September 11, 2018

Mr. Joshua Barsis
Environmental Program Specialist
Alaska Department of Environmental Conservation
555 Cordova Street
Anchorage, Alaska 99501

Subject: NSB South Pad, Barrow, Alaska
ADEC File Number 310.38.028
Method Three Alternate Soil Cleanup Levels Request

Dear Mr. Barsis,

Agviq, LLC (Agviq) has been contracted by the North Slope Borough (NSB) to conduct site characterization and corrective action activities at the South Pad (Site) in Barrow, Alaska (**Figure 1**). Based on results of site characterization activities conducted in 2014 and 2015, and removal action activities in 2016, Agviq believes that assigned cleanup levels for petroleum hydrocarbons in soil approved by the Alaska Department of Environmental Conservation (ADEC) may not be applicable and that site-specific alternate cleanup levels may be more appropriate for the South Pad site. The South Pad site is located approximately one mile southwest of the community of Barrow, Alaska on Apayuk Road (**Figure 2**).

BACKGROUND

In 2014 and 2015, Agviq conducted site characterization activities to evaluate the nature and extent of petroleum hydrocarbons in soil, groundwater, and surface water. Soil conditions were evaluated by advancing 173 exploratory borings to collect soil samples for chemical analysis. The site characterization activities identified several areas of concern within the 17-acre man-made gravel pad. The findings and results of the site characterization activities were presented in *NSB Barrow South Pad Site Characterization Report* (Agviq. 2016a). During July and August 2016, Agviq excavated and transported off-site approximately 1,920 tons of petroleum hydrocarbon contaminated soil from the areas of concern identified during the site characterization activities. The corrective action activities were conducted in accordance with the ADEC approved *NSB Barrow South Pad Corrective Action Plan* (Agviq. 2016b). The corrective action activities and results were presented in *NSB Barrow South Pad Removal Action Report* (Agviq. 2017a). Following site characterization and corrective action activities, residual petroleum hydrocarbon impacted soil remains at the Site.

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In 2017, Agviq collected soil samples to evaluate the concentrations of total organic carbon present in surface soil (0 to 2 feet below ground surface [bgs]) and subsurface soil (2 to 4.5 feet bgs) to support a demonstration for Method Three alternate cleanup levels for the Site.

REGULATORY FRAMEWORK AND APPROACH

Agviq conducted the site characterization and removal action activities in accordance with Title 18 of the Alaska Administrative Code (AAC) Chapter 75-*Oil and Other Hazardous Substances Pollution Control* regulations (18 AAC 75)(ADEC. 2017a). Soil analytical results were compared to ADEC's Method One and Method Two Arctic Zone *Human Health-based* Cleanup Levels for diesel range organics (DRO), gasoline range organics (GRO), and residual range organics (RRO) set forth in tables A2 and B1, respectively (18 AAC 75.341). In accordance with ADEC's *Establishing Arctic Zone Cleanup Levels* (ADEC. 2017c) and 18 AAC 75.340(3)(e)(1), Method Three site-specific alternate cleanup levels may be more appropriate for the NSB South Pad site. Several factors justify this approach:

- Source area removal action activities have been completed.
- The property is considered commercial/industrial; future plans do not consider rezoning to residential.
- The site is located in region of continuous permafrost; therefore, migration to groundwater pathway is not applicable.
- A thorough site characterization has been completed. Petroleum hydrocarbon impacted soil is present in subsurface at depths greater than 2-feet bgs.
- The petroleum hydrocarbon contamination has not impacted adjacent lands, surface water or sediment. Surface water sample results do not exceed ADEC 18 AAC 70-*Water Quality Standards* (ADEC. 2018c).
- Depth to groundwater (pore water) ranges from 2.5 to 8 feet bgs within the man-made pad.
- No light non-aqueous phase liquid (LNAPL) free-phase product encountered on pore water/groundwater.
- Native mineral soil below the man-made pad ranges from depths of 3 to 6.5 feet bgs across the Site and acts as a confining layer.
- The pad pore water is not considered a future drinking water resource.
- Nearby surface water bodies are not a reasonable future resource for household purposes, such as bathing or cleaning or drinking water.
- South Pad consists of sandy gravel to gravelly sand (man-made pad) between 2.5 and 8 feet thick underlain by discontinuous geofabric liner material above native mineral soil.

Based on these site conditions, the only risk factor associated with the contaminated soil remaining at the Site to human and ecological receptors is vapor phase diffusion.

DEMONSTRATION FOR METHOD THREE ALTERNATE CLEANUP LEVELS

In June and July 2017, Agviq collected soil samples for chemical analysis to develop a Method Three Alternate Cleanup Level request for the South Pad Site. The sampling activities were conducted in

accordance with ADEC's *Field Sampling Guidance* (ADEC. 2017e) and *NSB Barrow South Pad, Method Three Alternate Cleanup Level Sampling Work Plan* (Agviq. 2017b). ADEC approved the work plan on June 10, 2017. On June 13, 2017, Agviq collected soil samples from four test pits located west of the identified areas of concern (**Figure 3**). All samples consisted of non-native man-made gravel pad material. The test pits were excavated utilizing a rubber-tired Caterpillar 400 series backhoe-loader supplied and operated by NSB. The location of the four test pits (TP-01 through TP-04) are presented in **Figure 3**. Frozen ground was present during the initial sampling event in June that prevented collection of samples from depths greater than 2 feet bgs.

On July 18, 2017, Agviq and NSB returned to the Site and collected four additional soil samples at depths of 4.5 feet bgs from re-exhumed test pits TP-01 through TP-04. All samples were non-native gravel pad material and were analyzed for GRO using Alaska Method (AK) 101, DRO using AK 102, RRO using AK 103, volatile organic compounds (VOCs) using U.S. Environmental Protection Agency (EPA) Method 8260B, and total organic carbon (TOC) using EPA Method 9060. All excavated test pits were backfilled with their respective exhumed soil to surrounding grade level.

Two field duplicates and one set of matrix spike/matrix spike duplicate (MS/MSD) samples were collected and analyzed for quality assurance/quality control (QA/QC) purposes. All samples were labeled with sample number, date and time of collection, project number, and location, and then stored in a cooler with gel ice until transport to the analytical laboratory using chain of custody procedures. All samples were delivered to SGS-North America, Inc. (SGS) analytical laboratory in Anchorage, Alaska.

2017 Analytical Results

A total of twelve (8 primary, 2 field duplicates, 1 MS, and 1 MSD) samples were collected and analyzed to determine TOC content in soil at the Site. Petroleum hydrocarbon and TOC analytical results are summarized in **Table 1**, and VOC analytical results are presented in **Table 2**. The location of the four test pits and sample locations are presented in **Figure 3**. The laboratory analytical reports, ADEC checklist, and Quality Assurance Summary are provided as attachments.

Detectable concentrations of GRO were reported for both samples collected from TP-2 and ranged from 0.537 to 1.27 milligrams per kilogram (mg/kg). Detectable concentrations of DRO were reported for all of the shallow (2-feet bgs) samples collected from TP-1 through TP-4, and the two samples collected from a depth of 4.5-feet bgs from TP-3 and TP-4. DRO concentrations ranged from 7.37 to 187 mg/kg. Detectable concentrations of RRO were reported for all of the 2-feet bgs samples collected from TP-1 through TP-4, and the two samples collected from a depth of 4.5-feet bgs from TP-3 and TP-4, similar to DRO findings. RRO concentrations ranged from 24.5 to 734 mg/kg (**Table 1**).

In summary, analytical results of soil samples collected from TP-01 through TP-04 indicated that concentrations of GRO, DRO, RRO and BTEX compounds were below ADEC Method One Arctic Zone Cleanup Levels (**Table 1**). All detections of GRO occurred at one location, test pit TP-02 (**Figure 3**). Low detectable concentrations of select VOCs (carbon tetrachloride, chloromethane, tetrachloroethene, trichloroethene) were reported from one location, test pit TP-04 (**Table 2**).

Total organic carbon content was evaluated in all samples collected in June and July 2017 and ranged from 0.0526 to 0.985 percent TOC. The highest percentage of TOC was reported for sample TP-04-4.5 collected from a depth of 4.5 feet bgs in test pit TP-04. The calculated average percent of TOC in soil is 0.351. For surface soil, the calculated average percent of TOC is 0.406, and for subsurface soil the average percent of TOC is 0.296 (**Table 1**).

Petroleum Cleanup Level Calculations

In accordance with ADEC's *Guidelines for Total Organic Carbon (TOC) Sample Collection and Data Reduction for Method Three and Method Four* (ADEC. 2008), *Procedures for Calculating Cleanup Levels* (ADEC. 2018a), *Determining the Fraction of Organic Carbon (foc) for Methods Three and Four* (ADEC. 2017d), and *Cleanup Levels Guidance for Methods Two and Three* (ADEC. 2017b), Agviq utilized ADEC's *Petroleum Cleanup Level Calculator* to develop alternate soil cleanup levels for DRO, RRO, and GRO for the NSB South Pad Site in Barrow, Alaska.

ADEC's Method Three *Petroleum Cleanup Level Calculator* is used to evaluate total cumulative risk across all exposure pathways. The *Petroleum Cleanup Level Calculator* was designed to assist in determining alternate cleanup levels using site specific soil data, aquifer data, or both. It also allows for the use of Arctic Zone and commercial /industrial exposure values without performing a full risk assessment under Method Four. The ADEC inhalation model assumes that no LNAPL free-phase product is present, no reduction in contaminant concentration occurs due to natural processes or source removal, and that vapor phase diffusion is the only transport mechanism. Based on the site characterization and corrective action activities, no LNAPL is present at the Site.

Based on site-specific soil analytical data and observations, Agviq utilized ADEC's Method Three *Petroleum Cleanup Level Calculator* to calculate total cumulative risk across all exposure pathways. All of the default settings were used except for organic carbon content in soil. The NSB Barrow South Pad Cleanup Level calculations are presented in **Attachment A**. The site-specific organic carbon input parameters used in the *Petroleum Cleanup Level Calculator* were based on five samples (4 primary, 1 field duplicate) collected from 2-feet bgs in June 2017, and the five samples (4 primary, 1 field duplicate) collected from 4.5-feet bgs in July 2017 from four excavated test pits at the Site (**Figure 3**). The 2017 laboratory results, ADEC checklists, and quality assurance review are presented in **Attachment B**. The total carbon contribution from DRO and RRO appears to be biogenic based on a review of chromatograms (**Attachment C**).

Agviq developed alternate cleanup levels for soil at the South Pad Site using the 2017 TOC data and default values of the *Petroleum Cleanup Level Calculator*. Cleanup levels were calculated using the average of the ten samples (0.351 percent TOC), the average of the five samples from 0 to 2-feet bgs (0.406 percent TOC), and the average of the five samples from 4.5-feet bgs (0.296 percent TOC). All of the 2017 TOC concentrations were greater than the default value of 0.1 percent used to calculate the Method Two Cleanup Levels.

The calculated GRO, DRO, and RRO Cleanup Levels for the *Inhalation* pathways for the NSB Barrow South Pad Site are presented in **Table 1-1**.

Table 1-1 Calculated Cleanup Levels for Inhalation Pathway

Soil Interval (in feet bgs)	GRO (mg/kg)	DRO (mg/kg)	RRO (mg/kg)	Percent TOC Average
Surface 0 to 2	**9800**	**58800**	**22200**	**0.406**
Subsurface 2 to 4.5	**8600**	**50800**	**22200**	**0.296**
0 to 4.5	**9200**	**55300**	**22200**	**0.351**

Notes: bgs = below ground surface; mg/kg = milligrams per kilogram

Cumulative Risk and Cleanup Level Calculations 2002 Data

In response to Agviq's Method Three request dated August 8, 2017 (Agviq. 2017c), ADEC requested evaluating cumulative risk and cleanup levels by incorporating 2002 data collected by Shannon & Wilson that included detectable concentrations of benzo(a)anthracene and benzo(a)pyrene in surface soil that exceeded the Method Two Cleanup Levels in 2002 (15 mg/kg and 1.5 mg/kg, respectively). The 2002 data provided by ADEC is presented in **Attachment D**.

The 2002 data included a benzo(a)anthracene concentration of 37.5 mg/kg and a benzo(a)pyrene concentration of 13.7 mg/kg. The 2016 Corrective Action Plan (Agviq. 2016b) listed the Method Two Cleanup Levels for benzo(a)anthracene and benzo(a)pyrene to be 2.7 mg/kg and 0.28 mg/kg, respectively. Since the 2002 samples were collected from depths of 0.2-0.4 feet bgs, Agviq used the 2017 average TOC value for surface soil (0.406 percent) for evaluating cumulative risk and calculation of cleanup levels for benzo(a)anthracene and benzo(a)pyrene. In accordance with ADEC's *Procedures for Calculating Cumulative Risk* (ADEC. 2018b), Agviq used ADEC's *Cumulative Risk* and *Cleanup Level* calculators to evaluate the 2002 data provided by ADEC. All default settings were utilized except for the 2017 site-specific TOC values (0 to 2 feet bgs, **Table 1-1**). The cumulative risk and cleanup level calculator outputs are presented in **Attachment D**.

The cumulative carcinogenic risk for benzo(a)anthracene and benzo(a)pyrene were calculated to be 1.04×10^{-5} and 3.79×10^{-5}, respectively. Both values exceed the cumulative risk standard of 1×10^{-5}. However, the cumulative risk standard applies to all pathways, and most importantly the migration to groundwater pathway across Alaska's climatic ecoregions. The South Pad Site is within the Arctic Zone where pad pore water is not considered a future drinking water source as well as surrounding surface waters. Current site conditions suggest that the only risk factor associated with the contaminated soil remaining at the Site to human and ecological receptors is vapor phase diffusion. Therefore the calculated total inhalation risk would apply to South Pad. Benzo(a)anthracene is more volatile than benzo(a)pyrene and both are considered carcinogenic mutagens. Total inhalation risk for both compounds was calculated to be 5.46×10^{-8}, less than the cumulative risk standard of 1×10^{-5}. The calculated benzo(a)anthracene cleanup level was 36 mg/kg. The calculated benzo(a)pyrene cleanup level was 3.6 mg/kg (**Attachment D**).

QUALITY ASSURANCE REVIEW SUMMARY

Laboratory QA/QC data for the 2017 soil sampling have been reviewed to evaluate the usability of the analytical data. The laboratory reports were presented in two sample delivery groups, Work Order number 1173405 included the June samples, and Work Order number 1174638 included the July samples. The 2017 laboratory results, quality assurance review and ADEC checklists are presented in **Attachment B**. Data was reviewed in accordance with National Functional Guidelines for Organic Superfund Methods Data Review (EPA. 2017a), National Functional Guidelines for Inorganic Superfund Methods Data Review (EPA. 2017b), analytical methodology and ADEC regulatory guidance documents (ADEC. 2017f; 2017g).

The data review focused on the following QC parameters and impact on data quality objectives: usability; sample handling and chain-of-custody documentation; holding time compliance; field QC (trip blanks and field duplicates); laboratory QC (method blanks, laboratory control samples, laboratory control sample duplicates, surrogates, MS/MSD samples, method reporting limits) and completeness. In general, the overall quality of the data is acceptable. The data quality was determined as acceptable or estimated. Acceptable data is associated with QC data that meets all QC criteria or with QC samples that did not meet QC criteria, but data quality objectives were not affected. Estimated "J" results are considered inaccurate due to a bias created by matrix interference or QC acceptance criteria which were not met. No results were rejected. Data quality meets the objectives established for this project (**Attachment B**).

RECOMMENDATION

In accordance with 18 AAC 75.340 (3)(e)(1), Agviq on behalf of NSB, recommends the adoption of site-specific alternate cleanup levels for GRO, DRO, and RRO at the NSB South Pad Site in Barrow, Alaska. The physical and chemical factors demonstrate that concentrations that remain in soil will not present a significant risk to human health, safety, or welfare, or to the environment by way of an inhalation pathway.

If you have any questions regarding this Method Three Alternate Cleanup Level Request for the South Pad Site in Barrow, Alaska, please don't hesitate to call me at (907) 365-6230.

Sincerely,

Darrin Lawless
Senior Program Manager

Cc: Ian Stroud – NSB
Melissa Bynum – NSB

Attachments:

Table 1 – 2017 Soil Analytical Results-Petroleum Hydrocarbons and Total Organic Carbon
Table 2 – 2017 Soil Analytical Results-Volatile Organic Compounds
Figure 1 – Site Location Map
Figure 2 – Site Map
Figure 3 – 2017 Test Pit and Sample Locations
Attachment A - NSB Barrow South Pad Method Three Alternate Cleanup Level Calculations
Attachment B - 2017 Analytical Laboratory Reports, ADEC Checklists and Quality Assurance Summary
Attachment C - 2017 Analytical Chromatograms Biogenic DRO and RRO
Attachment D – 2002 Data Provided by ADEC and Cumulative Risk and Cleanup Level Calculations

REFERENCES

Alaska Department of Environmental Conservation (ADEC) 2008. *Guidelines for Total Organic Carbon (TOC) Sample Collection and Data Reduction for Method Three and Method Four,* Technical Memorandum 08-002, September 30, 2008.

ADEC. 2017a. 18 AAC 75, *Oil and Other Hazardous Substances Pollution Control*. November 2017.

ADEC. 2017b. *Cleanup Levels Guidance for Methods Two and Three*-Draft*.* April 2017.

ADEC. 2017c. Technical Memorandum. *Establishing Arctic Zone Cleanup Levels.* March 2017.

ADEC. 2017d. Technical Memorandum. *Determining the Fraction of Organic Carbon (foc) for Methods Three and Four,* March 6, 2017.

ADEC. 2017e. *Field Sampling Guidance,* August, 2017.

ADEC. 2017f. Technical Memorandum. *Data Quality Objectives, Checklists, Quality Assurance Requirements for Laboratory Data, and Sample Handling.* March 2017.

ADEC. 2017g. Laboratory Data Review Checklist. July 2017.

ADEC. 2018a. *Procedures for Calculating Cleanup Levels*, February 1, 2018.

ADEC. 2018b. *Procedures for Calculating Cumulative Risk*, February 1, 2018.

ADEC. 2018c. 18 AAC 70, *Water Quality Standards*, April 6, 2018.

Agviq, LLC (Agviq). 2016a. *NSB Barrow South Pad Site Characterization Report Final,* May 9, 2016.

Agviq. 2016b. *NSB Barrow South Pad Corrective Action Plan Final*, July 12, 2016.

Agviq. 2017a. *NSB Barrow South Pad Removal Action Report Final.* May 23, 2017.

Agviq 2017b. *NSB Barrow South Pad, Method Three Alternate Cleanup Level Sampling Work Plan*, June 9, 2017.

Agviq 2017c. *NSB Barrow South Pad, Corrective Action Removal of Contaminated Soil, Request for Method Three Petroleum Hydrocarbon Soil Cleanup Levels*, August 8, 2017.

Agviq 2018. *NSB Barrow South Pad, Corrective Action Removal of Contaminated Soil, Request for Method Three Petroleum Hydrocarbon Soil Cleanup Levels*, Resubmittal with ADEC Checklist and Quality Assurance Summary, March 8, 2018.

U.S. Environmental Protection Agency (EPA). 2017a. National Functional Guidelines for Organic Superfund Methods Data Review. January 2017.

EPA. 2017b. National Functional Guidelines for Inorganic Superfund Methods Data Review. January 2017.

ATTACHMENTS

TABLES

TABLE 1 2017 SOIL ANALYTICAL RESULTS-PETROLEUM HYDROCARBONS AND TOTAL ORGANIC CARBON
NORTH SLOPE BOROUGH SOUTH PAD SITE
METHOD THREE ALTERNATE CLEANUP LEVEL REQUEST
BARROW, ALASKA

		Client Sample Id:	17-BRWSP-TP-01-2		17-BRWSP-TPZ-01-2		17-BRWSP-TP-02-2		17-BRWSP-TP-03-2		17-BRWSP-TP-04-2	
		Lab Sample Id:	1173405002		1173405003		1173405004		1173405005		1173405006	
		Matrix:	Soil		Soil		Soil		Soil		Soil	
		Sample Depth in feet:	2		2		2		2		2	
		Location:	TP-01		TP-01-2 Duplicate		TP-02		TP-03		TP-04	
		Date Sampled:	6/13/2017		6/13/2017		6/13/2017		6/13/2017		6/13/2017	
ADEC Cleanup Level	**Analyte**	**Unit**	**Result**	**IQ**	**Result**	**IQ**	**Result**	**IQ**	**Result**	**IQ**	**Result**	**IQ**
100	**Gasoline Range Organics**	mg/Kg	1.31U		1.19U		**0.537J**		0.990U		1.02U	
200	**Diesel Range Organics**	mg/Kg	**187**		**125**		**9.42J**		**30.2**		**7.37J**	
2000	**Residual Range Organics**	mg/Kg	**734**	JD	**401**	JD	**49.4**		**105**		**47.8**	
16000	**Benzene**	ug/Kg	**5.24J**	UB(13.1)	**5.96J**	UB(11.9)	4.46U		4.94U		5.10U	
200000	**Toluene**	ug/Kg	13.1U		11.9U		8.95U		9.90U		10.2U	
72000	**Ethylbenzene**	ug/Kg	**32.5**		**36.7**		**8.21J**	UB(17.9)	9.90U		10.2U	
57000	**Xylenes (total)**	ug/Kg	39.4U		35.8U		**20.7J**	UB(53.6)	29.6U		**22.4J**	UB(61.2)
	Total Organic Carbon	%	0.805		0.674		0.0526		0.269		0.229	
	Total Solids	%	89.3		88.0		95.4		95.6		95.0	

TABLE 1 2017 SOIL ANALYTICAL RESULTS-PETROLEUM HYDROCARBONS AND TOTAL ORGANIC CARBON
NORTH SLOPE BOROUGH SOUTH PAD SITE
METHOD THREE ALTERNATE CLEANUP LEVEL REQUEST
BARROW, ALASKA

		Client Sample Id:	17-BRWSP-TP-01-4.5		17-BRWSP-TPZ-02-4.5		17-BRWSP-TP-02-4.5		17-BRWSP-TP-03-4.5		17-BRWSP-TP-04-4.5	
		Lab Sample Id:	1174638002		1174638003		1174638004		1174638005		1174638008	
		Matrix:	Soil		Soil		Soil		Soil		Soil	
		Sample Depth in feet:	4.5		4.5		4.5		4.5		4.5	
		Location:	TP-01		TP-02-4.5 Duplicate		TP-02		TP-03		TP-04	
		Date Sampled:	7/18/2017		7/18/2017		7/18/2017		7/18/2017		7/18/2017	
ADEC Cleanup Level	**Analyte**	**Unit**	**Result**	**IQ**	**Result**	**IQ**	**Result**	**IQ**	**Result**	**IQ**	**Result**	**IQ**
100	**Gasoline Range Organics**	mg/Kg	1.49U		1.47U		**1.27J**		1.48U		1.48U	
200	**Diesel Range Organics**	mg/Kg	10.7U		10.7U		10.7U		10.7U		**7.42J**	
2000	**Residual Range Organics**	mg/Kg	10.7U		10.7U		10.7U		**24.5**		**60.3**	
16000	**Benzene**	ug/Kg	7.45U		7.35U		7.50U		7.35U		**7.68J**	UB(14.8)
200000	**Toluene**	ug/Kg	14.9U		14.7U		15.0U		14.8U		**9.45J**	
72000	**Ethylbenzene**	ug/Kg	**9.51J**		**10.6J**		15.0U		14.8U		14.8U	
57000	**Xylenes (total)**	ug/Kg	44.6U		44.1U		**27.9J**		44.2U		44.3U	
	Total Organic Carbon	%	0.168	JD	0.0824	JD	0.0779		0.170		0.985	
	Total Solids	%	92.9		92.7		92.5		93.1		93.4	

TABLE 2 2017 SOIL ANALYTICAL RESULTS-VOLATILE ORGANIC COMPOUNDS
NORTH SLOPE BOROUGH SOUTH PAD SITE
METHOD THREE ALTERNATE CLEANUP LEVEL REQUEST
BARROW, ALASKA

		Client Sample Id:	17-BRWSP-TP-01-2		17-BRWSP-TPZ-01-2		17-BRWSP-TP-02-2		17-BRWSP-TP-03-2		17-BRWSP-TP-04-2	
		Lab Sample Id:	1173405002		1173405003		1173405004		1173405005		1173405006	
		Matrix:	Soil		Soil		Soil		Soil		Soil	
		Sample Depth in feet:	2		2		2		2		2	
		Location:	TP-01		TP-01-2 Duplicate		TP-02		TP-03		TP-04	
		Date Sampled:	6/13/2017		6/13/2017		6/13/2017		6/13/2017		6/13/2017	
ADEC Cleanup Level	**Analyte**	**Unit**	**Result**	**IQ**	**Result**	**IQ**	**Result**	**IQ**	**Result**	**IQ**	**Result**	**IQ**
30000	1,1,1,2-Tetrachloroethane	ug/Kg	10.5U		9.55U		7.15U		7.90U		8.15U	
360000	1,1,1-Trichloroethane	ug/Kg	13.1U		11.9U		8.95U		9.90U		10.2U	
8800	1,1,2,2-Tetrachloroethane	ug/Kg	6.55U		5.95U		4.46U		4.94U		5.10U	
2300	1,1,2-Trichloroethane	ug/Kg	5.25U		4.76U		3.57U		3.96U		4.08U	
67000	1,1-Dichloroethane	ug/Kg	13.1U		11.9U		8.95U		9.90U		10.2U	
480000	1,1-Dichloroethene	ug/Kg	13.1U		11.9U		8.95U		9.90U		10.2U	
	1,1-Dichloropropene	ug/Kg	13.1U		11.9U		8.95U		9.90U		10.2U	
110000	1,2,3-Trichlorobenzene	ug/Kg	26.2U		23.9U		17.9U		19.8U		20.4U	
89	1,2,3-Trichloropropane	ug/Kg	13.1U		11.9U		8.95U		9.90U		10.2U	
65000	1,2,4-Trichlorobenzene	ug/Kg	13.1U		11.9U		8.95U		9.90U		10.2U	
43000	1,2,4-Trimethylbenzene	ug/Kg	26.2U		23.9U		17.9U		19.8U		**16.1J**	
	1,2-Dibromo-3-chloropropane	ug/Kg	52.5U		47.6U		35.7U		39.5U		40.8U	
620	1,2-Dibromoethane	ug/Kg	5.25U		4.76U		3.57U		3.96U		4.08U	
78000	1,2-Dichlorobenzene	ug/Kg	13.1U		11.9U		8.95U		9.90U		10.2U	
7900	1,2-Dichloroethane	ug/Kg	5.25U		4.76U		3.57U		3.96U		4.08U	
16000	1,2-Dichloropropane	ug/Kg	5.25U		4.76U		3.57U		3.96U		4.08U	
37000	1,3,5-Trimethylbenzene	ug/Kg	13.1U		11.9U		**12.9J**		9.90U		**7.75J**	
62000	1,3-Dichlorobenzene	ug/Kg	13.1U		11.9U		8.95U		9.90U		10.2U	
	1,3-Dichloropropane	ug/Kg	5.25U		4.76U		3.57U		3.96U		4.08U	
31000	1,4-Dichlorobenzene	ug/Kg	13.1U		11.9U		8.95U		9.90U		10.2U	
	2,2-Dichloropropane	ug/Kg	13.1U		11.9U		8.95U		9.90U		10.2U	
23000000	2-Butanone (MEK)	ug/Kg	131U		119U		89.5U		99.0U		102U	

TABLE 2 2017 SOIL ANALYTICAL RESULTS-VOLATILE ORGANIC COMPOUNDS
NORTH SLOPE BOROUGH SOUTH PAD SITE
METHOD THREE ALTERNATE CLEANUP LEVEL REQUEST
BARROW, ALASKA

		Client Sample Id:	17-BRWSP-TP-01-2		17-BRWSP-TPZ-01-2		17-BRWSP-TP-02-2		17-BRWSP-TP-03-2		17-BRWSP-TP-04-2	
		Lab Sample Id:	1173405002		1173405003		1173405004		1173405005		1173405006	
		Matrix:	Soil		Soil		Soil		Soil		Soil	
		Sample Depth in feet:	2		2		2		2		2	
		Location:	TP-01		TP-01-2 Duplicate		TP-02		TP-03		TP-04	
		Date Sampled:	6/13/2017		6/13/2017		6/13/2017		6/13/2017		6/13/2017	
ADEC Cleanup Level	**Analyte**	**Unit**	**Result**	**IQ**	**Result**	**IQ**	**Result**	**IQ**	**Result**	**IQ**	**Result**	**IQ**
	2-Chlorotoluene	ug/Kg	13.1U		11.9U		8.95U		9.90U		10.2U	
380000	2-Hexanone	ug/Kg	52.5U		47.6U		35.7U		39.5U		40.8U	
	4-Chlorotoluene	ug/Kg	13.1U		11.9U		8.95U		9.90U		10.2U	
	4-Isopropyltoluene	ug/Kg	13.1U		11.9U		8.95U		9.90U		10.2U	
2200000	4-Methyl-2-pentanone (MIBK)	ug/Kg	131U		119U		89.5U		99.0U		102U	
160000	Bromobenzene	ug/Kg	13.1U		11.9U		8.95U		9.90U		10.2U	
	Bromochloromethane	ug/Kg	13.1U		11.9U		8.95U		9.90U		10.2U	
5300	Bromodichloromethane	ug/Kg	13.1U		11.9U		8.95U		9.90U		10.2U	
340000	Bromoform	ug/Kg	13.1U		11.9U		8.95U		9.90U		10.2U	
15000	Bromomethane	ug/Kg	105U		95.5U		71.5U		79.0U		81.5U	
500000	Carbon disulfide	ug/Kg	52.5U		47.6U		35.7U		39.5U		40.8U	
13000	Carbon tetrachloride	ug/Kg	6.55U		5.95U		4.46U		4.94U		5.10U	
180000	Chlorobenzene	ug/Kg	13.1U		11.9U		8.95U		9.90U		10.2U	
	Chloroethane	ug/Kg	105U		95.5U		71.5U		79.0U		81.5U	
5800	Chloroform	ug/Kg	13.1U		11.9U		8.95U		9.90U		10.2U	
250000	Chloromethane	ug/Kg	13.1U		11.9U		8.95U		9.90U		10.2U	
140000	Dibromochloromethane	ug/Kg	13.1U		11.9U		8.95U		9.90U		10.2U	
45000	Dibromomethane	ug/Kg	13.1U		11.9U		8.95U		9.90U		10.2U	
220000	Dichlorodifluoromethane	ug/Kg	26.2U		23.9U		17.9U		19.8U		20.4U	
	Freon-113	ug/Kg	52.5U		47.6U		35.7U		39.5U		40.8U	
3300	Hexachlorobutadiene	ug/Kg	10.5U		9.55U		7.15U		7.9U		8.15U	

TABLE 2 2017 SOIL ANALYTICAL RESULTS-VOLATILE ORGANIC COMPOUNDS
NORTH SLOPE BOROUGH SOUTH PAD SITE
METHOD THREE ALTERNATE CLEANUP LEVEL REQUEST
BARROW, ALASKA

		Client Sample Id:	17-BRWSP-TP-01-2		17-BRWSP-TPZ-01-2		17-BRWSP-TP-02-2		17-BRWSP-TP-03-2		17-BRWSP-TP-04-2	
		Lab Sample Id:	1173405002		1173405003		1173405004		1173405005		1173405006	
		Matrix:	Soil		Soil		Soil		Soil		Soil	
		Sample Depth in feet:	2		2		2		2		2	
		Location:	TP-01		TP-01-2 Duplicate		TP-02		TP-03		TP-04	
		Date Sampled:	6/13/2017		6/13/2017		6/13/2017		6/13/2017		6/13/2017	
ADEC Cleanup Level	**Analyte**	**Unit**	**Result**	**IQ**	**Result**	**IQ**	**Result**	**IQ**	**Result**	**IQ**	**Result**	**IQ**
54000	Isopropylbenzene (Cumene)	ug/Kg	**8.91J**		**10.0J**		**11.1J**		9.90U		10.2U	
970000	Methyl-t-butyl ether	ug/Kg	52.5U		47.6U		35.7U		39.5U		40.8U	
630000	Methylene chloride	ug/Kg	52.5U		47.6U		35.7U		39.5U		40.8U	
42000	Naphthalene	ug/Kg	13.1U		11.9U		8.95U		9.90U		10.2U	
180000	Styrene	ug/Kg	13.1U		11.9U		8.95U		9.90U		10.2U	
68000	Tetrachloroethene	ug/Kg	6.55U		5.95U		4.46U		4.94U		**12.9**	
7100	Trichloroethene	ug/Kg	5.25U		4.76U		3.57U		3.96U		4.08U	
980000	Trichlorofluoromethane	ug/Kg	26.2U		23.9U		17.9U		19.8U		20.4U	
2100000	Vinyl acetate	ug/Kg	52.5U		47.6U		35.7U		39.5U		40.8U	
690	Vinyl chloride	ug/Kg	5.25U		4.76U		3.57U		3.96U		4.08U	
270000	cis-1,2-Dichloroethene	ug/Kg	13.1U		11.9U		8.95U		9.90U		10.2U	
	cis-1,3-Dichloropropene	ug/Kg	6.55U		5.95U		4.46U		4.94U		5.10U	
20000	n-Butylbenzene	ug/Kg	13.1U		11.9U		8.95U		9.90U		10.2U	
	n-Propylbenzene	ug/Kg	13.1U		**7.62J**		**8.39J**		9.90U		10.2U	
28000	sec-Butylbenzene	ug/Kg	13.1U		11.9U		8.95U		9.90U		10.2U	
35000	tert-Butylbenzene	ug/Kg	13.1U		11.9U		8.95U		9.90U		10.2U	
960000	trans-1,2-Dichloroethene	ug/Kg	13.1U		11.9U		8.95U		9.90U		10.2U	
	trans-1,3-Dichloropropene	ug/Kg	6.55U		5.95U		4.46U		4.94U		5.10U	

TABLE 2 2017 SOIL ANALYTICAL RESULTS-VOLATILE ORGANIC COMPOUNDS
NORTH SLOPE BOROUGH SOUTH PAD SITE
METHOD THREE ALTERNATE CLEANUP LEVEL REQUEST
BARROW, ALASKA

		Client Sample Id:	17-BRWSP-TP-01-4.5		17-BRWSP-TPZ-02-4.5		17-BRWSP-TP-02-4.5		17-BRWSP-TP-03-4.5		17-BRWSP-TP-04-4.5	
		Lab Sample Id:	1174638002		1174638003		1174638004		1174638005		1174638008	
		Matrix:	Soil		Soil		Soil		Soil		Soil	
		Sample Depth in feet:	4.5		4.5		4.5		4.5		4.5	
		Location:	TP-01		TP-02-4.5 Duplicate		TP-02		TP-03		TP-04	
		Date Sampled:	7/18/2017		7/18/2017		7/18/2017		7/18/2017		7/18/2017	
ADEC Cleanup Level	**Analyte**	**Unit**	**Result**	**IQ**	**Result**	**IQ**	**Result**	**IQ**	**Result**	**IQ**	**Result**	**IQ**
30000	1,1,1,2-Tetrachloroethane	ug/Kg	11.9U		11.8U		12.0U		11.8U		11.8U	
360000	1,1,1-Trichloroethane	ug/Kg	14.9U		14.7U		15.0U		14.8U		14.8U	
8800	1,1,2,2-Tetrachloroethane	ug/Kg	7.45U		7.35U		7.50U		7.35U		7.40U	
2300	1,1,2-Trichloroethane	ug/Kg	5.95U		5.90U		6.00U		5.90U		5.90U	
67000	1,1-Dichloroethane	ug/Kg	14.9U		14.7U		15.0U		14.8U		14.8U	
480000	1,1-Dichloroethene	ug/Kg	14.9U		14.7U		15.0U		14.8U		14.8U	
	1,1-Dichloropropene	ug/Kg	14.9U		14.7U		15.0U		14.8U		14.8U	
110000	1,2,3-Trichlorobenzene	ug/Kg	29.7U		29.4U		30.1U		29.5U		29.6U	
89	1,2,3-Trichloropropane	ug/Kg	14.9U		14.7U		15.0U		14.8U		14.8U	
65000	1,2,4-Trichlorobenzene	ug/Kg	14.9U		14.7U		15.0U		14.8U		14.8U	
43000	1,2,4-Trimethylbenzene	ug/Kg	**34.5J**		**34.2J**		30.1U		29.5U		29.6U	
	1,2-Dibromo-3-chloropropane	ug/Kg	59.5U		59.0U		60.0U		59.0U		59.0U	
620	1,2-Dibromoethane	ug/Kg	5.95U		5.90U		6.00U		5.90U		5.90U	
78000	1,2-Dichlorobenzene	ug/Kg	14.9U		14.7U		15.0U		14.8U		14.8U	
7900	1,2-Dichloroethane	ug/Kg	5.95U		5.90U		6.00U		5.90U		5.90U	
16000	1,2-Dichloropropane	ug/Kg	5.95U		5.90U		6.00U		5.90U		5.90U	
37000	1,3,5-Trimethylbenzene	ug/Kg	14.9U		14.7U		**15.9J**		14.8U		14.8U	
62000	1,3-Dichlorobenzene	ug/Kg	14.9U		14.7U		15.0U		14.8U		14.8U	
	1,3-Dichloropropane	ug/Kg	5.95U		5.90U		6.00U		5.90U		5.90U	
31000	1,4-Dichlorobenzene	ug/Kg	14.9U		14.7U		15.0U		14.8U		14.8U	
	2,2-Dichloropropane	ug/Kg	14.9U		14.7U		15.0U		14.8U		14.8U	
23000000	2-Butanone (MEK)	ug/Kg	149U		147U		150U		148U		148U	

TABLE 2 2017 SOIL ANALYTICAL RESULTS-VOLATILE ORGANIC COMPOUNDS
NORTH SLOPE BOROUGH SOUTH PAD SITE
METHOD THREE ALTERNATE CLEANUP LEVEL REQUEST
BARROW, ALASKA

		Client Sample Id:	17-BRWSP-TP-01-4.5		17-BRWSP-TPZ-02-4.5		17-BRWSP-TP-02-4.5		17-BRWSP-TP-03-4.5		17-BRWSP-TP-04-4.5	
		Lab Sample Id:	1174638002		1174638003		1174638004		1174638005		1174638008	
		Matrix:	Soil		Soil		Soil		Soil		Soil	
		Sample Depth in feet:	4.5		4.5		4.5		4.5		4.5	
		Location:	TP-01		TP-02-4.5 Duplicate		TP-02		TP-03		TP-04	
		Date Sampled:	7/18/2017		7/18/2017		7/18/2017		7/18/2017		7/18/2017	
ADEC Cleanup Level	**Analyte**	**Unit**	**Result**	**IQ**	**Result**	**IQ**	**Result**	**IQ**	**Result**	**IQ**	**Result**	**IQ**
	2-Chlorotoluene	ug/Kg	14.9U		14.7U		15.0U		14.8U		14.8U	
380000	2-Hexanone	ug/Kg	59.5U		59.0U		60.0U		59.0U		59.0U	
	4-Chlorotoluene	ug/Kg	14.9U		14.7U		15.0U		14.8U		14.8U	
	4-Isopropyltoluene	ug/Kg	14.9U		14.7U		**22.0J**		14.8U		14.8U	
2200000	4-Methyl-2-pentanone (MIBK)	ug/Kg	149U		147U		150U		148U		148U	
160000	Bromobenzene	ug/Kg	14.9U		14.7U		15.0U		14.8U		14.8U	
	Bromochloromethane	ug/Kg	14.9U		14.7U		15.0U		14.8U		14.8U	
5300	Bromodichloromethane	ug/Kg	14.9U		14.7U		15.0U		14.8U		14.8U	
340000	Bromoform	ug/Kg	14.9U		14.7U		15.0U		14.8U		14.8U	
15000	Bromomethane	ug/Kg	119U		118U		120U		118U		118U	
500000	Carbon disulfide	ug/Kg	59.5U		59.0U		60.0U		59.0U		59.0U	
13000	Carbon tetrachloride	ug/Kg	7.45U		7.35U		7.50U		7.35U		**10.6J**	
180000	Chlorobenzene	ug/Kg	14.9U		14.7U		15.0U		14.8U		14.8U	
	Chloroethane	ug/Kg	119U		118U		120U		118U		118U	
5800	Chloroform	ug/Kg	14.9U		14.7U		15.0U		14.8U		14.8U	
250000	Chloromethane	ug/Kg	14.9U		14.7U		15.0U		14.8U		**10.9J**	
140000	Dibromochloromethane	ug/Kg	14.9U		14.7U		15.0U		14.8U		14.8U	
45000	Dibromomethane	ug/Kg	14.9U		14.7U		15.0U		14.8U		14.8U	
220000	Dichlorodifluoromethane	ug/Kg	29.7U		29.4U		30.1U		29.5U		29.6U	
	Freon-113	ug/Kg	59.5U		59.0U		60.0U		59.0U		59.0U	
3300	Hexachlorobutadiene	ug/Kg	11.9U		11.8U		12.0U		11.8U		11.8U	

TABLE 2 2017 SOIL ANALYTICAL RESULTS-VOLATILE ORGANIC COMPOUNDS
NORTH SLOPE BOROUGH SOUTH PAD SITE
METHOD THREE ALTERNATE CLEANUP LEVEL REQUEST
BARROW, ALASKA

		Client Sample Id:	17-BRWSP-TP-01-4.5		17-BRWSP-TPZ-02-4.5		17-BRWSP-TP-02-4.5		17-BRWSP-TP-03-4.5		17-BRWSP-TP-04-4.5	
		Lab Sample Id:	1174638002		1174638003		1174638004		1174638005		1174638008	
		Matrix:	Soil		Soil		Soil		Soil		Soil	
		Sample Depth in feet:	4.5		4.5		4.5		4.5		4.5	
		Location:	TP-01		TP-02-4.5 Duplicate		TP-02		TP-03		TP-04	
		Date Sampled:	7/18/2017		7/18/2017		7/18/2017		7/18/2017		7/18/2017	
ADEC Cleanup Level	**Analyte**	**Unit**	**Result**	**IQ**	**Result**	**IQ**	**Result**	**IQ**	**Result**	**IQ**	**Result**	**IQ**
54000	Isopropylbenzene (Cumene)	ug/Kg	14.9U		14.7U		15.0U		14.8U		14.8U	
970000	Methyl-t-butyl ether	ug/Kg	59.5U		59.0U		60.0U		59.0U		59.0U	
630000	Methylene chloride	ug/Kg	59.5U		59.0U		60.0U		59.0U		59.0U	
42000	Naphthalene	ug/Kg	**100**		**116**		**27.3J**		14.8U		14.8U	
180000	Styrene	ug/Kg	14.9U		14.7U		15.0U		14.8U		14.8U	
68000	Tetrachloroethene	ug/Kg	7.45U		7.35U		7.50U		7.35U		**5.61J**	
7100	Trichloroethene	ug/Kg	5.95U		5.90U		6.00U		5.90U		**6.20J**	
980000	Trichlorofluoromethane	ug/Kg	29.7U		29.4U		30.1U		29.5U		29.6U	
2100000	Vinyl acetate	ug/Kg	59.5U		59.0U		60.0U		59.0U		59.0U	
690	Vinyl chloride	ug/Kg	5.95U		5.90U		6.00U		5.90U		5.90U	
270000	cis-1,2-Dichloroethene	ug/Kg	14.9U		14.7U		15.0U		14.8U		14.8U	
	cis-1,3-Dichloropropene	ug/Kg	7.45U		7.35U		7.50U		7.35U		7.40U	
20000	n-Butylbenzene	ug/Kg	14.9U		14.7U		15.0U		14.8U		14.8U	
	n-Propylbenzene	ug/Kg	**16.9J**		**19.1J**		**11.1J**		14.8U		14.8U	
28000	sec-Butylbenzene	ug/Kg	14.9U		14.7U		15.0U		14.8U		14.8U	
35000	tert-Butylbenzene	ug/Kg	14.9U		14.7U		15.0U		14.8U		14.8U	
960000	trans-1,2-Dichloroethene	ug/Kg	14.9U		14.7U		15.0U		14.8U		14.8U	
	trans-1,3-Dichloropropene	ug/Kg	7.45U		7.35U		7.50U		7.35U		7.40U	

TABLE NOTES
NORTH SLOPE BOROUGH SOUTH PAD SITE
BARROW, ALASKA
REQUEST FOR METHOD THREE ALTERNATE CLEANUP LEVELS

Notes:
Non-detect results are reported as ND (LOD).
Criteria:
Bolded highlighted grey text indicates concentration is above limit of detection

Bolded highlighted blue text indicates concentration exceeds ADEC Cleanup Level: 18 AAC 75.341; Table A2 and/or Table B1

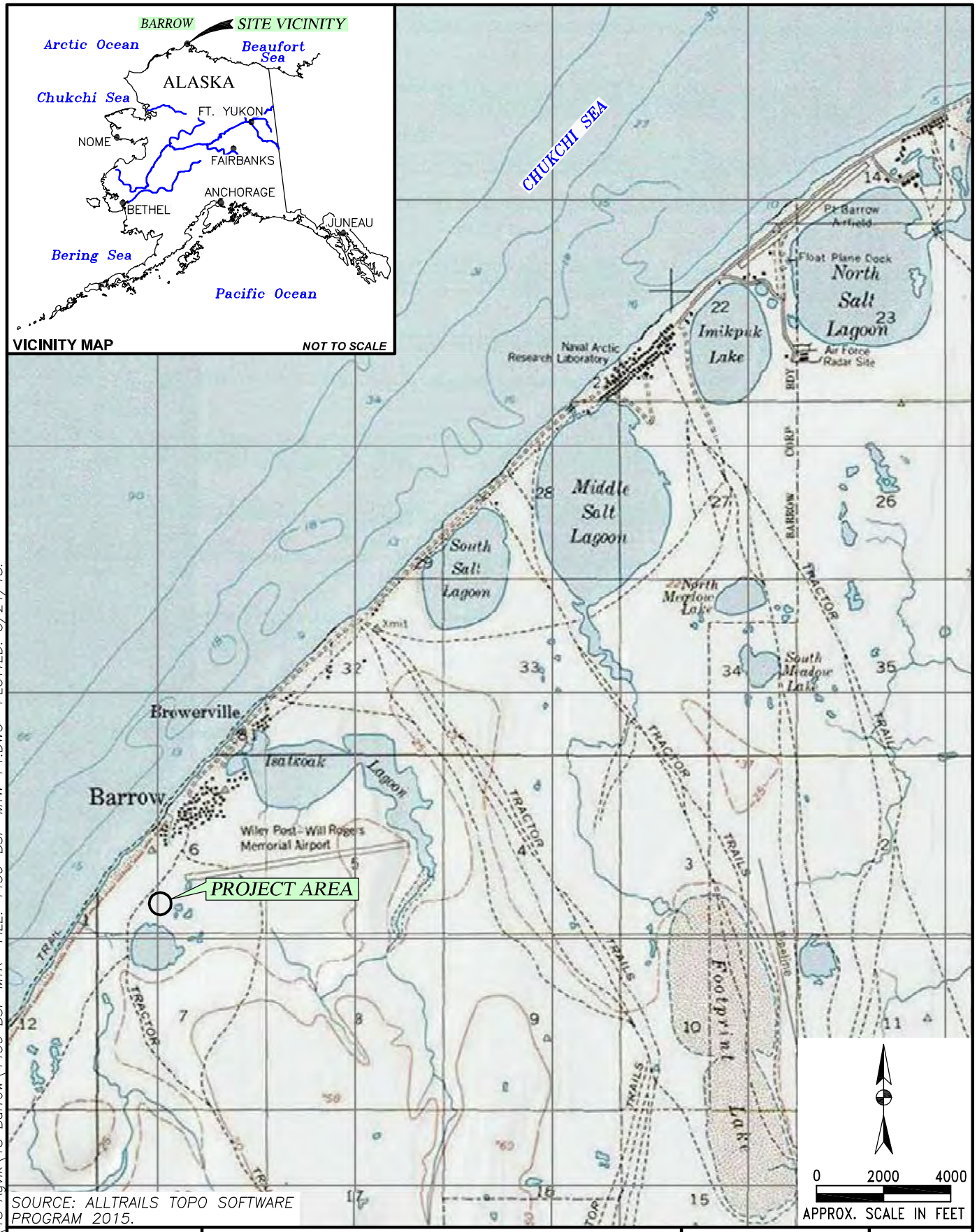
Acronyms:

ADEC	Alaska Department of Environmental Conservation
DL	Detection Limit
FD	Field Duplicate
IQ	Interpreted Qualifier
LOD	Limit of Detection
LOQ	Limit of Quantitation (two-times LOD)
µg/L	micogram per liter
SIM	Selective Ion Monitoring
T / D	Total (T) / Dissolved (D)
TB	Trip Blank
U	Indicates the analyte was analyzed for but not detected

Interpreted Qualifiers:

B	The analyte is detected in an associated blank and the sample result is greater than five-times the blank contamination.
J	The result is an estimation due to its quantitation level.
JD	The result is an estimation due to field duplicate imprecision.
UB	The result is considered not detected at the LOQ due to blank contamination.

FIGURES



SOURCE: ALLTRAILS TOPO SOFTWARE PROGRAM 2015.

PATH: 18 Dwgs\18 Agvik\18 Barrow\4430 BSP MTR FILE: 4430-BSP-MTW-F1.DWG PLOTTED: 5/24/18.

DATE: MAY 2018 CHKD: W.L. DRAWN: C.E.H. PROJ. No.: 4430	**SITE LOCATION MAP** NSB BARROW SOUTH PAD METHOD THREE REQUEST Barrow, Alaska	AGVIQ 301 W. Northern Lights Ave., Suite 660 Anchorage, Alaska 99503	**FIGURE** **1**

SOURCE: 2013 IMAGE BARROW_VICINITY_SW&SE .TIF PROVIDED BY ALASKA DEPT. OF COMMERCE, COMMUNITY AND ECONOMIC DEVELOPMENT.

PATH: 18 Dwgs\18 Agvik\18 Barrow\4430 BSP MTR FILE: 4430-BSP-MTW-F2.DWG PLOTTED: 5/24/18.

DATE: MAY 2018
CHKD: W.L.
DRAWN: C.E.H.
PROJ. No.: 4430

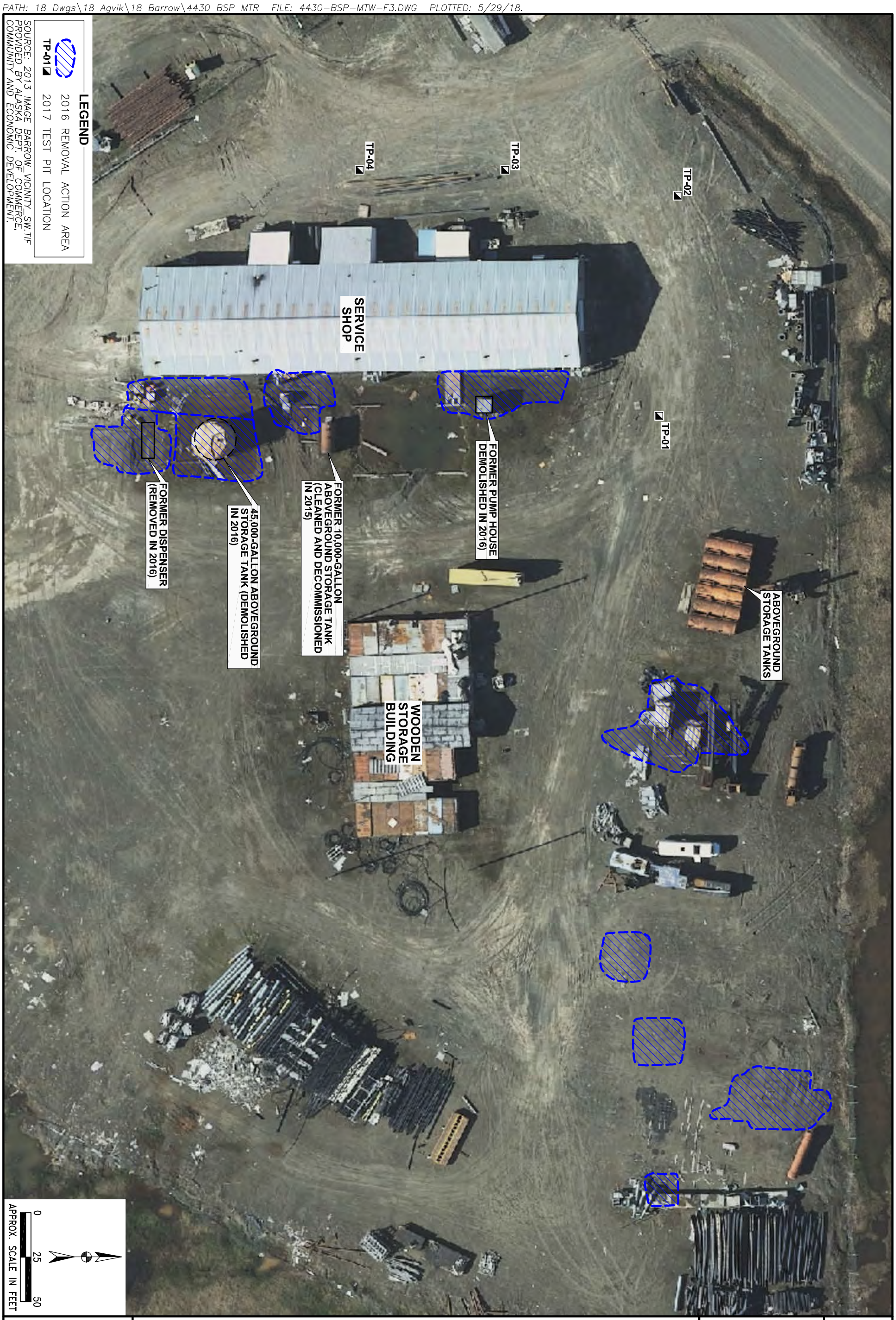
SITE MAP

NSB BARROW SOUTH PAD
METHOD THREE REQUEST
Barrow, Alaska

AGVIQ
301 W. Northern Lights Ave., Suite 660
Anchorage, Alaska 99503

FIGURE
2

PATH: 18 Dwgs\18 Agvik\18 Barrow\4430 BSP MTR FILE: 4430-BSP-MTW-F3.DWG PLOTTED: 5/29/18.



DATE: MAY 2018
CHKD: W.L.
DRAWN: C.E.H.
PROJ. No.: 4430

2017 TEST PIT AND SAMPLE LOCATIONS

NSB BARROW SOUTH PAD
METHOD THREE REQUEST
Barrow, Alaska

AGVIQ
301 W. Northern Lights Ave., Suite 660
Anchorage, Alaska 99503

FIGURE
3

ATTACHMENT A

NSB BARROW SOUTH PAD METHOD THREE ALTERNATE CLEANUP LEVEL CALCULATIONS

Petroleum Cleanup Level Calculator

NSB Barrow South Pad 0 to 2 feet

Site zone and exposure scenario: Arctic Zone - Commercial/Industrial Exposures

Cleanup Level Calculations 5/31/2018

Chemical	CAS	Type	Calculations		
DRO Aliphatic		Organic Non-Carcinogenic Petroleum	Ingestion Indoor Worker:	256000	mg/kg
			Ingestion Outdoor Worker:	128000	mg/kg
			Inhalation Cleanup Level:	76700	mg/kg
			Groundwater Cleanup Level:	3.7	mg/L
			Migration to Groundwater:	29700	mg/kg
DRO Aromatic		Organic Non-Carcinogenic Petroleum	Ingestion Indoor Worker:	102000	mg/kg
			Ingestion Outdoor Worker:	51100	mg/kg
			Inhalation Cleanup Level:	23500	mg/kg
			Groundwater Cleanup Level:	1.5	mg/L
			Migration to Groundwater:	410	mg/kg
DRO (Total)		Organic Non-Carcinogenic Petroleum	Ingestion Indoor Worker:	255000	mg/kg
			Ingestion Outdoor Worker:	128000	mg/kg
			Inhalation Cleanup Level:	58800	mg/kg
			Groundwater Cleanup Level:	1.5	mg/L
			Migration to Groundwater:	1000	mg/kg
GRO Aliphatic		Organic Non-Carcinogenic Petroleum	Ingestion Indoor Worker:	$> 10^6$	mg/kg
			Ingestion Outdoor Worker:	$> 10^6$	mg/kg
			Inhalation Cleanup Level:	81100	mg/kg
			Groundwater Cleanup Level:	180	mg/L
			Migration to Groundwater:	860	mg/kg
GRO Aromatic		Organic Non-Carcinogenic Petroleum	Ingestion Indoor Worker:	511000	mg/kg
			Ingestion Outdoor Worker:	256000	mg/kg
			Inhalation Cleanup Level:	4900	mg/kg
			Groundwater Cleanup Level:	7.3	mg/L
			Migration to Groundwater:	530	mg/kg
GRO (Total)		Organic Non-Carcinogenic Petroleum	Ingestion Indoor Worker:	$> 10^6$	mg/kg
			Ingestion Outdoor Worker:	512000	mg/kg
			Inhalation Cleanup Level:	9800	mg/kg
			Groundwater Cleanup Level:	2.2	mg/L
			Migration to Groundwater:	1100	mg/kg
RRO Aliphatic		Organic Non-Carcinogenic Petroleum	Ingestion Indoor Worker:	$> 10^6$	mg/kg
			Ingestion Outdoor Worker:	$> 10^6$	mg/kg
			Inhalation Cleanup Level:	20000	mg/kg
			Groundwater Cleanup Level:	73	mg/L
			Migration to Groundwater:	$> 10^6$	mg/kg

RRO Aromatic		Organic Non-Carcinogenic Petroleum	Ingestion Indoor Worker:	76700	mg/kg
			Ingestion Outdoor Worker:	38300	mg/kg
			Inhalation Cleanup Level:	10000	mg/kg
			Groundwater Cleanup Level:	1.1	mg/L
			Migration to Groundwater:	13500	mg/kg
RRO (Total)		Organic Non-Carcinogenic Petroleum	Ingestion Indoor Worker:	256000	mg/kg
			Ingestion Outdoor Worker:	128000	mg/kg
			Inhalation Cleanup Level:	22200	mg/kg
			Groundwater Cleanup Level:	1.1	mg/L
			Migration to Groundwater:	45000	mg/kg

Please Note

Chemical	Notes
DRO Aliphatic	The Maximum Allowable DRO Aliphatic concentration is 10000 mg/kg
DRO Aromatic	The Maximum Allowable DRO Aromatic concentration is 5000 mg/kg
DRO (Total)	The Maximum Allowable DRO concentration is 12500 mg/kg
GRO Aliphatic	The Maximum Allowable GRO Aliphatic concentration is 1000 mg/kg
GRO Aromatic	The Maximum Allowable GRO Aromatic concentration is 1000 mg/kg
GRO (Total)	The Maximum Allowable GRO concentration is 1400 mg/kg
RRO Aliphatic	The Maximum Allowable RRO Aliphatic concentration is 20000 mg/kg
RRO Aromatic	The Maximum Allowable RRO Aromatic concentration is 10000 mg/kg
RRO (Total)	The Maximum Allowable RRO concentration is 22000 mg/kg

The parameters used to calculate the above cleanup levels and the parameters' default values are as follows:

Volatilization Pathway Parameters

Symbol	Description	Value	Default	Units
ρ_b	Dry soil bulk density	1.5	1.5	g/cm^3
n	Total soil porosity	0.434	0.434	L_{pore}/L_{soil}
Θ_w	Water-filled soil porosity	0.15	0.15	L_{water}/L_{soil}
Θ_a	Air-filled soil porosity	0.284	0.284	L_{air}/L_{soil}
w	Average soil moisture content	0.1	0.1	g_{water}/g_{soil}
f_{oc}	Organic carbon content of soil	0.004	0.001	g/g

Groundwater Pathway Parameters

Symbol	Description	Value	Default	Units
Θ_w	Water-filled soil porosity	0.3	0.3	L_{water}/L_{soil}
Θ_a	Air-filled soil porosity	0.13	0.13	L_{air}/L_{soil}
w	Average soil moisture content	0.1	0.1	g_{water}/g_{soil}
K	Aquifer hydraulic conductivity	876	876	m/yr

i	Hydraulic gradient	0.002	0.002	m/m
L	Source length parallel to groundwater flow	32	32	m
I	Infiltration rate	0.13	0.13	m/yr
d_a	Aquifer thickness	10	10	m

Petroleum Cleanup Level Calculator

NSB Barrow South Pad 2 to 4.5 feet

Site zone and exposure scenario: Arctic Zone - Commercial/Industrial Exposures

Cleanup Level Calculations 5/31/2018

Chemical	CAS	Type	Calculations		
DRO Aliphatic		Organic Non-Carcinogenic Petroleum	Ingestion Indoor Worker:	256000	mg/kg
			Ingestion Outdoor Worker:	128000	mg/kg
			Inhalation Cleanup Level:	66000	mg/kg
			Groundwater Cleanup Level:	3.7	mg/L
			Migration to Groundwater:	21900	mg/kg
DRO Aromatic		Organic Non-Carcinogenic Petroleum	Ingestion Indoor Worker:	102000	mg/kg
			Ingestion Outdoor Worker:	51100	mg/kg
			Inhalation Cleanup Level:	20300	mg/kg
			Groundwater Cleanup Level:	1.5	mg/L
			Migration to Groundwater:	300	mg/kg
DRO (Total)		Organic Non-Carcinogenic Petroleum	Ingestion Indoor Worker:	255000	mg/kg
			Ingestion Outdoor Worker:	128000	mg/kg
			Inhalation Cleanup Level:	50800	mg/kg
			Groundwater Cleanup Level:	1.5	mg/L
			Migration to Groundwater:	750	mg/kg
GRO Aliphatic		Organic Non-Carcinogenic Petroleum	Ingestion Indoor Worker:	$> 10^6$	mg/kg
			Ingestion Outdoor Worker:	$> 10^6$	mg/kg
			Inhalation Cleanup Level:	72200	mg/kg
			Groundwater Cleanup Level:	180	mg/L
			Migration to Groundwater:	660	mg/kg
GRO Aromatic		Organic Non-Carcinogenic Petroleum	Ingestion Indoor Worker:	511000	mg/kg
			Ingestion Outdoor Worker:	256000	mg/kg
			Inhalation Cleanup Level:	4300	mg/kg
			Groundwater Cleanup Level:	7.3	mg/L
			Migration to Groundwater:	400	mg/kg
GRO (Total)		Organic Non-Carcinogenic Petroleum	Ingestion Indoor Worker:	$> 10^6$	mg/kg
			Ingestion Outdoor Worker:	512000	mg/kg
			Inhalation Cleanup Level:	8600	mg/kg
			Groundwater Cleanup Level:	2.2	mg/L
			Migration to Groundwater:	800	mg/kg
RRO Aliphatic		Organic Non-Carcinogenic Petroleum	Ingestion Indoor Worker:	$> 10^6$	mg/kg
			Ingestion Outdoor Worker:	$> 10^6$	mg/kg
			Inhalation Cleanup Level:	20000	mg/kg
			Groundwater Cleanup Level:	73	mg/L
			Migration to Groundwater:	$> 10^6$	mg/kg

RRO Aromatic		Organic Non-Carcinogenic Petroleum	Ingestion Indoor Worker:	76700	mg/kg
			Ingestion Outdoor Worker:	38300	mg/kg
			Inhalation Cleanup Level:	10000	mg/kg
			Groundwater Cleanup Level:	1.1	mg/L
			Migration to Groundwater:	10000	mg/kg
RRO (Total)		Organic Non-Carcinogenic Petroleum	Ingestion Indoor Worker:	256000	mg/kg
			Ingestion Outdoor Worker:	128000	mg/kg
			Inhalation Cleanup Level:	22200	mg/kg
			Groundwater Cleanup Level:	1.1	mg/L
			Migration to Groundwater:	33300	mg/kg

Please Note

Chemical	Notes
DRO Aliphatic	The Maximum Allowable DRO Aliphatic concentration is 10000 mg/kg
DRO Aromatic	The Maximum Allowable DRO Aromatic concentration is 5000 mg/kg
DRO (Total)	The Maximum Allowable DRO concentration is 12500 mg/kg
GRO Aliphatic	The Maximum Allowable GRO Aliphatic concentration is 1000 mg/kg
GRO Aromatic	The Maximum Allowable GRO Aromatic concentration is 1000 mg/kg
GRO (Total)	The Maximum Allowable GRO concentration is 1400 mg/kg
RRO Aliphatic	The Maximum Allowable RRO Aliphatic concentration is 20000 mg/kg
RRO Aromatic	The Maximum Allowable RRO Aromatic concentration is 10000 mg/kg
RRO (Total)	The Maximum Allowable RRO concentration is 22000 mg/kg

The parameters used to calculate the above cleanup levels and the parameters' default values are as follows:

Volatilization Pathway Parameters

Symbol	Description	Value	Default	Units
ρ_b	Dry soil bulk density	1.5	1.5	g/cm^3
n	Total soil porosity	0.434	0.434	L_{pore}/L_{soil}
Θ_w	Water-filled soil porosity	0.15	0.15	L_{water}/L_{soil}
Θ_a	Air-filled soil porosity	0.284	0.284	L_{air}/L_{soil}
w	Average soil moisture content	0.1	0.1	g_{water}/g_{soil}
f_{oc}	Organic carbon content of soil	0.00296	0.001	g/g

Groundwater Pathway Parameters

Symbol	Description	Value	Default	Units
Θ_w	Water-filled soil porosity	0.3	0.3	L_{water}/L_{soil}
Θ_a	Air-filled soil porosity	0.13	0.13	L_{air}/L_{soil}
w	Average soil moisture content	0.1	0.1	g_{water}/g_{soil}
K	Aquifer hydraulic conductivity	876	876	m/yr

i	Hydraulic gradient	0.002	0.002	m/m
L	Source length parallel to groundwater flow	32	32	m
I	Infiltration rate	0.13	0.13	m/yr
d_a	Aquifer thickness	10	10	m

Petroleum Cleanup Level Calculator

NSB Barrow South Pad 0 to 4.5 ft

Site zone and exposure scenario: Arctic Zone - Commercial/Industrial Exposures

Cleanup Level Calculations 9/7/2018

Chemical	CAS	Type	Calculations		
DRO Aliphatic		Organic Non-Carcinogenic Petroleum	Ingestion Indoor Worker:	256000	mg/kg
			Ingestion Outdoor Worker:	128000	mg/kg
			Inhalation Cleanup Level:	71800	mg/kg
			Groundwater Cleanup Level:	3.7	mg/L
			Migration to Groundwater:	26000	mg/kg
DRO Aromatic		Organic Non-Carcinogenic Petroleum	Ingestion Indoor Worker:	102000	mg/kg
			Ingestion Outdoor Worker:	51100	mg/kg
			Inhalation Cleanup Level:	22100	mg/kg
			Groundwater Cleanup Level:	1.5	mg/L
			Migration to Groundwater:	360	mg/kg
DRO (Total)		Organic Non-Carcinogenic Petroleum	Ingestion Indoor Worker:	255000	mg/kg
			Ingestion Outdoor Worker:	128000	mg/kg
			Inhalation Cleanup Level:	55300	mg/kg
			Groundwater Cleanup Level:	1.5	mg/L
			Migration to Groundwater:	900	mg/kg
GRO Aliphatic		Organic Non-Carcinogenic Petroleum	Ingestion Indoor Worker:	$> 10^6$	mg/kg
			Ingestion Outdoor Worker:	$> 10^6$	mg/kg
			Inhalation Cleanup Level:	77000	mg/kg
			Groundwater Cleanup Level:	180	mg/L
			Migration to Groundwater:	770	mg/kg
GRO Aromatic		Organic Non-Carcinogenic Petroleum	Ingestion Indoor Worker:	511000	mg/kg
			Ingestion Outdoor Worker:	256000	mg/kg
			Inhalation Cleanup Level:	4600	mg/kg
			Groundwater Cleanup Level:	7.3	mg/L
			Migration to Groundwater:	470	mg/kg
GRO (Total)		Organic Non-Carcinogenic Petroleum	Ingestion Indoor Worker:	$> 10^6$	mg/kg
			Ingestion Outdoor Worker:	512000	mg/kg
			Inhalation Cleanup Level:	9200	mg/kg
			Groundwater Cleanup Level:	2.2	mg/L
			Migration to Groundwater:	940	mg/kg
RRO Aliphatic		Organic Non-Carcinogenic Petroleum	Ingestion Indoor Worker:	$> 10^6$	mg/kg
			Ingestion Outdoor Worker:	$> 10^6$	mg/kg
			Inhalation Cleanup Level:	20000	mg/kg
			Groundwater Cleanup Level:	73	mg/L
			Migration to Groundwater:	$> 10^6$	mg/kg

RRO Aromatic		Organic Non-Carcinogenic Petroleum	Ingestion Indoor Worker:	76700	mg/kg
			Ingestion Outdoor Worker:	38300	mg/kg
			Inhalation Cleanup Level:	10000	mg/kg
			Groundwater Cleanup Level:	1.1	mg/L
			Migration to Groundwater:	11900	mg/kg
RRO (Total)		Organic Non-Carcinogenic Petroleum	Ingestion Indoor Worker:	256000	mg/kg
			Ingestion Outdoor Worker:	128000	mg/kg
			Inhalation Cleanup Level:	22200	mg/kg
			Groundwater Cleanup Level:	1.1	mg/L
			Migration to Groundwater:	39700	mg/kg

Please Note

Chemical	Notes
DRO Aliphatic	The Maximum Allowable DRO Aliphatic concentration is 10000 mg/kg
DRO Aromatic	The Maximum Allowable DRO Aromatic concentration is 5000 mg/kg
DRO (Total)	The Maximum Allowable DRO concentration is 12500 mg/kg
GRO Aliphatic	The Maximum Allowable GRO Aliphatic concentration is 1000 mg/kg
GRO Aromatic	The Maximum Allowable GRO Aromatic concentration is 1000 mg/kg
GRO (Total)	The Maximum Allowable GRO concentration is 1400 mg/kg
RRO Aliphatic	The Maximum Allowable RRO Aliphatic concentration is 20000 mg/kg
RRO Aromatic	The Maximum Allowable RRO Aromatic concentration is 10000 mg/kg
RRO (Total)	The Maximum Allowable RRO concentration is 22000 mg/kg

The parameters used to calculate the above cleanup levels and the parameters' default values are as follows:

Volatilization Pathway Parameters

Symbol	Description	Value	Default	Units
ρ_b	Dry soil bulk density	1.5	1.5	g/cm^3
n	Total soil porosity	0.434	0.434	L_{pore}/L_{soil}
Θ_w	Water-filled soil porosity	0.15	0.15	L_{water}/L_{soil}
Θ_a	Air-filled soil porosity	0.284	0.284	L_{air}/L_{soil}
w	Average soil moisture content	0.1	0.1	g_{water}/g_{soil}
f_{oc}	Organic carbon content of soil	0.00351	0.001	g/g

Groundwater Pathway Parameters

Symbol	Description	Value	Default	Units
Θ_w	Water-filled soil porosity	0.3	0.3	L_{water}/L_{soil}
Θ_a	Air-filled soil porosity	0.13	0.13	L_{air}/L_{soil}
w	Average soil moisture content	0.1	0.1	g_{water}/g_{soil}
K	Aquifer hydraulic conductivity	876	876	m/yr

i	Hydraulic gradient	0.002	0.002	m/m
L	Source length parallel to groundwater flow	32	32	m
I	Infiltration rate	0.13	0.13	m/yr
d_a	Aquifer thickness	10	10	m

ATTACHMENT B

2017 ANALYTICAL LABORATORY REPORTS, ADEC CHECKLISTS AND QUALITY ASSURANCE SUMMARY

Laboratory Report of Analysis

To: AGVIQ LLC
301 W. Northern Lights Blvd Ste. 660
Anchorage, AK 99507
(907)365-6230

Report Number: **1173405**

Client Project: **Barrow South Pad**

Dear Gloria Beckman,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of ten years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

If there are any questions about the report or services performed during this project, please call Forest at (907) 562-2343. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,
SGS North America Inc.

Forest Taylor
Project Manager
Forest.Taylor@sgs.com

Date

Print Date: 06/28/2017 4:18:27PM

Case Narrative

SGS Client: **AGVIQ LLC**
SGS Project: **1173405**
Project Name/Site: **Barrow South Pad**
Project Contact: **Gloria Beckman**

Refer to sample receipt form for information on sample condition.

1173405002MS (1392336) MS

9060A Mod - Total Organic Carbon - MS recovery (-35.2%) is outside of QC criteria. Refer to LCS for accuracy requirements.

1173358003MSD (1392766) MSD

8260C - MSD RPD for Chloromethane does not meet QC criteria.

*QC comments may be associated with the field samples found in this report. When applicable, comments will be applied to associated field samples.

SGS North America Inc.
200 West Potter Drive, Anchorage, AK 99518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Laboratory Qualifiers

Enclosed are the analytical results associated with the above work order. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. This document is issued by the Company under its General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>. Attention is drawn to the limitation of liability, indenmification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the context or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & UST-005 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8015C, 8021B, 8082A, 8260C, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

The following descriptors or qualifiers may be found in your report:

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
DF	Analytical Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LLQC/LLIQC	Low Level Quantitation Check
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
RPD	Relative Percent Difference
U	Indicates the analyte was analyzed for but not detected.

Note: Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content. All DRO/RRO analyses are integrated per SOP.

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Sample Summary

Client Sample ID	Lab Sample ID	Collected	Received	Matrix
17-BRWSP-TB-01	1173405001	06/13/2017	06/15/2017	Soil/Solid (dry weight)
17-BRWSP-TP-01-2'	1173405002	06/13/2017	06/15/2017	Soil/Solid (dry weight)
17-BRWSP-TPZ-01-2'	1173405003	06/13/2017	06/15/2017	Soil/Solid (dry weight)
17-BRWSP-TP-02-2'	1173405004	06/13/2017	06/15/2017	Soil/Solid (dry weight)
17-BRWSP-TP-03-2'	1173405005	06/13/2017	06/15/2017	Soil/Solid (dry weight)
17-BRWSP-TP-04-2'	1173405006	06/13/2017	06/15/2017	Soil/Solid (dry weight)

Method	Method Description
AK102	Diesel/Residual Range Organics
AK103	Diesel/Residual Range Organics
AK101	Gasoline Range Organics (S)
SM21 2540G	Percent Solids SM2540G
SW9060A-Mod	Total Organic Carbon-M in Soil
SW8260C	VOC 8260 (S) Field Extracted

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Detectable Results Summary

Client Sample ID: **17-BRWSP-TB-01**
Lab Sample ID: 1173405001

	Parameter	Result	Units
Volatile GC/MS	Benzene	7.70J	ug/Kg
	Ethylbenzene	7.70J	ug/Kg
	o-Xylene	6.35J	ug/Kg
	P & M -Xylene	15.0J	ug/Kg
	Toluene	8.66J	ug/Kg
	Xylenes (total)	21.4J	ug/Kg

Client Sample ID: **17-BRWSP-TP-01-2'**
Lab Sample ID: 1173405002

	Parameter	Result	Units
Semivolatile Organic Fuels	Diesel Range Organics	187	mg/Kg
	Residual Range Organics	734	mg/Kg
Volatile GC/MS	Benzene	5.24J	ug/Kg
	Ethylbenzene	32.5	ug/Kg
	Isopropylbenzene (Cumene)	8.91J	ug/Kg
Waters Department	Total Organic Carbon	0.805	%

Client Sample ID: **17-BRWSP-TPZ-01-2'**
Lab Sample ID: 1173405003

	Parameter	Result	Units
Semivolatile Organic Fuels	Diesel Range Organics	125	mg/Kg
	Residual Range Organics	401	mg/Kg
Volatile GC/MS	Benzene	5.96J	ug/Kg
	Ethylbenzene	36.7	ug/Kg
	Isopropylbenzene (Cumene)	10.0J	ug/Kg
	n-Propylbenzene	7.62J	ug/Kg
Waters Department	Total Organic Carbon	0.674	%

Client Sample ID: **17-BRWSP-TP-02-2'**
Lab Sample ID: 1173405004

	Parameter	Result	Units
Semivolatile Organic Fuels	Diesel Range Organics	9.42J	mg/Kg
	Residual Range Organics	49.4	mg/Kg
Volatile Fuels	Gasoline Range Organics	0.537J	mg/Kg
Volatile GC/MS	1,3,5-Trimethylbenzene	12.9J	ug/Kg
	Ethylbenzene	8.21J	ug/Kg
	Isopropylbenzene (Cumene)	11.1J	ug/Kg
	n-Propylbenzene	8.39J	ug/Kg
	P & M -Xylene	20.7J	ug/Kg
	Xylenes (total)	20.7J	ug/Kg
Waters Department	Total Organic Carbon	0.0526J	%

Client Sample ID: **17-BRWSP-TP-03-2'**
Lab Sample ID: 1173405005

	Parameter	Result	Units
Semivolatile Organic Fuels	Diesel Range Organics	30.2	mg/Kg
	Residual Range Organics	105	mg/Kg
Waters Department	Total Organic Carbon	0.269	%

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Detectable Results Summary

Client Sample ID: **17-BRWSP-TP-04-2'**
Lab Sample ID: 1173405006

	Parameter	Result	Units
Semivolatile Organic Fuels	Diesel Range Organics	7.37J	mg/Kg
	Residual Range Organics	47.8	mg/Kg
Volatile GC/MS	1,2,4-Trimethylbenzene	16.1J	ug/Kg
	1,3,5-Trimethylbenzene	7.75J	ug/Kg
	P & M -Xylene	22.4J	ug/Kg
	Tetrachloroethene	12.9	ug/Kg
	Xylenes (total)	22.4J	ug/Kg
Waters Department	Total Organic Carbon	0.229	%

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Results of **17-BRWSP-TB-01**

Client Sample ID: **17-BRWSP-TB-01**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1173405001
Lab Project ID: 1173405

Collection Date: 06/13/17 13:45
Received Date: 06/15/17 12:50
Matrix: Soil/Solid (dry weight)
Solids (%):
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	0.965	U	1.93	0.578	mg/Kg	1		06/22/17 01:09
Surrogates								
4-Bromofluorobenzene (surr)	106		50-150		%	1		06/22/17 01:09

Batch Information

Analytical Batch: VFC13693
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 06/22/17 01:09
Container ID: 1173405001-A

Prep Batch: VXX30705
Prep Method: SW5035A
Prep Date/Time: 06/13/17 13:45
Prep Initial Wt./Vol.: 64.919 g
Prep Extract Vol: 25 mL

Print Date: 06/28/2017 4:18:34PM

J flagging is activated

Results of **17-BRWSP-TB-01**

Client Sample ID: **17-BRWSP-TB-01**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1173405001
Lab Project ID: 1173405

Collection Date: 06/13/17 13:45
Received Date: 06/15/17 12:50
Matrix: Soil/Solid (dry weight)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	7.70	U	15.4	4.78	ug/Kg	1		06/18/17 20:20
1,1,1-Trichloroethane	9.65	U	19.3	6.01	ug/Kg	1		06/18/17 20:20
1,1,2,2-Tetrachloroethane	4.82	U	9.63	3.00	ug/Kg	1		06/18/17 20:20
1,1,2-Trichloroethane	3.85	U	7.70	2.39	ug/Kg	1		06/18/17 20:20
1,1-Dichloroethane	9.65	U	19.3	6.01	ug/Kg	1		06/18/17 20:20
1,1-Dichloroethene	9.65	U	19.3	6.01	ug/Kg	1		06/18/17 20:20
1,1-Dichloropropene	9.65	U	19.3	6.01	ug/Kg	1		06/18/17 20:20
1,2,3-Trichlorobenzene	19.3	U	38.5	11.6	ug/Kg	1		06/18/17 20:20
1,2,3-Trichloropropane	9.65	U	19.3	6.01	ug/Kg	1		06/18/17 20:20
1,2,4-Trichlorobenzene	9.65	U	19.3	6.01	ug/Kg	1		06/18/17 20:20
1,2,4-Trimethylbenzene	19.3	U	38.5	11.6	ug/Kg	1		06/18/17 20:20
1,2-Dibromo-3-chloropropane	38.5	U	77.0	23.9	ug/Kg	1		06/18/17 20:20
1,2-Dibromoethane	3.85	U	7.70	2.39	ug/Kg	1		06/18/17 20:20
1,2-Dichlorobenzene	9.65	U	19.3	6.01	ug/Kg	1		06/18/17 20:20
1,2-Dichloroethane	3.85	U	7.70	2.39	ug/Kg	1		06/18/17 20:20
1,2-Dichloropropane	3.85	U	7.70	2.39	ug/Kg	1		06/18/17 20:20
1,3,5-Trimethylbenzene	9.65	U	19.3	6.01	ug/Kg	1		06/18/17 20:20
1,3-Dichlorobenzene	9.65	U	19.3	6.01	ug/Kg	1		06/18/17 20:20
1,3-Dichloropropane	3.85	U	7.70	2.39	ug/Kg	1		06/18/17 20:20
1,4-Dichlorobenzene	9.65	U	19.3	6.01	ug/Kg	1		06/18/17 20:20
2,2-Dichloropropane	9.65	U	19.3	6.01	ug/Kg	1		06/18/17 20:20
2-Butanone (MEK)	96.5	U	193	60.1	ug/Kg	1		06/18/17 20:20
2-Chlorotoluene	9.65	U	19.3	6.01	ug/Kg	1		06/18/17 20:20
2-Hexanone	38.5	U	77.0	23.9	ug/Kg	1		06/18/17 20:20
4-Chlorotoluene	9.65	U	19.3	6.01	ug/Kg	1		06/18/17 20:20
4-Isopropyltoluene	9.65	U	19.3	6.01	ug/Kg	1		06/18/17 20:20
4-Methyl-2-pentanone (MIBK)	96.5	U	193	60.1	ug/Kg	1		06/18/17 20:20
Benzene	7.70	J	9.63	3.00	ug/Kg	1		06/18/17 20:20
Bromobenzene	9.65	U	19.3	6.01	ug/Kg	1		06/18/17 20:20
Bromochloromethane	9.65	U	19.3	6.01	ug/Kg	1		06/18/17 20:20
Bromodichloromethane	9.65	U	19.3	6.01	ug/Kg	1		06/18/17 20:20
Bromoform	9.65	U	19.3	6.01	ug/Kg	1		06/18/17 20:20
Bromomethane	77.0	U	154	47.8	ug/Kg	1		06/18/17 20:20
Carbon disulfide	38.5	U	77.0	23.9	ug/Kg	1		06/18/17 20:20
Carbon tetrachloride	4.82	U	9.63	3.00	ug/Kg	1		06/18/17 20:20
Chlorobenzene	9.65	U	19.3	6.01	ug/Kg	1		06/18/17 20:20
Chloroethane	77.0	U	154	47.8	ug/Kg	1		06/18/17 20:20

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Results of **17-BRWSP-TB-01**

Client Sample ID: **17-BRWSP-TB-01**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1173405001
Lab Project ID: 1173405

Collection Date: 06/13/17 13:45
Received Date: 06/15/17 12:50
Matrix: Soil/Solid (dry weight)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroform	9.65	U	19.3	6.01	ug/Kg	1		06/18/17 20:20
Chloromethane	9.65	U	19.3	6.01	ug/Kg	1		06/18/17 20:20
cis-1,2-Dichloroethene	9.65	U	19.3	6.01	ug/Kg	1		06/18/17 20:20
cis-1,3-Dichloropropene	4.82	U	9.63	3.00	ug/Kg	1		06/18/17 20:20
Dibromochloromethane	9.65	U	19.3	6.01	ug/Kg	1		06/18/17 20:20
Dibromomethane	9.65	U	19.3	6.01	ug/Kg	1		06/18/17 20:20
Dichlorodifluoromethane	19.3	U	38.5	11.6	ug/Kg	1		06/18/17 20:20
Ethylbenzene	7.70	J	19.3	6.01	ug/Kg	1		06/18/17 20:20
Freon-113	38.5	U	77.0	23.9	ug/Kg	1		06/18/17 20:20
Hexachlorobutadiene	7.70	U	15.4	4.78	ug/Kg	1		06/18/17 20:20
Isopropylbenzene (Cumene)	9.65	U	19.3	6.01	ug/Kg	1		06/18/17 20:20
Methylene chloride	38.5	U	77.0	23.9	ug/Kg	1		06/18/17 20:20
Methyl-t-butyl ether	38.5	U	77.0	23.9	ug/Kg	1		06/18/17 20:20
Naphthalene	9.65	U	19.3	6.01	ug/Kg	1		06/18/17 20:20
n-Butylbenzene	9.65	U	19.3	6.01	ug/Kg	1		06/18/17 20:20
n-Propylbenzene	9.65	U	19.3	6.01	ug/Kg	1		06/18/17 20:20
o-Xylene	6.35	J	19.3	6.01	ug/Kg	1		06/18/17 20:20
P & M -Xylene	15.0	J	38.5	11.6	ug/Kg	1		06/18/17 20:20
sec-Butylbenzene	9.65	U	19.3	6.01	ug/Kg	1		06/18/17 20:20
Styrene	9.65	U	19.3	6.01	ug/Kg	1		06/18/17 20:20
tert-Butylbenzene	9.65	U	19.3	6.01	ug/Kg	1		06/18/17 20:20
Tetrachloroethene	4.82	U	9.63	3.00	ug/Kg	1		06/18/17 20:20
Toluene	8.66	J	19.3	6.01	ug/Kg	1		06/18/17 20:20
trans-1,2-Dichloroethene	9.65	U	19.3	6.01	ug/Kg	1		06/18/17 20:20
trans-1,3-Dichloropropene	4.82	U	9.63	3.00	ug/Kg	1		06/18/17 20:20
Trichloroethene	3.85	U	7.70	2.39	ug/Kg	1		06/18/17 20:20
Trichlorofluoromethane	19.3	U	38.5	11.6	ug/Kg	1		06/18/17 20:20
Vinyl acetate	38.5	U	77.0	23.9	ug/Kg	1		06/18/17 20:20
Vinyl chloride	3.85	U	7.70	2.39	ug/Kg	1		06/18/17 20:20
Xylenes (total)	21.4	J	57.8	17.6	ug/Kg	1		06/18/17 20:20
Surrogates								
1,2-Dichloroethane-D4 (surr)	109		71-136		%	1		06/18/17 20:20
4-Bromofluorobenzene (surr)	122		55-151		%	1		06/18/17 20:20
Toluene-d8 (surr)	95.2		85-116		%	1		06/18/17 20:20

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Results of **17-BRWSP-TB-01**

Client Sample ID: **17-BRWSP-TB-01**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1173405001
Lab Project ID: 1173405

Collection Date: 06/13/17 13:45
Received Date: 06/15/17 12:50
Matrix: Soil/Solid (dry weight)
Solids (%):
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS16854
Analytical Method: SW8260C
Analyst: NRO
Analytical Date/Time: 06/18/17 20:20
Container ID: 1173405001-A

Prep Batch: VXX30710
Prep Method: SW5035A
Prep Date/Time: 06/13/17 13:45
Prep Initial Wt./Vol.: 64.919 g
Prep Extract Vol: 25 mL

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Results of **17-BRWSP-TP-01-2'**

Client Sample ID: **17-BRWSP-TP-01-2'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1173405002
Lab Project ID: 1173405

Collection Date: 06/13/17 13:40
Received Date: 06/15/17 12:50
Matrix: Soil/Solid (dry weight)
Solids (%):89.3
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	187		22.3	6.91	mg/Kg	1		06/27/17 21:50
Surrogates								
5a Androstane (surr)	92.5		50-150		%	1		06/27/17 21:50

Batch Information

Analytical Batch: XFC13483
Analytical Method: AK102
Analyst: KMD
Analytical Date/Time: 06/27/17 21:50
Container ID: 1173405002-A

Prep Batch: XXX37707
Prep Method: SW3550C
Prep Date/Time: 06/26/17 14:29
Prep Initial Wt./Vol.: 30.14 g
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	734		22.3	6.91	mg/Kg	1		06/27/17 21:50
Surrogates								
n-Triacontane-d62 (surr)	86		50-150		%	1		06/27/17 21:50

Batch Information

Analytical Batch: XFC13483
Analytical Method: AK103
Analyst: KMD
Analytical Date/Time: 06/27/17 21:50
Container ID: 1173405002-A

Prep Batch: XXX37707
Prep Method: SW3550C
Prep Date/Time: 06/26/17 14:29
Prep Initial Wt./Vol.: 30.14 g
Prep Extract Vol: 1 mL

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Results of **17-BRWSP-TP-01-2'**

Client Sample ID: **17-BRWSP-TP-01-2'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1173405002
Lab Project ID: 1173405

Collection Date: 06/13/17 13:40
Received Date: 06/15/17 12:50
Matrix: Soil/Solid (dry weight)
Solids (%):89.3
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.31	U	2.62	0.787	mg/Kg	1		06/22/17 05:00
Surrogates								
4-Bromofluorobenzene (surr)	111		50-150		%	1		06/22/17 05:00

Batch Information

Analytical Batch: VFC13693
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 06/22/17 05:00
Container ID: 1173405002-B

Prep Batch: VXX30705
Prep Method: SW5035A
Prep Date/Time: 06/13/17 13:40
Prep Initial Wt./Vol.: 69.248 g
Prep Extract Vol: 32.4219 mL

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Results of **17-BRWSP-TP-01-2'**

Client Sample ID: **17-BRWSP-TP-01-2'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1173405002
Lab Project ID: 1173405

Collection Date: 06/13/17 13:40
Received Date: 06/15/17 12:50
Matrix: Soil/Solid (dry weight)
Solids (%):89.3
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	10.5	U	21.0	6.50	ug/Kg	1		06/18/17 23:32
1,1,1-Trichloroethane	13.1	U	26.2	8.18	ug/Kg	1		06/18/17 23:32
1,1,2,2-Tetrachloroethane	6.55	U	13.1	4.09	ug/Kg	1		06/18/17 23:32
1,1,2-Trichloroethane	5.25	U	10.5	3.25	ug/Kg	1		06/18/17 23:32
1,1-Dichloroethane	13.1	U	26.2	8.18	ug/Kg	1		06/18/17 23:32
1,1-Dichloroethene	13.1	U	26.2	8.18	ug/Kg	1		06/18/17 23:32
1,1-Dichloropropene	13.1	U	26.2	8.18	ug/Kg	1		06/18/17 23:32
1,2,3-Trichlorobenzene	26.2	U	52.4	15.7	ug/Kg	1		06/18/17 23:32
1,2,3-Trichloropropane	13.1	U	26.2	8.18	ug/Kg	1		06/18/17 23:32
1,2,4-Trichlorobenzene	13.1	U	26.2	8.18	ug/Kg	1		06/18/17 23:32
1,2,4-Trimethylbenzene	26.2	U	52.4	15.7	ug/Kg	1		06/18/17 23:32
1,2-Dibromo-3-chloropropane	52.5	U	105	32.5	ug/Kg	1		06/18/17 23:32
1,2-Dibromoethane	5.25	U	10.5	3.25	ug/Kg	1		06/18/17 23:32
1,2-Dichlorobenzene	13.1	U	26.2	8.18	ug/Kg	1		06/18/17 23:32
1,2-Dichloroethane	5.25	U	10.5	3.25	ug/Kg	1		06/18/17 23:32
1,2-Dichloropropane	5.25	U	10.5	3.25	ug/Kg	1		06/18/17 23:32
1,3,5-Trimethylbenzene	13.1	U	26.2	8.18	ug/Kg	1		06/18/17 23:32
1,3-Dichlorobenzene	13.1	U	26.2	8.18	ug/Kg	1		06/18/17 23:32
1,3-Dichloropropane	5.25	U	10.5	3.25	ug/Kg	1		06/18/17 23:32
1,4-Dichlorobenzene	13.1	U	26.2	8.18	ug/Kg	1		06/18/17 23:32
2,2-Dichloropropane	13.1	U	26.2	8.18	ug/Kg	1		06/18/17 23:32
2-Butanone (MEK)	131	U	262	81.8	ug/Kg	1		06/18/17 23:32
2-Chlorotoluene	13.1	U	26.2	8.18	ug/Kg	1		06/18/17 23:32
2-Hexanone	52.5	U	105	32.5	ug/Kg	1		06/18/17 23:32
4-Chlorotoluene	13.1	U	26.2	8.18	ug/Kg	1		06/18/17 23:32
4-Isopropyltoluene	13.1	U	26.2	8.18	ug/Kg	1		06/18/17 23:32
4-Methyl-2-pentanone (MIBK)	131	U	262	81.8	ug/Kg	1		06/18/17 23:32
Benzene	5.24	J	13.1	4.09	ug/Kg	1		06/18/17 23:32
Bromobenzene	13.1	U	26.2	8.18	ug/Kg	1		06/18/17 23:32
Bromochloromethane	13.1	U	26.2	8.18	ug/Kg	1		06/18/17 23:32
Bromodichloromethane	13.1	U	26.2	8.18	ug/Kg	1		06/18/17 23:32
Bromoform	13.1	U	26.2	8.18	ug/Kg	1		06/18/17 23:32
Bromomethane	105	U	210	65.0	ug/Kg	1		06/18/17 23:32
Carbon disulfide	52.5	U	105	32.5	ug/Kg	1		06/18/17 23:32
Carbon tetrachloride	6.55	U	13.1	4.09	ug/Kg	1		06/18/17 23:32
Chlorobenzene	13.1	U	26.2	8.18	ug/Kg	1		06/18/17 23:32
Chloroethane	105	U	210	65.0	ug/Kg	1		06/18/17 23:32

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Results of **17-BRWSP-TP-01-2'**

Client Sample ID: **17-BRWSP-TP-01-2'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1173405002
Lab Project ID: 1173405

Collection Date: 06/13/17 13:40
Received Date: 06/15/17 12:50
Matrix: Soil/Solid (dry weight)
Solids (%):89.3
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroform	13.1	U	26.2	8.18	ug/Kg	1		06/18/17 23:32
Chloromethane	13.1	U	26.2	8.18	ug/Kg	1		06/18/17 23:32
cis-1,2-Dichloroethene	13.1	U	26.2	8.18	ug/Kg	1		06/18/17 23:32
cis-1,3-Dichloropropene	6.55	U	13.1	4.09	ug/Kg	1		06/18/17 23:32
Dibromochloromethane	13.1	U	26.2	8.18	ug/Kg	1		06/18/17 23:32
Dibromomethane	13.1	U	26.2	8.18	ug/Kg	1		06/18/17 23:32
Dichlorodifluoromethane	26.2	U	52.4	15.7	ug/Kg	1		06/18/17 23:32
Ethylbenzene	32.5		26.2	8.18	ug/Kg	1		06/18/17 23:32
Freon-113	52.5	U	105	32.5	ug/Kg	1		06/18/17 23:32
Hexachlorobutadiene	10.5	U	21.0	6.50	ug/Kg	1		06/18/17 23:32
Isopropylbenzene (Cumene)	8.91	J	26.2	8.18	ug/Kg	1		06/18/17 23:32
Methylene chloride	52.5	U	105	32.5	ug/Kg	1		06/18/17 23:32
Methyl-t-butyl ether	52.5	U	105	32.5	ug/Kg	1		06/18/17 23:32
Naphthalene	13.1	U	26.2	8.18	ug/Kg	1		06/18/17 23:32
n-Butylbenzene	13.1	U	26.2	8.18	ug/Kg	1		06/18/17 23:32
n-Propylbenzene	13.1	U	26.2	8.18	ug/Kg	1		06/18/17 23:32
o-Xylene	13.1	U	26.2	8.18	ug/Kg	1		06/18/17 23:32
P & M -Xylene	26.2	U	52.4	15.7	ug/Kg	1		06/18/17 23:32
sec-Butylbenzene	13.1	U	26.2	8.18	ug/Kg	1		06/18/17 23:32
Styrene	13.1	U	26.2	8.18	ug/Kg	1		06/18/17 23:32
tert-Butylbenzene	13.1	U	26.2	8.18	ug/Kg	1		06/18/17 23:32
Tetrachloroethene	6.55	U	13.1	4.09	ug/Kg	1		06/18/17 23:32
Toluene	13.1	U	26.2	8.18	ug/Kg	1		06/18/17 23:32
trans-1,2-Dichloroethene	13.1	U	26.2	8.18	ug/Kg	1		06/18/17 23:32
trans-1,3-Dichloropropene	6.55	U	13.1	4.09	ug/Kg	1		06/18/17 23:32
Trichloroethene	5.25	U	10.5	3.25	ug/Kg	1		06/18/17 23:32
Trichlorofluoromethane	26.2	U	52.4	15.7	ug/Kg	1		06/18/17 23:32
Vinyl acetate	52.5	U	105	32.5	ug/Kg	1		06/18/17 23:32
Vinyl chloride	5.25	U	10.5	3.25	ug/Kg	1		06/18/17 23:32
Xylenes (total)	39.4	U	78.7	23.9	ug/Kg	1		06/18/17 23:32
Surrogates								
1,2-Dichloroethane-D4 (surr)	114		71-136		%	1		06/18/17 23:32
4-Bromofluorobenzene (surr)	124		55-151		%	1		06/18/17 23:32
Toluene-d8 (surr)	94.3		85-116		%	1		06/18/17 23:32

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Results of **17-BRWSP-TP-01-2'**

Client Sample ID: **17-BRWSP-TP-01-2'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1173405002
Lab Project ID: 1173405

Collection Date: 06/13/17 13:40
Received Date: 06/15/17 12:50
Matrix: Soil/Solid (dry weight)
Solids (%):89.3
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS16854
Analytical Method: SW8260C
Analyst: NRO
Analytical Date/Time: 06/18/17 23:32
Container ID: 1173405002-B

Prep Batch: VXX30710
Prep Method: SW5035A
Prep Date/Time: 06/13/17 13:40
Prep Initial Wt./Vol.: 69.248 g
Prep Extract Vol: 32.4219 mL

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Results of **17-BRWSP-TP-01-2'**

Client Sample ID: **17-BRWSP-TP-01-2'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1173405002
Lab Project ID: 1173405

Collection Date: 06/13/17 13:40
Received Date: 06/15/17 12:50
Matrix: Soil/Solid (dry weight)
Solids (%):89.3
Location:

Results by **Waters Department**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Total Organic Carbon	0.805		0.0650	0.0195	%	1		06/20/17 16:18

Batch Information

Analytical Batch: WTC2690
Analytical Method: SW9060A-Mod
Analyst: K.W
Analytical Date/Time: 06/20/17 16:18
Container ID: 1173405002-A

Prep Batch: WXX11880
Prep Method: METHOD
Prep Date/Time: 06/20/17 09:15
Prep Initial Wt./Vol.: 431.1 mg
Prep Extract Vol: 1 mL

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Results of **17-BRWSP-TPZ-01-2'**

Client Sample ID: **17-BRWSP-TPZ-01-2'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1173405003
Lab Project ID: 1173405

Collection Date: 06/13/17 13:45
Received Date: 06/15/17 12:50
Matrix: Soil/Solid (dry weight)
Solids (%):88.0
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	125		22.4	6.96	mg/Kg	1		06/27/17 22:00
Surrogates								
5a Androstane (surr)	87.7		50-150		%	1		06/27/17 22:00

Batch Information

Analytical Batch: XFC13483
Analytical Method: AK102
Analyst: KMD
Analytical Date/Time: 06/27/17 22:00
Container ID: 1173405003-A

Prep Batch: XXX37707
Prep Method: SW3550C
Prep Date/Time: 06/26/17 14:29
Prep Initial Wt./Vol.: 30.36 g
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	401		22.4	6.96	mg/Kg	1		06/27/17 22:00
Surrogates								
n-Triacontane-d62 (surr)	94.5		50-150		%	1		06/27/17 22:00

Batch Information

Analytical Batch: XFC13483
Analytical Method: AK103
Analyst: KMD
Analytical Date/Time: 06/27/17 22:00
Container ID: 1173405003-A

Prep Batch: XXX37707
Prep Method: SW3550C
Prep Date/Time: 06/26/17 14:29
Prep Initial Wt./Vol.: 30.36 g
Prep Extract Vol: 1 mL

Print Date: 06/28/2017 4:18:34PM

J flagging is activated

Results of **17-BRWSP-TPZ-01-2'**

Client Sample ID: **17-BRWSP-TPZ-01-2'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1173405003
Lab Project ID: 1173405

Collection Date: 06/13/17 13:45
Received Date: 06/15/17 12:50
Matrix: Soil/Solid (dry weight)
Solids (%):88.0
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.19	U	2.38	0.715	mg/Kg	1		06/22/17 05:19
Surrogates								
4-Bromofluorobenzene (surr)	111		50-150		%	1		06/22/17 05:19

Batch Information

Analytical Batch: VFC13693
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 06/22/17 05:19
Container ID: 1173405003-B

Prep Batch: VXX30705
Prep Method: SW5035A
Prep Date/Time: 06/13/17 13:45
Prep Initial Wt./Vol.: 83.339 g
Prep Extract Vol: 34.9658 mL

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Results of **17-BRWSP-TPZ-01-2'**

Client Sample ID: **17-BRWSP-TPZ-01-2'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1173405003
Lab Project ID: 1173405

Collection Date: 06/13/17 13:45
Received Date: 06/15/17 12:50
Matrix: Soil/Solid (dry weight)
Solids (%):88.0
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	9.55	U	19.1	5.91	ug/Kg	1		06/18/17 23:48
1,1,1-Trichloroethane	11.9	U	23.8	7.43	ug/Kg	1		06/18/17 23:48
1,1,2,2-Tetrachloroethane	5.95	U	11.9	3.72	ug/Kg	1		06/18/17 23:48
1,1,2-Trichloroethane	4.76	U	9.53	2.95	ug/Kg	1		06/18/17 23:48
1,1-Dichloroethane	11.9	U	23.8	7.43	ug/Kg	1		06/18/17 23:48
1,1-Dichloroethene	11.9	U	23.8	7.43	ug/Kg	1		06/18/17 23:48
1,1-Dichloropropene	11.9	U	23.8	7.43	ug/Kg	1		06/18/17 23:48
1,2,3-Trichlorobenzene	23.9	U	47.7	14.3	ug/Kg	1		06/18/17 23:48
1,2,3-Trichloropropane	11.9	U	23.8	7.43	ug/Kg	1		06/18/17 23:48
1,2,4-Trichlorobenzene	11.9	U	23.8	7.43	ug/Kg	1		06/18/17 23:48
1,2,4-Trimethylbenzene	23.9	U	47.7	14.3	ug/Kg	1		06/18/17 23:48
1,2-Dibromo-3-chloropropane	47.6	U	95.3	29.5	ug/Kg	1		06/18/17 23:48
1,2-Dibromoethane	4.76	U	9.53	2.95	ug/Kg	1		06/18/17 23:48
1,2-Dichlorobenzene	11.9	U	23.8	7.43	ug/Kg	1		06/18/17 23:48
1,2-Dichloroethane	4.76	U	9.53	2.95	ug/Kg	1		06/18/17 23:48
1,2-Dichloropropane	4.76	U	9.53	2.95	ug/Kg	1		06/18/17 23:48
1,3,5-Trimethylbenzene	11.9	U	23.8	7.43	ug/Kg	1		06/18/17 23:48
1,3-Dichlorobenzene	11.9	U	23.8	7.43	ug/Kg	1		06/18/17 23:48
1,3-Dichloropropane	4.76	U	9.53	2.95	ug/Kg	1		06/18/17 23:48
1,4-Dichlorobenzene	11.9	U	23.8	7.43	ug/Kg	1		06/18/17 23:48
2,2-Dichloropropane	11.9	U	23.8	7.43	ug/Kg	1		06/18/17 23:48
2-Butanone (MEK)	119	U	238	74.3	ug/Kg	1		06/18/17 23:48
2-Chlorotoluene	11.9	U	23.8	7.43	ug/Kg	1		06/18/17 23:48
2-Hexanone	47.6	U	95.3	29.5	ug/Kg	1		06/18/17 23:48
4-Chlorotoluene	11.9	U	23.8	7.43	ug/Kg	1		06/18/17 23:48
4-Isopropyltoluene	11.9	U	23.8	7.43	ug/Kg	1		06/18/17 23:48
4-Methyl-2-pentanone (MIBK)	119	U	238	74.3	ug/Kg	1		06/18/17 23:48
Benzene	5.96	J	11.9	3.72	ug/Kg	1		06/18/17 23:48
Bromobenzene	11.9	U	23.8	7.43	ug/Kg	1		06/18/17 23:48
Bromochloromethane	11.9	U	23.8	7.43	ug/Kg	1		06/18/17 23:48
Bromodichloromethane	11.9	U	23.8	7.43	ug/Kg	1		06/18/17 23:48
Bromoform	11.9	U	23.8	7.43	ug/Kg	1		06/18/17 23:48
Bromomethane	95.5	U	191	59.1	ug/Kg	1		06/18/17 23:48
Carbon disulfide	47.6	U	95.3	29.5	ug/Kg	1		06/18/17 23:48
Carbon tetrachloride	5.95	U	11.9	3.72	ug/Kg	1		06/18/17 23:48
Chlorobenzene	11.9	U	23.8	7.43	ug/Kg	1		06/18/17 23:48
Chloroethane	95.5	U	191	59.1	ug/Kg	1		06/18/17 23:48

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J flagging is activated

Results of **17-BRWSP-TPZ-01-2'**

Client Sample ID: **17-BRWSP-TPZ-01-2'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1173405003
Lab Project ID: 1173405

Collection Date: 06/13/17 13:45
Received Date: 06/15/17 12:50
Matrix: Soil/Solid (dry weight)
Solids (%):88.0
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroform	11.9	U	23.8	7.43	ug/Kg	1		06/18/17 23:48
Chloromethane	11.9	U	23.8	7.43	ug/Kg	1		06/18/17 23:48
cis-1,2-Dichloroethene	11.9	U	23.8	7.43	ug/Kg	1		06/18/17 23:48
cis-1,3-Dichloropropene	5.95	U	11.9	3.72	ug/Kg	1		06/18/17 23:48
Dibromochloromethane	11.9	U	23.8	7.43	ug/Kg	1		06/18/17 23:48
Dibromomethane	11.9	U	23.8	7.43	ug/Kg	1		06/18/17 23:48
Dichlorodifluoromethane	23.9	U	47.7	14.3	ug/Kg	1		06/18/17 23:48
Ethylbenzene	36.7		23.8	7.43	ug/Kg	1		06/18/17 23:48
Freon-113	47.6	U	95.3	29.5	ug/Kg	1		06/18/17 23:48
Hexachlorobutadiene	9.55	U	19.1	5.91	ug/Kg	1		06/18/17 23:48
Isopropylbenzene (Cumene)	10.0	J	23.8	7.43	ug/Kg	1		06/18/17 23:48
Methylene chloride	47.6	U	95.3	29.5	ug/Kg	1		06/18/17 23:48
Methyl-t-butyl ether	47.6	U	95.3	29.5	ug/Kg	1		06/18/17 23:48
Naphthalene	11.9	U	23.8	7.43	ug/Kg	1		06/18/17 23:48
n-Butylbenzene	11.9	U	23.8	7.43	ug/Kg	1		06/18/17 23:48
n-Propylbenzene	7.62	J	23.8	7.43	ug/Kg	1		06/18/17 23:48
o-Xylene	11.9	U	23.8	7.43	ug/Kg	1		06/18/17 23:48
P & M -Xylene	23.9	U	47.7	14.3	ug/Kg	1		06/18/17 23:48
sec-Butylbenzene	11.9	U	23.8	7.43	ug/Kg	1		06/18/17 23:48
Styrene	11.9	U	23.8	7.43	ug/Kg	1		06/18/17 23:48
tert-Butylbenzene	11.9	U	23.8	7.43	ug/Kg	1		06/18/17 23:48
Tetrachloroethene	5.95	U	11.9	3.72	ug/Kg	1		06/18/17 23:48
Toluene	11.9	U	23.8	7.43	ug/Kg	1		06/18/17 23:48
trans-1,2-Dichloroethene	11.9	U	23.8	7.43	ug/Kg	1		06/18/17 23:48
trans-1,3-Dichloropropene	5.95	U	11.9	3.72	ug/Kg	1		06/18/17 23:48
Trichloroethene	4.76	U	9.53	2.95	ug/Kg	1		06/18/17 23:48
Trichlorofluoromethane	23.9	U	47.7	14.3	ug/Kg	1		06/18/17 23:48
Vinyl acetate	47.6	U	95.3	29.5	ug/Kg	1		06/18/17 23:48
Vinyl chloride	4.76	U	9.53	2.95	ug/Kg	1		06/18/17 23:48
Xylenes (total)	35.8	U	71.5	21.7	ug/Kg	1		06/18/17 23:48
Surrogates								
1,2-Dichloroethane-D4 (surr)	114		71-136		%	1		06/18/17 23:48
4-Bromofluorobenzene (surr)	132		55-151		%	1		06/18/17 23:48
Toluene-d8 (surr)	94.4		85-116		%	1		06/18/17 23:48

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Results of **17-BRWSP-TPZ-01-2'**

Client Sample ID: **17-BRWSP-TPZ-01-2'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1173405003
Lab Project ID: 1173405

Collection Date: 06/13/17 13:45
Received Date: 06/15/17 12:50
Matrix: Soil/Solid (dry weight)
Solids (%):88.0
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS16854
Analytical Method: SW8260C
Analyst: NRO
Analytical Date/Time: 06/18/17 23:48
Container ID: 1173405003-B

Prep Batch: VXX30710
Prep Method: SW5035A
Prep Date/Time: 06/13/17 13:45
Prep Initial Wt./Vol.: 83.339 g
Prep Extract Vol: 34.9658 mL

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Results of **17-BRWSP-TPZ-01-2'**

Client Sample ID: **17-BRWSP-TPZ-01-2'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1173405003
Lab Project ID: 1173405

Collection Date: 06/13/17 13:45
Received Date: 06/15/17 12:50
Matrix: Soil/Solid (dry weight)
Solids (%):88.0
Location:

Results by **Waters Department**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Total Organic Carbon	0.674		0.0611	0.0183	%	1		06/20/17 17:18

Batch Information

Analytical Batch: WTC2690
Analytical Method: SW9060A-Mod
Analyst: K.W
Analytical Date/Time: 06/20/17 17:18
Container ID: 1173405003-A

Prep Batch: WXX11880
Prep Method: METHOD
Prep Date/Time: 06/20/17 09:15
Prep Initial Wt./Vol.: 465 mg
Prep Extract Vol: 1 mL

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Results of **17-BRWSP-TP-02-2'**

Client Sample ID: **17-BRWSP-TP-02-2'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1173405004
Lab Project ID: 1173405

Collection Date: 06/13/17 14:15
Received Date: 06/15/17 12:50
Matrix: Soil/Solid (dry weight)
Solids (%):95.4
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	9.42	J	20.9	6.49	mg/Kg	1		06/27/17 22:09
Surrogates								
5a Androstane (surr)	87.7		50-150		%	1		06/27/17 22:09

Batch Information

Analytical Batch: XFC13483
Analytical Method: AK102
Analyst: KMD
Analytical Date/Time: 06/27/17 22:09
Container ID: 1173405004-A

Prep Batch: XXX37707
Prep Method: SW3550C
Prep Date/Time: 06/26/17 14:29
Prep Initial Wt./Vol.: 30.058 g
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	49.4		20.9	6.49	mg/Kg	1		06/27/17 22:09
Surrogates								
n-Triacontane-d62 (surr)	94.1		50-150		%	1		06/27/17 22:09

Batch Information

Analytical Batch: XFC13483
Analytical Method: AK103
Analyst: KMD
Analytical Date/Time: 06/27/17 22:09
Container ID: 1173405004-A

Prep Batch: XXX37707
Prep Method: SW3550C
Prep Date/Time: 06/26/17 14:29
Prep Initial Wt./Vol.: 30.058 g
Prep Extract Vol: 1 mL

Print Date: 06/28/2017 4:18:34PM

J flagging is activated

Results of **17-BRWSP-TP-02-2'**

Client Sample ID: **17-BRWSP-TP-02-2'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1173405004
Lab Project ID: 1173405

Collection Date: 06/13/17 14:15
Received Date: 06/15/17 12:50
Matrix: Soil/Solid (dry weight)
Solids (%):95.4
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	0.537	J	1.79	0.536	mg/Kg	1		06/22/17 05:39
Surrogates								
4-Bromofluorobenzene (surr)	112		50-150		%	1		06/22/17 05:39

Batch Information

Analytical Batch: VFC13693
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 06/22/17 05:39
Container ID: 1173405004-B

Prep Batch: VXX30705
Prep Method: SW5035A
Prep Date/Time: 06/13/17 14:15
Prep Initial Wt./Vol.: 85.012 g
Prep Extract Vol: 28.9494 mL

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Results of **17-BRWSP-TP-02-2'**

Client Sample ID: **17-BRWSP-TP-02-2'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1173405004
Lab Project ID: 1173405

Collection Date: 06/13/17 14:15
Received Date: 06/15/17 12:50
Matrix: Soil/Solid (dry weight)
Solids (%):95.4
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	7.15	U	14.3	4.43	ug/Kg	1		06/19/17 00:04
1,1,1-Trichloroethane	8.95	U	17.9	5.57	ug/Kg	1		06/19/17 00:04
1,1,2,2-Tetrachloroethane	4.46	U	8.93	2.79	ug/Kg	1		06/19/17 00:04
1,1,2-Trichloroethane	3.57	U	7.14	2.21	ug/Kg	1		06/19/17 00:04
1,1-Dichloroethane	8.95	U	17.9	5.57	ug/Kg	1		06/19/17 00:04
1,1-Dichloroethene	8.95	U	17.9	5.57	ug/Kg	1		06/19/17 00:04
1,1-Dichloropropene	8.95	U	17.9	5.57	ug/Kg	1		06/19/17 00:04
1,2,3-Trichlorobenzene	17.9	U	35.7	10.7	ug/Kg	1		06/19/17 00:04
1,2,3-Trichloropropane	8.95	U	17.9	5.57	ug/Kg	1		06/19/17 00:04
1,2,4-Trichlorobenzene	8.95	U	17.9	5.57	ug/Kg	1		06/19/17 00:04
1,2,4-Trimethylbenzene	17.9	U	35.7	10.7	ug/Kg	1		06/19/17 00:04
1,2-Dibromo-3-chloropropane	35.7	U	71.4	22.1	ug/Kg	1		06/19/17 00:04
1,2-Dibromoethane	3.57	U	7.14	2.21	ug/Kg	1		06/19/17 00:04
1,2-Dichlorobenzene	8.95	U	17.9	5.57	ug/Kg	1		06/19/17 00:04
1,2-Dichloroethane	3.57	U	7.14	2.21	ug/Kg	1		06/19/17 00:04
1,2-Dichloropropane	3.57	U	7.14	2.21	ug/Kg	1		06/19/17 00:04
1,3,5-Trimethylbenzene	12.9	J	17.9	5.57	ug/Kg	1		06/19/17 00:04
1,3-Dichlorobenzene	8.95	U	17.9	5.57	ug/Kg	1		06/19/17 00:04
1,3-Dichloropropane	3.57	U	7.14	2.21	ug/Kg	1		06/19/17 00:04
1,4-Dichlorobenzene	8.95	U	17.9	5.57	ug/Kg	1		06/19/17 00:04
2,2-Dichloropropane	8.95	U	17.9	5.57	ug/Kg	1		06/19/17 00:04
2-Butanone (MEK)	89.5	U	179	55.7	ug/Kg	1		06/19/17 00:04
2-Chlorotoluene	8.95	U	17.9	5.57	ug/Kg	1		06/19/17 00:04
2-Hexanone	35.7	U	71.4	22.1	ug/Kg	1		06/19/17 00:04
4-Chlorotoluene	8.95	U	17.9	5.57	ug/Kg	1		06/19/17 00:04
4-Isopropyltoluene	8.95	U	17.9	5.57	ug/Kg	1		06/19/17 00:04
4-Methyl-2-pentanone (MIBK)	89.5	U	179	55.7	ug/Kg	1		06/19/17 00:04
Benzene	4.46	U	8.93	2.79	ug/Kg	1		06/19/17 00:04
Bromobenzene	8.95	U	17.9	5.57	ug/Kg	1		06/19/17 00:04
Bromochloromethane	8.95	U	17.9	5.57	ug/Kg	1		06/19/17 00:04
Bromodichloromethane	8.95	U	17.9	5.57	ug/Kg	1		06/19/17 00:04
Bromoform	8.95	U	17.9	5.57	ug/Kg	1		06/19/17 00:04
Bromomethane	71.5	U	143	44.3	ug/Kg	1		06/19/17 00:04
Carbon disulfide	35.7	U	71.4	22.1	ug/Kg	1		06/19/17 00:04
Carbon tetrachloride	4.46	U	8.93	2.79	ug/Kg	1		06/19/17 00:04
Chlorobenzene	8.95	U	17.9	5.57	ug/Kg	1		06/19/17 00:04
Chloroethane	71.5	U	143	44.3	ug/Kg	1		06/19/17 00:04

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J flagging is activated

Results of **17-BRWSP-TP-02-2'**

Client Sample ID: **17-BRWSP-TP-02-2'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1173405004
Lab Project ID: 1173405

Collection Date: 06/13/17 14:15
Received Date: 06/15/17 12:50
Matrix: Soil/Solid (dry weight)
Solids (%):95.4
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroform	8.95	U	17.9	5.57	ug/Kg	1		06/19/17 00:04
Chloromethane	8.95	U	17.9	5.57	ug/Kg	1		06/19/17 00:04
cis-1,2-Dichloroethene	8.95	U	17.9	5.57	ug/Kg	1		06/19/17 00:04
cis-1,3-Dichloropropene	4.46	U	8.93	2.79	ug/Kg	1		06/19/17 00:04
Dibromochloromethane	8.95	U	17.9	5.57	ug/Kg	1		06/19/17 00:04
Dibromomethane	8.95	U	17.9	5.57	ug/Kg	1		06/19/17 00:04
Dichlorodifluoromethane	17.9	U	35.7	10.7	ug/Kg	1		06/19/17 00:04
Ethylbenzene	8.21	J	17.9	5.57	ug/Kg	1		06/19/17 00:04
Freon-113	35.7	U	71.4	22.1	ug/Kg	1		06/19/17 00:04
Hexachlorobutadiene	7.15	U	14.3	4.43	ug/Kg	1		06/19/17 00:04
Isopropylbenzene (Cumene)	11.1	J	17.9	5.57	ug/Kg	1		06/19/17 00:04
Methylene chloride	35.7	U	71.4	22.1	ug/Kg	1		06/19/17 00:04
Methyl-t-butyl ether	35.7	U	71.4	22.1	ug/Kg	1		06/19/17 00:04
Naphthalene	8.95	U	17.9	5.57	ug/Kg	1		06/19/17 00:04
n-Butylbenzene	8.95	U	17.9	5.57	ug/Kg	1		06/19/17 00:04
n-Propylbenzene	8.39	J	17.9	5.57	ug/Kg	1		06/19/17 00:04
o-Xylene	8.95	U	17.9	5.57	ug/Kg	1		06/19/17 00:04
P & M -Xylene	20.7	J	35.7	10.7	ug/Kg	1		06/19/17 00:04
sec-Butylbenzene	8.95	U	17.9	5.57	ug/Kg	1		06/19/17 00:04
Styrene	8.95	U	17.9	5.57	ug/Kg	1		06/19/17 00:04
tert-Butylbenzene	8.95	U	17.9	5.57	ug/Kg	1		06/19/17 00:04
Tetrachloroethene	4.46	U	8.93	2.79	ug/Kg	1		06/19/17 00:04
Toluene	8.95	U	17.9	5.57	ug/Kg	1		06/19/17 00:04
trans-1,2-Dichloroethene	8.95	U	17.9	5.57	ug/Kg	1		06/19/17 00:04
trans-1,3-Dichloropropene	4.46	U	8.93	2.79	ug/Kg	1		06/19/17 00:04
Trichloroethene	3.57	U	7.14	2.21	ug/Kg	1		06/19/17 00:04
Trichlorofluoromethane	17.9	U	35.7	10.7	ug/Kg	1		06/19/17 00:04
Vinyl acetate	35.7	U	71.4	22.1	ug/Kg	1		06/19/17 00:04
Vinyl chloride	3.57	U	7.14	2.21	ug/Kg	1		06/19/17 00:04
Xylenes (total)	20.7	J	53.6	16.3	ug/Kg	1		06/19/17 00:04
Surrogates								
1,2-Dichloroethane-D4 (surr)	110		71-136		%	1		06/19/17 00:04
4-Bromofluorobenzene (surr)	124		55-151		%	1		06/19/17 00:04
Toluene-d8 (surr)	96.6		85-116		%	1		06/19/17 00:04

Print Date: 06/28/2017 4:18:34PM

J flagging is activated

Results of **17-BRWSP-TP-02-2'**

Client Sample ID: **17-BRWSP-TP-02-2'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1173405004
Lab Project ID: 1173405

Collection Date: 06/13/17 14:15
Received Date: 06/15/17 12:50
Matrix: Soil/Solid (dry weight)
Solids (%):95.4
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS16854
Analytical Method: SW8260C
Analyst: NRO
Analytical Date/Time: 06/19/17 00:04
Container ID: 1173405004-B

Prep Batch: VXX30710
Prep Method: SW5035A
Prep Date/Time: 06/13/17 14:15
Prep Initial Wt./Vol.: 85.012 g
Prep Extract Vol: 28.9494 mL

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Results of **17-BRWSP-TP-02-2'**

Client Sample ID: **17-BRWSP-TP-02-2'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1173405004
Lab Project ID: 1173405

Collection Date: 06/13/17 14:15
Received Date: 06/15/17 12:50
Matrix: Soil/Solid (dry weight)
Solids (%):95.4
Location:

Results by **Waters Department**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Total Organic Carbon	0.0526	J	0.0540	0.0162	%	1		06/20/17 17:20

Batch Information

Analytical Batch: WTC2690
Analytical Method: SW9060A-Mod
Analyst: K.W
Analytical Date/Time: 06/20/17 17:20
Container ID: 1173405004-A

Prep Batch: WXX11880
Prep Method: METHOD
Prep Date/Time: 06/20/17 09:15
Prep Initial Wt./Vol.: 485.7 mg
Prep Extract Vol: 1 mL

Print Date: 06/28/2017 4:18:34PM

J flagging is activated

Results of **17-BRWSP-TP-03-2'**

Client Sample ID: **17-BRWSP-TP-03-2'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1173405005
Lab Project ID: 1173405

Collection Date: 06/13/17 14:25
Received Date: 06/15/17 12:50
Matrix: Soil/Solid (dry weight)
Solids (%):95.6
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	30.2		20.7	6.41	mg/Kg	1		06/27/17 22:19
Surrogates								
5a Androstane (surr)	86.8		50-150		%	1		06/27/17 22:19

Batch Information

Analytical Batch: XFC13483
Analytical Method: AK102
Analyst: KMD
Analytical Date/Time: 06/27/17 22:19
Container ID: 1173405005-A

Prep Batch: XXX37707
Prep Method: SW3550C
Prep Date/Time: 06/26/17 14:29
Prep Initial Wt./Vol.: 30.34 g
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	105		20.7	6.41	mg/Kg	1		06/27/17 22:19
Surrogates								
n-Triacontane-d62 (surr)	91.4		50-150		%	1		06/27/17 22:19

Batch Information

Analytical Batch: XFC13483
Analytical Method: AK103
Analyst: KMD
Analytical Date/Time: 06/27/17 22:19
Container ID: 1173405005-A

Prep Batch: XXX37707
Prep Method: SW3550C
Prep Date/Time: 06/26/17 14:29
Prep Initial Wt./Vol.: 30.34 g
Prep Extract Vol: 1 mL

Print Date: 06/28/2017 4:18:34PM

J flagging is activated

Results of **17-BRWSP-TP-03-2'**

Client Sample ID: **17-BRWSP-TP-03-2'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1173405005
Lab Project ID: 1173405

Collection Date: 06/13/17 14:25
Received Date: 06/15/17 12:50
Matrix: Soil/Solid (dry weight)
Solids (%):95.6
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	0.990	U	1.98	0.593	mg/Kg	1		06/22/17 05:58
Surrogates								
4-Bromofluorobenzene (surr)	96		50-150		%	1		06/22/17 05:58

Batch Information

Analytical Batch: VFC13693
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 06/22/17 05:58
Container ID: 1173405005-B

Prep Batch: VXX30705
Prep Method: SW5035A
Prep Date/Time: 06/13/17 14:25
Prep Initial Wt./Vol.: 74.767 g
Prep Extract Vol: 28.2685 mL

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Results of **17-BRWSP-TP-03-2'**

Client Sample ID: **17-BRWSP-TP-03-2'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1173405005
Lab Project ID: 1173405

Collection Date: 06/13/17 14:25
Received Date: 06/15/17 12:50
Matrix: Soil/Solid (dry weight)
Solids (%):95.6
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	7.90	U	15.8	4.90	ug/Kg	1		06/19/17 00:20
1,1,1-Trichloroethane	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
1,1,2,2-Tetrachloroethane	4.94	U	9.88	3.08	ug/Kg	1		06/19/17 00:20
1,1,2-Trichloroethane	3.96	U	7.91	2.45	ug/Kg	1		06/19/17 00:20
1,1-Dichloroethane	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
1,1-Dichloroethene	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
1,1-Dichloropropene	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
1,2,3-Trichlorobenzene	19.8	U	39.5	11.9	ug/Kg	1		06/19/17 00:20
1,2,3-Trichloropropane	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
1,2,4-Trichlorobenzene	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
1,2,4-Trimethylbenzene	19.8	U	39.5	11.9	ug/Kg	1		06/19/17 00:20
1,2-Dibromo-3-chloropropane	39.5	U	79.1	24.5	ug/Kg	1		06/19/17 00:20
1,2-Dibromoethane	3.96	U	7.91	2.45	ug/Kg	1		06/19/17 00:20
1,2-Dichlorobenzene	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
1,2-Dichloroethane	3.96	U	7.91	2.45	ug/Kg	1		06/19/17 00:20
1,2-Dichloropropane	3.96	U	7.91	2.45	ug/Kg	1		06/19/17 00:20
1,3,5-Trimethylbenzene	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
1,3-Dichlorobenzene	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
1,3-Dichloropropane	3.96	U	7.91	2.45	ug/Kg	1		06/19/17 00:20
1,4-Dichlorobenzene	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
2,2-Dichloropropane	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
2-Butanone (MEK)	99.0	U	198	61.7	ug/Kg	1		06/19/17 00:20
2-Chlorotoluene	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
2-Hexanone	39.5	U	79.1	24.5	ug/Kg	1		06/19/17 00:20
4-Chlorotoluene	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
4-Isopropyltoluene	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
4-Methyl-2-pentanone (MIBK)	99.0	U	198	61.7	ug/Kg	1		06/19/17 00:20
Benzene	4.94	U	9.88	3.08	ug/Kg	1		06/19/17 00:20
Bromobenzene	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
Bromochloromethane	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
Bromodichloromethane	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
Bromoform	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
Bromomethane	79.0	U	158	49.0	ug/Kg	1		06/19/17 00:20
Carbon disulfide	39.5	U	79.1	24.5	ug/Kg	1		06/19/17 00:20
Carbon tetrachloride	4.94	U	9.88	3.08	ug/Kg	1		06/19/17 00:20
Chlorobenzene	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
Chloroethane	79.0	U	158	49.0	ug/Kg	1		06/19/17 00:20

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J flagging is activated

Results of **17-BRWSP-TP-03-2'**

Client Sample ID: **17-BRWSP-TP-03-2'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1173405005
Lab Project ID: 1173405

Collection Date: 06/13/17 14:25
Received Date: 06/15/17 12:50
Matrix: Soil/Solid (dry weight)
Solids (%):95.6
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroform	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
Chloromethane	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
cis-1,2-Dichloroethene	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
cis-1,3-Dichloropropene	4.94	U	9.88	3.08	ug/Kg	1		06/19/17 00:20
Dibromochloromethane	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
Dibromomethane	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
Dichlorodifluoromethane	19.8	U	39.5	11.9	ug/Kg	1		06/19/17 00:20
Ethylbenzene	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
Freon-113	39.5	U	79.1	24.5	ug/Kg	1		06/19/17 00:20
Hexachlorobutadiene	7.90	U	15.8	4.90	ug/Kg	1		06/19/17 00:20
Isopropylbenzene (Cumene)	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
Methylene chloride	39.5	U	79.1	24.5	ug/Kg	1		06/19/17 00:20
Methyl-t-butyl ether	39.5	U	79.1	24.5	ug/Kg	1		06/19/17 00:20
Naphthalene	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
n-Butylbenzene	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
n-Propylbenzene	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
o-Xylene	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
P & M -Xylene	19.8	U	39.5	11.9	ug/Kg	1		06/19/17 00:20
sec-Butylbenzene	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
Styrene	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
tert-Butylbenzene	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
Tetrachloroethene	4.94	U	9.88	3.08	ug/Kg	1		06/19/17 00:20
Toluene	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
trans-1,2-Dichloroethene	9.90	U	19.8	6.17	ug/Kg	1		06/19/17 00:20
trans-1,3-Dichloropropene	4.94	U	9.88	3.08	ug/Kg	1		06/19/17 00:20
Trichloroethene	3.96	U	7.91	2.45	ug/Kg	1		06/19/17 00:20
Trichlorofluoromethane	19.8	U	39.5	11.9	ug/Kg	1		06/19/17 00:20
Vinyl acetate	39.5	U	79.1	24.5	ug/Kg	1		06/19/17 00:20
Vinyl chloride	3.96	U	7.91	2.45	ug/Kg	1		06/19/17 00:20
Xylenes (total)	29.6	U	59.3	18.0	ug/Kg	1		06/19/17 00:20
Surrogates								
1,2-Dichloroethane-D4 (surr)	110		71-136		%	1		06/19/17 00:20
4-Bromofluorobenzene (surr)	118		55-151		%	1		06/19/17 00:20
Toluene-d8 (surr)	95.5		85-116		%	1		06/19/17 00:20

Print Date: 06/28/2017 4:18:34PM

J flagging is activated

Results of **17-BRWSP-TP-03-2'**

Client Sample ID: **17-BRWSP-TP-03-2'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1173405005
Lab Project ID: 1173405

Collection Date: 06/13/17 14:25
Received Date: 06/15/17 12:50
Matrix: Soil/Solid (dry weight)
Solids (%):95.6
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS16854
Analytical Method: SW8260C
Analyst: NRO
Analytical Date/Time: 06/19/17 00:20
Container ID: 1173405005-B

Prep Batch: VXX30710
Prep Method: SW5035A
Prep Date/Time: 06/13/17 14:25
Prep Initial Wt./Vol.: 74.767 g
Prep Extract Vol: 28.2685 mL

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Results of **17-BRWSP-TP-03-2'**

Client Sample ID: **17-BRWSP-TP-03-2'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1173405005
Lab Project ID: 1173405

Collection Date: 06/13/17 14:25
Received Date: 06/15/17 12:50
Matrix: Soil/Solid (dry weight)
Solids (%):95.6
Location:

Results by **Waters Department**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Total Organic Carbon	0.269		0.0546	0.0164	%	1		06/20/17 18:10

Batch Information

Analytical Batch: WTC2690
Analytical Method: SW9060A-Mod
Analyst: K.W
Analytical Date/Time: 06/20/17 18:10
Container ID: 1173405005-A

Prep Batch: WXX11880
Prep Method: METHOD
Prep Date/Time: 06/20/17 09:15
Prep Initial Wt./Vol.: 479 mg
Prep Extract Vol: 1 mL

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Results of **17-BRWSP-TP-04-2'**

Client Sample ID: **17-BRWSP-TP-04-2'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1173405006
Lab Project ID: 1173405

Collection Date: 06/13/17 14:35
Received Date: 06/15/17 12:50
Matrix: Soil/Solid (dry weight)
Solids (%):95.0
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	7.37	J	20.9	6.47	mg/Kg	1		06/27/17 22:29
Surrogates								
5a Androstane (surr)	85.9		50-150		%	1		06/27/17 22:29

Batch Information

Analytical Batch: XFC13483
Analytical Method: AK102
Analyst: KMD
Analytical Date/Time: 06/27/17 22:29
Container ID: 1173405006-A

Prep Batch: XXX37707
Prep Method: SW3550C
Prep Date/Time: 06/26/17 14:29
Prep Initial Wt./Vol.: 30.266 g
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	47.8		20.9	6.47	mg/Kg	1		06/27/17 22:29
Surrogates								
n-Triacontane-d62 (surr)	92.5		50-150		%	1		06/27/17 22:29

Batch Information

Analytical Batch: XFC13483
Analytical Method: AK103
Analyst: KMD
Analytical Date/Time: 06/27/17 22:29
Container ID: 1173405006-A

Prep Batch: XXX37707
Prep Method: SW3550C
Prep Date/Time: 06/26/17 14:29
Prep Initial Wt./Vol.: 30.266 g
Prep Extract Vol: 1 mL

Print Date: 06/28/2017 4:18:34PM

J flagging is activated

Results of **17-BRWSP-TP-04-2'**

Client Sample ID: **17-BRWSP-TP-04-2'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1173405006
Lab Project ID: 1173405

Collection Date: 06/13/17 14:35
Received Date: 06/15/17 12:50
Matrix: Soil/Solid (dry weight)
Solids (%):95.0
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.02	U	2.04	0.612	mg/Kg	1		06/22/17 06:17
Surrogates								
4-Bromofluorobenzene (surr)	101		50-150		%	1		06/22/17 06:17

Batch Information

Analytical Batch: VFC13693
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 06/22/17 06:17
Container ID: 1173405006-B

Prep Batch: VXX30705
Prep Method: SW5035A
Prep Date/Time: 06/13/17 14:35
Prep Initial Wt./Vol.: 74.126 g
Prep Extract Vol: 28.7255 mL

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Results of **17-BRWSP-TP-04-2'**

Client Sample ID: **17-BRWSP-TP-04-2'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1173405006
Lab Project ID: 1173405

Collection Date: 06/13/17 14:35
Received Date: 06/15/17 12:50
Matrix: Soil/Solid (dry weight)
Solids (%):95.0
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	8.15	U	16.3	5.06	ug/Kg	1		06/19/17 00:36
1,1,1-Trichloroethane	10.2	U	20.4	6.37	ug/Kg	1		06/19/17 00:36
1,1,2,2-Tetrachloroethane	5.10	U	10.2	3.18	ug/Kg	1		06/19/17 00:36
1,1,2-Trichloroethane	4.08	U	8.16	2.53	ug/Kg	1		06/19/17 00:36
1,1-Dichloroethane	10.2	U	20.4	6.37	ug/Kg	1		06/19/17 00:36
1,1-Dichloroethene	10.2	U	20.4	6.37	ug/Kg	1		06/19/17 00:36
1,1-Dichloropropene	10.2	U	20.4	6.37	ug/Kg	1		06/19/17 00:36
1,2,3-Trichlorobenzene	20.4	U	40.8	12.2	ug/Kg	1		06/19/17 00:36
1,2,3-Trichloropropane	10.2	U	20.4	6.37	ug/Kg	1		06/19/17 00:36
1,2,4-Trichlorobenzene	10.2	U	20.4	6.37	ug/Kg	1		06/19/17 00:36
1,2,4-Trimethylbenzene	16.1	J	40.8	12.2	ug/Kg	1		06/19/17 00:36
1,2-Dibromo-3-chloropropane	40.8	U	81.6	25.3	ug/Kg	1		06/19/17 00:36
1,2-Dibromoethane	4.08	U	8.16	2.53	ug/Kg	1		06/19/17 00:36
1,2-Dichlorobenzene	10.2	U	20.4	6.37	ug/Kg	1		06/19/17 00:36
1,2-Dichloroethane	4.08	U	8.16	2.53	ug/Kg	1		06/19/17 00:36
1,2-Dichloropropane	4.08	U	8.16	2.53	ug/Kg	1		06/19/17 00:36
1,3,5-Trimethylbenzene	7.75	J	20.4	6.37	ug/Kg	1		06/19/17 00:36
1,3-Dichlorobenzene	10.2	U	20.4	6.37	ug/Kg	1		06/19/17 00:36
1,3-Dichloropropane	4.08	U	8.16	2.53	ug/Kg	1		06/19/17 00:36
1,4-Dichlorobenzene	10.2	U	20.4	6.37	ug/Kg	1		06/19/17 00:36
2,2-Dichloropropane	10.2	U	20.4	6.37	ug/Kg	1		06/19/17 00:36
2-Butanone (MEK)	102	U	204	63.7	ug/Kg	1		06/19/17 00:36
2-Chlorotoluene	10.2	U	20.4	6.37	ug/Kg	1		06/19/17 00:36
2-Hexanone	40.8	U	81.6	25.3	ug/Kg	1		06/19/17 00:36
4-Chlorotoluene	10.2	U	20.4	6.37	ug/Kg	1		06/19/17 00:36
4-Isopropyltoluene	10.2	U	20.4	6.37	ug/Kg	1		06/19/17 00:36
4-Methyl-2-pentanone (MIBK)	102	U	204	63.7	ug/Kg	1		06/19/17 00:36
Benzene	5.10	U	10.2	3.18	ug/Kg	1		06/19/17 00:36
Bromobenzene	10.2	U	20.4	6.37	ug/Kg	1		06/19/17 00:36
Bromochloromethane	10.2	U	20.4	6.37	ug/Kg	1		06/19/17 00:36
Bromodichloromethane	10.2	U	20.4	6.37	ug/Kg	1		06/19/17 00:36
Bromoform	10.2	U	20.4	6.37	ug/Kg	1		06/19/17 00:36
Bromomethane	81.5	U	163	50.6	ug/Kg	1		06/19/17 00:36
Carbon disulfide	40.8	U	81.6	25.3	ug/Kg	1		06/19/17 00:36
Carbon tetrachloride	5.10	U	10.2	3.18	ug/Kg	1		06/19/17 00:36
Chlorobenzene	10.2	U	20.4	6.37	ug/Kg	1		06/19/17 00:36
Chloroethane	81.5	U	163	50.6	ug/Kg	1		06/19/17 00:36

Print Date: 06/28/2017 4:18:34PM

J flagging is activated

Results of **17-BRWSP-TP-04-2'**

Client Sample ID: **17-BRWSP-TP-04-2'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1173405006
Lab Project ID: 1173405

Collection Date: 06/13/17 14:35
Received Date: 06/15/17 12:50
Matrix: Soil/Solid (dry weight)
Solids (%):95.0
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroform	10.2	U	20.4	6.37	ug/Kg	1		06/19/17 00:36
Chloromethane	10.2	U	20.4	6.37	ug/Kg	1		06/19/17 00:36
cis-1,2-Dichloroethene	10.2	U	20.4	6.37	ug/Kg	1		06/19/17 00:36
cis-1,3-Dichloropropene	5.10	U	10.2	3.18	ug/Kg	1		06/19/17 00:36
Dibromochloromethane	10.2	U	20.4	6.37	ug/Kg	1		06/19/17 00:36
Dibromomethane	10.2	U	20.4	6.37	ug/Kg	1		06/19/17 00:36
Dichlorodifluoromethane	20.4	U	40.8	12.2	ug/Kg	1		06/19/17 00:36
Ethylbenzene	10.2	U	20.4	6.37	ug/Kg	1		06/19/17 00:36
Freon-113	40.8	U	81.6	25.3	ug/Kg	1		06/19/17 00:36
Hexachlorobutadiene	8.15	U	16.3	5.06	ug/Kg	1		06/19/17 00:36
Isopropylbenzene (Cumene)	10.2	U	20.4	6.37	ug/Kg	1		06/19/17 00:36
Methylene chloride	40.8	U	81.6	25.3	ug/Kg	1		06/19/17 00:36
Methyl-t-butyl ether	40.8	U	81.6	25.3	ug/Kg	1		06/19/17 00:36
Naphthalene	10.2	U	20.4	6.37	ug/Kg	1		06/19/17 00:36
n-Butylbenzene	10.2	U	20.4	6.37	ug/Kg	1		06/19/17 00:36
n-Propylbenzene	10.2	U	20.4	6.37	ug/Kg	1		06/19/17 00:36
o-Xylene	10.2	U	20.4	6.37	ug/Kg	1		06/19/17 00:36
P & M -Xylene	22.4	J	40.8	12.2	ug/Kg	1		06/19/17 00:36
sec-Butylbenzene	10.2	U	20.4	6.37	ug/Kg	1		06/19/17 00:36
Styrene	10.2	U	20.4	6.37	ug/Kg	1		06/19/17 00:36
tert-Butylbenzene	10.2	U	20.4	6.37	ug/Kg	1		06/19/17 00:36
Tetrachloroethene	12.9		10.2	3.18	ug/Kg	1		06/19/17 00:36
Toluene	10.2	U	20.4	6.37	ug/Kg	1		06/19/17 00:36
trans-1,2-Dichloroethene	10.2	U	20.4	6.37	ug/Kg	1		06/19/17 00:36
trans-1,3-Dichloropropene	5.10	U	10.2	3.18	ug/Kg	1		06/19/17 00:36
Trichloroethene	4.08	U	8.16	2.53	ug/Kg	1		06/19/17 00:36
Trichlorofluoromethane	20.4	U	40.8	12.2	ug/Kg	1		06/19/17 00:36
Vinyl acetate	40.8	U	81.6	25.3	ug/Kg	1		06/19/17 00:36
Vinyl chloride	4.08	U	8.16	2.53	ug/Kg	1		06/19/17 00:36
Xylenes (total)	22.4	J	61.2	18.6	ug/Kg	1		06/19/17 00:36
Surrogates								
1,2-Dichloroethane-D4 (surr)	116		71-136		%	1		06/19/17 00:36
4-Bromofluorobenzene (surr)	124		55-151		%	1		06/19/17 00:36
Toluene-d8 (surr)	94.6		85-116		%	1		06/19/17 00:36

Print Date: 06/28/2017 4:18:34PM

J flagging is activated

Results of **17-BRWSP-TP-04-2'**

Client Sample ID: **17-BRWSP-TP-04-2'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1173405006
Lab Project ID: 1173405

Collection Date: 06/13/17 14:35
Received Date: 06/15/17 12:50
Matrix: Soil/Solid (dry weight)
Solids (%):95.0
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS16854
Analytical Method: SW8260C
Analyst: NRO
Analytical Date/Time: 06/19/17 00:36
Container ID: 1173405006-B

Prep Batch: VXX30710
Prep Method: SW5035A
Prep Date/Time: 06/13/17 14:35
Prep Initial Wt./Vol.: 74.126 g
Prep Extract Vol: 28.7255 mL

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Results of **17-BRWSP-TP-04-2'**

Client Sample ID: **17-BRWSP-TP-04-2'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1173405006
Lab Project ID: 1173405

Collection Date: 06/13/17 14:35
Received Date: 06/15/17 12:50
Matrix: Soil/Solid (dry weight)
Solids (%):95.0
Location:

Results by **Waters Department**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Total Organic Carbon	0.229		0.0560	0.0168	%	1		06/20/17 18:27

Batch Information

Analytical Batch: WTC2690
Analytical Method: SW9060A-Mod
Analyst: K.W
Analytical Date/Time: 06/20/17 18:27
Container ID: 1173405006-A

Prep Batch: WXX11880
Prep Method: METHOD
Prep Date/Time: 06/20/17 09:15
Prep Initial Wt./Vol.: 470.1 mg
Prep Extract Vol: 1 mL

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Method Blank

Blank ID: MB for HBN 1761728 [SPT/10191]
Blank Lab ID: 1392547

Matrix: Soil/Solid (dry weight)

QC for Samples:
1173405002, 1173405003, 1173405004, 1173405005, 1173405006

Results by **SM21 2540G**

Parameter	Results	LOQ/CL	DL	Units
Total Solids	100			%

Batch Information

Analytical Batch: SPT10191
Analytical Method: SM21 2540G
Instrument:
Analyst: NIC
Analytical Date/Time: 6/21/2017 6:46:00PM

Print Date: 06/28/2017 4:18:38PM

Duplicate Sample Summary

Original Sample ID: 1173405002
Duplicate Sample ID: 1392548

Analysis Date: 06/21/2017 18:46
Matrix: Soil/Solid (dry weight)

QC for Samples:

1173405002, 1173405003, 1173405004, 1173405005, 1173405006

Results by **SM21 2540G**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Solids	89.3	86.7	%	2.90	(< 15)

Batch Information

Analytical Batch: SPT10191
Analytical Method: SM21 2540G
Instrument:
Analyst: NIC

Print Date: 06/28/2017 4:18:39PM

Duplicate Sample Summary

Original Sample ID: 1173464012
Duplicate Sample ID: 1392549

Analysis Date: 06/21/2017 18:46
Matrix: Soil/Solid (dry weight)

QC for Samples:

1173405003, 1173405004, 1173405005, 1173405006

Results by **SM21 2540G**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Solids	83.5	82.5	%	1.20	(< 15)

Batch Information

Analytical Batch: SPT10191
Analytical Method: SM21 2540G
Instrument:
Analyst: NIC

Print Date: 06/28/2017 4:18:39PM

Method Blank

Blank ID: MB for HBN 1761738 [VXX/30705]
Blank Lab ID: 1392593

Matrix: Soil/Solid (dry weight)

QC for Samples:
1173405001, 1173405002, 1173405003, 1173405004, 1173405005, 1173405006

Results by **AK101**

Parameter	Results	LOQ/CL	DL	Units
Gasoline Range Organics	1.25U	2.50	0.750	mg/Kg
Surrogates				
4-Bromofluorobenzene (surr)	83.8	50-150		%

Batch Information

Analytical Batch: VFC13693
Analytical Method: AK101
Instrument: Agilent 7890 PID/FID
Analyst: ST
Analytical Date/Time: 6/22/2017 12:12:00AM

Prep Batch: VXX30705
Prep Method: SW5035A
Prep Date/Time: 6/21/2017 8:00:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

Print Date: 06/28/2017 4:18:42PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1173405 [VXX30705]
Blank Spike Lab ID: 1392594
Date Analyzed: 06/21/2017 23:14

Spike Duplicate ID: LCSD for HBN 1173405 [VXX30705]
Spike Duplicate Lab ID: 1392595
Matrix: Soil/Solid (dry weight)

QC for Samples: 1173405001, 1173405002, 1173405003, 1173405004, 1173405005, 1173405006

Results by **AK101**

	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Gasoline Range Organics	12.5	13.6	109	12.5	13.2	106	(60-120)	3.00	(< 20)
Surrogates									
4-Bromofluorobenzene (surr)	1.25	88	88	1.25	84.5	85	(50-150)	4.00	

Batch Information

Analytical Batch: **VFC13693**
Analytical Method: **AK101**
Instrument: **Agilent 7890 PID/FID**
Analyst: **ST**

Prep Batch: **VXX30705**
Prep Method: **SW5035A**
Prep Date/Time: **06/21/2017 08:00**
Spike Init Wt./Vol.: 12.5 mg/Kg Extract Vol: 25 mL
Dupe Init Wt./Vol.: 12.5 mg/Kg Extract Vol: 25 mL

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Method Blank

Blank ID: MB for HBN 1761776 [VXX/30710]
Blank Lab ID: 1392763

Matrix: Soil/Solid (dry weight)

QC for Samples:
1173405001, 1173405002, 1173405003, 1173405004, 1173405005, 1173405006

Results by **SW8260C**

Parameter	Results	LOQ/CL	DL	Units
1,1,1,2-Tetrachloroethane	10.0U	20.0	6.20	ug/Kg
1,1,1-Trichloroethane	12.5U	25.0	7.80	ug/Kg
1,1,2,2-Tetrachloroethane	6.25U	12.5	3.90	ug/Kg
1,1,2-Trichloroethane	5.00U	10.0	3.10	ug/Kg
1,1-Dichloroethane	12.5U	25.0	7.80	ug/Kg
1,1-Dichloroethene	12.5U	25.0	7.80	ug/Kg
1,1-Dichloropropene	12.5U	25.0	7.80	ug/Kg
1,2,3-Trichlorobenzene	25.0U	50.0	15.0	ug/Kg
1,2,3-Trichloropropane	12.5U	25.0	7.80	ug/Kg
1,2,4-Trichlorobenzene	12.5U	25.0	7.80	ug/Kg
1,2,4-Trimethylbenzene	25.0U	50.0	15.0	ug/Kg
1,2-Dibromo-3-chloropropane	50.0U	100	31.0	ug/Kg
1,2-Dibromoethane	5.00U	10.0	3.10	ug/Kg
1,2-Dichlorobenzene	12.5U	25.0	7.80	ug/Kg
1,2-Dichloroethane	5.00U	10.0	3.10	ug/Kg
1,2-Dichloropropane	5.00U	10.0	3.10	ug/Kg
1,3,5-Trimethylbenzene	12.5U	25.0	7.80	ug/Kg
1,3-Dichlorobenzene	12.5U	25.0	7.80	ug/Kg
1,3-Dichloropropane	5.00U	10.0	3.10	ug/Kg
1,4-Dichlorobenzene	12.5U	25.0	7.80	ug/Kg
2,2-Dichloropropane	12.5U	25.0	7.80	ug/Kg
2-Butanone (MEK)	125U	250	78.0	ug/Kg
2-Chlorotoluene	12.5U	25.0	7.80	ug/Kg
2-Hexanone	50.0U	100	31.0	ug/Kg
4-Chlorotoluene	12.5U	25.0	7.80	ug/Kg
4-Isopropyltoluene	12.5U	25.0	7.80	ug/Kg
4-Methyl-2-pentanone (MIBK)	125U	250	78.0	ug/Kg
Benzene	6.25U	12.5	3.90	ug/Kg
Bromobenzene	12.5U	25.0	7.80	ug/Kg
Bromochloromethane	12.5U	25.0	7.80	ug/Kg
Bromodichloromethane	12.5U	25.0	7.80	ug/Kg
Bromoform	12.5U	25.0	7.80	ug/Kg
Bromomethane	100U	200	62.0	ug/Kg
Carbon disulfide	50.0U	100	31.0	ug/Kg
Carbon tetrachloride	6.25U	12.5	3.90	ug/Kg
Chlorobenzene	12.5U	25.0	7.80	ug/Kg
Chloroethane	100U	200	62.0	ug/Kg
Chloroform	12.5U	25.0	7.80	ug/Kg

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Method Blank

Blank ID: MB for HBN 1761776 [VXX/30710]
Blank Lab ID: 1392763

Matrix: Soil/Solid (dry weight)

QC for Samples:
1173405001, 1173405002, 1173405003, 1173405004, 1173405005, 1173405006

Results by **SW8260C**

Parameter	Results	LOQ/CL	DL	Units
Chloromethane	12.5U	25.0	7.80	ug/Kg
cis-1,2-Dichloroethene	12.5U	25.0	7.80	ug/Kg
cis-1,3-Dichloropropene	6.25U	12.5	3.90	ug/Kg
Dibromochloromethane	12.5U	25.0	7.80	ug/Kg
Dibromomethane	12.5U	25.0	7.80	ug/Kg
Dichlorodifluoromethane	25.0U	50.0	15.0	ug/Kg
Ethylbenzene	12.5U	25.0	7.80	ug/Kg
Freon-113	50.0U	100	31.0	ug/Kg
Hexachlorobutadiene	10.0U	20.0	6.20	ug/Kg
Isopropylbenzene (Cumene)	12.5U	25.0	7.80	ug/Kg
Methylene chloride	50.0U	100	31.0	ug/Kg
Methyl-t-butyl ether	50.0U	100	31.0	ug/Kg
Naphthalene	12.5U	25.0	7.80	ug/Kg
n-Butylbenzene	12.5U	25.0	7.80	ug/Kg
n-Propylbenzene	12.5U	25.0	7.80	ug/Kg
o-Xylene	12.5U	25.0	7.80	ug/Kg
P & M -Xylene	25.0U	50.0	15.0	ug/Kg
sec-Butylbenzene	12.5U	25.0	7.80	ug/Kg
Styrene	12.5U	25.0	7.80	ug/Kg
tert-Butylbenzene	12.5U	25.0	7.80	ug/Kg
Tetrachloroethene	6.25U	12.5	3.90	ug/Kg
Toluene	12.5U	25.0	7.80	ug/Kg
trans-1,2-Dichloroethene	12.5U	25.0	7.80	ug/Kg
trans-1,3-Dichloropropene	6.25U	12.5	3.90	ug/Kg
Trichloroethene	5.00U	10.0	3.10	ug/Kg
Trichlorofluoromethane	25.0U	50.0	15.0	ug/Kg
Vinyl acetate	50.0U	100	31.0	ug/Kg
Vinyl chloride	5.00U	10.0	3.10	ug/Kg
Xylenes (total)	37.5U	75.0	22.8	ug/Kg
Surrogates				
1,2-Dichloroethane-D4 (surr)	111	71-136		%
4-Bromofluorobenzene (surr)	92.5	55-151		%
Toluene-d8 (surr)	94.2	85-116		%

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Method Blank

Blank ID: MB for HBN 1761776 [VXX/30710]
Blank Lab ID: 1392763

Matrix: Soil/Solid (dry weight)

QC for Samples:
1173405001, 1173405002, 1173405003, 1173405004, 1173405005, 1173405006

Results by **SW8260C**

Parameter	Results	LOQ/CL	DL	Units

Batch Information

Analytical Batch: VMS16854
Analytical Method: SW8260C
Instrument: VQA 7890/5975 GC/MS
Analyst: NRO
Analytical Date/Time: 6/18/2017 4:44:00PM

Prep Batch: VXX30710
Prep Method: SW5035A
Prep Date/Time: 6/18/2017 6:00:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

Print Date: 06/28/2017 4:18:46PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1173405 [VXX30710]
Blank Spike Lab ID: 1392764
Date Analyzed: 06/18/2017 18:29

Matrix: Soil/Solid (dry weight)

QC for Samples: 1173405001, 1173405002, 1173405003, 1173405004, 1173405005, 1173405006

Results by **SW8260C**

	Blank Spike (ug/Kg)			
Parameter	Spike	Result	Rec (%)	CL
1,1,1,2-Tetrachloroethane	750	771	103	(78-125)
1,1,1-Trichloroethane	750	835	111	(73-130)
1,1,2,2-Tetrachloroethane	750	778	104	(70-124)
1,1,2-Trichloroethane	750	731	98	(78-121)
1,1-Dichloroethane	750	763	102	(76-125)
1,1-Dichloroethene	750	675	90	(70-131)
1,1-Dichloropropene	750	788	105	(76-125)
1,2,3-Trichlorobenzene	750	635	85	(66-130)
1,2,3-Trichloropropane	750	791	105	(73-125)
1,2,4-Trichlorobenzene	750	682	91	(67-129)
1,2,4-Trimethylbenzene	750	762	102	(75-123)
1,2-Dibromo-3-chloropropane	750	806	107	(61-132)
1,2-Dibromoethane	750	765	102	(78-122)
1,2-Dichlorobenzene	750	758	101	(78-121)
1,2-Dichloroethane	750	767	102	(73-128)
1,2-Dichloropropane	750	777	104	(76-123)
1,3,5-Trimethylbenzene	750	751	100	(73-124)
1,3-Dichlorobenzene	750	756	101	(77-121)
1,3-Dichloropropane	750	739	99	(77-121)
1,4-Dichlorobenzene	750	781	104	(75-120)
2,2-Dichloropropane	750	886	118	(67-133)
2-Butanone (MEK)	2250	2300	102	(51-148)
2-Chlorotoluene	750	772	103	(75-122)
2-Hexanone	2250	2260	100	(53-145)
4-Chlorotoluene	750	765	102	(72-124)
4-Isopropyltoluene	750	772	103	(73-127)
4-Methyl-2-pentanone (MIBK)	2250	2370	105	(65-135)
Benzene	750	754	101	(77-121)
Bromobenzene	750	803	107	(78-121)
Bromochloromethane	750	829	110	(78-125)
Bromodichloromethane	750	818	109	(75-127)
Bromoform	750	802	107	(67-132)
Bromomethane	750	688	92	(53-143)
Carbon disulfide	1130	957	85	(63-132)

Print Date: 06/28/2017 4:18:48PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1173405 [VXX30710]
Blank Spike Lab ID: 1392764
Date Analyzed: 06/18/2017 18:29

Matrix: Soil/Solid (dry weight)

QC for Samples: 1173405001, 1173405002, 1173405003, 1173405004, 1173405005, 1173405006

Results by **SW8260C**

	Blank Spike (ug/Kg)			
Parameter	Spike	Result	Rec (%)	CL
Carbon tetrachloride	750	855	114	(70-135)
Chlorobenzene	750	749	100	(79-120)
Chloroethane	750	699	93	(59-139)
Chloroform	750	787	105	(78-123)
Chloromethane	750	601	80	(50-136)
cis-1,2-Dichloroethene	750	783	104	(77-123)
cis-1,3-Dichloropropene	750	830	111	(74-126)
Dibromochloromethane	750	782	104	(74-126)
Dibromomethane	750	830	111	(78-125)
Dichlorodifluoromethane	750	763	102	(29-149)
Ethylbenzene	750	760	101	(76-122)
Freon-113	1130	1060	94	(66-136)
Hexachlorobutadiene	750	685	91	(61-135)
Isopropylbenzene (Cumene)	750	779	104	(68-134)
Methylene chloride	750	787	105	(70-128)
Methyl-t-butyl ether	1130	1210	108	(73-125)
Naphthalene	750	678	90	(62-129)
n-Butylbenzene	750	747	100	(70-128)
n-Propylbenzene	750	767	102	(73-125)
o-Xylene	750	760	101	(77-123)
P & M -Xylene	1500	1520	101	(77-124)
sec-Butylbenzene	750	772	103	(73-126)
Styrene	750	760	101	(76-124)
tert-Butylbenzene	750	778	104	(73-125)
Tetrachloroethene	750	748	100	(73-128)
Toluene	750	742	99	(77-121)
trans-1,2-Dichloroethene	750	786	105	(74-125)
trans-1,3-Dichloropropene	750	805	107	(71-130)
Trichloroethene	750	778	104	(77-123)
Trichlorofluoromethane	750	944	126	(62-140)
Vinyl acetate	750	815	109	(50-151)
Vinyl chloride	750	682	91	(56-135)
Xylenes (total)	2250	2280	101	(78-124)

Print Date: 06/28/2017 4:18:48PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1173405 [VXX30710]
Blank Spike Lab ID: 1392764
Date Analyzed: 06/18/2017 18:29

Matrix: Soil/Solid (dry weight)

QC for Samples: 1173405001, 1173405002, 1173405003, 1173405004, 1173405005, 1173405006

Results by **SW8260C**

Parameter	Spike	Blank Spike (%) Result	Rec (%)	CL
Surrogates				
1,2-Dichloroethane-D4 (surr)	750	106	106	(71-136)
4-Bromofluorobenzene (surr)	750	91.1	91	(55-151)
Toluene-d8 (surr)	750	98.2	98	(85-116)

Batch Information

Analytical Batch: **VMS16854**
Analytical Method: **SW8260C**
Instrument: **VQA 7890/5975 GC/MS**
Analyst: **NRO**

Prep Batch: **VXX30710**
Prep Method: **SW5035A**
Prep Date/Time: **06/18/2017 06:00**
Spike Init Wt./Vol.: 750 ug/Kg Extract Vol: 25 mL
Dupe Init Wt./Vol.: Extract Vol:

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Matrix Spike Summary

Original Sample ID: 1173358003 — Analysis Date: 06/18/2017 21:24
MS Sample ID: 1392765 MS — Analysis Date: 06/18/2017 19:00
MSD Sample ID: 1392766 MSD — Analysis Date: 06/18/2017 19:16
Matrix: Soil/Solid (dry weight)

QC for Samples: 1173405001, 1173405002, 1173405003, 1173405004, 1173405005, 1173405006

Results by **SW8260C**

		Matrix Spike (ug/Kg)			Spike Duplicate (ug/Kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1,1,1,2-Tetrachloroethane	17.7U	409	422	103	409	436	107	78-125	3.40	(< 20)
1,1,1-Trichloroethane	22.1U	409	402	98	409	412	101	73-130	2.50	(< 20)
1,1,2,2-Tetrachloroethane	11.0U	409	421	103	409	431	106	70-124	2.70	(< 20)
1,1,2-Trichloroethane	8.83U	409	410	100	409	417	102	78-121	1.60	(< 20)
1,1-Dichloroethane	22.1U	409	370	91	409	382	93	76-125	3.00	(< 20)
1,1-Dichloroethene	22.1U	409	310	76	409	314	77	70-131	1.70	(< 20)
1,1-Dichloropropene	22.1U	409	391	96	409	402	98	76-125	2.90	(< 20)
1,2,3-Trichlorobenzene	44.2U	409	334	82	409	387	94	66-130	14.50	(< 20)
1,2,3-Trichloropropane	22.1U	409	429	105	409	446	109	73-125	4.20	(< 20)
1,2,4-Trichlorobenzene	22.1U	409	356	87	409	390	96	67-129	9.00	(< 20)
1,2,4-Trimethylbenzene	44.2U	409	390	95	409	410	100	75-123	4.90	(< 20)
1,2-Dibromo-3-chloropropane	88.3U	409	416	102	409	458	112	61-132	9.40	(< 20)
1,2-Dibromoethane	8.83U	409	428	105	409	430	105	78-122	0.57	(< 20)
1,2-Dichlorobenzene	22.1U	409	393	96	409	405	99	78-121	3.30	(< 20)
1,2-Dichloroethane	8.83U	409	382	93	409	391	96	73-128	2.50	(< 20)
1,2-Dichloropropane	8.83U	409	395	97	409	404	99	76-123	2.40	(< 20)
1,3,5-Trimethylbenzene	22.1U	409	388	95	409	402	98	73-124	3.40	(< 20)
1,3-Dichlorobenzene	22.1U	409	390	96	409	404	99	77-121	3.50	(< 20)
1,3-Dichloropropane	8.83U	409	415	102	409	417	102	77-121	0.43	(< 20)
1,4-Dichlorobenzene	22.1U	409	397	97	409	416	102	75-120	4.40	(< 20)
2,2-Dichloropropane	22.1U	409	430	105	409	431	105	67-133	0.13	(< 20)
2-Butanone (MEK)	221U	1227	1238	101	1227	1308	107	51-148	5.30	(< 20)
2-Chlorotoluene	22.1U	409	394	96	409	408	100	75-122	3.60	(< 20)
2-Hexanone	88.3U	1227	1192	98	1227	1308	107	53-145	8.90	(< 20)
4-Chlorotoluene	22.1U	409	397	97	409	408	100	72-124	2.40	(< 20)
4-Isopropyltoluene	22.1U	409	388	95	409	412	101	73-127	6.10	(< 20)
4-Methyl-2-pentanone (MIBK)	221U	1227	1192	98	1227	1273	104	65-135	6.40	(< 20)
Benzene	11.0U	409	390	96	409	398	97	77-121	2.00	(< 20)
Bromobenzene	22.1U	409	403	99	409	423	104	78-121	4.80	(< 20)
Bromochloromethane	22.1U	409	411	101	409	403	98	78-125	2.20	(< 20)
Bromodichloromethane	22.1U	409	407	99	409	416	102	75-127	2.40	(< 20)
Bromoform	22.1U	409	447	109	409	443	108	67-132	0.92	(< 20)
Bromomethane	177U	409	320	78	409	331	81	53-143	3.50	(< 20)
Carbon disulfide	88.3U	613	457	75	613	447	73	63-132	2.10	(< 20)
Carbon tetrachloride	11.0U	409	409	100	409	418	102	70-135	2.30	(< 20)
Chlorobenzene	22.1U	409	396	97	409	402	98	79-120	1.40	(< 20)
Chloroethane	177U	409	315	77	409	333	82	59-139	5.70	(< 20)

Print Date: 06/28/2017 4:18:49PM

Matrix Spike Summary

Original Sample ID: 1173358003
MS Sample ID: 1392765 MS
MSD Sample ID: 1392766 MSD

Analysis Date: 06/18/2017 21:24
Analysis Date: 06/18/2017 19:00
Analysis Date: 06/18/2017 19:16
Matrix: Soil/Solid (dry weight)

QC for Samples: 1173405001, 1173405002, 1173405003, 1173405004, 1173405005, 1173405006

Results by **SW8260C**

		Matrix Spike (ug/Kg)			Spike Duplicate (ug/Kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Chloroform	22.1U	409	387	94	409	396	97	78-123	2.50	(< 20)
Chloromethane	22.1U	409	291	71	409	418	102	50-136	35.80	* (< 20)
cis-1,2-Dichloroethene	22.1U	409	380	93	409	394	96	77-123	3.60	(< 20)
cis-1,3-Dichloropropene	11.0U	409	425	104	409	435	106	74-126	2.10	(< 20)
Dibromochloromethane	22.1U	409	431	105	409	435	106	74-126	0.85	(< 20)
Dibromomethane	22.1U	409	410	100	409	415	101	78-125	0.96	(< 20)
Dichlorodifluoromethane	44.2U	409	334	82	409	340	83	29-149	2.00	(< 20)
Ethylbenzene	22.1U	409	384	94	409	393	96	76-122	2.10	(< 20)
Freon-113	88.3U	613	485	79	613	489	80	66-136	0.92	(< 20)
Hexachlorobutadiene	17.7U	409	346	85	409	366	89	61-135	5.60	(< 20)
Isopropylbenzene (Cumene)	22.1U	409	389	95	409	400	98	68-134	2.60	(< 20)
Methylene chloride	88.3U	409	386	94	409	391	96	70-128	1.60	(< 20)
Methyl-t-butyl ether	88.3U	613	624	102	613	636	104	73-125	1.90	(< 20)
Naphthalene	22.1U	409	369	90	409	419	103	62-129	12.70	(< 20)
n-Butylbenzene	22.1U	409	371	91	409	394	96	70-128	5.80	(< 20)
n-Propylbenzene	22.1U	409	390	95	409	404	99	73-125	3.70	(< 20)
o-Xylene	22.1U	409	387	94	409	398	97	77-123	3.10	(< 20)
P & M -Xylene	44.2U	818	769	94	818	794	97	77-124	3.30	(< 20)
sec-Butylbenzene	22.1U	409	387	95	409	402	98	73-126	3.90	(< 20)
Styrene	22.1U	409	388	95	409	398	97	76-124	2.60	(< 20)
tert-Butylbenzene	22.1U	409	393	96	409	410	100	73-125	4.10	(< 20)
Tetrachloroethene	11.0U	409	393	96	409	409	100	73-128	4.30	(< 20)
Toluene	22.1U	409	389	95	409	402	98	77-121	3.20	(< 20)
trans-1,2-Dichloroethene	22.1U	409	381	93	409	389	95	74-125	1.90	(< 20)
trans-1,3-Dichloropropene	11.0U	409	453	111	409	450	110	71-130	0.73	(< 20)
Trichloroethene	8.83U	409	395	96	409	404	99	77-123	2.60	(< 20)
Trichlorofluoromethane	44.2U	409	383	94	409	368	90	62-140	3.80	(< 20)
Vinyl acetate	88.3U	409	422	103	409	387	94	50-151	8.90	(< 20)
Vinyl chloride	8.83U	409	307	75	409	314	77	56-135	2.50	(< 20)
Xylenes (total)	66.3U	1227	1154	94	1227	1192	97	78-124	3.20	(< 20)
Surrogates										
1,2-Dichloroethane-D4 (surr)		409	411	101	409	410	100	71-136	0.33	
4-Bromofluorobenzene (surr)		681	555	81	681	581	85	55-151	4.70	
Toluene-d8 (surr)		409	408	100	409	410	100	85-116	0.60	

Print Date: 06/28/2017 4:18:49PM

Matrix Spike Summary

Original Sample ID: 1173358003
MS Sample ID: 1392765 MS
MSD Sample ID: 1392766 MSD

Analysis Date:
Analysis Date: 06/18/2017 19:00
Analysis Date: 06/18/2017 19:16
Matrix: Soil/Solid (dry weight)

QC for Samples: 1173405001, 1173405002, 1173405003, 1173405004, 1173405005, 1173405006

Results by **SW8260C**

		Matrix Spike (%)			Spike Duplicate (%)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL

Batch Information

Analytical Batch: VMS16854
Analytical Method: SW8260C
Instrument: VQA 7890/5975 GC/MS
Analyst: NRO
Analytical Date/Time: 6/18/2017 7:00:00PM

Prep Batch: VXX30710
Prep Method: Vol. Extraction SW8260 Field Extracted L
Prep Date/Time: 6/18/2017 6:00:00AM
Prep Initial Wt./Vol.: 107.13g
Prep Extract Vol: 25.00mL

Print Date: 06/28/2017 4:18:49PM

Method Blank

Blank ID: MB for HBN 1761675 [WXX/11880]
Blank Lab ID: 1392333

Matrix: Soil/Solid (dry weight)

QC for Samples:
1173405002, 1173405003, 1173405004, 1173405005, 1173405006

Results by **SW9060A-Mod**

Parameter	Results	LOQ/CL	DL	Units
Total Organic Carbon	0.0250U	0.0500	0.0150	%

Batch Information

Analytical Batch: WTC2690
Analytical Method: SW9060A-Mod
Instrument: TOC Analyzer
Analyst: K.W
Analytical Date/Time: 6/20/2017 2:42:39PM

Prep Batch: WXX11880
Prep Method: METHOD
Prep Date/Time: 6/20/2017 9:15:00AM
Prep Initial Wt./Vol.: 500 mg
Prep Extract Vol: 1 mL

Print Date: 06/28/2017 4:18:51PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1173405 [WXX11880]
Blank Spike Lab ID: 1392334
Date Analyzed: 06/20/2017 15:36

Spike Duplicate ID: LCSD for HBN 1173405 [WXX11880]
Spike Duplicate Lab ID: 1392335
Matrix: Soil/Solid (dry weight)

QC for Samples: 1173405002, 1173405003, 1173405004, 1173405005, 1173405006

Results by **SW9060A-Mod**

	Blank Spike (%)			Spike Duplicate (%)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Total Organic Carbon	3.35	3.28	98	3.35	3.33	99	(75-125)	1.40	(< 25)

Batch Information

Analytical Batch: **WTC2690**
Analytical Method: **SW9060A-Mod**
Instrument: **TOC Analyzer**
Analyst: **K.W**

Prep Batch: **WXX11880**
Prep Method: **METHOD**
Prep Date/Time: **06/20/2017 09:15**
Spike Init Wt./Vol.: 3.35 % Extract Vol: 1 mL
Dupe Init Wt./Vol.: 3.35 % Extract Vol: 1 mL

Print Date: 06/28/2017 4:18:53PM

Matrix Spike Summary

Original Sample ID: 1173405002
MS Sample ID: 1392336 MS
MSD Sample ID:

Analysis Date: 06/20/2017 16:18
Analysis Date: 06/20/2017 16:38
Analysis Date:
Matrix: Soil/Solid (dry weight)

QC for Samples: 1173405002, 1173405003, 1173405004, 1173405005, 1173405006

Results by **SW9060A-Mod**

		Matrix Spike (%)				Spike Duplicate (%)					
Parameter	Sample	Spike	Result	Rec (%)		Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Total Organic Carbon	0.805	0.255	0.716	-35	*				75-125		

Batch Information

Analytical Batch: WTC2690
Analytical Method: SW9060A-Mod
Instrument: TOC Analyzer
Analyst: K.W
Analytical Date/Time: 6/20/2017 4:38:18PM

Prep Batch: WXX11880
Prep Method: TOC Soils Prep (S)
Prep Date/Time: 6/20/2017 9:15:00AM
Prep Initial Wt./Vol.: 438.50mg
Prep Extract Vol: 1.00mL

Print Date: 06/28/2017 4:18:54PM

Method Blank

Blank ID: MB for HBN 1762036 [XXX/37707]
Blank Lab ID: 1393622

Matrix: Soil/Solid (dry weight)

QC for Samples:
1173405002, 1173405003, 1173405004, 1173405005, 1173405006

Results by **AK102**

Parameter	Results	LOQ/CL	DL	Units
Diesel Range Organics	10.0U	20.0	6.20	mg/Kg
Surrogates				
5a Androstane (surr)	83.3	60-120		%

Batch Information

Analytical Batch: XFC13483
Analytical Method: AK102
Instrument: Agilent 7890B F
Analyst: KMD
Analytical Date/Time: 6/27/2017 7:04:00PM

Prep Batch: XXX37707
Prep Method: SW3550C
Prep Date/Time: 6/26/2017 2:29:43PM
Prep Initial Wt./Vol.: 30 g
Prep Extract Vol: 1 mL

Print Date: 06/28/2017 4:18:55PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1173405 [XXX37707]
Blank Spike Lab ID: 1393623
Date Analyzed: 06/27/2017 19:14

Spike Duplicate ID: LCSD for HBN 1173405 [XXX37707]
Spike Duplicate Lab ID: 1393624
Matrix: Soil/Solid (dry weight)

QC for Samples: 1173405002, 1173405003, 1173405004, 1173405005, 1173405006

Results by **AK102**

	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Diesel Range Organics	167	137	82	167	137	82	(75-125)	0.55	(< 20)
Surrogates									
5a Androstane (surr)	3.33	99.4	99	3.33	99.4	99	(60-120)	0.05	

Batch Information

Analytical Batch: **XFC13483**
Analytical Method: **AK102**
Instrument: **Agilent 7890B F**
Analyst: **KMD**

Prep Batch: **XXX37707**
Prep Method: **SW3550C**
Prep Date/Time: **06/26/2017 14:29**
Spike Init Wt./Vol.: 167 mg/Kg Extract Vol: 1 mL
Dupe Init Wt./Vol.: 167 mg/Kg Extract Vol: 1 mL

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Method Blank

Blank ID: MB for HBN 1762036 [XXX/37707]
Blank Lab ID: 1393622

Matrix: Soil/Solid (dry weight)

QC for Samples:
1173405002, 1173405003, 1173405004, 1173405005, 1173405006

Results by **AK103**

Parameter	Results	LOQ/CL	DL	Units
Residual Range Organics	10.0U	20.0	6.20	mg/Kg
Surrogates				
n-Triacontane-d62 (surr)	90.9	60-120		%

Batch Information

Analytical Batch: XFC13483
Analytical Method: AK103
Instrument: Agilent 7890B F
Analyst: KMD
Analytical Date/Time: 6/27/2017 7:04:00PM

Prep Batch: XXX37707
Prep Method: SW3550C
Prep Date/Time: 6/26/2017 2:29:43PM
Prep Initial Wt./Vol.: 30 g
Prep Extract Vol: 1 mL

Print Date: 06/28/2017 4:18:59PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1173405 [XXX37707]
Blank Spike Lab ID: 1393623
Date Analyzed: 06/27/2017 19:14

Spike Duplicate ID: LCSD for HBN 1173405 [XXX37707]
Spike Duplicate Lab ID: 1393624
Matrix: Soil/Solid (dry weight)

QC for Samples: 1173405002, 1173405003, 1173405004, 1173405005, 1173405006

Results by **AK103**

	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Residual Range Organics	167	135	81	167	135	81	(60-120)	0.23	(< 20)
Surrogates									
n-Triacontane-d62 (surr)	3.33	108	108	3.33	106	106	(60-120)	1.20	

Batch Information

Analytical Batch: **XFC13483**
Analytical Method: **AK103**
Instrument: **Agilent 7890B F**
Analyst: **KMD**

Prep Batch: **XXX37707**
Prep Method: **SW3550C**
Prep Date/Time: **06/26/2017 14:29**
Spike Init Wt./Vol.: 167 mg/Kg Extract Vol: 1 mL
Dupe Init Wt./Vol.: 167 mg/Kg Extract Vol: 1 mL

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SGS

SGS Environmental Services Inc.
CHAIN OF CUSTODY RECORD

1173405

CLIENT:	AGVIQ LLC		
CONTACT:	GLORIA BECKMAN	PHONE NO:	907-365-6299
PROJECT:	BARROW SOUTH PAD	SITE/PWSID#:	4430
REPORTS TO:	GLORIA BECKMAN	E-MAIL:	gbeckman@tikigaq.com
INVOICE TO:	DIANE KINKA	QUOTE #:	?
		P.O. #:	?

SGS Reference #:

page 01 of 01

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX CODE	# CONTAINERS	Preserv Used / SAMPLE TYPE C = COMP G = GRAB Multi Incremental Samples	GRO (AK101) MeOH	VOCs (SW8260B) MeOH	DRO/RRO (AK102/103) NONE	Total Organic Carbon (9060) NONE						REMARKS/ LOC ID
1A	17-BRWSP-TB-01	6/13/2017	13:45	SO-P	1	G =	X	X								
2A-B	17-BRWSP-TP-01-2'	6/13/2017	14:00	SO-P	2	G =	X	X	X	X						
3A-B	17-BRWSP-TPZ-01-2'	6/13/2017	14:05	SO-P	2	G =	X	X	X	X						
4A-B	17-BRWSP-TP-02-2'	6/13/2017	14:15	SO-P	2	G =	X	X	X	X						
5A-B	17-BRWSP-TP-03-2'	6/13/2017	14:25	SO-P	2	G =	X	X	X	X						
6A-B	17-BRWSP-TP-04-2'	6/13/2017	14:35	SO-P	2	G =	X	X	X	X						

Collected/Relinquished By: (1) BRANDON MALONEY	Date 6/15/2017	Time 12:30	Received By:
Relinquished By: (2)	Date 6/15/2017	Time 12:30	Received By:
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	Date 6/15/17	Time 1250	Received For Laboratory By:

DOD Project? NO

Special Deliverable Requirements:

Cooler ID 01

Requested Turnaround Time and-or Special Instructions:
Standard TAT

Samples Received Cold? YES NO Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Cooler TB

Temperature °C: 5.1 DIL

IF

HD

200 W. Potter Drive **Anchorage, AK 99518** Tel: (907) 562-2343 Fax: (907) 561-5301
5500 Business Drive **Wilmington, NC 28405** Tel: (910) 350-1903 Fax: (910) 350-1557

F016_SGS_COC_electronic.xls
rev 09/12/2008

e-Sample Receipt Form

SGS Workorder #: **1173405**

1 1 7 3 4 0 5

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
Chain of Custody / Temperature Requirements		N/A Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	Yes	1F
COC accompanied samples?	Yes	
N/A **Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	Yes	Cooler ID: 1 @ 5.1 °C Therm. ID: D11
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
If >6°C, were samples collected <8 hours ago?	N/A	
If <0°C, were sample containers ice free?	N/A	
If samples received without a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "**COOLER TEMP**" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note "ambient" or "chilled".		
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
Holding Time / Documentation / Sample Condition Requirements		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Were samples received within holding time?	Yes	
Do samples **match COC**** (i.e.,sample IDs,dates/times collected)? **Note: If times differ <1hr, record details & login per COC.	Yes	
Were analyses requested unambiguous? (i.e., method is specified for analyses with >1 option for analysis)	Yes	
		N/A ***Exemption permitted for metals (e.g,200.8/6020A).
Were proper containers (type/mass/volume/preservative***)used?	Yes	
Volatile / LL-Hg Requirements		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	Yes	
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	N/A	
Were all soil VOAs field extracted with MeOH+BFB?	Yes	

Note to Client: Any "No", answer above indicates non-compliance with standard procedures and may impact data quality.

Additional notes (if applicable):

F1020_SRFpm_20170131

Sample Containers and Preservatives

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1173405001-A	Methanol field pres. 4 C	OK			
1173405002-A	No Preservative Required	OK			
1173405002-B	Methanol field pres. 4 C	OK			
1173405003-A	No Preservative Required	OK			
1173405003-B	Methanol field pres. 4 C	OK			
1173405004-A	No Preservative Required	OK			
1173405004-B	Methanol field pres. 4 C	OK			
1173405005-A	No Preservative Required	OK			
1173405005-B	Methanol field pres. 4 C	OK			
1173405006-A	No Preservative Required	OK			
1173405006-B	Methanol field pres. 4 C	OK			

Container Condition Glossary

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates than an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.
BU - The container was received with headspace greater than 6mm.
DM- The container was received damaged.
FR- The container was received frozen and not usable for Bacteria or BOD analyses.
PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.
PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

Laboratory Data Review Checklist

Completed By:

Melissa Pike

Title:

Mid-Level Scientist/Project Chemist

Date:

11/22/2017

CS Report Name:

Barrow South Pad

Report Date:

December 2017

Consultant Firm:

Agviq LLC

Laboratory Name:

SGS North America, Inc.

Laboratory Report Number:

1173405

ADEC File Number:

310.38.028

Hazard Identification Number:

1173405

1. Laboratory

   a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?

   ◉ Yes ○ No Comments:

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   ○ Yes ◉ No Comments:

   NA. No samples were transferred or subcontracted to an alternate laboratory.

2. Chain of Custody (CoC)

   a. CoC information completed, signed, and dated (including released/received by)?

   ◉ Yes ○ No Comments:

   b. Correct Analyses requested?

   ◉ Yes ○ No Comments:

3. Laboratory Sample Receipt Documentation

   a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

   ◉ Yes ○ No Comments:

   Samples arrived at 5.1°C.

   b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

   ◉ Yes ○ No Comments:

   c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

   ◉ Yes ○ No Comments:

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

○ Yes ◉ No Comments:

NA - No discrepancies.

e. Data quality or usability affected?

Comments:

Data is acceptable.

4. Case Narrative

a. Present and understandable?

◉ Yes ○ No Comments:

b. Discrepancies, errors, or QC failures identified by the lab?

◉ Yes ○ No Comments:

TOC MS percent recovery (%R) was below the QC criteria; and the Chloromethane MSD RPD was outside quality control limits.

c. Were all corrective actions documented?

○ Yes ◉ No Comments:

Corrective action was not required when samples were diluted or matrix interference was observed.

d. What is the effect on data quality/usability according to the case narrative?

Comments:

Data quality and usability is not affected with respect to the case narrative report.

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

◉ Yes ○ No Comments:

b. All applicable holding times met?

◉ Yes ○ No Comments:

c. All soils reported on a dry weight basis?

(●) Yes ( ) No Comments:

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

(●) Yes ( ) No Comments:

e. Data quality or usability affected?

( ) Yes (●) No Comments:

Data quality and usability is not affected with respect to the reported sample results.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

(●) Yes ( ) No Comments:

ii. All method blank results less than limit of quantitation (LOQ)?

(●) Yes ( ) No Comments:

iii. If above LOQ, what samples are affected?

Comments:

NA – MB results were < LOQ.

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

( ) Yes (●) No Comments:

NA – MB results were < LOQ.

v. Data quality or usability affected?

Comments:

Data quality and usability is not affected with respect to the reported method blank sample results.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

(●) Yes ( ) No Comments:

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

( ) Yes (●) No Comments:

NA – only organics analyzed.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

( ) Yes (●) No Comments:

TOC MS percent recovery (%R) was below the QC criteria.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

( ) Yes (●) No Comments:

Chloromethane MSD RPD was outside quality control limits

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

TOC: 17-BRWSP-TP-01-2', 17-BRWSP-TPZ-01-02', 17-BRWSP-TP-0-2-2', 17-BRWSP-TP-03-2' , and 17-BRWSP-TP-04-2'.
Chloromethane: all samples within the data package.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

(●) Yes ( ) No Comments:

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

Associated LCS/LCSD results were within limits and used to assess accuracy and precision. No data was qualified. Data quality and usability is not affected.

c. Surrogates – Organics Only

i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?

(•) Yes ( ) No Comments:

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

(•) Yes ( ) No Comments:

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

( ) Yes (•) No Comments:

NA. All surrogate results are within quality control criteria.

iv. Data quality or usability affected?

Comments:

Data quality and usability is not affected with respect to the surrogate results.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?
(If not, enter explanation below.)

(•) Yes ( ) No Comments:

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

(•) Yes ( ) No Comments:

iii. All results less than LOQ?

( ) Yes (•) No Comments:

Benzene (7.70J ug/Kg); Ethylbenzene (7.70J ug/Kg); o-Xylene (6.35J ug/Kg); p&m-xylene (15.0J ug/Kg); Toluene (8.66J ug/Kg); and Xylenes, total (24.1J ug/Kg).

iv. If above LOQ, what samples are affected?

Comments:

All samples within the data package are potentially affected.

v. Data quality or usability affected?

Comments:

Data quality and usability is somewhat affected. Associated benzene, ethylbenzene, and xylene results, that were reported greater than the detection limit and less than the LOQ, are considered not detected (UB) at the LOQ due to blank contamination.

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

(•) Yes ( ) No Comments:

Primary 17-BRWSP-TP-01-2' with duplicate 17-BRWSP-TPZ-01-02'.

ii. Submitted blind to lab?

(•) Yes ( ) No Comments:

iii. Precision – All relative percent differences (RPD) less than specified DQOs? (Recommended: 30% water, 50% soil)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

( ) Yes (•) No Comments:

RRO (58.67%)

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality and usability is somewhat affected. The RRO results in the primary and duplicate are considered estimated (JD) due to duplicate RPD imprecision.

f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).

( ) Yes ( ) No (•) Not Applicable

NA – Disposable sampling equipment was used.

i. All results less than LOQ?

○ Yes ◉ No Comments:

NA – Disposable sampling equipment was used.

ii. If above LOQ, what samples are affected?

Comments:

NA – Disposable sampling equipment was used.

iii. Data quality or usability affected?

Comments:

NA – Disposable sampling equipment was used.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

◉ Yes ○ No Comments:

Lab flags were defined in lab report and validator flags were defined above.

Laboratory Report of Analysis

To: AGVIQ LLC
301 W. Northern Lights Blvd Ste. 660
Anchorage, AK 99507
(907)365-6230

Report Number: **1174638**

Client Project: **Barrow South Pad**

Dear Gloria Beckman,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of ten years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

If there are any questions about the report or services performed during this project, please call Forest at (907) 562-2343. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,
SGS North America Inc.

Forest Taylor Date
Project Manager
Forest.Taylor@sgs.com

Print Date: 07/24/2017 2:01:32PM

Case Narrative

SGS Client: **AGVIQ LLC**
SGS Project: **1174638**
Project Name/Site: **Barrow South Pad**
Project Contact: **Gloria Beckman**

Refer to sample receipt form for information on sample condition.

17-BRWSP-TP-03-4.5' MS (1174638006) BMS

8260C - BMS recovery for trichlorofluoromethane (144%) does not meet QC criteria. Refer to LCS for accuracy.

17-BRWSP-TP-03-4.5' MSD (1174638007) BMSD

8260C - BMSD RPD for several analytes do not meet QC criteria. Results for these analytes are estimated in the associated samples..

1174638005MS (1399921) MS

8260C - MS recovery for trichlorofluoromethane (144%) does not meet QC criteria. Refer to LCS for accuracy.

1174638005MSD (1399922) MSD

8260C - MSD RPD for several analytes do not meet QC criteria. Results for these analytes are estimated in the associated samples..

*QC comments may be associated with the field samples found in this report. When applicable, comments will be applied to associated field samples.

SGS North America Inc.
200 West Potter Drive, Anchorage, AK 99518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Laboratory Qualifiers

Enclosed are the analytical results associated with the above work order. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. This document is issued by the Company under its General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>. Attention is drawn to the limitation of liability, indenmification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the context or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & UST-005 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8015C, 8021B, 8082A, 8260C, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

The following descriptors or qualifiers may be found in your report:

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
DF	Analytical Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LLQC/LLIQC	Low Level Quantitation Check
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
RPD	Relative Percent Difference
U	Indicates the analyte was analyzed for but not detected.

Note: Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content. All DRO/RRO analyses are integrated per SOP.

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Sample Summary

Client Sample ID	Lab Sample ID	Collected	Received	Matrix
17-BRWSP-TB-02	1174638001	07/18/2017	07/19/2017	Soil/Solid (dry weight)
17-BRWSP-TP-01-4.5'	1174638002	07/18/2017	07/19/2017	Soil/Solid (dry weight)
17-BRWSP-TPZ-02-4.5'	1174638003	07/18/2017	07/19/2017	Soil/Solid (dry weight)
17-BRWSP-TP-02-4.5'	1174638004	07/18/2017	07/19/2017	Soil/Solid (dry weight)
17-BRWSP-TP-03-4.5'	1174638005	07/18/2017	07/19/2017	Soil/Solid (dry weight)
17-BRWSP-TP-03-4.5' MS	1174638006	07/18/2017	07/19/2017	Soil/Solid (dry weight)
17-BRWSP-TP-03-4.5' MSD	1174638007	07/18/2017	07/19/2017	Soil/Solid (dry weight)
17-BRWSP-TP-04-4.5'	1174638008	07/18/2017	07/19/2017	Soil/Solid (dry weight)

Method	Method Description
AK102	Diesel/Residual Range Organics
AK103	Diesel/Residual Range Organics
AK101	Gasoline Range Organics (S)
SM21 2540G	Percent Solids SM2540G
SW9060A-Mod	Total Organic Carbon-M in Soil
SW8260C	VOC 8260 (S) Field Extracted

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Detectable Results Summary

Client Sample ID: **17-BRWSP-TB-02**
Lab Sample ID: 1174638001

	Parameter	Result	Units
Volatile GC/MS	Benzene	3.66J	ug/Kg

Client Sample ID: **17-BRWSP-TP-01-4.5'**
Lab Sample ID: 1174638002

	Parameter	Result	Units
Volatile GC/MS	1,2,4-Trimethylbenzene	34.5J	ug/Kg
	Ethylbenzene	9.51J	ug/Kg
	Naphthalene	100	ug/Kg
	n-Propylbenzene	16.9J	ug/Kg
Waters Department	Total Organic Carbon	0.168	%

Client Sample ID: **17-BRWSP-TPZ-02-4.5'**
Lab Sample ID: 1174638003

	Parameter	Result	Units
Volatile GC/MS	1,2,4-Trimethylbenzene	34.2J	ug/Kg
	Ethylbenzene	10.6J	ug/Kg
	Naphthalene	116	ug/Kg
	n-Propylbenzene	19.1J	ug/Kg
Waters Department	Total Organic Carbon	0.0824	%

Client Sample ID: **17-BRWSP-TP-02-4.5'**
Lab Sample ID: 1174638004

	Parameter	Result	Units
Volatile Fuels	Gasoline Range Organics	1.27J	mg/Kg
Volatile GC/MS	1,3,5-Trimethylbenzene	15.9J	ug/Kg
	4-Isopropyltoluene	22.2J	ug/Kg
	Naphthalene	27.3J	ug/Kg
	n-Propylbenzene	11.1J	ug/Kg
	P & M -Xylene	27.9J	ug/Kg
	Xylenes (total)	27.9J	ug/Kg
Waters Department	Total Organic Carbon	0.0779	%

Client Sample ID: **17-BRWSP-TP-03-4.5'**
Lab Sample ID: 1174638005

	Parameter	Result	Units
Semivolatile Organic Fuels	Residual Range Organics	24.5	mg/Kg
Waters Department	Total Organic Carbon	0.170	%

Client Sample ID: **17-BRWSP-TP-04-4.5'**
Lab Sample ID: 1174638008

	Parameter	Result	Units
Semivolatile Organic Fuels	Diesel Range Organics	7.42J	mg/Kg
	Residual Range Organics	60.3	mg/Kg
Volatile GC/MS	Benzene	7.68J	ug/Kg
	Carbon tetrachloride	10.6J	ug/Kg
	Chloromethane	10.9J	ug/Kg
	Tetrachloroethene	5.61J	ug/Kg
	Toluene	9.45J	ug/Kg
	Trichloroethene	6.20J	ug/Kg
Waters Department	Total Organic Carbon	0.985	%

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Results of **17-BRWSP-TB-02**

Client Sample ID: **17-BRWSP-TB-02**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1174638001
Lab Project ID: 1174638

Collection Date: 07/18/17 10:45
Received Date: 07/19/17 17:02
Matrix: Soil/Solid (dry weight)
Solids (%):
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	0.965	U	1.93	0.579	mg/Kg	1		07/20/17 17:41
Surrogates								
4-Bromofluorobenzene (surr)	82.1		50-150		%	1		07/20/17 17:41

Batch Information

Analytical Batch: VFC13763
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 07/20/17 17:41
Container ID: 1174638001-A

Prep Batch: VXX30918
Prep Method: SW5035A
Prep Date/Time: 07/18/17 10:45
Prep Initial Wt./Vol.: 64.822 g
Prep Extract Vol: 25 mL

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Results of **17-BRWSP-TB-02**

Client Sample ID: **17-BRWSP-TB-02**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1174638001
Lab Project ID: 1174638

Collection Date: 07/18/17 10:45
Received Date: 07/19/17 17:02
Matrix: Soil/Solid (dry weight)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	7.70	U	15.4	4.78	ug/Kg	1		07/20/17 19:20
1,1,1-Trichloroethane	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
1,1,2,2-Tetrachloroethane	4.82	U	9.64	3.01	ug/Kg	1		07/20/17 19:20
1,1,2-Trichloroethane	3.86	U	7.71	2.39	ug/Kg	1		07/20/17 19:20
1,1-Dichloroethane	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
1,1-Dichloroethene	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
1,1-Dichloropropene	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
1,2,3-Trichlorobenzene	19.3	U	38.6	11.6	ug/Kg	1		07/20/17 19:20
1,2,3-Trichloropropane	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
1,2,4-Trichlorobenzene	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
1,2,4-Trimethylbenzene	19.3	U	38.6	11.6	ug/Kg	1		07/20/17 19:20
1,2-Dibromo-3-chloropropane	38.5	U	77.1	23.9	ug/Kg	1		07/20/17 19:20
1,2-Dibromoethane	3.86	U	7.71	2.39	ug/Kg	1		07/20/17 19:20
1,2-Dichlorobenzene	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
1,2-Dichloroethane	3.86	U	7.71	2.39	ug/Kg	1		07/20/17 19:20
1,2-Dichloropropane	3.86	U	7.71	2.39	ug/Kg	1		07/20/17 19:20
1,3,5-Trimethylbenzene	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
1,3-Dichlorobenzene	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
1,3-Dichloropropane	3.86	U	7.71	2.39	ug/Kg	1		07/20/17 19:20
1,4-Dichlorobenzene	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
2,2-Dichloropropane	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
2-Butanone (MEK)	96.5	U	193	60.2	ug/Kg	1		07/20/17 19:20
2-Chlorotoluene	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
2-Hexanone	38.5	U	77.1	23.9	ug/Kg	1		07/20/17 19:20
4-Chlorotoluene	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
4-Isopropyltoluene	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
4-Methyl-2-pentanone (MIBK)	96.5	U	193	60.2	ug/Kg	1		07/20/17 19:20
Benzene	3.66	J	9.64	3.01	ug/Kg	1		07/20/17 19:20
Bromobenzene	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
Bromochloromethane	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
Bromodichloromethane	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
Bromoform	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
Bromomethane	77.0	U	154	47.8	ug/Kg	1		07/20/17 19:20
Carbon disulfide	38.5	U	77.1	23.9	ug/Kg	1		07/20/17 19:20
Carbon tetrachloride	4.82	U	9.64	3.01	ug/Kg	1		07/20/17 19:20
Chlorobenzene	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
Chloroethane	77.0	U	154	47.8	ug/Kg	1		07/20/17 19:20

J flagging is activated

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Results of **17-BRWSP-TB-02**

Client Sample ID: **17-BRWSP-TB-02**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1174638001
Lab Project ID: 1174638

Collection Date: 07/18/17 10:45
Received Date: 07/19/17 17:02
Matrix: Soil/Solid (dry weight)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroform	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
Chloromethane	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
cis-1,2-Dichloroethene	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
cis-1,3-Dichloropropene	4.82	U	9.64	3.01	ug/Kg	1		07/20/17 19:20
Dibromochloromethane	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
Dibromomethane	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
Dichlorodifluoromethane	19.3	U	38.6	11.6	ug/Kg	1		07/20/17 19:20
Ethylbenzene	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
Freon-113	38.5	U	77.1	23.9	ug/Kg	1		07/20/17 19:20
Hexachlorobutadiene	7.70	U	15.4	4.78	ug/Kg	1		07/20/17 19:20
Isopropylbenzene (Cumene)	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
Methylene chloride	38.5	U	77.1	23.9	ug/Kg	1		07/20/17 19:20
Methyl-t-butyl ether	38.5	U	77.1	23.9	ug/Kg	1		07/20/17 19:20
Naphthalene	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
n-Butylbenzene	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
n-Propylbenzene	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
o-Xylene	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
P & M -Xylene	19.3	U	38.6	11.6	ug/Kg	1		07/20/17 19:20
sec-Butylbenzene	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
Styrene	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
tert-Butylbenzene	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
Tetrachloroethene	4.82	U	9.64	3.01	ug/Kg	1		07/20/17 19:20
Toluene	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
trans-1,2-Dichloroethene	9.65	U	19.3	6.02	ug/Kg	1		07/20/17 19:20
trans-1,3-Dichloropropene	4.82	U	9.64	3.01	ug/Kg	1		07/20/17 19:20
Trichloroethene	3.86	U	7.71	2.39	ug/Kg	1		07/20/17 19:20
Trichlorofluoromethane	19.3	U	38.6	11.6	ug/Kg	1		07/20/17 19:20
Vinyl acetate	38.5	U	77.1	23.9	ug/Kg	1		07/20/17 19:20
Vinyl chloride	3.86	U	7.71	2.39	ug/Kg	1		07/20/17 19:20
Xylenes (total)	28.9	U	57.9	17.6	ug/Kg	1		07/20/17 19:20
Surrogates								
1,2-Dichloroethane-D4 (surr)	119		71-136		%	1		07/20/17 19:20
4-Bromofluorobenzene (surr)	119		55-151		%	1		07/20/17 19:20
Toluene-d8 (surr)	97		85-116		%	1		07/20/17 19:20

Print Date: 07/24/2017 2:01:39PM

J flagging is activated

Results of **17-BRWSP-TB-02**

Client Sample ID: **17-BRWSP-TB-02**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1174638001
Lab Project ID: 1174638

Collection Date: 07/18/17 10:45
Received Date: 07/19/17 17:02
Matrix: Soil/Solid (dry weight)
Solids (%):
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS16965
Analytical Method: SW8260C
Analyst: NRO
Analytical Date/Time: 07/20/17 19:20
Container ID: 1174638001-A

Prep Batch: VXX30883
Prep Method: SW5035A
Prep Date/Time: 07/18/17 10:45
Prep Initial Wt./Vol.: 64.822 g
Prep Extract Vol: 25 mL

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Results of **17-BRWSP-TP-01-4.5'**

Client Sample ID: **17-BRWSP-TP-01-4.5'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1174638002
Lab Project ID: 1174638

Collection Date: 07/18/17 11:00
Received Date: 07/19/17 17:02
Matrix: Soil/Solid (dry weight)
Solids (%):92.9
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	10.7	U	21.4	6.63	mg/Kg	1		07/20/17 14:58
Surrogates								
5a Androstane (surr)	86.1		50-150		%	1		07/20/17 14:58

Batch Information

Analytical Batch: XFC13574
Analytical Method: AK102
Analyst: JMG
Analytical Date/Time: 07/20/17 14:58
Container ID: 1174638002-A

Prep Batch: XXX37923
Prep Method: SW3550C
Prep Date/Time: 07/20/17 09:38
Prep Initial Wt./Vol.: 30.229 g
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	10.7	U	21.4	6.63	mg/Kg	1		07/20/17 14:58
Surrogates								
n-Triacontane-d62 (surr)	90.8		50-150		%	1		07/20/17 14:58

Batch Information

Analytical Batch: XFC13574
Analytical Method: AK103
Analyst: JMG
Analytical Date/Time: 07/20/17 14:58
Container ID: 1174638002-A

Prep Batch: XXX37923
Prep Method: SW3550C
Prep Date/Time: 07/20/17 09:38
Prep Initial Wt./Vol.: 30.229 g
Prep Extract Vol: 1 mL

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Results of **17-BRWSP-TP-01-4.5'**

Client Sample ID: **17-BRWSP-TP-01-4.5'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1174638002
Lab Project ID: 1174638

Collection Date: 07/18/17 11:00
Received Date: 07/19/17 17:02
Matrix: Soil/Solid (dry weight)
Solids (%):92.9
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.49	U	2.97	0.892	mg/Kg	1		07/20/17 20:29
Surrogates								
4-Bromofluorobenzene (surr)	91.5		50-150		%	1		07/20/17 20:29

Batch Information

Analytical Batch: VFC13763
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 07/20/17 20:29
Container ID: 1174638002-B

Prep Batch: VXX30918
Prep Method: SW5035A
Prep Date/Time: 07/18/17 11:00
Prep Initial Wt./Vol.: 52.007 g
Prep Extract Vol: 28.7106 mL

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Results of **17-BRWSP-TP-01-4.5'**

Client Sample ID: **17-BRWSP-TP-01-4.5'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1174638002
Lab Project ID: 1174638

Collection Date: 07/18/17 11:00
Received Date: 07/19/17 17:02
Matrix: Soil/Solid (dry weight)
Solids (%):92.9
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	11.9	U	23.8	7.37	ug/Kg	1		07/20/17 20:24
1,1,1-Trichloroethane	14.9	U	29.7	9.27	ug/Kg	1		07/20/17 20:24
1,1,2,2-Tetrachloroethane	7.45	U	14.9	4.64	ug/Kg	1		07/20/17 20:24
1,1,2-Trichloroethane	5.95	U	11.9	3.69	ug/Kg	1		07/20/17 20:24
1,1-Dichloroethane	14.9	U	29.7	9.27	ug/Kg	1		07/20/17 20:24
1,1-Dichloroethene	14.9	U	29.7	9.27	ug/Kg	1		07/20/17 20:24
1,1-Dichloropropene	14.9	U	29.7	9.27	ug/Kg	1		07/20/17 20:24
1,2,3-Trichlorobenzene	29.7	U	59.4	17.8	ug/Kg	1		07/20/17 20:24
1,2,3-Trichloropropane	14.9	U	29.7	9.27	ug/Kg	1		07/20/17 20:24
1,2,4-Trichlorobenzene	14.9	U	29.7	9.27	ug/Kg	1		07/20/17 20:24
1,2,4-Trimethylbenzene	34.5	J	59.4	17.8	ug/Kg	1		07/20/17 20:24
1,2-Dibromo-3-chloropropane	59.5	U	119	36.9	ug/Kg	1		07/20/17 20:24
1,2-Dibromoethane	5.95	U	11.9	3.69	ug/Kg	1		07/20/17 20:24
1,2-Dichlorobenzene	14.9	U	29.7	9.27	ug/Kg	1		07/20/17 20:24
1,2-Dichloroethane	5.95	U	11.9	3.69	ug/Kg	1		07/20/17 20:24
1,2-Dichloropropane	5.95	U	11.9	3.69	ug/Kg	1		07/20/17 20:24
1,3,5-Trimethylbenzene	14.9	U	29.7	9.27	ug/Kg	1		07/20/17 20:24
1,3-Dichlorobenzene	14.9	U	29.7	9.27	ug/Kg	1		07/20/17 20:24
1,3-Dichloropropane	5.95	U	11.9	3.69	ug/Kg	1		07/20/17 20:24
1,4-Dichlorobenzene	14.9	U	29.7	9.27	ug/Kg	1		07/20/17 20:24
2,2-Dichloropropane	14.9	U	29.7	9.27	ug/Kg	1		07/20/17 20:24
2-Butanone (MEK)	149	U	297	92.7	ug/Kg	1		07/20/17 20:24
2-Chlorotoluene	14.9	U	29.7	9.27	ug/Kg	1		07/20/17 20:24
2-Hexanone	59.5	U	119	36.9	ug/Kg	1		07/20/17 20:24
4-Chlorotoluene	14.9	U	29.7	9.27	ug/Kg	1		07/20/17 20:24
4-Isopropyltoluene	14.9	U	29.7	9.27	ug/Kg	1		07/20/17 20:24
4-Methyl-2-pentanone (MIBK)	149	U	297	92.7	ug/Kg	1		07/20/17 20:24
Benzene	7.45	U	14.9	4.64	ug/Kg	1		07/20/17 20:24
Bromobenzene	14.9	U	29.7	9.27	ug/Kg	1		07/20/17 20:24
Bromochloromethane	14.9	U	29.7	9.27	ug/Kg	1		07/20/17 20:24
Bromodichloromethane	14.9	U	29.7	9.27	ug/Kg	1		07/20/17 20:24
Bromoform	14.9	U	29.7	9.27	ug/Kg	1		07/20/17 20:24
Bromomethane	119	U	238	73.7	ug/Kg	1		07/20/17 20:24
Carbon disulfide	59.5	U	119	36.9	ug/Kg	1		07/20/17 20:24
Carbon tetrachloride	7.45	U	14.9	4.64	ug/Kg	1		07/20/17 20:24
Chlorobenzene	14.9	U	29.7	9.27	ug/Kg	1		07/20/17 20:24
Chloroethane	119	U	238	73.7	ug/Kg	1		07/20/17 20:24

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Results of **17-BRWSP-TP-01-4.5'**

Client Sample ID: **17-BRWSP-TP-01-4.5'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1174638002
Lab Project ID: 1174638

Collection Date: 07/18/17 11:00
Received Date: 07/19/17 17:02
Matrix: Soil/Solid (dry weight)
Solids (%):92.9
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroform	14.9	U	29.7	9.27	ug/Kg	1		07/20/17 20:24
Chloromethane	14.9	U	29.7	9.27	ug/Kg	1		07/20/17 20:24
cis-1,2-Dichloroethene	14.9	U	29.7	9.27	ug/Kg	1		07/20/17 20:24
cis-1,3-Dichloropropene	7.45	U	14.9	4.64	ug/Kg	1		07/20/17 20:24
Dibromochloromethane	14.9	U	29.7	9.27	ug/Kg	1		07/20/17 20:24
Dibromomethane	14.9	U	29.7	9.27	ug/Kg	1		07/20/17 20:24
Dichlorodifluoromethane	29.7	U	59.4	17.8	ug/Kg	1		07/20/17 20:24
Ethylbenzene	9.51	J	29.7	9.27	ug/Kg	1		07/20/17 20:24
Freon-113	59.5	U	119	36.9	ug/Kg	1		07/20/17 20:24
Hexachlorobutadiene	11.9	U	23.8	7.37	ug/Kg	1		07/20/17 20:24
Isopropylbenzene (Cumene)	14.9	U	29.7	9.27	ug/Kg	1		07/20/17 20:24
Methylene chloride	59.5	U	119	36.9	ug/Kg	1		07/20/17 20:24
Methyl-t-butyl ether	59.5	U	119	36.9	ug/Kg	1		07/20/17 20:24
Naphthalene	100		29.7	9.27	ug/Kg	1		07/20/17 20:24
n-Butylbenzene	14.9	U	29.7	9.27	ug/Kg	1		07/20/17 20:24
n-Propylbenzene	16.9	J	29.7	9.27	ug/Kg	1		07/20/17 20:24
o-Xylene	14.9	U	29.7	9.27	ug/Kg	1		07/20/17 20:24
P & M -Xylene	29.7	U	59.4	17.8	ug/Kg	1		07/20/17 20:24
sec-Butylbenzene	14.9	U	29.7	9.27	ug/Kg	1		07/20/17 20:24
Styrene	14.9	U	29.7	9.27	ug/Kg	1		07/20/17 20:24
tert-Butylbenzene	14.9	U	29.7	9.27	ug/Kg	1		07/20/17 20:24
Tetrachloroethene	7.45	U	14.9	4.64	ug/Kg	1		07/20/17 20:24
Toluene	14.9	U	29.7	9.27	ug/Kg	1		07/20/17 20:24
trans-1,2-Dichloroethene	14.9	U	29.7	9.27	ug/Kg	1		07/20/17 20:24
trans-1,3-Dichloropropene	7.45	U	14.9	4.64	ug/Kg	1		07/20/17 20:24
Trichloroethene	5.95	U	11.9	3.69	ug/Kg	1		07/20/17 20:24
Trichlorofluoromethane	29.7	U	59.4	17.8	ug/Kg	1		07/20/17 20:24
Vinyl acetate	59.5	U	119	36.9	ug/Kg	1		07/20/17 20:24
Vinyl chloride	5.95	U	11.9	3.69	ug/Kg	1		07/20/17 20:24
Xylenes (total)	44.6	U	89.2	27.1	ug/Kg	1		07/20/17 20:24
Surrogates								
1,2-Dichloroethane-D4 (surr)	115		71-136		%	1		07/20/17 20:24
4-Bromofluorobenzene (surr)	127		55-151		%	1		07/20/17 20:24
Toluene-d8 (surr)	98.4		85-116		%	1		07/20/17 20:24

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Results of **17-BRWSP-TP-01-4.5'**

Client Sample ID: **17-BRWSP-TP-01-4.5'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1174638002
Lab Project ID: 1174638

Collection Date: 07/18/17 11:00
Received Date: 07/19/17 17:02
Matrix: Soil/Solid (dry weight)
Solids (%):92.9
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS16965
Analytical Method: SW8260C
Analyst: NRO
Analytical Date/Time: 07/20/17 20:24
Container ID: 1174638002-B

Prep Batch: VXX30883
Prep Method: SW5035A
Prep Date/Time: 07/18/17 11:00
Prep Initial Wt./Vol.: 52.007 g
Prep Extract Vol: 28.7106 mL

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Results of **17-BRWSP-TP-01-4.5'**

Client Sample ID: **17-BRWSP-TP-01-4.5'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1174638002
Lab Project ID: 1174638

Collection Date: 07/18/17 11:00
Received Date: 07/19/17 17:02
Matrix: Soil/Solid (dry weight)
Solids (%):92.9
Location:

Results by **Waters Department**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Total Organic Carbon	0.168		0.0520	0.0156	%	1		07/21/17 13:03

Batch Information

Analytical Batch: WTC2701
Analytical Method: SW9060A-Mod
Analyst: K.W
Analytical Date/Time: 07/21/17 13:03
Container ID: 1174638002-A

Prep Batch: WXX11920
Prep Method: METHOD
Prep Date/Time: 07/21/17 10:30
Prep Initial Wt./Vol.: 517.8 mg
Prep Extract Vol: 1 mL

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Results of **17-BRWSP-TPZ-02-4.5'**

Client Sample ID: **17-BRWSP-TPZ-02-4.5'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1174638003
Lab Project ID: 1174638

Collection Date: 07/18/17 11:10
Received Date: 07/19/17 17:02
Matrix: Soil/Solid (dry weight)
Solids (%):92.7
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	10.7	U	21.3	6.59	mg/Kg	1		07/20/17 15:07
Surrogates								
5a Androstane (surr)	80.3		50-150		%	1		07/20/17 15:07

Batch Information

Analytical Batch: XFC13574
Analytical Method: AK102
Analyst: JMG
Analytical Date/Time: 07/20/17 15:07
Container ID: 1174638003-A

Prep Batch: XXX37923
Prep Method: SW3550C
Prep Date/Time: 07/20/17 09:38
Prep Initial Wt./Vol.: 30.437 g
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	10.7	U	21.3	6.59	mg/Kg	1		07/20/17 15:07
Surrogates								
n-Triacontane-d62 (surr)	84.9		50-150		%	1		07/20/17 15:07

Batch Information

Analytical Batch: XFC13574
Analytical Method: AK103
Analyst: JMG
Analytical Date/Time: 07/20/17 15:07
Container ID: 1174638003-A

Prep Batch: XXX37923
Prep Method: SW3550C
Prep Date/Time: 07/20/17 09:38
Prep Initial Wt./Vol.: 30.437 g
Prep Extract Vol: 1 mL

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Results of **17-BRWSP-TPZ-02-4.5'**

Client Sample ID: **17-BRWSP-TPZ-02-4.5'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1174638003
Lab Project ID: 1174638

Collection Date: 07/18/17 11:10
Received Date: 07/19/17 17:02
Matrix: Soil/Solid (dry weight)
Solids (%):92.7
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.47	U	2.94	0.883	mg/Kg	1		07/20/17 18:18
Surrogates								
4-Bromofluorobenzene (surr)	87.4		50-150		%	1		07/20/17 18:18

Batch Information

Analytical Batch: VFC13763
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 07/20/17 18:18
Container ID: 1174638003-B

Prep Batch: VXX30918
Prep Method: SW5035A
Prep Date/Time: 07/18/17 11:10
Prep Initial Wt./Vol.: 52.874 g
Prep Extract Vol: 28.8645 mL

J flagging is activated

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Results of **17-BRWSP-TPZ-02-4.5'**

Client Sample ID: **17-BRWSP-TPZ-02-4.5'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1174638003
Lab Project ID: 1174638

Collection Date: 07/18/17 11:10
Received Date: 07/19/17 17:02
Matrix: Soil/Solid (dry weight)
Solids (%):92.7
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	11.8	U	23.6	7.30	ug/Kg	1		07/20/17 20:41
1,1,1-Trichloroethane	14.7	U	29.4	9.19	ug/Kg	1		07/20/17 20:41
1,1,2,2-Tetrachloroethane	7.35	U	14.7	4.59	ug/Kg	1		07/20/17 20:41
1,1,2-Trichloroethane	5.90	U	11.8	3.65	ug/Kg	1		07/20/17 20:41
1,1-Dichloroethane	14.7	U	29.4	9.19	ug/Kg	1		07/20/17 20:41
1,1-Dichloroethene	14.7	U	29.4	9.19	ug/Kg	1		07/20/17 20:41
1,1-Dichloropropene	14.7	U	29.4	9.19	ug/Kg	1		07/20/17 20:41
1,2,3-Trichlorobenzene	29.4	U	58.9	17.7	ug/Kg	1		07/20/17 20:41
1,2,3-Trichloropropane	14.7	U	29.4	9.19	ug/Kg	1		07/20/17 20:41
1,2,4-Trichlorobenzene	14.7	U	29.4	9.19	ug/Kg	1		07/20/17 20:41
1,2,4-Trimethylbenzene	34.2	J	58.9	17.7	ug/Kg	1		07/20/17 20:41
1,2-Dibromo-3-chloropropane	59.0	U	118	36.5	ug/Kg	1		07/20/17 20:41
1,2-Dibromoethane	5.90	U	11.8	3.65	ug/Kg	1		07/20/17 20:41
1,2-Dichlorobenzene	14.7	U	29.4	9.19	ug/Kg	1		07/20/17 20:41
1,2-Dichloroethane	5.90	U	11.8	3.65	ug/Kg	1		07/20/17 20:41
1,2-Dichloropropane	5.90	U	11.8	3.65	ug/Kg	1		07/20/17 20:41
1,3,5-Trimethylbenzene	14.7	U	29.4	9.19	ug/Kg	1		07/20/17 20:41
1,3-Dichlorobenzene	14.7	U	29.4	9.19	ug/Kg	1		07/20/17 20:41
1,3-Dichloropropane	5.90	U	11.8	3.65	ug/Kg	1		07/20/17 20:41
1,4-Dichlorobenzene	14.7	U	29.4	9.19	ug/Kg	1		07/20/17 20:41
2,2-Dichloropropane	14.7	U	29.4	9.19	ug/Kg	1		07/20/17 20:41
2-Butanone (MEK)	147	U	294	91.9	ug/Kg	1		07/20/17 20:41
2-Chlorotoluene	14.7	U	29.4	9.19	ug/Kg	1		07/20/17 20:41
2-Hexanone	59.0	U	118	36.5	ug/Kg	1		07/20/17 20:41
4-Chlorotoluene	14.7	U	29.4	9.19	ug/Kg	1		07/20/17 20:41
4-Isopropyltoluene	14.7	U	29.4	9.19	ug/Kg	1		07/20/17 20:41
4-Methyl-2-pentanone (MIBK)	147	U	294	91.9	ug/Kg	1		07/20/17 20:41
Benzene	7.35	U	14.7	4.59	ug/Kg	1		07/20/17 20:41
Bromobenzene	14.7	U	29.4	9.19	ug/Kg	1		07/20/17 20:41
Bromochloromethane	14.7	U	29.4	9.19	ug/Kg	1		07/20/17 20:41
Bromodichloromethane	14.7	U	29.4	9.19	ug/Kg	1		07/20/17 20:41
Bromoform	14.7	U	29.4	9.19	ug/Kg	1		07/20/17 20:41
Bromomethane	118	U	236	73.0	ug/Kg	1		07/20/17 20:41
Carbon disulfide	59.0	U	118	36.5	ug/Kg	1		07/20/17 20:41
Carbon tetrachloride	7.35	U	14.7	4.59	ug/Kg	1		07/20/17 20:41
Chlorobenzene	14.7	U	29.4	9.19	ug/Kg	1		07/20/17 20:41
Chloroethane	118	U	236	73.0	ug/Kg	1		07/20/17 20:41

Print Date: 07/24/2017 2:01:39PM

J flagging is activated

Results of **17-BRWSP-TPZ-02-4.5'**

Client Sample ID: **17-BRWSP-TPZ-02-4.5'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1174638003
Lab Project ID: 1174638

Collection Date: 07/18/17 11:10
Received Date: 07/19/17 17:02
Matrix: Soil/Solid (dry weight)
Solids (%):92.7
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroform	14.7	U	29.4	9.19	ug/Kg	1		07/20/17 20:41
Chloromethane	14.7	U	29.4	9.19	ug/Kg	1		07/20/17 20:41
cis-1,2-Dichloroethene	14.7	U	29.4	9.19	ug/Kg	1		07/20/17 20:41
cis-1,3-Dichloropropene	7.35	U	14.7	4.59	ug/Kg	1		07/20/17 20:41
Dibromochloromethane	14.7	U	29.4	9.19	ug/Kg	1		07/20/17 20:41
Dibromomethane	14.7	U	29.4	9.19	ug/Kg	1		07/20/17 20:41
Dichlorodifluoromethane	29.4	U	58.9	17.7	ug/Kg	1		07/20/17 20:41
Ethylbenzene	10.6	J	29.4	9.19	ug/Kg	1		07/20/17 20:41
Freon-113	59.0	U	118	36.5	ug/Kg	1		07/20/17 20:41
Hexachlorobutadiene	11.8	U	23.6	7.30	ug/Kg	1		07/20/17 20:41
Isopropylbenzene (Cumene)	14.7	U	29.4	9.19	ug/Kg	1		07/20/17 20:41
Methylene chloride	59.0	U	118	36.5	ug/Kg	1		07/20/17 20:41
Methyl-t-butyl ether	59.0	U	118	36.5	ug/Kg	1		07/20/17 20:41
Naphthalene	116		29.4	9.19	ug/Kg	1		07/20/17 20:41
n-Butylbenzene	14.7	U	29.4	9.19	ug/Kg	1		07/20/17 20:41
n-Propylbenzene	19.1	J	29.4	9.19	ug/Kg	1		07/20/17 20:41
o-Xylene	14.7	U	29.4	9.19	ug/Kg	1		07/20/17 20:41
P & M -Xylene	29.4	U	58.9	17.7	ug/Kg	1		07/20/17 20:41
sec-Butylbenzene	14.7	U	29.4	9.19	ug/Kg	1		07/20/17 20:41
Styrene	14.7	U	29.4	9.19	ug/Kg	1		07/20/17 20:41
tert-Butylbenzene	14.7	U	29.4	9.19	ug/Kg	1		07/20/17 20:41
Tetrachloroethene	7.35	U	14.7	4.59	ug/Kg	1		07/20/17 20:41
Toluene	14.7	U	29.4	9.19	ug/Kg	1		07/20/17 20:41
trans-1,2-Dichloroethene	14.7	U	29.4	9.19	ug/Kg	1		07/20/17 20:41
trans-1,3-Dichloropropene	7.35	U	14.7	4.59	ug/Kg	1		07/20/17 20:41
Trichloroethene	5.90	U	11.8	3.65	ug/Kg	1		07/20/17 20:41
Trichlorofluoromethane	29.4	U	58.9	17.7	ug/Kg	1		07/20/17 20:41
Vinyl acetate	59.0	U	118	36.5	ug/Kg	1		07/20/17 20:41
Vinyl chloride	5.90	U	11.8	3.65	ug/Kg	1		07/20/17 20:41
Xylenes (total)	44.1	U	88.3	26.9	ug/Kg	1		07/20/17 20:41
Surrogates								
1,2-Dichloroethane-D4 (surr)	108		71-136		%	1		07/20/17 20:41
4-Bromofluorobenzene (surr)	123		55-151		%	1		07/20/17 20:41
Toluene-d8 (surr)	95.3		85-116		%	1		07/20/17 20:41

Print Date: 07/24/2017 2:01:39PM

J flagging is activated

Results of **17-BRWSP-TPZ-02-4.5'**

Client Sample ID: **17-BRWSP-TPZ-02-4.5'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1174638003
Lab Project ID: 1174638

Collection Date: 07/18/17 11:10
Received Date: 07/19/17 17:02
Matrix: Soil/Solid (dry weight)
Solids (%):92.7
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS16965
Analytical Method: SW8260C
Analyst: NRO
Analytical Date/Time: 07/20/17 20:41
Container ID: 1174638003-B

Prep Batch: VXX30883
Prep Method: SW5035A
Prep Date/Time: 07/18/17 11:10
Prep Initial Wt./Vol.: 52.874 g
Prep Extract Vol: 28.8645 mL

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Results of **17-BRWSP-TPZ-02-4.5'**

Client Sample ID: **17-BRWSP-TPZ-02-4.5'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1174638003
Lab Project ID: 1174638

Collection Date: 07/18/17 11:10
Received Date: 07/19/17 17:02
Matrix: Soil/Solid (dry weight)
Solids (%):92.7
Location:

Results by **Waters Department**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Total Organic Carbon	0.0824		0.0510	0.0153	%	1		07/21/17 13:53

Batch Information

Analytical Batch: WTC2701
Analytical Method: SW9060A-Mod
Analyst: K.W
Analytical Date/Time: 07/21/17 13:53
Container ID: 1174638003-A

Prep Batch: WXX11920
Prep Method: METHOD
Prep Date/Time: 07/21/17 10:30
Prep Initial Wt./Vol.: 528.8 mg
Prep Extract Vol: 1 mL

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Results of **17-BRWSP-TP-02-4.5'**

Client Sample ID: **17-BRWSP-TP-02-4.5'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1174638004
Lab Project ID: 1174638

Collection Date: 07/18/17 11:45
Received Date: 07/19/17 17:02
Matrix: Soil/Solid (dry weight)
Solids (%):92.5
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	10.7	U	21.4	6.63	mg/Kg	1		07/20/17 15:17
Surrogates								
5a Androstane (surr)	83.6		50-150		%	1		07/20/17 15:17

Batch Information

Analytical Batch: XFC13574
Analytical Method: AK102
Analyst: JMG
Analytical Date/Time: 07/20/17 15:17
Container ID: 1174638004-A

Prep Batch: XXX37923
Prep Method: SW3550C
Prep Date/Time: 07/20/17 09:38
Prep Initial Wt./Vol.: 30.292 g
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	10.7	U	21.4	6.63	mg/Kg	1		07/20/17 15:17
Surrogates								
n-Triacontane-d62 (surr)	92.3		50-150		%	1		07/20/17 15:17

Batch Information

Analytical Batch: XFC13574
Analytical Method: AK103
Analyst: JMG
Analytical Date/Time: 07/20/17 15:17
Container ID: 1174638004-A

Prep Batch: XXX37923
Prep Method: SW3550C
Prep Date/Time: 07/20/17 09:38
Prep Initial Wt./Vol.: 30.292 g
Prep Extract Vol: 1 mL

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Results of **17-BRWSP-TP-02-4.5'**

Client Sample ID: **17-BRWSP-TP-02-4.5'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1174638004
Lab Project ID: 1174638

Collection Date: 07/18/17 11:45
Received Date: 07/19/17 17:02
Matrix: Soil/Solid (dry weight)
Solids (%):92.5
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.27	J	3.00	0.901	mg/Kg	1		07/20/17 18:37
Surrogates								
4-Bromofluorobenzene (surr)	88.6		50-150		%	1		07/20/17 18:37

Batch Information

Analytical Batch: VFC13763
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 07/20/17 18:37
Container ID: 1174638004-B

Prep Batch: VXX30918
Prep Method: SW5035A
Prep Date/Time: 07/18/17 11:45
Prep Initial Wt./Vol.: 51.946 g
Prep Extract Vol: 28.8733 mL

J flagging is activated

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Results of **17-BRWSP-TP-02-4.5'**

Client Sample ID: **17-BRWSP-TP-02-4.5'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1174638004
Lab Project ID: 1174638

Collection Date: 07/18/17 11:45
Received Date: 07/19/17 17:02
Matrix: Soil/Solid (dry weight)
Solids (%):92.5
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	12.0	U	24.0	7.45	ug/Kg	1		07/20/17 20:57
1,1,1-Trichloroethane	15.0	U	30.0	9.37	ug/Kg	1		07/20/17 20:57
1,1,2,2-Tetrachloroethane	7.50	U	15.0	4.68	ug/Kg	1		07/20/17 20:57
1,1,2-Trichloroethane	6.00	U	12.0	3.72	ug/Kg	1		07/20/17 20:57
1,1-Dichloroethane	15.0	U	30.0	9.37	ug/Kg	1		07/20/17 20:57
1,1-Dichloroethene	15.0	U	30.0	9.37	ug/Kg	1		07/20/17 20:57
1,1-Dichloropropene	15.0	U	30.0	9.37	ug/Kg	1		07/20/17 20:57
1,2,3-Trichlorobenzene	30.1	U	60.1	18.0	ug/Kg	1		07/20/17 20:57
1,2,3-Trichloropropane	15.0	U	30.0	9.37	ug/Kg	1		07/20/17 20:57
1,2,4-Trichlorobenzene	15.0	U	30.0	9.37	ug/Kg	1		07/20/17 20:57
1,2,4-Trimethylbenzene	30.1	U	60.1	18.0	ug/Kg	1		07/20/17 20:57
1,2-Dibromo-3-chloropropane	60.0	U	120	37.2	ug/Kg	1		07/20/17 20:57
1,2-Dibromoethane	6.00	U	12.0	3.72	ug/Kg	1		07/20/17 20:57
1,2-Dichlorobenzene	15.0	U	30.0	9.37	ug/Kg	1		07/20/17 20:57
1,2-Dichloroethane	6.00	U	12.0	3.72	ug/Kg	1		07/20/17 20:57
1,2-Dichloropropane	6.00	U	12.0	3.72	ug/Kg	1		07/20/17 20:57
1,3,5-Trimethylbenzene	15.9	J	30.0	9.37	ug/Kg	1		07/20/17 20:57
1,3-Dichlorobenzene	15.0	U	30.0	9.37	ug/Kg	1		07/20/17 20:57
1,3-Dichloropropane	6.00	U	12.0	3.72	ug/Kg	1		07/20/17 20:57
1,4-Dichlorobenzene	15.0	U	30.0	9.37	ug/Kg	1		07/20/17 20:57
2,2-Dichloropropane	15.0	U	30.0	9.37	ug/Kg	1		07/20/17 20:57
2-Butanone (MEK)	150	U	300	93.7	ug/Kg	1		07/20/17 20:57
2-Chlorotoluene	15.0	U	30.0	9.37	ug/Kg	1		07/20/17 20:57
2-Hexanone	60.0	U	120	37.2	ug/Kg	1		07/20/17 20:57
4-Chlorotoluene	15.0	U	30.0	9.37	ug/Kg	1		07/20/17 20:57
4-Isopropyltoluene	22.2	J	30.0	9.37	ug/Kg	1		07/20/17 20:57
4-Methyl-2-pentanone (MIBK)	150	U	300	93.7	ug/Kg	1		07/20/17 20:57
Benzene	7.50	U	15.0	4.68	ug/Kg	1		07/20/17 20:57
Bromobenzene	15.0	U	30.0	9.37	ug/Kg	1		07/20/17 20:57
Bromochloromethane	15.0	U	30.0	9.37	ug/Kg	1		07/20/17 20:57
Bromodichloromethane	15.0	U	30.0	9.37	ug/Kg	1		07/20/17 20:57
Bromoform	15.0	U	30.0	9.37	ug/Kg	1		07/20/17 20:57
Bromomethane	120	U	240	74.5	ug/Kg	1		07/20/17 20:57
Carbon disulfide	60.0	U	120	37.2	ug/Kg	1		07/20/17 20:57
Carbon tetrachloride	7.50	U	15.0	4.68	ug/Kg	1		07/20/17 20:57
Chlorobenzene	15.0	U	30.0	9.37	ug/Kg	1		07/20/17 20:57
Chloroethane	120	U	240	74.5	ug/Kg	1		07/20/17 20:57

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Results of **17-BRWSP-TP-02-4.5'**

Client Sample ID: **17-BRWSP-TP-02-4.5'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1174638004
Lab Project ID: 1174638

Collection Date: 07/18/17 11:45
Received Date: 07/19/17 17:02
Matrix: Soil/Solid (dry weight)
Solids (%):92.5
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroform	15.0	U	30.0	9.37	ug/Kg	1		07/20/17 20:57
Chloromethane	15.0	U	30.0	9.37	ug/Kg	1		07/20/17 20:57
cis-1,2-Dichloroethene	15.0	U	30.0	9.37	ug/Kg	1		07/20/17 20:57
cis-1,3-Dichloropropene	7.50	U	15.0	4.68	ug/Kg	1		07/20/17 20:57
Dibromochloromethane	15.0	U	30.0	9.37	ug/Kg	1		07/20/17 20:57
Dibromomethane	15.0	U	30.0	9.37	ug/Kg	1		07/20/17 20:57
Dichlorodifluoromethane	30.1	U	60.1	18.0	ug/Kg	1		07/20/17 20:57
Ethylbenzene	15.0	U	30.0	9.37	ug/Kg	1		07/20/17 20:57
Freon-113	60.0	U	120	37.2	ug/Kg	1		07/20/17 20:57
Hexachlorobutadiene	12.0	U	24.0	7.45	ug/Kg	1		07/20/17 20:57
Isopropylbenzene (Cumene)	15.0	U	30.0	9.37	ug/Kg	1		07/20/17 20:57
Methylene chloride	60.0	U	120	37.2	ug/Kg	1		07/20/17 20:57
Methyl-t-butyl ether	60.0	U	120	37.2	ug/Kg	1		07/20/17 20:57
Naphthalene	27.3	J	30.0	9.37	ug/Kg	1		07/20/17 20:57
n-Butylbenzene	15.0	U	30.0	9.37	ug/Kg	1		07/20/17 20:57
n-Propylbenzene	11.1	J	30.0	9.37	ug/Kg	1		07/20/17 20:57
o-Xylene	15.0	U	30.0	9.37	ug/Kg	1		07/20/17 20:57
P & M -Xylene	27.9	J	60.1	18.0	ug/Kg	1		07/20/17 20:57
sec-Butylbenzene	15.0	U	30.0	9.37	ug/Kg	1		07/20/17 20:57
Styrene	15.0	U	30.0	9.37	ug/Kg	1		07/20/17 20:57
tert-Butylbenzene	15.0	U	30.0	9.37	ug/Kg	1		07/20/17 20:57
Tetrachloroethene	7.50	U	15.0	4.68	ug/Kg	1		07/20/17 20:57
Toluene	15.0	U	30.0	9.37	ug/Kg	1		07/20/17 20:57
trans-1,2-Dichloroethene	15.0	U	30.0	9.37	ug/Kg	1		07/20/17 20:57
trans-1,3-Dichloropropene	7.50	U	15.0	4.68	ug/Kg	1		07/20/17 20:57
Trichloroethene	6.00	U	12.0	3.72	ug/Kg	1		07/20/17 20:57
Trichlorofluoromethane	30.1	U	60.1	18.0	ug/Kg	1		07/20/17 20:57
Vinyl acetate	60.0	U	120	37.2	ug/Kg	1		07/20/17 20:57
Vinyl chloride	6.00	U	12.0	3.72	ug/Kg	1		07/20/17 20:57
Xylenes (total)	27.9	J	90.1	27.4	ug/Kg	1		07/20/17 20:57
Surrogates								
1,2-Dichloroethane-D4 (surr)	107		71-136		%	1		07/20/17 20:57
4-Bromofluorobenzene (surr)	121		55-151		%	1		07/20/17 20:57
Toluene-d8 (surr)	96.3		85-116		%	1		07/20/17 20:57

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J flagging is activated

Results of **17-BRWSP-TP-02-4.5'**

Client Sample ID: **17-BRWSP-TP-02-4.5'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1174638004
Lab Project ID: 1174638

Collection Date: 07/18/17 11:45
Received Date: 07/19/17 17:02
Matrix: Soil/Solid (dry weight)
Solids (%):92.5
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS16965
Analytical Method: SW8260C
Analyst: NRO
Analytical Date/Time: 07/20/17 20:57
Container ID: 1174638004-B

Prep Batch: VXX30883
Prep Method: SW5035A
Prep Date/Time: 07/18/17 11:45
Prep Initial Wt./Vol.: 51.946 g
Prep Extract Vol: 28.8733 mL

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Results of **17-BRWSP-TP-02-4.5'**

Client Sample ID: **17-BRWSP-TP-02-4.5'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1174638004
Lab Project ID: 1174638

Collection Date: 07/18/17 11:45
Received Date: 07/19/17 17:02
Matrix: Soil/Solid (dry weight)
Solids (%):92.5
Location:

Results by **Waters Department**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Total Organic Carbon	0.0779		0.0536	0.0161	%	1		07/21/17 14:56

Batch Information

Analytical Batch: WTC2701
Analytical Method: SW9060A-Mod
Analyst: K.W
Analytical Date/Time: 07/21/17 14:56
Container ID: 1174638004-A

Prep Batch: WXX11920
Prep Method: METHOD
Prep Date/Time: 07/21/17 10:30
Prep Initial Wt./Vol.: 504.1 mg
Prep Extract Vol: 1 mL

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Results of **17-BRWSP-TP-03-4.5'**

Client Sample ID: **17-BRWSP-TP-03-4.5'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1174638005
Lab Project ID: 1174638

Collection Date: 07/18/17 12:00
Received Date: 07/19/17 17:02
Matrix: Soil/Solid (dry weight)
Solids (%):93.1
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	10.7	U	21.3	6.60	mg/Kg	1		07/20/17 15:27
Surrogates								
5a Androstane (surr)	91.5		50-150		%	1		07/20/17 15:27

Batch Information

Analytical Batch: XFC13574
Analytical Method: AK102
Analyst: JMG
Analytical Date/Time: 07/20/17 15:27
Container ID: 1174638005-A

Prep Batch: XXX37923
Prep Method: SW3550C
Prep Date/Time: 07/20/17 09:38
Prep Initial Wt./Vol.: 30.274 g
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	24.5		21.3	6.60	mg/Kg	1		07/20/17 15:27
Surrogates								
n-Triacontane-d62 (surr)	98.5		50-150		%	1		07/20/17 15:27

Batch Information

Analytical Batch: XFC13574
Analytical Method: AK103
Analyst: JMG
Analytical Date/Time: 07/20/17 15:27
Container ID: 1174638005-A

Prep Batch: XXX37923
Prep Method: SW3550C
Prep Date/Time: 07/20/17 09:38
Prep Initial Wt./Vol.: 30.274 g
Prep Extract Vol: 1 mL

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Results of **17-BRWSP-TP-03-4.5'**

Client Sample ID: **17-BRWSP-TP-03-4.5'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1174638005
Lab Project ID: 1174638

Collection Date: 07/18/17 12:00
Received Date: 07/19/17 17:02
Matrix: Soil/Solid (dry weight)
Solids (%):93.1
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.48	U	2.95	0.884	mg/Kg	1		07/20/17 19:33
Surrogates								
4-Bromofluorobenzene (surr)	85.4		50-150		%	1		07/20/17 19:33

Batch Information

Analytical Batch: VFC13763
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 07/20/17 19:33
Container ID: 1174638005-C

Prep Batch: VXX30918
Prep Method: SW5035A
Prep Date/Time: 07/18/17 12:00
Prep Initial Wt./Vol.: 52.003 g
Prep Extract Vol: 28.5622 mL

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Results of **17-BRWSP-TP-03-4.5'**

Client Sample ID: **17-BRWSP-TP-03-4.5'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1174638005
Lab Project ID: 1174638

Collection Date: 07/18/17 12:00
Received Date: 07/19/17 17:02
Matrix: Soil/Solid (dry weight)
Solids (%):93.1
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	11.8	U	23.6	7.31	ug/Kg	1		07/20/17 21:13
1,1,1-Trichloroethane	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
1,1,2,2-Tetrachloroethane	7.35	U	14.7	4.60	ug/Kg	1		07/20/17 21:13
1,1,2-Trichloroethane	5.90	U	11.8	3.66	ug/Kg	1		07/20/17 21:13
1,1-Dichloroethane	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
1,1-Dichloroethene	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
1,1-Dichloropropene	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
1,2,3-Trichlorobenzene	29.5	U	59.0	17.7	ug/Kg	1		07/20/17 21:13
1,2,3-Trichloropropane	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
1,2,4-Trichlorobenzene	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
1,2,4-Trimethylbenzene	29.5	U	59.0	17.7	ug/Kg	1		07/20/17 21:13
1,2-Dibromo-3-chloropropane	59.0	U	118	36.6	ug/Kg	1		07/20/17 21:13
1,2-Dibromoethane	5.90	U	11.8	3.66	ug/Kg	1		07/20/17 21:13
1,2-Dichlorobenzene	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
1,2-Dichloroethane	5.90	U	11.8	3.66	ug/Kg	1		07/20/17 21:13
1,2-Dichloropropane	5.90	U	11.8	3.66	ug/Kg	1		07/20/17 21:13
1,3,5-Trimethylbenzene	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
1,3-Dichlorobenzene	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
1,3-Dichloropropane	5.90	U	11.8	3.66	ug/Kg	1		07/20/17 21:13
1,4-Dichlorobenzene	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
2,2-Dichloropropane	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
2-Butanone (MEK)	148	U	295	92.0	ug/Kg	1		07/20/17 21:13
2-Chlorotoluene	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
2-Hexanone	59.0	U	118	36.6	ug/Kg	1		07/20/17 21:13
4-Chlorotoluene	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
4-Isopropyltoluene	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
4-Methyl-2-pentanone (MIBK)	148	U	295	92.0	ug/Kg	1		07/20/17 21:13
Benzene	7.35	U	14.7	4.60	ug/Kg	1		07/20/17 21:13
Bromobenzene	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
Bromochloromethane	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
Bromodichloromethane	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
Bromoform	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
Bromomethane	118	U	236	73.1	ug/Kg	1		07/20/17 21:13
Carbon disulfide	59.0	U	118	36.6	ug/Kg	1		07/20/17 21:13
Carbon tetrachloride	7.35	U	14.7	4.60	ug/Kg	1		07/20/17 21:13
Chlorobenzene	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
Chloroethane	118	U	236	73.1	ug/Kg	1		07/20/17 21:13

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Results of **17-BRWSP-TP-03-4.5'**

Client Sample ID: **17-BRWSP-TP-03-4.5'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1174638005
Lab Project ID: 1174638

Collection Date: 07/18/17 12:00
Received Date: 07/19/17 17:02
Matrix: Soil/Solid (dry weight)
Solids (%):93.1
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroform	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
Chloromethane	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
cis-1,2-Dichloroethene	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
cis-1,3-Dichloropropene	7.35	U	14.7	4.60	ug/Kg	1		07/20/17 21:13
Dibromochloromethane	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
Dibromomethane	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
Dichlorodifluoromethane	29.5	U	59.0	17.7	ug/Kg	1		07/20/17 21:13
Ethylbenzene	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
Freon-113	59.0	U	118	36.6	ug/Kg	1		07/20/17 21:13
Hexachlorobutadiene	11.8	U	23.6	7.31	ug/Kg	1		07/20/17 21:13
Isopropylbenzene (Cumene)	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
Methylene chloride	59.0	U	118	36.6	ug/Kg	1		07/20/17 21:13
Methyl-t-butyl ether	59.0	U	118	36.6	ug/Kg	1		07/20/17 21:13
Naphthalene	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
n-Butylbenzene	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
n-Propylbenzene	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
o-Xylene	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
P & M -Xylene	29.5	U	59.0	17.7	ug/Kg	1		07/20/17 21:13
sec-Butylbenzene	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
Styrene	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
tert-Butylbenzene	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
Tetrachloroethene	7.35	U	14.7	4.60	ug/Kg	1		07/20/17 21:13
Toluene	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
trans-1,2-Dichloroethene	14.8	U	29.5	9.20	ug/Kg	1		07/20/17 21:13
trans-1,3-Dichloropropene	7.35	U	14.7	4.60	ug/Kg	1		07/20/17 21:13
Trichloroethene	5.90	U	11.8	3.66	ug/Kg	1		07/20/17 21:13
Trichlorofluoromethane	29.5	U	59.0	17.7	ug/Kg	1		07/20/17 21:13
Vinyl acetate	59.0	U	118	36.6	ug/Kg	1		07/20/17 21:13
Vinyl chloride	5.90	U	11.8	3.66	ug/Kg	1		07/20/17 21:13
Xylenes (total)	44.2	U	88.4	26.9	ug/Kg	1		07/20/17 21:13
Surrogates								
1,2-Dichloroethane-D4 (surr)	109		71-136		%	1		07/20/17 21:13
4-Bromofluorobenzene (surr)	118		55-151		%	1		07/20/17 21:13
Toluene-d8 (surr)	95.7		85-116		%	1		07/20/17 21:13

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Results of **17-BRWSP-TP-03-4.5'**

Client Sample ID: **17-BRWSP-TP-03-4.5'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1174638005
Lab Project ID: 1174638

Collection Date: 07/18/17 12:00
Received Date: 07/19/17 17:02
Matrix: Soil/Solid (dry weight)
Solids (%):93.1
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS16965
Analytical Method: SW8260C
Analyst: NRO
Analytical Date/Time: 07/20/17 21:13
Container ID: 1174638005-C

Prep Batch: VXX30883
Prep Method: SW5035A
Prep Date/Time: 07/18/17 12:00
Prep Initial Wt./Vol.: 52.003 g
Prep Extract Vol: 28.5622 mL

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Results of **17-BRWSP-TP-03-4.5'**

Client Sample ID: **17-BRWSP-TP-03-4.5'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1174638005
Lab Project ID: 1174638

Collection Date: 07/18/17 12:00
Received Date: 07/19/17 17:02
Matrix: Soil/Solid (dry weight)
Solids (%):93.1
Location:

Results by **Waters Department**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Total Organic Carbon	0.170		0.0879	0.0264	%	1		07/21/17 11:57

Batch Information

Analytical Batch: WTC2701
Analytical Method: SW9060A-Mod
Analyst: K.W
Analytical Date/Time: 07/21/17 11:57
Container ID: 1174638005-A

Prep Batch: WXX11920
Prep Method: METHOD
Prep Date/Time: 07/21/17 10:30
Prep Initial Wt./Vol.: 305.4 mg
Prep Extract Vol: 1 mL

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Results of **17-BRWSP-TP-04-4.5'**

Client Sample ID: **17-BRWSP-TP-04-4.5'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1174638008
Lab Project ID: 1174638

Collection Date: 07/18/17 12:20
Received Date: 07/19/17 17:02
Matrix: Soil/Solid (dry weight)
Solids (%):93.4
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	7.42	J	21.3	6.61	mg/Kg	1		07/20/17 15:56
Surrogates								
5a Androstane (surr)	91.8		50-150		%	1		07/20/17 15:56

Batch Information

Analytical Batch: XFC13574
Analytical Method: AK102
Analyst: JMG
Analytical Date/Time: 07/20/17 15:56
Container ID: 1174638008-A

Prep Batch: XXX37923
Prep Method: SW3550C
Prep Date/Time: 07/20/17 09:38
Prep Initial Wt./Vol.: 30.119 g
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	60.3		21.3	6.61	mg/Kg	1		07/20/17 15:56
Surrogates								
n-Triacontane-d62 (surr)	93.4		50-150		%	1		07/20/17 15:56

Batch Information

Analytical Batch: XFC13574
Analytical Method: AK103
Analyst: JMG
Analytical Date/Time: 07/20/17 15:56
Container ID: 1174638008-A

Prep Batch: XXX37923
Prep Method: SW3550C
Prep Date/Time: 07/20/17 09:38
Prep Initial Wt./Vol.: 30.119 g
Prep Extract Vol: 1 mL

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Results of **17-BRWSP-TP-04-4.5'**

Client Sample ID: **17-BRWSP-TP-04-4.5'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1174638008
Lab Project ID: 1174638

Collection Date: 07/18/17 12:20
Received Date: 07/19/17 17:02
Matrix: Soil/Solid (dry weight)
Solids (%):93.4
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.48	U	2.95	0.886	mg/Kg	1		07/20/17 20:48
Surrogates								
4-Bromofluorobenzene (surr)	86.4		50-150		%	1		07/20/17 20:48

Batch Information

Analytical Batch: VFC13763
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 07/20/17 20:48
Container ID: 1174638008-B

Prep Batch: VXX30918
Prep Method: SW5035A
Prep Date/Time: 07/18/17 12:20
Prep Initial Wt./Vol.: 51.459 g
Prep Extract Vol: 28.3954 mL

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Results of **17-BRWSP-TP-04-4.5'**

Client Sample ID: **17-BRWSP-TP-04-4.5'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1174638008
Lab Project ID: 1174638

Collection Date: 07/18/17 12:20
Received Date: 07/19/17 17:02
Matrix: Soil/Solid (dry weight)
Solids (%):93.4
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	11.8	U	23.6	7.33	ug/Kg	1		07/20/17 20:08
1,1,1-Trichloroethane	14.8	U	29.5	9.22	ug/Kg	1		07/20/17 20:08
1,1,2,2-Tetrachloroethane	7.40	U	14.8	4.61	ug/Kg	1		07/20/17 20:08
1,1,2-Trichloroethane	5.90	U	11.8	3.66	ug/Kg	1		07/20/17 20:08
1,1-Dichloroethane	14.8	U	29.5	9.22	ug/Kg	1		07/20/17 20:08
1,1-Dichloroethene	14.8	U	29.5	9.22	ug/Kg	1		07/20/17 20:08
1,1-Dichloropropene	14.8	U	29.5	9.22	ug/Kg	1		07/20/17 20:08
1,2,3-Trichlorobenzene	29.6	U	59.1	17.7	ug/Kg	1		07/20/17 20:08
1,2,3-Trichloropropane	14.8	U	29.5	9.22	ug/Kg	1		07/20/17 20:08
1,2,4-Trichlorobenzene	14.8	U	29.5	9.22	ug/Kg	1		07/20/17 20:08
1,2,4-Trimethylbenzene	29.6	U	59.1	17.7	ug/Kg	1		07/20/17 20:08
1,2-Dibromo-3-chloropropane	59.0	U	118	36.6	ug/Kg	1		07/20/17 20:08
1,2-Dibromoethane	5.90	U	11.8	3.66	ug/Kg	1		07/20/17 20:08
1,2-Dichlorobenzene	14.8	U	29.5	9.22	ug/Kg	1		07/20/17 20:08
1,2-Dichloroethane	5.90	U	11.8	3.66	ug/Kg	1		07/20/17 20:08
1,2-Dichloropropane	5.90	U	11.8	3.66	ug/Kg	1		07/20/17 20:08
1,3,5-Trimethylbenzene	14.8	U	29.5	9.22	ug/Kg	1		07/20/17 20:08
1,3-Dichlorobenzene	14.8	U	29.5	9.22	ug/Kg	1		07/20/17 20:08
1,3-Dichloropropane	5.90	U	11.8	3.66	ug/Kg	1		07/20/17 20:08
1,4-Dichlorobenzene	14.8	U	29.5	9.22	ug/Kg	1		07/20/17 20:08
2,2-Dichloropropane	14.8	U	29.5	9.22	ug/Kg	1		07/20/17 20:08
2-Butanone (MEK)	148	U	295	92.2	ug/Kg	1		07/20/17 20:08
2-Chlorotoluene	14.8	U	29.5	9.22	ug/Kg	1		07/20/17 20:08
2-Hexanone	59.0	U	118	36.6	ug/Kg	1		07/20/17 20:08
4-Chlorotoluene	14.8	U	29.5	9.22	ug/Kg	1		07/20/17 20:08
4-Isopropyltoluene	14.8	U	29.5	9.22	ug/Kg	1		07/20/17 20:08
4-Methyl-2-pentanone (MIBK)	148	U	295	92.2	ug/Kg	1		07/20/17 20:08
Benzene	7.68	J	14.8	4.61	ug/Kg	1		07/20/17 20:08
Bromobenzene	14.8	U	29.5	9.22	ug/Kg	1		07/20/17 20:08
Bromochloromethane	14.8	U	29.5	9.22	ug/Kg	1		07/20/17 20:08
Bromodichloromethane	14.8	U	29.5	9.22	ug/Kg	1		07/20/17 20:08
Bromoform	14.8	U	29.5	9.22	ug/Kg	1		07/20/17 20:08
Bromomethane	118	U	236	73.3	ug/Kg	1		07/20/17 20:08
Carbon disulfide	59.0	U	118	36.6	ug/Kg	1		07/20/17 20:08
Carbon tetrachloride	10.6	J	14.8	4.61	ug/Kg	1		07/20/17 20:08
Chlorobenzene	14.8	U	29.5	9.22	ug/Kg	1		07/20/17 20:08
Chloroethane	118	U	236	73.3	ug/Kg	1		07/20/17 20:08

J flagging is activated

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Results of **17-BRWSP-TP-04-4.5'**

Client Sample ID: **17-BRWSP-TP-04-4.5'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1174638008
Lab Project ID: 1174638

Collection Date: 07/18/17 12:20
Received Date: 07/19/17 17:02
Matrix: Soil/Solid (dry weight)
Solids (%):93.4
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroform	14.8	U	29.5	9.22	ug/Kg	1		07/20/17 20:08
Chloromethane	10.9	J	29.5	9.22	ug/Kg	1		07/20/17 20:08
cis-1,2-Dichloroethene	14.8	U	29.5	9.22	ug/Kg	1		07/20/17 20:08
cis-1,3-Dichloropropene	7.40	U	14.8	4.61	ug/Kg	1		07/20/17 20:08
Dibromochloromethane	14.8	U	29.5	9.22	ug/Kg	1		07/20/17 20:08
Dibromomethane	14.8	U	29.5	9.22	ug/Kg	1		07/20/17 20:08
Dichlorodifluoromethane	29.6	U	59.1	17.7	ug/Kg	1		07/20/17 20:08
Ethylbenzene	14.8	U	29.5	9.22	ug/Kg	1		07/20/17 20:08
Freon-113	59.0	U	118	36.6	ug/Kg	1		07/20/17 20:08
Hexachlorobutadiene	11.8	U	23.6	7.33	ug/Kg	1		07/20/17 20:08
Isopropylbenzene (Cumene)	14.8	U	29.5	9.22	ug/Kg	1		07/20/17 20:08
Methylene chloride	59.0	U	118	36.6	ug/Kg	1		07/20/17 20:08
Methyl-t-butyl ether	59.0	U	118	36.6	ug/Kg	1		07/20/17 20:08
Naphthalene	14.8	U	29.5	9.22	ug/Kg	1		07/20/17 20:08
n-Butylbenzene	14.8	U	29.5	9.22	ug/Kg	1		07/20/17 20:08
n-Propylbenzene	14.8	U	29.5	9.22	ug/Kg	1		07/20/17 20:08
o-Xylene	14.8	U	29.5	9.22	ug/Kg	1		07/20/17 20:08
P & M -Xylene	29.6	U	59.1	17.7	ug/Kg	1		07/20/17 20:08
sec-Butylbenzene	14.8	U	29.5	9.22	ug/Kg	1		07/20/17 20:08
Styrene	14.8	U	29.5	9.22	ug/Kg	1		07/20/17 20:08
tert-Butylbenzene	14.8	U	29.5	9.22	ug/Kg	1		07/20/17 20:08
Tetrachloroethene	5.61	J	14.8	4.61	ug/Kg	1		07/20/17 20:08
Toluene	9.45	J	29.5	9.22	ug/Kg	1		07/20/17 20:08
trans-1,2-Dichloroethene	14.8	U	29.5	9.22	ug/Kg	1		07/20/17 20:08
trans-1,3-Dichloropropene	7.40	U	14.8	4.61	ug/Kg	1		07/20/17 20:08
Trichloroethene	6.20	J	11.8	3.66	ug/Kg	1		07/20/17 20:08
Trichlorofluoromethane	29.6	U	59.1	17.7	ug/Kg	1		07/20/17 20:08
Vinyl acetate	59.0	U	118	36.6	ug/Kg	1		07/20/17 20:08
Vinyl chloride	5.90	U	11.8	3.66	ug/Kg	1		07/20/17 20:08
Xylenes (total)	44.3	U	88.6	26.9	ug/Kg	1		07/20/17 20:08
Surrogates								
1,2-Dichloroethane-D4 (surr)	121		71-136		%	1		07/20/17 20:08
4-Bromofluorobenzene (surr)	120		55-151		%	1		07/20/17 20:08
Toluene-d8 (surr)	97.1		85-116		%	1		07/20/17 20:08

Print Date: 07/24/2017 2:01:39PM

J flagging is activated

Results of **17-BRWSP-TP-04-4.5'**

Client Sample ID: **17-BRWSP-TP-04-4.5'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1174638008
Lab Project ID: 1174638

Collection Date: 07/18/17 12:20
Received Date: 07/19/17 17:02
Matrix: Soil/Solid (dry weight)
Solids (%):93.4
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS16965
Analytical Method: SW8260C
Analyst: NRO
Analytical Date/Time: 07/20/17 20:08
Container ID: 1174638008-B

Prep Batch: VXX30883
Prep Method: SW5035A
Prep Date/Time: 07/18/17 12:20
Prep Initial Wt./Vol.: 51.459 g
Prep Extract Vol: 28.3954 mL

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Results of **17-BRWSP-TP-04-4.5'**

Client Sample ID: **17-BRWSP-TP-04-4.5'**
Client Project ID: **Barrow South Pad**
Lab Sample ID: 1174638008
Lab Project ID: 1174638

Collection Date: 07/18/17 12:20
Received Date: 07/19/17 17:02
Matrix: Soil/Solid (dry weight)
Solids (%):93.4
Location:

Results by **Waters Department**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Total Organic Carbon	0.985		0.0533	0.0160	%	1		07/21/17 15:29

Batch Information

Analytical Batch: WTC2701
Analytical Method: SW9060A-Mod
Analyst: K.W
Analytical Date/Time: 07/21/17 15:29
Container ID: 1174638008-A

Prep Batch: WXX11920
Prep Method: METHOD
Prep Date/Time: 07/21/17 10:30
Prep Initial Wt./Vol.: 502.3 mg
Prep Extract Vol: 1 mL

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Method Blank

Blank ID: MB for HBN 1763983 [SPT/10233]
Blank Lab ID: 1399183

Matrix: Soil/Solid (dry weight)

QC for Samples:
1174638002, 1174638003, 1174638004, 1174638005, 1174638008

Results by **SM21 2540G**

Parameter	Results	LOQ/CL	DL	Units
Total Solids	100			%

Batch Information

Analytical Batch: SPT10233
Analytical Method: SM21 2540G
Instrument:
Analyst: DMM
Analytical Date/Time: 7/19/2017 11:36:00PM

Print Date: 07/24/2017 2:01:42PM

Duplicate Sample Summary

Original Sample ID: 1174627010
Duplicate Sample ID: 1399184

Analysis Date: 07/19/2017 23:36
Matrix: Soil/Solid (dry weight)

QC for Samples:

1174638002, 1174638003, 1174638004, 1174638005, 1174638008

Results by **SM21 2540G**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Solids	72.3	73.1	%	1.00	(< 15)

Batch Information

Analytical Batch: SPT10233
Analytical Method: SM21 2540G
Instrument:
Analyst: DMM

Print Date: 07/24/2017 2:01:42PM

Method Blank

Blank ID: MB for HBN 1763785 [VXX/30883]
Blank Lab ID: 1398518

Matrix: Soil/Solid (dry weight)

QC for Samples:
1174638001, 1174638002, 1174638003, 1174638004, 1174638005, 1174638008

Results by **SW8260C**

Parameter	Results	LOQ/CL	DL	Units
1,1,1,2-Tetrachloroethane	10.0U	20.0	6.20	ug/Kg
1,1,1-Trichloroethane	12.5U	25.0	7.80	ug/Kg
1,1,2,2-Tetrachloroethane	6.25U	12.5	3.90	ug/Kg
1,1,2-Trichloroethane	5.00U	10.0	3.10	ug/Kg
1,1-Dichloroethane	12.5U	25.0	7.80	ug/Kg
1,1-Dichloroethene	12.5U	25.0	7.80	ug/Kg
1,1-Dichloropropene	12.5U	25.0	7.80	ug/Kg
1,2,3-Trichlorobenzene	25.0U	50.0	15.0	ug/Kg
1,2,3-Trichloropropane	12.5U	25.0	7.80	ug/Kg
1,2,4-Trichlorobenzene	12.5U	25.0	7.80	ug/Kg
1,2,4-Trimethylbenzene	25.0U	50.0	15.0	ug/Kg
1,2-Dibromo-3-chloropropane	50.0U	100	31.0	ug/Kg
1,2-Dibromoethane	5.00U	10.0	3.10	ug/Kg
1,2-Dichlorobenzene	12.5U	25.0	7.80	ug/Kg
1,2-Dichloroethane	3.25J	10.0	3.10	ug/Kg
1,2-Dichloropropane	5.00U	10.0	3.10	ug/Kg
1,3,5-Trimethylbenzene	12.5U	25.0	7.80	ug/Kg
1,3-Dichlorobenzene	12.5U	25.0	7.80	ug/Kg
1,3-Dichloropropane	5.00U	10.0	3.10	ug/Kg
1,4-Dichlorobenzene	12.5U	25.0	7.80	ug/Kg
2,2-Dichloropropane	12.5U	25.0	7.80	ug/Kg
2-Butanone (MEK)	125U	250	78.0	ug/Kg
2-Chlorotoluene	12.5U	25.0	7.80	ug/Kg
2-Hexanone	50.0U	100	31.0	ug/Kg
4-Chlorotoluene	12.5U	25.0	7.80	ug/Kg
4-Isopropyltoluene	12.5U	25.0	7.80	ug/Kg
4-Methyl-2-pentanone (MIBK)	125U	250	78.0	ug/Kg
Benzene	6.25U	12.5	3.90	ug/Kg
Bromobenzene	12.5U	25.0	7.80	ug/Kg
Bromochloromethane	12.5U	25.0	7.80	ug/Kg
Bromodichloromethane	12.5U	25.0	7.80	ug/Kg
Bromoform	12.5U	25.0	7.80	ug/Kg
Bromomethane	100U	200	62.0	ug/Kg
Carbon disulfide	50.0U	100	31.0	ug/Kg
Carbon tetrachloride	6.25U	12.5	3.90	ug/Kg
Chlorobenzene	12.5U	25.0	7.80	ug/Kg
Chloroethane	100U	200	62.0	ug/Kg
Chloroform	12.5U	25.0	7.80	ug/Kg

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Method Blank

Blank ID: MB for HBN 1763785 [VXX/30883]
Blank Lab ID: 1398518

Matrix: Soil/Solid (dry weight)

QC for Samples:
1174638001, 1174638002, 1174638003, 1174638004, 1174638005, 1174638008

Results by **SW8260C**

Parameter	Results	LOQ/CL	DL	Units
Chloromethane	12.5U	25.0	7.80	ug/Kg
cis-1,2-Dichloroethene	12.5U	25.0	7.80	ug/Kg
cis-1,3-Dichloropropene	6.25U	12.5	3.90	ug/Kg
Dibromochloromethane	12.5U	25.0	7.80	ug/Kg
Dibromomethane	12.5U	25.0	7.80	ug/Kg
Dichlorodifluoromethane	25.0U	50.0	15.0	ug/Kg
Ethylbenzene	12.5U	25.0	7.80	ug/Kg
Freon-113	50.0U	100	31.0	ug/Kg
Hexachlorobutadiene	10.0U	20.0	6.20	ug/Kg
Isopropylbenzene (Cumene)	12.5U	25.0	7.80	ug/Kg
Methylene chloride	50.0U	100	31.0	ug/Kg
Methyl-t-butyl ether	50.0U	100	31.0	ug/Kg
Naphthalene	12.5U	25.0	7.80	ug/Kg
n-Butylbenzene	12.5U	25.0	7.80	ug/Kg
n-Propylbenzene	12.5U	25.0	7.80	ug/Kg
o-Xylene	12.5U	25.0	7.80	ug/Kg
P & M -Xylene	25.0U	50.0	15.0	ug/Kg
sec-Butylbenzene	12.5U	25.0	7.80	ug/Kg
Styrene	12.5U	25.0	7.80	ug/Kg
tert-Butylbenzene	12.5U	25.0	7.80	ug/Kg
Tetrachloroethene	6.25U	12.5	3.90	ug/Kg
Toluene	12.5U	25.0	7.80	ug/Kg
trans-1,2-Dichloroethene	12.5U	25.0	7.80	ug/Kg
trans-1,3-Dichloropropene	6.25U	12.5	3.90	ug/Kg
Trichloroethene	5.00U	10.0	3.10	ug/Kg
Trichlorofluoromethane	25.0U	50.0	15.0	ug/Kg
Vinyl acetate	50.0U	100	31.0	ug/Kg
Vinyl chloride	5.00U	10.0	3.10	ug/Kg
Xylenes (total)	37.5U	75.0	22.8	ug/Kg
Surrogates				
1,2-Dichloroethane-D4 (surr)	114	71-136		%
4-Bromofluorobenzene (surr)	92.9	55-151		%
Toluene-d8 (surr)	98	85-116		%

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Method Blank

Blank ID: MB for HBN 1763785 [VXX/30883]
Blank Lab ID: 1398518

Matrix: Soil/Solid (dry weight)

QC for Samples:
1174638001, 1174638002, 1174638003, 1174638004, 1174638005, 1174638008

Results by **SW8260C**

Parameter	Results	LOQ/CL	DL	Units

Batch Information

Analytical Batch: VMS16965
Analytical Method: SW8260C
Instrument: Agilent 7890-75MS
Analyst: NRO
Analytical Date/Time: 7/20/2017 2:59:00PM

Prep Batch: VXX30883
Prep Method: SW5035A
Prep Date/Time: 7/20/2017 6:00:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1174638 [VXX30883]
Blank Spike Lab ID: 1398519
Date Analyzed: 07/20/2017 15:15

Matrix: Soil/Solid (dry weight)

QC for Samples: 1174638001, 1174638002, 1174638003, 1174638004, 1174638005, 1174638008

Results by **SW8260C**

	Blank Spike (ug/Kg)			
Parameter	Spike	Result	Rec (%)	CL
1,1,1,2-Tetrachloroethane	750	711	95	(78-125)
1,1,1-Trichloroethane	750	799	106	(73-130)
1,1,2,2-Tetrachloroethane	750	728	97	(70-124)
1,1,2-Trichloroethane	750	725	97	(78-121)
1,1-Dichloroethane	750	746	100	(76-125)
1,1-Dichloroethene	750	782	104	(70-131)
1,1-Dichloropropene	750	768	102	(76-125)
1,2,3-Trichlorobenzene	750	688	92	(66-130)
1,2,3-Trichloropropane	750	709	95	(73-125)
1,2,4-Trichlorobenzene	750	720	96	(67-129)
1,2,4-Trimethylbenzene	750	725	97	(75-123)
1,2-Dibromo-3-chloropropane	750	720	96	(61-132)
1,2-Dibromoethane	750	754	100	(78-122)
1,2-Dichlorobenzene	750	701	94	(78-121)
1,2-Dichloroethane	750	699	93	(73-128)
1,2-Dichloropropane	750	763	102	(76-123)
1,3,5-Trimethylbenzene	750	707	94	(73-124)
1,3-Dichlorobenzene	750	704	94	(77-121)
1,3-Dichloropropane	750	719	96	(77-121)
1,4-Dichlorobenzene	750	710	95	(75-120)
2,2-Dichloropropane	750	900	120	(67-133)
2-Butanone (MEK)	2250	2100	93	(51-148)
2-Chlorotoluene	750	726	97	(75-122)
2-Hexanone	2250	2200	98	(53-145)
4-Chlorotoluene	750	728	97	(72-124)
4-Isopropyltoluene	750	726	97	(73-127)
4-Methyl-2-pentanone (MIBK)	2250	2230	99	(65-135)
Benzene	750	733	98	(77-121)
Bromobenzene	750	680	91	(78-121)
Bromochloromethane	750	759	101	(78-125)
Bromodichloromethane	750	789	105	(75-127)
Bromoform	750	765	102	(67-132)
Bromomethane	750	820	109	(53-143)
Carbon disulfide	1130	1180	105	(63-132)

Print Date: 07/24/2017 2:01:47PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1174638 [VXX30883]
Blank Spike Lab ID: 1398519
Date Analyzed: 07/20/2017 15:15

Matrix: Soil/Solid (dry weight)

QC for Samples: 1174638001, 1174638002, 1174638003, 1174638004, 1174638005, 1174638008

Results by **SW8260C**

	Blank Spike (ug/Kg)			
Parameter	Spike	Result	Rec (%)	CL
Carbon tetrachloride	750	770	103	(70-135)
Chlorobenzene	750	720	96	(79-120)
Chloroethane	750	764	102	(59-139)
Chloroform	750	741	99	(78-123)
Chloromethane	750	778	104	(50-136)
cis-1,2-Dichloroethene	750	742	99	(77-123)
cis-1,3-Dichloropropene	750	779	104	(74-126)
Dibromochloromethane	750	751	100	(74-126)
Dibromomethane	750	774	103	(78-125)
Dichlorodifluoromethane	750	799	107	(29-149)
Ethylbenzene	750	736	98	(76-122)
Freon-113	1130	1190	106	(66-136)
Hexachlorobutadiene	750	773	103	(61-135)
Isopropylbenzene (Cumene)	750	748	100	(68-134)
Methylene chloride	750	754	100	(70-128)
Methyl-t-butyl ether	1130	1120	99	(73-125)
Naphthalene	750	666	89	(62-129)
n-Butylbenzene	750	760	101	(70-128)
n-Propylbenzene	750	751	100	(73-125)
o-Xylene	750	709	95	(77-123)
P & M -Xylene	1500	1460	97	(77-124)
sec-Butylbenzene	750	739	99	(73-126)
Styrene	750	720	96	(76-124)
tert-Butylbenzene	750	732	98	(73-125)
Tetrachloroethene	750	716	96	(73-128)
Toluene	750	692	92	(77-121)
trans-1,2-Dichloroethene	750	750	100	(74-125)
trans-1,3-Dichloropropene	750	746	99	(71-130)
Trichloroethene	750	759	101	(77-123)
Trichlorofluoromethane	750	904	121	(62-140)
Vinyl acetate	750	936	125	(50-151)
Vinyl chloride	750	771	103	(56-135)
Xylenes (total)	2250	2170	96	(78-124)

Print Date: 07/24/2017 2:01:47PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1174638 [VXX30883]
Blank Spike Lab ID: 1398519
Date Analyzed: 07/20/2017 15:15

Matrix: Soil/Solid (dry weight)

QC for Samples: 1174638001, 1174638002, 1174638003, 1174638004, 1174638005, 1174638008

Results by **SW8260C**

Parameter	Spike	Blank Spike (%) Result	Rec (%)	CL
Surrogates				
1,2-Dichloroethane-D4 (surr)	750	101	101	(71-136)
4-Bromofluorobenzene (surr)	750	91.9	92	(55-151)
Toluene-d8 (surr)	750	95.8	96	(85-116)

Batch Information

Analytical Batch: **VMS16965**
Analytical Method: **SW8260C**
Instrument: **Agilent 7890-75MS**
Analyst: **NRO**

Prep Batch: **VXX30883**
Prep Method: **SW5035A**
Prep Date/Time: **07/20/2017 06:00**
Spike Init Wt./Vol.: 750 ug/Kg Extract Vol: 25 mL
Dupe Init Wt./Vol.: Extract Vol:

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Billable Matrix Spike Summary

Original Sample ID: 1174638005
MS Sample ID: 1174638006 BMS
MSD Sample ID: 1174638007 BMSD

Analysis Date: 07/20/2017 21:13
Analysis Date: 07/20/2017 18:15
Analysis Date: 07/20/2017 18:31
Matrix: Soil/Solid (dry weight)

QC for Samples:

Results by **SW8260C**

		Matrix Spike (ug/Kg)			Spike Duplicate (ug/Kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1,1,1,2-Tetrachloroethane	11.8U	888	801	90	888	815	92	78-125	1.80	(< 20)
1,1,1-Trichloroethane	14.8U	888	909	102	888	907	102	73-130	0.16	(< 20)
1,1,2,2-Tetrachloroethane	7.35U	888	836	94	888	829	93	70-124	0.82	(< 20)
1,1,2-Trichloroethane	5.90U	888	817	92	888	828	93	78-121	1.40	(< 20)
1,1-Dichloroethane	14.8U	888	851	96	888	846	95	76-125	0.56	(< 20)
1,1-Dichloroethene	14.8U	888	969	109	888	884	100	70-131	9.10	(< 20)
1,1-Dichloropropene	14.8U	888	855	96	888	872	98	76-125	2.00	(< 20)
1,2,3-Trichlorobenzene	29.5U	888	611	69	888	799	90	66-130	26.60	* (< 20)
1,2,3-Trichloropropane	14.8U	888	792	89	888	813	92	73-125	2.60	(< 20)
1,2,4-Trichlorobenzene	14.8U	888	682	77	888	842	95	67-129	21.10	* (< 20)
1,2,4-Trimethylbenzene	29.5U	888	788	89	888	828	93	75-123	4.90	(< 20)
1,2-Dibromo-3-chloropropane	59.0U	888	786	89	888	846	95	61-132	7.40	(< 20)
1,2-Dibromoethane	5.90U	888	858	97	888	863	97	78-122	0.51	(< 20)
1,2-Dichlorobenzene	14.8U	888	774	87	888	805	91	78-121	3.90	(< 20)
1,2-Dichloroethane	5.90U	888	799	90	888	798	90	73-128	0.15	(< 20)
1,2-Dichloropropane	5.90U	888	846	95	888	858	97	76-123	1.40	(< 20)
1,3,5-Trimethylbenzene	14.8U	888	765	86	888	815	92	73-124	6.40	(< 20)
1,3-Dichlorobenzene	14.8U	888	763	86	888	809	91	77-121	5.90	(< 20)
1,3-Dichloropropane	5.90U	888	823	93	888	826	93	77-121	0.47	(< 20)
1,4-Dichlorobenzene	14.8U	888	791	89	888	815	92	75-120	3.00	(< 20)
2,2-Dichloropropane	14.8U	888	1031	116	888	1019	115	67-133	1.20	(< 20)
2-Butanone (MEK)	148U	2664	2266	85	2664	2481	93	51-148	8.80	(< 20)
2-Chlorotoluene	14.8U	888	793	89	888	827	93	75-122	4.20	(< 20)
2-Hexanone	59.0U	2664	2503	94	2664	2513	94	53-145	0.32	(< 20)
4-Chlorotoluene	14.8U	888	815	92	888	849	96	72-124	4.00	(< 20)
4-Isopropyltoluene	14.8U	888	781	88	888	834	94	73-127	6.40	(< 20)
4-Methyl-2-pentanone (MIBK)	148U	2664	2492	94	2664	2503	94	65-135	0.27	(< 20)
Benzene	7.35U	888	820	92	888	830	94	77-121	1.30	(< 20)
Bromobenzene	14.8U	888	760	86	888	756	85	78-121	0.54	(< 20)
Bromochloromethane	14.8U	888	869	98	888	851	96	78-125	2.20	(< 20)
Bromodichloromethane	14.8U	888	910	102	888	889	100	75-127	2.40	(< 20)
Bromoform	14.8U	888	903	102	888	880	99	67-132	2.60	(< 20)
Bromomethane	118U	888	983	111	888	867	98	53-143	12.50	(< 20)
Carbon disulfide	59.0U	1332	1525	114	1332	1386	104	63-132	9.30	(< 20)
Carbon tetrachloride	7.35U	888	902	102	888	879	99	70-135	2.70	(< 20)
Chlorobenzene	14.8U	888	794	89	888	805	91	79-120	1.30	(< 20)
Chloroethane	118U	888	963	108	888	828	93	59-139	15.20	(< 20)

Print Date: 07/24/2017 2:01:48PM

Billable Matrix Spike Summary

Original Sample ID: 1174638005 — Analysis Date: 07/20/2017 21:13
MS Sample ID: 1174638006 BMS — Analysis Date: 07/20/2017 18:15
MSD Sample ID: 1174638007 BMSD — Analysis Date: 07/20/2017 18:31
Matrix: Soil/Solid (dry weight)

QC for Samples:

Results by **SW8260C**

		Matrix Spike (ug/Kg)				Spike Duplicate (ug/Kg)						
Parameter	Sample	Spike	Result	Rec (%)		Spike	Result	Rec (%)	CL	RPD (%)		RPD CL
Chloroform	14.8U	888	829	93		888	834	94	78-123	0.53		(< 20)
Chloromethane	14.8U	888	859	97		888	802	90	50-136	6.90		(< 20)
cis-1,2-Dichloroethene	14.8U	888	842	95		888	832	94	77-123	1.20		(< 20)
cis-1,3-Dichloropropene	7.35U	888	886	100		888	889	100	74-126	0.37		(< 20)
Dibromochloromethane	14.8U	888	872	98		888	868	98	74-126	0.41		(< 20)
Dibromomethane	14.8U	888	887	100		888	867	98	78-125	2.30		(< 20)
Dichlorodifluoromethane	29.5U	888	796	90		888	733	83	29-149	8.30		(< 20)
Ethylbenzene	14.8U	888	806	91		888	835	94	76-122	3.60		(< 20)
Freon-113	59.0U	1332	1418	106		1332	1343	101	66-136	5.10		(< 20)
Hexachlorobutadiene	11.8U	888	825	93		888	933	105	61-135	12.40		(< 20)
Isopropylbenzene (Cumene)	14.8U	888	810	91		888	842	95	68-134	3.90		(< 20)
Methylene chloride	59.0U	888	885	100		888	846	95	70-128	4.50		(< 20)
Methyl-t-butyl ether	59.0U	1332	1257	94		1332	1257	94	73-125	0.02		(< 20)
Naphthalene	14.8U	888	628	71		888	777	87	62-129	21.10	*	(< 20)
n-Butylbenzene	14.8U	888	835	94		888	873	98	70-128	4.60		(< 20)
n-Propylbenzene	14.8U	888	807	91		888	850	96	73-125	5.20		(< 20)
o-Xylene	14.8U	888	785	88		888	806	91	77-123	2.60		(< 20)
P & M -Xylene	29.5U	1772	1579	89		1772	1654	93	77-124	4.50		(< 20)
sec-Butylbenzene	14.8U	888	800	90		888	841	95	73-126	5.00		(< 20)
Styrene	14.8U	888	802	90		888	813	92	76-124	1.40		(< 20)
tert-Butylbenzene	14.8U	888	796	90		888	837	94	73-125	5.00		(< 20)
Tetrachloroethene	7.35U	888	786	89		888	825	93	73-128	4.70		(< 20)
Toluene	14.8U	888	784	88		888	799	90	77-121	1.80		(< 20)
trans-1,2-Dichloroethene	14.8U	888	873	98		888	861	97	74-125	1.30		(< 20)
trans-1,3-Dichloropropene	7.35U	888	857	97		888	859	97	71-130	0.24		(< 20)
Trichloroethene	5.90U	888	836	94		888	855	96	77-123	2.30		(< 20)
Trichlorofluoromethane	29.5U	888	1278	144	*	888	914	103	62-140	33.50	*	(< 20)
Vinyl acetate	59.0U	888	1063	120		888	1057	119	50-151	0.67		(< 20)
Vinyl chloride	5.90U	888	887	100		888	828	93	56-135	6.90		(< 20)
Xylenes (total)	44.2U	2664	2363	89		2664	2460	92	78-124	3.90		(< 20)
Surrogates												
1,2-Dichloroethane-D4 (surr)		888	916	103		888	889	100	71-136	3.00		
4-Bromofluorobenzene (surr)		1289	1525	118		1289	1568	121	55-151	2.30		
Toluene-d8 (surr)		888	872	98		888	852	96	85-116	2.30		

Print Date: 07/24/2017 2:01:48PM

Billable Matrix Spike Summary

Original Sample ID: 1174638005
MS Sample ID: 1174638006 BMS
MSD Sample ID: 1174638007 BMSD

QC for Samples:

Analysis Date:
Analysis Date: 07/20/2017 18:15
Analysis Date: 07/20/2017 18:31
Matrix: Soil/Solid (dry weight)

Results by **SW8260C**

		Matrix Spike (%)			Spike Duplicate (%)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL

Batch Information

Analytical Batch: VMS16965
Analytical Method: SW8260C
Instrument: Agilent 7890-75MS
Analyst: NRO
Analytical Date/Time: 7/20/2017 6:15:00PM

Prep Batch: VXX30883
Prep Method: Vol. Extraction SW8260 Field Extracted L
Prep Date/Time: 7/18/2017 12:00:00PM
Prep Initial Wt./Vol.: 52.00g
Prep Extract Vol: 28.56mL

Print Date: 07/24/2017 2:01:48PM

Method Blank

Blank ID: MB for HBN 1764119 [VXX/30918]
Blank Lab ID: 1399646

Matrix: Soil/Solid (dry weight)

QC for Samples:
1174638001, 1174638002, 1174638003, 1174638004, 1174638005, 1174638008

Results by **AK101**

Parameter	Results	LOQ/CL	DL	Units
Gasoline Range Organics	1.25U	2.50	0.750	mg/Kg
Surrogates				
4-Bromofluorobenzene (surr)	100	50-150		%

Batch Information

Analytical Batch: VFC13763
Analytical Method: AK101
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 7/20/2017 2:34:00PM

Prep Batch: VXX30918
Prep Method: SW5035A
Prep Date/Time: 7/20/2017 8:00:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

Print Date: 07/24/2017 2:01:49PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1174638 [VXX30918]
Blank Spike Lab ID: 1399649
Date Analyzed: 07/20/2017 13:37

Spike Duplicate ID: LCSD for HBN 1174638 [VXX30918]
Spike Duplicate Lab ID: 1399650
Matrix: Soil/Solid (dry weight)

QC for Samples: 1174638001, 1174638002, 1174638003, 1174638004, 1174638005, 1174638008

Results by **AK101**

	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Gasoline Range Organics	12.5	13.3	106	12.5	13.2	106	(60-120)	0.78	(< 20)
Surrogates									
4-Bromofluorobenzene (surr)	1.25	104	104	1.25	105	105	(50-150)	0.58	

Batch Information

Analytical Batch: **VFC13763**
Analytical Method: **AK101**
Instrument: **Agilent 7890A PID/FID**
Analyst: **ST**

Prep Batch: **VXX30918**
Prep Method: **SW5035A**
Prep Date/Time: **07/20/2017 08:00**
Spike Init Wt./Vol.: 12.5 mg/Kg Extract Vol: 25 mL
Dupe Init Wt./Vol.: 12.5 mg/Kg Extract Vol: 25 mL

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Billable Matrix Spike Summary

Original Sample ID: 1174638005
MS Sample ID: 1174638006 BMS
MSD Sample ID: 1174638007 BMSD

Analysis Date: 07/20/2017 19:33
Analysis Date: 07/20/2017 19:52
Analysis Date: 07/20/2017 20:11
Matrix: Soil/Solid (dry weight)

QC for Samples:

Results by **AK101**

		Matrix Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Gasoline Range Organics	1.48U	14.7	14.7	100	14.7	14.9	102	60-120	1.80	(< 20)
Surrogates										
4-Bromofluorobenzene (surr)		1.29	1.12	87	1.29	1.14	88	50-150	2.00	

Batch Information

Analytical Batch: VFC13763
Analytical Method: AK101
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 7/20/2017 7:52:00PM

Prep Batch: VXX30918
Prep Method: AK101 Extraction (S)
Prep Date/Time: 7/18/2017 12:00:00PM
Prep Initial Wt./Vol.: 52.00g
Prep Extract Vol: 28.56mL

Print Date: 07/24/2017 2:01:51PM

Method Blank

Blank ID: MB for HBN 1764125 [WXX/11920]
Blank Lab ID: 1399676

Matrix: Soil/Solid (dry weight)

QC for Samples:
1174638002, 1174638003, 1174638004, 1174638005, 1174638008

Results by **SW9060A-Mod**

Parameter	Results	LOQ/CL	DL	Units
Total Organic Carbon	0.0250U	0.0500	0.0150	%

Batch Information

Analytical Batch: WTC2701
Analytical Method: SW9060A-Mod
Instrument: TOC Analyzer
Analyst: K.W
Analytical Date/Time: 7/21/2017 11:03:30AM

Prep Batch: WXX11920
Prep Method: METHOD
Prep Date/Time: 7/21/2017 10:30:00AM
Prep Initial Wt./Vol.: 500 mg
Prep Extract Vol: 1 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1174638 [WXX11920]
Blank Spike Lab ID: 1399677
Date Analyzed: 07/21/2017 11:18

Spike Duplicate ID: LCSD for HBN 1174638 [WXX11920]
Spike Duplicate Lab ID: 1399678
Matrix: Soil/Solid (dry weight)

QC for Samples: 1174638002, 1174638003, 1174638004, 1174638005, 1174638008

Results by **SW9060A-Mod**

	Blank Spike (%)			Spike Duplicate (%)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Total Organic Carbon	3.35	3.14	94	3.35	3.23	97	(75-125)	2.80	(< 25)

Batch Information

Analytical Batch: **WTC2701**
Analytical Method: **SW9060A-Mod**
Instrument: **TOC Analyzer**
Analyst: **K.W**

Prep Batch: **WXX11920**
Prep Method: **METHOD**
Prep Date/Time: **07/21/2017 10:30**
Spike Init Wt./Vol.: 3.35 % Extract Vol: 1 mL
Dupe Init Wt./Vol.: 3.35 % Extract Vol: 1 mL

Print Date: 07/24/2017 2:01:54PM

Billable Matrix Spike Summary

Original Sample ID: 1174638005 — Analysis Date: 07/21/2017 11:57
MS Sample ID: 1174638006 BMS — Analysis Date: 07/21/2017 12:40
MSD Sample ID: 1174638007 BMSD — Analysis Date: 07/21/2017 12:55
Matrix: Soil/Solid (dry weight)

QC for Samples:

Results by **SW9060A-Mod**

		Matrix Spike (%)			Spike Duplicate (%)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Total Organic Carbon	0.170	0.309	0.412	78	0.284	0.447	98	75-125	7.90	(< 50)

Batch Information

Analytical Batch: WTC2701
Analytical Method: SW9060A-Mod
Instrument: TOC Analyzer
Analyst: K.W
Analytical Date/Time: 7/21/2017 12:40:29PM

Prep Batch: WXX11920
Prep Method: TOC Soils Prep (S)
Prep Date/Time: 7/21/2017 10:30:00AM
Prep Initial Wt./Vol.: 346.80mg
Prep Extract Vol: 1.00mL

Print Date: 07/24/2017 2:01:55PM

Method Blank

Blank ID: MB for HBN 1763981 [XXX/37923]
Blank Lab ID: 1399177

Matrix: Soil/Solid (dry weight)

QC for Samples:
1174638002, 1174638003, 1174638004, 1174638005, 1174638008

Results by **AK102**

Parameter	Results	LOQ/CL	DL	Units
Diesel Range Organics	10.0U	20.0	6.20	mg/Kg
Surrogates				
5a Androstane (surr)	81.4	60-120		%

Batch Information

Analytical Batch: XFC13574
Analytical Method: AK102
Instrument: Agilent 7890B R
Analyst: JMG
Analytical Date/Time: 7/20/2017 2:28:00PM

Prep Batch: XXX37923
Prep Method: SW3550C
Prep Date/Time: 7/20/2017 9:38:58AM
Prep Initial Wt./Vol.: 30 g
Prep Extract Vol: 1 mL

Print Date: 07/24/2017 2:01:56PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1174638 [XXX37923]
Blank Spike Lab ID: 1399178
Date Analyzed: 07/20/2017 14:38

Spike Duplicate ID: LCSD for HBN 1174638 [XXX37923]
Spike Duplicate Lab ID: 1399179
Matrix: Soil/Solid (dry weight)

QC for Samples: 1174638002, 1174638003, 1174638004, 1174638005, 1174638008

Results by **AK102**

	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Diesel Range Organics	167	159	95	167	185	111	(75-125)	15.50	(< 20)
Surrogates									
5a Androstane (surr)	3.33	104	104	3.33	118	118	(60-120)	12.20	

Batch Information

Analytical Batch: **XFC13574**
Analytical Method: **AK102**
Instrument: **Agilent 7890B R**
Analyst: **JMG**

Prep Batch: **XXX37923**
Prep Method: **SW3550C**
Prep Date/Time: **07/20/2017 09:38**
Spike Init Wt./Vol.: 167 mg/Kg Extract Vol: 1 mL
Dupe Init Wt./Vol.: 167 mg/Kg Extract Vol: 1 mL

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Billable Matrix Spike Summary

Original Sample ID: 1174638005
MS Sample ID: 1174638006 BMS
MSD Sample ID: 1174638007 BMSD

Analysis Date: 07/20/2017 15:27
Analysis Date: 07/20/2017 15:37
Analysis Date: 07/20/2017 15:46
Matrix: Soil/Solid (dry weight)

QC for Samples:

Results by **AK102**

		Matrix Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Diesel Range Organics	10.7U	176	179	101	177	171	96	60-140	4.90	(< 50)
Surrogates										
5a Androstane (surr)		3.53	3.98	113	3.56	3.67	103	50-150	8.00	

Batch Information

Analytical Batch: XFC13574
Analytical Method: AK102
Instrument: Agilent 7890B R
Analyst: JMG
Analytical Date/Time: 7/20/2017 3:37:00PM

Prep Batch: XXX37923
Prep Method: Sonication Extraction Soil AK102
Prep Date/Time: 7/20/2017 9:38:58AM
Prep Initial Wt./Vol.: 30.41g
Prep Extract Vol: 1.00mL

Print Date: 07/24/2017 2:01:59PM

Method Blank

Blank ID: MB for HBN 1763981 [XXX/37923]
Blank Lab ID: 1399177

Matrix: Soil/Solid (dry weight)

QC for Samples:
1174638002, 1174638003, 1174638004, 1174638005, 1174638008

Results by **AK103**

Parameter	Results	LOQ/CL	DL	Units
Residual Range Organics	10.0U	20.0	6.20	mg/Kg
Surrogates				
n-Triacontane-d62 (surr)	90.9	60-120		%

Batch Information

Analytical Batch: XFC13574
Analytical Method: AK103
Instrument: Agilent 7890B R
Analyst: JMG
Analytical Date/Time: 7/20/2017 2:28:00PM

Prep Batch: XXX37923
Prep Method: SW3550C
Prep Date/Time: 7/20/2017 9:38:58AM
Prep Initial Wt./Vol.: 30 g
Prep Extract Vol: 1 mL

Print Date: 07/24/2017 2:02:01PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1174638 [XXX37923]
Blank Spike Lab ID: 1399178
Date Analyzed: 07/20/2017 14:38

Spike Duplicate ID: LCSD for HBN 1174638 [XXX37923]
Spike Duplicate Lab ID: 1399179
Matrix: Soil/Solid (dry weight)

QC for Samples: 1174638002, 1174638003, 1174638004, 1174638005, 1174638008

Results by **AK103**

	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Residual Range Organics	167	164	98	167	187	112	(60-120)	13.40	(< 20)
Surrogates									
n-Triacontane-d62 (surr)	3.33	93.7	94	3.33	109	109	(60-120)	14.70	

Batch Information

Analytical Batch: **XFC13574**
Analytical Method: **AK103**
Instrument: **Agilent 7890B R**
Analyst: **JMG**

Prep Batch: **XXX37923**
Prep Method: **SW3550C**
Prep Date/Time: **07/20/2017 09:38**
Spike Init Wt./Vol.: 167 mg/Kg Extract Vol: 1 mL
Dupe Init Wt./Vol.: 167 mg/Kg Extract Vol: 1 mL

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Billable Matrix Spike Summary

Original Sample ID: 1174638005
MS Sample ID: 1174638006 BMS
MSD Sample ID: 1174638007 BMSD

Analysis Date: 07/20/2017 15:27
Analysis Date: 07/20/2017 15:37
Analysis Date: 07/20/2017 15:46
Matrix: Soil/Solid (dry weight)

QC for Samples:

Results by **AK103**

		Matrix Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Residual Range Organics	24.5	176	204	102	177	203	100	60-140	0.78	(< 50)
Surrogates										
n-Triacontane-d62 (surr)		3.53	3.43	97	3.56	3.21	90	50-150	6.40	

Batch Information

Analytical Batch: XFC13574
Analytical Method: AK103
Instrument: Agilent 7890B R
Analyst: JMG
Analytical Date/Time: 7/20/2017 3:37:00PM

Prep Batch: XXX37923
Prep Method: Sonication Extraction Soil AK102
Prep Date/Time: 7/20/2017 9:38:58AM
Prep Initial Wt./Vol.: 30.41g
Prep Extract Vol: 1.00mL

Print Date: 07/24/2017 2:02:04PM

SGS

1174638

SGS Environmental Services Inc.
CHAIN OF CUSTODY RECORD

Locations Nationwide
Alaska, Maryland, New Jersey, New York, North Carolina, Ohio, West Virgina
www.us.sgs.com

CLIENT: AGVIQ LLC
CONTACT: GLORIA BECKMAN PHONE NO: 907-365-6299
PROJECT: BARROW SOUTH PAD SITE/PWSID#: 4430
REPORTS TO: GLORIA BECKMAN E-MAIL: gbeckman@tikigaq.com
INVOICE TO: DIANE KINKA QUOTE #: ? P.O. #: ?

SGS Reference #:
page 01 of 01

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX CODE	# CONTAINERS	SAMPLE TYPE C = COMP G = GRAB Multi Incremental Samples	GRO (AK101)	VOCs (SW8260B)	DRO/RRO (AK102/103)	Total Organic Carbon (9060)						REMARKS/ LOC ID
						Preserv Used	MeOH	MeOH	NONE	NONE						
1 A	17-BRWSP-TB-02	7/18/2017	10:45	SO-P	1	G =	X	X								
2 A-B	17-BRWSP-TP-01-4.5'	7/18/2017	11:00	SO-P	2	G =	X	X	X	X						
3 A-B	17-BRWSP-TPZ-02-4.5'	7/18/2017	11:10	SO-P	2	G =	X	X	X	X						
4 A-B	17-BRWSP-TP-02-4.5'	7/18/2017	11:45	SO-P	2	G =	X	X	X	X						
5 6 7 A-D	17-BRWSP-TP-03-4.5'	7/18/2017	12:00	SO-P	4	G =	X	X	X	X						MS/MSD
8 A-B	17-BRWSP-TP-04-4.5'	7/18/2017	12:20	SO-P	2	G =	X	X	X	X						

	Date	Time	Received By:
Collected/Relinquished By: (1) BRANDON MALONEY	7/19/2017	6:00	
Relinquished By: (2)	7/19/2017	6:00	
Relinquished By: (3)			
Relinquished By: (4)	7/19/17	17:02	Received For Laboratory By:

DOD Project? NO
Special Deliverable Requirements:
Cooler ID 02
Requested Turnaround Time and-or Special Instructions: RUSH IAI
Samples Received Cold? YES NO Chain of Custody Seal: (Ci
Cooler TB INTACT BROKEN AB
Temperature °C: 0.2 23 1F 1B

200 W. Potter Drive Anchorage, AK 99518 Tel: (907) 562-2343 Fax: (907) 561-5301
3000 Business Drive Wilmington, NC 28405 Tel: (910) 350-1903 Fax: (910) 350-1557

http://www.sgs.com/terms_and_conditions.htm

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rev 09/12/2008

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Returned Bottles Inventory

Name of individual returning bottles: Brandon Maloney

Date Received: 7/19/17

Client Name: AGVIQ LLC

Received by: HHD

Project Name: Barrow South Pad

SGS PM: FT

HDPE/Nalgene:	1-L					
	500-ml					
	250-ml or 8-oz					
	125-ml or 4-oz					
	60-ml or 2-oz					
	other					
amber glass:	1-L					
	500-ml					
	250-ml or 8-oz					
	125-ml or 4-oz with or without septa	8				
	40-ml VOA vial					
	other					
Subtotal:		8				

Note: Returned bottles (regardless of size/pres.) are billed back at $4/bottle ***unless otherwise quoted****.*

Amount to Invoice Client $: 32.00

WO#: 1174638

027 BRW 3197 6980 C 027-3197 6980

Shipper's Name and Address	Shipper's Account Number	Not Negotiable
Agviq LLC 301 W Northern Lights Blvd Suite 660 Anchorage, AK 99503 USA Tel: 9073656299	27442481828 Customer's ID Number 16966	**Air Waybill** Issued By Alaska. AIR CARGO P.O. BOX 68900 SEATTLE, WA 98168 800-225-2752 ALASKACARGO.COM
Consignee's Name and Address	Consignee's Account Number	Also notify
Sgs Environmental Servic 200 W. Potter Drive Anchorage, AK 99518 USA Tel: 9075622343		7/19 4:27pm no contact Tel:
Issuing Carrier's Agent and City		Accounting Information 16966
		Agviq LLC 301 W Northern Lights Blvd S 660 Anchorage, AK 99503 USA 1174638
Agent's IATA Code	Account No.	
Airport of Departure (Addr. of First Carrier) and Requested Routing		GoldStreak
Barrow		

To	By First Carrier	To / By	To / By	Currency		WT/VAL	Other	Declared Value For Carriage	Declared Value For Customs
ANC	Alaska Airlines			USD	PX	X	X	NVD	NCV

Airport of Destination	Flight/Date	Flight/Date	Amount of Insurance
Anchorage	AS 055/19		XXX

Handling Information

NOA SGS 9075622343

DANGEROUS GOODS IN EXCEPTED QUANTITIES DGD AND NOTOC NOT REQUIRED

SCI

No of Pieces	Gross Weight	kg lb			Commodity Item No.	Chargeable Weight	Rate / Charge	Total	Nature and Quantity of Goods (Incl. Dimensions or Volume)
1	34.0	L		N		34.0		AS AGREED	SOIL SAMPLES Dims: 23 x 13 x14 x 1 GSX REQ
1	34.0							AS AGREED	Volume: 2.422

Prepaid	Weight Charge	Collect	Other Charges
	AS AGREED		XBC 0.00
	Valuation Charge		
	Tax		
	Total Other Charges Due Agent		
	Total Other Charges Due Carrier		
Total Prepaid		Total Collect	
AS AGREED			

Shipper certifies that the particulars on the face hereof are correct and that **insofar as any part of the consignment contains dangerous goods, such part is properly described by name and is in proper condition for carriage by air according to the applicable Dangerous Goods Regulations. I consent to the inspection of this cargo.**

For: Agviq LLC

Signature of Shipper or his Agent

☐ THIS SHIPMENT DOES NOT CONTAIN DANGEROUS GOODS

☒ THIS SHIPMENT DOES CONTAIN DANGEROUS GOODS

Executed On (Date)	at (Place)	Signature of Issuing Carrier or its Agent
19 Jul 2017 09:02	Barrow	Alaska Airlines

027-3197 6980

Alert Expeditors Inc. #376556

Citywide Delivery • 440-3351
8421 Flamingo Drive • Anchorage, Alaska 99502

Date 7/9/17

From Anna

To 056

Collect ❒	Prepay ❒ Account ❒	Advance Charges ❒
Job #	PO#	

1 @ 3d

3197.90

1174638

Shipped Signature

Total Charge

e-Sample Receipt Form

SGS Workorder #: **1174638**

1 1 7 4 6 3 8

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
Chain of Custody / Temperature Requirements		N/A Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	Yes	1F 1B
COC accompanied samples?	Yes	
N/A **Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	Yes	Cooler ID: 1 @ 0.2 °C Therm. ID: D23
	N/A	Cooler ID: @ °C Therm. ID:
	N/A	Cooler ID: @ °C Therm. ID:
	N/A	Cooler ID: @ °C Therm. ID:
	N/A	Cooler ID: @ °C Therm. ID:
If >6°C, were samples collected <8 hours ago?	N/A	
If <0°C, were sample containers ice free?	N/A	
If samples received without a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "**COOLER TEMP**" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note "ambient" or "chilled".		
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
Holding Time / Documentation / Sample Condition Requirements		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Were samples received within holding time?	Yes	
Do samples **match COC**** (i.e.,sample IDs,dates/times collected)? **Note: If times differ <1hr, record details & login per COC.	Yes	
Were analyses requested unambiguous? (i.e., method is specified for analyses with >1 option for analysis)	Yes	
		N/A ***Exemption permitted for metals (e.g,200.8/6020A).
Were proper containers (type/mass/volume/preservative***)used?	Yes	
Volatile / LL-Hg Requirements		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	Yes	
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	N/A	
Were all soil VOAs field extracted with MeOH+BFB?	Yes	

Note to Client: Any "No", answer above indicates non-compliance with standard procedures and may impact data quality.

Additional notes (if applicable):

F1020_SRFpm_20170131

Sample Containers and Preservatives

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1174638001-A	Methanol field pres. 4 C	OK			
1174638002-A	No Preservative Required	OK			
1174638002-B	Methanol field pres. 4 C	OK			
1174638003-A	No Preservative Required	OK			
1174638003-B	Methanol field pres. 4 C	OK			
1174638004-A	No Preservative Required	OK			
1174638004-B	Methanol field pres. 4 C	OK			
1174638005-A	No Preservative Required	OK			
1174638005-B	No Preservative Required	OK			
1174638005-C	Methanol field pres. 4 C	OK			
1174638005-D	Methanol field pres. 4 C	OK			
1174638006-A	No Preservative Required	OK			
1174638006-B	No Preservative Required	OK			
1174638006-C	Methanol field pres. 4 C	OK			
1174638006-D	Methanol field pres. 4 C	OK			
1174638007-A	No Preservative Required	OK			
1174638007-B	No Preservative Required	OK			
1174638007-C	Methanol field pres. 4 C	OK			
1174638007-D	Methanol field pres. 4 C	OK			
1174638008-A	No Preservative Required	OK			
1174638008-B	Methanol field pres. 4 C	OK			

Container Condition Glossary

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates than an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.
BU - The container was received with headspace greater than 6mm.
DM- The container was received damaged.
FR- The container was received frozen and not usable for Bacteria or BOD analyses.
PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.
PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

Laboratory Data Review Checklist

Completed By:

Melissa Pike

Title:

Mid-Level Scientist/Project Chemist

Date:

11/22/2017

CS Report Name:

Barrow South Pad

Report Date:

December 2017

Consultant Firm:

Agviq LLC

Laboratory Name:

SGS North America, Inc.

Laboratory Report Number:

1174638

ADEC File Number:

310.38.028

Hazard Identification Number:

1174638

1. Laboratory

   a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?

   ◉ Yes ○ No Comments:

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   ○ Yes ◉ No Comments:

   NA. No samples were transferred or subcontracted to an alternate laboratory.

2. Chain of Custody (CoC)

   a. CoC information completed, signed, and dated (including released/received by)?

   ◉ Yes ○ No Comments:

   b. Correct Analyses requested?

   ◉ Yes ○ No Comments:

3. Laboratory Sample Receipt Documentation

   a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

   ◉ Yes ○ No Comments:

   Samples arrived at 0.2°C.

   b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

   ◉ Yes ○ No Comments:

   c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

   ◉ Yes ○ No Comments:

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

○ Yes ◉ No Comments:

NA - No discrepancies.

e. Data quality or usability affected?

Comments:

Data is acceptable.

4. Case Narrative

a. Present and understandable?

◉ Yes ○ No Comments:

b. Discrepancies, errors, or QC failures identified by the lab?

◉ Yes ○ No Comments:

The MS %R for trichlorofluoromethane and several method 8260C MSD RPDs did not meet quality control criteria.

c. Were all corrective actions documented?

○ Yes ◉ No Comments:

Corrective action was not required when samples were diluted or matrix interference was observed.

d. What is the effect on data quality/usability according to the case narrative?

Comments:

Data quality and usability is not affected with respect to the case narrative report.

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

◉ Yes ○ No Comments:

b. All applicable holding times met?

◉ Yes ○ No Comments:

c. All soils reported on a dry weight basis?

(●) Yes ( ) No Comments:

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

(●) Yes ( ) No Comments:

e. Data quality or usability affected?

( ) Yes (●) No Comments:

Data quality and usability is not affected with respect to the reported sample results.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

(●) Yes ( ) No Comments:

ii. All method blank results less than limit of quantitation (LOQ)?

(●) Yes ( ) No Comments:

iii. If above LOQ, what samples are affected?

Comments:

NA – MB results were < LOQ.

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

( ) Yes (●) No Comments:

NA – MB results were < LOQ.

v. Data quality or usability affected?

Comments:

Data quality and usability is not affected with respect to the reported method blank sample results.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

(●) Yes ( ) No Comments:

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

( ) Yes (●) No Comments:

NA – only organics analyzed.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

( ) Yes (●) No Comments:

The MS %R for trichlorofluoromethane did not meet quality control criteria.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

( ) Yes (●) No Comments:

Several method 8260C MSD RPDs did not meet quality control criteria.

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

17-BRWSP-TP-03-4.5

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

(●) Yes ( ) No Comments:

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

Associated LCS/LCSD results were within limits and used to assess accuracy and precision. No data was qualified. Data quality and usability is not affected.

c. Surrogates – Organics Only

i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?

◉ Yes ○ No Comments:

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

◉ Yes ○ No Comments:

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

○ Yes ◉ No Comments:

NA. All surrogate results are within quality control criteria.

iv. Data quality or usability affected?

Comments:

Data quality and usability is not affected with respect to the surrogate results.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?
(If not, enter explanation below.)

◉ Yes ○ No Comments:

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

◉ Yes ○ No Comments:

iii. All results less than LOQ?

○ Yes ◉ No Comments:

Benzene (3.66J ug/Kg)

iv. If above LOQ, what samples are affected?

Comments:

All samples within the data package are potentially affected.

v. Data quality or usability affected?

Comments:

Data quality and usability is somewhat affected. Benzene result in sample 17-BRWSP-TP-04-4.5' is considered not detected (UB) at the LOQ due to trip blank contamination.

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

(•) Yes ( ) No Comments:

Primary 17-BRWSP-TP-01-4.5' with duplicate 17-BRWSP-TPZ-02-4.5'.

ii. Submitted blind to lab?

(•) Yes ( ) No Comments:

iii. Precision – All relative percent differences (RPD) less than specified DQOs? (Recommended: 30% water, 50% soil)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

(•) Yes ( ) No Comments:

Total Organic Carbon (68.37%)

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality and usability is somewhat affected. The TOC results in the primary and duplicate are considered estimated (JD) due to duplicate RPD imprecision.

f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).

( ) Yes ( ) No (•) Not Applicable

NA – Disposable sampling equipment was used.

i. All results less than LOQ?

○ Yes ◉ No Comments:

NA – Disposable sampling equipment was used.

ii. If above LOQ, what samples are affected?

Comments:

NA – Disposable sampling equipment was used.

iii. Data quality or usability affected?

Comments:

NA – Disposable sampling equipment was used.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

◉ Yes ○ No Comments:

Lab flags were defined in lab report and validator flags were defined above.

QUALITY ASSURANCE SUMMARY

SGS LABORATORY REPORTS 1173405 AND 1174638

NSB BARROW SOUTH PAD

CORRECTIVE ACTION-REMOVAL

DECEMBER 2017

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1. INTRODUCTION

This Quality Assurance (QA) Summary describes the technical review of analytical results generated during June and July 2017 soil sampling activities at the Barrow South Pad. Samples and laboratory quality assurance/quality control (QA/QC) data were reviewed to assess whether the data met the designated data quality objectives (DQO) and were acceptable for project use. The project data were reviewed for deviations to the requirements presented in the *Work Plan* (Agviq, 2017) and for any effects on data validity and/or usability due to field sampling and laboratory quality control discrepancies.

1.1. Data Quality Objectives

The six DQOs used for this review were precision, accuracy, representativeness, comparability, completeness, and sensitivity.

- Precision measures the reproducibility of repetitive measurements. It is measured by calculating the relative percent difference (RPD) between duplicate samples. Field duplicate samples, matrix spike (MS) and matrix spike duplicate (MSD) sample pairs, and laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) pairs were used to measure precision for this project.
- Accuracy measures the correctness, or the closeness, between the true value and the quantity detected. It is measured by calculating the percent recovery of known concentrations of spiked compounds that were introduced into the appropriate sample matrix. Surrogate, LCS, and MS sample recoveries were used to measure accuracy for this project.
- Representativeness describes the degree to which data accurately and precisely represents site characteristics. Representativeness was demonstrated by choosing the number of samples, sample locations, and sampling procedures in order to produce results showing as accurately as possible the matrix and site conditions.
- Comparability describes whether two data sets can be considered equivalent with respect to the project goal. Comparability is achieved by keeping the analytical laboratory the same throughout the project. Analytical methods, laboratory procedures, and reporting limits are therefore consistent and comparable between laboratory reports.
- Completeness describes the amount of valid data obtained from the sampling event(s). It is calculated as the percentage of valid measurements compared to the total number of measurements.
- Sensitivity describes the lowest concentration that the analytical method can reliably quantitate, and is evaluated by verifying that the detected results and/or limits of quantitation (LOQ) meet the project specific cleanup levels and/or screening levels. Sensitivity is also assessed by comparison of method blank and trip blank results to the LOQ.

In addition to these criteria for the six DQOs described above, sample collection and handling procedures and blank samples were reviewed to ensure overall data quality. Sample collection forms were reviewed to verify that representative samples were collected and samples were without headspace (if applicable). Sample handling was reviewed to assess parameters such as chain-of-custody (CoC) documentation, the use of appropriate sample containers and preservatives, shipment cooler temperature, and method-specified sample holding times. Blank samples were analyzed to detect potential field or laboratory cross-contamination. Each of these parameters contributes to the general representativeness and comparability of the project data. The combination of evaluations of the above-mentioned parameters will lead to a determination of the overall project data completeness. The following data qualifiers are used to indicate a potential bias in an analytical result or a deviation from method or project QC procedures.

U The analyte was analyzed for, but not detected.

UB The analyte is detected in an associated blank and the sample result is less than 5x or 10x (for the common lab contaminants) the blank contamination. If the sample result is less than the LOQ, the result is considered not detected at the LOQ. If the sample result is greater than the LOQ, the result is considered not detected and the sample result is considered the new LOQ.

J The analyte is considered an estimated value due to its quantitation level.

R The result is rejected because of deficiencies in meeting QC criteria and may not be used for decision making.

1.2. Summary

A total of 14 samples (soil), consisting of nine (9) primary samples, two (2) field duplicate samples, and two (2) trip blank samples were collected in support of the North Slope Borough (NSB) Barrow South Pad Method Three Alternative Cleanup Level Sampling project in June and July 2017. Extra volume was collected for MS/MSD analysis for one (1) soil sample. A trip blank sample accompanied each cooler containing samples for volatile analyses. Each sample was analyzed by one or more of the following analytical methods.

- Gasoline range organic compounds (GRO) by Alaska (AK) Method 101
- Diesel range organic compounds (DRO) by AK Method 102
- Residual range organic compounds (RRO) by AK Method 103
- Volatile organic compounds (VOC) by United States Environmental Protection Agency (EPA) Method SW8260B
- Total Organic Carbon (TOC), Method SW9060A-Mod
- Percent Solids SM2540G, Method SM21 SM2540G

Project and quality control samples for all analyses were analyzed by SGS North America, Inc. of Anchorage, Alaska (SGS). SGS is accredited by the State of Alaska through the Contaminated Sites (CS) Program and is certified through the Environmental Laboratory Accreditation Program (ELAP) for the applicable methods employed for this project. The samples were organized into two (2) sample delivery groups (SDG) at the laboratory: 1173405 and 1174638.

2. DATA QUALITY REVIEW

2.1. Sample Handling

The evaluation of proper sample handling procedures included verification of the following: correct CoC documentation, appropriate sample containers and preservatives, cooler temperatures maintained 4 degrees Celsius (°C) (±2 °C), and sample analyses performed within method-specified holding times. All sample preservation, handling and temperature met the appropriate quality control criteria.

2.2. Blanks

Method blanks and trip blanks were utilized to detect potential cross-contamination of project samples. The blank samples were reviewed for detections of target analytes and the effect (if any) on project samples is addressed.

2.2.1. Method Blanks

Method blanks were utilized to detect potential cross-contamination of project samples occurring in the laboratory. Method blanks are analyzed at the frequency of one per matrix, analysis, and 20 samples. All method blank results were not detected.

2.2.2. Trip Blanks

Trip blanks were utilized to detect potential cross-contamination of project samples occurring during shipment and storage. A trip blank accompanied every cooler containing samples for volatiles analyses.

- SDG 1173405: Trip Blank, 17-BRWSP-TB-01, reported benzene (7.70J ug/Kg); ethylbenzene (7.70J ug/Kg); o-xylene (6.35J ug/Kg); p&m-xylene (15.0J ug/Kg); toluene (8.66J ug/Kg); and xylenes, total (24.1J ug/Kg). Associated benzene, ethylbenzene, and xylene results, that were reported greater than the detection limit and less than the LOQ, are considered not detected (UB) at the LOQ due to blank contamination.
- SDG 1174638: Trip Blank, 17-BRWSP-TB-02, reported benzene at 3.66J ug/Kg. This analyte was detected in associated sample 17-BRWSP-TP-04-4.5' and results were qualified as not detected (UB) at the LOQ due to blank contamination.

2.3. Laboratory Control Samples

LCS/LCSD samples were prepared by adding spike compounds to blank samples in order to assess laboratory extraction and instrumentation performance. LCS samples are analyzed at the frequency of one per matrix, analysis, and 20 samples for all methods. Additionally, LCSD samples are analyzed at the frequency of one per matrix, analysis, and 20 samples for Alaska fuel methods. LCS/LCSD samples were analyzed at the correct frequency and all results met laboratory accuracy and precision limits.

2.4. Matrix Spike Samples

MS/MSD samples were prepared by adding spike compounds to project samples in order to assess potential matrix interference, recovery accuracy, and precision. MS/MSD samples were only provided for surface water samples. Only MS/MSD samples prepared from project samples are reviewed as only their results apply to samples from this project.

- SDG 1173405: The TOC MS percent recovery (%R) was below the QC criteria and chloromethane MSD RPD was outside quality control limits. Associated TOC samples include: 17-BRWSP-TP-01-2', 17-BRWSP-TPZ-01-02', 17-BRWSP-TP-0-2-2', 17-BRWSP-TP-03-2', and 17-BRWSP-TP-04-2'. All chloromethane results within the data set are potentially impacted. Associated LCS/LCSD results were within limits and used to assess accuracy and precision. No data was qualified. Data quality and usability is not affected, and data qualifiers were not necessary.
- SDG 1174638: The MS %R for trichlorofluoromethane and several method 8260C MSD RPDs did not meet quality control criteria. The associated LCS was within limits; therefore, qualification was not necessary.

2.5. Surrogate Recovery

Surrogate compounds were added to project samples by the laboratory prior to analysis, in accordance with method requirements. Surrogate recoveries were then calculated as percentages and reported by the laboratory as a measure of analytical extraction efficiency. Recoveries for surrogates were within laboratory limits.

2.6. Field Duplicates

Comparison of field sample duplicate results to the associated parent sample results provides precision information for the overall sample collection and analytical process. Field duplicate samples are submitted to the laboratory as blind samples. Field duplicates are analyzed for each method and matrix at the frequency of one daily and one per 10 project samples (10%) The 10% frequency is assessed on a per project basis (rather than per laboratory report basis), although in this case a 10% frequency per laboratory report is also met. Results between field duplicates and parent samples are considered comparable when RPDs are within ADEC criterion of ≤ 50% for a soil matrix. In the case where a target analyte was not detected, the limit of detection (LOD) was used for RPD calculation purposes.

- SDG 1173405: Primary 17-BRWSP-TP-01-2' with duplicate 17-BRWSP-TPZ-01-02' were submitted for analysis. The RPDs between primary and duplicate met ADEC recommended <50% for soil samples, with one exception. The RPD between primary and duplicate samples for RRO results was 58.67%. Results were qualified as estimated (JD) due to duplicate imprecision.

- SDG 1174638: Primary 17-BRWSP-TP-01-4.5' with duplicate 17-BRWSP-TPZ-02-4.5' were submitted for analysis. The RPDs between primary and duplicate met ADEC recommended <50% for soil samples, with one exception. The RPD between primary and duplicate samples for TOC results was 68.37%. Results were qualified as estimated (JD) due to duplicate imprecision.

2.7. Analytical Sensitivity

Limit of Quantitation (LOQ) met or were below established criteria specified for all analyses in the project sampling plan and LOQs were also below the ADEC established cleanup levels.

2.8. Summary of Qualified Results

The table below details the list of qualified results for this project.

Table 2.8: Summary of Qualified Results

SDG	Analyte(s)	Associated Sample	Sample Result	LOQ	Interpreted Result	Qualification Reason
1173405	Benzene	17-BRWSP-TP-01-2' 17-BRWSP-TPZ-01-2'	5.24J ug/Kg 5.96J ug/Kg	13.1 ug/Kg 11.9 ug/Kg	UB (13.1) UB (11.9)	Trip Blank Contamination
1173405	Ethylbenzene	17-BRWSP-TP-02-2'	8.21J ug/Kg	17.9 ug/Kg	UB (17.9)	Trip Blank Contamination
1173405	P&M-Xylene	17-BRWSP-TP-02-2' 17-BRWSP-TP-04-2'	20.7J ug/Kg 22.4J ug/Kg	35.7 ug/Kg 40.8 ug/Kg	UB (35.7) UB (40.8)	Trip Blank Contamination
1173405	Xylenes (total)	17-BRWSP-TP-02-2' 17-BRWSP-TP-04-2'	20.7J ug/Kg 22.4J ug/Kg	53.6 ug/Kg 61.2 ug/Kg	UB (53.6) UB (61.2)	Trip Blank Contamination
1173405	RRO	17-BRWSP-TP-01-2' 17-BRWSP-TPZ-01-02'	734 mg/Kg 401 mg/Kg	22.3 mg/Kg 22.4 mg/Kg	734 JD 401 JD	Field Duplicate Imprecision
1174638	Benzene	17-BRWSP-TP-04-4.5'	7.68J ug/Kg	14.8 ug/Kg	UB (14.8)	Trip Blank Contamination
1174638	Total Organic Organic	17-BRWSP-TP-01-4.5' 17-BRWSP-TPZ-02-4.5'	0.168 % 0.0824 %	0.0520 % 0.0510 %	0.168 JD 0.0824 JD	Field Duplicate Imprecision

2.9. Completeness

Data completeness is defined as the percentage of usable data (usable data divided by the total possible data). The overall project completeness goal is 90%:

$$\% \text{ completeness} = \frac{\text{number of valid (i.e., non-R flagged) results}}{\text{number of possible results}}$$

All requested analyses were performed in accordance with Work Plan specifications (Agviq, 2017). No sample results were rejected. Completeness for this project is 100%.

2.10. Data Summary

In general, the overall quality of the data was acceptable. Acceptable data are associated with QC data that meet all QC criteria or with QC samples that did not meet QC criteria but data quality objectives were not affected. The EPA National Functional Guidelines (EPA, 2016) were used to evaluate the acceptability of the data.

Data quality meets established data quality objectives established for this project. Although some data were qualified due to quality control criteria not being met, no results were rejected. All data are suitable for their intended use.

3. REFERENCES

ADEC. 2017. *Data Review Checklist*. July.

Agviq, LLC (Agviq). 2017. *NSB Barrow South Pad, Method Three Alternative Cleanup Level Sampling Work Plan*. June 9.

EPA. 2016. *National Functional Guidelines for Organic Data Review*. EPA 540-R-2016-002. September.

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ATTACHMENT C

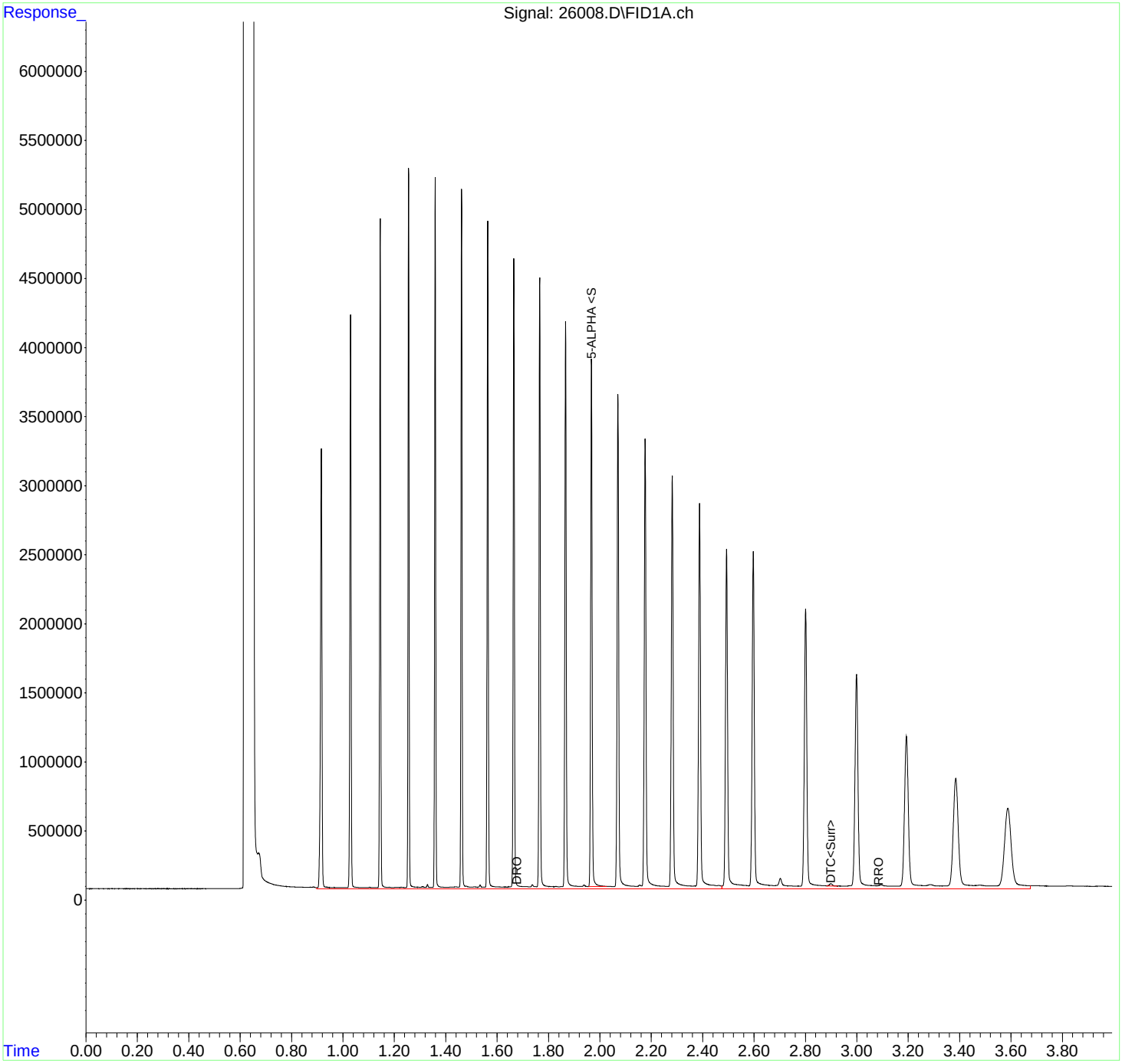
2017 ANALYTICAL CHROMATOGRAMS BIOGENIC DRO AND RRO

Quantitation Report (QT Reviewed)

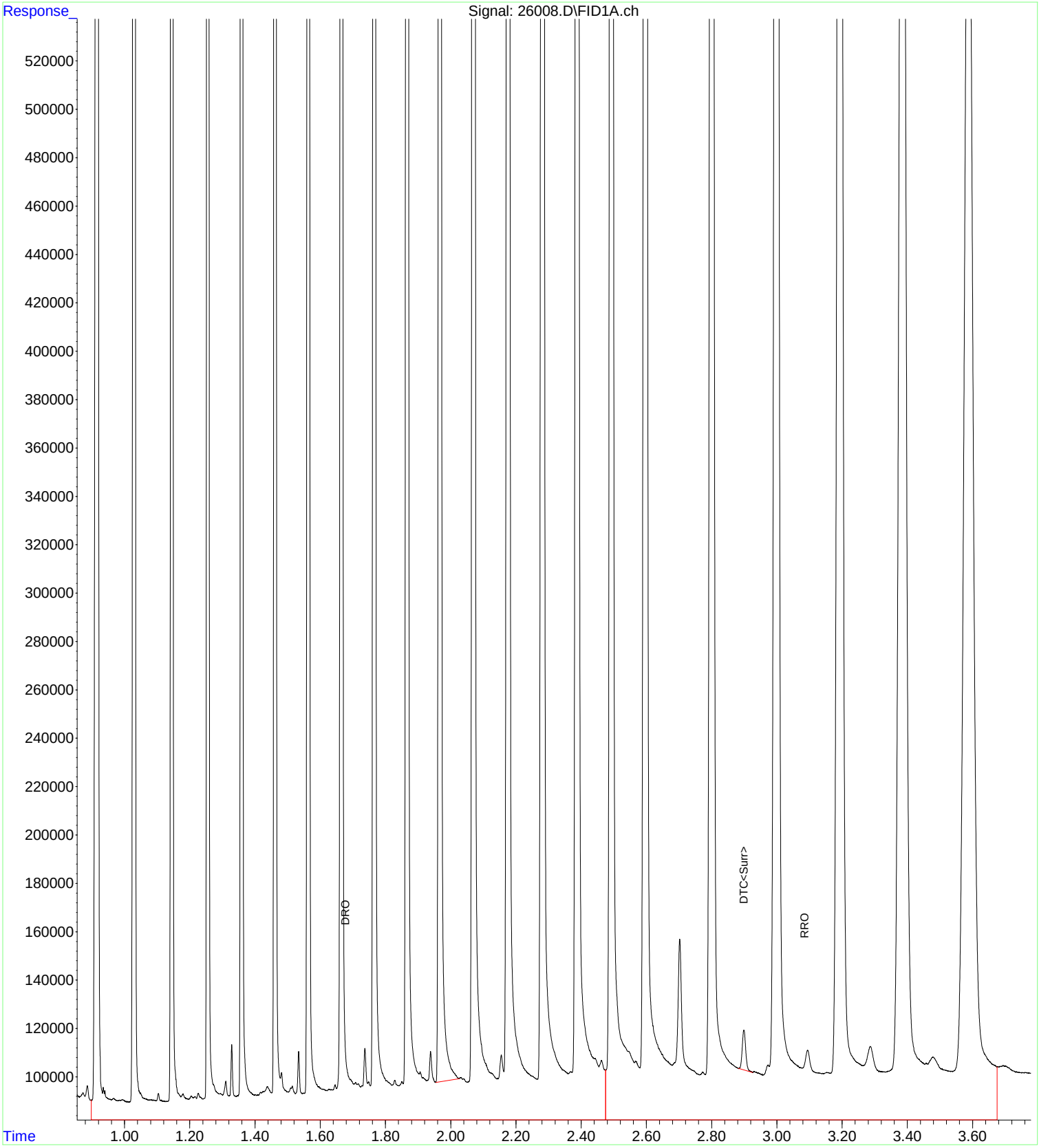
Data Path : Z:\06\SF\DATA\062717\
Data File : 26008.D
Signal(s) : FID1A.ch
Acq On : 27 Jun 2017 10:11 am
Operator : JMG
Sample : NAS
Misc :
ALS Vial : 2 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Jun 27 16:25:18 2017
Quant Method : Z:\06\SF\METHOD\SFF2017-0614L.M
Quant Title : DRO/RRO by Method AK 102/103
QLast Update : Thu Jun 15 16:09:04 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



File :Z:\06\SF\DATA\062717\26008.D
Operator : JMG
Acquired : 27 Jun 2017 10:11 am using AcqMethod SF_MXTDUAL_2015C.M
Instrument : SY
Sample Name: NAS
Misc Info :
Vial Number: 2



Area Percent Report

Data Path : Z:\06\SF\DATA\062717\
Data File : 26008.D
Signal(s) : FID1A.ch
Acq On : 27 Jun 2017 10:11 am
Sample : NAS
Misc :
ALS Vial : 2 Sample Multiplier: 1

Integration File: autoint1.e

Method : Z:\06\SF\METHOD\SFF2017-0614L.M
Title : DRO/RRO by Method AK 102/103

Signal : FID1A.ch

peak #	R.T. min	Start min	End min	PK TY	peak height	peak area	peak % max.	% of total
1	0.616	0.598	0.668	BV	424147231	5012959471	100.00%	94.169%
2	0.672	0.668	0.822	VB	254496	3701037	0.07%	0.070%
3	0.916	0.898	0.933	BV	3158132	12759318	0.25%	0.240%
4	1.030	1.013	1.065	BB	4141923	13638850	0.27%	0.256%
5	1.145	1.128	1.173	BV	4806677	14014591	0.28%	0.263%
6	1.256	1.241	1.289	BB	5160829	14396766	0.29%	0.270%
7	1.329	1.323	1.342	BB	21110	63990	0.00%	0.001%
8	1.359	1.344	1.404	BB	5086723	14689239	0.29%	0.276%
9	1.462	1.452	1.478	PV	5015960	14889342	0.30%	0.280%
10	1.534	1.526	1.546	BB	17391	58814	0.00%	0.001%
11	1.564	1.549	1.606	BB	4774217	15091724	0.30%	0.284%
12	1.665	1.650	1.702	VV	4519748	15218360	0.30%	0.286%
13	1.737	1.722	1.746	BV	15556	60692	0.00%	0.001%
14	1.766	1.754	1.802	PB	4371884	15345539	0.31%	0.288%
15	1.867	1.840	1.904	BV	4077353	15197074	0.30%	0.285%
16	1.967	1.955	2.027	PV	3802130	15327000	0.31%	0.288%
17	2.071	2.052	2.142	BB	3547988	15554915	0.31%	0.292%
18	2.176	2.163	2.258	VB	3233275	15205509	0.30%	0.286%
19	2.282	2.263	2.359	BV	2963708	14948846	0.30%	0.281%
20	2.388	2.359	2.455	PV	2769571	14586950	0.29%	0.274%
21	2.493	2.475	2.564	BV	2435298	13524854	0.27%	0.254%
22	2.597	2.579	2.678	BV	2418481	14224320	0.28%	0.267%
23	2.703	2.678	2.739	VB	53822	420066	0.01%	0.008%
24	2.801	2.779	2.881	BB	2003353	13374279	0.27%	0.251%
25	2.899	2.882	2.926	BB	16469	121700	0.00%	0.002%
26	2.999	2.955	3.077	BB	1530974	12452747	0.25%	0.234%
27	3.193	3.162	3.265	BB	1082762	11039965	0.22%	0.207%
28	3.385	3.343	3.453	BV	778411	10396867	0.21%	0.195%
29	3.588	3.539	3.675	BB	562634	10087086	0.20%	0.189%

Sum of corrected areas: 5323349910

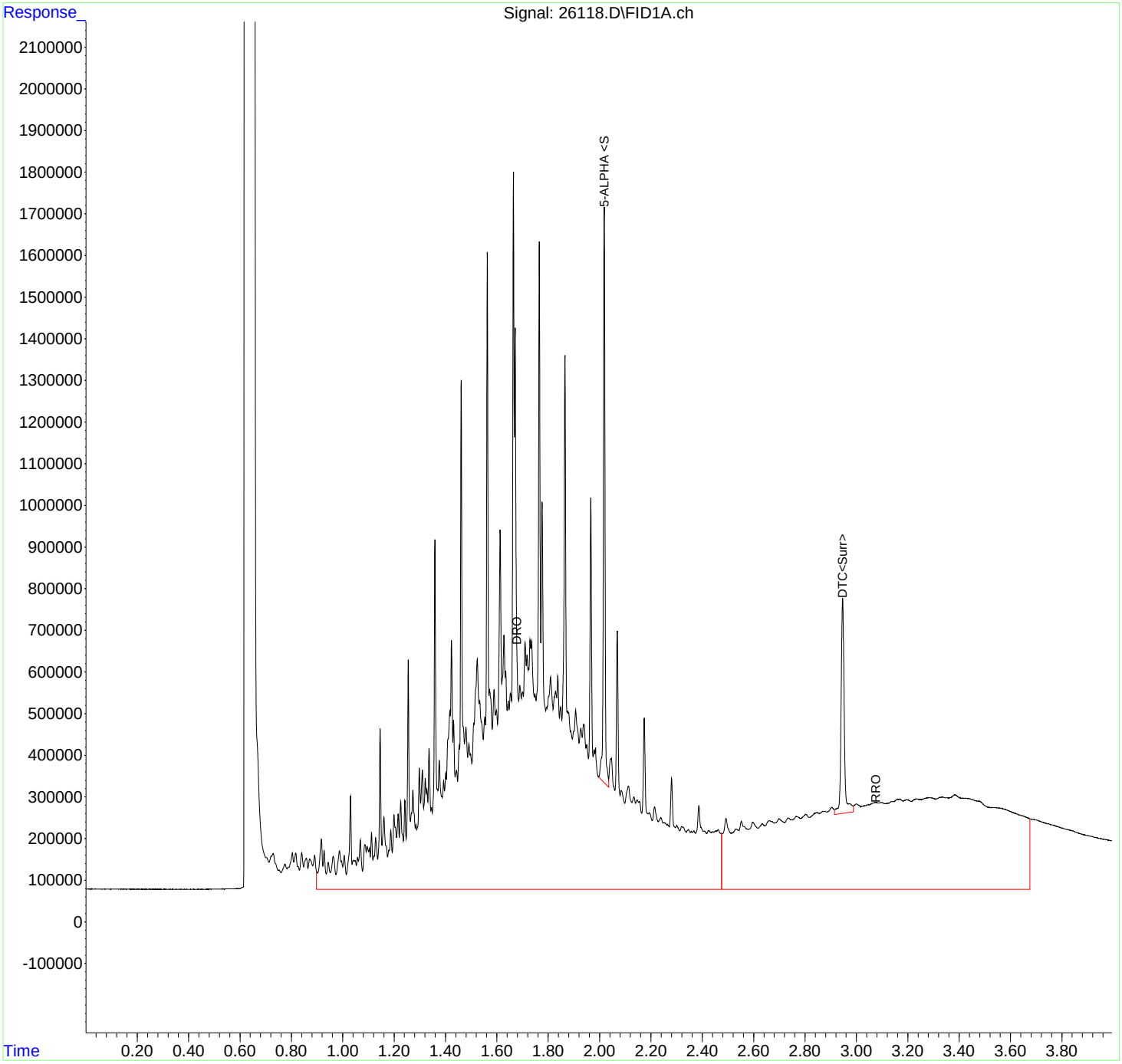
SFF2017-0614L.M Tue Jun 27 16:17:53 2017

Quantitation Report (QT Reviewed)

Data Path : Z:\06\SF\DATA\062717\
Data File : 26118.D
Signal(s) : FID1A.ch
Acq On : 27 Jun 2017 7:14 pm
Operator : JMG
Sample : 1393623 LCS
Misc :
ALS Vial : 102 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Jun 28 08:38:36 2017
Quant Method : Z:\06\SF\METHOD\SFF2017-0614L.M
Quant Title : DRO/RRO by Method AK 102/103
QLast Update : Thu Jun 15 16:09:04 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

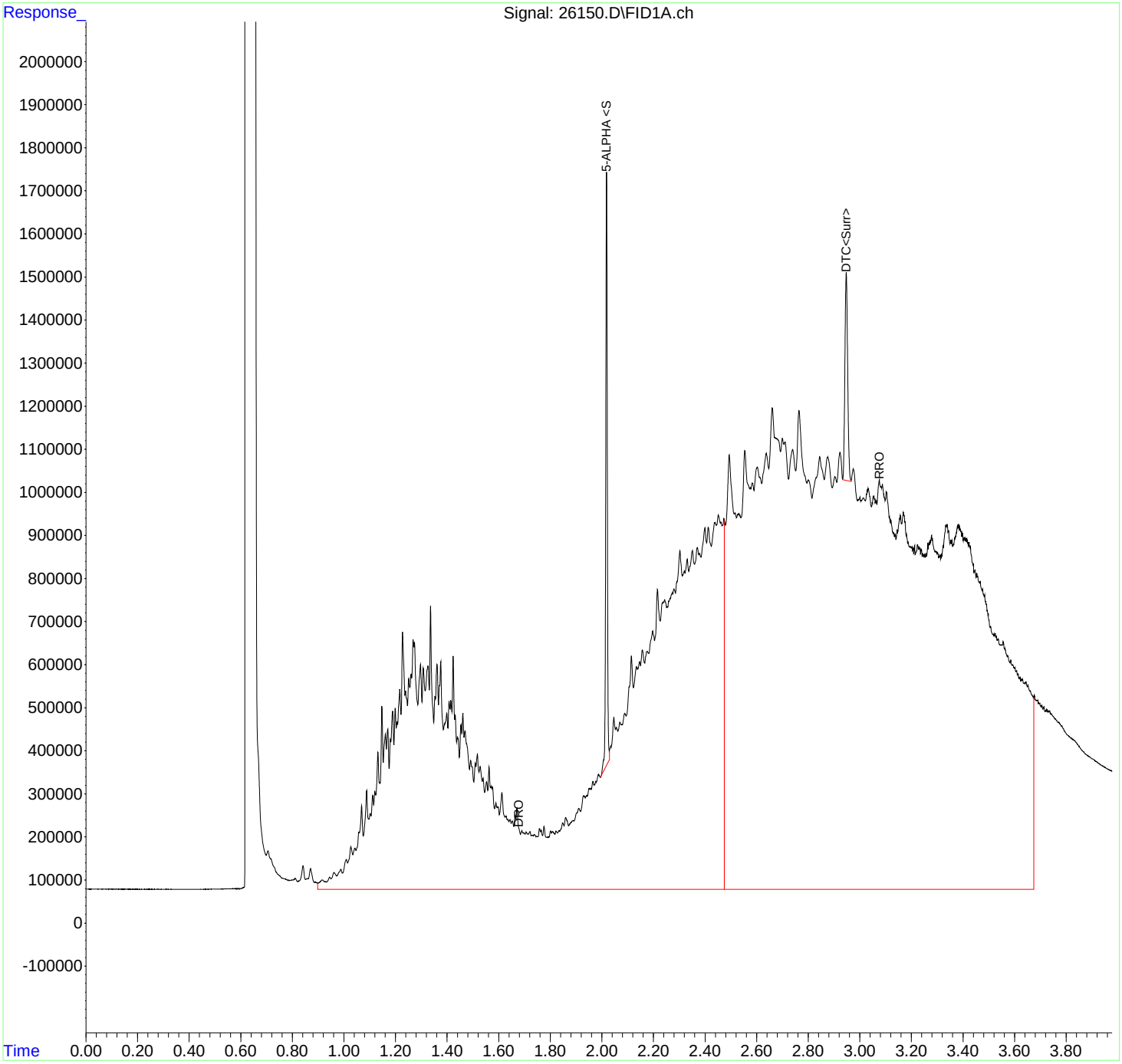


Quantitation Report (QT Reviewed)

Data Path : Z:\06\SF\DATA\062717\
Data File : 26150.D
Signal(s) : FID1A.ch
Acq On : 27 Jun 2017 9:50 pm
Operator : JMG
Sample : 1173405002
Misc :
ALS Vial : 116 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Jun 28 08:53:41 2017
Quant Method : Z:\06\SF\METHOD\SFF2017-0614L.M
Quant Title : DRO/RRO by Method AK 102/103
QLast Update : Thu Jun 15 16:09:04 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

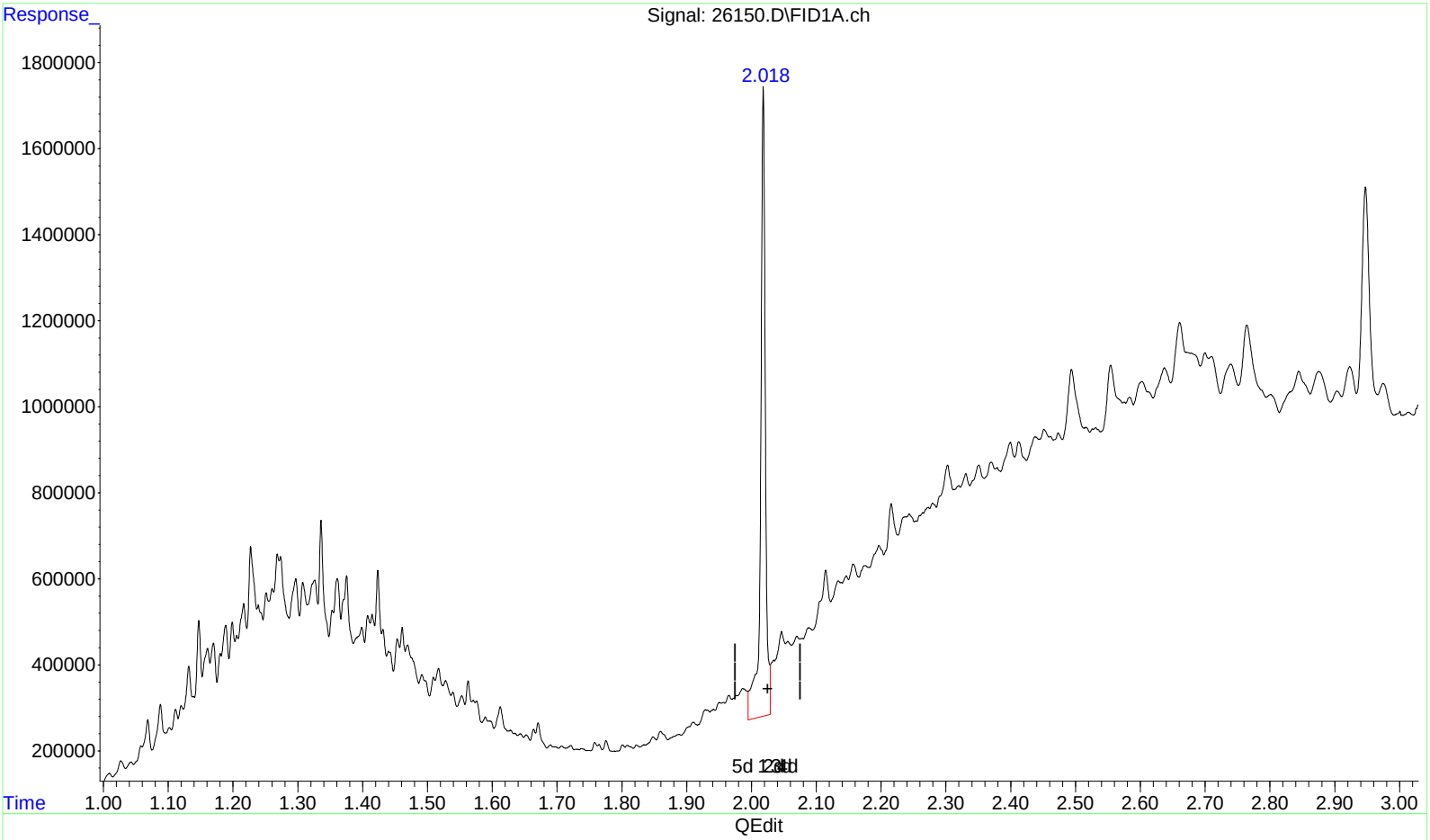


Quantitation Report (Qedit)

Data Path : Z:\06\SF\DATA\062717\
Data File : 26150.D
Signal(s) : FID1A.ch
Acq On : 27 Jun 2017 9:50 pm
Operator : JMG
Sample : 1173405002
Misc :
ALS Vial : 116 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Jun 28 08:51:53 2017
Quant Method : Z:\06\SF\METHOD\SFF2017-0614L.M
Quant Title : DRO/RRO by Method AK 102/103
QLast Update : Thu Jun 15 16:09:04 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



(2) 5-ALPHA <Surr> (S)

2.018min 119.026 µg/mL

response 7465189

O-BLC

Jun 28, 2017

Phyllis Woods 6/28/2017

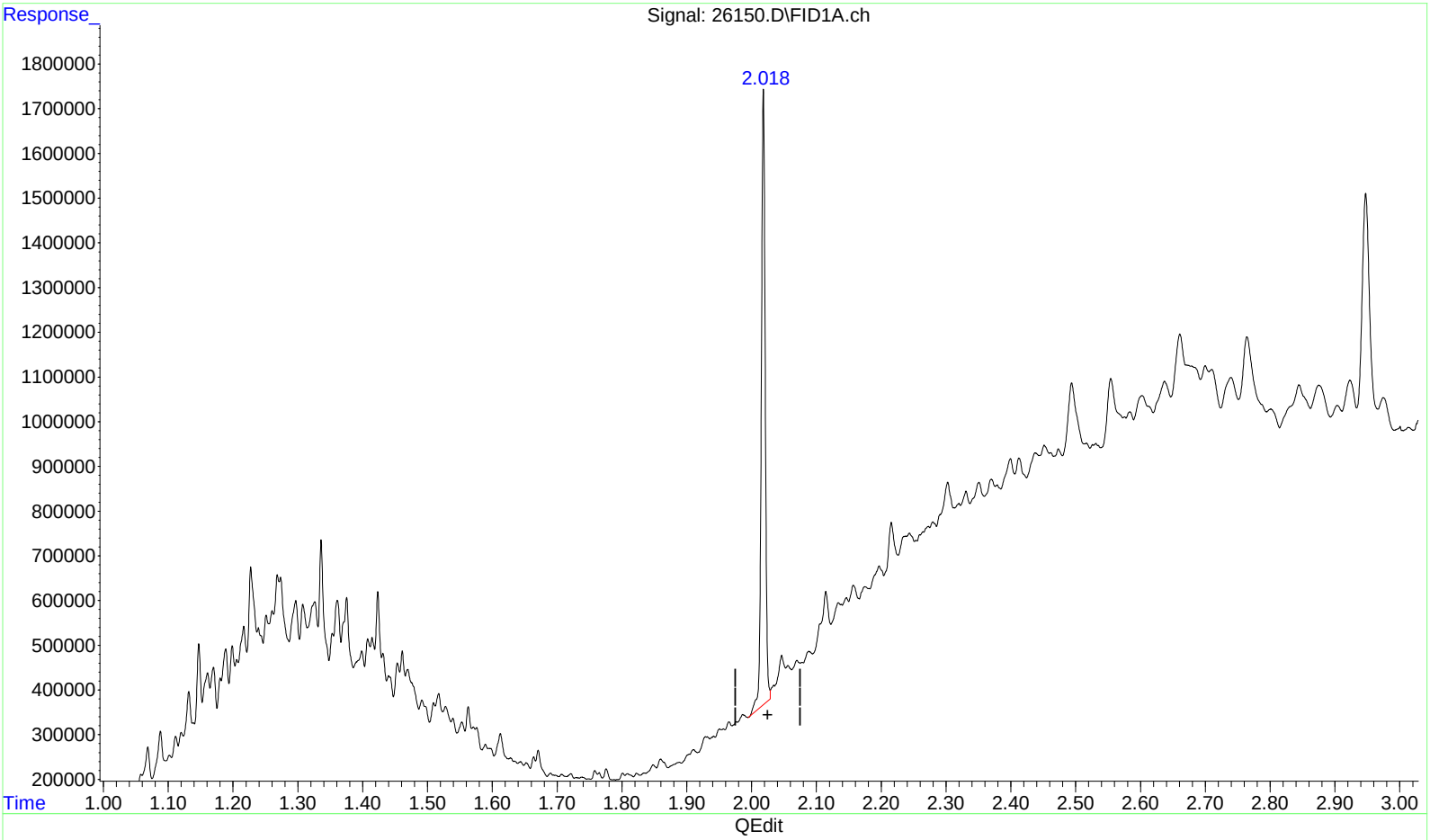
(+) = Expected Retention Time

Quantitation Report (Qedit)

Data Path : Z:\06\SF\DATA\062717\
Data File : 26150.D
Signal(s) : FID1A.ch
Acq On : 27 Jun 2017 9:50 pm
Operator : JMG
Sample : 1173405002
Misc :
ALS Vial : 116 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Jun 28 08:51:53 2017
Quant Method : Z:\06\SF\METHOD\SFF2017-0614L.M
Quant Title : DRO/RRO by Method AK 102/103
QLast Update : Thu Jun 15 16:09:04 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



(2) 5-ALPHA <Surr> (S)

2.018min 92.536 µg/mL m

response 5803763

M-BLC
Jun 28, 2017

Phyllis Woods
6/28/2017

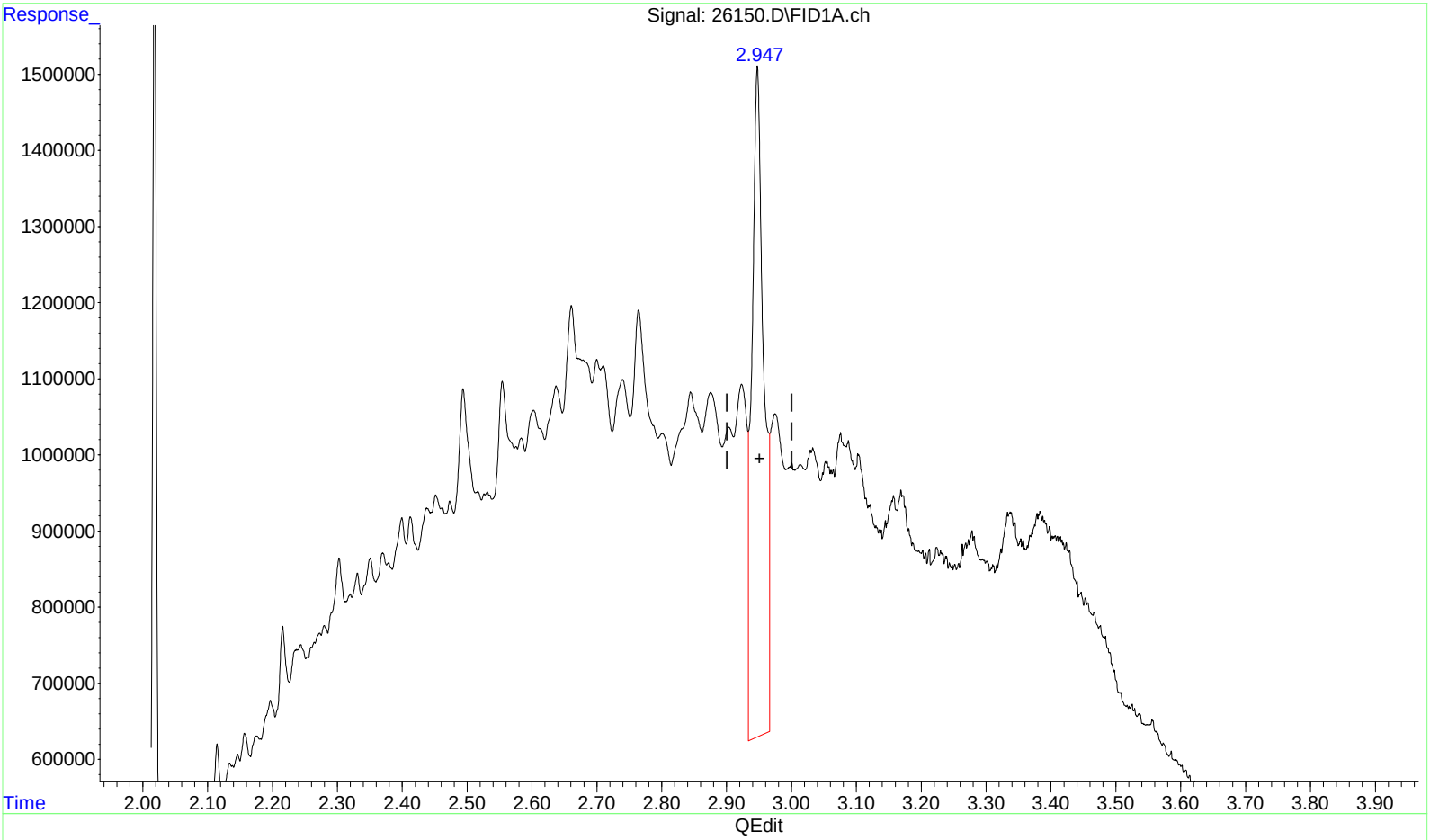
(+) = Expected Retention Time

Quantitation Report (Qedit)

Data Path : Z:\06\SF\DATA\062717\
Data File : 26150.D
Signal(s) : FID1A.ch
Acq On : 27 Jun 2017 9:50 pm
Operator : JMG
Sample : 1173405002
Misc :
ALS Vial : 116 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Jun 28 08:51:53 2017
Quant Method : Z:\06\SF\METHOD\SFF2017-0614L.M
Quant Title : DRO/RRO by Method AK 102/103
QLast Update : Thu Jun 15 16:09:04 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



(4) DTC<Surr> (S)

2.948min 273.633 µg/mL

response 11366127

O-BLC

Jun 28, 2017

Phyllis Woods

6/28/2017

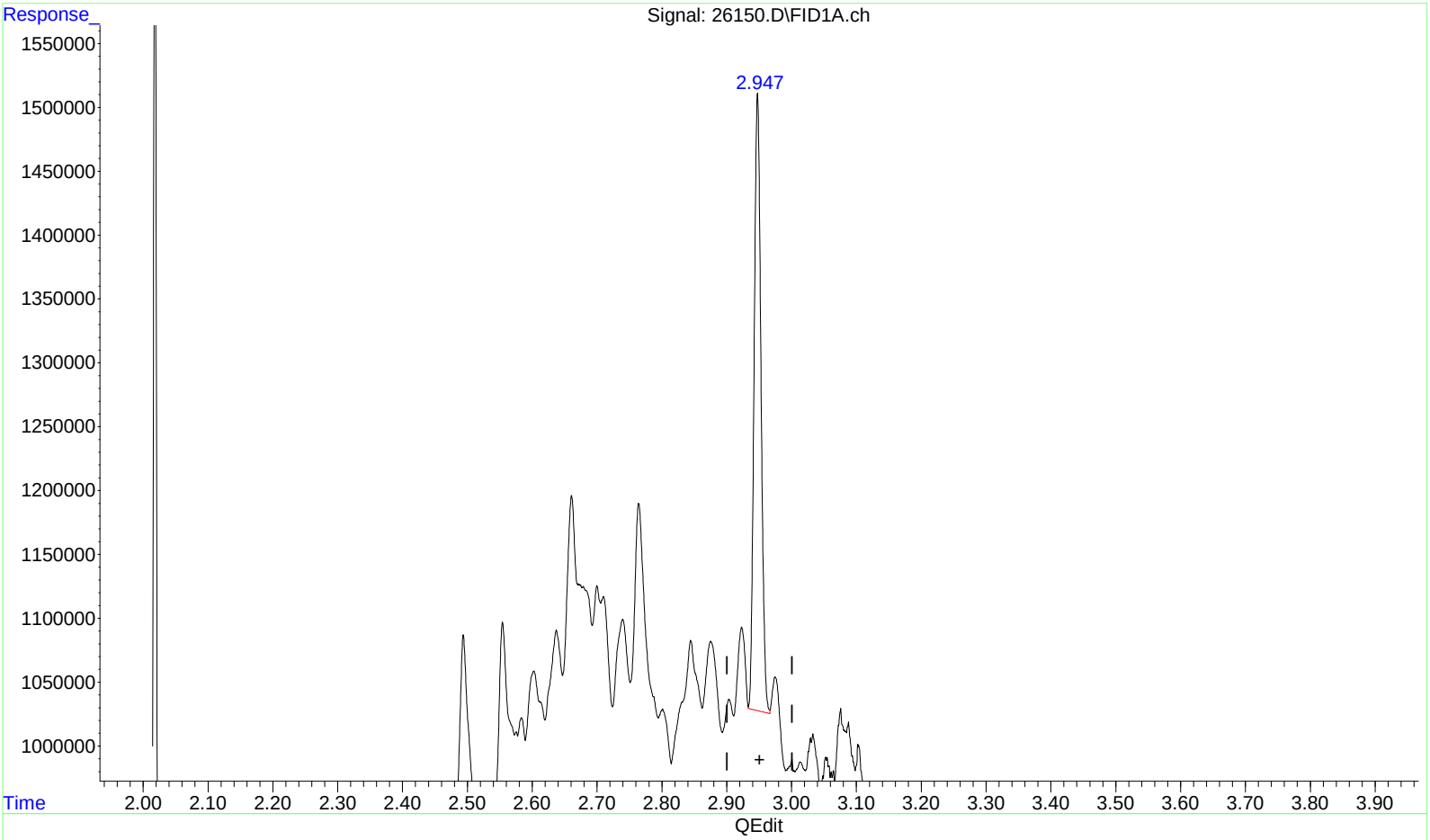
(+) = Expected Retention Time

Quantitation Report (Qedit)

Data Path : Z:\06\SF\DATA\062717\
Data File : 26150.D
Signal(s) : FID1A.ch
Acq On : 27 Jun 2017 9:50 pm
Operator : JMG
Sample : 1173405002
Misc :
ALS Vial : 116 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Jun 28 08:51:53 2017
Quant Method : Z:\06\SF\METHOD\SFF2017-0614L.M
Quant Title : DRO/RRO by Method AK 102/103
QLast Update : Thu Jun 15 16:09:04 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



(4) DTC<Surr> (S)

2.947min 86.049 µg/mL m

response 3574296

M-BLC
Jun 28, 2017

Phyllis Woods 6/28/2017

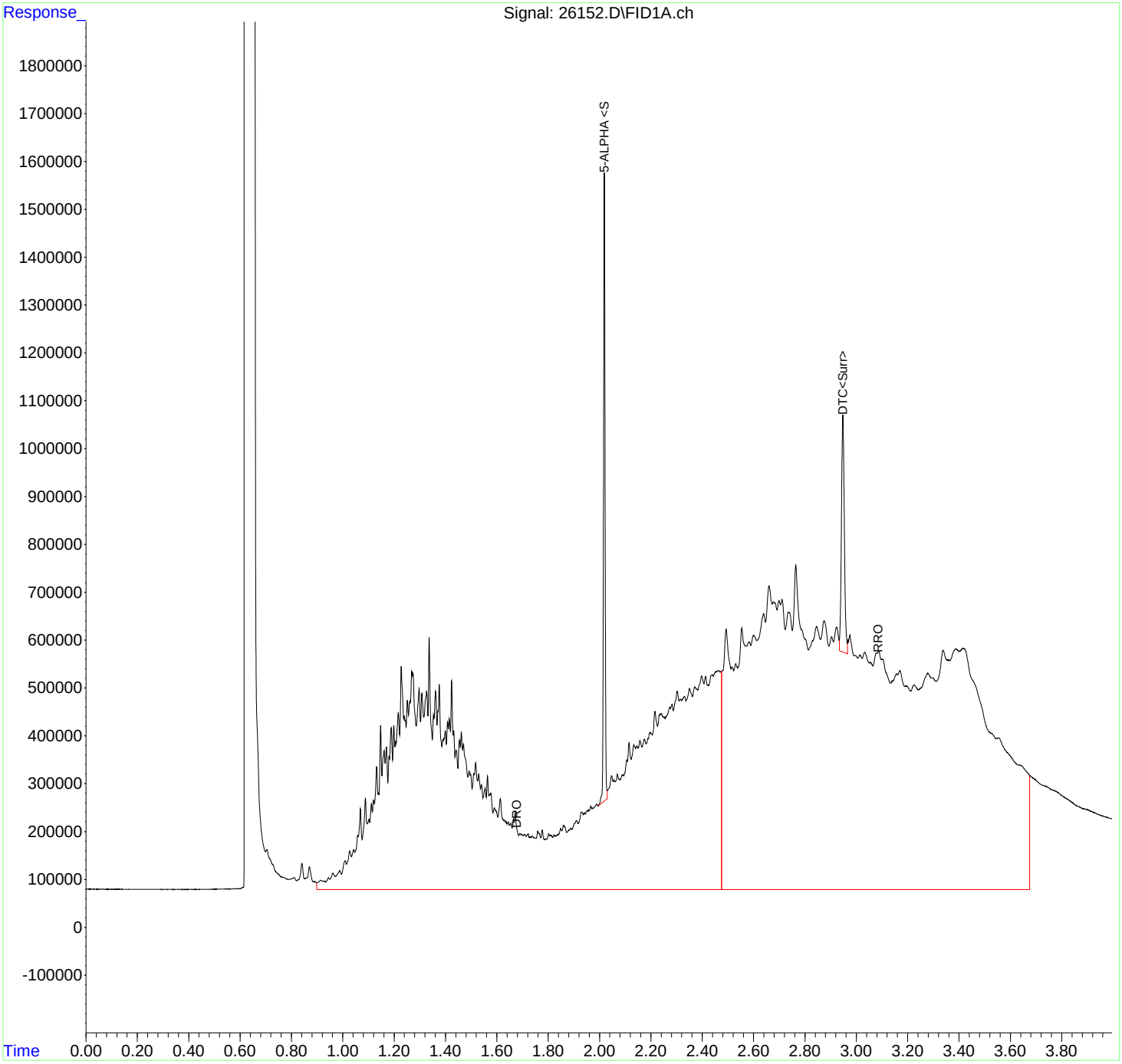
(+) = Expected Retention Time

Quantitation Report (QT Reviewed)

Data Path : Z:\06\SF\DATA\062717\
Data File : 26152.D
Signal(s) : FID1A.ch
Acq On : 27 Jun 2017 10:00 pm
Operator : JMG
Sample : 1173405003
Misc :
ALS Vial : 117 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Jun 28 08:56:00 2017
Quant Method : Z:\06\SF\METHOD\SFF2017-0614L.M
Quant Title : DRO/RRO by Method AK 102/103
QLast Update : Thu Jun 15 16:09:04 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

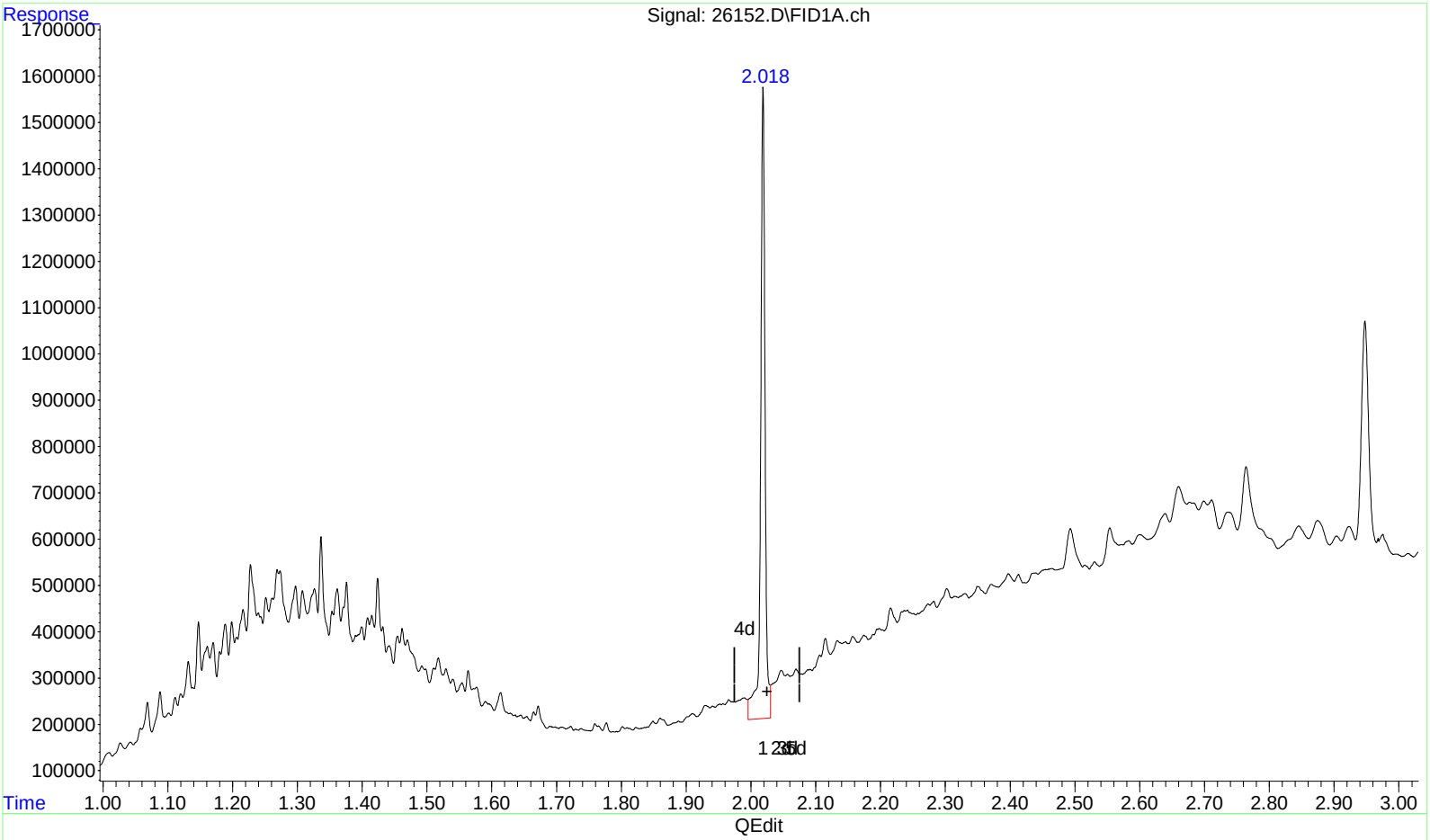


Quantitation Report (Qedit)

Data Path : Z:\06\SF\DATA\062717\
Data File : 26152.D
Signal(s) : FID1A.ch
Acq On : 27 Jun 2017 10:00 pm
Operator : JMG
Sample : 1173405003
Misc :
ALS Vial : 117 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Jun 28 08:54:21 2017
Quant Method : Z:\06\SF\METHOD\SFF2017-0614L.M
Quant Title : DRO/RRO by Method AK 102/103
QLast Update : Thu Jun 15 16:09:04 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



(2) 5-ALPHA <Surr> (S)

2.019min 104.011 µg/mL

response 6523483

O-BLC

Jun 28, 2017

Phyllis Woods 6/28/2017

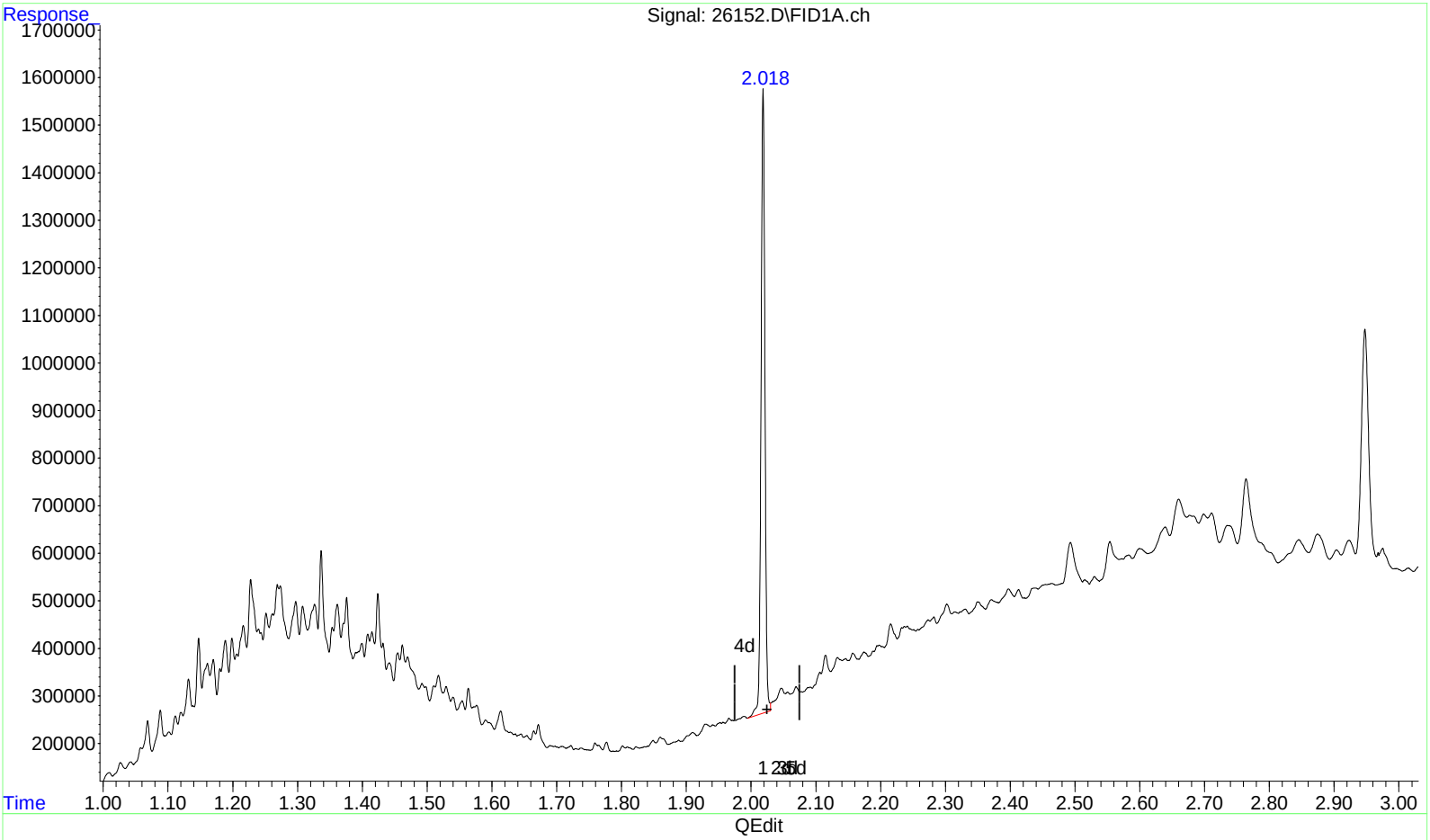
(+) = Expected Retention Time

Quantitation Report (Qedit)

Data Path : Z:\06\SF\DATA\062717\
Data File : 26152.D
Signal(s) : FID1A.ch
Acq On : 27 Jun 2017 10:00 pm
Operator : JMG
Sample : 1173405003
Misc :
ALS Vial : 117 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Jun 28 08:54:21 2017
Quant Method : Z:\06\SF\METHOD\SFF2017-0614L.M
Quant Title : DRO/RRO by Method AK 102/103
QLast Update : Thu Jun 15 16:09:04 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



(2) 5-ALPHA <Surr> (S)

2.018min 87.732 µg/mL m

response 5502473

M-BLC
Jun 28, 2017

Phyllis Woods
6/28/2017

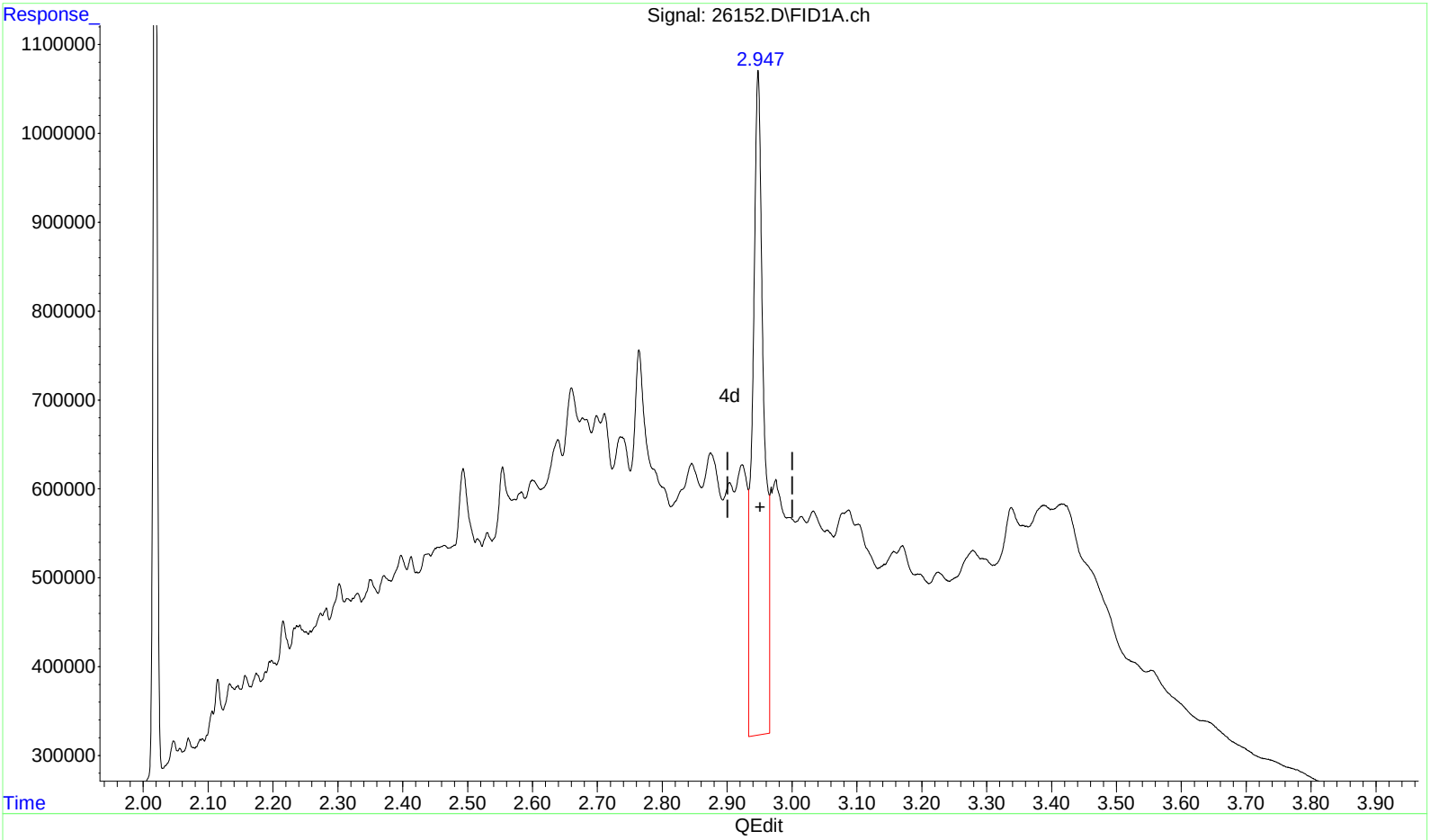
(+) = Expected Retention Time

Quantitation Report (Qedit)

Data Path : Z:\06\SF\DATA\062717\
Data File : 26152.D
Signal(s) : FID1A.ch
Acq On : 27 Jun 2017 10:00 pm
Operator : JMG
Sample : 1173405003
Misc :
ALS Vial : 117 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Jun 28 08:54:21 2017
Quant Method : Z:\06\SF\METHOD\SFF2017-0614L.M
Quant Title : DRO/RRO by Method AK 102/103
QLast Update : Thu Jun 15 16:09:04 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



(4) DTC<Surr> (S)

2.948min 211.569 µg/mL

response 8788121

O-BLC

Jun 28, 2017

Phyllis Woods 6/28/2017

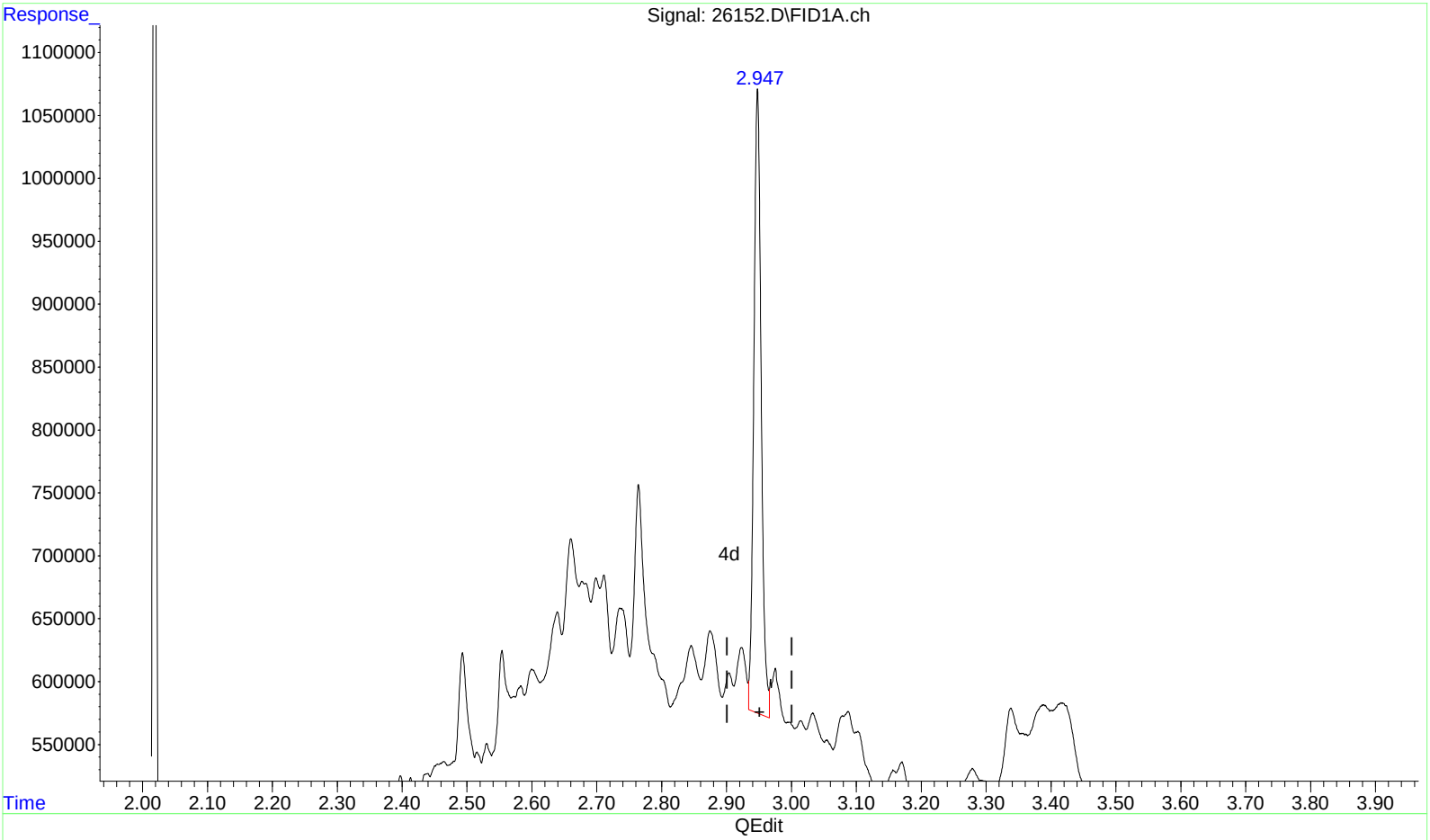
(+) = Expected Retention Time

Quantitation Report (Qedit)

Data Path : Z:\06\SF\DATA\062717\
Data File : 26152.D
Signal(s) : FID1A.ch
Acq On : 27 Jun 2017 10:00 pm
Operator : JMG
Sample : 1173405003
Misc :
ALS Vial : 117 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Jun 28 08:54:21 2017
Quant Method : Z:\06\SF\METHOD\SFF2017-0614L.M
Quant Title : DRO/RRO by Method AK 102/103
QLast Update : Thu Jun 15 16:09:04 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



(4) DTC<Surr> (S)

2.947min 94.509 µg/mL m

response 3925689

M-BLC
Jun 28, 2017

Phyllis Woods
6/28/2017

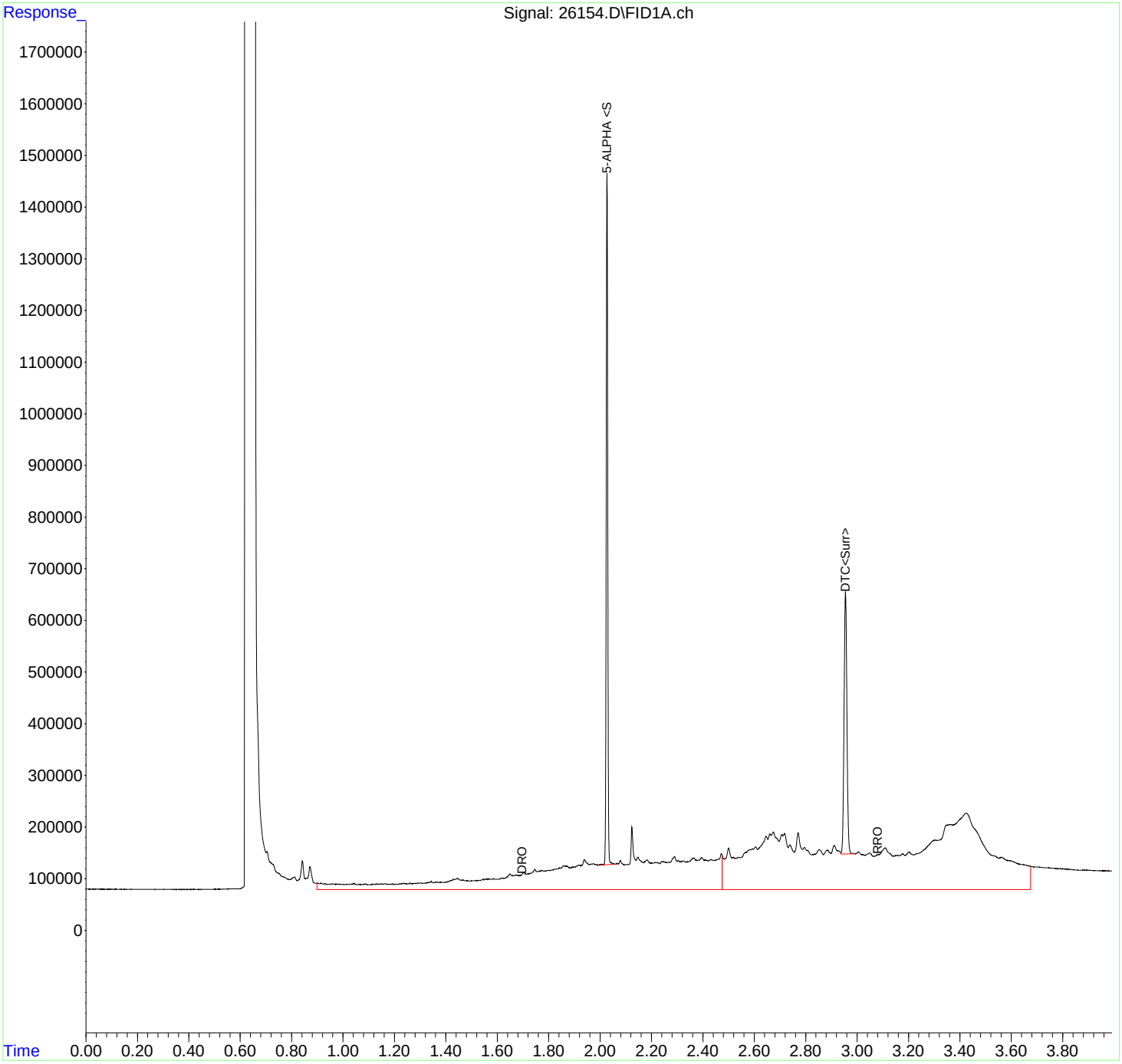
(+) = Expected Retention Time

Quantitation Report (QT Reviewed)

Data Path : Z:\06\SF\DATA\062717\
Data File : 26154.D
Signal(s) : FID1A.ch
Acq On : 27 Jun 2017 10:09 pm
Operator : JMG
Sample : 1173405004
Misc :
ALS Vial : 118 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Jun 28 08:57:04 2017
Quant Method : Z:\06\SF\METHOD\SFF2017-0614L.M
Quant Title : DRO/RRO by Method AK 102/103
QLast Update : Thu Jun 15 16:09:04 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

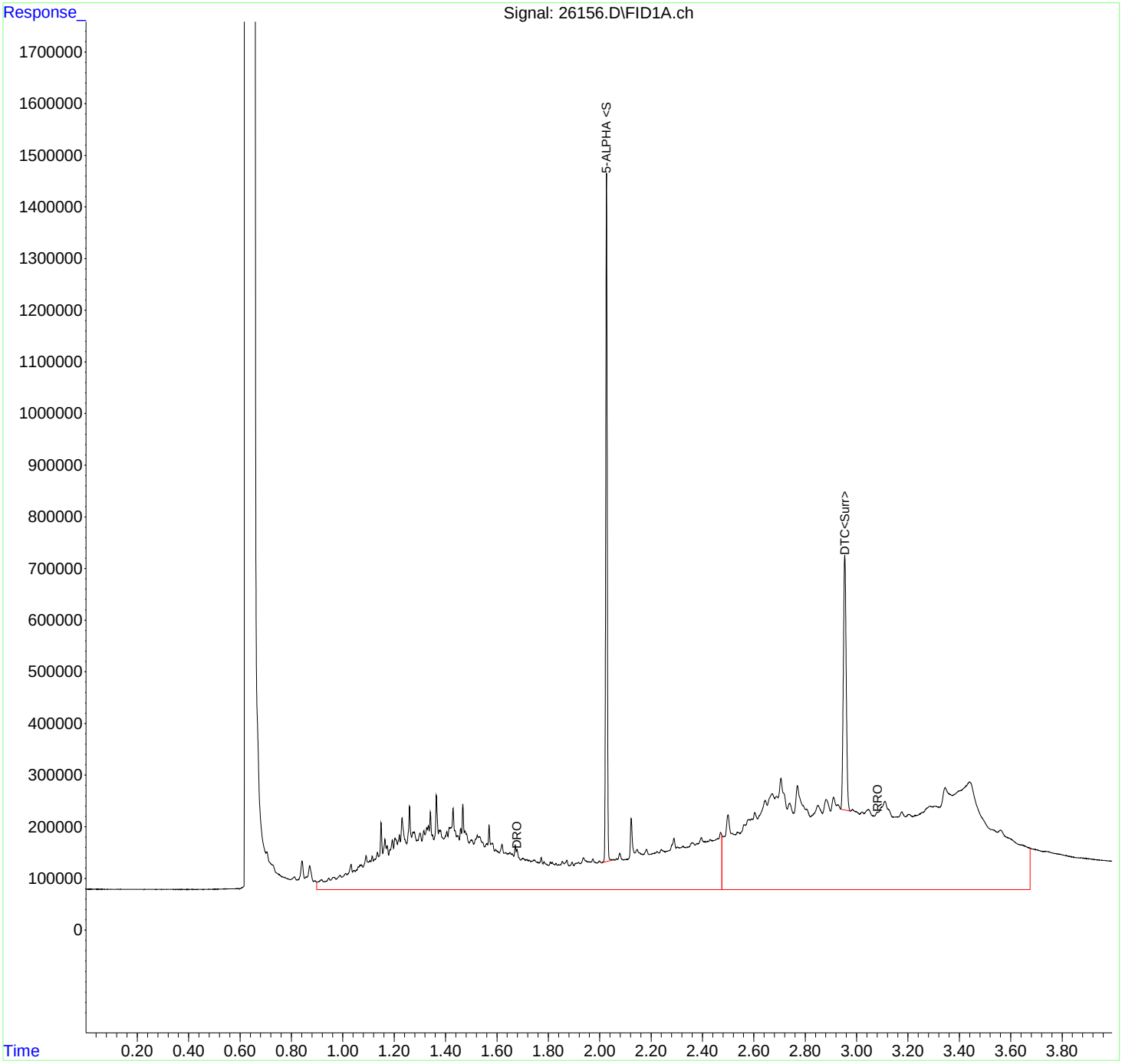


Quantitation Report (QT Reviewed)

Data Path : Z:\06\SF\DATA\062717\
Data File : 26156.D
Signal(s) : FID1A.ch
Acq On : 27 Jun 2017 10:19 pm
Operator : JMG
Sample : 1173405005
Misc :
ALS Vial : 119 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Jun 28 08:58:09 2017
Quant Method : Z:\06\SF\METHOD\SFF2017-0614L.M
Quant Title : DRO/RRO by Method AK 102/103
QLast Update : Thu Jun 15 16:09:04 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

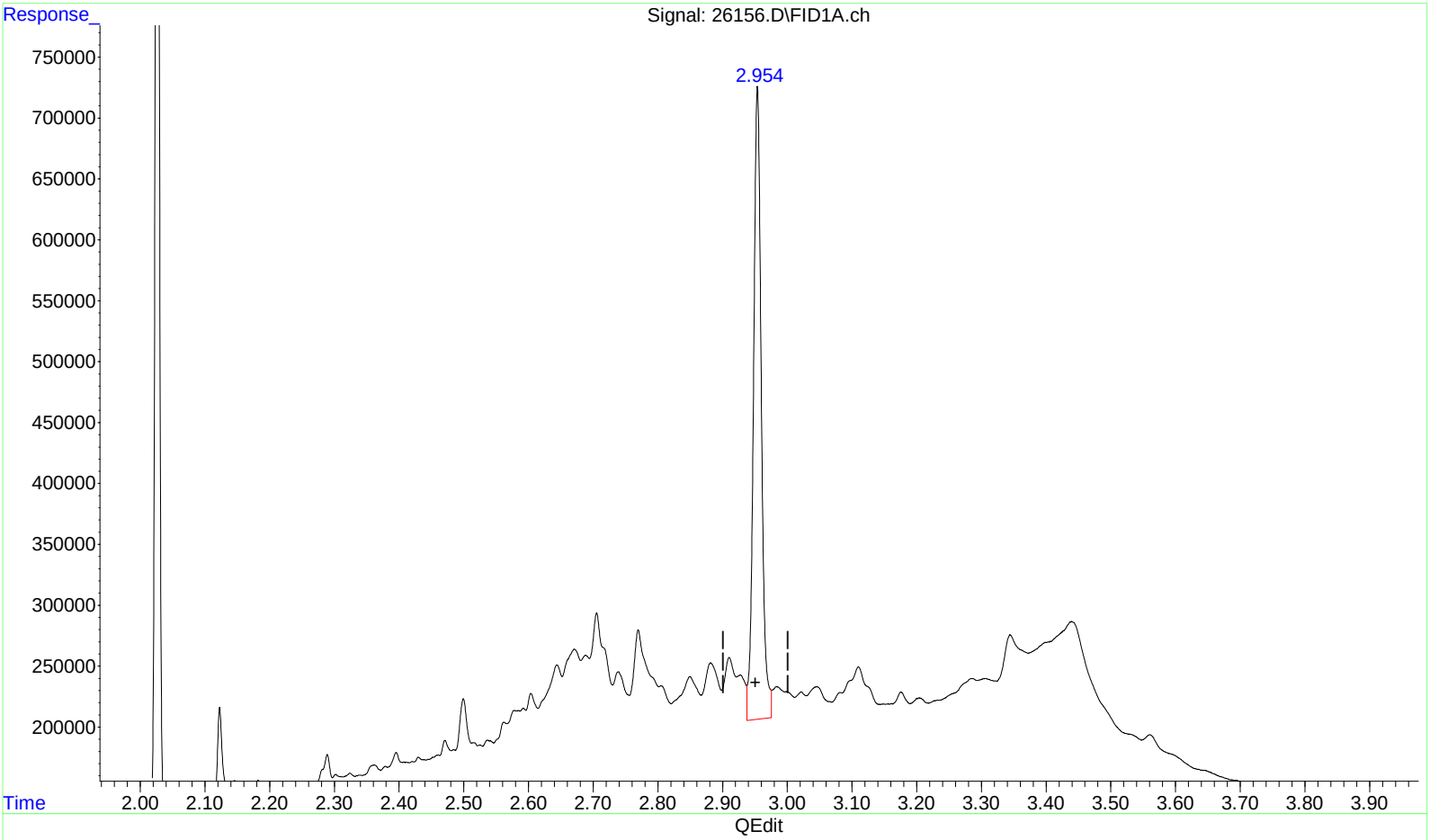


Quantitation Report (Qedit)

Data Path : Z:\06\SF\DATA\062717\
Data File : 26156.D
Signal(s) : FID1A.ch
Acq On : 27 Jun 2017 10:19 pm
Operator : JMG
Sample : 1173405005
Misc :
ALS Vial : 119 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Jun 28 08:57:26 2017
Quant Method : Z:\06\SF\METHOD\SFF2017-0614L.M
Quant Title : DRO/RRO by Method AK 102/103
QLast Update : Thu Jun 15 16:09:04 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



(4) DTC<Surr> (S)

2.954min 105.404 µg/mL

response 4378258

O-BLC

Jun 28, 2017

Phyllis Woods 6/28/2017

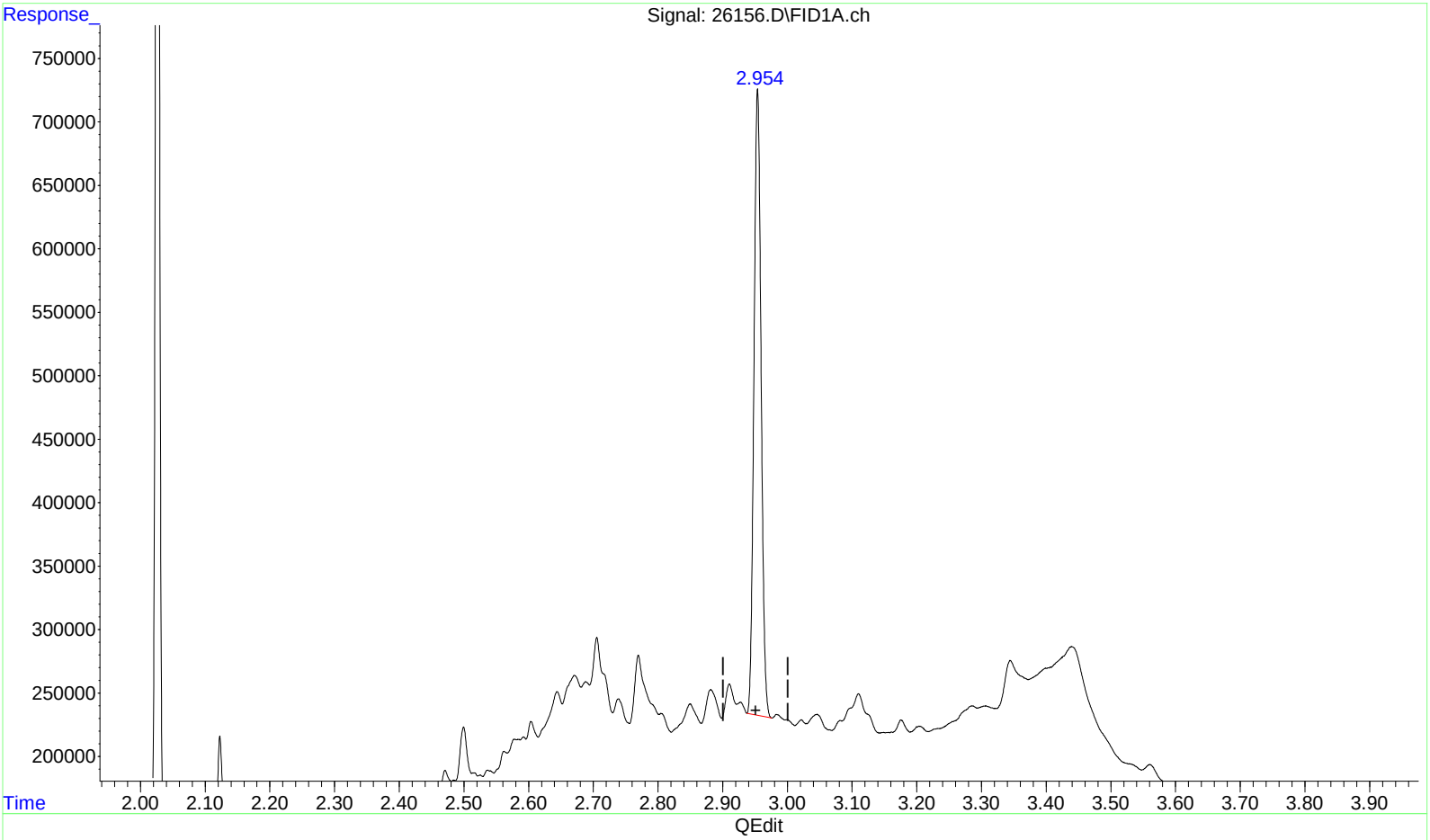
(+) = Expected Retention Time

Quantitation Report (Qedit)

Data Path : Z:\06\SF\DATA\062717\
Data File : 26156.D
Signal(s) : FID1A.ch
Acq On : 27 Jun 2017 10:19 pm
Operator : JMG
Sample : 1173405005
Misc :
ALS Vial : 119 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Jun 28 08:57:26 2017
Quant Method : Z:\06\SF\METHOD\SFF2017-0614L.M
Quant Title : DRO/RRO by Method AK 102/103
QLast Update : Thu Jun 15 16:09:04 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



(4) DTC<Surr> (S)

2.954min 91.363 µg/mL m

response 3795036

M-BLC
Jun 28, 2017

Phyllis Woods
6/28/2017

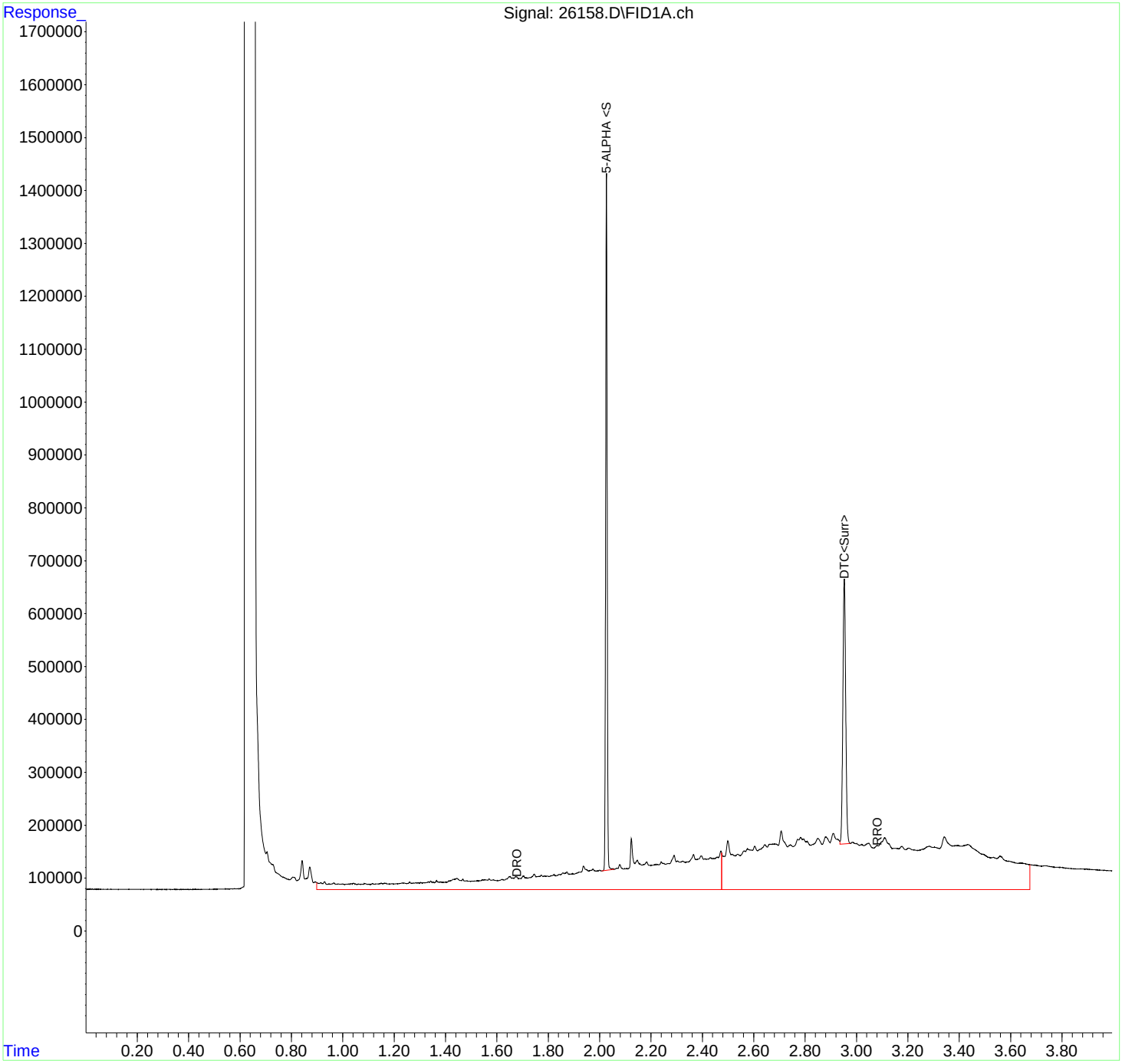
(+) = Expected Retention Time

Quantitation Report (QT Reviewed)

Data Path : Z:\06\SF\DATA\062717\
Data File : 26158.D
Signal(s) : FID1A.ch
Acq On : 27 Jun 2017 10:29 pm
Operator : JMG
Sample : 1173405006
Misc :
ALS Vial : 120 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Jun 28 08:58:47 2017
Quant Method : Z:\06\SF\METHOD\SFF2017-0614L.M
Quant Title : DRO/RRO by Method AK 102/103
QLast Update : Thu Jun 15 16:09:04 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

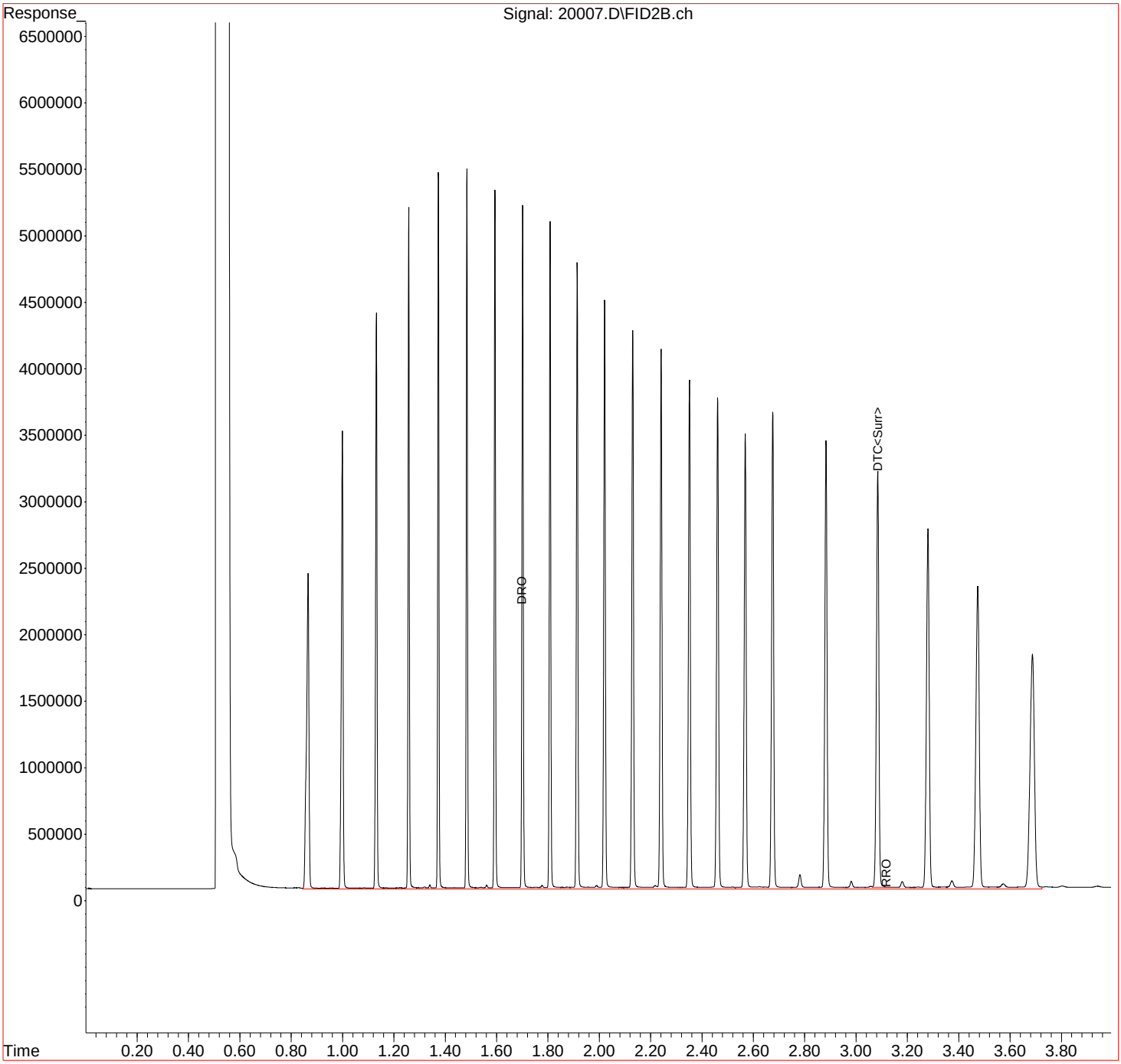


Quantitation Report (QT Reviewed)

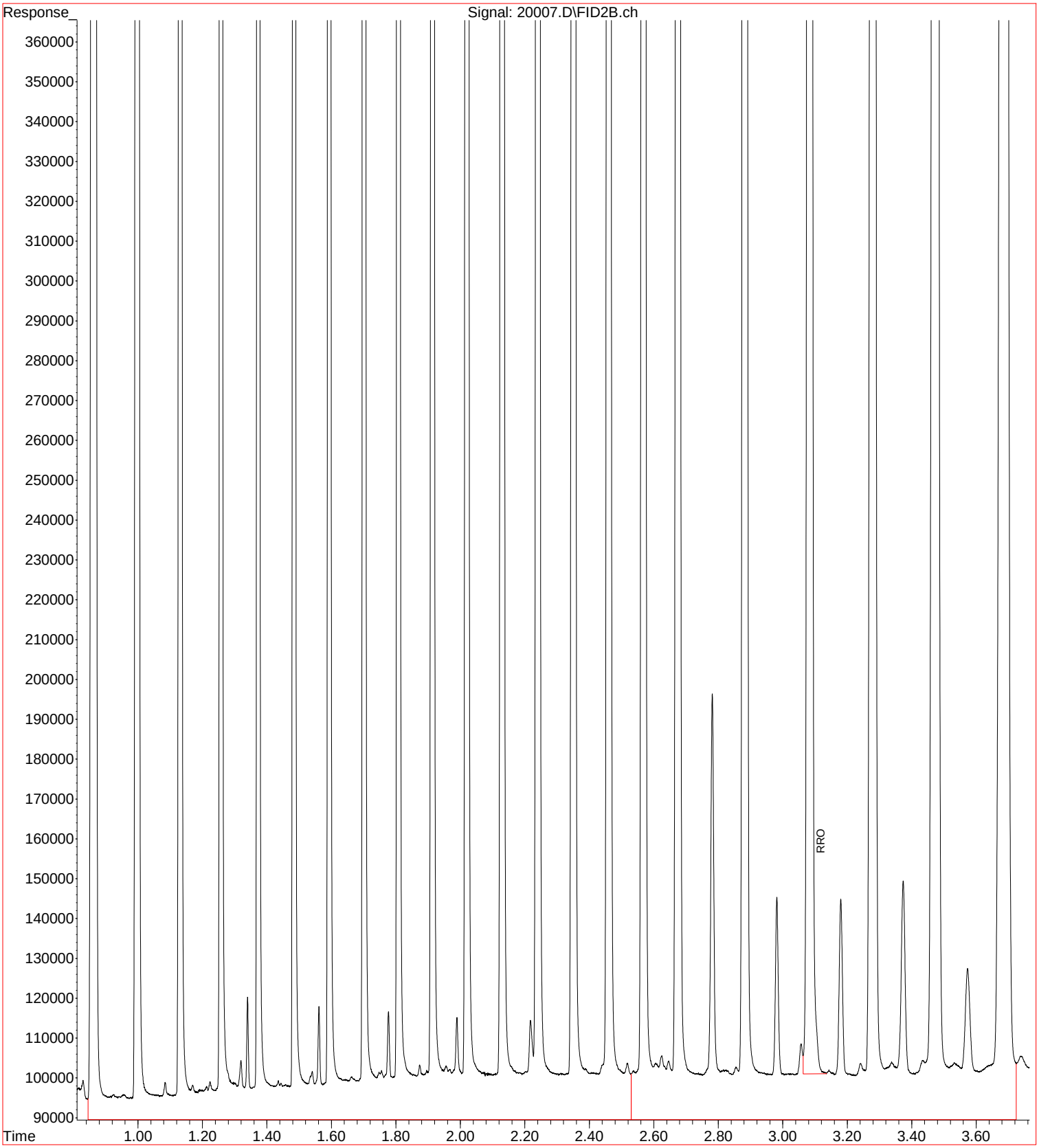
Data Path : Z:\07\SF\DATA\072017A.SEC\
Data File : 20007.D
Signal(s) : FID2B.ch
Acq On : 20 Jul 2017 1:55 pm
Operator : KMD
Sample : NAS
Misc :
ALS Vial : 2 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Jul 21 10:33:33 2017
Quant Method : Z:\07\SF\METHOD\SFR2017-0710M.M
Quant Title : DRO/RRO by Method AK 102/103
QLast Update : Tue Jul 11 11:48:00 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



File :Z:\07\SF\DATA\072017A.SEC\20007.D
Operator : KMD
Acquired : 20 Jul 2017 1:55 pm using AcqMethod SF_MXTDUAL_2015C.M
Instrument : SY
Sample Name: NAS
Misc Info :
Vial Number: 2



Area Percent Report

Data Path : Z:\07\SF\DATA\072017A.SEC\
Data File : 20007.D
Signal(s) : FID2B.ch
Acq On : 20 Jul 2017 1:55 pm
Sample : NAS
Misc :
ALS Vial : 2 Sample Multiplier: 1

Integration File: autoint1.e

Method : Z:\07\SF\METHOD\SFR2017-0710M.M
Title : DRO/RRO by Method AK 102/103

Signal : FID2B.ch

peak #	R.T. min	Start min	End min	PK TY	peak height	peak area	peak % max.	% of total
1	0.508	0.486	0.785	BB	330965918	5417833390	100.00%	92.888%
2	0.866	0.845	0.906	BB	2363944	15504408	0.29%	0.266%
3	0.999	0.980	1.037	BB	3426101	16226502	0.30%	0.278%
4	1.132	1.112	1.164	BV	4317023	16610267	0.31%	0.285%
5	1.258	1.242	1.295	BV	5079636	17107201	0.32%	0.293%
6	1.340	1.331	1.351	BB	22568	77107	0.00%	0.001%
7	1.373	1.358	1.410	BB	5354398	17522320	0.32%	0.300%
8	1.485	1.465	1.522	BB	5371354	17976311	0.33%	0.308%
9	1.562	1.547	1.574	VB	19476	73276	0.00%	0.001%
10	1.594	1.577	1.630	BB	5222090	18247039	0.34%	0.313%
11	1.702	1.683	1.741	BV	5099851	18512682	0.34%	0.317%
12	1.777	1.765	1.790	BB	16324	63844	0.00%	0.001%
13	1.809	1.790	1.852	BB	4987390	18846461	0.35%	0.323%
14	1.914	1.885	1.944	BV	4680649	18829354	0.35%	0.323%
15	1.990	1.974	2.004	BV	13965	66365	0.00%	0.001%
16	2.021	2.004	2.069	PB	4400028	19060789	0.35%	0.327%
17	2.130	2.095	2.175	BB	4175932	19510257	0.36%	0.335%
18	2.241	2.227	2.282	VB	4034071	19336329	0.36%	0.332%
19	2.352	2.329	2.400	BB	3809297	19390821	0.36%	0.332%
20	2.461	2.428	2.509	BV	3677022	19487293	0.36%	0.334%
21	2.569	2.530	2.597	PV	3406495	18408435	0.34%	0.316%
22	2.676	2.657	2.719	BB	3571813	19901903	0.37%	0.341%
23	2.782	2.752	2.806	BB	95198	614816	0.01%	0.011%
24	2.883	2.840	2.931	BB	3356797	20064690	0.37%	0.344%
25	2.982	2.964	3.005	BB	44472	274225	0.01%	0.005%
26	3.085	3.063	3.135	VB	3126781	20560805	0.38%	0.353%
27	3.180	3.160	3.202	BB	43925	302931	0.01%	0.005%
28	3.280	3.251	3.317	BV	2694350	20255745	0.37%	0.347%
29	3.374	3.349	3.402	BB	47520	386925	0.01%	0.007%
30	3.474	3.405	3.517	BV	2263672	20583736	0.38%	0.353%
31	3.573	3.548	3.605	BB	25219	245989	0.00%	0.004%
32	3.687	3.647	3.724	BV	1747436	20755799	0.38%	0.356%

Sum of corrected areas: 5832638014

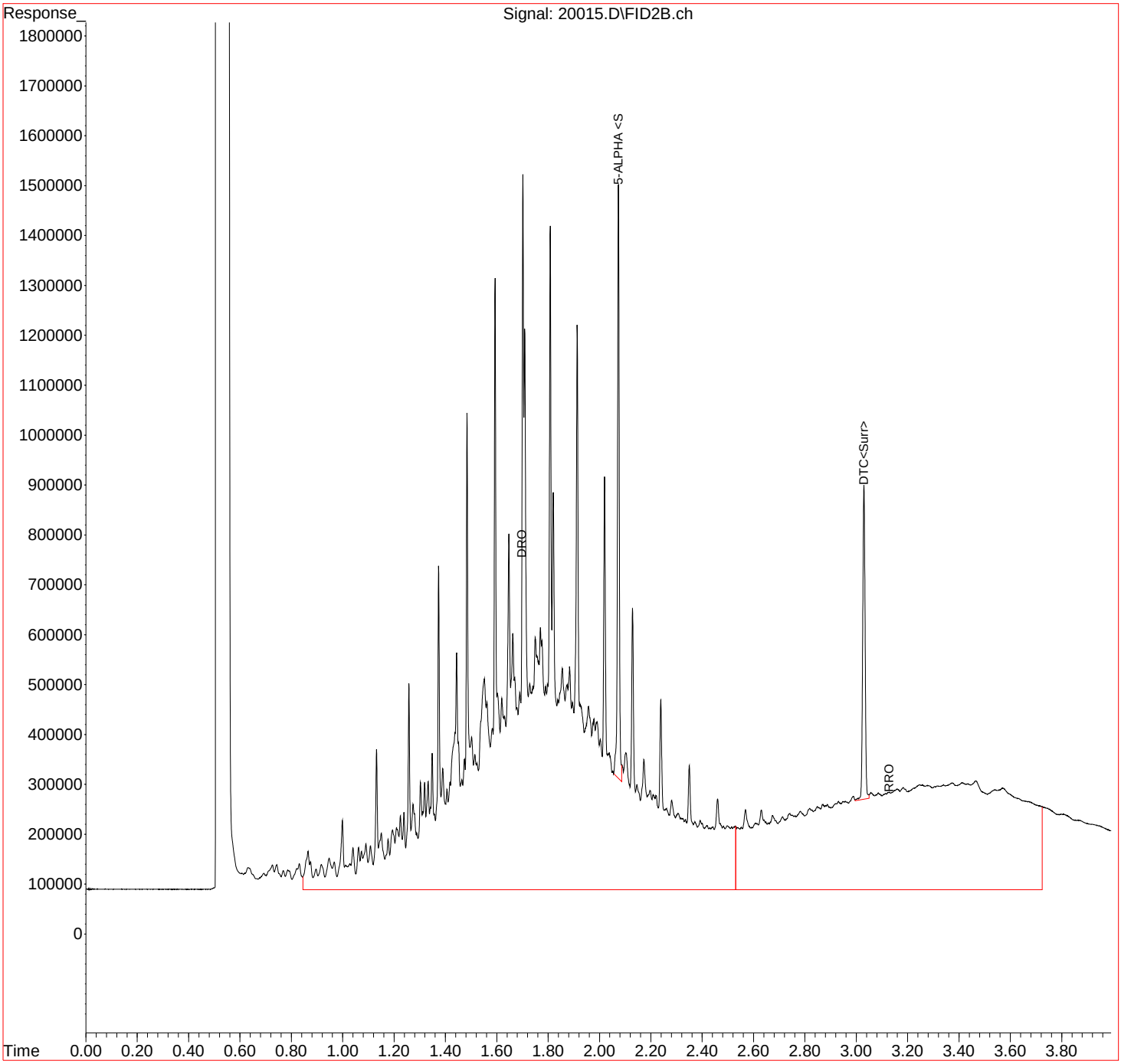
SFR2017-0710M.M Fri Jul 21 10:29:41 2017

Quantitation Report (QT Reviewed)

Data Path : Z:\07\SF\DATA\072017A.SEC\
Data File : 20015.D
Signal(s) : FID2B.ch
Acq On : 20 Jul 2017 2:38 pm
Operator : KMD
Sample : 1399178 LCS
Misc :
ALS Vial : 102 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Jul 21 10:36:53 2017
Quant Method : Z:\07\SF\METHOD\SFR2017-0710M.M
Quant Title : DRO/RRO by Method AK 102/103
QLast Update : Tue Jul 11 11:48:00 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

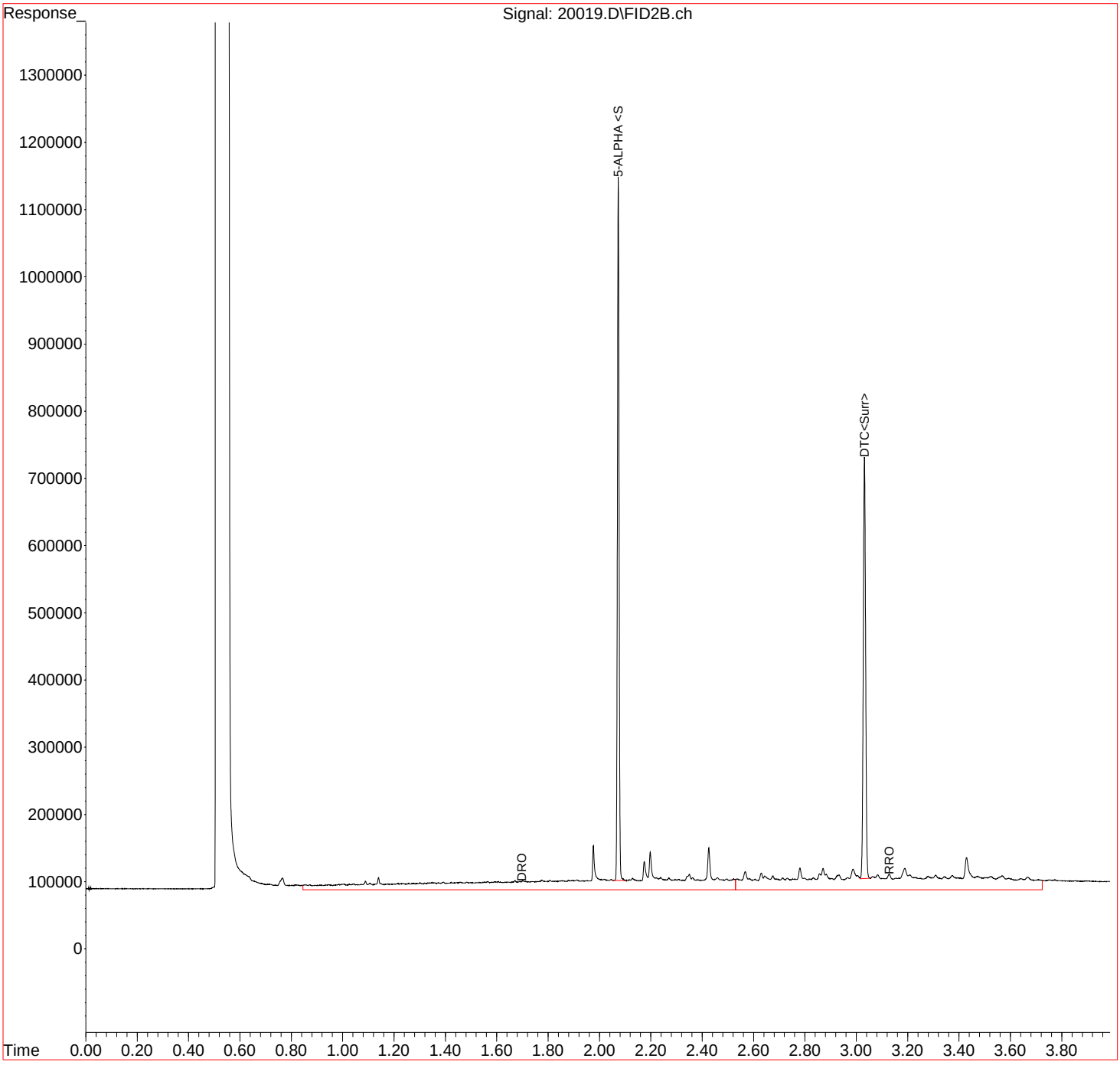


Quantitation Report (QT Reviewed)

Data Path : Z:\07\SF\DATA\072017A.SEC\
Data File : 20019.D
Signal(s) : FID2B.ch
Acq On : 20 Jul 2017 2:58 pm
Operator : KMD
Sample : 1174638002
Misc :
ALS Vial : 104 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Jul 21 10:45:00 2017
Quant Method : Z:\07\SF\METHOD\SFR2017-0710M.M
Quant Title : DRO/RRO by Method AK 102/103
QLast Update : Tue Jul 11 11:48:00 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

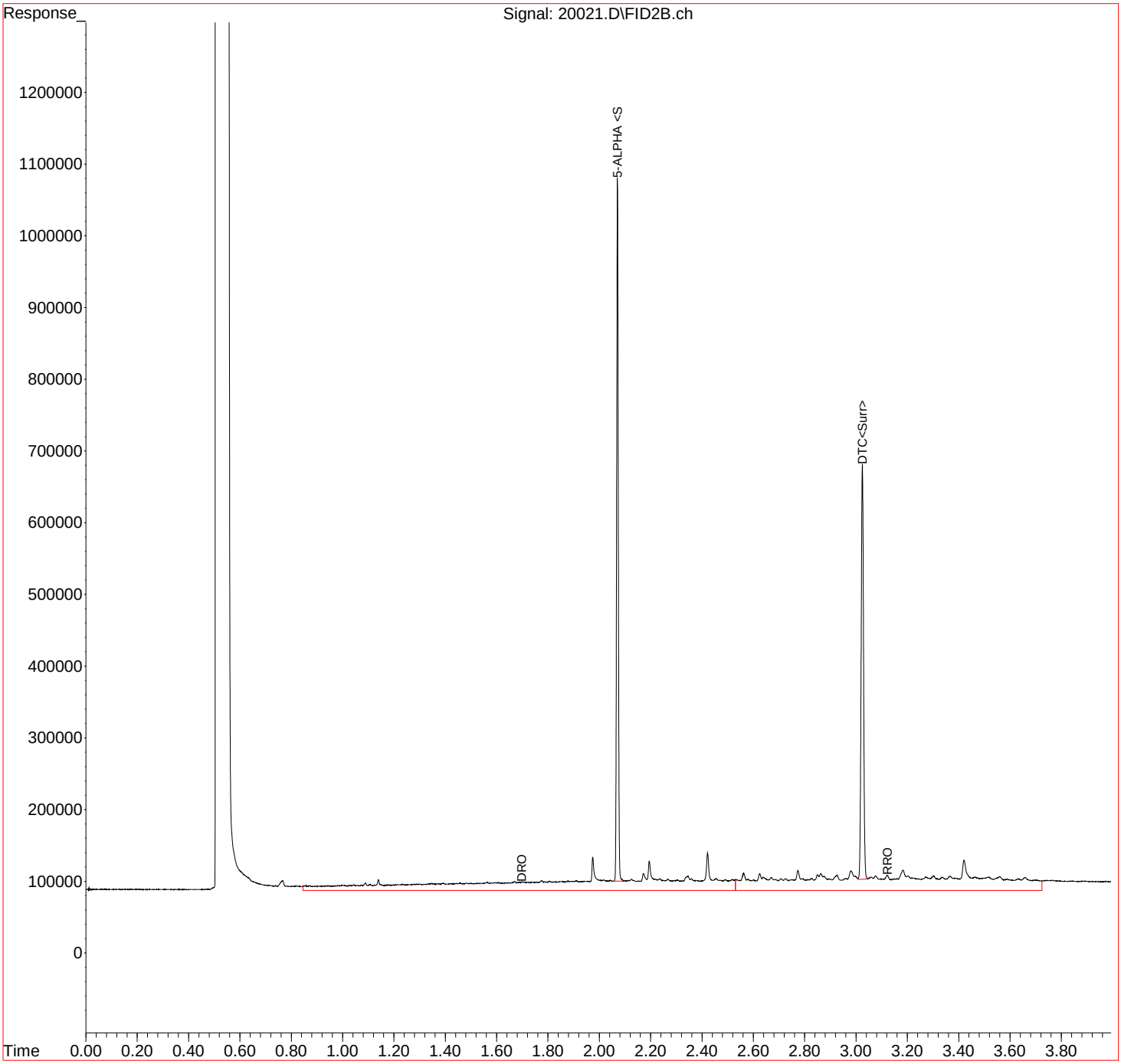


Quantitation Report (QT Reviewed)

Data Path : Z:\07\SF\DATA\072017A.SEC\
Data File : 20021.D
Signal(s) : FID2B.ch
Acq On : 20 Jul 2017 3:07 pm
Operator : KMD
Sample : 1174638003
Misc :
ALS Vial : 105 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Jul 21 10:45:15 2017
Quant Method : Z:\07\SF\METHOD\SFR2017-0710M.M
Quant Title : DRO/RRO by Method AK 102/103
QLast Update : Tue Jul 11 11:48:00 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

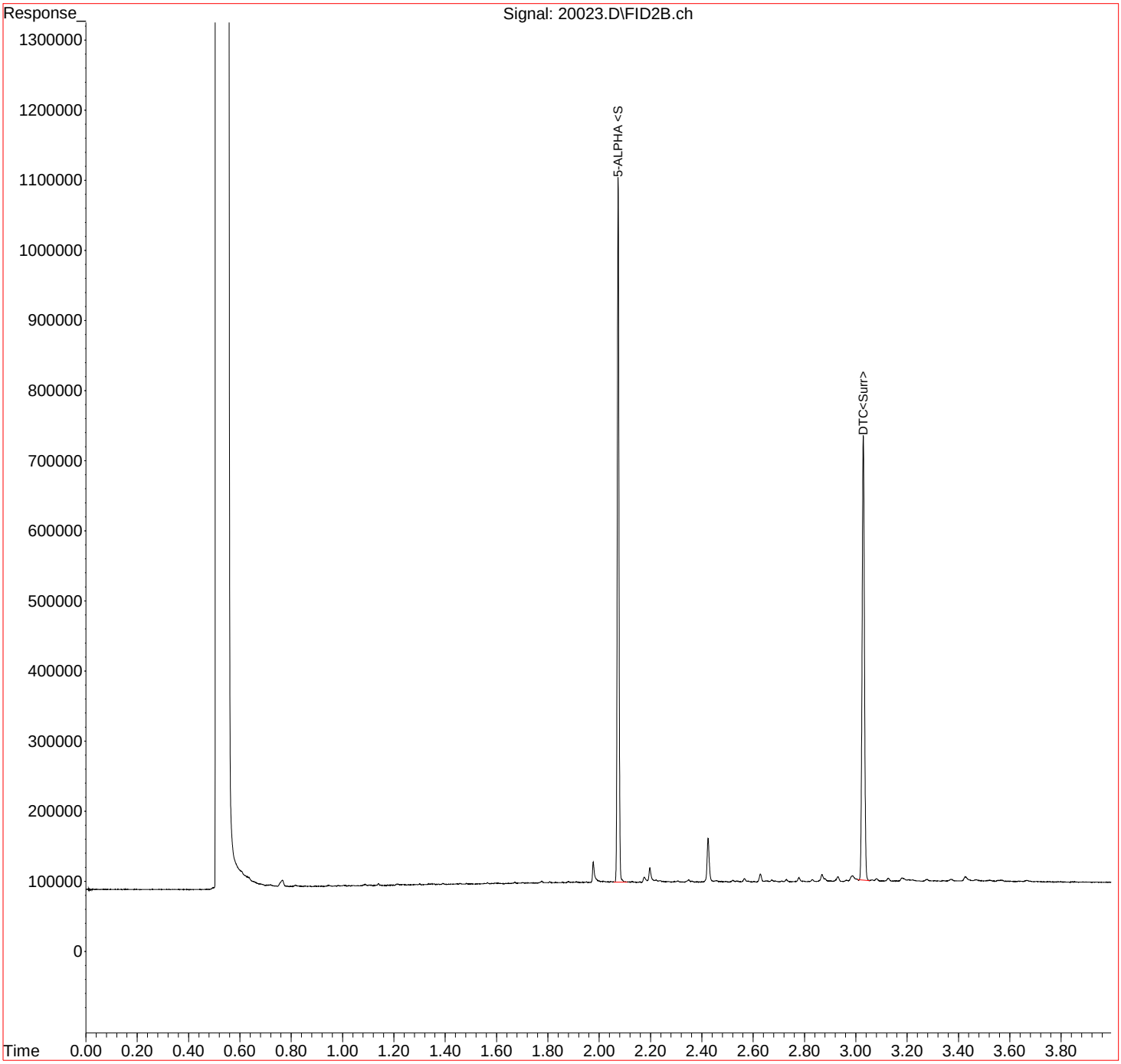


Quantitation Report (QT Reviewed)

Data Path : Z:\07\SF\DATA\072017A.SEC\
Data File : 20023.D
Signal(s) : FID2B.ch
Acq On : 20 Jul 2017 3:17 pm
Operator : KMD
Sample : 1174638004
Misc :
ALS Vial : 106 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Jul 21 10:45:27 2017
Quant Method : Z:\07\SF\METHOD\SFR2017-0710M.M
Quant Title : DRO/RRO by Method AK 102/103
QLast Update : Tue Jul 11 11:48:00 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

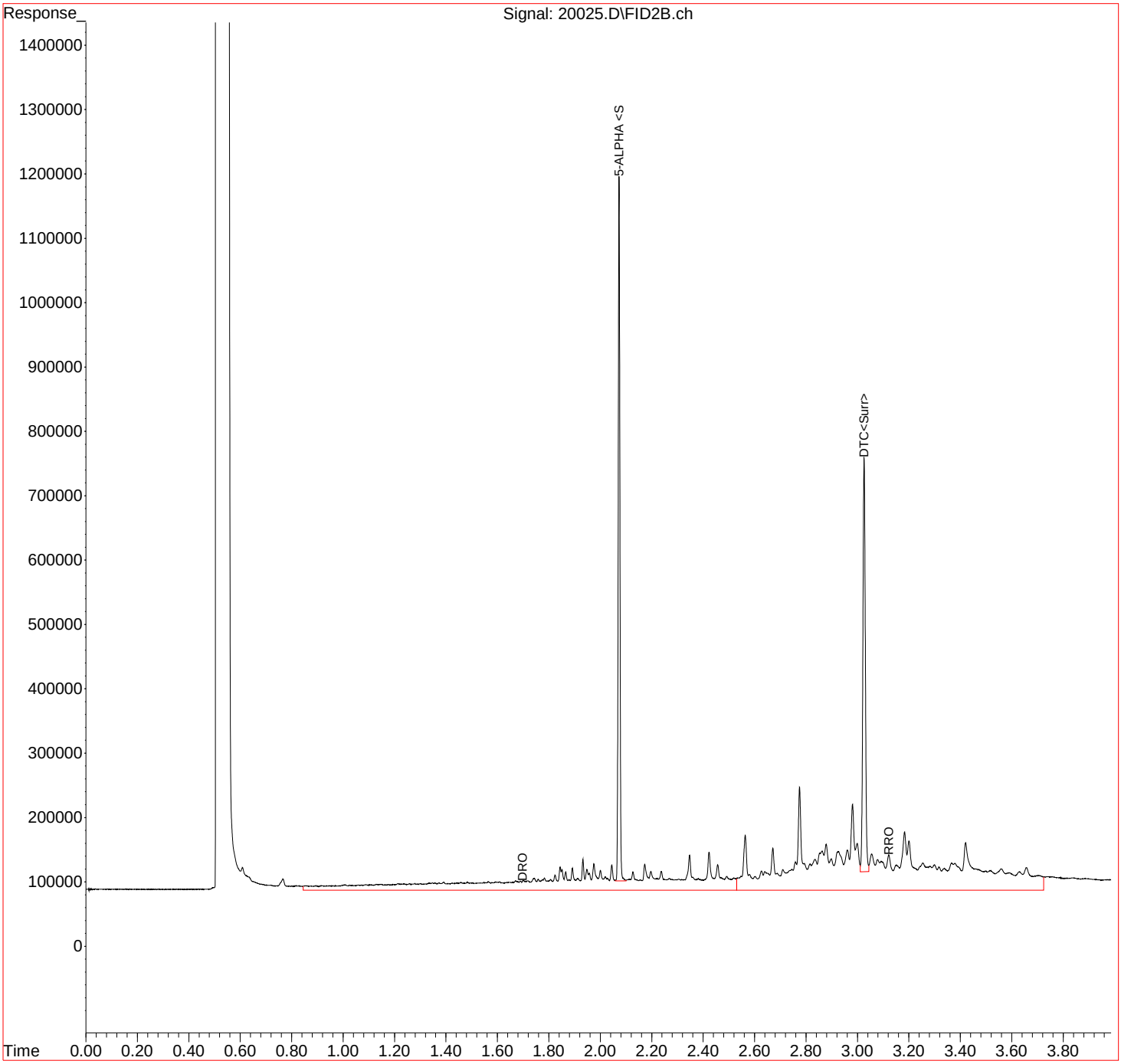


Quantitation Report (QT Reviewed)

Data Path : Z:\07\SF\DATA\072017A.SEC\
Data File : 20025.D
Signal(s) : FID2B.ch
Acq On : 20 Jul 2017 3:27 pm
Operator : KMD
Sample : 1174638005
Misc :
ALS Vial : 107 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Jul 21 10:45:39 2017
Quant Method : Z:\07\SF\METHOD\SFR2017-0710M.M
Quant Title : DRO/RRO by Method AK 102/103
QLast Update : Tue Jul 11 11:48:00 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

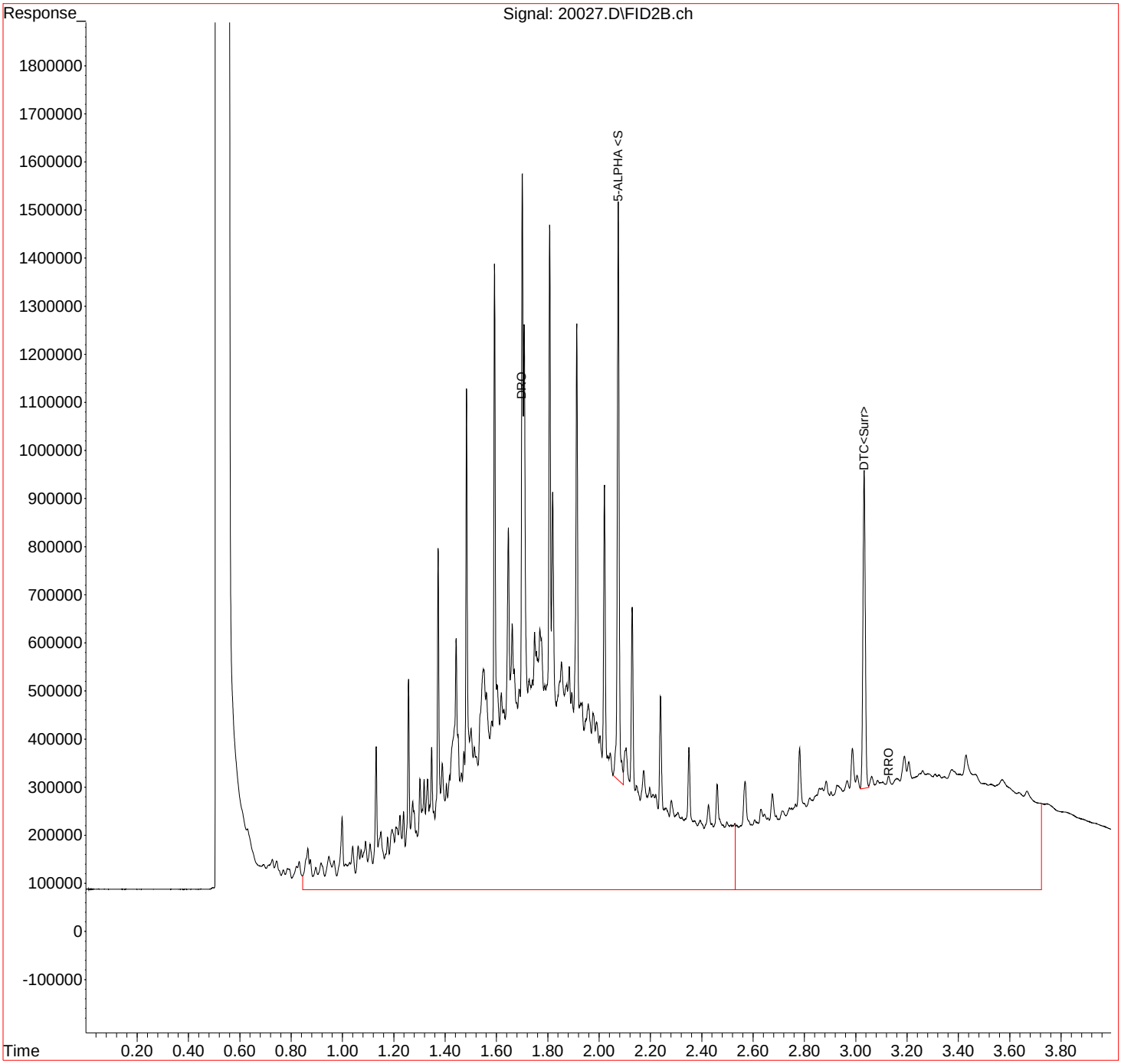


Quantitation Report (QT Reviewed)

Data Path : Z:\07\SF\DATA\072017A.SEC\
Data File : 20027.D
Signal(s) : FID2B.ch
Acq On : 20 Jul 2017 3:37 pm
Operator : KMD
Sample : 1174638006 BMS
Misc :
ALS Vial : 108 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Jul 21 13:37:42 2017
Quant Method : Z:\07\SF\METHOD\SFR2017-0710M.M
Quant Title : DRO/RRO by Method AK 102/103
QLast Update : Tue Jul 11 11:48:00 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

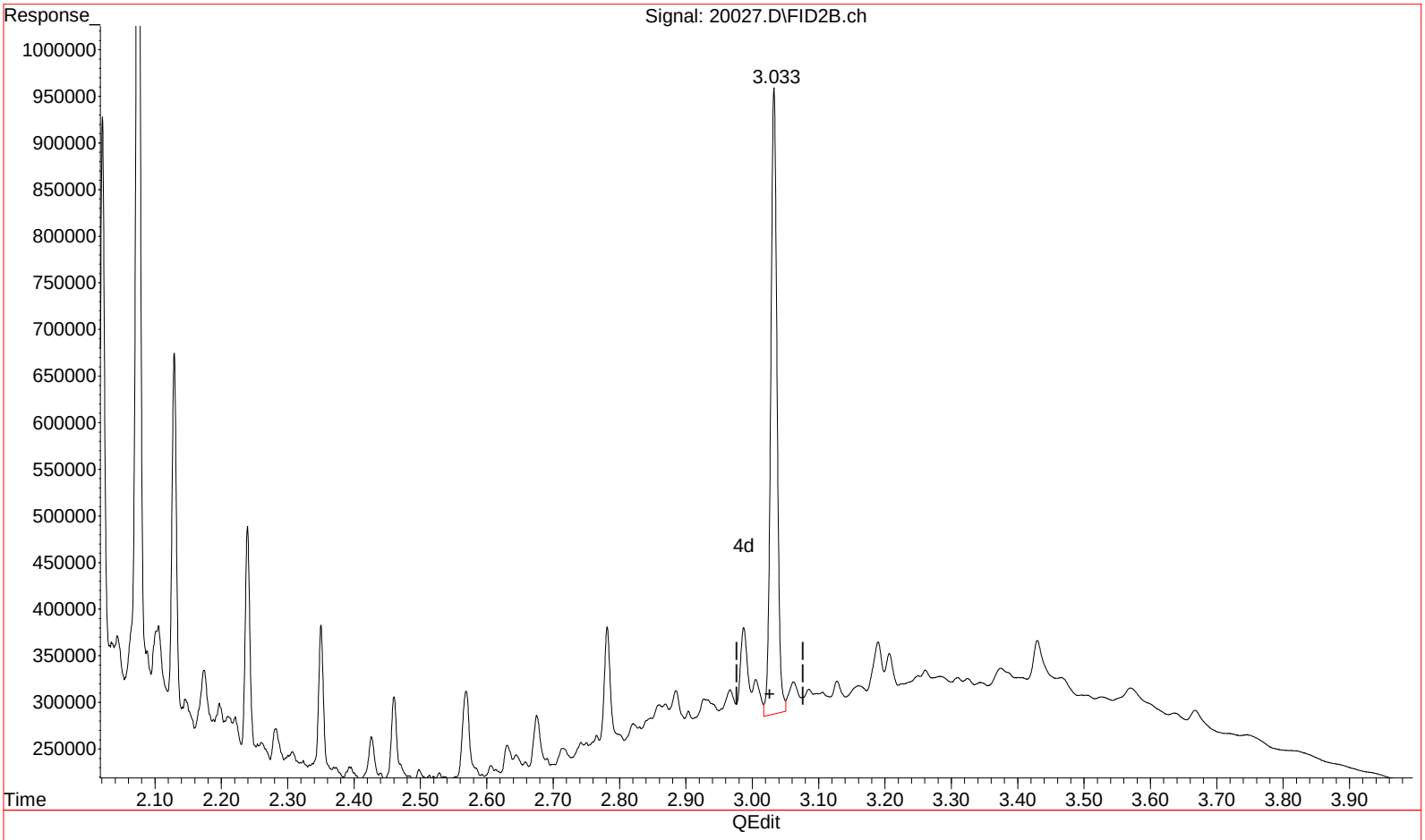


Quantitation Report (Qedit)

Data Path : Z:\07\SF\DATA\072017A.SEC\
Data File : 20027.D
Signal(s) : FID2B.ch
Acq On : 20 Jul 2017 3:37 pm
Operator : KMD
Sample : 1174638006 BMS
Misc :
ALS Vial : 108 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Jul 21 13:36:38 2017
Quant Method : Z:\07\SF\METHOD\SFR2017-0710M.M
Quant Title : DRO/RRO by Method AK 102/103
QLast Update : Tue Jul 11 11:48:00 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



(4) DTC<Surr> (S)

3.033min 101.352 µg/mL

response 4442136

O-BLC

Jul 21, 2017

Justin Goff

Phyllis Woods 7/21/2017

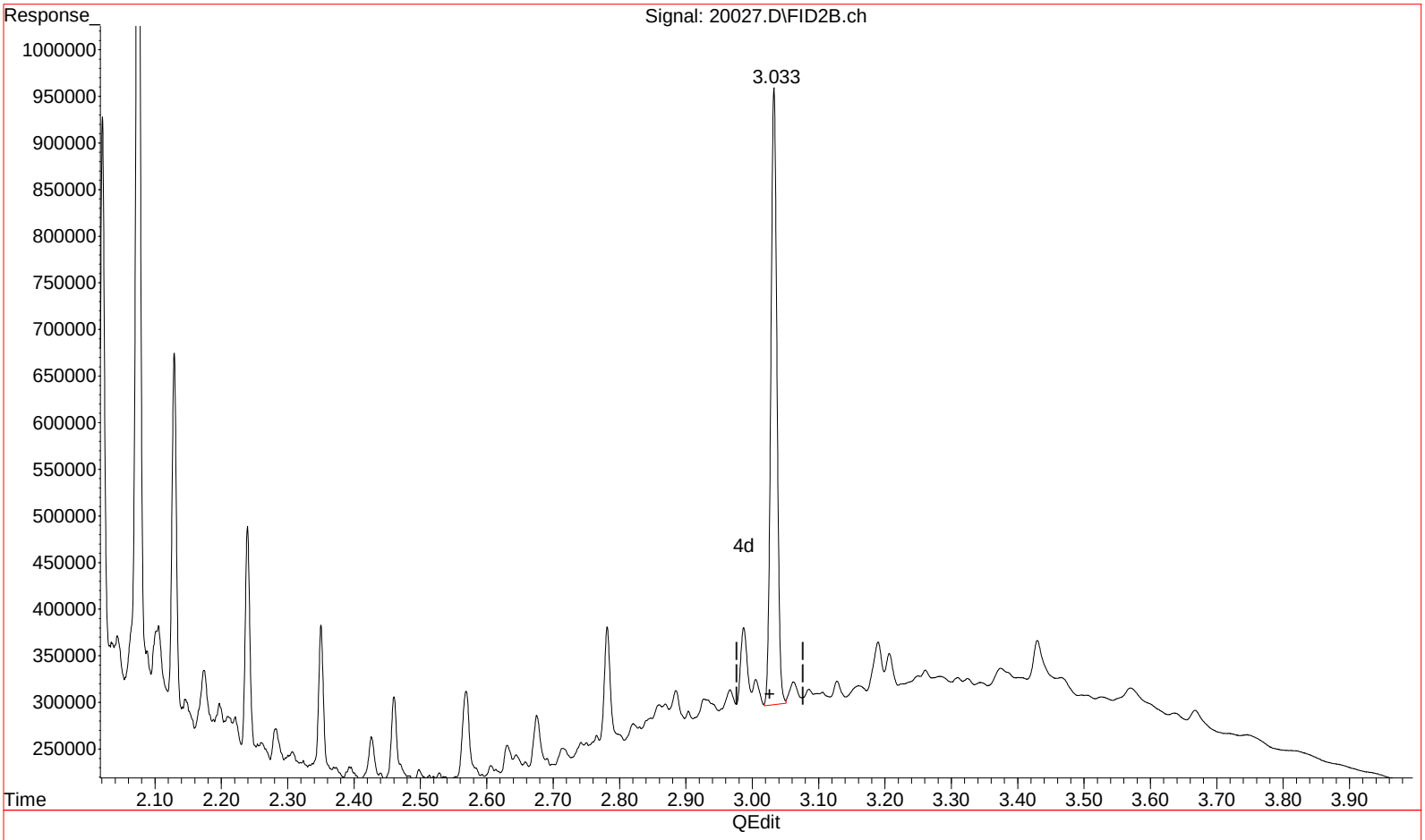
(+) = Expected Retention Time

Quantitation Report (Qedit)

Data Path : Z:\07\SF\DATA\072017A.SEC\
Data File : 20027.D
Signal(s) : FID2B.ch
Acq On : 20 Jul 2017 3:37 pm
Operator : KMD
Sample : 1174638006 BMS
Misc :
ALS Vial : 108 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Jul 21 13:36:38 2017
Quant Method : Z:\07\SF\METHOD\SFR2017-0710M.M
Quant Title : DRO/RRO by Method AK 102/103
QLast Update : Tue Jul 11 11:48:00 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



(4) DTC<Surr> (S)

3.033min 96.878 µg/mL m M-BLC

response 4246058 Jul 21, 2017

Justin Goff

Phyllis Woods
Phyllis Woods
7/21/2017

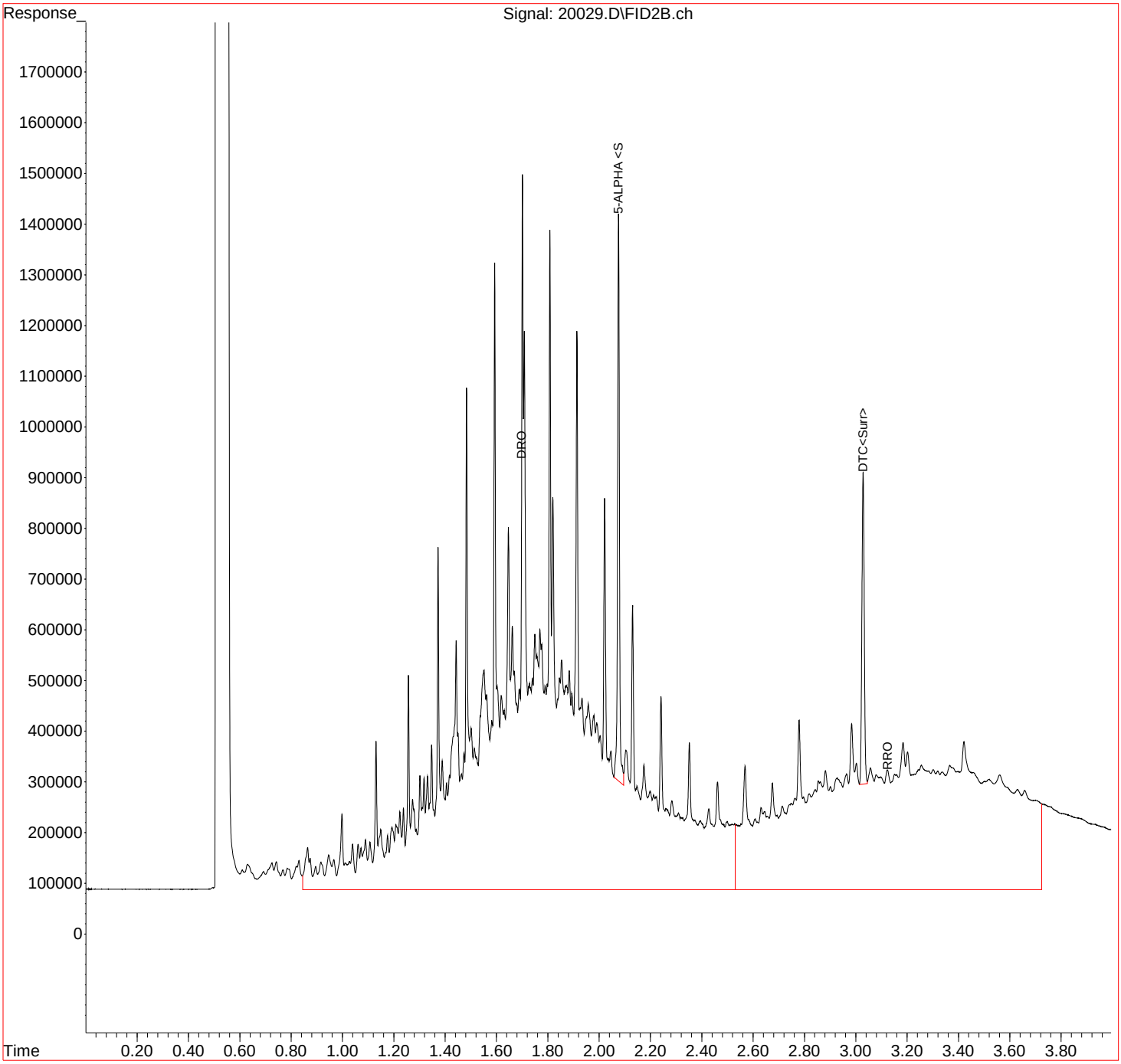
(+) = Expected Retention Time

Quantitation Report (QT Reviewed)

Data Path : Z:\07\SF\DATA\072017A.SEC\
Data File : 20029.D
Signal(s) : FID2B.ch
Acq On : 20 Jul 2017 3:46 pm
Operator : KMD
Sample : 1174638007 BMSD
Misc :
ALS Vial : 109 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Jul 21 10:49:14 2017
Quant Method : Z:\07\SF\METHOD\SFR2017-0710M.M
Quant Title : DRO/RRO by Method AK 102/103
QLast Update : Tue Jul 11 11:48:00 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

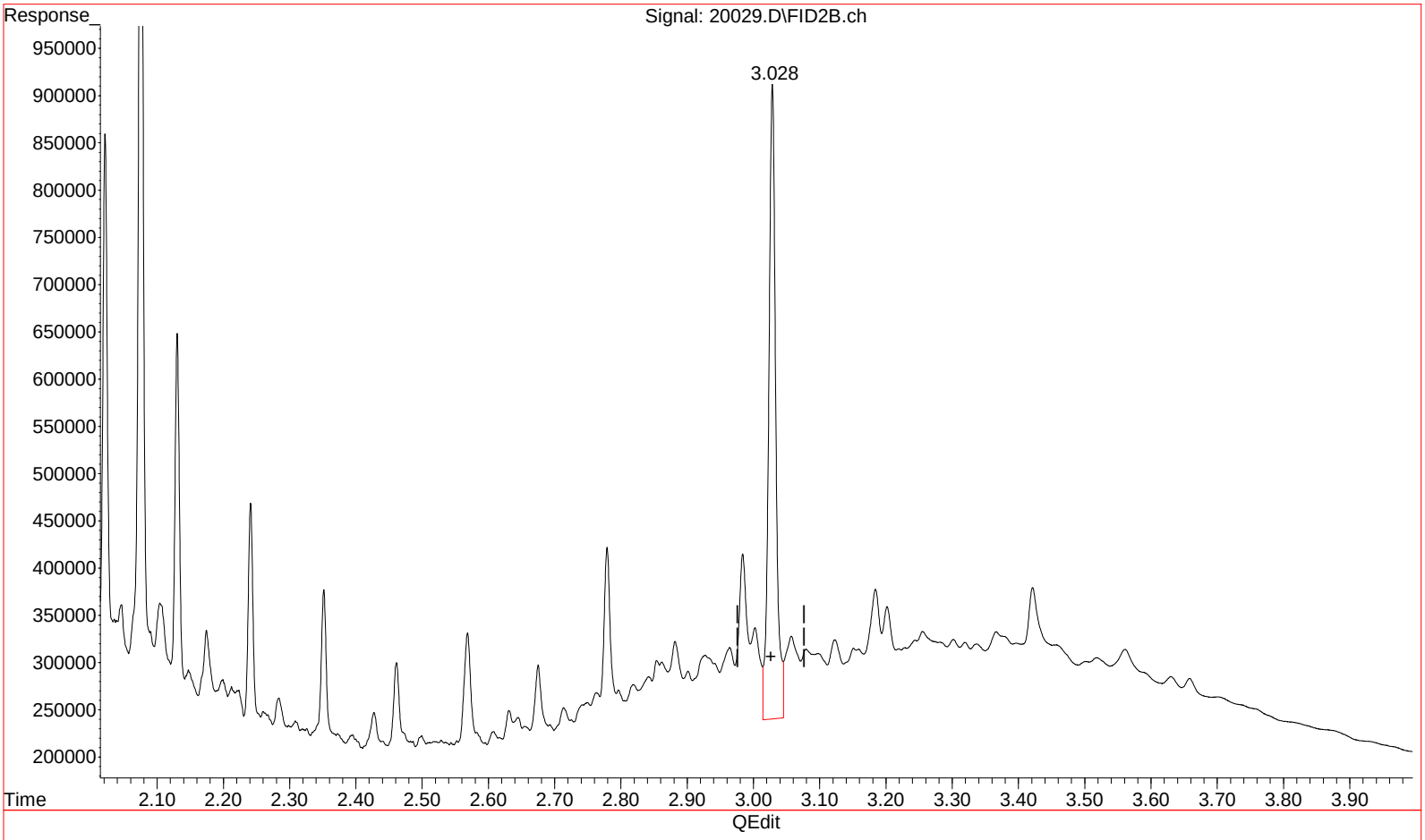


Quantitation Report (Qedit)

Data Path : Z:\07\SF\DATA\072017A.SEC\
Data File : 20029.D
Signal(s) : FID2B.ch
Acq On : 20 Jul 2017 3:46 pm
Operator : KMD
Sample : 1174638007 BMSD
Misc :
ALS Vial : 109 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Jul 21 10:46:24 2017
Quant Method : Z:\07\SF\METHOD\SFR2017-0710M.M
Quant Title : DRO/RRO by Method AK 102/103
QLast Update : Tue Jul 11 11:48:00 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



(4) DTC<Surr> (S)

3.029min 113.859 µg/mL

response 4990308

O-BLC

Jul 21, 2017

Justin Goff

Phyllis Woods

Phyllis Woods 7/21/2017

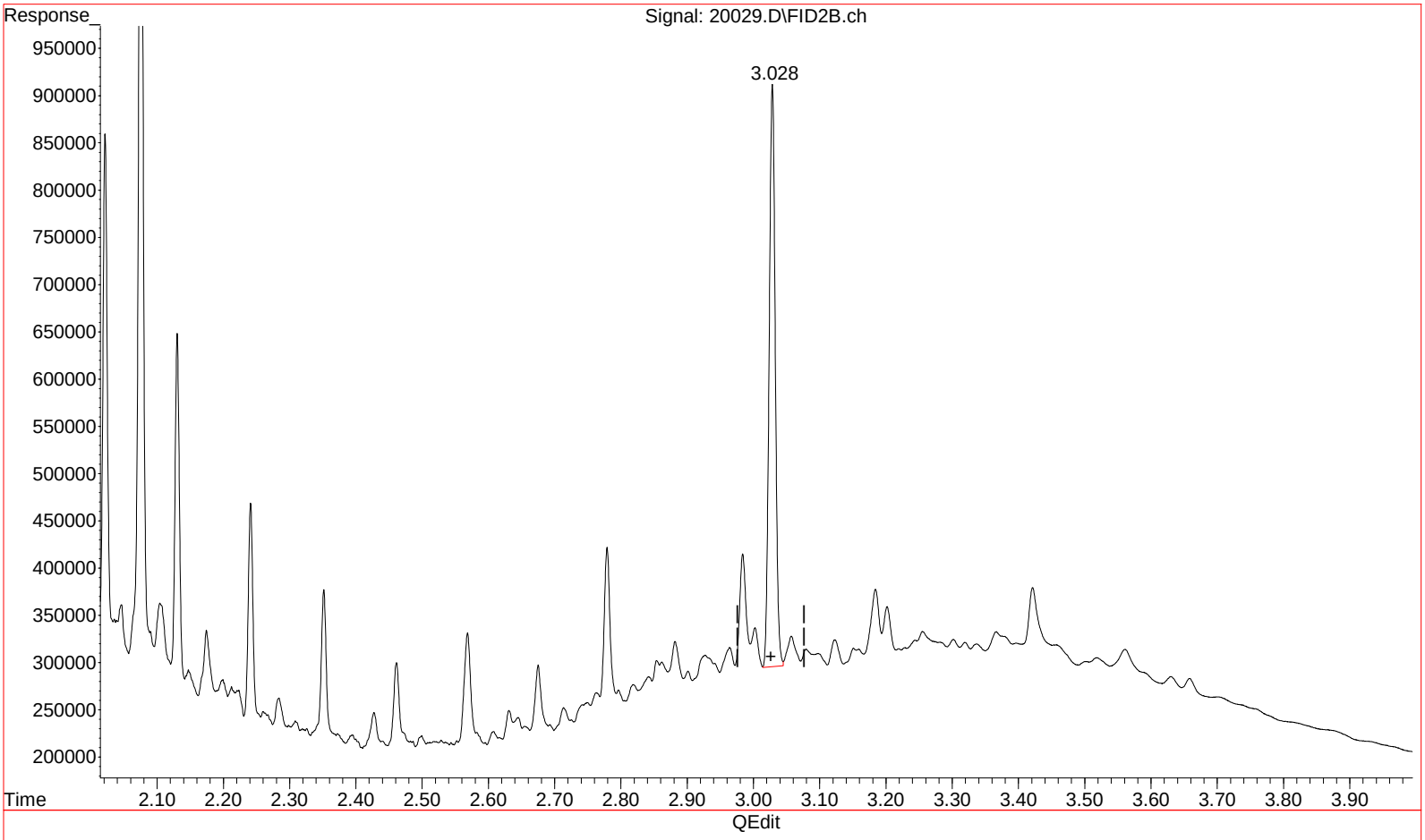
(+) = Expected Retention Time

Quantitation Report (Qedit)

Data Path : Z:\07\SF\DATA\072017A.SEC\
Data File : 20029.D
Signal(s) : FID2B.ch
Acq On : 20 Jul 2017 3:46 pm
Operator : KMD
Sample : 1174638007 BMSD
Misc :
ALS Vial : 109 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Jul 21 10:46:24 2017
Quant Method : Z:\07\SF\METHOD\SFR2017-0710M.M
Quant Title : DRO/RRO by Method AK 102/103
QLast Update : Tue Jul 11 11:48:00 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



(4) DTC<Surr> (S)

3.028min 90.357 µg/mL m

response 3960263

M-BLC
Jul 21, 2017

Justin Goff

Phyllis Woods
Phyllis Woods 7/21/2017

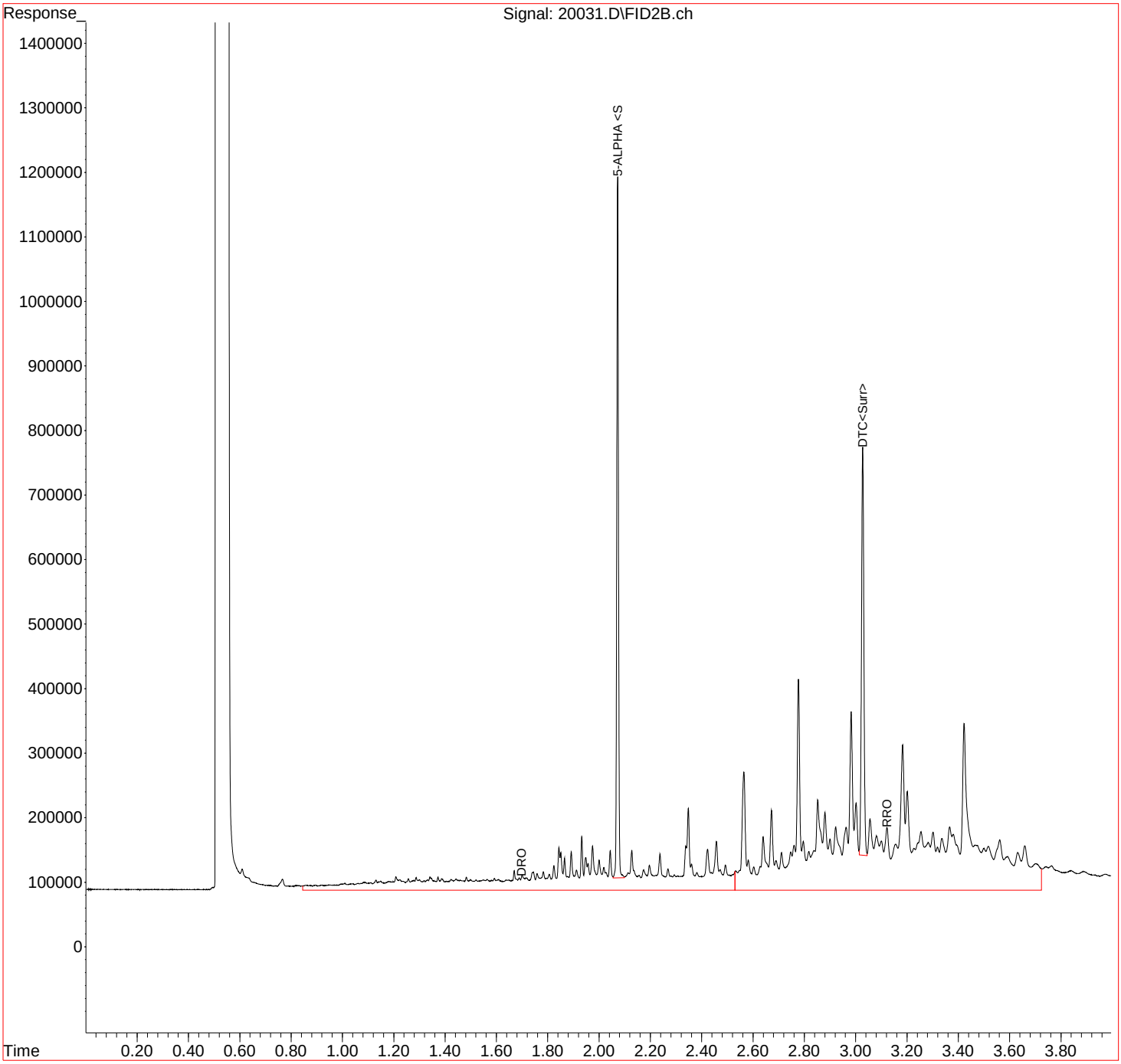
(+) = Expected Retention Time

Quantitation Report (QT Reviewed)

Data Path : Z:\07\SF\DATA\072017A.SEC\
Data File : 20031.D
Signal(s) : FID2B.ch
Acq On : 20 Jul 2017 3:56 pm
Operator : KMD
Sample : 1174638008
Misc :
ALS Vial : 110 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Jul 21 10:50:39 2017
Quant Method : Z:\07\SF\METHOD\SFR2017-0710M.M
Quant Title : DRO/RRO by Method AK 102/103
QLast Update : Tue Jul 11 11:48:00 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

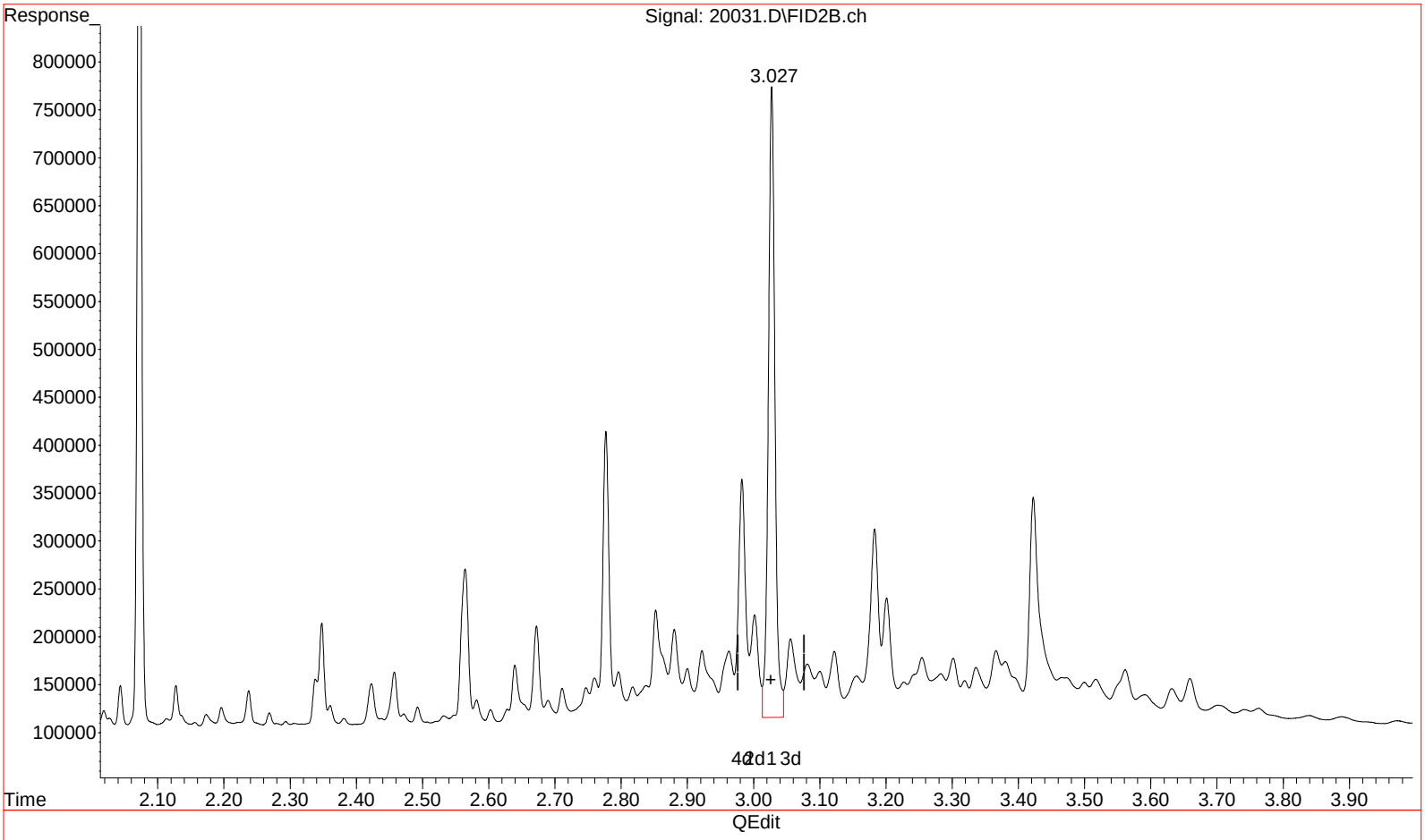


Quantitation Report (Qedit)

Data Path : Z:\07\SF\DATA\072017A.SEC\
Data File : 20031.D
Signal(s) : FID2B.ch
Acq On : 20 Jul 2017 3:56 pm
Operator : KMD
Sample : 1174638008
Misc :
ALS Vial : 110 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Jul 21 10:49:35 2017
Quant Method : Z:\07\SF\METHOD\SFR2017-0710M.M
Quant Title : DRO/RRO by Method AK 102/103
QLast Update : Tue Jul 11 11:48:00 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



(4) DTC<Surr> (S)

3.028min 104.844 µg/mL

response 4595207

O-BLC

Jul 21, 2017

Justin Goff

Phyllis Woods

7/21/2017

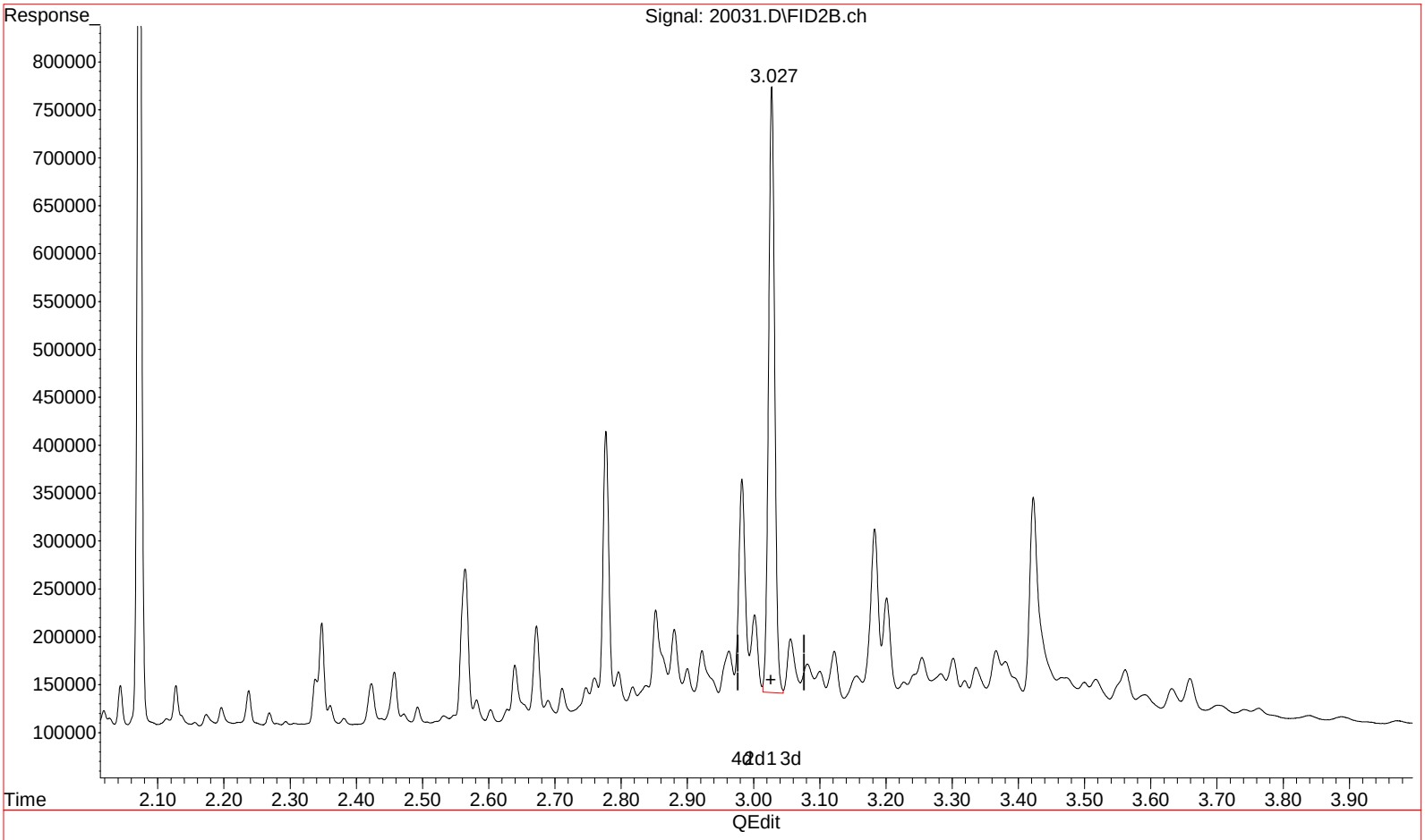
(+) = Expected Retention Time

Quantitation Report (Qedit)

Data Path : Z:\07\SF\DATA\072017A.SEC\
Data File : 20031.D
Signal(s) : FID2B.ch
Acq On : 20 Jul 2017 3:56 pm
Operator : KMD
Sample : 1174638008
Misc :
ALS Vial : 110 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Jul 21 10:49:35 2017
Quant Method : Z:\07\SF\METHOD\SFR2017-0710M.M
Quant Title : DRO/RRO by Method AK 102/103
QLast Update : Tue Jul 11 11:48:00 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



(4) DTC<Surr> (S)

3.027min 93.365 µg/mL m

response 4092075

M-BLC
Jul 21, 2017

Justin Goff

Phyllis Woods
Phyllis Woods 7/21/2017

(+) = Expected Retention Time

ATTACHMENT D

2002 DATA PROVIDED BY ADEC AND CUMULATIVE RISK AND CLEANUP LEVEL CALCULATIONS

TABLE 2 - SUMMARY OF ANALYTICAL RESULTS - SOIL SAMPLES

Parameter Tested	Method*	Cleanup Level (mg/Kg)**	Sample Number and Collection Depth in Feet (See Table 1)					
			SS78 0.2-0.4	SS84 0.2-0.4	SS86 0.2-0.4	SS87 0.2-0.4	SS88 1.0	SS188^ 1.0
PID Headspace Reading - ppm	OVM 580B	-	0.2	115	0.7	0.6	0.3	0.3
Total Solids - Percent	SM20 2540G	-	90.6	85.8	98.4	91.2	95.8	95.0
Diesel Range Organics (DRO) - mg/Kg	AK 102	12,500	<10.9	1,910	2,950	29.8	<10.5	<10.9
Residual Range Organics (RRO) - mg/Kg	AK 103	13,700	37.6	<120	1,220	69.5	<21.1	<21.8
Gasoline Range Organics (GRO) - mg/Kg	AK 101/EPA 8021B	1,400	<1.40	13.1	<2.32	<2.53	-	-
Aromatic Volatile Organics (BTEX)								
Benzene - mg/Kg	AK 101/EPA 8021B	13	<0.00698	<0.0138	<0.0116	<0.0126	-	-
Toluene - mg/Kg	AK 101/EPA 8021B	89	<0.0279	<0.0552	<0.0464	<0.0506	-	-
Ethylbenzene - mg/Kg	AK 101/EPA 8021B	180	<0.0279	<0.0552	<0.0464	<0.0506	-	-
Xylenes - mg/Kg	AK 101/EPA 8021B	81	<0.0279	0.1557	<0.0464	<0.0506	-	-
Volatile Organic Compounds (VOCs)								
Trichlorofluoromethane - mg/Kg	EPA 8260B	-	-	0.391	-	-	-	-
Methylene chloride - mg/Kg	EPA 8260B	270	-	<0.110	-	-	-	-
Other VOCs - mg/Kg	EPA 8260B	Various	-	ND	-	-	-	-
Semi-Volatile Organic Compounds (SVOCs)								
Acenaphthene - mg/Kg	EPA 8270C	8,200	<0.552	-	32.3	<0.548	<0.533	<0.535
Dibenzofuran - mg/Kg	EPA 8270C	-	<0.552	-	40.2	<0.548	<0.533	<0.535
Fluorene - mg/Kg	EPA 8270C	5,500	<0.552	-	93.6	<0.548	<0.533	<0.535
Pentachlorophenol - mg/Kg	EPA 8270C	46.7	<5.52	-	<101	10.6	<5.33	<5.35
Phenanthrene - mg/Kg	EPA 8270C	-	<0.552	-	460	<0.548	<0.533	<0.535
Anthracene - mg/Kg	EPA 8270C	41,000	<0.552	-	24.6	<0.548	<0.533	<0.535
Fluoranthene - mg/Kg	EPA 8270C	5,500	<0.552	-	268	<0.548	<0.533	<0.535
Pyrene - mg/Kg	EPA 8270C	4,100	<0.552	-	191	<0.548	<0.533	<0.535
Benzo(a)Anthracene - mg/Kg	EPA 8270C	15	<0.552	-	37.5	<0.548	<0.533	<0.535
Chrysene - mg/Kg	EPA 8270C	1,500	<0.552	-	48.9	<0.548	<0.533	<0.535
Benzo(k)fluoranthene - mg/Kg	EPA 8270C	150	<0.552	-	21.4	<0.548	<0.533	<0.535
Benzo(a)pyrene - mg/Kg	EPA 8270C	1.5	<0.552	-	13.7	<0.548	<0.533	<0.535
Other SVOCs - mg/Kg	EPA 8270C	Various	ND	-	ND	ND	ND	ND
Polynuclear Aromatic Hydrocarbons (PAHs)								
Naphthalene - mg/Kg	PAH SIM	5,500	-	-	-	-	-	-
Acenaphthene - mg/Kg	PAH SIM	8,200	-	-	-	-	-	-
Phenanthrene - mg/Kg	PAH SIM	-	-	-	-	-	-	-
Fluoranthene - mg/Kg	PAH SIM	5,500	-	-	-	-	-	-
Other PAHs - mg/Kg	PAH SIM	-	-	-	-	-	-	-
Polychlorinated Biphenyls (PCBs) - mg/Kg	EPA 8082	10	-	-	-	-	-	-
RCRA Metals								
Arsenic - mg/Kg	EPA 6020	8	-	-	12.7	13.5	-	-
Barium - mg/Kg	EPA 6020	9,600	-	-	75.7	115	-	-
Cadmium - mg/Kg	EPA 6020	140	-	-	<0.195	<0.211	-	-
Chromium - mg/Kg	EPA 6020	680	-	-	3.03	3.10	-	-
Lead - mg/Kg	EPA 6020	1,000	-	-	3.36	6.94	-	-
Mercury - mg/Kg	EPA 6020	26	-	-	<0.0330	<0.0352	-	-
Selenium - mg/Kg	EPA 6020	680	-	-	<0.974	<1.05	-	-
Silver - mg/Kg	EPA 6020	680	-	-	<0.0974	<0.105	-	-

CT&E Environmental Services Inc.

CT&E Ref.#	1015056011	**Client PO#**	
Client Name	Shannon & Wilson Inc.	**Printed Date/Time**	08/28/2001 16:14
Project Name/#	6383-4 South Pad	**Collected Date/Time**	07/31/2001 13:20
Client Sample ID	6383-4-SS86	**Received Date/Time**	08/03/2001 16:55
Matrix	Soil/Solid	**Technical Director**	**Stephen C. Ede**
Ordered By			

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date
Semivolatile Organic GC/MS							
2,4-Dichlorophenol	20.3 U	20.3	mg/Kg	SW846-8270C		08/06/01	08/21/01
2-Methylnaphthalene	14.2 U	14.2	mg/Kg	SW846-8270C		08/06/01	08/21/01
Hexachlorocyclopentadiene	20.3 U	20.3	mg/Kg	SW846-8270C		08/06/01	08/21/01
2,4,6-Trichlorophenol	10.1 U	10.1	mg/Kg	SW846-8270C		08/06/01	08/21/01
2,4,5-Trichlorophenol	10.1 U	10.1	mg/Kg	SW846-8270C		08/06/01	08/21/01
2-Chloronaphthalene	10.1 U	10.1	mg/Kg	SW846-8270C		08/06/01	08/21/01
2-Nitroaniline	10.1 U	10.1	mg/Kg	SW846-8270C		08/06/01	08/21/01
Dimethylphthalate	10.1 U	10.1	mg/Kg	SW846-8270C		08/06/01	08/21/01
Acenaphthylene	10.1 U	10.1	mg/Kg	SW846-8270C		08/06/01	08/21/01
2,6-Dinitrotoluene	10.1 U	10.1	mg/Kg	SW846-8270C		08/06/01	08/21/01
3-Nitroaniline	10.1 U	10.1	mg/Kg	SW846-8270C		08/06/01	08/21/01
Acenaphthene	32.3	10.1	mg/Kg	SW846-8270C		08/06/01	08/21/01
2,4-Dinitrophenol	122 U	122	mg/Kg	SW846-8270C		08/06/01	08/21/01
4-Nitrophenol	101 U	101	mg/Kg	SW846-8270C		08/06/01	08/21/01
Dibenzofuran	40.2	10.1	mg/Kg	SW846-8270C		08/06/01	08/21/01
2,4-Dinitrotoluene	10.1 U	10.1	mg/Kg	SW846-8270C		08/06/01	08/21/01
Diethylphthalate	10.1 U	10.1	mg/Kg	SW846-8270C		08/06/01	08/21/01
4-Chlorophenyl-phenylether	10.1 U	10.1	mg/Kg	SW846-8270C		08/06/01	08/21/01
Fluorene	93.6	10.1	mg/Kg	SW846-8270C		08/06/01	08/21/01
4-Nitroaniline	10.1 U	10.1	mg/Kg	SW846-8270C		08/06/01	08/21/01
2-Methyl-4,6-dinitrophenol	122 U	122	mg/Kg	SW846-8270C		08/06/01	08/21/01
N-Nitrosodiphenylamine	10.1 U	10.1	mg/Kg	SW846-8270C		08/06/01	08/21/01
4-Bromophenyl-phenylether	10.1 U	10.1	mg/Kg	SW846-8270C		08/06/01	08/21/01
Hexachlorobenzene	10.1 U	10.1	mg/Kg	SW846-8270C		08/06/01	08/21/01
Pentachlorophenol	101 U	101	mg/Kg	SW846-8270C		08/06/01	08/21/01
Phenanthrene	460	101	mg/Kg	SW846-8270C		08/06/01	08/21/01
Anthracene	24.6	10.1	mg/Kg	SW846-8270C		08/06/01	08/21/01
Di-n-butylphthalate	10.1 U	10.1	mg/Kg	SW846-8270C		08/06/01	08/21/01
Fluoranthene	268	101	mg/Kg	SW846-8270C		08/06/01	08/21/01
Pyrene	191	101	mg/Kg	SW846-8270C		08/06/01	08/21/01
Azobenzene	0.406 U	0.406	mg/Kg	SW846-8270C		08/06/01	08/21/01
Butylbenzylphthalate	10.1 U	10.1	mg/Kg	SW846-8270C		08/06/01	08/21/01
3,3-Dichlorobenzidine	20.3 U	20.3	mg/Kg	SW846-8270C		08/06/01	08/21/01
Benzo(a)Anthracene	37.5	10.1	mg/Kg	SW846-8270C		08/06/01	08/21/01

CT&E Environmental Services Inc.

CT&E Ref.#	1015056011	**Client PO#**	
Client Name	Shannon & Wilson Inc.	**Printed Date/Time**	08/28/2001 16:14
Project Name/#	6383-4 South Pad	**Collected Date/Time**	07/31/2001 13:20
Client Sample ID	6383-4-SS86	**Received Date/Time**	08/03/2001 16:55
Matrix	Soil/Solid	**Technical Director**	**Stephen C. Ede**
Ordered By			

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
Semivolatile Organic GC/MS								
Chrysene	48.9	10.1	mg/Kg	SW846-8270C		08/06/01	08/21/01	SPM
bis(2-Ethylhexyl)phthalate	10.1 U	10.1	mg/Kg	SW846-8270C		08/06/01	08/21/01	SPM
di-n-Octylphthalate	10.1 U	10.1	mg/Kg	SW846-8270C		08/06/01	08/21/01	SPM
Benzo[b]Fluoranthene	142 U	142	mg/Kg	SW846-8270C		08/06/01	08/21/01	SPM
Benzo[k]fluoranthene	21.4	10.1	mg/Kg	SW846-8270C		08/06/01	08/21/01	SPM
Benzo[a]pyrene	13.7	10.1	mg/Kg	SW846-8270C		08/06/01	08/21/01	SPM
Indeno[1,2,3-c,d] pyrene	10.1 U	10.1	mg/Kg	SW846-8270C		08/06/01	08/21/01	SPM
Dibenzo[a,h]anthracene	14.2 U	14.2	mg/Kg	SW846-8270C		08/06/01	08/21/01	SPM
Ben[illegible]lh,i]perylene	14.2 U	14.2	mg/Kg	SW846-8270C		08/06/01	08/21/01	SPM
Surrogates								
2-Fluorophenol <Surr>	43.3		%	SW846-8270C	18-83	08/06/01	08/21/01	SPM
Phenol-d6 <Surr>	44.1		%	SW846-8270C	24-88	08/06/01	08/21/01	SPM
Nitrobenzene-d5 <Surr>	50.9		%	SW846-8270C	18-109	08/06/01	08/21/01	SPM
2-Fluorobiphenyl <Surr>	64.7		%	SW846-8270C	30-103	08/06/01	08/21/01	SPM
2,4,6-Tribromophenol <Surr>	52.9		%	SW846-8270C	18-122	08/06/01	08/21/01	SPM
Terphenyl-d14 <Surr>	76.1		%	SW846-8270C	21-142	08/06/01	08/21/01	SPM

Site-specific Risk Models
Outdoor Worker Equation Inputs
Soil (Arctic Zone)

Variable	Value
AT_{ow} (averaging time)	365
$EF_{ow\text{-}arctic}$ (exposure frequency) d/yr	200
ED_{ow} (exposure duration) yr	25
ET_{ow} (exposure time) hr/day	8
LT (lifetime) yr	70
BW_{ow} (body weight) kg	80
IRS_{ow} (soil ingestion rate) mg/day	100
AF_{ow} (skin adherence factor - adult) mg/cm ^{2}	0.12
SA_{ow} (skin surface area - adult) cm ^{2}/day	3527
A_c (acres)	0.5
Q/C_{wp} (g/m^2-s per kg/m^3)	101.8877
PEF (particulate emission factor) m ^{3}/kg	269953472.7803
A (PEF Dispersion Constant)	7.1414
B (PEF Dispersion Constant)	31.1794
C (PEF Dispersion Constant)	382.6078
V (fraction of vegetative cover) unitless	0.5
U_m (mean annual wind speed) m/s	5.77
U_t (equivalent threshold value)	11.32
F(x) (function dependent on U_m/U_t) unitless	0.57
A_c (acres)	0.5
Q/C_{wp} (g/m^2-s per kg/m^3)	101.8877
foc (fraction organic carbon in soil) g/g	0.004
p_b (dry soil bulk density) g/cm ^{3}	1.5
p_s (soil particle density) g/cm ^{3}	2.65
θ $_w$ (water-filled soil porosity) L_{water}/L_{soil}	0.15
θ $_a$ (air-filled soil porosity) L_{air}/L_{soil}	0.28396
n (total soil porosity) L_{pore}/L_{soil}	0.43396
T (exposure interval) s	819936000
A (VF Dispersion Constant)	7.1414
B (VF Dispersion Constant)	31.1794
C (VF Dispersion Constant)	382.6078

Output generated 31MAY2018:18:27:57

Site-specific Risk Models
Outdoor Worker Cumulative Risk
Soil (Arctic Zone)

ca=Cancer, nc=Noncancer, ca* (Where nc CL < 100 x ca CL), ca** (Where nc CL < 10 x ca CL),
max=CL exceeds ceiling limit (see User's Guide), sat=CL exceeds csat, sol=CL exceeds Solubility
I=IRIS; D=Drinking Water/Health Advisory Goals; P=PPRTV; A=ATSDR; C=Cal EPA; X=APPENDIX PPRTV SCREEN; H=HEAST; S=SURROGATE

Chemical	Mutagen?	Volatile?	RfD (mg/kg-day)	RfD Ref	RfC (mg/m^3)	RfC Ref	Ingestion SF (mg/kg-day)$^{-1}$	SFO Ref	Inhalation Unit Risk (ug/m^3)$^{-1}$	IUR Ref	GIABS	ABS	MW	Density (g/cm^3)	D_{ia} (cm^2/s)
Benz[a]anthracene	Yes	Yes	-		-		7.30E-01	U	1.10E-04	U	1	0.13	2.28E+02	1.27E+00	2.61E-02
Benzo[a]pyrene	Yes	No	-		-		7.30E+00	U	1.10E-03	U	1	0.13	2.52E+02	-	4.76E-02
**Total Risk/HI*			-		-		-		-		-	-	-	-	-

Site-specific Risk Models
Outdoor Worker Cumulative Risk
Soil (Arctic Zone)

ca=Cancer, nc=Noncancer, ca* (Where nc CL < 100 x ca CL), ca** (Where nc CL < 10 x ca CL),
max=CL exceeds ceiling limit (see User's Guide), sat=CL exceeds csat, sol=CL exceeds Solubility
I=IRIS; D=Drinking Water/Health Advisory Goals; P=PPRTV; A=ATSDR; C=Cal EPA; X=APPENDIX PPRTV SCREEN; H=HEAST; S=SURROGATE

Chemical	D_{iw} (cm^2/s)	Henry's Law Constant (unitless)	Volatilization Factor (m^3/kg)	K_{oc} (cm^3/g)	K_d (cm^3/g)	Particulate Emission Factor (m^3/kg)	RBA	Concentration (mg/kg)	Ingestion Noncarcinogenic CDI Adult	Inhalation Noncarcinogenic (Volatiles) CDI Adult
Benz[a]anthracene	6.75E-06	4.91E-04	5.39E+06	1.77E+05	7.08E+02	2.70E+08	1	3.75E+01	-	-
Benzo[a]pyrene	5.56E-06	1.87E-05	-	5.87E+05	-	2.70E+08	1	1.37E+01	-	-
**Total Risk/HI*	-	-	-	-	-	-	-	-	-	-

Site-specific Risk Models
Outdoor Worker Cumulative Risk
Soil (Arctic Zone)

ca=Cancer, nc=Noncancer, ca* (Where nc CL < 100 x ca CL), ca** (Where nc CL < 10 x ca CL),
max=CL exceeds ceiling limit (see User's Guide), sat=CL exceeds csat, sol=CL exceeds Solubility
I=IRIS; D=Drinking Water/Health Advisory Goals; P=PPRTV; A=ATSDR; C=Cal EPA; X=APPENDIX PPRTV SCREEN; H=HEAST; S=SURROGATE

Chemical	Inhalation Noncarcinogenic (Particulates) CDI Adult	Dermal Noncarcinogenic CDI Adult	Ingestion Carcinogenic CDI	Inhalation (Volatiles) Carcinogenic CDI	Inhalation (Particulates) Carcinogenic CDI	Dermal Carcinogenic CDI	Ingestion HI Adult	Inhalation (Volatiles) HI Adult	Inhalation (Particulates) HI Adult
Benz[a]anthracene	-	-	9.17E-06	4.54E-04	9.06E-06	5.05E-06	-	-	-
Benzo[a]pyrene	-	-	3.35E-06	-	3.31E-06	1.84E-06	-	-	-
**Total Risk/HI*	-	-	-	-	-	-	-	-	-

Site-specific Risk Models
Outdoor Worker Cumulative Risk
Soil (Arctic Zone)

ca=Cancer, nc=Noncancer, ca* (Where nc CL < 100 x ca CL), ca** (Where nc CL < 10 x ca CL),
max=CL exceeds ceiling limit (see User's Guide), sat=CL exceeds csat, sol=CL exceeds Solubility
I=IRIS; D=Drinking Water/Health Advisory Goals; P=PPRTV; A=ATSDR; C=Cal EPA; X=APPENDIX PPRTV SCREEN; H=HEAST; S=SURROGATE

Chemical	Dermal HI Adult	Noncarcinogenic HI Adult	Ingestion Risk	Inhalation (Volatiles) Risk	Inhalation (Particulates) Risk	Dermal Risk	Carcinogenic Risk
Benz[a]anthracene	-	-	6.70E-06	5.00E-08	9.97E-10	3.68E-06	**1.04E-05**
Benzo[a]pyrene	-	-	2.45E-05	-	3.64E-09	1.35E-05	**3.79E-05**
**Total Risk/HI*	-	-	*3.12E-05*	*5.00E-08*	*4.64E-09*	*1.71E-05*	***4.84E-05***

Site-specific
Outdoor Worker Equation Inputs
Soil (Arctic Zone)

Variable	Value
TR (target cancer risk) unitless	1e-05
THQ (target hazard quotient) unitless	1
AT_{ow} (averaging time)	365
$EF_{ow\text{-}arctic}$ (exposure frequency) d/yr	200
ED_{ow} (exposure duration) yr	25
ET_{ow} (exposure time) hr/day	8
LT (lifetime) yr	70
BW_{ow} (body weight) kg	80
IRS_{ow} (soil ingestion rate) mg/day	100
AF_{ow} (skin adherence factor - adult) mg/cm ^{2}	0.12
SA_{ow} (skin surface area - adult) cm ^{2}/day	3527
A_c (acres)	0.5
Q/C_{wp} (g/m^2-s per kg/m^3)	101.8877
PEF (particulate emission factor) m ^{3}/kg	269953472.7803
A (PEF Dispersion Constant)	7.1414
B (PEF Dispersion Constant)	31.1794
C (PEF Dispersion Constant)	382.6078
V (fraction of vegetative cover) unitless	0.5
U_m (mean annual wind speed) m/s	5.77
U_t (equivalent threshold value)	11.32
F(x) (function dependent on U_m/U_t) unitless	0.57
A_c (acres)	0.5
Q/C_{wp} (g/m^2-s per kg/m^3)	101.8877
foc (fraction organic carbon in soil) g/g	0.004
p_b (dry soil bulk density) g/cm ^{3}	1.5
p_s (soil particle density) g/cm ^{3}	2.65
θ $_w$ (water-filled soil porosity) L_{water}/L_{soil}	0.15
θ $_a$ (air-filled soil porosity) L_{air}/L_{soil}	0.28396
n (total soil porosity) L_{pore}/L_{soil}	0.43396
T (exposure interval) s	819936000
A (VF Dispersion Constant)	7.1414

Output generated 31MAY2018:18:22:47

Site-specific
Outdoor Worker Equation Inputs
Soil (Arctic Zone)

Variable	Value
B (VF Dispersion Constant)	31.1794
C (VF Dispersion Constant)	382.6078

Site-specific
Outdoor Worker Cleanup Levels
Soil (Arctic Zone)

ca=Cancer, nc=Noncancer, ca* (Where nc CL < 100 x ca CL), ca** (Where nc CL < 10 x ca CL),
max=CL exceeds ceiling limit (see User's Guide), sat=CL exceeds csat, sol=CL exceeds Solubility
I=IRIS; D=Drinking Water/Health Advisory Goals; P=PPRTV; A=ATSDR; C=Cal EPA; X=APPENDIX PPRTV SCREEN; H=HEAST; S=SURROGATE

Substitution for threshold maximum in soil has been enabled.

Chemical	CAS Number	Mutagen?	Volatile?	Ingestion SF (mg/kg-day) $^{-1}$	SFO Ref	Inhalation Unit Risk (ug/m^3)$^{-1}$	IUR Ref	RfD (mg/kg-day)	RfD Ref	RfC (mg/m^3)	RfC Ref	GIABS	ABS
Benz[a]anthracene	56-55-3	Yes	Yes	7.30E-01	U	1.10E-04	U	-		-		1	0.13
Benzo[a]pyrene	50-32-8	Yes	No	7.30E+00	U	1.10E-03	U	-		-		1	0.13

Chemical	RBA	D_{ia} (cm^2/s)	D_{iw} (cm^2/s)	Volatilization Factor (m^3/kg)	K_{oc} (cm^3/g)	K_d (cm^3/g)	Henry's Law Constant (unitless)	Soil Saturation Concentration (mg/kg)	Water Solubility (mg/L)	Particulate Emission Factor (m^3/kg)
Benz[a]anthracene	1	2.61E-02	6.75E-06	5.39E+06	1.77E+05	7.08E+02	4.91E-04	-	9.40E-03	2.70E+08
Benzo[a]pyrene	1	4.76E-02	5.56E-06	-	5.87E+05	-	1.87E-05	-	1.62E-03	2.70E+08

Chemical	Ingestion CL TR=1e-05 (mg/kg)	Dermal CL TR=1e-05 (mg/kg)	Inhalation CL TR=1e-05 (mg/kg)	Carcinogenic CL TR=1e-05 (mg/kg)	Ingestion CL HQ=1 (mg/kg)	Dermal CL HQ=1 (mg/kg)	Inhalation CL HQ=1 (mg/kg)	Noncarcinogenic CL HQ=1 (mg/kg)	Cleanup Level (mg/kg)
Benz[a]anthracene	5.60E+01	1.02E+02	7.36E+03	3.59E+01	-	-	-	-	3.6E+01 ca
Benzo[a]pyrene	5.60E+00	1.02E+01	3.76E+04	3.61E+00	-	-	-	-	3.6E+00 ca

Site-specific
Outdoor Worker Risk
Soil (Arctic Zone)

Chemical	Ingestion SF (mg/kg-day) $^{-1}$	SFO Ref	Inhalation Unit Risk (ug/m^3)$^{-1}$	IUR Ref	RfD (mg/kg-day)	RfD Ref	RfC (mg/m^3)	RfC Ref	GIABS	ABS	RBA	D_{ia} (cm^2/s)	D_{iw} (cm^2/s)	Volatilization Factor (m^3/kg)	K_{oc} (cm^3/g)	K_d (cm^3/g)
Benz[a]anthracene	7.30E-01	U	1.10E-04	U	-		-		1	0.13	1	2.61E-02	6.75E-06	5.39E+06	1.77E+05	7.08E+02
Benzo[a]pyrene	7.30E+00	U	1.10E-03	U	-		-		1	0.13	1	4.76E-02	5.56E-06	-	5.87E+05	-
**Total Risk*	-		-		-		-		-	-	-	-	-	-	-	-

Chemical	Henry's Law Constant (unitless)	Soil Saturation Concentration (mg/kg)	Particulate Emission Factor (m^3/kg)	Concentration (mg/kg)	Ingestion Risk	Dermal Risk	Inhalation Risk	Total Risk	Ingestion HQ	Dermal HQ	Inhalation HQ	Noncarcinogenic HI
Benz[a]anthracene	4.91E-04	-	2.70E+08	37.5	6.70E-06	3.68E-06	5.10E-08	1.04E-05	-	-	-	-
Benzo[a]pyrene	1.87E-05	-	2.70E+08	13.7	2.45E-05	1.35E-05	3.64E-09	3.79E-05	-	-	-	-
**Total Risk*	-	-	-	-	*3.12E-05*	*1.71E-05*	*5.46E-08*	*4.84E-05*	-	-	-	-

END OF DOCUMENT