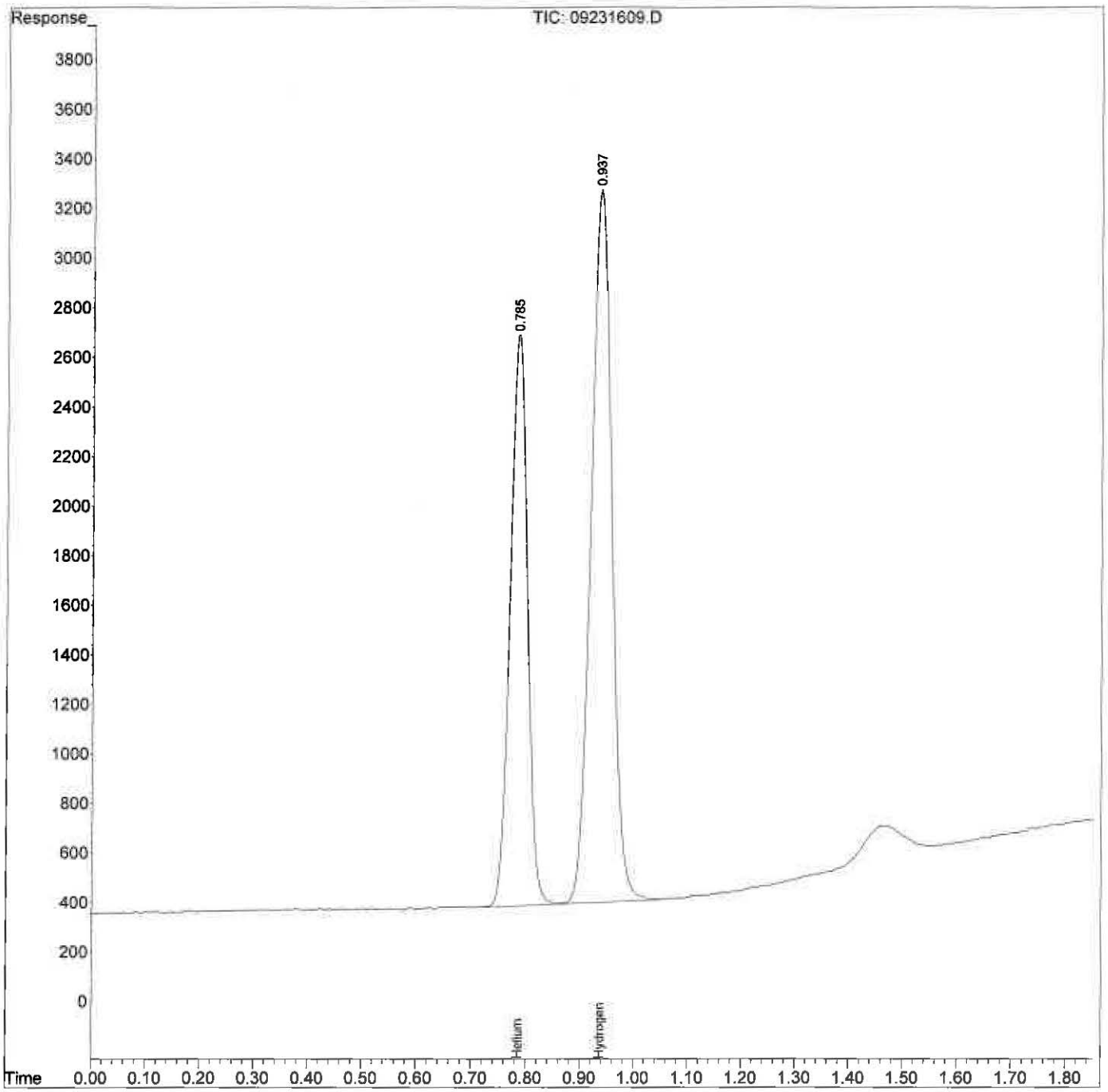
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : I:\GC08\DATA\H2_He\2016_09\23\
Data File : 09231609.D
Signal(s) : TCD1A.CH
Acq On : 23-Sep-2016, 17:12:27
Operator : amf
Sample : ICV s30-09231602
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 23 17:15:39 2016
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
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

Instrument : Instrument #8 / TCD #8
Date Acquired : 3/6/2017
Sample Amount : 1 mL

Opening CCV[1]

std s30-03061701		He
Sample result (ppm)	**inj vol.**	10190.14
ACTUAL	0.10	10000.00
%Difference		1.90%

Opening CCV[1]

std s30-03061701		He
Sample result (ppm)	**inj vol.**	11186.38
ACTUAL	0.10	10000.00
%Difference		11.86%

Laboratory Control Spike[2]

lcs s30-03061702	He
sample result ppm	10767.61
spike amount	10000
% recovery	107.68%

Closing CCV[1]

std s30-03061701		He
Sample result (ppm)	**inj vol.**	10139.67
ACTUAL	0.10	10000.00
%Difference		1.40%

Laboratory Control Spike[2]

lcsd s30-03061702	He
sample result ppm	10851.72
spike amount	10000
% recovery	108.52%
% RPD	0.78%

FINAL SAMPLE RESULT SUMMARIES

Sample ID	Inject. Vol(ml)	Dilution DF	Pi	Pf	PiPf DF	He Result (ppm)	FINAL HELIUM RESULT ppm	FINAL HELIUM RESULT mg/M3	File ID	Acq time
Reporting Limit							25.0	4.09		
mb 1ml	1.000	1.0			1.00	0.00	**ND**	**ND**		
0971-003 1ml	1.00	1.0	-3.07	0.00	1.26	3333.19	**4213.062**	**689.419**	03061742.D	14:40

M 3/7/17

1. 15% difference allowed for the opening and closing standards.
2. 75-124% helium recovery for the lab control spike.
3. 15% helium RPD allowed between duplicate samples.

Quantitation Report (QT Reviewed)

Data Path : J:\GC08\DATA\H2_He\2017_03\06\
Data File : 03061725.D
Signal(s) : TCD1A.CH
Acq On : 06-Mar-2017, 11:41
Operator : MC
Sample : std s30-03061701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Mar 06 11:47:25 2017
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Helium	0.782	43844	1019.014	ppm
2)	Hydrogen	0.000	0	N.D.	ppm

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

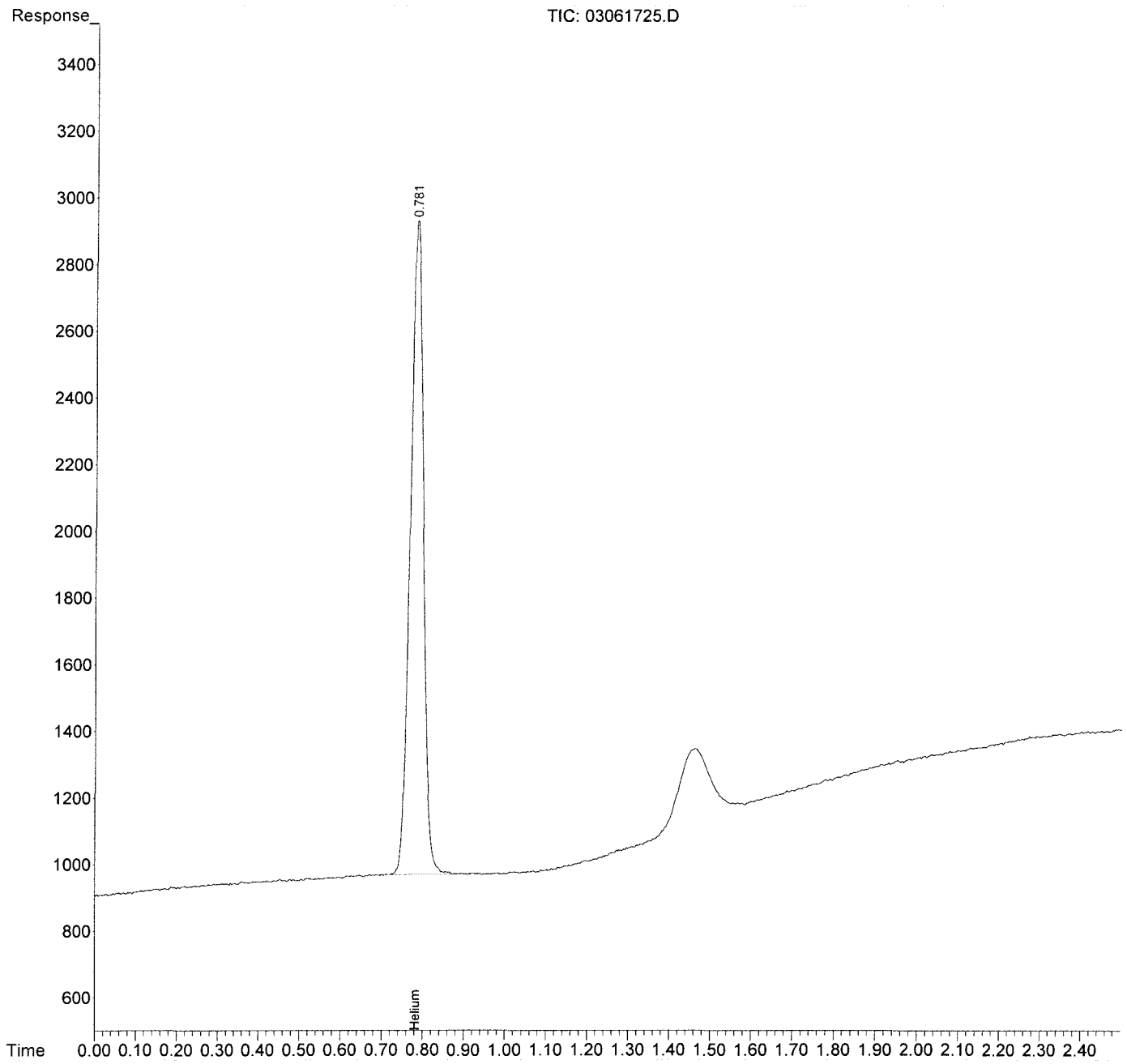
M 3/7/17

Quantitation Report (QT Reviewed)

Data Path : J:\GC08\DATA\H2_He\2017_03\06\
Data File : 03061725.D
Signal(s) : TCD1A.CH
Acq On : 06-Mar-2017, 11:41
Operator : MC
Sample : std s30-03061701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Mar 06 11:47:25 2017
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : J:\GC08\DATA\H2_He\2017_03\06\
Data File : 03061737.D
Signal(s) : TCD1A.CH
Acq On : 06-Mar-2017, 13:45
Operator : MC
Sample : std s30-03061701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Mar 06 13:58:57 2017
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Helium	0.781	43626	1013.967	ppm
2)	Hydrogen	0.000	0	N.D.	ppm

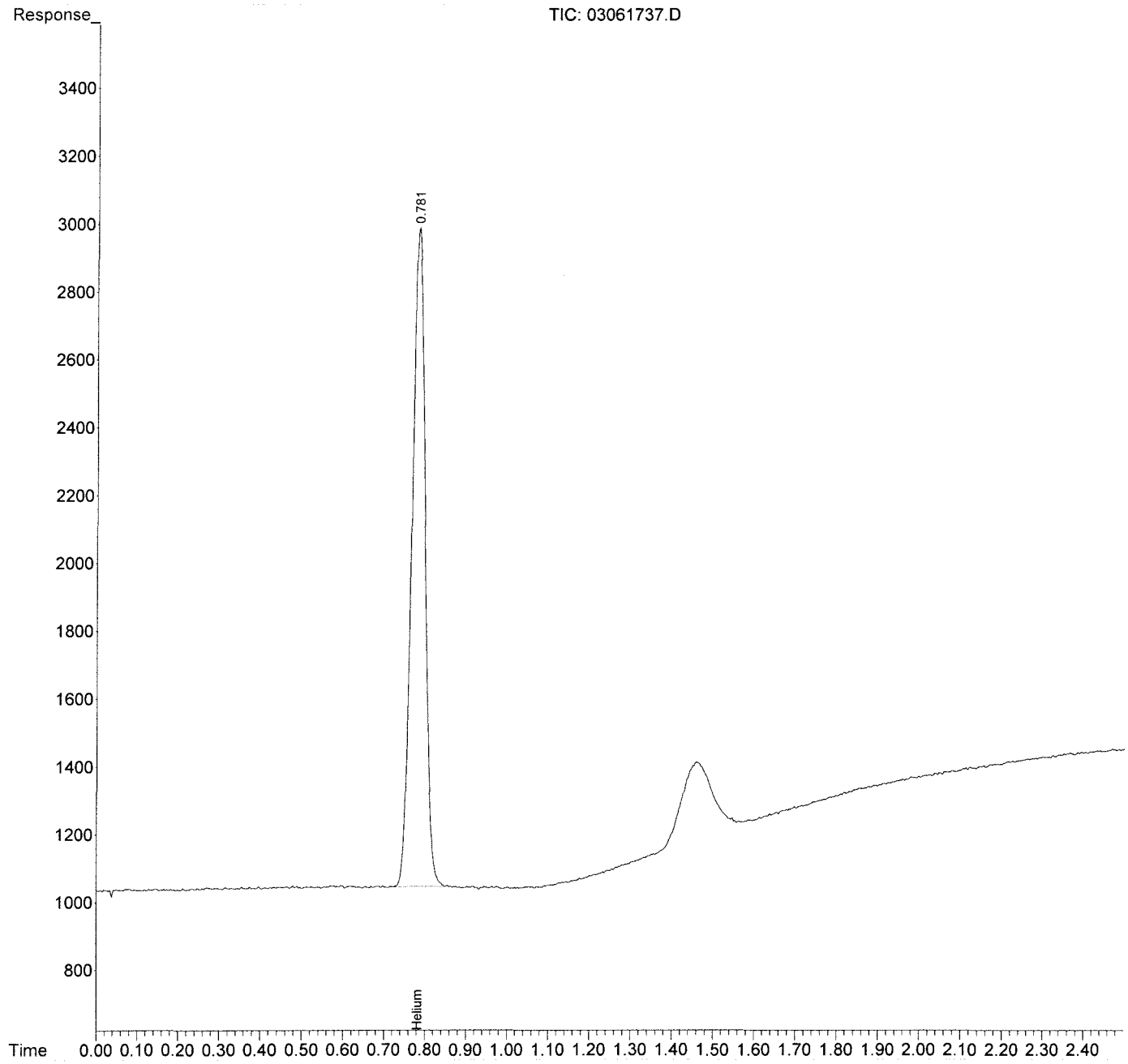
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : J:\GC08\DATA\H2_He\2017_03\06\
Data File : 03061737.D
Signal(s) : TCD1A.CH
Acq On : 06-Mar-2017, 13:45
Operator : MC
Sample : std s30-03061701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Mar 06 13:58:57 2017
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : J:\GC08\DATA\H2_He\2017_03\06\
Data File : 03061745.D
Signal(s) : TCD1A.CH
Acq On : 06-Mar-2017, 15:12
Operator : MC
Sample : std s30-03061701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Mar 06 15:18:29 2017
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Helium	0.790	48130	1118.638	ppm	m
2)	Hydrogen	0.000	0	N.D.	ppm	

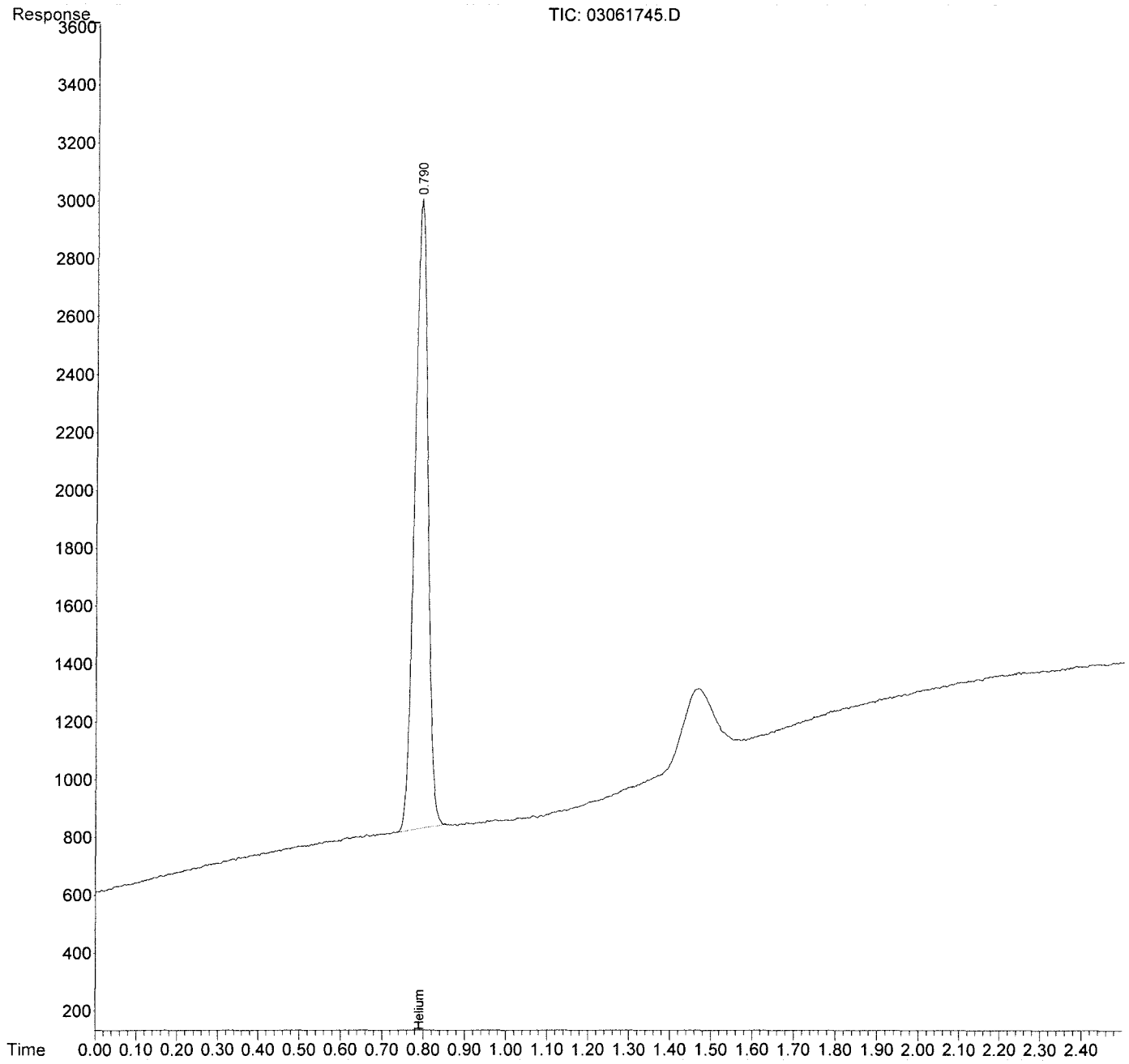
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : J:\GC08\DATA\H2_He\2017_03\06\
Data File : 03061745.D
Signal(s) : TCD1A.CH
Acq On : 06-Mar-2017, 15:12
Operator : MC
Sample : std s30-03061701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Mar 06 15:18:29 2017
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

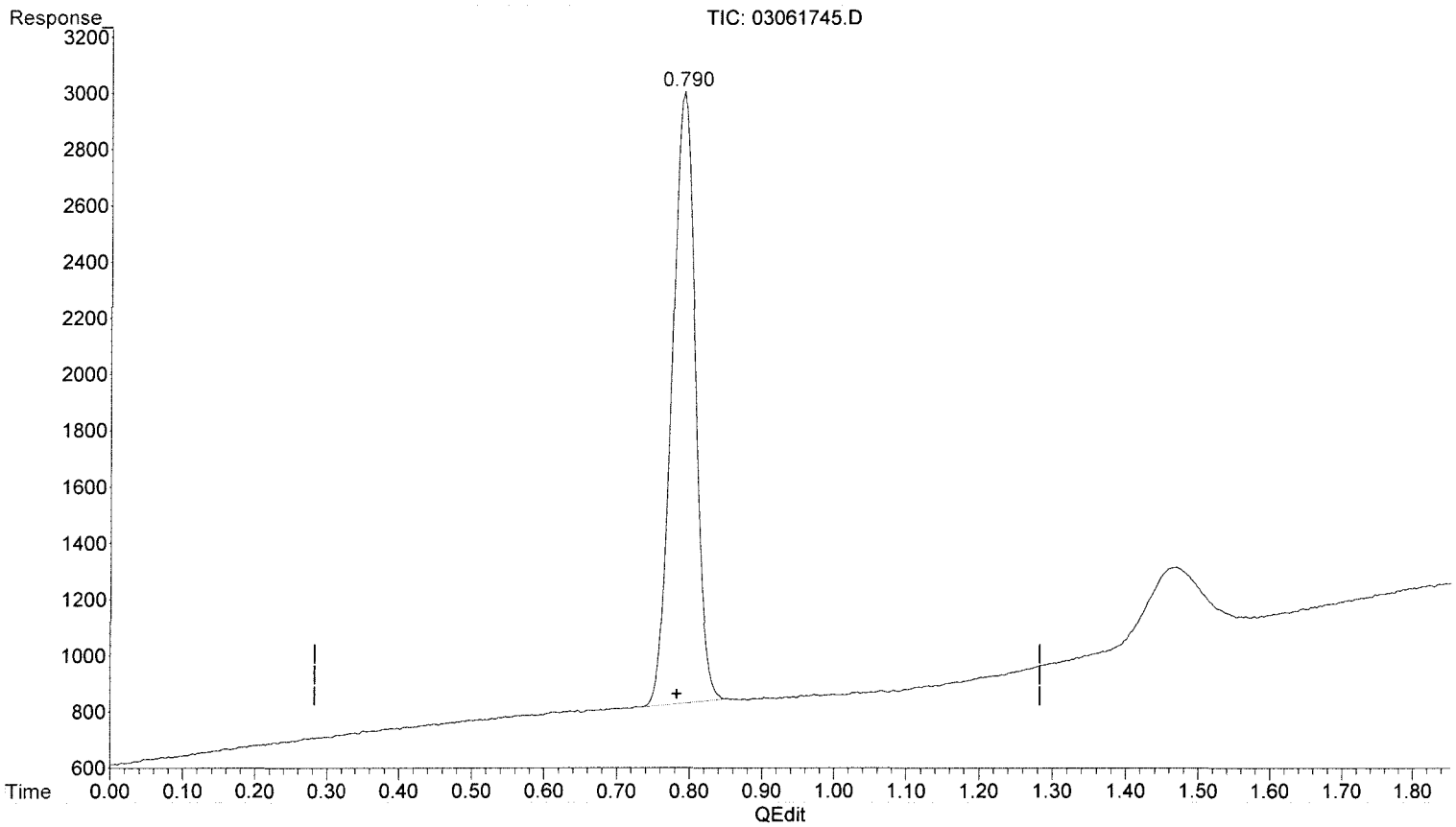


Quantitation Report (Qedit)

Data Path : J:\GC08\DATA\H2_He\2017_03\06\
Data File : 03061745.D
Signal(s) : TCD1A.CH
Acq On : 06-Mar-2017, 15:12
Operator : MC
Sample : std s30-03061701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Mar 06 15:18:29 2017
Quant Method : I:\GC08\METHODS\H2HE092316.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Fri Sep 23 17:05:35 2016
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



(1) Helium

0.790min 1118.638 ppm m

response 48130

3/9/17

3/9/17

BLC

no previous

(+) = Expected Retention Time

H2HE092316.M Tue Mar 07 15:04:17 2017

Page: 1

Injection Log

Directory: I:\GC08\DATA\H2_HE\2016_09\23\

	Sample ID	Date/Time	Acquisition Method	File Name	Misc Info	Operator
	ccv s30-09231601	23-Sep-16, 14:46:59	H2_HE.M	09231601.D		amf
	mb 1ml	23-Sep-16, 14:56:46	H2_HE.M	09231602.D		amf
	s30-09231601 20ppm	23-Sep-16, 15:05:31	H2_HE.M	09231603.D		amf
	s30-09231601 100ppm	23-Sep-16, 15:16:08	H2_HE.M	09231604.D		amf
	s30-09231601 1000ppm	23-Sep-16, 16:53:58	H2_HE.M	09231605.D		amf
	s30-09231601 5000ppm	23-Sep-16, 17:00:18	H2_HE.M	09231606.D		amf
	s30-09231601 10000ppm	23-Sep-16, 17:03:41	H2_HE.M	09231607.D		amf
	mb 1ml	23-Sep-16, 17:09:40	H2_HE.M	09231608.D		amf
	ICV s30-09231602	23-Sep-16, 17:12:27	H2_HE.M	09231609.D		amf

Injection Log

Directory: I:\GC08\DATA\H2_HE\2017_03\06\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Acquisition Method	Comments
1	06-Mar-17, 07:46:08	03061701.D	std s30-03061701		MC	H2_HE.M	Pass
2	06-Mar-17, 07:56:59	03061702.D	mb 1ml		MC	H2_HE.M	Pass
3	06-Mar-17, 08:07:19	03061703.D	1029-001 1ml		MC	H2_HE.M	
4	06-Mar-17, 08:13:50	03061704.D	1029-002 1ml		MC	H2_HE.M	
5	06-Mar-17, 08:19:49	03061705.D	1029-003 1ml		MC	H2_HE.M	
6	06-Mar-17, 08:28:30	03061706.D	1029-004 1ml		MC	H2_HE.M	
7	06-Mar-17, 08:39:03	03061707.D	1029-005 1ml		MC	H2_HE.M	
8	06-Mar-17, 08:47:28	03061708.D	1029-006 1ml		MC	H2_HE.M	
9	06-Mar-17, 08:56:02	03061709.D	x1029-007 1ml		MC	H2_HE.M	
10	06-Mar-17, 09:03:45	03061710.D	1029-008 1ml		MC	H2_HE.M	
11	06-Mar-17, 09:10:31	03061711.D	0947-008 1ml		MC	H2_HE.M	
12	06-Mar-17, 09:21:37	03061712.D	0947-009 1ml		MC	H2_HE.M	
13	06-Mar-17, 09:32:15	03061713.D	std s30-03061701		MC	H2_HE.M	Pass
14	06-Mar-17, 09:41:19	03061714.D	1029-007 0.5ml		MC	H2_HE.M	
15	06-Mar-17, 09:49:44	03061715.D	0947-010 1ml		MC	H2_HE.M	
16	06-Mar-17, 09:58:16	03061716.D	0947-011 1ml		MC	H2_HE.M	
17	06-Mar-17, 10:30:37	03061717.D	0947-012 1ml		MC	H2_HE.M	
18	06-Mar-17, 10:38:21	03061718.D	0947-013 1ml		MC	H2_HE.M	
19	06-Mar-17, 10:45:35	03061719.D	0947-014 1ml		MC	H2_HE.M	
20	06-Mar-17, 10:53:16	03061720.D	0947-015 1ml		MC	H2_HE.M	
21	06-Mar-17, 11:12:48	03061721.D	0947-016 1ml		MC	H2_HE.M	
22	06-Mar-17, 11:18:46	03061722.D	0947-017 1ml		MC	H2_HE.M	
23	06-Mar-17, 11:26:26	03061723.D	lcs s30-03061702		MC	H2_HE.M	Pass
24	06-Mar-17, 11:33:17	03061724.D	lcsd s30-03061702		MC	H2_HE.M	Pass
25	06-Mar-17, 11:41:44	03061725.D	std s30-03061701		MC	H2_HE.M	Pass
26	06-Mar-17, 11:48:13	03061726.D	mb 1ml		MC	H2_HE.M	Pass
27	06-Mar-17, 11:58:05	03061727.D	1046-001 1ml		MC	H2_HE.M	
28	06-Mar-17, 12:06:38	03061728.D	1046-002 1ml		MC	H2_HE.M	
29	06-Mar-17, 12:14:38	03061729.D	1047-001 1ml		MC	H2_HE.M	
30	06-Mar-17, 12:21:25	03061730.D	1014-001 1ml		MC	H2_HE.M	
31	06-Mar-17, 12:27:45	03061731.D	1014-002 1ml		MC	H2_HE.M	
32	06-Mar-17, 12:35:08	03061732.D	1014-003 1ml		MC	H2_HE.M	
33	06-Mar-17, 12:41:39	03061733.D	1015-001 1ml		MC	H2_HE.M	
34	06-Mar-17, 12:48:25	03061734.D	1015-002 1ml		MC	H2_HE.M	
35	06-Mar-17, 12:58:08	03061735.D	1015-003 1ml		MC	H2_HE.M	
36	06-Mar-17, 13:05:40	03061736.D	1042-001 1ml		MC	H2_HE.M	
37	06-Mar-17, 13:45:20	03061737.D	std s30-03061701		MC	H2_HE.M	Pass
38	06-Mar-17, 14:00:37	03061738.D	1042-002 1ml		MC	H2_HE.M	

Injection Log

Directory: I:\GC08\DATA\H2_HE\2017_03\06\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Acquisition Method	Comments
39	06-Mar-17, 14:07:49	03061739.D	1042-003 1ml		MC	H2_HE.M	
40	06-Mar-17, 14:13:48	03061740.D	1042-004 1ml		MC	H2_HE.M	
41	06-Mar-17, 14:22:40	03061741.D	1042-001 1ml		MC	H2_HE.M	
42	06-Mar-17, 14:40:13	03061742.D	0971-003 1ml		MC	H2_HE.M	
43	06-Mar-17, 14:49:56	03061743.D	lcs s30-03061702		MC	H2_HE.M	Pass
44	06-Mar-17, 15:05:23	03061744.D	lcsd s30-03061702		MC	H2_HE.M	Pass
45	06-Mar-17, 15:12:24	03061745.D	std s30-03061701		MC	H2_HE.M	Pass

Quantitation Report (QT Reviewed)

Data Path : I:\GC01\DATA\FXG\2017_03\06\
Data File : 03061727.D
Signal(s) : TCD1A.CH
Acq On : 6 Mar 2017 3:58 pm
Operator : MC
Sample : 0971-003
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Mar 06 16:18:46 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 17:15:32 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.000	0	N.D.	ppm
2)	Oxygen	2.195	198659	129983.081	ppm
3)	Nitrogen	2.319	1455704	818895.332	ppm
4)	Carbon Monoxide	0.000	0	N.D.	ppm
5)	Methane	0.000	0	N.D.	ppm
6)	Carbon Dioxide	6.766	844	414.624	ppm

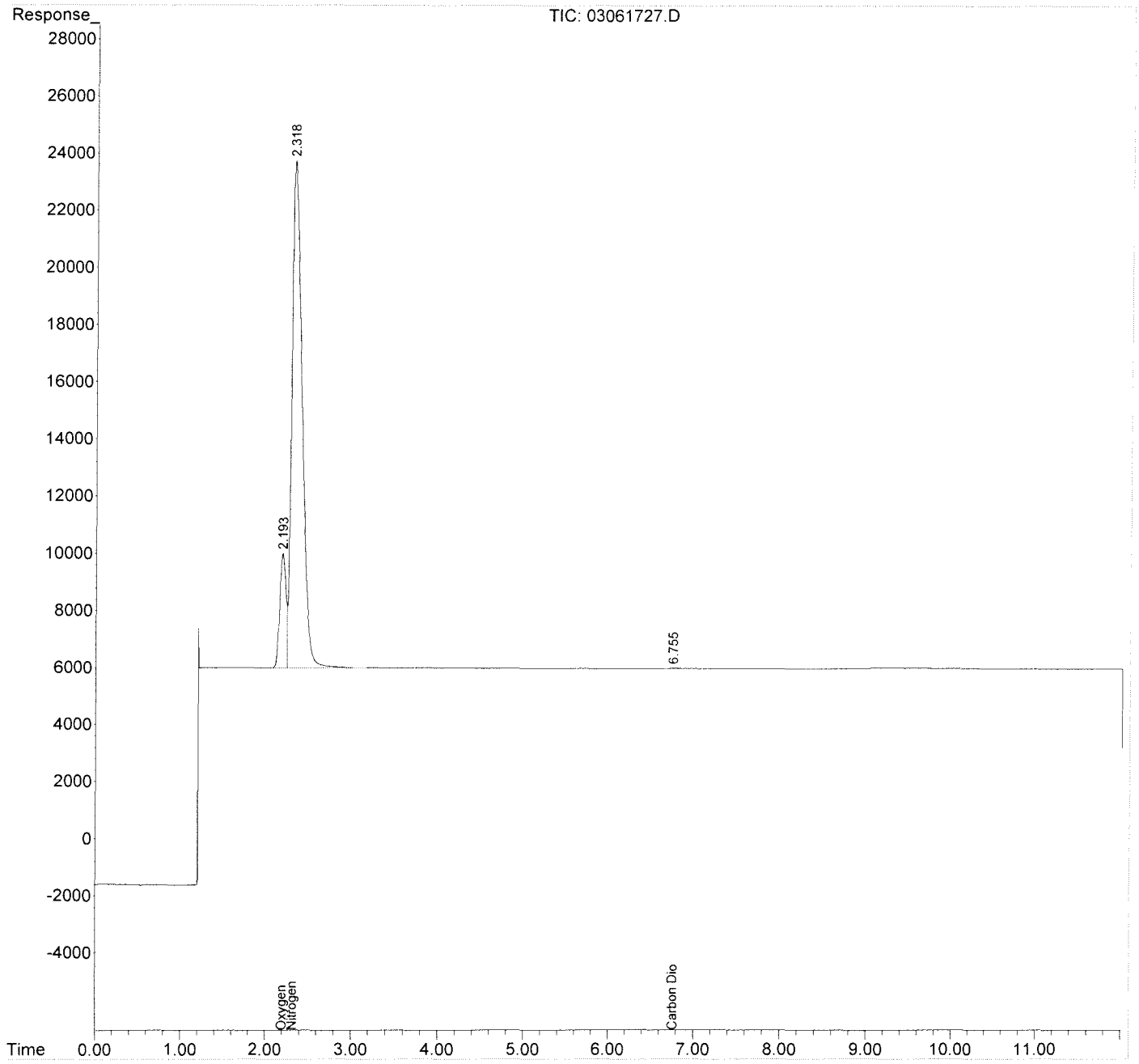
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : I:\GC01\DATA\FXG\2017_03\06\
Data File : 03061727.D
Signal(s) : TCD1A.CH
Acq On : 6 Mar 2017 3:58 pm
Operator : MC
Sample : 0971-003
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Mar 06 16:18:46 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 17:15:32 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : I:\GC01\DATA\FXG\2017_03\06\
Data File : 03061702.D
Signal(s) : TCD1A.CH
Acq On : 6 Mar 2017 8:14 am
Operator : MC
Sample : mb
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Mar 06 16:10:23 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 17:15:32 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

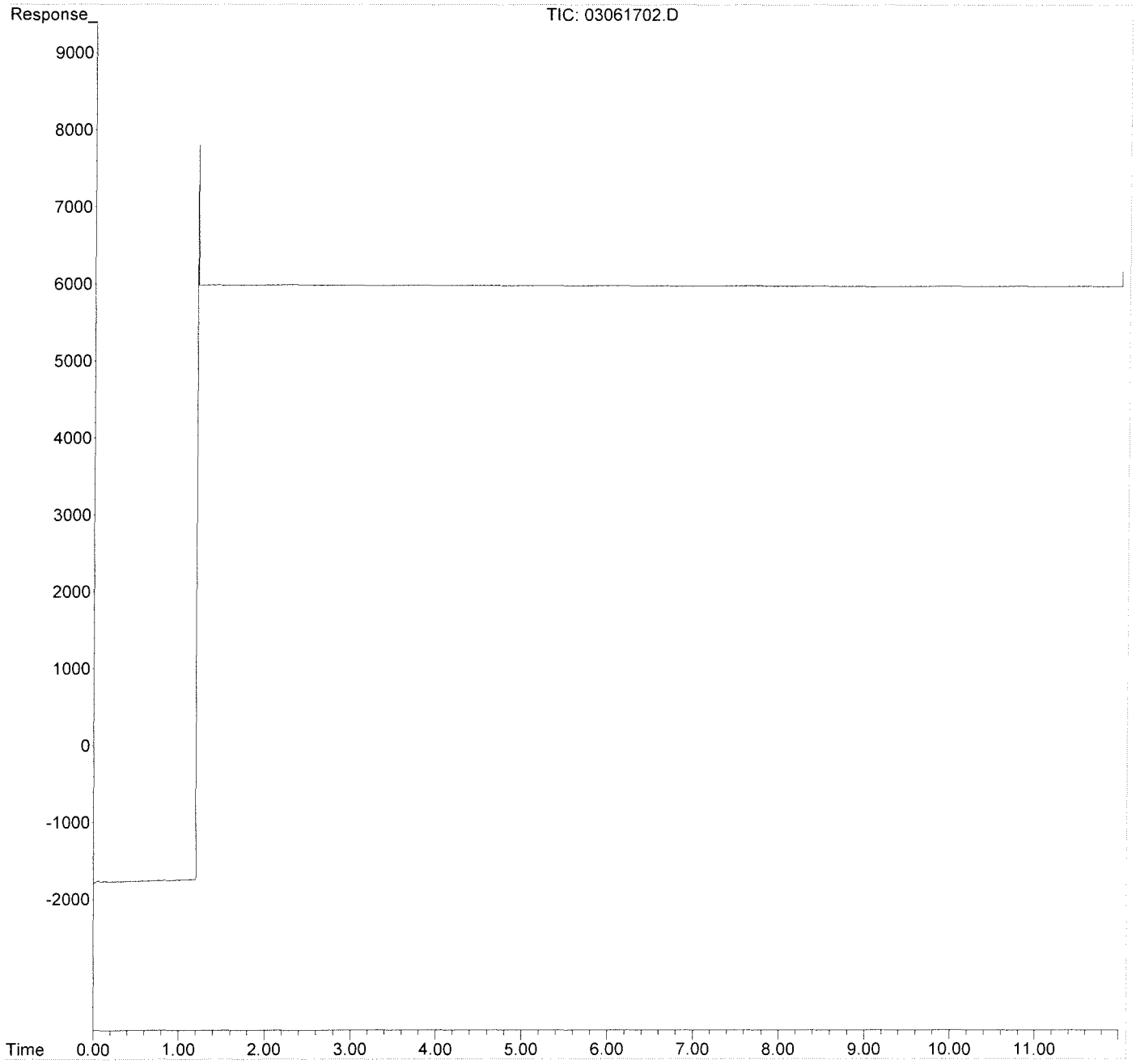
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.000	0	N.D.	ppm
2)	Oxygen	0.000	0	N.D.	ppm
3)	Nitrogen	0.000	0	N.D.	ppm
4)	Carbon Monoxide	0.000	0	N.D.	ppm
5)	Methane	0.000	0	N.D.	ppm
6)	Carbon Dioxide	0.000	0	N.D.	ppm

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

Data Path : I:\GC01\DATA\FXG\2017_03\06\
Data File : 03061702.D
Signal(s) : TCD1A.CH
Acq On : 6 Mar 2017 8:14 am
Operator : MC
Sample : mb
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Mar 06 16:10:23 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 17:15:32 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : I:\GC01\DATA\FXG\2017_03\06\
Data File : 03061707.D
Signal(s) : TCD1A.CH
Acq On : 6 Mar 2017 9:42 am
Operator : MC
Sample : lcs s30-02211703
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Mar 06 10:00:46 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 17:15:32 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

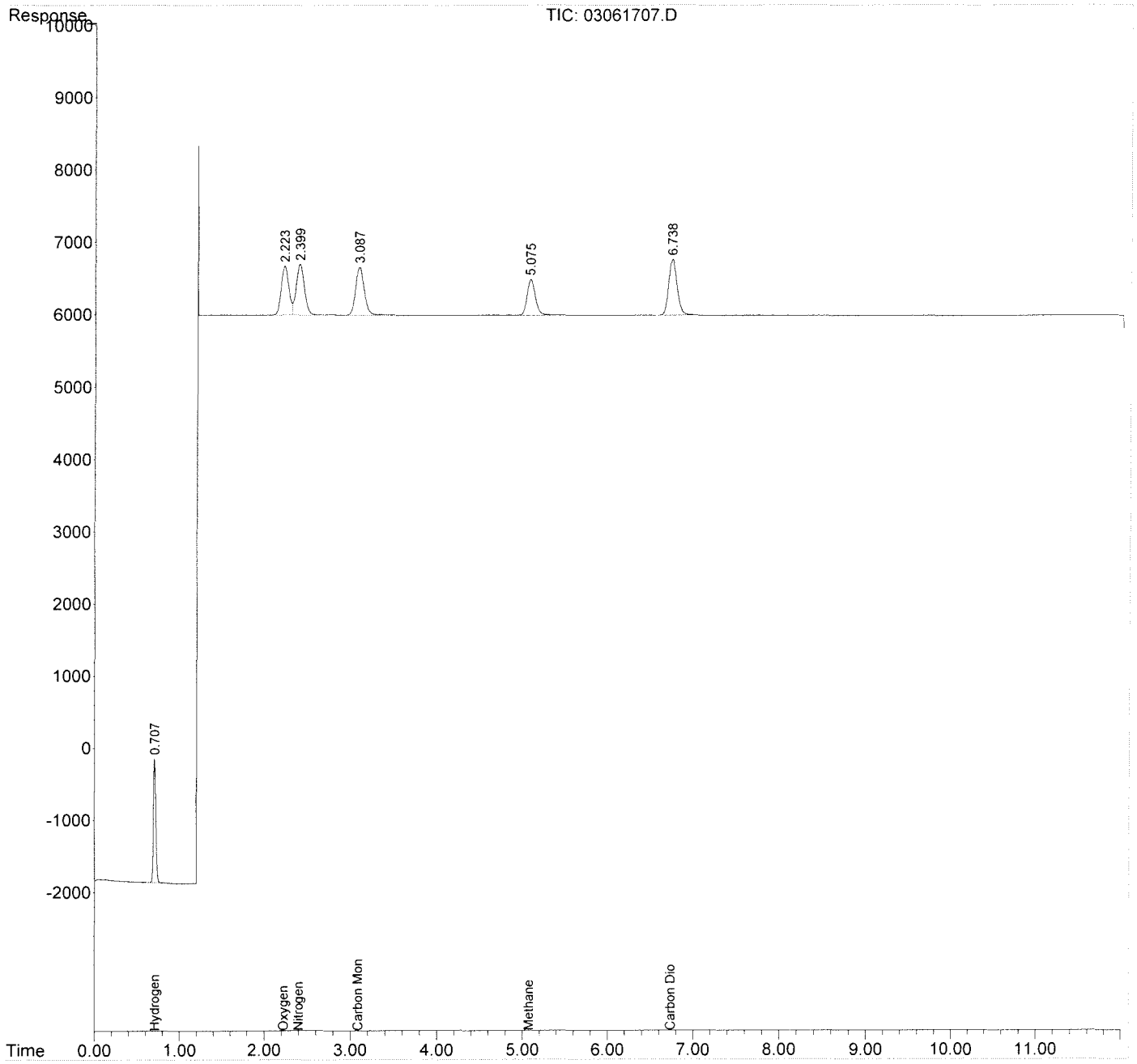
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.709	34362	25329.365	ppm
2)	Oxygen	2.225	41180	26944.063	ppm
3)	Nitrogen	2.401	47174	26537.600	ppm
4)	Carbon Monoxide	3.088	46101	26886.100	ppm
5)	Methane	5.077	32925	25766.053	ppm
6)	Carbon Dioxide	6.739	52920	25998.356	ppm

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

Data Path : I:\GC01\DATA\FXG\2017_03\06\
Data File : 03061707.D
Signal(s) : TCD1A.CH
Acq On : 6 Mar 2017 9:42 am
Operator : MC
Sample : lcs s30-02211703
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Mar 06 10:00:46 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 17:15:32 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



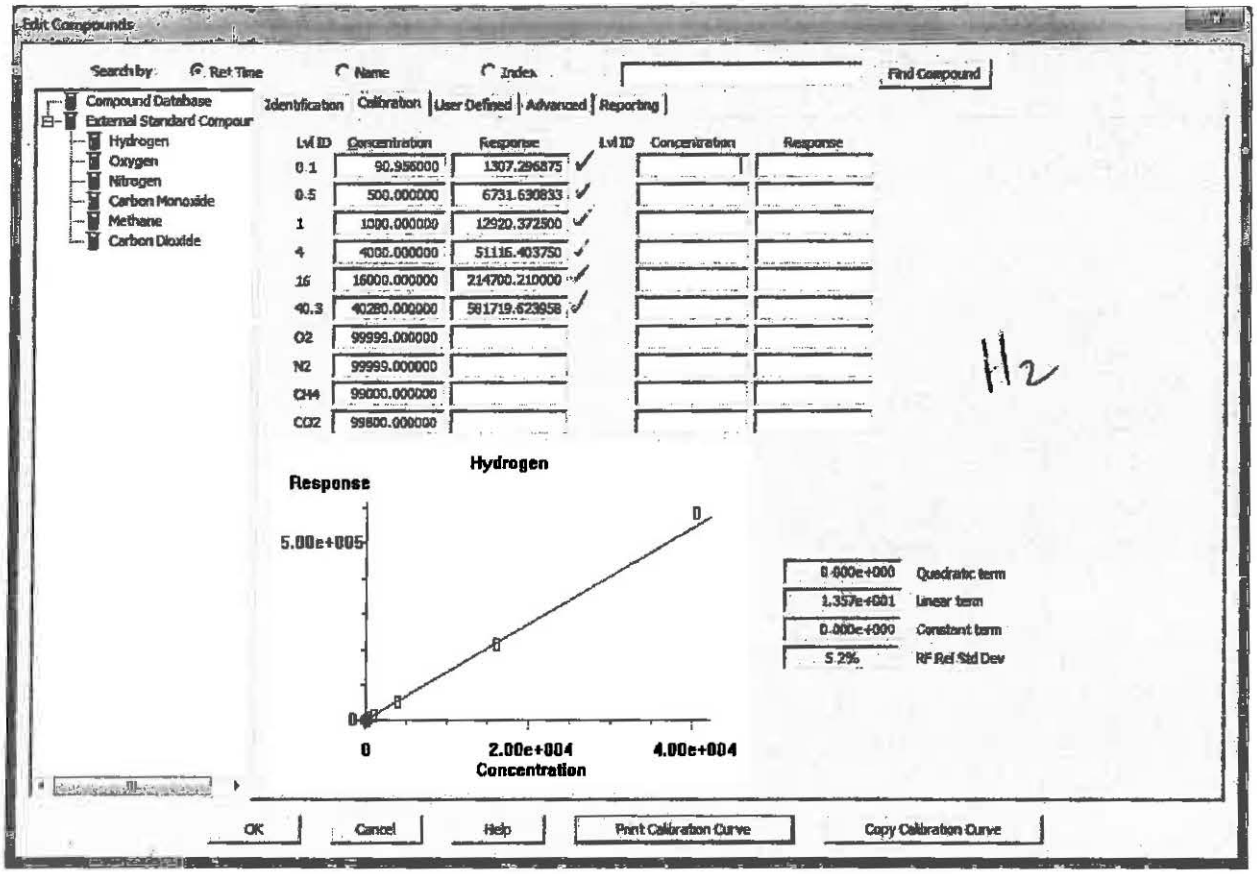
Method Path : I:\GC01\METHODS\
Method File : 3C012417.M
Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
Last Update : Tue Jan 24 17:15:32 2017
Response Via : Initial Calibration

Calibration Files

0.1	=01241708.D	0.5	=01241710.D	1	=01241711.D
4	=01241712.D	16	=01241713.D	40.3	=01241727.D

	Compound	0.1	0.5	1	4	16	40.3	Avg		%RSD
1)	Hydrogen	1.437	1.346	1.292	1.278	1.342	1.444	1.357	E1	5.20
2)	Oxygen	1.567	1.611	1.539	1.520	1.496	1.473	1.528	E1	3.15
3)	Nitrogen	1.858	1.875	1.740	1.695	1.671	1.668	1.778	E1	6.22
4)	Carbon Monoxide	1.736	1.818	1.718	1.684	1.670	1.662	1.715	E1	3.39
5)	Methane	1.322	1.367	1.266	1.252	1.241	1.228	1.278	E1	3.87
6)	Carbon Dioxide	2.083	2.165	2.077	2.020	2.008	1.978	2.036	E1	3.97

(#) = Out of Range ### Number of calibration levels exceeded format ###


Edit Compounds
Search by: Ret Time
Name
Index
Find Compound
Compound Database
External Standard Compour
Hydrogen
Oxygen
Nitrogen
Carbon Monoxide
Methane
Carbon Dioxide
Identification
Calibration
User Defined
Advanced
Reporting
Lvl ID Concentration Response
0.1 90.956000 1307.296875
0.5 500.000000 6731.630833
1 1000.000000 12920.372500
4 4000.000000 51116.403750
16 16000.000000 214700.210000
40.3 40280.000000 581719.623958
O2 99999.000000
N2 99999.000000
CH4 99000.000000
CO2 99800.000000
Lvl ID Concentration Response
Hydrogen
Response
5.00e+005
0
2.00e+004
4.00e+004
Concentration
0.000e+000 Quadratic term
1.357e+001 Linear term
0.000e+000 Constant term
5.2% RF Rel Std Dev
OK
Cancel
Help
Print Calibration Curve
Copy Calibration Curve

H2

WS 1/26/12

Edit Compounds

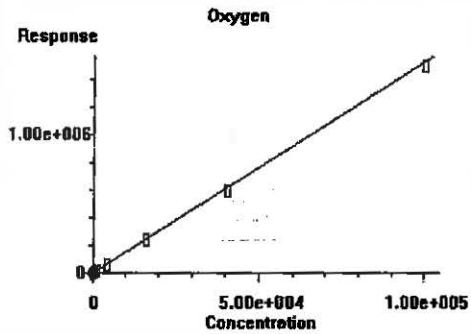
Search by: Ret Time | Name | Index | Find Compound

- Compound Database
  - External Standard Compour
    - Hydrogen
    - Oxygen
    - Nitrogen
    - Carbon Monoxide
    - Methane
    - Carbon Dioxide

Identification | Calibration | User Defined | Advanced | Reporting

Lvl ID	Concentration	Response	Lvl ID	Concentration	Response
0.1	99.957000	1566.340000			
0.5	500.000000	8055.157518			
1	1000.000000	15390.027874			
4	4000.000000	60782.564471			
16	16000.000000	239369.990034			
40.3	40280.000000	593437.071076			
O2	99999.000000	1492463.135000			
N2	99999.000000				
CH4	99000.000000				
CO2	99800.000000				

O2



0.000e+000	Quadratic term
1.528e+001	Linear term
0.000e+000	Constant term
3.1%	RF Rel Std Dev

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

W 1/21/17

Edit Compounds

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

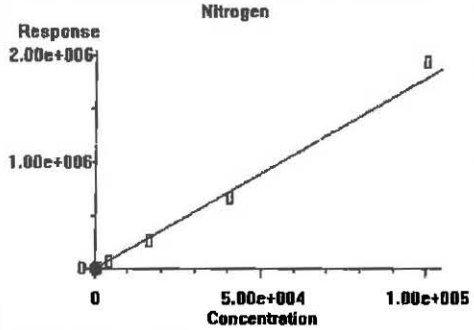
- Compound Database
- External Standard Compour
  - Hydrogen
  - Oxygen
  - Nitrogen
  - Carbon Monoxide
  - Methane
  - Carbon Dioxide

Identification | Calibration | User Defined | Advanced | Reporting

Lvl ID	Concentration	Response	Lvl ID	Concentration	Response
0.1	109.154000	2027.677794			
0.5	500.000000	9372.544982			
1	1000.000000	17396.560251			
4	4000.000000	67800.338029			
16	16000.000000	267290.892466			
40.3	40280.000000	671823.641725			
O2	99999.000000				
N2	99999.000000	1938226.562917			
CH4	99000.000000				
CO2	99800.000000				

N2

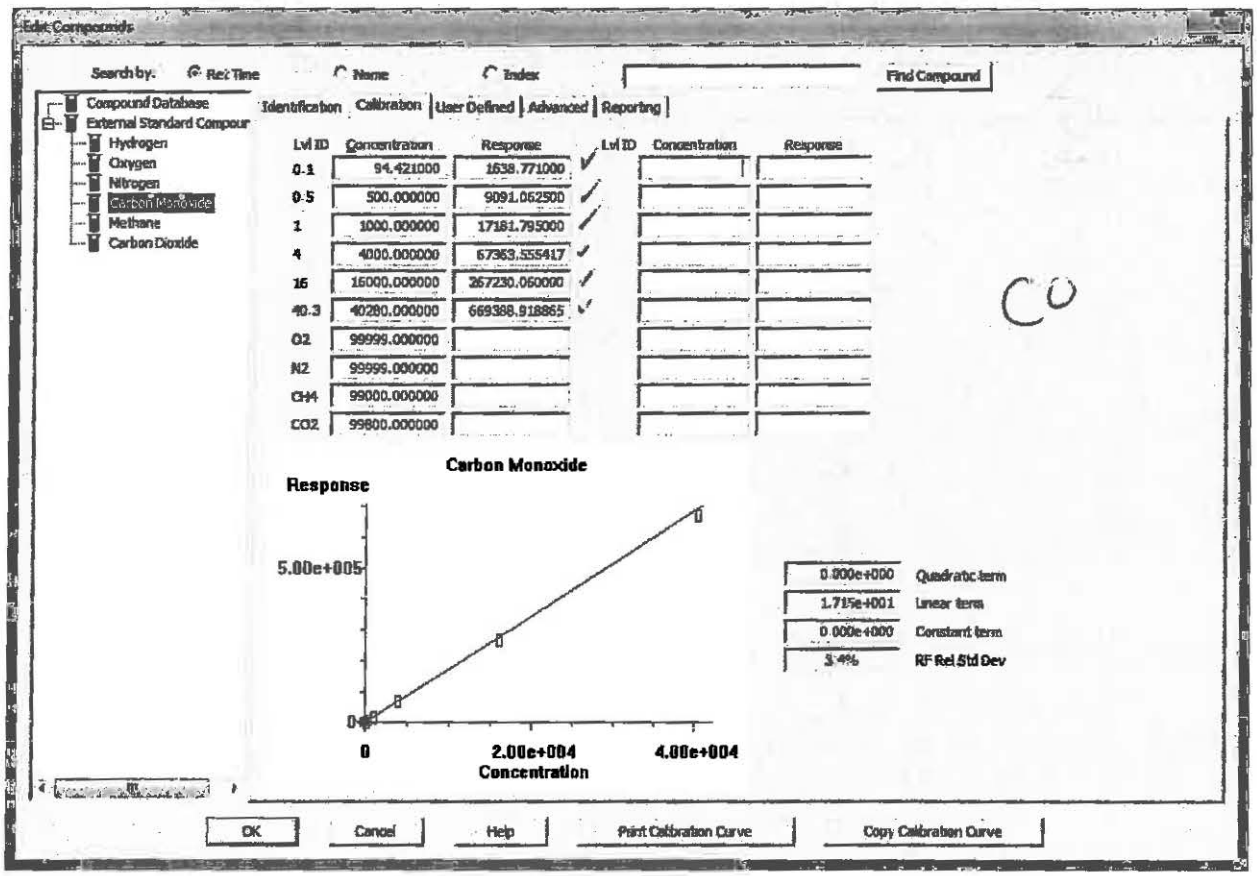
Nitrogen



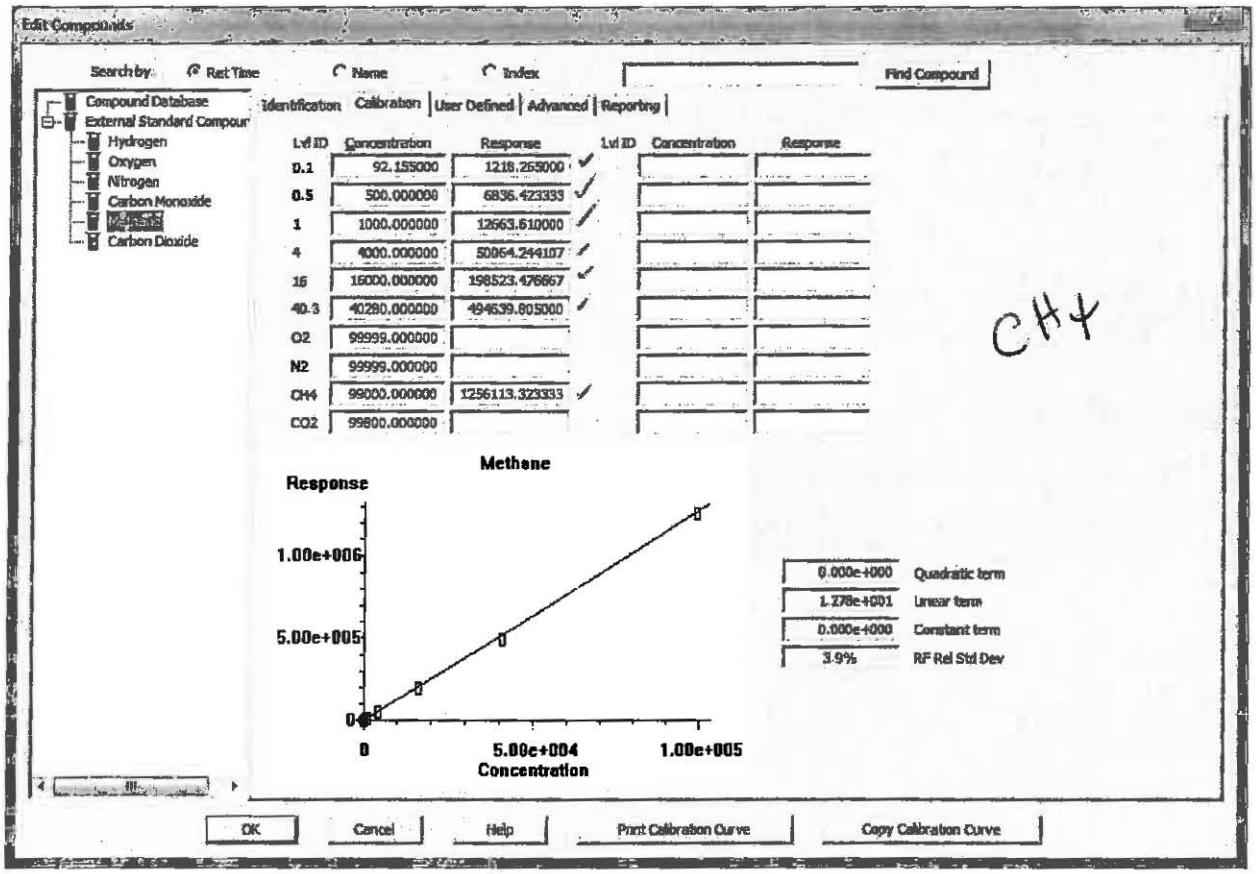
0.000e+000	Quadratic term
1.778e+001	Linear term
0.000e+000	Constant term
6.2%	RF Rel Std Dev

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

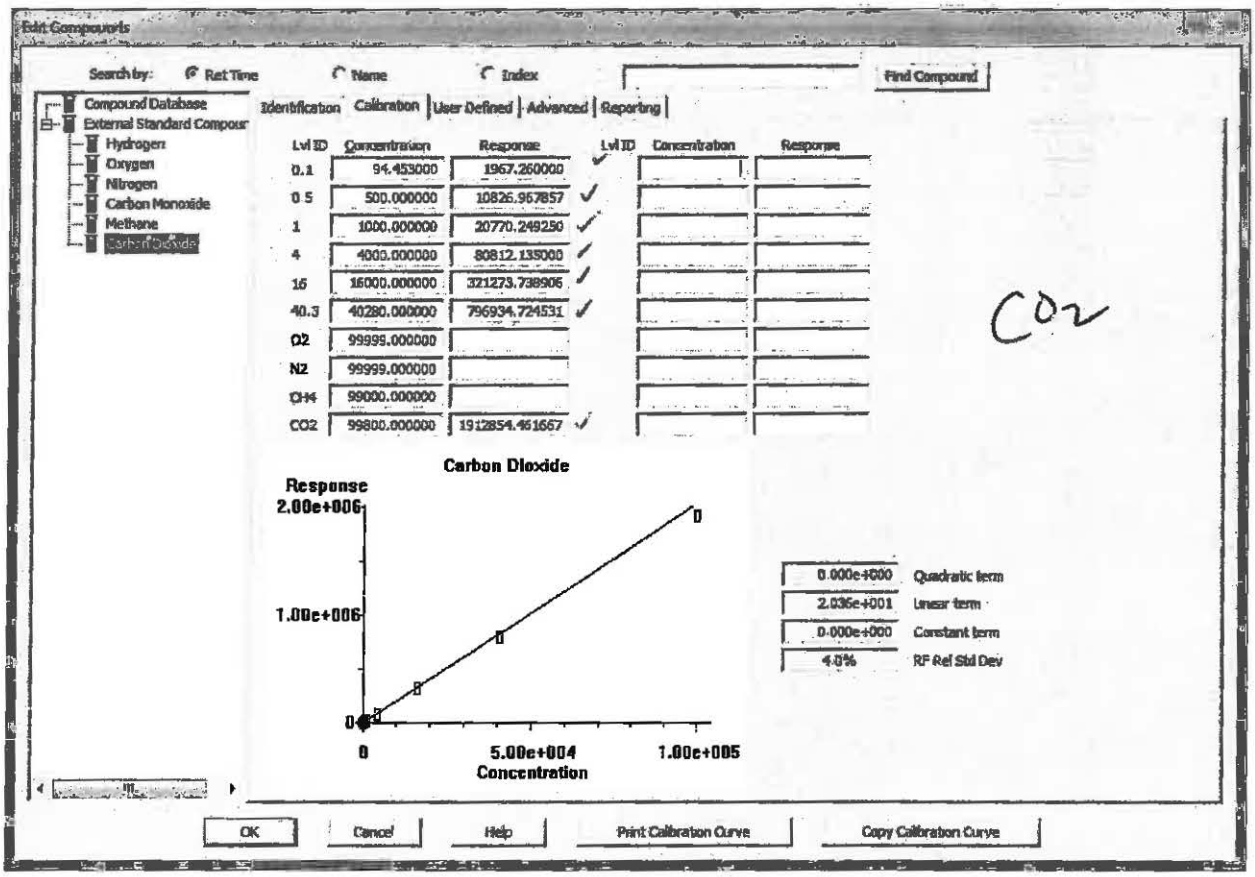
WW 1/26/17


Edit Compounds
Search by: Ret Time Name Index
Find Compound
Compound Database
External Standard Compour
Hydrogen
Oxygen
Nitrogen
Carbon Monoxide
Methane
Carbon Dioxide
Identification Calibration User Defined Advanced Reporting
Lvl ID Concentration Response
0.1 94.421000 1638.771000
0.5 500.000000 9091.062500
1 1000.000000 17181.795000
4 4000.000000 67363.555417
16 16000.000000 267230.060000
40.3 40280.000000 669388.918865
O2 99999.000000
N2 99999.000000
CH4 99000.000000
CO2 99800.000000
Lvl ID Concentration Response
CO
Carbon Monoxide
Response
5.00e+005
0
0
2.00e+004
4.00e+004
Concentration
0.000e+000 Quadratic term
1.715e+001 Linear term
0.000e+000 Constant term
3.4% RF Rel Std Dev
OK
Cancel
Help
Print Calibration Curve
Copy Calibration Curve

1/26/17


Edit Compounds
Search by: Ret Time
Name
Index
Find Compound
Compound Database
External Standard Compour
Hydrogen
Oxygen
Nitrogen
Carbon Monoxide
Methane
Carbon Dioxide
Identification
Calibration
User Defined
Advanced
Reporting
Lvl ID Concentration Response
0.1 92.155000 1218.265000
0.5 500.000000 6836.423333
1 1000.000000 12663.610000
4 4000.000000 50864.244107
16 16000.000000 198523.476667
40.3 40280.000000 494539.805000
O2 99999.000000
N2 99999.000000
CH4 99000.000000 1256113.323333
CO2 99800.000000
Methane
Response
1.00e+006
5.00e+005
0
5.00e+004
1.00e+005
Concentration
0.000e+000 Quadratic term
1.278e+001 Linear term
0.000e+000 Constant term
3.9% RF Rel Std Dev
OK
Cancel
Help
Print Calibration Curve
Copy Calibration Curve
CH4

1/26/17


Edit Compounds
Search by: Ret Time Name Index
Find Compound
Compound Database
External Standard Compour
Hydrogen
Oxygen
Nitrogen
Carbon Monoxide
Methane
Carbon Dioxide
Identification Calibration User Defined Advanced Reporting
Lvl ID Concentration Response Lvl ID Concentration Response
0.1 94.453000 1967.260000
0.5 500.000000 10826.957857
1 1000.000000 20770.249250
4 4000.000000 80812.135000
16 16000.000000 321273.738906
40.3 40280.000000 796934.724531
O2 99999.000000
N2 99999.000000
CH4 99000.000000
CO2 99800.000000 1912854.461667
CO2
Carbon Dioxide
Response
2.00e+006
1.00e+006
0
0
5.00e+004
1.00e+005
Concentration
0.000e+000 Quadratic term
2.036e+001 Linear term
0.000e+000 Constant term
4.0% RF Rel Std Dev
OK
Cancel
Help
Print Calibration Curve
Copy Calibration Curve

WL 11/16/05

Method Path : I:\GC01\METHODS\
Method File : 3C012417.M
Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
Last Update : Tue Jan 24 17:15:32 2017
Response Via : Initial Calibration

#	ID	Conc	ISTD Conc	Path\File
1	0.1	94	0	I:\GC01\DATA\FXG\2017_01\24\01241708.D
2	0.5	500	0	I:\GC01\DATA\FXG\2017_01\24\01241710.D
3	1	1000	0	I:\GC01\DATA\FXG\2017_01\24\01241711.D
4	4	4000	0	I:\GC01\DATA\FXG\2017_01\24\01241712.D
5	16	16000	0	I:\GC01\DATA\FXG\2017_01\24\01241713.D
6	40.3	40280	0	I:\GC01\DATA\FXG\2017_01\24\01241726.D
7	O2	99999	0	I:\GC01\DATA\FXG\2017_01\24\01241714.D
8	N2	99999	0	I:\GC01\DATA\FXG\2017_01\24\01241724.D
9	CH4	99000	0	I:\GC01\DATA\FXG\2017_01\24\01241716.D
10	CO2	99800	0	I:\GC01\DATA\FXG\2017_01\24\01241728.D

#	ID	Update Time	Quant Time	Acquisition Time
1	0.1	Jan 24 17:11 2017	Jan 24 17:11 2017	24 Jan 2017 9:54 am
2	0.5	Jan 24 17:09 2017	Jan 24 17:07 2017	24 Jan 2017 10:28 am
3	1	Jan 24 16:02 2017	Jan 24 11:06 2017	24 Jan 2017 10:46 am
4	4	Jan 24 16:02 2017	Jan 24 11:29 2017	24 Jan 2017 11:04 am
5	16	Jan 24 16:02 2017	Jan 24 11:44 2017	24 Jan 2017 11:28 am
6	40.3	Jan 24 16:58 2017	Jan 24 16:13 2017	24 Jan 2017 3:39 pm
7	O2	Jan 24 16:47 2017	Jan 24 12:03 2017	24 Jan 2017 11:45 am
8	N2	Jan 24 16:50 2017	Jan 24 15:54 2017	24 Jan 2017 3:08 pm
9	CH4	Jan 24 16:49 2017	Jan 24 15:50 2017	24 Jan 2017 12:21 pm
10	CO2	Jan 24 17:15 2017	Jan 24 17:14 2017	24 Jan 2017 4:51 pm

3C012417.M Thu Jan 26 10:32:03 2017

Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241708.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 9:54 am
Operator : MC
Sample : std s30-12301601 0.1%
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 17:11:21 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 16:58:22 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

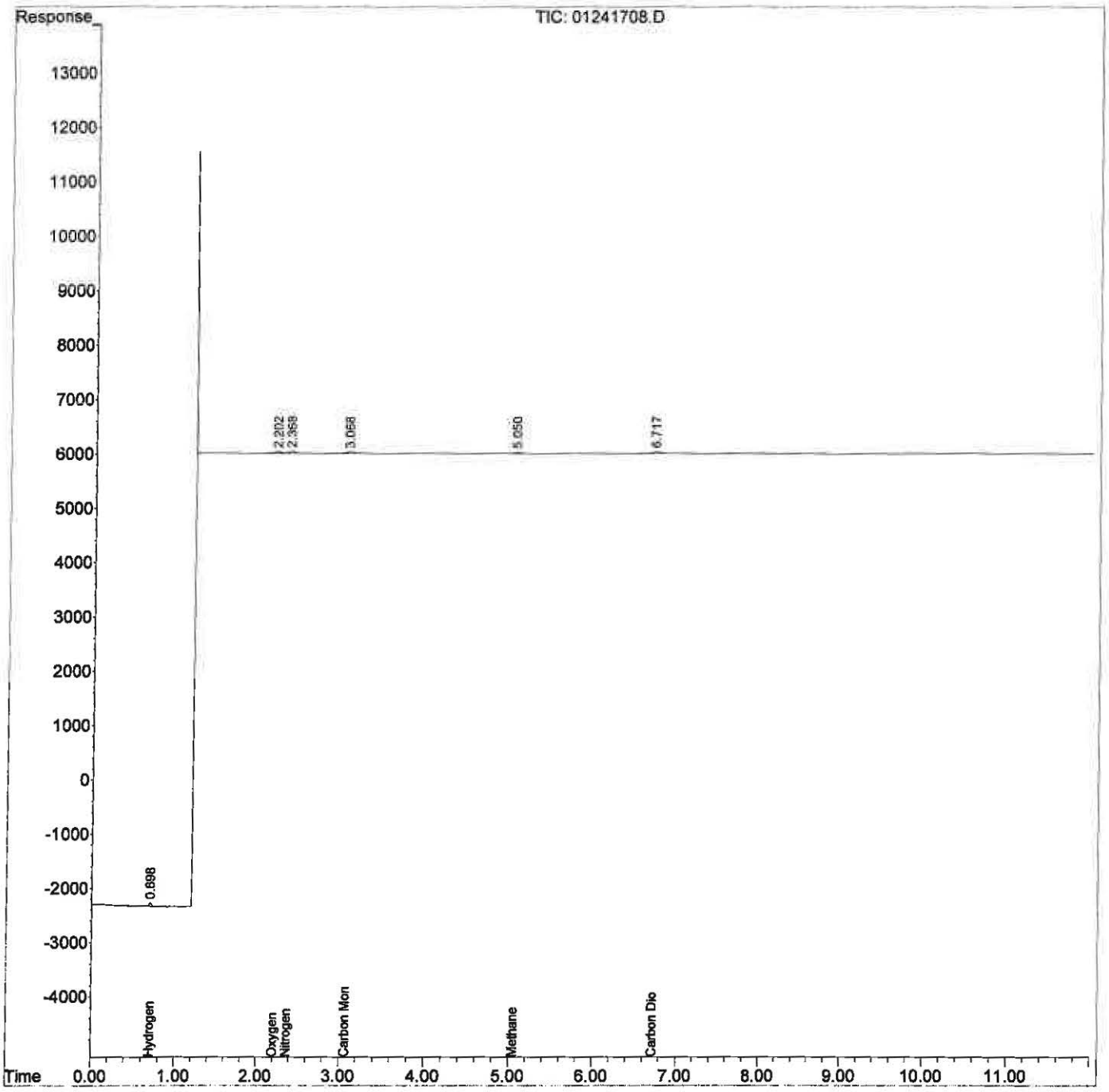
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Hydrogen	0.699	1307	963.654	ppm	
2)	Oxygen	2.202	1566	1022.329	ppm	m
3)	Nitrogen	2.368	2028	1155.333	ppm	m
4)	Carbon Monoxide	3.071	1639	955.727	ppm	
5)	Methane	5.052	1218	953.387	ppm	
6)	Carbon Dioxide	6.719	1967	957.152	ppm	

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

Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241708.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 9:54 am
Operator : MC
Sample : std s30-12301601 0.1%
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 17:11:21 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 16:58:22 2017
Response via : Initial Calibration
Integrator: ChemStation

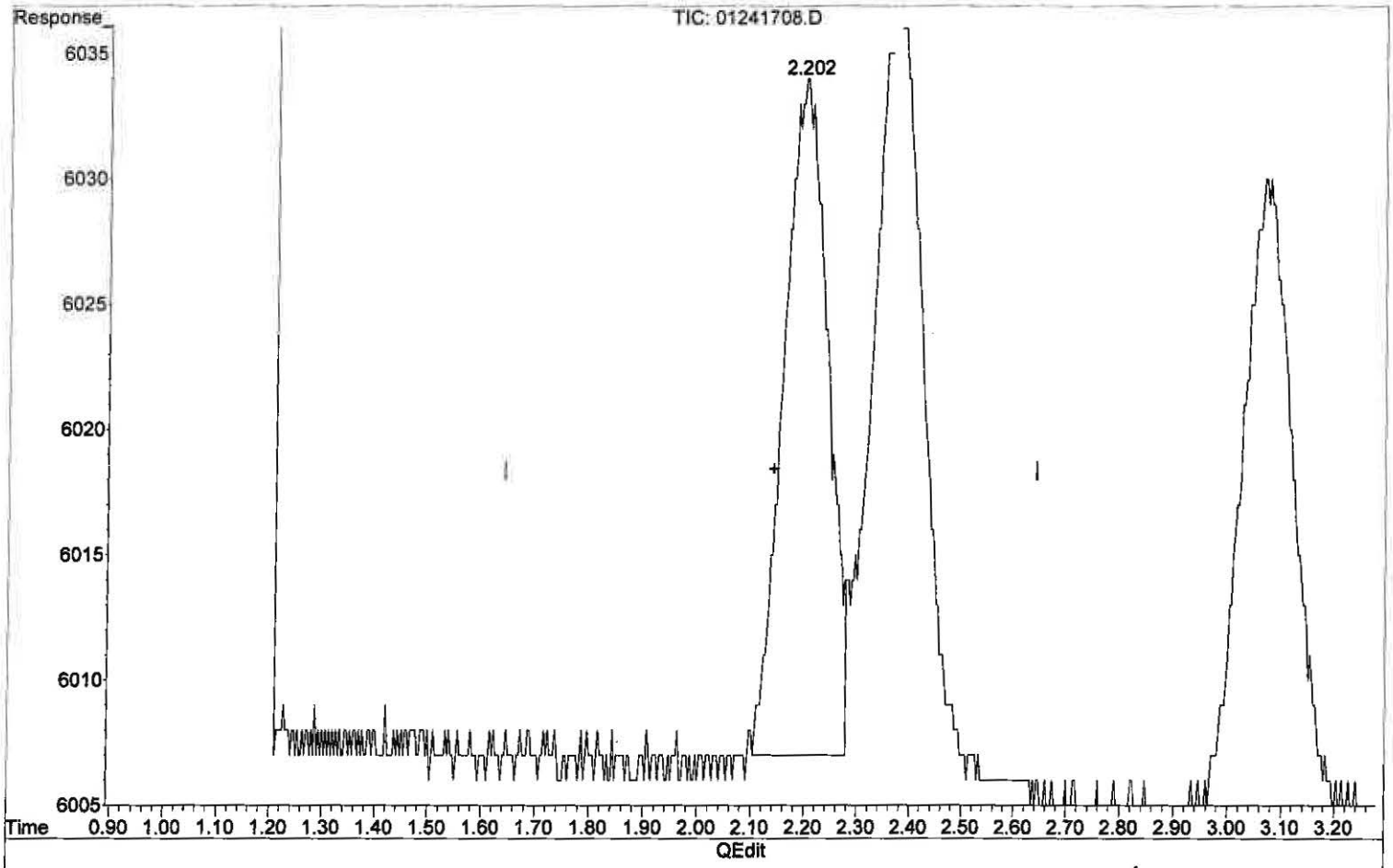
Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241708.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 9:54 am
Operator : MC
Sample : std s30-12301601 0.1%
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 17:11:21 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 16:58:22 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



(2) Oxygen

2.202min 1022.329 ppm m

response 1566

M 1/26/17

W 1/26/17

no previous

BLC

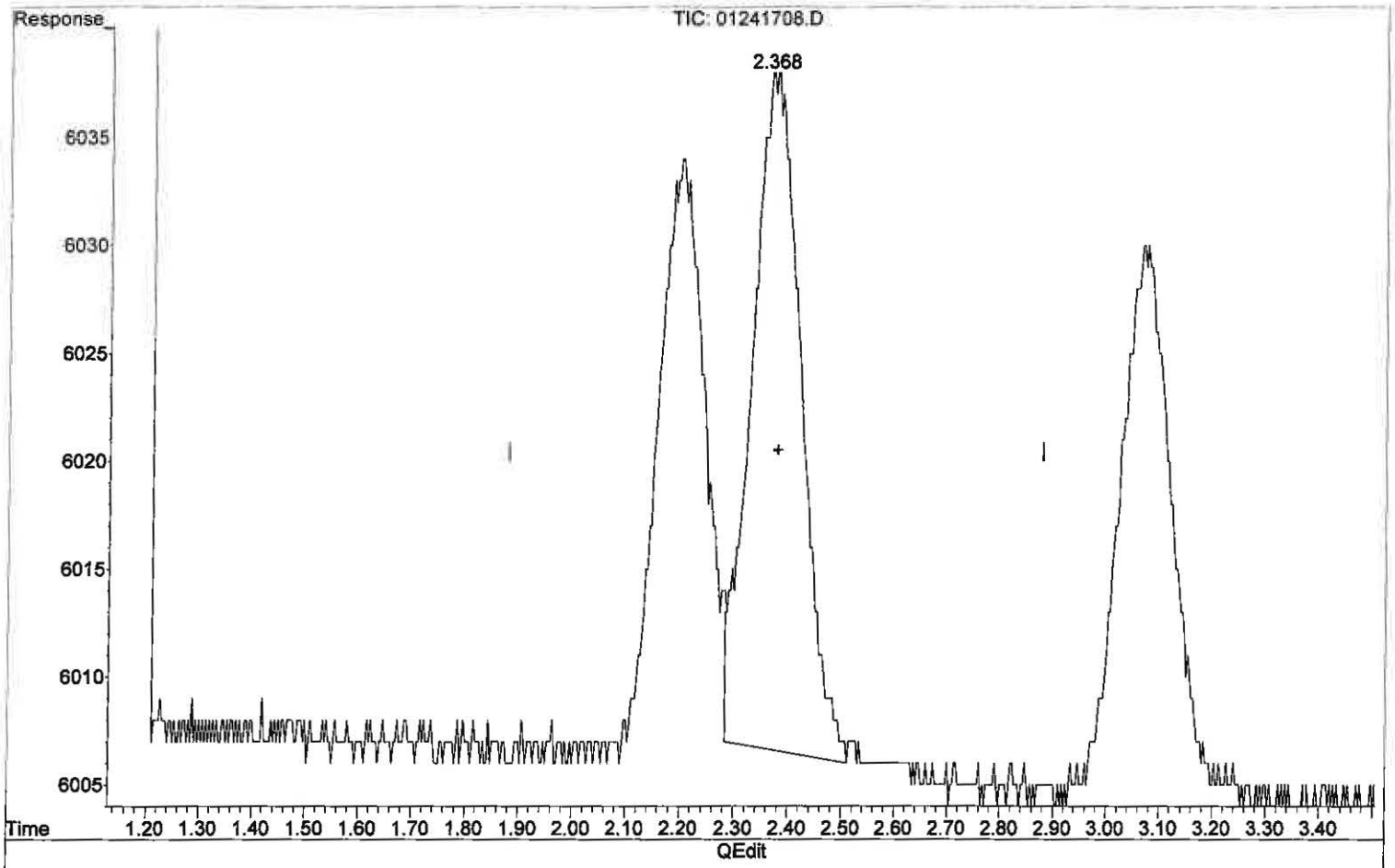
(+) = Expected Retention Time

3C012417.M Thu Jan 26 12:02:14 2017

Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241708.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 9:54 am
Operator : MC
Sample : std s30-12301601 0.1%
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 17:11:21 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 16:58:22 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



(3) Nitrogen

2.368min 1155.333 ppm m

response 2028

M 1/26/17

1/26/17
no previous
BL

(+) = Expected Retention Time

Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241710.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 10:28 am
Operator : MC
Sample : std s30-1231702 0.5%
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 17:07:30 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 16:58:22 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

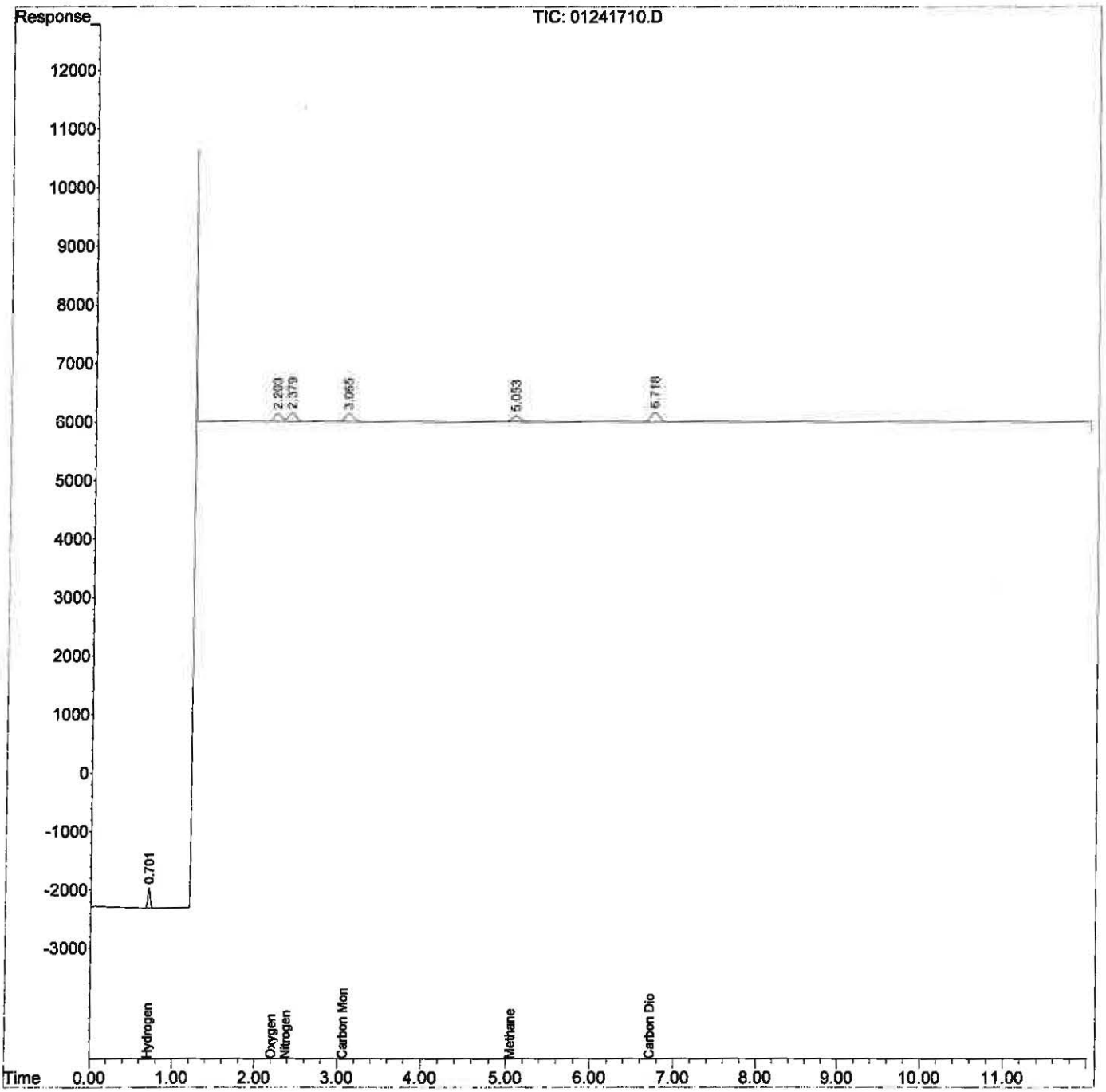
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.702	6732	4962.119	ppm
2)	Oxygen	2.204	8055	5257.492	ppm
3)	Nitrogen	2.380	9373	5340.301	ppm
4)	Carbon Monoxide	3.070	9091	5301.886	ppm
5)	Methane	5.056	6836	5350.030	ppm
6)	Carbon Dioxide	6.719	10827	5267.759	ppm

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

Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241710.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 10:28 am
Operator : MC
Sample : std s30-1231702 0.5%
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 17:07:30 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 16:58:22 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241711.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 10:46 am
Operator : MC
Sample : std s30-01231701 1%
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 11:06:38 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 11:05:53 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

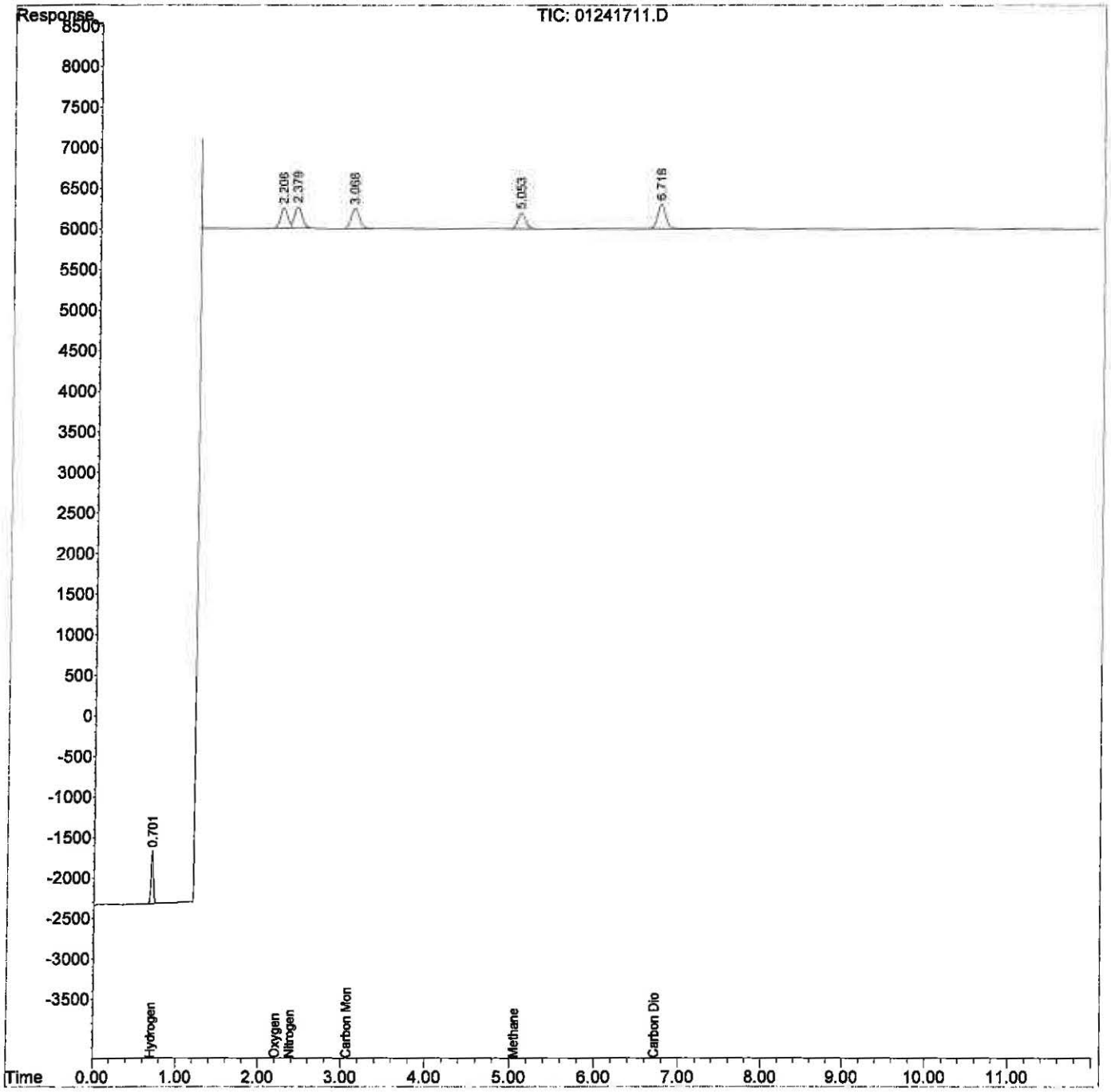
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.703	12920	9749.462	ppm
2)	Oxygen	2.207	15390	10022.255	ppm
3)	Nitrogen	2.381	17397	10088.258	ppm
4)	Carbon Monoxide	3.070	17182	10123.136	ppm
5)	Methane	5.056	12664	10035.134	ppm
6)	Carbon Dioxide	6.720	20770	10324.389	ppm

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

Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241711.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 10:46 am
Operator : MC
Sample : std s30-01231701 1%
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 11:06:38 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 11:05:53 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241712.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 11:04 am
Operator : MC
Sample : std s30-12191601 4%
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 11:29:02 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 11:06:54 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

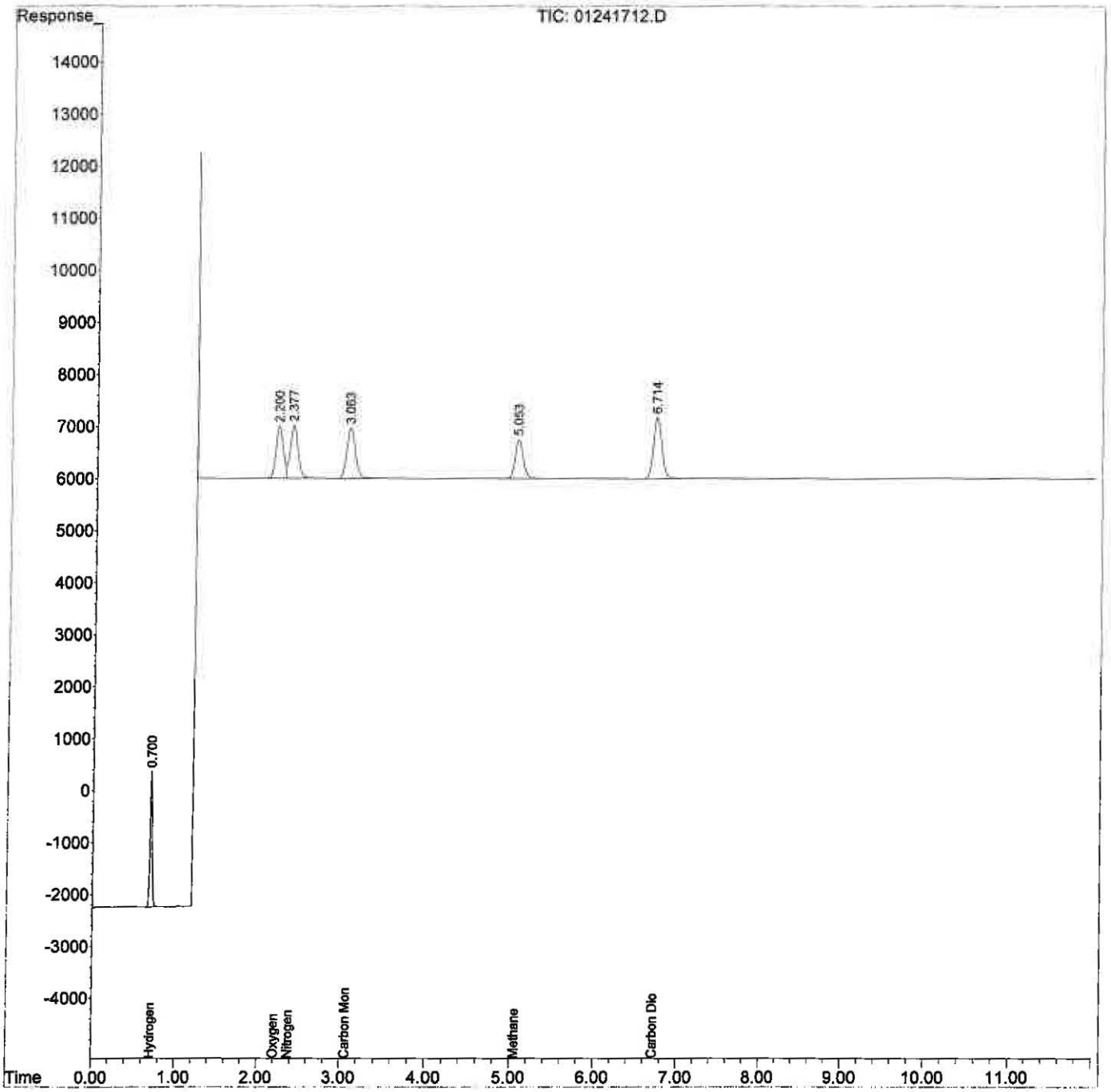
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.701	51116	38471.422	ppm
2)	Oxygen	2.202	60783	39655.182	ppm
3)	Nitrogen	2.378	67800	39325.034	ppm
4)	Carbon Monoxide	3.065	67364	39718.927	ppm
5)	Methane	5.054	50064	39812.023	ppm
6)	Carbon Dioxide	6.716	80812	40218.015	ppm

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

Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241712.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 11:04 am
Operator : MC
Sample : std s30-12191601 4%
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 11:29:02 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 11:06:54 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241713.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 11:28 am
Operator : MC
Sample : std s30-01231703 16%
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 11:44:36 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 11:30:32 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

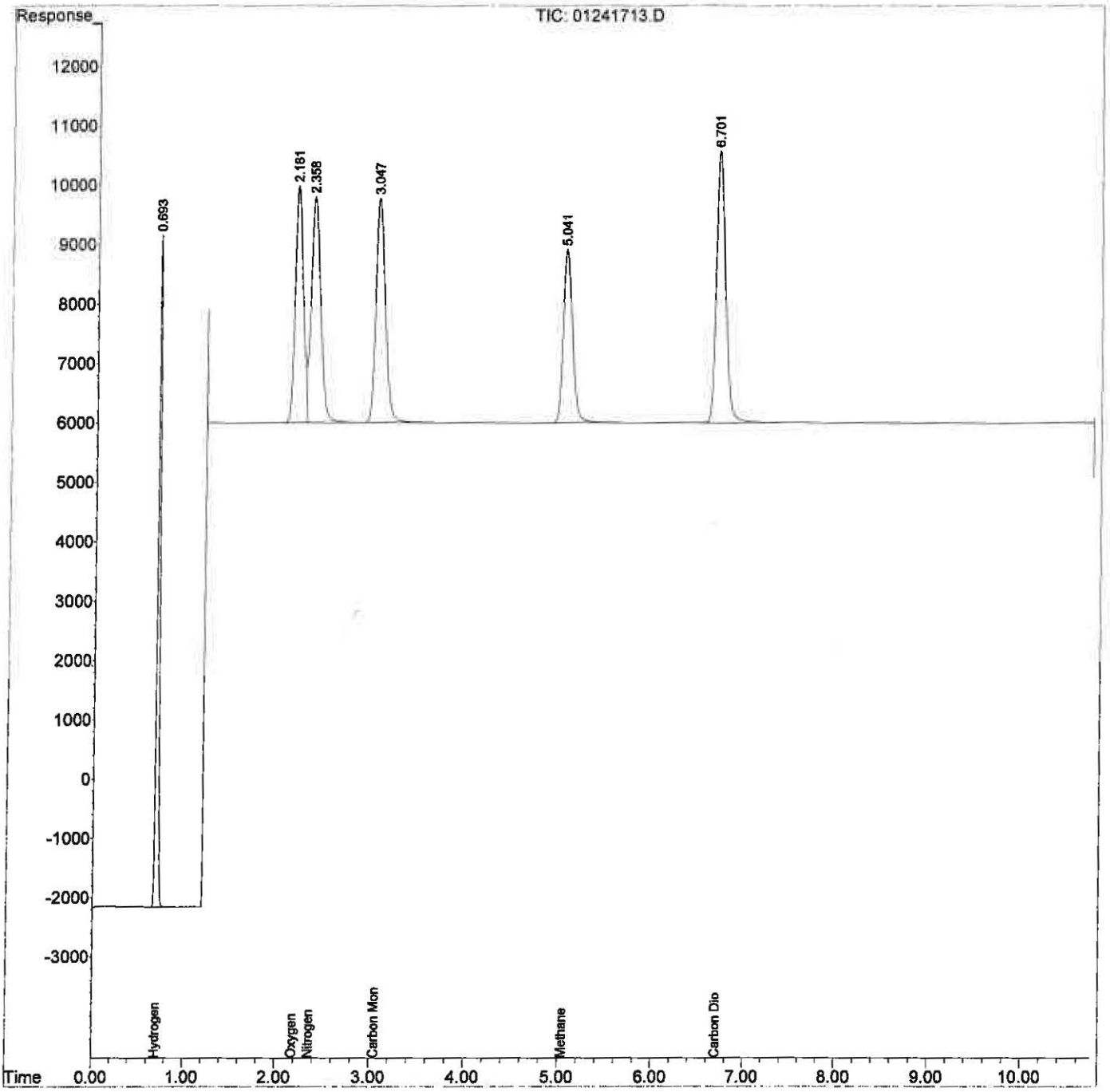
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.695	214700	160970.040	ppm
2)	Oxygen	2.182	239370	156211.792	ppm
3)	Nitrogen	2.360	267291	155149.115	ppm
4)	Carbon Monoxide	3.048	267230	157650.776	ppm
5)	Methane	5.043	198523	158115.703	ppm
6)	Carbon Dioxide	6.703	321274	160126.033	ppm

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

Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241713.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 11:28 am
Operator : MC
Sample : std s30-01231703 16%
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 11:44:36 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 11:30:32 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241714.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 11:45 am
Operator : MC
Sample : s11-12021503 O2
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 12:03:07 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 11:45:03 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

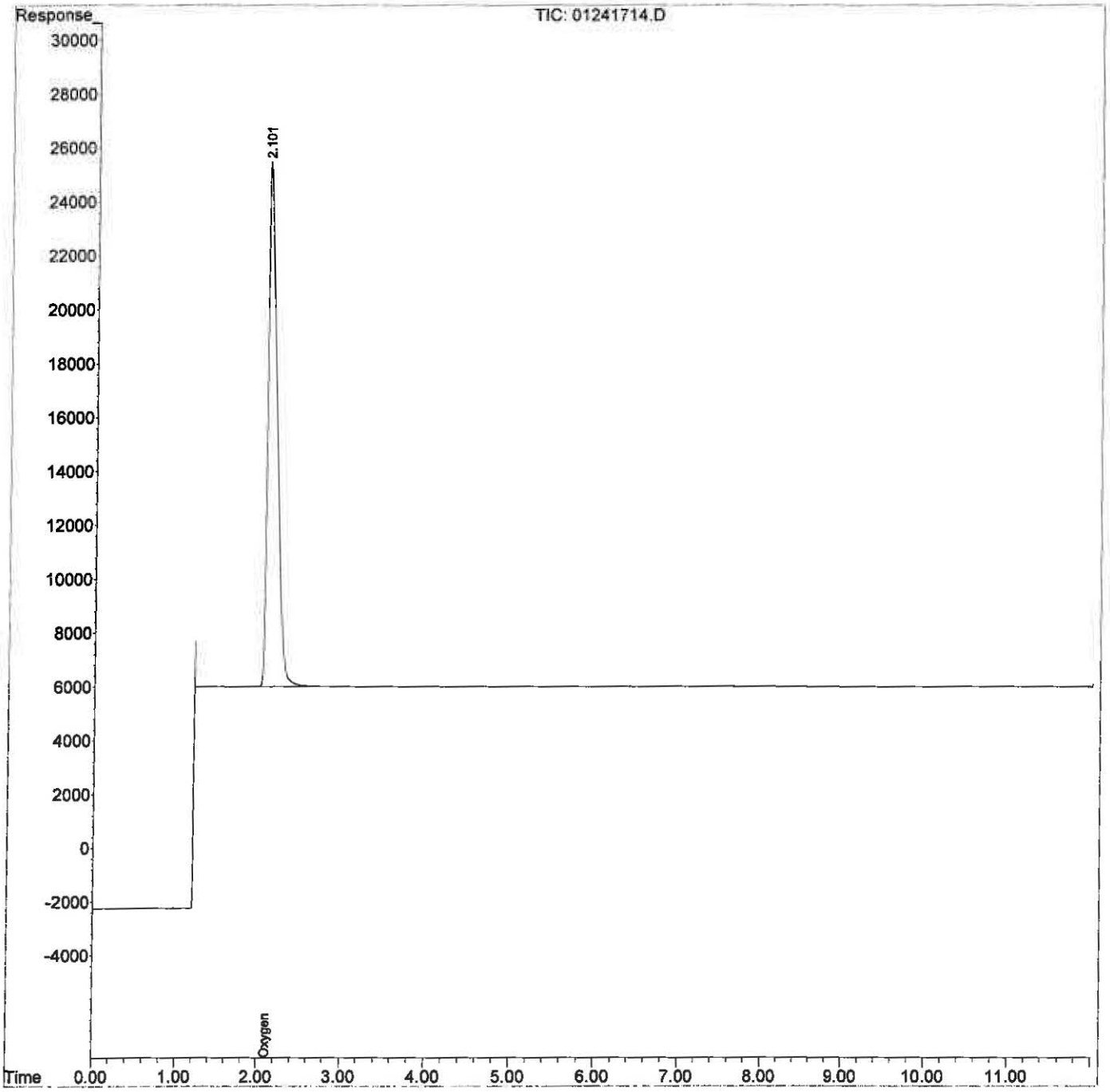
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.000	0	N.D.	ppm
2)	Oxygen	2.102	1492463	975822.655	ppm
3)	Nitrogen	0.000	0	N.D.	ppm
4)	Carbon Monoxide	0.000	0	N.D.	ppm
5)	Methane	0.000	0	N.D.	ppm
6)	Carbon Dioxide	0.000	0	N.D.	ppm

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

Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241714.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 11:45 am
Operator : MC
Sample : s11-12021503 O2
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 12:03:07 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 11:45:03 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241716.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 12:21 pm
Operator : MC
Sample : s30-01241701 CH4
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 15:50:33 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 12:21:02 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

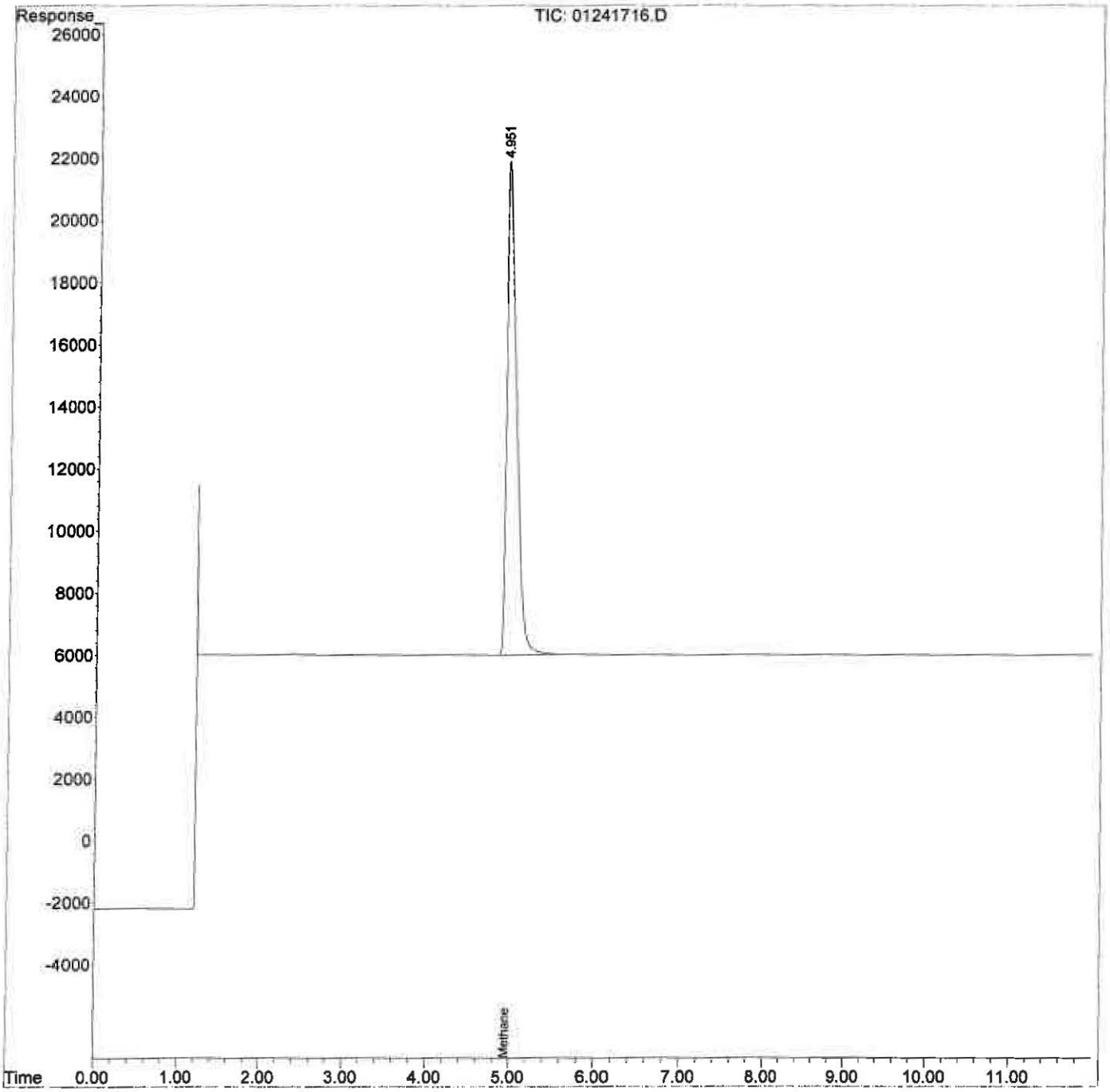
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Hydrogen	0.000	0	N.D.	ppm	
2)	Oxygen	0.000	0	N.D.	ppm	d
3)	Nitrogen	0.000	0	N.D.	ppm	d
4)	Carbon Monoxide	0.000	0	N.D.	ppm	
5)	Methane	4.953	1256113	1001419.959	ppm	
6)	Carbon Dioxide	0.000	0	N.D.	ppm	

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

Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241716.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 12:21 pm
Operator : MC
Sample : s30-01241701 CH4
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 15:50:33 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 12:21:02 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241724.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 3:08 pm
Operator : MC
Sample : s11-12021502 N2
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 15:54:48 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 13:54:15 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

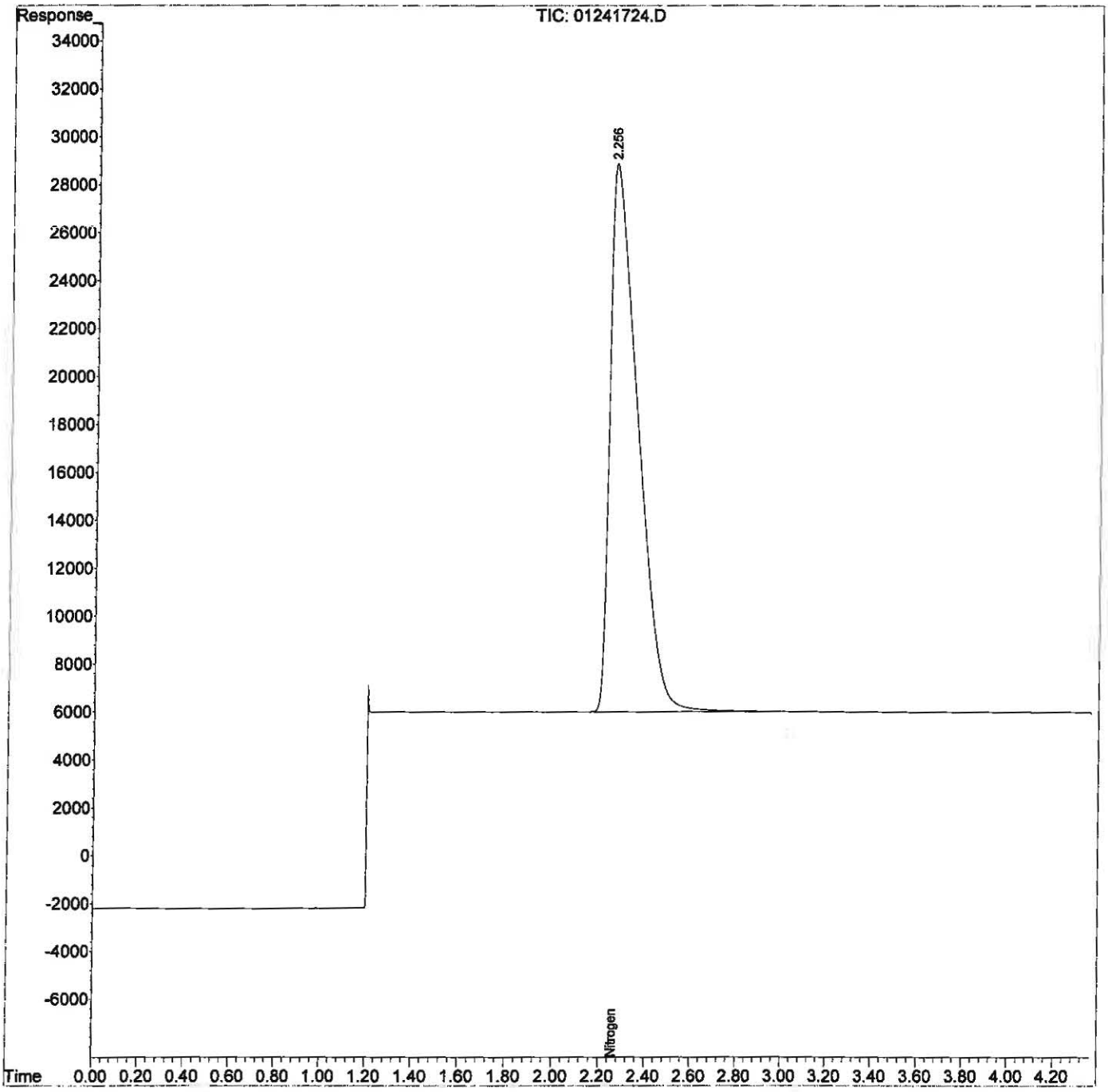
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Hydrogen	0.000	0	N.D.	ppm	
2)	Oxygen	0.000	0	N.D.	ppm	d
3)	Nitrogen	2.258	1938227	1101353.052	ppm	
4)	Carbon Monoxide	0.000	0	N.D.	ppm	
5)	Methane	0.000	0	N.D.	ppm	
6)	Carbon Dioxide	0.000	0	N.D.	ppm	

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

Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241724.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 3:08 pm
Operator : MC
Sample : s11-12021502 N2
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 15:54:48 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 13:54:15 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241727.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 4:13 pm
Operator : MC
Sample : 1g loop S30-12191601 40.28%
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 16:40:16 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 16:07:39 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

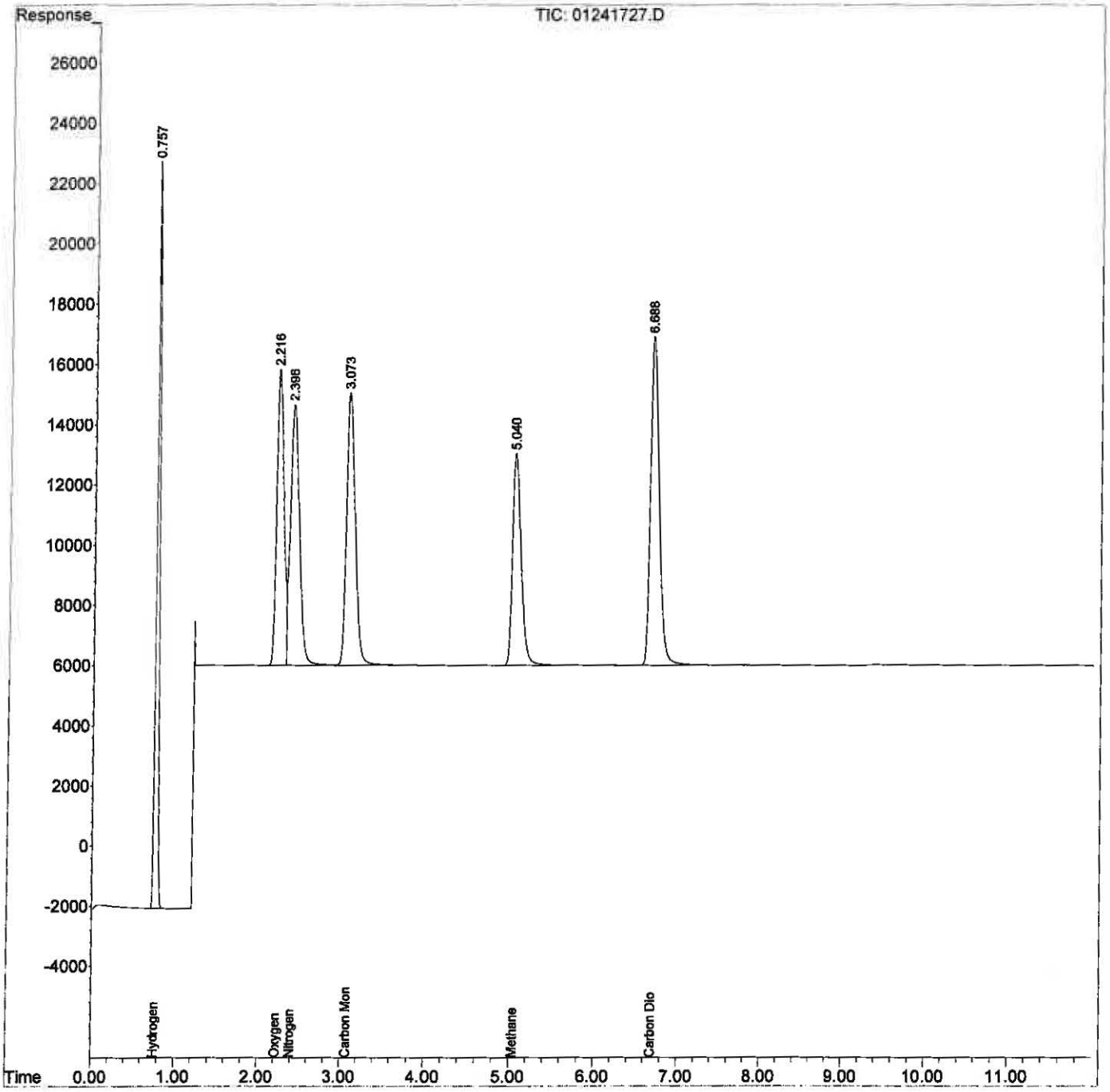
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.759	581720	434415.125	ppm
2)	Oxygen	2.218	593437	384865.128	ppm
3)	Nitrogen	2.397	671824	379650.320	ppm
4)	Carbon Monoxide	3.075	669389	387994.466	ppm
5)	Methane	5.042	494640	384594.565	ppm
6)	Carbon Dioxide	6.690	796935	384863.394	ppm

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

Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241727.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 4:13 pm
Operator : MC
Sample : lg loop S30-12191601 40.28%
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 16:40:16 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 16:07:39 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241728.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 4:51 pm
Operator : MC
Sample : S30-01241702 CO2
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 17:14:40 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 17:11:31 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

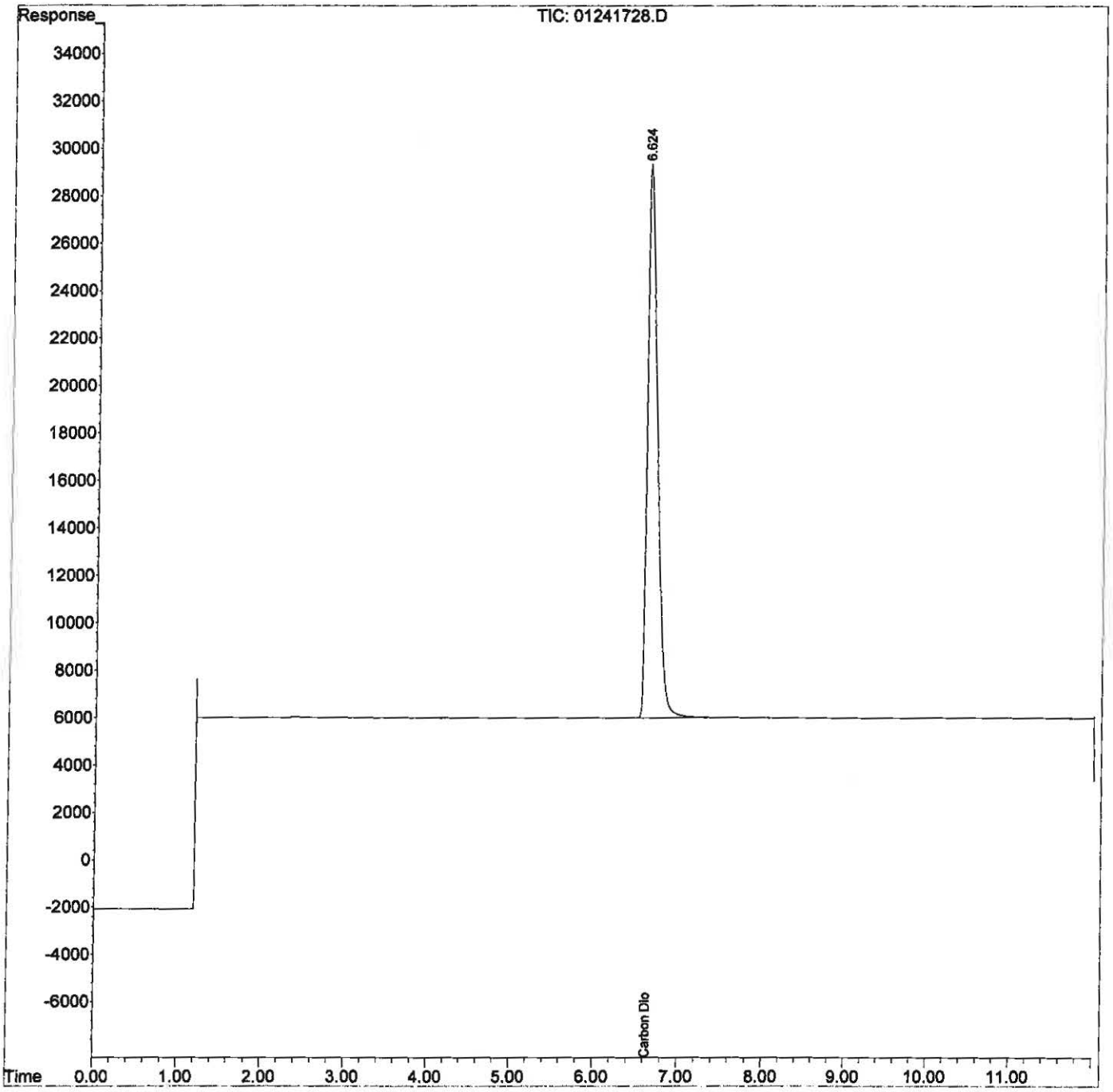
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Hydrogen	0.000	0	N.D.	ppm	
2)	Oxygen	0.000	0	N.D.	ppm	
3)	Nitrogen	0.000	0	N.D.	ppm	d
4)	Carbon Monoxide	0.000	0	N.D.	ppm	
5)	Methane	0.000	0	N.D.	ppm	
6)	Carbon Dioxide	6.625	1912854	930681.280	ppm	

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

Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241728.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 4:51 pm
Operator : MC
Sample : S30-01241702 CO2
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 24 17:14:40 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 17:11:31 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241729.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 5:13 pm
Operator : MC
Sample : icv S30-12091603
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 26 11:43:57 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 17:15:32 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

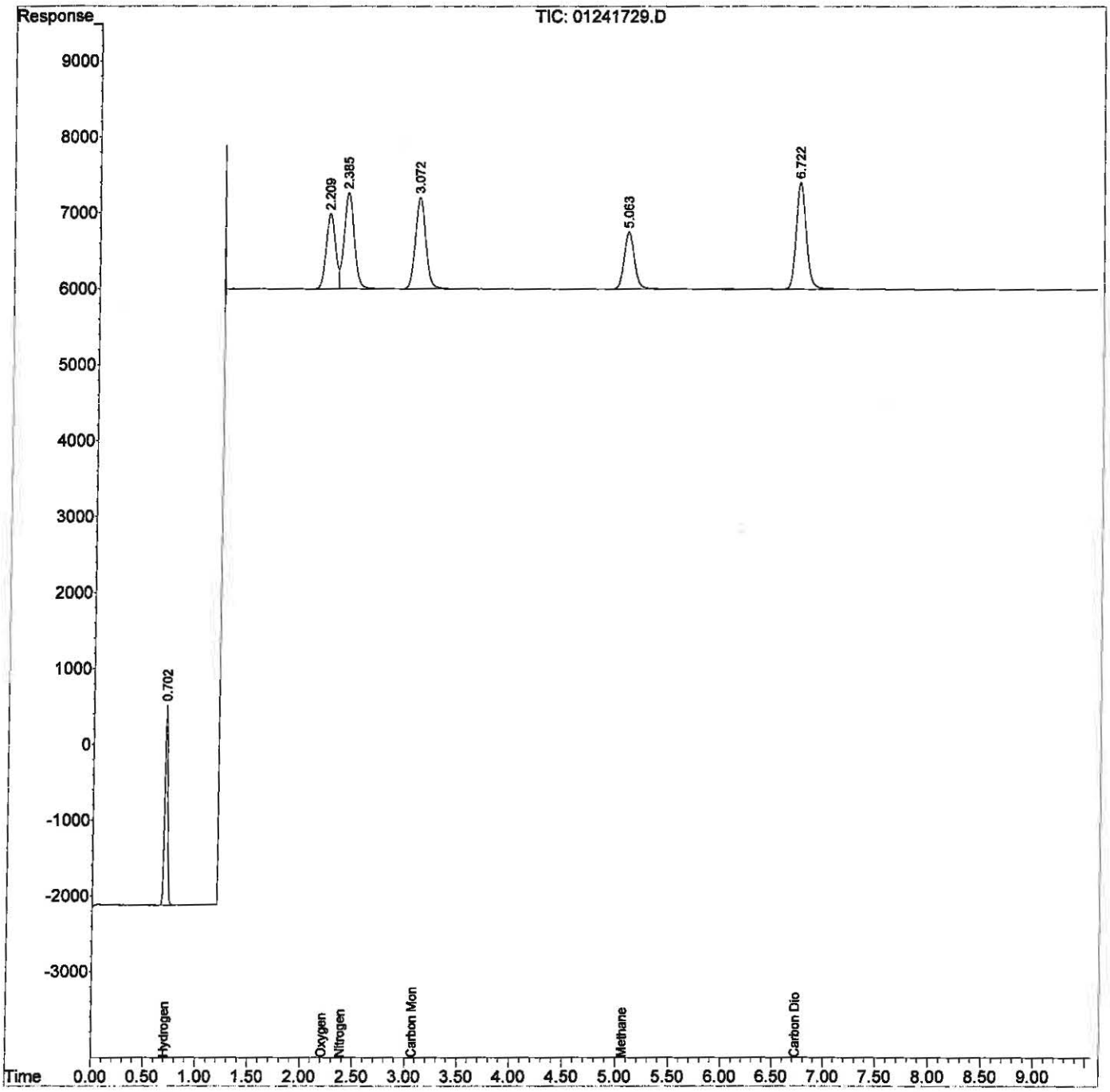
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.704	52203	38480.504	ppm
2)	Oxygen	2.211	60261	39428.995	ppm
3)	Nitrogen	2.386	85544	48121.904	ppm
4)	Carbon Monoxide	3.073	84807	49459.452	ppm
5)	Methane	5.064	50827	39776.144	ppm
6)	Carbon Dioxide	6.724	97748	48020.992	ppm

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

Data Path : I:\GC01\DATA\FXG\2017_01\24\
Data File : 01241729.D
Signal(s) : TCD1A.CH
Acq On : 24 Jan 2017 5:13 pm
Operator : MC
Sample : icv S30-12091603
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Jan 26 11:43:57 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 17:15:32 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Modified EPA Method 3C Daily QC Summary

Client : Trihydro Corporation
Analyst : MC
Method Name : EPA 3C, ASTM D 1946-90, VOA-EPA3C

Instrument : GC 1
Date Analyzed : 3/6/17

RT Summaries and QC Check (minutes)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time
ICAL Mean RT	**0.708**	**2.188**	**2.368**	**3.076**	**5.045**	**6.707**		
RT Windows (+/- min)	**0.072**	**0.133**	**0.146**	**0.034**	**0.130**	**0.145**		
std s30-01301701	0.712	2.231	2.407	3.094	5.084	6.742	03061701.D	07:56
+/- 0.33min of ICAL Mean RT	Pass	Pass	Pass	Pass	Pass	Pass		
mb							03061702.D	08:14
lab air		2.182 Pass	2.321 Pass			6.766 Pass	03061703.D	08:30
lcs s30-02211703	0.709 Pass	2.225 Pass	2.401 Pass	3.088 Pass	5.077 Pass	6.739 Pass	03061707.D	09:42
lcsd s30-02211703	0.711 Pass	2.229 Pass	2.406 Pass	3.094 Pass	5.081 Pass	6.742 Pass	03061708.D	09:59
0971-003		2.195 Pass	2.319 Pass			6.766 Pass	03061727.D	15:58
std s30-01301701	0.714 Pass	2.238 Pass	2.415 Pass	3.102 Pass	5.095 Pass	6.753 Pass	03061728.D	16:14

Continuing Calibration Standards Summary (ppm)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time
ACTUAL	40000.0	40000.0	50000.0	50000.0	40000.0	50000.0		
CCV Criteria (+/- %D)	**15.0%**	**10.0%**	**10.0%**	**10.0%**	**10.0%**	**10.0%**		
std s30-01301701	40836.9 2.1%	42439.9 6.1%	51887.1 3.8%	53197.6 6.4%	42978.6 7.4%	51664.8 3.3%	03061701.D	07:56
std s30-01301701	41192.2 3.0%	42702.1 6.8%	51968.7 3.9%	53392.4 6.8%	43026.3 7.6%	51813.8 3.6%	03061728.D	16:14
	####	####	####	####	####	#####		
	####	####	####	####	####	#####		

Lab Dup Summary (ppm, without DF correction and nomalization)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time

LCS / LCS Dup Summary (ppm, without DF correction)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time
LCS Actual Conc. (ppm)	25000.0	25000.0	25000.0	25000.0	25000.0	25000.0		
LCS Criteria (% Range)	**94%-105%**	**97%-108%**	**89%-113%**	**98%-108%**	**94%-111%**	**94%-104%**		
lcs s30-02211703	25329.4	26944.1	26537.6	26886.1	25766.1	25998.4	03061707.D	09:42
LCS % Recovery	101% Pass	108% Pass	106% Pass	108% Pass	103% Pass	104% Pass		
lcsd s30-02211703	25229.7	26977.0	26345.7	26697.9	25575.3	25860.8	03061708.D	09:59
LCS % Recovery	101% Pass	108% Pass	105% Pass	107% Pass	102% Pass	103% Pass		
Duplicate % RPD	0.4%	0.1%	0.7%	0.7%	0.7%	0.5%		
Duplicate Criteria % RPD	**3%** Pass	**3%** Pass	**7%** Pass	**3%** Pass	**3%** Pass	**3%** Pass		

Lab Air QC Summary

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxid	Methane	Carbon Dioxide	Lab Air Criteria Total (90%-110%)
lab air		209808.1	740775.0			417.9	95.1% Pass
Lab Air Normalized (%)		22.06%	77.89%			0.04%	100.0%

KAH 3/7/17

Quantitation Report (QT Reviewed)

Data Path : I:\GC01\DATA\FXG\2017_03\06\
Data File : 03061701.D
Signal(s) : TCD1A.CH
Acq On : 6 Mar 2017 7:56 am
Operator : MC
Sample : std s30-01301701
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Mar 06 08:28:31 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 17:15:32 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.712	55400	40836.923	ppm
2)	Oxygen	2.231	64863	42439.868	ppm
3)	Nitrogen	2.407	92237	51887.063	ppm
4)	Carbon Monoxide	3.094	91217	53197.576	ppm
5)	Methane	5.084	54919	42978.592	ppm
6)	Carbon Dioxide	6.742	105165	51664.780	ppm

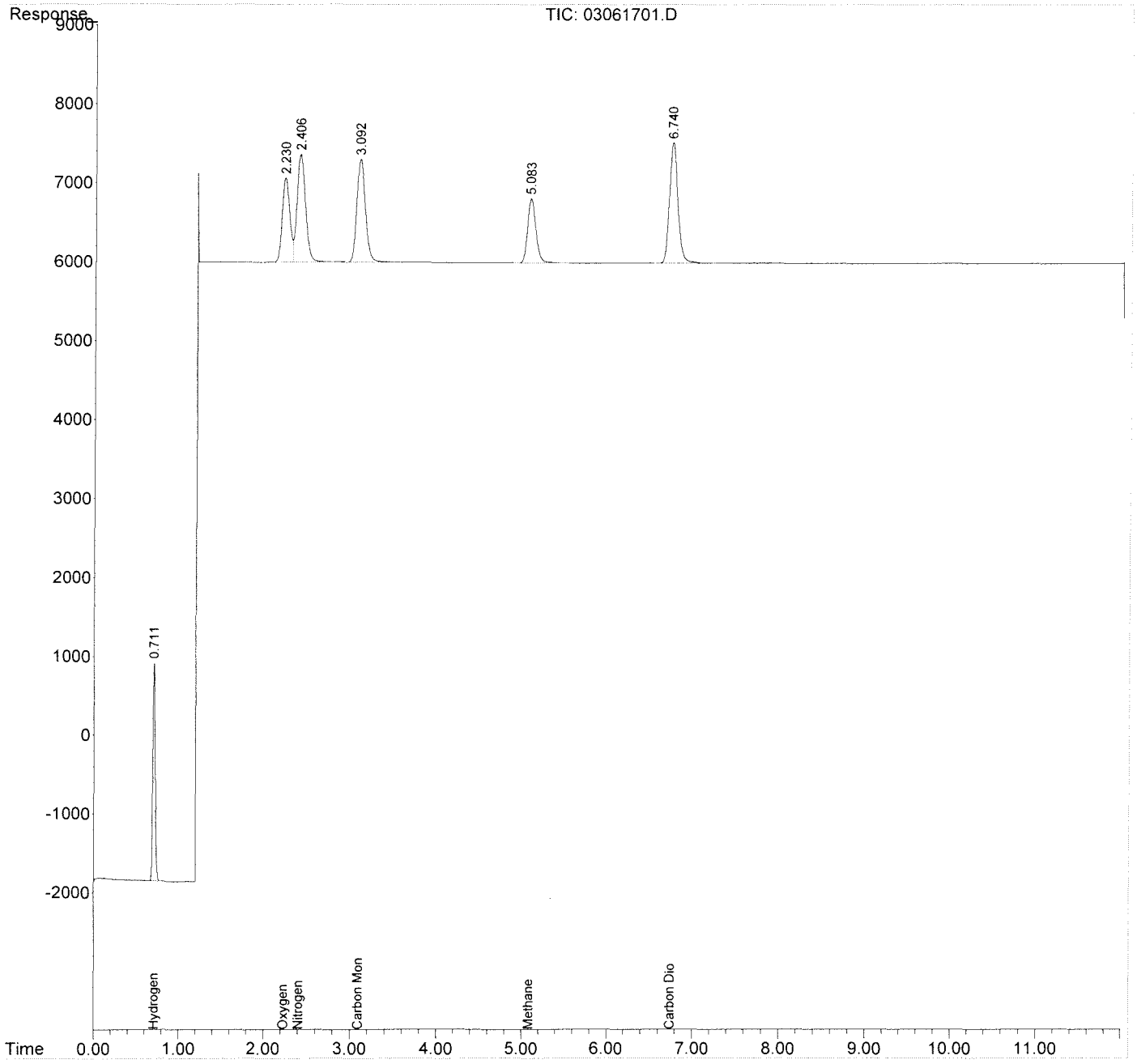
(f)=RT Delta > 1/2 Window (m)=manual int.

KAM 3/7/17

Data Path : I:\GC01\DATA\FXG\2017_03\06\
Data File : 03061701.D
Signal(s) : TCD1A.CH
Acq On : 6 Mar 2017 7:56 am
Operator : MC
Sample : std s30-01301701
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Mar 06 08:28:31 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 17:15:32 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : I:\GC01\DATA\FXG\2017_03\06\
Data File : 03061728.D
Signal(s) : TCD1A.CH
Acq On : 6 Mar 2017 4:14 pm
Operator : MC
Sample : std s30-01301701
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Mar 06 16:24:01 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 17:15:32 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Hydrogen	0.714	55882	41192.225	ppm
2)	Oxygen	2.238	65264	42702.130	ppm
3)	Nitrogen	2.415	92382	51968.700	ppm
4)	Carbon Monoxide	3.102	91551	53392.364	ppm
5)	Methane	5.095	54980	43026.322	ppm
6)	Carbon Dioxide	6.753	105468	51813.756	ppm

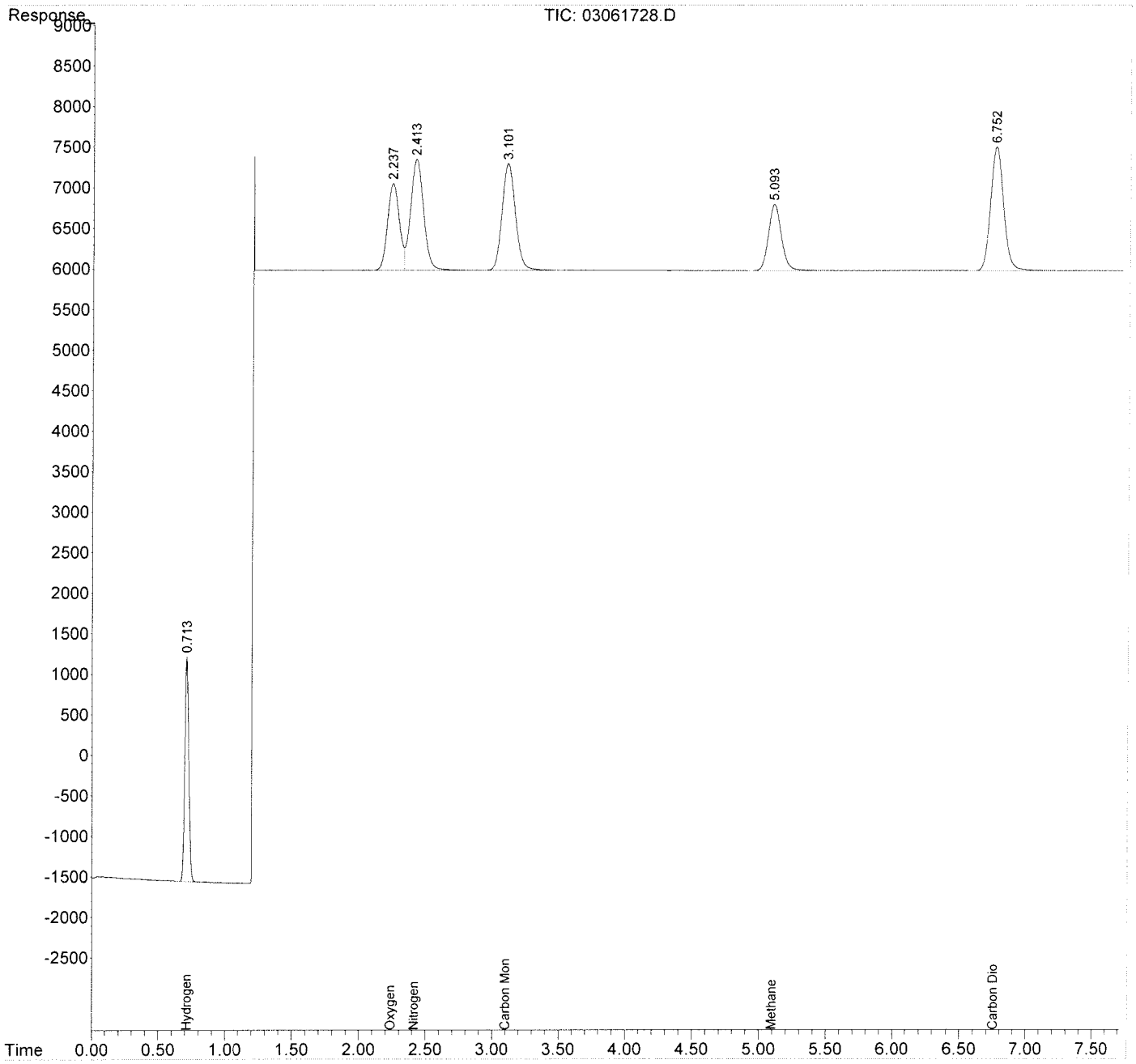
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : I:\GC01\DATA\FXG\2017_03\06\
Data File : 03061728.D
Signal(s) : TCD1A.CH
Acq On : 6 Mar 2017 4:14 pm
Operator : MC
Sample : std s30-01301701
Misc :
ALS Vial : 1 Sample Multiplier: 10

Integration File: autoint1.e
Quant Time: Mar 06 16:24:01 2017
Quant Method : I:\GC01\METHODS\3C012417.M
Quant Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
QLast Update : Tue Jan 24 17:15:32 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 100ul
Signal Phase : CarboSieve Packed Column
Signal Info :



Injection Log

Directory: I:\GC01\DATA\FXG\2017_01\24\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Acquisition Method	Comments
1	24 Jan 117 8:04 am	01241701.D	X		MC	MFXGS25C.M	
2	24 Jan 117 8:19 am	01241702.D	xstd s30-01231703		MC	MFXGS25C.M	
3	24 Jan 117 8:32 am	01241703.D	std 30-12091603		MC	MFXGS25C.M	
4	24 Jan 117 8:48 am	01241704.D	mb		MC	MFXGS25C.M	
5	24 Jan 117 9:04 am	01241705.D	lab air		MC	MFXGS25C.M	
6	24 Jan 117 9:22 am	01241706.D	0285-001		MC	MFXGS25C.M	
7	24 Jan 117 9:38 am	01241707.D	0285-002		MC	MFXGS25C.M	
8	24 Jan 117 9:54 am	01241708.D	std s30-12301601 0.1%		MC	MFXGS25C.M	
9	24 Jan 117 10:12 am	01241709.D	pressure check		MC	MFXGS25C.M	
10	24 Jan 117 10:28 am	01241710.D	std s30-1231702 0.5%		MC	MFXGS25C.M	
11	24 Jan 117 10:46 am	01241711.D	std s30-01231701 1%		MC	MFXGS25C.M	
12	24 Jan 117 11:04 am	01241712.D	std s30-12191601 4%		MC	MFXGS25C.M	
13	24 Jan 117 11:28 am	01241713.D	std s30-01231703 16%		MC	MFXGS25C.M	
14	24 Jan 117 11:45 am	01241714.D	s11-12021503 O2		MC	MFXGS25C.M	
15	24 Jan 117 12:02 pm	01241715.D	pressure check		MC	MFXGS25C.M	
16	24 Jan 117 12:21 pm	01241716.D	s30-01241701 CH4		MC	MFXGS25C.M	
17	24 Jan 117 12:38 pm	01241717.D	pressure check		MC	MFXGS25C.M	
18	24 Jan 117 1:55 pm	01241718.D	pressure check		MC	MFXGS25C.M	
19	24 Jan 117 2:11 pm	01241719.D	pressure check		MC	MFXGS25C.M	
20	24 Jan 117 2:32 pm	01241720.D	pressure check		MC	MFXGS25C.M	
21	24 Jan 117 2:42 pm	01241721.D	pressure check		MC	MFXGS25C.M	
22	24 Jan 117 2:54 pm	01241722.D	pressure check		MC	MFXGS25C.M	
23	24 Jan 117 3:01 pm	01241723.D	pressure check		MC	MFXGS25C.M	
24	24 Jan 117 3:08 pm	01241724.D	s11-12021502 N2		MC	MFXGS25C.M	
25	24 Jan 117 3:17 pm	01241725.D	mb		MC	MFXGS25C.M	
26	24 Jan 117 3:39 pm	01241726.D	pressure check		MC	MFXGS25C.M	
27	24 Jan 117 4:13 pm	01241727.D	lg loop S30-12191601 40.28%		MC	MFXGS25C.M	
28	24 Jan 117 4:51 pm	01241728.D	S30-01241702 CO2		MC	MFXGS25C.M	
29	24 Jan 117 5:13 pm	01241729.D	icv S30-12091603		MC	MFXGS25C.M	

Injection Log

Directory: I:\GC01\DATA\FXG\2017_03\06\

	Sample ID	Date/Time	Acquisition Method	File Name	Misc Info	Operator	Comments
1	std s30-01301701	3/6/17 7:56	MFXGS25C.M	03061701.D		MC	pass
2	mb	3/6/17 8:14	MFXGS25C.M	03061702.D		MC	pass
3	lab air	3/6/17 8:30	MFXGS25C.M	03061703.D		MC	pass
4	lcs	3/6/17 8:46	MFXGS25C.M	03061704.D		MC	fail
5	lcs	3/6/17 9:08	MFXGS25C.M	03061705.D		MC	fail
6	lcs	3/6/17 9:26	MFXGS25C.M	03061706.D		MC	fail
7	lcs s30-02211703	3/6/17 9:42	MFXGS25C.M	03061707.D		MC	pass
8	lcsd s30-02211703	3/6/17 9:59	MFXGS25C.M	03061708.D		MC	pass
	1014-001	3/6/17 10:20	MFXGS25C.M	03061709.D		MC	
	1014-002	3/6/17 10:38	MFXGS25C.M	03061710.D		MC	
	1014-003	3/6/17 10:54	MFXGS25C.M	03061711.D		MC	
	1015-001	3/6/17 11:11	MFXGS25C.M	03061712.D		MC	
	1015-002	3/6/17 11:27	MFXGS25C.M	03061713.D		MC	
	1015-003	3/6/17 11:44	MFXGS25C.M	03061714.D		MC	
	1042-001	3/6/17 11:59	MFXGS25C.M	03061715.D		MC	
	1042-002	3/6/17 12:15	MFXGS25C.M	03061716.D		MC	
	1042-003	3/6/17 12:32	MFXGS25C.M	03061717.D		MC	
	1042-004	3/6/17 12:48	MFXGS25C.M	03061718.D		MC	
#VALUE!	std s30-01301701	3/6/17 13:04	MFXGS25C.M	03061719.D		MC	pass
	1086-014	3/6/17 13:21	MFXGS25C.M	03061720.D		MC	
	1086-015	3/6/17 14:00	MFXGS25C.M	03061721.D		MC	
	1086-016	3/6/17 14:17	MFXGS25C.M	03061722.D		MC	
	1047-001	3/6/17 14:33	MFXGS25C.M	03061723.D		MC	
	1046-001	3/6/17 14:48	MFXGS25C.M	03061724.D		MC	
	1046-002	3/6/17 15:24	MFXGS25C.M	03061725.D		MC	
	1067-001	3/6/17 15:41	MFXGS25C.M	03061726.D		MC	
	0971-003	3/6/17 15:58	MFXGS25C.M	03061727.D		MC	
#VALUE!	std s30-01301701	3/6/17 16:14	MFXGS25C.M	03061728.D		MC	pass

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091717.D
Acq On : 9 Mar 2017 15:48 Operator: LH
Sample : P1700971-001 (1000mL)
Misc : S29-03071701
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Mar 10 17:10:35 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/10/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.54	130	377341	12.500 ng	-0.01
7) 1,4-Difluorobenzene (IS2)	13.65	114	1931085	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1503587	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.39	65	707972	13.132 ng	0.00
Spiked Amount 12.500				Recovery = 105.04%	
12) Toluene-d8 (SS2)	16.10	98	2061524	13.011 ng	0.00
Spiked Amount 12.500				Recovery = 104.08%	
20) p-Bromofluorobenzene (...	19.28	174	584579	11.082 ng	0.00
Spiked Amount 12.500				Recovery = 88.64%	

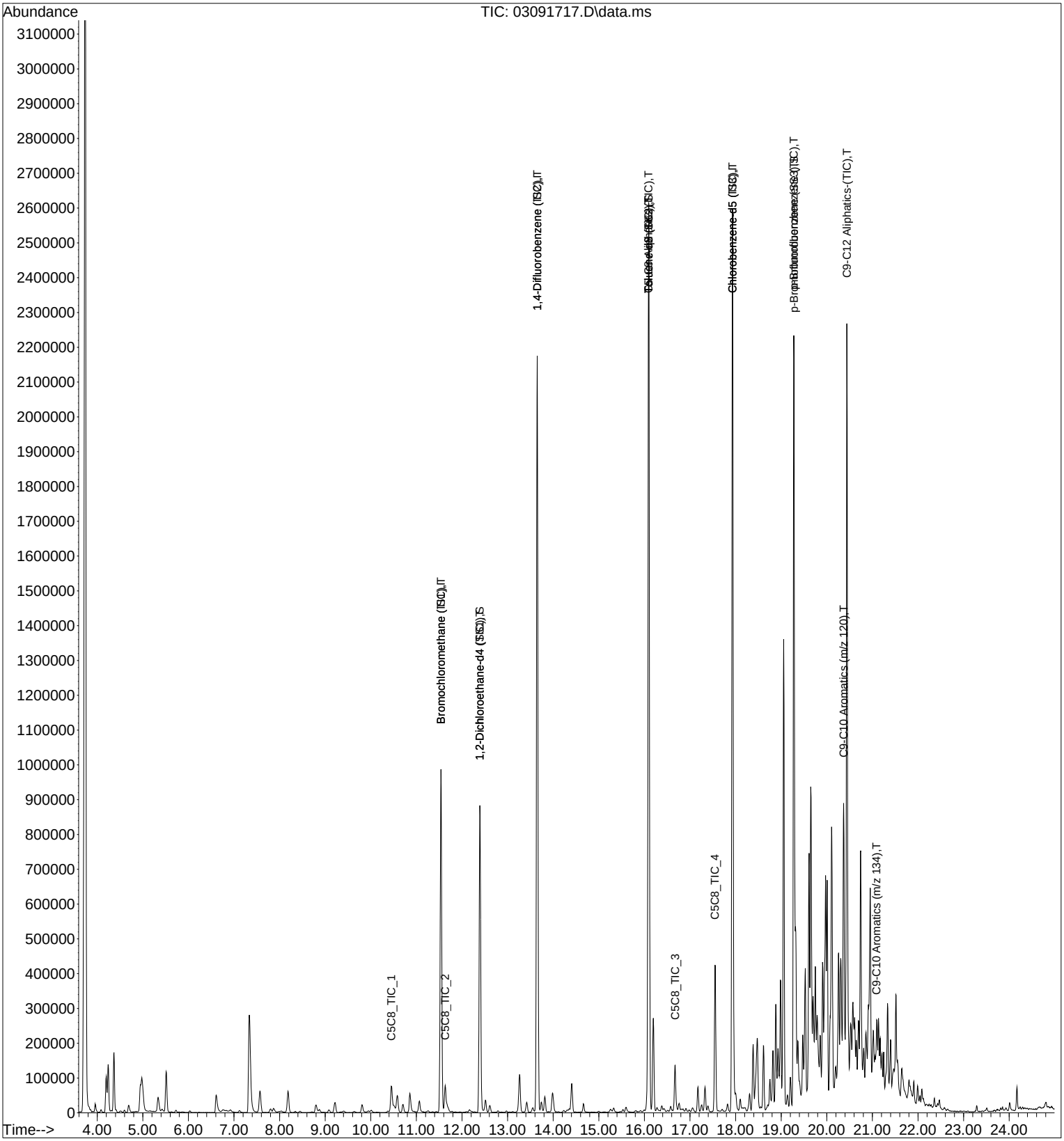
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.54	TIC	2311921	15.098 ng	100
3) Isopentane	7.34	TIC	895662	No Calib #	
4) n-Hexane	11.63	TIC	245251	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.39	TIC	2032297	13.451 ng	100
8) 1,4-Difluorobenzene (TIC)	13.65	TIC	4625590	13.038 ng	100
9) Cyclohexane	13.55	TIC	35292	No Calib	
10) 2,3-Dimethylpentane	13.81	TIC	98394	No Calib	
11) n-Heptane	14.66	TIC	49180	No Calib	
13) Toluene-d8 (TIC)	16.09	TIC	5581491	13.307 ng	100
14) n-Octane	17.17	TIC	140560	No Calib	
15) C5-C8 Aliphatics (TIC)	16.09	TIC	30251784m	66.944 ng	
17) Chlorobenzene-d5 (TIC)	17.93	TIC	5326706	13.861 ng	100
18) 2,3-Dimethylheptane	18.38	TIC	378784	No Calib	
19) n-Nonane	19.06	TIC	2322107	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	4212577m	14.089 ng	
22) Isopropylbenzene	19.39	120	1707	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	17236	No Calib	
24) 1,3,5-Trimethylbenzene	20.02	120	10900	No Calib	
25) n-Decane	20.44	TIC	3515930	No Calib #	
26) p-Isopropyltoluene	20.73	134	3648	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	10542	No Calib	
28) Butylcyclohexane	20.95	TIC	1316094	No Calib	
29) n-Undecane	21.51	TIC	748517	No Calib	
30) n-Dodecane	22.43	TIC	21647	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.44	TIC	44914188m	465.259 ng	
32) C9-C10 Aromatics (m/z ...	20.37	120	120028m	6.024 ng	
33) C9-C10 Aromatics (m/z ...	21.08	134	47434m	4.240 ng	
34) C5C8_TIC_1	10.45	TIC	605483m	0.209 ng	
35) C5C8 TIC 2	11.63	TIC	354977m	0.123 ng	
36) C5C8 TIC 3	16.67	TIC	325010m	0.112 ng	
37) C5C8 TIC 4	17.55	TIC	1126710m	0.389 ng	
38) C9C12 TIC 1	0.00	TIC	0	N.D. d	
39) C9C12 TIC 2	0.00	TIC	0	N.D. d	
40) C9C12 TIC 3	0.00	TIC	0	N.D. d	
41) C9C12 TIC 4	0.00	TIC	0	N.D. d	
42) C9C10 TIC 1	0.00	120	0	N.D. d	
43) C9C10 TIC 2	20.30	134	2699	N.D.	

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091717.D
Acq On : 9 Mar 2017 15:48 Operator: LH
Sample : P1700971-001 (1000mL)
Misc : S29-03071701
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Mar 10 17:10:35 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091718.D
Acq On : 9 Mar 2017 16:35 Operator: LH
Sample : P1700971-002 (1000mL)
Misc : S29-03071701
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Mar 13 10:26:29 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/13/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.54	130	390963	12.500 ng	0.00
7) 1,4-Difluorobenzene (IS2)	13.65	114	2007859	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1554528	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.40	65	734889	13.157 ng	0.00
Spiked Amount 12.500				Recovery = 105.28%	
12) Toluene-d8 (SS2)	16.10	98	2141087	12.996 ng	0.00
Spiked Amount 12.500				Recovery = 104.00%	
20) p-Bromofluorobenzene (...	19.28	174	598869	10.981 ng	0.00
Spiked Amount 12.500				Recovery = 87.84%	

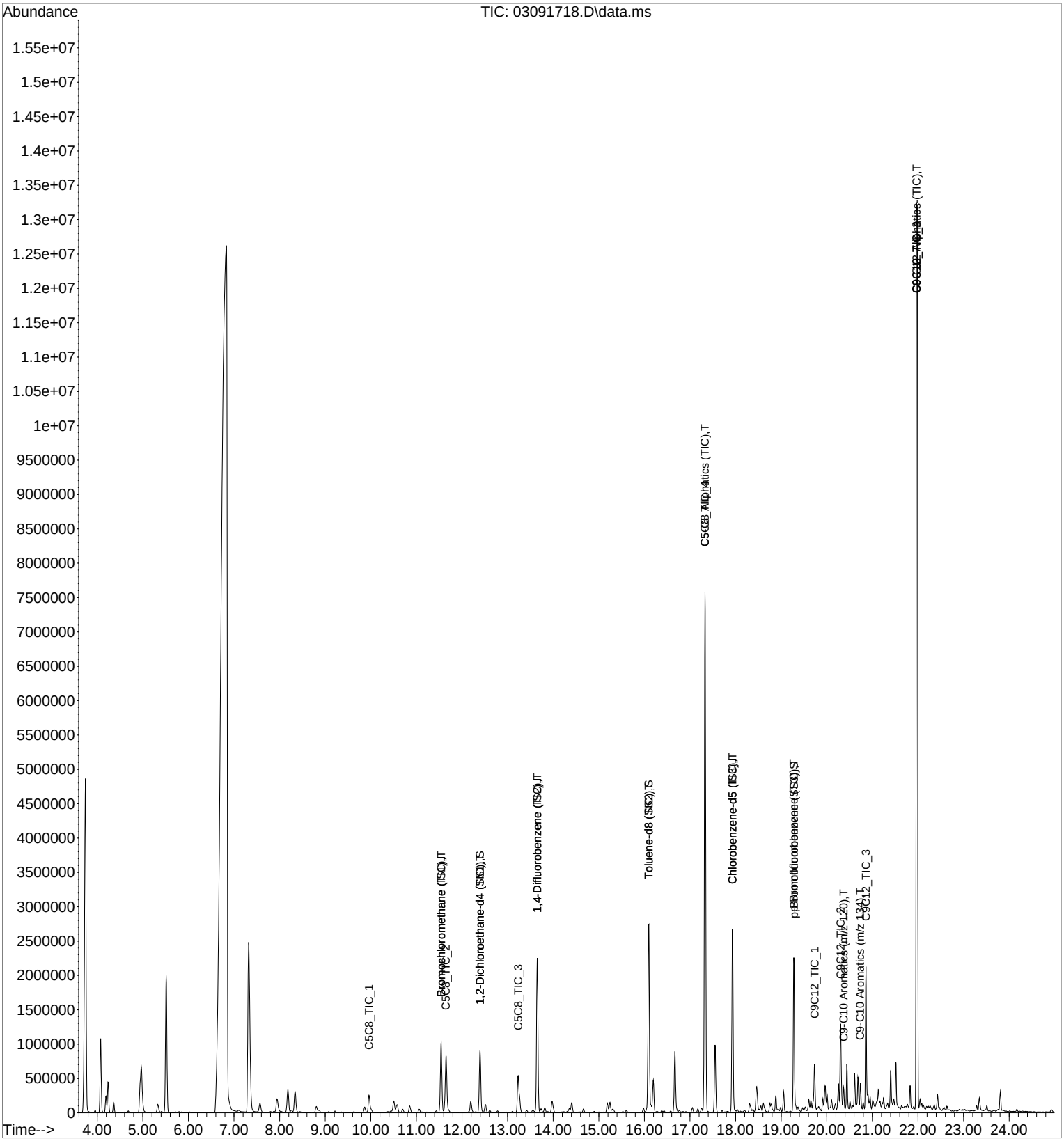
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.54	TIC	2409225	15.185 ng	100
3) Isopentane	7.32	TIC	7673494	No Calib #	
4) n-Hexane	11.65	TIC	2202069	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.40	TIC	2115020	13.511 ng	100
8) 1,4-Difluorobenzene (TIC)	13.65	TIC	4832761	13.101 ng	100
9) Cyclohexane	13.56	TIC	111587	No Calib	
10) 2,3-Dimethylpentane	13.82	TIC	140770	No Calib	
11) n-Heptane	14.67	TIC	124437	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	6061178	13.898 ng	100
14) n-Octane	17.18	TIC	103205	No Calib	
15) C5-C8 Aliphatics (TIC)	17.33	TIC	59898955m	127.483 ng	
17) Chlorobenzene-d5 (TIC)	17.93	TIC	5252485	13.220 ng	100
18) 2,3-Dimethylheptane	18.38	TIC	52367	No Calib	
19) n-Nonane	19.06	TIC	514694	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	4064633	13.149 ng	100
22) Isopropylbenzene	19.40	120	2946	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	23129	No Calib	
24) 1,3,5-Trimethylbenzene	20.02	120	16350	No Calib	
25) n-Decane	20.44	TIC	973919	No Calib	
26) p-Isopropyltoluene	20.73	134	20850	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	21128	No Calib #	
28) Butylcyclohexane	20.95	TIC	270643	No Calib	
29) n-Undecane	21.51	TIC	1159171	No Calib	
30) n-Dodecane	22.43	TIC	496713	No Calib	
31) C9-C12 Aliphatics-(TIC)	21.97	TIC	60417928m	605.351 ng	
32) C9-C10 Aromatics (m/z ...	20.37	120	176583m	8.572 ng	
33) C9-C10 Aromatics (m/z ...	20.73	134	113079m	9.776 ng	
34) C5C8_TIC_1	9.96	TIC	2420036m	0.809 ng	
35) C5C8 TIC 2	11.65	TIC	2813392m	0.941 ng	
36) C5C8 TIC 3	13.23	TIC	1852041m	0.619 ng	
37) C5C8 TIC 4	17.33	TIC	19745466m	6.601 ng	
38) C9C12 TIC 1	19.73	TIC	1267997m	2.139 ng	
39) C9C12 TIC 2	20.30	TIC	3037298m	5.123 ng	
40) C9C12 TIC 3	20.86	TIC	3240200m	5.465 ng	
41) C9C12 TIC 4	21.97	TIC	29182288m	49.224 ng	
42) C9C10 TIC 1	21.98	120	9628	N.D.	
43) C9C10 TIC 2	21.97	134	19326m	0.340 ng	

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091718.D
Acq On : 9 Mar 2017 16:35 Operator: LH
Sample : P1700971-002 (1000mL)
Misc : S29-03071701
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Mar 13 10:26:29 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091719.D
Acq On : 9 Mar 2017 17:09 Operator: LH
Sample : P1700971-003 (120mL)
Misc : S29-03071701
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Mar 13 10:29:32 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/13/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.53	130	371656	12.500 ng	-0.02
7) 1,4-Difluorobenzene (IS2)	13.64	114	1915899	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1480155	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.39	65	701233	13.206 ng	0.00
Spiked Amount 12.500				Recovery = 105.68%	
12) Toluene-d8 (SS2)	16.09	98	2026356	12.890 ng	0.00
Spiked Amount 12.500				Recovery = 103.12%	
20) p-Bromofluorobenzene (...	19.28	174	563863	10.859 ng	0.00
Spiked Amount 12.500				Recovery = 86.88%	

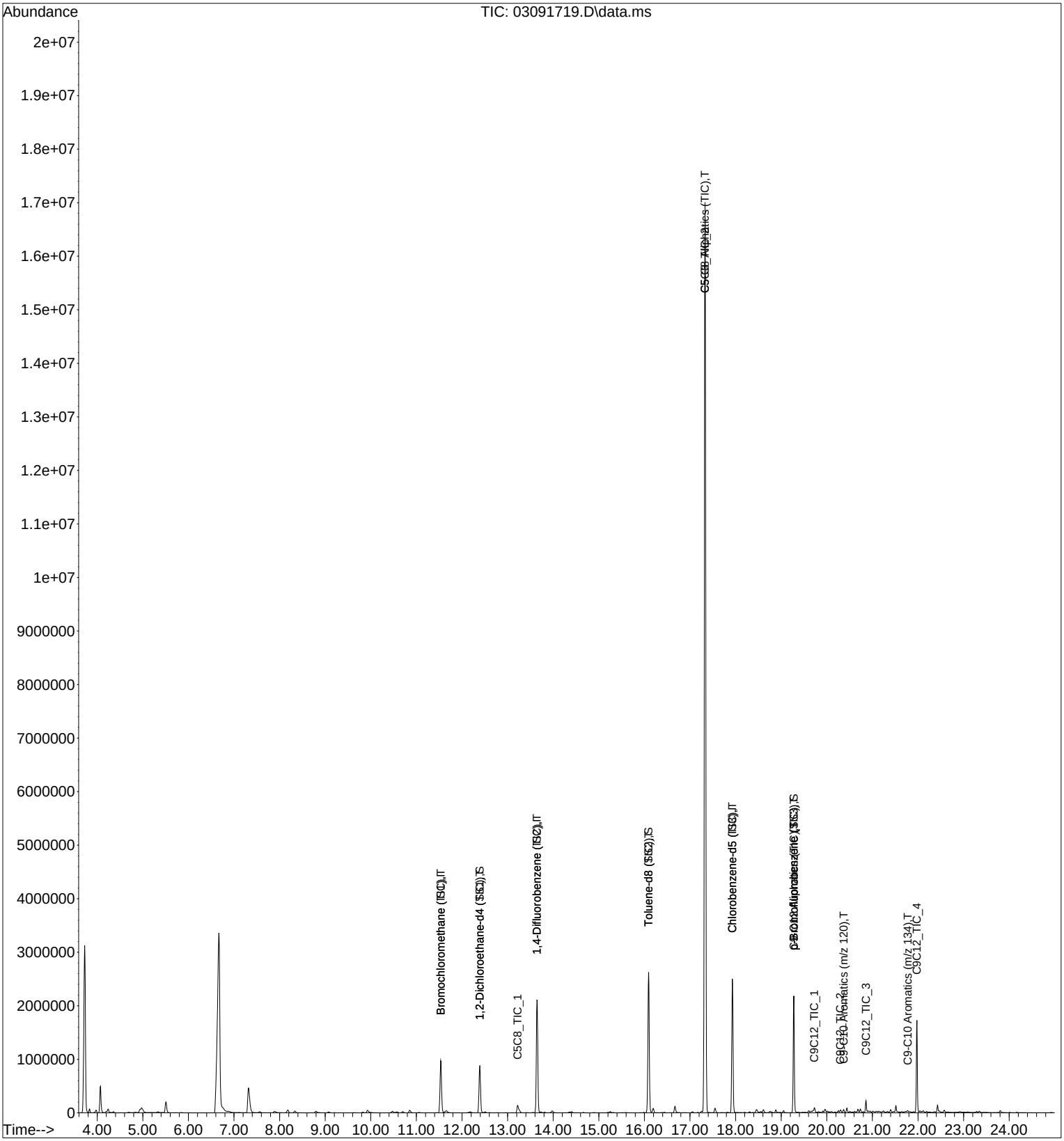
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.53	TIC	2287886	15.169 ng	100
3) Isopentane	7.32	TIC	1447819	No Calib #	
4) n-Hexane	11.66	TIC	146538	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.39	TIC	2021456	13.584 ng	100
8) 1,4-Difluorobenzene (TIC)	13.64	TIC	4589346	13.038 ng	100
9) Cyclohexane	13.55	TIC	15449	No Calib	
10) 2,3-Dimethylpentane	13.82	TIC	25289	No Calib	
11) n-Heptane	14.66	TIC	19783	No Calib	
13) Toluene-d8 (TIC)	16.09	TIC	5472696	13.151 ng	100
14) n-Octane	17.33	TIC	35698131	No Calib	
15) C5-C8 Aliphatics (TIC)	17.33	TIC	59529989m	132.779 ng	
17) Chlorobenzene-d5 (TIC)	17.93	TIC	4870826	12.876 ng	100
18) 2,3-Dimethylheptane	18.37	TIC	9256	No Calib	
19) n-Nonane	19.05	TIC	66786	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	3633454	12.345 ng	100
22) Isopropylbenzene	19.39	120	454	No Calib #	
23) 1-Methyl-3-ethylbenzene	19.92	120	3677	No Calib	
24) 1,3,5-Trimethylbenzene	20.01	120	3564	No Calib	
25) n-Decane	20.44	TIC	126554	No Calib	
26) p-Isopropyltoluene	20.73	134	3618	No Calib	
27) 1,2,3-Trimethylbenzene	20.73	120	3849	No Calib	
28) Butylcyclohexane	20.95	TIC	36021	No Calib	
29) n-Undecane	21.51	TIC	210474	No Calib	
30) n-Dodecane	22.43	TIC	253335	No Calib	
31) C9-C12 Aliphatics-(TIC)	19.28	TIC	10067071m	105.934 ng	
32) C9-C10 Aromatics (m/z ...	20.37	120	33417m	1.704 ng	
33) C9-C10 Aromatics (m/z ...	21.78	134	30836m	2.800 ng	
34) C5C8_TIC_1	13.22	TIC	420615m	0.148 ng	
35) C5C8 TIC 2	17.33	TIC	36440546m	12.795 ng	
36) C5C8 TIC 3	0.00	TIC	0	N.D. d	
37) C5C8 TIC 4	0.00	TIC	0	N.D. d	
38) C9C12 TIC 1	19.73	TIC	200378m	0.355 ng	
39) C9C12 TIC 2	20.30	TIC	152888m	0.271 ng	
40) C9C12 TIC 3	20.86	TIC	338610m	0.600 ng	
41) C9C12 TIC 4	21.98	TIC	2502293m	4.433 ng	
42) C9C10 TIC 1	21.98	120	818	N.D.	
43) C9C10 TIC 2	21.98	134	1849	N.D.	

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091719.D
Acq On : 9 Mar 2017 17:09 Operator: LH
Sample : P1700971-003 (120mL)
Misc : S29-03071701
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Mar 13 10:29:32 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091720.D
Acq On : 9 Mar 2017 17:43 Operator: LH
Sample : P1700971-004 (1000mL)
Misc : S29-03071701
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Mar 13 10:35:07 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/13/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.54	130	377727	12.500 ng	-0.01
7) 1,4-Difluorobenzene (IS2)	13.65	114	1943924	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1504373	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.39	65	707649	13.113 ng	0.00
Spiked Amount 12.500				Recovery = 104.88%	
12) Toluene-d8 (SS2)	16.09	98	2070565	12.982 ng	0.00
Spiked Amount 12.500				Recovery = 103.84%	
20) p-Bromofluorobenzene (...	19.28	174	582974	11.046 ng	0.00
Spiked Amount 12.500				Recovery = 88.40%	

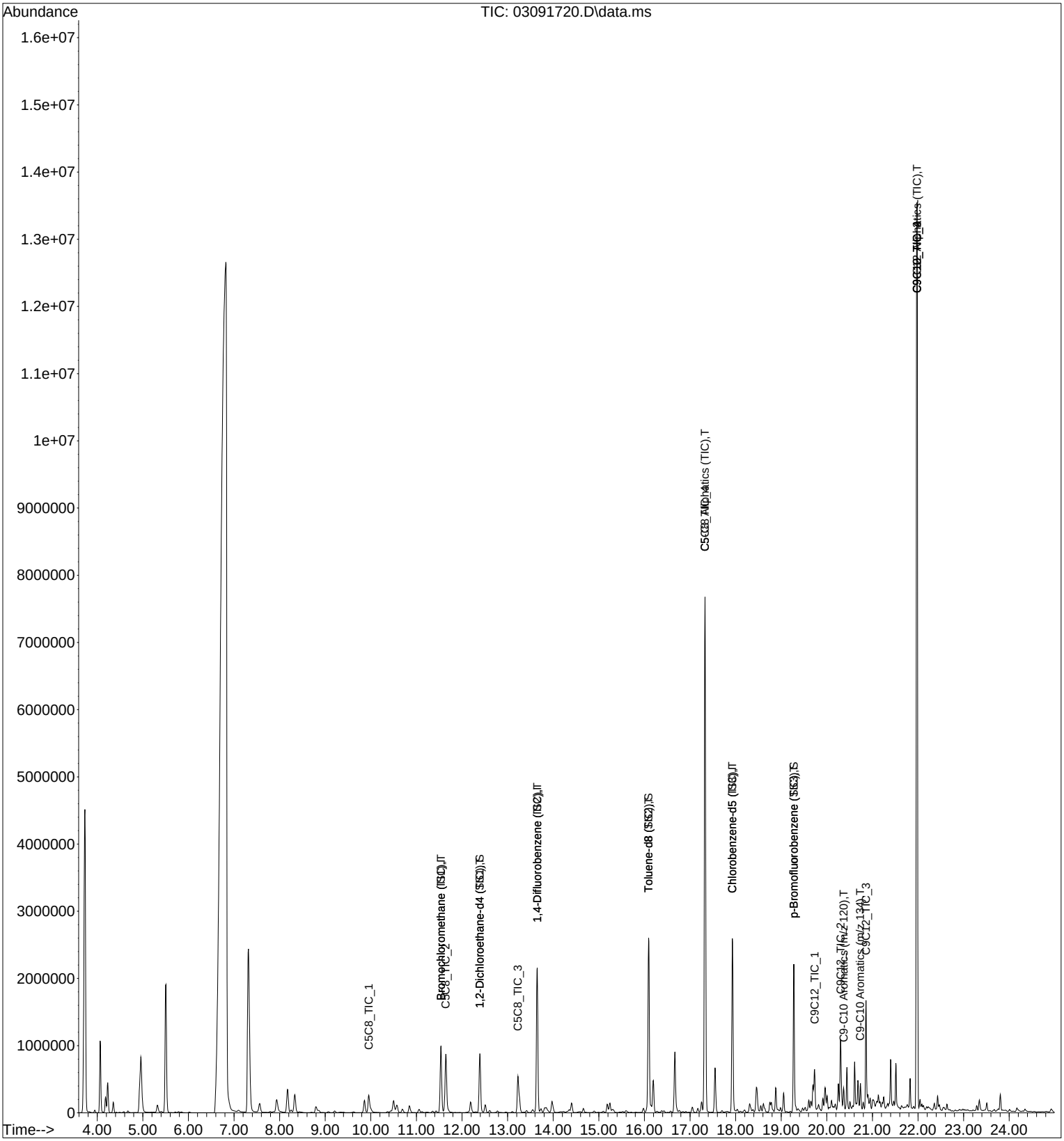
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.54	TIC	2323049	15.155 ng	100
3) Isopentane	7.31	TIC	7472055	No Calib #	
4) n-Hexane	11.64	TIC	2318774	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.39	TIC	2030587	13.426 ng	100
8) 1,4-Difluorobenzene (TIC)	13.65	TIC	4621806	12.941 ng	100
9) Cyclohexane	13.55	TIC	122332	No Calib	
10) 2,3-Dimethylpentane	13.84	TIC	323971	No Calib	
11) n-Heptane	14.66	TIC	144069	No Calib	
13) Toluene-d8 (TIC)	16.09	TIC	5840497	13.832 ng	100
14) n-Octane	17.17	TIC	127615	No Calib	
15) C5-C8 Aliphatics (TIC)	17.33	TIC	59849515m	131.567 ng	
17) Chlorobenzene-d5 (TIC)	17.93	TIC	5099477	13.263 ng	100
18) 2,3-Dimethylheptane	18.38	TIC	55334	No Calib	
19) n-Nonane	19.06	TIC	503643	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	3927401	13.129 ng	100
22) Isopropylbenzene	19.39	120	2528	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	24079	No Calib	
24) 1,3,5-Trimethylbenzene	20.01	120	15440	No Calib	
25) n-Decane	20.44	TIC	929984	No Calib	
26) p-Isopropyltoluene	20.73	134	20869	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	20603	No Calib #	
28) Butylcyclohexane	20.95	TIC	245099	No Calib	
29) n-Undecane	21.51	TIC	1134182	No Calib	
30) n-Dodecane	22.43	TIC	348661	No Calib	
31) C9-C12 Aliphatics-(TIC)	21.98	TIC	59108105m	611.972 ng	
32) C9-C10 Aromatics (m/z ...	20.37	120	186379m	9.350 ng	
33) C9-C10 Aromatics (m/z ...	20.73	134	112808m	10.078 ng	
34) C5C8_TIC_1	9.95	TIC	1520843m	0.525 ng	
35) C5C8 TIC 2	11.64	TIC	2871220m	0.992 ng	
36) C5C8 TIC 3	13.23	TIC	1889860m	0.653 ng	
37) C5C8 TIC 4	17.33	TIC	19410054m	6.705 ng	
38) C9C12 TIC 1	19.73	TIC	1801605m	3.140 ng	
39) C9C12 TIC 2	20.30	TIC	2739479m	4.775 ng	
40) C9C12 TIC 3	20.86	TIC	2530608m	4.411 ng	
41) C9C12 TIC 4	21.98	TIC	27845894m	48.535 ng	
42) C9C10 TIC 1	21.98	120	9412	N.D.	
43) C9C10 TIC 2	21.98	134	18588m	0.338 ng	

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091720.D
Acq On : 9 Mar 2017 17:43 Operator: LH
Sample : P1700971-004 (1000mL)
Misc : S29-03071701
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Mar 13 10:35:07 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091721.D
Acq On : 9 Mar 2017 18:17 Operator: LH
Sample : P1700971-005 (1000mL)
Misc : S29-03071701
ALS Vial : 10 Sample Multiplier: 1

Quant Time: Mar 13 10:37:18 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/13/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.53	130	374333	12.500 ng	-0.02
7) 1,4-Difluorobenzene (IS2)	13.64	114	1927332	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1486235	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.39	65	701487	13.116 ng	-0.01
Spiked Amount 12.500				Recovery = 104.96%	
12) Toluene-d8 (SS2)	16.09	98	2043361	12.922 ng	0.00
Spiked Amount 12.500				Recovery = 103.36%	
20) p-Bromofluorobenzene (...	19.28	174	567877	10.891 ng	0.00
Spiked Amount 12.500				Recovery = 87.12%	

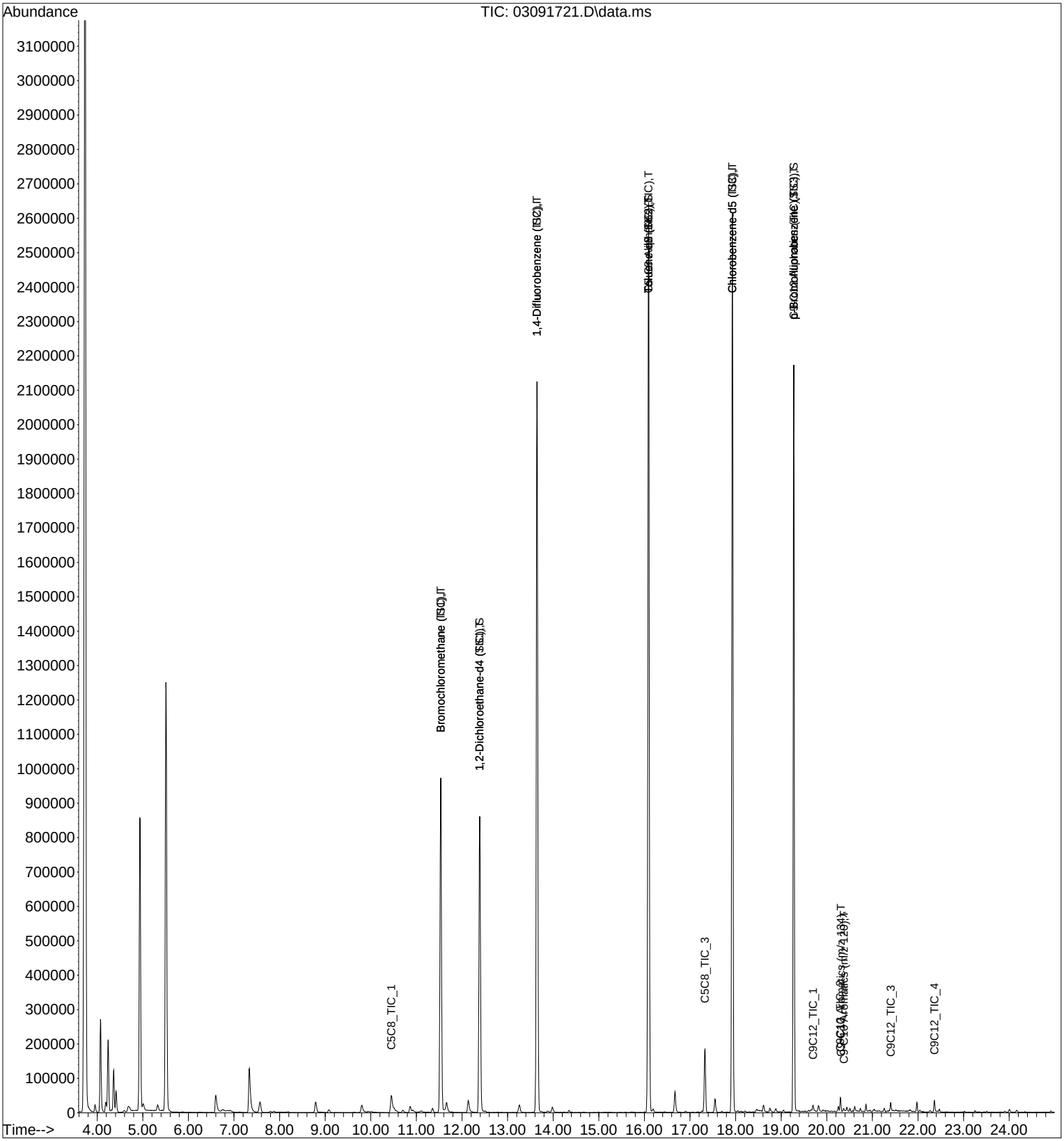
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.53	TIC	2287071	15.055 ng	100
3) Isopentane	7.34	TIC	365512	No Calib #	
4) n-Hexane	11.66	TIC	92205	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.39	TIC	2011879	13.423 ng	100
8) 1,4-Difluorobenzene (TIC)	13.64	TIC	4593492	12.973 ng	100
9) Cyclohexane	13.64	TIC	4593492	No Calib	
10) 2,3-Dimethylpentane	13.88	TIC	11105	No Calib	
11) n-Heptane	14.67	TIC	3835	No Calib	
13) Toluene-d8 (TIC)	16.09	TIC	5482435	13.096 ng	100
14) n-Octane	17.18	TIC	4139	No Calib	
15) C5-C8 Aliphatics (TIC)	16.09	TIC	21445200m	47.549 ng	
17) Chlorobenzene-d5 (TIC)	17.93	TIC	4900620	12.902 ng	100
18) 2,3-Dimethylheptane	18.38	TIC	2171	No Calib	
19) n-Nonane	19.05	TIC	10667	No Calib #	
21) p-Bromofluorobenzene (...	19.28	TIC	3615442	12.233 ng	100
22) Isopropylbenzene	0.00	120	0	N.D.	
23) 1-Methyl-3-ethylbenzene	19.91	120	577	No Calib	
24) 1,3,5-Trimethylbenzene	20.01	120	341	No Calib #	
25) n-Decane	20.44	TIC	20752	No Calib #	
26) p-Isopropyltoluene	20.73	134	544	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	689	No Calib	
28) Butylcyclohexane	20.95	TIC	8949	No Calib	
29) n-Undecane	21.51	TIC	12854	No Calib	
30) n-Dodecane	22.43	TIC	4318	No Calib	
31) C9-C12 Aliphatics-(TIC)	19.28	TIC	4581755m	48.016 ng	
32) C9-C10 Aromatics (m/z ...	20.38	120	4096m	0.208 ng	
33) C9-C10 Aromatics (m/z ...	20.31	134	1564m	0.141 ng	
34) C5C8_TIC_1	10.45	TIC	525827m	0.184 ng	
35) C5C8 TIC 2	12.14	TIC	220766	N.D.	
36) C5C8 TIC 3	17.33	TIC	659838m	0.231 ng	
37) C5C8 TIC 4	18.62	TIC	53807	N.D.	
38) C9C12 TIC 1	19.70	TIC	95586m	0.169 ng	
39) C9C12 TIC 2	20.30	TIC	108487m	0.191 ng	
40) C9C12 TIC 3	21.40	TIC	80807m	0.143 ng	
41) C9C12 TIC 4	22.36	TIC	150228m	0.265 ng	
42) C9C10 TIC 1	21.04	120	569	N.D.	
43) C9C10 TIC 2	20.31	134	470	N.D.	

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091721.D
Acq On : 9 Mar 2017 18:17 Operator: LH
Sample : P1700971-005 (1000mL)
Misc : S29-03071701
ALS Vial : 10 Sample Multiplier: 1

Quant Time: Mar 13 10:37:18 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091722.D
Acq On : 9 Mar 2017 18:50 Operator: LH
Sample : P1700971-006 (35mL)
Misc : S29-03071701
ALS Vial : 11 Sample Multiplier: 1

Quant Time: Mar 13 10:44:40 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/13/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.53	130	374950	12.500 ng	-0.02
7) 1,4-Difluorobenzene (IS2)	13.64	114	1932334	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1504309	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.39	65	709518	13.245 ng	-0.01
Spiked Amount 12.500				Recovery = 105.92%	
12) Toluene-d8 (SS2)	16.09	98	2051930	12.942 ng	0.00
Spiked Amount 12.500				Recovery = 103.52%	
20) p-Bromofluorobenzene (...	19.28	174	573391	10.865 ng	0.00
Spiked Amount 12.500				Recovery = 86.88%	

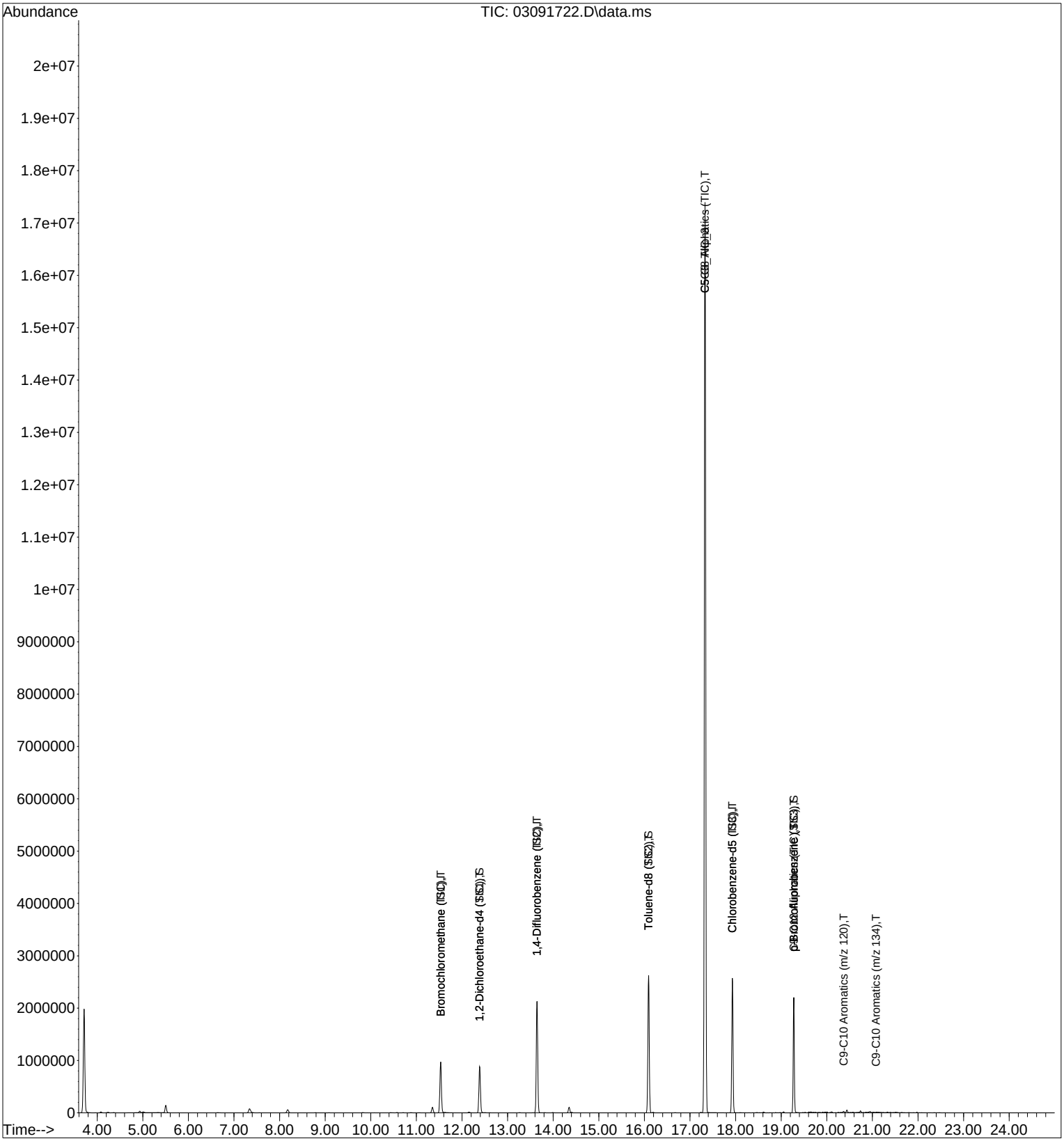
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.53	TIC	2295708	15.087 ng	100
3) Isopentane	7.34	TIC	251326	No Calib	
4) n-Hexane	11.53	TIC	2295708	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.39	TIC	2031838	13.534 ng	100
8) 1,4-Difluorobenzene (TIC)	13.64	TIC	4615613	13.001 ng	100
9) Cyclohexane	13.64	TIC	4613391	No Calib	
10) 2,3-Dimethylpentane	13.82	TIC	11066	No Calib	
11) n-Heptane	14.66	TIC	2114	No Calib	
13) Toluene-d8 (TIC)	16.09	TIC	5510946	13.130 ng	100
14) n-Octane	17.33	TIC	36379931	No Calib	
15) C5-C8 Aliphatics (TIC)	17.33	TIC	57455088m	127.061 ng	
17) Chlorobenzene-d5 (TIC)	17.93	TIC	4924588	12.809 ng	100
18) 2,3-Dimethylheptane	18.38	TIC	6319	No Calib	
19) n-Nonane	19.06	TIC	32876	No Calib #	
21) p-Bromofluorobenzene (...	19.28	TIC	3670769	12.271 ng	100
22) Isopropylbenzene	0.00	120	0	N.D.	
23) 1-Methyl-3-ethylbenzene	19.91	120	1037	No Calib	
24) 1,3,5-Trimethylbenzene	20.02	120	779	No Calib	
25) n-Decane	20.44	TIC	86418	No Calib #	
26) p-Isopropyltoluene	20.73	134	52	No Calib #	
27) 1,2,3-Trimethylbenzene	20.74	120	1150	No Calib	
28) Butylcyclohexane	20.95	TIC	51220	No Calib	
29) n-Undecane	21.52	TIC	28859	No Calib	
30) n-Dodecane	22.43	TIC	3404	No Calib	
31) C9-C12 Aliphatics-(TIC)	19.28	TIC	5114135m	52.951 ng	
32) C9-C10 Aromatics (m/z ...	20.37	120	6102m	0.306 ng	
33) C9-C10 Aromatics (m/z ...	21.08	134	1663m	0.149 ng	
34) C5C8_TIC_1	11.35	TIC	246264	N.D.	
35) C5C8 TIC 2	14.35	TIC	262686	N.D.	
36) C5C8 TIC 3	17.33	TIC	36411541m	12.579 ng	
37) C5C8 TIC 4	0.00	TIC	0	N.D. d	
38) C9C12 TIC 1	21.98	TIC	17474	N.D.	
39) C9C12 TIC 2	0.00	TIC	0	N.D. d	
40) C9C12 TIC 3	0.00	TIC	0	N.D. d	
41) C9C12 TIC 4	0.00	TIC	0	N.D. d	
42) C9C10 TIC 1	0.00	120	0	N.D. d	
43) C9C10 TIC 2	0.00	134	0	N.D. d	

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091722.D
Acq On : 9 Mar 2017 18:50 Operator: LH
Sample : P1700971-006 (35mL)
Misc : S29-03071701
ALS Vial : 11 Sample Multiplier: 1

Quant Time: Mar 13 10:44:40 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091704.D
Acq On : 9 Mar 2017 4:02 Operator: LH
Sample : MB R16030917 1000mL
Misc : S29-03071701 AC00442
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Mar 09 08:06:41 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/9/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.53	130	355025	12.500 ng	-0.02
7) 1,4-Difluorobenzene (IS2)	13.64	114	1829503	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1366204	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.39	65	670977	13.228 ng	-0.01
Spiked Amount 12.500			Recovery	= 105.84%	
12) Toluene-d8 (SS2)	16.09	98	1921761	12.802 ng	0.00
Spiked Amount 12.500			Recovery	= 102.40%	
20) p-Bromofluorobenzene (...	19.28	174	511186	10.665 ng	0.00
Spiked Amount 12.500			Recovery	= 85.36%	

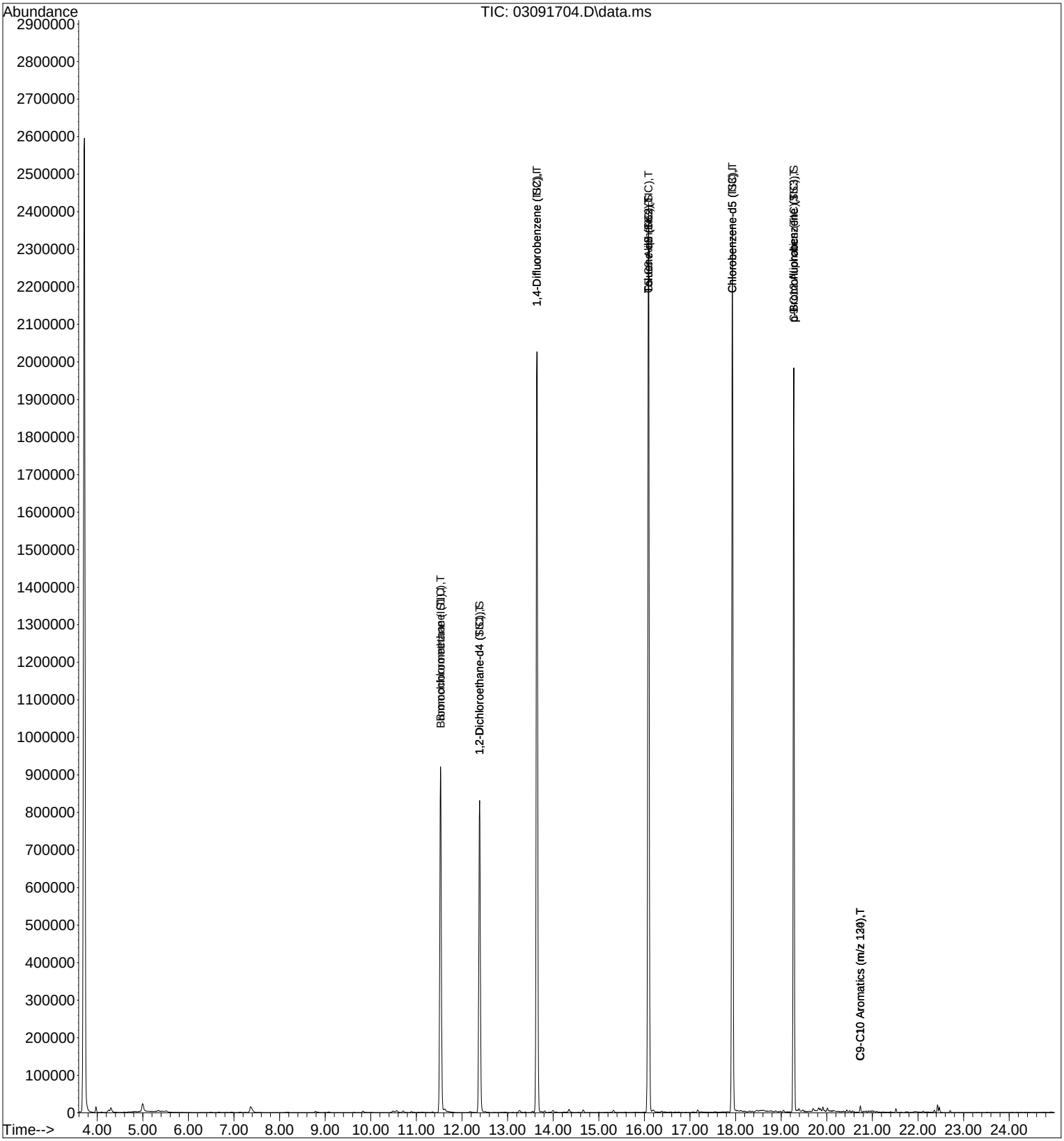
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.53	TIC	2178435	15.120 ng	100
3) Isopentane	7.36	TIC	60077	No Calib #	
4) n-Hexane	11.53	TIC	2178435	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.39	TIC	1928148	13.564 ng	100
8) 1,4-Difluorobenzene (TIC)	13.64	TIC	4374506	13.015 ng	100
9) Cyclohexane	13.64	TIC	4374506	No Calib	
10) 2,3-Dimethylpentane	13.82	TIC	10629	No Calib	
11) n-Heptane	14.66	TIC	14502	No Calib	
13) Toluene-d8 (TIC)	16.09	TIC	5163489	12.994 ng	100
14) n-Octane	17.17	TIC	13757	No Calib	
15) C5-C8 Aliphatics (TIC)	16.09	TIC	18983326m	44.341 ng	
17) Chlorobenzene-d5 (TIC)	17.93	TIC	4521457	12.949 ng	100
18) 2,3-Dimethylheptane	18.36	TIC	3667	No Calib	
19) n-Nonane	19.05	TIC	7982	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	3295015	12.129 ng	100
22) Isopropylbenzene	19.40	120	973	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	3220	No Calib #	
24) 1,3,5-Trimethylbenzene	19.91	120	3220	No Calib	
25) n-Decane	20.44	TIC	8545	No Calib #	
26) p-Isopropyltoluene	20.73	134	903	No Calib #	
27) 1,2,3-Trimethylbenzene	20.74	120	2729	No Calib	
28) Butylcyclohexane	20.95	TIC	4909	No Calib	
29) n-Undecane	21.51	TIC	14618	No Calib	
30) n-Dodecane	22.43	TIC	29871	No Calib	
31) C9-C12 Aliphatics-(TIC)	19.28	TIC	3905706m	44.527 ng	
32) C9-C10 Aromatics (m/z ...	20.74	120	26956m	1.489 ng	
33) C9-C10 Aromatics (m/z ...	20.73	134	4870m	0.479 ng	
34) C5C8_TIC_1	0.00	TIC	0	N.D. d	
35) C5C8 TIC 2	0.00	TIC	0	N.D. d	
36) C5C8 TIC 3	0.00	TIC	0	N.D. d	
37) C5C8 TIC 4	0.00	TIC	0	N.D. d	
38) C9C12 TIC 1	0.00	TIC	0	N.D. d	
39) C9C12 TIC 2	0.00	TIC	0	N.D. d	
40) C9C12 TIC 3	0.00	TIC	0	N.D. d	
41) C9C12 TIC 4	0.00	TIC	0	N.D. d	
42) C9C10 TIC 1	0.00	120	0	N.D. d	
43) C9C10 TIC 2	0.00	134	0	N.D. d	

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091704.D
Acq On : 9 Mar 2017 4:02 Operator: LH
Sample : MB R16030917 1000mL
Misc : S29-03071701 AC00442
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Mar 09 08:06:41 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091705.D
Acq On : 9 Mar 2017 4:35 Operator: LH
Sample : LCS R16030917 25ng
Misc : S29-03071701/S29-03031707 (1/1)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Mar 09 08:07:00 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/9/17

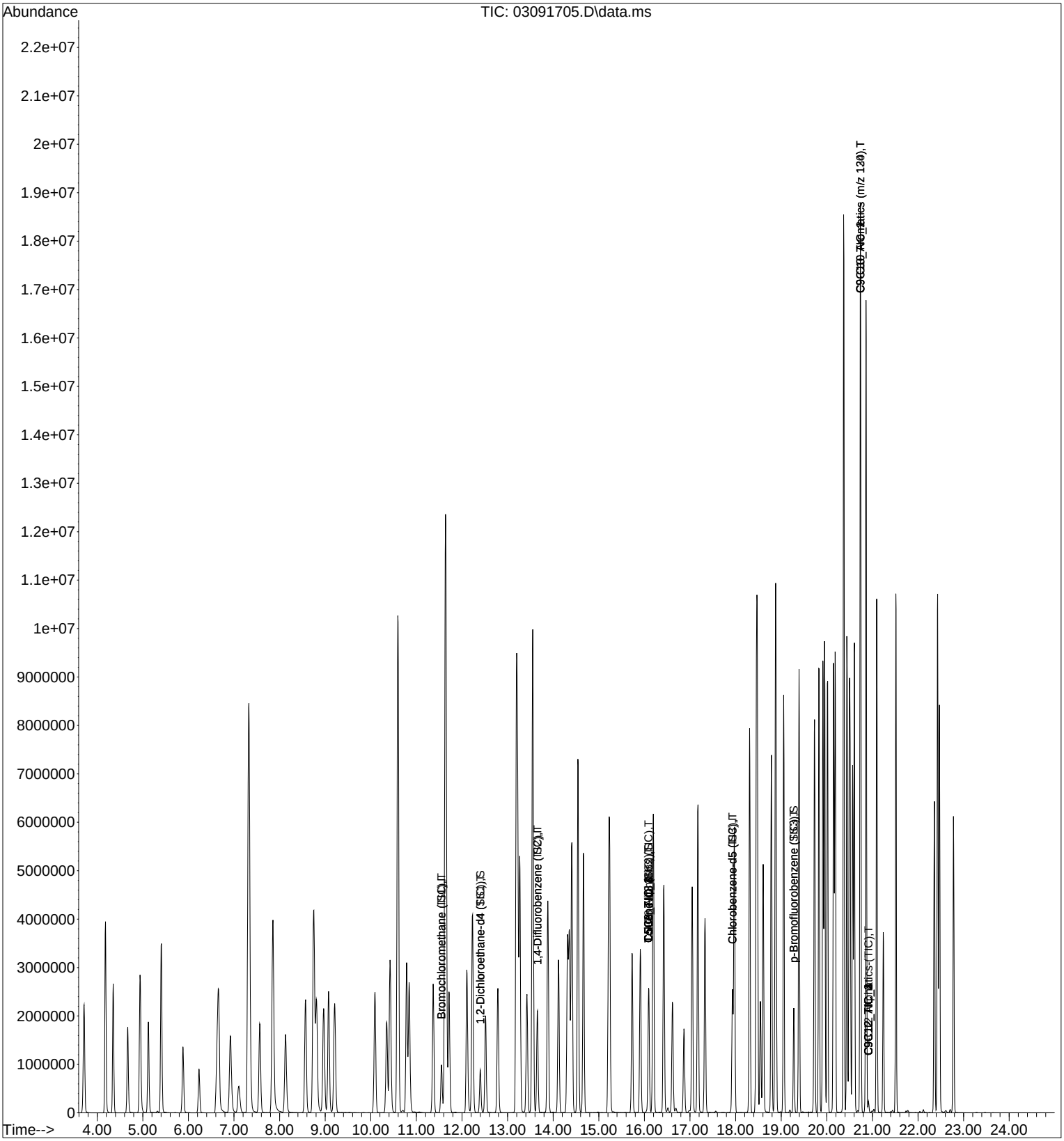
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	383773	12.500 ng	0.00
7) 1,4-Difluorobenzene (IS2)	13.66	114	1920844	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1501252	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.40	65	698010	12.730 ng	0.00
Spiked Amount 12.500				Recovery = 101.84%	
12) Toluene-d8 (SS2)	16.09	98	2048520	12.998 ng	0.00
Spiked Amount 12.500				Recovery = 104.00%	
20) p-Bromofluorobenzene (...	19.28	174	577988	10.974 ng	0.00
Spiked Amount 12.500				Recovery = 87.76%	
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.55	TIC	2339061	15.019 ng	100
3) Isopentane	7.33	TIC	27971338	No Calib #	
4) n-Hexane	11.64	TIC	34574126	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.40	TIC	2031884	13.223 ng	100
8) 1,4-Difluorobenzene (TIC)	13.66	TIC	4555723	12.910 ng	100
9) Cyclohexane	13.55	TIC	22827882	No Calib	
10) 2,3-Dimethylpentane	13.88	TIC	9902083	No Calib	
11) n-Heptane	14.66	TIC	10837533	No Calib	
13) Toluene-d8 (TIC)	16.09	TIC	5563354	13.334 ng	100
14) n-Octane	17.17	TIC	12088056	No Calib	
15) C5-C8 Aliphatics (TIC)	16.09	TIC	5574329	12.401 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	4750030	12.380 ng	100
18) 2,3-Dimethylheptane	18.31	TIC	14020234	No Calib	
19) n-Nonane	19.06	TIC	13004742	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	3617280	12.117 ng	100
22) Isopropylbenzene	19.39	120	1511870	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	1830997	No Calib	
24) 1,3,5-Trimethylbenzene	20.02	120	2301702	No Calib	
25) n-Decane	20.44	TIC	13966655	No Calib	
26) p-Isopropyltoluene	20.74	134	1370859	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	2493237	No Calib	
28) Butylcyclohexane	20.91	TIC	295780	No Calib	
29) n-Undecane	21.51	TIC	14447177	No Calib	
30) n-Dodecane	22.43	TIC	15469806	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.91	TIC	301990	3.133 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	2493237	125.331 ng	100
33) C9-C10 Aromatics (m/z ...	20.74	134	1370859	122.724 ng	100
34) C5C8_TIC_1	16.09	TIC	5574329	1.930 ng	100
35) C5C8 TIC 2	16.09	TIC	5574329	1.930 ng	100
36) C5C8 TIC 3	16.09	TIC	5574329	1.930 ng	100
37) C5C8 TIC 4	16.09	TIC	5574329	1.930 ng	100
38) C9C12 TIC 1	20.91	TIC	301990	0.527 ng	100
39) C9C12 TIC 2	20.91	TIC	301990	0.527 ng	100
40) C9C12 TIC 3	20.91	TIC	301990	0.527 ng	100
41) C9C12 TIC 4	20.91	TIC	301990	0.527 ng	100
42) C9C10 TIC 1	20.74	120	2493237	25.526 ng	100
43) C9C10 TIC 2	20.74	134	1370859	24.995 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091705.D
Acq On : 9 Mar 2017 4:35 Operator: LH
Sample : LCS R16030917 25ng
Misc : S29-03071701/S29-03031707 (1/1)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Mar 09 08:07:00 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091723.D
Acq On : 9 Mar 2017 19:24 Operator: LH
Sample : P1700971-006dup (35mL)
Misc : S29-03071701
ALS Vial : 11 Sample Multiplier: 1

Quant Time: Mar 13 10:40:56 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/13/17

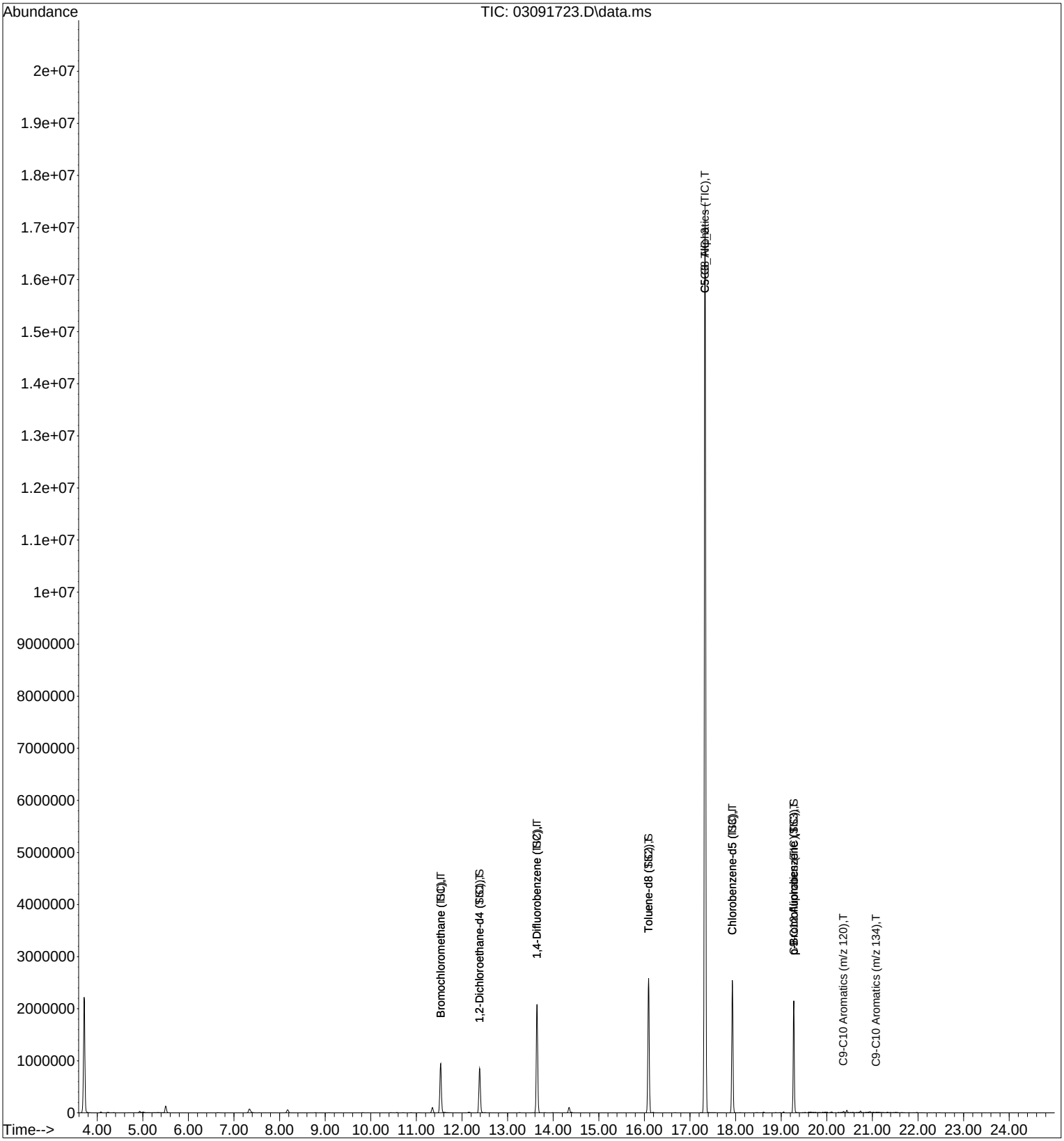
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.53	130	369240	12.500 ng	-0.02
7) 1,4-Difluorobenzene (IS2)	13.64	114	1884462	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1479445	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.39	65	688586	13.053 ng	-0.01
Spiked Amount 12.500				Recovery = 104.40%	
12) Toluene-d8 (SS2)	16.09	98	2012162	13.014 ng	0.00
Spiked Amount 12.500				Recovery = 104.08%	
20) p-Bromofluorobenzene (...	19.28	174	561729	10.823 ng	0.00
Spiked Amount 12.500				Recovery = 86.56%	
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.53	TIC	2247415	14.998 ng	100
3) Isopentane	7.34	TIC	243696	No Calib	
4) n-Hexane	11.53	TIC	2247415	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.39	TIC	1969000	13.318 ng	100
8) 1,4-Difluorobenzene (TIC)	13.64	TIC	4488448	12.964 ng	100
9) Cyclohexane	13.64	TIC	4486979	No Calib	
10) 2,3-Dimethylpentane	13.82	TIC	11756	No Calib	
11) n-Heptane	14.66	TIC	1651	No Calib	
13) Toluene-d8 (TIC)	16.09	TIC	5401967	13.197 ng	100
14) n-Octane	17.33	TIC	36297138	No Calib	
15) C5-C8 Aliphatics (TIC)	17.33	TIC	56869957m	128.962 ng	
17) Chlorobenzene-d5 (TIC)	17.93	TIC	4851719	12.831 ng	100
18) 2,3-Dimethylheptane	18.38	TIC	6375	No Calib	
19) n-Nonane	19.06	TIC	31912	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	3597270	12.228 ng	100
22) Isopropylbenzene	0.00	120	0	N.D.	
23) 1-Methyl-3-ethylbenzene	19.91	120	806	No Calib	
24) 1,3,5-Trimethylbenzene	20.01	120	583	No Calib	
25) n-Decane	20.44	TIC	83721	No Calib #	
26) p-Isopropyltoluene	20.74	134	60	No Calib #	
27) 1,2,3-Trimethylbenzene	20.74	120	1024	No Calib	
28) Butylcyclohexane	20.95	TIC	50160	No Calib	
29) n-Undecane	21.51	TIC	31432	No Calib	
30) n-Dodecane	22.43	TIC	1377	No Calib	
31) C9-C12 Aliphatics-(TIC)	19.28	TIC	4959646m	52.215 ng	
32) C9-C10 Aromatics (m/z ...	20.36	120	5403m	0.276 ng	
33) C9-C10 Aromatics (m/z ...	21.08	134	1374m	0.125 ng	
34) C5C8_TIC_1	11.35	TIC	239798	N.D.	
35) C5C8 TIC 2	14.35	TIC	263898	N.D.	
36) C5C8 TIC 3	17.33	TIC	36331936m	12.763 ng	
37) C5C8 TIC 4	0.00	TIC	0	N.D. d	
38) C9C12 TIC 1	21.98	TIC	13412	N.D.	
39) C9C12 TIC 2	0.00	TIC	0	N.D. d	
40) C9C12 TIC 3	0.00	TIC	0	N.D. d	
41) C9C12 TIC 4	0.00	TIC	0	N.D. d	
42) C9C10 TIC 1	0.00	120	0	N.D. d	
43) C9C10 TIC 2	0.00	134	0	N.D. d	

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091723.D
Acq On : 9 Mar 2017 19:24 Operator: LH
Sample : P1700971-006dup (35mL)
Misc : S29-03071701
ALS Vial : 11 Sample Multiplier: 1

Quant Time: Mar 13 10:40:56 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Massachusetts APH | ICAL Method: M16121916.M | ICAL Date: 12/19/16 | Instrument ID: MS16 | LH 12/21/16

Hydrocarbon Ranges

	areas							masses					
C5-C8 Aliphatics	0.5	1	5	25	50	100		0.5	1	5	25	50	100
Isopentane	145992	251075	1071839	5786983	11537839	24462071		0.520	1.04	5.20	26.00	52.00	104.00
n-Hexane	194294	317520	1251336	5985003	11728245	25181283		0.510	1.02	5.10	25.50	51.00	102.00
Cyclohexane	161369	280207	1234019	7028601	14143584	30151415		0.515	1.03	5.15	25.75	51.50	103.00
2,3-Dimethylpentane	165093	289518	1287102	7336654	14784784	31435664		0.555	1.11	5.55	27.75	55.50	111.00
n-Heptane	154577	265906	1179401	6689806	13558680	29444115		0.515	1.03	5.15	25.75	51.50	103.00
n-Octane	182574	306792	1342879	7876179	16113832	34704181		0.530	1.06	5.30	26.50	53.00	106.00
area sum:	1003899	1711018	7366576	40703226	81866964	175378729	sum:	3.145	6.290	31.45	157.25	314.50	629.00
C9-C12 Aliphatics	0.5	1	5	25	50	100		0.5	1	5	25	50	100
2,3-Dimethylheptane	190562	336375	1477001	8638505	17810606	37607727		0.510	1.02	5.10	25.50	51.0	102
n-Nonane	177815	310390	1406543	8346424	17334221	36388397		0.505	1.01	5.05	25.25	50.5	101
n-Decane	181143	315493	1452982	8968276	18673731	38060288		0.490	0.98	4.90	24.50	49.0	98
Butylcyclohexane	212287	378384	1704547	10241012	21367070	42699385		0.510	1.02	5.10	25.50	51.0	102
n-Undecane	161102	300459	1420417	8828047	18631052	38121852		0.480	0.96	4.80	24.00	48.0	96
n-Dodecane	449	249005	1259084	7461396	16096908	34899971		0.475	0.95	4.75	23.75	47.5	95
area sum:	923358	1890106	8720574	52483660	109913588	227777620	sum:	2.970	5.940	29.70	148.50	297.00	594.00
C9-C10 Aromatics	0.5	1	5	25	50	100		0.5	1	5	25	50	100
Isopropylbenzene	23988	40776	186003	1138777	2371392	4777654		0.505	1.01	5.05	25.25	50.5	101
3-Ethyltoluene	24891	43239	200071	1279486	2658644	5308282		0.480	0.96	4.80	24.00	48.0	96
1,3,5-Trimethylbenzene	34652	60385	275729	1732103	3561772	6986753		0.495	0.99	4.95	24.75	49.5	99
1,2,3-Trimethylbenzene	35087	62934	298908	2010849	3867319	6207230		0.485	0.97	4.85	24.25	48.5	97
p-Isopropyltoluene	19324	35427	170154	1125800	2171411	3516405		0.490	0.98	4.90	24.50	49.0	98
area sum:	137942	242761	1130865	7287015	14630538	26796324	sum:	2.455	4.910	24.55	122.75	245.50	491.00

Massachusetts APH | ICAL: M16121916.M | ICAL Date: 12/19/16 | Instrument ID: MS16

Hydrocarbon Ranges

areas

Internal Standards (TIC)	0.5	1	5	25	50	100
Bromochloromethane (IS1)	1576090	1538202	1320241	1316783	1283090	1345404
1,4-Difluorobenzene (IS2)	3309515	3276539	3118912	3066006	3082836	3132467
Chlorobenzene-d5 (IS3)	3464345	3446417	3298025	3304897	3323875	3455252

Internal Standards (EIC)						
Bromochloromethane (IS1)	284009	282839	267602	270737	268499	276134
1,4-Difluorobenzene (IS2)	1431810	1415627	1350648	1341426	1348020	1379188
Chlorobenzene-d5 (IS3)	1093970	1084403	1034748	1037530	1036571	1065075

LH 12/21/16

Surrogates (TIC)	0.5	1	5	25	50	100
1,2-Dichloroethane-d4	1418884	1410987	1354096	1340717	1346053	1386295
Toluene-d8	3859177	3834085	3658491	3636514	3675145	3780224
p-Bromofluorobenzene	2672493	2653301	2567540	2601878	2613704	2677175

RRFs

C5-C8 Aliphatics	0.5	1	5	25	50	100	RRF_{avg}	%RSD
	2.7867	2.4020	2.1678	2.4120	2.4138	2.5270	2.452	8.24

C9-C12 Aliphatics	0.5	1	5	25	50	100	RRF_{avg}	%RSD
	3.5524	3.6679	3.5470	4.2580	4.4628	4.5004	3.998	11.45

C9-C10 Aromatics	0.5	1	5	25	50	100	RRF_{avg}	%RSD
	0.6420	0.5699	0.5565	0.7152	0.7187	0.6405	0.640	10.76

LH 12/21/16

AIR-PHASE PETROLEUM HYDROCARBONS (APH)

Primary Source Standards Concentrations

4ng/L Std. ID:
20ng/L Std. ID: S29-10281604
200ng/L Std. ID: S29-10281603

					ICAL Concentrations (Primary Source)					
Dilution Factors:		**5**	**50**	**Working STD Conc.(ng/L):**	**20**	**20**	**20**	**200**	**200**	**200**
	Source Std.	**Primary Working Standards**		**Injection (L):**	**0.025**	**0.050**	**0.25**	**0.125**	**0.25**	**0.50**
Compounds	**mg/m^3**	**200ng/L**	**20ng/L**	**ICAL Points:**	**0.5ng**	**1ng**	**5ng**	**25ng**	**50ng**	**100ng**
1-Methyl-3-ethylbenzene	0.96	192	19.2		0.480	0.96	4.80	24.00	48.0	96
1,3,5-Trimethylbenzene	0.99	198	19.8		0.495	0.99	4.95	24.75	49.5	99
n-Decane	0.98	196	19.6		0.490	0.98	4.90	24.50	49.0	98
1,2,3-Trimethylbenzene	0.97	194	19.4		0.485	0.97	4.85	24.25	48.5	97
p-Isopropyltoluene	0.98	196	19.6		0.490	0.98	4.90	24.50	49.0	98
n-Butylcyclohexane	1.02	204	20.4		0.510	1.02	5.10	25.50	51.0	102
n-Undecane	0.96	192	19.2		0.480	0.96	4.80	24.00	48.0	96
n-Dodecane	0.95	190	19.0		0.475	0.95	4.75	23.75	47.5	95
Isopentane	1.04	208	20.8		0.520	1.04	5.20	26.00	52.0	104
n-Hexane	1.02	204	20.4		0.510	1.02	5.10	25.50	51.0	102
Cyclohexane	1.03	206	20.6		0.515	1.03	5.15	25.75	51.5	103
2,3-Dimethylpentane	1.11	222	22.2		0.555	1.11	5.55	27.75	55.5	111
n-Heptane	1.03	206	20.6		0.515	1.03	5.15	25.75	51.5	103
n-Octane	1.06	212	21.2		0.530	1.06	5.30	26.50	53.0	106
2,3-Dimethylheptane	1.02	204	20.4		0.510	1.02	5.10	25.50	51.0	102
n-Nonane	1.01	202	20.2		0.505	1.01	5.05	25.25	50.5	101
Isopropylbenzene	1.01	202	20.2		0.505	1.01	5.05	25.25	50.5	101

Primary Source Standard:
Std. ID: S29-10281601
Spectra Gas Cyl. #: CC-302316
Expiration: 10/12/17

AIR-PHASE PETROLEUM HYDROCARBONS (APH)

Secondary Source Standards Concentrations

20ng/L Working Std. ID:
100ng/L Working Std. ID:
200ng/L Working Std. ID: S29-12011603
Dilution Factor: 5 | 10 | 50
Working Std. Conc. Utilized: 200

Working Std. Injection Amounts (L): 0.125

		Secondary Working Std. Conc.			ICV / LCS
Compounds	**mg/m^3**	**200ng/L**	**100ng/L**	**20ng/L**	**Actual Conc.(ng)**
1-Methyl-3-ethylbenzene	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	1.061	212.2	106.1	21.22	26.525
n-Decane	1.061	212.2	106.1	21.22	26.525
1,2,3-Trimethylbenzene	1.062	212.4	106.2	21.24	26.550
p-Isopropyltoluene	1.062	212.4	106.2	21.24	26.550
n-Butylcyclohexane	NA	NA	NA	NA	NA
n-Undecane	1.064	212.8	106.4	21.28	26.600
n-Dodecane	1.062	212.4	106.2	21.24	26.550
Isopentane	NA	NA	NA	NA	NA
n-Hexane	1.064	212.8	106.4	21.28	26.600
Cyclohexane	2.125	425.0	212.5	42.50	53.125
2,3-Dimethylpentane	NA	NA	NA	NA	NA
n-Heptane	1.064	212.8	106.4	21.28	26.600
n-Octane	1.060	212.0	106.0	21.20	26.500
2,3-Dimethylheptane	NA	NA	NA	NA	NA
n-Nonane	1.059	211.8	105.9	21.18	26.475
Isopropylbenzene	NA	NA	NA	NA	NA

Secondary Source Standard:
Std. ID: S29-10051602
Spectra Gas Cyl. #: CC-250189
Expiration: 09/23/17

Calibration Status Report GCMS-16

Method : I:\MS16\METHODS\M16121916.M (RTE Integrator)
Title : Massachusetts APH
Last Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration

#	ID	Conc	ISTD Conc	Path\File
1	0.5	3	13	I:\MS16\DATA\2016_12\19\12191612.D
2	1	6	13	I:\MS16\DATA\2016_12\19\12191613.D
3	5	31	13	I:\MS16\DATA\2016_12\19\12191614.D
4	25	157	13	I:\MS16\DATA\2016_12\19\12191615.D
5	50	314	13	I:\MS16\DATA\2016_12\19\12191616.D
6	100	629	13	I:\MS16\DATA\2016_12\19\12191617.D

#	ID	Update Time	Quant Time	Acquisition Time
1	0.5	Dec 20 16:11 2016	Dec 20 16:06 2016	19 Dec 2016 19:32
2	1	Dec 20 16:11 2016	Dec 20 16:08 2016	19 Dec 2016 20:05
3	5	Dec 20 16:00 2016	Dec 20 16:00 2016	19 Dec 2016 20:39
4	25	Dec 20 16:00 2016	Dec 20 16:00 2016	19 Dec 2016 21:12
5	50	Dec 20 16:01 2016	Dec 20 16:00 2016	19 Dec 2016 21:45
6	100	Dec 20 16:01 2016	Dec 20 16:00 2016	19 Dec 2016 22:18

M16121916.M Wed Dec 21 16:01:40 2016

LH 12/21/16

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191612.D
Acq On : 19 Dec 2016 19:32 Operator: LH
Sample : 0.5ng MAPH ICAL STD
Misc : S29-12061601/S29-10281604 (12/25)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Dec 20 16:06:19 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	284009	12.500 ng	0.00
7) 1,4-Difluorobenzene (IS2)	13.65	114	1431810	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1093970	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.40	65	506203	13.038 ng	0.00
Spiked Amount 12.500				Recovery = 104.32%	
12) Toluene-d8 (SS2)	16.10	98	1456818	12.318 ng	0.00
Spiked Amount 12.500				Recovery = 98.56%	
20) p-Bromofluorobenzene (...	19.28	174	474949	12.434 ng	0.00
Spiked Amount 12.500				Recovery = 99.44%	

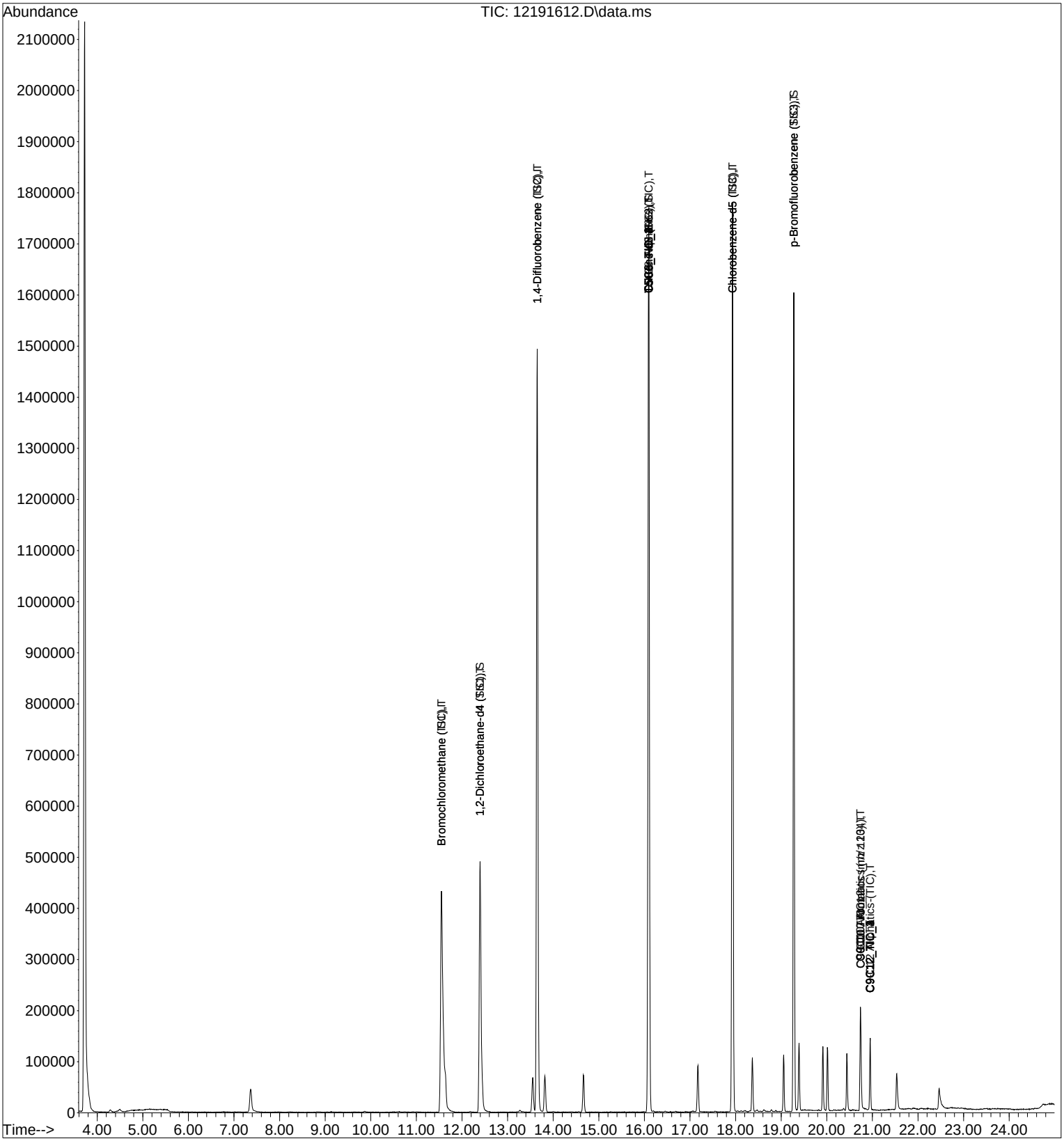
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.55	TIC	1576090m	12.721 ng	
3) Isopentane	7.36	TIC	145992	No Calib	
4) n-Hexane	11.62	TIC	194294	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.40	TIC	1418884	12.923 ng	100
8) 1,4-Difluorobenzene (TIC)	13.65	TIC	3309515	12.737 ng	100
9) Cyclohexane	13.55	TIC	161369	No Calib	
10) 2,3-Dimethylpentane	13.82	TIC	165093	No Calib	
11) n-Heptane	14.66	TIC	154577	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	3859177	12.530 ng	100
14) n-Octane	17.17	TIC	182574	No Calib	
15) C5-C8 Aliphatics (TIC)	16.10	TIC	3859177	11.572 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3464345	12.733 ng	100
18) 2,3-Dimethylheptane	18.37	TIC	190562	No Calib	
19) n-Nonane	19.06	TIC	177815	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	2672493	12.632 ng	100
22) Isopropylbenzene	19.39	120	23988	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	24891	No Calib	
24) 1,3,5-Trimethylbenzene	20.02	120	34652	No Calib	
25) n-Decane	20.44	TIC	181143	No Calib	
26) p-Isopropyltoluene	20.74	134	19324	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	35087	No Calib	
28) Butylcyclohexane	20.95	TIC	212287	No Calib	
29) n-Undecane	21.54	TIC	161102	No Calib	
30) n-Dodecane	22.41	TIC	449	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.95	TIC	218845	2.265 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	35087	2.831 ng	100
33) C9-C10 Aromatics (m/z ...	20.74	134	19324	2.793 ng	100
34) C5C8_TIC_1	16.10	TIC	3859177	1.885 ng	100
35) C5C8 TIC 2	16.10	TIC	3859177	1.885 ng	100
36) C5C8 TIC 3	16.10	TIC	3859177	1.885 ng	100
37) C5C8 TIC 4	16.10	TIC	3859177	1.885 ng	100
38) C9C12 TIC 1	20.95	TIC	218845	0.381 ng	100
39) C9C12 TIC 2	20.95	TIC	218845	0.381 ng	100
40) C9C12 TIC 3	20.95	TIC	218845	0.381 ng	100
41) C9C12 TIC 4	20.95	TIC	218845	0.381 ng	100
42) C9C10 TIC 1	20.74	120	35087	0.577 ng	100
43) C9C10 TIC 2	20.74	134	19324	0.569 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191612.D
Acq On : 19 Dec 2016 19:32 Operator: LH
Sample : 0.5ng MAPH ICAL STD
Misc : S29-12061601/S29-10281604 (12/25)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Dec 20 16:06:19 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191613.D
Acq On : 19 Dec 2016 20:05 Operator: LH
Sample : 1.0ng MAPH ICAL STD
Misc : S29-12061601/S29-10281604 (12/25)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Dec 20 16:08:28 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	282839	12.500 ng	0.00
7) 1,4-Difluorobenzene (IS2)	13.65	114	1415627	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1084403	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.40	65	503499	13.022 ng	0.00
Spiked Amount 12.500				Recovery = 104.16%	
12) Toluene-d8 (SS2)	16.10	98	1449112	12.393 ng	0.00
Spiked Amount 12.500				Recovery = 99.12%	
20) p-Bromofluorobenzene (...	19.28	174	467486	12.346 ng	0.00
Spiked Amount 12.500				Recovery = 98.80%	

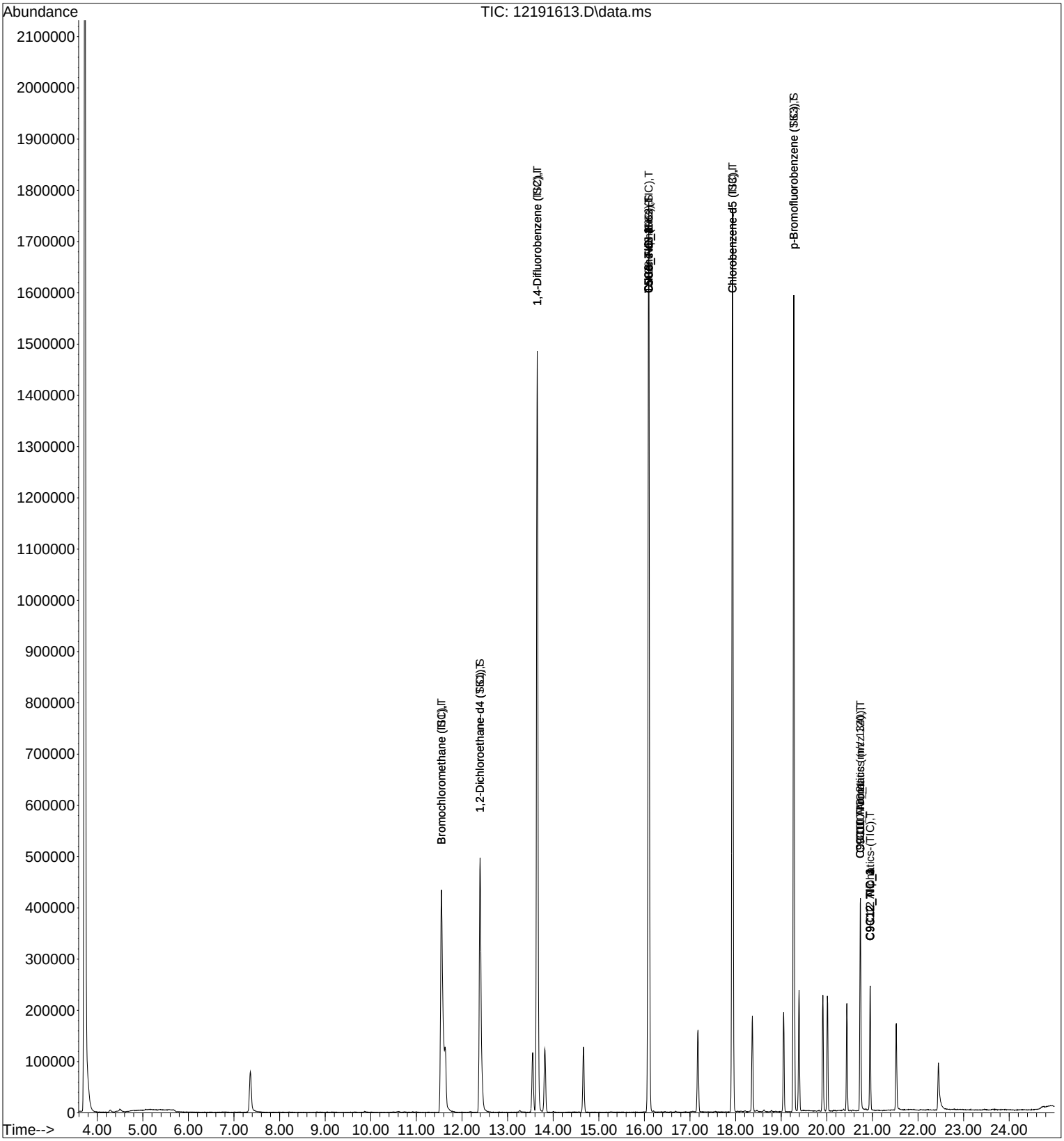
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.55	TIC	1538202m	12.467 ng	
3) Isopentane	7.36	TIC	251075	No Calib	
4) n-Hexane	11.63	TIC	317520	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.40	TIC	1410987	12.904 ng	100
8) 1,4-Difluorobenzene (TIC)	13.65	TIC	3276539	12.754 ng	100
9) Cyclohexane	13.55	TIC	280207	No Calib	
10) 2,3-Dimethylpentane	13.81	TIC	289518	No Calib	
11) n-Heptane	14.66	TIC	265906	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	3834085	12.591 ng	100
14) n-Octane	17.17	TIC	306792	No Calib	
15) C5-C8 Aliphatics (TIC)	16.10	TIC	3834625	11.629 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3446417	12.779 ng	100
18) 2,3-Dimethylheptane	18.37	TIC	336375	No Calib	
19) n-Nonane	19.06	TIC	310390	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	2653301	12.652 ng	100
22) Isopropylbenzene	19.39	120	40776	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	43239	No Calib	
24) 1,3,5-Trimethylbenzene	20.01	120	60385	No Calib	
25) n-Decane	20.44	TIC	315493	No Calib	
26) p-Isopropyltoluene	20.73	134	35427	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	62934	No Calib	
28) Butylcyclohexane	20.95	TIC	378384	No Calib	
29) n-Undecane	21.52	TIC	300459	No Calib	
30) n-Dodecane	22.45	TIC	249005	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.95	TIC	379243	3.960 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	62934	5.122 ng	100
33) C9-C10 Aromatics (m/z ...	20.73	134	35427	5.166 ng	100
34) C5C8_TIC_1	16.10	TIC	3834625	1.889 ng	100
35) C5C8 TIC 2	16.10	TIC	3834625	1.889 ng	100
36) C5C8 TIC 3	16.10	TIC	3834625	1.889 ng	100
37) C5C8 TIC 4	16.10	TIC	3834625	1.889 ng	100
38) C9C12 TIC 1	20.95	TIC	379243	0.667 ng	100
39) C9C12 TIC 2	20.95	TIC	379243	0.667 ng	100
40) C9C12 TIC 3	20.95	TIC	379243	0.667 ng	100
41) C9C12 TIC 4	20.95	TIC	379243	0.667 ng	100
42) C9C10 TIC 1	20.74	120	62934	1.043 ng	100
43) C9C10 TIC 2	20.73	134	35427	1.052 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191613.D
Acq On : 19 Dec 2016 20:05 Operator: LH
Sample : 1.0ng MAPH ICAL STD
Misc : S29-12061601/S29-10281604 (12/25)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Dec 20 16:08:28 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191614.D
Acq On : 19 Dec 2016 20:39 Operator: LH
Sample : 5.0ng MAPH ICAL STD
Misc : S29-12061601/S29-10281604 (12/25)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Dec 20 16:00:31 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016 LH 12/20/16
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	267602	12.500 ng	0.00
7) 1,4-Difluorobenzene (IS2)	13.65	114	1350648	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1034748	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.40	65	479851	13.117 ng	0.00
Spiked Amount 12.500				Recovery = 104.96%	
12) Toluene-d8 (SS2)	16.10	98	1382015	12.387 ng	0.00
Spiked Amount 12.500				Recovery = 99.12%	
20) p-Bromofluorobenzene (...	19.28	174	454232	12.572 ng	0.00
Spiked Amount 12.500				Recovery = 100.56%	

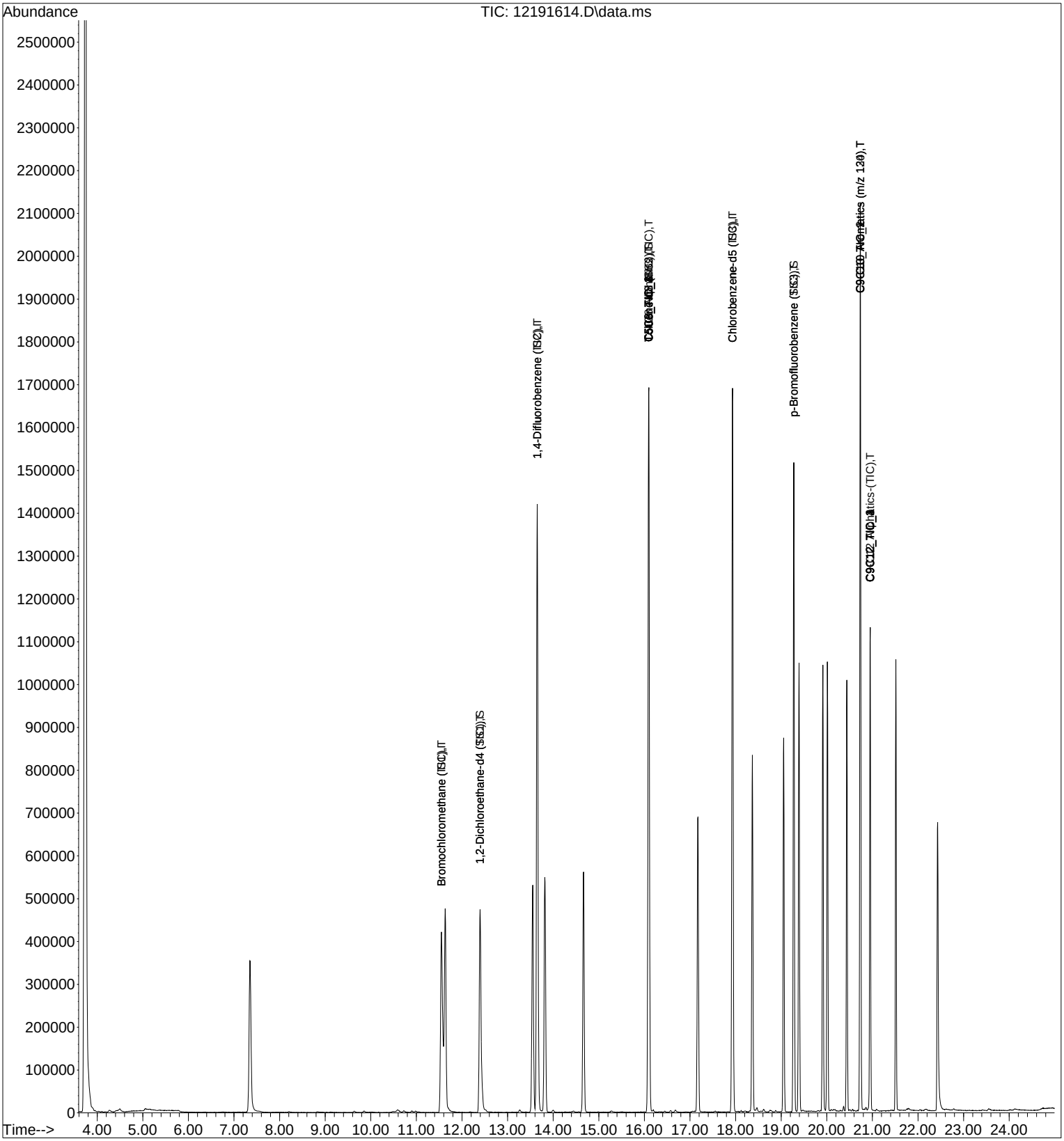
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.55	TIC	1320241	11.310 ng	100
3) Isopentane	7.35	TIC	1071839	No Calib	
4) n-Hexane	11.63	TIC	1251336	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.40	TIC	1354096	13.089 ng	100
8) 1,4-Difluorobenzene (TIC)	13.65	TIC	3118912	12.724 ng	100
9) Cyclohexane	13.55	TIC	1234019	No Calib	
10) 2,3-Dimethylpentane	13.81	TIC	1287102	No Calib	
11) n-Heptane	14.67	TIC	1179401	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	3658491	12.593 ng	100
14) n-Octane	17.17	TIC	1342879	No Calib	
15) C5-C8 Aliphatics (TIC)	16.10	TIC	3658491	11.629 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3298025	12.816 ng	100
18) 2,3-Dimethylheptane	18.37	TIC	1477001	No Calib	
19) n-Nonane	19.06	TIC	1406543	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	2567540	12.830 ng	100
22) Isopropylbenzene	19.39	120	186003	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	200071	No Calib	
24) 1,3,5-Trimethylbenzene	20.01	120	275729	No Calib	
25) n-Decane	20.44	TIC	1452982	No Calib	
26) p-Isopropyltoluene	20.73	134	170154	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	298908	No Calib	
28) Butylcyclohexane	20.95	TIC	1704547	No Calib	
29) n-Undecane	21.51	TIC	1420417	No Calib	
30) n-Dodecane	22.43	TIC	1259084	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.95	TIC	1709008	18.701 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	298908	25.495 ng	100
33) C9-C10 Aromatics (m/z ...	20.73	134	170154	26.001 ng	100
34) C5C8_TIC_1	16.10	TIC	3658491	1.889 ng	100
35) C5C8 TIC 2	16.10	TIC	3658491	1.889 ng	100
36) C5C8 TIC 3	16.10	TIC	3658491	1.889 ng	100
37) C5C8 TIC 4	16.10	TIC	3658491	1.889 ng	100
38) C9C12 TIC 1	20.95	TIC	1709008	3.148 ng	100
39) C9C12 TIC 2	20.95	TIC	1709008	3.148 ng	100
40) C9C12 TIC 3	20.95	TIC	1709008	3.148 ng	100
41) C9C12 TIC 4	20.95	TIC	1709008	3.148 ng	100
42) C9C10 TIC 1	20.74	120	298908	5.193 ng	100
43) C9C10 TIC 2	20.73	134	170154	5.296 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191614.D
Acq On : 19 Dec 2016 20:39 Operator: LH
Sample : 5.0ng MAPH ICAL STD
Misc : S29-12061601/S29-10281604 (12/25)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Dec 20 16:00:31 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191615.D
Acq On : 19 Dec 2016 21:12 Operator: LH
Sample : 25ng MAPH ICAL STD
Misc : S29-12061601/S29-10281603 (12/25)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Dec 20 16:00:32 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

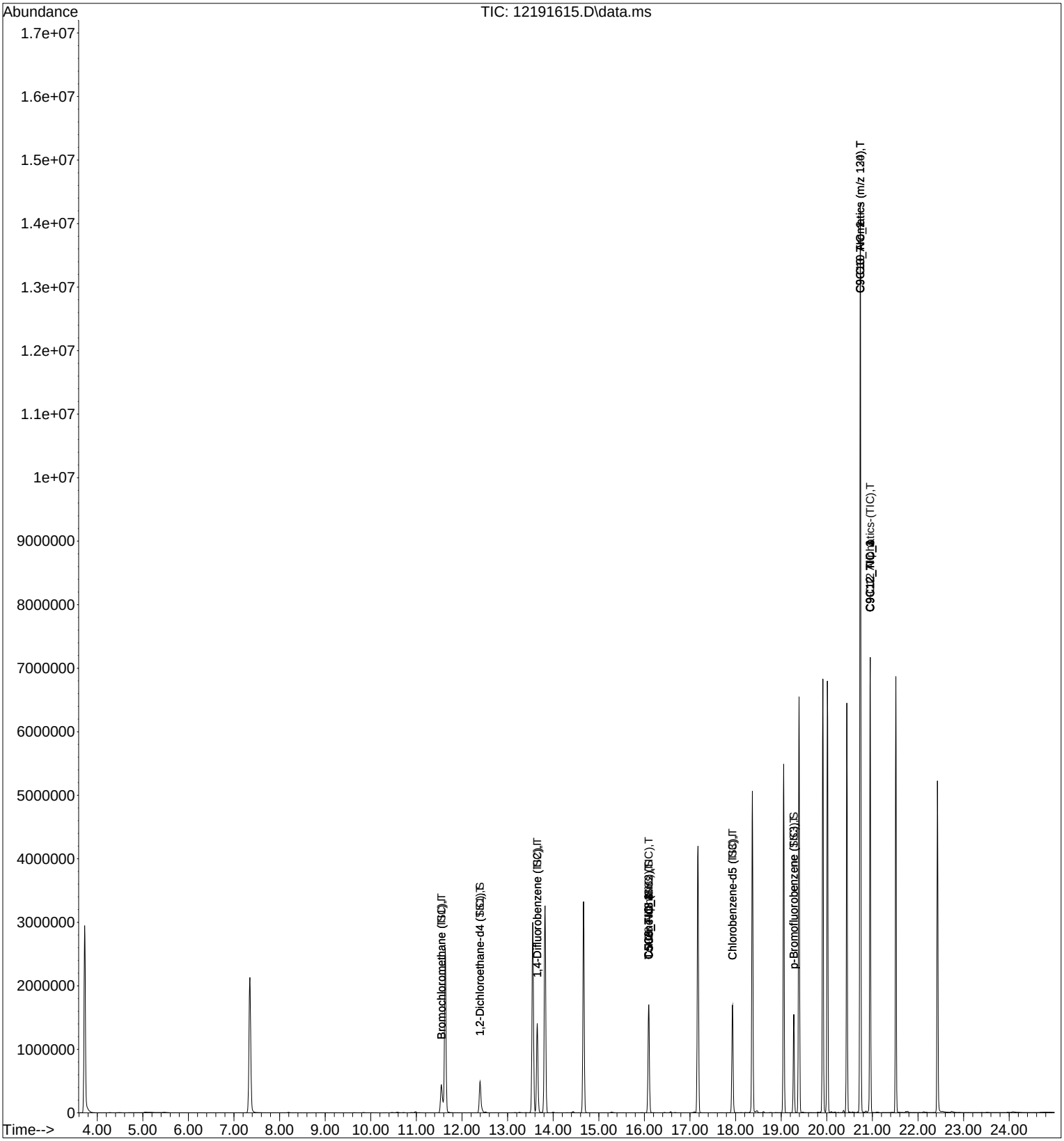
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	270737	12.500 ng	0.00
7) 1,4-Difluorobenzene (IS2)	13.65	114	1341426	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1037530	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.40	65	480900	12.994 ng	0.00
Spiked Amount 12.500				Recovery = 103.92%	
12) Toluene-d8 (SS2)	16.10	98	1377301	12.430 ng	0.00
Spiked Amount 12.500				Recovery = 99.44%	
20) p-Bromofluorobenzene (...	19.28	174	459253	12.677 ng	0.00
Spiked Amount 12.500				Recovery = 101.44%	
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.55	TIC	1316783	11.149 ng	100
3) Isopentane	7.35	TIC	5786983	No Calib	
4) n-Hexane	11.63	TIC	5985003	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.40	TIC	1340717	12.810 ng	100
8) 1,4-Difluorobenzene (TIC)	13.65	TIC	3066006	12.595 ng	100
9) Cyclohexane	13.55	TIC	7028601	No Calib	
10) 2,3-Dimethylpentane	13.82	TIC	7336654	No Calib	
11) n-Heptane	14.67	TIC	6689806	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	3636514	12.603 ng	100
14) n-Octane	17.17	TIC	7876179	No Calib	
15) C5-C8 Aliphatics (TIC)	16.10	TIC	3636514	11.639 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3304897	12.808 ng	100
18) 2,3-Dimethylheptane	18.37	TIC	8638505	No Calib	
19) n-Nonane	19.06	TIC	8346424	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	2601878	12.967 ng	100
22) Isopropylbenzene	19.39	120	1138777	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	1279486	No Calib	
24) 1,3,5-Trimethylbenzene	20.01	120	1732103	No Calib	
25) n-Decane	20.44	TIC	8968276	No Calib	
26) p-Isopropyltoluene	20.73	134	1125800	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	2010849	No Calib	
28) Butylcyclohexane	20.95	TIC	10241012	No Calib	
29) n-Undecane	21.51	TIC	8828047	No Calib	
30) n-Dodecane	22.43	TIC	7461396	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.95	TIC	10241012	111.765 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	2010849	171.055 ng	100
33) C9-C10 Aromatics (m/z ...	20.73	134	1125800	171.574 ng	100
34) C5C8_TIC_1	16.10	TIC	3636514	1.873 ng	100
35) C5C8 TIC 2	16.10	TIC	3636514	1.873 ng	100
36) C5C8 TIC 3	16.10	TIC	3636514	1.873 ng	100
37) C5C8 TIC 4	16.10	TIC	3636514	1.873 ng	100
38) C9C12 TIC 1	20.95	TIC	10241012	18.816 ng	100
39) C9C12 TIC 2	20.95	TIC	10241012	18.816 ng	100
40) C9C12 TIC 3	20.95	TIC	10241012	18.816 ng	100
41) C9C12 TIC 4	20.95	TIC	10241012	18.816 ng	100
42) C9C10 TIC 1	20.74	120	2010849	34.838 ng	100
43) C9C10 TIC 2	20.73	134	1125800	34.944 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191615.D
Acq On : 19 Dec 2016 21:12 Operator: LH
Sample : 25ng MAPH ICAL STD
Misc : S29-12061601/S29-10281603 (12/25)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Dec 20 16:00:32 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191616.D
Acq On : 19 Dec 2016 21:45 Operator: LH
Sample : 50ng MAPH ICAL STD
Misc : S29-12061601/S29-10281603 (12/25)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Dec 20 16:00:33 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

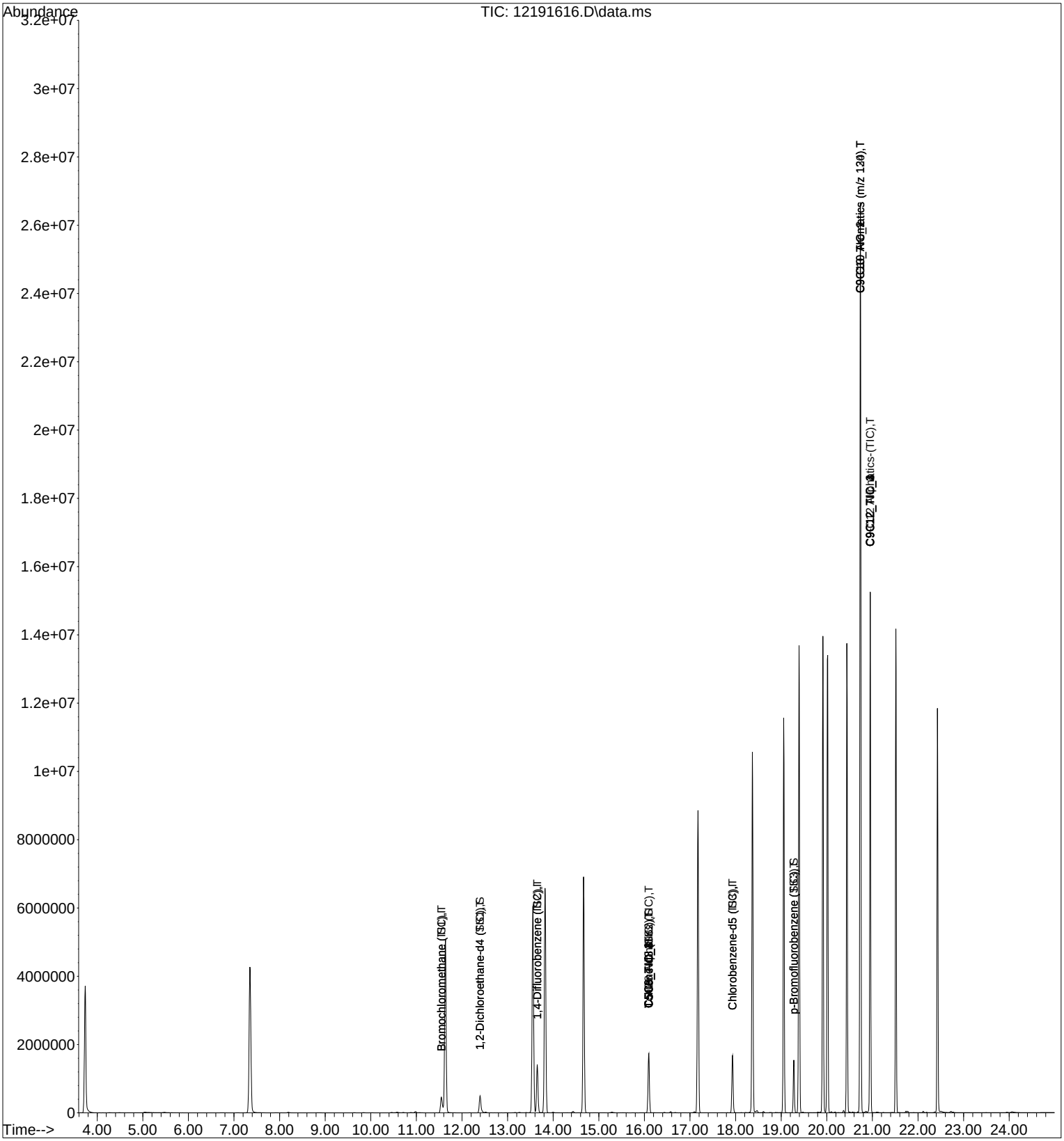
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	268499	12.500 ng	0.00
7) 1,4-Difluorobenzene (IS2)	13.65	114	1348020	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1036571	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.40	65	480798	13.099 ng	0.00
Spiked Amount 12.500				Recovery = 104.80%	
12) Toluene-d8 (SS2)	16.10	98	1388648	12.471 ng	0.00
Spiked Amount 12.500				Recovery = 99.76%	
20) p-Bromofluorobenzene (...	19.28	174	459998	12.709 ng	0.00
Spiked Amount 12.500				Recovery = 101.68%	
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.55	TIC	1283090	10.955 ng	100
3) Isopentane	7.35	TIC	11537839	No Calib	
4) n-Hexane	11.64	TIC	11728245	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.40	TIC	1346053	12.968 ng	100
8) 1,4-Difluorobenzene (TIC)	13.65	TIC	3082836	12.602 ng	100
9) Cyclohexane	13.56	TIC	14143584	No Calib	
10) 2,3-Dimethylpentane	13.82	TIC	14784784	No Calib	
11) n-Heptane	14.67	TIC	13558680	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	3675145	12.675 ng	100
14) n-Octane	17.17	TIC	16113832	No Calib	
15) C5-C8 Aliphatics (TIC)	16.10	TIC	3675145	11.705 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3323875	12.894 ng	100
18) 2,3-Dimethylheptane	18.37	TIC	17810606	No Calib	
19) n-Nonane	19.06	TIC	17334221	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	2613704	13.038 ng	100
22) Isopropylbenzene	19.39	120	2371392	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	2658644	No Calib	
24) 1,3,5-Trimethylbenzene	20.02	120	3561772	No Calib	
25) n-Decane	20.44	TIC	18673731	No Calib	
26) p-Isopropyltoluene	20.73	134	2171411	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	3867319	No Calib	
28) Butylcyclohexane	20.95	TIC	21367070	No Calib	
29) n-Undecane	21.51	TIC	18631052	No Calib	
30) n-Dodecane	22.43	TIC	16096908	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.95	TIC	21367070	233.406 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	3867319	329.283 ng	100
33) C9-C10 Aromatics (m/z ...	20.73	134	2171411	331.233 ng	100
34) C5C8_TIC_1	16.10	TIC	3675145	1.894 ng	100
35) C5C8 TIC 2	16.10	TIC	3675145	1.894 ng	100
36) C5C8 TIC 3	16.10	TIC	3675145	1.894 ng	100
37) C5C8 TIC 4	16.10	TIC	3675145	1.894 ng	100
38) C9C12 TIC 1	20.95	TIC	21367070	39.294 ng	100
39) C9C12 TIC 2	20.95	TIC	21367070	39.294 ng	100
40) C9C12 TIC 3	20.95	TIC	21367070	39.294 ng	100
41) C9C12 TIC 4	20.95	TIC	21367070	39.294 ng	100
42) C9C10 TIC 1	20.74	120	3867319	67.064 ng	100
43) C9C10 TIC 2	20.73	134	2171411	67.461 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191616.D
Acq On : 19 Dec 2016 21:45 Operator: LH
Sample : 50ng MAPH ICAL STD
Misc : S29-12061601/S29-10281603 (12/25)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Dec 20 16:00:33 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191617.D
Acq On : 19 Dec 2016 22:18 Operator: LH
Sample : 100ng MAPH ICAL STD
Misc : S29-12061601/S29-10281603 (12/25)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Dec 20 16:00:34 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

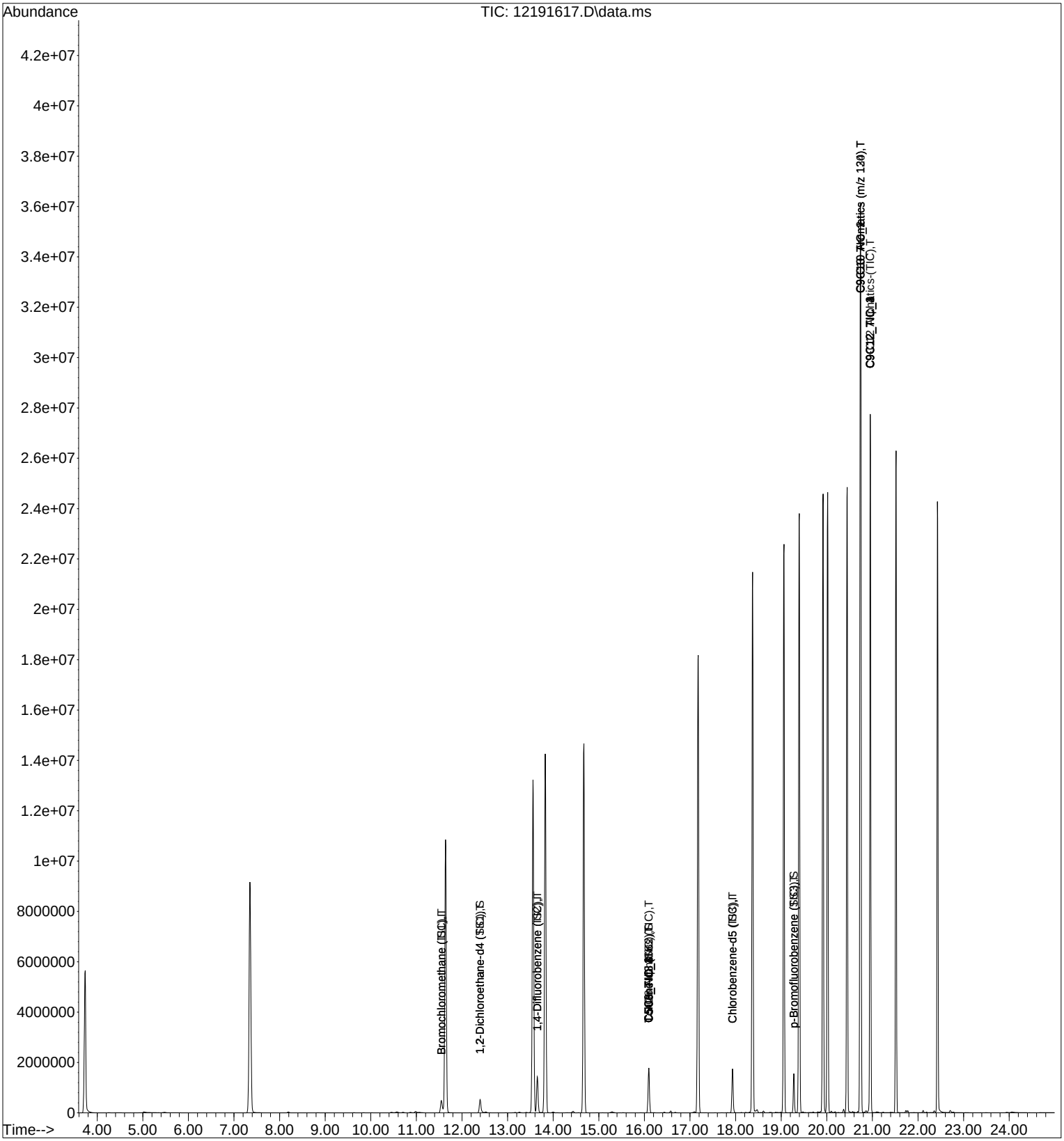
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	276134	12.500 ng	0.00
7) 1,4-Difluorobenzene (IS2)	13.65	114	1379188	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1065075	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.40	65	495029	13.114 ng	0.00
Spiked Amount 12.500				Recovery = 104.88%	
12) Toluene-d8 (SS2)	16.10	98	1423969	12.499 ng	0.00
Spiked Amount 12.500				Recovery = 100.00%	
20) p-Bromofluorobenzene (...	19.28	174	469178	12.616 ng	0.00
Spiked Amount 12.500				Recovery = 100.96%	
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.55	TIC	1345404	11.169 ng	100
3) Isopentane	7.35	TIC	24462071	No Calib	
4) n-Hexane	11.64	TIC	25181283	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.40	TIC	1386295	12.986 ng	100
8) 1,4-Difluorobenzene (TIC)	13.65	TIC	3132467	12.515 ng	100
9) Cyclohexane	13.56	TIC	30151415	No Calib	
10) 2,3-Dimethylpentane	13.83	TIC	31435664	No Calib	
11) n-Heptane	14.67	TIC	29444115	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	3780224	12.742 ng	100
14) n-Octane	17.18	TIC	34704181	No Calib	
15) C5-C8 Aliphatics (TIC)	16.10	TIC	3778521	11.762 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3455252	13.044 ng	100
18) 2,3-Dimethylheptane	18.37	TIC	37607727	No Calib	
19) n-Nonane	19.06	TIC	36388397	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	2677175	12.997 ng	100
22) Isopropylbenzene	19.40	120	4777654	No Calib	
23) 1-Methyl-3-ethylbenzene	19.92	120	5308282	No Calib	
24) 1,3,5-Trimethylbenzene	20.02	120	6986753	No Calib	
25) n-Decane	20.45	TIC	38060288	No Calib	
26) p-Isopropyltoluene	20.74	134	3516405	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	6207230	No Calib	
28) Butylcyclohexane	20.95	TIC	42699385	No Calib	
29) n-Undecane	21.52	TIC	38121852	No Calib	
30) n-Dodecane	22.43	TIC	34899971	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.95	TIC	42708354	454.044 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	6207230	514.370 ng	100
33) C9-C10 Aromatics (m/z ...	20.74	134	3516405	522.047 ng	100
34) C5C8_TIC_1	16.10	TIC	3778521	1.896 ng	100
35) C5C8 TIC 2	16.10	TIC	3778521	1.896 ng	100
36) C5C8 TIC 3	16.10	TIC	3778521	1.896 ng	100
37) C5C8 TIC 4	16.10	TIC	3778521	1.896 ng	100
38) C9C12 TIC 1	20.95	TIC	42708354	76.438 ng	100
39) C9C12 TIC 2	20.95	TIC	42708354	76.438 ng	100
40) C9C12 TIC 3	20.95	TIC	42708354	76.438 ng	100
41) C9C12 TIC 4	20.95	TIC	42708354	76.438 ng	100
42) C9C10 TIC 1	20.74	120	6207230	104.760 ng	100
43) C9C10 TIC 2	20.74	134	3516405	106.323 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191617.D
Acq On : 19 Dec 2016 22:18 Operator: LH
Sample : 100ng MAPH ICAL STD
Misc : S29-12061601/S29-10281603 (12/25)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Dec 20 16:00:34 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 15:57:46 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191618.D
Acq On : 19 Dec 2016 22:52 Operator: LH
Sample : 25ng MAPH ICV STD
Misc : S29-12061601/S29-12011603 (12/30)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 16:12:20 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.56	130	305732	12.500 ng	0.01
7) 1,4-Difluorobenzene (IS2)	13.66	114	1464517	12.500 ng	0.01
16) Chlorobenzene-d5 (IS3)	17.93	117	1154900	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.41	65	532142	12.183 ng	0.01
Spiked Amount 12.500				Recovery = 97.44%	
12) Toluene-d8 (SS2)	16.10	98	1504935	12.524 ng	0.00
Spiked Amount 12.500				Recovery = 100.16%	
20) p-Bromofluorobenzene (...	19.28	174	502213	12.395 ng	0.00
Spiked Amount 12.500				Recovery = 99.20%	

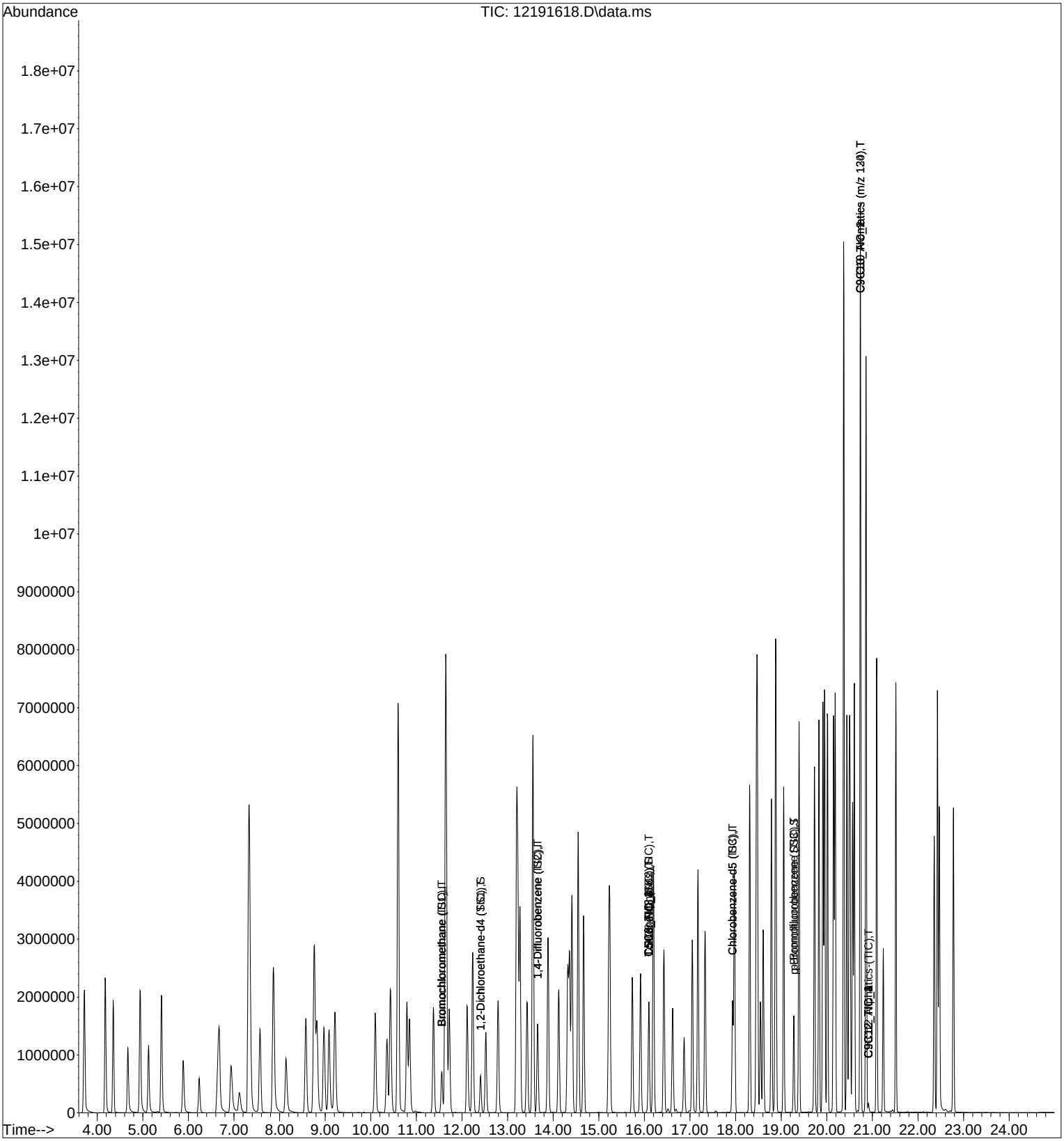
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.55	TIC	1715527	13.827 ng	100
3) Isopentane	7.33	TIC	18528219	No Calib #	
4) n-Hexane	11.64	TIC	21993235	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.41	TIC	1492336	12.191 ng	100
8) 1,4-Difluorobenzene (TIC)	13.66	TIC	3380530	12.564 ng	100
9) Cyclohexane	13.56	TIC	15138007	No Calib	
10) 2,3-Dimethylpentane	13.81	TIC	15647	No Calib	
11) n-Heptane	14.67	TIC	6882590	No Calib	
13) Toluene-d8 (TIC)	16.10	TIC	4043706	12.712 ng	100
14) n-Octane	17.17	TIC	7863461	No Calib	
15) C5-C8 Aliphatics (TIC)	16.10	TIC	4043706	11.799 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	3852933	13.053 ng	100
18) 2,3-Dimethylheptane	18.31	TIC	10055348	No Calib	
19) n-Nonane	19.06	TIC	8692614	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	2858159	12.445 ng	100
22) Isopropylbenzene	19.39	120	1175762	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	1448006	No Calib	
24) 1,3,5-Trimethylbenzene	20.02	120	1828657	No Calib	
25) n-Decane	20.44	TIC	9456791	No Calib	
26) p-Isopropyltoluene	20.74	134	1216748	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	2172555	No Calib	
28) Butylcyclohexane	20.91	TIC	203268	No Calib	
29) n-Undecane	21.51	TIC	9918169	No Calib	
30) n-Dodecane	22.46	TIC	8664481	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.91	TIC	203268	2.741 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	2172555	141.963 ng	100
33) C9-C10 Aromatics (m/z ...	20.74	134	1216748	141.595 ng	100
34) C5C8_TIC_1	16.10	TIC	4043706	1.820 ng	100
35) C5C8 TIC 2	16.10	TIC	4043706	1.820 ng	100
36) C5C8 TIC 3	16.10	TIC	4043706	1.820 ng	100
37) C5C8 TIC 4	16.10	TIC	4043706	1.820 ng	100
38) C9C12 TIC 1	20.91	TIC	203268	0.462 ng	100
39) C9C12 TIC 2	20.91	TIC	203268	0.462 ng	100
40) C9C12 TIC 3	20.91	TIC	203268	0.462 ng	100
41) C9C12 TIC 4	20.91	TIC	203268	0.462 ng	100
42) C9C10 TIC 1	20.74	120	2172555	28.913 ng	100
43) C9C10 TIC 2	20.74	134	1216748	28.838 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191618.D
Acq On : 19 Dec 2016 22:52 Operator: LH
Sample : 25ng MAPH ICV STD
Misc : S29-12061601/S29-12011603 (12/30)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 16:12:20 2016
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Massachusetts APH

Initial Calibration Verification/Laboratory Control Sample Check Sheet

Data File Name: **12191618.D**
Data File Path: **I:\MS16\DATA\2016_12\19**
Operator: **LH**
Date Acquired: **12/19/16 22:52**
Acq. Method File: **TO15.M**
Sample Name: **25ng MAPH ICV STD**
Misc Info: **S29-12061601/S29-12011603 (12/30)**
Instrument Name: **GCMS-16**

Enter RRFs from current ICAL!

	Internal Standards	**RT**	**Area**
7)	1,4-Difluorobenzene (IS2)	13.66	1464517
16)	Chlorobenzene-d5 (IS3)	17.93	1154900

	C5-C8 Aliphatics	**RT**	**Area**	**RRF**	**ng**	**% Rec.**	**LCL**	**UCL**	**Pass/Fail**
11)	n-Heptane	14.67	6882590	2.208	23.96	**90.1**	**70**	**130**	Pass

Spike Amt (ng)	**ICAL RRF**
26.600	2.452

	C9-C12 Aliphatics	**RT**	**Area**	**RRF**	**ng**	**% Rec.**			
29)	n-Undecane	21.51	9918169	4.036	26.85	**100.9**	**70**	**130**	Pass

Spike Amt (ng)	**ICAL RRF**
26.600	3.998

	C9-C10 Aromatics	**RT**	**Area**	**RRF**	**ng**	**% Rec.**			
24)	1,3,5-Trimethylbenzene	20.02	1828657	0.621	51.50	**97.0**	**70**	**130**	Pass
26)	p-Isopropyltoluene	20.74	1216748						
			3045405						

Spike Amt (ng)	**ICAL RRF**
53.075	0.640

LH ***12/20/16***

Massachusetts APH

Continuing Calibration Verification Check Sheet

Data File Name: **03091703.D**
Data File Path: **I:\MS16\DATA\2017_03\09**
Operator: **LH**
Date Acquired: **3/9/17 3:28**
Acq. Method File: **TO15.M**
Sample Name: **CCV M16030917_25ng**
Misc Info: **S29-03071701/S29-02221702 (4/21)**
Instrument Name: **GCMS-16**

Enter RRFs from current ICAL!

	Internal Standards	RT	Area
7)	1,4-Difluorobenzene (IS2)	13.64	1855213
16)	Chlorobenzene-d5 (IS3)	17.93	1420897

	C5-C8 Aliphatics	RT	Area	RRF	ng	% D	LCL	UCL	Pass/Fai
3)	Isopentane	7.34	9330034	2.724	174.7	**11.08**	**-30**	**30**	Pass
4)	n-Hexane	11.63	9475488						
9)	Cyclohexane	13.55	10690897						
10)	2,3-Dimethylpentane	13.82	11308239	**Spike**	**ICAL**				
11)	n-Heptane	14.66	10645310	**Amt (ng)**	**RRF**				
14)	n-Octane	17.18	12119428	157.25	2.452				
			63569396						

	C9-C12 Aliphatics	RT	Area	RRF	ng	% D			
18)	2,3-Dimethylheptane	18.37	13097134	4.868	180.8	**21.77**	**-30**	**30**	Pass
19)	n-Nonane	19.06	12746743						
25)	n-Decane	20.44	13516214						
28)	Butylcyclohexane	20.95	14813078	**Spike**	**ICAL**				
29)	n-Undecane	21.51	13852813	**Amt (ng)**	**RRF**				
30)	n-Dodecane	22.43	14151868	148.50	3.998				
			82177850						

	C9-C10 Aromatics	RT	Area	RRF	ng	% D			
22)	Isopropylbenzene	19.39	1477427	0.653	125.2	**2.01**	**-30**	**30**	Pass
23)	1-Methyl-3-ethylbenzene	19.91	1654895						
24)	1,3,5-Trimethylbenzene	20.01	2236428						
26)	p-Isopropyltoluene	20.73	1324631	**Spike**	**ICAL**				
27)	1,2,3-Trimethylbenzene	20.74	2416183	**Amt (ng)**	**RRF**				
			9109564	122.75	0.640				

LH *3/9/17*

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091703.D
Acq On : 9 Mar 2017 3:28 Operator: LH
Sample : CCV M16030917 25ng
Misc : S29-03071701/S29-02221702 (4/21)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Mar 09 07:14:37 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/9/17

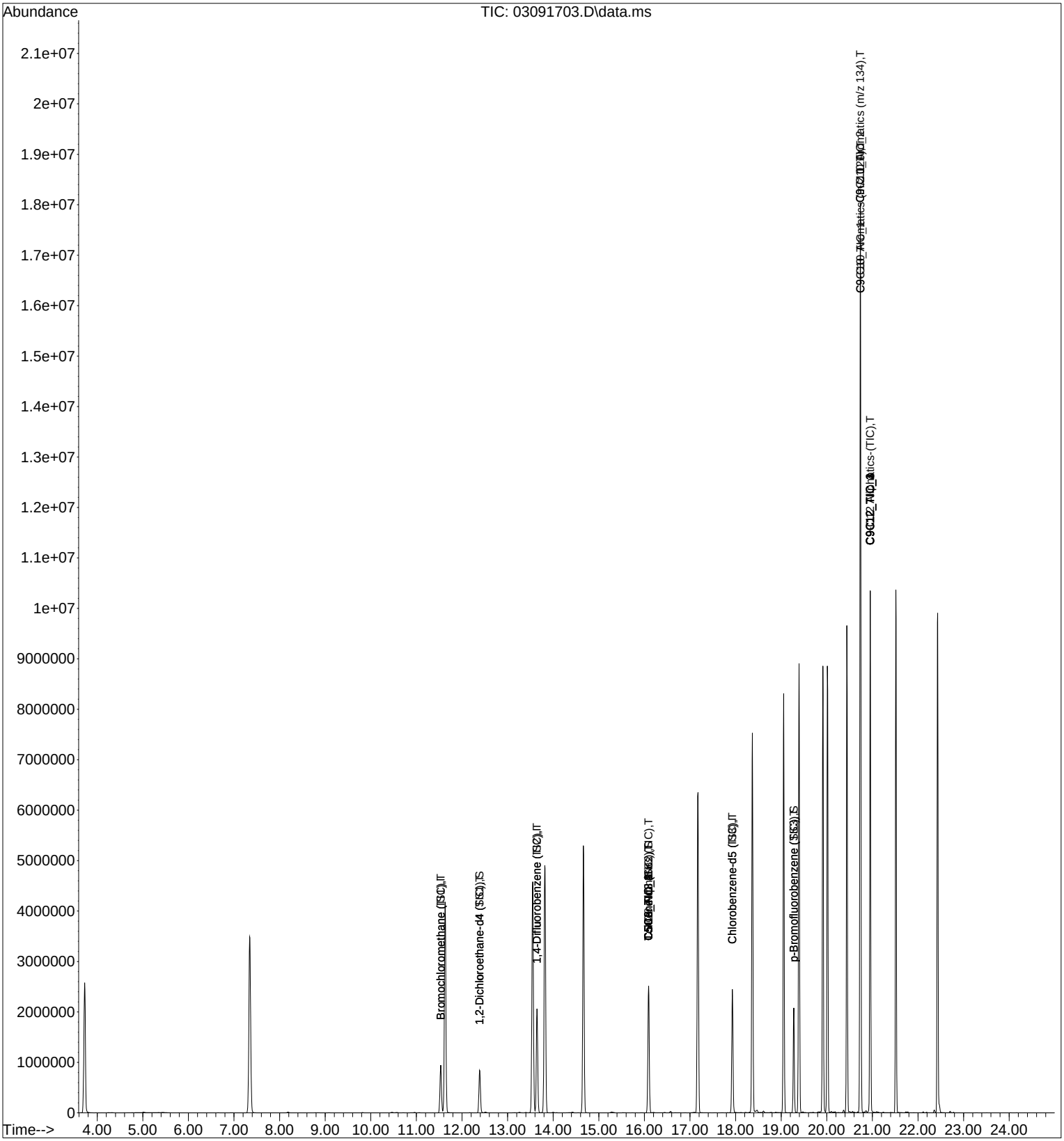
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.53	130	357166	12.500 ng	-0.02
7) 1,4-Difluorobenzene (IS2)	13.64	114	1855213	12.500 ng	0.00
16) Chlorobenzene-d5 (IS3)	17.93	117	1420897	12.500 ng	0.00
System Monitoring Compounds					
5) 1,2-Dichloroethane-d4 ...	12.39	65	679800	13.322 ng	-0.01
Spiked Amount 12.500				Recovery = 106.56%	
12) Toluene-d8 (SS2)	16.09	98	1964470	12.906 ng	0.00
Spiked Amount 12.500				Recovery = 103.28%	
20) p-Bromofluorobenzene (...	19.28	174	546127	10.956 ng	0.00
Spiked Amount 12.500				Recovery = 87.68%	
Target Compounds					Qvalue
2) Bromochloromethane (TIC)	11.53	TIC	2191395	15.119 ng	100
3) Isopentane	7.34	TIC	9330034	No Calib	
4) n-Hexane	11.63	TIC	9475488	No Calib	
6) 1,2-Dichloroethane-d4 ...	12.39	TIC	1951194	13.644 ng	100
8) 1,4-Difluorobenzene (TIC)	13.64	TIC	4409684	12.938 ng	100
9) Cyclohexane	13.55	TIC	10690897	No Calib	
10) 2,3-Dimethylpentane	13.82	TIC	11308239	No Calib	
11) n-Heptane	14.66	TIC	10645310	No Calib	
13) Toluene-d8 (TIC)	16.09	TIC	5286863	13.120 ng	100
14) n-Octane	17.18	TIC	12119428	No Calib	
15) C5-C8 Aliphatics (TIC)	16.09	TIC	5286863	12.178 ng	100
17) Chlorobenzene-d5 (TIC)	17.93	TIC	4732720	13.032 ng	100
18) 2,3-Dimethylheptane	18.37	TIC	13097134	No Calib	
19) n-Nonane	19.06	TIC	12746743	No Calib	
21) p-Bromofluorobenzene (...	19.28	TIC	3486594	12.340 ng	100
22) Isopropylbenzene	19.39	120	1477427	No Calib	
23) 1-Methyl-3-ethylbenzene	19.91	120	1654895	No Calib	
24) 1,3,5-Trimethylbenzene	20.01	120	2236428	No Calib	
25) n-Decane	20.44	TIC	13516214	No Calib	
26) p-Isopropyltoluene	20.73	134	1324631	No Calib	
27) 1,2,3-Trimethylbenzene	20.74	120	2416183	No Calib	
28) Butylcyclohexane	20.95	TIC	14813078	No Calib	
29) n-Undecane	21.51	TIC	13852813	No Calib	
30) n-Dodecane	22.43	TIC	14151868	No Calib	
31) C9-C12 Aliphatics-(TIC)	20.95	TIC	14813078	162.376 ng	100
32) C9-C10 Aromatics (m/z ...	20.74	120	2416183	128.326 ng	100
33) C9-C10 Aromatics (m/z ...	20.73	134	1324631	125.292 ng	100
34) C5C8_TIC_1	16.09	TIC	5286863	1.934 ng	100
35) C5C8 TIC 2	16.09	TIC	5286863	1.934 ng	100
36) C5C8 TIC 3	16.09	TIC	5286863	1.934 ng	100
37) C5C8 TIC 4	16.09	TIC	5286863	1.934 ng	100
38) C9C12 TIC 1	20.95	TIC	14813078	27.336 ng	100
39) C9C12 TIC 2	20.95	TIC	14813078	27.336 ng	100
40) C9C12 TIC 3	20.95	TIC	14813078	27.336 ng	100
41) C9C12 TIC 4	20.95	TIC	14813078	27.336 ng	100
42) C9C10 TIC 1	20.74	120	2416183	26.136 ng	100
43) C9C10 TIC 2	20.73	134	1324631	25.518 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091703.D
Acq On : 9 Mar 2017 3:28 Operator: LH
Sample : CCV M16030917 25ng
Misc : S29-03071701/S29-02221702 (4/21)
ALS Vial : 4 Sample Multiplier: 1

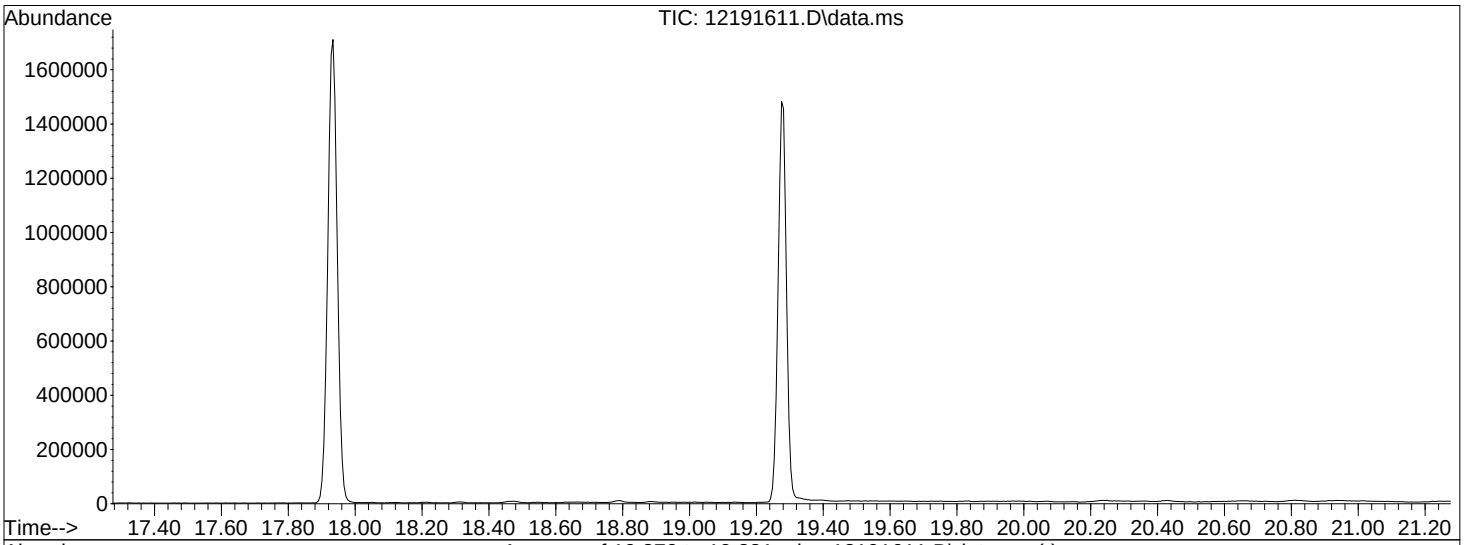
Quant Time: Mar 09 07:14:37 2017
Quant Method : I:\MS16\METHODS\M16121916.M
Quant Title : Massachusetts APH
QLast Update : Tue Dec 20 16:11:55 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

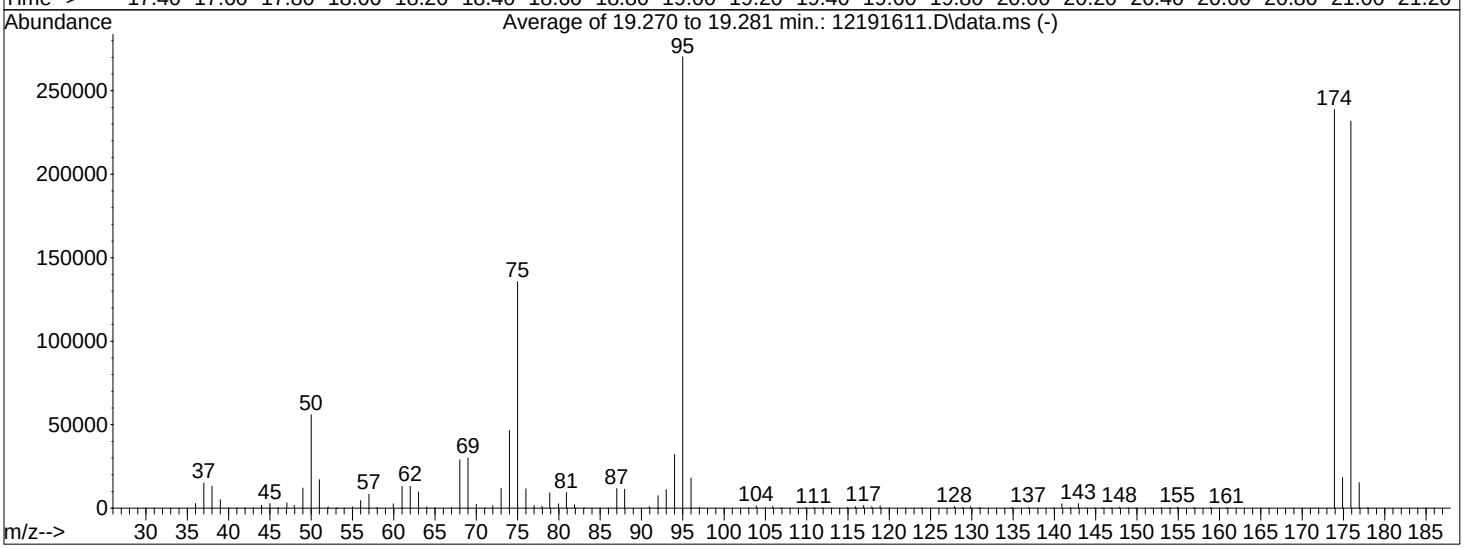


Data Path : I:\MS16\DATA\2016 12\19\
Data File : 12191611.D
Acq On : 19 Dec 2016 18:59
Operator : LH
Sample : 12.5ng TO-15 BFB
Misc : S29-12061601
ALS Vial : 2 Sample Multiplier: 1

Integration File: RTEINT.P

Method : I:\MS16\METHODS\M16121916.M
Title : Massachusetts APH
Last Update : Tue Dec 20 14:50:26 2016





AutoFind: Scans 2852, 2853, 2854; Background Corrected with Scan 2843

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	20.7	56021	PASS
75	95	30	66	50.2	135707	PASS
95	95	100	100	100.0	270357	PASS
96	95	5	9	6.7	18099	PASS
173	174	0.00	2	0.0	0	PASS
174	95	50	120	88.3	238592	PASS
175	174	4	9	7.7	18392	PASS
176	174	93	101	97.2	231808	PASS
177	176	5	9	6.6	15296	PASS

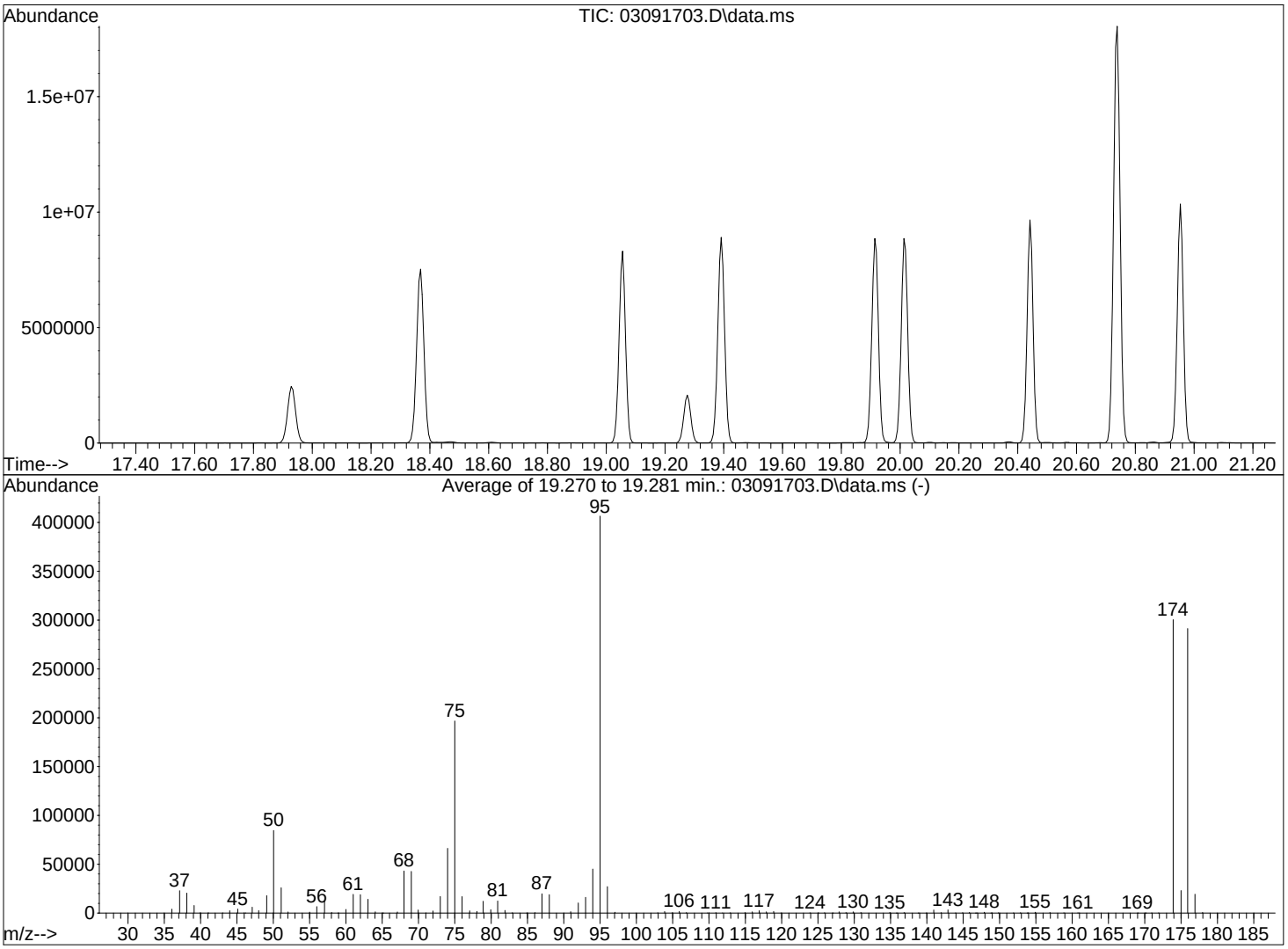
LH 12/20/16

BFB

Data Path : I:\MS16\DATA\2017 03\09\
Data File : 03091703.D
Acq On : 9 Mar 2017 3:28
Operator : LH
Sample : CCV M16030917 25ng
Misc : S29-03071701/S29-02221702 (4/21)
ALS Vial : 4 Sample Multiplier: 1

Integration File: RTEINT.P

Method : I:\MS16\METHODS\M16121916.M
Title : Massachusetts APH
Last Update : Tue Dec 20 16:11:55 2016



AutoFind: Scans 2852, 2853, 2854; Background Corrected with Scan 2842

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	20.8	84627	PASS
75	95	30	66	48.4	196736	PASS
95	95	100	100	100.0	406528	PASS
96	95	5	9	6.7	27139	PASS
173	174	0.00	2	0.0	0	PASS
174	95	50	120	73.9	300416	PASS
175	174	4	9	7.7	23021	PASS
176	174	93	101	97.0	291371	PASS
177	176	5	9	6.7	19381	PASS

LH 3/9/17

Injection Log

Directory: J:\MS16\DATA\2016_12\19\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	12/19/16 8:58	12191601.D	Blank (100mL)	S29-12061601	LH	2	
2	12/19/16 10:27	12191602.D	Blank (100mL)	S29-12061601	LH	2	
3	12/19/16 11:01	12191603.D	0.1ng std check	S29-12061601/S29-11301611 (12/29)	LH	6	
4	12/19/16 12:03	12191604.D	Blank (100mL)	S29-12061601	LH	2	
5	12/19/16 12:36	12191605.D	Blank (100mL)	S29-12061601	LH	2	
6	12/19/16 13:09	12191606.D	Blank (100mL)	S29-12061601	LH	2	
7	12/19/16 13:43	12191607.D	Blank (100mL)	S29-12061601	LH	2	
8	12/19/16 17:19	12191608.D	1.0ng std check	S29-12061601/S29-12191607 (1/17)	LH	8	
9	12/19/16 17:52	12191609.D	5.0ng std check	S29-12061601/S29-12191605 (1/17)	LH	9	
10	12/19/16 18:26	12191610.D	25ng std check	S29-12061601/S29-12191605 (1/17)	LH	2	
11	12/19/16 18:59	12191611.D	12.5ng TO-15 BFB	S29-12061601	LH	2	
12	12/19/16 19:32	12191612.D	0.5ng MAPH ICAL STD	S29-12061601/S29-10281604 (12/25)	LH	7	
13	12/19/16 20:05	12191613.D	1.0ng MAPH ICAL STD	S29-12061601/S29-10281604 (12/25)	LH	7	
14	12/19/16 20:39	12191614.D	5.0ng MAPH ICAL STD	S29-12061601/S29-10281604 (12/25)	LH	7	
15	12/19/16 21:12	12191615.D	25ng MAPH ICAL STD	S29-12061601/S29-10281603 (12/25)	LH	4	
16	12/19/16 21:45	12191616.D	50ng MAPH ICAL STD	S29-12061601/S29-10281603 (12/25)	LH	4	
17	12/19/16 22:18	12191617.D	100ng MAPH ICAL STD	S29-12061601/S29-10281603 (12/25)	LH	4	
18	12/19/16 22:52	12191618.D	25ng MAPH ICV STD	S29-12061601/S29-12011603 (12/30)	LH	2	
19	12/19/16 23:25	12191619.D	12.5ng TO-15 BFB	S29-12061601	LH	2	
20	12/19/16 23:59	12191620.D	0.08ng TO-15 ICAL STD	S29-12061601/S29-12191607 (1/17)	LH	8	
21	12/20/16 0:33	12191621.D	0.1ng TO-15 ICAL STD	S29-12061601/S29-12191607 (1/17)	LH	8	
22	12/20/16 1:06	12191622.D	0.2ng TO-15 ICAL STD	S29-12061601/S29-12191607 (1/17)	LH	8	
23	12/20/16 1:39	12191623.D	0.4ng TO-15 ICAL STD	S29-12061601/S29-12191607 (1/17)	LH	8	
24	12/20/16 2:13	12191624.D	1.0ng TO-15 ICAL STD	S29-12061601/S29-12191605 (1/17)	LH	9	
25	12/20/16 2:46	12191625.D	5.0ng TO-15 ICAL STD	S29-12061601/S29-12191605 (1/17)	LH	9	
26	12/20/16 3:19	12191626.D	25ng TO-15 ICAL STD	S29-12061601/S29-12191603 (1/17)	LH	2	
27	12/20/16 3:52	12191627.D	50ng TO-15 ICAL STD	S29-12061601/S29-12191603 (1/17)	LH	2	
28	12/20/16 4:25	12191628.D	100ng TO-15 ICAL STD	S29-12061601/S29-12191603 (1/17)	LH	2	
29	12/20/16 4:58	12191629.D	25ng TO-15 ICV STD	S29-12061601/S29-12011603 (12/30)	LH	2	
30	12/20/16 5:32	12191630.D	Blank (100mL)	S29-12061601	LH	2	
	ICAL passed for all compounds 0.08ng-100ng, except: propene, methylene chloride 0.2ng-100ng, dichlorodifluoromethane,						
	chloromethane 0.1ng-100ng, acetonitrile, carbon disulfide, benzyl chloride, 1,2-dibromo-3-chloropropane, naphthalene 0.4ng-100ng,						
	vinyl chloride 2.0ng-500ng.						
				LH 12/21/16			
##							

Injection Log

Directory: I:\MS16\DATA\2017_03\09\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	3/9/17 2:20	03091701.D	CCV R16030917_25ng	S29-03071701/S29-02171704 (3/18)	LH	2	passed
2	3/9/17 2:54	03091702.D	CCV C16030917_25ng	S29-03071701/S29-03031405 (4/1)	LH	3	passed
3	3/9/17 3:28	03091703.D	CCV M16030917_25ng	S29-03071701/S29-02221702 (4/21)	LH	4	passed
4	3/9/17 4:02	03091704.D	MB R16030917_1000mL	S29-03071701 AC00442	LH	2	passed
5	3/9/17 4:35	03091705.D	LCS R16030917_25ng	S29-03071701/S29-03031707 (1/1)	LH	2	passed
6	3/9/17 5:09	03091706.D	LCSD R16030917_25ng	S29-03071701/S29-03031707 (1/1)	LH	2	passed
7	3/9/17 8:05	03091707.D	P1701055-003dil (5.0mL)	S29-03071701	LH	1	
8	3/9/17 8:38	03091708.D	P1701055-011dil (15mL)	S29-03071701	LH	12	
9	3/9/17 9:11	03091709.D	P1701055-012dil (15mL)	S29-03071701	LH	13	
10	3/9/17 9:45	03091710.D	P1701055-013dil (5.0mL)	S29-03071701	LH	1	
11	3/9/17 10:20	03091711.D	P1700972-004dil (25mL)	S29-03071701	LH	6	
12	3/9/17 10:54	03091712.D	P1701055-014dil (20mL)	S29-03071701	LH	15	
13	3/9/17 11:27	03091713.D	P1701055-016dil (5.0mL)	S29-03071701	LH	1	
14	3/9/17 12:03	03091714.D	P1701057-001 (4.0mL)	S29-03071701	LH	1	
15	3/9/17 13:53	03091715.D	P1700971-003 (20mL)	S29-03071701	LH	8	over diluted
16	3/9/17 14:59	03091716.D	P1701057-002 (1000mL)	S29-03071701	LH	16	
17	3/9/17 15:48	03091717.D	P1700971-001 (1000mL)	S29-03071701	LH	6	
18	3/9/17 16:35	03091718.D	P1700971-002 (1000mL)	S29-03071701	LH	7	
19	3/9/17 17:09	03091719.D	P1700971-003 (120mL)	S29-03071701	LH	8	
20	3/9/17 17:43	03091720.D	P1700971-004 (1000mL)	S29-03071701	LH	9	
21	3/9/17 18:17	03091721.D	P1700971-005 (1000mL)	S29-03071701	LH	10	
22	3/9/17 18:50	03091722.D	P1700971-006 (35mL)	S29-03071701	LH	11	
23	3/9/17 19:24	03091723.D	P1700971-006dup (35mL)	S29-03071701	LH	11	passed
24	3/9/17 19:58	03091724.D	Blank (100mL)	S29-03071701	LH	2	
25	3/9/17 20:32	03091725.D	P1701095-001 (400mL)	S29-03071701	LH	12	
26	3/9/17 21:06	03091726.D	P1701120-001 (400mL)	S29-03071701	LH	13	
27	3/9/17 21:39	03091727.D	P1701137-001 (400mL)	S29-03071701	LH	14	

LH 3/10/17

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091717.D
Acq On : 9 Mar 2017 15:48 Operator: LH
Sample : P1700971-001 (1000mL)
Misc : S29-03071701
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Mar 10 16:11:44 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/10/17

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.54	130	378501	12.500	ng	-0.04
37) 1,4-Difluorobenzene (IS2)	13.65	114	1931078	12.500	ng	-0.02
56) Chlorobenzene-d5 (IS3)	17.93	82	894613	12.500	ng	0.00

System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...	12.39	65	707972	13.020	ng	-0.03
Spiked Amount 12.500	Range 70 - 130		Recovery = 104.16%			
57) Toluene-d8 (SS2)	16.10	98	2062680	12.017	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.16%			
73) Bromofluorobenzene (SS3)	19.28	174	585217	10.681	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 85.44%			

Target Compounds

							Qvalue
2) Propene	4.20	42	30434m	0.582	ng		
3) Dichlorodifluoromethan...	4.37	85	171024	1.789	ng		99
4) Chloromethane	4.69	50	17583	0.224	ng		99
5) 1,2-Dichloro-1,1,2,2-t...	4.96	135	3440	N.D.			
6) Vinyl Chloride	0.00	62	0	N.D.			
7) 1,3-Butadiene	5.42	54	3391	N.D.			
8) Bromomethane	5.90	94	987	N.D.			
9) Chloroethane	0.00	64	0	N.D.			
10) Ethanol	6.61	45	120049	3.354	ng		100
11) Acetonitrile	6.92	41	9702	0.118	ng		94
12) Acrolein	7.12	56	6656	0.212	ng		92
13) Acetone	7.33	58	131291	3.653	ng		93
14) Trichlorofluoromethane	7.57	101	67666	0.825	ng		99
15) 2-Propanol (Isopropanol)	7.87	45	28581	0.233	ng		94
16) Acrylonitrile	8.18	53	1889	N.D.			
17) 1,1-Dichloroethene	0.00	96	0	N.D.			
18) 2-Methyl-2-Propanol (t...	8.82	59	4746	N.D.			
19) Methylene Chloride	8.80	84	11579	0.257	ng		98
20) 3-Chloro-1-propene (Al...	8.87	41	3744	N.D.			
21) Trichlorotrifluoroethane	9.22	151	12231	0.304	ng		86
22) Carbon Disulfide	9.09	76	15481	0.097	ng		97
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	10.46	73	1469	N.D.			
26) Vinyl Acetate	0.00	86	0	N.D. d			
27) 2-Butanone (MEK)	10.86	72	20848	0.672	ng	#	88
28) cis-1,2-Dichloroethene	11.36	61	895	N.D.			
29) Diisopropyl Ether	0.00	87	0	N.D.			
30) Ethyl Acetate	11.68	61	3864	0.219	ng		94
31) n-Hexane	11.63	57	39670	0.495	ng		97
32) Chloroform	11.70	83	4792	N.D.			
34) Tetrahydrofuran (THF)	12.17	72	2387	N.D.			
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.			
36) 1,2-Dichloroethane	12.51	62	2806	N.D.			
38) 1,1,1-Trichloroethane	12.78	97	507	N.D.			
39) Isopropyl Acetate	13.26	61	649	N.D.			
40) 1-Butanol	0.00	56	0	N.D. d			
41) Benzene	13.27	78	100028	0.507	ng		100
42) Carbon Tetrachloride	13.42	117	17623	0.269	ng		100
43) Cyclohexane	13.55	84	5066	N.D.			
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.			
45) 1,2-Dichloropropane	14.12	63	979	N.D.			
46) Bromodichloromethane	14.31	83	650	N.D.			
47) Trichloroethene	14.35	130	1726	N.D.			
48) 1,4-Dioxane	14.38	88	638	N.D.			
49) 2,2,4-Trimethylpentane...	0.00	57	0	N.D. d			

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091717.D
Acq On : 9 Mar 2017 15:48 Operator: LH
Sample : P1700971-001 (1000mL)
Misc : S29-03071701
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Mar 10 16:11:44 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

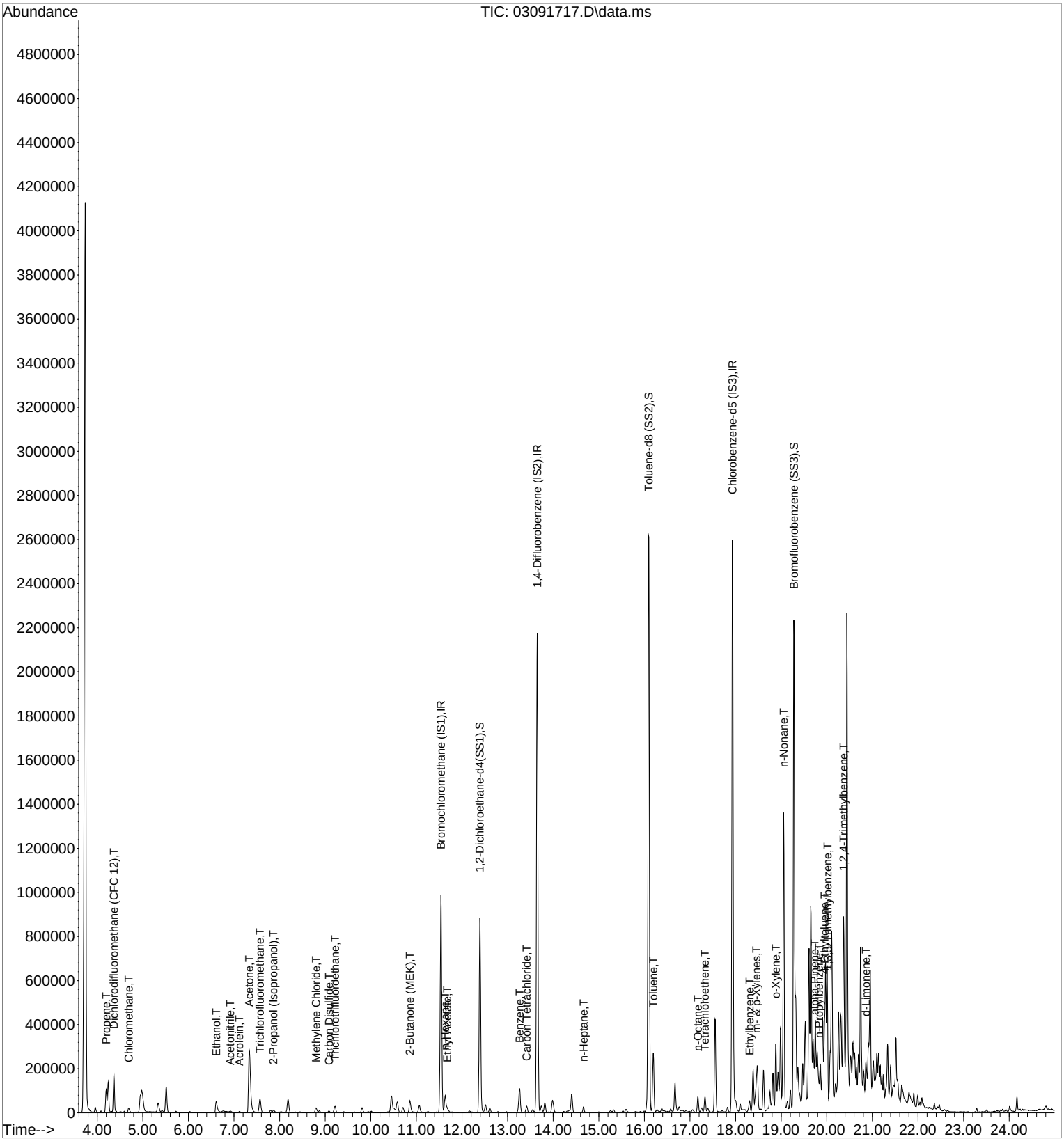
Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
50) Methyl Methacrylate	14.67	100	1563	N.D.		
51) n-Heptane	14.67	71	6174	0.130 ng		91
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.		
53) 4-Methyl-2-pentanone	15.26	58	2752	N.D.		
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.		
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.		
58) Toluene	16.20	91	216776	1.034 ng		99
59) 2-Hexanone	16.43	43	5788	N.D.		
60) Dibromochloromethane	0.00	129	0	N.D.		
61) 1,2-Dibromoethane	0.00	107	0	N.D.		
62) n-Butyl Acetate	17.06	43	7907	N.D.		
63) n-Octane	17.17	57	14558	0.316 ng		94
64) Tetrachloroethene	17.33	166	21509	0.379 ng		100
65) Chlorobenzene	17.99	112	8813	N.D.		
66) Ethylbenzene	18.31	91	36673	0.156 ng		99
67) m- & p-Xylenes	18.46	91	88658	0.483 ng		98
68) Bromoform	0.00	173	0	N.D.		
69) Styrene	18.78	104	4778	N.D.		
70) o-Xylene	18.89	91	38164	0.202 ng		99
71) n-Nonane	19.06	43	492201	4.331 ng		95
72) 1,1,2,2-Tetrachloroethane	18.89	83	5672	N.D.		
74) Cumene	19.39	105	6872	N.D.		
75) alpha-Pinene	19.73	93	15640	0.127 ng	#	1
76) n-Propylbenzene	19.83	91	25582	0.092 ng	#	77
77) 3-Ethyltoluene	0.00	105	0	N.D. d		
78) 4-Ethyltoluene	19.95	105	20491	0.098 ng		99
79) 1,3,5-Trimethylbenzene	20.02	105	20654	0.106 ng		96
80) alpha-Methylstyrene	20.15	118	596	N.D.		
81) 2-Ethyltoluene	0.00	105	0	N.D. d		
82) 1,2,4-Trimethylbenzene	20.37	105	65139	0.341 ng		89
83) n-Decane	0.00	57	0	N.D. d		
84) Benzyl Chloride	20.52	91	943	N.D.		
85) 1,3-Dichlorobenzene	20.57	146	1478	N.D.		
86) 1,4-Dichlorobenzene	20.57	146	1478	N.D.		
87) sec-Butylbenzene	20.60	105	5924	N.D.		
88) 4-Isopropyltoluene (p-...	20.74	119	14708	N.D.		
89) 1,2,3-Trimethylbenzene	0.00	105	0	N.D. d		
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.		
91) d-Limonene	20.86	68	10358	0.126 ng	#	72
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	22.35	180	579	N.D.		
95) Naphthalene	22.47	128	16659	N.D.		
96) n-Dodecane	22.43	57	5443	N.D.		
97) Hexachlorobutadiene	0.00	225	0	N.D.		
98) Cyclohexanone	0.00	55	0	N.D. d		
99) tert-Butylbenzene	20.37	119	8296	N.D.		
100) n-Butylbenzene	21.10	91	16007	N.D.		

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091717.D
Acq On : 9 Mar 2017 15:48 Operator: LH
Sample : P1700971-001 (1000mL)
Misc : S29-03071701
ALS Vial : 6 Sample Multiplier: 1

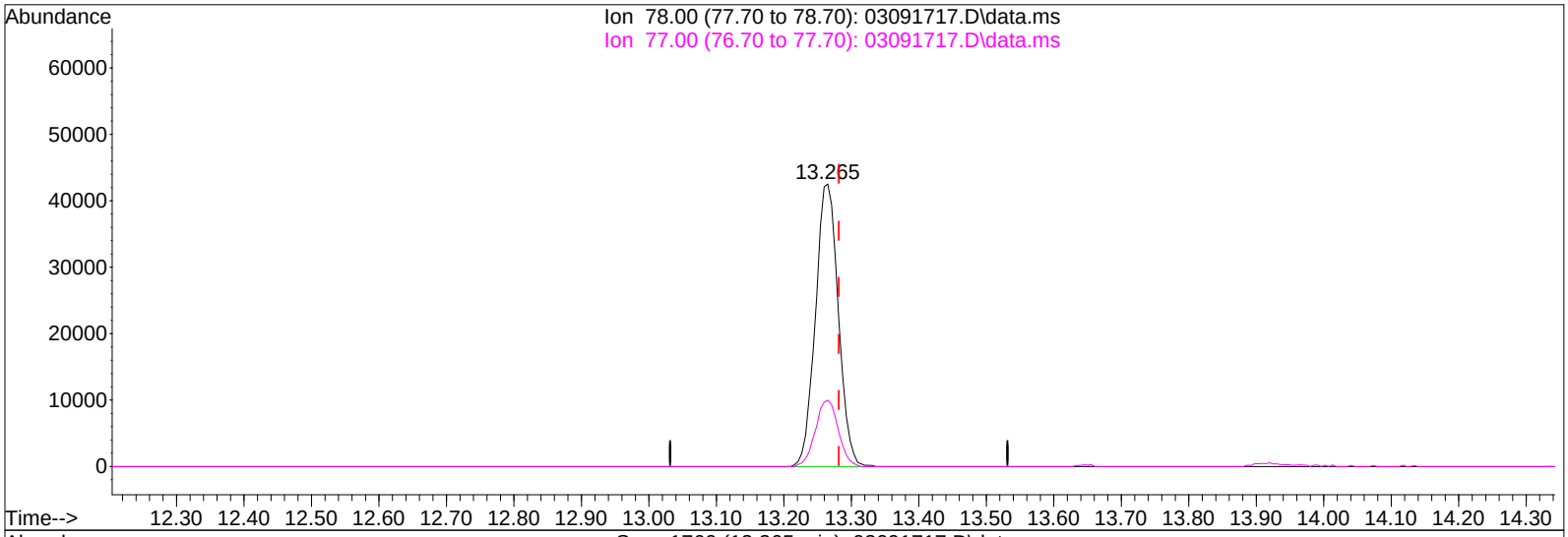
Quant Time: Mar 10 16:11:44 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

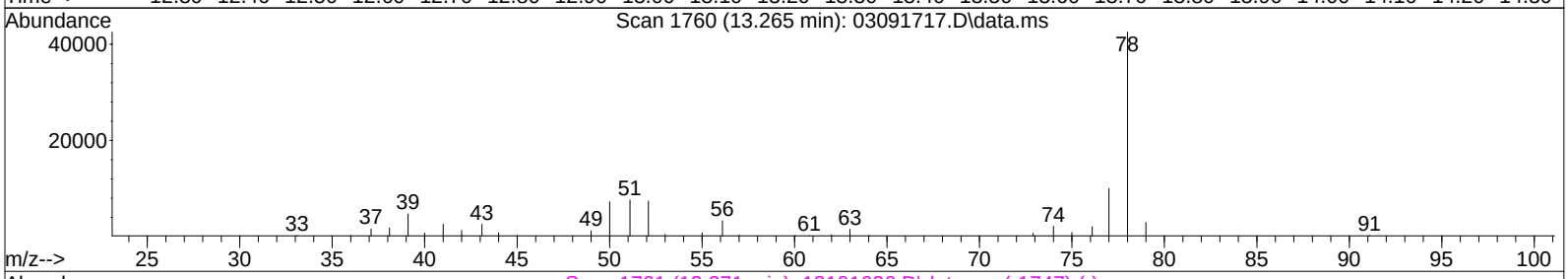


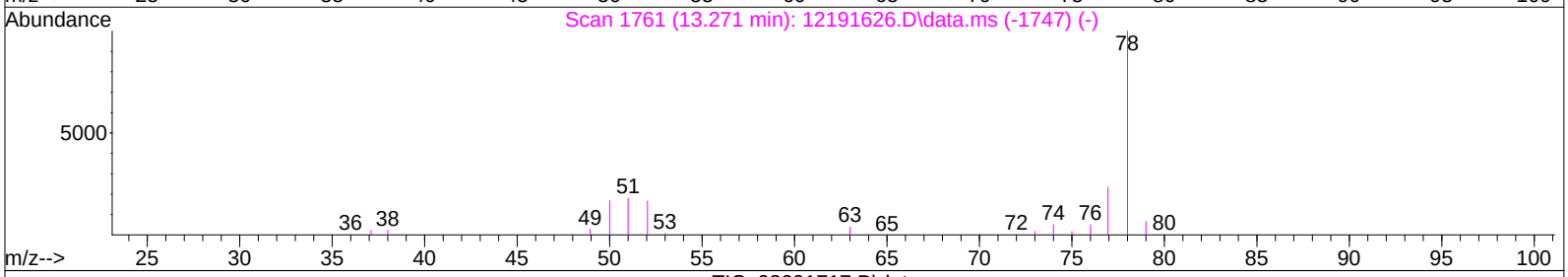
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091717.D
Acq On : 9 Mar 2017 15:48 Operator: LH
Sample : P1700971-001 (1000mL)
Misc : S29-03071701
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Mar 10 16:11:44 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 03091717.D\data.ms

(41) Benzene (T)

13.265min (-0.017) 0.51ng

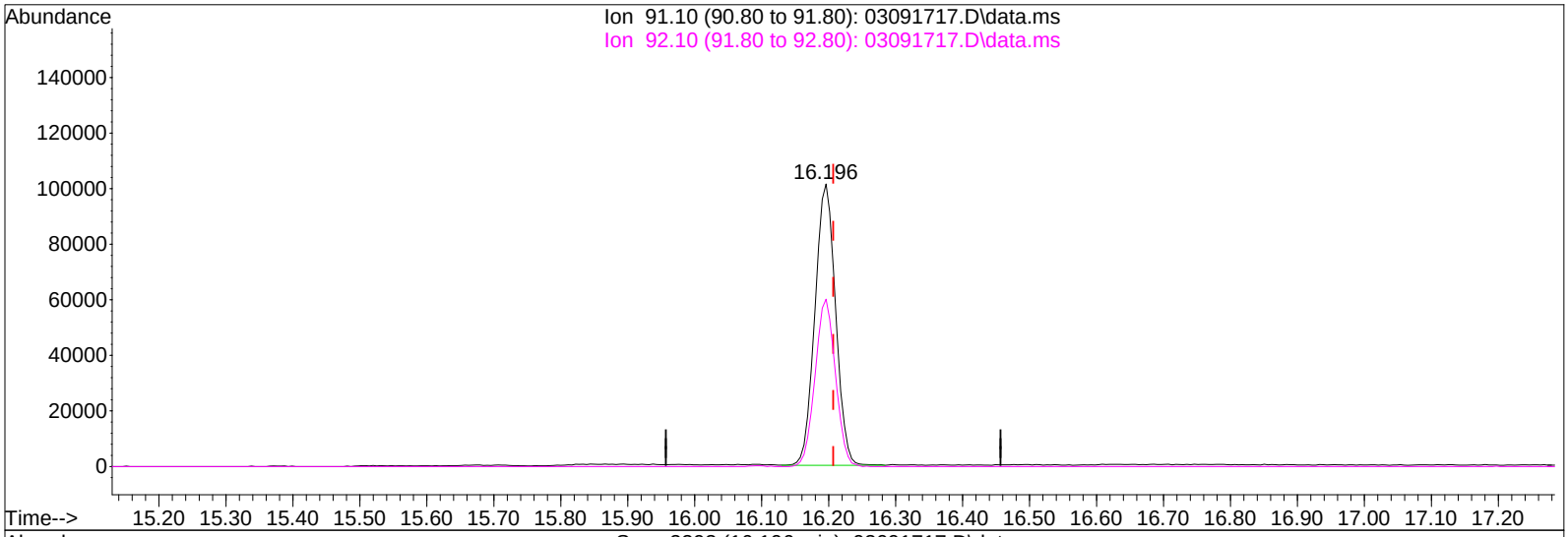
response 100028

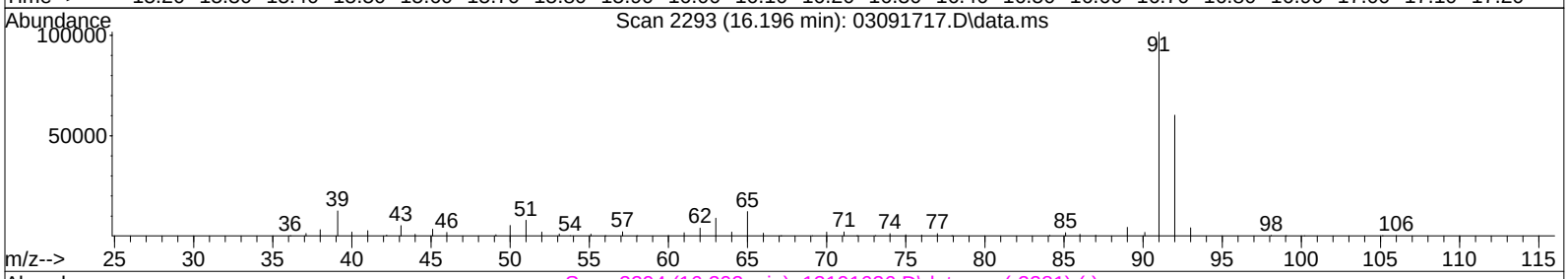
Ion	Exp%	Act%
78.00	100	100
77.00	23.50	23.52
0.00	0.00	0.00
0.00	0.00	0.00

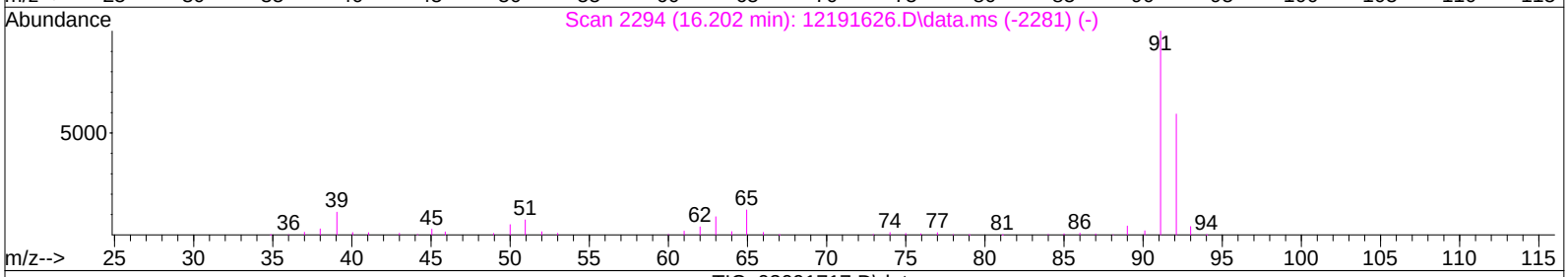
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091717.D
Acq On : 9 Mar 2017 15:48 Operator: LH
Sample : P1700971-001 (1000mL)
Misc : S29-03071701
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Mar 10 16:11:44 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 03091717.D\data.ms

(58) Toluene (T)

16.196min (-0.011) 1.03ng

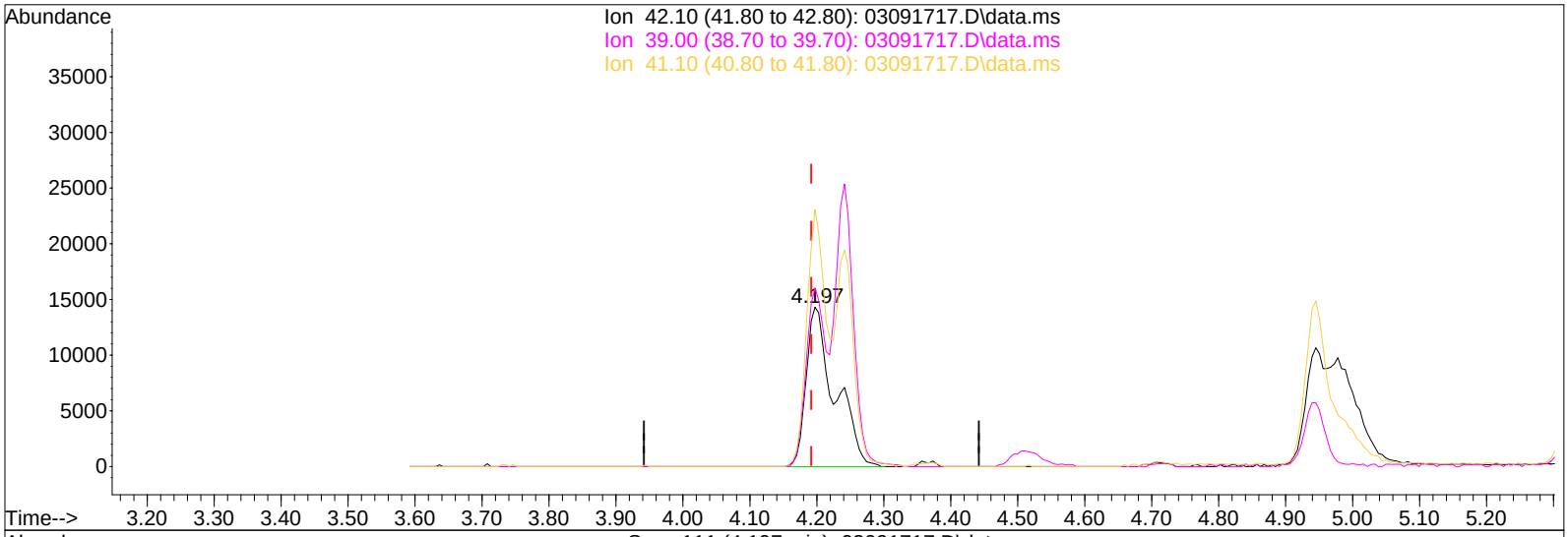
response 216776

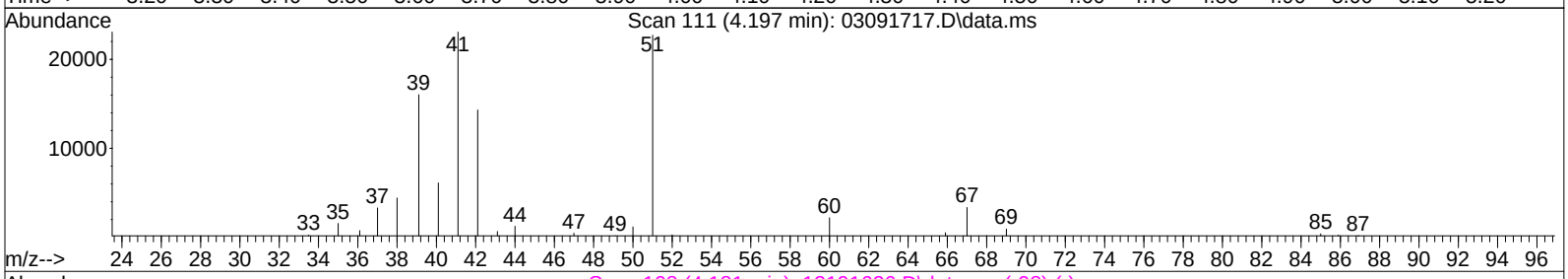
Ion	Exp%	Act%
91.10	100	100
92.10	59.10	58.62
0.00	0.00	0.00
0.00	0.00	0.00

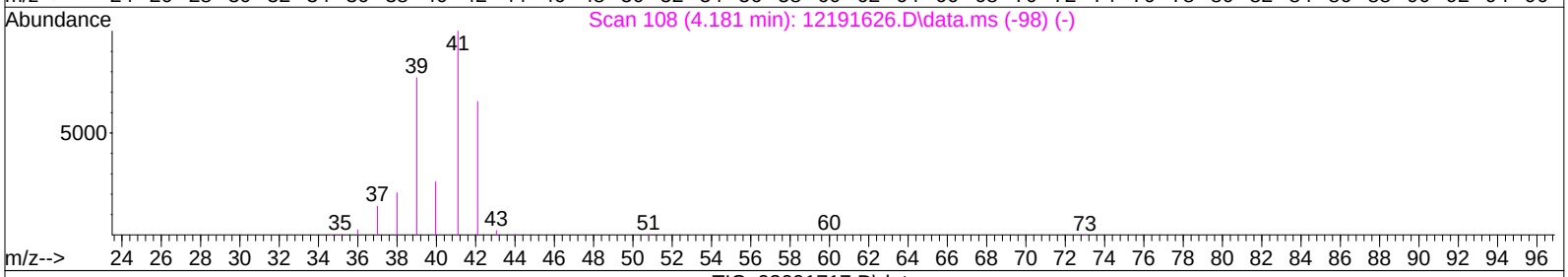
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091717.D
Acq On : 9 Mar 2017 15:48 Operator: LH
Sample : P1700971-001 (1000mL)
Misc : S29-03071701
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Mar 10 08:39:00 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 03091717.D\data.ms

(2) Propene (T)

4.197min (+0.005) 0.81ng

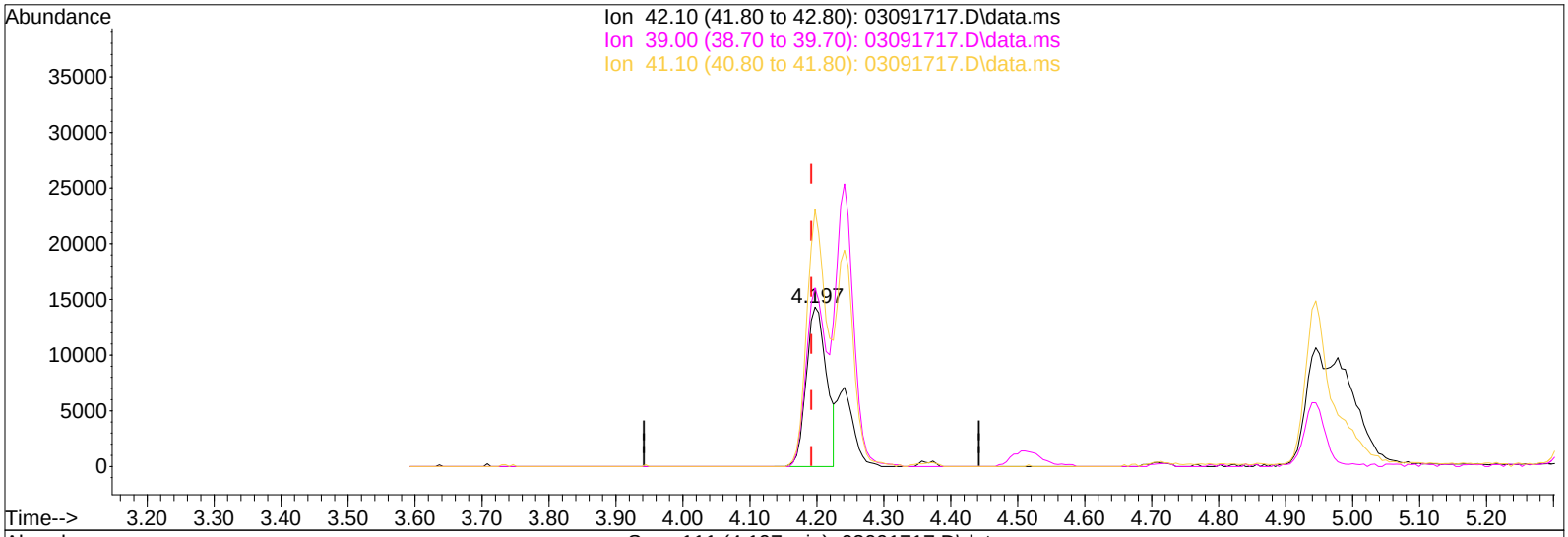
response 42508

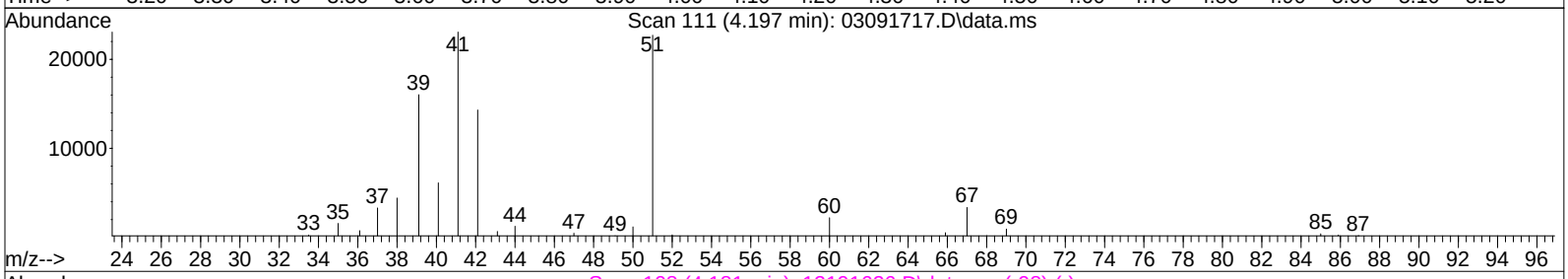
Ion	Exp%	Act%
42.10	100	100
39.00	118.20	78.62#
41.10	152.40	113.78#
0.00	0.00	0.00

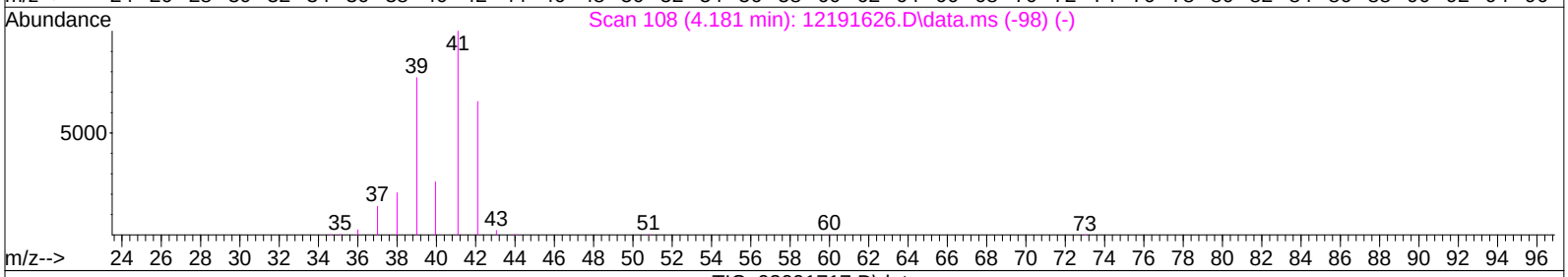
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091717.D
Acq On : 9 Mar 2017 15:48 Operator: LH
Sample : P1700971-001 (1000mL)
Misc : S29-03071701
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Mar 10 08:39:00 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 03091717.D\data.ms

(2) Propene (T)

4.197min (+0.005) 0.58ng m

response 30434

Ion	Exp%	Act%
42.10	100	100
39.00	118.20	109.81
41.10	152.40	158.92
0.00	0.00	0.00

IPC

LH 3/10/17

WA 03/13/17

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091718.D
Acq On : 9 Mar 2017 16:35 Operator: LH
Sample : P1700971-002 (1000mL)
Misc : S29-03071701
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Mar 10 16:16:53 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/10/17

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.54	130	392230	12.500	ng	-0.03
37) 1,4-Difluorobenzene (IS2)	13.65	114	2008469	12.500	ng	-0.02
56) Chlorobenzene-d5 (IS3)	17.93	82	929151	12.500	ng	0.00

System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...	12.40	65	734889	13.042	ng	-0.03
Spiked Amount 12.500	Range 70 - 130		Recovery = 104.32%			
57) Toluene-d8 (SS2)	16.10	98	2141087	12.010	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.08%			
73) Bromofluorobenzene (SS3)	19.28	174	599159	10.529	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 84.24%			

Target Compounds

							Qvalue
2) Propene	4.19	42	84730	1.563	ng		95
3) Dichlorodifluoromethan...	4.36	85	145675	1.470	ng		99
4) Chloromethane	4.68	50	15214	0.187	ng		96
5) 1,2-Dichloro-1,1,2,2-t...	4.95	135	2718	N.D.			
6) Vinyl Chloride	0.00	62	0	N.D.			
7) 1,3-Butadiene	5.41	54	7974	0.147	ng		95
8) Bromomethane	5.90	94	761	N.D.			
9) Chloroethane	6.24	64	545	N.D.			
10) Ethanol	6.83	45	63821999	1720.582	ng		97
11) Acetonitrile	6.91	41	42038	0.495	ng		95
12) Acrolein	7.11	56	23098	0.709	ng		94
13) Acetone	7.32	58	1255623	33.712	ng		93
14) Trichlorofluoromethane	7.57	101	143319	1.685	ng		99
15) 2-Propanol (Isopropanol)	7.94	45	422698	3.323	ng		99
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	8.80	84	17653	0.378	ng		96
20) 3-Chloro-1-propene (Al...	8.95	41	1374	N.D.			
21) Trichlorotrifluoroethane	9.22	151	9872	0.237	ng		90
22) Carbon Disulfide	9.07	76	26137	0.159	ng		98
23) trans-1,2-Dichloroethene	10.09	61	986	N.D.			
24) 1,1-Dichloroethane	0.00	63	0	N.D.			
25) Methyl tert-Butyl Ether	10.46	73	768	N.D.			
26) Vinyl Acetate	10.56	86	13936	1.279	ng	#	94
27) 2-Butanone (MEK)	10.85	72	36028	1.120	ng	#	90
28) cis-1,2-Dichloroethene	11.36	61	1106	N.D.			
29) Diisopropyl Ether	11.65	87	2681	N.D.			
30) Ethyl Acetate	11.65	61	163058	8.902	ng		91
31) n-Hexane	11.63	57	49559	0.596	ng		98
32) Chloroform	11.71	83	21133	0.245	ng		99
34) Tetrahydrofuran (THF)	12.15	72	6196	0.189	ng	#	1
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.			
36) 1,2-Dichloroethane	12.51	62	66863	0.945	ng		99
38) 1,1,1-Trichloroethane	12.78	97	571	N.D.			
39) Isopropyl Acetate	13.22	61	760	N.D.			
40) 1-Butanol	0.00	56	0	N.D. d			
41) Benzene	13.27	78	154620	0.754	ng		100
42) Carbon Tetrachloride	13.42	117	17230	0.253	ng		99
43) Cyclohexane	13.55	84	7598	0.100	ng		89
44) tert-Amyl Methyl Ether	13.85	73	513	N.D.			
45) 1,2-Dichloropropane	14.11	63	1369	N.D.			
46) Bromodichloromethane	14.31	83	2017	N.D.			
47) Trichloroethene	14.35	130	18627	0.346	ng		99
48) 1,4-Dioxane	14.37	88	1069	N.D.			
49) 2,2,4-Trimethylpentane...	0.00	57	0	N.D. d			

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091718.D
Acq On : 9 Mar 2017 16:35 Operator: LH
Sample : P1700971-002 (1000mL)
Misc : S29-03071701
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Mar 10 16:16:53 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

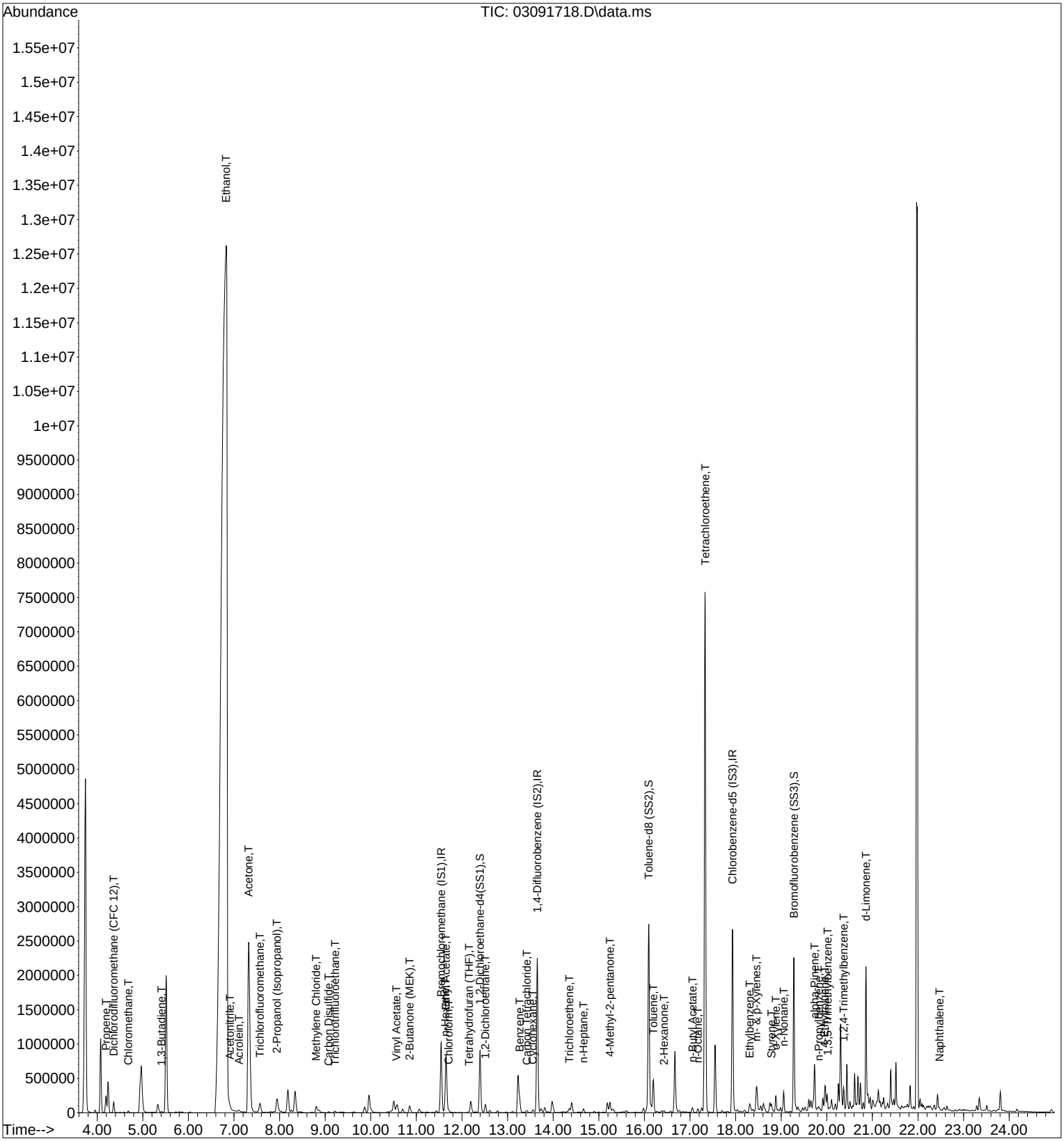
Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
50) Methyl Methacrylate	14.55	100	598	N.D.		
51) n-Heptane	14.66	71	13686	0.277 ng		93
52) cis-1,3-Dichloropropene	15.11	75	2242	N.D.		
53) 4-Methyl-2-pentanone	15.24	58	50677	1.029 ng		96
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.		
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.		
58) Toluene	16.20	91	379880	1.745 ng		99
59) 2-Hexanone	16.43	43	17583	0.131 ng	#	68
60) Dibromochloromethane	0.00	129	0	N.D.		
61) 1,2-Dibromoethane	0.00	107	0	N.D.		
62) n-Butyl Acetate	17.05	43	59334	0.411 ng		98
63) n-Octane	17.18	57	10811	0.226 ng		95
64) Tetrachloroethene	17.33	166	2272054	38.518 ng		99
65) Chlorobenzene	17.99	112	3307	N.D.		
66) Ethylbenzene	18.31	91	93308	0.381 ng		99
67) m- & p-Xylenes	18.46	91	276834	1.453 ng		98
68) Bromoform	0.00	173	0	N.D.		
69) Styrene	18.79	104	57479	0.389 ng		100
70) o-Xylene	18.89	91	105874	0.540 ng		96
71) n-Nonane	19.06	43	109059	0.924 ng		95
72) 1,1,2,2-Tetrachloroethane	18.87	83	1348	N.D.		
74) Cumene	19.39	105	9615	N.D.		
75) alpha-Pinene	19.73	93	258454	2.019 ng		97
76) n-Propylbenzene	19.83	91	28662	0.100 ng		87
77) 3-Ethyltoluene	0.00	105	0	N.D. d		
78) 4-Ethyltoluene	19.95	105	30238	0.140 ng		92
79) 1,3,5-Trimethylbenzene	20.02	105	34336	0.170 ng		97
80) alpha-Methylstyrene	20.14	118	2522	N.D.		
81) 2-Ethyltoluene	0.00	105	0	N.D. d		
82) 1,2,4-Trimethylbenzene	20.37	105	102320	0.515 ng		88
83) n-Decane	0.00	57	0	N.D. d		
84) Benzyl Chloride	20.50	91	652	N.D.		
85) 1,3-Dichlorobenzene	20.57	146	1983	N.D.		
86) 1,4-Dichlorobenzene	20.57	146	1983	N.D.		
87) sec-Butylbenzene	20.61	105	6652	N.D.		
88) 4-Isopropyltoluene (p-...	0.00	119	0	N.D. d		
89) 1,2,3-Trimethylbenzene	0.00	105	0	N.D. d		
90) 1,2-Dichlorobenzene	20.86	146	536	N.D.		
91) d-Limonene	20.86	68	492797	5.791 ng		96
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	22.36	180	560	N.D.		
95) Naphthalene	22.47	128	21896	0.101 ng		91
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	20.37	119	12978	N.D.		
100) n-Butylbenzene	21.09	91	18373	N.D.		

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091718.D
Acq On : 9 Mar 2017 16:35 Operator: LH
Sample : P1700971-002 (1000mL)
Misc : S29-03071701
ALS Vial : 7 Sample Multiplier: 1

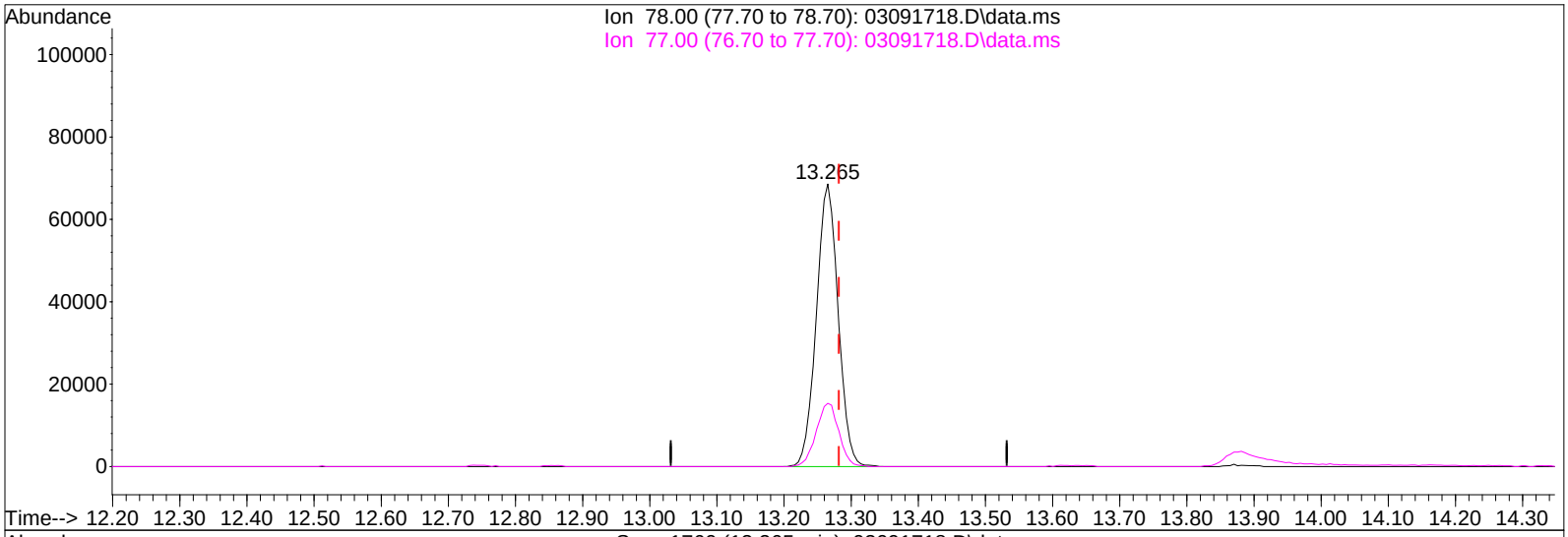
Quant Time: Mar 10 16:16:53 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

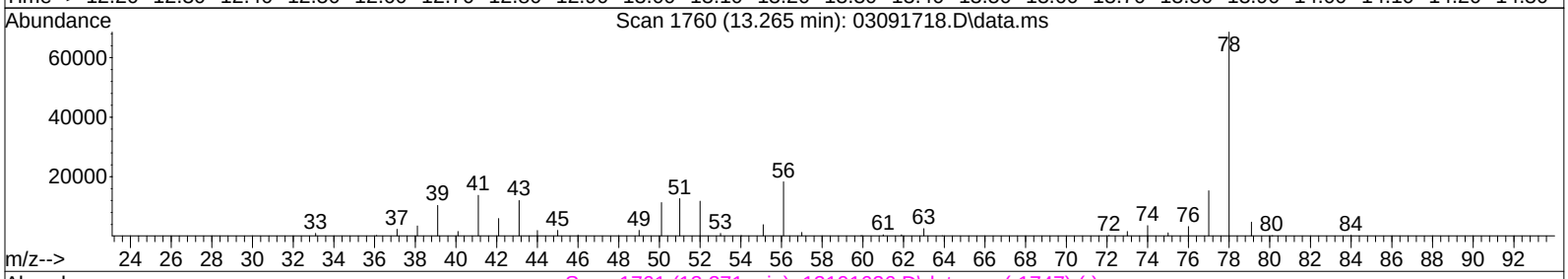


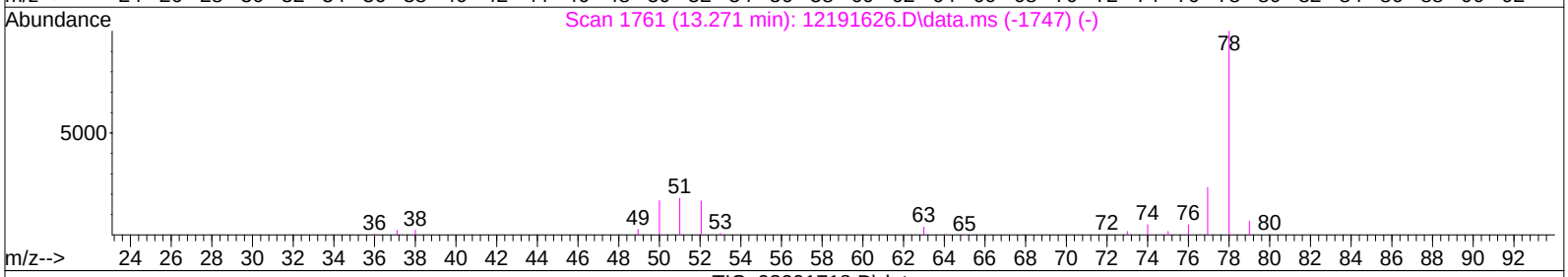
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091718.D
Acq On : 9 Mar 2017 16:35 Operator: LH
Sample : P1700971-002 (1000mL)
Misc : S29-03071701
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Mar 10 08:39:11 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 03091718.D\data.ms

(41) Benzene (T)

13.265min (-0.016) 0.75ng

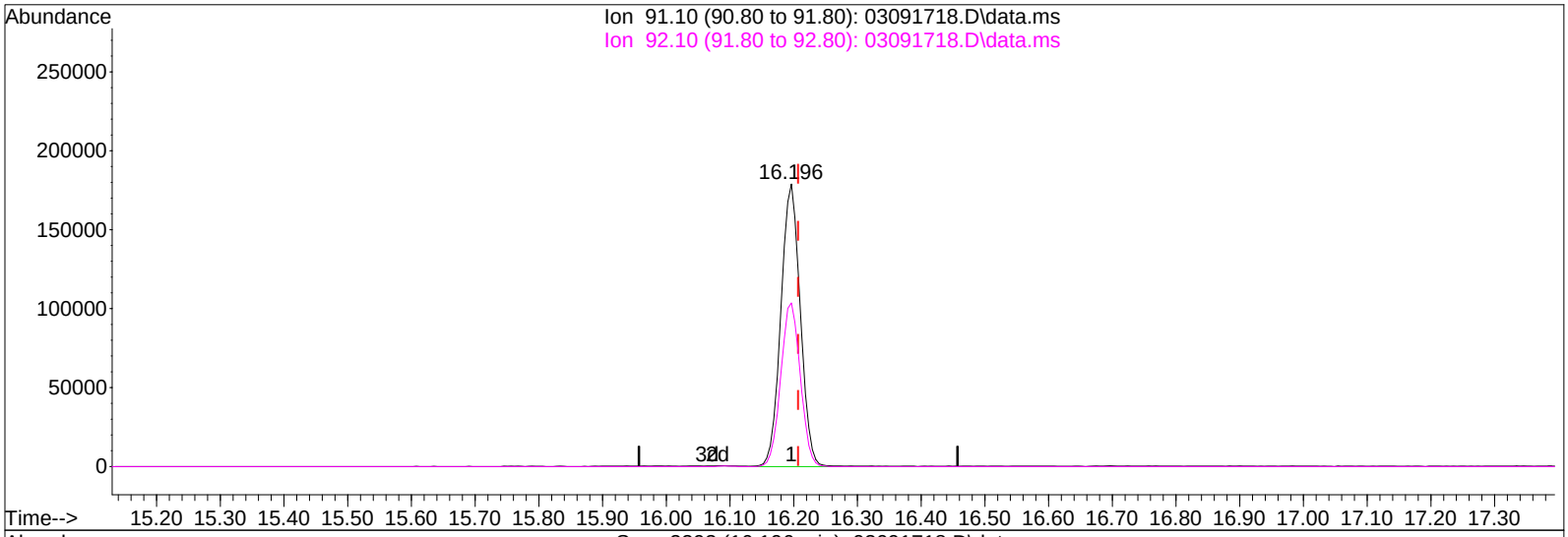
response 154620

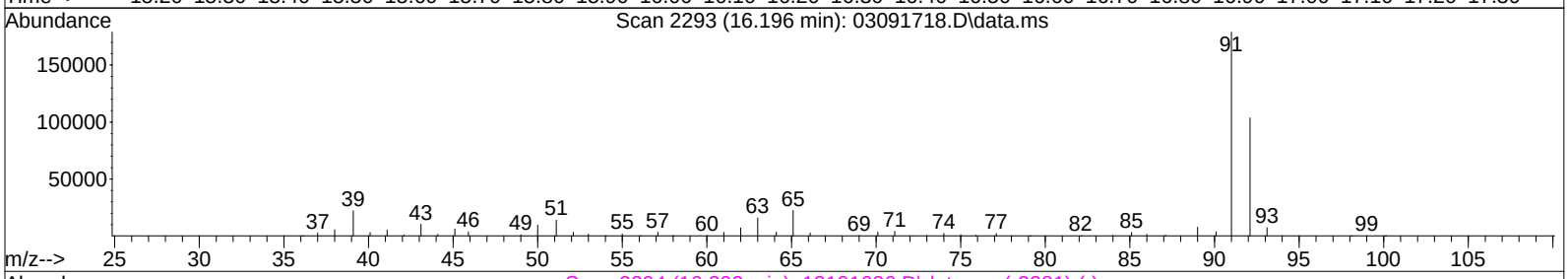
Ion	Exp%	Act%
78.00	100	100
77.00	23.50	23.26
0.00	0.00	0.00
0.00	0.00	0.00

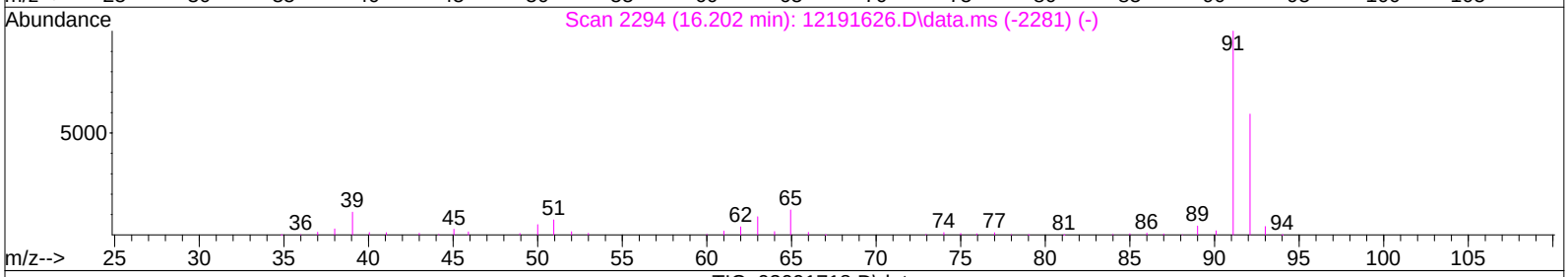
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091718.D
Acq On : 9 Mar 2017 16:35 Operator: LH
Sample : P1700971-002 (1000mL)
Misc : S29-03071701
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Mar 10 08:39:11 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 03091718.D\data.ms

(58) Toluene (T)

16.196min (-0.011) 1.75ng

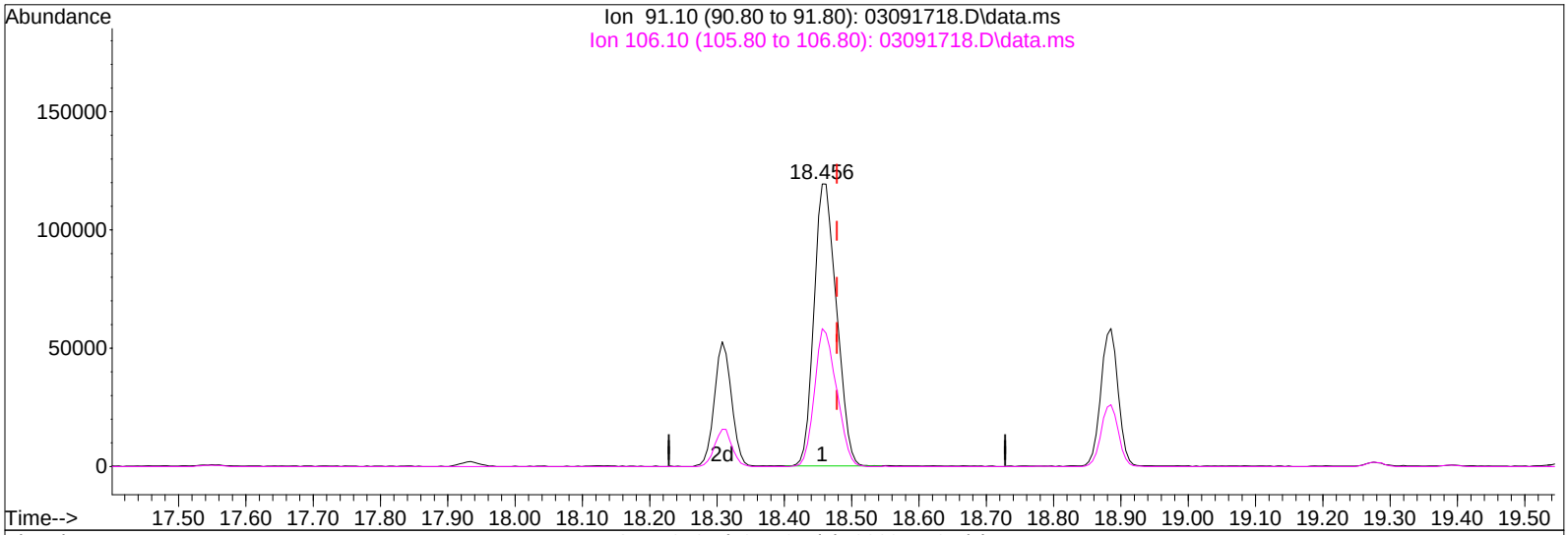
response 379880

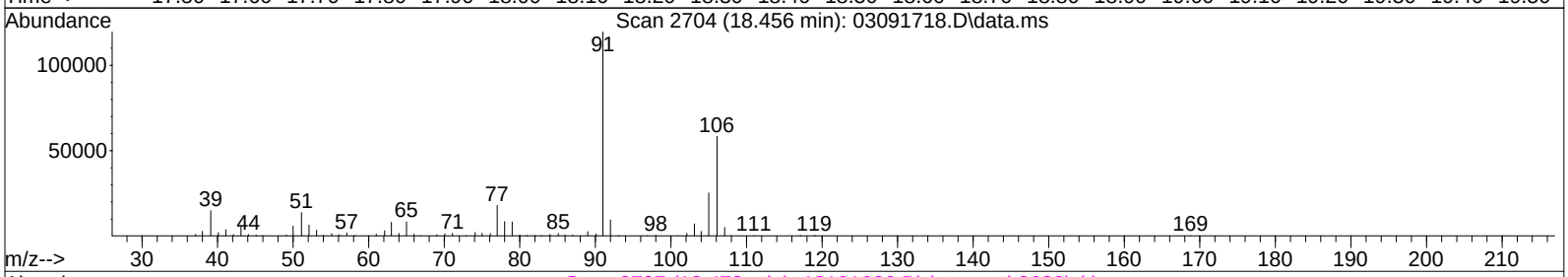
Ion	Exp%	Act%
91.10	100	100
92.10	59.10	57.98
0.00	0.00	0.00
0.00	0.00	0.00

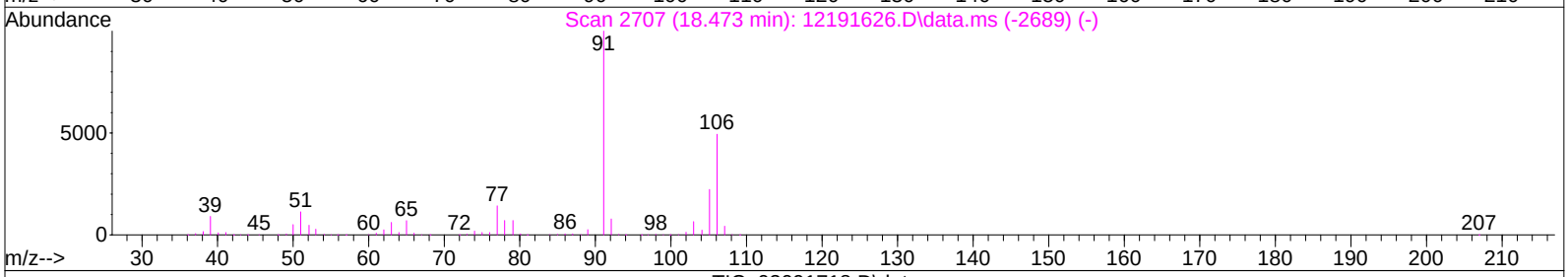
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091718.D
Acq On : 9 Mar 2017 16:35 Operator: LH
Sample : P1700971-002 (1000mL)
Misc : S29-03071701
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Mar 10 08:39:11 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 03091718.D\data.ms

(67) m- & p-Xylenes (T)

18.456min (-0.022) 1.45ng

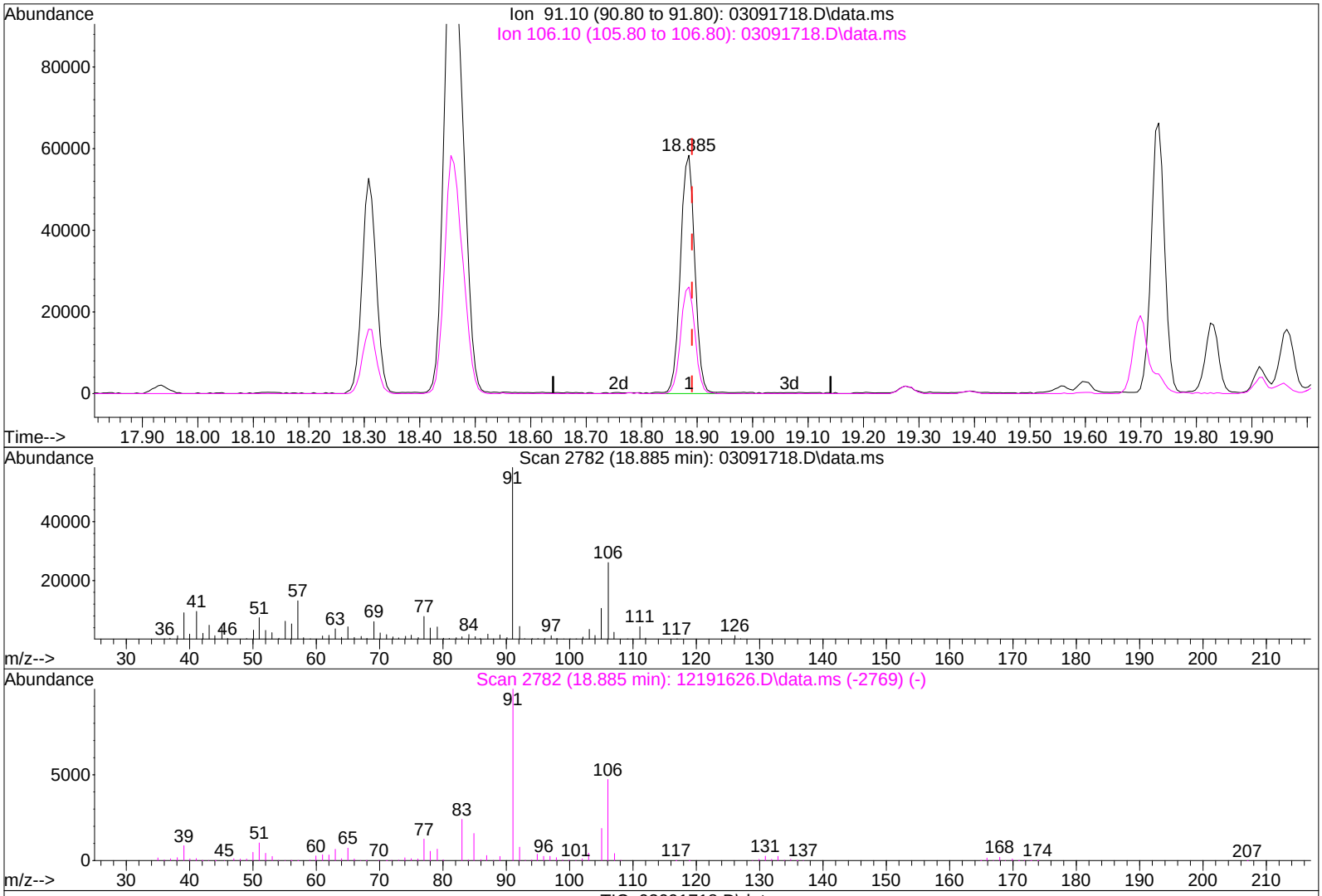
response 276834

Ion	Exp%	Act%
91.10	100	100
106.10	49.30	47.96
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091718.D
Acq On : 9 Mar 2017 16:35 Operator: LH
Sample : P1700971-002 (1000mL)
Misc : S29-03071701
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Mar 10 08:39:11 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



(70) o-Xylene (T)

18.885min (-0.005) 0.54ng

response 105874

Ion	Exp%	Act%
91.10	100	100
106.10	46.90	44.14
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091719.D
Acq On : 9 Mar 2017 17:09 Operator: LH
Sample : P1700971-003 (120mL)
Misc : S29-03071701
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Mar 10 16:18:50 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/10/17

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.53	130	372078	12.500	ng	-0.04
37) 1,4-Difluorobenzene (IS2)	13.64	114	1915899	12.500	ng	-0.03
56) Chlorobenzene-d5 (IS3)	17.93	82	875118	12.500	ng	0.00

System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.39	65	704213	13.175	ng	-0.03
Spiked Amount 12.500	Range 70 - 130		Recovery = 105.36%			
57) Toluene-d8 (SS2)	16.09	98	2027764	12.077	ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.64%			
73) Bromofluorobenzene (SS3)	19.28	174	564449	10.531	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 84.24%			

Target Compounds						Qvalue
2) Propene	4.20	42	7921	0.154	ng #	86
3) Dichlorodifluoromethan...	4.36	85	20487	0.218	ng	98
4) Chloromethane	4.69	50	7978	0.103	ng	96
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	5.42	54	1183	N.D.		
8) Bromomethane	0.00	94	0	N.D.		
9) Chloroethane	0.00	64	0	N.D.		
10) Ethanol	6.67	45	7739389	219.947	ng	100
11) Acetonitrile	6.91	41	11426	0.142	ng	93
12) Acrolein	7.11	56	4284	0.139	ng	89
13) Acetone	7.32	58	250879	7.101	ng	99
14) Trichlorofluoromethane	7.57	101	20373	0.253	ng	98
15) 2-Propanol (Isopropanol)	7.89	45	62883	0.521	ng	98
16) Acrylonitrile	8.18	53	926	N.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	8.79	84	11069	0.250	ng	96
20) 3-Chloro-1-propene (Al...	8.86	41	3069	N.D.		
21) Trichlorotrifluoroethane	9.21	151	1272	N.D.		
22) Carbon Disulfide	9.07	76	33411	0.214	ng	100
23) trans-1,2-Dichloroethene	0.00	61	0	N.D.		
24) 1,1-Dichloroethane	0.00	63	0	N.D.		
25) Methyl tert-Butyl Ether	0.00	73	0	N.D.		
26) Vinyl Acetate	10.55	86	2630	0.254	ng #	90
27) 2-Butanone (MEK)	10.86	72	17330	0.568	ng #	90
28) cis-1,2-Dichloroethene	0.00	61	0	N.D.		
29) Diisopropyl Ether	0.00	87	0	N.D.		
30) Ethyl Acetate	11.66	61	6967	0.401	ng	94
31) n-Hexane	11.63	57	7250	0.092	ng	95
32) Chloroform	11.70	83	3574	N.D.		
34) Tetrahydrofuran (THF)	12.15	72	3986	0.128	ng #	5
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.		
36) 1,2-Dichloroethane	12.51	62	9303	0.139	ng	97
38) 1,1,1-Trichloroethane	0.00	97	0	N.D.		
39) Isopropyl Acetate	0.00	61	0	N.D.		
40) 1-Butanol	0.00	56	0	N.D. d		
41) Benzene	13.26	78	23457	0.120	ng	98
42) Carbon Tetrachloride	13.42	117	2304	N.D.		
43) Cyclohexane	13.55	84	1207	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	14.34	130	3323	N.D.		
48) 1,4-Dioxane	14.36	88	4721	0.120	ng #	64
49) 2,2,4-Trimethylpentane...	0.00	57	0	N.D. d		

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091719.D
Acq On : 9 Mar 2017 17:09 Operator: LH
Sample : P1700971-003 (120mL)
Misc : S29-03071701
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Mar 10 16:18:50 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

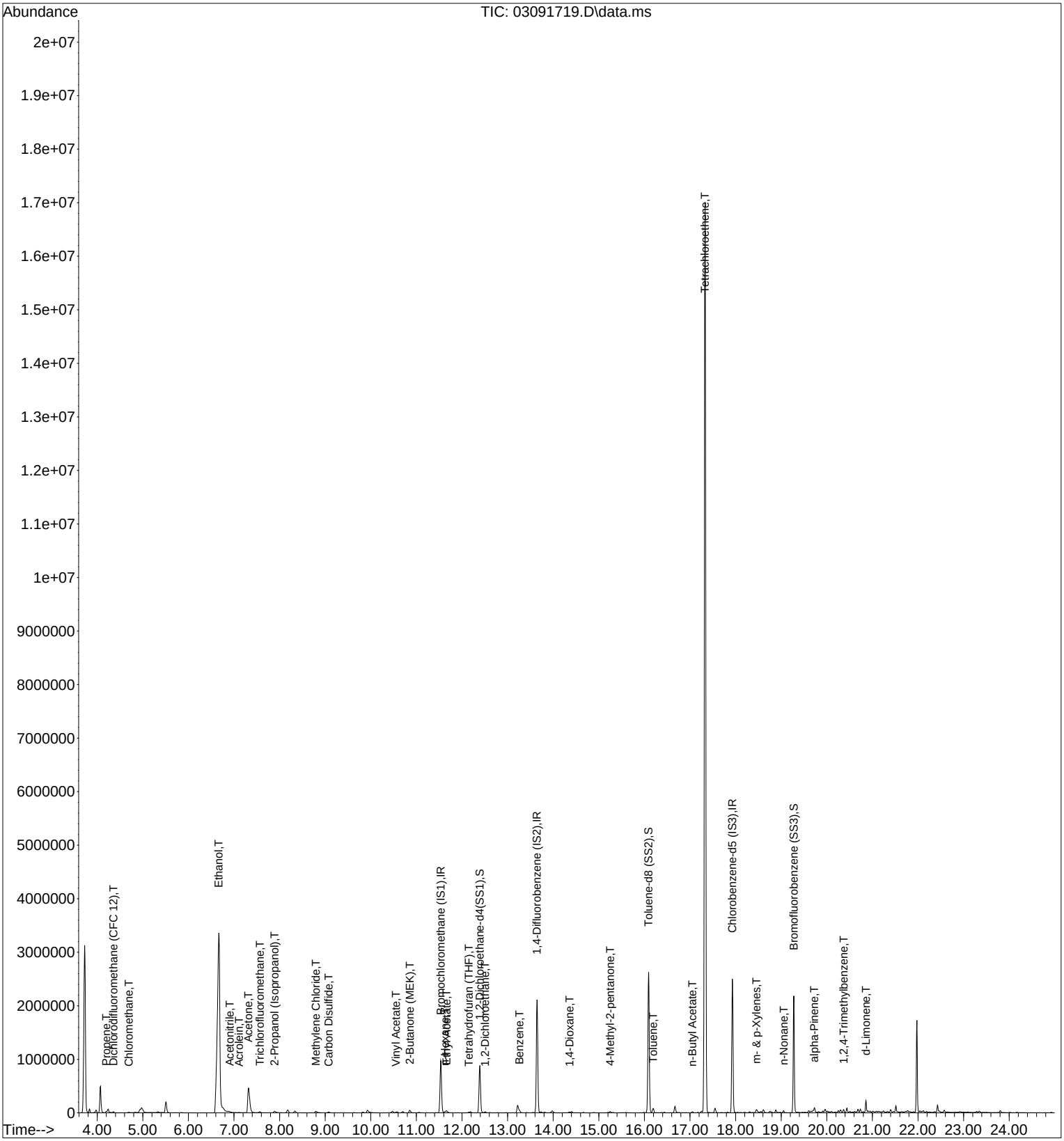
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	14.66	100	507	N.D.	
51) n-Heptane	14.67	71	1992	N.D.	
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
53) 4-Methyl-2-pentanone	15.25	58	7698	0.164 ng	90
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.	
58) Toluene	16.19	91	66036	0.322 ng	98
59) 2-Hexanone	16.43	43	7885	N.D.	
60) Dibromochloromethane	0.00	129	0	N.D.	
61) 1,2-Dibromoethane	0.00	107	0	N.D.	
62) n-Butyl Acetate	17.05	43	18660	0.137 ng	97
63) n-Octane	17.18	57	2165	N.D.	
64) Tetrachloroethene	17.33	166	5285075	95.129 ng	98
65) Chlorobenzene	17.98	112	1051	N.D.	
66) Ethylbenzene	18.31	91	14382	N.D.	
67) m- & p-Xylenes	18.46	91	42055	0.234 ng	97
68) Bromoform	0.00	173	0	N.D.	
69) Styrene	18.79	104	7248	N.D.	
70) o-Xylene	18.88	91	15912	N.D.	
71) n-Nonane	19.06	43	14308	0.129 ng	94
72) 1,1,2,2-Tetrachloroethane	18.81	83	503	N.D.	
74) Cumene	19.39	105	2363	N.D.	
75) alpha-Pinene	19.73	93	33310	0.276 ng	95
76) n-Propylbenzene	19.83	91	5500	N.D.	
77) 3-Ethyltoluene	19.91	105	12341	N.D.	
78) 4-Ethyltoluene	19.95	105	5928	N.D.	
79) 1,3,5-Trimethylbenzene	20.02	105	7281	N.D.	
80) alpha-Methylstyrene	20.30	118	639	N.D.	
81) 2-Ethyltoluene	20.18	105	6051	N.D.	
82) 1,2,4-Trimethylbenzene	20.37	105	18530	0.099 ng	88
83) n-Decane	0.00	57	0	N.D. d	
84) Benzyl Chloride	20.50	91	694	N.D.	
85) 1,3-Dichlorobenzene	20.56	146	868	N.D.	
86) 1,4-Dichlorobenzene	20.56	146	868	N.D.	
87) sec-Butylbenzene	20.60	105	1534	N.D.	
88) 4-Isopropyltoluene (p-...	20.73	119	15188	N.D.	
89) 1,2,3-Trimethylbenzene	20.74	105	6680	N.D.	
90) 1,2-Dichlorobenzene	20.86	146	618	N.D.	
91) d-Limonene	20.86	68	49972	0.623 ng	99
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	22.36	180	569	N.D.	
95) Naphthalene	22.47	128	10888	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	20.37	119	2831	N.D.	
100) n-Butylbenzene	21.08	91	4256	N.D.	

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091719.D
Acq On : 9 Mar 2017 17:09 Operator: LH
Sample : P1700971-003 (120mL)
Misc : S29-03071701
ALS Vial : 8 Sample Multiplier: 1

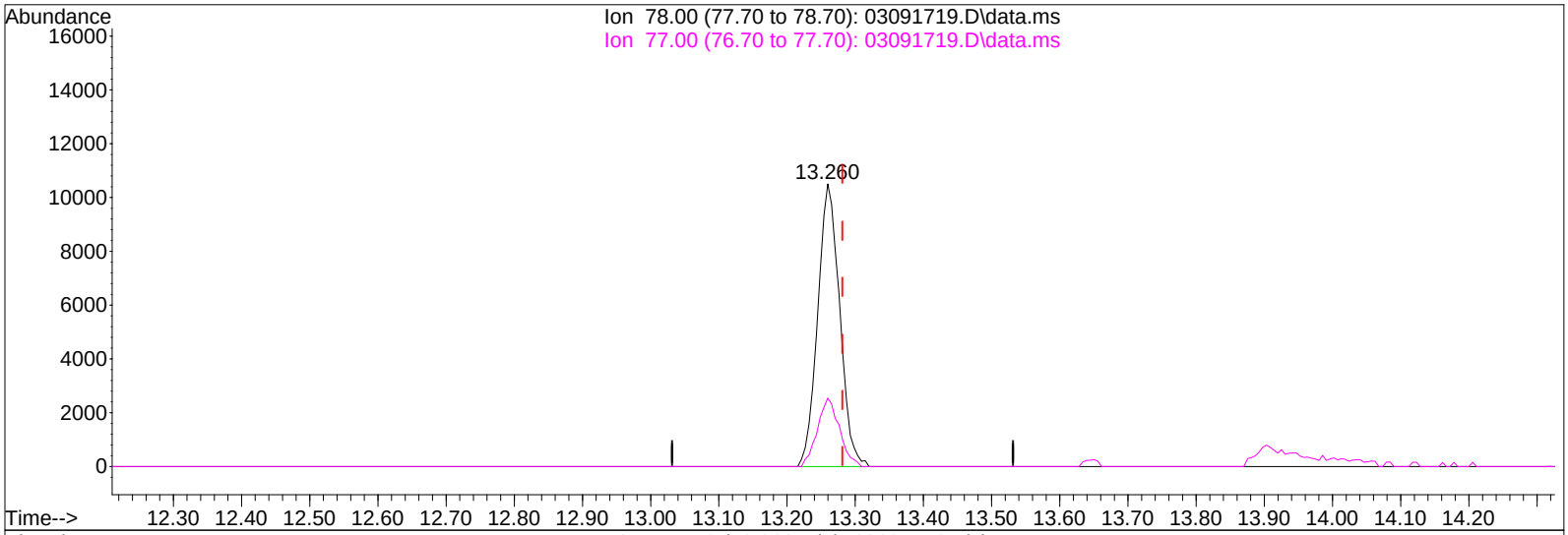
Quant Time: Mar 10 16:18:50 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

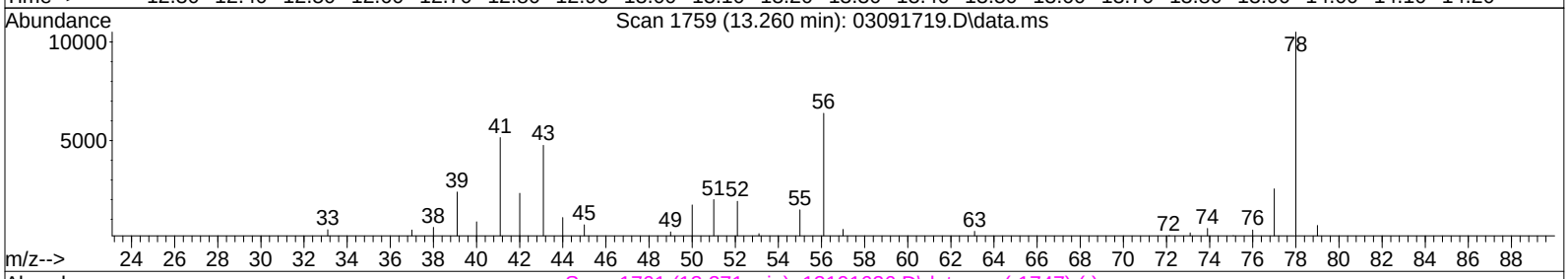


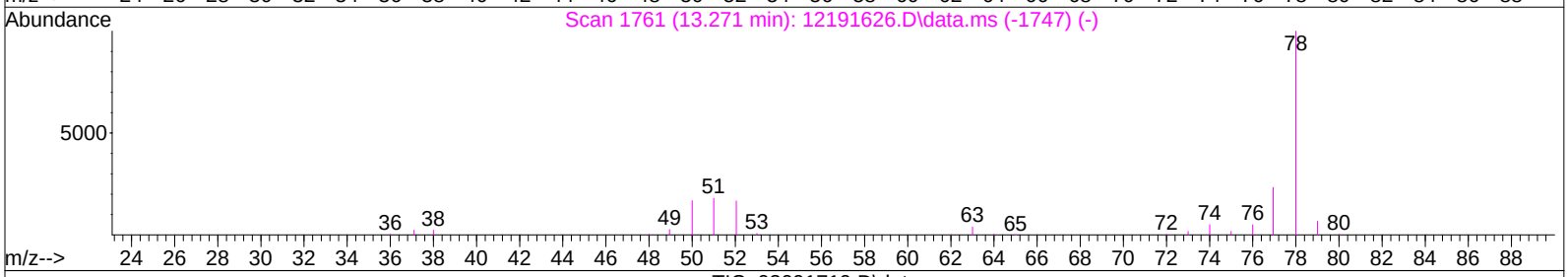
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091719.D
Acq On : 9 Mar 2017 17:09 Operator: LH
Sample : P1700971-003 (120mL)
Misc : S29-03071701
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Mar 10 08:39:27 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 03091719.D\data.ms

(41) Benzene (T)

13.260min (-0.022) 0.12ng

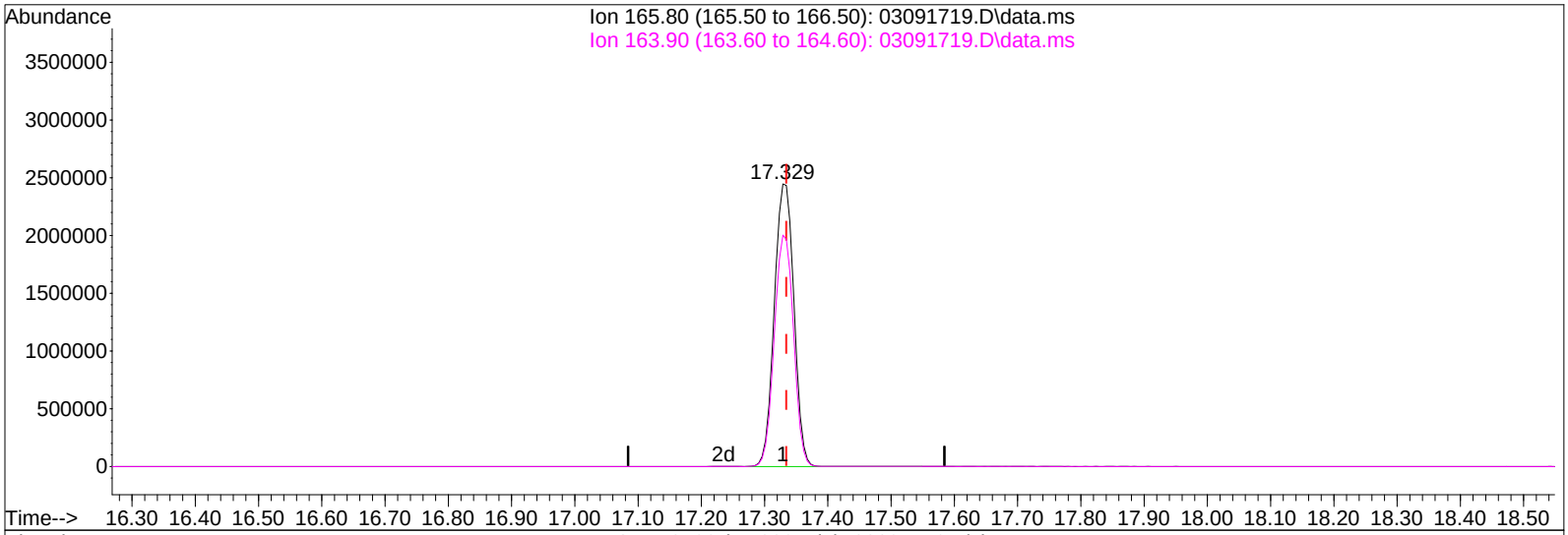
response 23457

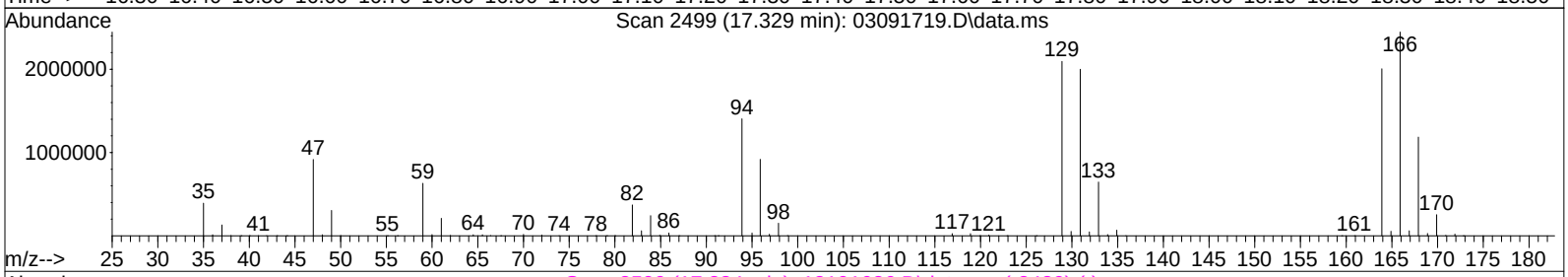
Ion	Exp%	Act%
78.00	100	100
77.00	23.50	24.30
0.00	0.00	0.00
0.00	0.00	0.00

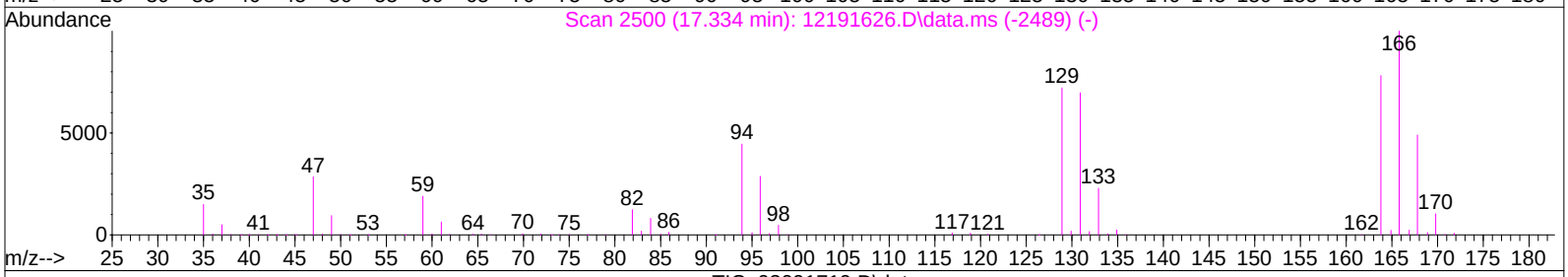
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091719.D
Acq On : 9 Mar 2017 17:09 Operator: LH
Sample : P1700971-003 (120mL)
Misc : S29-03071701
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Mar 10 08:39:27 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 03091719.D\data.ms

(64) Tetrachloroethene (T)

17.329min (-0.005) 95.13ng

response 5285075

Ion	Exp%	Act%
165.80	100	100
163.90	78.50	80.58
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091720.D
Acq On : 9 Mar 2017 17:43 Operator: LH
Sample : P1700971-004 (1000mL)
Misc : S29-03071701
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Mar 10 16:21:19 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/10/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.54	130	378958	12.500 ng	-0.04
37) 1,4-Difluorobenzene (IS2)	13.65	114	1943924	12.500 ng	-0.02
56) Chlorobenzene-d5 (IS3)	17.93	82	901232	12.500 ng	0.00
System Monitoring Compounds					
33) 1,2-Dichloroethane-d4(...	12.39	65	707649	12.999 ng	-0.03
Spiked Amount 12.500	Range 70 - 130		Recovery = 104.00%		
57) Toluene-d8 (SS2)	16.09	98	2071226	11.979 ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 95.84%		
73) Bromofluorobenzene (SS3)	19.28	174	582974	10.562 ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 84.48%		

Target Compounds					Qvalue
2) Propene	4.18	42	84093	1.605 ng	93
3) Dichlorodifluoromethan...	4.35	85	142409	1.488 ng	99
4) Chloromethane	4.68	50	15181	0.193 ng	98
5) 1,2-Dichloro-1,1,2,2-t...	4.94	135	2775	N.D.	
6) Vinyl Chloride	5.13	62	1772	N.D.	
7) 1,3-Butadiene	5.40	54	7463	0.143 ng	92
8) Bromomethane	5.88	94	715	N.D.	
9) Chloroethane	6.23	64	729	N.D.	
10) Ethanol	6.83	45	63290704	1766.016 ng	97
11) Acetonitrile	6.90	41	40417	0.492 ng	86
12) Acrolein	7.10	56	24249	0.770 ng	93
13) Acetone	7.31	58	1223339	33.996 ng	94
14) Trichlorofluoromethane	7.56	101	142106	1.730 ng	100
15) 2-Propanol (Isopropanol)	7.94	45	413431	3.364 ng	99
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	8.79	84	16738	0.371 ng	93
20) 3-Chloro-1-propene (Al...	0.00	41	0	N.D. d	
21) Trichlorotrifluoroethane	9.21	151	9972	0.248 ng	87
22) Carbon Disulfide	9.06	76	28239	0.177 ng	99
23) trans-1,2-Dichloroethene	10.09	61	834	N.D.	
24) 1,1-Dichloroethane	0.00	63	0	N.D.	
25) Methyl tert-Butyl Ether	10.50	73	2532	N.D.	
26) Vinyl Acetate	0.00	86	0	N.D. d	
27) 2-Butanone (MEK)	10.85	72	37579	1.210 ng	93
28) cis-1,2-Dichloroethene	11.36	61	13426	0.204 ng	93
29) Diisopropyl Ether	11.65	87	2735	N.D.	
30) Ethyl Acetate	11.65	61	173394	9.797 ng	91
31) n-Hexane	11.63	57	53705	0.669 ng	97
32) Chloroform	11.70	83	20589	0.247 ng	99
34) Tetrahydrofuran (THF)	12.14	72	6332	0.200 ng #	1
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.	
36) 1,2-Dichloroethane	12.51	62	66868	0.978 ng	99
38) 1,1,1-Trichloroethane	0.00	97	0	N.D.	
39) Isopropyl Acetate	13.21	61	834	N.D.	
40) 1-Butanol	0.00	56	0	N.D. d	
41) Benzene	13.26	78	154033	0.776 ng	100
42) Carbon Tetrachloride	13.42	117	17549	0.266 ng	100
43) Cyclohexane	13.54	84	8454	0.115 ng	97
44) tert-Amyl Methyl Ether	13.87	73	515	N.D.	
45) 1,2-Dichloropropane	14.12	63	1316	N.D.	
46) Bromodichloromethane	14.30	83	1560	N.D.	
47) Trichloroethene	14.35	130	12371	0.237 ng	95
48) 1,4-Dioxane	14.36	88	970	N.D.	
49) 2,2,4-Trimethylpentane...	0.00	57	0	N.D. d	

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091720.D
Acq On : 9 Mar 2017 17:43 Operator: LH
Sample : P1700971-004 (1000mL)
Misc : S29-03071701
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Mar 10 16:21:19 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

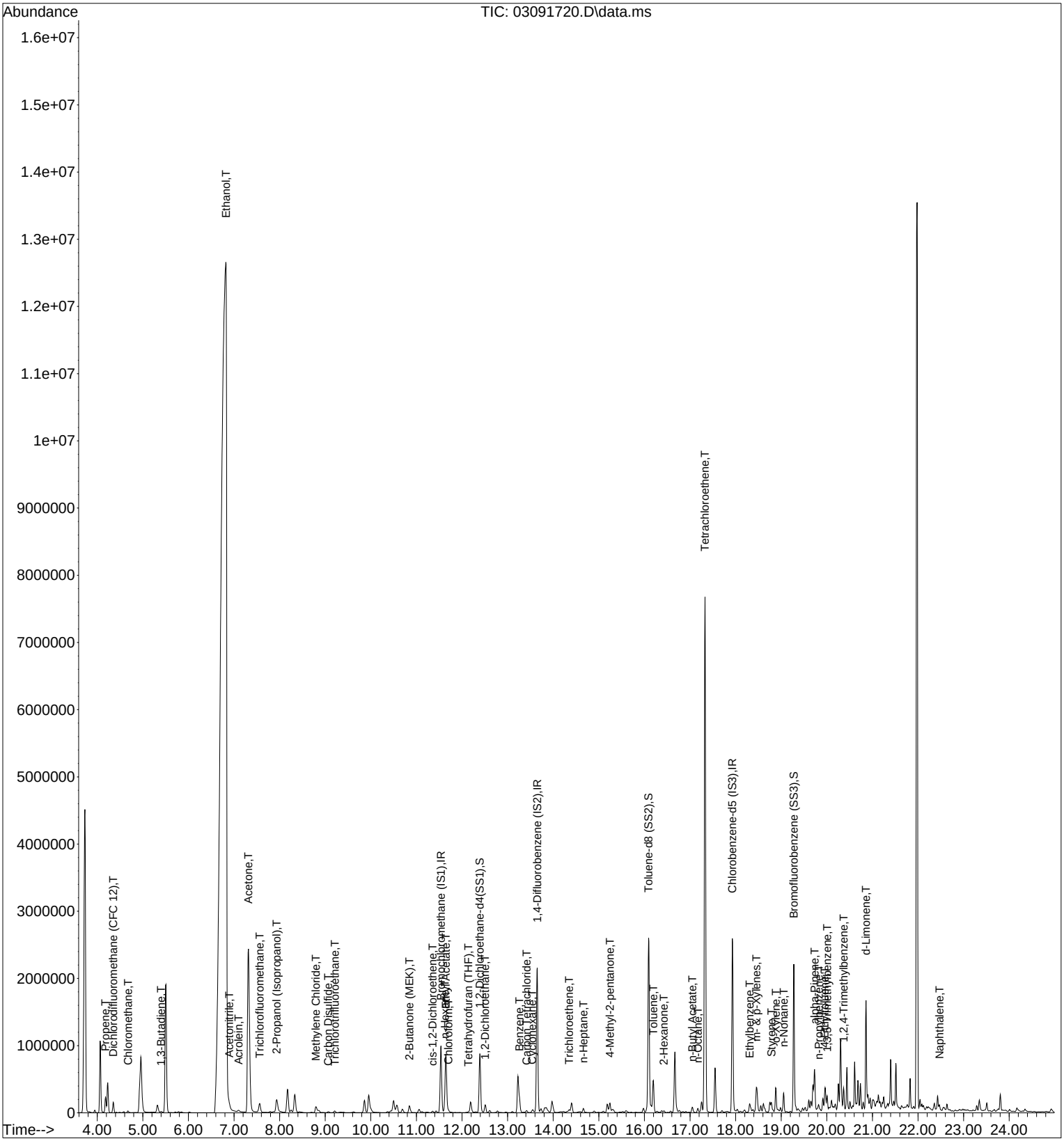
Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
50) Methyl Methacrylate	14.55	100	699	N.D.		
51) n-Heptane	14.66	71	15708	0.328 ng		94
52) cis-1,3-Dichloropropene	15.22	75	505	N.D.		
53) 4-Methyl-2-pentanone	15.24	58	48418	1.016 ng		95
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.		
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.		
58) Toluene	16.20	91	385321	1.825 ng		99
59) 2-Hexanone	16.43	43	17220	0.132 ng		74
60) Dibromochloromethane	0.00	129	0	N.D.		
61) 1,2-Dibromoethane	0.00	107	0	N.D.		
62) n-Butyl Acetate	17.05	43	68628	0.490 ng		99
63) n-Octane	17.17	57	14639	0.316 ng	#	81
64) Tetrachloroethene	17.33	166	2278494	39.823 ng		99
65) Chlorobenzene	17.99	112	3538	N.D.		
66) Ethylbenzene	18.31	91	96525	0.406 ng		98
67) m- & p-Xylenes	18.46	91	282768	1.530 ng		97
68) Bromoform	0.00	173	0	N.D.		
69) Styrene	18.79	104	70103	0.489 ng		99
70) o-Xylene	18.88	91	106156	0.558 ng		97
71) n-Nonane	19.06	43	108849	0.951 ng		94
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D. d		
74) Cumene	19.39	105	9979	N.D.		
75) alpha-Pinene	19.73	93	241998	1.949 ng	#	1
76) n-Propylbenzene	19.83	91	30565	0.110 ng	#	71
77) 3-Ethyltoluene	0.00	105	0	N.D. d		
78) 4-Ethyltoluene	19.95	105	35461	0.169 ng		86
79) 1,3,5-Trimethylbenzene	20.01	105	31527	0.161 ng		99
80) alpha-Methylstyrene	20.15	118	3354	N.D.		
81) 2-Ethyltoluene	0.00	105	0	N.D. d		
82) 1,2,4-Trimethylbenzene	20.37	105	101786	0.529 ng		90
83) n-Decane	0.00	57	0	N.D. d		
84) Benzyl Chloride	20.49	91	653	N.D.		
85) 1,3-Dichlorobenzene	20.52	146	644	N.D.		
86) 1,4-Dichlorobenzene	20.57	146	3131	N.D.		
87) sec-Butylbenzene	20.61	105	7094	N.D.		
88) 4-Isopropyltoluene (p-...	0.00	119	0	N.D. d		
89) 1,2,3-Trimethylbenzene	0.00	105	0	N.D. d		
90) 1,2-Dichlorobenzene	20.86	146	692	N.D.		
91) d-Limonene	20.86	68	385899	4.675 ng		95
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	22.36	180	740	N.D.		
95) Naphthalene	22.47	128	52078	0.247 ng		97
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	20.37	119	13121	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:\MS16\DATA\2017 03\09\03091720.D
Acq On : 9 Mar 2017 17:43 Operator: LH
Sample : P1700971-004 (1000mL)
Misc : S29-03071701
ALS Vial : 9 Sample Multiplier: 1

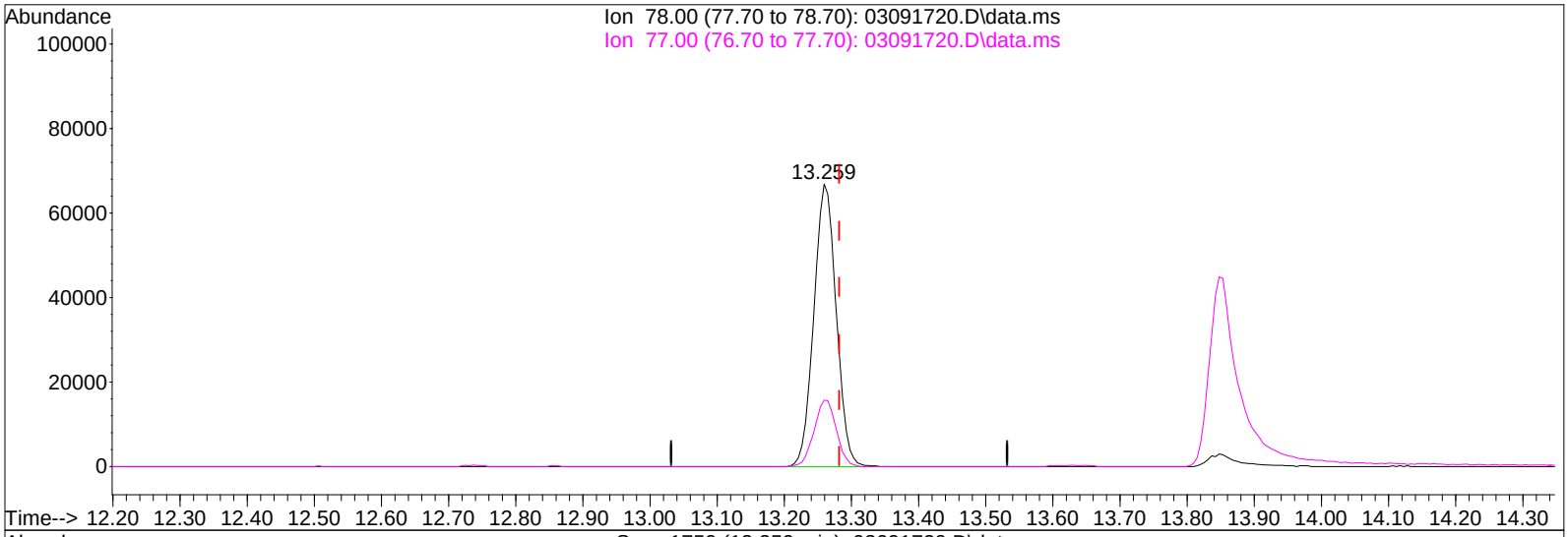
Quant Time: Mar 10 16:21:19 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

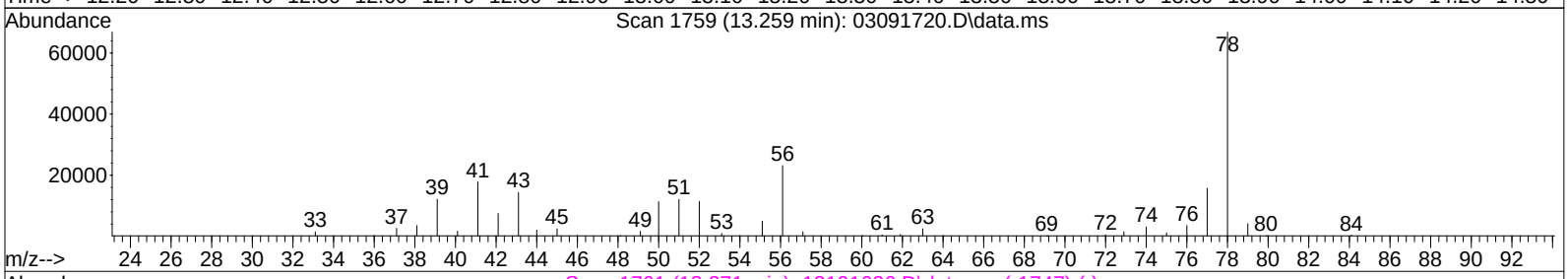


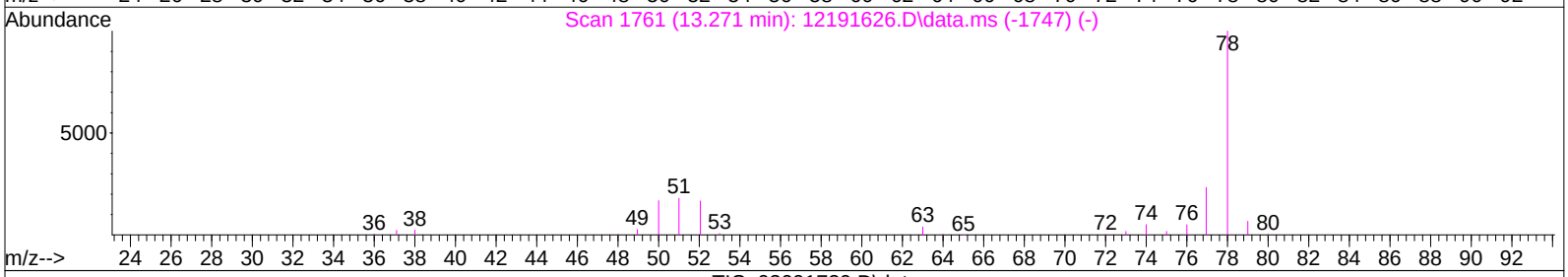
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091720.D
Acq On : 9 Mar 2017 17:43 Operator: LH
Sample : P1700971-004 (1000mL)
Misc : S29-03071701
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Mar 10 08:39:38 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 03091720.D\data.ms

(41) Benzene (T)

13.259min (-0.022) 0.78ng

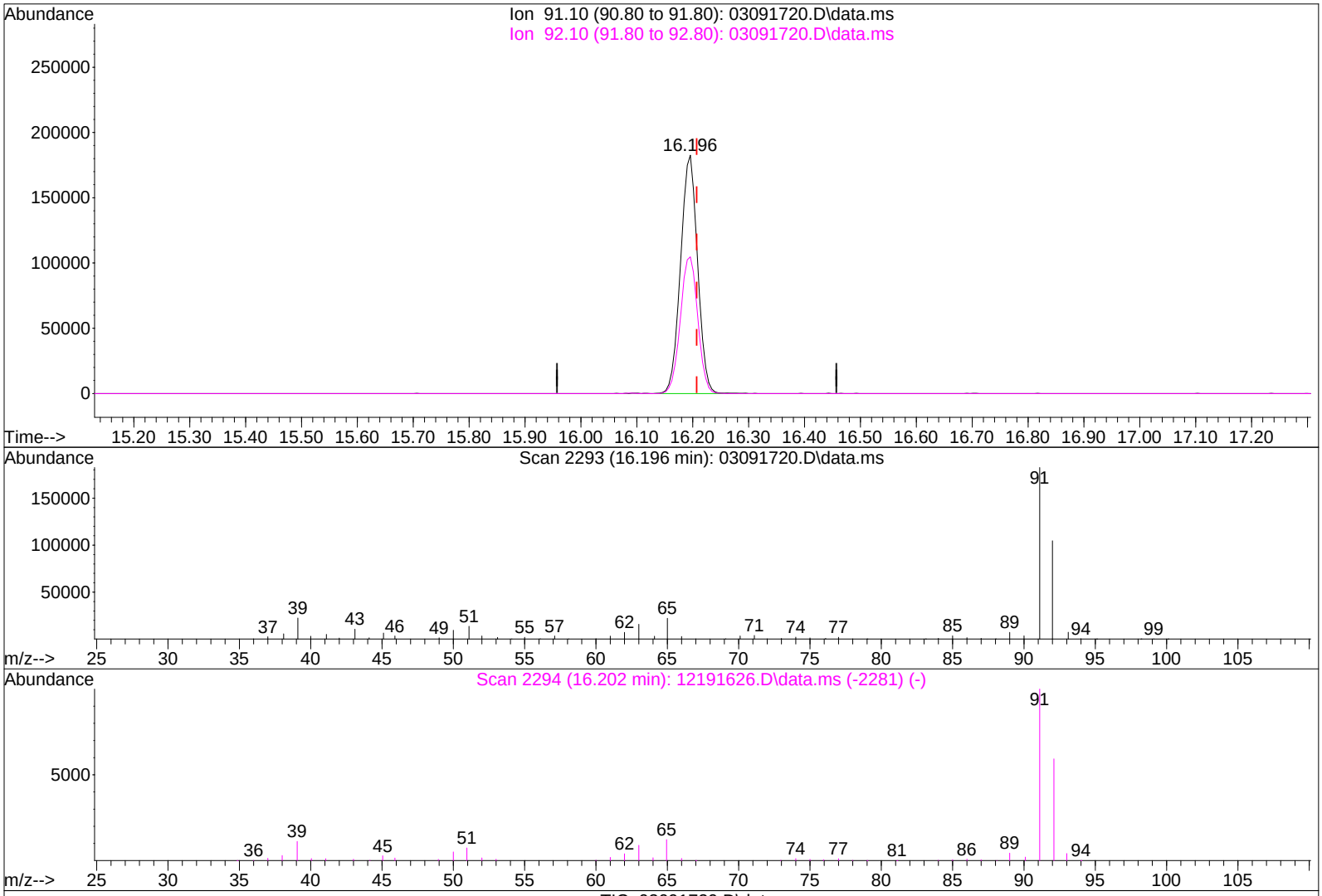
response 154033

Ion	Exp%	Act%
78.00	100	100
77.00	23.50	23.46
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091720.D
Acq On : 9 Mar 2017 17:43 Operator: LH
Sample : P1700971-004 (1000mL)
Misc : S29-03071701
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Mar 10 08:39:38 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



(58) Toluene (T)

16.196min (-0.011) 1.83ng

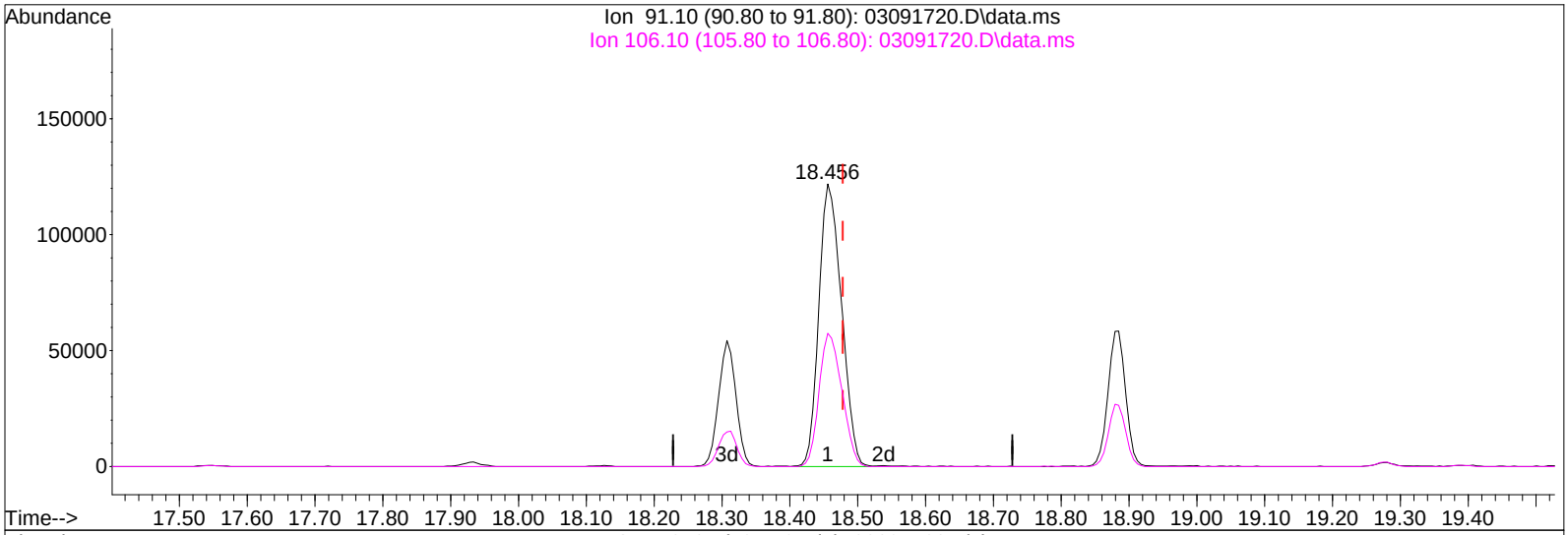
response 385321

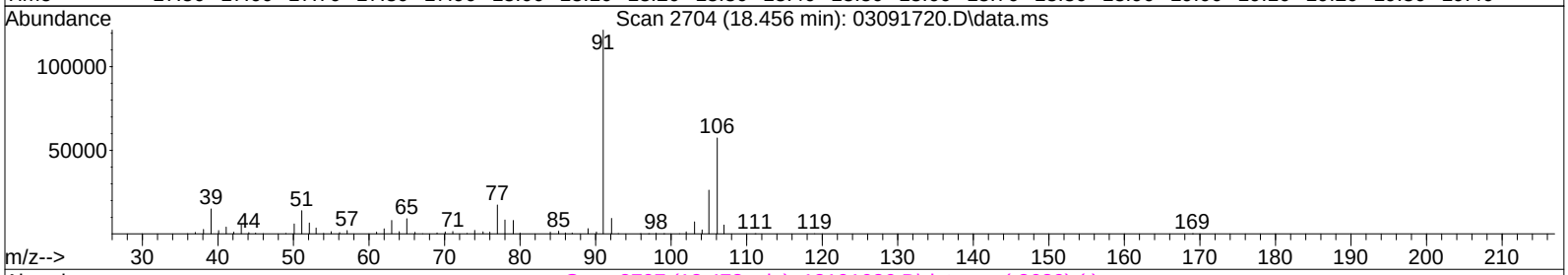
Ion	Exp%	Act%
91.10	100	100
92.10	59.10	58.65
0.00	0.00	0.00
0.00	0.00	0.00

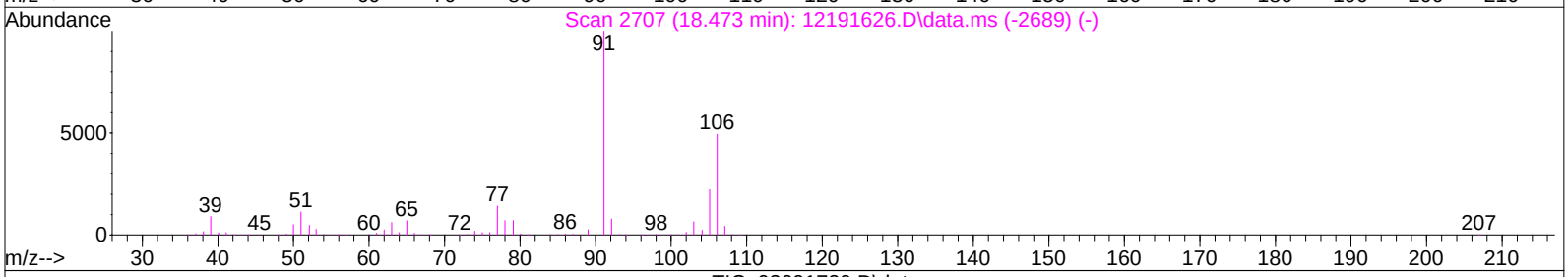
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091720.D
Acq On : 9 Mar 2017 17:43 Operator: LH
Sample : P1700971-004 (1000mL)
Misc : S29-03071701
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Mar 10 08:39:38 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 03091720.D\data.ms

(67) m- & p-Xylenes (T)

18.456min (-0.022) 1.53ng

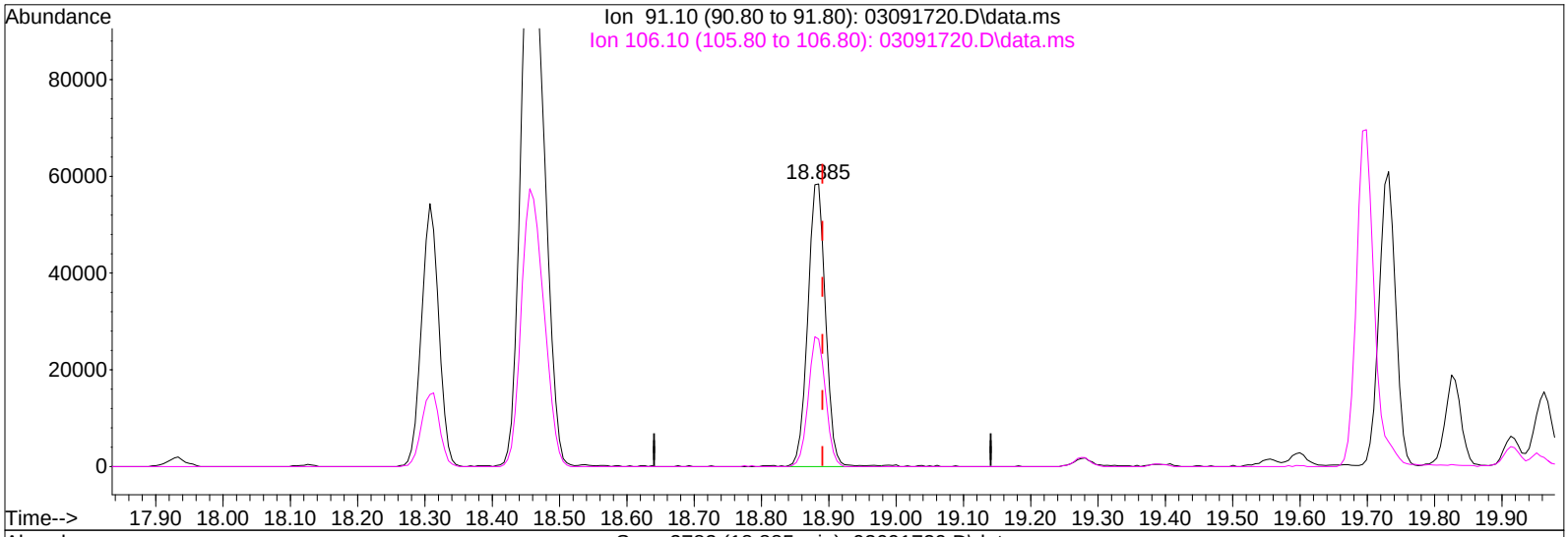
response 282768

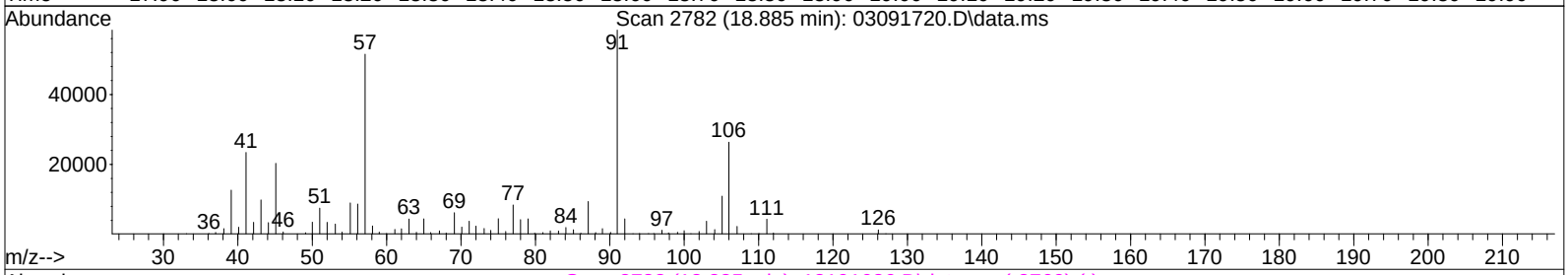
Ion	Exp%	Act%
91.10	100	100
106.10	49.30	47.41
0.00	0.00	0.00
0.00	0.00	0.00

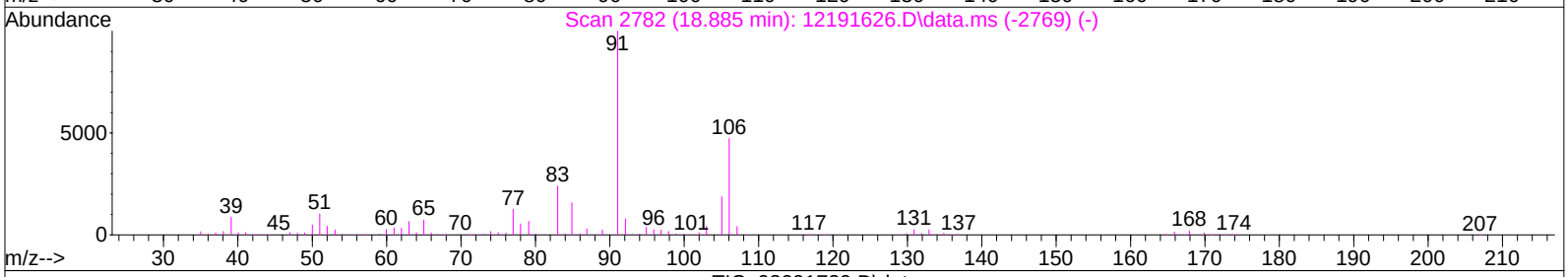
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091720.D
Acq On : 9 Mar 2017 17:43 Operator: LH
Sample : P1700971-004 (1000mL)
Misc : S29-03071701
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Mar 10 08:39:38 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 03091720.D\data.ms

(70) o-Xylene (T)

18.885min (-0.006) 0.56ng

response 106156

Ion	Exp%	Act%
91.10	100	100
106.10	46.90	44.68
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091721.D
Acq On : 9 Mar 2017 18:17 Operator: LH
Sample : P1700971-005 (1000mL)
Misc : S29-03071701
ALS Vial : 10 Sample Multiplier: 1

Quant Time: Mar 10 16:22:47 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/10/17

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.53	130	375411	12.500	ng	-0.04
37) 1,4-Difluorobenzene (IS2)	13.64	114	1927332	12.500	ng	-0.03
56) Chlorobenzene-d5 (IS3)	17.93	82	885425	12.500	ng	0.00

System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...	12.39	65	702268	13.022	ng	-0.04
Spiked Amount 12.500	Range 70 - 130		Recovery = 104.16%			
57) Toluene-d8 (SS2)	16.09	98	2044158	12.033	ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.24%			
73) Bromofluorobenzene (SS3)	19.28	174	568851	10.490	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 83.92%			

Target Compounds

							Qvalue
2) Propene	0.00	42	0	N.D. d			
3) Dichlorodifluoromethan...	4.36	85	116095	1.224	ng		99
4) Chloromethane	4.69	50	9986	0.128	ng		99
5) 1,2-Dichloro-1,1,2,2-t...	4.95	135	2289	N.D.			
6) Vinyl Chloride	0.00	62	0	N.D.			
7) 1,3-Butadiene	5.51	54	3452	N.D.			
8) Bromomethane	0.00	94	0	N.D.			
9) Chloroethane	6.25	64	881	N.D.			
10) Ethanol	6.60	45	128865	3.630	ng		99
11) Acetonitrile	6.92	41	5710	N.D.			
12) Acrolein	7.12	56	1507	N.D.			
13) Acetone	7.34	58	71295	2.000	ng		98
14) Trichlorofluoromethane	7.57	101	33509	0.412	ng		99
15) 2-Propanol (Isopropanol)	7.88	45	12312	0.101	ng	#	57
16) Acrylonitrile	8.12	53	973	N.D.			
17) 1,1-Dichloroethene	0.00	96	0	N.D.			
18) 2-Methyl-2-Propanol (t...	8.87	59	6551	N.D.			
19) Methylene Chloride	8.79	84	16455	0.368	ng		95
20) 3-Chloro-1-propene (Al...	8.93	41	847	N.D.			
21) Trichlorotrifluoroethane	0.00	151	0	N.D.			
22) Carbon Disulfide	9.09	76	15786	0.100	ng		100
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	10.46	73	791	N.D.			
26) Vinyl Acetate	10.57	86	557	N.D.			
27) 2-Butanone (MEK)	10.87	72	6937	0.225	ng	#	35
28) cis-1,2-Dichloroethene	11.36	61	8608	0.132	ng		95
29) Diisopropyl Ether	0.00	87	0	N.D.			
30) Ethyl Acetate	11.66	61	5152	0.294	ng		93
31) n-Hexane	11.63	57	1872	N.D.			
32) Chloroform	0.00	83	0	N.D.			
34) Tetrahydrofuran (THF)	12.14	72	12082	0.386	ng	#	86
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. d			
41) Benzene	13.26	78	12230	N.D.			
42) Carbon Tetrachloride	0.00	117	0	N.D.			
43) Cyclohexane	13.64	84	1496	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	14.35	130	1911	N.D.			
48) 1,4-Dioxane	0.00	88	0	N.D.			
49) 2,2,4-Trimethylpentane...	14.41	57	1383	N.D.			

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091721.D
Acq On : 9 Mar 2017 18:17 Operator: LH
Sample : P1700971-005 (1000mL)
Misc : S29-03071701
ALS Vial : 10 Sample Multiplier: 1

Quant Time: Mar 10 16:22:47 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

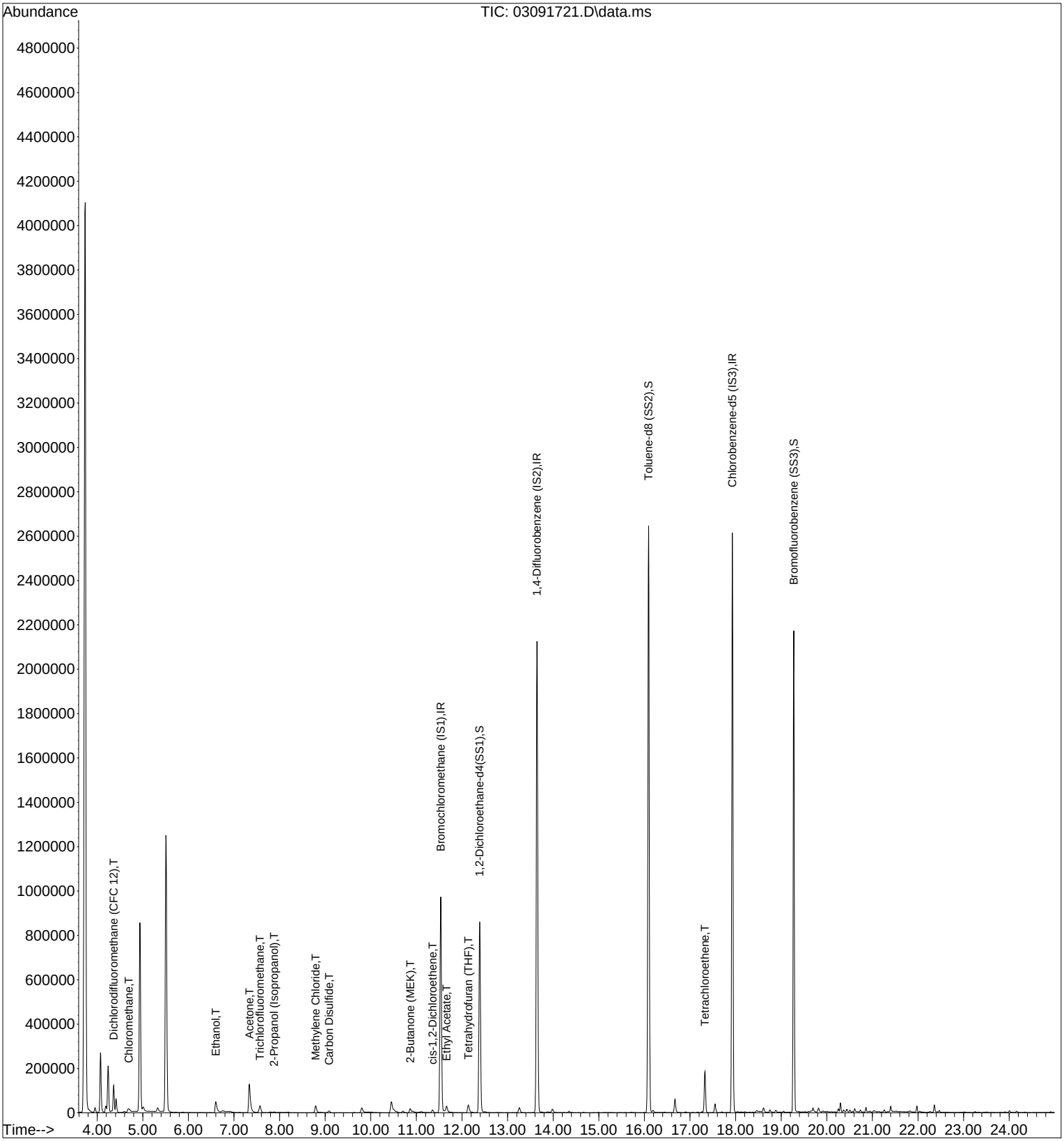
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	0.00	100	0	N.D.	
51) n-Heptane	0.00	71	0	N.D.	
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.	
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.	
58) Toluene	16.19	91	7899	N.D.	
59) 2-Hexanone	16.43	43	2177	N.D.	
60) Dibromochloromethane	0.00	129	0	N.D.	
61) 1,2-Dibromoethane	0.00	107	0	N.D.	
62) n-Butyl Acetate	17.05	43	2066	N.D.	
63) n-Octane	17.18	57	513	N.D.	
64) Tetrachloroethene	17.33	166	58242	1.036 ng	99
65) Chlorobenzene	17.97	112	805	N.D.	
66) Ethylbenzene	18.31	91	1845	N.D.	
67) m- & p-Xylenes	18.45	91	5425	N.D.	
68) Bromoform	0.00	173	0	N.D.	
69) Styrene	18.79	104	1536	N.D.	
70) o-Xylene	18.88	91	2099	N.D.	
71) n-Nonane	19.05	43	2514	N.D.	
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.	
74) Cumene	19.39	105	694	N.D.	
75) alpha-Pinene	19.73	93	802	N.D.	
76) n-Propylbenzene	19.83	91	1882	N.D.	
77) 3-Ethyltoluene	19.91	105	2328	N.D.	
78) 4-Ethyltoluene	19.95	105	993	N.D.	
79) 1,3,5-Trimethylbenzene	20.01	105	1008	N.D.	
80) alpha-Methylstyrene	20.30	118	638	N.D.	
81) 2-Ethyltoluene	20.18	105	907	N.D.	
82) 1,2,4-Trimethylbenzene	20.37	105	3017	N.D.	
83) n-Decane	20.44	57	3731	N.D.	
84) Benzyl Chloride	20.49	91	885	N.D.	
85) 1,3-Dichlorobenzene	20.51	146	740	N.D.	
86) 1,4-Dichlorobenzene	20.56	146	1088	N.D.	
87) sec-Butylbenzene	20.61	105	579	N.D.	
88) 4-Isopropyltoluene (p-...	20.73	119	2609	N.D.	
89) 1,2,3-Trimethylbenzene	20.74	105	1152	N.D.	
90) 1,2-Dichlorobenzene	20.86	146	522	N.D.	
91) d-Limonene	20.86	68	4692	N.D.	
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.	
93) n-Undecane	21.51	57	950	N.D.	
94) 1,2,4-Trichlorobenzene	22.36	180	906	N.D.	
95) Naphthalene	22.47	128	6128	N.D.	
96) n-Dodecane	22.43	57	1222	N.D.	
97) Hexachlorobutadiene	0.00	225	0	N.D.	
98) Cyclohexanone	0.00	55	0	N.D. d	
99) tert-Butylbenzene	20.37	119	502	N.D.	
100) n-Butylbenzene	21.09	91	1788	N.D.	

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091721.D
Acq On : 9 Mar 2017 18:17 Operator: LH
Sample : P1700971-005 (1000mL)
Misc : S29-03071701
ALS Vial : 10 Sample Multiplier: 1

Quant Time: Mar 10 16:22:47 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091722.D
Acq On : 9 Mar 2017 18:50 Operator: LH
Sample : P1700971-006 (35mL)
Misc : S29-03071701
ALS Vial : 11 Sample Multiplier: 1

Quant Time: Mar 10 16:23:54 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/10/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.53	130	375988	12.500 ng	-0.04
37) 1,4-Difluorobenzene (IS2)	13.64	114	1932334	12.500 ng	-0.03
56) Chlorobenzene-d5 (IS3)	17.93	82	886426	12.500 ng	0.00

System Monitoring Compounds					
33) 1,2-Dichloroethane-d4(...	12.39	65	710339	13.151 ng	-0.04
Spiked Amount 12.500	Range 70 - 130		Recovery = 105.20%		
57) Toluene-d8 (SS2)	16.09	98	2051930	12.065 ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.56%		
73) Bromofluorobenzene (SS3)	19.28	174	575292	10.597 ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 84.80%		

Target Compounds						Qvalue
2) Propene	4.21	42	2204	N.D.		
3) Dichlorodifluoromethan...	4.37	85	5066	N.D.		
4) Chloromethane	4.70	50	1862	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	6.63	45	11788	0.332 ng		89
11) Acetonitrile	6.93	41	914	N.D.		
12) Acrolein	7.13	56	605	N.D.		
13) Acetone	7.38	58	12771	0.358 ng	#	1
14) Trichlorofluoromethane	7.56	101	2418	N.D.		
15) 2-Propanol (Isopropanol)	7.91	45	1044	N.D.		
16) Acrylonitrile	8.18	53	982	N.D.		
17) 1,1-Dichloroethene	0.00	96	0	N.D.		
18) 2-Methyl-2-Propanol (t...	8.86	59	494	N.D.		
19) Methylene Chloride	8.79	84	2197	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	9.09	76	4138	N.D.		
23) trans-1,2-Dichloroethene	10.08	61	863	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)	10.88	72	1896	N.D.		
28) cis-1,2-Dichloroethene	11.35	61	75169	1.151 ng		96
29) Diisopropyl Ether	0.00	87	0	N.D.		
30) Ethyl Acetate	0.00	61	0	N.D.		
31) n-Hexane	11.63	57	1864	N.D.		
32) Chloroform	11.70	83	520	N.D.		
34) Tetrahydrofuran (THF)	12.15	72	4503	0.144 ng	#	84
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	13.26	56	680	N.D.		
41) Benzene	13.26	78	4501	N.D.		
42) Carbon Tetrachloride	0.00	117	0	N.D.		
43) Cyclohexane	13.55	84	502	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	14.35	130	38086	0.734 ng		99
48) 1,4-Dioxane	0.00	88	0	N.D.		
49) 2,2,4-Trimethylpentane...	14.41	57	10593	N.D.		

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091722.D
Acq On : 9 Mar 2017 18:50 Operator: LH
Sample : P1700971-006 (35mL)
Misc : S29-03071701
ALS Vial : 11 Sample Multiplier: 1

Quant Time: Mar 10 16:23:54 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

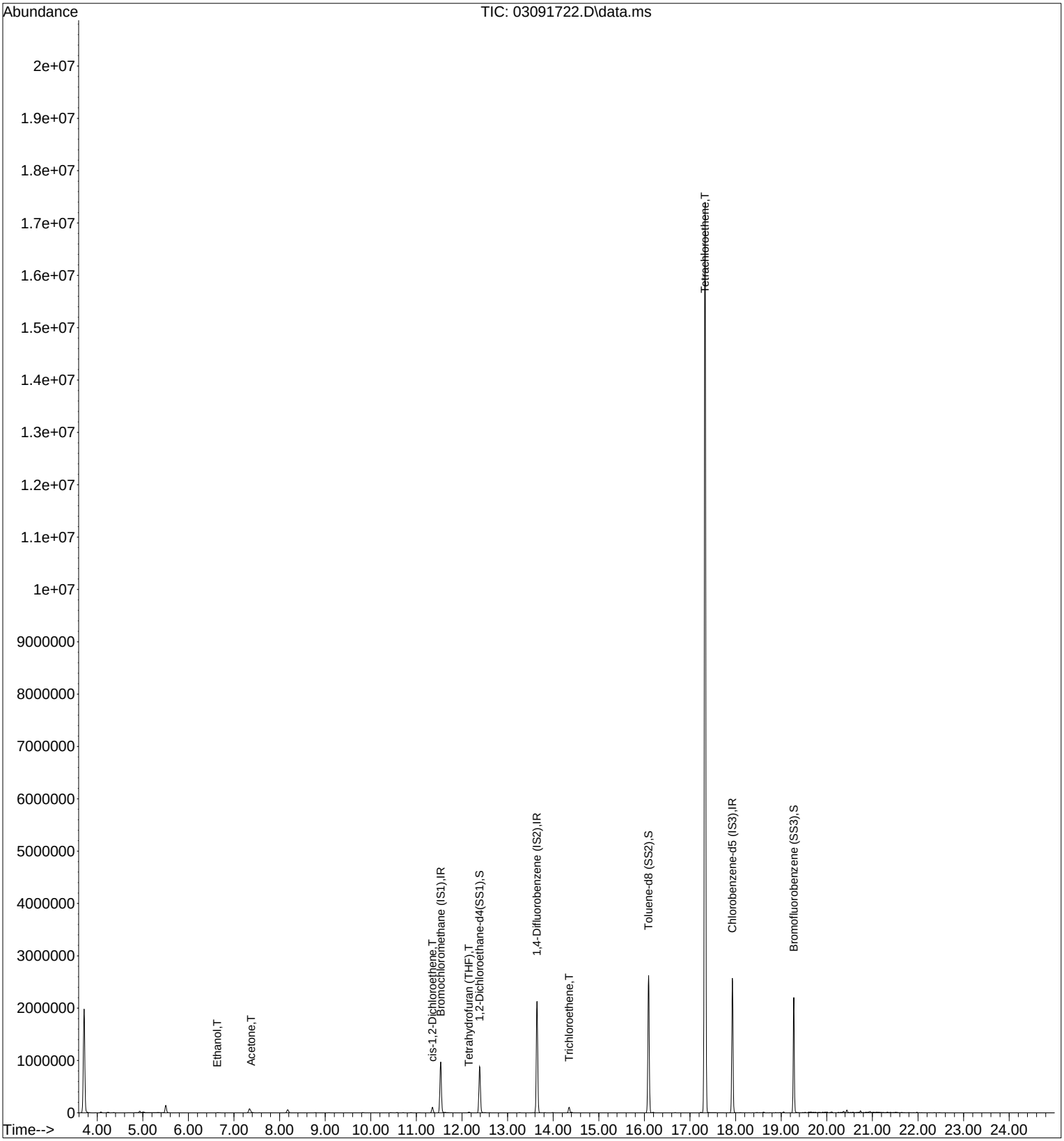
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	0.00	100	0	N.D.	
51) n-Heptane	0.00	71	0	N.D.	
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.	
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.	
58) Toluene	16.19	91	6748	N.D.	
59) 2-Hexanone	16.45	43	722	N.D.	
60) Dibromochloromethane	0.00	129	0	N.D.	
61) 1,2-Dibromoethane	0.00	107	0	N.D.	
62) n-Butyl Acetate	17.17	43	792	N.D.	
63) n-Octane	0.00	57	0	N.D.	
64) Tetrachloroethene	17.33	166	5400177	95.961 ng	98
65) Chlorobenzene	17.96	112	677	N.D.	
66) Ethylbenzene	18.31	91	1551	N.D.	
67) m- & p-Xylenes	18.46	91	3759	N.D.	
68) Bromoform	0.00	173	0	N.D.	
69) Styrene	0.00	104	0	N.D.	
70) o-Xylene	18.88	91	2357	N.D.	
71) n-Nonane	19.06	43	7798	N.D.	
72) 1,1,2,2-Tetrachloroethane	18.93	83	888	N.D.	
74) Cumene	19.40	105	550	N.D.	
75) alpha-Pinene	0.00	93	0	N.D.	
76) n-Propylbenzene	19.83	91	1469	N.D.	
77) 3-Ethyltoluene	19.91	105	3056	N.D.	
78) 4-Ethyltoluene	19.95	105	1418	N.D.	
79) 1,3,5-Trimethylbenzene	20.01	105	1439	N.D.	
80) alpha-Methylstyrene	0.00	118	0	N.D.	
81) 2-Ethyltoluene	20.18	105	1861	N.D.	
82) 1,2,4-Trimethylbenzene	20.37	105	4410	N.D.	
83) n-Decane	0.00	57	0	N.D. d	
84) Benzyl Chloride	20.37	91	571	N.D.	
85) 1,3-Dichlorobenzene	20.56	146	534	N.D.	
86) 1,4-Dichlorobenzene	20.56	146	534	N.D.	
87) sec-Butylbenzene	20.61	105	600	N.D.	
88) 4-Isopropyltoluene (p-...	20.73	119	1140	N.D.	
89) 1,2,3-Trimethylbenzene	20.74	105	2405	N.D.	
90) 1,2-Dichlorobenzene	20.86	146	528	N.D.	
91) d-Limonene	20.86	68	1139	N.D.	
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.	
93) n-Undecane	21.52	57	2476	N.D.	
94) 1,2,4-Trichlorobenzene	0.00	180	0	N.D.	
95) Naphthalene	22.47	128	3225	N.D.	
96) n-Dodecane	22.42	57	836	N.D.	
97) Hexachlorobutadiene	0.00	225	0	N.D.	
98) Cyclohexanone	18.62	55	5585	N.D.	
99) tert-Butylbenzene	20.37	119	752	N.D.	
100) n-Butylbenzene	21.10	91	1150	N.D.	

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091722.D
Acq On : 9 Mar 2017 18:50 Operator: LH
Sample : P1700971-006 (35mL)
Misc : S29-03071701
ALS Vial : 11 Sample Multiplier: 1

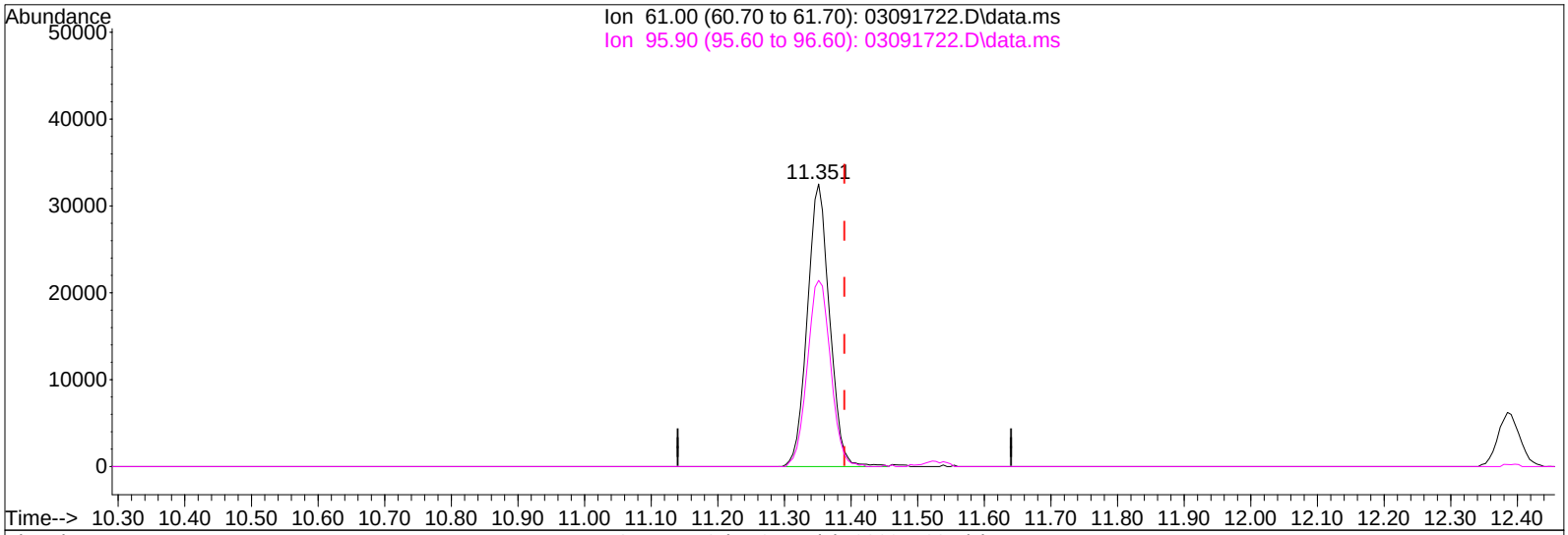
Quant Time: Mar 10 16:23:54 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

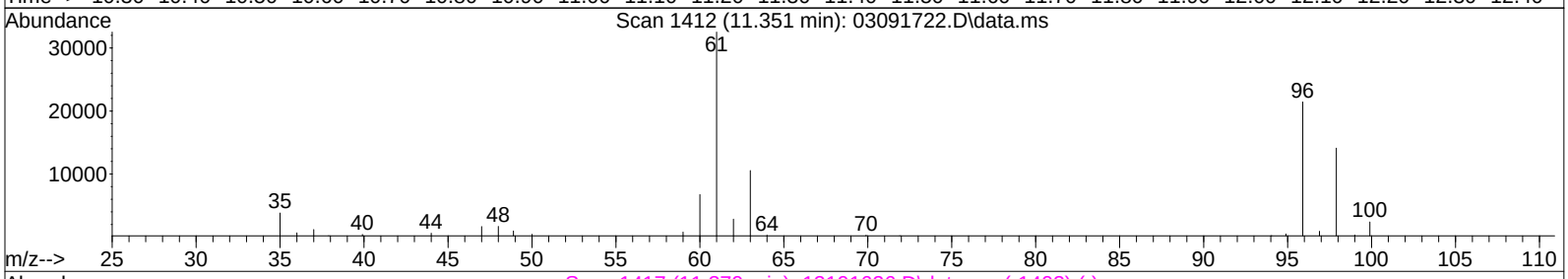


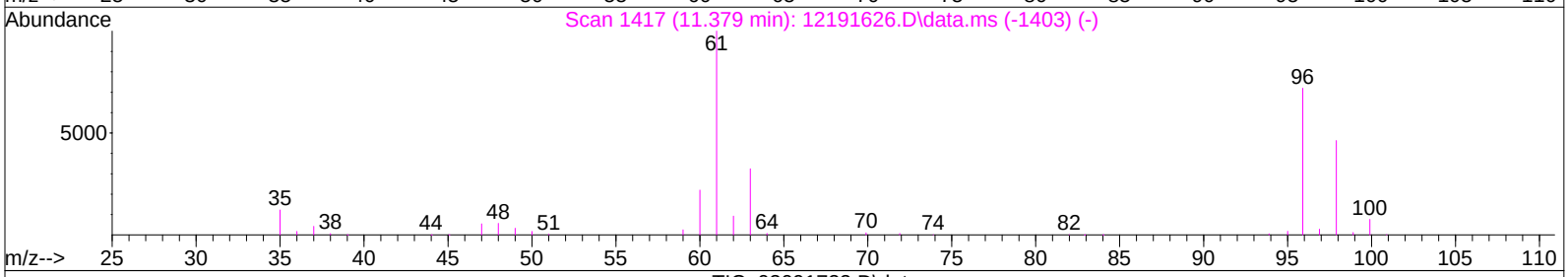
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091722.D
Acq On : 9 Mar 2017 18:50 Operator: LH
Sample : P1700971-006 (35mL)
Misc : S29-03071701
ALS Vial : 11 Sample Multiplier: 1

Quant Time: Mar 10 08:39:53 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 03091722.D\data.ms

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

11.351min (-0.039) 1.15ng

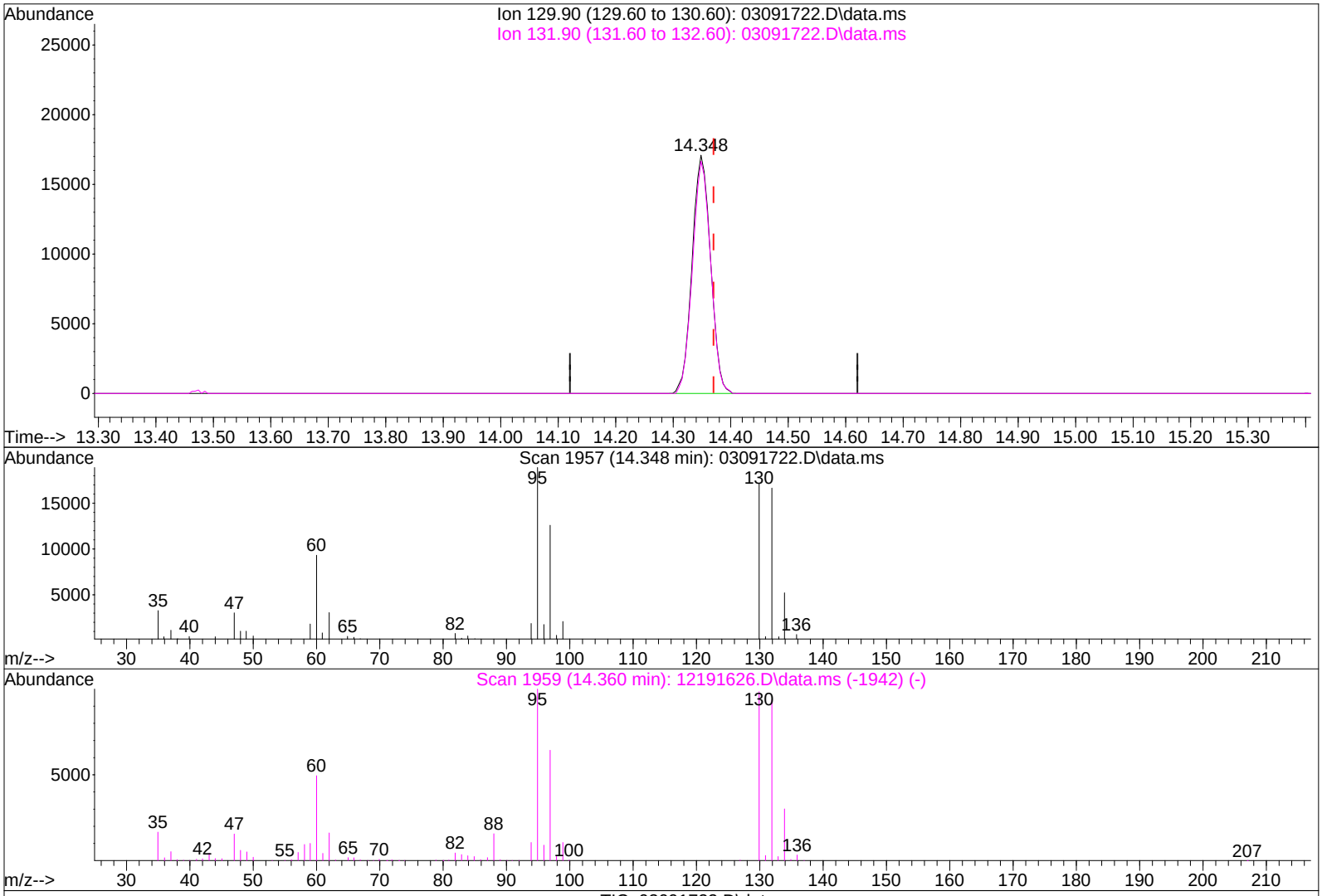
response 75169

Ion	Exp%	Act%
61.00	100	100
95.90	72.00	69.08
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091722.D
Acq On : 9 Mar 2017 18:50 Operator: LH
Sample : P1700971-006 (35mL)
Misc : S29-03071701
ALS Vial : 11 Sample Multiplier: 1

Quant Time: Mar 10 08:39:53 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 03091722.D\data.ms

(47) Trichloroethene (T)

14.348min (-0.022) 0.73ng

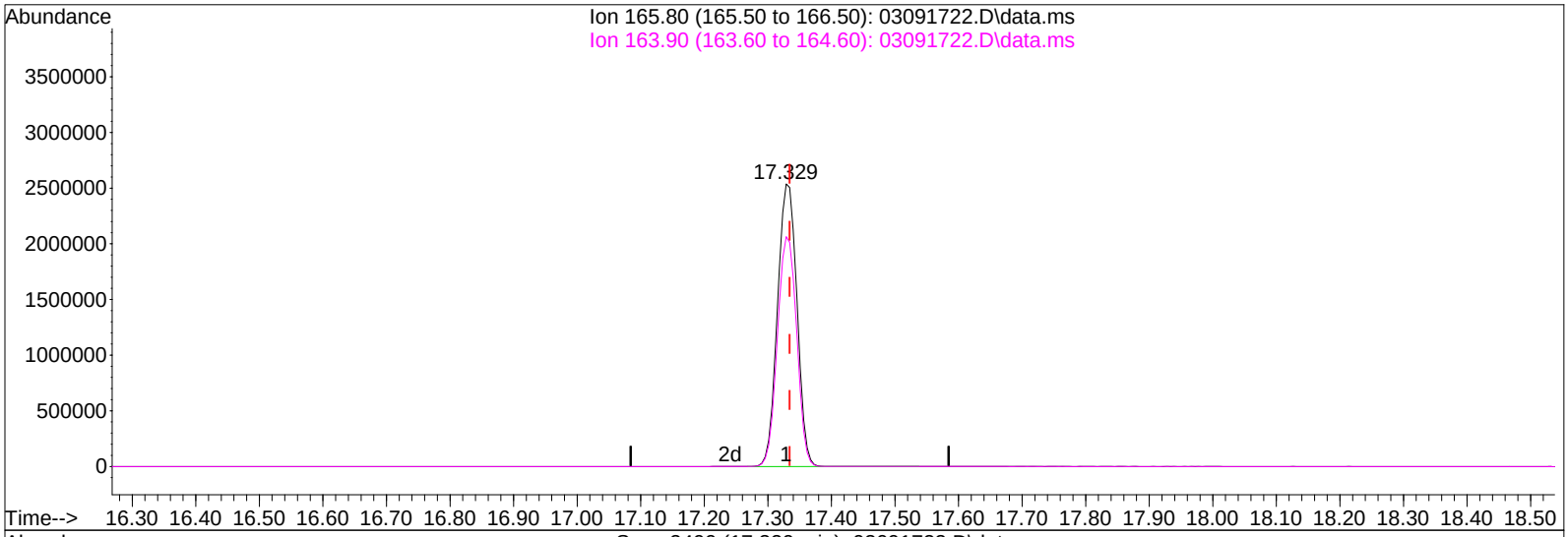
response 38086

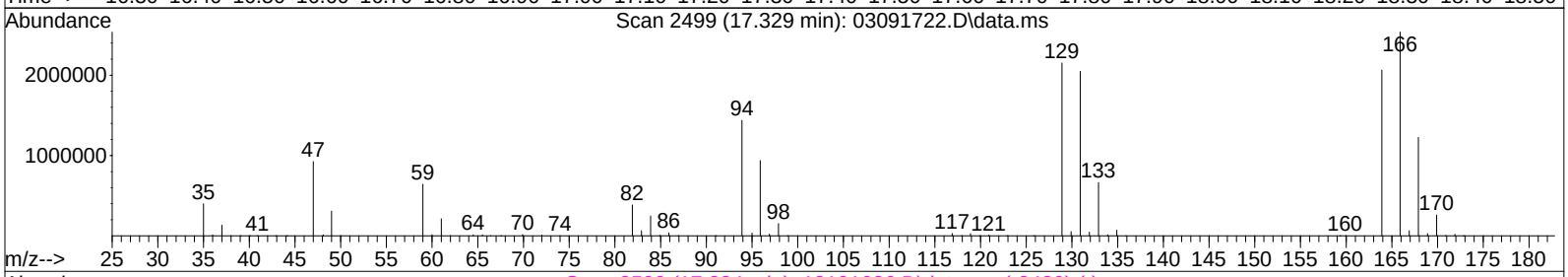
Ion	Exp%	Act%
129.90	100	100
131.90	95.40	96.11
0.00	0.00	0.00
0.00	0.00	0.00

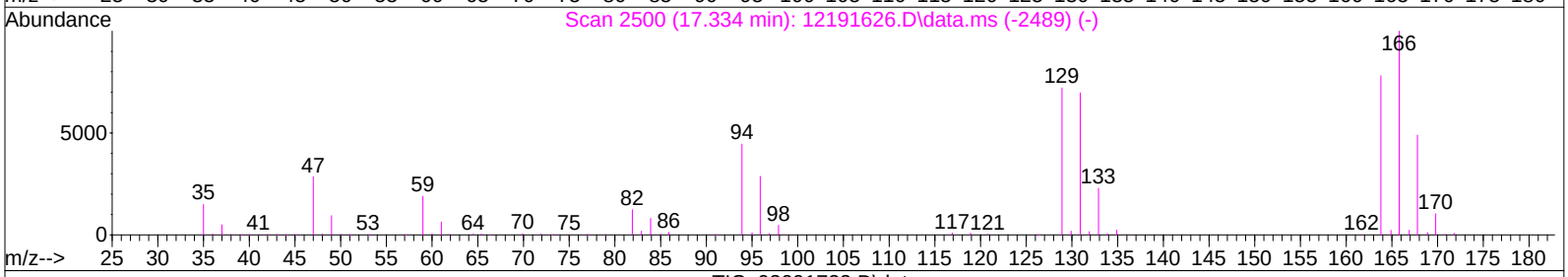
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091722.D
Acq On : 9 Mar 2017 18:50 Operator: LH
Sample : P1700971-006 (35mL)
Misc : S29-03071701
ALS Vial : 11 Sample Multiplier: 1

Quant Time: Mar 10 08:39:53 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 03091722.D\data.ms

(64) Tetrachloroethene (T)

17.329min (-0.006) 95.96ng

response 5400177

Ion	Exp%	Act%
165.80	100	100
163.90	78.50	80.60
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091704.D
Acq On : 9 Mar 2017 4:02 Operator: LH
Sample : MB R16030917 1000mL
Misc : S29-03071701 AC00442
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Mar 09 07:55:55 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/9/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	11.53	130	355025	12.500 ng	-0.04
37) 1,4-Difluorobenzene (IS2)	13.64	114	1829503	12.500 ng	-0.03
56) Chlorobenzene-d5 (IS3)	17.93	82	815907	12.500 ng	0.00

System Monitoring Compounds					
33) 1,2-Dichloroethane-d4(...	12.39	65	671028	13.157 ng	-0.04
Spiked Amount 12.500	Range 70 - 130		Recovery = 105.28%		
57) Toluene-d8 (SS2)	16.09	98	1921761	12.276 ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.24%		
73) Bromofluorobenzene (SS3)	19.28	174	511697	10.240 ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 81.92%		

Target Compounds					Qvalue
2) Propene	4.25	42	1373	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	6.77	45	263	N.D.	
11) Acetonitrile	6.93	41	1756	N.D.	
12) Acrolein	7.13	56	1514	N.D.	
13) Acetone	7.37	58	11631	0.345 ng	# 79
14) Trichlorofluoromethane	0.00	101	0	N.D.	
15) 2-Propanol (Isopropanol)	7.92	45	140	N.D.	
16) Acrylonitrile	8.12	53	752	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	8.79	84	1768	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	9.09	76	3452	N.D.	
23) trans-1,2-Dichloroethene	0.00	61	0	N.D.	
24) 1,1-Dichloroethane	0.00	63	0	N.D.	
25) Methyl tert-Butyl Ether	0.00	73	0	N.D.	
26) Vinyl Acetate	0.00	86	0	N.D.	
27) 2-Butanone (MEK)	10.90	72	1001	N.D.	
28) cis-1,2-Dichloroethene	11.35	61	1262	N.D.	
29) Diisopropyl Ether	0.00	87	0	N.D.	
30) Ethyl Acetate	0.00	61	0	N.D.	
31) n-Hexane	11.63	57	2247	N.D.	
32) Chloroform	0.00	83	0	N.D.	
34) Tetrahydrofuran (THF)	12.17	72	703	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	13.27	56	2299	N.D.	
41) Benzene	13.26	78	3586	N.D.	
42) Carbon Tetrachloride	0.00	117	0	N.D.	
43) Cyclohexane	13.55	84	1216	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	14.35	130	2963	N.D.	
48) 1,4-Dioxane	0.00	88	0	N.D.	
49) 2,2,4-Trimethylpentane...	0.00	57	0	N.D.	

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091704.D
Acq On : 9 Mar 2017 4:02 Operator: LH
Sample : MB R16030917 1000mL
Misc : S29-03071701 AC00442
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Mar 09 07:55:55 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

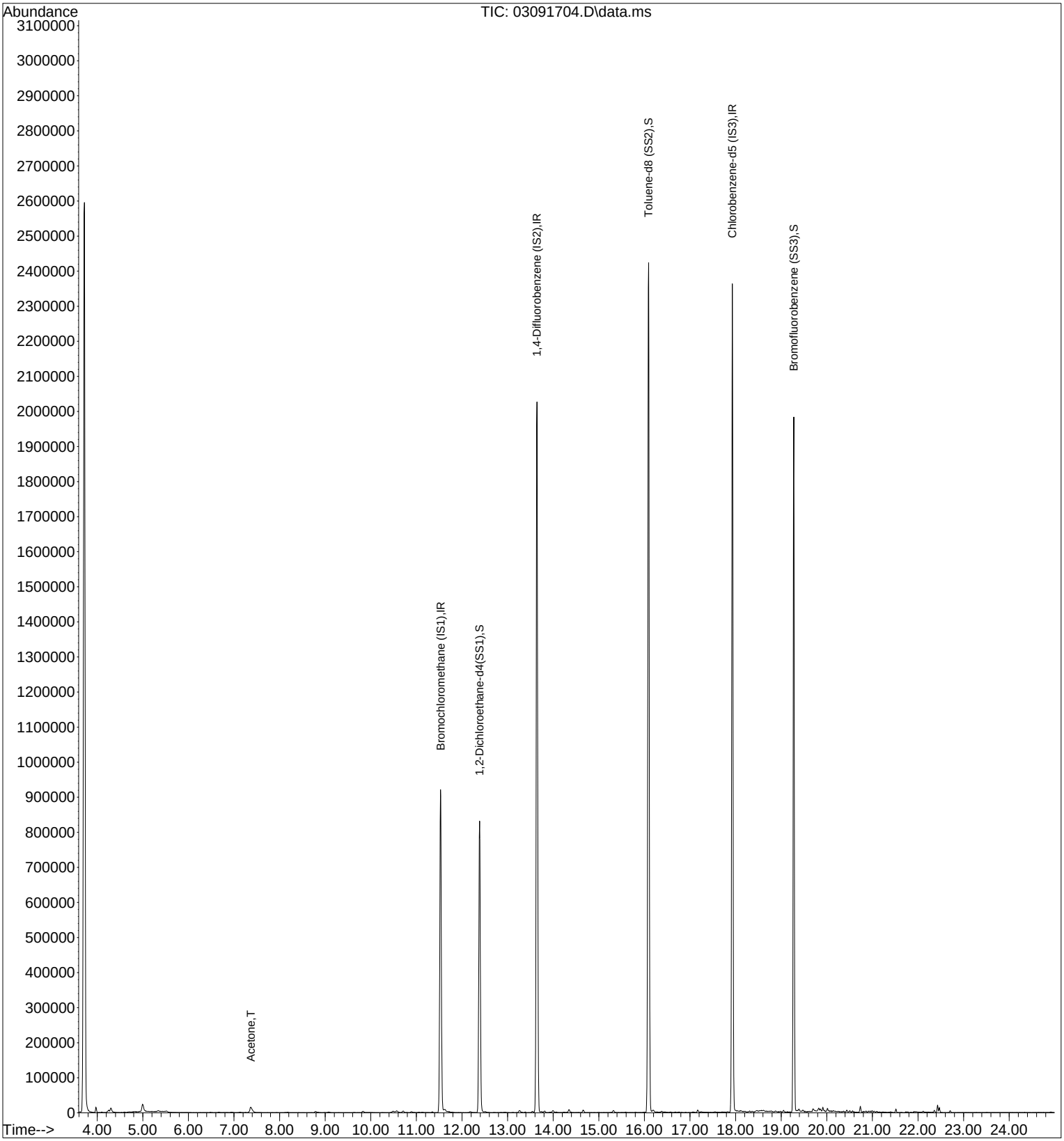
Internal Standards	R.T.	QIon	Response	Conc Units Dev(Min)
50) Methyl Methacrylate	0.00	100	0	N.D.
51) n-Heptane	14.66	71	1722	N.D.
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.
58) Toluene	16.19	91	5140	N.D.
59) 2-Hexanone	16.46	43	1248	N.D.
60) Dibromochloromethane	0.00	129	0	N.D.
61) 1,2-Dibromoethane	0.00	107	0	N.D.
62) n-Butyl Acetate	17.07	43	2714	N.D.
63) n-Octane	17.16	57	1821	N.D.
64) Tetrachloroethene	0.00	166	0	N.D.
65) Chlorobenzene	17.98	112	1153	N.D.
66) Ethylbenzene	18.31	91	2937	N.D.
67) m- & p-Xylenes	18.46	91	5500	N.D.
68) Bromoform	0.00	173	0	N.D.
69) Styrene	18.79	104	937	N.D.
70) o-Xylene	18.88	91	1112	N.D.
71) n-Nonane	19.05	43	2071	N.D.
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.
74) Cumene	19.39	105	4371	N.D.
75) alpha-Pinene	0.00	93	0	N.D.
76) n-Propylbenzene	19.81	91	3060	N.D.
77) 3-Ethyltoluene	19.91	105	7142	N.D.
78) 4-Ethyltoluene	19.91	105	7142	N.D.
79) 1,3,5-Trimethylbenzene	20.02	105	4585	N.D.
80) alpha-Methylstyrene	20.14	118	699	N.D.
81) 2-Ethyltoluene	20.18	105	699	N.D.
82) 1,2,4-Trimethylbenzene	20.36	105	3458	N.D.
83) n-Decane	20.44	57	1810	N.D.
84) Benzyl Chloride	20.49	91	1673	N.D.
85) 1,3-Dichlorobenzene	20.51	146	1253	N.D.
86) 1,4-Dichlorobenzene	20.56	146	1657	N.D.
87) sec-Butylbenzene	20.74	105	5617	N.D.
88) 4-Isopropyltoluene (p-...	20.74	119	4562	N.D.
89) 1,2,3-Trimethylbenzene	20.74	105	5617	N.D.
90) 1,2-Dichlorobenzene	20.86	146	960	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	21.52	57	3218	N.D.
94) 1,2,4-Trichlorobenzene	22.36	180	1990	N.D.
95) Naphthalene	22.47	128	10814	N.D.
96) n-Dodecane	22.43	57	6695	N.D.
97) Hexachlorobutadiene	0.00	225	0	N.D.
98) Cyclohexanone	18.62	55	1172	N.D.
99) tert-Butylbenzene	20.37	119	821	N.D.
100) n-Butylbenzene	21.10	91	1263	N.D.

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091704.D
Acq On : 9 Mar 2017 4:02 Operator: LH
Sample : MB R16030917 1000mL
Misc : S29-03071701 AC00442
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Mar 09 07:55:55 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091705.D
Acq On : 9 Mar 2017 4:35 Operator: LH
Sample : LCS R16030917 25ng
Misc : S29-03071701/S29-03031707 (1/1)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Mar 09 07:56:23 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/9/17

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	383773	12.500	ng	-0.03
37) 1,4-Difluorobenzene (IS2)	13.66	114	1920844	12.500	ng	-0.02
56) Chlorobenzene-d5 (IS3)	17.93	82	891332	12.500	ng	0.00

System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.40	65	698010	12.661	ng	-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 101.28%			
57) Toluene-d8 (SS2)	16.09	98	2048520	11.979	ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 95.84%			
73) Bromofluorobenzene (SS3)	19.28	174	577988	10.588	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 84.72%			

Target Compounds							Qvalue
2) Propene	4.18	42	1589690	29.963	ng		97
3) Dichlorodifluoromethan...	4.35	85	2524634	26.041	ng		99
4) Chloromethane	4.67	50	2202074	27.613	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.94	135	1203563	22.340	ng		100
6) Vinyl Chloride	5.12	62	2318415	30.569	ng		100
7) 1,3-Butadiene	5.41	54	1883699	35.573	ng		98
8) Bromomethane	5.88	94	1128431	28.116	ng		99
9) Chloroethane	6.23	64	962748	30.463	ng		100
10) Ethanol	6.66	45	5806273	159.981	ng		100
11) Acetonitrile	6.92	41	2726124	32.793	ng		99
12) Acrolein	7.11	56	882328	27.667	ng		92
13) Acetone	7.33	58	5565533	152.722	ng		93
14) Trichlorofluoromethane	7.56	101	2033892	24.443	ng		100
15) 2-Propanol (Isopropanol)	7.85	45	8038167	64.581	ng		99
16) Acrylonitrile	8.13	53	1895730	30.809	ng		99
17) 1,1-Dichloroethene	8.57	96	1179451	28.195	ng		95
18) 2-Methyl-2-Propanol (t...	8.75	59	7237703	55.432	ng		97
19) Methylene Chloride	8.81	84	1306635	28.598	ng		94
20) 3-Chloro-1-propene (Al...	8.96	41	2242511	32.436	ng		97
21) Trichlorotrifluoroethane	9.21	151	968560	23.754	ng		89
22) Carbon Disulfide	9.07	76	4781219	29.664	ng		99
23) trans-1,2-Dichloroethene	10.09	61	2013318	29.746	ng		95
24) 1,1-Dichloroethane	10.35	63	2420533	28.538	ng		100
25) Methyl tert-Butyl Ether	10.42	73	3943646	26.840	ng		97
26) Vinyl Acetate	10.60	86	1690691	158.595	ng	#	91
27) 2-Butanone (MEK)	10.84	72	961840	30.572	ng		94
28) cis-1,2-Dichloroethene	11.37	61	1942077	29.127	ng		96
29) Diisopropyl Ether	11.64	87	1121429	26.550	ng	#	76
30) Ethyl Acetate	11.65	61	1180430	65.862	ng		100
31) n-Hexane	11.63	57	2563059	31.515	ng		99
32) Chloroform	11.71	83	2227563	26.351	ng		100
34) Tetrahydrofuran (THF)	12.10	72	930865	29.085	ng		94
35) Ethyl tert-Butyl Ether	12.23	87	1519311	27.231	ng		92
36) 1,2-Dichloroethane	12.52	62	1834891	26.492	ng		100
38) 1,1,1-Trichloroethane	12.79	97	1870882	24.863	ng		98
39) Isopropyl Acetate	13.19	61	1991406	61.801	ng		97
40) 1-Butanol	13.22	56	3741414	72.597	ng		99
41) Benzene	13.27	78	5289955	26.972	ng		100
42) Carbon Tetrachloride	13.42	117	1638051	25.147	ng		100
43) Cyclohexane	13.55	84	4089125	56.084	ng		93
44) tert-Amyl Methyl Ether	13.88	73	3821381	27.007	ng		98
45) 1,2-Dichloropropane	14.12	63	1404298	28.793	ng		100
46) Bromodichloromethane	14.31	83	1883421	27.678	ng		100
47) Trichloroethene	14.35	130	1283703	24.899	ng		99
48) 1,4-Dioxane	14.33	88	1177133	29.939	ng		92
49) 2,2,4-Trimethylpentane...	14.41	57	5887747	28.494	ng		98

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091705.D
Acq On : 9 Mar 2017 4:35 Operator: LH
Sample : LCS R16030917 25ng
Misc : S29-03071701/S29-03031707 (1/1)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Mar 09 07:56:23 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

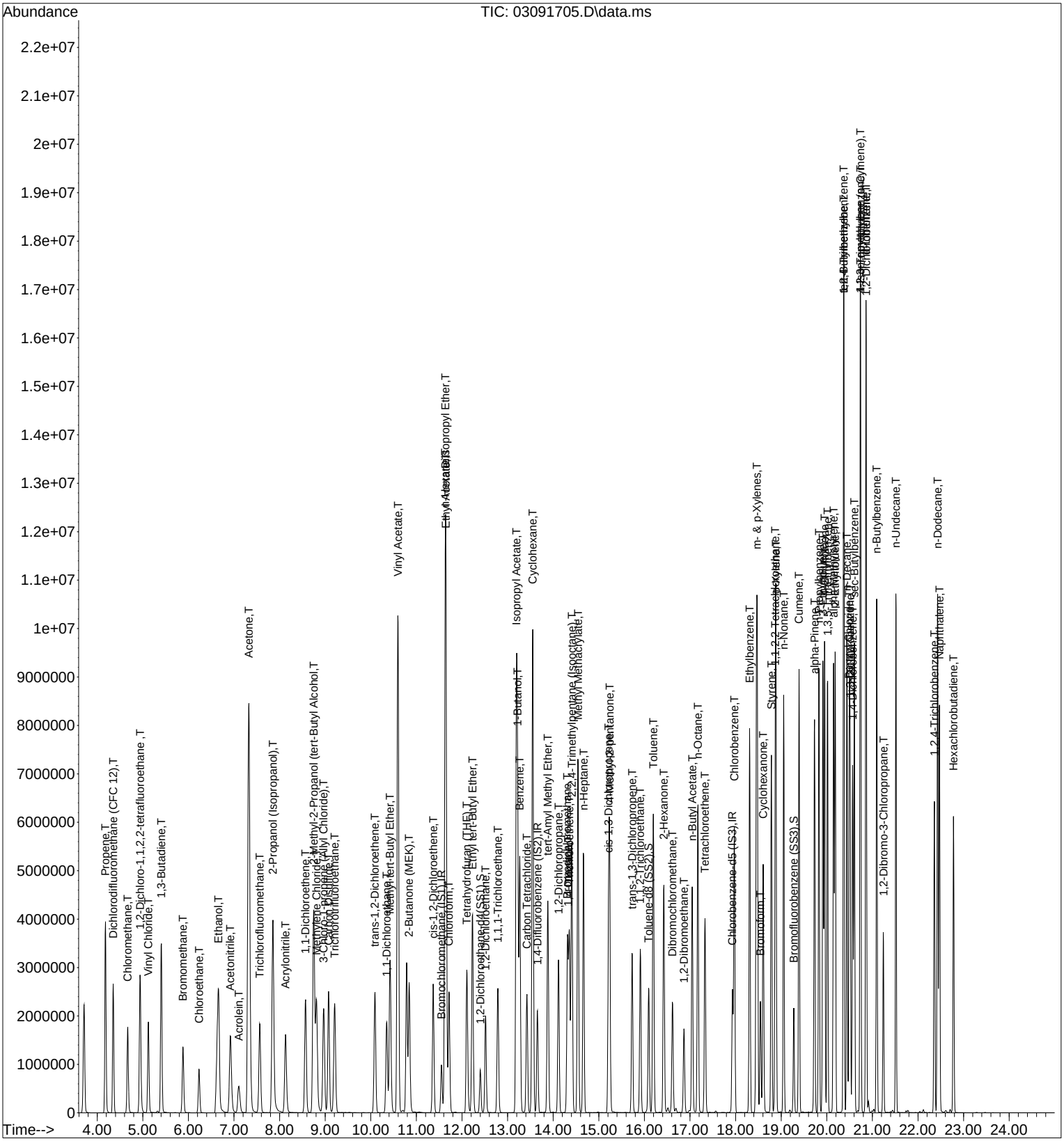
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	14.55	100	1071364	55.714 ng #	87
51) n-Heptane	14.67	71	1368026	28.924 ng	97
52) cis-1,3-Dichloropropene	15.21	75	2312491	29.285 ng	100
53) 4-Methyl-2-pentanone	15.24	58	1535504	32.601 ng	96
54) trans-1,3-Dichloropropene	15.73	75	2080288	29.549 ng	100
55) 1,1,2-Trichloroethane	15.91	97	1250523	27.390 ng	97
58) Toluene	16.20	91	5138177	24.607 ng	100
59) 2-Hexanone	16.43	43	3935626	30.599 ng	100
60) Dibromochloromethane	16.61	129	1428830	24.852 ng	99
61) 1,2-Dibromoethane	16.87	107	1419572	25.249 ng	99
62) n-Butyl Acetate	17.05	43	4135094	29.867 ng	99
63) n-Octane	17.17	57	1281438	27.933 ng	95
64) Tetrachloroethene	17.33	166	1240645	21.925 ng	100
65) Chlorobenzene	17.97	112	3339702	24.269 ng	100
66) Ethylbenzene	18.31	91	6014422	25.607 ng	99
67) m- & p-Xylenes	18.47	91	9454022	51.735 ng	98
68) Bromoform	18.54	173	1115887	23.847 ng	100
69) Styrene	18.79	104	3637532	25.651 ng	99
70) o-Xylene	18.89	91	4802555	25.542 ng	99
71) n-Nonane	19.06	43	3167734	27.976 ng	96
72) 1,1,2,2-Tetrachloroethane	18.87	83	2546459	28.891 ng	99
74) Cumene	19.39	105	5770366	24.666 ng	99
75) alpha-Pinene	19.73	93	3183492	25.927 ng	99
76) n-Propylbenzene	19.83	91	7327393	26.579 ng	98
77) 3-Ethyltoluene	19.91	105	5907031	24.932 ng	99
78) 4-Ethyltoluene	19.95	105	5478270	26.359 ng	99
79) 1,3,5-Trimethylbenzene	20.02	105	4745976	24.559 ng	98
80) alpha-Methylstyrene	20.15	118	2629473	27.343 ng	99
81) 2-Ethyltoluene	20.18	105	5647340	25.450 ng	99
82) 1,2,4-Trimethylbenzene	20.37	105	5029839	26.409 ng	97
83) n-Decane	20.44	57	3126305	28.401 ng	97
84) Benzyl Chloride	20.49	91	4642238	29.962 ng	98
85) 1,3-Dichlorobenzene	20.51	146	2655282	27.759 ng	100
86) 1,4-Dichlorobenzene	20.57	146	2641375	23.270 ng	99
87) sec-Butylbenzene	20.61	105	6329651	25.615 ng	99
88) 4-Isopropyltoluene (p-...	20.74	119	5672440	23.955 ng	96
89) 1,2,3-Trimethylbenzene	20.74	105	5116904	25.186 ng	97
90) 1,2-Dichlorobenzene	20.86	146	2567648	24.001 ng	100
91) d-Limonene	20.86	68	2375139	29.094 ng	95
92) 1,2-Dibromo-3-Chloropr...	21.24	157	941417	26.433 ng	91
93) n-Undecane	21.51	57	3304122	28.549 ng	98
94) 1,2,4-Trichlorobenzene	22.36	180	1904034	27.701 ng	100
95) Naphthalene	22.47	128	6392658	30.620 ng	100
96) n-Dodecane	22.43	57	3395661	32.855 ng	97
97) Hexachlorobutadiene	22.78	225	1055552	21.976 ng	100
98) Cyclohexanone	18.60	55	2305992	29.195 ng	98
99) tert-Butylbenzene	20.37	119	4506543	24.082 ng	99
100) n-Butylbenzene	21.10	91	5467320	27.241 ng	99

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091705.D
Acq On : 9 Mar 2017 4:35 Operator: LH
Sample : LCS R16030917 25ng
Misc : S29-03071701/S29-03031707 (1/1)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Mar 09 07:56:23 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091723.D
Acq On : 9 Mar 2017 19:24 Operator: LH
Sample : P1700971-006dup (35mL)
Misc : S29-03071701
ALS Vial : 11 Sample Multiplier: 1

Quant Time: Mar 10 16:30:07 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/10/17

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.53	130	369831	12.500	ng	-0.04
37) 1,4-Difluorobenzene (IS2)	13.64	114	1884462	12.500	ng	-0.03
56) Chlorobenzene-d5 (IS3)	17.93	82	873352	12.500	ng	0.00

System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...	12.39	65	688586	12.960	ng	-0.04
Spiked Amount 12.500	Range 70 - 130		Recovery = 103.68%			
57) Toluene-d8 (SS2)	16.09	98	2012162	12.008	ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.08%			
73) Bromofluorobenzene (SS3)	19.28	174	563046	10.526	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 84.24%			

Target Compounds

						Qvalue
2) Propene	4.21	42	2122	N.D.		
3) Dichlorodifluoromethan...	4.37	85	5094	N.D.		
4) Chloromethane	4.70	50	1667	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	6.64	45	9403	0.269	ng	84
11) Acetonitrile	6.94	41	765	N.D.		
12) Acrolein	7.14	56	724	N.D.		
13) Acetone	7.36	58	12245	0.349	ng #	1
14) Trichlorofluoromethane	7.57	101	2461	N.D.		
15) 2-Propanol (Isopropanol)	7.94	45	1117	N.D.		
16) Acrylonitrile	8.17	53	872	N.D.		
17) 1,1-Dichloroethene	0.00	96	0	N.D.		
18) 2-Methyl-2-Propanol (t...	8.85	59	186	N.D.		
19) Methylene Chloride	8.78	84	2216	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	9.08	76	3880	N.D.		
23) trans-1,2-Dichloroethene	10.07	61	819	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)	10.88	72	1786	N.D.		
28) cis-1,2-Dichloroethene	11.35	61	74275	1.156	ng	95
29) Diisopropyl Ether	0.00	87	0	N.D.		
30) Ethyl Acetate	0.00	61	0	N.D.		
31) n-Hexane	11.62	57	1819	N.D.		
32) Chloroform	0.00	83	0	N.D.		
34) Tetrahydrofuran (THF)	12.15	72	4604	0.149	ng #	88
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	13.29	56	703	N.D.		
41) Benzene	13.26	78	4776	N.D.		
42) Carbon Tetrachloride	0.00	117	0	N.D.		
43) Cyclohexane	13.55	84	575	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	14.35	83	522	N.D.		
47) Trichloroethene	14.35	130	38293	0.757	ng	97
48) 1,4-Dioxane	0.00	88	0	N.D.		
49) 2,2,4-Trimethylpentane...	14.40	57	10449	N.D.		

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091723.D
Acq On : 9 Mar 2017 19:24 Operator: LH
Sample : P1700971-006dup (35mL)
Misc : S29-03071701
ALS Vial : 11 Sample Multiplier: 1

Quant Time: Mar 10 16:30:07 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

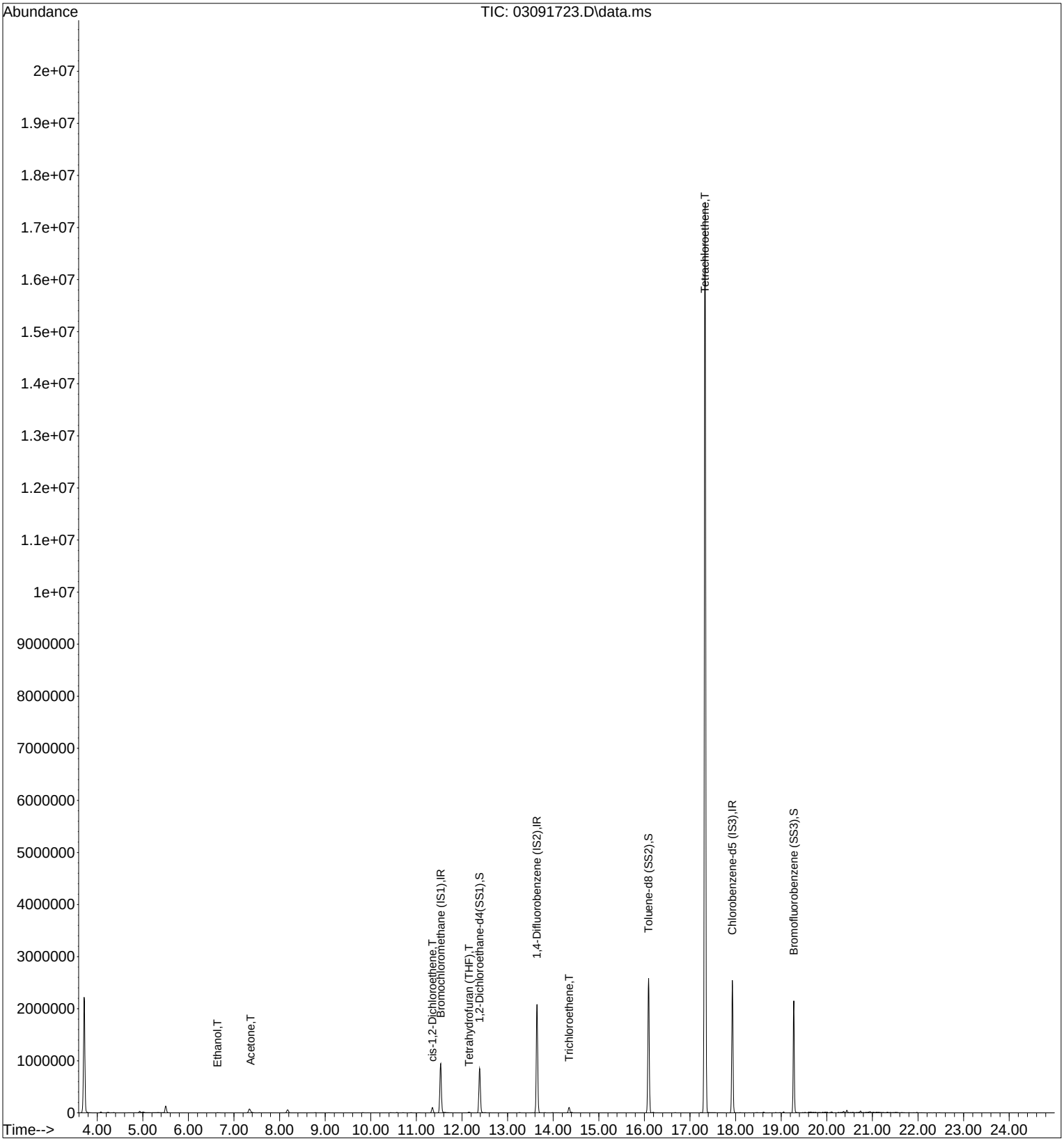
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	0.00	100	0	N.D.	
51) n-Heptane	0.00	71	0	N.D.	
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.	
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.	
58) Toluene	16.20	91	6593	N.D.	
59) 2-Hexanone	16.44	43	778	N.D.	
60) Dibromochloromethane	0.00	129	0	N.D.	
61) 1,2-Dibromoethane	0.00	107	0	N.D.	
62) n-Butyl Acetate	17.17	43	618	N.D.	
63) n-Octane	0.00	57	0	N.D.	
64) Tetrachloroethene	17.33	166	5404563	97.476 ng	98
65) Chlorobenzene	17.97	112	524	N.D.	
66) Ethylbenzene	18.31	91	1419	N.D.	
67) m- & p-Xylenes	18.46	91	3445	N.D.	
68) Bromoform	0.00	173	0	N.D.	
69) Styrene	0.00	104	0	N.D.	
70) o-Xylene	18.89	91	2161	N.D.	
71) n-Nonane	19.06	43	6774	N.D.	
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.	
74) Cumene	19.39	105	537	N.D.	
75) alpha-Pinene	0.00	93	0	N.D.	
76) n-Propylbenzene	19.83	91	1405	N.D.	
77) 3-Ethyltoluene	19.91	105	2742	N.D.	
78) 4-Ethyltoluene	19.95	105	1567	N.D.	
79) 1,3,5-Trimethylbenzene	20.02	105	1365	N.D.	
80) alpha-Methylstyrene	0.00	118	0	N.D.	
81) 2-Ethyltoluene	20.18	105	1777	N.D.	
82) 1,2,4-Trimethylbenzene	20.36	105	4294	N.D.	
83) n-Decane	0.00	57	0	N.D. d	
84) Benzyl Chloride	20.36	91	592	N.D.	
85) 1,3-Dichlorobenzene	20.57	146	552	N.D.	
86) 1,4-Dichlorobenzene	20.57	146	552	N.D.	
87) sec-Butylbenzene	20.61	105	564	N.D.	
88) 4-Isopropyltoluene (p-...	20.74	119	1036	N.D.	
89) 1,2,3-Trimethylbenzene	20.74	105	2334	N.D.	
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.	
91) d-Limonene	20.86	68	896	N.D.	
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.	
93) n-Undecane	21.51	57	2673	N.D.	
94) 1,2,4-Trichlorobenzene	0.00	180	0	N.D.	
95) Naphthalene	22.47	128	2984	N.D.	
96) n-Dodecane	22.43	57	717	N.D.	
97) Hexachlorobutadiene	0.00	225	0	N.D.	
98) Cyclohexanone	18.61	55	5403	N.D.	
99) tert-Butylbenzene	20.38	119	637	N.D.	
100) n-Butylbenzene	21.09	91	1178	N.D.	

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091723.D
Acq On : 9 Mar 2017 19:24 Operator: LH
Sample : P1700971-006dup (35mL)
Misc : S29-03071701
ALS Vial : 11 Sample Multiplier: 1

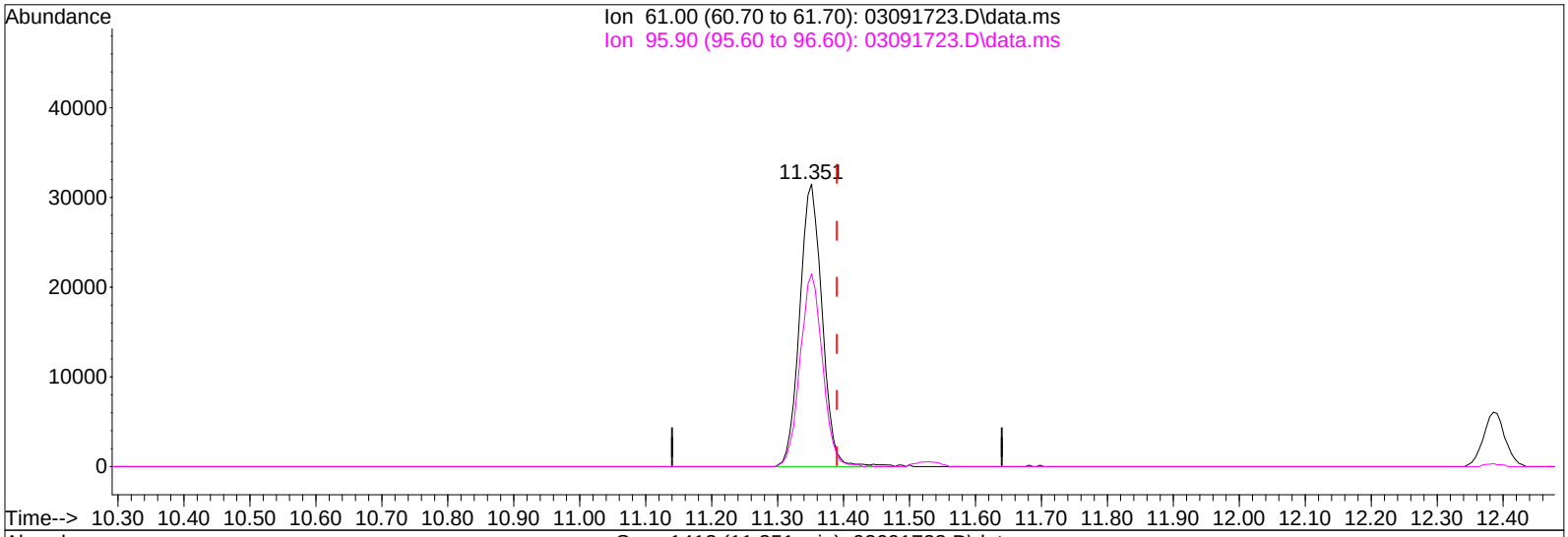
Quant Time: Mar 10 16:30:07 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

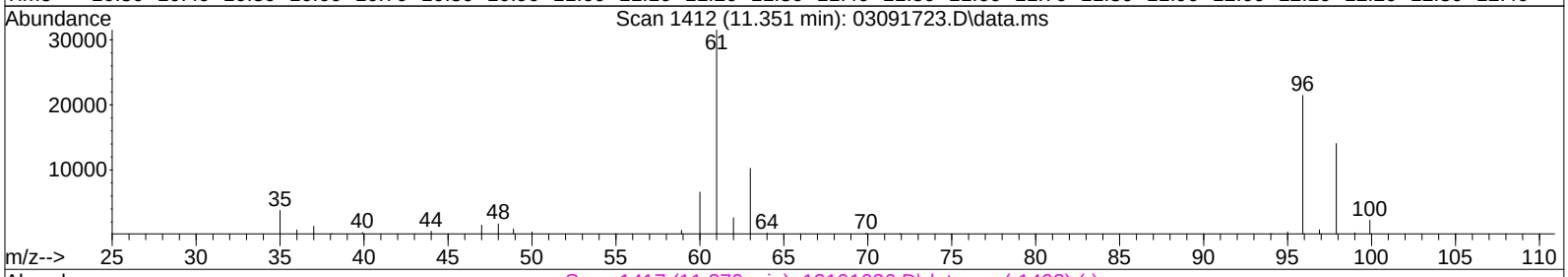


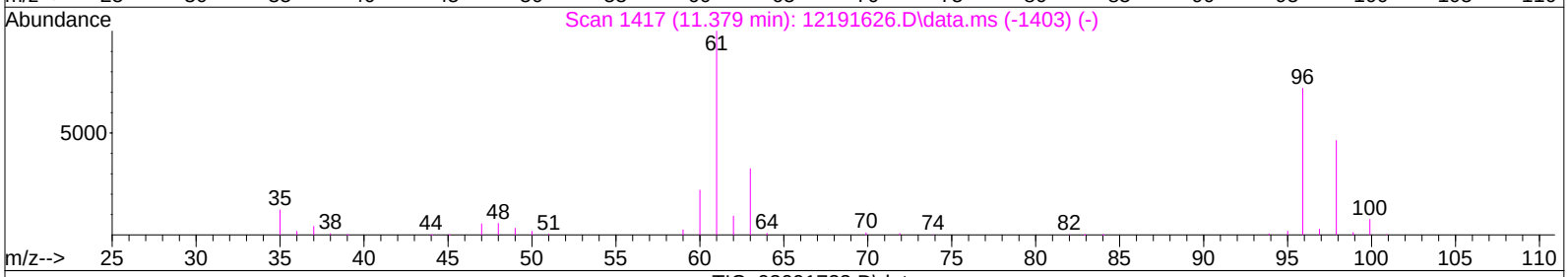
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091723.D
Acq On : 9 Mar 2017 19:24 Operator: LH
Sample : P1700971-006dup (35mL)
Misc : S29-03071701
ALS Vial : 11 Sample Multiplier: 1

Quant Time: Mar 10 08:40:05 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 03091723.D\data.ms

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

11.351min (-0.039) 1.16ng

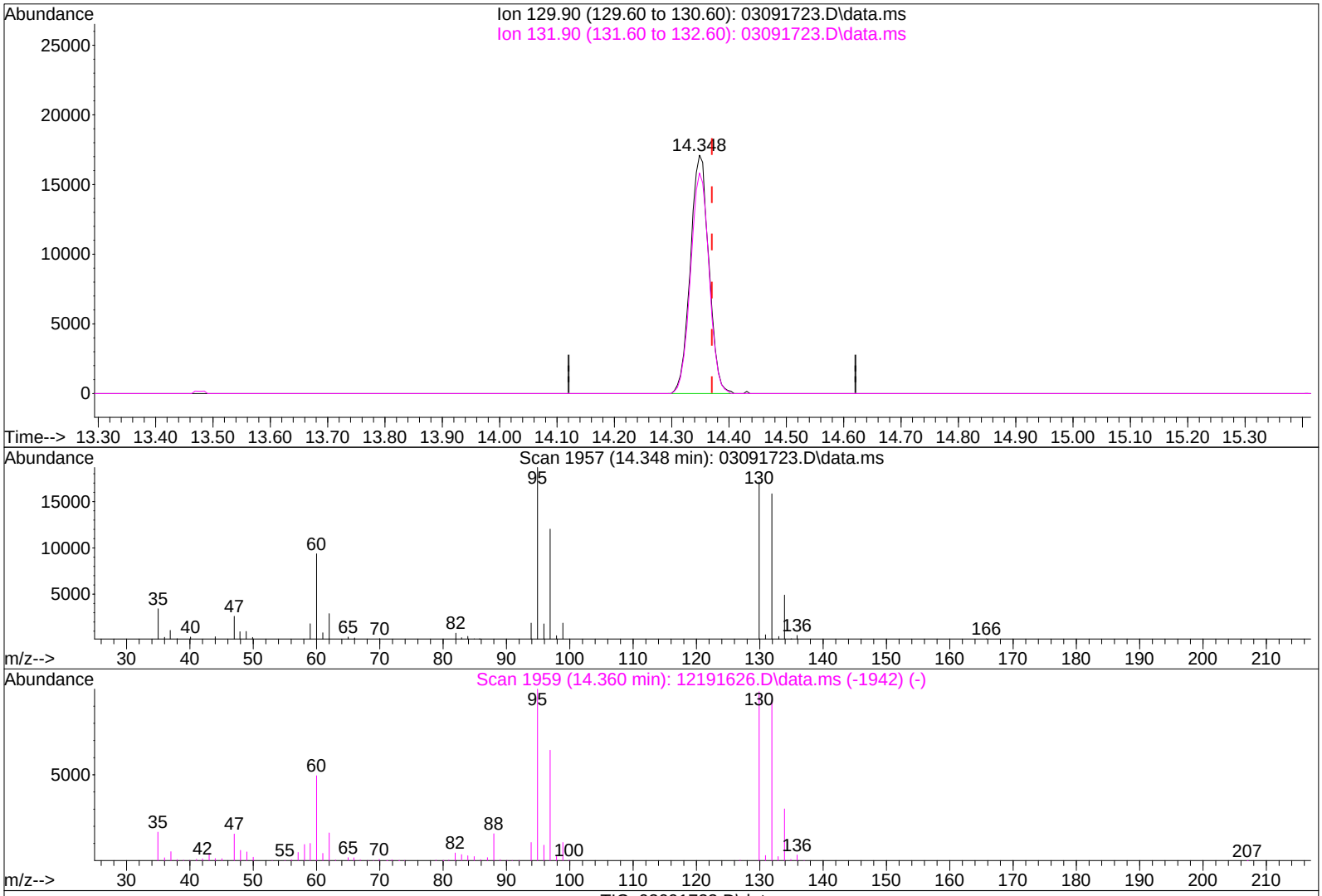
response 74275

Ion	Exp%	Act%
61.00	100	100
95.90	72.00	68.19
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091723.D
Acq On : 9 Mar 2017 19:24 Operator: LH
Sample : P1700971-006dup (35mL)
Misc : S29-03071701
ALS Vial : 11 Sample Multiplier: 1

Quant Time: Mar 10 08:40:05 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 03091723.D\data.ms

(47) Trichloroethene (T)

14.348min (-0.022) 0.76ng

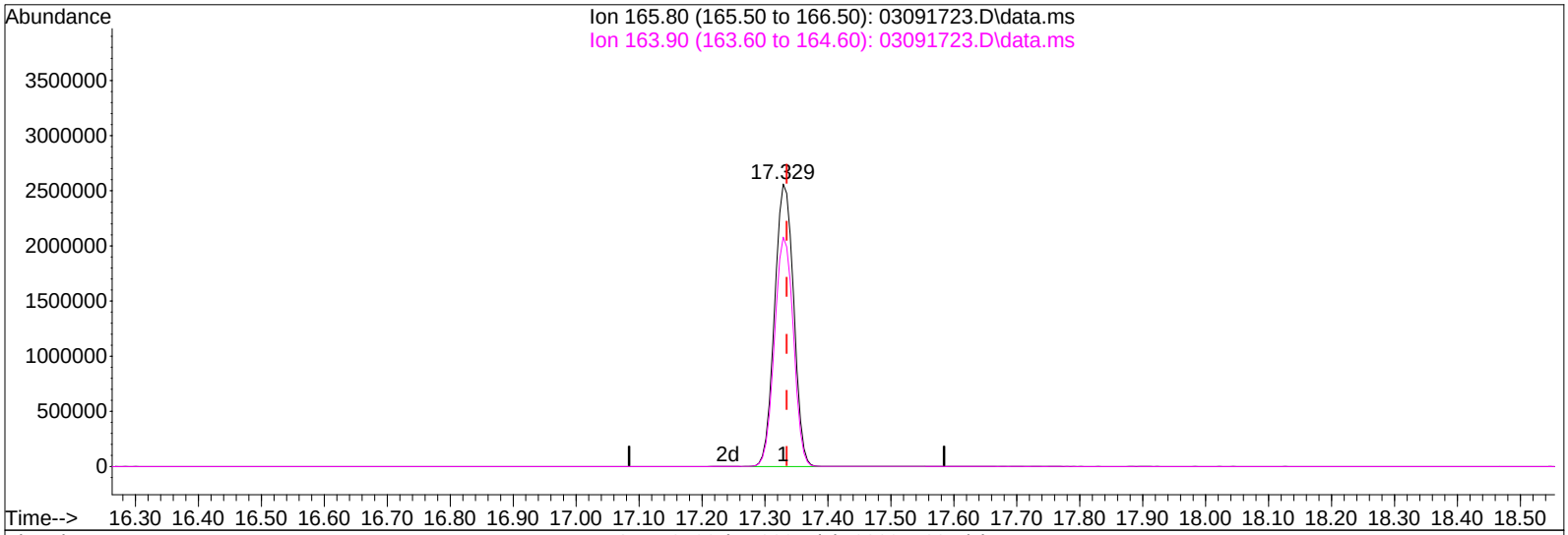
response 38293

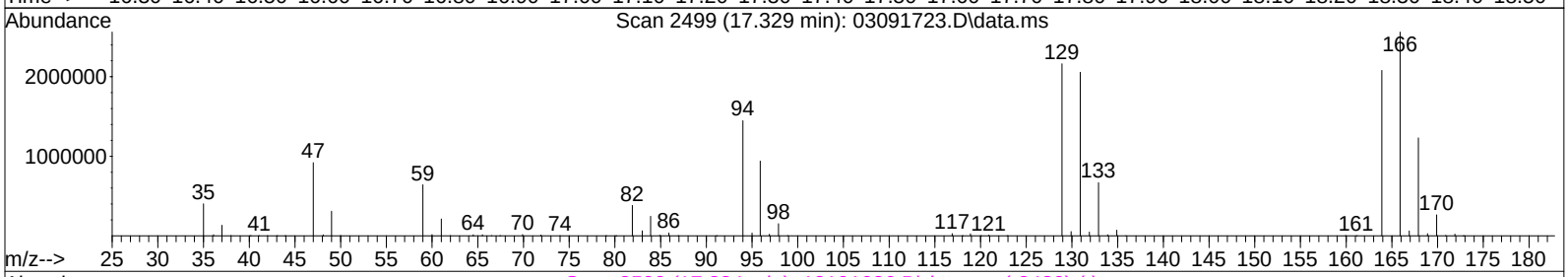
Ion	Exp%	Act%
129.90	100	100
131.90	95.40	92.33
0.00	0.00	0.00
0.00	0.00	0.00

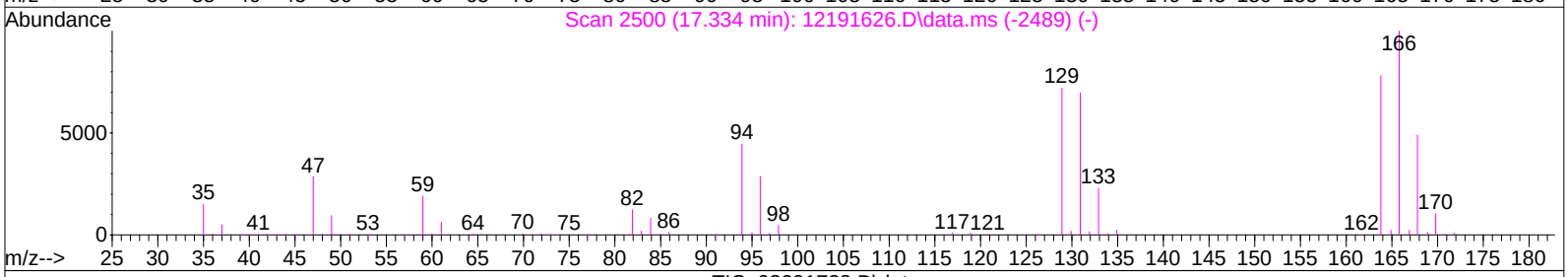
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2017 03\09\03091723.D
Acq On : 9 Mar 2017 19:24 Operator: LH
Sample : P1700971-006dup (35mL)
Misc : S29-03071701
ALS Vial : 11 Sample Multiplier: 1

Quant Time: Mar 10 08:40:05 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 03091723.D\data.ms

(64) Tetrachloroethene (T)

17.329min (-0.006) 97.48ng

response 5404563

Ion	Exp%	Act%
165.80	100	100
163.90	78.50	80.35
0.00	0.00	0.00
0.00	0.00	0.00

Response Factor Report GCMS-16

Method Path : I:\MS16\METHODS\
Method File : R16121916.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue Dec 20 10:31:33 2016
Response Via : Initial Calibration

LH 12/21/16

Calibration Files
0.08=12191620.D 0.10=12191621.D 0.20=12191622.D 0.40=12191623.D 1.0 =12191624.D 5.0 =12191
50 =12191627.D 100 =12191628.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			1.789	1.704	1.575	1.520	1.621	1.686	2.202	1.728	13.12
3)	T	Dichlorodifluo...		3.833	3.235	3.320	3.072	2.817	3.126	2.942	2.916	3.158	10.14
4)	T	Chloromethane		3.246	2.823	2.750	2.593	2.294	2.574	2.389	2.111	2.597	13.55
5)	T	1,2-Dichloro-1...	2.195	2.011	1.833	1.734	1.662	1.541	1.690	1.593	1.534	1.755	12.74
6)	T	Vinyl Chloride	2.678	2.620	2.205	2.494	2.425	2.326	2.586	2.471	2.426	2.470	5.98
7)	T	1,3-Butadiene	1.670	1.706	1.491	1.469	1.740	1.655	1.945	1.907	1.939	1.725	10.37
8)	T	Bromomethane	1.399	1.359	1.243	1.328	1.261	1.211	1.346	1.281	1.337	1.307	4.70
9)	T	Chloroethane	1.078	1.040	1.018	1.028	0.993	0.948	1.081	1.032	1.046	1.029	4.00
10)	T	Ethanol	1.430	1.328	1.150	1.098	1.063	0.981	1.179	1.180	1.231	1.182	11.50
11)	T	Acetonitrile				2.985	2.732	2.442	2.767	2.656	2.664	2.708	6.52
12)	T	Acrolein	1.380	1.286	1.076	1.040	0.953	0.867	0.940	0.902	0.906	1.039	17.43
13)	T	Acetone	1.446	1.354	1.140	1.110	1.051	1.005	1.200	1.176	1.201	1.187	11.75
14)	T	Trichlorofluor...	3.376	3.171	2.763	2.697	2.471	2.362	2.593	2.488	2.471	2.710	12.77
15)	T	2-Propanol (Is...	4.996	4.728	3.968	3.994	3.862	3.506	4.277	3.994	3.160	4.054	13.90
16)	T	Acrylonitrile	2.429	2.238	1.931	1.901	1.845	1.766	2.020	1.946	1.961	2.004	10.26
17)	T	1,1-Dichloroet...	1.465	1.526	1.287	1.336	1.306	1.218	1.403	1.357	1.365	1.363	6.83
18)	T	2-Methyl-2-Pro...	4.972	4.780	4.178	4.055	3.810	3.612	4.356	4.308	4.204	4.253	10.06
19)	T	Methylene Chlo...			1.636	1.552	1.405	1.325	1.491	1.461	1.546	1.488	6.92
20)	T	3-Chloro-1-pro...	2.086	3.150	2.091	2.043	2.009	2.011	2.341	2.269	2.267	2.252	15.92
21)	T	Trichlorotrifl...	1.648	1.567	1.278	1.305	1.213	1.155	1.290	1.248	1.247	1.328	12.50
22)	T	Carbon Disulfide				5.713	5.316	4.812	5.401	5.141	5.116	5.250	5.80
23)	T	trans-1,2-Dich...	2.600	2.416	2.105	2.124	2.019	1.954	2.243	2.171	2.209	2.205	9.03
24)	T	1,1-Dichloroet...	3.165	3.064	2.805	2.832	2.577	2.444	2.736	2.615	2.625	2.763	8.46
25)	T	Methyl tert-Bu...	5.973	5.560	4.772	4.774	4.324	4.093	4.617	4.447	4.512	4.786	12.63
26)	T	Vinyl Acetate				0.291	0.282	0.306	0.404	0.415	0.385	0.347	17.42
27)	T	2-Butanone (MEK)	1.174	1.066	0.965	0.980	0.961	0.915	1.044	1.038	1.079	1.025	7.64
28)	T	cis-1,2-Dichlo...	2.563	2.424	2.073	2.070	2.007	1.927	2.201	2.123	2.157	2.172	9.32
29)	T	Diisopropyl Ether	1.823	1.738	1.429	1.219	1.102	1.082	1.329	1.340	1.321	1.376	18.64
30)	T	Ethyl Acetate	0.604	0.608	0.516	0.524	0.524	0.517	0.641	0.666	0.655	0.584	10.87
31)	T	n-Hexane	3.121	2.945	2.513	2.608	2.277	2.238	2.650	2.729	2.760	2.649	10.81
32)	T	Chloroform	3.306	3.168	2.774	2.754	2.550	2.408	2.691	2.588	2.542	2.753	10.85
33)	S	1,2-Dichloroet...	1.792	1.799	1.802	1.823	1.811	1.790	1.775	1.795	1.773	1.796	0.88
34)	T	Tetrahydrofura...	1.404	1.191	0.982	0.979	0.949	0.885	1.001	0.979	1.012	1.042	15.21
35)	T	Ethyl tert-But...	2.092	2.052	1.787	1.756	1.640	1.566	1.814	1.784	1.864	1.817	9.41
36)	T	1,2-Dichloroet...	2.780	2.549	2.219	2.212	2.073	1.963	2.219	2.148	2.139	2.256	11.18
37)	IR	1,4-Difluorobenzen...	----------ISTD----------										
38)	T	1,1,1-Trichlor...	0.573	0.556	0.489	0.475	0.451	0.423	0.487	0.472	0.481	0.490	9.71
39)	T	Isopropyl Acetate	0.231	0.223	0.189	0.193	0.185	0.180	0.222	0.228	0.238	0.210	10.83
40)	T	1-Butanol	0.352	0.319	0.279	0.271	0.293	0.295	0.395	0.400	0.415	0.335	16.74
41)	T	Benzene	1.616	1.536	1.269	1.197	1.134	1.067	1.226	1.217	1.227	1.276	14.18
42)	T	Carbon Tetrach...	0.479	0.461	0.399	0.407	0.394	0.375	0.440	0.426	0.434	0.424	7.89
43)	T	Cyclohexane	0.561	0.515	0.460	0.441	0.428	0.404	0.495	0.490	0.477	0.474	10.04
44)	T	tert-Amyl Meth...	1.101	1.038	0.894	0.863	0.823	0.784	0.933	0.910	0.940	0.921	10.78
45)	T	1,2-Dichloropr...	0.389	0.361	0.311	0.304	0.286	0.270	0.313	0.305	0.317	0.317	11.47
46)	T	Bromodichlorom...	0.493	0.477	0.425	0.416	0.393	0.386	0.463	0.460	0.472	0.443	8.71
47)	T	Trichloroethene	0.418	0.384	0.325	0.312	0.302	0.280	0.334	0.331	0.333	0.336	12.49
48)	T	1,4-Dioxane	0.283	0.267	0.231	0.223	0.236	0.224	0.273	0.275	0.290	0.256	10.54
49)	T	2,2,4-Trimethy...	1.639	1.552	1.336	1.317	1.218	1.142	1.338	1.289	1.270	1.345	11.64
50)	T	Methyl Methacr...	0.136	0.127	0.116	0.113	0.115	0.110	0.135	0.135	0.137	0.125	8.99
51)	T	n-Heptane	0.366	0.347	0.296	0.295	0.276	0.261	0.303	0.302	0.325	0.308	10.77
52)	T	cis-1,3-Dichlo...	0.578	0.527	0.459	0.455	0.458	0.454	0.557	0.556	0.581	0.514	11.03
53)	T	4-Methyl-2-pen...	0.345	0.315	0.288	0.273	0.277	0.265	0.325	0.324	0.348	0.307	10.26
54)	T	trans-1,3-Dich...	0.501	0.469	0.407	0.400	0.409	0.416	0.509	0.497	0.516	0.458	10.78

55)	T	1,1,2-Trichlor...	0.347	0.320	0.284	0.283	0.276	0.261	0.304	0.294	0.304	0.297	8.68
56)	IR	Chlorobenzene-d5 (...	----------ISTD----------										
57)	S	Toluene-d8 (SS2)	2.461	2.457	2.420	2.443	2.397	2.387	2.363	2.347	2.308	2.398	2.19
58)	T	Toluene	3.801	3.443	2.892	2.898	2.631	2.490	2.845	2.749	2.608	2.928	14.55
59)	T	2-Hexanone	2.305	1.961	1.678	1.583	1.647	1.617	1.861	1.791	1.790	1.804	12.46
60)	T	Dibromochlorom...	0.926	0.872	0.750	0.733	0.727	0.730	0.857	0.831	0.831	0.806	9.11
61)	T	1,2-Dibromoethane	0.946	0.854	0.747	0.742	0.732	0.714	0.813	0.777	0.770	0.788	9.28
62)	T	n-Butyl Acetate	2.301	2.112	1.794	1.732	1.806	1.775	2.051	1.966	1.938	1.942	9.68
63)	T	n-Octane			0.720	0.665	0.597	0.553	0.644	0.646	0.680	0.643	8.52
64)	T	Tetrachloroethene	0.965	0.927	0.784	0.768	0.714	0.682	0.786	0.763	0.752	0.794	11.73
65)	T	Chlorobenzene	2.384	2.255	1.863	1.847	1.754	1.644	1.933	1.876	1.813	1.930	12.32
66)	T	Ethylbenzene	4.013	3.789	3.199	3.156	3.086	2.901	3.409	3.295	2.797	3.294	11.99
67)	T	m- & p-Xylenes	3.255	2.878	2.446	2.422	2.364	2.246	2.747	2.648	2.058	2.563	14.12
68)	T	Bromoform	0.721	0.647	0.575	0.584	0.591	0.607	0.746	0.725	0.708	0.656	10.55
69)	T	Styrene	2.366	2.176	1.824	1.797	1.823	1.796	2.127	2.065	1.924	1.989	10.29
70)	T	o-Xylene	3.301	2.974	2.472	2.489	2.396	2.305	2.794	2.717	2.283	2.637	12.91
71)	T	n-Nonane	1.997	1.805	1.581	1.489	1.432	1.342	1.586	1.565	1.494	1.588	12.56
72)	T	1,1,2,2-Tetrac...	1.282	1.217	1.111	1.129	1.148	1.156	1.422	1.401	1.258	1.236	9.31
73)	S	Bromofluoroben...	0.764	0.762	0.760	0.768	0.774	0.776	0.776	0.761	0.749	0.766	1.16
74)	T	Cumene	4.124	3.865	3.201	3.128	3.021	2.875	3.412	3.262	2.640	3.281	14.22
75)	T	alpha-Pinene	1.993	1.853	1.629	1.613	1.550	1.502	1.837	1.823	1.698	1.722	9.48
76)	T	n-Propylbenzene	4.866	4.366	3.708	3.741	3.683	3.550	4.166	3.887	2.829	3.866	14.71
77)	T	3-Ethyltoluene	4.254	3.850	3.256	2.952	2.936	2.838	3.629	3.373	2.816	3.323	15.14
78)	T	4-Ethyltoluene	3.346	3.103	2.653	2.937	2.915	2.783	3.154	3.067	2.273	2.915	10.85
79)	T	1,3,5-Trimethy...	3.366	3.220	2.535	2.541	2.427	2.381	2.871	2.766	2.284	2.710	13.98
80)	T	alpha-Methylst...	1.395	1.264	1.168	1.214	1.285	1.298	1.595	1.544	1.375	1.349	10.69
81)	T	2-Ethyltoluene	3.661	3.470	3.176	2.901	2.892	2.809	3.383	3.187	2.527	3.112	11.59
82)	T	1,2,4-Trimethy...	2.944	2.744	2.597	2.561	2.495	2.473	3.236	2.883	2.107	2.671	12.20
83)	T	n-Decane	1.871	1.690	1.381	1.392	1.387	1.356	1.654	1.658	1.504	1.544	11.77
84)	T	Benzyl Chloride				1.166	1.842	2.140	2.818	2.798	2.272	2.173	28.68
85)	T	1,3-Dichlorobe...	1.047	1.083	1.185	1.284	1.406	1.389	1.708	1.615	1.356	1.341	16.63
86)	T	1,4-Dichlorobe...	2.030	2.067	1.348	1.386	1.399	1.406	1.673	1.611	1.406	1.592	17.67
87)	T	sec-Butylbenzene	4.046	3.828	3.459	3.408	3.329	3.208	3.793	3.501	2.619	3.465	12.00
88)	T	4-Isopropyltol...	4.215	3.795	3.231	3.124	3.091	3.054	3.834	3.260	2.283	3.321	16.97
89)	T	1,2,3-Trimethy...	4.094	3.109	2.593	2.601	2.539	2.499	3.240	2.886	2.081	2.849	20.41
90)	T	1,2-Dichlorobe...	1.855	1.685	1.403	1.345	1.386	1.364	1.713	1.552	1.200	1.500	14.20
91)	T	d-Limonene	1.240	1.161	1.013	1.037	1.045	1.060	1.355	1.359	1.034	1.145	12.27
92)	T	1,2-Dibromo-3-...				0.368	0.432	0.479	0.585	0.575	0.558	0.499	17.59
93)	T	n-Undecane	2.115	1.749	1.454	1.398	1.412	1.407	1.727	1.763	1.583	1.623	14.78
94)	T	1,2,4-Trichlor...	0.918	0.778	0.705	0.755	0.913	1.010	1.229	1.220	1.147	0.964	20.78
95)	T	Naphthalene				2.016	2.514	3.048	3.696	3.539	2.754	2.928	21.65
96)	T	n-Dodecane	1.816	1.497	1.118	1.065	1.353	1.376	1.599	1.649	1.573	1.449	17.02
97)	T	Hexachlorobuta...	0.731	0.682	0.587	0.590	0.600	0.616	0.764	0.764	0.728	0.674	11.28
98)	T	Cyclohexanone	1.459	1.213	0.989	0.966	1.006	0.965	1.142	1.100	1.129	1.108	14.30
99)	T	tert-Butylbenzene	3.101	3.169	2.550	2.496	2.422	2.360	2.992	2.598	1.932	2.624	15.19
100)	T	n-Butylbenzene	3.139	2.906	2.583	2.658	2.776	2.685	3.188	3.033	2.364	2.815	9.73

(#) = Out of Range

R16121916.M Wed Dec 21 14:52:14 2016

LH 12/21/16

Primary Source Standards Concentrations (Working & Initial Calibration)

1ng/L Std. ID:
4ng/L Std. ID: S29-12191607
20ng/L Std. ID: S29-12191605
200ng/L Std. ID: S29-12191603

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
Propene	1.036	207.2	20.72	4.144	1.036		0.08288	0.1036	0.2072	0.4144	1.036	5.180	25.900	51.80	103.6
Dichlorodifluoromethane	1.047	209.4	20.94	4.188	1.047		0.08376	0.1047	0.2094	0.4188	1.047	5.235	26.175	52.35	104.7
Chloromethane	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
Freon-114	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
Vinyl Chloride	1.023	204.6	20.46	4.092	1.023		0.08184	0.1023	0.2046	0.4092	1.023	5.115	25.575	51.15	102.3
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
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	1.009	201.8	20.18	4.036	1.009		0.08072	0.1009	0.2018	0.4036	1.009	5.045	25.225	50.45	100.9
Ethanol	5.207	1041.4	104.14	20.828	5.207		0.41656	0.5207	1.0414	2.0828	5.207	26.035	130.175	260.35	520.7
Acetonitrile	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
Acrolein	1.041	208.2	20.82	4.164	1.041		0.08328	0.1041	0.2082	0.4164	1.041	5.205	26.025	52.05	104.1
Acetone	5.313	1062.6	106.26	21.252	5.313		0.42504	0.5313	1.0626	2.1252	5.313	26.565	132.825	265.65	531.3
Trichlorofluoromethane	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
Isopropanol	2.105	421.0	42.10	8.420	2.105		0.16840	0.2105	0.4210	0.8420	2.105	10.525	52.625	105.25	210.5
Acrylonitrile	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-Dichloroethene	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
tert-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
Methylene Chloride	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
Allyl Chloride	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
Trichlorotrifluoroethane	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
Carbon Disulfide	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
trans-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
1,1-Dichloroethane	1.020	204.0	20.40	4.080	1.020		0.08160	0.1020	0.2040	0.4080	1.020	5.100	25.500	51.00	102.0
Methyl tert-Butyl Ether	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
Vinyl Acetate	5.265	1053.0	105.30	21.060	5.265		0.42120	0.5265	1.0530	2.1060	5.265	26.325	131.625	263.25	526.5
2-Butanone	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
cis-1,2-Dichloroethene	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
Diisopropyl Ether	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
Ethyl Acetate	2.129	425.8	42.58	8.516	2.129		0.17032	0.2129	0.4258	0.8516	2.129	10.645	53.225	106.45	212.9
n-Hexane	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
Chloroform	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
Tetrahydrofuran	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
Ethyl tert-Butyl 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-Dichloroethane	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
1,1,1-Trichloroethane	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
Isopropyl Acetate	2.104	420.8	42.08	8.416	2.104		0.16832	0.2104	0.4208	0.8416	2.104	10.520	52.600	105.20	210.4
1-Butanol	2.105	421.0	42.10	8.420	2.105		0.16840	0.2105	0.4210	0.8420	2.105	10.525	52.625	105.25	210.5
Benzene	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
Carbon Tetrachloride	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
Cyclohexane	2.130	426.0	42.60	8.520	2.130		0.17040	0.2130	0.4260	0.8520	2.130	10.650	53.250	106.50	213.0
tert-Amyl Methyl Ether	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
1,2-Dichloropropane	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
Bromodichloromethane	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
Trichloroethene	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
1,4-Dioxane	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
Isooctane	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
Methyl Methacrylate	2.110	422.0	42.20	8.440	2.110		0.16880	0.2110	0.4220	0.8440	2.110	10.550	52.750	105.50	211.0
n-Heptane	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
cis-1,3-Dichloropropene	1.116	223.2	22.32	4.464	1.116		0.08928	0.1116	0.2232	0.4464	1.116	5.580	27.900	55.80	111.6
4-Methyl-2-pentanone	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
trans-1,3-Dichloropropene	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
1,1,2-Trichloroethane	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
Toluene	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
2-Hexanone	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

Primary Source Standards Concentrations (Working & Initial Calibration)

1ng/L Std. ID:
4ng/L Std. ID: S29-12191607
20ng/L Std. ID: S29-12191605
200ng/L Std. ID: S29-12191603

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
Dibromochloromethane	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
1,2-Dibromoethane	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-Butyl Acetate	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-Octane	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
Tetrachloroethene	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
Chlorobenzene	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
Ethylbenzene	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
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	1.061	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
o-Xylene	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
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	1.056	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
Cumene	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
alpha-Pinene	1.044	208.8	20.88	4.176	1.044		0.08352	0.1044	0.2088	0.4176	1.044	5.220	26.100	52.20	104.4
n-Propylbenzene	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
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	1.050	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
2-Ethyltoluene	1.062	212.4	21.24	4.248	1.062		0.08496	0.1062	0.2124	0.4248	1.062	5.310	26.550	53.10	106.2
1,2,4-Trimethylbenzene	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
n-Decane	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
Benzyl Chloride	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
1,3-Dichlorobenzene	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
1,4-Dichlorobenzene	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
sec-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
p-Isopropyltoluene	1.027	205.4	20.54	4.108	1.027		0.08216	0.1027	0.2054	0.4108	1.027	5.135	25.675	51.35	102.7
1,2,3-Trimethylbenzene	1.027	205.4	20.54	4.108	1.027		0.08216	0.1027	0.2054	0.4108	1.027	5.135	25.675	51.35	102.7
1,2-Dichlorobenzene	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
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	1.053	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
n-Undecane	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
1,2,4-Trichlorobenzene	1.043	208.6	20.86	4.172	1.043		0.08344	0.1043	0.2086	0.4172	1.043	5.215	26.075	52.15	104.3
Naphthalene	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
n-Dodecane	1.045	209.0	20.90	4.180	1.045		0.08360	0.1045	0.2090	0.4180	1.045	5.225	26.125	52.25	104.5
Hexachloro-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
Methacrylonitrile	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
Cyclohexanone	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
tert-Butylbenzene	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-Butylbenzene	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

Calibration Status Report GCMS-16

Method : I:\MS16\METHODS\R16121916.M (RTE Integrator)
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration

#	ID	Conc	ISTD Conc	Path\File
1	0.08	0	13	I:\MS16\DATA\2016_12\19\12191620.D
2	0.10	0	13	I:\MS16\DATA\2016_12\19\12191621.D
3	0.20	0	13	I:\MS16\DATA\2016_12\19\12191622.D
4	0.40	0	13	I:\MS16\DATA\2016_12\19\12191623.D
5	1.0	1	13	I:\MS16\DATA\2016_12\19\12191624.D
6	5.0	5	13	I:\MS16\DATA\2016_12\19\12191625.D
7	25	26	13	I:\MS16\DATA\2016_12\19\12191626.D
8	50	52	13	I:\MS16\DATA\2016_12\19\12191627.D
9	100	104	13	I:\MS16\DATA\2016_12\19\12191628.D

#	ID	Update Time	Quant Time	Acquisition Time
1	0.08	Dec 20 10:30 2016	Dec 20 09:09 2016	19 Dec 2016 23:59
2	0.10	Dec 20 10:30 2016	Dec 20 09:39 2016	20 Dec 2016 00:33
3	0.20	Dec 20 10:30 2016	Dec 20 09:45 2016	20 Dec 2016 1:06
4	0.40	Dec 20 10:30 2016	Dec 20 09:52 2016	20 Dec 2016 1:39
5	1.0	Dec 20 10:30 2016	Dec 20 09:54 2016	20 Dec 2016 2:13
6	5.0	Dec 20 10:31 2016	Dec 20 08:57 2016	20 Dec 2016 2:46
7	25	Dec 20 10:31 2016	Dec 20 08:57 2016	20 Dec 2016 3:19
8	50	Dec 20 10:31 2016	Dec 20 08:57 2016	20 Dec 2016 3:52
9	100	Dec 20 10:31 2016	Dec 20 08:57 2016	20 Dec 2016 4:25

R16121916.M Wed Dec 21 14:53:49 2016

LH 12/21/16

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191621.D
Acq On : 20 Dec 2016 00:33 Operator: LH
Sample : 0.1ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 09:39:14 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	282571	12.500	ng		-0.01
37) 1,4-Difluorobenzene (IS2)	13.65	114	1423235	12.500	ng		-0.01
56) Chlorobenzene-d5 (IS3)	17.93	82	599403	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.40	65	508455	13.755	ng		-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 110.00%				
57) Toluene-d8 (SS2)	16.10	98	1472932	12.900	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 103.20%				
73) Bromofluorobenzene (SS3)	19.28	174	456549	12.454	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.60%				
Target Compounds							Qvalue
2) Propene	4.25	42	5006	0.137	ng		90
3) Dichlorodifluoromethan...	4.41	85	9073	0.153	ng	#	97
4) Chloromethane	4.75	50	7374	0.153	ng		96
5) 1,2-Dichloro-1,1,2,2-t...	4.98	135	4568	0.147	ng		95
6) Vinyl Chloride	5.22	62	6060	0.126	ng		91
7) 1,3-Butadiene	5.50	54	4077	0.130	ng		97
8) Bromomethane	5.96	94	3051	0.111	ng		99
9) Chloroethane	6.30	64	2373	0.105	ng		96
10) Ethanol	6.72	45	15628	0.627	ng		96
11) Acetonitrile	7.11	41	9093m	0.143	ng		
12) Acrolein	7.28	56	3027m	0.126	ng		
13) Acetone	7.38	58	16263	0.673	ng	#	83
14) Trichlorofluoromethane	7.60	101	7520	0.146	ng		99
15) 2-Propanol (Isopropanol)	7.91	45	22499	0.271	ng		79
16) Acrylonitrile	8.26	53	5338	0.123	ng		95
17) 1,1-Dichloroethene	8.61	96	3653	0.135	ng		87
18) 2-Methyl-2-Propanol (t...	8.82	59	22844	0.285	ng		89
19) Methylene Chloride	8.82	84	4843	0.150	ng		94
20) 3-Chloro-1-propene (Al...	8.99	41	7490	0.152	ng		74
21) Trichlorotrifluoroethane	9.22	151	3717	0.144	ng		98
22) Carbon Disulfide	9.14	76	18060	0.163	ng		95
23) trans-1,2-Dichloroethene	10.11	61	5828	0.130	ng		95
24) 1,1-Dichloroethane	10.35	63	7064	0.124	ng		96
25) Methyl tert-Butyl Ether	10.46	73	13398	0.146	ng		98
26) Vinyl Acetate	10.63	86	3164	0.467	ng	#	45
27) 2-Butanone (MEK)	10.89	72	2527	0.117	ng	#	53
28) cis-1,2-Dichloroethene	11.37	61	5831	0.133	ng		98
29) Diisopropyl Ether	11.65	87	4172	0.154	ng	#	66
30) Ethyl Acetate	11.69	61	2924	0.253	ng		99
31) n-Hexane	11.64	57	7076	0.135	ng		98
32) Chloroform	11.71	83	7577	0.141	ng		98
34) Tetrahydrofuran (THF)	12.15	72	2860	0.129	ng	#	77
35) Ethyl tert-Butyl Ether	12.24	87	4904	0.140	ng		100
36) 1,2-Dichloroethane	12.51	62	6062	0.149	ng		97
38) 1,1,1-Trichloroethane	12.79	97	6805	0.146	ng		99
39) Isopropyl Acetate	13.21	61	5334	0.251	ng		95
40) 1-Butanol	13.27	56	7650	0.230	ng		82
41) Benzene	13.27	78	18395	0.133	ng		99
42) Carbon Tetrachloride	13.42	117	5541	0.139	ng		97
43) Cyclohexane	13.56	84	12479	0.268	ng		98
44) tert-Amyl Methyl Ether	13.89	73	12456	0.138	ng		93
45) 1,2-Dichloropropane	14.12	63	4370	0.129	ng		96
46) Bromodichloromethane	14.32	83	5787	0.140	ng		98
47) Trichloroethene	14.36	130	4636	0.145	ng		99
48) 1,4-Dioxane	14.36	88	3232	0.120	ng	#	65
49) 2,2,4-Trimethylpentane...	14.41	57	18708	0.133	ng		96

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191621.D
Acq On : 20 Dec 2016 00:33 Operator: LH
Sample : 0.1ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 09:39:14 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

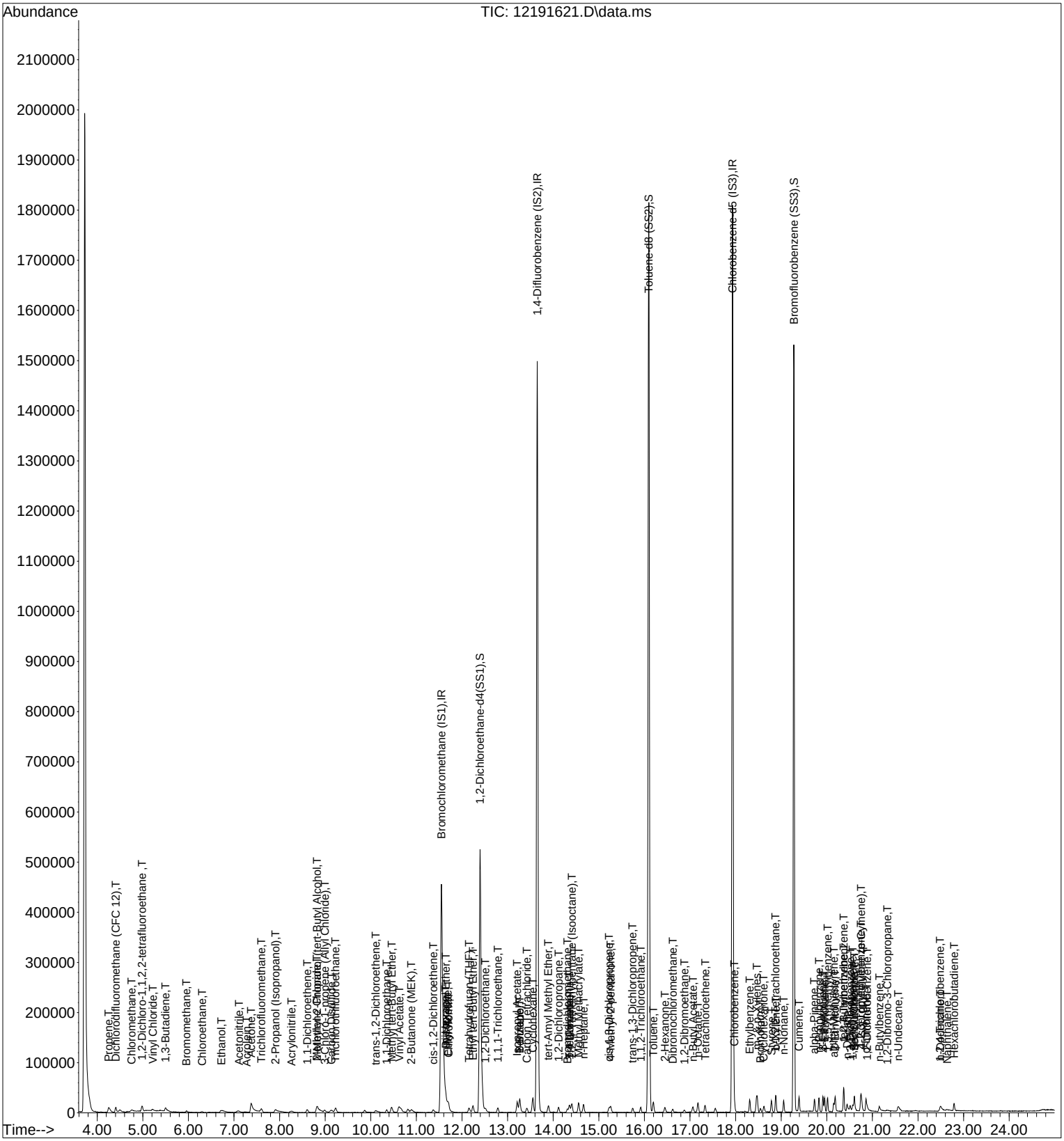
Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
50) Methyl Methacrylate	14.56	100	3052	0.254 ng		97
51) n-Heptane	14.67	71	4193	0.133 ng		96
52) cis-1,3-Dichloropropene	15.23	75	6699	0.134 ng		98
53) 4-Methyl-2-pentanone	15.26	58	3794	0.123 ng		81
54) trans-1,3-Dichloropropene	15.74	75	5676	0.128 ng		98
55) 1,1,2-Trichloroethane	15.92	97	3867	0.130 ng		98
58) Toluene	16.20	91	17383	0.147 ng		99
59) 2-Hexanone	16.45	43	9978	0.132 ng		90
60) Dibromochloromethane	16.63	129	4442	0.137 ng		100
61) 1,2-Dibromoethane	16.88	107	4326	0.130 ng		100
62) n-Butyl Acetate	17.06	43	10776	0.125 ng		94
63) n-Octane	17.17	57	4789	0.170 ng	#	78
64) Tetrachloroethene	17.33	166	4716	0.143 ng		99
65) Chlorobenzene	17.97	112	11472	0.142 ng		96
66) Ethylbenzene	18.31	91	19166	0.135 ng		98
67) m- & p-Xylenes	18.47	91	29295	0.273 ng		98
68) Bromoform	18.54	173	3299	0.127 ng		99
69) Styrene	18.79	104	11071	0.134 ng		99
70) o-Xylene	18.89	91	15032	0.139 ng		98
71) n-Nonane	19.06	43	9123	0.135 ng		95
72) 1,1,2,2-Tetrachloroethane	18.87	83	6162	0.119 ng		100
74) Cumene	19.39	105	19458	0.151 ng		99
75) alpha-Pinene	19.73	93	9278	0.132 ng		97
76) n-Propylbenzene	19.83	91	22255	0.137 ng		98
77) 3-Ethyltoluene	19.91	105	19387	0.141 ng		98
78) 4-Ethyltoluene	19.95	105	15607	0.128 ng		100
79) 1,3,5-Trimethylbenzene	20.02	105	16196	0.144 ng		96
80) alpha-Methylstyrene	20.16	118	6366	0.119 ng		90
81) 2-Ethyltoluene	20.18	105	17670	0.135 ng		99
82) 1,2,4-Trimethylbenzene	20.37	105	13841	0.125 ng		98
83) n-Decane	20.45	57	8535	0.130 ng		96
84) Benzyl Chloride	20.60	91	9758	0.115 ng	#	55
85) 1,3-Dichlorobenzene	20.52	146	5494	0.094 ng		96
86) 1,4-Dichlorobenzene	20.57	146	10487	0.158 ng		99
87) sec-Butylbenzene	20.61	105	19347	0.135 ng	#	63
88) 4-Isopropyltoluene (p-...	20.75	119	18691	0.141 ng		93
89) 1,2,3-Trimethylbenzene	20.75	105	15310	0.136 ng		99
90) 1,2-Dichlorobenzene	20.89	146	8548	0.144 ng		92
91) d-Limonene	20.86	68	5596	0.128 ng		99
92) 1,2-Dibromo-3-Chloropr...	21.33	157	1622	0.081 ng	#	13
93) n-Undecane	21.57	57	8838	0.130 ng		90
94) 1,2,4-Trichlorobenzene	22.48	180	3893	0.095 ng	#	92
95) Naphthalene	22.64	128	6149	0.055 ng	#	71
96) n-Dodecane	22.49	57	7499m	0.121 ng		
97) Hexachlorobutadiene	22.79	225	3463	0.125 ng		93
98) Cyclohexanone	18.62	55	6140	0.129 ng		94
99) tert-Butylbenzene	20.37	119	15970	0.154 ng		95
100) n-Butylbenzene	21.16	91	14714	0.124 ng	#	90

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191621.D
Acq On : 20 Dec 2016 00:33 Operator: LH
Sample : 0.1ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

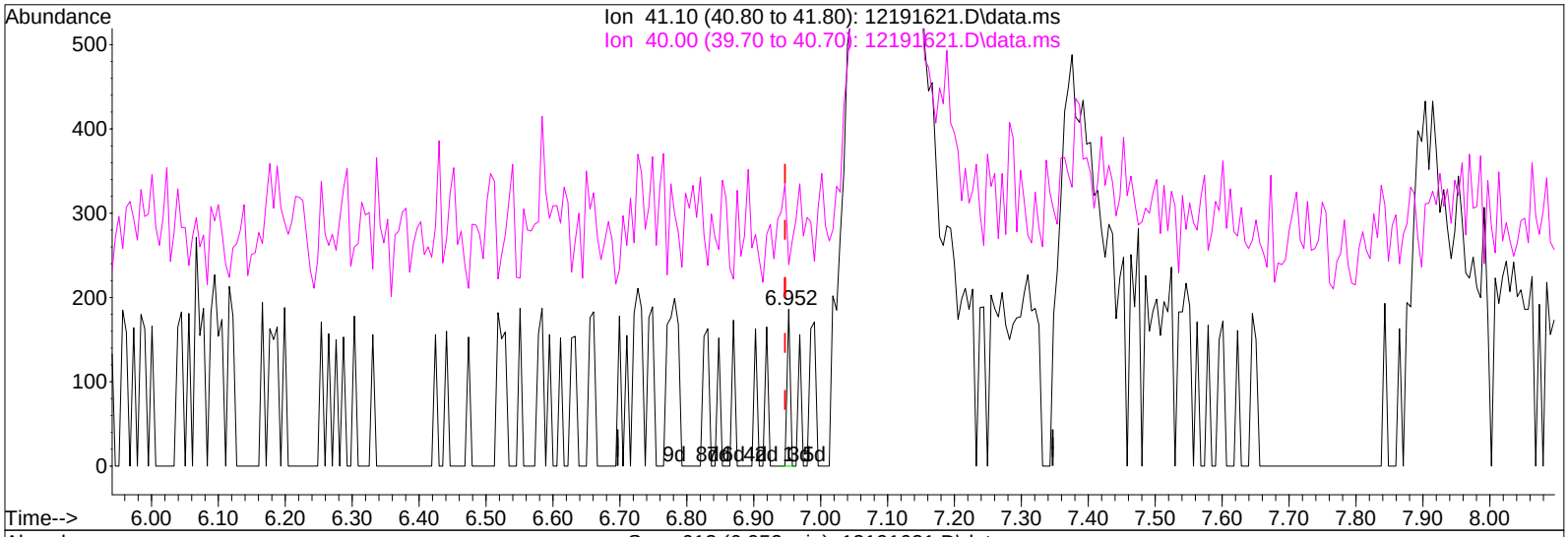
Quant Time: Dec 20 09:39:14 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

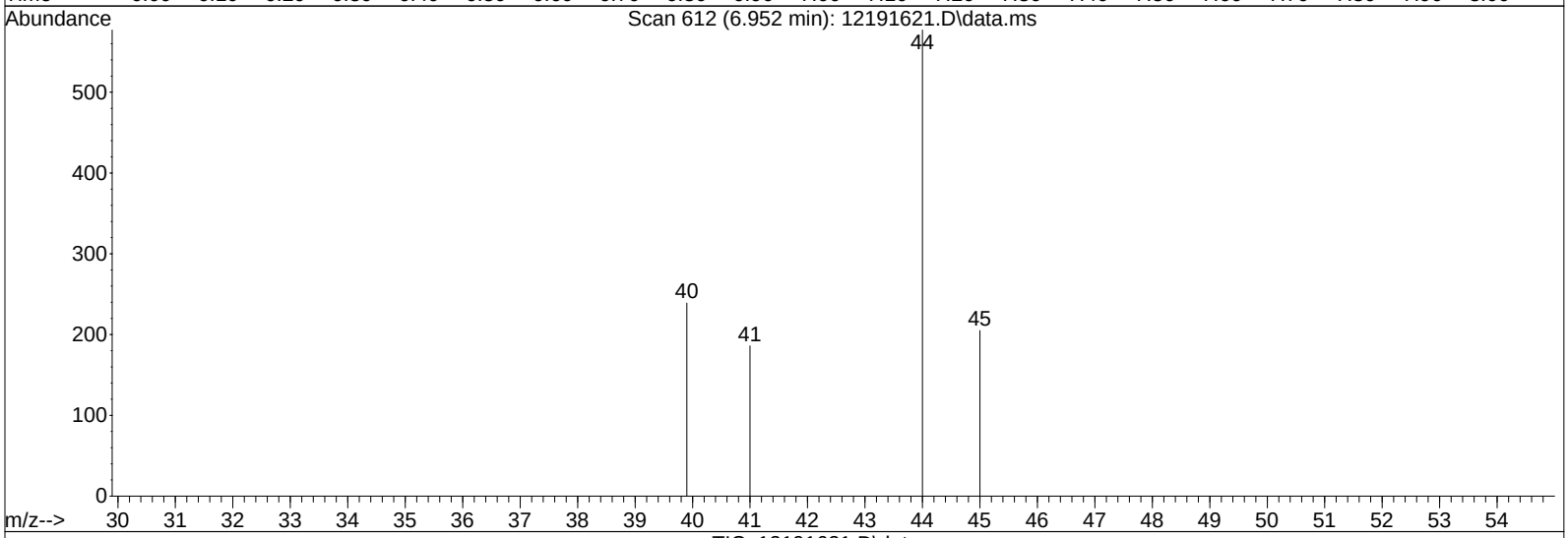


Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191621.D
Acq On : 20 Dec 2016 00:33 Operator: LH
Sample : 0.1ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:33 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





(11) Acetonitrile (T)

6.952min (+0.005) 0.00ng

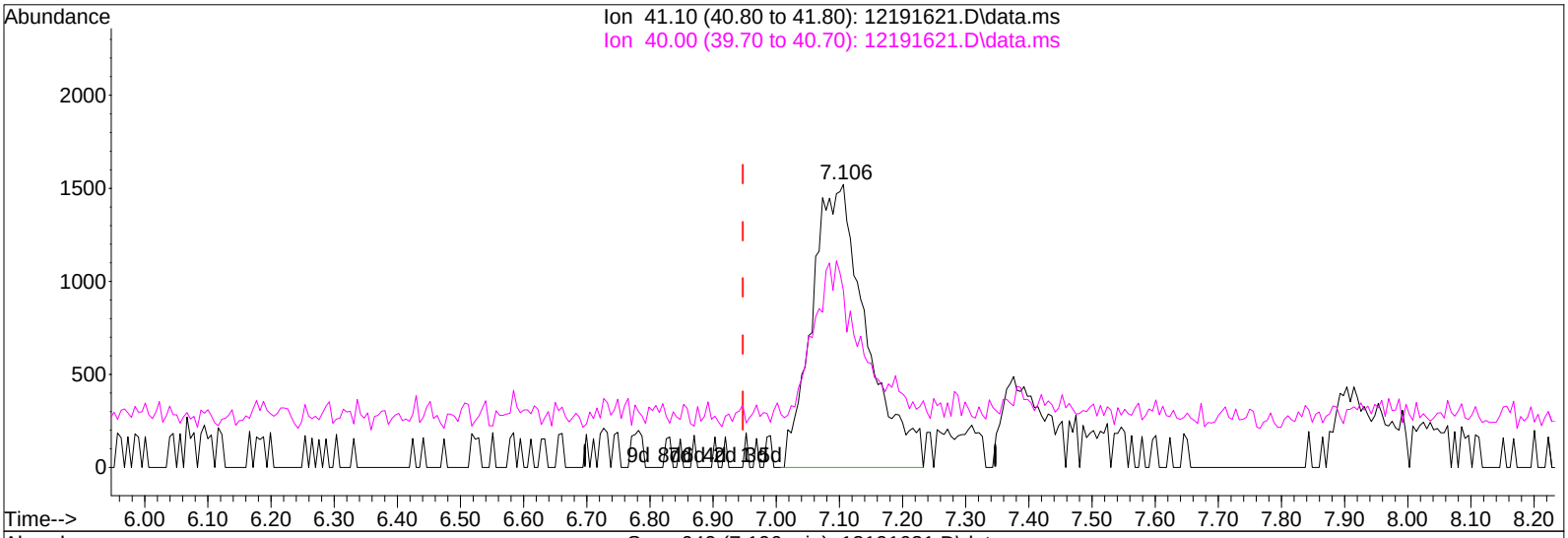
response 61

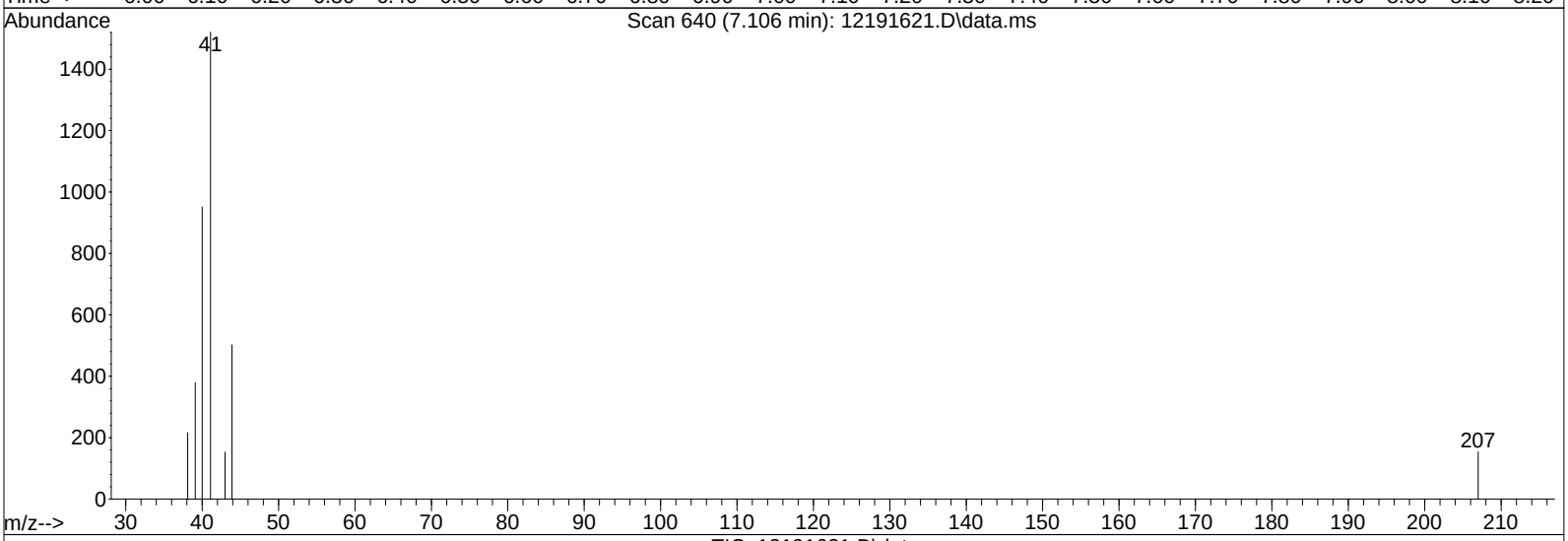
Ion	Exp%	Act%
41.10	100	100
40.00	54.30	122.95#
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191621.D
Acq On : 20 Dec 2016 00:33 Operator: LH
Sample : 0.1ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:33 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191621.D\data.ms

(11) Acetonitrile (T)

7.106min (+0.159) 0.14ng m

response 9093

Ion	Exp%	Act%
41.10	100	100
40.00	54.30	0.82#
0.00	0.00	0.00
0.00	0.00	0.00

IPC

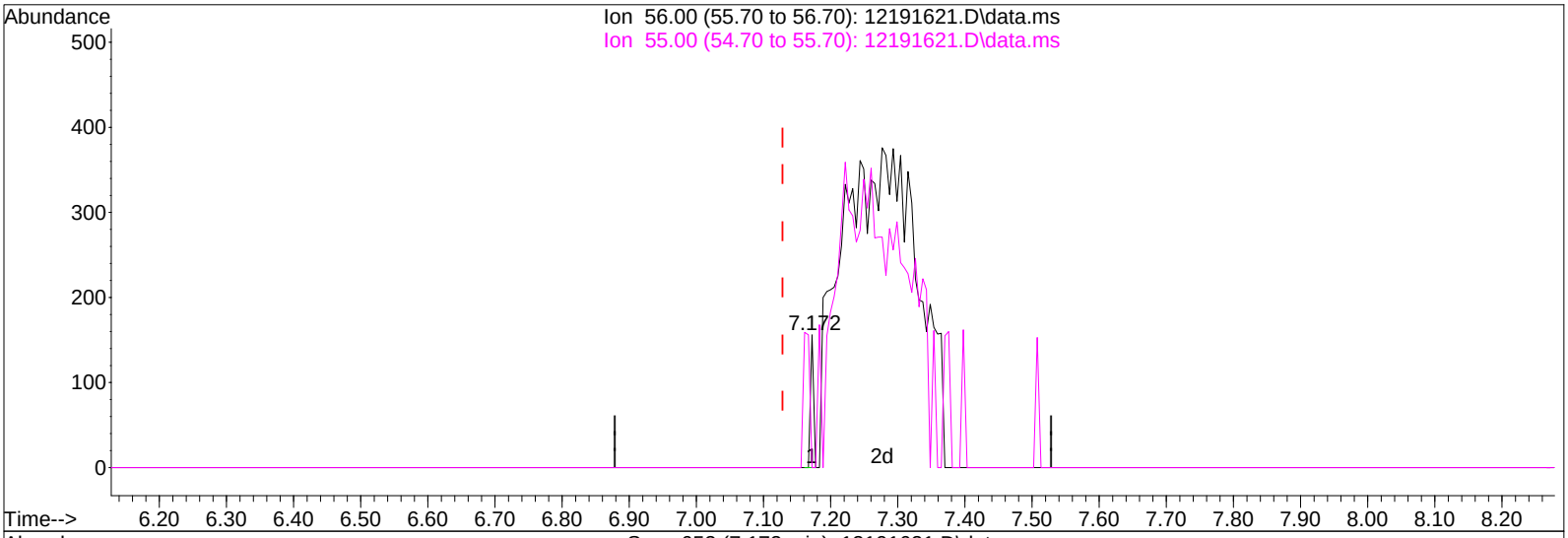
LH 12/20/16

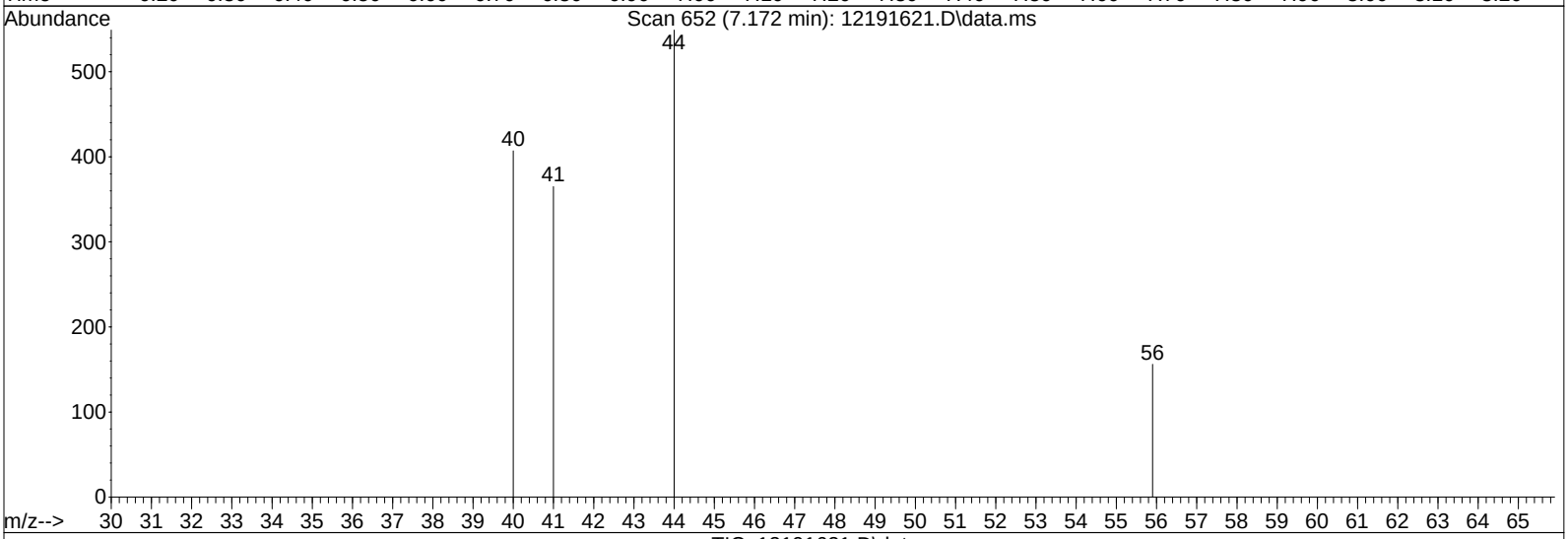
12/30/16

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191621.D
Acq On : 20 Dec 2016 00:33 Operator: LH
Sample : 0.1ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:33 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191621.D\data.ms

(12) Acrolein (T)

7.172min (+0.044) 0.00ng

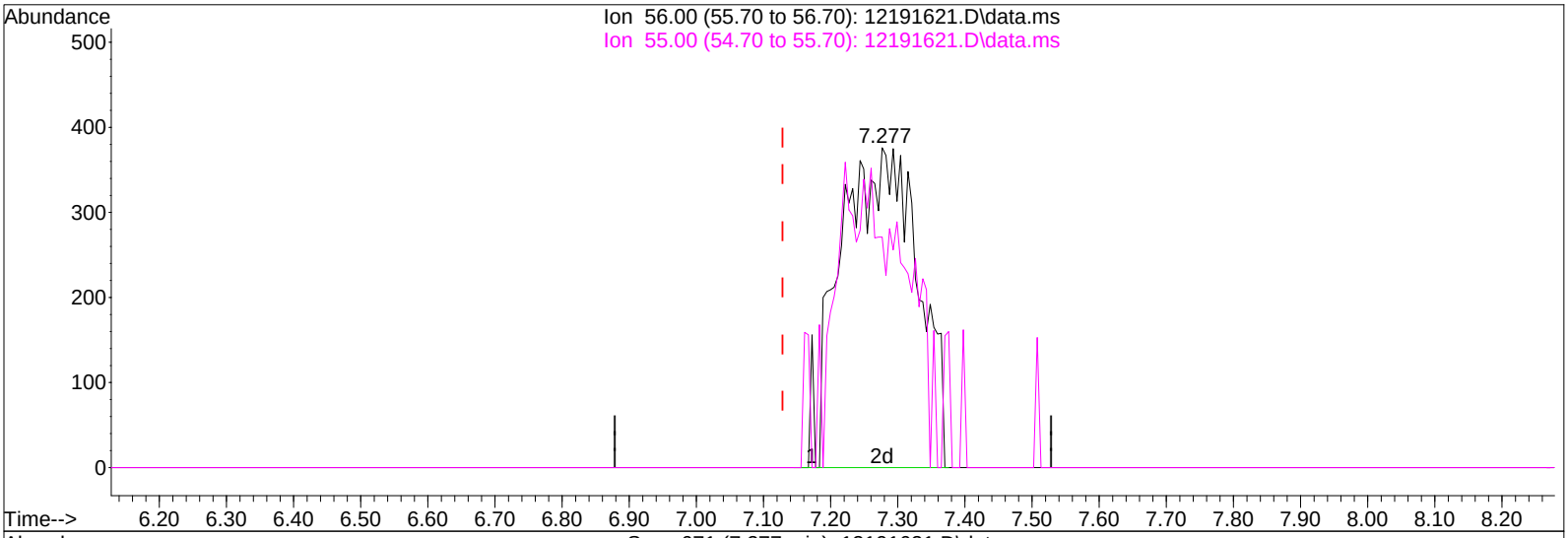
response 51

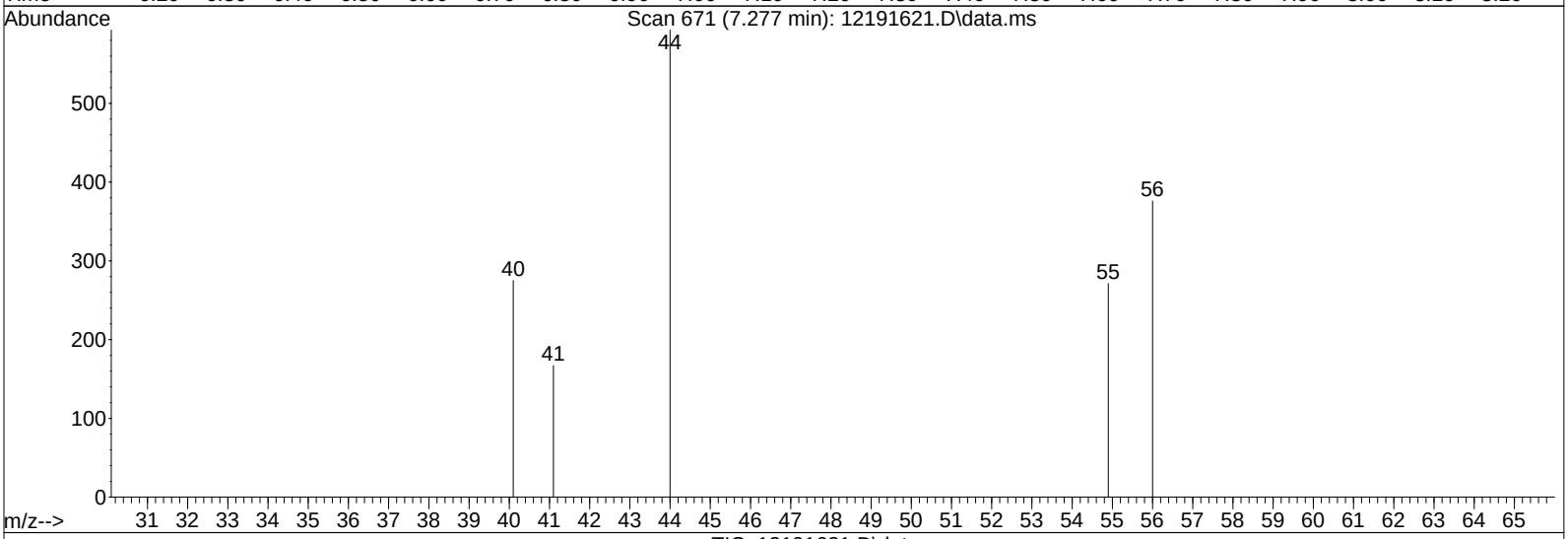
Ion	Exp%	Act%
56.00	100	100
55.00	76.80	203.92#
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191621.D
Acq On : 20 Dec 2016 00:33 Operator: LH
Sample : 0.1ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:33 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191621.D\data.ms

(12) Acrolein (T)

7.277min (+0.148) 0.13ng m

response 3027

Ion	Exp%	Act%
56.00	100	100
55.00	76.80	3.44#
0.00	0.00	0.00
0.00	0.00	0.00

MP

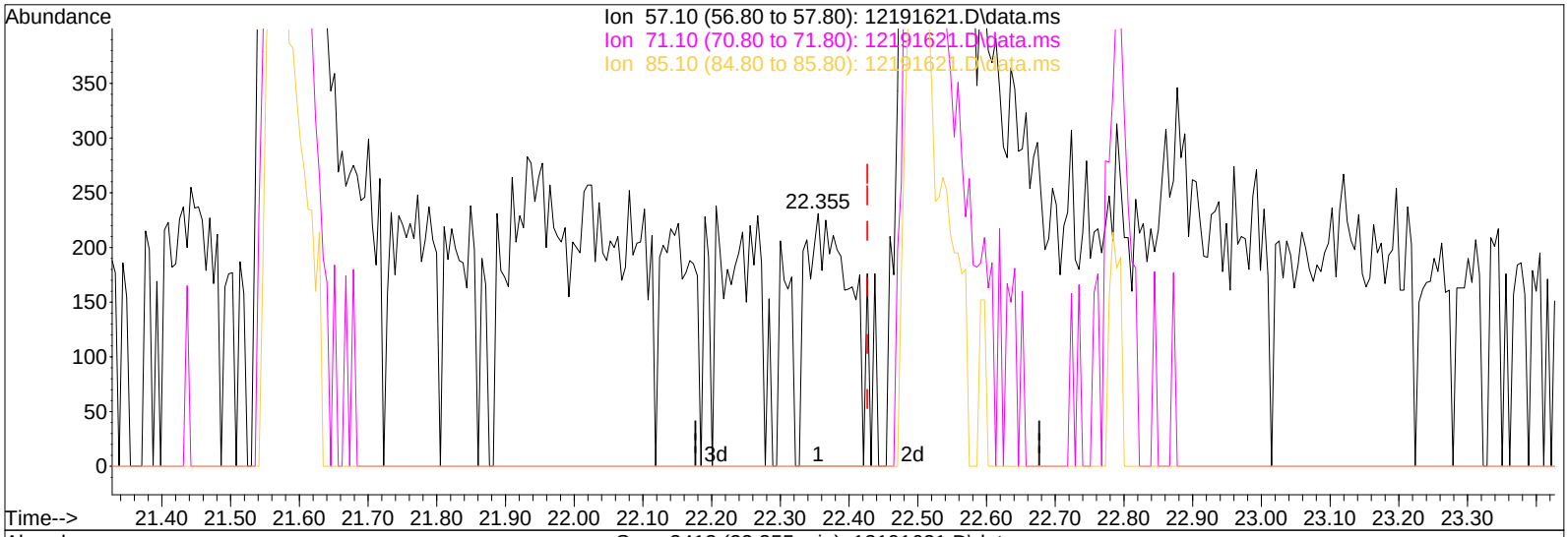
LH 12/20/16

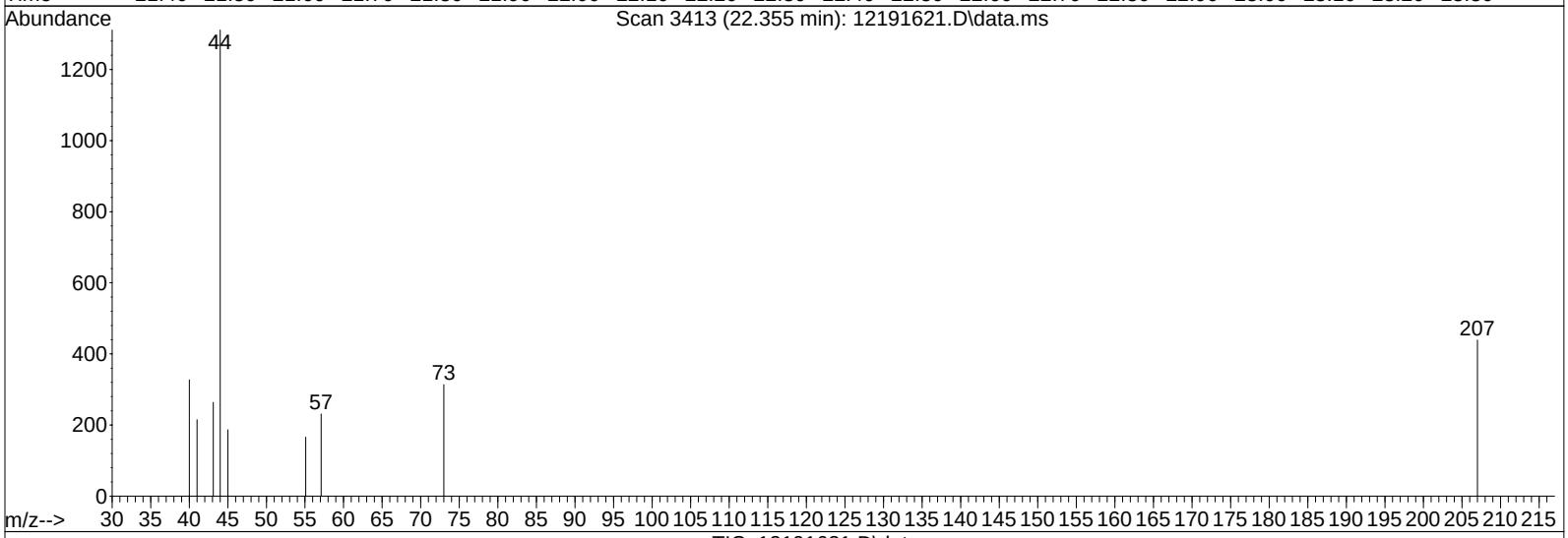
12/30/16

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191621.D
Acq On : 20 Dec 2016 00:33 Operator: LH
Sample : 0.1ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:33 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191621.D\data.ms

(96) n-Dodecane (T)

22.355min (-0.072) 0.02ng

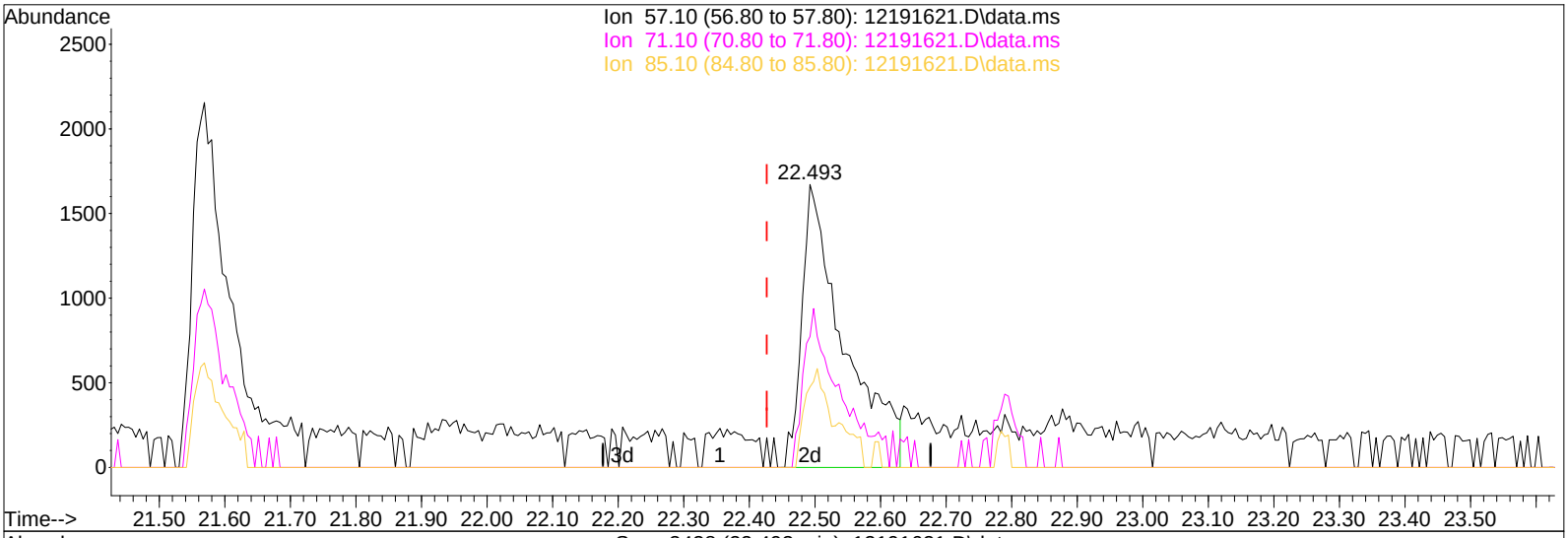
response 997

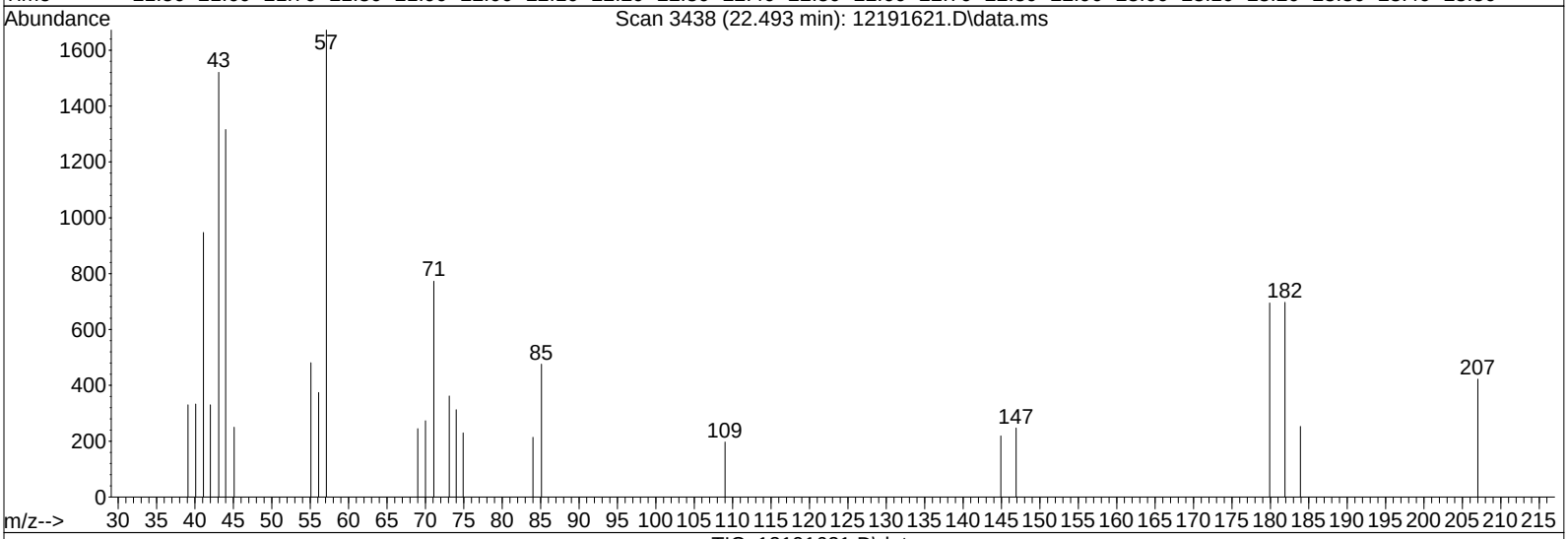
Ion	Exp%	Act%
57.10	100	100
71.10	54.10	0.00#
85.10	31.90	0.00#
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191621.D
Acq On : 20 Dec 2016 00:33 Operator: LH
Sample : 0.1ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:33 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191621.D\data.ms

(96) n-Dodecane (T)

22.493min (+0.066) 0.12ng m

response 7499

Ion	Exp%	Act%
57.10	100	100
71.10	54.10	0.00#
85.10	31.90	0.00#
0.00	0.00	0.00

MP

LH 12/20/16

12/30/16

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 09:45:07 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	280722	12.500	ng	-0.01
37) 1,4-Difluorobenzene (IS2)	13.66	114	1408357	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	17.93	82	601873	12.500	ng	0.00

System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.40	65	505835	13.774	ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 110.16%			
57) Toluene-d8 (SS2)	16.10	98	1456615	12.705	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 101.68%			
73) Bromofluorobenzene (SS3)	19.28	174	457156	12.419	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.36%			

Target Compounds							Qvalue
2) Propene	4.26	42	8324	0.229	ng		92
3) Dichlorodifluoromethan...	4.41	85	15213	0.258	ng		99
4) Chloromethane	4.76	50	12742	0.266	ng		98
5) 1,2-Dichloro-1,1,2,2-t...	4.99	135	8275	0.268	ng		98
6) Vinyl Chloride	5.21	62	10133	0.212	ng		99
7) 1,3-Butadiene	5.50	54	7078m	0.228	ng		
8) Bromomethane	5.97	94	5543	0.202	ng		94
9) Chloroethane	6.30	64	4615	0.206	ng		94
10) Ethanol	6.71	45	26891	1.087	ng		96
11) Acetonitrile	7.08	41	15593m	0.246	ng		
12) Acrolein	7.25	56	5029	0.211	ng		96
13) Acetone	7.37	58	27202	1.132	ng		88
14) Trichlorofluoromethane	7.60	101	13016	0.254	ng		99
15) 2-Propanol (Isopropanol)	7.89	45	37518	0.456	ng		80
16) Acrylonitrile	8.26	53	9148	0.213	ng		95
17) 1,1-Dichloroethene	8.61	96	6124	0.228	ng		92
18) 2-Methyl-2-Propanol (t...	8.82	59	39674	0.498	ng		93
19) Methylene Chloride	8.83	84	7768	0.241	ng		92
20) 3-Chloro-1-propene (Al...	8.99	41	9880m	0.202	ng		
21) Trichlorotrifluoroethane	9.23	151	6021	0.235	ng		91
22) Carbon Disulfide	9.14	76	29121	0.265	ng		97
23) trans-1,2-Dichloroethene	10.11	61	10089	0.227	ng		99
24) 1,1-Dichloroethane	10.35	63	12850	0.227	ng		95
25) Methyl tert-Butyl Ether	10.46	73	22850	0.250	ng		99
26) Vinyl Acetate	10.62	86	6065	0.901	ng	#	66
27) 2-Butanone (MEK)	10.88	72	4549	0.212	ng	#	91
28) cis-1,2-Dichloroethene	11.37	61	9909	0.228	ng		98
29) Diisopropyl Ether	11.65	87	6815	0.254	ng	#	72
30) Ethyl Acetate	11.68	61	4935	0.430	ng		97
31) n-Hexane	11.64	57	11998	0.231	ng		99
32) Chloroform	11.71	83	13181	0.247	ng		98
34) Tetrahydrofuran (THF)	12.15	72	4684	0.213	ng	#	82
35) Ethyl tert-Butyl Ether	12.24	87	8484	0.244	ng		99
36) 1,2-Dichloroethane	12.52	62	10487	0.259	ng		100
38) 1,1,1-Trichloroethane	12.79	97	11845	0.257	ng		98
39) Isopropyl Acetate	13.21	61	8966	0.427	ng	#	89
40) 1-Butanol	13.26	56	13251	0.403	ng	#	79
41) Benzene	13.27	78	30081	0.219	ng		100
42) Carbon Tetrachloride	13.42	117	9487	0.240	ng		97
43) Cyclohexane	13.55	84	22097	0.479	ng		99
44) tert-Amyl Methyl Ether	13.90	73	21242	0.237	ng		95
45) 1,2-Dichloropropane	14.12	63	7444	0.223	ng		96
46) Bromodichloromethane	14.31	83	10202	0.250	ng		96
47) Trichloroethene	14.36	130	7773	0.245	ng		100
48) 1,4-Dioxane	14.35	88	5535	0.208	ng	#	67
49) 2,2,4-Trimethylpentane...	14.41	57	31883	0.229	ng		98

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 09:45:07 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

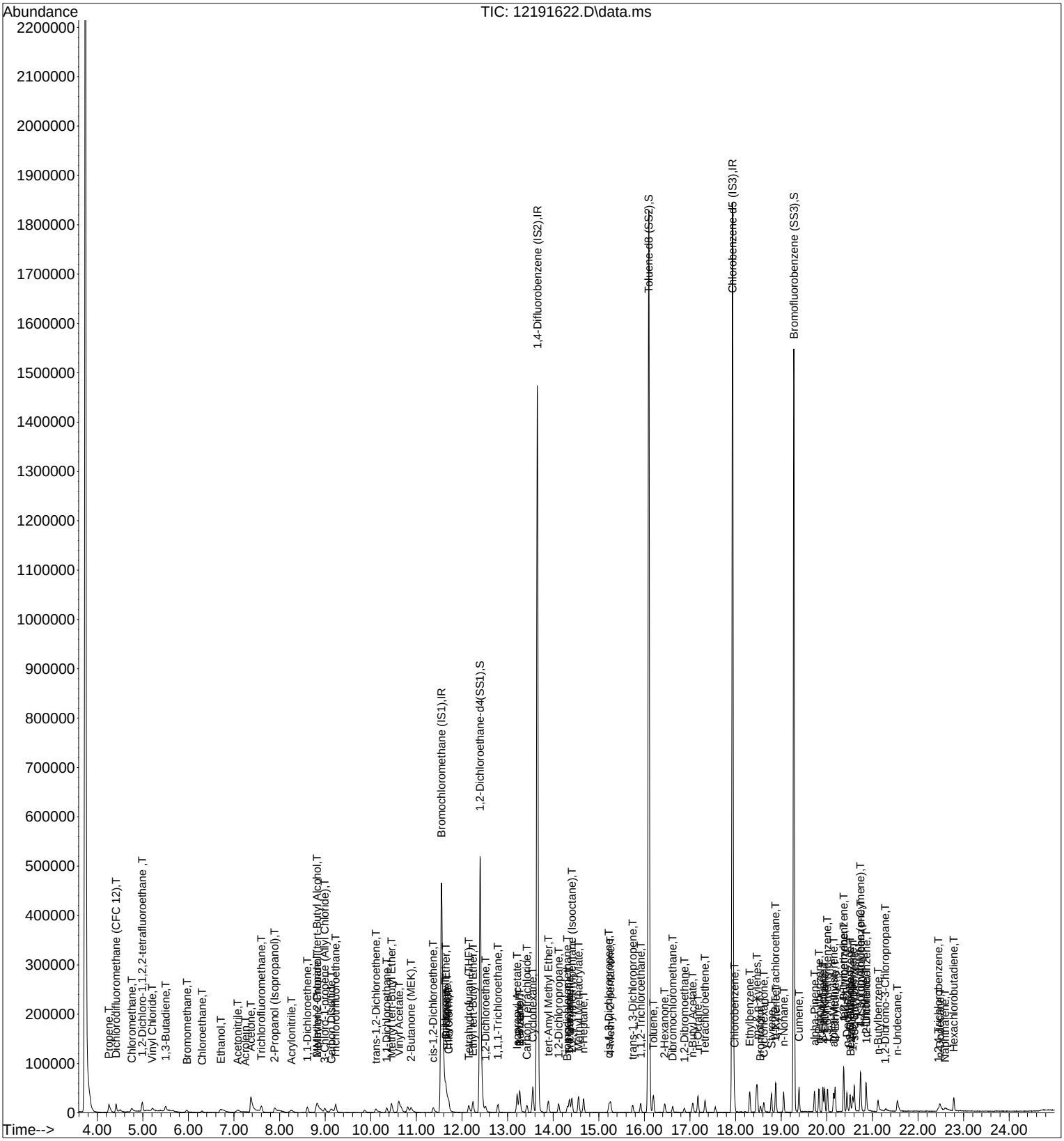
Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
50) Methyl Methacrylate	14.56	100	5538	0.466 ng		99
51) n-Heptane	14.67	71	7072	0.226 ng		98
52) cis-1,3-Dichloropropene	15.22	75	11545	0.233 ng		99
53) 4-Methyl-2-pentanone	15.26	58	6862	0.225 ng		89
54) trans-1,3-Dichloropropene	15.75	75	9755	0.222 ng		99
55) 1,1,2-Trichloroethane	15.92	97	6796	0.231 ng		99
58) Toluene	16.20	91	29322	0.247 ng		98
59) 2-Hexanone	16.44	43	17145	0.226 ng		92
60) Dibromochloromethane	16.62	129	7666	0.235 ng		100
61) 1,2-Dibromoethane	16.88	107	7595	0.227 ng		98
62) n-Butyl Acetate	17.06	43	18384	0.212 ng		96
63) n-Octane	17.17	57	7326	0.259 ng		86
64) Tetrachloroethene	17.33	166	8007	0.242 ng		99
65) Chlorobenzene	17.98	112	19036	0.234 ng		97
66) Ethylbenzene	18.31	91	32498	0.229 ng		99
67) m- & p-Xylenes	18.47	91	50000	0.464 ng		100
68) Bromoform	18.54	173	5890	0.226 ng		99
69) Styrene	18.79	104	18639	0.225 ng		99
70) o-Xylene	18.89	91	25091	0.232 ng		99
71) n-Nonane	19.06	43	16052	0.236 ng		91
72) 1,1,2,2-Tetrachloroethane	18.87	83	11297	0.216 ng		98
74) Cumene	19.39	105	32370	0.250 ng		99
75) alpha-Pinene	19.73	93	16376	0.231 ng		99
76) n-Propylbenzene	19.83	91	37956	0.232 ng		98
77) 3-Ethyltoluene	19.91	105	32919	0.238 ng		100
78) 4-Ethyltoluene	19.95	105	26804	0.219 ng		100
79) 1,3,5-Trimethylbenzene	20.01	105	25611	0.227 ng		99
80) alpha-Methylstyrene	20.15	118	11807	0.221 ng		96
81) 2-Ethyltoluene	20.18	105	32482	0.248 ng		95
82) 1,2,4-Trimethylbenzene	20.37	105	26310	0.237 ng		96
83) n-Decane	20.44	57	14003	0.212 ng		99
84) Benzyl Chloride	20.52	91	8139	0.095 ng		95
85) 1,3-Dichlorobenzene	20.51	146	12069	0.206 ng		98
86) 1,4-Dichlorobenzene	20.57	146	13734	0.206 ng		92
87) sec-Butylbenzene	20.61	105	35105	0.243 ng		87
88) 4-Isopropyltoluene (p-...	20.74	119	31956	0.240 ng		98
89) 1,2,3-Trimethylbenzene	20.74	105	25646	0.226 ng		100
90) 1,2-Dichlorobenzene	20.87	146	14293	0.239 ng		97
91) d-Limonene	20.86	68	9801	0.223 ng		98
92) 1,2-Dibromo-3-Chloropr...	21.28	157	3414	0.171 ng	#	63
93) n-Undecane	21.55	57	14754	0.216 ng		90
94) 1,2,4-Trichlorobenzene	22.45	180	7083	0.173 ng	#	94
95) Naphthalene	22.60	128	15149m	0.135 ng		
96) n-Dodecane	22.48	57	11247	0.181 ng		93
97) Hexachlorobutadiene	22.78	225	5982	0.216 ng		96
98) Cyclohexanone	18.62	55	10057	0.211 ng		92
99) tert-Butylbenzene	20.37	119	25807	0.248 ng		98
100) n-Butylbenzene	21.12	91	26263	0.220 ng		95

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

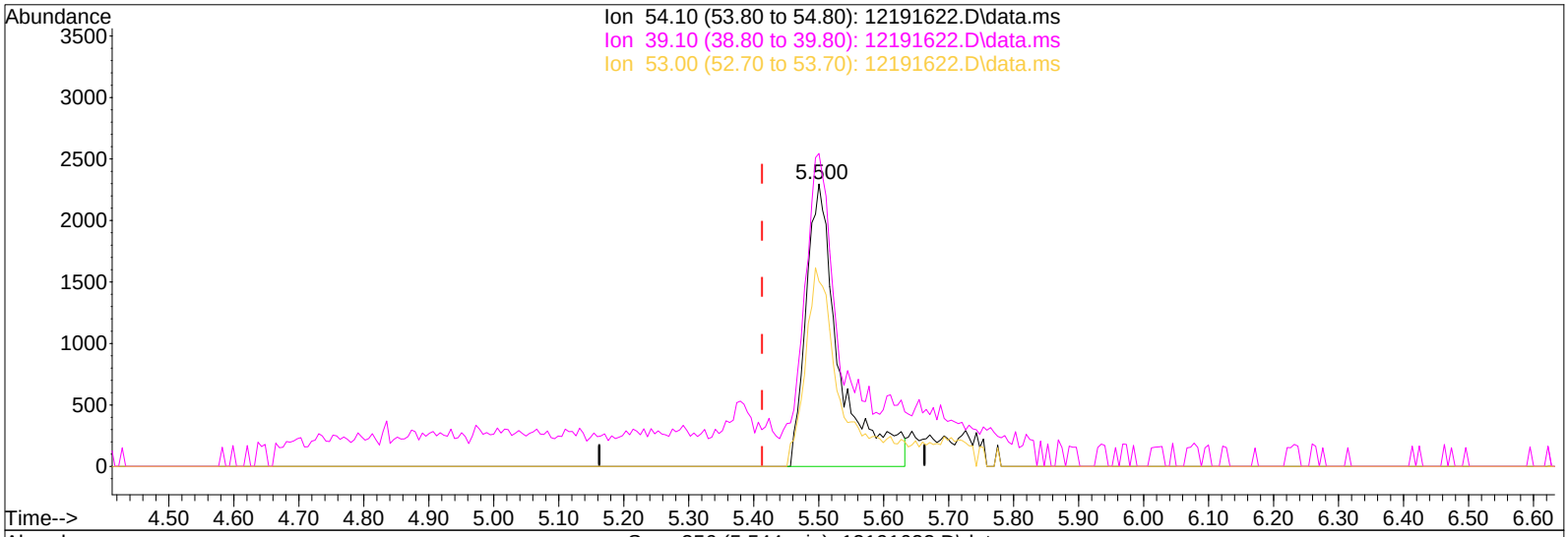
Quant Time: Dec 20 09:45:07 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

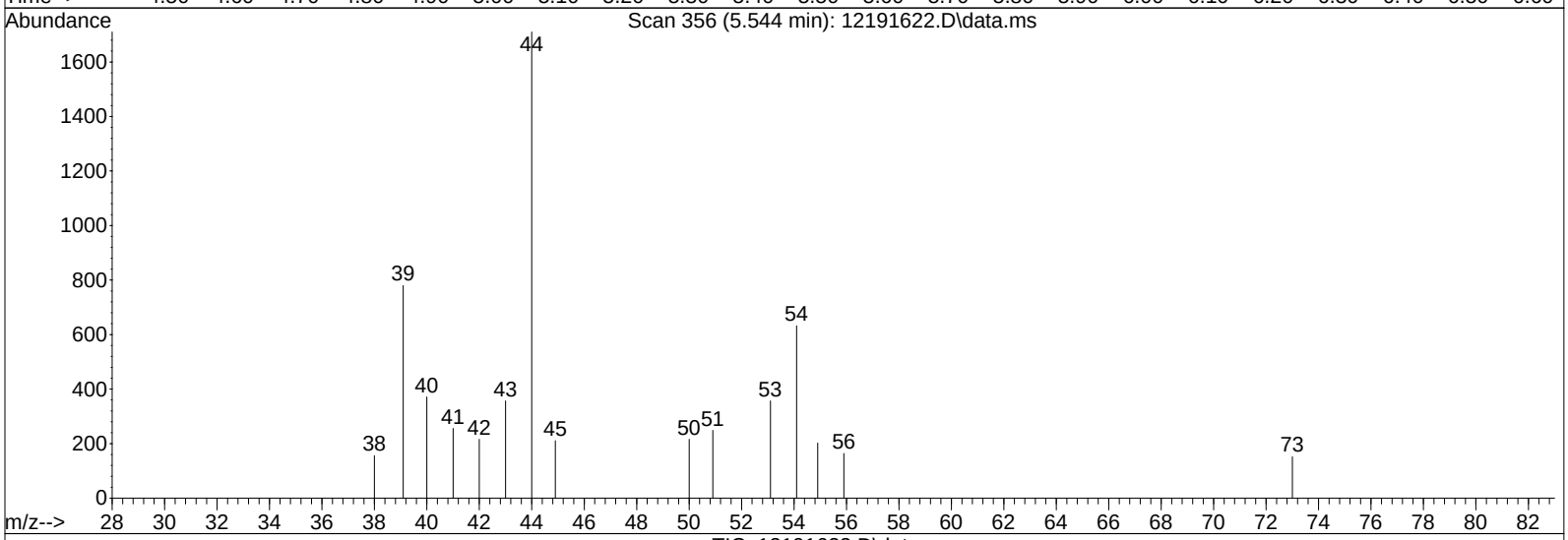


Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:35 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191622.D\data.ms

(7) 1,3-Butadiene (T)

5.500min (+0.088) 0.26ng

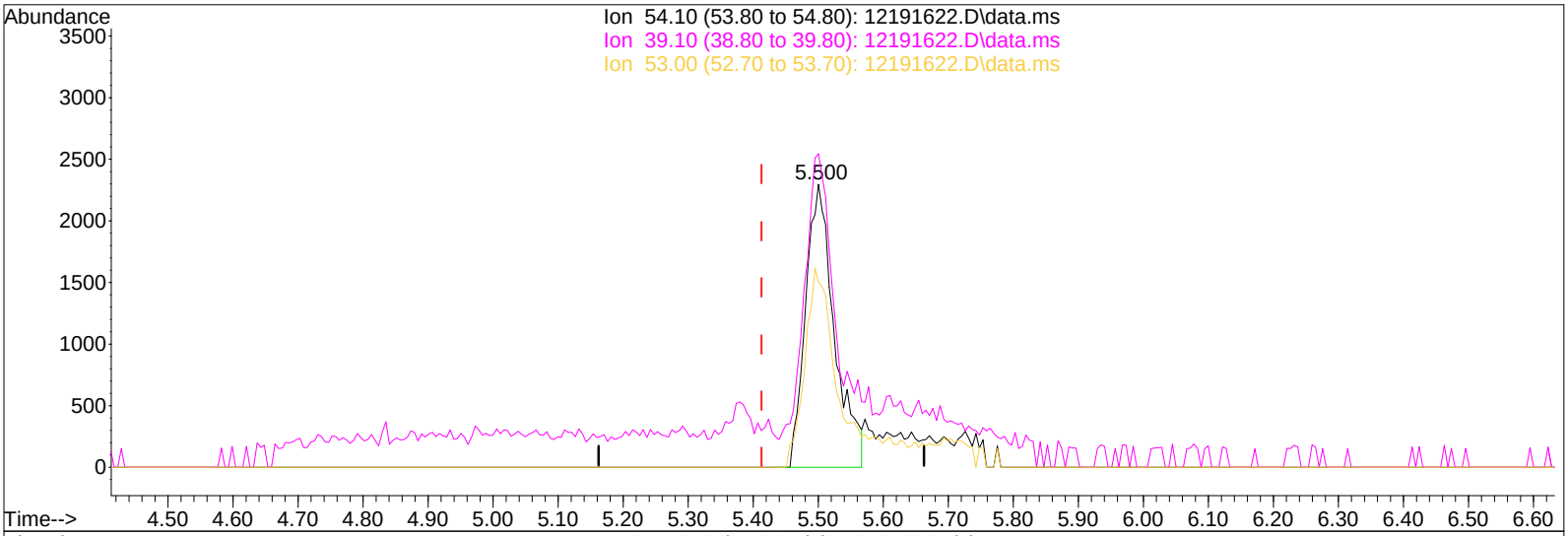
response 8163

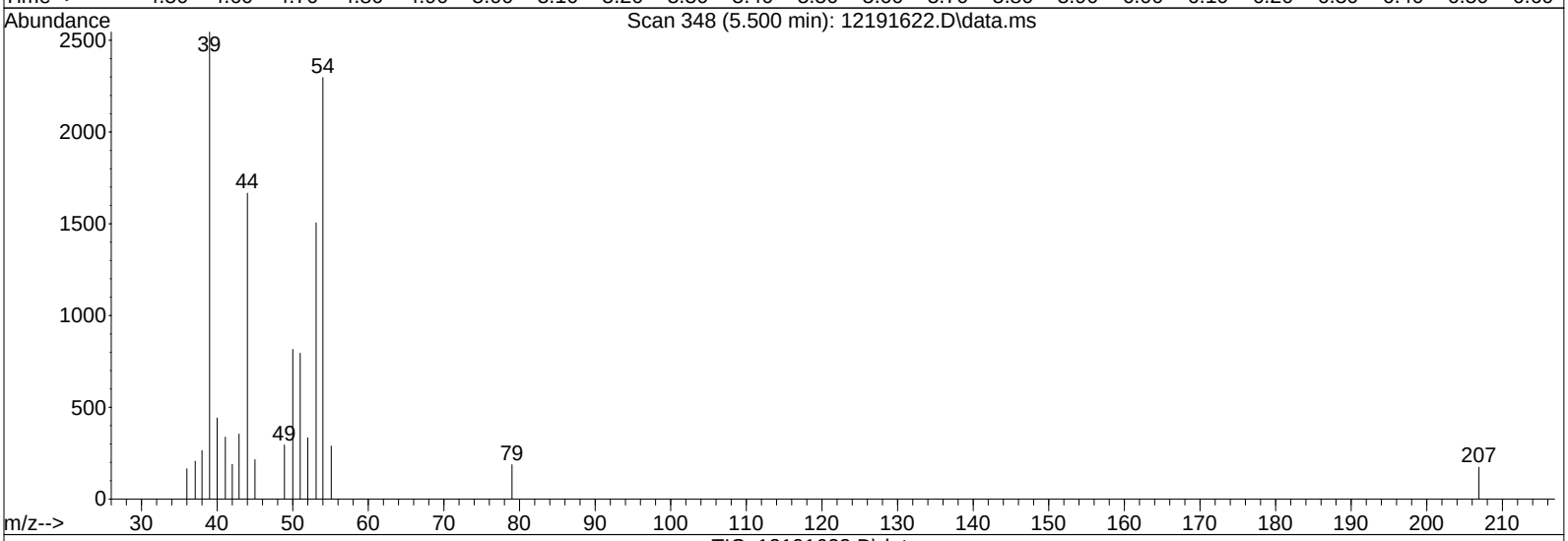
Ion	Exp%	Act%
54.10	100	100
39.10	104.80	94.25
53.00	70.30	74.07
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:35 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191622.D\data.ms

(7) 1,3-Butadiene (T)

5.500min (+0.088) 0.23ng m

response 7078

Ion	Exp%	Act%
54.10	100	100
39.10	104.80	108.70
53.00	70.30	85.42
0.00	0.00	0.00

IPC

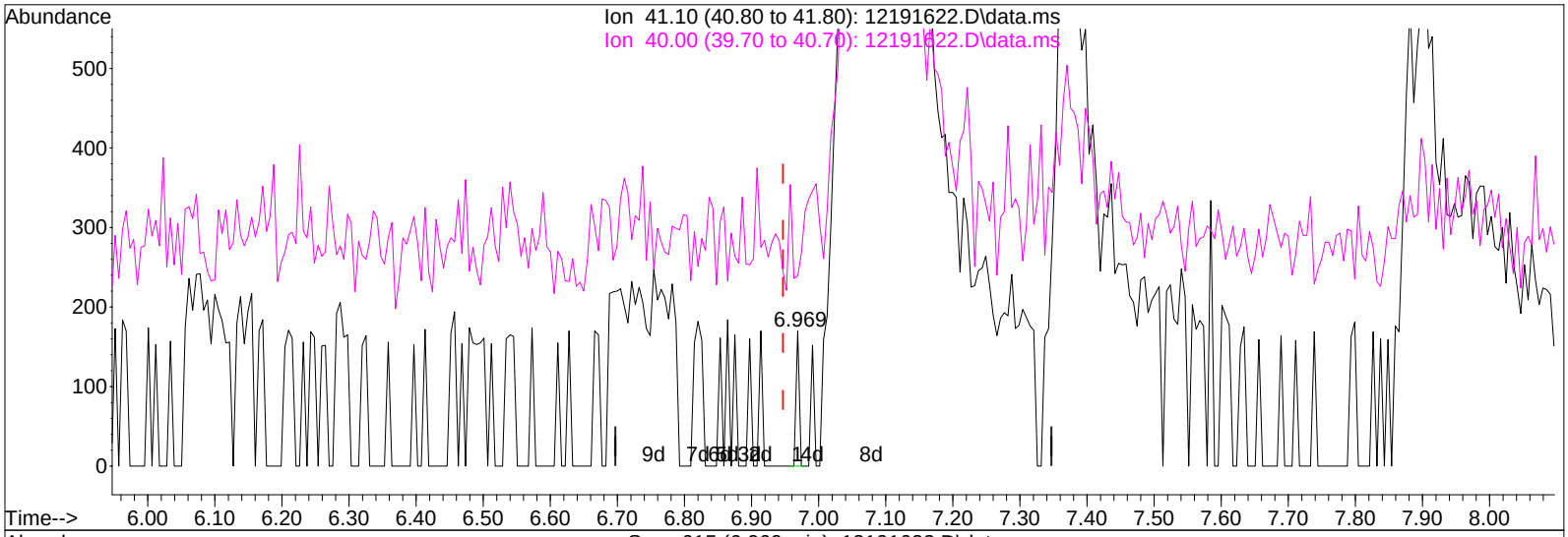
LH 12/20/16

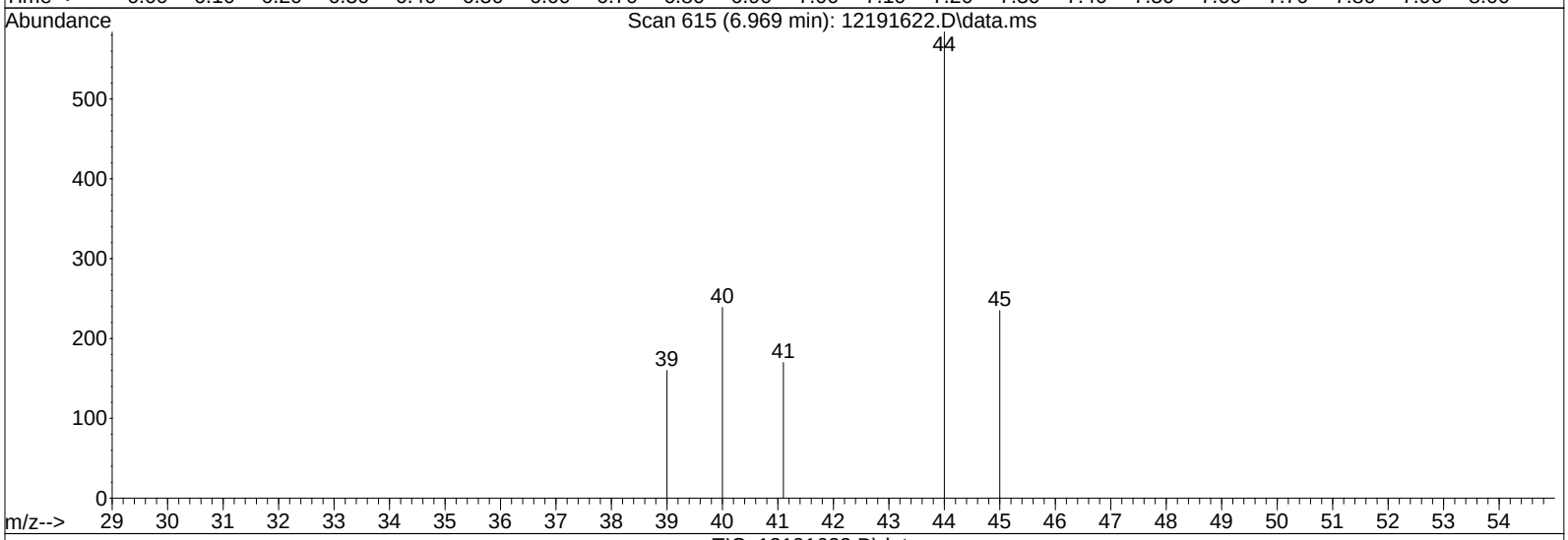
12/30/16

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:35 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





(11) Acetonitrile (T)

6.969min (+0.022) 0.00ng

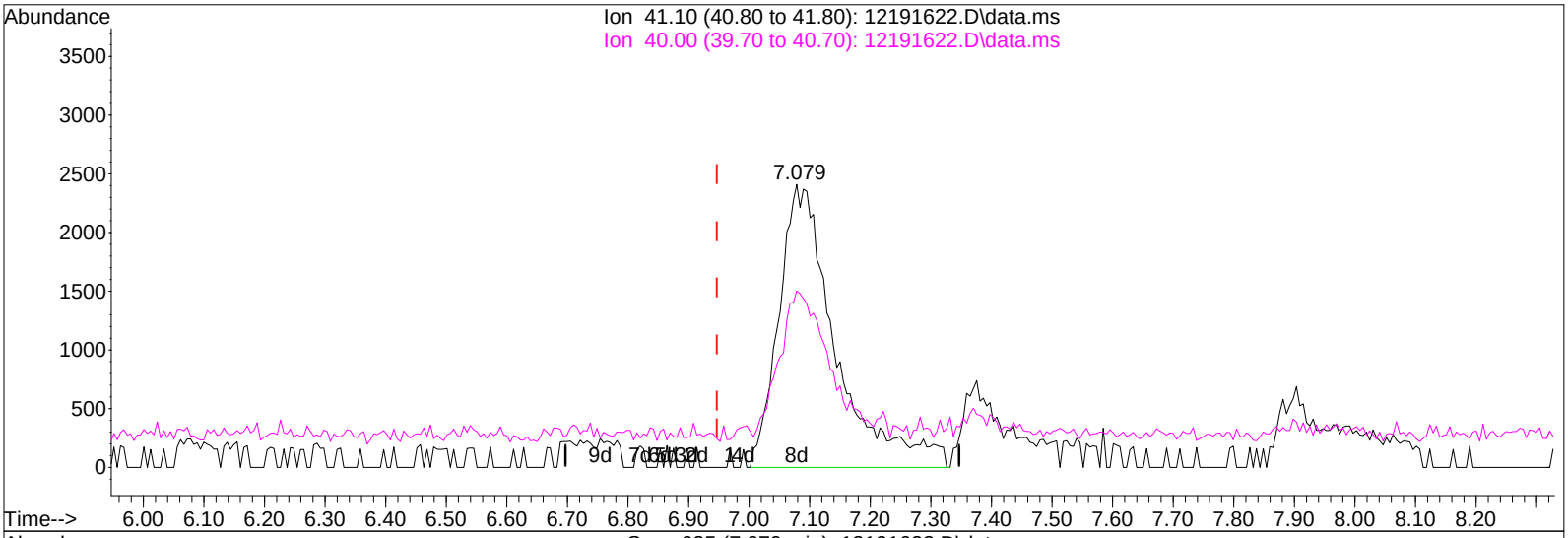
response 56

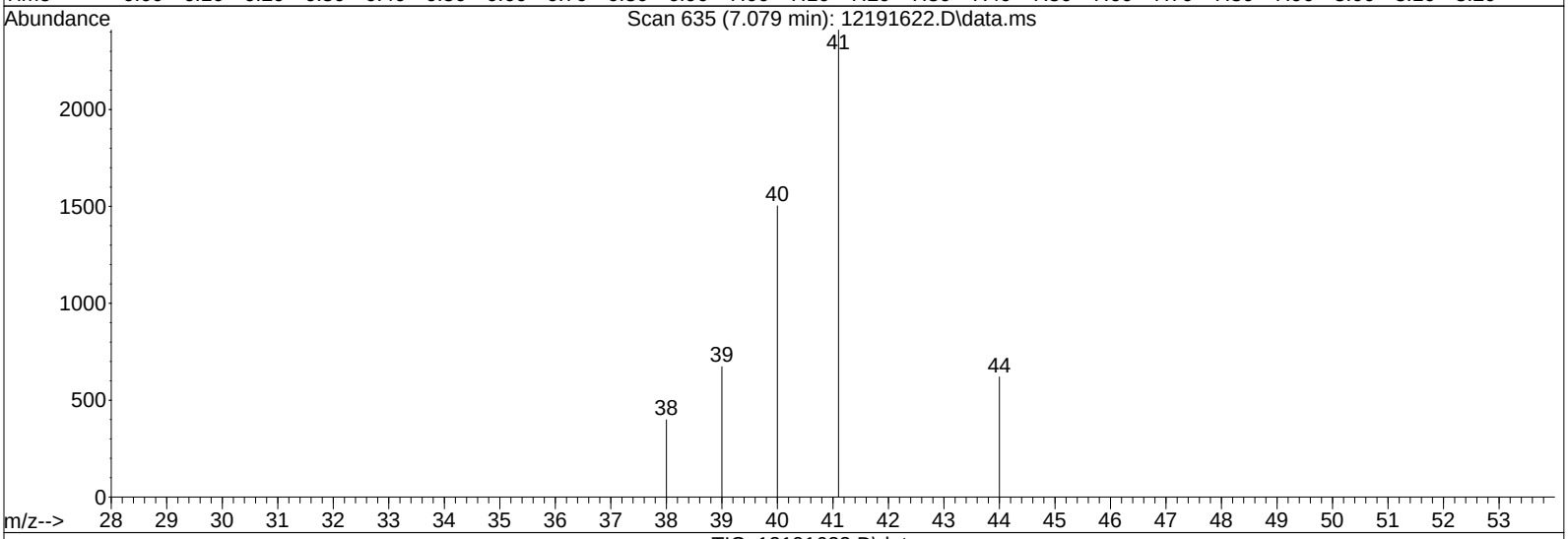
Ion	Exp%	Act%
41.10	100	100
40.00	54.30	98.21#
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:35 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





(11) Acetonitrile (T)

7.079min (+0.132) 0.25ng m

response 15593

Ion	Exp%	Act%
41.10	100	100
40.00	54.30	0.35#
0.00	0.00	0.00
0.00	0.00	0.00

MP

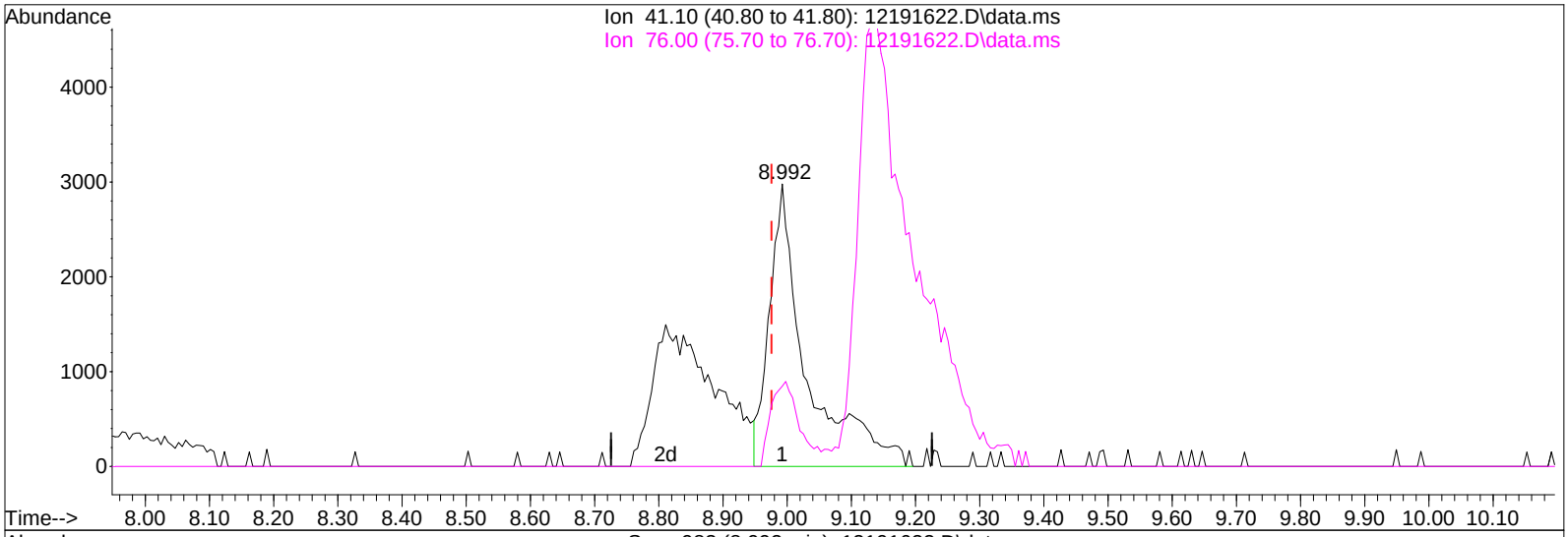
LH 12/20/16

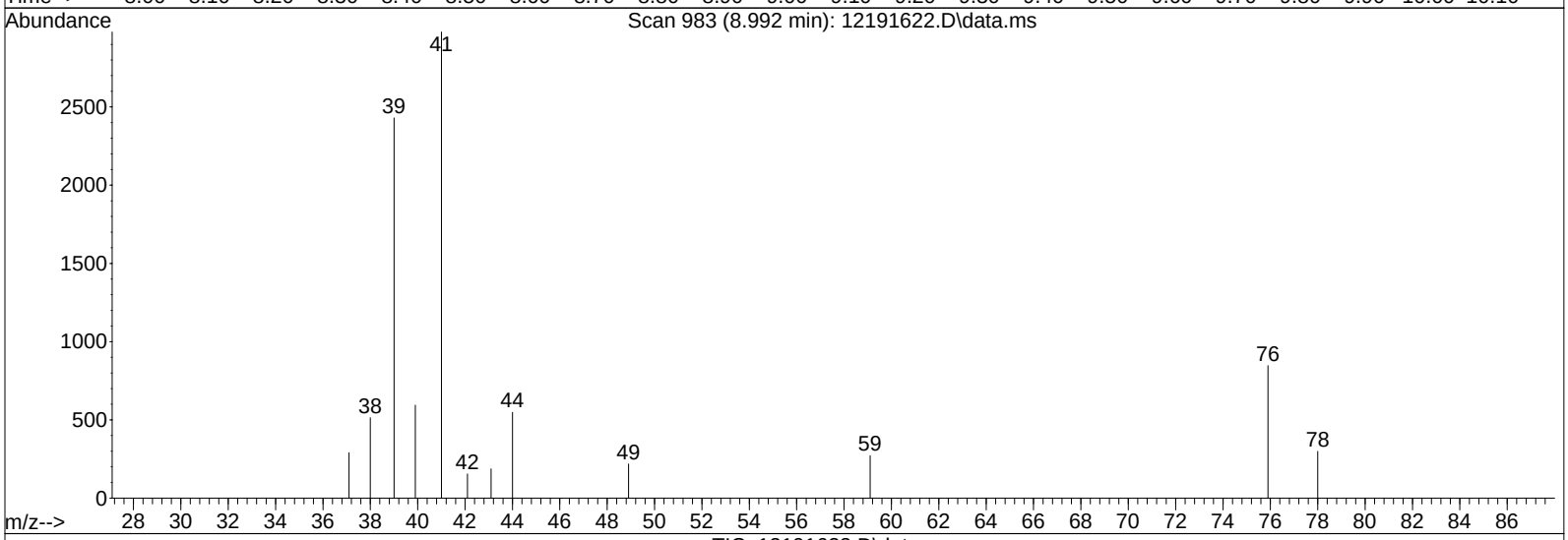
12/30/16

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:35 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191622.D\data.ms

(20) 3-Chloro-1-propene (Allyl Chloride) (T)

8.992min (+0.016) 0.25ng

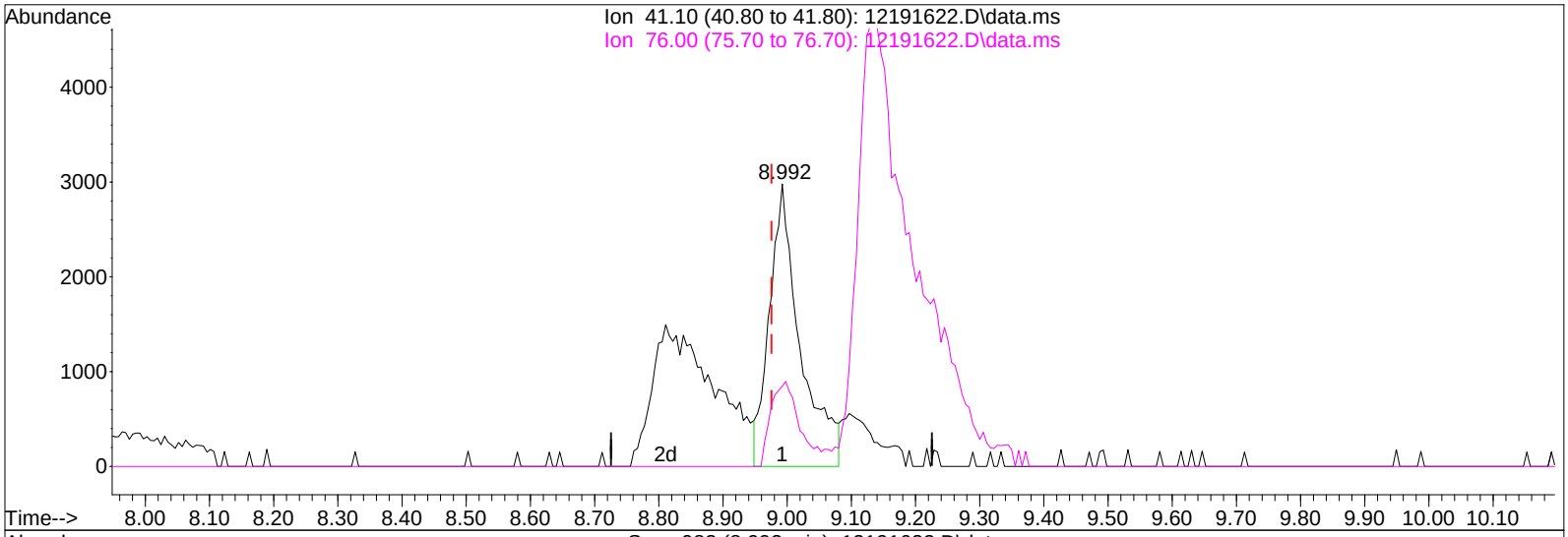
response 11986

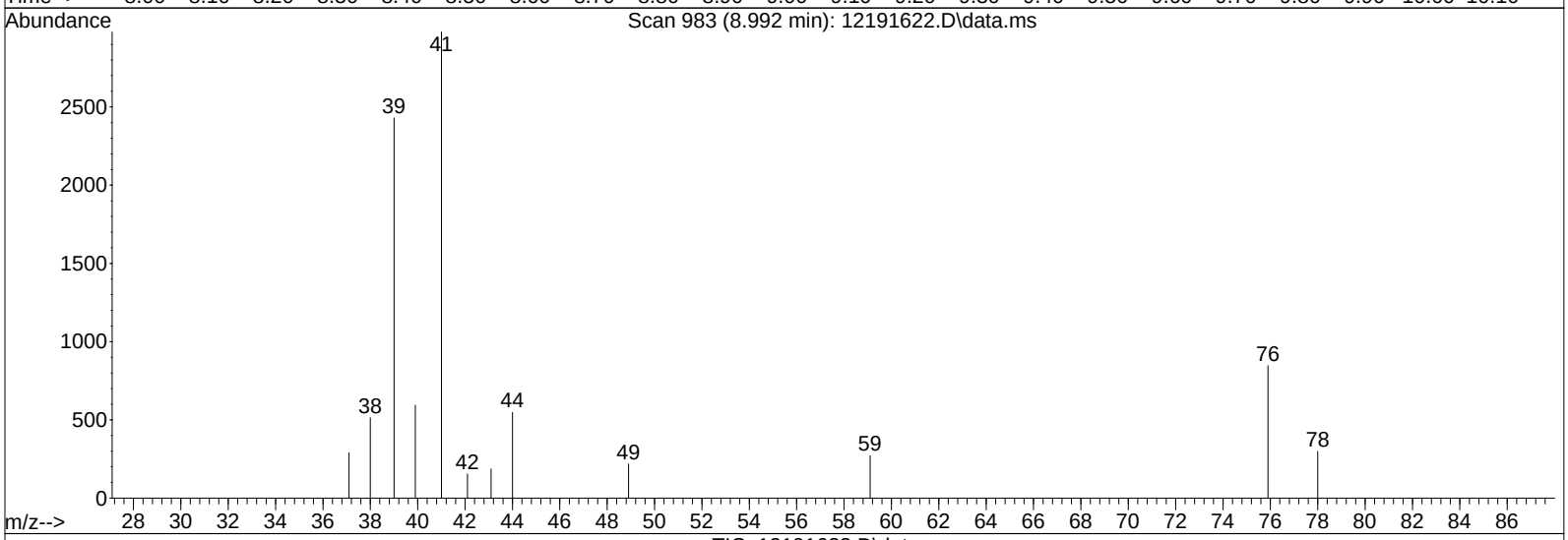
Ion	Exp%	Act%
41.10	100	100
76.00	34.90	24.80
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:35 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191622.D\data.ms

(20) 3-Chloro-1-propene (Allyl Chloride) (T)

8.992min (+0.016) 0.20ng m

response 9880

Ion	Exp%	Act%
41.10	100	100
76.00	34.90	30.08
0.00	0.00	0.00
0.00	0.00	0.00

IPC

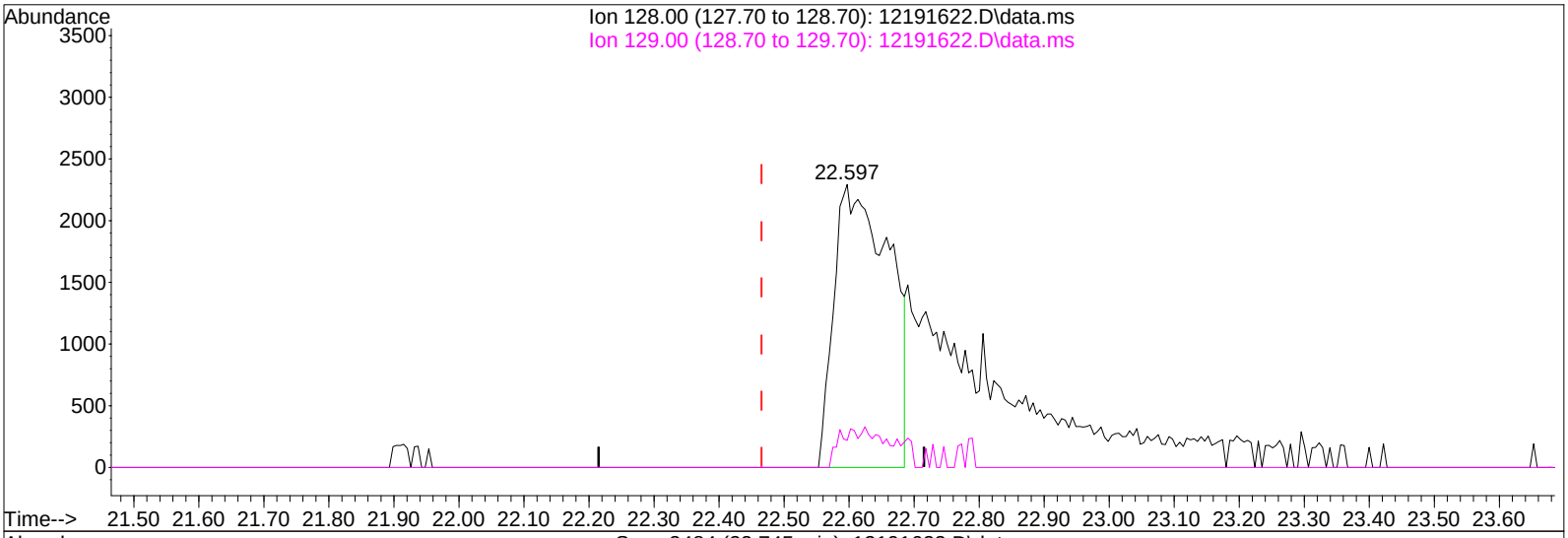
LH 12/20/16

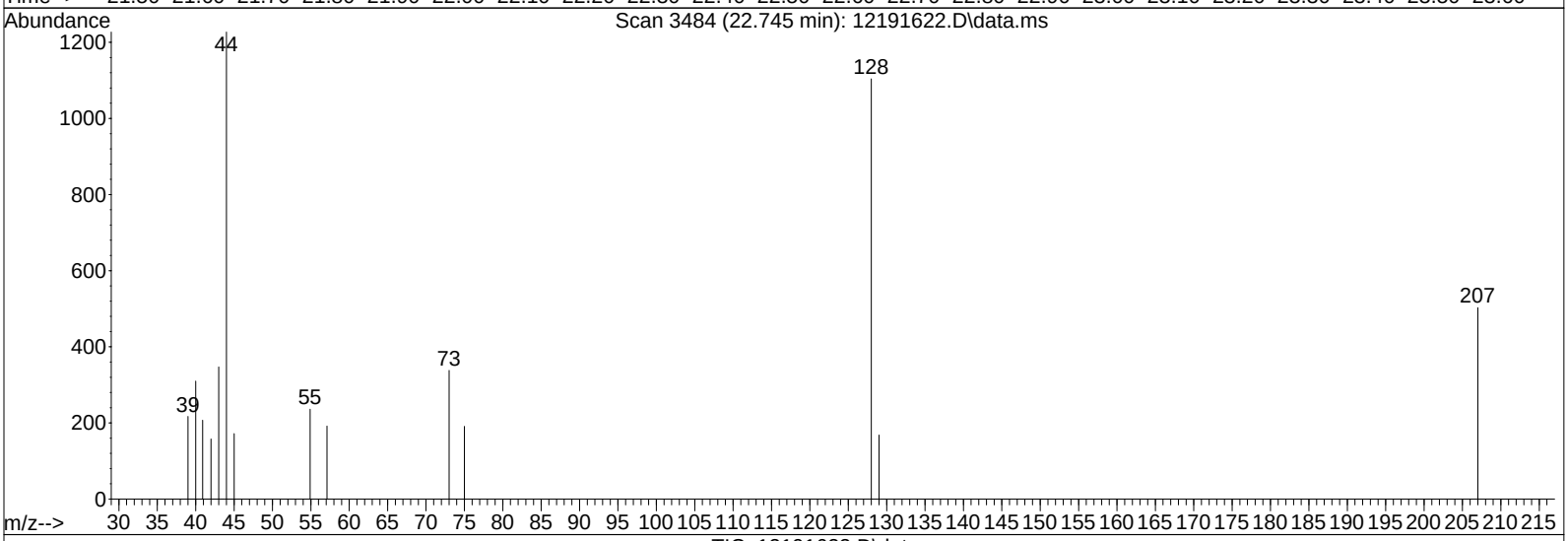
12/30/16

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:35 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191622.D\data.ms

(95) Naphthalene (T)

22.597min (+0.132) 0.12ng

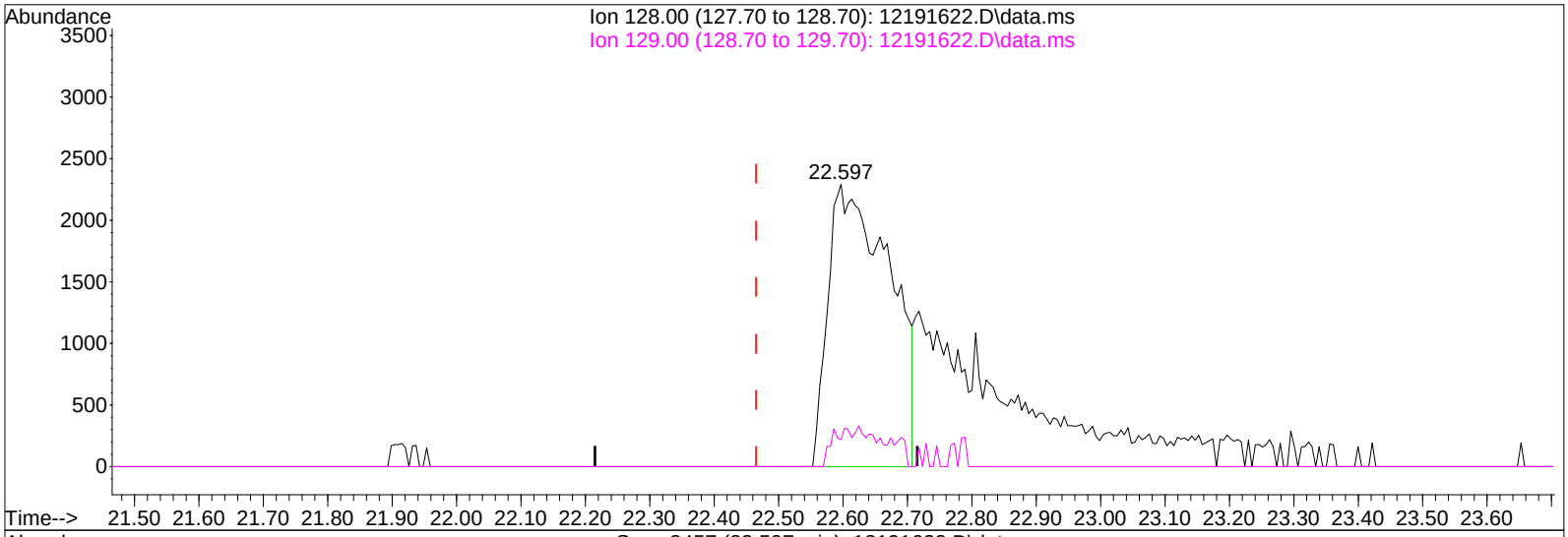
response 13470

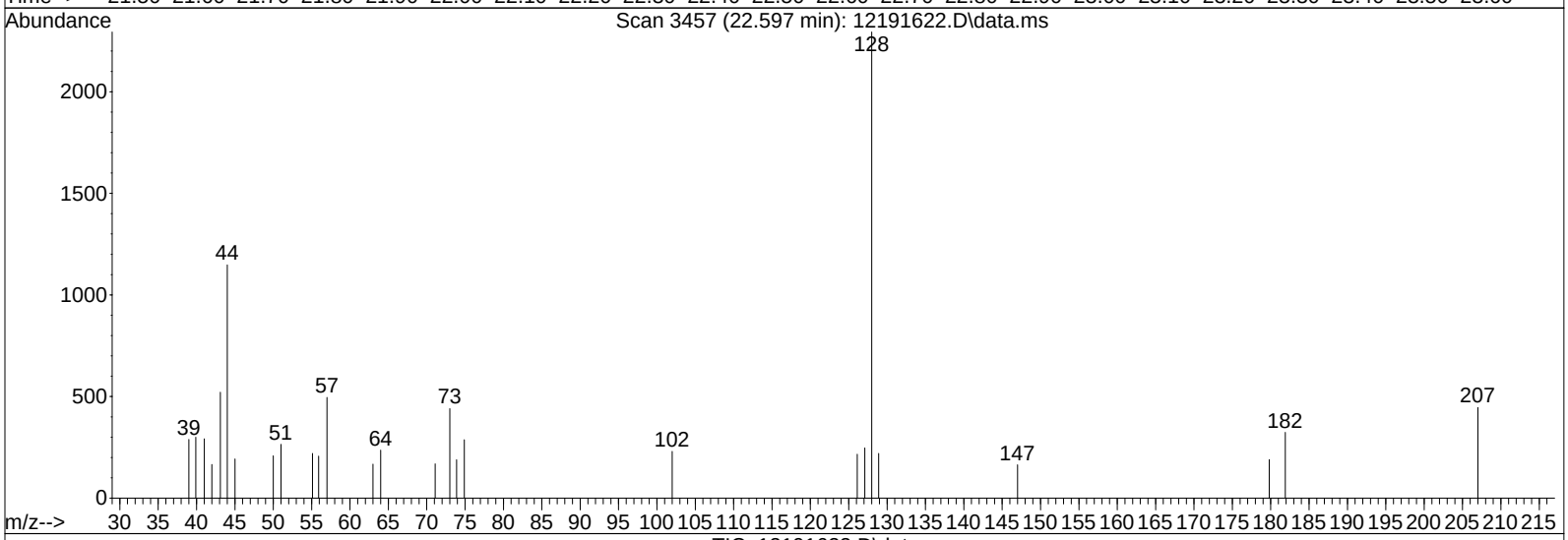
Ion	Exp%	Act%
128.00	100	100
129.00	11.00	12.09
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191622.D
Acq On : 20 Dec 2016 1:06 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:35 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191622.D\data.ms

(95) Naphthalene (T)

22.597min (+0.132) 0.14ng m

response 15149

Ion	Exp%	Act%
128.00	100	100
129.00	11.00	10.75
0.00	0.00	0.00
0.00	0.00	0.00

BLC

LH 12/20/16

12/30/16

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 09:52:42 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	266024	12.500	ng		-0.01
37) 1,4-Difluorobenzene (IS2)	13.65	114	1350700	12.500	ng		-0.01
56) Chlorobenzene-d5 (IS3)	17.93	82	571668	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.40	65	484887	13.933	ng		-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 111.44%				
57) Toluene-d8 (SS2)	16.10	98	1396735	12.826	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 102.64%				
73) Bromofluorobenzene (SS3)	19.28	174	439250	12.563	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.48%				
Target Compounds							Qvalue
2) Propene	4.24	42	15026	0.437	ng		96
3) Dichlorodifluoromethan...	4.40	85	29589	0.530	ng		99
4) Chloromethane	4.74	50	23526	0.519	ng		97
5) 1,2-Dichloro-1,1,2,2-t...	4.98	135	14839	0.508	ng		99
6) Vinyl Chloride	5.20	62	21720	0.479	ng		97
7) 1,3-Butadiene	5.49	54	13222	0.449	ng		90
8) Bromomethane	5.95	94	11227	0.433	ng		96
9) Chloroethane	6.29	64	8828	0.415	ng		94
10) Ethanol	6.68	45	48653	2.075	ng		97
11) Acetonitrile	7.08	41	26579m	0.443	ng		
12) Acrolein	7.20	56	9212	0.408	ng		99
13) Acetone	7.35	58	50221	2.206	ng		88
14) Trichlorofluoromethane	7.60	101	24081	0.496	ng		99
15) 2-Propanol (Isopropanol)	7.86	45	71574	0.917	ng		87
16) Acrylonitrile	8.27	53	17077	0.419	ng		100
17) 1,1-Dichloroethene	8.60	96	12048	0.474	ng		98
18) 2-Methyl-2-Propanol (t...	8.77	59	72972	0.966	ng		94
19) Methylene Chloride	8.82	84	13969	0.458	ng		93
20) 3-Chloro-1-propene (Al...	8.99	41	18295m	0.395	ng		
21) Trichlorotrifluoroethane	9.23	151	11653	0.480	ng		99
22) Carbon Disulfide	9.13	76	51598	0.495	ng		96
23) trans-1,2-Dichloroethene	10.10	61	19294	0.457	ng		99
24) 1,1-Dichloroethane	10.35	63	24593	0.458	ng		98
25) Methyl tert-Butyl Ether	10.44	73	43325	0.501	ng		99
26) Vinyl Acetate	10.60	86	13036	2.045	ng	#	79
27) 2-Butanone (MEK)	10.87	72	8752	0.430	ng		95
28) cis-1,2-Dichloroethene	11.37	61	18751	0.455	ng		97
29) Diisopropyl Ether	11.64	87	11018	0.433	ng		98
30) Ethyl Acetate	11.66	61	9505	0.874	ng		99
31) n-Hexane	11.64	57	23598	0.479	ng		99
32) Chloroform	11.70	83	24803	0.491	ng		99
34) Tetrahydrofuran (THF)	12.14	72	8849	0.425	ng	#	89
35) Ethyl tert-Butyl Ether	12.24	87	15804	0.479	ng		100
36) 1,2-Dichloroethane	12.51	62	19810	0.516	ng		99
38) 1,1,1-Trichloroethane	12.79	97	22038	0.499	ng		99
39) Isopropyl Acetate	13.20	61	17510	0.869	ng		96
40) 1-Butanol	13.25	56	24650	0.781	ng	#	74
41) Benzene	13.27	78	54425	0.413	ng		98
42) Carbon Tetrachloride	13.42	117	18576	0.490	ng		99
43) Cyclohexane	13.55	84	40595	0.917	ng		99
44) tert-Amyl Methyl Ether	13.89	73	39324	0.458	ng		97
45) 1,2-Dichloropropane	14.12	63	13932	0.435	ng		100
46) Bromodichloromethane	14.31	83	19179	0.491	ng		99
47) Trichloroethene	14.35	130	14278	0.470	ng		98
48) 1,4-Dioxane	14.35	88	10215	0.401	ng	#	68
49) 2,2,4-Trimethylpentane...	14.41	57	60305	0.452	ng		99

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 09:52:42 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

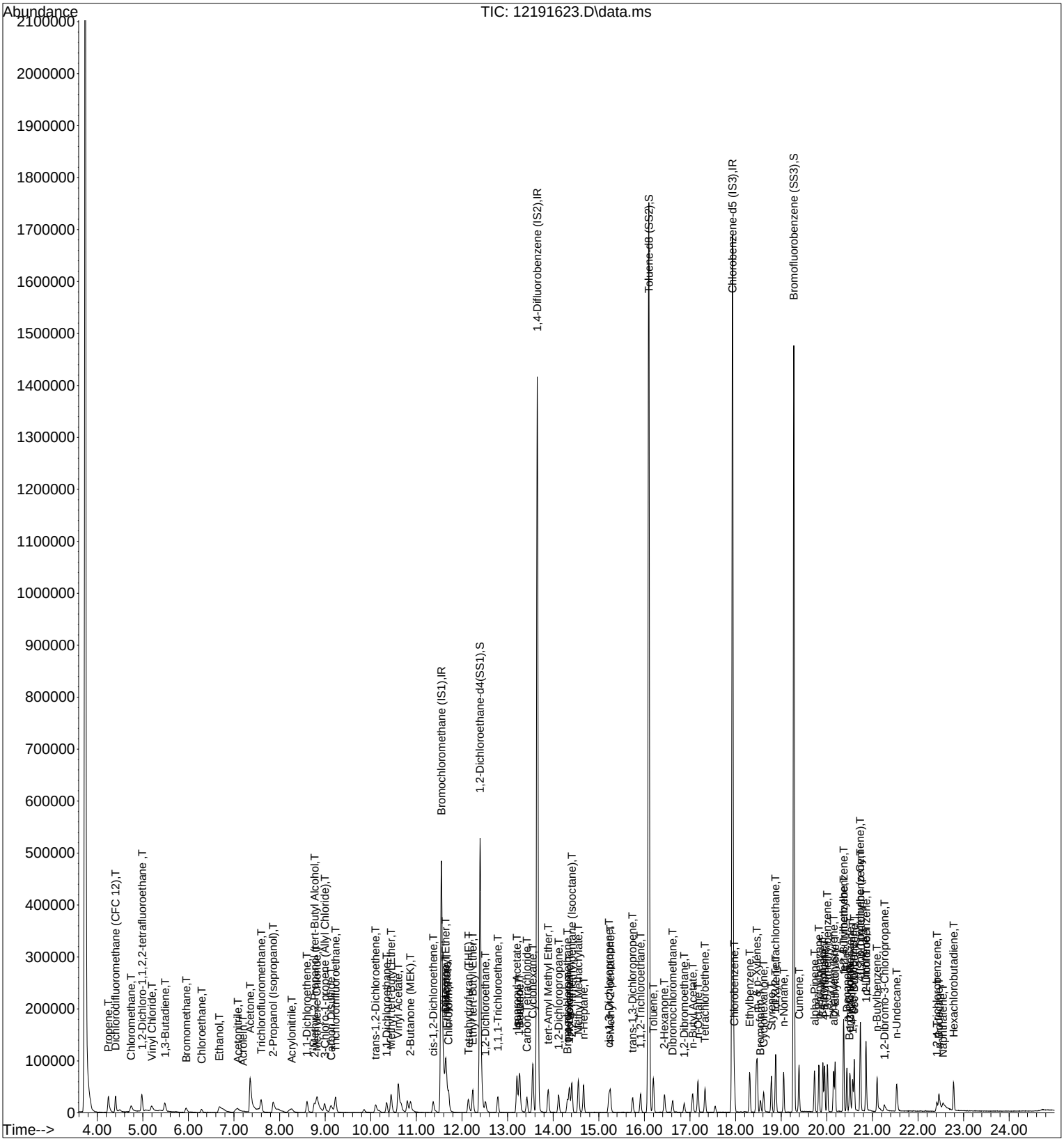
Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
50) Methyl Methacrylate	14.55	100	10335	0.907 ng		99
51) n-Heptane	14.67	71	13537	0.452 ng		98
52) cis-1,3-Dichloropropene	15.22	75	21948	0.461 ng		99
53) 4-Methyl-2-pentanone	15.26	58	12490	0.426 ng		87
54) trans-1,3-Dichloropropene	15.74	75	18415	0.436 ng		100
55) 1,1,2-Trichloroethane	15.92	97	12956	0.458 ng		98
58) Toluene	16.20	91	55819	0.494 ng		98
59) 2-Hexanone	16.44	43	30733	0.426 ng		96
60) Dibromochloromethane	16.62	129	14234	0.460 ng		97
61) 1,2-Dibromoethane	16.87	107	14329	0.450 ng		99
62) n-Butyl Acetate	17.06	43	33707	0.409 ng		97
63) n-Octane	17.18	57	12853	0.478 ng		93
64) Tetrachloroethene	17.33	166	14914	0.474 ng		99
65) Chlorobenzene	17.97	112	35858	0.464 ng		100
66) Ethylbenzene	18.31	91	60915	0.451 ng		99
67) m- & p-Xylenes	18.47	91	94072	0.919 ng		99
68) Bromoform	18.54	173	11360	0.459 ng		98
69) Styrene	18.79	104	34882	0.443 ng		99
70) o-Xylene	18.88	91	48000	0.467 ng		98
71) n-Nonane	19.06	43	28706	0.445 ng		96
72) 1,1,2,2-Tetrachloroethane	18.87	83	21812	0.440 ng		100
74) Cumene	19.39	105	60077	0.488 ng		99
75) alpha-Pinene	19.73	93	30805	0.458 ng		99
76) n-Propylbenzene	19.83	91	72745	0.468 ng		98
77) 3-Ethyltoluene	19.91	105	56699	0.432 ng		96
78) 4-Ethyltoluene	19.95	105	56365	0.485 ng		94
79) 1,3,5-Trimethylbenzene	20.01	105	48769	0.455 ng		99
80) alpha-Methylstyrene	20.15	118	23326	0.459 ng		96
81) 2-Ethyltoluene	20.18	105	56367	0.453 ng		100
82) 1,2,4-Trimethylbenzene	20.37	105	49281	0.468 ng		99
83) n-Decane	20.44	57	26815	0.427 ng		99
84) Benzyl Chloride	20.50	91	22636	0.280 ng		96
85) 1,3-Dichlorobenzene	20.51	146	24851	0.447 ng		98
86) 1,4-Dichlorobenzene	20.57	146	26829	0.424 ng		99
87) sec-Butylbenzene	20.60	105	65702	0.479 ng		90
88) 4-Isopropyltoluene (p-...	20.73	119	58694	0.465 ng		98
89) 1,2,3-Trimethylbenzene	20.74	105	48873	0.454 ng		100
90) 1,2-Dichlorobenzene	20.86	146	26031	0.458 ng		99
91) d-Limonene	20.86	68	19065	0.457 ng		99
92) 1,2-Dibromo-3-Chloropr...	21.27	157	7087	0.373 ng	#	75
93) n-Undecane	21.53	57	26959	0.416 ng		94
94) 1,2,4-Trichlorobenzene	22.42	180	14400	0.369 ng		97
95) Naphthalene	22.55	128	39950m	0.375 ng		
96) n-Dodecane	22.46	57	20350	0.344 ng		97
97) Hexachlorobutadiene	22.78	225	11426	0.434 ng		96
98) Cyclohexanone	18.62	55	18659	0.412 ng		97
99) tert-Butylbenzene	20.37	119	47988	0.485 ng		99
100) n-Butylbenzene	21.10	91	51353	0.453 ng		96

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

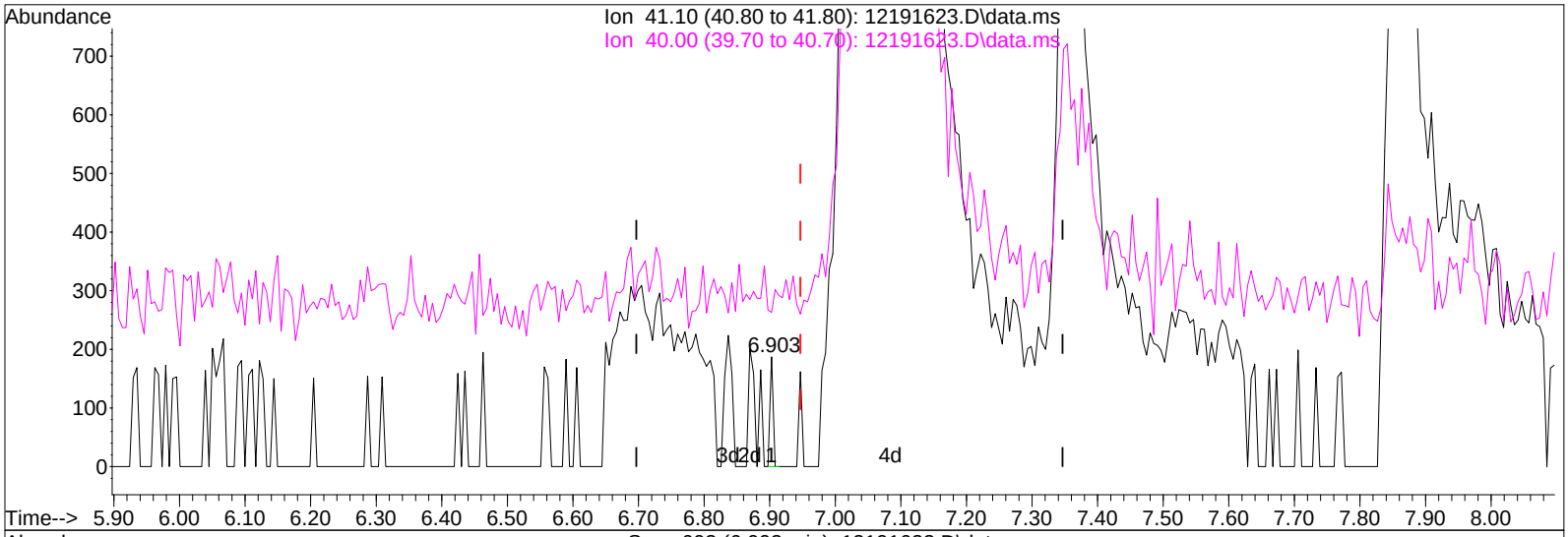
Quant Time: Dec 20 09:52:42 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

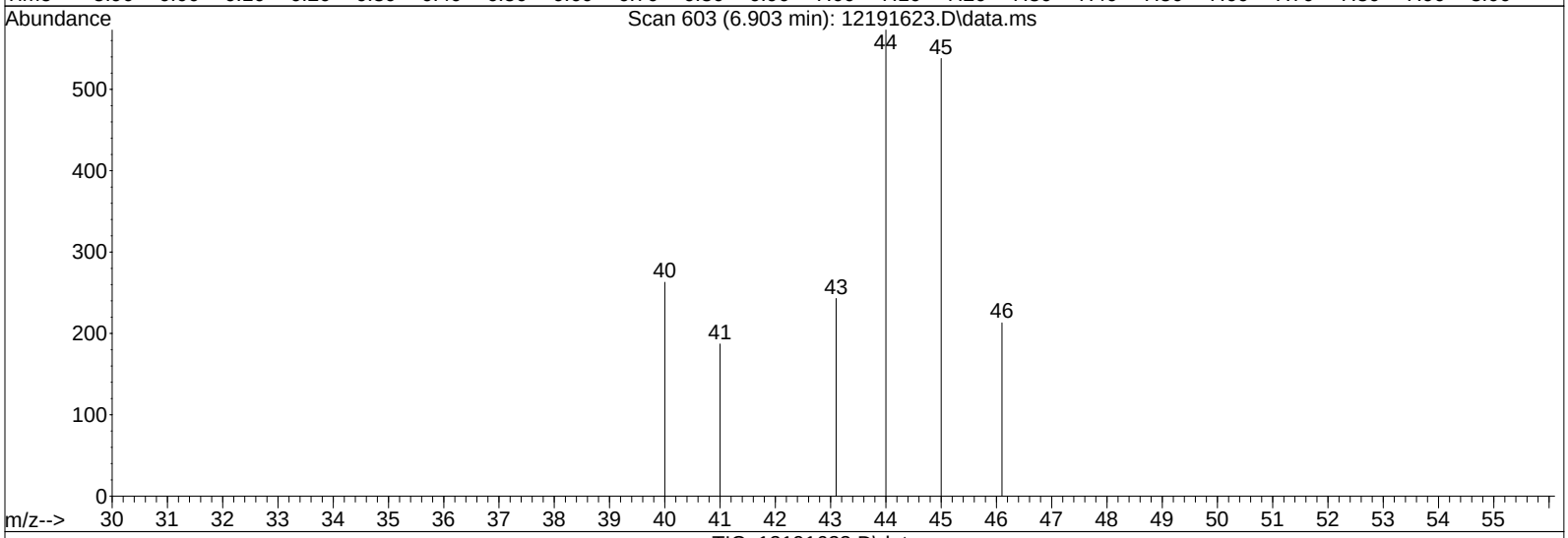


Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:37 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191623.D\data.ms

(11) Acetonitrile (T)

6.903min (-0.044) 0.00ng

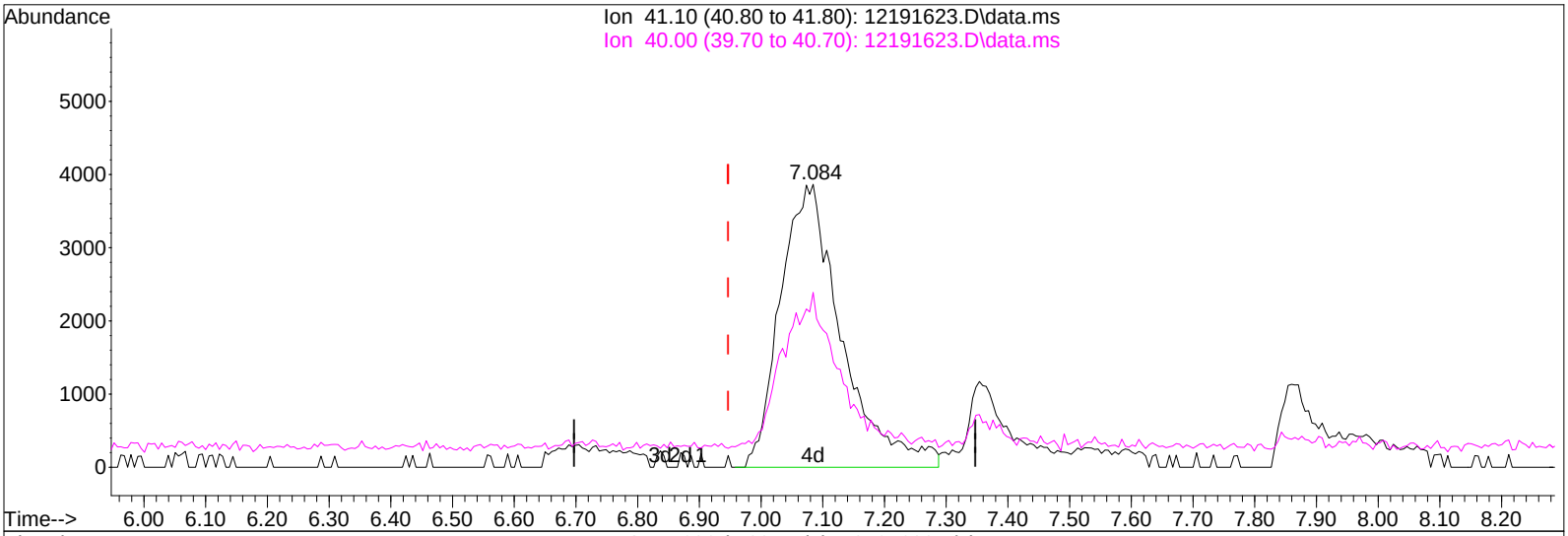
response 62

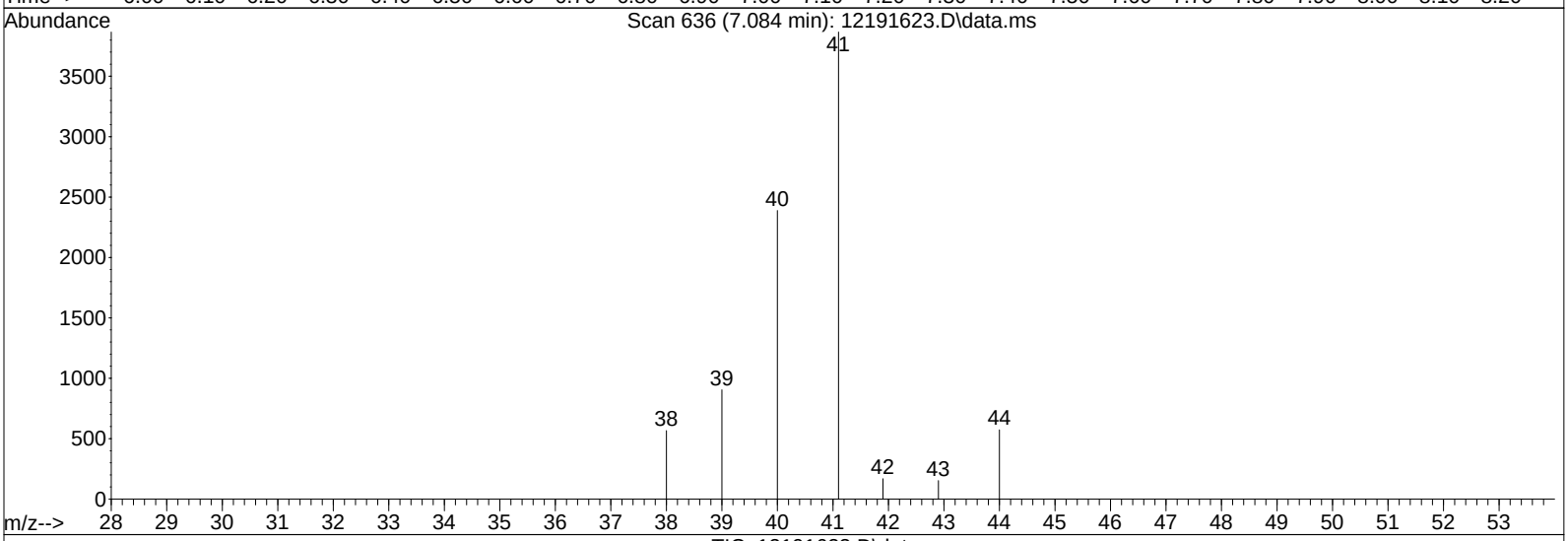
Ion	Exp%	Act%
41.10	100	100
40.00	54.30	322.58#
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:37 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191623.D\data.ms

(11) Acetonitrile (T)

7.084min (+0.137) 0.44ng m

response 26579

Ion	Exp%	Act%
41.10	100	100
40.00	54.30	0.75#
0.00	0.00	0.00
0.00	0.00	0.00

IPC

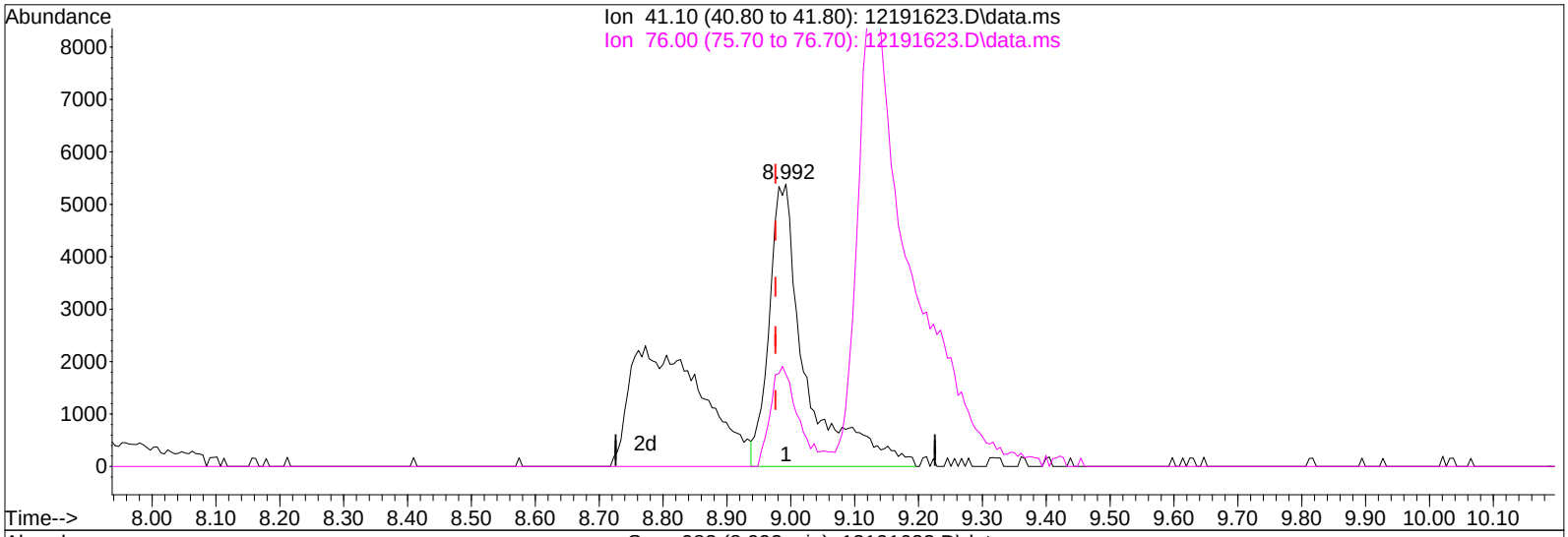
LH 12/20/16

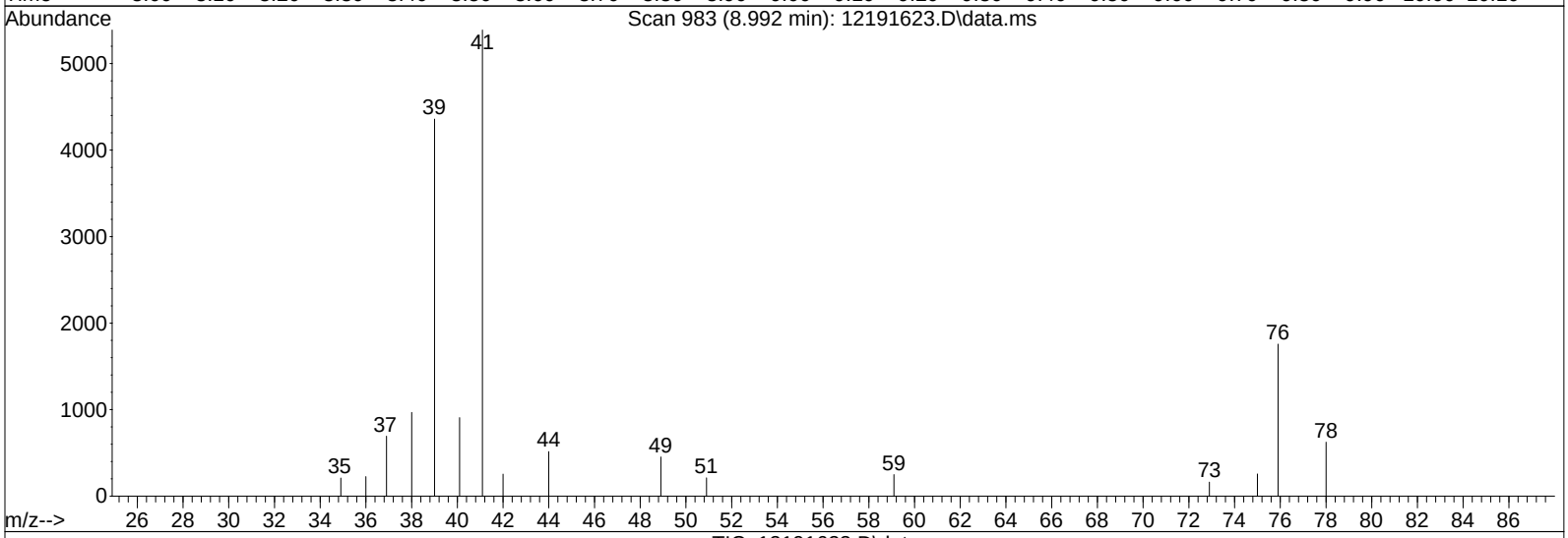
12/30/16

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:37 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191623.D\data.ms

(20) 3-Chloro-1-propene (Allyl Chloride) (T)

8.992min (+0.016) 0.46ng

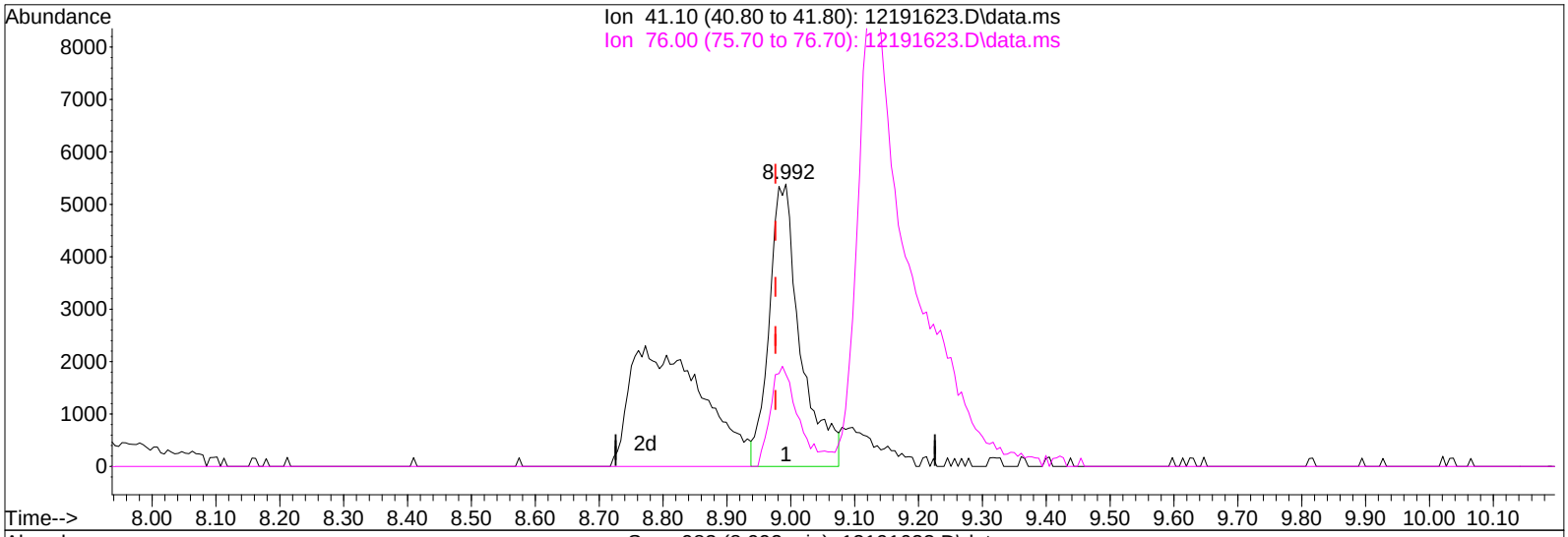
response 21371

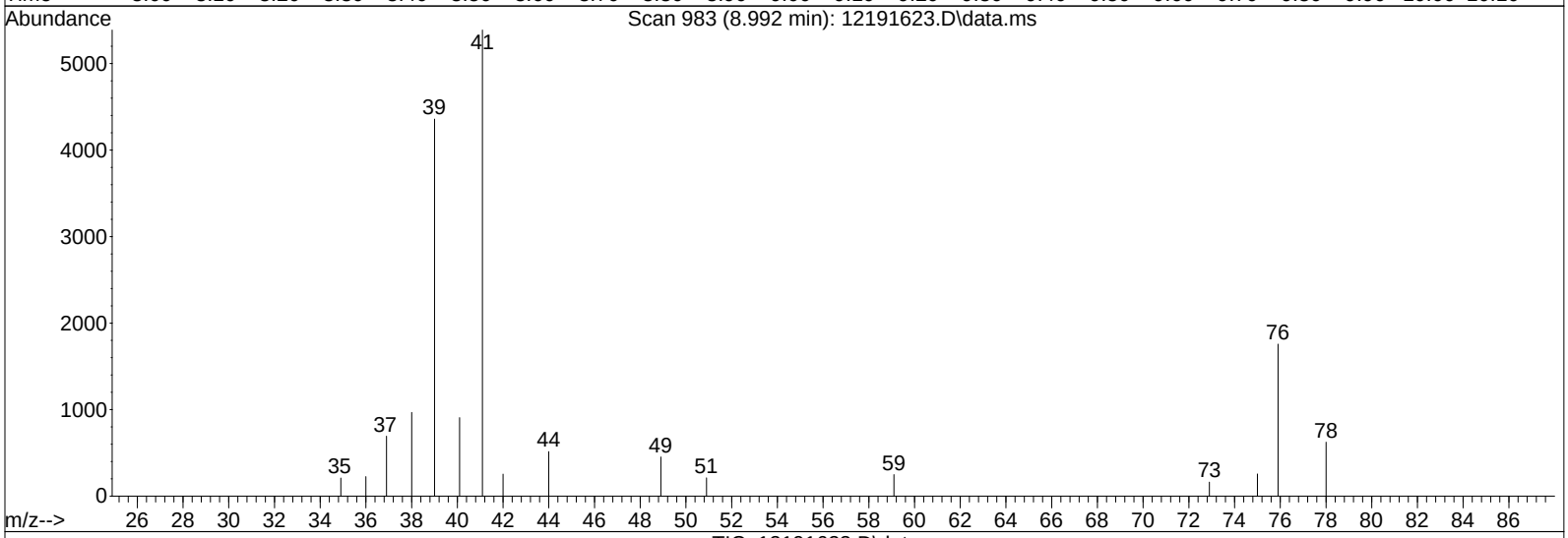
Ion	Exp%	Act%
41.10	100	100
76.00	34.90	28.45
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:37 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191623.D\data.ms

(20) 3-Chloro-1-propene (Allyl Chloride) (T)

8.992min (+0.016) 0.39ng m

response 18295

Ion	Exp%	Act%
41.10	100	100
76.00	34.90	33.24
0.00	0.00	0.00
0.00	0.00	0.00

IPC

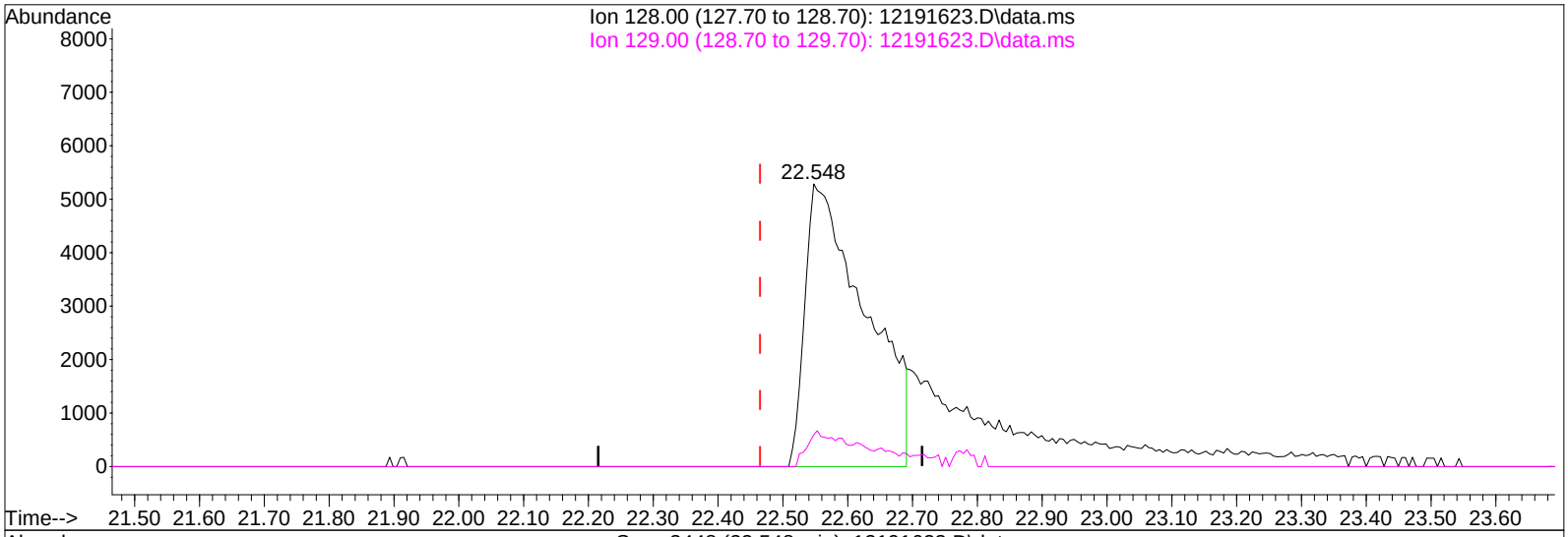
LH 12/20/16

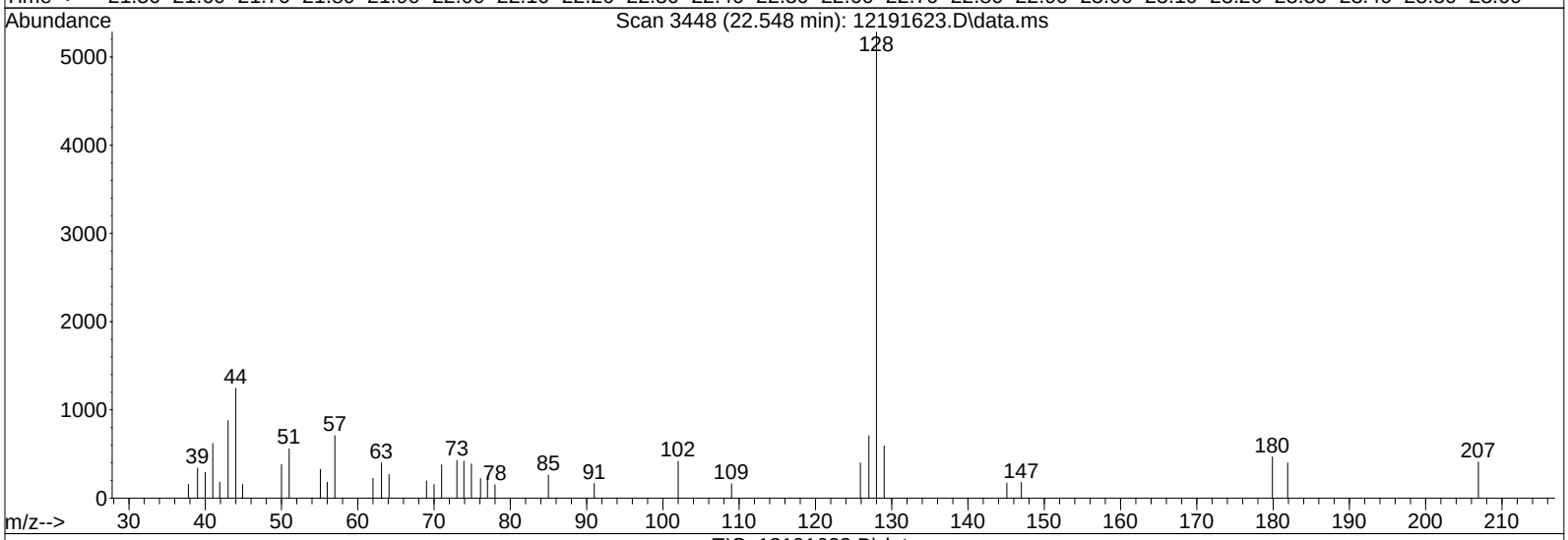
12/30/16

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:37 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191623.D\data.ms

(95) Naphthalene (T)

22.548min (+0.082) 0.32ng

response 34200

Ion	Exp%	Act%
128.00	100	100
129.00	11.00	11.75
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191623.D
Acq On : 20 Dec 2016 1:39 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:37 2016
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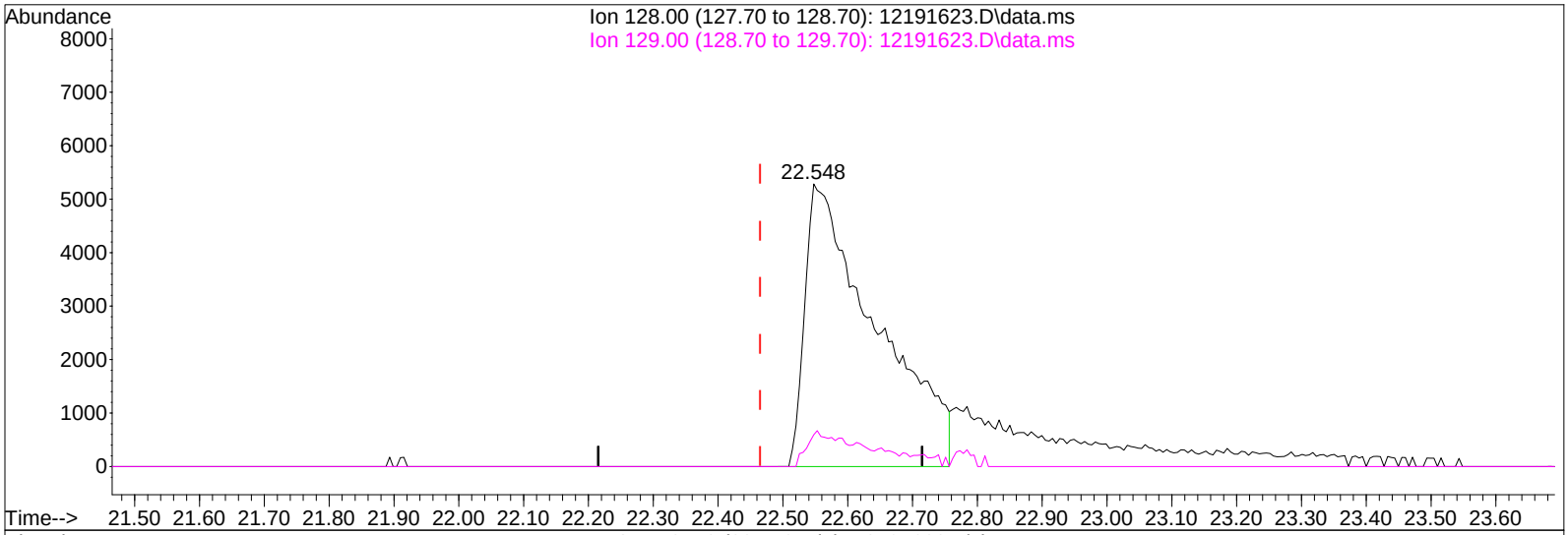
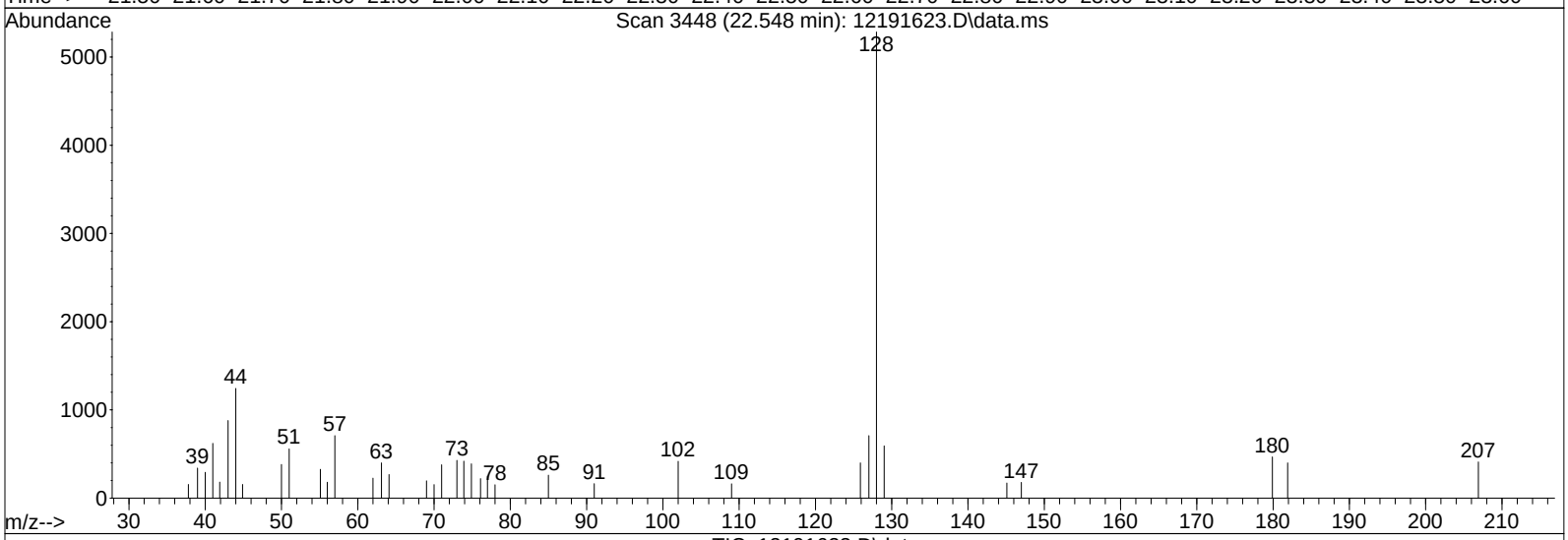
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191623.D\data.ms

(95) Naphthalene (T)

22.548min (+0.082) 0.38ng m

response 39950

Ion	Exp%	Act%
128.00	100	100
129.00	11.00	10.06
0.00	0.00	0.00
0.00	0.00	0.00

BLC

LH 12/20/16

12/30/16

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191620.D
Acq On : 19 Dec 2016 23:59 Operator: LH
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 09:09:38 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	287891	12.500	ng	-0.01
37) 1,4-Difluorobenzene (IS2)	13.65	114	1442786	12.500	ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.93	82	606464	12.500	ng	0.00

System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.40	65	516035	13.702	ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 109.60%			
57) Toluene-d8 (SS2)	16.10	98	1492567	12.920	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 103.36%			
73) Bromofluorobenzene (SS3)	19.28	174	463606	12.499	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.00%			

Target Compounds							Qvalue
2) Propene	4.26	42	4455	0.120	ng		87
3) Dichlorodifluoromethan...	4.41	85	7720	0.128	ng	#	97
4) Chloromethane	4.76	50	6115	0.125	ng		99
5) 1,2-Dichloro-1,1,2,2-t...	4.99	135	4065	0.129	ng		98
6) Vinyl Chloride	5.23	62	5048	0.103	ng		85
7) 1,3-Butadiene	5.50	54	3252	0.102	ng		94
8) Bromomethane	5.97	94	2560	0.091	ng		100
9) Chloroethane	6.30	64	2005	0.087	ng		90
10) Ethanol	6.74	45	13717	0.541	ng		93
11) Acetonitrile	7.10	41	9474m	0.146	ng		
12) Acrolein	7.28	56	2647	0.108	ng		99
13) Acetone	7.39	58	14157	0.575	ng	#	81
14) Trichlorofluoromethane	7.61	101	6526	0.124	ng		96
15) 2-Propanol (Isopropanol)	7.91	45	19376	0.229	ng		73
16) Acrylonitrile	8.27	53	4721	0.107	ng		97
17) 1,1-Dichloroethene	8.61	96	2858	0.104	ng		94
18) 2-Methyl-2-Propanol (t...	8.83	59	19366	0.237	ng	#	72
19) Methylene Chloride	8.82	84	3788	0.115	ng		88
20) 3-Chloro-1-propene (Al...	8.99	41	4044	0.081	ng		89
21) Trichlorotrifluoroethane	9.23	151	3186	0.121	ng		98
22) Carbon Disulfide	9.13	76	15656	0.139	ng		93
23) trans-1,2-Dichloroethene	10.10	61	5111	0.112	ng		98
24) 1,1-Dichloroethane	10.35	63	5949	0.102	ng		99
25) Methyl tert-Butyl Ether	10.46	73	11732	0.125	ng		97
26) Vinyl Acetate	10.63	86	2997	0.434	ng	#	82
27) 2-Butanone (MEK)	10.89	72	2269	0.103	ng	#	55
28) cis-1,2-Dichloroethene	11.37	61	5025	0.113	ng		97
29) Diisopropyl Ether	11.65	87	3567	0.130	ng	#	68
30) Ethyl Acetate	11.68	61	2368	0.201	ng		98
31) n-Hexane	11.64	57	6112	0.115	ng		97
32) Chloroform	11.71	83	6444	0.118	ng		99
34) Tetrahydrofuran (THF)	12.15	72	2748	0.122	ng	#	84
35) Ethyl tert-Butyl Ether	12.24	87	4075	0.114	ng		95
36) 1,2-Dichloroethane	12.51	62	5388	0.130	ng		100
38) 1,1,1-Trichloroethane	12.78	97	5686	0.121	ng		97
39) Isopropyl Acetate	13.22	61	4479	0.208	ng	#	86
40) 1-Butanol	13.26	56	6847	0.203	ng		86
41) Benzene	13.26	78	15697	0.112	ng		97
42) Carbon Tetrachloride	13.42	117	4664	0.115	ng		96
43) Cyclohexane	13.55	84	11027	0.233	ng		99
44) tert-Amyl Methyl Ether	13.89	73	10713	0.117	ng		92
45) 1,2-Dichloropropane	14.12	63	3810	0.111	ng		95
46) Bromodichloromethane	14.32	83	4852	0.116	ng		100
47) Trichloroethene	14.35	130	4092	0.126	ng		99
48) 1,4-Dioxane	14.36	88	2774	0.102	ng	#	66
49) 2,2,4-Trimethylpentane...	14.41	57	16032	0.113	ng		90

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191620.D
Acq On : 19 Dec 2016 23:59 Operator: LH
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 09:09:38 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

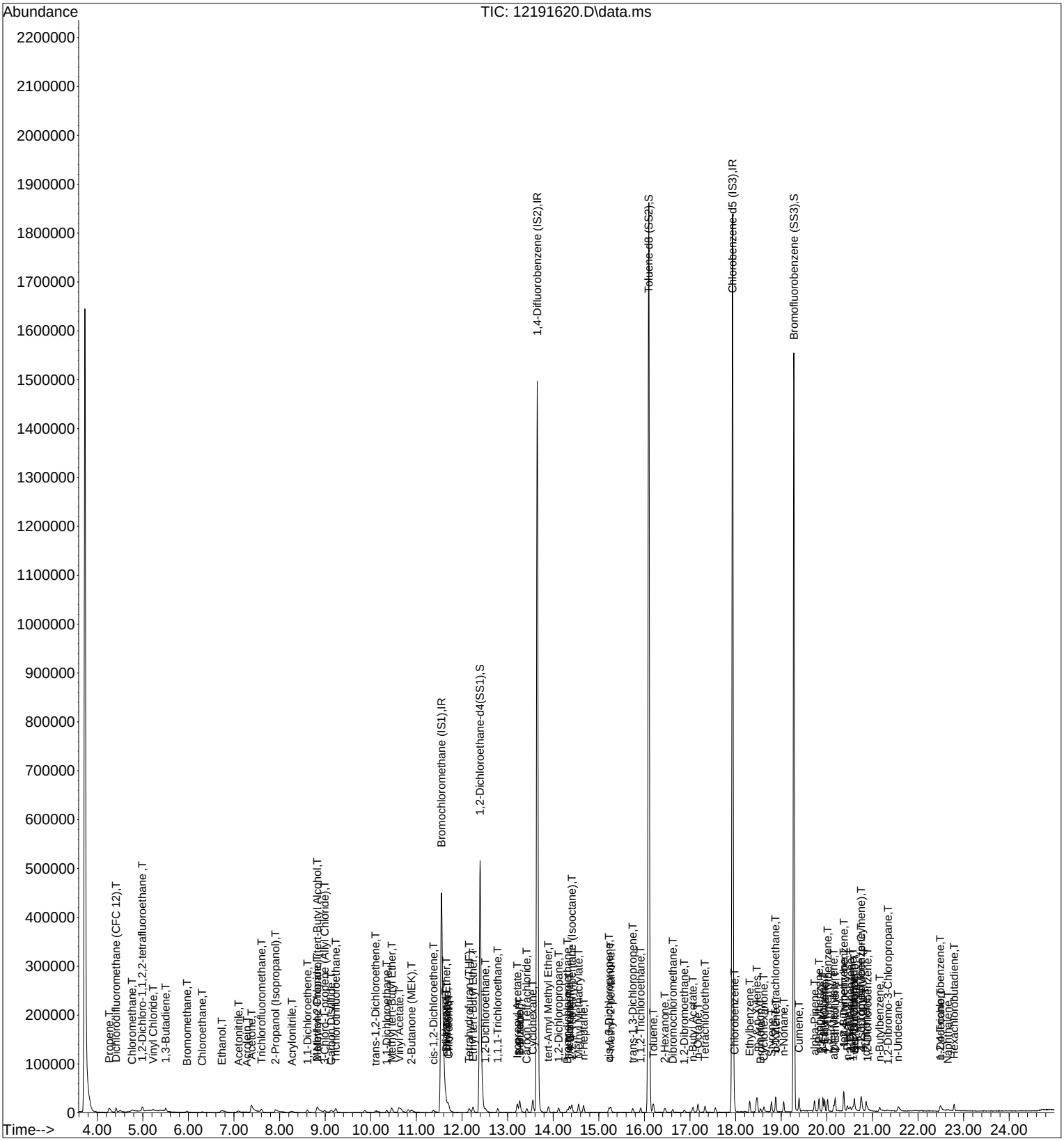
Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
50) Methyl Methacrylate	14.56	100	2657	0.218 ng		92
51) n-Heptane	14.67	71	3588	0.112 ng		95
52) cis-1,3-Dichloropropene	15.23	75	5961	0.117 ng		99
53) 4-Methyl-2-pentanone	15.26	58	3367	0.108 ng	#	73
54) trans-1,3-Dichloropropene	15.75	75	4924	0.109 ng		98
55) 1,1,2-Trichloroethane	15.92	97	3404	0.113 ng		99
58) Toluene	16.20	91	15536	0.130 ng		96
59) 2-Hexanone	16.45	43	9494	0.124 ng		85
60) Dibromochloromethane	16.62	129	3816	0.116 ng		98
61) 1,2-Dibromoethane	16.87	107	3878	0.115 ng		97
62) n-Butyl Acetate	17.06	43	9503	0.109 ng		94
63) n-Octane	17.17	57	3901	0.137 ng	#	81
64) Tetrachloroethene	17.33	166	3974	0.119 ng		99
65) Chlorobenzene	17.98	112	9816	0.120 ng		92
66) Ethylbenzene	18.31	91	16434	0.115 ng		99
67) m- & p-Xylenes	18.47	91	26820	0.247 ng		98
68) Bromoform	18.55	173	2976	0.113 ng		97
69) Styrene	18.79	104	9744	0.117 ng		99
70) o-Xylene	18.89	91	13504	0.124 ng		99
71) n-Nonane	19.06	43	8168	0.119 ng		91
72) 1,1,2,2-Tetrachloroethane	18.87	83	5256	0.100 ng		98
74) Cumene	19.39	105	16806	0.129 ng		96
75) alpha-Pinene	19.73	93	8077	0.113 ng		95
76) n-Propylbenzene	19.83	91	20076	0.122 ng		97
77) 3-Ethyltoluene	19.91	105	17336	0.125 ng		98
78) 4-Ethyltoluene	19.95	105	13624	0.111 ng		95
79) 1,3,5-Trimethylbenzene	20.02	105	13705	0.120 ng		94
80) alpha-Methylstyrene	20.15	118	5685	0.105 ng		90
81) 2-Ethyltoluene	20.18	105	15092	0.114 ng		99
82) 1,2,4-Trimethylbenzene	20.38	105	12020	0.108 ng		95
83) n-Decane	20.45	57	7645	0.115 ng		93
84) Benzyl Chloride	20.61	91	8398	0.098 ng	#	55
85) 1,3-Dichlorobenzene	20.52	146	4298	0.073 ng		99
86) 1,4-Dichlorobenzene	20.57	146	8335m	0.124 ng		
87) sec-Butylbenzene	20.61	105	16552	0.114 ng	#	64
88) 4-Isopropyltoluene (p-...	20.75	119	16800	0.125 ng		89
89) 1,2,3-Trimethylbenzene	20.75	105	16318	0.143 ng		88
90) 1,2-Dichlorobenzene	20.89	146	7618	0.126 ng		99
91) d-Limonene	20.86	68	4838	0.109 ng		97
92) 1,2-Dibromo-3-Chloropr...	21.34	157	1336	0.066 ng	#	57
93) n-Undecane	21.56	57	8653	0.126 ng		85
94) 1,2,4-Trichlorobenzene	22.49	180	3718	0.090 ng	#	95
95) Naphthalene	22.66	128	6128	0.054 ng	#	71
96) n-Dodecane	22.49	57	7367m	0.118 ng		
97) Hexachlorobutadiene	22.79	225	3006	0.108 ng		100
98) Cyclohexanone	18.62	55	5979	0.125 ng		92
99) tert-Butylbenzene	20.37	119	12649	0.121 ng		99
100) n-Butylbenzene	21.16	91	12866	0.107 ng		91

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191620.D
Acq On : 19 Dec 2016 23:59 Operator: LH
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

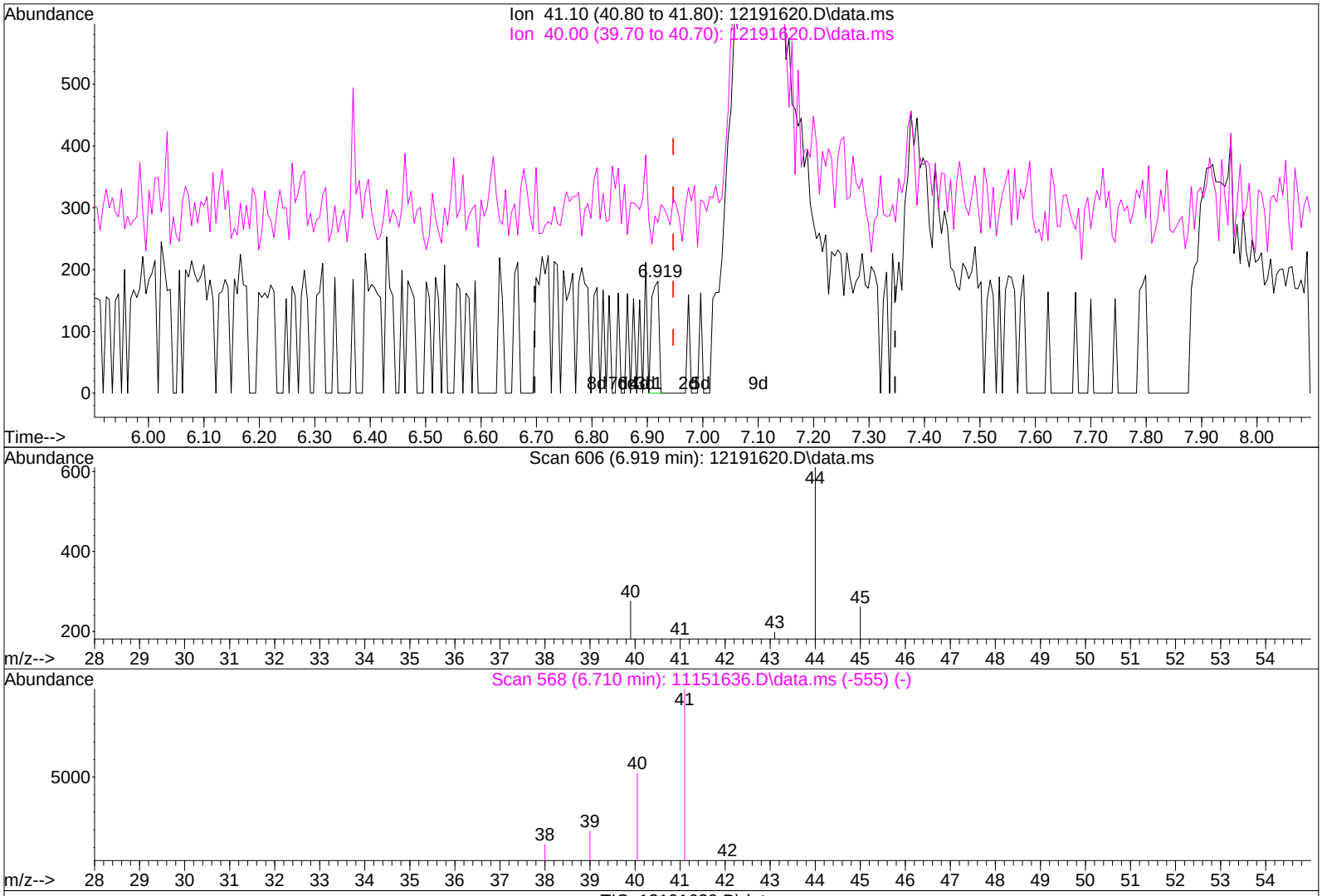
Quant Time: Dec 20 09:09:38 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191620.D
Acq On : 19 Dec 2016 23:59 Operator: LH
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:31 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12191620.D\data.ms

(11) Acetonitrile (T)

6.919min (-0.028) 0.00ng

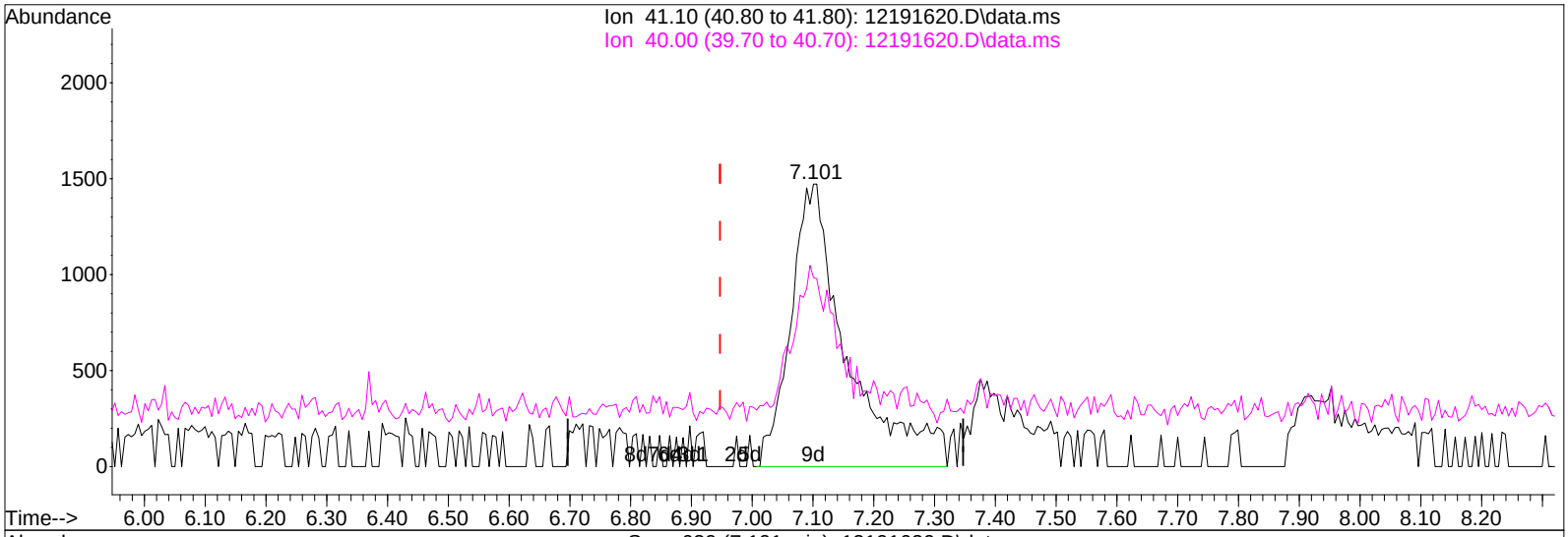
response 168

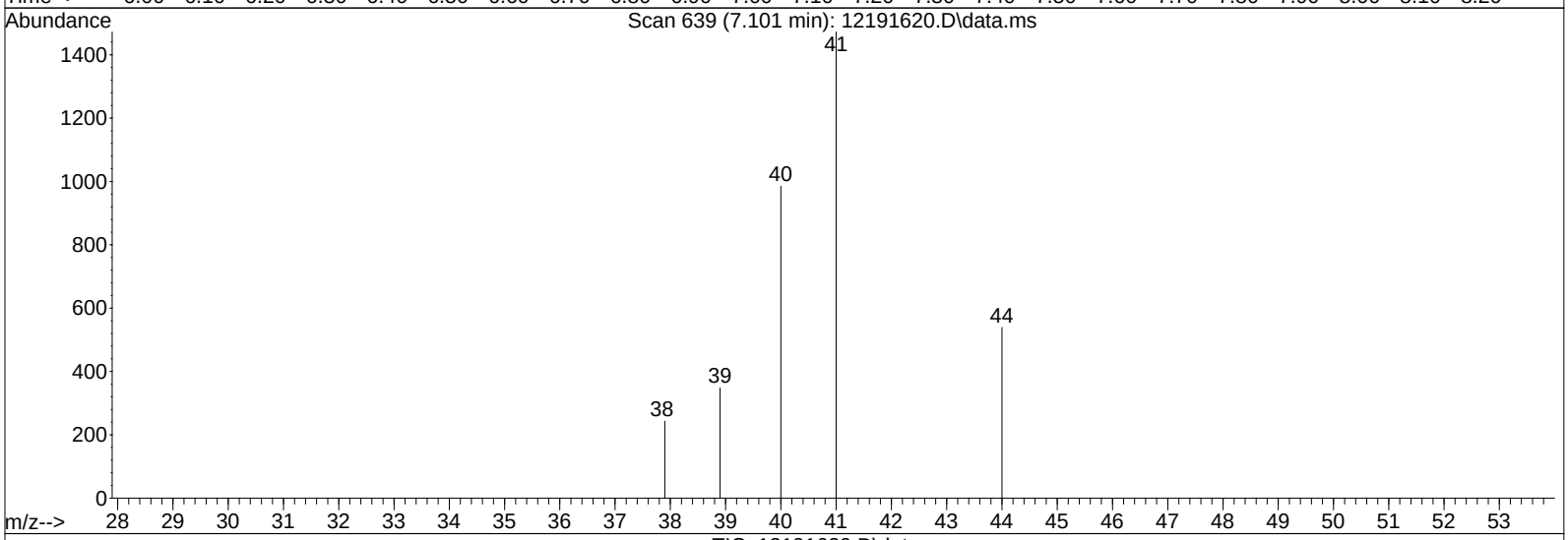
Ion	Exp%	Act%
41.10	100	100
40.00	54.30	91.07#
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191620.D
Acq On : 19 Dec 2016 23:59 Operator: LH
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:31 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191620.D\data.ms

(11) Acetonitrile (T)

7.101min (+0.154) 0.15ng m

response 9474

Ion	Exp%	Act%
41.10	100	100
40.00	54.30	1.61#
0.00	0.00	0.00
0.00	0.00	0.00

RTS

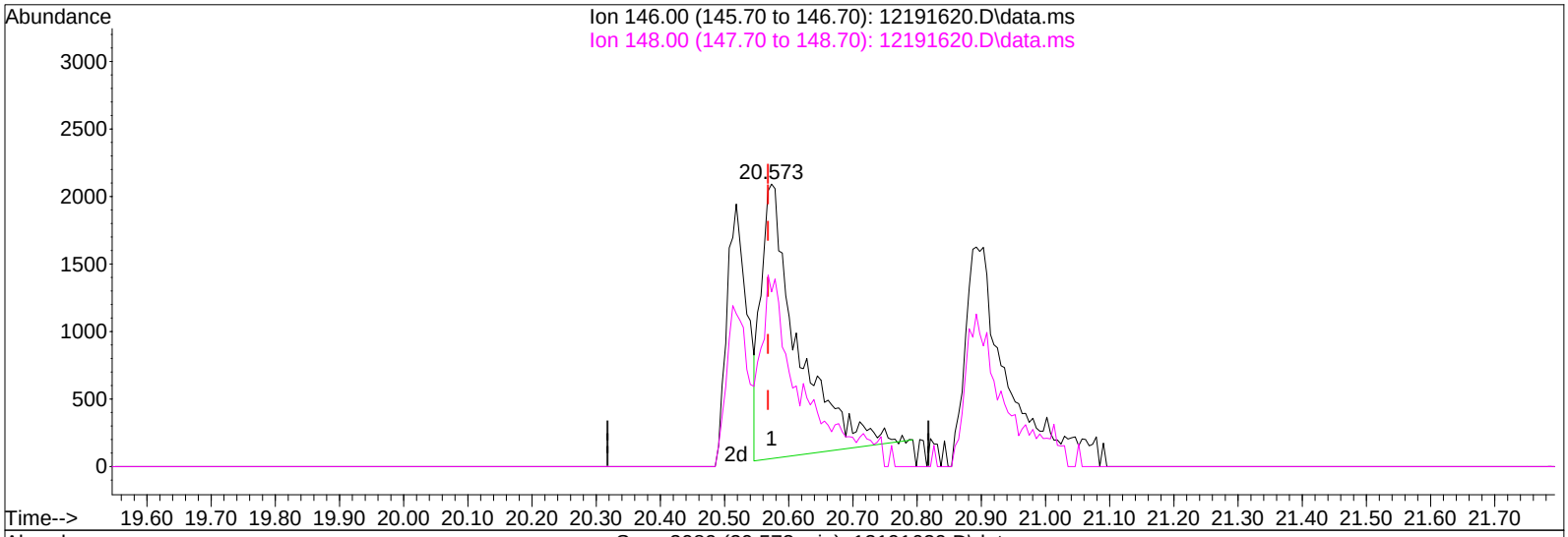
LH 12/20/16

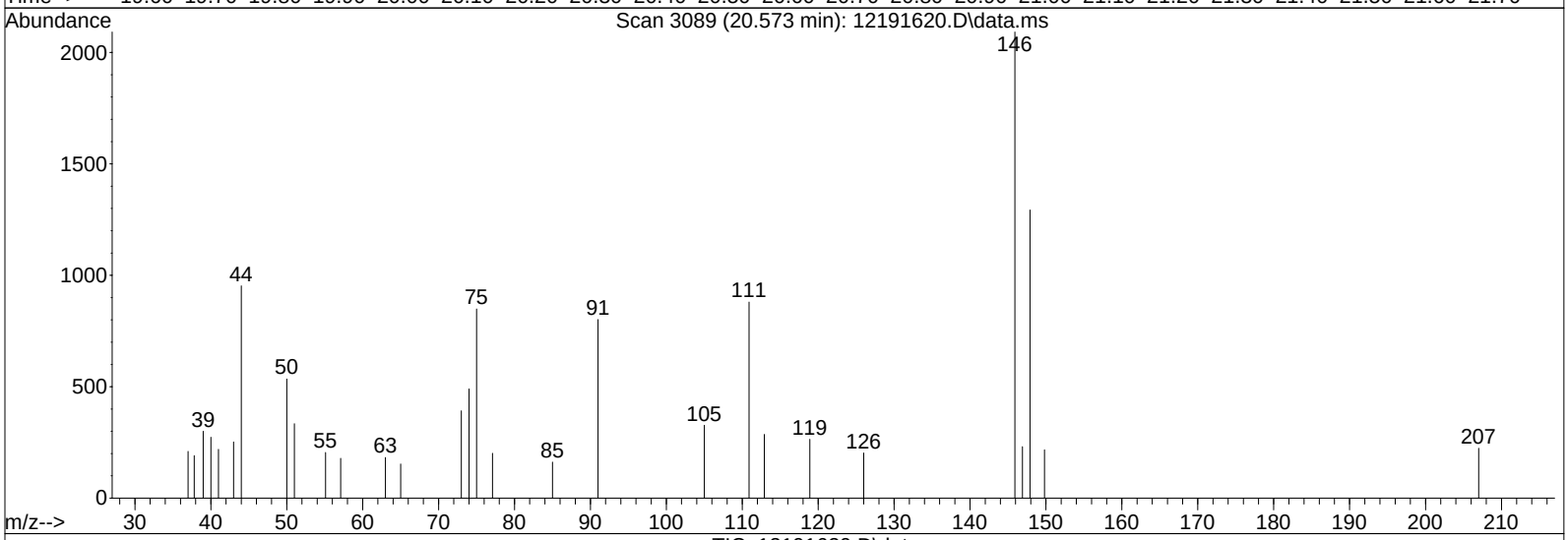
12/30/16

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191620.D
Acq On : 19 Dec 2016 23:59 Operator: LH
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:31 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191620.D\data.ms

(86) 1,4-Dichlorobenzene (T)

20.573min (+0.005) 0.12ng

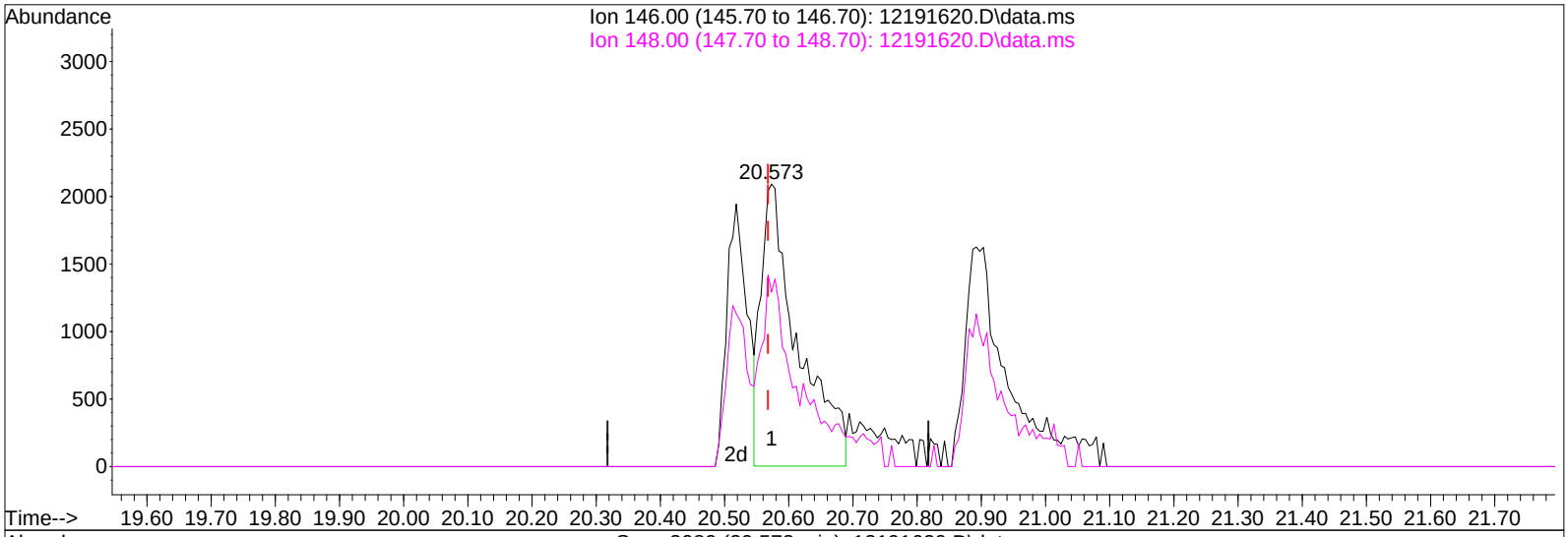
response 8112

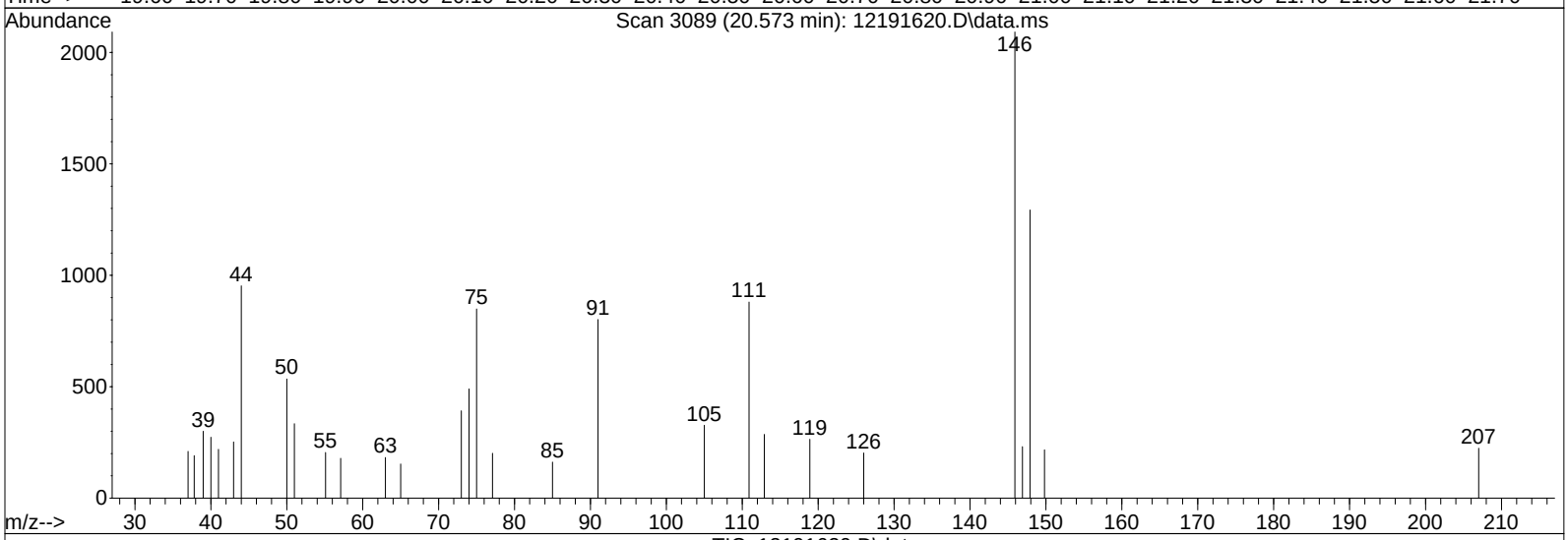
Ion	Exp%	Act%
146.00	100	100
148.00	63.90	76.43
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191620.D
Acq On : 19 Dec 2016 23:59 Operator: LH
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:31 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191620.D\data.ms

(86) 1,4-Dichlorobenzene (T)

20.573min (+0.005) 0.12ng m

response 8335

Ion	Exp%	Act%
146.00	100	100
148.00	63.90	74.39
0.00	0.00	0.00
0.00	0.00	0.00

BLC

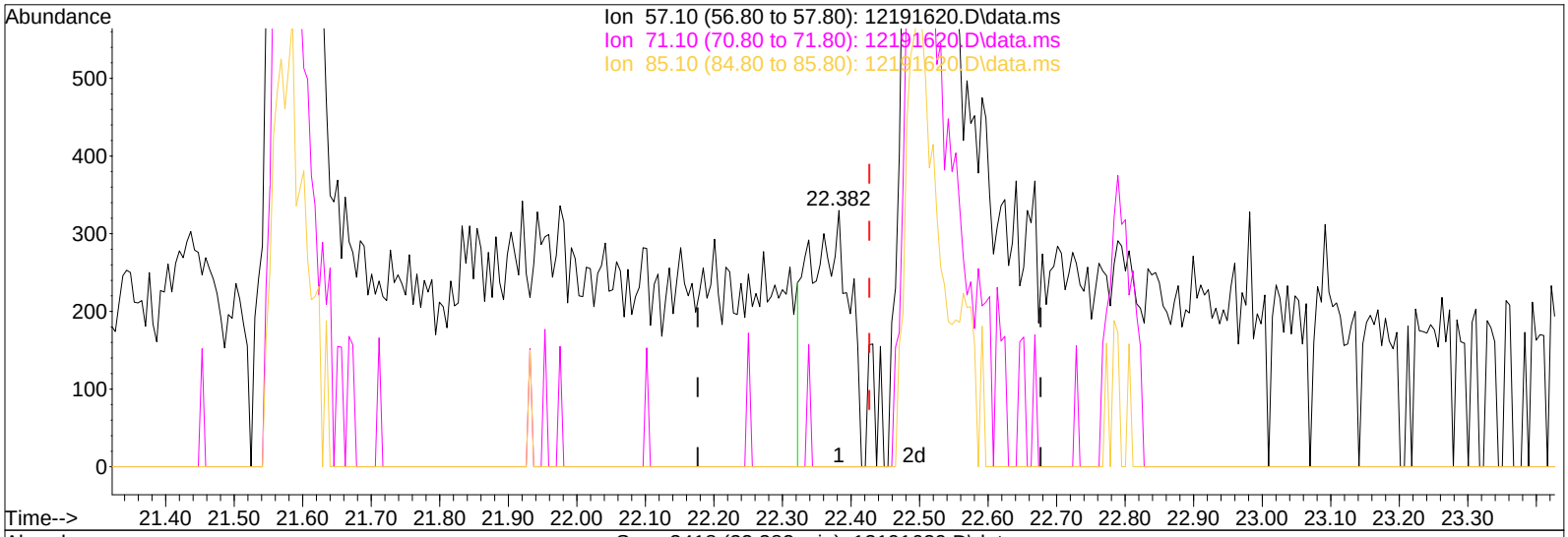
LH 12/20/16

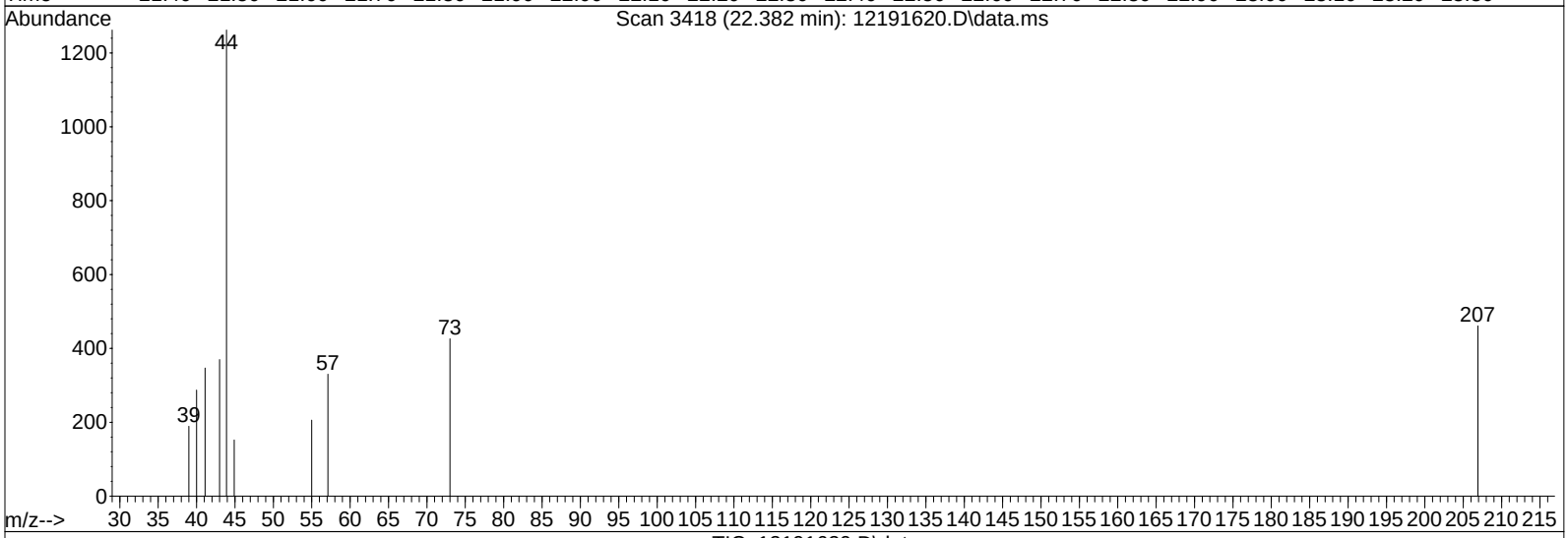
12/30/16

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191620.D
Acq On : 19 Dec 2016 23:59 Operator: LH
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:31 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191620.D\data.ms

(96) n-Dodecane (T)

22.382min (-0.044) 0.02ng

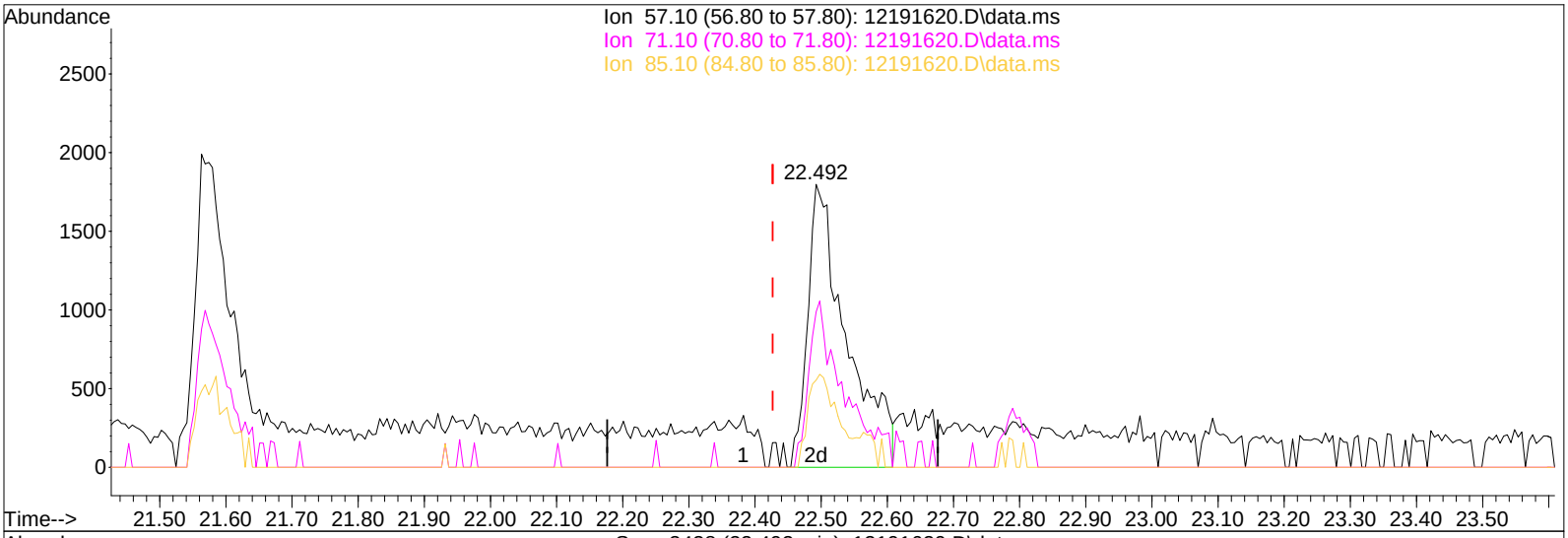
response 1319

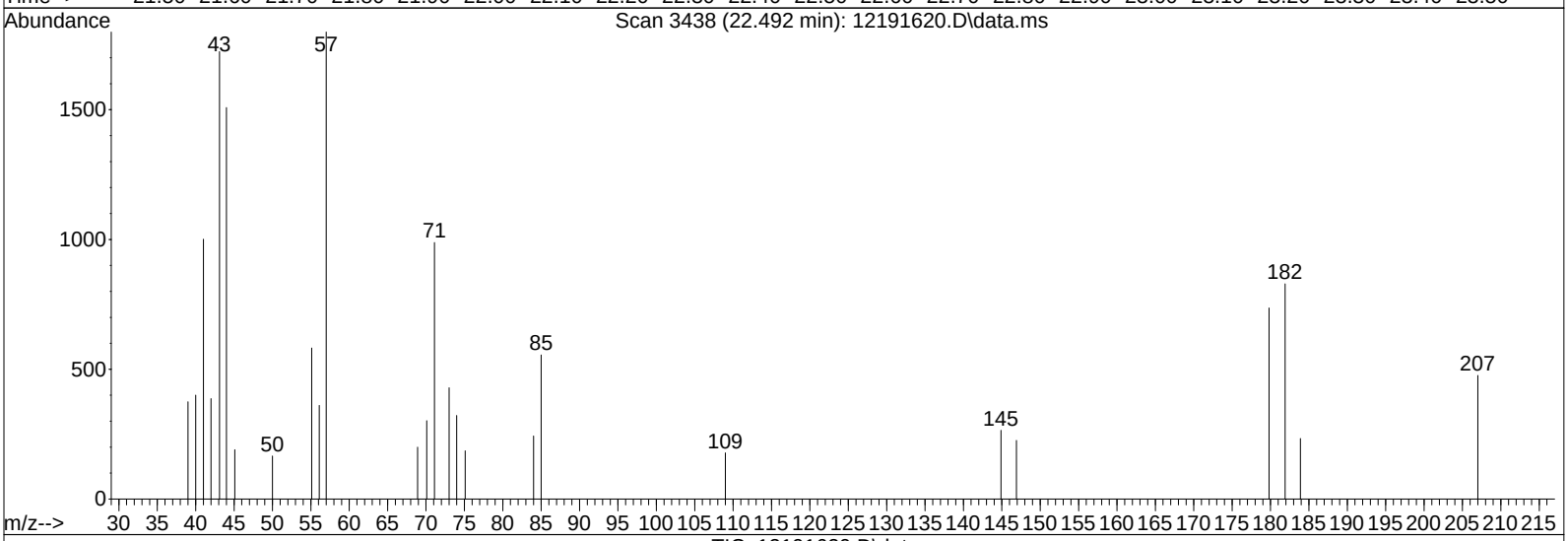
Ion	Exp%	Act%
57.10	100	100
71.10	54.10	0.00#
85.10	31.90	0.00#
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191620.D
Acq On : 19 Dec 2016 23:59 Operator: LH
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191607 (1/17)
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Dec 20 08:57:31 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191620.D\data.ms

(96) n-Dodecane (T)

22.492min (+0.066) 0.12ng m

response 7367

Ion	Exp%	Act%
57.10	100	100
71.10	54.10	0.00#
85.10	31.90	0.00#
0.00	0.00	0.00

MP

LH 12/20/16

12/30/16

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191624.D
Acq On : 20 Dec 2016 2:13 Operator: LH
Sample : 1.0ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191605 (1/17)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Dec 20 09:54:12 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.54	130	281285	12.500	ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.65	114	1385694	12.500	ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.93	82	594876	12.500	ng	0.00

System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...	12.39	65	509536	13.847	ng	-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 110.80%			
57) Toluene-d8 (SS2)	16.10	98	1425991	12.584	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.64%			
73) Bromofluorobenzene (SS3)	19.28	174	460316	12.652	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 101.20%			

Target Compounds

							Qvalue
2) Propene	4.22	42	36719	1.010	ng		97
3) Dichlorodifluoromethan...	4.38	85	72389	1.226	ng		100
4) Chloromethane	4.70	50	58646	1.223	ng		99
5) 1,2-Dichloro-1,1,2,2-t...	4.96	135	37579	1.216	ng		99
6) Vinyl Chloride	5.15	62	55830	1.164	ng		98
7) 1,3-Butadiene	5.44	54	41386	1.330	ng		99
8) Bromomethane	5.92	94	28182	1.027	ng		96
9) Chloroethane	6.26	64	22541	1.003	ng		96
10) Ethanol	6.64	45	124549	5.023	ng		100
11) Acetonitrile	7.01	41	64313m	1.013	ng		
12) Acrolein	7.13	56	22314	0.935	ng		100
13) Acetone	7.33	58	125638	5.220	ng		91
14) Trichlorofluoromethane	7.58	101	58339	1.136	ng		100
15) 2-Propanol (Isopropanol)	7.83	45	182943	2.217	ng		90
16) Acrylonitrile	8.19	53	43804	1.016	ng		100
17) 1,1-Dichloroethene	8.59	96	31117	1.157	ng		99
18) 2-Methyl-2-Propanol (t...	8.73	59	181241	2.269	ng		97
19) Methylene Chloride	8.81	84	33421	1.037	ng		92
20) 3-Chloro-1-propene (Al...	8.98	41	47552	0.970	ng		94
21) Trichlorotrifluoroethane	9.22	151	28632	1.115	ng		99
22) Carbon Disulfide	9.11	76	126930	1.152	ng		98
23) trans-1,2-Dichloroethene	10.10	61	48489	1.087	ng		100
24) 1,1-Dichloroethane	10.34	63	59142	1.042	ng		99
25) Methyl tert-Butyl Ether	10.43	73	103720	1.133	ng		99
26) Vinyl Acetate	10.59	86	33468	4.965	ng	#	78
27) 2-Butanone (MEK)	10.85	72	22680	1.053	ng		96
28) cis-1,2-Dichloroethene	11.36	61	48058	1.102	ng		99
29) Diisopropyl Ether	11.64	87	26335	0.979	ng	#	89
30) Ethyl Acetate	11.66	61	25096	2.181	ng		99
31) n-Hexane	11.63	57	54461	1.045	ng		99
32) Chloroform	11.70	83	60704	1.137	ng		100
34) Tetrahydrofuran (THF)	12.12	72	22683	1.030	ng		97
35) Ethyl tert-Butyl Ether	12.23	87	39004	1.118	ng		99
36) 1,2-Dichloroethane	12.51	62	49084	1.209	ng		99
38) 1,1,1-Trichloroethane	12.78	97	53677	1.184	ng		100
39) Isopropyl Acetate	13.20	61	43070	2.082	ng		96
40) 1-Butanol	13.24	56	68319	2.111	ng		86
41) Benzene	13.27	78	132189	0.979	ng		100
42) Carbon Tetrachloride	13.42	117	46065	1.184	ng		100
43) Cyclohexane	13.55	84	101148	2.228	ng		100
44) tert-Amyl Methyl Ether	13.89	73	96200	1.092	ng		97
45) 1,2-Dichloropropane	14.12	63	33701	1.025	ng		99
46) Bromodichloromethane	14.31	83	46468	1.158	ng		99
47) Trichloroethene	14.35	130	35500	1.139	ng		99
48) 1,4-Dioxane	14.34	88	27794	1.063	ng		100
49) 2,2,4-Trimethylpentane...	14.40	57	142985	1.046	ng		99

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191624.D
Acq On : 20 Dec 2016 2:13 Operator: LH
Sample : 1.0ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191605 (1/17)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Dec 20 09:54:12 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

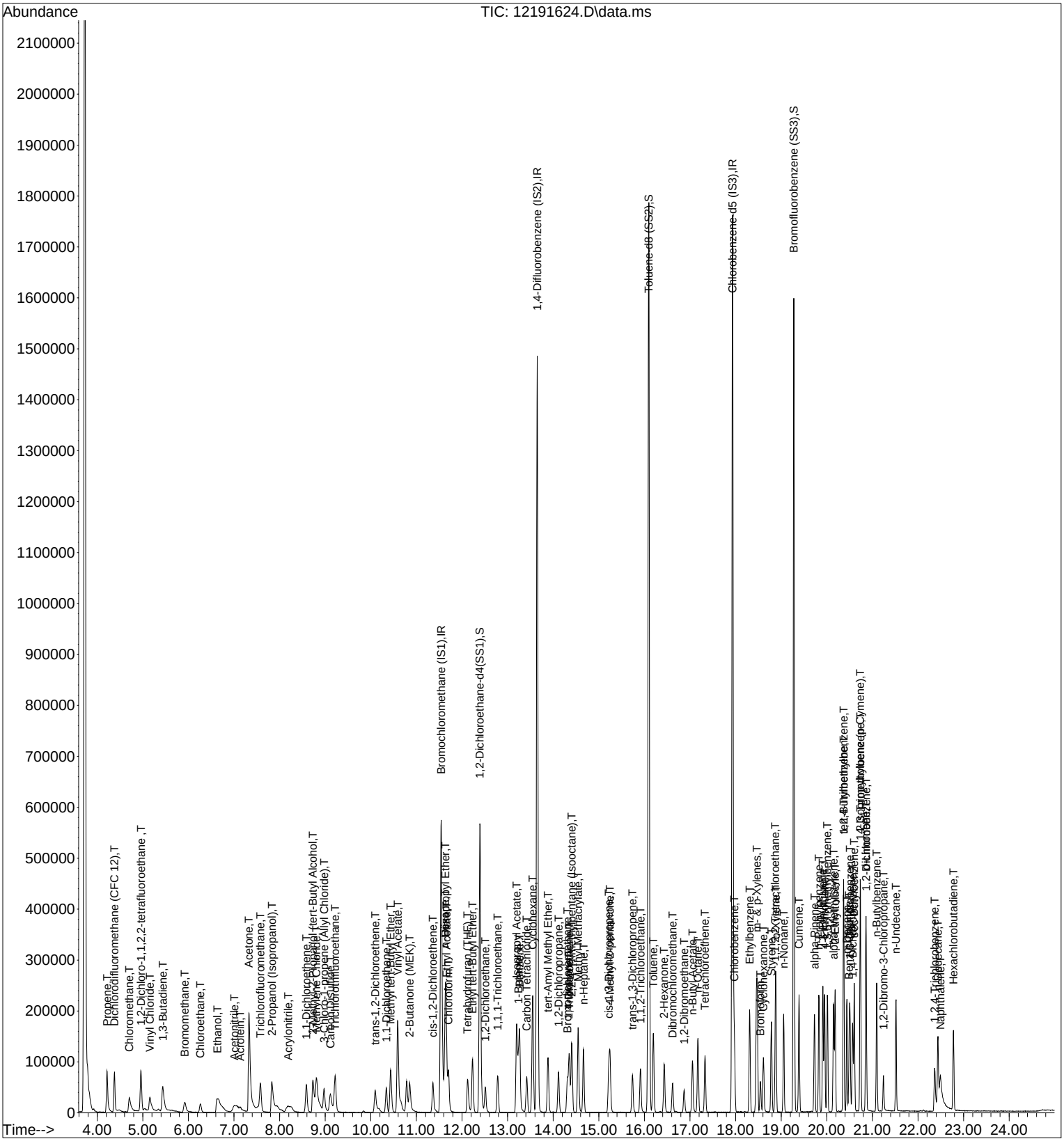
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	14.55	100	26894	2.300 ng	98
51) n-Heptane	14.67	71	32479	1.056 ng	100
52) cis-1,3-Dichloropropene	15.22	75	56609	1.159 ng	99
53) 4-Methyl-2-pentanone	15.24	58	32528	1.082 ng	91
54) trans-1,3-Dichloropropene	15.74	75	48271	1.114 ng	99
55) 1,1,2-Trichloroethane	15.92	97	32416	1.118 ng	98
58) Toluene	16.20	91	131845	1.122 ng	99
59) 2-Hexanone	16.43	43	83179	1.109 ng	99
60) Dibromochloromethane	16.62	129	36746	1.141 ng	100
61) 1,2-Dibromoethane	16.87	107	36801	1.111 ng	99
62) n-Butyl Acetate	17.05	43	91437	1.067 ng	99
63) n-Octane	17.17	57	30021	1.073 ng	98
64) Tetrachloroethene	17.33	166	36051	1.101 ng	98
65) Chlorobenzene	17.97	112	88550	1.101 ng	100
66) Ethylbenzene	18.31	91	154958	1.104 ng	99
67) m- & p-Xylenes	18.47	91	238842	2.243 ng	99
68) Bromoform	18.54	173	29895	1.160 ng	100
69) Styrene	18.79	104	92032	1.122 ng	100
70) o-Xylene	18.89	91	120193	1.123 ng	99
71) n-Nonane	19.06	43	71839	1.070 ng	96
72) 1,1,2,2-Tetrachloroethane	18.87	83	57693	1.119 ng	100
74) Cumene	19.39	105	150969	1.179 ng	99
75) alpha-Pinene	19.73	93	76994	1.101 ng	99
76) n-Propylbenzene	19.83	91	186295	1.151 ng	98
77) 3-Ethyltoluene	19.91	105	146689	1.075 ng	97
78) 4-Ethyltoluene	19.95	105	145514	1.204 ng	93
79) 1,3,5-Trimethylbenzene	20.01	105	121137	1.086 ng	99
80) alpha-Methylstyrene	20.15	118	64190	1.214 ng	99
81) 2-Ethyltoluene	20.18	105	146185	1.129 ng	100
82) 1,2,4-Trimethylbenzene	20.37	105	124924	1.140 ng	99
83) n-Decane	20.44	57	69520	1.064 ng	99
84) Benzyl Chloride	20.49	91	93026	1.104 ng	97
85) 1,3-Dichlorobenzene	20.51	146	70806	1.223 ng	100
86) 1,4-Dichlorobenzene	20.57	146	70454	1.071 ng	99
87) sec-Butylbenzene	20.60	105	166968	1.170 ng	99
88) 4-Isopropyltoluene (p-...	20.73	119	151070	1.150 ng	99
89) 1,2,3-Trimethylbenzene	20.74	105	124106	1.109 ng	98
90) 1,2-Dichlorobenzene	20.86	146	69762	1.181 ng	100
91) d-Limonene	20.86	68	49971	1.151 ng	98
92) 1,2-Dibromo-3-Chloropr...	21.24	157	21668	1.095 ng	90
93) n-Undecane	21.52	57	70840	1.050 ng	99
94) 1,2,4-Trichlorobenzene	22.37	180	45322	1.117 ng	100
95) Naphthalene	22.49	128	129578	1.169 ng	100
96) n-Dodecane	22.44	57	67309	1.095 ng	98
97) Hexachlorobutadiene	22.78	225	30228	1.104 ng	100
98) Cyclohexanone	18.61	55	50567	1.074 ng	99
99) tert-Butylbenzene	20.37	119	121153	1.177 ng	99
100) n-Butylbenzene	21.10	91	139532	1.182 ng	96

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191624.D
Acq On : 20 Dec 2016 2:13 Operator: LH
Sample : 1.0ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191605 (1/17)
ALS Vial : 9 Sample Multiplier: 1

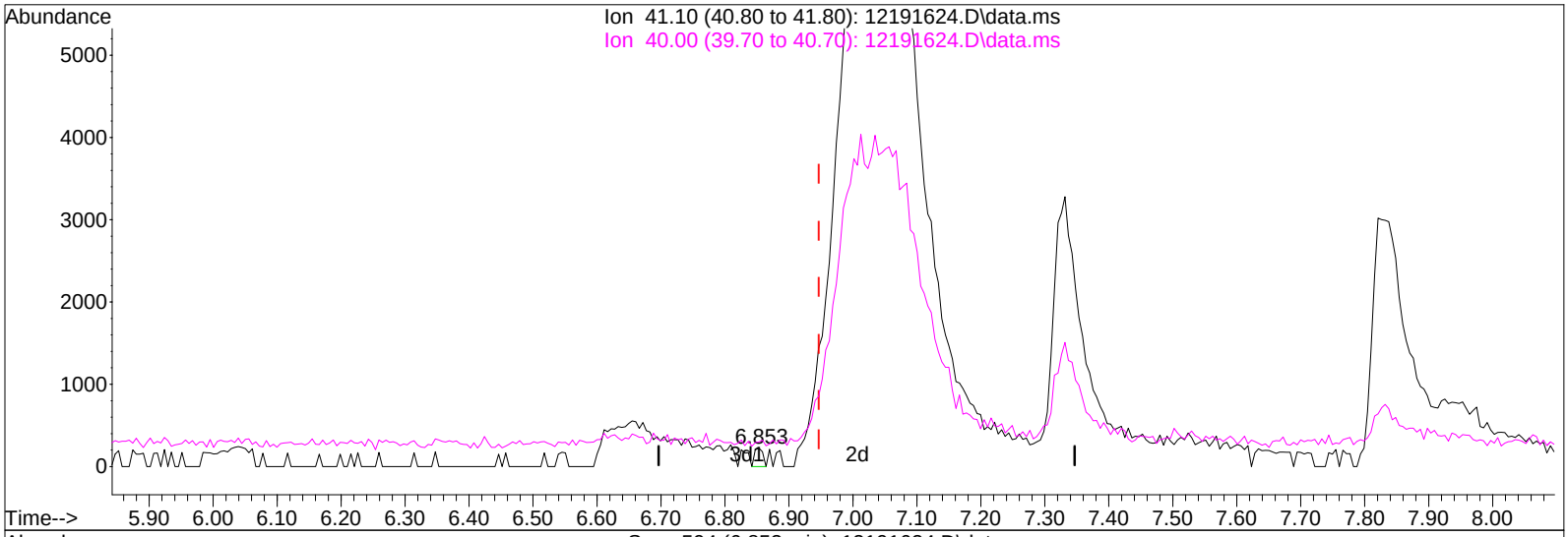
Quant Time: Dec 20 09:54:12 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

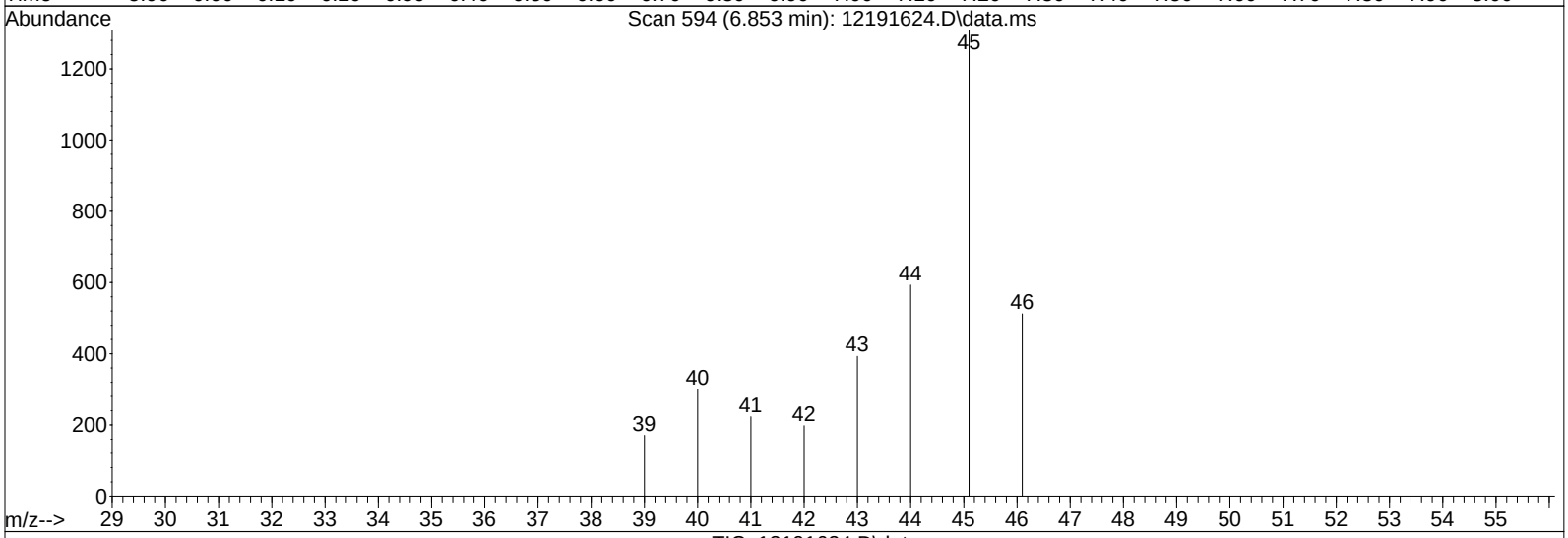


Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191624.D
Acq On : 20 Dec 2016 2:13 Operator: LH
Sample : 1.0ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191605 (1/17)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Dec 20 08:57:39 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191624.D\data.ms

(11) Acetonitrile (T)

6.853min (-0.094) 0.00ng

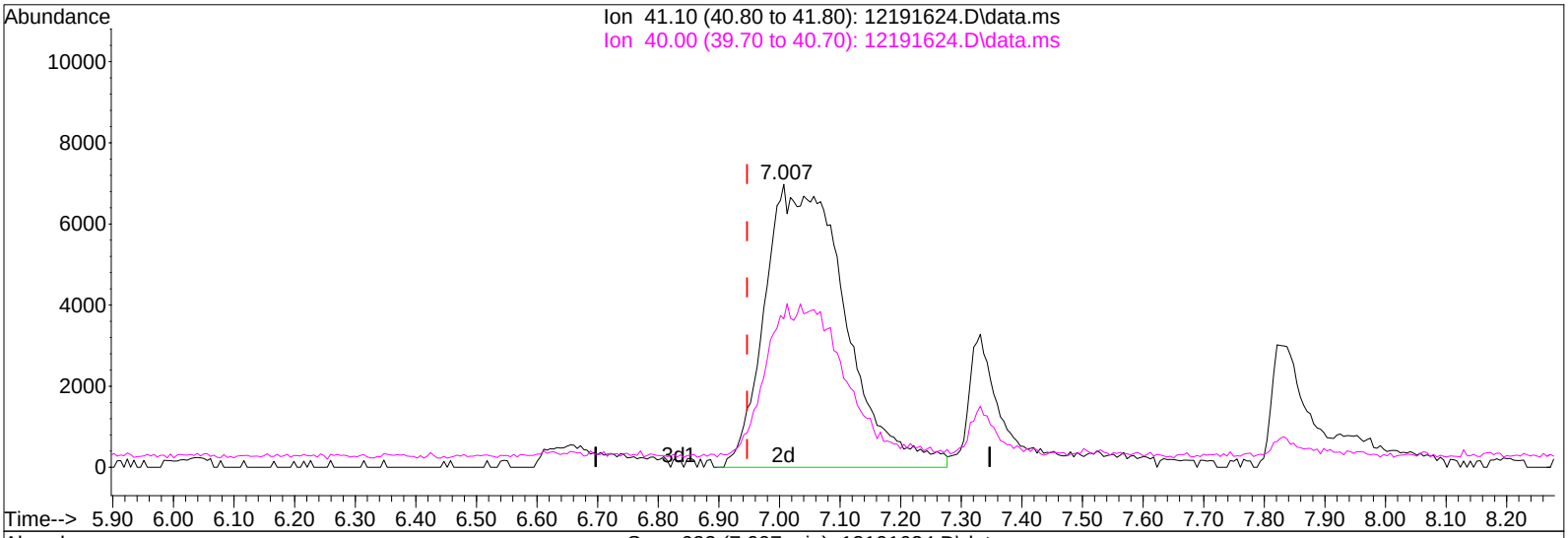
response 201

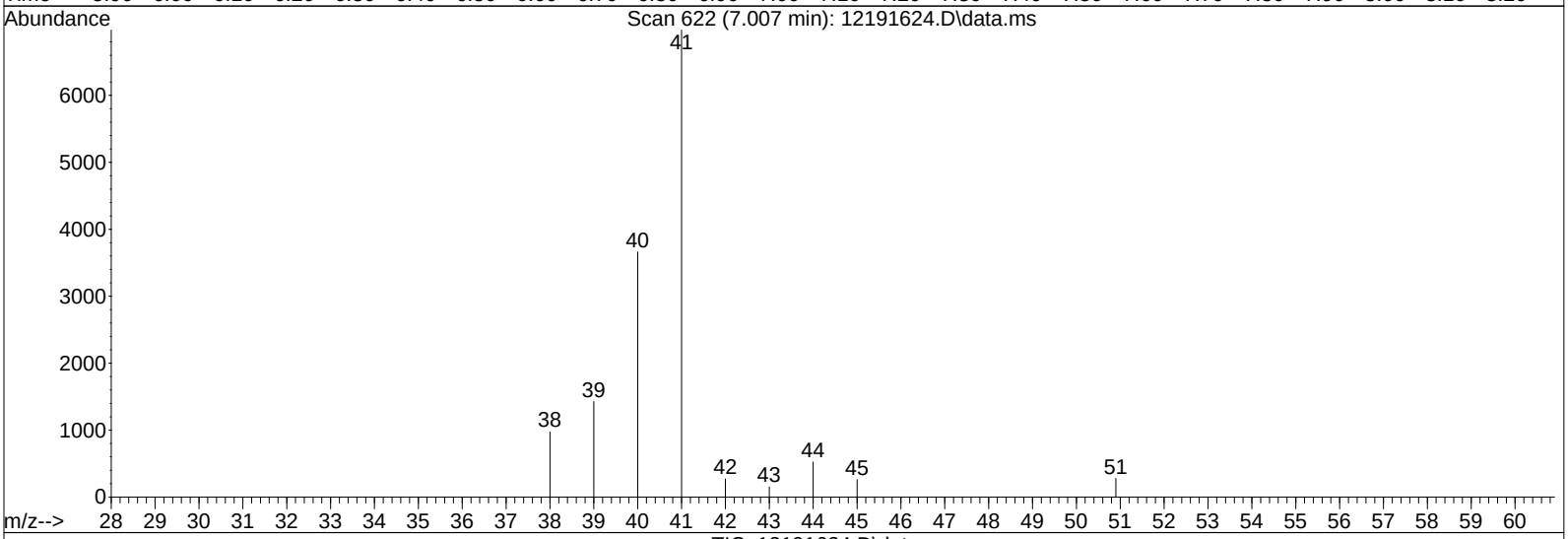
Ion	Exp%	Act%
41.10	100	100
40.00	54.30	42.79
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2016 12\19\12191624.D
Acq On : 20 Dec 2016 2:13 Operator: LH
Sample : 1.0ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191605 (1/17)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Dec 20 08:57:39 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12191624.D\data.ms

(11) Acetonitrile (T)

7.007min (+0.060) 1.01ng m

response 64313

Ion	Exp%	Act%
41.10	100	100
40.00	54.30	0.13#
0.00	0.00	0.00
0.00	0.00	0.00

MP

LH 12/20/16

12/30/16

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191625.D
Acq On : 20 Dec 2016 2:46 Operator: LH
Sample : 5.0ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191605 (1/17)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Dec 20 08:57:41 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS) LH 12/20/16
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.54	130	274566	12.500	ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.65	114	1362305	12.500	ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.93	82	583787	12.500	ng	0.00

System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.40	65	491596	13.686	ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 109.52%			
57) Toluene-d8 (SS2)	16.10	98	1393526	12.531	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.24%			
73) Bromofluorobenzene (SS3)	19.28	174	453121	12.691	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 101.52%			

Target Compounds							Qvalue
2) Propene	4.19	42	172991	4.873	ng		99
3) Dichlorodifluoromethan...	4.36	85	323912	5.620	ng		100
4) Chloromethane	4.68	50	253241	5.411	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.95	135	170104	5.639	ng		100
6) Vinyl Chloride	5.13	62	261376	5.583	ng		99
7) 1,3-Butadiene	5.41	54	192137	6.324	ng		99
8) Bromomethane	5.89	94	132068	4.933	ng		98
9) Chloroethane	6.24	64	105067	4.789	ng		99
10) Ethanol	6.63	45	560933	23.176	ng		99
11) Acetonitrile	6.94	41	280547	4.528	ng		100
12) Acrolein	7.12	56	99123	4.257	ng		100
13) Acetone	7.32	58	586134	24.947	ng		92
14) Trichlorofluoromethane	7.57	101	272066	5.427	ng		100
15) 2-Propanol (Isopropanol)	7.83	45	810563	10.064	ng		97
16) Acrylonitrile	8.13	53	204653	4.862	ng		100
17) 1,1-Dichloroethene	8.57	96	141640	5.396	ng		100
18) 2-Methyl-2-Propanol (t...	8.73	59	838580	10.755	ng		99
19) Methylene Chloride	8.80	84	153828	4.889	ng		98
20) 3-Chloro-1-propene (Al...	8.96	41	232385	4.859	ng		98
21) Trichlorotrifluoroethane	9.21	151	133118	5.311	ng		100
22) Carbon Disulfide	9.10	76	560695	5.212	ng		96
23) trans-1,2-Dichloroethene	10.09	61	228955	5.258	ng		100
24) 1,1-Dichloroethane	10.34	63	273816	4.944	ng		99
25) Methyl tert-Butyl Ether	10.43	73	479196	5.364	ng		99
26) Vinyl Acetate	10.59	86	176958	26.892	ng	#	81
27) 2-Butanone (MEK)	10.85	72	105448	5.016	ng		99
28) cis-1,2-Dichloroethene	11.36	61	225138	5.289	ng		100
29) Diisopropyl Ether	11.64	87	126228	4.807	ng	#	93
30) Ethyl Acetate	11.65	61	120800	10.757	ng		99
31) n-Hexane	11.63	57	261332	5.138	ng		100
32) Chloroform	11.71	83	279846	5.369	ng		100
34) Tetrahydrofuran (THF)	12.12	72	103208	4.802	ng		99
35) Ethyl tert-Butyl Ether	12.23	87	181749	5.336	ng		99
36) 1,2-Dichloroethane	12.51	62	226792	5.724	ng		100
38) 1,1,1-Trichloroethane	12.79	97	247382	5.553	ng		100
39) Isopropyl Acetate	13.19	61	206147	10.138	ng		97
40) 1-Butanol	13.22	56	338395	10.634	ng		94
41) Benzene	13.27	78	611386	4.604	ng		100
42) Carbon Tetrachloride	13.42	117	215572	5.635	ng		100
43) Cyclohexane	13.55	84	468540	10.496	ng		100
44) tert-Amyl Methyl Ether	13.88	73	450516	5.203	ng		99
45) 1,2-Dichloropropane	14.12	63	156332	4.836	ng		100
46) Bromodichloromethane	14.31	83	224462	5.692	ng		99
47) Trichloroethene	14.35	130	161956	5.287	ng		99
48) 1,4-Dioxane	14.33	88	129682	5.047	ng		100
49) 2,2,4-Trimethylpentane...	14.41	57	659279	4.905	ng		99

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191625.D
Acq On : 20 Dec 2016 2:46 Operator: LH
Sample : 5.0ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191605 (1/17)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Dec 20 08:57:41 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

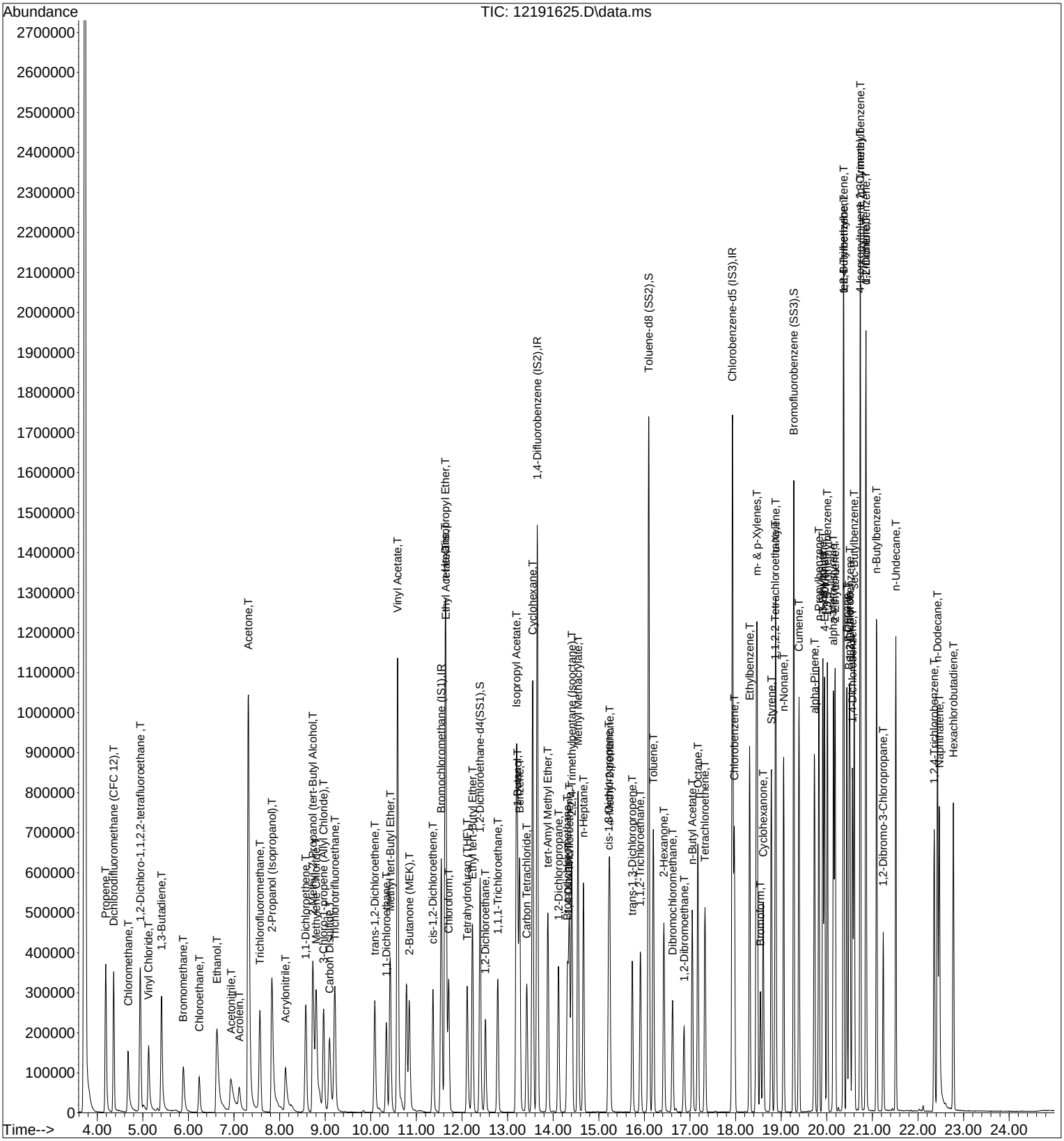
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	14.55	100	126982	11.045 ng	99
51) n-Heptane	14.66	71	150996	4.994 ng	99
52) cis-1,3-Dichloropropene	15.22	75	275944	5.746 ng	100
53) 4-Methyl-2-pentanone	15.24	58	152598	5.164 ng	97
54) trans-1,3-Dichloropropene	15.73	75	240927	5.656 ng	100
55) 1,1,2-Trichloroethane	15.91	97	150862	5.293 ng	99
58) Toluene	16.20	91	612219	5.311 ng	100
59) 2-Hexanone	16.43	43	400582	5.441 ng	98
60) Dibromochloromethane	16.62	129	180990	5.725 ng	100
61) 1,2-Dibromoethane	16.87	107	176174	5.419 ng	100
62) n-Butyl Acetate	17.05	43	440951	5.244 ng	99
63) n-Octane	17.18	57	136383	4.968 ng	99
64) Tetrachloroethene	17.33	166	169034	5.260 ng	100
65) Chlorobenzene	17.97	112	407405	5.160 ng	100
66) Ethylbenzene	18.31	91	714615	5.186 ng	99
67) m- & p-Xylenes	18.47	91	1113508	10.657 ng	99
68) Bromoform	18.54	173	150697	5.958 ng	100
69) Styrene	18.79	104	445051	5.530 ng	100
70) o-Xylene	18.88	91	567381	5.401 ng	99
71) n-Nonane	19.06	43	330213	5.010 ng	98
72) 1,1,2,2-Tetrachloroethane	18.87	83	285183	5.634 ng	99
74) Cumene	19.39	105	704833	5.611 ng	99
75) alpha-Pinene	19.73	93	366284	5.335 ng	99
76) n-Propylbenzene	19.83	91	881174	5.550 ng	98
77) 3-Ethyltoluene	19.91	105	695890	5.194 ng	96
78) 4-Ethyltoluene	19.95	105	681706	5.748 ng	94
79) 1,3,5-Trimethylbenzene	20.01	105	583332	5.328 ng	99
80) alpha-Methylstyrene	20.14	118	318182	6.132 ng	99
81) 2-Ethyltoluene	20.18	105	696590	5.483 ng	99
82) 1,2,4-Trimethylbenzene	20.37	105	607523	5.647 ng	99
83) n-Decane	20.44	57	333533	5.202 ng	100
84) Benzyl Chloride	20.49	91	530116	6.412 ng	99
85) 1,3-Dichlorobenzene	20.51	146	343245	6.041 ng	100
86) 1,4-Dichlorobenzene	20.56	146	347364	5.379 ng	100
87) sec-Butylbenzene	20.60	105	789502	5.635 ng	99
88) 4-Isopropyltoluene (p-...	20.73	119	732453	5.681 ng	98
89) 1,2,3-Trimethylbenzene	20.74	105	599404	5.457 ng	98
90) 1,2-Dichlorobenzene	20.86	146	336998	5.812 ng	99
91) d-Limonene	20.86	68	248824	5.840 ng	98
92) 1,2-Dibromo-3-Chloropr...	21.24	157	117743	6.063 ng	95
93) n-Undecane	21.51	57	346298	5.229 ng	99
94) 1,2,4-Trichlorobenzene	22.36	180	246071	6.179 ng	100
95) Naphthalene	22.47	128	770737	7.086 ng	100
96) n-Dodecane	22.43	57	335656	5.564 ng	100
97) Hexachlorobutadiene	22.78	225	152374	5.669 ng	100
98) Cyclohexanone	18.60	55	237948	5.148 ng	100
99) tert-Butylbenzene	20.37	119	579259	5.735 ng	100
100) n-Butylbenzene	21.09	91	662158	5.716 ng	99

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191625.D
Acq On : 20 Dec 2016 2:46 Operator: LH
Sample : 5.0ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191605 (1/17)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Dec 20 08:57:41 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191626.D
Acq On : 20 Dec 2016 3:19 Operator: LH
Sample : 25ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:42 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.56	130	300261	12.500	ng	0.00
37) 1,4-Difluorobenzene (IS2)	13.66	114	1458864	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	17.93	82	643369	12.500	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.41	65	532918	13.567	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 108.56%			
57) Toluene-d8 (SS2)	16.10	98	1520400	12.406	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.28%			
73) Bromofluorobenzene (SS3)	19.28	174	499274	12.689	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 101.52%			
Target Compounds						Qvalue
2) Propene	4.18	42	1008395	25.973	ng	100
3) Dichlorodifluoromethan...	4.36	85	1965498	31.185	ng	100
4) Chloromethane	4.68	50	1553377	30.351	ng	100
5) 1,2-Dichloro-1,1,2,2-t...	4.95	135	1020133	30.922	ng	100
6) Vinyl Chloride	5.13	62	1588635	31.029	ng	100
7) 1,3-Butadiene	5.41	54	1234683	37.163	ng	100
8) Bromomethane	5.89	94	802417	27.407	ng	100
9) Chloroethane	6.24	64	654892	27.295	ng	100
10) Ethanol	6.68	45	3687842	139.329	ng	100
11) Acetonitrile	6.95	41	1737821	25.650	ng	100
12) Acrolein	7.13	56	587846	23.083	ng	100
13) Acetone	7.34	58	3827877	148.981	ng	100
14) Trichlorofluoromethane	7.57	101	1633337	29.791	ng	100
15) 2-Propanol (Isopropanol)	7.88	45	5406782	61.388	ng	100
16) Acrylonitrile	8.15	53	1279841	27.802	ng	100
17) 1,1-Dichloroethene	8.58	96	892434	31.092	ng	100
18) 2-Methyl-2-Propanol (t...	8.77	59	5529837	64.851	ng	100
19) Methylene Chloride	8.82	84	946475	27.507	ng	100
20) 3-Chloro-1-propene (Al...	8.98	41	1478909	28.275	ng	100
21) Trichlorotrifluoroethane	9.22	151	812915	29.655	ng	100
22) Carbon Disulfide	9.09	76	3441195	29.252	ng	100
23) trans-1,2-Dichloroethene	10.10	61	1437199	30.181	ng	100
24) 1,1-Dichloroethane	10.36	63	1675734	27.669	ng	100
25) Methyl tert-Butyl Ether	10.43	73	2955288	30.252	ng	100
26) Vinyl Acetate	10.60	86	1276200	177.348	ng	100
27) 2-Butanone (MEK)	10.85	72	657523	28.600	ng	100
28) cis-1,2-Dichloroethene	11.38	61	1406043	30.205	ng	100
29) Diisopropyl Ether	11.64	87	847497	29.514	ng	100
30) Ethyl Acetate	11.66	61	819350	66.716	ng	100
31) n-Hexane	11.64	57	1691828	30.416	ng	100
32) Chloroform	11.73	83	1710002	30.002	ng	100
34) Tetrahydrofuran (THF)	12.12	72	638254	27.154	ng	100
35) Ethyl tert-Butyl Ether	12.24	87	1151380	30.910	ng	100
36) 1,2-Dichloroethane	12.52	62	1402084	32.360	ng	100
38) 1,1,1-Trichloroethane	12.79	97	1525853	31.982	ng	100
39) Isopropyl Acetate	13.20	61	1362137	62.554	ng	100
40) 1-Butanol	13.23	56	2423188	71.110	ng	100
41) Benzene	13.27	78	3763293	26.464	ng	100
42) Carbon Tetrachloride	13.43	117	1353759	33.047	ng	100
43) Cyclohexane	13.56	84	3077226	64.372	ng	100
44) tert-Amyl Methyl Ether	13.89	73	2868398	30.932	ng	100
45) 1,2-Dichloropropane	14.12	63	970813	28.044	ng	100
46) Bromodichloromethane	14.32	83	1440290	34.106	ng	100
47) Trichloroethene	14.36	130	1033587	31.507	ng	100
48) 1,4-Dioxane	14.33	88	847041	30.783	ng	100
49) 2,2,4-Trimethylpentane...	14.41	57	4133269	28.714	ng	100

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191626.D
Acq On : 20 Dec 2016 3:19 Operator: LH
Sample : 25ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:42 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

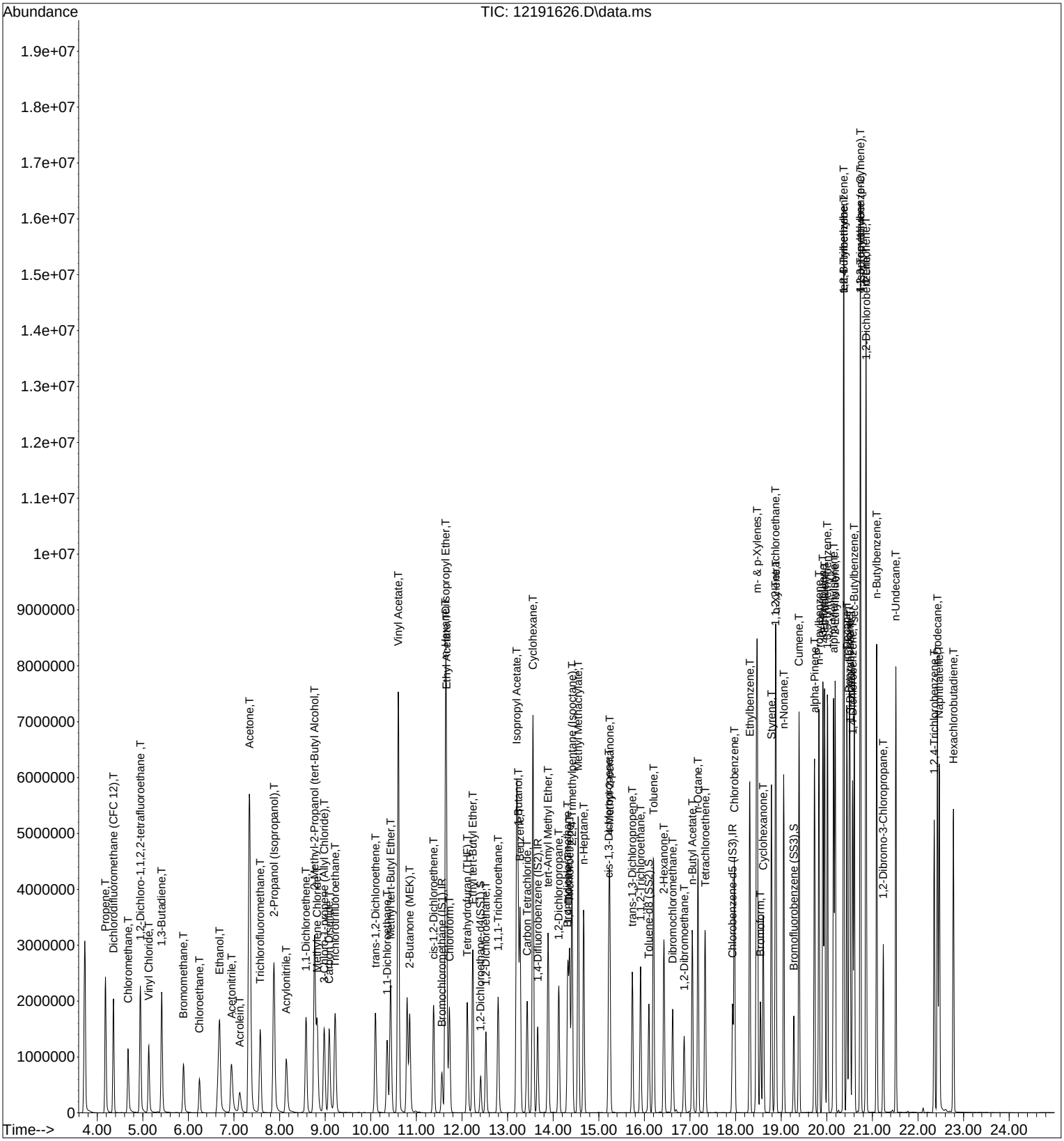
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	14.55	100	832320	67.607 ng	100
51) n-Heptane	14.67	71	937645	28.961 ng	100
52) cis-1,3-Dichloropropene	15.22	75	1815211	35.299 ng	100
53) 4-Methyl-2-pentanone	15.24	58	1001930	31.661 ng	100
54) trans-1,3-Dichloropropene	15.73	75	1579463	34.624 ng	100
55) 1,1,2-Trichloroethane	15.92	97	942337	30.872 ng	100
58) Toluene	16.20	91	3855230	30.346 ng	100
59) 2-Hexanone	16.43	43	2540913	31.318 ng	100
60) Dibromochloromethane	16.62	129	1171096	33.614 ng	100
61) 1,2-Dibromoethane	16.87	107	1105186	30.847 ng	100
62) n-Butyl Acetate	17.05	43	2807744	30.297 ng	100
63) n-Octane	17.18	57	876344	28.967 ng	100
64) Tetrachloroethene	17.33	166	1073124	30.301 ng	100
65) Chlorobenzene	17.97	112	2638707	30.326 ng	100
66) Ethylbenzene	18.31	91	4628156	30.478 ng	100
67) m- & p-Xylenes	18.47	91	7505389	65.178 ng	100
68) Bromoform	18.54	173	1020863	36.624 ng	100
69) Styrene	18.79	104	2903328	32.735 ng	100
70) o-Xylene	18.89	91	3789054	32.730 ng	100
71) n-Nonane	19.06	43	2151021	29.612 ng	100
72) 1,1,2,2-Tetrachloroethane	18.87	83	1931546	34.628 ng	100
74) Cumene	19.39	105	4609627	33.295 ng	100
75) alpha-Pinene	19.73	93	2467306	32.608 ng	100
76) n-Propylbenzene	19.83	91	5698324	32.564 ng	100
77) 3-Ethyltoluene	19.91	105	4902800	33.207 ng	100
78) 4-Ethyltoluene	19.95	105	4257540	32.574 ng	100
79) 1,3,5-Trimethylbenzene	20.01	105	3875045	32.116 ng	100
80) alpha-Methylstyrene	20.15	118	2154463	37.678 ng	100
81) 2-Ethyltoluene	20.18	105	4622691	33.016 ng	100
82) 1,2,4-Trimethylbenzene	20.37	105	4379832	36.943 ng	100
83) n-Decane	20.44	57	2241515	31.725 ng	100
84) Benzyl Chloride	20.49	91	3847795	42.232 ng	100
85) 1,3-Dichlorobenzene	20.51	146	2325406	37.134 ng	100
86) 1,4-Dichlorobenzene	20.57	146	2277699	32.003 ng	100
87) sec-Butylbenzene	20.60	105	5144001	33.317 ng	100
88) 4-Isopropyltoluene (p-...	20.74	119	5067027	35.658 ng	100
89) 1,2,3-Trimethylbenzene	20.74	105	4281623	35.373 ng	100
90) 1,2-Dichlorobenzene	20.86	146	2331718	36.491 ng	100
91) d-Limonene	20.86	68	1821853	38.801 ng	100
92) 1,2-Dibromo-3-Chloropr...	21.24	157	792241	37.019 ng	100
93) n-Undecane	21.51	57	2341676	32.086 ng	100
94) 1,2,4-Trichlorobenzene	22.36	180	1649154	37.578 ng	100
95) Naphthalene	22.47	128	5150243	42.964 ng	100
96) n-Dodecane	22.43	57	2149666	32.331 ng	100
97) Hexachlorobutadiene	22.78	225	1040984	35.143 ng	100
98) Cyclohexanone	18.60	55	1552070	30.471 ng	100
99) tert-Butylbenzene	20.37	119	4045821	36.344 ng	100
100) n-Butylbenzene	21.10	91	4331265	33.925 ng	100

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191626.D
Acq On : 20 Dec 2016 3:19 Operator: LH
Sample : 25ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:42 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191627.D
Acq On : 20 Dec 2016 3:52 Operator: LH
Sample : 50ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:45 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS) LH 12/20/16
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.57	130	315445	12.500	ng		0.01
37) 1,4-Difluorobenzene (IS2)	13.67	114	1537731	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	17.93	82	682922	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.42	65	566318	13.723	ng		0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 109.76%				
57) Toluene-d8 (SS2)	16.10	98	1603043	12.323	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.56%				
73) Bromofluorobenzene (SS3)	19.28	174	519610	12.441	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.52%				
Target Compounds							Qvalue
2) Propene	4.19	42	2203767	54.029	ng		99
3) Dichlorodifluoromethan...	4.36	85	3887109	58.705	ng		100
4) Chloromethane	4.68	50	3029186	56.338	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.96	135	2019789	58.276	ng		100
6) Vinyl Chloride	5.14	62	3189329	59.295	ng		100
7) 1,3-Butadiene	5.42	54	2542966	72.858	ng		99
8) Bromomethane	5.90	94	1605423	52.194	ng		100
9) Chloroethane	6.25	64	1313374	52.105	ng		100
10) Ethanol	6.72	45	7753505	278.833	ng		100
11) Acetonitrile	6.96	41	3506029	49.258	ng		100
12) Acrolein	7.13	56	1184215	44.263	ng		100
13) Acetone	7.36	58	7882532	292.022	ng		90
14) Trichlorofluoromethane	7.58	101	3292962	57.170	ng		100
15) 2-Propanol (Isopropanol)	7.90	45	10609071	114.655	ng		99
16) Acrylonitrile	8.17	53	2590588	53.567	ng		100
17) 1,1-Dichloroethene	8.59	96	1812953	60.122	ng		100
18) 2-Methyl-2-Propanol (t...	8.79	59	11491299	128.277	ng		99
19) Methylene Chloride	8.83	84	1948502	53.903	ng		100
20) 3-Chloro-1-propene (Al...	8.98	41	3011770	54.810	ng		100
21) Trichlorotrifluoroethane	9.22	151	1651899	57.361	ng		100
22) Carbon Disulfide	9.09	76	6882703	55.690	ng		99
23) trans-1,2-Dichloroethene	10.11	61	2922284	58.414	ng		100
24) 1,1-Dichloroethane	10.37	63	3365912	52.901	ng		100
25) Methyl tert-Butyl Ether	10.44	73	5981263	58.280	ng		100
26) Vinyl Acetate	10.62	86	2757360	364.733	ng	#	53
27) 2-Butanone (MEK)	10.86	72	1374411	56.904	ng		98
28) cis-1,2-Dichloroethene	11.38	61	2849913	58.276	ng		100
29) Diisopropyl Ether	11.65	87	1795400	59.516	ng	#	94
30) Ethyl Acetate	11.67	61	1787842	138.569	ng		99
31) n-Hexane	11.64	57	3659839	62.631	ng		100
32) Chloroform	11.74	83	3455346	57.707	ng		100
34) Tetrahydrofuran (THF)	12.12	72	1311419	53.107	ng		99
35) Ethyl tert-Butyl Ether	12.24	87	2378967	60.791	ng		99
36) 1,2-Dichloroethane	12.53	62	2851613	62.647	ng		100
38) 1,1,1-Trichloroethane	12.80	97	3116416	61.970	ng		100
39) Isopropyl Acetate	13.20	61	2948766	128.473	ng	#	88
40) 1-Butanol	13.24	56	5173592	144.037	ng		96
41) Benzene	13.28	78	7871939	52.517	ng		100
42) Carbon Tetrachloride	13.44	117	2762864	63.987	ng		100
43) Cyclohexane	13.56	84	6416063	127.333	ng		99
44) tert-Amyl Methyl Ether	13.89	73	5901544	60.377	ng		99
45) 1,2-Dichloropropane	14.13	63	1991051	54.566	ng		100
46) Bromodichloromethane	14.32	83	3018808	67.818	ng		100
47) Trichloroethene	14.36	130	2155354	62.331	ng		100
48) 1,4-Dioxane	14.34	88	1799139	62.031	ng		98
49) 2,2,4-Trimethylpentane...	14.41	57	8398743	55.353	ng		99

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191627.D
Acq On : 20 Dec 2016 3:52 Operator: LH
Sample : 50ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:45 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

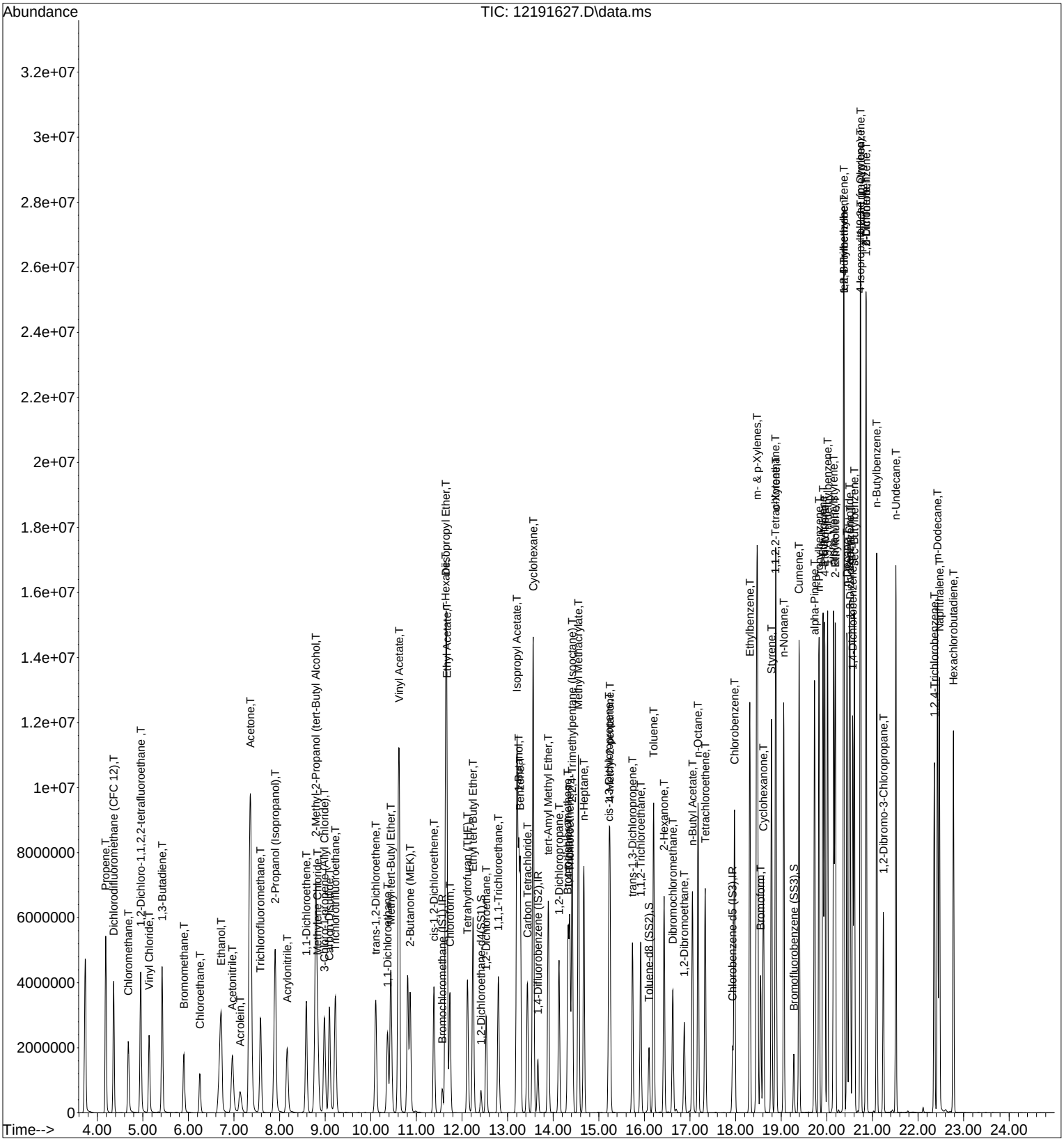
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
50) Methyl Methacrylate	14.55	100	1757607	135.443	ng	99
51) n-Heptane	14.67	71	1973639	57.833	ng	100
52) cis-1,3-Dichloropropene	15.22	75	3813352	70.353	ng	100
53) 4-Methyl-2-pentanone	15.24	58	2105888	63.134	ng	97
54) trans-1,3-Dichloropropene	15.74	75	3251354	67.618	ng	100
55) 1,1,2-Trichloroethane	15.92	97	1921774	59.730	ng	100
58) Toluene	16.20	91	7906025	58.627	ng	99
59) 2-Hexanone	16.43	43	5190566	60.270	ng	98
60) Dibromochloromethane	16.63	129	2411325	65.205	ng	100
61) 1,2-Dibromoethane	16.87	107	2240638	58.917	ng	100
62) n-Butyl Acetate	17.05	43	5713152	58.078	ng	99
63) n-Octane	17.17	57	1864618	58.064	ng	100
64) Tetrachloroethene	17.33	166	2211852	58.837	ng	100
65) Chlorobenzene	17.98	112	5437320	58.870	ng	100
66) Ethylbenzene	18.31	91	9496091	58.912	ng	99
67) m- & p-Xylenes	18.47	91	15358117	125.648	ng	99
68) Bromoform	18.55	173	2106676	71.201	ng	100
69) Styrene	18.79	104	5985604	63.579	ng	99
70) o-Xylene	18.89	91	7821769	63.652	ng	100
71) n-Nonane	19.06	43	4506167	58.442	ng	98
72) 1,1,2,2-Tetrachloroethane	18.87	83	4041761	68.262	ng	100
74) Cumene	19.39	105	9355302	63.660	ng	98
75) alpha-Pinene	19.73	93	5197572	64.713	ng	100
76) n-Propylbenzene	19.83	91	11288361	60.773	ng	98
77) 3-Ethyltoluene	19.92	105	9675999	61.740	ng	99
78) 4-Ethyltoluene	19.95	105	8789793	63.354	ng	99
79) 1,3,5-Trimethylbenzene	20.02	105	7926510	61.888	ng	100
80) alpha-Methylstyrene	20.15	118	4429813	72.984	ng	99
81) 2-Ethyltoluene	20.19	105	9246623	62.216	ng	99
82) 1,2,4-Trimethylbenzene	20.38	105	8285271	65.837	ng	98
83) n-Decane	20.44	57	4767841	63.573	ng	100
84) Benzyl Chloride	20.50	91	8110314	83.860	ng	100
85) 1,3-Dichlorobenzene	20.51	146	4668897	70.238	ng	100
86) 1,4-Dichlorobenzene	20.57	146	4657427	61.650	ng	100
87) sec-Butylbenzene	20.61	105	10080080	61.506	ng	98
88) 4-Isopropyltoluene (p-...	20.74	119	9147023	60.643	ng	97
89) 1,2,3-Trimethylbenzene	20.74	105	8096163	63.013	ng	98
90) 1,2-Dichlorobenzene	20.86	146	4485305	66.129	ng	100
91) d-Limonene	20.86	68	3730226	74.844	ng	99
92) 1,2-Dibromo-3-Chloropr...	21.24	157	1652550	72.746	ng	98
93) n-Undecane	21.51	57	5077136	65.538	ng	100
94) 1,2,4-Trichlorobenzene	22.36	180	3474797	74.591	ng	99
95) Naphthalene	22.47	128	10469752	82.282	ng	99
96) n-Dodecane	22.43	57	4706948	66.692	ng	99
97) Hexachlorobutadiene	22.78	225	2211494	70.334	ng	100
98) Cyclohexanone	18.61	55	3174201	58.707	ng	99
99) tert-Butylbenzene	20.38	119	7458368	63.119	ng	100
100) n-Butylbenzene	21.10	91	8750025	64.566	ng	98

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191627.D
Acq On : 20 Dec 2016 3:52 Operator: LH
Sample : 50ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:45 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191628.D
Acq On : 20 Dec 2016 4:25 Operator: LH
Sample : 100ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:47 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/20/16

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.58	130	329273	12.500	ng		0.02
37) 1,4-Difluorobenzene (IS2)	13.67	114	1591058	12.500	ng		0.01
56) Chlorobenzene-d5 (IS3)	17.93	82	721832	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.42	65	583840	13.554	ng		0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 108.40%				
57) Toluene-d8 (SS2)	16.10	98	1665906	12.116	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.96%				
73) Bromofluorobenzene (SS3)	19.28	174	540887	12.252	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.00%				
Target Compounds							Qvalue
2) Propene	4.19	42	6008959	141.134	ng		96
3) Dichlorodifluoromethan...	4.36	85	8043167	116.370	ng		99
4) Chloromethane	4.68	50	5589101	99.582	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.96	135	4060580	112.239	ng		100
6) Vinyl Chloride	5.14	62	6538231	116.451	ng		100
7) 1,3-Butadiene	5.42	54	5399660	148.207	ng		98
8) Bromomethane	5.90	94	3496795	108.911	ng		100
9) Chloroethane	6.25	64	2780718	105.686	ng		100
10) Ethanol	6.76	45	16883590	581.672	ng		99
11) Acetonitrile	6.99	41	7339130	98.782	ng		99
12) Acrolein	7.14	56	2483696	88.935	ng		100
13) Acetone	7.38	58	16812434	596.688	ng	#	61
14) Trichlorofluoromethane	7.58	101	6829163	113.583	ng		99
15) 2-Propanol (Isopropanol)	7.93	45	17522615	181.419	ng		99
16) Acrylonitrile	8.18	53	5449202	107.945	ng		100
17) 1,1-Dichloroethene	8.59	96	3806536	120.933	ng		99
18) 2-Methyl-2-Propanol (t...	8.82	59	23412841	250.381	ng		99
19) Methylene Chloride	8.84	84	4304984	114.092	ng		100
20) 3-Chloro-1-propene (Al...	8.99	41	6282009	109.522	ng		100
21) Trichlorotrifluoroethane	9.22	151	3445812	114.628	ng		99
22) Carbon Disulfide	9.10	76	14297695	110.829	ng		98
23) trans-1,2-Dichloroethene	10.11	61	6208655	118.894	ng		99
24) 1,1-Dichloroethane	10.37	63	7053876	106.207	ng		99
25) Methyl tert-Butyl Ether	10.44	73	12670326	118.271	ng		99
26) Vinyl Acetate	10.63	86	5343344	677.115	ng	#	1
27) 2-Butanone (MEK)	10.88	72	2982673	118.304	ng	#	92
28) cis-1,2-Dichloroethene	11.39	61	6046232	118.444	ng		100
29) Diisopropyl Ether	11.65	87	3695372	117.354	ng	#	73
30) Ethyl Acetate	11.68	61	3675126	272.883	ng		97
31) n-Hexane	11.64	57	7729185	126.715	ng		100
32) Chloroform	11.75	83	7083157	113.326	ng		100
34) Tetrahydrofuran (THF)	12.13	72	2830906	109.825	ng		98
35) Ethyl tert-Butyl Ether	12.25	87	5190600	127.069	ng		96
36) 1,2-Dichloroethane	12.54	62	5928544	124.774	ng		100
38) 1,1,1-Trichloroethane	12.80	97	6572961	126.324	ng		100
39) Isopropyl Acetate	13.21	61	6378183	268.573	ng	#	60
40) 1-Butanol	13.27	56	11112782	299.019	ng		92
41) Benzene	13.28	78	16424941	105.906	ng		98
42) Carbon Tetrachloride	13.44	117	5830576	130.508	ng		100
43) Cyclohexane	13.56	84	12926651	247.944	ng		97
44) tert-Amyl Methyl Ether	13.90	73	12610453	124.689	ng		98
45) 1,2-Dichloropropane	14.13	63	4291470	113.668	ng		100
46) Bromodichloromethane	14.33	83	6399081	138.938	ng		99
47) Trichloroethene	14.37	130	4493086	125.582	ng		100
48) 1,4-Dioxane	14.34	88	3917241	130.533	ng		93
49) 2,2,4-Trimethylpentane...	14.42	57	17120018	109.051	ng		99

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191628.D
Acq On : 20 Dec 2016 4:25 Operator: LH
Sample : 100ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:47 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

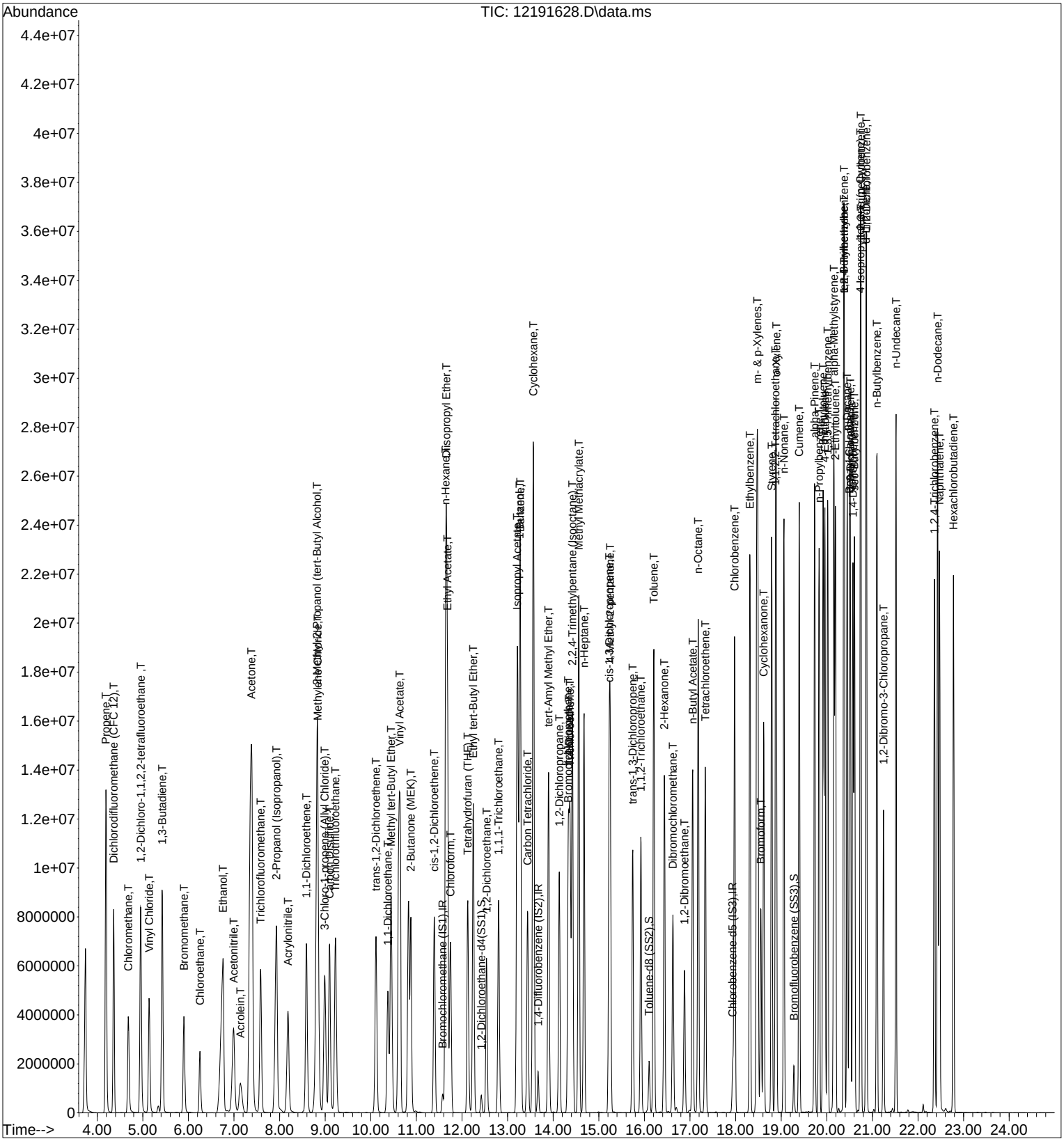
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	14.56	100	3679489	274.042 ng	96
51) n-Heptane	14.68	71	4399434	124.594 ng	99
52) cis-1,3-Dichloropropene	15.23	75	8248548	147.077 ng	99
53) 4-Methyl-2-pentanone	15.25	58	4683120	135.693 ng	91
54) trans-1,3-Dichloropropene	15.75	75	6987802	140.453 ng	99
55) 1,1,2-Trichloroethane	15.92	97	4108624	123.418 ng	99
58) Toluene	16.21	91	15856097	111.243 ng	95
59) 2-Hexanone	16.44	43	10964453	120.451 ng	94
60) Dibromochloromethane	16.63	129	5097352	130.407 ng	99
61) 1,2-Dibromoethane	16.88	107	4696846	116.844 ng	100
62) n-Butyl Acetate	17.06	43	11910418	114.551 ng	96
63) n-Octane	17.18	57	4147708	122.196 ng	98
64) Tetrachloroethene	17.33	166	4609727	116.013 ng	99
65) Chlorobenzene	17.98	112	11107353	113.777 ng	98
66) Ethylbenzene	18.31	91	17038464	100.006 ng	90
67) m- & p-Xylenes	18.48	91	25235722	195.330 ng	91
68) Bromoform	18.56	173	4346874	138.996 ng	100
69) Styrene	18.79	104	11787997	118.463 ng	95
70) o-Xylene	18.89	91	13896416	106.991 ng	98
71) n-Nonane	19.06	43	9095628	111.605 ng	95
72) 1,1,2,2-Tetrachloroethane	18.87	83	7673756	122.617 ng	100
74) Cumene	19.40	105	16006089	103.045 ng	91
75) alpha-Pinene	19.73	93	10236511	120.580 ng	97
76) n-Propylbenzene	19.83	91	17367590	88.461 ng	85
77) 3-Ethyltoluene	19.92	105	17077463	103.093 ng	92
78) 4-Ethyltoluene	19.96	105	13768231	93.888 ng	91
79) 1,3,5-Trimethylbenzene	20.02	105	13834479	102.194 ng	96
80) alpha-Methylstyrene	20.16	118	8337402	129.960 ng	97
81) 2-Ethyltoluene	20.19	105	15494984	98.638 ng	93
82) 1,2,4-Trimethylbenzene	20.38	105	12799085	96.222 ng	100
83) n-Decane	20.45	57	9147243	115.392 ng	99
84) Benzyl Chloride	20.50	91	13922055	136.193 ng	96
85) 1,3-Dichlorobenzene	20.52	146	8283962	117.905 ng	99
86) 1,4-Dichlorobenzene	20.57	146	8587741	107.547 ng	99
87) sec-Butylbenzene	20.61	105	15937525	92.005 ng	91
88) 4-Isopropyltoluene (p-...	20.74	119	13537503	84.912 ng	93
89) 1,2,3-Trimethylbenzene	20.75	105	12341662	90.879 ng	99
90) 1,2-Dichlorobenzene	20.87	146	7334449	102.307 ng	99
91) d-Limonene	20.86	68	6001043	113.915 ng	100
92) 1,2-Dibromo-3-Chloropr...	21.24	157	3395976	141.434 ng	93
93) n-Undecane	21.52	57	9633509	117.651 ng	98
94) 1,2,4-Trichlorobenzene	22.36	180	6907903	140.295 ng	99
95) Naphthalene	22.47	128	17224604	128.072 ng	93
96) n-Dodecane	22.43	57	9492916	127.254 ng	98
97) Hexachlorobutadiene	22.78	225	4454502	134.033 ng	99
98) Cyclohexanone	18.62	55	6886299	120.498 ng	97
99) tert-Butylbenzene	20.38	119	11723693	93.867 ng	99
100) n-Butylbenzene	21.10	91	14415146	100.635 ng	90

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191628.D
Acq On : 20 Dec 2016 4:25 Operator: LH
Sample : 100ng TO-15 ICAL STD
Misc : S29-12061601/S29-12191603 (1/17)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 08:57:47 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 08:56:53 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191629.D
Acq On : 20 Dec 2016 4:58 Operator: LH
Sample : 25ng TO-15 ICV STD
Misc : S29-12061601/S29-12011603 (12/30)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 10:51:50 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/21/16

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.56	130	324263	12.500	ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.66	114	1591523	12.500	ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.93	82	692153	12.500	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.41	65	586813	12.597	ng	-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.80%			
57) Toluene-d8 (SS2)	16.10	98	1634742	12.310	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.48%			
73) Bromofluorobenzene (SS3)	19.28	174	523510	12.349	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.80%			
Target Compounds						Qvalue
2) Propene	4.19	42	1124028	25.074	ng	99
3) Dichlorodifluoromethan...	4.36	85	2046175	24.979	ng	100
4) Chloromethane	4.68	50	1694320	25.145	ng	100
5) 1,2-Dichloro-1,1,2,2-t...	4.95	135	1055579	23.189	ng	100
6) Vinyl Chloride	5.13	62	1693438	26.426	ng	100
7) 1,3-Butadiene	5.42	54	1289867	28.829	ng	100
8) Bromomethane	5.90	94	891470	26.288	ng	100
9) Chloroethane	6.24	64	710995	26.626	ng	100
10) Ethanol	6.67	45	3936175	128.358	ng	100
11) Acetonitrile	6.94	41	1869029	26.609	ng	100
12) Acrolein	7.12	56	633199	23.499	ng	100
13) Acetone	7.33	58	3999279	129.883	ng	99
14) Trichlorofluoromethane	7.57	101	1719917	24.463	ng	100
15) 2-Propanol (Isopropanol)	7.87	45	5628222	53.518	ng	99
16) Acrylonitrile	8.15	53	1361059	26.179	ng	100
17) 1,1-Dichloroethene	8.58	96	932075	26.370	ng	99
18) 2-Methyl-2-Propanol (t...	8.76	59	5717162	51.822	ng	99
19) Methylene Chloride	8.82	84	987850	25.589	ng	100
20) 3-Chloro-1-propene (Al...	8.98	41	1631080	27.922	ng	100
21) Trichlorotrifluoroethane	9.22	151	850278	24.680	ng	100
22) Carbon Disulfide	9.09	76	3636405	26.702	ng	100
23) trans-1,2-Dichloroethene	10.10	61	1500866	26.244	ng	99
24) 1,1-Dichloroethane	10.36	63	1808134	25.230	ng	100
25) Methyl tert-Butyl Ether	10.43	73	3070833	24.735	ng	100
26) Vinyl Acetate	10.60	86	1306597	145.059	ng	98
27) 2-Butanone (MEK)	10.85	72	699761	26.323	ng	100
28) cis-1,2-Dichloroethene	11.38	61	1442544	25.606	ng	99
29) Diisopropyl Ether	11.64	87	862033	24.154	ng	98
30) Ethyl Acetate	11.66	61	847035	55.934	ng	100
31) n-Hexane	11.64	57	1743220	25.368	ng	100
32) Chloroform	11.72	83	1774939	24.850	ng	100
34) Tetrahydrofuran (THF)	12.12	72	661555	24.464	ng	100
35) Ethyl tert-Butyl Ether	12.24	87	1195210	25.353	ng	99
36) 1,2-Dichloroethane	12.52	62	1464666	25.028	ng	100
38) 1,1,1-Trichloroethane	12.79	97	1562252	25.058	ng	100
39) Isopropyl Acetate	13.20	61	1413573	52.946	ng	97
40) 1-Butanol	13.23	56	2417638	56.618	ng	99
41) Benzene	13.27	78	3951203	24.315	ng	100
42) Carbon Tetrachloride	13.43	117	1398229	25.907	ng	100
43) Cyclohexane	13.56	84	3104966	51.398	ng	99
44) tert-Amyl Methyl Ether	13.89	73	2968989	25.325	ng	100
45) 1,2-Dichloropropane	14.12	63	1005086	24.872	ng	100
46) Bromodichloromethane	14.32	83	1494154	26.501	ng	100
47) Trichloroethene	14.36	130	1042656	24.408	ng	100
48) 1,4-Dioxane	14.33	88	858499	26.353	ng	98
49) 2,2,4-Trimethylpentane...	14.41	57	4258097	24.871	ng	99

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2016 12\19\12191629.D
Acq On : 20 Dec 2016 4:58 Operator: LH
Sample : 25ng TO-15 ICV STD
Misc : S29-12061601/S29-12011603 (12/30)
ALS Vial : 2 Sample Multiplier: 1

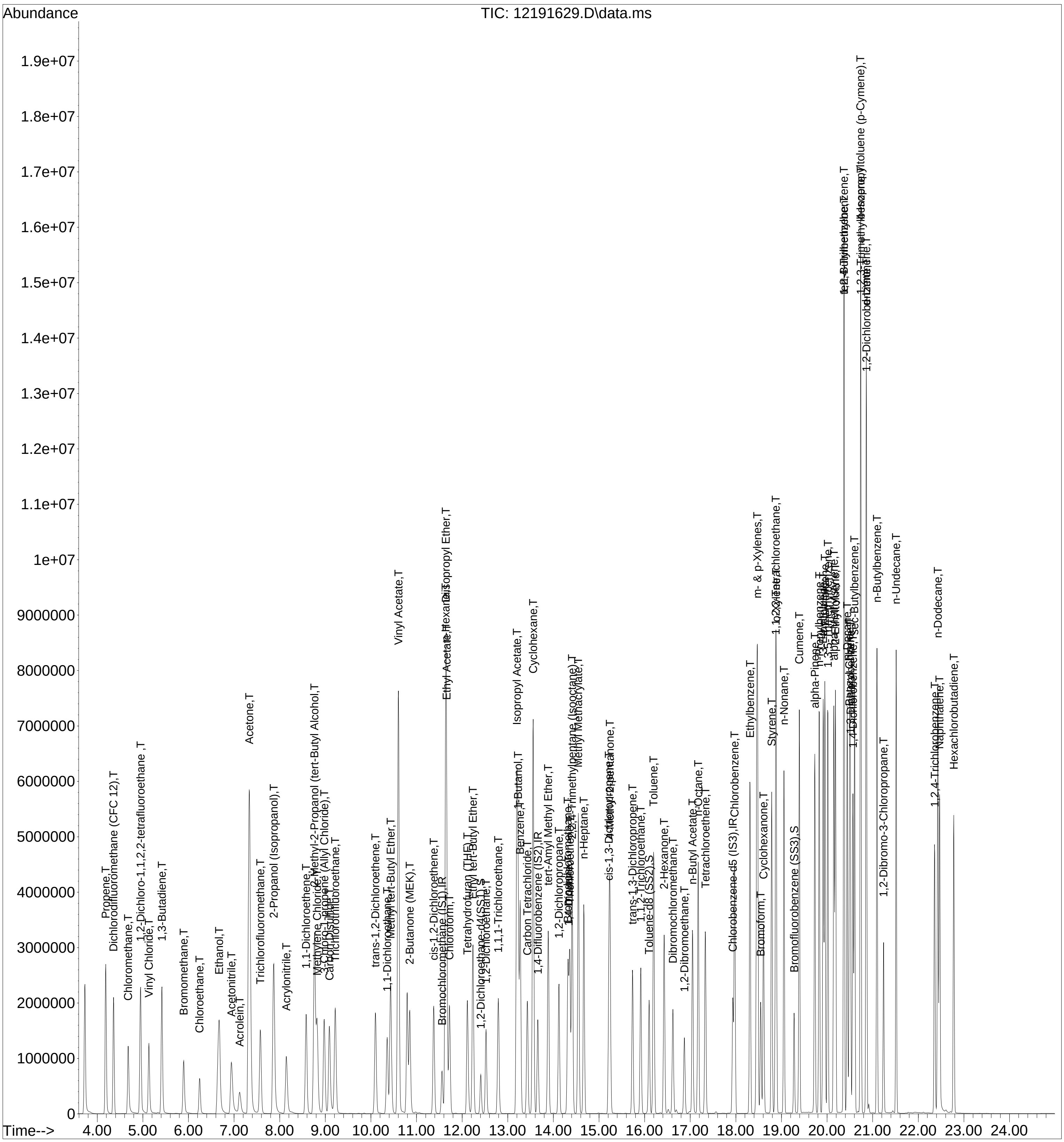
Quant Time: Dec 20 10:51:50 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	14.55	100	853414	53.563 ng	99
51) n-Heptane	14.67	71	972515	24.817 ng	100
52) cis-1,3-Dichloropropene	15.22	75	1748844	26.730 ng	100
53) 4-Methyl-2-pentanone	15.24	58	1026423	26.302 ng	100
54) trans-1,3-Dichloropropene	15.73	75	1611272	27.622 ng	100
55) 1,1,2-Trichloroethane	15.92	97	960805	25.399 ng	100
58) Toluene	16.20	91	3948316	24.350 ng	100
59) 2-Hexanone	16.43	43	2609129	26.123 ng	100
60) Dibromochloromethane	16.62	129	1186720	26.581 ng	100
61) 1,2-Dibromoethane	16.87	107	1117028	25.586 ng	100
62) n-Butyl Acetate	17.05	43	2902880	27.001 ng	99
63) n-Octane	17.17	57	898189	25.213 ng	100
64) Tetrachloroethene	17.33	166	1083122	24.649 ng	100
65) Chlorobenzene	17.97	112	2650579	24.804 ng	100
66) Ethylbenzene	18.31	91	4687446	25.700 ng	100
67) m- & p-Xylenes	18.47	91	7521675	53.005 ng	100
68) Bromoform	18.54	173	1016807	27.983 ng	100
69) Styrene	18.79	104	2887022	26.217 ng	100
70) o-Xylene	18.89	91	3814142	26.123 ng	100
71) n-Nonane	19.06	43	2207942	25.111 ng	100
72) 1,1,2,2-Tetrachloroethane	18.87	83	1920280	28.056 ng	100
74) Cumene	19.39	105	4669797	25.706 ng	100
75) alpha-Pinene	19.73	93	2516642	26.394 ng	100
76) n-Propylbenzene	19.83	91	5748335	26.851 ng	100
77) 3-Ethyltoluene	19.91	105	4824280	26.221 ng	99
78) 4-Ethyltoluene	19.95	105	4440812	27.516 ng	100
79) 1,3,5-Trimethylbenzene	20.02	105	3891708	25.933 ng	100
80) alpha-Methylstyrene	20.15	118	2133951	28.576 ng	100
81) 2-Ethyltoluene	20.18	105	4628604	26.862 ng	100
82) 1,2,4-Trimethylbenzene	20.37	105	4323279	29.231 ng	100
83) n-Decane	20.44	57	2317960	27.117 ng	99
84) Benzyl Chloride	20.49	91	3775432	31.379 ng	100
85) 1,3-Dichlorobenzene	20.51	146	2266889	30.518 ng	100
86) 1,4-Dichlorobenzene	20.57	146	2200963	24.970 ng	100
87) sec-Butylbenzene	20.60	105	5189431	27.044 ng	100
88) 4-Isopropyltoluene (p-...	20.73	119	5108284	27.780 ng	99
89) 1,2,3-Trimethylbenzene	20.74	105	4405266	27.923 ng	100
90) 1,2-Dichlorobenzene	20.86	146	2262220	27.231 ng	99
91) d-Limonene	20.86	68	1849244	29.170 ng	99
92) 1,2-Dibromo-3-Chloropr...	21.24	157	806286	29.153 ng	99
93) n-Undecane	21.51	57	2438089	27.128 ng	100
94) 1,2,4-Trichlorobenzene	22.36	180	1606384	30.096 ng	100
95) Naphthalene	22.46	128	4812376	29.684 ng	100
96) n-Dodecane	22.43	57	2427846	30.251 ng	100
97) Hexachlorobutadiene	22.78	225	1047435	28.082 ng	100
98) Cyclohexanone	18.60	55	1554818	25.350 ng	100
99) tert-Butylbenzene	20.37	119	4016249	27.638 ng	100
100) n-Butylbenzene	21.10	91	4360718	27.979 ng	100

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

Data File: I:\MS16\DATA\2016 12\19\12191629.D
Acq On : 20 Dec 2016 4:58 Operator: LH
Sample : 25ng TO-15 ICV STD
Misc : S29-12061601/S29-12011603 (12/30)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Dec 20 10:51:50 2016
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M



Initial Calibration Verification/LABORATORY CONTROL SAMPLE CHECK SHEET

Data File Name: **12191629.D**
Data File Path: **I:\MS16\DATA\2016_12\19**
Operator: **LH**
Date Acquired: **12/20/16** **4:58**

Acq. Method File: **TO15.M**
Sample Name: **25ng TO-15 ICV STD**
Misc Info: **S29-12061601/S29-12011603 (**
Instrument Name: **GCMS-16**

#	Compound Name	Ret. Time	Amt. (ng)	Spike Amt.(ng)	% Rec.	Lower Limit	Upper Limit	* OR Fail	ICV/AZ 70-130%
2)	Propene	4.19	25.074	26.275	95	52	127	*	*
3)	Dichlorodifluoromethane (CFC 1	4.36	24.979	26.250	95	68	109	*	*
4)	Chloromethane	4.68	25.145	26.225	96	51	130	*	*
5)	1,2-Dichloro-1,1,2,2-tetrafluoroet	4.95	23.189	26.375	88	66	114	*	*
6)	Vinyl Chloride	5.13	26.426	26.250	101	61	125	*	*
7)	1,3-Butadiene	5.42	28.829	26.250	110	62	144	*	*
8)	Bromomethane	5.90	26.288	26.250	100	73	123	*	*
9)	Chloroethane	6.24	26.626	26.225	102	69	122	*	*
10)	Ethanol	6.67	128.358	132.650	97	62	124	*	*
11)	Acetonitrile	6.94	26.609	26.650	100	57	114	*	*
12)	Acrolein	7.12	23.499	26.525	89	62	116	*	*
13)	Acetone	7.33	129.883	133.050	98	57	117	*	*
14)	Trichlorofluoromethane	7.57	24.463	26.275	93	63	98	*	*
15)	2-Propanol (Isopropanol)	7.87	53.518	53.025	101	66	121	*	*
16)	Acrylonitrile	8.15	26.179	26.575	99	68	123	*	*
17)	1,1-Dichloroethene	8.58	26.370	26.575	99	76	118	*	*
18)	2-Methyl-2-Propanol (tert-Butyl Alc	8.76	51.822	53.275	97	74	126	*	*
19)	Methylene Chloride	8.82	25.589	26.550	96	60	118	*	*
20)	3-Chloro-1-propene (Allyl Chlori	8.98	27.922	26.500	105	65	126	*	*
21)	Trichlorotrifluoroethane	9.22	24.680	26.450	93	73	114	*	*
22)	Carbon Disulfide	9.09	26.702	26.675	100	57	102	*	*
23)	trans-1,2-Dichloroethene	10.10	26.244	26.675	98	74	123	*	*
24)	1,1-Dichloroethane	10.36	25.230	26.550	95	69	111	*	*
25)	Methyl tert-Butyl Ether	10.43	24.735	26.600	93	69	113	*	*
26)	Vinyl Acetate	10.60	145.059	132.550	109	76	128	*	*
27)	2-Butanone (MEK)	10.85	26.323	26.550	99	63	127	*	*
28)	cis-1,2-Dichloroethene	11.38	25.606	26.475	97	72	117	*	*
29)	Diisopropyl Ether	11.64	24.154	26.575	91	64	118	*	*
30)	Ethyl Acetate	11.66	55.934	53.275	105	68	127	*	*
31)	n-Hexane	11.64	25.368	26.600	95	55	116	*	*
32)	Chloroform	11.72	24.850	26.475	94	70	109	*	*
34)	Tetrahydrofuran (THF)	12.12	24.464	26.575	92	72	113	*	*
35)	Ethyl tert-Butyl Ether	12.24	25.353	26.525	96	73	117	*	*
36)	1,2-Dichloroethane	12.52	25.028	26.500	94	69	113	*	*
38)	1,1,1-Trichloroethane	12.79	25.058	26.475	95	72	115	*	*
39)	Isopropyl Acetate	13.20	52.946	53.050	100	68	122	*	*
40)	1-Butanol	13.23	56.618	53.075	107	75	141	*	*
41)	Benzene	13.27	24.315	26.525	92	65	107	*	*
42)	Carbon Tetrachloride	13.43	25.907	26.600	97	71	113	*	*
43)	Cyclohexane	13.56	51.398	53.125	97	71	115	*	*
44)	tert-Amyl Methyl Ether	13.89	25.325	26.525	95	73	115	*	*
45)	1,2-Dichloropropane	14.12	24.872	26.525	94	71	115	*	*
46)	Bromodichloromethane	14.32	26.501	26.700	99	75	118	*	*
47)	Trichloroethene	14.36	24.408	26.550	92	68	114	*	*
48)	1,4-Dioxane	14.33	26.353	26.600	99	81	131	*	*
49)	2,2,4-Trimethylpentane (Isooctane)	14.41	24.871	26.525	94	68	112	*	*

Initial Calibration Verification/LABORATORY CONTROL SAMPLE CHECK SHEET

Data File Name: **12191629.D** **TO15.M**
Data File Path: **I:\MS16\DATA\2016_12\19** Sample Name: **25ng TO-15 ICV STD**
Operator: **LH** Misc Info: **S29-12061601/S29-12011603 (**
Date Acquired: **12/20/16** **4:58** Instrument Name: **GCMS-16**

#	Compound Name	Ret. Time	Amt. (ng)	Spike Amt.(ng)	% Rec.	Lower Limit	Upper Limit	* OR Fail	ICV/AZ 70-130%
50)	**Methyl Methacrylate**	**14.55**	**53.563**	**53.000**	101	**72**	**130**	*	*
51)	**n-Heptane**	**14.67**	**24.817**	**26.600**	93	**68**	**116**	*	*
52)	**cis-1,3-Dichloropropene**	**15.22**	**26.730**	**26.275**	102	**77**	**126**	*	*
53)	**4-Methyl-2-pentanone**	**15.24**	**26.302**	**26.575**	99	**69**	**126**	*	*
54)	**trans-1,3-Dichloropropene**	**15.73**	**27.622**	**26.675**	104	**79**	**125**	*	*
55)	**1,1,2-Trichloroethane**	**15.92**	**25.399**	**26.525**	96	**75**	**119**	*	*
58)	**Toluene**	**16.20**	**24.350**	**26.450**	92	**59**	**118**	*	*
59)	**2-Hexanone**	**16.43**	**26.123**	**26.575**	98	**69**	**129**	*	*
60)	**Dibromochloromethane**	**16.62**	**26.581**	**26.600**	100	**74**	**136**	*	*
61)	**1,2-Dibromoethane**	**16.87**	**25.586**	**26.450**	97	**73**	**131**	*	*
62)	**n-Butyl Acetate**	**17.05**	**27.001**	**26.950**	100	**69**	**130**	*	*
63)	**n-Octane**	**17.17**	**25.213**	**26.500**	95	**66**	**120**	*	*
64)	**Tetrachloroethene**	**17.33**	**24.649**	**26.575**	93	**65**	**130**	*	*
65)	**Chlorobenzene**	**17.97**	**24.804**	**26.500**	94	**68**	**120**	*	*
66)	**Ethylbenzene**	**18.31**	**25.700**	**26.450**	97	**68**	**122**	*	*
67)	**m- & p-Xylenes**	**18.47**	**53.005**	**53.025**	100	**68**	**123**	*	*
68)	**Bromoform**	**18.54**	**27.983**	**26.550**	105	**69**	**130**	*	*
69)	**Styrene**	**18.79**	**26.217**	**26.475**	99	**71**	**133**	*	*
70)	**o-Xylene**	**18.89**	**26.123**	**26.450**	99	**68**	**122**	*	*
71)	**n-Nonane**	**19.06**	**25.111**	**26.475**	95	**65**	**120**	*	*
72)	**1,1,2,2-Tetrachloroethane**	**18.87**	**28.056**	**26.500**	106	**69**	**130**	*	*
74)	**Cumene**	**19.39**	**25.706**	**26.525**	97	**70**	**123**	*	*
75)	**alpha-Pinene**	**19.73**	**26.394**	**26.575**	99	**70**	**128**	*	*
76)	**n-Propylbenzene**	**19.83**	**26.851**	**26.725**	100	**69**	**125**	*	*
77)	3-Ethyltoluene	19.91	26.221	26.550	99	67	128	*	*
78)	**4-Ethyltoluene**	**19.95**	**27.516**	**26.525**	**104**	**67**	**130**	*	*
79)	**1,3,5-Trimethylbenzene**	**20.02**	**25.933**	**26.525**	**98**	**67**	**124**	*	*
80)	alpha-Methylstyrene	20.15	28.576	26.550	**108**	67	141	*	*
81)	2-Ethyltoluene	20.18	26.862	26.550	**101**	67	124	*	*
82)	**1,2,4-Trimethylbenzene**	**20.37**	**29.231**	**26.525**	**110**	**67**	**129**	*	*
83)	n-Decane	20.44	27.117	26.525	**102**	66	124	*	*
84)	**Benzyl Chloride**	**20.49**	**31.379**	**26.550**	**118**	**79**	**138**	*	*
85)	**1,3-Dichlorobenzene**	**20.51**	**30.518**	**26.475**	**115**	**65**	**136**	*	*
86)	**1,4-Dichlorobenzene**	**20.57**	**24.970**	**26.650**	**94**	**66**	**141**	*	*
87)	sec-Butylbenzene	20.60	27.044	26.550	**102**	68	125	*	*
88)	4-Isopropyltoluene (p-Cymene)	20.73	27.780	26.550	**105**	68	131	*	*
89)	1,2,3-Trimethylbenzene	20.74	27.923	26.500	**105**	68	132	*	*
90)	**1,2-Dichlorobenzene**	**20.86**	**27.231**	**26.550**	**103**	**67**	**136**	*	*
91)	**d-Limonene**	**20.86**	**29.170**	**26.550**	**110**	**71**	**134**	*	*
92)	**1,2-Dibromo-3-Chloropropane**	**21.24**	**29.153**	**26.475**	**110**	**73**	**136**	*	*
93)	n-Undecane	21.51	27.128	26.600	**102**	68	132	*	*
94)	**1,2,4-Trichlorobenzene**	**22.36**	**30.096**	**26.500**	**114**	**64**	**134**	*	*
95)	**Naphthalene**	**22.46**	**29.684**	**26.700**	**111**	**62**	**136**	*	*
96)	n-Dodecane	22.43	30.251	26.550	**114**	61	137	*	*
97)	**Hexachlorobutadiene**	**22.78**	**28.082**	**26.575**	**106**	60	133	*	*
98)	Cyclohexanone	18.61	25.350	26.575	95	64	131	*	*
99)	tert-Butylbenzene	20.37	27.638	26.500	104	67	128	*	*
100)	n-Butylbenzene	21.10	27.979	26.500	106	68	128	*	*

Bold = 75 Compound List
*** = Pass**

Evaluate Continuing Calibration Report

Data File: I:\MS16\DATA\2017 03\09\03091701.D
Acq On : 9 Mar 2017 2:20 Operator: LH
Sample : CCV R16030917 25ng
Misc : S29-03071701/S29-02171704 (3/18)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Mar 09 07:13:57 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/9/17

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	131	-0.02
2	T	Propene	1.728	2.012	-16.4	163	0.00
3	T	Dichlorodifluoromethane (CF	3.158	3.047	3.5	128	0.00
4	T	Chloromethane	2.597	2.752	-6.0	141	0.00
5	T	1,2-Dichloro-1,1,2,2-tetraf	1.755	1.489	15.2	116	-0.01
6	T	Vinyl Chloride	2.470	2.882	-16.7	146	-0.01
7	T	1,3-Butadiene	1.725	2.345	-35.9#	158	-0.02
8	T	Bromomethane	1.307	1.406	-7.6	137	-0.02
9	T	Chloroethane	1.029	1.203	-16.9	146	-0.02
10	T	Ethanol	1.182	1.424	-20.5	159	-0.10
11	T	Acetonitrile	2.708	3.405	-25.7	162	-0.07
12	T	Acrolein	1.039	1.081	-4.0	151	-0.03
13	T	Acetone	1.187	1.352	-13.9	148	-0.05
14	T	Trichlorofluoromethane	2.710	2.500	7.7	127	-0.02
15	T	2-Propanol (Isopropanol)	4.054	4.694	-15.8	144	-0.07
16	T	Acrylonitrile	2.004	2.324	-16.0	151	-0.05
17	T	1,1-Dichloroethene	1.363	1.427	-4.7	134	-0.02
18	T	2-Methyl-2-Propanol (tert-B	4.253	4.449	-4.6	134	-0.07
19	T	Methylene Chloride	1.488	1.566	-5.2	138	-0.03
20	T	3-Chloro-1-propene (Allyl C	2.252	2.651	-17.7	149	-0.02
21	T	Trichlorotrifluoroethane	1.328	1.156	13.0	118	-0.01
22	T	Carbon Disulfide	5.250	5.849	-11.4	142	-0.02
23	T	trans-1,2-Dichloroethene	2.205	2.417	-9.6	142	-0.02
24	T	1,1-Dichloroethane	2.763	2.922	-5.8	140	-0.02
25	T	Methyl tert-Butyl Ether	4.786	4.752	0.7	135	-0.02
26	T	Vinyl Acetate	0.347	0.408	-17.6	133	-0.03
27	T	2-Butanone (MEK)	1.025	1.157	-12.9	146	-0.04
28	T	cis-1,2-Dichloroethene	2.172	2.351	-8.2	140	-0.02
29	T	Diisopropyl Ether	1.376	1.343	2.4	133	-0.02
30	T	Ethyl Acetate	0.584	0.715	-22.4	147	-0.03
31	T	n-Hexane	2.649	3.077	-16.2	153	-0.01
32	T	Chloroform	2.753	2.683	2.5	131	-0.03
33	S	1,2-Dichloroethane-d4(SS1)	1.796	1.833	-2.1	136	-0.02
34	T	Tetrahydrofuran (THF)	1.042	1.103	-5.9	145	-0.02
35	T	Ethyl tert-Butyl Ether	1.817	1.833	-0.9	133	-0.02
36	T	1,2-Dichloroethane	2.256	2.213	1.9	131	-0.02
37	IR	1,4-Difluorobenzene (IS2)	1.000	1.000	0.0	136	-0.02
38	T	1,1,1-Trichloroethane	0.490	0.448	8.6	125	-0.02
39	T	Isopropyl Acetate	0.210	0.241	-14.8	147	-0.02
40	T	1-Butanol	0.335	0.410	-22.4	141	-0.04
41	T	Benzene	1.276	1.251	2.0	139	-0.02
42	T	Carbon Tetrachloride	0.424	0.389	8.3	120	-0.01
43	T	Cyclohexane	0.474	0.486	-2.5	133	-0.01
44	T	tert-Amyl Methyl Ether	0.921	0.925	-0.4	135	-0.02
45	T	1,2-Dichloropropane	0.317	0.337	-6.3	146	-0.02
46	T	Bromodichloromethane	0.443	0.441	0.5	129	-0.02
47	T	Trichloroethene	0.336	0.302	10.1	123	-0.02
48	T	1,4-Dioxane	0.256	0.271	-5.9	135	-0.02
49	T	2,2,4-Trimethylpentane (Iso	1.345	1.415	-5.2	144	-0.01
50	T	Methyl Methacrylate	0.125	0.128	-2.4	128	-0.02
51	T	n-Heptane	0.308	0.326	-5.8	146	-0.01
52	T	cis-1,3-Dichloropropene	0.514	0.554	-7.8	135	-0.01
53	T	4-Methyl-2-pentanone	0.307	0.349	-13.7	146	-0.01
54	T	trans-1,3-Dichloropropene	0.458	0.492	-7.4	131	-0.01

Evaluate Continuing Calibration Report

Data File: I:\MS16\DATA\2017 03\09\03091701.D
Acq On : 9 Mar 2017 2:20 Operator: LH
Sample : CCV R16030917 25ng
Misc : S29-03071701/S29-02171704 (3/18)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Mar 09 07:13:57 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
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)
55	T	1,1,2-Trichloroethane	0.297	0.296	0.3	132	-0.01
56	IR	Chlorobenzene-d5 (IS3)	1.000	1.000	0.0	144	0.00
57	S	Toluene-d8 (SS2)	2.398	2.282	4.8	139	0.00
58	T	Toluene	2.928	2.636	10.0	133	-0.01
59	T	2-Hexanone	1.804	1.909	-5.8	148	-0.01
60	T	Dibromochloromethane	0.806	0.724	10.2	121	0.00
61	T	1,2-Dibromoethane	0.788	0.719	8.8	127	-0.01
62	T	n-Butyl Acetate	1.942	2.124	-9.4	149	-0.01
63	T	n-Octane	0.643	0.654	-1.7	146	0.00
64	T	Tetrachloroethene	0.794	0.625	21.3	114	0.00
65	T	Chlorobenzene	1.930	1.699	12.0	126	0.00
66	T	Ethylbenzene	3.294	3.088	6.3	130	0.00
67	T	m- & p-Xylenes	2.563	2.421	5.5	127	-0.01
68	T	Bromoform	0.656	0.571	13.0	110	-0.01
69	T	Styrene	1.989	1.842	7.4	125	0.00
70	T	o-Xylene	2.637	2.472	6.3	127	0.00
71	T	n-Nonane	1.588	1.643	-3.5	149	0.00
72	T	1,1,2,2-Tetrachloroethane	1.236	1.321	-6.9	134	0.00
73	S	Bromofluorobenzene (SS3)	0.766	0.642	16.2	119	0.00
74	T	Cumene	3.281	2.944	10.3	124	0.00
75	T	alpha-Pinene	1.722	1.600	7.1	125	0.00
76	T	n-Propylbenzene	3.866	3.712	4.0	128	0.00
77	T	3-Ethyltoluene	3.323	3.068	7.7	122	0.00
78	T	4-Ethyltoluene	2.915	2.714	6.9	124	0.00
79	T	1,3,5-Trimethylbenzene	2.710	2.437	10.1	122	0.00
80	T	alpha-Methylstyrene	1.349	1.248	7.5	113	0.00
81	T	2-Ethyltoluene	3.112	2.861	8.1	122	0.00
82	T	1,2,4-Trimethylbenzene	2.671	2.571	3.7	114	-0.01
83	T	n-Decane	1.544	1.590	-3.0	138	0.00
84	T	Benzyl Chloride	2.173	2.345	-7.9	120	0.00
85	T	1,3-Dichlorobenzene	1.341	1.340	0.1	113	0.00
86	T	1,4-Dichlorobenzene	1.592	1.339	15.9	115	0.00
87	T	sec-Butylbenzene	3.465	3.214	7.2	122	0.00
88	T	4-Isopropyltoluene (p-Cymen	3.321	2.927	11.9	110	0.00
89	T	1,2,3-Trimethylbenzene	2.849	2.581	9.4	115	-0.01
90	T	1,2-Dichlorobenzene	1.500	1.303	13.1	109	0.00
91	T	d-Limonene	1.145	1.129	1.4	120	0.00
92	T	1,2-Dibromo-3-Chloropropane	0.499	0.469	6.0	115	0.00
93	T	n-Undecane	1.623	1.636	-0.8	136	0.00
94	T	1,2,4-Trichlorobenzene	0.964	0.922	4.4	108	0.00
95	T	Naphthalene	2.928	3.023	-3.2	118	0.00
96	T	n-Dodecane	1.449	1.496	-3.2	135	0.00
97	T	Hexachlorobutadiene	0.674	0.522	22.6	98	0.00
98	T	Cyclohexanone	1.108	1.131	-2.1	142	-0.01
99	T	tert-Butylbenzene	2.624	2.299	12.4	111	0.00
100	T	n-Butylbenzene	2.815	2.782	1.2	126	0.00

(#) = Out of Range SPCC's out = 0 CCC's out = 0

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091701.D
Acq On : 9 Mar 2017 2:20 Operator: LH
Sample : CCV R16030917 25ng
Misc : S29-03071701/S29-02171704 (3/18)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Mar 09 07:13:57 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 3/9/17

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.55	130	394642	12.500	ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.66	114	1981191	12.500	ng	-0.02
56) Chlorobenzene-d5 (IS3)	17.93	82	925551	12.500	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.40	65	723450	12.761	ng	-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 102.08%			
57) Toluene-d8 (SS2)	16.10	98	2112370	11.895	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 95.20%			
73) Bromofluorobenzene (SS3)	19.28	174	594392	10.486	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 83.92%			

Target Compounds							Qvalue
2) Propene	4.19	42	1645467	30.160	ng		98
3) Dichlorodifluoromethan...	4.36	85	2517748	25.254	ng		99
4) Chloromethane	4.68	50	2183040	26.621	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.95	135	1181065	21.318	ng		100
6) Vinyl Chloride	5.13	62	2327056	29.838	ng		100
7) 1,3-Butadiene	5.41	54	1956414	35.929	ng		98
8) Bromomethane	5.89	94	1102254	26.707	ng		99
9) Chloroethane	6.24	64	958066	29.480	ng		100
10) Ethanol	6.66	45	5853832	156.849	ng		100
11) Acetonitrile	6.92	41	2811538	32.889	ng		98
12) Acrolein	7.11	56	888372	27.089	ng		91
13) Acetone	7.33	58	5668020	151.251	ng		93
14) Trichlorofluoromethane	7.57	101	2070076	24.193	ng		100
15) 2-Propanol (Isopropanol)	7.86	45	7798718	60.932	ng		98
16) Acrylonitrile	8.13	53	1934926	30.580	ng		99
17) 1,1-Dichloroethene	8.57	96	1192452	27.720	ng		95
18) 2-Methyl-2-Propanol (t...	8.75	59	7423595	55.289	ng		98
19) Methylene Chloride	8.81	84	1306872	27.816	ng		94
20) 3-Chloro-1-propene (Al...	8.97	41	2201222	30.962	ng		96
21) Trichlorotrifluoroethane	9.21	151	957001	22.824	ng		88
22) Carbon Disulfide	9.07	76	4897790	29.551	ng		99
23) trans-1,2-Dichloroethene	10.09	61	2035340	29.243	ng		95
24) 1,1-Dichloroethane	10.35	63	2352505	26.972	ng		100
25) Methyl tert-Butyl Ether	10.42	73	3998486	26.464	ng		97
26) Vinyl Acetate	10.60	86	1696877	154.792	ng	#	87
27) 2-Butanone (MEK)	10.84	72	958173	29.616	ng		93
28) cis-1,2-Dichloroethene	11.37	61	1974734	28.801	ng		95
29) Diisopropyl Ether	11.64	87	1125481	25.912	ng	#	73
30) Ethyl Acetate	11.65	61	1202171	65.228	ng		100
31) n-Hexane	11.63	57	2581644	30.870	ng		99
32) Chloroform	11.72	83	2240117	25.769	ng		100
34) Tetrahydrofuran (THF)	12.11	72	924742	28.098	ng		94
35) Ethyl tert-Butyl Ether	12.23	87	1528959	26.649	ng		92
36) 1,2-Dichloroethane	12.52	62	1837516	25.799	ng		100
38) 1,1,1-Trichloroethane	12.79	97	1906447	24.564	ng		98
39) Isopropyl Acetate	13.19	61	2005328	60.338	ng		99
40) 1-Butanol	13.22	56	3418502	64.311	ng		98
41) Benzene	13.27	78	5215591	25.783	ng		100
42) Carbon Tetrachloride	13.42	117	1625627	24.196	ng		100
43) Cyclohexane	13.55	84	4101506	54.540	ng		92
44) tert-Amyl Methyl Ether	13.88	73	3864822	26.482	ng		98
45) 1,2-Dichloropropane	14.12	63	1420090	28.230	ng		100
46) Bromodichloromethane	14.31	83	1861703	26.526	ng		100
47) Trichloroethene	14.35	130	1270471	23.892	ng		100
48) 1,4-Dioxane	14.33	88	1139640	28.103	ng		92
49) 2,2,4-Trimethylpentane...	14.41	57	5938177	27.862	ng		98

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091701.D
Acq On : 9 Mar 2017 2:20 Operator: LH
Sample : CCV R16030917 25ng
Misc : S29-03071701/S29-02171704 (3/18)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Mar 09 07:13:57 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

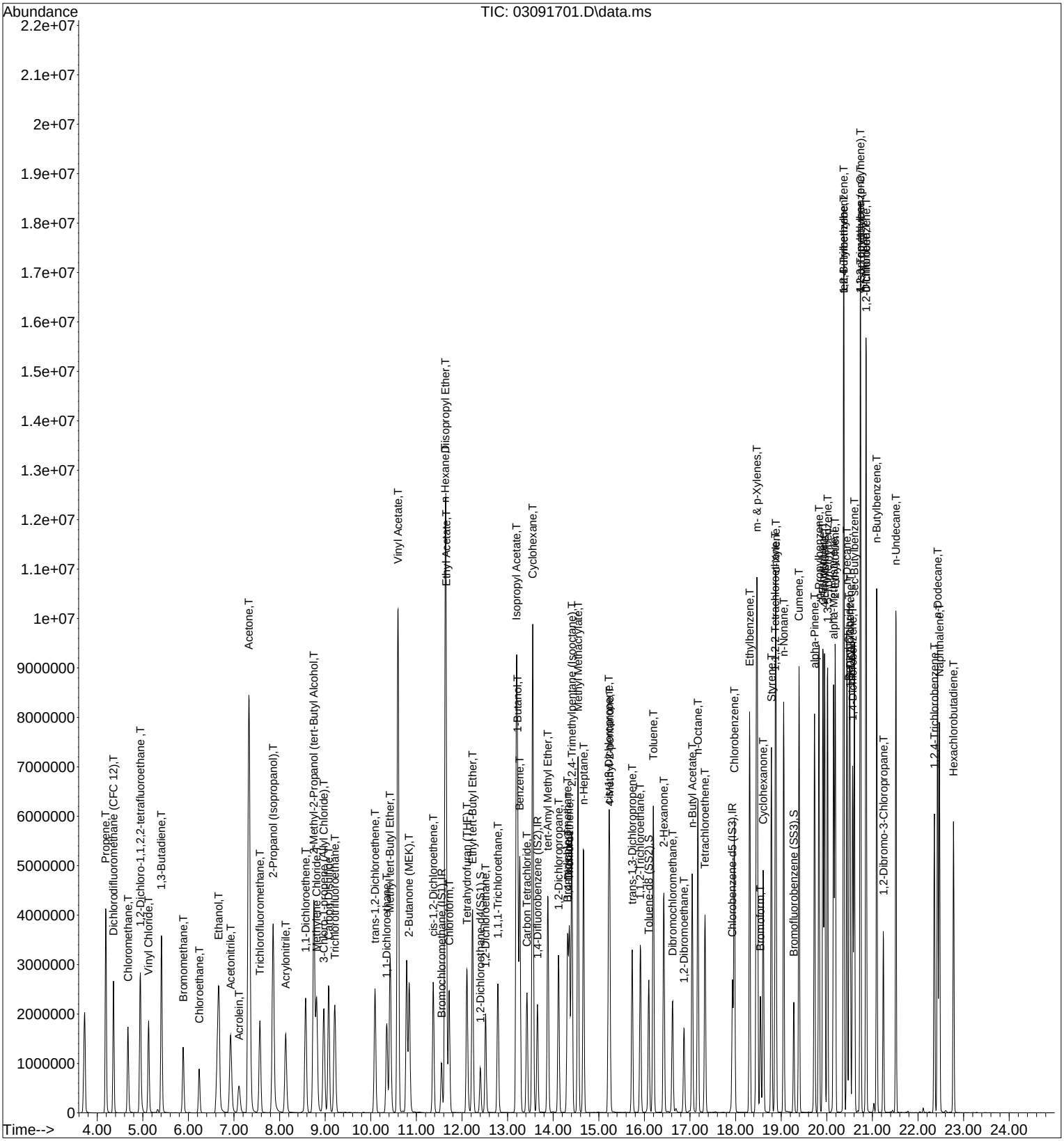
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
50) Methyl Methacrylate	14.55	100	1066841	53.789	ng #	86
51) n-Heptane	14.67	71	1373466	28.155	ng	96
52) cis-1,3-Dichloropropene	15.22	75	2450406	30.087	ng	100
53) 4-Methyl-2-pentanone	15.24	58	1461463	30.084	ng	96
54) trans-1,3-Dichloropropene	15.73	75	2073963	28.561	ng	100
55) 1,1,2-Trichloroethane	15.91	97	1245553	26.450	ng	97
58) Toluene	16.20	91	5137805	23.695	ng	100
59) 2-Hexanone	16.43	43	3749705	28.076	ng	100
60) Dibromochloromethane	16.62	129	1422430	23.826	ng	100
61) 1,2-Dibromoethane	16.87	107	1405131	24.068	ng	100
62) n-Butyl Acetate	17.05	43	4183249	29.098	ng	98
63) n-Octane	17.17	57	1280106	26.873	ng	95
64) Tetrachloroethene	17.33	166	1226947	20.881	ng	99
65) Chlorobenzene	17.97	112	3336754	23.351	ng	100
66) Ethylbenzene	18.31	91	6030122	24.724	ng	99
67) m- & p-Xylenes	18.47	91	9515189	50.145	ng	98
68) Bromoform	18.54	173	1122703	23.106	ng	100
69) Styrene	18.79	104	3618228	24.572	ng	99
70) o-Xylene	18.89	91	4822706	24.701	ng	98
71) n-Nonane	19.06	43	3205786	27.266	ng	96
72) 1,1,2,2-Tetrachloroethane	18.87	83	2581580	28.206	ng	99
74) Cumene	19.39	105	5722696	23.558	ng	99
75) alpha-Pinene	19.73	93	3092823	24.257	ng	99
76) n-Propylbenzene	19.83	91	7303313	25.512	ng	97
77) 3-Ethyltoluene	19.91	105	5963708	24.240	ng	99
78) 4-Ethyltoluene	19.95	105	5269426	24.417	ng	99
79) 1,3,5-Trimethylbenzene	20.02	105	4732295	23.583	ng	98
80) alpha-Methylstyrene	20.15	118	2425868	24.293	ng	99
81) 2-Ethyltoluene	20.18	105	5624691	24.411	ng	99
82) 1,2,4-Trimethylbenzene	20.37	105	5006154	25.313	ng	97
83) n-Decane	20.44	57	3099336	27.115	ng	97
84) Benzyl Chloride	20.49	91	4604807	28.621	ng	98
85) 1,3-Dichlorobenzene	20.51	146	2624779	26.425	ng	100
86) 1,4-Dichlorobenzene	20.57	146	2621749	22.244	ng	99
87) sec-Butylbenzene	20.61	105	6271581	24.442	ng	99
88) 4-Isopropyltoluene (p-...	20.74	119	5564754	22.631	ng	97
89) 1,2,3-Trimethylbenzene	20.74	105	4905913	23.255	ng	97
90) 1,2-Dichlorobenzene	20.86	146	2551692	22.970	ng	100
91) d-Limonene	20.86	68	2184055	25.764	ng	95
92) 1,2-Dibromo-3-Chloropr...	21.24	157	914210	24.720	ng	90
93) n-Undecane	21.51	57	3191459	26.556	ng	97
94) 1,2,4-Trichlorobenzene	22.36	180	1780782	24.950	ng	100
95) Naphthalene	22.47	128	6059480	27.951	ng	100
96) n-Dodecane	22.43	57	2893502	26.962	ng	97
97) Hexachlorobutadiene	22.78	225	1023591	20.523	ng	99
98) Cyclohexanone	18.60	55	2210269	26.949	ng	97
99) tert-Butylbenzene	20.37	119	4471830	23.013	ng	99
100) n-Butylbenzene	21.10	91	5437574	26.091	ng	99

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

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2017 03\09\03091701.D
Acq On : 9 Mar 2017 2:20 Operator: LH
Sample : CCV R16030917 25ng
Misc : S29-03071701/S29-02171704 (3/18)
ALS Vial : 2 Sample Multiplier: 1

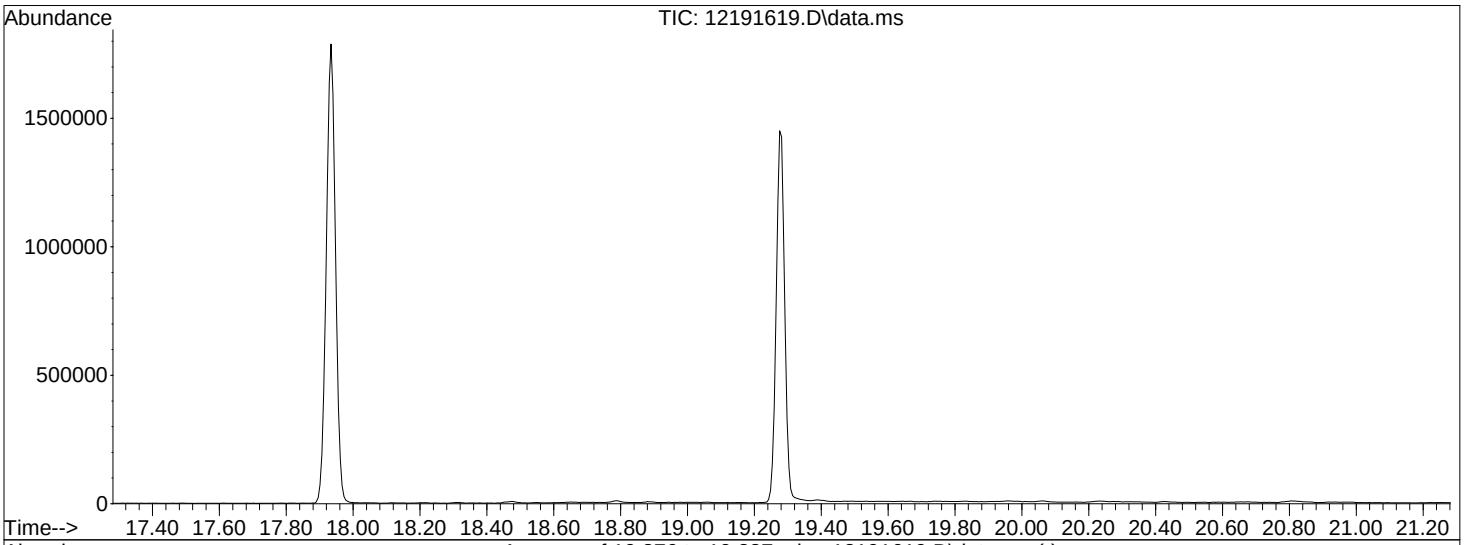
Quant Time: Mar 09 07:13:57 2017
Quant Method : I:\MS16\METHODS\R16121916.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 20 10:31:33 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

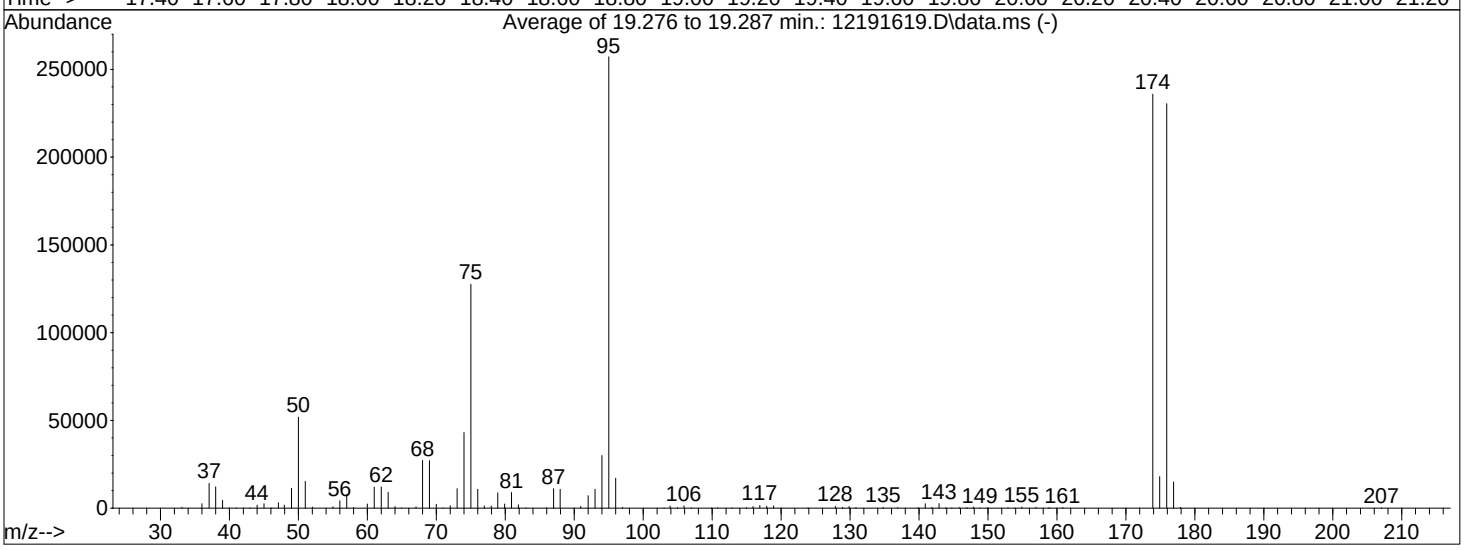


Data Path : I:\MS16\DATA\2016 12\19\
Data File : 12191619.D
Acq On : 19 Dec 2016 23:25
Operator : LH
Sample : 12.5ng TO-15 BFB
Misc : S29-12061601
ALS Vial : 2 Sample Multiplier: 1

Integration File: LSCINT.P

Method : I:\MS16\METHODS\R16121916.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue Dec 20 08:56:53 2016





AutoFind: Scans 2853, 2854, 2855; Background Corrected with Scan 2844

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	20.2	51872	PASS
75	95	30	66	49.6	127557	PASS
95	95	100	100	100.0	257173	PASS
96	95	5	9	6.6	17067	PASS
173	174	0.00	2	0.0	0	PASS
174	95	50	120	91.7	235883	PASS
175	174	4	9	7.6	17991	PASS
176	174	93	101	97.7	230443	PASS
177	176	5	9	6.5	15000	PASS

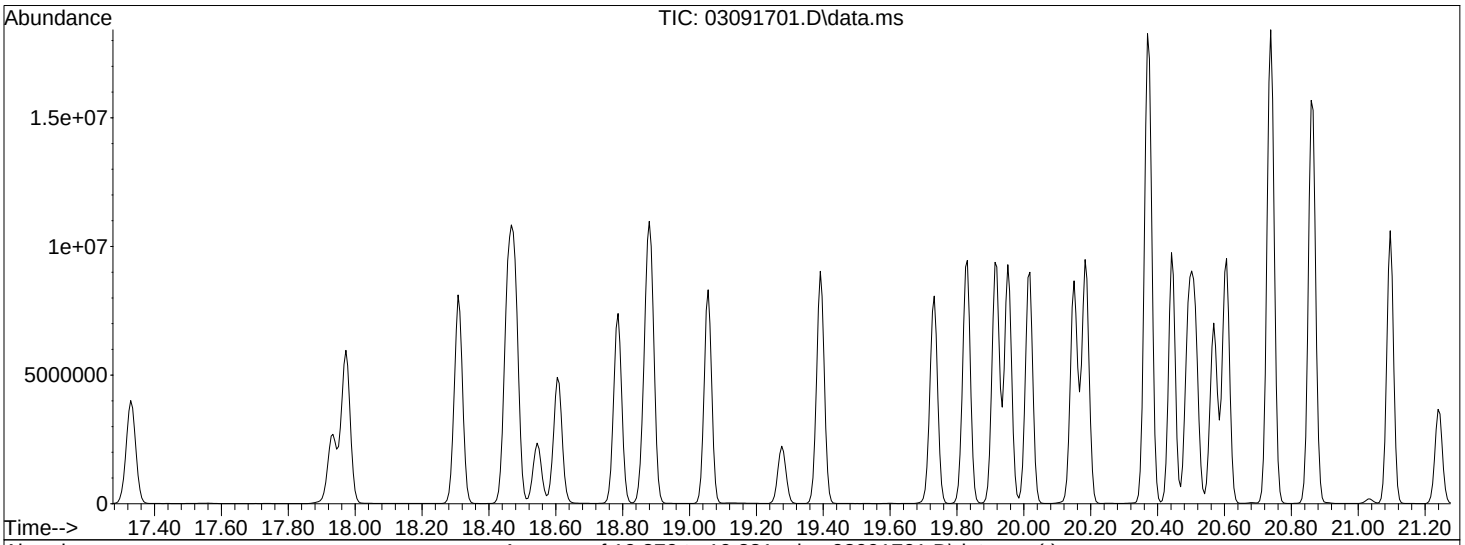
LH 12/20/16

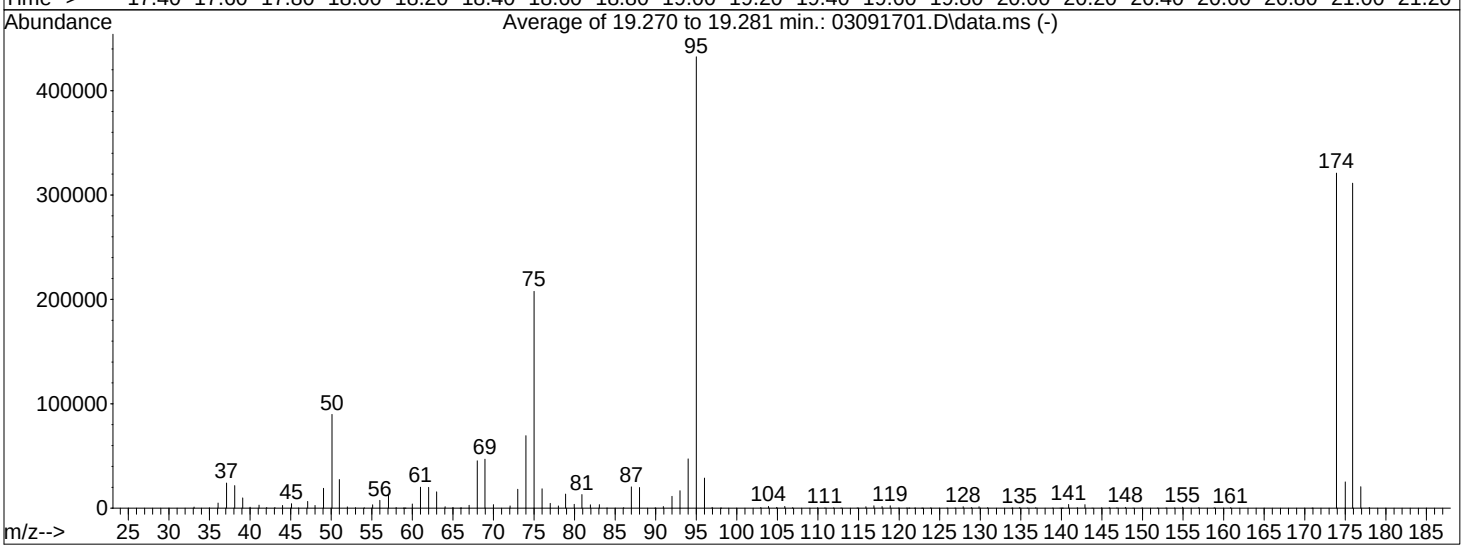
BFB

Data Path : I:\MS16\DATA\2017 03\09\
Data File : 03091701.D
Acq On : 9 Mar 2017 2:20
Operator : LH
Sample : CCV R16030917 25ng
Misc : S29-03071701/S29-02171704 (3/18)
ALS Vial : 2 Sample Multiplier: 1

Integration File: LSCINT.P

Method : I:\MS16\METHODS\R16121916.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue Dec 20 10:31:33 2016





AutoFind: Scans 2852, 2853, 2854; Background Corrected with Scan 2844

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	20.8	89819	PASS
75	95	30	66	48.1	207787	PASS
95	95	100	100	100.0	432423	PASS
96	95	5	9	6.7	28797	PASS
173	174	0.00	2	0.0	0	PASS
174	95	50	120	74.2	320981	PASS
175	174	4	9	7.8	25093	PASS
176	174	93	101	97.0	311339	PASS
177	176	5	9	6.6	20480	PASS

LH 3/9/17

Injection Log

Directory: J:\MS16\DATA\2016_12\19\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	12/19/16 8:58	12191601.D	Blank (100mL)	S29-12061601	LH	2	
2	12/19/16 10:27	12191602.D	Blank (100mL)	S29-12061601	LH	2	
3	12/19/16 11:01	12191603.D	0.1ng std check	S29-12061601/S29-11301611 (12/29)	LH	6	
4	12/19/16 12:03	12191604.D	Blank (100mL)	S29-12061601	LH	2	
5	12/19/16 12:36	12191605.D	Blank (100mL)	S29-12061601	LH	2	
6	12/19/16 13:09	12191606.D	Blank (100mL)	S29-12061601	LH	2	
7	12/19/16 13:43	12191607.D	Blank (100mL)	S29-12061601	LH	2	
8	12/19/16 17:19	12191608.D	1.0ng std check	S29-12061601/S29-12191607 (1/17)	LH	8	
9	12/19/16 17:52	12191609.D	5.0ng std check	S29-12061601/S29-12191605 (1/17)	LH	9	
10	12/19/16 18:26	12191610.D	25ng std check	S29-12061601/S29-12191605 (1/17)	LH	2	
11	12/19/16 18:59	12191611.D	12.5ng TO-15 BFB	S29-12061601	LH	2	
12	12/19/16 19:32	12191612.D	0.5ng MAPH ICAL STD	S29-12061601/S29-10281604 (12/25)	LH	7	
13	12/19/16 20:05	12191613.D	1.0ng MAPH ICAL STD	S29-12061601/S29-10281604 (12/25)	LH	7	
14	12/19/16 20:39	12191614.D	5.0ng MAPH ICAL STD	S29-12061601/S29-10281604 (12/25)	LH	7	
15	12/19/16 21:12	12191615.D	25ng MAPH ICAL STD	S29-12061601/S29-10281603 (12/25)	LH	4	
16	12/19/16 21:45	12191616.D	50ng MAPH ICAL STD	S29-12061601/S29-10281603 (12/25)	LH	4	
17	12/19/16 22:18	12191617.D	100ng MAPH ICAL STD	S29-12061601/S29-10281603 (12/25)	LH	4	
18	12/19/16 22:52	12191618.D	25ng MAPH ICV STD	S29-12061601/S29-12011603 (12/30)	LH	2	
19	12/19/16 23:25	12191619.D	12.5ng TO-15 BFB	S29-12061601	LH	2	
20	12/19/16 23:59	12191620.D	0.08ng TO-15 ICAL STD	S29-12061601/S29-12191607 (1/17)	LH	8	
21	12/20/16 0:33	12191621.D	0.1ng TO-15 ICAL STD	S29-12061601/S29-12191607 (1/17)	LH	8	
22	12/20/16 1:06	12191622.D	0.2ng TO-15 ICAL STD	S29-12061601/S29-12191607 (1/17)	LH	8	
23	12/20/16 1:39	12191623.D	0.4ng TO-15 ICAL STD	S29-12061601/S29-12191607 (1/17)	LH	8	
24	12/20/16 2:13	12191624.D	1.0ng TO-15 ICAL STD	S29-12061601/S29-12191605 (1/17)	LH	9	
25	12/20/16 2:46	12191625.D	5.0ng TO-15 ICAL STD	S29-12061601/S29-12191605 (1/17)	LH	9	
26	12/20/16 3:19	12191626.D	25ng TO-15 ICAL STD	S29-12061601/S29-12191603 (1/17)	LH	2	
27	12/20/16 3:52	12191627.D	50ng TO-15 ICAL STD	S29-12061601/S29-12191603 (1/17)	LH	2	
28	12/20/16 4:25	12191628.D	100ng TO-15 ICAL STD	S29-12061601/S29-12191603 (1/17)	LH	2	
29	12/20/16 4:58	12191629.D	25ng TO-15 ICV STD	S29-12061601/S29-12011603 (12/30)	LH	2	
30	12/20/16 5:32	12191630.D	Blank (100mL)	S29-12061601	LH	2	
	ICAL passed for all compounds 0.08ng-100ng, except: propene, methylene chloride 0.2ng-100ng, dichlorodifluoromethane,						
	chloromethane 0.1ng-100ng, acetonitrile, carbon disulfide, benzyl chloride, 1,2-dibromo-3-chloropropane, naphthalene 0.4ng-100ng,						
	vinyl chloride 2.0ng-500ng.						
				LH 12/21/16			
##							

Injection Log

Directory: I:\MS16\DATA\2017_03\09\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	3/9/17 2:20	03091701.D	CCV R16030917_25ng	S29-03071701/S29-02171704 (3/18)	LH	2	passed
2	3/9/17 2:54	03091702.D	CCV C16030917_25ng	S29-03071701/S29-03031405 (4/1)	LH	3	passed
3	3/9/17 3:28	03091703.D	CCV M16030917_25ng	S29-03071701/S29-02221702 (4/21)	LH	4	passed
4	3/9/17 4:02	03091704.D	MB R16030917_1000mL	S29-03071701 AC00442	LH	2	passed
5	3/9/17 4:35	03091705.D	LCS R16030917_25ng	S29-03071701/S29-03031707 (1/1)	LH	2	passed
6	3/9/17 5:09	03091706.D	LCSD R16030917_25ng	S29-03071701/S29-03031707 (1/1)	LH	2	passed
7	3/9/17 8:05	03091707.D	P1701055-003dil (5.0mL)	S29-03071701	LH	1	
8	3/9/17 8:38	03091708.D	P1701055-011dil (15mL)	S29-03071701	LH	12	
9	3/9/17 9:11	03091709.D	P1701055-012dil (15mL)	S29-03071701	LH	13	
10	3/9/17 9:45	03091710.D	P1701055-013dil (5.0mL)	S29-03071701	LH	1	
11	3/9/17 10:20	03091711.D	P1700972-004dil (25mL)	S29-03071701	LH	6	
12	3/9/17 10:54	03091712.D	P1701055-014dil (20mL)	S29-03071701	LH	15	
13	3/9/17 11:27	03091713.D	P1701055-016dil (5.0mL)	S29-03071701	LH	1	
14	3/9/17 12:03	03091714.D	P1701057-001 (4.0mL)	S29-03071701	LH	1	
15	3/9/17 13:53	03091715.D	P1700971-003 (20mL)	S29-03071701	LH	8	over diluted
16	3/9/17 14:59	03091716.D	P1701057-002 (1000mL)	S29-03071701	LH	16	
17	3/9/17 15:48	03091717.D	P1700971-001 (1000mL)	S29-03071701	LH	6	
18	3/9/17 16:35	03091718.D	P1700971-002 (1000mL)	S29-03071701	LH	7	
19	3/9/17 17:09	03091719.D	P1700971-003 (120mL)	S29-03071701	LH	8	
20	3/9/17 17:43	03091720.D	P1700971-004 (1000mL)	S29-03071701	LH	9	
21	3/9/17 18:17	03091721.D	P1700971-005 (1000mL)	S29-03071701	LH	10	
22	3/9/17 18:50	03091722.D	P1700971-006 (35mL)	S29-03071701	LH	11	
23	3/9/17 19:24	03091723.D	P1700971-006dup (35mL)	S29-03071701	LH	11	passed
24	3/9/17 19:58	03091724.D	Blank (100mL)	S29-03071701	LH	2	
25	3/9/17 20:32	03091725.D	P1701095-001 (400mL)	S29-03071701	LH	12	
26	3/9/17 21:06	03091726.D	P1701120-001 (400mL)	S29-03071701	LH	13	
27	3/9/17 21:39	03091727.D	P1701137-001 (400mL)	S29-03071701	LH	14	

LH 3/10/17

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071718.D Vial: 10
Acq On : 7 Mar 2017 19:23 Operator: CL
Sample : P1700971-001 (1000mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 09 14:17:14 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/9/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.76	130	43836	1000.000 pg	-0.02
25) 1,4-Difluorobenzene (IS2)	11.71	114	216994	1000.000 pg	-0.01
38) Chlorobenzene-d5 (IS3)	16.05	54	46497	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.54	65	85741	1009.116 pg	-0.02
Spiked Amount 1000.000	Range 70 - 130		Recovery = 100.91%		
33) Toluene-d8 (SS2)	14.15	98	224939	1020.800 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 102.08%		
45) Bromofluorobenzene (SS3)	17.55	174	78602	920.611 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 92.06%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.40	85	326181	2403.634 pg	100
3) Chloromethane	4.64	52	19521	533.121 pg	97
4) 1,2-Dichloro,1,1,2,2-t...	4.80	85	14939	97.548 pg	99
5) Vinyl Chloride	4.95	62	351	N.D.	
6) 1,3-Butadiene	0.00	54	0	N.D. d	
7) Bromomethane	5.47	94	1272	28.554 pg	90
8) Chloroethane	5.68	64	580	N.D.	
9) Acrolein	6.27	56	6563	235.352 pg	98
10) Acetone	6.40	58	156926	4080.348 pg	100
11) Trichlorofluoromethane	6.59	101	122329	1173.497 pg	100
12) 1,1-Dichloroethene	0.00	96	0	N.D.	
13) Methylene Chloride	7.48	84	17469	277.623 pg	96
14) Trichlorotrifluoroethane	7.79	151	25791	468.712 pg	99
15) trans-1,2-Dichloroethene	8.51	96	192	N.D.	
16) 1,1-Dichloroethane	8.72	63	594	N.D.	
17) Methyl tert-Butyl Ether	8.80	73	699	N.D.	
18) cis-1,2-Dichloroethene	9.60	96	759	N.D.	
19) Chloroform	9.89	83	11213	90.652 pg	99
21) 1,2-Dichloroethane	10.65	62	5535	56.064 pg	97
22) 1,1,1-Trichloroethane	10.91	97	1290	N.D.	
23) Benzene	11.37	78	173662	682.801 pg	100
24) Carbon Tetrachloride	11.52	117	40680	418.752 pg	100
26) 1,2-Dichloropropane	12.17	63	1194	N.D.	
27) Bromodichloromethane	12.38	83	1098	N.D.	
28) Trichloroethene	12.41	130	1651	25.001 pg	100
29) 1,4-Dioxane	12.39	88	1455	29.179 pg	95
30) cis-1,3-Dichloropropene	13.26	75	166	N.D.	
31) trans-1,3-Dichloropropene	13.73	75	164	N.D.	
32) 1,1,2-Trichloroethane	13.95	83	262	N.D.	
34) Toluene	14.25	91	379278	1472.910 pg	99
35) Dibromochloromethane	14.66	129	125	N.D.	
36) 1,2-Dibromoethane	14.92	107	85	N.D.	
37) Tetrachloroethene	15.40	166	45160	652.173 pg	99
39) Chlorobenzene	0.00	112	0	N.D. d	
40) Ethylbenzene	16.48	91	65655	223.191 pg	100
41) m,p-Xylene	16.65	91	164460	733.852 pg	100
42) Styrene	17.02	104	7813	50.027 pg	96
43) o-Xylene	17.12	106	32112	286.057 pg	100
44) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D. d	
46) 1,3,5-Trimethylbenzene	18.38	105	42369	169.799 pg	100
47) 1,2,4-Trimethylbenzene	18.77	105	135579	547.704 pg	89
48) 1,3-Dichlorobenzene	18.92	146	293	N.D.	
49) 1,4-Dichlorobenzene	18.98	146	1916	N.D.	
50) 1,2-Dichlorobenzene	19.31	146	504	N.D.	
51) 1,2-Dibromo-3-chloropr...	19.76	157	63	N.D.	
52) 1,2,4-Trichlorobenzene	20.95	182	292	N.D.	
53) Naphthalene	21.06	128	22661	92.166 pg	97

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071718.D Vial: 10
Acq On : 7 Mar 2017 19:23 Operator: CL
Sample : P1700971-001 (1000mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 09 14:17:14 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

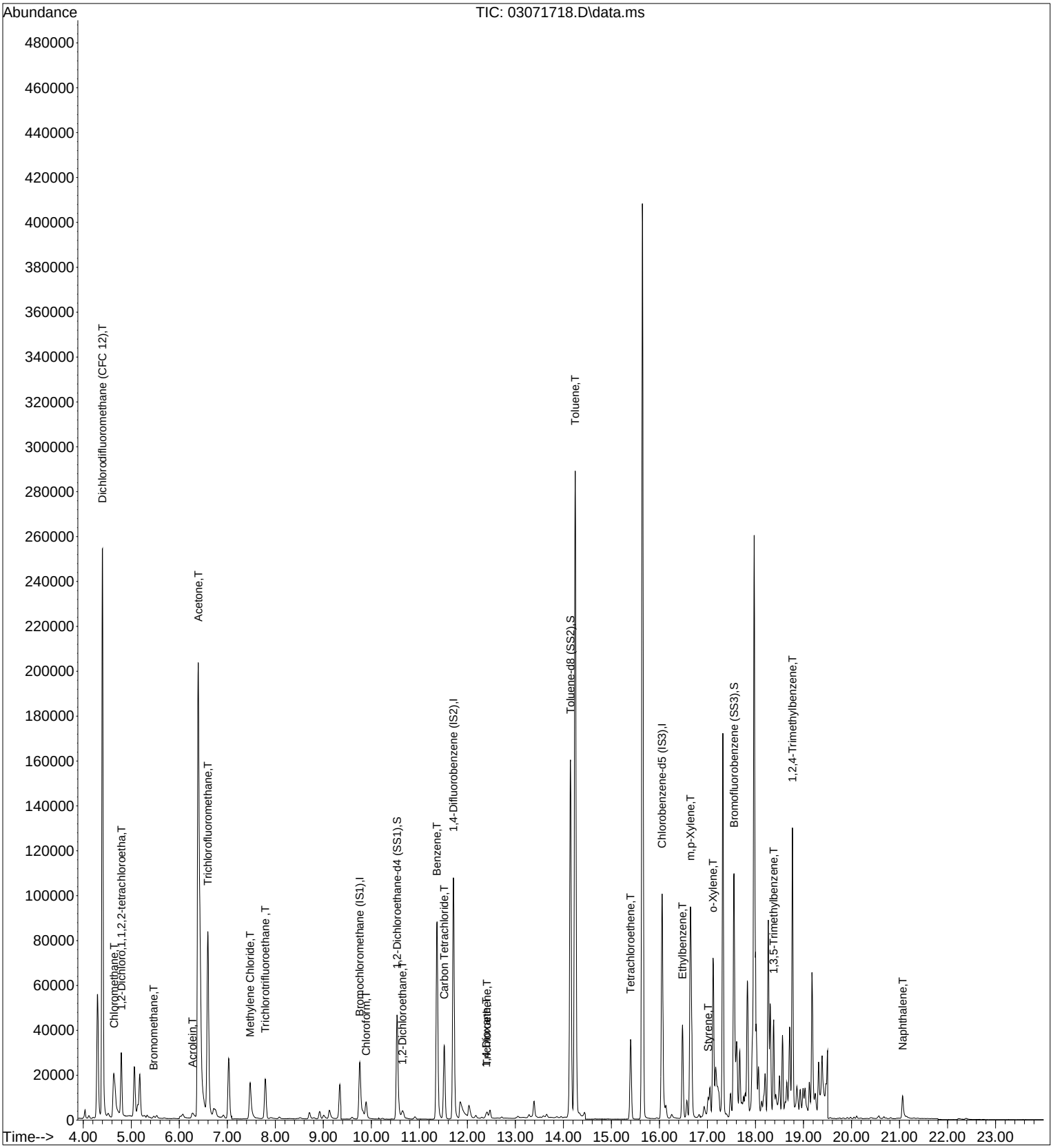
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	0.00	225	0	N.D.	

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071718.D Vial: 10
Acq On : 7 Mar 2017 19:23 Operator: CL
Sample : P1700971-001 (1000mL) Inst : MS19
Misc : S29-01241701

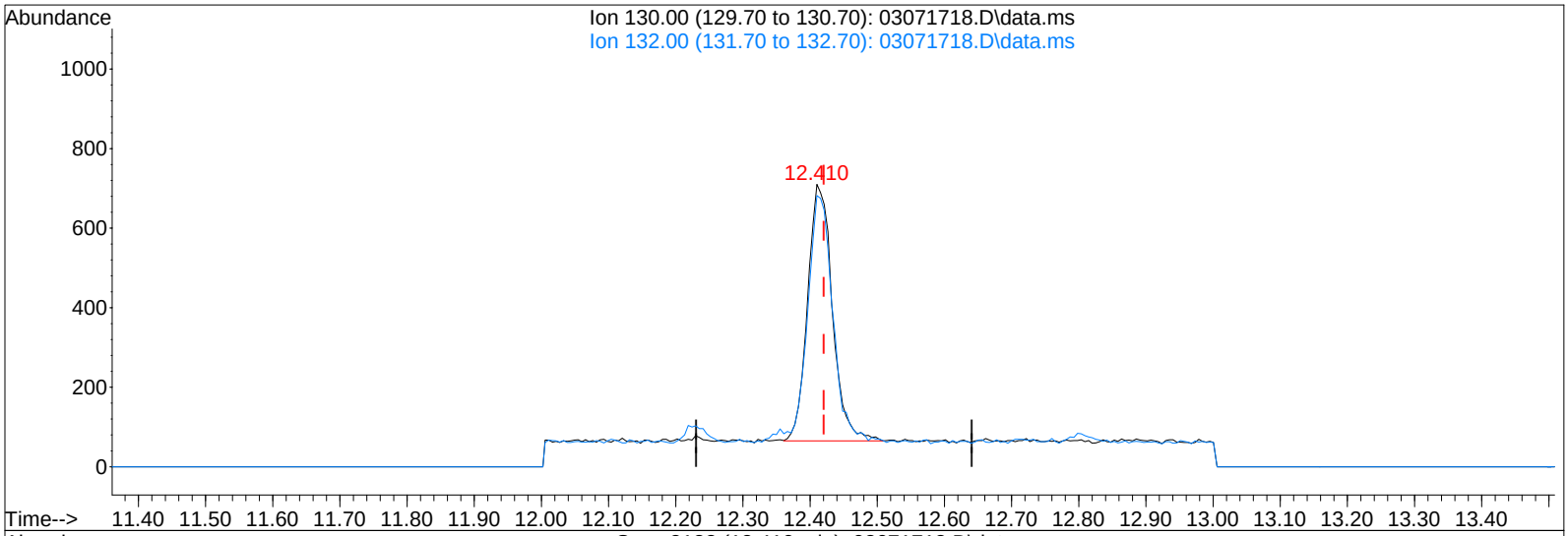
Quant Time: Mar 09 14:17:14 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

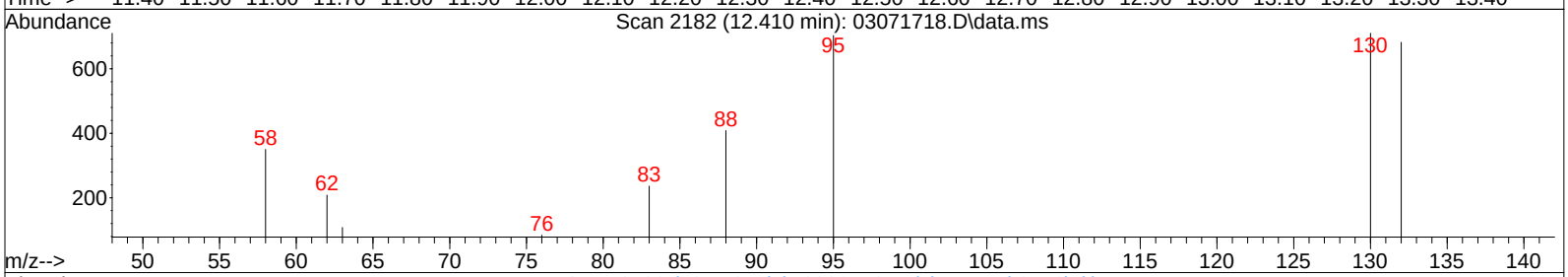


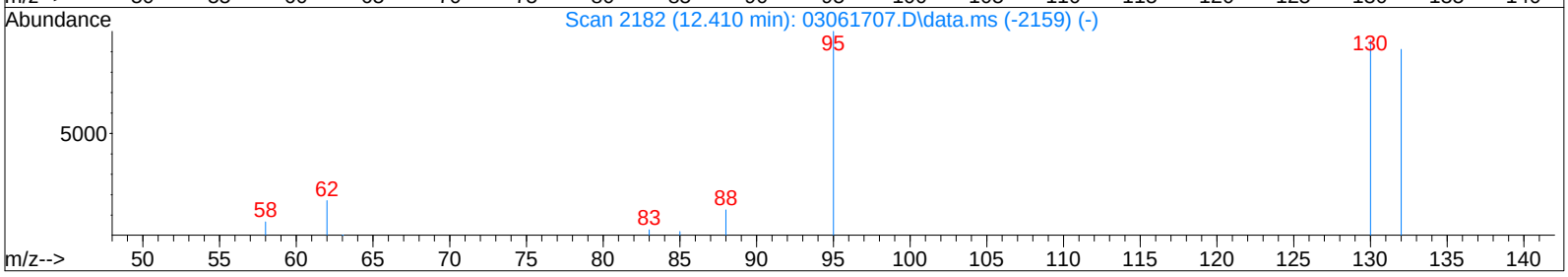
Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\07\03071718.D Vial: 10
Acq On : 7 Mar 2017 19:23 Operator: CL
Sample : P1700971-001 (1000mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 08 07:15:51 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M







TIC: 03071718.D\data.ms

(28) Trichloroethene (T)

12.410min (-0.010) 25.00pg

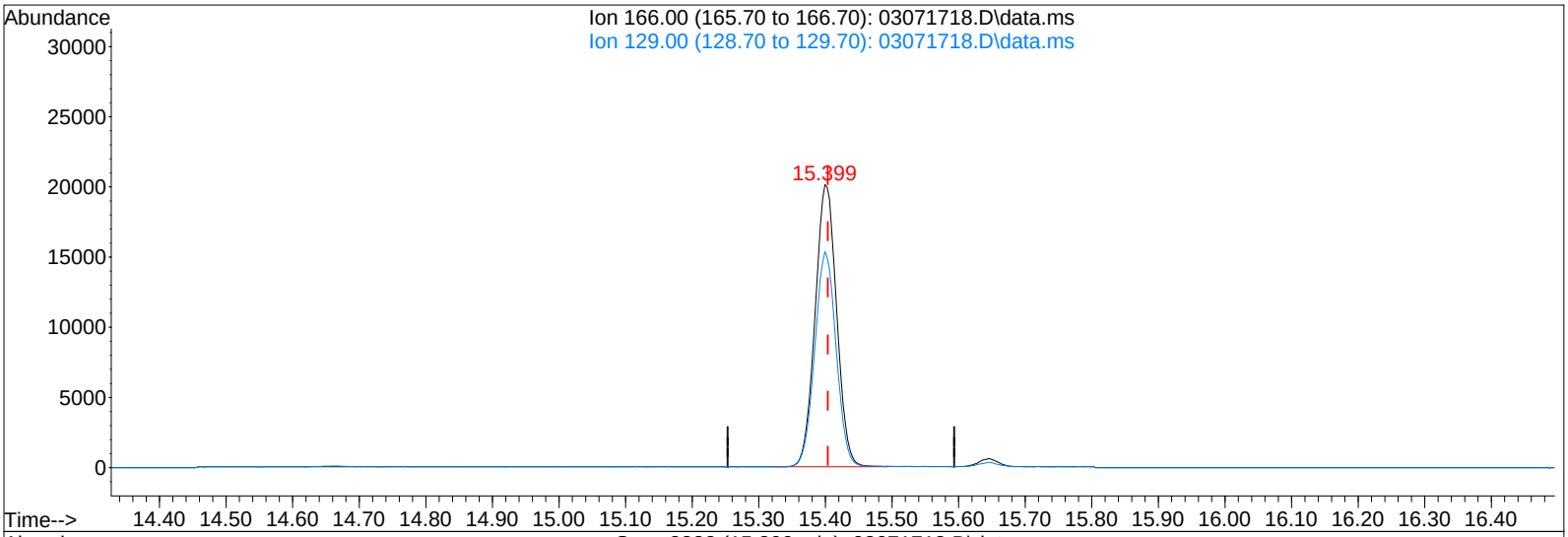
response 1651

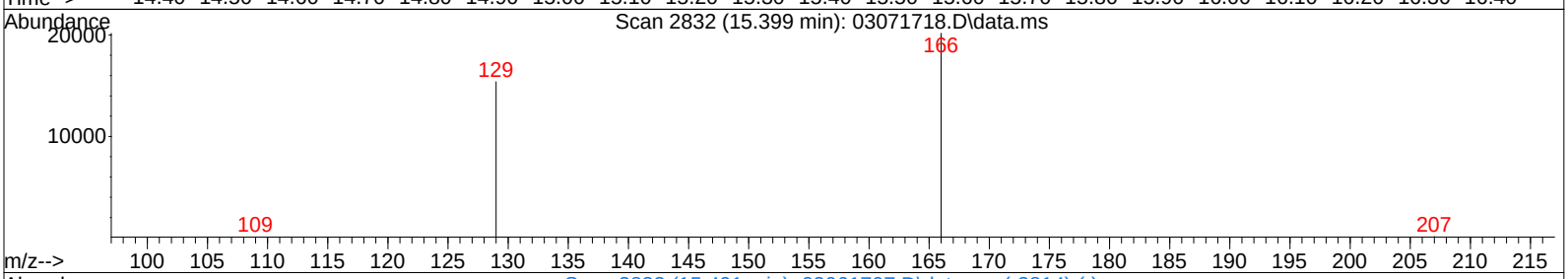
Ion	Exp%	Act%
130.00	100	100
132.00	95.00	95.03
0.00	0.00	0.00
0.00	0.00	0.00

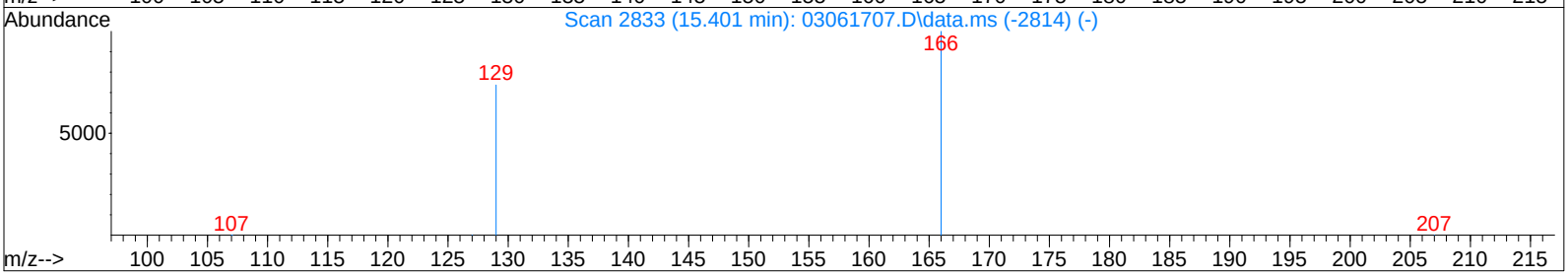
Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\07\03071718.D Vial: 10
Acq On : 7 Mar 2017 19:23 Operator: CL
Sample : P1700971-001 (1000mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 08 07:15:51 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M







TIC: 03071718.D\data.ms

(37) Tetrachloroethene (T)

15.399min (-0.004) 652.17pg

response 45160

Ion	Exp%	Act%
166.00	100	100
129.00	74.90	75.85
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071719.D Vial: 11
Acq On : 7 Mar 2017 19:54 Operator: CL
Sample : P1700971-002 (1000mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 09 14:18:16 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/9/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.75	130	48594	1000.000 pg	-0.02
25) 1,4-Difluorobenzene (IS2)	11.71	114	238501	1000.000 pg	-0.02
38) Chlorobenzene-d5 (IS3)	16.05	54	49561	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.53	65	92227	979.172 pg	-0.02
Spiked Amount 1000.000	Range 70 - 130		Recovery = 97.92%		
33) Toluene-d8 (SS2)	14.14	98	245012	1011.628 pg	-0.01
Spiked Amount 1000.000	Range 70 - 130		Recovery = 101.16%		
45) Bromofluorobenzene (SS3)	17.55	174	119717	1315.477 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 131.55%#		

Target Compounds

						Qvalue
2) Dichlorodifluoromethan...	4.38	85	281804	1873.290 pg		99
3) Chloromethane	4.61	52	16651	410.216 pg	#	88
4) 1,2-Dichloro,1,1,2,2-t...	4.78	85	11613	68.405 pg		99
5) Vinyl Chloride	4.92	62	103	N.D.		
6) 1,3-Butadiene	5.11	54	14473	194.468 pg		86
7) Bromomethane	5.44	94	1109	22.457 pg		95
8) Chloroethane	5.66	64	660	N.D.		
9) Acrolein	6.24	56	30784	995.840 pg		94
10) Acetone	6.38	58	1577209	36994.722 pg		97
11) Trichlorofluoromethane	6.58	101	282166	2441.775 pg		100
12) 1,1-Dichloroethene	7.32	96	201	N.D.		
13) Methylene Chloride	7.47	84	29257	419.436 pg		95
14) Trichlorotrifluoroethane	7.79	151	22135	362.882 pg		99
15) trans-1,2-Dichloroethene	8.50	96	1054	N.D.		
16) 1,1-Dichloroethane	8.75	63	1151	N.D.		
17) Methyl tert-Butyl Ether	0.00	73	0	N.D. d		
18) cis-1,2-Dichloroethene	9.59	96	205	N.D.		
19) Chloroform	9.89	83	42231	307.989 pg		100
21) 1,2-Dichloroethane	10.64	62	131963	1205.770 pg		99
22) 1,1,1-Trichloroethane	10.91	97	1154	N.D.		
23) Benzene	11.36	78	274124	972.265 pg		100
24) Carbon Tetrachloride	11.52	117	41107	381.715 pg		99
26) 1,2-Dichloropropane	12.18	63	2023	28.860 pg		98
27) Bromodichloromethane	0.00	83	0	N.D. d		
28) Trichloroethene	12.41	130	6964	95.945 pg		96
29) 1,4-Dioxane	12.38	88	1989	36.291 pg		99
30) cis-1,3-Dichloropropene	13.24	75	811	N.D.		
31) trans-1,3-Dichloropropene	13.77	75	113	N.D.		
32) 1,1,2-Trichloroethane	13.92	83	218	N.D.		
34) Toluene	14.24	91	690718	2440.489 pg		99
35) Dibromochloromethane	14.66	129	174	N.D.		
36) 1,2-Dibromoethane	0.00	107	0	N.D.		
37) Tetrachloroethene	15.40	166	4583925	60228.753 pg		98
39) Chlorobenzene	0.00	112	0	N.D. d		
40) Ethylbenzene	16.48	91	188314	600.587 pg		99
41) m,p-Xylene	16.64	91	558544	2338.248 pg		99
42) Styrene	17.01	104	113447	681.498 pg		100
43) o-Xylene	17.12	106	96704	808.193 pg		99
44) 1,1,2,2-Tetrachloroethane	17.12	83	2076	N.D.		
46) 1,3,5-Trimethylbenzene	18.38	105	89110	335.042 pg		98
47) 1,2,4-Trimethylbenzene	18.77	105	264973	1004.246 pg		90
48) 1,3-Dichlorobenzene	18.92	146	388	N.D.		
49) 1,4-Dichlorobenzene	18.98	146	4490	30.122 pg		99
50) 1,2-Dichlorobenzene	19.31	146	719	N.D.		
51) 1,2-Dibromo-3-chloropr...	19.75	157	50	N.D.		
52) 1,2,4-Trichlorobenzene	20.94	182	370	N.D.		
53) Naphthalene	21.06	128	40457	154.372 pg		91

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071719.D Vial: 11
Acq On : 7 Mar 2017 19:54 Operator: CL
Sample : P1700971-002 (1000mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 09 14:18:16 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

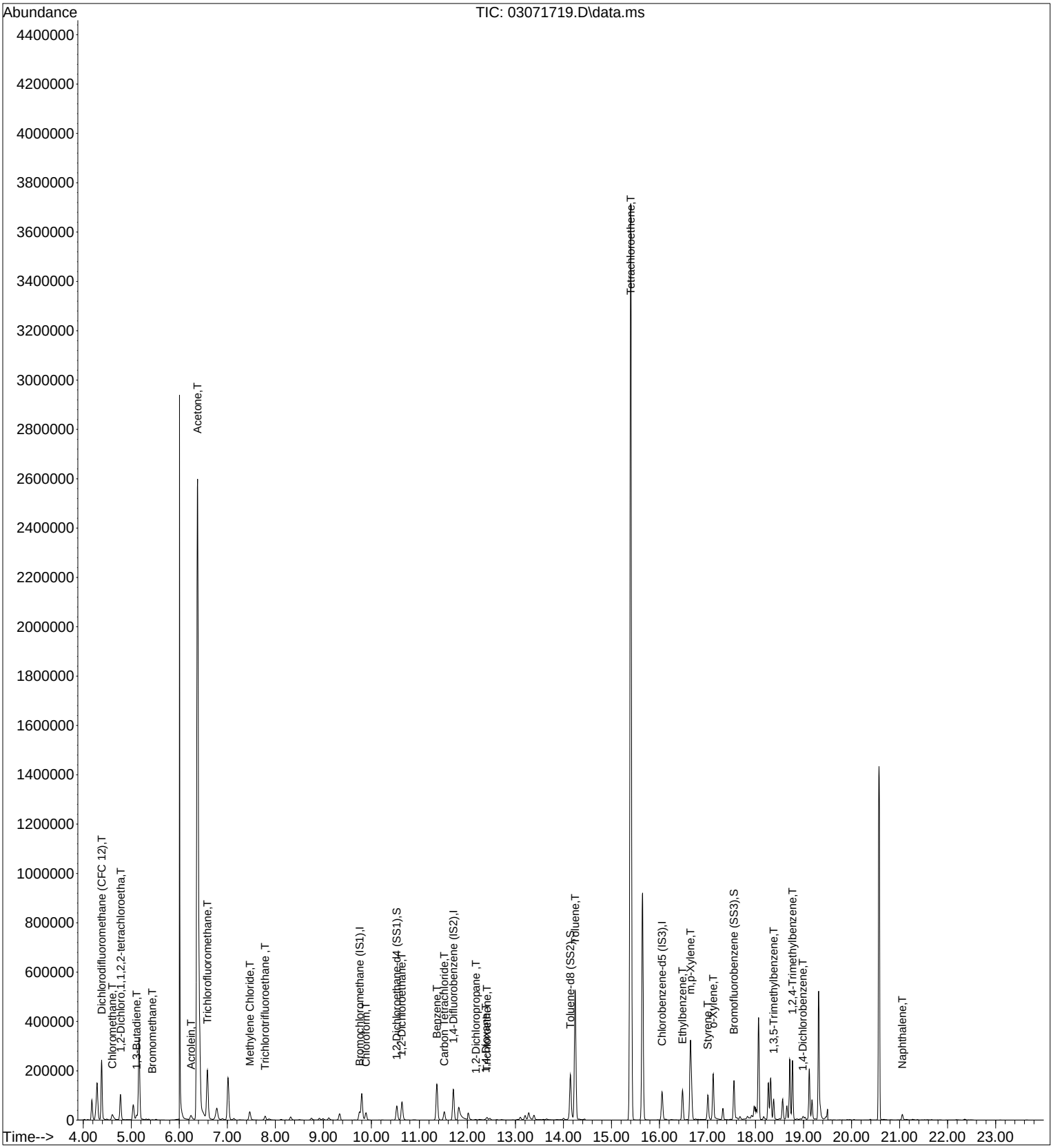
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	21.41	225	83	N.D.	

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071719.D Vial: 11
Acq On : 7 Mar 2017 19:54 Operator: CL
Sample : P1700971-002 (1000mL) Inst : MS19
Misc : S29-01241701

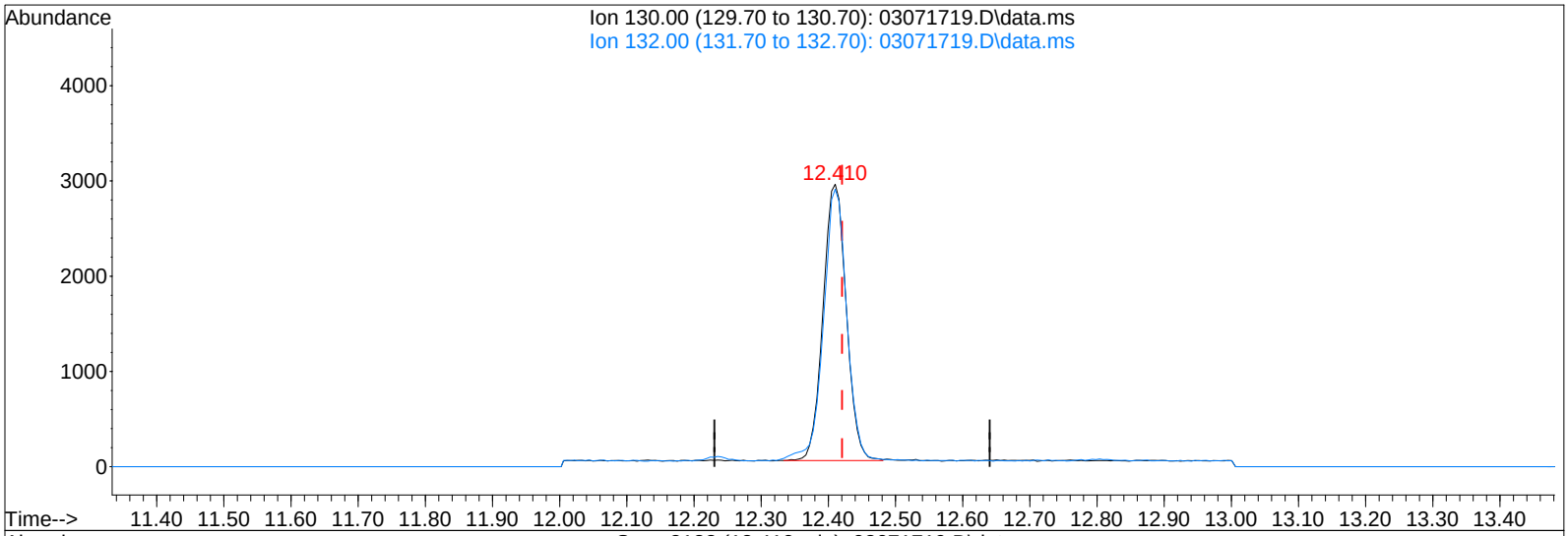
Quant Time: Mar 09 14:18:16 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

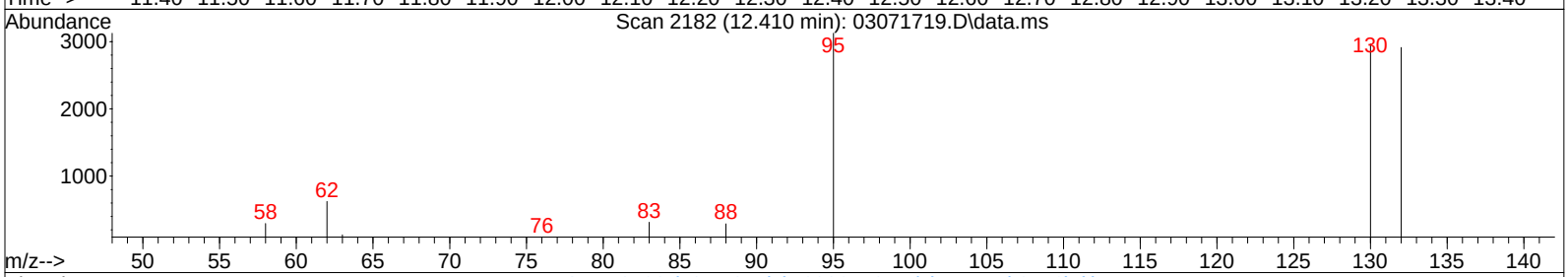


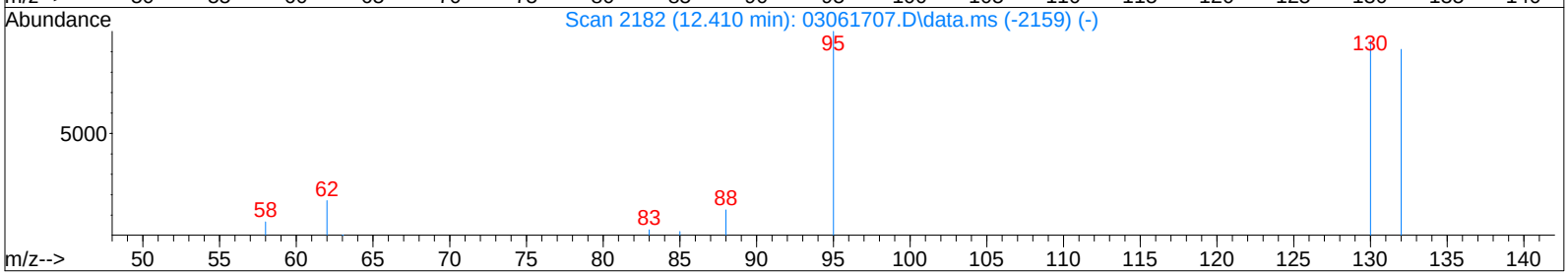
Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\07\03071719.D Vial: 11
Acq On : 7 Mar 2017 19:54 Operator: CL
Sample : P1700971-002 (1000mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 08 07:15:53 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M







TIC: 03071719.D\data.ms

(28) Trichloroethene (T)

12.410min (-0.010) 95.94pg

response 6964

Ion	Exp%	Act%
130.00	100	100
132.00	95.00	99.05
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081714.D Vial: 11
Acq On : 8 Mar 2017 11:57 Operator: CL
Sample : P1700971-002dil (100mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 08 13:01:32 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/9/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.77	130	34734	1000.000 pg	-0.01
25) 1,4-Difluorobenzene (IS2)	11.71	114	168274	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.05	54	33582	1000.000 pg	0.00

System Monitoring Compounds					
20) 1,2-Dichloroethane-d4 ...	10.54	65	68474	1017.079 pg	-0.01
Spiked Amount 1000.000	Range 70 - 130		Recovery = 101.71%		
33) Toluene-d8 (SS2)	14.14	98	194388	1137.565 pg	-0.01
Spiked Amount 1000.000	Range 70 - 130		Recovery = 113.76%		
45) Bromofluorobenzene (SS3)	17.55	174	54559	884.764 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 88.48%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.41	85	23562	219.128 pg	99
3) Chloromethane	4.67	52	3547	122.253 pg	95
4) 1,2-Dichloro,1,1,2,2-t...	4.81	85	990	N.D.	
5) Vinyl Chloride	4.97	62	54	N.D.	
6) 1,3-Butadiene	5.09	54	211	N.D.	
7) Bromomethane	5.49	94	126	N.D.	
8) Chloroethane	0.00	64	0	N.D.	
9) Acrolein	6.29	56	2414	109.252 pg	97
10) Acetone	6.41	58	125955	4133.270 pg	97
11) Trichlorofluoromethane	6.62	101	21061	254.981 pg	100
12) 1,1-Dichloroethene	0.00	96	0	N.D.	
13) Methylene Chloride	7.49	84	2455	49.240 pg	92
14) Trichlorotrifluoroethane	7.80	151	1656	37.982 pg	99
15) trans-1,2-Dichloroethene	0.00	96	0	N.D.	
16) 1,1-Dichloroethane	0.00	63	0	N.D.	
17) Methyl tert-Butyl Ether	8.75	73	82	N.D.	
18) cis-1,2-Dichloroethene	0.00	96	0	N.D.	
19) Chloroform	9.90	83	4976	50.771 pg	99
21) 1,2-Dichloroethane	10.65	62	10044	128.395 pg	95
22) 1,1,1-Trichloroethane	10.91	97	102	N.D.	
23) Benzene	11.37	78	22849	113.379 pg	98
24) Carbon Tetrachloride	11.52	117	3246	42.170 pg	99
26) 1,2-Dichloropropane	12.18	63	144	N.D.	
27) Bromodichloromethane	12.38	83	202	N.D.	
28) Trichloroethene	12.42	130	559	N.D.	
29) 1,4-Dioxane	12.40	88	127	N.D.	
30) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
31) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
32) 1,1,2-Trichloroethane	0.00	83	0	N.D.	
34) Toluene	14.25	91	60968	305.317 pg	100
35) Dibromochloromethane	0.00	129	0	N.D.	
36) 1,2-Dibromoethane	0.00	107	0	N.D.	
37) Tetrachloroethene	15.40	166	317784	5917.954 pg	99
39) Chlorobenzene	16.10	112	220	N.D.	
40) Ethylbenzene	16.48	91	12475	58.717 pg	100
41) m,p-Xylene	16.65	91	36441	225.142 pg	100
42) Styrene	17.01	104	5894	52.253 pg	97
43) o-Xylene	17.12	106	6321	77.963 pg	100
44) 1,1,2,2-Tetrachloroethane	17.12	83	132	N.D.	
46) 1,3,5-Trimethylbenzene	18.38	105	4432	24.593 pg	99
47) 1,2,4-Trimethylbenzene	18.77	105	13363	74.744 pg	88
48) 1,3-Dichlorobenzene	18.99	146	260	N.D.	
49) 1,4-Dichlorobenzene	18.99	146	260	N.D.	
50) 1,2-Dichlorobenzene	19.31	146	74	N.D.	
51) 1,2-Dibromo-3-chloropr...	0.00	157	0	N.D.	
52) 1,2,4-Trichlorobenzene	0.00	182	0	N.D.	
53) Naphthalene	21.13	128	1872	N.D.	

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081714.D Vial: 11
Acq On : 8 Mar 2017 11:57 Operator: CL
Sample : P1700971-002dil (100mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 08 13:01:32 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

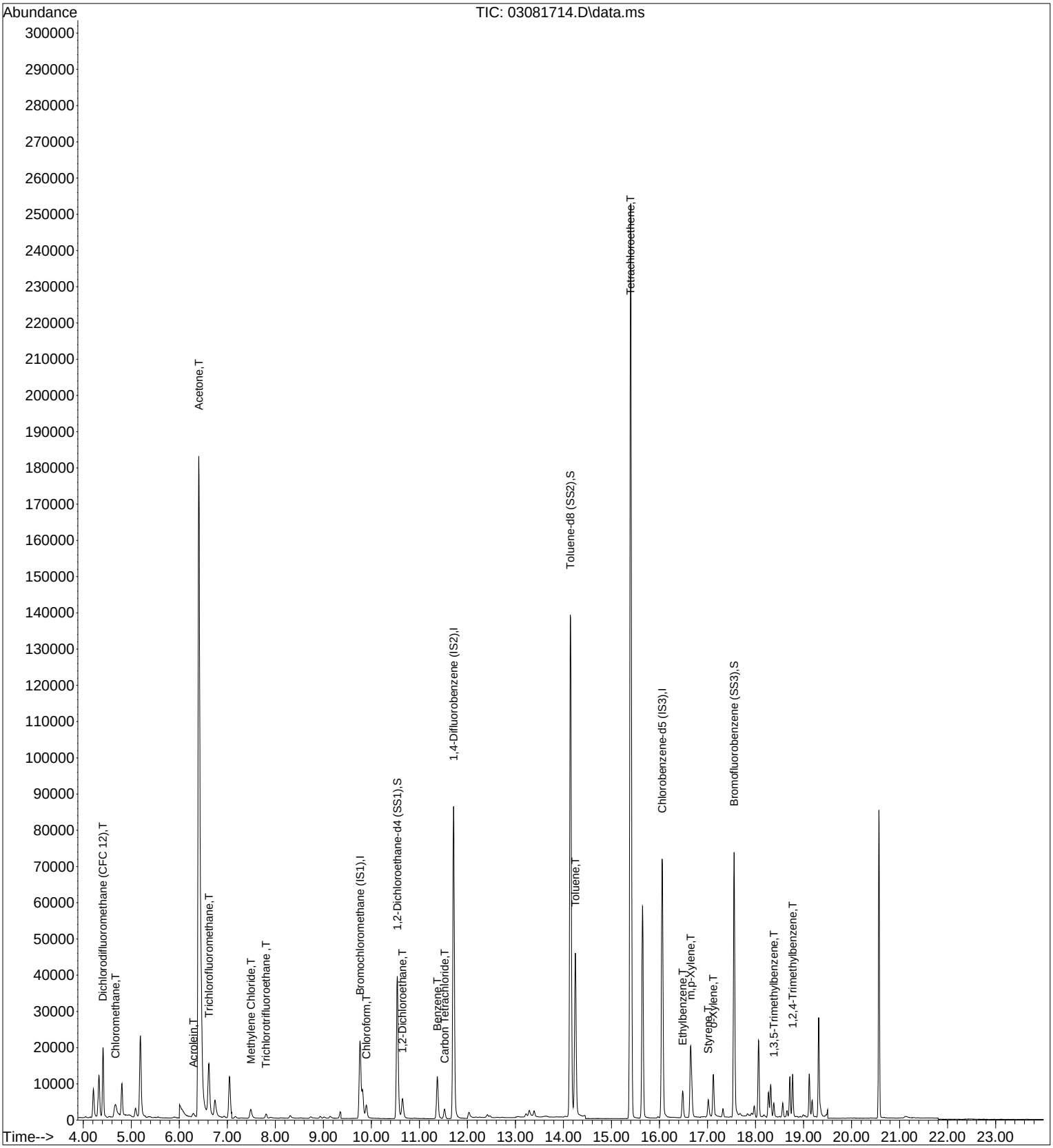
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	0.00	225	0	N.D.	

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081714.D Vial: 11
Acq On : 8 Mar 2017 11:57 Operator: CL
Sample : P1700971-002dil (100mL) Inst : MS19
Misc : S29-01241701

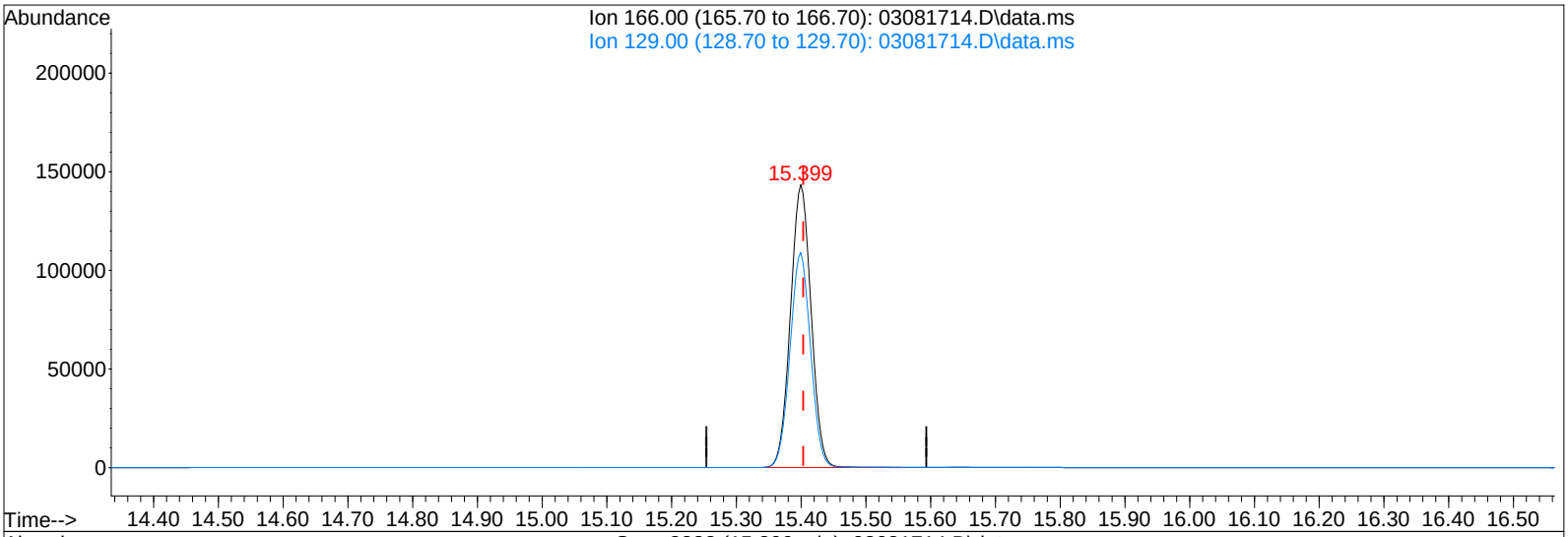
Quant Time: Mar 08 13:01:32 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

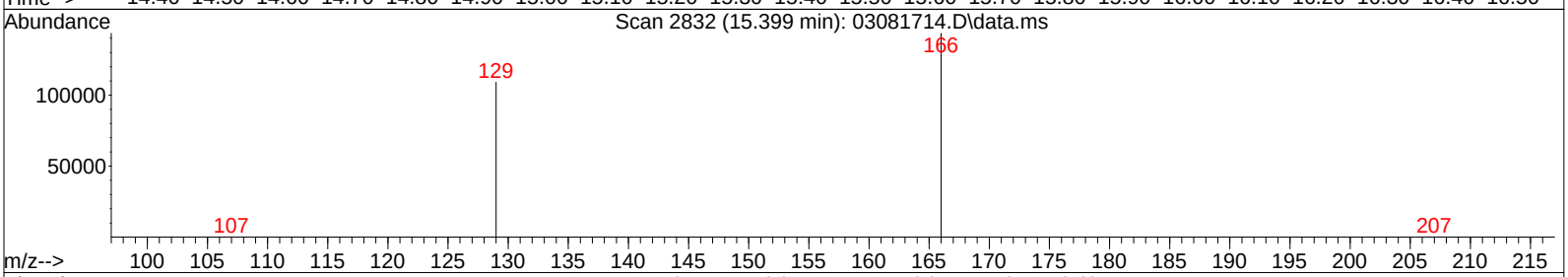


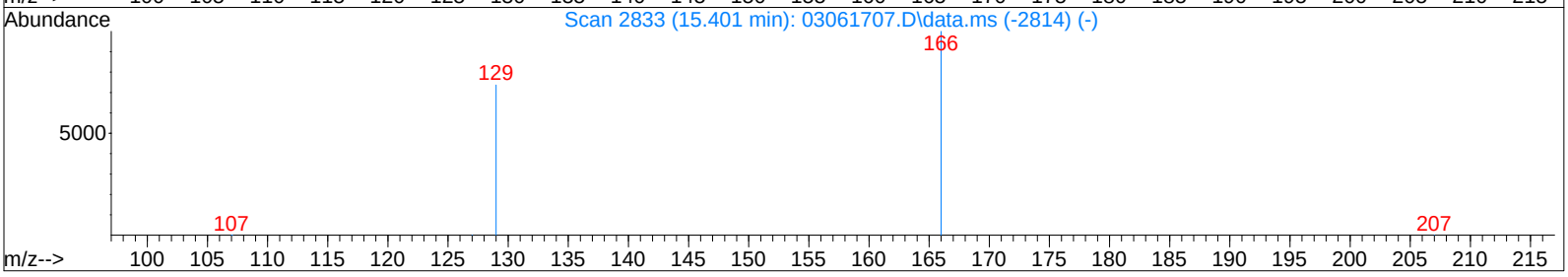
Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\08\03081714.D Vial: 11
Acq On : 8 Mar 2017 11:57 Operator: CL
Sample : P1700971-002dil (100mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 08 13:01:32 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M







TIC: 03081714.D\data.ms

(37) Tetrachloroethene (T)

15.399min (-0.004) 5917.95pg

response 317784

Ion	Exp%	Act%
166.00	100	100
129.00	74.90	75.81
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071720.D Vial: 12
Acq On : 7 Mar 2017 20:25 Operator: CL
Sample : P1700971-004 (1000mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 09 14:19:28 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/9/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.75	130	52244	1000.000 pg	-0.02
25) 1,4-Difluorobenzene (IS2)	11.71	114	255575	1000.000 pg	-0.01
38) Chlorobenzene-d5 (IS3)	16.05	54	52212	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.53	65	97361	961.462 pg	-0.02
Spiked Amount 1000.000	Range 70 - 130		Recovery = 96.15%		
33) Toluene-d8 (SS2)	14.14	98	261873	1009.011 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 100.90%		
45) Bromofluorobenzene (SS3)	17.55	174	91895	958.493 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 95.85%		

Target Compounds

						Qvalue
2) Dichlorodifluoromethan...	4.39	85	303814	1878.503 pg		100
3) Chloromethane	4.61	52	17685	405.250 pg	#	88
4) 1,2-Dichloro,1,1,2,2-t...	4.79	85	12172	66.689 pg		99
5) Vinyl Chloride	4.94	62	227	N.D.		
6) 1,3-Butadiene	5.12	54	14420	180.219 pg	#	75
7) Bromomethane	5.45	94	1220	22.979 pg		99
8) Chloroethane	5.67	64	718	N.D.		
9) Acrolein	6.25	56	33590	1010.697 pg		95
10) Acetone	6.39	58	1617536	35289.922 pg		96
11) Trichlorofluoromethane	6.59	101	291661	2347.608 pg		100
12) 1,1-Dichloroethene	7.33	96	144	N.D.		
13) Methylene Chloride	7.47	84	30045	400.640 pg		96
14) Trichlorotrifluoroethane	7.79	151	23131	352.717 pg		100
15) trans-1,2-Dichloroethene	8.51	96	1079	N.D.		
16) 1,1-Dichloroethane	8.73	63	525	N.D.		
17) Methyl tert-Butyl Ether	0.00	73	0	N.D. d		
18) cis-1,2-Dichloroethene	9.59	96	182	N.D.		
19) Chloroform	9.89	83	43315	293.824 pg		98
21) 1,2-Dichloroethane	10.64	62	137789	1171.044 pg		100
22) 1,1,1-Trichloroethane	10.91	97	1188	N.D.		
23) Benzene	11.36	78	285035	940.334 pg		100
24) Carbon Tetrachloride	11.52	117	42758	369.307 pg		100
26) 1,2-Dichloropropane	12.18	63	2059	27.411 pg		92
27) Bromodichloromethane	0.00	83	0	N.D. d		
28) Trichloroethene	12.41	130	7295	93.791 pg		97
29) 1,4-Dioxane	12.38	88	2144	36.505 pg		97
30) cis-1,3-Dichloropropene	13.24	75	910	N.D.		
31) trans-1,3-Dichloropropene	13.73	75	734	N.D.		
32) 1,1,2-Trichloroethane	13.92	83	560	N.D.		
34) Toluene	14.24	91	742693	2448.823 pg		99
35) Dibromochloromethane	14.67	129	122	N.D.		
36) 1,2-Dibromoethane	14.91	107	60	N.D.		
37) Tetrachloroethene	15.40	166	4752785	58275.549 pg		98
39) Chlorobenzene	0.00	112	0	N.D. d		
40) Ethylbenzene	16.48	91	201982	611.471 pg		100
41) m,p-Xylene	16.64	91	594256	2361.438 pg		99
42) Styrene	17.01	104	149340	851.565 pg		99
43) o-Xylene	17.12	106	102370	812.106 pg		98
44) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D. d		
46) 1,3,5-Trimethylbenzene	18.38	105	72481	258.682 pg		99
47) 1,2,4-Trimethylbenzene	18.77	105	233142	838.743 pg		88
48) 1,3-Dichlorobenzene	18.92	146	383	N.D.		
49) 1,4-Dichlorobenzene	18.98	146	5593	35.617 pg		100
50) 1,2-Dichlorobenzene	19.31	146	846	N.D.		
51) 1,2-Dibromo-3-chloropr...	19.76	157	76	N.D.		
52) 1,2,4-Trichlorobenzene	20.94	182	475	N.D.		
53) Naphthalene	21.06	128	106300	385.016 pg		97

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071720.D Vial: 12
Acq On : 7 Mar 2017 20:25 Operator: CL
Sample : P1700971-004 (1000mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 09 14:19:28 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

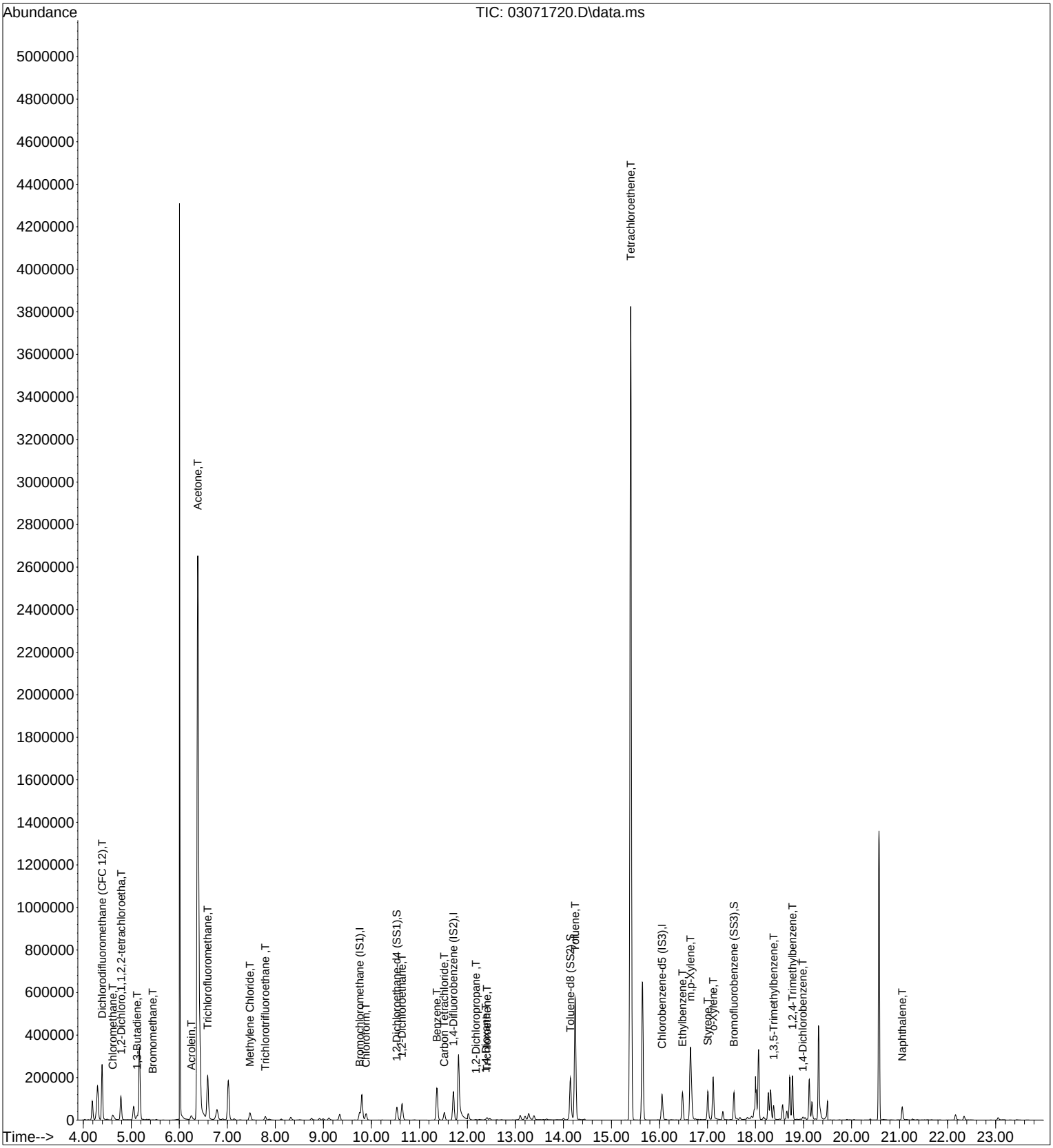
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	121	N.D.	

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071720.D Vial: 12
Acq On : 7 Mar 2017 20:25 Operator: CL
Sample : P1700971-004 (1000mL) Inst : MS19
Misc : S29-01241701

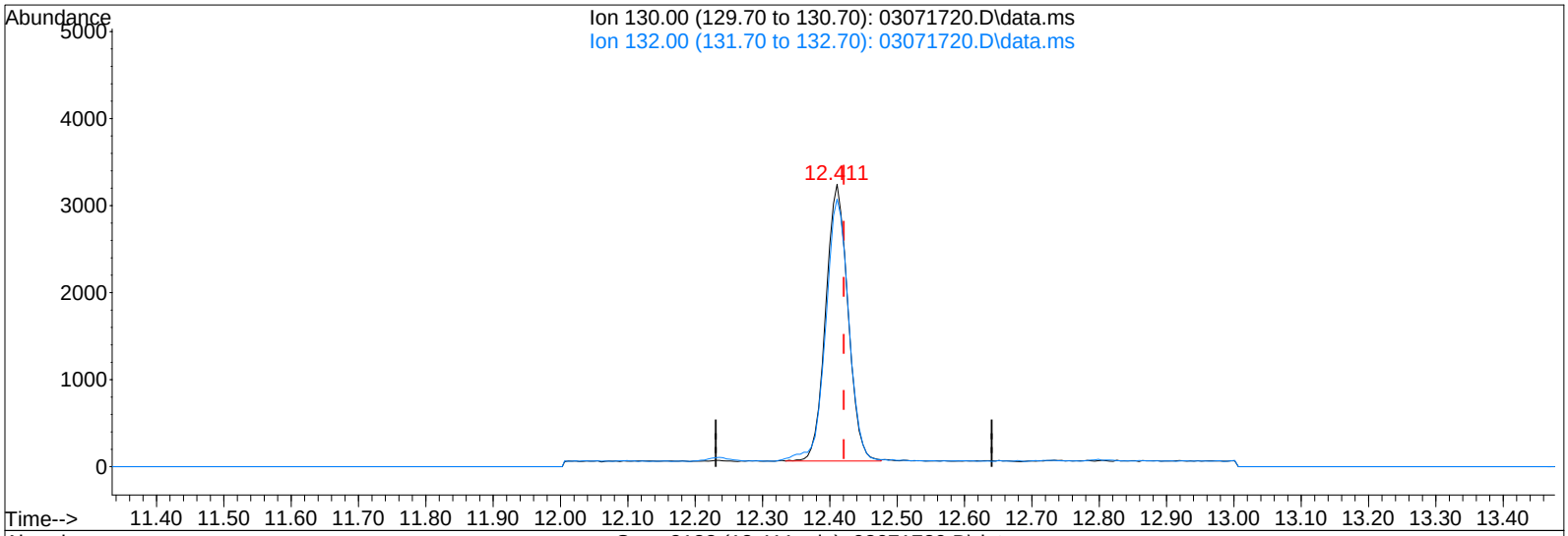
Quant Time: Mar 09 14:19:28 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

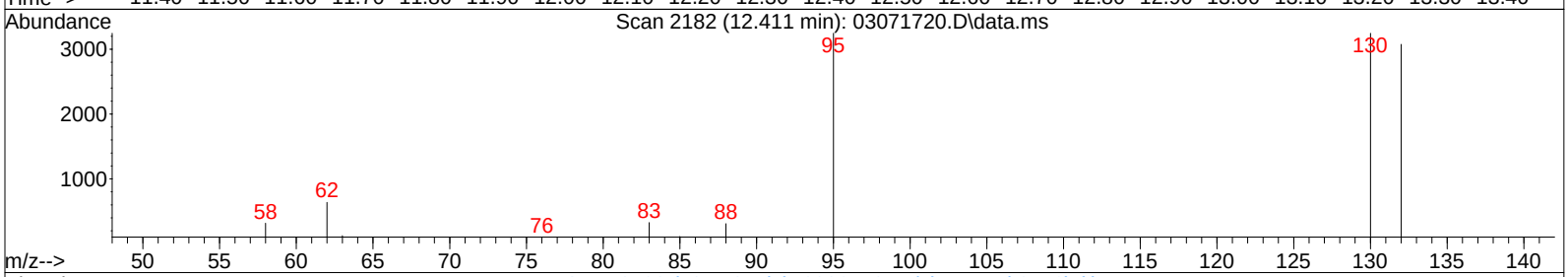


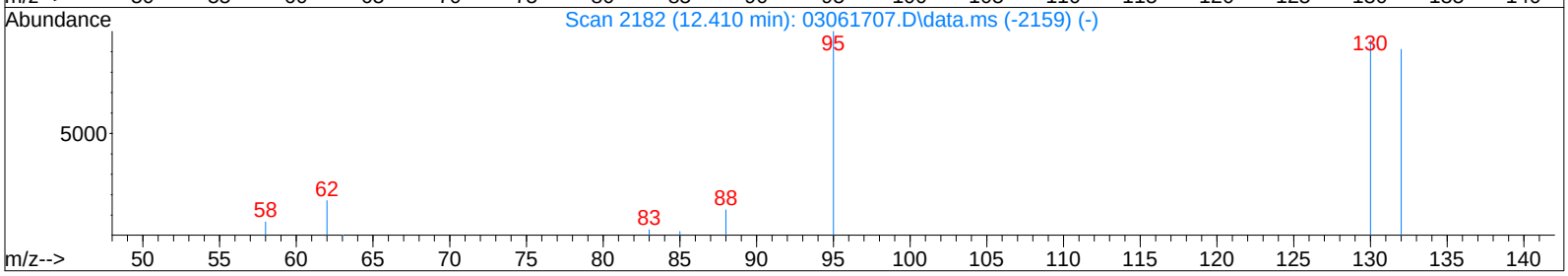
Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\07\03071720.D Vial: 12
Acq On : 7 Mar 2017 20:25 Operator: CL
Sample : P1700971-004 (1000mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 08 07:15:55 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M







TIC: 03071720.D\data.ms

(28) Trichloroethene (T)

12.411min (-0.010) 93.79pg

response 7295

Ion	Exp%	Act%
130.00	100	100
132.00	95.00	98.33
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081715.D Vial: 12
Acq On : 8 Mar 2017 12:29 Operator: CL
Sample : P1700971-004dil (100mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 08 13:01:43 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/9/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.77	130	34296	1000.000 pg	-0.01
25) 1,4-Difluorobenzene (IS2)	11.71	114	165446	1000.000 pg	-0.01
38) Chlorobenzene-d5 (IS3)	16.06	54	33130	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.54	65	67715	1018.650 pg	-0.01
Spiked Amount 1000.000	Range 70 - 130		Recovery = 101.87%		
33) Toluene-d8 (SS2)	14.15	98	167041	994.238 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 99.42%		
45) Bromofluorobenzene (SS3)	17.56	174	54176	890.539 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 89.05%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.41	85	23135	217.905 pg	100
3) Chloromethane	4.67	52	3321	115.926 pg	93
4) 1,2-Dichloro,1,1,2,2-t...	4.82	85	995	N.D.	
5) Vinyl Chloride	0.00	62	0	N.D.	
6) 1,3-Butadiene	5.09	54	191	N.D.	
7) Bromomethane	0.00	94	0	N.D.	
8) Chloroethane	0.00	64	0	N.D.	
9) Acrolein	6.29	56	2415	110.693 pg	99
10) Acetone	6.41	58	122484	4070.700 pg	97
11) Trichlorofluoromethane	6.62	101	20514	251.530 pg	100
12) 1,1-Dichloroethene	0.00	96	0	N.D.	
13) Methylene Chloride	7.49	84	2262	45.948 pg	88
14) Trichlorotrifluoroethane	7.81	151	1653	38.397 pg	99
15) trans-1,2-Dichloroethene	0.00	96	0	N.D.	
16) 1,1-Dichloroethane	0.00	63	0	N.D.	
17) Methyl tert-Butyl Ether	8.80	73	100	N.D.	
18) cis-1,2-Dichloroethene	0.00	96	0	N.D.	
19) Chloroform	9.90	83	4872	50.344 pg	98
21) 1,2-Dichloroethane	10.65	62	9903	128.209 pg	99
22) 1,1,1-Trichloroethane	0.00	97	0	N.D.	
23) Benzene	11.37	78	21938	110.249 pg	99
24) Carbon Tetrachloride	11.52	117	3120	41.050 pg	99
26) 1,2-Dichloropropane	12.17	63	176	N.D.	
27) Bromodichloromethane	12.38	83	68	N.D.	
28) Trichloroethene	12.42	130	515	N.D.	
29) 1,4-Dioxane	12.40	88	128	N.D.	
30) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
31) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
32) 1,1,2-Trichloroethane	0.00	83	0	N.D.	
34) Toluene	14.25	91	51997	264.843 pg	100
35) Dibromochloromethane	0.00	129	0	N.D.	
36) 1,2-Dibromoethane	0.00	107	0	N.D.	
37) Tetrachloroethene	15.40	166	311200	5894.404 pg	99
39) Chlorobenzene	16.11	112	176	N.D.	
40) Ethylbenzene	16.48	91	12538	59.819 pg	100
41) m,p-Xylene	16.65	91	36756	230.187 pg	100
42) Styrene	17.02	104	7374	66.266 pg	99
43) o-Xylene	17.13	106	6269	78.377 pg	100
44) 1,1,2,2-Tetrachloroethane	17.13	83	182	N.D.	
46) 1,3,5-Trimethylbenzene	18.38	105	4313	24.259 pg	94
47) 1,2,4-Trimethylbenzene	18.77	105	13304	75.429 pg	89
48) 1,3-Dichlorobenzene	18.92	146	59	N.D.	
49) 1,4-Dichlorobenzene	18.99	146	365	N.D.	
50) 1,2-Dichlorobenzene	19.31	146	76	N.D.	
51) 1,2-Dibromo-3-chloropr...	0.00	157	0	N.D.	
52) 1,2,4-Trichlorobenzene	20.96	182	84	N.D.	
53) Naphthalene	21.08	128	5098	29.100 pg	93

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081715.D Vial: 12
Acq On : 8 Mar 2017 12:29 Operator: CL
Sample : P1700971-004dil (100mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 08 13:01:43 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

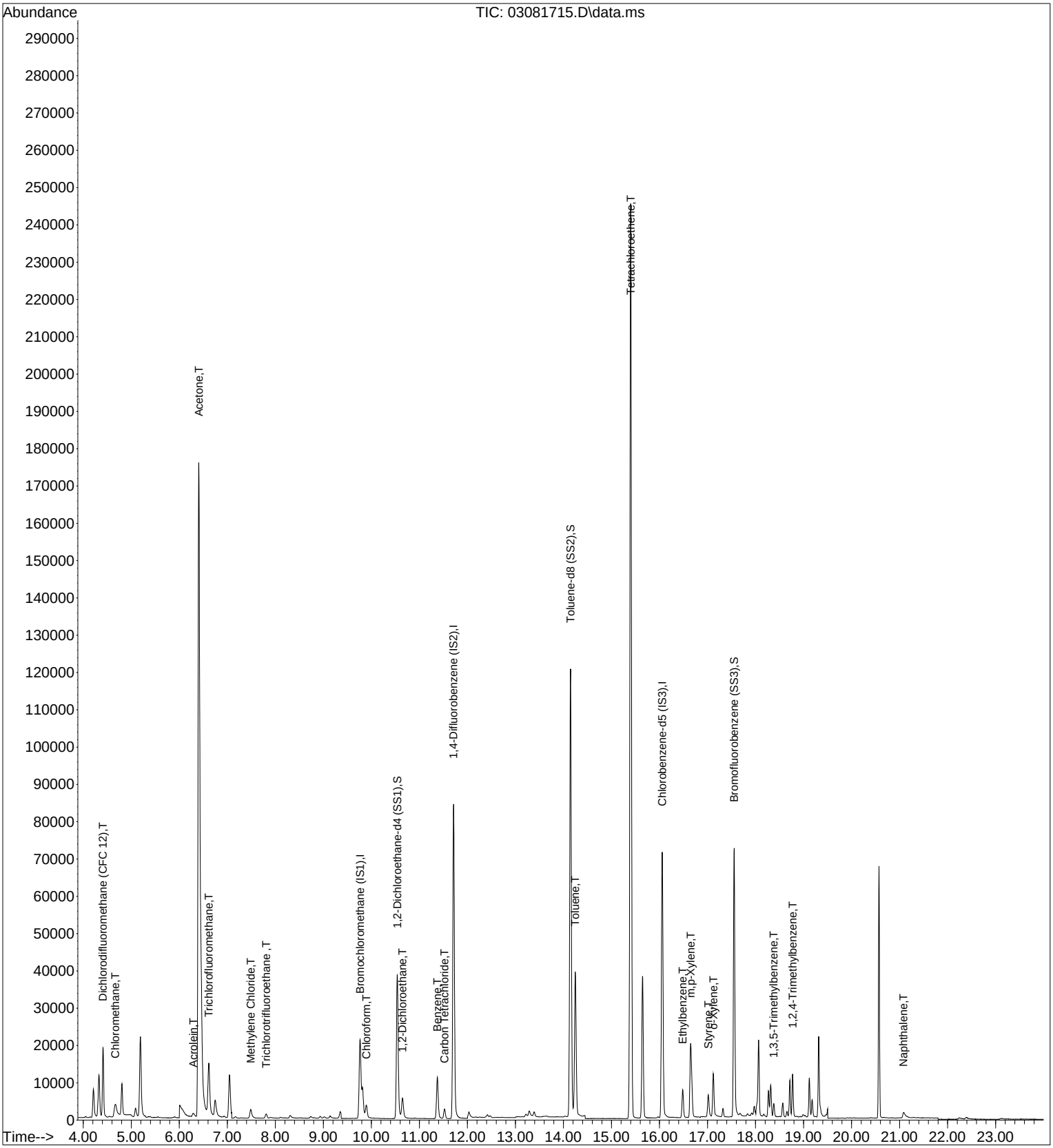
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	0.00	225	0	N.D.	

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081715.D Vial: 12
Acq On : 8 Mar 2017 12:29 Operator: CL
Sample : P1700971-004dil (100mL) Inst : MS19
Misc : S29-01241701

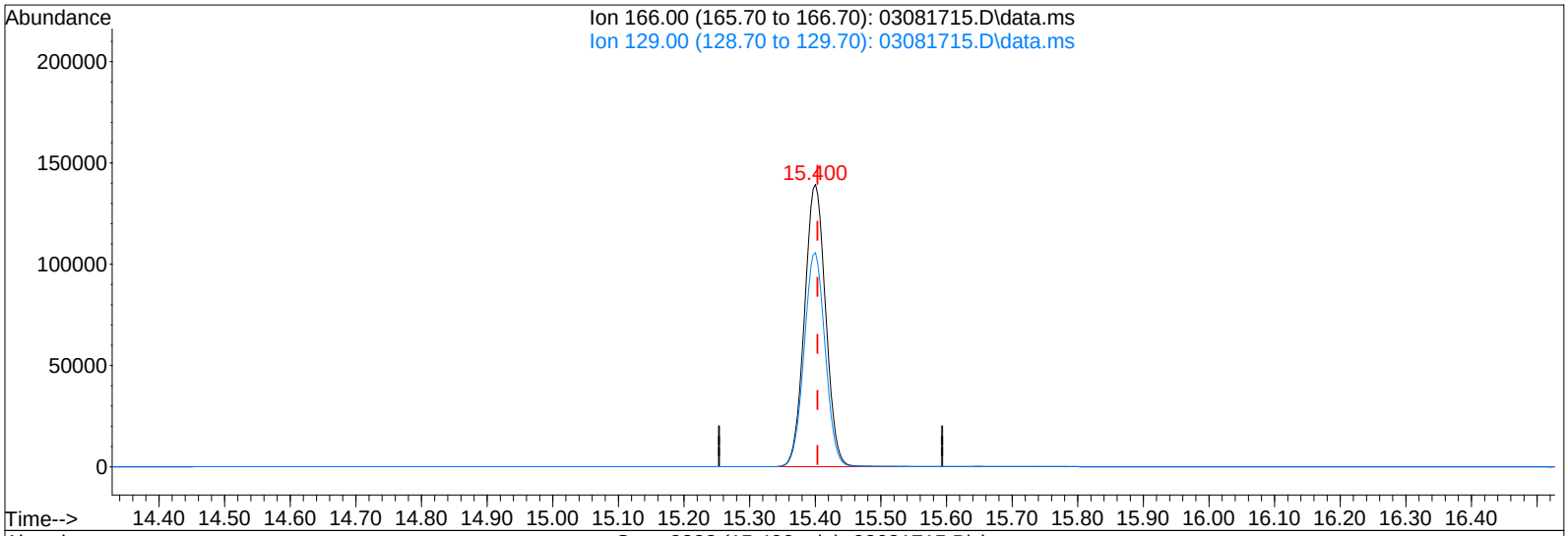
Quant Time: Mar 08 13:01:43 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\08\03081715.D Vial: 12
Acq On : 8 Mar 2017 12:29 Operator: CL
Sample : P1700971-004dil (100mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 08 13:01:43 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



TIC: 03081715.D\data.ms

(37) Tetrachloroethene (T)

15.400min (-0.003) 5894.40pg

response 311200

Ion	Exp%	Act%
166.00	100	100
129.00	74.90	75.80
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081717.D Vial: 1
Acq On : 8 Mar 2017 13:32 Operator: CL
Sample : P1700971-005 (1000mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 08 14:10:27 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/9/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.78	130	34810	1000.000 pg	0.00
25) 1,4-Difluorobenzene (IS2)	11.72	114	169604	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.06	54	34813	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.55	65	69498	1030.035 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 103.00%		
33) Toluene-d8 (SS2)	14.15	98	171166	993.814 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 99.38%		
45) Bromofluorobenzene (SS3)	17.56	174	56745	887.674 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 88.77%		

Target Compounds

						Qvalue
2) Dichlorodifluoromethan...	4.40	85	173167	1606.947 pg		99
3) Chloromethane	4.65	52	8149	280.256 pg	#	88
4) 1,2-Dichloro,1,1,2,2-t...	4.81	85	7535	61.959 pg		99
5) Vinyl Chloride	0.00	62	0	N.D.		
6) 1,3-Butadiene	5.10	54	491	N.D.		
7) Bromomethane	5.50	94	69	N.D.		
8) Chloroethane	5.73	64	842	31.178 pg		95
9) Acrolein	6.34	56	1251	56.494 pg	#	67
10) Acetone	6.43	58	70063	2294.129 pg		97
11) Trichlorofluoromethane	6.63	101	46140	557.387 pg		100
12) 1,1-Dichloroethene	0.00	96	0	N.D.		
13) Methylene Chloride	7.50	84	20455	409.368 pg		94
14) Trichlorotrifluoroethane	7.82	151	76	N.D.		
15) trans-1,2-Dichloroethene	0.00	96	0	N.D.		
16) 1,1-Dichloroethane	8.73	63	138	N.D.		
17) Methyl tert-Butyl Ether	8.73	73	1091	N.D.		
18) cis-1,2-Dichloroethene	0.00	96	0	N.D.		
19) Chloroform	9.90	83	2334	23.762 pg		96
21) 1,2-Dichloroethane	0.00	62	0	N.D.		
22) 1,1,1-Trichloroethane	0.00	97	0	N.D.		
23) Benzene	11.38	78	15421	76.353 pg		100
24) Carbon Tetrachloride	11.53	117	267	N.D.		
26) 1,2-Dichloropropane	0.00	63	0	N.D.		
27) Bromodichloromethane	0.00	83	0	N.D.		
28) Trichloroethene	12.42	130	138	N.D.		
29) 1,4-Dioxane	12.42	88	175	N.D.		
30) cis-1,3-Dichloropropene	0.00	75	0	N.D.		
31) trans-1,3-Dichloropropene	0.00	75	0	N.D.		
32) 1,1,2-Trichloroethane	0.00	83	0	N.D.		
34) Toluene	14.25	91	9888	49.129 pg		99
35) Dibromochloromethane	0.00	129	0	N.D.		
36) 1,2-Dibromoethane	0.00	107	0	N.D.		
37) Tetrachloroethene	15.40	166	87435	1615.496 pg		99
39) Chlorobenzene	16.11	112	225	N.D.		
40) Ethylbenzene	16.49	91	1733	N.D.		
41) m,p-Xylene	16.65	91	5341	31.831 pg		99
42) Styrene	17.02	104	1125	N.D.		
43) o-Xylene	17.13	106	867	N.D.		
44) 1,1,2,2-Tetrachloroethane	17.12	83	377	N.D.		
46) 1,3,5-Trimethylbenzene	18.38	105	683	N.D.		
47) 1,2,4-Trimethylbenzene	18.77	105	2386	N.D.		
48) 1,3-Dichlorobenzene	18.93	146	150	N.D.		
49) 1,4-Dichlorobenzene	18.99	146	342	N.D.		
50) 1,2-Dichlorobenzene	19.31	146	236	N.D.		
51) 1,2-Dibromo-3-chloropr...	0.00	157	0	N.D.		
52) 1,2,4-Trichlorobenzene	20.97	182	277	N.D.		
53) Naphthalene	21.11	128	1968	N.D.		

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081717.D Vial: 1
Acq On : 8 Mar 2017 13:32 Operator: CL
Sample : P1700971-005 (1000mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 08 14:10:27 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

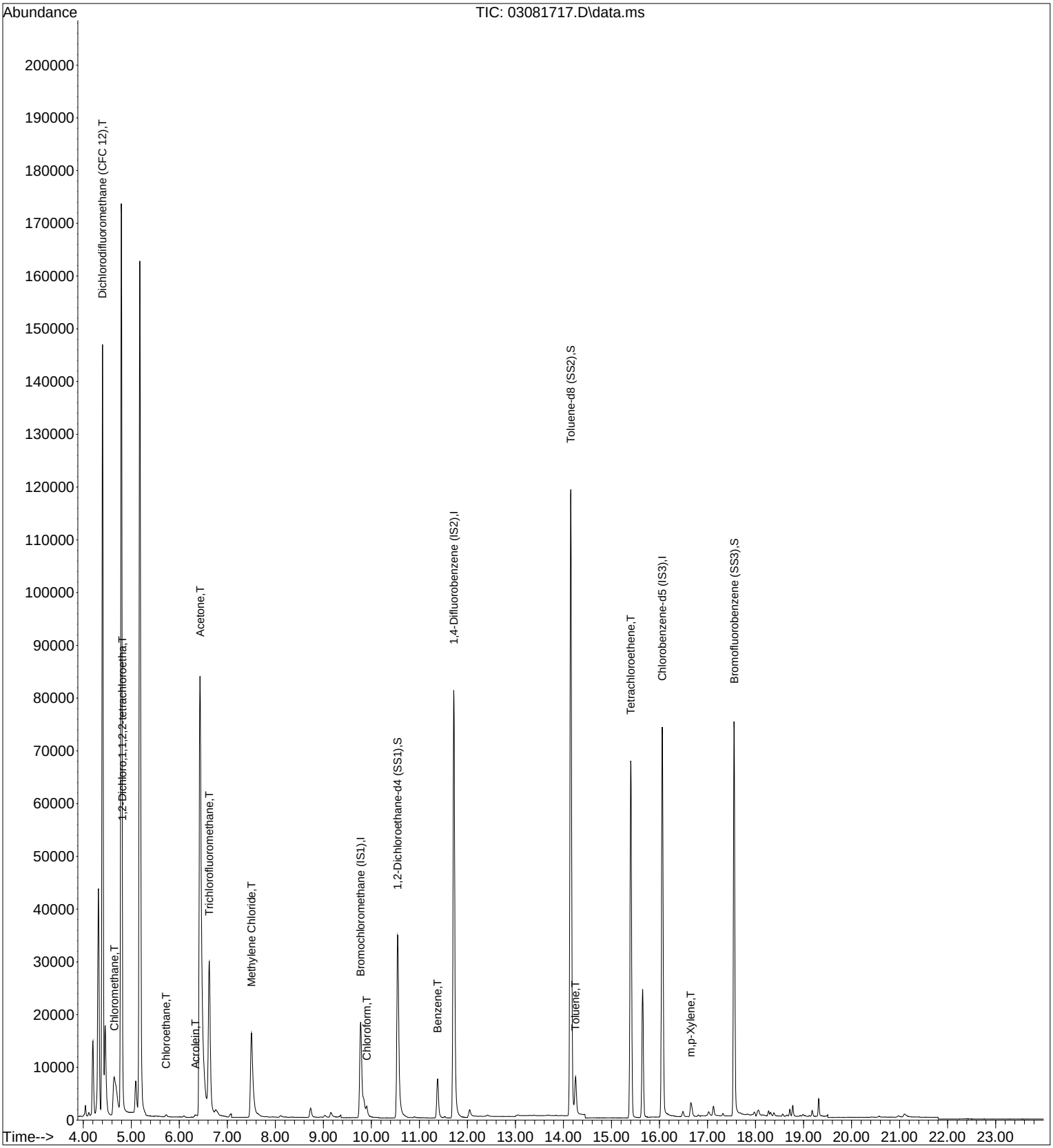
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	0.00	225	0	N.D.	

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081717.D Vial: 1
Acq On : 8 Mar 2017 13:32 Operator: CL
Sample : P1700971-005 (1000mL) Inst : MS19
Misc : S29-01241701

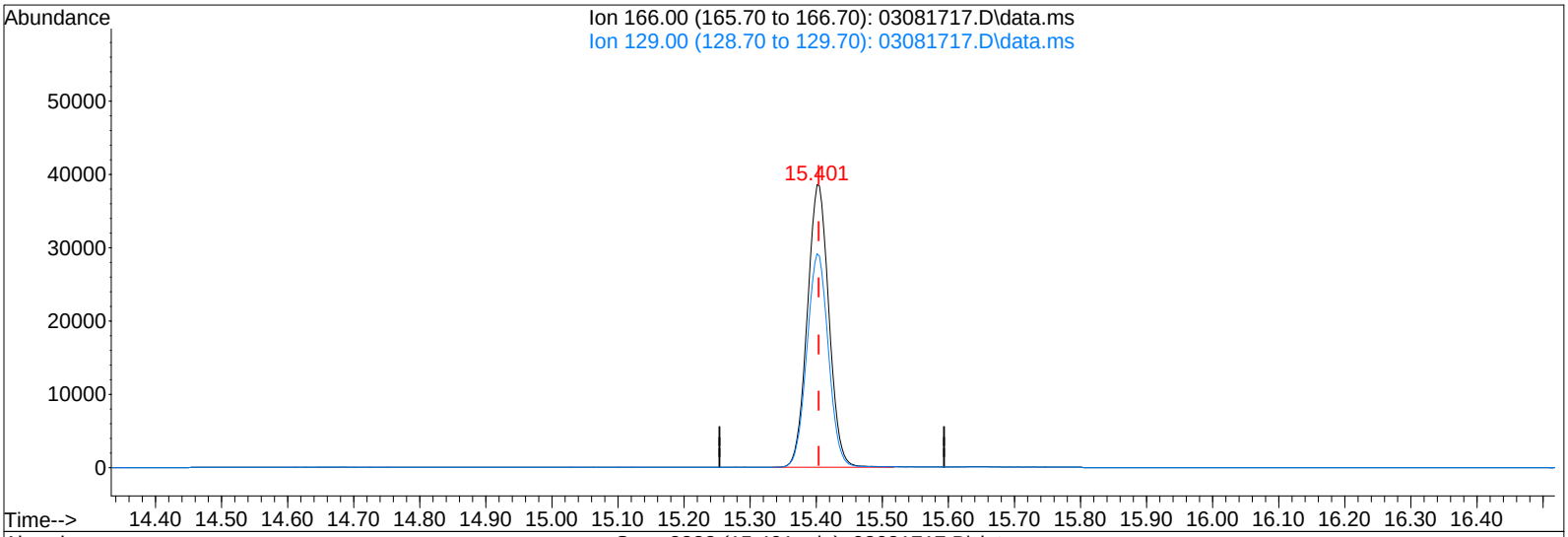
Quant Time: Mar 08 14:10:27 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

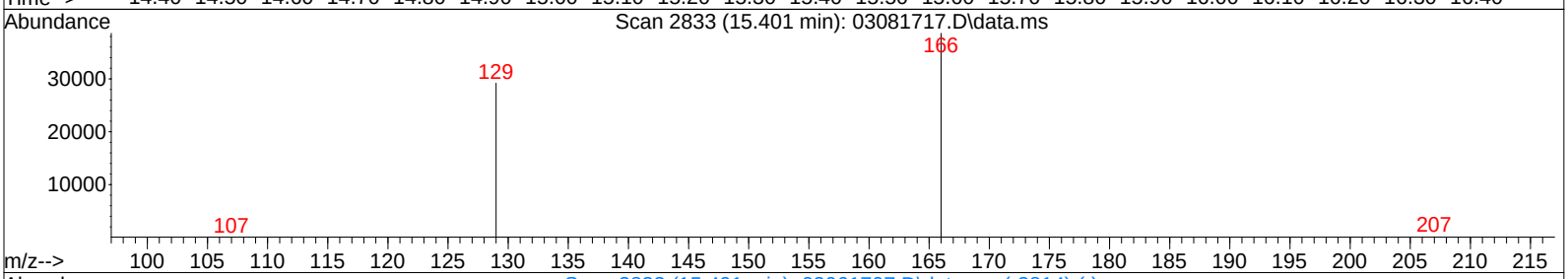


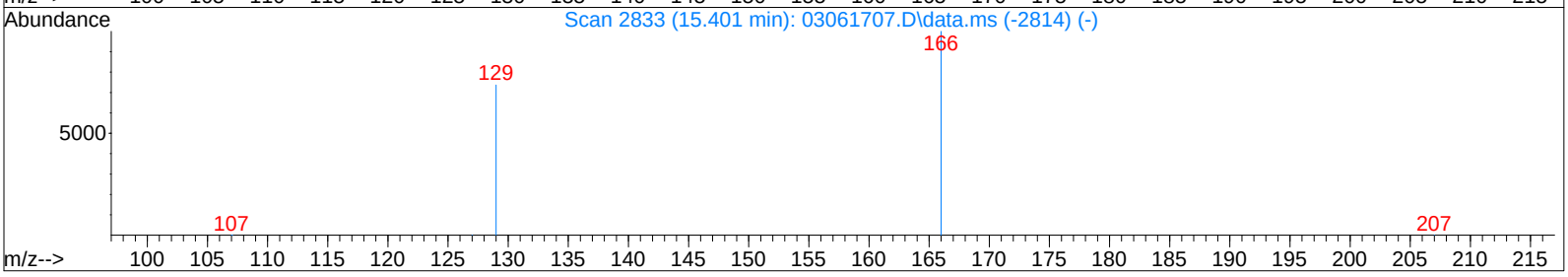
Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\08\03081717.D Vial: 1
Acq On : 8 Mar 2017 13:32 Operator: CL
Sample : P1700971-005 (1000mL) Inst : MS19
Misc : S29-01241701

Quant Time: Mar 08 14:10:27 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M







TIC: 03081717.D\data.ms

(37) Tetrachloroethene (T)

15.401min (-0.002) 1615.50pg

response 87435

Ion	Exp%	Act%
166.00	100	100
129.00	74.90	75.48
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071703.D Vial: 2
Acq On : 7 Mar 2017 10:51 Operator: CL
Sample : MB S19030717 1000mL Inst : MS19
Misc : S29-01241701/AC01205

Quant Time: Mar 07 11:40:56 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/7/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.79	130	40001	1000.000 pg	0.00
25) 1,4-Difluorobenzene (IS2)	11.72	114	193105	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.06	54	39786	1000.000 pg	0.00

System Monitoring Compounds					
20) 1,2-Dichloroethane-d4 ...	10.55	65	80946	1044.018 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 104.40%		
33) Toluene-d8 (SS2)	14.15	98	195015	994.485 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 99.45%		
45) Bromofluorobenzene (SS3)	17.56	174	61152	837.043 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 83.70%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.45	85	366	N.D.	
3) Chloromethane	0.00	52	0	N.D.	
4) 1,2-Dichloro,1,1,2,2-t...	4.83	85	100	N.D.	
5) Vinyl Chloride	0.00	62	0	N.D.	
6) 1,3-Butadiene	0.00	54	0	N.D.	
7) Bromomethane	0.00	94	0	N.D.	
8) Chloroethane	0.00	64	0	N.D.	
9) Acrolein	0.00	56	0	N.D.	
10) Acetone	6.47	58	10843	308.967 pg	96
11) Trichlorofluoromethane	6.65	101	101	N.D.	
12) 1,1-Dichloroethene	0.00	96	0	N.D.	
13) Methylene Chloride	7.52	84	350	N.D.	
14) Trichlorotrifluoroethane	0.00	151	0	N.D.	
15) trans-1,2-Dichloroethene	0.00	96	0	N.D.	
16) 1,1-Dichloroethane	0.00	63	0	N.D.	
17) Methyl tert-Butyl Ether	0.00	73	0	N.D.	
18) cis-1,2-Dichloroethene	0.00	96	0	N.D.	
19) Chloroform	9.91	83	1545	N.D.	
21) 1,2-Dichloroethane	0.00	62	0	N.D.	
22) 1,1,1-Trichloroethane	0.00	97	0	N.D.	
23) Benzene	11.38	78	4767	20.540 pg	95
24) Carbon Tetrachloride	11.53	117	50	N.D.	
26) 1,2-Dichloropropane	0.00	63	0	N.D.	
27) Bromodichloromethane	0.00	83	0	N.D.	
28) Trichloroethene	0.00	130	0	N.D.	
29) 1,4-Dioxane	12.42	88	169	N.D.	
30) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
31) trans-1,3-Dichloropropene	13.81	75	50	N.D.	
32) 1,1,2-Trichloroethane	0.00	83	0	N.D.	
34) Toluene	14.26	91	1368	N.D.	
35) Dibromochloromethane	0.00	129	0	N.D.	
36) 1,2-Dibromoethane	0.00	107	0	N.D.	
37) Tetrachloroethene	0.00	166	0	N.D.	
39) Chlorobenzene	16.11	112	333	N.D.	
40) Ethylbenzene	16.50	91	612	N.D.	
41) m,p-Xylene	16.67	91	1084	N.D.	
42) Styrene	17.04	104	387	N.D.	
43) o-Xylene	17.13	106	178	N.D.	
44) 1,1,2,2-Tetrachloroethane	17.12	83	577	N.D.	
46) 1,3,5-Trimethylbenzene	18.38	105	227	N.D.	
47) 1,2,4-Trimethylbenzene	18.78	105	342	N.D.	
48) 1,3-Dichlorobenzene	18.93	146	432	N.D.	
49) 1,4-Dichlorobenzene	18.99	146	548	N.D.	
50) 1,2-Dichlorobenzene	19.32	146	406	N.D.	
51) 1,2-Dibromo-3-chloropr...	19.72	157	111	N.D.	
52) 1,2,4-Trichlorobenzene	20.98	182	807	N.D.	
53) Naphthalene	21.00	128	73	N.D.	

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071703.D Vial: 2
Acq On : 7 Mar 2017 10:51 Operator: CL
Sample : MB S19030717 1000mL Inst : MS19
Misc : S29-01241701/AC01205

Quant Time: Mar 07 11:40:56 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

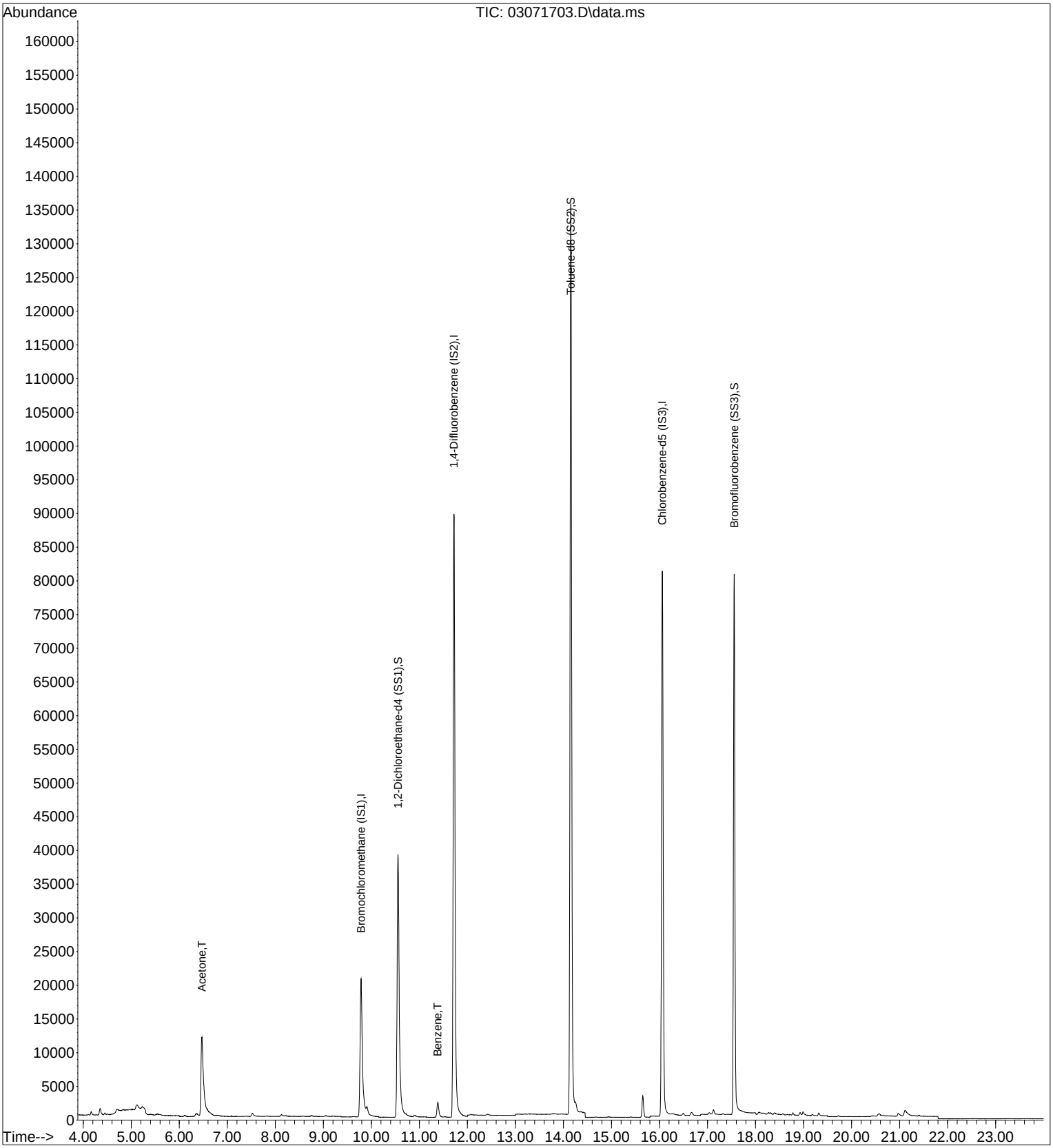
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	120	N.D.	

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071703.D Vial: 2
Acq On : 7 Mar 2017 10:51 Operator: CL
Sample : MB S19030717 1000mL Inst : MS19
Misc : S29-01241701/AC01205

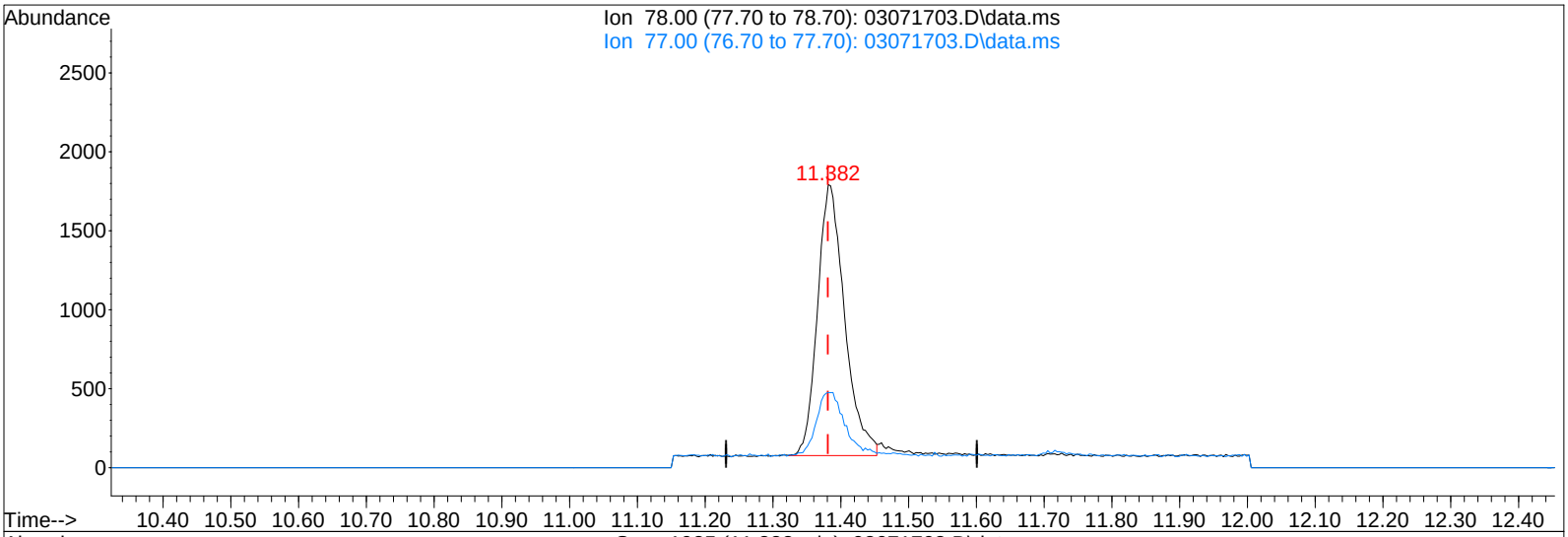
Quant Time: Mar 07 11:40:56 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

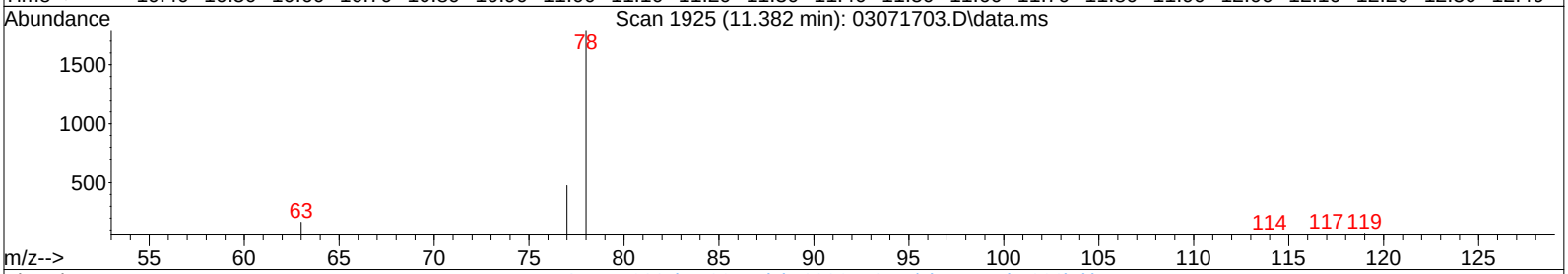


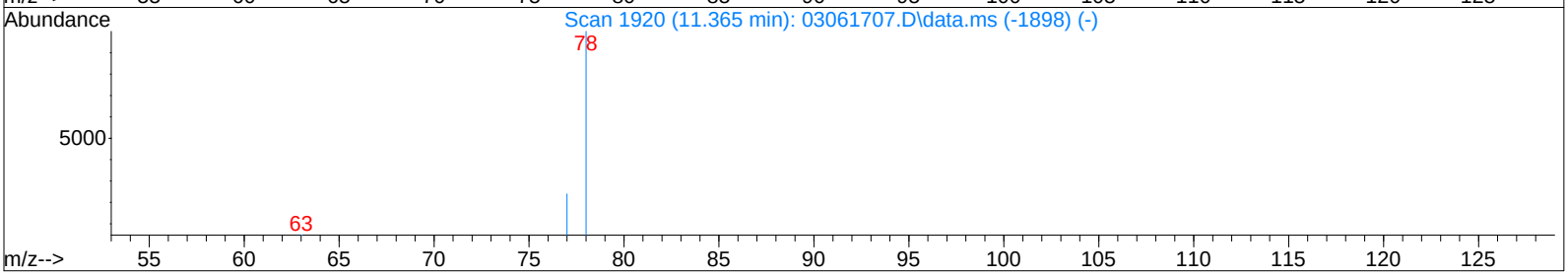
Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\07\03071703.D Vial: 2
Acq On : 7 Mar 2017 10:51 Operator: CL
Sample : MB S19030717 1000mL Inst : MS19
Misc : S29-01241701/AC01205

Quant Time: Mar 07 11:40:56 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M







TIC: 03071703.D\data.ms

(23) Benzene (T)

11.382min (+0.001) 20.54pg

response 4767

Ion	Exp%	Act%
78.00	100	100
77.00	23.80	21.42
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081703.D Vial: 2
Acq On : 8 Mar 2017 5:25 Operator: CL
Sample : MB S19030817 1000mL Inst : MS19
Misc : S29-01241701/AC01205

Quant Time: Mar 08 07:16:14 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/8/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.79	130	35866	1000.000 pg	0.00
25) 1,4-Difluorobenzene (IS2)	11.72	114	174009	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.06	54	35012	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.56	65	69924	1005.835 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 100.58%		
33) Toluene-d8 (SS2)	14.15	98	175156	991.236 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 99.12%		
45) Bromofluorobenzene (SS3)	17.56	174	55444	862.393 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 86.24%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.45	85	211	N.D.	
3) Chloromethane	0.00	52	0	N.D.	
4) 1,2-Dichloro,1,1,2,2-t...	0.00	85	0	N.D.	
5) Vinyl Chloride	0.00	62	0	N.D.	
6) 1,3-Butadiene	0.00	54	0	N.D.	
7) Bromomethane	0.00	94	0	N.D.	
8) Chloroethane	0.00	64	0	N.D.	
9) Acrolein	0.00	56	0	N.D.	
10) Acetone	6.48	58	5616	178.475 pg	92
11) Trichlorofluoromethane	0.00	101	0	N.D.	
12) 1,1-Dichloroethene	0.00	96	0	N.D.	
13) Methylene Chloride	7.52	84	124	N.D.	
14) Trichlorotrifluoroethane	0.00	151	0	N.D.	
15) trans-1,2-Dichloroethene	0.00	96	0	N.D.	
16) 1,1-Dichloroethane	0.00	63	0	N.D.	
17) Methyl tert-Butyl Ether	0.00	73	0	N.D.	
18) cis-1,2-Dichloroethene	0.00	96	0	N.D.	
19) Chloroform	9.91	83	1537	N.D.	
21) 1,2-Dichloroethane	0.00	62	0	N.D.	
22) 1,1,1-Trichloroethane	0.00	97	0	N.D.	
23) Benzene	11.39	78	3849	N.D.	
24) Carbon Tetrachloride	0.00	117	0	N.D.	
26) 1,2-Dichloropropane	0.00	63	0	N.D.	
27) Bromodichloromethane	0.00	83	0	N.D.	
28) Trichloroethene	0.00	130	0	N.D.	
29) 1,4-Dioxane	0.00	88	0	N.D.	
30) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
31) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
32) 1,1,2-Trichloroethane	0.00	83	0	N.D.	
34) Toluene	14.26	91	1315	N.D.	
35) Dibromochloromethane	0.00	129	0	N.D.	
36) 1,2-Dibromoethane	0.00	107	0	N.D.	
37) Tetrachloroethene	0.00	166	0	N.D.	
39) Chlorobenzene	16.11	112	162	N.D.	
40) Ethylbenzene	16.50	91	465	N.D.	
41) m,p-Xylene	16.66	91	900	N.D.	
42) Styrene	17.04	104	237	N.D.	
43) o-Xylene	17.13	106	163	N.D.	
44) 1,1,2,2-Tetrachloroethane	17.13	83	280	N.D.	
46) 1,3,5-Trimethylbenzene	18.32	105	102	N.D.	
47) 1,2,4-Trimethylbenzene	18.80	105	192	N.D.	
48) 1,3-Dichlorobenzene	18.94	146	85	N.D.	
49) 1,4-Dichlorobenzene	19.00	146	120	N.D.	
50) 1,2-Dichlorobenzene	19.33	146	153	N.D.	
51) 1,2-Dibromo-3-chloropr...	19.73	157	68	N.D.	
52) 1,2,4-Trichlorobenzene	20.99	182	341	N.D.	
53) Naphthalene	21.13	128	1707	N.D.	

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081703.D Vial: 2
Acq On : 8 Mar 2017 5:25 Operator: CL
Sample : MB S19030817 1000mL Inst : MS19
Misc : S29-01241701/AC01205

Quant Time: Mar 08 07:16:14 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

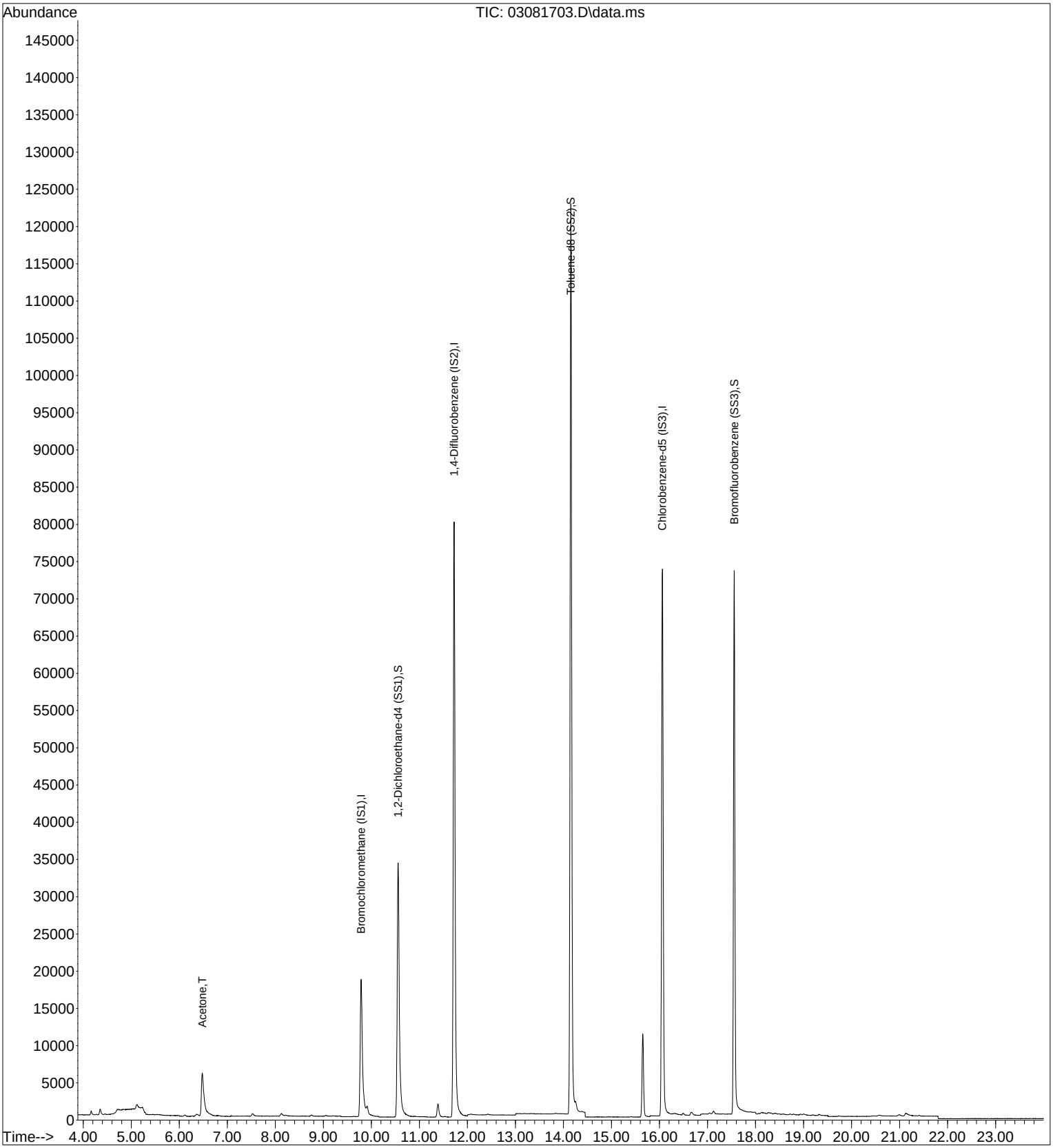
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	90	N.D.	

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081703.D Vial: 2
Acq On : 8 Mar 2017 5:25 Operator: CL
Sample : MB S19030817 1000mL Inst : MS19
Misc : S29-01241701/AC01205

Quant Time: Mar 08 07:16:14 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071705.D Vial: 2
Acq On : 7 Mar 2017 11:53 Operator: CL
Sample : LCS S19030717 500pg Inst : MS19
Misc : S29-01241701/S29-03031708 (4/1)

Quant Time: Mar 07 12:18:15 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/7/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.76	130	38667	1000.000 pg	-0.02
25) 1,4-Difluorobenzene (IS2)	11.71	114	190496	1000.000 pg	-0.01
38) Chlorobenzene-d5 (IS3)	16.05	54	39422	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.53	65	77000	1027.387 pg	-0.02
Spiked Amount 1000.000	Range 70 - 130		Recovery = 102.74%		
33) Toluene-d8 (SS2)	14.15	98	192810	996.707 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 99.67%		
45) Bromofluorobenzene (SS3)	17.55	174	65960	911.191 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 91.12%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.42	85	75278	628.880 pg	99
3) Chloromethane	4.65	52	20898	647.022 pg	97
4) 1,2-Dichloro,1,1,2,2-t...	4.81	85	76907	569.313 pg	100
5) Vinyl Chloride	4.95	62	73662	627.242 pg	99
6) 1,3-Butadiene	5.14	54	35576	600.744 pg	97
7) Bromomethane	5.47	94	23852	607.010 pg	100
8) Chloroethane	5.70	64	18294	609.821 pg	99
9) Acrolein	6.27	56	13989	568.713 pg	97
10) Acetone	6.40	58	104382	3076.935 pg	99
11) Trichlorofluoromethane	6.61	101	55200	600.319 pg	100
12) 1,1-Dichloroethene	7.35	96	29762	590.085 pg	99
13) Methylene Chloride	7.48	84	35047	631.435 pg	99
14) Trichlorotrifluoroethane	7.80	151	28309	583.247 pg	99
15) trans-1,2-Dichloroethene	8.51	96	32671	605.286 pg	99
16) 1,1-Dichloroethane	8.72	63	60541	610.211 pg	100
17) Methyl tert-Butyl Ether	8.79	73	98202	607.255 pg	100
18) cis-1,2-Dichloroethene	9.59	96	34680	601.565 pg	99
19) Chloroform	9.89	83	64657	592.599 pg	100
21) 1,2-Dichloroethane	10.64	62	52800	606.301 pg	100
22) 1,1,1-Trichloroethane	10.91	97	56325	583.267 pg	100
23) Benzene	11.37	78	134094	597.708 pg	100
24) Carbon Tetrachloride	11.52	117	48785	569.314 pg	100
26) 1,2-Dichloropropane	12.18	63	32914	587.868 pg	100
27) Bromodichloromethane	12.36	83	46003	570.454 pg	100
28) Trichloroethene	12.41	130	33513	578.070 pg	100
29) 1,4-Dioxane	12.38	88	25846	590.415 pg	99
30) cis-1,3-Dichloropropene	13.26	75	46306	558.685 pg	100
31) trans-1,3-Dichloropropene	13.77	75	40546	570.981 pg	100
32) 1,1,2-Trichloroethane	13.95	83	27587	585.007 pg	99
34) Toluene	14.25	91	127597	564.444 pg	100
35) Dibromochloromethane	14.66	129	31167	528.691 pg	100
36) 1,2-Dibromoethane	14.92	107	32826	567.201 pg	100
37) Tetrachloroethene	15.40	166	34158	561.905 pg	100
39) Chlorobenzene	16.10	112	84092	563.052 pg	100
40) Ethylbenzene	16.48	91	143445	575.149 pg	100
41) m,p-Xylene	16.66	91	222061	1168.710 pg	100
42) Styrene	17.01	104	72278	545.857 pg	100
43) o-Xylene	17.12	106	52168	548.121 pg	99
44) 1,1,2,2-Tetrachloroethane	17.09	83	55283	547.559 pg	100
46) 1,3,5-Trimethylbenzene	18.38	105	115348	545.235 pg	100
47) 1,2,4-Trimethylbenzene	18.77	105	117301	558.910 pg	100
48) 1,3-Dichlorobenzene	18.92	146	65045	565.095 pg	99
49) 1,4-Dichlorobenzene	18.98	146	64419	543.325 pg	99
50) 1,2-Dichlorobenzene	19.31	146	63174	545.856 pg	100
51) 1,2-Dibromo-3-chloropr...	19.72	157	17980	517.900 pg	98
52) 1,2,4-Trichlorobenzene	20.94	182	38773	575.222 pg	100
53) Naphthalene	21.06	128	123002	590.051 pg	99

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071705.D Vial: 2
Acq On : 7 Mar 2017 11:53 Operator: CL
Sample : LCS S19030717 500pg Inst : MS19
Misc : S29-01241701/S29-03031708 (4/1)

Quant Time: Mar 07 12:18:15 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

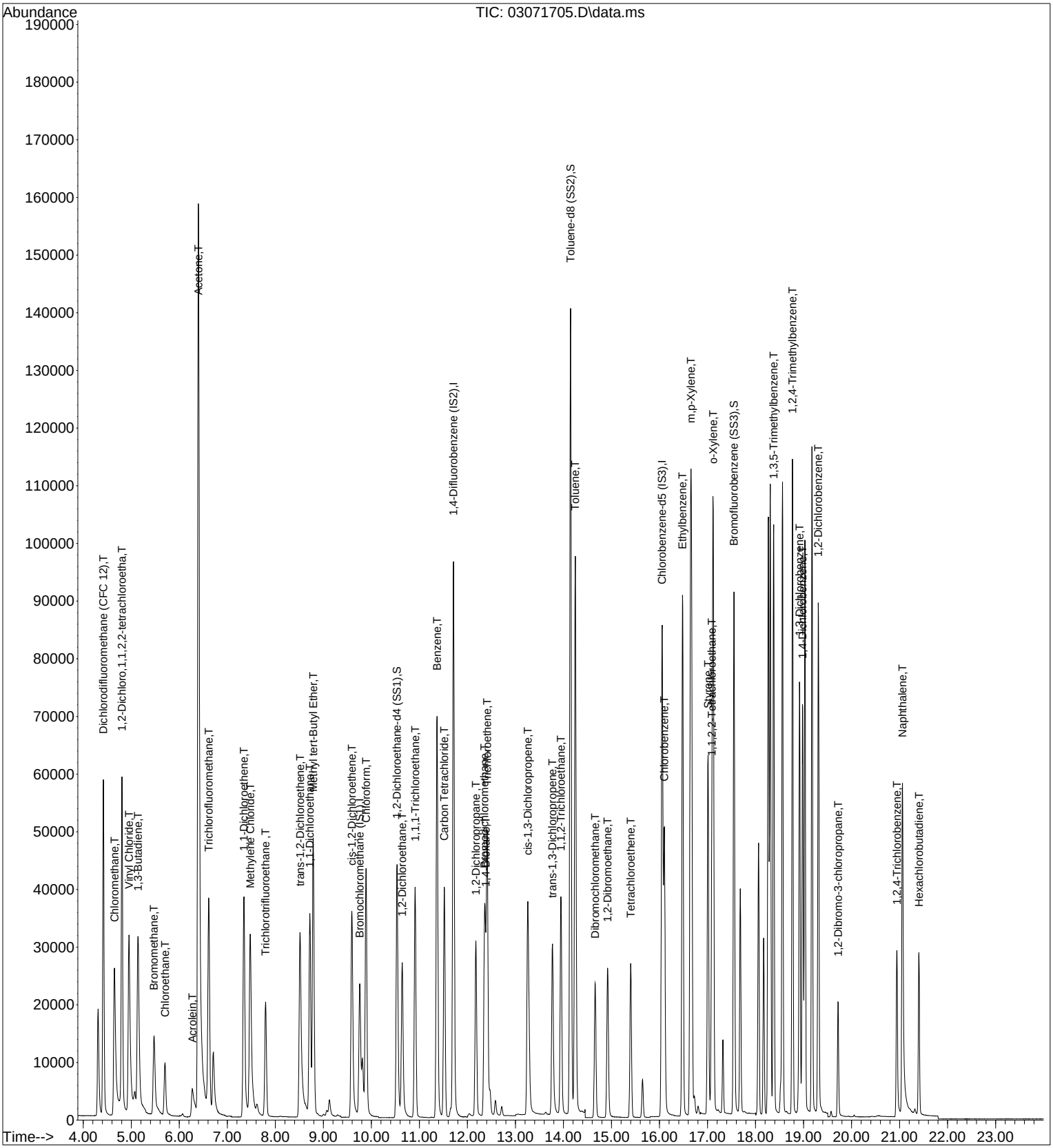
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	27235	557.933	pg	100

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071705.D Vial: 2
Acq On : 7 Mar 2017 11:53 Operator: CL
Sample : LCS S19030717 500pg Inst : MS19
Misc : S29-01241701/S29-03031708 (4/1)

Quant Time: Mar 07 12:18:15 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081705.D Vial: 2
Acq On : 8 Mar 2017 6:28 Operator: CL
Sample : LCS S19030817 500pg Inst : MS19
Misc : S29-01241701/S29-03031708 (4/1)

Quant Time: Mar 08 07:16:16 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/8/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.76	130	36066	1000.000 pg	-0.02
25) 1,4-Difluorobenzene (IS2)	11.71	114	176331	1000.000 pg	-0.01
38) Chlorobenzene-d5 (IS3)	16.05	54	35327	1000.000 pg	0.00

System Monitoring Compounds					
20) 1,2-Dichloroethane-d4 ...	10.53	65	69317	991.575 pg	-0.02
Spiked Amount 1000.000	Range 70 - 130		Recovery = 99.16%		
33) Toluene-d8 (SS2)	14.15	98	176822	987.487 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 98.75%		
45) Bromofluorobenzene (SS3)	17.55	174	59417	915.949 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 91.59%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.42	85	75811	679.008 pg	99
3) Chloromethane	4.65	52	20263	672.606 pg	95
4) 1,2-Dichloro,1,1,2,2-t...	4.81	85	74863	594.148 pg	100
5) Vinyl Chloride	4.96	62	71960	656.940 pg	99
6) 1,3-Butadiene	5.14	54	37308	675.425 pg	96
7) Bromomethane	5.48	94	24596	671.086 pg	99
8) Chloroethane	5.71	64	18539	662.555 pg	99
9) Acrolein	6.27	56	13850	603.669 pg	95
10) Acetone	6.40	58	103809	3280.728 pg	96
11) Trichlorofluoromethane	6.62	101	55484	646.924 pg	100
12) 1,1-Dichloroethene	7.35	96	30020	638.125 pg	99
13) Methylene Chloride	7.48	84	32943	636.332 pg	98
14) Trichlorotrifluoroethane	7.80	151	28429	627.960 pg	100
15) trans-1,2-Dichloroethene	8.52	96	32037	636.345 pg	99
16) 1,1-Dichloroethane	8.72	63	59681	644.925 pg	100
17) Methyl tert-Butyl Ether	8.79	73	98643	653.973 pg	100
18) cis-1,2-Dichloroethene	9.59	96	34130	634.720 pg	99
19) Chloroform	9.89	83	63466	623.633 pg	100
21) 1,2-Dichloroethane	10.64	62	51512	634.170 pg	99
22) 1,1,1-Trichloroethane	10.91	97	56762	630.183 pg	100
23) Benzene	11.37	78	133254	636.799 pg	100
24) Carbon Tetrachloride	11.52	117	49157	615.026 pg	100
26) 1,2-Dichloropropane	12.18	63	32444	626.024 pg	100
27) Bromodichloromethane	12.36	83	45346	607.478 pg	100
28) Trichloroethene	12.41	130	33810	630.042 pg	100
29) 1,4-Dioxane	12.38	88	25883	638.758 pg	99
30) cis-1,3-Dichloropropene	13.26	75	46485	605.899 pg	100
31) trans-1,3-Dichloropropene	13.77	75	40453	615.434 pg	100
32) 1,1,2-Trichloroethane	13.95	83	27230	623.823 pg	100
34) Toluene	14.25	91	126848	606.208 pg	100
35) Dibromochloromethane	14.66	129	31266	572.976 pg	100
36) 1,2-Dibromoethane	14.92	107	32932	614.744 pg	99
37) Tetrachloroethene	15.40	166	34357	610.581 pg	100
39) Chlorobenzene	16.10	112	83845	626.474 pg	100
40) Ethylbenzene	16.48	91	142242	636.436 pg	100
41) m,p-Xylene	16.66	91	220003	1292.097 pg	100
42) Styrene	17.01	104	71074	598.985 pg	100
43) o-Xylene	17.12	106	52256	612.689 pg	100
44) 1,1,2,2-Tetrachloroethane	17.09	83	54097	597.922 pg	100
46) 1,3,5-Trimethylbenzene	18.38	105	114056	601.622 pg	100
47) 1,2,4-Trimethylbenzene	18.77	105	114977	611.340 pg	100
48) 1,3-Dichlorobenzene	18.92	146	63042	611.180 pg	100
49) 1,4-Dichlorobenzene	18.98	146	63597	598.569 pg	99
50) 1,2-Dichlorobenzene	19.31	146	61980	597.617 pg	100
51) 1,2-Dibromo-3-chloropr...	19.72	157	17154	551.384 pg	95
52) 1,2,4-Trichlorobenzene	20.95	182	37328	617.978 pg	99
53) Naphthalene	21.06	128	117439	628.668 pg	100

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081705.D Vial: 2
Acq On : 8 Mar 2017 6:28 Operator: CL
Sample : LCS S19030817 500pg Inst : MS19
Misc : S29-01241701/S29-03031708 (4/1)

Quant Time: Mar 08 07:16:16 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	26926	615.543 pg	100

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081705.D Vial: 2
Acq On : 8 Mar 2017 6:28 Operator: CL
Sample : LCS S19030817 500pg Inst : MS19
Misc : S29-01241701/S29-03031708 (4/1)

Quant Time: Mar 08 07:16:16 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
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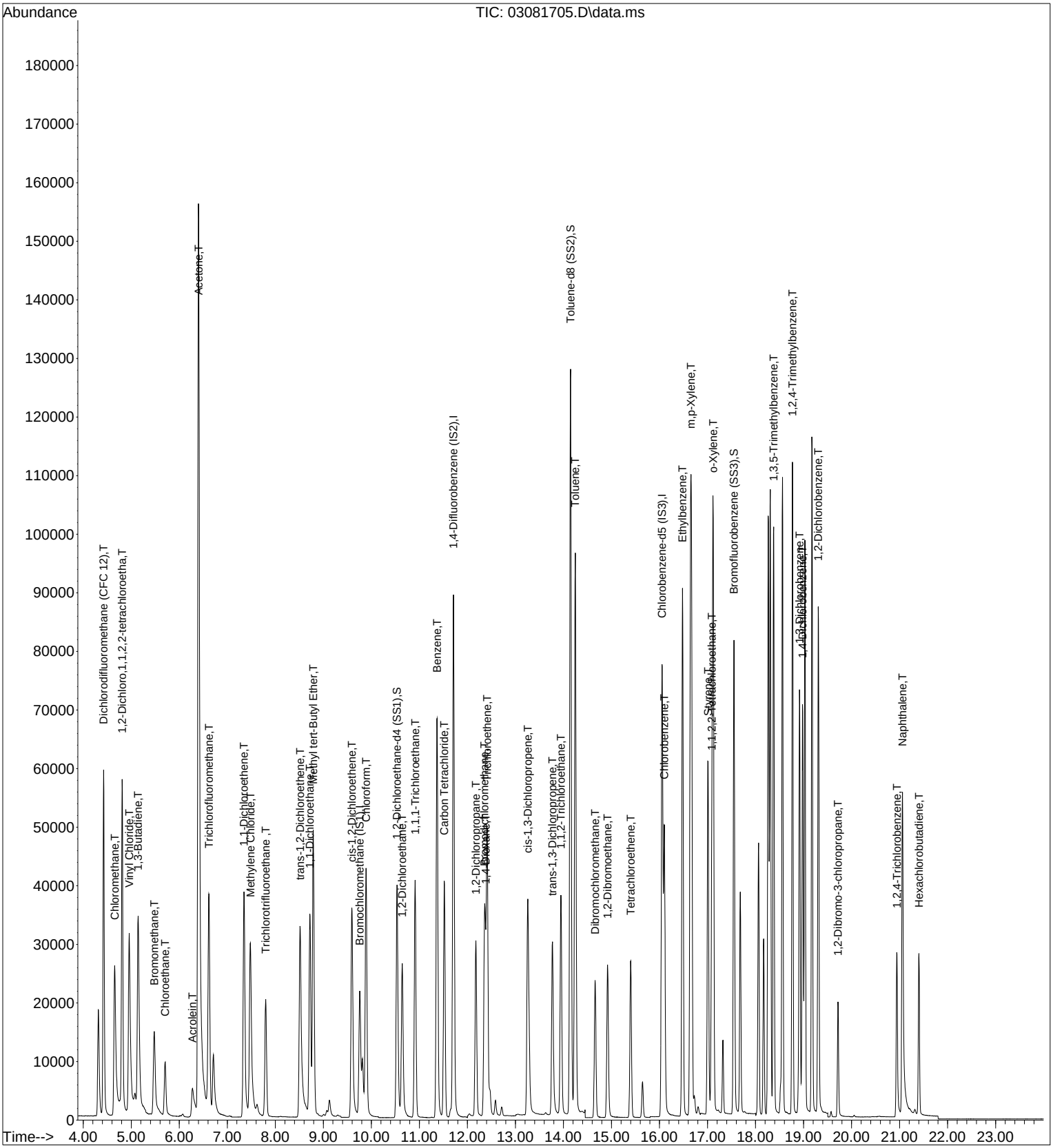


Response Factor Report MS19

Method Path : I:\MS19\METHODS\
Method File : S19030617.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue Mar 07 08:48:37 2017
Response Via : Initial Calibration

CL 3/7/17

Calibration Files
20 =03061703.D 50 =03061704.D 100 =03061705.D 500 =03061706.D 1000=03061707.D 2000=03061708.D 5000=03061709.D
10K =03061710.D 50K =03061717.D

		Compound	20	50	100	500	1000	2000	5000	10K	50K	Avg	%RSD
1)	I	Bromochloromethane...	----------ISTD----------										
2)	T	Dichlorodifluo...	3.949	3.647	3.375	3.274	3.017	2.891	2.765	2.729	2.214	3.096	16.98
3)	T	Chloromethane		1.366	1.152	0.949	0.824	0.725	0.638	0.433	0.595	0.835	36.91
4)	T	1,2-Dichloro,1...	4.734	4.170	3.779	3.717	3.339	3.144	3.004	2.865	2.691	3.494	19.07
5)	T	Vinyl Chloride	3.440	3.658	3.310	3.283	2.932	2.823	2.723	2.659	2.505	3.037	13.09
6)	T	1,3-Butadiene	1.533	1.376	1.336	1.453	1.355	1.338	1.436	1.805	2.150	1.532	17.94
7)	T	Bromomethane	1.325	1.094	1.052	1.040	0.960	0.928	0.938	0.934	0.874	1.016	13.35
8)	T	Chloroethane	0.874	0.893	0.796	0.803	0.737	0.722	0.742	0.750	0.665	0.776	9.45
9)	T	Acrolein		0.833	0.625	0.591	0.540	0.567	0.617	0.649	0.667	0.636	14.12
10)	T	Acetone		1.229	0.975	0.842	0.773	0.766	0.764	0.792		0.877	19.64
11)	T	Trichlorofluor...	2.833	2.659	2.461	2.409	2.235	2.212	2.253	2.202	2.138	2.378	9.93
12)	T	1,1-Dichloroet...	1.453	1.387	1.307	1.316	1.238	1.258	1.285	1.253	1.243	1.304	5.58
13)	T	Methylene Chlo...		1.797	1.565	1.450	1.337	1.339	1.351	1.306	1.339	1.435	11.77
14)	T	Trichlorotrifl...	1.536	1.384	1.263	1.261	1.192	1.165	1.141	1.137	1.219	1.255	10.39
15)	T	trans-1,2-Dich...	1.644	1.476	1.337	1.428	1.334	1.363	1.359	1.309	1.313	1.396	7.73
16)	T	1,1-Dichloroet...	3.035	2.763	2.580	2.665	2.503	2.477	2.451	2.326	2.294	2.566	8.99
17)	T	Methyl tert-Bu...	4.966	4.451	4.139	4.287	4.037	4.050	4.051	3.563	4.096	4.182	9.05
18)	T	cis-1,2-Dichlo...	1.633	1.575	1.450	1.526	1.446	1.468	1.456	1.428	1.437	1.491	4.80
19)	T	Chloroform		3.743	3.209	2.894	2.673	2.612	2.528	2.448	2.467	2.822	15.97
20)	S	1,2-Dichloroet...	1.973	1.979	1.990	1.963	1.955	1.955	1.946	1.883	1.801	1.938	3.10
21)	T	1,2-Dichloroet...	2.623	2.423	2.287	2.365	2.210	2.185	2.135	2.039	2.004	2.252	8.70
22)	T	1,1,1-Trichlor...	3.069	2.633	2.467	2.551	2.400	2.387	2.360	2.279	2.332	2.497	9.65
23)	T	Benzene		7.344	6.297	5.971	5.512	5.387	5.334	5.240	5.330	5.802	12.47
24)	T	Carbon Tetrach...	2.683	2.340	2.160	2.217	2.084	2.083	2.114	2.093	2.172	2.216	8.73
25)	I	1,4-Difluorobenzen...	----------ISTD----------										
26)	T	1,2-Dichloropr...	0.339	0.313	0.297	0.301	0.284	0.284	0.279	0.271	0.276	0.294	7.31
27)	T	Bromodichlorom...	0.493	0.444	0.403	0.423	0.402	0.408	0.408	0.400	0.429	0.423	7.09
28)	T	Trichloroethene	0.362	0.325	0.301	0.311	0.290	0.286	0.280	0.276	0.308	0.304	8.82
29)	T	1,4-Dioxane	0.236	0.226	0.212	0.239	0.224	0.227	0.226	0.223	0.253	0.230	5.09
30)	T	cis-1,3-Dichlo...	0.427	0.403	0.383	0.428	0.416	0.439	0.457	0.455	0.508	0.435	8.29
31)	T	trans-1,3-Dich...	0.328	0.310	0.290	0.365	0.361	0.393	0.419	0.425	0.464	0.373	15.44
32)	T	1,1,2-Trichlor...	0.285	0.259	0.243	0.251	0.238	0.239	0.235	0.230	0.246	0.248	6.68
33)	S	Toluene-d8 (SS2)	1.020	1.014	1.019	1.012	1.010	1.017	1.018	1.012	1.018	1.015	0.36
34)	T	Toluene	1.516	1.271	1.160	1.175	1.108	1.106	1.116	1.097	1.132	1.187	11.34
35)	T	Dibromochlorom...	0.329	0.283	0.275	0.296	0.286	0.301	0.320	0.328	0.368	0.309	9.50
36)	T	1,2-Dibromoethane	0.315	0.297	0.279	0.306	0.288	0.301	0.308	0.309	0.331	0.304	4.95
37)	T	Tetrachloroethene	0.376	0.340	0.313	0.317	0.296	0.294	0.299	0.297	0.340	0.319	8.68
38)	I	Chlorobenzene-d5 (...	----------ISTD----------										
39)	T	Chlorobenzene	4.486	4.012	3.704	3.777	3.548	3.538	3.625	3.618		3.789	8.47
40)	T	Ethylbenzene	6.863	6.308	5.901	6.386	6.145	6.193	6.433	6.385		6.327	4.38
41)	T	m,p-Xylene	4.995	4.617	4.415	4.945	4.755	4.724	5.037	5.071		4.820	4.80

Method Path : I:\MS19\METHODS\
Method File : S19030617.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

42)	T	Styrene	2.873	2.700	3.365	3.338	3.212	3.452	3.908	4.023		3.359	13.52
43)	T	o-Xylene	2.468	2.238	2.845	2.348	2.256	2.259	2.434	2.467		2.414	8.23
44)	T	1,1,2,2-Tetrac...	2.603	2.436	2.905	2.526	2.423	2.447	2.578	2.571		2.561	6.07
45)	S	Bromofluoroben...	1.594	1.628	2.178	1.675	1.699	1.725	2.132	1.861	2.033	1.836	12.21
46)	T	1,3,5-Trimethy...	4.330	4.643	5.687	5.206	5.055	5.221	7.004	5.785		5.366	15.27
47)	T	1,2,4-Trimethy...	4.693	4.493	4.372	5.252	5.148	5.459	7.132	6.041		5.324	17.15
48)	T	1,3-Dichlorobe...	2.364	2.678	2.620	2.938	2.731	2.887	3.951	3.188		2.920	16.53
49)	T	1,4-Dichlorobe...	2.969	2.915	2.816	2.922	2.701	2.797	3.835	3.106		3.008	11.84
50)	T	1,2-Dichlorobe...	2.762	2.731	2.592	2.858	2.717	2.875	3.813	3.138		2.936	13.24
51)	T	1,2-Dibromo-3-...		0.643	0.625	0.833	0.837	0.961	1.117	1.149		0.881	23.67
52)	T	1,2,4-Trichlor...	1.670	1.698	1.571	1.696	1.572	1.719	1.891	1.862		1.710	6.86
53)	T	Naphthalene	5.045	5.034	4.625	5.202	4.858	5.406	5.990	6.142		5.288	10.08
54)	T	Hexachlorobuta...	1.368	1.283	1.171	1.227	1.155	1.200	1.262	1.239		1.238	5.50

(#) = Out of Range

Primary Source Standards Concentrations (Working & Initial Calibration)

CL 3/7/17

0.2ng/L Std. ID: | 20ng/L Std. ID: S29-02171708
1ng/L Std. ID: S29-03061701 | 200ng/L Std. ID: S29-03021703
4ng/L Std. ID: S29-03021708

Dilution Factors:		5	50	250	1000	5000	Working STD Conc.(ng/L):	NA	1	1	1	4	20	20	20	20		200
	Source Std.	Primary Working Standards					Injection (L):	NA	0.020	0.050	0.100	0.125	0.050	0.100	0.250	0.500	NA	0.250
Compounds	mg/m^3	200ng/L	20ng/L	4ng/L	1ng/L	0.2ng/L	ICAL Points:	0.01ng	0.02ng	0.05ng	0.1ng	0.5ng	1ng	2ng	5ng	10ng	20ng	50ng
Propene	1.036	207.2	20.72	4.144	1.036	0.2072		NA	0.02072	0.05180	0.1036	0.5180	1.036	2.072	5.180	10.36	NA	51.80
Dichlorodifluoromethane	1.047	209.4	20.94	4.188	1.047	0.2094		NA	0.02094	0.05235	0.1047	0.5235	1.047	2.094	5.235	10.47	NA	52.35
Chloromethane	1.005	201.0	20.10	4.020	1.005	0.2010		NA	0.02010	0.05025	0.1005	0.5025	1.005	2.010	5.025	10.05	NA	50.25
Freon-114	1.005	201.0	20.10	4.020	1.005	0.2010		NA	0.02010	0.05025	0.1005	0.5025	1.005	2.010	5.025	10.05	NA	50.25
Vinyl Chloride	1.023	204.6	20.46	4.092	1.023	0.2046		NA	0.02046	0.05115	0.1023	0.5115	1.023	2.046	5.115	10.23	NA	51.15
1,3-Butadiene	1.057	211.4	21.14	4.228	1.057	0.2114		NA	0.02114	0.05285	0.1057	0.5285	1.057	2.114	5.285	10.57	NA	52.85
Bromomethane	0.993	198.6	19.86	3.972	0.993	0.1986		NA	0.01986	0.04965	0.0993	0.4965	0.993	1.986	4.965	9.93	NA	49.65
Chloroethane	1.009	201.8	20.18	4.036	1.009	0.2018		NA	0.02018	0.05045	0.1009	0.5045	1.009	2.018	5.045	10.09	NA	50.45
Ethanol	5.207	1041.4	104.14	20.828	5.207	1.0414		NA	0.10414	0.26035	0.5207	2.6035	5.207	10.414	26.035	52.07	NA	260.35
Acetonitrile	1.046	209.2	20.92	4.184	1.046	0.2092		NA	0.02092	0.05230	0.1046	0.5230	1.046	2.092	5.230	10.46	NA	52.30
Acrolein	1.041	208.2	20.82	4.164	1.041	0.2082		NA	0.02082	0.05205	0.1041	0.5205	1.041	2.082	5.205	10.41	NA	52.05
Acetone	5.313	1062.6	106.26	21.252	5.313	1.0626		NA	0.10626	0.26565	0.5313	2.6565	5.313	10.626	26.565	53.13	NA	265.65
Trichlorofluoromethane	1.049	209.8	20.98	4.196	1.049	0.2098		NA	0.02098	0.05245	0.1049	0.5245	1.049	2.098	5.245	10.49	NA	52.45
Isopropanol	2.105	421.0	42.10	8.420	2.105	0.4210		NA	0.04210	0.10525	0.2105	1.0525	2.105	4.210	10.525	21.05	NA	105.25
Acrylonitrile	1.055	211.0	21.10	4.220	1.055	0.2110		NA	0.02110	0.05275	0.1055	0.5275	1.055	2.110	5.275	10.55	NA	52.75
1,1-Dichloroethene	1.059	211.8	21.18	4.236	1.059	0.2118		NA	0.02118	0.05295	0.1059	0.5295	1.059	2.118	5.295	10.59	NA	52.95
tert-Butanol	2.114	422.8	42.28	8.456	2.114	0.4228		NA	0.04228	0.10570	0.2114	1.0570	2.114	4.228	10.570	21.14	NA	105.70
Methylene Chloride	1.057	211.4	21.14	4.228	1.057	0.2114		NA	0.02114	0.05285	0.1057	0.5285	1.057	2.114	5.285	10.57	NA	52.85
Allyl Chloride	1.052	210.4	21.04	4.208	1.052	0.2104		NA	0.02104	0.05260	0.1052	0.5260	1.052	2.104	5.260	10.52	NA	52.60
Trichlorotrifluoroethane	1.049	209.8	20.98	4.196	1.049	0.2098		NA	0.02098	0.05245	0.1049	0.5245	1.049	2.098	5.245	10.49	NA	52.45
Carbon Disulfide	1.061	212.2	21.22	4.244	1.061	0.2122		NA	0.02122	0.05305	0.1061	0.5305	1.061	2.122	5.305	10.61	NA	53.05
trans-1,2-Dichloroethene	1.067	213.4	21.34	4.268	1.067	0.2134		NA	0.02134	0.05335	0.1067	0.5335	1.067	2.134	5.335	10.67	NA	53.35
1,1-Dichloroethane	1.020	204.0	20.40	4.080	1.020	0.2040		NA	0.02040	0.05100	0.1020	0.5100	1.020	2.040	5.100	10.20	NA	51.00
Methyl tert-Butyl Ether	1.066	213.2	21.32	4.264	1.066	0.2132		NA	0.02132	0.05330	0.1066	0.5330	1.066	2.132	5.330	10.66	NA	53.30
Vinyl Acetate	5.265	1053.0	105.30	21.060	5.265	1.0530		NA	0.10530	0.26325	0.5265	2.6325	5.265	10.530	26.325	52.65	NA	263.25
2-Butanone	1.049	209.8	20.98	4.196	1.049	0.2098		NA	0.02098	0.05245	0.1049	0.5245	1.049	2.098	5.245	10.49	NA	52.45
cis-1,2-Dichloroethene	1.064	212.8	21.28	4.256	1.064	0.2128		NA	0.02128	0.05320	0.1064	0.5320	1.064	2.128	5.320	10.64	NA	53.20
Diisopropyl Ether	1.062	212.4	21.24	4.248	1.062	0.2124		NA	0.02124	0.05310	0.1062	0.5310	1.062	2.124	5.310	10.62	NA	53.10
Ethyl Acetate	2.129	425.8	42.58	8.516	2.129	0.4258		NA	0.04258	0.10645	0.2129	1.0645	2.129	4.258	10.645	21.29	NA	106.45
n-Hexane	1.063	212.6	21.26	4.252	1.063	0.2126		NA	0.02126	0.05315	0.1063	0.5315	1.063	2.126	5.315	10.63	NA	53.15
Chloroform	1.058	211.6	21.16	4.232	1.058	0.2116		NA	0.02116	0.05290	0.1058	0.5290	1.058	2.116	5.290	10.58	NA	52.90
Tetrahydrofuran	1.062	212.4	21.24	4.248	1.062	0.2124		NA	0.02124	0.05310	0.1062	0.5310	1.062	2.124	5.310	10.62	NA	53.10
Ethyl tert-Butyl Ether	1.057	211.4	21.14	4.228	1.057	0.2114		NA	0.02114	0.05285	0.1057	0.5285	1.057	2.114	5.285	10.57	NA	52.85
1,2-Dichloroethane	1.052	210.4	21.04	4.208	1.052	0.2104		NA	0.02104	0.05260	0.1052	0.5260	1.052	2.104	5.260	10.52	NA	52.60
1,1,1-Trichloroethane	1.074	214.8	21.48	4.296	1.074	0.2148		NA	0.02148	0.05370	0.1074	0.5370	1.074	2.148	5.370	10.74	NA	53.70
Isopropyl Acetate	2.104	420.8	42.08	8.416	2.104	0.4208		NA	0.04208	0.10520	0.2104	1.0520	2.104	4.208	10.520	21.04	NA	105.20
1-Butanol	2.105	421.0	42.10	8.420	2.105	0.4210		NA	0.04210	0.10525	0.2105	1.0525	2.105	4.210	10.525	21.05	NA	105.25
Benzene	1.052	210.4	21.04	4.208	1.052	0.2104		NA	0.02104	0.05260	0.1052	0.5260	1.052	2.104	5.260	10.52	NA	52.60
Carbon Tetrachloride	1.055	211.0	21.10	4.220	1.055	0.2110		NA	0.02110	0.05275	0.1055	0.5275	1.055	2.110	5.275	10.55	NA	52.75
Cyclohexane	2.130	426.0	42.60	8.520	2.130	0.4260		NA	0.04260	0.10650	0.2130	1.0650	2.130	4.260	10.650	21.30	NA	106.50
tert-Amyl Methyl Ether	1.054	210.8	21.08	4.216	1.054	0.2108		NA	0.02108	0.05270	0.1054	0.5270	1.054	2.108	5.270	10.54	NA	52.70
1,2-Dichloropropane	1.062	212.4	21.24	4.248	1.062	0.2124		NA	0.02124	0.05310	0.1062	0.5310	1.062	2.124	5.310	10.62	NA	53.10
Bromodichloromethane	1.066	213.2	21.32	4.264	1.066	0.2132		NA	0.02132	0.05330	0.1066	0.5330	1.066	2.132	5.330	10.66	NA	53.30
Trichloroethene	1.060	212.0	21.20	4.240	1.060	0.2120		NA	0.02120	0.05300	0.1060	0.5300	1.060	2.120	5.300	10.60	NA	53.00
1,4-Dioxane	1.062	212.4	21.24	4.248	1.062	0.2124		NA	0.02124	0.05310	0.1062	0.5310	1.062	2.124	5.310	10.62	NA	53.10
Isooctane	1.059	211.8	21.18	4.236	1.059	0.2118		NA	0.02118	0.05295	0.1059	0.5295	1.059	2.118	5.295	10.59	NA	52.95
Methyl Methacrylate	2.110	422.0	42.20	8.440	2.110	0.4220		NA	0.04220	0.10550	0.2110	1.0550	2.110	4.220	10.550	21.10	NA	105.50
n-Heptane	1.062	212.4	21.24	4.248	1.062	0.2124		NA	0.02124	0.05310	0.1062	0.5310	1.062	2.124	5.310	10.62	NA	53.10
cis-1,3-Dichloropropene	1.116	223.2	22.32	4.464	1.116	0.2232		NA	0.02232	0.05580	0.1116	0.5580	1.116	2.232	5.580	11.16	NA	55.80

Primary Source Standards Concentrations (Working & Initial Calibration)

0.2ng/L Std. ID: | 20ng/L Std. ID: S29-02171708
1ng/L Std. ID: S29-03061701 | 200ng/L Std. ID: S29-03021703
4ng/L Std. ID: S29-03021708

Dilution Factors:		5	50	250	1000	5000	Working STD Conc.(ng/L):	NA	1	1	1	4	20	20	20	20		200
	Source Std.	Primary Working Standards					Injection (L):	NA	0.020	0.050	0.100	0.125	0.050	0.100	0.250	0.500	NA	0.250
Compounds	mg/m^3	200ng/L	20ng/L	4ng/L	1ng/L	0.2ng/L	ICAL Points:	0.01ng	0.02ng	0.05ng	0.1ng	0.5ng	1ng	2ng	5ng	10ng	20ng	50ng
4-Methyl-2-pentanone	1.058	211.6	21.16	4.232	1.058	0.2116		NA	0.02116	0.05290	0.1058	0.5290	1.058	2.116	5.290	10.58	NA	52.90
trans-1,3-Dichloropropene	1.064	212.8	21.28	4.256	1.064	0.2128		NA	0.02128	0.05320	0.1064	0.5320	1.064	2.128	5.320	10.64	NA	53.20
1,1,2-Trichloroethane	1.061	212.2	21.22	4.244	1.061	0.2122		NA	0.02122	0.05305	0.1061	0.5305	1.061	2.122	5.305	10.61	NA	53.05
Toluene	1.053	210.6	21.06	4.212	1.053	0.2106		NA	0.02106	0.05265	0.1053	0.5265	1.053	2.106	5.265	10.53	NA	52.65
2-Hexanone	1.061	212.2	21.22	4.244	1.061	0.2122		NA	0.02122	0.05305	0.1061	0.5305	1.061	2.122	5.305	10.61	NA	53.05
Dibromochloromethane	1.062	212.4	21.24	4.248	1.062	0.2124		NA	0.02124	0.05310	0.1062	0.5310	1.062	2.124	5.310	10.62	NA	53.10
1,2-Dibromoethane	1.056	211.2	21.12	4.224	1.056	0.2112		NA	0.02112	0.05280	0.1056	0.5280	1.056	2.112	5.280	10.56	NA	52.80
n-Butyl Acetate	1.064	212.8	21.28	4.256	1.064	0.2128		NA	0.02128	0.05320	0.1064	0.5320	1.064	2.128	5.320	10.64	NA	53.20
n-Octane	1.057	211.4	21.14	4.228	1.057	0.2114		NA	0.02114	0.05285	0.1057	0.5285	1.057	2.114	5.285	10.57	NA	52.85
Tetrachloroethene	1.061	212.2	21.22	4.244	1.061	0.2122		NA	0.02122	0.05305	0.1061	0.5305	1.061	2.122	5.305	10.61	NA	53.05
Chlorobenzene	1.061	212.2	21.22	4.244	1.061	0.2122		NA	0.02122	0.05305	0.1061	0.5305	1.061	2.122	5.305	10.61	NA	53.05
Ethylbenzene	1.055	211.0	21.10	4.220	1.055	0.2110		NA	0.02110	0.05275	0.1055	0.5275	1.055	2.110	5.275	10.55	NA	52.75
m-&p-Xylene	2.123	424.6	42.46	8.492	2.123	0.4246		NA	0.04246	0.10615	0.2123	1.0615	2.123	4.246	10.615	21.23	NA	106.15
Bromoform	1.063	212.6	21.26	4.252	1.063	0.2126		NA	0.02126	0.05315	0.1063	0.5315	1.063	2.126	5.315	10.63	NA	53.15
Styrene	1.061	212.2	21.22	4.244	1.061	0.2122		NA	0.02122	0.05305	0.1061	0.5305	1.061	2.122	5.305	10.61	NA	53.05
o-Xylene	1.054	210.8	21.08	4.216	1.054	0.2108		NA	0.02108	0.05270	0.1054	0.5270	1.054	2.108	5.270	10.54	NA	52.70
n-Nonane	1.054	210.8	21.08	4.216	1.054	0.2108		NA	0.02108	0.05270	0.1054	0.5270	1.054	2.108	5.270	10.54	NA	52.70
1,1,2,2-Tetrachloroethane	1.056	211.2	21.12	4.224	1.056	0.2112		NA	0.02112	0.05280	0.1056	0.5280	1.056	2.112	5.280	10.56	NA	52.80
Cumene	1.050	210.0	21.00	4.200	1.050	0.2100		NA	0.02100	0.05250	0.1050	0.5250	1.050	2.100	5.250	10.50	NA	52.50
alpha-Pinene	1.044	208.8	20.88	4.176	1.044	0.2088		NA	0.02088	0.05220	0.1044	0.5220	1.044	2.088	5.220	10.44	NA	52.20
n-Propylbenzene	1.063	212.6	21.26	4.252	1.063	0.2126		NA	0.02126	0.05315	0.1063	0.5315	1.063	2.126	5.315	10.63	NA	53.15
3-Ethyltoluene	1.050	210.0	21.00	4.200	1.050	0.2100		NA	0.02100	0.05250	0.1050	0.5250	1.050	2.100	5.250	10.50	NA	52.50
4-Ethyltoluene	1.049	209.8	20.98	4.196	1.049	0.2098		NA	0.02098	0.05245	0.1049	0.5245	1.049	2.098	5.245	10.49	NA	52.45
1,3,5-Trimethylbenzene	1.049	209.8	20.98	4.196	1.049	0.2098		NA	0.02098	0.05245	0.1049	0.5245	1.049	2.098	5.245	10.49	NA	52.45
alpha-Methylstyrene	1.050	210.0	21.00	4.200	1.050	0.2100		NA	0.02100	0.05250	0.1050	0.5250	1.050	2.100	5.250	10.50	NA	52.50
2-Ethyltoluene	1.062	212.4	21.24	4.248	1.062	0.2124		NA	0.02124	0.05310	0.1062	0.5310	1.062	2.124	5.310	10.62	NA	53.10
1,2,4-Trimethylbenzene	1.052	210.4	21.04	4.208	1.052	0.2104		NA	0.02104	0.05260	0.1052	0.5260	1.052	2.104	5.260	10.52	NA	52.60
n-Decane	1.053	210.6	21.06	4.212	1.053	0.2106		NA	0.02106	0.05265	0.1053	0.5265	1.053	2.106	5.265	10.53	NA	52.65
Benzyl Chloride	1.061	212.2	21.22	4.244	1.061	0.2122		NA	0.02122	0.05305	0.1061	0.5305	1.061	2.122	5.305	10.61	NA	53.05
1,3-Dichlorobenzene	1.058	211.6	21.16	4.232	1.058	0.2116		NA	0.02116	0.05290	0.1058	0.5290	1.058	2.116	5.290	10.58	NA	52.90
1,4-Dichlorobenzene	1.058	211.6	21.16	4.232	1.058	0.2116		NA	0.02116	0.05290	0.1058	0.5290	1.058	2.116	5.290	10.58	NA	52.90
sec-Butylbenzene	1.054	210.8	21.08	4.216	1.054	0.2108		NA	0.02108	0.05270	0.1054	0.5270	1.054	2.108	5.270	10.54	NA	52.70
p-Isopropyltoluene	1.027	205.4	20.54	4.108	1.027	0.2054		NA	0.02054	0.05135	0.1027	0.5135	1.027	2.054	5.135	10.27	NA	51.35
1,2,3-Trimethylbenzene	1.027	205.4	20.54	4.108	1.027	0.2054		NA	0.02054	0.05135	0.1027	0.5135	1.027	2.054	5.135	10.27	NA	51.35
1,2-Dichlorobenzene	1.058	211.6	21.16	4.232	1.058	0.2116		NA	0.02116	0.05290	0.1058	0.5290	1.058	2.116	5.290	10.58	NA	52.90
d-Limonene	1.005	201.0	20.10	4.020	1.005	0.2010		NA	0.02010	0.05025	0.1005	0.5025	1.005	2.010	5.025	10.05	NA	50.25
1,2-Dibromo-3-chloropropane	1.053	210.6	21.06	4.212	1.053	0.2106		NA	0.02106	0.05265	0.1053	0.5265	1.053	2.106	5.265	10.53	NA	52.65
n-Undecane	1.054	210.8	21.08	4.216	1.054	0.2108		NA	0.02108	0.05270	0.1054	0.5270	1.054	2.108	5.270	10.54	NA	52.70
1,2,4-Trichlorobenzene	1.043	208.6	20.86	4.172	1.043	0.2086		NA	0.02086	0.05215	0.1043	0.5215	1.043	2.086	5.215	10.43	NA	52.15
Naphthalene	1.083	216.6	21.66	4.332	1.083	0.2166		NA	0.02166	0.05415	0.1083	0.5415	1.083	2.166	5.415	10.83	NA	54.15
n-Dodecane	1.045	209.0	20.90	4.180	1.045	0.2090		NA	0.02090	0.05225	0.1045	0.5225	1.045	2.090	5.225	10.45	NA	52.25
Hexachloro-1,3-butadiene	1.059	211.8	21.18	4.236	1.059	0.2118		NA	0.02118	0.05295	0.1059	0.5295	1.059	2.118	5.295	10.59	NA	52.95
Methacrylonitrile	1.065	213.0	21.30	4.260	1.065	0.2130		NA	0.02130	0.05325	0.1065	0.5325	1.065	2.130	5.325	10.65	NA	53.25
Cyclohexanone	1.056	211.2	21.12	4.224	1.056	0.2112		NA	0.02112	0.05280	0.1056	0.5280	1.056	2.112	5.280	10.56	NA	52.80
tert-Butylbenzene	1.051	210.2	21.02	4.204	1.051	0.2102		NA	0.02102	0.05255	0.1051	0.5255	1.051	2.102	5.255	10.51	NA	52.55
n-Butylbenzene	1.056	211.2	21.12	4.224	1.056	0.2112		NA	0.02112	0.05280	0.1056	0.5280	1.056	2.112	5.280	10.56	NA	52.80

Calibration Status Report MS19

Method : I:\MS19\METHODS\S19030617.M (RTE Integrator)
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration

CL 3/7/17

#	ID	Conc	ISTD Conc	Path\File
1	20	1000	1000	I:\MS19\DATA\2017_03\06\03061703.D
2	50	1000	1000	I:\MS19\DATA\2017_03\06\03061704.D
3	100	1000	1000	I:\MS19\DATA\2017_03\06\03061705.D
4	500	1000	1000	I:\MS19\DATA\2017_03\06\03061706.D
5	1000	1000	1000	I:\MS19\DATA\2017_03\06\03061707.D
6	2000	1000	1000	I:\MS19\DATA\2017_03\06\03061708.D
7	5000	1000	1000	I:\MS19\DATA\2017_03\06\03061709.D
8	10K	1000	1000	I:\MS19\DATA\2017_03\06\03061710.D
9	50K	1000	1000	I:\MS19\DATA\2017_03\06\03061717.D

#	ID	Update Time	Quant Time	Acquisition Time
1	20	Mar 07 08:39 2017	Mar 07 07:18 2017	6 Mar 2017 16:03
2	50	Mar 07 08:40 2017	Mar 07 07:21 2017	6 Mar 2017 16:35
3	100	Mar 07 08:40 2017	Mar 07 07:11 2017	6 Mar 2017 17:06
4	500	Mar 07 08:40 2017	Mar 07 07:11 2017	6 Mar 2017 17:37
5	1000	Mar 07 08:40 2017	Mar 07 07:11 2017	6 Mar 2017 18:09
6	2000	Mar 07 08:40 2017	Mar 07 07:11 2017	6 Mar 2017 18:40
7	5000	Mar 07 08:40 2017	Mar 07 07:11 2017	6 Mar 2017 19:11
8	10K	Mar 07 08:40 2017	Mar 07 07:11 2017	6 Mar 2017 19:42
9	50K	Mar 07 08:40 2017	Mar 07 08:36 2017	7 Mar 2017 08:11

S19030617.M Tue Mar 07 14:05:32 2017

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061703.D Vial: 12
Acq On : 6 Mar 2017 16:03 Operator: CL
Sample : 20pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

Quant Time: Mar 07 07:18:52 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/7/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.78	130	41369	1000.000 pg	0.02
25) 1,4-Difluorobenzene (IS2)	11.72	114	197738	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.06	54	40957	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.55	65	81631	1029.919 pg	0.02
Spiked Amount 1000.000	Range 70 - 130		Recovery = 102.99%		
33) Toluene-d8 (SS2)	14.15	98	201615	988.764 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 98.88%		
45) Bromofluorobenzene (SS3)	17.56	174	65298	955.190 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 95.52%		

Target Compounds

						Qvalue
2) Dichlorodifluoromethan...	4.45	85	3421	32.810 pg		99
3) Chloromethane	4.70	52	1370	51.553 pg		98
4) 1,2-Dichloro,1,1,2,2-t...	4.83	85	3936	36.500 pg		99
5) Vinyl Chloride	5.01	62	2912	30.280 pg		82
6) 1,3-Butadiene	5.21	54	1341	24.263 pg		88
7) Bromomethane	5.52	94	1089m	32.169 pg		
8) Chloroethane	5.74	64	730	27.164 pg		97
9) Acrolein	6.37	56	971m	44.165 pg		
10) Acetone	6.47	58	7295	254.698 pg		95
11) Trichlorofluoromethane	6.64	101	2459	30.452 pg		94
12) 1,1-Dichloroethene	7.39	96	1273	28.824 pg		94
13) Methylene Chloride	7.51	84	2434	50.735 pg		96
14) Trichlorotrifluoroethane	7.82	151	1333	32.665 pg		98
15) trans-1,2-Dichloroethene	8.55	96	1451m	30.973 pg		
16) 1,1-Dichloroethane	8.75	63	2561	30.755 pg		99
17) Methyl tert-Butyl Ether	8.82	73	4380	30.963 pg		98
18) cis-1,2-Dichloroethene	9.62	96	1438	28.853 pg		100
19) Chloroform	9.91	83	4897	53.722 pg		99
21) 1,2-Dichloroethane	10.66	62	2283	31.450 pg		98
22) 1,1,1-Trichloroethane	10.92	97	2727	33.486 pg		97
23) Benzene	11.38	78	9765	50.255 pg		99
24) Carbon Tetrachloride	11.53	117	2342	33.225 pg		98
26) 1,2-Dichloropropane	12.19	63	1424	31.273 pg		98
27) Bromodichloromethane	12.37	83	2079	32.033 pg		99
28) Trichloroethene	12.42	130	1518	31.820 pg		99
29) 1,4-Dioxane	12.42	88	993	26.395 pg		98
30) cis-1,3-Dichloropropene	13.27	75	1885	27.660 pg		96
31) trans-1,3-Dichloropropene	13.80	75	1380	23.511 pg	#	67
32) 1,1,2-Trichloroethane	13.96	83	1196	31.128 pg		99
34) Toluene	14.25	91	6312	33.212 pg		100
35) Dibromochloromethane	14.67	129	1381	28.784 pg		100
36) 1,2-Dibromoethane	14.94	107	1314	27.356 pg		99
37) Tetrachloroethene	15.41	166	1576	32.023 pg		99
39) Chlorobenzene	16.11	112	3899	30.554 pg		99
40) Ethylbenzene	16.49	91	5931	27.228 pg		99
41) m,p-Xylene	16.67	91	8687	51.072 pg		97
42) Styrene	17.02	104	2497	20.951 pg		99
43) o-Xylene	17.13	106	2131	26.172 pg		96
44) 1,1,2,2-Tetrachloroethane	17.10	83	2252	27.047 pg		99
46) 1,3,5-Trimethylbenzene	18.38	105	3721	20.805 pg		93
47) 1,2,4-Trimethylbenzene	18.78	105	4044	21.914 pg		100
48) 1,3-Dichlorobenzene	18.93	146	2049	20.523 pg		99
49) 1,4-Dichlorobenzene	18.99	146	2573	25.170 pg		96
50) 1,2-Dichlorobenzene	19.32	146	2394	23.785 pg		99
51) 1,2-Dibromo-3-chloropr...	19.74	157	513	16.098 pg		99
52) 1,2,4-Trichlorobenzene	20.99	182	1427	23.828 pg		86
53) Naphthalene	21.13	128	4476	23.348 pg		88

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061703.D Vial: 12
Acq On : 6 Mar 2017 16:03 Operator: CL
Sample : 20pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

Quant Time: Mar 07 07:18:52 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

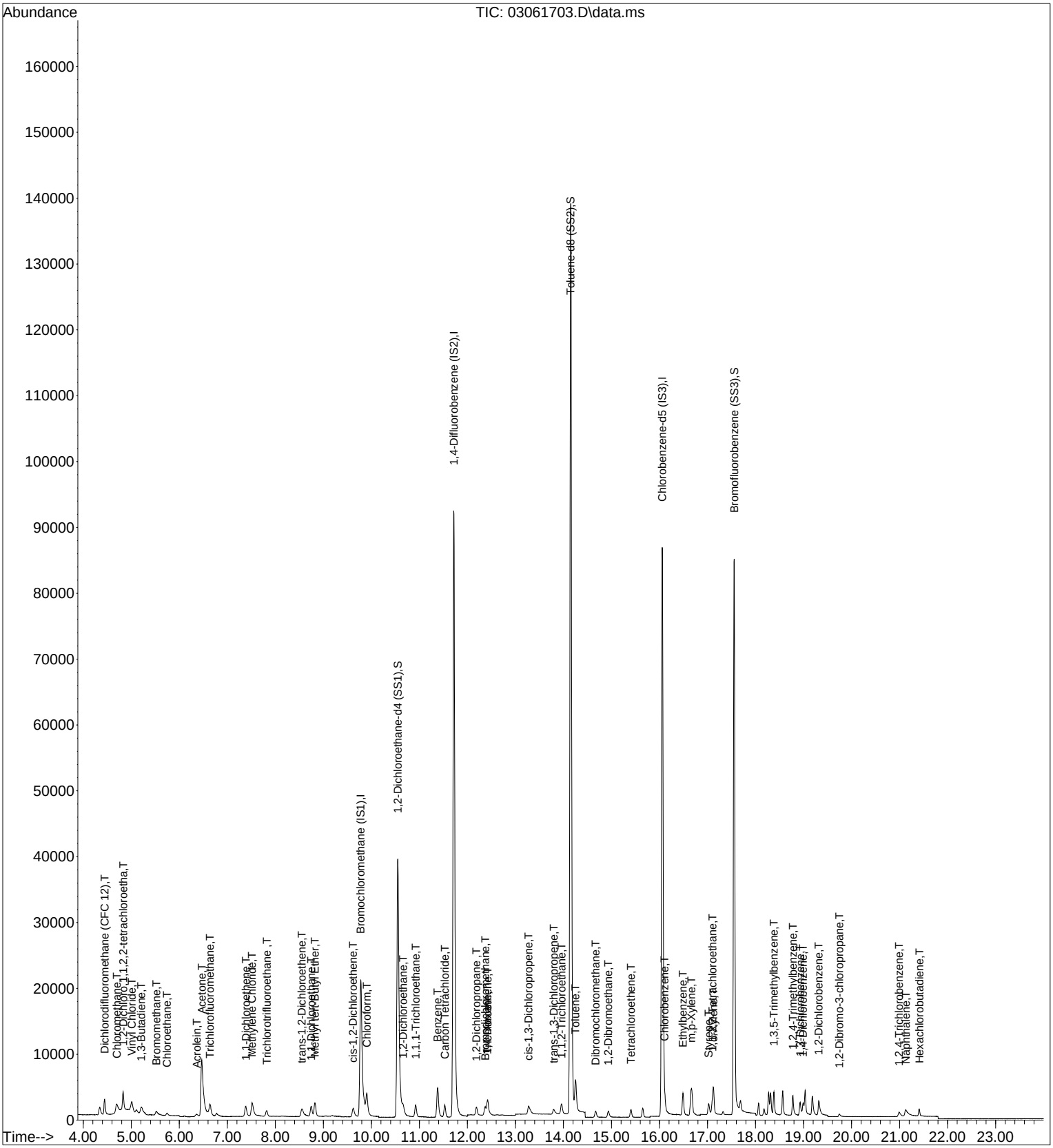
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
54) Hexachlorobutadiene	21.41	225	1187	29.101	pg	99

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061703.D Vial: 12
Acq On : 6 Mar 2017 16:03 Operator: CL
Sample : 20pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

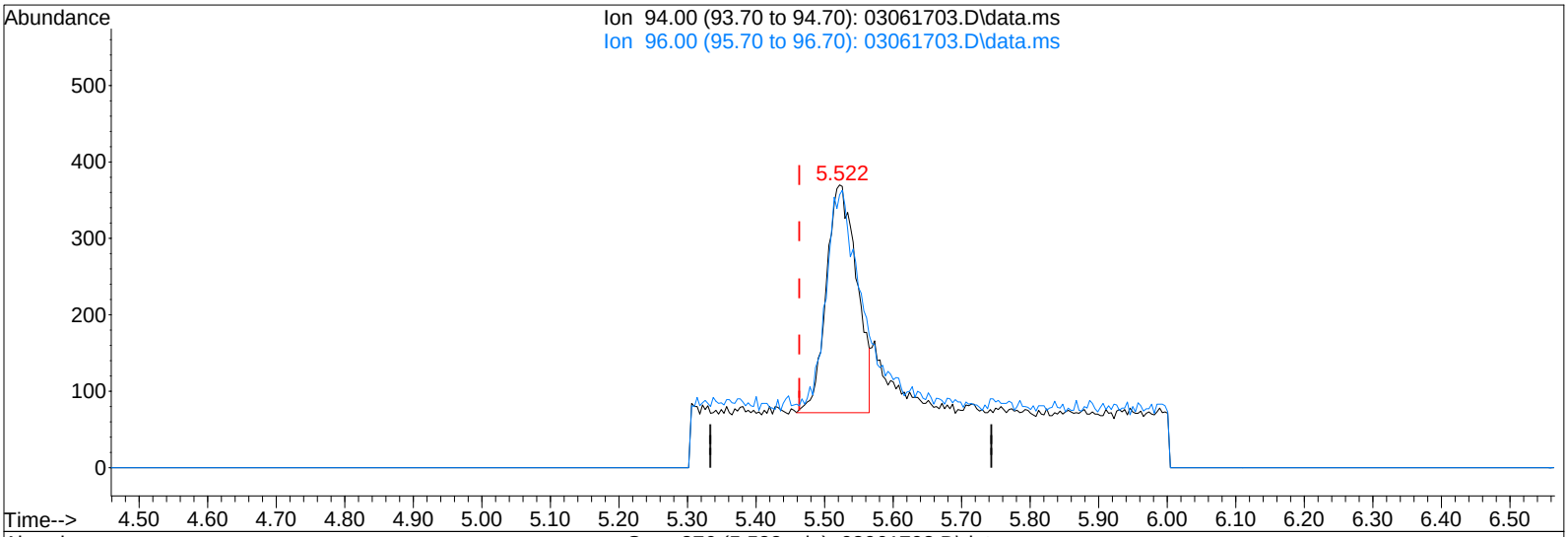
Quant Time: Mar 07 07:18:52 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

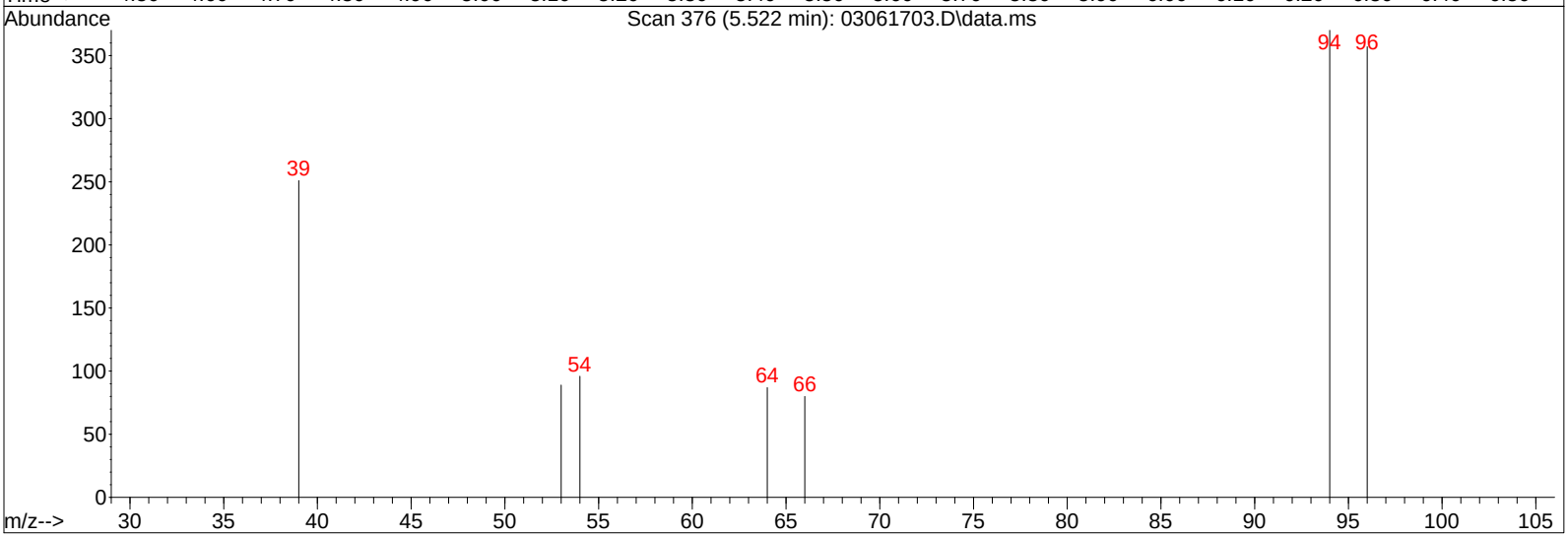


Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\06\03061703.D Vial: 12
Acq On : 6 Mar 2017 16:03 Operator: CL
Sample : 20pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

Quant Time: Mar 07 07:11:27 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M





TIC: 03061703.D\data.ms

(7) Bromomethane (T)

5.522min (+0.059) 27.27pg

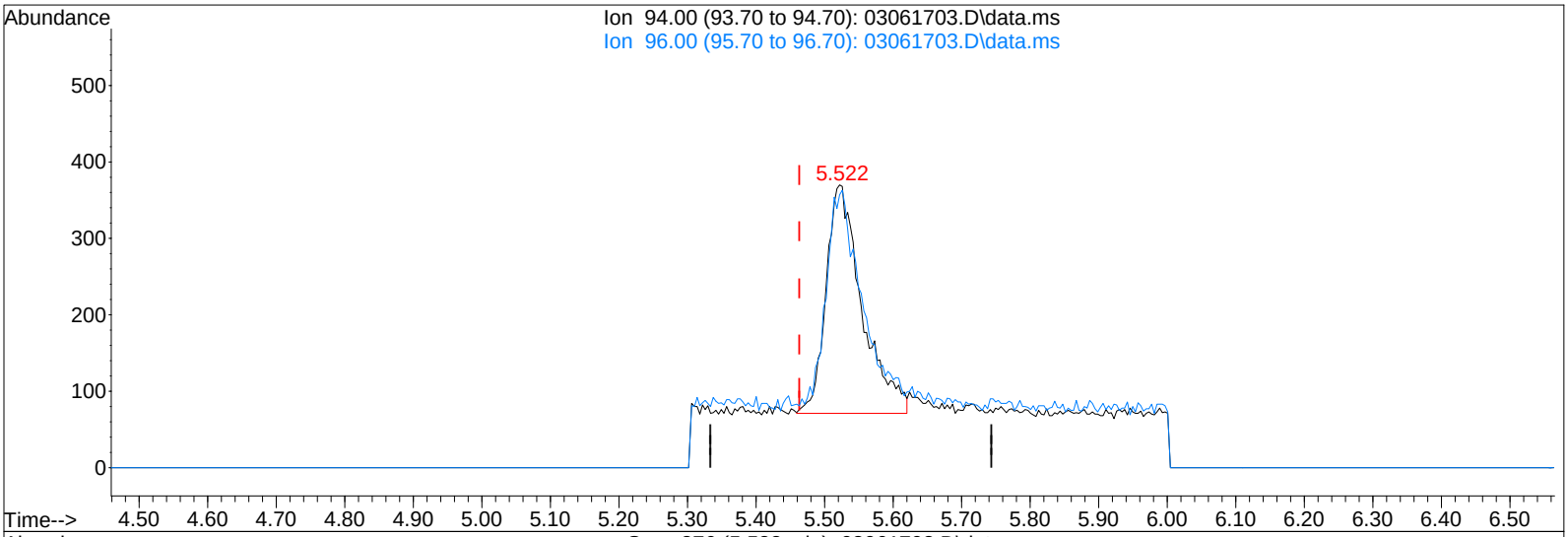
response 923

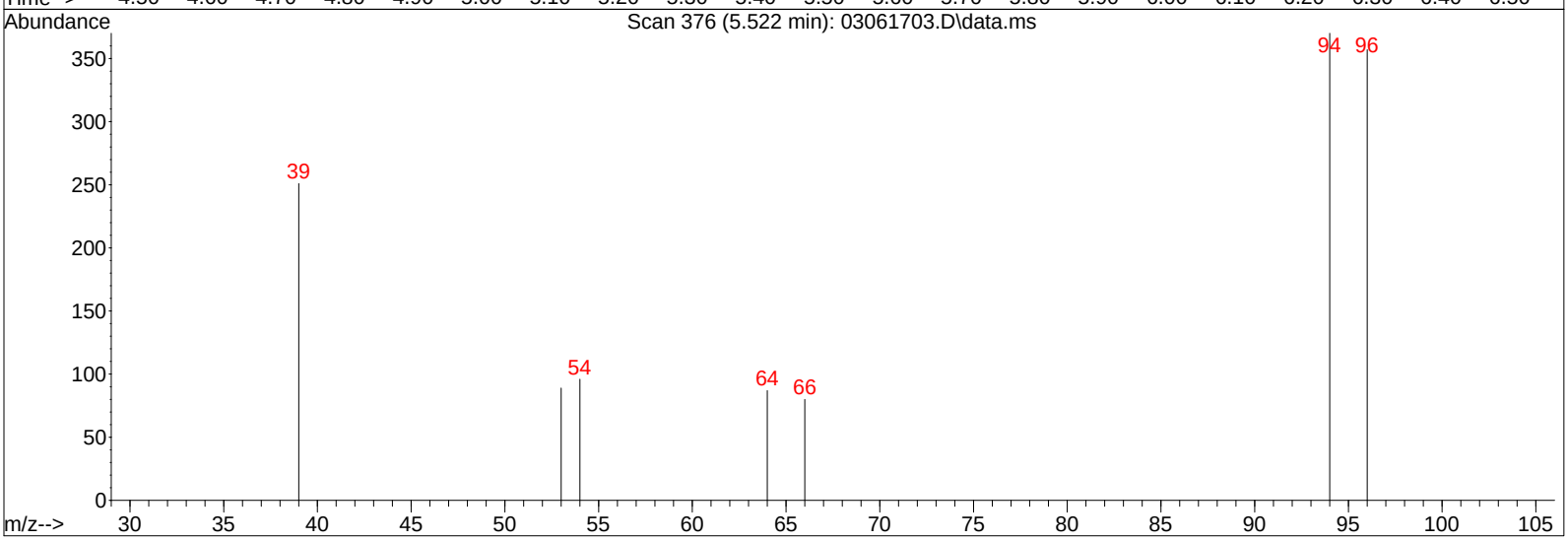
Ion	Exp%	Act%
94.00	100	100
96.00	93.80	53.09#
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\06\03061703.D Vial: 12
Acq On : 6 Mar 2017 16:03 Operator: CL
Sample : 20pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

Quant Time: Mar 07 07:11:27 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M





TIC: 03061703.D\data.ms

(7) Bromomethane (T)

5.522min (+0.059) 32.17pg m

response 1089

Ion	Exp%	Act%
94.00	100	100
96.00	93.80	45.00#
0.00	0.00	0.00
0.00	0.00	0.00

BLC

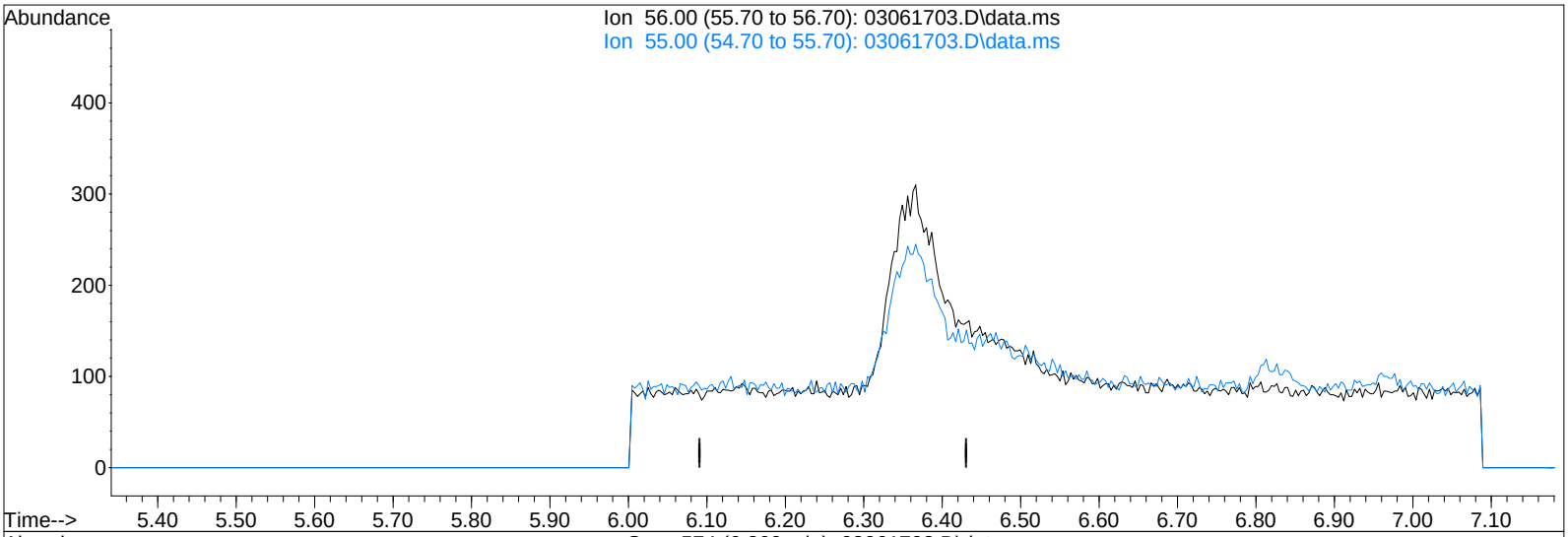
CL 3/7/17

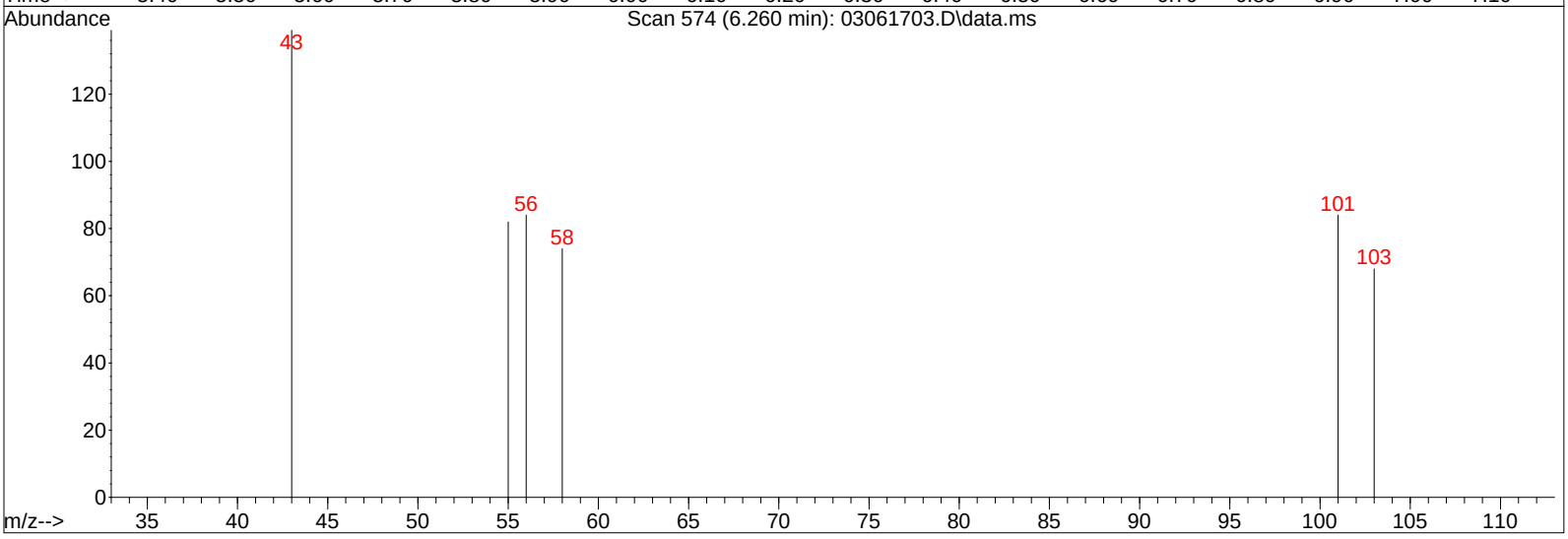
LH 3/8/17

Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\06\03061703.D Vial: 12
Acq On : 6 Mar 2017 16:03 Operator: CL
Sample : 20pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

Quant Time: Mar 07 07:11:27 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M





TIC: 03061703.D\data.ms

(9) Acrolein (T)

6.261min (-6.261) 0.00pg

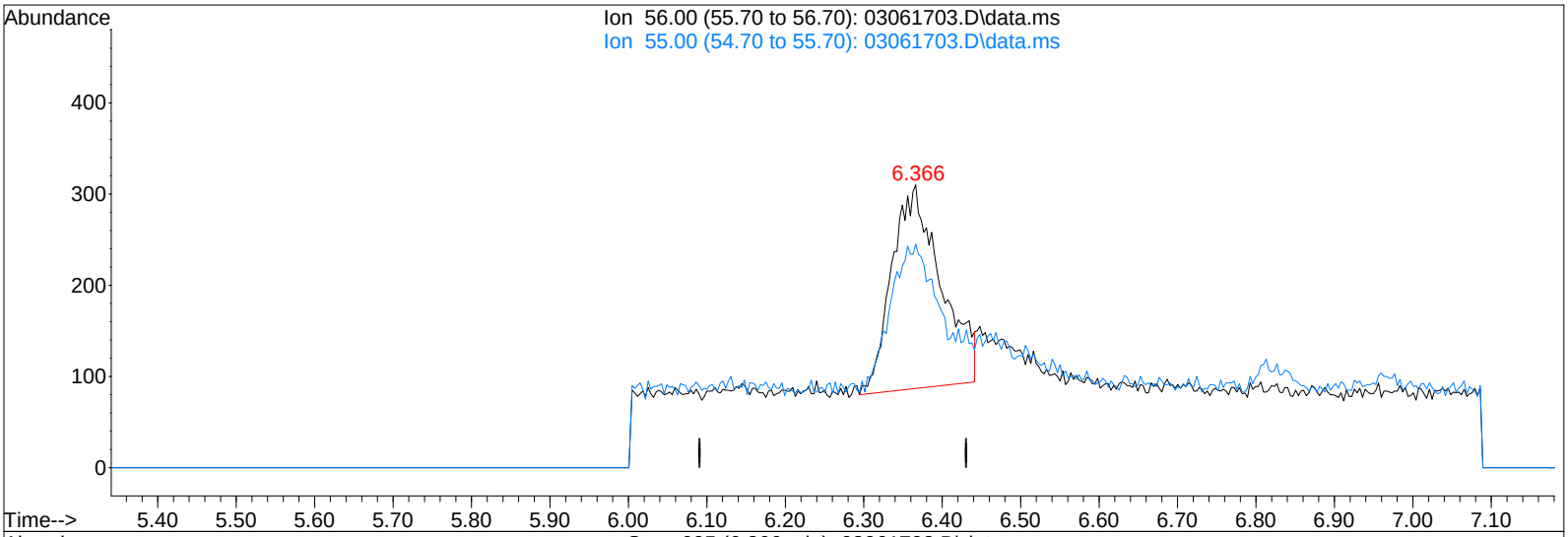
response 0

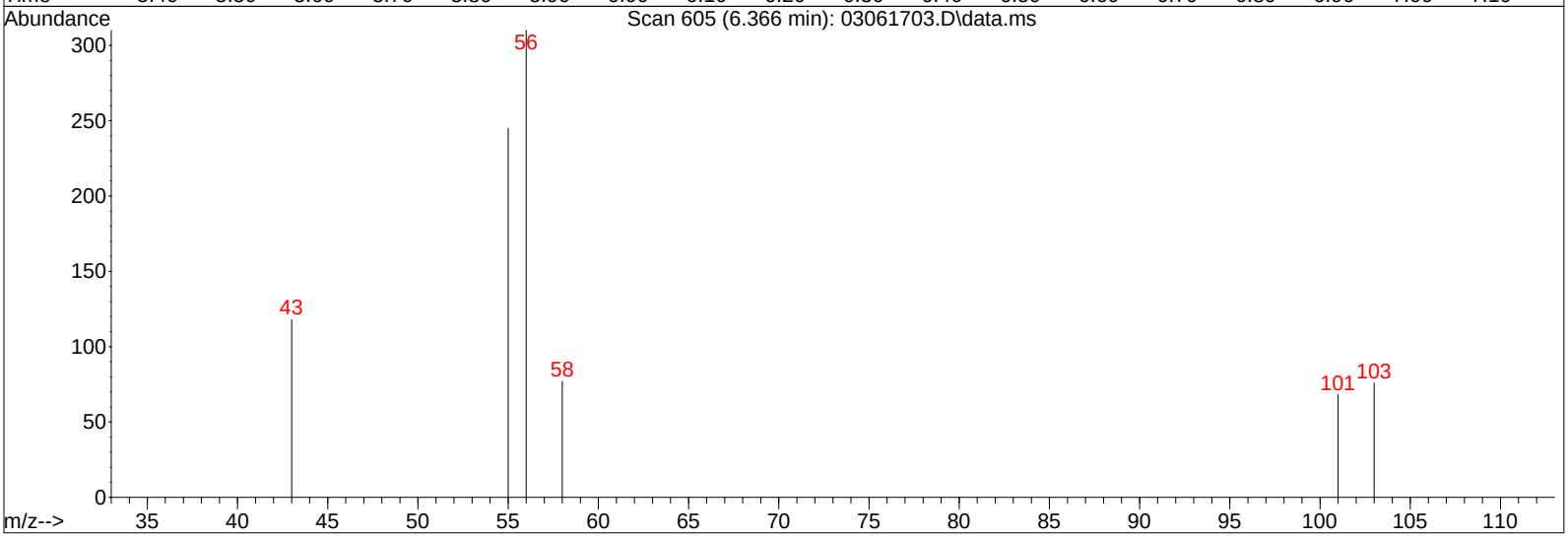
Ion	Exp%	Act%
56.00	100	0.00
55.00	64.20	0.00#
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\06\03061703.D Vial: 12
Acq On : 6 Mar 2017 16:03 Operator: CL
Sample : 20pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

Quant Time: Mar 07 07:11:27 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M





TIC: 03061703.D\data.ms

(9) Acrolein (T)

6.366min (+0.106) 44.17pg m

response 971

Ion	Exp%	Act%
56.00	100	100
55.00	64.20	0.00#
0.00	0.00	0.00
0.00	0.00	0.00

MP

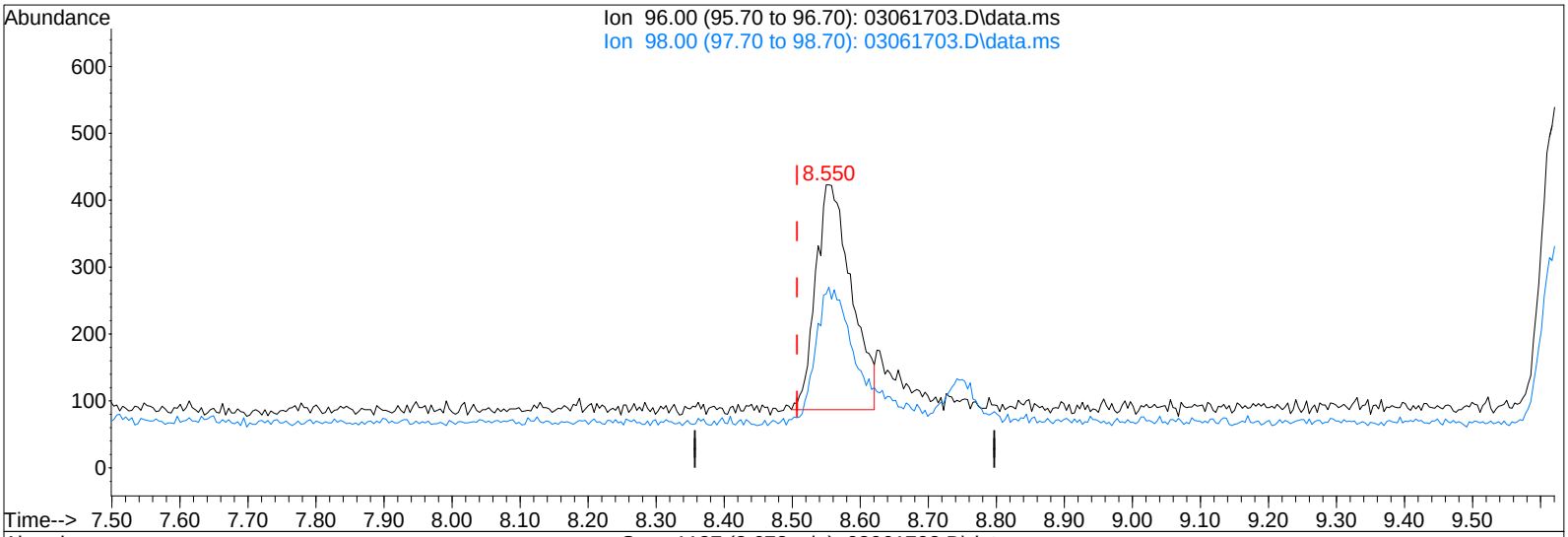
CL 3/7/17

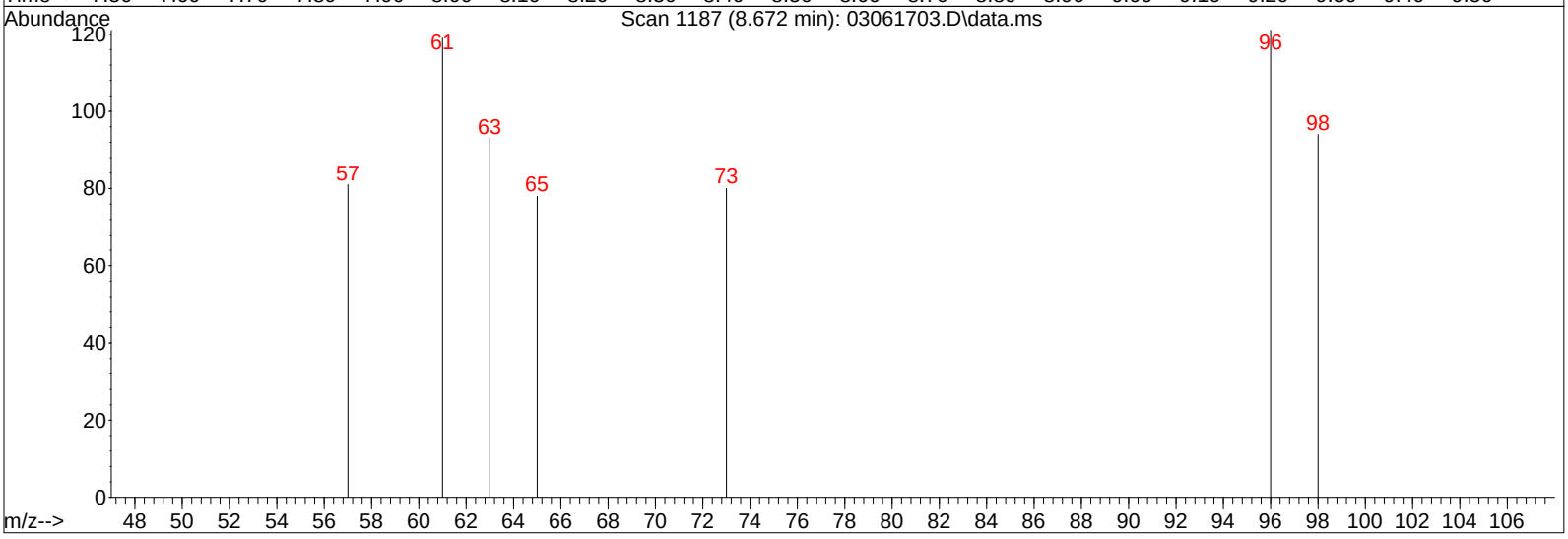
LH 3/8/17

Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\06\03061703.D Vial: 12
Acq On : 6 Mar 2017 16:03 Operator: CL
Sample : 20pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

Quant Time: Mar 07 07:11:27 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M





TIC: 03061703.D\data.ms

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

8.550min (+0.043) 26.19pg

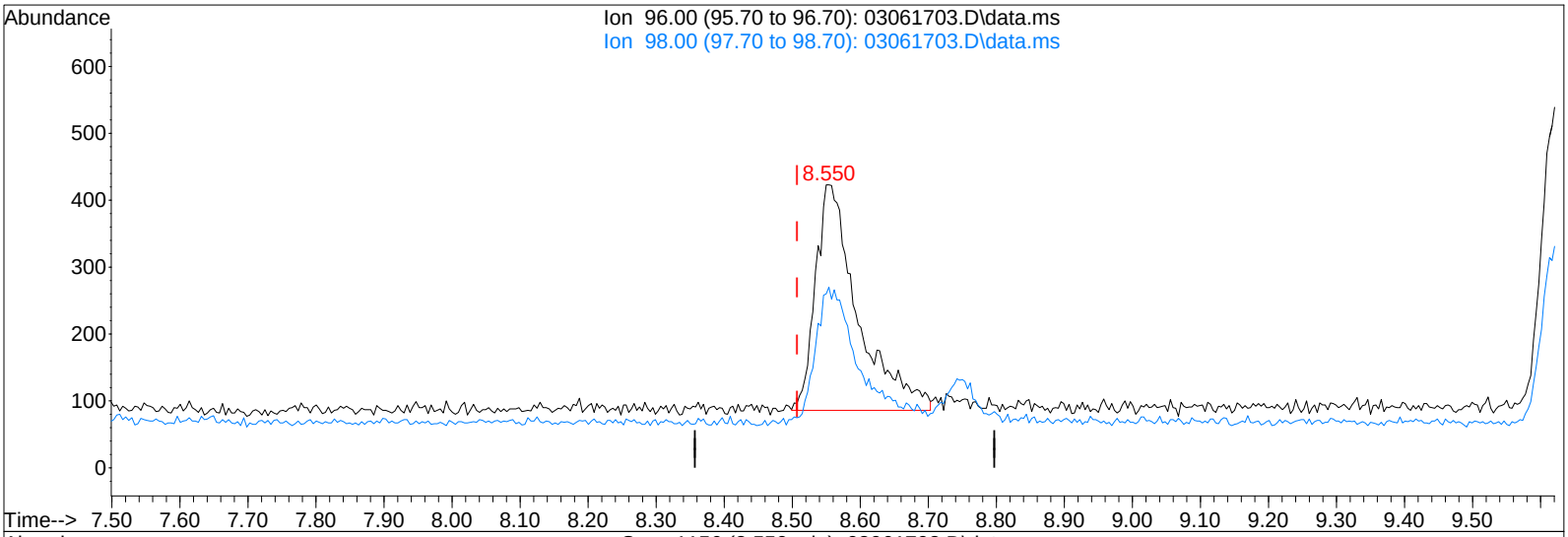
response 1227

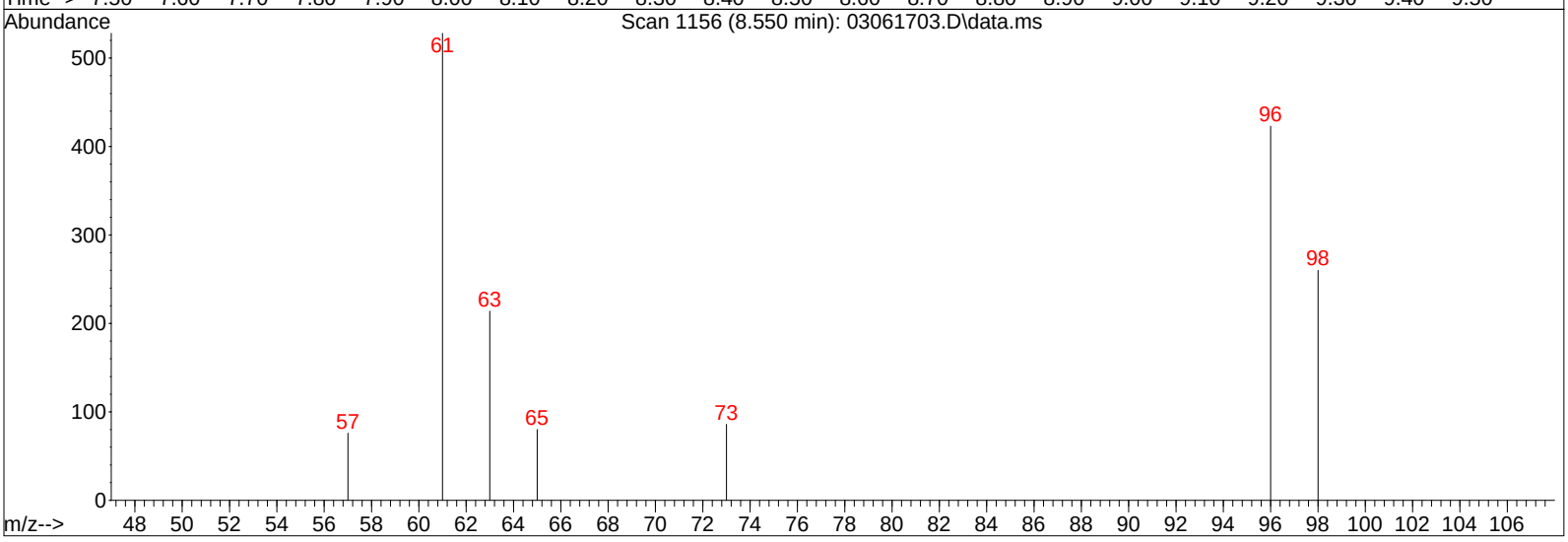
Ion	Exp%	Act%
96.00	100	100
98.00	62.50	59.09
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\06\03061703.D Vial: 12
Acq On : 6 Mar 2017 16:03 Operator: CL
Sample : 20pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

Quant Time: Mar 07 07:11:27 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M





TIC: 03061703.D\data.ms

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

8.550min (+0.043) 30.97pg m

response 1451

Ion	Exp%	Act%
96.00	100	100
98.00	62.50	49.97
0.00	0.00	0.00
0.00	0.00	0.00

BLC

CL 3/7/17

LH 3/8/17

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061704.D Vial: 12
Acq On : 6 Mar 2017 16:35 Operator: CL
Sample : 50pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

Quant Time: Mar 07 07:21:29 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/7/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.78	130	40257	1000.000 pg	0.02
25) 1,4-Difluorobenzene (IS2)	11.72	114	191669	1000.000 pg	0.01
38) Chlorobenzene-d5 (IS3)	16.06	54	39355	1000.000 pg	0.00
System Monitoring Compounds					
20) 1,2-Dichloroethane-d4 ...	10.55	65	79650	1032.683 pg	0.02
Spiked Amount 1000.000	Range 70 - 130		Recovery = 103.27%		
33) Toluene-d8 (SS2)	14.15	98	194279	982.956 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 98.30%		
45) Bromofluorobenzene (SS3)	17.56	174	64089	975.667 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 97.57%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.44	85	7686	75.751 pg	99
3) Chloromethane	4.69	52	2763	106.843 pg	93
4) 1,2-Dichloro,1,1,2,2-t...	4.82	85	8435	80.382 pg	99
5) Vinyl Chloride	5.00	62	7532	80.484 pg	95
6) 1,3-Butadiene	5.20	54	2928	54.441 pg	93
7) Bromomethane	5.51	94	2186	66.359 pg	100
8) Chloroethane	5.74	64	1814	69.366 pg	98
9) Acrolein	6.35	56	1746m	81.609 pg	
10) Acetone	6.46	58	13146	471.658 pg	94
11) Trichlorofluoromethane	6.63	101	5615	71.456 pg	99
12) 1,1-Dichloroethene	7.38	96	2956	68.780 pg	99
13) Methylene Chloride	7.51	84	3823	81.889 pg	99
14) Trichlorotrifluoroethane	7.81	151	2923	73.606 pg	99
15) trans-1,2-Dichloroethene	8.55	96	3171	69.559 pg	98
16) 1,1-Dichloroethane	8.74	63	5673	70.010 pg	99
17) Methyl tert-Butyl Ether	8.82	73	9551	69.384 pg	100
18) cis-1,2-Dichloroethene	9.62	96	3373	69.546 pg	92
19) Chloroform	9.90	83	7971	89.860 pg	99
21) 1,2-Dichloroethane	10.66	62	5130	72.622 pg	89
22) 1,1,1-Trichloroethane	10.92	97	5691	71.813 pg	98
23) Benzene	11.38	78	15552	82.248 pg	100
24) Carbon Tetrachloride	11.53	117	4969	72.441 pg	100
26) 1,2-Dichloropropane	12.19	63	3185	72.162 pg	98
27) Bromodichloromethane	12.37	83	4532	72.040 pg	99
28) Trichloroethene	12.42	130	3301	71.385 pg	99
29) 1,4-Dioxane	12.40	88	2304	63.183 pg	99
30) cis-1,3-Dichloropropene	13.27	75	4315	65.323 pg	100
31) trans-1,3-Dichloropropene	13.79	75	3161	55.559 pg	95
32) 1,1,2-Trichloroethane	13.96	83	2638	70.832 pg	98
34) Toluene	14.25	91	12826	69.624 pg	99
35) Dibromochloromethane	14.67	129	2884	62.015 pg	99
36) 1,2-Dibromoethane	14.93	107	3005	64.542 pg	99
37) Tetrachloroethene	15.40	166	3456	72.446 pg	100
39) Chlorobenzene	16.11	112	8377	68.317 pg	97
40) Ethylbenzene	16.49	91	13095	62.563 pg	100
41) m,p-Xylene	16.67	91	19287m	118.007 pg	
42) Styrene	17.02	104	5637	49.223 pg	99
43) o-Xylene	17.12	106	4641	59.319 pg	100
44) 1,1,2,2-Tetrachloroethane	17.10	83	5062	63.270 pg	99
46) 1,3,5-Trimethylbenzene	18.38	105	9583	55.761 pg	100
47) 1,2,4-Trimethylbenzene	18.77	105	9300	52.447 pg	99
48) 1,3-Dichlorobenzene	18.93	146	5576	58.124 pg	99
49) 1,4-Dichlorobenzene	18.99	146	6068	61.775 pg	97
50) 1,2-Dichlorobenzene	19.31	146	5686	58.791 pg	99
51) 1,2-Dibromo-3-chloropr...	19.73	157	1333	43.533 pg	96
52) 1,2,4-Trichlorobenzene	20.98	182	3485	60.561 pg	99
53) Naphthalene	21.11	128	10728	58.239 pg	93

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061704.D Vial: 12
Acq On : 6 Mar 2017 16:35 Operator: CL
Sample : 50pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

Quant Time: Mar 07 07:21:29 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

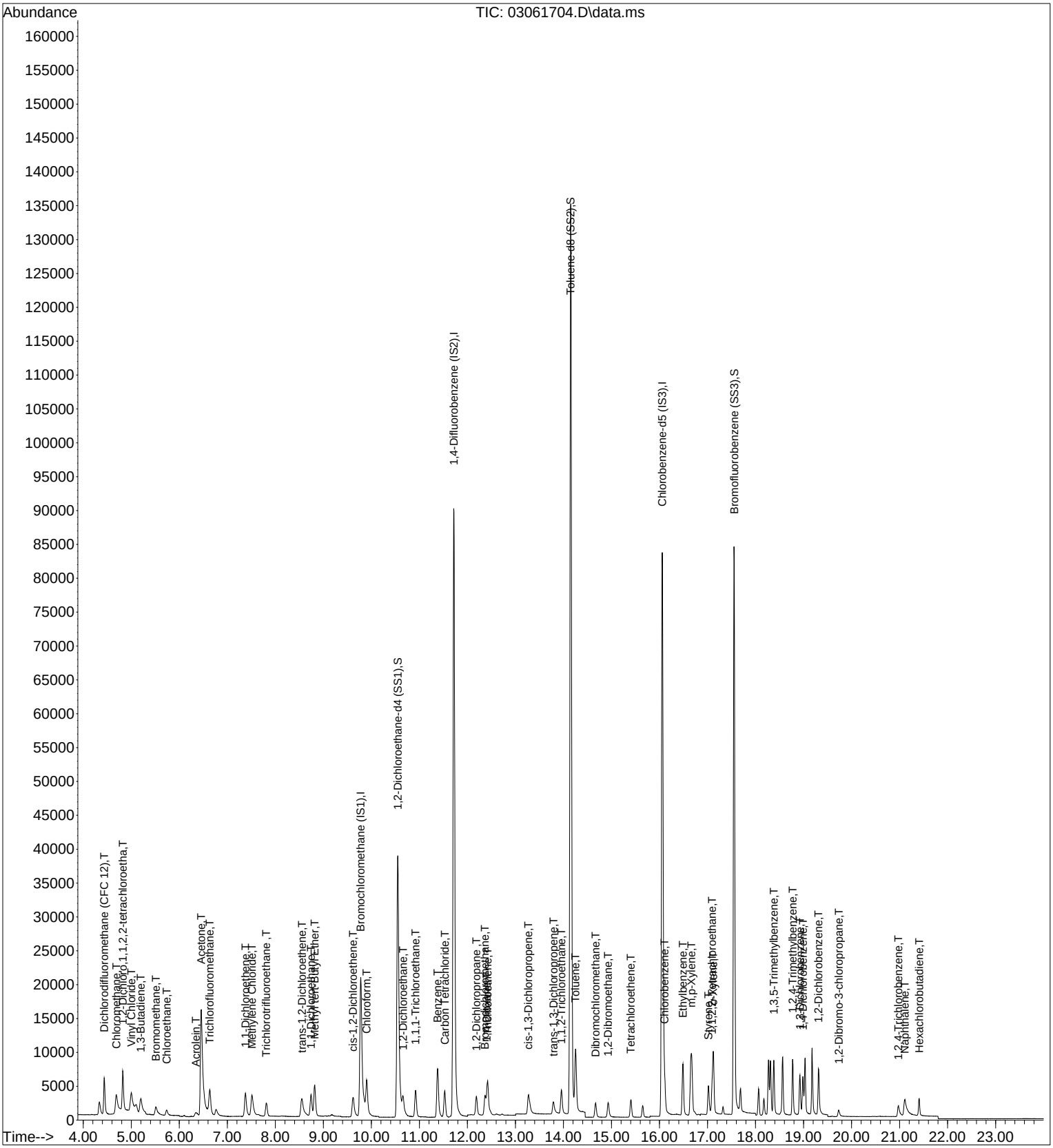
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
54) Hexachlorobutadiene	21.41	225	2673	68.201	pg	99

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061704.D Vial: 12
Acq On : 6 Mar 2017 16:35 Operator: CL
Sample : 50pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

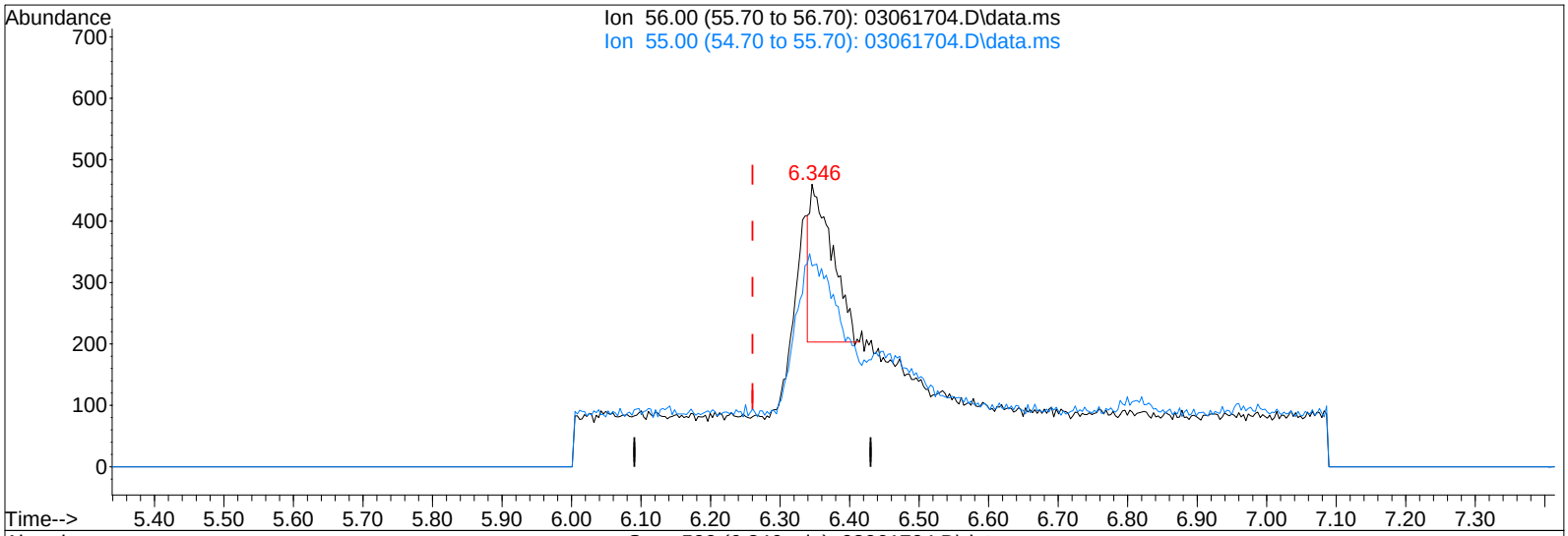
Quant Time: Mar 07 07:21:29 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

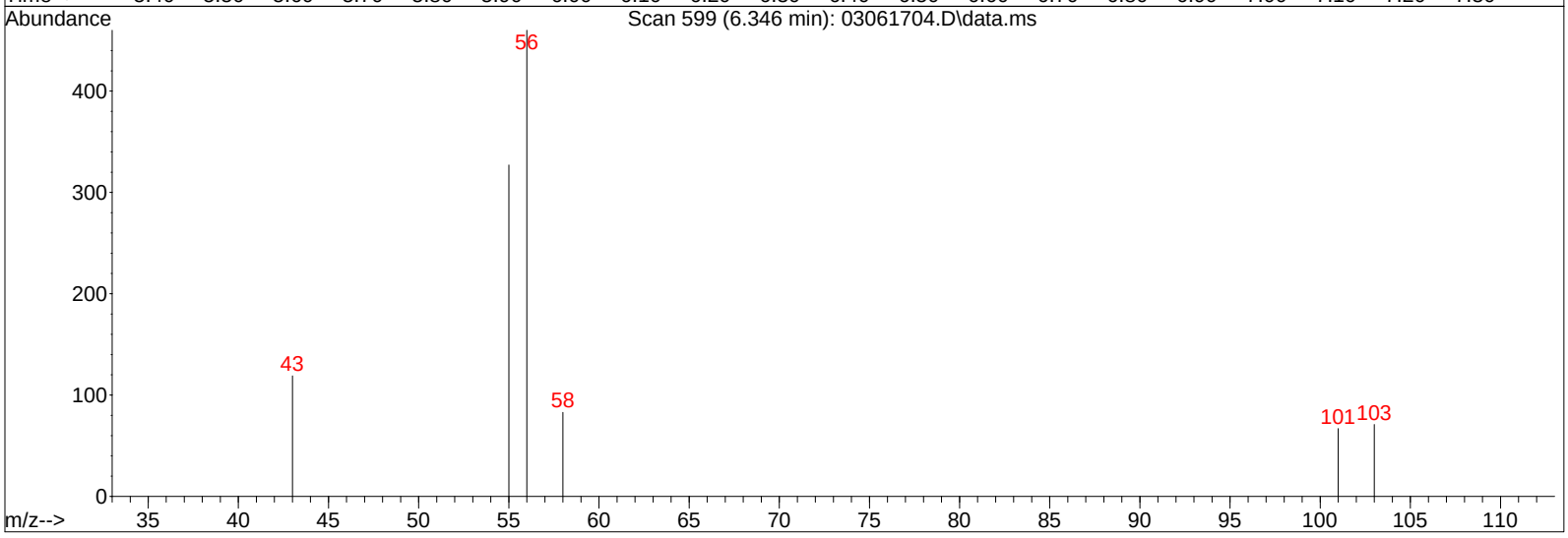


Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\06\03061704.D Vial: 12
Acq On : 6 Mar 2017 16:35 Operator: CL
Sample : 50pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

Quant Time: Mar 07 07:11:28 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M





TIC: 03061704.D\data.ms

(9) Acrolein (T)

6.346min (+0.085) 27.16pg

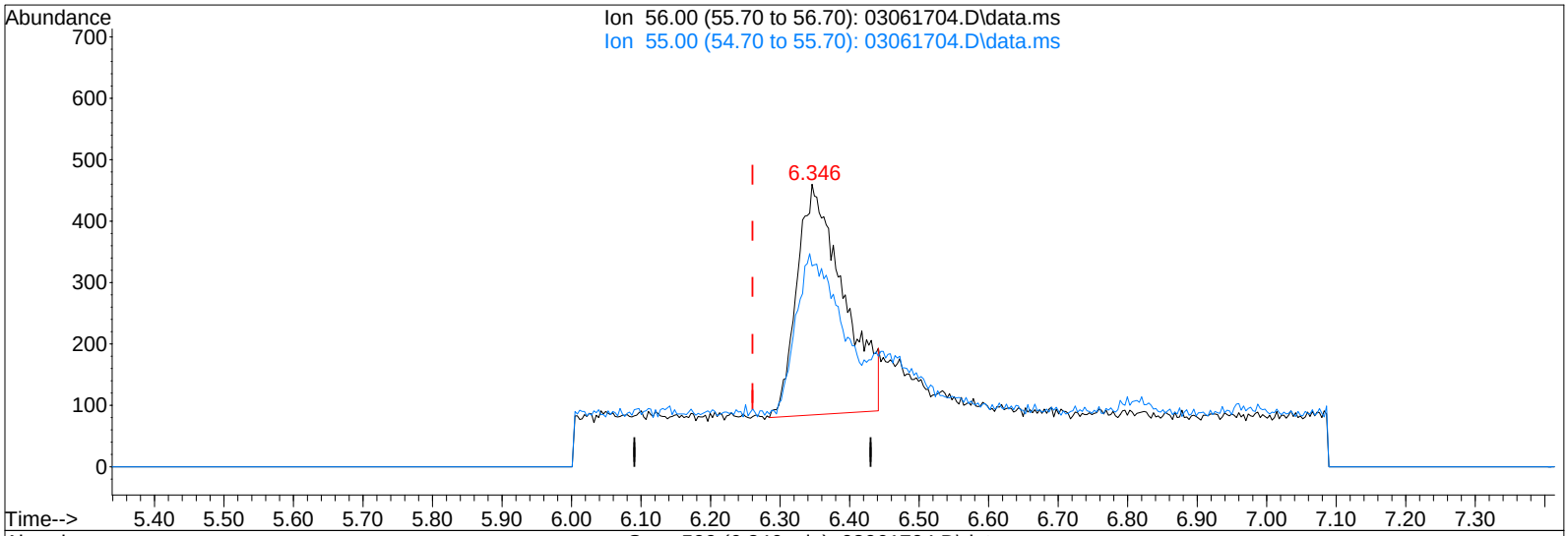
response 581

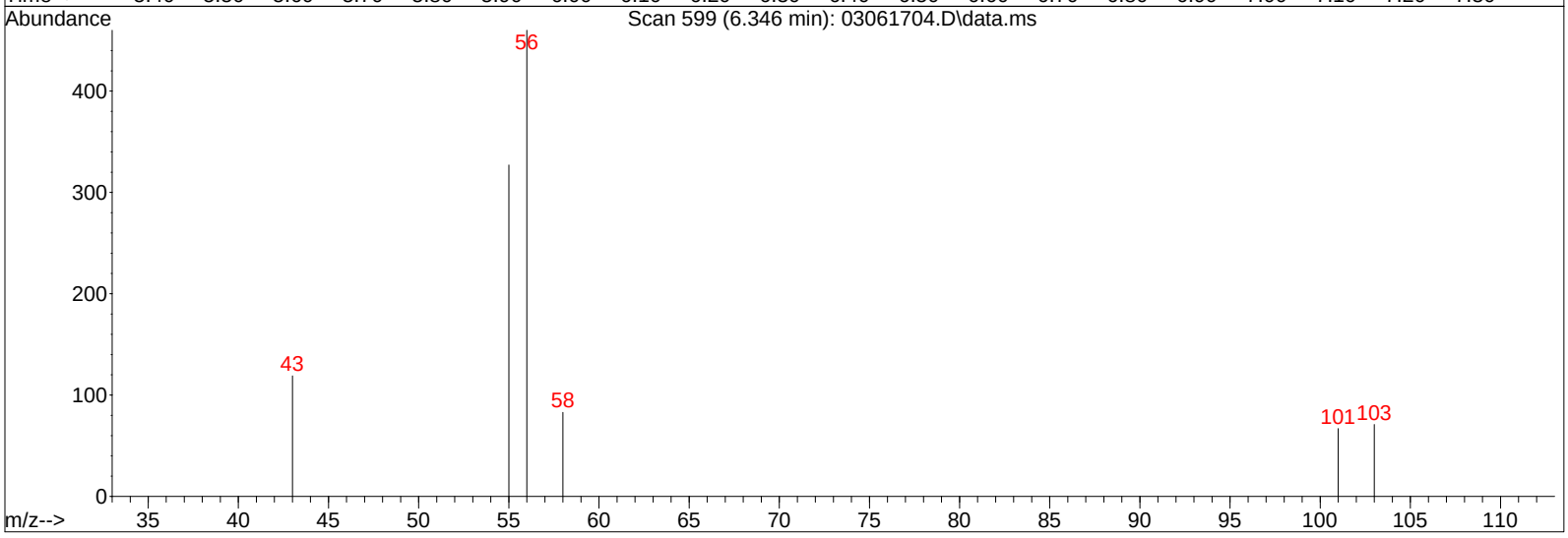
Ion	Exp%	Act%
56.00	100	100
55.00	64.20	206.88#
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\06\03061704.D Vial: 12
Acq On : 6 Mar 2017 16:35 Operator: CL
Sample : 50pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

Quant Time: Mar 07 07:11:28 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M





TIC: 03061704.D\data.ms

(9) Acrolein (T)

6.346min (+0.085) 81.61pg m

response 1746

Ion	Exp%	Act%
56.00	100	100
55.00	64.20	68.84
0.00	0.00	0.00
0.00	0.00	0.00

SP

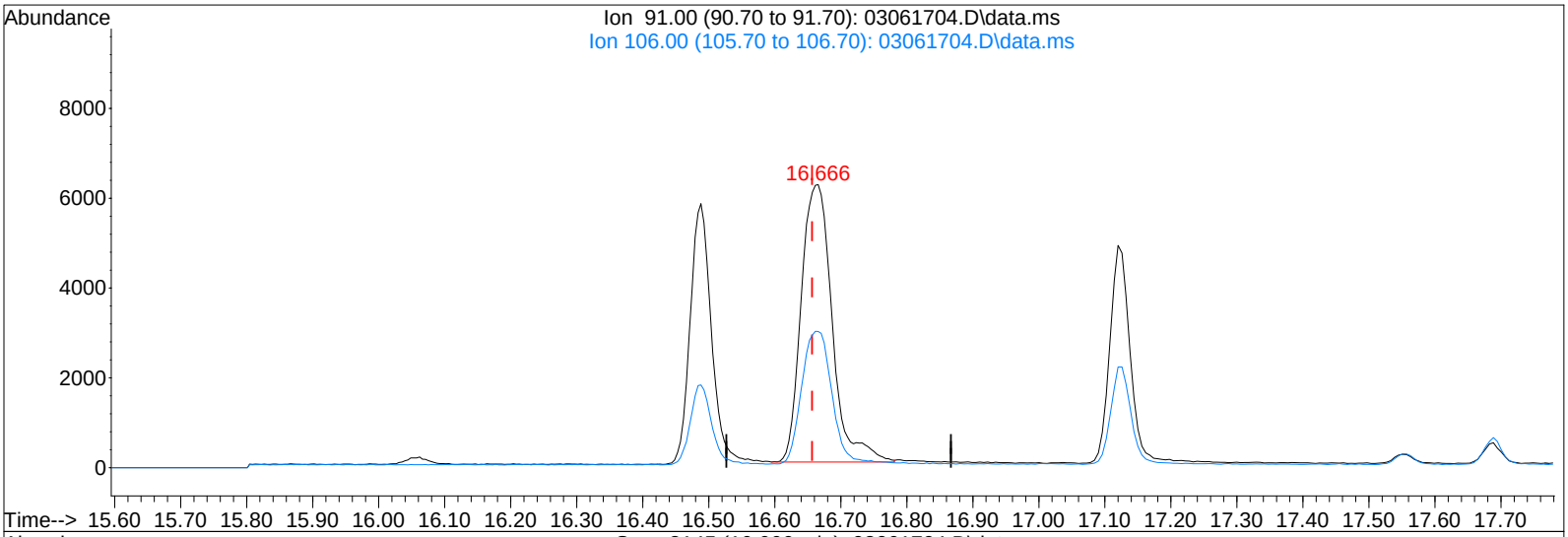
CL 3/7/17

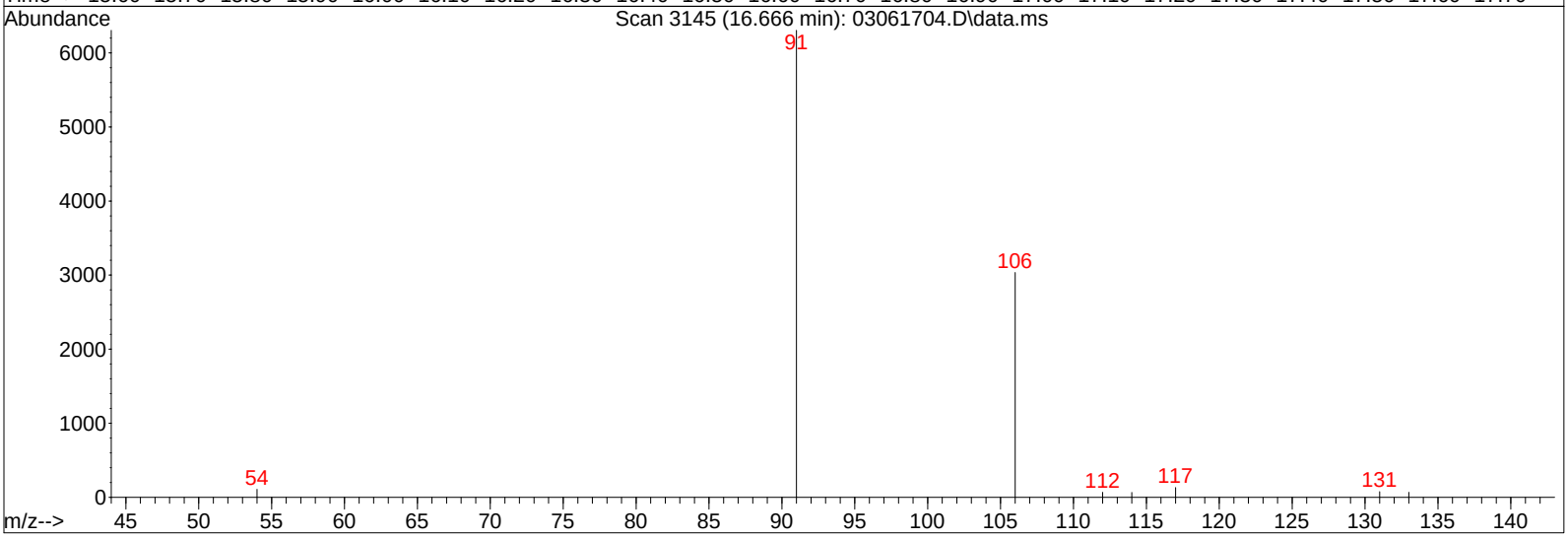
LH 3/8/17

Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\06\03061704.D Vial: 12
Acq On : 6 Mar 2017 16:35 Operator: CL
Sample : 50pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

Quant Time: Mar 07 07:11:28 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M





TIC: 03061704.D\data.ms

(41) m,p-Xylene (T)

16.666min (+0.009) 123.26pg

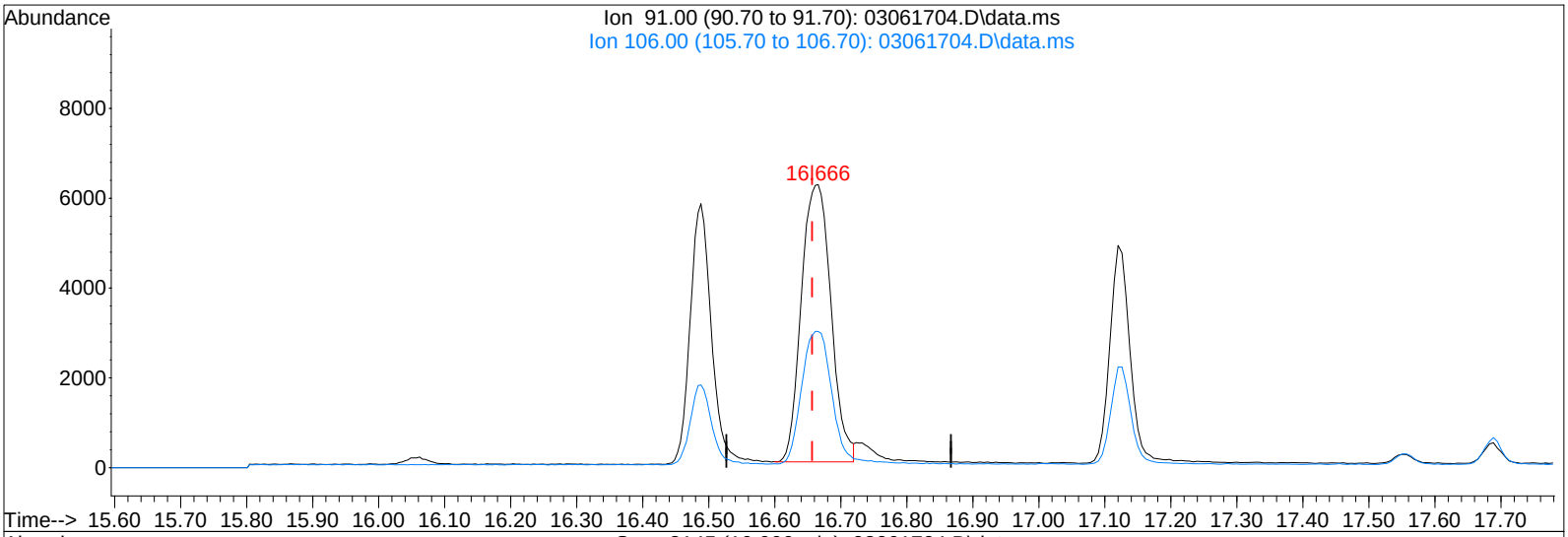
response 20146

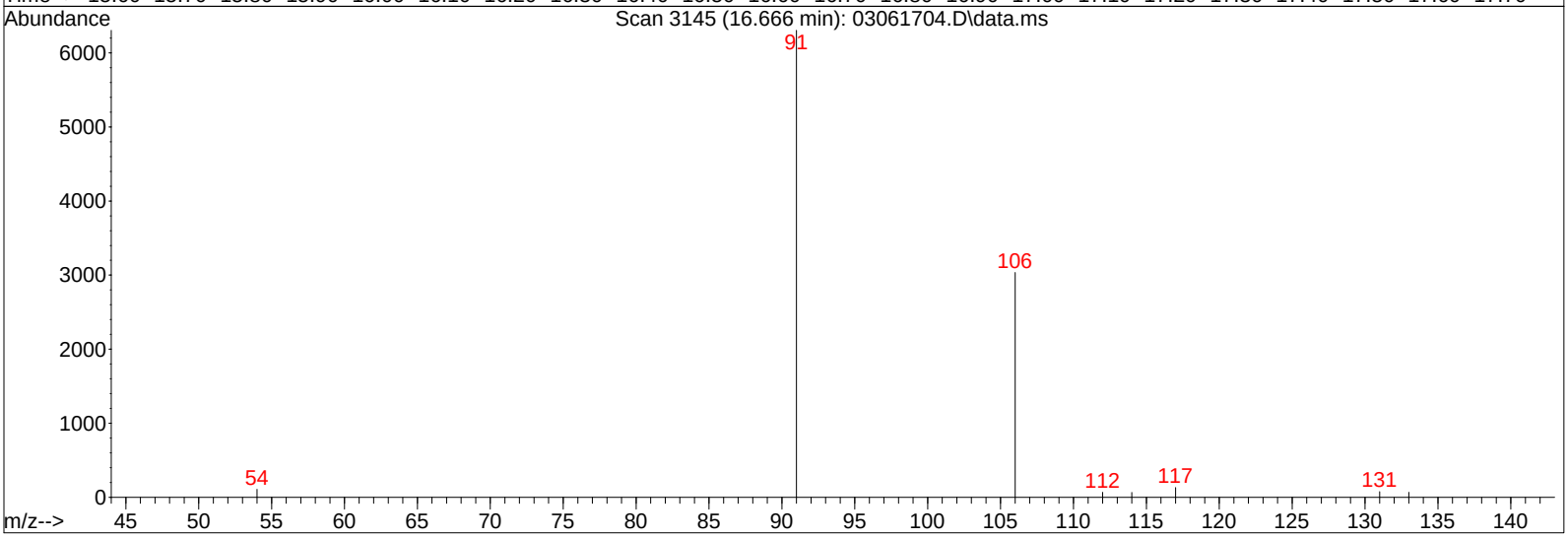
Ion	Exp%	Act%
91.00	100	100
106.00	48.10	46.64
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS19\DATA\2017 03\06\03061704.D Vial: 12
Acq On : 6 Mar 2017 16:35 Operator: CL
Sample : 50pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

Quant Time: Mar 07 07:11:28 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M





TIC: 03061704.D\data.ms

(41) m,p-Xylene (T)

16.666min (+0.009) 118.01pg m

response 19287

Ion	Exp%	Act%
91.00	100	100
106.00	48.10	48.72
0.00	0.00	0.00
0.00	0.00	0.00

IPC

CL 3/7/17

LH 3/8/17

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061705.D Vial: 12
Acq On : 6 Mar 2017 17:06 Operator: CL
Sample : 100pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

Quant Time: Mar 07 07:11:29 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/7/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.77	130	42976	1000.000 pg	0.02
25) 1,4-Difluorobenzene (IS2)	11.72	114	205885	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.06	54	42673	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.55	65	85538	1038.857 pg	0.02
Spiked Amount 1000.000	Range 70 - 130		Recovery = 103.89%		
33) Toluene-d8 (SS2)	14.15	98	209871	988.525 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 98.85%		
45) Bromofluorobenzene (SS3)	17.56	174	92933	1304.773 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 130.48%#		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.43	85	15186	140.200 pg	100
3) Chloromethane	4.68	52	4976	180.244 pg	97
4) 1,2-Dichloro,1,1,2,2-t...	4.82	85	16323	145.710 pg	100
5) Vinyl Chloride	4.99	62	14554	145.679 pg	97
6) 1,3-Butadiene	5.18	54	6069	105.703 pg	91
7) Bromomethane	5.50	94	4489	127.648 pg	98
8) Chloroethane	5.72	64	3451	123.615 pg	98
9) Acrolein	6.33	56	2797	122.463 pg	92
10) Acetone	6.44	58	22270	748.460 pg	94
11) Trichlorofluoromethane	6.63	101	11093	132.236 pg	100
12) 1,1-Dichloroethene	7.36	96	5949	129.663 pg	99
13) Methylene Chloride	7.50	84	7109	142.642 pg	96
14) Trichlorotrifluoroethane	7.80	151	5692	134.266 pg	99
15) trans-1,2-Dichloroethene	8.54	96	6129	125.939 pg	96
16) 1,1-Dichloroethane	8.73	63	11308	130.721 pg	99
17) Methyl tert-Butyl Ether	8.81	73	18962	129.035 pg	100
18) cis-1,2-Dichloroethene	9.61	96	6632	128.091 pg	99
19) Chloroform	9.90	83	14589	154.062 pg	100
21) 1,2-Dichloroethane	10.66	62	10338	137.088 pg	92
22) 1,1,1-Trichloroethane	10.91	97	11389	134.621 pg	100
23) Benzene	11.37	78	28469	141.036 pg	100
24) Carbon Tetrachloride	11.52	117	9792	133.721 pg	99
26) 1,2-Dichloropropane	12.18	63	6485	136.784 pg	100
27) Bromodichloromethane	12.37	83	8850	130.964 pg	100
28) Trichloroethene	12.42	130	6564	132.147 pg	98
29) 1,4-Dioxane	12.39	88	4643	118.534 pg	99
30) cis-1,3-Dichloropropene	13.26	75	8792	123.908 pg	98
31) trans-1,3-Dichloropropene	13.78	75	6362	104.100 pg	98
32) 1,1,2-Trichloroethane	13.95	83	5312	132.783 pg	98
34) Toluene	14.25	91	25139	127.041 pg	100
35) Dibromochloromethane	14.67	129	6007	120.250 pg	100
36) 1,2-Dibromoethane	14.93	107	6066	121.290 pg	100
37) Tetrachloroethene	15.40	166	6842	133.522 pg	100
39) Chlorobenzene	16.10	112	16770	126.131 pg	100
40) Ethylbenzene	16.48	91	26567	117.057 pg	100
41) m,p-Xylene	16.66	91	39997	225.692 pg	99
42) Styrene	17.02	104	15234	122.682 pg	100
43) o-Xylene	17.12	106	12794	150.812 pg	97
44) 1,1,2,2-Tetrachloroethane	17.10	83	13089	150.880 pg	99
46) 1,3,5-Trimethylbenzene	18.38	105	25457	136.611 pg	99
47) 1,2,4-Trimethylbenzene	18.77	105	19628	102.085 pg	99
48) 1,3-Dichlorobenzene	18.92	146	11828	113.708 pg	100
49) 1,4-Dichlorobenzene	18.98	146	12712	119.351 pg	98
50) 1,2-Dichlorobenzene	19.31	146	11703	111.596 pg	100
51) 1,2-Dibromo-3-chloropr...	19.72	157	2807	84.544 pg	94
52) 1,2,4-Trichlorobenzene	20.96	182	6993	112.074 pg	99
53) Naphthalene	21.09	128	21376	107.020 pg	98

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061705.D Vial: 12
Acq On : 6 Mar 2017 17:06 Operator: CL
Sample : 100pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

Quant Time: Mar 07 07:11:29 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

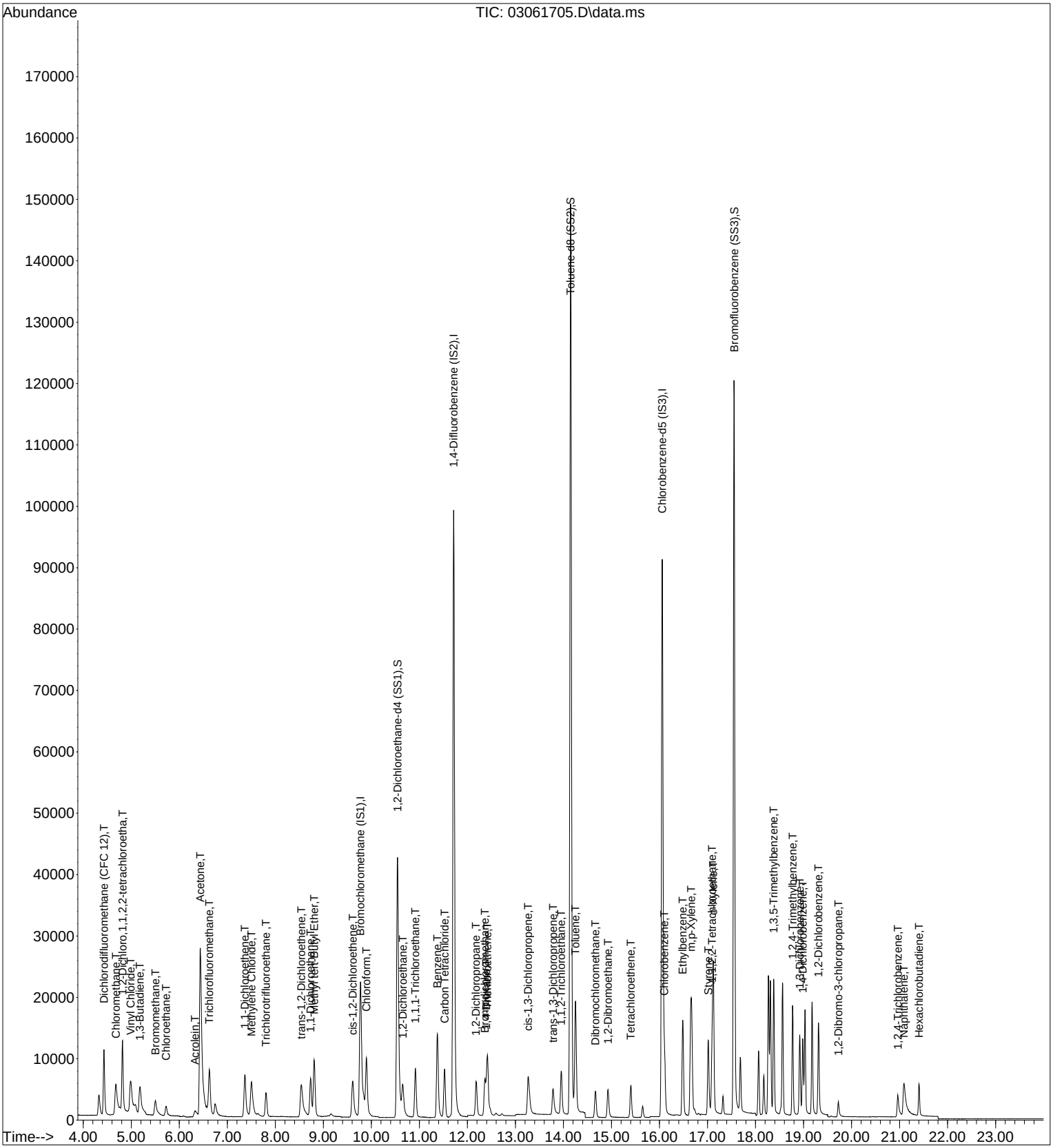
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	5291	124.502	pg	100

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061705.D Vial: 12
Acq On : 6 Mar 2017 17:06 Operator: CL
Sample : 100pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03061701 (4/4)

Quant Time: Mar 07 07:11:29 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061706.D Vial: 13
Acq On : 6 Mar 2017 17:37 Operator: CL
Sample : 500pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03021708 (3/31)

Quant Time: Mar 07 07:11:30 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/7/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.76	130	43230	1000.000 pg	0.00
25) 1,4-Difluorobenzene (IS2)	11.71	114	211696	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.05	54	43642	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.53	65	84872	1024.713 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 102.47%		
33) Toluene-d8 (SS2)	14.15	98	214176	981.111 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 98.11%		
45) Bromofluorobenzene (SS3)	17.55	174	73116	1003.751 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 100.37%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.42	85	74090	679.993 pg	100
3) Chloromethane	4.65	52	20617	742.413 pg	100
4) 1,2-Dichloro,1,1,2,2-t...	4.81	85	80748	716.577 pg	100
5) Vinyl Chloride	4.95	62	72596	722.381 pg	100
6) 1,3-Butadiene	5.14	54	33207	574.963 pg	99
7) Bromomethane	5.48	94	22317	630.873 pg	99
8) Chloroethane	5.70	64	17506	623.380 pg	99
9) Acrolein	6.27	56	13303	579.031 pg	99
10) Acetone	6.40	58	96710	3231.177 pg	99
11) Trichlorofluoromethane	6.61	101	54627	647.366 pg	100
12) 1,1-Dichloroethene	7.35	96	30123	652.699 pg	100
13) Methylene Chloride	7.48	84	33117	660.587 pg	99
14) Trichlorotrifluoroethane	7.80	151	28597	670.600 pg	100
15) trans-1,2-Dichloroethene	8.51	96	32942	672.917 pg	95
16) 1,1-Dichloroethane	8.72	63	58759	675.266 pg	100
17) Methyl tert-Butyl Ether	8.79	73	98781	668.249 pg	100
18) cis-1,2-Dichloroethene	9.59	96	35085	673.653 pg	99
19) Chloroform	9.89	83	66189	694.858 pg	99
21) 1,2-Dichloroethane	10.64	62	53769	708.821 pg	100
22) 1,1,1-Trichloroethane	10.91	97	59231	696.014 pg	100
23) Benzene	11.37	78	135776	668.683 pg	100
24) Carbon Tetrachloride	11.52	117	50550	686.263 pg	100
26) 1,2-Dichloropropane	12.17	63	33865	694.686 pg	100
27) Bromodichloromethane	12.35	83	47769	687.491 pg	100
28) Trichloroethene	12.41	130	34917	683.658 pg	100
29) 1,4-Dioxane	12.38	88	26908	668.095 pg	99
30) cis-1,3-Dichloropropene	13.26	75	50520	692.450 pg	100
31) trans-1,3-Dichloropropene	13.77	75	41142	654.718 pg	99
32) 1,1,2-Trichloroethane	13.95	83	28234	686.385 pg	99
34) Toluene	14.25	91	130939	643.542 pg	100
35) Dibromochloromethane	14.66	129	33255	647.434 pg	100
36) 1,2-Dibromoethane	14.92	107	34229	665.624 pg	99
37) Tetrachloroethene	15.40	166	35578	675.246 pg	100
39) Chlorobenzene	16.10	112	87434	643.012 pg	100
40) Ethylbenzene	16.48	91	147002	633.327 pg	100
41) m,p-Xylene	16.66	91	229072	1263.892 pg	100
42) Styrene	17.01	104	77272	608.468 pg	100
43) o-Xylene	17.12	106	53996	622.358 pg	100
44) 1,1,2,2-Tetrachloroethane	17.09	83	58204	656.034 pg	100
46) 1,3,5-Trimethylbenzene	18.38	105	119166	625.289 pg	100
47) 1,2,4-Trimethylbenzene	18.77	105	120573	613.177 pg	100
48) 1,3-Dichlorobenzene	18.92	146	67835	637.650 pg	99
49) 1,4-Dichlorobenzene	18.98	146	67465	619.356 pg	100
50) 1,2-Dichlorobenzene	19.31	146	65988	615.268 pg	100
51) 1,2-Dibromo-3-chloropr...	19.72	157	19132	563.441 pg	100
52) 1,2,4-Trichlorobenzene	20.94	182	38589	604.717 pg	100
53) Naphthalene	21.06	128	122935	601.815 pg	100

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061706.D Vial: 13
Acq On : 6 Mar 2017 17:37 Operator: CL
Sample : 500pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03021708 (3/31)

Quant Time: Mar 07 07:11:30 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

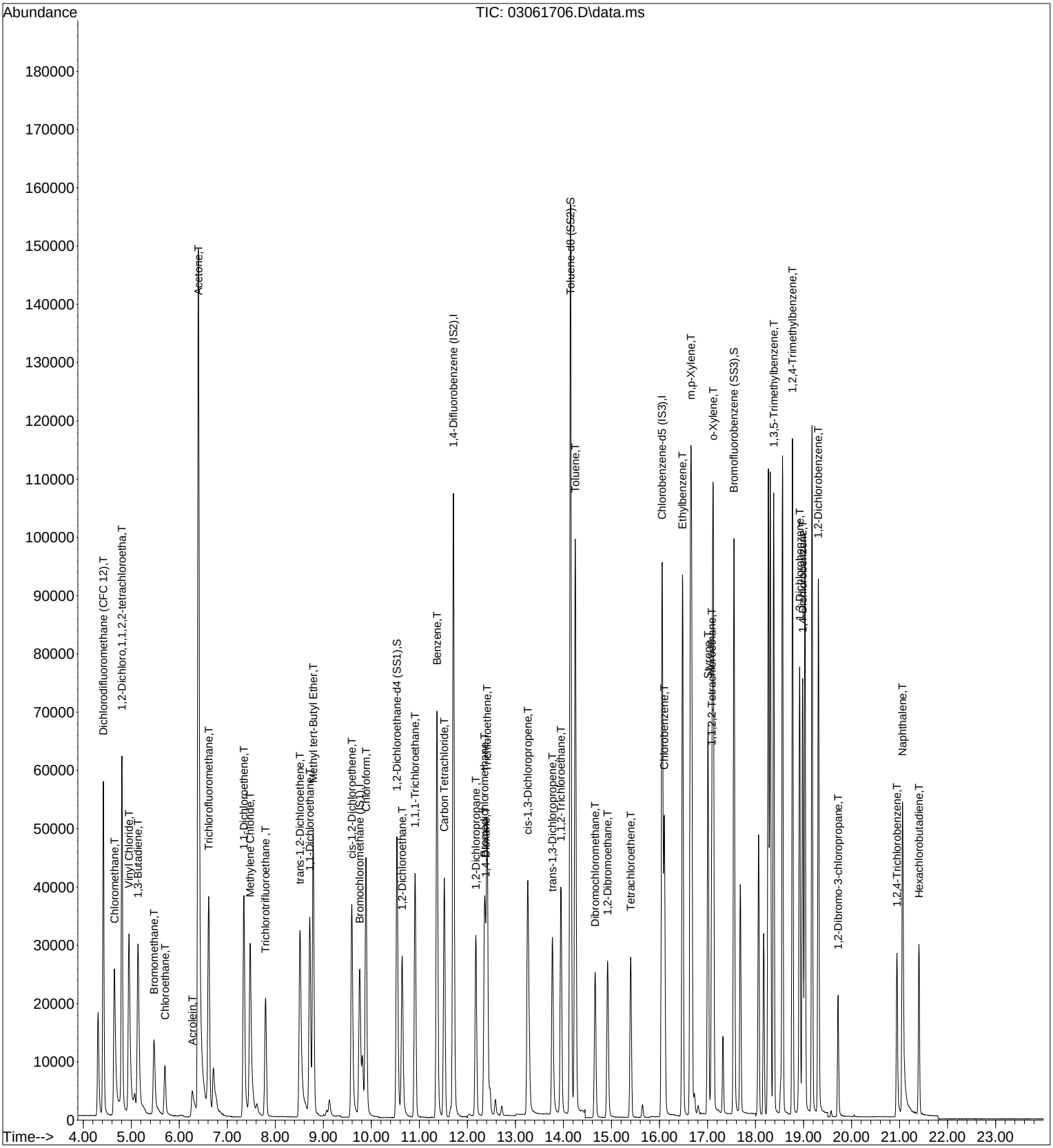
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	28356	652.426 pg	100

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061706.D Vial: 13
Acq On : 6 Mar 2017 17:37 Operator: CL
Sample : 500pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03021708 (3/31)

Quant Time: Mar 07 07:11:30 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061707.D Vial: 14
Acq On : 6 Mar 2017 18:09 Operator: CL
Sample : 1000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 07 07:11:33 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/7/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.75	130	43515	1000.000 pg	0.00
25) 1,4-Difluorobenzene (IS2)	11.71	114	214340	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.05	54	43809	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.53	65	85059	1020.244 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 102.02%		
33) Toluene-d8 (SS2)	14.14	98	216526	979.641 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 97.96%		
45) Bromofluorobenzene (SS3)	17.55	174	74451	1018.182 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 101.82%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.41	85	137467	1253.399 pg	100
3) Chloromethane	4.64	52	36026	1288.791 pg	99
4) 1,2-Dichloro,1,1,2,2-t...	4.80	85	146021	1287.338 pg	100
5) Vinyl Chloride	4.94	62	130530	1290.359 pg	100
6) 1,3-Butadiene	5.13	54	62332	1072.179 pg	99
7) Bromomethane	5.46	94	41493	1165.272 pg	100
8) Chloroethane	5.69	64	32339	1144.033 pg	100
9) Acrolein	6.26	56	24463	1057.812 pg	99
10) Acetone	6.39	58	178606	5928.321 pg	100
11) Trichlorofluoromethane	6.61	101	102027	1201.169 pg	100
12) 1,1-Dichloroethene	7.34	96	57070	1228.481 pg	100
13) Methylene Chloride	7.47	84	61517	1219.047 pg	100
14) Trichlorotrifluoroethane	7.79	151	54395	1267.208 pg	100
15) trans-1,2-Dichloroethene	8.51	96	61928	1256.738 pg	100
16) 1,1-Dichloroethane	8.71	63	111095	1268.357 pg	100
17) Methyl tert-Butyl Ether	8.78	73	187256	1258.482 pg	100
18) cis-1,2-Dichloroethene	9.59	96	66958	1277.214 pg	100
19) Chloroform	9.88	83	123044	1283.266 pg	100
21) 1,2-Dichloroethane	10.64	62	101162	1324.855 pg	100
22) 1,1,1-Trichloroethane	10.91	97	112148	1309.201 pg	100
23) Benzene	11.36	78	252349	1234.653 pg	100
24) Carbon Tetrachloride	11.52	117	95675	1290.369 pg	100
26) 1,2-Dichloropropane	12.18	63	64745	1311.756 pg	100
27) Bromodichloromethane	12.36	83	91774	1304.517 pg	100
28) Trichloroethene	12.41	130	65902	1274.413 pg	100
29) 1,4-Dioxane	12.38	88	51042	1251.682 pg	100
30) cis-1,3-Dichloropropene	13.25	75	99483	1346.739 pg	100
31) trans-1,3-Dichloropropene	13.77	75	82230	1292.435 pg	100
32) 1,1,2-Trichloroethane	13.95	83	54198	1301.332 pg	100
34) Toluene	14.25	91	250097	1214.019 pg	100
35) Dibromochloromethane	14.66	129	65133	1252.418 pg	100
36) 1,2-Dibromoethane	14.92	107	65231	1252.848 pg	100
37) Tetrachloroethene	15.40	166	67297	1261.494 pg	100
39) Chlorobenzene	16.10	112	164924	1208.270 pg	100
40) Ethylbenzene	16.48	91	283995	1218.868 pg	100
41) m,p-Xylene	16.66	91	442235	2430.705 pg	100
42) Styrene	17.01	104	149283	1171.028 pg	100
43) o-Xylene	17.12	106	104182	1196.224 pg	100
44) 1,1,2,2-Tetrachloroethane	17.09	83	112084	1258.516 pg	100
46) 1,3,5-Trimethylbenzene	18.37	105	232299	1214.274 pg	100
47) 1,2,4-Trimethylbenzene	18.77	105	237277	1202.078 pg	100
48) 1,3-Dichlorobenzene	18.92	146	126585	1185.365 pg	100
49) 1,4-Dichlorobenzene	18.98	146	125182	1144.841 pg	100
50) 1,2-Dichlorobenzene	19.31	146	125938	1169.761 pg	100
51) 1,2-Dibromo-3-chloropr...	19.72	157	38596	1132.326 pg	100
52) 1,2,4-Trichlorobenzene	20.94	182	71820	1121.179 pg	100
53) Naphthalene	21.06	128	230504	1124.106 pg	100

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061707.D Vial: 14
Acq On : 6 Mar 2017 18:09 Operator: CL
Sample : 1000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 07 07:11:33 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

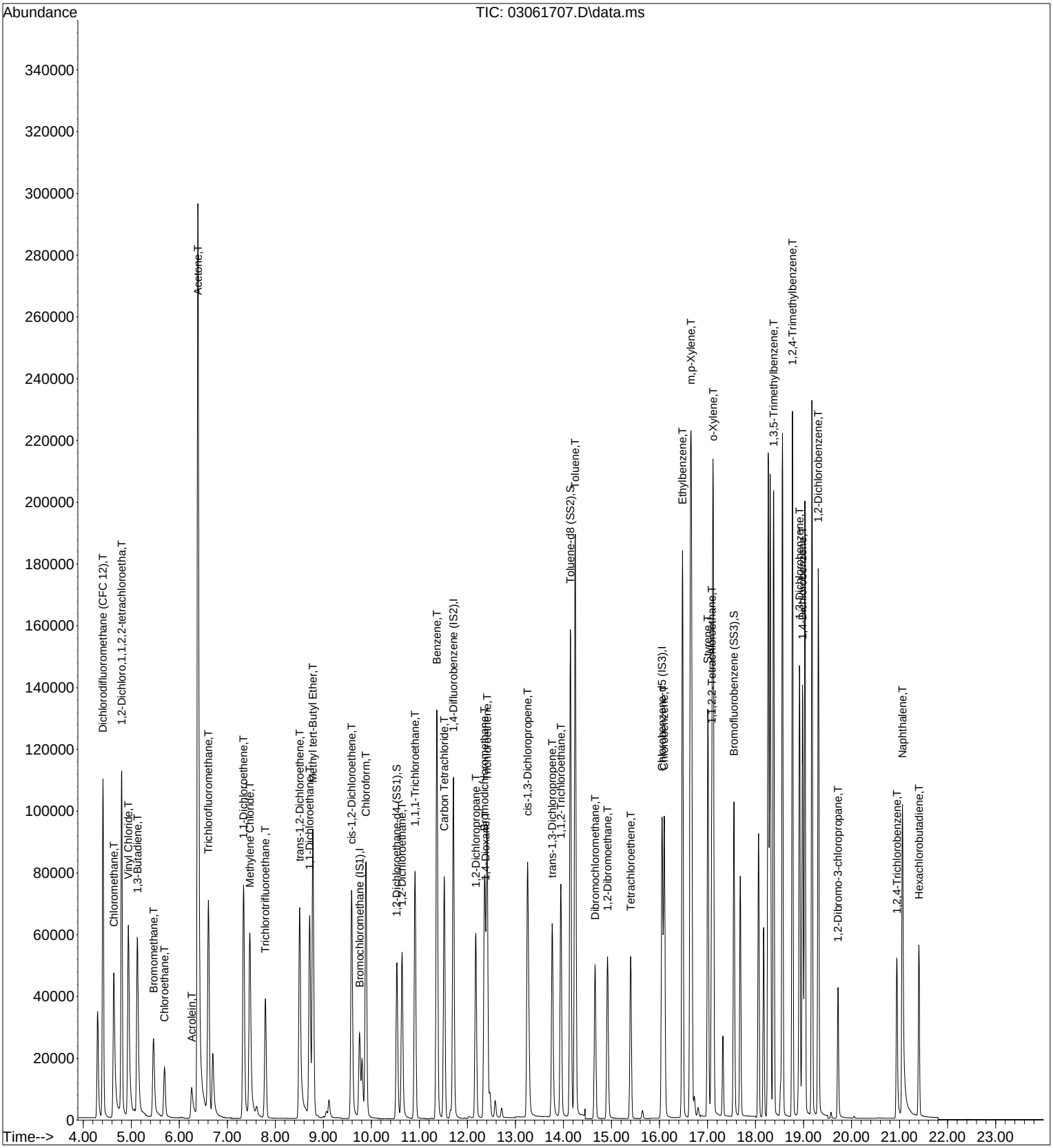
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	53606	1228.687 pg	100

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061707.D Vial: 14
Acq On : 6 Mar 2017 18:09 Operator: CL
Sample : 1000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 07 07:11:33 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061708.D Vial: 14
Acq On : 6 Mar 2017 18:40 Operator: CL
Sample : 2000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 07 07:11:34 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/7/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.75	130	47497	1000.000 pg	0.00
25) 1,4-Difluorobenzene (IS2)	11.71	114	234465	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.05	54	48103	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.53	65	92871	1020.556 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 102.06%		
33) Toluene-d8 (SS2)	14.14	98	238439	986.187 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 98.62%		
45) Bromofluorobenzene (SS3)	17.55	174	82970	1033.397 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 103.34%		

Target Compounds						Qvalue
2) Dichlorodifluoromethan...	4.41	85	287561	2402.115 pg		100
3) Chloromethane	4.63	52	69252	2269.717 pg	#	89
4) 1,2-Dichloro,1,1,2,2-t...	4.79	85	300127	2424.126 pg		100
5) Vinyl Chloride	4.93	62	274344	2484.668 pg		99
6) 1,3-Butadiene	5.12	54	134326	2116.846 pg		98
7) Bromomethane	5.45	94	87567	2253.023 pg		100
8) Chloroethane	5.68	64	69241	2244.130 pg		100
9) Acrolein	6.25	56	56073	2221.393 pg		98
10) Acetone	6.38	58	386808	11762.616 pg		99
11) Trichlorofluoromethane	6.60	101	220419	2377.447 pg		100
12) 1,1-Dichloroethene	7.34	96	126550	2495.719 pg		99
13) Methylene Chloride	7.47	84	134484	2441.567 pg		99
14) Trichlorotrifluoroethane	7.79	151	116127	2478.535 pg		100
15) trans-1,2-Dichloroethene	8.50	96	138177	2569.013 pg		99
16) 1,1-Dichloroethane	8.71	63	239964	2509.955 pg		100
17) Methyl tert-Butyl Ether	8.78	73	410158	2525.429 pg		100
18) cis-1,2-Dichloroethene	9.59	96	148333	2592.220 pg		99
19) Chloroform	9.89	83	262494	2508.121 pg		99
21) 1,2-Dichloroethane	10.64	62	218366	2620.044 pg		99
22) 1,1,1-Trichloroethane	10.91	97	243498	2604.252 pg		100
23) Benzene	11.36	78	538293	2412.875 pg		100
24) Carbon Tetrachloride	11.52	117	208755	2579.438 pg		100
26) 1,2-Dichloropropane	12.17	63	141585	2622.341 pg		100
27) Bromodichloromethane	12.35	83	203904	2649.604 pg		100
28) Trichloroethene	12.41	130	142360	2516.661 pg		100
29) 1,4-Dioxane	12.37	88	113182	2537.283 pg		100
30) cis-1,3-Dichloropropene	13.25	75	229778	2843.598 pg		100
31) trans-1,3-Dichloropropene	13.76	75	195925	2815.097 pg		99
32) 1,1,2-Trichloroethane	13.95	83	119118	2614.613 pg		99
34) Toluene	14.25	91	546014	2422.959 pg		99
35) Dibromochloromethane	14.66	129	149880	2634.614 pg		100
36) 1,2-Dibromoethane	14.91	107	149017	2616.408 pg		99
37) Tetrachloroethene	15.40	166	146439	2509.410 pg		100
39) Chlorobenzene	16.10	112	361180	2409.877 pg		100
40) Ethylbenzene	16.48	91	628524	2456.739 pg		100
41) m,p-Xylene	16.66	91	964756	4829.340 pg		99
42) Styrene	17.01	104	352379	2517.435 pg		100
43) o-Xylene	17.12	106	229019	2394.873 pg		99
44) 1,1,2,2-Tetrachloroethane	17.09	83	248571	2541.889 pg		100
46) 1,3,5-Trimethylbenzene	18.38	105	526949	2508.587 pg		100
47) 1,2,4-Trimethylbenzene	18.77	105	552506	2549.207 pg		100
48) 1,3-Dichlorobenzene	18.92	146	293877	2506.263 pg		99
49) 1,4-Dichlorobenzene	18.98	146	284658	2370.925 pg		99
50) 1,2-Dichlorobenzene	19.31	146	292603	2475.201 pg		100
51) 1,2-Dibromo-3-chloropr...	19.72	157	97336	2600.722 pg		99
52) 1,2,4-Trichlorobenzene	20.94	182	172505	2452.576 pg		99
53) Naphthalene	21.05	128	563286	2501.780 pg		99

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061708.D Vial: 14
Acq On : 6 Mar 2017 18:40 Operator: CL
Sample : 2000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 07 07:11:34 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

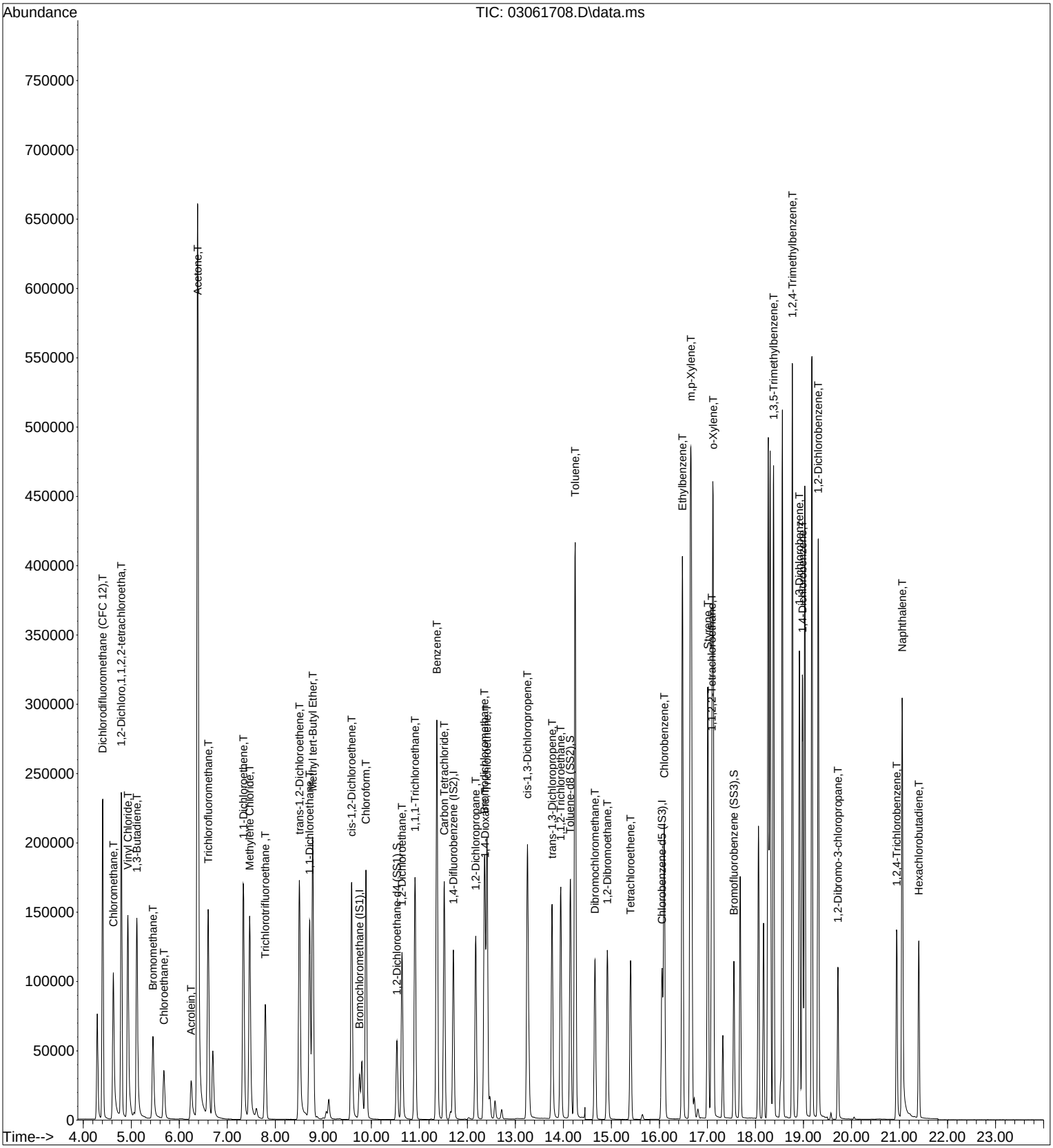
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	122232	2551.549	pg	100

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061708.D Vial: 14
Acq On : 6 Mar 2017 18:40 Operator: CL
Sample : 2000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 07 07:11:34 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061709.D Vial: 14
Acq On : 6 Mar 2017 19:11 Operator: CL
Sample : 5000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 07 07:11:36 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/7/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.76	130	50795	1000.000 pg	0.00
25) 1,4-Difluorobenzene (IS2)	11.71	114	254359	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.05	54	51792	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.53	65	98835	1015.577 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 101.56%		
33) Toluene-d8 (SS2)	14.14	98	258985	987.387 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 98.74%		
45) Bromofluorobenzene (SS3)	17.55	174	110412	1277.238 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 127.72%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.39	85	735357	5743.904 pg	99
3) Chloromethane	4.61	52	162922	4993.031 pg	94
4) 1,2-Dichloro,1,1,2,2-t...	4.78	85	766808	5791.379 pg	100
5) Vinyl Chloride	4.91	62	707568	5992.200 pg	99
6) 1,3-Butadiene	5.10	54	385621	5682.443 pg	98
7) Bromomethane	5.44	94	236569	5691.519 pg	100
8) Chloroethane	5.67	64	190097	5761.098 pg	100
9) Acrolein	6.24	56	163133	6043.084 pg	95
10) Acetone	6.38	58	1030298	29296.555 pg	95
11) Trichlorofluoromethane	6.59	101	600164	6053.087 pg	100
12) 1,1-Dichloroethene	7.33	96	345533	6371.890 pg	98
13) Methylene Chloride	7.47	84	362679	6156.952 pg	99
14) Trichlorotrifluoroethane	7.79	151	303990	6066.894 pg	100
15) trans-1,2-Dichloroethene	8.50	96	368156	6400.406 pg	99
16) 1,1-Dichloroethane	8.71	63	634905	6209.744 pg	100
17) Methyl tert-Butyl Ether	8.77	73	1096731	6314.359 pg	100
18) cis-1,2-Dichloroethene	9.59	96	393337	6427.529 pg	100
19) Chloroform	9.89	83	679388	6070.050 pg	99
21) 1,2-Dichloroethane	10.64	62	570339	6398.850 pg	99
22) 1,1,1-Trichloroethane	10.91	97	643631	6436.797 pg	100
23) Benzene	11.36	78	1425231	5973.743 pg	100
24) Carbon Tetrachloride	11.52	117	566375	6543.913 pg	100
26) 1,2-Dichloropropane	12.18	63	377371	6442.751 pg	100
27) Bromodichloromethane	12.36	83	553129	6625.407 pg	100
28) Trichloroethene	12.41	130	377860	6157.417 pg	100
29) 1,4-Dioxane	12.37	88	305275	6308.321 pg	99
30) cis-1,3-Dichloropropene	13.25	75	648948	7402.878 pg	100
31) trans-1,3-Dichloropropene	13.76	75	566979	7509.335 pg	99
32) 1,1,2-Trichloroethane	13.94	83	317749	6429.025 pg	98
34) Toluene	14.25	91	1494690	6113.983 pg	99
35) Dibromochloromethane	14.66	129	431595	6993.276 pg	100
36) 1,2-Dibromoethane	14.91	107	414248	6704.415 pg	100
37) Tetrachloroethene	15.40	166	404085	6382.906 pg	100
39) Chlorobenzene	16.10	112	995944	6171.853 pg	99
40) Ethylbenzene	16.48	91	1757507	6380.339 pg	99
41) m,p-Xylene	16.65	91	2769240	12874.796 pg	98
42) Styrene	17.01	104	1073784	7124.832 pg	100
43) o-Xylene	17.12	106	664424	6453.062 pg	97
44) 1,1,2,2-Tetrachloroethane	17.09	83	705118	6696.956 pg	99
46) 1,3,5-Trimethylbenzene	18.37	105	1902734	8412.947 pg	95
47) 1,2,4-Trimethylbenzene	18.77	105	1942947	8326.040 pg	96
48) 1,3-Dichlorobenzene	18.92	146	1082568	8574.833 pg	100
49) 1,4-Dichlorobenzene	18.98	146	1050831	8128.993 pg	99
50) 1,2-Dichlorobenzene	19.31	146	1044619	8207.275 pg	99
51) 1,2-Dibromo-3-chloropr...	19.72	157	304634	7559.764 pg	94
52) 1,2,4-Trichlorobenzene	20.94	182	510741	6744.209 pg	99
53) Naphthalene	21.05	128	1679935	6929.822 pg	99

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061709.D Vial: 14
Acq On : 6 Mar 2017 19:11 Operator: CL
Sample : 5000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 07 07:11:36 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

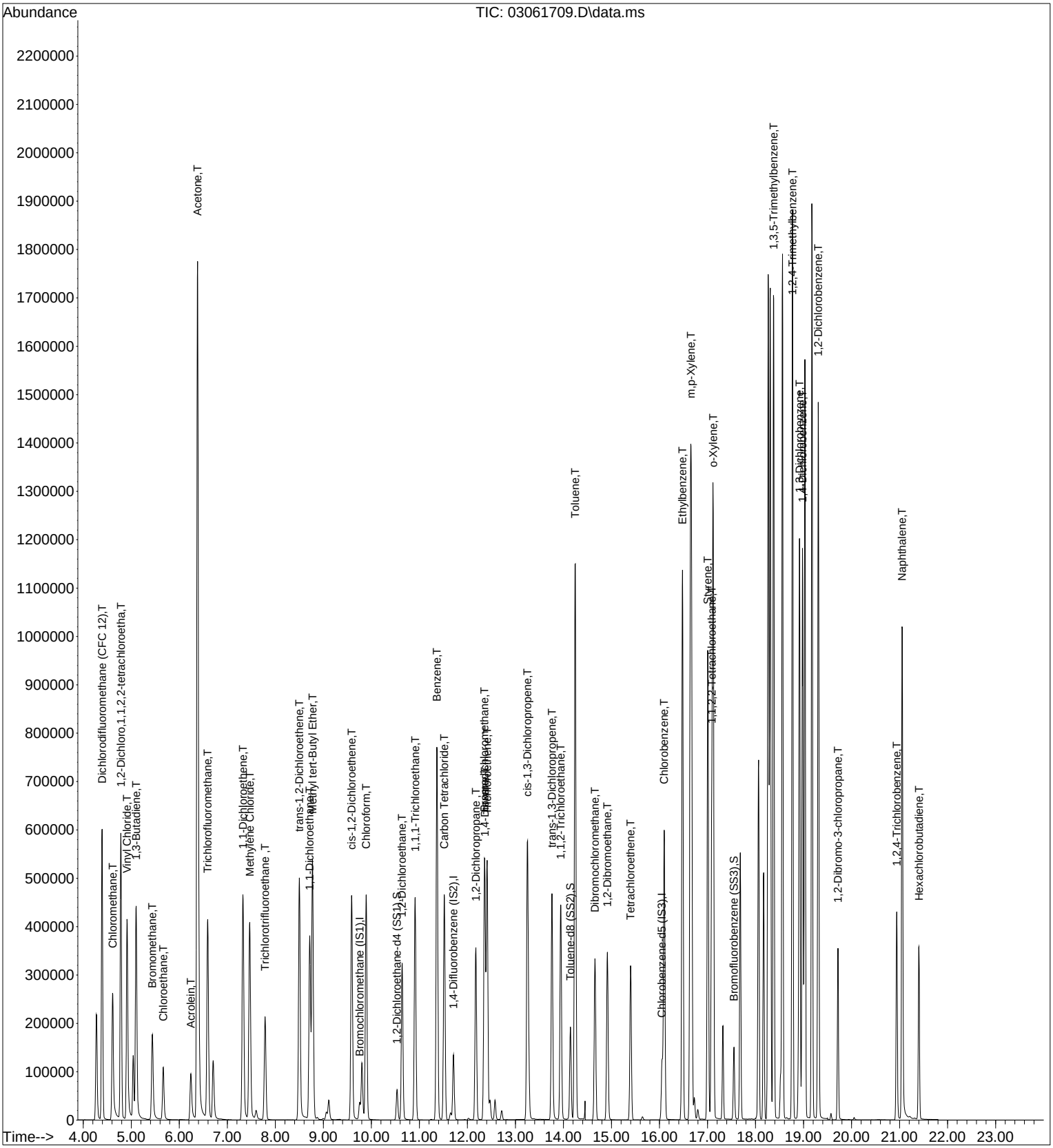
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	346209	6712.231	pg	100

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061709.D Vial: 14
Acq On : 6 Mar 2017 19:11 Operator: CL
Sample : 5000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 07 07:11:36 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061710.D Vial: 14
Acq On : 6 Mar 2017 19:42 Operator: CL
Sample : 10000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 07 07:11:37 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/7/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.76	130	55632	1000.000 pg	0.00
25) 1,4-Difluorobenzene (IS2)	11.71	114	280338	1000.000 pg	0.00
38) Chlorobenzene-d5 (IS3)	16.05	54	56561	1000.000 pg	0.00

System Monitoring Compounds					
20) 1,2-Dichloroethane-d4 ...	10.54	65	104744	982.714 pg	0.01
Spiked Amount 1000.000	Range 70 - 130		Recovery = 98.27%		
33) Toluene-d8 (SS2)	14.15	98	283620	981.104 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 98.11%		
45) Bromofluorobenzene (SS3)	17.55	174	105285	1115.238 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 111.52%		

Target Compounds						Qvalue
2) Dichlorodifluoromethan...	4.39	85	1589289	11334.650 pg		99
3) Chloromethane	4.61	52	242221	6777.861 pg		93
4) 1,2-Dichloro,1,1,2,2-t...	4.78	85	1602060	11047.662 pg		99
5) Vinyl Chloride	4.92	62	1513211	11700.755 pg		99
6) 1,3-Butadiene	5.10	54	1061408	14280.817 pg		99
7) Bromomethane	5.44	94	516216	11339.610 pg		100
8) Chloroethane	5.67	64	421075	11651.604 pg		99
9) Acrolein	6.25	56	375598	12703.880 pg		94
10) Acetone	6.39	58	2341429	60789.837 pg	#	88
11) Trichlorofluoromethane	6.59	101	1284954	11832.891 pg		99
12) 1,1-Dichloroethene	7.32	96	738236	12429.975 pg		96
13) Methylene Chloride	7.48	84	767766	11900.590 pg		100
14) Trichlorotrifluoroethane	7.79	151	663285	12086.583 pg		100
15) trans-1,2-Dichloroethene	8.51	96	777161	12336.244 pg		99
16) 1,1-Dichloroethane	8.72	63	1319913	11787.089 pg		99
17) Methyl tert-Butyl Ether	8.78	73	2112730	11106.301 pg		100
18) cis-1,2-Dichloroethene	9.60	96	845067	12608.594 pg		100
19) Chloroform	9.90	83	1441097	11756.117 pg		99
21) 1,2-Dichloroethane	10.65	62	1193519	12226.284 pg		99
22) 1,1,1-Trichloroethane	10.91	97	1361614	12433.207 pg		99
23) Benzene	11.37	78	3066938	11737.148 pg		100
24) Carbon Tetrachloride	11.52	117	1228377	12958.699 pg		99
26) 1,2-Dichloropropane	12.18	63	807904	12514.909 pg		100
27) Bromodichloromethane	12.36	83	1195347	12991.079 pg		100
28) Trichloroethene	12.42	130	818795	12106.203 pg		100
29) 1,4-Dioxane	12.37	88	663908	12447.885 pg		99
30) cis-1,3-Dichloropropene	13.25	75	1424188	14740.872 pg		99
31) trans-1,3-Dichloropropene	13.76	75	1267759	15234.785 pg		99
32) 1,1,2-Trichloroethane	13.95	83	684326	12562.877 pg		97
34) Toluene	14.25	91	3237461	12015.526 pg		98
35) Dibromochloromethane	14.66	129	976436	14355.331 pg		100
36) 1,2-Dibromoethane	14.92	107	915223	13439.792 pg		100
37) Tetrachloroethene	15.40	166	882483	12647.865 pg		100
39) Chlorobenzene	16.10	112	2170950	12319.018 pg		99
40) Ethylbenzene	16.48	91	3809836	12664.806 pg		98
41) m,p-Xylene	16.66	91	6089052	25922.390 pg		96
42) Styrene	17.01	104	2414459	14669.765 pg		99
43) o-Xylene	17.12	106	1470736	13079.793 pg		94
44) 1,1,2,2-Tetrachloroethane	17.09	83	1535368	13352.843 pg		99
46) 1,3,5-Trimethylbenzene	18.38	105	3432462	13897.011 pg		96
47) 1,2,4-Trimethylbenzene	18.77	105	3594324	14103.937 pg		97
48) 1,3-Dichlorobenzene	18.92	146	1907852	13837.601 pg		99
49) 1,4-Dichlorobenzene	18.98	146	1858803	13166.880 pg		99
50) 1,2-Dichlorobenzene	19.31	146	1877604	13507.989 pg		99
51) 1,2-Dibromo-3-chloropr...	19.72	157	684490	15554.016 pg		91
52) 1,2,4-Trichlorobenzene	20.94	182	1098323	13280.242 pg		99
53) Naphthalene	21.06	128	3762123	14210.462 pg		98

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061710.D Vial: 14
Acq On : 6 Mar 2017 19:42 Operator: CL
Sample : 10000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 07 07:11:37 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

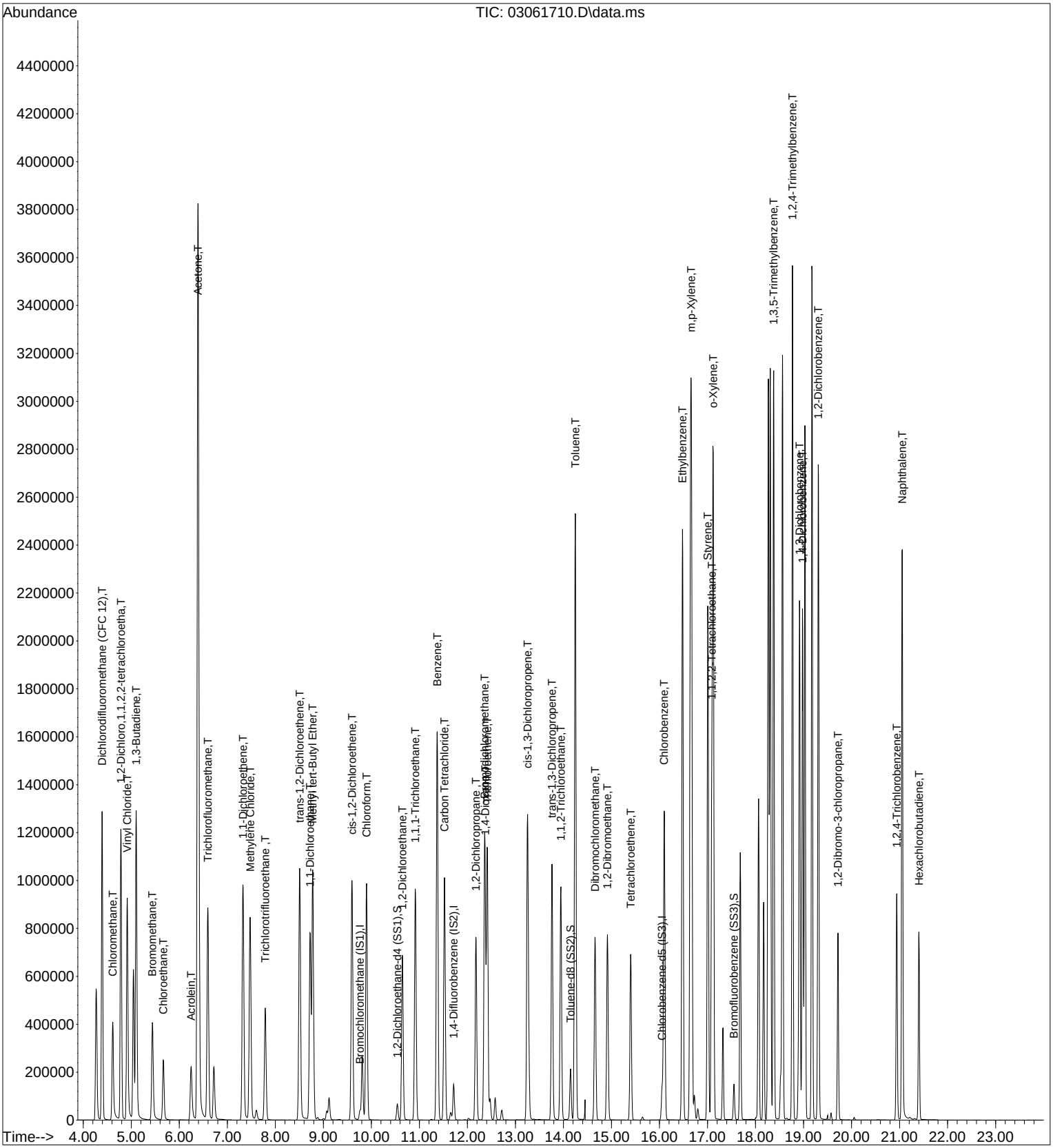
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	742354	13179.083 pg	99

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061710.D Vial: 14
Acq On : 6 Mar 2017 19:42 Operator: CL
Sample : 10000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 07 07:11:37 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061717.D Vial: 15
Acq On : 7 Mar 2017 8:11 Operator: CL
Sample : 50000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03021703 (3/31)

Quant Time: Mar 07 08:36:11 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/7/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.78	130	59122	1000.000 pg	0.02
25) 1,4-Difluorobenzene (IS2)	11.72	114	295429	1000.000 pg	0.01
38) Chlorobenzene-d5 (IS3)	16.05	54	69357	1000.000 pg	0.00

System Monitoring Compounds					
20) 1,2-Dichloroethane-d4 ...	10.55	65	106451	939.774 pg	0.02
Spiked Amount 1000.000	Range 70 - 130		Recovery = 93.98%		
33) Toluene-d8 (SS2)	14.15	98	300771	987.286 pg	0.01
Spiked Amount 1000.000	Range 70 - 130		Recovery = 98.73%		
45) Bromofluorobenzene (SS3)	17.55	174	140987	1217.887 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 121.79%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.39	85	6851954	45982.782 pg	97
3) Chloromethane	4.61	52	1766832	46521.282 pg	95
4) 1,2-Dichloro,1,1,2,2-t...	4.79	85	7993216	51866.712 pg	97
5) Vinyl Chloride	4.92	62	7575931	55122.129 pg	96
6) 1,3-Butadiene	5.11	54	6718815	85062.654 pg	97
7) Bromomethane	5.45	94	2565902	53037.408 pg	99
8) Chloroethane	5.68	64	1984833	51680.390 pg	99
9) Acrolein	6.26	56	2051967	65306.894 pg	92
10) Acetone	6.42	58	14231399	347674.737 pg #	44
11) Trichlorofluoromethane	6.60	101	6630642	57455.871 pg	98
12) 1,1-Dichloroethene	7.33	96	3889927	61629.982 pg	94
13) Methylene Chloride	7.49	84	4182527	61003.384 pg	99
14) Trichlorotrifluoroethane	7.80	151	3779061	64798.184 pg	99
15) trans-1,2-Dichloroethene	8.52	96	4142942	61880.865 pg	98
16) 1,1-Dichloroethane	8.74	63	6915559	58111.772 pg	98
17) Methyl tert-Butyl Ether	8.79	73	12907382	63846.803 pg	98
18) cis-1,2-Dichloroethene	9.61	96	4519918	63457.304 pg	99
19) Chloroform	9.92	83	7714820	59220.495 pg	97
21) 1,2-Dichloroethane	10.66	62	6231922	60070.700 pg	97
22) 1,1,1-Trichloroethane	10.92	97	7402735	63605.831 pg	98
23) Benzene	11.38	78	16575510	59689.790 pg	98
24) Carbon Tetrachloride	11.53	117	6773517	67238.729 pg	98
26) 1,2-Dichloropropane	12.19	63	4327231	63607.287 pg	99
27) Bromodichloromethane	12.37	83	6756090	69674.765 pg	98
28) Trichloroethene	12.42	130	4817016	67583.349 pg	99
29) 1,4-Dioxane	12.38	88	3971132	70653.036 pg	97
30) cis-1,3-Dichloropropene	13.26	75	8367265	82180.395 pg	96
31) trans-1,3-Dichloropropene	13.77	75	7292207	83154.828 pg	96
32) 1,1,2-Trichloroethane	13.95	83	3848851	67048.030 pg	97
34) Toluene	14.25	91	17613314	62030.913 pg	90
35) Dibromochloromethane	14.66	129	5769680	80491.496 pg	98
36) 1,2-Dibromoethane	14.92	107	5158662	71883.885 pg	97
37) Tetrachloroethene	15.40	166	5330304	72492.269 pg	97
39) Chlorobenzene	16.10	112	12428506	57513.786 pg	94
40) Ethylbenzene	16.47	91	20140329	54599.116 pg	81
41) m,p-Xylene	16.64	91	30557766	106089.828 pg #	64
42) Styrene	17.01	104	16139729	79969.859 pg	98
43) o-Xylene	17.13	106	10710644	77679.871 pg #	71
44) 1,1,2,2-Tetrachloroethane	17.10	83	9902348	70230.576 pg	96
46) 1,3,5-Trimethylbenzene	18.37	105	17852832	58945.352 pg #	71
47) 1,2,4-Trimethylbenzene	18.76	105	18373814	58796.196 pg #	62
48) 1,3-Dichlorobenzene	18.92	146	13043221	77148.545 pg	96
49) 1,4-Dichlorobenzene	18.98	146	12372050	71469.040 pg	96
50) 1,2-Dichlorobenzene	19.31	146	14051571	82440.071 pg	93
51) 1,2-Dibromo-3-chloropr...	19.72	157	4400740	81550.745 pg	86
52) 1,2,4-Trichlorobenzene	20.94	182	8346892	82305.241 pg	99
53) Naphthalene	21.05	128	20752767	63926.067 pg	64

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061717.D Vial: 15
Acq On : 7 Mar 2017 8:11 Operator: CL
Sample : 50000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03021703 (3/31)

Quant Time: Mar 07 08:36:11 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

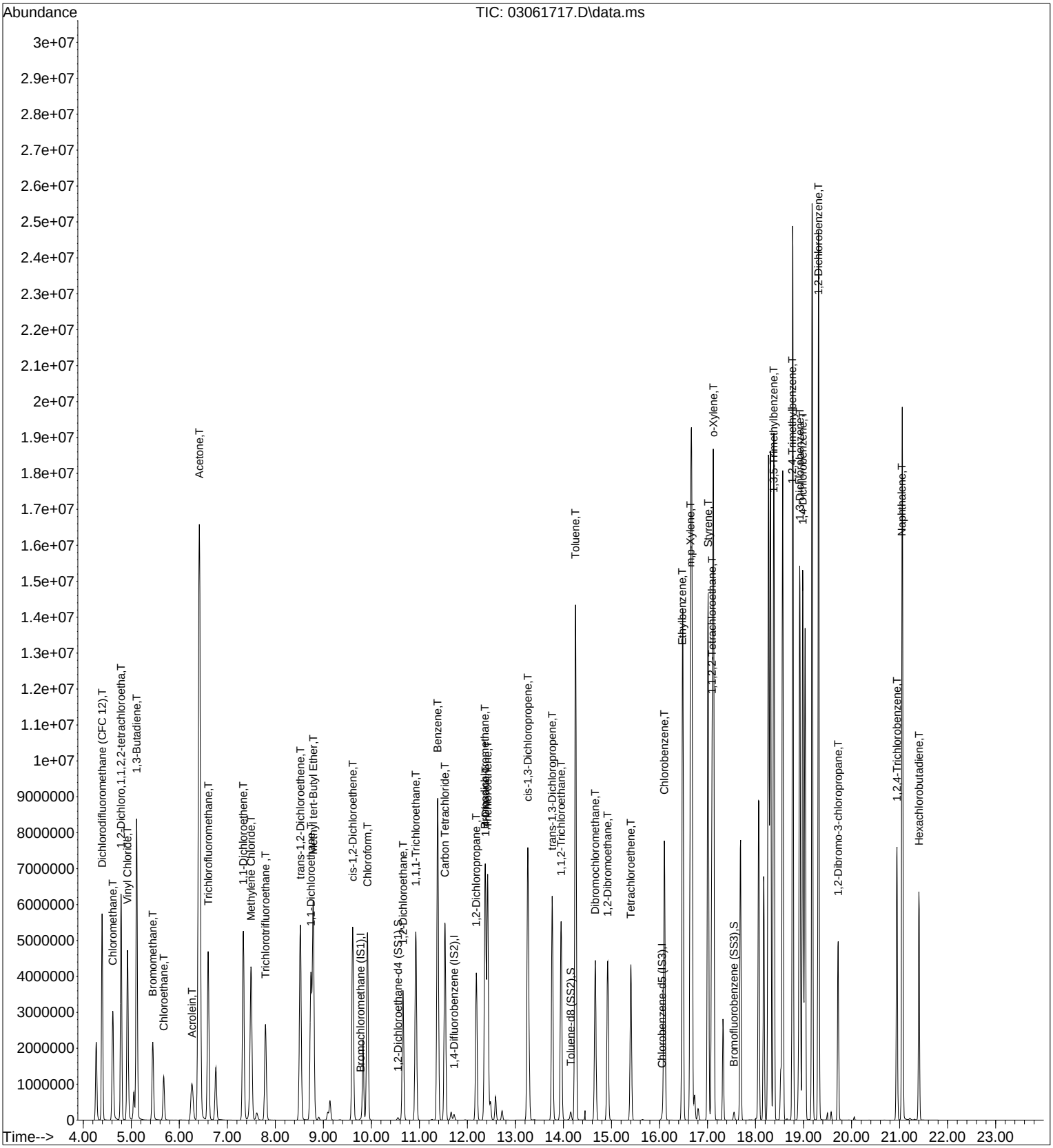
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	5365894	77686.042 pg	98

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061717.D Vial: 15
Acq On : 7 Mar 2017 8:11 Operator: CL
Sample : 50000pg TO15SIM ICAL STD Inst : MS19
Misc : S29-01241701/S29-03021703 (3/31)

Quant Time: Mar 07 08:36:11 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 07:11:06 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061719.D Vial: 11
Acq On : 7 Mar 2017 9:14 Operator: CL
Sample : 500pg TO15SIM ICV Inst : MS19
Misc : S29-01241701/S29-03031708 (4/1)

Quant Time: Mar 07 09:48:43 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration CL 3/7/17
DataAcq Meth:TO15SIM.M

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.76	130	44480	1000.000 pg	-0.02
25) 1,4-Difluorobenzene (IS2)	11.71	114	219757	1000.000 pg	-0.01
38) Chlorobenzene-d5 (IS3)	16.05	54	44710	1000.000 pg	0.00

System Monitoring Compounds

20) 1,2-Dichloroethane-d4 ...	10.53	65	86949	1008.518 pg	-0.02
Spiked Amount 1000.000	Range 70 - 130		Recovery = 100.85%		
33) Toluene-d8 (SS2)	14.15	98	221893	994.316 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 99.43%		
45) Bromofluorobenzene (SS3)	17.55	174	74117	902.777 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 90.28%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.42	85	86317	626.862 pg	100
3) Chloromethane	4.65	52	21932	590.294 pg	97
4) 1,2-Dichloro,1,1,2,2-t...	4.81	85	85227	548.451 pg	100
5) Vinyl Chloride	4.96	62	82416	610.069 pg	99
6) 1,3-Butadiene	5.14	54	43004	631.273 pg	97
7) Bromomethane	5.48	94	28343	627.036 pg	100
8) Chloroethane	5.71	64	20790	602.454 pg	99
9) Acrolein	6.27	56	15978	564.683 pg	96
10) Acetone	6.40	58	119768	3069.087 pg	97
11) Trichlorofluoromethane	6.62	101	62883	594.500 pg	100
12) 1,1-Dichloroethene	7.35	96	34285	590.925 pg	99
13) Methylene Chloride	7.48	84	39181	613.662 pg	98
14) Trichlorotrifluoroethane	7.80	151	32553	583.035 pg	100
15) trans-1,2-Dichloroethene	8.51	96	37217	599.398 pg	100
16) 1,1-Dichloroethane	8.72	63	68182	597.415 pg	99
17) Methyl tert-Butyl Ether	8.79	73	112628	605.443 pg	100
18) cis-1,2-Dichloroethene	9.59	96	39278	592.282 pg	99
19) Chloroform	9.89	83	72576	578.248 pg	100
21) 1,2-Dichloroethane	10.64	62	58859	587.548 pg	100
22) 1,1,1-Trichloroethane	10.91	97	63718	573.593 pg	100
23) Benzene	11.37	78	150412	582.825 pg	100
24) Carbon Tetrachloride	11.52	117	54936	557.312 pg	100
26) 1,2-Dichloropropane	12.18	63	37142	575.053 pg	100
27) Bromodichloromethane	12.36	83	50929	547.448 pg	100
28) Trichloroethene	12.41	130	38208	571.301 pg	100
29) 1,4-Dioxane	12.38	88	29833	590.751 pg	99
30) cis-1,3-Dichloropropene	13.26	75	52583	549.944 pg	100
31) trans-1,3-Dichloropropene	13.77	75	46377	566.134 pg	99
32) 1,1,2-Trichloroethane	13.95	83	30799	566.156 pg	100
34) Toluene	14.25	91	145517	558.004 pg	100
35) Dibromochloromethane	14.66	129	34803	511.760 pg	100
36) 1,2-Dibromoethane	14.92	107	37055	555.020 pg	100
37) Tetrachloroethene	15.40	166	38475	548.646 pg	99
39) Chlorobenzene	16.10	112	95814	565.662 pg	100
40) Ethylbenzene	16.48	91	164246	580.662 pg	100
41) m,p-Xylene	16.65	91	253667	1177.152 pg	100
42) Styrene	17.01	104	81938	545.623 pg	100
43) o-Xylene	17.12	106	59485	551.078 pg	99
44) 1,1,2,2-Tetrachloroethane	17.09	83	61300	535.345 pg	100
46) 1,3,5-Trimethylbenzene	18.38	105	131640	548.650 pg	99
47) 1,2,4-Trimethylbenzene	18.77	105	131235	551.345 pg	99
48) 1,3-Dichlorobenzene	18.92	146	72225	553.259 pg	99
49) 1,4-Dichlorobenzene	18.98	146	73007	542.931 pg	99
50) 1,2-Dichlorobenzene	19.31	146	70577	537.696 pg	100
51) 1,2-Dibromo-3-chloropr...	19.72	157	19480	494.743 pg	96
52) 1,2,4-Trichlorobenzene	20.94	182	43024	562.796 pg	99
53) Naphthalene	21.06	128	138979	587.841 pg	100

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061719.D Vial: 11
Acq On : 7 Mar 2017 9:14 Operator: CL
Sample : 500pg TO15SIM ICV Inst : MS19
Misc : S29-01241701/S29-03031708 (4/1)

Quant Time: Mar 07 09:48:43 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

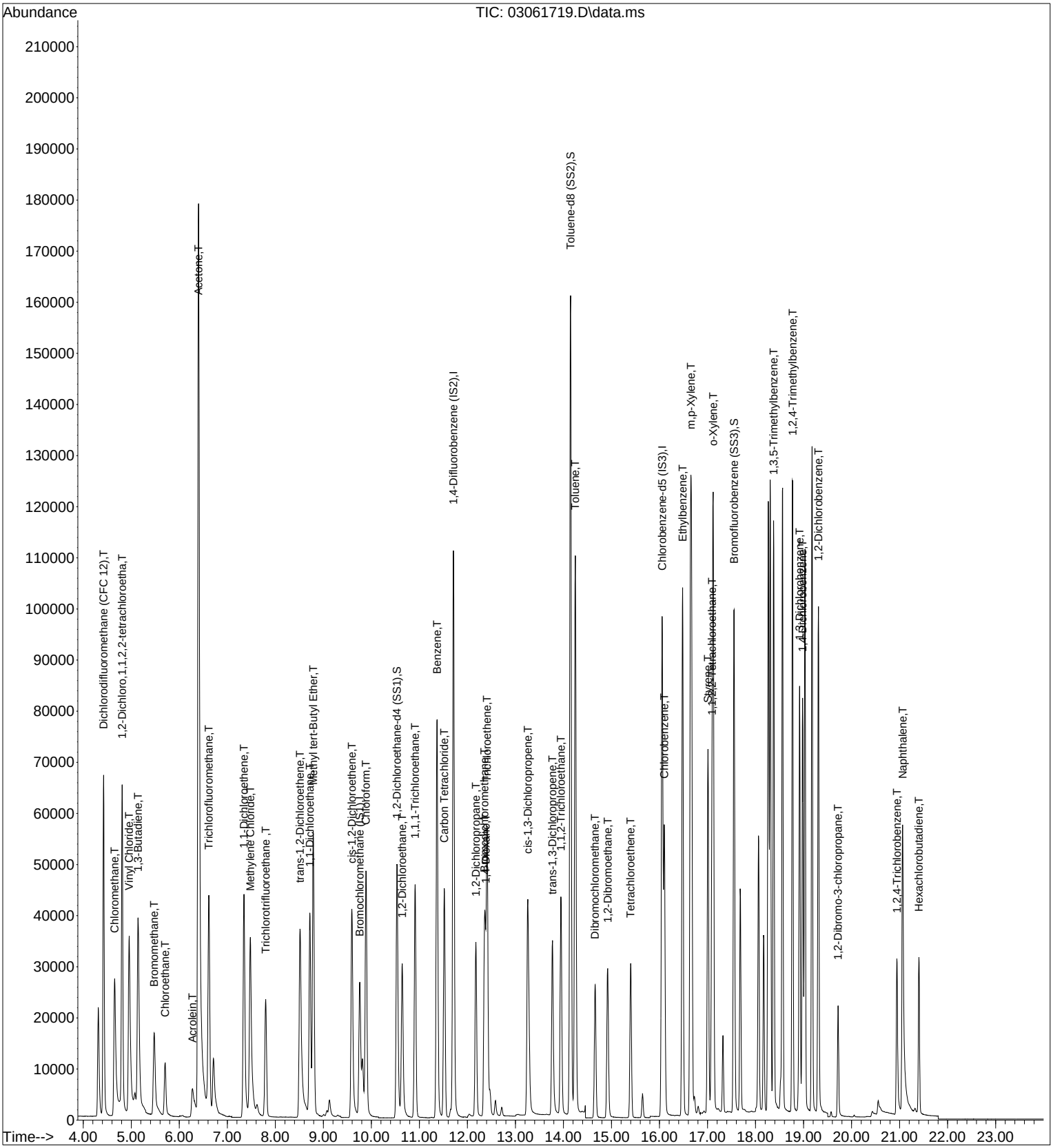
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	29369	530.490 pg	100

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\06\03061719.D Vial: 11
Acq On : 7 Mar 2017 9:14 Operator: CL
Sample : 500pg TO15SIM ICV Inst : MS19
Misc : S29-01241701/S29-03031708 (4/1)

Quant Time: Mar 07 09:48:43 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Data File Name:	**03061719.D**
Data File Path:	**I:\MS19\DATA\2017_03\06**
Operator:	**CL**
Instrument Name:	**MS19**
Sample Name:	**500pg TO15SIM ICV**
Misc Info:	**S29-01241701/S29-03031708 (4/1)**
Date Acquired:	**3/7/17 9:14**
Acq. Method File:	**TO15SIM.M**

CL 3/7/17

#	Compound Name	Ret. Time	Amount Spiked (pg)	Amount Found (pg)	Percent Recovery	Lower Limit	Upper Limit	Flag
2)	Dichlorodifluoromethane (CFC 12)	4.42	525	626.9	119.4	70	130	*
3)	Chloromethane	4.65	524.5	590.3	112.5	70	130	*
4)	*1,2-Dichloro,1,1,2,2-tetrachloroetha*	4.81	527.5	548.5	104.0	70	130	*
5)	Vinyl Chloride	4.96	525	610.1	116.2	70	130	*
6)	*1,3-Butadiene*	5.14	525	631.3	120.2	70	130	*
7)	Bromomethane	5.48	525	627.0	119.4	70	130	*
8)	Chloroethane	5.71	524.5	602.5	114.9	70	130	*
9)	*Acrolein*	6.27	530.5	564.7	106.4	70	130	*
10)	Acetone	6.40	2661	3069.1	115.3	70	130	*
11)	Trichlorofluoromethane	6.62	525.5	594.5	113.1	70	130	*
12)	1,1-Dichloroethene	7.35	531.5	590.9	111.2	70	130	*
13)	Methylene Chloride	7.48	531	613.7	115.6	70	130	*
14)	Trichlorotrifluoroethane	7.80	529	583.0	110.2	70	130	*
15)	trans-1,2-Dichloroethene	8.51	533.5	599.4	112.4	70	130	*
16)	1,1-Dichloroethane	8.72	531	597.4	112.5	70	130	*
17)	Methyl tert-Butyl Ether	8.79	532	605.4	113.8	70	130	*
18)	cis-1,2-Dichloroethene	9.59	529.5	592.3	111.9	70	130	*
19)	Chloroform	9.89	529.5	578.2	109.2	70	130	*
21)	1,2-Dichloroethane	10.64	530	587.5	110.9	70	130	*
22)	1,1,1-Trichloroethane	10.91	529.5	573.6	108.3	70	130	*
25)	Benzene	11.37	530.5	582.8	109.9	70	130	*
24)	Carbon Tetrachloride	11.52	532	557.3	104.8	70	130	*
26)	1,2-Dichloropropane	12.18	530.5	575.1	108.4	70	130	*
27)	Bromodichloromethane	12.36	534	547.4	102.5	70	130	*
28)	Trichloroethene	12.41	531	571.3	107.6	70	130	*
29)	1,4-Dioxane	12.38	532	590.8	111.0	70	130	*
30)	cis-1,3-Dichloropropene	13.26	525.5	549.9	104.7	70	130	*
31)	trans-1,3-Dichloropropene	13.77	533.5	566.1	106.1	70	130	*
32)	1,1,2-Trichloroethane	13.95	530.5	566.2	106.7	70	130	*
34)	Toluene	14.15	529	558.0	105.5	70	130	*
35)	*Dibromochloromethane*	14.66	532	511.8	96.2	70	130	*
36)	1,2-Dibromoethane	14.92	529	555.0	104.9	70	130	*
37)	Tetrachloroethene	15.40	531.5	495.0	93.1	70	130	*
39)	Chlorobenzene	16.10	530	565.7	106.7	70	130	*
40)	Ethylbenzene	16.48	529	580.7	109.8	70	130	*
41)	m,p-Xylene	16.65	1060.5	1177.2	111.0	70	130	*
42)	*Styrene*	17.01	529.5	545.6	103.0	70	130	*
43)	o-Xylene	17.12	529	551.1	104.2	70	130	*
44)	1,1,2,2-Tetrachloroethane	17.09	530	535.3	101.0	70	130	*
46)	*1,3,5-Trimethylbenzene*	18.38	530.5	548.7	103.4	70	130	*
47)	*1,2,4-Trimethylbenzene*	18.77	530.5	551.3	103.9	70	130	*
48)	1,3-Dichlorobenzene	18.92	529.5	553.3	104.5	70	130	*
49)	1,4-Dichlorobenzene	18.98	533	542.9	101.9	70	130	*
50)	1,2-Dichlorobenzene	19.31	531	537.7	101.3	70	130	*
51)	*1,2-Dibromo-3-chloropropane*	19.72	529.5	494.7	93.4	70	130	*
52)	1,2,4-Trichlorobenzene	20.94	530	562.8	106.2	70	130	*
53)	Naphthalene	19.31	534	587.8	110.1	70	130	*
54)	Hexachlorobutadiene	21.40	531.5	530.5	99.8	70	130	*

Evaluate Continuing Calibration Report

Data File : I:\MS19\DATA\2017 03\07\03071702.D Vial: 16
Acq On : 7 Mar 2017 10:20 Operator: CL
Sample : CCV S19030717 1000pg Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 07 10:59:36 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/7/17

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	I	Bromochloromethane (IS1)	1.000	1.000	0.0	96	-0.02
2	T	Dichlorodifluoromethane (CF	3.096	3.023	2.4	96	0.02
3	T	Chloromethane	0.835	0.808	3.2	94	0.03
4	T	1,2-Dichloro,1,1,2,2-tetrac	3.494	3.353	4.0	96	0.02
5	T	Vinyl Chloride	3.037	2.876	5.3	94	0.02
6	T	1,3-Butadiene	1.532	1.430	6.7	101	0.02
7	T	Bromomethane	1.016	1.009	0.7	101	0.02
8	T	Chloroethane	0.776	0.734	5.4	96	0.02
9	T	Acrolein	0.636	0.550	13.5	98	0.00
10	T	Acetone	0.877	0.786	10.4	98	-0.02
11	T	Trichlorofluoromethane	2.378	2.272	4.5	98	0.00
12	T	1,1-Dichloroethene	1.304	1.249	4.2	97	0.00
13	T	Methylene Chloride	1.435	1.312	8.6	94	-0.02
14	T	Trichlorotrifluoroethane	1.255	1.180	6.0	95	0.00
15	T	trans-1,2-Dichloroethene	1.396	1.364	2.3	98	-0.01
16	T	1,1-Dichloroethane	2.566	2.482	3.3	95	-0.03
17	T	Methyl tert-Butyl Ether	4.182	4.106	1.8	98	0.00
18	T	cis-1,2-Dichloroethene	1.491	1.458	2.2	97	-0.02
19	T	Chloroform	2.822	2.642	6.4	95	-0.03
20	S	1,2-Dichloroethane-d4 (SS1)	1.938	1.965	-1.4	97	-0.02
21	T	1,2-Dichloroethane	2.252	2.196	2.5	96	-0.02
22	T	1,1,1-Trichloroethane	2.497	2.395	4.1	96	-0.02
23	T	Benzene	5.802	5.441	6.2	95	-0.02
24	T	Carbon Tetrachloride	2.216	2.080	6.1	96	-0.02
25	I	1,4-Difluorobenzene (IS2)	1.000	1.000	0.0	97	-0.01
26	T	1,2-Dichloropropane	0.294	0.279	5.1	95	0.00
27	T	Bromodichloromethane	0.423	0.392	7.3	95	0.00
28	T	Trichloroethene	0.304	0.286	5.9	96	0.00
29	T	1,4-Dioxane	0.230	0.223	3.0	96	0.00
30	T	cis-1,3-Dichloropropene	0.435	0.412	5.3	96	0.00
31	T	trans-1,3-Dichloropropene	0.373	0.362	2.9	97	0.00
32	T	1,1,2-Trichloroethane	0.248	0.235	5.2	95	0.00
33	S	Toluene-d8 (SS2)	1.015	1.007	0.8	97	0.00
34	T	Toluene	1.187	1.093	7.9	96	0.00
35	T	Dibromochloromethane	0.309	0.281	9.1	95	0.00
36	T	1,2-Dibromoethane	0.304	0.287	5.6	96	0.00
37	T	Tetrachloroethene	0.319	0.290	9.1	95	0.00
38	I	Chlorobenzene-d5 (IS3)	1.000	1.000	0.0	96	0.00
39	T	Chlorobenzene	3.789	3.538	6.6	96	0.00
40	T	Ethylbenzene	6.327	6.170	2.5	96	0.00
41	T	m,p-Xylene	4.820	4.769	1.1	96	0.00
42	T	Styrene	3.359	3.223	4.0	96	0.00
43	T	o-Xylene	2.414	2.242	7.1	95	0.00
44	T	1,1,2,2-Tetrachloroethane	2.561	2.400	6.3	95	0.00
45	S	Bromofluorobenzene (SS3)	1.836	1.662	9.5	94	0.00
46	T	1,3,5-Trimethylbenzene	5.366	5.058	5.7	96	0.00
47	T	1,2,4-Trimethylbenzene	5.324	5.159	3.1	96	0.00
48	T	1,3-Dichlorobenzene	2.920	2.711	7.2	95	0.00
49	T	1,4-Dichlorobenzene	3.008	2.686	10.7	96	0.00
50	T	1,2-Dichlorobenzene	2.936	2.709	7.7	96	0.00
51	T	1,2-Dibromo-3-chloropropane	0.881	0.831	5.7	95	0.00
52	T	1,2,4-Trichlorobenzene	1.710	1.589	7.1	97	0.00
53	T	Naphthalene	5.288	5.010	5.3	99	0.01
54	T	Hexachlorobutadiene	1.238	1.168	5.7	97	0.00

Evaluate Continuing Calibration Report

Data File : I:\MS19\DATA\2017 03\07\03071702.D Vial: 16
Acq On : 7 Mar 2017 10:20 Operator: CL
Sample : CCV S19030717 1000pg Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 07 10:59:36 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.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)

(#) = Out of Range SPCC's out = 0 CCC's out = 0

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071702.D Vial: 16
Acq On : 7 Mar 2017 10:20 Operator: CL
Sample : CCV S19030717 1000pg Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 07 10:59:36 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/7/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.75	130	41816	1000.000 pg	-0.02
25) 1,4-Difluorobenzene (IS2)	11.71	114	207762	1000.000 pg	-0.01
38) Chlorobenzene-d5 (IS3)	16.05	54	42091	1000.000 pg	0.00

System Monitoring Compounds					
20) 1,2-Dichloroethane-d4 ...	10.53	65	82148	1013.534 pg	-0.02
Spiked Amount 1000.000	Range 70 - 130		Recovery = 101.35%		
33) Toluene-d8 (SS2)	14.14	98	209283	991.954 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 99.19%		
45) Bromofluorobenzene (SS3)	17.55	174	69944	904.959 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 90.50%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.41	85	132352	1022.418 pg	100
3) Chloromethane	4.64	52	33950	971.968 pg	96
4) 1,2-Dichloro,1,1,2,2-t...	4.81	85	140895	964.448 pg	100
5) Vinyl Chloride	4.94	62	123020	968.647 pg	99
6) 1,3-Butadiene	5.13	54	63215	987.076 pg	100
7) Bromomethane	5.47	94	41889	985.756 pg	99
8) Chloroethane	5.69	64	30952	954.070 pg	99
9) Acrolein	6.26	56	23933	899.709 pg	99
10) Acetone	6.39	58	174684	4761.500 pg	100
11) Trichlorofluoromethane	6.61	101	99641	1002.026 pg	100
12) 1,1-Dichloroethene	7.34	96	55291	1013.690 pg	100
13) Methylene Chloride	7.47	84	57976	965.882 pg	96
14) Trichlorotrifluoroethane	7.80	151	51748	985.870 pg	100
15) trans-1,2-Dichloroethene	8.51	96	60880	1042.967 pg	99
16) 1,1-Dichloroethane	8.71	63	105866	986.700 pg	99
17) Methyl tert-Butyl Ether	8.78	73	183049	1046.686 pg	100
18) cis-1,2-Dichloroethene	9.59	96	64852	1040.218 pg	99
19) Chloroform	9.88	83	116904	990.770 pg	99
21) 1,2-Dichloroethane	10.64	62	96619	1025.924 pg	99
22) 1,1,1-Trichloroethane	10.91	97	107549	1029.842 pg	100
23) Benzene	11.36	78	239333	986.462 pg	100
24) Carbon Tetrachloride	11.51	117	91770	990.295 pg	100
26) 1,2-Dichloropropane	12.18	63	61510	1007.314 pg	100
27) Bromodichloromethane	12.36	83	86798	986.879 pg	100
28) Trichloroethene	12.41	130	62938	995.406 pg	100
29) 1,4-Dioxane	12.38	88	49175	1029.979 pg	99
30) cis-1,3-Dichloropropene	13.25	75	95614	1057.721 pg	100
31) trans-1,3-Dichloropropene	13.77	75	80001	1032.972 pg	100
32) 1,1,2-Trichloroethane	13.95	83	51713	1005.486 pg	100
34) Toluene	14.24	91	239179	970.115 pg	100
35) Dibromochloromethane	14.66	129	61896	962.696 pg	100
36) 1,2-Dibromoethane	14.92	107	62899	996.511 pg	99
37) Tetrachloroethene	15.40	166	64009	965.454 pg	99
39) Chlorobenzene	16.10	112	158017	990.939 pg	100
40) Ethylbenzene	16.48	91	273974	1028.854 pg	100
41) m,p-Xylene	16.65	91	426163	2100.679 pg	100
42) Styrene	17.01	104	143931	1018.068 pg	100
43) o-Xylene	17.12	106	99475	978.893 pg	100
44) 1,1,2,2-Tetrachloroethane	17.09	83	106679	989.618 pg	100
46) 1,3,5-Trimethylbenzene	18.37	105	223349	988.797 pg	100
47) 1,2,4-Trimethylbenzene	18.77	105	228454	1019.502 pg	100
48) 1,3-Dichlorobenzene	18.92	146	120739	982.436 pg	100
49) 1,4-Dichlorobenzene	18.98	146	119600	944.771 pg	100
50) 1,2-Dichlorobenzene	19.31	146	120649	976.366 pg	100
51) 1,2-Dibromo-3-chloropr...	19.72	157	36837	993.780 pg	97
52) 1,2,4-Trichlorobenzene	20.95	182	69770	969.448 pg	99
53) Naphthalene	21.06	128	228388	1026.124 pg	100

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071702.D Vial: 16
Acq On : 7 Mar 2017 10:20 Operator: CL
Sample : CCV S19030717 1000pg Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 07 10:59:36 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	52046	998.599	pg	99

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\07\03071702.D Vial: 16
Acq On : 7 Mar 2017 10:20 Operator: CL
Sample : CCV S19030717 1000pg Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 07 10:59:36 2017
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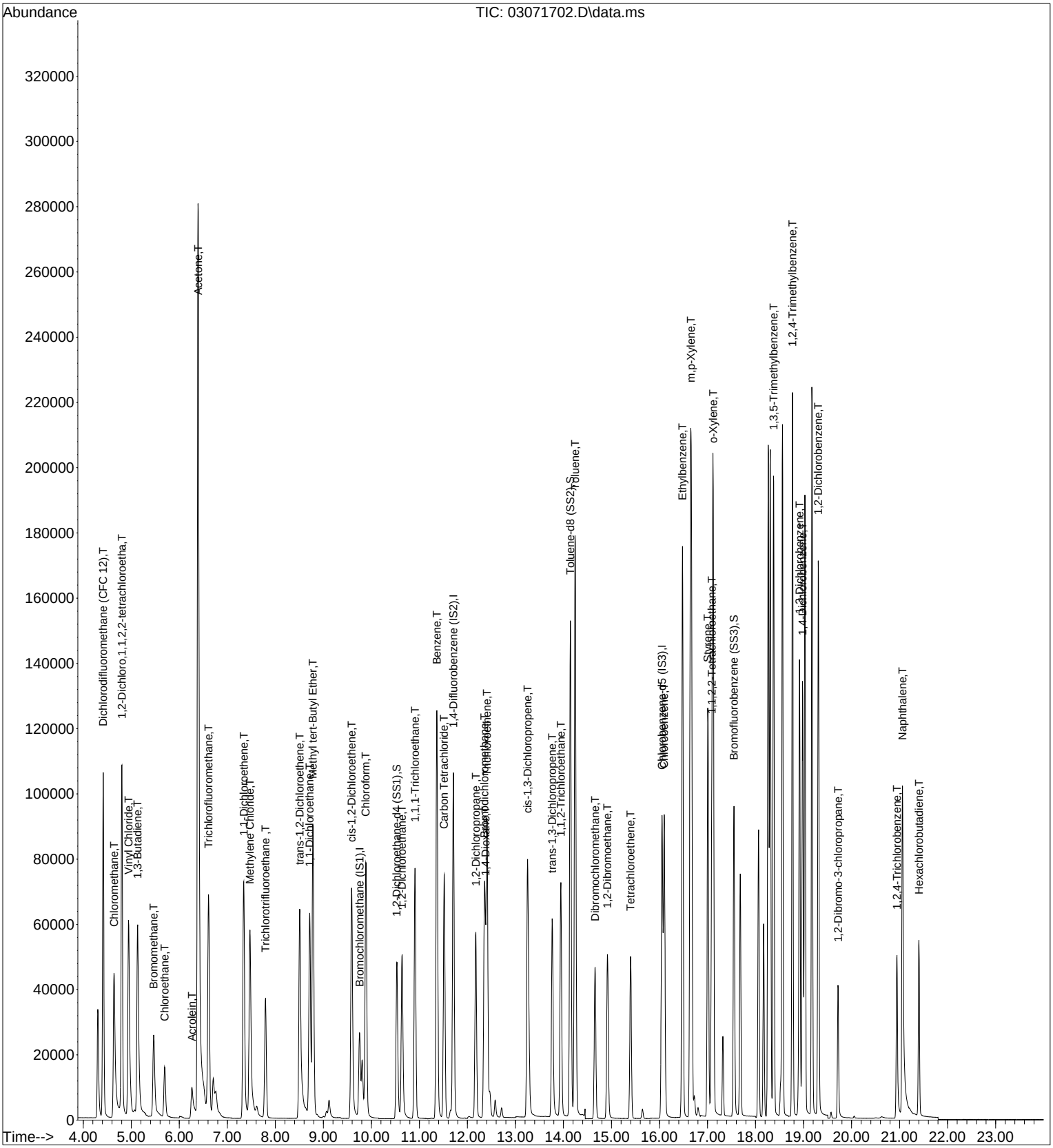
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M



Evaluate Continuing Calibration Report

Data File : I:\MS19\DATA\2017 03\08\03081702.D Vial: 16
Acq On : 8 Mar 2017 4:54 Operator: CL
Sample : CCV S19030817 1000pg Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 08 07:16:13 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/8/17

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	I	Bromochloromethane (IS1)	1.000	1.000	0.0	89	-0.03
2	T	Dichlorodifluoromethane (CF	3.096	3.342	-7.9	98	0.02
3	T	Chloromethane	0.835	0.846	-1.3	91	0.02
4	T	1,2-Dichloro,1,1,2,2-tetrac	3.494	3.648	-4.4	97	0.00
5	T	Vinyl Chloride	3.037	3.182	-4.8	96	0.02
6	T	1,3-Butadiene	1.532	1.590	-3.8	104	0.01
7	T	Bromomethane	1.016	1.115	-9.7	103	0.01
8	T	Chloroethane	0.776	0.834	-7.5	100	0.02
9	T	Acrolein	0.636	0.603	5.2	99	0.00
10	T	Acetone	0.877	0.852	2.9	98	-0.03
11	T	Trichlorofluoromethane	2.378	2.504	-5.3	99	0.00
12	T	1,1-Dichloroethene	1.304	1.381	-5.9	99	0.00
13	T	Methylene Chloride	1.435	1.470	-2.4	97	-0.03
14	T	Trichlorotrifluoroethane	1.255	1.316	-4.9	98	0.00
15	T	trans-1,2-Dichloroethene	1.396	1.514	-8.5	100	-0.02
16	T	1,1-Dichloroethane	2.566	2.745	-7.0	97	-0.03
17	T	Methyl tert-Butyl Ether	4.182	4.566	-9.2	100	0.00
18	T	cis-1,2-Dichloroethene	1.491	1.623	-8.9	99	-0.02
19	T	Chloroform	2.822	2.915	-3.3	97	-0.03
20	S	1,2-Dichloroethane-d4 (SS1)	1.938	1.906	1.7	86	-0.02
21	T	1,2-Dichloroethane	2.252	2.393	-6.3	96	-0.02
22	T	1,1,1-Trichloroethane	2.497	2.694	-7.9	99	-0.02
23	T	Benzene	5.802	5.994	-3.3	96	-0.02
24	T	Carbon Tetrachloride	2.216	2.346	-5.9	100	-0.02
25	I	1,4-Difluorobenzene (IS2)	1.000	1.000	0.0	89	-0.02
26	T	1,2-Dichloropropane	0.294	0.309	-5.1	97	-0.02
27	T	Bromodichloromethane	0.423	0.437	-3.3	97	-0.02
28	T	Trichloroethene	0.304	0.323	-6.3	99	-0.01
29	T	1,4-Dioxane	0.230	0.251	-9.1	100	0.00
30	T	cis-1,3-Dichloropropene	0.435	0.470	-8.0	101	0.00
31	T	trans-1,3-Dichloropropene	0.373	0.411	-10.2	101	0.00
32	T	1,1,2-Trichloroethane	0.248	0.261	-5.2	98	0.00
33	S	Toluene-d8 (SS2)	1.015	1.015	0.0	89	-0.01
34	T	Toluene	1.187	1.232	-3.8	99	-0.01
35	T	Dibromochloromethane	0.309	0.317	-2.6	99	0.00
36	T	1,2-Dibromoethane	0.304	0.324	-6.6	100	0.00
37	T	Tetrachloroethene	0.319	0.330	-3.4	99	0.00
38	I	Chlorobenzene-d5 (IS3)	1.000	1.000	0.0	87	0.00
39	T	Chlorobenzene	3.789	4.053	-7.0	100	0.00
40	T	Ethylbenzene	6.327	8.082	-27.7	115	0.00
41	T	m,p-Xylene	4.820	6.442	-33.7#	118	0.00
42	T	Styrene	3.359	4.700	-39.9#	127	0.00
43	T	o-Xylene	2.414	3.354	-38.9#	130	0.00
44	T	1,1,2,2-Tetrachloroethane	2.561	3.267	-27.6	117	0.00
45	S	Bromofluorobenzene (SS3)	1.836	2.337	-27.3	120	0.00
46	T	1,3,5-Trimethylbenzene	5.366	5.748	-7.1	99	0.00
47	T	1,2,4-Trimethylbenzene	5.324	5.791	-8.8	98	0.00
48	T	1,3-Dichlorobenzene	2.920	3.061	-4.8	98	0.00
49	T	1,4-Dichlorobenzene	3.008	3.031	-0.8	98	0.00
50	T	1,2-Dichlorobenzene	2.936	3.012	-2.6	97	0.00
51	T	1,2-Dibromo-3-chloropropane	0.881	0.934	-6.0	97	0.00
52	T	1,2,4-Trichlorobenzene	1.710	1.772	-3.6	98	0.00
53	T	Naphthalene	5.288	5.567	-5.3	100	0.01
54	T	Hexachlorobutadiene	1.238	1.282	-3.6	97	0.00

Evaluate Continuing Calibration Report

Data File : I:\MS19\DATA\2017 03\08\03081702.D Vial: 16
Acq On : 8 Mar 2017 4:54 Operator: CL
Sample : CCV S19030817 1000pg Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 08 07:16:13 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.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)

(#) = Out of Range SPCC's out = 0 CCC's out = 0

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081702.D Vial: 16
Acq On : 8 Mar 2017 4:54 Operator: CL
Sample : CCV S19030817 1000pg Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 08 07:16:13 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

CL 3/8/17

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	9.75	130	38524	1000.000 pg	-0.03
25) 1,4-Difluorobenzene (IS2)	11.71	114	190769	1000.000 pg	-0.02
38) Chlorobenzene-d5 (IS3)	16.05	54	38163	1000.000 pg	0.00

System Monitoring Compounds					
20) 1,2-Dichloroethane-d4 ...	10.53	65	73425	983.323 pg	-0.02
Spiked Amount 1000.000	Range 70 - 130		Recovery = 98.33%		
33) Toluene-d8 (SS2)	14.14	98	193656	999.647 pg	-0.01
Spiked Amount 1000.000	Range 70 - 130		Recovery = 99.96%		
45) Bromofluorobenzene (SS3)	17.55	174	89180	1272.601 pg	0.00
Spiked Amount 1000.000	Range 70 - 130		Recovery = 127.26%		

Target Compounds					Qvalue
2) Dichlorodifluoromethan...	4.41	85	134787	1130.205 pg	100
3) Chloromethane	4.64	52	32764	1018.170 pg	97
4) 1,2-Dichloro,1,1,2,2-t...	4.80	85	141239	1049.419 pg	100
5) Vinyl Chloride	4.94	62	125394	1071.711 pg	100
6) 1,3-Butadiene	5.12	54	64731	1097.119 pg	98
7) Bromomethane	5.46	94	42638	1089.124 pg	99
8) Chloroethane	5.69	64	32425	1084.882 pg	100
9) Acrolein	6.26	56	24186	986.915 pg	97
10) Acetone	6.39	58	174423	5160.664 pg	99
11) Trichlorofluoromethane	6.61	101	101198	1104.649 pg	100
12) 1,1-Dichloroethene	7.34	96	56334	1121.069 pg	98
13) Methylene Chloride	7.47	84	59861	1082.508 pg	99
14) Trichlorotrifluoroethane	7.79	151	53167	1099.460 pg	100
15) trans-1,2-Dichloroethene	8.50	96	62224	1157.085 pg	98
16) 1,1-Dichloroethane	8.71	63	107875	1091.341 pg	100
17) Methyl tert-Butyl Ether	8.78	73	187497	1163.736 pg	99
18) cis-1,2-Dichloroethene	9.59	96	66516	1158.080 pg	99
19) Chloroform	9.88	83	118819	1093.051 pg	100
21) 1,2-Dichloroethane	10.64	62	96978	1117.730 pg	99
22) 1,1,1-Trichloroethane	10.91	97	111481	1158.714 pg	100
23) Benzene	11.36	78	242914	1086.779 pg	100
24) Carbon Tetrachloride	11.51	117	95366	1117.040 pg	100
26) 1,2-Dichloropropane	12.17	63	62675	1117.820 pg	100
27) Bromodichloromethane	12.35	83	88853	1100.233 pg	100
28) Trichloroethene	12.41	130	65345	1125.532 pg	100
29) 1,4-Dioxane	12.37	88	50938	1161.942 pg	98
30) cis-1,3-Dichloropropene	13.25	75	100109	1206.094 pg	100
31) trans-1,3-Dichloropropene	13.77	75	83367	1172.319 pg	99
32) 1,1,2-Trichloroethane	13.95	83	52851	1119.148 pg	99
34) Toluene	14.24	91	247398	1092.835 pg	100
35) Dibromochloromethane	14.66	129	64245	1088.239 pg	100
36) 1,2-Dibromoethane	14.92	107	65285	1126.446 pg	100
37) Tetrachloroethene	15.40	166	66842	1097.990 pg	99
39) Chlorobenzene	16.10	112	164120	1135.145 pg	100
40) Ethylbenzene	16.48	91	325410	1347.789 pg	98
41) m,p-Xylene	16.65	91	521901	2837.389 pg	97
42) Styrene	17.01	104	190321	1484.759 pg	99
43) o-Xylene	17.12	106	134920	1464.348 pg	93
44) 1,1,2,2-Tetrachloroethane	17.09	83	131680	1347.272 pg	99
46) 1,3,5-Trimethylbenzene	18.37	105	230104	1123.554 pg	100
47) 1,2,4-Trimethylbenzene	18.77	105	232503	1144.366 pg	100
48) 1,3-Dichlorobenzene	18.92	146	123578	1109.033 pg	100
49) 1,4-Dichlorobenzene	18.98	146	122382	1066.252 pg	100
50) 1,2-Dichlorobenzene	19.31	146	121620	1085.527 pg	100
51) 1,2-Dibromo-3-chloropr...	19.72	157	37549	1117.252 pg	99
52) 1,2,4-Trichlorobenzene	20.94	182	70535	1080.954 pg	99
53) Naphthalene	21.06	128	230096	1140.203 pg	100

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081702.D Vial: 16
Acq On : 8 Mar 2017 4:54 Operator: CL
Sample : CCV S19030817 1000pg Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 08 07:16:13 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

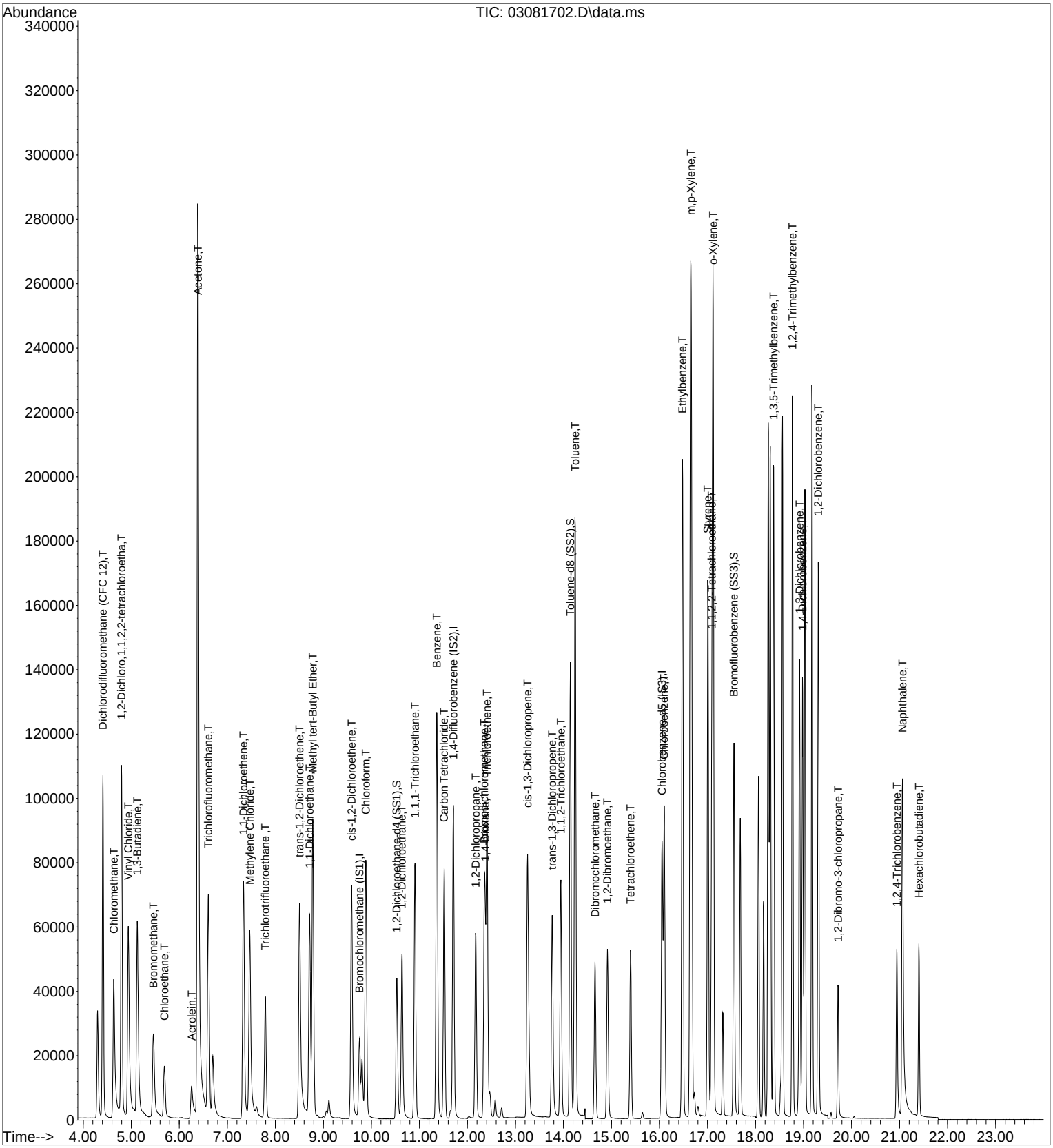
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
54) Hexachlorobutadiene	21.40	225	51814	1096.472 pg	100

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

Quantitation Report (QT Reviewed)

Data File : I:\MS19\DATA\2017 03\08\03081702.D Vial: 16
Acq On : 8 Mar 2017 4:54 Operator: CL
Sample : CCV S19030817 1000pg Inst : MS19
Misc : S29-01241701/S29-02171708 (3/18)

Quant Time: Mar 08 07:16:13 2017
Quant Method : I:\MS19\METHODS\S19030617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 07 08:48:37 2017
Response via : Initial Calibration
DataAcq Meth:TO15SIM.M

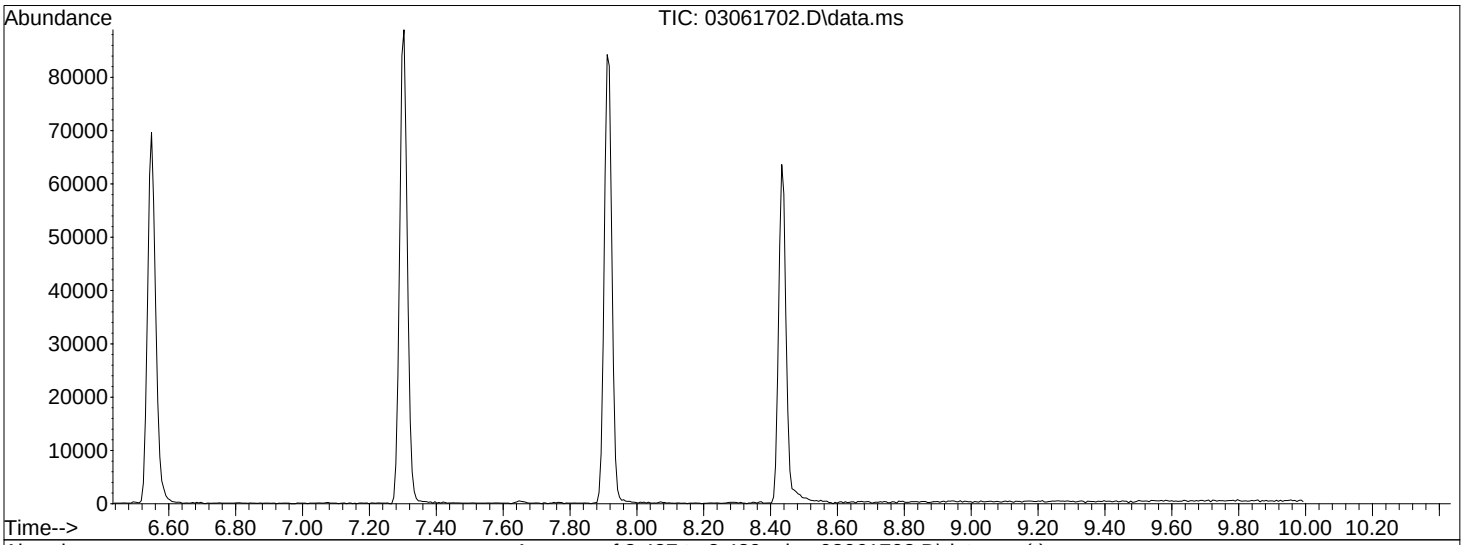


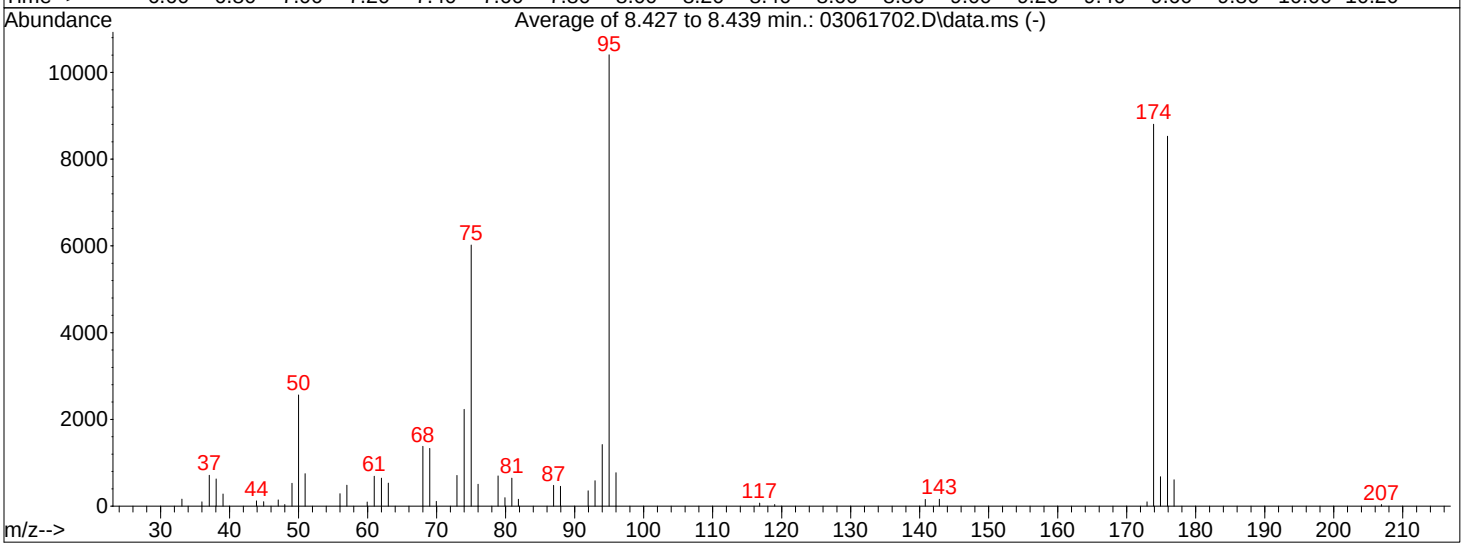
Data Path : I:\MS19\DATA\2017 03\06\
Data File : 03061702.D
Acq On : 6 Mar 2017 15:33
Operator : CL
Sample : BFB S19030617
Misc : S29-01241701
ALS Vial : 2 Sample Multiplier: 1

Integration File: rteint.p

Method : I:\MS19\METHODS\S19030617.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue Mar 07 08:48:37 2017

CL 3/7/17





AutoFind: Scans 707, 708, 709; Background Corrected with Scan 702

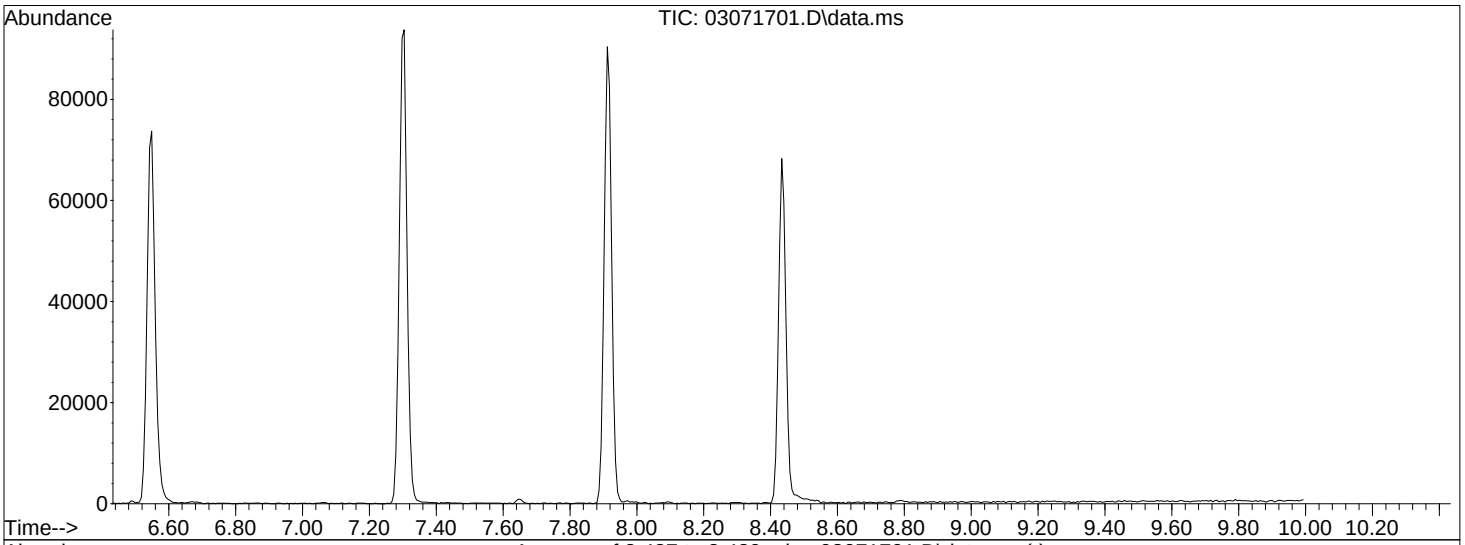
Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	24.6	2562	PASS
75	95	30	66	57.9	6021	PASS
95	95	100	100	100.0	10406	PASS
96	95	5	9	7.4	772	PASS
173	174	0.00	2	1.1	100	PASS
174	95	50	120	84.6	8805	PASS
175	174	4	9	7.7	680	PASS
176	174	93	101	96.9	8529	PASS
177	176	5	9	7.1	607	PASS

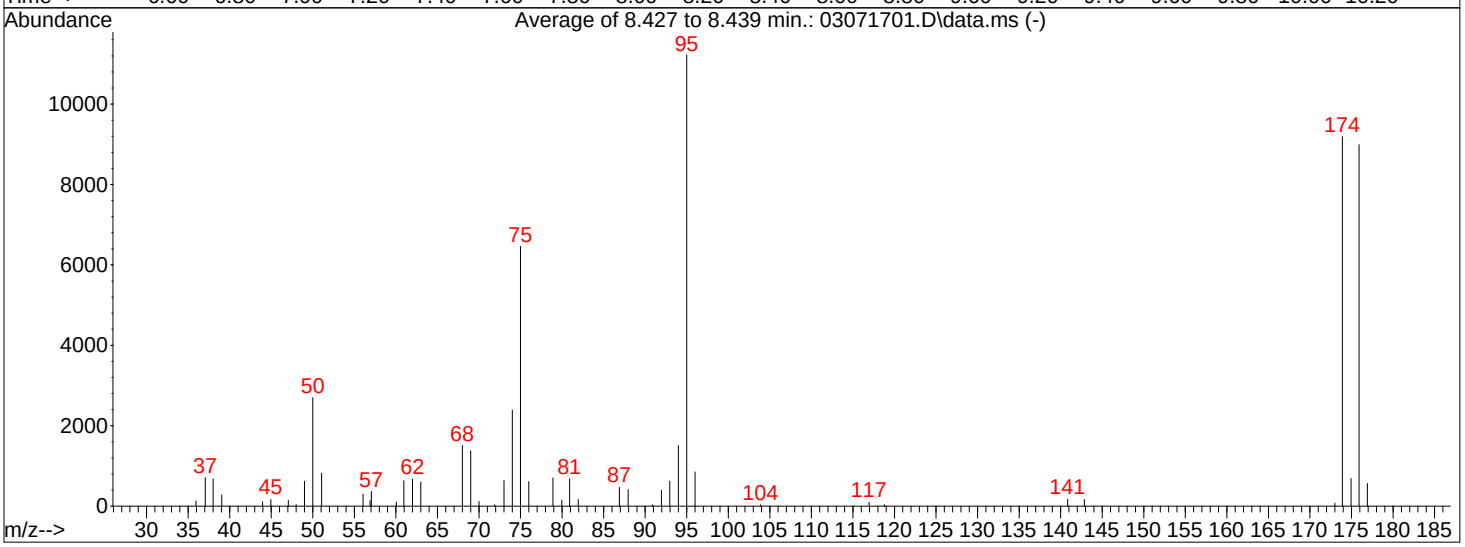
Data Path : I:\MS19\DATA\2017 03\07\
Data File : 03071701.D
Acq On : 7 Mar 2017 10:00
Operator : CL
Sample : BFB S19030717
Misc : S29-01241701
ALS Vial : 2 Sample Multiplier: 1

Integration File: rteint.p

Method : I:\MS19\METHODS\S19030617.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue Mar 07 08:48:37 2017

CL 3/7/17





AutoFind: Scans 707, 708, 709; Background Corrected with Scan 702

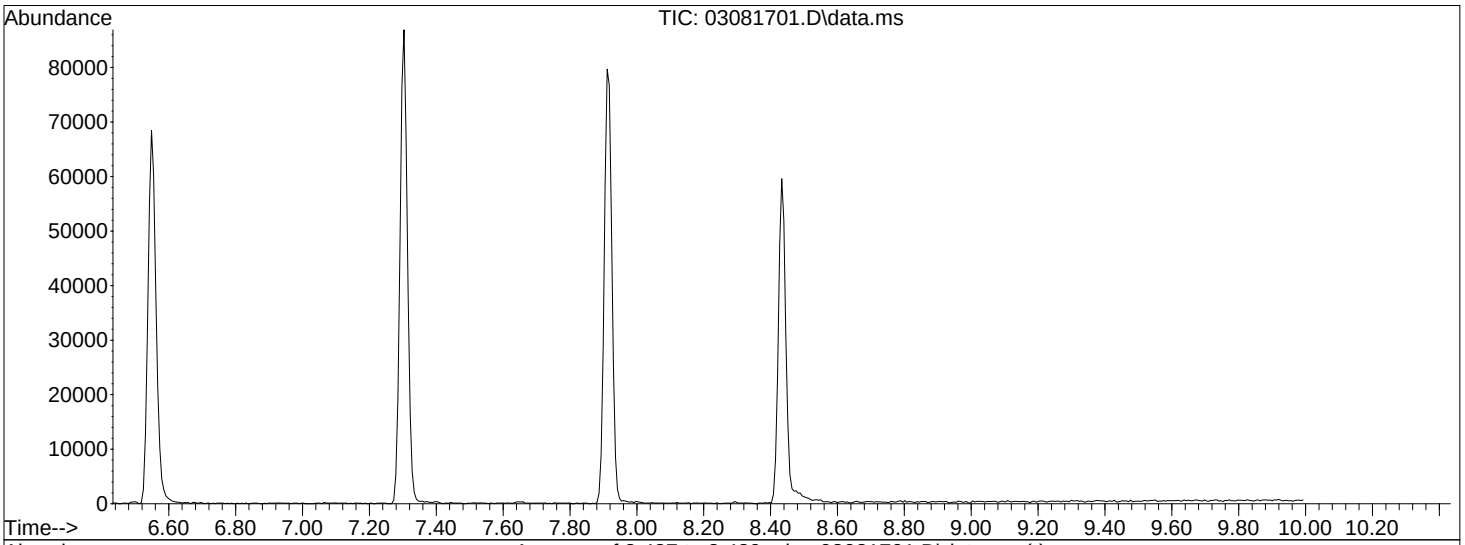
Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	24.0	2700	PASS
75	95	30	66	57.5	6458	PASS
95	95	100	100	100.0	11227	PASS
96	95	5	9	7.6	852	PASS
173	174	0.00	2	0.8	77	PASS
174	95	50	120	81.8	9189	PASS
175	174	4	9	7.5	688	PASS
176	174	93	101	97.8	8990	PASS
177	176	5	9	6.3	567	PASS

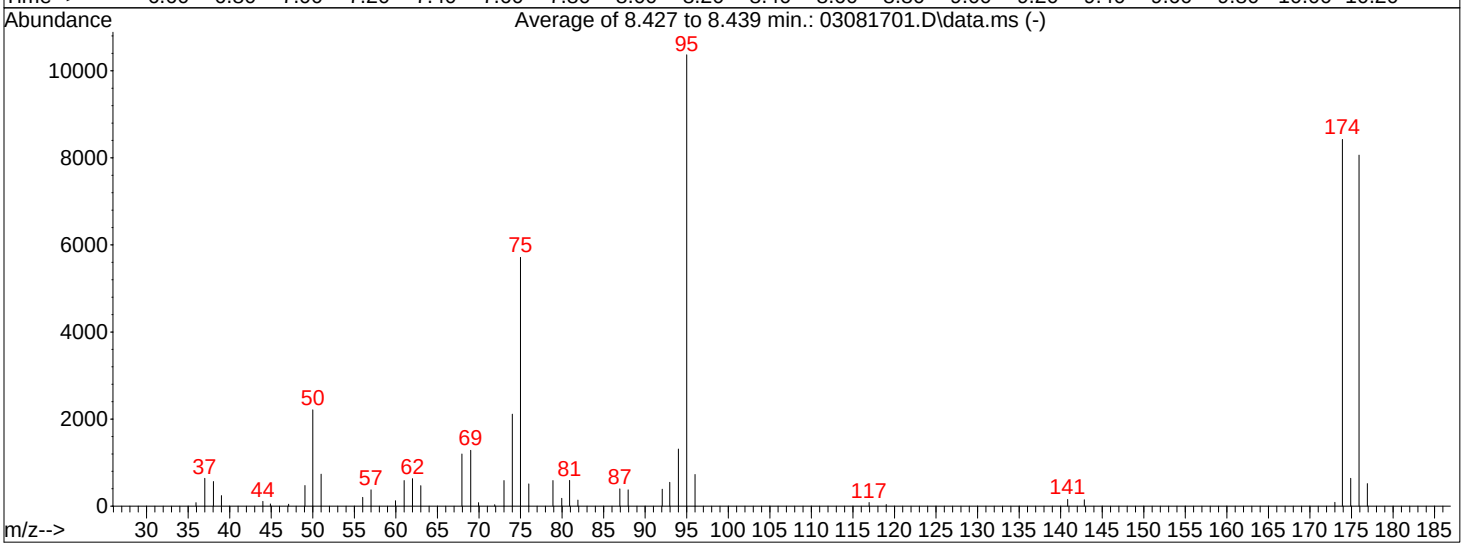
Data Path : I:\MS19\DATA\2017 03\08\
Data File : 03081701.D
Acq On : 8 Mar 2017 4:35
Operator : CL
Sample : BFB S19030817
Misc : S29-01241701
ALS Vial : 2 Sample Multiplier: 1

Integration File: rteint.p

Method : I:\MS19\METHODS\S19030617.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue Mar 07 08:48:37 2017

CL 3/8/17





AutoFind: Scans 707, 708, 709; Background Corrected with Scan 702

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	21.3	2211	PASS
75	95	30	66	55.1	5716	PASS
95	95	100	100	100.0	10368	PASS
96	95	5	9	7.0	729	PASS
173	174	0.00	2	1.0	87	PASS
174	95	50	120	81.3	8424	PASS
175	174	4	9	7.6	640	PASS
176	174	93	101	95.7	8064	PASS
177	176	5	9	6.4	519	PASS

Injection Log

Directory: I:\MS19\DATA\2017_03\06\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	3/6/17 15:33	03061702.D	BFB S19030617	S29-01241701	CL	2	Pass
2	3/6/17 16:03	03061703.D	20pg TO15SIM ICAL STD	S29-01241701/S29-03061701 (4/4)	CL	12	
3	3/6/17 16:35	03061704.D	50pg TO15SIM ICAL STD	S29-01241701/S29-03061701 (4/4)	CL	12	
4	3/6/17 17:06	03061705.D	100pg TO15SIM ICAL STD	S29-01241701/S29-03061701 (4/4)	CL	12	
5	3/6/17 17:37	03061706.D	500pg TO15SIM ICAL STD	S29-01241701/S29-03021708 (3/31)	CL	13	
6	3/6/17 18:09	03061707.D	1000pg TO15SIM ICAL STD	S29-01241701/S29-02171708 (3/18)	CL	14	
7	3/6/17 18:40	03061708.D	2000pg TO15SIM ICAL STD	S29-01241701/S29-02171708 (3/18)	CL	14	
8	3/6/17 19:11	03061709.D	5000pg TO15SIM ICAL STD	S29-01241701/S29-02171708 (3/18)	CL	14	
9	3/6/17 19:42	03061710.D	10000pg TO15SIM ICAL STD	S29-01241701/S29-02171708 (3/18)	CL	14	
10	3/6/17 20:13	03061711.D	blank	S29-01241701	CL	2	
11	3/6/17 20:45	03061712.D	50000pg TO15SIM ICAL STD	S29-01241701/S29-03021703 (3/31)	CL	15	Not Used
12	3/6/17 21:16	03061713.D	blank	S29-01241701	CL	2	
13	3/6/17 21:48	03061714.D	500pg TO15SIM ICV	S29-01241701/S29-03031708 (4/1)	CL	11	Not Used
14	3/6/17 22:18	03061715.D	500pg TO15SIM ICV	S29-01241701/S29-03031708 (4/1)	CL	11	Not Used
15	3/7/17 7:40	03061716.D	blank	S29-01241701	CL	2	
16	3/7/17 8:11	03061717.D	50000pg TO15SIM ICAL STD	S29-01241701/S29-03021703 (3/31)	CL	15	
17	3/7/17 8:43	03061718.D	blank	S29-01241701	CL	2	
18	3/7/17 9:14	03061719.D	500pg TO15SIM ICV	S29-01241701/S29-03031708 (4/1)	CL	11	Pass

CL 3/7/17

Injection Log

Directory: I:\MS19\DATA\2017_03\07\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	3/7/17 10:00	03071701.D	BFB S19030717	S29-01241701	CL	2	Pass
2	3/7/17 10:20	03071702.D	CCV S19030717_1000pg	S29-01241701/S29-02171708 (3/18)	CL	16	Pass
3	3/7/17 10:51	03071703.D	MB S19030717_1000mL	S29-01241701/AC01205	CL	2	Pass
4	3/7/17 11:22	03071704.D	xxLCS S19030717_500pgxx	S29-01241701/S29-03031708 (4/1)	CL	2	
5	3/7/17 11:53	03071705.D	LCS S19030717_500pg	S29-01241701/S29-03031708 (4/1)	CL	2	Pass
6	3/7/17 13:01	03071706.D	xxP1700939-013 (500mL)xx	S29-01241701	CL	1	IS3 Fail, RR
7	3/7/17 13:32	03071707.D	P1700939-016 (500mL)	S29-01241701	CL	3	
8	3/7/17 14:03	03071708.D	P1700947-018 (1000mL)	S29-01241701	CL	4	
9	3/7/17 14:34	03071709.D	P1700939-013 (250mL)	S29-01241701	CL	1	
10	3/7/17 15:05	03071710.D	P1700947-019 (1000mL)	S29-01241701	CL	5	
11	3/7/17 15:45	03071711.D	blank	S29-01241701	CL	2	
12	3/7/17 16:16	03071712.D	P1700947-021 (1000mL) PF2	S29-01241701	CL	7	
13	3/7/17 16:47	03071713.D	P1700947-020 (1000mL)	S29-01241701	CL	6	
14	3/7/17 17:19	03071714.D	P1700947-020dup (1000mL)	S29-01241701	CL	6	Pass for Dup
15	3/7/17 17:50	03071715.D	P1700947-022 (1000mL)	S29-01241701	CL	8	
16	3/7/17 18:21	03071716.D	P1700947-024 (1000mL)	S29-01241701	CL	9	
17	3/7/17 18:52	03071717.D	blank	S29-01241701	CL	2	
18	3/7/17 19:23	03071718.D	P1700971-001 (1000mL)	S29-01241701	CL	10	IS3 Fail, RR
19	3/7/17 19:54	03071719.D	P1700971-002 (1000mL)	S29-01241701	CL	11	Surr3 Fail
20	3/7/17 20:25	03071720.D	P1700971-004 (1000mL)	S29-01241701	CL	12	
21	3/7/17 20:57	03071721.D	P1700992-001 (1000mL)	S29-01241701	CL	1	
22	3/7/17 21:28	03071722.D	P1700992-003 (1000mL)	S29-01241701	CL	3	
23	3/7/17 21:59	03071723.D	P1700992-004 (1000mL)	S29-01241701	CL	4	
24	3/7/17 22:30	03071724.D	blank	S29-01241701	CL	2	
25	3/7/17 23:02	03071725.D	P1700992-006 (1000mL)	S29-01241701	CL	5	IS3 Fail, RR
26	3/7/17 23:33	03071726.D	P1700992-008 (1000mL)	S29-01241701	CL	13	
27	3/8/17 0:04	03071727.D	P1700992-014 (1000mL)	S29-01241701	CL	14	
28	3/8/17 0:36	03071728.D	P1700992-016 (1000mL)	S29-01241701	CL	15	
29	3/8/17 1:07	03071729.D	blank	S29-01241701	CL	2	
30	3/8/17 4:04	03071730.D	blank	S29-01241701	CL	2	

CL 3/8/17

Injection Log

Directory: I:\MS19\DATA\2017_03\08\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	3/8/17 4:35	03081701.D	BFB S19030817	S29-01241701	CL	2	Pass
2	3/8/17 4:54	03081702.D	CCV S19030817_1000pg	S29-01241701/S29-02171708 (3/18)	CL	16	Pass
3	3/8/17 5:25	03081703.D	MB S19030817_1000mL	S29-01241701/AC01205	CL	2	Pass
4	3/8/17 5:57	03081704.D	xxLCS S19030817_500pgxx	S29-01241701/S29-03031708 (4/1)	CL	2	
5	3/8/17 6:28	03081705.D	LCS S19030817_500pg	S29-01241701/S29-03031708 (4/1)	CL	2	Pass
6	3/8/17 7:47	03081706.D	xxP1700992-001 (500mL)xx	S29-01241701	CL	1	IS failed
7	3/8/17 8:18	03081707.D	xxP1700992-003dil (100mL)xx	S29-01241701	CL	3	IS failed
8	3/8/17 8:49	03081708.D	xxP1700992-001 (250mL)xx	S29-01241701	CL	1	IS failed
9	3/8/17 9:20	03081709.D	blank	S29-01241701	CL	2	
10	3/8/17 9:52	03081710.D	P1700992-003dil (100mL)	S29-01241701	CL	3	
11	3/8/17 10:23	03081711.D	P1700992-004dil (100mL)	S29-01241701	CL	4	
12	3/8/17 10:54	03081712.D	xxP1700992-006 (500mL)xx	S29-01241701	CL	5	IS failed
13	3/8/17 11:26	03081713.D	blank	S29-01241701	CL	2	
14	3/8/17 11:57	03081714.D	P1700971-002dil (100mL)	S29-01241701	CL	11	
15	3/8/17 12:29	03081715.D	P1700971-004dil (100mL)	S29-01241701	CL	12	
16	3/8/17 13:01	03081716.D	CCV Test_500pg	S29-01241701/S29-02171709 (3/15)	CL	16	
17	3/8/17 13:32	03081717.D	P1700971-005 (1000mL)	S29-01241701	CL	1	
18	3/8/17 14:04	03081718.D	CCV Test_500pg	S29-01241701/S29-02171710 (3/15)	CL	16	
19	3/8/17 15:19	03081719.D	blank	S29-01241701	CL	2	
20	3/8/17 15:50	03081720.D	P1701033-001 (1000mL)	S29-01241701	CL	1	
21	3/8/17 16:22	03081721.D	P1701033-002 (1000mL)	S29-01241701	CL	3	
22	3/8/17 16:53	03081722.D	P1701033-002dup (1000mL)	S29-01241701	CL	3	Pass for Dup
23	3/8/17 17:24	03081723.D	P1701021-009 (500mL)	S29-01241701	CL	4	
24	3/8/17 17:55	03081724.D	P1701021-010 (500mL)	S29-01241701	CL	5	
25	3/8/17 18:27	03081725.D	blank	S29-01241701	CL	2	
26	3/8/17 18:58	03081726.D	P1700938-009 (1000mL)	S29-01241701	CL	6	IS failed
27	3/8/17 19:30	03081727.D	P1700938-012 (1000mL)	S29-01241701	CL	7	IS failed
28	3/8/17 20:01	03081728.D	P1700938-013 (1000mL)	S29-01241701	CL	8	
29	3/8/17 20:33	03081729.D	P1700938-014 (1000mL)	S29-01241701	CL	9	IS failed
30	3/8/17 21:04	03081730.D	P1700938-015 (1000mL)	S29-01241701	CL	10	IS failed
31	3/8/17 21:36	03081731.D	P1700938-016 (1000mL)	S29-01241701	CL	11	
32	3/8/17 22:07	03081732.D	blank	S29-01241701	CL	2	
33	3/8/17 22:41	03081733.D	P1700936-013 (1000mL)	S29-01241701	CL	12	
34	3/8/17 23:12	03081734.D	P1700936-015 (1000mL)	S29-01241701	CL	13	
35	3/8/17 23:44	03081735.D	blank	S29-01241701	CL	2	
36	3/9/17 5:04	03081736.D	blank	S29-01241701	CL	2	

CL 3/9/17

Tier III Data Validation Report Summary

Client: Montana Department of Environmental Quality (MDEQ)	Laboratory: ALS Environmental
Project Name: Whitefish Solvent Site	Sample Matrix: Air
Project Number: 776-033-001	Sample Start Date: 02/22/2017
Date Validated: 03/24/2017	Sample End Date: 02/22/2017
Parameters Included: ▪ Volatile Organic Compounds (VOC) by Environmental Protection Agency (EPA) Modified Method TO-15 and Method TO-15 with Selective Ion Monitoring (SIM) ▪ Methane by EPA Method 3C ▪ Helium by EPA Modified Method 3C ▪ Air-Phase Petroleum Hydrocarbons (APH) by Massachusetts (MA) Method	
Laboratory Project ID: P1700971	
Data Validator: Charles Ballek, Senior Chemist	
Draft Reviewer: Kyle Power, Environmental Chemist	Final Reviewer: Mike Phillips, Senior Chemist

DATA EVALUATION CRITERIA SUMMARY

A Tier III Data Validation was performed by Trihydro Corporation's Chemical Data Evaluation Services Group on the analytical data report package generated by ALS Environmental evaluating samples from the MDEQ Whitefish Solvent Site, located in Whitefish, Montana.

Precision, accuracy, method compliance, and completeness of this data package were assessed during this data review. Precision was determined by evaluating the calculated relative percent difference (RPD) values from:

- Field duplicate pairs
- Laboratory duplicate pairs

Laboratory accuracy was established by reviewing the demonstrated percent recoveries (%R) of the following items to verify that data are not biased.

- Laboratory control sample (LCS)
- Organic system monitoring compounds (surrogates)

Method compliance was established by reviewing sample integrity, holding times, detection limits, surrogate recoveries, laboratory blanks, initial and continuing calibrations (where applicable), and the LCS percent recoveries against method-specific requirements.

Completeness was evaluated by determining the overall ratio of the number of samples and analyses planned versus the number of samples with valid analyses. Determination of completeness included a review of the chain-of-custody (CoC), laboratory analytical methods, and other laboratory and field documents associated with this analytical data set.

Tier III Data Validation Report Summary

SAMPLE NUMBERS TABLE

Client Sample ID	Laboratory Sample Number
MTN-AA-1	P1700971-001
MTN-VI-1	P1700971-002
MTN-SS-1	P1700971-003
MTN-BD-1	P1700971-004
MTN-POST	P1700971-005
MTN-PRE	P1700971-006

Tier III Data Validation Report Summary

The laboratory data were reviewed to evaluate compliance with the methods and the quality of the reported data. Assessment of CoC completeness is included in Item 3 of the Data Validation Checklist. A check mark (✓) indicates that the referenced validation criteria were deemed acceptable, whereas a crossed circle (⊗) indicates validation criteria for which the data have been qualified by the data validator. An empty circle (○) indicates that the specified criterion does not apply to the reviewed data. Details are noted in the tables below.

Validation Criteria

- ✓ Data Completeness
- ✓ CoC Documentation
- ✓ Holding Times and Preservation
- ✓ Field Duplicates
- ○ Field, Equipment, and Trip Blanks
- ✓ Initial and Continuing Calibrations
- ✓ Instrument Tunes
- ✓ Internal Standards
- ✓ System Performance Checks
- ✓ Laboratory Blanks
- ⊗ LCS
- ○ Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
- ✓ System Monitoring Compounds (i.e. Surrogates)
- ✓ Laboratory Duplicates

Guidance References

Chemical data validation was conducted in accordance with the United States Environmental Protection Agency (USEPA) Contract Laboratory Program (CLP) National Functional Guidelines for the analyses listed below, or by the appropriate method if not covered in the National Functional Guidelines.

- Air and vapor data for samples collected in canisters and analyzed by EPA organics Method TO-15 were reviewed with reference to the USEPA Hazardous Waste Support Branch Validating Air Samples Volatile Organic Analysis of Ambient Air in Canister by Method TO-15, standard operating procedure number HW-31 revision 4, October 2006.
- Data for organic analyses were evaluated according to validation criteria set forth in the USEPA CLP National Functional Guidelines for Superfund Organic Methods Data Review, document number EPA-540-R-2016-002, September 2016 with additional reference to the USEPA CLP National Functional Guidelines for Organic Data Review, document number EPA 540/R-99/008, October 1999.
- Review of field duplicates was conducted according to the USEPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures, EQADR-Supplement0, April 2013.
- Trihydro Data Validation Variance Documentation, February 2017.
- Project-specific Quality Assurance Project Plans (QAPP) data validation requirements, as applicable.

Tier III Data Validation Report Summary

OVERALL DATA PACKAGE ASSESSMENT

Based on a data validation review, the data are acceptable as delivered. Data qualified by the laboratory are discussed in Item 2 of the Validation Criteria Checklist.

The purpose of validating data and assigning qualifiers is to assist in proper data interpretation. Data that are not qualified meet the site data quality objectives. If values are assigned qualifiers other than an R (rejected, data not usable), the data may be used for site evaluation; however, consideration should be given to the reasons for qualification when interpreting sample concentrations. Data points that are assigned an R qualifier should not be used for site evaluation purposes.

Text identified in **bold font** in the Validation Criteria Checklist indicates that further action and/or qualification of the data were required. Data validation qualifiers were added for the items noted with crossed circles in the Validation Criteria section above. Please see the Data Qualification Summary table at the end of this report for a complete list of samples and analytes qualified.

Data qualifiers used during this validation are included in the following table.

Qualifier	Definition
J+	The result is an estimated concentration, but may be biased high

Data Completeness

The analyses were performed as requested on the CoC records. The samples were received by the laboratory and analyzed properly unless otherwise noted in the Criteria Checklist below. The complete data package consisted of 92 data points. No data points were rejected. The data completeness measure for this data package is calculated to be 100% and is acceptable.

TABLE 1. GENERAL VALIDATION CRITERIA CHECKLIST	
1. Was the report free of non-conformances identified by the laboratory?	No
Comments: The laboratory noted the following non-conformances as related to this data set. The surrogate spike recovery for bromofluorobenzene was exceeded in MTN-VI-1 (P1700971-002) in SIM mode due to matrix interference. The target analytes and surrogate recoveries for the associated QC were acceptable. The data has been flagged with the appropriate qualifier. No further corrective action was taken. The spike recoveries in the Laboratory Control Samples (LCS) analyzed in SIM mode were outside the laboratory generated control criteria. The recovery errors equate to a potential high bias. However, these recoveries were within the method criteria, therefore, the data quality has not been significantly affected. No corrective action was taken.	
2. Were the data free of data qualification flags or other notes used by the laboratory? If no, define.	No
Comments: The laboratory used the following data qualification flags with this data set. D – The reported result is from a dilution. L – Laboratory control sample recovery outside the specified limits; results may be biased high. S – Surrogate recovery not within specified limits.	
3. Were sample CoC forms and procedures complete?	Yes
Comments: The CoC record from the field to the laboratory was complete and custody was maintained as evidenced by the field and laboratory personnel signatures, dates, and times of receipt.	
4. Were detection limits in accordance with the quality assurance project plan (QAPP), permit, or method, or indicated as acceptable?	Yes
Comments: The detection limits appeared to be acceptable. The following dilutions were applied. Method TO-15: Dilutions of 1.3 to 49.1 times were applied for the VOC analyses of the submitted samples. Method TO-15 SIM: Dilutions of 1.3 to 17.1 times were applied for the VOC analyses of the submitted samples. Method 3C: Sample MTN-SS-1 was diluted by a factor of 1.61 times for the analysis of methane. Method 3C Modified: Sample MTN-SS-1 was diluted by a factor of 1.26 times for the analysis of helium. Method MA APH: Dilutions of 1.3 to 49.1 times were applied for the APH analyses of the submitted samples.	
5. Were the reported analytical methods and constituents in compliance with the QAPP, permit, or CoC?	Yes
Comments: The reported analytical methods were in compliance with the CoC and the laboratory reported the requested constituents in accordance with the CoC.	
6. Were samples received in good condition within method-specified requirements?	Yes
Comments: Samples were received intact and in good condition. The final vacuums from the field and receipt vacuums measured by the laboratory were compared by the project team and the vacuums appeared to be acceptable. The laboratory indicated that the sample containers were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. The canister certification results were not available for review. Helium was used as a tracer gas during the sampling for MTN-SS-1 and the leak check calculation indicated leakage of less than 10%, within the guidance limits for this project.	
7. Were samples extracted/digested and analyzed within method-specified or technical holding times?	Yes
Comments: The samples were analyzed within method-specific holding times.	

TABLE 1. GENERAL VALIDATION CRITERIA CHECKLIST	
8. Were reported units appropriate for the sample matrix/matrices and analytical method(s)? Specify if wet or dry units were used for soil.	Yes
Comments: The results were reported in concentration units of micrograms per cubic meters (µg/m^3), parts per billion by volume (ppbV), parts per million by volume (ppmV), and percent volume per volume (%V/V), which were acceptable for the sample matrix and the analyses requested.	
9. Was the number of field duplicate samples collected equal to at least 10% of the total number of samples or as required by the project guidelines, QAPP, SAP, or permit?	Yes
Comments: The number of field duplicates collected was equal to at least 10% of the number of samples. Sample MTN-BD-1 was collected as a field duplicate of sample MTN-VI-1.	
10. Were field duplicate RPD values within data validation quality control (QC) limits (soil 0-50%, water 0-30%, or air 0-25%)?	Yes
Comments: As indicated in the Field Duplicate Summary Table at the end of this report, field duplicate RPD values were within the data validation QC limits of 0-25% for air samples. Qualification of data was not required.	
11. Were the number of trip blank, field blank, and/or equipment blank samples collected equal to at least 10% of the total number of samples or as required by the project guidelines, QAPP, SAP, or permit?	No
Comments: Trip, field, and equipment blank samples were not collected for this sample set.	
12. Were target analytes reported as not detected in the trip blank, field blank, and/or equipment blank samples?	N/A
Comments: Trip, field, and equipment blank samples were not collected for this sample set.	

TABLE 2. VALIDATION CRITERIA CHECKLIST FOR VOC ANALYSES (TO-15 and TO-15 SIM)	
1. Were instrument calibrations within data validation QC limits and analyzed at the appropriate frequency?	Yes
Comments: The initial and continuing calibrations were analyzed at appropriate frequencies and the results were within data validation limits. Non-compliant calibration results were noted for analytes that were not reported for the submitted samples. No further validation action was required based on those results.	
2. Were the instrument tunes within data validation control limits and analyzed at the appropriate frequency?	Yes
Comments: Instrument tunes were performed at the required frequency and the results were within data validation limits.	
3. Were the internal standards within data validation control limits?	Yes
Comments: The area counts and retention times for the internal standards were within method control limits.	
4. Was the total number of laboratory blank samples prepared equal to at least 5% of the total number of samples or analyzed as required by the method?	Yes
Comments: The total number of laboratory blank samples prepared was equal to at least 5% of the total number of samples.	
5. Were target analytes reported as not detected in the laboratory blanks?	Yes
Comments: Target analytes were reported as not detected in the laboratory blanks.	
6. Was the total number of LCSs analyzed equal to at least 5% of the total number of samples or analyzed as required by the method?	Yes
Comments: The total number of LCS samples analyzed was equal to at least 5% of the total number of samples.	
7. Were LCS/LCSD percent recoveries and LCS/LCSD RPDs within data validation or laboratory QC limits?	No
Comments: The LCS percent recoveries were within laboratory QC limits, with the following exceptions. **<u>Method TO-15 SIM</u>: The LCS percent recoveries for batches MS19030717 and MS19030817 were outside laboratory QC limits for the target analytes indicating high biases. Trichloroethene and tetrachloroethene were detected in associated samples MTN-AA-1, MTN-VI-1, and MTN-BD-1; and tetrachloroethene was detected in sample MTN-POST. These results were assigned J+ qualifiers to indicate estimated concentrations that may be biased high.** Qualification was not required for the non-detected results in the associated samples.	
8. Was the total number of MS samples prepared equal to at least 5% of the total number of samples or analyzed as required by the method?	No
Comments: Analysis of matrix spike samples is not required by Method TO-15 or Method TO-15 SIM.	
9. For MS/MSDs prepared from project samples, were percent recoveries and RPDs within data validation or laboratory QC limits?	N/A
Comments: Analysis of matrix spike samples is not required by Method TO-15 or Method TO-15 SIM.	
10. Were surrogate recoveries within laboratory QC limits?	No
Comments: Surrogate recoveries were within laboratory QC limits, with the following exception. In sample MTN-VI-1, the Method TO-15 SIM surrogate bromofluorobenzene was recovered outside the acceptance limits of 70-130% at 132%. The target analytes reported by this method were not associated with this surrogate and qualification of the results was not required.	

TABLE 2. VALIDATION CRITERIA CHECKLIST FOR VOC ANALYSES (TO-15 and TO-15 SIM)	
11. Were laboratory duplicates prepared?	Yes
Comments: A laboratory duplicate was prepared for Method TO-15 batch MS16030917 from sample MTN-PRE.	
12. Were laboratory duplicates RPD values within the laboratory acceptance limits?	Yes
Comments: Laboratory duplicate RPDs were within laboratory acceptance limits.	

TABLE 3. VALIDATION CRITERIA CHECKLIST FOR METHANE and HELIUM ANALYSES (3C and 3C MODIFIED)	
1. Were instrument calibrations within data validation QC limits and analyzed at the appropriate frequency?	Yes
Comments: The initial and continuing calibrations were analyzed at appropriate frequencies and the results were within data validation limits.	
2. Was the total number of laboratory blank samples prepared equal to at least 5% of the total number of samples or analyzed as required by the method?	Yes
Comments: The total number of laboratory blank samples prepared was equal to at least 5% of the total number of samples.	
3. Were target analytes reported as not detected in the laboratory blanks?	Yes
Comments: Target analytes were reported as not detected in the laboratory blanks.	
4. Was the total number of LCSs analyzed equal to at least 5% of the total number of samples or analyzed as required by the method?	Yes
Comments: The total number of LCS samples analyzed was equal to at least 5% of the total number of samples.	
5. Were LCS/LCSD percent recoveries and LCS/LCSD RPDs within data validation or laboratory QC limits?	Yes
Comments: The LCS percent recoveries were within laboratory QC limits.	
6. Was the total number of MS samples prepared equal to at least 5% of the total number of samples or analyzed as required by the method?	No
Comments: Analysis of matrix spike samples is not required by Method 3C or 3C modified.	
7. For MS/MSDs prepared from project samples, were percent recoveries and RPDs within data validation or laboratory QC limits?	N/A
Comments: Analysis of matrix spike samples is not required by Method 3C or 3C modified.	
8. Were surrogate recoveries within laboratory QC limits?	N/A
Comments: Analysis of surrogates is not required by Method 3C or 3C modified.	
9. Were laboratory duplicates prepared?	No
Comments: Laboratory duplicates were not analyzed for Method 3C or 3C modified.	
10. Were laboratory duplicates RPD values within the laboratory acceptance limits?	N/A
Comments: Laboratory duplicates were not analyzed for Method 3C or 3C modified.	

TABLE 4. VALIDATION CRITERIA CHECKLIST FOR APH ANALYSES (MA APH)	
1. Were instrument calibrations within data validation QC limits and analyzed at the appropriate frequency?	Yes
Comments: The initial and continuing calibrations were analyzed at appropriate frequencies and the results were within data validation limits.	
2. Was the total number of laboratory blank samples prepared equal to at least 5% of the total number of samples or analyzed as required by the method?	Yes
Comments: The total number of laboratory blank samples prepared was equal to at least 5% of the total number of samples.	
3. Were target analytes reported as not detected in the laboratory blanks?	Yes
Comments: Target analytes were reported as not detected in the laboratory blanks.	
4. Was the total number of LCSs analyzed equal to at least 5% of the total number of samples or analyzed as required by the method?	Yes
Comments: The total number of LCS samples analyzed was equal to at least 5% of the total number of samples.	
5. Were LCS/LCSD percent recoveries and LCS/LCSD RPDs within data validation or laboratory QC limits?	Yes
Comments: The LCS percent recoveries were within laboratory QC limits.	
6. Was the total number of MS samples prepared equal to at least 5% of the total number of samples or analyzed as required by the method?	No
Comments: Analysis of matrix spike samples is not required by MA APH Method.	
7. Were MS/MSD percent recoveries and MS/MSD RPDs within data validation or laboratory QC limits?	N/A
Comments: Analysis of matrix spike samples is not required by MA APH Method.	
8. Were surrogate recoveries within laboratory QC limits?	N/A
Comments: Analysis of surrogates is not required by MA APH Method.	
9. Were laboratory duplicates prepared?	Yes
Comments: A laboratory duplicate was prepared for batch MS16030917 from sample MTN-PRE.	
10. Were laboratory duplicates RPD values within the laboratory acceptance limits?	Yes
Comments: Laboratory duplicate RPDs were within laboratory QC limits.	

TABLE 5. FIELD DUPLICATE SUMMARY

Client Sample ID: MTN-VI-1 Field Duplicate Sample ID: MTN-BD-1				
Analyte	**Method**	**Laboratory Result ($\mu g/m^3$)**	**Duplicate Result ($\mu g/m^3$)**	**Relative Percent Difference (RPD)**
C5-C8, Aliphatic, Adjusted	MADEP APH 1.0	44	55	22.2% +/-RL
C9-C10, Aromatic, Adjusted	MADEP APH 1.0	5.5	6.0	8.7% +/-RL
C9-C12, Aliphatic, Adjusted	MADEP APH 1.0	60	66	9.5%
Benzene	TO-15	1.3	1.3	0.0%
m,p-Xylene	TO-15	2.4	2.6	8.0%
o-Xylene	TO-15	0.90	0.95	5.4% +/-RL
Toluene	TO-15	2.9	3.1	6.7%
Tetrachloroethene	TO-15 SIM	99	100	1.0%
Trichloroethene	TO-15 SIM	0.16	0.16	0.0%

Field duplicate RPD control limits are not to exceed 25% for air or vapor as established by USEPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures, EQADR-Supplement0, April 2013.

+/-RL – Indicates that the detections in both of the samples were within two times the reporting limit. Qualification of data was not required.

ATTACHMENT A

BATCH MATCH TABLE

BATCH MATCH TABLE

Field Sample ID	Lab Sample ID	TO-15	TO-15 SIM	MADEP APH	3C	3C Modified
MTN-AA-1	P1700971-001	MS16030917	MS19030717	MS16030917	--	--
MTN-VI-1	P1700971-002	MS16030917	MS19030717, MS19030817	MS16030917	--	--
MTN-SS-1	P1700971-003	MS16030917	--	MS16030917	TD1030617	TD8030617
MTN-BD-1	P1700971-004	MS16030917	MS19030717, MS19030817	MS16030917	--	--
MTN-POST	P1700971-005	MS16030917	MS19030817	MS16030917	--	--
MTN-PRE	P1700971-006	MS16030917	--	MS16030917	--	--

ATTACHMENT B

DATA QUALIFICATION SUMMARY

DATA QUALIFICATION SUMMARY

Abbreviation	Reason
HR-LCS	The LCS and/or LCSD percent recovery was greater than the upper acceptable limit indicating a possible high bias.

Analyte	Method	Field Sample ID	Lab Sample ID	Result	Limit	Units	Reviewer Qualifier	DV Flag Reasons
Tetrachloroethene	TO-15 SIM	MTN-AA-1	P1700971-001	0.85	0.033	µg/m^3	J+	HR-LCS
Tetrachloroethene	TO-15 SIM	MTN-VI-1	P1700971-002	99	0.42	µg/m^3	J+	HR-LCS
Tetrachloroethene	TO-15 SIM	MTN-BD-1	P1700971-004	100	0.43	µg/m^3	J+	HR-LCS
Tetrachloroethene	TO-15 SIM	MTN-POST	P1700971-005	2.6	0.04	µg/m^3	J+	HR-LCS
Trichloroethene	TO-15 SIM	MTN-AA-1	P1700971-001	0.033	0.033	µg/m^3	J+	HR-LCS
Trichloroethene	TO-15 SIM	MTN-VI-1	P1700971-002	0.16	0.042	µg/m^3	J+	HR-LCS
Trichloroethene	TO-15 SIM	MTN-BD-1	P1700971-004	0.16	0.043	µg/m^3	J+	HR-LCS

ANALYTICAL SUMMARY REPORT

March 17, 2017

Trihydro-Laramie
1252 Commerce Dr
Laramie, WY 82070-7000

Work Order: H17020313 Quote ID: H1375 - Groundwater EPH/VPH

Project Name: MDEQ Whitefish Solvent Site

Energy Laboratories Inc Helena MT received the following 10 samples for Trihydro-Laramie on 2/23/2017 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
H17020313-001	MTN-MW3	02/21/17 15:25	02/23/17	Groundwater	EPH-Sep Funnel Extraction EPH Fractionation Hydrocarbons, Aliphatic Extractable Petroleum Hydrocarbons, Aromatic Extractable Petroleum Hydrocarbons, Extractable Petroleum Screen Volatile Petroleum Hydrocarbons Separatory Funnel Liquid-Liquid Ext. Low Level PAH 8260-Volatile Organic Compounds-Short List
H17020313-002	MTN-MW1	02/21/17 16:15	02/23/17	Groundwater	Same As Above
H17020313-003	MTN-MW2	02/21/17 17:35	02/23/17	Groundwater	Same As Above
H17020313-004	FB-1	02/21/17 17:30	02/23/17	Groundwater	EPH-Sep Funnel Extraction Hydrocarbons, Extractable Petroleum Screen Volatile Petroleum Hydrocarbons 8260-Volatile Organic Compounds-Short List
H17020313-005	BD-1	02/21/17 17:35	02/23/17	Groundwater	EPH-Sep Funnel Extraction EPH Fractionation Hydrocarbons, Aliphatic Extractable Petroleum Hydrocarbons, Aromatic Extractable Petroleum Hydrocarbons, Extractable Petroleum Screen Volatile Petroleum Hydrocarbons Separatory Funnel Liquid-Liquid Ext. Low Level PAH 8260-Volatile Organic Compounds-Short List
H17020313-006	WSMW-7	02/22/17 17:25	02/23/17	Groundwater	Same As Above
H17020313-007	C1 TB 6171	02/21/17 15:25	02/23/17	Trip Blank	Volatile Petroleum Hydrocarbons
H17020313-008	C1 TB 6171	02/21/17 15:25	02/23/17	Trip Blank	8260-Volatile Organic Compounds-Short List
H17020313-009	C2 TB 6171	02/21/17 15:25	02/23/17	Trip Blank	Volatile Petroleum Hydrocarbons
H17020313-010	C2 TB 6171	02/21/17 15:25	02/23/17	Trip Blank	8260-Volatile Organic Compounds-Short List

ANALYTICAL SUMMARY REPORT

The analyses presented in this report were performed by Energy Laboratories, Inc., 3161 E. Lyndale Ave., Helena, MT 59604, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

The results as reported relate only to the item(s) submitted for testing.

If you have any questions regarding these test results, please call.

Report Approved By:

CLIENT: Trihydro-Laramie
Project: MDEQ Whitefish Solvent Site
Work Order: H17020313

Report Date: 03/17/17

CASE NARRATIVE

Tests associated with analyst identified as ELI-B were subcontracted to Energy Laboratories, 1120 S. 27th St., Billings, MT, EPA Number MT00005.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish Solvent Site
Lab ID: H17020313-001
Client Sample ID: MTN-MW3

Report Date: 03/17/17
Collection Date: 02/21/17 15:25
DateReceived: 02/23/17
Matrix: Groundwater

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Benzene	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
Bromobenzene	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
Bromochloromethane	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
Bromodichloromethane	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
Bromoform	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
Bromomethane	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
Carbon tetrachloride	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
Chlorobenzene	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
Chlorodibromomethane	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
Chloroethane	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
Chloroform	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
Chloromethane	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
1,2-Dibromoethane	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
2-Chlorotoluene	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
4-Chlorotoluene	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
Dibromomethane	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
1,2-Dichlorobenzene	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
1,3-Dichlorobenzene	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
1,4-Dichlorobenzene	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
Dichlorodifluoromethane	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
1,1-Dichloroethane	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
1,2-Dichloroethane	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
1,1-Dichloroethene	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
cis-1,2-Dichloroethene	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
trans-1,2-Dichloroethene	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
1,2-Dichloropropane	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
1,3-Dichloropropane	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
2,2-Dichloropropane	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
1,1-Dichloropropene	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
cis-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
trans-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
Ethylbenzene	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
Methyl ethyl ketone	ND	ug/L		20		SW8260B	03/01/17 17:57 / kjw
Methyl tert-butyl ether (MTBE)	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
Methylene chloride	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
Styrene	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
1,1,1,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
1,1,2,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
Tetrachloroethene	36	ug/L		1.2		SW8260B	03/02/17 16:10 / kjw
Toluene	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
1,1,1-Trichloroethane	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
1,1,2-Trichloroethane	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
Trichloroethene	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish Solvent Site
Lab ID: H17020313-001
Client Sample ID: MTN-MW3

Report Date: 03/17/17
Collection Date: 02/21/17 15:25
DateReceived: 02/23/17
Matrix: Groundwater

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Trichlorofluoromethane	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
1,2,3-Trichloropropane	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
Vinyl chloride	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
m+p-Xylenes	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
o-Xylene	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
Xylenes, Total	ND	ug/L		1.0		SW8260B	03/01/17 17:57 / kjw
Surr: Dibromofluoromethane	103	%REC		70-125		SW8260B	03/01/17 17:57 / kjw
Surr: 1,2-Dichloroethane-d4	88.0	%REC		69-131		SW8260B	03/01/17 17:57 / kjw
Surr: Toluene-d8	91.0	%REC		80-119		SW8260B	03/01/17 17:57 / kjw
Surr: p-Bromofluorobenzene	113	%REC		76-123		SW8260B	03/01/17 17:57 / kjw
PETROLEUM HYDROCARBONS-VOLATILE							
Methyl tert-butyl ether (MTBE)	ND	ug/L		1.0	30	MA-VPH	03/01/17 17:03 / tjb
Benzene	ND	ug/L		0.50	5	MA-VPH	03/01/17 17:03 / tjb
Toluene	ND	ug/L		0.50	1000	MA-VPH	03/01/17 17:03 / tjb
Ethylbenzene	ND	ug/L		0.50	700	MA-VPH	03/01/17 17:03 / tjb
m+p-Xylenes	ND	ug/L		0.50		MA-VPH	03/01/17 17:03 / tjb
o-Xylene	ND	ug/L		0.50		MA-VPH	03/01/17 17:03 / tjb
Xylenes, Total	ND	ug/L		0.50	10000	MA-VPH	03/01/17 17:03 / tjb
Naphthalene	ND	ug/L		1.0	100	MA-VPH	03/01/17 17:03 / tjb
C9 to C10 Aromatics	ND	ug/L		20	1100	MA-VPH	03/01/17 17:03 / tjb
C5 to C8 Aliphatics	71	ug/L		20	650	MA-VPH	03/01/17 17:03 / tjb
C9 to C12 Aliphatics	ND	ug/L		20	1400	MA-VPH	03/01/17 17:03 / tjb
Total Purgeable Hydrocarbons	86	ug/L		20	1000	MA-VPH	03/01/17 17:03 / tjb
Surr: VPH Aromatics Surrogate	125	%REC		70-130		MA-VPH	03/01/17 17:03 / tjb
Surr: VPH Aliphatics Surrogate	115	%REC		70-130		MA-VPH	03/01/17 17:03 / tjb

- Note 1: The C5 to C8 Aliphatics value is corrected for aromatic constituents Benzene and Toluene.
- Note 2: The C9 to C12 Aliphatics value is corrected for aromatic constituents Ethylbenzene, m+p-Xylenes, o-Xylene and C9 to C10 Aromatics.

EXTRACTABLE PETROLEUM HYDROCARBONS-SCREEN ANALYSIS							
Total Extractable Hydrocarbons	1210	ug/L	*	306	1000	SW8015M	03/03/17 12:28 / JRS
Surr: o-Terphenyl	85.0	%REC		40-140		SW8015M	03/03/17 12:28 / JRS

- Note: Total Extractable Hydrocarbons are defined as the total hydrocarbon responses regardless of elution time.

EXTRACTABLE PETROLEUM HYDROCARBONS							
C9 to C18 Aliphatics	ND	ug/L		306	1400	MA-EPH	03/09/17 06:43 / JRS
C19 to C36 Aliphatics	ND	ug/L		306	1000	MA-EPH	03/09/17 06:43 / JRS
Surr: 1-Chloro-octadecane	72.0	%REC		40-140		MA-EPH	03/09/17 06:43 / JRS
C11 to C22 Aromatics	ND	ug/L		306	1100	MA-EPH	03/09/17 07:25 / JRS
Total Extractable Hydrocarbons	ND	ug/L		306	1000	MA-EPH	03/09/17 07:25 / JRS
Surr: 2-Bromonaphthalene	94.0	%REC		40-140		MA-EPH	03/09/17 07:25 / JRS
Surr: 2-Fluorobiphenyl	98.0	%REC		40-140		MA-EPH	03/09/17 07:25 / JRS
Surr: o-Terphenyl	89.0	%REC		40-140		MA-EPH	03/09/17 07:25 / JRS

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
* - The result exceeds the MCL.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish Solvent Site
Lab ID: H17020313-001
Client Sample ID: MTN-MW3

Report Date: 03/17/17
Collection Date: 02/21/17 15:25
DateReceived: 02/23/17
Matrix: Groundwater

- A significant portion of the hydrocarbons measured in the EPH Screening analysis were not recovered from the silica gel fractionation cartridge. Silica gel can act as a cleanup media for non-petroleum hydrocarbons.

SEMI-VOLATILE ORGANIC COMPOUNDS (LOW LEVEL)

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
1-Methylnaphthalene	ND	ug/L		0.20	11	SW8270C	03/17/17 00:06 / eli-b
2-Methylnaphthalene	ND	ug/L		0.20	36	SW8270C	03/17/17 00:06 / eli-b
Acenaphthene	ND	ug/L		0.20	670	SW8270C	03/17/17 00:06 / eli-b
Acenaphthylene	ND	ug/L		0.20		SW8270C	03/17/17 00:06 / eli-b
Anthracene	ND	ug/L		0.20	2100	SW8270C	03/17/17 00:06 / eli-b
Benzo(a)anthracene	ND	ug/L		0.20	0.5	SW8270C	03/17/17 00:06 / eli-b
Benzo(a)pyrene	ND	ug/L		0.20	0.05	SW8270C	03/17/17 00:06 / eli-b
Benzo(b)fluoranthene	ND	ug/L		0.20	0.5	SW8270C	03/17/17 00:06 / eli-b
Benzo(g,h,i)perylene	ND	ug/L		0.20		SW8270C	03/17/17 00:06 / eli-b
Benzo(k)fluoranthene	ND	ug/L		0.20	5	SW8270C	03/17/17 00:06 / eli-b
Chrysene	ND	ug/L		0.20	50	SW8270C	03/17/17 00:06 / eli-b
Dibenzo(a,h)anthracene	ND	ug/L		0.20	0.05	SW8270C	03/17/17 00:06 / eli-b
Fluoranthene	ND	ug/L		0.20	130	SW8270C	03/17/17 00:06 / eli-b
Fluorene	ND	ug/L		0.20	1100	SW8270C	03/17/17 00:06 / eli-b
Indeno(1,2,3-cd)pyrene	ND	ug/L		0.20	0.5	SW8270C	03/17/17 00:06 / eli-b
Naphthalene	0.27	ug/L	B	0.20	100	SW8270C	03/17/17 00:06 / eli-b
Phenanthrene	ND	ug/L		0.20		SW8270C	03/17/17 00:06 / eli-b
Pyrene	ND	ug/L		0.20	830	SW8270C	03/17/17 00:06 / eli-b
Surr: 2-Fluorobiphenyl	69.0	%REC		40-140		SW8270C	03/16/17 23:34 / eli-b
Surr: o-Terphenyl	80.0	%REC		40-140		SW8270C	03/16/17 23:34 / eli-b

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
B - The analyte was detected in the method blank.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish Solvent Site
Lab ID: H17020313-002
Client Sample ID: MTN-MW1

Report Date: 03/17/17
Collection Date: 02/21/17 16:15
DateReceived: 02/23/17
Matrix: Groundwater

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Benzene	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
Bromobenzene	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
Bromochloromethane	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
Bromodichloromethane	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
Bromoform	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
Bromomethane	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
Carbon tetrachloride	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
Chlorobenzene	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
Chlorodibromomethane	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
Chloroethane	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
Chloroform	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
Chloromethane	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
1,2-Dibromoethane	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
2-Chlorotoluene	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
4-Chlorotoluene	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
Dibromomethane	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
1,2-Dichlorobenzene	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
1,3-Dichlorobenzene	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
1,4-Dichlorobenzene	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
Dichlorodifluoromethane	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
1,1-Dichloroethane	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
1,2-Dichloroethane	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
1,1-Dichloroethene	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
cis-1,2-Dichloroethene	118	ug/L		2.5		SW8260B	03/02/17 13:56 / kjw
trans-1,2-Dichloroethene	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
1,2-Dichloropropane	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
1,3-Dichloropropane	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
2,2-Dichloropropane	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
1,1-Dichloropropene	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
cis-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
trans-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
Ethylbenzene	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
Methyl ethyl ketone	ND	ug/L		20		SW8260B	03/01/17 19:04 / kjw
Methyl tert-butyl ether (MTBE)	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
Methylene chloride	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
Styrene	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
1,1,1,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
1,1,2,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
Tetrachloroethene	66	ug/L		2.5		SW8260B	03/02/17 13:56 / kjw
Toluene	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
1,1,1-Trichloroethane	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
1,1,2-Trichloroethane	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
Trichloroethene	14	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish Solvent Site
Lab ID: H17020313-002
Client Sample ID: MTN-MW1

Report Date: 03/17/17
Collection Date: 02/21/17 16:15
DateReceived: 02/23/17
Matrix: Groundwater

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Trichlorofluoromethane	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
1,2,3-Trichloropropane	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
Vinyl chloride	2.3	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
m+p-Xylenes	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
o-Xylene	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
Xylenes, Total	ND	ug/L		1.0		SW8260B	03/01/17 19:04 / kjw
Surr: Dibromofluoromethane	99.0	%REC		70-125		SW8260B	03/01/17 19:04 / kjw
Surr: 1,2-Dichloroethane-d4	92.0	%REC		69-131		SW8260B	03/01/17 19:04 / kjw
Surr: Toluene-d8	101	%REC		80-119		SW8260B	03/01/17 19:04 / kjw
Surr: p-Bromofluorobenzene	116	%REC		76-123		SW8260B	03/01/17 19:04 / kjw
PETROLEUM HYDROCARBONS-VOLATILE							
Methyl tert-butyl ether (MTBE)	ND	ug/L		1.0	30	MA-VPH	03/01/17 18:05 / tjb
Benzene	ND	ug/L		0.50	5	MA-VPH	03/01/17 18:05 / tjb
Toluene	ND	ug/L		0.50	1000	MA-VPH	03/01/17 18:05 / tjb
Ethylbenzene	ND	ug/L		0.50	700	MA-VPH	03/01/17 18:05 / tjb
m+p-Xylenes	ND	ug/L		0.50		MA-VPH	03/01/17 18:05 / tjb
o-Xylene	ND	ug/L		0.50		MA-VPH	03/01/17 18:05 / tjb
Xylenes, Total	ND	ug/L		0.50	10000	MA-VPH	03/01/17 18:05 / tjb
Naphthalene	ND	ug/L		1.0	100	MA-VPH	03/01/17 18:05 / tjb
C9 to C10 Aromatics	ND	ug/L		20	1100	MA-VPH	03/01/17 18:05 / tjb
C5 to C8 Aliphatics	61	ug/L		20	650	MA-VPH	03/01/17 18:05 / tjb
C9 to C12 Aliphatics	ND	ug/L		20	1400	MA-VPH	03/01/17 18:05 / tjb
Total Purgeable Hydrocarbons	69	ug/L		20	1000	MA-VPH	03/01/17 18:05 / tjb
Surr: VPH Aromatics Surrogate	184	%REC	S	70-130		MA-VPH	03/01/17 18:05 / tjb
Surr: VPH Aliphatics Surrogate	111	%REC		70-130		MA-VPH	03/01/17 18:05 / tjb

- Note 1: The C5 to C8 Aliphatics value is corrected for aromatic constituents Benzene and Toluene.
- Note 2: The C9 to C12 Aliphatics value is corrected for aromatic constituents Ethylbenzene, m+p-Xylenes, o-Xylene and C9 to C10 Aromatics.
- S=The Surrogate recovery was outside QC advisory limits due to positive sample matrix interference.

EXTRACTABLE PETROLEUM HYDROCARBONS-SCREEN ANALYSIS							
Total Extractable Hydrocarbons	8320	ug/L	*	300	1000	SW8015M	03/03/17 16:27 / JRS
Surr: o-Terphenyl	76.0	%REC		40-140		SW8015M	03/03/17 16:27 / JRS

- Note: Total Extractable Hydrocarbons are defined as the total hydrocarbon responses regardless of elution time.

EXTRACTABLE PETROLEUM HYDROCARBONS							
C9 to C18 Aliphatics	ND	ug/L		300	1400	MA-EPH	03/09/17 13:45 / JRS
C19 to C36 Aliphatics	ND	ug/L		300	1000	MA-EPH	03/09/17 13:45 / JRS
Surr: 1-Chloro-octadecane	62.0	%REC		40-140		MA-EPH	03/09/17 13:45 / JRS
C11 to C22 Aromatics	ND	ug/L		300	1100	MA-EPH	03/09/17 14:28 / JRS
Total Extractable Hydrocarbons	ND	ug/L		300	1000	MA-EPH	03/09/17 14:28 / JRS
Surr: 2-Bromonaphthalene	92.0	%REC		40-140		MA-EPH	03/09/17 14:28 / JRS
Surr: 2-Fluorobiphenyl	96.0	%REC		40-140		MA-EPH	03/09/17 14:28 / JRS
Surr: o-Terphenyl	79.0	%REC		40-140		MA-EPH	03/09/17 14:28 / JRS

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
* - The result exceeds the MCL.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
S - Spike recovery outside of advisory limits.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish Solvent Site
Lab ID: H17020313-002
Client Sample ID: MTN-MW1

Report Date: 03/17/17
Collection Date: 02/21/17 16:15
DateReceived: 02/23/17
Matrix: Groundwater

- A significant portion of the hydrocarbons measured in the EPH Screening analysis were not recovered from the silica gel fractionation cartridge. Silica gel can act as a cleanup media for non-petroleum hydrocarbons.

SEMI-VOLATILE ORGANIC COMPOUNDS (LOW LEVEL)

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
1-Methylnaphthalene	ND	ug/L		0.20	11	SW8270C	03/16/17 19:55 / eli-b
2-Methylnaphthalene	ND	ug/L		0.20	36	SW8270C	03/16/17 19:55 / eli-b
Acenaphthene	ND	ug/L		0.20	670	SW8270C	03/16/17 19:55 / eli-b
Acenaphthylene	ND	ug/L		0.20		SW8270C	03/16/17 19:55 / eli-b
Anthracene	ND	ug/L		0.20	2100	SW8270C	03/16/17 19:55 / eli-b
Benzo(a)anthracene	ND	ug/L		0.20	0.5	SW8270C	03/16/17 19:55 / eli-b
Benzo(a)pyrene	ND	ug/L		0.20	0.05	SW8270C	03/16/17 19:55 / eli-b
Benzo(b)fluoranthene	ND	ug/L		0.20	0.5	SW8270C	03/16/17 19:55 / eli-b
Benzo(g,h,i)perylene	ND	ug/L		0.20		SW8270C	03/16/17 19:55 / eli-b
Benzo(k)fluoranthene	ND	ug/L		0.20	5	SW8270C	03/16/17 19:55 / eli-b
Chrysene	ND	ug/L		0.20	50	SW8270C	03/16/17 19:55 / eli-b
Dibenzo(a,h)anthracene	ND	ug/L		0.20	0.05	SW8270C	03/16/17 19:55 / eli-b
Fluoranthene	ND	ug/L		0.20	130	SW8270C	03/16/17 19:55 / eli-b
Fluorene	ND	ug/L		0.20	1100	SW8270C	03/16/17 19:55 / eli-b
Indeno(1,2,3-cd)pyrene	ND	ug/L		0.20	0.5	SW8270C	03/16/17 19:55 / eli-b
Naphthalene	0.24	ug/L	B	0.20	100	SW8270C	03/16/17 19:55 / eli-b
Phenanthrene	ND	ug/L		0.20		SW8270C	03/16/17 19:55 / eli-b
Pyrene	ND	ug/L		0.20	830	SW8270C	03/16/17 19:55 / eli-b
Surr: 2-Fluorobiphenyl	71.0	%REC		40-140		SW8270C	03/16/17 19:24 / eli-b
Surr: o-Terphenyl	66.0	%REC		40-140		SW8270C	03/16/17 19:24 / eli-b

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
B - The analyte was detected in the method blank.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish Solvent Site
Lab ID: H17020313-003
Client Sample ID: MTN-MW2

Report Date: 03/17/17
Collection Date: 02/21/17 17:35
DateReceived: 02/23/17
Matrix: Groundwater

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Benzene	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
Bromobenzene	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
Bromochloromethane	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
Bromodichloromethane	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
Bromoform	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
Bromomethane	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
Carbon tetrachloride	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
Chlorobenzene	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
Chlorodibromomethane	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
Chloroethane	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
Chloroform	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
Chloromethane	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
1,2-Dibromoethane	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
2-Chlorotoluene	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
4-Chlorotoluene	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
Dibromomethane	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
1,2-Dichlorobenzene	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
1,3-Dichlorobenzene	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
1,4-Dichlorobenzene	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
Dichlorodifluoromethane	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
1,1-Dichloroethane	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
1,2-Dichloroethane	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
1,1-Dichloroethene	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
cis-1,2-Dichloroethene	576	ug/L		25		SW8260B	03/02/17 13:23 / kjw
trans-1,2-Dichloroethene	18	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
1,2-Dichloropropane	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
1,3-Dichloropropane	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
2,2-Dichloropropane	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
1,1-Dichloropropene	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
cis-1,3-Dichloropropene	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
trans-1,3-Dichloropropene	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
Ethylbenzene	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
Methyl ethyl ketone	ND	ug/L		20		SW8260B	03/01/17 21:17 / kjw
Methyl tert-butyl ether (MTBE)	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
Methylene chloride	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
Styrene	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
1,1,1,2-Tetrachloroethane	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
1,1,2,2-Tetrachloroethane	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
Tetrachloroethene	1470	ug/L		25		SW8260B	03/02/17 13:23 / kjw
Toluene	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
1,1,1-Trichloroethane	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
1,1,2-Trichloroethane	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
Trichloroethene	1290	ug/L		25		SW8260B	03/02/17 13:23 / kjw

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish Solvent Site
Lab ID: H17020313-003
Client Sample ID: MTN-MW2

Report Date: 03/17/17
Collection Date: 02/21/17 17:35
DateReceived: 02/23/17
Matrix: Groundwater

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Trichlorofluoromethane	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
1,2,3-Trichloropropane	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
Vinyl chloride	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
m+p-Xylenes	ND	ug/L		2.5		SW8260B	03/01/17 21:17 / kjw
o-Xylene	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
Xylenes, Total	ND	ug/L		1.2		SW8260B	03/01/17 21:17 / kjw
Surr: Dibromofluoromethane	103	%REC		70-125		SW8260B	03/01/17 21:17 / kjw
Surr: 1,2-Dichloroethane-d4	86.0	%REC		69-131		SW8260B	03/01/17 21:17 / kjw
Surr: Toluene-d8	97.0	%REC		80-119		SW8260B	03/01/17 21:17 / kjw
Surr: p-Bromofluorobenzene	106	%REC		76-123		SW8260B	03/01/17 21:17 / kjw
PETROLEUM HYDROCARBONS-VOLATILE							
Methyl tert-butyl ether (MTBE)	ND	ug/L	D	10	30	MA-VPH	03/04/17 00:01 / eli-b
Benzene	ND	ug/L	D	5.0	5	MA-VPH	03/04/17 00:01 / eli-b
Toluene	ND	ug/L	D	5.0	1000	MA-VPH	03/04/17 00:01 / eli-b
Ethylbenzene	ND	ug/L	D	5.0	700	MA-VPH	03/04/17 00:01 / eli-b
m+p-Xylenes	ND	ug/L	D	5.0		MA-VPH	03/04/17 00:01 / eli-b
o-Xylene	ND	ug/L	D	5.0		MA-VPH	03/04/17 00:01 / eli-b
Xylenes, Total	ND	ug/L	D	5.0	10000	MA-VPH	03/04/17 00:01 / eli-b
Naphthalene	ND	ug/L	D	10	100	MA-VPH	03/04/17 00:01 / eli-b
C9 to C10 Aromatics	253	ug/L		200	1100	MA-VPH	03/04/17 00:01 / eli-b
C5 to C8 Aliphatics	3800	ug/L	*	200	650	MA-VPH	03/04/17 00:01 / eli-b
C9 to C12 Aliphatics	442	ug/L		200	1400	MA-VPH	03/04/17 00:01 / eli-b
Total Purgeable Hydrocarbons	3590	ug/L	*	200	1000	MA-VPH	03/04/17 00:01 / eli-b
Surr: VPH Aromatics Surrogate	0	%REC	1	70-130		MA-VPH	03/04/17 00:01 / eli-b
Surr: VPH Aliphatics Surrogate	0	%REC	1	70-130		MA-VPH	03/04/17 00:01 / eli-b

- Note 1: The C5 to C8 Aliphatics value is corrected for aromatic constituents Benzene and Toluene.
- Note 2: The C9 to C12 Aliphatics value is corrected for aromatic constituents Ethylbenzene, m+p-Xylenes, o-Xylene and C9 to C10 Aromatics.
- 1 = The surrogate was not resolved from a closely eluting peak. Surrogate recovery could not be calculated.

EXTRACTABLE PETROLEUM HYDROCARBONS-SCREEN ANALYSIS							
Total Extractable Hydrocarbons	22800	ug/L	*	300	1000	SW8015M	03/03/17 17:15 / JRS
Surr: o-Terphenyl	75.0	%REC		40-140		SW8015M	03/03/17 17:15 / JRS

- Note: Total Extractable Hydrocarbons are defined as the total hydrocarbon responses regardless of elution time.

EXTRACTABLE PETROLEUM HYDROCARBONS							
C9 to C18 Aliphatics	ND	ug/L		300	1400	MA-EPH	03/09/17 15:10 / JRS
C19 to C36 Aliphatics	ND	ug/L		300	1000	MA-EPH	03/09/17 15:10 / JRS
Surr: 1-Chloro-octadecane	71.0	%REC		40-140		MA-EPH	03/09/17 15:10 / JRS
C11 to C22 Aromatics	ND	ug/L		300	1100	MA-EPH	03/09/17 15:52 / JRS
Total Extractable Hydrocarbons	645	ug/L		300	1000	MA-EPH	03/09/17 15:52 / JRS
Surr: 2-Bromonaphthalene	102	%REC		40-140		MA-EPH	03/09/17 15:52 / JRS
Surr: 2-Fluorobiphenyl	102	%REC		40-140		MA-EPH	03/09/17 15:52 / JRS
Surr: o-Terphenyl	86.0	%REC		40-140		MA-EPH	03/09/17 15:52 / JRS

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
* - The result exceeds the MCL.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
D - RL increased due to sample matrix.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish Solvent Site
Lab ID: H17020313-003
Client Sample ID: MTN-MW2

Report Date: 03/17/17
Collection Date: 02/21/17 17:35
DateReceived: 02/23/17
Matrix: Groundwater

- A significant portion of the hydrocarbons measured in the EPH Screening analysis were not recovered from the silica gel fractionation cartridge. Silica gel can act as a cleanup media for non-petroleum hydrocarbons.

SEMI-VOLATILE ORGANIC COMPOUNDS (LOW LEVEL)

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
1-Methylnaphthalene	0.49	ug/L		0.19	11	SW8270C	03/16/17 20:58 / eli-b
2-Methylnaphthalene	0.53	ug/L		0.19	36	SW8270C	03/16/17 20:58 / eli-b
Acenaphthene	ND	ug/L		0.19	670	SW8270C	03/16/17 20:58 / eli-b
Acenaphthylene	ND	ug/L		0.19		SW8270C	03/16/17 20:58 / eli-b
Anthracene	0.27	ug/L		0.19	2100	SW8270C	03/16/17 20:58 / eli-b
Benzo(a)anthracene	ND	ug/L		0.19	0.5	SW8270C	03/16/17 20:58 / eli-b
Benzo(a)pyrene	ND	ug/L		0.19	0.05	SW8270C	03/16/17 20:58 / eli-b
Benzo(b)fluoranthene	ND	ug/L		0.19	0.5	SW8270C	03/16/17 20:58 / eli-b
Benzo(g,h,i)perylene	ND	ug/L		0.19		SW8270C	03/16/17 20:58 / eli-b
Benzo(k)fluoranthene	ND	ug/L		0.19	5	SW8270C	03/16/17 20:58 / eli-b
Chrysene	ND	ug/L		0.19	50	SW8270C	03/16/17 20:58 / eli-b
Dibenzo(a,h)anthracene	ND	ug/L		0.19	0.05	SW8270C	03/16/17 20:58 / eli-b
Fluoranthene	0.59	ug/L		0.19	130	SW8270C	03/16/17 20:58 / eli-b
Fluorene	0.21	ug/L		0.19	1100	SW8270C	03/16/17 20:58 / eli-b
Indeno(1,2,3-cd)pyrene	ND	ug/L		0.19	0.5	SW8270C	03/16/17 20:58 / eli-b
Naphthalene	0.86	ug/L	B	0.19	100	SW8270C	03/16/17 20:58 / eli-b
Phenanthrene	0.40	ug/L		0.19		SW8270C	03/16/17 20:58 / eli-b
Pyrene	0.61	ug/L		0.19	830	SW8270C	03/16/17 20:58 / eli-b
Surr: 2-Fluorobiphenyl	73.0	%REC		40-140		SW8270C	03/16/17 20:27 / eli-b
Surr: o-Terphenyl	68.0	%REC		40-140		SW8270C	03/16/17 20:27 / eli-b

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
B - The analyte was detected in the method blank.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish Solvent Site
Lab ID: H17020313-004
Client Sample ID: FB-1

Report Date: 03/17/17
Collection Date: 02/21/17 17:30
DateReceived: 02/23/17
Matrix: Groundwater

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Benzene	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
Bromobenzene	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
Bromochloromethane	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
Bromodichloromethane	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
Bromoform	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
Bromomethane	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
Carbon tetrachloride	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
Chlorobenzene	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
Chlorodibromomethane	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
Chloroethane	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
Chloroform	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
Chloromethane	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
1,2-Dibromoethane	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
2-Chlorotoluene	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
4-Chlorotoluene	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
Dibromomethane	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
1,2-Dichlorobenzene	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
1,3-Dichlorobenzene	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
1,4-Dichlorobenzene	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
Dichlorodifluoromethane	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
1,1-Dichloroethane	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
1,2-Dichloroethane	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
1,1-Dichloroethene	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
cis-1,2-Dichloroethene	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
trans-1,2-Dichloroethene	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
1,2-Dichloropropane	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
1,3-Dichloropropane	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
2,2-Dichloropropane	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
1,1-Dichloropropene	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
cis-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
trans-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
Ethylbenzene	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
Methyl ethyl ketone	ND	ug/L		20		SW8260B	03/01/17 18:30 / kjw
Methyl tert-butyl ether (MTBE)	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
Methylene chloride	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
Styrene	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
1,1,1,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
1,1,2,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
Tetrachloroethene	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
Toluene	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
1,1,1-Trichloroethane	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
1,1,2-Trichloroethane	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
Trichloroethene	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish Solvent Site
Lab ID: H17020313-004
Client Sample ID: FB-1

Report Date: 03/17/17
Collection Date: 02/21/17 17:30
DateReceived: 02/23/17
Matrix: Groundwater

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Trichlorofluoromethane	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
1,2,3-Trichloropropane	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
Vinyl chloride	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
m+p-Xylenes	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
o-Xylene	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
Xylenes, Total	ND	ug/L		1.0		SW8260B	03/01/17 18:30 / kjw
Surr: Dibromofluoromethane	94.0	%REC		70-125		SW8260B	03/01/17 18:30 / kjw
Surr: 1,2-Dichloroethane-d4	83.0	%REC		69-131		SW8260B	03/01/17 18:30 / kjw
Surr: Toluene-d8	95.0	%REC		80-119		SW8260B	03/01/17 18:30 / kjw
Surr: p-Bromofluorobenzene	119	%REC		76-123		SW8260B	03/01/17 18:30 / kjw
PETROLEUM HYDROCARBONS-VOLATILE							
Methyl tert-butyl ether (MTBE)	ND	ug/L		1.0	30	MA-VPH	03/01/17 13:38 / tjb
Benzene	ND	ug/L		0.50	5	MA-VPH	03/01/17 13:38 / tjb
Toluene	ND	ug/L		0.50	1000	MA-VPH	03/01/17 13:38 / tjb
Ethylbenzene	ND	ug/L		0.50	700	MA-VPH	03/01/17 13:38 / tjb
m+p-Xylenes	ND	ug/L		0.50		MA-VPH	03/01/17 13:38 / tjb
o-Xylene	ND	ug/L		0.50		MA-VPH	03/01/17 13:38 / tjb
Xylenes, Total	ND	ug/L		0.50	10000	MA-VPH	03/01/17 13:38 / tjb
Naphthalene	ND	ug/L		1.0	100	MA-VPH	03/01/17 13:38 / tjb
C9 to C10 Aromatics	ND	ug/L		20	1100	MA-VPH	03/01/17 13:38 / tjb
C5 to C8 Aliphatics	ND	ug/L		20	650	MA-VPH	03/01/17 13:38 / tjb
C9 to C12 Aliphatics	ND	ug/L		20	1400	MA-VPH	03/01/17 13:38 / tjb
Total Purgeable Hydrocarbons	ND	ug/L		20	1000	MA-VPH	03/01/17 13:38 / tjb
Surr: VPH Aromatics Surrogate	95.0	%REC		70-130		MA-VPH	03/01/17 13:38 / tjb
Surr: VPH Aliphatics Surrogate	94.0	%REC		70-130		MA-VPH	03/01/17 13:38 / tjb

- Note 1: The C5 to C8 Aliphatics value is corrected for aromatic constituents Benzene and Toluene.
- Note 2: The C9 to C12 Aliphatics value is corrected for aromatic constituents Ethylbenzene, m+p-Xylenes, o-Xylene and C9 to C10 Aromatics.

EXTRACTABLE PETROLEUM HYDROCARBONS-SCREEN ANALYSIS							
Total Extractable Hydrocarbons	ND	ug/L		300	1000	SW8015M	03/03/17 14:51 / JRS
Surr: o-Terphenyl	81.0	%REC		40-140		SW8015M	03/03/17 14:51 / JRS

- Note: Total Extractable Hydrocarbons are defined as the total hydrocarbon responses regardless of elution time.

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish Solvent Site
Lab ID: H17020313-005
Client Sample ID: BD-1

Report Date: 03/17/17
Collection Date: 02/21/17 17:35
DateReceived: 02/23/17
Matrix: Groundwater

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Benzene	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
Bromobenzene	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
Bromochloromethane	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
Bromodichloromethane	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
Bromoform	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
Bromomethane	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
Carbon tetrachloride	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
Chlorobenzene	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
Chlorodibromomethane	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
Chloroethane	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
Chloroform	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
Chloromethane	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
1,2-Dibromoethane	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
2-Chlorotoluene	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
4-Chlorotoluene	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
Dibromomethane	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
1,2-Dichlorobenzene	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
1,3-Dichlorobenzene	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
1,4-Dichlorobenzene	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
Dichlorodifluoromethane	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
1,1-Dichloroethane	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
1,2-Dichloroethane	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
1,1-Dichloroethene	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
cis-1,2-Dichloroethene	114	ug/L		2.5		SW8260B	03/02/17 14:30 / kjw
trans-1,2-Dichloroethene	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
1,2-Dichloropropane	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
1,3-Dichloropropane	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
2,2-Dichloropropane	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
1,1-Dichloropropene	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
cis-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
trans-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
Ethylbenzene	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
Methyl ethyl ketone	ND	ug/L		20		SW8260B	03/01/17 20:10 / kjw
Methyl tert-butyl ether (MTBE)	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
Methylene chloride	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
Styrene	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
1,1,1,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
1,1,2,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
Tetrachloroethene	64	ug/L		2.5		SW8260B	03/02/17 14:30 / kjw
Toluene	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
1,1,1-Trichloroethane	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
1,1,2-Trichloroethane	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
Trichloroethene	13	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish Solvent Site
Lab ID: H17020313-005
Client Sample ID: BD-1

Report Date: 03/17/17
Collection Date: 02/21/17 17:35
DateReceived: 02/23/17
Matrix: Groundwater

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Trichlorofluoromethane	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
1,2,3-Trichloropropane	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
Vinyl chloride	2.1	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
m+p-Xylenes	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
o-Xylene	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
Xylenes, Total	ND	ug/L		1.0		SW8260B	03/01/17 20:10 / kjw
Surr: Dibromofluoromethane	97.0	%REC		70-125		SW8260B	03/01/17 20:10 / kjw
Surr: 1,2-Dichloroethane-d4	93.0	%REC		69-131		SW8260B	03/01/17 20:10 / kjw
Surr: Toluene-d8	94.0	%REC		80-119		SW8260B	03/01/17 20:10 / kjw
Surr: p-Bromofluorobenzene	114	%REC		76-123		SW8260B	03/01/17 20:10 / kjw
PETROLEUM HYDROCARBONS-VOLATILE							
Methyl tert-butyl ether (MTBE)	ND	ug/L		1.0	30	MA-VPH	03/01/17 18:36 / tjb
Benzene	ND	ug/L		0.50	5	MA-VPH	03/01/17 18:36 / tjb
Toluene	ND	ug/L		0.50	1000	MA-VPH	03/01/17 18:36 / tjb
Ethylbenzene	ND	ug/L		0.50	700	MA-VPH	03/01/17 18:36 / tjb
m+p-Xylenes	ND	ug/L		0.50		MA-VPH	03/01/17 18:36 / tjb
o-Xylene	ND	ug/L		0.50		MA-VPH	03/01/17 18:36 / tjb
Xylenes, Total	ND	ug/L		0.50	10000	MA-VPH	03/01/17 18:36 / tjb
Naphthalene	ND	ug/L		1.0	100	MA-VPH	03/01/17 18:36 / tjb
C9 to C10 Aromatics	ND	ug/L		20	1100	MA-VPH	03/01/17 18:36 / tjb
C5 to C8 Aliphatics	61	ug/L		20	650	MA-VPH	03/01/17 18:36 / tjb
C9 to C12 Aliphatics	ND	ug/L		20	1400	MA-VPH	03/01/17 18:36 / tjb
Total Purgeable Hydrocarbons	69	ug/L		20	1000	MA-VPH	03/01/17 18:36 / tjb
Surr: VPH Aromatics Surrogate	188	%REC	S	70-130		MA-VPH	03/01/17 18:36 / tjb
Surr: VPH Aliphatics Surrogate	115	%REC		70-130		MA-VPH	03/01/17 18:36 / tjb

- Note 1: The C5 to C8 Aliphatics value is corrected for aromatic constituents Benzene and Toluene.
- Note 2: The C9 to C12 Aliphatics value is corrected for aromatic constituents Ethylbenzene, m+p-Xylenes, o-Xylene and C9 to C10 Aromatics.
- S=The Surrogate recovery was outside QC advisory limits due to positive sample matrix interference.

EXTRACTABLE PETROLEUM HYDROCARBONS-SCREEN ANALYSIS							
Total Extractable Hydrocarbons	10400	ug/L	*	300	1000	SW8015M	03/03/17 18:03 / JRS
Surr: o-Terphenyl	78.0	%REC		40-140		SW8015M	03/03/17 18:03 / JRS

- Note: Total Extractable Hydrocarbons are defined as the total hydrocarbon responses regardless of elution time.

EXTRACTABLE PETROLEUM HYDROCARBONS							
C9 to C18 Aliphatics	ND	ug/L		300	1400	MA-EPH	03/10/17 12:27 / JRS
C19 to C36 Aliphatics	377	ug/L		300	1000	MA-EPH	03/10/17 12:27 / JRS
Surr: 1-Chloro-octadecane	65.0	%REC		40-140		MA-EPH	03/10/17 12:27 / JRS
C11 to C22 Aromatics	ND	ug/L		300	1100	MA-EPH	03/10/17 13:09 / JRS
Total Extractable Hydrocarbons	752	ug/L		300	1000	MA-EPH	03/10/17 13:09 / JRS
Surr: 2-Bromonaphthalene	90.0	%REC		40-140		MA-EPH	03/10/17 13:09 / JRS
Surr: 2-Fluorobiphenyl	95.0	%REC		40-140		MA-EPH	03/10/17 13:09 / JRS
Surr: o-Terphenyl	79.0	%REC		40-140		MA-EPH	03/10/17 13:09 / JRS

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
* - The result exceeds the MCL.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
S - Spike recovery outside of advisory limits.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish Solvent Site
Lab ID: H17020313-005
Client Sample ID: BD-1

Report Date: 03/17/17
Collection Date: 02/21/17 17:35
DateReceived: 02/23/17
Matrix: Groundwater

- A significant portion of the hydrocarbons measured in the EPH Screening analysis were not recovered from the silica gel fractionation cartridge. Silica gel can act as a cleanup media for non-petroleum hydrocarbons.

SEMI-VOLATILE ORGANIC COMPOUNDS (LOW LEVEL)

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
1-Methylnaphthalene	ND	ug/L		0.19	11	SW8270C	03/16/17 22:01 / eli-b
2-Methylnaphthalene	ND	ug/L		0.19	36	SW8270C	03/16/17 22:01 / eli-b
Acenaphthene	ND	ug/L		0.19	670	SW8270C	03/16/17 22:01 / eli-b
Acenaphthylene	ND	ug/L		0.19		SW8270C	03/16/17 22:01 / eli-b
Anthracene	ND	ug/L		0.19	2100	SW8270C	03/16/17 22:01 / eli-b
Benzo(a)anthracene	ND	ug/L		0.19	0.5	SW8270C	03/16/17 22:01 / eli-b
Benzo(a)pyrene	ND	ug/L		0.19	0.05	SW8270C	03/16/17 22:01 / eli-b
Benzo(b)fluoranthene	ND	ug/L		0.19	0.5	SW8270C	03/16/17 22:01 / eli-b
Benzo(g,h,i)perylene	ND	ug/L		0.19		SW8270C	03/16/17 22:01 / eli-b
Benzo(k)fluoranthene	ND	ug/L		0.19	5	SW8270C	03/16/17 22:01 / eli-b
Chrysene	ND	ug/L		0.19	50	SW8270C	03/16/17 22:01 / eli-b
Dibenzo(a,h)anthracene	ND	ug/L		0.19	0.05	SW8270C	03/16/17 22:01 / eli-b
Fluoranthene	ND	ug/L		0.19	130	SW8270C	03/16/17 22:01 / eli-b
Fluorene	ND	ug/L		0.19	1100	SW8270C	03/16/17 22:01 / eli-b
Indeno(1,2,3-cd)pyrene	ND	ug/L		0.19	0.5	SW8270C	03/16/17 22:01 / eli-b
Naphthalene	0.21	ug/L	B	0.19	100	SW8270C	03/16/17 22:01 / eli-b
Phenanthrene	ND	ug/L		0.19		SW8270C	03/16/17 22:01 / eli-b
Pyrene	ND	ug/L		0.19	830	SW8270C	03/16/17 22:01 / eli-b
Surr: 2-Fluorobiphenyl	72.0	%REC		40-140		SW8270C	03/16/17 21:29 / eli-b
Surr: o-Terphenyl	65.0	%REC		40-140		SW8270C	03/16/17 21:29 / eli-b

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
B - The analyte was detected in the method blank.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish Solvent Site
Lab ID: H17020313-006
Client Sample ID: WSMW-7

Report Date: 03/17/17
Collection Date: 02/22/17 17:25
DateReceived: 02/23/17
Matrix: Groundwater

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Benzene	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
Bromobenzene	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
Bromochloromethane	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
Bromodichloromethane	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
Bromoform	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
Bromomethane	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
Carbon tetrachloride	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
Chlorobenzene	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
Chlorodibromomethane	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
Chloroethane	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
Chloroform	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
Chloromethane	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
1,2-Dibromoethane	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
2-Chlorotoluene	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
4-Chlorotoluene	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
Dibromomethane	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
1,2-Dichlorobenzene	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
1,3-Dichlorobenzene	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
1,4-Dichlorobenzene	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
Dichlorodifluoromethane	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
1,1-Dichloroethane	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
1,2-Dichloroethane	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
1,1-Dichloroethene	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
cis-1,2-Dichloroethene	2740	ug/L		125		SW8260B	03/02/17 12:49 / kjw
trans-1,2-Dichloroethene	304	ug/L		125		SW8260B	03/02/17 12:49 / kjw
1,2-Dichloropropane	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
1,3-Dichloropropane	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
2,2-Dichloropropane	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
1,1-Dichloropropene	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
cis-1,3-Dichloropropene	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
trans-1,3-Dichloropropene	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
Ethylbenzene	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
Methyl ethyl ketone	ND	ug/L		20		SW8260B	03/01/17 22:23 / kjw
Methyl tert-butyl ether (MTBE)	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
Methylene chloride	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
Styrene	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
1,1,1,2-Tetrachloroethane	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
1,1,2,2-Tetrachloroethane	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
Tetrachloroethene	2760	ug/L		125		SW8260B	03/02/17 12:49 / kjw
Toluene	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
1,1,1-Trichloroethane	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
1,1,2-Trichloroethane	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
Trichloroethene	13000	ug/L		250		SW8260B	03/02/17 15:36 / kjw

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish Solvent Site
Lab ID: H17020313-006
Client Sample ID: WSMW-7

Report Date: 03/17/17
Collection Date: 02/22/17 17:25
DateReceived: 02/23/17
Matrix: Groundwater

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Trichlorofluoromethane	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
1,2,3-Trichloropropane	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
Vinyl chloride	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
m+p-Xylenes	ND	ug/L		5.0		SW8260B	03/01/17 22:23 / kjw
o-Xylene	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
Xylenes, Total	ND	ug/L		2.5		SW8260B	03/01/17 22:23 / kjw
Surr: Dibromofluoromethane	93.0	%REC		70-125		SW8260B	03/01/17 22:23 / kjw
Surr: 1,2-Dichloroethane-d4	83.0	%REC		69-131		SW8260B	03/01/17 22:23 / kjw
Surr: Toluene-d8	101	%REC		80-119		SW8260B	03/01/17 22:23 / kjw
Surr: p-Bromofluorobenzene	142	%REC	S	76-123		SW8260B	03/01/17 22:23 / kjw
PETROLEUM HYDROCARBONS-VOLATILE							
Methyl tert-butyl ether (MTBE)	ND	ug/L	D	10	30	MA-VPH	03/04/17 03:16 / eli-b
Benzene	ND	ug/L	D	5.0	5	MA-VPH	03/04/17 03:16 / eli-b
Toluene	ND	ug/L	D	5.0	1000	MA-VPH	03/04/17 03:16 / eli-b
Ethylbenzene	ND	ug/L	D	5.0	700	MA-VPH	03/04/17 03:16 / eli-b
m+p-Xylenes	ND	ug/L	D	5.0		MA-VPH	03/04/17 03:16 / eli-b
o-Xylene	ND	ug/L	D	5.0		MA-VPH	03/04/17 03:16 / eli-b
Xylenes, Total	ND	ug/L	D	5.0	10000	MA-VPH	03/04/17 03:16 / eli-b
Naphthalene	ND	ug/L	D	10	100	MA-VPH	03/04/17 03:16 / eli-b
C9 to C10 Aromatics	ND	ug/L	D	200	1100	MA-VPH	03/04/17 03:16 / eli-b
C5 to C8 Aliphatics	2150	ug/L	*	200	650	MA-VPH	03/04/17 03:16 / eli-b
C9 to C12 Aliphatics	ND	ug/L	D	200	1400	MA-VPH	03/04/17 03:16 / eli-b
Total Purgeable Hydrocarbons	1770	ug/L	*	200	1000	MA-VPH	03/04/17 03:16 / eli-b
Surr: VPH Aromatics Surrogate	0	%REC	1	70-130		MA-VPH	03/04/17 03:16 / eli-b
Surr: VPH Aliphatics Surrogate	0	%REC	1	70-130		MA-VPH	03/04/17 03:16 / eli-b

- Note 1: The C5 to C8 Aliphatics value is corrected for aromatic constituents Benzene and Toluene.
- Note 2: The C9 to C12 Aliphatics value is corrected for aromatic constituents Ethylbenzene, m+p-Xylenes, o-Xylene and C9 to C10 Aromatics.
- 1 = The surrogate was not resolved from a closely eluting peak. Surrogate recovery could not be calculated.

EXTRACTABLE PETROLEUM HYDROCARBONS-SCREEN ANALYSIS							
Total Extractable Hydrocarbons	54200	ug/L	*	6150	1000	SW8015M	03/04/17 04:26 / JRS
Surr: o-Terphenyl	83.0	%REC		40-140		SW8015M	03/04/17 04:26 / JRS

- Note: Total Extractable Hydrocarbons are defined as the total hydrocarbon responses regardless of elution time.

EXTRACTABLE PETROLEUM HYDROCARBONS							
C9 to C18 Aliphatics	ND	ug/L		461	1400	MA-EPH	03/09/17 17:59 / JRS
C19 to C36 Aliphatics	ND	ug/L		461	1000	MA-EPH	03/09/17 17:59 / JRS
Surr: 1-Chloro-octadecane	69.0	%REC		40-140		MA-EPH	03/09/17 17:59 / JRS
C11 to C22 Aromatics	2890	ug/L	*	461	1100	MA-EPH	03/09/17 18:41 / JRS
Total Extractable Hydrocarbons	5560	ug/L	*	461	1000	MA-EPH	03/09/17 18:41 / JRS
Surr: 2-Bromonaphthalene	105	%REC		40-140		MA-EPH	03/09/17 18:41 / JRS
Surr: 2-Fluorobiphenyl	144	%REC	S	40-140		MA-EPH	03/09/17 18:41 / JRS
Surr: o-Terphenyl	85.0	%REC		40-140		MA-EPH	03/09/17 18:41 / JRS

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
* - The result exceeds the MCL.
S - Spike recovery outside of advisory limits.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
D - RL increased due to sample matrix.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish Solvent Site
Lab ID: H17020313-006
Client Sample ID: WSMW-7

Report Date: 03/17/17
Collection Date: 02/22/17 17:25
DateReceived: 02/23/17
Matrix: Groundwater

- A significant portion of the hydrocarbons measured in the EPH Screening analysis were not recovered from the silica gel fractionation cartridge. Silica gel can act as a cleanup media for non-petroleum hydrocarbons.

SEMI-VOLATILE ORGANIC COMPOUNDS (LOW LEVEL)

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
1-Methylnaphthalene	ND	ug/L		0.31	11	SW8270C	03/16/17 23:03 / eli-b
2-Methylnaphthalene	ND	ug/L		0.31	36	SW8270C	03/16/17 23:03 / eli-b
Acenaphthene	ND	ug/L		0.31	670	SW8270C	03/16/17 23:03 / eli-b
Acenaphthylene	ND	ug/L		0.31		SW8270C	03/16/17 23:03 / eli-b
Anthracene	ND	ug/L		0.31	2100	SW8270C	03/16/17 23:03 / eli-b
Benzo(a)anthracene	ND	ug/L		0.31	0.5	SW8270C	03/16/17 23:03 / eli-b
Benzo(a)pyrene	ND	ug/L		0.31	0.05	SW8270C	03/16/17 23:03 / eli-b
Benzo(b)fluoranthene	ND	ug/L		0.31	0.5	SW8270C	03/16/17 23:03 / eli-b
Benzo(g,h,i)perylene	ND	ug/L		0.31		SW8270C	03/16/17 23:03 / eli-b
Benzo(k)fluoranthene	ND	ug/L		0.31	5	SW8270C	03/16/17 23:03 / eli-b
Chrysene	ND	ug/L		0.31	50	SW8270C	03/16/17 23:03 / eli-b
Dibenzo(a,h)anthracene	ND	ug/L		0.31	0.05	SW8270C	03/16/17 23:03 / eli-b
Fluoranthene	ND	ug/L		0.31	130	SW8270C	03/16/17 23:03 / eli-b
Fluorene	ND	ug/L		0.31	1100	SW8270C	03/16/17 23:03 / eli-b
Indeno(1,2,3-cd)pyrene	ND	ug/L		0.31	0.5	SW8270C	03/16/17 23:03 / eli-b
Naphthalene	0.46	ug/L	B	0.31	100	SW8270C	03/16/17 23:03 / eli-b
Phenanthrene	ND	ug/L		0.31		SW8270C	03/16/17 23:03 / eli-b
Pyrene	ND	ug/L		0.31	830	SW8270C	03/16/17 23:03 / eli-b
Surr: 2-Fluorobiphenyl	105	%REC		40-140		SW8270C	03/16/17 22:32 / eli-b
Surr: o-Terphenyl	66.0	%REC		40-140		SW8270C	03/16/17 22:32 / eli-b

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
B - The analyte was detected in the method blank.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish Solvent Site
Lab ID: H17020313-007
Client Sample ID: C1 TB 6171

Report Date: 03/17/17
Collection Date: 02/21/17 15:25
DateReceived: 02/23/17
Matrix: Trip Blank

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PETROLEUM HYDROCARBONS-VOLATILE							
Methyl tert-butyl ether (MTBE)	ND	ug/L		1.0	30	MA-VPH	03/01/17 12:34 / tjb
Benzene	ND	ug/L		0.50	5	MA-VPH	03/01/17 12:34 / tjb
Toluene	ND	ug/L		0.50	1000	MA-VPH	03/01/17 12:34 / tjb
Ethylbenzene	ND	ug/L		0.50	700	MA-VPH	03/01/17 12:34 / tjb
m+p-Xylenes	ND	ug/L		0.50		MA-VPH	03/01/17 12:34 / tjb
o-Xylene	ND	ug/L		0.50		MA-VPH	03/01/17 12:34 / tjb
Xylenes, Total	ND	ug/L		0.50	10000	MA-VPH	03/01/17 12:34 / tjb
Naphthalene	ND	ug/L		1.0	100	MA-VPH	03/01/17 12:34 / tjb
C9 to C10 Aromatics	ND	ug/L		20	1100	MA-VPH	03/01/17 12:34 / tjb
C5 to C8 Aliphatics	ND	ug/L		20	650	MA-VPH	03/01/17 12:34 / tjb
C9 to C12 Aliphatics	ND	ug/L		20	1400	MA-VPH	03/01/17 12:34 / tjb
Total Purgeable Hydrocarbons	ND	ug/L		20	1000	MA-VPH	03/01/17 12:34 / tjb
Surr: VPH Aromatics Surrogate	93.0	%REC		70-130		MA-VPH	03/01/17 12:34 / tjb
Surr: VPH Aliphatics Surrogate	94.0	%REC		70-130		MA-VPH	03/01/17 12:34 / tjb

- Note 1: The C5 to C8 Aliphatics value is corrected for aromatic constituents Benzene and Toluene.
- Note 2: The C9 to C12 Aliphatics value is corrected for aromatic constituents Ethylbenzene, m+p-Xylenes, o-Xylene and C9 to C10 Aromatics.

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish Solvent Site
Lab ID: H17020313-008
Client Sample ID: C1 TB 6171

Report Date: 03/17/17
Collection Date: 02/21/17 15:25
DateReceived: 02/23/17
Matrix: Trip Blank

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Benzene	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
Bromobenzene	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
Bromochloromethane	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
Bromodichloromethane	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
Bromoform	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
Bromomethane	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
Carbon tetrachloride	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
Chlorobenzene	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
Chlorodibromomethane	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
Chloroethane	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
Chloroform	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
Chloromethane	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
1,2-Dibromoethane	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
2-Chlorotoluene	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
4-Chlorotoluene	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
Dibromomethane	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
1,2-Dichlorobenzene	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
1,3-Dichlorobenzene	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
1,4-Dichlorobenzene	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
Dichlorodifluoromethane	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
1,1-Dichloroethane	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
1,2-Dichloroethane	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
1,1-Dichloroethene	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
cis-1,2-Dichloroethene	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
trans-1,2-Dichloroethene	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
1,2-Dichloropropane	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
1,3-Dichloropropane	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
2,2-Dichloropropane	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
1,1-Dichloropropene	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
cis-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
trans-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
Ethylbenzene	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
Methyl ethyl ketone	ND	ug/L		20		SW8260B	03/01/17 13:30 / kjw
Methyl tert-butyl ether (MTBE)	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
Methylene chloride	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
Styrene	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
1,1,1,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
1,1,2,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
Tetrachloroethene	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
Toluene	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
1,1,1-Trichloroethane	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
1,1,2-Trichloroethane	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
Trichloroethene	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish Solvent Site
Lab ID: H17020313-008
Client Sample ID: C1 TB 6171

Report Date: 03/17/17
Collection Date: 02/21/17 15:25
DateReceived: 02/23/17
Matrix: Trip Blank

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Trichlorofluoromethane	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
1,2,3-Trichloropropane	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
Vinyl chloride	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
m+p-Xylenes	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
o-Xylene	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
Xylenes, Total	ND	ug/L		1.0		SW8260B	03/01/17 13:30 / kjw
Surr: Dibromofluoromethane	104	%REC		70-125		SW8260B	03/01/17 13:30 / kjw
Surr: 1,2-Dichloroethane-d4	85.0	%REC		69-131		SW8260B	03/01/17 13:30 / kjw
Surr: Toluene-d8	98.0	%REC		80-119		SW8260B	03/01/17 13:30 / kjw
Surr: p-Bromofluorobenzene	123	%REC		76-123		SW8260B	03/01/17 13:30 / kjw

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish Solvent Site
Lab ID: H17020313-009
Client Sample ID: C2 TB 6171

Report Date: 03/17/17
Collection Date: 02/21/17 15:25
DateReceived: 02/23/17
Matrix: Trip Blank

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PETROLEUM HYDROCARBONS-VOLATILE							
Methyl tert-butyl ether (MTBE)	ND	ug/L		1.0	30	MA-VPH	03/01/17 13:04 / tjb
Benzene	ND	ug/L		0.50	5	MA-VPH	03/01/17 13:04 / tjb
Toluene	ND	ug/L		0.50	1000	MA-VPH	03/01/17 13:04 / tjb
Ethylbenzene	ND	ug/L		0.50	700	MA-VPH	03/01/17 13:04 / tjb
m+p-Xylenes	ND	ug/L		0.50		MA-VPH	03/01/17 13:04 / tjb
o-Xylene	ND	ug/L		0.50		MA-VPH	03/01/17 13:04 / tjb
Xylenes, Total	ND	ug/L		0.50	10000	MA-VPH	03/01/17 13:04 / tjb
Naphthalene	ND	ug/L		1.0	100	MA-VPH	03/01/17 13:04 / tjb
C9 to C10 Aromatics	ND	ug/L		20	1100	MA-VPH	03/01/17 13:04 / tjb
C5 to C8 Aliphatics	ND	ug/L		20	650	MA-VPH	03/01/17 13:04 / tjb
C9 to C12 Aliphatics	ND	ug/L		20	1400	MA-VPH	03/01/17 13:04 / tjb
Total Purgeable Hydrocarbons	ND	ug/L		20	1000	MA-VPH	03/01/17 13:04 / tjb
Surr: VPH Aromatics Surrogate	96.0	%REC		70-130		MA-VPH	03/01/17 13:04 / tjb
Surr: VPH Aliphatics Surrogate	97.0	%REC		70-130		MA-VPH	03/01/17 13:04 / tjb

- Note 1: The C5 to C8 Aliphatics value is corrected for aromatic constituents Benzene and Toluene.
- Note 2: The C9 to C12 Aliphatics value is corrected for aromatic constituents Ethylbenzene, m+p-Xylenes, o-Xylene and C9 to C10 Aromatics.

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish Solvent Site
Lab ID: H17020313-010
Client Sample ID: C2 TB 6171

Report Date: 03/17/17
Collection Date: 02/21/17 15:25
DateReceived: 02/23/17
Matrix: Trip Blank

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Benzene	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
Bromobenzene	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
Bromochloromethane	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
Bromodichloromethane	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
Bromoform	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
Bromomethane	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
Carbon tetrachloride	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
Chlorobenzene	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
Chlorodibromomethane	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
Chloroethane	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
Chloroform	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
Chloromethane	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
1,2-Dibromoethane	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
2-Chlorotoluene	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
4-Chlorotoluene	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
Dibromomethane	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
1,2-Dichlorobenzene	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
1,3-Dichlorobenzene	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
1,4-Dichlorobenzene	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
Dichlorodifluoromethane	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
1,1-Dichloroethane	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
1,2-Dichloroethane	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
1,1-Dichloroethene	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
cis-1,2-Dichloroethene	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
trans-1,2-Dichloroethene	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
1,2-Dichloropropane	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
1,3-Dichloropropane	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
2,2-Dichloropropane	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
1,1-Dichloropropene	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
cis-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
trans-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
Ethylbenzene	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
Methyl ethyl ketone	ND	ug/L		20		SW8260B	03/01/17 14:03 / kjw
Methyl tert-butyl ether (MTBE)	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
Methylene chloride	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
Styrene	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
1,1,1,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
1,1,2,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
Tetrachloroethene	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
Toluene	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
1,1,1-Trichloroethane	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
1,1,2-Trichloroethane	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
Trichloroethene	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish Solvent Site
Lab ID: H17020313-010
Client Sample ID: C2 TB 6171

Report Date: 03/17/17
Collection Date: 02/21/17 15:25
DateReceived: 02/23/17
Matrix: Trip Blank

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Trichlorofluoromethane	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
1,2,3-Trichloropropane	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
Vinyl chloride	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
m+p-Xylenes	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
o-Xylene	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
Xylenes, Total	ND	ug/L		1.0		SW8260B	03/01/17 14:03 / kjw
Surr: Dibromofluoromethane	99.0	%REC		70-125		SW8260B	03/01/17 14:03 / kjw
Surr: 1,2-Dichloroethane-d4	88.0	%REC		69-131		SW8260B	03/01/17 14:03 / kjw
Surr: Toluene-d8	91.0	%REC		80-119		SW8260B	03/01/17 14:03 / kjw
Surr: p-Bromofluorobenzene	118	%REC		76-123		SW8260B	03/01/17 14:03 / kjw

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 03/17/17

Project: MDEQ Whitefish Solvent Site **Work Order:** H17020313

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: MA-EPH										Batch: 36436
Lab ID: MB-36436-32395	3	Method Blank				Run: HHP_170308A				03/09/17 03:54
C9 to C18 Aliphatics		ND	ug/L	300						
C19 to C36 Aliphatics		ND	ug/L	300						
Surr: 1-Chloro-octadecane				5.0	71	40	140			
Lab ID: LCS-36436-32395	17	Laboratory Control Sample				Run: HHP_170308A				03/09/17 05:18
C9 to C18 Aliphatics		807	ug/L	300	67	40	140			
C19 to C36 Aliphatics		1370	ug/L	300	86	40	140			
n-Nonane		89.8	ug/L	5.0	45	30	140			
n-Decane		108	ug/L	5.0	54	40	140			
n-Dodecane		128	ug/L	5.0	64	40	140			
n-Tetradecane		140	ug/L	5.0	70	40	140			
n-Hexadecane		151	ug/L	5.0	76	40	140			
n-Octadecane		162	ug/L	5.0	81	40	140			
n-Nonadecane		127	ug/L	5.0	63	40	140			
n-Eicosane		172	ug/L	5.0	86	40	140			
n-Docosane		173	ug/L	5.0	86	40	140			
n-Tetracosane		176	ug/L	5.0	88	40	140			
n-Hexacosane		178	ug/L	5.0	89	40	140			
n-Octacosane		172	ug/L	5.0	86	40	140			
n-Triacontane		202	ug/L	5.0	101	40	140			
n-Hexatriacontane		162	ug/L	5.0	81	40	140			
Surr: 1-Chloro-octadecane				5.0	72	40	140			
Lab ID: H17020313-001BMS	17	Sample Matrix Spike				Run: HHP_170308A				03/09/17 08:07
C9 to C18 Aliphatics		1600	ug/L	600	66	40	140			
C19 to C36 Aliphatics		2890	ug/L	600	90	40	140			
n-Nonane		154	ug/L	10	39	30	140			
n-Decane		209	ug/L	10	52	40	140			
n-Dodecane		256	ug/L	10	64	40	140			
n-Tetradecane		292	ug/L	10	73	40	140			
n-Hexadecane		313	ug/L	10	78	40	140			
n-Octadecane		335	ug/L	10	84	40	140			
n-Nonadecane		262	ug/L	10	66	40	140			
n-Eicosane		358	ug/L	10	89	40	140			
n-Docosane		366	ug/L	10	91	40	140			
n-Tetracosane		376	ug/L	10	94	40	140			
n-Hexacosane		380	ug/L	10	95	40	140			
n-Octacosane		367	ug/L	10	92	40	140			
n-Triacontane		430	ug/L	10	108	40	140			
n-Hexatriacontane		323	ug/L	10	81	40	140			
Surr: 1-Chloro-octadecane				10	73	40	140			
Lab ID: H17020313-001BMSD	17	Sample Matrix Spike Duplicate				Run: HHP_170308A				03/09/17 09:31
C9 to C18 Aliphatics		1640	ug/L	600	68	40	140	3.0	20	
C19 to C36 Aliphatics		2800	ug/L	600	87	40	140	3.4	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 03/17/17

Project: MDEQ Whitefish Solvent Site **Work Order:** H17020313

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: MA-EPH										Batch: 36436
Lab ID: H17020313-001BMSD	17	Sample Matrix Spike Duplicate				Run: HHP_170308A			03/09/17 09:31	
n-Nonane		184	ug/L	10	46	30	140	17	30	
n-Decane		232	ug/L	10	58	40	140	10	20	
n-Dodecane		266	ug/L	10	67	40	140	3.9	20	
n-Tetradecane		294	ug/L	10	73	40	140	0.8	20	
n-Hexadecane		314	ug/L	10	78	40	140	0.3	20	
n-Octadecane		332	ug/L	10	83	40	140	0.8	20	
n-Nonadecane		258	ug/L	10	65	40	140	1.5	20	
n-Eicosane		352	ug/L	10	88	40	140	1.5	20	
n-Docosane		358	ug/L	10	89	40	140	2.2	20	
n-Tetracosane		365	ug/L	10	91	40	140	2.7	20	
n-Hexacosane		370	ug/L	10	92	40	140	2.8	20	
n-Octacosane		358	ug/L	10	89	40	140	2.7	20	
n-Triacontane		418	ug/L	10	105	40	140	2.9	20	
n-Hexatriacontane		298	ug/L	10	74	40	140	8.1	20	
Surr: 1-Chloro-octadecane				10	78	40	140	0.0	20	
Lab ID: MB-36436-32395	20	Method Blank				Run: HHP_170308A			03/09/17 04:36	
C11 to C22 Aromatics		ND	ug/L	300						
Total Extractable Hydrocarbons		ND	ug/L	300						
Naphthalene		ND	ug/L	5.0						
2-MethylNaphthalene		ND	ug/L	5.0						
Acenaphthylene		ND	ug/L	5.0						
Acenaphthene		ND	ug/L	5.0						
Fluorene		ND	ug/L	5.0						
Phenanthrene		ND	ug/L	5.0						
Anthracene		ND	ug/L	5.0						
Fluoranthene		ND	ug/L	5.0						
Pyrene		ND	ug/L	5.0						
Benzo(a)Anthracene		ND	ug/L	5.0						
Chrysene		ND	ug/L	5.0						
Benzo(b)Fluoranthene/Benzo(k)Fluorant		ND	ug/L	5.0						
Benzo(a)Pyrene		ND	ug/L	5.0						
Dibenz(a,h)anthracene/Indeno(1,2,3-cd)		ND	ug/L	5.0						
Benzo(g,h,I)perylene		ND	ug/L	5.0						
Surr: 2-Bromonaphthalene				5.0	91	40	140			
Surr: 2-Fluorobiphenyl				5.0	93	40	140			
Surr: o-Terphenyl				5.0	84	40	140			
Lab ID: LCS-36436-32395	19	Laboratory Control Sample				Run: HHP_170308A			03/09/17 06:00	
C11 to C22 Aromatics		2300	ug/L	300	64	40	140			
Naphthalene		104	ug/L	5.0	52	40	140			
2-MethylNaphthalene		79.4	ug/L	5.0	40	40	140			
Acenaphthylene		118	ug/L	5.0	59	40	140			
Acenaphthene		126	ug/L	5.0	63	40	140			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 03/17/17

Project: MDEQ Whitefish Solvent Site **Work Order:** H17020313

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: MA-EPH										Batch: 36436
Lab ID: LCS-36436-32395	19	Laboratory Control Sample				Run: HHP_170308A				03/09/17 06:00
Fluorene		124	ug/L	5.0	62	40	140			
Phenanthrene		124	ug/L	5.0	62	40	140			
Anthracene		111	ug/L	5.0	55	40	140			
Fluoranthene		140	ug/L	5.0	70	40	140			
Pyrene		140	ug/L	5.0	70	40	140			
Benzo(a)Anthracene		123	ug/L	5.0	62	40	140			
Chrysene		101	ug/L	5.0	51	40	140			
Benzo(b)Fluoranthene/Benzo(k)Fluorant		275	ug/L	5.0	69	40	140			
Benzo(a)Pyrene		129	ug/L	5.0	64	40	140			
Dibenz(a,h)anthracene/Indeno(1,2,3-cd)		266	ug/L	5.0	67	40	140			
Benzo(g,h,I)perylene		133	ug/L	5.0	67	40	140			
Surr: 2-Bromonaphthalene				5.0	82	40	140			
Surr: 2-Fluorobiphenyl				5.0	89	40	140			
Surr: o-Terphenyl				5.0	86	40	140			
Lab ID: H17020313-001BMS	19	Sample Matrix Spike				Run: HHP_170308A				03/09/17 08:49
C11 to C22 Aromatics		5080	ug/L	600	71	40	140			
Naphthalene		216	ug/L	10	54	40	140			
2-MethylNaphthalene		174	ug/L	10	43	40	140			
Acenaphthylene		258	ug/L	10	64	40	140			
Acenaphthene		270	ug/L	10	67	40	140			
Fluorene		268	ug/L	10	67	40	140			
Phenanthrene		269	ug/L	10	67	40	140			
Anthracene		239	ug/L	10	60	40	140			
Fluoranthene		308	ug/L	10	77	40	140			
Pyrene		309	ug/L	10	77	40	140			
Benzo(a)Anthracene		277	ug/L	10	69	40	140			
Chrysene		228	ug/L	10	57	40	140			
Benzo(b)Fluoranthene/Benzo(k)Fluorant		623	ug/L	10	78	40	140			
Benzo(a)Pyrene		290	ug/L	10	73	40	140			
Dibenz(a,h)anthracene/Indeno(1,2,3-cd)		606	ug/L	10	76	40	140			
Benzo(g,h,I)perylene		301	ug/L	10	75	40	140			
Surr: 2-Bromonaphthalene				10	101	40	140			
Surr: 2-Fluorobiphenyl				10	103	40	140			
Surr: o-Terphenyl				10	94	40	140			
Lab ID: H17020313-001BMSD	19	Sample Matrix Spike Duplicate				Run: HHP_170308A				03/09/17 10:14
C11 to C22 Aromatics		5180	ug/L	600	72	40	140	1.8	20	
Naphthalene		240	ug/L	10	60	40	140	11	20	
2-MethylNaphthalene		186	ug/L	10	47	40	140	6.8	20	
Acenaphthylene		272	ug/L	10	68	40	140	5.2	20	
Acenaphthene		282	ug/L	10	70	40	140	4.5	20	
Fluorene		282	ug/L	10	71	40	140	5.4	20	
Phenanthrene		275	ug/L	10	69	40	140	2.3	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 03/17/17

Project: MDEQ Whitefish Solvent Site **Work Order:** H17020313

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: MA-EPH										Batch: 36436
Lab ID: H17020313-001BMSD	19	Sample Matrix Spike Duplicate				Run: HHP_170308A			03/09/17 10:14	
Anthracene		245	ug/L	10	61	40	140	2.2	20	
Fluoranthene		313	ug/L	10	78	40	140	1.5	20	
Pyrene		313	ug/L	10	78	40	140	1.0	20	
Benzo(a)Anthracene		278	ug/L	10	70	40	140	0.4	20	
Chrysene		228	ug/L	10	57	40	140	0.0	20	
Benzo(b)Fluoranthene/Benzo(k)Fluorant		621	ug/L	10	78	40	140	0.4	20	
Benzo(a)Pyrene		290	ug/L	10	73	40	140	0.1	20	
Dibenz(a,h)anthracene/Indeno(1,2,3-cd)		594	ug/L	10	74	40	140	2.1	20	
Benzo(g,h,I)perylene		293	ug/L	10	73	40	140	2.7	20	
Surr: 2-Bromonaphthalene				10	106	40	140			
Surr: 2-Fluorobiphenyl				10	107	40	140			
Surr: o-Terphenyl				10	95	40	140			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 03/17/17

Project: MDEQ Whitefish Solvent Site **Work Order:** H17020313

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: MA-EPH									Analytical Run: R123262	
Lab ID: CCV_0308GC118r-W	15	Continuing Calibration Verification Standard							03/09/17 02:29	
n-Nonane		229	ug/L	5.0	114	30	125			
n-Decane		226	ug/L	5.0	113	75	125			
n-Dodecane		225	ug/L	5.0	112	75	125			
n-Tetradecane		224	ug/L	5.0	112	75	125			
n-Hexadecane		223	ug/L	5.0	111	75	125			
n-Octadecane		222	ug/L	5.0	111	75	125			
n-Nonadecane		221	ug/L	5.0	110	75	125			
n-Eicosane		223	ug/L	5.0	111	75	125			
n-Docosane		220	ug/L	5.0	110	75	125			
n-Tetracosane		219	ug/L	5.0	110	75	125			
n-Hexacosane		222	ug/L	5.0	111	75	125			
n-Octacosane		221	ug/L	5.0	110	75	125			
n-Triacontane		221	ug/L	5.0	110	75	125			
n-Hexatriacontane		211	ug/L	5.0	106	75	125			
Surr: 1-Chloro-octadecane				5.0	103	75	125			
Lab ID: CCV_0308GC119r-W	18	Continuing Calibration Verification Standard							03/09/17 03:11	
Naphthalene		186	ug/L	5.0	93	75	125			
2-MethylNaphthalene		186	ug/L	5.0	93	75	125			
Acenaphthylene		186	ug/L	5.0	93	75	125			
Acenaphthene		186	ug/L	5.0	93	75	125			
Fluorene		185	ug/L	5.0	92	75	125			
Phenanthrene		187	ug/L	5.0	94	75	125			
Anthracene		186	ug/L	5.0	93	75	125			
Fluoranthene		183	ug/L	5.0	92	75	125			
Pyrene		187	ug/L	5.0	94	75	125			
Benzo(a)Anthracene		186	ug/L	5.0	93	75	125			
Chrysene		187	ug/L	5.0	94	75	125			
Benzo(b)Fluoranthene/Benzo(k)Fluorant		367	ug/L	5.0	92	75	125			
Benzo(a)Pyrene		172	ug/L	5.0	86	75	125			
Dibenz(a,h)anthracene/Indeno(1,2,3-cd)		375	ug/L	5.0	94	75	125			
Benzo(g,h,I)perylene		186	ug/L	5.0	93	75	125			
Surr: 2-Bromonaphthalene				5.0	124	40	140			
Surr: 2-Fluorobiphenyl				5.0	123	40	140			
Surr: o-Terphenyl				5.0	112	40	140			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 03/17/17

Project: MDEQ Whitefish Solvent Site **Work Order:** H17020313

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: MA-EPH									Analytical Run: R123281	
Lab ID: CCV_0309GC125r-S	15	Continuing Calibration Verification Standard							03/10/17 06:41	
n-Nonane		6.94	mg/kg-dry	0.17	104	75	125			
n-Decane		6.77	mg/kg-dry	0.17	102	75	125			
n-Dodecane		6.94	mg/kg-dry	0.17	104	75	125			
n-Tetradecane		6.94	mg/kg-dry	0.17	104	75	125			
n-Hexadecane		6.92	mg/kg-dry	0.17	104	75	125			
n-Octadecane		6.89	mg/kg-dry	0.17	103	75	125			
n-Nonadecane		6.87	mg/kg-dry	0.17	103	75	125			
n-Eicosane		6.93	mg/kg-dry	0.17	104	75	125			
n-Docosane		6.83	mg/kg-dry	0.17	102	75	125			
n-Tetracosane		6.83	mg/kg-dry	0.17	102	75	125			
n-Hexacosane		6.92	mg/kg-dry	0.17	104	75	125			
n-Octacosane		6.88	mg/kg-dry	0.17	103	75	125			
n-Triacontane		6.87	mg/kg-dry	0.17	103	75	125			
n-Hexatriacontane		6.56	mg/kg-dry	0.17	98	75	125			
Surr: 1-Chloro-octadecane				0.17	96	75	125			
Lab ID: CCV_0309GC126r-S	18	Continuing Calibration Verification Standard							03/10/17 07:23	
Naphthalene		5.95	mg/kg-dry	0.17	89	75	125			
2-MethylNaphthalene		5.96	mg/kg-dry	0.17	89	75	125			
Acenaphthylene		5.85	mg/kg-dry	0.17	88	75	125			
Acenaphthene		5.96	mg/kg-dry	0.17	89	75	125			
Fluorene		5.89	mg/kg-dry	0.17	88	75	125			
Phenanthrene		6.00	mg/kg-dry	0.17	90	75	125			
Anthracene		5.95	mg/kg-dry	0.17	89	75	125			
Fluoranthene		5.87	mg/kg-dry	0.17	88	75	125			
Pyrene		6.00	mg/kg-dry	0.17	90	75	125			
Benzo(a)Anthracene		5.97	mg/kg-dry	0.17	90	75	125			
Chrysene		6.02	mg/kg-dry	0.17	90	75	125			
Benzo(b)Fluoranthene/Benzo(k)Fluorant		12.3	mg/kg-dry	0.17	92	75	125			
Benzo(a)Pyrene		5.88	mg/kg-dry	0.17	88	75	125			
Dibenz(a,h)anthracene/Indeno(1,2,3-cd)		12.0	mg/kg-dry	0.17	90	75	125			
Benzo(g,h,I)perylene		5.95	mg/kg-dry	0.17	89	75	125			
Surr: 2-Bromonaphthalene				0.17	119	40	140			
Surr: 2-Fluorobiphenyl				0.17	118	40	140			
Surr: o-Terphenyl				0.17	108	40	140			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 03/17/17

Project: MDEQ Whitefish Solvent Site **Work Order:** H17020313

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: MA-EPH									Analytical Run: R123304	
Lab ID: CCV_0310GC106r-W	18	Continuing Calibration Verification Standard							03/10/17 14:34	
Naphthalene		176	ug/L	5.0	88	75	125			
2-MethylNaphthalene		176	ug/L	5.0	88	75	125			
Acenaphthylene		172	ug/L	5.0	86	75	125			
Acenaphthene		176	ug/L	5.0	88	75	125			
Fluorene		174	ug/L	5.0	87	75	125			
Phenanthrene		177	ug/L	5.0	89	75	125			
Anthracene		176	ug/L	5.0	88	75	125			
Fluoranthene		173	ug/L	5.0	87	75	125			
Pyrene		178	ug/L	5.0	89	75	125			
Benzo(a)Anthracene		177	ug/L	5.0	88	75	125			
Chrysene		177	ug/L	5.0	89	75	125			
Benzo(b)Fluoranthene/Benzo(k)Fluorant		370	ug/L	5.0	92	75	125			
Benzo(a)Pyrene		174	ug/L	5.0	87	75	125			
Dibenz(a,h)anthracene/Indeno(1,2,3-cd)		356	ug/L	5.0	89	75	125			
Benzo(g,h,I)perylene		176	ug/L	5.0	88	75	125			
Surr: 2-Bromonaphthalene				5.0	118	40	140			
Surr: 2-Fluorobiphenyl				5.0	116	40	140			
Surr: o-Terphenyl				5.0	106	40	140			
Lab ID: CCV_0310GC105r-W	15	Continuing Calibration Verification Standard							03/10/17 13:52	
n-Nonane		224	ug/L	5.0	112	30	125			
n-Decane		219	ug/L	5.0	110	75	125			
n-Dodecane		222	ug/L	5.0	111	75	125			
n-Tetradecane		221	ug/L	5.0	111	75	125			
n-Hexadecane		221	ug/L	5.0	110	75	125			
n-Octadecane		220	ug/L	5.0	110	75	125			
n-Nonadecane		219	ug/L	5.0	109	75	125			
n-Eicosane		221	ug/L	5.0	110	75	125			
n-Docosane		218	ug/L	5.0	109	75	125			
n-Tetracosane		218	ug/L	5.0	109	75	125			
n-Hexacosane		220	ug/L	5.0	110	75	125			
n-Octacosane		219	ug/L	5.0	110	75	125			
n-Triacontane		219	ug/L	5.0	109	75	125			
n-Hexatriacontane		211	ug/L	5.0	105	75	125			
Surr: 1-Chloro-octadecane				5.0	102	75	125			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 03/17/17

Project: MDEQ Whitefish Solvent Site **Work Order:** H17020313

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: MA-VPH									Analytical Run: B_R275866	
Lab ID: CCV_0302VA234r-W	15	Continuing Calibration Verification Standard							03/03/17 10:28	
1,2,4-Trimethylbenzene		25.3	ug/L	1.0	101	75	125			
2,2,4-Trimethylpentane		23.9	ug/L	1.0	96	75	125			
2-Methylpentane		24.1	ug/L	1.0	96	75	125			
n-Butylcyclohexane		23.3	ug/L	1.0	93	75	125			
n-Decane		23.9	ug/L	1.0	96	75	125			
n-Pentane		23.6	ug/L	1.0	94	75	125			
Methyl tert-butyl ether (MTBE)		24.4	ug/L	1.0	98	75	125			
Benzene		24.8	ug/L	0.50	99	75	125			
Toluene		25.2	ug/L	0.50	101	75	125			
Ethylbenzene		25.2	ug/L	0.50	101	75	125			
m+p-Xylenes		48.9	ug/L	0.50	98	75	125			
o-Xylene		25.0	ug/L	0.50	100	75	125			
Naphthalene		25.6	ug/L	1.0	103	75	125			
Surr: VPH Aromatics Surrogate				1.0	104	75	125			
Surr: VPH Aliphatics Surrogate				1.0	105	75	125			
Method: MA-VPH									Batch: B_R275866	
Lab ID: LCS_0302VA235r	16	Laboratory Control Sample				Run: SUB-B275866			03/03/17 11:00	
1,2,4-Trimethylbenzene		24.3	ug/L	1.0	97	70	130			
2,2,4-Trimethylpentane		23.7	ug/L	1.0	95	70	130			
2-Methylpentane		23.9	ug/L	1.0	96	70	130			
n-Butylcyclohexane		23.6	ug/L	1.0	95	70	130			
n-Decane		21.7	ug/L	1.0	87	70	130			
n-Pentane		24.5	ug/L	1.0	98	70	130			
Methyl tert-butyl ether (MTBE)		23.5	ug/L	1.0	94	70	130			
Benzene		23.5	ug/L	0.50	94	70	130			
Toluene		23.7	ug/L	0.50	95	70	130			
Ethylbenzene		23.8	ug/L	0.50	95	70	130			
m+p-Xylenes		47.0	ug/L	0.50	94	70	130			
o-Xylene		23.9	ug/L	0.50	96	70	130			
Naphthalene		25.1	ug/L	1.0	100	70	130			
Total Purgeable Hydrocarbons		363	ug/L	20	97	70	130			
Surr: VPH Aromatics Surrogate				1.0	95	70	130			
Surr: VPH Aliphatics Surrogate				1.0	98	70	130			
Lab ID: MBLK_0302VA238r	14	Method Blank				Run: SUB-B275866			03/03/17 12:37	
Methyl tert-butyl ether (MTBE)		ND	ug/L	1.0						
Benzene		ND	ug/L	0.50						
Toluene		ND	ug/L	0.50						
Ethylbenzene		ND	ug/L	0.50						
m+p-Xylenes		ND	ug/L	0.50						
o-Xylene		ND	ug/L	0.50						
Xylenes, Total		ND	ug/L	0.50						
Naphthalene		ND	ug/L	1.0						

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 03/17/17

Project: MDEQ Whitefish Solvent Site **Work Order:** H17020313

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: MA-VPH									Batch: B_R275866	
Lab ID: MBLK_0302VA238r	14	Method Blank				Run: SUB-B275866			03/03/17 12:37	
C9 to C10 Aromatics		ND	ug/L	20						
C5 to C8 Aliphatics		ND	ug/L	20						
C9 to C12 Aliphatics		ND	ug/L	20						
Total Purgeable Hydrocarbons		ND	ug/L	20						
Surr: VPH Aromatics Surrogate				1.0	98	70	130			
Surr: VPH Aliphatics Surrogate				1.0	98	70	130			
Lab ID: B17030006-005CMS	10	Sample Matrix Spike				Run: SUB-B275866			03/03/17 16:27	
Methyl tert-butyl ether (MTBE)		48.7	ug/L	2.0	97	70	130			
Benzene		51.6	ug/L	1.0	97	70	130			
Toluene		48.7	ug/L	1.0	97	70	130			
Ethylbenzene		50.1	ug/L	1.0	98	70	130			
m+p-Xylenes		102	ug/L	1.0	96	70	130			
o-Xylene		51.8	ug/L	1.0	98	70	130			
Naphthalene		49.9	ug/L	2.0	100	70	130			
Total Purgeable Hydrocarbons		834	ug/L	40	102	70	130			
Surr: VPH Aromatics Surrogate				2.0	100	70	130			
Surr: VPH Aliphatics Surrogate				2.0	104	70	130			
Lab ID: B17030006-005CMSD	10	Sample Matrix Spike Duplicate				Run: SUB-B275866			03/03/17 16:59	
Methyl tert-butyl ether (MTBE)		46.3	ug/L	2.0	93	70	130	4.9	20	
Benzene		48.3	ug/L	1.0	90	70	130	6.6	20	
Toluene		45.9	ug/L	1.0	92	70	130	5.9	20	
Ethylbenzene		47.0	ug/L	1.0	91	70	130	6.6	20	
m+p-Xylenes		97.3	ug/L	1.0	91	70	130	5.1	20	
o-Xylene		49.1	ug/L	1.0	93	70	130	5.2	20	
Naphthalene		49.3	ug/L	2.0	99	70	130	1.2	20	
Total Purgeable Hydrocarbons		838	ug/L	40	103	70	130	0.5	20	
Surr: VPH Aromatics Surrogate				2.0	97	70	130			
Surr: VPH Aliphatics Surrogate				2.0	102	70	130			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 03/17/17

Project: MDEQ Whitefish Solvent Site **Work Order:** H17020313

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: MA-VPH									Analytical Run: R123104	
Lab ID: CCV_0301GC202r-W	15	Continuing Calibration Verification Standard							03/01/17 10:00	
1,2,4-Trimethylbenzene		25.0	ug/L	1.0	100	75	125			
2,2,4-Trimethylpentane		26.4	ug/L	1.0	106	75	125			
2-Methylpentane		25.9	ug/L	1.0	104	75	125			
n-Butylcyclohexane		23.4	ug/L	1.0	94	75	125			
n-Decane		22.9	ug/L	1.0	92	75	125			
n-Pentane		25.9	ug/L	1.0	104	75	125			
Methyl tert-butyl ether (MTBE)		26.5	ug/L	1.0	106	75	125			
Benzene		25.0	ug/L	0.50	100	75	125			
Toluene		24.8	ug/L	0.50	99	75	125			
Ethylbenzene		25.7	ug/L	0.50	103	75	125			
m+p-Xylenes		51.5	ug/L	0.50	103	75	125			
o-Xylene		24.7	ug/L	0.50	99	75	125			
Naphthalene		23.2	ug/L	1.0	93	75	125			
Surr: VPH Aromatics Surrogate				1.0	91	70	130			
Surr: VPH Aliphatics Surrogate				1.0	90	70	130			
Method: MA-VPH									Batch: R123104	
Lab ID: LCS_0301GC203r	16	Laboratory Control Sample				Run: GC2_170301A			03/01/17 10:41	
1,2,4-Trimethylbenzene		25.9	ug/L	1.0	104	70	130			
2,2,4-Trimethylpentane		27.6	ug/L	1.0	110	70	130			
2-Methylpentane		27.3	ug/L	1.0	109	70	130			
n-Butylcyclohexane		23.3	ug/L	1.0	93	70	130			
n-Decane		19.7	ug/L	1.0	79	70	130			
n-Pentane		28.1	ug/L	1.0	112	70	130			
Methyl tert-butyl ether (MTBE)		26.8	ug/L	1.0	107	70	130			
Benzene		25.6	ug/L	0.50	103	70	130			
Toluene		25.4	ug/L	0.50	102	70	130			
Ethylbenzene		26.5	ug/L	0.50	106	70	130			
m+p-Xylenes		53.7	ug/L	0.50	107	70	130			
o-Xylene		25.7	ug/L	0.50	103	70	130			
Naphthalene		24.3	ug/L	1.0	97	70	130			
Total Purgeable Hydrocarbons		388	ug/L	20	103	70	130			
Surr: VPH Aromatics Surrogate				1.0	92	70	130			
Surr: VPH Aliphatics Surrogate				1.0	91	70	130			
Lab ID: MBLK_0301GC205r	14	Method Blank				Run: GC2_170301A			03/01/17 11:53	
Methyl tert-butyl ether (MTBE)		ND	ug/L	1.0						
Benzene		ND	ug/L	0.50						
Toluene		ND	ug/L	0.50						
Ethylbenzene		ND	ug/L	0.50						
m+p-Xylenes		ND	ug/L	0.50						
o-Xylene		ND	ug/L	0.50						
Naphthalene		ND	ug/L	1.0						
C9 to C10 Aromatics		ND	ug/L	20						

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 03/17/17

Project: MDEQ Whitefish Solvent Site **Work Order:** H17020313

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: MA-VPH									Batch: R123104	
Lab ID: MBLK_0301GC205r	14	Method Blank				Run: GC2_170301A			03/01/17 11:53	
C5 to C8 Aliphatics		ND	ug/L	20						
C9 to C12 Aliphatics		ND	ug/L	20						
Total Purgeable Hydrocarbons		ND	ug/L	20						
Xylenes, Total		ND	ug/L	0.50						
Surr: VPH Aromatics Surrogate				1.0	90	70	130			
Surr: VPH Aliphatics Surrogate				1.0	91	70	130			
Lab ID: H17020313-004AMS	10	Sample Matrix Spike				Run: GC2_170301A			03/01/17 14:59	
Methyl tert-butyl ether (MTBE)		26.1	ug/L	1.0	104	70	130			
Benzene		24.8	ug/L	0.50	99	70	130			
Toluene		24.7	ug/L	0.50	99	70	130			
Ethylbenzene		25.1	ug/L	0.50	101	70	130			
m+p-Xylenes		51.3	ug/L	0.50	103	70	130			
o-Xylene		24.4	ug/L	0.50	98	70	130			
Naphthalene		22.7	ug/L	1.0	91	70	130			
Total Purgeable Hydrocarbons		377	ug/L	20	101	70	130			
Surr: VPH Aromatics Surrogate				1.0	90	70	130			
Surr: VPH Aliphatics Surrogate				1.0	89	70	130			
Lab ID: H17020313-004AMSD	10	Sample Matrix Spike Duplicate				Run: GC2_170301A			03/01/17 15:30	
Methyl tert-butyl ether (MTBE)		26.0	ug/L	1.0	104	70	130	0.3	20	
Benzene		24.7	ug/L	0.50	99	70	130	0.3	20	
Toluene		24.7	ug/L	0.50	99	70	130	0.1	20	
Ethylbenzene		25.4	ug/L	0.50	101	70	130	0.9	20	
m+p-Xylenes		51.5	ug/L	0.50	103	70	130	0.2	20	
o-Xylene		24.4	ug/L	0.50	98	70	130	0.1	20	
Naphthalene		23.2	ug/L	1.0	93	70	130	2.2	20	
Total Purgeable Hydrocarbons		370	ug/L	20	99	70	130	1.9	20	
Surr: VPH Aromatics Surrogate				1.0	94	70	130			
Surr: VPH Aliphatics Surrogate				1.0	94	70	130			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 03/17/17

Project: MDEQ Whitefish Solvent Site **Work Order:** H17020313

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8015M										Batch: 36395
Lab ID: MB-36395	2	Method Blank				Run: HHP2_170303A				03/03/17 10:52
Total Extractable Hydrocarbons		ND	ug/L	300						
Surr: o-Terphenyl					83	40	140			
Lab ID: LCS-36395	2	Laboratory Control Sample				Run: HHP2_170303A				03/03/17 11:40
Total Extractable Hydrocarbons		6750	ug/L	300	106	60	140			
Surr: o-Terphenyl					95	40	140			
Lab ID: H17020313-001BMS	2	Sample Matrix Spike				Run: HHP2_170303A				03/03/17 13:16
Total Extractable Hydrocarbons		13200	ug/L	600	94	60	140			
Surr: o-Terphenyl					86	40	140			
Lab ID: H17020313-001BMSD	2	Sample Matrix Spike Duplicate				Run: HHP2_170303A				03/03/17 14:03
Total Extractable Hydrocarbons		13200	ug/L	600	93	60	140	0.2	20	
Surr: o-Terphenyl					85	40	140			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 03/17/17

Project: MDEQ Whitefish Solvent Site **Work Order:** H17020313

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8015M									Analytical Run: R123152	
Lab ID: CCV_0303GC402r-W	15	Continuing Calibration Verification Standard							03/03/17 09:56	
n-Nonane		206	ug/L		103	75	125			
n-Decane		200	ug/L		100	75	125			
n-Dodecane		205	ug/L		102	75	125			
n-Tetradecane		206	ug/L		103	75	125			
n-Hexadecane		204	ug/L		102	75	125			
n-Octadecane		204	ug/L		102	75	125			
n-Nonadecane		205	ug/L		103	75	125			
n-Eicosane		203	ug/L		102	75	125			
n-Docosane		203	ug/L		102	75	125			
n-Tetracosane		205	ug/L		103	75	125			
n-Hexacosane		204	ug/L		102	75	125			
n-Octacosane		203	ug/L		101	75	125			
n-Triacontane		202	ug/L		101	75	125			
n-Hexatriacontane		211	ug/L		106	75	125			
Surr: o-Terphenyl					91	75	125			
Lab ID: CCV_0303GC414r-W	15	Continuing Calibration Verification Standard							03/03/17 19:39	
n-Nonane		229	ug/L		115	75	125			
n-Decane		233	ug/L		117	75	125			
n-Dodecane		215	ug/L		107	75	125			
n-Tetradecane		216	ug/L		108	75	125			
n-Hexadecane		215	ug/L		107	75	125			
n-Octadecane		215	ug/L		107	75	125			
n-Nonadecane		216	ug/L		108	75	125			
n-Eicosane		214	ug/L		107	75	125			
n-Docosane		214	ug/L		107	75	125			
n-Tetracosane		216	ug/L		108	75	125			
n-Hexacosane		215	ug/L		108	75	125			
n-Octacosane		214	ug/L		107	75	125			
n-Triacontane		214	ug/L		107	75	125			
n-Hexatriacontane		222	ug/L		111	75	125			
Surr: o-Terphenyl					96	75	125			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 03/17/17

Project: MDEQ Whitefish Solvent Site **Work Order:** H17020313

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B									Analytical Run: R123056	
Lab ID: 030117_CCV_2	53	Continuing Calibration Verification Standard							03/01/17 11:05	
Benzene		5.36	ug/L	0.50	107	70	130			
Bromobenzene		4.92	ug/L	0.50	98	70	130			
Bromochloromethane		4.40	ug/L	0.50	88	70	130			
Bromodichloromethane		4.56	ug/L	0.50	91	70	130			
Bromoform		3.52	ug/L	0.50	70	70	130			
Bromomethane		5.20	ug/L	0.50	104	70	130			
Carbon tetrachloride		5.48	ug/L	0.50	110	70	130			
Chlorobenzene		5.20	ug/L	0.50	104	70	130			
Chlorodibromomethane		4.64	ug/L	0.50	93	70	130			
Chloroethane		5.76	ug/L	0.50	115	70	130			
Chloroform		4.96	ug/L	0.50	99	80	120			
Chloromethane		6.04	ug/L	0.50	121	70	130			
2-Chlorotoluene		5.04	ug/L	0.50	101	70	130			
4-Chlorotoluene		5.44	ug/L	0.50	109	70	130			
1,2-Dibromoethane		5.28	ug/L	0.50	106	70	130			
Dibromomethane		4.64	ug/L	0.50	93	70	130			
1,2-Dichlorobenzene		5.28	ug/L	0.50	106	70	130			
1,3-Dichlorobenzene		5.60	ug/L	0.50	112	70	130			
1,4-Dichlorobenzene		5.00	ug/L	0.50	100	70	130			
Dichlorodifluoromethane		5.60	ug/L	0.50	112	70	130			
1,1-Dichloroethane		5.00	ug/L	0.50	100	70	130			
1,2-Dichloroethane		5.08	ug/L	0.50	102	70	130			
1,1-Dichloroethene		5.60	ug/L	0.50	112	80	120			
cis-1,2-Dichloroethene		5.12	ug/L	0.50	102	70	130			
trans-1,2-Dichloroethene		5.44	ug/L	0.50	109	70	130			
1,2-Dichloropropane		5.00	ug/L	0.50	100	80	120			
1,3-Dichloropropane		4.36	ug/L	0.50	87	70	130			
2,2-Dichloropropane		5.92	ug/L	0.50	118	70	130			
1,1-Dichloropropene		5.52	ug/L	0.50	110	70	130			
cis-1,3-Dichloropropene		4.96	ug/L	0.50	99	70	130			
trans-1,3-Dichloropropene		5.00	ug/L	0.50	100	70	130			
Ethylbenzene		5.00	ug/L	0.50	100	80	120			
Methyl tert-butyl ether (MTBE)		4.84	ug/L	0.50	97	70	130			
Methyl ethyl ketone		44.8	ug/L	10	90	70	130			
Methylene chloride		5.08	ug/L	0.50	102	70	130			
Styrene		5.28	ug/L	0.50	106	70	130			
1,1,1,2-Tetrachloroethane		5.04	ug/L	0.50	101	70	130			
1,1,2,2-Tetrachloroethane		4.76	ug/L	0.50	95	70	130			
Tetrachloroethene		5.20	ug/L	0.50	104	70	130			
Toluene		4.96	ug/L	0.50	99	80	120			
1,1,1-Trichloroethane		5.16	ug/L	0.50	103	70	130			
1,1,2-Trichloroethane		4.72	ug/L	0.50	94	70	130			
Trichloroethene		4.76	ug/L	0.50	95	70	130			
Trichlorofluoromethane		5.12	ug/L	0.50	102	70	130			

Qualifiers:

RL - Analyte reporting limit. ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 03/17/17

Project: MDEQ Whitefish Solvent Site **Work Order:** H17020313

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B									Analytical Run: R123056	
Lab ID: 030117_CCV_2	53	Continuing Calibration Verification Standard							03/01/17 11:05	
1,2,3-Trichloropropane		5.12	ug/L	0.50	102	70	130			
Vinyl chloride		4.84	ug/L	0.50	97	80	120			
m+p-Xylenes		10.2	ug/L	0.50	102	70	130			
o-Xylene		5.16	ug/L	0.50	103	70	130			
Xylenes, Total		15.4	ug/L	0.50	102	70	130			
Surr: 1,2-Dichloroethane-d4				1.0	92	69	131			
Surr: Dibromofluoromethane				1.0	106	70	125			
Surr: p-Bromofluorobenzene				1.0	102	76	123			
Surr: Toluene-d8				1.0	97	80	119			
Method: SW8260B									Batch: R123056	
Lab ID: 030117_LCS_3	53	Laboratory Control Sample				Run: 1SATURN_170301A			03/01/17 11:45	
Benzene		5.32	ug/L	0.50	106	69	129			
Bromobenzene		5.04	ug/L	0.50	101	79	120			
Bromochloromethane		5.20	ug/L	0.50	104	72	125			
Bromodichloromethane		4.52	ug/L	0.50	90	71	122			
Bromoform		3.79	ug/L	0.50	76	65	130			
Bromomethane		5.48	ug/L	0.50	110	60	136			
Carbon tetrachloride		5.20	ug/L	0.50	104	77	121			
Chlorobenzene		5.40	ug/L	0.50	108	78	120			
Chlorodibromomethane		4.40	ug/L	0.50	88	70	122			
Chloroethane		5.52	ug/L	0.50	110	62	135			
Chloroform		5.00	ug/L	0.50	100	71	121			
Chloromethane		6.08	ug/L	0.50	122	66	139			
2-Chlorotoluene		5.32	ug/L	0.50	106	78	125			
4-Chlorotoluene		5.92	ug/L	0.50	118	76	126			
1,2-Dibromoethane		4.76	ug/L	0.50	95	60	137			
Dibromomethane		4.36	ug/L	0.50	87	69	122			
1,2-Dichlorobenzene		5.36	ug/L	0.50	107	74	122			
1,3-Dichlorobenzene		5.52	ug/L	0.50	110	78	120			
1,4-Dichlorobenzene		4.96	ug/L	0.50	99	75	122			
Dichlorodifluoromethane		6.16	ug/L	0.50	123	57	144			
1,1-Dichloroethane		4.52	ug/L	0.50	90	76	125			
1,2-Dichloroethane		4.52	ug/L	0.50	90	69	131			
1,1-Dichloroethene		5.24	ug/L	0.50	105	67	129			
cis-1,2-Dichloroethene		5.04	ug/L	0.50	101	75	122			
trans-1,2-Dichloroethene		4.84	ug/L	0.50	97	75	124			
1,2-Dichloropropane		4.52	ug/L	0.50	90	75	127			
1,3-Dichloropropane		4.48	ug/L	0.50	90	70	122			
2,2-Dichloropropane		5.56	ug/L	0.50	111	78	132			
1,1-Dichloropropene		5.80	ug/L	0.50	116	69	127			
cis-1,3-Dichloropropene		4.56	ug/L	0.50	91	73	124			
trans-1,3-Dichloropropene		4.44	ug/L	0.50	89	72	127			
Ethylbenzene		5.08	ug/L	0.50	102	74	125			

Qualifiers:

RL - Analyte reporting limit. ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 03/17/17

Project: MDEQ Whitefish Solvent Site **Work Order:** H17020313

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B										Batch: R123056
Lab ID: 030117_LCS_3	53	Laboratory Control Sample				Run: 1SATURN_170301A				03/01/17 11:45
Methyl tert-butyl ether (MTBE)		5.00	ug/L	0.50	100	62	128			
Methyl ethyl ketone		44.4	ug/L	10	89	56	141			
Methylene chloride		4.56	ug/L	0.50	91	61	125			
Styrene		4.76	ug/L	0.50	95	75	120			
1,1,1,2-Tetrachloroethane		4.68	ug/L	0.50	94	76	122			
1,1,2,2-Tetrachloroethane		4.88	ug/L	0.50	98	67	124			
Tetrachloroethene		5.04	ug/L	0.50	101	75	126			
Toluene		4.56	ug/L	0.50	91	73	122			
1,1,1-Trichloroethane		5.20	ug/L	0.50	104	76	124			
1,1,2-Trichloroethane		4.44	ug/L	0.50	89	72	125			
Trichloroethene		4.52	ug/L	0.50	90	72	126			
Trichlorofluoromethane		5.60	ug/L	0.50	112	73	131			
1,2,3-Trichloropropane		4.64	ug/L	0.50	93	58	142			
Vinyl chloride		5.16	ug/L	0.50	103	69	129			
m+p-Xylenes		10.2	ug/L	0.50	102	72	124			
o-Xylene		5.28	ug/L	0.50	106	74	123			
Xylenes, Total		15.5	ug/L	0.50	103	72	124			
Surr: 1,2-Dichloroethane-d4				1.0	85	69	131			
Surr: Dibromofluoromethane				1.0	99	70	125			
Surr: p-Bromofluorobenzene				1.0	105	76	123			
Surr: Toluene-d8				1.0	96	80	119			
Lab ID: 030117_MBLK_5	53	Method Blank				Run: 1SATURN_170301A				03/01/17 12:56
Benzene		ND	ug/L	0.50						
Bromobenzene		ND	ug/L	0.50						
Bromochloromethane		ND	ug/L	0.50						
Bromodichloromethane		ND	ug/L	0.50						
Bromoform		ND	ug/L	0.50						
Bromomethane		ND	ug/L	0.50						
Carbon tetrachloride		ND	ug/L	0.50						
Chlorobenzene		ND	ug/L	0.50						
Chlorodibromomethane		ND	ug/L	0.50						
Chloroethane		ND	ug/L	0.50						
Chloroform		ND	ug/L	0.50						
Chloromethane		ND	ug/L	0.50						
2-Chlorotoluene		ND	ug/L	0.50						
4-Chlorotoluene		ND	ug/L	0.50						
1,2-Dibromoethane		ND	ug/L	0.50						
Dibromomethane		ND	ug/L	0.50						
1,2-Dichlorobenzene		ND	ug/L	0.50						
1,3-Dichlorobenzene		ND	ug/L	0.50						
1,4-Dichlorobenzene		ND	ug/L	0.50						
Dichlorodifluoromethane		ND	ug/L	0.50						
1,1-Dichloroethane		ND	ug/L	0.50						

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 03/17/17

Project: MDEQ Whitefish Solvent Site **Work Order:** H17020313

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B										Batch: R123056
Lab ID: 030117_MBLK_5	53	Method Blank				Run: 1SATURN_170301A				03/01/17 12:56
1,2-Dichloroethane		ND	ug/L	0.50						
1,1-Dichloroethene		ND	ug/L	0.50						
cis-1,2-Dichloroethene		ND	ug/L	0.50						
trans-1,2-Dichloroethene		ND	ug/L	0.50						
1,2-Dichloropropane		ND	ug/L	0.50						
1,3-Dichloropropane		ND	ug/L	0.50						
2,2-Dichloropropane		ND	ug/L	0.50						
1,1-Dichloropropene		ND	ug/L	0.50						
cis-1,3-Dichloropropene		ND	ug/L	0.50						
trans-1,3-Dichloropropene		ND	ug/L	0.50						
Ethylbenzene		ND	ug/L	0.50						
Methyl tert-butyl ether (MTBE)		ND	ug/L	0.50						
Methyl ethyl ketone		ND	ug/L	10						
Methylene chloride		ND	ug/L	0.50						
Styrene		ND	ug/L	0.50						
1,1,1,2-Tetrachloroethane		ND	ug/L	0.50						
1,1,2,2-Tetrachloroethane		ND	ug/L	0.50						
Tetrachloroethene		ND	ug/L	0.50						
Toluene		ND	ug/L	0.50						
1,1,1-Trichloroethane		ND	ug/L	0.50						
1,1,2-Trichloroethane		ND	ug/L	0.50						
Trichloroethene		ND	ug/L	0.50						
Trichlorofluoromethane		ND	ug/L	0.50						
1,2,3-Trichloropropane		ND	ug/L	0.50						
Vinyl chloride		ND	ug/L	0.50						
m+p-Xylenes		ND	ug/L	0.50						
o-Xylene		ND	ug/L	0.50						
Xylenes, Total		ND	ug/L	0.50						
Surr: 1,2-Dichloroethane-d4				1.0	86	69	131			
Surr: Dibromofluoromethane				1.0	102	70	125			
Surr: p-Bromofluorobenzene				1.0	122	76	123			
Surr: Toluene-d8				1.0	95	80	119			
Lab ID: H17020330-001AMS	53	Sample Matrix Spike				Run: 1SATURN_170301A				03/01/17 16:17
Benzene		10.6	ug/L	1.0	106	69	129			
Bromobenzene		10.2	ug/L	1.0	102	79	120			
Bromochloromethane		8.48	ug/L	1.0	85	72	125			
Bromodichloromethane		8.96	ug/L	1.0	90	71	122			
Bromoform		8.24	ug/L	1.0	82	65	130			
Bromomethane		8.16	ug/L	1.0	82	60	136			
Carbon tetrachloride		9.20	ug/L	1.0	92	77	121			
Chlorobenzene		10.2	ug/L	1.0	102	78	120			
Chlorodibromomethane		9.04	ug/L	1.0	90	70	122			
Chloroethane		2.26	ug/L	1.0	23	62	135			S

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

S - Spike recovery outside of advisory limits.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 03/17/17

Project: MDEQ Whitefish Solvent Site **Work Order:** H17020313

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B										Batch: R123056
Lab ID: H17020330-001AMS	53	Sample Matrix Spike				Run: 1SATURN_170301A				03/01/17 16:17
Chloroform		10.7	ug/L	1.0	106	71	121			
Chloromethane		9.76	ug/L	1.0	98	66	139			
2-Chlorotoluene		10.3	ug/L	1.0	103	78	125			
4-Chlorotoluene		10.8	ug/L	1.0	108	76	126			
1,2-Dibromoethane		11.6	ug/L	1.0	116	60	137			
Dibromomethane		9.60	ug/L	1.0	96	69	122			
1,2-Dichlorobenzene		10.0	ug/L	1.0	100	74	122			
1,3-Dichlorobenzene		10.5	ug/L	1.0	105	78	120			
1,4-Dichlorobenzene		9.60	ug/L	1.0	96	75	122			
Dichlorodifluoromethane		10.4	ug/L	1.0	104	57	144			
1,1-Dichloroethane		8.00	ug/L	1.0	80	76	125			
1,2-Dichloroethane		9.68	ug/L	1.0	97	69	131			
1,1-Dichloroethene		9.36	ug/L	1.0	94	67	129			
cis-1,2-Dichloroethene		9.20	ug/L	1.0	92	75	122			
trans-1,2-Dichloroethene		8.48	ug/L	1.0	85	75	124			
1,2-Dichloropropane		9.76	ug/L	1.0	98	75	127			
1,3-Dichloropropane		10.7	ug/L	1.0	107	70	122			
2,2-Dichloropropane		10.4	ug/L	1.0	104	78	132			
1,1-Dichloropropene		11.1	ug/L	1.0	111	69	127			
cis-1,3-Dichloropropene		11.4	ug/L	1.0	114	73	124			
trans-1,3-Dichloropropene		10.7	ug/L	1.0	107	72	127			
Ethylbenzene		10.2	ug/L	1.0	102	74	125			
Methyl tert-butyl ether (MTBE)		9.28	ug/L	1.0	93	62	128			
Methyl ethyl ketone		110	ug/L	20	110	56	141			
Methylene chloride		8.08	ug/L	1.0	81	61	125			
Styrene		10.2	ug/L	1.0	102	75	120			
1,1,1,2-Tetrachloroethane		8.88	ug/L	1.0	89	76	122			
1,1,2,2-Tetrachloroethane		9.44	ug/L	1.0	94	67	124			
Tetrachloroethene		10.4	ug/L	1.0	104	75	126			
Toluene		9.92	ug/L	1.0	99	73	122			
1,1,1-Trichloroethane		9.36	ug/L	1.0	94	76	124			
1,1,2-Trichloroethane		10.4	ug/L	1.0	104	72	125			
Trichloroethene		9.60	ug/L	1.0	96	72	126			
Trichlorofluoromethane		9.92	ug/L	1.0	99	73	131			
1,2,3-Trichloropropane		9.84	ug/L	1.0	98	58	142			
Vinyl chloride		8.96	ug/L	1.0	90	69	129			
m+p-Xylenes		19.7	ug/L	1.0	98	72	124			
o-Xylene		10.6	ug/L	1.0	106	74	123			
Xylenes, Total		30.2	ug/L	1.0	101	72	124			
Surr: 1,2-Dichloroethane-d4				2.0	88	69	131			
Surr: Dibromofluoromethane				2.0	97	70	125			
Surr: p-Bromofluorobenzene				2.0	104	76	123			
Surr: Toluene-d8				2.0	105	80	119			

- 2-Chloroethyl vinyl ether will degrade in acid-preserved samples.

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 03/17/17

Project: MDEQ Whitefish Solvent Site **Work Order:** H17020313

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B									Batch: R123056	
Lab ID: H17020330-001AMSD	53	Sample Matrix Spike Duplicate				Run: 1SATURN_170301A			03/01/17 16:51	
Benzene		10.2	ug/L	1.0	102	69	129	3.1	20	
Bromobenzene		10.1	ug/L	1.0	101	79	120	0.8	20	
Bromochloromethane		9.12	ug/L	1.0	91	72	125	7.3	20	
Bromodichloromethane		8.88	ug/L	1.0	89	71	122	0.9	20	
Bromoform		8.32	ug/L	1.0	83	65	130	1.0	20	
Bromomethane		8.32	ug/L	1.0	83	60	136	1.9	20	
Carbon tetrachloride		8.96	ug/L	1.0	90	77	121	2.6	20	
Chlorobenzene		9.60	ug/L	1.0	96	78	120	5.7	20	
Chlorodibromomethane		8.96	ug/L	1.0	90	70	122	0.9	20	
Chloroethane		2.41	ug/L	1.0	24	62	135	6.2	20	S
Chloroform		8.96	ug/L	1.0	88	71	121	18	20	
Chloromethane		10.7	ug/L	1.0	107	66	139	9.4	20	
2-Chlorotoluene		10.1	ug/L	1.0	101	78	125	2.4	20	
4-Chlorotoluene		10.1	ug/L	1.0	101	76	126	6.9	20	
1,2-Dibromoethane		10.0	ug/L	1.0	100	60	137	15	20	
Dibromomethane		9.28	ug/L	1.0	93	69	122	3.4	20	
1,2-Dichlorobenzene		9.76	ug/L	1.0	98	74	122	2.4	20	
1,3-Dichlorobenzene		10.4	ug/L	1.0	104	78	120	0.8	20	
1,4-Dichlorobenzene		9.04	ug/L	1.0	90	75	122	6.0	20	
Dichlorodifluoromethane		11.0	ug/L	1.0	110	57	144	6.0	20	
1,1-Dichloroethane		8.32	ug/L	1.0	83	76	125	3.9	20	
1,2-Dichloroethane		9.92	ug/L	1.0	99	69	131	2.4	20	
1,1-Dichloroethene		9.20	ug/L	1.0	92	67	129	1.7	20	
cis-1,2-Dichloroethene		9.12	ug/L	1.0	91	75	122	0.9	20	
trans-1,2-Dichloroethene		8.56	ug/L	1.0	86	75	124	0.9	20	
1,2-Dichloropropane		9.36	ug/L	1.0	94	75	127	4.2	20	
1,3-Dichloropropane		10.4	ug/L	1.0	104	70	122	3.0	20	
2,2-Dichloropropane		10.2	ug/L	1.0	102	78	132	1.6	20	
1,1-Dichloropropene		10.9	ug/L	1.0	109	69	127	2.2	20	
cis-1,3-Dichloropropene		10.8	ug/L	1.0	108	73	124	5.8	20	
trans-1,3-Dichloropropene		9.92	ug/L	1.0	99	72	127	7.8	20	
Ethylbenzene		9.20	ug/L	1.0	92	74	125	9.9	20	
Methyl tert-butyl ether (MTBE)		9.52	ug/L	1.0	95	62	128	2.6	20	
Methyl ethyl ketone		114	ug/L	20	114	56	141	2.9	20	
Methylene chloride		8.32	ug/L	1.0	83	61	125	2.9	20	
Styrene		8.88	ug/L	1.0	89	75	120	14	20	
1,1,1,2-Tetrachloroethane		8.32	ug/L	1.0	83	76	122	6.5	20	
1,1,2,2-Tetrachloroethane		9.84	ug/L	1.0	98	67	124	4.1	20	
Tetrachloroethene		9.60	ug/L	1.0	96	75	126	8.0	20	
Toluene		9.04	ug/L	1.0	90	73	122	9.3	20	
1,1,1-Trichloroethane		9.36	ug/L	1.0	94	76	124	0.0	20	
1,1,2-Trichloroethane		9.52	ug/L	1.0	95	72	125	8.8	20	
Trichloroethene		9.04	ug/L	1.0	90	72	126	6.0	20	
Trichlorofluoromethane		10.2	ug/L	1.0	102	73	131	2.4	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

S - Spike recovery outside of advisory limits.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 03/17/17

Project: MDEQ Whitefish Solvent Site **Work Order:** H17020313

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B										Batch: R123056
Lab ID: H17020330-001AMSD	53	Sample Matrix Spike Duplicate				Run: 1SATURN_170301A			03/01/17 16:51	
1,2,3-Trichloropropane		10.9	ug/L	1.0	109	58	142	10	20	
Vinyl chloride		9.52	ug/L	1.0	95	69	129	6.1	20	
m+p-Xylenes		18.6	ug/L	1.0	93	72	124	5.9	20	
o-Xylene		9.76	ug/L	1.0	98	74	123	7.9	20	
Xylenes, Total		28.3	ug/L	1.0	94	72	124	6.6	20	
Surr: 1,2-Dichloroethane-d4				2.0	98	69	131			
Surr: Dibromofluoromethane				2.0	100	70	125			
Surr: p-Bromofluorobenzene				2.0	100	76	123			
Surr: Toluene-d8				2.0	100	80	119			
- 2-Chloroethyl vinyl ether will degrade in acid-preserved samples.										
Method: SW8260B										Analytical Run: R123091
Lab ID: 030217_CCV_2	4	Continuing Calibration Verification Standard							03/02/17 09:25	
cis-1,2-Dichloroethene		4.76	ug/L	0.50	95	70	130			
trans-1,2-Dichloroethene		4.32	ug/L	0.50	86	70	130			
Tetrachloroethene		5.72	ug/L	0.50	114	70	130			
Trichloroethene		5.44	ug/L	0.50	109	70	130			
Method: SW8260B										Batch: R123091
Lab ID: 030217_LCS_3	4	Laboratory Control Sample				Run: 1SATURN_170302A			03/02/17 10:02	
cis-1,2-Dichloroethene		4.48	ug/L	0.50	90	75	122			
trans-1,2-Dichloroethene		4.40	ug/L	0.50	88	75	124			
Tetrachloroethene		5.44	ug/L	0.50	109	75	126			
Trichloroethene		5.08	ug/L	0.50	102	72	126			
Lab ID: 030217_MBLK_5	4	Method Blank				Run: 1SATURN_170302A			03/02/17 11:09	
cis-1,2-Dichloroethene		ND	ug/L	0.50						
trans-1,2-Dichloroethene		ND	ug/L	0.50						
Tetrachloroethene		ND	ug/L	0.50						
Trichloroethene		ND	ug/L	0.50						
Lab ID: H17020313-001CMS	4	Sample Matrix Spike				Run: 1SATURN_170302A			03/02/17 16:43	
cis-1,2-Dichloroethene		25.6	ug/L	2.5	102	75	122			
trans-1,2-Dichloroethene		24.8	ug/L	2.5	99	75	124			
Tetrachloroethene		60.2	ug/L	2.5	96	75	126			
Trichloroethene		26.0	ug/L	2.5	94	72	126			
Lab ID: H17020313-001CMSD	4	Sample Matrix Spike Duplicate				Run: 1SATURN_170302A			03/02/17 17:17	
cis-1,2-Dichloroethene		25.4	ug/L	2.5	102	75	122	0.8	20	
trans-1,2-Dichloroethene		23.6	ug/L	2.5	94	75	124	5.0	20	
Tetrachloroethene		59.8	ug/L	2.5	94	75	126	0.7	20	
Trichloroethene		24.4	ug/L	2.5	87	72	126	6.3	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 03/17/17

Project: MDEQ Whitefish Solvent Site **Work Order:** H17020313

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8270C										Batch: B_107532
Lab ID: MB-107532-36436-323	18	Method Blank				Run: SUB-B276497				03/16/17 18:53
1-Methylnaphthalene		ND	ug/L	0.20						
2-Methylnaphthalene		ND	ug/L	0.20						
Acenaphthene		ND	ug/L	0.20						
Acenaphthylene		ND	ug/L	0.20						
Anthracene		ND	ug/L	0.20						
Benzo(a)anthracene		ND	ug/L	0.20						
Benzo(a)pyrene		ND	ug/L	0.20						
Benzo(b)fluoranthene		ND	ug/L	0.20						
Benzo(g,h,i)perylene		ND	ug/L	0.20						
Benzo(k)fluoranthene		ND	ug/L	0.20						
Chrysene		ND	ug/L	0.20						
Dibenzo(a,h)anthracene		ND	ug/L	0.20						
Fluoranthene		ND	ug/L	0.20						
Fluorene		ND	ug/L	0.20						
Indeno(1,2,3-cd)pyrene		ND	ug/L	0.20						
Naphthalene		0.260	ug/L	0.20						
Phenanthrene		ND	ug/L	0.20						
Pyrene		ND	ug/L	0.20						
Lab ID: H17020313-001B	20	Sample Matrix Spike				Run: SUB-B276497				03/17/17 00:37
1-Methylnaphthalene		286	ug/L	8.0	71	40	140			
2-Methylnaphthalene		210	ug/L	8.0	52	40	140			
Acenaphthene		304	ug/L	8.0	76	40	140			
Acenaphthylene		314	ug/L	8.0	79	40	140			
Anthracene		252	ug/L	8.0	63	40	140			
Benzo(a)anthracene		381	ug/L	8.0	95	40	140			
Benzo(a)pyrene		371	ug/L	8.0	93	40	140			
Benzo(b)fluoranthene		322	ug/L	8.0	80	40	140			
Benzo(g,h,i)perylene		451	ug/L	8.0	113	40	140			
Benzo(k)fluoranthene		377	ug/L	8.0	94	40	140			
Chrysene		263	ug/L	8.0	66	40	140			
Dibenzo(a,h)anthracene		365	ug/L	8.0	91	40	140			
Fluoranthene		406	ug/L	8.0	101	40	140			
Fluorene		314	ug/L	8.0	79	40	140			
Indeno(1,2,3-cd)pyrene		380	ug/L	8.0	95	40	140			
Naphthalene		232	ug/L	8.0	58	40	140			
Phenanthrene		314	ug/L	8.0	79	40	140			
Pyrene		414	ug/L	8.0	104	40	140			
Surr: 2-Fluorobiphenyl				8.0	80	40	140			
Surr: o-Terphenyl				8.0	79	40	140			
Lab ID: H17020313-001B	20	Sample Matrix Spike Duplicate				Run: SUB-B276497				03/17/17 01:08
1-Methylnaphthalene		282	ug/L	8.0	70	40	140	1.4	40	
2-Methylnaphthalene		203	ug/L	8.0	51	40	140	3.1	40	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 03/17/17

Project: MDEQ Whitefish Solvent Site **Work Order:** H17020313

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8270C									Batch: B_107532	
Lab ID: H17020313-001B	20	Sample Matrix Spike Duplicate				Run: SUB-B276497			03/17/17 01:08	
Acenaphthene		297	ug/L	8.0	74	40	140	2.4	40	
Acenaphthylene		290	ug/L	8.0	73	40	140	7.9	40	
Anthracene		298	ug/L	8.0	74	40	140	17	40	
Benzo(a)anthracene		323	ug/L	8.0	81	40	140	16	40	
Benzo(a)pyrene		337	ug/L	8.0	84	40	140	9.7	40	
Benzo(b)fluoranthene		266	ug/L	8.0	67	40	140	19	40	
Benzo(g,h,i)perylene		366	ug/L	8.0	92	40	140	21	40	
Benzo(k)fluoranthene		378	ug/L	8.0	94	40	140	0.2	40	
Chrysene		267	ug/L	8.0	67	40	140	1.5	40	
Dibenzo(a,h)anthracene		336	ug/L	8.0	84	40	140	8.2	40	
Fluoranthene		377	ug/L	8.0	94	40	140	7.4	40	
Fluorene		299	ug/L	8.0	75	40	140	5.0	40	
Indeno(1,2,3-cd)pyrene		333	ug/L	8.0	83	40	140	13	40	
Naphthalene		233	ug/L	8.0	58	40	140	0.3	40	
Phenanthrene		302	ug/L	8.0	76	40	140	3.9	40	
Pyrene		398	ug/L	8.0	99	40	140	4.1	40	
Surr: 2-Fluorobiphenyl				8.0	75	40	140			
Surr: o-Terphenyl				8.0	75	40	140			
Lab ID: LCS-107532	20	Sample Matrix Spike				Run: SUB-B276497			03/17/17 01:39	
1-Methylnaphthalene		149	ug/L	4.0	74	40	140			
2-Methylnaphthalene		112	ug/L	4.0	56	40	140			
Acenaphthene		159	ug/L	4.0	79	40	140			
Acenaphthylene		157	ug/L	4.0	79	40	140			
Anthracene		150	ug/L	4.0	75	40	140			
Benzo(a)anthracene		188	ug/L	4.0	94	40	140			
Benzo(a)pyrene		182	ug/L	4.0	91	40	140			
Benzo(b)fluoranthene		172	ug/L	4.0	86	40	140			
Benzo(g,h,i)perylene		205	ug/L	4.0	103	40	140			
Benzo(k)fluoranthene		178	ug/L	4.0	89	40	140			
Chrysene		131	ug/L	4.0	66	40	140			
Dibenzo(a,h)anthracene		174	ug/L	4.0	87	40	140			
Fluoranthene		192	ug/L	4.0	96	40	140			
Fluorene		167	ug/L	4.0	83	40	140			
Indeno(1,2,3-cd)pyrene		183	ug/L	4.0	92	40	140			
Naphthalene		126	ug/L	4.0	63	40	140			
Phenanthrene		159	ug/L	4.0	79	40	140			
Pyrene		203	ug/L	4.0	102	40	140			
Surr: 2-Fluorobiphenyl				4.0	83	40	140			
Surr: o-Terphenyl				4.0	80	40	140			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 03/17/17

Project: MDEQ Whitefish Solvent Site **Work Order:** H17020313

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8270C									Analytical Run: B_R276497	
Lab ID: 16-Mar-17_CCV_14	20	Continuing Calibration Verification Standard							03/16/17 17:50	
1-Methylnaphthalene		2.00	ug/L	0.10	100	80	120			
2-Methylnaphthalene		2.05	ug/L	0.10	102	80	120			
Acenaphthene		2.03	ug/L	0.10	101	80	120			
Acenaphthylene		2.07	ug/L	0.10	103	80	120			
Anthracene		1.92	ug/L	0.10	96	80	120			
Benzo(a)anthracene		1.92	ug/L	0.10	96	80	120			
Benzo(a)pyrene		1.85	ug/L	0.10	93	80	120			
Benzo(b)fluoranthene		1.94	ug/L	0.10	97	80	120			
Benzo(g,h,i)perylene		2.09	ug/L	0.10	104	80	120			
Benzo(k)fluoranthene		2.09	ug/L	0.10	104	80	120			
Chrysene		1.87	ug/L	0.10	94	80	120			
Dibenzo(a,h)anthracene		1.81	ug/L	0.10	91	80	120			
Fluoranthene		1.96	ug/L	0.10	98	80	120			
Fluorene		2.16	ug/L	0.10	108	80	120			
Indeno(1,2,3-cd)pyrene		1.84	ug/L	0.10	92	80	120			
Naphthalene		1.92	ug/L	0.10	96	80	120			
o-Terphenyl		1.85	ug/L	0.10	93	80	120			
Phenanthrene		1.99	ug/L	0.10	100	80	120			
Pyrene		2.03	ug/L	0.10	101	80	120			
Surr: 2-Fluorobiphenyl				0.10	100	80	120			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

MTN-MW3 Batch ID: 36395

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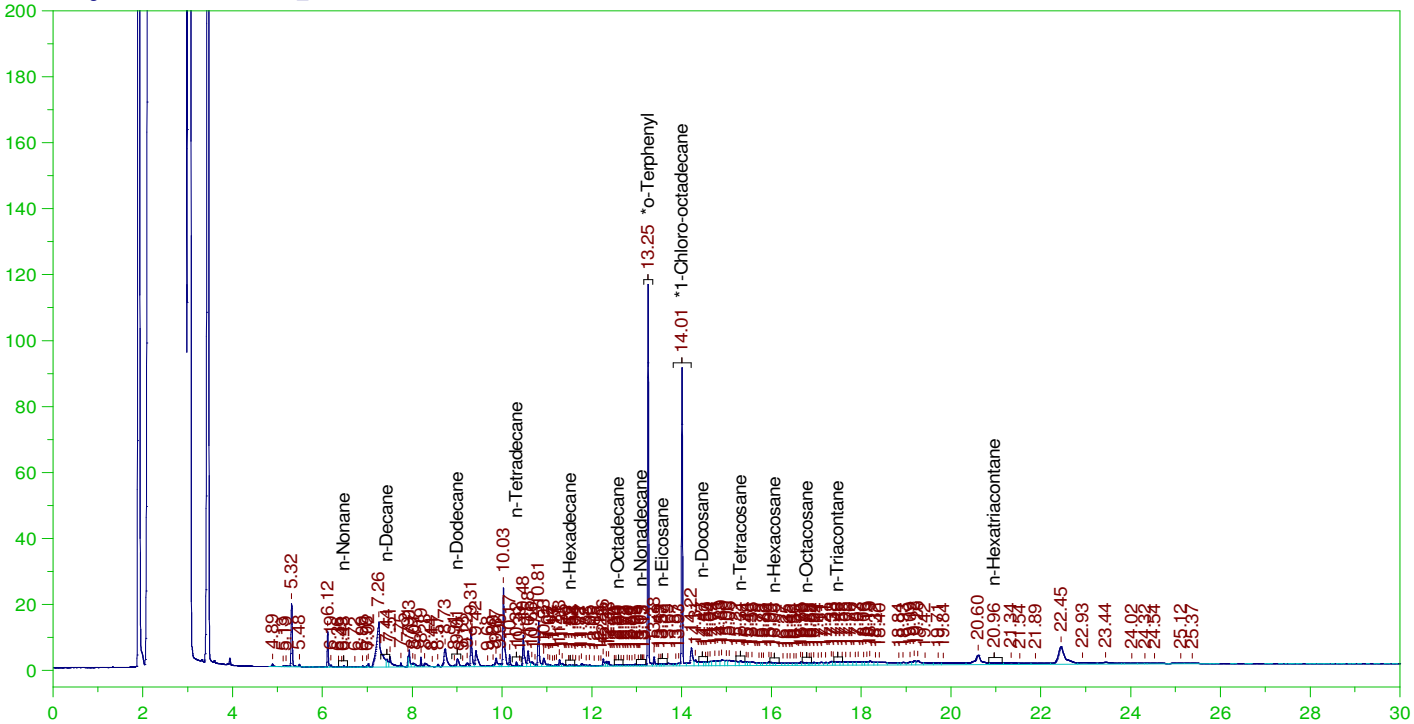


EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) SCREENING ANALYSIS CHROMATOGRAM

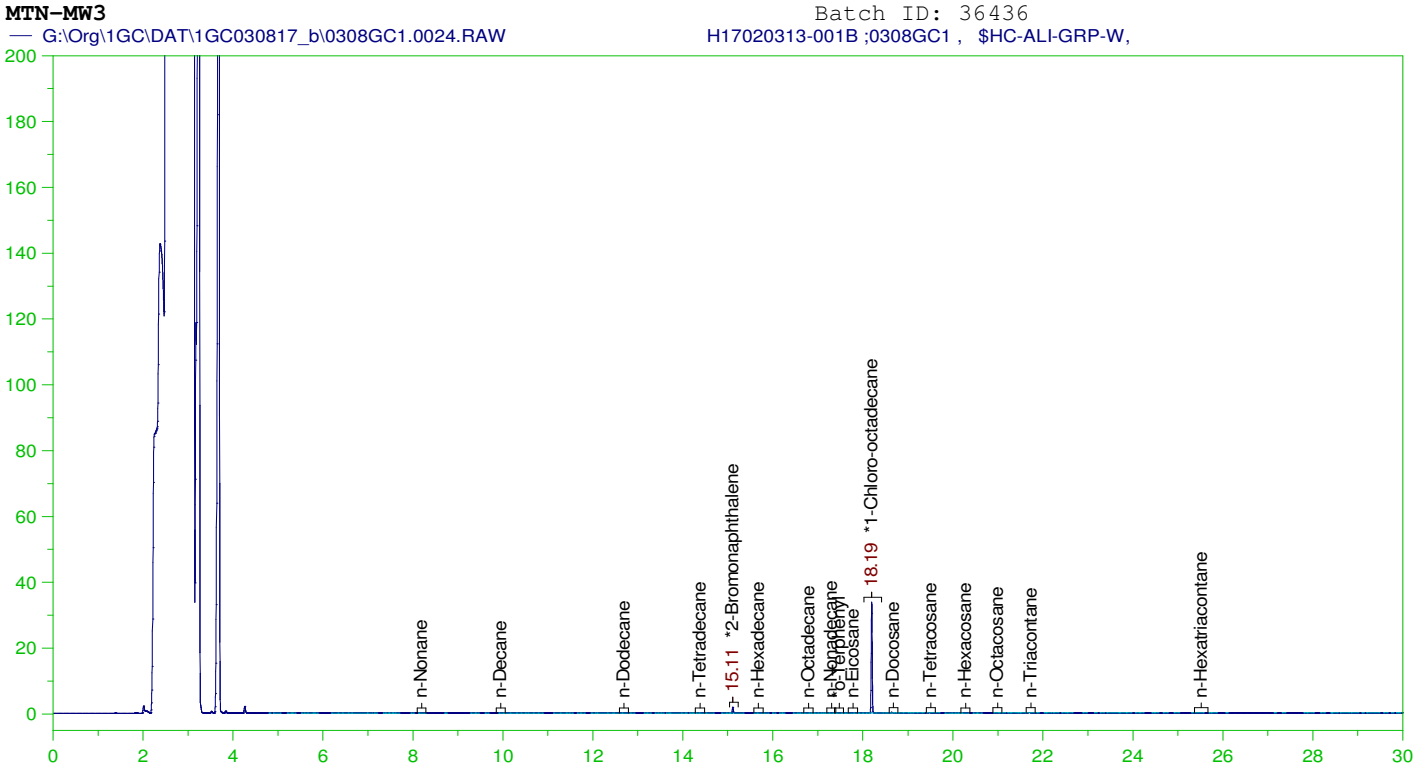
Sample Name: H17020313-001B ;0303GC4 , $HC-EPH-SCRN-W,
Raw File: G:\Org\4GC\DAT\4GC030317_b\0303GC4.0005.RAW
Date & Time Acquired: 3/3/2017 12:28:09 PM
Method File: G:\Org\4GC\Methods\SR022117C.MET
Calibration File: G:\Org\4GC\Cals\SC022117C.CAL
Sample Weight: 0.9806 Dilution: 2 S.A.: 1

Mean RF for C9 to C18 Hydrocarbons: 1719.001
Mean RF for C19 to C36 Hydrocarbons: 1771.909
Mean RF for Total Extractable Hydrocarbons: 1745.455
Rt range for Diesel Range Organics: 7.3 to 17.59
Rt range for C9 to C18 Hydrocarbons: 6.36 to 13.16
Rt range for C19 to C36 Hydrocarbons: 13.21 to 21.14

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*o-Terphenyl	13.255	185911	203.957	177.625	87.09	-
*1-Chloro-octadecane	14.01	155127	203.957	187.763	92.06	-

DRO Area:613404.6 DRO Amount: 716.7645
TEH Area:1039509 TEH Amount: 1214.668
C9-C18 Area:469575 C9-C18 Amount: 557.1432
C19-C36 Area:394428.3 C19-C36 Amount: 454.0093

MTN-MW3 Batch ID: 36436



EPH ALIPHATICS (FID) ANALYSIS REPORT

Sample Name: H17020313-001B ;0308GC1 , $HC-ALI-GRP-W,
Raw File: G:\Org\1GC\DAT\1GC030817_b\0308GC1.0024.RAW
Date & Time Acquired: 3/9/2017 6:43:05 AM
Method File: G:\Org\1GC\Methods\AL021517C.MET
Calibration File: G:\Org\1GC\Cals\AL021517C.CAL
Sample Weight: 0.9806 Dilution: 2 S.A.: 1

Mean RF for C9 to C18 Aliphatic Hydrocarbons: 792.405
Mean RF for C19 to C36 Aliphatic Hydrocarbons: 813.9085
Mean RF for Total Extractable Hydrocarbons: 804.6927
Rt range for Diesel Range Organics: 9.849999 to 21.09
Rt range for C9 to C18 Aliphatic Hydrocarbons: 8.089999 to 17.2
Rt range for C19 to C36 Aliphatic Hydrocarbons: 17.25 to 25.67

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*1-Chloro-octadecane	18.194	55027	203.957	147.014	72.08	-

DRO Area:5682.483 DRO Amount: 14.40278
TEH Area:10826.98 TEH Amount: 27.44198

Aliphatic Hydrocarbon Areas and Amounts:
C9-C18 Area:4768.809 C9-C18 Amount: 12.27442
C19-C36 Area:5172.843 C19-C36 Amount: 12.96259

MTN-MW3 Batch ID: 36436

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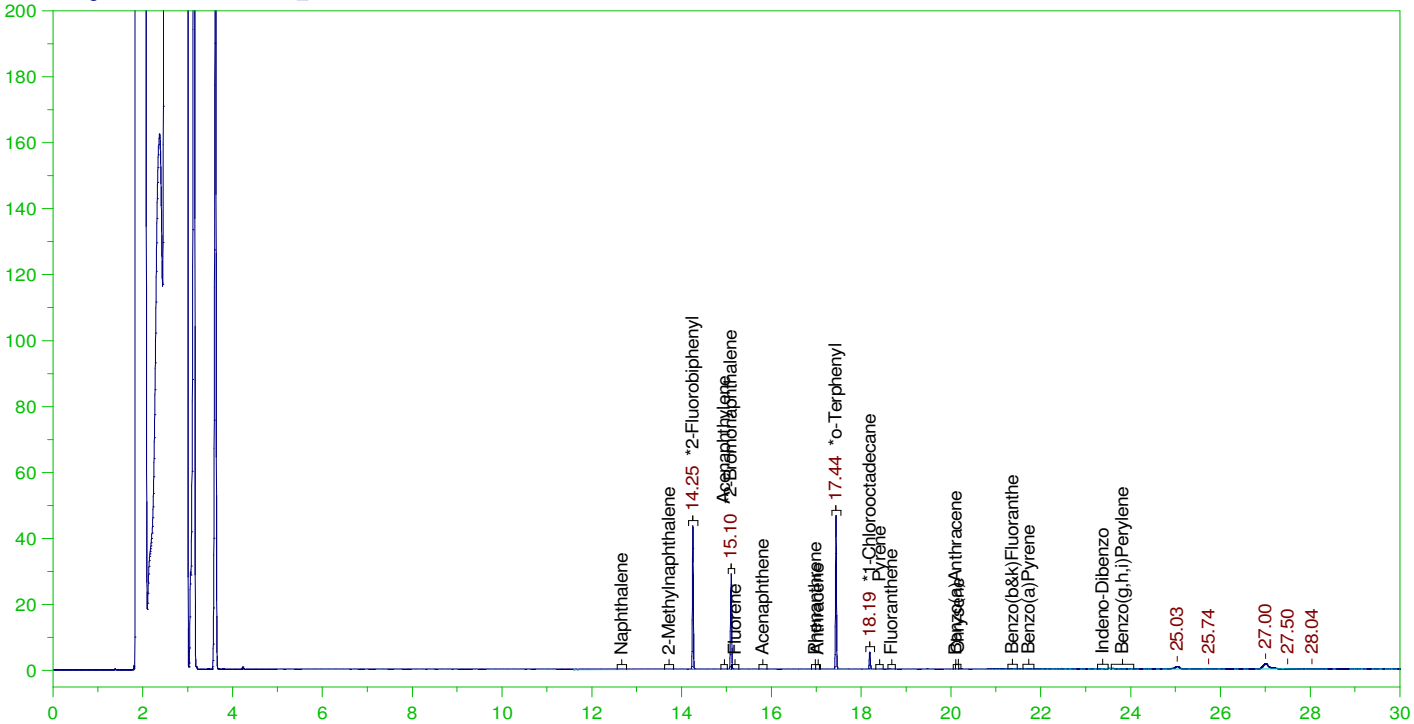

EPH AROMATICS RANGE VALUES (FID) ANALYSIS REPORT

Sample Name: H17020313-001B ;0308GC1 , $HC-ARO-GRP-W,
Raw File: G:\Org\1GC\DAT\1GC030817_b\0308GC1.0025.RAW
Date & Time Acquired: 3/9/2017 7:25:17 AM
Method File: G:\Org\1GC\Methods\AR021517D.MET
Calibration File: G:\Org\1GC\Cals\AR021517D.CAL
Sample Weight: 0.9806 Dilution: 2 S.A.: 1

Mean RF EPH Aromatics: 1019.269
Rt range for EPH C11 to C22 Aromatics: 12.57 to 24.07

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*2-Fluorobiphenyl	14.25	66372	203.957	200.752	98.43	-
*2-Bromonaphthalene	15.102	45113	203.957	191.891	94.08	-
*o-Terphenyl	17.44	72746	203.957	182.207	89.34	-
*1-Chlorooctadecane	18.192	8902	203.957	27.744	13.6	-

C11-C22 Aromatics Area:7977.536 C11-C22 Aromatics Amount: 15.96312
EPH Aromatics total Area:35976.51 EPH Aromatics Total Amount: 71.98934

MTN-MW3 Batch ID: 36436

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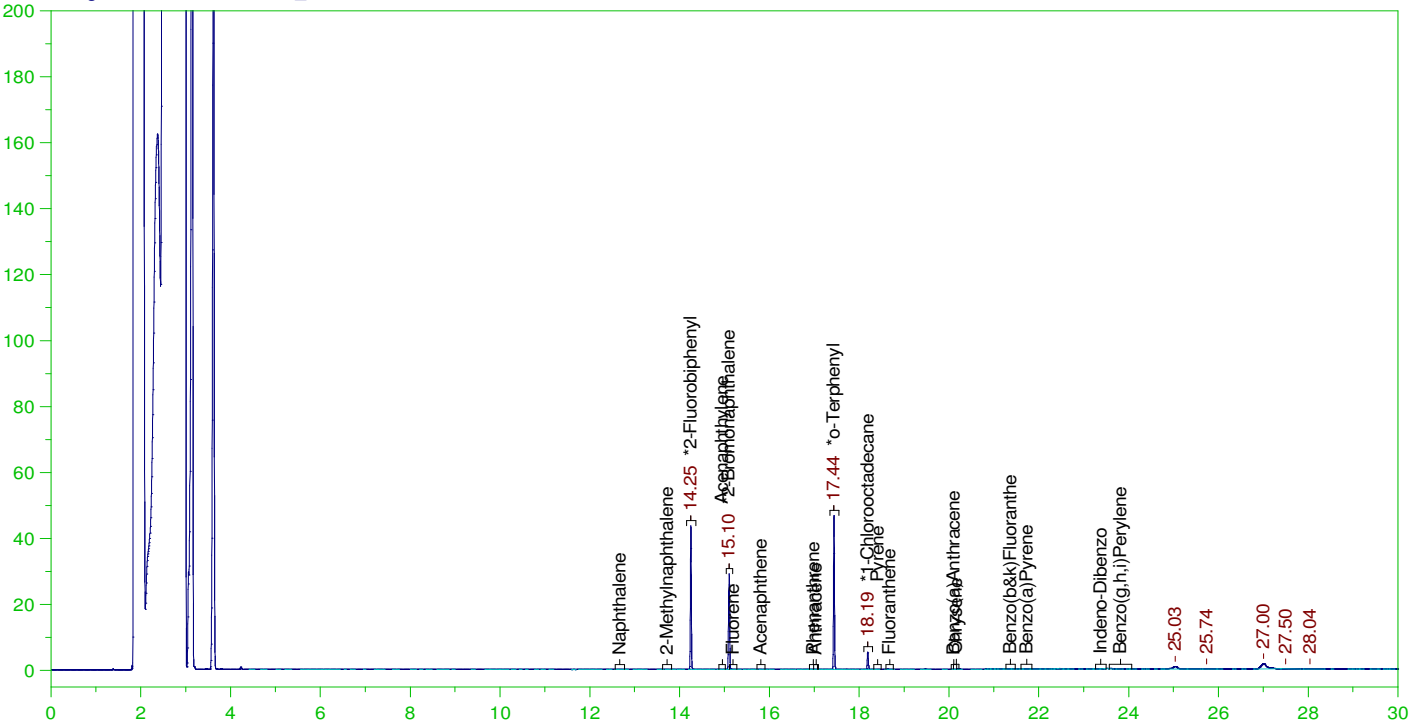

EPH AROMATICS TARGET VALUES (FID) ANALYSIS REPORT

Sample Name: H17020313-001B ;0308GC1 , $HC-ARO-GRP-W,
Raw File: G:\Org\1GC\DAT\1GC030817_b\0308GC1.0025.RAW
Date & Time Acquired: 3/9/2017 7:25:17 AM
Method File: G:\Org\1GC\Methods\AROQC021517D.met
Calibration File: G:\Org\1GC\Cals\AR021517D.CAL
Sample Weight: 0.9806 Dilution: 2 S.A.: 1

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
Naphthalene	.	.	.		2.04	U
2-Methylnaphthalene	.	.	.		2.04	U
Acenaphthylene	.	.	.		2.04	U
Fluorene	.	.	.		2.04	U
Acenaphthene	.	.	.		2.04	U
Phenanthrene	.	.	.		2.04	U
Anthracene	.	.	.		2.04	U
Pyrene	.	.	.		2.04	U
Fluoranthene	.	.	.		2.04	U
Benzo(a)Anthracene	.	.	.		2.04	U
Chrysene	.	.	.		2.04	U
Benzo(b&k)Fluoranthe	.	.	.		4.079	U
Benzo(a)Pyrene	.	.	.		2.04	U
Indeno-Dibenzo	.	.	.		4.079	U
Benzo(g,h,i)Perylene	.	.	.		2.04	U

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	QC LIMITS
*2-Fluorobiphenyl	14.25	66236	203.957	200.339	98.23	40-140
*2-Bromonaphthalene	15.102	45060	203.957	191.668	93.97	40-140
*o-Terphenyl	17.44	72699	203.957	182.089	89.28	40-140
*1-Chlorooctadecane	18.192	8855	203.957	27.599	13.53	40-140

MTN-MW1 Batch ID: 36395

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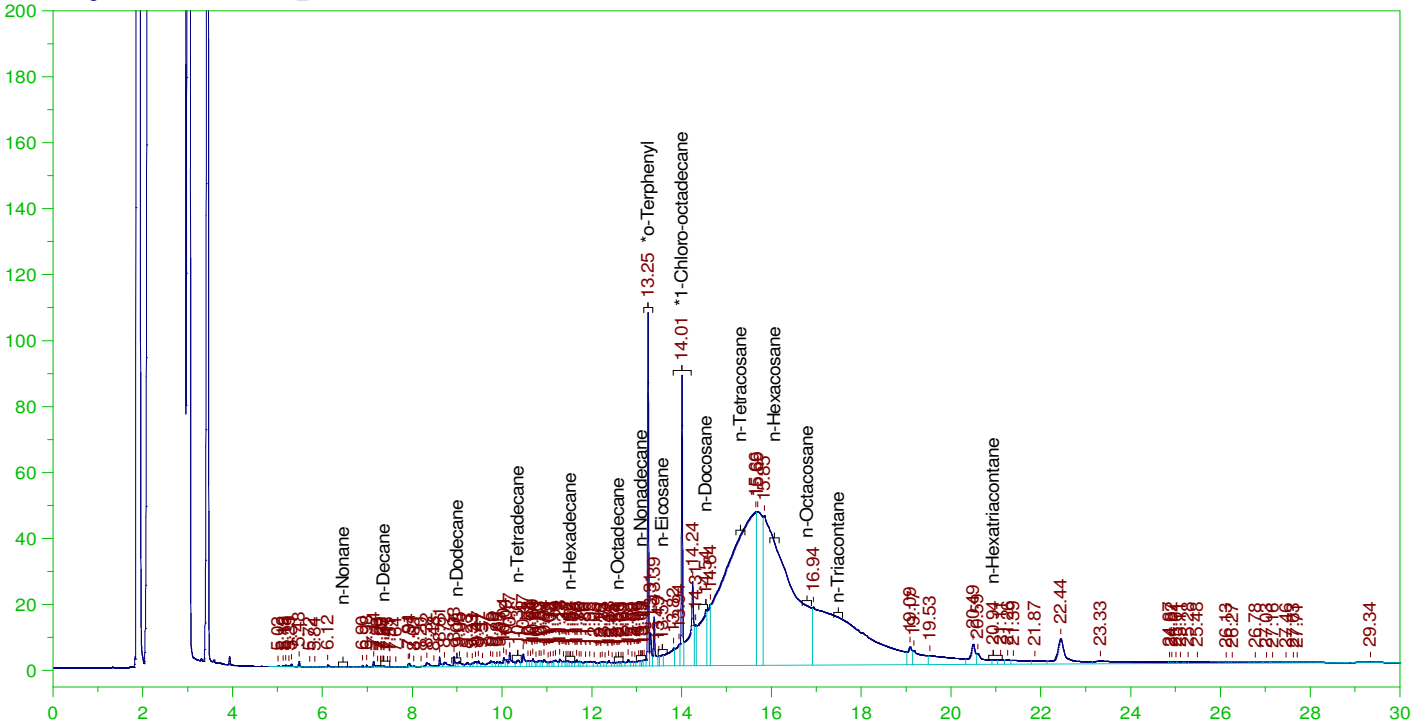


EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) SCREENING ANALYSIS CHROMATOGRAM

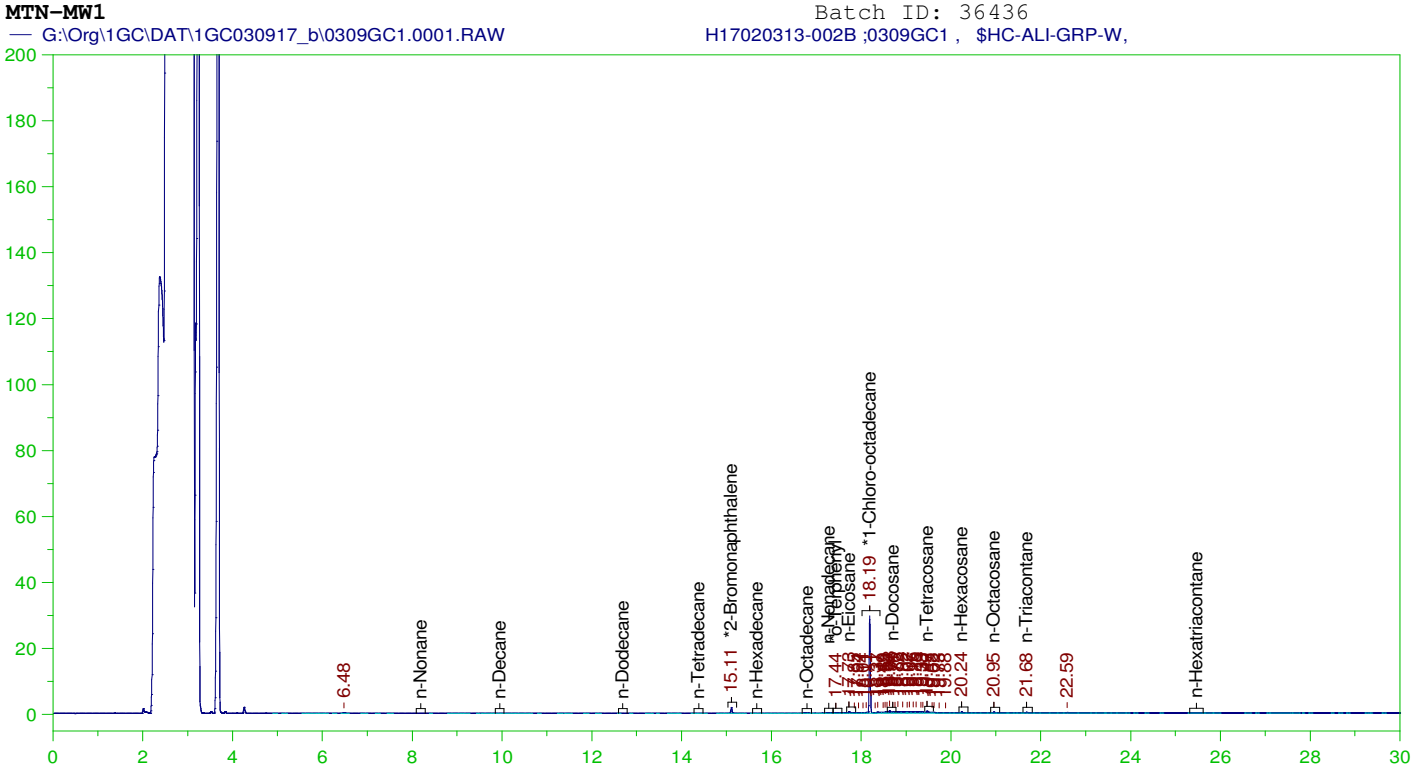
Sample Name: H17020313-002B ;0303GC4 , $HC-EPH-SCRN-W,
Raw File: G:\Org\4GC\DAT\4GC030317_b\0303GC4.0010.RAW
Date & Time Acquired: 3/3/2017 4:27:35 PM
Method File: G:\Org\4GC\Methods\03031710.MET
Calibration File: G:\Org\4GC\Cals\SC022117C.CAL
Sample Weight: 1.0087 Dilution: 2 S.A.: 1

Mean RF for C9 to C18 Hydrocarbons: 1719.001
Mean RF for C19 to C36 Hydrocarbons: 1771.909
Mean RF for Total Extractable Hydrocarbons: 1745.455
Rt range for Diesel Range Organics: 7.3 to 17.59
Rt range for C9 to C18 Hydrocarbons: 6.36 to 13.16
Rt range for C19 to C36 Hydrocarbons: 13.21 to 21.14

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*o-Terphenyl	13.255	175548	198.275	163.052	82.24	-
*1-Chloro-octadecane	14.01	169668	198.275	199.641	100.69	-

DRO Area:6720451 DRO Amount: 7634.097
TEH Area:7324788 TEH Amount: 8320.595
C9-C18 Area:409284.6 C9-C18 Amount: 472.0818
C19-C36 Area:6628020 C19-C36 Amount: 7416.695

MTN-MW1 Batch ID: 36436



EPH ALIPHATICS (FID) ANALYSIS REPORT

Sample Name: H17020313-002B ;0309GC1 , $HC-ALI-GRP-W,
Raw File: G:\Org\1GC\DAT\1GC030917_b\0309GC1.0001.RAW
Date & Time Acquired: 3/9/2017 1:45:44 PM
Method File: G:\Org\1GC\Methods\03091701.MET
Calibration File: G:\Org\1GC\Cals\AL021517D.CAL
Sample Weight: 1.0087 Dilution: 2 S.A.: 1

Mean RF for C9 to C18 Aliphatic Hydrocarbons: 792.405
Mean RF for C19 to C36 Aliphatic Hydrocarbons: 813.9085
Mean RF for Total Extractable Hydrocarbons: 804.6927
Rt range for Diesel Range Organics: 9.849999 to 21.08
Rt range for C9 to C18 Aliphatic Hydrocarbons: 8.089999 to 17.18
Rt range for C19 to C36 Aliphatic Hydrocarbons: 17.23 to 25.62

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*1-Chloro-octadecane	18.192	48851	198.275	126.878	63.99	-

DRO Area:39330.98 DRO Amount: 96.91093
TEH Area:48707.64 TEH Amount: 120.0149

Aliphatic Hydrocarbon Areas and Amounts:
C9-C18 Area:5545.179 C9-C18 Amount: 13.87511
C19-C36 Area:41691.49 C19-C36 Amount: 101.564

MTN-MW1 Batch ID: 36436

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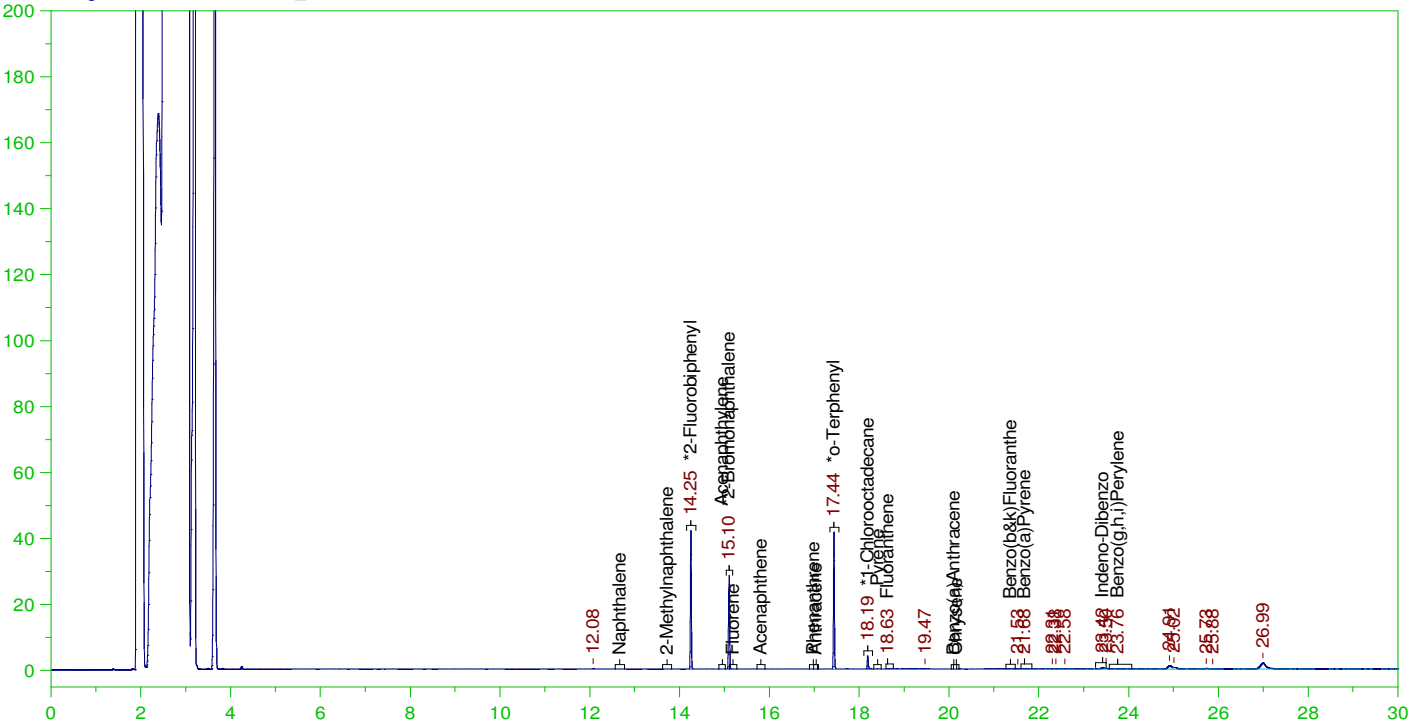

EPH AROMATICS RANGE VALUES (FID) ANALYSIS REPORT

Sample Name: H17020313-002B ;0309GC1 , $HC-ARO-GRP-W,
Raw File: G:\Org\1GC\DAT\1GC030917_b\0309GC1.0002.RAW
Date & Time Acquired: 3/9/2017 2:28:02 PM
Method File: G:\Org\1GC\Methods\03091702.MET
Calibration File: G:\Org\1GC\Cals\AR021517D.CAL
Sample Weight: 1.0087 Dilution: 2 S.A.: 1

Mean RF EPH Aromatics: 1019.269
Rt range for EPH C11 to C22 Aromatics: 12.57 to 24.07

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*2-Fluorobiphenyl	14.25	65149	198.275	191.562	96.61	-
*2-Bromonaphthalene	15.101	43935	198.275	181.674	91.63	-
*o-Terphenyl	17.439	64588	198.275	157.267	79.32	-
*1-Chlorooctadecane	18.192	7114	198.275	21.555	10.87	-

C11-C22 Aromatics Area:17695.06 C11-C22 Aromatics Amount: 34.42159
EPH Aromatics total Area:50205.21 EPH Aromatics Total Amount: 97.66249

MTN-MW1 Batch ID: 36436

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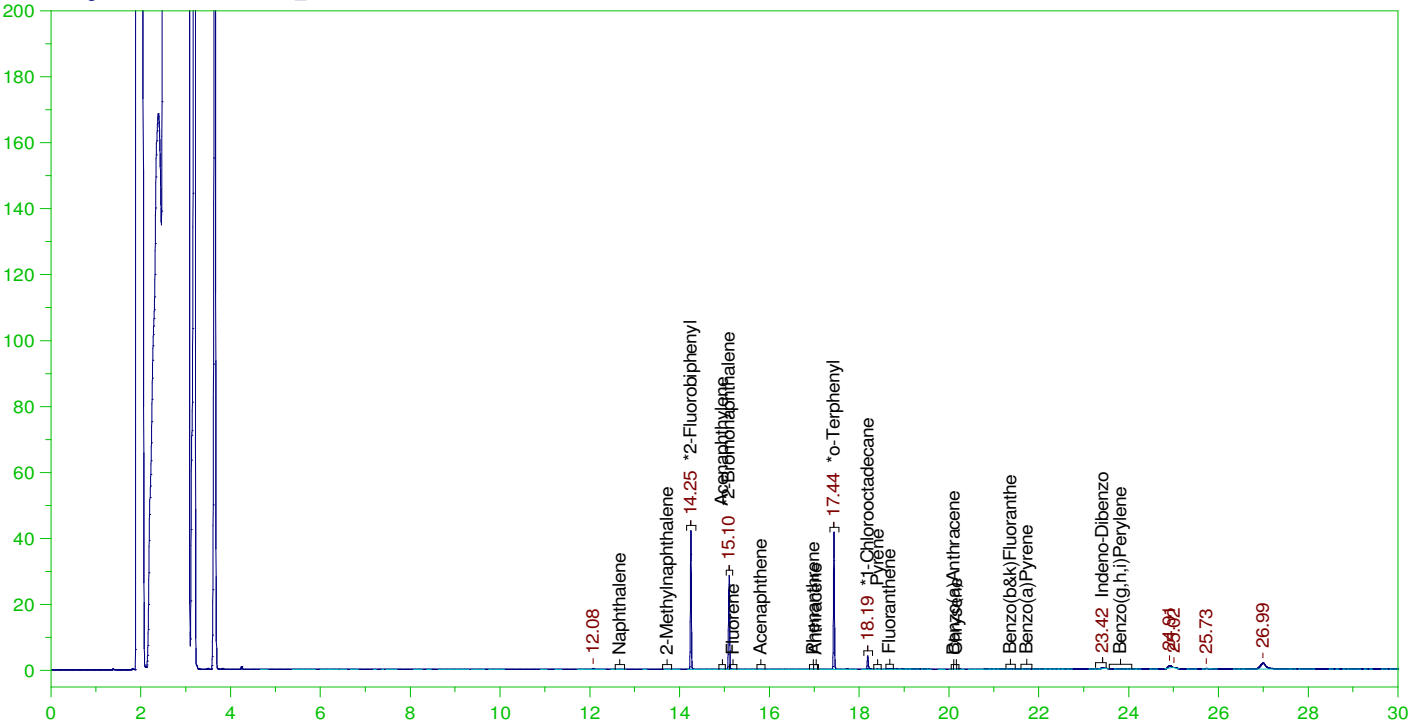

EPH AROMATICS TARGET VALUES (FID) ANALYSIS REPORT

Sample Name: H17020313-002B ;0309GC1 , $HC-ARO-GRP-W,
Raw File: G:\Org\1GC\DAT\1GC030917_b\0309GC1.0002.RAW
Date & Time Acquired: 3/9/2017 2:28:02 PM
Method File: G:\Org\1GC\Methods\AROQC021517D.met
Calibration File: G:\Org\1GC\Cals\AR021517D.CAL
Sample Weight: 1.0087 Dilution: 2 S.A.: 1

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
Naphthalene	.	.	.		1.983	U
2-Methylnaphthalene	.	.	.		1.983	U
Acenaphthylene	.	.	.		1.983	U
Fluorene	.	.	.		1.983	U
Acenaphthene	.	.	.		1.983	U
Phenanthrene	.	.	.		1.983	U
Anthracene	.	.	.		1.983	U
Pyrene	.	.	.		1.983	U
Fluoranthene	.	.	.		1.983	U
Benzo(a)Anthracene	.	.	.		1.983	U
Chrysene	.	.	.		1.983	U
Benzo(b&k)Fluoranthe	.	.	.		3.966	U
Benzo(a)Pyrene	.	.	.		1.983	U
Indeno-Dibenzo	23.417	23.417	23.417	1090	3.966	U
Benzo(g,h,i)Perylene	.	.	.		1.983	U

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	QC LIMITS
*2-Fluorobiphenyl	14.25	65005	198.275	191.138	96.4	40-140
*2-Bromonaphthalene	15.101	43902	198.275	181.54	91.56	40-140
*o-Terphenyl	17.439	64490	198.275	157.028	79.2	40-140
*1-Chlorooctadecane	18.192	6793	198.275	20.582	10.38	40-140

MTN-MW2 Batch ID: 36395

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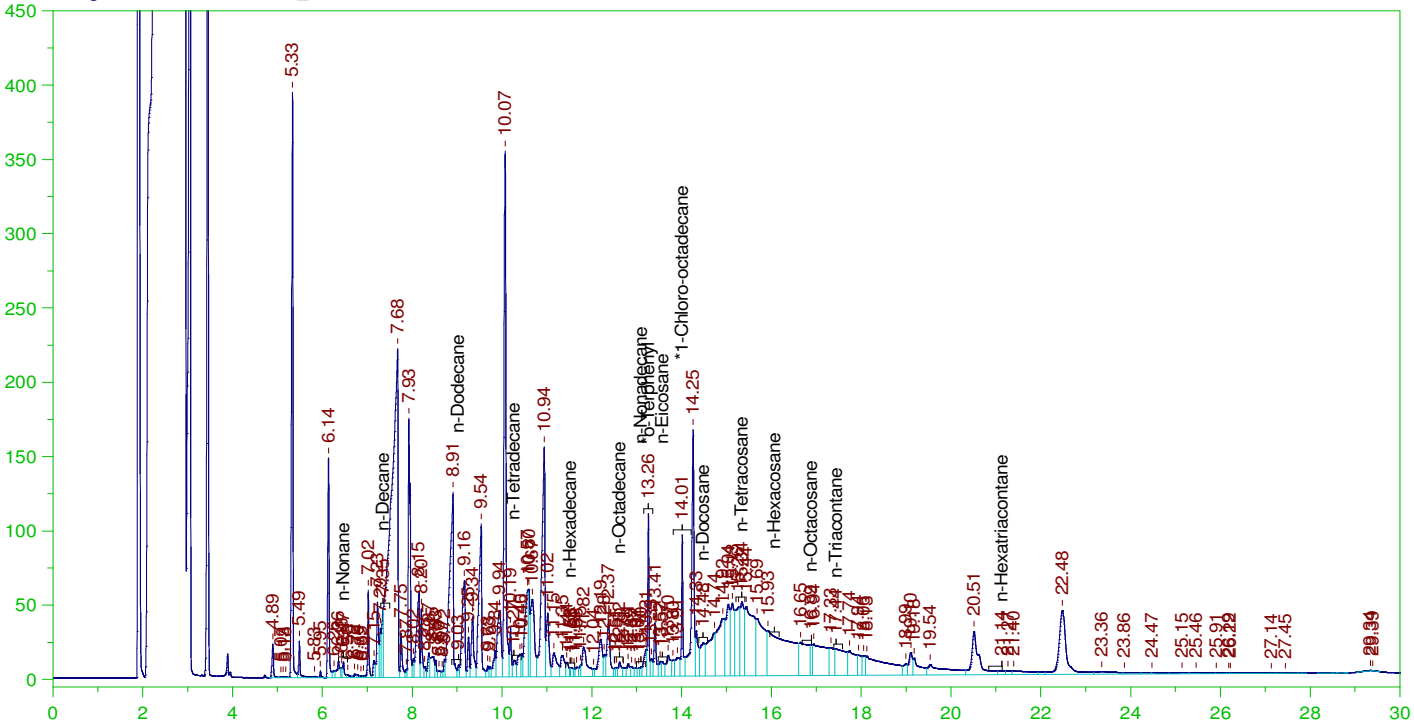


EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) SCREENING ANALYSIS CHROMATOGRAM

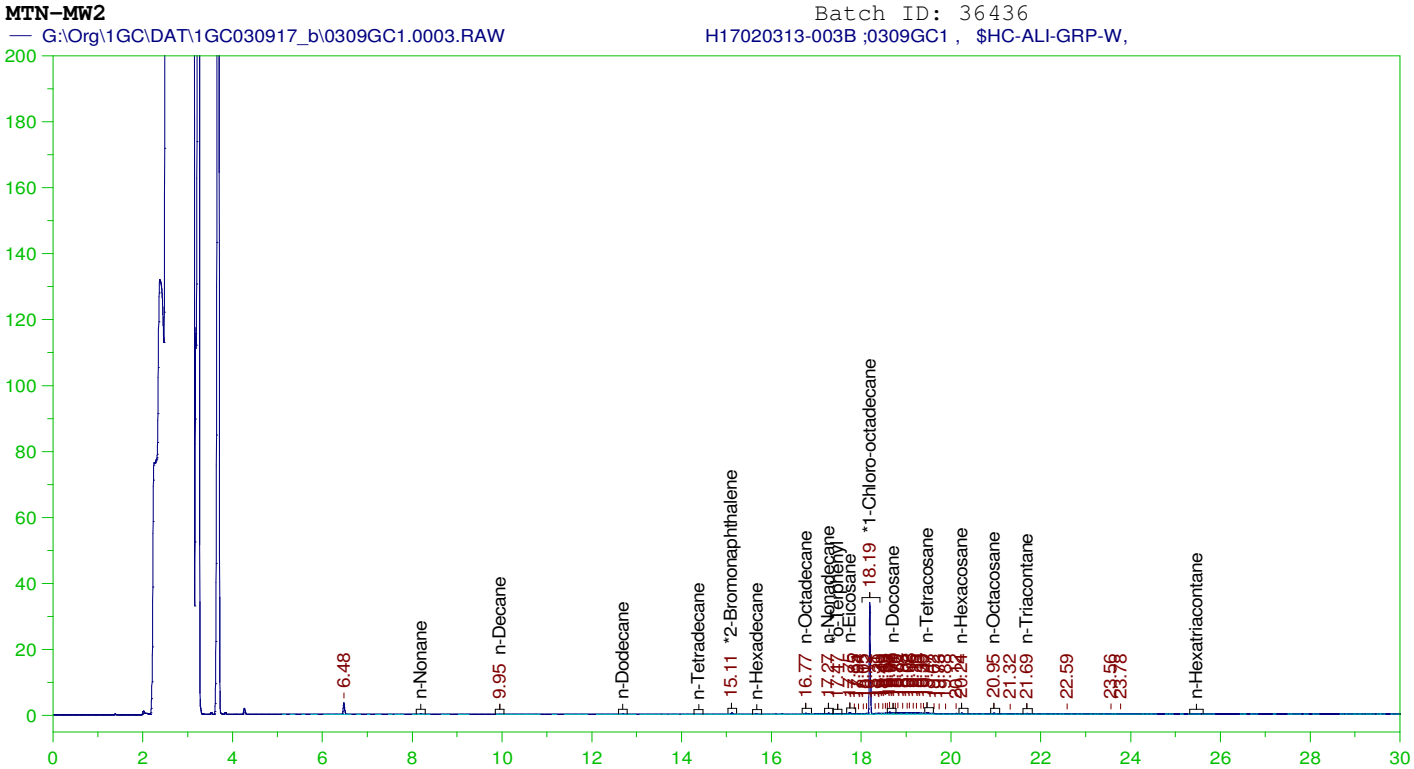
Sample Name: H17020313-003B ;0303GC4 , $HC-EPH-SCRN-W,
Raw File: G:\Org\4GC\DAT\4GC030317_b\0303GC4.0011.RAW
Date & Time Acquired: 3/3/2017 5:15:38 PM
Method File: G:\Org\4GC\Methods\03031711.MET
Calibration File: G:\Org\4GC\Cals\SC022117C.CAL
Sample Weight: 1.0545 Dilution: 2 S.A.: 1

Mean RF for C9 to C18 Hydrocarbons: 1719.001
Mean RF for C19 to C36 Hydrocarbons: 1771.909
Mean RF for Total Extractable Hydrocarbons: 1745.455
Rt range for Diesel Range Organics: 7.3 to 17.59
Rt range for C9 to C18 Hydrocarbons: 6.36 to 13.16
Rt range for C19 to C36 Hydrocarbons: 13.21 to 21.14

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*o-Terphenyl	13.261	224200	189.663	199.196	105.03	-
*1-Chloro-octadecane	14.015	223372	189.663	251.417	132.56	-

DRO Area:1.69086E+07 DRO Amount: 18373.1
TEH Area:2.09376E+07 TEH Amount: 22751.06
C9-C18 Area:1.04546E+07 C9-C18 Amount: 11534.92
C19-C36 Area:8356295 C19-C36 Amount: 8944.494

MTN-MW2 Batch ID: 36436



EPH ALIPHATICS (FID) ANALYSIS REPORT

Sample Name: H17020313-003B ;0309GC1 , $HC-ALI-GRP-W,
Raw File: G:\Org\1GC\DAT\1GC030917_b\0309GC1.0003.RAW
Date & Time Acquired: 3/9/2017 3:10:19 PM
Method File: G:\Org\1GC\Methods\03091703.MET
Calibration File: G:\Org\1GC\Cals\AL021517D.CAL
Sample Weight: 1.0545 Dilution: 2 S.A.: 1

Mean RF for C9 to C18 Aliphatic Hydrocarbons: 792.405
Mean RF for C19 to C36 Aliphatic Hydrocarbons: 813.9085
Mean RF for Total Extractable Hydrocarbons: 804.6927
Rt range for Diesel Range Organics: 9.849999 to 21.08
Rt range for C9 to C18 Aliphatic Hydrocarbons: 8.089999 to 17.18
Rt range for C19 to C36 Aliphatic Hydrocarbons: 17.23 to 25.62

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*1-Chloro-octadecane	18.194	55329	189.663	137.46	72.48	-

DRO Area:42605.96 DRO Amount: 100.4208
TEH Area:59611.33 TEH Amount: 140.5019

Aliphatic Hydrocarbon Areas and Amounts:
C9-C18 Area:6109.811 C9-C18 Amount: 14.62393
C19-C36 Area:45022.43 C19-C36 Amount: 104.9148

MTN-MW2 Batch ID: 36436

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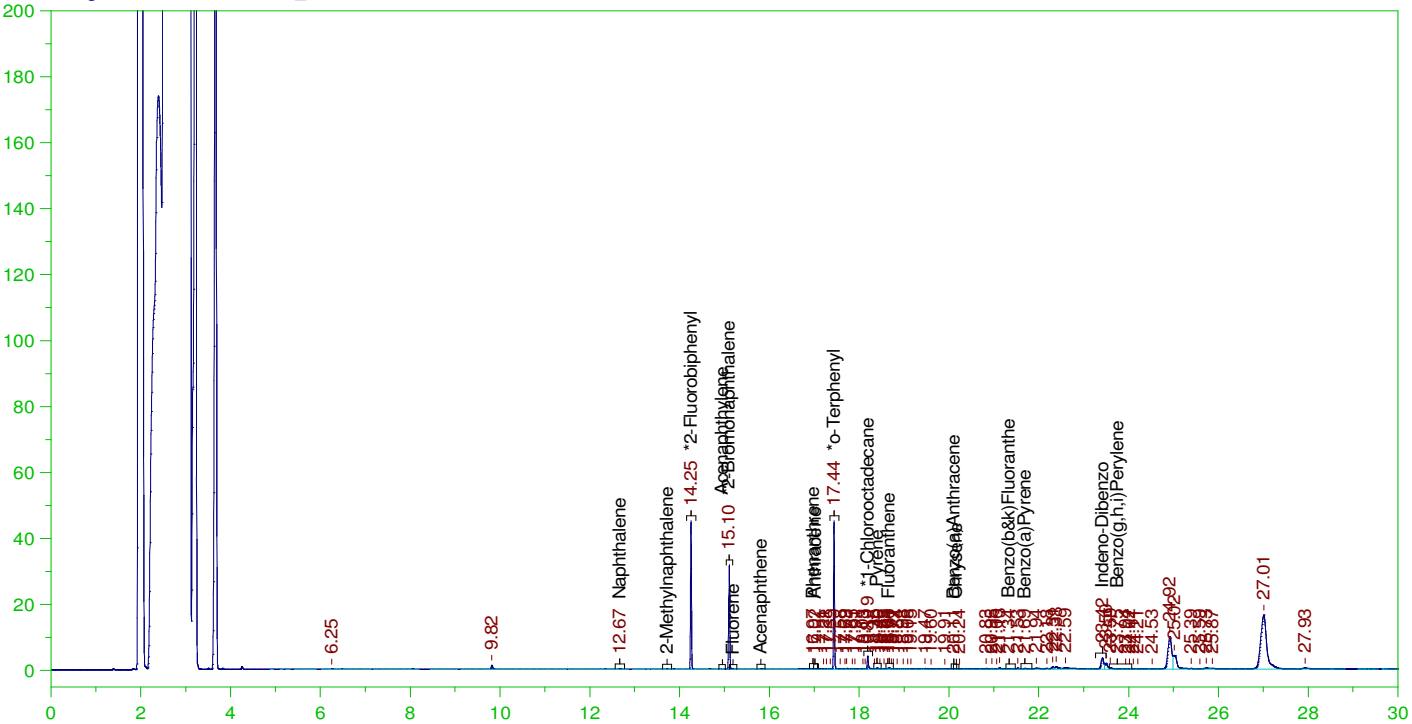

EPH AROMATICS RANGE VALUES (FID) ANALYSIS REPORT

Sample Name: H17020313-003B ;0309GC1 , $HC-ARO-GRP-W,
Raw File: G:\Org\1GC\DAT\1GC030917_b\0309GC1.0004.RAW
Date & Time Acquired: 3/9/2017 3:52:35 PM
Method File: G:\Org\1GC\Methods\03091704.MET
Calibration File: G:\Org\1GC\Cals\AR021517D.CAL
Sample Weight: 1.0545 Dilution: 2 S.A.: 1

Mean RF EPH Aromatics: 1019.269
Rt range for EPH C11 to C22 Aromatics: 12.57 to 24.07

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*2-Fluorobiphenyl	14.253	68652	189.663	193.095	101.81	-
*2-Bromonaphthalene	15.104	48846	189.663	193.21	101.87	-
*o-Terphenyl	17.441	70956	189.663	165.267	87.14	-
*1-Chlorooctadecane	18.192	8295	189.663	24.042	12.68	-

C11-C22 Aromatics Area:84223.39 C11-C22 Aromatics Amount: 156.721
EPH Aromatics total Area:346440.2 EPH Aromatics Total Amount: 644.6481

MTN-MW2 Batch ID: 36436

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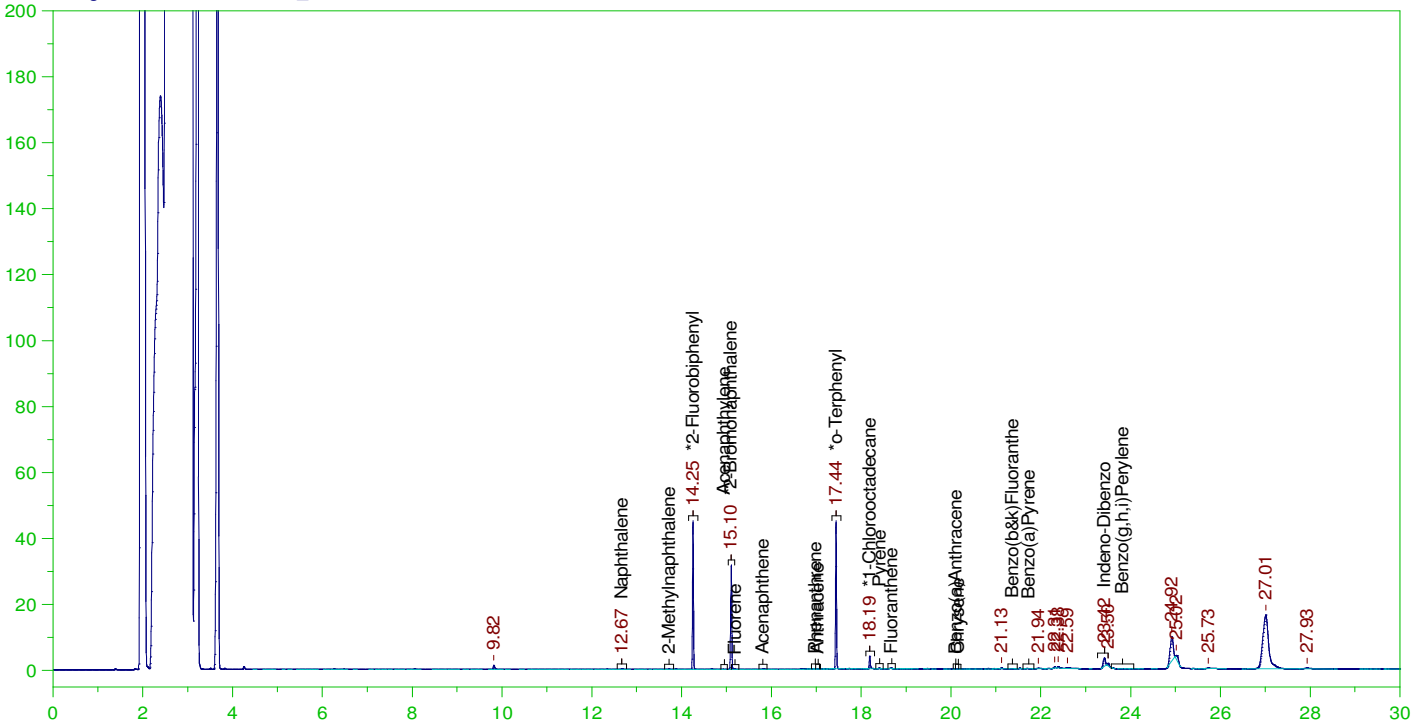

EPH AROMATICS TARGET VALUES (FID) ANALYSIS REPORT

Sample Name: H17020313-003B ;0309GC1 , $HC-ARO-GRP-W,
Raw File: G:\Org\1GC\DAT\1GC030917_b\0309GC1.0004.RAW
Date & Time Acquired: 3/9/2017 3:52:35 PM
Method File: G:\Org\1GC\Methods\AROQC021517D.met
Calibration File: G:\Org\1GC\Cals\AR021517D.CAL
Sample Weight: 1.0545 Dilution: 2 S.A.: 1

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
Naphthalene	12.671	12.671	12.671	557	1.897	U
2-Methylnaphthalene	.	.	.		1.897	U
Acenaphthylene	.	.	.		1.897	U
Fluorene	.	.	.		1.897	U
Acenaphthene	.	.	.		1.897	U
Phenanthrene	.	.	.		1.897	U
Anthracene	.	.	.		1.897	U
Pyrene	.	.	.		1.897	U
Fluoranthene	.	.	.		1.897	U
Benzo(a)Anthracene	.	.	.		1.897	U
Chrysene	.	.	.		1.897	U
Benzo(b&k)Fluoranthe	.	.	.		3.793	U
Benzo(a)Pyrene	.	.	.		1.897	U
Indeno-Dibenzo	23.416	-8.27	-8.312	8452	15.748	
Benzo(g,h,i)Perylene	.	.	.		1.897	U

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	QC LIMITS
*2-Fluorobiphenyl	14.253	68520	189.663	192.725	101.61	40-140
*2-Bromonaphthalene	15.104	48830	189.663	193.148	101.84	40-140
*o-Terphenyl	17.441	69756	189.663	162.473	85.66	40-140
*1-Chlorooctadecane	18.192	6530	189.663	18.925	9.98	40-140

FB-1 Batch ID: 36395

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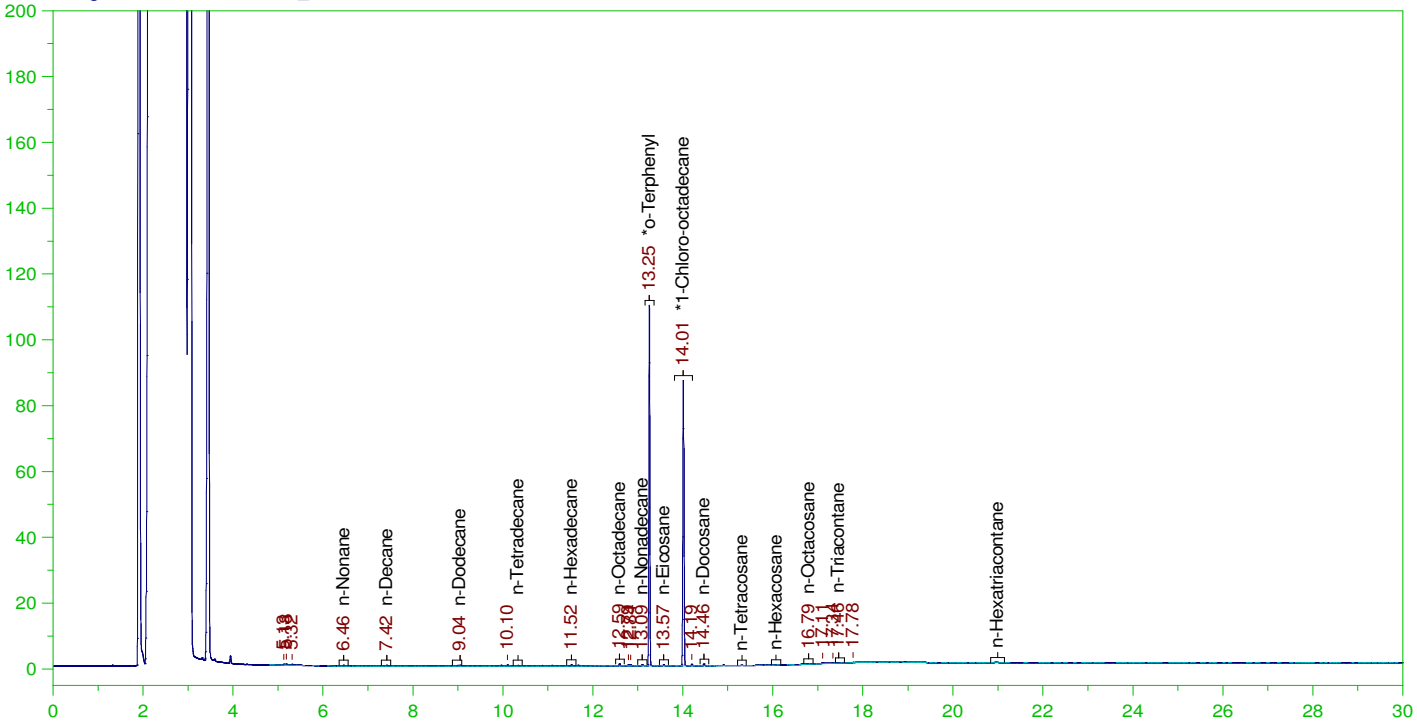

EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) SCREENING ANALYSIS CHROMATOGRAM

Sample Name: H17020313-004B ;0303GC4 , $HC-EPH-SCRN-W,
Raw File: G:\Org\4GC\DAT\4GC030317_b\0303GC4.0008.RAW
Date & Time Acquired: 3/3/2017 2:51:56 PM
Method File: G:\Org\4GC\Methods\SR022117C.MET
Calibration File: G:\Org\4GC\Cals\SC022117C.CAL
Sample Weight: 1.0191 Dilution: 2 S.A.: 1

Mean RF for C9 to C18 Hydrocarbons: 1719.001
Mean RF for C19 to C36 Hydrocarbons: 1771.909
Mean RF for Total Extractable Hydrocarbons: 1745.455
Rt range for Diesel Range Organics: 7.3 to 17.59
Rt range for C9 to C18 Hydrocarbons: 6.36 to 13.16
Rt range for C19 to C36 Hydrocarbons: 13.21 to 21.14

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*o-Terphenyl	13.254	172685	196.252	158.756	80.89	-
*1-Chloro-octadecane	14.01	144611	196.252	168.422	85.82	-

DRO Area:21596.84 DRO Amount: 24.28258
TEH Area:30081.88 TEH Amount: 33.82279
C9-C18 Area:13459.48 C9-C18 Amount: 15.36616
C19-C36 Area:12198.81 C19-C36 Amount: 13.51106

BD-1 Batch ID: 36395

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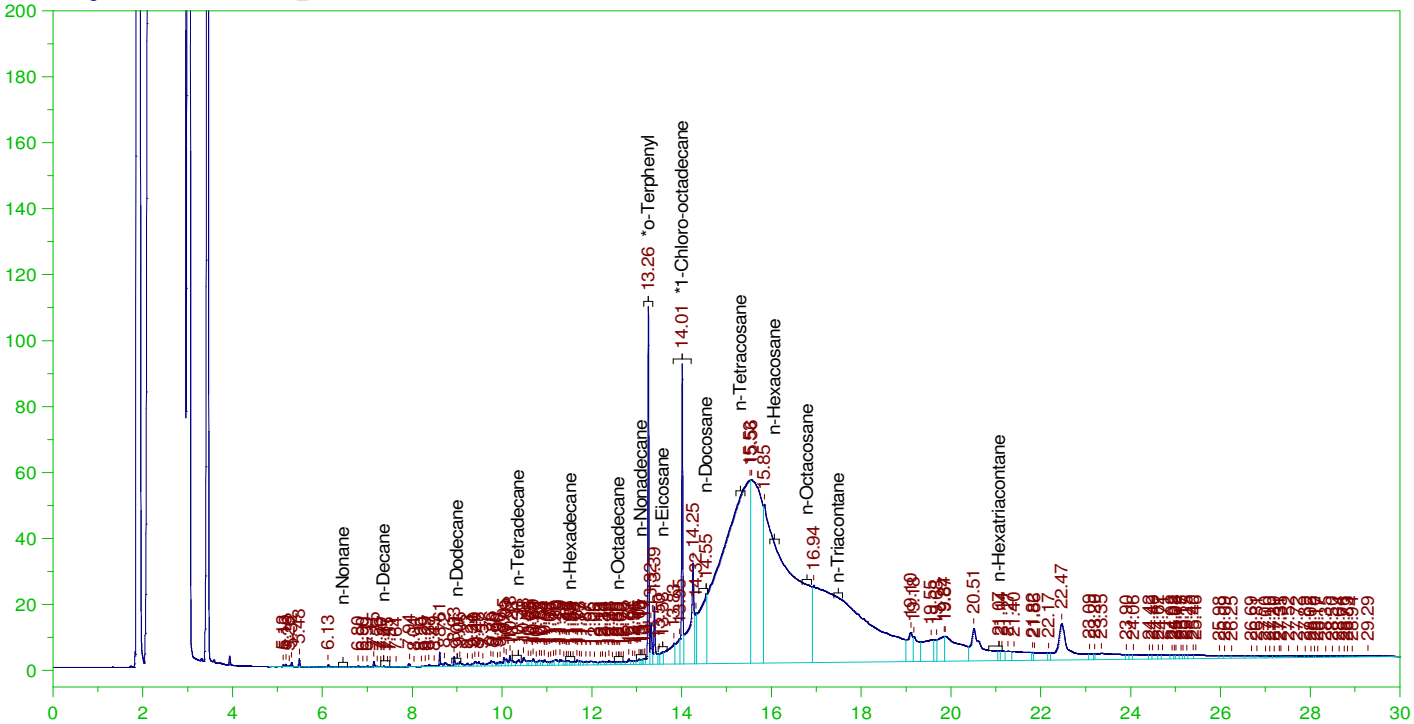

EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) SCREENING ANALYSIS CHROMATOGRAM

Sample Name: H17020313-005B ;0303GC4 , $HC-EPH-SCRN-W,
Raw File: G:\Org\4GC\DAT\4GC030317_b\0303GC4.0012.RAW
Date & Time Acquired: 3/3/2017 6:03:27 PM
Method File: G:\Org\4GC\Methods\03031712.MET
Calibration File: G:\Org\4GC\Cals\SC022117C.CAL
Sample Weight: 1.0422 Dilution: 2 S.A.: 1

Mean RF for C9 to C18 Hydrocarbons: 1719.001
Mean RF for C19 to C36 Hydrocarbons: 1771.909
Mean RF for Total Extractable Hydrocarbons: 1745.455
Rt range for Diesel Range Organics: 7.3 to 17.59
Rt range for C9 to C18 Hydrocarbons: 6.36 to 13.16
Rt range for C19 to C36 Hydrocarbons: 13.21 to 21.14

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*o-Terphenyl	13.26	180777	191.902	162.512	84.68	-
*1-Chloro-octadecane	14.014	183633	191.902	209.128	108.98	-

DRO Area:8058320 DRO Amount: 8859.614
TEH Area:9483685 TEH Amount: 10426.71
C9-C18 Area:332291.4 C9-C18 Amount: 370.9555
C19-C36 Area:8470586 C19-C36 Amount: 9173.837

BD-1 Batch ID: 36436

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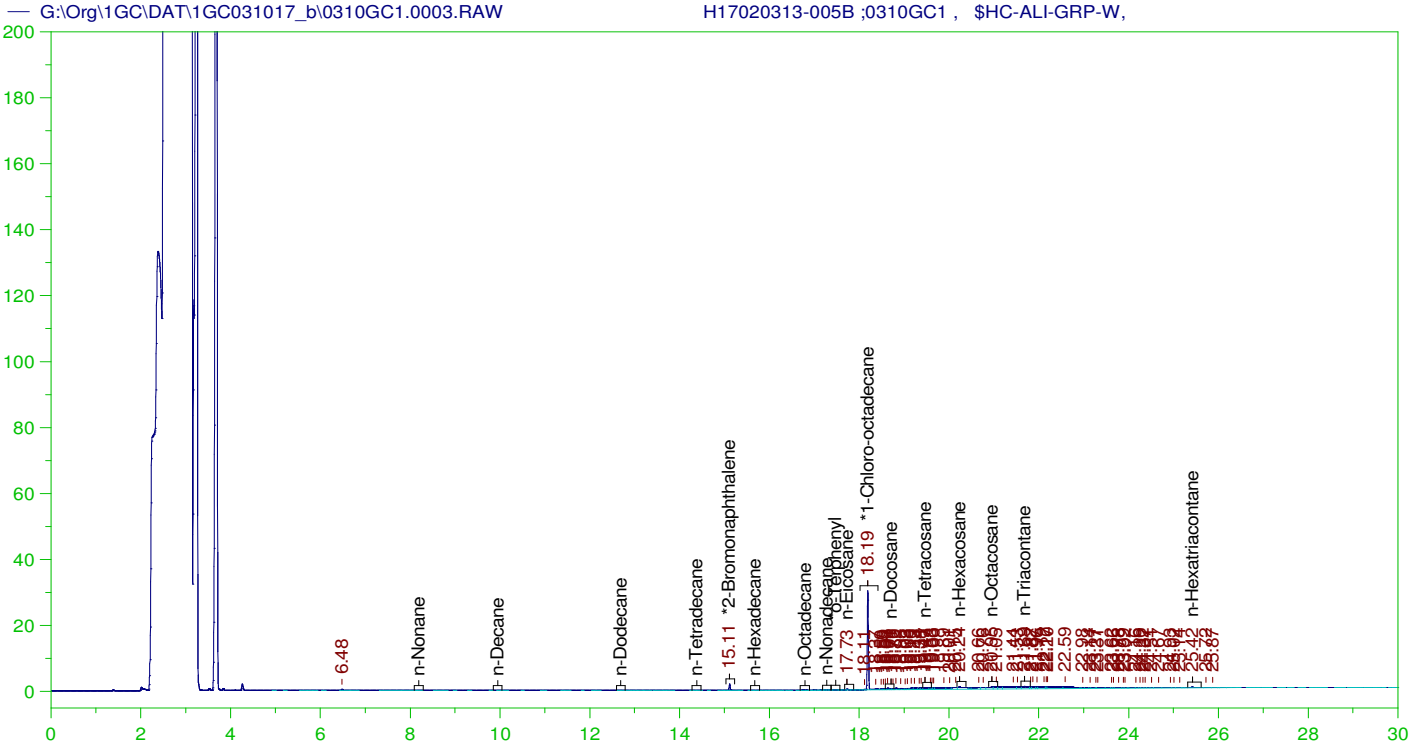

EPH ALIPHATICS (FID) ANALYSIS REPORT

Sample Name: H17020313-005B ;0310GC1 , $HC-ALI-GRP-W,
Raw File: G:\Org\1GC\DAT\1GC031017_b\0310GC1.0003.RAW
Date & Time Acquired: 3/10/2017 12:27:23 PM
Method File: G:\Org\1GC\Methods\AL021517D.MET
Calibration File: G:\Org\1GC\Cals\AL021517D.CAL
Sample Weight: 1.0422 Dilution: 2 S.A.: 1

Mean RF for C9 to C18 Aliphatic Hydrocarbons: 792.405
Mean RF for C19 to C36 Aliphatic Hydrocarbons: 813.9085
Mean RF for Total Extractable Hydrocarbons: 804.6927
Rt range for Diesel Range Organics: 9.849999 to 21.08
Rt range for C9 to C18 Aliphatic Hydrocarbons: 8.089999 to 17.18
Rt range for C19 to C36 Aliphatic Hydrocarbons: 17.23 to 25.62

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*1-Chloro-octadecane	18.194	49877	191.902	125.378	65.33	-

DRO Area:76672.71 DRO Amount: 182.8478
TEH Area:169013.8 TEH Amount: 403.0614

Aliphatic Hydrocarbon Areas and Amounts:
C9-C18 Area:5095.655 C9-C18 Amount: 12.34047
C19-C36 Area:159827.1 C19-C36 Amount: 376.8372

BD-1 Batch ID: 36436

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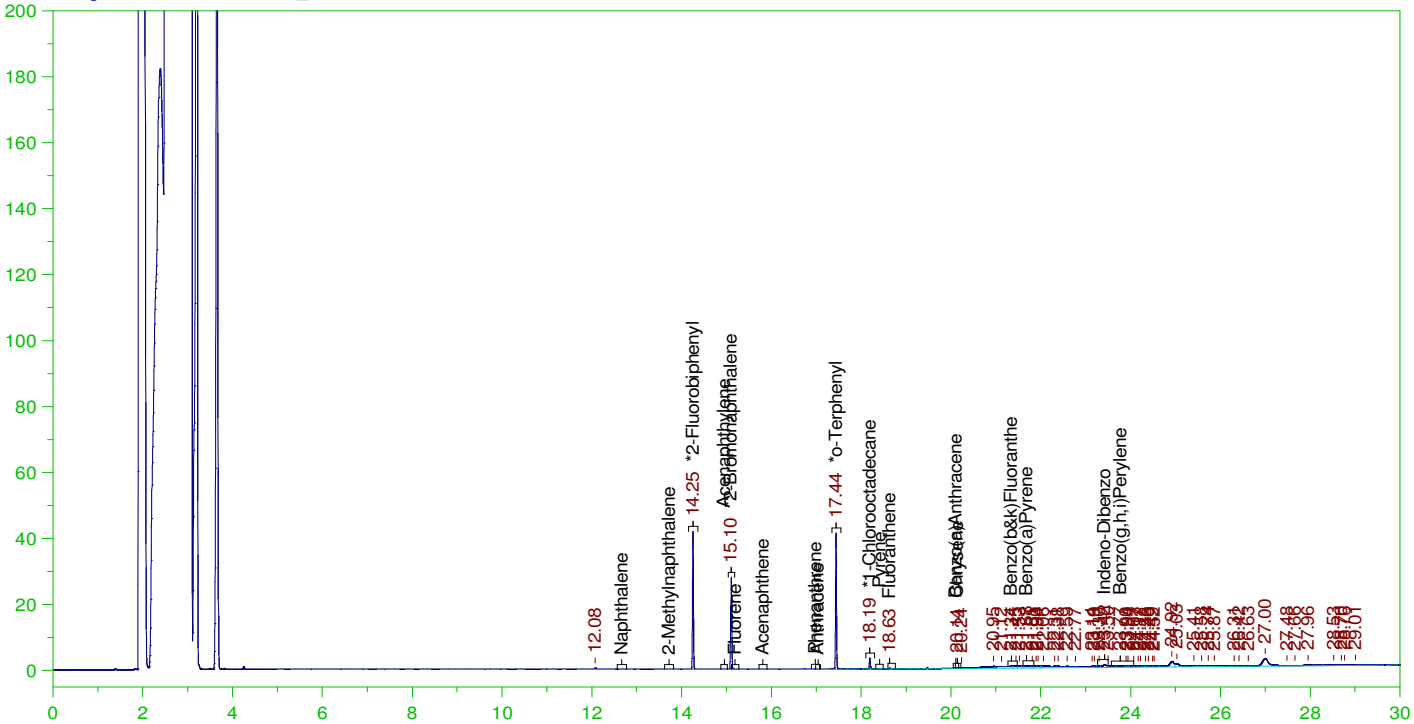


EPH AROMATICS RANGE VALUES (FID) ANALYSIS REPORT

Sample Name: H17020313-005B ;0310GC1 , $HC-ARO-GRP-W,
Raw File: G:\Org\1GC\DAT\1GC031017_b\0310GC1.0004.RAW
Date & Time Acquired: 3/10/2017 1:09:43 PM
Method File: G:\Org\1GC\Methods\03101704.MET
Calibration File: G:\Org\1GC\Cals\AR021517D.CAL
Sample Weight: 1.0422 Dilution: 2 S.A.: 1

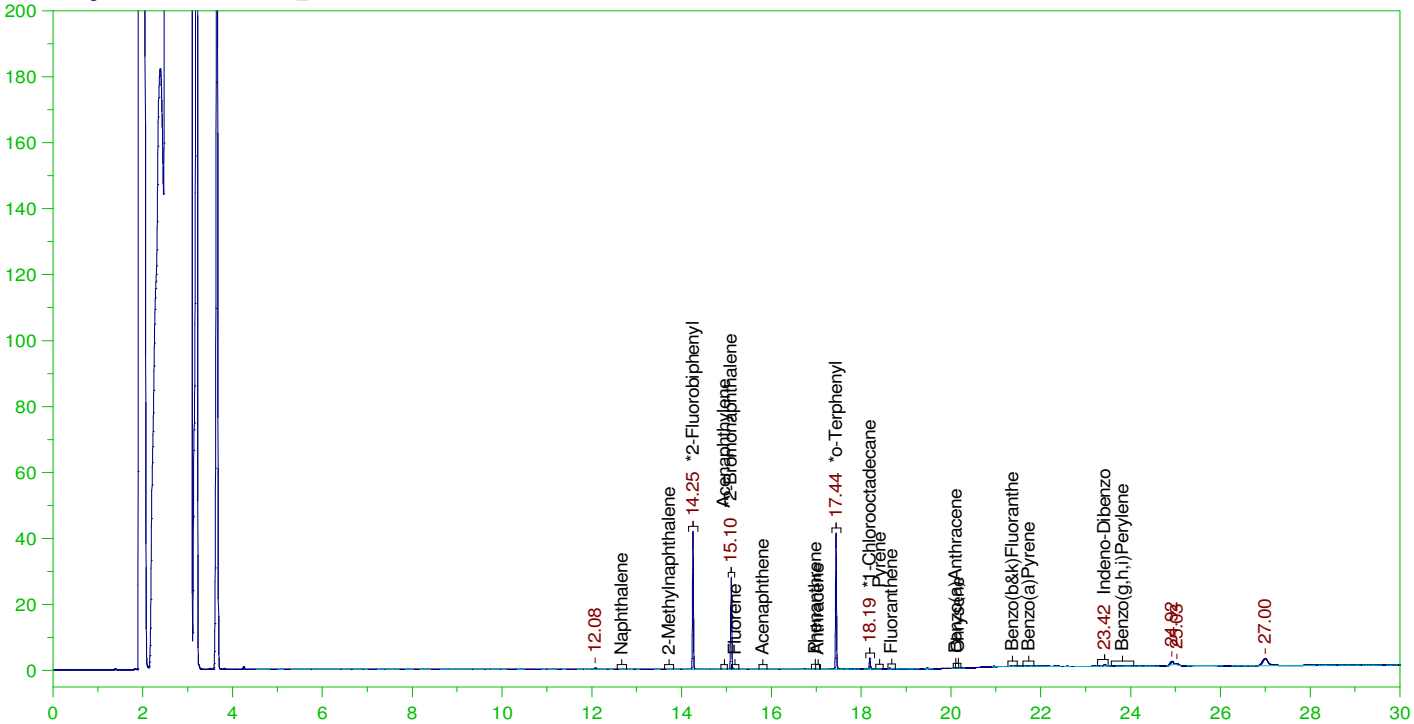
Mean RF EPH Aromatics: 1019.269
Rt range for EPH C11 to C22 Aromatics: 12.57 to 24.07

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*2-Fluorobiphenyl	14.252	64321	191.902	183.05	95.39	-
*2-Bromonaphthalene	15.104	43179	191.902	172.809	90.05	-
*o-Terphenyl	17.441	64147	191.902	151.173	78.78	-
*1-Chlorooctadecane	18.193	5845	191.902	17.141	8.93	-

C11-C22 Aromatics Area:96175.98 C11-C22 Aromatics Amount: 181.0742
EPH Aromatics total Area:185401.1 EPH Aromatics Total Amount: 349.0618

BD-1 Batch ID: 36436

G:\Org\1GC\DAT\1GC031017_b\0310GC1.0004.RAW H17020313-005B ;0310GC1 , $HC-ARO-GRP-W,



EPH AROMATICS TARGET VALUES (FID) ANALYSIS REPORT

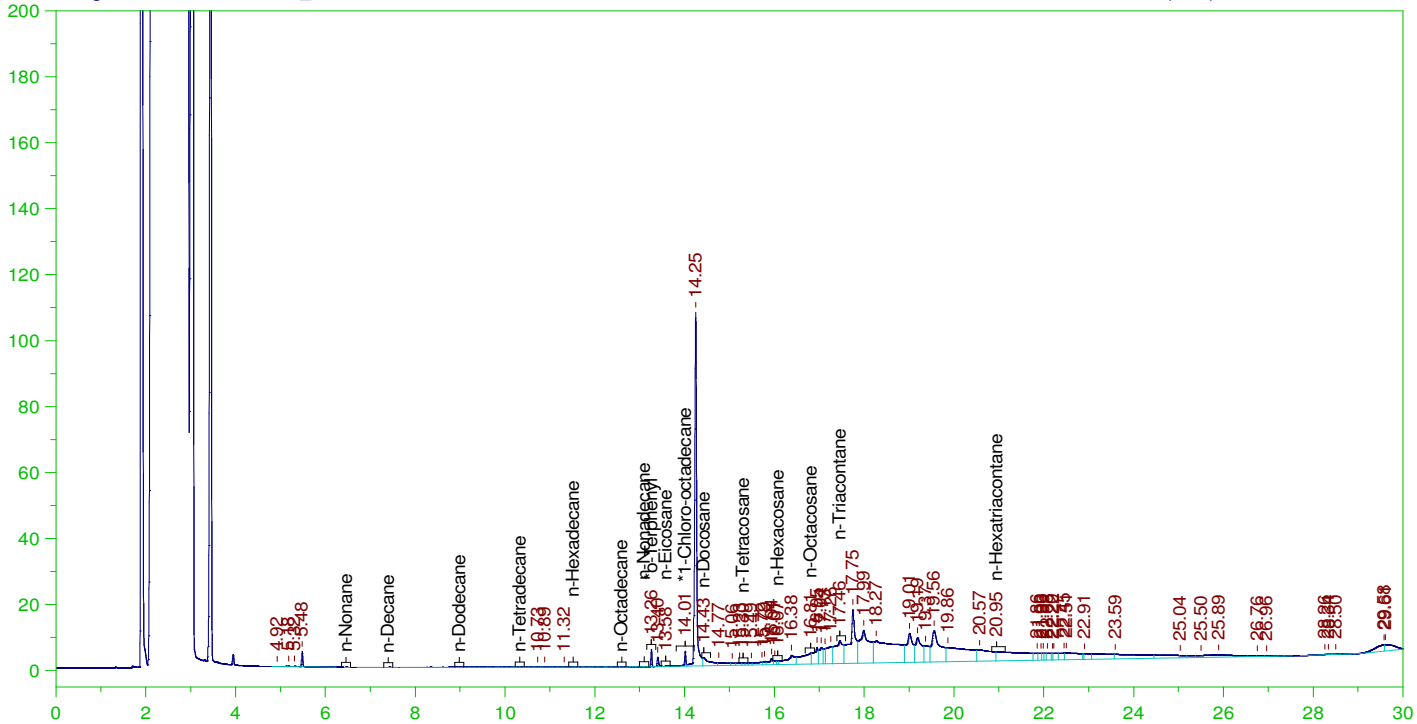
Sample Name: H17020313-005B ;0310GC1 , $HC-ARO-GRP-W,
Raw File: G:\Org\1GC\DAT\1GC031017_b\0310GC1.0004.RAW
Date & Time Acquired: 3/10/2017 1:09:43 PM
Method File: G:\Org\1GC\Methods\AROQC021517D.met
Calibration File: G:\Org\1GC\Cals\AR021517D.CAL
Sample Weight: 1.0422 Dilution: 2 S.A.: 1

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
Naphthalene	.	.	.		1.919	U
2-Methylnaphthalene	.	.	.		1.919	U
Acenaphthylene	.	.	.		1.919	U
Fluorene	.	.	.		1.919	U
Acenaphthene	.	.	.		1.919	U
Phenanthrene	.	.	.		1.919	U
Anthracene	.	.	.		1.919	U
Pyrene	.	.	.		1.919	U
Fluoranthene	.	.	.		1.919	U
Benzo(a)Anthracene	.	.	.		1.919	U
Chrysene	.	.	.		1.919	U
Benzo(b&k)Fluoranthe	.	.	.		3.838	U
Benzo(a)Pyrene	.	.	.		1.919	U
Indeno-Dibenzo	23.418	23.418	23.418	1230	3.838	U
Benzo(g,h,i)Perylene	.	.	.		1.919	U

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	QC LIMITS
*2-Fluorobiphenyl	14.252	64212	191.902	182.738	95.22	40-140
*2-Bromonaphthalene	15.104	43179	191.902	172.809	90.05	40-140
*o-Terphenyl	17.441	64135	191.902	151.145	78.76	40-140
*1-Chlorooctadecane	18.193	5732	191.902	16.808	8.76	40-140

WSMW-7 Batch ID: 36395

— G:\Org\4GC\DAT\4GC030317_b\0303GC4.0025.RAW H17020313-006B ;0303GC4 , $HC-EPH-SCRN-W, ,(2,20)



EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) SCREENING ANALYSIS CHROMATOGRAM

Sample Name: H17020313-006B ;0303GC4 , $HC-EPH-SCRN-W, ,(2,20)
Raw File: G:\Org\4GC\DAT\4GC030317_b\0303GC4.0025.RAW
Date & Time Acquired: 3/4/2017 4:26:22 AM
Method File: G:\Org\4GC\Methods\03031725.MET
Calibration File: G:\Org\4GC\Cals\SC022117C.CAL
Sample Weight: 0.9752 Dilution: 40 S.A.: 1

Mean RF for C9 to C18 Hydrocarbons: 1719.001
Mean RF for C19 to C36 Hydrocarbons: 1771.909
Mean RF for Total Extractable Hydrocarbons: 1745.455
Rt range for Diesel Range Organics: 7.3 to 17.59
Rt range for C9 to C18 Hydrocarbons: 6.36 to 13.16
Rt range for C19 to C36 Hydrocarbons: 13.21 to 21.14

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*o-Terphenyl	13.262	8970	205.086	172.357	84.04	-
*1-Chloro-octadecane	14.015	13032	205.086	317.208	154.67	-

DRO Area:754856 DRO Amount: 17738.7
TEH Area:2305419 TEH Amount: 54176.07
C9-C18 Area:10659.51 C9-C18 Amount: 254.3475
C19-C36 Area:1962857 C19-C36 Amount: 45437.4

WSMW-7 Batch ID: 36436

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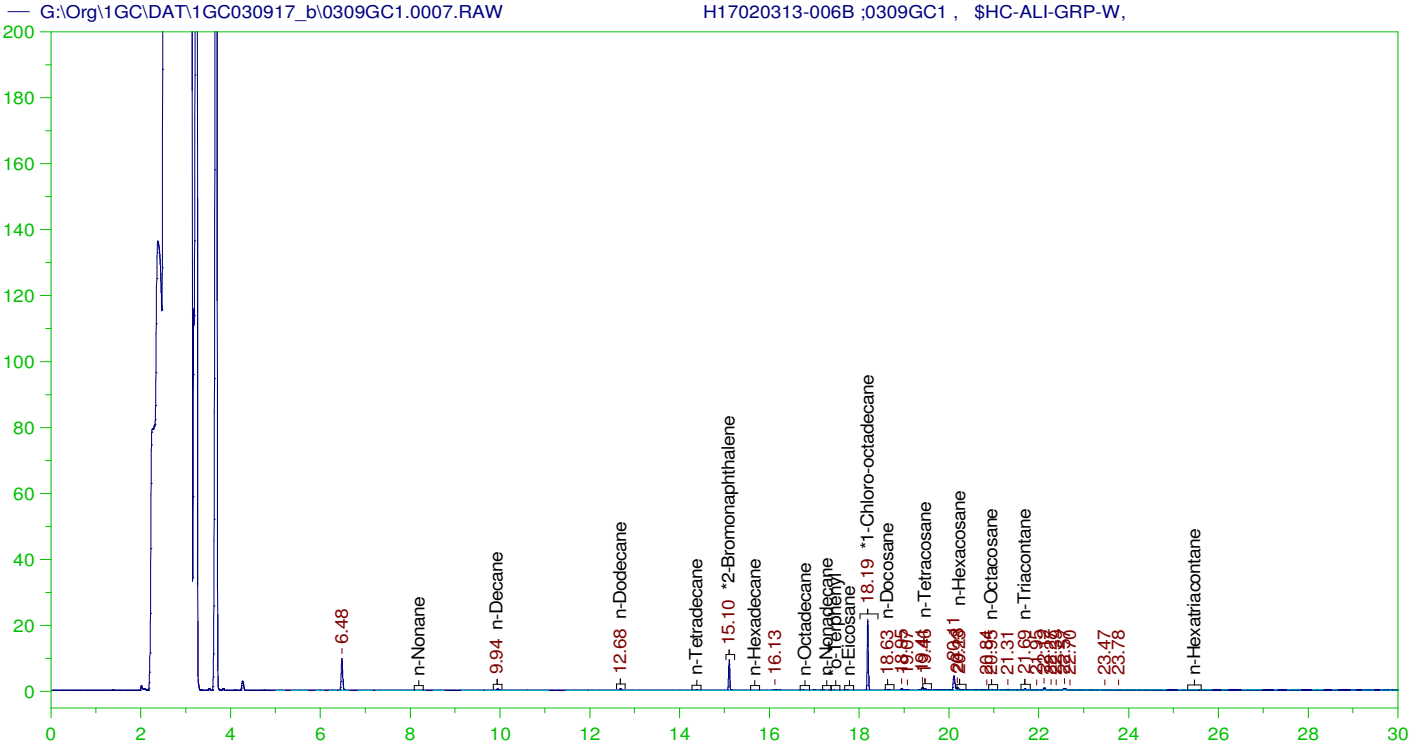

EPH ALIPHATICS (FID) ANALYSIS REPORT

Sample Name: H17020313-006B ;0309GC1 , $HC-ALI-GRP-W,
Raw File: G:\Org\1GC\DAT\1GC030917_b\0309GC1.0007.RAW
Date & Time Acquired: 3/9/2017 5:59:28 PM
Method File: G:\Org\1GC\Methods\03091707.MET
Calibration File: G:\Org\1GC\Cals\AL021517D.CAL
Sample Weight: 0.9752 Dilution: 3 S.A.: 1

Mean RF for C9 to C18 Aliphatic Hydrocarbons: 792.405
Mean RF for C19 to C36 Aliphatic Hydrocarbons: 813.9085
Mean RF for Total Extractable Hydrocarbons: 804.6927
Rt range for Diesel Range Organics: 9.849999 to 21.08
Rt range for C9 to C18 Aliphatic Hydrocarbons: 8.089999 to 17.18
Rt range for C19 to C36 Aliphatic Hydrocarbons: 17.23 to 25.62

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*1-Chloro-octadecane	18.192	35267	205.086	142.114	69.29	-

DRO Area:30978.14 DRO Amount: 118.4276
TEH Area:81746.8 TEH Amount: 312.5132

Aliphatic Hydrocarbon Areas and Amounts:
C9-C18 Area:22296.65 C9-C18 Amount: 86.56053
C19-C36 Area:36773.68 C19-C36 Amount: 138.9918

WSMW-7 Batch ID: 36436

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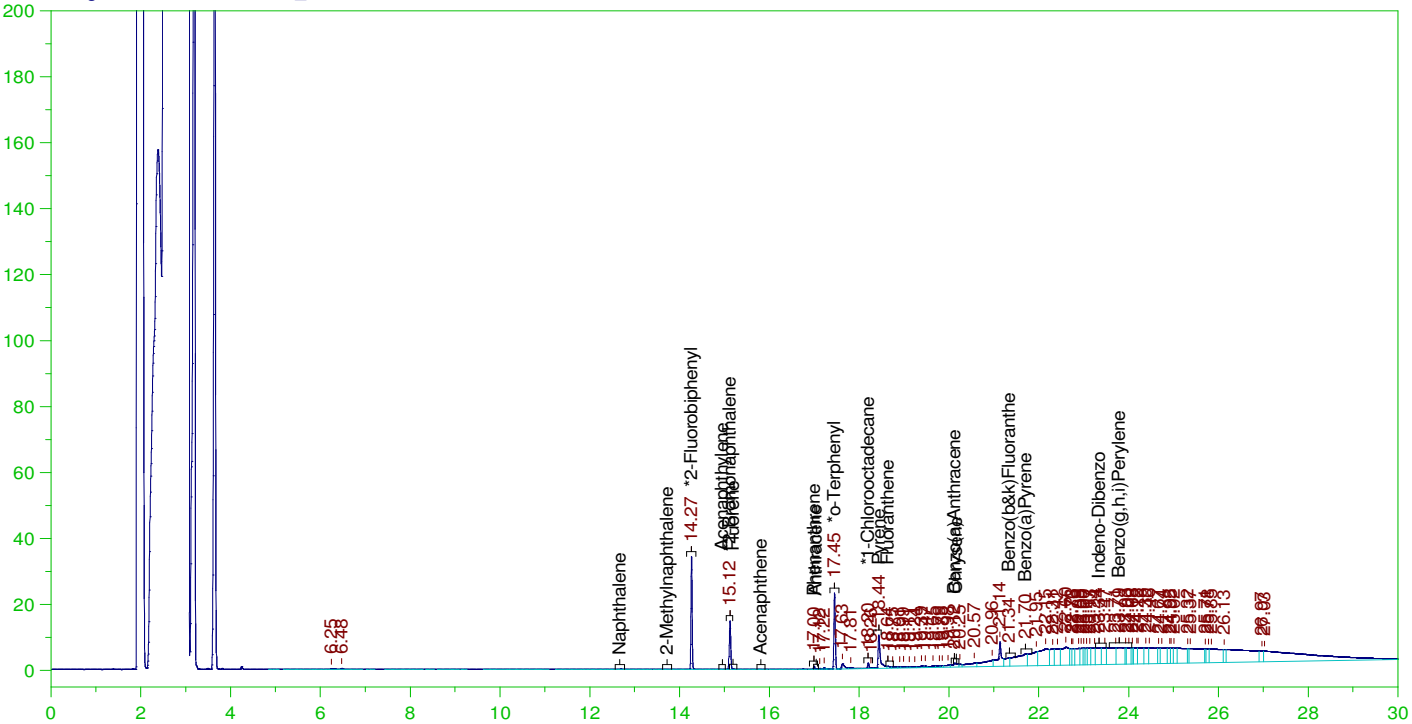

EPH AROMATICS RANGE VALUES (FID) ANALYSIS REPORT

Sample Name: H17020313-006B ;0309GC1 , $HC-ARO-GRP-W,
Raw File: G:\Org\1GC\DAT\1GC030917_b\0309GC1.0008.RAW
Date & Time Acquired: 3/9/2017 6:41:39 PM
Method File: G:\Org\1GC\Methods\AR021517D.MET
Calibration File: G:\Org\1GC\Cals\AR021517D.CAL
Sample Weight: 0.9752 Dilution: 3 S.A.: 1

Mean RF EPH Aromatics: 1019.269
Rt range for EPH C11 to C22 Aromatics: 12.57 to 24.07

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*2-Fluorobiphenyl	14.265	64865	205.086	295.917	144.29	-
*2-Bromonaphthalene	15.121	33642	205.086	215.835	105.24	-
*o-Terphenyl	17.452	46027	205.086	173.884	84.79	-
*1-Chlorooctadecane	18.203	3586	205.086	16.859	8.22	-

C11-C22 Aromatics Area:956747.1 C11-C22 Aromatics Amount: 2887.592
EPH Aromatics total Area:1737717 EPH Aromatics Total Amount: 5244.664

WSMW-7 Batch ID: 36436

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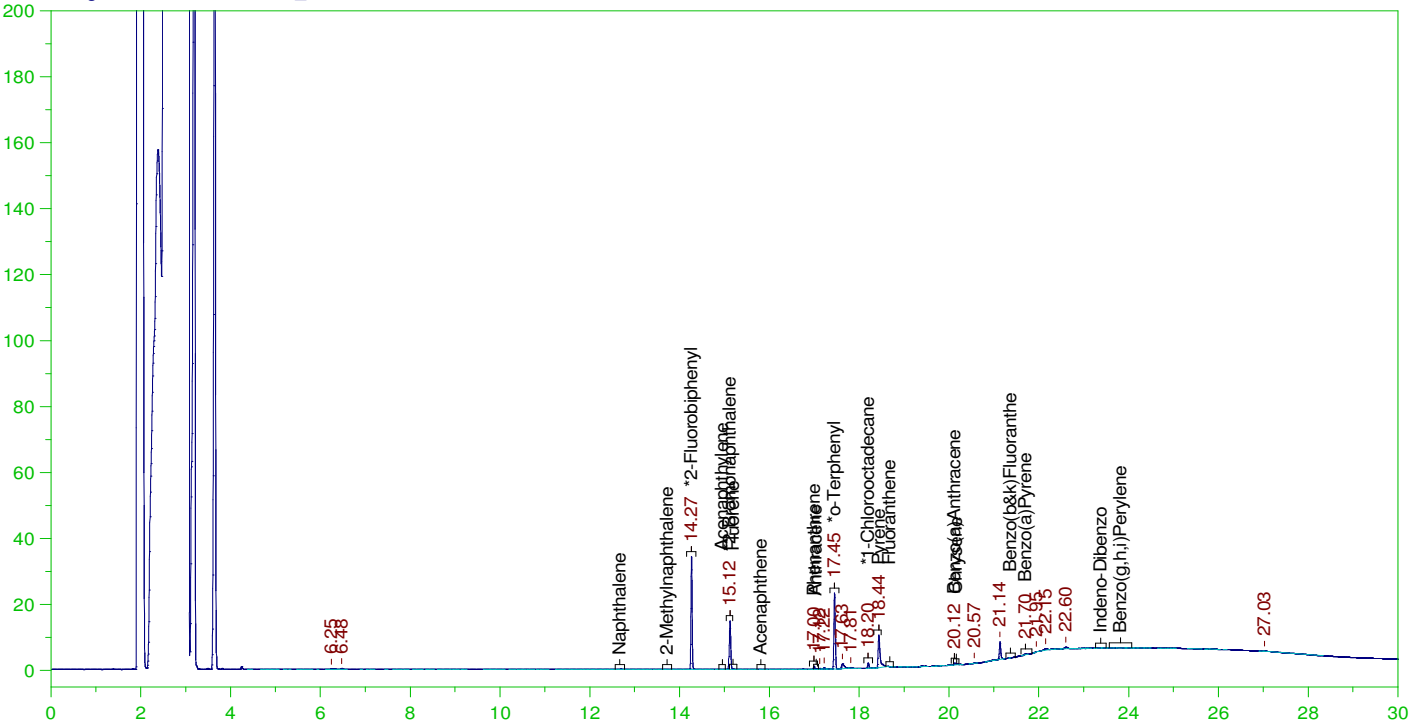

EPH AROMATICS TARGET VALUES (FID) ANALYSIS REPORT

Sample Name: H17020313-006B ;0309GC1 , $HC-ARO-GRP-W,
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Date & Time Acquired: 3/9/2017 6:41:39 PM
Method File: G:\Org\1GC\Methods\AROQC021517D.met
Calibration File: G:\Org\1GC\Cals\AR021517D.CAL
Sample Weight: 0.9752 Dilution: 3 S.A.: 1

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
Naphthalene	.	.	.		3.076	U
2-Methylnaphthalene	.	.	.		3.076	U
Acenaphthylene	.	.	.		3.076	U
Fluorene	.	.	.		3.076	U
Acenaphthene	.	.	.		3.076	U
Phenanthrene	16.998	-1.87	-1.877	1910	5.865	
Anthracene	.	.	.		3.076	U
Pyrene	18.438	-3.3	-3.317	31397	94.16	
Fluoranthene	.	.	.		3.076	U
Benzo(a)Anthracene	20.123	-5.	-5.002	2131	6.473	
Chrysene	.	.	.		3.076	U
Benzo(b&k)Fluoranthe	.	.	.		6.153	U
Benzo(a)Pyrene	21.704	21.704	21.704	1166	3.076	U
Indeno-Dibenzo	.	.	.		6.153	U
Benzo(g,h,i)Perylene	.	.	.		3.076	U

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	QC LIMITS
*2-Fluorobiphenyl	14.265	64775	205.086	295.51	144.09	40-140
*2-Bromonaphthalene	15.121	33519	205.086	215.051	104.86	40-140
*o-Terphenyl	17.452	45979	205.086	173.702	84.7	40-140
*1-Chlorooctadecane	18.203	3060	205.086	14.386	7.01	40-140

MTN-MW3

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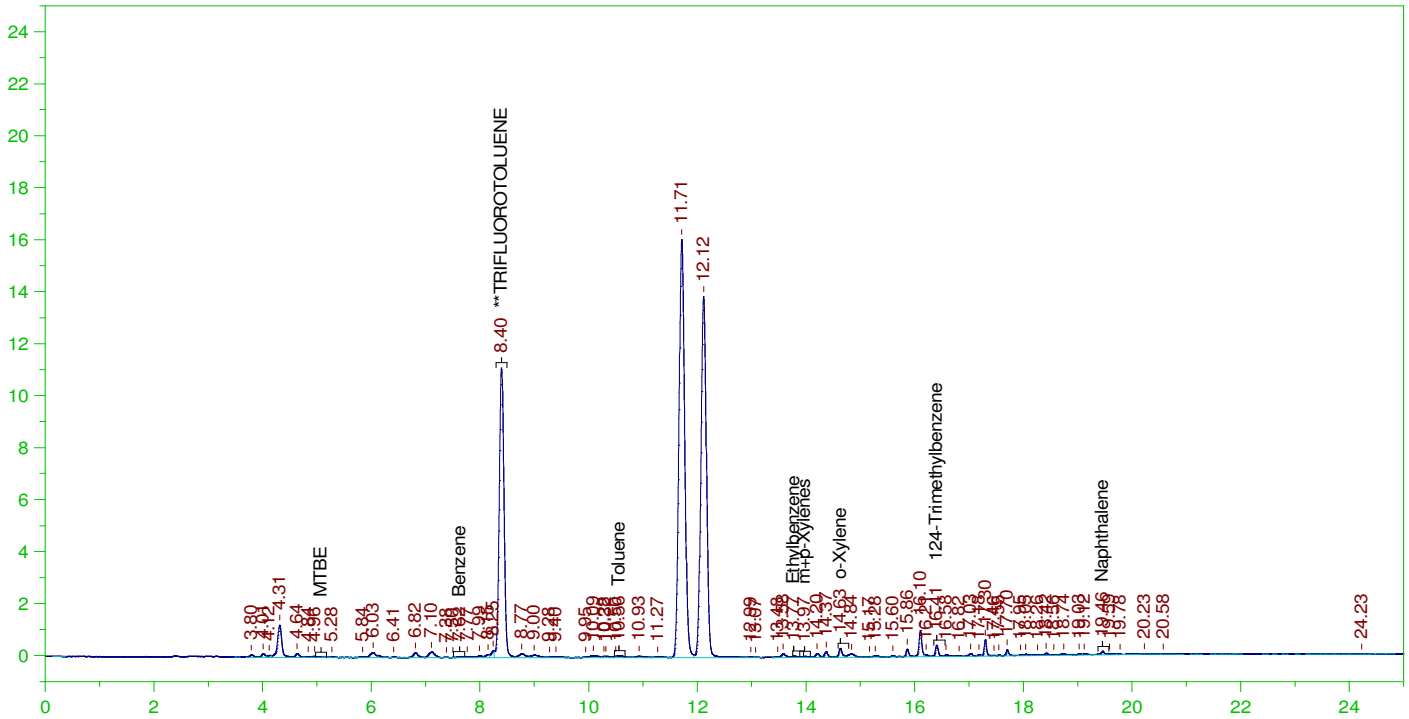


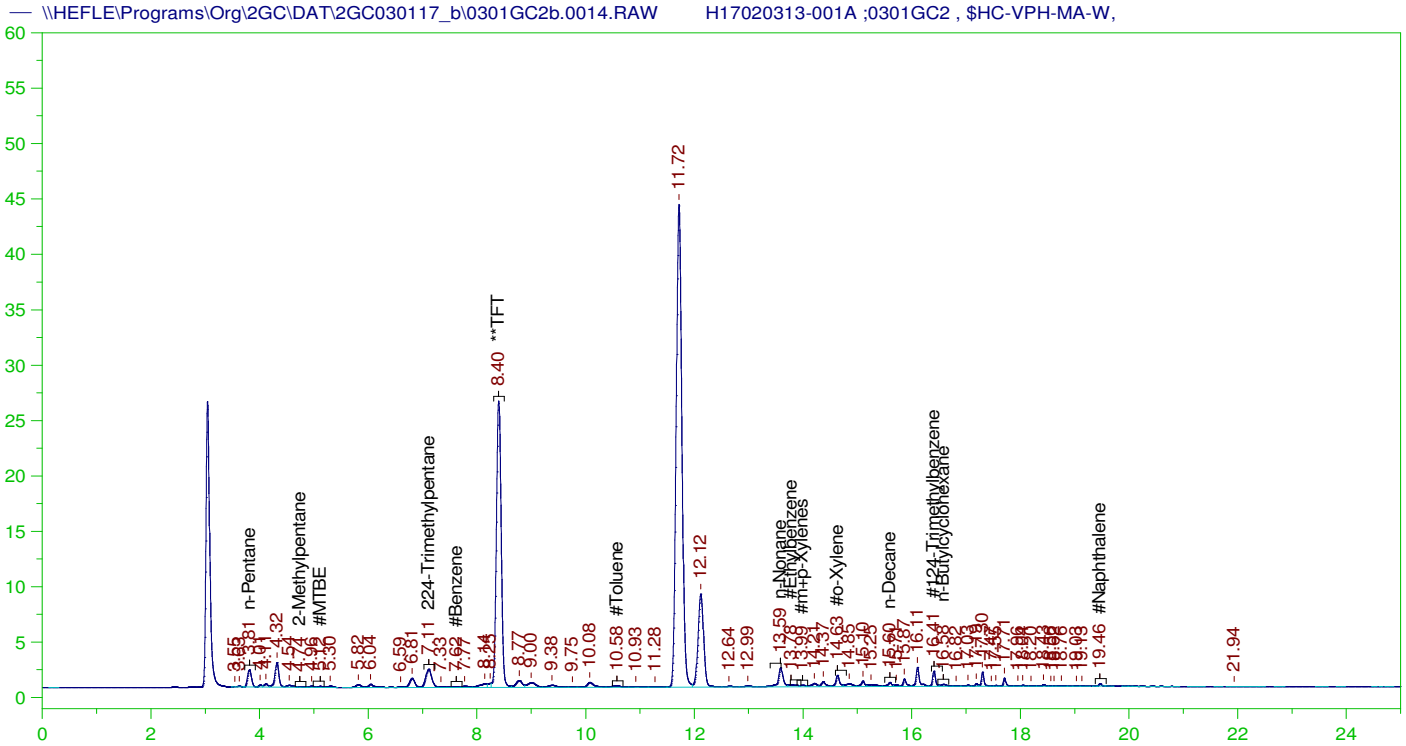
VPH AROMATICS PHOTOIONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: H17020313-001A ;0301GC2 , $HC-VPH-MA-W,
Raw File: \\HEFLE\Programs\Org\2GC\DAT\2GC030117_b\0301GC2.0014.RAW
Date & Time Acquired: 3/1/2017 5:03:25 PM
Method File: G:\Org\2GC\Methods\03011714.MET
Calibration File: G:\Org\2GC\Cals\GC2022417.cal
Sample Weight: 5 Dilution: 1 S.A.: 1

Mean RF for C9 to C10 Aromatic Hydrocarbons: 796.55
Rt range for C9 to C10 Aromatics: 14.788 to 19.372
Aromatic Hydrocarbon Range Area and Quantitation:
C9-C10 Aromatics Area:16050.84 C9-C10 Aromatics Amount: 4.030089

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
MTBE	.	.	.		1.	U
Benzene	7.623	7.623	7.623	253	.5	U
Toluene	10.562	10.562	10.562	630	.5	U
Ethylbenzene	13.775	13.775	13.775	398	.5	U
m+p-Xylenes	13.973	13.973	13.973	272	1.	U
o-Xylene	14.632	14.632	14.632	1555	.5	U
124-Trimethylbenzene	16.406	-8.06	-8.007	1759	.505	
Naphthalene	19.457	19.457	19.457	639	1.	U

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC
**TRIFLUOROTOLUENE	8.399	67616	25.	31.181	124.72



VPH ALIPHATICS FLAME IONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: H17020313-001A ;0301GC2 , $HC-VPH-MA-W,
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Date & Time Acquired: 3/1/2017 5:03:25 PM
Method File: G:\Org\2GC\Methods\03011714B.MET
Calibration File: G:\Org\2GC\Cals\GC2022417B.cal
Sample Weight: 5 Dilution: 1 S.A.: 1

Mean RF for C5 to C8 Aliphatic Hydrocarbons: 1279.437
Mean RF for C9 to C12 Aliphatic Hydrocarbons: 726.7627
Mean RF for all calibrated compounds: 1191.722
Rt range for Gasoline Range Organics: 4.657 to 15.702
Rt range for C5 to C8 Aliphatic Hydrocarbons: 3.725 to 13.397
Rt range for C9 to C12 Aliphatic Hydrocarbons: 13.447 to 19.38

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
**TFT	8.402	157868	25.	28.665	114.66	-

GRO Area:460721.4 GRO Amount: 77.32032
TPH Area:514063.9 TPH Amount: 86.27249

Aliphatic Hydrocarbon Areas and Quantitations uncorrected for Aromatics:
C5-C8 Area:452030.3 C5-C8 Amount: 70.6608
C9-C12 Area:60284 C9-C12 Amount: 16.58974

MTN-MW1

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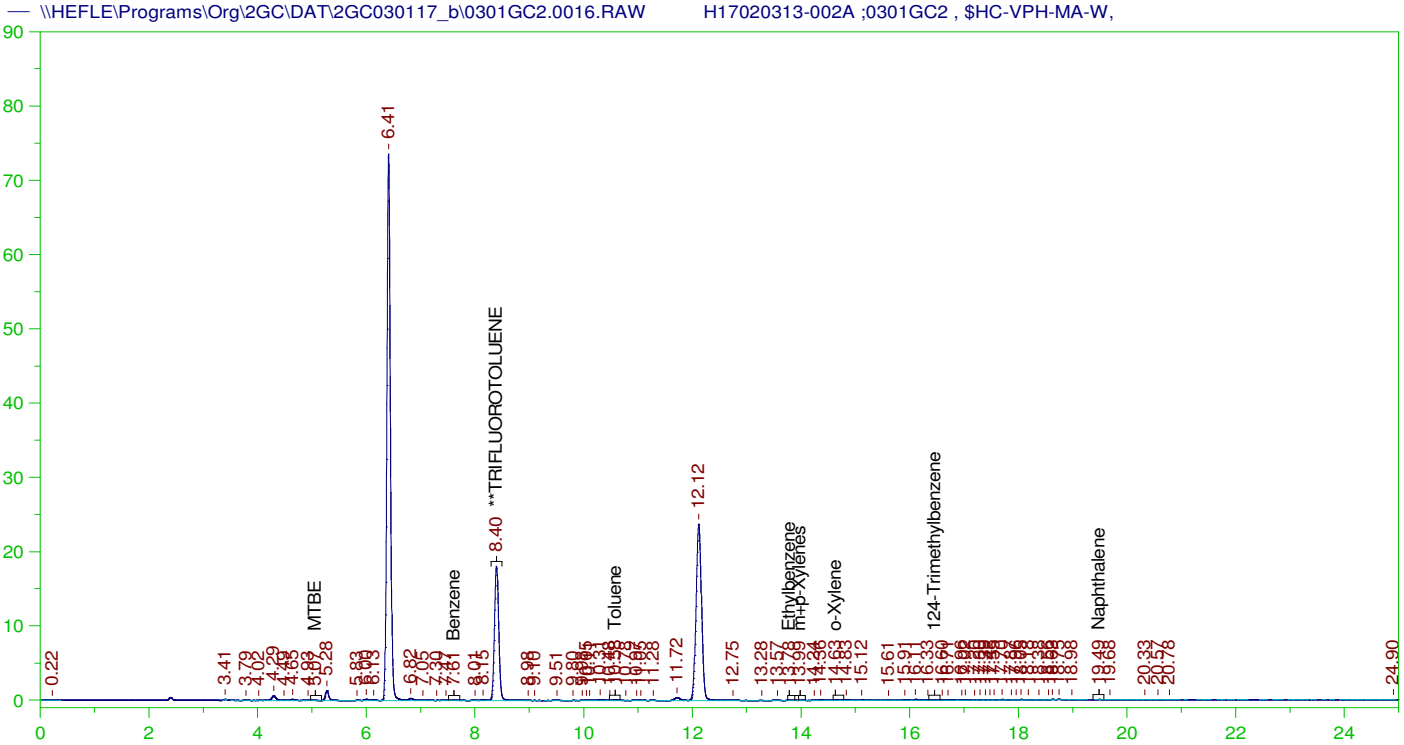

VPH AROMATICS PHOTOIONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: H17020313-002A ;0301GC2 , $HC-VPH-MA-W,
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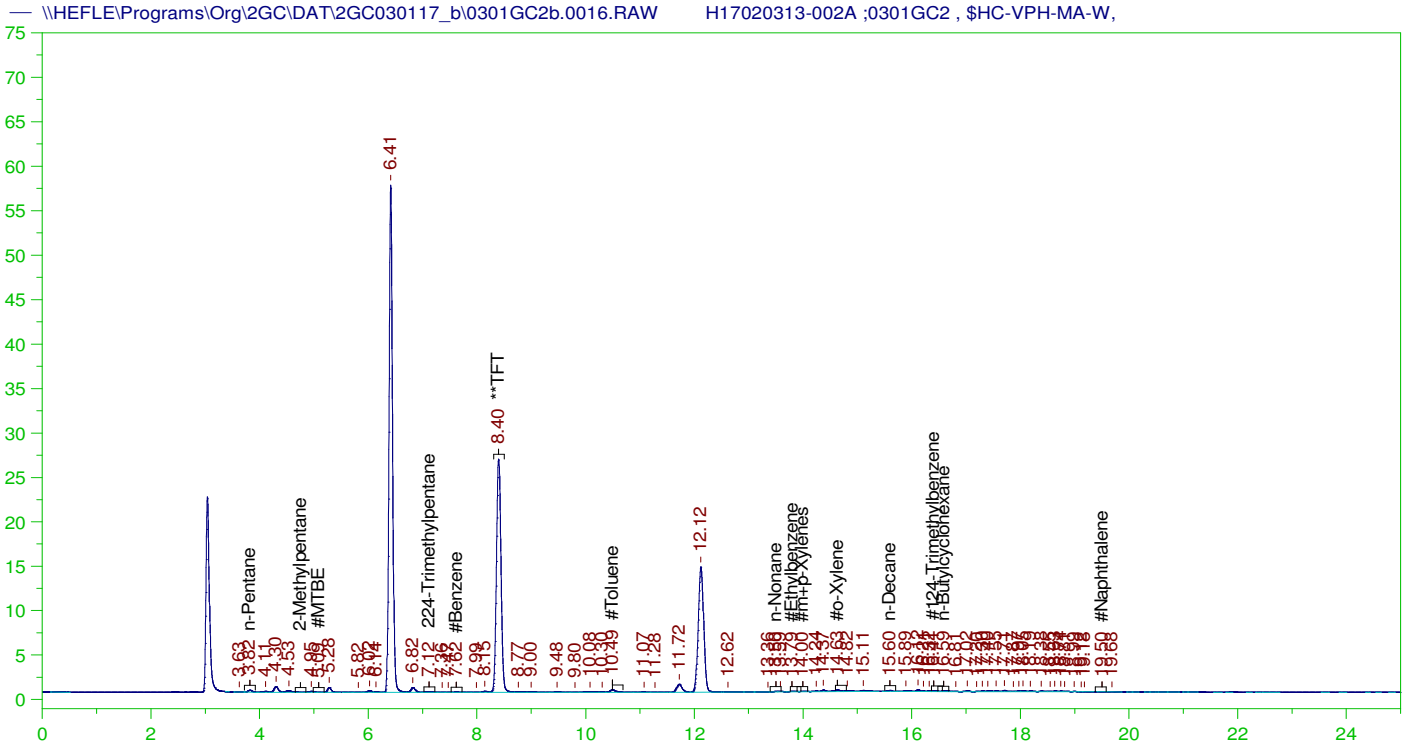
Date & Time Acquired: 3/1/2017 6:05:15 PM
Method File: G:\Org\2GC\Methods\03011716.MET
Calibration File: G:\Org\2GC\Cals\GC2022417.cal
Sample Weight: 5 Dilution: 1 S.A.: 1

Mean RF for C9 to C10 Aromatic Hydrocarbons: 796.55
Rt range for C9 to C10 Aromatics: 14.788 to 19.372
Aromatic Hydrocarbon Range Area and Quantitation:
C9-C10 Aromatics Area:7334.334 C9-C10 Aromatics Amount: 1.841525

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
MTBE	5.065	5.065	5.065	59	1.	U
Benzene	7.613	7.613	7.613	260	.5	U
Toluene	10.584	10.584	10.584	518	.5	U
Ethylbenzene	13.782	13.782	13.782	252	.5	U
m+p-Xylenes	13.985	13.985	13.985	176	1.	U
o-Xylene	14.634	14.634	14.634	470	.5	U
124-Trimethylbenzene	.	.	.		.5	U
Naphthalene	19.486	19.486	19.486	129	1.	U

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC
**TRIFLUOROTOLUENE	8.398	99831	25.	46.036	184.14



VPH ALIPHATICS FLAME IONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: H17020313-002A ;0301GC2 , $HC-VPH-MA-W,
Raw File: \\HEFLE\Programs\Org\2GC\DAT\2GC030117_b\0301GC2b.0016.RAW
Date & Time Acquired: 3/1/2017 6:05:15 PM
Method File: G:\Org\2GC\Methods\03011716B.MET
Calibration File: G:\Org\2GC\Cals\GC2022417B.cal
Sample Weight: 5 Dilution: 1 S.A.: 1

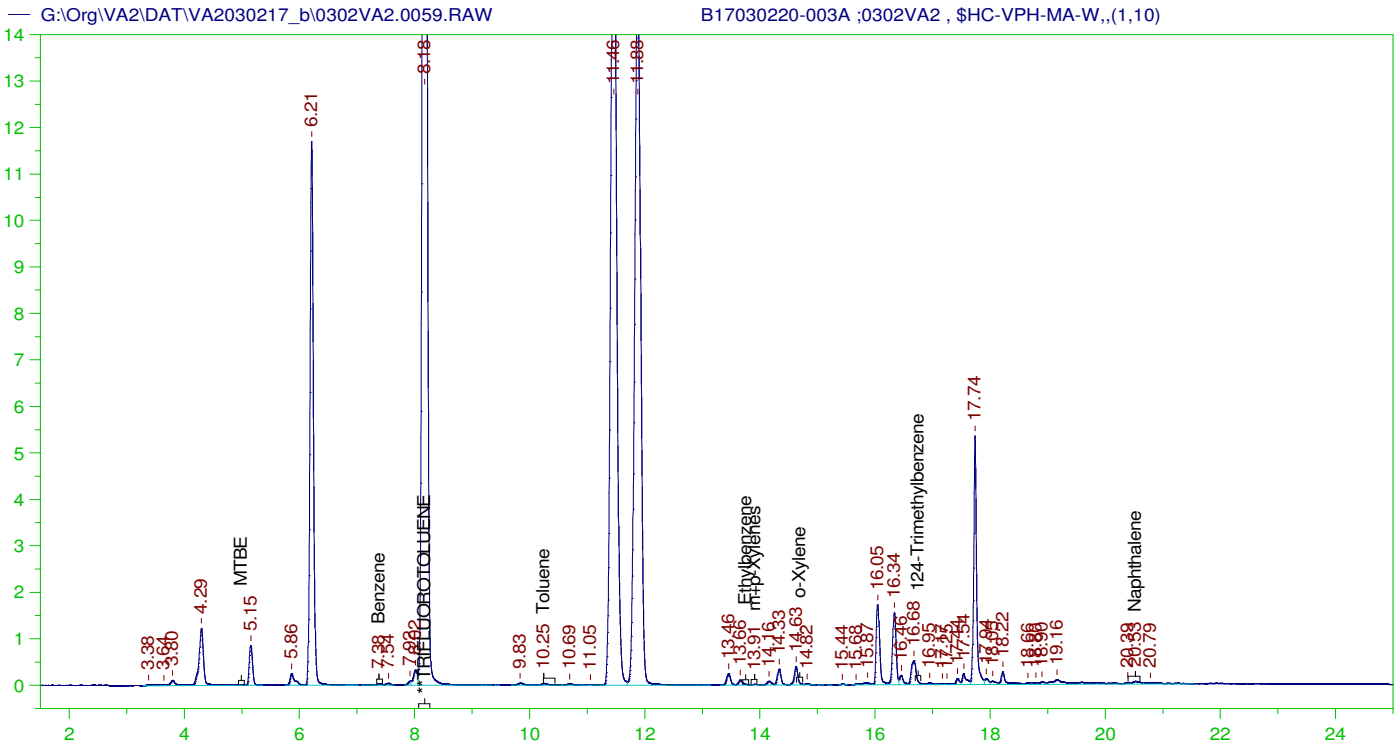
Mean RF for C5 to C8 Aliphatic Hydrocarbons: 1279.437
Mean RF for C9 to C12 Aliphatic Hydrocarbons: 726.7627
Mean RF for all calibrated compounds: 1191.722
Rt range for Gasoline Range Organics: 4.657 to 15.702
Rt range for C5 to C8 Aliphatic Hydrocarbons: 3.725 to 13.397
Rt range for C9 to C12 Aliphatic Hydrocarbons: 13.447 to 19.38

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
**TFT	8.4	152577	25.	27.704	110.82	-

GRO Area:390854.8 GRO Amount: 65.59498
TPH Area:408298.7 TPH Amount: 68.5225

Aliphatic Hydrocarbon Areas and Quantitations uncorrected for Aromatics:
C5-C8 Area:391203.6 C5-C8 Amount: 61.15245
C9-C12 Area:16310.98 C9-C12 Amount: 4.488667

H17020313-003A



VPH AROMATICS PHOTOIONIZATION DETECTOR CHROMATOGRAM REPORT

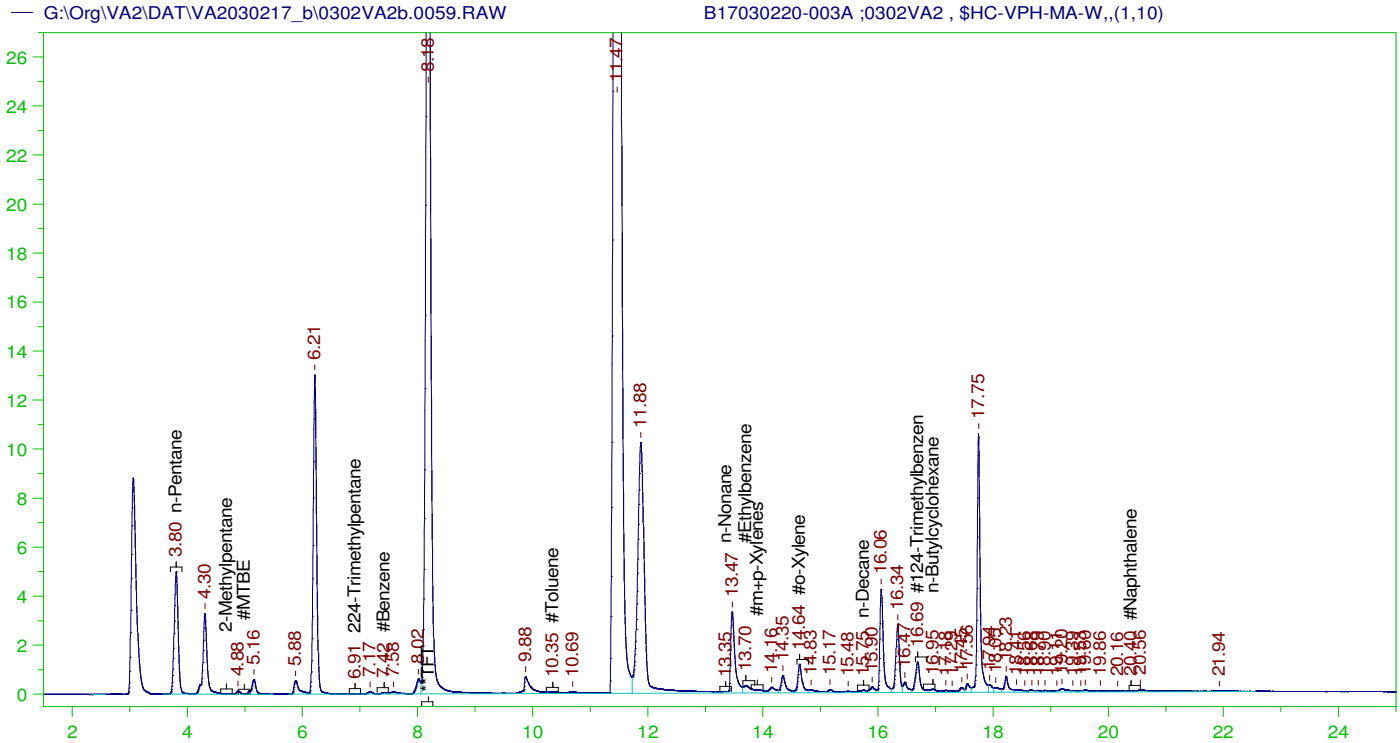
Sample Name: B17030220-003A ;0302VA2 , $HC-VPH-MA-W,,(1,10)
Raw File: G:\Org\VA2\DAT\VA2030217_b\0302VA2.0059.RAW
Date & Time Acquired: 3/4/2017 12:01:54 AM
Method File: G:\Org\VA2\Methods\170301VA2V220-3.MET
Calibration File: G:\Org\VA2\Cals\170301VA2VPH.CAL
Sample Weight: 5 Dilution: 10 S.A.: 10

Mean RF for C9 to C10 Aromatic Hydrocarbons: 366.7145
Rt range for C9 to C10 Aromatics: 14.74 to 20.399
Aromatic Hydrocarbon Range Area and Quantitation:
C9-C10 Aromatics Area:46473.47 C9-C10 Aromatics Amount: 253.4586

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
MTBE	.	.	.		10.	U
Benzene	7.384	7.384	7.384	133	5.	U
Toluene	10.245	10.245	10.245	327	5.	U
Ethylbenzene	.	.	.		5.	U
m+p-Xylenes	13.908	13.908	13.908	109	5.	U
o-Xylene	.	.	.		5.	U
124-Trimethylbenzene	.	.	.		5.	U
Naphthalene	20.529	20.529	20.529	534	10.	U

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	QC LIMITS
**TRIFLUOROTOLUENE	8.176	250.	2778.198	1111.28	70-130

H17020313-003A



VPH ALIPHATICS FLAME IONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B17030220-003A ;0302VA2 , $HC-VPH-MA-W,,(1,10)
Raw File: G:\Org\VA2\DAT\VA2030217_b\0302VA2b.0059.RAW
Date & Time Acquired: 3/4/2017 12:01:54 AM
Method File: G:\Org\VA2\Methods\170301VA2V220-3B.MET
Calibration File: G:\Org\VA2\Cals\170301VA2VPHb.CAL
Sample Weight: 5 Dilution: 10 S.A.: 10

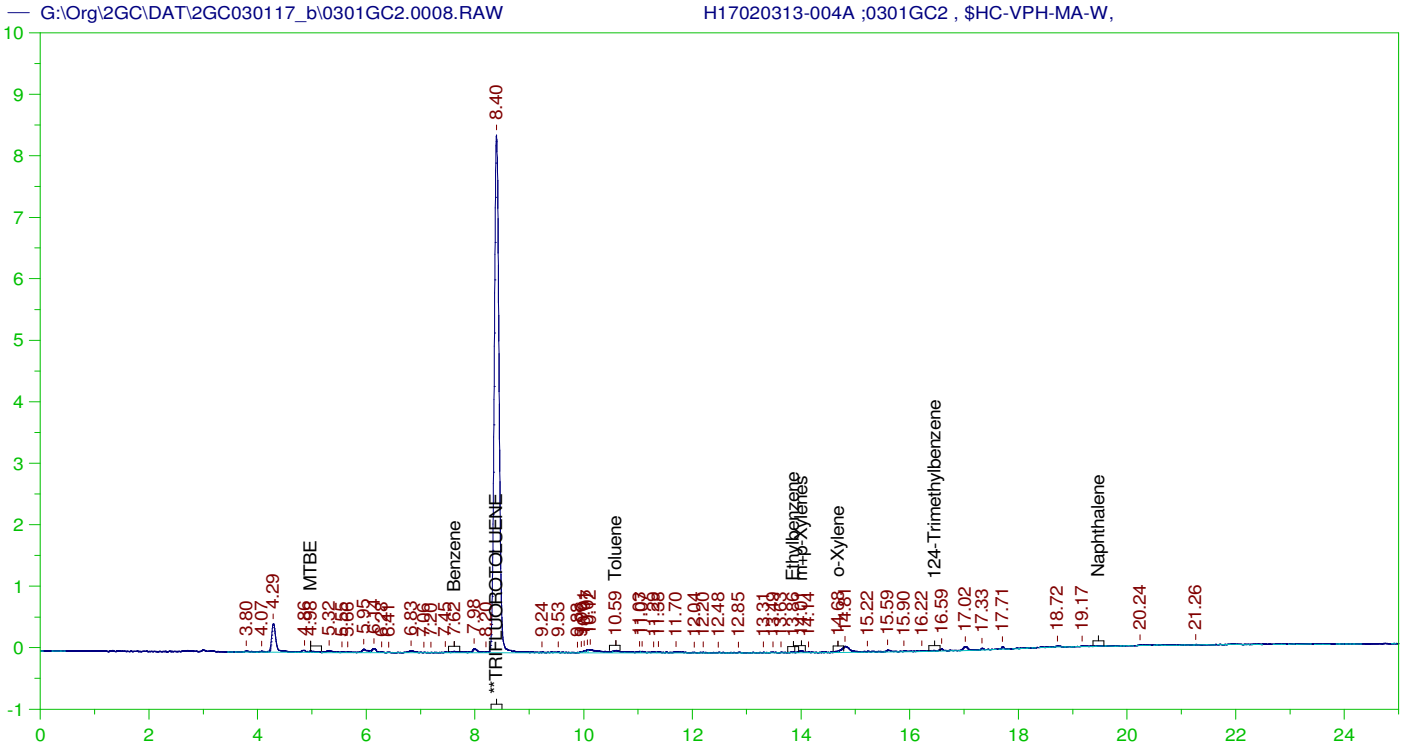
Mean RF for C5 to C8 Aliphatic Hydrocarbons: 457.2002
Mean RF for C9 to C12 Aliphatic Hydrocarbons: 390.8903
Mean RF for all calibrated compounds: 561.369
Rt range for Gasoline Range Organics: 4.576 to 15.843
Rt range for C5 to C8 Aliphatic Hydrocarbons: 3.705 to 13.251
Rt range for C9 to C12 Aliphatic Hydrocarbons: 13.301 to 20.362

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	
**TFT	8.184	250.	1044.414	417.77	-

GRO Area:865651.8 GRO Amount: 3084.074
TPH Area:1007909 TPH Amount: 3590.896

Aliphatic Hydrocarbon Areas and Quantitations uncorrected for Aromatics:
C5-C8 Area:868956.5 C5-C8 Amount: 3801.208
C9-C12 Area:135834.5 C9-C12 Amount: 695.0006

FB-1



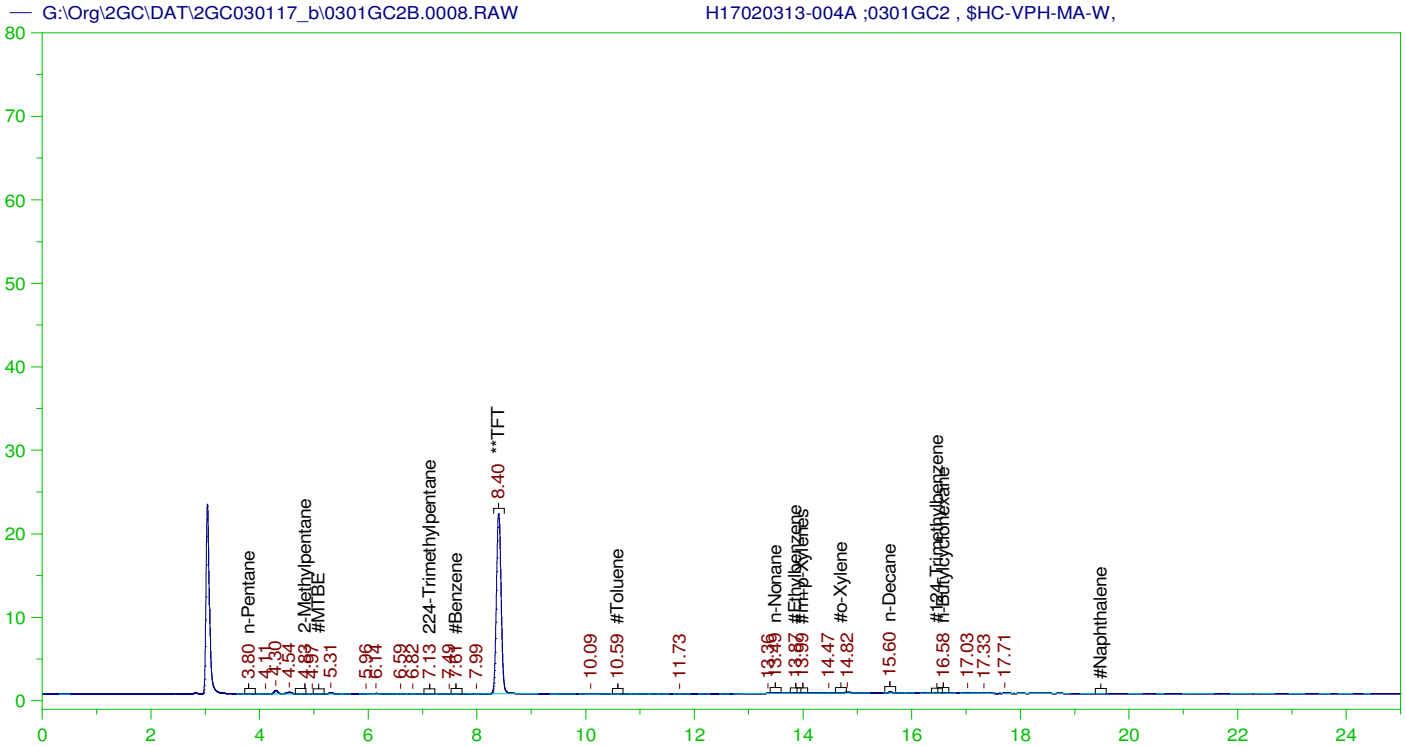
VPH AROMATICS PHOTOIONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: H17020313-004A ;0301GC2 , $HC-VPH-MA-W,
Raw File: G:\Org\2GC\DAT\2GC030117_b\0301GC2.0008.RAW
Date & Time Acquired: 3/1/2017 1:38:27 PM
Method File: G:\Org\2GC\Methods\GC2022417.MET
Calibration File: G:\Org\2GC\Cals\GC2022417.cal
Sample Weight: 5 Dilution: 1 S.A.: 1

Mean RF for C9 to C10 Aromatic Hydrocarbons: 796.55
Rt range for C9 to C10 Aromatics: 14.788 to 19.372
Aromatic Hydrocarbon Range Area and Quantitation:
C9-C10 Aromatics Area:3009.656 C9-C10 Aromatics Amount: 0.7556727

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
MTBE	4.978	4.978	4.978	109	1.	U
Benzene	7.616	7.616	7.616	274	.5	U
Toluene	10.594	10.594	10.594	354	.5	U
Ethylbenzene	13.86	13.86	13.86	93	.5	U
m+p-Xylenes	14.006	14.006	14.006	212	1.	U
o-Xylene	14.68	14.68	14.68	94	.5	U
124-Trimethylbenzene	.	.	.		.5	U
Naphthalene	.	.	.		1.	U

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC
**TRIFLUOROTOLUENE	8.398	51479	25.	23.739	94.96



VPH ALIPHATICS FLAME IONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: H17020313-004A ;0301GC2 , $HC-VPH-MA-W,
Raw File: G:\Org\2GC\DAT\2GC030117_b\0301GC2B.0008.RAW
Date & Time Acquired: 3/1/2017 1:38:27 PM
Method File: G:\Org\2GC\Methods\GC2022417B.MET
Calibration File: G:\Org\2GC\Cals\GC2022417B.cal
Sample Weight: 5 Dilution: 1 S.A.: 1

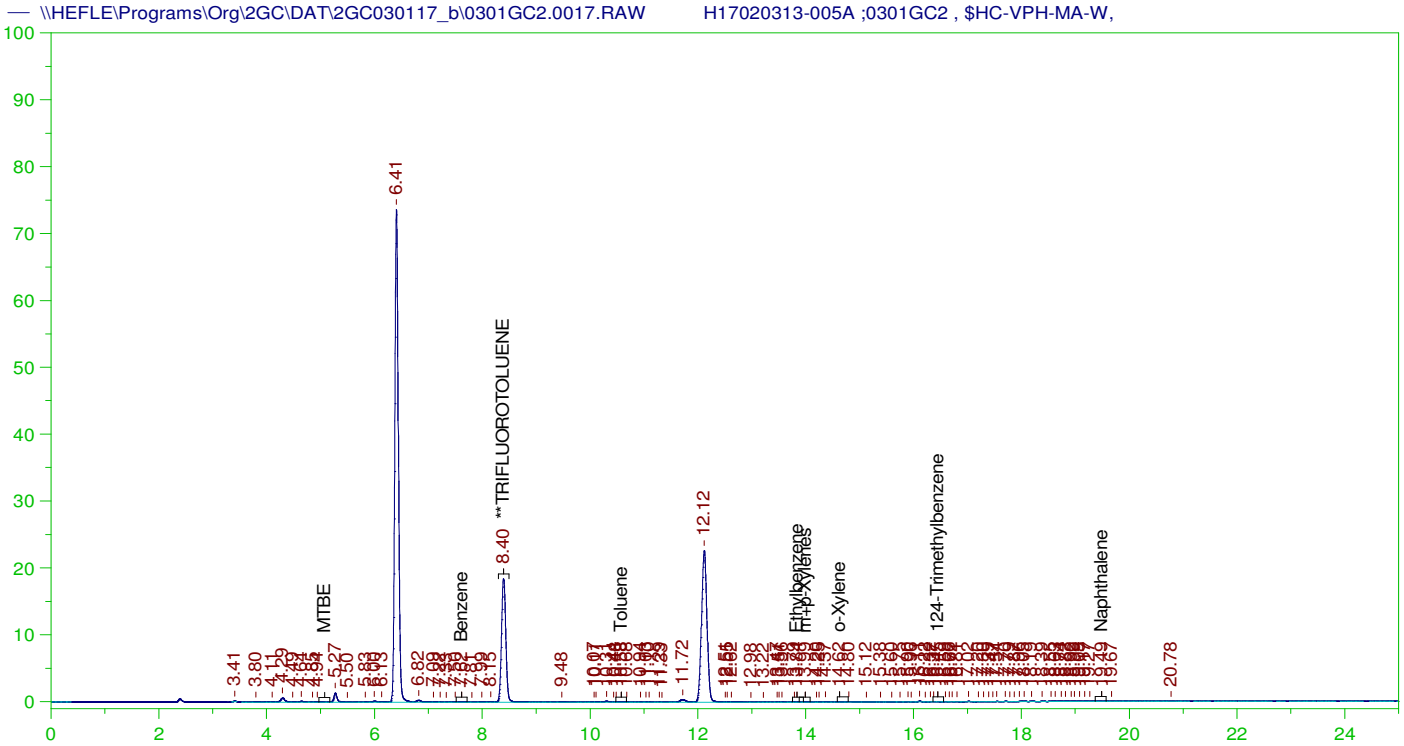
Mean RF for C5 to C8 Aliphatic Hydrocarbons: 1279.437
Mean RF for C9 to C12 Aliphatic Hydrocarbons: 726.7627
Mean RF for all calibrated compounds: 1191.722
Rt range for Gasoline Range Organics: 4.657 to 15.702
Rt range for C5 to C8 Aliphatic Hydrocarbons: 3.725 to 13.397
Rt range for C9 to C12 Aliphatic Hydrocarbons: 13.447 to 19.38

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
**TFT	8.401	130078	25.	23.619	94.48	-

GRO Area:9556.063 GRO Amount: 1.603741
TPH Area:15268.41 TPH Amount: 2.562412

Aliphatic Hydrocarbon Areas and Quantitations uncorrected for Aromatics:
C5-C8 Area:9317.094 C5-C8 Amount: 1.456436
C9-C12 Area:5676.56 C9-C12 Amount: 1.56215

BD-1



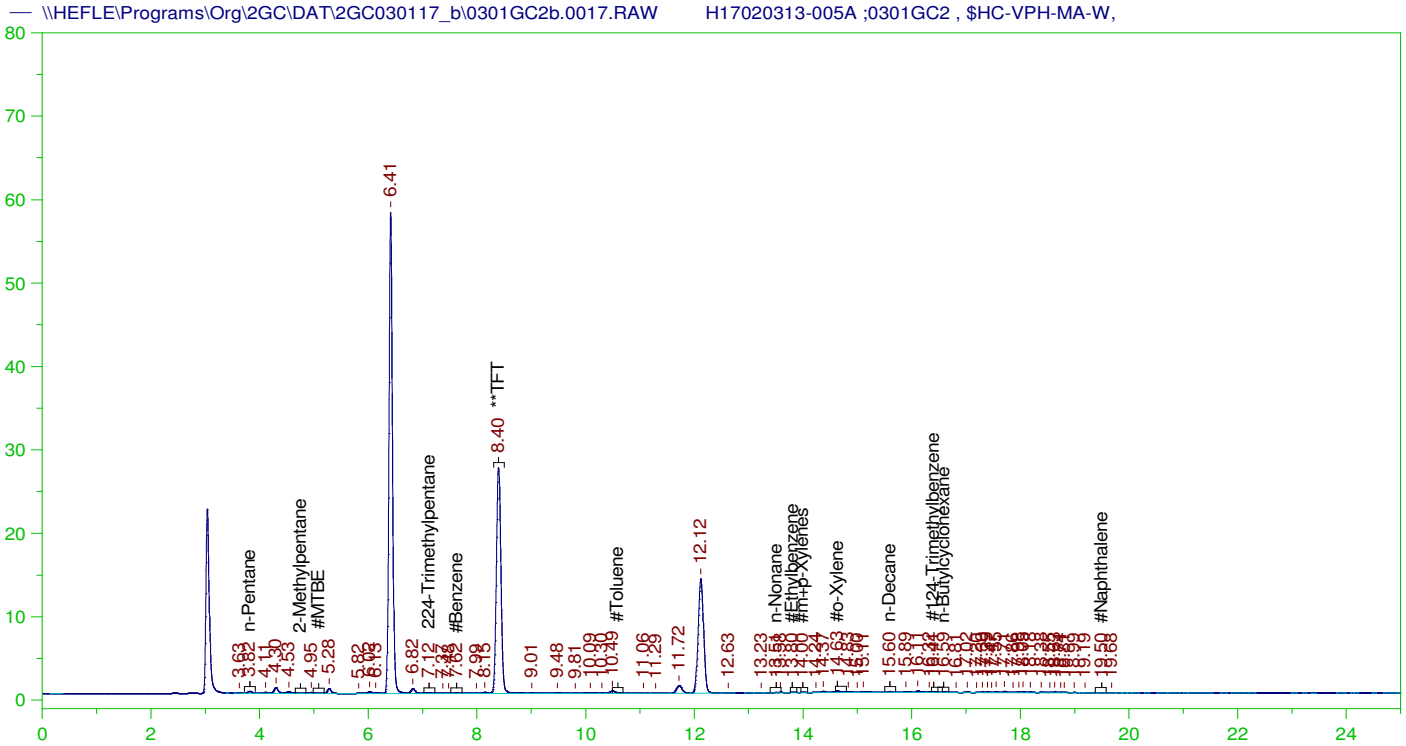
VPH AROMATICS PHOTOIONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: H17020313-005A ;0301GC2 , $HC-VPH-MA-W,
Raw File: \\HEFLE\Programs\Org\2GC\DAT\2GC030117_b\0301GC2.0017.RAW
Date & Time Acquired: 3/1/2017 6:36:14 PM
Method File: G:\Org\2GC\Methods\03011717.MET
Calibration File: G:\Org\2GC\Cals\GC2022417.cal
Sample Weight: 5 Dilution: 1 S.A.: 1

Mean RF for C9 to C10 Aromatic Hydrocarbons: 796.55
Rt range for C9 to C10 Aromatics: 14.788 to 19.372
Aromatic Hydrocarbon Range Area and Quantitation:
C9-C10 Aromatics Area:8675.555 C9-C10 Aromatics Amount: 2.178282

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
MTBE	.	.	.		1.	U
Benzene	7.619	7.619	7.619	267	.5	U
Toluene	10.579	10.579	10.579	455	.5	U
Ethylbenzene	13.84	13.84	13.84	122	.5	U
m+p-Xylenes	13.994	13.994	13.994	213	1.	U
o-Xylene	14.622	14.622	14.622	521	.5	U
124-Trimethylbenzene	16.452	16.452	16.452	153	.5	U
Naphthalene	19.491	19.491	19.491	210	1.	U

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC
**TRIFLUOROTOLUENE	8.396	101893	25.	46.987	187.95



VPH ALIPHATICS FLAME IONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: H17020313-005A ;0301GC2 , $HC-VPH-MA-W,
Raw File: \\HEFLE\Programs\Org\2GC\DAT\2GC030117_b\0301GC2b.0017.RAW
Date & Time Acquired: 3/1/2017 6:36:14 PM
Method File: G:\Org\2GC\Methods\03011717B.MET
Calibration File: G:\Org\2GC\Cals\GC2022417B.cal
Sample Weight: 5 Dilution: 1 S.A.: 1

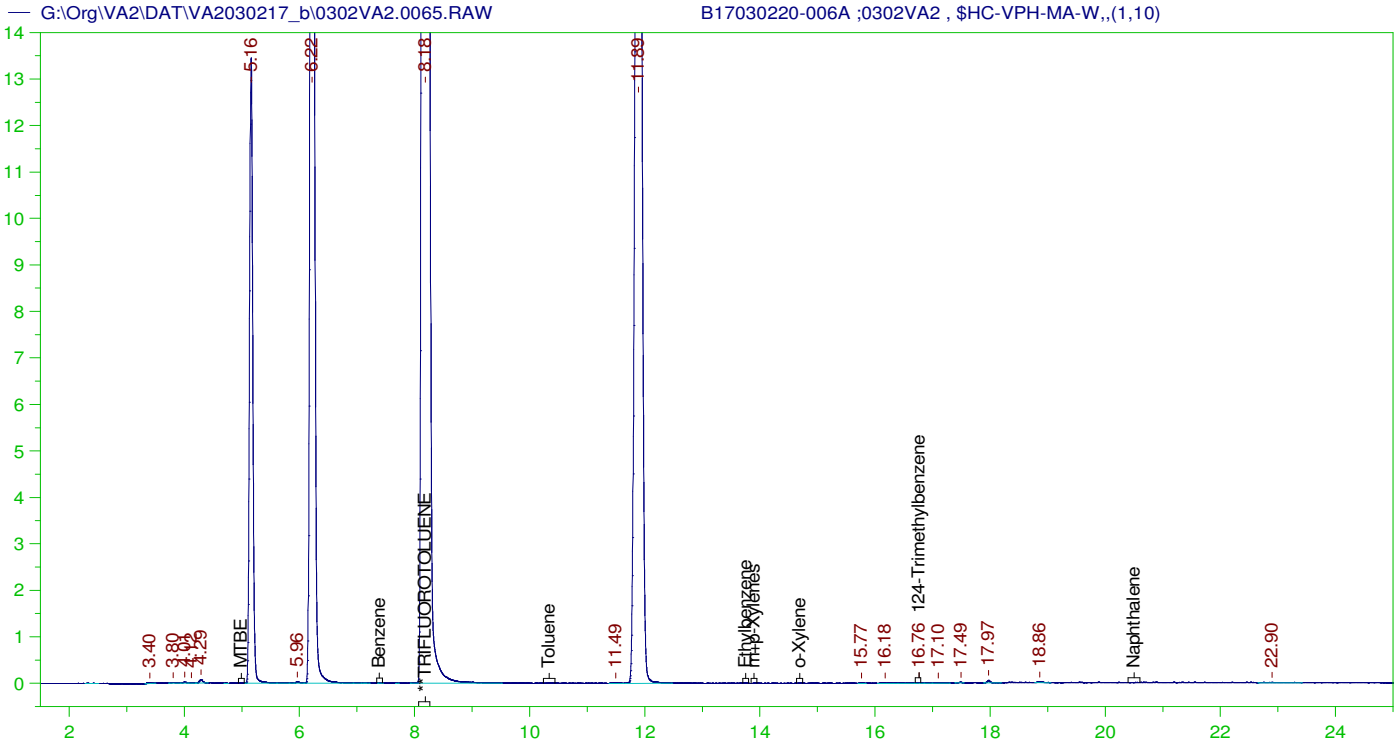
Mean RF for C5 to C8 Aliphatic Hydrocarbons: 1279.437
Mean RF for C9 to C12 Aliphatic Hydrocarbons: 726.7627
Mean RF for all calibrated compounds: 1191.722
Rt range for Gasoline Range Organics: 4.657 to 15.702
Rt range for C5 to C8 Aliphatic Hydrocarbons: 3.725 to 13.397
Rt range for C9 to C12 Aliphatic Hydrocarbons: 13.447 to 19.38

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
**TFT	8.399	157885	25.	28.668	114.67	-

GRO Area:391748.4 GRO Amount: 65.74496
TPH Area:409377.2 TPH Amount: 68.7035

Aliphatic Hydrocarbon Areas and Quantitations uncorrected for Aromatics:
C5-C8 Area:392261.3 C5-C8 Amount: 61.31778
C9-C12 Area:16219.8 C9-C12 Amount: 4.463575

H17020313-006A



VPH AROMATICS PHOTOIONIZATION DETECTOR CHROMATOGRAM REPORT

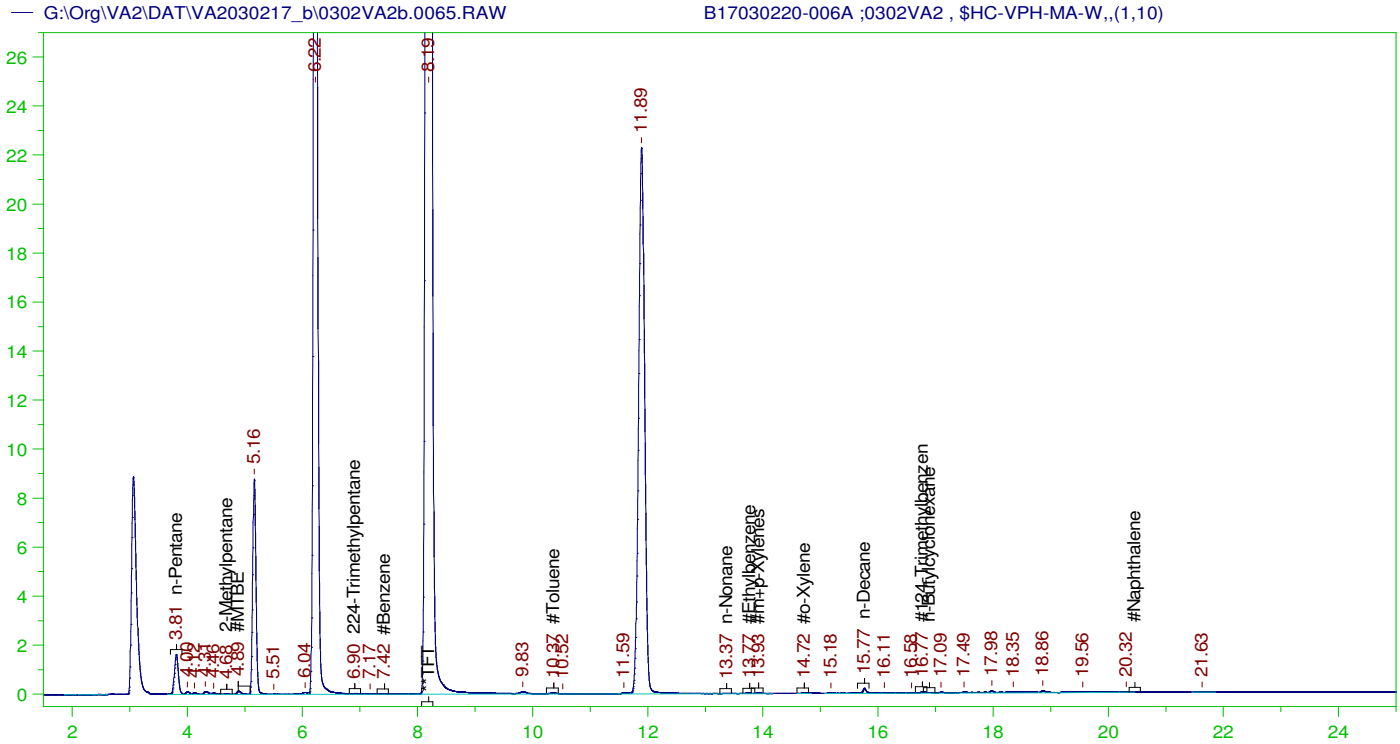
Sample Name: B17030220-006A ;0302VA2 , $HC-VPH-MA-W,,(1,10)
Raw File: G:\Org\VA2\DAT\VA2030217_b\0302VA2.0065.RAW
Date & Time Acquired: 3/4/2017 3:16:32 AM
Method File: G:\Org\VA2\Methods\170301VA2V220-6.MET
Calibration File: G:\Org\VA2\Cals\170301VA2VPH.CAL
Sample Weight: 5 Dilution: 10 S.A.: 10

Mean RF for C9 to C10 Aromatic Hydrocarbons: 366.7145
Rt range for C9 to C10 Aromatics: 14.74 to 20.399
Aromatic Hydrocarbon Range Area and Quantitation:
C9-C10 Aromatics Area:707.3056 C9-C10 Aromatics Amount: 3.857527

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
MTBE	.	.	.		10.	U
Benzene	.	.	.		5.	U
Toluene	.	.	.		5.	U
Ethylbenzene	.	.	.		5.	U
m+p-Xylenes	.	.	.		5.	U
o-Xylene	.	.	.		5.	U
124-Trimethylbenzene	16.765	16.765	16.765	80	5.	U
Naphthalene	.	.	.		10.	U

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	QC LIMITS
**TRIFLUOROTOLUENE	8.183	250.	15032.78	6013.11	70-130

H17020313-006A



VPH ALIPHATICS FLAME IONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B17030220-006A ;0302VA2 , $HC-VPH-MA-W,,(1,10)
Raw File: G:\Org\VA2\DAT\VA2030217_b\0302VA2b.0065.RAW
Date & Time Acquired: 3/4/2017 3:16:32 AM
Method File: G:\Org\VA2\Methods\170301VA2V220-6B.MET
Calibration File: G:\Org\VA2\Cals\170301VA2VPHb.CAL
Sample Weight: 5 Dilution: 10 S.A.: 10

Mean RF for C5 to C8 Aliphatic Hydrocarbons: 457.2002
Mean RF for C9 to C12 Aliphatic Hydrocarbons: 390.8903
Mean RF for all calibrated compounds: 561.369
Rt range for Gasoline Range Organics: 4.576 to 15.843
Rt range for C5 to C8 Aliphatic Hydrocarbons: 3.705 to 13.251
Rt range for C9 to C12 Aliphatic Hydrocarbons: 13.301 to 20.362

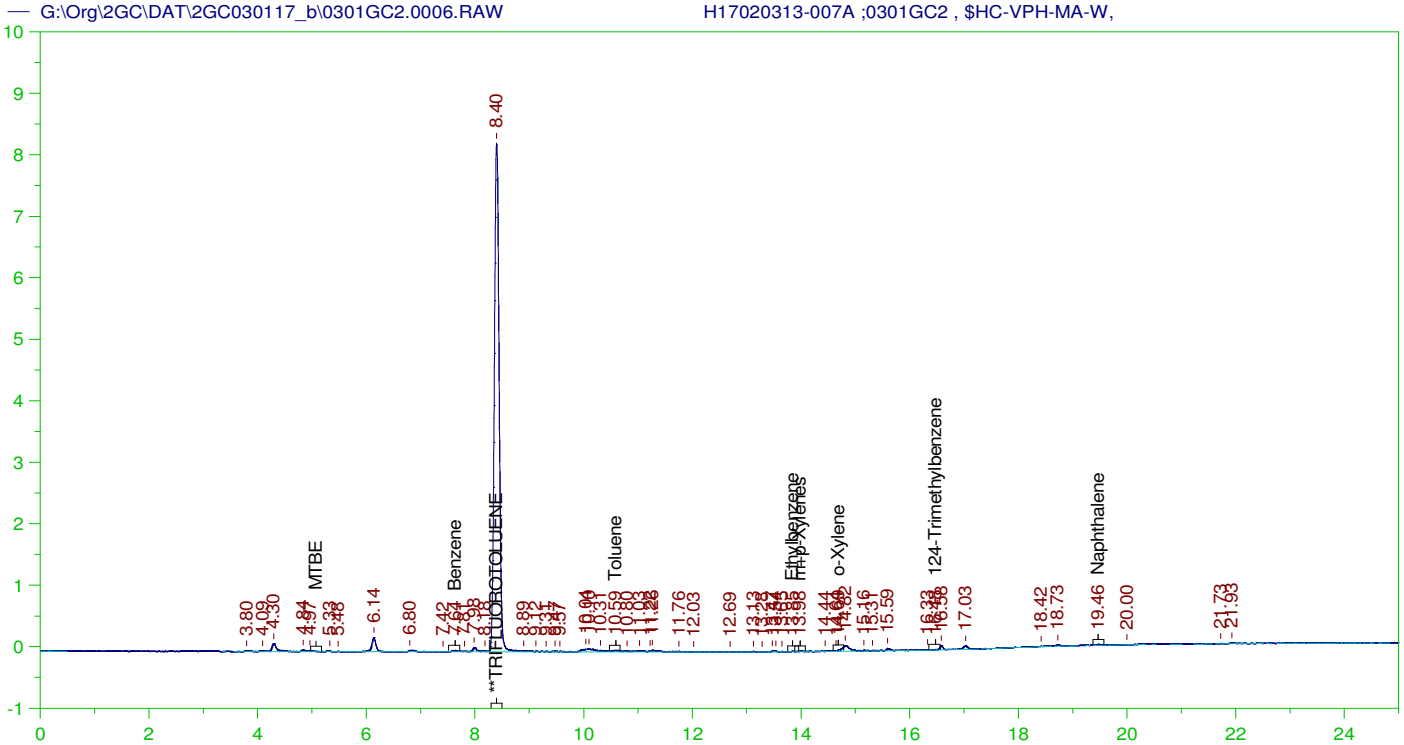
SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC
**TFT	8.192	250.	4848.991	1939.6 -

GRO Area:483049.6 GRO Amount: 1720.97
TPH Area:498126.6 TPH Amount: 1774.685

Aliphatic Hydrocarbon Areas and Quantitations uncorrected for Aromatics:
C5-C8 Area:490849.9 C5-C8 Amount: 2147.199
C9-C12 Area:7034.719 C9-C12 Amount: 35.99331

C1 TB 6171

G:\Org\2GC\DAT\2GC030117_b\0301GC2.0006.RAW H17020313-007A ;0301GC2 , $HC-VPH-MA-W,



VPH AROMATICS PHOTOIONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: H17020313-007A ;0301GC2 , $HC-VPH-MA-W,
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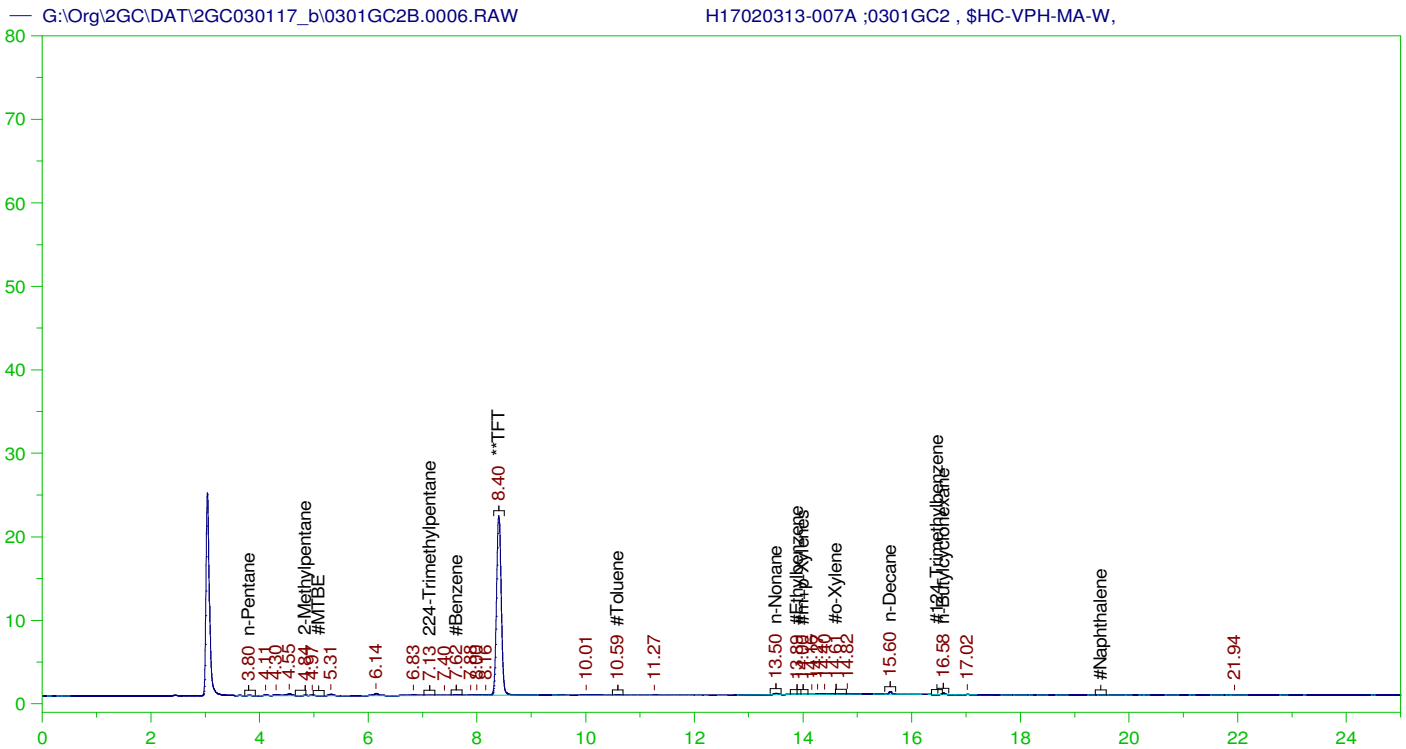
Date & Time Acquired: 3/1/2017 12:34:00 PM
Method File: G:\Org\2GC\Methods\GC2022417.MET
Calibration File: G:\Org\2GC\Cals\GC2022417.cal
Sample Weight: 5 Dilution: 1 S.A.: 1

Mean RF for C9 to C10 Aromatic Hydrocarbons: 796.55
Rt range for C9 to C10 Aromatics: 14.788 to 19.372
Aromatic Hydrocarbon Range Area and Quantitation:
C9-C10 Aromatics Area:2729.428 C9-C10 Aromatics Amount: 0.6853124

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
MTBE	.	.	.		1.	U
Benzene	7.637	7.637	7.637	228	.5	U
Toluene	10.592	10.592	10.592	298	.5	U
Ethylbenzene	13.848	13.848	13.848	83	.5	U
m+p-Xylenes	13.984	13.984	13.984	78	1.	U
o-Xylene	14.69	14.69	14.69	62	.5	U
124-Trimethylbenzene	16.479	16.479	16.479	52	.5	U
Naphthalene	19.465	19.465	19.465	76	1.	U

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC
**TRIFLUOROTOLUENE	8.4	50294	25.	23.193	92.77



VPH ALIPHATICS FLAME IONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: H17020313-007A ;0301GC2 , $HC-VPH-MA-W,
Raw File: G:\Org\2GC\DAT\2GC030117_b\0301GC2B.0006.RAW
Date & Time Acquired: 3/1/2017 12:34:00 PM
Method File: G:\Org\2GC\Methods\GC2022417B.MET
Calibration File: G:\Org\2GC\Cals\GC2022417B.cal
Sample Weight: 5 Dilution: 1 S.A.: 1

Mean RF for C5 to C8 Aliphatic Hydrocarbons: 1279.437
Mean RF for C9 to C12 Aliphatic Hydrocarbons: 726.7627
Mean RF for all calibrated compounds: 1191.722
Rt range for Gasoline Range Organics: 4.657 to 15.702
Rt range for C5 to C8 Aliphatic Hydrocarbons: 3.725 to 13.397
Rt range for C9 to C12 Aliphatic Hydrocarbons: 13.447 to 19.38

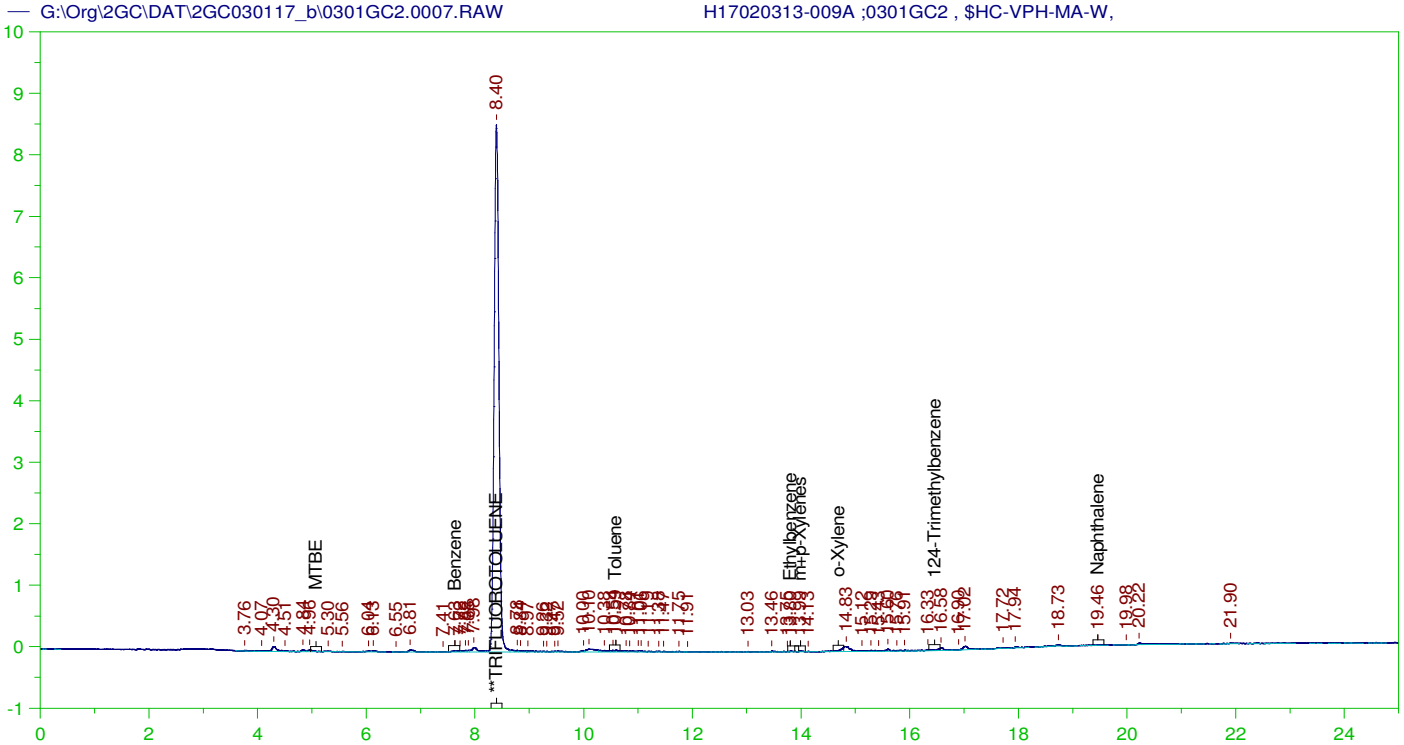
SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
**TFT	8.403	129415	25.	23.499	94.	-

GRO Area:11324.2 GRO Amount: 1.900477
TPH Area:15260.1 TPH Amount: 2.561018

Aliphatic Hydrocarbon Areas and Quantitations uncorrected for Aromatics:
C5-C8 Area:8387.867 C5-C8 Amount: 1.311181
C9-C12 Area:6556.741 C9-C12 Amount: 1.804369

C2 TB 6171

G:\Org\2GC\DAT\2GC030117_b\0301GC2.0007.RAW H17020313-009A ;0301GC2 , $HC-VPH-MA-W,



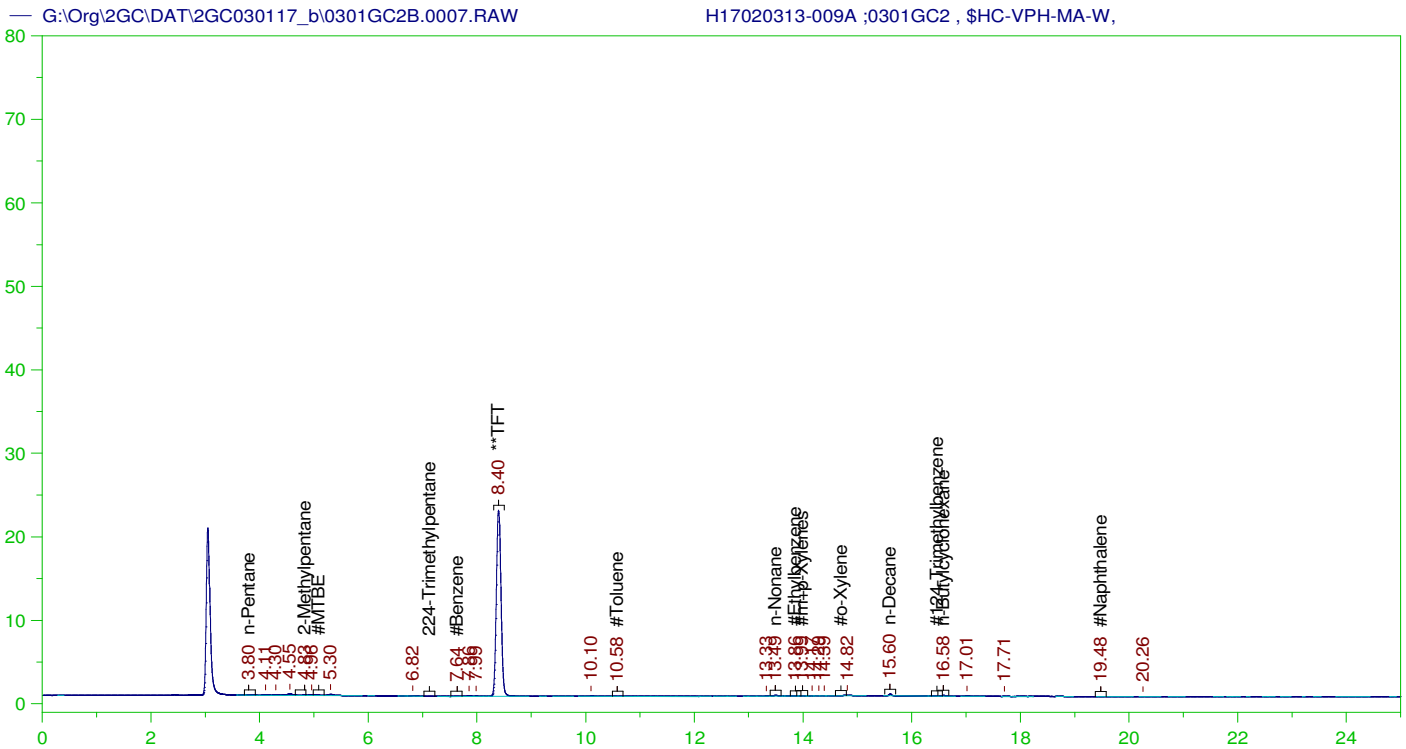
VPH AROMATICS PHOTOIONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: H17020313-009A ;0301GC2 , $HC-VPH-MA-W,
Raw File: G:\Org\2GC\DAT\2GC030117_b\0301GC2.0007.RAW
Date & Time Acquired: 3/1/2017 1:04:52 PM
Method File: G:\Org\2GC\Methods\GC2022417.MET
Calibration File: G:\Org\2GC\Cals\GC2022417.cal
Sample Weight: 5 Dilution: 1 S.A.: 1

Mean RF for C9 to C10 Aromatic Hydrocarbons: 796.55
Rt range for C9 to C10 Aromatics: 14.788 to 19.372
Aromatic Hydrocarbon Range Area and Quantitation:
C9-C10 Aromatics Area:3165.323 C9-C10 Aromatics Amount: 0.7947581

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
MTBE	.	.	.		1.	U
Benzene	7.629	7.629	7.629	113	.5	U
Toluene	10.593	10.593	10.593	282	.5	U
Ethylbenzene	13.803	13.803	13.803	111	.5	U
m+p-Xylenes	13.991	13.991	13.991	105	1.	U
o-Xylene	.	.	.		.5	U
124-Trimethylbenzene	.	.	.		.5	U
Naphthalene	19.46	19.46	19.46	65	1.	U

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC
**TRIFLUOROTOLUENE	8.396	51883	25.	23.925	95.7



VPH ALIPHATICS FLAME IONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: H17020313-009A ;0301GC2 , $HC-VPH-MA-W,
Raw File: G:\Org\2GC\DAT\2GC030117_b\0301GC2B.0007.RAW
Date & Time Acquired: 3/1/2017 1:04:52 PM
Method File: G:\Org\2GC\Methods\GC2022417B.MET
Calibration File: G:\Org\2GC\Cals\GC2022417B.cal
Sample Weight: 5 Dilution: 1 S.A.: 1

Mean RF for C5 to C8 Aliphatic Hydrocarbons: 1279.437
Mean RF for C9 to C12 Aliphatic Hydrocarbons: 726.7627
Mean RF for all calibrated compounds: 1191.722
Rt range for Gasoline Range Organics: 4.657 to 15.702
Rt range for C5 to C8 Aliphatic Hydrocarbons: 3.725 to 13.397
Rt range for C9 to C12 Aliphatic Hydrocarbons: 13.447 to 19.38

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
**TFT	8.399	133496	25.	24.24	96.96	-

GRO Area:8872.953 GRO Amount: 1.489098
TPH Area:12696.92 TPH Amount: 2.130854

Aliphatic Hydrocarbon Areas and Quantitations uncorrected for Aromatics:
C5-C8 Area:7849.266 C5-C8 Amount: 1.226987
C9-C12 Area:4438.389 C9-C12 Amount: 1.221413

Work Order Receipt Checklist

Trihydro-Laramie

H17020313

Login completed by: Tracy L. Lorash

Date Received: 2/23/2017

Reviewed by: BL2000\acarlson

Received by: bjs

Reviewed Date: 3/17/2017

Carrier name: Hand Del

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	°C See comments		
Water - VOA vials have zero headspace?	Yes ☑	No ☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	Yes ☑	No ☐	Not Applicable ☐

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

Contact and Corrective Action Comments:

No collection time on COC or bottles for BD-1. Estimated time in the laboratory.
Cooler 1 was received at 2.0°C, Cooler 2 at 1.4°C. Samples were received on wet ice. tl 2/23/17. Fractionate samples over the MCL with PAH's per A. Vann. wj 3/7/17

ENERGY
Trust our People. Trust our Data.

Chain of Custody & Analytical Request Record

www.energylab.com

Account Information (Billing information)

Company/Name	Trihydro Corporation - Laramie
Contact	Andrew Vann
Phone	307-~~760~~ 745-7474
Mailing Address	1252 Commerce Dr
City, State, Zip	Laramie, WY 82070
Email	AVann@Trihydro.com
Receive Invoice	☐Hard Copy ☒Email
Receive Report	☐Hard Copy ☒Email
Purchase Order	
Quote	1375
Bottle Order	23137

Report Information (if different than Account Information)

Company/Name	
Contact	
Phone	
Mailing Address	
City, State, Zip	
Email	
Receive Report	☐Hard Copy ☐Email

Special Report/Formats:
☐ LEVEL IV ☐ NELAC ☐ EDD/EDT (contact laboratory) ☐ Other_____

Comments

C1 = 2.0
C2 = 1.4

Project Information

Project Name, PWSID, Permit, etc.	MDEQ Whitefish Solvent Site
Sampler Name	Joel Riebli
Sampler Phone	307 760 2793
Sample Origin State	MT
EPA/State Compliance	☒Yes ☐ No

MINING CLIENTS, please indicate sample type.
*If ore has been processed or refined, call before sending.
☐ Byproduct 11 (e)2 material ☐ Unprocessed ore (NOT ground or refined)*

Matrix Codes
A - Air
W - Water
S - Soils/Solids
V - Vegetation
B - Bioassay
O - Other
DW - Drinking Water

All turnaround times are standard unless marked as RUSH.
Energy Laboratories MUST be contacted prior to RUSH sample submittal for charges and scheduling – See Instructions Page

	Sample Identification (Name, Location, Interval, etc.)	Collection Date	Collection Time	Number of Containers	Matrix (See Codes Above)	VOC's (Short list) 8260	EPH	VPH MA-VPH							See Attached	RUSH TAT	ELI LAB ID (Laboratory Use Only)
C2 1	MTN-MW3	2/21/17	1525	7	W	X	X	X									H17020313
C2 2	MTN-MW1	|	1615	7	W	X	X	X									
C1 3	MTN-MW2	|	1735	7	W	X	X	X									
C1 4	FB-1	|	1730	7	W	X	X	X									
C2 5	BD-1	2/21/17	—	7	W	X	X	X									
C1 6	WSMW-7	2/22/17	1725	7	W	X	X	X									
7	Trip blank 1	—	—	2	W												
8	Trip blank 2	—	—	2	W												
9																	
10																	

Custody Record MUST be signed	Relinquished by (print)	Date/Time	Signature	Received by (print)	Date/Time	Signature
	Joel Riebli	02/23/17 @ 1340	[signature]			
	Relinquished by (print)	Date/Time	Signature	Received by Laboratory (print) B. Sether	Date/Time 02/23/17 13:40	Signature Brandy Sether

LABORATORY USE ONLY

Shipped by	Cooler ID(s)	Custody Seals	Intact	Receipt Temp	Temp Blank	On Ice	Payment Type	Amount	Receipt Number (cash/check only)
hand del	X2	Y N C B	Y N	See comm. °C	Y N	Y N	CC Cash Check_____	$	

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All subcontracted data will be clearly notated on your analytical report.

Tier II Data Validation Report Summary

Client: Montana Department of Environmental Quality (MDEQ)	Laboratory: Energy Laboratories
Project Name: Whitefish Solvent Site	Sample Matrix: Groundwater
Project Number: 776-033-001	Sample Start Date: 02/21/2017
Date Validated: 03/24/2017	Sample End Date: 02/22/2017
Parameters Included: ▪ Volatile Organic Compounds (VOC) by Environmental Protection Agency (EPA) Test Methods for Evaluating Solid Waste (SW-846) Method 8260B ▪ Semivolatile Organic Compounds (SVOC) by SW-846 Method 8270C ▪ Total Extractable Hydrocarbons by SW-846 Method 8015M ▪ Volatile Petroleum Hydrocarbons (VPH) by Massachusetts Department of Environmental Protection (MADEP) Method MA-VPH ▪ Extractable Petroleum Hydrocarbons (EPH) by MADEP Method MA-EPH	
Laboratory Project ID: H17020313	
Data Validator: Charles Ballek, Senior Chemist	
Reviewer: Kyle Power, Environmental Chemist	

DATA EVALUATION CRITERIA SUMMARY

A Tier II Data Validation was performed by Trihydro Corporation's Chemical Data Evaluation Services Group on the analytical data report package generated by Energy Laboratories in Helena, Montana with additional data from Energy Laboratories in Billings, Montana evaluating samples from the MDEQ Whitefish Solvent Site, located in Whitefish, Montana.

Precision, accuracy, method compliance, and completeness of this data package were assessed during this data review. Precision was determined by evaluating the calculated relative percent difference (RPD) values from:

- Field duplicate pairs
- Matrix spike (MS) and matrix spike duplicate (MSD) pairs

Laboratory accuracy was established by reviewing the demonstrated percent recoveries (%R) of the following items to verify that data are not biased.

- MS/MSD samples
- Laboratory control samples (LCS)
- Organic system monitoring compounds (surrogates)

Field accuracy was established by collecting and analyzing the following samples to monitor for possible ambient or cross contamination during sampling and transportation.

- Trip blanks
- Field blanks

Method compliance was established by reviewing sample integrity, holding times, detection limits, surrogate recoveries, laboratory blanks, initial and continuing calibrations (where applicable) percent recoveries, and LCS percent recoveries against method-specific requirements.

Tier II Data Validation Report Summary

Completeness was evaluated by determining the overall ratio of the number of samples and analyses planned versus the number of samples with valid analyses. Determination of completeness included a review of the chain-of-custody (CoC), laboratory analytical methods, and other laboratory and field documents associated with this analytical data set.

SAMPLE NUMBERS TABLE

Client Sample ID	Laboratory Sample Number
MTN-MW3	H17020313-001
MTN-MW1	H17020313-002
MTN-MW2	H17020313-003
FB-1	H17020313-004
BD-1	H17020313-005
WSMW-7	H17020313-006
C1 TB 6171	H17020313-007
C1 TB 6171	H17020313-008
C2 TB 6171	H17020313-009
C2 TB 6171	H17020313-010

Tier II Data Validation Report Summary

The laboratory data were reviewed to evaluate compliance with the methods and the quality of the reported data. Assessment of CoC completeness is included in Item 3 of the Data Validation Checklist. A check mark (✓) indicates that the referenced validation criteria were deemed acceptable, whereas a crossed circle (⊗) indicates validation criteria for which the data have been qualified by the data validator. An empty circle (○) indicates that the specified criterion does not apply to the reviewed data. Details are noted in the tables below.

Validation Criteria

- ✓ Data Completeness
- ✓ CoC Documentation (Item 3)
- ⊗ Holding Times and Preservation (Items 6 and 7)
- ✓ Initial and Continuing Calibrations (Items 9 and 10)
- ⊗ Laboratory Blanks (Items 11 and 12)
- ✓ MS/MSD (Items 13 and 14)
- ✓ LCS (Items 15 and 16)
- ⊗ System Monitoring Compounds (i.e., Surrogates) (Item 17)
- ✓ Field and Trip Blanks (Items 18 and 19)
- ⊗ Field Duplicates (Items 20 and 21)
- ○ Laboratory Duplicates (Item 22)
- ✓ Data Relationships (Item 23)

Guidance References

Chemical data validation was conducted in accordance with the United States Environmental Protection Agency (USEPA) Contract Laboratory Program (CLP) National Functional Guidelines for the analyses listed below, or by the appropriate method if not covered in the National Functional Guidelines.

- Data for organic analyses were evaluated according to validation criteria set forth in the USEPA CLP National Functional Guidelines for Superfund Organic Methods Data Review, document number EPA-540-R-2016-002, September 2016 with additional reference to the USEPA CLP National Functional Guidelines for Organic Data Review, document number EPA 540/R-99/008, October 1999.
- Review of field duplicates was conducted according to the USEPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures, EQADR-Supplement0, April 2013.
- Project-specific Quality Assurance Project Plans (QAPP) data validation requirements, as applicable.
- Trihydro Data Validation Variance Documentation, February 2017.

Tier II Data Validation Report Summary

OVERALL DATA PACKAGE ASSESSMENT

Based on a data validation review, the data are acceptable as delivered. Data qualified by the laboratory are discussed in Item 2 of the Validation Criteria Checklist.

The purpose of validating data and assigning qualifiers is to assist in proper data interpretation. Data that are not qualified meet the site data quality objectives.

Text identified in **bold font** in the Validation Criteria Checklist indicates that further action and/or qualification of the data were required. Data validation qualifiers were added for the items noted with crossed circles in the Validation Criteria section above. Please see the Data Qualification Summary table at the end of this report for a complete list of samples and analytes qualified.

Data that would be qualified with more than one flag were assigned one qualifier based on the severity; however, all reasons for qualification were retained. Data that would be qualified with both J+ and J- flags were evaluated based on validation criteria and assigned the appropriate flag. The hierarchy of qualifiers from the most to least severe is as follows:

- R > JB/U > NJ > J+/J- > J/UJ

Data qualifiers used during this validation are included in the following table.

Qualifier	Definition
J	Estimated concentration
J+	The result is an estimated concentration, but may be biased high
J-	The result is an estimated concentration, but may be biased low
UJ	Estimated reporting limit
U	Evaluated to be undetected at the reporting limit
JB	Estimated concentration due to blank contamination

Data Completeness

The analyses were performed as requested on the CoC records. The associated samples were received by the laboratory and analyzed properly unless otherwise noted in the Criteria Checklist below. The complete data package consisted of 420 data points excluding blank samples. No data points were rejected. The data completeness measure for this data package is calculated to be 100% and is acceptable.

VALIDATION CRITERIA CHECKLIST	
1. Was the report free of non-conformances identified by the laboratory?	No
Comments: The laboratory noted the following non-conformances as related to this data set. A significant portion of the hydrocarbons measured in the EPH Screening analysis were not recovered from the silica gel fractionation cartridge. Silica gel can act as a cleanup media for non-petroleum hydrocarbons. The surrogate recovery was outside QC advisory limits for samples MTN-MW1 and BD-1 due to positive sample matrix interference. The MA-VPH surrogates for samples MTN-MW2 and WSMW-7 were not resolved from a closely eluting peak. Surrogate recovery could not be calculated.	
2. Were the data free of data qualification flags and/or notes used by the laboratory? If no, define.	No
Comments: The laboratory applied the following data qualifier to results reported for this data set. D – RL increased due to sample matrix. B – The analyte was detected in the method blank. S – Spike recovery outside of advisory limits. * – The result exceeds the MCL.	
3. Were sample CoC forms and custody procedures complete?	Yes
Comments: The CoC record from field to laboratory was complete and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. Custody seals were not present nor required since the samples were delivered to the laboratory by project personnel and custody was maintained at all times.	
4. Were detection limits in accordance with the quality assurance project plan (QAPP), permit, or method, or indicated as acceptable?	Yes
Comments: The detection limits appeared to be acceptable. Dilutions were applied to the samples for the following analyses. <u>Method 8260B:</u> Dilutions of 5 to 1000 times were applied to the submitted environmental samples for the analyses of volatile organics. <u>Method MA-VPH:</u> Dilutions of 10 times were applied to samples MTN-MW2 and WSMW-7 for the analyses of volatile organics. <u>Method 8015M:</u> Sample WSMW-7 was diluted by a factor of 20 times for the analysis of extractable hydrocarbons. Final determination of the data quality based on detection limits will be established by the project team.	
5. Were the reported analytical methods and constituents in compliance with the QAPP, permit, or CoC?	No
Comments: The reported analytical methods were in compliance with the CoC and the laboratory reported the requested constituents in accordance with the CoC. The field staff did not enter analyses to be performed for the trip blank samples, C1 TB 6171 and C2 TB 6171, but the laboratory appropriately analyzed the samples for volatile organics by Method MA-VPH and Method 8260B. No further validation action was required.	

VALIDATION CRITERIA CHECKLIST	
6. Were samples received in good condition within method-specified requirements?	No
Comments: Samples were received in good condition as noted on the Sample Receipt Checklist. Samples were received on ice, in good condition, with the cooler temperatures both within and outside the recommended temperature range of 4°C ± 2°C at 1.4°C and 2.0°C as noted on the CoC and the *Work Order Receipt Checklist*. The cooler temperature below 2°C was judged as acceptable since the sample was not reported to be frozen upon receipt at the laboratory and the sample containers were reported to be intact. The laboratory indicated that the sample containers were intact and sufficient sample volume/mass was provided to complete the requested analyses.	
7. Were samples extracted/digested and analyzed within method-specified or technical holding times?	No
Comments: The samples were extracted and analyzed within method-specific holding times with the following exceptions. Method 8270C: **Samples MTN-MW1, MTN-MW2, MTN-MW3, and BD-1 were extracted after expiration of the 7 day holding time. Detected analytes were qualified as J- and the non-detect results were assigned UJ qualifiers.** Method 8015M: **Samples MTN-MW1, MTN-MW2, MTN-MW3, FB-1, and BD-1 were extracted after expiration of the 7 day holding time. Detected analytes were qualified as J and the non-detect result for FB-1 was assigned a UJ qualifier.** Method MA-EPH: **Samples MTN-MW1, MTN-MW2, and BD-1 were extracted after expiration of the 14 day holding time. Detected analytes were qualified as J and non-detects were assigned UJ qualifiers.**	
8. Were reported units appropriate for the sample matrix/matrices and analytical method(s)? Specify if wet or dry units were used for soil.	Yes
Comments: The analytical results for the submitted sample were reported in concentration units of micrograms per liter (µg/L). These units were acceptable for the sample matrix and the analyses requested.	
9. Did the laboratory provide any specific initial and/or continuing calibration results?	Yes
Comments: Limited continuing calibration summary data for Methods MA-VPH, MA-EPH, 8015M, 8260B, and 8270C were included as part of this data set. Full calibration data was not available for review.	
10. If initial and/or continuing calibration results were provided, were the results within acceptable limits?	Yes
Comments: The available continuing calibration data were within acceptance limits.	
11. Was the total number of laboratory blank samples prepared equal to at least 5% of the total number of samples or analyzed as required by the method?	Yes
Comments: The total number of laboratory blank samples prepared was equal to at least 5% of the total number of samples.	
12. Were target analytes reported as not detected in the laboratory blanks?	No
Comments: Target analytes were not detected in the laboratory blanks, with the following exceptions. **Naphthalene was detected in the method blank for Method 8270C batch B_107532 at a concentration of 0.260 µg/L. Naphthalene was detected in associated samples MTN-MW1 and BD-1 at concentrations less than the blank level and those results were assigned U qualifiers. Naphthalene was detected in the remaining associated samples at concentrations above the reporting limit but less than 10 times the blank level and the results were assigned JB qualifiers.**	

VALIDATION CRITERIA CHECKLIST

13. Was the total number of MS samples prepared equal to at least 5% of the total number of samples or analyzed as required by the method? Yes

Comments: The total number of matrix spike samples prepared was equal to at least 5% of the total number of samples. The matrix spike sample source for each analytical batch in this sample set has been indicated below.

Method	Analytes	Batch	MS Sample Source
8260B	VOC	R123056	Not Associated
8260B	VOC	R123091	MTN-MW3
8270C	SVOC	B_107532	MTN-MW3
MA-VPH	VPH	B_R275866	Not Associated
MA-VPH	VPH	R123104	FB-1
8015M	EPH	39395	MTN-MW3
MA-EPH	EPH	36436	MTN-MW3

Not Associated – The MS sample source was not associated with this project.

14. For MS/MSDs prepared from project samples, were percent recoveries and RPDs within data validation or laboratory quality control (QC) limits? Yes

Comments: The recoveries and RPDs for the MS/MSDs prepared from project samples were within laboratory QC limits.

The percent recoveries and RPD values for MS/MSDs prepared from non-project samples were evaluated and considered but data were not qualified based on those results since matrix similarity to project samples could not be guaranteed.

15. Was the total number of LCSs analyzed equal to at least 5% of the total number of samples or analyzed as required by the method? Yes

Comments: The total number of LCS samples analyzed was equal to at least 5% of the total number of samples.

16. Were LCS/LCSD percent recoveries and LCS/LCSD RPDs within data validation or laboratory QC limits? Yes

Comments: The LCS percent recoveries were within laboratory QC limits.

The laboratory did not analyze LCSDs for the batches reported in this data set.

17. Were surrogate recoveries within laboratory QC limits? No

Comments: The surrogate recoveries were within laboratory QC limits, with the following exception.

The reported recoveries for the Method MA-VPH surrogate VPH Aromatics Surrogate in samples MTN-MW1 and BD-1 were outside the acceptance limits of 70-130% at 184% and 188%, respectively. The target analyte Total Purgeable Hydrocarbons associated with this surrogate was detected in samples MTN-MW1 and BD-1 and was assigned a J+ qualifier due to evidence of potential high bias. The remaining associated aromatic analytes were not detected in the samples and did not require qualification.

The reported recovery for the Method 8260B surrogate bromofluorobenzene in sample WSMW-7 was outside the acceptance limits of 76-123% at 142%. Since Method 8260B surrogate associations were not available from the laboratory, qualification would be assigned to all of the target analytes when two or more of the four surrogates were outside the acceptance range. This condition did not exist for sample WSMW-7 and qualification of sample data was not required,

The reported recovery for the Method MA-EPH surrogate 2-fluorobiphenyl in sample WSMW-7 was outside the acceptance limits of 40-140% at 144%. The target analytes associated with this surrogate, C11-C22 aromatics and total extractable hydrocarbons, were detected in sample WSMW-7 and were assigned J+ qualifiers due to evidence of potential high bias.

The laboratory noted that the MA-VPH surrogates for samples MTN-MW2 and WSMW-7 were not resolved from a closely eluting peak. Surrogate recovery could not be calculated and qualification was not applied based on these results.

VALIDATION CRITERIA CHECKLIST	
18. Were the number of trip blank, field blank, and/or equipment blank samples collected equal to at least 10% of the total number of samples or as required by the project guidelines, QAPP, SAP, or permit?	Yes
Comments: The number of trip, field, and equipment blanks collected was equal to at least 10% of the total number of samples. Two trip blank samples, C1 TB 6171 and C2 TB 6171, and one field blank sample, FB-1, were collected as part of this sample set.	
19. Were target analytes reported as not detected in the trip blank, field blank, and/or equipment blank samples?	Yes
Comments: Target analytes were not detected in the field blank and trip blank samples.	
20. Was the number of field duplicates collected equal to at least 10% of the total number of samples or as required by the project guidelines, QAPP, SAP, or permit?	Yes
Comments: The number of field duplicates collected was equal to at least 10% of the number of samples. Sample BD-1 was collected as a field duplicate of sample MTN-MW1.	
21. Were field duplicate RPD values within data validation QC limits (soil 0-50%, water 0-30%, or air 0-25%)?	No
Comments: As indicated in the Field Duplicate Summary Table at the end of this report, field duplicate RPD values were within data validation QC limits of 0-30% for water samples, with the following exception. **The result for Total Extractable Hydrocarbons in the field duplicate sample, BD-1, was greater than 2 times the applicable reporting limit and therefore, the DL exception did not apply. The Total Extractable Hydrocarbons result for MTN-MW1 was qualified UJ and the result for BD-1 was assigned a J qualifier based on evidence of poor precision.**	
22. For laboratory duplicates prepared from project samples, were RPDs within laboratory QC limits?	N/A
Comments: Laboratory duplicates were not prepared for the analyses reported in this data set.	
23. Were the following data relationships realistic and acceptable?	
• Target analytes were reported by more than one method (e.g., 8260/8270, EPH/8270) and the results were in agreement?	Yes
Comments: Multiple analytes were reported by more than one method and the results were consistent. Detections of naphthalene in the samples by Method 8270C analyses were below the detection limits reported for the Method MA-VPH analyses and were therefore not contradictory.	
• Both total and dissolved metals analyses were performed and the total metals results were greater than or equal to the dissolved metals results?	N/A
Comments: Metals analyses were not performed as part of this data set.	

FIELD DUPLICATE SUMMARY

Client Sample ID: MTN-MW1 Field Duplicate Sample ID: BD-1				
Method	**Analyte**	**Laboratory Result (µg/L)**	**Duplicate Result (µg/L)**	**Relative Percent Difference (RPD)**
MA-EPH	C19-C36, Aliphatic, Adjusted	ND (300)	377	DL
MA-EPH	**Total Extractable Hydrocarbons**	**ND (300)**	**752**	**DL**
MA-VPH	C5-C8	61	61	0.0%
MA-VPH	TPH GRO	69	69	0.0%
SW8015M	Total Extractable Hydrocarbons	8,320	10,400	22.2%
SW8260B	cis-1,2-Dichloroethene	118	114	3.4%
SW8260B	Tetrachloroethene	66	64	3.1%
SW8260B	Trichloroethene	14	13	7.4%
SW8260B	Vinyl Chloride	2.3	2.1	9.1%
SW8270C	Naphthalene	0.24	0.21	13.3% +/-RL

Field duplicate RPD control limits are not to exceed 30% for water as established by USEPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures, EQADR-Supplement0, April 2013.

DL – Indicates that the analyte was detected in one of the duplicate samples and was undetected in the other sample, and therefore an RPD could not be calculated. Data were not qualified since the detection was within two times the reporting limit. Non-detected results are indicated above with the applicable reporting limit as ND (RL).

The result for Total Extractable Hydrocarbons in the field duplicate sample, BD-1, was greater than 2 times the applicable reporting limit and therefore, the DL exception did not apply. The Total Extractable Hydrocarbons result for MTN-MW1 was qualified UJ and the result for BD-1 was assigned a J qualifier based on evidence of poor precision.

+/-RL – Indicates that the detections in both of the samples were within two times the reporting limit. Qualification of data was not required.

DATA QUALIFICATION SUMMARY

Abbreviation	Reason
HT-EX	Sample was extracted outside of the method holding time.
MBD	Method blank detection
HR-SUR	The surrogate percent recovery was greater than the upper acceptable limit indicating a possible high bias.
ERPD-FD	High field duplicate RPD.

Analyte	Method	Field Sample ID	Lab Sample ID	Result	Limit	Units	Reviewer Qualifier	DV Flag Reasons
1-Methylnaphthalene	SW8270C	MTN-MW3	H17020313-001	ND	0.2	µg/L	UJ	HT-EX
1-Methylnaphthalene	SW8270C	MTN-MW1	H17020313-002	ND	0.2	µg/L	UJ	HT-EX
1-Methylnaphthalene	SW8270C	MTN-MW2	H17020313-003	0.49	0.19	µg/L	J-	HT-EX
1-Methylnaphthalene	SW8270C	BD-1	H17020313-005	ND	0.19	µg/L	UJ	HT-EX
2-Methylnaphthalene	SW8270C	MTN-MW3	H17020313-001	ND	0.2	µg/L	UJ	HT-EX
2-Methylnaphthalene	SW8270C	MTN-MW1	H17020313-002	ND	0.2	µg/L	UJ	HT-EX
2-Methylnaphthalene	SW8270C	MTN-MW2	H17020313-003	0.53	0.19	µg/L	J-	HT-EX
2-Methylnaphthalene	SW8270C	BD-1	H17020313-005	ND	0.19	µg/L	UJ	HT-EX
Acenaphthene	SW8270C	MTN-MW3	H17020313-001	ND	0.2	µg/L	UJ	HT-EX
Acenaphthene	SW8270C	MTN-MW1	H17020313-002	ND	0.2	µg/L	UJ	HT-EX
Acenaphthene	SW8270C	MTN-MW2	H17020313-003	ND	0.19	µg/L	UJ	HT-EX
Acenaphthene	SW8270C	BD-1	H17020313-005	ND	0.19	µg/L	UJ	HT-EX
Acenaphthylene	SW8270C	MTN-MW3	H17020313-001	ND	0.2	µg/L	UJ	HT-EX
Acenaphthylene	SW8270C	MTN-MW1	H17020313-002	ND	0.2	µg/L	UJ	HT-EX
Acenaphthylene	SW8270C	MTN-MW2	H17020313-003	ND	0.19	µg/L	UJ	HT-EX
Acenaphthylene	SW8270C	BD-1	H17020313-005	ND	0.19	µg/L	UJ	HT-EX
Anthracene	SW8270C	MTN-MW3	H17020313-001	ND	0.2	µg/L	UJ	HT-EX
Anthracene	SW8270C	MTN-MW1	H17020313-002	ND	0.2	µg/L	UJ	HT-EX
Anthracene	SW8270C	MTN-MW2	H17020313-003	0.27	0.19	µg/L	J-	HT-EX
Anthracene	SW8270C	BD-1	H17020313-005	ND	0.19	µg/L	UJ	HT-EX

Analyte	Method	Field Sample ID	Lab Sample ID	Result	Limit	Units	Reviewer Qualifier	DV Flag Reasons
Benzo(a)anthracene	SW8270C	MTN-MW3	H17020313-001	ND	0.2	µg/L	UJ	HT-EX
Benzo(a)anthracene	SW8270C	MTN-MW1	H17020313-002	ND	0.2	µg/L	UJ	HT-EX
Benzo(a)anthracene	SW8270C	MTN-MW2	H17020313-003	ND	0.19	µg/L	UJ	HT-EX
Benzo(a)anthracene	SW8270C	BD-1	H17020313-005	ND	0.19	µg/L	UJ	HT-EX
Benzo(a)pyrene	SW8270C	MTN-MW3	H17020313-001	ND	0.2	µg/L	UJ	HT-EX
Benzo(a)pyrene	SW8270C	MTN-MW1	H17020313-002	ND	0.2	µg/L	UJ	HT-EX
Benzo(a)pyrene	SW8270C	MTN-MW2	H17020313-003	ND	0.19	µg/L	UJ	HT-EX
Benzo(a)pyrene	SW8270C	BD-1	H17020313-005	ND	0.19	µg/L	UJ	HT-EX
Benzo(b)fluoranthene	SW8270C	MTN-MW3	H17020313-001	ND	0.2	µg/L	UJ	HT-EX
Benzo(b)fluoranthene	SW8270C	MTN-MW1	H17020313-002	ND	0.2	µg/L	UJ	HT-EX
Benzo(b)fluoranthene	SW8270C	MTN-MW2	H17020313-003	ND	0.19	µg/L	UJ	HT-EX
Benzo(b)fluoranthene	SW8270C	BD-1	H17020313-005	ND	0.19	µg/L	UJ	HT-EX
Benzo(g,h,i)perylene	SW8270C	MTN-MW3	H17020313-001	ND	0.2	µg/L	UJ	HT-EX
Benzo(g,h,i)perylene	SW8270C	MTN-MW1	H17020313-002	ND	0.2	µg/L	UJ	HT-EX
Benzo(g,h,i)perylene	SW8270C	MTN-MW2	H17020313-003	ND	0.19	µg/L	UJ	HT-EX
Benzo(g,h,i)perylene	SW8270C	BD-1	H17020313-005	ND	0.19	µg/L	UJ	HT-EX
Benzo(k)fluoranthene	SW8270C	MTN-MW3	H17020313-001	ND	0.2	µg/L	UJ	HT-EX
Benzo(k)fluoranthene	SW8270C	MTN-MW1	H17020313-002	ND	0.2	µg/L	UJ	HT-EX
Benzo(k)fluoranthene	SW8270C	MTN-MW2	H17020313-003	ND	0.19	µg/L	UJ	HT-EX
Benzo(k)fluoranthene	SW8270C	BD-1	H17020313-005	ND	0.19	µg/L	UJ	HT-EX
C11-C22, Aromatic, Adjusted	MA-EPH	MTN-MW1	H17020313-002	ND	300	µg/L	UJ	HT-EX
C11-C22, Aromatic, Adjusted	MA-EPH	MTN-MW2	H17020313-003	ND	300	µg/L	UJ	HT-EX
C11-C22, Aromatic, Adjusted	MA-EPH	BD-1	H17020313-005	ND	300	µg/L	UJ	HT-EX
C11-C22, Aromatic, Adjusted	MA-EPH	WSMW-7	H17020313-006	2890	461	µg/L	J+	HR-SUR
C19-C36, Aliphatic, Adjusted	MA-EPH	MTN-MW1	H17020313-002	ND	300	µg/L	UJ	HT-EX
C19-C36, Aliphatic, Adjusted	MA-EPH	MTN-MW2	H17020313-003	ND	300	µg/L	UJ	HT-EX
C19-C36, Aliphatic, Adjusted	MA-EPH	BD-1	H17020313-005	377	300	µg/L	J	HT-EX
C9-C18, Aliphatic, Adjusted	MA-EPH	MTN-MW1	H17020313-002	ND	300	µg/L	UJ	HT-EX

Analyte	Method	Field Sample ID	Lab Sample ID	Result	Limit	Units	Reviewer Qualifier	DV Flag Reasons
C9-C18, Aliphatic, Adjusted	MA-EPH	MTN-MW2	H17020313-003	ND	300	µg/L	UJ	HT-EX
C9-C18, Aliphatic, Adjusted	MA-EPH	BD-1	H17020313-005	ND	300	µg/L	UJ	HT-EX
Chrysene	SW8270C	MTN-MW3	H17020313-001	ND	0.2	µg/L	UJ	HT-EX
Chrysene	SW8270C	MTN-MW1	H17020313-002	ND	0.2	µg/L	UJ	HT-EX
Chrysene	SW8270C	MTN-MW2	H17020313-003	ND	0.19	µg/L	UJ	HT-EX
Chrysene	SW8270C	BD-1	H17020313-005	ND	0.19	µg/L	UJ	HT-EX
Dibenzo(a,h)anthracene	SW8270C	MTN-MW3	H17020313-001	ND	0.2	µg/L	UJ	HT-EX
Dibenzo(a,h)anthracene	SW8270C	MTN-MW1	H17020313-002	ND	0.2	µg/L	UJ	HT-EX
Dibenzo(a,h)anthracene	SW8270C	MTN-MW2	H17020313-003	ND	0.19	µg/L	UJ	HT-EX
Dibenzo(a,h)anthracene	SW8270C	BD-1	H17020313-005	ND	0.19	µg/L	UJ	HT-EX
Fluoranthene	SW8270C	MTN-MW3	H17020313-001	ND	0.2	µg/L	UJ	HT-EX
Fluoranthene	SW8270C	MTN-MW1	H17020313-002	ND	0.2	µg/L	UJ	HT-EX
Fluoranthene	SW8270C	MTN-MW2	H17020313-003	0.59	0.19	µg/L	J-	HT-EX
Fluoranthene	SW8270C	BD-1	H17020313-005	ND	0.19	µg/L	UJ	HT-EX
Fluorene	SW8270C	MTN-MW3	H17020313-001	ND	0.2	µg/L	UJ	HT-EX
Fluorene	SW8270C	MTN-MW1	H17020313-002	ND	0.2	µg/L	UJ	HT-EX
Fluorene	SW8270C	MTN-MW2	H17020313-003	0.21	0.19	µg/L	J-	HT-EX
Fluorene	SW8270C	BD-1	H17020313-005	ND	0.19	µg/L	UJ	HT-EX
Indeno(1,2,3-cd)pyrene	SW8270C	MTN-MW3	H17020313-001	ND	0.2	µg/L	UJ	HT-EX
Indeno(1,2,3-cd)pyrene	SW8270C	MTN-MW1	H17020313-002	ND	0.2	µg/L	UJ	HT-EX
Indeno(1,2,3-cd)pyrene	SW8270C	MTN-MW2	H17020313-003	ND	0.19	µg/L	UJ	HT-EX
Indeno(1,2,3-cd)pyrene	SW8270C	BD-1	H17020313-005	ND	0.19	µg/L	UJ	HT-EX
Naphthalene	SW8270C	MTN-MW3	H17020313-001	0.27	0.2	µg/L	JB	HT-EX, MBD
Naphthalene	SW8270C	MTN-MW1	H17020313-002	0.24	0.2	µg/L	U	HT-EX, MBD
Naphthalene	SW8270C	MTN-MW2	H17020313-003	0.86	0.19	µg/L	JB	HT-EX, MBD
Naphthalene	SW8270C	BD-1	H17020313-005	0.21	0.19	µg/L	U	HT-EX, MBD
Naphthalene	SW8270C	WSMW-7	H17020313-006	0.46	0.31	µg/L	JB	MBD
Phenanthrene	SW8270C	MTN-MW3	H17020313-001	ND	0.2	µg/L	UJ	HT-EX

Analyte	Method	Field Sample ID	Lab Sample ID	Result	Limit	Units	Reviewer Qualifier	DV Flag Reasons
Phenanthrene	SW8270C	MTN-MW1	H17020313-002	ND	0.2	µg/L	UJ	HT-EX
Phenanthrene	SW8270C	MTN-MW2	H17020313-003	0.4	0.19	µg/L	J-	HT-EX
Phenanthrene	SW8270C	BD-1	H17020313-005	ND	0.19	µg/L	UJ	HT-EX
Pyrene	SW8270C	MTN-MW3	H17020313-001	ND	0.2	µg/L	UJ	HT-EX
Pyrene	SW8270C	MTN-MW1	H17020313-002	ND	0.2	µg/L	UJ	HT-EX
Pyrene	SW8270C	MTN-MW2	H17020313-003	0.61	0.19	µg/L	J-	HT-EX
Pyrene	SW8270C	BD-1	H17020313-005	ND	0.19	µg/L	UJ	HT-EX
Total Extractable Hydrocarbons	SW8015M	MTN-MW3	H17020313-001	1210	306	µg/L	J	HT-EX
Total Extractable Hydrocarbons	SW8015M	MTN-MW1	H17020313-002	8320	300	µg/L	J	HT-EX
Total Extractable Hydrocarbons	MA-EPH	MTN-MW1	H17020313-002	ND	300	µg/L	UJ	ERPD-FD, HT-EX
Total Extractable Hydrocarbons	MA-EPH	MTN-MW2	H17020313-003	645	300	µg/L	J	HT-EX
Total Extractable Hydrocarbons	SW8015M	MTN-MW2	H17020313-003	22800	300	µg/L	J	HT-EX
Total Extractable Hydrocarbons	SW8015M	FB-1	H17020313-004	ND	300	µg/L	UJ	HT-EX
Total Extractable Hydrocarbons	MA-EPH	BD-1	H17020313-005	752	300	µg/L	J	ERPD-FD, HT-EX
Total Extractable Hydrocarbons	SW8015M	BD-1	H17020313-005	10400	300	µg/L	J	HT-EX
Total Extractable Hydrocarbons	MA-EPH	WSMW-7	H17020313-006	5560	461	µg/L	J+	HR-SUR
TPH GRO	MA-VPH	MTN-MW1	H17020313-002	69	20	µg/L	J+	HR-SUR
TPH GRO	MA-VPH	BD-1	H17020313-005	69	20	µg/L	J+	HR-SUR

ANALYTICAL SUMMARY REPORT

February 06, 2017

Trihydro-Laramie
1252 Commerce Dr
Laramie, WY 82070-7000

Work Order: H17010374 Quote ID: H1351 - MDEQ Whitefish-Filteration Media/Condensation

Project Name: MDEQ Whitefish

Energy Laboratories Inc Helena MT received the following 1 sample for Trihydro-Laramie on 1/27/2017 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
H17010374-001	MTN - Purge	01/26/17 15:45	01/27/17	Aqueous	8260-Volatile Organic Compounds-Short List

The analyses presented in this report were performed by Energy Laboratories, Inc., 3161 E. Lyndale Ave., Helena, MT 59604, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

The results as reported relate only to the item(s) submitted for testing.

If you have any questions regarding these test results, please call.

Report Approved By:

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish
Lab ID: H17010374-001
Client Sample ID: MTN - Purge

Report Date: 02/06/17
Collection Date: 01/26/17 15:45
DateReceived: 01/27/17
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Benzene	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
Bromobenzene	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
Bromochloromethane	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
Bromodichloromethane	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
Bromoform	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
Bromomethane	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
Carbon tetrachloride	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
Chlorobenzene	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
Chlorodibromomethane	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
Chloroethane	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
Chloroform	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
Chloromethane	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
1,2-Dibromoethane	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
2-Chlorotoluene	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
4-Chlorotoluene	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
Dibromomethane	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
1,2-Dichlorobenzene	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
1,3-Dichlorobenzene	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
1,4-Dichlorobenzene	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
Dichlorodifluoromethane	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
1,1-Dichloroethane	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
1,2-Dichloroethane	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
1,1-Dichloroethene	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
cis-1,2-Dichloroethene	12	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
trans-1,2-Dichloroethene	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
1,2-Dichloropropane	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
1,3-Dichloropropane	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
2,2-Dichloropropane	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
1,1-Dichloropropene	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
cis-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
trans-1,3-Dichloropropene	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
Ethylbenzene	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
Methyl ethyl ketone	ND	ug/L		20		SW8260B	02/03/17 13:33 / kjw
Methyl tert-butyl ether (MTBE)	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
Methylene chloride	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
Styrene	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
1,1,1,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
1,1,2,2-Tetrachloroethane	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
Tetrachloroethene	840	ug/L		25		SW8260B	02/03/17 16:20 / kjw
Toluene	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
1,1,1-Trichloroethane	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
1,1,2-Trichloroethane	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
Trichloroethene	412	ug/L		25		SW8260B	02/03/17 16:20 / kjw

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish
Lab ID: H17010374-001
Client Sample ID: MTN - Purge

Report Date: 02/06/17
Collection Date: 01/26/17 15:45
DateReceived: 01/27/17
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Trichlorofluoromethane	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
1,2,3-Trichloropropane	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
Vinyl chloride	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
m+p-Xylenes	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
o-Xylene	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
Xylenes, Total	ND	ug/L		1.0		SW8260B	02/03/17 13:33 / kjw
Surr: Dibromofluoromethane	85.0	%REC		70-125		SW8260B	02/03/17 13:33 / kjw
Surr: 1,2-Dichloroethane-d4	94.0	%REC		69-131		SW8260B	02/03/17 13:33 / kjw
Surr: Toluene-d8	111	%REC		80-119		SW8260B	02/03/17 13:33 / kjw
Surr: p-Bromofluorobenzene	132	%REC	S	76-123		SW8260B	02/03/17 13:33 / kjw

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
S - Spike recovery outside of advisory limits.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish

Report Date: 02/06/17
Work Order: H17010374

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B									Analytical Run: R122478
Lab ID: 020317_CCV_2	Continuing Calibration Verification Standard								02/03/17 09:30
Benzene	5.08	ug/L	0.50	102	70	130			
Bromobenzene	6.00	ug/L	0.50	120	70	130			
Bromochloromethane	3.73	ug/L	0.50	75	70	130			
Bromodichloromethane	4.80	ug/L	0.50	96	70	130			
Bromoform	5.88	ug/L	0.50	118	70	130			
Bromomethane	4.72	ug/L	0.50	94	70	130			
Carbon tetrachloride	4.16	ug/L	0.50	83	70	130			
Chlorobenzene	5.00	ug/L	0.50	100	70	130			
Chlorodibromomethane	5.08	ug/L	0.50	102	70	130			
Chloroethane	5.24	ug/L	0.50	105	70	130			
Chloroform	4.48	ug/L	0.50	90	80	120			
Chloromethane	5.20	ug/L	0.50	104	70	130			
2-Chlorotoluene	5.96	ug/L	0.50	119	70	130			
4-Chlorotoluene	6.08	ug/L	0.50	122	70	130			
1,2-Dibromoethane	5.04	ug/L	0.50	101	70	130			
Dibromomethane	4.64	ug/L	0.50	93	70	130			
1,2-Dichlorobenzene	4.88	ug/L	0.50	98	70	130			
1,3-Dichlorobenzene	5.36	ug/L	0.50	107	70	130			
1,4-Dichlorobenzene	5.04	ug/L	0.50	101	70	130			
Dichlorodifluoromethane	5.04	ug/L	0.50	101	70	130			
1,1-Dichloroethane	4.16	ug/L	0.50	83	70	130			
1,2-Dichloroethane	5.72	ug/L	0.50	114	70	130			
1,1-Dichloroethene	4.68	ug/L	0.50	94	80	120			
cis-1,2-Dichloroethene	4.80	ug/L	0.50	96	70	130			
trans-1,2-Dichloroethene	4.48	ug/L	0.50	90	70	130			
1,2-Dichloropropane	5.56	ug/L	0.50	111	80	120			
1,3-Dichloropropane	4.92	ug/L	0.50	98	70	130			
2,2-Dichloropropane	4.40	ug/L	0.50	88	70	130			
1,1-Dichloropropene	4.72	ug/L	0.50	94	70	130			
cis-1,3-Dichloropropene	5.56	ug/L	0.50	111	70	130			
trans-1,3-Dichloropropene	4.80	ug/L	0.50	96	70	130			
Ethylbenzene	4.96	ug/L	0.50	99	80	120			
Methyl tert-butyl ether (MTBE)	3.74	ug/L	0.50	75	70	130			
Methyl ethyl ketone	41.2	ug/L	10	82	70	130			
Methylene chloride	3.71	ug/L	0.50	74	70	130			
Styrene	4.60	ug/L	0.50	92	70	130			
1,1,1,2-Tetrachloroethane	4.36	ug/L	0.50	87	70	130			
1,1,2,2-Tetrachloroethane	4.76	ug/L	0.50	95	70	130			
Tetrachloroethene	5.88	ug/L	0.50	118	70	130			
Toluene	5.12	ug/L	0.50	102	80	120			
1,1,1-Trichloroethane	4.32	ug/L	0.50	86	70	130			
1,1,2-Trichloroethane	5.00	ug/L	0.50	100	70	130			
Trichloroethene	5.44	ug/L	0.50	109	70	130			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish

Report Date: 02/06/17
Work Order: H17010374

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B									Analytical Run: R122478
Lab ID: 020317_CCV_2	Continuing Calibration Verification Standard								02/03/17 09:30
Trichlorofluoromethane	5.04	ug/L	0.50	101	70	130			
1,2,3-Trichloropropane	5.28	ug/L	0.50	106	70	130			
Vinyl chloride	4.76	ug/L	0.50	95	80	120			
m+p-Xylenes	9.84	ug/L	0.50	98	70	130			
o-Xylene	4.72	ug/L	0.50	94	70	130			
Xylenes, Total	14.6	ug/L	0.50	97	70	130			
Surr: 1,2-Dichloroethane-d4			1.0	100	69	131			
Surr: Dibromofluoromethane			1.0	96	70	125			
Surr: p-Bromofluorobenzene			1.0	116	76	123			
Surr: Toluene-d8			1.0	104	80	119			
Method: SW8260B									Batch: R122478
Lab ID: 020317_LCS_3	Laboratory Control Sample				Run: 1SATURN_170203A				02/03/17 10:08
Benzene	4.72	ug/L	0.50	94	69	129			
Bromobenzene	5.16	ug/L	0.50	103	79	120			
Bromochloromethane	4.32	ug/L	0.50	86	72	125			
Bromodichloromethane	4.44	ug/L	0.50	89	71	122			
Bromoform	5.00	ug/L	0.50	100	65	130			
Bromomethane	5.44	ug/L	0.50	109	60	136			
Carbon tetrachloride	4.12	ug/L	0.50	82	77	121			
Chlorobenzene	4.80	ug/L	0.50	96	78	120			
Chlorodibromomethane	4.64	ug/L	0.50	93	70	122			
Chloroethane	5.80	ug/L	0.50	116	62	135			
Chloroform	4.60	ug/L	0.50	92	71	121			
Chloromethane	5.48	ug/L	0.50	110	66	139			
2-Chlorotoluene	5.48	ug/L	0.50	110	78	125			
4-Chlorotoluene	5.52	ug/L	0.50	110	76	126			
1,2-Dibromoethane	4.92	ug/L	0.50	98	60	137			
Dibromomethane	4.80	ug/L	0.50	96	69	122			
1,2-Dichlorobenzene	4.84	ug/L	0.50	97	74	122			
1,3-Dichlorobenzene	5.16	ug/L	0.50	103	78	120			
1,4-Dichlorobenzene	4.72	ug/L	0.50	94	75	122			
Dichlorodifluoromethane	5.32	ug/L	0.50	106	57	144			
1,1-Dichloroethane	3.78	ug/L	0.50	76	76	125			
1,2-Dichloroethane	5.04	ug/L	0.50	101	69	131			
1,1-Dichloroethene	4.48	ug/L	0.50	90	67	129			
cis-1,2-Dichloroethene	4.32	ug/L	0.50	86	75	122			
trans-1,2-Dichloroethene	4.28	ug/L	0.50	86	75	124			
1,2-Dichloropropane	5.04	ug/L	0.50	101	75	127			
1,3-Dichloropropane	4.52	ug/L	0.50	90	70	122			
2,2-Dichloropropane	4.16	ug/L	0.50	83	78	132			
1,1-Dichloropropene	4.72	ug/L	0.50	94	69	127			
cis-1,3-Dichloropropene	5.16	ug/L	0.50	103	73	124			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish

Report Date: 02/06/17
Work Order: H17010374

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B									Batch: R122478
Lab ID: 020317_LCS_3	Laboratory Control Sample				Run: 1SATURN_170203A				02/03/17 10:08
trans-1,3-Dichloropropene	4.36	ug/L	0.50	87	72	127			
Ethylbenzene	4.68	ug/L	0.50	94	74	125			
Methyl tert-butyl ether (MTBE)	3.77	ug/L	0.50	75	62	128			
Methyl ethyl ketone	39.2	ug/L	10	78	56	141			
Methylene chloride	3.74	ug/L	0.50	75	61	125			
Styrene	4.64	ug/L	0.50	93	75	120			
1,1,1,2-Tetrachloroethane	4.60	ug/L	0.50	92	76	122			
1,1,2,2-Tetrachloroethane	4.32	ug/L	0.50	86	67	124			
Tetrachloroethene	5.08	ug/L	0.50	102	75	126			
Toluene	4.56	ug/L	0.50	91	73	122			
1,1,1-Trichloroethane	4.36	ug/L	0.50	87	76	124			
1,1,2-Trichloroethane	4.84	ug/L	0.50	97	72	125			
Trichloroethene	4.96	ug/L	0.50	99	72	126			
Trichlorofluoromethane	5.76	ug/L	0.50	115	73	131			
1,2,3-Trichloropropane	5.44	ug/L	0.50	109	58	142			
Vinyl chloride	5.24	ug/L	0.50	105	69	129			
m+p-Xylenes	9.60	ug/L	0.50	96	72	124			
o-Xylene	4.92	ug/L	0.50	98	74	123			
Xylenes, Total	14.5	ug/L	0.50	97	72	124			
Surr: 1,2-Dichloroethane-d4			1.0	88	69	131			
Surr: Dibromofluoromethane			1.0	98	70	125			
Surr: p-Bromofluorobenzene			1.0	110	76	123			
Surr: Toluene-d8			1.0	103	80	119			
Lab ID: 020317_MBLK_5	Method Blank				Run: 1SATURN_170203A				02/03/17 11:19
Benzene	ND	ug/L	0.50						
Bromobenzene	ND	ug/L	0.50						
Bromochloromethane	ND	ug/L	0.50						
Bromodichloromethane	ND	ug/L	0.50						
Bromoform	ND	ug/L	0.50						
Bromomethane	ND	ug/L	0.50						
Carbon tetrachloride	ND	ug/L	0.50						
Chlorobenzene	ND	ug/L	0.50						
Chlorodibromomethane	ND	ug/L	0.50						
Chloroethane	ND	ug/L	0.50						
Chloroform	ND	ug/L	0.50						
Chloromethane	ND	ug/L	0.50						
2-Chlorotoluene	ND	ug/L	0.50						
4-Chlorotoluene	ND	ug/L	0.50						
1,2-Dibromoethane	ND	ug/L	0.50						
Dibromomethane	ND	ug/L	0.50						
1,2-Dichlorobenzene	ND	ug/L	0.50						
1,3-Dichlorobenzene	ND	ug/L	0.50						

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish

Report Date: 02/06/17
Work Order: H17010374

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B									Batch: R122478
Lab ID: 020317_MBLK_5	Method Blank				Run: 1SATURN_170203A				02/03/17 11:19
1,4-Dichlorobenzene	ND	ug/L	0.50						
Dichlorodifluoromethane	ND	ug/L	0.50						
1,1-Dichloroethane	ND	ug/L	0.50						
1,2-Dichloroethane	ND	ug/L	0.50						
1,1-Dichloroethene	ND	ug/L	0.50						
cis-1,2-Dichloroethene	ND	ug/L	0.50						
trans-1,2-Dichloroethene	ND	ug/L	0.50						
1,2-Dichloropropane	ND	ug/L	0.50						
1,3-Dichloropropane	ND	ug/L	0.50						
2,2-Dichloropropane	ND	ug/L	0.50						
1,1-Dichloropropene	ND	ug/L	0.50						
cis-1,3-Dichloropropene	ND	ug/L	0.50						
trans-1,3-Dichloropropene	ND	ug/L	0.50						
Ethylbenzene	ND	ug/L	0.50						
Methyl tert-butyl ether (MTBE)	ND	ug/L	0.50						
Methyl ethyl ketone	ND	ug/L	10						
Methylene chloride	ND	ug/L	0.50						
Styrene	ND	ug/L	0.50						
1,1,1,2-Tetrachloroethane	ND	ug/L	0.50						
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50						
Tetrachloroethene	ND	ug/L	0.50						
Toluene	ND	ug/L	0.50						
1,1,1-Trichloroethane	ND	ug/L	0.50						
1,1,2-Trichloroethane	ND	ug/L	0.50						
Trichloroethene	ND	ug/L	0.50						
Trichlorofluoromethane	ND	ug/L	0.50						
1,2,3-Trichloropropane	ND	ug/L	0.50						
Vinyl chloride	ND	ug/L	0.50						
m+p-Xylenes	ND	ug/L	0.50						
o-Xylene	ND	ug/L	0.50						
Xylenes, Total	ND	ug/L	0.50						
Surr: 1,2-Dichloroethane-d4			1.0	96	69	131			
Surr: Dibromofluoromethane			1.0	98	70	125			
Surr: p-Bromofluorobenzene			1.0	117	76	123			
Surr: Toluene-d8			1.0	96	80	119			
Lab ID: H17010374-001AMS	Sample Matrix Spike				Run: 1SATURN_170203A				02/03/17 16:53
Benzene	492	ug/L	50	98	69	129			
Bromobenzene	496	ug/L	50	99	79	120			
Bromochloromethane	424	ug/L	50	85	72	125			
Bromodichloromethane	452	ug/L	50	90	71	122			
Bromoform	536	ug/L	50	107	65	130			
Bromomethane	476	ug/L	50	95	60	136			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish

Report Date: 02/06/17
Work Order: H17010374

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B									Batch: R122478
Lab ID: H17010374-001AMS	Sample Matrix Spike				Run: 1SATURN_170203A				02/03/17 16:53
Carbon tetrachloride	404	ug/L	50	81	77	121			
Chlorobenzene	500	ug/L	50	100	78	120			
Chlorodibromomethane	488	ug/L	50	98	70	122			
Chloroethane	500	ug/L	50	100	62	135			
Chloroform	428	ug/L	50	86	71	121			
Chloromethane	476	ug/L	50	95	66	139			
2-Chlorotoluene	556	ug/L	50	111	78	125			
4-Chlorotoluene	572	ug/L	50	114	76	126			
1,2-Dibromoethane	492	ug/L	50	98	60	137			
Dibromomethane	488	ug/L	50	98	69	122			
1,2-Dichlorobenzene	500	ug/L	50	100	74	122			
1,3-Dichlorobenzene	512	ug/L	50	102	78	120			
1,4-Dichlorobenzene	464	ug/L	50	93	75	122			
Dichlorodifluoromethane	456	ug/L	50	91	57	144			
1,1-Dichloroethane	388	ug/L	50	78	76	125			
1,2-Dichloroethane	532	ug/L	50	106	69	131			
1,1-Dichloroethene	424	ug/L	50	85	67	129			
cis-1,2-Dichloroethene	472	ug/L	50	94	75	122			
trans-1,2-Dichloroethene	408	ug/L	50	82	75	124			
1,2-Dichloropropane	520	ug/L	50	104	75	127			
1,3-Dichloropropane	480	ug/L	50	96	70	122			
2,2-Dichloropropane	424	ug/L	50	85	78	132			
1,1-Dichloropropene	480	ug/L	50	96	69	127			
cis-1,3-Dichloropropene	548	ug/L	50	110	73	124			
trans-1,3-Dichloropropene	416	ug/L	50	83	72	127			
Ethylbenzene	464	ug/L	50	93	74	125			
Methyl tert-butyl ether (MTBE)	377	ug/L	50	75	62	128			
Methyl ethyl ketone	4360	ug/L	1000	87	56	141			
Methylene chloride	356	ug/L	50	71	61	125			
Styrene	432	ug/L	50	86	75	120			
1,1,1,2-Tetrachloroethane	444	ug/L	50	89	76	122			
1,1,2,2-Tetrachloroethane	448	ug/L	50	90	67	124			
Tetrachloroethene	1400	ug/L	50	111	75	126			
Toluene	492	ug/L	50	98	73	122			
1,1,1-Trichloroethane	408	ug/L	50	82	76	124			
1,1,2-Trichloroethane	480	ug/L	50	96	72	125			
Trichloroethene	984	ug/L	50	114	72	126			
Trichlorofluoromethane	512	ug/L	50	102	73	131			
1,2,3-Trichloropropane	528	ug/L	50	106	58	142			
Vinyl chloride	460	ug/L	50	92	69	129			
m+p-Xylenes	952	ug/L	50	95	72	124			
o-Xylene	476	ug/L	50	95	74	123			
Xylenes, Total	1430	ug/L	50	95	72	124			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Report Date: 02/06/17
Project: MDEQ Whitefish
Work Order: H17010374

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B									Batch: R122478
Lab ID: H17010374-001AMS	Sample Matrix Spike				Run: 1SATURN_170203A			02/03/17 16:53	
Surr: 1,2-Dichloroethane-d4			100	95	69	131			
Surr: Dibromofluoromethane			100	99	70	125			
Surr: p-Bromofluorobenzene			100	108	76	123			
Surr: Toluene-d8			100	101	80	119			
Lab ID: H17010374-001AMSD	Sample Matrix Spike Duplicate				Run: 1SATURN_170203A			02/03/17 17:27	
Benzene	496	ug/L	50	99	69	129	0.8	20	
Bromobenzene	548	ug/L	50	110	79	120	10.0	20	
Bromochloromethane	382	ug/L	50	76	72	125	11	20	
Bromodichloromethane	448	ug/L	50	90	71	122	0.9	20	
Bromoform	576	ug/L	50	115	65	130	7.2	20	
Bromomethane	512	ug/L	50	102	60	136	7.3	20	
Carbon tetrachloride	400	ug/L	50	80	77	121	1.0	20	
Chlorobenzene	516	ug/L	50	103	78	120	3.1	20	
Chlorodibromomethane	496	ug/L	50	99	70	122	1.6	20	
Chloroethane	536	ug/L	50	107	62	135	6.9	20	
Chloroform	456	ug/L	50	91	71	121	6.3	20	
Chloromethane	504	ug/L	50	101	66	139	5.7	20	
2-Chlorotoluene	564	ug/L	50	113	78	125	1.4	20	
4-Chlorotoluene	608	ug/L	50	122	76	126	6.1	20	
1,2-Dibromoethane	484	ug/L	50	97	60	137	1.6	20	
Dibromomethane	480	ug/L	50	96	69	122	1.7	20	
1,2-Dichlorobenzene	520	ug/L	50	104	74	122	3.9	20	
1,3-Dichlorobenzene	516	ug/L	50	103	78	120	0.8	20	
1,4-Dichlorobenzene	508	ug/L	50	102	75	122	9.1	20	
Dichlorodifluoromethane	480	ug/L	50	96	57	144	5.1	20	
1,1-Dichloroethane	360	ug/L	50	72	76	125	7.5	20	S
1,2-Dichloroethane	492	ug/L	50	98	69	131	7.8	20	
1,1-Dichloroethene	420	ug/L	50	84	67	129	0.9	20	
cis-1,2-Dichloroethene	484	ug/L	50	97	75	122	2.5	20	
trans-1,2-Dichloroethene	424	ug/L	50	85	75	124	3.8	20	
1,2-Dichloropropane	508	ug/L	50	102	75	127	2.3	20	
1,3-Dichloropropane	500	ug/L	50	100	70	122	4.1	20	
2,2-Dichloropropane	412	ug/L	50	82	78	132	2.9	20	
1,1-Dichloropropene	464	ug/L	50	93	69	127	3.4	20	
cis-1,3-Dichloropropene	568	ug/L	50	114	73	124	3.6	20	
trans-1,3-Dichloropropene	436	ug/L	50	87	72	127	4.7	20	
Ethylbenzene	464	ug/L	50	93	74	125	0.0	20	
Methyl tert-butyl ether (MTBE)	388	ug/L	50	78	62	128	3.0	20	
Methyl ethyl ketone	4120	ug/L	1000	82	56	141	5.7	20	
Methylene chloride	370	ug/L	50	74	61	125	3.9	20	
Styrene	476	ug/L	50	95	75	120	9.7	20	
1,1,1,2-Tetrachloroethane	452	ug/L	50	90	76	122	1.8	20	

Qualifiers:

RL - Analyte reporting limit.
ND - Not detected at the reporting limit.
S - Spike recovery outside of advisory limits.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Report Date: 02/06/17
Project: MDEQ Whitefish
Work Order: H17010374

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B									Batch: R122478
Lab ID: H17010374-001AMSD	Sample Matrix Spike Duplicate				Run: 1SATURN_170203A			02/03/17 17:27	
1,1,2,2-Tetrachloroethane	492	ug/L	50	98	67	124	9.4	20	
Tetrachloroethene	1340	ug/L	50	99	75	126	4.4	20	
Toluene	452	ug/L	50	90	73	122	8.5	20	
1,1,1-Trichloroethane	408	ug/L	50	82	76	124	0.0	20	
1,1,2-Trichloroethane	460	ug/L	50	92	72	125	4.3	20	
Trichloroethene	952	ug/L	50	108	72	126	3.3	20	
Trichlorofluoromethane	536	ug/L	50	107	73	131	4.6	20	
1,2,3-Trichloropropane	560	ug/L	50	112	58	142	5.9	20	
Vinyl chloride	472	ug/L	50	94	69	129	2.6	20	
m+p-Xylenes	996	ug/L	50	100	72	124	4.5	20	
o-Xylene	500	ug/L	50	100	74	123	4.9	20	
Xylenes, Total	1500	ug/L	50	100	72	124	4.7	20	
Surr: 1,2-Dichloroethane-d4			100	90	69	131			
Surr: Dibromofluoromethane			100	94	70	125			
Surr: p-Bromofluorobenzene			100	106	76	123			
Surr: Toluene-d8			100	106	80	119			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

Work Order Receipt Checklist

Trihydro-Laramie

H17010374

Login completed by: Tracy L. Lorash

Date Received: 1/27/2017

Reviewed by: BL2000\kwiegand

Received by: TLL

Reviewed Date: 2/3/2017

Carrier name: Hand Del

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☐	No ☑	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	1.2°C On Ice		
Water - VOA vials have zero headspace?	Yes ☑	No ☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	Yes ☐	No ☐	Not Applicable ☑

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

Contact and Corrective Action Comments:

Received the trip blank broken. tl 1/27/17

ENERGY LAB
Trust our People. Trust our Data.

Chain of Custody & Analytical Request Record

www.energylab.com

Account Information (Billing information)

Company/Name	Trihydro Corporation
Contact	Andrew Vann
Phone	(307) 745-7474
Mailing Address	1252 Commerce Dr.
City, State, Zip	Laramie WY 82070
Email	AVanne trihydro.com
Receive Invoice	☐Hard Copy ☒Email
Receive Report	☐Hard Copy ☒Email
Purchase Order	
Quote	1351
Bottle Order	22827

Report Information (if different than Account Information)

Company/Name	
Contact	
Phone	
Mailing Address	
City, State, Zip	
Email	
Receive Report	☐Hard Copy ☐Email
Special Report/Formats:	☐ LEVEL IV ☐ NELAC ☒EDD/EDT (contact laboratory) Trihydro ☐ Other

Comments

Project Information

Project Name, PWSID, Permit, etc.	MDEQ Whitefish
Sampler Name	Joel Riebli
Sampler Phone	(307)760-2793
Sample Origin State	MT
EPA/State Compliance	☐ Yes ☐ No

MINING CLIENTS, please indicate sample type.
*If ore has been processed or refined, call before sending.
☐ Byproduct 11 (e)2 material ☐ Unprocessed ore (NOT ground or refined)*

Matrix Codes
A - Air
W - Water
S - Soils/Solids
V - Vegetation
B - Bioassay
O - Other
DW - Drinking Water

All turnaround times are standard unless marked as RUSH.
Energy Laboratories MUST be contacted prior to RUSH sample submittal for charges and scheduling – See Instructions Page

	Sample Identification (Name, Location, Interval, etc.)	Collection Date	Collection Time	Number of Containers	Matrix (See Codes Above)	8260 VOC short list								See Attached	RUSH TAT	ELI LAB ID (Laboratory Use Only)
1	MTN-Purge	1/26/17	1545	3	W	X										H17010374
2	Trip Blank	—	—	1	W	X										
3																
4																
5																
6																
7																
8																
9																
10																

Custody Record MUST be signed	Relinquished by (print)	Date/Time	Signature	Received by (print)	Date/Time	Signature
	Joel Riebli	1/27/17 @ 1630				
	Relinquished by (print)	Date/Time	Signature	Received by Laboratory (print)	Date/Time	Signature
					1/27/17 1630	

LABORATORY USE ONLY

Shipped By	Cooler ID(s)	Custody Seals	Intact	Receipt Temp	Temp Blank	On Ice	Payment Type	Amount	Receipt Number (cash/check only)
Hand	4	Y (N) C B	Y N	1.2 °C	(Y) N	(Y) N	CC Cash Check	$	

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All subcontracted data will be clearly notated

ANALYTICAL SUMMARY REPORT

March 23, 2017

Trihydro-Laramie
1252 Commerce Dr
Laramie, WY 82070-7000

Work Order: H17030185

Project Name: MDEQ Whitefish Solvent Site

Energy Laboratories Inc Helena MT received the following 1 sample for Trihydro-Laramie on 3/13/2017 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
H17030185-001	MTN - Drum	03/13/17 12:45	03/13/17	Aqueous	Metals by ICP/ICPMS, Total Recoverable Mercury, Total Digestion, Total Metals Digestion, Mercury by CVAA

The analyses presented in this report were performed by Energy Laboratories, Inc., 3161 E. Lyndale Ave., Helena, MT 59604, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

The results as reported relate only to the item(s) submitted for testing.

If you have any questions regarding these test results, please call.

Report Approved By:

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: MDEQ Whitefish Solvent Site
Lab ID: H17030185-001
Client Sample ID: MTN - Drum

Report Date: 03/23/17
Collection Date: 03/13/17 12:45
DateReceived: 03/13/17
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS, TOTAL RECOVERABLE							
Arsenic	0.006	mg/L		0.001		SW6020	03/16/17 19:23 / dck
Barium	0.29	mg/L		0.05		SW6020	03/16/17 19:23 / dck
Cadmium	ND	mg/L		0.001		SW6020	03/16/17 19:23 / dck
Chromium	ND	mg/L		0.005		SW6020	03/16/17 19:23 / dck
Lead	0.003	mg/L		0.001		SW6020	03/16/17 19:23 / dck
Selenium	ND	mg/L		0.001		SW6020	03/16/17 19:23 / dck
Silver	ND	mg/L		0.001		SW6020	03/16/17 19:23 / dck
METALS, TOTAL							
Mercury	ND	mg/L		0.0001		SW7470A	03/16/17 15:39 / dck

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 03/23/17

Project: MDEQ Whitefish Solvent Site **Work Order:** H17030185

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **E245.1**								Analytical Run: HGCV202-H_170316A		
Lab ID: **ICV**		Initial Calibration Verification Standard							03/16/17 14:37	
Mercury		0.000192	mg/L	0.00010	96	90	110			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 03/23/17

Project: MDEQ Whitefish Solvent Site **Work Order:** H17030185

Analyte		Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method:	**SW6020**								Analytical Run: ICPMS205-H_170316B		
Lab ID:	**ICV**	7	Initial Calibration Verification Standard							03/16/17 16:34	
Arsenic			0.0598	mg/L	0.0010	100	90	110			
Barium			0.0597	mg/L	0.0010	100	90	110			
Cadmium			0.0300	mg/L	0.0010	100	90	110			
Chromium			0.0593	mg/L	0.0010	99	90	110			
Lead			0.0586	mg/L	0.0010	98	90	110			
Selenium			0.0605	mg/L	0.0010	101	90	110			
Silver			0.0294	mg/L	0.0010	98	90	110			
Method:	**SW6020**										Batch: 36528
Lab ID:	**MB-36528**	7	Method Blank				Run: ICPMS205-H_170316B			03/16/17 19:17	
Arsenic			0.0007	mg/L	0.0002						
Barium			ND	mg/L	0.0006						
Cadmium			ND	mg/L	4E-05						
Chromium			0.0006	mg/L	0.0005						
Lead			ND	mg/L	5E-05						
Selenium			8E-05	mg/L	6E-05						
Silver			0.0006	mg/L	3E-05						
Lab ID:	**LCS-36528**	7	Laboratory Control Sample				Run: ICPMS205-H_170316B			03/16/17 19:19	
Arsenic			0.416	mg/L	0.0010	83	80	120			
Barium			0.533	mg/L	0.050	107	80	120			
Cadmium			0.263	mg/L	0.0010	105	80	120			
Chromium			0.450	mg/L	0.0050	90	80	120			
Lead			0.514	mg/L	0.0010	103	80	120			
Selenium			0.418	mg/L	0.0010	84	80	120			
Silver			0.0558	mg/L	0.0010	110	80	120			
Lab ID:	**H17030185-001AMS3**	7	Sample Matrix Spike				Run: ICPMS205-H_170316B			03/16/17 19:26	
Arsenic			0.429	mg/L	0.0010	85	75	125			
Barium			0.920	mg/L	0.050	127	75	125			S
Cadmium			0.260	mg/L	0.0010	104	75	125			
Chromium			0.459	mg/L	0.0050	91	75	125			
Lead			0.526	mg/L	0.0010	105	75	125			
Selenium			0.419	mg/L	0.0010	84	75	125			
Silver			0.0540	mg/L	0.0010	108	75	125			
Lab ID:	**H17030185-001AMSD**	7	Sample Matrix Spike Duplicate				Run: ICPMS205-H_170316B			03/16/17 19:28	
Arsenic			0.436	mg/L	0.0010	86	75	125	1.5	20	
Barium			0.901	mg/L	0.050	123	75	125	2.1	20	
Cadmium			0.254	mg/L	0.0010	102	75	125	2.4	20	
Chromium			0.464	mg/L	0.0050	93	75	125	1.3	20	
Lead			0.517	mg/L	0.0010	103	75	125	1.6	20	
Selenium			0.414	mg/L	0.0010	83	75	125	1.3	20	
Silver			0.0527	mg/L	0.0010	105	75	125	2.3	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

S - Spike recovery outside of advisory limits.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie **Report Date:** 03/23/17

Project: MDEQ Whitefish Solvent Site **Work Order:** H17030185

Analyte		Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method:	**SW7470A**										Batch: 36529
Lab ID:	**MB-36529**	Method Blank					Run: HGCV202-H_170316A				03/16/17 15:34
Mercury			ND	mg/L	5E-06						
Lab ID:	**LCS-36529**	Laboratory Control Sample					Run: HGCV202-H_170316A				03/16/17 15:36
Mercury			0.000141	mg/L	0.00010	94	90	110			
Lab ID:	**H17030185-001AMS**	Sample Matrix Spike					Run: HGCV202-H_170316A				03/16/17 15:48
Mercury			0.000170	mg/L	0.00010	106	85	115			
Lab ID:	**H17030185-001AMSD**	Sample Matrix Spike Duplicate					Run: HGCV202-H_170316A				03/16/17 15:51
Mercury			0.000153	mg/L	0.00010	95	85	115	10	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

Work Order Receipt Checklist

Trihydro-Laramie

H17030185

Login completed by: Tracy L. Lorash

Reviewed by: BL2000\wjohnson

Reviewed Date: 3/15/2017

Date Received: 3/13/2017

Received by: abc

Carrier name: Hand Del

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☐	No ☑	Not Applicable ☐
Container/Temp Blank temperature:	1.6°C On Ice - From Field		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☑	Not Applicable ☐

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

Contact and Corrective Action Comments:

Metals samples was preserved with 2 mL nitric acid upon receipt to pH <2 in the laboratory. In accordance with the Clean Water Act, these samples must be held for 24 hours prior to analysis. tl 3/14/17

ENERGY LABORATORIES

Chain of Custody and Analytical Request Record

Page _____ of _____

PLEASE PRINT **(Provide as much information as possible.)**

Company Name: Trihydro Corporation

Project Name, PWS, Permit, Etc.: MDEQ Whitefish

Sample Origin State: MT

EPA/State Compliance: Yes ☒ No ☐

Report Mail Address (Required): 1252 Commerce Drive Laramie, WY 82070

☐ No Hard Copy Email:

Contact Name: Andrew Vara

Phone/Fax: (307) 745-7474

Cell:

Sampler: (Please Print) Joel Riebli

Invoice Contact & Phone: SAME

Purchase Order:

Quote/Bottle Order:

Invoice Address (Required): SAME

☐ No Hard Copy Email:

Special Report/Formats:

☐ DW
☐ POTW/WWTP
☐ State: _____
☐ Other: _____
☒ EDD/EDT (Electronic Data) Format: Trihydro
☐ LEVEL IV
☐ NELAC

ANALYSIS REQUESTED

Number of Containers
Sample Type: A W S V B O DW
Air Water Soils/Solids
Vegetation Bioassay Other
DW - Drinking Water

SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	RCRA 8 metals	SEE ATTACHED
1 MTN-Drum	3/13/17	1245	WT	1	
2					
3					
4					
5					
6					
7					
8					
9					
10					

Standard Turnaround (TAT)

RUSH

Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments:

Shipped by: hand del.

Cooler ID(s): 4

Receipt Temp: 1.6 °C

On Ice: (Y) N

Custody Seal: On Bottle Y (N); On Cooler Y (N)

Intact: Y N

Signature Match: Y N

LABORATORY USE ONLY H17030185

Custody Record MUST be Signed

Relinquished by (print): Joel Riebli Date/Time: 03/13/17 @ 1700 Signature:

Relinquished by (print): Date/Time: Signature:

Received by (print): Date/Time: Signature:

Received by (print): Date/Time: Signature:

Received by Laboratory: Amanda Carlson Date/Time: 3/13/17 17:00 Signature: Amanda Carlson

Sample Disposal: Return to Client: _____ Lab Disposal: _____

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly noted on your analytical report.

ANALYTICAL SUMMARY REPORT

February 23, 2017

Trihydro-Laramie
1252 Commerce Dr
Laramie, WY 82070-7000

Work Order: H17020183 Quote ID: H1351 - MDEQ Whitefish-Filteration Media/Condensation

Project Name: Whitefish Solvent Site

Energy Laboratories Inc Helena MT received the following 2 samples for Trihydro-Laramie on 2/14/2017 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
H17020183-001	GAC	02/12/17 16:42	02/14/17	Solid	Moisture Percent Moisture TCLP Zero Headspace Extraction, Volatiles Volatile Organic Compounds, TCLP Volatile Organics, Methanol Extraction 8260-Volatile Organic Compounds - Short List
H17020183-002	Zeolite	02/12/17 16:51	02/14/17	Solid	Same As Above

The analyses presented in this report were performed by Energy Laboratories, Inc., 3161 E. Lyndale Ave., Helena, MT 59604, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

The results as reported relate only to the item(s) submitted for testing.

If you have any questions regarding these test results, please call.

Report Approved By:

CLIENT: Trihydro-Laramie
Project: Whitefish Solvent Site
Work Order: H17020183

Report Date: 02/23/17

CASE NARRATIVE

Tests associated with analyst identified as ELI-B were subcontracted to Energy Laboratories, 1120 S. 27th St., Billings, MT, EPA Number MT00005.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: Whitefish Solvent Site
Lab ID: H17020183-001
Client Sample ID: GAC

Report Date: 02/23/17
Collection Date: 02/12/17 16:42
DateReceived: 02/14/17
Matrix: Solid

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL CHARACTERISTICS							
Moisture	0.50	wt%		0.20		A2540 G	02/15/17 15:43 / eli-b
VOLATILE ORGANIC COMPOUNDS, TCLP EXTRACTABLE							
Benzene	ND	mg/L		0.10	0.5	SW8260B	02/16/17 19:15 / eli-b16
Carbon tetrachloride	ND	mg/L		0.10	0.5	SW8260B	02/16/17 19:15 / eli-b16
Chlorobenzene	ND	mg/L		0.10	100	SW8260B	02/16/17 19:15 / eli-b16
Chloroform	ND	mg/L		0.10	6	SW8260B	02/16/17 19:15 / eli-b16
1,4-Dichlorobenzene	ND	mg/L		0.10	7.5	SW8260B	02/16/17 19:15 / eli-b16
1,2-Dichloroethane	ND	mg/L		0.10	0.5	SW8260B	02/16/17 19:15 / eli-b16
1,1-Dichloroethene	ND	mg/L		0.10	0.7	SW8260B	02/16/17 19:15 / eli-b16
Methyl ethyl ketone	ND	mg/L		2.0	200	SW8260B	02/16/17 19:15 / eli-b16
Tetrachloroethene	0.11	mg/L		0.10	0.7	SW8260B	02/16/17 19:15 / eli-b16
Trichloroethene	ND	mg/L		0.10	0.5	SW8260B	02/16/17 19:15 / eli-b16
Vinyl chloride	ND	mg/L		0.10	0.2	SW8260B	02/16/17 19:15 / eli-b16
Surr: 1,2-Dichloroethane-d4	80.0	%REC		70-130		SW8260B	02/16/17 19:15 / eli-b16
Surr: Dibromofluoromethane	88.0	%REC		77-126		SW8260B	02/16/17 19:15 / eli-b16
Surr: p-Bromofluorobenzene	92.0	%REC		76-127		SW8260B	02/16/17 19:15 / eli-b16
Surr: Toluene-d8	99.0	%REC		79-122		SW8260B	02/16/17 19:15 / eli-b16
VOLATILE ORGANIC COMPOUNDS							
Bromoform	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
Benzene	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
Bromobenzene	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
Bromochloromethane	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
Bromodichloromethane	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
Bromomethane	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
Carbon tetrachloride	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
Chlorobenzene	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
Chloroethane	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
2-Chloroethyl vinyl ether	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
Chloroform	15	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
Chloromethane	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
2-Chlorotoluene	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
4-Chlorotoluene	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
Chlorodibromomethane	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
1,2-Dibromoethane	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
Dibromomethane	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
1,2-Dichlorobenzene	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
1,3-Dichlorobenzene	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
1,4-Dichlorobenzene	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
Dichlorodifluoromethane	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
1,1-Dichloroethane	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
1,2-Dichloroethane	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: Whitefish Solvent Site
Lab ID: H17020183-001
Client Sample ID: GAC

Report Date: 02/23/17
Collection Date: 02/12/17 16:42
DateReceived: 02/14/17
Matrix: Solid

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
cis-1,2-Dichloroethene	638	mg/kg-dry		20		SW8260B	02/17/17 18:04 / kjw
1,1-Dichloroethene	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
trans-1,2-Dichloroethene	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
1,2-Dichloropropane	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
1,3-Dichloropropane	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
2,2-Dichloropropane	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
1,1-Dichloropropene	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
cis-1,3-Dichloropropene	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
trans-1,3-Dichloropropene	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
Ethylbenzene	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
Methyl tert-butyl ether (MTBE)	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
Methylene chloride	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
Methyl ethyl ketone	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
Styrene	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
1,1,1,2-Tetrachloroethane	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
1,1,2,2-Tetrachloroethane	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
Tetrachloroethene	2170	mg/kg-dry		60		SW8260B	02/17/17 17:31 / kjw
Toluene	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
1,1,1-Trichloroethane	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
1,1,2-Trichloroethane	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
Trichloroethene	150	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
Trichlorofluoromethane	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
1,2,3-Trichloropropane	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
Vinyl chloride	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
m+p-Xylenes	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
o-Xylene	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
Xylenes, Total	ND	mg/kg-dry		10		SW8260B	02/16/17 17:31 / kjw
Surr: p-Bromofluorobenzene	0	%REC	O	60-143		SW8260B	02/16/17 17:31 / kjw
Surr: Dibromofluoromethane	0	%REC	O	71-135		SW8260B	02/16/17 17:31 / kjw
Surr: 1,2-Dichloroethane-d4	0	%REC	O	65-147		SW8260B	02/16/17 17:31 / kjw
Surr: Toluene-d8	0	%REC	O	76-133		SW8260B	02/16/17 17:31 / kjw

- The reporting limit reflects a 50 times dilution. The sample was diluted due to sample matrix interference.

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
O - Diluted out.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: Whitefish Solvent Site
Lab ID: H17020183-002
Client Sample ID: Zeolite

Report Date: 02/23/17
Collection Date: 02/12/17 16:51
DateReceived: 02/14/17
Matrix: Solid

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL CHARACTERISTICS							
Moisture	2.63	wt%		0.20		A2540 G	02/15/17 15:43 / eli-b
VOLATILE ORGANIC COMPOUNDS, TCLP EXTRACTABLE							
Benzene	ND	mg/L		0.10	0.5	SW8260B	02/16/17 20:13 / eli-b16
Carbon tetrachloride	ND	mg/L		0.10	0.5	SW8260B	02/16/17 20:13 / eli-b16
Chlorobenzene	ND	mg/L		0.10	100	SW8260B	02/16/17 20:13 / eli-b16
Chloroform	ND	mg/L		0.10	6	SW8260B	02/16/17 20:13 / eli-b16
1,4-Dichlorobenzene	ND	mg/L		0.10	7.5	SW8260B	02/16/17 20:13 / eli-b16
1,2-Dichloroethane	ND	mg/L		0.10	0.5	SW8260B	02/16/17 20:13 / eli-b16
1,1-Dichloroethene	ND	mg/L		0.10	0.7	SW8260B	02/16/17 20:13 / eli-b16
Methyl ethyl ketone	ND	mg/L		2.0	200	SW8260B	02/16/17 20:13 / eli-b16
Tetrachloroethene	ND	mg/L		0.10	0.7	SW8260B	02/16/17 20:13 / eli-b16
Trichloroethene	ND	mg/L		0.10	0.5	SW8260B	02/16/17 20:13 / eli-b16
Vinyl chloride	ND	mg/L		0.10	0.2	SW8260B	02/16/17 20:13 / eli-b16
Surr: 1,2-Dichloroethane-d4	82.0	%REC		70-130		SW8260B	02/16/17 20:13 / eli-b16
Surr: Dibromofluoromethane	88.0	%REC		77-126		SW8260B	02/16/17 20:13 / eli-b16
Surr: p-Bromofluorobenzene	93.0	%REC		76-127		SW8260B	02/16/17 20:13 / eli-b16
Surr: Toluene-d8	102	%REC		79-122		SW8260B	02/16/17 20:13 / eli-b16
VOLATILE ORGANIC COMPOUNDS							
Bromoform	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
Benzene	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
Bromobenzene	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
Bromochloromethane	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
Bromodichloromethane	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
Bromomethane	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
Carbon tetrachloride	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
Chlorobenzene	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
Chloroethane	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
2-Chloroethyl vinyl ether	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
Chloroform	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
Chloromethane	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
2-Chlorotoluene	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
4-Chlorotoluene	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
Chlorodibromomethane	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
1,2-Dibromoethane	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
Dibromomethane	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
1,2-Dichlorobenzene	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
1,3-Dichlorobenzene	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
1,4-Dichlorobenzene	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
Dichlorodifluoromethane	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
1,1-Dichloroethane	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
1,2-Dichloroethane	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: Whitefish Solvent Site
Lab ID: H17020183-002
Client Sample ID: Zeolite

Report Date: 02/23/17
Collection Date: 02/12/17 16:51
DateReceived: 02/14/17
Matrix: Solid

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
cis-1,2-Dichloroethene	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
1,1-Dichloroethene	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
trans-1,2-Dichloroethene	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
1,2-Dichloropropane	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
1,3-Dichloropropane	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
2,2-Dichloropropane	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
1,1-Dichloropropene	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
cis-1,3-Dichloropropene	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
trans-1,3-Dichloropropene	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
Ethylbenzene	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
Methyl tert-butyl ether (MTBE)	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
Methylene chloride	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
Methyl ethyl ketone	ND	mg/kg-dry		4.0		SW8260B	02/22/17 20:03 / kjw
Styrene	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
1,1,1,2-Tetrachloroethane	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
1,1,2,2-Tetrachloroethane	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
Tetrachloroethene	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
Toluene	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
1,1,1-Trichloroethane	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
1,1,2-Trichloroethane	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
Trichloroethene	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
Trichlorofluoromethane	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
1,2,3-Trichloropropane	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
Vinyl chloride	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
m+p-Xylenes	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
o-Xylene	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
Xylenes, Total	ND	mg/kg-dry		0.20		SW8260B	02/22/17 20:03 / kjw
Surr: p-Bromofluorobenzene	127	%REC		60-143		SW8260B	02/22/17 20:03 / kjw
Surr: Dibromofluoromethane	100	%REC		71-135		SW8260B	02/22/17 20:03 / kjw
Surr: 1,2-Dichloroethane-d4	101	%REC		65-147		SW8260B	02/22/17 20:03 / kjw
Surr: Toluene-d8	110	%REC		76-133		SW8260B	02/22/17 20:03 / kjw

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Report Date: 02/23/17
Project: Whitefish Solvent Site
Work Order: H17020183

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2540 G									Batch: B_R274997
Lab ID: B17020878-001ADUP	Sample Duplicate				Run: SUB-B274997				02/15/17 15:46
Moisture	0.12	wt%	0.20						

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Report Date: 02/23/17
Project: Whitefish Solvent Site
Work Order: H17020183

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B									Batch: 36240
Lab ID: LCS-36240	Laboratory Control Sample				Run: 1SATURN_170216A				02/16/17 10:12
Benzene	1.18	mg/kg	0.20	118	71	119			
Bromobenzene	1.04	mg/kg	0.20	104	77	134			
Bromochloromethane	1.11	mg/kg	0.20	111	61	129			
Bromodichloromethane	0.992	mg/kg	0.20	99	64	139			
Bromoform	1.06	mg/kg	0.20	106	52	141			
Bromomethane	1.06	mg/kg	0.20	106	40	121			
Carbon tetrachloride	1.10	mg/kg	0.20	110	65	131			
Chlorobenzene	1.21	mg/kg	0.20	121	74	131			
Chlorodibromomethane	1.09	mg/kg	0.20	109	58	135			
Chloroethane	0.976	mg/kg	0.20	98	53	140			
2-Chloroethyl vinyl ether	0.864	mg/kg	0.20	86	67.2	113			
Chloroform	1.09	mg/kg	0.20	109	65	126			
Chloromethane	1.09	mg/kg	0.20	109	46	144			
2-Chlorotoluene	1.08	mg/kg	0.20	108	72	137			
4-Chlorotoluene	1.15	mg/kg	0.20	115	70	133			
1,2-Dibromoethane	1.17	mg/kg	0.20	117	54	131			
Dibromomethane	1.08	mg/kg	0.20	108	60	140			
1,2-Dichlorobenzene	1.21	mg/kg	0.20	121	61	137			
1,3-Dichlorobenzene	1.21	mg/kg	0.20	121	67	133			
1,4-Dichlorobenzene	1.08	mg/kg	0.20	108	62	137			
Dichlorodifluoromethane	0.808	mg/kg	0.20	81	38	132			
1,1-Dichloroethane	0.976	mg/kg	0.20	98	66	124			
1,2-Dichloroethane	0.992	mg/kg	0.20	99	54	125			
1,1-Dichloroethene	1.13	mg/kg	0.20	113	64	113			
cis-1,2-Dichloroethene	1.04	mg/kg	0.20	104	68	133			
trans-1,2-Dichloroethene	1.07	mg/kg	0.20	107	70	130			
1,2-Dichloropropane	1.07	mg/kg	0.20	107	78	143			
1,3-Dichloropropane	1.06	mg/kg	0.20	106	63	140			
2,2-Dichloropropane	1.21	mg/kg	0.20	121	71	137			
1,1-Dichloropropene	1.19	mg/kg	0.20	119	66	136			
cis-1,3-Dichloropropene	1.16	mg/kg	0.20	116	75	137			
trans-1,3-Dichloropropene	1.00	mg/kg	0.20	100	70	107			
Ethylbenzene	1.18	mg/kg	0.20	118	78	132			
Methyl tert-butyl ether (MTBE)	1.03	mg/kg	0.20	103	57	132			
Methyl ethyl ketone	10.5	mg/kg	4.0	105	50	150			
Methylene chloride	1.00	mg/kg	0.20	100	62	125			
Styrene	1.11	mg/kg	0.20	111	70	132			
1,1,1,2-Tetrachloroethane	1.12	mg/kg	0.20	112	73	127			
1,1,2,2-Tetrachloroethane	0.992	mg/kg	0.20	99	74	120			
Tetrachloroethene	1.18	mg/kg	0.20	118	84	108			S
Toluene	1.08	mg/kg	0.20	108	78	125			
1,1,1-Trichloroethane	1.15	mg/kg	0.20	115	73	124			
1,1,2-Trichloroethane	1.01	mg/kg	0.20	101	78	114			

Qualifiers:

RL - Analyte reporting limit.
ND - Not detected at the reporting limit.
S - Spike recovery outside of advisory limits.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: Whitefish Solvent Site

Report Date: 02/23/17
Work Order: H17020183

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B									Batch: 36240
Lab ID: LCS-36240	Laboratory Control Sample				Run: 1SATURN_170216A				02/16/17 10:12
Trichloroethene	1.08	mg/kg	0.20	108	70	144			
Trichlorofluoromethane	1.04	mg/kg	0.20	104	60	128			
1,2,3-Trichloropropane	1.03	mg/kg	0.20	103	63	148			
Vinyl chloride	0.992	mg/kg	0.20	99	64	124			
m+p-Xylenes	2.28	mg/kg	0.20	114	74	136			
o-Xylene	1.20	mg/kg	0.20	120	70	134			
Surr: 1,2-Dichloroethane-d4			0.20	87	65	147			
Surr: Dibromofluoromethane			0.20	102	71	135			
Surr: p-Bromofluorobenzene			0.20	106	60	143			
Surr: Toluene-d8			0.20	103	76	133			
Lab ID: MB-36240	Method Blank				Run: 1SATURN_170216A				02/16/17 11:22
Benzene	ND	mg/kg	0.20						
Bromobenzene	ND	mg/kg	0.20						
Bromochloromethane	ND	mg/kg	0.20						
Bromodichloromethane	ND	mg/kg	0.20						
Bromoform	ND	mg/kg	0.20						
Bromomethane	ND	mg/kg	0.20						
Carbon tetrachloride	ND	mg/kg	0.20						
Chlorobenzene	ND	mg/kg	0.20						
Chlorodibromomethane	ND	mg/kg	0.20						
Chloroethane	ND	mg/kg	0.20						
2-Chloroethyl vinyl ether	ND	mg/kg	0.20						
Chloroform	ND	mg/kg	0.20						
Chloromethane	ND	mg/kg	0.20						
2-Chlorotoluene	ND	mg/kg	0.20						
4-Chlorotoluene	ND	mg/kg	0.20						
1,2-Dibromoethane	ND	mg/kg	0.20						
Dibromomethane	ND	mg/kg	0.20						
1,2-Dichlorobenzene	ND	mg/kg	0.20						
1,3-Dichlorobenzene	ND	mg/kg	0.20						
1,4-Dichlorobenzene	ND	mg/kg	0.20						
Dichlorodifluoromethane	ND	mg/kg	0.20						
1,1-Dichloroethane	ND	mg/kg	0.20						
1,2-Dichloroethane	ND	mg/kg	0.20						
1,1-Dichloroethene	ND	mg/kg	0.20						
cis-1,2-Dichloroethene	ND	mg/kg	0.20						
trans-1,2-Dichloroethene	ND	mg/kg	0.20						
1,2-Dichloropropane	ND	mg/kg	0.20						
1,3-Dichloropropane	ND	mg/kg	0.20						
2,2-Dichloropropane	ND	mg/kg	0.20						
1,1-Dichloropropene	ND	mg/kg	0.20						
cis-1,3-Dichloropropene	ND	mg/kg	0.20						

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: Whitefish Solvent Site

Report Date: 02/23/17
Work Order: H17020183

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B									Batch: 36240
Lab ID: MB-36240	Method Blank				Run: 1SATURN_170216A				02/16/17 11:22
trans-1,3-Dichloropropene	ND	mg/kg	0.20						
Ethylbenzene	ND	mg/kg	0.20						
Methyl tert-butyl ether (MTBE)	ND	mg/kg	0.20						
Methyl ethyl ketone	ND	mg/kg	4.0						
Methylene chloride	ND	mg/kg	0.20						
Styrene	ND	mg/kg	0.20						
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.20						
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.20						
Tetrachloroethene	ND	mg/kg	0.20						
Toluene	ND	mg/kg	0.20						
1,1,1-Trichloroethane	ND	mg/kg	0.20						
1,1,2-Trichloroethane	ND	mg/kg	0.20						
Trichloroethene	ND	mg/kg	0.20						
Trichlorofluoromethane	ND	mg/kg	0.20						
1,2,3-Trichloropropane	ND	mg/kg	0.20						
Vinyl chloride	ND	mg/kg	0.20						
m+p-Xylenes	ND	mg/kg	0.20						
o-Xylene	ND	mg/kg	0.20						
Surr: 1,2-Dichloroethane-d4			0.20	86	65	147			
Surr: Dibromofluoromethane			0.20	99	71	135			
Surr: p-Bromofluorobenzene			0.20	106	60	143			
Surr: Toluene-d8			0.20	95	76	133			
Lab ID: H17020183-002AMS	Sample Matrix Spike				Run: 1SATURN_170222B				02/22/17 20:36
Benzene	2.05	mg/kg-dry	0.20	100	71	119			
Bromobenzene	2.12	mg/kg-dry	0.20	103	77	134			
Bromochloromethane	1.78	mg/kg-dry	0.20	87	61	129			
Bromodichloromethane	1.96	mg/kg-dry	0.20	96	64	139			
Bromoform	2.17	mg/kg-dry	0.20	106	52	141			
Bromomethane	1.62	mg/kg-dry	0.20	79	40	121			
Carbon tetrachloride	1.96	mg/kg-dry	0.20	96	65	131			
Chlorobenzene	2.28	mg/kg-dry	0.20	111	74	131			
Chlorodibromomethane	2.00	mg/kg-dry	0.20	98	58	135			
Chloroethane	0.316	mg/kg-dry	0.20	15	53	140			S
2-Chloroethyl vinyl ether	2.83	mg/kg-dry	0.20	138	67.2	113			S
Chloroform	1.87	mg/kg-dry	0.20	91	65	126			
Chloromethane	1.56	mg/kg-dry	0.20	76	46	144			
2-Chlorotoluene	2.22	mg/kg-dry	0.20	108	72	137			
4-Chlorotoluene	2.25	mg/kg-dry	0.20	110	70	133			
1,2-Dibromoethane	2.09	mg/kg-dry	0.20	102	54	131			
Dibromomethane	1.89	mg/kg-dry	0.20	92	60	140			
1,2-Dichlorobenzene	2.16	mg/kg-dry	0.20	105	61	137			
1,3-Dichlorobenzene	2.30	mg/kg-dry	0.20	112	67	133			

Qualifiers:

RL - Analyte reporting limit.
ND - Not detected at the reporting limit.
S - Spike recovery outside of advisory limits.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Report Date: 02/23/17
Project: Whitefish Solvent Site
Work Order: H17020183

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B									Batch: 36240
Lab ID: H17020183-002AMS	Sample Matrix Spike				Run: 1SATURN_170222B			02/22/17 20:36	
1,4-Dichlorobenzene	2.15	mg/kg-dry	0.20	105	62	137			
Dichlorodifluoromethane	1.10	mg/kg-dry	0.20	54	38	132			
1,1-Dichloroethane	1.91	mg/kg-dry	0.20	93	66	124			
1,2-Dichloroethane	1.91	mg/kg-dry	0.20	93	54	125			
1,1-Dichloroethene	2.03	mg/kg-dry	0.20	99	64	113			
cis-1,2-Dichloroethene	1.87	mg/kg-dry	0.20	91	68	133			
trans-1,2-Dichloroethene	1.95	mg/kg-dry	0.20	95	70	130			
1,2-Dichloropropane	1.94	mg/kg-dry	0.20	94	78	143			
1,3-Dichloropropane	2.13	mg/kg-dry	0.20	104	63	140			
2,2-Dichloropropane	2.13	mg/kg-dry	0.20	104	71	137			
1,1-Dichloropropene	2.21	mg/kg-dry	0.20	108	66	136			
cis-1,3-Dichloropropene	2.23	mg/kg-dry	0.20	109	75	137			
trans-1,3-Dichloropropene	2.14	mg/kg-dry	0.20	104	70	107			
Ethylbenzene	2.20	mg/kg-dry	0.20	107	78	132			
Methyl tert-butyl ether (MTBE)	1.96	mg/kg-dry	0.20	96	57	132			
Methyl ethyl ketone	19.8	mg/kg-dry	4.0	96	50	150			
Methylene chloride	1.62	mg/kg-dry	0.20	79	62	125			
Styrene	2.19	mg/kg-dry	0.20	107	70	132			
1,1,1,2-Tetrachloroethane	1.95	mg/kg-dry	0.20	95	73	127			
1,1,2,2-Tetrachloroethane	1.84	mg/kg-dry	0.20	90	74	120			
Tetrachloroethene	2.33	mg/kg-dry	0.20	111	84	108			S
Toluene	2.28	mg/kg-dry	0.20	111	78	125			
1,1,1-Trichloroethane	1.88	mg/kg-dry	0.20	92	73	124			
1,1,2-Trichloroethane	2.11	mg/kg-dry	0.20	103	78	114			
Trichloroethene	2.24	mg/kg-dry	0.20	109	70	144			
Trichlorofluoromethane	1.81	mg/kg-dry	0.20	88	60	128			
1,2,3-Trichloropropane	2.31	mg/kg-dry	0.20	112	63	148			
Vinyl chloride	1.73	mg/kg-dry	0.20	84	64	124			
m+p-Xylenes	4.54	mg/kg-dry	0.20	110	74	136			E
o-Xylene	2.25	mg/kg-dry	0.20	110	70	134			
Surr: 1,2-Dichloroethane-d4			0.20	89	65	147			
Surr: Dibromofluoromethane			0.20	90	71	135			
Surr: p-Bromofluorobenzene			0.20	104	60	143			
Surr: Toluene-d8			0.20	99	76	133			
Lab ID: H17020183-002AMSD	Sample Matrix Spike Duplicate				Run: 1SATURN_170222B			02/22/17 21:09	
Benzene	2.30	mg/kg-dry	0.20	112	71	119	12	20	
Bromobenzene	2.25	mg/kg-dry	0.20	110	77	134	6.0	20	
Bromochloromethane	1.91	mg/kg-dry	0.20	93	61	129	6.7	20	
Bromodichloromethane	2.05	mg/kg-dry	0.20	100	64	139	4.1	20	
Bromoform	2.20	mg/kg-dry	0.20	107	52	141	1.5	20	
Bromomethane	1.59	mg/kg-dry	0.20	77	40	121	2.1	20	
Carbon tetrachloride	2.20	mg/kg-dry	0.20	107	65	131	11	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

E - Estimated value. Result exceeds the instrument upper quantitation limit.

S - Spike recovery outside of advisory limits.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Report Date: 02/23/17
Project: Whitefish Solvent Site
Work Order: H17020183

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B									Batch: 36240
Lab ID: H17020183-002AMSD	Sample Matrix Spike Duplicate				Run: 1SATURN_170222B			02/22/17 21:09	
Chlorobenzene	2.35	mg/kg-dry	0.20	114	74	131	2.8	20	
Chlorodibromomethane	2.08	mg/kg-dry	0.20	101	58	135	3.6	20	
Chloroethane	0.321	mg/kg-dry	0.20	16	53	140	1.5	20	S
2-Chloroethyl vinyl ether	2.90	mg/kg-dry	0.20	141	67.2	113	2.6	20	S
Chloroform	2.04	mg/kg-dry	0.20	99	65	126	8.4	20	
Chloromethane	1.50	mg/kg-dry	0.20	73	46	144	4.3	20	
2-Chlorotoluene	2.25	mg/kg-dry	0.20	110	72	137	1.5	20	
4-Chlorotoluene	2.56	mg/kg-dry	0.20	124	70	133	13	20	
1,2-Dibromoethane	2.09	mg/kg-dry	0.20	102	54	131	0.0	20	
Dibromomethane	2.10	mg/kg-dry	0.20	102	60	140	11	20	
1,2-Dichlorobenzene	2.44	mg/kg-dry	0.20	119	61	137	12	20	
1,3-Dichlorobenzene	2.34	mg/kg-dry	0.20	114	67	133	1.8	20	
1,4-Dichlorobenzene	2.26	mg/kg-dry	0.20	110	62	137	4.8	20	
Dichlorodifluoromethane	0.978	mg/kg-dry	0.20	48	38	132	12	20	
1,1-Dichloroethane	2.12	mg/kg-dry	0.20	103	66	124	11	20	
1,2-Dichloroethane	2.07	mg/kg-dry	0.20	101	54	125	8.3	20	
1,1-Dichloroethene	2.06	mg/kg-dry	0.20	100	64	113	1.6	20	
cis-1,2-Dichloroethene	2.11	mg/kg-dry	0.20	103	68	133	12	20	
trans-1,2-Dichloroethene	2.08	mg/kg-dry	0.20	101	70	130	6.5	20	
1,2-Dichloropropane	2.10	mg/kg-dry	0.20	102	78	143	8.1	20	
1,3-Dichloropropane	2.37	mg/kg-dry	0.20	115	63	140	11	20	
2,2-Dichloropropane	2.09	mg/kg-dry	0.20	102	71	137	1.9	20	
1,1-Dichloropropene	2.51	mg/kg-dry	0.20	122	66	136	13	20	
cis-1,3-Dichloropropene	2.42	mg/kg-dry	0.20	118	75	137	8.1	20	
trans-1,3-Dichloropropene	2.19	mg/kg-dry	0.20	107	70	107	2.7	20	
Ethylbenzene	2.31	mg/kg-dry	0.20	112	78	132	4.7	20	
Methyl tert-butyl ether (MTBE)	1.88	mg/kg-dry	0.20	92	57	132	4.3	20	
Methyl ethyl ketone	20.8	mg/kg-dry	4.0	101	50	150	4.9	20	
Methylene chloride	1.65	mg/kg-dry	0.20	80	62	125	2.0	20	
Styrene	2.37	mg/kg-dry	0.20	116	70	132	7.9	20	
1,1,1,2-Tetrachloroethane	1.98	mg/kg-dry	0.20	96	73	127	1.7	20	
1,1,2,2-Tetrachloroethane	1.94	mg/kg-dry	0.20	94	74	120	5.2	20	
Tetrachloroethene	2.38	mg/kg-dry	0.20	114	84	108	2.4	20	S
Toluene	2.39	mg/kg-dry	0.20	116	78	125	4.9	20	
1,1,1-Trichloroethane	2.12	mg/kg-dry	0.20	103	73	124	12	20	
1,1,2-Trichloroethane	2.22	mg/kg-dry	0.20	108	78	114	4.9	20	
Trichloroethene	2.41	mg/kg-dry	0.20	117	70	144	7.1	20	
Trichlorofluoromethane	1.77	mg/kg-dry	0.20	86	60	128	2.3	20	
1,2,3-Trichloropropane	2.32	mg/kg-dry	0.20	113	63	148	0.4	20	
Vinyl chloride	1.61	mg/kg-dry	0.20	78	64	124	6.9	20	
m+p-Xylenes	4.81	mg/kg-dry	0.20	117	74	136	6.0	20	E
o-Xylene	2.28	mg/kg-dry	0.20	111	70	134	1.1	20	
Surr: 1,2-Dichloroethane-d4			0.20	85	65	147			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

E - Estimated value. Result exceeds the instrument upper quantitation limit.

S - Spike recovery outside of advisory limits.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Report Date: 02/23/17
Project: Whitefish Solvent Site
Work Order: H17020183

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B									Batch: 36240
Lab ID: H17020183-002AMSD	Sample Matrix Spike Duplicate				Run: 1SATURN_170222B				02/22/17 21:09
Surr: Dibromofluoromethane			0.20	89	71	135			
Surr: p-Bromofluorobenzene			0.20	103	60	143			
Surr: Toluene-d8			0.20	104	76	133			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: Whitefish Solvent Site

Report Date: 02/23/17
Work Order: H17020183

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B									Batch: B_106763
Lab ID: mb-106763	Method Blank				Run: SUB-B275059				02/16/17 18:45
Benzene	ND	mg/L	0.010						
Carbon tetrachloride	ND	mg/L	0.010						
Chlorobenzene	ND	mg/L	0.010						
Chloroform	ND	mg/L	0.010						
1,4-Dichlorobenzene	ND	mg/L	0.010						
1,2-Dichloroethane	ND	mg/L	0.010						
1,1-Dichloroethene	ND	mg/L	0.010						
Methyl ethyl ketone	ND	mg/L	0.20						
Tetrachloroethene	ND	mg/L	0.010						
Trichloroethene	ND	mg/L	0.010						
Vinyl chloride	ND	mg/L	0.010						
Surr: 1,2-Dichloroethane-d4			0.010	80	70	130			
Surr: Dibromofluoromethane			0.010	88	77	126			
Surr: p-Bromofluorobenzene			0.010	94	76	127			
Surr: Toluene-d8			0.010	99	79	122			
Lab ID: lcs021617	Laboratory Control Sample				Run: SUB-B275059				02/16/17 09:58
Benzene	0.00492	mg/L	0.0010	98	71	133			
Carbon tetrachloride	0.00396	mg/L	0.0010	79	61	144			
Chlorobenzene	0.00488	mg/L	0.0010	98	78	136			
Chloroform	0.00448	mg/L	0.0010	90	69	133			
1,4-Dichlorobenzene	0.00492	mg/L	0.0010	98	78	132			
1,2-Dichloroethane	0.00364	mg/L	0.0010	73	57	146			
1,1-Dichloroethene	0.00432	mg/L	0.0010	86	66	142			
Methyl ethyl ketone	0.0476	mg/L	0.020	95	55	145			
Tetrachloroethene	0.00472	mg/L	0.0010	94	78	137			
Trichloroethene	0.00448	mg/L	0.0010	90	75	138			
Vinyl chloride	0.00508	mg/L	0.0010	102	66	140			
Surr: 1,2-Dichloroethane-d4			0.0010	82	70	130			
Surr: Dibromofluoromethane			0.0010	90	77	126			
Surr: p-Bromofluorobenzene			0.0010	94	76	127			
Surr: Toluene-d8			0.0010	98	79	122			
Lab ID: H17020183-001A	Sample Matrix Spike				Run: SUB-B275059				02/16/17 19:44
Benzene	0.480	mg/L	0.10	96	71	133			
Carbon tetrachloride	0.364	mg/L	0.10	73	61	144			
Chlorobenzene	0.464	mg/L	0.10	93	78	136			
Chloroform	0.432	mg/L	0.10	86	69	133			
1,4-Dichlorobenzene	0.468	mg/L	0.10	94	78	132			
1,2-Dichloroethane	0.359	mg/L	0.10	72	57	146			
1,1-Dichloroethene	0.420	mg/L	0.10	84	66	142			
Methyl ethyl ketone	4.80	mg/L	2.0	96	55	145			
Tetrachloroethene	0.564	mg/L	0.10	90	78	137			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Report Date: 02/23/17
Project: Whitefish Solvent Site
Work Order: H17020183

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B									Batch: B_106763
Lab ID: H17020183-001A	Sample Matrix Spike				Run: SUB-B275059				02/16/17 19:44
Trichloroethene	0.464	mg/L	0.10	93	75	138			
Vinyl chloride	0.484	mg/L	0.10	97	66	140			
Surr: 1,2-Dichloroethane-d4			0.10	80	70	130			
Surr: Dibromofluoromethane			0.10	88	77	126			
Surr: p-Bromofluorobenzene			0.10	93	76	127			
Surr: Toluene-d8			0.10	103	79	122			
Lab ID: H17020183-002A	Sample Matrix Spike				Run: SUB-B275059				02/16/17 20:42
Benzene	0.500	mg/L	0.10	100	71	133			
Carbon tetrachloride	0.374	mg/L	0.10	75	61	144			
Chlorobenzene	0.480	mg/L	0.10	96	78	136			
Chloroform	0.452	mg/L	0.10	90	69	133			
1,4-Dichlorobenzene	0.496	mg/L	0.10	99	78	132			
1,2-Dichloroethane	0.377	mg/L	0.10	75	57	146			
1,1-Dichloroethene	ND	mg/L	0.10	0	66	142			1 S
Methyl ethyl ketone	4.60	mg/L	2.0	92	55	145			
Tetrachloroethene	0.376	mg/L	0.10	75	78	137			S
Trichloroethene	ND	mg/L	0.10	0	75	138			1 S
Vinyl chloride	ND	mg/L	0.10	0	66	140			1 S
Surr: 1,2-Dichloroethane-d4			0.10	80	70	130			
Surr: Dibromofluoromethane			0.10	88	77	126			
Surr: p-Bromofluorobenzene			0.10	93	76	127			
Surr: Toluene-d8			0.10	98	79	122			

- 1 = The compound was not recovered in the matrix spike sample performed on this sample. The recovery of this compound was normal in the Laboratory Control Sample (LCS). The compound appears to have reacted with the sample matrix.

Qualifiers:

RL - Analyte reporting limit.
ND - Not detected at the reporting limit.
S - Spike recovery outside of advisory limits.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: Whitefish Solvent Site

Report Date: 02/23/17
Work Order: H17020183

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B									Analytical Run: R122777
Lab ID: 021617_CCV_2	Continuing Calibration Verification Standard								02/16/17 09:28
Benzene	1.01	mg/kg	0.20	101	70	130			
Bromobenzene	0.992	mg/kg	0.20	99	70	130			
Bromochloromethane	0.912	mg/kg	0.20	91	70	130			
Bromodichloromethane	0.936	mg/kg	0.20	94	70	130			
Bromoform	1.01	mg/kg	0.20	101	70	130			
Bromomethane	0.912	mg/kg	0.20	91	70	130			
Carbon tetrachloride	0.920	mg/kg	0.20	92	70	130			
Chlorobenzene	1.05	mg/kg	0.20	105	70	130			
Chlorodibromomethane	1.01	mg/kg	0.20	101	70	130			
Chloroethane	0.896	mg/kg	0.20	90	70	130			
2-Chloroethyl vinyl ether	0.757	mg/kg	0.20	76	70	130			
Chloroform	0.920	mg/kg	0.20	92	80	120			
Chloromethane	1.00	mg/kg	0.20	100	70	130			
2-Chlorotoluene	0.968	mg/kg	0.20	97	70	130			
4-Chlorotoluene	1.02	mg/kg	0.20	102	70	130			
1,2-Dibromoethane	0.976	mg/kg	0.20	98	70	130			
Dibromomethane	0.920	mg/kg	0.20	92	70	130			
1,2-Dichlorobenzene	1.01	mg/kg	0.20	101	70	130			
1,3-Dichlorobenzene	1.05	mg/kg	0.20	105	70	130			
1,4-Dichlorobenzene	0.960	mg/kg	0.20	96	70	130			
Dichlorodifluoromethane	0.904	mg/kg	0.20	90	70	130			
1,1-Dichloroethane	0.856	mg/kg	0.20	86	70	130			
1,2-Dichloroethane	0.896	mg/kg	0.20	90	70	130			
1,1-Dichloroethene	0.960	mg/kg	0.20	96	80	120			
trans-1,2-Dichloroethene	0.920	mg/kg	0.20	92	70	130			
1,2-Dichloropropane	0.936	mg/kg	0.20	94	80	120			
1,3-Dichloropropane	0.912	mg/kg	0.20	91	70	130			
2,2-Dichloropropane	1.10	mg/kg	0.20	110	70	130			
1,1-Dichloropropene	1.03	mg/kg	0.20	103	70	130			
cis-1,3-Dichloropropene	0.976	mg/kg	0.20	98	70	130			
trans-1,3-Dichloropropene	0.984	mg/kg	0.20	98	70	130			
Ethylbenzene	1.02	mg/kg	0.20	102	80	120			
Methyl tert-butyl ether (MTBE)	0.856	mg/kg	0.20	86	70	130			
Methyl ethyl ketone	11.0	mg/kg	4.0	110	70	130			
Methylene chloride	0.832	mg/kg	0.20	83	70	130			
Styrene	0.960	mg/kg	0.20	96	70	130			
1,1,1,2-Tetrachloroethane	0.984	mg/kg	0.20	98	70	130			
1,1,2,2-Tetrachloroethane	0.896	mg/kg	0.20	90	70	130			
Toluene	0.944	mg/kg	0.20	94	80	120			
1,1,1-Trichloroethane	0.936	mg/kg	0.20	94	70	130			
1,1,2-Trichloroethane	0.888	mg/kg	0.20	89	70	130			
Trichloroethene	0.944	mg/kg	0.20	94	70	130			
Trichlorofluoromethane	0.928	mg/kg	0.20	93	70	130			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: Whitefish Solvent Site

Report Date: 02/23/17
Work Order: H17020183

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B									Analytical Run: R122777
Lab ID: 021617_CCV_2	Continuing Calibration Verification Standard								02/16/17 09:28
1,2,3-Trichloropropane	0.992	mg/kg	0.20	99	70	130			
Vinyl chloride	0.840	mg/kg	0.20	84	80	120			
m+p-Xylenes	1.99	mg/kg	0.20	100	70	130			
o-Xylene	1.00	mg/kg	0.20	100	70	130			
Surr: 1,2-Dichloroethane-d4			0.20	82	70	130			
Surr: Dibromofluoromethane			0.20	97	70	130			
Surr: p-Bromofluorobenzene			0.20	96	70	130			
Surr: Toluene-d8			0.20	100	70	130			
Method: SW8260B									Analytical Run: R122802
Lab ID: 021717_CCV_2	Continuing Calibration Verification Standard								02/17/17 09:35
cis-1,2-Dichloroethene	0.992	mg/kg	0.20	99	70	130			
Tetrachloroethene	1.04	mg/kg	0.20	104	70	130			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Project: Whitefish Solvent Site

Report Date: 02/23/17
Work Order: H17020183

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B									Analytical Run: R122910
Lab ID: 022217_CCV_2	Continuing Calibration Verification Standard								02/22/17 09:28
Benzene	1.02	mg/kg	0.20	102	70	130			
Bromobenzene	1.08	mg/kg	0.20	108	70	130			
Bromochloromethane	0.880	mg/kg	0.20	88	70	130			
Bromodichloromethane	0.984	mg/kg	0.20	98	70	130			
Bromoform	1.05	mg/kg	0.20	105	70	130			
Bromomethane	0.928	mg/kg	0.20	93	70	130			
Carbon tetrachloride	1.00	mg/kg	0.20	100	70	130			
Chlorobenzene	1.04	mg/kg	0.20	104	70	130			
Chlorodibromomethane	0.928	mg/kg	0.20	93	70	130			
Chloroethane	0.992	mg/kg	0.20	99	70	130			
2-Chloroethyl vinyl ether	0.746	mg/kg	0.20	75	70	130			
Chloroform	0.944	mg/kg	0.20	94	80	120			
Chloromethane	1.03	mg/kg	0.20	103	70	130			
2-Chlorotoluene	1.13	mg/kg	0.20	113	70	130			
4-Chlorotoluene	1.13	mg/kg	0.20	113	70	130			
1,2-Dibromoethane	1.10	mg/kg	0.20	110	70	130			
Dibromomethane	0.960	mg/kg	0.20	96	70	130			
1,2-Dichlorobenzene	1.14	mg/kg	0.20	114	70	130			
1,3-Dichlorobenzene	1.15	mg/kg	0.20	115	70	130			
1,4-Dichlorobenzene	1.04	mg/kg	0.20	104	70	130			
Dichlorodifluoromethane	1.00	mg/kg	0.20	100	70	130			
1,1-Dichloroethane	0.904	mg/kg	0.20	90	70	130			
1,2-Dichloroethane	0.928	mg/kg	0.20	93	70	130			
1,1-Dichloroethene	1.07	mg/kg	0.20	107	80	120			
cis-1,2-Dichloroethene	0.944	mg/kg	0.20	94	70	130			
trans-1,2-Dichloroethene	0.968	mg/kg	0.20	97	70	130			
1,2-Dichloropropane	1.02	mg/kg	0.20	102	80	120			
1,3-Dichloropropane	0.968	mg/kg	0.20	97	70	130			
2,2-Dichloropropane	1.12	mg/kg	0.20	112	70	130			
1,1-Dichloropropene	1.06	mg/kg	0.20	106	70	130			
cis-1,3-Dichloropropene	1.05	mg/kg	0.20	105	70	130			
trans-1,3-Dichloropropene	0.992	mg/kg	0.20	99	70	130			
Ethylbenzene	1.10	mg/kg	0.20	110	80	120			
Methyl tert-butyl ether (MTBE)	0.864	mg/kg	0.20	86	70	130			
Methyl ethyl ketone	8.56	mg/kg	4.0	86	70	130			
Methylene chloride	0.864	mg/kg	0.20	86	70	130			
Styrene	1.08	mg/kg	0.20	108	70	130			
1,1,1,2-Tetrachloroethane	0.952	mg/kg	0.20	95	70	130			
1,1,2,2-Tetrachloroethane	0.992	mg/kg	0.20	99	70	130			
Tetrachloroethene	1.22	mg/kg	0.20	122	70	130			
Toluene	1.11	mg/kg	0.20	111	80	120			
1,1,1-Trichloroethane	0.992	mg/kg	0.20	99	70	130			
1,1,2-Trichloroethane	0.960	mg/kg	0.20	96	70	130			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Trihydro-Laramie
Report Date: 02/23/17
Project: Whitefish Solvent Site
Work Order: H17020183

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8260B									Analytical Run: R122910
Lab ID: 022217_CCV_2	Continuing Calibration Verification Standard								02/22/17 09:28
Trichloroethene	1.07	mg/kg	0.20	107	70	130			
Trichlorofluoromethane	0.976	mg/kg	0.20	98	70	130			
1,2,3-Trichloropropane	1.06	mg/kg	0.20	106	70	130			
Vinyl chloride	0.888	mg/kg	0.20	89	80	120			
m+p-Xylenes	2.11	mg/kg	0.20	106	70	130			
o-Xylene	1.14	mg/kg	0.20	114	70	130			
Surr: 1,2-Dichloroethane-d4			0.20	86	70	130			
Surr: Dibromofluoromethane			0.20	93	70	130			
Surr: p-Bromofluorobenzene			0.20	101	70	130			
Surr: Toluene-d8			0.20	102	70	130			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

Work Order Receipt Checklist

Trihydro-Laramie H17020183

Login completed by: Tracy L. Lorash
Reviewed by: BL2000\wjohnson
Reviewed Date: 2/15/2017

Date Received: 2/14/2017
Received by: wjj
Carrier name: Hand Del

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☐	No ☑	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	2.6°C On Ice		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☐	Not Applicable ☑

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

Contact and Corrective Action Comments:

Lid on GAC jar was received broken.
Per Andrew Vann, we are to analyze for 8260 short list and 8260 TCLP. tl 2/14/17

ENERGY LAB
Trust our People. Trust our Data.

Chain of Custody & Analytical Request Record

www.energylab.com

Account Information (Billing information)

Company/Name	Trihydro Corp
Contact	Andrew Vann
Phone	307-745-8474
Mailing Address	1252 Commerce Dr
City, State, Zip	Laramie, WY 82070
Email	avann@trihydro.com
Receive Invoice	☐Hard Copy ☒Email
Receive Report	☐Hard Copy ☒Email
Purchase Order	
Quote	
Bottle Order	22827

Report Information (if different than Account Information)

Company/Name	
Contact	
Phone	
Mailing Address	
City, State, Zip	
Email	
Receive Report	☐Hard Copy ☐Email

Special Report/Formats: ☐ LEVEL IV ☐ NELAC ☐ EDD/EDT (contact laboratory) ☐ Other_____

Comments

Project Information

Project Name, PWSID, Permit, etc.	Whitefish Solvent Site
Sampler Name	Andrew Vann
Sampler Phone	307-399-7144
Sample Origin State	MT
EPA/State Compliance	☐ Yes ☒ No

MINING CLIENTS, please indicate sample type.
*If ore has been processed or refined, call before sending.
☐ Byproduct 11 (e)2 material ☐ Unprocessed ore (NOT ground or refined)*

Matrix Codes
A - Air
W - Water
S - Soils/Solids
V - Vegetation
B - Bioassay
O - Other
DW - Drinking Water

All turnaround times are standard unless marked as RUSH.
Energy Laboratories MUST be contacted prior to RUSH sample submittal for charges and scheduling – See Instructions Page

Analysis Requested

Sample Identification (Name, Location, Interval, etc.)	Collection Date	Collection Time	Number of Containers	Matrix (See Codes Above)	8260 VOCs									See Attached	RUSH TAT	ELI LAB ID (Laboratory Use Only)
1 GAC	2/12/17	1642	1	S	X										X	H17020183
2 Zeolite	2/12/17	1651	1	S	X										X	
3																
4																
5																
6																
7																
8																
9																
10																

Custody Record MUST be signed	Relinquished by (print)	Date/Time	Signature	Received by (print)	Date/Time	Signature
	Andrew Vann	2/12/17 1900	[signature]			
	Joel Ribli	2/14/17 1244	[signature]	Wanda Jam	2-14-17 12	[signature]

LABORATORY USE ONLY

Shipped By	Cooler ID(s)	Custody Seals	Intact	Receipt Temp	Temp Blank	On Ice	Payment Type	Amount	Receipt Number (cash/check only)
hand	365	Y N C B	Y N	2.6 °C	Y N	Y N	CC Cash Check_____	$	

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested.

APPENDIX E

SVE MANUALS

ONION EQUIP CO.

Vapor Extraction System
OPERATING AND MAINTENANCE INSTRUCTIONS

Barry Zuibleman 239-566-700
Kyle Combs 765-748-1919

Submitted To:

Jacobs

F22 Weapons Shop SVE Blower Module and Controls

August, 2011

Check rotation of all motors, Change wiring
Check panel for wires that came loose during shipping

ONION EQUIP CO.

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ONION EQUIP CO.

1.0 INTRODUCTION

We at Onion Enterprises Company (OE.) are highly pleased that you have selected us for your VES Treatment Systems. OE products are tested and inspected before leaving the factory. However, certain checks should be made before putting the system into regular operation. Please read the initial start up requirements in the Maintenance Instructions.

We hope you use it, to get to know your system and how to get the most out of it. That is why we urge you to read this manual from cover to cover. First, you will become familiar with the various controls and instruments. As you read further, we tell you how to maintain your system and what services need to be performed to keep it in excellent running condition.

The subject index on the title page permits you to quickly open the manual to any section.

2.0 PARTS AND SERVICES

Replacement parts can be obtained through our manufacturing company or directly through the distributors of such products. The distributors of these products are listed in the "spare parts list

2.1 Controls

Hand off auto: There are Two (2) hand off auto (HOA) switches located in the front panel of the control panel. These switches will allow you to turn the corresponding motor to hand position, auto position or to off. By turning the switch to vertical position, the motor can be turned off.

Alarm reset: An alarm reset button is located in the front of the control panel. In the event the system is in the shut down mode, and system needs to be turned back into auto mode, the alarm reset button should be depressed after correcting the respective reason for the shut-off.

Alarm Points

- High liquid level condensate separator: The condensate tank is designed to remove water particles present as moisture from the intake of the Vacuum pump.
  High high-level switch: The moisture separator acts as a reservoir to collect water. The transfer pump automatically pumps the collected water out of the moisture separator. However, if this pump fails to keep up with the influent flow, a high high liquid level switch will allow the system to go into system fail/safe mode.

- High Vacuum switch: The high vacuum switch is used to protect the blower. Although, high vacuum is unlikely, if it does occur it will shut down the blower. Typically this is caused by human error, valves closed, air lines crushed.

Motor Thermal Overloads: All the pumps and the blower have motors necessary to drive the respective pumps and blower. The horsepower of these motors is adequately designed and provided accordingly. However, due to any abnormal operating conditions, such as clogged filters, clogged suction or discharge lines, if the motors draw more than the rated amperage, then the system will go into system fail/safe mode.

Pump controls: one transfer pump operates utilizing pump controls. These pump controls are essentially two level switches positioned at different elevations for the pumps to operate within the difference elevation. Pump motors will turn on when both the level switches are closed and will continue to operate until both level switches are open.

2.2 Instruments

Water flow meter: In this groundwater treatment, system a water total flow meter is used to account for the total water pumped prior to discharge.

Air flow meter: The air flow meter indicates air flow in cfm.

3.0 OPERATING INSTRUCTIONS

3.1 Starting the system

Before starting the system, the VES blower needs to be filled with oil. Watch the fill tube on the side of the unit

Check rotation of all motors, if reversed
Check panel for wires that came loose during shipping

Your VES treatment system consists of several moving parts, hence require lubrication. The system released from the factory is full of oil prior to starting the system. However, as a safety precaution, please verify the oil level on the pump ring gauge for normal operating levels. Please refer to the factory manual for proper operating levels.

ONION EQUIP CO.

Important! Prior to starting unit check for correct rotation

Your VES treatment system is equipped with air filters. Please verify periodically for particulate build up in the air filter cartridges, if there is any noticeable build up of particulate, please change the corresponding cartridge with new one. New cartridges may be obtained from OE. manufacturing facility.

WARNING! Be sure to follow all local codes and regulations with respect to installation and operation of the blower. The blower motor should be wired to a branch circuit disconnect and all other safety devices Recommended by the relevant sections of NFPA 70, National Electrical Code, and in accordance with all applicable state and local regulations and Requirements.

Installation Procedure

Perform the installation exactly in accordance with the following steps:

1. For vacuum operation, connect the suction pipe to connection A, and for pressure operation connect the pressure pipe to connection B (See Figure 1). Install startup screens before startup to protect pump from debris.

CAUTION! Design your piping system to avoid unnecessary pressure loss, which may significantly affect the operation of any regenerative blower. Contact your OEC representative for assistance in designing and configuring an appropriate piping system for your application.

For alternation between vacuum and pressure in any application, changeover valves are available. Use of the changeover valve allows the same connection to be used for both vacuum and pressure.

ONION EQUIP CO.

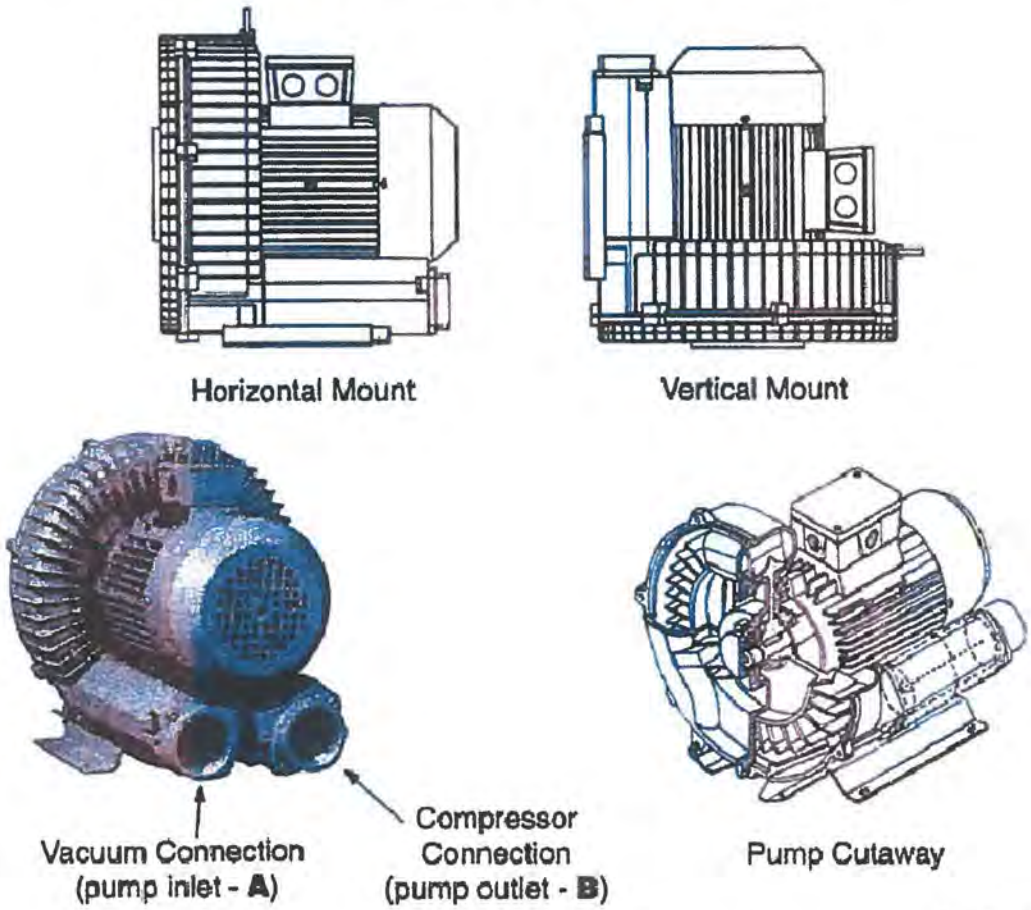

Figure 1

2. The electrical data shown in Tables 1 to 4 should be confirmed by examination of the motor data plate on your 3BA blower. The motors feature Class F insulation as a standard and are UL recognized for applications in both Canada and the United States (CUL). Motors are IEC design IP55, equal to a NEMA TEFC motor design. The connection diagram for the motors can be found in the inside of the terminal box cover. Be sure to confirm that your electrical supply has sufficient capacity to operate the blower according to the nameplate requirements.

3. A magnetic motor starter should always be used to connect the motor to the power supply. It is advisable to use thermal overload motor starters to provide 16 maximum protection for the motor and wiring. All cabling used on starters should be secured with good quality cable clamps. We recommend that the motor starters used feature a time delay trip on high amperage to avoid nuisance

trips on start-up. When the unit is started cold, over amperage may be experienced for a short time due to the higher resistance of the windings at lower temperatures. If using a change over or solenoid valve, ensure that the voltage connected to the valve matches that shown on the valve instructions or nameplate. Most valves are rated for 110 Volts 60Hz or 220 Volts 50 Hz. Connection of these valves to higher voltages may result in immediate valve failure.

WARNING! The electrical installation should be made by a qualified electrician and in complete compliance with all NFPA 70 (National Electrical Code) requirements along with all state and local code requirements. The main disconnect and motors starters are assumed to be provided by others.

4. Install the necessary relief valves and confirm their proper operation.

3. Start-up

CAUTION! Do not start the blower motor more than 10 times in one hour. If multiple and frequent start-ups are required by your application, install a minimum run timer in the motor control circuit to avoid decreased motor life and possible fire due to over-starting of the motor.

1. Before operation, confirm the correct direction of rotation by jogging (switching rapidly on and off) the motor and observing the motor fan rotation in the same direction as the arrow. If the direction of rotation is incorrect, lock out the power and switch two leads (three phase) or rewire (single phase) to effect the opposite rotation direction. Recheck the direction of rotation before proceeding.

2. Do not operate the blower at pressure or vacuum ranges that exceed those shown in Tables one through four for the model being installed. This can be achieved by use of the recommended relief valve shown in Table 5.

Note: Relief valves that have been factory pre-set have a label indicating the set pressure and an arrow indicating the direction of flow. The arrow will point into the pipe when installed in vacuum applications and out of the pipe when installed in pressure applications. Do not re-set the relief valve if it has been pre-set from the factory.

In the event the relief valve setting needs to be reset, adjust the set screw to increase or decrease the tension on the spring. Place the blower in operation and note the current draw of the motor. When the current draw of the motor is near the maximum noted on the motor nameplate, tighten the locking nut on the valve and proceed.

ONION EQUIP CO.

3. When checking the current draw of the motor with an ammeter, be sure to confirm the voltage at the motor junction box. Low voltage conditions may result in difficulty starting or in unexpected motor failure or motor starter trips.

Potential Risks for Operators

Noise emission: Free field noise limits are indicated in Tables one through four. Hearing protection is not normally required at the expected noise generation levels in the table; however, local conditions may result in higher ambient noise. If this is the case and local noise exceeds OSHA recommended levels for expected exposure time (typically 85 dBA for eight hours), hearing protection should be used.

4. Maintenance and Servicing

WARNING! Be sure the power supply is disconnected and locked out before attempting to do any maintenance on the unit. It is critical that the unit be locked out from starting during maintenance as severe injury or death could result from exposure to high voltage or rotating parts.

CAUTION! Allow the blower to cool to a surface temperature of lees than 100 F before attempting maintenance. Prolonged exposure to temperatures above 120F can cause severe burns.

Clean the blower surfaces periodically to avoid build up of dust or other debris. Build up of debris can cause overheating and premature failure of the blower. If an inlet filter is being use, ensure that it remains clean during operation by examining the filter cartridge for debris build up. Replace dirty or clogged filter cartridges.

On pressure units, periodically clean the inlet mesh screen to avoid loss of capacity. If an external inlet filter is used,

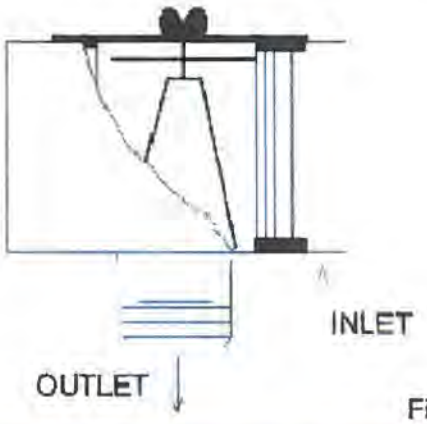

Figure 2

the filter element should be cleaned monthly or as frequently as required by local conditions. Excessive pressure drop will develop from use of clogged or dirty filters. This pressure drop will degrade blower performance and increase operating temperatures, leading possibly to premature pump failure. To replace the filter, remove the wing nut and cover. Remove the element and either clean with compressed air or replace. Reassemble in reverse order.
For vacuum applications, the optional in-line vacuum filter must be cleaned regularly, depending on local conditions. Cleaning can be achieved by blowing out with compressed air. If cleaning is not possible, replace the cartridge. Access the cartridge by unhooking the relevant clips and removing the cover.
CAUTION! Do not attempt to check the filter cartridge during operation of the blower. Only check the cartridge after disconnecting the power from the blower and locking out the power to prevent an unexpected start

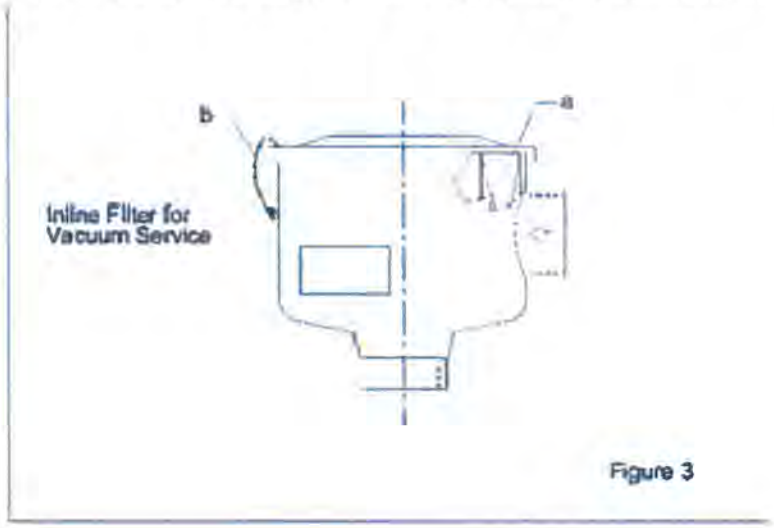

Figure 3

Filter: #274B (Solberg)

Bearings require regreasing with Exxon/Esso UNIREX N3 or equal grease after approximately 8,000 operating hours , or once a year (normal conditions) . Do not mix grease types.

Repair on-site

WARNING! Before attempting an on-site repair, ensure that a qualified electrician has disconnected the motor from the power supply so that accidental starting of the motor is impossible.

After a repair and before re-installation be sure to follow the instructions noted in this manual under "Installation and Operation."

Lifting

For smaller units (less than 65 lbs/ 30 kgs), it may be possible to lift the units manually. When doing so, be sure to understand the weight of the unit being

lifted and to follow good lifting safety procedures.
Weight

3.2 Preventive Maintenance

VES

Blower motor should be greased periodically. Proper lubrication information for this motor can be obtained in the "Manufactures data section of this manual". The air filter should be checked for accumulation of dirt and replaced when necessary.

The bottom of the moisture separator should be cleaned to prevent pump fowling

3.3 Electrical Controls

Modes of operation:

Startup sequence (Local)

Verify that front panel of unit is not displaying any alarm conditions. If an alarm is indicated, reset the system after correcting the appropriate alarm condition. Place all the Hand/Off/Auto switches in the Auto position. The unit should now be operating in the auto mode.

Normal Operation (Local)

The following alarms or shutdowns are provided with each unit:

1. High water level, Condensate tank
2. Blower motor and pump motor overloads
3. High Vacuum

Each alarm condition shuts down the unit, the system will then need to be manually reset.

Reset of each unit is accomplished by locally pressing the reset switch on the front of the unit The unit will automatically reset if the fault has cleared, otherwise operator intervention locally at the site will be required.

Alarm Mode (Local)

Each alarm is latched until the unit has been reset. This will allow the operator to easily troubleshoot each unit when a fault occurs. Clearing mechanical faults will be discussed later in this manual.

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4.0 SPECIAL SITUATIONS

4.1 Problem Diagnosis

Most operating troubles that might be encountered with a new or well maintained unit will be of a minor nature. Therefore, if you have troubles starting or operating your system, look for some simple cause rather than failure of a major component. For instance, check a clogged filter rather than a bad switch.

A tripped thermal overload is more likely than a bad motor starter.

In many cases, system operating troubles are coupled with outside factors, such as climatic conditions, operating conditions, change of servicing or power source or even change of operator.

System troubles that occur as a result of normal use and wear usually give plenty of advance warning. These troubles usually result from failure to implement the preventive maintenance schedule.

Whenever system performance seems less than normal in any category, it is best to consult with OEC at the first symptom rather than wait until a serious problem develops. One of the aims of this regular maintenance is to help you in just these circumstances.

4.2 Quick Trouble Shoot System Won't Start

1. Power the control panel with the main disconnect switch located at the top right hand side of the control panel. Turn the system to auto position as described in the "Starting the system." If nothing happens, and electrical lead(s) may be loose or disconnected, as the system should run under the "normally closed" mode, any disconnected lead will not let the system to run in an "auto" mode. Check the power into the panel. The power should be 230 VAC. and 3 phase.

2. Check the air filter elements in the "inlet filter" to the blower. If they are clogged, replace the filter elements.
3. Check the liquid level in the condensate separator. If the liquid level is touching the high high level switch, drain the liquid, press the reset switch and turn the system into "auto" position.

If The above does not work go to the Trouble Shooting Chart

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Troubleshooting Chart

Fault	Cause	Remedy	Responsible Party
Motor does not start, no noise.	Two or more power legs interrupted	Check fuses, terminals, etc.. for source of interruption and correct.	Electrician
Motor does not start, humming noise.	One power supply lead interrupted	Check fuses, terminals, etc.. for source of interruption and correct.	Electrician
	Impeller is jammed.	Open blower cover, remove debris, clean.	Service Technician
		Check impeller clearance and reset if necessary.	
	Defective Impeller	Replace impeller.	Service Technician
	Defective Bearing	Replace defective bearing.	Service Technician
Trip of motor starter at start-up	Incorrect starter setting	Ensure starter setting is correct (check current on nameplate)	Electrician
	Winding short-circuit	Megger motor	Electrician
	Motor overloaded due to operation of pump at excessive differential pressures.	Inspect filters, mufflers and connection pipes and clean as required. Check relief valve operation. Reset or replace as necessary.	Operator
	Impeller Jammed	See above fault Motor does not start, humming noise, cause jammed impeller.	Operator
Excessive Power Consumption	Lime or other deposits	Decalcify or clean unit as required (see Maintenance Chart)	Operator
No Vacuum or Pressure.	Severe leak in system	Close off pump and run deadheaded to confirm pump is operating properly. If so, find and fix leak in the system.	Operator
	Wrong direction of rotation	Check air flow direction and change direction of rotation if necessary.	Operator Electrician

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Insufficient Vacuum	System too small	Use larger system	Operator
	Inlet piping too long or too small.	Increase pipe diameter to reduce pressure loss in inlet piping. Contact Airtech for assistance in determining correct pipe size.	Operator
	Leak at connection to vacuum system.	Check for leaks and repair if necessary.	Operator
	Density of gas handles different from air.	Consider increased limits on operation due to density differences. Consult Airtech, Inc. for assistance.	Airtech Engineering
	Change in impeller geometry due to erosion	Clean impeller and examine for wear. Replace if necessary.	Service Technician
	Inlet filter clogged.	Change filter element; remove clog.	Operator
	Vacuum relief valve incorrectly set.	Reset or replace vacuum relief valve. Contact Airtech for assistance.	Operator
	Seal defective.	Replace seal.	Service Technician
Abnormal flow noises.	Flow speed too high.	Clean pipes or use larger pipes to connect unit to process.	Operator
	Muffler soiled.	Clean muffler inserts, replace if necessary.	Operator
Abnormal running noise	Ball bearing defective or insufficient lubrication on bearing.	Re-grease or replace bearing as required.	Service Technician
Compressor leaky	Seals on muffler defective.	Tighten muffler connection. Replace gasket if necessary.	Operator
	Seals in motor area defective	Replace as necessary.	Service Technician

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4.3 Emergency Starting and Hand Operation

If the system won't run in auto mode, and to ensure that the motors are working normally, follow following procedure:

Turn the desired pump into "hand" mode

Note: Don't leave the system unattended in "hand" mode

5.0 SPARE PARTS INFORMATION SD-02

Your groundwater treatment system is designed and fabricated to minimize the replacement of parts over the period of operation. In the following comprehensive list, you will find all the components used to build this system.

TABLE 6.1 MAJOR COMPONENTS

Item	Manufacturer	Component No	Description of the part
Inlet Filter Dilution	Solberg	F-	Replacement Part .
Condensate tank	OE	OE 30d	60 Gallon capacity
Control panel	OE	Custom control panel	
Vacuum Pump	MD		Liquid Ring Pump 10hsp230/3/60
Transfer Pump	Grundfos	HS	.5 hsp

Tabulated below is a list of the instrumentation (gauges, pressure switches, and flow sensor)

TABLE 6.2 GAUGES, FLOW Meter, Level sensors

Item	Manufacturer	Part No	Description
Vacuum Gauges			0-30 hg
Air Meter	Dwyer	DS 300	4" meter
Level switch	oe	s3-0	Pump level switch
Water flow meter	MASTER	tt-3/4	3/4"

6. Shipping and return. Before returning system the renter is required to return the system totally decontaminated. This includes steam cleaning the K-Pot and the FILTER. The Pump Needs top be drained and flushed.

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- **PLC I/O Tables**

Discrete Inputs 24VDC Sourcing		**Device ID**	**I/O Address**	**Wire Number**	**Alarm Y / N**	**Alarm Type**	**Alarm Delay Time**
1	Master Control Relay	MCR147	I:0/0	2000	YES	Active Low	0
2	Phase Monitoring Relay	PHM110	I:0/1	2020	YES	Active Low	0
3	VFD Running	VFD115	I:0/2	2040	NO		
4	VFD Fault	VFD115	I:0/3	2060	YES	Active High	0
5	Transfer Pump Aux.	M228	I:0/4	2080	NO		
6	Transfer Pump Motor Overload	MCP120	I:0/5	2100	YES	Active High	0
7	KOT Low Lvl Float		I:0/6	2121	NO		
8	KOT High Lvl Float		I:0/7	2141	NO		
9	KOT High/High Lvl Float		I:0/8	2161	YES	Active High	5 seconds
10	High Vacuum Switch		I:0/9	2181	YES	Active High	30 seconds

Total Spare Inputs: 16 24VDC Sourcing.

Note: Discrete inputs 7-10 are installed on intrinsically safe barriers

Discrete Outputs Relay		**Device ID**	**I/O Address**	**Wire Number**	**Voltage**	**Notes:**
1	Vacuum Blower Motor Starter	VFD115	O:0/0	2000	24VDC	
2	Transfer Pump Motor Starter	M228	O:0/1	2020	24VDC	
3	Spare (Isolated Relay)		O:0/2	2040		
4	Spare (Isolated Relay)		O:0/3	2060		
5	Blower Running	Uplink 250	O:0/4	2080	12VDC	Output for Uplink 2550
6	System Fault	Uplink 2550	O:0/5	2100	12VDC	Output for Uplink 2550
7						
8	Solenoid Valve #1	SOL401	O:2/0	4011	120VAC	
9	Solenoid Valve #2	SOL403	O:2/1	4031	120VAC	
10	Solenoid Valve #3	SOL405	O:2/2	4051	120VAC	
11	Solenoid Valve #4	SOL407	O:2/3	4071	120VAC	
12	Solenoid Valve #5	SOL409	O:2/4	4091	120VAC	
13	Solenoid Valve #6	SOL411	O:2/5	4111	120VAC	
14	Solenoid Valve #7	SOL413	O:2/6	4131	120VAC	
15	Solenoid Valve #8	SOL415	O:2/7	4151	120VAC	
16	Solenoid Valve #9	SOL426	O:2/8	4260	120VAC	

Total Spare Outputs: (2) Isolated Relay Outputs, (7) 120VAC Relay Outputs.

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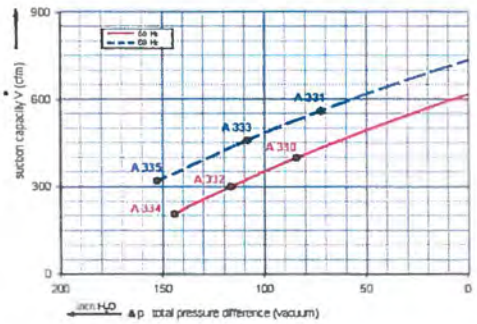
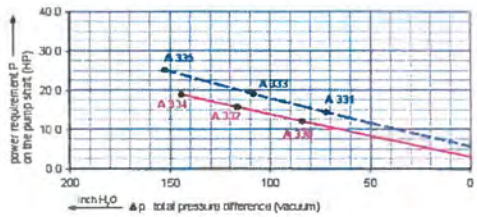
Specification sheet

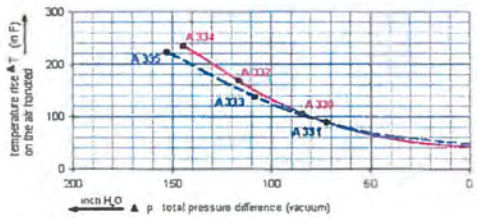
nash_elmo | G_200

2BH1 900

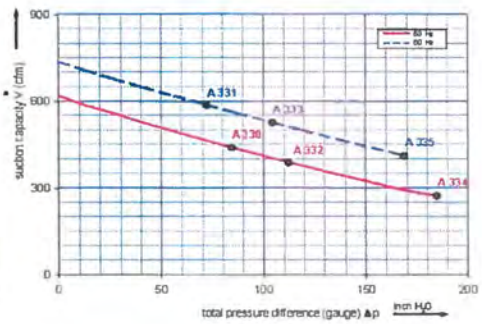
Performance curve for Vacuum pump

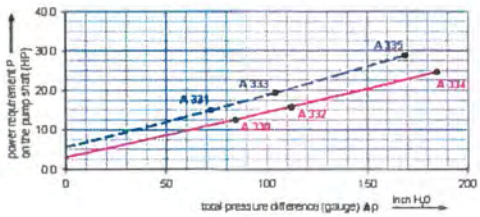


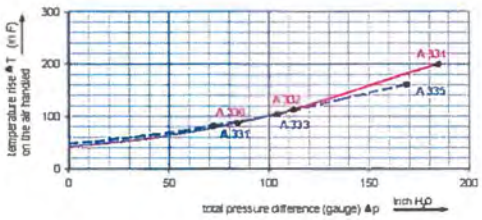




Performance curve for Compressor







The performance curves are based on air at a temperature of 59 F and an atmospheric pressure of 401.53 inch H2O with a tolerance of +/- 10 %
The total pressure differences are valid for suction and ambient temperatures up to 77 F
For other conditions please confer with us.

Each G_200 type can be applied both as vacuum pump and compressor in continuous operation over the total stated performance curve range. The motors are available as standard for the input voltage range of 50 and 60 Hz and for protection category IP 55 as well as approbated for UL and CSA. Blowers with ATEX 94/9 EG are available, too

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Selection and ordering data

Type 2BH1 900

Curve No	Order No	Frequency Hz	Rated power HP	Input voltage V				Input current A		Permissible total differential pressure [2] Vacuum inch H2O	Compressor inch H2O	Sound pressure level [3] dB(A)	Weight ca lbs
3~ 60/60 Hz IP55 isulation material class F 1)													
A 330	2BH1900-7AH06	50	11.39	200D	240D	345Y	415Y	33.0D	19.1Y	-84	84	74	379
A 331	2BH1900-7AH06	60	13.14	220D	275D	380Y	480Y	33.0D	19.1Y	-72	72	79	379
A 332	2BH1900-7AH18	50	16.76	200D	240D	345Y	415Y	48.5D	28.0Y	-118	112	74	421
A 333	2BH1900-7AH18	60	19.44	220D	275D	380Y	480Y	50.0D	29.0Y	-108	104	79	421
A 334	2BH1900-7AH38	50	24.90	200D	240D	345Y	415Y	64.5D	37.0Y	-145	185	74	449
A 335	2BH1900-7AH38	60	28.55	220D	275D	380Y	480Y	68.0D	39.0Y	-153	189	79	449

Other voltage ranges

		2BH1900-7A ☐ ☐
50Hz	60Hz	↑ ↑
3~		
185 225V D / 320 390V Y	200 240V D / 345 415V Y	H 1
200 240V D / 345 415V Y	220 275V D / 380 480V Y	H 6
345 415V D	380 480V D	H 7
500 V D	575 V D	C 5

Machines according to the ATEX norm 94/4 EG are available for the whole performance range.
Following types available: Category 3 G, 3/2 G, 3 D and 3/2 D

Further voltage range on request, please quote in plain text.

All G_200 achieve the standards and norms of the low voltage directive 72/23/EWG, rotating electrotechnical motor EN 60034-1-34, electromagnetic compatibility (EMC) DIN EN 61000-3/-6/-4

1) For standard UL for ELECTRIC FANS UL 507 and CSA 22.2 No. 13 for Fans and Ventilators (Certificate Number E225239)

2) Relief valve are available for limiting differential pressure

3) Measuring-surface sound-pressure level acc. to DIN EN 21680, measured at a distance of 3.28 ft. The pump is throttled to an average suction pressure, a hose is connected to the discharge side (vacuum pump) / suction side (compressor), but is not fitted with relief valves

The motors are designed according to the DIN EN 60 034 / DIN IEC 34-1 and temperature class F

For the three phase machines the tolerances are +/- 10 % for fixed voltage and +/- 5 % for voltage range

For all three phase machines which designed according to the UL and CSA norm (UL 507 and CSA 22.2 No. 100) the maximum allowed voltage tolerances are - 10 % resp. + 6 %.

The frequency tolerance is maximum +/- 2 %.

Changes in particular the quoted performance curve, datas and weights without prior notice. The figures are without obligations

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ONION EQUIP CO.

Control Logic Description

Automatic Control of Solenoid Valves

Input State:

MCR147: ON

PHM110: ON

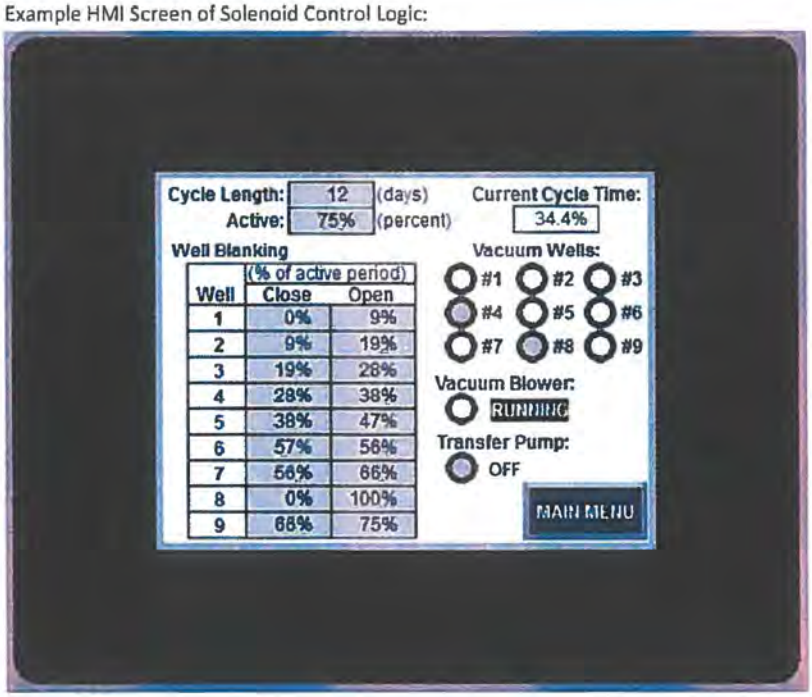
VFD115 FAULT: OFF

KOT HI/HI FLOAT SWITCH: OFF

Well control logic is based on a total Cycle Length entered in days. The amount of time the wells are controlled across the cycle is adjusted by the Active percent input. The following screen image demonstrates a 12 Day cycle with a 75% Active percent. In other words, the entire cycle length is 12 days but the active period is only 9 days; all wells would be closed and the Vacuum Blower would be OFF for the final 3 days out of the 12 day cycle. Well #8 is set to "Close" for the entire Cycle Length. The screen image shows the Current Cycle Time at 34.4% complete therefore Well #4 is "Closed".

Anytime the Active cycle percentage is changed, the corresponding percentage values will be automatically entered for each Well that is set to AUTO mode. Each well percentage may also be arbitrarily adjusted. The accumulated cycle time is retentive so a shutdown does not interrupt the cycle, it only pauses it. The cycle time can be manually adjusted by changing the Current Cycle Time percentage to the desired amount.

Example HMI Screen of Solenoid Control Logic:



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Each well will have its own screen to allow its mode to be changed. When set to AUTO mode, each well is controlled as explained on the previous page. When set to HAND, the well will open. The accumulated time each well is OPEN will be stored in the PLC and displayed on the HMI.

Example HMI Screen of Well Control:

Automatic Control of Vacuum Blower MOT116:

Input State:

MCR147: ON
PHM110: ON
VFD115 FAULT: OFF
KOT HI/HI FLOAT SWITCH: OFF

For the vacuum blower to operate in automatic, it must be placed in AUTO mode via selector switch on the Operator Interface Unit. When in AUTO MODE, the Vacuum Blower will run anytime a Well is called to be open in AUTO mode, provided no shutdown alarms exist.

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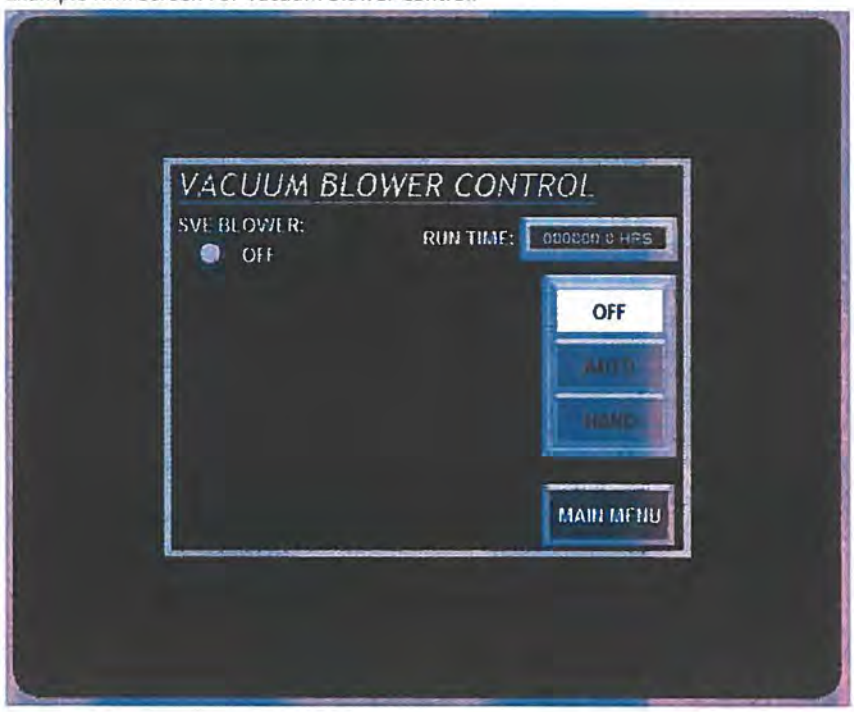
Example HMI Screen For Vacuum Blower Control:



Automatic Control of Transfer Pump MOT121:

Input State:

MCR147: ON
PHM110: ON
VFD115 FAULT: OFF
KOT LOW LVL FLOAT: OFF (Stops Pump)
KOT HI LVL FLOAT: ON (Starts Pump)
KOT HI/HI FLOAT SWITCH: OFF

To operate the Transfer Pump in AUTO mode, place the selector switch on the HMI to AUTO. When in AUTO MODE, the Transfer Pump will be controlled by the float switches located in the Knock-Out Tank (KOT). The Transfer Pump may also be operated in HAND mode at any time by operating personnel.

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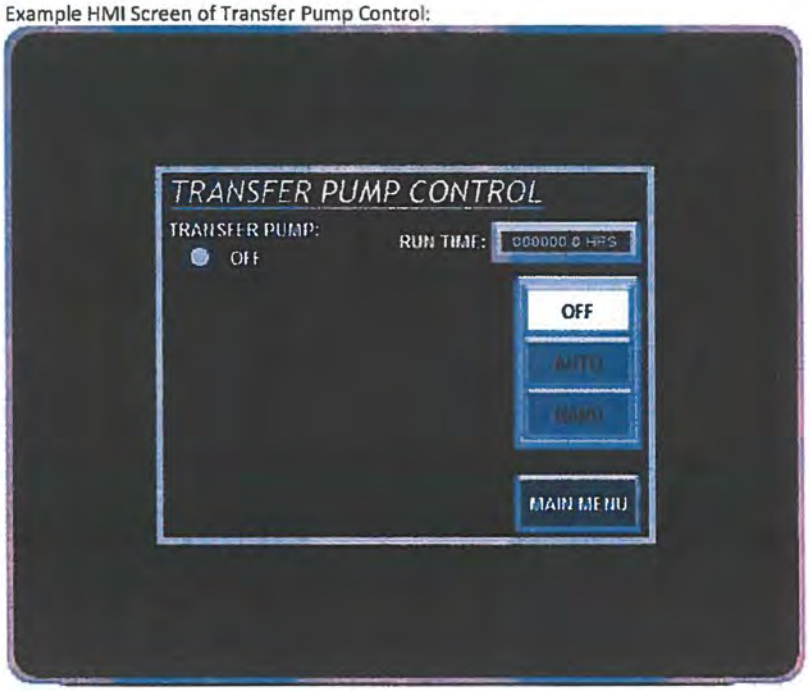
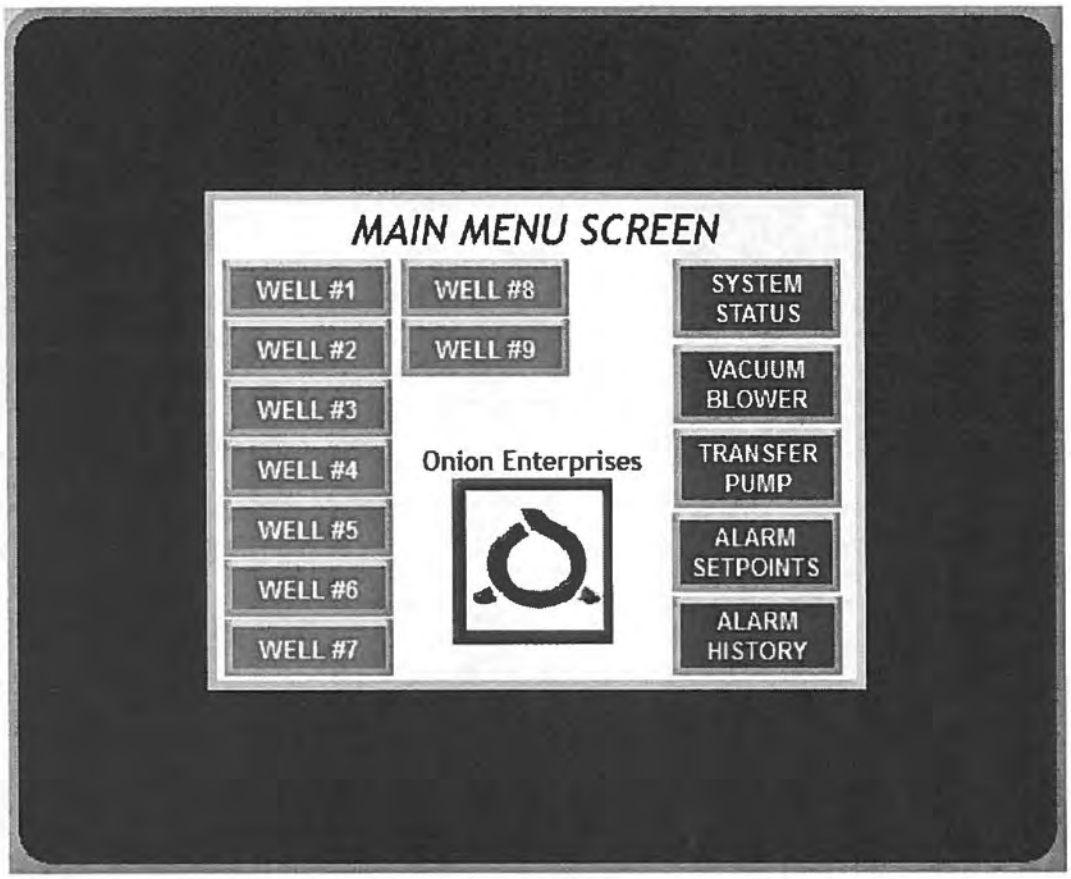
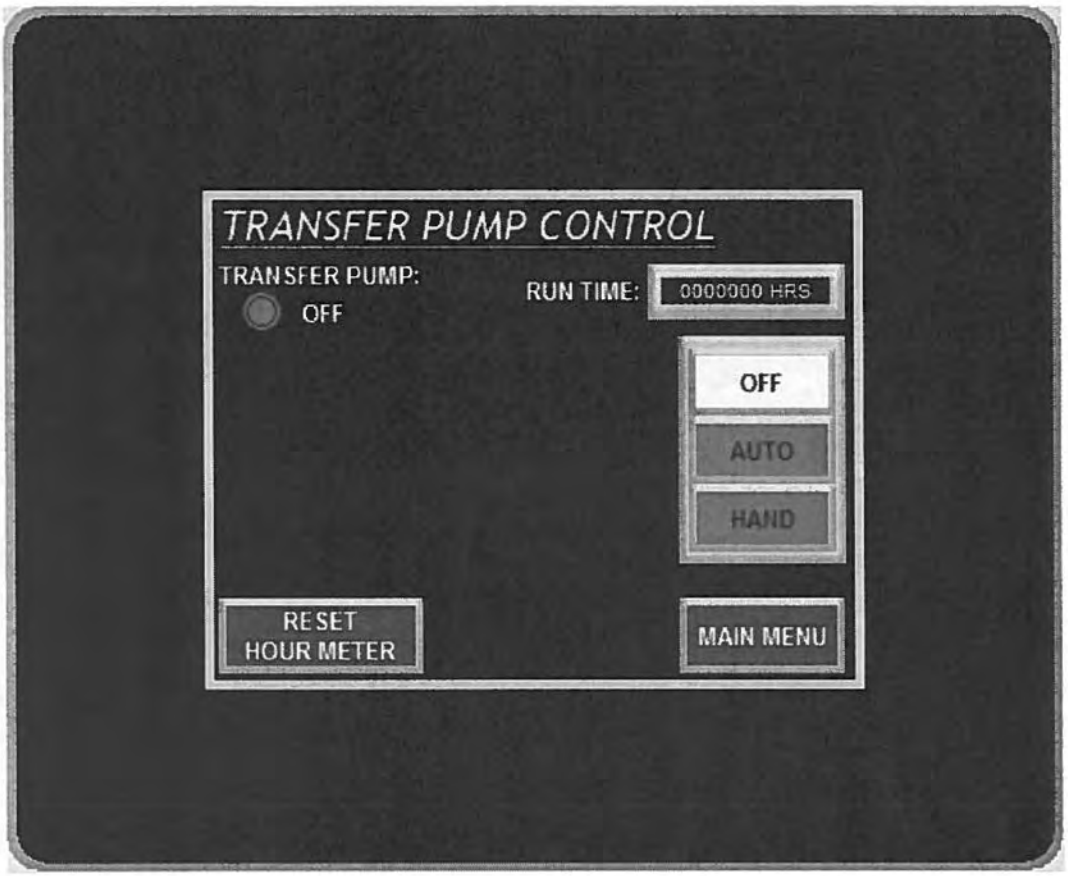
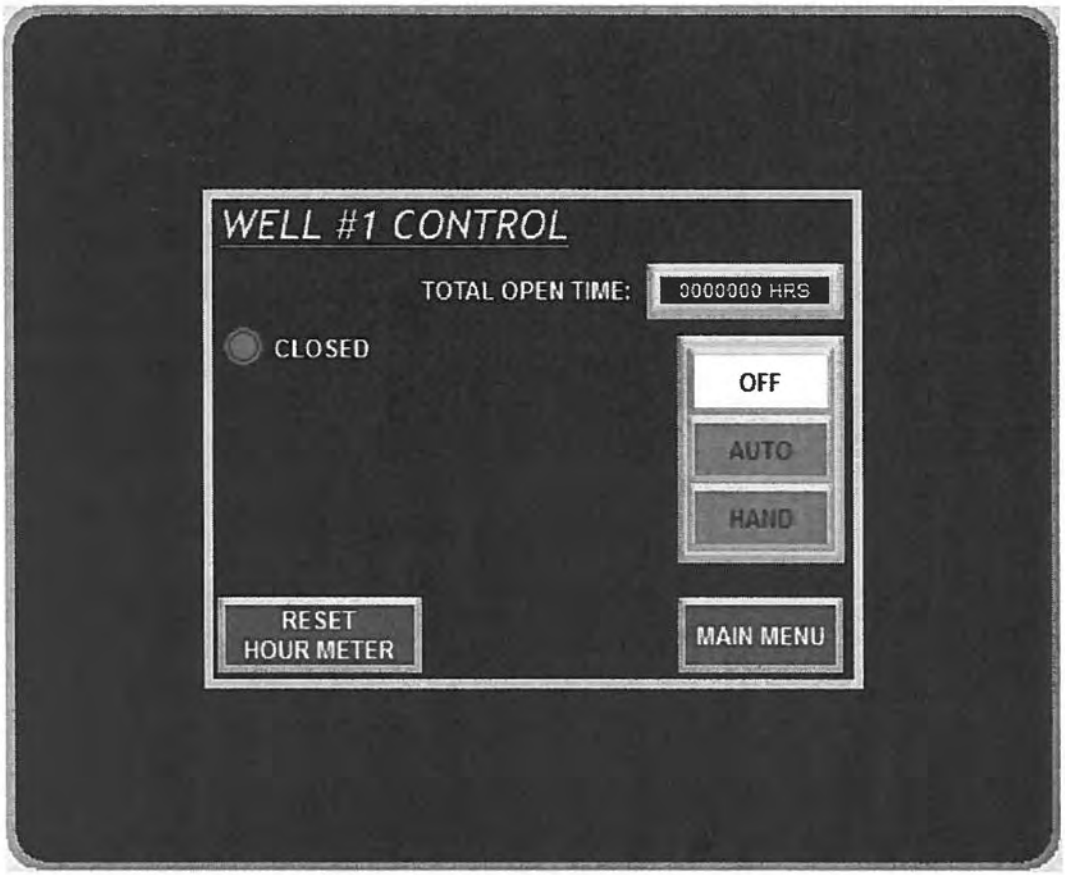
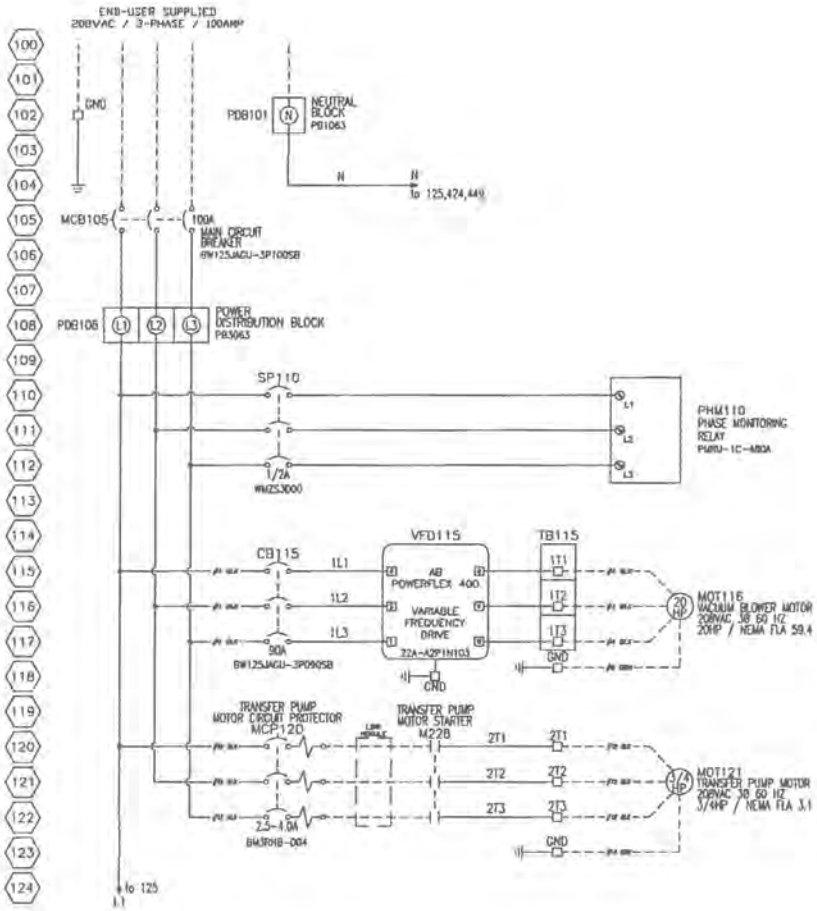
Example HMI Screen of Transfer Pump Control:

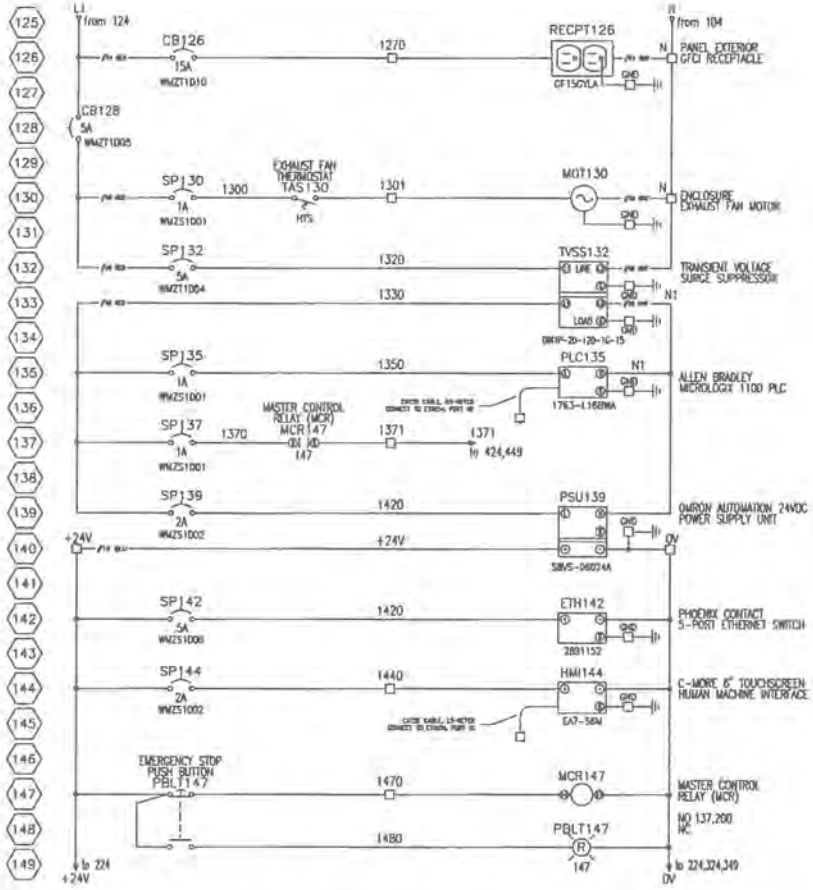



MAIN MENU SCREEN
WELL #1
WELL #2
WELL #3
WELL #4
WELL #5
WELL #6
WELL #7
WELL #8
WELL #9
Onion Enterprises
SYSTEM STATUS
VACUUM BLOWER
TRANSFER PUMP
ALARM SETPOINTS
ALARM HISTORY


TRANSFER PUMP CONTROL
TRANSFER PUMP:
OFF
RUN TIME:
0000000 HRS
OFF
AUTO
HAND
RESET
HOUR METER
MAIN MENU


WELL #1 CONTROL
TOTAL OPEN TIME:
0000000 HRS
CLOSED
OFF
AUTO
HAND
RESET
HOUR METER
MAIN MENU





DRAWING NOTES:

1	- -	
2	- -	
3	- -	
4	- -	
5	- -	

◇ INTERNAL PANEL-USE TERMINAL BLOCK
□ FIELD WIRING TERMINAL BLOCK

FIELD WIRING BY OTHERS: ————————
COMPONENT BUS OR OUTLINE: — — — —

PROCESS LOGIC CORPORATION

REVISION NOTES:					
REV.	DATE:		BY:	DRAWN BY:	KBC
				CHECKED BY:	KBC
				PROJECT DATE:	6-8-2011
				PROJECT NUMBER:	

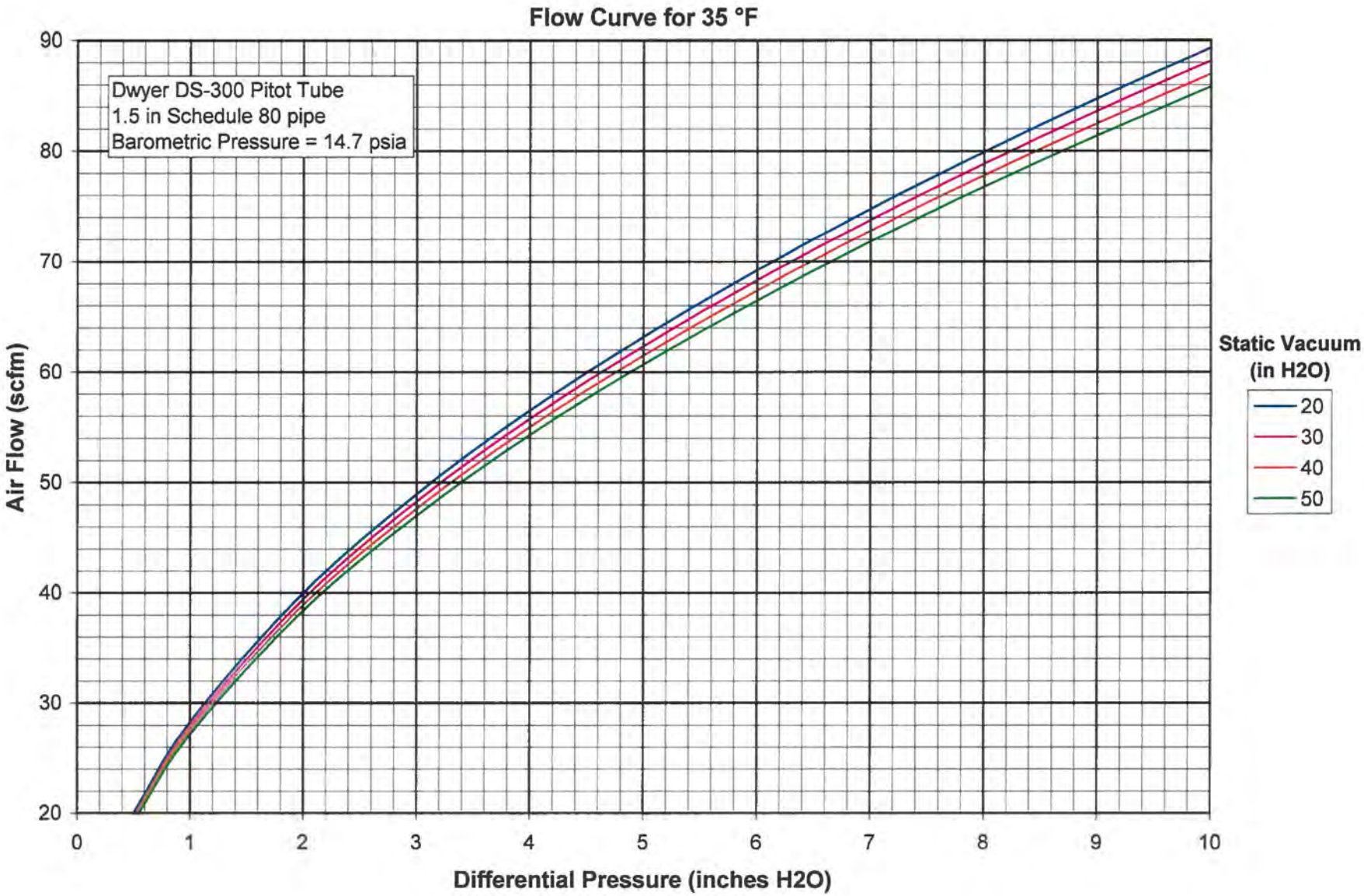
CAD FILENAME: Jacobs-Anchorage SVC Control Panel.dwg

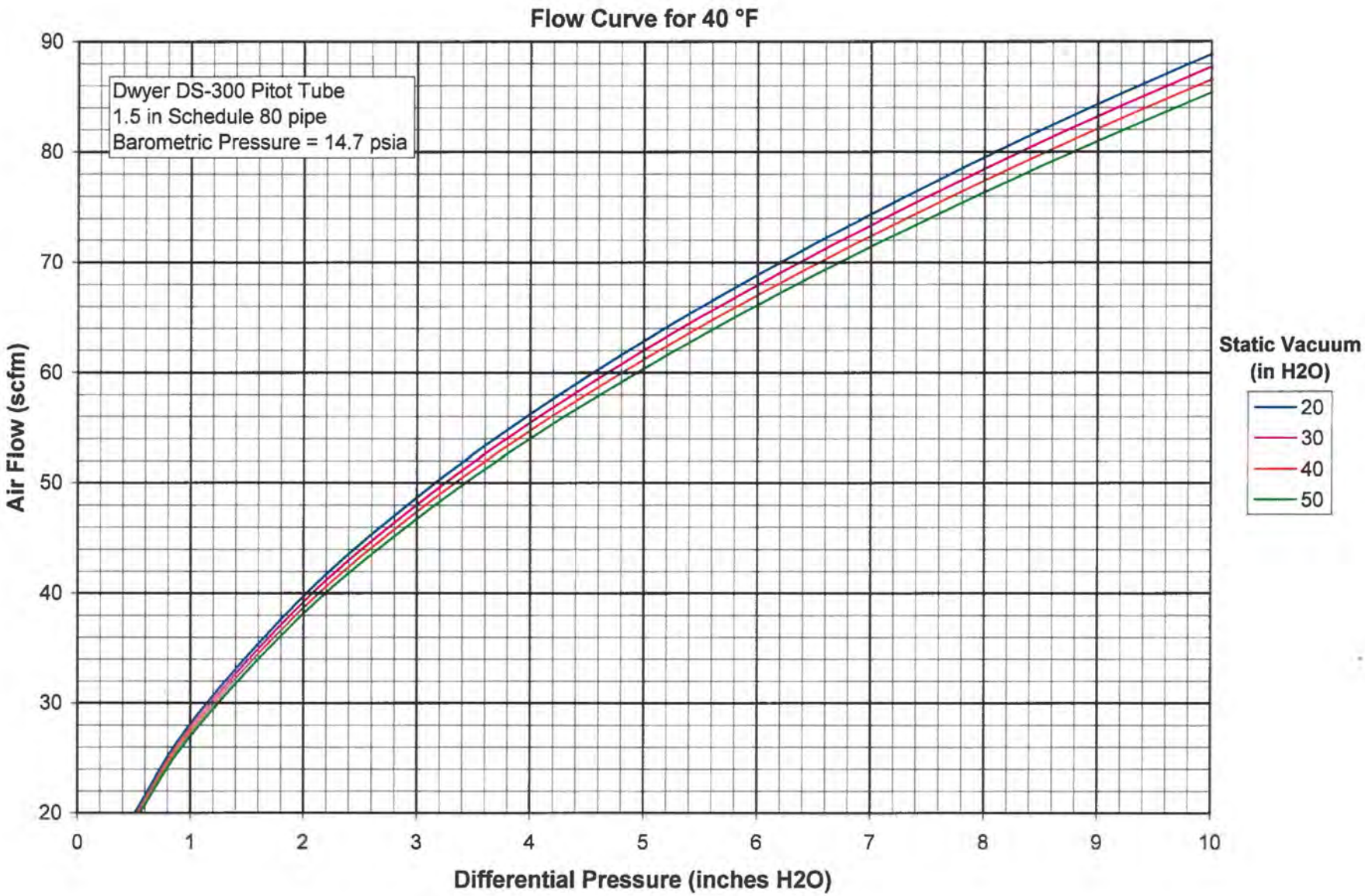
ONION ENTERPRISES

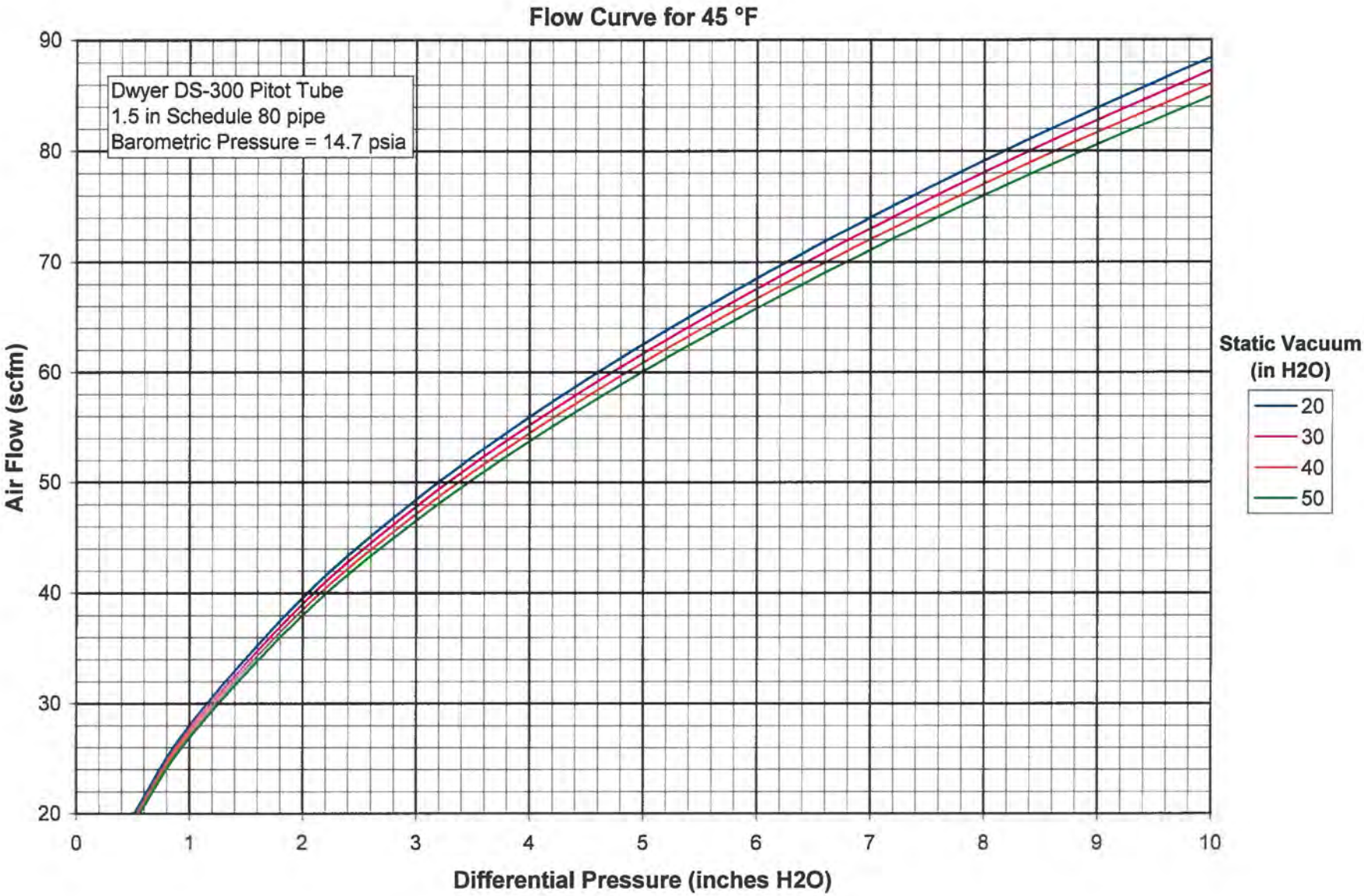
20HP BLOWER RENTAL SYSTEM CONTROL PANEL

Description: ELECTRICAL SCHEMATICS

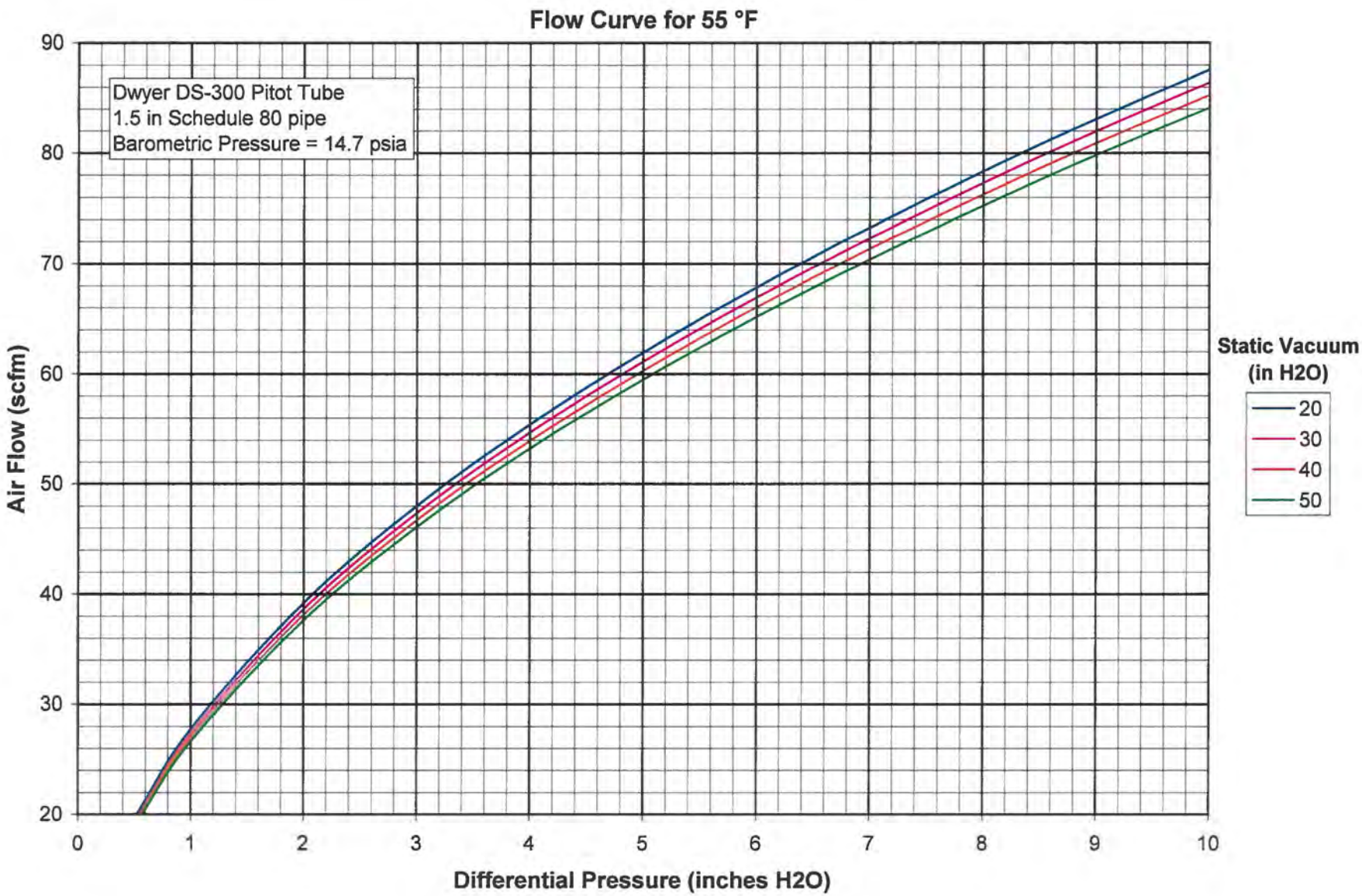
1 of 6

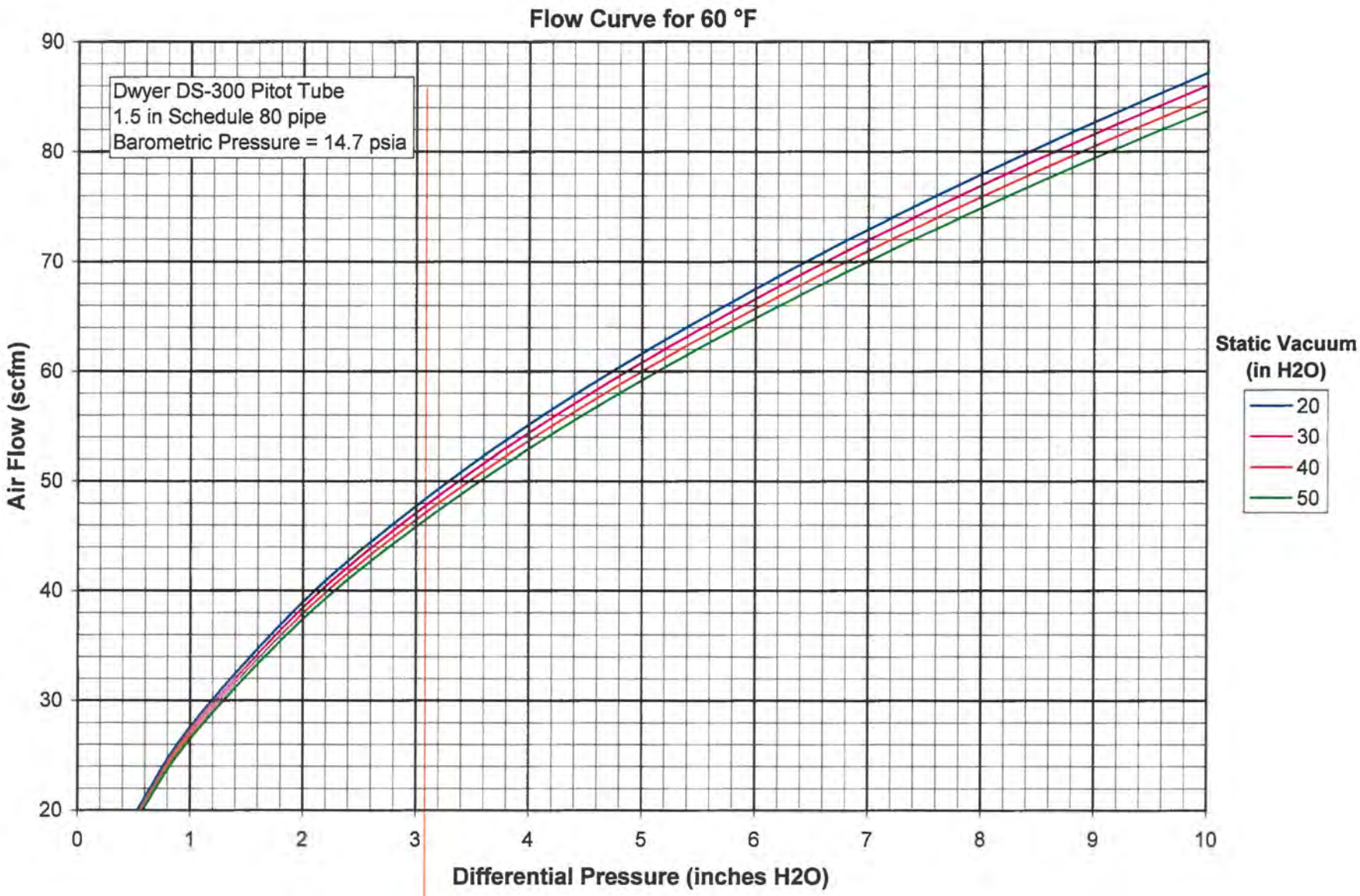

Flow Curve for 35 °F
Dwyer DS-300 Pitot Tube
1.5 in Schedule 80 pipe
Barometric Pressure = 14.7 psia
Air Flow (scfm)
90
80
70
60
50
40
30
20
0
1
2
3
4
5
6
7
8
9
10
Differential Pressure (inches H2O)
Static Vacuum (in H2O)
20
30
40
50

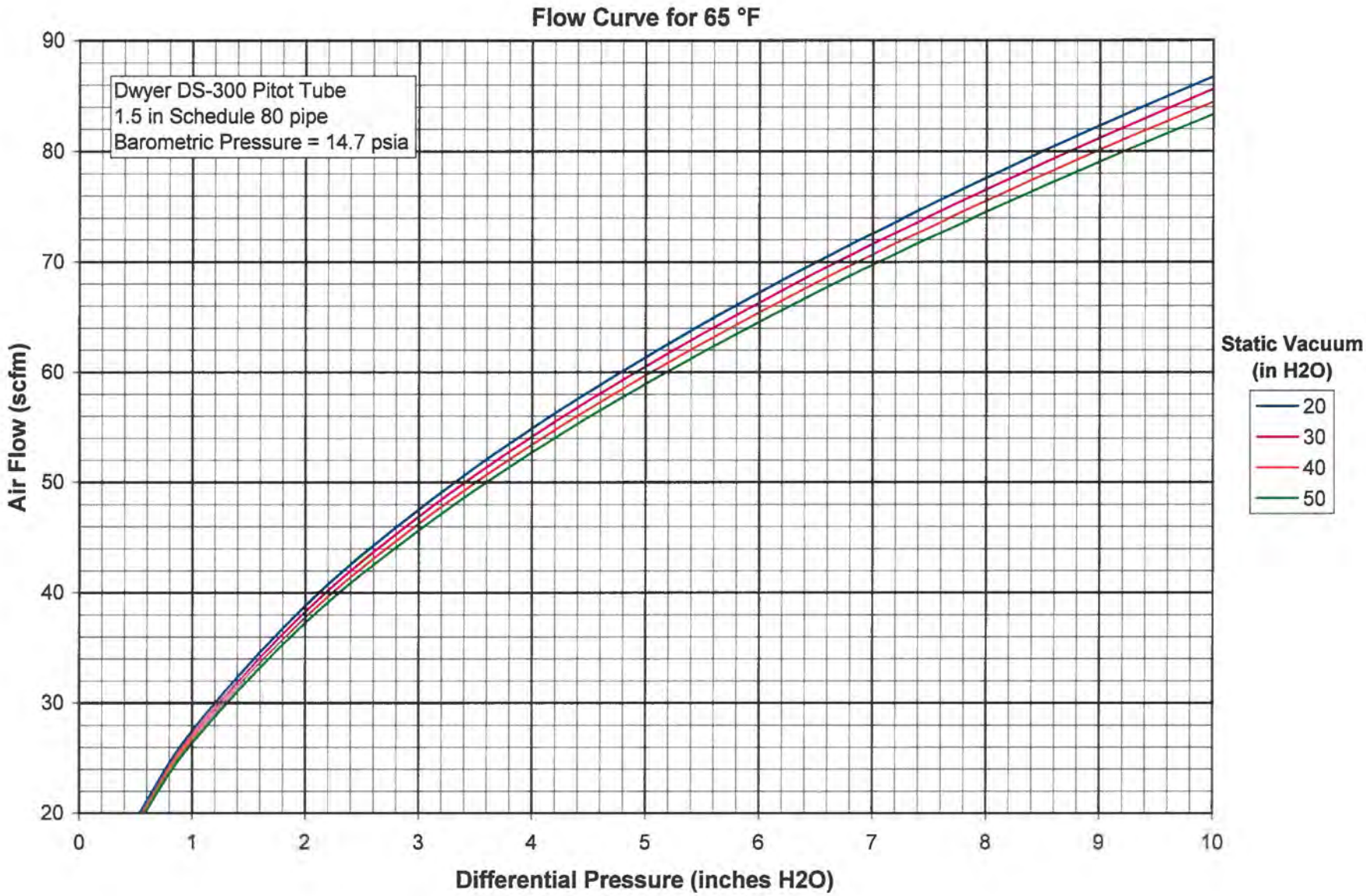

Flow Curve for 40 °F
Dwyer DS-300 Pitot Tube
1.5 in Schedule 80 pipe
Barometric Pressure = 14.7 psia
Air Flow (scfm)
90
80
70
60
50
40
30
20
0
1
2
3
4
5
6
7
8
9
10
Differential Pressure (inches H2O)
Static Vacuum
(in H2O)
20
30
40
50


Flow Curve for 45 °F
Dwyer DS-300 Pitot Tube
1.5 in Schedule 80 pipe
Barometric Pressure = 14.7 psia
Air Flow (scfm)
90
80
70
60
50
40
30
20
0
1
2
3
4
5
6
7
8
9
10
Differential Pressure (inches H2O)
Static Vacuum (in H2O)
20
30
40
50

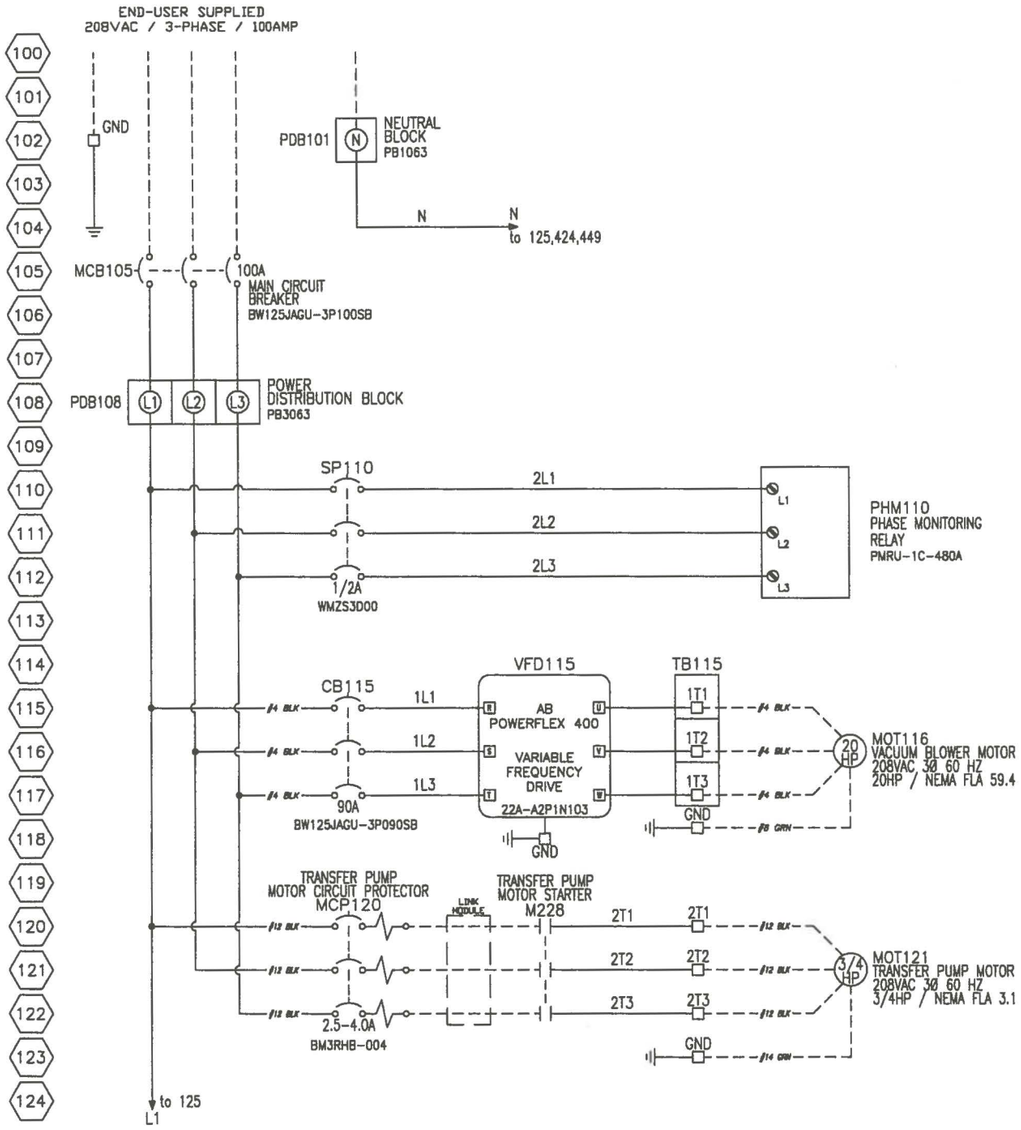
Flow Curve for 50 °F
Dwyer DS-300 Pitot Tube
1.5 in Schedule 80 pipe
Barometric Pressure = 14.7 psia
Air Flow (scfm)
90
80
70
60
50
40
30
20
0
1
2
3
4
5
6
7
8
9
10
Differential Pressure (inches H2O)
Static Vacuum (in H2O)
20
30
40
50

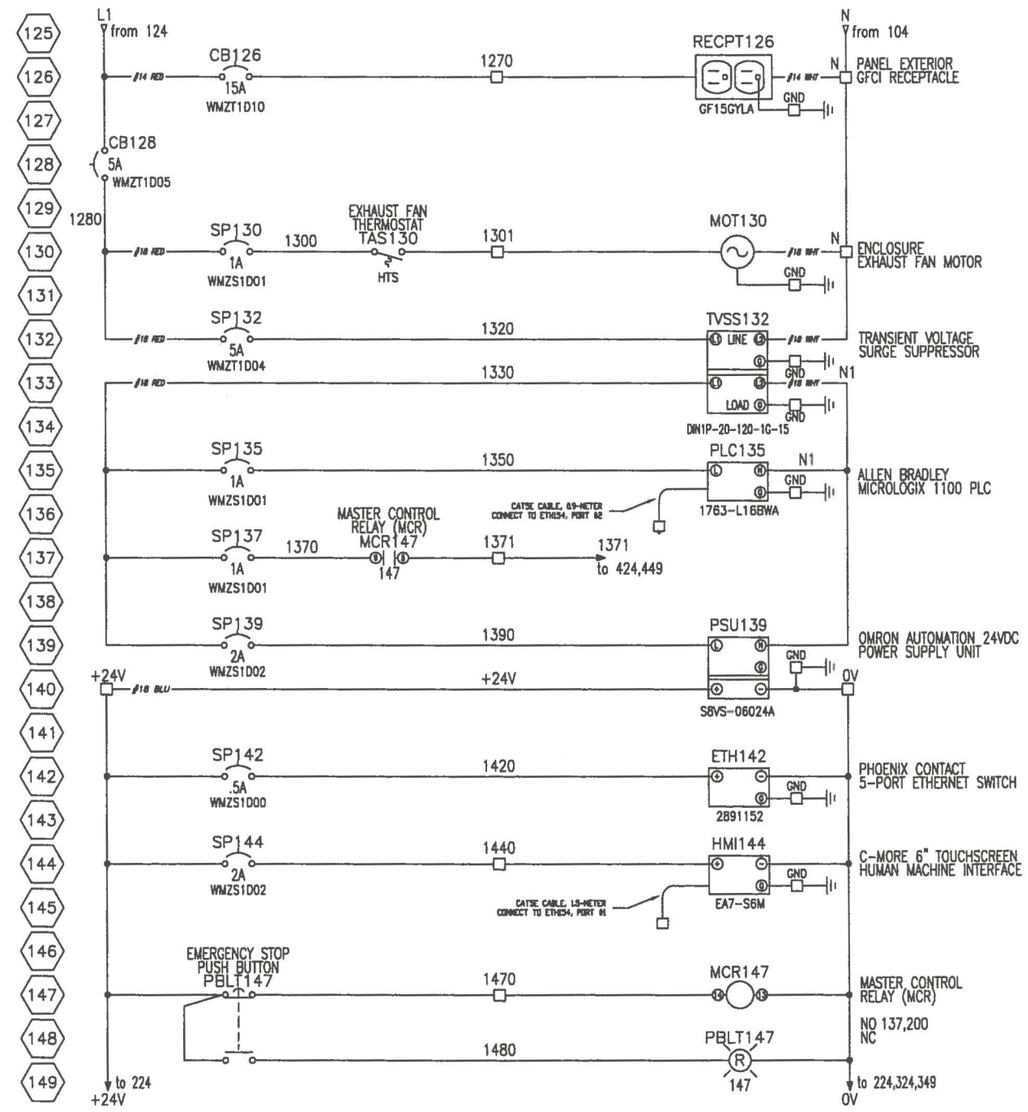

Flow Curve for 55 °F
Dwyer DS-300 Pitot Tube
1.5 in Schedule 80 pipe
Barometric Pressure = 14.7 psia
Air Flow (scfm)
90
80
70
60
50
40
30
20
0
1
2
3
4
5
6
7
8
9
10
Differential Pressure (inches H2O)
Static Vacuum
(in H2O)
20
30
40
50


Flow Curve for 60 °F
Dwyer DS-300 Pitot Tube
1.5 in Schedule 80 pipe
Barometric Pressure = 14.7 psia
Air Flow (scfm)
90
80
70
60
50
40
30
20
0
1
2
3
4
5
6
7
8
9
10
Differential Pressure (inches H2O)
Static Vacuum
(in H2O)
20
30
40
50


Flow Curve for 65 °F
Dwyer DS-300 Pitot Tube
1.5 in Schedule 80 pipe
Barometric Pressure = 14.7 psia
Air Flow (scfm)
90
80
70
60
50
40
30
20
0
1
2
3
4
5
6
7
8
9
10
Differential Pressure (inches H2O)
Static Vacuum
(in H2O)
20
30
40
50

As Builts 7/8/11





DRAWING NOTES:

1	- -	
2	- -	
3	- -	
4	- -	
5	- -	

◇ INTERNAL PANEL-USE TERMINAL BLOCK
□ FIELD WIRING TERMINAL BLOCK

FIELD WIRING BY OTHERS: - - - - - - - - - -
COMPONENT BUS OR OUTLINE: — — — —

PROCESS LOGIC CORPORATION

REVISION NOTES:					
REV.	DATE:		BY:	DRAWN BY:	KBC
				CHECKED BY:	KBC
				PROJECT DATE:	6-8-2011
				PROJECT NUMBER:	

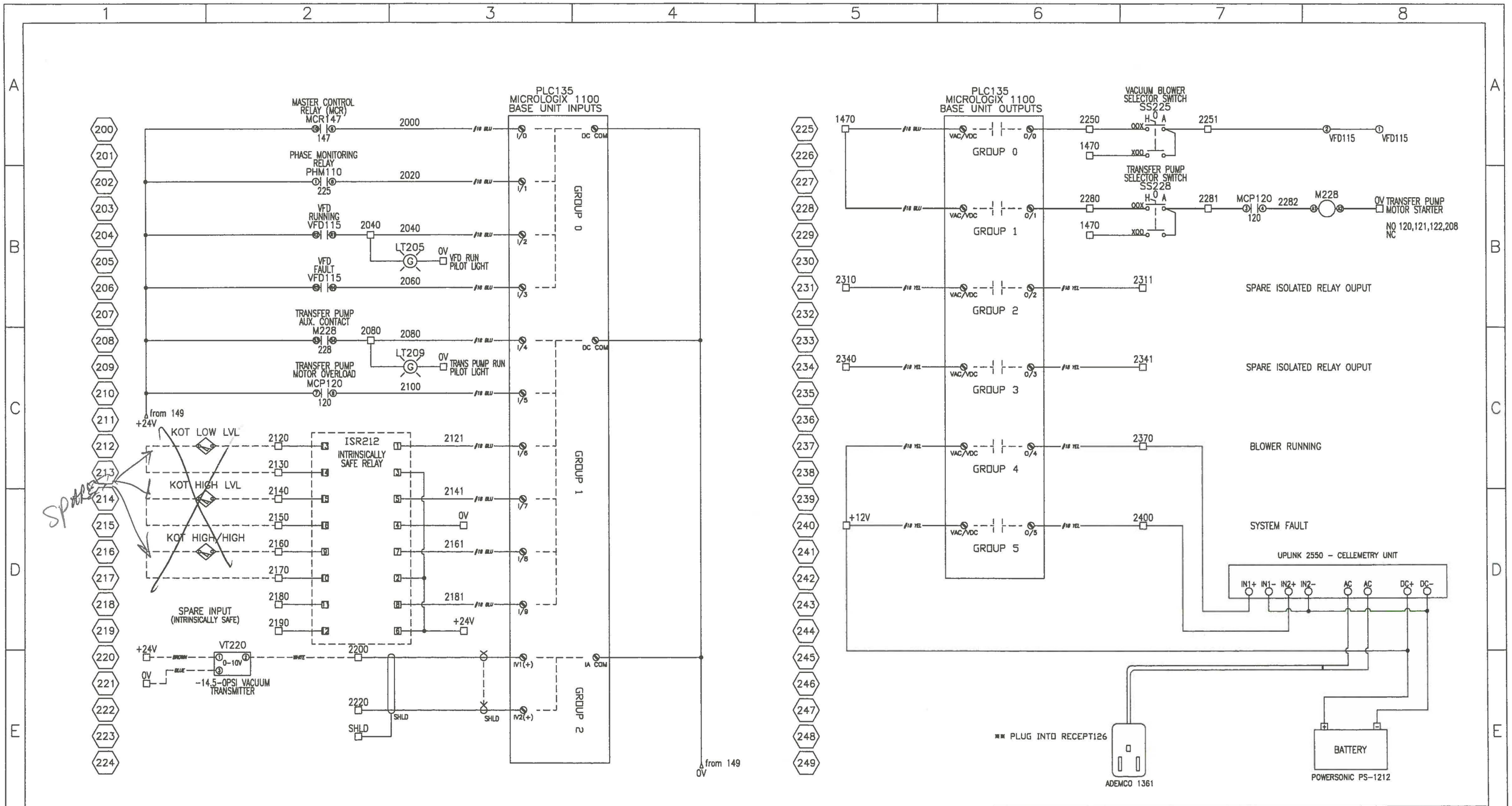
CAD FILENAME: Jacobs-Anchorage SVE Control Panel.dwg

ONION ENTERPRISES

20HP BLOWER RENTAL SYSTEM CONTROL PANEL

Description: ELECTRICAL SCHEMATICS

1 OF 6



DRAWING NOTES:

1	- -	
2	- -	
3	- -	
4	- -	
5	- -	

◇ INTERNAL PANEL-USE TERMINAL BLOCK
□ FIELD WIRING TERMINAL BLOCK

FIELD WIRING BY OTHERS: - - - - - - - - - -
COMPONENT BUS OR OUTLINE: — — — —

PROCESS LOGIC CORPORATION

ONION ENTERPRISES

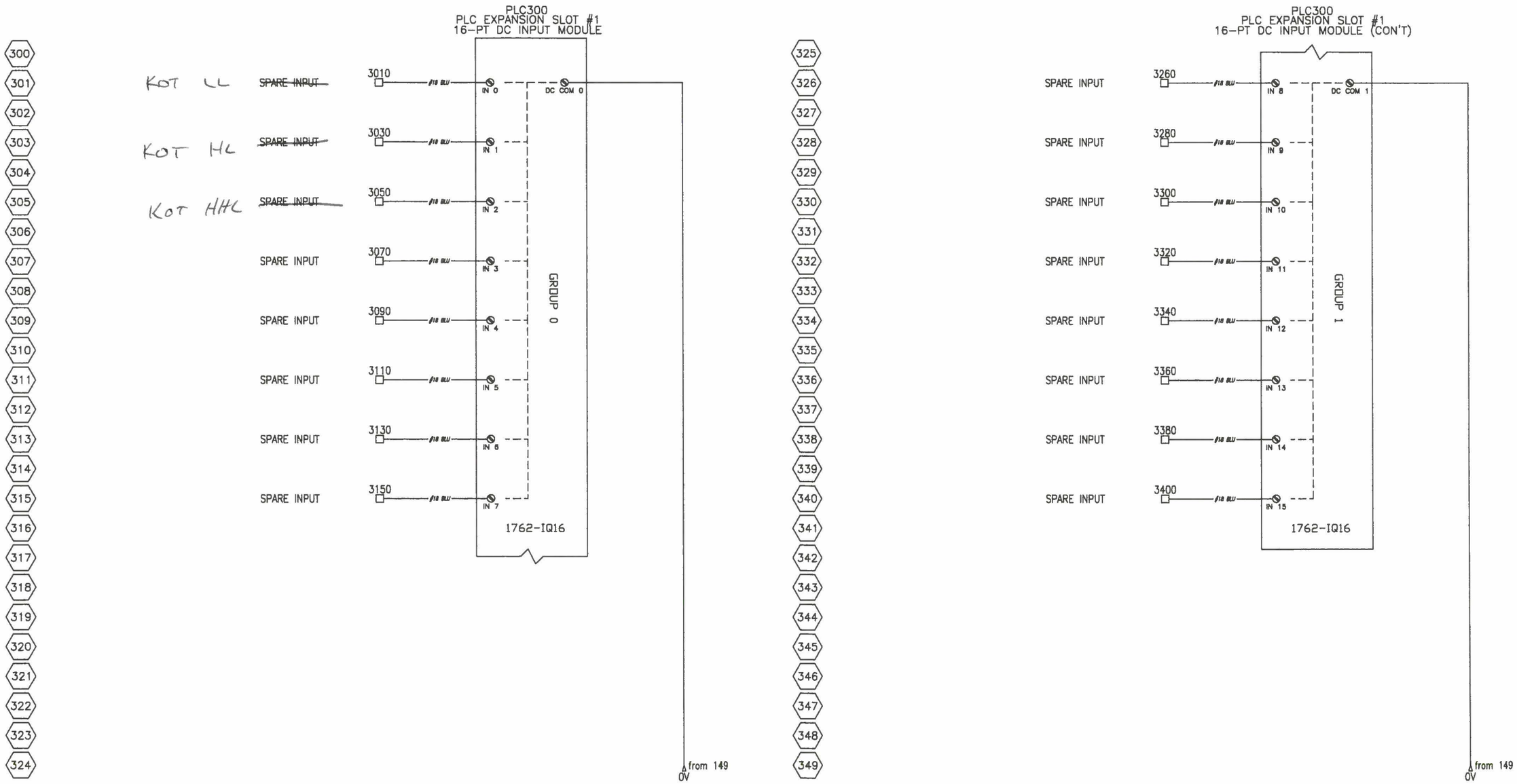
REVISION NOTES:					
REV.	DATE:		BY:	DRAWN BY:	KBC
				CHECKED BY:	KBC
				PROJECT DATE:	6-8-2011
				PROJECT NUMBER:	

20HP BLOWER RENTAL SYSTEM CONTROL PANEL

Description: PLC BASE UNIT I/O

2 OF 6

CAD FILENAME: Jacobs-Anchorage SVE Control Panel.dwg



DRAWING NOTES:

1	- -	
2	- -	
3	- -	
4	- -	
5	- -	

◇ INTERNAL PANEL-USE TERMINAL BLOCK
□ FIELD WIRING TERMINAL BLOCK

FIELD WIRING BY OTHERS: - - - - - - - - - -
COMPONENT BUS OR OUTLINE: — — — —

PROCESS LOGIC CORPORATION

REVISION NOTES:					
REV.	DATE:		BY:	DRAWN BY:	KBC
				CHECKED BY:	KBC
				PROJECT DATE:	6-8-2011
				PROJECT NUMBER:	

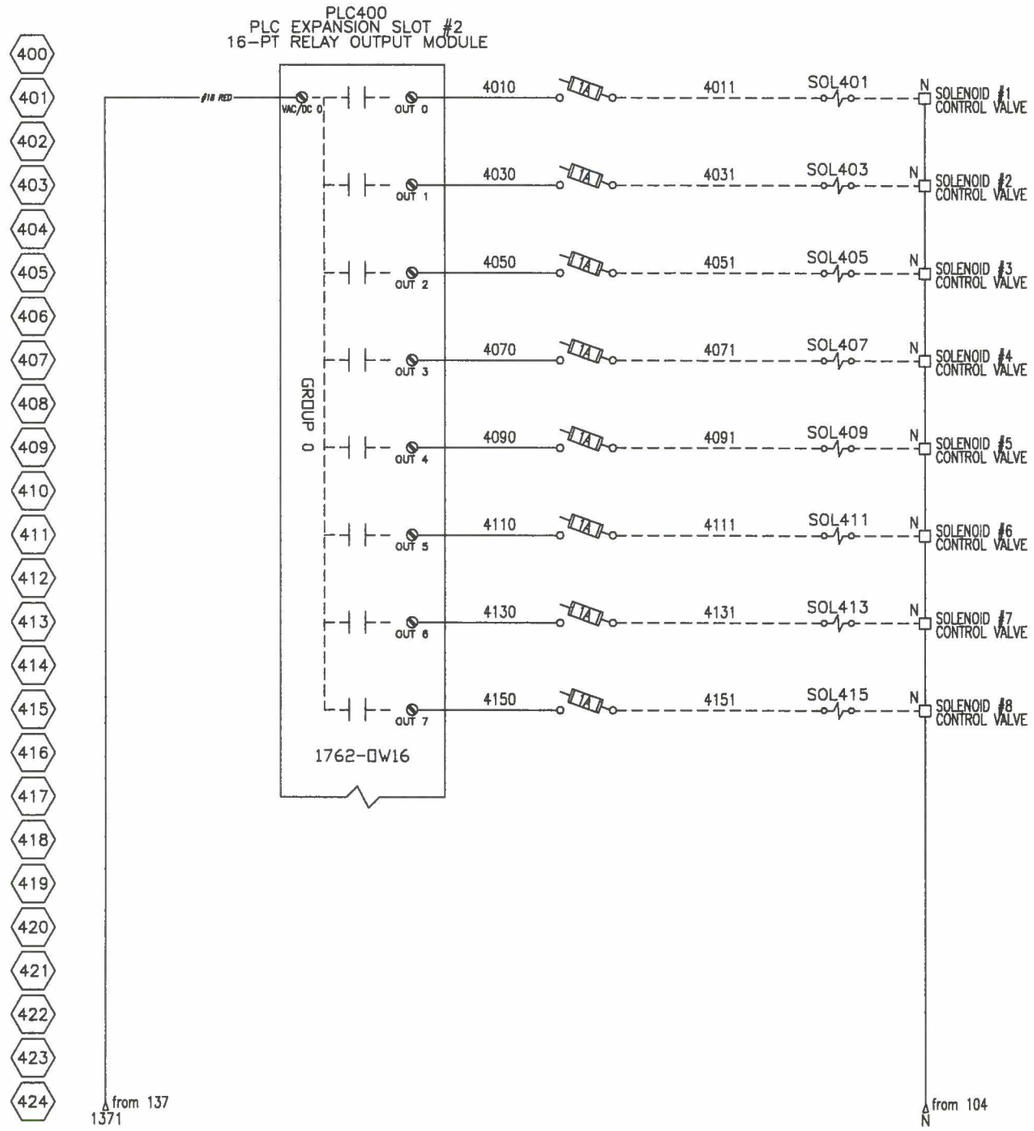
CAD FILENAME: Jacobs-Anchorage SVE Control Panel.dwg

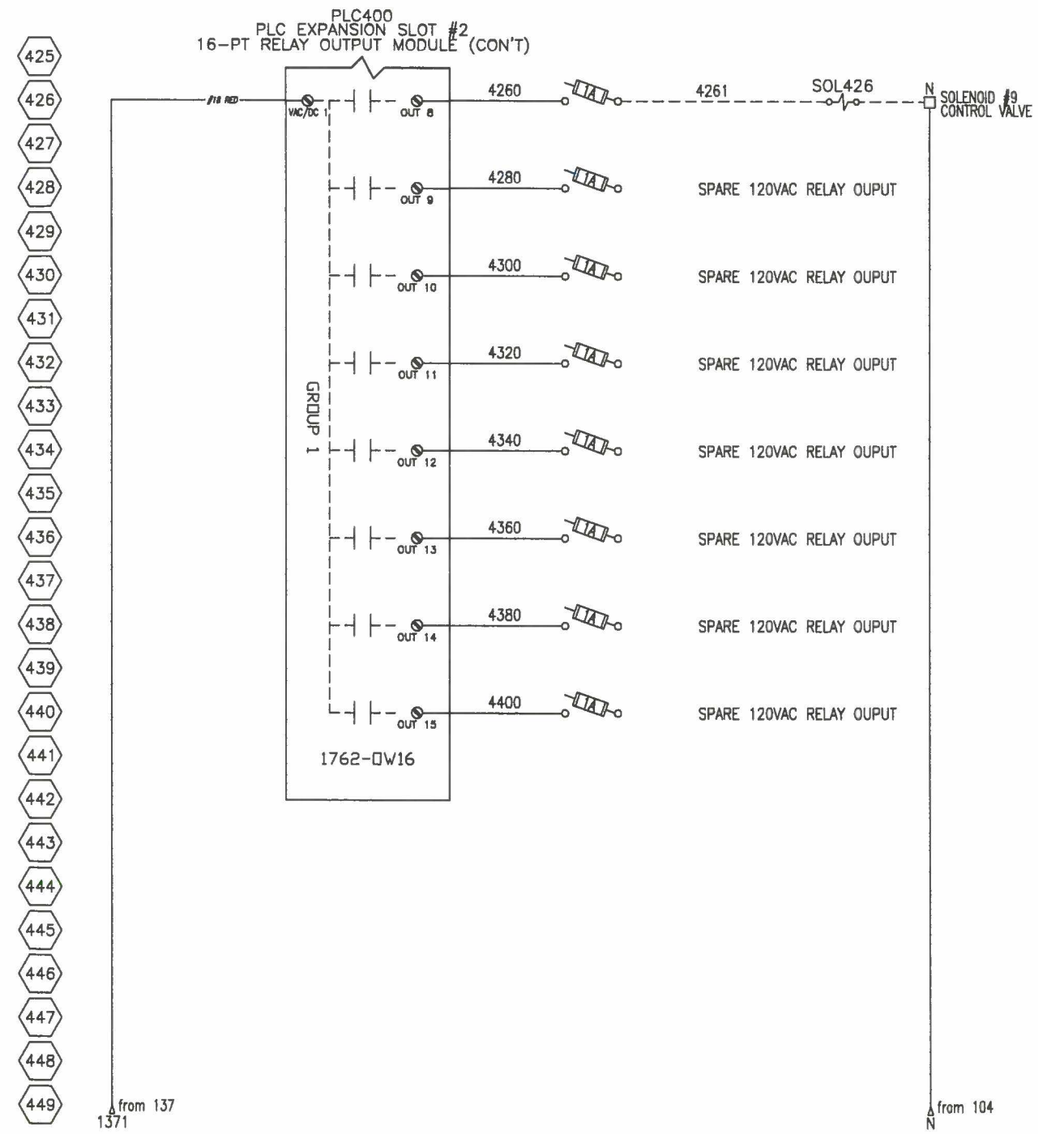
ONION ENTERPRISES

20HP BLOWER RENTAL SYSTEM CONTROL PANEL

Description:
24VDC DISCRETE INPUTS

3 OF 6





DRAWING NOTES:

1	- -	
2	- -	
3	- -	
4	- -	
5	- -	

◇ INTERNAL PANEL-USE TERMINAL BLOCK
□ FIELD WIRING TERMINAL BLOCK

FIELD WIRING BY OTHERS: - - - - - - - - - -
COMPONENT BUS OR OUTLINE: — — — —

PROCESS LOGIC CORPORATION

REVISION NOTES:					
REV.	DATE:		BY:	DRAWN BY:	KBC
				CHECKED BY:	KBC
				PROJECT DATE:	6-8-2011
				PROJECT NUMBER:	

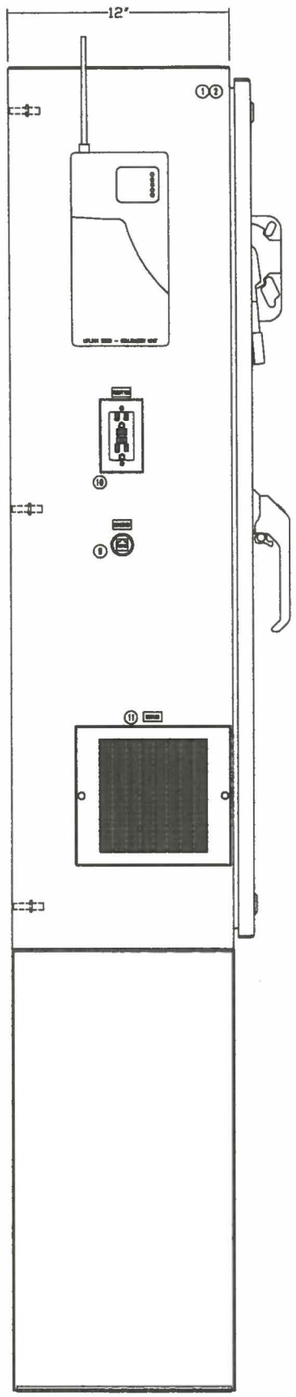
CAD FILENAME: Jacobs-Anchorage SVE Control Panel.dwg

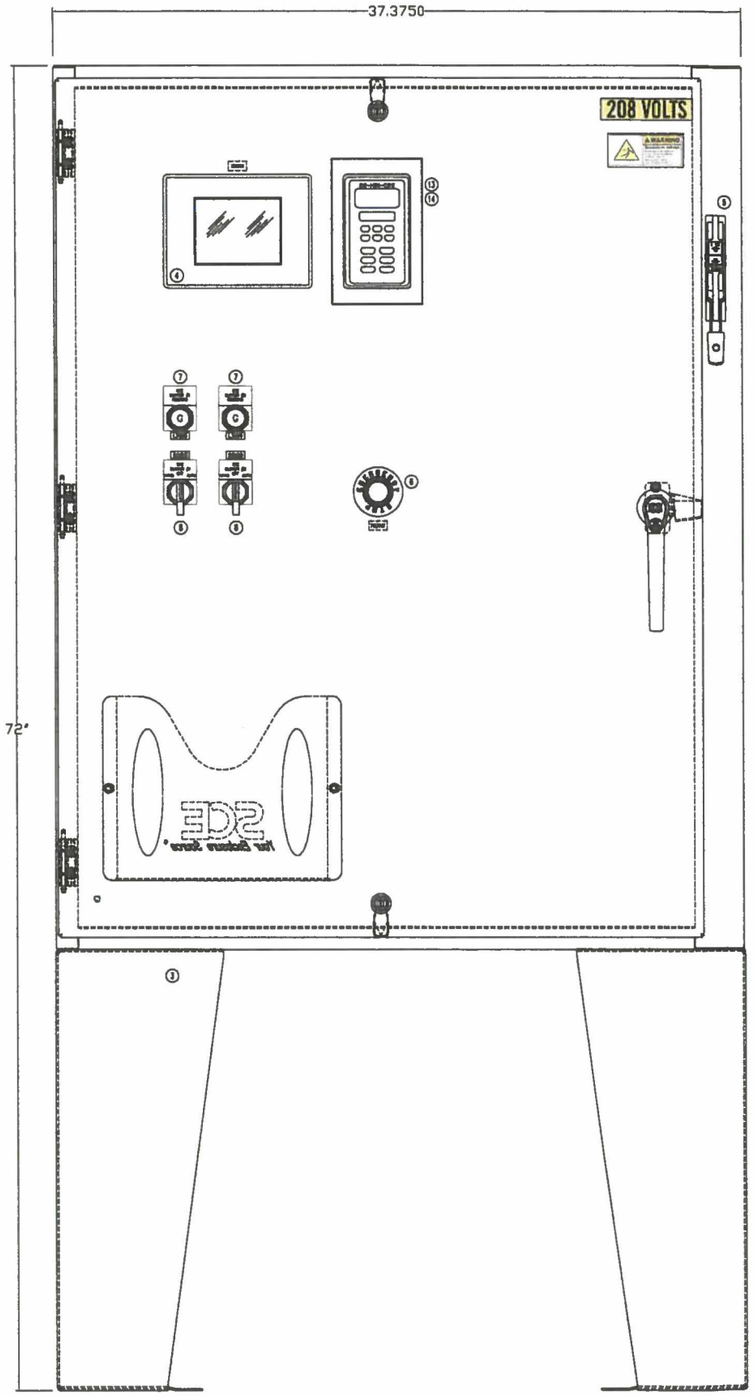
ONION ENTERPRISES

20HP BLOWER RENTAL SYSTEM CONTROL PANEL

Description: 120VAC RELAY OUTPUTS

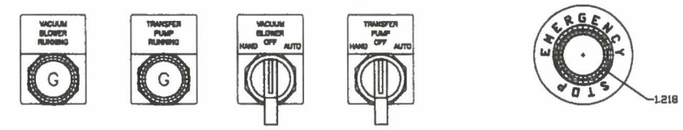
4 OF 6



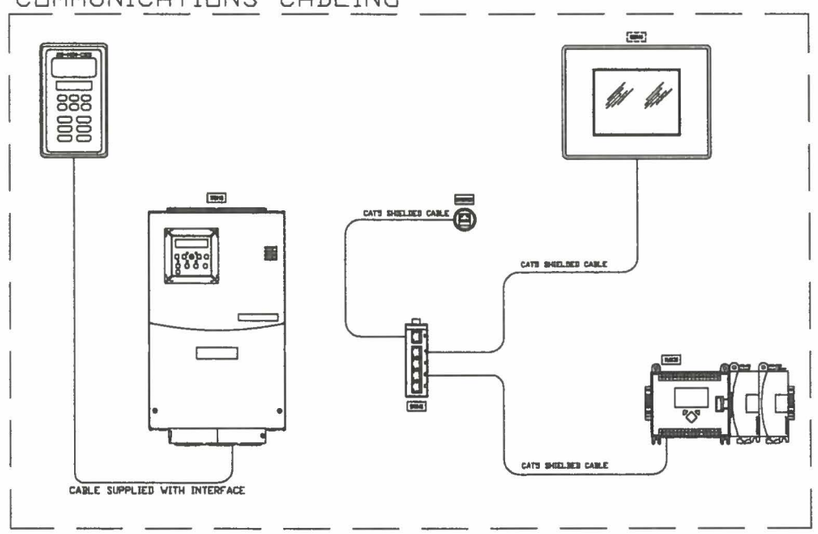


ITEM #	QTY	CATALOG	MFG	DESCRIPTION
1	1	SCE-48XEL3712LP	SAGINAW C&E	NEMA 4/12 ENCLOSURE 48" x 37" x 12"
2	1	SCE-48P36	SAGINAW C&E	48" x 36" STEEL BACK PANEL
3	1	SCE-FK2412	SAGINAW C&E	24"x12" FLOOR STAND KIT
4	1	EA7-T6M	C-MORE	6" MONOCHROME TOUCH SCREEN W/ ETHERNET
5	1	BW9F0GA-15A	FUJI ELECTRIC	FLANGE DISCONNECT HANDLE, 1.5M CABLE
6	1	FVPPM24LR-INCRD-NO-NC	C3 CONTROLS	30mm ILLUM. PUSH BUTTON MAINT. 1-NC/1-NO
7	2	FVLU24LWA-PLLGN	C3 CONTROLS	30mm GREEN LED PILOT LIGHT 24VDC
8	2	SS03-ASLWE-NO/NO	C3 CONTROLS	30mm 3-POS. SELECTOR SWITCH
9	1	PX0833	BULGIN	RJ45 ETHERNET PANEL INTERFACE
10	1	GF15GYLA	HUBBELL	15AMP GFCI RECEPTACLE, GRAY
11	1	SCE-FA66	SAGINAW C&E	6" EXHAUST FAN MOTOR W/ FILTER & COVER
12	1	SCE-FGA66	SAGINAW C&E	6" FILTER GRILLE
13	1	22-HIM-C2S	ALLEN BRADLEY	POWERFLEX 400 REMOTE OPERATOR INTERFACE
14	1	22-HIM-B1	ALLEN BRADLEY	REMOTE OPERATOR INTERFACE BEZEL KIT

30mm AB JUMBO SIZED
METAL ENGRAVED



COMMUNICATIONS CABLING



PROCESS LOGIC CORPORATION

ONION ENTERPRISES

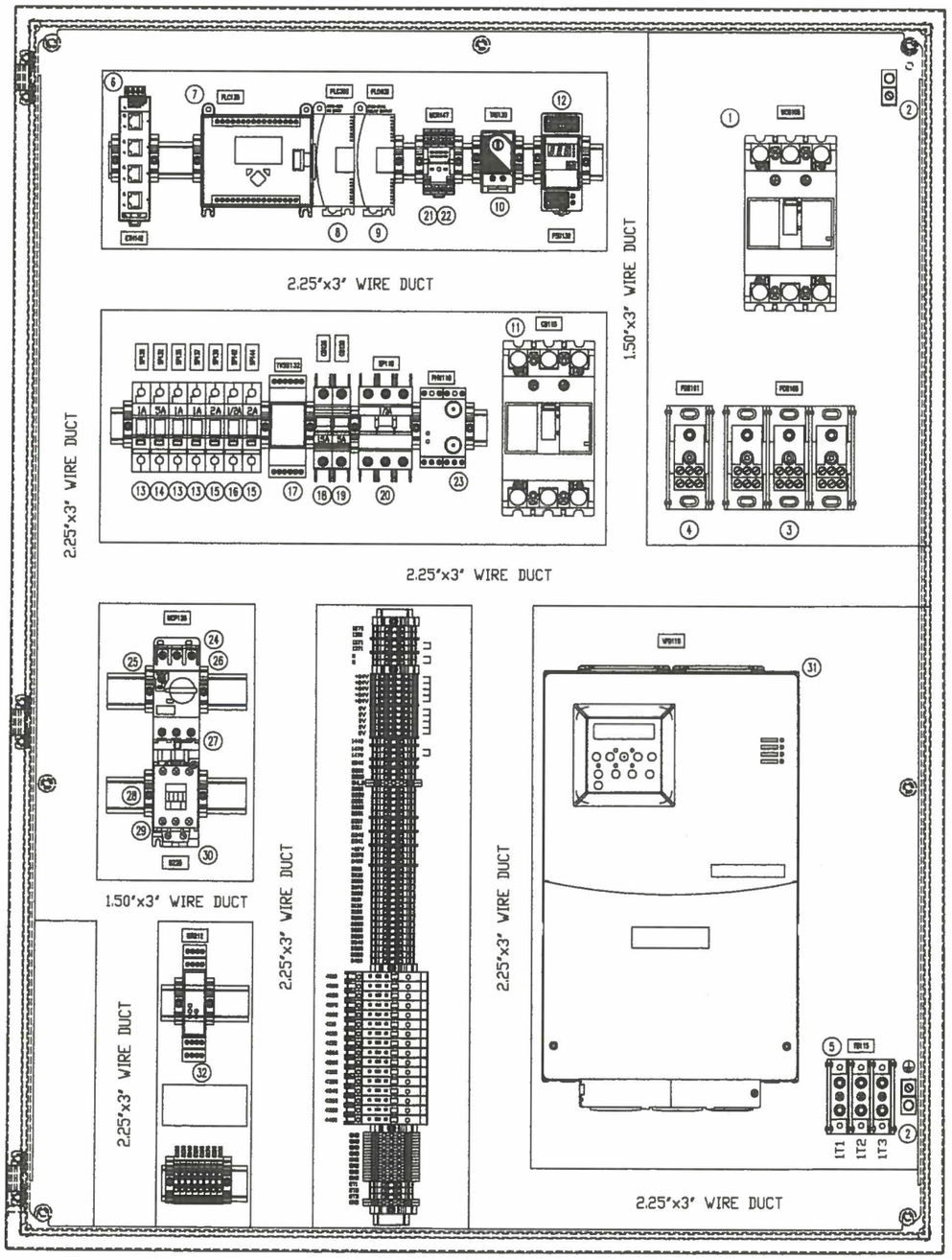
20HP BLOWER RENTAL SYSTEM CONTROL PANEL

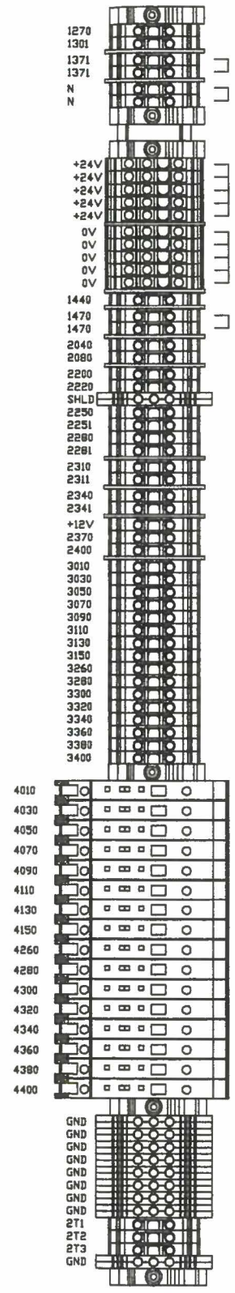
REVISION NOTES:				DRAWN BY:	KBC
REV.	DATE:		BY:	CHECKED BY:	KBC
				PROJECT DATE:	6-8-2011
				PROJECT NUMBER:	

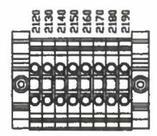
Description:
CONTROL PANEL EXTERIOR

5 OF 6

CAD FILENAME: Jacobs-Anchorage SVE Control Panel.dwg







ITEM #	QTY	CATALOG	MFG	DESCRIPTION
1	1	BW125JAGU-3P100SB	FUJI ELECTRIC	UL489 MOLDED CASE CIRCUIT BREAKER 100AMP
2	2	CX70-14-CY	PANDUIT	#4-#14 COPPER MECHANICAL LUG
3	1	PB3063	EDISON	DIST. BLOCK, 310A, 3P,6-OUT, 1-IN
4	1	PB1063	EDISON	DIST. BLOCK, 310A, 1P,6-OUT, 1-IN
5	1	PB1013	EDISON	DIST. BLOCK, 175A, 3P,1-OUT, 1-IN
6	1	2891152	PHOENIX CONTACT	5-PORT UNMANAGED ETHERNET SWITCH
7	1	1763-L16BWA	ALLEN BRADLEY	MICROLOGIX 1100 PROGRAMMABLE CONTROLLER
8	1	1762-IQ16	ALLEN BRADLEY	16-PT DC INPUT MODULE
9	1	1762-OW16	ALLEN BRADLEY	16-PT RELAY OUTPUT MODULE
10	1	ATEMND	HOFFMAN	EXHAUST FAN THEMROSTAT
11	1	BW125JAGU-3P090SB	FUJI ELECTRIC	UL489 MOLDED CASE CIRCUIT BREAKER 90AMP
12	1	S8VS-06024A	OMRON	POWER SUPPLY 24VDC, 60W, SWITCHING
13	3	WMZS1D01	EATON	SUPPLLEMENTARY PROTECTOR, 1P, 1A
14	1	WMZS1D05	EATON	SUPPLLEMENTARY PROTECTOR, 1P, 5A
15	2	WMZS1D02	EATON	SUPPLLEMENTARY PROTECTOR, 1P, 2A
16	1	WMZS1D00	EATON	SUPPLLEMENTARY PROTECTOR, 1P, 1/2A
17	1	DIN1P-20-120-1G-15	SUPERIOR ELECTRIC	TRANSIENT VOLTAGE SURGE SUPPRESSOR
18	1	WMZT1D15	EATON	UL489 CIRCUIT BREAKER, 1P, 15A
19	1	WMZT1D05	EATON	UL489 CIRCUIT BREAKER, 1P, 5A
20	1	WMZSD00	EATON	SUPPLLEMENTARY PROTECTOR, 3P, 1/2A
21	1	MY4INDC24(S)	OMRON	5A-24VDC MINATURE SQUARE BASE RELAY
22	1	PYF14A-E	OMRON	7A, 14-BLADE RELAY BASE
23	1	PMRU-1C-480A	PROSENSE	PHASE MONITOR, UNIVERSAL, 208-480VAC
24	1	BM3RHB-004	FUJI ELECTRIC	MMS 4.0A 45MM ROTARY MOTOR CIRCUIT PROT.
25	1	BZ0KIA	FUJI ELECTRIC	MMS ALARM CONTACT 1NO
26	1	BZ0WIA	FUJI ELECTRIC	MMS AUXILIARY CONTACT 1NO
27	1	BZ0LRE22GA	FUJI ELECTRIC	LINK MODULE BM3RH DC
28	1	SZ-A20T	FUJI ELECTRIC	AUX CONTACT 2NO E02-E4 FRONT
29	1	SC-E02-24VDC	FUJI ELECTRIC	9 A CONTACTOR 43MM 24VDC
30	1	BZ0BPRE22A	FUJI ELECTRIC	MMS BASE PLATE BM3RH
31	1	22C-B065A103	ALLEN BRADLEY	POWERFLEX 400 VFD. 240 (208) VAC, 3 PH.
32	1	D1031Q	GMI SAFETY	4-CH INTRINSCIALLY SAFE BARRIER
33				
34				
35				
36				
37				
38				
39				
40				

PROCESS LOGIC CORPORATION

ONION ENTERPRISES

20HP BLOWER RENTAL SYSTEM CONTROL PANEL

REVISION NOTES:					
REV.	DATE:		BY:	DRAWN BY:	KBC
				CHECKED BY:	KBC
				PROJECT DATE:	6-8-2011
				PROJECT NUMBER:	

Description: CONTROL PANEL INTERIOR

6 OF 6

CAD FILENAME: Jacobs-Anchorage SVE Control Panel.dwg

APPENDIX F

MONITORING WELL INSTALLATION

TRIHYDRO CORPORATION

Sheet 1 of 1 Sheets

SOIL BORING LOG

Project Name: Former Martin's Cleaners – Whitefish Solvent Site	Date: 01/08/2017		01/18/2017
Client: MDEQ	Time Started: 0755	Time Completed:	1220
Project Location: Whitefish liquor Store, Whitefish MT	Drilling Contractor: Remington Technologies	Backfilled: Y or N	NA
Weather: Some snow ~5°F	Operator: Robby Orr & Jose Pereira	Diameter:	6"
Logged by: Joel Richli	Crew: Eric Conrad & Jesse Carlo	Groundwater Depth:	5.5*
Logger's Signature:	Drill Method: Rotary	Total Depth:	18.8
	Equipment/Rig Type: Geoprobe 7822DT	Well Completed: (Y) or N	

* inserted into the soil around location before drilling – elevated water table.

BORING ID: MTN-MW2

Location: Parking lot of Whitefish liquor Store.

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppm	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-3"	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			Asphalt
3'1"-5'5"	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other % olive grey	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
5'5"-6'5"	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:		26.4	Silt layer
6'5"-18.8	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other % olive grey	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			

Samples Collected: NONE

Sample IDs:

Number/Size of Containers: NONE

Analyses to be Performed:

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 1 Sheets

SOIL BORING LOG

Project Name: Former Martins Cleaners – Whitefish Solvent Site	Date: 01/05/2017		01/05/2017
Client: MDEQ	Time Started: 1220	Time Completed:	1550
Project Location: Whitefish liquor Store, Whitefish MT	Drilling Contractor: Remington Technologies	Backfilled: Y or N	NA
Weather: Cloudy Temp ~ -4°F	Operator: Robby Orr	Diameter:	6"
Logged by: Joel Riehl	Crew: Eric Conrad, Jesse Carlo, Jose Pereda	Groundwater Depth:	~ 12
Logger's Signature:	Drill Method: Rotary	Total Depth:	19
	Equipment/Rig Type: Geoprobe 7822DT	Well Completed:	Y or N

BORING ID: MTN – MW1

Location: Near alleyway behind the whitefish liquor Store

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppm	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-3"	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			Asphalt
3"-6"	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			Road base
6"-4'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other % olive grey	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
4'-4.4"	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:		50.4	silt layer
4.4"-19'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other % olive grey	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			Wet below 12'
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			

Samples Collected: None

Sample IDs:

Number/Size of Containers: NONE

Analyses to be Performed:

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 1 Sheets

SOIL BORING LOG

Project Name: Former Martins Cleaners – Whitefish Solvent Site	Date: 01/05/2017		01/05/2017
Client: MDEQ	Time Started: 0925	Time Completed:	1200
Project Location: Whitefish Liquor Store, Whitefish, MT	Drilling Contractor: Remington Technologies	Backfilled: Y or N	NA
Weather: Cloudy Temp ~0°F	Operator: Robby Orr & Joes Pineda	Diameter:	6"
Logged by: Joel Riehl	Crew: Eric Coourad & Jeff Carlo	Groundwater Depth:	~12.5
Logger's Signature: [signature]	Drill Method: Rotary	Total Depth:	18.5
	Equipment/Rig Type: Geoprobe 7822DT	Well Completed: Y or N	

BORING ID: MTN-MW3

Location: in third street between Whitefish liquor Store & Walking Man Gallery

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppm	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-4"	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			Asphalt
4"-8"	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			Road base
8"-5'5"	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, % Olive Grey	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			
5'5"-6'5"	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:		29	Silt layer
6'5"-18.5'	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, % Olive Grey	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			water ~12.5
	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			
	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			

Samples Collected: NONE

Sample IDs:

Number/Size of Containers: NONE

Analyses to be Performed:

Duplicate Collected:

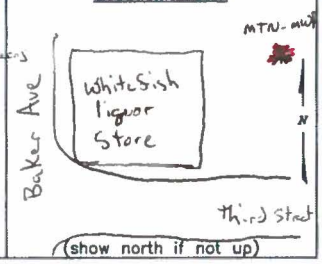
Notes:

Nested Well Completion Diagram

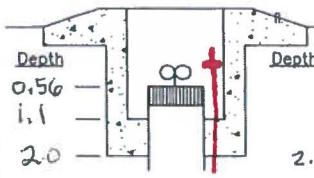
Well Designation: MTN-MW1
Job Number: 776-033-001
Project: MDEQ Whitefish Solvent Site
Loc. or Coords.:
Datum Location and Elevation (if applicable):
Start Date: 01/05/2017
End Date: 01/05/2017

Logged by: J. Riebli
Drilling Company and Drilling Personnel: Remington Technologies / Inberg-Miller Engineers
Jose Pereda (IME); Bobby Orr (RT)
Eric Conrad (RT); Jesse Carlo (RT)
Drilling Method/Fluid Used: Rotary
hydrated bentonite with City of Whitefish water
Surveyed By:

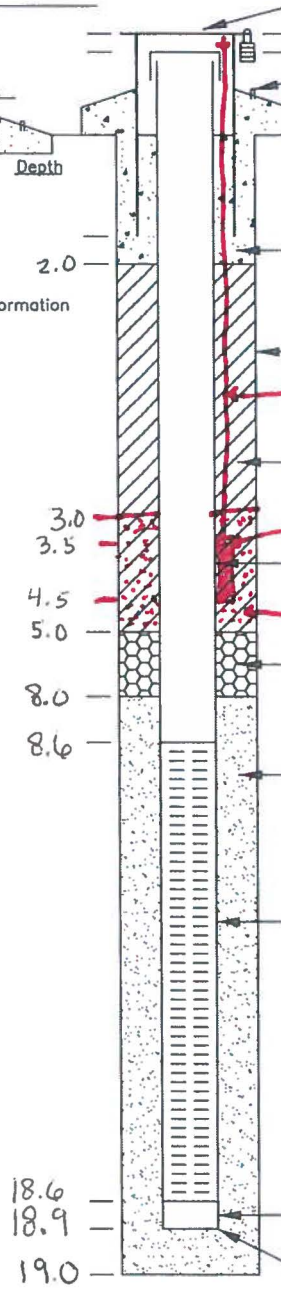
Location Sketch



Diameter and Type of Flush Mount Box: 12" metal
Elevation of Top of Casing:
Type and Size of Apron: Concrete 18" Dia



(complete flush mount information if applicable)



Diameter and Type of Protective Casing:
Elevation of Top of Protective Casing:
Elevation of Top of Casing:
Elevation of Survey Pin (if any):
Type and Size of Apron (if any):
Ground Surface Elevation:
Type of Surface Seal: Concrete
Diameter of Borehole: 6"
Diameter & type of vapor tubing: 1/4" stainless steel tubing
Type of Grout or Backfill: 3/8" hydrated bentonite plug
Diameter & type of vapor inlet: 1/2" stainless steel inlet
Diameter and Type of Casing: 2" sch 40 PVC
Type of sand Pack: 10/20 filter silica sand
Type of Seal: 3/8" hydrated bentonite plug
Type of Sand Pack: 10/20 filter silica sand
Diameter and Type of Well Screen: 2" sch 40 PVC
Perforation Size and Type: slotted 0.010
Type and Length of Sediment Trap (if any): 3"
Type and Length of End Cap (if any): 2" sch 40 PVC cap

Include Fluid Levels, Date and Time for:

Depth to Water Encountered During Drilling	12.0	1/05/17
Depth to Water in Completed Well	9.81	1/11/17
Depth to Water After Development	11.92	1/25/17

Materials Used in Well Construction:
10/20 filter sand
bentonite plug
Concrete

Trihydro CORPORATION
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Laramie, Wyoming 82070
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WELLCOMP_FIELDLOG

Nested **Well Completion Diagram**

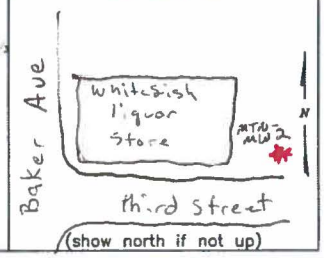
Well Designation MTN-MW2
Job Number 776-033-001
Project MDEQ Whitefish Solvent Site
Loc. or Coords.

Datum Location and Elevation (if applicable)

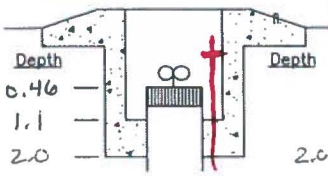
Start Date 01/08/2017
End Date 01/08/2017

Logged by J. Riebli
Drilling Company and Drilling Personnel Remington Technologies / Iaberg-Miller Engineers
Jose Pereda (CME); Robby Orr (RT)
Eric Cournad (RT); Jeff Carlo (RT)
Drilling Method/Fluid Used Rotary
hydrated bentonite with City of Whitefish water
Surveyed By

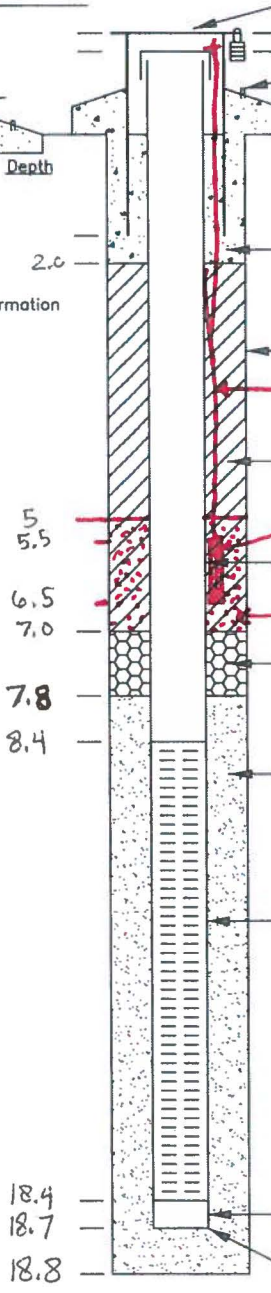
Location Sketch



Diameter and Type of Flush Mount Box: 12" metal
Elevation of Top of Casing:
Type and Size of Apron: Concrete 18" dia



(complete flush mount information if applicable)



Diameter and Type of Protective Casing
Elevation of Top of Protective Casing
Elevation of Top of Casing
Elevation of Survey Pin (if any)
Type and Size of Apron (if any)
Ground Surface Elevation

Type of Surface Seal Concrete

Diameter of Borehole 6"

Diameter & type of vapor tubing 1/4" stainless steel tubing

Type of Grout or Backfill 3/8" hydrated bentonite plug

Diameter & type of vapor inlet 1/2" stainless steel inlet

Diameter and Type of Casing 2" Sch 40 PVC

type of Sand Pack 10/20 filter Silica Sand

Type of Seal 3/8" hydrated bentonite plug

Type of Sand Pack 10/20 filter Silica Sand

Diameter and Type of Well Screen 2" Sch 40 PVC

Perforation Size and Type Slotted 0.010

Type and Length of Sediment Trap (if any) 3"

Type and Length of End Cap (if any) 2" Sch 40 PVC cap

Include Fluid Levels, Date and Time for:

Depth to Water Encountered During Drilling	~5.5	01/08/17
Depth to Water in Completed Well	8.84	01/11/17
Depth to Water After Development	~~18~~ 11.73	01/25/17

Materials Used in Well Construction:
10/20 filter Sand
bentonite plug
Concrete

Trihydro CORPORATION
1252 Commerce Drive
Laramie, Wyoming 82070
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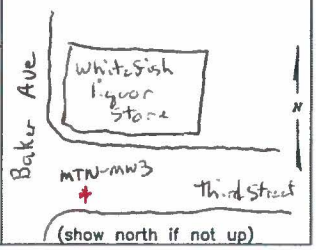
WELLCOMP_FIELDLOG

Nested Well Completion Diagram

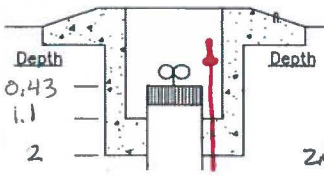
Well Designation: MTN-MW3
Job Number: 776-033-001
Project: MDEQ Whitefish Solvent Site
Loc. or Coords.:
Datum Location and Elevation (if applicable):
Start Date: 01/05/2017
End Date: 01/05/2017

Logged by: J. Riebli
Drilling Company and Drilling Personnel: Remington Technology / Inberg-Miller Engineers
Jose Pereda (IME); Robby Orr (RT)
Eric Conrad (RT); Jesse Carlo (RT)
Drilling Method/Fluid Used: ~~Auger~~ Rotary
Hydrated bentonite with City of Whitefish water
Surveyed By:

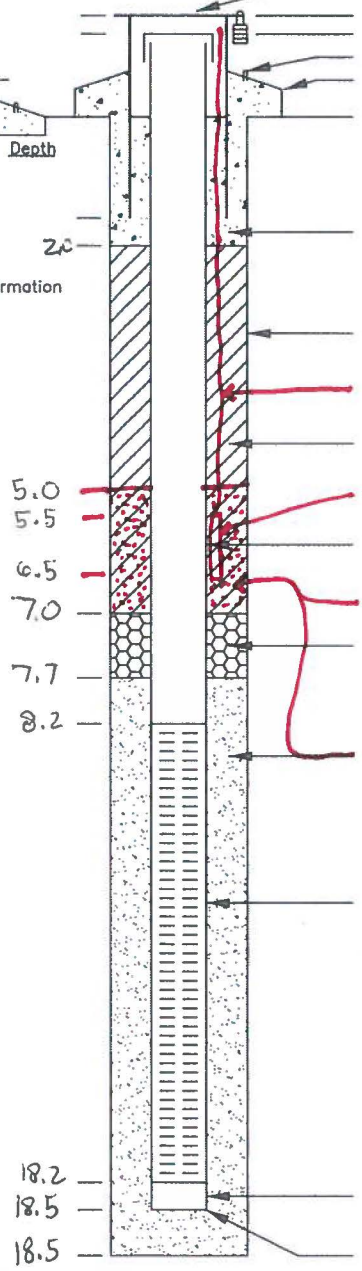
Location Sketch



Diameter and Type of Flush Mount Box: 12" metal
Elevation of Top of Casing:
Type and Size of Apron: Concrete 18" Dia



(complete flush mount information if applicable)



Diameter and Type of Protective Casing:
Elevation of Top of Protective Casing:
Elevation of Top of Casing:
Elevation of Survey Pin (if any):
Type and Size of Apron (if any):
Ground Surface Elevation:
Type of Surface Seal: Concrete
Diameter of Borehole: 6"
Diameter & type of vapor tubing: 1/4" Stainless Steel Tubing
Type of Grout or Backfill: 3/8" hydrated bentonite Chip
Diameter & type of vapor Inlet Screen: 1/2" Stainless Steel inlet
Diameter and Type of Casing: 2" Sch 40 PVC
Type of Sand Pack: 10/20 Silter silica Sand
Type of Seal: 3/8" hydrated bentonite chip
Type of Sand Pack: 10/20 Silter silica Sand
Diameter and Type of Well Screen: 2" Sch 40 PVC
Perforation Size and Type: Slotted 0.010
Type and Length of Sediment Trap (if any): 3"
Type and Length of End Cap (if any): 2" Sch 40 PVC Cap

Include Fluid Levels, Date and Time for:

Depth to Water Encountered During Drilling	12.5	1/5/17
Depth to Water in Completed Well	8.15	1/11/17
Depth to Water After Development	12.29	1/27/17

Materials Used in Well Construction:
10/20 Silter Sand
bentonite chip
concrete

Trihydro Corporation
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(F) 307/745.7729

WELLCOMP_FIELDLOG

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Thursday, January 5, 2017		
Temperature	<32 °F	**Work Day**	
Weather	Cloudy	**Work Start**	700
Wind	Light (1-10 mph)	**Work Stop**	1625

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Robby Orr / Remington Technologies	Field Supervisor
Jeff Carlo / Remington Technologies	Laborer
Eric Coonrad / Remington Technologies	Laborer
Jose Pereda / Inberg-Miller Engineers	Driller
Lana Walker / Whitefish Liquor Store	General Manager
Utility Locators	Utility Locators

Equipment Present Onsite	Count
PID	1
Geoprobe 7822DT	1

Health and Safety Comments	Subzero air temperatures for most of the day; snow and ice covered surface conditions (most of the ice removed from the parking lot by the end of the work day).
Record of Samples Collected	Collected PID readings from the two monitoring well silt layers. MTN-MW1 (near alleyway) silt layer (3.9-4.3 ft bgs) at 50.4 ppm. MTN-MW3 (Third Street) silt layer (5.5-6.5 ft bgs) at 2.9 ppm.
Work Activities Conducted	The city of Whitefish water/sewer locator and the city of Whitefish irrigation locator stopped by the site. A water service line was located very close to the proposed MTN-MW3 location. This location was moved to the north away from the utility. A irrigation line is under the sidewalk on the north side of Third Street, the injection locations will need to be moved to stay clear of this utility.

Drilled and installed monitoring wells MTN-MW1 (near the alleyway) and MTN-MW3 (in Third Street). Both were drilled to 18 ft bgs and both have 10 feet of 2" diameter 0.010 slotted screen. At MTN-MW1, the vapor inlet screen was set at 3.5-4.5 ft bgs, where as the MTN-MW3 vapor inlet screen was installed at 5.5-6.5 ft bgs. Note, the third and final monitoring well (MTN-MW2; which will be installed in the parking lot) will be installed after some of the nearby injection points are performed.

Continued to remove snow and ice from the injection work areas.

Collected SVE system operation data.

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

Photo Date:	1/5/2017
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Using the Geoprobe 7822DT to drill a six inch borehole (MTN-MW3) within Third Street.

Photo Date:	1/5/2017
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	A close up of the 2" end cap, 0.010 slotted well screen, and vapor inlet screen that will be installed within borehole MTN-MW3.

Photo Date:	1/5/2017
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	A look at the vapor sample well material; the bottom 12 inches is the inlet for the vapor well (placed a depth of 5.5-6.5 feet bgs at MTN-MW3).

Photo Date:	1/5/2017
Direction:	Northwest
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Inserting the 2" PVC (10 foot of 0.010 slotted screen and 8 foot of blank) into borehole MTN-MW1.

Photo Date:	1/5/2017
Direction:	Southeast
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Inserting the vapor sampling 1/4" well into borehole MTN-MW1. The one foot vapor inlet screen set at 3.5-4.5 feet bgs.

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 01/05/2017	TIME: 1615	OPERATOR: Joel

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: miniRAE 3000 / 592-000488

BLOWER SYSTEM HOURS: 336	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: 1
WELL #7 (EAST) HOURS: 336	WELL #8 (SOUTH) HOURS: 336	WELL #9 (WEST) HOURS: 336

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	-25	2.0	39	40.9*
WELL #8 (SOUTH):	ON	-30	1.8	37	8.2*
WELL #9 (WEST):	ON	-28	1.8	37	10.3*

MANIFOLD TEMP (°F): 44	MANIFOLD PID (PPM): 15.9*
KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -21

BLOWER VACUUM (in H2O): 13.5	BLOWER DISCHARGE PRESSURE (in H2O): 35	BLOWER DISCHARGE TEMPERATURE (°F): 101
PRE GAC / ZEOLITE PID (PPM): 16.6	POST GAC DRUM PID (PPM): 0.1	POST ZEOLITE DRUM PID (PPM): 0.0

NOTES: * PID reads collected with system off on vacuum side of the blower.

DAILY SHEET OF

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Sunday, January 8, 2017		
Temperature	<32 °F	**Work Day**	
Weather	Cloudy	**Work Start**	700
Wind	Light (1-10 mph)	**Work Stop**	1730

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Robby Orr / Remington Technologies	Field Supervisor
Jeff Carlo / Remington Technologies	Laborer
Eric Coonrad / Remington Technologies	Laborer
Jose Pereda / Inberg-Miller Engineers	Driller

Equipment Present Onsite	Count
Geoprobe 7822DT	1
Box truck that mixes injection fluids	1
Truck with water tank	1

Health and Safety Comments	Site received two inches of snow overnight. Temperatures were in the teens most of the day.
Record of Samples Collected	None.
Work Activities Conducted	Using the Geoprobe, drilled and installed monitoring wells MTN-MW2 (parking lot). Drilled to 18.5 ft bgs with 10 feet of 2" diameter 0.010 slotted screen. The vapor inlet screen was set at 5.5-6.5 ft bgs; this was the observed silt layer. A PID reading of the silt layer recorded 26.4 ppm. The silt layer was saturated from all the injections of EVO around the monitoring well location. There was a delay in setting the well as an item fell into the borehole and had to be fished out before proceeding. Continued using the Geoprobe to push injection rod down to 12 feet bgs, injecting

emulsified vegetable oil (mixing 12.5 gallons of RNAS Newman Zone emulsified vegetable oil with 410 gallons of City of Whitefish water) at 12 feet bgs and 5.5 feet bgs. The injection boreholes were plugged with bentonite. A total of six injection locations (A1, A2, A3, C1, D1, and D2) were completed. This brings the up to date injection total to 19 of the 50 points.

The SVE system continued operating. The blower unit has been slowed down so not to suck up any injection fluids.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

Photo Date:	1/8/2017
Direction:	Southeast
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Using the Geoprobe to pushing the soil sampler rod and tube at monitoring well MTN-MW2 to locate the subsurface silt layer. The silt layer was found between 5.5 and 6.5 feet bgs.

Photo Date:	1/8/2017
Direction:	Northeast
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Using the Geoprobe to auger down and make a borehole MTN-MW2. Location drilled down to 18.5 feet bgs.

Photo Date:	1/8/2017
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	MTN-MW2 2" groundwater well (screen set between 8 and 18 feet bgs) and 1/4" vapor well (screen set between 5.5 and 6.5 feet bgs).

Photo Date:	1/8/2017
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Using the Geoprobe to inject EVO mixed fluids at injection location A2. The safety cone is monitoring well MTN-MW1. The box truck is the EVO mixing area.

Photo Date:	1/8/2017
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Adding bentonite chip into injection borehole A3 after injecting EVO mix at the 12 feet bgs and 5.5 feet bgs.

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Wednesday, January 25, 2017		
Temperature	<32 °F	**Work Day**	
Weather	Snow	**Work Start**	1115
Wind	Calm (<1 mph)	**Work Stop**	1805

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Lana Walker / Whitefish Liquor Store	General Manager

Equipment Present Onsite	Count
PID	1
Horiba U-52 Water Quality Meter	1
Solinst Interface Meter	1

Health and Safety Comments	Snow and Ice covered surface conditions. Placed safety cones out when working around the three new monitoring wells.
Record of Samples Collected	None
Work Activities Conducted	Started developing the three new site monitoring wells using well development surge tools in each well. Surged the water column using the well development surge tool before bailing well fluids and sediment from each well. Generated well development fluids were placed in a 55-gallon drum stored in the SVE system building. Groundwater elevation and water quality measurements were collected every few bailed well case volumes. Injection fluids were observed in each of the three monitoring wells. Development activities will continue into tomorrow. Vacuum and PID readings were collected from each of the monitoring wells vapor well.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 01/25/2017	TIME: 1755	OPERATOR: JR

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: mini RAE 3000 / 592-000488

BLOWER SYSTEM HOURS: 801	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: 1

WELL #7 (EAST) HOURS: 807	WELL #8 (SOUTH) HOURS: 817	WELL #9 (WEST) HOURS: 817

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	25	1.9	38	22.1*
WELL #8 (SOUTH):	ON	29.5	1.7	36	4.6*
WELL #9 (WEST):	ON	27	1.7	36	6.7*

MANIFOLD TEMP (°F): 28	MANIFOLD PID (PPM): 9.6*

KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -20.5

BLOWER VACUUM (in H2O): 13.1	BLOWER DISCHARGE PRESSURE (in H2O): 37	BLOWER DISCHARGE TEMPERATURE (°F): 87

PRE GAC / ZEOLITE PID (PPM): 9.7	POST GAC DRUM PID (PPM): 0.0	POST ZEOLITE DRUM PID (PPM): 0.0

NOTES: * Collected with system off.

Well ID	Vacuum (in H2O)	PID (ppm)
MTN-MW1	-0.02	2.6
MTN-MW2	-0.02	32.0
MTN-MW3	-0.01	1.6

DAILY SHEET OF

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Thursday, January 26, 2017		
Temperature	<32 °F	**Work Day**	
Weather	Cloudy	**Work Start**	800
Wind	Calm (<1 mph)	**Work Stop**	1600

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Lana Walker / Whitefish Liquor Store	General Manager

Equipment Present Onsite	Count
PID	1
Horiba U-52 Water Quality Meter	1
Solinst Interface Meter	1

Health and Safety Comments	One inch of snow fell overnight; snow and ice covered surfaces.
Record of Samples Collected	Collected a sample of well development fluids from the 55-gallon storage drum; drum contains less than 40 gallons.
Work Activities Conducted	Continued, and completed, well development field activities at the three new monitoring wells (MTN-MW1, MTN-MW2, and MTN-MW3) and started WSMW-7. Development fluids were placed in a 55-gallon drum located inside the remediation building; a sample of the fluids was collected for disposal options. Use well development tools in the three new monitoring wells to surge the water column and flush out sediment. At WSMW-7, the 0.75 inch diameter well is too small for surging the well, so the well was only bailed. Collected system operating data.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

MONITORING WELL DEVELOPMENT LOG

Trihydro CORPORATION

Well ID MTN-MW1

All Measurements taken from: [X] Top of Casing [ ] Protective Casing [ ] Ground Level

Client	MDEQ	Project	Whitefish Solvent Site - Martins Cleaners	Job Number	776-033-001
Date	01/25/2017	Time Start	01/25/2017 @ 1532	Time End	01/26/2017 @ 1127
Development Method	Well Development Surge Tool	Purging Equipment	Bailer	Well Diameter	2"
Measured Depth (pre-development)	18.29**	Measured Depth (post-development)	18.32***	Water Level Equipment	Solinst Interface Meter
Static Water Level (ft)	11.36*	Standing Water Column (ft)	6.93	WQ Meter	Horiba U-52
One Well Volume (gal)	1.13	Minimum Gallons to Purge (10 WCV's)	11.3		

* or 11.92 (BGS) ** or 18.85 (BGS) *** or 18.88 (BGS)

	Time	Amount Purged (gal)	Field Parameters Measured: Water Level	pH	Temp. °C	ORP	Conductivity mS/cm	Turbidity NTU	D.O. mg/L	T.D.S. g/L	Comments	Field Tech.
1/25	1532	Ø	11.36	7.17	10.49	197	1.89	47	5.74	1.22		JR
	1533–	1550	Surge	water	column	with	surge	tool				
	1551	Start	bailing								High amount of silt in purge	
	1554	3	15.24	6.94	10.19	189	2.04	> 800	7.93	1.31		
	1606	5.5	17.90	7.06	10.03	196	2.06	> 800	9.14	1.32	Letting the well Recharge	
	1732	5.5	15.60									
	1741	7	18.17	7.20	9.99	187	1.94	> 800	8.10	1.24	Letting the well Recharge	
1/26	1042	7	11.99									
	1043–	1058	Surge	water	column	with	surge	tool			Low amount of silt in purge.	
	1108	11	16.77	7.21	10.97	195	1.82	> 800	9.00	1.17		JR
	1127	12.25	17.93	7.22	10.73	196	1.83	> 800	12.58	1.17		JR

MONITORING WELL DEVELOPMENT LOG

Trihydro CORPORATION

Well ID MTN-MW2

All Measurements taken from: [X] Top of Casing [ ] Protective Casing [ ] Ground Level

Client	MDEQ	Project	Whitefish Solvent Site - Martins Cleaners	Job Number	776-033-001
Date	01/25/2017	Time Start	01/25/2017 @ 1619	Time End	01/26/2017 @ 1328
Development Method	Well Development Surge Tool	Purging Equipment	Bailer	Well Diameter	2"
Measured Depth (pre-development)	17.04 **	Measured Depth (post-development)	18.21 ***	Water Level Equipment	Solinst Interface Meter
Static Water Level (ft)	11.73*	Standing Water Column (ft)	5.31	WQ Meter	Horiba U-52
One Well Volume (gal)	0.8	Minimum Gallons to Purge (10 WCV's)	8.7		

* or 12.19 bgs ** or 17.50 bgs *** or 18.67 bgs

	Time	Amount Purged (gal)	Field Parameters Measured: Water Level	pH	Temp. °C	ORP	Conductivity mS/cm	Turbidity NTU	D.O. mg/L	T.D.S. g/L	Comments	Field Tech.
1/25	1619	Ø	11.73	6.82	9.61	193	1.43	75	9.26	0.917	Diluted injection fluids noted	JR
	1620-	1635	Surge	water	column	with	surge	tool				
	1636	start	bailing									
	1641	2.5	15.51	7.18	9.66	180	1.28	> 800	7.19	0.818	High amount of silt in purge	
	1656	4.5	17.50	7.40	9.58	175	1.45	> 800	10.09	0.925	High amount of silt in purge	
1/26	0855	4.5	11.72									
	0856-	0910	Surge	water	column	with	surge	tool				
	0915	6	16.95	7.41	10.27	~~16.70~~ 167	1.36	> 800	7.37	0.828	High amount of silt in purge	
	0926	8.5	17.38	7.43	10.54	190	1.26	> 800	8.81	0.808		
	1318	8.5	12.14									
	1328	11.75	17.49	7.11	10.08	157	1.32	> 800	8.06	0.844		JR

MONITORING WELL DEVELOPMENT LOG

Trihydro CORPORATION

Well ID MTN-MW3

All Measurements taken from: [X] Top of Casing [ ] Protective Casing [ ] Ground Level

Client	MDEQ	Project	Whitefish Solvent Site - Martins Cleaners	Job Number	776-033-001
Date	01/25/2017	Time Start	01/25/2017 @ 1420	Time End	01/26/2017 @ 1257
Development Method	Well Development Surge Tool	Purging Equipment	Bailer	Well Diameter	2"
Measured Depth (pre-development)	18.14 **	Measured Depth (post-development)	18.49 ***	Water Level Equipment	Solinst Interface Meter
Static Water Level (ft)	12.29 *	Standing Water Column (ft)	5.85	WQ Meter	Horiba U-52
One Well Volume (gal)	0.9	Minimum Gallons to Purge (10 WCV's)	9.5		

* or 12.72 bgs ** or 18.57 bgs *** or 18.92 bgs

	Time	Amount Purged (gal)	Field Parameters Measured: Water Level	pH	Temp. °C	ORP	Conductivity mS/cm	Turbidity NTU	D.O. mg/L	T.D.S. g/L	Comments	Field Tech.
1/25	1420	Ø	12.29	6.92	10.23	198	1.84	51.1	3.72	1.17		JR
	1421 –	1435	Surge	water	column	with	surge	tool				
	1436	Start	bailing								High amount of silt purged	
	1449	5	17.74	6.94	10.80	172	1.69	> 800	6.65	1.08		
	1508	6.5	17.95	7.19	10.26	173	1.70	> 800	12.40	1.09	letting the well recharge	
	1710	6.5	13.26									
	1718	10.5	17.40	7.21	10.29	186	1.72	> 800	20.77	1.10		
1/26	1255	10.5	12.38									
	1257	11	13.41	7.12	10.37	144	1.80	> 800	9.25	1.15		JR

Trihydro CORPORATION

MONITORING WELL DEVELOPMENT LOG

Well ID WSMW-7

All Measurements taken from: ☒ Top of Casing ☐ Protective Casing ☐ Ground Level

Client	MDEQ	Project	Whitefish Solvent Site - Martins Cleaners	Job Number	776-033-001
Date	01/26/2017	Time Start	0847	Time End	1523
Development Method	~~Well Development Surge Tool~~ "Bailer"	Purging Equipment	Bailer	Well Diameter	0.75" ~~2"~~
Measured Depth (pre-development)	12.35	Measured Depth (post-development)	21.47	Water Level Equipment	Solinst Interface Meter
Static Water Level (ft)	11.79	Standing Water Column (ft)	0.56	WQ Meter	Horiba U-52
One Well Volume (gal)	0.1	Minimum Gallons to Purge (10 WCV's)	1.3		

Time	Amount Purged (gal)	Field Parameters Measured								Comments	Field Tech.
		Water Level	pH	Temp. °C	ORP	Conductivity mS/cm	Turbidity NTU	D.O. mg/L	T.D.S. g/L		
0847	Ø	11.79	7.04	10.58	186	1.66	62	6.34	1.07		JR
0848	start bailing										
1000	0.25	18.44	7.27	10.91	204	2.11	> 800	9.01	1.35		
1032	0.5	20.30	7.44	11.52	198	1.23	> 800	14.03	0.792		
1142	0.5	15.02									
1225	0.9	20.36	7.23	10.86	185	0.974	735	9.65	0.625		
1440	0.9	13.28									
1523	1.3	20.54									JR

MDEQ WHITEFISH SOLVENT SITE - FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 01/26/2017	TIME: 1535	OPERATOR: Joel

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: MiniRAE 3000 / 592-000488

BLOWER SYSTEM HOURS: 823	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: 1

WELL #7 (EAST) HOURS: 829	WELL #8 (SOUTH) HOURS: 839	WELL #9 (WEST) HOURS: 839

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	-26	2.2	40	21.6 *
WELL #8 (SOUTH):	ON	-32	2.0	38	4.3 *
WELL #9 (WEST):	ON	-30	2.0	38	5.4 *

MANIFOLD TEMP (°F): 38	MANIFOLD PID (PPM): 9.8*

KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -22

BLOWER VACUUM (in H2O): ~~15.1~~ 15.5 (JD)	BLOWER DISCHARGE PRESSURE (in H2O): 42	BLOWER DISCHARGE TEMPERATURE (°F): 100

PRE GAC / ZEOLITE PID (PPM): 9.9	POST GAC DRUM PID (PPM): 0.0	POST ZEOLITE DRUM PID (PPM): 0.0

NOTES: * Readings collected with system off.

Well ID:	Vacuum (in-H2O)
MTN-MW1	-0.03
MTN-MW2	-0.04
MTN-MW3	-0.02

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Account Information (Billing information)

Company/Name	Trihydro Corporation
Contact	Andrew Vann
Phone	(307) 745-7474
Mailing Address	1252 Commerce Dr.
City, State, Zip	Laramie, WY 82070
Email	Avanne trihydro.com
Receive Invoice	☐Hard Copy ☒Email
Receive Report	☐Hard Copy ☒Email
Purchase Order	
Quote	1351
Bottle Order	22827

Report Information (if different than Account Information)

Company/Name	
Contact	
Phone	
Mailing Address	
City, State, Zip	
Email	
Receive Report	☐Hard Copy ☐Email
Special Report/Formats:	☐ LEVEL IV ☐ NELAC ☒EDD/EDT (contact laboratory) Trihydro ☐ Other_____

Comments

Project Information

Project Name, PWSID, Permit, etc.	MDEQ Whitefish
Sampler Name	Joel Riebli
Sampler Phone	(307)760-2793
Sample Origin State	MT
EPA/State Compliance	☐ Yes ☐ No

MINING CLIENTS, please indicate sample type.
*If ore has been processed or refined, call before sending.
☐ Byproduct 11 (e)2 material ☐ Unprocessed ore (NOT ground or refined)*

Matrix Codes

A - Air
W - Water
S - Soils/Solids
V - Vegetation
B - Bioassay
O - Other
DW - Drinking Water

All turnaround times are standard unless marked as RUSH.

Energy Laboratories MUST be contacted prior to RUSH sample submittal for charges and scheduling – See Instructions Page

Analysis Requested

	Sample Identification (Name, Location, Interval, etc.)	Collection Date	Collection Time	Number of Containers	Matrix (See Codes Above)	8260 VOC short list									See Attached	RUSH TAT	ELI LAB ID (Laboratory Use Only)
1	MTN-Purge	1/26/17	1545	3	W	X											
2	Trip Blank	—	—	1	W	X											
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Custody Record MUST be signed	Relinquished by (print)	Date/Time	Signature	Received by (print)	Date/Time	Signature
	Joel Riebli	1/27/17 @ 1630				
	Relinquished by (print)	Date/Time	Signature	Received by Laboratory (print)	Date/Time	Signature
					1/27/17 1630	

LABORATORY USE ONLY

Shipped By	Cooler ID(s)	Custody Seals	Intact	Receipt Temp	Temp Blank	On Ice	Payment Type	Amount	Receipt Number (cash/check only)
Hand	9	Y (N) C B	Y N	1.2 °C	(Y) N	(Y) N	CC Cash Check_____	$	

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All subcontracted data will be clearly notated on your analytical report.

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Tuesday, February 21, 2017		
Temperature	32-50 °F	**Work Day**	
Weather	Rain	**Work Start**	1140
Wind	Light (1-10 mph)	**Work Stop**	1950

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Sarah Seitz / Trihydro Corporation	Engineer
Lana Walker / Whitefish Liquor Store	General Manager
Utility Locators	Utility Locators

Equipment Present Onsite	Count
PID -ppb	1
Horiba U-52 Water Quality Meter	1
Solinst Interface Meter	1
Peristaltic Pump	1
Rotary hammer drill w/ 1" bit	1

Health and Safety Comments	Rain and snow mix weather conditions.
Record of Samples Collected	Purged and collected the groundwater samples from the following monitoring wells: •MTN-MW1 •MTN-MW2 •MTN-MW3
Work Activities Conducted	Mobilized from Helena to Whitefish. Utility locators marked utilities outside of the Whitefish Liquor Store prior to arrival.

Gauged the four groundwater monitoring wells. The groundwater table has risen approximately four feet since the January 25, 2017 well development field activities. Using a peristaltic pump, purged, collected water quality measurements, and sampled groundwater from monitoring wells MTN-MW1, MTN-MW2, and MTN-MW3.

Met with Whitefish Liquor Store general manager Lana Walker. Interviewed her for indoor air quality testing. Using a 1" drill bit and a rotary hammer drill, drilled and installed a subslab vapor well in the utility closet of the Whitefish Liquor Store. The concrete was approximately nine inches thick; the vapor well was drilled to 15 inches. Silica sand, teflon tubing, and bentonite was installed to make the subslab well; the inlet of the teflon tubing installed approximately 14.5 inches below the top of the concrete surface.

The SVE remediation system was running on arrival to the site and continued operating through out the day.

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

Photo Date:	2/23/2017
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	-114.3375
Y Coordinate:	48.40944444
Location:	
Description:	Utility closet inside the Whitefish Liquor Store before the installation of the subslab vapor well.

Photo Date:	2/23/2017
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	-114.3375
Y Coordinate:	48.40944444
Location:	
Description:	Completed subslab vapor port MTN-SS inside the utility closet of the Whitefish Liquor Store. The well is located 7.5' south of the northern interior wall and 15.5' west of the eastern interior wall. The inlet of the teflon tubing is approximately 14.5" below the floor.

Daily Tailgate Meeting Checklist

Site Name: Trihydro Corporation – Whitefish Solvent Site

Site Address: 239 Baker Avenue, Whitefish, Montana

Work Being Performed: ISCO-Injection

Date & Time of Meeting: 1/5/17 **Weather:** Clear -17

Name of Presenter: ~~Grant Drennan~~ Robby Orr

Itemize the Specific Topics Discussed (if more space is needed use the back of this page):

6 REMINGTON CARDINAL SAFETY PRINCIPLES

- ☑ I will report to work physically rested and mentally alert
- ☑ I will be responsible for my actions
- ☑ I will communicate with my co-workers
- ☑ I will be aware of all changing site conditions that may impact safety
- ☑ I will NOT tolerate willful unsafe acts
- ☑ I will STOP all unsafe work

✓	Introductions	✓	PPE check - Level D
✓	Scope of Work Discussion	✓	Special PPE - Respirator, face shield etc.
✓	Site Walk	✓	JHAs reviewed prior to work start
✓	Utility locations checked - Look up	✓	Overhead Obstacles
✓	STOP WORK Authority	N/A	Short Service Employees (List them)
✓	Hospital Location/Route Explained	✓	Good Housekeeping
✓	HASP Reviewed	✓	Communication with Mixer in Box Truck
✓	Emergency Evacuation Areas	✓	Exclusion zone
✓	Eye Wash/First Aid Kit Location	✓	Eating/Drinking/Smoking/Cell Phones
✓	Spotters needed for moving equipment	✓	Stakeholders - direct to client
✓	Fire Extinguisher Location	✓	Heat Stress
✓	3 Points of Contact for equipment	✓	Cold Stress
✓	Proper Lifting Technique	✓	Equipment Inspections
		✓	Shared Learnings

Job Hazard Analyses:

✓	Arrival and Site Setup	✓	Chemical Injection
✓	Core Drilling	N/A	Jackhammering
✓	Borehole Clearance	N/A	Skidsteer Operation
✓	Drilling Operation (Direct Push)	N/A	Well Injection
	Other		Other

- **I have participated in the Job Hazard Analysis (JHAs) review and discussion of the above referenced JHAs.**
- **I have read and understood the contents of this Site Health and Safety Plan and I agree to abide by all provisions specified within.**

Daily Safety Tailgate Meeting Participants (Use the back of this form if needed)

Print Name:	Signature:	Company:	Date:
Grant Drennan		Remington Technologies	
Robby Orr	Robby Orr	Remington Technologies	1/5/17
Jeff Carlo	Jeff Carlo	Remington Technologies	1/5/17
Eric Counsaz	Eric Counsaz	Remington	1/5/17
Jose Pereda	Jose Pereda	IMC	1/5/17
Jal Riebli	Jal Riebli	Trihydro	1/5/2017

Daily Tailgate Meeting Checklist

Site Name: Trihydro Corporation – Whitefish Solvent Site

Site Address: 239 Baker Avenue, Whitefish, Montana

Work Being Performed: ISCO-Injection

Date & Time of Meeting: 1/8/17 7:30 AM **Weather:** Snowing 20°

Name of Presenter: ~~Grant Drennan~~ Robby Orr

Itemize the Specific Topics Discussed (if more space is needed use the back of this page):

6 REMINGTON CARDINAL SAFETY PRINCIPLES

- ☑ I will report to work physically rested and mentally alert
- ☑ I will be responsible for my actions
- ☑ I will communicate with my co-workers
- ☑ I will be aware of all changing site conditions that may impact safety
- ☑ I will NOT tolerate willful unsafe acts
- ☑ I will STOP all unsafe work

✓	Introductions	✓	PPE check - Level D
✓	Scope of Work Discussion	✓	Special PPE - Respirator, face shield etc.
✓	Site Walk	✓	JHAs reviewed prior to work start
✓	Utility locations checked - Look up	✓	Overhead Obstacles
✓	STOP WORK Authority	NA	Short Service Employees (List them)
✓	Hospital Location/Route Explained	✓	Good Housekeeping
✓	HASP Reviewed	✓	Communication with Mixer in Box Truck
✓	Emergency Evacuation Areas	✓	Exclusion zone
✓	Eye Wash/First Aid Kit Location	✓	Eating/Drinking/Smoking/Cell Phones
✓	Spotters needed for moving equipment	✓	Stakeholders - direct to client
✓	Fire Extinguisher Location	✓	Heat Stress
✓	3 Points of Contact for equipment	✓	Cold Stress
✓	Proper Lifting Technique	✓	Equipment Inspections
		✓	Shared Learnings

Job Hazard Analyses:

	Arrival and Site Setup	✓	Chemical Injection
✓	Core Drilling		Jackhammering
✓	Borehole Clearance		Skidsteer Operation
✓	Drilling Operation (Direct Push)		Well Injection
	Other		Other

- **I have participated in the Job Hazard Analysis (JHAs) review and discussion of the above referenced JHAs.**
- **I have read and understood the contents of this Site Health and Safety Plan and I agree to abide by all provisions specified within.**

Daily Safety Tailgate Meeting Participants (Use the back of this form if needed)

Print Name:	Signature:	Company:	Date:
~~Grant Drennan~~ Eric Coombs	[illegible]	Remington Technologies	1-8-17
Robby Orr	[illegible]	Remington Technologies	1/8/17
Jeff Carlo	[illegible]	Remington Technologies	1/8/17
Joel Riebli	[illegible]	Trihydro	1/8/2017
Joe Pereda	[illegible]	IMG	1/8/17

DAILY TAILGATE SAFETY MEETING

Trihydro CORPORATION

NOTE: A new tailgate meeting must be conducted if conditions, location, or personnel change.

Date: 04/12/17 Time: 0900 ☒ a.m. ☐ p.m. Location: Whitefish (city, state)

Project Name: Former Martin's Cleaners Client: MDEQ

Current Objective/Description: Survey monitoring wells.

Commitment to Safety

1. I will protect myself for me, my family, Trihydro, clients, and contractors by watching for and mitigating risky behaviors, exercising stop-work authority to prevent incidents and injuries and by complying with Trihydro and client policies, procedures, and JSAs/JLAs
2. I understand that safety is my personal responsibility and that working safely is a key component in providing quality work
3. I will set an example for my fellow employees, contractors, clients, and family by working safely
4. I will drive defensively and "Safely for My Family," abiding by Trihydro and client policies and applicable laws and regulations
5. I will "slow down" appropriately to work at a pace that will allow me and others to complete each task efficiently and safely
6. I will hold myself accountable for my safety and the safety of those around me. I will think about the safety of me, my coworkers, contractors, and our clients before I conduct each task

** Stop Work Authority (SWA) – "Everyone has the authority and obligation to immediately stop all unsafe work."*

Identify High-Hazard Work:

- ☐ Hot Work
- ☐ Elevated/overhead work
- ☐ Boat / over-water operations
- ☐ Work involving equipment within 15' of active overhead electrical line or pole supporting an electric line
- ☐ LOTO
- ☐ Excavations - any
- ☐ Demolition, removal of pipelines and buried structures
- ☐ Confined Space Entry
- ☐ Drilling - any

Associated and Identified Hazards:

- ☒ Abrasions, cuts, scrapes
- ☐ Allergies (self & co-workers)
- ☐ Asbestos
- ☐ Biological
- ☐ Buried utilities
- ☐ Burn hazards
- ☐ Chemical exposure
- ☐ Cold stress
- ☐ Compressed gases
- ☐ Crane or lifting equipment
- ☐ Drilling in area?
- ☐ Earthquake
- ☐ Electrical
- ☐ Equipment failure
- ☐ Ergonomic
- ☐ Excavations in area?
- ☐ Falling
- ☐ Fire/explosion
- ☐ H_2S
- ☒ Hand injury
- ☐ Heat stress
- ☐ Heavy equipment
- ☐ High-pressure processes
- ☐ High-temperature processes
- ☐ High wind
- ☐ Laceration
- ☐ Lightning
- ☐ Loud noise
- ☐ Machine guarding
- ☒ Motor vehicle crash
- ☐ No locking/fixed blades
- ☐ Overexertion
- ☐ Overhead utilities
- ☒ Pedestrian
- ☐ Pinch points
- ☐ Power tools
- ☐ Pulled into
- ☐ Radiation/X-ray
- ☐ Security
- ☐ Severe weather
- ☐ Scaffolds
- ☒ Slips, trips, falls
- ☐ Subsurface utilities
- ☒ Traffic
- ☐ Water
- ☐ Other: _____

See it! Identify Current Objective Hazards:

Assess Trihydro's 3 Most Serious Risks

- ☒ Traffic/Heavy Equipment
- ☐ Hazardous Atmosphere
- ☐ Utility Contact

Assess Trihydro's 5 Most Frequent Risks

- ☒ Hand Injuries
- ☐ Lifting
- ☐ Biological Hazards
- ☐ Chemical Exposure
- ☒ Slips, trips, falls

Other Hazards

- ☒ Weather
- ☐ Working at Heights

Personal Protective Equipment (PPE):

- ☐ Hard hat
- ☐ Safety glasses
- ☐ Safety toed boots
- ☐ Ear plugs (as needed)
- ☐ Face shield
- ☐ Fall protection
- ☐ Gloves (as needed)
- ☐ Arm sleeves
- ☒ High visibility vest
- ☐ Rain gear
- ☐ Rubber boots
- ☐ SCBA
- ☐ Snake chaps
- ☐ Sunscreen (as needed)
- ☐ Dust mask
- ☐ Respirator Cartridges/filters:
  - ☐ VOC/H_2S escape
- ☐ H_2S monitor
  - ☐ Bump test
- ☐ FRCs/Nomex
- ☐ Tyvek®
- ☐ Insect repellant
  Do not apply DEET to FRCs

Other special equipment:

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

Before Beginning Work:

- ☐ Sign in and out of process unit ☐ N/A
- ☐ HASP reviewed & acknowledged
- ☐ Locate the nearest evacuation point and a secondary location
- ☐ Identify the nearest fire extinguisher, eyewash station, first aid kit, and Material Safety Data Sheets (MSDS)
- ☐ Identify CPR/AED/first aid certified employees
- ☐ If lone worker, implement lone worker procedures ☐ N/A
- ☐ Identify SSE, visitor(s), or guest(s) ☐ N/A
- ☐ Determine and acquire necessary permits ☐ N/A
  Permit required: _____
- ☐ Review the JSA and "dirty up" if necessary
- ☐ Weather forecast: ☐ Hot ☐ Cold ☐ Inclement
  Wind Direction: _____
- ☐ Employee(s) are wearing proper PPE
- ☐ Perform a "self check" on each personal H_2S monitor
- ☐ Perform a Work-Site Self Assessment (WSSA)
- ☐ Review the dashboard emergency flyer for the specific site; place in a visible location inside vehicle
- ☐ Barricade work zone (as needed)
- ☐ Review WorkCare Injury Accident Program card
- ☐ PPE Action Levels (PID 10ppm)

Safe Vehicle Use:

- ☐ Pre-inspection complete
- ☐ Seat belt
- ☐ Follow all speed and traffic rules
- ☐ Emergency brake used
- ☐ Keys left in vehicle
- ☐ Trailer Safety Inspection form
- ☐ Mileage sheet filled out
- ☐ No cell phones used while driving
- ☐ Parked in a safe location
- ☐ Orange cone used
- ☐ Chock tires (if needed)
- ☐ Other: _____
- ☐ GOAL sticker in window
- ☐ Spotter used (if available)
- ☐ First move forward, backed in
- ☐ Load secured in vehicle
- ☐ 3D-Driving (every 2 years)
- ☐ Other: _____

Site-Specific Comments: _____

Positive Reinforcement (R+): _____

Signatures:

Meeting Conducted By: Joel Richli (designated project on-site safety responder) Company: Trihydro

Printed Name	Signature	Company	Attended Mid-Day Safety Focus	Is this worker new on-site?
1. Anny Bielski		LDG	☒ Yes ☐ No	☒ Yes ☐ No
2. Nate Wyatt		RDG	☒ Yes ☐ No	☒ Yes ☐ No
3.			☐ Yes ☐ No	☐ Yes ☐ No
4.			☐ Yes ☐ No	☐ Yes ☐ No
5.			☐ Yes ☐ No	☐ Yes ☐ No
6.			☐ Yes ☐ No	☐ Yes ☐ No
7.			☐ Yes ☐ No	☐ Yes ☐ No
8.			☐ Yes ☐ No	☐ Yes ☐ No

MONITORING WELL DEVELOPMENT LOG

Trihydro CORPORATION

Well ID MTN-MW1

All Measurements taken from: [X] Top of Casing [ ] Protective Casing [ ] Ground Level

Client MDEQ
Date 01/25/2017
Development Method Well Development Surge Tool
Measured Depth (pre-development) 18.29 **
Static Water Level (ft) 11.36 *
One Well Volume (gal) 1.13

Project Whitefish Solvent Site - Martins Cleaners
Time Start 01/25/2017 @ 1532
Purging Equipment Bailer
Measured Depth (post-development) 18.32 ***
Standing Water Column (ft) 6.93
Minimum Gallons to Purge (10 WCV's) 11.3

Job Number 776-033-001
Time End 01/26/2017 @ 1127
Well Diameter 2"
Water Level Equipment Solinst Interface Meter
WQ Meter Horiba U-52

* or 11.92 (BGS) ** or 18.85 (BGS) *** or 18.88 (BGS)

	Time	Amount Purged (gal)	Field Parameters Measured: Water Level	pH	Temp. °C	ORP	Conductivity mS/cm	Turbidity NTU	D.O. mg/L	T.D.S. g/L	Comments	Field Tech.
1/25	1532	Ø	11.36	7.17	10.49	197	1.89	47	5.74	1.22		JR
	1533–	1550	Surge	water	column	with	surge	tool				
	1551	Start	bailing								High amount of silt in purge	
	1554	3	15.24	6.94	10.19	189	2.04	> 800	7.93	1.31		
	1606	5.5	17.90	7.06	10.03	196	2.06	> 800	9.14	1.32	Letting the well Recharge	
	1732	5.5	15.60									
	1741	7	18.17	7.20	9.99	187	1.94	> 800	8.10	1.24	Letting the well Recharge	
1/26	1042	7	11.99									
	1043–	1058	Surge	water	column	with	surge	tool			Low amount of silt in purge.	
	1108	11	16.77	7.21	10.97	195	1.82	> 800	9.00	1.17		JR
	1127	12.25	17.93	7.22	10.73	196	1.83	> 800	12.58	1.17		JR

Trihydro CORPORATION

MONITORING WELL DEVELOPMENT LOG

Well ID MTN-MW2

All Measurements taken from: [X] Top of Casing [ ] Protective Casing [ ] Ground Level

Client	MDEQ	Project	Whitefish Solvent Site - Martins Cleaners	Job Number	776-033-001
Date	01/25/2017	Time Start	01/25/2017 @ 1619	Time End	01/26/2017 @ 1328
Development Method	Well Development Surge Tool	Purging Equipment	Bailer	Well Diameter	2"
Measured Depth (pre-development)	17.04 **	Measured Depth (post-development)	18.21 ***	Water Level Equipment	Solinst Interface Meter
Static Water Level (ft)	11.73*	Standing Water Column (ft)	5.31	WQ Meter	Horiba U-52
One Well Volume (gal)	0.8	Minimum Gallons to Purge (10 WCV's)	8.7		

* or 12.19 bgs ** or 17.50 bgs *** or 18.67 bgs

	Time	Amount Purged (gal)	Field Parameters Measured: Water Level	pH	Temp. °C	ORP	Conductivity mS/cm	Turbidity NTU	D.O. mg/L	T.D.S. g/L	Comments	Field Tech.
1/25	1619	Ø	11.73	6.82	9.61	193	1.43	75	9.26	0.917	Diluted injection fluids noted	SR
	1620-	1635	Surge	water	column	with	surge	tool				
	1636	start	bailing									
	1641	2.5	15.51	7.18	9.66	180	1.28	> 800	7.19	0.818	High amount of silt in purge	
	1656	4.5	17.50	7.40	9.58	175	1.45	> 800	10.09	0.925	High amount of silt in purge	
1/26	0855	4.5	11.72									
	0856-	0910	Surge	water	column	with	surge	tool				
	0915	6	16.95	7.41	10.27	~~16.70~~ 167	1.36	> 800	7.37	0.828	High amount of silt in purge	
	0926	8.5	17.38	7.43	10.54	190	1.26	> 800	8.81	0.808		
	1318	8.5	12.14									
	1328	11.75	17.49	7.11	10.08	157	1.32	> 800	8.06	0.844		SR

Trihydro CORPORATION

MONITORING WELL DEVELOPMENT LOG

Well ID MTN-MW3

All Measurements taken from: [X] Top of Casing [ ] Protective Casing [ ] Ground Level

Client MDEQ
Date 01/25/2017
Development Method Well Development Surge Tool
Measured Depth (pre-development) 18.14 **
Static Water Level (ft) 12.29 *
One Well Volume (gal) 0.9

Project Whitefish Solvent Site - Martins Cleaners
Time Start 01/25/2017 @ 1420
Purging Equipment Bailer
Measured Depth (post-development) 18.49 ***
Standing Water Column (ft) 5.85
Minimum Gallons to Purge (10 WCV's) 9.5

Job Number 776-033-001
Time End 01/26/2017 @ 1257
Well Diameter 2"
Water Level Equipment Solinst Interface Meter
WQ Meter Horiba U-52

* or 12.72 bgs ** or 18.57 bgs *** or 18.92 bgs

	Time	Amount Purged (gal)	Field Parameters Measured: Water Level	pH	Temp. °C	ORP	Conductivity mS/cm	Turbidity NTU	D.O. mg/L	T.D.S. g/L	Comments	Field Tech.
1/25	1420	Ø	12.29	6.92	10.23	198	1.84	51.1	3.72	1.17		JR
	1421 –	1435	Surge	water	column	with	surge	tool				
	1436	Start	bailing								High amount of silt purged	
	1449	5	17.74	6.94	10.80	172	1.69	> 800	6.65	1.08		
	1508	6.5	17.95	7.19	10.26	173	1.70	> 800	12.40	1.09	Letting the well recharge	
	1710	6.5	13.26									
	1718	10.5	17.40	7.21	10.29	186	1.72	> 800	20.77	1.10		
1/26	1255	10.5	12.38									
	1257	11	13.41	7.12	10.37	144	1.80	> 800	9.25	1.15		JR

Trihydro CORPORATION

MONITORING WELL DEVELOPMENT LOG

Well ID WSMW-7

All Measurements taken from: [X] Top of Casing [ ] Protective Casing [ ] Ground Level

Client	MDEQ	Project	Whitefish Solvent Site - Martins Cleaners	Job Number	776-033-001
Date	01/26/2017	Time Start	0847	Time End	1523
Development Method	~~Well Development Surge Tool~~ "Bailer"	Purging Equipment	Bailer	Well Diameter	0.75" ~~2"~~
Measured Depth (pre-development)	12.35	Measured Depth (post-development)	21.47	Water Level Equipment	Solinst Interface Meter
Static Water Level (ft)	11.79	Standing Water Column (ft)	0.56	WQ Meter	Horiba U-52
One Well Volume (gal)	0.1	Minimum Gallons to Purge (10 WCV's)	1.3		

Time	Amount Purged (gal)	Field Parameters Measured								Comments	Field Tech.
		Water Level	pH	Temp. °C	ORP	Conductivity mS/cm	Turbidity NTU	D.O. mg/L	T.D.S. g/L		
0847	Ø	11.79	7.04	10.58	186	1.66	62	6.34	1.07		JR
0848	start bailing										
1000	0.25	18.44	7.27	10.91	204	2.11	> 800	9.01	1.35		
1032	0.5	20.30	7.44	11.52	198	1.23	> 800	14.03	0.792		
1142	0.5	15.02									
1225	0.9	20.36	7.23	10.86	185	0.974	735	9.65	0.625		
1440	0.9	13.28									
1523	1.3	20.54									JR

RDG
RIVER DESIGN GROUP

April 25, 2017

Joel Riebli
Trihydro Coorporation
2707 Broadwater Avenue
Helena, MT 59601

RE: Whitefish Well Locations

Joel,

The WGS-84 locations and elevations are as shown below. Note, the elevations established are originated from the requested WSMW-7 well at elevation = 3032.83 feet.

RDG surveyed the wells together utilizing a digital level to assure accuracy to 0.001'.

WELL NAME	LATITUDE (NAD83 2011)	LONGITUDE (NAD83-2011)	ELEVATION *(BASED ON WSMW-7)* (usft)
MTN-MW1	N48°24'35.41470"	W114°20'15.07425"	3033.882
MTN-MW2	N48°24'34.95887"	W114°20'15.49880"	3032.921
WSMW-7	N48°24'35.02552"	W114°20'15.79383"	3032.83
MTN-MW3	N48°24'34.53351"	W114°20'16.76671"	3031.778

I have attached the above information in Excel Format for your ease of use.

Please let me know if I can be of further assistance,

Professionally,

Andrew Belski, PLS
River Design Group, Inc.

Montana Office
236 Wisconsin Avenue
PO Box 1722
Whitefish, Montana 59937
(406) 862-4927 • Fax (406) 862-4963

Oregon Office
311 SW Jefferson Avenue
Corvallis, Oregon 97333
(541) 738-2920 • Fax (541) 758-8524

APPENDIX G

INJECTIONS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
1595 Wynkoop Street
Denver, CO 80202-1129
Phone 800-227-8917
www.epa.gov/region8

DEC 21 2016

Ref: 8WP-SUI

Mr. Michael Gipson
Montana Department of Environmental Quality
1225 Cedar Street
Helena, Montana 59620

RE: CLASS V UIC PROGRAM
Rule Authorization: Aquifer Remediation Well
Martin's Cleaners (former)
239 Baker Avenue
Whitefish, Montana
EPA File #MT50000-11317

Dear Mr. Gipson:

The Environmental Protection Agency Region 8 Underground Injection Control Program staff has reviewed the application that was submitted by you or on your behalf for the Class V aquifer remediation injection well(s) at the above referenced location. Based on our understanding of the proposed program and limited potential for groundwater contamination, we have determined that a permit is not necessary at this time. Therefore, your aquifer remediation injection well(s) is currently "authorized by rule" in accordance with Title 40 Code of Federal Regulations (40 CFR) Sections 144.24 and 144.84(a). This authorization is based on information provided in your application and is valid for:

injections of EVO (emulsified vegetable oil) compound in to 55 injection points in a manner as described in your application, and is limited to the location(s) indicated in the application that we received on November 23, 2016.

All injection wells are regulated under the UIC Program in accordance with 40 CFR parts 144 and 146, which have been promulgated under Part C of the Safe Drinking Water Act, 42 United States Code Sections 1421 through 1428. Your Class V injection well(s) is subject to periodic compliance inspections, which may include sampling and analysis of your fluids. Finally, be aware that under 40 CFR Sections144.12(c), (d), and (e), the EPA can require you to apply for a permit or close your injection well(s) under certain circumstances.

Please notify us if the potential for groundwater contamination increases. If you intend to change the proposed plan, please notify us in advance. Any changes in operating methods or any other conditions that may adversely impact groundwater MUST be approved in advance by the EPA. Failure to comply with the above requirements will result in violations of UIC regulations and possible enforcement actions and penalties.

Please be advised that this rule authorization pertains solely to the UIC Program and does NOT relieve you from satisfying any other federal, state or local regulations that may apply.

Please contact Dennis Hotovec at (800) 227-8917, extension 312-6582 or (303) 312-6582 if you have any questions or need more information. More information on the EPA Region 8 Class V program can also be found online at: http://www.epa.gov/uic

Sincerely,

Douglas Minter
UIC Unit Manager
Office of Water Protection

cc: Andrew Vann
Trihydro Corporation
2707 Broadwater Avenue
Helena, Montana 59601
avann@trihydro.com

MONTANA ONE CALL
Tel.406-755-8344 Tel.800-551-8344 Fax.406-752-7220
*** Locate Request Confirmation ***

Priority Type:STANDARD Request Type:REMARK
Ticket No: 2017010022
Update of: 2016530007

Original Call Date: 01/04/2017 Time: 09:07:26 AM OP: 46
Transmit Date: 01/04/2017 Time: 09:07:51 AM

Work to Begin Date: 01/07/2017 Time:

Company: REMINGTON TECHNOLOGIES
Contact Name: SUE HAREM Contact Phone: (970)278-1646
Alternate Contact: Altern. Phone:
Best Time to Call: Fax No:
Cell Phone: Pager/Work No:
Email Address: sharem@remingtontech.net

*** DIG SITE INFORMATION ***
County: FLATHEAD City: WHITEFISH
Community/Subdivision: WHITEFISH
Address: 239 , BAKER AVE
Lot/Unit#:
To Address:
Nearest Intersecting Street: E 3RD ST
2nd Intersecting Street:
On the side of street and approximately 0.00 FEET of Intersection 1
Latitude: 48.40995600 Longitude: -114.3378525

Purpose of the dig: ENVIRONMENTAL RE-MEDIATION & SOIL B Depth: 25.00 FT
Machine Dig: YES Public Property: YES Area is Marked: NO
Hand Dig: YES Private Property: YES Area is Not Marked: NO

Site meet requested: NO Map being faxed: NO Right of way: YES
Work order #:
Additional Information/Directions/Comments:
WHITEFISH LIQUOR STORE
PREVIOUS LINE LOCATE # 2016-48-0095

Description of dig spot & how it will marked:
LOCATE ENITRE PROPERTY TO INCLUDE EAST 3RD ST ON
SOUTH SIDE OF ADDRESS FROM RIGHT OF WAY TO RIGHT
OF WAY**NEEDS RELOCATED DUE TO WEATHER**

Work Being Done For:

The following utility owners have been notified of your proposed excavation site:
FLHE01 FLATHEAD ELECTRIC EL CENT01 CENTURYTEL KALISPELL
NWEG01 NORTHWESTERN ENERGY RONT01 ACCESS MONTANA
BREST01 CHARTER (BRESNAN) WHTWS01 CITY OF WHITEFISH
MDOT01 MONTANA DEPT OF TRAN SKYT01 SKYLINK FIBER COMMUN

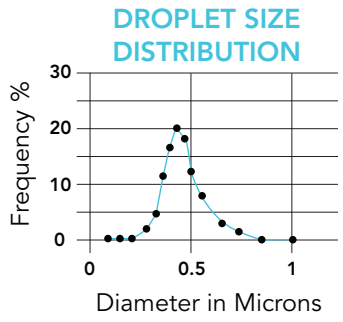
*** PLEASE REMEMBER: ***
*You are not clear to excavate until all members notified have contacted you.
*During the course of excavation you are required to maintain identification as to where any buried facilities are located.
*Only hand digging can occur within 18 inches of buried facilities no machine digging.
*You must contact Montana One Call at 1 800 551-8344 (406-755-8344)
if there are any errors or omissions in this document. == END ==

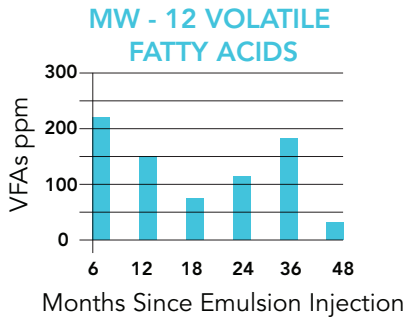
RNAS REMEDIATION PRODUCTS
6712 West River Road, Brooklyn Center, MN 55430
(763) 585.6191 www.RNASinc.com

Newman Zone

A Balance Of Fast And Slow Release Electron Donors

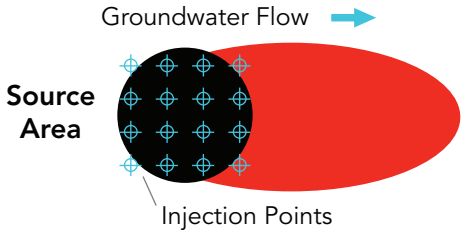
Newman Zone® is an electron donor for enhancing the in situ anaerobic bioremediation of chlorinated solvents, nitrated explosives (RDX, HMX, TNT), selected toxic metals (chrome VI), perchlorate and nitrate. Newman Zone® has both fast and slow-release electron donors. Lactate stimulates microbial growth within hours of injection and rapidly produces anaerobic conditions in the subsurface. Vegetable oil droplets are retained on soil particles and slowly ferment to hydrogen and volatile fatty acids which support anaerobic biodegradation for as long as five years after injection.

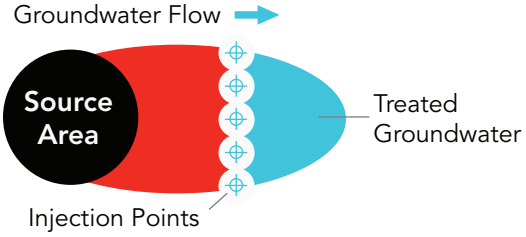




Application

Newman Zone® emulsions contain a minimum of 50 percent vegetable oil by volume in concentrated form. The emulsion is usually diluted to 5 percent or less oil by volume prior to injection. After dilution the emulsion has a low viscosity similar to water allowing it to be applied by direct push injections, injection wells, water circulation systems and even direct application to source area excavations prior to backfilling. Common treatment configurations include an injection grid used to treat contaminant source areas and bio-barriers to treat dissolved plumes.





Benefits – The Smallest Emulsion Droplet Size in the Industry

Newman Zone® is an oil-in-water emulsion consisting of oil droplets between 0.15 and 0.60 microns in size with a median size of 0.30 microns. Our uniquely small oil droplet size maximizes mobility in silt and clay soils and allows for excellent stability when blended with oxygen scavengers, buffers and other amendments prior to injection. The large droplet emulsions provided by other companies can result in oil/water separation, limited distribution or reduced soil permeability.

Experience – Over a Decade of Results From Millions of Pounds Delivered!

Newman Zone® was the first factory produced small droplet emulsified oil product on the market. Since the first production run in 2002 we have delivered millions of pounds of emulsion to thousands of sites around the world.

RNAS REMEDIATION PRODUCTS
6712 West River Road, Brooklyn Center, MN 55430
(763) 585.6191 www.RNASinc.com

Newman Zone

A Balance Of Fast And Slow Release Electron Donors

Product Content

Chemical Name	CAS Number	Composition
Soybean Oil (food grade)	8001-22-7	>46%
Sodium-L-Lactate	867-56-1	4%
Sodium Bicarbonate (buffered formulations only)	144-55-8	1%
Food Additives / Emulsifiers / Preservatives	Proprietary	<10%
Water		45%

Product Characteristics

Parameter	Unit	Specification
Density	g/cm^3	0.99
Particle Size	um	0.15 - 0.60
Flash Point	°F/	>540 (closed cup)
Appearance		White opaque liquid

Packaging

Newman Zone® is available in 5-gallon pails (40 pounds net) and 275-gallon totes (2,100 pounds net). For large projects bulk emulsion can be delivered in either Agmark iso-tanks (47,500 pounds net typical) or food grade tanker truck loads (48,000 pounds net typical).

Storage

The small droplet Newman Zone® emulsion is kinetically stable and pasteurization prevents microbial spoilage. We keep inventory in chilled storage where the shelf-life can exceed five years. Newman Zone® can be stored on-site for 2-4 months without refrigeration. Avoid freezing conditions. Temperatures that average below 25 degrees Fahrenheit may result in frozen emulsion.

Safety

No protective equipment is necessary under normal use conditions. All ingredients consist of food or food grade additives.

SAFETY DATA SHEET

Newman Zone – Buffered Non-ionic Formulation 190-6730

Prepared to U.S. OSHA, CMA, ANSI, Canadian WHMIS Standards, Australian WorkSafe, Japanese Industrial Standard JIS Z 7250:2000, and European Directives

1. PRODUCT IDENTIFICATION

TRADE NAME (AS LABELED):	***Newman Zone – Buffered Non-ionic Formulation 190-6730***
SYNONYMS:	None known
CAS#:	Mixture
PRODUCT USE:	This product is used for soil and ground water remediation. It is formulated and processed using food grade additives, following packaging, sanitation and storage as required by Best Practices used for Food products.
CHEMICAL SHIPPING NAME/CLASS:	Non-Regulated Material
U.N. NUMBER:	None
MANUFACTURER'S NAME:	**RNAS Remediation Products**
ADDRESS:	6712 West River Road, Brooklyn Center, MN 55430
BUSINESS PHONE:	1-763-585-6191
EMERGENCY PHONE:	1-800-424-9300 (Chemtrec 24 Hr Service – Emergency Only)
DATE OF CURRENT REVISION:	June 25, 2014
DATE OF LAST REVISION:	May 20, 2013

2. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: This product is a white liquid with a vegetable oil odor.
Health Hazards: Not expected to cause adverse health effects when used as intended. Prolonged or repeated exposure may cause irritation to skin. May cause irritation to eyes upon contact. Inhalation of vapors/sprays or mist may cause respiratory irritation. Ingestion of large amounts of this product may cause gastrointestinal irritation.
Flammability Hazards: This product is a Non-Flammable liquid with a flash point of >540°F (>282°C)
Reactivity Hazards: None known
Environmental Hazards: The Environmental effects of this product have not been investigated. Release of this product is not anticipated to have significant adverse effects in the aquatic environment.

US DOT SYMBOLS	CANADA (WHMIS) SYMBOLS	EUROPEAN and (GHS) Hazard Symbols
		None
Non-Regulated Material	"Not Controlled"	Signal Word: **None**

EU LABELING AND CLASSIFICATION:
This product does not meet the definition of a hazardous substance or preparation as defined by the European Union Council Directives 67/548/EEC, 1999/45/EC, 1272/2008/EC and subsequent Directives.
EU HAZARD CLASSIFICATION OF INGREDIENTS PER DIRECTIVE 1272/2008/EC:
None of the ingredients are listed in Annex I
Substances not listed either individually or in group entries must be self classified.
OSHA HAZARD CLASSIFICATION:
These chemicals are not considered hazardous by OSHA
Component(s) Contributing to Classification(s)
All Ingredients
GHS Hazard Classification(s):
None known

Hazard Statement(s):
None known

Precautionary Statement(s):
None known

HEALTH HAZARDS OR RISKS FROM EXPOSURE:
SYMPTOMS OF OVEREXPOSURE BY ROUTE OF EXPOSURE: The most significant routes of overexposure for this product are by contact with skin or eyes, inhalation of vapors and ingestion. The symptoms of overexposure are described below.
ACUTE:
INHALATION: Not expected to cause adverse health effects when used as intended. Inhalation of vapors/mist/spray may cause respiratory irritation.
CONTACT WITH SKIN: Not expected to cause adverse health effects when used as intended. Prolonged and

repeated contact may cause irritation to skin.

EYE CONTACT: Direct eye contact can cause irritation with redness, tearing and blurred vision.

INGESTION: Under normal conditions of intended use, this material is not expected to be an ingestion hazard. Ingestion of large quantities may cause gastrointestinal irritation, nausea and vomiting.

CHRONIC: None known

TARGET ORGANS: Acute: Skin, Respiratory System and Eyes **Chronic:** None known

3. COMPOSITION AND INFORMATION ON INGREDIENTS

Hazardous Ingredients:	WT%	CAS#	EINECS #	Hazard Classification	Risk Phrases
Food Grade Soybean Oil	45 - 50%	8001-22-7	232-274-4	None	None Known
Water	30 – 40%	7732-18-5	231-791-2	None	None Known
Food Grade Sodium-L-lactate	3 – 7%	867-56-1	212-762-3	None	None Known
Proprietary Food Grade Surfactant Blend	3 – 7%	Proprietary	Not Listed in ESIS	None	None Known
Sodium Bicarbonate	1 - 2%	144-55-8	205-633-8	None	None Known
Balance of other ingredients is less than 1% in concentration (or 0.1% for carcinogens, reproductive toxins, or respiratory sensitizers).					

NOTE: ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-2010 format. This product has been classified in accordance with the hazard criteria of the CPR and the SDS contains all the information required by the CPR, EU Directives and the Japanese Industrial Standard *JIS Z 7250: 2000*.

4. FIRST-AID MEASURES

EYE CONTACT: If product enters the eyes, open eyes while under gentle running water for at least 15 minutes. Seek medical attention if irritation persists.

SKIN CONTACT: Wash skin thoroughly with soap and water after handling. Seek medical attention if irritation develops and persists.

INHALATION: If breathing becomes difficult, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Seek medical attention.

INGESTION: If product is swallowed, call physician or poison control center for most current information. If professional advice is not available, do not induce vomiting. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or who cannot swallow. Seek medical advice. Take a copy of the label and/or SDS with the victim to the health professional.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: None known

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and eliminate overexposure.

5. FIRE-FIGHTING MEASURES

FLASH POINT: Non-Flammable with flash point >540°F (>282°C)

AUTOIGNITION TEMPERATURE: Not Available

FLAMMABLE LIMITS (in air by volume, %): Lower NA Upper NA

FIRE EXTINGUISHING MATERIALS: Use fire extinguishing methods below:

Water Spray: Yes Carbon Dioxide: Yes
Foam: Yes Dry Chemical: Yes
Halon: Yes Other: Any "C" Class

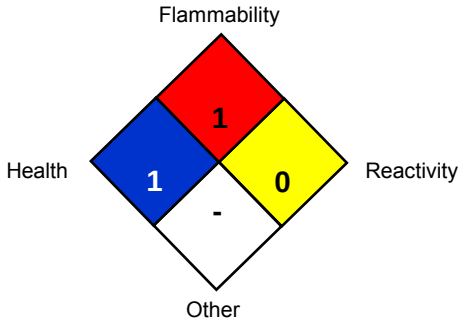
UNUSUAL FIRE AND EXPLOSION HAZARDS: Not considered a fire or explosion hazard.

Explosion Sensitivity to Mechanical Impact: No

Explosion Sensitivity to Static Discharge: No

SPECIAL FIRE-FIGHTING PROCEDURES: Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Isolate materials not yet involved in the fire and protect personnel. Move containers from fire area if this can be done without risk; otherwise, cool with carefully applied water spray. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas.

NFPA RATING SYSTEM



HMIS RATING SYSTEM

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

HEALTH HAZARD (BLUE)	**1**
FLAMMABILITY HAZARD (RED)	**1**
PHYSICAL HAZARD (YELLOW)	**0**

PROTECTIVE EQUIPMENT

EYES	RESPIRATORY	HANDS	BODY
	See Sect 8		See Sect 8

For Routine Industrial Use and Handling Applications

Hazard Scale: 0 = Minimal **1** = Slight **2** = Moderate **3** = Serious **4** = Severe * = Chronic hazard

6. ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: Stop the flow of material, if this can be done safety. Contain discharged material. Absorb spill using an absorbent, non-combustible material such as earth, sand, or vermiculite. Place in a proper container for disposal. Dispose of in accordance with U.S. Federal, State, and local hazardous waste disposal regulations and those of Canada and its Provinces, those of Australia, Japan and EU Member States (see Section 13, Disposal Considerations).

7. HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Use good hygiene practices.

STORAGE AND HANDLING PRACTICES: Store in original container. Keep container closed when not in use. Store in a cool, dry location. Avoid freezing or extended storage in high temperatures and away from incompatible materials.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

Chemical Name	CAS#	ACGIH TLV	OSHA TWA
Blend of Food Grade Soybean Oil	8001-22-7	10 mg/m³ Oil Mists	15 mg/m³ Oil Mists
Food Grade Sodium-L-lactate	867-56-1	Not Listed	Not Listed
Proprietary Food Grade Surfactant Blend	Proprietary	Not Listed	Not Listed
Sodium Bicarbonate	144-55-8	Not Listed	Not Listed

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation to ensure exposure levels are maintained below the limits provided above.

The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132) or equivalent standard of Canada, or standards of EU member states (including EN 149 for respiratory PPE, and EN 166 for face/eye protection), and those of Japan. Please reference applicable regulations and standards for relevant details.

RESPIRATORY PROTECTION: Not required when using this product. Maintain airborne contaminant concentrations below guidelines listed above, if applicable. If necessary, use only respiratory protection authorized in the U.S. Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), equivalent U.S. State standards, Canadian CSA Standard Z94.4-93, the European Standard EN149, or EU member states.

EYE PROTECTION: Safety glasses or goggles are recommended to avoid eye contact. If necessary, refer to U.S. OSHA 29 CFR 1910.133, Canadian Standards, and the European Standard EN166, Australian Standards, or relevant Japanese Standards.

SKIN PROTECTION: Wear impervious gloves for prolonged or repeated exposure as appropriate to task when using this product. If necessary, refer to U.S. OSHA 29 CFR 1910.138, the European Standard DIN EN 374, the appropriate Standards of Canada, Australian Standards, or relevant Japanese Standards.

BODY PROTECTION: Use body protection appropriate to task being performed. If necessary, refer to appropriate Standards of Canada, or appropriate Standards of the EU, Australian Standards, or relevant Japanese Standards.

9. PHYSICAL and CHEMICAL PROPERTIES

APPEARANCE (Physical State) and COLOR: This product is a white liquid with a vegetable oil odor.
ODOR: Slight
ODOR THRESHOLD: Not Applicable
pH: 7.0
MELTING/FREEZING POINT: Not Available
BOILING POINT: Not Available
FLASH POINT: >540°F (>282°C)(For pure soybean oil)
EVAPORATION RATE (n-BuAc=1): Not Available
FLAMMABILITY (SOLID, GAS): Not Applicable
UPPER/LOWER FLAMMABILITY OR EXPLOSION LIMITS: Not Available
VAPOR PRESSURE (mm Hg @ 20°C (68°F): Not Available
VAPOR DENSITY: Not Available
RELATIVE DENSITY: Not Available
SPECIFIC GRAVITY: 0.99
SOLUBILITY IN WATER: Dispersible in water
WEIGHT PER GALLON: Not Available
PARTITION COEFFICENT (n-octanol/water): Not Available
AUTO-IGNITION TEMPERATURE: Not Available
DECOMPOSITION TEMPERATURE: Not Available
VISCOSITY: 23.6 cPs @ 20°C

10. STABILITY and REACTIVITY

STABILITY: Stable under conditions of normal storage and use.
HAZARDOUS DECOMPOSITION PRODUCTS: Thermal decomposition products include oxides of carbon.
MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Strong oxidizing materials.
POSSIBILITY OF HAZARDOUS REACTIONS: Will not occur.
CONDITIONS TO AVOID: Incompatible materials

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA:
No LD50 Data available for this product.
SUSPECTED CANCER AGENT: Ingredients within this product are not found on the following lists: FEDERAL OSHA Z LIST, NTP, IARC, or CAL/OSHA and therefore are not considered to be, nor suspected to be, cancer-causing agents by these agencies.
IRRITANCY OF PRODUCT: No specific data available
SENSITIZATION TO THE PRODUCT: This product is not a skin and respiratory sensitizer
REPRODUCTIVE TOXICITY INFORMATION: No information concerning the effects of this product and its components on the human reproductive system.

12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.
ENVIRONMENTAL STABILITY: No specific data available on this product.
CHEMICAL EFFECT ON PLANTS, ANIMALS AND AQUATIC LIFE: This product is not expected to cause significant harm to plants, animals or aquatic life.
WATER ENDANGERMENT CLASS: Water endangering in accordance with EU Guideline 91/155-EWG – Not Determined.
SPECIFIC AVAILABLE COMPONENT INFORMATION: No additional data available at this time.

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate U.S. Federal, State, and local regulations, those of Canada, Australia, EU Member States and Japan.
EU Waste Code: Not determined

14. TRANSPORTATION INFORMATION

US DOT, IATA, IMO, ADR:

U.S. DEPARTMENT OF TRANSPORTATION (DOT) SHIPPING REGULATIONS: This product is classified (per 49 CFR 172.101) by the U.S. Department of Transportation, as follows.

PROPER SHIPPING NAME:	Non-Regulated Material
HAZARD CLASS NUMBER and DESCRIPTION:	None
UN IDENTIFICATION NUMBER:	None
PACKING GROUP:	NA
DOT LABEL(S) REQUIRED:	None
NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER:	None
RQ QUANTITY:	None

MARINE POLLUTANT: The components of this product are not designated by the Department of Transportation to be Marine Pollutants (49 CFR 172.101, Appendix B).

INTERNATIONAL AIR TRANSPORT ASSOCIATION SHIPPING INFORMATION (IATA): This product is not considered as dangerous goods.

INTERNATIONAL MARITIME ORGANIZATION SHIPPING INFORMATION (IMO): This product is not considered as dangerous goods.

EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR): This product is not considered by the United Nations Economic Commission for Europe to be dangerous goods.

15. REGULATORY INFORMATION

UNITED STATES REGULATIONS:

U.S. SARA REPORTING REQUIREMENTS: The components of this product are subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act as follows: None
U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for the components of this product. The default Federal SDS submission and inventory requirement filing threshold of 10,000 lbs (4,540 kg) therefore applies, per 40 CFR 370.20.
U.S. CERCLA REPORTABLE QUANTITY (RQ): None
U.S. TSCA INVENTORY STATUS: The components of this product are listed on the TSCA Inventory or are exempted form listing.
OTHER U.S. FEDERAL REGULATIONS: None
CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): Ingredients within this product are not on the Proposition 65 Lists.

CANADIAN REGULATIONS:

CANADIAN DSL/NDSL INVENTORY STATUS: The components of this product are on the DSL Inventory, or are exempted from listing.
OTHER CANADIAN REGULATIONS: Not applicable.
CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS:
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all of the information required by those regulations.
CANADIAN WHMIS CLASSIFICATION and SYMBOLS: This product is "Not Controlled:" per WHMIS Controlled Product Regulations

EUROPEAN ECONOMIC COMMUNITY INFORMATION:

This product does not meet the definition of a hazardous substance or preparation as defined by the European Union Council Directives 67/548/EEC, 1999/45/EC, 1272/2008/EC and subsequent Directives.
See Section 2 for Details

AUSTRALIAN INFORMATION FOR PRODUCT: The components of this product are listed on the International Chemical Inventory list.

JAPANESE INFORMATION FOR PRODUCT:
JAPANESE MINISTER OF INTERNATIONAL TRADE AND INDUSTRY (MITI) STATUS: The components of this product are not listed as Class I Specified Chemical Substances, Class II Specified Chemical Substances, or Designated Chemical Substances by the Japanese MITI.

JAPANESE ENCS INVENTORY: The components of this product are on the ENCS Inventory as indicated in the section on International Chemical Inventories, below.

POISONOUS AND DELETERIOUS SUBSTANCES CONTROL LAW: No component of this product is a listed Specified Poisonous Substance under the Poisonous and Deleterious Substances Control Law.

INTERNATIONAL CHEMICAL INVENTORIES:

Listing of the components on individual country Chemical Inventories is as follows:
Asia-Pac: Listed or Exempt from listing
Australian Inventory of Chemical Substances (AICS): Listed or Exempt from listing
Korean Existing Chemicals List (ECL): Listed or Exempt from listing
Japanese Existing National Inventory of Chemical Substances (ENCS): Listed or Exempt from listing
Philippines Inventory if Chemicals and Chemical Substances (PICCS): Listed or Exempt from listing
Swiss Giftliste List of Toxic Substances: Listed or Exempt from listing
U.S. TSCA: Listed

16. OTHER INFORMATION

ABBREVIATIONS AND ACRONYMS:

EPA: United States Environmental Protection Agency
ARD: European Agreement concerning the International Carriage of Dangerous Goods by Road
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
ACGIH: American Conference of Governmental Industrial Hygienists
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)

PREPARED BY: Paul Eigbrett – (**GHS MSDS Compliance PLUS)**
DATE OF PRINTING: June 25, 2014

The information contained herein is believed to be accurate but is not warranted to be so. Data and calculations are based on information furnished by the manufacturer of the product and manufacturers of the components of the product. Users are advised to confirm in advance of the need that information is current, applicable and suited to the circumstances of use. Remediation and Natural Attenuation Services Inc. assumes no responsibility for injury to vendee or third party person proximately caused by the material if reasonable safety procedures are no adhered to as stipulated in the data sheet. Furthermore, Remediation and Natural Attenuation Services Inc. assumes no responsibility for injury caused by abnormal use of this material even if reasonable safety procedures are followed.

END OF SDS SHEET

INJECTION INFORMATION FORM
REMEDIATION INJECTIONS
MDEQ WHITEFISH - MARTIN'S CLEANERS
WHITEFISH, MONTANA

	Point Location	Date	Potholed (yes/no)	Starting Interval (ft bgs)	Ending Interval (ft bgs)	Newman Zone gallons ~~(lbs)~~	Water (gal)	Comments
1	F1	01/06/17	No	12	5.5	12.5	410	
2	F2	01/06/17	No	12	5.5	12.5	410	
3	F3	01/06/17	No	12	5.5	12.5	410	~1/2 gallon surfaced around rod
4	F4	01/06/17	No	12	5.5	12.5	410	
5	F5	01/06/17	No	12	5.5	12.5	410	
6	F6	01/06/17	No	12	5.5	12.5	410	~1/2 gallon surfaced around rod
7	E1	01/07/17	No	12	5.5	12.5	410	~1/2 gallon surfaced around rod
8	E2	01/07/17	No	12	5.5	12.5	410	
9	E3	01/07/17	No	12	5.5	12.5	410	
10	E4	01/07/17	No	12	5.5	12.5	410	~1/2 gallon surfaced around rod
11	E5	01/07/17	No	12	5.5	12.5	410	~1/2 gallon surfaced around rod
12	E6	01/07/17	No	11	5.5	12.5	410	
13	C2	01/07/17	No	12	5.5	12.5	410	
14	C1	01/08/17	No	12	5.5	12.5	410	~1/2 gallon surfaced around rod
15	D1	01/08/17	No	12	5.5	12.5	410	
16	A1	01/08/17	No	12	5.5	12.5	410	
17	A2	01/08/17	No	12	5.5	12.5	410	
18	A3	01/08/17	No	12	5.5	12.5	410	
19	D2	01/08/17	No	12	5.5	12.5	410	
20	D3	01/09/17	No	12	5.5	12.5	410	

Notes:

INJECTION INFORMATION FORM
REMEDIATION INJECTIONS
MDEQ WHITEFISH - MARTIN'S CLEANERS
WHITEFISH, MONTANA

	Point Location	Date	Potholed (yes/no)	Starting Interval (ft bgs)	Ending Interval (ft bgs)	Newman Zone gallons ~~(lbs)~~	Water (gal)	Comments
21	D4	01/09/17	NO	12	5.5	12.5	410	
22	C4	01/09/17	NO	12	5.5	~~25~~ 25	820	Double shot
23	C3	01/09/17	NO	12	5.5	12.5	410	
24	B1	01/09/17	NO	12	5.5	12.5	410	
25	B2	01/09/17	NO	12	5.5	12.5	410	~2 gallons surfaced at location B1
26	B3	01/09/17	NO	12	5.5	12.5	410	
27	H1	01/10/17	NO	12	5.5	25	820	~ 1/2 gallon surfaced at the rod; Double shot
28	G1	01/10/17	NO	12	5.5	25	820	Double shot
29	H2	01/10/17	NO	12	5.5	12.5	410	
30	G2	01/10/17	NO	12	5.5	12.5	410	
31	H3	01/10/17	NO	12	5.5	12.5	410	~ 2 gallons surfaced at the rod
32	G3	01/10/17	NO	12	5.5	12.5	410	
33	H4	01/10/17	NO	12	5.5	12.5	410	
34	G4	01/10/17	NO	12	5.5	12.5	410	
35	H5	01/10/17	NO	12	5.5	12.5	410	~ 3 gallons surfaced at the rod
36	G5	01/10/17	NO	12	5.5	12.5	410	
37	H6	01/10/17	NO	12	5.5	12.5	410	~ 5 gallons surfaced at the rod
38	G6	01/10/17	NO	12	5.5	12.5	410	~ 5 gallons surfaced at the rod
39	H7	01/11/17	NO	12	5.5	12.5	410	
40	G7	01/11/17	NO	12	—	12.5	410	injected all fluids at 12' bgs

Notes:

INJECTION INFORMATION FORM
REMEDIATION INJECTIONS
MDEQ WHITEFISH - MARTIN'S CLEANERS
WHITEFISH, MONTANA

	Point Location	Date	Potholed (yes/no)	Starting Interval (ft bgs)	Ending Interval (ft bgs)	Newman Zone Gallons ~~(lbs)~~	Water (gal)	Comments
41	H8	01/11/17	NO	12	5.5	12.5	410	
42	G8	01/11/17	NO	12	—	12.5	410	Injected all fluids at 12'
43	H9	01/11/17	NO	12	5.5	12.5	410	
44	G9	01/11/17	NO	12	—	12.5	410	~5 gallons surfaced at G8 ; Injected all fluids at 12'
45	H10	01/11/17	NO	12	5.5	12.5	410	~5 gallons surfaced at the rod
46	G10	01/11/17	NO	12	—	12.5	410	Injected all fluids at 12'
47	G11	01/11/17	NO	12	—	12.5	410	Injected all fluids at 12'
48								
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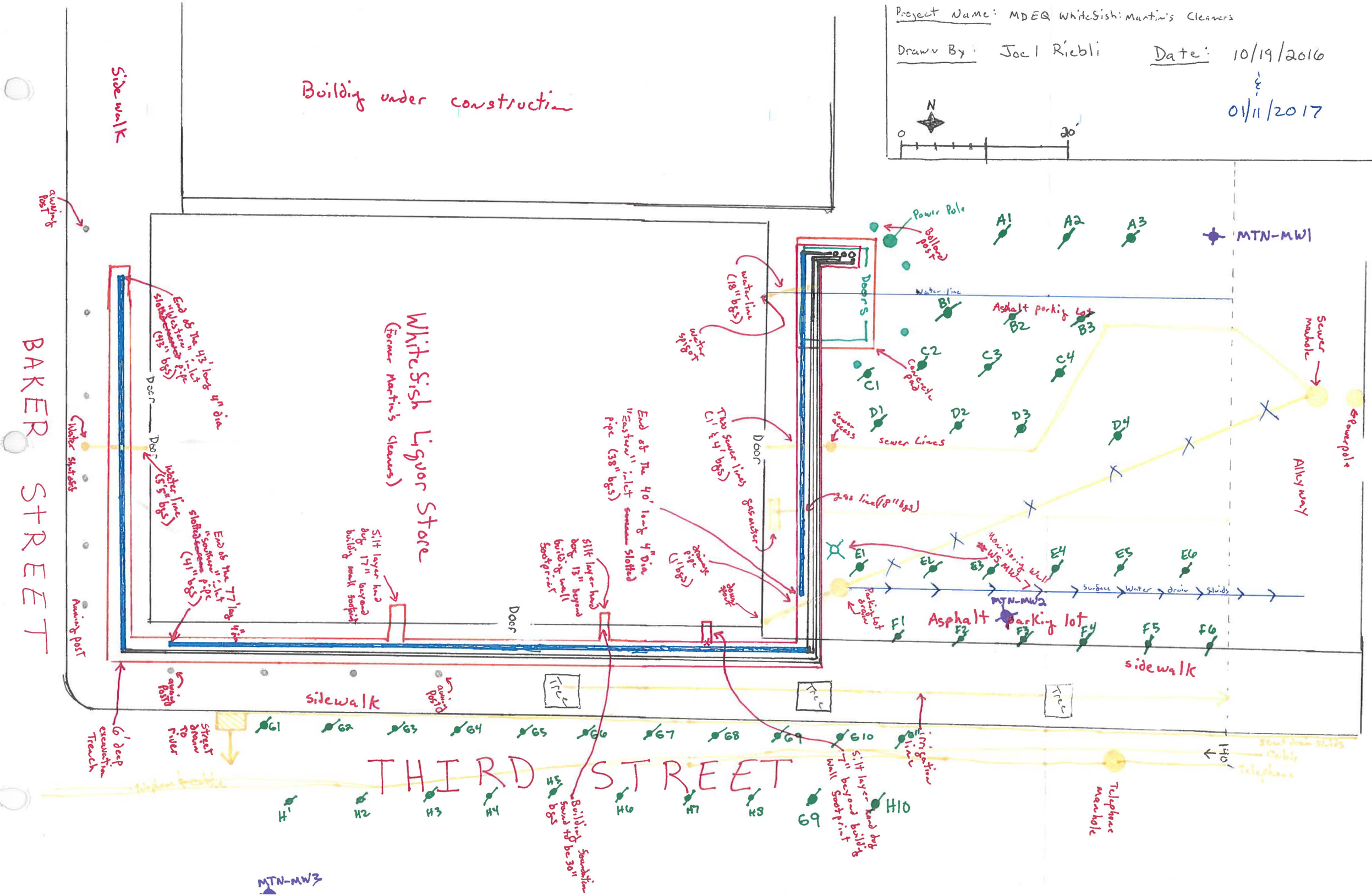
Notes:

Project Name: MDEQ Whitefish: Martin's Cleaners

Drawn By: Joel Riebli

Date: 10/19/2016 & 01/11/2017



	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Wednesday, January 4, 2017		
Temperature	<32 °F	**Work Day**	
Weather	Clear	**Work Start**	725
Wind	Light (1-10 mph)	**Work Stop**	1710

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Robby Orr / Remington Technologies	Field Supervisor
Jeff Carlo / Remington Technologies	Laborer
Eric Coonrad / Remington Technologies	Laborer
Jose Pereda / Inberg-Miller Engineers	Driller
Lana Walker / Whitefish Liquor Store	General Manager
Utility Locators	Utility Locators

Equipment Present Onsite	Count
PID	1

Health and Safety Comments	Subzero air temperatures (as low as -20 F); snow and ice surface conditions.
Record of Samples Collected	None.
Work Activities Conducted	Remington spent multiple hours getting their box truck and Geoprobe units to start after the -20 F air temperatures; going forward the equipment will be parked in a heated building during overnight hours. Since equipment was being thawed out, field activities focused on refreshing the utility markings (City water/sewer, gas, tv. cable, and phone utilities were remarked by three different locators), removing some ice from the parking lot, and installing metal flashing on the remediation system.

I did update Lana Walker on starting well drilling and injections on Thursday. Lana said that Thursday will be the only Thursday of the year where no supply truck will be coming.

Collected system operating data.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

Photo Date:	1/4/2017
Direction:	East
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Refreshed tv cable (red) and telephone (orange) utility markings within Third Street.

Photo Date:	1/4/2017
Direction:	Northwest
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Metal flashing installed on the upper portion of the system building.

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 01/04/2016	TIME: 1655	OPERATOR: Joel

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: Mini RAE 3000 / 592-006488

BLOWER SYSTEM HOURS: 313	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: I
WELL #7 (EAST) HOURS: 313	WELL #8 (SOUTH) HOURS: 313	WELL #9 (WEST) HOURS: 313

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	-26	2.1	39	44.3*
WELL #8 (SOUTH):	ON	-31	1.8	37	8.9*
WELL #9 (WEST):	ON	-29	1.8	37	9.4*

MANIFOLD TEMP (°F): 45	MANIFOLD PID (PPM): 17.6*
KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -22

BLOWER VACUUM (in H2O): 14.3	BLOWER DISCHARGE PRESSURE (in H2O): 35	BLOWER DISCHARGE TEMPERATURE (°F): 104
PRE GAC / ZEOLITE PID (PPM): 19.0	POST GAC DRUM PID (PPM): 0.1	POST ZEOLITE DRUM PID (PPM): 0.0

NOTES: * Shut system down to collect vacuum PID Readings

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Thursday, January 5, 2017		
Temperature	<32 °F	**Work Day**	
Weather	Cloudy	**Work Start**	700
Wind	Light (1-10 mph)	**Work Stop**	1625

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Robby Orr / Remington Technologies	Field Supervisor
Jeff Carlo / Remington Technologies	Laborer
Eric Coonrad / Remington Technologies	Laborer
Jose Pereda / Inberg-Miller Engineers	Driller
Lana Walker / Whitefish Liquor Store	General Manager
Utility Locators	Utility Locators

Equipment Present Onsite	Count
PID	1
Geoprobe 7822DT	1

Health and Safety Comments	Subzero air temperatures for most of the day; snow and ice covered surface conditions (most of the ice removed from the parking lot by the end of the work day).
Record of Samples Collected	Collected PID readings from the two monitoring well silt layers. MTN-MW1 (near alleyway) silt layer (3.9-4.3 ft bgs) at 50.4 ppm. MTN-MW3 (Third Street) silt layer (5.5-6.5 ft bgs) at 2.9 ppm.
Work Activities Conducted	The city of Whitefish water/sewer locator and the city of Whitefish irrigation locator stopped by the site. A water service line was located very close to the proposed MTN-MW3 location. This location was moved to the north away from the utility. A irrigation line is under the sidewalk on the north side of Third Street, the injection locations will need to be moved to stay clear of this utility.

Drilled and installed monitoring wells MTN-MW1 (near the alleyway) and MTN-MW3 (in Third Street). Both were drilled to 18 ft bgs and both have 10 feet of 2" diameter 0.010 slotted screen. At MTN-MW1, the vapor inlet screen was set at 3.5-4.5 ft bgs, where as the MTN-MW3 vapor inlet screen was installed at 5.5-6.5 ft bgs. Note, the third and final monitoring well (MTN-MW2; which will be installed in the parking lot) will be installed after some of the nearby injection points are performed.

Continued to remove snow and ice from the injection work areas.

Collected SVE system operation data.

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

Photo Date:	1/5/2017
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Using the Geoprobe 7822DT to drill a six inch borehole (MTN-MW3) within Third Street.

Photo Date:	1/5/2017
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	A close up of the 2" end cap, 0.010 slotted well screen, and vapor inlet screen that will be installed within borehole MTN-MW3.

Photo Date:	1/5/2017
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	A look at the vapor sample well material; the bottom 12 inches is the inlet for the vapor well (placed a depth of 5.5-6.5 feet bgs at MTN-MW3).

Photo Date:	1/5/2017
Direction:	Northwest
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Inserting the 2" PVC (10 foot of 0.010 slotted screen and 8 foot of blank) into borehole MTN-MW1.

Photo Date:	1/5/2017
Direction:	Southeast
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Inserting the vapor sampling 1/4" well into borehole MTN-MW1. The one foot vapor inlet screen set at 3.5-4.5 feet bgs.

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 01/05/2017	TIME: 1615	OPERATOR: Joel

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: miniRAE 3000 / 592-000488

BLOWER SYSTEM HOURS: 336	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: 1
WELL #7 (EAST) HOURS: 336	WELL #8 (SOUTH) HOURS: 336	WELL #9 (WEST) HOURS: 336

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	-25	2.0	39	40.9*
WELL #8 (SOUTH):	ON	-30	1.8	37	8.2*
WELL #9 (WEST):	ON	-28	1.8	37	10.3*

MANIFOLD TEMP (°F): 44	MANIFOLD PID (PPM): 15.9*
KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -21

BLOWER VACUUM (in H2O): 13.5	BLOWER DISCHARGE PRESSURE (in H2O): 35	BLOWER DISCHARGE TEMPERATURE (°F): 101
PRE GAC / ZEOLITE PID (PPM): 16.6	POST GAC DRUM PID (PPM): 0.1	POST ZEOLITE DRUM PID (PPM): 0.0

NOTES: * PID reads collected with system off on vacuum side of the blower.

DAILY SHEET OF

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Friday, January 6, 2017		
Temperature	<32 °F	**Work Day**	
Weather	Snow	**Work Start**	700
Wind	Light (1-10 mph)	**Work Stop**	1740

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Robby Orr / Remington Technologies	Field Supervisor
Jeff Carlo / Remington Technologies	Laborer
Eric Coonrad / Remington Technologies	Laborer
Jose Pereda / Inberg-Miller Engineers	Driller
Lana Walker / Whitefish Liquor Store	General Manager
Utility Locators	Utility Locators

Equipment Present Onsite	Count
Geoprobe 7822DT	1
Box truck that mixes injection fluids	1
Truck with water tank	1

Health and Safety Comments	Air temperatures in the single digits through out the day with wind chill temperatures in the negative digits. Snow and ice covered surface conditions,
Record of Samples Collected	None.
Work Activities Conducted	American Leak Detection arrived and performed private utility locating of the water line located in the north portion of the parking lot and also the parking lot street drain. Some of the injection points near the water line will be adjusted. It was a slow start performing injections due to finding a fire hydrant that wasn't frozen up, getting the air compressor started, and some of the box truck piping

system frozen. At 1130, equipment was repaired and or able to startup allowing the start of injection field activities. The Geoprobe push injection rod down to 12 feet bgs and emulsified vegetable oil injection fluids (12.5 gallons of vegetable oil was mixed with 410 gallons of city of Whitefish water) was pumped into the drill rods and into the subsurface. Approximatedly 260 gallons of injections fluids was injected at 12 feet bgs and then the rod was raised to approximately 5.5 feet bgs where another approximately 150 gallons of injection fluids was pumped into the subsurface. Six injection locations (F1 through F6) was completed in the southern end of the parking lot. Two of the locations had approximately one gallon of fluids surface before bentonite plug material was added to seal the surfacing location. After the six injection point was completed, the hoses and drill rod was blown out with the air compressor. During this process, approximately five gallons of injection mix surfaced from a previously completed and plugged injection location. After each of the six injection points were completed, bentonite was placed in the borehole.

The SVE system continued to operate. The Uplink cell phone monitoring unit was installed, replacing the outdated 2G wireless unit.

Deviation from approved plans:

Work conducted in accordance with approved plans? Yes

Photo Date:	1/6/2017
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Label of the emulsified vegetable oil on the five gallon buckets. Twelve and a half gallons of the RNAS oil is being mix with 410 gallons of City of Whitefish water at each injection point.

Photo Date:	1/7/2017
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Using the Geoprobe unit to push the injection rod down 12 feet in the southern portion of the parking lot. This is injection location F4. The orange line to the right of the injection point is the parking lot stormwater drain line. The box truck to the left of the Geoprobe is where the emulsified vegetable oil is mixed with City of Whitefish water.

Photo Date:	1/7/2017
Direction:	South
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Remington Technologies Eric Coonrad monitors as injecting of emulsified vegetable oil (12.5 gallons of oil mixed with 410 gallons of City of Whitefish water) through the Geoprobe rod at injection location F5. Injections were made at 12 feet bgs and at 5.5 feet bgs. The orange marking is the location of the parking lot stormwater drain utility location.

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Saturday, January 7, 2017		
Temperature	<32 °F	**Work Day**	
Weather	Clear	**Work Start**	730
Wind	Light (1-10 mph)	**Work Stop**	1630

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Robby Orr / Remington Technologies	Field Supervisor
Jeff Carlo / Remington Technologies	Laborer
Eric Coonrad / Remington Technologies	Laborer
Jose Pereda / Inberg-Miller Engineers	Driller
Lana Walker / Whitefish Liquor Store	General Manager

Equipment Present Onsite	Count
Geoprobe 7822DT	1
Box truck that mixes injection fluids	1
Truck with water tank	1

Health and Safety Comments	Air temperatures to start the day were at -14 F.
Record of Samples Collected	None
Work Activities Conducted	Because of the subzero temperatures (-14 F) to start the day, some injection parts froze and broke during the night. So it was a slow start before injections started. Continued using the Geoprobe to push injection rod down to 12 feet bgs, injecting emulsified vegetable oil (mixing 12.5 gallons of RNAS Newman Zone emulsified vegetable oil with 410 gallons of City of Whitefish water) at 12 feet bgs and 5.5 feet bgs. The injection boreholes were plugged with bentonite. A total of seven injection

locations (C2 and E1 through E6) were completed.

The SVE system continued operating. The blower unit has been slowed down so not to suck up any injection fluids.

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

Photo Date:	1/7/2017
Direction:	Southeast
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	The cup on the right is a sample of the EVO fluids before being mixed with City of Whitefish water. The cup on the right is a sample of the injection fluids being injected at 12 feet bgs and 5.5 feet bgs. In the back ground is the injection of EVO at location E1.

Photo Date:	1/7/2017
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Using the Geoprobe to push injection rod down to 12 feet bgs at location E4. The box truck is where injection fluids are mixed and pumped from.

Photo Date:	1/7/2017
Direction:	Northwest
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Using the Geoprobe to push injection rod down to 12 feet bgs at injection location C2. The asphalt patch that matches the back of the building door, is the sewer utility.

Photo Date:	1/7/2017
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Injecting mixed emulsified vegetable oil at location C2 through the injection rod at 12 feet bgs. The injection pressure is shown at 21 psi.

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 01/07/2017	TIME: 1600	OPERATOR: JR

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: MiniRAE 3000

BLOWER SYSTEM HOURS: 382	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: 2
WELL #7 (EAST) HOURS: 376	WELL #8 (SOUTH) HOURS: 382	WELL #9 (WEST) HOURS: 382

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	-21	1.1	30	29.1*
WELL #8 (SOUTH):	ON	-25	1.1	30	6.0*
WELL #9 (WEST):	ON	-23	1.1	30	7.8*

MANIFOLD TEMP (°F): 43	MANIFOLD PID (PPM): 8.4*
KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -16

BLOWER VACUUM (in H2O): 8.7	BLOWER DISCHARGE PRESSURE (in H2O): 22	BLOWER DISCHARGE TEMPERATURE (°F): 82
PRE GAC / ZEOLITE PID (PPM): 8.9	POST GAC DRUM PID (PPM): 0.1	POST ZEOLITE DRUM PID (PPM): 0.0

NOTES: * PID collected with the blower shut down to collect the vacuum side pid readings.

System is slowed down because injecting slurry at the SVE piping Elevation.

DAILY SHEET OF

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Sunday, January 8, 2017		
Temperature	<32 °F	**Work Day**	
Weather	Cloudy	**Work Start**	700
Wind	Light (1-10 mph)	**Work Stop**	1730

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Robby Orr / Remington Technologies	Field Supervisor
Jeff Carlo / Remington Technologies	Laborer
Eric Coonrad / Remington Technologies	Laborer
Jose Pereda / Inberg-Miller Engineers	Driller

Equipment Present Onsite	Count
Geoprobe 7822DT	1
Box truck that mixes injection fluids	1
Truck with water tank	1

Health and Safety Comments	Site received two inches of snow overnight. Temperatures were in the teens most of the day.
Record of Samples Collected	None.
Work Activities Conducted	Using the Geoprobe, drilled and installed monitoring wells MTN-MW2 (parking lot). Drilled to 18.5 ft bgs with 10 feet of 2" diameter 0.010 slotted screen. The vapor inlet screen was set at 5.5-6.5 ft bgs; this was the observed silt layer. A PID reading of the silt layer recorded 26.4 ppm. The silt layer was saturated from all the injections of EVO around the monitoring well location. There was a delay in setting the well as an item fell into the borehole and had to be fished out before proceeding. Continued using the Geoprobe to push injection rod down to 12 feet bgs, injecting

emulsified vegetable oil (mixing 12.5 gallons of RNAS Newman Zone emulsified vegetable oil with 410 gallons of City of Whitefish water) at 12 feet bgs and 5.5 feet bgs. The injection boreholes were plugged with bentonite. A total of six injection locations (A1, A2, A3, C1, D1, and D2) were completed. This brings the up to date injection total to 19 of the 50 points.

The SVE system continued operating. The blower unit has been slowed down so not to suck up any injection fluids.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

Photo Date:	1/8/2017
Direction:	Southeast
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Using the Geoprobe to pushing the soil sampler rod and tube at monitoring well MTN-MW2 to locate the subsurface silt layer. The silt layer was found between 5.5 and 6.5 feet bgs.

Photo Date:	1/8/2017
Direction:	Northeast
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Using the Geoprobe to auger down and make a borehole MTN-MW2. Location drilled down to 18.5 feet bgs.

Photo Date:	1/8/2017
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	MTN-MW2 2" groundwater well (screen set between 8 and 18 feet bgs) and 1/4" vapor well (screen set between 5.5 and 6.5 feet bgs).

Photo Date:	1/8/2017
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Using the Geoprobe to inject EVO mixed fluids at injection location A2. The safety cone is monitoring well MTN-MW1. The box truck is the EVO mixing area.

Photo Date:	1/8/2017
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Adding bentonite chip into injection borehole A3 after injecting EVO mix at the 12 feet bgs and 5.5 feet bgs.

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Monday, January 9, 2017		
Temperature	<32 °F	**Work Day**	
Weather	Snow	**Work Start**	700
Wind	Light (1-10 mph)	**Work Stop**	1655

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Robby Orr / Remington Technologies	Field Supervisor
Jeff Carlo / Remington Technologies	Laborer
Eric Coonrad / Remington Technologies	Laborer

Equipment Present Onsite	Count
Geoprobe 7822DT	1
Box truck that mixes injection fluids	1
Truck with water tank	1

Health and Safety Comments	The site received five inches of snow overnight and an additional two inches during the day.
Record of Samples Collected	None.
Work Activities Conducted	Continued using the Geoprobe to push injection rod down to 12 feet bgs, injecting emulsified vegetable oil (mixing 12.5 gallons of RNAS Newman Zone emulsified vegetable oil with 410 gallons of City of Whitefish water) at 12 feet bgs and 5.5 feet bgs. The injection boreholes were plugged with bentonite. A total of seven injection locations (B1, B2, B3, C3, C4, D3, and D4) were completed; these injections points complete the field activities in the parking lot. The C4 location received double the volume (25 gallons of RNAS Newman Zone and 810 gallons of water). This brings the up to date injection total to 26 completed points. The 26 injection locations were capped with cold patch asphalt.

Monitoring wells MTN-MW1 and MTN-MW2 were completed with concrete once air temperatures reached 30 F. The concrete will be monitored for the next few months to see if it set properly or will need to be replaced.

The SVE system continued operating. The blower unit has been slowed down so not to suck up any injection fluids.

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

Photo Date:	1/9/2017
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Remington Technologies driller adding a five foot injection rod extension to push the injection tip down to 12 feet bgs using the Geoprobe. Injection location C3.

Photo Date:	1/9/2017
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	View of the parking lot site from across the alleyway. Using the Geoprobe to push injection rod down to 12 feet bgs at injection point B2.

Photo Date:	1/9/2017
Direction:	North
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Injecting EVO mixed fluids into injection point B3 using the Geoprobe unit.

Photo Date:	1/9/2017
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	View of the southern portion of the parking lot and the cold patch asphalt added to the "D", "E", and "F" series injection points. The safety cones are next to monitoring well MTN-MW2.

Photo Date:	1/9/2017
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	View of the central portion of the parking lot and the cold patch asphalt added to the "A" (next to the white trailer), "B", "C", "D", "E", and "F" (where Remington is working) series injection points.

Photo Date:	1/9/2017
Direction:	Northwest
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	View of the northern portion of the parking lot and the cold patch asphalt added to the "A", "B", "C", and "D" series injection points. The safety cone near the Geoprobe is monitoring well MTN-MW1.

Photo Date:	1/9/2017
Direction:	Northeast
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	View of the northern portion of the parking lot and the cold patch asphalt added to the "A", "B", "C", and "D" series injection points. The round cover on the bottom left of the photo is the sewer cleanout cover.

Photo Date:	1/9/2017
Direction:	Southeast
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	View of the southern portion of the parking lot and the cold patch asphalt added to the "E" and "F" series injection points. The safety cones are next to monitoring well MTN-MW2.

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Tuesday, January 10, 2017		
Temperature	<32 °F	**Work Day**	
Weather	Cloudy	**Work Start**	700
Wind	Light (1-10 mph)	**Work Stop**	1745

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Robby Orr / Remington Technologies	Field Supervisor
Jeff Carlo / Remington Technologies	Laborer
Eric Coonrad / Remington Technologies	Laborer
Lana Walker / Whitefish Liquor Store	General Manager

Equipment Present Onsite	Count
Geoprobe 7822DT	1
Box truck that mixes injection fluids	1
Truck with water tank	1

Health and Safety Comments	One inch of snow fell overnight. Air temperatures were less than 20 degrees F.
Record of Samples Collected	None
Work Activities Conducted	Continued using the Geoprobe to push injection rod down to 12 feet bgs, injecting emulsified vegetable oil (mixing 12.5 gallons of RNAS Newman Zone emulsified vegetable oil with 410 gallons of City of Whitefish water) at 12 feet bgs and 5.5 feet bgs. The injection boreholes were plugged with bentonite. A total of eleven injection locations (G1, G2, G3, G4, G5, H1, H2, H3, H4, H5, and H6) were completed; these injections points complete the field activities in the parking lot. The G1 and H1 locations received double the volume (25 gallons of RNAS Newman Zone and 810 gallons of water). This brings the up to date injection total to 37 completed points. The eleven injection locations were capped with cold patch asphalt.

The eleven injection locations were capped with cold patch asphalt.

The SVE system continued operating. The blower unit has been slowed down so not to suck up any injection fluids.

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

Photo Date:	1/10/2017
Direction:	Southeast
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Coned off work zone in the parking lane of Second Street. Geoprobe pushing injection rod down injection point H1.

Photo Date:	1/10/2017
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Injecting EVO mixed fluid into injection point H3 (red hose) while Remington uses the Geoprobe to remove the injection rod from point location G2.

Photo Date:	1/10/2017
Direction:	East
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Looking down Second street as injection progress eastward. Currently injecting into point location G4, while the Geoprobe pushes injection rod down 12 feet bgs at point location H5.

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Wednesday, January 11, 2017		
Temperature	<32 °F	**Work Day**	
Weather	Clear	**Work Start**	700
Wind	Light (1-10 mph)	**Work Stop**	1815

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Robby Orr / Remington Technologies	Field Supervisor
Jeff Carlo / Remington Technologies	Laborer
Eric Coonrad / Remington Technologies	Laborer
Lana Walker / Whitefish Liquor Store	General Manager

Equipment Present Onsite	Count
Geoprobe 7822DT	1
Box truck that mixes injection fluids	1
Truck with water tank	1

Health and Safety Comments	Subzero windchills as the low at the start of the day was -7 F.
Record of Samples Collected	None
Work Activities Conducted	Continued using the Geoprobe to push injection rod down to 12 feet bgs, injecting emulsified vegetable oil (mixing 12.5 gallons of RNAS Newman Zone emulsified vegetable oil with 410 gallons of City of Whitefish water). The injection boreholes were plugged with bentonite and capped with cold patch asphalt. The final ten injection locations (G6, G7, G8, G9, G10, G11, H7, H8, H9, and H10) were completed. This brings the up to date injection total to 47 completed points. When injecting at pointsG6 and H10, both had approximately five gallons of injection fluids surface around the injection rod. When injecting into injection point G9, approximately five gallons of injection fluids surfaced out of injection borehole G8.

approximately five gallons of injection fluids surfaced out of injection borehole G8.

The SVE system continued operating. The blower unit has been slowed down so not to suck up any injection fluids.

Gauged monitoring well data:

- MTN-MW1 (near alleyway): depth to water top of casing gauged at 9.25 feet (9.81 feet bgs) and total well depth top of casing gauged at 18.29 feet.
- MTN-MW2 (parking lot): depth to water top of casing gauged at 8.38 feet (8.84 feet bgs) and total well depth top of casing gauged at 17.18 feet.
- MTN-MW3 (Third Street): depth to water top of casing gauged at 8.15 feet (8.58 feet bgs) and total well depth top of casing gauged at 18.41 feet.
- WSMW-7: unable to gauge as a vehicle parked over the well through out the day.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

Photo Date:	1/11/2017
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Injecting EVO mixed fluids into borehole injection point H8 (red hose connected to injection rod) while Remington drilles down 12 feet bgs using the Geoprobe at injection point G8.

Photo Date:	1/11/2017
Direction:	East
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Completed field activities in Third Street, including capping the final ten boreholes with asphalt cold patch.

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Thursday, January 12, 2017		
Temperature	<32 °F	**Work Day**	
Weather	Clear	**Work Start**	715
Wind	Light (1-10 mph)	**Work Stop**	915

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Lana Walker / Whitefish Liquor Store	General Manager

Equipment Present Onsite	Count
PID	1

Health and Safety Comments	Clear and -7 F this morning; surface conditions very slick in the parking lot.
Record of Samples Collected	Laboratory effluent vapor sample MTN-POST.
Work Activities Conducted	Collected effluent vapor sample MTN-POST from the outlet of the GAC / Zeolite SVE system drum filtration between 0810 and 0840. Adjusted the blower to operate at 20.00 HZ (3.00 HZ higher than was operated during injection activities and 4.00 HZ lower than pre injection activities). Demobilized from Whitefish to Helena.

	Deviation from approved plans:
Work conducted in accordance with approved plans?	

Photo Date:	1/12/2017
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Collecting effluent summa canister sample MTN-POST. The drum on the left is the first drum and contains GAC. The vapor passes through the GAC and then into the drum on the right (contains Zeolite). The sample collection point is on the outlet of the Zeolite drum.

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 01/12/2017	TIME: 0810 - 0840	OPERATOR: Jo.l

SYSTEM STATUS: ON OFF Restart	IF OFF, WHY: Setting up to collect summa canist samples.

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: mini RAE 3000 / 592-000488

BLOWER SYSTEM HOURS: 480	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: 1
WELL #7 (EAST) HOURS: 486	WELL #8 (SOUTH) HOURS: 496	WELL #9 (WEST) HOURS: 496

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	-26.5	~~2.1~~ 1.8	~~38~~ 36	16.9 *
WELL #8 (SOUTH):	ON	-31.9	1.8	36	1.5 *
WELL #9 (WEST):	ON	-29.7	1.8	36	5.2 *

MANIFOLD TEMP (°F): 43	MANIFOLD PID (PPM): 6.7 *
KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -21

BLOWER VACUUM (in H2O): 14.7	BLOWER DISCHARGE PRESSURE (in H2O): 34	BLOWER DISCHARGE TEMPERATURE (°F): 84
PRE GAC / ZEOLITE PID (PPM): 13.3 @ 0811 7.8 @ 0818 7.1 @ 0826 6.9 @ 0839	POST GAC DRUM PID (PPM): 0.4 @ 0811 0.2 @ 0818 0.1 @ 0826 0.1 @ 0839	POST ZEOLITE DRUM PID (PPM): 0.0 @ 0811 0.0 @ 0818 0.0 @ 0826 0.0 @ 0839

NOTES: Collect MTN-Post summa canister sample from 0810-0840

* Collected after test with blower off

Changed the blower from 24.00 Hz to 20.00 Hz @ 0850.

Daily Tailgate Meeting Checklist

Site Name: Trihydro Corporation – Whitefish Solvent Site

Site Address: 239 Baker Avenue, Whitefish, Montana

Work Being Performed: ISCO-Injection

Date & Time of Meeting: 1-4-17 **Weather:** Clear -16

Name of Presenter: [redacted]nan Robby

Itemize the Specific Topics Discussed (if more space is needed use the back of this page):

6 REMINGTON CARDINAL SAFETY PRINCIPLES

- ☑ I will report to work physically rested and mentally alert
- ☑ I will be responsible for my actions
- ☑ I will communicate with my co-workers
- ☑ I will be aware of all changing site conditions that may impact safety
- ☑ I will NOT tolerate willful unsafe acts
- ☑ I will STOP all unsafe work

✓ Introductions	✓ PPE check - Level D
✓ Scope of Work Discussion	✓ Special PPE - Respirator, face shield etc.
✓ Site Walk	✓ JHAs reviewed prior to work start
✓ Utility locations checked - Look up	✓ Overhead Obstacles
✓ STOP WORK Authority	NA Short Service Employees (List them)
✓ Hospital Location/Route Explained	✓ Good Housekeeping
✓ HASP Reviewed	✓ Communication with Mixer in Box Truck
✓ Emergency Evacuation Areas	✓ Exclusion zone
✓ Eye Wash/First Aid Kit Location	✓ Eating/Drinking/Smoking/Cell Phones
✓ Spotters needed for moving equipment	✓ Stakeholders - direct to client
✓ Fire Extinguisher Location	✓ Heat Stress
✓ 3 Points of Contact for equipment	✓ Cold Stress
✓ Proper Lifting Technique	✓ Equipment Inspections
	✓ Shared Learnings

Job Hazard Analyses:

✓ Arrival and Site Setup	✓ Chemical Injection
✓ Core Drilling	✓ Jackhammering
✓ Borehole Clearance	NA Skidsteer Operation
✓ Drilling Operation (Direct Push)	NA Well Injection
Other	Other

- **I have participated in the Job Hazard Analysis (JHAs) review and discussion of the above referenced JHAs.**
- **I have read and understood the contents of this Site Health and Safety Plan and I agree to abide by all provisions specified within.**

Daily Safety Tailgate Meeting Participants (Use the back of this form if needed)

Print Name:	Signature:	Company:	Date:
Grant Drennan		Remington Technologies	
Robby Orr	Robby	Remington Technologies	1-4-17
Jeff Carlo	[illegible]	Remington Technologies	
Joe Pr[illegible]	Joe Pr[illegible]	TNC	1-4-17
Eric	[illegible]		1-4-17
Joel Rich	[illegible]	Trihydro	1/4/17

Daily Tailgate Meeting Checklist

Site Name: Trihydro Corporation – Whitefish Solvent Site

Site Address: 239 Baker Avenue, Whitefish, Montana

Work Being Performed: ISCO-Injection

Date & Time of Meeting: 1/5/17 **Weather:** Clear -17

Name of Presenter: ~~Grant Drennan~~ Robby Orr

Itemize the Specific Topics Discussed (if more space is needed use the back of this page):

6 REMINGTON CARDINAL SAFETY PRINCIPLES

- ☑ I will report to work physically rested and mentally alert
- ☑ I will be responsible for my actions
- ☑ I will communicate with my co-workers
- ☑ I will be aware of all changing site conditions that may impact safety
- ☑ I will NOT tolerate willful unsafe acts
- ☑ I will STOP all unsafe work

✓	Introductions	✓	PPE check - Level D
✓	Scope of Work Discussion	✓	Special PPE - Respirator, face shield etc.
✓	Site Walk	✓	JHAs reviewed prior to work start
✓	Utility locations checked - Look up	✓	Overhead Obstacles
✓	STOP WORK Authority	N/A	Short Service Employees (List them)
✓	Hospital Location/Route Explained	✓	Good Housekeeping
✓	HASP Reviewed	✓	Communication with Mixer in Box Truck
✓	Emergency Evacuation Areas	✓	Exclusion zone
✓	Eye Wash/First Aid Kit Location	✓	Eating/Drinking/Smoking/Cell Phones
✓	Spotters needed for moving equipment	✓	Stakeholders - direct to client
✓	Fire Extinguisher Location	✓	Heat Stress
✓	3 Points of Contact for equipment	✓	Cold Stress
✓	Proper Lifting Technique	✓	Equipment Inspections
		✓	Shared Learnings

Job Hazard Analyses:

✓	Arrival and Site Setup	✓	Chemical Injection
✓	Core Drilling	N/A	Jackhammering
✓	Borehole Clearance	N/A	Skidsteer Operation
✓	Drilling Operation (Direct Push)	N/A	Well Injection
	Other		Other

- **I have participated in the Job Hazard Analysis (JHAs) review and discussion of the above referenced JHAs.**
- **I have read and understood the contents of this Site Health and Safety Plan and I agree to abide by all provisions specified within.**

Daily Safety Tailgate Meeting Participants (Use the back of this form if needed)

Print Name:	Signature:	Company:	Date:
Grant Drennan		Remington Technologies	
Robby Orr	Robby Orr	Remington Technologies	1/5/17
Jeff Carlo	Jeff Carlo	Remington Technologies	1/5/17
Eric Counsaz	Eric Counsaz	Remington	1/5/17
Jose Pereda	Jose Pereda	IMC	1/5/17
Jal Riebli	Jal Riebli	Trihydro	1/5/2017

Daily Tailgate Meeting Checklist

Site Name: Trihydro Corporation – Whitefish Solvent Site

Site Address: 239 Baker Avenue, Whitefish, Montana

Work Being Performed: ISCO-Injection

Date & Time of Meeting: 1/6/18 **Weather:** Cold overcast -6

Name of Presenter: ~~Grant Brennan~~ Robby ORR

Itemize the Specific Topics Discussed (if more space is needed use the back of this page):

6 REMINGTON CARDINAL SAFETY PRINCIPLES

- ☑ I will report to work physically rested and mentally alert
- ☑ I will be responsible for my actions
- ☑ I will communicate with my co-workers
- ☑ I will be aware of all changing site conditions that may impact safety
- ☑ I will NOT tolerate willful unsafe acts
- ☑ I will STOP all unsafe work

✓	Introductions	✓	PPE check - Level D
✓	Scope of Work Discussion	✓	Special PPE - Respirator, face shield etc.
✓	Site Walk	✓	JHAs reviewed prior to work start
✓	Utility locations checked - Look up	✓	Overhead Obstacles
✓	STOP WORK Authority	N/A	Short Service Employees (List them)
✓	Hospital Location/Route Explained	✓	Good Housekeeping
✓	HASP Reviewed	✓	Communication with Mixer in Box Truck
✓	Emergency Evacuation Areas	✓	Exclusion zone
✓	Eye Wash/First Aid Kit Location	✓	Eating/Drinking/Smoking/Cell Phones
✓	Spotters needed for moving equipment	✓	Stakeholders - direct to client
✓	Fire Extinguisher Location	✓	Heat Stress
✓	3 Points of Contact for equipment	✓	Cold Stress
✓	Proper Lifting Technique	✓	Equipment Inspections
		✓	Shared Learnings

Job Hazard Analyses:

	Arrival and Site Setup	✓	Chemical Injection
✓	Core Drilling	N/A	Jackhammering
✓	Borehole Clearance	N/A	Skidsteer Operation
✓	Drilling Operation (Direct Push)	N/A	Well Injection
	Other		Other

- **I have participated in the Job Hazard Analysis (JHAs) review and discussion of the above referenced JHAs.**
- **I have read and understood the contents of this Site Health and Safety Plan and I agree to abide by all provisions specified within.**

Daily Safety Tailgate Meeting Participants (Use the back of this form if needed)

Print Name:	Signature:	Company:	Date:
[redacted] Eric Carlo		Remington Technologies	1-6-18
Robby Orr		Remington Technologies	1-6-18
Jeff Carlo		Remington Technologies	1-6-18
Jose Pereda		Inte	1-6-18
Joel Riebli		Trihydro	01/06/2018

Daily Tailgate Meeting Checklist

Site Name: Trihydro Corporation – Whitefish Solvent Site

Site Address: 239 Baker Avenue, Whitefish, Montana

Work Being Performed: ISCO-Injection

Date & Time of Meeting: 0:730 1-7-17 **Weather:** Clear -13

Name of Presenter: ~~Grant Drennan~~ Robby ORR

Itemize the Specific Topics Discussed (if more space is needed use the back of this page):

6 REMINGTON CARDINAL SAFETY PRINCIPLES

- ☑ I will report to work physically rested and mentally alert
- ☑ I will be responsible for my actions
- ☑ I will communicate with my co-workers
- ☑ I will be aware of all changing site conditions that may impact safety
- ☑ I will NOT tolerate willful unsafe acts
- ☑ I will STOP all unsafe work

✓	Introductions	✓	PPE check - Level D
✓	Scope of Work Discussion	✓	Special PPE - Respirator, face shield etc.
✓	Site Walk	✓	JHAs reviewed prior to work start
✓	Utility locations checked - Look up	✓	Overhead Obstacles
✓	STOP WORK Authority	N/A	Short Service Employees (List them)
✓	Hospital Location/Route Explained	✓	Good Housekeeping
✓	HASP Reviewed	✓	Communication with Mixer in Box Truck
✓	Emergency Evacuation Areas	✓	Exclusion zone
✓	Eye Wash/First Aid Kit Location	✓	Eating/Drinking/Smoking/Cell Phones
✓	Spotters needed for moving equipment	✓	Stakeholders - direct to client
✓	Fire Extinguisher Location	✓	Heat Stress
✓	3 Points of Contact for equipment	✓	Cold Stress
✓	Proper Lifting Technique	✓	Equipment Inspections
		✓	Shared Learnings

Job Hazard Analyses:

✓	Arrival and Site Setup	✓	Chemical Injection
✓	Core Drilling	N/A	Jackhammering
✓	Borehole Clearance	N/A	Skidsteer Operation
✓	Drilling Operation (Direct Push)	N/A	Well Injection
	Other		Other

- **I have participated in the Job Hazard Analysis (JHAs) review and discussion of the above referenced JHAs.**
- **I have read and understood the contents of this Site Health and Safety Plan and I agree to abide by all provisions specified within.**

Daily Safety Tailgate Meeting Participants (Use the back of this form if needed)

Print Name:	Signature:	Company:	Date:
~~Grant Drennan~~ Brian Lowrey	[illegible]	Remington Technologies	1-7-17
Robby Orr	[illegible]	Remington Technologies	1-7-17
Jeff Carlo	[illegible]	Remington Technologies	1-7-17
Joel Ribell	[illegible]	Trihydro	1/7/2017
Jose Pulido	[illegible]	IME	1/7/17

Daily Tailgate Meeting Checklist

Site Name: Trihydro Corporation – Whitefish Solvent Site

Site Address: 239 Baker Avenue, Whitefish, Montana

Work Being Performed: ISCO-Injection

Date & Time of Meeting: 1/8/17 7:30 AM **Weather:** Snowing 20°

Name of Presenter: ~~Grant Drennan~~ Robby Orr

Itemize the Specific Topics Discussed (if more space is needed use the back of this page):

6 REMINGTON CARDINAL SAFETY PRINCIPLES

- ☑ I will report to work physically rested and mentally alert
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- ☑ I will STOP all unsafe work

✓	Introductions	✓	PPE check - Level D
✓	Scope of Work Discussion	✓	Special PPE - Respirator, face shield etc.
✓	Site Walk	✓	JHAs reviewed prior to work start
✓	Utility locations checked - Look up	✓	Overhead Obstacles
✓	STOP WORK Authority	NA	Short Service Employees (List them)
✓	Hospital Location/Route Explained	✓	Good Housekeeping
✓	HASP Reviewed	✓	Communication with Mixer in Box Truck
✓	Emergency Evacuation Areas	✓	Exclusion zone
✓	Eye Wash/First Aid Kit Location	✓	Eating/Drinking/Smoking/Cell Phones
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✓	Fire Extinguisher Location	✓	Heat Stress
✓	3 Points of Contact for equipment	✓	Cold Stress
✓	Proper Lifting Technique	✓	Equipment Inspections
		✓	Shared Learnings

Job Hazard Analyses:

	Arrival and Site Setup	✓	Chemical Injection
✓	Core Drilling		Jackhammering
✓	Borehole Clearance		Skidsteer Operation
✓	Drilling Operation (Direct Push)		Well Injection
	Other		Other

- **I have participated in the Job Hazard Analysis (JHAs) review and discussion of the above referenced JHAs.**
- **I have read and understood the contents of this Site Health and Safety Plan and I agree to abide by all provisions specified within.**

Daily Safety Tailgate Meeting Participants (Use the back of this form if needed)

Print Name:	Signature:	Company:	Date:
~~Grant Drennan~~ Eric Coombs	[illegible]	Remington Technologies	1-8-17
Robby Orr	[illegible]	Remington Technologies	1/8/17
Jeff Carlo	[illegible]	Remington Technologies	1/8/17
Joel Riebli	[illegible]	Trihydro	1/8/2017
Joe Pereda	[illegible]	IMG	1/8/17

Daily Tailgate Meeting Checklist

Site Name: Trihydro Corporation – Whitefish Solvent Site

Site Address: 239 Baker Avenue, Whitefish, Montana

Work Being Performed: ISCO-Injection

Date & Time of Meeting: 1-9-17 0700 **Weather:** Snowing 17°

Name of Presenter: Grant Drennan

Itemize the Specific Topics Discussed (if more space is needed use the back of this page):

6 REMINGTON CARDINAL SAFETY PRINCIPLES

- ☑ I will report to work physically rested and mentally alert
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- ☑ I will be aware of all changing site conditions that may impact safety
- ☑ I will NOT tolerate willful unsafe acts
- ☑ I will STOP all unsafe work

✓	Introductions	✓	PPE check - Level D
✓	Scope of Work Discussion	✓	Special PPE - Respirator, face shield etc.
✓	Site Walk	✓	JHAs reviewed prior to work start
✓	Utility locations checked - Look up	✓	Overhead Obstacles
✓	STOP WORK Authority	N/A	Short Service Employees (List them)
✓	Hospital Location/Route Explained	✓	Good Housekeeping
✓	HASP Reviewed	✓	Communication with Mixer in Box Truck
✓	Emergency Evacuation Areas	✓	Exclusion zone
✓	Eye Wash/First Aid Kit Location	✓	Eating/Drinking/Smoking/Cell Phones
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✓	Fire Extinguisher Location	✓	Heat Stress
✓	3 Points of Contact for equipment	✓	Cold Stress
✓	Proper Lifting Technique	✓	Equipment Inspections
		✓	Shared Learnings

Job Hazard Analyses:

	Arrival and Site Setup	✓	Chemical Injection
✓	Core Drilling		Jackhammering
✓	Borehole Clearance		Skidsteer Operation
✓	Drilling Operation (Direct Push)		Well Injection
	Other		Other

- **I have participated in the Job Hazard Analysis (JHAs) review and discussion of the above referenced JHAs.**
- **I have read and understood the contents of this Site Health and Safety Plan and I agree to abide by all provisions specified within.**

Daily Safety Tailgate Meeting Participants (Use the back of this form if needed)

Print Name:	Signature:	Company:	Date:
~~Grant Drennan~~ Eric Carlo	[signature]	Remington Technologies	1-9-17
Robby Orr	[signature]	Remington Technologies	1-9-17
Jeff Carlo	[signature]	Remington Technologies	1/9/17
Joel Riebl	[signature]	Trihydro	01/09/2017

Daily Tailgate Meeting Checklist

Site Name: Trihydro Corporation – Whitefish Solvent Site

Site Address: 239 Baker Avenue, Whitefish, Montana

Work Being Performed: ISCO-Injection

Date & Time of Meeting: 1/10/~~20~~17 7:00 AM **Weather:**

Name of Presenter: ~~Grant Drennan~~ Robby Orr

Itemize the Specific Topics Discussed (if more space is needed use the back of this page):

6 REMINGTON CARDINAL SAFETY PRINCIPLES

- ☑ I will report to work physically rested and mentally alert
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- ☑ I will be aware of all changing site conditions that may impact safety
- ☑ I will NOT tolerate willful unsafe acts
- ☑ I will STOP all unsafe work

✓	Introductions	✓	PPE check - Level D
✓	Scope of Work Discussion	✓	Special PPE - Respirator, face shield etc.
✓	Site Walk	✓	JHAs reviewed prior to work start
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✓	STOP WORK Authority	N/A	Short Service Employees (List them)
✓	Hospital Location/Route Explained	✓	Good Housekeeping
✓	HASP Reviewed	✓	Communication with Mixer in Box Truck
✓	Emergency Evacuation Areas	✓	Exclusion zone
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✓	Fire Extinguisher Location	✓	Heat Stress
✓	3 Points of Contact for equipment	✓	Cold Stress
✓	Proper Lifting Technique	✓	Equipment Inspections
		✓	Shared Learnings

Job Hazard Analyses:

✓	Arrival and Site Setup	✓	Chemical Injection
✓	Core Drilling	N/A	Jackhammering
✓	Borehole Clearance	N/A	Skidsteer Operation
✓	Drilling Operation (Direct Push)	N/A	Well Injection
	Other		Other

- **I have participated in the Job Hazard Analysis (JHAs) review and discussion of the above referenced JHAs.**
- **I have read and understood the contents of this Site Health and Safety Plan and I agree to abide by all provisions specified within.**

Daily Safety Tailgate Meeting Participants (Use the back of this form if needed)

Print Name:	Signature:	Company:	Date:
~~Grant Drennan~~		Remington Technologies	1-10-17
Robby Orr		Remington Technologies	1/10/~~20~~17
Jeff Carlo		Remington Technologies	1-10-17
Joel Riebell		Trihydro Corporation	01/10/2017

Daily Tailgate Meeting Checklist

Site Name: Trihydro Corporation – Whitefish Solvent Site

Site Address: 239 Baker Avenue, Whitefish, Montana

Work Being Performed: ISCO-Injection

Date & Time of Meeting: 1/11/17 **Weather:** Cold + Clear -6

Name of Presenter: ~~Grant Drennan~~ Robby ORR

Itemize the Specific Topics Discussed (if more space is needed use the back of this page):

6 REMINGTON CARDINAL SAFETY PRINCIPLES

- ☑ I will report to work physically rested and mentally alert
- ☑ I will be responsible for my actions
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- ☑ I will be aware of all changing site conditions that may impact safety
- ☑ I will NOT tolerate willful unsafe acts
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✓	Introductions	✓	PPE check - Level D
✓	Scope of Work Discussion	✓	Special PPE - Respirator, face shield etc.
✓	Site Walk	✓	JHAs reviewed prior to work start
✓	Utility locations checked - Look up	✓	Overhead Obstacles
✓	STOP WORK Authority	N/A	Short Service Employees (List them)
✓	Hospital Location/Route Explained	✓	Good Housekeeping
✓	HASP Reviewed	✓	Communication with Mixer in Box Truck
✓	Emergency Evacuation Areas	✓	Exclusion zone
✓	Eye Wash/First Aid Kit Location	✓	Eating/Drinking/Smoking/Cell Phones
✓	Spotters needed for moving equipment	✓	Stakeholders - direct to client
✓	Fire Extinguisher Location	✓	Heat Stress
✓	3 Points of Contact for equipment	✓	Cold Stress
✓	Proper Lifting Technique	✓	Equipment Inspections
		✓	Shared Learnings

Job Hazard Analyses:

✓	Arrival and Site Setup	✓	Chemical Injection
✓	Core Drilling	N/A	Jackhammering
✓	Borehole Clearance	N/A	Skidsteer Operation
✓	Drilling Operation (Direct Push)	N/A	Well Injection
	Other		Other

- **I have participated in the Job Hazard Analysis (JHAs) review and discussion of the above referenced JHAs.**
- **I have read and understood the contents of this Site Health and Safety Plan and I agree to abide by all provisions specified within.**

Daily Safety Tailgate Meeting Participants (Use the back of this form if needed)

Print Name:	Signature:	Company:	Date:
~~Grant Drennan~~ Eric Conrad		Remington Technologies	1-11-17
Robby Orr		Remington Technologies	1-11-17
Jeff Carlo		Remington Technologies	1-11-17
Joel Riebli		Trihydro	01/11/2017

Remington
PROBLEM SOLVED

Remediation Injection Report
Provided for:

Trihydro
CORPORATION

Location:
239 Baker Avenue
Whitefish, Montana
Whitefish Solvent Site
January 16, 2017

Remington
PROBLEM SOLVED

Soil and Groundwater Remediation
8100 Arkins Court
Loveland, CO 80538
(970) 278-1646

Joel Riebli
Trihydro Corporation
2707 Broadwater Ave
Helena, Montana 59601

January 16, 2017

Re: Remedial Injection Report
Whitefish Solvent Site
239 Baker Avenue
Whitefish, Montana

Dear Mr. Riebli,

Remington Technologies, LLC (Remington) personnel and equipment mobilized to 239 Baker Avenue, Whitefish, Montana on January 2, 2017 and arrived on site January 4, 2017 at 0730 hours. Upon arriving, Remington personnel discussed the scope-of-work with Joel Riebli of Trihydro Corporation. After discussing the scope-of-work, an initial plan to perform tasks was communicated between the party representatives of Trihydro Corporation and Remington.

Before work began, the job hazard analyses (JHAs), Health and Safety Plan (HASP), and emergency evacuation routes were discussed. Documentation of the daily safety meetings were acknowledged by signing Remington's daily tailgate forms. These forms were kept in the Remington company vehicle for inspection throughout the duration of the project.

Tasks completed throughout the project:

- Obtained water for injection and cleanup activities from a nearby fill station.
- Operated the Geoprobe® 7822DT to advance probe rod into the subsurface.
- Pumped the remedial solution into the specified treatment injection depths recommended in the proposal.
- Injected a 3.1 percent Emulsified Vegetable Oil (EVO) solution to further degrade remaining chlorinated impacts observed in the subsurface.
- Injected a total of 21,250 gallons of EVO solution throughout the duration of the injection event.
- Communicated all actions with the Trihydro Corporation representative.
- Cleaned and restored all site conditions to like or better conditions.

Details regarding each injection location, including job site location, injection point identification numbers, injection times, volumes, injection depths, flow rates, pressures, etc., can be reviewed in Tables 1-7. Each Table below represents one day on site.

Monitoring Well/Nested Well Installations and Completions

During the project, Remington representatives also drilled three monitoring wells that were constructed using schedule 40, 2-inch diameter, flush-threaded PVC casing coupled with 2-inch diameter, flush-threaded, 0.010-inch slotted PVC screen. The monitoring wells were installed to a depth of approximately 18 feet bgs. A 10/20 silica sand pack was installed in the annulus from the total depth of the monitoring well to a minimum of 6 inches above the top of the screen. Bentonite chips were also used to complete the minimum 1 1/2-foot thick bentonite seal above the sand pack.

The vapor nested wells were constructed using a vapor implant anchor point, 12-inch-long stainless steel implant with 1/4-inch Swagelok fitting, 1/4-inch Teflon or stainless steel tubing, and 1/4-inch polyethylene implant Swagelok fitting. The vapor inlet screens were installed at a depth of approximately five and 6 feet bgs. A 10/20 silica sand pack was poured to fill in the annulus from the bottom of the vapor inlet screen to six inches above the top of the screen. Bentonite chips were also used to install the 1-foot thick bentonite seal above the sand pack. The bentonite seal was hydrated in 2-foot intervals.

Each monitoring well casing was cut 4 inches bgs and finished with a compression or slip well cap. To complete the well, Remington representatives installed concrete from 0.25 feet bgs to the surface to prevent damage to the casing. To ensure correct completion of each monitoring well and nested well, Remington subcontracted a Montana-licensed water well driller.

Table 1

DAILY INJECTION FIELD LOG SHEET

Client / Project:	**Trihydro Corporation / Whitefish Solvent Site**	**Client Representative:**	**Joel Riebli**
Location:	**239 Baker Avenue, Whitefish, Montana**	**Additional Client Rep:**	**N/A**
Remington Technicians:	**Robby Orr / Eric Coonrad / Jeff Carlo**	**Solution Percentage**	**3.1**
Injection Scope of work:	**6 Injection Locations / 2,550 Gallons of Solution**	**Time of Arrival:**	**7:30**

Boring / Well ID No.	Date	Start Time	End Time	Total Time	Injection Interval	Average PSI	Total Injected @ interval	Average Flow Rate	Pump Used	Airknifed	DP / Auger Packer	Break Through Pressure	Surface Y/N	Feet / Direction Surfacing
IP-1	1/6/17	11:29	12:00	31	12'	5	325	10.48	SPX	No	DP	15	No	N/A
IP-1	1/6/17	12:00	12:17	17	5.5'	5	100	5.88	DIA	No	DP	15	No	N/A
IP-2	1/6/17	12:40	12:56	16	12'	10	325	20.31	DIA	No	DP	20	No	N/A
IP-2	1/6/17	12:56	13:10	14	5.5'	10	100	7.14	DIA	No	DP	20	No	N/A
IP-3	1/6/17	13:30	13:50	20	12'	10	200	10.00	DIA	No	DP	10	Yes	Around Rod
IP-3	1/6/17	13:50	14:04	14	5.5'	10	225	16.07	DIA	No	DP	10	No	N/A
IP-4	1/6/17	14:30	14:45	15	12'	15	325	21.67	DIA	No	DP	25	No	N/A
IP-4	1/6/17	14:45	14:58	13	5.5'	15	100	7.69	DIA	No	DP	25	No	N/A
IP-5	1/6/17	15:20	15:50	30	12'	5	325	10.83	DIA	No	DP	10	No	N/A
IP-5	1/6/17	15:50	16:05	15	5.5'	5	175	11.67	DIA	No	DP	10	No	N/A
IP-6	1/6/17	16:15	16:35	20	12'	5	175	8.75	DIA	No	DP	10	No	N/A
IP-6	1/6/17	16:35	16:50	15	5.5'	5	175	11.67	DIA	No	DP	10	No	N/A

Number of Injection Points	6	Daily Total Injected (Gallons)	2,550	Total Number of Locations Air-knifed	0
Number of Drums Used	2	Daily Total Pounds of Chemical	78	Number of Monitoring Wells Drilled	2
Drums Remaining Onsite	2			Number of Soil Samples Collected	2

Table 2

DAILY INJECTION FIELD LOG SHEET

Client / Project:	**Trihydro Corporation / Whitefish Solvent Site**	**Client Representative:**	**Joel Riebli**
Location:	**239 Baker Avenue, Whitefish, Montana**	**Additional Client Rep:**	**N/A**
Remington Technicians:	**Robby Orr / Eric Coonrad / Jeff Carlo**	**Solution Percentage**	**3.1**
Injection Scope of work:	**7 Injection Locations / 2,975 Gallons of Solution**	**Time of Arrival:**	**7:30**

Boring / Well ID No.	Date	Start Time	End Time	Total Time	Injection Interval	Average PSI	Total Injected @ interval	Average Flow Rate	Pump Used	Airknifed	DP / Auger Packer	Break Through Pressure	Surface Y/N	Feet / Direction Surfacing
IP-7	1/7/17	10:00	10:30	30	12'	10	325	10.83	DIA	No	DP	35	No	N/A
IP-7	1/7/17	10:30	10:44	14	5.5'	5	100	7.14	DIA	No	DP	35	No	N/A
IP-8	1/7/17	11:00	11:28	28	12'	10	325	11.61	DIA	No	DP	15	No	N/A
IP-8	1/7/17	11:28	11:40	12	5.5'	10	100	8.33	DIA	No	DP	15	No	N/A
IP-9	1/7/17	12:03	12:24	21	12'	5	325	15.48	DIA	No	DP	20	No	N/A
IP-9	1/7/17	12:24	12:39	15	5.5'	5	100	6.67	DIA	No	DP	20	No	N/A
IP-10	1/7/17	12:49	13:17	28	12'	10	325	11.61	DIA	No	DP	25	No	N/A
IP-10	1/7/17	13:17	13:35	18	5.5'	5	100	5.56	DIA	No	DP	25	No	N/A
IP-11	1/7/17	13:50	14:18	28	12'	10	325	11.61	DIA	No	DP	40	No	N/A
IP-11	1/7/17	14:18	14:30	12	5.5'	10	100	8.33	DIA	No	DP	40	No	N/A
IP-12	1/7/17	14:40	15:08	28	12'	15	325	11.61	DIA	No	DP	30	No	N/A
IP-12	1/7/17	15:08	15:20	12	5.5'	5	100	8.33	DIA	No	DP	30	No	N/A
IP-13	1/7/17	15:28	15:56	28	12'	15	325	11.61	DIA	No	DP	20	No	N/A
IP-13	1/7/17	15:56	16:18	22	5.5'	5	100	4.55	DIA	No	DP	20	No	N/A

Number of Injection Points	7	Daily Total Injected (Gallons)	2,975	Total Number of Locations Air-knifed	0
Number of Drums Used	0	Daily Total Pounds of Chemical	91	Number of Monitoring Wells Drilled	0
Drums Remaining Onsite	3			Number of Soil Samples Collected	0

Table 3

DAILY INJECTION FIELD LOG SHEET

Client / Project:	**Trihydro Corporation / Whitefish Solvent Site**	**Client Representative:**	**Joel Riebli**
Location:	**239 Baker Avenue, Whitefish, Montana**	**Additional Client Rep:**	**N/A**
Remington Technicians:	**Robby Orr / Eric Coonrad / Jeff Carlo**	**Solution Percentage**	**3.1**
Injection Scope of work:	**6 Injection Locations / 2,550 Gallons of Solution**	**Time of Arrival:**	**7:00**

Boring / Well ID No.	Date	Start Time	End Time	Total Time	Injection Interval	Average PSI	Total Injected @ interval	Average Flow Rate	Pump Used	Airknifed	DP / Auger Packer	Break Through Pressure	Surface Y/N	Feet / Direction Surfacing
IP-14	1/8/17	12:55	13:18	23	12'	50	325	14.13	DIA	No	DP	100	No	N/A
IP-14	1/8/17	13:18	13:28	10	5.5'	5	100	10.00	DIA	No	DP	100	No	N/A
IP-15	1/8/17	13:45	14:08	23	12'	40	325	14.13	DIA	No	DP	110	No	N/A
IP-15	1/8/17	14:08	14:23	15	5.5'	20	100	6.67	DIA	No	DP	110	No	N/A
IP-16	1/8/17	14:30	14:51	21	12'	40	325	15.48	DIA	No	DP	120	No	N/A
IP-16	1/8/17	14:51	14:58	7	5.5'	40	100	14.29	DIA	No	DP	120	No	N/A
IP-17	1/8/17	15:10	15:30	20	12'	50	325	16.25	DIA	No	DP	120	No	N/A
IP-17	1/8/17	15:30	15:40	10	5.5'	30	100	10.00	DIA	No	DP	120	No	N/A
IP-18	1/8/17	15:47	16:15	28	12'	60	325	11.61	DIA	No	DP	100	No	N/A
IP-18	1/8/17	16:15	16:25	10	5.5'	40	100	10.00	DIA	No	DP	100	No	N/A
IP-19	1/8/17	16:35	17:09	34	12'	40	325	9.56	DIA	No	DP	100	No	N/A
IP-19	1/8/17	17:09	17:21	12	5.5'	35	100	8.33	DIA	No	DP	100	No	N/A

Number of Injection Points	6	Daily Total Injected (Gallons)	2,550	Total Number of Locations Air-knifed	0
Number of Drums Used	0	Daily Total Pounds of Chemical	78	Number of Monitoring Wells Drilled	1
Drums Remaining Onsite	3			Number of Soil Samples Collected	1

Table 4

DAILY INJECTION FIELD LOG SHEET

Client / Project:	**Trihydro Corporation / Whitefish Solvent Site**	**Client Representative:**	**Joel Riebli**
Location:	**239 Baker Avenue, Whitefish, Montana**	**Additional Client Rep:**	**N/A**
Remington Technicians:	**Robby Orr / Eric Coonrad / Jeff Carlo**	**Solution Percentage**	**3.1**
Injection Scope of work:	**7 Injection Locations / 3,400 Gallons of Solution**	**Time of Arrival:**	**7:00**

Boring / Well ID No.	Date	Start Time	End Time	Total Time	Injection Interval	Average PSI	Total Injected @ interval	Average Flow Rate	Pump Used	Airknifed	DP / Auger Packer	Break Through Pressure	Surface Y/N	Feet / Direction Surfacing
IP-20	1/9/17	8:59	9:12	13	12'	65	325	25.00	DIA	No	DP	150	No	N/A
IP-20	1/9/17	9:12	9:19	7	5.5'	40	100	14.29	DIA	No	DP	150	No	N/A
IP-21	1/9/17	9:33	9:48	15	12'	60	325	21.67	DIA	No	DP	150	No	N/A
IP-21	1/9/17	9:48	10:00	12	5.5'	50	100	8.33	DIA	No	DP	150	No	N/A
IP-22	1/9/17	10:35	11:15	40	12'	30	750	18.75	DIA	No	DP	130	No	N/A
IP-22	1/9/17	11:15	11:25	10	5.5'	20	100	10.00	DIA	No	DP	130	No	N/A
IP-23	1/9/17	11:38	11:56	18	12'	40	325	18.06	DIA	No	DP	150	No	N/A
IP-23	1/9/17	11:56	12:03	7	5.5'	25	100	14.29	DIA	No	DP	150	No	N/A
IP-24	1/9/17	12:15	12:35	20	12'	40	325	16.25	DIA	No	DP	85	No	N/A
IP-24	1/9/17	12:35	12:42	7	5.5'	10	100	14.29	DIA	No	DP	85	No	N/A
IP-25	1/9/17	12:55	13:20	25	12'	50	325	13.00	DIA	No	DP	110	No	N/A
IP-25	1/9/17	13:20	13:29	9	5.5'	20	100	11.11	DIA	No	DP	110	No	N/A
IP-26	1/9/17	13:40	13:59	19	12'	50	325	17.11	DIA	No	DP	140	No	N/A
IP-26	1/9/17	13:59	14:07	8	5.5'	20	100	12.50	DIA	No	DP	140	No	N/A

Number of Injection Points	7	Daily Total Injected (Gallons)	3,400	Total Number of Locations Air-knifed	0
Number of Drums Used	0	Daily Total Pounds of Chemical	104	Number of Monitoring Wells Drilled	0
Drums Remaining Onsite	0			Number of Soil Samples Collected	0

Table 5

DAILY INJECTION FIELD LOG SHEET

Client / Project:	**Trihydro Corporation / Whitefish Solvent Site**	**Client Representative:**	**Joel Riebli**
Location:	**239 Baker Avenue, Whitefish, Montana**	**Additional Client Rep:**	**N/A**
Remington Technicians:	**Robby Orr / Eric Coonrad / Jeff Carlo**	**Solution Percentage**	**3.1**
Injection Scope of work:	**8 Injection Locations / 4,250 Gallons of Solution**	**Time of Arrival:**	**7:00**

Boring / Well ID No.	Date	Start Time	End Time	Total Time	Injection Interval	Average PSI	Total Injected @ interval	Average Flow Rate	Pump Used	Airknifed	DP / Auger Packer	Break Through Pressure	Surface Y/N	Feet / Direction Surfacing
IP-27	1/10/17	8:52	9:35	43	12'	60	750	17.44	DIA	No	DP	120	No	N/A
IP-27	1/10/17	9:35	9:49	14	5.5'	50	100	7.14	DIA	No	DP	120	No	N/A
IP-28	1/10/17	10:06	11:00	54	12'	5	750	13.89	DIA	No	DP	15	No	N/A
IP-28	1/10/17	11:00	11:18	18	5.5'	5	100	5.56	DIA	No	DP	15	No	N/A
IP-29	1/10/17	11:19	11:54	35	12'	5	325	9.29	DIA	No	DP	10	No	N/A
IP-29	1/10/17	11:54	12:07	13	5.5'	5	100	7.69	DIA	No	DP	10	No	N/A
IP-30	1/10/17	12:08	12:30	22	12'	5	325	14.77	DIA	No	DP	10	No	N/A
IP-30	1/10/17	12:30	12:38	8	5.5'	5	100	12.50	DIA	No	DP	10	No	N/A
IP-31	1/10/17	12:39	12:57	18	12'	5	325	18.06	DIA	No	DP	25	No	N/A
IP-31	1/10/17	12:57	13:13	16	5.5'	5	100	6.25	DIA	No	DP	25	No	N/A
IP-32	1/10/17	13:19	13:45	26	12'	40	325	12.50	DIA	No	DP	100	No	N/A
IP-32	1/10/17	13:45	13:55	10	5.5'	5	100	10.00	DIA	No	DP	100	No	N/A
IP-33	1/10/17	14:05	14:26	21	12'	5	325	15.48	DIA	No	DP	40	No	N/A
IP-33	1/10/17	14:26	14:39	13	5.5'	5	100	7.69	DIA	No	DP	40	No	N/A
IP-34	1/10/17	14:42	15:08	26	12'	5	325	12.50	DIA	No	DP	60	No	N/A
IP-34	1/10/17	15:08	15:19	11	5.5'	5	100	9.09	DIA	No	DP	60	No	N/A

Number of Injection Points	8	Daily Total Injected (Gallons)	4,250	Total Number of Locations Air-knifed	0
Number of Drums Used	0	Daily Total Pounds of Chemical	130	Number of Monitoring Wells Drilled	0
Drums Remaining Onsite	0			Number of Soil Samples Collected	0

Table 6

DAILY INJECTION FIELD LOG SHEET

Client / Project:	**Trihydro Corporation / Whitefish Solvent Site**	**Client Representative:**	**Joel Riebli**
Location:	**239 Baker Avenue, Whitefish, Montana**	**Additional Client Rep:**	**N/A**
Remington Technicians:	**Robby Orr / Eric Coonrad / Jeff Carlo**	**Solution Percentage**	**3.1**
Injection Scope of work:	**3 Injection Locations / 1,275 Gallons of Solution**	**Time of Arrival:**	**7:00**

Boring / Well ID No.	Date	Start Time	End Time	Total Time	Injection Interval	Average PSI	Total Injected @ interval	Average Flow Rate	Pump Used	Airknifed	DP / Auger Packer	Break Through Pressure	Surface Y/N	Feet / Direction Surfacing
IP-35	1/10/17	15:23	15:50	27	12'	5	325	12.04	DIA	No	DP	60	No	N/A
IP-35	1/10/17	15:50	16:08	18	5.5'	5	100	5.56	DIA	No	DP	60	No	N/A
IP-36	1/10/17	16:11	16:36	25	12'	5	325	13.00	DIA	No	DP	40	No	N/A
IP-36	1/10/17	16:36	16:45	9	5.5'	5	100	11.11	DIA	No	DP	40	No	N/A
IP-37	1/10/17	16:48	17:16	28	12'	5	325	11.61	DIA	No	DP	20	No	N/A
IP-37	1/10/17	17:16	17:25	9	5.5'	5	100	11.11	DIA	No	DP	20	No	N/A

Number of Injection Points	3	Daily Total Injected (Gallons)	1,275	Total Number of Locations Air-knifed	0
Number of Drums Used	0	Daily Total Pounds of Chemical	39	Number of Monitoring Wells Drilled	0
Drums Remaining Onsite	0			Number of Soil Samples Collected	0

Table 7

DAILY INJECTION FIELD LOG SHEET

Client / Project:	**Trihydro Corporation / Whitefish Solvent Site**	**Client Representative:**	**Joel Riebli**
Location:	**239 Baker Avenue, Whitefish, Montana**	**Additional Client Rep:**	**N/A**
Remington Technicians:	**Robby Orr / Eric Coonrad / Jeff Carlo**	**Solution Percentage**	**3.1**
Injection Scope of work:	**10 Injection Locations / 4,250 Gallons of Solution**	**Time of Arrival:**	**7:00**

Boring / Well ID No.	Date	Start Time	End Time	Total Time	Injection Interval	Average PSI	Total Injected @ interval	Average Flow Rate	Pump Used	Airknifed	DP / Auger Packer	Break Through Pressure	Surface Y/N	Feet / Direction Surfacing
IP-38	1/11/17	9:18	9:47	29	12'	5	325	11.21	DIA	No	DP	60	Yes	Around Rod
IP-38	1/11/17	9:47	9:57	10	5.5'	5	100	10.00	DIA	No	DP	60	No	N/A
IP-39	1/11/17	10:02	10:29	27	12'	10	325	12.04	DIA	No	DP	60	No	N/A
IP-39	1/11/17	10:29	10:37	8	5.5'	5	100	12.50	DIA	No	DP	60	No	N/A
IP-40	1/11/17	10:40	11:04	24	12'	5	425	17.71	DIA	No	DP	20	No	N/A
IP-41	1/11/17	11:05	11:30	25	12'	10	325	13.00	DIA	No	DP	40	No	N/A
IP-41	1/11/17	11:30	11:39	9	5.5'	5	100	11.11	DIA	No	DP	40	No	N/A
IP-42	1/11/17	11:43	12:22	39	12'	10	425	10.90	DIA	No	DP	60	No	N/A
IP-43	1/11/17	12:23	12:48	25	5.5'	5	325	13.00	DIA	No	DP	20	No	N/A
IP-43	1/11/17	12:48	12:56	8	12'	5	100	12.50	DIA	No	DP	20	No	N/A
IP-44	1/11/17	12:58	13:27	29	5.5'	10	425	14.66	DIA	No	DP	40	No	N/A
IP-45	1/11/17	13:34	14:10	36	12'	5	325	9.03	DIA	No	DP	60	No	N/A
IP-45	1/11/17	14:10	14:16	6	5.5'	5	100	16.67	DIA	No	DP	40	No	N/A
IP-46	1/11/17	14:18	15:04	46	12'	10	425	9.24	DIA	No	DP	40	No	N/A
IP-47	1/11/17	15:23	15:50	27	5.5'	20	425	15.74	DIA	No	DP	40	No	N/A

Number of Injection Points	10	Daily Total Injected (Gallons)	4,250	Total Number of Locations Air-knifed	0
Number of Drums Used	0	Daily Total Pounds of Chemical	130	Number of Monitoring Wells Drilled	0
Drums Remaining Onsite	0			Number of Soil Samples Collected	0

Daily Job Summary

Remington
PROBLEM SOLVED

Soil and Groundwater Remediation
8100 Arkins Court
Loveland, CO 80538
(970) 278-1646

Client/Project Name:	**Trihydro Corporation / Whitefish Solvent Site**							
Day	**Date**	**Total Time**	**Average PSI**	**Total Injected @ interval**	**Average Flow Rate**	**Average Break Through Pressure**	**Total Number of Points That Surfaced**	**Total Number of Points**
Day 1	1/6/17	220	8.33	2550	11.85	15.00	0	6
Day 2	1/7/17	296	8.57	2975	9.52	26.43	0	7
Day 3	1/8/17	213	37.50	2550	11.70	108.33	0	6
Day 4	1/9/17	210	37.14	3400	15.33	130.71	0	7
Day 5	1/10/17	348	13.44	4250	11.24	47.50	0	8
Day 6	1/10/17	116	5.00	1275	10.74	40.00	0	3
Day 7	1/11/17	348	7.67	4250	12.62	44.00	0	10
Injection Summary Average		**250.14**	**17.42**	**21250**	**11.96**	**60.00**	**0**	**47**

The project was completed in eight working days. The project was completed January 4, 2017 through January 11, 2017. The site map (**Figure 1**) shows the location of each injection location.

The proposed scope of work was completed with the following deviations:

Proposed Scope of Work	**Deviations from Scope of Work**
3.1 percent EVO solution	NONE
28 temporary injection points	NONE
100-325 gallons of remedial solution per injection interval	100-750 gallons of remedial solution per injection interval due to client's request.
21,250 gallons of EVO	NONE
650 pounds of EVO	NONE
3 nested monitoring well installations	NONE
3 monitor well completions	NONE

Borehole Abandonment

After the injections, each borehole was abandoned by placing sand from the bottom of the borehole to approximate groundwater elevation. After sand was added, bentonite was poured and hydrated from groundwater surface to approximately 1.5 feet bgs. Sand was used to fill the void space from 1.5 feet bgs to 0.5 feet bgs. Concrete, dyed concrete or native material was placed in the remaining portion of the borehole up to ground surface to match site conditions.

Waste Disposal

During this event, three 55-gallon steel drums were used to collect investigation-derived waste that was generated. The three drums filled with waste were transported offsite by Remington representatives. After disposing of the waste, Remington will notify Trihydro Corporation and provide Trihydro Corporation with a copy of the manifest received by the certified waste facility.

Summary

In summary, the work proposed on November 4, 2016 was successfully completed by injecting a total of 21,250 gallons of remedial material into the subsurface. The solution was delivered in a 3.1 percent concentration and contained 650 pounds of EVO material.

After the injections were completed, Remington representatives conducted a site walk to pick up any remaining items onsite.

If you have any questions or comments, please contact Grant Drennan or Sue Harem at (970) 278-1646.

Sincerely,

Remington Technologies, LLC

Grant Drennan
Vice President of Operations
Gdrennan@RemingtonTech.Net

Susan Harem
Office Manager
SHarem@RemingtonTech.Net

Figure 1

NOTE:
LOCATION OF UTILITIES ARE APPROXIMATE

N

0 20'

Trihydro CORPORATION
1252 Commerce Drive
Laramie, Wyoming 82070
www.trihydro.com
(P) 307/745.7474 (F) 307/745.7729

FIGURE 1

PROPOSED INJECTION AND WELL LOCATIONS

WHITEFISH SOLVENT SITE
239 BAKER AVENUE
WHITEFISH, MONTANA

Drawn By: PC	Checked By: AV	Scale: 1" = 20'	Date: 10/31/16	File: 776WF-SYSLAY201610

H:_CO\STATE\MDEQSDS\WHITEFISHSOLVENT\C400_EXHIBITS\776WF-SYSLAY201610

APPENDIX H

INDOOR AIR & SUB-SLAB SAMPLING

memorandum

To:	Mr. Mike Gipson, Montana DEQ
From:	Mr. Andrew Vann, Trihydro Corporation
cc:	Ms. Sarah Seitz and Mr. Joel Riebli, Trihydro Corporation
Date:	February 10, 2017
Re:	Indoor Air/Subslab Vapor Sampling Work Plan Whitefish Solvent Site, Whitefish, Montana

Trihydro Corporation (Trihydro) has been working with the Montana Department of Environmental Quality (DEQ) to address impacts of the chlorinated solvents tetrachloroethene (PCE) and its daughter products (trichloroethene [TCE], cis-1,2-dichloroethene, trans-1,2-dichloroethene, and vinyl chloride), at the former Martin's Cleaners facility located at 239 Baker Avenue in downtown Whitefish, MT. As part of interim remediation for chlorinated solvents at the former Martin's Cleaners facility, Trihydro installed and is operating a soil vapor extraction system with effluent treatment and recently completed in-situ enhanced bioremediation injections.

The overall objectives of the interim remedial activities are to reduce the potential migration of chlorinated solvents to indoor air and to protect human health and the environment. This memo outlines the scope of work (SOW) for vapor intrusion sampling activities to evaluate the effectiveness of the remedial activities.

Vapor intrusion sampling of indoor and sub-slab air will evaluate the potential risk to workers and customers at the former Martin's Cleaners. This memo is in accordance with DEQ's vapor intrusion guidance (Section 3.6) document (DEQ 2011) and includes the following:

- Site Access and Survey (Section 1.0)
- Sampling Locations and Collection Methodology (Section 2.0)
- Analytical Methodology (Section 3.0)
- Quality Assurance and Quality Control (Section 4.0)
- Reporting (Section 5.0)

Underground utility clearance, decontamination procedures, disposal of investigative waste, and site restoration are not required as part of indoor air/subslab vapor sampling. Trihydro will dispose of sampling gloves in a sanitary landfill and will be careful not to disturb the building or its occupants during sampling activities.

1.0 INDOOR AIR SAMPLING SITE ACCESS AND SURVEY

Trihydro will coordinate with the property owner, building occupant and DEQ prior to conducting occupant surveys and sampling activities. After coordination with DEQ, a list of potential dates will be provided to the occupant for both surveying and sampling.

Trihydro will interview the building occupant to identify the building construction and factors that may affect indoor air quality. Since the risk-based screening levels for indoor air are low, many items can affect indoor air quality. Trihydro will look for potential contamination sources such as cigarette smoke, vehicle exhaust entry points, heating systems and types, air fresheners, and chemicals used for cleaning or operations. Surveys will be conducted using the Occupied Building Questionnaires (DEQ 2011). A copy of the indoor air survey form has been included in Attachment A. Trihydro will work with DEQ to determine final placement of the indoor air sampling canisters once interviews are complete.

2.0 SAMPLING LOCATIONS AND COLLECTION METHODOLOGY

Indoor air samples will be collected in general accordance with DEQ Vapor Intrusion guidance (DEQ 2011) and with reference to the USEPA Vapor Intrusion guidelines (USEPA 2016). Trihydro intends to collect two indoor air samples, one blind duplicate, and one ambient sample as part of the investigation. The target areas will be determined following results of the indoor air survey. However, in general the locations will be as follows:

- One sample from a storage area or office
- One field duplicate from a storage area or office
- Sub-slab co-located in the storage area or office
- One ambient air sample from prevailing upwind direction

Prior to going into the field, Trihydro will order individually clean-certified 6-liter (L) Summa® canisters with corresponding individually clean certified 8-hour flow controllers from ALS Laboratories in Simi Valley, California. Canisters will be checked to ensure that depressurization of the canister did not occur during shipment.

2.1 INDOOR AIR SAMPLING METHODOLOGY

Each area proposed for indoor air sampling will be screened prior to sampling using a low-level (ppb) extended range handheld PID or equivalent. The results of the screening will be used to document total organic vapor concentrations within the building. The starting and completion times will be documented. The results of the screening will be used to find “hot spots” and likely sampling locations, and to assess the relative degree of contamination (MADEP 2002).

Indoor air samples will be placed in locations determined and agreed upon with property occupants during the site survey. A blind duplicate Summa® canister sample will be collected next to one of the sampling locations. The Summa® canisters will be placed at breathing height (approximately 3-5 feet above the floor). Structure occupants will be asked to keep windows and outside doors shut during the sampling event, with the exception of normal entry and exit by the occupants, customers, and field personnel. The starting and completion times and an initial and final vacuum for each Summa® canister will be recorded. The indoor air sample will be collected over 8 hours primarily during the time that the store is open for business.

2.2 AMBIENT AIR SAMPLE METHODOLOGY

Ambient air may be impacted by human activities, including automotive emissions, and other potential industrial emissions. One outdoor ambient air sample will be collected at the same time indoor air sampling is conducted to qualitatively evaluate potential offsite/outside air influence on indoor air quality. The ambient air sample will also be collected in individually clean-certified 6-liter (L) Summa® canisters with corresponding individually clean certified 8-hour flow controllers at breathing height (approximately 3-5 feet above the ground). The starting and completion times will be documented. An initial and final vacuum for the Summa® canister will be recorded in the field documentation. Outdoor air sampling will generally be collected from a representative upwind location, away from wind obstructions and obvious potential sources of Volatile Organic Compounds (VOCs).

2.3 SUB-SLAB AIR SAMPLING METHODOLOGY

Sub-slab air samples will be collected from vapor sample implants placed installed through the concrete floor. The locations will be determined and agreed upon with property occupants during the site survey, but will be ideally located in a closet or storage area where the sampling apparatus will not be disturbed by customers or employees. A hammer drill will be used to drill through the concrete floor (expected to be approximately 12 inches thick). Concrete dust will be suppressed with water mist and will be collected during drilling with a shop vacuum. The vapor implant will be connected to Teflon tubing and installed to a depth beneath the floor. An electrical outlet-type cover will be installed to protect the implant and tubing so the implant can be left in place for potential future monitoring events. The hole surrounding the tubing will be sealed with bentonite, and the cover will be sealed with cement or similar materials.

The Summa® canister will be connected to the sample implant with Teflon tubing and a Swage-lok valve. The entire sample setup will be placed beneath a shroud (plastic container or similar), into which balloon-grade helium will be introduced. The sample tubing/sample implant integrity will be tested using a helium meter. If helium is detected in the sample port with the helium meter, the tightness of the fittings and tubing will be checked. If the seal around the tubing through the concrete appears to be compromised, the implant may need to be removed and reinstalled. Helium will also be analyzed in the Summa® canister to evaluate the sample integrity.

The starting and completion times and an initial and final vacuum for each will be recorded. The sub-slab air sample will be collected over 30 minutes during the same timeframe as the indoor air sample is collected.

2.4 FIELD DOCUMENTATION

Field observations are critical to the verification and interpretation of the indoor air analytical results. The starting and completion times and an initial and final vacuum for each Summa® canister will be recorded on the field documentation form (Indoor Air Sampling Field Data Sheet found in Appendix D of DEQ's Vapor Intrusion Guidance) included as Attachment B. Field personnel will document the date, names of on-site personnel, weather conditions (including wind direction and speed), sampling locations, time of sampling, health and safety measures implemented, deviations from the work plan or clarifications of sampling procedures, and other pertinent information. Specific to air sampling, the field personnel will document sources of VOCs in the surrounding neighborhood. The field personnel will also note variables within and in close proximity to the building that may influence sampling such as: operation of HVAC systems, heating systems, large drafts, any products found within the building prior to sampling, traffic conditions, etc. The current condition of the building and the estimated timeframe during which the building remained sealed up prior to sampling will also be documented. Field personnel will photograph each of the sampling locations and other portions of the site that may influence the analytical results.

2.5 SAMPLE HANDLING

Samples will be packed and shipped to the laboratory for chemical analysis according to analytical and laboratory methodology. Immediately after samples are collected in the field, completed sample labels will be attached to the sample containers. A chain-of-custody (COC) form will be prepared at the time samples are collected, and will identify the required analytical methods. Samples will be tracked beginning at the sampling locations, through shipment to the laboratory, and through sample analysis by the laboratory. Data from the analysis of the samples will be tracked upon receipt from the laboratory and throughout data analysis and data reporting based on unique sample numbers. The sample handling procedures promote both sample chain-of-custody and data integrity of laboratory analysis. A completed COC form will accompany the samples to the analytical laboratory.

3.0 ANALYTICAL METHODOLOGY

Indoor air and ambient air samples will be submitted to ALS Laboratories in Simi Valley, California. A completed COC will accompany the samples to the laboratory. Trihydro will request analysis of:

- VOCs by EPA Method TO-15 Selective Ion Monitoring (SIM)
- Massachusetts (MA) Air-Phase Petroleum Hydrocarbons (APH)

- Methane by Method 3C Modified
- Helium (sub-slab only)
- Fixed gas

ALS Laboratories reporting limits for the VOCs will meet corresponding screening levels as shown in Table 1 with a few exceptions (1,2-Dibromo-3-chloropropane, 1,2-dibromoethane, and acrolein). However, these analytes are not primary target analytes.

4.0 QUALITY ASSURANCE AND QUALITY CONTROL

Quality assurance and quality control (QA/QC) will serve two purposes for field and laboratory sampling: 1) documentation of data quality and 2) to identify areas of weakness within the measurement process that need correction.

4.1 FIELD QUALITY CONTROL

The field quality control sample will be a field duplicate for vapor samples. Duplicate samples are collected to check sampling and laboratory analytical precision. A minimum of one duplicate per 10 samples is required per DEQ guidance (DEQ 2011). Therefore, a blind duplicate (field replicate) sample will be collected to evaluate precision associated with the reproducibility of sampling techniques and the homogeneity of sample matrices. Since the replicate will be "blind" to the laboratory, it will have a coded identity on its label and on the chain-of-custody record form. The actual sampling location and identification will be recorded on the daily log form and the sampling log form.

4.2 DATA VERIFICATION AND USABILITY

The process of data verification is the examination of objective evidence that the requirements of these specified QC acceptance criteria are met. The process of data validation requires confirmation by examination and provision of objective evidence that the particular requirements for a specific intended use have been fulfilled. Data validation procedures shall be performed for both field and laboratory operations, as described below.

4.2.1 FIELD DATA

Field data validation tasks to be performed may include review of field data contained on field sampling logs for completeness; verification that field duplicates were properly prepared, identified, and analyzed; checking on field analysis for equipment calibration and condition; and review of COC forms for proper completion, signatures of field personnel, and the laboratory sample custodian, and dates. The field data packages will undergo review. If inconsistencies or issues are identified during the review, the records will be verified by field personnel and corrected. Inconsistencies or issues noted during the field data

validation review will require implementation of corrective measures and 100% validation of field records.

4.2.2 LABORATORY DATA

Trihydro will perform data validation review on all data received from the laboratory. The data validation will be in accordance with DEQ requirements (Montana DEQ - Remediation Division Data Validation Summary Form (Version 1.2, Revised 11/4/16). Data qualifiers will be applied to the data based on the data validation review. These qualifiers will be maintained in the database with each data point. The data validator will evaluate the overall completeness of the data package. Completeness checks will be administered on all data to determine whether deliverables specified in the QA/QC Plan are present. At a minimum, deliverables will include sample COC forms, analytical results, and QC summaries. The reviewer will determine whether all required items are present and request copies of missing deliverables. The results of the data validation review will be summarized in a Data Validation Report for each sample report issued by the laboratory.

4.2.3 CANISTER PRESSURE

The initial canister pressure difference from the laboratory will be compared with the final canister pressure difference from the field to the laboratory. During data validation, R-flags will be applied to the chemical analyses for samples where the canister vacuum varied an amount of 5 inches of mercury (in-Hg) or greater in addition to the pressure variation originally examined from the laboratory to the field. However, professional judgment may be used in the event of canister vacuum loss during data qualification.

5.0 REPORTING

Results of sampling and analysis will be reported to DEQ following receipt of final and validated data. A summary of sampling activities and non-conformances from this work plan will be summarized in a letter to DEQ. In addition, summary tables documenting analytical data will be denoted with flags resulting from the Trihydro data validation process, in addition to the laboratory data qualifier flags. Samples which are rejected as part of the data validation process “R” flag will not be considered valid data for this site. Final Sample results will be compared against Environmental Protection Agency (EPA) Regional Screening Levels (RSL) Industrial and Residential Air Standards and DEQ Site-Specific Screening Levels for Indoor Air (Residential and Industrial), if provided by DEQ. These results will be used to evaluate the effectiveness of the SVE system at reducing vapor intrusion.

6.0 REFERENCES

Massachusetts Department of Environmental Protection (MADEP). 2002. Indoor Air Sampling and Evaluation Guide, WSC Policy #02-430. April. Available from: (http://www.mass.gov/eea/agencies/massdep/cleanup/regulations/vapor-intrusion-and-indoor-air-contamination-waste-sites.html).

Montana Department of Environmental Quality. 2011. "Montana Vapor Intrusion Guide." Regulatory Guidance, Helena.

USEPA. 2002. Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C. EPA/530/F-02/052, March 2004.

USEPA. 2012. EPA's Vapor Intrusion Database: Evaluation and Characterization of Attenuation Factors for Chlorinated Volatile Organic Compounds and Residential Buildings, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, EPA 530-R-10-002. March 16. P70. Available from: (http://www.epa.gov/oswer/vaporintrusion/documents/OSWER_2010_Database_Report_03-16-2012_Final_witherratum_508.pdf).

776-033-001

TABLE

TABLE 1. LIST OF CONSTITUENTS AND DESIRED REPORTING LIMITS FOR VAPOR INTRUSION INVESTIGATION
INDOOR AIR SAMPLING WORK PLAN
MARTIN'S CLEANERS, WHITEFISH, MONTANA

Target Analytes[1]	CAS Number	Residential RSL[2] (µg/m^3)	Industrial RSL[3] (µg/m^3)	Method	ALS Achievable Detection Limits Method TO-15 SIM		Comparison of Laboratory Limits to Residential RSL	Comparison of Laboratory Limits to Industrial RSL	Method	ALS Achievable Detection Limits Method TO-15 Scan (Low Level)		Comparison of Laboratory Limits to Residential RSL	Comparison of Laboratory Limits to Industrial RSL
					Method Reporting Limit (µg/m^3)	Method Detection Limit (µg/m^3)				Method Reporting Limit (µg/m^3)	Method Detection Limit (µg/m^3)		
1,1-Dichloroethene	00075-35-4	21	88	TO-15 SIM	0.025	0.0086	MRL below RSL	MRL below RSL	TO-15 Scan (Low Level)	0.10	0.09	MRL below RSL	MRL below RSL
Benzene	00071-43-2	0.36	1.6	TO-15 SIM	0.075	0.020	MRL below RSL	MRL below RSL	TO-15 Scan (Low Level)	0.10	0.08	MRL below RSL	MRL below RSL
Ethylbenzene	00100-41-4	1.1	4.9	TO-15 SIM	0.10	0.0097	MRL below RSL	MRL below RSL	TO-15 Scan (Low Level)	0.50	0.16	MRL below RSL	MRL below RSL
MTBE	01634-04-4	11	47	TO-15 SIM	0.025	0.0093	MRL below RSL	MRL below RSL	TO-15 Scan (Low Level)	0.10	0.09	MRL below RSL	MRL below RSL
Naphthalene	00091-20-3	0.083	0.36	TO-15 SIM	0.10	0.016	RSL below MRL	MRL below RSL	TO-15 Scan (Low Level)	0.50	0.18	**RSL below MDL**	RSL below MRL
Tetrachloroethene	00127-18-4	4.2	18	TO-15 SIM	0.025	0.0082	MRL below RSL	MRL below RSL	TO-15 Scan (Low Level)	0.10	0.07	MRL below RSL	MRL below RSL
Toluene	00108-88-3	520	2200	TO-15 SIM	0.10	0.011	MRL below RSL	MRL below RSL	TO-15 Scan (Low Level)	0.50	0.17	MRL below RSL	MRL below RSL
Trichloroethene	00079-01-6	0.21	0.88	TO-15 SIM	0.025	0.0085	MRL below RSL	MRL below RSL	TO-15 Scan (Low Level)	0.10	0.09	MRL below RSL	MRL below RSL
Vinyl Chloride	00075-01-4	0.17	2.8	TO-15 SIM	0.025	0.0076	MRL below RSL	MRL below RSL	TO-15 Scan (Low Level)	5.0	0.65	**RSL below MDL**	RSL below MRL
Xylenes, Total	01330-20-7	10	44	TO-15 SIM	0.10	0.019	MRL below RSL	MRL below RSL	TO-15 Scan (Low Level)	0.10	0.10	MRL below RSL	MRL below RSL
C5-C8, Aliphatic	C5-C8_AL	73	NL	MA APH	20.00	NL	MRL below RSL	MRL below RSL	MA APH	20.00	NL	MRL below RSL	MRL below RSL
C9-C12, Aliphatic	C9-C12_AL	20.9	NL	MA APH	10	NL	MRL below RSL	MRL below RSL	MA APH	10	NL	MRL below RSL	MRL below RSL
C11-C22, Aromatic	C11-C22_AR	5.2	NL	MA APH	5.00	NL	MRL below RSL	MRL below RSL	MA APH	5.00	NL	MRL below RSL	MRL below RSL

Abbreviations:
MRL: Method Reporting Limit
MDL: Method Detection Limit
NA: Not Available
NL: Not listed in referenced document
RL: Reporting Limit
RSL: Regional Screening Level
µg/m^3: micrograms per cubic meter

Notes:
1. Target analyte list is based on ALS/Columbia Analytical Services (CAS) TO-15 SIM and TO-15
2. United States Environmental Protection Agency Regional Screening Levels for Residential Air, May 2016 RSL tables
3. United States Environmental Protection Agency Regional Screening Levels for Industrial Air, May 2016 RSL tables

ATTACHMENT A

Department of Environmental Quality
Hazardous Waste Site Cleanup Bureau P.O. Box 200901 Helena MT 59620-0901 (406) 841-5000

COMMERCIAL / INDUSTRIAL BUILDING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: _____ Survey / questionnaire completed by: _____

1. Contact Name:_____

   Address: _____City: _____State: _____Zip:_____

   Phone 1: _____ Phone 2: _____ Cell Phone: _____

2. What is the best time to call to speak with you? _____

3. Are you the Owner ☐, Renter ☐, Other ☐ (please specify) _____ of this Building/Structure? If you are not the owner, please provide owner contact information

   Owner Name:_____

   Address: _____City: _____State: _____Zip:_____

   Phone 1: _____ Phone 2: _____ Cell Phone: _____

4. Total number of occupants/persons at this location? _____

   Number of Children_____Ages_____

5. How long have you occupied this location?_____

   How many days per week is the building occupied?_____

   How many hours per day is the building occupied? _____

General Building / Structure Description

6. Type of Building/Structure (check only one): Single Business ☐, Multiple Businesses ☐,

   Other _____

7. Building/Structure Description:
   Number of floors: _____ Area /square footage of main or ground floor: _____square feet
   Basement ☐ Area /square footage of Basement: _____ square feet
   Crawlspace ☐ Area /square footage of Crawlspace: _____ square feet
   Partial crawlspace/basement ☐ % of each_____
   Slab on grade ☐ Area /square footage of Slab on grade: _____ square feet
   Other ☐ _____

8. Age of Building/Structure: _____years, Not sure/Unknown ☐

9. General Above-Ground Building/Structure construction (check all that apply):
   Wood ☐, Brick ☐, Concrete ☐, Cement Block ☐, Other ☐_____

10. Foundation Construction (check all that apply):
Concrete Slab ☐
Fieldstone ☐
Concrete Block ☐
Elevated Above Ground/Grade ☐
Other ☐ _____

11. Do you have a Private Well ☐ or Cistern ☐?
If yes, please describe location, use, and current condition _____
_____
_____

12. Do you have a Septic System? Yes ☐ No ☐ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? _____
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your Building? (pond, ditch, etc.) Yes ☐ No ☐

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☐ or Unfinished ☐?

15. If finished, how many rooms are in the basement?_____
What are rooms used for? Office ☐, Shop ☐, Storage ☐,
Other_____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☐

17. Is the basement floor (check all that apply) Concrete ☐, Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☐, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐

Describe the moisture problem _____
_____
_____

20. Does the basement ever flood?

Yes, frequently (3 or more times/year) ☐

Yes, occasionally (1-2 times/year) ☐

Yes, rarely (less that 1 time/year) ☐

No ☐

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☐, Floor Drain ☐, Other Hole/Opening In Floor ☐
Describe_____

22. Are any of the following used or stored in the basement (check all that apply):

Paint ☐, Paint Stripper/Remover ☐, Paint Thinner ☐, Metal Degreaser/Cleaner ☐, Gasoline ☐, Diesel Fuel ☐, Solvents ☐, Glue ☐, Laundry Spot Removers ☐, Drain Cleaners ☐, Pesticides ☐,
Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.) ☐,
Other products with/containing Volatile Organic Compounds, describe: _____
_____

23. Has the Building / structure recently (within the last six months) had any painting or remodeling?
Yes ☐ No ☐
If yes, specify what was done, where in the Building, and what month:
_____
_____

24. Has new carpeting been installed in the Building / Structure within the last year? Yes ☐ No ☐
If yes, when and where? _____

25. Do any occupants / employees regularly conduct or work in the beauty / hair-dressing business?
Yes, work at a beauty / hair-dressing business ☐
Yes, store supplies for beauty / hair-dressing business ☐ Distance to sample point: _____
Yes, building contains beauty / hair-dressing business ☐ Distance to sample point: _____
Yes, building is near beauty / hair-dressing business ☐ Distance to sample point: _____
No ☐

26. Do any occupants / employees / anyone regularly use or work or conduct a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
Yes, building contains or is near dry cleaning service ☐ Distance to sample point: _____
No ☐

27. Do any occupants / employees / anyone in the Building / structure use solvents at work?
Yes ☐ If yes, how many persons?
No ☐ If no, go to question 28

28. If yes for question 26, are the work clothes washed at Building? Yes ☐ No ☐

29. Does Building / Structure contain a washer/dryer? Yes ☐ No ☐
Where are they located?
Basement ☐
Upstairs ☐
Ground floor ☐
Garage ☐
Other, please specify ☐ _____

30. If Building / Structure contains a dryer, is it vented to the outdoors? Yes ☐ No ☐

31. What type(s) of Building heating do you have (check all that apply)
Fuel type: Gas ☐, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐_____

Heat conveyance system: Forced Hot Air ☐ Forced Hot Water ☐ Steam ☐
Radiant Floor Heat ☐ Wood Stove ☐ Coal Furnace ☐ Fireplace ☐
Other ☐ _____

32. Does Building / Structure have (or had in the past) a storage tank for storage of Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? _____
_____
How is/was the tank filled? _____
_____
Is there staining near the tank? Yes ☐ No ☐

33. Does Building / Structure have air conditioning? Yes ☐ No ☐
Central Air Conditioning ☐
Window Air Conditioning Unit(s) ☐
Other (please specify) _____

34. Does Building / Structure have any: Room Fans ☐, Ceiling Fans ☐, Attic Fan ☐

35. Does Building / Structure ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☐

36. Has Building / Structure had termite or other pesticide treatment? Yes ☐ No ☐ Unknown ☐
If yes, please specify type of pest controlled _____
And approximate date of service _____

37. Water heater type: Gas ☐, Electric ☐, by Furnace ☐,
Other (please describe)_____

38. Water heater location: Basement ☐, Upstairs ☐, Ground Floor ☐, Attic ☐,
Other (please specify) _____

39. Does Building / Structure have any cooking appliances? Electric ☐, Gas ☐
Other (please describe) _____

40. Is there a stove exhaust hood present? Yes ☐ No ☐
Does it vent to the outdoors? Yes ☐ No ☐

41. Smoking in Building / Structure:
None ☐, Rare (only guests) ☐, Moderate (occupants, light smokers) ☐,
Heavy (at least one heavy smoker in Building / Structure) ☐

42. If yes to question 41, what do they smoke?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐

43. Does Building / Structure regularly contain/use air fresheners? Yes ☐ No ☐

44. Does anyone in the Building have indoor Building hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐ _____
_____
_____

45. General Building / Structure use of industrial / office / consumer products (circle as appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	**Frequency of Use**				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol Deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window Cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuel	Never	Hardly ever	Occasionally	Regularly	Often

46. Please check weekly Building / Structure maintenance, janitorial, and cleaning practices:

Dusting ☐

Dry Sweeping ☐

Vacuuming ☐

Polishing (furniture, etc.) ☐

Washing/Waxing Floors ☐

Other (describe) ☐_____

47. Other comments including items / subjects not covered in this questionnaire yet an issue or concern for the Building / Structure:

_____

_____

_____

_____

_____

_____

_____

_____

_____

48. **Chemical Inventory/Summary**

Chemical/Chemical Product (consumer name)	Amount present in Building / Structure
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

ATTACHMENT B

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	
	Start Weather:
	Start Outdoor Air Temp:
Project Name:	**Start Atmospheric Pressure:**
Sample Location:	
Date:	**End Weather:**
Field Personnel:	**End Outdoor Air Temp:**
Recorded by:	**End Atmospheric Pressure:**

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp

Comments:

Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s):

Location Sketch:

MONTANA ONE CALL
Tel.406-755-8344 Tel.800-551-8344 Fax.406-752-7220
***** LOCATE REQUEST TICKET *****

Priority Type:STANDARD Request Type:REGULAR
Ticket No: 2017070042
Update of:

Original Call Date: 02/14/2017 Time: 04:20:34 PM OP: 50
Transmit Date: 02/14/2017 Time: 04:28:49 PM

Work to Begin Date: 02/17/2017 Time:

Company: TRIHYDRO
Contact Name: SARAH SEITZ Contact Phone: (303)910-6187
Alternate Contact: Altern. Phone:
Best Time to Call: Fax No:
Cell Phone: Pager/Work No:
Email Address: ssietz@trihydro.com

*** DIG SITE INFORMATION ***
County: FLATHEAD City: WHITEFISH
Community/Subdivision: WHITEFISH
Address: 239 , BAKER AVE
Lot/Unit#:
To Address:
Nearest Intersecting Street: E 3RD ST
2nd Intersecting Street:
On the side of street and approximately 0.00 FEET of Intersection 1
Latitude: 48.40972150 Longitude: -114.3379985

Purpose of the dig: SOIL SAMPLING Depth: 3.00 FT
Machine Dig: YES Public Property: YES Area is Marked: YES
Hand Dig: NO Private Property: NO Area is Not Marked: NO

Site meet requested: NO Map being faxed: NO Right of way: NO
Work order #:
Additional Information/Directions/Comments:
LOCATION IS THE WHITEFISH FINE WINE & LIQUOR STORE

Description of dig spot & how it will marked:
LOCATE THE N & E WALL ON THE OUTSIDE OF THE BLDG
ABOUT 3' OUT FROM BLDG

Work Being Done For:

```
Send To:            Seq No: 0000
Sending to: (listing of utilities tkt sent to)
FLHE01       FLATHEAD ELECTRIC EL    CENT01       CENTURYTEL KALISPELL
NWEG01       NORTHWESTERN ENERGY     BREST01      CHARTER (BRESNAN)
WHTWS01      CITY OF WHITEFISH       SKYT01       SKYLINK FIBER COMMUN
```

Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

MTN-SS-1

Site ID:	Whitefish Solvent Site		
Project Name:	VI Sampling	PID (model/serial #):	
Sample location:	Whitefish, MT	Helium Detector (model/serial #):	GasCheck G3 2942 model 10-01203
Date:	2/22/17	Weather:	Cool - partly cloudy
Field Personnel:	S. Seitz	Air Temp:	37°F outside
Recorded by:	S. J. Seitz	Atmospheric Pressure:	30 in Hg

Slab Data

Surface/slab Type:	Concrete w/ linoleum glued to top
Surface/slab Thickness (inches):	9"
Slab/subsurface substrate comments:	Dry clay
Depth of hole through the slab:	9" + 6" under = 15"
Length of sampling train (feet):	10 ft w/ extra tubing for screwpick & sampling

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 300 mL

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud ~~(%) min~~ ppm	Helium Beneath Shroud ~~(%) max~~ ppm	Helium in Probe (ppm or %)	PID reading in probe ~~(ppb)~~ (ppb) PID-SS	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max
2/22/17	10:00	500 mL	999999.0 ppm	999999.0 ppm *	3140-7280	~~[illegible]~~ NT	99	99
2/22/17	10:10	500 mL	" ↖ maxed " for meter		10,880 ppm	780 ppb	99	99 *
2/22/17	11:05	500 mL	61,000 ppm	65,271 ppm	1997 ppm	490 ppb	61%	65%
Note:	Takes 17 sec to fill 1 L w/ high volume vacuum air sampler							

Reseal unit for bentonite to cure/expand

Ready to sample <10% in purge. SJS

Conversion: 1.0% = 10,000 ppm

At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

He ≈ 180 ppm in ambient air indoor

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
2/22/17	11:18	11:46	MTN-SS-1	SC01772	OA00161	✓	-26.99	-3.89

PID Reading @ 11:20 ≈ 780 ppb in probe
≈ 585-541 @ bentonite seal.

PID @ 18:00 = 571 ppb @ Floor bentonite seal 521 ppb

In bathroom near sink @ 499 ppb

Comments:

Analyses for TO-15, CH4 & APH & He

Temperature @ 66-70° during sampling - in building

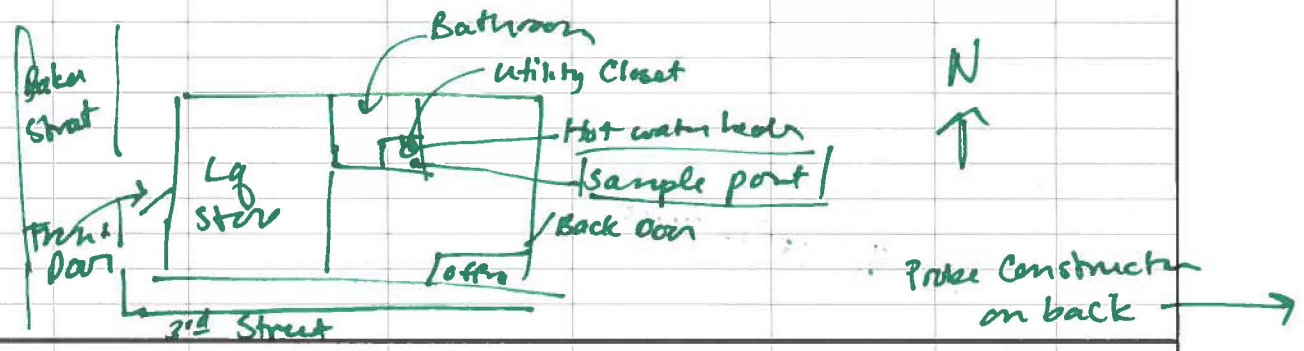
Sub-Slab Soil Vapor Sampling Field Data Sheet

Project Name: Whitefish Soil Vapor Site Sample Location/ ID: MTN-SS-1

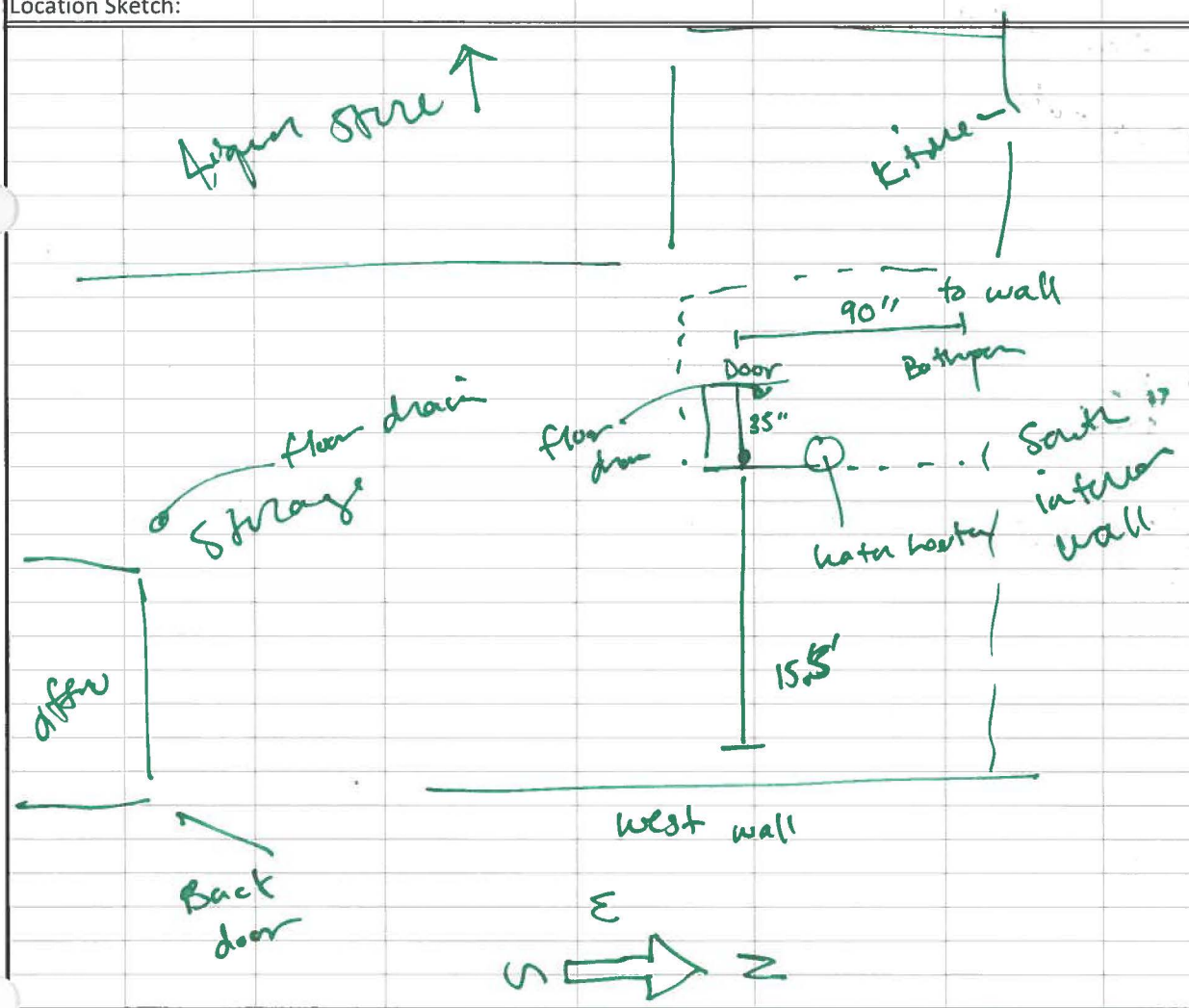
Date: 2/22/17

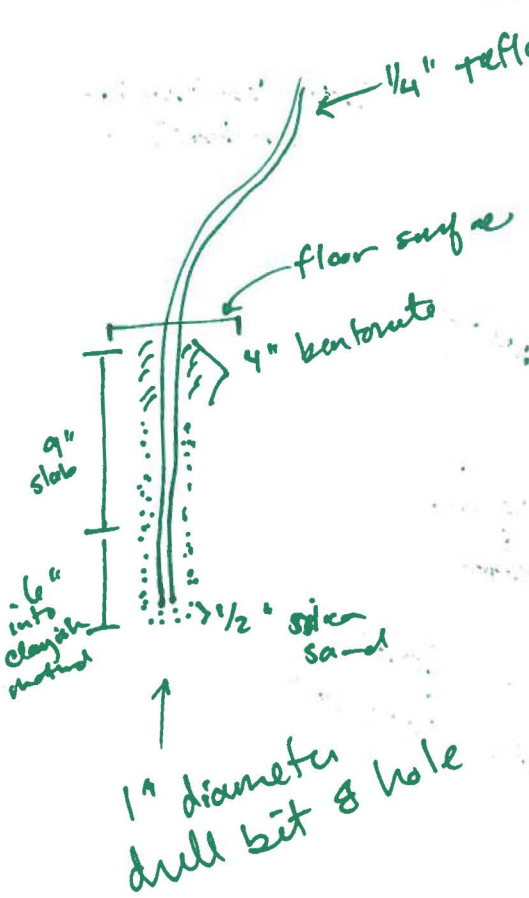
Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.

Floor - linoleum over concrete in utility shed - near Hot water heater (gas supply to hot water



Location Sketch:




1/4" teflon tube
floor surface
4" bentonite
9" slab
6" into clayish material
1/2" silica sand
1" diameter drill bit & hole

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Tuesday, February 21, 2017		
Temperature	32-50 °F	**Work Day**	
Weather	Rain	**Work Start**	1140
Wind	Light (1-10 mph)	**Work Stop**	1950

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Sarah Seitz / Trihydro Corporation	Engineer
Lana Walker / Whitefish Liquor Store	General Manager
Utility Locators	Utility Locators

Equipment Present Onsite	Count
PID -ppb	1
Horiba U-52 Water Quality Meter	1
Solinst Interface Meter	1
Peristaltic Pump	1
Rotary hammer drill w/ 1" bit	1

Health and Safety Comments	Rain and snow mix weather conditions.
Record of Samples Collected	Purged and collected the groundwater samples from the following monitoring wells: •MTN-MW1 •MTN-MW2 •MTN-MW3
Work Activities Conducted	Mobilized from Helena to Whitefish. Utility locators marked utilities outside of the Whitefish Liquor Store prior to arrival.

Gauged the four groundwater monitoring wells. The groundwater table has risen approximately four feet since the January 25, 2017 well development field activities. Using a peristaltic pump, purged, collected water quality measurements, and sampled groundwater from monitoring wells MTN-MW1, MTN-MW2, and MTN-MW3.

Met with Whitefish Liquor Store general manager Lana Walker. Interviewed her for indoor air quality testing. Using a 1" drill bit and a rotary hammer drill, drilled and installed a subslab vapor well in the utility closet of the Whitefish Liquor Store. The concrete was approximately nine inches thick; the vapor well was drilled to 15 inches. Silica sand, teflon tubing, and bentonite was installed to make the subslab well; the inlet of the teflon tubing installed approximately 14.5 inches below the top of the concrete surface.

The SVE remediation system was running on arrival to the site and continued operating through out the day.

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

Photo Date:	2/23/2017
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	-114.3375
Y Coordinate:	48.40944444
Location:	
Description:	Utility closet inside the Whitefish Liquor Store before the installation of the subslab vapor well.

Photo Date:	2/23/2017
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	-114.3375
Y Coordinate:	48.40944444
Location:	
Description:	Completed subslab vapor port MTN-SS inside the utility closet of the Whitefish Liquor Store. The well is located 7.5' south of the northern interior wall and 15.5' west of the eastern interior wall. The inlet of the teflon tubing is approximately 14.5" below the floor.

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Wednesday, February 22, 2017		
Temperature	32-50 °F	**Work Day**	
Weather	Cloudy	**Work Start**	940
Wind	Calm (<1 mph)	**Work Stop**	1840

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Sarah Seitz / Trihydro Corporation	Engineer
Lana Walker / Whitefish Liquor Store	General Manager

Equipment Present Onsite	Count
PID -ppb	1
Horiba U-52 Water Quality Meter	1
Solinst Interface Meter	1
Peristaltic Pump	1
Helium meter	1
Summa Canisters	6

Health and Safety Comments

Record of Samples Collected

Groundwater:

•WSMW-7

Indoor Air:

•MTN-AA-1
•MTN-VI-1 (& MTN-BD-1)

Subslab:

•MTN-SS-1

SVE System:

•MTN-PRE
•MTN-POST

Work Activities Conducted

Finished groundwater sampling by purging and sampling groundwater from monitoring well WSMW-7. WSMW-7 was purge dry before groundwater parameters stabilized; the well was allowed to recharge for five hours and ten minutes before collecting a grab sample.

Indoor vapor intrusion and subslab summa canister sampling was conducted inside the Whitefish Liquor Store. The subslab vapor well, located in the utility closet, was leak tested using helium, purged, and then sampled over a 26 minute period with a 6 liter summa canister sample.

A eight hour vapor intrusion summa canister, and duplicate canister, was collected inside the Whitefish Liquor Store between 1006 and 1806. A corresponding ambient air sample was collected off of the power pole next to the SVE remediation system for five hours and fifteen minutes.

The SVE system before GAC and Zeolite filtration medias and after medias summa canister samples were collected for 30 minutes.

	Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 02/22/2017	TIME: 1345	OPERATOR: Joel Riebli

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: ppbRAE 3000 / 594-905182

BLOWER SYSTEM HOURS: 1468	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: 1

WELL #7 (EAST) HOURS: 1475	WELL #8 (SOUTH) HOURS: 1485	WELL #9 (WEST) HOURS: 1485

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPB):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	-31	2.7	45	5,264
WELL #8 (SOUTH):	ON	-36	2.5	43	1,466
WELL #9 (WEST):	ON	-33	2.9	47	1,823

MANIFOLD TEMP (°F): 42	MANIFOLD PID (PPB): 2,403

KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -23

BLOWER VACUUM (in H2O): 19.1	BLOWER DISCHARGE PRESSURE (in H2O): 51	BLOWER DISCHARGE TEMPERATURE (°F): 128

PRE GAC / ZEOLITE PID (PPB): 2,117	POST GAC DRUM PID (PPB): 185	POST ZEOLITE DRUM PID (PPB): 13

	VACUUM (In H2O)	PID (PPB):		VACUUM (in H2O)	PID (PPB):
MTN-MW1:	0.03	364	MTN-MW3:	0.02	1829
MTN-MW2:	1.2	102.2 ppm	Subslab:	NM	571

NOTES:

1345 start "MTN-PRE" & "MTN-POST" on the influent & effluent filtration media drums.
1345 - 1415

Ambient Outdoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

MTN-AA-1

Site ID:	Whitefish Solvent Site	Start Weather:	37° F Cool - sunny, partly cloudy
		Start Air Temp:	37° F
Project Name:	Whitefish Solvent Site	Start Atmospheric Pressure:	30 in Hg
Sample location:	N (100) of sample SVE shed - on power pole - 4-5' above grnd		
Date:	2/22/17	End Weather:	39° F Partly to Mostly Cloudy (65% Humidity)
Field Personnel:	S. SEITZ, J. RIEKE	End Air Temp:	39° F
Recorded by:	S. SEITZ	End Atmospheric Pressure:	30 in Hg Wind NNE 3mph

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
2/22/17	10:00	2/22/17	~~8:00~~ 3:15 *	MTN-AA-1	SSC00144	FCA00975	NA	-27.22	-0.11

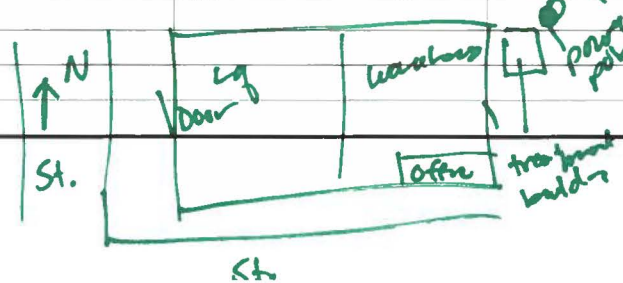
* Finished early due to controller being quicker than anticipated (5.25 hrs rather than 8 hr planned sample)

Comment/location description:

Location - on N side of power pole @ NE edge of treatment building - Construction equipment & heavy machinery moving @ development N. of AA sample (shared lot)

Sample for TO-15 SIM, APH

A lot of vehicle traffic in alley & surrounding streets.



Indoor Air Sam[illegible]g Field Data Sheet

Prepared by the Montana Department of Environmental Quality

MTN - VI-1

Site ID:	Whitefish DEQ	Start Weather:	Cool - partly cloudy
		Start Outdoor Air Temp:	37°F
Project Name:	Whitefish Solvent Site	Start Atmospheric Pressure:	30 in Hg.
Sample Location:	Whitefish, MT		
Date:	2/22/17	End Weather:	~~BQ~~ Sunny w/ some clouds - 65% humidity
Field Personnel:	S. SEITZ, J RIEBCE	End Outdoor Air Temp:	39°F
Recorded by:	S. SEITZ	End Atmospheric Pressure:	30 in Hg.

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
2/22/17	10:06	2/22/17 ~~18:06~~	18:06	MTN - VI - 1	SSC 00326	FCA00549	AVG03810	-27.05	-5.34	66°F	66°F

PID Reading in building ≅ 545 - 585 ppb

~~Art~~ sample location ≅ 575 ppb

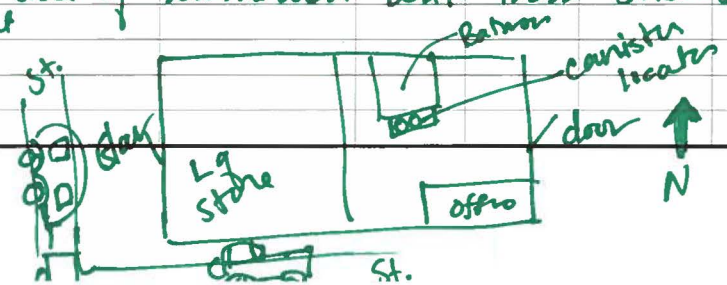
PID Reading w/ sample @ 18:04 = 451 ppb

Comments:

Analyses for TO-15 SIM and APH

Canisters @ ≅ 5' above grad surface in "warehouse" area of liquor store just on other side of load-bearing wall from sub-slab point

Duplicate MTN - ~~BD~~ - VI - BD - 1



Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

MTN-BD-1

Site ID:	Whitefish Solvent Site	Start Weather:	See info for MTN-VI-1
		Start Outdoor Air Temp:	
Project Name:	See info for MTN-VI-1	Start Atmospheric Pressure:	
Sample Location:			
Date:		End Weather:	
Field Personnel:		End Outdoor Air Temp:	
Recorded by:		End Atmospheric Pressure:	

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
2/22/16	10:06	2/22/16	18:06	MTN-BD-1	A500150	CS00036	NA no #	-27.03	-5.96	66°F	66°F

Comments:

MTN-BD-1 = Blind dup for Indoor air sample MTN-VI-1

Sample for TO-15, APH

Same location TO- ≅ 5' above ground surface in breathing zone

Department of Environmental Quality
Hazardous Waste Site Cleanup Bureau P.O. Box 200901 Helena MT 59620-0901 (406) 841-5000

COMMERCIAL / INDUSTRIAL BUILDING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 2-21-17 Survey / questionnaire completed by: S. SEITZ

1. Contact Name: Lana Walker (owner business @ location - lease building)
   Address: 239 Baker Ave City: Whitefish State: MT Zip: 59937
   Phone 1: 406-862-4476 Phone 2: _____ Cell Phone: _____

2. What is the best time to call to speak with you? _____

3. Are you the Owner ☐, Renter ☑, Other ☐ (please specify) _____ of this Building/Structure? If you are not the owner, please provide owner contact information
   Owner Name: Liz Larsen (Larry & Sigrid Larsen)
   Address: 3625 MT HWY 40 W City: Columbia Falls State: MT Zip: 59912
   Phone 1: — Phone 2: _____ Cell Phone: _____

4. Total number of occupants/persons at this location? Business ≅ 10 workers
   Number of Children — Ages — NA

5. How long have you occupied this location? 5 years
   How many days per week is the building occupied? 4 days per week
   How many hours per day is the building occupied? 10 am - 7 pm ←

General Building / Structure Description

6. Type of Building/Structure (check only one): Single Business ☑, Multiple Businesses ☐,
   Other Concrete Block building w/ wood ceiling frame Wine/liquor store

7. Building/Structure Description: → * attic storage
   Number of floors: 1 * Area /square footage of main or ground floor: _____ square feet
   Basement NA Area /square footage of Basement: _____ square feet
   Crawlspace NA Area /square footage of Crawlspace: _____ square feet
   Partial crawlspace/basement NA % of each _____
   Slab on grade ☑ Area /square footage of Slab on grade: _____ square feet
   Other NA _____

8. Age of Building/Structure: ≅ 77 years, Not sure/Unknown ☐ Cadastral says 1940

9. General Above-Ground Building/Structure construction (check all that apply):
   Wood ☒ (ceilings), Brick ☐, Concrete ☒ (walls), Cement Block ☐, Other ☐ _____

Plaque outside says 1920

10. Foundation Construction (check all that apply):
Concrete Slab ☑
Fieldstone ☐
Concrete Block ☐
Elevated Above Ground/Grade ☐
Other ☐ _____

11. Do you have a Private Well ☐ or Cistern ☐? NO
If yes, please describe location, use, and current condition _____

12. Do you have a Septic System? Yes ☐ No ☑ Not Used ☐ Unknown ☐ City sewer
If yes, what is the construction type? _____
Where is it located? _____
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your Building? (pond, ditch, etc.) Yes ☑ No ☐
near S/SE wall w/ new sidewalk

Basement Description (please check all boxes that apply): NA

14. Is the basement Finished ☐ or Unfinished ☐?

15. If finished, how many rooms are in the basement? _____
What are rooms used for? Office ☐, Shop ☐, Storage ☐,
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☐

17. Is the basement floor (check all that apply) Concrete ☐, Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☐, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☑ NA

Describe the moisture problem _____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐

Northeast corner flooding off roof
→ few years not happened since

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☐, Floor Drain ☐, Other Hole/Opening In Floor ☐
Describe NA

Drain ← closet main hall to office

22. Are any of the following used or stored in the basement (check all that apply):

Paint ☐, Paint Stripper/Remover ☐, Paint Thinner ☐, Metal Degreaser/Cleaner ☐, Gasoline ☐, Diesel Fuel ☐, Solvents ☐, Glue ☐, Laundry Spot Removers ☐, Drain Cleaners ☐, Pesticides ☐,
Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.) ☐,
Other products with/containing Volatile Organic Compounds, describe: stored upstairs

look in attic for more

23. Has the Building / structure recently (within the last six months) had any painting or remodeling?
Yes ☐ No ☒
If yes, specify what was done, where in the Building, and what month:
→ office wall w/windows

24. Has new carpeting been installed in the Building / Structure within the last year? Yes ☐ No ☒
If yes, when and where? 3 years

25. Do any occupants / employees regularly conduct or work in the beauty / hair-dressing business?
Yes, work at a beauty / hair-dressing business ☐
Yes, store supplies for beauty / hair-dressing business ☐ Distance to sample point: _____
Yes, building contains beauty / hair-dressing business ☐ Distance to sample point: _____
Yes, building is near beauty / hair-dressing business ☐ Distance to sample point: _____
No ☒

past 11-13 yrs hairdressing beauty salon

26. Do any occupants / employees / anyone regularly use or work or conduct a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
Yes, building contains or is near dry cleaning service ☐ Distance to sample point: _____
No ☒ → past yes history

27. Do any occupants / employees / anyone in the Building / structure use solvents at work?
Yes ☐ If yes, how many persons?
No ☒ If no, go to question 28 Goo be gone – organic solvent on floor v. painfully

28. If yes for question 26, are the work clothes washed at Building? Yes ☐ No ☒

29. Does Building / Structure contain a washer/dryer? Yes ☐ No ☒
Where are they located?
Basement ☐
Upstairs ☐
Ground floor ☐
Garage ☐
Other, please specify ☐ _____

30. If Building / Structure contains a dryer, is it vented to the outdoors? Yes ☐ No ☒

31. What type(s) of Building heating do you have (check all that apply)
Fuel type: Gas ☒, Oil ☐, Electric ☒, Wood ☐, Coal ☐,
Other ☐ _____

Heat conveyance system: Forced Hot Air ☒ Forced Hot Water ☐ Steam ☐
Radiant Floor Heat ☐ Wood Stove ☐ Coal Furnace ☐ Fireplace ☐
Other ☐ _____

32. Does Building / Structure have (or had in the past) a storage tank for storage of Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? not owned by occupant

How is/was the tank filled?

Is there staining near the tank? Yes ☐ No ☐

33. Does Building / Structure have air conditioning? Yes ☑ No ☐
Central Air Conditioning ☑
Window Air Conditioning Unit(s) ☐
Other (please specify)

34. Does Building / Structure have any: Room Fans ☐, Ceiling Fans ☑, Attic Fan ☐

35. Does Building / Structure ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☑

36. Has Building / Structure had termite or other pesticide treatment? Yes ☐ No ☑ Unknown ☐
If yes, please specify type of pest controlled
And approximate date of service

37. Water heater type: Gas ☑, Electric ☐, by Furnace ☐,
Other (please describe)

38. Water heater location: Basement ☐, Upstairs ☐, Ground Floor ☑, Attic ☐,
Other (please specify) closet - utility closet - north wall

39. Does Building / Structure have any cooking appliances? Electric ☐, Gas ☐ NO
Other (please describe) microwave

40. Is there a stove exhaust hood present? Yes ☐ No ☑
Does it vent to the outdoors? Yes ☐ No ☐

41. Smoking in Building / Structure:
None ☑, Rare (only guests) ☐, Moderate (occupants, light smokers) ☐,
Heavy (at least one heavy smoker in Building / Structure) ☐

42. If yes to question 41, what do they smoke?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐

43. Does Building / Structure regularly contain/use air fresheners? Yes ☑ No ☐

44. Does anyone in the Building have indoor Building hobbies or crafts involving: NO
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐

45. General Building / Structure use of industrial / office / consumer products (circle as appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol Deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window Cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuel	Never	Hardly ever	Occasionally	Regularly	Often

46. Please check weekly Building / Structure maintenance, janitorial, and cleaning practices:

Dusting ☑

Dry Sweeping ☑

Vacuuming ☑

Polishing (furniture, etc.) ☑

Washing/Waxing Floors ☐

Other (describe) ☐ _____

47. Other comments including items / subjects not covered in this questionnaire yet an issue or concern for the Building / Structure:

MT CADASTRAL

CODE : 07-4292-36-1-40-0000

ASSESSMENT : 0000561651

48. **Chemical Inventory/Summary**

Chemical/Chemical Product (consumer name)	Amount present in Building / Structure
a) Clorox & Lysol wipes	- 2 80 wipe containers
b) Pledge cleaner aerosol	- 3 containers
c) 1 aerosol wasp cleaner	
d) 1 aerosol ant cleaner	
e) Soft scrub	
f) Scrubbing Bubbles cleaner	- 5 spray cans
g) Chlorox cleaner + Bleach	- 1 spray qt.
h) Goof Off	≈ 12 oz spray
i)	
j) Tarnish Remover (Tarn X)	- 12 oz
k) Windex	
l) Duragloss Vinyl & leather Dressing	1 qt. spray
m) 1 Large Pine Sol container	
n) Swiffer wet cleaner cloths	2 boxes
o)	

In Kitchen just west of stairs area

Attic has paints ~~[illegible]~~
2, 5 gallon satin latex paint
containers 1 gallon latex paint

Bathroom

4 Lysol bleach toilet bowl cleaners 32 oz
2 Scrubbing bubbles
2 Clorox + bleach 32 oz cleaner toilet
4 Lysol Disinfectant Spray
1 Pledge Cleaner Spray / Polish
1 large 40+ oz Lysol liquid cleaner
Kirkland disinfecting wipes ≈ 50 wipes
Ajax powder cleaner for toilet bowl

APPENDIX I

SVE OPERATION & MAINTENANCE

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 12/22/2016	TIME: 1450	OPERATOR: Joel R.

SYSTEM STATUS: ON OFF	IF OFF, WHY: Initial Startup with air dilution open only

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: MiniRAE 3000/592-000488

BLOWER SYSTEM HOURS: Turned on Ø	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: turned on

WELL #7 (EAST) HOURS: OFF Ø	WELL #8 (SOUTH) HOURS: OFF Ø	WELL #9 (WEST) HOURS: OFF Ø

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	turned on	-11	3.6	54	NC
WELL #7 (EAST):	OFF	—	—	—	—
WELL #8 (SOUTH):	OFF	—	—	—	—
WELL #9 (WEST):	OFF	—	—	—	—

MANIFOLD TEMP (°F): 61	MANIFOLD PID (PPM): NC

KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -11

BLOWER VACUUM (in H2O): 3.6	BLOWER DISCHARGE PRESSURE (in H2O): 67	BLOWER DISCHARGE TEMPERATURE (°F): 102

PRE GAC / ZEOLITE PID (PPM): NC	POST GAC DRUM PID (PPM): NC	POST ZEOLITE DRUM PID (PPM): NC

NOTES: Collected summa canister sample "MTN-PRE-STARTUP" by running the air dilution valve open and SVE wells off. The sample collection is at the inlet to the first filtration drum. So the sample will be collected before the filtration. End sample collection time = 1520.

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 12/22/2016	TIME: 1544	OPERATOR: Joel R.

SYSTEM STATUS: ON OFF Turned on for first time	IF OFF, WHY: Initial SVE well start up

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: mini RAE 3000 / 592-000488

BLOWER SYSTEM HOURS: Ø	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: Ø
WELL #7 (EAST) Turned ON HOURS: Ø	WELL #8 (SOUTH) Turned ON HOURS: Ø	WELL #9 (WEST) Turned ON HOURS: Ø

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	-8	0.6		62.5*
WELL #8 (SOUTH):	ON	-10	<0.1		43.8*
WELL #9 (WEST):	ON	-10	<0.1		38.0*

MANIFOLD TEMP (°F): 50	MANIFOLD PID (PPM): 43.8*

KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -10

BLOWER VACUUM (in H2O): 3.6	BLOWER DISCHARGE PRESSURE (in H2O): 84	BLOWER DISCHARGE TEMPERATURE (°F): 135
PRE GAC / ZEOLITE PID (PPM): 17.9 @ 1544 5.9 @ 1552 6.1 @ 1600 8.8 @ 1610	POST GAC DRUM PID (PPM): 0.2 @ 1544 0.1 @ 1552 0.0 @ 1601 0.1 @ 1608	POST ZEOLITE DRUM PID (PPM): 0.0 @ 1544 0.0 @ 1553 0.0 @ 1600 0.0 @ 1610

NOTES: Collected "MTN-PRE" at inlet to GAC Filtration and "MTN-POST" at outlet of zeolite filtration between 1544 and 1614. These are the initial start up system samples collected at startup.

*Collected after blower was shut off and PID placed in the vacuum sample ports.

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 12/22/2016	TIME: 1800	OPERATOR: Joel R.

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: miniRAE 3000 /592-000488

BLOWER SYSTEM HOURS: 2	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: Ø
WELL #7 (EAST) HOURS: 2	WELL #8 (SOUTH) HOURS: 2	WELL #9 (WEST) HOURS: 2

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	-13	0.2		NC
WELL #8 (SOUTH):	ON	-19	<0.1		NC
WELL #9 (WEST):	ON	-17	<0.1		NC

MANIFOLD TEMP (°F): 52	MANIFOLD PID (PPM): NC
KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -10

BLOWER VACUUM (in H2O): 2.8	BLOWER DISCHARGE PRESSURE (in H2O): 65	BLOWER DISCHARGE TEMPERATURE (°F): 130
PRE GAC / ZEOLITE PID (PPM): 9.0	POST GAC DRUM PID (PPM): 0.0	POST ZEOLITE DRUM PID (PPM): 0.0

NOTES:

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 12/23/2016	TIME: 0755	OPERATOR: Joel R.

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: MiniRAE 3000 / 592-000488

BLOWER SYSTEM HOURS: 16	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: 7
WELL #7 (EAST) HOURS: 16	WELL #8 (SOUTH) HOURS: 16	WELL #9 (WEST) HOURS: 16

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	-13	0.2		87.1*
WELL #8 (SOUTH):	ON	-18	<0.1		37.7*
WELL #9 (WEST):	ON	-17	<0.1		29.2*

MANIFOLD TEMP (°F): 52	MANIFOLD PID (PPM): 45.4*
KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -11

BLOWER VACUUM (in H2O): 2.8	BLOWER DISCHARGE PRESSURE (in H2O): 64	BLOWER DISCHARGE TEMPERATURE (°F): 126
PRE GAC / ZEOLITE PID (PPM): 11.0	POST GAC DRUM PID (PPM): 0.0	POST ZEOLITE DRUM PID (PPM): 0.0

NOTES: * Readings collected with blower off to collect the vacuum side concentrations

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 12/23/2016	TIME: 0930	OPERATOR: Joel R

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: miniRAE 3000 / 592-000488

BLOWER SYSTEM HOURS: 18	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: 7
WELL #7 (EAST) HOURS: 18	WELL #8 (SOUTH) HOURS: 18	WELL #9 (WEST) HOURS: 18

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	-11	0.2		79.4*
WELL #8 (SOUTH):	ON	-18	<0.1		53.1*
WELL #9 (WEST):	ON	-17	<0.1		31.0*

MANIFOLD TEMP (°F): 53	MANIFOLD PID (PPM): 36.6*
KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -11

BLOWER VACUUM (in H2O): 2.8	BLOWER DISCHARGE PRESSURE (in H2O): 66	BLOWER DISCHARGE TEMPERATURE (°F): 128
PRE GAC / ZEOLITE PID (PPM): 10.2	POST GAC DRUM PID (PPM): 0.0	POST ZEOLITE DRUM PID (PPM): 0.0

NOTES: * Collected with system shut down to collect vacuum PID concentr

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 12/23/2016	TIME: 0955	OPERATOR: Joel R.

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: Mini RAE 3000 / 592-000488

BLOWER SYSTEM HOURS: 18	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: 1

WELL #7 (EAST) HOURS: 18	WELL #8 (SOUTH) HOURS: 18	WELL #9 (WEST) HOURS: 18

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	−32	2.9	~46	NC
WELL #8 (SOUTH):	ON	−38	2.6	~44	NC
WELL #9 (WEST):	ON	−37	2.6	~44	NC

MANIFOLD TEMP (°F): 47	MANIFOLD PID (PPM): NC

KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): −28

BLOWER VACUUM (in H2O): 21.5	BLOWER DISCHARGE PRESSURE (in H2O): 44	BLOWER DISCHARGE TEMPERATURE (°F): 129

PRE GAC / ZEOLITE PID (PPM): 64.1	POST GAC DRUM PID (PPM): 0.6	POST ZEOLITE DRUM PID (PPM): 0.0

NOTES: @ 0940: Found air leak on air filter (in line) between the blower & knockout tank. After sealing up the leak the vacuums ~~increa~~ increased to expected levels.

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 12/23/2016	TIME: 1025	OPERATOR: Joel R.

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: miniRAE 3000 / 592-000488

BLOWER SYSTEM HOURS: 19	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: 7
WELL #7 (EAST) HOURS: 19	WELL #8 (SOUTH) HOURS: 19	WELL #9 (WEST) HOURS: 19

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	-27	2.2	39	144.3 *
WELL #8 (SOUTH):	ON	-33	2.0	38	45.0 *
WELL #9 (WEST):	ON	-32	1.9	37	54.9 *

MANIFOLD TEMP (°F): 45	MANIFOLD PID (PPM): 56.3*

KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -22

BLOWER VACUUM (in H2O): 16.7	BLOWER DISCHARGE PRESSURE (in H2O): 34	BLOWER DISCHARGE TEMPERATURE (°F): 115
PRE GAC / ZEOLITE PID (PPM): 65.3	POST GAC DRUM PID (PPM): 0.3	POST ZEOLITE DRUM PID (PPM): 0.0

NOTES: @ 1015 reduced the blower vacuum ~~to~~ since the system optimization will take place in a few days. Trying not to bring water into the system.

* Collected after shutting down the blower and placing the PID on the vacuum side sample ports.

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 01/03/2017	TIME: 1300	OPERATOR: Joel

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: RAE 3000 / 592-000488

BLOWER SYSTEM HOURS: 285	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: 1
WELL #7 (EAST) HOURS: 285	WELL #8 (SOUTH) HOURS: 285	WELL #9 (WEST) HOURS: 285

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	-22.4	1.4	33	44.1 *
WELL #8 (SOUTH):	ON	-27.8	1.2	30	9.3 *
WELL #9 (WEST):	ON	-25.4	1.3	32	9.6 *

MANIFOLD TEMP (°F): 46	MANIFOLD PID (PPM): 15.6 *
KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -20

BLOWER VACUUM (in H2O): 10.3	BLOWER DISCHARGE PRESSURE (in H2O): 36	BLOWER DISCHARGE TEMPERATURE (°F): 106
PRE GAC / ZEOLITE PID (PPM): 16.9	POST GAC DRUM PID (PPM): 0.1	POST ZEOLITE DRUM PID (PPM): 0.0

NOTES: * Shut system down to collect vacuum PID readings

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 01/03/2017	TIME: 1610	OPERATOR: Joel

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: mini RAE 3000 / 592-000488

BLOWER SYSTEM HOURS: 288	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: 1

WELL #7 (EAST) HOURS: 288	WELL #8 (SOUTH) HOURS: 288	WELL #9 (WEST) HOURS: 288

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	-25.1	2.1	39	46.5*
WELL #8 (SOUTH):	ON	-30.1	1.8	36	10.1*
WELL #9 (WEST):	ON	-29.0	1.8	36	10.4*

MANIFOLD TEMP (°F): 44	MANIFOLD PID (PPM): 17.6*

KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -21

BLOWER VACUUM (in H2O): 14.3	BLOWER DISCHARGE PRESSURE (in H2O): 35	BLOWER DISCHARGE TEMPERATURE (°F): 104

PRE GAC / ZEOLITE PID (PPM): 21.0	POST GAC DRUM PID (PPM): 0.2	POST ZEOLITE DRUM PID (PPM): 0.0

NOTES: System shut down to collect reading

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 01/04/2016	TIME: 1655	OPERATOR: Joel

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: mini RAE 3000 / 592-000488

BLOWER SYSTEM HOURS: 313	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: 7

WELL #7 (EAST) HOURS: 313	WELL #8 (SOUTH) HOURS: 313	WELL #9 (WEST) HOURS: 313

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	-26	2.1	39	44.3*
WELL #8 (SOUTH):	ON	-31	1.8	37	8.9*
WELL #9 (WEST):	ON	-29	1.8	37	9.4*

MANIFOLD TEMP (°F): 45	MANIFOLD PID (PPM): 17.6*

KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -22

BLOWER VACUUM (in H2O): 14.3	BLOWER DISCHARGE PRESSURE (in H2O): 35	BLOWER DISCHARGE TEMPERATURE (°F): 104

PRE GAC / ZEOLITE PID (PPM): 19.0	POST GAC DRUM PID (PPM): 0.1	POST ZEOLITE DRUM PID (PPM): 0.0

NOTES: * Shut system down to collect vacuum PID Readings

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 01/05/2017	TIME: 1615	OPERATOR: Joel

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: miniRAE 3000 / 592-000488

BLOWER SYSTEM HOURS: 336	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: 1
WELL #7 (EAST) HOURS: 336	WELL #8 (SOUTH) HOURS: 336	WELL #9 (WEST) HOURS: 336

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	-25	2.0	39	40.9*
WELL #8 (SOUTH):	ON	-30	1.8	37	8.2*
WELL #9 (WEST):	ON	-28	1.8	37	10.3*

MANIFOLD TEMP (°F): 44	MANIFOLD PID (PPM): 15.9*
KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -21

BLOWER VACUUM (in H2O): 13.5	BLOWER DISCHARGE PRESSURE (in H2O): 35	BLOWER DISCHARGE TEMPERATURE (°F): 101
PRE GAC / ZEOLITE PID (PPM): 16.6	POST GAC DRUM PID (PPM): 0.1	POST ZEOLITE DRUM PID (PPM): 0.0

NOTES: * PID reads collected with system off on vacuum side of the blower.

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 01/07/2017	TIME: 1600	OPERATOR: JR

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: M.. RAE 3000

BLOWER SYSTEM HOURS: 382	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: 2

WELL #7 (EAST) HOURS: 376	WELL #8 (SOUTH) HOURS: 382	WELL #9 (WEST) HOURS: 382

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	-21	1.1	30	29.1*
WELL #8 (SOUTH):	ON	-25	1.1	30	6.0*
WELL #9 (WEST):	ON	-23	1.1	30	7.8*

MANIFOLD TEMP (°F): 43	MANIFOLD PID (PPM): 8.4*

KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -16

BLOWER VACUUM (in H2O): 8.7	BLOWER DISCHARGE PRESSURE (in H2O): 22	BLOWER DISCHARGE TEMPERATURE (°F): 82

PRE GAC / ZEOLITE PID (PPM): 8.9	POST GAC DRUM PID (PPM): 0.1	POST ZEOLITE DRUM PID (PPM): 0.0

NOTES: * PID collected with the blower shut down to collect the vacuum side pid readings.

System is slowed down because injecting solids at the SVE piping Elevation.

DAILY SHEET OF

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 01/12/2017	TIME: 0810 - 0840	OPERATOR: Joel

SYSTEM STATUS: ON OFF Restart	IF OFF, WHY: Setting up to collect summa canist samples.

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: MiniRAE 3000 / 592-000488

BLOWER SYSTEM HOURS: 480	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: 1
WELL #7 (EAST) HOURS: 486	WELL #8 (SOUTH) HOURS: 496	WELL #9 (WEST) HOURS: 496

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	-26.5	~~2.1~~ 1.8 (SD)	~~38~~ 36 (SD)	16.9 *
WELL #8 (SOUTH):	ON	-31.9	1.8	36	1.5 *
WELL #9 (WEST):	ON	-29.7	1.8	36	5.2 *

MANIFOLD TEMP (°F): 43	MANIFOLD PID (PPM): 6.7 *

KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -21

BLOWER VACUUM (in H2O): 14.7	BLOWER DISCHARGE PRESSURE (in H2O): 34	BLOWER DISCHARGE TEMPERATURE (°F): 84
PRE GAC / ZEOLITE PID (PPM): 13.3 @ 0811 7.8 @ 0818 7.1 @ 0826 6.9 @ 0839	POST GAC DRUM PID (PPM): 0.4 @ 0811 0.2 @ 0818 0.1 @ 0826 0.1 @ 0839	POST ZEOLITE DRUM PID (PPM): 0.0 @ 0811 0.0 @ 0818 0.0 @ 0826 0.0 @ 0839

NOTES: Collect MTN-Post summa canister sample from 0810-0840

* Collected after test with blower off

Changed the blower from 24.00 HZ to 20.00 HZ @ 0850.

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 01/25/2017	TIME: 1755	OPERATOR: JR

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: mini RAE 3000 / 592-000488

BLOWER SYSTEM HOURS: 801	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: 1

WELL #7 (EAST) HOURS: 807	WELL #8 (SOUTH) HOURS: 817	WELL #9 (WEST) HOURS: 817

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	25	1.9	38	22.1*
WELL #8 (SOUTH):	ON	29.5	1.7	36	4.6*
WELL #9 (WEST):	ON	27	1.7	36	6.7*

MANIFOLD TEMP (°F): 28	MANIFOLD PID (PPM): 9.6*

KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -20.5

BLOWER VACUUM (in H2O): 13.1	BLOWER DISCHARGE PRESSURE (in H2O): 37	BLOWER DISCHARGE TEMPERATURE (°F): 87

PRE GAC / ZEOLITE PID (PPM): 9.7	POST GAC DRUM PID (PPM): 0.0	POST ZEOLITE DRUM PID (PPM): 0.0

NOTES: * Collected with system off.

Well ID	Vacuum (in H2O)	PID (ppm)
MTN-MW1	-0.02	2.6
MTN-MW2	-0.02	32.0
MTN-MW3	-0.01	1.6

DAILY SHEET OF

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 01/26/2017	TIME: 1535	OPERATOR: Joel

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: MiniRAE 3000 / 592-000488

BLOWER SYSTEM HOURS: 823	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: 1
WELL #7 (EAST) HOURS: 829	WELL #8 (SOUTH) HOURS: 839	WELL #9 (WEST) HOURS: 839

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	-26	2.2	40	21.6 *
WELL #8 (SOUTH):	ON	-32	2.0	38	4.3 *
WELL #9 (WEST):	ON	-30	2.0	38	5.4 *

MANIFOLD TEMP (°F): 38	MANIFOLD PID (PPM): 9.8*

KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -22

BLOWER VACUUM (in H2O): ~~15.1~~ 15.5 (3)	BLOWER DISCHARGE PRESSURE (in H2O): 42	BLOWER DISCHARGE TEMPERATURE (°F): 100
PRE GAC / ZEOLITE PID (PPM): 9.9	POST GAC DRUM PID (PPM): 0.0	POST ZEOLITE DRUM PID (PPM): 0.0

NOTES: * Readings collected with system off.

Well ID:	Vacuum (in-H2O)
MTN-MW1	-0.03
MTN-MW2	-0.04
MTN-MW3	-0.02

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 2/12/17	TIME: 1545	OPERATOR: Andrew Vann

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: MiniRAE 3000 592-001229

BLOWER SYSTEM HOURS: 1231	TRANSFER PUMP SYSTEM HOURS: 0	WELL #1 (AIR DILUTION) HOURS: 1

WELL #7 (EAST) HOURS: 1237	WELL #8 (SOUTH) HOURS: 1247	WELL #9 (WEST) HOURS: 1247

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	OFF				
WELL #7 (EAST):	ON	27	2.0	39	10.2
WELL #8 (SOUTH):	ON	32	2.0	39	2.3
WELL #9 (WEST):	ON	30	2.0	39	4.1

MANIFOLD TEMP (°F): 41	MANIFOLD PID (PPM): 4.8

KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): 20

BLOWER VACUUM (in H2O): AV ~~20~~ 14.7	BLOWER DISCHARGE PRESSURE (in H2O): 41	BLOWER DISCHARGE TEMPERATURE (°F): 112

PRE GAC / ZEOLITE PID (PPM): 6.9	POST GAC DRUM PID (PPM): 0.0	POST ZEOLITE DRUM PID (PPM): ~~6.9~~ 1.0

NOTES: Well 8 solenoid very loud - turned off & back on and it was quieter
Changed GAC + Zeolite. Raised blower to 30 Hz. Sampled
used GAC + Zeolite

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 2/12/17	TIME: 1700	OPERATOR: AV

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: MiniRAE 3000 592-001229

BLOWER SYSTEM HOURS: 1232	TRANSFER PUMP SYSTEM HOURS: 0	WELL #1 (AIR DILUTION) HOURS: 1

WELL #7 (EAST) HOURS: 1239	WELL #8 (SOUTH) HOURS: 1249	WELL #9 (WEST) HOURS: 1249

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	off				
WELL #7 (EAST):	on	30	2.4	43	10.7
WELL #8 (SOUTH):	on	36	2.6	44	2.5
WELL #9 (WEST):	on	34	2.9	47	4.4

MANIFOLD TEMP (°F): 40	MANIFOLD PID (PPM): 4.8

KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): 0 Empty	INLINE AIR FILTER VACUUM (in H2O): 26

BLOWER VACUUM (in H2O): 19.1	BLOWER DISCHARGE PRESSURE (in H2O): 53	BLOWER DISCHARGE TEMPERATURE (°F): 114

PRE GAC / ZEOLITE PID (PPM): 6.7	POST GAC DRUM PID (PPM): 0.0	POST ZEOLITE DRUM PID (PPM): 0.0

NOTES: Post GAC/Zeolite change

DAILY SHEET OF

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 02/22/2017	TIME: 1345	OPERATOR: Joel Riebli

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: ppbRAE 3000 / 594-905182

BLOWER SYSTEM HOURS: 1468	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: 1

WELL #7 (EAST) HOURS: 1475	WELL #8 (SOUTH) HOURS: 1485	WELL #9 (WEST) HOURS: 1485

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPB):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	-31	2.7	45	5,264
WELL #8 (SOUTH):	ON	-36	2.5	43	1,466
WELL #9 (WEST):	ON	-33	2.9	47	1,823

MANIFOLD TEMP (°F): 42	MANIFOLD PID (PPB): 2,403

KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -23

BLOWER VACUUM (in H2O): 19.1	BLOWER DISCHARGE PRESSURE (in H2O): 51	BLOWER DISCHARGE TEMPERATURE (°F): 128

PRE GAC / ZEOLITE PID (PPB): 2,117	POST GAC DRUM PID (PPB): 185	POST ZEOLITE DRUM PID (PPB): 13

	VACUUM (In H2O)	PID (PPB):		VACUUM (in H2O)	PID (PPB):
MTN-MW1:	0.03	364	MTN-MW3:	0.02	1829
MTN-MW2:	1.2	102.2 ppm	Subslab:	NM	571

NOTES:

1345 start "MTN-PRE" & "MTN-POST" on the influent & effluent filtration media drums.
1345 - 1415

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 03/13/2017	TIME: 1030	OPERATOR: JR
SYSTEM STATUS: ON OFF	IF OFF, WHY:	
SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: NA		
BLOWER SYSTEM HOURS: 1919	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: 1
WELL #7 (EAST) HOURS: 1927	WELL #8 (SOUTH) HOURS: 1937	WELL #9 (WEST) HOURS: 1937

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPB):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	~~4.8~~ -40	4.8	60	—
WELL #8 (SOUTH):	ON	~~4.3~~ -47	4.3	56	—
WELL #9 (WEST):	ON	~~5.2~~ -45	5.2	63	—

MANIFOLD TEMP (°F): ~~97~~ 49	MANIFOLD PID (PPB): NA
KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -28

BLOWER VACUUM (in H2O): 29.4	BLOWER DISCHARGE PRESSURE (in H2O): 50	BLOWER DISCHARGE TEMPERATURE (°F): 96
PRE GAC / ZEOLITE PID (PPB): —	POST GAC DRUM PID (PPB): —	POST ZEOLITE DRUM PID (PPB): —

	VACUUM (In H2O)	PID (PPB):		VACUUM (in H2O)	PID (PPB):
MTN-MW1:	NA Ice out	—	MTN-MW3:	-0.02	—
MTN-MW2:	-1.3	—		6.23 DTW	

6.18 DTW

NOTES:

WSMW-7 6.46 DTW

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 04/10/2017	TIME: 1530	OPERATOR: Joel

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: ppbRAE 3000 / 594-905182

BLOWER SYSTEM HOURS: 2,596	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: ~~Ø~~
WELL #7 (EAST) HOURS: 2,604	WELL #8 (SOUTH) HOURS: 2,614	WELL #9 (WEST) HOURS: 2614

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPB):
WELL #1 (AIR DULITION):	OFF	~~28~~	—	—	—
WELL #7 (EAST):	ON	-28	2.6	44	7,223
WELL #8 (SOUTH):	ON	-34	2.3	41	1,210
WELL #9 (WEST):	ON	-32	2.6	44	2,284

MANIFOLD TEMP (°F): 52	MANIFOLD PID (PPB): 3,058
KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -24

BLOWER VACUUM (in H2O): ~~Ø~~ 17.1	BLOWER DISCHARGE PRESSURE (in H2O): 50	BLOWER DISCHARGE TEMPERATURE (°F): 140
PRE GAC / ZEOLITE PID (PPB): 2919	POST GAC DRUM PID (PPB): 2	POST ZEOLITE DRUM PID (PPB): Ø

	VACUUM (In H2O)	PID (PPB):		VACUUM (in H2O)	PID (PPB):
MTN-MW1:	0.05	63	MTN-MW3:	-0.03	29
MTN-MW2:	-5.4	5,382	sub slab:	~~Ø~~	417

NOTES:

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 04/25/2017	TIME: 1715	OPERATOR: Joel R

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: ppbRAE3000/ 594-000943

BLOWER SYSTEM HOURS: 2,957	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: 1
WELL #7 (EAST) HOURS: 2,966	WELL #8 (SOUTH) HOURS: 2,976	WELL #9 (WEST) HOURS: 2,976

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPB):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	(ON) ~~2.3~~ -27	2.3	41	7,765
WELL #8 (SOUTH):	ON	~~2.1~~ -32	2.1	40	1,365
WELL #9 (WEST):	ON	~~2.3~~ -30	2.3	41	2,305

MANIFOLD TEMP (°F): 58	MANIFOLD PID (PPB): 3,561
KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -22

BLOWER VACUUM (in H2O): ~~15.~~ (ON) 155	BLOWER DISCHARGE PRESSURE (in H2O): 57	BLOWER DISCHARGE TEMPERATURE (°F): 149
PRE GAC / ZEOLITE PID (PPB): 3,592	POST GAC DRUM PID (PPB): 13	POST ZEOLITE DRUM PID (PPB): Ø

	VACUUM (In H2O)	PID (PPB):		VACUUM (in H2O)	PID (PPB):
MTN-MW1:	—	—	MTN-MW3:	—	—
MTN-MW2:	—	—			

NOTES:

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 5/15/2017	TIME: 1800 1730 —	OPERATOR: Joel

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: ppbRAE 3000 594-905182

BLOWER SYSTEM HOURS: 3435	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: 1
WELL #7 (EAST) HOURS: 3446	WELL #8 (SOUTH) HOURS: 3456	WELL #9 (WEST) HOURS: 3456

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPB):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	-24	1.8	37	5,774
WELL #8 (SOUTH):	ON	-29	1.6	35	829
WELL #9 (WEST):	ON	-26	1.7	36	2,621

MANIFOLD TEMP (°F): 50	MANIFOLD PID (PPB): 2,477
KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -20

BLOWER VACUUM (in H2O): 11.9	BLOWER DISCHARGE PRESSURE (in H2O): 44	BLOWER DISCHARGE TEMPERATURE (°F): 128
PRE GAC / ZEOLITE PID (PPB): 2,379 (POST GAC DR #2 8)	POST GAC DRUM PID (PPB): Ø	POST ZEOLITE DRUM PID (PPB): Ø

	VACUUM (In H2O)	PID (PPB):		VACUUM (in H2O)	PID (PPB):
MTN-MW1:	-0.03	108	MTN-MW3:	-0.03	14,420
MTN-MW2:	-3.5	66,370	MTN-SS	Ø	808

NOTES: Collect quarterly influent "MTN-PRE" and effluent "MTN-POST" before & after the three drum filtration media drums.

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Thursday, December 22, 2016		
Temperature	<32 °F	**Work Day**	
Weather	Cloudy	**Work Start**	710
Wind	Light (1-10 mph)	**Work Stop**	1805

Onsite Personnel (name/company)	Role
Lana Walker / Whitefish Liquor Store	General Manager
Viktor Gayvoronsky / PowerHouse Electric	Electrican
Joel Riebli / Trihydro Corporation	Engineer

Equipment Present Onsite	Count
PID	1

Health and Safety Comments	Slick surface conditions with snow and ice.
Record of Samples Collected	Collected three laboratory summa canister samples from the SVE system: •MTN-PRE-STARTUP (running the air dilution piping only and collected 30 minutes of sample from before the filtration drums). •MTN-PRE (running the three SVE wells only and collected the first 30 minutes of system extraction before the filtration drums). (NOTE - SAMPLE NOT RAN BY LAB AS A AIR LEAK WAS FOUND AFTER SAMPLE COLLECTION). •MTN-POST (running the three SVE wells only and collected the first 30 minutes of the outflow from the GAC and Zeolite drums). (NOTE - SAMPLE NOT RAN BY LAB AS A AIR LEAK WAS FOUND AFTER SAMPLE COLLECTION).
Work Activities Conducted	Attempted to start the SVE system in automated mode just after 8 am. However the blower would not operate because of a October 4, 2016 utility voltage error. Called

out PowerHouse Electric to help find the issue. The electrician wasn't able to find an issue. Called Onion Equipment and it was determined that two PLC control wires needed switched. This allowed the SVE system to be operated in automatic mode.

Started up the system with only the air dilution valve open to collect a laboratory pre startup equipment condition sample.

At 1544, started up the SVE system with the three SVE wells fully opened (air dilution valve closed). Collected pre and post filtration laboratory samples.

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

Photo Date:	12/22/2016
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Summa canister sampling of pre and post filtration. The drum on the right side is the GAC filtration drum and is the first drum where vapor passes through. The drum on the left side is the Zeolite filtration drum.

Photo Date:	12/22/2016
Direction:	Northeast
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Initial summa canister sampling before filtation (left drum) and post filtration (right drum). The drum near the manifold meters is the backup GAC drum.

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: 75553

Company Name & Address (Reporting Information): Trihydro Corporation, 1252 Commerce Drive, Laramie, WY 82070

Project Name: MDEQ Whitefish, Montana

Project Number: 77603300l

ALS Contact: Kelly Hamuchi

Project Manager: Andrew Vann

P.O. # / Billing Information: 16-385WO-2

Phone: (307) 745-7474

Fax:

Email Address for Result Reporting: AVann@trihydro.com

Sampler (Print & Sign): Joel Richli (307) 760-2793

Analysis Method: TO-15: BTEX, MTBE, Naph; MA APH HC's; Sim - PCE, TCE, cis-1,2 DCE, VC

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	TO-15: BTEX, MTBE, Naph	MA APH HC's	Comments e.g. Actual Preservative or specific instructions
MTN-PRE-STARTUP		10/22/16	1520	SC00311	OA00964	-27.47	-2.65	6L	X		
~~MTN-PRE~~	~~AC01767~~	~~10/22/16~~	~~1614~~	~~AC01767~~	~~OA01148~~	~~-26.82~~	~~0.74~~	~~6L~~	~~X~~		Do Not Analyze
~~MTN-POST~~	~~AC02180~~	~~10/22/16~~	~~1614~~	~~AC02180~~	~~OA00111~~	~~-26.88~~	~~-5.57~~	~~6L~~	~~X~~		Do not Analyze

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: Trihydro Units: _____

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
[signature]	10/22/16	1750			
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank Temperature _____°C

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 12/22/2016	TIME: 1450	OPERATOR: Joel R.

SYSTEM STATUS: ON (OFF)	IF OFF, WHY: Initial startup with air dilution open only

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: MiniRAE 3000/592-000488

BLOWER SYSTEM HOURS: Turned ON Ø	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: turned ON
WELL #7 (EAST) HOURS: OFF Ø	WELL #8 (SOUTH) HOURS: OFF Ø	WELL #9 (WEST) HOURS: OFF Ø

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	Turned ON	-11	3.6	54	NC
WELL #7 (EAST):	OFF	—	—	—	—
WELL #8 (SOUTH):	OFF	—	—	—	—
WELL #9 (WEST):	OFF	—	—	—	—

MANIFOLD TEMP (°F): 61	MANIFOLD PID (PPM): NC
KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -11

BLOWER VACUUM (in H2O): 3.6	BLOWER DISCHARGE PRESSURE (in H2O): 67	BLOWER DISCHARGE TEMPERATURE (°F): 102
PRE GAC / ZEOLITE PID (PPM): NC	POST GAC DRUM PID (PPM): NC	POST ZEOLITE DRUM PID (PPM): NC

NOTES: Collected summa canister sample "MTN-PRE-STARTUP" by removing the air dilution valve open and SVE wells off. The sample collection is at the inlet to the first filtration drum. So the sample will be collected before the filtration. End sample collection time = 1520.

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 12/22/2016	TIME: 1544	OPERATOR: Joel R.

SYSTEM STATUS: ON OFF turned on for first time	IF OFF, WHY: Initial SVE well start up

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: mini RAE 3000 / 592-000488

BLOWER SYSTEM HOURS: Ø	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: Ø

WELL #7 (EAST) HOURS: Turned on Ø	WELL #8 (SOUTH) HOURS: Turned on Ø	WELL #9 (WEST) HOURS: Turned on Ø

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	-8	0.6		62.5*
WELL #8 (SOUTH):	ON	-10	<0.1		43.8*
WELL #9 (WEST):	ON	-10	<0.1		38.0*

MANIFOLD TEMP (°F): 50	MANIFOLD PID (PPM): 43.8*

KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -10

BLOWER VACUUM (in H2O): 3.6	BLOWER DISCHARGE PRESSURE (in H2O): 84	BLOWER DISCHARGE TEMPERATURE (°F): 135

PRE GAC / ZEOLITE PID (PPM): 17.9 @ 1544 5.9 @ 1552 6.1 @ 1600 8.8 @ 1610	POST GAC DRUM PID (PPM): 0.2 @ 1544 0.1 @ 1552 0.0 @ 1601 0.1 @ 1608	POST ZEOLITE DRUM PID (PPM): 0.0 @ 1544 0.0 @ 1553 0.0 @ 1600 0.0 @ 1610

NOTES: Collected "MTN-PRE" at inlet to GAC filtration and "MTN-POST" at outlet of zeolite filtration between 1544 and 1614. These are the initial start up system samples collected at startup.

* Collected after blower was shut off and PID placed in the vacuum sample ports.

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 12/22/2016	TIME: 1800	OPERATOR: Joel R.

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: miniRAE 3000 /592-000488

BLOWER SYSTEM HOURS: 2	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: Ø
WELL #7 (EAST) HOURS: 2	WELL #8 (SOUTH) HOURS: 2	WELL #9 (WEST) HOURS: 2

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	-13	0.2		NC
WELL #8 (SOUTH):	ON	-19	<0.1		NC
WELL #9 (WEST):	ON	-17	<0.1		NC

MANIFOLD TEMP (°F): 52	MANIFOLD PID (PPM): NC

KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -10

BLOWER VACUUM (in H2O): 2.8	BLOWER DISCHARGE PRESSURE (in H2O): 65	BLOWER DISCHARGE TEMPERATURE (°F): 130
PRE GAC / ZEOLITE PID (PPM): 9.0	POST GAC DRUM PID (PPM): 0.0	POST ZEOLITE DRUM PID (PPM): 0.0

NOTES:

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Friday, December 23, 2016		
Temperature	<32 °F	**Work Day**	
Weather	Cloudy	**Work Start**	740
Wind	Calm (<1 mph)	**Work Stop**	1130

Onsite Personnel (name/company)	Role
Lana Walker / Whitefish Liquor Store	General Manager
Joel Riebli / Trihydro Corporation	Engineer

Equipment Present Onsite	Count
PID	1

Health and Safety Comments	Slick snow/ice surface conditions outside the remediation system.
Record of Samples Collected	None - collected system reading with PID meter.
Work Activities Conducted	Collected system data. Found an air leak at the inline filter (located between the blower and the knockout tank). After the air leak was sealed up, vacuums increased at the three open SVE wells. Because of this air leak, the collected initial startup "MTN-PRE" and "MTN-POST" samples will be rerun in early January.

	Deviation from approved plans:
Work conducted in accordance with approved plans?	No

Photo Date:	12/23/2016
Direction:	Northwest
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Shows the meter base, power pole, and service line installed on the exterior of the remediation system building.

Photo Date:	12/23/2016
Direction:	North
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	The first PVC piping is the exhaust stack (outlet from the filtration drums) and the short PVC piping in the rear is the air dilution intake (currently off).

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 12/23/2016	TIME: 0755	OPERATOR: Joel R.

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: MiniRAE 3000 / 592-000488

BLOWER SYSTEM HOURS: 16	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: 7

WELL #7 (EAST) HOURS: 16	WELL #8 (SOUTH) HOURS: 16	WELL #9 (WEST) HOURS: 16

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	-13	0.2		87.1*
WELL #8 (SOUTH):	ON	-18	<0.1		37.7*
WELL #9 (WEST):	ON	-17	<0.1		29.2*

MANIFOLD TEMP (°F): 52	MANIFOLD PID (PPM): 45.4*

KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -11

BLOWER VACUUM (in H2O): 2.8	BLOWER DISCHARGE PRESSURE (in H2O): 64	BLOWER DISCHARGE TEMPERATURE (°F): 126

PRE GAC / ZEOLITE PID (PPM): 11.0	POST GAC DRUM PID (PPM): 0.0	POST ZEOLITE DRUM PID (PPM): 0.0

NOTES: * Readings collected with blower off to collect the vacuum side concentrations

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 12/23/2016	TIME: 0930	OPERATOR: Joel R

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: miniRAE 3000 / 592-000488

BLOWER SYSTEM HOURS: 18	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: 7
WELL #7 (EAST) HOURS: 18	WELL #8 (SOUTH) HOURS: 18	WELL #9 (WEST) HOURS: 18

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	-11	0.2		79.4*
WELL #8 (SOUTH):	ON	-18	<0.1		53.1*
WELL #9 (WEST):	ON	-17	<0.1		31.0*

MANIFOLD TEMP (°F): 53	MANIFOLD PID (PPM): 36.6*
KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -11

BLOWER VACUUM (in H2O): 2.8	BLOWER DISCHARGE PRESSURE (in H2O): 66	BLOWER DISCHARGE TEMPERATURE (°F): 128
PRE GAC / ZEOLITE PID (PPM): 10.2	POST GAC DRUM PID (PPM): 0.0	POST ZEOLITE DRUM PID (PPM): 0.0

NOTES: * Collected with system shut down to collect vacuum PID concentrations.

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 12/23/2016	TIME: 0955	OPERATOR: Joel R.

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: Mini RAE 3000 / 592-000488

BLOWER SYSTEM HOURS: 18	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: 1
WELL #7 (EAST) HOURS: 18	WELL #8 (SOUTH) HOURS: 18	WELL #9 (WEST) HOURS: 18

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	-32	2.9	~46	NC
WELL #8 (SOUTH):	ON	-38	2.6	~44	NC
WELL #9 (WEST):	ON	-37	2.6	~44	NC

MANIFOLD TEMP (°F): 47	MANIFOLD PID (PPM): NC
KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -28

BLOWER VACUUM (in H2O): 21.5	BLOWER DISCHARGE PRESSURE (in H2O): 44	BLOWER DISCHARGE TEMPERATURE (°F): 129
PRE GAC / ZEOLITE PID (PPM): 64.1	POST GAC DRUM PID (PPM): 0.6	POST ZEOLITE DRUM PID (PPM): 0.0

NOTES: @ 0940: Found air leak on air filter (in line) between the blower & knockout tank. After sealing up the leak the vacuums ~~inches~~ (JP) increased to expected levels.

MDEQ WHITEFISH SOLVENT SITE - FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 12/23/2016	TIME: 1025	OPERATOR: Joel R.

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: miniRAE 3000 / 592-000488

BLOWER SYSTEM HOURS: 19	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: 7
WELL #7 (EAST) HOURS: 19	WELL #8 (SOUTH) HOURS: 19	WELL #9 (WEST) HOURS: 19

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	-27	2.2	39	144.3 *
WELL #8 (SOUTH):	ON	-33	2.0	38	45.0 *
WELL #9 (WEST):	ON	-32	1.9	37	54.9 *

MANIFOLD TEMP (°F): 45	MANIFOLD PID (PPM): 56.3*
KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -22

BLOWER VACUUM (in H2O): 16.7	BLOWER DISCHARGE PRESSURE (in H2O): 34	BLOWER DISCHARGE TEMPERATURE (°F): 115
PRE GAC / ZEOLITE PID (PPM): 65.3	POST GAC DRUM PID (PPM): 0.3	POST ZEOLITE DRUM PID (PPM): 0.0

NOTES: @ 1015 reduced the blower vacuum ~~to~~ since the system optimization will take place in a few days. Trying not to bring water into the system.

* Collected after shutting down the blower and placing the PID on the vacuum side sample ports.

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Tuesday, January 3, 2017		
Temperature	<32 °F	**Work Day**	
Weather	Clear	**Work Start**	1245
Wind	Light (1-10 mph)	**Work Stop**	1620

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer

Equipment Present Onsite	Count
PID	1

Health and Safety Comments	Area is snow and ice covered surface conditions; construction remains next door.
Record of Samples Collected	No lab samples but did collect two system data sets using PID meter (see attached field forms).
Work Activities Conducted	Mobilized from Helena to Whitefish. SVE system was operating on arrival. Collected two system data sets. Field prep for injection and monitoring well field activities.

	Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 01/03/2017	TIME: 1300	OPERATOR: Joel

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: Mini RAE 3000 / 592-000488

BLOWER SYSTEM HOURS: 285	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: 1
WELL #7 (EAST) HOURS: 285	WELL #8 (SOUTH) HOURS: 285	WELL #9 (WEST) HOURS: 285

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	-22.4	1.4	33	44.1 *
WELL #8 (SOUTH):	ON	-27.8	1.2	30	9.3*
WELL #9 (WEST):	ON	-25.4	1.3	32	9.6*

MANIFOLD TEMP (°F): 46	MANIFOLD PID (PPM): 15.6*
KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -20

BLOWER VACUUM (in H2O): 10.3	BLOWER DISCHARGE PRESSURE (in H2O): 36	BLOWER DISCHARGE TEMPERATURE (°F): 106
PRE GAC / ZEOLITE PID (PPM): 16.9	POST GAC DRUM PID (PPM): 0.1	POST ZEOLITE DRUM PID (PPM): 0.0

NOTES: * Shut system down to collect vacuum PID readings

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 01/03/2017	TIME: 1610	OPERATOR: Joel

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: mini RAE 3000 / 592-000488

BLOWER SYSTEM HOURS: 288	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: 1
WELL #7 (EAST) HOURS: 288	WELL #8 (SOUTH) HOURS: 288	WELL #9 (WEST) HOURS: 288

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	-25.1	2.1	39	46.5*
WELL #8 (SOUTH):	ON	-30.1	1.8	36	10.1*
WELL #9 (WEST):	ON	-29.0	1.8	36	10.4*

MANIFOLD TEMP (°F): 44	MANIFOLD PID (PPM): 17.6*
KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -21

BLOWER VACUUM (in H2O): 143	BLOWER DISCHARGE PRESSURE (in H2O): 35	BLOWER DISCHARGE TEMPERATURE (°F): 104
PRE GAC / ZEOLITE PID (PPM): 21.0	POST GAC DRUM PID (PPM): 0.2	POST ZEOLITE DRUM PID (PPM): 0.0

NOTES: System shut down to collect reading

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Thursday, January 12, 2017		
Temperature	<32 °F	**Work Day**	
Weather	Clear	**Work Start**	715
Wind	Light (1-10 mph)	**Work Stop**	915

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Lana Walker / Whitefish Liquor Store	General Manager

Equipment Present Onsite	Count
PID	1

Health and Safety Comments	Clear and -7 F this morning; surface conditions very slick in the parking lot.
Record of Samples Collected	Laboratory effluent vapor sample MTN-POST.
Work Activities Conducted	Collected effluent vapor sample MTN-POST from the outlet of the GAC / Zeolite SVE system drum filtration between 0810 and 0840. Adjusted the blower to operate at 20.00 HZ (3.00 HZ higher than was operated during injection activities and 4.00 HZ lower than pre injection activities). Demobilized from Whitefish to Helena.

	Deviation from approved plans:
Work conducted in accordance with approved plans?	

Photo Date:	1/12/2017
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Collecting effluent summa canister sample MTN-POST. The drum on the left is the first drum and contains GAC. The vapor passes through the GAC and then into the drum on the right (contains Zeolite). The sample collection point is on the outlet of the Zeolite drum.

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 01/12/2017	TIME: 0810 - 0840	OPERATOR: Jo.l

SYSTEM STATUS: ON OFF Restart	IF OFF, WHY: Setting up to collect summa canist samples.

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: mini RAE 3000 / 592-000488

BLOWER SYSTEM HOURS: 480	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: 1
WELL #7 (EAST) HOURS: 486	WELL #8 (SOUTH) HOURS: 496	WELL #9 (WEST) HOURS: 496

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	-26.5	~~2.1~~ 1.8	~~38~~ 36	16.9 *
WELL #8 (SOUTH):	ON	-31.9	1.8	36	1.5 *
WELL #9 (WEST):	ON	-29.7	1.8	36	5.2 *

MANIFOLD TEMP (°F): 43	MANIFOLD PID (PPM): 6.7 *
KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -21

BLOWER VACUUM (in H2O): 14.7	BLOWER DISCHARGE PRESSURE (in H2O): 34	BLOWER DISCHARGE TEMPERATURE (°F): 84
PRE GAC / ZEOLITE PID (PPM): 13.3 @ 0811 7.8 @ 0818 7.1 @ 0826 6.9 @ 0839	POST GAC DRUM PID (PPM): 0.4 @ 0811 0.2 @ 0818 0.1 @ 0826 0.1 @ 0839	POST ZEOLITE DRUM PID (PPM): 0.0 @ 0811 0.0 @ 0818 0.0 @ 0826 0.0 @ 0839

NOTES: Collect MTN-Post summa canister sample from 0810-0840

* Collected after test with blower off

Changed the blower from 24.00 Hz to 20.00 Hz @ 0850.

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Wednesday, January 25, 2017		
Temperature	<32 °F	**Work Day**	
Weather	Snow	**Work Start**	1115
Wind	Calm (<1 mph)	**Work Stop**	1805

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Lana Walker / Whitefish Liquor Store	General Manager

Equipment Present Onsite	Count
PID	1
Horiba U-52 Water Quality Meter	1
Solinst Interface Meter	1

Health and Safety Comments	Snow and Ice covered surface conditions. Placed safety cones out when working around the three new monitoring wells.
Record of Samples Collected	None
Work Activities Conducted	Started developing the three new site monitoring wells using well development surge tools in each well. Surged the water column using the well development surge tool before bailing well fluids and sediment from each well. Generated well development fluids were placed in a 55-gallon drum stored in the SVE system building. Groundwater elevation and water quality measurements were collected every few bailed well case volumes. Injection fluids were observed in each of the three monitoring wells. Development activities will continue into tomorrow. Vacuum and PID readings were collected from each of the monitoring wells vapor well.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 01/25/2017	TIME: 1755	OPERATOR: JR

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: miniRAE 3000 / 592-000488

BLOWER SYSTEM HOURS: 801	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: 1

WELL #7 (EAST) HOURS: 807	WELL #8 (SOUTH) HOURS: 817	WELL #9 (WEST) HOURS: 817

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	25	1.9	38	22.1*
WELL #8 (SOUTH):	ON	29.5	1.7	36	4.6*
WELL #9 (WEST):	ON	27	1.7	36	6.7*

MANIFOLD TEMP (°F): 28	MANIFOLD PID (PPM): 9.6*

KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -20.5

BLOWER VACUUM (in H2O): 13.1	BLOWER DISCHARGE PRESSURE (in H2O): 37	BLOWER DISCHARGE TEMPERATURE (°F): 87

PRE GAC / ZEOLITE PID (PPM): 9.7	POST GAC DRUM PID (PPM): 0.0	POST ZEOLITE DRUM PID (PPM): 0.0

NOTES: * Collected with system off.

Well ID	Vacuum (in H_2O)	PID (ppm)
MTN-MW1	-0.02	2.6
MTN-MW2	-0.02	32.0
MTN-MW3	-0.01	1.6

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Thursday, January 26, 2017		
Temperature	<32 °F	**Work Day**	
Weather	Cloudy	**Work Start**	800
Wind	Calm (<1 mph)	**Work Stop**	1600

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Lana Walker / Whitefish Liquor Store	General Manager

Equipment Present Onsite	Count
PID	1
Horiba U-52 Water Quality Meter	1
Solinst Interface Meter	1

Health and Safety Comments	One inch of snow fell overnight; snow and ice covered surfaces.
Record of Samples Collected	Collected a sample of well development fluids from the 55-gallon storage drum; drum contains less than 40 gallons.
Work Activities Conducted	Continued, and completed, well development field activities at the three new monitoring wells (MTN-MW1, MTN-MW2, and MTN-MW3) and started WSMW-7. Development fluids were placed in a 55-gallon drum located inside the remediation building; a sample of the fluids was collected for disposal options. Use well development tools in the three new monitoring wells to surge the water column and flush out sediment. At WSMW-7, the 0.75 inch diameter well is too small for surging the well, so the well was only bailed. Collected system operating data.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

MONITORING WELL DEVELOPMENT LOG

Trihydro CORPORATION

Well ID MTN-MW1

All Measurements taken from: [X] Top of Casing [ ] Protective Casing [ ] Ground Level

Client	MDEQ	Project	Whitefish Solvent Site - Martins Cleaners	Job Number	776-033-001
Date	01/25/2017	Time Start	01/25/2017 @ 1532	Time End	01/26/2017 @ 1127
Development Method	Well Development Surge Tool	Purging Equipment	Bailer	Well Diameter	2"
Measured Depth (pre-development)	18.29**	Measured Depth (post-development)	18.32***	Water Level Equipment	Solinst Interface Meter
Static Water Level (ft)	11.36*	Standing Water Column (ft)	6.93	WQ Meter	Horiba U-52
One Well Volume (gal)	1.13	Minimum Gallons to Purge (10 WCV's)	11.3		

* or 11.92 (BGS) ** or 18.85 (BGS) *** or 18.88 (BGS)

	Time	Amount Purged (gal)	Field Parameters Measured: Water Level	pH	Temp. °C	ORP	Conductivity mS/cm	Turbidity NTU	D.O. mg/L	T.D.S. g/L	Comments	Field Tech.
1/25	1532	Ø	11.36	7.17	10.49	197	1.89	47	5.74	1.22		JR
	1533–	1550	Surge	water	column	with	surge	tool				
	1551	Start	bailing								High amount of silt in purge	
	1554	3	15.24	6.94	10.19	189	2.04	> 800	7.93	1.31		
	1606	5.5	17.90	7.06	10.03	196	2.06	> 800	9.14	1.32	Letting the well Recharge	
	1732	5.5	15.60									
	1741	7	18.17	7.20	9.99	187	1.94	> 800	8.10	1.24	Letting the well Recharge	
1/26	1042	7	11.99									
	1043–	1058	Surge	water	column	with	surge	tool			Low amount of silt in purge.	
	1108	11	16.77	7.21	10.97	195	1.82	> 800	9.00	1.17		JR
	1127	12.25	17.93	7.22	10.73	196	1.83	> 800	12.58	1.17		JR

MONITORING WELL DEVELOPMENT LOG

Trihydro CORPORATION

Well ID MTN-MW2

All Measurements taken from: [X] Top of Casing [ ] Protective Casing [ ] Ground Level

Client	MDEQ	Project	Whitefish Solvent Site - Martins Cleaners	Job Number	776-033-001
Date	01/25/2017	Time Start	01/25/2017 @ 1619	Time End	01/26/2017 @ 1328
Development Method	Well Development Surge Tool	Purging Equipment	Bailer	Well Diameter	2"
Measured Depth (pre-development)	17.04 **	Measured Depth (post-development)	18.21 ***	Water Level Equipment	Solinst Interface Meter
Static Water Level (ft)	11.73*	Standing Water Column (ft)	5.31	WQ Meter	Horiba U-52
One Well Volume (gal)	0.8	Minimum Gallons to Purge (10 WCV's)	8.7		

* or 12.19 bgs ** or 17.50 bgs *** or 18.67 bgs

	Time	Amount Purged (gal)	Field Parameters Measured: Water Level	pH	Temp. °C	ORP	Conductivity mS/cm	Turbidity NTU	D.O. mg/L	T.D.S. g/L	Comments	Field Tech.
1/25	1619	Ø	11.73	6.82	9.61	193	1.43	75	9.26	0.917	Diluted injection fluids noted	JR
	1620-	1635	Surge	water	column	with	surge	tool				
	1636	start	bailing									
	1641	2.5	15.51	7.18	9.66	180	1.28	> 800	7.19	0.818	High amount of silt in purge	
	1656	4.5	17.50	7.40	9.58	175	1.45	> 800	10.09	0.925	High amount of silt in purge	
1/26	0855	4.5	11.72									
	0856-	0910	Surge	water	column	with	surge	tool				
	0915	6	16.95	7.41	10.27	~~16.70~~ 167	1.36	> 800	7.37	0.828	High amount of silt in purge	
	0926	8.5	17.38	7.43	10.54	190	1.26	> 800	8.81	0.808		
	1318	8.5	12.14									
	1328	11.75	17.49	7.11	10.08	157	1.32	> 800	8.06	0.844		JR

MONITORING WELL DEVELOPMENT LOG

Trihydro CORPORATION

Well ID MTN-MW3

All Measurements taken from: [X] Top of Casing [ ] Protective Casing [ ] Ground Level

Client MDEQ
Date 01/25/2017
Development Method Well Development Surge Tool
Measured Depth (pre-development) 18.14 **
Static Water Level (ft) 12.29 *
One Well Volume (gal) 0.9

Project Whitefish Solvent Site - Martins Cleaners
Time Start 01/25/2017 @ 1420
Purging Equipment Bailer
Measured Depth (post-development) 18.49 ***
Standing Water Column (ft) 5.85
Minimum Gallons to Purge (10 WCV's) 9.5

Job Number 776-033-001
Time End 01/26/2017 @ 1257
Well Diameter 2"
Water Level Equipment Solinst Interface Meter
WQ Meter Horiba U-52

* or 12.72 bgs ** or 18.57 bgs *** or 18.92 bgs

	Time	Amount Purged (gal)	Field Parameters Measured: Water Level	pH	Temp. °C	ORP	Conductivity mS/cm	Turbidity NTU	D.O. mg/L	T.D.S. g/L	Comments	Field Tech.
1/25	1420	Ø	12.29	6.92	10.23	198	1.84	51.1	3.72	1.17		JR
	1421 –	1435	Surge	water	column	with	surge	tool				
	1436	Start	bailing								High amount of silt purged	
	1449	5	17.74	6.94	10.80	172	1.69	> 800	6.65	1.08		
	1508	6.5	17.95	7.19	10.26	173	1.70	> 800	12.40	1.09	letting the well recharge	
	1710	6.5	13.26									
	1718	10.5	17.40	7.21	10.29	186	1.72	> 800	20.77	1.10		
1/26	1255	10.5	12.38									
	1257	11	13.41	7.12	10.37	144	1.80	> 800	9.25	1.15		JR

Trihydro CORPORATION

MONITORING WELL DEVELOPMENT LOG

Well ID WSMW-7

All Measurements taken from: ☒ Top of Casing ☐ Protective Casing ☐ Ground Level

Client	MDEQ	Project	Whitefish Solvent Site - Martins Cleaners	Job Number	776-033-001
Date	01/26/2017	Time Start	0847	Time End	1523
Development Method	~~Well Development Surge Tool~~ "Bailer"	Purging Equipment	Bailer	Well Diameter	0.75" ~~2"~~
Measured Depth (pre-development)	12.35	Measured Depth (post-development)	21.47	Water Level Equipment	Solinst Interface Meter
Static Water Level (ft)	11.79	Standing Water Column (ft)	0.56	WQ Meter	Horiba U-52
One Well Volume (gal)	0.1	Minimum Gallons to Purge (10 WCV's)	1.3		

Time	Amount Purged (gal)	Field Parameters Measured								Comments	Field Tech.
		Water Level	pH	Temp. °C	ORP	Conductivity mS/cm	Turbidity NTU	D.O. mg/L	T.D.S. g/L		
0847	Ø	11.79	7.04	10.58	186	1.66	62	6.34	1.07		JR
0848	start bailing										↓
1000	0.25	18.44	7.27	10.91	204	2.11	> 800	9.01	1.35		
1032	0.5	20.30	7.44	11.52	198	1.23	> 800	14.03	0.792		
1142	0.5	15.02									
1225	0.9	20.36	7.23	10.86	185	0.974	735	9.65	0.625		
1440	0.9	13.28									
1523	1.3	20.54									JR

MDEQ WHITEFISH SOLVENT SITE - FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 01/26/2017	TIME: 1535	OPERATOR: Joel

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: MiniRAE 3000 / 592-000488

BLOWER SYSTEM HOURS: 823	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: 1
WELL #7 (EAST) HOURS: 829	WELL #8 (SOUTH) HOURS: 839	WELL #9 (WEST) HOURS: 839

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPM):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	-26	2.2	40	21.6 *
WELL #8 (SOUTH):	ON	-32	2.0	38	4.3 *
WELL #9 (WEST):	ON	-30	2.0	38	5.4 *

MANIFOLD TEMP (°F): 38	MANIFOLD PID (PPM): 9.8*
KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -22

BLOWER VACUUM (in H2O): ~~15.1~~ 15.5 (JD)	BLOWER DISCHARGE PRESSURE (in H2O): 42	BLOWER DISCHARGE TEMPERATURE (°F): 100
PRE GAC / ZEOLITE PID (PPM): 9.9	POST GAC DRUM PID (PPM): 0.0	POST ZEOLITE DRUM PID (PPM): 0.0

NOTES: * Readings collected with system off.

Well ID:	Vacuum (in-H2O)
MTN-MW1	-0.03
MTN-MW2	-0.04
MTN-MW3	-0.02

ENERGY LABORATORIES

Trust our People. Trust our Data.

Chain of Custody & Analytical Request Record

www.energylab.com

Account Information (Billing information)

Company/Name	Trihydro Corporation
Contact	Andrew Vann
Phone	(307) 745-7474
Mailing Address	1252 Commerce Dr.
City, State, Zip	Laramie, WY 82070
Email	Avanne trihydro.com
Receive Invoice	☐Hard Copy ☒Email
Receive Report	☐Hard Copy ☒Email
Purchase Order	
Quote	1351
Bottle Order	22827

Report Information (if different than Account Information)

Company/Name	
Contact	
Phone	
Mailing Address	
City, State, Zip	
Email	
Receive Report	☐Hard Copy ☐Email
Special Report/Formats:	☐ LEVEL IV ☐ NELAC ☒EDD/EDT (contact laboratory) Trihydro ☐ Other_____

Comments

Project Information

Project Name, PWSID, Permit, etc.	MDEQ Whitefish
Sampler Name	Joel Riebli
Sampler Phone	(307)760-2793
Sample Origin State	MT
EPA/State Compliance	☐ Yes ☐ No

MINING CLIENTS, please indicate sample type.
*If ore has been processed or refined, call before sending.
☐ Byproduct 11 (e)2 material ☐ Unprocessed ore (NOT ground or refined)*

Matrix Codes
A - Air
W - Water
S - Soils/Solids
V - Vegetation
B - Bioassay
O - Other
DW - Drinking Water

All turnaround times are standard unless marked as RUSH.
Energy Laboratories MUST be contacted prior to RUSH sample submittal for charges and scheduling – See Instructions Page

Analysis Requested

	Sample Identification (Name, Location, Interval, etc.)	Collection Date	Collection Time	Number of Containers	Matrix (See Codes Above)	8260 VOC short list									See Attached	RUSH TAT	ELI LAB ID (Laboratory Use Only)
1	MTN-Purge	1/26/17	1545	3	W	X											
2	Trip Blank	—	—	1	W	X											
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Custody Record MUST be signed	Relinquished by (print)	Date/Time	Signature	Received by (print)	Date/Time	Signature
	Joel Riebli	1/27/17 @ 1630				
	Relinquished by (print)	Date/Time	Signature	Received by Laboratory (print)	Date/Time	Signature
					1/27/17 1630	

LABORATORY USE ONLY

Shipped By	Cooler ID(s)	Custody Seals	Intact	Receipt Temp	Temp Blank	On Ice	Payment Type	Amount	Receipt Number (cash/check only)
Hand	9	Y (N) C B	Y N	1.2 °C	(Y) N	(Y) N	CC Cash Check_____	$	

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All subcontracted data will be clearly notated on your analytical report.

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Tuesday, February 21, 2017		
Temperature	32-50 °F	**Work Day**	
Weather	Rain	**Work Start**	1140
Wind	Light (1-10 mph)	**Work Stop**	1950

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Sarah Seitz / Trihydro Corporation	Engineer
Lana Walker / Whitefish Liquor Store	General Manager
Utility Locators	Utility Locators

Equipment Present Onsite	Count
PID -ppb	1
Horiba U-52 Water Quality Meter	1
Solinst Interface Meter	1
Peristaltic Pump	1
Rotary hammer drill w/ 1" bit	1

Health and Safety Comments	Rain and snow mix weather conditions.
Record of Samples Collected	Purged and collected the groundwater samples from the following monitoring wells: •MTN-MW1 •MTN-MW2 •MTN-MW3
Work Activities Conducted	Mobilized from Helena to Whitefish. Utility locators marked utilities outside of the Whitefish Liquor Store prior to arrival.

Gauged the four groundwater monitoring wells. The groundwater table has risen approximately four feet since the January 25, 2017 well development field activities. Using a peristaltic pump, purged, collected water quality measurements, and sampled groundwater from monitoring wells MTN-MW1, MTN-MW2, and MTN-MW3.

Met with Whitefish Liquor Store general manager Lana Walker. Interviewed her for indoor air quality testing. Using a 1" drill bit and a rotary hammer drill, drilled and installed a subslab vapor well in the utility closet of the Whitefish Liquor Store. The concrete was approximately nine inches thick; the vapor well was drilled to 15 inches. Silica sand, teflon tubing, and bentonite was installed to make the subslab well; the inlet of the teflon tubing installed approximately 14.5 inches below the top of the concrete surface.

The SVE remediation system was running on arrival to the site and continued operating through out the day.

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

Photo Date:	2/23/2017
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	-114.3375
Y Coordinate:	48.40944444
Location:	
Description:	Utility closet inside the Whitefish Liquor Store before the installation of the subslab vapor well.

Photo Date:	2/23/2017
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	-114.3375
Y Coordinate:	48.40944444
Location:	
Description:	Completed subslab vapor port MTN-SS inside the utility closet of the Whitefish Liquor Store. The well is located 7.5' south of the northern interior wall and 15.5' west of the eastern interior wall. The inlet of the teflon tubing is approximately 14.5" below the floor.

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Wednesday, February 22, 2017		
Temperature	32-50 °F	**Work Day**	
Weather	Cloudy	**Work Start**	940
Wind	Calm (<1 mph)	**Work Stop**	1840

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Sarah Seitz / Trihydro Corporation	Engineer
Lana Walker / Whitefish Liquor Store	General Manager

Equipment Present Onsite	Count
PID -ppb	1
Horiba U-52 Water Quality Meter	1
Solinst Interface Meter	1
Peristaltic Pump	1
Helium meter	1
Summa Canisters	6

Health and Safety Comments

Record of Samples Collected

Groundwater:

•WSMW-7

Indoor Air:

•MTN-AA-1
•MTN-VI-1 (& MTN-BD-1)

Subslab:

•MTN-SS-1

SVE System:

•MTN-PRE
•MTN-POST

Work Activities Conducted

Finished groundwater sampling by purging and sampling groundwater from monitoring well WSMW-7. WSMW-7 was purge dry before groundwater parameters stabilized; the well was allowed to recharge for five hours and ten minutes before collecting a grab sample.

Indoor vapor intrusion and subslab summa canister sampling was conducted inside the Whitefish Liquor Store. The subslab vapor well, located in the utility closet, was leak tested using helium, purged, and then sampled over a 26 minute period with a 6 liter summa canister sample.

A eight hour vapor intrusion summa canister, and duplicate canister, was collected inside the Whitefish Liquor Store between 1006 and 1806. A corresponding ambient air sample was collected off of the power pole next to the SVE remediation system for five hours and fifteen minutes.

The SVE system before GAC and Zeolite filtration medias and after medias summa canister samples were collected for 30 minutes.

	Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 02/22/2017	TIME: 1345	OPERATOR: Joel Riebli

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: ppbRAE 3000 / 594-905182

BLOWER SYSTEM HOURS: 1468	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: 1

WELL #7 (EAST) HOURS: 1475	WELL #8 (SOUTH) HOURS: 1485	WELL #9 (WEST) HOURS: 1485

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPB):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	-31	2.7	45	5,264
WELL #8 (SOUTH):	ON	-36	2.5	43	1,466
WELL #9 (WEST):	ON	-33	2.9	47	1,823

MANIFOLD TEMP (°F): 42	MANIFOLD PID (PPB): 2,403

KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -23

BLOWER VACUUM (in H2O): 19.1	BLOWER DISCHARGE PRESSURE (in H2O): 51	BLOWER DISCHARGE TEMPERATURE (°F): 128

PRE GAC / ZEOLITE PID (PPB): 2,117	POST GAC DRUM PID (PPB): 185	POST ZEOLITE DRUM PID (PPB): 13

	VACUUM (In H2O)	PID (PPB):		VACUUM (in H2O)	PID (PPB):
MTN-MW1:	0.03	364	MTN-MW3:	0.02	1829
MTN-MW2:	1.2	102.2 ppm	Subslab:	NM	571

NOTES:

1345 start "MTN-PRE" & "MTN-POST" on the influent & effluent filtration media drums.
1345 - 1415

	Name:	Company:
Report Created By	Joel Riebli	Trihydro Corporation
Date	Thursday, February 23, 2017	

Temperature		**Work Day**	
Weather		**Work Start**	700
Wind		**Work Stop**	1110

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Sarah Seitz / Trihydro Corporation	Engineer

Health and Safety Comments

Record of Samples Collected

Work Activities Conducted Demobilized from Whitefish to Helena. Dropped off groundwater samples at Energy Labs, shipped summa canister samples to ALS, and shipped rented groundwater and leak testing equipment to rental companies.

	Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Monday, March 13, 2017		
Temperature	32-50 °F	**Work Day**	
Weather	Cloudy	**Work Start**	1020
Wind	Calm (<1 mph)	**Work Stop**	1305

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer

Equipment Present Onsite	Count
Interface meter	1

Health and Safety Comments	A section of sidewalk located the east end of the southern SVE trench has formed a trip hazard. Used yellow paint to help pedestrians see the trip hazard.
Record of Samples Collected	Collected a grab sample of liquid from the drum containing groundwater. The sample was placed on ice and hand delivered to Energy Labs in Helena for RCRA 8 metal analysis.
Work Activities Conducted	Drove from Helena to Whitefish. Painted the portion of sidewalk were a trip hazard is present with yellow marking paint. SVE system was running on arrival to the former Martin's Cleaners. Collected SVE operating data; did not have a PID so no vapor readings were collected. Gauged site monitoring wells: ID Depth to water (TOC) MTN-MW1 well iced over MTN-MW2 6.18'

MTN-MW3	6.23'
WSMW-7	6.46'

Collected measurements of the southern sidewalk containing negative slope.

Demobilized back to Helena and Energy Labs.

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

Photo Date:	3/13/2017
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Applied yellow paint to a portion of southern sidewalk were a trip hazard has formed. Negative drainage has formed from the middle of the sidewalk back towards the building.

Photo Date:	3/13/2017
Direction:	East
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Standing water under the awning with the negative drainage that has occured in the middle of the sidewalk.

Photo Date:	3/13/2017
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Negative draingage and standing water on the western end of the southern SVE trench.

Photo Date:	3/13/2017
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Negative draingage in the southern SVE sidewalk.

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 03/13/2017	TIME: 1030	OPERATOR: JR
SYSTEM STATUS: ON OFF	IF OFF, WHY:	

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: NA

BLOWER SYSTEM HOURS: 1919	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: 1
WELL #7 (EAST) HOURS: 1927	WELL #8 (SOUTH) HOURS: 1937	WELL #9 (WEST) HOURS: 1937

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPB):
WELL #1 (AIR DULITION):	OFF	—	—	—	—
WELL #7 (EAST):	ON	~~4.8~~ -40	4.8	60	—
WELL #8 (SOUTH):	ON	~~4.3~~ -47	4.3	56	—
WELL #9 (WEST):	ON	~~5.2~~ -45	5.2	63	—

MANIFOLD TEMP (°F): ~~96~~ 49	MANIFOLD PID (PPB): NA
KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -28

BLOWER VACUUM (in H2O): 29.4	BLOWER DISCHARGE PRESSURE (in H2O): 50	BLOWER DISCHARGE TEMPERATURE (°F): 96
PRE GAC / ZEOLITE PID (PPB): —	POST GAC DRUM PID (PPB): —	POST ZEOLITE DRUM PID (PPB): —

	VACUUM (In H2O)	PID (PPB):		VACUUM (in H2O)	PID (PPB):
MTN-MW1:	NA Ice out	—	MTN-MW3:	-0.02	—
MTN-MW2:	-1.3	—			

6.18 DTW

6.23 DTW

NOTES:

WSMW-7 6.46 DTW

DAILY SHEET OF

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Monday, April 10, 2017		
Temperature	32-50 °F	**Work Day**	
Weather	Cloudy	**Work Start**	1525
Wind	Calm (<1 mph)	**Work Stop**	1655

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Midway Rentals	Delivered Forklift

Equipment Present Onsite	Count
Forklift	1
ppbRae 3000 PID	1

Health and Safety Comments	The sidewalk trip hazard is no more. The frost heave is gone and the sidewalk has returned to the previous position.
Record of Samples Collected	None
Work Activities Conducted	Mobilized from Helena to Whitefish. Purchased field supplies in Columbia Falls and rented a forklift for off loading pallet tomorrow. Forklift was delivered SVE system was running on arrival.; collected system operating data. Inspected the southern sidewalk, most of the sidewalk has recovered from the frost heaving; still have negative slope under the awning.

	Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes

Photo Date:	4/13/2017
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Southern sidwalk with the trip hazard (yellow paint) returning to normal position).

Photo Date:	4/13/2017
Direction:	East
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Negative slope still present under the western end of the awning along the southern sidewalk.

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
SYSTEM OPERATIONS FIELD FORM

TRIHYDRO CORPORATION
776-033-001

DATE: 04/10/2017	TIME: 1530	OPERATOR: Joel

SYSTEM STATUS: (ON) OFF	IF OFF, WHY:

SYSTEM MONITORING EQUIPMENT TYPE / SERIAL NUMBER: ppbRAE 3000 / 594-905182

BLOWER SYSTEM HOURS: 2,596	TRANSFER PUMP SYSTEM HOURS: Ø	WELL #1 (AIR DILUTION) HOURS: ~~Ø~~
WELL #7 (EAST) HOURS: 2,604	WELL #8 (SOUTH) HOURS: 2,614	WELL #9 (WEST) HOURS: 2614

	STATUS: ON / OFF	VACUUM (in H2O):	DIFFERENTIAL PRESSURE (in H2O):	CONVERTED FLOW (SCFM):	PID (PPB):
WELL #1 (AIR DULITION):	OFF	~~28~~	—	—	—
WELL #7 (EAST):	ON	-28	2.6	44	7,223
WELL #8 (SOUTH):	ON	-34	2.3	41	1,210
WELL #9 (WEST):	ON	-32	2.6	44	2,284

MANIFOLD TEMP (°F): 52	MANIFOLD PID (PPB): 3,058
KNOCKOUT TANK SIGHT TUBE LEVEL (ESTIMATED INCHES): Empty	INLINE AIR FILTER VACUUM (in H2O): -24

BLOWER VACUUM (in H2O): ~~50~~ 17.1	BLOWER DISCHARGE PRESSURE (in H2O): 50	BLOWER DISCHARGE TEMPERATURE (°F): 140
PRE GAC / ZEOLITE PID (PPB): 2919	POST GAC DRUM PID (PPB): 2	POST ZEOLITE DRUM PID (PPB): Ø

	VACUUM (In H2O)	PID (PPB):		VACUUM (in H2O)	PID (PPB):
MTN-MW1:	0.05	63	MTN-MW3:	-0.03	29
MTN-MW2:	-5.4	5,382	sub slab:	~~Ø~~	417

NOTES:

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Tuesday, April 11, 2017		
Temperature	32-50 °F	**Work Day**	
Weather	Clear	**Work Start**	740
Wind	Calm (<1 mph)	**Work Stop**	1245

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Midway Rentals	Picked up Forklift
Shayne / Cutting Edge Excavation	Excavation Supervisor

Equipment Present Onsite	Count
Forklift	1

Health and Safety Comments	None
Record of Samples Collected	None
Work Activities Conducted	Transferred the contents of Zeolite 55-gallon drum #1 into eight 5-gallon buckets. Transferred the contents of GAC 55-gallon drum #1 into nine 5-gallon buckets. The 17 buckets were sealed with lids and placed in the rear of the remediation system. Got in touch with YRC Transport, the shipment of replacement drums has been handed off to North Park Transportation. North Park will be delivering tomorrow and no forklift will be required. The rented forklift was picked up by Mid-Way Rentals. Cutting Edge Excavation stopped by to inspect the southern sidewalk and to see if all of the sidewalk had leveled back in place. A portion of the sidewalk under the awning still has a negative slope. Cutting Edge will be excavating about a mile

south of the site tomorrow and will be able to see if frost is present in the subsurface.

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Wednesday, April 12, 2017		
Temperature	32-50 °F	**Work Day**	
Weather	Rain	**Work Start**	910
Wind	Calm (<1 mph)	**Work Stop**	1225

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Andrew Belski / River Design Group	Surveyor
Nate Wyatt / River Design Group	Surveyor
Lana Walker / Whitefish Liquor Store	General Manager
North Park Transportation	Delivery Driver

Equipment Present Onsite	Count
Interface meter	1
Surveyor Equipment	1

Health and Safety Comments	Had safety meeting and hazard analysis with River Design Group.
Record of Samples Collected	None
Work Activities Conducted	River Design Group surveyed the four monitoring wells; capturing both the monitoring well surface elevation and the top of casing elevation. Two new GAC drums were delivered to the site, one of the drums was installed between the current GAC drum #2 and Zeolite drum #2. The SVE system is having the vapor stream go through two GAC drums and then a Zeolite drum before exiting the remediation system. The other GAC drum was placed in the remediation shed for future use. Gauged the four monitoring wells with the interface water level meter:

Gauged the four monitoring wells with the interface water level meter:

ID:	Top of Casing depth to water:
MTN-MW1	7.74 '
MTN-MW2	7.31'
MTN-MW3	6.45'
WSMW-7	7.01'

Stopped by and met with Cutting Edge Excavation, who was excavating about one mile south of the site on Baker Ave. Cutting Edge had dug down approximately seven feet but did not find any frost.

Demobilized back to Helena.

Deviation from approved plans:

Work conducted in accordance with approved plans? Yes

Photo Date:	4/14/2017
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	The three filtration 55-gallon drums connected to the SVE system inside the remediation system.

Photo Date:	4/14/2017
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	The three filtration drums (left to right; GAC #2, GAC #3, Zeolite #2). The middle drum, or GAC #3, was installed today.

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Tuesday, April 25, 2017		
Temperature	32-50 °F	**Work Day**	
Weather	Rain	**Work Start**	635
Wind	Light (1-10 mph)	**Work Stop**	1730

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Marc Blanden / Cutting Edge Excavation	Excavation Supervisor
Dustin Gatch / Cutting Edge Excavation	Laborer
Chris Waldusky / Cutting Edge Excavation	Laborer
Bryan Stephans /Cutting Edge Excavation	Laborer
Valene Edwards / Cutting Edge Excavation	Laborer
Andrew Belski / River Design Group	Surveyor
Lana Walker / Whitefish Liquor Store	Whitefish Liquor Store General Manager
Randy Reynolds / City of Whitefish	Building Inspector

Equipment Present Onsite	Count
ppbRae 3000 PID	1
End Dump Truck	1
Bobcat	1
Jack hammer	1
Surveyor Equipment	1
Concrete cutter	1

Health and Safety Comments

Did not start field activities until the windows were protected by OSB boards during jack hammering activities.

Shut down for heavy rain at 1130.

Record of Samples Collected	None collected.
Work Activities Conducted	Cutting Edge Excavation placed work cones out along Third Avenue along the liquor store. Cutting Edge Excavation used a concrete cutter (wetted down the cutting surface with water) and a jackhammer to remove concrete covering the southern sidewalk covering the SVE trench. OSB boards were placed over the three liquor store windows to protect the glass from jack hammering activities. The broken up pieces of concrete were placed in the bobcat bucket ,and the bobcat placed the broken concrete pieces into the dump truck. The dump truck took two loads of concrete to Knife River (south of Columbia Falls) for recycling. The strip of 10" wide concrete strip up against the liquor store building was removed. Below this strip of concrete the liquor store building slab and footers were exposed. Can not pour a 7 foot wide sidewalk up against the liquor store building because the footers and building stab would provide a very thin amount of sidewalk concrete poured on top of it. The City of Whitefish concrete building inspector Randy Reynolds stopped by the site and provided previously approved plans for installing a zip strip of concrete along a building and sidewalk. The plans call for pinning the building foundation to the new concrete, installing expansion material up against the building surface, and installing a zip strip metal to tie the small concrete pour with the wider sidewalk. 7/8" coarse rock was brought into the excavated sidewalk area and compacted down. Round tips were installed six feet off the existing sidewalk set for a 1.95% grade (towards the street) and a four inch thick concrete pour. River Design Group collected GPS positions for the four monitoring wells. Met with Lana Walker over the western sidewalk issues (filling in the four low posts) and the parking lot. The parking lot may be modified and Lana said that near the back door of the building a ramp might be constructed. I let her know that the system piping is deeper than three feet so unless deep excavating takes place, none of the ramp construction will affect the remediation system. If they need the monitoring wells raised or lowered to get with Trihydro to help with modified the wells elevations. Lana didn't think that the wells elevations would change as they are a good distance away from where they are looking at making the ramp. Collected system operating data using a ppb PID meter.

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

Photo Date:	4/25/2017
Direction:	East
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Looking at the southern sidewalk before the sidewalk is removed along the south end of the liquor store building.

Photo Date:	4/25/2017
Direction:	Northwest
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Looking at the southern sidewalk before removal activities begin.

Photo Date:	4/25/2017
Direction:	East
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Cutting Edge Excavating operating a jack hammer to breakup sidewalk next to the ADA plate. Placing the broken concrete into the bobcat bucket.

Photo Date:	4/25/2017
Direction:	East
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Cutting Edge Excavating jack hammering next to one of the liquor store windows (covered by OSB boards). The broken concete placed in the bobcat bucket.

Photo Date:	4/25/2017
Direction:	East
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	River Design Group surveyor collecting GPS positoning data at monitoring well MTN-MW2. In the backgound, Cutting Edge Excavating jack hammering concrete sidewalk and placing the broken conrete into the bobcat bucket, who places the concrete into the dump truck.

Photo Date:	4/25/2017
Direction:	South
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Bobcat dumping bucket of concrete into the end dump. The end dump took the concrete to Knife River (south of Columbia Falls) for recycling.

Photo Date:	4/25/2017
Direction:	East
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Cutting Edge Excavating adding 7/8" course rock to build a base below the sidewalk. The material was compacted down so that 4 inches of concrete could be poured with a 1.95% slope (over six feet wide) towards the street. A 10" wide strip of concrete will be built up against the building wall due to the shallow footers and building foundation.

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Wednesday, April 26, 2017		
Temperature	32-50 °F	**Work Day**	
Weather	Rain	**Work Start**	1200
Wind	Calm (<1 mph)	**Work Stop**	1545

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Marc Blanden / Cutting Edge Excavation	Excavation Supervisor
Cody Sandon / Sandon Construction Company	Supervisor
Frank Simon / Sandon Constuction Company	Laborer
Brad Clark / Sandon Construction Company	Laborer
Josh Clark / Sandon Construction Company	Laborer

Health and Safety Comments	Light rain falling through out the day.
Record of Samples Collected	None.
Work Activities Conducted	Sandon Construction Company prepped for upcoming concrete sidewalk pours, one a six foot wide sidewalk with a 1.95 % slope and a 10 inch wide strip of concrete up against the liquor store building. Sandon installed the rod which will tie in the liquor store footers and building slab into the 10 inch wide concrete. The SVE system blower motor is showing higher temperatures (~150 degrees) than previously observed; the increased temperature is likely due to the blower pushing through three filtration drums rather than the previous two drums. The blower setting were reduced from 30 Hertz (Hz) down to 28 Hz.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

Photo Date:	4/26/2017
Direction:	East
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Secured work area after installing rods into the building foundation and building slab.

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Friday, April 28, 2017		
Temperature	32-50 °F	**Work Day**	
Weather	Rain	**Work Start**	830
Wind	Light (1-10 mph)	**Work Stop**	1410

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Marc Blanden / Cutting Edge Excavation	Excavation Supervisor
Frank Simon / Sandon Constuction Company	Laborer
Josh Clark / Sandon Construction Company	Laborer
Chris Fraleigh / Sandon Construction Company	Laborer
James McHeffey / Sandon Construction Company	Laborer
Rodney Dyer / Sandon Construction Company	Laborer
Casey Littlefield / Schellinger Concrete	Driver

Equipment Present Onsite	Count
Concrete Truck	1

Health and Safety Comments	
Record of Samples Collected	None
Work Activities Conducted	Sandon Construction Company installed wire mesh, zip strip, and framing. Schellinger Construction delivered one load of concrete and Sandon Construction

Company poured the six foot wide sidewalk. The poured concrete was covered with plastic as rain is forecast in the afternoon and evening.

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

Photo Date:	4/28/2017
Direction:	East
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Wire mesh, zip strip, and framing installed as concrete truck arrives onsite.

Photo Date:	4/28/2017
Direction:	East
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Sandon Construction Company pouring the six foot wide 1.95 % grade concrete sidewalk.

Photo Date:	4/28/2017
Direction:	East
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Sandon Constuction Company starting to broom the sidewalk as light rain begins to fall.

Photo Date:	4/28/2017
Direction:	East
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Covered sidewalk pour as the sun shines.

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Sunday, April 30, 2017		
Temperature	32-50 °F	**Work Day**	
Weather	Rain	**Work Start**	820
Wind	Light (1-10 mph)	**Work Stop**	1035

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Josh Clark / Sandon Construction Company	Laborer
Chris Fraleigh / Sandon Construction Company	Laborer
James McHeffey / Sandon Construction Company	Laborer
Rodney Dyer / Sandon Construction Company	Laborer
Johnathon Evangelestoff / LHC	Driver
Cody Sandon / Sandon Construction Company	Supervisor
Delray Gronlay / Sandon Construction Company	Laborer

Equipment Present Onsite	Count
Concrete Truck	1

Health and Safety Comments	Light rain falling off and on
Record of Samples Collected	Recollected a media sample from the used "Zeolite" filtration media for laboratory analysis; the previous sample has some rejected data after qualified.
Work Activities Conducted	Sandon Construction Company removed the framing from yesterday's concrete pour exposing the zip strip. Expansion board was placed up against the liquor store

building and concrete was poured over the rods tied into the liquor store foundation and slab. The fresh concrete was covered with plastic, which will be removed on Monday morning.

Updated Liquor Store operator Lana Walker with the concrete work. Looking at filling in the western sidewalk posts next week. Date unknown.

Mobilized back to Helena

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

Photo Date:	4/29/2017
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Zip strip exposed from yesterday's concrete pour that will tie in with todays pour.

Photo Date:	4/29/2017
Direction:	East
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Sandon Construction Company pouring the strip of concrete up against the liquor store building.

Photo Date:	4/29/2017
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Covering the newly poured strip of concrete up against the building.

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Thursday, May 4, 2017		
Temperature	50-70 °F	**Work Day**	
Weather	Clear	**Work Start**	710
Wind	Calm (<1 mph)	**Work Stop**	2010

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Rodney Dyer / Sandon Construction Company	Laborer
Ty Weber / Sandon Construction Company	Laborer
Lana Walker / Whitefish Liquor Store	Whitefish Liquor Store General Manager

Health and Safety Comments	
Record of Samples Collected	None.
Work Activities Conducted	Sandon Construction Company cleaned up the areas in the western and southern sidewalk were concrete patch was applied. They mixed Cement All Rapid Set and Ma-Ca-Bond and applied the mix to the sidewalk areas needing filled. Whitefish Liquor Store operator Lana Walker arrived on-site while the concrete patch was drying. She walked both sidewalks but did not see any additional areas where the patch was needed. The three monitoring wells drilled and installed in January 2017 had their concrete collar removed and replaced with Sakrete fast setting concrete mix by Trihydro. The concrete poured in January took place in freezing temperatures resulting in the water freezing in the mix and no bonding in the concrete mix.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

Photo Date:	5/4/2017
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Cement All and Ma-Ca-Bond mixed and used as concrete patch in Western and Southern sidewalk areas. The Eucopatch material was not used.

Photo Date:	5/4/2017
Direction:	Northeast
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Concrete patch in the western sidewalk awning posts.

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Monday, May 15, 2017		
Temperature	50-70 °F	**Work Day**	
Weather	Cloudy	**Work Start**	1545
Wind	Light (1-10 mph)	**Work Stop**	1840

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer

Equipment Present Onsite	Count
Interface meter	1
PID -ppb	1

Health and Safety Comments	
Record of Samples Collected	Collected the quarterly SVE system filtration laboratory influent (MTN-PRE) and effluent (MTN-POST) summa canister samples.
Work Activities Conducted	Mobilized from Helena to Whitefish. The SVE system was running on arrival to the site. Collected water elevations and vacuum and PID readings from monitoring wells and subslab sample ports. Collected 30-minute long influent (MTN-PRE) and effluent (MTN-POST) vapor samples before and after the three drum SVE filtration media. Collected SVE system operation data and inspected the system; the blower temperature has gone down since the last site visit.

	Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes

Photo Date:	5/15/2017
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Influent (second drum on right side) and effluent (far left drum) summa canister sample collection.

Photo Date:	5/15/2017
Direction:	Northeast
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Influent (center left) and effluent (center right) filtration media vapor sampling. The influent sample is before the two GAC and zeolite drums; the effluent is collected after the filtration media.

Photo Date:	5/15/2017
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	The condition of the southern sidewalk.

Photo Date:	5/15/2017
Direction:	North
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	The western sidewalk with two weeks ago concrete patch around the awning posts.

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Friday, May 5, 2017		
Temperature	50-70 °F	**Work Day**	
Weather	Rain	**Work Start**	710
Wind	Light (1-10 mph)	**Work Stop**	1420

Onsite Personnel (name/company)	Role
Joel Riebli / Trihydro Corporation	Engineer
Lana Walker / Whitefish Liquor Store	Whitefish Liquor Store General Manager
Mike Gipson / MDEQ	Project Manager

Health and Safety Comments	
Record of Samples Collected	None
Work Activities Conducted	A sample port was installed on the outlet of the second GAC drum for VOC monitoring. Sitewalk with MDEQ's Mike Gipson and Whitefish Liquor Store operator Lana Walker. Discussed possibly replacing two panels of sidewalk located in the southern sidewalk and the upcoming parking lot replacement and fence installation. Demobilized back to Helena.

	Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes

Photo Date:	5/5/2017
Direction:	Northwest
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Two panels of sidewalk that Lana Walker would like replaced.

SVE Filtration ~~Indoor Air~~ Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	Martin's Cleaners	Start Weather:	Cloudy ~~[illegible]~~ SP
		Start Outdoor Air Temp:	~10°F
Project Name:	MDEQ Whitefish Site	Start Atmospheric Pressure:	30.19 in
Sample Location:	Martin's Cleaners SVE System		
Date:	12/22/2016	End Weather:	Cloudy
Field Personnel:	Joel Riebli	End Outdoor Air Temp:	7°F
Recorded by:	Joel Riebli	End Atmospheric Pressure:	30.17 in

Canister and Sample Information

	Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
	12/22/16	1450	12/22/16	1520	MTN-PRE-STARTUP	SC 00311	OA 00964		-27.47	-2.65	~75°F	~75°F
*	~~12/22/16~~	~~1544~~	~~12/22/16~~	~~1614~~	~~MTN-PRE~~	~~AC01767~~	~~OA01148~~		~~-26.82~~	~~-0.74~~	~~~75°F~~	~~~75°F~~
*	~~12/22/16~~	~~1544~~	~~12/22/16~~	~~1614~~	~~MTN-POST~~	~~AC02180~~	~~OA 00111~~		~~-26.88~~	~~-5.57~~	~~~75°F~~	~~~75°F~~

Comments:

MTN-PRE-STARTUP: SVE horizontal wells valves OFF, all flow going through the air dilution valve/ inline filter / KO tank / blower before sample collection (Influent Sample)

MTN-PRE: Air dilution valve closed all three SVE horizontal valves 100% open. Sample is influent before GAC & zeolite drums.

MTN-POST: Effluent post GAC & zeolite drums.

* Sample not run as air leak on the inline air filter was discovered after sample collection.

SVE Filtration ~~Indoor Air~~ Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	Martin's Cleaners	Start Weather:	Cloudy
		Start Outdoor Air Temp:	-9°F
Project Name:	MDEQ Whitefish Solvent Site	Start Atmospheric Pressure:	30.38 in
Sample Location:	Whitefish, MT		
Date:	01/12/2017	End Weather:	Cloudy
Field Personnel:	Joel Riebli	End Outdoor Air Temp:	-11°F
Recorded by:	Joel Riebli	End Atmospheric Pressure:	30.40 in

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
01/12/17	0810	01/12/17	0840	MTN-POST	AS00206	OA00074		-27.1	-3.8	75°F	75°F

Comments:

MTN-POST: Effluent sample ~~post~~ port (ST) post GAC & zeolite drums.

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	Whitefish Solvent Site	Start Weather:	Cool - cloudy w/ partial sun
		Start Outdoor Air Temp:	39° F
Project Name:	VI Sampling	Start Atmospheric Pressure:	30 in Hg.
Sample Location:	Whitefish, MT		
Date:	2/22/17	End Weather:	Same as above 65% Humidity
Field Personnel:	J. Riddi, S. Seitz	End Outdoor Air Temp:	39 °F
Recorded by:	S. Seitz	End Atmospheric Pressure:	30 in Hg

wind WSW 2mph

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
2/22/17	13:45 ~~13:45~~	2/22/17	14:15 ~~15:45~~	POST MTN-~~[illegible]~~	AC01989	OA01234	NO #	-27.00	-4.79	NA	outside
2/22/17	13:45	2/22/17	14:15	PRE MTN-~~[illegible]~~	SC02200	OA01764	NO #	-26.97	-4.51	NA	in SVC

≅ 85°F

PRE = Influent into treatment building
POST = Effluent out of 2nd treatment drum within treatment building

"Comfort Zone" in treatment building

Comments:

Analyses TO15 (Sim for POST ONLY), APH

APPENDIX J

GROUNDWATER SAMPLING

ATTACHMENT 1

memorandum

To:	Mr. Mike Gipson, Montana DEQ
From:	Mr. Andrew Vann, Trihydro Corporation
cc:	Mr. Joel Riebli, Trihydro Corporation
Date:	February 8, 2017
Re:	Groundwater Sampling Work Plan, Whitefish Solvent Site, Whitefish, Montana

Trihydro Corporation (Trihydro) has been working with the Montana Department of Environmental Quality (DEQ) to investigate potential impacts of chlorinated solvents, tetrachloroethylene (PCE) and its daughter products (trichloroethylene (TCE), cis-1,2-dichloroethene, trans-1,2-dichloroethene, and vinyl chloride), at the former Martin's Cleaners facility located at 239 Baker Avenue in downtown Whitefish, MT. As part of interim remediation for chlorinated solvents at the former Martin's Cleaners facility, Trihydro has installed and is operating a soil vapor extraction system with effluent treatment and recently completed in-situ enhanced bioremediation injections.

The overall objective of the interim remedial activities is to reduce the potential migration of chlorinated solvents to indoor air and to protect human health and the environment. This memo outlines the scope of work (SOW) for groundwater sampling to evaluate contaminant concentrations and interim action effectiveness.

1.0 FLUID LEVEL MEASUREMENT

Fluid level data are collected in association with water quality monitoring events to evaluate the groundwater flow gradient. Water level measurements are collected prior to preparing the well for sample collection. To minimize the potential for cross contamination and entraining sediment that may be at the bottom of the well into the water column, post-development total well depth measurements from January will be used. In addition, the well condition is observed for potential damage to the wellhead, surface completion or well casing. If well damage is noted during monitoring activities, Trihydro will determine whether the well requires repair, abandonment, replacement, or resurveying.

An electronic oil/water interface probe will be used to determine the interfaces (if present) of the immiscible layers (i.e., air to light immiscible, light immiscible to water, and water to heavy immiscible). As the interfaces are detected, the probe is slowly lowered and raised to record an accurate measurement of the interface. These measurements are recorded to the nearest 0.01 foot.

Measurements made during a particular monitoring event are made to the designated reference points with the same instrument. The vertical reference points (e.g., north side top of casing) will be established by a licensed surveyor in relation to the nearest permanent benchmark (i.e., USC and GS, USGS, or NGVD), and the vertical control datum used to determine the elevation of the well will be the North American Vertical Datum

of 1988 (NAVD 88). The survey results will provide an accuracy of plus or minus 0.1 foot horizontally, and plus or minus 0.01 foot vertically. The horizontal well coordinates will be established by surveying in reference to a permanent benchmark (USGS, or equivalent), and the latitude and longitude coordinates will reference the State Plane NAD83 HARN Coordinate System.

2.0 SAMPLE COLLECTION METHODOLOGY

The three recently installed monitoring wells (MTN-MW1, MTN-MW2, and MTN-MW3) are 2-inch diameter PVC wells. The previously installed well, WSMW-7, was constructed with ¾-inch PVC. Submersible electric or bladder pumps are not available to collect a sample from a well this small. Therefore the options for sampling this well are small diameter bailer and low-flow using a peristaltic pump. Both methods potentially reduce VOC concentrations through volatilization, but the wells appear to have relatively high PCE concentrations based on a sample of well development water (basically a composite from the 4 wells) with a PCE concentration of 840 ug/L. Therefore, plume delineation to DEQ-7 screening levels is unlikely (chlorinated solvent concentrations in groundwater in each well likely exceed screening levels), and slight volatilization of VOCs is unlikely to affect conclusions based on groundwater sampling. Measurement of field parameters (dissolved oxygen [DO] and oxidation-reduction potential [ORP] in particular) will be more accurate with peristaltic pump sampling than bailer sampling. Sampling the three new wells with a bladder pump and the older well with a peristaltic pump is an option; however this approach would introduce additional cost and reduce the comparability between sampling methods. Therefore, Trihydro recommends sampling each of the wells using the low flow technique described below using a peristaltic pump.

When low-flow sampling, the tubing (if using a peristaltic pump) or the submersible pump will be positioned slowly into the well to the midpoint of the zone to be sampled and the pump intake kept 2 feet from the bottom of the well in order to minimize agitation of sediment. If the water column is less than 2 feet, collection of a turbidity-free sample may not be possible. New sample tubing will be used for each well during the initial sampling event. Tubing will be stored in a sealed plastic bag labelled with each well name for used during future sampling events.

The pump speed will be adjusted until there is little or no water-level drawdown (less than 0.3 feet). If the minimum drawdown that can be achieved is greater than 0.3 feet but remains stable, the well will continue to be purged and documented per United States Environmental Protection Agency (USEPA) guidelines. The diameter of monitoring well WSMW-7 is too small to have both the purge line and collect water level measurements; since it will be the last of the four wells sampled, it will be sampled at the lowest purge rate measured from the three previous 2-inch wells.

The field parameters pH, conductivity, ORP, and DO will be measured every 3 to 5 minutes during purging using a water quality meter with a flow-through cell. Stabilization is considered to be when these parameters vary less than 10% over three consecutive measurements. If ORP values remain between 10 millivolts (mV) and -10mV or DO values remain <1 milligrams per liter (mg/L) for three consecutive measurements along

with stability of the other parameters, the well will be considered stable. At this time temperature and turbidity measurements will also be made, and the groundwater sample will be collected.

Groundwater samples will be analyzed for VOCs (short list) by Method EPA 8260B, and will also be analyzed for extractable petroleum hydrocarbons and volatile petroleum hydrocarbons by the Montana-modified Massachusetts method by Energy Laboratories in Helena, Montana.

One blind duplicate and one field blank will be collected from decontaminated equipment during each groundwater sampling event.

2.1 SAMPLE HANDLING

Samples will be packed and shipped or hand delivered to the laboratory for chemical analysis according to analytical and laboratory methodology. Immediately after samples are collected in the field, completed sample labels will be attached to the sample containers. Samples will be stored on ice per preservation requirements. A chain-of-custody (COC) form will be prepared at the time samples are collected, and will identify the required analytical methods. Samples will be tracked beginning at the sampling locations, through shipment to the laboratory, and through sample analysis by the laboratory. Data from the analysis of the samples will be tracked upon receipt from the laboratory and throughout data analysis and data reporting based on unique sample numbers. The sample handling procedures promote both sample chain-of-custody and data integrity of laboratory analysis. A completed COC form will accompany the samples to the analytical laboratory.

3.0 ANALYTICAL METHODOLOGY

Groundwater samples will be submitted to Energy Laboratories in Helena, Montana. Trihydro will request analysis of:

- Short list VOCs by EPA Method 8260B
- Extractable petroleum hydrocarbons and volatile petroleum hydrocarbons by the Montana-modified Massachusetts method

Energy Laboratories reporting limits for the VOCs will meet Montana numeric water quality (DEQ-7) standards and risk-based screening levels for petroleum fractions (RBSLs) (DEQ's Risk-based Corrective Action Guidance for Petroleum Releases, September 2016).

4.0 QUALITY ASSURANCE AND QUALITY CONTROL

Quality assurance and quality control (QA/QC) will serve two purposes for field and laboratory sampling: 1) documentation of data quality and 2) to identify areas of weakness within the measurement process that need correction.

4.1 FIELD QUALITY CONTROL

The field quality control sample will be a blind duplicate for water samples. Duplicate samples are collected to check sampling and laboratory analytical precision. One blind duplicate will be collected per sampling event. A blind duplicate (field replicate) sample will be collected to evaluate precision associated with the reproducibility of sampling techniques and the homogeneity of sample matrices. Since the replicate will be "blind" to the laboratory, it will have a coded identity on its label and on the chain-of-custody record form. The actual sampling location and identification will be recorded on the daily log form and the sampling log form.

4.2 DATA VERIFICATION AND USABILITY

The process of data verification is the examination of objective evidence that the requirements of these specified QC acceptance criteria are met. The process of data validation requires confirmation by examination and provision of objective evidence that the particular requirements for a specific intended use have been fulfilled. Data validation procedures shall be performed for both field and laboratory operations, as described below.

4.3 FIELD DATA

Field data validation tasks to be performed may include review of field data contained on field sampling logs for completeness; verification that field duplicates were properly prepared, identified, and analyzed; checking on field analysis for equipment calibration and condition; and review of COC forms for proper completion, signatures of field personnel, and the laboratory sample custodian, and dates. The field data packages will undergo review. If inconsistencies or issues are identified during the review, the records will be verified by field personnel and corrected. Inconsistencies or issues noted during the field data validation review will require implementation of corrective measures and 100% validation of field records.

4.4 LABORATORY DATA

Trihydro will perform data validation review on all data received from the laboratory. The data validation will be in accordance with DEQ requirements (Montana DEQ - Remediation Division Data Validation Summary Form (Version 1.2, Revised 11/4/16). Data qualifiers will be applied to the data based on the data validation review. These qualifiers will be maintained in the database with each data point. The data validator will evaluate the overall completeness of the data package. Completeness checks will be administered on all data to determine whether deliverables specified in the QA/QC Plan are present. At a minimum, deliverables will include sample COC forms, analytical results, and QC summaries. The reviewer will determine whether all required items are present and request copies of missing deliverables.

The results of the data validation review will be summarized in a Data Validation Report for each sample report issued by the laboratory.

5.0 REPORTING

Results of sampling and analysis will be reported to DEQ following receipt of final and validated data. A summary of sampling activities and non-conformances from this work plan will be summarized in a letter to the DEQ. In addition, summary tables documenting analytical data will be denoted with any flags resulting from the Trihydro data validation process, in addition to the laboratory data qualifier flags. Samples which are rejected as part of the data validation process "R" flag will not be considered valid data for this site. Final Sample results will be compared against DEQ-7 standards and RBSLs. These results will be used to evaluate groundwater contamination conditions. In addition, a potentiometric surface map will be provided using the elevations from the four sampled wells.

776-033-001

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
FLUID LEVELS FORM

TRIHYDRO CORPORATION
776-033-001

GAUGING PERSONAL: Joel

WEATHER: Snow ~20°F

INTERFACE METER MODEL / SERIAL NUMBER: Model 122 / SN 287940

Well ID	Casing Diameter (in)	Measuring Point Elevation (ft msl)	Date / Time	Depth to Product (ft-bmp)	Depth to Water (ft-bmp)	DTGW (ft-bmp)	Total Depth (ft-bmp)	TDWD (ft-bmp)
MTN-MW1	2		01/25/17 1532	ND	11.36			
MTN-MW2	2		01/25/17 1619	ND	11.73			
MTN-MW3	2		01/25/17 1420	ND	12.29			
WSMW-7	0.75		01/26/17 0847	ND	11.79			

COMMENTS / OBSERVATIONS:

ft bmp - feet below measuring point
H_2O - water
ID - identificaiton
in - inches

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
FLUID LEVELS FORM

TRIHYDRO CORPORATION
776-033-001

GAUGING PERSONAL: Joel Richli & Sarah Seitz

WEATHER: Snow/rain, Temp ~ 35-37 F, Calm

INTERFACE METER MODEL / SERIAL NUMBER: Solinst Interface Meter, Model 122
SN: 287940

Well ID	Casing Diameter (in)	Measuring Point Elevation (ft msl)	Date / Time	Depth to Product (ft-bmp)	Depth to Water (ft-bmp)	DTGW (ft-bmp) - Jan-17	Total Depth (ft-bmp)	TDWD (ft-bmp) - Jan-17	PID well (PPB)
MTN-MW1	2		2/21/17 1325	ND	7.23	-- / 11.36	18.32	-- / 18.32	202
MTN-MW2	2		2/21/17 1300	ND	6.85	-- / 11.73	18.21	-- / 18.21	549.5 PPM
MTN-MW3	2		2/21/17 1245 ~~1245~~	ND	8.95	-- / 12.29	18.49	-- / 18.49	202
WSMW-7	0.75		2/21/17 1645	ND	6.69	-- / 11.79	21.47	-- / 21.47	NM

COMMENTS / OBSERVATIONS:

ft bmp - feet below measuring point
H_2O - water
ID - identificaiton
in - inches

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
FLUID LEVELS FORM

TRIHYDRO CORPORATION
776-033-001

GAUGING PERSONAL: Joel Richill

WEATHER: Cloudy, ~35°F

INTERFACE METER MODEL / SERIAL NUMBER: Solinist Interface Meter Model 122 / SN 287940

Well ID	Casing Diameter (in)	Measuring Point Elevation (ft msl)	Date / Time	Depth to Product (ft-bmp)	Depth to Water (ft-bmp)	DTGW (ft-bmp) Feb-17 / Jan-17	Total Depth (ft-bmp)	TDWD (ft-bmp) Feb-17 / Jan-17
MTN-MW1	2		3/13/17	Monitoring Well Iced		7.23 / 11.36	OVER ~~18.32~~	-- / 18.32
MTN-MW2	2		3/13/17	ND	6.18	6.85 / 11.73	NM ~~18.21~~	-- / 18.21
MTN-MW3	2		3/13/17	ND	6.23	8.95 / 12.29	NM ~~18.49~~	-- / 18.49
WSMW-7	0.75		3/13/17	ND	6.46	6.69 / 11.79	NM ~~21.47~~	-- / 21.47

COMMENTS / OBSERVATIONS:

ft bmp - feet below measuring point
H_2O - water
ID - identificaiton
in - inches

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
FLUID LEVELS FORM

TRIHYDRO CORPORATION
776-033-001

GAUGING PERSONAL: Joel Riebli

WEATHER: Rain, ~45°F

INTERFACE METER MODEL / SERIAL NUMBER: Solinist Interface Meter Model 122 / SN 287940

Well ID	Casing Diameter (in)	Measuring Point Elevation (ft msl)	Date / Time	Depth to Product (ft-bmp)	Depth to Water (ft-bmp)	DTGW (ft-bmp) Feb-17 / Jan-17	Total Depth (ft-bmp)	TDWD (ft-bmp) Feb-17 / Jan-17
MTN-MW1	2		4/12/17	ND	7.74	7.23 / 11.36	~~18.32~~	-- / 18.32
MTN-MW2	2		4/12/17	ND	7.31	6.85 / 11.73	~~18.21~~	-- / 18.21
MTN-MW3	2		4/12/17	ND	6.45	8.95 / 12.29	~~18.49~~	-- / 18.49
WSMW-7	0.75		4/12/17	ND	7.01	6.69 / 11.79	~~21.47~~	-- / 21.47

COMMENTS / OBSERVATIONS:

ft bmp - feet below measuring point
H_2O - water
ID - identificaiton
in - inches

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
FLUID LEVELS FORM

TRIHYDRO CORPORATION
776-033-001

GAUGING PERSONAL: Joel

WEATHER: Sunny

INTERFACE METER MODEL / SERIAL NUMBER: Solinst model 122 / SN 287940

Vacuum (in H_2O)	Well ID	Casing Diameter (in)	Measuring Point Elevation (ft msl)	Date / Time	Depth to Product (ft-bmp)	Depth to Water (ft-bmp)	DTGW (ft-bmp) Feb-17 / Jan-17	Total Depth (ft-bmp)	TDWD (ft-bmp) Feb-17 / Jan-17	PID (ppb)
-0.03	MTN-MW1	2	3033.88	5/15/17	—	8.15	7.23 / 11.36	18.32	-- / 18.32	108
3.5	MTN-MW2	2	3032.92	↓	—	7.85	6.85 / 11.73	18.21	-- / 18.21	66.37
-0.03	MTN-MW3	2	3031.78	↓	—	7.58	8.95 / 12.29	18.49	-- / 18.49	14.42 ppm
Ø	WSMW-7	0.75	3032.83	↓	—	7.74	6.69 / 11.79	21.47	-- / 21.47	—
Ø	MTN-SS	—	—	5/15/17	—	—	—	—	—	808 ppb

COMMENTS / OBSERVATIONS:

ft bmp - feet below measuring point
H_2O - water
ID - identificaiton
in - inches

MDEQ WHITEFISH SOLVENT SITE -
FORMER MARTINS CLEANERS
GROUNDWATER SAMPLING FORM

TRIHYDRO CORPORATION
776-033-001

SAMPLE ID	DATE	TIME	COMMENTS
MTN-MW1	02/21/2017	1615	BD-1
MTN-MW2	02/21/2017	1735	FB-1
MTN-MW3	02/21/2017	1525	
WSMW-7	02/22/2017	1725	Well pursed dry at 1215 after purging 2.5 liters, let recharge until 1725.
BD-1	02/21/2017	1615	MTN-MW1
FB-1	02/21/2017	1730	MTN-MW2

- Groundwater samples will be collected after pH, conductivity, ORP, and DO stabilize.

- One blind duplicates and one field blank will be collected during this event.

- Groundwater samples will be collected for VOC's by EPA Method 8260B and EPH and VPH by the Montana-modified Massachusetts method.

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.75	0.023	0.087
2	0.163	0.617

LOW - FLOW PURGING /SAMPLING FORM

PROJECT NAME: MDEQ Whitefish Solvent Site - Martin's Cleaners
PROJECT NO.: 776-033-001
WELL NO.: MTN-MW1 **WELL DIAMETER:** 2"
SAMPLER: Joel Richli & Sarah Seitz
DATE: 02/21/2017
WEATHER CONDITIONS Rain/snow, Temp ~35°F, Calm

Sampling Device: Parastaltic Pump
Make/Model: Ecopump Easy Load II/900-1280
Serial Number: C1302218

Water Quality Inst.: Flow through Cell
Make/Model: Horiba U-52
Serial Number: H66MVBR9

Tubing Type: X Teflon ☐ Poly ☐ Other **Decontamination:** X Decontaminated Water Meter X Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 7.23 **Total Well Depth (ft-bpm):** 18.32 **Depth to Pump Inlet(ft-bmp):** 11.1

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria			±0.5	±10%	--	--	±10%	±10%	--
1	1559	Start	Purging	MTN-	MW1					
2	1602	0.14		6.72	2.19	127	7.62	0.75	-52	8.25
3	1605			6.72	2.19	127	7.80	0.61	-68	8.21
4	1608			6.73	2.20	126	7.83	0.58	-72	8.22
5	1611		1.75	6.74	2.20	126	7.88	0.58	-73	8.27
6	1615	Sample	MTN-	MW1	(BD-1)					
7	1655	End	sample	collection						
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										

Sample ID: MTN-MW1 **SampleClarity/Color/Odor:** slight turbid / light white / none
Sample Time: 1615 **QAQC Samples Collected:** ☐ No X Yes: BD-1
Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.75	0.023	0.087
2	0.163	0.617

LOW - FLOW PURGING /SAMPLING FORM

PROJECT NAME: MDEQ Whitefish Solvent Site - Martin's Cleaners
PROJECT NO.: 776-033-001
WELL NO.: MTN-MW2 **WELL DIAMETER:** 2"
SAMPLER: Joel Riebli & Sarah Seitz
DATE: 02/21/2017
WEATHER CONDITIONS Cloudy, light rain, temp ~34°F, ~5mph

Sampling Device: Parastaltic Pump
Make/Model: Geopump Easy Load II / 900-1280
Serial Number: C1302218

Water Quality Inst.: Flow through cell
Make/Model: Horiba U-52
Serial Number: H66MVBR9

Tubing Type: X Teflon (New) ☐ Poly ☐ Other **Decontamination:** X Decontaminated Water Meter X Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 6.85 **Total Well Depth (ft-bpm):** 18.21 **Depth to Pump Inlet(ft-bmp):** 11.4

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria:			±0.5	±10%	--	--	±10%	±10%	--
1	1710	Begin	Purging	MTN-	MW2					
2	1713	0.15		6.71	1.89	237	6.67	1.49	131	7.35
3	1716			6.70	1.88	230	7.15	0.93	124	7.53
4	1719		1.5	6.71	1.90	226	7.24	0.75	119	7.84
5	1722			6.73	1.91	225	7.41	0.71	119	8.08
6	1725			6.74	1.92	223	7.39	0.65	121	8.13
7	1728		3.0	6.77	1.93	222	7.43	0.61	122	8.16
8	1731			6.79	1.96	221	7.39	0.59	123	8.18
9	1735	Sample	MTN-	MW2						
10	1751	End	Sample	collection						
11										
12										
13										
14										
15										
16										
17										
18										

Sample ID: MTN-MW 2 **SampleClarity/Color/Odor:** slightly Cloudy / light white / none
Sample Time: 1735 **QAQC Samples Collected:** ☐ No X Yes: FB-1 @ 1730
Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.75	0.023	0.087
2	0.163	0.617

LOW - FLOW PURGING /SAMPLING FORM

PROJECT NAME:	MDEQ Whitefish Solvent Site - Martin's Cleaners
PROJECT NO.:	776-033-001
WELL NO.:	MTN-MW3 WELL DIAMETER: 2"
SAMPLER:	Joel Riebli & Sarah Seitz
DATE:	02/21/2017
WEATHER CONDITIONS	Rain/snow, Temp ~32°F, Calm

Sampling Device:	Parastaltic Pump	Water Quality Inst.:	Flow Through Cell
Make/Model:	Geopump Easy Load II / 900-1280	Make/Model:	Horiba U-52
Serial Number:	C1302218	Serial Number:	H66MVBR9

Tubing Type: X Teflon ☐ Poly ☐ Other Decontamination: X Decontaminated Water Meter X Decontaminated Flow Through Cell

Depth to Water (ft-bmp): ~8.95 Total Well Depth (ft-bpm): 18.49 Depth to Pump Inlet(ft-bmp): 13.7

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria			±0.5	±10%	--	--	±10%	±10%	--
1	1449	Begin	Purging	MTN-	MW3					
2	1452	0.14		7.13	1.65	36.0	7.20	2.80	-100	8.63
3	1455			7.05	1.64	35.8	7.30	2.55	-107	8.70
4	1458			6.98	1.64	29.4	7.45	2.16	-108	8.86
5	1501			6.95	1.63	26.0	7.45	1.96	-103	8.96
6	1504			6.95	1.63	24.4	7.41	1.77	-100	8.98
7	1507			6.95	1.63	23.1	7.37	1.63	-92	9.04
8	1510		3.0	6.95	1.63	22.2	7.38	1.63	-86	9.11
9	1513			6.95	1.63	21.5	7.43	1.63	-79	9.19
10	1517			6.94	1.64	20.6	7.50	1.64	-74	9.28
11	1520			6.95	1.63	19.7	7.49	1.63	-73	9.34
12	1525	Sample	MTN-	MW3						
13	1537	End	Sample	collection						
14										
15										
16										
17										
18										

Sample ID:	MTN-MW3	SampleClarity/Color/Odor:	clear / clear / none
Sample Time:	1525	QAQC Samples Collected:	X No ☐ Yes:

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.75	0.023	0.087
2	0.163	0.617

LOW - FLOW PURGING /SAMPLING FORM

PROJECT NAME: MDEQ Whitefish Solvent Site - Martin's Cleaners
PROJECT NO.: 776-033-001
WELL NO.: WSMW-7 **WELL DIAMETER:** 0.75"
SAMPLER: Joel & Sarah
DATE: 02/22/2017
WEATHER CONDITIONS Mostly Sunny, Temp ~40, Calm

Sampling Device: Parastaltic Pump
Make/Model: Geo pump Easy Load II / 900-1280
Serial Number: C13002218

Water Quality Inst.: Flow through Cell
Make/Model: Horiba U-52
Serial Number: H6GMVBR9

Tubing Type: X Teflon ☐ Poly ☐ Other **Decontamination:** X Decontaminated Water Meter X Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 6.69 **Total Well Depth (ft-bpm):** 21.47 **Depth to Pump Inlet(ft-bmp):** 14.1

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria			±0.5	±10%	--	--	±10%	±10%	--
1	1144	Begin	purging	WSMW-7				0.75		
2	1147	0.1		6.35	1.70	510	17.39	~~0.47~~	46	Well dia too small to gauge with purge line and
3	1150			6.35	1.73	>800	16.65	0.70	44	
4	1153			6.38	1.73	>800	16.14	0.62	-5	
5	1154	Lowered	pump	in lit	to	18'				
6	1156		1.4	6.40	1.73	>800	15.69	0.89	-36	
7	1159			6.42	1.72	>800	14.64	1.21	-33	
8	1202	Lower	pump	inlet	to	19.5' (2' off of	bottom)			
9	1204			6.45	1.66	>800	14.36	1.65	-6	
10	1207		1.9	6.49	1.70	>800	14.12	0.96	-1	
11	1208	Lower	pump	inlet	to	21.4				
12	1212			6.51	1.74	>800	13.84	1.44	18	
13	1215	Well	purged	dry (total purged	including	flow through	cell volume	= 2.5 liters)		
14	1715	Recharged								7.90
15	1725	Begin	sampling	WSMW-7	; Pump intake	set	at 19.5'			
16	1800	End	sample	collection	(well	is dry)				
17										
18										

Sample ID: WSMW-7 **SampleClarity/Color/Odor:** cloudy / milky white / NONE
Sample Time: 1725 **QAQC Samples Collected:** X No ☐ Yes:
Comments:

ENERGY LABORATORIES
Trust our People. Trust our Data.

Chain of Custody & Analytical Request Record

www.energylab.com

Account Information (Billing information)

Company/Name	Trihydro Corporation-Laramie
Contact	Andrew Vann
Phone	307-~~760~~ 745-7474
Mailing Address	1252 Commerce Dr
City, State, Zip	Laramie, WY 82070
Email	AVann@Trihydro.com
Receive Invoice	☐ Hard Copy ☒ Email
Receive Report	☐ Hard Copy ☒ Email
Purchase Order	
Quote	1375
Bottle Order	23137

Report Information (if different than Account Information)

Company/Name	
Contact	
Phone	
Mailing Address	
City, State, Zip	
Email	
Receive Report	☐ Hard Copy ☐ Email

Special Report/Formats: ☐ LEVEL IV ☐ NELAC ☐ EDD/EDT (contact laboratory) ☐ Other_____

Comments

C1 = 2.0
C2 = 1.4

Project Information

Project Name, PWSID, Permit, etc.	MDEQ Whitefish Solvent Site
Sampler Name	Joel Riebli
Sampler Phone	307 760 2793
Sample Origin State	MT
EPA/State Compliance	☒ Yes ☐ No

MINING CLIENTS, please indicate sample type.
*If ore has been processed or refined, call before sending.
☐ Byproduct 11 (e)2 material ☐ Unprocessed ore (NOT ground or refined)*

Matrix Codes
A - Air
W - Water
S - Soils/Solids
V - Vegetation
B - Bioassay
O - Other
DW - Drinking Water

All turnaround times are standard unless marked as RUSH.
Energy Laboratories MUST be contacted prior to RUSH sample submittal for charges and scheduling – See Instructions Page

Analysis Requested

	Sample Identification (Name, Location, Interval, etc.)	Collection Date	Collection Time	Number of Containers	Matrix (See Codes Above)	VOC's (short list) 8260	EPH	VPH MA-VPH							See Attached	RUSH TAT	ELI LAB ID (Laboratory Use Only)
1	MTN-MW3	2/21/17	1525	7	W	X	X	X									
2	MTN-MW1	|	1615	7	W	X	X	X									
3	MTN-MW2	|	1735	7	W	X	X	X									
4	FB-1	|	1730	7	W	X	X	X									
5	BD-1	2/21/17	—	7	W	X	X	X									
6	WSMW-7	2/22/17	1725	7	W	X	X	X									
7	Trip blank 1	—	—	2	W												
8	Trip blank 2	—	—	2	W												
9																	
10																	

Custody Record MUST be signed	Relinquished by (print)	Date/Time	Signature	Received by (print)	Date/Time	Signature
	Joel Riebli	02/23/17 @ 1340	[signature]			
	Relinquished by (print)	Date/Time	Signature	Received by Laboratory (print)	Date/Time	Signature
				B. Setter	02/23/17 13:40	Brandy Setter

LABORATORY USE ONLY

Shipped by	Cooler ID(s)	Custody Seals	Intact	Receipt Temp	Temp Blank	On Ice	Payment Type	Amount	Receipt Number (cash/check only)
hand del	X2	Y N C B	Y N	See comm. C	Y N	Y N	CC Cash Check_____	$	

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested.

Environmental • Fire • HazMat • CBRNE

FarrWest Environmental Supply

Certificate of Calibration

Calibration Reference Number
107074

Calibration Information

Customer	Date	Technician
TRIHYDRO	2017-02-13	Jonathan Martin

Device Information

Model	Manufacturer	Serial Number
U-52	HORIBA	H6GMVBR9

Calibration Standards

Calibration Standard	Mfr.	Exp.	Lot Number
AUTO CAL SOLUTION (PH 4, 0.0 NTU, 4.49 MS/CM)	AURICAL	2017-11-23	12501

Sensor Readings

Sensor:	pH	TEMP	CON	D.O.	TURB	ORP	TDS
Reading:	4.0	21.85	4.49	9.01	0.0	260	2.87

Calibration Result

PASSED

Comments

The above instrument has been calibrated according to manufacturers's instructions and by comparison to laboratory standards traceable to the National Institute of Standards and Technology (NIST).

FarrWest Environmental Supply
108 Commercial Place, Suite 200 Schertz, Texas 78154
Ph: 210-566-1857 Fax: 210-566-1897 Email: info@farrwestenv.com

HORIBA
WATER QUALITY METER DAILY CALIBRATION FORM

Trihydro CORPORATION

DATE: 02/22/2017

PROJECT NAME: MDEQ Whitefish Solvent Site

PROJECT NUMBER: 776-033-001

EVENT: Feb 2017

CALIBRATOR: Joel

MAKE: Horiba

MODEL: U-52

SERIAL NUMBER: H6GMVBR9

CALIBRATION SOLUTION SERIAL NUMBER: 12501

CALIBRATION SOLUTION EXPERATION DATE: 11/23/2017

	pH	CONDUCTIVITY (mS/cm):	TURBIDITY (NTU's):	DISSOLVED OXYGEN (mg/L):	TEMPERATURE (°C):	AUTO CALIBRATED:
STANDARD CONCENTRATION (C_{std}):	4.00	4.49	0	NA	NA	NA
CALIBRATION READING (C_{act}):	3.98	4.49	0.0	6.74	27.00	YES ☑ NO ☐
PERCENT RECOVERY (%R):				NA	NA	NA
ACCEPTANCE CRITERIA FOR %R:	90-110%	90-110%	+/- 1.0	NA	NA	NA

$\%R = (C_{act} / C_{std}) \times 100$

COMMENTS: