

Flint Hills Resources Alaska, LLC

2015 ONSITE EXCAVATION REPORT

North Pole Terminal
North Pole, Alaska

November 30, 2015

A large, solid orange geometric shape, resembling a stylized triangle or a section of a larger triangle, is positioned in the bottom right corner of the page. It is composed of two overlapping triangles, creating a complex, angular form that extends from the bottom edge towards the top right corner.

2015 ONSITE EXCAVATION REPORT

North Pole Terminal
North Pole, Alaska



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ACRONYMS AND ABBREVIATIONS

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
Arcadis	Arcadis U.S., Inc.
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
DRO	diesel-range organics
FHRA	Flint Hills Resources Alaska, LLC
Final OCP	Final Onsite Cleanup Plan
FTA	Fire Training Area
GPS	global positioning system
GRO	gasoline-range organics
mg/kg	milligrams per kilogram
PFC	perfluorinated compound
report	2015 Onsite Excavation Report
site	Flint Hills Resources Alaska, LLC North Pole Terminal, located on H and H Lane in North Pole, Alaska
SWA	Southwest Former Wash Area
USEPA	United States Environmental Protection Agency
µg/kg	micrograms per kilogram

1 INTRODUCTION

On behalf of Flint Hills Resources Alaska, LLC (FHRA), Arcadis U.S., Inc. (Arcadis) prepared this 2015 Onsite Excavation Report (report) for the FHRA North Pole Terminal, located on H and H Lane in North Pole, Alaska (site). This report summarizes excavation activities completed during 2015 within Lagoon B, the Southwest Former Wash Area (SWA), and the Fire Training Area (FTA). The scope of the soil excavation work is defined in Section 5.3 of the Final Onsite Cleanup Plan (Final OCP; Arcadis 2014), which was approved by the Alaska Department of Environmental Conservation (ADEC) on October 16, 2014.

2 EXCAVATION ACTIVITIES

Excavation activities were completed at Lagoon B, the SWA, and the FTA between June 2 and September 11, 2015. This section describes these excavation activities.

2.1 Lagoon B Soil Excavation

Lagoon B is located on the western portion of the site, as shown on Figure 2-1. Excavation activities were completed at Lagoon B between June 2 and 10, 2015 consistent with the footprint set forth in the Final OCP (Arcadis 2014). The excavation was advanced vertically through the unsaturated soil and terminated at saturated soil in the capillary fringe or top of groundwater at a depth between approximately 2 and 3.5 feet below ground surface (bgs). Due to the relatively shallow depth of groundwater beneath the bottom of the lagoon, no excavation sidewall sloping was required.

Soil was removed from two excavation areas within Lagoon B. The extent of the excavation and soil sampling locations were documented using a global positioning system (GPS) and were plotted on Figure 2-2. After soil removal activities were completed, the excavated area was backfilled with gravel. Photo logs are included as Appendix A.

2.1.1 Excavated Soil Handling

The excavated soil was handled in accordance with applicable requirements (as outlined in 18 Alaska Administrative Code [AAC] 75.360, 18 AAC 75.370, and 18 AAC 75.325(i)), including soil transport requirements outlined in 18 AAC 60.015. As soil was excavated, each load was weighed and directly placed into 12 lined railcar gondolas that were covered and secured to ensure that excavated soil did not come in contact with surface soil during the cleanup and transport process. Debris and other materials (i.e., lagoon liners, piping, and concrete supports) were included with excavated soil and transported offsite for disposal. Approval to transport documentation is included in Appendix B.

2.1.2 Excavated Soil Disposal

Approximately 945 tons of soil and debris excavated from Lagoon B were classified as listed hazardous waste materials and were segregated for offsite transportation and disposal in accordance with applicable federal, state, and local regulations. Hazardous waste was transported by rail as a covered load in accordance with 18 AAC 60.015 to Chemical Waste Management of the Northwest located in Arlington, Oregon for disposal via landfilling. Uniform hazardous waste manifests were completed and accompanied

each load as it was transported to the disposal facility. Certificates of Disposal are included in Appendix C.

2.1.3 Post-Excavation Soil Sampling

Post-excavation soil sampling began on June 2, 2015 and was completed on June 10, 2015. Sixteen soil samples were collected from the excavation sidewalls and nine soil samples were collected from the excavation base. Soil samples were analyzed for sulfolane using United States Environmental Protection Agency (USEPA) modified Method 8270D with isotope dilution. Sulfolane was not detected in 14 of the 16 sidewall samples. Remaining samples were detected at concentrations of 0.00582 JL* milligrams per kilogram (mg/kg [LGB-SW-15]) and 0.00719 J mg/kg (LGB-SW-16). Sulfolane was detected in each base sample with results ranging from 0.00401 J mg/kg (LGB-F-2) to 0.0673 mg/kg (LGB-F-5; duplicate sample). Analytical results are summarized in Table 2-1. Data validation reports and laboratory packets are included as Appendix D.

2.2 Southwest Former Wash Area Excavation

The SWA is located on the western portion of the site, as shown on Figure 2-1. Excavation activities were completed at the SWA between July 28 and September 11, 2015, consistent with the footprint set forth in the Final OCP (Arcadis 2014). The excavation was advanced vertically through the unsaturated soil and was terminated at saturated soil in the capillary fringe or top of groundwater, approximately 8 to 9 feet bgs, which was deeper than anticipated and resulted in a greater volume of soil for disposal. To maintain the structural integrity of the excavation, an approximate 2:1 to 1.5:1 (run:rise) slope was completed along the edge of the excavation. Additionally, FHRA removed a portion of the concrete pad at the former Materials Storage Area. The concrete material was broken into manageable pieces and disposed of with the soil. Soil from beneath the concrete pad was included in the slope material to be removed to provide structural stability of the excavation and was managed along with the excavated soil and debris.

Soil, including material from sloping, was removed from the SWA. The extent of the excavation and soil sampling locations were documented using GPS and plotted on Figure 2-3. After soil removal and sampling activities were completed, the excavated area was backfilled to grade. Photo logs are included as Appendix A.

2.2.1 Excavated Soil Handling

The excavated soil was handled in accordance with applicable requirements (as outlined in 18 AAC 75.360, 18 AAC 75.370, and 18 AAC 75.325(i)), including soil transport requirements outlined in 18 AAC 60.015. As soil was excavated, each load was weighed and placed directly into 66 lined railcar gondolas that were covered and secured to ensure that excavated soil did not come in contact with surface soil during the cleanup and transport process. Debris and other materials (i.e., steel piping and concrete) were included with the excavated soil and transported offsite for disposal. Approval to transport documentation is included in Appendix B.

2.2.2 Excavated Soil Disposal

Approximately 5,893 tons of soil and debris, including material from sloping, were excavated from the SWA and classified as listed hazardous waste materials. Materials excavated from the SWA were

segregated for offsite transportation and disposal in accordance with applicable federal, state, and local regulations. Hazardous waste was transported by rail as a covered load in accordance with 18 AAC 60.015 to Chemical Waste Management of the Northwest located in Arlington, Oregon for disposal via landfilling. Uniform hazardous waste manifests were completed and accompanied each load as it was transported to the disposal facility. Certificates of Disposal are included in Appendix C.

2.2.3 Post-Excavation Soil Sampling

Post-excavation soil sampling was completed on September 12, 2015. Twelve soil samples were collected from the excavation sidewalls and analyzed for sulfolane using USEPA modified Method 8270D with isotope dilution. Previous sampling in the SWA confirmed the presence of high sulfolane concentrations in soil below the planned excavation depth. As indicated in the Final OCP (Arcadis 2014), this characterization is considered adequate for characterization of soil remaining in-place at the base of the excavation, and no further excavation base sampling was performed. Sulfolane was not detected in four of the sidewall samples. Detections in the remaining samples ranged from 0.00508 J mg/kg (SWA-12-S) to 25.2 mg/kg (SWA-1-S). Analytical results are summarized in Table 2-2. Data validation reports and laboratory packets are included as Appendix D.

2.3 Fire Training Area Soil Excavation

The FTA is located on the southwestern portion of the NPR, as shown on Figure 2-1. Approximately 80,000 gallons of standing water were removed from the FTA prior to initiating excavation. Approval to transport documentation is included in Appendix B. The water was transported by rail to the Emerald Alaska facility in Anchorage, Alaska for treatment. Excavation activities were completed at the FTA between June 16 and July 27, 2015, consistent with the criteria set forth in the Final OCP (Arcadis 2014). Soil was removed from the existing ground surface down to the membrane liner, at approximately 2 to 3 feet below existing grade. The horizontal limits of excavation were defined by the extent of the FTA liner.

Soil and the membrane liner were removed from the FTA. The extent of the excavation and soil sampling locations were documented using GPS and plotted on Figures 2-4 and 2-5. After soil removal activities were completed, the excavated area was backfilled to grade. Photo logs are included as Appendix A.

2.3.1 Excavated Soil Handling

The excavated soil was handled in accordance with applicable requirements (as outlined in 18 AAC 75.360, 18 AAC 75.370, and 18 AAC 75.325(i)), including soil transport requirements outlined in 18 AAC 60.015. As soil was excavated, each load was weighed and placed directly into 27 lined railcar gondolas that were covered and secured to ensure that excavated soil did not come in contact with surface soil during the cleanup and transport process. Debris and other materials (i.e., liner material and concrete) were included with excavated soil and transported offsite for appropriate recycling or disposal. Approval to transport documentation is included in Appendix B.

2.3.2 Excavated Soil Disposal

Approximately 2,404 tons of soil and debris excavated from the FTA were characterized as non-hazardous waste materials and were segregated for offsite transportation and disposal in accordance with applicable federal, state, and local regulations. Non-hazardous waste was transported by rail as a

covered load in accordance with 18 AAC 60.015 to Chemical Waste Management of the Northwest located in Arlington, Oregon for disposal via landfilling. Disposal at Chemical Waste Management was a deviation from the Final OCP (Arcadis 2014), but was approved by ADEC (Appendix B). Uniform non-hazardous waste manifests were completed and accompanied each load as it was transported to the disposal facility. Certificates of Disposal are included in Appendix C.

2.3.3 Post-Excavation Soil Sampling

Post-excavation soil sampling began on July 11, 2015 and was completed on July 30, 2015. Thirty soil samples were collected from the excavation sidewalls. Samples were not collected from the excavation base because soil was excavated to the membrane liner. Soil samples were analyzed for the following:

- Benzene, toluene, ethylbenzene, and total xylenes (BTEX) by USEPA Method 8021
- Gasoline-range organics (GRO) by Alaska Method AK101
- Diesel-range organics (DRO) by Alaska Method AK102
- Perfluorinated compounds (PFCs) by Method DV-LC-0012

Benzene was detected in two sidewall samples at concentrations of 12.4 J micrograms per kilogram ($\mu\text{g/kg}$) (FTA-14-SW) and 13.4 J $\mu\text{g/kg}$ (FTA-13-SW). Toluene was detected in six sidewall samples at concentrations ranging from 95.2 $\mu\text{g/kg}$ (FTA-12-SW) to 129 $\mu\text{g/kg}$ (FTA-14-SW). Ethylbenzene was not detected in any of the 30 sidewall samples. Total xylenes was detected in soil sample FTA-13-SW at a concentration of 66.1 J $\mu\text{g/kg}$.

GRO was detected in five sidewall samples at concentrations ranging from 1.61 mg/kg (FTA-12-SW) to 2.10 mg/kg (FTA-14-SW).

DRO was detected in 24 sidewall samples at concentrations ranging from 11.0 J mg/kg (FTA-7-SW and FTA-13-SW) to 2,240 J* mg/kg (FTA-30-SW; duplicate sample).

Perfluorooctanoic acid and perfluorooctane sulfonate concentrations were detected in 28 sidewall samples and ranged from 0.27 J to 250 $\mu\text{g/kg}$ and 0.31 J to 3,000 $\mu\text{g/kg}$, respectively.

Analytical results for BTEX, GRO, and DRO are summarized in Table 2-3a. Analytical results for PFCs are summarized in Table 2-3b. Data validation reports and laboratory packets are included as Appendix D.

2.4 Summary

As proposed in the Final OCP (Arcadis 2014), excavation activities were completed between June 2 and September 11, 2015. A total of 9,242 tons of soil and debris were removed from the three excavation areas and transported to Chemical Waste Management of the Northwest located in Arlington, Oregon for disposal. Post-excavation sampling was completed, and the excavations were backfilled to grade. The excavation work as planned in the Final OCP (Arcadis 2014) is complete.

3 REFERENCES

Arcadis. 2014. Final Onsite Cleanup Plan. October 2014.

TABLES



**Table 2-1
Lagoon B - Post Excavation Soil Sampling Analytical Results**

**Onsite Soil Excavation Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Sample ID	Collection Date	Duplicate	Approximate Depth (feet bgs)	Sulfolane (mg/kg)	Comments
LGB-SW-1	6/2/2015		2.0	<0.00595 J*	
LGB-SW-2	6/2/2015		2.0	<0.00525	
LGB-SW-3	6/2/2015		2.0	<0.00555	
LGB-SW-4	6/2/2015		2.0	<0.00525	
LGB-SW-5	6/3/2015		2.0	<0.00525	
LGB-SW-5	6/3/2015	DUP	2.0	<0.00525	duplicate sample BD-2
LGB-SW-6	6/3/2015		2.0	<0.00530	
LGB-SW-7	6/9/2015		3.5	<0.00535	
LGB-SW-8	6/9/2015		2.0	<0.00545	
LGB-SW-9	6/9/2015		2.0	<0.00555	
LGB-SW-10	6/9/2015		2.0	<0.00545	
LGB-SW-11	6/9/2015		2.0	<0.00605	
LGB-SW-12	6/9/2015		2.0	<0.00525	
LGB-SW-13	6/9/2015		2.0	<0.00545	
LGB-SW-14	6/9/2015		2.0	<0.00525	
LGB-SW-14	6/9/2015	DUP	2.0	<0.00520	duplicate sample BD-4
LGB-SW-15	6/10/2015		2.0	0.00582 JL*	
LGB-SW-15	6/10/2015	DUP	2.0	0.00620 J	duplicate sample BD-5
LGB-SW-16	6/10/2015		3.5	0.00719 J	
LGB-F-1	6/2/2015		3.0	0.00876 J	
LGB-F-2	6/2/2015		3.0	0.00401 J	
LGB-F-2	6/2/2015	DUP	3.0	<0.00580 J*	duplicate sample BD-1
LGB-F-3	6/3/2015		2.0	0.00686 J	
LGB-F-4	6/9/2015		--	0.00904 J	
LGB-F-5	6/9/2015		3.5	0.0557	
LGB-F-5	6/9/2015	DUP	3.5	0.0673	duplicate sample BD-3
LGB-F-6	6/9/2015		3.4	0.0116 J	
LGB-F-7	6/9/2015		3.5	0.0203	
LGB-F-8	6/9/2015		2.0	0.0122	
LGB-F-9	6/10/2015		2.0	0.0192	

Notes:

bgs = below ground surface

mg/kg = milligrams per kilogram

DUP = duplicate

J = Estimated concentration detected below the laboratory limit of quantitation (LOQ); flag applied by laboratory.

J* = The analyte was not detected; the listed LOD may not represent the true LOD due to sample-handling or laboratory quality-control (QC) failures (i.e., the reported LOD may be inaccurate or imprecise); flag applied by Arcadis.

JL* = Result is considered estimated (biased low); flag applied by Arcadis.

< = not detected, limit of detection (LOD) or limit of quantitation (LOQ; for older data) listed; flag applied by laboratory

-- = not available

Table 2-2
Southwest Former Wash Area - Post Excavation Soil Sampling Analytical Results

Onsite Soil Excavation Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Sample ID	Collection Date	Duplicate	Approximate Depth (feet bgs)	Sulfolane (mg/kg)	Comments
SWA-1-S	9/12/2015		8.0	25.2	
SWA-2-S	9/12/2015		8.0	0.00656 J	
SWA-3-S	9/12/2015		8.0	0.0168	
SWA-4-S	9/12/2015		8.0	<0.00645	
SWA-5-S	9/12/2015		8.0	<0.00655	
SWA-6-S	9/12/2015		8.0	<0.00655	
SWA-7-S	9/12/2015		8.0	1.34	
SWA-8-S	9/12/2015		8.0	0.532	
SWA-9-S	9/12/2015		8.0	5.57	
SWA-10-S	9/12/2015		8.0	<0.00550	
SWA-11-S	9/12/2015		8.0	0.00546 J	
SWA-11-S	9/12/2015	Dup	8.0	0.488 J*	Duplicate sample BD-1-S
SWA-12-S	9/12/2015		8.0	0.00508 J	

Notes:

bgs = below ground surface

mg/kg = milligrams per kilogram

DUP = duplicate

J = Estimated concentration detected below the laboratory limit of quantitation (LOQ); flag applied by laboratory.

J* = The analyte was not detected; the listed LOD may not represent the true LOD due to sample-handling or laboratory quality-control (QC) failures (i.e., the reported LOD may be inaccurate or imprecise); flag applied by Arcadis.

< = not detected, limit of detection (LOD) or limit of quantitation (LOQ; for older data) listed; flag applied by laboratory

Table 2-3a
Fire Training Area - Post Excavation Soil Sampling Analytical Results

Onsite Soil Excavation Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Sample ID	Collection Date	Duplicate	Approximate Depth (feet bgs)	Benzene (µg/kg)	Toluene (µg/kg)	Ethylbenzene (µg/kg)	Total Xylenes (µg/kg)	GRO (mg/kg)	DRO (mg/kg)	Comments
FTA-1-SW	7/11/2015		1.5	<13.3	101 J*	<26.6 J*	<79.5	<2.65	<10.3	
FTA-2-SW	7/11/2015		1.5	<13.5	<27.1	<27.1 J*	<81.0	<2.71	<10.4	
FTA-3-SW	7/11/2015		1.5	<12.9	<25.8	<25.8 J*	<77.5	<2.58	<10.2	
FTA-4-SW	7/11/2015		1.5	<13.6	<27.2	<27.2 J*	<81.5	<2.72	<10.2	
FTA-5-SW	7/11/2015		1.5	<13.0	<26.0	<26.0 J*	<78.0	1.62 J	<10.3	
FTA-6-SW	7/11/2015		1.5	<13.4	109	<26.9 J*	<80.5	1.81 J	<10.3	
FTA-7-SW	7/11/2015		1.5	<14.9	112	<29.9 J*	<89.5	<2.99	11.0 J	
FTA-8-SW	7/11/2015		1.5	<15.1	115	<30.1 J*	<90.5	<3.01	36.7	
FTA-9-SW	7/11/2015		1.5	<19.1	<38.2	<38.2 J*	<115	<3.82	31.8	
FTA-10-SW	7/11/2015		1.5	<17.6	<35.3	<35.3 J*	<106	<3.52	31.2	
FTA-10-SW	7/11/2015	DUP	1.5	<13.7	<27.3 J*	<27.3 J*	<82.0	<2.73	<10.2	Duplicate sample FTA-BD-1
FTA-11-SW	7/30/2015		1.5	<16.1	<32.1	<32.1	<96.5	<3.21	26.1	
FTA-12-SW	7/30/2015		1.5	<12.5	95.2	<25.1	<75.0	1.61 J	13.5 J	
FTA-13-SW	7/30/2015		1.5	13.4 J	<23.1	<23.1	66.1 J	1.85 J	11.0 J	
FTA-14-SW	7/30/2015		1.5	12.4 J	129	<29.6	<89.0	2.10 J	28.5	
FTA-15-SW	7/30/2015		1.5	<12.8	<25.5	<25.5	<76.5	<2.55	19.7 J	
FTA-16-SW	7/30/2015		1.5	<6.00	<11.9	<11.9	<35.9	<1.20	16.0 J	
FTA-17-SW	7/30/2015		1.5	<8.45	<16.9	<16.9	<50.5	<1.69	35.2	
FTA-18-SW	7/30/2015		1.5	<13.9	<27.9	<27.9	<84.0	<2.79	13.4 J	
FTA-19-SW	7/30/2015		1.5	<15.2	<30.3	<30.3	<91.0	<3.03	13.0 J	
FTA-20-SW	7/30/2015		1.5	<17.0	<34.0	<34.0	<102	<3.40	13.7 J	
FTA-20-SW	7/30/2015	DUP	1.5	<16.6	<33.4	<33.4	<100	<3.34	<23.4 B*	Duplicate sample FTA-BD-2
FTA-21-SW	7/30/2015		1.5	<11.8	<23.6	<23.6	<71.0	<2.36	13.5 J	
FTA-22-SW	7/30/2015		1.5	<14.6	<29.1	<29.1	<87.5	<2.92	36.8	
FTA-23-SW	7/30/2015		1.5	<15.9	<31.9	<31.9	<95.5	<3.19	31.4	
FTA-24-SW	7/30/2015		1.5	<13.2	<26.4	<26.4	<79.0	<2.63	20.7 J	
FTA-25-SW	7/30/2015		1.5	<13.6	<27.2	<27.2	<81.5	<2.72	56.2	
FTA-26-SW	7/30/2015		1.5	<14.7	<29.3	<29.3	<88.0	<5.86 B*	57.3	
FTA-27-SW	7/30/2015		1.5	<15.6	<31.1	<31.1	<93.5	<6.22 B*	54.3	
FTA-28-SW	7/30/2015		1.5	<13.2	<26.4	<26.4	<79.0	<2.64	156	
FTA-29-SW	7/30/2015		1.5	<15.4	<30.9	<30.9	<93.0	<3.09	85.5	
FTA-30-SW	7/30/2015		1.5	<15.3	<30.6	<30.6	<92.0	<3.06	135 J*	
FTA-30-SW	7/30/2015	DUP	1.5	<15.8	<31.5	<31.5	<94.5	<3.15	2240 J*	Duplicate sample FTA-BD-3

Notes:

bgs = below ground surface

mg/kg = milligrams per kilogram

µg/kg = micrograms per kilogram

DUP = duplicate

GRO = gasoline range organics

DRO = diesel range organics

J = Estimated concentration detected below the laboratory limit of quantitation (LOQ); flag applied by laboratory.

J* = The analyte was not detected; the listed LOD may not represent the true LOD due to sample-handling or laboratory quality-control (QC) failures (i.e., the reported LOD may be inaccurate or imprecise); flag applied by Arcadis.

Table 2-3a
Fire Training Area - Post Excavation Soil Sampling Analytical Results

Onsite Soil Excavation Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

B* = The analyte is considered not detected due to sample-contamination identified in a blank; the result is listed as less than the limit of quantitation (LOQ) or the concentration originally reported in the sample (higher of the two values); flag applied by Arcadis.

< = not detected, limit of detection (LOD) or limit of quantitation (LOQ; for older data) listed; flag applied by laboratory

Table 2-3b
Fire Training Area - Post Excavation Soil Sampling Analytical Results - PFCs

Onsite Soil Excavation Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Location ID	FTA-1-SW	FTA-2-SW	FTA-3-SW	FTA-4-SW	FTA-5-SW	FTA-6-SW	FTA-7-SW	FTA-8-SW	FTA-9-SW	FTA-10-SW
Sample Date	7/30/2015	7/30/2015	7/30/2015	7/30/2015	7/30/2015	7/30/2015	7/30/2015	7/30/2015	7/30/2015	7/30/2015
Sample Type	N	N	N	N	N	N	N	N	N	N
Perfluorobutane Sulfonate (PFBS)	<0.84	<0.78	<0.77	<0.76	<0.80	<0.83	<0.89	0.53 J	0.49 J	<0.91
Perfluorobutanoic acid (PFBA)	<0.84	0.33 J	<0.77	<0.76	<0.80	<0.83	<0.89	1.1	1.2	<0.91
Perfluorodecane sulfonate (PFDS)	<0.84	<0.78	<0.77	<0.76	<0.80	<0.83	<0.89	<0.87	<0.87	<0.91
Perfluorodecanoic acid (PFDA)	3.4	9.5	<0.77	<0.76	<0.80	<0.83	<0.89	0.30 J	0.83 J	<0.91
Perfluorododecanoic acid (PFDoA)	<2.1	<1.9	<1.9	<1.9	<2.0	<2.1	<2.2	<2.2	<2.2	<2.3
Perfluoroheptanoic acid (PFHpA)	<0.84	0.35 J	1.3	<0.76	0.85	<0.83	0.79 J	1.9	2.0	<0.91
Perfluorohexane Sulfonate (PFHxS)	0.51 J	1.6	1.4	<0.76	1.7	<0.83	1.2	1.5	12	0.56 J
Perfluorohexanoic acid (PFHxA)	0.45 J	1.3	0.49 J	<0.76	<0.80	<0.83	2.1	5.1	5.8	<0.91
Perfluorononanoic acid (PFNA)	200	220	4.6	0.25 J	12	<0.83	<0.89	8.9	94	0.70 J
Perfluorooctane Sulfonamide (FOSA)	0.13 J	<0.78	<0.77	<0.76	<0.80	<0.83	<0.89	<0.87	<0.87	<0.91
Perfluorooctanoic Sulfonate (PFOS)	170	750	13	0.34 J	0.85	<0.83	0.84 J	5.9	250	1.1
Perfluorooctanoic acid (PFOA)	3.0	3.7	6.1	<0.76	1.6	<0.83	1.3	0.70 J	9.5	0.60 J
Perfluoropentanoic acid (PFPA)	0.38 J	1.3	0.40 J	<0.76	<0.80	<0.83	<0.89	4.5	5.8	<0.91
Perfluorotetradecanoic acid (PFTeA)	<2.1	<1.9	<1.9	<1.9	<2.0	<2.1	<2.2	<2.2	<2.2	<2.3
Perfluorotridecanoic Acid (PFTriA)	<0.84	<0.78	<0.77	<0.76	1.3	<0.83	<0.89	<0.87	1.2	<0.91
Perfluoroundecanoic acid (PFUnA)	1.5	<0.78	<0.77	0.42 J	0.83	<0.83	<0.89	0.64 J	4.3	<0.91

Notes:
All results in micrograms per kilogram (µg/kg)

not detected, limit of detection (LOD)
< listed; flag applied by laboratory

Estimated concentration detected
below the laboratory limit of
quantitation (LOQ); flag applied by
laboratory.

J MS and/or MSD Recovery is outside
acceptance limits; flag applied by
Arcadis.

JL* Sample results are obtained from a
dilution

D Perfluorinated Compounds

N Normal Sample

FD Field Duplicate

Table 2-3b
Fire Training Area - Post Excavation Soil Sampling Analytical Results - PFCs

Onsite Soil Excavation Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Location ID	FTA-10-SW	FTA-11-SW	FTA-12-SW	FTA-13-SW	FTA-14-SW	FTA-15-SW	FTA-16-SW	FTA-17-SW	FTA-18-SW	FTA-19-SW
Sample Date	7/30/2015	7/30/2015	7/30/2015	7/30/2015	7/30/2015	7/30/2015	7/30/2015	7/30/2015	7/30/2015	7/30/2015
Sample Type	FD	N	N	N	N	N	N	N	N	N
Perfluorobutane Sulfonate (PFBS)	<0.86	<0.93	<0.81	<0.81	<0.86	<0.84	0.33 J	<0.88	<0.84	<0.81
Perfluorobutanoic acid (PFBA)	<0.86	<0.93	<0.81	<0.81	<0.86	0.35 J	0.89	<0.88	<0.84	<0.81
Perfluorodecane sulfonate (PFDS)	<0.86	<0.93	<0.81	<0.81	<0.86	<0.84	<0.82	<0.88	<0.84	<0.81
Perfluorodecanoic acid (PFDA)	<0.86	<0.93	<0.81	<0.81	<0.86	<0.84	<0.82	<0.88	<0.84	1.2
Perfluorododecanoic acid (PFDoA)	<2.2	<2.3	<2.0	<2.0	<2.2	<2.1	<2.0	<2.2	<2.1	<2.0
Perfluoroheptanoic acid (PFHpA)	<0.86	0.71 J	0.18 J	<0.81	0.71 J	1.1	6.2	1.9	1.6	3.7
Perfluorohexane Sulfonate (PFHxS)	<0.86	0.79 J	2.6	<0.81	<0.86	<0.84	74	11	3.0	9.7
Perfluorohexanoic acid (PFHxA)	<0.86	0.47 J	<0.81	<0.81	0.38 J	1.8	4.2	0.32 J	1.2	1.5
Perfluorononanoic acid (PFNA)	0.63 J	2.3	<0.81	<0.81	<0.86	<0.84	3.7	18	2.3	52
Perfluorooctane Sulfonamide (FOSA)	<0.86	<0.93	<0.81	<0.81	<0.86	<0.84	<0.82	<0.88	<0.84	<0.81
Perfluorooctanoic Sulfonate (PFOS)	1.1	0.40 J	0.27 J	<0.81	<0.86	<0.84	<0.82	1.8	1.2	9.1
Perfluorooctanoic acid (PFOA)	0.31 J	4.3	1.9	<0.81	0.42 J	0.45 J	41	11	4.2	5.4
Perfluoropentanoic acid (PFPA)	<0.86	0.36 J	<0.81	<0.81	0.58 J	1.3	3.9	0.68 J	0.74 J	0.82
Perfluorotetradecanoic acid (PFTeA)	<2.2	<2.3	<2.0	<2.0	<2.2	<2.1	<2.0	<2.2	<2.1	<2.0
Perfluorotridecanoic Acid (PFTriA)	1.0	<0.93	<0.81	<0.81	0.43 J	<0.84	<0.82	<0.88	<0.84	0.46 J
Perfluoroundecanoic acid (PFUnA)	2.0	<0.93	<0.81	<0.81	0.37 J	<0.84	2.5	<0.88	0.42 J	2.2

Notes:
All results in micrograms per kilogram (µg/kg)

not detected, limit of detection (LOD)
< listed; flag applied by laboratory

Estimated concentration detected
below the laboratory limit of
quantitation (LOQ); flag applied by
laboratory.

J MS and/or MSD Recovery is outside
acceptance limits; flag applied by
Arcadis.

JL* Sample results are obtained from a
dilution

D Perfluorinated Compounds

N Normal Sample

FD Field Duplicate

Table 2-3b
Fire Training Area - Post Excavation Soil Sampling Analytical Results - PFCs

Onsite Soil Excavation Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Location ID	FTA-20-SW	FTA-20-SW	FTA-21-SW	FTA-22-SW	FTA-23-SW	FTA-24-SW	FTA-25-SW	FTA-26-SW	FTA-27-SW	FTA-28-SW
Sample Date	7/30/2015	7/30/2015	7/30/2015	7/30/2015	7/30/2015	7/30/2015	7/30/2015	7/30/2015	7/30/2015	7/30/2015
Sample Type	N	FD	N	N	N	N	N	N	N	N
Perfluorobutane Sulfonate (PFBS)	<0.90	<0.88	1.4	0.26 J	<0.88	<0.88	<0.84	0.36 J	4.1	0.19 J
Perfluorobutanoic acid (PFBA)	0.37 J	<0.88	0.55 J	0.13 J	<0.88	0.65 J	0.50 J	1.1	4.9	1.2
Perfluorodecane sulfonate (PFDS)	<0.90	<0.88	<0.79	<0.86	<0.88	<0.88	<0.84	<0.84	<0.86	5.2
Perfluorodecanoic acid (PFDA)	0.91	0.97	<0.79	<0.86	<0.88	100	22	11	5.5	66
Perfluorododecanoic acid (PFDoA)	<2.2	<2.2	<2.0	<2.2	<2.2	<2.2	<2.1	<2.1	<2.2	3.5
Perfluoroheptanoic acid (PFHpA)	2.0	1.7	3.3	1.1	0.53 J	1.1	2.4	4.7	19	1.7
Perfluorohexane Sulfonate (PFHxS)	9.0	7.5	29 JL*	7.2	1.2	7.2	12	36	83	5.8
Perfluorohexanoic acid (PFHxA)	1.6	1.2	4.5	1.5	0.38 J	2.9	3.7	10	41	5.2
Perfluorononanoic acid (PFNA)	520	520	2.6	<0.86	1.2	950	920	3800	410	250
Perfluorooctane Sulfonamide (FOSA)	<0.90	<0.88	<0.79	<0.86	<0.88	0.53 J	0.22 J	0.15 J	0.12 J	3.5
Perfluorooctanoic Sulfonate (PFOS)	300	290	0.60 J	<0.86	0.91	2600	1000	2400	1400	760
Perfluorooctanoic acid (PFOA)	6.6	6.9	14	2.4	1.7	6.7	8.1	20	48	4.4
Perfluoropentanoic acid (PFPA)	1.4	1.0	3.3	2.2	0.78 J	1.3	2.2	6.9	29	3.4
Perfluorotetradecanoic acid (PFTeA)	<2.2	<2.2	<2.0	<2.2	<2.2	<2.2	<2.1	<2.1	<2.2	0.71 J
Perfluorotridecanoic Acid (PFTriA)	<0.90	0.48 J	<0.79	<0.86	<0.88	2.1	0.37 J	2.1	3.1	33
Perfluoroundecanoic acid (PFUnA)	1.3	1.6	<0.79	<0.86	1.9	10	0.93	15	12	370

Notes:
All results in micrograms per kilogram (µg/kg)

not detected, limit of detection (LOD)
< listed; flag applied by laboratory

Estimated concentration detected
below the laboratory limit of
quantitation (LOQ); flag applied by
laboratory.

J MS and/or MSD Recovery is outside
acceptance limits; flag applied by
Arcadis.

JL* Sample results are obtained from a
dilution

D Perfluorinated Compounds

N Normal Sample

FD Field Duplicate

Table 2-3b
Fire Training Area - Post Excavation Soil Sampling Analytical Results - PFCs

Onsite Soil Excavation Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Location ID	FTA-29-SW	FTA-30-SW	FTA-30-SW
Sample Date	7/30/2015	7/30/2015	7/30/2015
Sample Type	N	N	FD
Perfluorobutane Sulfonate (PFBS)	2.1	2.8	3.0
Perfluorobutanoic acid (PFBA)	4.4	7.6	7.2
Perfluorodecane sulfonate (PFDS)	<0.89	<0.90	<0.83
Perfluorodecanoic acid (PFDA)	91	8.5	8.2
Perfluorododecanoic acid (PFDoA)	<2.2	1.6 J	1.7 J
Perfluoroheptanoic acid (PFHpA)	11	15	15
Perfluorohexane Sulfonate (PFHxS)	28	32	35
Perfluorohexanoic acid (PFHxA)	29	43	46
Perfluorononanoic acid (PFNA)	2200	480 D	490
Perfluorooctane Sulfonamide (FOSA)	0.26 J	0.34 J	0.45 J
Perfluorooctanoic Sulfonate (PFOS)	3000	750 D	810
Perfluorooctanoic acid (PFOA)	23	38	38
Perfluoropentanoic acid (PFPA)	27	41	42
Perfluorotetradecanoic acid (PFTeA)	<2.2	<2.3	<2.1
Perfluorotridecanoic Acid (PFTriA)	0.95	11	11
Perfluoroundecanoic acid (PFUnA)	2.5	22	22

Notes:
All results in micrograms per kilogram (µg/kg)

not detected, limit of detection (LOD)
< listed; flag applied by laboratory

Estimated concentration detected below the laboratory limit of quantitation (LOQ); flag applied by laboratory.

J MS and/or MSD Recovery is outside acceptance limits; flag applied by Arcadis.

JL* Sample results are obtained from a dilution

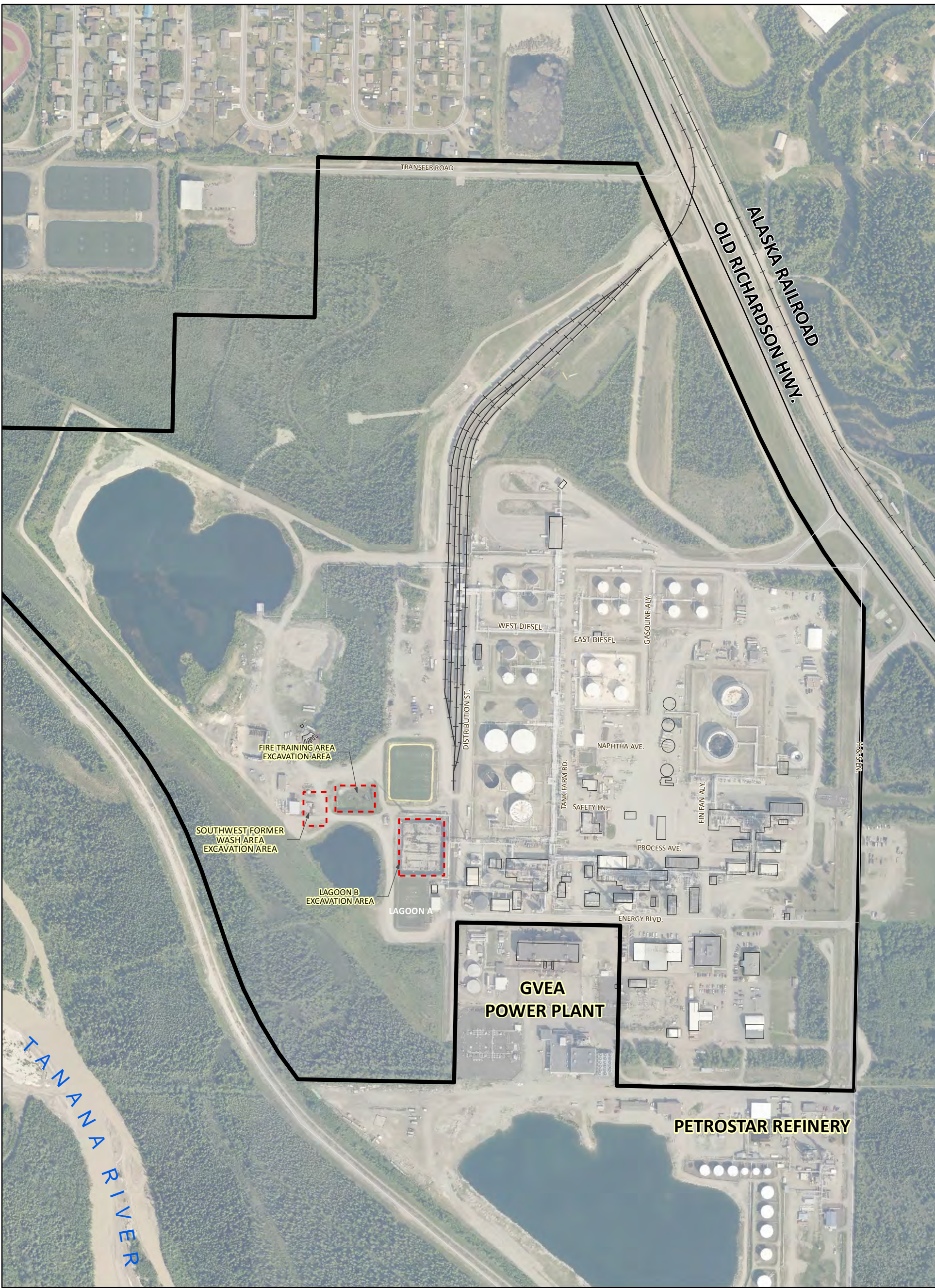
D Perfluorinated Compounds

N Normal Sample

FD Field Duplicate

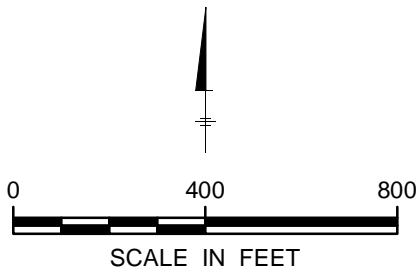
FIGURES





Legend
FHRA Property Boundary

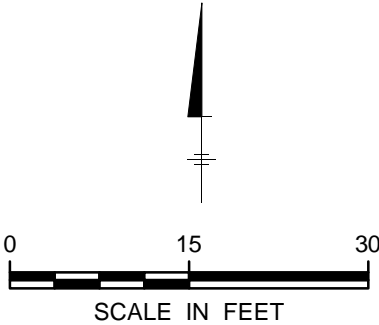
Notes:
GVEA: Golden Valley Electrical Authority
-Image provided courtesy of Pictometry International 2012



FLINT HILLS RESOURCES ALASKA, LLC NORTH POLE TERMINAL, NORTH POLE, ALASKA 2015 ONSITE EXCAVATION REPORT	
EXCAVATION AREAS	
	FIGURE 2-1



Legend:
2015 Excavation Soil Samples
● Non Detect
● 0.00391-1.00 mg/kg
- - - Complete Extent of Excavation



FLINT HILLS RESOURCES, ALASKA, LLC
NORTH POLE TERMINAL, NORTH POLE ALASKA
2015 ONSITE EXCAVATION REPORT

**LAGOON B EXCAVATION AND
SOIL SAMPLE LOCATIONS**

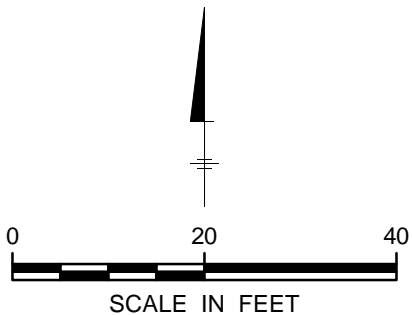


FIGURE
2-2



Notes:
mg/kg = miligrams per kilogram
Image provided courtesy of Pictometry International 2012

- Legend:
- 2015 Excavation Soil Samples**
- Non Detect
 - 0.00391 - 1.00 mg/kg
 - >1.00 mg/kg
 - Estimated Limit of Sloping
 - Completed Extent of Excavation



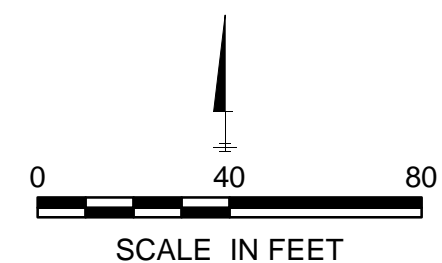
FLINT HILLS RESOURCES, ALASKA, LLC NORTH POLE TERMINAL, NORTH POLE ALASKA 2015 ONSITE EXCAVATION REPORT	
SOUTHWEST FORMER WASH EXCAVATION AND SOIL SAMPLE LOCATIONS	
	FIGURE 2-3



Legend

- 2015 Excavation Soil Sidewall Sample Locations
- Completed Extent of Excavation
- FHRA Property Boundary

Note:
 GRO = gasoline range organics
 DRO = diesel range organics
 Image provided courtesy of Pictometry International 2012



FLINT HILLS RESOURCES ALASKA, LLC
 NORTH POLE TERMINAL, NORTH POLE, ALASKA
 2015 ONSITE EXCAVATION REPORT

COMPLETED FIRE TRAINING AREA EXCAVATION
 AND SOIL SAMPLE LOCATIONS - BENZENE, GRO, DRO

 **ARCADIS**

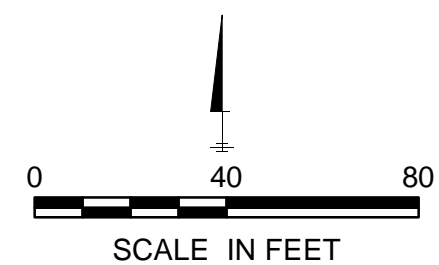
FIGURE
2-4



Legend

- 2015 Excavation Soil Sidewall Sample Locations
- Completed Extent of Excavation
- FHRA Property Boundary

Note:
PFCs = perfluorinated compounds
Image provided courtesy of Pictometry International 2012



FLINT HILLS RESOURCES ALASKA, LLC
NORTH POLE TERMINAL, NORTH POLE, ALASKA
2015 ONSITE EXCAVATION REPORT

**COMPLETED FIRE TRAINING AREA EXCAVATION
AND SOIL SAMPLE LOCATIONS - PFCs**

 **ARCADIS**

FIGURE
2-5

APPENDIX A

Photograph Logs



LAGOON B EXCAVATION PHOTO LOG

Photo 1: Completed Lagoon B Excavation (view facing west)¹



2015 ONSITE EXCAVATION REPORT

**2015 Onsite Excavation Report
Flint Hills Resources Alaska, LLC
North Pole, Alaska**

¹ The groundwater level rose during the excavation work, causing water to rise into the bottom of the excavations as shown in Photo 1.

LAGOON B EXCAVATION PHOTO LOG

Photo 2: Completed Lagoon B Excavation (view facing south) ²



2015 ONSITE EXCAVATION REPORT

**2015 Onsite Excavation Report
Flint Hills Resources Alaska, LLC
North Pole, Alaska**

² The groundwater level rose during the excavation work, causing water to rise into the bottom of the excavations as shown Photo 2.

LAGOON B EXCAVATION PHOTO LOG

Photo 3: Backfilled Lagoon B



2015 ONSITE EXCAVATION REPORT

**2015 Onsite Excavation Report
Flint Hills Resources Alaska, LLC
North Pole, Alaska**

LAGOON B EXCAVATION PHOTO LOG

Photo 4: Haul Route



2015 ONSITE EXCAVATION REPORT

**2015 Onsite Excavation Report
Flint Hills Resources Alaska, LLC
North Pole, Alaska**

LAGOON B EXCAVATION PHOTO LOG

Photo 5: Gondola Loading and Scale Area



2015 ONSITE EXCAVATION REPORT

**2015 Onsite Excavation Report
Flint Hills Resources Alaska, LLC
North Pole, Alaska**

SOUTHWEST FORMER WASH AREA EXCAVATION PHOTO LOG

Photo 1: Completed Southwest Former Wash Area Excavation (view facing west from the southeast corner of the excavation)¹



2015 ONSITE EXCAVATION REPORT

**2015 Onsite Excavation Report
Flint Hills Resources Alaska, LLC
North Pole, Alaska**

¹ The groundwater level generally decreased during the excavation work, resulting in a dryer appearance of the excavation bottom in Photo 1.

SOUTHWEST FORMER WASH AREA EXCAVATION PHOTO LOG

Photo 2: Completed Southwest Former Wash Area Excavation (view facing south southeast of the western edge of the excavation)²



2015 ONSITE EXCAVATION REPORT

**2015 Onsite Excavation Report
Flint Hills Resources Alaska, LLC
North Pole, Alaska**

² The groundwater level generally decreased during the excavation work, resulting in a dryer appearance of the excavation bottom in Photo 2.

SOUTHWEST FORMER WASH AREA EXCAVATION PHOTO LOG

Photo 3: Backfilled Southwest Former Wash Area



2015 ONSITE EXCAVATION REPORT

**2015 Onsite Excavation Report
Flint Hills Resources Alaska, LLC
North Pole, Alaska**

FIRE TRAINING AREA EXCAVATION PHOTO LOG

Photo 1: Completed Fire Training Area Excavation (view facing West)



2015 ONSITE EXCAVATION REPORT

**2015 Onsite Excavation Report
Flint Hills Resources Alaska, LLC
North Pole, Alaska**

FIRE TRAINING AREA EXCAVATION PHOTO LOG

Photo 2: Backfilled Fire Training Area



2015 ONSITE EXCAVATION REPORT

**2015 Onsite Excavation Report
Flint Hills Resources Alaska, LLC
North Pole, Alaska**

APPENDIX B

Approval to Transport Documentation





ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SPILL PREVENTION AND RESPONSE

Contaminated Sites and Prevention and Emergency Response Programs

Transport, Treatment, & Disposal Approval Form for Contaminated Media

DEC HAZARD/SPILL ID #	NAME OF SPILL OR CONTAMINATED SITE		
file no. 100.38.090	Flint Hills Resources Alaska, LLC - North Pole Refinery		
SITE OR SPILL LOCATION			
1100 H & H Lane, North Pole, AK 99705			
CURRENT LOCATION AND TYPE OF CONTAMINATED MEDIA		SOURCE OF THE CONTAMINATION	
1100 H&H Lane North Pole, AK 99705 - Soils		Wastewater treatment associated with Lagoon B at the FHRA North Pole Refinery	
COMPOUNDS OF CONCERN	ESTIMATED VOLUME	DATE(S) GENERATED	
Sulfolane	est. 416 cubic yards	June 2015 - September 2015	
POST TREATMENT ANALYSIS REQUIRED (such as GRO, DRO, RRO, BTEX, and/or Chlorinated Solvents)			
No post treatment analysis is being required since treatment is not being performed.			
COMMENTS			
Soils have been characterized as hazardous waste due to previous potential contact with F037 listed waste. Soils will be loaded into lined gondolas, covered and transported via rail to the Chemical Waste Management Facility in Oregon (EPA ID#ORD089452353) where it will be placed in a RCRA/TSCA Subtitle C Landfill for final disposal.			

Facility Accepting the Contaminated Media

NAME OF THE FACILITY	PHYSICAL ADDRESS/PHONE NUMBER
Chemical Waste Management of NW	17629 Cedar Springs Ln., Arlington, OR, 97812

Responsible Party and Contractor Information

BUSINESS/NAME	ADDRESS/PHONE NUMBER
Flint Hills Resources Alaska, LLC (FHRA)	1100 H&H Lane, North Pole, AK 99705 - 907-490-6217

Serena Lewellyn

Name of the Person Requesting Approval (printed)

Serena Lewellyn

Signature

Environmental Engineer

Title/Association

5/26/15

Date

(907) 490-6217

Phone Number

-----DEC USE ONLY-----

Based on the information provided, ADEC approves transport of the above-described media for treatment in accordance with the approved facility operations plan. The Responsible Party or their consultant must submit to the DEC Project Manager a copy of weight/volume receipts of the loads transported to the facility and a post treatment analytical report. If the media is contaminated soil, it shall be transported as a covered load in compliance with 18 AAC 60.015.

Kim DeRuyter

DEC Project Manager Name (printed)

Kim DeRuyter

Signature

Digitally signed by Kim DeRuyter
DN: cn=Kim DeRuyter, o=ADEC, ou=Contaminated Sites
Program, email=Kim.DeRuyter@Alaska.gov, c=US
Date: 2015.05.26 14:58:34 -08'00'

EPS IV

Project Manager Title

May 26, 2015

Date

907-451-2192

Phone Number



ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SPILL PREVENTION AND RESPONSE
Contaminated Sites and Prevention and Emergency Response Programs

Transport, Treatment, & Disposal Approval Form for Contaminated Media

DEC HAZARD/SPILL ID #		NAME OF SPILL OR CONTAMINATED SITE	
file no. 100.38.090		Flint Hills Resources Alaska, LLC - North Pole Refinery	
SITE OR SPILL LOCATION			
1100 H & H Lane, North Pole, AK 99705			
CURRENT LOCATION AND TYPE OF CONTAMINATED MEDIA		SOURCE OF THE CONTAMINATION	
1100 H&H Lane North Pole, AK 99705 - Soils		Southwest Area (SWA) Soil Excavation	
COMPOUNDS OF CONCERN	ESTIMATED VOLUME	DATE(S) GENERATED	
Sulfolane	1,562 cubic yards	June 2015 - September 2015	
POST TREATMENT ANALYSIS REQUIRED (such as GRO, DRO, RRO, BTEX, and/or Chlorinated Solvents)			
No post treatment analysis is being required since treatment is not being performed.			
COMMENTS			
Soils have been characterized as hazardous waste due to previous potential contact with K050 listed waste. Soils will be loaded into lined gondolas, covered and transported via rail to the Chemical Waste Management Facility in Oregon (EPA ID#ORD089452353) where it will be placed in a RCRA/TSCA Subtitle C Landfill for final disposal.			

Facility Accepting the Contaminated Media

NAME OF THE FACILITY	PHYSICAL ADDRESS/PHONE NUMBER
Chemical Waste Management of NW	17629 Cedar Springs Ln., Arlington, OR, 97812

Responsible Party and Contractor Information

BUSINESS/NAME	ADDRESS/PHONE NUMBER
Flint Hills Resources Alaska, LLC (FHRA)	1100 H&H Lane, North Pole, AK 99705 - 907-490-6217

Thomas Green

Name of the Person Requesting Approval (printed)

Signature

Environmental Engineer

Title/Association

6-5-2015

Date

907-490-6265

Phone Number

-----DEC USE ONLY-----

Based on the information provided, ADEC approves transport of the above-described media for treatment in accordance with the approved facility operations plan. The Responsible Party or their consultant must submit to the DEC Project Manager a copy of weight/volume receipts of the loads transported to the facility and a post treatment analytical report. If the media is contaminated soil, it shall be transported as a covered load in compliance with 18 AAC 60.015.

DEC Project Manager Name (printed)

Signature

Project Manager Title

Date

Phone Number



ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SPILL PREVENTION AND RESPONSE
Contaminated Sites and Prevention and Emergency Response Programs

Transport, Treatment, & Disposal Approval Form for Contaminated Media

DEC HAZARD/SPILL ID #		NAME OF SPILL OR CONTAMINATED SITE	
file no. 100.38.090		Flint Hills Resources North Pole Refinery	
SITE OR SPILL LOCATION			
1100 H & H Lane, North Pole, AK 99705			
CURRENT LOCATION AND TYPE OF CONTAMINATED MEDIA		SOURCE OF THE CONTAMINATION	
Fire Training Area - NPR		ponded rain water in contact with soil impacts from historical fire training exercises	
COMPOUNDS OF CONCERN	ESTIMATED VOLUME	DATE(S) GENERATED	
PFOA, PFOA	est. 80,000 gallons	May-June 2015	
POST TREATMENT ANALYSIS REQUIRED (such as GRO, DRO, RRO, BTEX, and/or Chlorinated Solvents)			
PFCs by DV-LC-0012 (TestAmerica, Inc, Denver, CO), DRO + GRO			
COMMENTS			
standing rain water to be removed in advance of soil excavation activities			

Facility Accepting the Contaminated Media

NAME OF THE FACILITY	PHYSICAL ADDRESS/PHONE NUMBER
Emerald Alaska	2020 Viking Drive, Anchorage, 907-258-1558

Responsible Party and Contractor Information

BUSINESS/NAME	ADDRESS/PHONE NUMBER
Flint Hills Resources Alaska, LLC (FHRA)	1100 H&H Lane, North Pole, AK 99705 - 907-490-6217

Steve Fernandez

Name of the Person Requesting Approval (printed)

Signature

Groundwater Mgr./FHR Alaska

Title/Association

Date

Phone Number

DEC USE ONLY

Based on the information provided, ADEC approves transport of the above-described media for treatment in accordance with the approved facility operations plan. The Responsible Party or their consultant must submit to the DEC Project Manager a copy of weight/volume receipts of the loads transported to the facility and a post treatment analytical report. If the media is contaminated soil, it shall be transported as a covered load in compliance with 18 AAC 60.015.

DEC Project Manager Name (printed)

Signature

Project Manager Title

Date

Phone Number



ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SPILL PREVENTION AND RESPONSE
Contaminated Sites and Prevention and Emergency Response Programs

Transport, Treatment, & Disposal Approval Form for Contaminated Media

DEC HAZARD/SPILL ID #		NAME OF SPILL OR CONTAMINATED SITE	
file no. 100.38.090		Flint Hills Resources Alaska, LLC - North Pole Refinery	
SITE OR SPILL LOCATION			
1100 H & H Lane, North Pole, AK 99705			
CURRENT LOCATION AND TYPE OF CONTAMINATED MEDIA		SOURCE OF THE CONTAMINATION	
1100 H&H Lane North Pole, AK 99705 - Soils		Historical fire fighting/training activities at FHRA's North Pole Refinery	
COMPOUNDS OF CONCERN	ESTIMATED VOLUME	DATE(S) GENERATED	
PFOS, PFOA, Petroleum Constituents	est. 867 cubic yards	June 2015 - September 2015	
POST TREATMENT ANALYSIS REQUIRED (such as GRO, DRO, RRO, BTEX, and/or Chlorinated Solvents)			
No post treatment analysis is being required since treatment is not being performed.			
COMMENTS			
This soil has been characterized as non-hazardous waste and will be loaded into lined gondolas, covered and transported via rail to the Chemical Waste Management Facility in Oregon (EPA ID#ORD089452353) where it will be placed in a RCRA/TSCA Subtitle C Landfill for final disposal.			

Facility Accepting the Contaminated Media

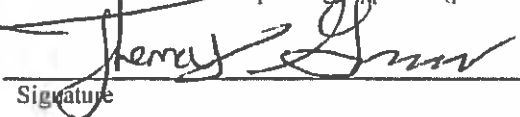
NAME OF THE FACILITY	PHYSICAL ADDRESS/PHONE NUMBER
Chemical Waste Management of NW	17629 Cedar Springs Ln., Arlington, OR, 97812

Responsible Party and Contractor Information

BUSINESS/NAME	ADDRESS/PHONE NUMBER
Flint Hills Resources Alaska, LLC (FHRA)	1100 H&H Lane, North Pole, AK 99705 - 907-490-6265

Tom Green

Name of the Person Requesting Approval (printed)


Signature

Environmental/Flint Hills Resources Alaska, LLC

Title/Association

5/28/2015
Date

907-490-6265

Phone Number

-----DEC USE ONLY-----

Based on the information provided, ADEC approves transport of the above-described media for treatment in accordance with the approved facility operations plan. The Responsible Party or their consultant must submit to the DEC Project Manager a copy of weight/volume receipts of the loads transported to the facility and a post treatment analytical report. If the media is contaminated soil, it shall be transported as a covered load in compliance with 18 AAC 60.015.


DEC Project Manager Name (printed)

EPS IV
Project Manager Title


Signature

May 29, 2015 451-2192
Date Phone Number

APPENDIX C

Waste Certificates of Disposal





CERTIFICATE OF DISPOSAL/RECYCLE

GENERATOR: FLINT HILLS RESOURCES ALASKA
1100 H & H LANE
NORTH POLE AK 99705

DISPOSAL FACILITY: NRC ALASKA LLC
2020 VIKING DRIVE
ANCHORAGE AK 99501

EPA ID NUMBER: AKD000850701
MANIFEST/DOCUMENT #: 94448A
DATE OF DISPOSAL/RECYCLE: 06/16/2015

<u>LINE</u>	<u>WASTE DESCRIPTION</u>	<u>CONTAINERS</u>	<u>TYPE</u>	<u>QUANTITY</u>	<u>UOM</u>
1	FTA CONTAMINATED WATERS	1	TT	22,958	G

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above described waste was managed in compliance with all applicable laws, regulations, permits, and licenses on the date listed above.

PREPARED BY: PATRICIA BEASLEY

SIGNATURE: Patricia L Beasley

DATE: 6/17/2015



QUALITY CONTROL REPORT

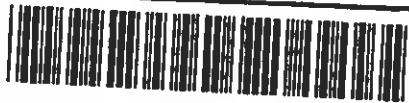
INBOUND WASTE ANALYSIS



Form 1000.08

VIKING FACILITY 2020 VIKING DRIVE ANCHORAGE, AK 99501

Revision: 02/2015



ANC-107399

COMPLETED

Job#: 94448

Date: 06/16/15

Client Name: Flint Hills Resources Alaska

Manifest: 94448A

Unit: G+Ax 36910

Analysis

BS/W

Quantity: 22 958

gallons

PROFILE	%	Gallons	Production Location
OIL			
FUEL			
WATER	100	22958	R-2
ANTIFREEZE			
SLUDGE			
SOLIDS			

*360 WALK AROUND

☒ OK

☐ Damage

Technician's Printed Name: Michael Conroy

Technician's Signature: Michael Conroy

****Breakdown for Office use only****

Truck QTY	BOL#S	ANC#S	Truck QTY	BOL#S	ANC#S



Rev02/25/15pb

6/16/2015



Manifest No: **94448A**
Generator Name: FLINT HILLS RESOURCES ALASKA
Generator Address: 1100 H & H LANE
NORTH POLE AK 99705

COMPLETED

Manifest Line	DOT Name	Containers	Container Type
 1	MATERIAL NOT REGULATED BY D.O.T.	1.00	 TT

JUN 16, 2015



CERTIFICATE OF DISPOSAL/RECYCLE

GENERATOR: FLINT HILLS RESOURCES ALASKA
1100 H & H LANE
NORTH POLE AK 99705

DISPOSAL FACILITY: NRC ALASKA LLC
2020 VIKING DRIVE
ANCHORAGE AK 99501

EPA ID NUMBER: AKD000850701
MANIFEST/DOCUMENT #: 94448B
DATE OF DISPOSAL/RECYCLE: 06/22/2015

<u>LINE</u>	<u>WASTE DESCRIPTION</u>	<u>CONTAINERS</u>	<u>TYPE</u>	<u>QUANTITY</u>	<u>UOM</u>
1	FTA CONTAMINATED WATERS	1	TT	6,679	G

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above described waste was managed in compliance with all applicable laws, regulations, permits, and licenses on the date listed above.

PREPARED BY: PATRICIA BEASLEY

SIGNATURE: _____

Patricia Beasley

DATE: 7/7/2015



QUALITY CONTROL REPORT



Form 1000.08

VIKING FACILITY 2020 VIKING DRIVE ANCHORAGE, AK 99501

Revision: 02/2015

**ANC-115085****COMPLETED**Job#: 94448Date: 6-22-15Client Name: Flint Hills Resources AlaskaManifest: 94448BUnit: GATX 33653

Analysis

BS/W

Quantity: 6679 (34) gallons

PROFILE	%	Gallons	Production Location
OIL			
FUEL			
WATER	100	6679	R-2
ANTIFREEZE			
SLUDGE			
SOLIDS			

*360 WALK AROUND



OK



Damage

Technician's Printed Name: Michael CooneyTechnician's Signature: Michael Cooney

****Breakdown for Office use only****

Truck QTY	BOL#S	ANC#S	Truck QTY	BOL#S	ANC#S

Rev02/25/15pb

6/16/2015



Manifest No: **94448B**
Generator Name: FLINT HILLS RESOURCES ALASKA
Generator Address: 1100 H & H LANE
NORTH POLE AK 99705

COMPLETED

Manifest Line	DOT Name	Containers	Container Type
1	MATERIAL NOT REGULATED BY D.O.T.	1.00	18967 TT Contaminated Water

JUN 16 2015



CERTIFICATE OF DISPOSAL/RECYCLE

GENERATOR: FLINT HILLS RESOURCES ALASKA
1100 H & H LANE
NORTH POLE AK 99705

DISPOSAL FACILITY: NRC ALASKA LLC
2020 VIKING DRIVE
ANCHORAGE AK 99501

EPA ID NUMBER: AKD000850701

MANIFEST/DOCUMENT #: 94448C

DATE OF DISPOSAL/RECYCLE: 07/08/2015

LINE WASTE DESCRIPTION

1 FTA CONTAMINATED WATERS

<u>CONTAINERS</u>	<u>TYPE</u>	<u>QUANTITY</u>	<u>UOM</u>
1	TT	23,029	G

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above described waste was managed in compliance with all applicable laws, regulations, permits, and licenses on the date listed above.

PREPARED BY: PATRICIA BEASLEY

SIGNATURE: Patricia Beasley

DATE: 7/9/2015



QUALITY CONTROL REPORT



Form 1000.08

VIKING FACILITY 2020 VIKING DRIVE ANCHORAGE, AK 99501

Revision: 02/2015

**ANC-115778****COMPLETED**Job#: 94448Date: 7-7-15Client Name: Flint Hills Refining AlaskaManifest: 94448CUnit: GATX 69863Quantity: 23029 gallonsAnalysis BS/W

PROFILE	%	Gallons	Production Location
OIL			
FUEL			
WATER	100	23029	R-2
ANTIFREEZE			
SLUDGE			
SOLIDS			

*360 WALK AROUND

☒ OK☐ DamageTechnician's Printed Name: Michael CooneyTechnician's Signature: Michael Cooney

****Breakdown for Office use only****

Truck QTY	BOL#'S	ANC#'S	Truck QTY	BOL#'S	ANC#'S

For Internal use only

REV02/25/15pb

6/16/2015



COMPLETED

Manifest No: 94448C
Generator Name: FLINT HILLS RESOURCES ALASKA
Generator Address: 1100 H & H LANE
NORTH POLE AK 99705

Manifest Line DOT Name



MATERIAL NOT REGULATED BY D.O.T.

1

115778

Containers Container Type

1.00



23029

TT contaminated
waters

JUN 16 2015



CERTIFICATE OF
DISPOSAL/RECYCLE

GENERATOR: FLINT HILLS RESOURCES ALASKA
1100 H & H LANE
NORTH POLE AK 99705

DISPOSAL FACILITY: NRC ALASKA LLC
2020 VIKING DRIVE
ANCHORAGE AK 99501

EPA ID NUMBER: AKD000850701
MANIFEST/DOCUMENT #: 94448D
DATE OF DISPOSAL/RECYCLE: 06/26/2015

<u>LINE</u>	<u>WASTE DESCRIPTION</u>	<u>CONTAINERS</u>	<u>TYPE</u>	<u>QUANTITY</u>	<u>UOM</u>
1	FTA CONTAMINATED WATERS	1	TT	22,568	G

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above described waste was managed in compliance with all applicable laws, regulations, permits, and licenses on the date listed above.

PREPARED BY: PATRICIA BEASLEY

SIGNATURE: Patricia L Beasley DATE: 6/26/2015

Form 1000.08

VIKING FACILITY 2020 VIKING DRIVE ANCHORAGE, AK 99501

Revision: 02/2015



ANC-115309

COMPLETED

Date: 6-26-15

Manifest: 94448D

Job#: 94448

Client Name: Flint Hills Resources Alaska

Unit: GATX 206861

Quantity: 22568 gallons

Analysis BS/W

PROFILE	%	Gallons	Production Location
OIL			
FUEL			
WATER	100	22568	R-2
ANTIFREEZE			
SLUDGE			
SOLIDS			

*360 WALK AROUND

☒ OK

☐ Damage

Techician's Printed Name: Michael Conney

Techician's Signature: Michael Conney

****Breakdown for Office use only****



Truck QTY	BOL#'S	ANC#'S	Truck QTY	BOL#'S	ANC#'S

6/16/2015



Manifest No: 94448D
Generator Name: FLINT HILLS RESOURCES ALASKA
Generator Address: 1100 H & H LANE
NORTH POLE AK 99705

COMPLETED

Manifest Line	DOT Name	Containers	Container Type
 1	MATERIAL NOT REGULATED BY D.O.T.	1.00	 22568 TT Contaminated waters

JUN 16 2015

**CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST**

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LN
NORTH POLE, AK 99705-7879


CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004889853FLE
CWM TRACKING ID:	442867-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	09/23/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	09/23/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 9/24/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LN
NORTH POLE, AK 99705-7879

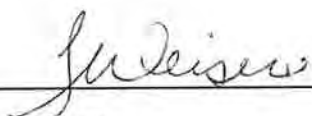
CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004889854FLE
CWM TRACKING ID:	442868-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	09/23/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	09/23/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 9/24/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LN
NORTH POLE, AK 99705-7879

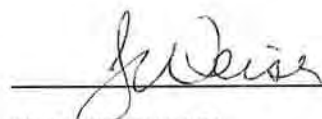
CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004889855FLE
CWM TRACKING ID:	442865-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	09/23/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	09/23/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 9/24/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901295FLE
CWM TRACKING ID:	442137-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	08/19/15
↓	
DISPOSAL PROCESS(ES):	LANDFILL
FINAL DISPOSAL LOCATION:	LANDFILL 14
DISPOSAL DATE:	08/19/15

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.

CWMNW RECORDS DEPARTMENT

Date: 8/31/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCE ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCE ALASKA
MANIFEST #:	004901296FLE
CWM TRACKING ID:	442136-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	08/19/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/19/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/26/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901297FLE
CWM TRACKING ID:	442291-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	08/26/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/26/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 9/15/2015

**CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST**

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879


CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901299FLE
CWM TRACKING ID:	442140-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	08/19/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/19/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/31/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901298FLE
CWM TRACKING ID:	442134-1
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	08/19/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/19/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/31/2015

Date: 8/26/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879


CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901302FLE
CWM TRACKING ID:	442139-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	08/19/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/19/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/31/2015

**CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST**

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LN
NORTH POLE, AK 99705-7879


CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901301FLE
CWM TRACKING ID:	442443-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	09/01/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	09/01/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 9/15/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCE ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCE ALASKA
MANIFEST #:	004901303FLE
CWM TRACKING ID:	442138-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	08/19/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/19/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.

CWMNW RECORDS DEPARTMENT

Date: 8/26/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901305FLE
CWM TRACKING ID:	442290-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	08/26/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/26/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/31/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LN
NORTH POLE, AK 99705-7879


CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901308FLE
CWM TRACKING ID:	442439-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	09/01/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	09/01/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 9/15/2015

**CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST**

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879


CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901304FLE
CWM TRACKING ID:	442286-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	08/26/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/26/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/31/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LN
NORTH POLE, AK 99705-7879


CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901307FLE
CWM TRACKING ID:	442440-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	09/01/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	09/01/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 9/15/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901312FLE
CWM TRACKING ID:	442444-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	09/01/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	09/01/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 9/15/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LN
NORTH POLE, AK 99705-7879


CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901310FLE
CWM TRACKING ID:	442436-01
PROFILE #:	QR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	09/01/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	09/01/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 9/15/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE AK 99705-7879

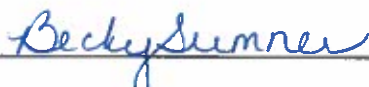
CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901306FLE
CWM TRACKING ID:	442575-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	09/08/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	09/11/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 09/21/15



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901315FLE
CWM TRACKING ID:	442445-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	09/01/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	09/01/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 9/15/2015

**CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST**

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901309FLE
CWM TRACKING ID:	442430-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	09/01/15
DISPOSAL PROCESS(ES):	LANDFILL
FINAL DISPOSAL LOCATION:	LANDFILL 14
DISPOSAL DATE:	09/01/15

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 9/15/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901314FLE
CWM TRACKING ID:	442288-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	08/26/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/26/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/31/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901317FLE
CWM TRACKING ID:	442442-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	09/01/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	09/01/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 9/15/2015

**CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST**

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901313FLE
CWM TRACKING ID:	442429-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	09/01/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	09/01/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 9/15/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901316FLE
CWM TRACKING ID:	442287-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	08/26/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/26/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/31/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901317FLE
CWM TRACKING ID:	442442-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	09/01/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	09/01/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 9/15/2015

**CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST**

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901318FLE
CWM TRACKING ID:	442438-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	09/01/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	09/01/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.

CWMNW RECORDS DEPARTMENT

Date: 9/15/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901319FLE
CWM TRACKING ID:	442437-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	09/01/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	09/01/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.

CWMNW RECORDS DEPARTMENT

Date: 9/15/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LN
NORTH POLE, AK 99705-7879

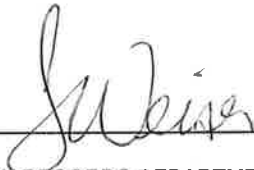
CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901321FLE
CWM TRACKING ID:	442446-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	09/01/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	09/01/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 9/15/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

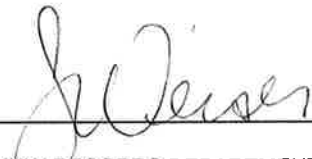
FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA	
MANIFEST #:	004901321FLE	
CWM TRACKING ID:	442447-1	
PROFILE #:	OR327272	
LINE ITEM:	9b.1	
QUANTITY:	1 HG	
RECEIVED DATE:	09/01/15	
DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	09/01/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 9/15/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901322FLE
CWM TRACKING ID:	442289-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	08/26/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/26/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/31/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

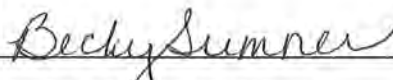
FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901325FLE
CWM TRACKING ID:	442711-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	09/14/15
DISPOSAL PROCESS(ES):	LANDFILL
FINAL DISPOSAL LOCATION:	LANDFILL 14
DISPOSAL DATE:	09/15/15

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT
Date: 09/21/15



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

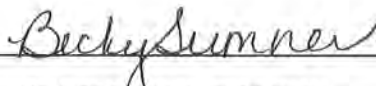
FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901326FLE
CWM TRACKING ID:	442710-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	09/14/15
DISPOSAL PROCESS(ES):	LANDFILL
FINAL DISPOSAL LOCATION:	LANDFILL 14
DISPOSAL DATE:	09/15/15

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 09/21/15

**CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST**

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LN
NORTH POLE, AK 99705-7879

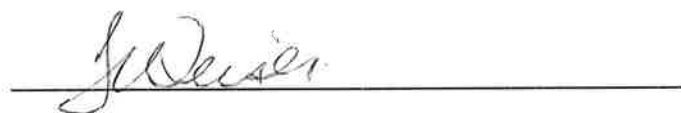
CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901327FLE
CWM TRACKING ID:	442435-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	09/01/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	09/01/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 9/15/2015

**CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST**

17629 Cedar Springs Lane
Arlington, OR 97812


FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901328FLE
CWM TRACKING ID:	442432-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	09/01/15
	↓
DISPOSAL PROCESS(ES):	LANDFILL
FINAL DISPOSAL LOCATION:	LANDFILL 14
DISPOSAL DATE:	09/01/15

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 9/15/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LN
NORTH POLE, AK 99705-7879


CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901329FLE
CWM TRACKING ID:	442869-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	09/23/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	09/23/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 9/24/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LN
NORTH POLE, AK 99705-7879


CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901330FLE
CWM TRACKING ID:	442871-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	09/23/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	09/23/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 9/24/2015

**CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST**

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LN
NORTH POLE, AK 99705-7879


CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901331FLE
CWM TRACKING ID:	442866-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	09/23/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	09/23/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 9/24/2015

**CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST**

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LN
NORTH POLE, AK 99705-7879


CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901335FLE
CWM TRACKING ID:	442870-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	09/23/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	09/23/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 9/24/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901339FLE
CWM TRACKING ID:	442864-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	09/23/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	09/23/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 9/24/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LN
NORTH POLE, AK 99705-7879


CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901336FLE
CWM TRACKING ID:	442872-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	09/23/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	09/23/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 9/24/2015

**CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST**

17629 Cedar Springs Lane
Arlington, OR 97812


FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901341FLE
CWM TRACKING ID:	442863-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	09/23/15
	↓
DISPOSAL PROCESS(ES):	LANDFILL
FINAL DISPOSAL LOCATION:	LANDFILL 14
DISPOSAL DATE:	09/23/15

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 9/24/2015

Date: 9/24/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

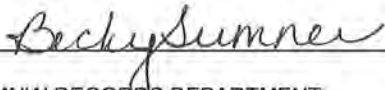
FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901343FLE
CWM TRACKING ID:	442709-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	09/14/15
DISPOSAL PROCESS(ES):	LANDFILL
FINAL DISPOSAL LOCATION:	LANDFILL 14
DISPOSAL DATE:	09/15/15

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 09/21/15



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901344FLE
CWM TRACKING ID:	442712-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	09/14/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	09/15/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT
Date: 09/21/15



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LANE
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901239FLE
CWM TRACKING ID:	441077-01
PROFILE #:	OR327269
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	06/30/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	07/01/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWM/NW RECORDS DEPARTMENT

Date: 01/13/14



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LANE
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901240FLE
CWM TRACKING ID:	441078-01
PROFILE #:	OR327269
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	06/30/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	07/01/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.

CWMNW RECORDS DEPARTMENT

Date: 01/13/14

Date: 01/13/14



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LANE
NORTH POLE, AK 99705-7879


CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901242FLE
CWM TRACKING ID:	441070-01
PROFILE #:	OR327269
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	06/30/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	07/02/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 01/13/14



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LANE
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901243FLE
CWM TRACKING ID:	441069-01
PROFILE #:	OR327269
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	06/30/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	07/01/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.

CWMNW RECORDS DEPARTMENT

Date: 01/13/14



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LANE
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901244FLE
CWM TRACKING ID:	441080-01
PROFILE #:	OR327269
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	06/30/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	07/01/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.

CWMNW RECORDS DEPARTMENT
Date: 01/13/14



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LANE
NORTH POLE, AK 99705-7879

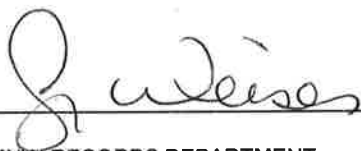
CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901245FLE
CWM TRACKING ID:	441071-01
PROFILE #:	OR327269
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	06/30/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	07/01/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 01/13/14



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901246FLE
CWM TRACKING ID:	441072-01
PROFILE #:	OR327269
LINE ITEM:	9a.1
QUANTITY:	1 HG
RECEIVED DATE:	06/30/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	07/01/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.

CWMNW RECORDS DEPARTMENT

Date: 01/13/14



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LANE
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901247FLE
CWM TRACKING ID:	441073-01
PROFILE #:	OR327269
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	06/30/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	07/01/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 6/1/13/14

**CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST**

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LANE
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901249FLE
CWM TRACKING ID:	441076-01
PROFILE #:	OR327269
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	06/30/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	07/01/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.

CWMNW RECORDS DEPARTMENT

Date: 01/13/14

**CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST**

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LANE
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901250FLE
CWM TRACKING ID:	441075-01
PROFILE #:	OR327269
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	06/30/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	07/01/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.

CWMNW RECORDS DEPARTMENT

Date: 01/13/14

**CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST**

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LANE
NORTH POLE, AK 99705-7879


CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901251FLE
CWM TRACKING ID:	441074-01
PROFILE #:	QR327269
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	06/30/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	07/01/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 01/13/14

RECEIVED

JUL 28 2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H&H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	93563B
CWM TRACKING ID:	441377-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	07/15/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	07/16/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.

A handwritten signature in cursive script, appearing to read 'Julie A. Johnson', written over a horizontal line.

CWMNW RECORDS DEPARTMENT

Date: 01/13/14



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879


CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	93563F
CWM TRACKING ID:	442163-01
PROFILE #:	OR327272
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/19/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/19/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/31/2015

CAR # MP642897



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	335631
CWM TRACKING ID:	441809-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/05/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/05/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.

A handwritten signature in dark ink, appearing to read 'J. W. Wiser', written over a horizontal line.

CWMNW RECORDS DEPARTMENT

Date: 8/6/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	93563G
CWM TRACKING ID:	441378-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	07/16/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	07/16/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.

CWMNW RECORDS DEPARTMENT

Date: 07/29/15

Car # MP641992



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879


CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	93563K
CWM TRACKING ID:	441807-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/05/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/05/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/6/2015

Car# GONX 330155



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	93563H
CWM TRACKING ID:	441810-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/05/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/05/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/6/2015

Car # WERC 3162

RECEIVED

AUG 17 2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	93563J
CWM TRACKING ID:	441804-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/05/15
DISPOSAL PROCESS(ES):	LANDFILL
FINAL DISPOSAL LOCATION:	LANDFILL 14
DISPOSAL DATE:	08/05/15

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/6/2015



Car# MP 641555

CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	93563M
CWM TRACKING ID:	441811-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/05/15
DISPOSAL PROCESS(ES):	LANDFILL
FINAL DISPOSAL LOCATION:	LANDFILL 14
DISPOSAL DATE:	08/05/15

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/6/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	935630
CWM TRACKING ID:	441965-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/12/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/12/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/27/2015

Car # MP642417



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	93563L
CWM TRACKING ID:	441808-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/05/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/05/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/6/2015

**CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST**

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879


CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	93563P
CWM TRACKING ID:	44196-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/12/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/12/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/27/2015

Car# WCRE3057



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	93563N
CWM TRACKING ID:	441806-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/05/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/05/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.

A handwritten signature in black ink, appearing to read 'J. J. J. J.', written over a horizontal line.

CWMNW RECORDS DEPARTMENT

Date: 8/6/2015

car# MP640639



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	935630
CWM TRACKING ID:	441805-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/05/15
DISPOSAL PROCESS(ES):	LANDFILL
FINAL DISPOSAL LOCATION:	LANDFILL 14
DISPOSAL DATE:	08/05/15

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.

A handwritten signature in black ink, appearing to read 'J. Deussen', is written over a horizontal line.

CWMNW RECORDS DEPARTMENT

Date: 8/6/2015

**CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST**

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	93563Q
CWM TRACKING ID:	441961-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/12/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/12/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/27/2015

**CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST**

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879


CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	93563R
CWM TRACKING ID:	441960-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/12/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/12/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/27/2015

**CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST**

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	93563S
CWM TRACKING ID:	441964-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/12/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/12/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.

CWM/NW RECORDS DEPARTMENT

Date: 8/27/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	93563T
CWM TRACKING ID:	441958-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/12/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/12/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.

CWMNW RECORDS DEPARTMENT

Date: 8/27/2015

**CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST**

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879


CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	93563U
CWM TRACKING ID:	441962-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/12/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/12/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/27/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	93563V
CWM TRACKING ID:	441966-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/12/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/12/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/27/2015

**CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST**

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	93563W
CWM TRACKING ID:	441968-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/12/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/12/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/27/2015

**CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST**

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	93563X
CWM TRACKING ID:	441967-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/12/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/12/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWM/NW RECORDS DEPARTMENT

Date: 8/27/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	93563Y
CWM TRACKING ID:	441959-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/12/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/12/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.

CWMNW RECORDS DEPARTMENT

Date: 8/27/2015

**CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST**

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	93563Z
CWM TRACKING ID:	441957-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/12/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/12/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.

CWMNW RECORDS DEPARTMENT

Date:

8/27/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812


FLINT HILLS RESOURCE ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCE ALASKA
MANIFEST #:	93563Z1
CWM TRACKING ID:	442142-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/19/15
DISPOSAL PROCESS(ES):	LANDFILL
FINAL DISPOSAL LOCATION:	LANDFILL 14
DISPOSAL DATE:	08/19/15

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/26/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCE ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCE ALASKA
MANIFEST #:	93563Z2
CWM TRACKING ID:	442133-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/19/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/19/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.

CWMNW RECORDS DEPARTMENT

Date: 8/26/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCE ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCE ALASKA
MANIFEST #:	93563Z2
CWM TRACKING ID:	442133-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/19/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/19/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.

CWMNW RECORDS DEPARTMENT

Date: 8/26/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCE ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCE ALASKA
MANIFEST #:	004901300FLE
CWM TRACKING ID:	442135-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	08/19/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/19/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/26/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCE ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCE ALASKA
MANIFEST #:	004901296FLE
CWM TRACKING ID:	442136-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	08/19/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/19/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/26/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCE ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCE ALASKA
MANIFEST #:	004901303FLE
CWM TRACKING ID:	442138-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	08/19/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/19/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/26/2015

**CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST**

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCE ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879


CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCE ALASKA
MANIFEST #:	93563Z1
CWM TRACKING ID:	442142-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/19/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/19/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/26/2015

**CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST**

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	93563Z
CWM TRACKING ID:	441957-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/12/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/12/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.

CWMNW RECORDS DEPARTMENT

Date: 8/27/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000350701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	93563T
CWM TRACKING ID:	441958-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/12/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/12/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/27/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	93563Y
CWM TRACKING ID:	441959-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/12/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/12/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.

CWMNW RECORDS DEPARTMENT

Date: 8/27/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	93563R
CWM TRACKING ID:	441960-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/12/15
DISPOSAL PROCESS(ES):	LANDFILL
FINAL DISPOSAL LOCATION:	LANDFILL 14
DISPOSAL DATE:	08/12/15

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.

CWMNW RECORDS DEPARTMENT

Date: 8/27/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879


CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	93563Q
CWM TRACKING ID:	441961-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/12/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/12/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/27/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879


CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	93563U
CWM TRACKING ID:	441962-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/12/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/12/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWM/NW RECORDS DEPARTMENT
Date: 8/27/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	93563P
CWM TRACKING ID:	44196-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/12/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/12/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/27/2015

**CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST**

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	93563S
CWM TRACKING ID:	441964-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/12/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/12/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.

CWM/NW RECORDS DEPARTMENT

Date: 8/27/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	935630
CWM TRACKING ID:	441965-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/12/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/12/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/27/2015

**CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST**

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	93563V
CWM TRACKING ID:	441966-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/12/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/12/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.

CWMNW RECORDS DEPARTMENT

Date: 8/27/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	93563X
CWM TRACKING ID:	441967-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/12/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/12/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/27/2015

**CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST**

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	93563W
CWM TRACKING ID:	441968-01
PROFILE #:	OR327591
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/12/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/12/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/27/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901298FLE
CWM TRACKING ID:	442134-1
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	08/19/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/19/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.

CWMNW RECORDS DEPARTMENT

Date: 8/31/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901295FLE
CWM TRACKING ID:	442137-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	08/19/15
↓	
DISPOSAL PROCESS(ES):	LANDFILL
FINAL DISPOSAL LOCATION:	LANDFILL 14
DISPOSAL DATE:	08/19/15

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/31/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901302FLE
CWM TRACKING ID:	442139-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	08/19/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/19/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/31/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879


CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901299FLE
CWM TRACKING ID:	442140-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	08/19/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/19/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/31/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	93563F
CWM TRACKING ID:	442163-01
PROFILE #:	OR327272
LINE ITEM:	11.a
QUANTITY:	1 HG
RECEIVED DATE:	08/19/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/19/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.

CWMNW RECORDS DEPARTMENT

Date: 8/31/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

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Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879


CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901304FLE
CWM TRACKING ID:	442286-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	08/26/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/26/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/31/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901316FLE
CWM TRACKING ID:	442287-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	08/26/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/26/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/31/2015

**CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST**

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Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901314FLE
CWM TRACKING ID:	442288-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	08/26/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/26/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/31/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901322FLE
CWM TRACKING ID:	442289-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	08/26/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/26/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/31/2015



CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

17629 Cedar Springs Lane
Arlington, OR 97812

FLINT HILLS RESOURCES ALASKA
AKD000850701
1100 H & H LN
NORTH POLE, AK 99705-7879

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	FLINT HILLS RESOURCES ALASKA
MANIFEST #:	004901305FLE
CWM TRACKING ID:	442290-01
PROFILE #:	OR327272
LINE ITEM:	9b.1
QUANTITY:	1 HG
RECEIVED DATE:	08/26/15

DISPOSAL PROCESS(ES):	LANDFILL	
FINAL DISPOSAL LOCATION:	LANDFILL	14
DISPOSAL DATE:	08/26/15	

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.



CWMNW RECORDS DEPARTMENT

Date: 8/31/2015

APPENDIX D

Data Validation Reports and Laboratory Packets



Flint Hill Resources Alaska, LLC

North Pole Refinery Site

Data Review

NORTH POLE, ALASKA

Sulfolane Analysis

SDG #: 1158047

Analyses Performed By:
SGS North America, Inc.
Wilmington, North Carolina

Review Level: Tier II
Project: B0081981.0084.00002

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #1158047 for samples collected in association with the North Pole Refinery site. The review was conducted as a Tier II evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis				
					VOC	SVOC	Sulfolane	MET	MISC
LGB-SW-1	1158047001	Soil	6/2/2015				X		
LGB-SW-2	1158047002	Soil	6/2/2015				X		
LGB-SW-3	1158047003	Soil	6/2/2015				X		
LGB-SW-4	1158047004	Soil	6/2/2015				X		
LGB-F-1	1158047005	Soil	6/2/2015				X		
LGB-F-2	1158047006	Soil	6/2/2015				X		
BD-1	1158047007	Soil	6/2/2015	LGB-F-2			X		
LGB-SW-5	1158047008	Soil	6/3/2015				X		
LGB-SW-6	1158047009	Soil	6/3/2015				X		
LGB-F-3	1158047010	Soil	6/3/2015				X		
BD-2	1158047011	Soil	6/3/2015	LGB-SW-5			X		

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

QA - Quality Assurance

ORGANIC ANALYSIS INTRODUCTION

A United States Environmental Protection Agency (USEPA)-approved method does not exist for sulfolane. A method (Sulfolane-SW8270D M) has been developed with input from the Alaska Department of Environmental Conservation (ADEC) using USEPA-approved 8270D analytical method with SW846 preparation 3550C (Shannon & Wilson, Inc. 2015). Data were reviewed in accordance with USEPA National Functional Guidelines of June 2008 (USEPA 2008).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

- U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
- B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

- E The compound was quantitated above the calibration range.
- D Concentration is based on a diluted sample analysis.
- Q QC parameter out of acceptance range.

- Validation Qualifiers

- J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
- JH The result is an estimated quantity, and may be biased high.
- JL The result is an estimated quantity, and may be biased low
- JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.
- UB Compound considered non-detect at the listed value due to associated blank contamination.
- UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
- R The sample results are rejected as unusable. The compound may or may not be present in the sample.

- * Qualifier applied by reviewer.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

SULFOLANE ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8270D	Soil	14 days from collection to extraction and 40 days from extraction to analysis	Cool to <6 °C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Holding Time	Criteria
LGB-SW-1 BD-1	Extraction Completed	28 Days

Sample results associated with sample locations analyzed by analytical method SW-846 8270D were qualified, as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than or equal to two times holding time	JL	UJ

2. Blank Contamination

Quality assurance (QA) blanks (i.e. laboratory method blanks and equipment rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the estimated detection limit (EDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Sulfolane was not detected at or above the limit of detection (LOD). All compound detections were not associated with blank contamination.

3. Surrogate Internal Standard Compounds

All field samples, blanks, LCS, and MS/MSD are spiked with surrogate internal standard compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique.

All surrogate internal standard recoveries were within the control limits, with the following exceptions:

Sample ID	Issue	Action	Re-Extraction Date	Re-Analysis Date
LGB-SW-1	m/z ratio outside QC criteria due to Hydrocarbon interference	Re-extract using Sulfolane Clean-up Method and Re-analyze	6/18/2015	6/25/2015
	m/z ratio outside QC criteria due to Hydrocarbon interference		6/30/2015	6/30/2015
LGB-F-2	m/z ratio outside QC criteria due to Hydrocarbon interference	Re-extract using Sulfolane Clean-up Method and Re-analyze	6/16/2015	6/17/2015
BD-1	m/z ratio outside QC criteria due to Hydrocarbon interference	Re-extract using Sulfolane Clean-up Method and Re-analyze	6/18/2015	6/25/2015
	Sulfolane-d8 recovery outside QC criteria		6/30/2015	6/30/2015

Qualification due to recoveries outside control limits was not required due to successful re-extraction using the sulfolane clean-up method.

4. Clean-up Recovery Surrogate Performance

All field samples, blanks, LCS, and MS/MSD are spiked with recovery surrogates prior to extract clean-up. Recovery surrogate acceptance criteria require that their calculated recoveries, S/N, m/z ratios, and relative retention times (RRTs) be within the method-specified acceptance limits.

Tier II data validation does not require verification of recovery surrogate. The case narrative did not mention any discrepancies, therefore, all recovery surrogate recoveries S/N, m/z ratios, and RRTs were within the control limits.

5. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The spiked compounds used in the MS/MSD analysis must exhibit recoveries within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS and MSD results must be within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of two or greater. Sample results associated with MS/MSD exceedances where the parent samples are not site-specific are not qualified.

The MS/MSD analysis exhibited recovery within the control limits for sulfolane

6. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD (also called Ongoing Precision and Recovery (OPR)) analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The spiked compounds used in the LCS/LCSD analysis must exhibit recoveries within the laboratory-established acceptance limits.

The LCS/LCSD analyses exhibited recoveries within the control limits for sulfolane.

7. Field Duplicate Sample Analysis

Field duplicate sample analysis is used to assess the precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices and 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. An RPD will only be calculated if at least one of the sample results is above the Limit of Quantitation (LOQ; synonymous with reporting limit).

Field duplicate samples are summarized in the table, below.

Sample ID / Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
LGB-F-2 / BD-1	Sulfolane	0.00401 J	0.0058 U	AC
LGB-SW-5 / BD-2	Sulfolane	0.00525 U	0.00525 U	AC

AC – Acceptable

J – The quantitation is an estimation.

U – Not Detected

All results for field duplicate samples were within control limits.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

9. References

Shannon & Wilson, Inc. 2015. Data Validation Program Plan, Flint Hills Resources Alaska, LLC, North Pole, Alaska. June.

USEPA. 2008. National Functional Guidelines for Organic Methods Data Review. Guidance document, United States Environmental Protection Agency. June.

DATA VALIDATION CHECKLIST FOR SULFOLANE

Sulfolane: SW-846 8270D	Reported		Performance Acceptable		Not Required	
	No	Yes	No	Yes		
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)						
Tier II Validation						
Holding Times		X	X			
Reporting limits (units)		X		X		
Blanks						
A. Method Blanks		X		X		
B. Trip Blanks					X	
C. Equipment Blanks					X	
Laboratory Control Sample (LCS) Accuracy (%R)		X		X		
Laboratory Control Sample Duplicate (LCSD) Accuracy (%R)		X		X		
LCS/LCSD Precision (RPD)		X		X		
Matrix Spike (MS) Accuracy (%R)		X		X		
Matrix Spike Duplicate (MSD) Accuracy (%R)		X		X		
MS/MSD Precision (RPD)		X		X		
Field/Laboratory Duplicate Sample RPD		X		X		
Surrogate Internal Standard Spike (%R)		X	X			
Recovery Surrogate Standard Spike (%R)		X		X		

%R – Percent Recovery
 RPD – Relative Percent Difference

Validation Performed By: Kylie Kegerreis

Date: July 21, 2015

Peer Review: Cassandra McCloud

Date: July 29, 2015

**ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
LABORATORY DATA REVIEW CHECKLIST**

Laboratory Data Review Checklist

Completed by:	Kylie Kegerreis		
Title:	Environmental Engineering Specialist	Date:	Jul 17, 2015
CS Report Name:	NPR Excavation	Report Date:	Jul 7, 2015
Consultant Firm:	ARCADIS US, Inc.		
Laboratory Name:	SGS North America, Inc.	Laboratory Report Number:	1158047
ADEC File Number:		ADEC RecKey Number:	

1. Laboratory

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

☒ Yes ☐ No ☐ NA (Please explain.) Comments:

Project-specific ADEC chemistry subgroup has approved SGS for sulfolane analysis. ADEC's website does not list sulfolane under the "Analytes" menu nor sulfolane analysis by isotope dilution under the "Methods" menu

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 ☒ NA (Please explain) Comments:

2. Chain of Custody (COC)

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

☒ Yes ☐ No ☐ NA (Please explain) Comments:

b. Correct analyses requested?

☒ Yes ☐ No ☐ NA (Please explain) Comments:

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt ($4^{\circ} \pm 2^{\circ}$ C)?

☒ Yes ☐ No ☐ NA (Please explain) Comments:

Temperature = 6.0 °C

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

Samples maintained within acceptable temperature range. Additional preservation not required for sulfolane analysis

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

Samples in good condition - no leaks/cracks/breakage

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

☐ Yes ☐ No ☐ NA (Please explain)

Comments:

No discrepancies noted

e. Data quality or usability affected? (Please explain)

Comments:

N/A

4. Case Narrative

a. Present and understandable?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

Sample re-extracted outside of hold time (LGB-SW-1). LCS - Sulfolane d-8 recover outside QC criteria.

c. Were all corrective actions documented?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

Samples re-extracted by the sulfolane soil clean up method (LGB-SW-1, LGB-F-2, BD-1).

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

Comments:

None

5. Samples Results

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

b. All applicable holding times met?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

Hold times: Extraction w/in 14 days, Analysis w/in 40 days of extraction.

Collection date: 6/2 - 6/3/15

Prepped: 6/11/2015

Analyzed: 6/12/2015

Sample "LGB-SW-1" re-extracted outside of hold time (re-extracted on 6/18 and 6/30/15)

c. All soils reported on a dry weight basis?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

mg/kg

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

☐ Yes ☐ No ☒ NA (Please explain)

Comments:

A Cleanup Level has not been established for this site.

e. Data quality or usability affected? (Please explain)

Comments:

The following results were detected between the DL and LOQ and were qualified "J" to indicate trace detection: - LGB-F-1: Sulfolane 0.00876 J mg/kg, - LGB-F-2: Sulfolane 0.00401 J mg/kg, - LGB-F-3: Sulfolane 0.00686 J mg/kg

6. QC Samples

a. Method Blank

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

One method blank per extraction/analysis (total of 4 method blanks)

ii. All method blank results less than PQL?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

iii. If above PQL, what samples are affected?

Comments:

N/A

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

☐ Yes ☐ No ☐ NA (Please explain)

Comments:

N/A

v. Data quality or usability affected? (Please explain)

Comments:

Not affected due to method blank

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 ☐ NA (Please explain)

Comments:

One LCS/LCSD per extraction/analysis (total of 4 LCS/LCSD)

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

☐ Yes ☐ No ☒ NA (Please explain)

Comments:

No Metals/Inorganics analysis

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 ☐ NA (Please explain)

Comments:

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/DMSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

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

Comments:

N/A

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

Sulfolane surrogate recoveries for LCS/LCSD for Blank Spike Lab IDs 1271896 (33 / 41%) and 1274220 (40 / 49%) were outside lab control limits (40 - 100%)

vii. Data quality or usability affected? (Please explain)

Comments:

No. Per page 18 of the Data Validation Program Plan: 5. Sulfolane-d8 recovery in laboratory samples: A recovery failure of internal standard in the LCS, LCSD, or MB does not affect the data if the sulfolane recovery is within laboratory control limits for the LCS/LCSD.

c. Surrogates - Organics Only

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

☒ Yes ☐ No ☐ NA (Please explain)

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 ☐ NA (Please explain)

Comments:

Surrogate recovery for sample "BD-1" (37.4%) outside of lab control limits (40 - 100%) for first re-extraction/re-analysis and for two LCS samples mentioned previously.

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

Clearly marked by "*"

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

Comments:

No. For sample "BD-1" the failed surrogate applies to the first re-extraction/re-analysis, however, the sample was re-extracted and analyzed again. The surrogate for the 2nd re-extraction/re-analysis is within lab control limits. LCS surrogate issue, mentioned in LCS/LCSD section.

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 ☒ NA (Please explain.)

Comments:

Not required for sulfolane (SVOC)

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 ☒ NA (Please explain.)

Comments:

Trip blank not required.

iii. All results less than PQL?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Trip blank not required.

iv. If above PQL, what samples are affected?

Comments:

N/A

v. Data quality or usability affected? (Please explain.)

Comments:

N/A

e. Field Duplicate

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

BD-1 = duplicate of LGB-F-2

BD-2 = duplicate of LGB-SW-5

ii. Submitted blind to lab?

☒ Yes ☐ No ☐ NA (Please explain.)

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 ☐ NA (Please explain)

Comments:

If at least one of the sample results is above the LOQ, RPD is calculated. Neither sample/duplicate pair had a result above the LOQ.

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

☐ Yes

☒ No

☐ NA (Please explain)

Comments:

Not affected because all RPD/differences are less than specified DQOs

f. Decontamination or Equipment Blank (if applicable)

☐ Yes

☐ No

☒ NA (Please explain)

Comments:

Equipment blank not collected

i. All results less than PQL?

☐ Yes

☐ No

☒ NA (Please explain)

Comments:

Equipment blank not collected

ii. If above PQL, what samples are affected?

Comments:

N/A

iii. Data quality or usability affected? (Please explain.)

Comments:

N/A

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

a. Defined and appropriate?

☐ Yes

☐ No

☒ NA (Please explain)

Comments:

Reset Form

**CHAIN OF CUSTODY /
LABORATORY QUALIFIERS /
CORRECTED SAMPLE ANALYSIS DATA SHEETS**

Laboratory Report of Analysis

To: Flint Hills Resources- North Pole
1100 H & H Lane
North Pole, AK 99705
(907)488-0723

Report Number: **1158047**

Client Project: **NPR Excavation**

Dear Loren Garner,

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 Jennifer 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.

Jennifer Dawkins
Project Manager

Date

Case Narrative

SGS Client: **Flint Hills Resources- North Pole**

SGS Project: **1158047**

Project Name/Site: **NPR Excavation**

Project Contact: **Loren Garner**

Refer to sample receipt form for information on sample condition.

LGB-SW-1 (1158047001) PS

1625B Sulf - Ion ratios for sulfolane are outside QC criteria due to hydrocarbon interference. Sample was re-extracted outside of hold time by the sulfolane soil clean up method.

LGB-F-2 (1158047006) PS

1625B Sulf - Ion ratios for sulfolane are outside QC criteria due to hydrocarbon interference. Sample was re-extracted by the sulfolane soil clean up method.

BD-1 (1158047007) PS

1625B Sulf - Ion ratios for sulfolane are outside QC criteria due to hydrocarbon interference. Sample was re-extracted outside of hold time by the sulfolane soil clean up method.

1625B - Sulfolane-d8 recovery (37.4%) is outside QC criteria for the first clean up extraction.

LCS for HBN 1711300 [XXX/33327 (1271896) LCS

1625B - Sulfolane-d8 recovery (33%) is outside 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.

Print Date: 07/07/2015 1:34:52PM

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, indemnification 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, 8021B, 8082A, 8260B, 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	Continuing Calibration Verification
CCCV	Closing Continuing Calibration Verification
CL	Control Limit
D	The analyte concentration is the result of a dilution.
DF	Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
F	Indicates value that is greater than or equal to the DL
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
JL	The analyte was positively identified, but the quantitation is a low estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
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
M	A matrix effect was present.
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
Q	QC parameter out of acceptance range.
R	Rejected
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.

Print Date: 07/07/2015 1:34:53PM

Sample Summary

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Collected</u>	<u>Received</u>	<u>Matrix</u>
LGB-SW-1	1158047001	06/02/2015	06/05/2015	Soil/Solid (dry weight)
LGB-SW-2	1158047002	06/02/2015	06/05/2015	Soil/Solid (dry weight)
LGB-SW-3	1158047003	06/02/2015	06/05/2015	Soil/Solid (dry weight)
LGB-SW-4	1158047004	06/02/2015	06/05/2015	Soil/Solid (dry weight)
LGB-F-1	1158047005	06/02/2015	06/05/2015	Soil/Solid (dry weight)
LGB-F-2	1158047006	06/02/2015	06/05/2015	Soil/Solid (dry weight)
BD-1	1158047007	06/02/2015	06/05/2015	Soil/Solid (dry weight)
LGB-SW-5	1158047008	06/03/2015	06/05/2015	Soil/Solid (dry weight)
LGB-SW-6	1158047009	06/03/2015	06/05/2015	Soil/Solid (dry weight)
LGB-F-3	1158047010	06/03/2015	06/05/2015	Soil/Solid (dry weight)
BD-2	1158047011	06/03/2015	06/05/2015	Soil/Solid (dry weight)

Method

SM21 2540G

Sulfolane-SW8270D M w/IsoDI 5

Method Description

Percent Solids SM2540G

Sulfolane SW8270D-M w/IsoDil(S)

Detectable Results Summary

Client Sample ID: **LGB-SW-1**

Lab Sample ID: 1158047001

Semivolatile Organic GC/MS

Parameter

Sulfolane

Result

0.0539

Units

mg/Kg

Client Sample ID: **LGB-F-1**

Lab Sample ID: 1158047005

Semivolatile Organic GC/MS

Parameter

Sulfolane

Result

0.00876J

Units

mg/Kg

Client Sample ID: **LGB-F-2**

Lab Sample ID: 1158047006

Semivolatile Organic GC/MS

Parameter

Sulfolane

Result

0.0151

Units

mg/Kg

Sulfolane

0.00401J

mg/Kg

Client Sample ID: **BD-1**

Lab Sample ID: 1158047007

Semivolatile Organic GC/MS

Parameter

Sulfolane

Result

0.00812J

Units

mg/Kg

Client Sample ID: **LGB-F-3**

Lab Sample ID: 1158047010

Semivolatile Organic GC/MS

Parameter

Sulfolane

Result

0.00686J

Units

mg/Kg

Results of LGB-SW-1

Client Sample ID: **LGB-SW-1**
 Client Project ID: **NPR Excavation**
 Lab Sample ID: 1158047001
 Lab Project ID: 1158047

Collection Date: 06/02/15 17:32
 Received Date: 06/05/15 11:00
 Matrix: Soil/Solid (dry weight)
 Solids (%):84.3
 Location:

Results by Semivolatile Organic GC/MS

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Sulfolane	0.00595 U UU	0.0119	0.00368	mg/Kg	1		06/30/15 23:08
Sulfolane	0.0539	0.0118	0.00368	mg/Kg	1		06/12/15 20:40
Sulfolane	0.00595 U	0.0119	0.00368	mg/Kg	1		06/25/15 15:53
Surrogates							
Sulfolane-d8	43.2	40-100		%	1		06/25/15 15:53
Sulfolane-d8	56.3	50-120		%	1		06/12/15 20:40
Sulfolane-d8	46.9	40-100		%	1		06/30/15 23:08

Batch Information

Analytical Batch: XMS8708
 Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
 Analyst: DSH
 Analytical Date/Time: 06/12/15 20:40
 Container ID: 1158047001-A

Prep Batch: XXX33273
 Prep Method: SW3550C
 Prep Date/Time: 06/11/15 12:14
 Prep Initial Wt./Vol.: 30.115 g
 Prep Extract Vol: 1 mL

Analytical Batch: XMS8735
 Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
 Analyst: DSH
 Analytical Date/Time: 06/25/15 15:53
 Container ID: 1158047001-A

Prep Batch: XXX33327
 Prep Method: SW3520C + Water Ext for Soils
 Prep Date/Time: 06/18/15 15:05
 Prep Initial Wt./Vol.: 60 g
 Prep Extract Vol: 1 mL

Analytical Batch: XMS8745
 Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
 Analyst: DSH
 Analytical Date/Time: 06/30/15 23:08
 Container ID: 1158047001-A

Prep Batch: XXX33420
 Prep Method: SW3520C + Water Ext for Soils
 Prep Date/Time: 06/30/15 11:30
 Prep Initial Wt./Vol.: 60 g
 Prep Extract Vol: 1 mL



Results of LGB-SW-2

Client Sample ID: **LGB-SW-2**
Client Project ID: **NPR Excavation**
Lab Sample ID: 1158047002
Lab Project ID: 1158047

Collection Date: 06/02/15 17:36
Received Date: 06/05/15 11:00
Matrix: Soil/Solid (dry weight)
Solids (%):93.8
Location:

Results by Semivolatile Organic GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	0.00525 U	0.0105	0.00325	mg/Kg	1		06/12/15 14:26
Surrogates							
Sulfolane-d8	81.6	50-120		%	1		06/12/15 14:26

Batch Information

Analytical Batch: XMS8708
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Analyst: DSH
Analytical Date/Time: 06/12/15 14:26
Container ID: 1158047002-A

Prep Batch: XXX33273
Prep Method: SW3550C
Prep Date/Time: 06/11/15 12:14
Prep Initial Wt./Vol.: 30.479 g
Prep Extract Vol: 1 mL



Results of LGB-SW-3

Client Sample ID: **LGB-SW-3**
Client Project ID: **NPR Excavation**
Lab Sample ID: 1158047003
Lab Project ID: 1158047

Collection Date: 06/02/15 17:38
Received Date: 06/05/15 11:00
Matrix: Soil/Solid (dry weight)
Solids (%):89.8
Location:

Results by Semivolatile Organic GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	0.00555 U	0.0111	0.00344	mg/Kg	1		06/12/15 14:51
Surrogates							
Sulfolane-d8	77.9	50-120		%	1		06/12/15 14:51

Batch Information

Analytical Batch: XMS8708
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Analyst: DSH
Analytical Date/Time: 06/12/15 14:51
Container ID: 1158047003-A

Prep Batch: XXX33273
Prep Method: SW3550C
Prep Date/Time: 06/11/15 12:14
Prep Initial Wt./Vol.: 30.119 g
Prep Extract Vol: 1 mL



Results of LGB-SW-4

Client Sample ID: **LGB-SW-4**
Client Project ID: **NPR Excavation**
Lab Sample ID: 1158047004
Lab Project ID: 1158047

Collection Date: 06/02/15 17:40
Received Date: 06/05/15 11:00
Matrix: Soil/Solid (dry weight)
Solids (%):94.2
Location:

Results by Semivolatile Organic GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	0.00525 U	0.0105	0.00326	mg/Kg	1		06/12/15 15:16
Surrogates							
Sulfolane-d8	74.2	50-120		%	1		06/12/15 15:16

Batch Information

Analytical Batch: XMS8708
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Analyst: DSH
Analytical Date/Time: 06/12/15 15:16
Container ID: 1158047004-A

Prep Batch: XXX33273
Prep Method: SW3550C
Prep Date/Time: 06/11/15 12:14
Prep Initial Wt./Vol.: 30.258 g
Prep Extract Vol: 1 mL



Results of LGB-F-1

Client Sample ID: **LGB-F-1**
Client Project ID: **NPR Excavation**
Lab Sample ID: 1158047005
Lab Project ID: 1158047

Collection Date: 06/02/15 17:42
Received Date: 06/05/15 11:00
Matrix: Soil/Solid (dry weight)
Solids (%):86.3
Location:

Results by Semivolatile Organic GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	0.00876 J	0.0114	0.00355	mg/Kg	1		06/12/15 16:30
Surrogates							
Sulfolane-d8	66.1	50-120		%	1		06/12/15 16:30

Batch Information

Analytical Batch: XMS8708
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Analyst: DSH
Analytical Date/Time: 06/12/15 16:30
Container ID: 1158047005-A

Prep Batch: XXX33273
Prep Method: SW3550C
Prep Date/Time: 06/11/15 12:14
Prep Initial Wt./Vol.: 30.378 g
Prep Extract Vol: 1 mL

Results of LGB-F-2

Client Sample ID: **LGB-F-2**
 Client Project ID: **NPR Excavation**
 Lab Sample ID: 1158047006
 Lab Project ID: 1158047

Collection Date: 06/02/15 17:45
 Received Date: 06/05/15 11:00
 Matrix: Soil/Solid (dry weight)
 Solids (%):83.1
 Location:

Results by Semivolatile Organic GC/MS

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Sulfolane	0.0151	0.0119	0.00369	mg/Kg	1		06/12/15 21:05
Sulfolane	0.00401 J	0.0120	0.00373	mg/Kg	1		06/17/15 00:22
Surrogates							
Sulfolane-d8	50.2	40-100		%	1		06/17/15 00:22
Sulfolane-d8	65	50-120		%	1		06/12/15 21:05

Batch Information

Analytical Batch: XMS8708
 Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
 Analyst: DSH
 Analytical Date/Time: 06/12/15 21:05
 Container ID: 1158047006-A

Prep Batch: XXX33273
 Prep Method: SW3550C
 Prep Date/Time: 06/11/15 12:14
 Prep Initial Wt./Vol.: 30.306 g
 Prep Extract Vol: 1 mL

Analytical Batch: XMS8716
 Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
 Analyst: DSH
 Analytical Date/Time: 06/17/15 00:22
 Container ID: 1158047006-A

Prep Batch: XXX33300
 Prep Method: SW3520C + Water Ext for Soils
 Prep Date/Time: 06/16/15 10:30
 Prep Initial Wt./Vol.: 60 g
 Prep Extract Vol: 1 mL

Results of BD-1

Client Sample ID: **BD-1**
 Client Project ID: **NPR Excavation**
 Lab Sample ID: 1158047007
 Lab Project ID: 1158047

Collection Date: 06/02/15 17:32
 Received Date: 06/05/15 11:00
 Matrix: Soil/Solid (dry weight)
 Solids (%):86.0
 Location:

Results by Semivolatile Organic GC/MS

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Sulfolane	0.00812 J	0.0116	0.00360	mg/Kg	1		06/12/15 21:30
Sulfolane	0.00580 J UU	0.0116	0.00360	mg/Kg	1		06/30/15 23:33
Sulfolane	0.00580 U	0.0116	0.00360	mg/Kg	1		06/25/15 16:18
Surrogates							
Sulfolane-d8	37.4 *	40-100		%	1		06/25/15 16:18
Sulfolane-d8	42.2	40-100		%	1		06/30/15 23:33
Sulfolane-d8	65.7	50-120		%	1		06/12/15 21:30

Batch Information

Analytical Batch: XMS8708
 Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
 Analyst: DSH
 Analytical Date/Time: 06/12/15 21:30
 Container ID: 1158047007-A

Prep Batch: XXX33273
 Prep Method: SW3550C
 Prep Date/Time: 06/11/15 12:14
 Prep Initial Wt./Vol.: 30.047 g
 Prep Extract Vol: 1 mL

Analytical Batch: XMS8735
 Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
 Analyst: DSH
 Analytical Date/Time: 06/25/15 16:18
 Container ID: 1158047007-A

Prep Batch: XXX33327
 Prep Method: SW3520C + Water Ext for Soils
 Prep Date/Time: 06/18/15 15:05
 Prep Initial Wt./Vol.: 60 g
 Prep Extract Vol: 1 mL

Analytical Batch: XMS8745
 Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
 Analyst: DSH
 Analytical Date/Time: 06/30/15 23:33
 Container ID: 1158047007-A

Prep Batch: XXX33420
 Prep Method: SW3520C + Water Ext for Soils
 Prep Date/Time: 06/30/15 11:30
 Prep Initial Wt./Vol.: 60 g
 Prep Extract Vol: 1 mL



Results of LGB-SW-5

Client Sample ID: **LGB-SW-5**
Client Project ID: **NPR Excavation**
Lab Sample ID: 1158047008
Lab Project ID: 1158047

Collection Date: 06/03/15 15:15
Received Date: 06/05/15 11:00
Matrix: Soil/Solid (dry weight)
Solids (%):94.4
Location:

Results by Semivolatile Organic GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	0.00525 U	0.0105	0.00325	mg/Kg	1		06/12/15 16:55
Surrogates							
Sulfolane-d8	69.7	50-120		%	1		06/12/15 16:55

Batch Information

Analytical Batch: XMS8708
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Analyst: DSH
Analytical Date/Time: 06/12/15 16:55
Container ID: 1158047008-A

Prep Batch: XXX33273
Prep Method: SW3550C
Prep Date/Time: 06/11/15 12:14
Prep Initial Wt./Vol.: 30.265 g
Prep Extract Vol: 1 mL



Results of LGB-SW-6

Client Sample ID: **LGB-SW-6**
Client Project ID: **NPR Excavation**
Lab Sample ID: 1158047009
Lab Project ID: 1158047

Collection Date: 06/03/15 15:20
Received Date: 06/05/15 11:00
Matrix: Soil/Solid (dry weight)
Solids (%):94.0
Location:

Results by Semivolatile Organic GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	0.00530 U	0.0106	0.00329	mg/Kg	1		06/12/15 17:20
Surrogates							
Sulfolane-d8	72	50-120		%	1		06/12/15 17:20

Batch Information

Analytical Batch: XMS8708
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Analyst: DSH
Analytical Date/Time: 06/12/15 17:20
Container ID: 1158047009-A

Prep Batch: XXX33273
Prep Method: SW3550C
Prep Date/Time: 06/11/15 12:14
Prep Initial Wt./Vol.: 30.042 g
Prep Extract Vol: 1 mL



Results of LGB-F-3

Client Sample ID: **LGB-F-3**
Client Project ID: **NPR Excavation**
Lab Sample ID: 1158047010
Lab Project ID: 1158047

Collection Date: 06/03/15 15:25
Received Date: 06/05/15 11:00
Matrix: Soil/Solid (dry weight)
Solids (%):81.5
Location:

Results by Semivolatile Organic GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	0.00686 J	0.0121	0.00376	mg/Kg	1		06/12/15 17:45
Surrogates							
Sulfolane-d8	66.7	50-120		%	1		06/12/15 17:45

Batch Information

Analytical Batch: XMS8708
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Analyst: DSH
Analytical Date/Time: 06/12/15 17:45
Container ID: 1158047010-A

Prep Batch: XXX33273
Prep Method: SW3550C
Prep Date/Time: 06/11/15 12:14
Prep Initial Wt./Vol.: 30.398 g
Prep Extract Vol: 1 mL



Results of **BD-2**

Client Sample ID: **BD-2**
Client Project ID: **NPR Excavation**
Lab Sample ID: 1158047011
Lab Project ID: 1158047

Collection Date: 06/03/15 17:32
Received Date: 06/05/15 11:00
Matrix: Soil/Solid (dry weight)
Solids (%):94.6
Location:

Results by **Semivolatile Organic GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	0.00525 U	0.0105	0.00325	mg/Kg	1		06/12/15 18:10
Surrogates							
Sulfolane-d8	68.2	50-120		%	1		06/12/15 18:10

Batch Information

Analytical Batch: XMS8708
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Analyst: DSH
Analytical Date/Time: 06/12/15 18:10
Container ID: 1158047011-A

Prep Batch: XXX33273
Prep Method: SW3550C
Prep Date/Time: 06/11/15 12:14
Prep Initial Wt./Vol.: 30.219 g
Prep Extract Vol: 1 mL



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1158047



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Instructions: Sections 1 - 5 must be filled out. Omissions may delay the onset of analysis.										Preservative										Page 1 of 2																																																																					
Section 1										Section 3										Section 4																																																																					
CLIENT: Flint Hills Resources										CONTACT: Loren Garner										PROJECT: PWSID/ PERMIT#:										REPORTS TO: Rebecca Anderson										E-MAIL: Rebecca.Anderson@aread15-us.sgs.com										INVOICE TO: Flint Hills Resources										QUOTE #: PENDING										P.O. #:																			
RESERVED for lab use										SAMPLE IDENTIFICATION										DATE mm/dd/yy										TIME HH:MM										MATRIX CODE										#										Type C = COMP G = GRAB MI = Multi Incre- mental Soils										REMARKS/ LOC ID																			
1A										LGB-SW-1										06/02/15										17:32										Soil										1										G																													
2A										LGB-SW-2										06/02/15										17:36										Soil										1										G																													
3A										LGB-SW-3										06/02/15										17:38										Soil										1										G																													
4A										LGB-SW-4										06/02/15										17:40										Soil										1										G																													
5A										LGB-F-1										06/02/15										17:42										Soil										1										G																													
6A										LGB-F-2										06/02/15										17:45										Soil										1										G																													
7A										BD-1										06/02/15																				Soil										1										G																													
8A										LGB-SW-5										06/03/15										15:15										Soil										1										G																													
9A										LGB-SW-6										06/03/15										15:20										Soil										1										G																													
10A										LGB-F-3										06/03/15										15:25										Soil										1										G																													
Relinquished By: (1)										Date										06/04/15										Time										0600										Received By:										6/4/15										08:10										Data Deliverable Requirements:									
Relinquished By: (2)										Date										6/4/15										Time										1600										Received By:																				Requested Turnaround Time and/or Special Instructions:																			
Relinquished By: (3)										Date																				Time																				Received By:																				Temp Blank °C: 6.0 or Ambient []										Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT									
Relinquished By: (4)										Date										6/6/15										Time										11:00										Received For Laboratory By:										Jude										(See attached Sample Receipt Form)																			

[] 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

http://www.sgs.com/terms-and-conditions

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IF, 1B

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[] 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

<http://www.sgs.com/terms-and-conditions>

F083-Kit_Request_and_COC_Templates-Blank
Revised 2013-03-24



Note: This form is to be completed by Fairbanks Receiving Staff for all samples

Form F010r08_SRFforTransfers_revised_01052015
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[illegible]

Sample Containers and Preservatives

<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>	<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>
1158047001-A	No Preservative Required	OK			
1158047002-A	No Preservative Required	OK			
1158047003-A	No Preservative Required	OK			
1158047004-A	No Preservative Required	OK			
1158047005-A	No Preservative Required	OK			
1158047006-A	No Preservative Required	OK			
1158047007-A	No Preservative Required	OK			
1158047008-A	No Preservative Required	OK			
1158047009-A	No Preservative Required	OK			
1158047010-A	No Preservative Required	OK			
1158047011-A	No Preservative Required	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 that an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.

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.

BU - The container was received with headspace greater than 6mm.

Flint Hill Resources Alaska, LLC

North Pole Refinery Site

Data Review

NORTH POLE, ALASKA

Sulfolane Analysis

SDG #: 1158102

Analyses Performed By:
SGS North America, Inc.
Wilmington, North Carolina

Review Level: Tier II
Project: B0081981.0084.00002

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #1158102 for samples collected in association with the North Pole Refinery site. The review was conducted as a Tier II evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis				
					VOC	SVOC	Sulfolane	MET	MISC
CGB-F-4	1158102001	Soil	6/9/2015				X		
CGB-SW-7	1158102002	Soil	6/9/2015				X		

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

QA - Quality Assurance

ORGANIC ANALYSIS INTRODUCTION

A United States Environmental Protection Agency (USEPA)-approved method does not exist for sulfolane. A method (Sulfolane-SW8270D M) has been developed with input from the Alaska Department of Environmental Conservation (ADEC) using USEPA-approved 8270D analytical method with SW846 preparation 3550C (Shannon & Wilson, Inc. 2015). Re-extractions were prepared using method 3520C. Data were reviewed in accordance with USEPA National Functional Guidelines of June 2008 (USEPA 2008).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

- U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
- B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

- E The compound was quantitated above the calibration range.
- D Concentration is based on a diluted sample analysis.
- Q QC parameter outside of acceptance range.

- Validation Qualifiers

- J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
- JH The result is an estimated quantity, and may be biased high.
- JL The result is an estimated quantity, and may be biased low
- JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.
- UB Compound considered non-detect at the listed value due to associated blank contamination.
- UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
- R The sample results are rejected as unusable. The compound may or may not be present in the sample.

- * Qualifier applied by reviewer.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

SULFOLANE ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8270D	Soil	14 days from collection to extraction and 40 days from extraction to analysis	Cool to <6 °C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Holding Time	Criteria
CGB-F-4 CGB-SW-7	Extraction Completed	15 Days

Per the laboratory case narrative, the samples were tumbled within hold time and are therefore within compliance. No qualification is required.

2. Blank Contamination

Quality assurance (QA) blanks (i.e. laboratory method blanks and equipment rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the estimated detection limit (EDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Sulfolane was not detected at or above the limit of detection. All compound detections were not associated with blank contamination.

3. Surrogate Internal Standard Compounds

All field samples, blanks, LCS, and MS/MSD are spiked with surrogate internal standard compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique.

All surrogate internal standard recoveries were within the control limits.

4. Clean-up Recovery Surrogate Performance

All field samples, blanks, LCS, and MS/MSD are spiked with recovery surrogates prior to extract clean-up. Recovery surrogate acceptance criteria require that their calculated recoveries, S/N, m/z ratios, and relative retention times (RRTs) be within the method-specified acceptance limits.

Tier II data validation does not require verification of recovery surrogate. The case narrative did not mention any discrepancies, therefore, all recovery surrogate recoveries S/N, m/z ratios, and RRTs were

within the control limits.

5. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The spiked compounds used in the MS/MSD analysis must exhibit recoveries within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS and MSD results must be within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of two or greater. Sample results associated with MS/MSD exceedances where the parent samples are not site-specific are not qualified.

An MS/MSD sample was not analyzed for this dataset.

6. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD (also called Ongoing Precision and Recovery (OPR)) analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The spiked compounds used in the LCS/LCSD analysis must exhibit recoveries within the laboratory-established acceptance limits.

The LCS/LCSD analyses exhibited recoveries within the control limits for sulfolane.

7. Field Duplicate Sample Analysis

Field duplicate sample analysis is used to assess the precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices and 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. An RPD will only be calculated if at least one of the sample results is above the Limit of Quantitation (LOQ; synonymous with reporting limit).

A field duplicate sample was not collected for this dataset.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

9. System Performance and Overall Assessment

Shannon & Wilson, Inc. 2015. Data Validation Program Plan, Flint Hills Resources Alaska, LLC, North Pole, Alaska. June.

USEPA. 2008. National Functional Guidelines for Organic Methods Data Review. Guidance document, United States Environmental Protection Agency. June.

DATA VALIDATION CHECKLIST FOR SULFOLANE

Sulfolane: SW-846 8270D	Reported		Performance Acceptable		Not Required	
	No	Yes	No	Yes		
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)						
Tier II Validation						
Holding Times		X		X		
Reporting limits (units)		X		X		
Blanks						
A. Method Blanks		X		X		
B. Trip Blanks					X	
C. Equipment Blanks					X	
Laboratory Control Sample (LCS) Accuracy (%R)		X		X		
Laboratory Control Sample Duplicate (LCSD) Accuracy (%R)		X		X		
LCS/LCSD Precision (RPD)		X		X		
Matrix Spike (MS) Accuracy (%R)					X	
Matrix Spike Duplicate (MSD) Accuracy (%R)					X	
MS/MSD Precision (RPD)					X	
Field/Laboratory Duplicate Sample RPD					X	
Surrogate Internal Standard Spike (%R)		X		X		
Recovery Surrogate Standard Spike (%R)		X		X		

%R – Percent Recovery
 RPD – Relative Percent Difference

Validation Performed By: Kylie Kegerreis

Date: July 22, 2015

Peer Review: Cassandra McCloud

Date: July 30, 2015

**ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
LABORATORY DATA REVIEW CHECKLIST**

Laboratory Data Review Checklist

Completed by:	Kylie Kegerreis		
Title:	Environmental Engineering Specialist	Date:	Jul 22, 2015
CS Report Name:	NPR Excavation	Report Date:	Jul 7, 2015
Consultant Firm:	ARCADIS US, Inc.		
Laboratory Name:	SGS North America, Inc.	Laboratory Report Number:	1158102
ADEC File Number:		ADEC RecKey Number:	

1. Laboratory

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

☒ Yes ☐ No ☐ NA (Please explain.) Comments:

Project-specific ADEC chemistry subgroup has approved SGS for sulfolane analysis. ADEC's website does not list sulfolane under the "Analytes" menu nor sulfolane analysis by isotope dilution under the "Methods" menu

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 ☒ NA (Please explain) Comments:

2. Chain of Custody (COC)

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

☒ Yes ☐ No ☐ NA (Please explain) Comments:

b. Correct analyses requested?

☒ Yes ☐ No ☐ NA (Please explain) Comments:

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt ($4^{\circ} \pm 2^{\circ} \text{C}$)?

☒ Yes ☐ No ☐ NA (Please explain) Comments:

Temperature = 1.4°C ; Per data validation program plan, $0 - 6^{\circ} \text{C}$ = no qualification

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

Samples maintained within acceptable temperature range. Additional preservation not required for sulfolane analysis

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

Samples in good condition - no leaks/cracks/breakage

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

☐ Yes ☐ No ☐ NA (Please explain)

Comments:

No discrepancies noted

e. Data quality or usability affected? (Please explain)

Comments:

N/A

4. Case Narrative

a. Present and understandable?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

Samples "CGB-F-4" and "CGB-SW-7": Sample was tumbled within hold time

c. Were all corrective actions documented?

☐ Yes ☐ No ☒ NA (Please explain)

Comments:

Corrective actions not needed

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

Comments:

None

5. Samples Results

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

b. All applicable holding times met?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

Hold times: Extraction w/in 14 days, Analysis w/in 40 days of extraction.

Collection date: 6/9/15

Prepped: 6/24/2015

Analyzed: 6/25/2015

As mentioned previously, Case Narrative states "Samples tumbled within hold time"

c. All soils reported on a dry weight basis?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

mg/kg

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

☐ Yes ☐ No ☒ NA (Please explain)

Comments:

A Cleanup Level has not been established for this site.

e. Data quality or usability affected? (Please explain)

Comments:

The following result was detected between the DL and LOQ and was qualified "J" to indicate trace detection: - CGB-F-4: Sulfolane 0.00904 J mg/kg

6. QC Samples

a. Method Blank

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

One method blank per extraction/analysis (total of 1 method blank)

ii. All method blank results less than PQL?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

iii. If above PQL, what samples are affected?

Comments:

N/A

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

☐ Yes ☐ No ☐ NA (Please explain)

Comments:

N/A

v. Data quality or usability affected? (Please explain)

Comments:

Not affected due to method blank

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 ☐ NA (Please explain)

Comments:

One LCS/LCSD per extraction/analysis (total of 1 LCS/LCSD)

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

☐ Yes ☐ No ☒ NA (Please explain)

Comments:

No Metals/Inorganics analysis

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 ☐ NA (Please explain)

Comments:

LCS/LCSD = 87 / 85%

Control Limits = 70 - 120%

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/DMSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

LCS/LCSD RPD = 3.10 (Control Limits = < 20)

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

Comments:

N/A

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

☐ Yes ☒ No ☐ NA (Please explain)

Comments:

vii. Data quality or usability affected? (Please explain)

Comments:

N/A

c. Surrogates - Organics Only

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

☒ Yes ☐ No ☐ NA (Please explain)

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 ☐ NA (Please explain)

Comments:

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

☐ Yes ☐ No ☒ NA (Please explain)

Comments:

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

Comments:

No, all surrogate recoveries within acceptable limits

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 ☒ NA (Please explain.)

Comments:

Not required for sulfolane (SVOC)

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 ☒ NA (Please explain.)

Comments:

Trip blank not required.

iii. All results less than PQL?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Trip blank not required

iv. If above PQL, what samples are affected?

Comments:

N/A

v. Data quality or usability affected? (Please explain.)

Comments:

N/A

e. Field Duplicate

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

☐ Yes ☐ No ☒ NA (Please explain)

Comments:

No field duplicate collected/required.

ii. Submitted blind to lab?

☐ Yes ☐ No ☒ NA (Please explain.)

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 ☒ NA (Please explain)

Comments:

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

☐ Yes

☐ No

☒ NA (Please explain)

Comments:

f. Decontamination or Equipment Blank (if applicable)

☐ Yes

☐ No

☒ NA (Please explain)

Comments:

Equipment blank not collected

i. All results less than PQL?

☐ Yes

☐ No

☒ NA (Please explain)

Comments:

Equipment blank not collected

ii. If above PQL, what samples are affected?

Comments:

N/A

iii. Data quality or usability affected? (Please explain.)

Comments:

N/A

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

a. Defined and appropriate?

☐ Yes

☐ No

☒ NA (Please explain)

Comments:

Reset Form

**CHAIN OF CUSTODY /
LABORATORY QUALIFIERS /
CORRECTED SAMPLE ANALYSIS DATA SHEETS**



Laboratory Report of Analysis

To: Flint Hills Resources- North Pole
1100 H & H Lane
North Pole, AK 99705
(907)488-0723

Report Number: **1158102**

[Amended report: Sample IDs edited per client request.](#)

Client Project: **NPR Excavation**

Dear Loren Garner,

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 Jennifer 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.

Jennifer Dawkins
Project Manager

Date

Print Date: 09/24/2015 9:19:51AM

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Case Narrative

SGS Client: **Flint Hills Resources- North Pole**

SGS Project: **1158102**

Project Name/Site: **NPR Excavation**

Project Contact: **Loren Garner**

Refer to sample receipt form for information on sample condition.

LGB-F-4 (1158102001) PS

1625B - Sample was tumbled within hold time.

LGB-SW-7 (1158102002) PS

1625B - Sample was tumbled within hold time.

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

Print Date: 09/24/2015 9:19:53AM

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, indemnification 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, 8021B, 8082A, 8260B, 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
D	The analyte concentration is the result of a dilution.
DF	Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
F	Indicates value that is greater than or equal to the DL
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
JL	The analyte was positively identified, but the quantitation is a low estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
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
M	A matrix effect was present.
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
Q	QC parameter out of acceptance range.
R	Rejected
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.

Sample Summary

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Collected</u>	<u>Received</u>	<u>Matrix</u>
LGB-F-4	1158102001	06/09/2015	06/18/2015	Soil/Solid (dry weight)
LGB-SW-7	1158102002	06/09/2015	06/18/2015	Soil/Solid (dry weight)

<u>Method</u>	<u>Method Description</u>
SM21 2540G	Percent Solids SM2540G
Sulfolane-SW8270D M w/IsoDI 5	Sulfolane SW8270D-M w/IsoDil(S)

Print Date: 09/24/2015 9:19:55AM

Detectable Results Summary

Client Sample ID: **LGB-F-4**
 Lab Sample ID: 1158102001
Semivolatile Organic GC/MS

Parameter
 Sulfolane

Result
 0.00904J

Units
 mg/Kg

Print Date: 09/24/2015 9:19:56AM

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Results of LGB-F-4

Client Sample ID: **LGB-F-4**
Client Project ID: **NPR Excavation**
Lab Sample ID: 1158102001
Lab Project ID: 1158102

Collection Date: 06/09/15 13:10
Received Date: 06/18/15 09:14
Matrix: Soil/Solid (dry weight)
Solids (%):88.4
Location:

Results by Semivolatile Organic GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	0.00904 J	0.0113	0.00351	mg/Kg	1		06/25/15 20:04
Surrogates							
Sulfolane-d8	47	40-100		%	1		06/25/15 20:04

Batch Information

Analytical Batch: XMS8735
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Analyst: DSH
Analytical Date/Time: 06/25/15 20:04
Container ID: 1158102001-A

Prep Batch: XXX33375
Prep Method: SW3520C + Water Ext for Soils
Prep Date/Time: 06/24/15 11:03
Prep Initial Wt./Vol.: 60 g
Prep Extract Vol: 1 mL

Print Date: 09/24/2015 9:19:57AM

J flagging is activated



Results of LGB-SW-7

Client Sample ID: **LGB-SW-7**
Client Project ID: **NPR Excavation**
Lab Sample ID: 1158102002
Lab Project ID: 1158102

Collection Date: 06/09/15 13:15
Received Date: 06/18/15 09:14
Matrix: Soil/Solid (dry weight)
Solids (%):93.1
Location:

Results by Semivolatile Organic GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	0.00535 U	0.0107	0.00333	mg/Kg	1		06/25/15 20:29
Surrogates							
Sulfolane-d8	52.9	40-100		%	1		06/25/15 20:29

Batch Information

Analytical Batch: XMS8735
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Analyst: DSH
Analytical Date/Time: 06/25/15 20:29
Container ID: 1158102002-A

Prep Batch: XXX33375
Prep Method: SW3520C + Water Ext for Soils
Prep Date/Time: 06/24/15 11:03
Prep Initial Wt./Vol.: 60 g
Prep Extract Vol: 1 mL

Print Date: 09/24/2015 9:19:57AM

J flagging is activated

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Method Blank

Blank ID: MB for HBN 1711320 [SPT/9637]

Blank Lab ID: 1271998

QC for Samples:

1158102001, 1158102002

Matrix: Soil/Solid (dry weight)

Results by SM21 2540G

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Total Solids	100			%

Batch Information

Analytical Batch: SPT9637

Analytical Method: SM21 2540G

Instrument:

Analyst: A.R

Analytical Date/Time: 6/18/2015 7:10:00PM

Print Date: 09/24/2015 9:19:59AM

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Duplicate Sample Summary

Original Sample ID: 1158103001

Duplicate Sample ID: 1271999

QC for Samples:

1158102001, 1158102002

Analysis Date: 06/18/2015 19:10

Matrix: Soil/Solid (dry weight)

Results by SM21 2540G

<u>NAME</u>	<u>Original</u>	<u>Duplicate</u>	<u>Units</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Total Solids	89.6	90.0	%	0.42	(< 5)

Batch Information

Analytical Batch: SPT9637

Analytical Method: SM21 2540G

Instrument:

Analyst: A.R

Print Date: 09/24/2015 9:20:01AM

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Method Blank

Blank ID: MB for HBN 1711730 [XXX/33375]

Blank Lab ID: 1273000

QC for Samples:

1158102001, 1158102002

Matrix: Soil/Solid (dry weight)

Results by Sulfolane-SW8270D M w/IsoDI SI

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Sulfolane	0.00500U	0.0100	0.00310	mg/Kg
Surrogates				
Sulfolane-d8	66.9	40-100		%

Batch Information

Analytical Batch: XMS8735

Analytical Method: Sulfolane-SW8270D M w/IsoDI SI

Instrument: SVA Agilent 780/5975 GC/MS

Analyst: DSH

Analytical Date/Time: 6/25/2015 6:49:00PM

Prep Batch: XXX33375

Prep Method: SW3520C + Water Ext for Soils

Prep Date/Time: 6/24/2015 11:03:33AM

Prep Initial Wt./Vol.: 60 g

Prep Extract Vol: 1 mL

Print Date: 09/24/2015 9:20:03AM

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1158102 [XXX33375]
Blank Spike Lab ID: 1273001
Date Analyzed: 06/25/2015 19:14

Spike Duplicate ID: LCSD for HBN 1158102
[XXX33375]
Spike Duplicate Lab ID: 1273002
Matrix: Soil/Solid (dry weight)

QC for Samples: 1158102001, 1158102002

Results by Sulfolane-SW8270D M w/IsoDI SI

Parameter	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Sulfolane	0.05	0.0436	87	0.05	0.0423	85	(70-120)	3.10	(< 20)
Surrogates									
Sulfolane-d8	0.833	52.3	52	0.833	52.1	52	(40-100)	0.31	

Batch Information

Analytical Batch: XMS8735
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Instrument: SVA Agilent 780/5975 GC/MS
Analyst: DSH

Prep Batch: XXX33375
Prep Method: SW3520C + Water Ext for Soils
Prep Date/Time: 06/24/2015 11:03
Spike Init Wt./Vol.: 0.05 mg/Kg Extract Vol: 1 mL
Dupe Init Wt./Vol.: 0.05 mg/Kg Extract Vol: 1 mL

Print Date: 09/24/2015 9:20:05AM

Pennick, Victoria (Anchorage)

From: Beaudoin, David [David.Beaudoin@arcadis.com]
Sent: Thursday, September 24, 2015 9:17 AM
To: Pennick, Victoria (Anchorage)
Cc: kylie.kegerries@arcadis.com
Subject: (SDG) #1158102 Sample ID Edit Request
Attachments: 1158102 - DV Report 19.pdf

Good morning,

I am afraid my penmanship has made some work for us. My Ls have been interpreted as Cs.

If you would be so kind, please, edit the laboratory report for these samples so that samples "CGB-F-4" and "CGB-SW-7" are indicated as:

LGB-F-4 (lab ID: 1158102001)

&

LGB-SW-7 (lab ID: 1158102002)

Thank you & my apologies,

Dave

David Beaudoin | Staff Scientist | david.beaudoin@arcadis.com

Arcadis | Arcadis U.S., Inc.

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Be green, leave it on the screen.

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From: [Dawkins, Jennifer A \(Anchorage\)](#)
To: [Dawkins, Jennifer A \(Anchorage\)](#)
Subject: 1158102 Change Order
Date: Friday, June 19, 2015 1:38:36 PM

These samples may have hydrocarbon interference. Please run them by the sulfolane cleanup method due to hold time, per client

Jen

Try our new online quote/kit order form: Website : www.SGS.com/Alaska

Jennifer A-B Dawkins
Environmental Services – Alaska Division
Project Manager

SGS – North America Inc.
3180 Peger Rd. Ste. 190
Fairbanks, AK 99709
Phone: 907-474-8656
Mobile: 907-322-8444
E-mail : jennifer.dawkins@sgs.com

Data Deliverables at: <https://engage.sgs.com>

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2014 SUSTAINABILITY
REVIEW**

**2014 ONLINE
SUSTAINABILITY
REPORT**





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[] 5500 Business Drive Wilmington, NC 28405 Tel: (910) 350-1903 Fax: (910) 350-1557



[illegible]



Sample Containers and Preservatives

<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>	<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>
1158102001-A	No Preservative Required	OK			
1158102002-A	No Preservative Required	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 that an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.

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.

BU - The container was received with headspace greater than 6mm.



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Flint Hill Resources Alaska, LLC

North Pole Refinery Site

Data Review

NORTH POLE, ALASKA

Sulfolane Analysis

SDG #: 1158072

Analyses Performed By:
SGS North America, Inc.
Wilmington, North Carolina

Review Level: Tier II
Project: B0081981.0084.00002

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #1158072 for samples collected in association with the North Pole Refinery site. The review was conducted as a Tier II evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis				
					VOC	SVOC	Sulfolane	MET	MISC
LGB-F-6	1158072001	Soil	6/9/2015				X		
LGB-F-7	1158072002	Soil	6/9/2015				X		
LFB-F-8	1158072003	Soil	6/9/2015				X		
LGB-SW-8	1158072004	Soil	6/9/2015				X		
LGB-SW-9	1158072005	Soil	6/9/2015				X		
LGB-SW-10	1158072006	Soil	6/9/2015				X		
LGB-SW-11	1158072007	Soil	6/9/2015				X		
LGB-SW-12	1158072008	Soil	6/9/2015				X		
LGB-SW-13	1158072009	Soil	6/9/2015				X		
LGB-SW-14	1158072010	Soil	6/9/2015				X		
LGB-F-5	1158072011	Soil	6/9/2015				X		
BD-3	1158072012	Soil	6/9/2015	LGB-F-5			X		
BD-4	1158072013	Soil	6/9/2015	LGB-SW-14			X		

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X	X		
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

QA - Quality Assurance

Note: As stated in the SGS North America Sample Receipt Form: "** Received container not recorded on the COC. Sample ID: LGB-F-5. Logged in as sample 1158072-011A"

ORGANIC ANALYSIS INTRODUCTION

A United States Environmental Protection Agency (USEPA)-approved method does not exist for sulfolane. A method (Sulfolane-SW8270D M) has been developed with input from the Alaska Department of Environmental Conservation (ADEC) using USEPA-approved 8270D analytical method with SW846 preparation 3550C (Shannon & Wilson, Inc. 2015). Re-extractions were prepared using method 3520C. Data were reviewed in accordance with USEPA National Functional Guidelines of June 2008 (USEPA 2008).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

- U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
- B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

- E The compound was quantitated above the calibration range.
- D Concentration is based on a diluted sample analysis.
- Q QC parameter out of acceptance range.

- Validation Qualifiers

- J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
- JH The result is an estimated quantity, and may be biased high.
- JL The result is an estimated quantity, and may be biased low
- JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.
- UB Compound considered non-detect at the listed value due to associated blank contamination.
- UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
- R The sample results are rejected as unusable. The compound may or may not be present in the sample.
- * Qualifier applied by reviewer.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

SULFOLANE ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8270D	Soil	14 days from collection to extraction and 40 days from extraction to analysis	Cool to <6 °C

All applicable holding times were met.

2. Blank Contamination

Quality assurance (QA) blanks (i.e. laboratory method blanks and equipment rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the estimated detection limit (EDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Sulfolane was not detected at or above the limit of detection (LOD). All compound detections were not associated with blank contamination.

3. Surrogate Internal Standard Compounds

All field samples, blanks, LCS, and MS/MSD are spiked with surrogate internal standard compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique.

All surrogate internal standard recoveries ratios were within the control limits, with the following exceptions:

Sample ID	Issue	Action	Re-Extraction Date	Re-Analysis Date
LGB-F-8	m/z ratio outside QC criteria due to Hydrocarbon interference	Re-extract using Sulfolane Clean-up Method and Re-analyze	6/23/2015	6/25/2015
LGB-SW-11	m/z ratio outside QC criteria due to Hydrocarbon interference	Re-extract using Sulfolane Clean-up Method and Re-analyze	6/23/2015	6/25/2015

Qualification due to recoveries outside control limits was not required due to successful re-extraction using the sulfolane clean-up method.

4. Clean-up Recovery Surrogate Performance

All field samples, blanks, LCS, and MS/MSD are spiked with recovery surrogates prior to extract clean-up. Recovery surrogate acceptance criteria require that their calculated recoveries, S/N, m/z ratios, and relative retention times (RRTs) be within the method-specified acceptance limits.

Tier II data validation does not require verification of recovery surrogate. The case narrative did not mention any discrepancies, therefore, all recovery surrogate recoveries S/N, m/z ratios, and RRTs were within the control limits.

5. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The spiked compounds used in the MS/MSD analysis must exhibit recoveries within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS and MSD results must be within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of two or greater. Sample results associated with MS/MSD exceedances where the parent samples are not site-specific are not qualified.

A MS/MSD sample was not analyzed in association with this dataset.

6. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD (also called Ongoing Precision and Recovery (OPR)) analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The spiked compounds used in the LCS/LCSD analysis must exhibit recoveries within the laboratory-established acceptance limits.

The LCS/LCSD analyses exhibited recoveries within the control limits for sulfolane.

7. Field Duplicate Sample Analysis

Field duplicate sample analysis is used to assess the precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices and 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. An RPD will only be calculated if at least one of the sample results is above the Limit of Quantitation (LOQ; synonymous with reporting limit).

Field duplicate samples are summarized in the table, below.

Sample ID / Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
LGB-F-5 / BD-3	Sulfolane	0.0557	0.0673	19%
LGB-SW-14 / BD-4	Sulfolane	0.00525 U	0.00520 U	AC

AC – Acceptable

J – The quantitation is an estimation.

U – Not Detected

All results for field duplicate samples were within control limits.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

9. References

Shannon & Wilson, Inc. 2015. Data Validation Program Plan, Flint Hills Resources Alaska, LLC, North Pole, Alaska. June.

USEPA. 2008. National Functional Guidelines for Organic Methods Data Review. Guidance document, United States Environmental Protection Agency. June.

DATA VALIDATION CHECKLIST FOR SULFOLANE

Sulfolane: SW-846 8270D	Reported		Performance Acceptable		Not Required	
	No	Yes	No	Yes		
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)						
Tier II Validation						
Holding Times		X		X		
Reporting limits (units)		X		X		
Blanks						
A. Method Blanks		X		X		
B. Trip Blanks					X	
C. Equipment Blanks					X	
Laboratory Control Sample (LCS) Accuracy (%R)		X		X		
Laboratory Control Sample Duplicate (LCSD) Accuracy (%R)		X		X		
LCS/LCSD Precision (RPD)		X		X		
Matrix Spike (MS) Accuracy (%R)		X		X		
Matrix Spike Duplicate (MSD) Accuracy (%R)		X		X		
MS/MSD Precision (RPD)		X		X		
Field/Laboratory Duplicate Sample RPD		X		X		
Surrogate Internal Standard Spike (%R)		X		X		
Recovery Surrogate Standard Spike (%R)		X		X		

%R – Percent Recovery
 RPD – Relative Percent Difference

Validation Performed By: Kylie Kegerreis

Date: July 21, 2015

Peer Review: Cassandra McCloud

Date: July 29, 2015

**ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
LABORATORY DATA REVIEW CHECKLIST**

Laboratory Data Review Checklist

Completed by:	Kylie Kegerreis		
Title:	Environmental Engineering Specialist	Date:	Jul 22, 2015
CS Report Name:	NPR Excavation	Report Date:	Jul 2, 2015
Consultant Firm:	ARCADIS US, Inc.		
Laboratory Name:	SGS North America, Inc.	Laboratory Report Number:	1158072
ADEC File Number:		ADEC RecKey Number:	

1. Laboratorya. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?
☒ Yes ☐ No ☐ NA (Please explain.) Comments:

Project-specific ADEC chemistry subgroup has approved SGS for sulfolane analysis. ADEC's website does not list sulfolane under the "Analytes" menu nor sulfolane analysis by isotope dilution under the "Methods" menu

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 ☒ NA (Please explain) Comments:
2. Chain of Custody (COC)

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

☒ Yes ☐ No ☐ NA (Please explain) Comments:

b. Correct analyses requested?

☒ Yes ☐ No ☐ NA (Please explain) Comments:
3. Laboratory Sample Receipt Documentationa. Sample/cooler temperature documented and within range at receipt ($4^{\circ} \pm 2^{\circ}$ C)?
☐ Yes ☐ No ☒ NA (Please explain) Comments:

"Chilled" and collected <8 hours ago

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

☒ Yes ☐ No ☐ NA (Please explain) Comments:

Samples maintained within acceptable temperature range. Additional preservation not required for sulfolane analysis

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

☒ Yes ☐ No ☐ NA (Please explain) Comments:

Samples in good condition - no leaks/cracks/breakage

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

☒ Yes ☐ No ☐ NA (Please explain) Comments:

"* Received container not recorded on the COC. Sample ID: LGB-F-5. Logged in as sample 1158072-011A"

e. Data quality or usability affected? (Please explain)

Comments:

N/A

4. Case Narrative

a. Present and understandable?

☒ Yes ☐ No ☐ NA (Please explain) Comments:

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

☒ Yes ☐ No ☐ NA (Please explain) Comments:

Samples "LGB-F-8" and "LGB-SW-11": Sulf-ion ratios for sulfolane outside QC criteria due to hydrocarbon interference.

c. Were all corrective actions documented?

☒ Yes ☐ No ☐ NA (Please explain) Comments:

Samples re-extracted by the sulfolane soil clean up method (LGB-F-8 and LGB-SW-11).

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

Comments:

None

5. Samples Results

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

b. All applicable holding times met?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

Hold times: Extraction w/in 14 days, Analysis w/in 40 days of extraction.
Collection date: 6/9/15
Prepped: 6/16/2015
Analyzed: 6/17/2015
Sample "LGB-F-8" re-extracted/re-analyzed (6/23/2015 / 6/25/2015)
Sample "LGB-SW-11" re-extracted/re-analyzed (6/23/2015 / 6/25/2015)

c. All soils reported on a dry weight basis?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

mg/kg

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

☐ Yes ☐ No ☒ NA (Please explain)

Comments:

A Cleanup Level has not been established for this site.

e. Data quality or usability affected? (Please explain)

Comments:

The following result was detected between the DL and LOQ and was qualified "J" to indicate trace detection: - LGB-F-6: Sulfolane 0.0116 J mg/kg

6. QC Samples

a. Method Blank

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

One method blank per extraction/analysis (total of 2 method blanks)

ii. All method blank results less than PQL?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

iii. If above PQL, what samples are affected?

Comments:

N/A

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

☐ Yes ☐ No ☐ NA (Please explain)

Comments:

N/A

v. Data quality or usability affected? (Please explain)

Comments:

Not affected due to method blank

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 ☐ NA (Please explain)

Comments:

One LCS/LCSD per extraction/analysis (total of 2 LCS and 1 LCSD)

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

☐ Yes ☐ No ☒ NA (Please explain)

Comments:

No Metals/Inorganics analysis

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 ☐ NA (Please explain)

Comments:

LCS %R = 93%

LCS/LCSD %R = 87/85%

Control Limits = 70 - 120%

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/DMSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

LCS/LCSD RPD = 3.10 (Control Limits = < 20)

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

Comments:

N/A, %R and RPD within acceptable limits

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

☐ Yes ☒ No ☐ NA (Please explain)

Comments:

vii. Data quality or usability affected? (Please explain)

Comments:

c. Surrogates - Organics Only

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

☒ Yes ☐ No ☐ NA (Please explain)

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 ☐ NA (Please explain)

Comments:

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

☐ Yes ☐ No ☒ NA (Please explain)

Comments:

No failed surrogate recoveries

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

Comments:

N/A, surrogate recoveries within acceptable limits

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 ☒ NA (Please explain.)

Comments:

Not required for sulfolane (SVOC)

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 ☒ NA (Please explain.)

Comments:

Trip blank not required.

iii. All results less than PQL?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Trip blank not required.

iv. If above PQL, what samples are affected?

Comments:

N/A

v. Data quality or usability affected? (Please explain.)

Comments:

N/A

e. Field Duplicate

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

BD-3 = duplicate of LGB-F-5

BD-4 = duplicate of LGB-SW-14

ii. Submitted blind to lab?

☒ Yes ☐ No ☐ NA (Please explain.)

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 ☐ NA (Please explain)

Comments:

LGB-F-5 / BD-3: RPD = 19%

LGB-SW-14 / BD-4: Difference between 2 samples is used when concentration is less than 5 times the LOQ

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

☐ Yes ☒ No ☐ NA (Please explain)

Comments:

Not affected because all RPD/differences are less than specified DQOs

- f. Decontamination or Equipment Blank (if applicable)

☐ Yes ☐ No ☒ NA (Please explain)

Comments:

Equipment blank not collected

- i. All results less than PQL?

☐ Yes ☐ No ☒ NA (Please explain)

Comments:

Equipment blank not collected

- ii. If above PQL, what samples are affected?

Comments:

N/A

- iii. Data quality or usability affected? (Please explain.)

Comments:

N/A

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

- a. Defined and appropriate?

☐ Yes ☐ No ☒ NA (Please explain)

Comments:

**CHAIN OF CUSTODY /
LABORATORY QUALIFIERS /
CORRECTED SAMPLE ANALYSIS DATA SHEETS**

Laboratory Report of Analysis

To: Flint Hills Resources- North Pole
1100 H & H Lane
North Pole, AK 99705
(907)488-0723

Report Number: **1158072**

Client Project: **NPR Excavation**

Dear Loren Garner,

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 Jennifer 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.

Jennifer Dawkins
Project Manager

Date

Case Narrative

SGS Client: **Flint Hills Resources- North Pole**

SGS Project: **1158072**

Project Name/Site: **NPR Excavation**

Project Contact: **Loren Garner**

Refer to sample receipt form for information on sample condition.

LGB-F-8 (1158072003) PS

1625B Sulf - Ion ratios for sulfolane are outside QC criteria due to hydrocarbon interference. Sample was re-extracted by the sulfolane soil clean up method.

LGB-SW-11 (1158072007) PS

1625B Sulf - Ion ratios for sulfolane are outside QC criteria due to hydrocarbon interference. Sample was re-extracted by the sulfolane soil clean up method.

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

Print Date: 07/01/2015 4:47:45PM

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, indemnification 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, 8021B, 8082A, 8260B, 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	Continuing Calibration Verification
CCCV	Closing Continuing Calibration Verification
CL	Control Limit
D	The analyte concentration is the result of a dilution.
DF	Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
F	Indicates value that is greater than or equal to the DL
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
JL	The analyte was positively identified, but the quantitation is a low estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
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
M	A matrix effect was present.
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
Q	QC parameter out of acceptance range.
R	Rejected
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.

Sample Summary

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Collected</u>	<u>Received</u>	<u>Matrix</u>
LGB-F-6	1158072001	06/09/2015	06/12/2015	Soil/Solid (dry weight)
LGB-F-7	1158072002	06/09/2015	06/12/2015	Soil/Solid (dry weight)
LGB-F-8	1158072003	06/09/2015	06/12/2015	Soil/Solid (dry weight)
LGB-SW-8	1158072004	06/09/2015	06/12/2015	Soil/Solid (dry weight)
LGB-SW-9	1158072005	06/09/2015	06/12/2015	Soil/Solid (dry weight)
LGB-SW-10	1158072006	06/09/2015	06/12/2015	Soil/Solid (dry weight)
LGB-SW-11	1158072007	06/09/2015	06/12/2015	Soil/Solid (dry weight)
LGB-SW-12	1158072008	06/09/2015	06/12/2015	Soil/Solid (dry weight)
LGB-SW-13	1158072009	06/09/2015	06/12/2015	Soil/Solid (dry weight)
LGB-SW-14	1158072010	06/09/2015	06/12/2015	Soil/Solid (dry weight)
LGB-F-5	1158072011	06/09/2015	06/12/2015	Soil/Solid (dry weight)
BD-3	1158072012	06/09/2015	06/12/2015	Soil/Solid (dry weight)
BD-4	1158072013	06/09/2015	06/12/2015	Soil/Solid (dry weight)

Method

SM21 2540G

Sulfolane-SW8270D M w/IsoDI 5

Method Description

Percent Solids SM2540G

Sulfolane SW8270D-M w/IsoDil(S)

Detectable Results Summary

Client Sample ID: **LGB-F-6**
 Lab Sample ID: 1158072001
Semivolatile Organic GC/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Sulfolane	0.0116J	mg/Kg

Client Sample ID: **LGB-F-7**
 Lab Sample ID: 1158072002
Semivolatile Organic GC/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Sulfolane	0.0203	mg/Kg

Client Sample ID: **LGB-F-8**
 Lab Sample ID: 1158072003
Semivolatile Organic GC/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Sulfolane	0.0125	mg/Kg
Sulfolane	0.0122	mg/Kg

Client Sample ID: **LGB-SW-11**
 Lab Sample ID: 1158072007
Semivolatile Organic GC/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Sulfolane	0.0630	mg/Kg

Client Sample ID: **LGB-F-5**
 Lab Sample ID: 1158072011
Semivolatile Organic GC/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Sulfolane	0.0557	mg/Kg

Client Sample ID: **BD-3**
 Lab Sample ID: 1158072012
Semivolatile Organic GC/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Sulfolane	0.0673	mg/Kg



Results of LGB-F-6

Client Sample ID: **LGB-F-6**
Client Project ID: **NPR Excavation**
Lab Sample ID: 1158072001
Lab Project ID: 1158072

Collection Date: 06/09/15 13:20
Received Date: 06/12/15 08:50
Matrix: Soil/Solid (dry weight)
Solids (%):77.2
Location:

Results by Semivolatile Organic GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	0.0116 J	0.0129	0.00399	mg/Kg	1		06/17/15 19:21
Surrogates							
Sulfolane-d8	73	50-120		%	1		06/17/15 19:21

Batch Information

Analytical Batch: XMS8715
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Analyst: DSH
Analytical Date/Time: 06/17/15 19:21
Container ID: 1158072001-A

Prep Batch: XXX33308
Prep Method: SW3550C
Prep Date/Time: 06/16/15 21:17
Prep Initial Wt./Vol.: 30.215 g
Prep Extract Vol: 1 mL



Results of LGB-F-7

Client Sample ID: **LGB-F-7**
Client Project ID: **NPR Excavation**
Lab Sample ID: 1158072002
Lab Project ID: 1158072

Collection Date: 06/09/15 13:25
Received Date: 06/12/15 08:50
Matrix: Soil/Solid (dry weight)
Solids (%):81.7
Location:

Results by Semivolatile Organic GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	0.0203	0.0122	0.00379	mg/Kg	1		06/17/15 19:46
Surrogates							
Sulfolane-d8	70.1	50-120		%	1		06/17/15 19:46

Batch Information

Analytical Batch: XMS8715
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Analyst: DSH
Analytical Date/Time: 06/17/15 19:46
Container ID: 1158072002-A

Prep Batch: XXX33308
Prep Method: SW3550C
Prep Date/Time: 06/16/15 21:17
Prep Initial Wt./Vol.: 30.062 g
Prep Extract Vol: 1 mL

Results of LGB-F-8

Client Sample ID: **LGB-F-8**
 Client Project ID: **NPR Excavation**
 Lab Sample ID: 1158072003
 Lab Project ID: 1158072

Collection Date: 06/09/15 13:30
 Received Date: 06/12/15 08:50
 Matrix: Soil/Solid (dry weight)
 Solids (%):87.6
 Location:

Results by Semivolatile Organic GC/MS

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Sulfolane	0.0125	0.0113	0.00352	mg/Kg	1		06/17/15 20:11
Sulfolane	0.0122	0.0114	0.00354	mg/Kg	1		06/25/15 22:09
Surrogates							
Sulfolane-d8	43.5	40-100		%	1		06/25/15 22:09
Sulfolane-d8	75.6	50-120		%	1		06/17/15 20:11

Batch Information

Analytical Batch: XMS8715
 Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
 Analyst: DSH
 Analytical Date/Time: 06/17/15 20:11
 Container ID: 1158072003-A

Prep Batch: XXX33308
 Prep Method: SW3550C
 Prep Date/Time: 06/16/15 21:17
 Prep Initial Wt./Vol.: 30.199 g
 Prep Extract Vol: 1 mL

Analytical Batch: XMS8735
 Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
 Analyst: DSH
 Analytical Date/Time: 06/25/15 22:09
 Container ID: 1158072003-A

Prep Batch: XXX33360
 Prep Method: SW3520C + Water Ext for Soils
 Prep Date/Time: 06/23/15 10:33
 Prep Initial Wt./Vol.: 60 g
 Prep Extract Vol: 1 mL



Results of LGB-SW-8

Client Sample ID: **LGB-SW-8**
Client Project ID: **NPR Excavation**
Lab Sample ID: 1158072004
Lab Project ID: 1158072

Collection Date: 06/09/15 13:35
Received Date: 06/12/15 08:50
Matrix: Soil/Solid (dry weight)
Solids (%):90.7
Location:

Results by Semivolatile Organic GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	0.00545 U	0.0109	0.00338	mg/Kg	1		06/18/15 02:52
Surrogates							
Sulfolane-d8	76.8	50-120		%	1		06/18/15 02:52

Batch Information

Analytical Batch: XMS8715
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Analyst: DSH
Analytical Date/Time: 06/18/15 02:52
Container ID: 1158072004-A

Prep Batch: XXX33308
Prep Method: SW3550C
Prep Date/Time: 06/16/15 21:17
Prep Initial Wt./Vol.: 30.286 g
Prep Extract Vol: 1 mL



Results of LGB-SW-9

Client Sample ID: **LGB-SW-9**
Client Project ID: **NPR Excavation**
Lab Sample ID: 1158072005
Lab Project ID: 1158072

Collection Date: 06/09/15 13:40
Received Date: 06/12/15 08:50
Matrix: Soil/Solid (dry weight)
Solids (%):89.1
Location:

Results by Semivolatile Organic GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	0.00555 U	0.0111	0.00343	mg/Kg	1		06/17/15 20:36
Surrogates							
Sulfolane-d8	68.9	50-120		%	1		06/17/15 20:36

Batch Information

Analytical Batch: XMS8715
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Analyst: DSH
Analytical Date/Time: 06/17/15 20:36
Container ID: 1158072005-A

Prep Batch: XXX33308
Prep Method: SW3550C
Prep Date/Time: 06/16/15 21:17
Prep Initial Wt./Vol.: 30.459 g
Prep Extract Vol: 1 mL



Results of LGB-SW-10

Client Sample ID: **LGB-SW-10**
Client Project ID: **NPR Excavation**
Lab Sample ID: 1158072006
Lab Project ID: 1158072

Collection Date: 06/09/15 13:45
Received Date: 06/12/15 08:50
Matrix: Soil/Solid (dry weight)
Solids (%):91.3
Location:

Results by Semivolatile Organic GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	0.00545 U	0.0109	0.00338	mg/Kg	1		06/17/15 21:01
Surrogates							
Sulfolane-d8	70.2	50-120		%	1		06/17/15 21:01

Batch Information

Analytical Batch: XMS8715
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Analyst: DSH
Analytical Date/Time: 06/17/15 21:01
Container ID: 1158072006-A

Prep Batch: XXX33308
Prep Method: SW3550C
Prep Date/Time: 06/16/15 21:17
Prep Initial Wt./Vol.: 30.16 g
Prep Extract Vol: 1 mL

Results of LGB-SW-11

Client Sample ID: **LGB-SW-11**
 Client Project ID: **NPR Excavation**
 Lab Sample ID: 1158072007
 Lab Project ID: 1158072

Collection Date: 06/09/15 13:50
 Received Date: 06/12/15 08:50
 Matrix: Soil/Solid (dry weight)
 Solids (%):82.8
 Location:

Results by Semivolatile Organic GC/MS

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Sulfolane	0.0030	0.0121	0.00374	mg/Kg	1		06/18/15 03:17
Sulfolane	0.00605 U	0.0121	0.00374	mg/Kg	1		06/25/15 22:34
Surrogates							
Sulfolane-d8	46.8	40-100		%	1		06/25/15 22:34
Sulfolane-d8	68.1	50-120		%	1		06/18/15 03:17

Batch Information

Analytical Batch: XMS8715
 Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
 Analyst: DSH
 Analytical Date/Time: 06/18/15 03:17
 Container ID: 1158072007-A

Prep Batch: XXX33308
 Prep Method: SW3550C
 Prep Date/Time: 06/16/15 21:17
 Prep Initial Wt./Vol.: 30.046 g
 Prep Extract Vol: 1 mL

Analytical Batch: XMS8735
 Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
 Analyst: DSH
 Analytical Date/Time: 06/25/15 22:34
 Container ID: 1158072007-A

Prep Batch: XXX33360
 Prep Method: SW3520C + Water Ext for Soils
 Prep Date/Time: 06/23/15 10:33
 Prep Initial Wt./Vol.: 60 g
 Prep Extract Vol: 1 mL



Results of LGB-SW-12

Client Sample ID: **LGB-SW-12**
Client Project ID: **NPR Excavation**
Lab Sample ID: 1158072008
Lab Project ID: 1158072

Collection Date: 06/09/15 13:55
Received Date: 06/12/15 08:50
Matrix: Soil/Solid (dry weight)
Solids (%):94.7
Location:

Results by Semivolatile Organic GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	0.00525 U	0.0105	0.00325	mg/Kg	1		06/17/15 21:26
Surrogates							
Sulfolane-d8	78.2	50-120		%	1		06/17/15 21:26

Batch Information

Analytical Batch: XMS8715
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Analyst: DSH
Analytical Date/Time: 06/17/15 21:26
Container ID: 1158072008-A

Prep Batch: XXX33308
Prep Method: SW3550C
Prep Date/Time: 06/16/15 21:17
Prep Initial Wt./Vol.: 30.189 g
Prep Extract Vol: 1 mL



Results of LGB-SW-13

Client Sample ID: **LGB-SW-13**
Client Project ID: **NPR Excavation**
Lab Sample ID: 1158072009
Lab Project ID: 1158072

Collection Date: 06/09/15 14:00
Received Date: 06/12/15 08:50
Matrix: Soil/Solid (dry weight)
Solids (%):91.4
Location:

Results by Semivolatile Organic GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	0.00545 U	0.0109	0.00337	mg/Kg	1		06/18/15 03:42
Surrogates							
Sulfolane-d8	70.2	50-120		%	1		06/18/15 03:42

Batch Information

Analytical Batch: XMS8715
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Analyst: DSH
Analytical Date/Time: 06/18/15 03:42
Container ID: 1158072009-A

Prep Batch: XXX33308
Prep Method: SW3550C
Prep Date/Time: 06/16/15 21:17
Prep Initial Wt./Vol.: 30.219 g
Prep Extract Vol: 1 mL



Results of LGB-SW-14

Client Sample ID: **LGB-SW-14**
Client Project ID: **NPR Excavation**
Lab Sample ID: 1158072010
Lab Project ID: 1158072

Collection Date: 06/09/15 14:05
Received Date: 06/12/15 08:50
Matrix: Soil/Solid (dry weight)
Solids (%):94.6
Location:

Results by Semivolatile Organic GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	0.00525 U	0.0105	0.00325	mg/Kg	1		06/17/15 21:52
Surrogates							
Sulfolane-d8	76	50-120		%	1		06/17/15 21:52

Batch Information

Analytical Batch: XMS8715
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Analyst: DSH
Analytical Date/Time: 06/17/15 21:52
Container ID: 1158072010-A

Prep Batch: XXX33308
Prep Method: SW3550C
Prep Date/Time: 06/16/15 21:17
Prep Initial Wt./Vol.: 30.28 g
Prep Extract Vol: 1 mL



Results of LGB-F-5

Client Sample ID: **LGB-F-5**
Client Project ID: **NPR Excavation**
Lab Sample ID: 1158072011
Lab Project ID: 1158072

Collection Date: 06/09/15 13:20
Received Date: 06/12/15 08:50
Matrix: Soil/Solid (dry weight)
Solids (%):82.7
Location:

Results by Semivolatile Organic GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	0.0557	0.0120	0.00371	mg/Kg	1		06/17/15 22:17
Surrogates							
Sulfolane-d8	70.4	50-120		%	1		06/17/15 22:17

Batch Information

Analytical Batch: XMS8715
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Analyst: DSH
Analytical Date/Time: 06/17/15 22:17
Container ID: 1158072011-A

Prep Batch: XXX33308
Prep Method: SW3550C
Prep Date/Time: 06/16/15 21:17
Prep Initial Wt./Vol.: 30.339 g
Prep Extract Vol: 1 mL



Results of **BD-3**

Client Sample ID: **BD-3**
Client Project ID: **NPR Excavation**
Lab Sample ID: 1158072012
Lab Project ID: 1158072

Collection Date: 06/09/15 13:20
Received Date: 06/12/15 08:50
Matrix: Soil/Solid (dry weight)
Solids (%):83.6
Location:

Results by **Semivolatile Organic GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	0.0673	0.0119	0.00368	mg/Kg	1		06/17/15 22:42
Surrogates							
Sulfolane-d8	69.5	50-120		%	1		06/17/15 22:42

Batch Information

Analytical Batch: XMS8715
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Analyst: DSH
Analytical Date/Time: 06/17/15 22:42
Container ID: 1158072012-A

Prep Batch: XXX33308
Prep Method: SW3550C
Prep Date/Time: 06/16/15 21:17
Prep Initial Wt./Vol.: 30.194 g
Prep Extract Vol: 1 mL

Results of BD-4

Client Sample ID: **BD-4**
 Client Project ID: **NPR Excavation**
 Lab Sample ID: 1158072013
 Lab Project ID: 1158072

Collection Date: 06/09/15 13:20
 Received Date: 06/12/15 08:50
 Matrix: Soil/Solid (dry weight)
 Solids (%):95.9
 Location:

Results by Semivolatile Organic GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	0.00520 U	0.0104	0.00323	mg/Kg	1		06/17/15 23:07
Surrogates							
Sulfolane-d8	81.8	50-120		%	1		06/17/15 23:07

Batch Information

Analytical Batch: XMS8715
 Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
 Analyst: DSH
 Analytical Date/Time: 06/17/15 23:07
 Container ID: 1158072013-A

Prep Batch: XXX33308
 Prep Method: SW3550C
 Prep Date/Time: 06/16/15 21:17
 Prep Initial Wt./Vol.: 30.037 g
 Prep Extract Vol: 1 mL



SGS North America
CHAIN OF CUSTODY FORM

1158072



Locations Nationwide
Alaska
New Jersey
North Carolina
West Virginia
Maryland
New York
Indiana
Kentucky
www.us.sgs.com

Instructions: Sections 1 - 5 must be filled out. Omissions may delay the onset of analysis.										Preservative										Page 1 of 2	
Section 1										Section 3										Section 4	
CLIENT: <i>Flint Hills Resources</i>										CONTACT: <i>Loren Garner</i>										Section 4	
PROJECT NAME: <i>NPR Excavation</i>										PHONE NO: <i>907.488.5122</i>										Cooler ID:	
REPORTS TO: <i>Rebecca Andresen</i>										E-MAIL: <i>Rebecca.Andresen@us.sgs.com</i>										Requested Turnaround Time and/or Special Instructions:	
INVOICE TO: <i>Flint Hills Resources</i>										QUOTE #: <i></i>										Temp Blank °C: <i>Chilled</i>	
P.O. #: <i></i>										P.O. #: <i></i>										or Ambient []	
RESERVED for lab use										Type										Chain of Custody Seal: (Circle)	
SAMPLE IDENTIFICATION										#										INTACT	
DATE										C O N T A I N E R S										BROKEN	
TIME										C = COMP G = GRAB MI = Multi-Incremental Soils										ABSENT	
MATRIX CODE										Soil										(See attached Sample Receipt Form)	
① A LGB-F-6										06/09/15 13:20										Soil	X
② A LGB-F-7										06/09/15 13:25										Soil	X
③ A LGB-F-8										06/09/15 13:30										Soil	X
④ A LGB-SW-8										06/09/15 13:35										Soil	X
⑤ A LGB-SW-9										06/09/15 13:40										Soil	X
⑥ A LGB-SW-10										06/09/15 13:45										Soil	X
⑦ A LGB-SW-11										06/09/15 13:50										Soil	X
⑧ A LGB-SW-12										06/09/15 13:55										Soil	X
⑨ A LGB-SW-13										06/09/15 14:00										Soil	X
⑩ A LGB-SW-14										06/09/15 14:05										Soil	X
Relinquished By: (1) <i>Rebecca Andresen</i>										Received By: <i>06-10-15</i>										Data Deliverable Requirements:	
Relinquished By: (2) <i>Rebecca Andresen</i>										Received By: <i>06-10-15 0800</i>										Data Deliverable Requirements:	
Relinquished By: (3) <i>Rebecca Andresen</i>										Received By: <i>06-10-15 1200</i>										Data Deliverable Requirements:	
Relinquished By: (4) <i>Rebecca Andresen</i>										Received By: <i>06-12-15 0850</i>										Data Deliverable Requirements:	

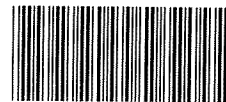


1158072

Locations Nationwide
Alaska
New Jersey
North Carolina
West Virginia
Maryland
New York
Indiana
Kentucky
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SGS North America
CHAIN OF CUSTODY F

CLIENT: <i>Flint Hills Resources</i>		Instructions: Sections 1 - 5 must be filled out. Omissions may delay the onset of analysis.		Page <u>2</u> of <u>2</u>	
CONTACT: <i>Loren Garner</i>		Section 3		Preservative	
PHONE NO: <i>907.488.5122</i>		Section 4		Data Deliverable Requirements:	
PROJECT PWSID/ PERMIT#: <i>NPR Excavation</i>		Cooler ID: <i>6-10-15</i>		Requested Turnaround Time and/or Special Instructions:	
REPORTS TO: <i>Rebecca Andresen</i>		Received By: <i>[Signature]</i>		Temp Blank °C: <i>Chilled</i>	
E-MAIL: <i>Rebecca.Andresen@flinthills.com</i>		Received By: <i>[Signature]</i>		Chain of Custody Seal: (Circle) <i>INTACT</i> BROKEN ABSENT	
INVOICE TO: <i>Flint Hills Resources</i>		Received By: <i>[Signature]</i>		(See attached Sample Receipt Form)	
QUOTE #: <i>P.O. #:</i>		Received By: <i>[Signature]</i>		(See attached Sample Receipt Form)	
RESERVED for lab use		Date		Time	
SAMPLE IDENTIFICATION		DATE mm/dd/yy		TIME HH:MM	
MATRIX/ MATRIX CODE		DATE mm/dd/yy		TIME HH:MM	
BD -3		06/09/15		0600	
BD -4		06/09/15		1400	
D.C. 06/12/15					
Relinquished By: (1) <i>[Signature]</i>		Date		Time	
Relinquished By: (2) <i>[Signature]</i>		Date		Time	
Relinquished By: (3) <i>[Signature]</i>		Date		Time	
Relinquished By: (4) <i>[Signature]</i>		Date		Time	
Section 5		Section 2		Section 1	



FAIRBANKS SAMPLE RECEIPT FORM

Note: This form is to be completed by Fairbanks Receiving Staff for all samples

Review Criteria:	Condition:	Comments/Actions Taken
Were custody seals intact? Note # & location, if applicable. COC accompanied samples?	<input checked="" type="radio"/> Yes No N/A <input checked="" type="radio"/> Yes No N/A	<input type="checkbox"/> Exemption permitted if sampler hand carries/delivers.
Temperature blank compliant* (i.e., 0-6°C) If >6°C, were samples collected <8 hours ago? If <0°C, were all sample containers ice free? Cooler ID: _____ @ _____ w/Therm. ID: _____ Cooler ID: _____ @ _____ w/Therm. ID: _____ Cooler ID: _____ @ _____ w/Therm. ID: _____ Cooler ID: _____ @ _____ w/Therm. ID: _____ Cooler ID: _____ @ _____ w/Therm. ID: _____ If samples are received without a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank and "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"	Yes No Yes No <input checked="" type="radio"/> N/A Yes No <input checked="" type="radio"/> N/A <i>Samples chilled.</i>	<input type="checkbox"/> Exemption permitted if chilled & collected <8hrs ago <i>Proceed w/analysis, per client. SABP-</i> <i>Note: Identify containers received at non-compliant temperature. Use form FS-0029 if more space is needed.</i>
Delivery Method: <u>Client</u> (hand carried) Other: _____	Tracking/AB# : _____ Or see attached <u>Or N/A</u>	
→ For samples received with payment, note amount (\$) and whether cash / check / CC (circle one) was received.		
Were samples in good condition (no leaks/cracks/breakage)? Packing material used (specify all that apply): Bubble Wrap Separate plastic bags Vermiculite Other: _____	<input checked="" type="radio"/> Yes No N/A	<i>Note: some samples are sent to Anchorage without inspection by SGS Fairbanks personnel.</i>
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	Yes No <input checked="" type="radio"/> N/A	
For RUSH/SHORT Hold Time , were COC/Bottles flagged accordingly? Was Rush/Short HT email sent, if applicable?	Yes No <input checked="" type="radio"/> N/A Yes No <input checked="" type="radio"/> N/A	
Additional notes (if applicable):		
<i>Note to Client: any "no" circled above indicates non-compliance with standard procedures and may impact data quality.</i>		



1158072



SAMPLE RECEIPT FORM

Review Criteria:	Yes	N/A	No	Comments/Action Taken:
Were custody seals intact? Note # & location, if applicable. COC accompanied samples?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>Exemption permitted if sampler hand carries/delivers.</i> 1F, 1B
Temperature blank compliant* (i.e., 0-6°C after CF)? If >6°C, were samples collected <8 hours ago? If <0°C, were all sample containers ice free?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>Exemption permitted if chilled & collected <8 hrs ago.</i>
Cooler ID: ¹ _____ @ 0.7 _____ w/ Therm.ID: #200 Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ If samples are received <u>without</u> 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 <u>nor</u> cooler temp can be obtained, note "ambient" or "chilled."	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<i>Note: Identify containers received at non-compliant temperature. Use form FS-0029 if more space is needed.</i>
Delivery method (specify all that apply): <input type="checkbox"/> Client (hand carried) <input type="checkbox"/> USPS <input checked="" type="checkbox"/> Lynden <input type="checkbox"/> AK Air <input type="checkbox"/> Alert Courier <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> RAVN <input type="checkbox"/> C&D Delivery <input type="checkbox"/> Carlie <input type="checkbox"/> Pen Air <input type="checkbox"/> Warp Speed <input type="checkbox"/> Other: _____ → For WO# with airbills, was the WO# & airbill info recorded in the Front Counter eLog?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	Yes	N/A	No	
Were samples received within hold time? Do samples match COC* (i.e., sample IDs, dates/times collected)? Were analyses requested unambiguous?	<input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	<i>Note: Refer to form F-083 "Sample Guide" for hold times.</i> <i>Note: If times differ <1hr, record details and login per COC.</i> *
Were samples in good condition (no leaks/cracks/breakage)? Packing material used (specify all that apply): <input checked="" type="checkbox"/> Bubble Wrap <input type="checkbox"/> Separate plastic bags <input type="checkbox"/> Vermiculite <input type="checkbox"/> Other:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were proper containers (type/mass/volume/preservative*) used? Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples? Were all VOA vials free of headspace (i.e., bubbles ≤6 mm)? Were all soil VOAs field extracted with MeOH+BFB?	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <i>Exemption permitted for metals (e.g., 200.8/6020A).</i>
For preserved waters (other than VOA vials, LL-Mercury or microbiological analyses), was pH verified and compliant ? If pH was adjusted, were bottles flagged (i.e., stickers)?	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	
For special handling (e.g., "MI" soils, foreign soils, lab filter for dissolved..., lab extract for volatiles, Ref Lab, limited volume), were bottles/paperwork flagged (e.g., sticker)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
For RUSH/SHORT Hold Time , were COC/Bottles flagged accordingly? Was Rush/Short HT email sent, if applicable?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
For SITE-SPECIFIC QC , e.g. BMS/BMSD/BDUP, were containers / paperwork flagged accordingly?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
For any question answered "No," has the PM been notified and the problem resolved (or paperwork put in their bin)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SRF Completed by: D.C 06/12/2015 PM notified: JAN
Was PEER REVIEW of <i>sample numbering/labeling completed</i> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Peer Reviewed by: VDL
Additional notes (if applicable): * Received container not recorded on the COC. Sample ID: LGB-F-5. Logged in as sample 1158072-011A.				
<i>Note to Client: Any "no" answer above indicates non-compliance with standard procedures and may impact data quality.</i>				

Sample Containers and Preservatives

<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>	<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>
1158072001-A	No Preservative Required	OK			
1158072002-A	No Preservative Required	OK			
1158072003-A	No Preservative Required	OK			
1158072004-A	No Preservative Required	OK			
1158072005-A	No Preservative Required	OK			
1158072006-A	No Preservative Required	OK			
1158072007-A	No Preservative Required	OK			
1158072008-A	No Preservative Required	OK			
1158072009-A	No Preservative Required	OK			
1158072010-A	No Preservative Required	OK			
1158072011-A	No Preservative Required	OK			
1158072012-A	No Preservative Required	OK			
1158072013-A	No Preservative Required	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 that an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.

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.

BU - The container was received with headspace greater than 6mm.

Flint Hill Resources Alaska, LLC

North Pole Refinery Site

Data Review

NORTH POLE, ALASKA

Sulfolane Analysis

SDG #: 1158076

Analyses Performed By:
SGS North America, Inc.
Wilmington, North Carolina

Review Level: Tier II
Project: B0081981.0084.00002

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #1158076 for samples collected in association with the North Pole Refinery site. The review was conducted as a Tier II evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis				
					VOC	SVOC	Sulfolane	MET	MISC
LGB-F-9	1158076001	Soil	6/10/2015				X		
LGB-SW-15	1158076002	Soil	6/10/2015				X		
LGB-SW-16	1158076003	Soil	6/10/2015				X		
BD-5	1158076004	Soil	6/10/2015				X		

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X	X		
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

QA - Quality Assurance

Note: Sulfolane analysis listed on COC, but boxes corresponding to each sample ID were not checked.

ORGANIC ANALYSIS INTRODUCTION

A United States Environmental Protection Agency (USEPA)-approved method does not exist for sulfolane. A method (Sulfolane-SW8270D M) has been developed with input from the Alaska Department of Environmental Conservation (ADEC) using USEPA-approved 8270D analytical method with SW846 preparation 3550C (Shannon & Wilson, Inc. 2015). Data were reviewed in accordance with USEPA National Functional Guidelines of June 2008 (USEPA 2008).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

- U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
- B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

- E The compound was quantitated above the calibration range.
- D Concentration is based on a diluted sample analysis.
- Q QC parameters outside of acceptance range.

- Validation Qualifiers

- J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
- JH The result is an estimated quantity, and may be biased high.
- JL The result is an estimated quantity, and may be biased low
- JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.
- UB Compound considered non-detect at the listed value due to associated blank contamination.
- UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
- R The sample results are rejected as unusable. The compound may or may not be present in the sample.

- * Qualifier applied by reviewer.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

SULFOLANE ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8270D	Soil	14 days from collection to extraction and 40 days from extraction to analysis	Cool to <6 °C

The analyses that exceeded the holding are presented in the following table.

Sample Locations	Holding Time	Criteria
LGB-SW-15	Extraction Completed	20 Days

Sample results associated with sample locations analyzed by analytical method SW-846 8270D were qualified, as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed less than or equal to two times holding time	JL	UJ

2. Blank Contamination

Quality assurance (QA) blanks (i.e. laboratory method blanks and equipment rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the estimated detection limit (EDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Sulfolane was not detected at or above the limit of detection (LOD). All compound detections were not associated with blank contamination.

3. Surrogate Internal Standard Compounds

All field samples, blanks, LCS, and MS/MSD are spiked with surrogate internal standard compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique.

All surrogate internal standard recoveries were within the control limits, with the following exceptions:

Sample ID	Issue	Action	Re-Extraction Date	Re-Analysis Date
LGB-SW-15	m/z ratio outside QC criteria due to Hydrocarbon interference	Re-extract using Sulfolane Clean-up Method and Re-analyze	6/23/2015	6/26/2015
	Sulfolane-d8 recovery outside QC criteria		6/30/2015	7/1/2015
LGB-SW-16	m/z ratio outside QC criteria due to Hydrocarbon interference	Re-extract using Sulfolane Clean-up Method and Re-analyze	6/23/2015	6/26/2015
BD-5	m/z ratio outside QC criteria due to Hydrocarbon interference	Re-extract using Sulfolane Clean-up Method and Re-analyze	6/23/2015	6/26/2015

Qualification due to recoveries outside control limits was not required due to successful re-extraction using the sulfolane clean-up method.

4. Clean-up Recovery Surrogate Performance

All field samples, blanks, LCS, and MS/MSD are spiked with recovery surrogates prior to extract clean-up. Recovery surrogate acceptance criteria require that their calculated recoveries, S/N, m/z ratios, and relative retention times (RRTs) be within the method-specified acceptance limits.

Tier II data validation does not require verification of recovery surrogate. The case narrative did not mention any discrepancies, therefore, all recovery surrogate recoveries S/N, m/z ratios, and RRTs were within the control limits.

5. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The spiked compounds used in the MS/MSD analysis must exhibit recoveries within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS and MSD results must be within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of two or greater. Sample results associated with MS/MSD exceedances where the parent samples are not site-specific are not qualified.

The MS/MSD analysis exhibited recovery within the control limits for sulfolane

6. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD (also called Ongoing Precision and Recovery (OPR)) analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The spiked compounds used in the LCS/LCSD analysis must exhibit recoveries within the laboratory-established acceptance limits.

The LCS/LCSD analyses exhibited recoveries within the control limits for sulfolane.

7. Field Duplicate Sample Analysis

Field duplicate sample analysis is used to assess the precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices and 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. An RPD will only be calculated if at least one of the sample results is above the Limit of Quantitation (LOQ; synonymous with reporting limit).

Field duplicate samples are summarized in the table, below.

Sample ID / Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
LGB-SW-15 / BD-5	Sulfolane	0.00582 J	0.00620 J	AC

AC – Acceptable

J – The quantitation is an estimation.

All results for field duplicate samples were within control limits.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

9. System Performance and Overall Assessment

Shannon & Wilson, Inc. 2015. Data Validation Program Plan, Flint Hills Resources Alaska, LLC, North Pole, Alaska. June.

USEPA. 2008. National Functional Guidelines for Organic Methods Data Review. Guidance document, United States Environmental Protection Agency. June.

DATA VALIDATION CHECKLIST FOR SULFOLANE

Sulfolane: SW-846 8270D	Reported		Performance Acceptable		Not Required	
	No	Yes	No	Yes		
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)						
Tier II Validation						
Holding Times		X	X			
Reporting limits (units)		X		X		
Blanks						
A. Method Blanks		X		X		
B. Trip Blanks					X	
C. Equipment Blanks					X	
Laboratory Control Sample (LCS) Accuracy (%R)		X		X		
Laboratory Control Sample Duplicate (LCSD) Accuracy (%R)		X		X		
LCS/LCSD Precision (RPD)		X		X		
Matrix Spike (MS) Accuracy (%R)		X		X		
Matrix Spike Duplicate (MSD) Accuracy (%R)		X		X		
MS/MSD Precision (RPD)		X		X		
Field/Laboratory Duplicate Sample RPD		X		X		
Surrogate Internal Standard Spike (%R)		X	X			
Recovery Surrogate Standard Spike (%R)		X		X		

%R – Percent Recovery
 RPD – Relative Percent Difference

Validation Performed By: Kylie Kegerreis

Date: July 22, 2015

Peer Review: Cassandra McCloud

Date: July 30, 2015

**ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
LABORATORY DATA REVIEW CHECKLIST**

Laboratory Data Review Checklist

Completed by:	Kylie Kegerreis		
Title:	Environmental Engineering Specialist	Date:	Jul 22, 2015
CS Report Name:	NPR Excavation	Report Date:	Jul 8, 2015
Consultant Firm:	ARCADIS US, Inc.		
Laboratory Name:	SGS North America, Inc.	Laboratory Report Number:	1158076
ADEC File Number:		ADEC RecKey Number:	

1. Laboratory

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

☒ Yes ☐ No ☐ NA (Please explain.) Comments:

Project-specific ADEC chemistry subgroup has approved SGS for sulfolane analysis. ADEC's website does not list sulfolane under the "Analytes" menu nor sulfolane analysis by isotope dilution under the "Methods" menu

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 ☒ NA (Please explain) Comments:

2. Chain of Custody (COC)

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

☒ Yes ☐ No ☐ NA (Please explain) Comments:

b. Correct analyses requested?

☐ Yes ☒ No ☐ NA (Please explain) Comments:

Sulfolane analysis listed on COC but boxes corresponding to each sample ID not checked

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt ($4^{\circ} \pm 2^{\circ}$ C)?

☒ Yes ☐ No ☐ NA (Please explain) Comments:

Temperature = 4.2 °C

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

Samples maintained within acceptable temperature range. Additional preservation not required for sulfolane analysis

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

Samples in good condition - no leaks/cracks/breakage

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

☐ Yes ☐ No ☒ NA (Please explain)

Comments:

No discrepancies noted

e. Data quality or usability affected? (Please explain)

Comments:

N/A

4. Case Narrative

a. Present and understandable?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

Samples "LGB-SW-15", "LGB-SW-16", and "BD-5": Sulf-ion ratios for sulfolane outside QC criteria due to hydrocarbon interference.

c. Were all corrective actions documented?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

Samples re-extracted by the sulfolane soil clean up method (LGB-SW-15, LGB-SW-16, BD-5).

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

Comments:

LGB-SW-15 re-extracted a second time outside of hold time due to surrogate recovery outside QC criteria during 1st re-extraction. HT (14 days) < t (20 days) <= 2 x HT (28 days)

5. Samples Results

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

b. All applicable holding times met?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

Hold times: Extraction w/in 14 days, Analysis w/in 40 days of extraction.

Collection date: 6/10/15

Prepped: 6/16/2015

Analyzed: 6/17/2015

Sample "LGB-SW-15" re-extracted outside of hold time (re-extracted on 6/23 and 6/30/15)

c. All soils reported on a dry weight basis?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

mg/kg

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

☐ Yes ☐ No ☒ NA (Please explain)

Comments:

A Cleanup Level has not been established for this site.

e. Data quality or usability affected? (Please explain)

Comments:

The following results were detected between the DL and LOQ and were qualified "J" to indicate trace detection: - LGB-SW-15: Sulfolane 0.00582 J mg/kg, - LGB-SW-16: Sulfolane 0.00719 J mg/kg, - BD-5: Sulfolane 0.00620 J mg/kg

6. QC Samples

a. Method Blank

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

One method blank per extraction/analysis (total of 3 method blanks)

ii. All method blank results less than PQL?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

iii. If above PQL, what samples are affected?

Comments:

N/A

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

☐ Yes ☐ No ☐ NA (Please explain)

Comments:

N/A

v. Data quality or usability affected? (Please explain)

Comments:

Not affected due to method blank

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 ☐ NA (Please explain)

Comments:

One LCS/LCSD per extraction/analysis (total of 3 LCS and 2 LCS/LCSD)

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

☐ Yes ☐ No ☒ NA (Please explain)

Comments:

No Metals/Inorganics analysis

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 ☐ NA (Please explain)

Comments:

LCS %R = 93%

LCS/LCSD = 87 / 85%, 87 / 84%

Control Limits = 70 - 120%

MS/MSD (Sample ID: BD-5) = 95 / 93%

Control Limits = 60 - 140%

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/DMSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

LCS/LCSD RPD = 3.10, 3.10 (Control Limits = < 20)

MS/MSD RPD = 1.70 (Control Limits = < 25)

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

Comments:

N/A

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

☐ Yes ☒ No ☐ NA (Please explain)

Comments:

vii. Data quality or usability affected? (Please explain)

Comments:

N/A

c. Surrogates - Organics Only

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

☒ Yes ☐ No ☐ NA (Please explain)

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 ☐ NA (Please explain)

Comments:

Surrogate recovery for sample "LGB-SW-15" (33.6%) outside of lab control limits (40 - 100%) for first re-extraction/re-analysis.

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

Clearly marked by "*"

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

Comments:

No. For sample "LGB-SW-15" the failed surrogate applies to the first re-extraction/re-analysis. The surrogate for the 2nd re-extraction/re-analysis is within lab control limits.

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 ☒ NA (Please explain.)

Comments:

Not required for sulfolane (SVOC)

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 ☒ NA (Please explain.)

Comments:

Trip blank not required.

iii. All results less than PQL?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Trip blank not required.

iv. If above PQL, what samples are affected?

Comments:

N/A

v. Data quality or usability affected? (Please explain.)

Comments:

N/A

e. Field Duplicate

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

BD-5 = duplicate of LGB-SW-15

ii. Submitted blind to lab?

☒ Yes ☐ No ☐ NA (Please explain.)

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 ☐ NA (Please explain)

Comments:

If at least one of the sample results is above the LOQ, RPD is calculated. Sample/duplicate pair did not have a result above the LOQ.

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

☐ Yes

☒ No

☐ NA (Please explain)

Comments:

Not affected because all RPD/differences are less than specified DQOs

f. Decontamination or Equipment Blank (if applicable)

☐ Yes

☐ No

☒ NA (Please explain)

Comments:

Equipment blank not collected

i. All results less than PQL?

☐ Yes

☐ No

☒ NA (Please explain)

Comments:

Equipment blank not collected

ii. If above PQL, what samples are affected?

Comments:

N/A

iii. Data quality or usability affected? (Please explain.)

Comments:

N/A

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

a. Defined and appropriate?

☐ Yes

☐ No

☒ NA (Please explain)

Comments:

Reset Form

**CHAIN OF CUSTODY /
LABORATORY QUALIFIERS /
CORRECTED SAMPLE ANALYSIS DATA SHEETS**

Laboratory Report of Analysis

To: Flint Hills Resources- North Pole
1100 H & H Lane
North Pole, AK 99705
(907)488-0723

Report Number: **1158076**

Client Project: **NPR Excavation**

Dear Loren Garner,

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 Jennifer 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.

Jennifer Dawkins
Project Manager

Date

Case Narrative

SGS Client: **Flint Hills Resources- North Pole**

SGS Project: **1158076**

Project Name/Site: **NPR Excavation**

Project Contact: **Loren Garner**

Refer to sample receipt form for information on sample condition.

LGB-SW-15 (1158076002) PS

1625B Sulf - Ion ratios for sulfolane are outside QC criteria due to hydrocarbon interference. Sample was re-extracted outside of hold time by the sulfolane soil clean up method.

1625B - Sulfolane-d8 recovery (34%) is outside QC criteria on the first sulfolane soil clean up method.

LGB-SW-16 (1158076003) PS

1625B Sulf - Ion ratios for sulfolane are outside QC criteria due to hydrocarbon interference. Sample was re-extracted by the sulfolane soil clean up method.

BD-5 (1158076004) PS

1625B Sulf - Ion ratios for sulfolane are outside QC criteria due to hydrocarbon interference. Sample was re-extracted by the sulfolane soil clean up method.

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

Print Date: 07/08/2015 10:22:57AM

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, indemnification and jurisdiction issues defined therein.

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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, 8021B, 8082A, 8260B, 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	Continuing Calibration Verification
CCCV	Closing Continuing Calibration Verification
CL	Control Limit
D	The analyte concentration is the result of a dilution.
DF	Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
F	Indicates value that is greater than or equal to the DL
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
JL	The analyte was positively identified, but the quantitation is a low estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
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
M	A matrix effect was present.
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
Q	QC parameter out of acceptance range.
R	Rejected
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.

Sample Summary

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Collected</u>	<u>Received</u>	<u>Matrix</u>
LGB-F-9	1158076001	06/10/2015	06/12/2015	Soil/Solid (dry weight)
LGB-SW-15	1158076002	06/10/2015	06/12/2015	Soil/Solid (dry weight)
LGB-SW-16	1158076003	06/10/2015	06/12/2015	Soil/Solid (dry weight)
BD-5	1158076004	06/10/2015	06/12/2015	Soil/Solid (dry weight)

<u>Method</u>	<u>Method Description</u>
SM21 2540G	Percent Solids SM2540G
Sulfolane-SW8270D M w/IsoDI 5	Sulfolane SW8270D-M w/IsoDil(S)

Print Date: 07/08/2015 10:22:58AM

Detectable Results Summary

Client Sample ID: **LGB-F-9**

Lab Sample ID: 1158076001

Semivolatile Organic GC/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Sulfolane	0.0192	mg/Kg

Client Sample ID: **LGB-SW-15**

Lab Sample ID: 1158076002

Semivolatile Organic GC/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Sulfolane	0.00787J	mg/Kg
Sulfolane	0.00623J	mg/Kg
Sulfolane	0.00582J	mg/Kg

Client Sample ID: **LGB-SW-16**

Lab Sample ID: 1158076003

Semivolatile Organic GC/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Sulfolane	0.0122J	mg/Kg
Sulfolane	0.00719J	mg/Kg

Client Sample ID: **BD-5**

Lab Sample ID: 1158076004

Semivolatile Organic GC/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Sulfolane	0.00950J	mg/Kg
Sulfolane	0.00620J	mg/Kg



Results of LGB-F-9

Client Sample ID: **LGB-F-9**
Client Project ID: **NPR Excavation**
Lab Sample ID: 1158076001
Lab Project ID: 1158076

Collection Date: 06/10/15 16:05
Received Date: 06/12/15 15:10
Matrix: Soil/Solid (dry weight)
Solids (%):73.6
Location:

Results by Semivolatile Organic GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	0.0192	0.0134	0.00417	mg/Kg	1		06/17/15 23:32
Surrogates							
Sulfolane-d8	66.3	50-120		%	1		06/17/15 23:32

Batch Information

Analytical Batch: XMS8715
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Analyst: DSH
Analytical Date/Time: 06/17/15 23:32
Container ID: 1158076001-A

Prep Batch: XXX33308
Prep Method: SW3550C
Prep Date/Time: 06/16/15 21:17
Prep Initial Wt./Vol.: 30.306 g
Prep Extract Vol: 1 mL

Results of LGB-SW-15

Client Sample ID: **LGB-SW-15**
 Client Project ID: **NPR Excavation**
 Lab Sample ID: 1158076002
 Lab Project ID: 1158076

Collection Date: 06/10/15 16:10
 Received Date: 06/12/15 15:10
 Matrix: Soil/Solid (dry weight)
 Solids (%):80.1
 Location:

Results by Semivolatile Organic GC/MS

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Sulfolane	0.00787 J	0.0124	0.00385	mg/Kg	1		06/17/15 23:57
Sulfolane	0.00623 J	0.0125	0.00387	mg/Kg	1		06/26/15 00:39
Sulfolane	0.00582 J JL	0.0125	0.00387	mg/Kg	1		07/01/15 01:13
Surrogates							
Sulfolane-d8	61.6	40-100		%	1		07/01/15 01:13
Sulfolane-d8	33.6 *	40-100		%	1		06/26/15 00:39
Sulfolane-d8	64.4	50-120		%	1		06/17/15 23:57

Batch Information

Analytical Batch: XMS8715
 Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
 Analyst: DSH
 Analytical Date/Time: 06/17/15 23:57
 Container ID: 1158076002-A

Prep Batch: XXX33308
 Prep Method: SW3550C
 Prep Date/Time: 06/16/15 21:17
 Prep Initial Wt./Vol.: 30.122 g
 Prep Extract Vol: 1 mL

Analytical Batch: XMS8736
 Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
 Analyst: DSH
 Analytical Date/Time: 06/26/15 00:39
 Container ID: 1158076002-A

Prep Batch: XXX33360
 Prep Method: SW3520C + Water Ext for Soils
 Prep Date/Time: 06/23/15 10:33
 Prep Initial Wt./Vol.: 60 g
 Prep Extract Vol: 1 mL

Analytical Batch: XMS8745
 Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
 Analyst: DSH
 Analytical Date/Time: 07/01/15 01:13
 Container ID: 1158076002-A

Prep Batch: XXX33419
 Prep Method: SW3520C + Water Ext for Soils
 Prep Date/Time: 06/30/15 11:30
 Prep Initial Wt./Vol.: 60 g
 Prep Extract Vol: 1 mL



Results of LGB-SW-16

Client Sample ID: **LGB-SW-16**
Client Project ID: **NPR Excavation**
Lab Sample ID: 1158076003
Lab Project ID: 1158076

Collection Date: 06/10/15 16:15
Received Date: 06/12/15 15:10
Matrix: Soil/Solid (dry weight)
Solids (%):78.7
Location:

Results by Semivolatile Organic GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	0.0122 J	0.0126	0.00392	mg/Kg	1		06/18/15 02:27
Sulfolane	0.00719 J	0.0127	0.00394	mg/Kg	1		06/26/15 01:04
Surrogates							
Sulfolane-d8	46	40-100		%	1		06/26/15 01:04
Sulfolane-d8	70.6	50-120		%	1		06/18/15 02:27

Batch Information

Analytical Batch: XMS8715
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Analyst: DSH
Analytical Date/Time: 06/18/15 02:27
Container ID: 1158076003-A

Prep Batch: XXX33308
Prep Method: SW3550C
Prep Date/Time: 06/16/15 21:17
Prep Initial Wt./Vol.: 30.166 g
Prep Extract Vol: 1 mL

Analytical Batch: XMS8736
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Analyst: DSH
Analytical Date/Time: 06/26/15 01:04
Container ID: 1158076003-A

Prep Batch: XXX33360
Prep Method: SW3520C + Water Ext for Soils
Prep Date/Time: 06/23/15 10:33
Prep Initial Wt./Vol.: 60 g
Prep Extract Vol: 1 mL

Results of BD-5

Client Sample ID: **BD-5**
 Client Project ID: **NPR Excavation**
 Lab Sample ID: 1158076004
 Lab Project ID: 1158076

Collection Date: 06/10/15 16:05
 Received Date: 06/12/15 15:10
 Matrix: Soil/Solid (dry weight)
 Solids (%):80.5
 Location:

Results by Semivolatile Organic GC/MS

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Sulfolane	0.00950 J	0.0124	0.00384	mg/Kg	1		06/17/15 18:05
Sulfolane	0.00620 J	0.0124	0.00385	mg/Kg	1		06/26/15 01:29
Surrogates							
Sulfolane-d8	45.7	40-100		%	1		06/26/15 01:29
Sulfolane-d8	65.1	50-120		%	1		06/17/15 18:05

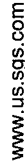
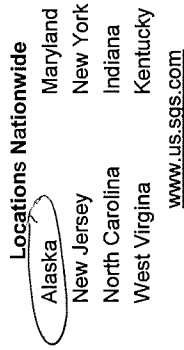
Batch Information

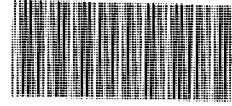
Analytical Batch: XMS8715
 Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
 Analyst: DSH
 Analytical Date/Time: 06/17/15 18:05
 Container ID: 1158076004-A

Prep Batch: XXX33308
 Prep Method: SW3550C
 Prep Date/Time: 06/16/15 21:17
 Prep Initial Wt./Vol.: 30.034 g
 Prep Extract Vol: 1 mL

Analytical Batch: XMS8736
 Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
 Analyst: DSH
 Analytical Date/Time: 06/26/15 01:29
 Container ID: 1158076004-A

Prep Batch: XXX33360
 Prep Method: SW3520C + Water Ext for Soils
 Prep Date/Time: 06/23/15 10:33
 Prep Initial Wt./Vol.: 60 g
 Prep Extract Vol: 1 mL





Note: This form is to be completed by Fairbanks Receiving Staff for all samples

Form F010r08_SRFforTransfers_revised_01052015
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[illegible]

Sample Containers and Preservatives

<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>	<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>
1158076001-A	No Preservative Required	OK			
1158076002-A	No Preservative Required	OK			
1158076003-A	No Preservative Required	OK			
1158076004-A	No Preservative Required	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 that an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.

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.

BU - The container was received with headspace greater than 6mm.

Flint Hill Resources Alaska, LLC

North Pole Refinery Site

Data Review

NORTH POLE, ALASKA

Gasoline Range Organics (AK101), Diesel Range Organics (AK102), and BTEX (8021B) Analyses

SDG #: 1158256

Analyses Performed By:
SGS North America, Inc.
Wilmington, North Carolina

Review Level: Tier II
Project: B0081981.0084.00002

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #1158256 for samples collected in association with the North Pole Refinery site. The review was conducted as a Tier II evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis				
					DRO	GRO	BTEX	MET	MISC
FTA-1-SW	1158256001	Soil	7/11/2015		X	X	X		
FTA-2-SW	1158256002	Soil	7/11/2015		X	X	X		
FTA-3-SW	1158256003	Soil	7/11/2015		X	X	X		
FTA-4-SW	1158256004	Soil	7/11/2015		X	X	X		
FTA-5-SW	1158256005	Soil	7/11/2015		X	X	X		
FTA-6-SW	1158256006	Soil	7/11/2015		X	X	X		
FTA-7-SW	1158256007	Soil	7/11/2015		X	X	X		
FTA-8-SW	1158256008	Soil	7/11/2015		X	X	X		
FTA-9-SW	1158256009	Soil	7/11/2015		X	X	X		
FTA-10-SW	1158256010	Soil	7/11/2015		X	X	X		
BD-1-FTA	1158256011	Soil	7/11/2015	FTA-1-SW	X	X	X		
Trip Blank	1158256012	Soil	7/11/2015			X	X		

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X	X		
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

QA - Quality Assurance

Note: For Lab Sample 1158256010, the container sample name "FTA-10-SW" did not match COC sample name "FTA-20-SW." The lab logged and reported the sample per the container name.

Note: Slight methanol loss was observed in trip blank. Results not impacted because all related results were not detected (no bias, no quals).

ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA)-SW-846 Method 8021B (benzene, toluene, ethylbenzene, and total xylenes [BTEX]) and Alaska Department of Environmental Conservation Methods AK101 (Gasoline Range Organics [GRO]) and AK102 (Diesel Range Organics [DRO]). Data were reviewed in accordance with USEPA National Functional Guidelines of June 2008 (USEPA 2008) and the Data-Validation Program Plan (Shannon & Wilson 2015)

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

- U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
- B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

- E The compound was quantitated above the calibration range.
- D Concentration is based on a diluted sample analysis.
- Q QC parameters outside of acceptance range.

- Validation Qualifiers

- J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
- JH The result is an estimated quantity, and may be biased high.
- JL The result is an estimated quantity, and may be biased low
- JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.
- UB Compound considered non-detect at the listed value due to associated blank contamination.
- UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
- R The sample results are rejected as unusable. The compound may or may not be present in the sample.

- * Qualifier applied by reviewer.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

VOLATILE ORGANIC COMPOUNDS (VOC) ANALYSIS - BENZENE, TOLUENE, ETHYLBENZENE, AND TOTAL XYLENES (BTEX)

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8021B	Soil	14 days from collection to analysis	Cool to <6 °C, Methanol

All analyses were completed within the specified holding time and were properly preserved.

2. Blank Contamination

Quality assurance (QA) blanks (i.e. laboratory method blanks and trip blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the estimated detection limit (EDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected at or above the limit of detection (LOD). All compound detections were not associated with blank contamination.

3. Surrogate Internal Standard Compounds

All field samples, blanks, LCS, and MS/MSD are spiked with surrogate internal standard compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. VOC analysis requires that all surrogates associated with the analysis exhibit recoveries within the method specified acceptance limits of 72 – 119%.

All surrogate internal standard recoveries were within the acceptance limits.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The spiked compounds used in the MS/MSD analysis must exhibit recoveries within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS and MSD results must be within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of two or greater. Sample results associated with MS/MSD exceedances where the parent samples are not site-specific are not qualified.

A project-specific MS/MSD sample was not analyzed in association with this dataset.

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD (also called Ongoing Precision and Recovery (OPR)) analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The spiked compounds used in the LCS/LCSD analysis must exhibit recoveries within the laboratory-established acceptance limits. The relative percent difference (RPD) between the LCS and LCSD results must be within the laboratory-established acceptance limit of 20%.

The LCS/LCSD analyses exhibited recoveries within the control limits for all compounds.

Sample locations associated with RPD analyses exhibiting recoveries outside of the control limits are presented in the following table.

Sample Location	Compound	RPD
FTA-1-SW FTA-2-SW FTA-3-SW FTA-4-SW FTA-5-SW FTA-6-SW FTA-7-SW FTA-8-SW FTA-9-SW FTA-10-SW BD-1-FTA Trip Blank	Ethylbenzene	> CL
FTA-1-SW FTA-2-SW FTA-3-SW FTA-4-SW FTA-5-SW FTA-6-SW FTA-7-SW FTA-8-SW FTA-9-SW FTA-10-SW BD-1-FTA Trip Blank	o-Xylene	> CL
FTA-1-SW FTA-2-SW FTA-3-SW FTA-4-SW FTA-5-SW FTA-6-SW FTA-7-SW FTA-8-SW FTA-9-SW FTA-10-SW BD-1-FTA Trip Blank	p&m – Xylene	> CL

CL Control Limit

The criteria used to evaluate the RPD recoveries are presented in the following table. In the case of any LCS/LCSD RPD deviations, the sample results are qualified as documented in the table below.

Criteria	Action	
	Detected Analytes	Not Detected Analytes
RPD \leq CL	No qualification	
RPD > CL	J	UJ

6. Laboratory Duplicate Sample Analysis

For select analyses, or when insufficient volume is submitted for analysis of an MS and MSD, the laboratory may analyze a project sample twice. The relative percent difference (RPD) between the parent sample and the laboratory duplicate sample is used to assess the precision of the analytical method.

The laboratory duplicate sample analysis was not performed on a sample location within this dataset.

7. Field Duplicate Sample Analysis

Field duplicate sample analysis is used to assess the precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices and 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. An RPD will only be calculated if at least one of the sample results is above the Limit of Quantitation (LOQ; synonymous with reporting limit).

Results (in $\mu\text{g/Kg}$) for the field duplicate samples are summarized in the table, below.

Sample ID / Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
FTA-1-SW / BD-1-FTA	Benzene	13.3 U	13.7 U	AC
	Ethylbenzene	26.6 U	27.3 U	AC
	o-Xylene	26.6 U	27.3 U	AC
	p&m-Xylene	53.0 U	54.5 U	AC
	Toluene	101	27.3 U	115%
	Total Xylenes	79.5 U	82.0 U	AC

AC – Acceptable

U – The analyte was analyzed for but not detected

The toluene results for field duplicate samples FTA-1-SW and BD-1-FTA exhibited an RPD greater than the control limit. The criteria used to evaluate the RPD recoveries are presented in the following table. The sample results are qualified as documented in the table below.

Criteria	Action	
	Detected Analytes	Not Detected Analytes
RPD \leq CL	No qualification	
RPD > CL	J	UJ

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

9. References

Shannon & Wilson, Inc. 2015. Data Validation Program Plan, Flint Hills Resources Alaska, LLC, North Pole, Alaska. June.

USEPA. 2008. National Functional Guidelines for Organic Methods Data Review. Guidance document, United States Environmental Protection Agency. June.

DATA VALIDATION CHECKLIST FOR VOCs

VOCs (BTEX): SW-846 8021B	Reported		Performance Acceptable		Not Required	
	No	Yes	No	Yes		
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)						
Tier II Validation						
Holding Times		X		X		
Reporting limits (units)		X		X		
Blanks						
A. Method Blanks		X		X		
B. Trip Blanks		X		X		
C. Equipment Blanks					X	
Laboratory Control Sample (LCS) Accuracy (%R)		X		X		
Laboratory Control Sample Duplicate (LCSD) Accuracy (%R)		X		X		
LCS/LCSD Precision (RPD)		X	X			
Matrix Spike (MS) Accuracy (%R)		X		X		
Matrix Spike Duplicate (MSD) Accuracy (%R)		X		X		
MS/MSD Precision (RPD)		X		X		
Field Duplicate Sample RPD		X	X			
Field/Laboratory Duplicate Sample RPD					X	
Surrogate Internal Standard Spike (%R)		X		X		

%R – Percent Recovery

RPD – Relative Percent Difference

GASOLINE RANGE ORGANICS (GRO) ANALYSIS

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
AK101	Soil	28 days from collection to analysis	Cool to <6 °C, Methanol

All analyses were completed within the specified holding time and were properly preserved.

2. Blank Contamination

Quality assurance (QA) blanks (i.e. laboratory method blanks and trip blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the estimated detection limit (EDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected at or above the limit of detection (LOD). All compound detections were not associated with blank contamination.

3. Surrogate Internal Standard Compounds

All field samples, blanks, LCS, and MS/MSD are spiked with surrogate internal standard compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. VOC analysis requires that all surrogates associated with the analysis exhibit recoveries within the method specified acceptance limits of 50 – 150%.

All surrogate internal standard recoveries were within the acceptance limits.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The spiked compounds used in the MS/MSD analysis must exhibit recoveries within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS and MSD results must be within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of two or greater. Sample results associated with MS/MSD exceedances where the parent samples are not site-specific are not qualified.

A MS/MSD sample was not analyzed in association with this dataset.

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD (also called Ongoing Precision and Recovery (OPR)) analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The spiked compounds used in the LCS/LCSD analysis must exhibit recoveries within the laboratory-established acceptance limits. The relative percent difference (RPD) between the LCS and LCSD results must be within the laboratory-established acceptance limit of 20%.

The LCS/LCSD analyses and associated RPD analysis exhibited recoveries were within the control limits for all compounds.

6. Laboratory Duplicate Sample Analysis

For select analyses, or when insufficient volume is submitted for analysis of an MS and MSD, the laboratory may analyze a project sample twice. The relative percent difference (RPD) between the parent sample and the laboratory duplicate sample is used to assess the precision of the analytical method.

The laboratory duplicate sample analysis was not performed on a sample location within this dataset.

7. Field Duplicate Sample Analysis

Field duplicate sample analysis is used to assess the precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices and 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. An RPD will only be calculated if at least one of the sample results is above the Limit of Quantitation (LOQ; synonymous with reporting limit).

Results (in mg/Kg) for the field duplicate samples are summarized in the table, below.

Sample ID / Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
FTA-1-SW / BD-1-FTA	GRO	2.65 U	2.73 U	AC

AC – Acceptable

GRO – gasoline range organics

U – The analyte was analyzed for but not detected

The calculated RPD between the parent sample and field duplicate was acceptable.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR GRO

GRO: AK101	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
D. Method Blanks		X		X	
E. Trip Blanks		X		X	
F. Equipment Blanks					X
Laboratory Control Sample (LCS) Accuracy (%R)		X		X	
Laboratory Control Sample Duplicate (LCSD) Accuracy (%R)		X		X	
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS) Accuracy (%R)					X
Matrix Spike Duplicate (MSD) Accuracy (%R)					X
MS/MSD Precision (RPD)					X
Field Duplicate Sample RPD		X		X	
Field/Laboratory Duplicate Sample RPD					X
Surrogate Internal Standard Spike (%R)		X		X	

%R – Percent Recovery

RPD – Relative Percent Difference

DIESEL RANGE ORGANICS (DRO) ANALYSIS

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
AK102	Soil	14 days from collection to extraction and 40 days from extraction to analysis	Cool to <6 °C

All analyses were completed within the specified holding time and were properly preserved.

2. Blank Contamination

Quality assurance (QA) blanks (i.e. laboratory method blanks and trip blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the estimated detection limit (EDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected at or above the limit of detection (LOD). All compound detections were not associated with blank contamination.

3. Surrogate Internal Standard Compounds

All field samples, blanks, LCS, and MS/MSD are spiked with surrogate internal standard compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. VOC analysis requires that all surrogates associated with the analysis exhibit recoveries within the method specified acceptance limits of 50 – 150%.

All surrogate internal standard recoveries were within the acceptance limits.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The spiked compounds used in the MS/MSD analysis must exhibit recoveries within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS and MSD results must be within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of two or greater. Sample results associated with MS/MSD exceedances where the parent samples are not site-specific are not qualified.

A MS/MSD sample was not analyzed in association with this dataset.

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD (also called Ongoing Precision and Recovery (OPR)) analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The spiked compounds used in the LCS/LCSD analysis must exhibit recoveries within the laboratory-established acceptance limits. The relative percent difference (RPD) between the LCS and LCSD results must be within the laboratory-established acceptance limit of 20%.

The LCS/LCSD analyses and associated RPD analysis exhibited recoveries were within the control limits for all compounds.

6. Laboratory Duplicate Sample Analysis

For select analyses, or when insufficient volume is submitted for analysis of an MS and MSD, the laboratory may analyze a project sample twice. The relative percent difference (RPD) between the parent sample and the laboratory duplicate sample is used to assess the precision of the analytical method.

The laboratory duplicate sample analysis was not performed on a sample location within this dataset.

7. Field Duplicate Sample Analysis

Field duplicate sample analysis is used to assess the precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices and 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. An RPD will only be calculated if at least one of the sample results is above the Limit of Quantitation (LOQ; synonymous with reporting limit).

Results (in mg/Kg) for the field duplicate samples are summarized in the table, below.

Sample ID / Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
FTA-1-SW / BD-1-FTA	DRO	10.3 U	10.2 U	AC

AC – Acceptable

DRO – diesel range organics

U – The analyte was analyzed for but not detected

The calculated RPD between the parent sample and field duplicate was acceptable.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

9. References

Shannon & Wilson, Inc. 2015. Data Validation Program Plan, Flint Hills Resources Alaska, LLC, North Pole, Alaska. June.

USEPA. 2008. National Functional Guidelines for Organic Methods Data Review. Guidance document, United States Environmental Protection Agency. June.

DATA VALIDATION CHECKLIST FOR DRO

DRO: AK102	Reported		Performance Acceptable		Not Required	
	No	Yes	No	Yes		
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)						
Tier II Validation						
Holding Times		X		X		
Reporting limits (units)		X		X		
Blanks						
G. Method Blanks		X		X		
H. Trip Blanks					X	
I. Equipment Blanks					X	
Laboratory Control Sample (LCS) Accuracy (%R)		X		X		
Laboratory Control Sample Duplicate (LCSD) Accuracy (%R)		X		X		
LCS/LCSD Precision (RPD)		X		X		
Matrix Spike (MS) Accuracy (%R)					X	
Matrix Spike Duplicate (MSD) Accuracy (%R)					X	
MS/MSD Precision (RPD)					X	
Field Duplicate Sample RPD		X		X		
Field/Laboratory Duplicate Sample RPD					X	
Surrogate Internal Standard Spike (%R)		X		X		

%R – Percent Recovery

RPD – Relative Percent Difference

Validation Performed By: Kylie Kegerreis

Date: August 6, 2015

Peer Review: Cassandra McCloud

Date: August 11, 2015

**ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
LABORATORY DATA REVIEW CHECKLIST**

Laboratory Data Review Checklist

Completed by:	Kylie Kegerreis		
Title:	Environmental Engineering Specialist	Date:	8/5/2015
CS Report Name:	NPR - FTA Exc	Report Date:	7/17/2015
Consultant Firm:	ARCADIS US, Inc.		
Laboratory Name:	SGS North America, Inc.	Laboratory Report Number:	1158256
ADEC File Number:		ADEC RecKey Number:	

1. Laboratory

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

☒ Yes ☐ No ☐ NA (Please explain.) Comments:

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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 ☒ NA (Please explain) Comments:

--

2. Chain of Custody (COC)

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

☒ Yes ☐ No ☐ NA (Please explain) Comments:

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b. Correct analyses requested?

☒ Yes ☐ No ☐ NA (Please explain) Comments:

--

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt ($4^{\circ} \pm 2^{\circ} \text{C}$)?

☒ Yes ☐ No ☐ NA (Please explain) Comments:

Cooler temp = 0.7 °C; Per data validation program plan, 0 - 6 °C = no qualification

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

Methanol - GRO (AK101) and BTEX (8021B)

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

"Trip Blank appears to have lost some methanol"

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

Lab sample 1158256010 sample name "FTA-10-SW" did not match COC sample name "FTA-20-SW".
Logged in per container name.

e. Data quality or usability affected? (Please explain)

Comments:

In regards to lost methanol in trip blank: Page 8 of DV Program Plan: "... results are not affected where analytes are not detected, as long as there is sufficient methanol to run the analysis." No qualification needed.

4. ~~Case Narrative~~

a. Present and understandable?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

LCS/LCSD RPD for ethylbenzene, p&m-xylene, and o-xylene does not meet QC criteria.

c. Were all corrective actions documented?

☐ Yes ☐ No ☒ NA (Please explain)

Comments:

Corrective actions not implemented/necessary

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

Comments:

All associated samples are below the LOD; therefore qualify all associated samples as UJ

5. Samples Results

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

b. All applicable holding times met?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

Hold Times: GRO = 28 days, DRO = Extraction w/in 14 days, Analysis w/in 40 days of extraction,
BTEX = 14 days
Collection Date: 7/11/2015
Prepped (DRO): 7/15/2015
Analyzed (DRO, GRO, BTEX): 7/16/2015

c. All soils reported on a dry weight basis?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

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

☐ Yes ☒ No ☐ NA (Please explain)

Comments:

benzene = 0.025 mg/kg. The provided PQLs for benzene are above the Cleanup Level, however, SGS provides the LOD for non-detect results, and all LODs for benzene are below the Cleanup Level.

e. Data quality or usability affected? (Please explain)

Comments:

Data quality/usability not affected.

6. QC Samples

a. Method Blank

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

ii. All method blank results less than PQL?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

iii. If above PQL, what samples are affected?

Comments:

N/A

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

☐ Yes ☐ No ☒ NA (Please explain)

Comments:

N/A

v. Data quality or usability affected? (Please explain)

Comments:

Data quality/usability not affected.

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 ☐ NA (Please explain)

Comments:

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

☐ Yes ☐ No ☒ NA (Please explain)

Comments:

No metals/inorganics analysis

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 ☐ NA (Please explain)

Comments:

GRO = 105 / 104%, benzene = 91 / 82%, EB = 106 / 85%, o-xylene = 106 / 84%

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/DMSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

☐ Yes ☒ No ☐ NA (Please explain)

Comments:

GRO, DRO, benzene, and toluene were w/in control limits. EB = 21.50%, o-xylene = 22.80%, p&m-xylene = 21.80% (limit = 20)

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

Comments:

All samples will require qualification. All results are non-detect, so Qualify "UJ"

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

☐ Yes ☒ No ☐ NA (Please explain)

Comments:

vii. Data quality or usability affected? (Please explain)

Comments:

No additional data flags are on affected samples.

c. Surrogates - Organics Only

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

☒ Yes ☐ No ☐ NA (Please explain)

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 ☐ NA (Please explain)

Comments:

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

☐ Yes ☐ No ☒ NA (Please explain)

Comments:

No failed surrogate recoveries

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

Comments:

N/A

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 ☐ NA (Please explain.)

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 ☐ NA (Please explain.)

Comments:

Cooler ID: 1 of 1

iii. All results less than PQL?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

iv. If above PQL, what samples are affected?

Comments:

N/A

v. Data quality or usability affected? (Please explain.)

Comments:

Data quality/usability not affected

e. Field Duplicate

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

ii. Submitted blind to lab?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

BD-1-FTA duplicate of FTA-1-SW

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 ☐ NA (Please explain)

Comments:

For Toluene: FTA-1-SW = 101 ug/kg, BD-1-FTA = 27.3 U ug/kg.
Qualify FTA-1-SW "J", Qualify BD-1-FTA "UJ"

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

☒ Yes ☐ No ☐ NA (Please explain) Comments:

Data will need qualification but is still usable.

f. Decontamination or Equipment Blank (if applicable)

☐ Yes ☐ No ☒ NA (Please explain) Comments:

No equipment blank collected

i. All results less than PQL?

☐ Yes ☐ No ☒ NA (Please explain) Comments:

No equipment blank collected

ii. If above PQL, what samples are affected?

Comments:

N/A

iii. Data quality or usability affected? (Please explain.)

Comments:

N/A

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

a. Defined and appropriate?

☒ Yes ☐ No ☐ NA (Please explain) Comments:

Trace detections:

FTA-5-SW: GRO = 1.62 J mg/kg

FTA-6-SW: GRO = 1.81 J mg/kg

FTA-7-SW: DRO = 11.0 J mg/kg

Reset Form

**CHAIN OF CUSTODY /
LABORATORY QUALIFIERS /
CORRECTED SAMPLE ANALYSIS DATA SHEETS**

Results of FTA-1-SW

Client Sample ID: **FTA-1-SW**
 Client Project ID: **NPR - FTA Exc**
 Lab Sample ID: 1158256001
 Lab Project ID: 1158256

Collection Date: 07/11/15 09:45
 Received Date: 07/14/15 08:56
 Matrix: Soil/Solid (dry weight)
 Solids (%):96.3
 Location:

Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	2.65 U	5.31	1.59	mg/Kg	1		07/16/15 16:51

Surrogates

4-Bromofluorobenzene (surr)	104	50-150		%	1		07/16/15 16:51
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Batch Information

Analytical Batch: VFC12521
 Analytical Method: AK101
 Analyst: CRD
 Analytical Date/Time: 07/16/15 16:51
 Container ID: 1158256001-B

Prep Batch: VXX27579
 Prep Method: SW5035A
 Prep Date/Time: 07/11/15 09:45
 Prep Initial Wt./Vol.: 25.372 g
 Prep Extract Vol: 25.9443 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	13.3 U	26.6	8.50	ug/Kg	1		07/16/15 16:51
Ethylbenzene	26.6 J UU	53.1	16.6	ug/Kg	1		07/16/15 16:51
o-Xylene	26.6 J UU	53.1	16.6	ug/Kg	1		07/16/15 16:51
P & M -Xylene	53.0 J UU	106	31.9	ug/Kg	1		07/16/15 16:51
Toluene	101 J	53.1	16.6	ug/Kg	1		07/16/15 16:51
Xylenes (total)	79.5 U	159	48.4	ug/Kg	1		07/16/15 16:51

Surrogates

1,4-Difluorobenzene (surr)	82.5	72-119		%	1		07/16/15 16:51
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Batch Information

Analytical Batch: VFC12521
 Analytical Method: SW8021B
 Analyst: CRD
 Analytical Date/Time: 07/16/15 16:51
 Container ID: 1158256001-B

Prep Batch: VXX27579
 Prep Method: SW5035A
 Prep Date/Time: 07/11/15 09:45
 Prep Initial Wt./Vol.: 25.372 g
 Prep Extract Vol: 25.9443 mL

Results of FTA-2-SW

Client Sample ID: **FTA-2-SW**
 Client Project ID: **NPR - FTA Exc**
 Lab Sample ID: 1158256002
 Lab Project ID: 1158256

Collection Date: 07/11/15 10:00
 Received Date: 07/14/15 08:56
 Matrix: Soil/Solid (dry weight)
 Solids (%):95.8
 Location:

Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	10.4 U	20.9	6.46	mg/Kg	1		07/16/15 15:17
Surrogates							
5a Androstane (surr)	84.4	50-150		%	1		07/16/15 15:17

Batch Information

Analytical Batch: XFC11944
 Analytical Method: AK102
 Analyst: AYC
 Analytical Date/Time: 07/16/15 15:17
 Container ID: 1158256002-A

Prep Batch: XXX33558
 Prep Method: SW3550C
 Prep Date/Time: 07/15/15 09:08
 Prep Initial Wt./Vol.: 30.034 g
 Prep Extract Vol: 1 mL



Results of FTA-2-SW

Client Sample ID: **FTA-2-SW**
Client Project ID: **NPR - FTA Exc**
Lab Sample ID: 1158256002
Lab Project ID: 1158256

Collection Date: 07/11/15 10:00
Received Date: 07/14/15 08:56
Matrix: Soil/Solid (dry weight)
Solids (%):95.8
Location:

Results by Volatile Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Gasoline Range Organics	2.71 U	5.41	1.62	mg/Kg	1		07/16/15 17:10

Surrogates

4-Bromofluorobenzene (surr)	101	50-150		%	1		07/16/15 17:10
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Batch Information

Analytical Batch: VFC12521
Analytical Method: AK101
Analyst: CRD
Analytical Date/Time: 07/16/15 17:10
Container ID: 1158256002-B

Prep Batch: VXX27579
Prep Method: SW5035A
Prep Date/Time: 07/11/15 10:00
Prep Initial Wt./Vol.: 25.163 g
Prep Extract Vol: 26.0586 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Benzene	13.5 U	27.0	8.65	ug/Kg	1		07/16/15 17:10
Ethylbenzene	27.1 U JJ	54.1	16.9	ug/Kg	1		07/16/15 17:10
o-Xylene	27.1 U JJ	54.1	16.9	ug/Kg	1		07/16/15 17:10
P & M -Xylene	54.0 U JJ	108	32.4	ug/Kg	1		07/16/15 17:10
Toluene	27.1 U	54.1	16.9	ug/Kg	1		07/16/15 17:10
Xylenes (total)	81.0 U	162	49.3	ug/Kg	1		07/16/15 17:10

Surrogates

1,4-Difluorobenzene (surr)	83.4	72-119		%	1		07/16/15 17:10
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Batch Information

Analytical Batch: VFC12521
Analytical Method: SW8021B
Analyst: CRD
Analytical Date/Time: 07/16/15 17:10
Container ID: 1158256002-B

Prep Batch: VXX27579
Prep Method: SW5035A
Prep Date/Time: 07/11/15 10:00
Prep Initial Wt./Vol.: 25.163 g
Prep Extract Vol: 26.0586 mL

Results of FTA-3-SW

Client Sample ID: **FTA-3-SW**
 Client Project ID: **NPR - FTA Exc**
 Lab Sample ID: 1158256003
 Lab Project ID: 1158256

Collection Date: 07/11/15 10:15
 Received Date: 07/14/15 08:56
 Matrix: Soil/Solid (dry weight)
 Solids (%):96.7
 Location:

Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	10.2 U	20.4	6.33	mg/Kg	1		07/16/15 15:27
Surrogates							
5a Androstane (surr)	80.6	50-150		%	1		07/16/15 15:27

Batch Information

Analytical Batch: XFC11944
 Analytical Method: AK102
 Analyst: AYC
 Analytical Date/Time: 07/16/15 15:27
 Container ID: 1158256003-A

Prep Batch: XXX33558
 Prep Method: SW3550C
 Prep Date/Time: 07/15/15 09:08
 Prep Initial Wt./Vol.: 30.4 g
 Prep Extract Vol: 1 mL



Results of FTA-3-SW

Client Sample ID: **FTA-3-SW**
Client Project ID: **NPR - FTA Exc**
Lab Sample ID: 1158256003
Lab Project ID: 1158256

Collection Date: 07/11/15 10:15
Received Date: 07/14/15 08:56
Matrix: Soil/Solid (dry weight)
Solids (%):96.7
Location:

Results by Volatile Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Gasoline Range Organics	2.58 U	5.16	1.55	mg/Kg	1		07/16/15 17:29

Surrogates

4-Bromofluorobenzene (surr)	104	50-150		%	1		07/16/15 17:29
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Batch Information

Analytical Batch: VFC12521
Analytical Method: AK101
Analyst: CRD
Analytical Date/Time: 07/16/15 17:29
Container ID: 1158256003-B

Prep Batch: VXX27579
Prep Method: SW5035A
Prep Date/Time: 07/11/15 10:15
Prep Initial Wt./Vol.: 25.926 g
Prep Extract Vol: 25.8613 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Benzene	12.9 U	25.8	8.25	ug/Kg	1		07/16/15 17:29
Ethylbenzene	25.8 U JJ	51.6	16.1	ug/Kg	1		07/16/15 17:29
o-Xylene	25.8 U JJ	51.6	16.1	ug/Kg	1		07/16/15 17:29
P & M -Xylene	51.5 U JJ	103	31.0	ug/Kg	1		07/16/15 17:29
Toluene	25.8 U	51.6	16.1	ug/Kg	1		07/16/15 17:29
Xylenes (total)	77.5 U	155	47.0	ug/Kg	1		07/16/15 17:29

Surrogates

1,4-Difluorobenzene (surr)	84.1	72-119		%	1		07/16/15 17:29
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Batch Information

Analytical Batch: VFC12521
Analytical Method: SW8021B
Analyst: CRD
Analytical Date/Time: 07/16/15 17:29
Container ID: 1158256003-B

Prep Batch: VXX27579
Prep Method: SW5035A
Prep Date/Time: 07/11/15 10:15
Prep Initial Wt./Vol.: 25.926 g
Prep Extract Vol: 25.8613 mL

Results of FTA-4-SW

Client Sample ID: **FTA-4-SW**
 Client Project ID: **NPR - FTA Exc**
 Lab Sample ID: 1158256004
 Lab Project ID: 1158256

Collection Date: 07/11/15 10:30
 Received Date: 07/14/15 08:56
 Matrix: Soil/Solid (dry weight)
 Solids (%):97.0
 Location:

Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	10.2 U	20.4	6.31	mg/Kg	1		07/16/15 15:36
Surrogates							
5a Androstane (surr)	80.2	50-150		%	1		07/16/15 15:36

Batch Information

Analytical Batch: XFC11944
 Analytical Method: AK102
 Analyst: AYC
 Analytical Date/Time: 07/16/15 15:36
 Container ID: 1158256004-A

Prep Batch: XXX33558
 Prep Method: SW3550C
 Prep Date/Time: 07/15/15 09:08
 Prep Initial Wt./Vol.: 30.387 g
 Prep Extract Vol: 1 mL



Results of FTA-4-SW

Client Sample ID: **FTA-4-SW**
Client Project ID: **NPR - FTA Exc**
Lab Sample ID: 1158256004
Lab Project ID: 1158256

Collection Date: 07/11/15 10:30
Received Date: 07/14/15 08:56
Matrix: Soil/Solid (dry weight)
Solids (%):97.0
Location:

Results by Volatile Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Gasoline Range Organics	2.72 U	5.44	1.63	mg/Kg	1		07/16/15 19:24

Surrogates

4-Bromofluorobenzene (surr)	102	50-150		%	1		07/16/15 19:24
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Batch Information

Analytical Batch: VFC12521
Analytical Method: AK101
Analyst: CRD
Analytical Date/Time: 07/16/15 19:24
Container ID: 1158256004-B

Prep Batch: VXX27579
Prep Method: SW5035A
Prep Date/Time: 07/11/15 10:30
Prep Initial Wt./Vol.: 24.353 g
Prep Extract Vol: 25.7272 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Benzene	13.6 U	27.2	8.71	ug/Kg	1		07/16/15 19:24
Ethylbenzene	27.2 U UJ	54.4	17.0	ug/Kg	1		07/16/15 19:24
o-Xylene	27.2 U UJ	54.4	17.0	ug/Kg	1		07/16/15 19:24
P & M -Xylene	54.5 U UJ	109	32.7	ug/Kg	1		07/16/15 19:24
Toluene	27.2 U	54.4	17.0	ug/Kg	1		07/16/15 19:24
Xylenes (total)	81.5 U	163	49.7	ug/Kg	1		07/16/15 19:24

Surrogates

1,4-Difluorobenzene (surr)	83.7	72-119		%	1		07/16/15 19:24
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Batch Information

Analytical Batch: VFC12521
Analytical Method: SW8021B
Analyst: CRD
Analytical Date/Time: 07/16/15 19:24
Container ID: 1158256004-B

Prep Batch: VXX27579
Prep Method: SW5035A
Prep Date/Time: 07/11/15 10:30
Prep Initial Wt./Vol.: 24.353 g
Prep Extract Vol: 25.7272 mL

Results of FTA-5-SW

Client Sample ID: **FTA-5-SW**
 Client Project ID: **NPR - FTA Exc**
 Lab Sample ID: 1158256005
 Lab Project ID: 1158256

Collection Date: 07/11/15 10:45
 Received Date: 07/14/15 08:56
 Matrix: Soil/Solid (dry weight)
 Solids (%):97.0
 Location:

Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	10.3 U	20.6	6.39	mg/Kg	1		07/16/15 15:46
Surrogates							
5a Androstane (surr)	89.5	50-150		%	1		07/16/15 15:46

Batch Information

Analytical Batch: XFC11944
 Analytical Method: AK102
 Analyst: AYC
 Analytical Date/Time: 07/16/15 15:46
 Container ID: 1158256005-A

Prep Batch: XXX33558
 Prep Method: SW3550C
 Prep Date/Time: 07/15/15 09:08
 Prep Initial Wt./Vol.: 30.002 g
 Prep Extract Vol: 1 mL

Results of FTA-5-SW

Client Sample ID: **FTA-5-SW**
 Client Project ID: **NPR - FTA Exc**
 Lab Sample ID: 1158256005
 Lab Project ID: 1158256

Collection Date: 07/11/15 10:45
 Received Date: 07/14/15 08:56
 Matrix: Soil/Solid (dry weight)
 Solids (%):97.0
 Location:

Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.62 J	5.20	1.56	mg/Kg	1		07/16/15 19:43

Surrogates

4-Bromofluorobenzene (surr)	103	50-150		%	1		07/16/15 19:43
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Batch Information

Analytical Batch: VFC12521
 Analytical Method: AK101
 Analyst: CRD
 Analytical Date/Time: 07/16/15 19:43
 Container ID: 1158256005-B

Prep Batch: VXX27579
 Prep Method: SW5035A
 Prep Date/Time: 07/11/15 10:45
 Prep Initial Wt./Vol.: 25.545 g
 Prep Extract Vol: 25.7787 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	13.0 U	26.0	8.33	ug/Kg	1		07/16/15 19:43
Ethylbenzene	26.0 J UJ	52.0	16.2	ug/Kg	1		07/16/15 19:43
o-Xylene	26.0 J UJ	52.0	16.2	ug/Kg	1		07/16/15 19:43
P & M -Xylene	52.0 J UJ	104	31.2	ug/Kg	1		07/16/15 19:43
Toluene	26.0 U	52.0	16.2	ug/Kg	1		07/16/15 19:43
Xylenes (total)	78.0 U	156	47.5	ug/Kg	1		07/16/15 19:43

Surrogates

1,4-Difluorobenzene (surr)	82.3	72-119		%	1		07/16/15 19:43
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Batch Information

Analytical Batch: VFC12521
 Analytical Method: SW8021B
 Analyst: CRD
 Analytical Date/Time: 07/16/15 19:43
 Container ID: 1158256005-B

Prep Batch: VXX27579
 Prep Method: SW5035A
 Prep Date/Time: 07/11/15 10:45
 Prep Initial Wt./Vol.: 25.545 g
 Prep Extract Vol: 25.7787 mL

Results of FTA-6-SW

Client Sample ID: **FTA-6-SW**
 Client Project ID: **NPR - FTA Exc**
 Lab Sample ID: 1158256006
 Lab Project ID: 1158256

Collection Date: 07/11/15 11:00
 Received Date: 07/14/15 08:56
 Matrix: Soil/Solid (dry weight)
 Solids (%):96.8
 Location:

Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	10.3 U	20.6	6.38	mg/Kg	1		07/16/15 15:56
Surrogates							
5a Androstane (surr)	80	50-150		%	1		07/16/15 15:56

Batch Information

Analytical Batch: XFC11944
 Analytical Method: AK102
 Analyst: AYC
 Analytical Date/Time: 07/16/15 15:56
 Container ID: 1158256006-A

Prep Batch: XXX33558
 Prep Method: SW3550C
 Prep Date/Time: 07/15/15 09:08
 Prep Initial Wt./Vol.: 30.108 g
 Prep Extract Vol: 1 mL

Results of FTA-6-SW

Client Sample ID: **FTA-6-SW**
 Client Project ID: **NPR - FTA Exc**
 Lab Sample ID: 1158256006
 Lab Project ID: 1158256

Collection Date: 07/11/15 11:00
 Received Date: 07/14/15 08:56
 Matrix: Soil/Solid (dry weight)
 Solids (%):96.8
 Location:

Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.81 J	5.38	1.61	mg/Kg	1		07/16/15 20:02

Surrogates

4-Bromofluorobenzene (surr)	103	50-150		%	1		07/16/15 20:02
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Batch Information

Analytical Batch: VFC12521
 Analytical Method: AK101
 Analyst: CRD
 Analytical Date/Time: 07/16/15 20:02
 Container ID: 1158256006-B

Prep Batch: VXX27579
 Prep Method: SW5035A
 Prep Date/Time: 07/11/15 11:00
 Prep Initial Wt./Vol.: 24.743 g
 Prep Extract Vol: 25.7896 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	13.4 U	26.9	8.61	ug/Kg	1		07/16/15 20:02
Ethylbenzene	26.9 J UJ	53.8	16.8	ug/Kg	1		07/16/15 20:02
o-Xylene	26.9 J UJ	53.8	16.8	ug/Kg	1		07/16/15 20:02
P & M -Xylene	54.0 J UJ	108	32.3	ug/Kg	1		07/16/15 20:02
Toluene	109	53.8	16.8	ug/Kg	1		07/16/15 20:02
Xylenes (total)	80.5 U	161	49.1	ug/Kg	1		07/16/15 20:02

Surrogates

1,4-Difluorobenzene (surr)	84.3	72-119		%	1		07/16/15 20:02
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Batch Information

Analytical Batch: VFC12521
 Analytical Method: SW8021B
 Analyst: CRD
 Analytical Date/Time: 07/16/15 20:02
 Container ID: 1158256006-B

Prep Batch: VXX27579
 Prep Method: SW5035A
 Prep Date/Time: 07/11/15 11:00
 Prep Initial Wt./Vol.: 24.743 g
 Prep Extract Vol: 25.7896 mL

Results of FTA-7-SW

Client Sample ID: **FTA-7-SW**
 Client Project ID: **NPR - FTA Exc**
 Lab Sample ID: 1158256007
 Lab Project ID: 1158256

Collection Date: 07/11/15 11:15
 Received Date: 07/14/15 08:56
 Matrix: Soil/Solid (dry weight)
 Solids (%):90.6
 Location:

Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	11.0 J	22.1	6.84	mg/Kg	1		07/16/15 16:06
Surrogates							
5a Androstane (surr)	93.4	50-150		%	1		07/16/15 16:06

Batch Information

Analytical Batch: XFC11944
 Analytical Method: AK102
 Analyst: AYC
 Analytical Date/Time: 07/16/15 16:06
 Container ID: 1158256007-A

Prep Batch: XXX33558
 Prep Method: SW3550C
 Prep Date/Time: 07/15/15 09:08
 Prep Initial Wt./Vol.: 30.001 g
 Prep Extract Vol: 1 mL



Results of FTA-7-SW

Client Sample ID: **FTA-7-SW**
Client Project ID: **NPR - FTA Exc**
Lab Sample ID: 1158256007
Lab Project ID: 1158256

Collection Date: 07/11/15 11:15
Received Date: 07/14/15 08:56
Matrix: Soil/Solid (dry weight)
Solids (%):90.6
Location:

Results by Volatile Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Gasoline Range Organics	2.99 U	5.98	1.79	mg/Kg	1		07/16/15 20:20

Surrogates

4-Bromofluorobenzene (surr)	101	50-150		%	1		07/16/15 20:20
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Batch Information

Analytical Batch: VFC12521
Analytical Method: AK101
Analyst: CRD
Analytical Date/Time: 07/16/15 20:20
Container ID: 1158256007-B

Prep Batch: VXX27579
Prep Method: SW5035A
Prep Date/Time: 07/11/15 11:15
Prep Initial Wt./Vol.: 25.257 g
Prep Extract Vol: 27.3688 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Benzene	14.9 U	29.9	9.57	ug/Kg	1		07/16/15 20:20
Ethylbenzene	29.9 U JJ	59.8	18.7	ug/Kg	1		07/16/15 20:20
o-Xylene	29.9 U JJ	59.8	18.7	ug/Kg	1		07/16/15 20:20
P & M -Xylene	60.0 U JJ	120	35.9	ug/Kg	1		07/16/15 20:20
Toluene	112	59.8	18.7	ug/Kg	1		07/16/15 20:20
Xylenes (total)	89.5 U	179	54.5	ug/Kg	1		07/16/15 20:20

Surrogates

1,4-Difluorobenzene (surr)	84.3	72-119		%	1		07/16/15 20:20
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Batch Information

Analytical Batch: VFC12521
Analytical Method: SW8021B
Analyst: CRD
Analytical Date/Time: 07/16/15 20:20
Container ID: 1158256007-B

Prep Batch: VXX27579
Prep Method: SW5035A
Prep Date/Time: 07/11/15 11:15
Prep Initial Wt./Vol.: 25.257 g
Prep Extract Vol: 27.3688 mL

Results of FTA-8-SW

Client Sample ID: **FTA-8-SW**
 Client Project ID: **NPR - FTA Exc**
 Lab Sample ID: 1158256008
 Lab Project ID: 1158256

Collection Date: 07/11/15 11:30
 Received Date: 07/14/15 08:56
 Matrix: Soil/Solid (dry weight)
 Solids (%):90.1
 Location:

Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	36.7	21.9	6.78	mg/Kg	1		07/16/15 16:16
Surrogates							
5a Androstane (surr)	98	50-150		%	1		07/16/15 16:16

Batch Information

Analytical Batch: XFC11944
 Analytical Method: AK102
 Analyst: AYC
 Analytical Date/Time: 07/16/15 16:16
 Container ID: 1158256008-A

Prep Batch: XXX33558
 Prep Method: SW3550C
 Prep Date/Time: 07/15/15 09:08
 Prep Initial Wt./Vol.: 30.464 g
 Prep Extract Vol: 1 mL

Results of FTA-8-SW

Client Sample ID: **FTA-8-SW**
 Client Project ID: **NPR - FTA Exc**
 Lab Sample ID: 1158256008
 Lab Project ID: 1158256

Collection Date: 07/11/15 11:30
 Received Date: 07/14/15 08:56
 Matrix: Soil/Solid (dry weight)
 Solids (%):90.1
 Location:

Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	3.01 U	6.02	1.81	mg/Kg	1		07/16/15 20:39

Surrogates

4-Bromofluorobenzene (surr)	105	50-150		%	1		07/16/15 20:39
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Batch Information

Analytical Batch: VFC12521
 Analytical Method: AK101
 Analyst: CRD
 Analytical Date/Time: 07/16/15 20:39
 Container ID: 1158256008-B

Prep Batch: VXX27579
 Prep Method: SW5035A
 Prep Date/Time: 07/11/15 11:30
 Prep Initial Wt./Vol.: 25.383 g
 Prep Extract Vol: 27.5167 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	15.1 U	30.1	9.63	ug/Kg	1		07/16/15 20:39
Ethylbenzene	30.1 U JJ	60.2	18.8	ug/Kg	1		07/16/15 20:39
o-Xylene	30.1 U JJ	60.2	18.8	ug/Kg	1		07/16/15 20:39
P & M -Xylene	60.0 U JJ	120	36.1	ug/Kg	1		07/16/15 20:39
Toluene	115	60.2	18.8	ug/Kg	1		07/16/15 20:39
Xylenes (total)	90.5 U	181	54.9	ug/Kg	1		07/16/15 20:39

Surrogates

1,4-Difluorobenzene (surr)	82.6	72-119		%	1		07/16/15 20:39
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Batch Information

Analytical Batch: VFC12521
 Analytical Method: SW8021B
 Analyst: CRD
 Analytical Date/Time: 07/16/15 20:39
 Container ID: 1158256008-B

Prep Batch: VXX27579
 Prep Method: SW5035A
 Prep Date/Time: 07/11/15 11:30
 Prep Initial Wt./Vol.: 25.383 g
 Prep Extract Vol: 27.5167 mL

Results of FTA-9-SW

Client Sample ID: **FTA-9-SW**
 Client Project ID: **NPR - FTA Exc**
 Lab Sample ID: 1158256009
 Lab Project ID: 1158256

Collection Date: 07/11/15 11:45
 Received Date: 07/14/15 08:56
 Matrix: Soil/Solid (dry weight)
 Solids (%):80.7
 Location:

Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	31.8	24.7	7.64	mg/Kg	1		07/16/15 16:26
Surrogates							
5a Androstane (surr)	86	50-150		%	1		07/16/15 16:26

Batch Information

Analytical Batch: XFC11944
 Analytical Method: AK102
 Analyst: AYC
 Analytical Date/Time: 07/16/15 16:26
 Container ID: 1158256009-A

Prep Batch: XXX33558
 Prep Method: SW3550C
 Prep Date/Time: 07/15/15 09:08
 Prep Initial Wt./Vol.: 30.169 g
 Prep Extract Vol: 1 mL



Results of FTA-9-SW

Client Sample ID: **FTA-9-SW**
Client Project ID: **NPR - FTA Exc**
Lab Sample ID: 1158256009
Lab Project ID: 1158256

Collection Date: 07/11/15 11:45
Received Date: 07/14/15 08:56
Matrix: Soil/Solid (dry weight)
Solids (%):80.7
Location:

Results by Volatile Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Gasoline Range Organics	3.82 U	7.64	2.29	mg/Kg	1		07/16/15 20:58

Surrogates

4-Bromofluorobenzene (surr)	111	50-150		%	1		07/16/15 20:58
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Batch Information

Analytical Batch: VFC12521
Analytical Method: AK101
Analyst: CRD
Analytical Date/Time: 07/16/15 20:58
Container ID: 1158256009-B

Prep Batch: VXX27579
Prep Method: SW5035A
Prep Date/Time: 07/11/15 11:45
Prep Initial Wt./Vol.: 24.044 g
Prep Extract Vol: 29.6468 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Benzene	19.1 U	38.2	12.2	ug/Kg	1		07/16/15 20:58
Ethylbenzene	38.2 ✓ UJ	76.4	23.8	ug/Kg	1		07/16/15 20:58
o-Xylene	38.2 ✓ UJ	76.4	23.8	ug/Kg	1		07/16/15 20:58
P & M -Xylene	76.5 ✓ UJ	153	45.9	ug/Kg	1		07/16/15 20:58
Toluene	38.2 U	76.4	23.8	ug/Kg	1		07/16/15 20:58
Xylenes (total)	115 U	229	69.7	ug/Kg	1		07/16/15 20:58

Surrogates

1,4-Difluorobenzene (surr)	84.6	72-119		%	1		07/16/15 20:58
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Batch Information

Analytical Batch: VFC12521
Analytical Method: SW8021B
Analyst: CRD
Analytical Date/Time: 07/16/15 20:58
Container ID: 1158256009-B

Prep Batch: VXX27579
Prep Method: SW5035A
Prep Date/Time: 07/11/15 11:45
Prep Initial Wt./Vol.: 24.044 g
Prep Extract Vol: 29.6468 mL



Results of FTA-10-SW

Client Sample ID: **FTA-10-SW**
Client Project ID: **NPR - FTA Exc**
Lab Sample ID: 1158256010
Lab Project ID: 1158256

Collection Date: 07/11/15 12:00
Received Date: 07/14/15 08:56
Matrix: Soil/Solid (dry weight)
Solids (%):85.3
Location:

Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	31.2	23.4	7.26	mg/Kg	1		07/16/15 16:36
Surrogates							
5a Androstane (surr)	90.3	50-150		%	1		07/16/15 16:36

Batch Information

Analytical Batch: XFC11944
Analytical Method: AK102
Analyst: AYC
Analytical Date/Time: 07/16/15 16:36
Container ID: 1158256010-A

Prep Batch: XXX33558
Prep Method: SW3550C
Prep Date/Time: 07/15/15 09:08
Prep Initial Wt./Vol.: 30.038 g
Prep Extract Vol: 1 mL



Results of FTA-10-SW

Client Sample ID: **FTA-10-SW**
Client Project ID: **NPR - FTA Exc**
Lab Sample ID: 1158256010
Lab Project ID: 1158256

Collection Date: 07/11/15 12:00
Received Date: 07/14/15 08:56
Matrix: Soil/Solid (dry weight)
Solids (%):85.3
Location:

Results by Volatile Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Gasoline Range Organics	3.52 U	7.05	2.11	mg/Kg	1		07/16/15 21:17

Surrogates

4-Bromofluorobenzene (surr)	100	50-150		%	1		07/16/15 21:17
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Batch Information

Analytical Batch: VFC12521
Analytical Method: AK101
Analyst: CRD
Analytical Date/Time: 07/16/15 21:17
Container ID: 1158256010-B

Prep Batch: VXX27579
Prep Method: SW5035A
Prep Date/Time: 07/11/15 12:00
Prep Initial Wt./Vol.: 23.71 g
Prep Extract Vol: 28.4908 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Benzene	17.6 U	35.2	11.3	ug/Kg	1		07/16/15 21:17
Ethylbenzene	35.3 U UU	70.5	22.0	ug/Kg	1		07/16/15 21:17
o-Xylene	35.3 U UU	70.5	22.0	ug/Kg	1		07/16/15 21:17
P & M -Xylene	70.5 U UU	141	42.3	ug/Kg	1		07/16/15 21:17
Toluene	35.3 U	70.5	22.0	ug/Kg	1		07/16/15 21:17
Xylenes (total)	106 U	211	64.3	ug/Kg	1		07/16/15 21:17

Surrogates

1,4-Difluorobenzene (surr)	85.6	72-119		%	1		07/16/15 21:17
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Batch Information

Analytical Batch: VFC12521
Analytical Method: SW8021B
Analyst: CRD
Analytical Date/Time: 07/16/15 21:17
Container ID: 1158256010-B

Prep Batch: VXX27579
Prep Method: SW5035A
Prep Date/Time: 07/11/15 12:00
Prep Initial Wt./Vol.: 23.71 g
Prep Extract Vol: 28.4908 mL

Results of BD-1-FTA

Client Sample ID: **BD-1-FTA**
 Client Project ID: **NPR - FTA Exc**
 Lab Sample ID: 1158256011
 Lab Project ID: 1158256

Collection Date: 07/11/15 09:45
 Received Date: 07/14/15 08:56
 Matrix: Soil/Solid (dry weight)
 Solids (%):96.5
 Location:

Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	10.2 U	20.4	6.33	mg/Kg	1		07/16/15 16:46
Surrogates							
5a Androstane (surr)	98.2	50-150		%	1		07/16/15 16:46

Batch Information

Analytical Batch: XFC11944
 Analytical Method: AK102
 Analyst: AYC
 Analytical Date/Time: 07/16/15 16:46
 Container ID: 1158256011-A

Prep Batch: XXX33558
 Prep Method: SW3550C
 Prep Date/Time: 07/15/15 09:08
 Prep Initial Wt./Vol.: 30.427 g
 Prep Extract Vol: 1 mL



Results of BD-1-FTA

Client Sample ID: **BD-1-FTA**
Client Project ID: **NPR - FTA Exc**
Lab Sample ID: 1158256011
Lab Project ID: 1158256

Collection Date: 07/11/15 09:45
Received Date: 07/14/15 08:56
Matrix: Soil/Solid (dry weight)
Solids (%):96.5
Location:

Results by Volatile Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Gasoline Range Organics	2.73 U	5.45	1.64	mg/Kg	1		07/16/15 21:36

Surrogates

4-Bromofluorobenzene (surr)	101	50-150		%	1		07/16/15 21:36
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Batch Information

Analytical Batch: VFC12521
Analytical Method: AK101
Analyst: CRD
Analytical Date/Time: 07/16/15 21:36
Container ID: 1158256011-B

Prep Batch: VXX27579
Prep Method: SW5035A
Prep Date/Time: 07/11/15 09:45
Prep Initial Wt./Vol.: 24.571 g
Prep Extract Vol: 25.8584 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Benzene	13.7 U	27.3	8.72	ug/Kg	1		07/16/15 21:36
Ethylbenzene	27.3 U UU	54.5	17.0	ug/Kg	1		07/16/15 21:36
o-Xylene	27.3 U UU	54.5	17.0	ug/Kg	1		07/16/15 21:36
P & M -Xylene	54.5 U UU	109	32.7	ug/Kg	1		07/16/15 21:36
Toluene	27.3 U UU	54.5	17.0	ug/Kg	1		07/16/15 21:36
Xylenes (total)	82.0 U	164	49.7	ug/Kg	1		07/16/15 21:36

Surrogates

1,4-Difluorobenzene (surr)	85.7	72-119		%	1		07/16/15 21:36
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Batch Information

Analytical Batch: VFC12521
Analytical Method: SW8021B
Analyst: CRD
Analytical Date/Time: 07/16/15 21:36
Container ID: 1158256011-B

Prep Batch: VXX27579
Prep Method: SW5035A
Prep Date/Time: 07/11/15 09:45
Prep Initial Wt./Vol.: 24.571 g
Prep Extract Vol: 25.8584 mL

Results of Trip Blank

Client Sample ID: **Trip Blank**
 Client Project ID: **NPR - FTA Exc**
 Lab Sample ID: 1158256012
 Lab Project ID: 1158256

Collection Date: 07/11/15 09:45
 Received Date: 07/14/15 08:56
 Matrix: Solid/Soil (Wet Weight)
 Solids (%):
 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	0.881	mg/Kg	1		07/16/15 22:14

Surrogates

4-Bromofluorobenzene (surr)	104	50-150		%	1		07/16/15 22:14
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Batch Information

Analytical Batch: VFC12521
 Analytical Method: AK101
 Analyst: CRD
 Analytical Date/Time: 07/16/15 22:14
 Container ID: 1158256012-A

Prep Batch: VXX27579
 Prep Method: SW5035A
 Prep Date/Time: 07/11/15 09:45
 Prep Initial Wt./Vol.: 42.568 g
 Prep Extract Vol: 25 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	7.35 U	14.7	4.70	ug/Kg	1		07/16/15 22:14
Ethylbenzene	14.7 U UJ	29.4	9.16	ug/Kg	1		07/16/15 22:14
o-Xylene	14.7 U UJ	29.4	9.16	ug/Kg	1		07/16/15 22:14
P & M -Xylene	29.4 U UJ	58.7	17.6	ug/Kg	1		07/16/15 22:14
Toluene	14.7 U	29.4	9.16	ug/Kg	1		07/16/15 22:14
Xylenes (total)	44.0 U	88.1	26.8	ug/Kg	1		07/16/15 22:14

Surrogates

1,4-Difluorobenzene (surr)	83.4	72-119		%	1		07/16/15 22:14
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Batch Information

Analytical Batch: VFC12521
 Analytical Method: SW8021B
 Analyst: CRD
 Analytical Date/Time: 07/16/15 22:14
 Container ID: 1158256012-A

Prep Batch: VXX27579
 Prep Method: SW5035A
 Prep Date/Time: 07/11/15 09:45
 Prep Initial Wt./Vol.: 42.568 g
 Prep Extract Vol: 25 mL

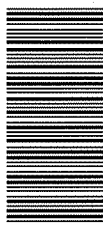
9528



CLIENT: Flint Hills Resources										INSTRUCTIONS: SECTIONS 1-5 MUST BE FILLED OUT. OMISSIONS MAY DELAY THE ONSET OF ANALYSIS.										Page 1 of 2																													
CONTACT: Loren Garner										PHONE #: (907) 488-5122										SECTION 3																													
PROJECT NAME: NPR - FTA Exc.										PROJECT/ PWSID/ PERMIT #:										PRESERVATIVE																													
REPORTS TO: Rebecca Andresen										E-MAIL: Rebecca.Andresen@arcadis-us.com																																							
INVOICE TO: Flint Hills Resources										QUOTE #: P.O. #: K28164																																							
RESERVED FOR LAB USE										SAMPLE IDENTIFICATION										DATE										TIME										MATRIX CODE									
1) A-B										FTA-1-SW										07.11.15										09:45										Soil									
2) A-B										FTA-2-SW										07.11.15										10:00										Soil									
3) A-B										FTA-3-SW										07.11.15										10:15										Soil									
4) A-B										FTA-4-SW										07.11.15										10:30										Soil									
5) A-B										FTA-5-SW										07.11.15										10:45										Soil									
6) A-B										FTA-6-SW										07.11.15										11:00										Soil									
7) A-B										FTA-7-SW										07.11.15										11:15										Soil									
8) A-B										FTA-8-SW										07.11.15										11:30										Soil									
9) A-B										FTA-9-SW										07.11.15										11:45										Soil									
10) A-B										FTA-20-SW										07.11.15										12:00										Soil									
RELINQUISHED BY: (1)										DATE										07.13.15										08:00										RECEIVED BY: 7-13-15 0930									
RELINQUISHED BY: (2)										DATE										7-13-15										1500										RECEIVED BY:									
RELINQUISHED BY: (3)										DATE																														RECEIVED BY:									
RELINQUISHED BY: (4)										DATE										7-13-15										0850										RECEIVED FOR LABORATORY BY: J2									

<http://www.sqs.com/terms-and-conditions>

F101_eCOC Revised 2014-12-10

[illegible]

Flint Hill Resources Alaska, LLC

North Pole Refinery Site

Data Review

NORTH POLE, ALASKA

Gasoline Range Organics (AK101), Diesel Range Organics (AK102), and BTEX (8021B) Analyses

SDG #: 1158398

Analyses Performed By:
SGS North America, Inc.
Anchorage, Alaska

Review Level: Tier II
Project: B0081981.0084.00002

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #1158398 for samples collected in association with the North Pole Refinery site. The review was conducted as a Tier II evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis				
					DRO	GRO	BTEX	MET	MISC
FTA-11-SW	1158398001	Soil	7/30/2015		X	X	X		
FTA-12-SW	1158398002	Soil	7/30/2015		X	X	X		
FTA-13-SW	1158398003	Soil	7/30/2015		X	X	X		
FTA-14-SW	1158398004	Soil	7/30/2015		X	X	X		
FTA-15-SW	1158398005	Soil	7/30/2015		X	X	X		
FTA-16-SW	1158398006	Soil	7/30/2015		X	X	X		
FTA-17-SW	1158398007	Soil	7/30/2015		X	X	X		
FTA-18-SW	1158398008	Soil	7/30/2015		X	X	X		
FTA-19-SW	1158398009	Soil	7/30/2015		X	X	X		
FTA-20-SW	1158398010	Soil	7/30/2015		X	X	X		
FTA-21-SW	1158398011	Soil	7/30/2015		X	X	X		
FTA-22-SW	1158398012	Soil	7/30/2015		X	X	X		
FTA-23-SW	1158398013	Soil	7/30/2015		X	X	X		
FTA-24-SW	1158398014	Soil	7/30/2015		X	X	X		
FTA-25-SW	1158398015	Soil	7/30/2015		X	X	X		
FTA-26-SW	1158398016	Soil	7/30/2015		X	X	X		
FTA-27-SW	1158398017	Soil	7/30/2015		X	X	X		
FTA-28-SW	1158398018	Soil	7/30/2015		X	X	X		
FTA-29-SW	1158398019	Soil	7/30/2015		X	X	X		
FTA-30-SW	1158398020	Soil	7/30/2015		X	X	X		
FTA-BD-2	1158398021	Soil	7/30/2015	FTA-20-SW	X	X	X		
FTA-BD-3	1158398022	Soil	7/30/2015	FTA-30-SW	X	X	X		
Trip Blank 1	1158398023	Soil	5/07/2015			X	X		
Trip Blank 2	1158398024	Soil	7/29/2015			X	X		
Trip Blank 3	1158398025	Soil	5/06/2015			X	X		

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

QA - Quality Assurance

ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA)-SW-846 Method 8021B (benzene, toluene, ethylbenzene, and total xylenes [BTEX]) and Alaska Department of Environmental Conservation Methods AK101 (Gasoline Range Organics [GRO]) and AK102 (Diesel Range Organics [DRO]). Data were reviewed in accordance with USEPA National Functional Guidelines of June 2008 (USEPA 2008) and the Data-Validation Program Plan (Shannon & Wilson 2015)

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

- U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
- B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

- E The compound was quantitated above the calibration range.
- D Concentration is based on a diluted sample analysis.
- Q QC parameters outside of acceptance range.

- Validation Qualifiers

- J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
- JH The result is an estimated quantity, and may be biased high.
- JL The result is an estimated quantity, and may be biased low
- JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.
- UB Compound considered non-detect at the listed value due to associated blank contamination.
- UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
- R The sample results are rejected as unusable. The compound may or may not be present in the sample.

- * Qualifier applied by reviewer.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

VOLATILE ORGANIC COMPOUNDS (VOC) ANALYSIS - BENZENE, TOLUENE, ETHYLBENZENE, AND TOTAL XYLENES (BTEX)

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8021B	Soil	14 days from collection to analysis	Cool to <6 °C, Methanol

The analyses that exceeded the holding time are presented in the following table.

Sample IDs	Holding Time	Criteria
Trip Blank 1 (Collection Date: 5/7/15)	Analysis Completed	96 Days
Trip Blank 3 (Collection Date: 5/6/15)		97 Days

Sample results associated with sample locations analyzed by analytical method SW-846 8027B were qualified, as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed greater than or equal to two times holding time	R	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e. laboratory method blanks and trip blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the estimated detection limit (EDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Although one analyte was detected below the limit of quantitation (LOQ) but above the detection limit (DL), all associated sample results were below the limit of quantitation, therefore qualification was not required.

3. Surrogate Internal Standard Compounds

All field samples, blanks, LCS, and MS/MSD are spiked with surrogate internal standard compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. VOC analysis requires that all surrogates associated with the analysis exhibit recoveries within

the method specified acceptance limits of 72 – 119%.

All surrogate internal standard recoveries were within the acceptance limits.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The spiked compounds used in the MS/MSD analysis must exhibit recoveries within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS and MSD results must be within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of two or greater. Sample results associated with MS/MSD exceedances where the parent samples are not site-specific are not qualified.

The MS/MSD analyses exhibited recovery within the control limits for all compounds.

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD (also called Ongoing Precision and Recovery (OPR)) analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The spiked compounds used in the LCS/LCSD analysis must exhibit recoveries within the laboratory-established acceptance limits. The relative percent difference (RPD) between the LCS and LCSD results must be within the laboratory-established acceptance limit of 20%.

The LCS/LCSD analyses exhibited recoveries within the control limits for all compounds.

6. Laboratory Duplicate Sample Analysis

For select analyses, or when insufficient volume is submitted for analysis of an MS and MSD, the laboratory may analyze a project sample twice. The relative percent difference (RPD) between the parent sample and the laboratory duplicate sample is used to assess the precision of the analytical method.

The laboratory duplicate sample analysis was not performed on a sample location within this dataset.

7. Field Duplicate Sample Analysis

Field duplicate sample analysis is used to assess the precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices and 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. An RPD will only be calculated if at least one of the sample results is above the Limit of Quantitation (LOQ; synonymous with reporting limit).

Results (in µg/Kg) for the field duplicate samples are summarized in the table, below.

Sample ID / Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
FTA-20-SW / FTA-BD-2	Benzene	17 U	16.6 U	AC
	Ethylbenzene	34 U	33.4 U	AC
	o-Xylene	34 U	33.4 U	AC
	p&m-Xylene	68 U	66.5 U	AC

	Toluene	34 U	33.4 U	AC
	Total Xylenes	102 U	100 U	AC
FTA-30-SW / FTA-BD-3	Benzene	15.3 U	15.8 U	AC
	Ethylbenzene	30.6 U	31.5 U	AC
	o-Xylene	30.6 U	31.5 U	AC
	p&m-Xylene	61 U	63 U	AC
	Toluene	30.6 U	31.5 U	AC
	Total Xylenes	92 U	94.5 U	AC

AC – Acceptable

U – The analyte was analyzed for but not detected

All results for field duplicate samples were within control limits.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

9. References

Shannon & Wilson, Inc. 2015. Data Validation Program Plan, Flint Hills Resources Alaska, LLC, North Pole, Alaska. June.

USEPA. 2008. National Functional Guidelines for Organic Methods Data Review. Guidance document, United States Environmental Protection Agency. June.

DATA VALIDATION CHECKLIST FOR VOCs

VOCs (BTEX): SW-846 8021B	Reported		Performance Acceptable		Not Required	
	No	Yes	No	Yes		
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)						
Tier II Validation						
Holding Times		X	X			
Reporting limits (units)		X		X		
Blanks						
A. Method Blanks		X		X		
B. Trip Blanks		X	X			
C. Equipment Blanks					X	
Laboratory Control Sample (LCS) Accuracy (%R)		X		X		
Laboratory Control Sample Duplicate (LCSD) Accuracy (%R)		X		X		
LCS/LCSD Precision (RPD)		X		X		
Matrix Spike (MS) Accuracy (%R)		X		X		
Matrix Spike Duplicate (MSD) Accuracy (%R)		X		X		
MS/MSD Precision (RPD)		X		X		
Field Duplicate Sample RPD		X		X		
Field/Laboratory Duplicate Sample RPD					X	
Surrogate Internal Standard Spike (%R)		X		X		

%R – Percent Recovery

RPD – Relative Percent Difference

GASOLINE RANGE ORGANICS (GRO) ANALYSIS

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
AK101	Soil	28 days from collection to analysis	Cool to <6 °C, Methanol

The analyses that exceeded the holding time are presented in the following table.

Sample IDs	Holding Time	Criteria
Trip Blank 1 (Collection Date: 5/7/15)	Analysis Completed	96 Days
Trip Blank 3 (Collection Date: 5/6/15)		97 Days

Sample results associated with sample locations analyzed by analytical method SW-846 8027B were qualified, as specified in the table below. All other holding times were met.

Criteria	Qualification	
	Detected Analytes	Non-detect Analytes
Analysis completed greater than or equal to two times holding time	JL	R

2. Blank Contamination

Quality assurance (QA) blanks (i.e. laboratory method blanks and trip blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the estimated detection limit (EDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

All compound detections were not associated with blank contamination, with the exception of the compounds listed in the following table. Note that sample results that are greater than the BAL are not associated with blanks exhibiting contamination, and therefore do not require qualification. Sample results less than the BAL are associated with the following sample locations were qualified as listed in the following table.

Sample Location	Analyte	Sample Result	Qualification
FTA-26-SW FTA-27-SW	GRO	Detected sample results < LOQ	"UB" at LOQ

3. Surrogate Internal Standard Compounds

All field samples, blanks, LCS, and MS/MSD are spiked with surrogate internal standard compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. VOC analysis requires that all surrogates associated with the analysis exhibit recoveries within the method specified acceptance limits of 50 – 150%.

All surrogate internal standard recoveries were within the acceptance limits.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The spiked compounds used in the MS/MSD analysis must exhibit recoveries within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS and MSD results must be within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of two or greater. Sample results associated with MS/MSD exceedances where the parent samples are not site-specific are not qualified.

A MS/MSD sample was not analyzed in association with this dataset.

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD (also called Ongoing Precision and Recovery (OPR)) analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The spiked compounds used in the LCS/LCSD analysis must exhibit recoveries within the laboratory-established acceptance limits. The relative percent difference (RPD) between the LCS and LCSD results must be within the laboratory-established acceptance limit of 20%.

The LCS/LCSD analyses and associated RPD analysis exhibited recoveries were within the control limits for all compounds.

6. Laboratory Duplicate Sample Analysis

For select analyses, or when insufficient volume is submitted for analysis of an MS and MSD, the laboratory may analyze a project sample twice. The relative percent difference (RPD) between the parent sample and the laboratory duplicate sample is used to assess the precision of the analytical method.

The laboratory duplicate sample analysis was not performed on a sample location within this dataset.

7. Field Duplicate Sample Analysis

Field duplicate sample analysis is used to assess the precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices and 50% for soil matrices is applied to the

RPD between the parent sample and the field duplicate. An RPD will only be calculated if at least one of the sample results is above the Limit of Quantitation (LOQ; synonymous with reporting limit).

Results (in mg/Kg) for the field duplicate samples are summarized in the table, below.

Sample ID / Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
FTA-20-SW / FTA-BD-2	GRO	3.40 U	3.34 U	AC
FTA-30-SW / FTA-BD-3	GRO	3.06 U	3.15 U	AC

AC – Acceptable

GRO – gasoline range organics

U – The analyte was analyzed for but not detected

The calculated RPD between the parent sample and field duplicate was acceptable.

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR GRO

GRO: AK101	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Holding Times		X	X		
Reporting limits (units)		X		X	
Blanks					
D. Method Blanks		X		X	
E. Trip Blanks		X	X		
F. Equipment Blanks					X
Laboratory Control Sample (LCS) Accuracy (%R)		X		X	
Laboratory Control Sample Duplicate (LCSD) Accuracy (%R)		X		X	
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS) Accuracy (%R)					X
Matrix Spike Duplicate (MSD) Accuracy (%R)					X
MS/MSD Precision (RPD)					X
Field Duplicate Sample RPD		X		X	
Field/Laboratory Duplicate Sample RPD					X
Surrogate Internal Standard Spike (%R)		X		X	

%R – Percent Recovery

RPD – Relative Percent Difference

DIESEL RANGE ORGANICS (DRO) ANALYSIS

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
AK102	Soil	14 days from collection to extraction and 40 days from extraction to analysis	Cool to <6 °C

All analyses were completed within the specified holding time and were properly preserved.

2. Blank Contamination

Quality assurance (QA) blanks (i.e. laboratory method blanks and trip blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the estimated detection limit (EDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

All compound detections were not associated with blank contamination, with the exception of the compounds listed in the following table. Note that sample results that are greater than the BAL are not associated with blanks exhibiting contamination, and therefore do not require qualification. Sample results less than the BAL are associated with the following sample locations were qualified as listed in the following table.

Sample Location	Analyte	Sample Result	Qualification
FTA-BD-2	DRO	Detected sample results < LOQ	"UB" at LOQ

3. Surrogate Internal Standard Compounds

All field samples, blanks, LCS, and MS/MSD are spiked with surrogate internal standard compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. VOC analysis requires that all surrogates associated with the analysis exhibit recoveries within the method specified acceptance limits of 50 – 150%.

One surrogate recovery associated with the LCSD was outside the acceptance limits, however, the recovery of individual analytes associated with the surrogate are within acceptance limits, therefore qualification is not required (Shannon & Wilson 2015).

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The spiked compounds used in the MS/MSD analysis must exhibit recoveries within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS and MSD results must be within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of two or greater. Sample results associated with MS/MSD exceedances where the parent samples are not site-specific are not qualified.

A MS/MSD sample was not analyzed in association with this dataset.

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD (also called Ongoing Precision and Recovery (OPR)) analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The spiked compounds used in the LCS/LCSD analysis must exhibit recoveries within the laboratory-established acceptance limits. The relative percent difference (RPD) between the LCS and LCSD results must be within the laboratory-established acceptance limit of 20%.

The LCS/LCSD analyses and associated RPD analysis exhibited recoveries were within the control limits for all compounds.

6. Laboratory Duplicate Sample Analysis

For select analyses, or when insufficient volume is submitted for analysis of an MS and MSD, the laboratory may analyze a project sample twice. The relative percent difference (RPD) between the parent sample and the laboratory duplicate sample is used to assess the precision of the analytical method.

The laboratory duplicate sample analysis was not performed on a sample location within this dataset.

7. Field Duplicate Sample Analysis

Field duplicate sample analysis is used to assess the precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices and 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. An RPD will only be calculated if at least one of the sample results is above the Limit of Quantitation (LOQ; synonymous with reporting limit).

Results (in mg/Kg) for the field duplicate samples are summarized in the table, below.

Sample ID / Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
FTA-20-SW / FTA-BD-2	DRO	13.7 J	10.3 J	AC
FTA-30-SW / FTA-BD-3	DRO	135	2240	177%

AC – Acceptable

DRO – diesel range organics

The DRO results for field duplicate samples FTA-30-SW and FTA-BD-3 exhibited an RPD greater than the control limit. The criteria used to evaluate the RPD recoveries are presented in the following table. The sample results are qualified as documented in the table below.

Criteria	Action	
	Detected Analytes	Not Detected Analytes
$RPD \leq CL$	No qualification	
$RPD > CL$	J	UJ

8. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

9. References

Shannon & Wilson, Inc. 2015. Data Validation Program Plan, Flint Hills Resources Alaska, LLC, North Pole, Alaska. June.

USEPA. 2008. National Functional Guidelines for Organic Methods Data Review. Guidance document, United States Environmental Protection Agency. June.

DATA VALIDATION CHECKLIST FOR DRO

DRO: AK102	Reported		Performance Acceptable		Not Required	
	No	Yes	No	Yes		
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)						
Tier II Validation						
Holding Times		X		X		
Reporting limits (units)		X		X		
Blanks						
G. Method Blanks		X	X			
H. Trip Blanks					X	
I. Equipment Blanks					X	
Laboratory Control Sample (LCS) Accuracy (%R)		X		X		
Laboratory Control Sample Duplicate (LCSD) Accuracy (%R)		X		X		
LCS/LCSD Precision (RPD)		X		X		
Matrix Spike (MS) Accuracy (%R)					X	
Matrix Spike Duplicate (MSD) Accuracy (%R)					X	
MS/MSD Precision (RPD)					X	
Field Duplicate Sample RPD		X	X			
Field/Laboratory Duplicate Sample RPD					X	
Surrogate Internal Standard Spike (%R)		X		X		

%R – Percent Recovery
 RPD – Relative Percent Difference

Validation Performed By: Kylie Kegerreis

Date: October 19, 2015

Peer Review: Cassandra McCloud

Date: October 27, 2015

**ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
LABORATORY DATA REVIEW CHECKLIST**

Laboratory Data Review Checklist

Completed by:	Kylie Kegerreis		
Title:	Environmental Engineering Specialist	Date:	10/14/2015
CS Report Name:	NPR - FTA Exc.	Report Date:	10/26/2015
Consultant Firm:	ARCADIS US, Inc.		
Laboratory Name:	SGS North America, Inc.	Laboratory Report Number:	1158398
ADEC File Number:		ADEC RecKey Number:	

1. Laboratory

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

☒ Yes ☐ No ☐ NA (Please explain.) 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 ☐ NA (Please explain) Comments:

Samples transferred from Fairbanks, Alaska location to Anchorage, Alaska location.
--

2. Chain of Custody (COC)

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

☒ Yes ☐ No ☐ NA (Please explain) Comments:

--

b. Correct analyses requested?

☒ Yes ☐ No ☐ NA (Please explain) Comments:

--

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt ($4^{\circ} \pm 2^{\circ}$ C)?

☒ Yes ☐ No ☐ NA (Please explain) Comments:

Temperature = 4.2 °C

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

Methanol - GRO (AK101) and BTEX (8021B)

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

Samples in good condition - no leaks/cracks/breakage

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

☐ Yes ☐ No ☒ NA (Please explain)

Comments:

No discrepancies

e. Data quality or usability affected? (Please explain)

Comments:

Data quality or usability not affected

4. Case Narrative

a. Present and understandable?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

Samples "Trip Blank 1" and "Trip Blank 3" received and analyzed past hold time (discussed in Section 5b). All others discussed in Sections below.

c. Were all corrective actions documented?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

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

Comments:

Data quality/usability not effected according to case narrative.

5. Samples Results

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

b. All applicable holding times met?

☐ Yes ☒ No ☐ NA (Please explain)

Comments:

Hold Times: GRO = 28 days, DRO = Extraction w/in 14 days, Analysis w/in 40 days of extraction.
BTEX = 14 days
Collection Date: 7/30/15 (Trip Blank 1 = 5/7/15, Trip Blank 3 = 5/6/15)
Prep Date (Batch[es]): DRO - 8/5/15 (33759), 8/6/15 (33769), 8/10/15 (33803); GRO and BTEX - 7/30/15 (27693, 27700, and 27702)
Analyzed (Batch[es]): DRO - 8/8 - 8/9/15 (11996), 8/9/15 (12003), 8/10/15 (12001), 8/11/15 (12000 and 12004); GRO and BTEX - 8/11/05 (12573, 12575, and 12577)
Trip Blank 1 and Trip Blank 3, analysis date for BTEX and GRO > 2x HT; Qualifier "R"

c. All soils reported on a dry weight basis?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

mg/kg (DRO and GRO), ug/kg (BTEX)

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

☐ Yes ☒ No ☐ NA (Please explain)

Comments:

benzene = 0.025 mg/kg. Some of the provided PQLs for benzene are above the Cleanup Level, however, SGS provides the LOD for non-detect results, and all LODs for benzene are below the Cleanup Level.

e. Data quality or usability affected? (Please explain)

Comments:

Rejected Results: Trip Blank 1 - benzene, ethylbenzene, o-xylene, p&m-xylene, xylenes (total); Trip Blank 3 - all results
Qualified Results: Trip Blank 1 - GRO = 0.808 JL mg/kg, toluene = 54.4 JL ug/kg

6. QC Samples

a. Method Blank

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

ii. All method blank results less than PQL?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

(1) GRO MB (Lab ID: 1283010) Below PQL but above DL.
(2) Toluene MB (Lab ID: 1283010) Below PQL but above DL
(3) Toluene MB (Lab ID: 1283022) Below PQL but above DL
(4) DRO MB (Lab ID: 1281871) Below PQL but above DL

iii. If above PQL, what samples are affected?

Comments:

(1) "FTA-26-SW" and "FTA-27-SW"
(2) None
(3) None
(4) "FTA-BD-2"

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

UB

v. Data quality or usability affected? (Please explain)

Comments:

Usability not affected, but following qualifications required:

Results less than LOQ; qualify "UB" at LOQ

"FTA-26-SW" change from 1.79 J to 5.86 UB mg/kg, "FTA-27-SW" change from 1.89 J to 6.22 UB mg/kg, "FTA-BD-2" change from 10.3 J to 23.4 UB mg/kg

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 ☐ NA (Please explain)

Comments:

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

☐ Yes ☐ No ☒ NA (Please explain)

Comments:

Metals/Inorganics analyses not performed.

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 ☐ NA (Please explain) Comments:

GRO: 99/98%, 97/101%, 99/99% (limits = 60-120%)
BTEX: 95-98/91-94%, 94-98/97-100%, 98-111/94-108% (limits = 70 [T], 75 [B,E,o-X], 80 [m/p-X] to 125%
DRO: 107/97%, 105/124%, 102/106% (limits = 75-125%)

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/DMSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

☒ Yes ☐ No ☐ NA (Please explain) Comments:

All LCS/LCSD and MS/MSD RPDs w/in limits (< 20)

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

Comments:

N/A

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

☐ Yes ☐ No ☒ NA (Please explain) Comments:

vii. Data quality or usability affected? (Please explain)

Comments:

Data quality or usability not affected

c. Surrogates - Organics Only

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

☐ Yes ☒ No ☐ NA (Please explain) Comments:

DRO surrogate recovery not reported for FTA-BD-3

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 ☐ NA (Please explain) Comments:

Surrogate for DRO LCSD associated with prep/analytical batch 33769/12001 %R = 123 (Limits = 50-150%), GRO: Limits = 50-150%, BTEX: Limits = 72-119%

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

*

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

Comments:

Data quality or usability is not affected because the recovery of individual analytes associated with that surrogate are within laboratory control limits for the QC sample (pg. 18 of QAPP)

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 ☐ NA (Please explain.)

Comments:

Trip Blank 2 provided in cooler (Trip Blanks 1 and 3 were sent to the lab at a later date in a separate cooler and were outside holding time, see previous explanation).

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 ☐ NA (Please explain.)

Comments:

iii. All results less than PQL?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

iv. If above PQL, what samples are affected?

Comments:

N/A

v. Data quality or usability affected? (Please explain.)

Comments:

Data quality or usability is not affected

e. Field Duplicate

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

ii. Submitted blind to lab?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

FTA-BD-2 is duplicate of FTA-20-SW
FTA-BD-3 is duplicate of FTA-30-SW

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 ☐ NA (Please explain)

Comments:

FTA-BD-2/FTA-20-SW pair: No results > LOQ; RPD not calculated
FTA-BD-3/FTA-30-SW pair: DRO RPD = 177%; Qual detections "J"; All other results < LOQ; RPD not calculated

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

Some data requires qualification, but is still usable:
"FTA-30-SW" (Parent Sample): DRO Result = 135 J ug/kg
"FTA-BD-3" (Duplicate Sample): DRO Result = 2240 J ug/kg

f. Decontamination or Equipment Blank (if applicable)

☐ Yes ☐ No ☒ NA (Please explain)

Comments:

Decontamination or equipment blank not collected.

i. All results less than PQL?

☐ Yes ☐ No ☒ NA (Please explain)

Comments:

ii. If above PQL, what samples are affected?

Comments:

N/A

iii. Data quality or usability affected? (Please explain.)

Comments:

Data quality or usability not affected.

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

a. Defined and appropriate?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

The following results were detected between the DL and the LOQ and were qualified "J" to indicate trace detection: "FTA-12-SW": DRO = 13.5 J mg/kg, GRO = 1.61 J mg/kg; "FTA-13-SW": DRO = 11.0 J mg/kg, GRO = 1.85 J mg/kg, benzene = 13.4 J ug/kg, o-xylene = 21.7 J ug/kg, p&m-xylenes = 44.4 J ug/kg, xylenes (total) = 66.1 J ug/kg; "FTA-14-SW": GRO = 2.10 J mg/kg, benzene = 12.4 J ug/kg, p&m-xylene = 39.1 J ug/kg; "FTA-15-SW": DRO = 19.7 J mg/kg;
"FTA-16-SW": DRO = 16.0 J mg/kg; "FTA-18-SW": DRO = 13.4 J mg/kg;
"FTA-19-SW": DRO = 13.0 J mg/kg; "FTA-20-SW": DRO = 13.7 J mg/kg; "FTA-21-SW": DRO = 13.5 J mg/kg; "FTA-24-SW": DRO = 20.7 J mg/kg

Reset Form

**CHAIN OF CUSTODY /
LABORATORY QUALIFIERS /
CORRECTED SAMPLE ANALYSIS DATA SHEETS**

Laboratory Report of Analysis

To: Flint Hills Resources- North Pole
1100 H & H Lane
North Pole, AK 99705
(907)488-0723

Report Number: **1158398**

Client Project: **NPR-FTA Exc.**

Dear Loren Garner,

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 Jennifer 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.

Jennifer Dawkins
Project Manager

Date

Case Narrative

Customer: MPCOAKP

Flint Hills Resources- North Pole

Project: 1158398

NPR-FTA Exc.

Refer to the sample receipt form for information on sample condition.

1158398023 TB

Trip Blank 1

AK101/8021b - sample received and analyzed past hold time.

1158398025 TB

Trip Blank 3

AK101/8021b - sample received and analyzed past hold time.

1281576 MB

XXX/33759]

AK103 MB - RRO is detected greater than the LOQ.

1281871 MB

XXX/33769]

AK102 - DRO is detected in the MB above half but less than the LOQ.

1281872 LCS

XXX/33769

AK102/103 - LCSD surrogate recoveries for 5a-androstane (123%) and n-triacontane (122%) do not meet QC criteria; however the sample surrogates are within criteria.

1281873 LCSD

XXX/3376

AK102/103 LCSD - Surrogate recoveries for 5a-androstane (123%) and n-triacontane (122%) do not meet QC criteria; however the sample surrogates are within criteria.

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, indemnification 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, 8021B, 8082A, 8260B, 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
D	The analyte concentration is the result of a dilution.
DF	Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
F	Indicates value that is greater than or equal to the DL
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
JL	The analyte was positively identified, but the quantitation is a low estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
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
M	A matrix effect was present.
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
Q	QC parameter out of acceptance range.
R	Rejected
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.

Sample Summary

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Collected</u>	<u>Received</u>	<u>Matrix</u>
FTA-11-SW	1158398001	07/30/2015	08/04/2015	Soil/Solid (dry weight)
FTA-12-SW	1158398002	07/30/2015	08/04/2015	Soil/Solid (dry weight)
FTA-13-SW	1158398003	07/30/2015	08/04/2015	Soil/Solid (dry weight)
FTA-14-SW	1158398004	07/30/2015	08/04/2015	Soil/Solid (dry weight)
FTA-15-SW	1158398005	07/30/2015	08/04/2015	Soil/Solid (dry weight)
FTA-16-SW	1158398006	07/30/2015	08/04/2015	Soil/Solid (dry weight)
FTA-17-SW	1158398007	07/30/2015	08/04/2015	Soil/Solid (dry weight)
FTA-18-SW	1158398008	07/30/2015	08/04/2015	Soil/Solid (dry weight)
FTA-19-SW	1158398009	07/30/2015	08/04/2015	Soil/Solid (dry weight)
FTA-20-SW	1158398010	07/30/2015	08/04/2015	Soil/Solid (dry weight)
FTA-21-SW	1158398011	07/30/2015	08/04/2015	Soil/Solid (dry weight)
FTA-22-SW	1158398012	07/30/2015	08/04/2015	Soil/Solid (dry weight)
FTA-23-SW	1158398013	07/30/2015	08/04/2015	Soil/Solid (dry weight)
FTA-24-SW	1158398014	07/30/2015	08/04/2015	Soil/Solid (dry weight)
FTA-25-SW	1158398015	07/30/2015	08/04/2015	Soil/Solid (dry weight)
FTA-26-SW	1158398016	07/30/2015	08/04/2015	Soil/Solid (dry weight)
FTA-27-SW	1158398017	07/30/2015	08/04/2015	Soil/Solid (dry weight)
FTA-28-SW	1158398018	07/30/2015	08/04/2015	Soil/Solid (dry weight)
FTA-29-SW	1158398019	07/30/2015	08/04/2015	Soil/Solid (dry weight)
FTA-30-SW	1158398020	07/30/2015	08/04/2015	Soil/Solid (dry weight)
FTA-BD-2	1158398021	07/30/2015	08/04/2015	Soil/Solid (dry weight)
FTA-BD-3	1158398022	07/30/2015	08/04/2015	Soil/Solid (dry weight)
Trip Blank 1	1158398023	05/07/2015	08/04/2015	Soil/Solid (dry weight)
Trip Blank 2	1158398024	07/29/2015	08/04/2015	Soil/Solid (dry weight)
Trip Blank 3	1158398025	05/06/2015	08/04/2015	Soil/Solid (dry weight)

<u>Method</u>	<u>Method Description</u>
AK101	AK101/8021 Combo. (S)
SW8021B	AK101/8021 Combo. (S)
AK102	Diesel Range Organics (S)
SM21 2540G	Percent Solids SM2540G

Detectable Results Summary

Client Sample ID: **FTA-11-SW**

Lab Sample ID: 1158398001

Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Diesel Range Organics	26.1	mg/Kg

Client Sample ID: **FTA-12-SW**

Lab Sample ID: 1158398002

Semivolatile Organic Fuels

Volatile Fuels

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Diesel Range Organics	13.5J	mg/Kg
Gasoline Range Organics	1.61J	mg/Kg
Toluene	95.2	ug/Kg

Client Sample ID: **FTA-13-SW**

Lab Sample ID: 1158398003

Semivolatile Organic Fuels

Volatile Fuels

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Diesel Range Organics	11.0J	mg/Kg
Benzene	13.4J	ug/Kg
Gasoline Range Organics	1.85J	mg/Kg
o-Xylene	21.7J	ug/Kg
P & M -Xylene	44.4J	ug/Kg
Xylenes (total)	66.1J	ug/Kg

Client Sample ID: **FTA-14-SW**

Lab Sample ID: 1158398004

Semivolatile Organic Fuels

Volatile Fuels

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Diesel Range Organics	28.5	mg/Kg
Benzene	12.4J	ug/Kg
Gasoline Range Organics	2.10J	mg/Kg
P & M -Xylene	39.1J	ug/Kg
Toluene	129	ug/Kg

Client Sample ID: **FTA-15-SW**

Lab Sample ID: 1158398005

Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Diesel Range Organics	19.7J	mg/Kg

Client Sample ID: **FTA-16-SW**

Lab Sample ID: 1158398006

Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Diesel Range Organics	16.0J	mg/Kg

Client Sample ID: **FTA-17-SW**

Lab Sample ID: 1158398007

Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Diesel Range Organics	35.2	mg/Kg

Client Sample ID: **FTA-18-SW**

Lab Sample ID: 1158398008

Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Diesel Range Organics	13.4J	mg/Kg

Client Sample ID: **FTA-19-SW**

Lab Sample ID: 1158398009

Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Diesel Range Organics	13.0J	mg/Kg

Client Sample ID: **FTA-20-SW**

Lab Sample ID: 1158398010

Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Diesel Range Organics	13.7J	mg/Kg

Detectable Results Summary

Client Sample ID: FTA-21-SW			
Lab Sample ID: 1158398011	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Semivolatile Organic Fuels	Diesel Range Organics	13.5J	mg/Kg
Client Sample ID: FTA-22-SW			
Lab Sample ID: 1158398012	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Semivolatile Organic Fuels	Diesel Range Organics	36.8	mg/Kg
Client Sample ID: FTA-23-SW			
Lab Sample ID: 1158398013	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Semivolatile Organic Fuels	Diesel Range Organics	31.4	mg/Kg
Client Sample ID: FTA-24-SW			
Lab Sample ID: 1158398014	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Semivolatile Organic Fuels	Diesel Range Organics	20.7J	mg/Kg
Client Sample ID: FTA-25-SW			
Lab Sample ID: 1158398015	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Semivolatile Organic Fuels	Diesel Range Organics	56.2	mg/Kg
Client Sample ID: FTA-26-SW			
Lab Sample ID: 1158398016	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Semivolatile Organic Fuels	Diesel Range Organics	57.3	mg/Kg
Volatile Fuels	Gasoline Range Organics	1.79J	mg/Kg
Client Sample ID: FTA-27-SW			
Lab Sample ID: 1158398017	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Semivolatile Organic Fuels	Diesel Range Organics	54.3	mg/Kg
Volatile Fuels	Gasoline Range Organics	1.89J	mg/Kg
Client Sample ID: FTA-28-SW			
Lab Sample ID: 1158398018	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Semivolatile Organic Fuels	Diesel Range Organics	156	mg/Kg
Client Sample ID: FTA-29-SW			
Lab Sample ID: 1158398019	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Semivolatile Organic Fuels	Diesel Range Organics	85.5	mg/Kg
Client Sample ID: FTA-30-SW			
Lab Sample ID: 1158398020	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Semivolatile Organic Fuels	Diesel Range Organics	135	mg/Kg
Client Sample ID: FTA-BD-2			
Lab Sample ID: 1158398021	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Semivolatile Organic Fuels	Diesel Range Organics	10.3J	mg/Kg
Client Sample ID: FTA-BD-3			
Lab Sample ID: 1158398022	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Semivolatile Organic Fuels	Diesel Range Organics	2240	mg/Kg

Detectable Results Summary

Client Sample ID: **Trip Blank 1**

Lab Sample ID: 1158398023

Volatile Fuels

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Gasoline Range Organics	0.808J	mg/Kg
Toluene	54.4	ug/Kg

Print Date: 10/26/2015 1:47:25PM

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Results of FTA-11-SW

Client Sample ID: **FTA-11-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398001
 Lab Project ID: 1158398

Collection Date: 07/30/15 20:10
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):85.9
 Location:

Results by Semivolatile Organic Fuels

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	26.1		23.1	7.17	mg/Kg	1		08/08/15 21:11
Surrogates								
5a Androstane (surr)	94.4		50-150		%	1		08/08/15 21:11

Batch Information

Analytical Batch: XFC11996
 Analytical Method: AK102
 Analyst: KJO
 Analytical Date/Time: 08/08/15 21:11
 Container ID: 1158398001-A

Prep Batch: XXX33759
 Prep Method: SW3550C
 Prep Date/Time: 08/05/15 14:50
 Prep Initial Wt./Vol.: 30.213 g
 Prep Extract Vol: 1 mL



Results of FTA-11-SW

Client Sample ID: **FTA-11-SW**
Client Project ID: **NPR-FTA Exc.**
Lab Sample ID: 1158398001
Lab Project ID: 1158398

Collection Date: 07/30/15 20:10
Received Date: 08/04/15 09:30
Matrix: Soil/Solid (dry weight)
Solids (%):85.9
Location:

Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	3.21 U	6.43	1.93	mg/Kg	1		08/11/15 00:20
Surrogates							
4-Bromofluorobenzene (surr)	106	50-150		%	1		08/11/15 00:20

Batch Information

Analytical Batch: VFC12573
Analytical Method: AK101
Analyst: CRD
Analytical Date/Time: 08/11/15 00:20
Container ID: 1158398001-B

Prep Batch: VXX27693
Prep Method: SW5035A
Prep Date/Time: 07/30/15 20:10
Prep Initial Wt./Vol.: 25.922 g
Prep Extract Vol: 28.6509 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	16.1 U	32.2	10.3	ug/Kg	1		08/11/15 00:20
Ethylbenzene	32.1 U	64.3	20.1	ug/Kg	1		08/11/15 00:20
o-Xylene	32.1 U	64.3	20.1	ug/Kg	1		08/11/15 00:20
P & M -Xylene	64.5 U	129	38.6	ug/Kg	1		08/11/15 00:20
Toluene	32.1 U	64.3	20.1	ug/Kg	1		08/11/15 00:20
Xylenes (total)	96.5 U	193	58.7	ug/Kg	1		08/11/15 00:20
Surrogates							
1,4-Difluorobenzene (surr)	85.7	72-119		%	1		08/11/15 00:20

Batch Information

Analytical Batch: VFC12573
Analytical Method: SW8021B
Analyst: CRD
Analytical Date/Time: 08/11/15 00:20
Container ID: 1158398001-B

Prep Batch: VXX27693
Prep Method: SW5035A
Prep Date/Time: 07/30/15 20:10
Prep Initial Wt./Vol.: 25.922 g
Prep Extract Vol: 28.6509 mL

Results of FTA-12-SW

Client Sample ID: **FTA-12-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398002
 Lab Project ID: 1158398

Collection Date: 07/30/15 20:18
 Received Date: 08/04/15 09:30
 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	13.5 J	21.3	6.62	mg/Kg	1		08/08/15 21:32
Surrogates							
5a Androstane (surr)	96.9	50-150		%	1		08/08/15 21:32

Batch Information

Analytical Batch: XFC11996
 Analytical Method: AK102
 Analyst: KJO
 Analytical Date/Time: 08/08/15 21:32
 Container ID: 1158398002-A

Prep Batch: XXX33759
 Prep Method: SW3550C
 Prep Date/Time: 08/05/15 14:50
 Prep Initial Wt./Vol.: 30.329 g
 Prep Extract Vol: 1 mL

Results of FTA-12-SW

Client Sample ID: **FTA-12-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398002
 Lab Project ID: 1158398

Collection Date: 07/30/15 20:18
 Received Date: 08/04/15 09:30
 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	1.61 J	5.01	1.50	mg/Kg	1		08/11/15 03:30
Surrogates							
4-Bromofluorobenzene (surr)	108	50-150		%	1		08/11/15 03:30

Batch Information

Analytical Batch: VFC12573
 Analytical Method: AK101
 Analyst: CRD
 Analytical Date/Time: 08/11/15 03:30
 Container ID: 1158398002-B

Prep Batch: VXX27693
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 20:18
 Prep Initial Wt./Vol.: 29.228 g
 Prep Extract Vol: 27.1389 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	12.5 U	25.0	8.01	ug/Kg	1		08/11/15 03:30
Ethylbenzene	25.1 U	50.1	15.6	ug/Kg	1		08/11/15 03:30
o-Xylene	25.1 U	50.1	15.6	ug/Kg	1		08/11/15 03:30
P & M -Xylene	50.0 U	100	30.1	ug/Kg	1		08/11/15 03:30
Toluene	95.2	50.1	15.6	ug/Kg	1		08/11/15 03:30
Xylenes (total)	75.0 U	150	45.7	ug/Kg	1		08/11/15 03:30
Surrogates							
1,4-Difluorobenzene (surr)	84	72-119		%	1		08/11/15 03:30

Batch Information

Analytical Batch: VFC12573
 Analytical Method: SW8021B
 Analyst: CRD
 Analytical Date/Time: 08/11/15 03:30
 Container ID: 1158398002-B

Prep Batch: VXX27693
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 20:18
 Prep Initial Wt./Vol.: 29.228 g
 Prep Extract Vol: 27.1389 mL

Results of FTA-13-SW

Client Sample ID: **FTA-13-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398003
 Lab Project ID: 1158398

Collection Date: 07/30/15 20:26
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):94.5
 Location:

Results by Semivolatile Organic Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	11.0 J	21.1	6.53	mg/Kg	1		08/08/15 21:52
Surrogates							
5a Androstane (surr)	93	50-150		%	1		08/08/15 21:52

Batch Information

Analytical Batch: XFC11996
 Analytical Method: AK102
 Analyst: KJO
 Analytical Date/Time: 08/08/15 21:52
 Container ID: 1158398003-A

Prep Batch: XXX33759
 Prep Method: SW3550C
 Prep Date/Time: 08/05/15 14:50
 Prep Initial Wt./Vol.: 30.134 g
 Prep Extract Vol: 1 mL

Results of FTA-13-SW

Client Sample ID: **FTA-13-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398003
 Lab Project ID: 1158398

Collection Date: 07/30/15 20:26
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):94.5
 Location:

Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.85 J	4.63	1.39	mg/Kg	1		08/11/15 03:49
Surrogates							
4-Bromofluorobenzene (surr)	105	50-150		%	1		08/11/15 03:49

Batch Information

Analytical Batch: VFC12573
 Analytical Method: AK101
 Analyst: CRD
 Analytical Date/Time: 08/11/15 03:49
 Container ID: 1158398003-B

Prep Batch: VXX27693
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 20:26
 Prep Initial Wt./Vol.: 30.496 g
 Prep Extract Vol: 26.6695 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	13.4 J	23.1	7.40	ug/Kg	1		08/11/15 03:49
Ethylbenzene	23.1 U	46.3	14.4	ug/Kg	1		08/11/15 03:49
o-Xylene	21.7 J	46.3	14.4	ug/Kg	1		08/11/15 03:49
P & M -Xylene	44.4 J	92.5	27.8	ug/Kg	1		08/11/15 03:49
Toluene	23.1 U	46.3	14.4	ug/Kg	1		08/11/15 03:49
Xylenes (total)	66.1 J	139	42.2	ug/Kg	1		08/11/15 03:49
Surrogates							
1,4-Difluorobenzene (surr)	85.4	72-119		%	1		08/11/15 03:49

Batch Information

Analytical Batch: VFC12573
 Analytical Method: SW8021B
 Analyst: CRD
 Analytical Date/Time: 08/11/15 03:49
 Container ID: 1158398003-B

Prep Batch: VXX27693
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 20:26
 Prep Initial Wt./Vol.: 30.496 g
 Prep Extract Vol: 26.6695 mL

Results of FTA-14-SW

Client Sample ID: **FTA-14-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398004
 Lab Project ID: 1158398

Collection Date: 07/30/15 20:34
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):86.4
 Location:

Results by Semivolatile Organic Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	28.5	23.0	7.14	mg/Kg	1		08/08/15 22:13
Surrogates							
5a Androstane (surr)	90	50-150		%	1		08/08/15 22:13

Batch Information

Analytical Batch: XFC11996
 Analytical Method: AK102
 Analyst: KJO
 Analytical Date/Time: 08/08/15 22:13
 Container ID: 1158398004-A

Prep Batch: XXX33759
 Prep Method: SW3550C
 Prep Date/Time: 08/05/15 14:50
 Prep Initial Wt./Vol.: 30.147 g
 Prep Extract Vol: 1 mL



Results of FTA-14-SW

Client Sample ID: **FTA-14-SW**
Client Project ID: **NPR-FTA Exc.**
Lab Sample ID: 1158398004
Lab Project ID: 1158398

Collection Date: 07/30/15 20:34
Received Date: 08/04/15 09:30
Matrix: Soil/Solid (dry weight)
Solids (%):86.4
Location:

Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	2.10 J	5.92	1.78	mg/Kg	1		08/11/15 05:05
Surrogates							
4-Bromofluorobenzene (surr)	107	50-150		%	1		08/11/15 05:05

Batch Information

Analytical Batch: VFC12573
Analytical Method: AK101
Analyst: CRD
Analytical Date/Time: 08/11/15 05:05
Container ID: 1158398004-B

Prep Batch: VXX27693
Prep Method: SW5035A
Prep Date/Time: 07/30/15 20:34
Prep Initial Wt./Vol.: 28.191 g
Prep Extract Vol: 28.8307 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	12.4 J	29.6	9.47	ug/Kg	1		08/11/15 05:05
Ethylbenzene	29.6 U	59.2	18.5	ug/Kg	1		08/11/15 05:05
o-Xylene	29.6 U	59.2	18.5	ug/Kg	1		08/11/15 05:05
P & M -Xylene	39.1 J	118	35.5	ug/Kg	1		08/11/15 05:05
Toluene	129	59.2	18.5	ug/Kg	1		08/11/15 05:05
Xylenes (total)	89.0 U	178	54.0	ug/Kg	1		08/11/15 05:05
Surrogates							
1,4-Difluorobenzene (surr)	85.8	72-119		%	1		08/11/15 05:05

Batch Information

Analytical Batch: VFC12573
Analytical Method: SW8021B
Analyst: CRD
Analytical Date/Time: 08/11/15 05:05
Container ID: 1158398004-B

Prep Batch: VXX27693
Prep Method: SW5035A
Prep Date/Time: 07/30/15 20:34
Prep Initial Wt./Vol.: 28.191 g
Prep Extract Vol: 28.8307 mL

Results of FTA-15-SW

Client Sample ID: **FTA-15-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398005
 Lab Project ID: 1158398

Collection Date: 07/30/15 20:42
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):88.9
 Location:

Results by Semivolatile Organic Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	19.7 J	22.3	6.91	mg/Kg	1		08/08/15 22:34
Surrogates							
5a Androstane (surr)	101	50-150		%	1		08/08/15 22:34

Batch Information

Analytical Batch: XFC11996
 Analytical Method: AK102
 Analyst: KJO
 Analytical Date/Time: 08/08/15 22:34
 Container ID: 1158398005-A

Prep Batch: XXX33759
 Prep Method: SW3550C
 Prep Date/Time: 08/05/15 14:50
 Prep Initial Wt./Vol.: 30.253 g
 Prep Extract Vol: 1 mL

Results of FTA-15-SW

Client Sample ID: **FTA-15-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398005
 Lab Project ID: 1158398

Collection Date: 07/30/15 20:42
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):88.9
 Location:

Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	2.55 U	5.10	1.53	mg/Kg	1		08/11/15 05:24
Surrogates							
4-Bromofluorobenzene (surr)	109	50-150		%	1		08/11/15 05:24

Batch Information

Analytical Batch: VFC12573
 Analytical Method: AK101
 Analyst: CRD
 Analytical Date/Time: 08/11/15 05:24
 Container ID: 1158398005-B

Prep Batch: VXX27693
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 20:42
 Prep Initial Wt./Vol.: 31.413 g
 Prep Extract Vol: 28.4767 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	12.8 U	25.5	8.15	ug/Kg	1		08/11/15 05:24
Ethylbenzene	25.5 U	51.0	15.9	ug/Kg	1		08/11/15 05:24
o-Xylene	25.5 U	51.0	15.9	ug/Kg	1		08/11/15 05:24
P & M -Xylene	51.0 U	102	30.6	ug/Kg	1		08/11/15 05:24
Toluene	25.5 U	51.0	15.9	ug/Kg	1		08/11/15 05:24
Xylenes (total)	76.5 U	153	46.5	ug/Kg	1		08/11/15 05:24
Surrogates							
1,4-Difluorobenzene (surr)	84.3	72-119		%	1		08/11/15 05:24

Batch Information

Analytical Batch: VFC12573
 Analytical Method: SW8021B
 Analyst: CRD
 Analytical Date/Time: 08/11/15 05:24
 Container ID: 1158398005-B

Prep Batch: VXX27693
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 20:42
 Prep Initial Wt./Vol.: 31.413 g
 Prep Extract Vol: 28.4767 mL

Results of FTA-16-SW

Client Sample ID: **FTA-16-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398006
 Lab Project ID: 1158398

Collection Date: 07/30/15 20:50
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):94.1
 Location:

Results by Semivolatile Organic Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	16.0 J	21.0	6.52	mg/Kg	1		08/08/15 22:54
Surrogates							
5a Androstane (surr)	103	50-150		%	1		08/08/15 22:54

Batch Information

Analytical Batch: XFC11996
 Analytical Method: AK102
 Analyst: KJO
 Analytical Date/Time: 08/08/15 22:54
 Container ID: 1158398006-A

Prep Batch: XXX33759
 Prep Method: SW3550C
 Prep Date/Time: 08/05/15 14:50
 Prep Initial Wt./Vol.: 30.3 g
 Prep Extract Vol: 1 mL

Results of FTA-16-SW

Client Sample ID: **FTA-16-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398006
 Lab Project ID: 1158398

Collection Date: 07/30/15 20:50
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):94.1
 Location:

Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.20 U	2.39	0.718	mg/Kg	1		08/11/15 05:44
Surrogates							
4-Bromofluorobenzene (surr)	110	50-150		%	1		08/11/15 05:44

Batch Information

Analytical Batch: VFC12573
 Analytical Method: AK101
 Analyst: CRD
 Analytical Date/Time: 08/11/15 05:44
 Container ID: 1158398006-B

Prep Batch: VXX27693
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 20:50
 Prep Initial Wt./Vol.: 63.908 g
 Prep Extract Vol: 28.7679 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	6.00 U	12.0	3.83	ug/Kg	1		08/11/15 05:44
Ethylbenzene	11.9 U	23.9	7.46	ug/Kg	1		08/11/15 05:44
o-Xylene	11.9 U	23.9	7.46	ug/Kg	1		08/11/15 05:44
P & M -Xylene	23.9 U	47.8	14.4	ug/Kg	1		08/11/15 05:44
Toluene	11.9 U	23.9	7.46	ug/Kg	1		08/11/15 05:44
Xylenes (total)	35.9 U	71.8	21.8	ug/Kg	1		08/11/15 05:44
Surrogates							
1,4-Difluorobenzene (surr)	85.4	72-119		%	1		08/11/15 05:44

Batch Information

Analytical Batch: VFC12573
 Analytical Method: SW8021B
 Analyst: CRD
 Analytical Date/Time: 08/11/15 05:44
 Container ID: 1158398006-B

Prep Batch: VXX27693
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 20:50
 Prep Initial Wt./Vol.: 63.908 g
 Prep Extract Vol: 28.7679 mL

Results of FTA-17-SW

Client Sample ID: **FTA-17-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398007
 Lab Project ID: 1158398

Collection Date: 07/30/15 20:58
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):84.7
 Location:

Results by Semivolatile Organic Fuels

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	35.2		23.6	7.31	mg/Kg	1		08/08/15 23:15
Surrogates								
5a Androstane (surr)	92.6		50-150		%	1		08/08/15 23:15

Batch Information

Analytical Batch: XFC11996
 Analytical Method: AK102
 Analyst: KJO
 Analytical Date/Time: 08/08/15 23:15
 Container ID: 1158398007-A

Prep Batch: XXX33759
 Prep Method: SW3550C
 Prep Date/Time: 08/05/15 14:50
 Prep Initial Wt./Vol.: 30.059 g
 Prep Extract Vol: 1 mL

Results of FTA-17-SW

Client Sample ID: **FTA-17-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398007
 Lab Project ID: 1158398

Collection Date: 07/30/15 20:58
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):84.7
 Location:

Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.69 U	3.37	1.01	mg/Kg	1		08/11/15 06:03
Surrogates							
4-Bromofluorobenzene (surr)	120	50-150		%	1		08/11/15 06:03

Batch Information

Analytical Batch: VFC12573
 Analytical Method: AK101
 Analyst: CRD
 Analytical Date/Time: 08/11/15 06:03
 Container ID: 1158398007-B

Prep Batch: VXX27693
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 20:58
 Prep Initial Wt./Vol.: 59.824 g
 Prep Extract Vol: 34.1638 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	8.45 U	16.9	5.39	ug/Kg	1		08/11/15 06:03
Ethylbenzene	16.9 U	33.7	10.5	ug/Kg	1		08/11/15 06:03
o-Xylene	16.9 U	33.7	10.5	ug/Kg	1		08/11/15 06:03
P & M -Xylene	33.7 U	67.4	20.2	ug/Kg	1		08/11/15 06:03
Toluene	16.9 U	33.7	10.5	ug/Kg	1		08/11/15 06:03
Xylenes (total)	50.5 U	101	30.8	ug/Kg	1		08/11/15 06:03
Surrogates							
1,4-Difluorobenzene (surr)	85.2	72-119		%	1		08/11/15 06:03

Batch Information

Analytical Batch: VFC12573
 Analytical Method: SW8021B
 Analyst: CRD
 Analytical Date/Time: 08/11/15 06:03
 Container ID: 1158398007-B

Prep Batch: VXX27693
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 20:58
 Prep Initial Wt./Vol.: 59.824 g
 Prep Extract Vol: 34.1638 mL

Results of FTA-18-SW

Client Sample ID: **FTA-18-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398008
 Lab Project ID: 1158398

Collection Date: 07/30/15 21:06
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):93.0
 Location:

Results by Semivolatile Organic Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	13.4 J	21.3	6.61	mg/Kg	1		08/08/15 23:36
Surrogates							
5a Androstane (surr)	94.2	50-150		%	1		08/08/15 23:36

Batch Information

Analytical Batch: XFC11996
 Analytical Method: AK102
 Analyst: KJO
 Analytical Date/Time: 08/08/15 23:36
 Container ID: 1158398008-A

Prep Batch: XXX33759
 Prep Method: SW3550C
 Prep Date/Time: 08/05/15 14:50
 Prep Initial Wt./Vol.: 30.257 g
 Prep Extract Vol: 1 mL

Results of FTA-18-SW

Client Sample ID: **FTA-18-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398008
 Lab Project ID: 1158398

Collection Date: 07/30/15 21:06
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):93.0
 Location:

Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	2.79 U	5.59	1.68	mg/Kg	1		08/11/15 06:22
Surrogates							
4-Bromofluorobenzene (surr)	99	50-150		%	1		08/11/15 06:22

Batch Information

Analytical Batch: VFC12573
 Analytical Method: AK101
 Analyst: CRD
 Analytical Date/Time: 08/11/15 06:22
 Container ID: 1158398008-B

Prep Batch: VXX27693
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 21:06
 Prep Initial Wt./Vol.: 25.816 g
 Prep Extract Vol: 26.8198 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	13.9 U	27.9	8.94	ug/Kg	1		08/11/15 06:22
Ethylbenzene	27.9 U	55.9	17.4	ug/Kg	1		08/11/15 06:22
o-Xylene	27.9 U	55.9	17.4	ug/Kg	1		08/11/15 06:22
P & M -Xylene	56.0 U	112	33.5	ug/Kg	1		08/11/15 06:22
Toluene	27.9 U	55.9	17.4	ug/Kg	1		08/11/15 06:22
Xylenes (total)	84.0 U	168	51.0	ug/Kg	1		08/11/15 06:22
Surrogates							
1,4-Difluorobenzene (surr)	84.5	72-119		%	1		08/11/15 06:22

Batch Information

Analytical Batch: VFC12573
 Analytical Method: SW8021B
 Analyst: CRD
 Analytical Date/Time: 08/11/15 06:22
 Container ID: 1158398008-B

Prep Batch: VXX27693
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 21:06
 Prep Initial Wt./Vol.: 25.816 g
 Prep Extract Vol: 26.8198 mL

Results of FTA-19-SW

Client Sample ID: **FTA-19-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398009
 Lab Project ID: 1158398

Collection Date: 07/30/15 21:14
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):89.7
 Location:

Results by Semivolatile Organic Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	13.0 J	22.0	6.81	mg/Kg	1		08/11/15 10:02
Surrogates							
5a Androstane (surr)	80.6	50-150		%	1		08/11/15 10:02

Batch Information

Analytical Batch: XFC12000
 Analytical Method: AK102
 Analyst: AYC
 Analytical Date/Time: 08/11/15 10:02
 Container ID: 1158398009-A

Prep Batch: XXX33803
 Prep Method: SW3550C
 Prep Date/Time: 08/10/15 18:00
 Prep Initial Wt./Vol.: 30.424 g
 Prep Extract Vol: 1 mL

Results of FTA-19-SW

Client Sample ID: **FTA-19-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398009
 Lab Project ID: 1158398

Collection Date: 07/30/15 21:14
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):89.7
 Location:

Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	3.03 U	6.06	1.82	mg/Kg	1		08/11/15 06:41
Surrogates							
4-Bromofluorobenzene (surr)	101	50-150		%	1		08/11/15 06:41

Batch Information

Analytical Batch: VFC12573
 Analytical Method: AK101
 Analyst: CRD
 Analytical Date/Time: 08/11/15 06:41
 Container ID: 1158398009-B

Prep Batch: VXX27693
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 21:14
 Prep Initial Wt./Vol.: 25.377 g
 Prep Extract Vol: 27.6104 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	15.2 U	30.3	9.70	ug/Kg	1		08/11/15 06:41
Ethylbenzene	30.3 U	60.6	18.9	ug/Kg	1		08/11/15 06:41
o-Xylene	30.3 U	60.6	18.9	ug/Kg	1		08/11/15 06:41
P & M -Xylene	60.5 U	121	36.4	ug/Kg	1		08/11/15 06:41
Toluene	30.3 U	60.6	18.9	ug/Kg	1		08/11/15 06:41
Xylenes (total)	91.0 U	182	55.3	ug/Kg	1		08/11/15 06:41
Surrogates							
1,4-Difluorobenzene (surr)	85.5	72-119		%	1		08/11/15 06:41

Batch Information

Analytical Batch: VFC12573
 Analytical Method: SW8021B
 Analyst: CRD
 Analytical Date/Time: 08/11/15 06:41
 Container ID: 1158398009-B

Prep Batch: VXX27693
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 21:14
 Prep Initial Wt./Vol.: 25.377 g
 Prep Extract Vol: 27.6104 mL

Results of FTA-20-SW

Client Sample ID: **FTA-20-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398010
 Lab Project ID: 1158398

Collection Date: 07/30/15 21:22
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):84.8
 Location:

Results by Semivolatile Organic Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	13.7 J	23.4	7.26	mg/Kg	1		08/09/15 00:17
Surrogates							
5a Androstane (surr)	102	50-150		%	1		08/09/15 00:17

Batch Information

Analytical Batch: XFC11996
 Analytical Method: AK102
 Analyst: KJO
 Analytical Date/Time: 08/09/15 00:17
 Container ID: 1158398010-A

Prep Batch: XXX33759
 Prep Method: SW3550C
 Prep Date/Time: 08/05/15 14:50
 Prep Initial Wt./Vol.: 30.196 g
 Prep Extract Vol: 1 mL

Results of FTA-20-SW

Client Sample ID: **FTA-20-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398010
 Lab Project ID: 1158398

Collection Date: 07/30/15 21:22
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):84.8
 Location:

Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	3.40 U	6.80	2.04	mg/Kg	1		08/11/15 07:00
Surrogates							
4-Bromofluorobenzene (surr)	100	50-150		%	1		08/11/15 07:00

Batch Information

Analytical Batch: VFC12573
 Analytical Method: AK101
 Analyst: CRD
 Analytical Date/Time: 08/11/15 07:00
 Container ID: 1158398010-B

Prep Batch: VXX27693
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 21:22
 Prep Initial Wt./Vol.: 24.987 g
 Prep Extract Vol: 28.7992 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	17.0 U	34.0	10.9	ug/Kg	1		08/11/15 07:00
Ethylbenzene	34.0 U	68.0	21.2	ug/Kg	1		08/11/15 07:00
o-Xylene	34.0 U	68.0	21.2	ug/Kg	1		08/11/15 07:00
P & M -Xylene	68.0 U	136	40.8	ug/Kg	1		08/11/15 07:00
Toluene	34.0 U	68.0	21.2	ug/Kg	1		08/11/15 07:00
Xylenes (total)	102 U	204	62.0	ug/Kg	1		08/11/15 07:00
Surrogates							
1,4-Difluorobenzene (surr)	85.6	72-119		%	1		08/11/15 07:00

Batch Information

Analytical Batch: VFC12573
 Analytical Method: SW8021B
 Analyst: CRD
 Analytical Date/Time: 08/11/15 07:00
 Container ID: 1158398010-B

Prep Batch: VXX27693
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 21:22
 Prep Initial Wt./Vol.: 24.987 g
 Prep Extract Vol: 28.7992 mL

Results of FTA-21-SW

Client Sample ID: **FTA-21-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398011
 Lab Project ID: 1158398

Collection Date: 07/30/15 21:27
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):94.3
 Location:

Results by Semivolatile Organic Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	13.5 J	21.1	6.55	mg/Kg	1		08/09/15 00:38
Surrogates							
5a Androstane (surr)	102	50-150		%	1		08/09/15 00:38

Batch Information

Analytical Batch: XFC11996
 Analytical Method: AK102
 Analyst: KJO
 Analytical Date/Time: 08/09/15 00:38
 Container ID: 1158398011-A

Prep Batch: XXX33759
 Prep Method: SW3550C
 Prep Date/Time: 08/05/15 14:50
 Prep Initial Wt./Vol.: 30.096 g
 Prep Extract Vol: 1 mL

Results of FTA-21-SW

Client Sample ID: **FTA-21-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398011
 Lab Project ID: 1158398

Collection Date: 07/30/15 21:27
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):94.3
 Location:

Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	2.36 U	4.72	1.42	mg/Kg	1		08/11/15 07:19
Surrogates							
4-Bromofluorobenzene (surr)	101	50-150		%	1		08/11/15 07:19

Batch Information

Analytical Batch: VFC12573
 Analytical Method: AK101
 Analyst: CRD
 Analytical Date/Time: 08/11/15 07:19
 Container ID: 1158398011-B

Prep Batch: VXX27693
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 21:27
 Prep Initial Wt./Vol.: 29.998 g
 Prep Extract Vol: 26.6979 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	11.8 U	23.6	7.55	ug/Kg	1		08/11/15 07:19
Ethylbenzene	23.6 U	47.2	14.7	ug/Kg	1		08/11/15 07:19
o-Xylene	23.6 U	47.2	14.7	ug/Kg	1		08/11/15 07:19
P & M -Xylene	47.1 U	94.3	28.3	ug/Kg	1		08/11/15 07:19
Toluene	23.6 U	47.2	14.7	ug/Kg	1		08/11/15 07:19
Xylenes (total)	71.0 U	142	43.0	ug/Kg	1		08/11/15 07:19
Surrogates							
1,4-Difluorobenzene (surr)	84.9	72-119		%	1		08/11/15 07:19

Batch Information

Analytical Batch: VFC12573
 Analytical Method: SW8021B
 Analyst: CRD
 Analytical Date/Time: 08/11/15 07:19
 Container ID: 1158398011-B

Prep Batch: VXX27693
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 21:27
 Prep Initial Wt./Vol.: 29.998 g
 Prep Extract Vol: 26.6979 mL

Results of FTA-22-SW

Client Sample ID: **FTA-22-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398012
 Lab Project ID: 1158398

Collection Date: 07/30/15 21:30
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):87.7
 Location:

Results by Semivolatile Organic Fuels

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	36.8		22.6	7.02	mg/Kg	1		08/09/15 00:59
Surrogates								
5a Androstane (surr)	104		50-150		%	1		08/09/15 00:59

Batch Information

Analytical Batch: XFC11996
 Analytical Method: AK102
 Analyst: KJO
 Analytical Date/Time: 08/09/15 00:59
 Container ID: 1158398012-A

Prep Batch: XXX33759
 Prep Method: SW3550C
 Prep Date/Time: 08/05/15 14:50
 Prep Initial Wt./Vol.: 30.236 g
 Prep Extract Vol: 1 mL

Results of FTA-22-SW

Client Sample ID: **FTA-22-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398012
 Lab Project ID: 1158398

Collection Date: 07/30/15 21:30
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):87.7
 Location:

Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	2.92 U	5.83	1.75	mg/Kg	1		08/11/15 07:37
Surrogates							
4-Bromofluorobenzene (surr)	103	50-150		%	1		08/11/15 07:37

Batch Information

Analytical Batch: VFC12573
 Analytical Method: AK101
 Analyst: CRD
 Analytical Date/Time: 08/11/15 07:37
 Container ID: 1158398012-B

Prep Batch: VXX27693
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 21:30
 Prep Initial Wt./Vol.: 27.826 g
 Prep Extract Vol: 28.4355 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	14.6 U	29.1	9.33	ug/Kg	1		08/11/15 07:37
Ethylbenzene	29.1 U	58.3	18.2	ug/Kg	1		08/11/15 07:37
o-Xylene	29.1 U	58.3	18.2	ug/Kg	1		08/11/15 07:37
P & M -Xylene	58.5 U	117	35.0	ug/Kg	1		08/11/15 07:37
Toluene	29.1 U	58.3	18.2	ug/Kg	1		08/11/15 07:37
Xylenes (total)	87.5 U	175	53.2	ug/Kg	1		08/11/15 07:37
Surrogates							
1,4-Difluorobenzene (surr)	84.3	72-119		%	1		08/11/15 07:37

Batch Information

Analytical Batch: VFC12573
 Analytical Method: SW8021B
 Analyst: CRD
 Analytical Date/Time: 08/11/15 07:37
 Container ID: 1158398012-B

Prep Batch: VXX27693
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 21:30
 Prep Initial Wt./Vol.: 27.826 g
 Prep Extract Vol: 28.4355 mL

Results of FTA-23-SW

Client Sample ID: **FTA-23-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398013
 Lab Project ID: 1158398

Collection Date: 07/30/15 21:38
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):87.1
 Location:

Results by Semivolatile Organic Fuels

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	31.4		22.9	7.11	mg/Kg	1		08/09/15 01:20
Surrogates								
5a Androstane (surr)	107		50-150		%	1		08/09/15 01:20

Batch Information

Analytical Batch: XFC11996
 Analytical Method: AK102
 Analyst: KJO
 Analytical Date/Time: 08/09/15 01:20
 Container ID: 1158398013-A

Prep Batch: XXX33759
 Prep Method: SW3550C
 Prep Date/Time: 08/05/15 14:50
 Prep Initial Wt./Vol.: 30.033 g
 Prep Extract Vol: 1 mL

Results of FTA-23-SW

Client Sample ID: **FTA-23-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398013
 Lab Project ID: 1158398

Collection Date: 07/30/15 21:38
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):87.1
 Location:

Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	3.19 U	6.38	1.91	mg/Kg	1		08/11/15 20:28
Surrogates							
4-Bromofluorobenzene (surr)	92.8	50-150		%	1		08/11/15 20:28

Batch Information

Analytical Batch: VFC12575
 Analytical Method: AK101
 Analyst: CRD
 Analytical Date/Time: 08/11/15 20:28
 Container ID: 1158398013-B

Prep Batch: VXX27700
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 21:38
 Prep Initial Wt./Vol.: 25.477 g
 Prep Extract Vol: 28.2982 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	15.9 U	31.9	10.2	ug/Kg	1		08/11/15 20:28
Ethylbenzene	31.9 U	63.8	19.9	ug/Kg	1		08/11/15 20:28
o-Xylene	31.9 U	63.8	19.9	ug/Kg	1		08/11/15 20:28
P & M -Xylene	64.0 U	128	38.3	ug/Kg	1		08/11/15 20:28
Toluene	31.9 U	63.8	19.9	ug/Kg	1		08/11/15 20:28
Xylenes (total)	95.5 U	191	58.2	ug/Kg	1		08/11/15 20:28
Surrogates							
1,4-Difluorobenzene (surr)	83.7	72-119		%	1		08/11/15 20:28

Batch Information

Analytical Batch: VFC12575
 Analytical Method: SW8021B
 Analyst: CRD
 Analytical Date/Time: 08/11/15 20:28
 Container ID: 1158398013-B

Prep Batch: VXX27700
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 21:38
 Prep Initial Wt./Vol.: 25.477 g
 Prep Extract Vol: 28.2982 mL

Results of FTA-24-SW

Client Sample ID: **FTA-24-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398014
 Lab Project ID: 1158398

Collection Date: 07/30/15 21:46
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):90.3
 Location:

Results by Semivolatile Organic Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	20.7 J	22.1	6.86	mg/Kg	1		08/09/15 01:40
Surrogates							
5a Androstane (surr)	100	50-150		%	1		08/09/15 01:40

Batch Information

Analytical Batch: XFC11996
 Analytical Method: AK102
 Analyst: KJO
 Analytical Date/Time: 08/09/15 01:40
 Container ID: 1158398014-A

Prep Batch: XXX33759
 Prep Method: SW3550C
 Prep Date/Time: 08/05/15 14:50
 Prep Initial Wt./Vol.: 30.044 g
 Prep Extract Vol: 1 mL

Results of FTA-24-SW

Client Sample ID: **FTA-24-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398014
 Lab Project ID: 1158398

Collection Date: 07/30/15 21:46
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):90.3
 Location:

Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	2.63 U	5.27	1.58	mg/Kg	1		08/11/15 14:44
Surrogates							
4-Bromofluorobenzene (surr)	94.4	50-150		%	1		08/11/15 14:44

Batch Information

Analytical Batch: VFC12577
 Analytical Method: AK101
 Analyst: CRD
 Analytical Date/Time: 08/11/15 14:44
 Container ID: 1158398014-B

Prep Batch: VXX27702
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 21:46
 Prep Initial Wt./Vol.: 29.223 g
 Prep Extract Vol: 27.8333 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	13.2 U	26.4	8.44	ug/Kg	1		08/11/15 14:44
Ethylbenzene	26.4 U	52.7	16.5	ug/Kg	1		08/11/15 14:44
o-Xylene	26.4 U	52.7	16.5	ug/Kg	1		08/11/15 14:44
P & M -Xylene	52.5 U	105	31.6	ug/Kg	1		08/11/15 14:44
Toluene	26.4 U	52.7	16.5	ug/Kg	1		08/11/15 14:44
Xylenes (total)	79.0 U	158	48.1	ug/Kg	1		08/11/15 14:44
Surrogates							
1,4-Difluorobenzene (surr)	82.3	72-119		%	1		08/11/15 14:44

Batch Information

Analytical Batch: VFC12577
 Analytical Method: SW8021B
 Analyst: CRD
 Analytical Date/Time: 08/11/15 14:44
 Container ID: 1158398014-B

Prep Batch: VXX27702
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 21:46
 Prep Initial Wt./Vol.: 29.223 g
 Prep Extract Vol: 27.8333 mL

Results of FTA-25-SW

Client Sample ID: **FTA-25-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398015
 Lab Project ID: 1158398

Collection Date: 07/30/15 21:54
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):87.2
 Location:

Results by Semivolatile Organic Fuels

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	56.2		22.6	7.01	mg/Kg	1		08/09/15 02:01
Surrogates								
5a Androstane (surr)	107		50-150		%	1		08/09/15 02:01

Batch Information

Analytical Batch: XFC11996
 Analytical Method: AK102
 Analyst: KJO
 Analytical Date/Time: 08/09/15 02:01
 Container ID: 1158398015-A

Prep Batch: XXX33759
 Prep Method: SW3550C
 Prep Date/Time: 08/05/15 14:50
 Prep Initial Wt./Vol.: 30.426 g
 Prep Extract Vol: 1 mL

Results of FTA-25-SW

Client Sample ID: **FTA-25-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398015
 Lab Project ID: 1158398

Collection Date: 07/30/15 21:54
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):87.2
 Location:

Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	2.72 U	5.44	1.63	mg/Kg	1		08/11/15 20:47
Surrogates							
4-Bromofluorobenzene (surr)	100	50-150		%	1		08/11/15 20:47

Batch Information

Analytical Batch: VFC12575
 Analytical Method: AK101
 Analyst: CRD
 Analytical Date/Time: 08/11/15 20:47
 Container ID: 1158398015-B

Prep Batch: VXX27700
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 21:54
 Prep Initial Wt./Vol.: 30.502 g
 Prep Extract Vol: 28.9093 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	13.6 U	27.2	8.70	ug/Kg	1		08/11/15 20:47
Ethylbenzene	27.2 U	54.4	17.0	ug/Kg	1		08/11/15 20:47
o-Xylene	27.2 U	54.4	17.0	ug/Kg	1		08/11/15 20:47
P & M -Xylene	54.5 U	109	32.6	ug/Kg	1		08/11/15 20:47
Toluene	27.2 U	54.4	17.0	ug/Kg	1		08/11/15 20:47
Xylenes (total)	81.5 U	163	49.6	ug/Kg	1		08/11/15 20:47
Surrogates							
1,4-Difluorobenzene (surr)	82.2	72-119		%	1		08/11/15 20:47

Batch Information

Analytical Batch: VFC12575
 Analytical Method: SW8021B
 Analyst: CRD
 Analytical Date/Time: 08/11/15 20:47
 Container ID: 1158398015-B

Prep Batch: VXX27700
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 21:54
 Prep Initial Wt./Vol.: 30.502 g
 Prep Extract Vol: 28.9093 mL

Results of FTA-26-SW

Client Sample ID: **FTA-26-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398016
 Lab Project ID: 1158398

Collection Date: 07/30/15 22:02
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):88.8
 Location:

Results by Semivolatile Organic Fuels

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	57.3		22.4	6.95	mg/Kg	1		08/09/15 02:21
Surrogates								
5a Androstane (surr)	102		50-150		%	1		08/09/15 02:21

Batch Information

Analytical Batch: XFC11996
 Analytical Method: AK102
 Analyst: KJO
 Analytical Date/Time: 08/09/15 02:21
 Container ID: 1158398016-A

Prep Batch: XXX33759
 Prep Method: SW3550C
 Prep Date/Time: 08/05/15 14:50
 Prep Initial Wt./Vol.: 30.14 g
 Prep Extract Vol: 1 mL

Results of FTA-26-SW

Client Sample ID: **FTA-26-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398016
 Lab Project ID: 1158398

Collection Date: 07/30/15 22:02
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):88.8
 Location:

Results by Volatile Fuels

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	5.86	1.79 J UB	5.86	1.76	mg/Kg	1		08/11/15 21:06

Surrogates

4-Bromofluorobenzene (surr)	102		50-150		%	1		08/11/15 21:06
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Batch Information

Analytical Batch: VFC12575
 Analytical Method: AK101
 Analyst: CRD
 Analytical Date/Time: 08/11/15 21:06
 Container ID: 1158398016-B

Prep Batch: VXX27700
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 22:02
 Prep Initial Wt./Vol.: 26.864 g
 Prep Extract Vol: 27.9957 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	14.7	U	29.3	9.38	ug/Kg	1		08/11/15 21:06
Ethylbenzene	29.3	U	58.6	18.3	ug/Kg	1		08/11/15 21:06
o-Xylene	29.3	U	58.6	18.3	ug/Kg	1		08/11/15 21:06
P & M -Xylene	58.5	U	117	35.2	ug/Kg	1		08/11/15 21:06
Toluene	29.3	U	58.6	18.3	ug/Kg	1		08/11/15 21:06
Xylenes (total)	88.0	U	176	53.5	ug/Kg	1		08/11/15 21:06

Surrogates

1,4-Difluorobenzene (surr)	81.4		72-119		%	1		08/11/15 21:06
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Batch Information

Analytical Batch: VFC12575
 Analytical Method: SW8021B
 Analyst: CRD
 Analytical Date/Time: 08/11/15 21:06
 Container ID: 1158398016-B

Prep Batch: VXX27700
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 22:02
 Prep Initial Wt./Vol.: 26.864 g
 Prep Extract Vol: 27.9957 mL

Results of FTA-27-SW

Client Sample ID: **FTA-27-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398017
 Lab Project ID: 1158398

Collection Date: 07/30/15 22:10
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):88.7
 Location:

Results by Semivolatile Organic Fuels

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	54.3		22.3	6.93	mg/Kg	1		08/09/15 03:23
Surrogates								
5a Androstane (surr)	104		50-150		%	1		08/09/15 03:23

Batch Information

Analytical Batch: XFC11996
 Analytical Method: AK102
 Analyst: KJO
 Analytical Date/Time: 08/09/15 03:23
 Container ID: 1158398017-A

Prep Batch: XXX33759
 Prep Method: SW3550C
 Prep Date/Time: 08/05/15 14:50
 Prep Initial Wt./Vol.: 30.285 g
 Prep Extract Vol: 1 mL

Results of FTA-27-SW

Client Sample ID: **FTA-27-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398017
 Lab Project ID: 1158398

Collection Date: 07/30/15 22:10
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):88.7
 Location:

Results by Volatile Fuels

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	6.22	1.89 J UB	6.22	1.87	mg/Kg	1		08/11/15 21:25
Surrogates								
4-Bromofluorobenzene (surr)	98.6		50-150		%	1		08/11/15 21:25

Batch Information

Analytical Batch: VFC12575
 Analytical Method: AK101
 Analyst: CRD
 Analytical Date/Time: 08/11/15 21:25
 Container ID: 1158398017-B

Prep Batch: VXX27700
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 22:10
 Prep Initial Wt./Vol.: 25.261 g
 Prep Extract Vol: 27.8646 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	15.6	U	31.1	9.95	ug/Kg	1		08/11/15 21:25
Ethylbenzene	31.1	U	62.2	19.4	ug/Kg	1		08/11/15 21:25
o-Xylene	31.1	U	62.2	19.4	ug/Kg	1		08/11/15 21:25
P & M -Xylene	62.0	U	124	37.3	ug/Kg	1		08/11/15 21:25
Toluene	31.1	U	62.2	19.4	ug/Kg	1		08/11/15 21:25
Xylenes (total)	93.5	U	187	56.7	ug/Kg	1		08/11/15 21:25

Surrogates

1,4-Difluorobenzene (surr)	81.7		72-119		%	1		08/11/15 21:25
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Batch Information

Analytical Batch: VFC12575
 Analytical Method: SW8021B
 Analyst: CRD
 Analytical Date/Time: 08/11/15 21:25
 Container ID: 1158398017-B

Prep Batch: VXX27700
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 22:10
 Prep Initial Wt./Vol.: 25.261 g
 Prep Extract Vol: 27.8646 mL

Results of FTA-28-SW

Client Sample ID: **FTA-28-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398018
 Lab Project ID: 1158398

Collection Date: 07/30/15 22:18
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):93.0
 Location:

Results by Semivolatile Organic Fuels

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	156		21.3	6.61	mg/Kg	1		08/09/15 03:44
Surrogates								
5a Androstane (surr)	111		50-150		%	1		08/09/15 03:44

Batch Information

Analytical Batch: XFC11996
 Analytical Method: AK102
 Analyst: KJO
 Analytical Date/Time: 08/09/15 03:44
 Container ID: 1158398018-A

Prep Batch: XXX33759
 Prep Method: SW3550C
 Prep Date/Time: 08/05/15 14:50
 Prep Initial Wt./Vol.: 30.245 g
 Prep Extract Vol: 1 mL

Results of FTA-28-SW

Client Sample ID: **FTA-28-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398018
 Lab Project ID: 1158398

Collection Date: 07/30/15 22:18
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):93.0
 Location:

Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	2.64 U	5.28	1.58	mg/Kg	1		08/11/15 14:41
Surrogates							
4-Bromofluorobenzene (surr)	100	50-150		%	1		08/11/15 14:41

Batch Information

Analytical Batch: VFC12575
 Analytical Method: AK101
 Analyst: CRD
 Analytical Date/Time: 08/11/15 14:41
 Container ID: 1158398018-B

Prep Batch: VXX27700
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 22:18
 Prep Initial Wt./Vol.: 27.404 g
 Prep Extract Vol: 26.9053 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	13.2 U	26.4	8.44	ug/Kg	1		08/11/15 14:41
Ethylbenzene	26.4 U	52.8	16.5	ug/Kg	1		08/11/15 14:41
o-Xylene	26.4 U	52.8	16.5	ug/Kg	1		08/11/15 14:41
P & M -Xylene	53.0 U	106	31.7	ug/Kg	1		08/11/15 14:41
Toluene	26.4 U	52.8	16.5	ug/Kg	1		08/11/15 14:41
Xylenes (total)	79.0 U	158	48.1	ug/Kg	1		08/11/15 14:41
Surrogates							
1,4-Difluorobenzene (surr)	81.1	72-119		%	1		08/11/15 14:41

Batch Information

Analytical Batch: VFC12575
 Analytical Method: SW8021B
 Analyst: CRD
 Analytical Date/Time: 08/11/15 14:41
 Container ID: 1158398018-B

Prep Batch: VXX27700
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 22:18
 Prep Initial Wt./Vol.: 27.404 g
 Prep Extract Vol: 26.9053 mL

Results of FTA-29-SW

Client Sample ID: **FTA-29-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398019
 Lab Project ID: 1158398

Collection Date: 07/30/15 22:26
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):88.4
 Location:

Results by Semivolatile Organic Fuels

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	85.5		22.3	6.90	mg/Kg	1		08/09/15 04:04
Surrogates								
5a Androstane (surr)	115		50-150		%	1		08/09/15 04:04

Batch Information

Analytical Batch: XFC11996
 Analytical Method: AK102
 Analyst: KJO
 Analytical Date/Time: 08/09/15 04:04
 Container ID: 1158398019-A

Prep Batch: XXX33759
 Prep Method: SW3550C
 Prep Date/Time: 08/05/15 14:50
 Prep Initial Wt./Vol.: 30.485 g
 Prep Extract Vol: 1 mL

Results of FTA-29-SW

Client Sample ID: **FTA-29-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398019
 Lab Project ID: 1158398

Collection Date: 07/30/15 22:26
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):88.4
 Location:

Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	3.09 U	6.18	1.86	mg/Kg	1		08/11/15 21:44
Surrogates							
4-Bromofluorobenzene (surr)	98.1	50-150		%	1		08/11/15 21:44

Batch Information

Analytical Batch: VFC12575
 Analytical Method: AK101
 Analyst: CRD
 Analytical Date/Time: 08/11/15 21:44
 Container ID: 1158398019-B

Prep Batch: VXX27700
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 22:26
 Prep Initial Wt./Vol.: 25.576 g
 Prep Extract Vol: 27.9661 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	15.4 U	30.9	9.90	ug/Kg	1		08/11/15 21:44
Ethylbenzene	30.9 U	61.8	19.3	ug/Kg	1		08/11/15 21:44
o-Xylene	30.9 U	61.8	19.3	ug/Kg	1		08/11/15 21:44
P & M -Xylene	62.0 U	124	37.1	ug/Kg	1		08/11/15 21:44
Toluene	30.9 U	61.8	19.3	ug/Kg	1		08/11/15 21:44
Xylenes (total)	93.0 U	186	56.4	ug/Kg	1		08/11/15 21:44
Surrogates							
1,4-Difluorobenzene (surr)	83.3	72-119		%	1		08/11/15 21:44

Batch Information

Analytical Batch: VFC12575
 Analytical Method: SW8021B
 Analyst: CRD
 Analytical Date/Time: 08/11/15 21:44
 Container ID: 1158398019-B

Prep Batch: VXX27700
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 22:26
 Prep Initial Wt./Vol.: 25.576 g
 Prep Extract Vol: 27.9661 mL

Results of FTA-30-SW

Client Sample ID: **FTA-30-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398020
 Lab Project ID: 1158398

Collection Date: 07/30/15 22:34
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):87.1
 Location:

Results by Semivolatile Organic Fuels

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	135	J	91.3	28.3	mg/Kg	4		08/09/15 03:44
Surrogates								
5a Androstane (surr)	117		50-150		%	4		08/09/15 03:44

Batch Information

Analytical Batch: XFC12003
 Analytical Method: AK102
 Analyst: KJO
 Analytical Date/Time: 08/09/15 03:44
 Container ID: 1158398020-A

Prep Batch: XXX33769
 Prep Method: SW3550C
 Prep Date/Time: 08/06/15 16:32
 Prep Initial Wt./Vol.: 30.164 g
 Prep Extract Vol: 1 mL

Results of FTA-30-SW

Client Sample ID: **FTA-30-SW**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398020
 Lab Project ID: 1158398

Collection Date: 07/30/15 22:34
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):87.1
 Location:

Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	3.06 U	6.12	1.84	mg/Kg	1		08/11/15 22:03
Surrogates							
4-Bromofluorobenzene (surr)	97.8	50-150		%	1		08/11/15 22:03

Batch Information

Analytical Batch: VFC12575
 Analytical Method: AK101
 Analyst: CRD
 Analytical Date/Time: 08/11/15 22:03
 Container ID: 1158398020-B

Prep Batch: VXX27700
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 22:34
 Prep Initial Wt./Vol.: 26.637 g
 Prep Extract Vol: 28.4294 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	15.3 U	30.6	9.80	ug/Kg	1		08/11/15 22:03
Ethylbenzene	30.6 U	61.2	19.1	ug/Kg	1		08/11/15 22:03
o-Xylene	30.6 U	61.2	19.1	ug/Kg	1		08/11/15 22:03
P & M -Xylene	61.0 U	122	36.7	ug/Kg	1		08/11/15 22:03
Toluene	30.6 U	61.2	19.1	ug/Kg	1		08/11/15 22:03
Xylenes (total)	92.0 U	184	55.9	ug/Kg	1		08/11/15 22:03
Surrogates							
1,4-Difluorobenzene (surr)	81.9	72-119		%	1		08/11/15 22:03

Batch Information

Analytical Batch: VFC12575
 Analytical Method: SW8021B
 Analyst: CRD
 Analytical Date/Time: 08/11/15 22:03
 Container ID: 1158398020-B

Prep Batch: VXX27700
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 22:34
 Prep Initial Wt./Vol.: 26.637 g
 Prep Extract Vol: 28.4294 mL

Results of FTA-BD-2

Client Sample ID: **FTA-BD-2**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398021
 Lab Project ID: 1158398

Collection Date: 07/30/15 20:10
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):85.0
 Location:

Results by Semivolatile Organic Fuels

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	23.4	10.3 J UB	23.4	7.26	mg/Kg	1		08/10/15 05:54
Surrogates								
5a Androstane (surr)	102		50-150		%	1		08/10/15 05:54

Batch Information

Analytical Batch: XFC12001
 Analytical Method: AK102
 Analyst: KJO
 Analytical Date/Time: 08/10/15 05:54
 Container ID: 1158398021-A

Prep Batch: XXX33769
 Prep Method: SW3550C
 Prep Date/Time: 08/06/15 16:32
 Prep Initial Wt./Vol.: 30.146 g
 Prep Extract Vol: 1 mL

Results of FTA-BD-2

Client Sample ID: **FTA-BD-2**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398021
 Lab Project ID: 1158398

Collection Date: 07/30/15 20:10
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):85.0
 Location:

Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	3.34 U	6.67	2.00	mg/Kg	1		08/11/15 22:22
Surrogates							
4-Bromofluorobenzene (surr)	101	50-150		%	1		08/11/15 22:22

Batch Information

Analytical Batch: VFC12575
 Analytical Method: AK101
 Analyst: CRD
 Analytical Date/Time: 08/11/15 22:22
 Container ID: 1158398021-B

Prep Batch: VXX27700
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 20:10
 Prep Initial Wt./Vol.: 25.43 g
 Prep Extract Vol: 28.8148 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	16.6 U	33.3	10.7	ug/Kg	1		08/11/15 22:22
Ethylbenzene	33.4 U	66.7	20.8	ug/Kg	1		08/11/15 22:22
o-Xylene	33.4 U	66.7	20.8	ug/Kg	1		08/11/15 22:22
P & M -Xylene	66.5 U	133	40.0	ug/Kg	1		08/11/15 22:22
Toluene	33.4 U	66.7	20.8	ug/Kg	1		08/11/15 22:22
Xylenes (total)	100 U	200	60.8	ug/Kg	1		08/11/15 22:22
Surrogates							
1,4-Difluorobenzene (surr)	81.4	72-119		%	1		08/11/15 22:22

Batch Information

Analytical Batch: VFC12575
 Analytical Method: SW8021B
 Analyst: CRD
 Analytical Date/Time: 08/11/15 22:22
 Container ID: 1158398021-B

Prep Batch: VXX27700
 Prep Method: SW5035A
 Prep Date/Time: 07/30/15 20:10
 Prep Initial Wt./Vol.: 25.43 g
 Prep Extract Vol: 28.8148 mL

Results of FTA-BD-3

Client Sample ID: **FTA-BD-3**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398022
 Lab Project ID: 1158398

Collection Date: 07/30/15 20:10
 Received Date: 08/04/15 09:30
 Matrix: Soil/Solid (dry weight)
 Solids (%):84.9
 Location:

Results by Semivolatile Organic Fuels

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	2240	J	23.5	7.30	mg/Kg	1		08/11/15 14:33

Batch Information

Analytical Batch: XFC12004
 Analytical Method: AK102
 Analyst: KJO
 Analytical Date/Time: 08/11/15 14:33
 Container ID: 1158398022-A



Results of FTA-BD-3

Client Sample ID: **FTA-BD-3**
Client Project ID: **NPR-FTA Exc.**
Lab Sample ID: 1158398022
Lab Project ID: 1158398

Collection Date: 07/30/15 20:10
Received Date: 08/04/15 09:30
Matrix: Soil/Solid (dry weight)
Solids (%):84.9
Location:

Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	3.15 U	6.30	1.89	mg/Kg	1		08/11/15 22:41
Surrogates							
4-Bromofluorobenzene (surr)	99.4	50-150		%	1		08/11/15 22:41

Batch Information

Analytical Batch: VFC12575
Analytical Method: AK101
Analyst: CRD
Analytical Date/Time: 08/11/15 22:41
Container ID: 1158398022-B

Prep Batch: VXX27700
Prep Method: SW5035A
Prep Date/Time: 07/30/15 20:10
Prep Initial Wt./Vol.: 27.161 g
Prep Extract Vol: 29.0891 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	15.8 U	31.5	10.1	ug/Kg	1		08/11/15 22:41
Ethylbenzene	31.5 U	63.0	19.7	ug/Kg	1		08/11/15 22:41
o-Xylene	31.5 U	63.0	19.7	ug/Kg	1		08/11/15 22:41
P & M -Xylene	63.0 U	126	37.8	ug/Kg	1		08/11/15 22:41
Toluene	31.5 U	63.0	19.7	ug/Kg	1		08/11/15 22:41
Xylenes (total)	94.5 U	189	57.5	ug/Kg	1		08/11/15 22:41
Surrogates							
1,4-Difluorobenzene (surr)	82.9	72-119		%	1		08/11/15 22:41

Batch Information

Analytical Batch: VFC12575
Analytical Method: SW8021B
Analyst: CRD
Analytical Date/Time: 08/11/15 22:41
Container ID: 1158398022-B

Prep Batch: VXX27700
Prep Method: SW5035A
Prep Date/Time: 07/30/15 20:10
Prep Initial Wt./Vol.: 27.161 g
Prep Extract Vol: 29.0891 mL

Results of Trip Blank 1

Client Sample ID: **Trip Blank 1**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398023
 Lab Project ID: 1158398

Collection Date: 05/07/15 20:10
 Received Date: 08/04/15 09:30
 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	0.808 J R	2.63	0.789	mg/Kg	1		08/11/15 01:55
Surrogates							
4-Bromofluorobenzene (surr)	108	50-150		%	1		08/11/15 01:55

Batch Information

Analytical Batch: VFC12573
 Analytical Method: AK101
 Analyst: CRD
 Analytical Date/Time: 08/11/15 01:55
 Container ID: 1158398023-A

Prep Batch: VXX27693
 Prep Method: SW5035A
 Prep Date/Time: 05/07/15 20:10
 Prep Initial Wt./Vol.: 47.54 g
 Prep Extract Vol: 25 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	6.55 U R	13.1	4.21	ug/Kg	1		08/11/15 01:55
Ethylbenzene	13.2 U	26.3	8.20	ug/Kg	1		08/11/15 01:55
o-Xylene	13.2 U	26.3	8.20	ug/Kg	1		08/11/15 01:55
P & M -Xylene	26.3 U	52.6	15.8	ug/Kg	1		08/11/15 01:55
Toluene	54.4	26.3	8.20	ug/Kg	1		08/11/15 01:55
Xylenes (total)	39.5 U ↓	78.9	24.0	ug/Kg	1		08/11/15 01:55
Surrogates							
1,4-Difluorobenzene (surr)	84.6	72-119		%	1		08/11/15 01:55

Batch Information

Analytical Batch: VFC12573
 Analytical Method: SW8021B
 Analyst: CRD
 Analytical Date/Time: 08/11/15 01:55
 Container ID: 1158398023-A

Prep Batch: VXX27693
 Prep Method: SW5035A
 Prep Date/Time: 05/07/15 20:10
 Prep Initial Wt./Vol.: 47.54 g
 Prep Extract Vol: 25 mL

Results of Trip Blank 2

Client Sample ID: **Trip Blank 2**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398024
 Lab Project ID: 1158398

Collection Date: 07/29/15 20:10
 Received Date: 08/04/15 09:30
 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	1.24 U	2.48	0.744	mg/Kg	1		08/11/15 02:14
Surrogates							
4-Bromofluorobenzene (surr)	101	50-150		%	1		08/11/15 02:14

Batch Information

Analytical Batch: VFC12573
 Analytical Method: AK101
 Analyst: CRD
 Analytical Date/Time: 08/11/15 02:14
 Container ID: 1158398024-A

Prep Batch: VXX27693
 Prep Method: SW5035A
 Prep Date/Time: 07/29/15 20:10
 Prep Initial Wt./Vol.: 50.376 g
 Prep Extract Vol: 25 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	6.20 U	12.4	3.97	ug/Kg	1		08/11/15 02:14
Ethylbenzene	12.4 U	24.8	7.74	ug/Kg	1		08/11/15 02:14
o-Xylene	12.4 U	24.8	7.74	ug/Kg	1		08/11/15 02:14
P & M -Xylene	24.8 U	49.6	14.9	ug/Kg	1		08/11/15 02:14
Toluene	12.4 U	24.8	7.74	ug/Kg	1		08/11/15 02:14
Xylenes (total)	37.2 U	74.4	22.6	ug/Kg	1		08/11/15 02:14
Surrogates							
1,4-Difluorobenzene (surr)	84.8	72-119		%	1		08/11/15 02:14

Batch Information

Analytical Batch: VFC12573
 Analytical Method: SW8021B
 Analyst: CRD
 Analytical Date/Time: 08/11/15 02:14
 Container ID: 1158398024-A

Prep Batch: VXX27693
 Prep Method: SW5035A
 Prep Date/Time: 07/29/15 20:10
 Prep Initial Wt./Vol.: 50.376 g
 Prep Extract Vol: 25 mL

Results of Trip Blank 3

Client Sample ID: **Trip Blank 3**
 Client Project ID: **NPR-FTA Exc.**
 Lab Sample ID: 1158398025
 Lab Project ID: 1158398

Collection Date: 05/06/15 20:10
 Received Date: 08/04/15 09:30
 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	1.30 U R	2.60	0.780	mg/Kg	1		08/11/15 02:33
Surrogates							
4-Bromofluorobenzene (surr)	103	50-150		%	1		08/11/15 02:33

Batch Information

Analytical Batch: VFC12573
 Analytical Method: AK101
 Analyst: CRD
 Analytical Date/Time: 08/11/15 02:33
 Container ID: 1158398025-A

Prep Batch: VXX27693
 Prep Method: SW5035A
 Prep Date/Time: 05/06/15 20:10
 Prep Initial Wt./Vol.: 48.062 g
 Prep Extract Vol: 25 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	6.50 U R	13.0	4.16	ug/Kg	1		08/11/15 02:33
Ethylbenzene	13.0 U	26.0	8.11	ug/Kg	1		08/11/15 02:33
o-Xylene	13.0 U	26.0	8.11	ug/Kg	1		08/11/15 02:33
P & M -Xylene	26.0 U	52.0	15.6	ug/Kg	1		08/11/15 02:33
Toluene	13.0 U	26.0	8.11	ug/Kg	1		08/11/15 02:33
Xylenes (total)	39.0 U	78.0	23.7	ug/Kg	1		08/11/15 02:33
Surrogates							
1,4-Difluorobenzene (surr)	84.4	72-119		%	1		08/11/15 02:33

Batch Information

Analytical Batch: VFC12573
 Analytical Method: SW8021B
 Analyst: CRD
 Analytical Date/Time: 08/11/15 02:33
 Container ID: 1158398025-A

Prep Batch: VXX27693
 Prep Method: SW5035A
 Prep Date/Time: 05/06/15 20:10
 Prep Initial Wt./Vol.: 48.062 g
 Prep Extract Vol: 25 mL



CLIENT: Flint Hills Resources										INSTRUCTIONS: SECTIONS 1-5 MUST BE FILLED OUT. OMISSIONS MAY DELAY THE ONSET OF ANALYSIS.										Page 1 of 3																													
CONTACT: Loren Garner										PHONE #: 907.488.5122										SECTION 3																													
PROJECT NAME: NPR - FTA EXC.										PROJECT/ PWSID/ PERMIT #: FHR NPT Ph III FTA										PRESERVATIVE																													
REPORTS TO: Rebecca Andresen										E-MAIL: rebecca.andresen@arcadis-us.com										SECTION 4																													
INVOICE TO: Flint Hills Resources										QUOTE #: KP28164										SECTION 5																													
RESERVED FOR LAB USE										SAMPLE IDENTIFICATION										DATE										TIME										MATRIX/ MATRIX CODE									
1A-B										FTA-11-SW										07.30.15										20:10										Soil									
2A-B										FTA-12-SW										07.30.15										20:18										Soil									
3A-B										FTA-13-SW										07.30.15										20:26										Soil									
4A-B										FTA-14-SW										07.30.15										20:34										Soil									
5A-B										FTA-15-SW										07.30.15										20:42										Soil									
6A-B										FTA-16-SW										07.30.15										20:50										Soil									
7A-B										FTA-17-SW										07.30.15										20:58										Soil									
8A-B										FTA-18-SW										07.30.15										21:06										Soil									
9A-B										FTA-19-SW										07.30.15										21:14										Soil									
10A-B										FTA-20-SW										07.30.15										21:22										Soil									
RELINQUISHED BY: (1)										DATE										08.03.15										06:30										RECEIVED BY:									
RELINQUISHED BY: (2)										DATE										8.3.15										1330										RECEIVED BY:									
RELINQUISHED BY: (3)										DATE																														RECEIVED BY:									
RELINQUISHED BY: (4)										DATE										8/4/15										9:30										RECEIVED FOR LABORATORY BY:									



1158398



SGS NORTH / ALASKA

CUSTODY RECORD

SGS Environmental Services
200 West Potter Road
Anchorage, AK 99518
(907) 562-2343
www.sgs.com/alaska

CLIENT: Flint Hills Resources										INSTRUCTIONS: SECTIONS 1-5 MUST BE FILLED OUT. OMISSIONS MAY DELAY THE ONSET OF ANALYSIS.										Page 2 of 3	
CONTACT: Loren Garner										PHONE #: 907.488.5122											
PROJECT NAME: NPR - FTA Exc.										PROJECT/ PWSID/ PERMIT #: FHR NPT Ph III FTA											
REPORTS TO: Rebecca Andresen										E-MAIL: rebecca.andresen@arcadis-us.com											
INVOICE TO: Flint Hills Resources										QUOTE #: P.O. #:											
RESERVED FOR LAB USE		SAMPLE IDENTIFICATION		DATE MM/DD/YY		TIME HH:MM		MATRIX/ MATRIX CODE		SECTION 3		SAMPLE TYPE:		PRESERVATIVE		REMARKS/ LOC ID					
										#		Comp		None							
11A-B		FTA-21-SW		07.30.15		21:27		Soil		2		G		DRO AK102							
12A-B		FTA-22-SW		07.30.15		21:30		Soil		2		G		GRO AK101							
13A-B		FTA-23-SW		07.30.15		21:38		Soil		2		G									
14A-B		FTA-24-SW		07.30.15		21:46		Soil		2		G									
15A-B		FTA-25-SW		07.30.15		21:54		Soil		2		G									
16A-B		FTA-26-SW		07.30.15		22:02		Soil		2		G									
17A-B		FTA-27-SW		07.30.15		22:10		Soil		2		G									
18A-B		FTA-28-SW		07.30.15		22:18		Soil		2		G									
19A-B		FTA-29-SW		07.30.15		22:26		Soil		2		G									
20A-B		FTA-30-SW		07.30.15		22:34		Soil		2		G									
RELINQUISHED BY: (1)		DATE 08/03/15		TIME 0830		RECEIVED BY: 8/3/15		SECTION 4 DOD Project?		COC ID:		DATA DELIVERABLE REQUIREMENTS:									
RELINQUISHED BY: (2)		DATE 8/3/15		TIME 0830		RECEIVED BY: 0830		Cooler ID:				Type III STA									
RELINQUISHED BY: (3)		DATE		TIME		RECEIVED BY:		REQUESTED TURNAROUND TIME AND/OR SPECIAL INSTRUCTIONS													
RELINQUISHED BY: (4)		DATE 8/4/15		TIME 9:30		RECEIVED FOR LABORATORY BY: Diane Chen		TEMP BLANK °C: 49		OR AMBIENT []		CHAIN OF CUSTODY SEAL: (CIRCLE)		INTACT		BROKEN ABSENT					

Anch: 4.2/238 IF 1B

<http://www.sgs.com/terms-and-conditions>

F101_eCOC_Revise_2014-12-10

158398

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(See attached complete receipt only)
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Anch: 4.2°/238 IF 1B

F101_eCOC_Revised_2014-12-10

Flint Hill Resources Alaska, LLC

North Pole Refinery Site

Data Review

NORTH POLE, ALASKA

Perfluorinated Hydrocarbons (PFH) Analysis

SDG #: 280-72684-1

Analyses Performed By:
TestAmerica Laboratories
Arvada, Colorado

Review Level: Tier II
Project: B0081981.0083.00002

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #280-72684-1 for samples collected in association with the North Pole Refinery site. The review was conducted as a Tier II evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis				
					VOC	SVOC	PFH	MET	MISC
FTA-1-SW	280-72684-1	Soil	7/30/2015				X		
FTA-2-SW	280-72684-2	Soil	7/30/2015				X		
FTA-3-SW	280-72684-3	Soil	7/30/2015				X		
FTA-4-SW	280-72684-4	Soil	7/30/2015				X		
FTA-5-SW	280-72684-5	Soil	7/30/2015				X		
FTA-6-SW	280-72684-6	Soil	7/30/2015				X		
FTA-7-SW	280-72684-7	Soil	7/30/2015				X		
FTA-8-SW	280-72684-8	Soil	7/30/2015				X		
FTA-9-SW	280-72684-9	Soil	7/30/2015				X		
FTA-10-SW	280-72684-10	Soil	7/30/2015				X		
FTA-FRB-1	280-72684-11	Water	7/30/2015				X		
FTA-11-SW	280-72684-12	Soil	7/30/2015				X		
FTA-12-SW	280-72684-13	Soil	7/30/2015				X		
FTA-13-SW	280-72684-14	Soil	7/30/2015				X		
FTA-14-SW	280-72684-15	Soil	7/30/2015				X		
FTA-15-SW	280-72684-16	Soil	7/30/2015				X		
FTA-16-SW	280-72684-17	Soil	7/30/2015				X		
FTA-17-SW	280-72684-18	Soil	7/30/2015				X		
FTA-18-SW	280-72684-19	Soil	7/30/2015				X		
FTA-19-SW	280-72684-20	Soil	7/30/2015				X		
FTA-20-SW	280-72684-21	Soil	7/30/2015				X		
FTA-FRB-2	280-72684-22	Water	7/30/2015				X		
FTA-21-SW	280-72684-23	Soil	7/30/2015				X		
FTA-22-SW	280-72684-24	Soil	7/30/2015				X		
FTA-23-SW	280-72684-25	Soil	7/30/2015				X		
FTA-24-SW	280-72684-26	Soil	7/30/2015				X		
FTA-25-SW	280-72684-27	Soil	7/30/2015				X		
FTA-26-SW	280-72684-28	Soil	7/30/2015				X		
FTA-27-SW	280-72684-29	Soil	7/30/2015				X		
FTA-28-SW	280-72684-30	Soil	7/30/2015				X		
FTA-29-SW	280-72684-31	Soil	7/30/2015				X		

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis				
					VOC	SVOC	PFH	MET	MISC
FTA-30-SW	280-72684-32	Soil	7/30/2015				X		
FTA-FRB-3	280-72684-33	Water	7/30/2015				X		
FTA-BD-1	280-72684-34	Soil	7/30/2015	FTA-10-SW			X		
FTA-BD-2	280-72684-35	Soil	7/30/2015	FTA-20-SW			X		
FTA-BD-3	280-72684-36	Soil	7/30/2015	FTA-30-SW			X		

Note: Due to insufficient sample volume in the reagent blank samples, analysis was only performed on perfluorooctane sulfonamide.

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X	X		
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

QA - Quality Assurance

Note: As stated in the Case Narrative, a number of discrepancies were noted between the COC and sample container and/or lid label. (1) For sample FTA-BD-1, the COC and container label list the ID as "FTA-BD-1", but the container lid lists the ID as "FTA-BD-1-SW". (2) For sample FTA-BD-1, the COC lists the ID as "FTA-BD-2", but the container lid and label lists the ID as "FTA-BD-2-SW". (3) Sample FTA-BD-3 did not have a true sample label. The sample ID was written directly on the soil jar; therefore, the sample collection date/time was not listed on the container or on a label. (4) For sample FTA-BD-3, the COC lists the ID as "FTA-BD-3", but the container lists the ID as "FTA-BD-3-SW". In all instances, the laboratory used the sample ID listed on the COC and notified ARCADIS.

ORGANIC ANALYSIS INTRODUCTION

Water analyses were performed according to United States Environmental Protection Agency (USEPA) Method 3535 and TestAmerica Method PFC-FOSA. Soil analyses were performed according to TestAmerica Standard Operating Procedures (SOPs) PFC-LEACH and DV-LC-0012, which have received accreditation from the American Association for Laboratory Accreditation. Data were reviewed in accordance with USEPA National Functional Guidelines of June 2008 (USEPA 2008) and the Data-Validation Program Plan (Shannon & Wilson, Inc. 2015).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

- U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
- B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

- E The compound was quantitated above the calibration range.
- D Concentration is based on a diluted sample analysis.
- Q QC parameter out of acceptance range.

- Validation Qualifiers

- J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
- JH The result is an estimated quantity, and may be biased high.
- JL The result is an estimated quantity, and may be biased low
- JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.
- UB Compound considered non-detect at the listed value due to associated blank contamination.
- UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
- R The sample results are rejected as unusable. The compound may or may not be present in the sample.
- * Qualifier applied by reviewer.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

PERFLUORINATED HYDROCARBONS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
PFC leach, DV-LC-0012	Soil	14 days from collection to extraction and 40 days from extraction to analysis	Cool to <6 °C
SW 3535, PFC-FOSA	Water	14 days from collection to extraction and 40 days from extraction to analysis	Cool to <6 °C

All applicable holding times were met.

2. Blank Contamination

Quality assurance (QA) blanks (i.e. laboratory method blanks and equipment rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the estimated detection limit (EDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Three field reagent blanks (FTA-FRB-1, FTA-FRB-2, and FTA-FRB-3) were collected to ensure cross-contamination did not occur.

Analytes were not detected at or above the limit of detection (LOD) in the method blanks or field reagent blanks. All compound detections were not associated with blank contamination.

3. Surrogate Internal Standard Compounds

All field samples, blanks, LCS, and MS/MSD are spiked with surrogate internal standard compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique.

All surrogate internal standard recoveries ratios were within the control limits.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The spiked compounds used in the MS/MSD analysis must exhibit recoveries within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS and MSD results must be within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of two or greater. Sample results associated with MS/MSD exceedances where the parent samples are not site-specific are not qualified.

Two MS/MSD analyses were performed on project samples “FTA-1-SW” and “FTA-21-SW.” Sample locations associated with recoveries outside the control limits are as follows:

Sample Location	Compound	%R		Control Limits	Qualification
		MS	MSD		
FTA-1-SW	PFNA	30	553	64 - 138	Not required. Sample result is > 4 times the spiked amount.
	PFOS	-249	-187	70 - 130	
FTA-21-SW	PFHxS	99	44	70 - 135	Qualify JL for low bias

%R – percent recovery

PFHxS – perfluorohexane sulfonate

PFNA – perfluorononanoic acid

PFOS – perfluorooctane sulfonate

Sample locations associated with RPDs outside the control limits are as follows:

Sample Location	Compound	RPD	Control Limit	Qualification
FTA-1-SW	PFNA	40	30	Not required. Sample result is > 4 times the spiked amount

PFNA – perfluorononanoic acid

RPD – relative percent difference

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD (also called Ongoing Precision and Recovery (OPR)) analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The spiked compounds used in the LCS/LCSD analysis must exhibit recoveries within the laboratory-established acceptance limits.

The LCS/LCSD analyses exhibited recoveries and RPDs within the control limits for all analytes.

6. Field Duplicate Sample Analysis

Field duplicate sample analysis is used to assess the precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices and 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. An RPD will only be calculated if at least one of the sample results is above the Limit of Quantitation (LOQ; synonymous with reporting limit).

Field duplicate samples are summarized in the table, below.

Sample ID / Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
FTA-10-SW / FTA-BD-1	PFOS	1.1	1.1	0%
	All other compounds	--	--	AC
FTA-20-SW / FTA-BD-2	PFDA	0.91	0.97	6%
	PFHpA	2.0	1.7	16%
	PFHxS	9.0	7.5	18%
	PFHxA	1.6	1.2	29%
	PFNA	520	520	0%
	PFOS	300	290	3%

Sample ID / Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
FTA-20-SW / FTA-BD-2	PFOA	6.6	6.9	4%
	PFPA	1.4	1.0	33%
	PFUnA	1.3	1.6	21%
	All other compounds	--	--	AC
FTA-30-SW / FTA-BD-3	PFBS	2.8	3.0	7%
	PFBA	7.6	7.2	5%
	PFDA	8.5	8.2	4%
	PFHpA	15	15	0%
	PFHxS	32	35	9%
	PFHxA	43	46	7%
	PFNA	480 D	490	2%
	PFOS	750 D	810	8%
	PFOA	38	38	0%
	PFPA	41	42	2%
	PFTriA	11	11	0%
	PFUnA	22	22	0%
	All other compounds	--	--	AC

Units are in micrograms per kilogram

AC – Acceptable

D – Sample results are obtained from a dilution.

PFBS – perfluorobutane sulfonate

PFBA – perfluorobutanoic acid

PFDA – perfluorodecanoic acid

PFHpA – perfluoroheptanoic acid

PFHxS – perfluorohexane sulfonate

PFHxA – perfluorohexanoic acid

PFNA – perfluorononanoic acid

PFOS – perfluorooctane sulfonate

PFOA – perfluorooctanoic acid

PFPA – perfluoropentanoic acid

PFTriA – perfluorotridecanoic acid

PFUnA – perfluoroundecanoic acid

All results for field duplicate samples were within control limits.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

8. References

Shannon & Wilson, Inc. 2015. Data Validation Program Plan, Flint Hills Resources Alaska, LLC, North Pole, Alaska. June.

USEPA. 2008. National Functional Guidelines for Organic Methods Data Review. Guidance document, United States Environmental Protection Agency. June.

DATA VALIDATION CHECKLIST FOR PERFLUORINATED HYDROCARBONS

Perfluorinated Hydrocarbons: Method DV-LC-0012	Reported		Performance Acceptable		Not Required	
	No	Yes	No	Yes		
LIQUID CHROMATOGRAPHY/MASS SPECTROMETRY (LC/MS)						
Tier II Validation						
Holding Times		X		X		
Reporting limits (units)		X		X		
Blanks						
A. Method Blanks		X		X		
B. Trip Blanks					X	
C. Equipment Blanks					X	
D. Field Rinsate Blanks		X		X		
Laboratory Control Sample (LCS) Accuracy (%R)		X		X		
Laboratory Control Sample Duplicate (LCSD) Accuracy (%R)		X		X		
LCS/LCSD Precision (RPD)		X		X		
Matrix Spike (MS) Accuracy (%R)		X	X			
Matrix Spike Duplicate (MSD) Accuracy (%R)		X	X			
MS/MSD Precision (RPD)		X	X			
Field/Laboratory Duplicate Sample RPD		X		X		
Surrogate Internal Standard Spike (%R)		X		X		

%R – Percent Recovery
 RPD – Relative Percent Difference

Validation Performed By: Kylie Kegerreis

Date: September 8, 2015

Peer Review: Cassandra McCloud

Date: September 14, 2015

**ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
LABORATORY DATA REVIEW CHECKLIST**

Laboratory Data Review Checklist

Completed by:	Kylie Kegerreis		
Title:	Environmental Engineering Specialist II	Date:	8/27/2015
CS Report Name:	FHR North Pole Refinery Phase III - FTA	Report Date:	8/26/2015
Consultant Firm:	ARCADIS US, Inc.		
Laboratory Name:	TestAmerica (Arvada, CO)	Laboratory Report Number:	280-72684-1
ADEC File Number:		ADEC RecKey Number:	

1. Laboratorya. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?
☒ Yes ☐ No ☐ NA (Please explain.) Comments:

Laboratory certification is not required in cases where ADEC does not list an analytical method. The TestAmerica in Arvada, CO is listed under the approved laboratories with "Full status"

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 ☐ NA (Please explain) Comments:

The samples were received at the Anchorage, AK TestAmerica location. Samples were then transferred to another "network" laboratory (Arvada, CO) for analysis.

2. Chain of Custody (COC)

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

☒ Yes ☐ No ☐ NA (Please explain) Comments:

--

b. Correct analyses requested?

☒ Yes ☐ No ☐ NA (Please explain) Comments:

--

3. Laboratory Sample Receipt Documentationa. Sample/cooler temperature documented and within range at receipt ($4^{\circ} \pm 2^{\circ} \text{C}$)?
☒ Yes ☐ No ☐ NA (Please explain) Comments:

Temps = 2.5°C (8/4/15) & 0.9°C (8/5/15); Per data validation program plan, $0 - 6^{\circ}\text{C}$ = no qualification

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

Samples maintained within acceptable temperature range. Additional preservation not required for perfluorinated analyses

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

Samples in good condition - no leaks/cracks/breakage

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

(A) Insufficient sample volume for field reagent blanks (FTA-FRB-1, FTA-FRB-2, FTA-FRB-3).

Samples analyzed for PFC_FOSA only.

(B) Discrepancies between COC and container and/or lid label: (1) Sample ID "FTA-BD-1", container lid lists "FTA-BD-1-SW" (2) Sample ID "FTA-BD-2", container lid and label lists "FTA-BD-2-SW" (3) Sample ID "FTA-BD-3", container did not have a label with date/time listed. (4) Sample ID "FTA-BD-3", container has "FTA-BD-3-SW" written directly on it.

For all instances, laboratory used sample ID listed on COC and notified client (ARCADIS).

e. Data quality or usability affected? (Please explain)

Comments:

Data quality or usability not affected.

4. Case Narrative

a. Present and understandable?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

- (A) (A) Due to high concentrations of target analytes and/or analytes above the linear calibration curve, the following samples had to be analyzed at dilutions: FTA-2-SW, FTA-20-SW, FTA-24-SW, FTA-25-SW, FTA-26-SW, FTA-27-SW, FTA-28-SW, FTA-29-SW, FTA-30-SW, FTA-BD-2, and FTA-BD-3. Surrogate and Internal Standard recoveries could not be accurately calculated for several of the diluted analyses.
- (B) Internal standard responses were outside the control limits for samples: FTA-2-SW, FTA-24-SW, FTA-25-SW, FTA-26-SW, FTA-27-SW, FTA-28-SW, and FTA-29-SW. The samples show evidence of matrix interference. The internal standards were in control for the Method Blank and LCS, indicating the sample matrix may be causing the internal standard outages.
- (C) All others discussed in sections below.

c. Were all corrective actions documented?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

--

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

Comments:

No effect on data quality/usability according to the case narrative.

5. Samples Results

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

Yes, with the exception noted in Section 3, part d, point A.

b. All applicable holding times met?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

Hold times: Extraction w/in 14 days, Analysis w/in 40 days of extraction;
Collection date: 7/30/15
Prepped: PFCs - 8/11/15; FOSA - 8/10/15
Analyzed: PFCs - 8/13, 8/14, and 8/18/15; FOSA - 8/14/15

c. All soils reported on a dry weight basis?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

ug/kg

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

PFOs = 1.2 mg/kg; PFOA = 1.1 mg/kg

e. Data quality or usability affected? (Please explain)

Comments:

Data quality or usability not affected.

6. QC Samples

a. Method Blank

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

One method blank per extraction/analysis (total of 2 method blanks for soil samples and 1 method blank for water samples)

ii. All method blank results less than PQL?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

iii. If above PQL, what samples are affected?

Comments:

N/A

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

☐ Yes ☐ No ☐ NA (Please explain)

Comments:

N/A

v. Data quality or usability affected? (Please explain)

Comments:

Data quality or usability not affected due to method blank

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 ☐ NA (Please explain)

Comments:

One LCS per extraction/analysis (total of 2 LCS for soil samples and 1 LCS/LCSD for water samples)

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

☐ Yes ☐ No ☒ NA (Please explain)

Comments:

No Metals/Inorganics analysis

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 ☐ NA (Please explain)

Comments:

All %R for LCS and LCSD within limits.

Samples "FTA-1-SW" (prep/analysis batch 290031/290994) and "FTA-21-SW" (prep/analysis batch 290034/290994) used for MS/MSD analyses.

For FTA-1-SW: PFNA 30 / 553% (limits = 64 - 138%); PFOS -249 / -187% (limits = 70 - 130%)

For FTA-21-SW: PFHxS 99 / 44% (limits = 70 - 135%)

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/DMSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

☐ Yes ☒ No ☐ NA (Please explain) Comments:

All RPD within limits for LCS/LCSD.
For FTA-1-SW: PFNA = 40 (limit = < 30)

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

Comments:

For organic analyses, only the spiked samples (FTA-1-SW and FTA-21-SW) are affected

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

☒ Yes ☐ No ☐ NA (Please explain) Comments:

F1 = MS and/or MSD Recovery is outside acceptance limits.
F2 = MS/MSD RPD exceeds control limits.
4 = MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore control limits are not applicable.

vii. Data quality or usability affected? (Please explain)

Comments:

Data quality or usability not affected due to LCS and/or LCS/LCSD analyses. The following qualification is necessary due to MS recovery: For "FTA-21-SW" qualify PFHxS with "J". All other MS/ MSD exceedances do not require qualification because the sample concentration is greater than 4 times the spiking amount.

c. Surrogates - Organics Only

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

☒ Yes ☐ No ☐ NA (Please explain) 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 ☐ NA (Please explain) Comments:

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

☐ Yes ☐ No ☒ NA (Please explain) Comments:

No failed surrogate recoveries

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

Comments:

Data quality or usability not affected because surrogate recoveries within acceptable limits

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 ☒ NA (Please explain.)

Comments:

Not required for perfluorinated hydrocarbon analysis

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 ☒ NA (Please explain.)

Comments:

Trip blank not required.

iii. All results less than PQL?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Trip blank not required.

iv. If above PQL, what samples are affected?

Comments:

N/A

v. Data quality or usability affected? (Please explain.)

Comments:

N/A

e. Field Duplicate

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

FTA-BD-1 is duplicate of FTA-10-SW; FTA-BD-2 is duplicate of FTA-20-SW; FTA-BD-3 is duplicate of FTA-30-SW

ii. Submitted blind to lab?

☒ Yes ☐ No ☐ NA (Please explain.)

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 ☐ NA (Please explain) Comments:

All RPD less than 50% for soil samples

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

☐ Yes ☒ No ☐ NA (Please explain) Comments:

Not affected because all RPD/differences are less than specified DQOs

- f. Decontamination or Equipment Blank (if applicable)

☒ Yes ☐ No ☐ NA (Please explain) Comments:

Field Reagent Blanks collected (FTA-FRB-1, FTA-FRB-2, and FTA-FRB-3)

- i. All results less than PQL?

☒ Yes ☐ No ☐ NA (Please explain) Comments:

- ii. If above PQL, what samples are affected?

Comments:

N/A

- iii. Data quality or usability affected? (Please explain.)

Comments:

Data quality or usability not affected.

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

- a. Defined and appropriate?

☒ Yes ☐ No ☐ NA (Please explain) Comments:

See Attachment 1 for list of results detected between the MDL and the RL (aka trace detections).

Reset Form

**CHAIN OF CUSTODY /
LABORATORY QUALIFIERS /
CORRECTED SAMPLE ANALYSIS DATA SHEETS**

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Denver

4955 Yarrow Street

Arvada, CO 80002

Tel: (303)736-0100

TestAmerica Job ID: 280-72684-1

Client Project/Site: FHR North Pole Refinery Phase III - FTA

For:


ARCADIS U.S., Inc.

1100 Olive Way

Suite 800

Seattle, Washington 98101

Attn: Rebecca Andresen



Authorized for release by:

8/26/2015 4:04:03 PM

Michelle Johnston, Project Manager II

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: ARCADIS U.S., Inc.

Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Qualifiers

LCMS

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
F2	MS/MSD RPD exceeds control limits
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
E	Result exceeded calibration range.
D	Sample results are obtained from a dilution; the surrogate or matrix spike recoveries reported are calculated from diluted samples.
F1	MS and/or MSD Recovery is outside acceptance limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Job ID: 280-72684-1

Laboratory: TestAmerica Denver

Narrative

CASE NARRATIVE

Client: Arcadis U.S., Inc.

Project: FHR North Pole Refinery Phase III - FTA

Report Number: 280-72684-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

Sample Receipt

The following report contains the analytical results for thirty-three soil samples and three water samples received August 4, 2015, and August 5, 2015, according to documented sample acceptance procedures. The samples were received at temperatures of 2.5°C and 0.9°C, respectively.

Due to a FedEx shipping delay, one of the two coolers arrived at the laboratory on August 4, 2015, as intended. The client was notified on August 4, 2015. The remaining cooler was received on August 5, 2015. Both coolers arrived at an acceptable temperature. A Chain of Custody (COC) was not present in the cooler received on August 4; therefore, the samples were logged in on August 5 per the associated COC that was received with the August 5 cooler. The client was notified on August 6, 2015.

Insufficient sample volume was provided for field reagent blanks FTA-FRB-1 (280-72684-11), FTA-FRB-2 (280-72684-22) and FTA-FRB-3 (280-72684-33). The laboratory received 1 X 250-mL unpreserved poly bottle for each of these three samples. The requested PFC and PFC_FOSA analyses require each aqueous sample extracted and analyzed twice as each preparation/analysis requires 250-mL. The minimum volume required to perform both the PFC and the PFC_FOSA analyses is 2 X 250-mL containers per sample; however, the laboratory recommended volume to perform both analyses is 4 X 250-mL containers per sample. The client was notified on August 6, 2015. In accordance with the client's instructions provided on August 7, 2015, these three samples were analyzed for PFC_FOSA.

A discrepancy was noted between the sample ID listed on the Chain of Custody (COC), container label and the sample ID listed on the container lid for sample FTA-BD-1 (280-72684-34). The COC and container label list the ID as "FTA-BD-1", but the container lid lists the ID as "FTA-BD-1-SW". As the container label matched the sample ID listed on the COC, the sample ID was logged per the COC. The client was notified on August 6, 2015.

A discrepancy was noted between the sample ID listed on the Chain of Custody (COC) and the sample ID listed on the container lid and container label for sample FTA-BD-2 (280-72684-35). The COC lists the ID as "FTA-BD-2", but the container lid and container label lists the ID as "FTA-BD-2-SW". The sample ID was logged per the COC. The client was notified on August 6, 2015.

The sample container for sample FTA-BD-3 (280-72684-36) does not have a true sample label. The sample ID was written directly on the soil jar for sample FTA-BD-3 (280-72684-36); therefore, the sample collection date/time was not listed on the container or on a container label. The sample ID and collection date/time were logged per the Chain of Custody. The client was notified on August 6, 2015.

A discrepancy was noted between the sample ID listed on the Chain of Custody (COC) and the sample ID listed on the container for sample FTA-BD-3 (280-72684-36). The COC lists the ID as "FTA-BD-3", but the container lists the ID as "FTA-BD-3-SW". The sample ID was logged per the COC. The client was notified on August 6, 2015.

No other anomalies were encountered during sample receipt.

Perfluorinated Hydrocarbons (PFC)

Samples FTA-1-SW (280-72684-1), FTA-2-SW (280-72684-2), FTA-3-SW (280-72684-3), FTA-4-SW (280-72684-4), FTA-5-SW

Case Narrative

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Job ID: 280-72684-1 (Continued)

Laboratory: TestAmerica Denver (Continued)

(280-72684-5), FTA-6-SW (280-72684-6), FTA-7-SW (280-72684-7), FTA-8-SW (280-72684-8), FTA-9-SW (280-72684-9), FTA-10-SW (280-72684-10), FTA-11-SW (280-72684-12), FTA-12-SW (280-72684-13), FTA-13-SW (280-72684-14), FTA-14-SW (280-72684-15), FTA-15-SW (280-72684-16), FTA-16-SW (280-72684-17), FTA-17-SW (280-72684-18), FTA-18-SW (280-72684-19), FTA-19-SW (280-72684-20), FTA-20-SW (280-72684-21), FTA-21-SW (280-72684-23), FTA-22-SW (280-72684-24), FTA-23-SW (280-72684-25), FTA-24-SW (280-72684-26), FTA-25-SW (280-72684-27), FTA-26-SW (280-72684-28), FTA-27-SW (280-72684-29), FTA-28-SW (280-72684-30), FTA-29-SW (280-72684-31), FTA-30-SW (280-72684-32), FTA-BD-1 (280-72684-34), FTA-BD-2 (280-72684-35) and FTA-BD-3 (280-72684-36) were analyzed for Perfluorinated Hydrocarbons (PFC) in accordance with SOP DV-LC-0012. The samples were prepared on 08/11/2015 and analyzed on 08/13/2015, 08/14/2015 and 08/18/2015.

Each sample is analyzed to achieve the lowest possible reporting limits within the constraints of the method. Due to high concentrations of target analytes and/or analytes present above the linear calibration curve, samples FTA-2-SW (280-72684-2), FTA-20-SW (280-72684-21), FTA-24-SW (280-72684-26), FTA-25-SW (280-72684-27), FTA-26-SW (280-72684-28), FTA-27-SW (280-72684-29), FTA-28-SW (280-72684-30), FTA-29-SW (280-72684-31), FTA-30-SW (280-72684-32), FTA-BD-2 (280-72684-35) and FTA-BD-3 (280-72684-36) had to be analyzed at dilutions. Surrogate and Internal Standard recoveries could not be accurately calculated for several of the diluted analyses because the extracts were diluted beyond the ability to reliably quantitate recoveries. The reporting limits and method detection limits have been adjusted relative to the dilutions required.

The MS/MSD associated with prep batch 280-290031 was performed on sample FTA-1-SW (280-72684-1). The MS/MSD spike compound recoveries and RPD data could not be reliably calculated for Perfluorononanoic acid (PFNA) and Perfluorooctane Sulfonate (PFOS) because the sample concentrations were greater than four times the spike amounts. The acceptable LCS analysis data indicated that the analytical system was operating within control; therefore, corrective action is deemed unnecessary.

The MS/MSD associated with prep batch 280-290034 was performed on sample FTA-21-SW (280-72684-23). The MS/MSD exhibited a spike compound recovery outside the QC control limits for Perfluorohexane Sulfonate (PFHxS). The acceptable LCS analysis data indicated that the analytical system was operating within control; therefore, corrective action is deemed unnecessary.

Internal standard responses were outside the control limits for samples FTA-2-SW (280-72684-2), FTA-24-SW (280-72684-26), FTA-25-SW (280-72684-27), FTA-26-SW (280-72684-28), FTA-27-SW (280-72684-29), FTA-28-SW (280-72684-30) and FTA-29-SW (280-72684-31). The samples show evidence of matrix interference. The internal standards were in control for the Method Blank and LCS, indicating the sample matrix may be causing the internal standard outages.

No other analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Perfluorooctane Sulfonamide (FOSA)

Samples FTA-FRB-1 (280-72684-11), FTA-FRB-2 (280-72684-22) and FTA-FRB-3 (280-72684-33) were analyzed for Perfluorinated Hydrocarbons (PFC) in accordance with SOP DV-LC-0012. The samples were prepared on 08/10/2015 and analyzed on 08/14/2015.

The method required MS/MSD analyses could not be performed on prep batch 280-289835, due to insufficient sample volume. Method precision and accuracy have been verified by the acceptable LCS/LCSD data.

No other analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Percent Solids

Samples FTA-1-SW (280-72684-1), FTA-2-SW (280-72684-2), FTA-3-SW (280-72684-3), FTA-4-SW (280-72684-4), FTA-5-SW (280-72684-5), FTA-6-SW (280-72684-6), FTA-7-SW (280-72684-7), FTA-8-SW (280-72684-8), FTA-9-SW (280-72684-9), FTA-10-SW (280-72684-10), FTA-11-SW (280-72684-12), FTA-12-SW (280-72684-13), FTA-13-SW (280-72684-14), FTA-14-SW (280-72684-15), FTA-15-SW (280-72684-16), FTA-16-SW (280-72684-17), FTA-17-SW (280-72684-18), FTA-18-SW (280-72684-19), FTA-19-SW (280-72684-20), FTA-20-SW (280-72684-21), FTA-21-SW (280-72684-23), FTA-22-SW (280-72684-24), FTA-23-SW (280-72684-25), FTA-24-SW (280-72684-26), FTA-25-SW (280-72684-27), FTA-26-SW (280-72684-28), FTA-27-SW (280-72684-29), FTA-28-SW (280-72684-30), FTA-29-SW (280-72684-31), FTA-30-SW (280-72684-32), FTA-BD-1 (280-72684-34), FTA-BD-2 (280-72684-35) and FTA-BD-3 (280-72684-36) were analyzed for percent solids in accordance with ASTM D2216-90. The samples were analyzed on 08/05/2015.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-1-SW

Lab Sample ID: 280-72684-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorodecanoic acid (PFDA)	3.4		0.84	0.28	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorohexane Sulfonate (PFHxS)	0.51	J	0.84	0.29	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorohexanoic acid (PFHxA)	0.45	J	0.84	0.16	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorononanoic acid (PFNA)	200	F2	0.84	0.23	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorooctane Sulfonamide (FOSA)	0.13	J	0.84	0.10	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorooctane Sulfonate (PFOS)	170		0.84	0.15	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorooctanoic acid (PFOA)	3.0		0.84	0.24	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoropentanoic acid (PFPA)	0.38	J	0.84	0.25	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoroundecanoic acid (PFUnA)	1.5		0.84	0.34	ug/Kg	1	✱	DV-LC-0012	Total/NA

Client Sample ID: FTA-2-SW

Lab Sample ID: 280-72684-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.33	J	0.78	0.12	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorodecanoic acid (PFDA)	9.5		0.78	0.26	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.35	J	0.78	0.12	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorohexane Sulfonate (PFHxS)	1.6		0.78	0.27	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorohexanoic acid (PFHxA)	1.3		0.78	0.15	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorononanoic acid (PFNA)	220		0.78	0.21	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorooctanoic acid (PFOA)	3.7		0.78	0.22	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoropentanoic acid (PFPA)	1.3		0.78	0.23	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorooctane Sulfonate (PFOS) - DL	750		7.8	1.4	ug/Kg	10	✱	DV-LC-0012	Total/NA

Client Sample ID: FTA-3-SW

Lab Sample ID: 280-72684-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	1.3		0.77	0.12	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorohexane Sulfonate (PFHxS)	1.4		0.77	0.27	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorohexanoic acid (PFHxA)	0.49	J	0.77	0.14	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorononanoic acid (PFNA)	4.6		0.77	0.21	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorooctane Sulfonate (PFOS)	13		0.77	0.13	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorooctanoic acid (PFOA)	6.1		0.77	0.22	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoropentanoic acid (PFPA)	0.40	J	0.77	0.23	ug/Kg	1	✱	DV-LC-0012	Total/NA

Client Sample ID: FTA-4-SW

Lab Sample ID: 280-72684-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorononanoic acid (PFNA)	0.25	J	0.76	0.21	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorooctane Sulfonate (PFOS)	0.34	J	0.76	0.13	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.42	J	0.76	0.30	ug/Kg	1	✱	DV-LC-0012	Total/NA

Client Sample ID: FTA-5-SW

Lab Sample ID: 280-72684-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.85		0.80	0.12	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorohexane Sulfonate (PFHxS)	1.7		0.80	0.28	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorononanoic acid (PFNA)	12		0.80	0.22	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorooctane Sulfonate (PFOS)	0.85		0.80	0.14	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorooctanoic acid (PFOA)	1.6		0.80	0.23	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorotridecanoic Acid (PFTriA)	1.3		0.80	0.32	ug/Kg	1	✱	DV-LC-0012	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Denver

Detection Summary

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-5-SW (Continued)

Lab Sample ID: 280-72684-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroundecanoic acid (PFUnA)	0.83		0.80	0.32	ug/Kg	1	✱	DV-LC-0012	Total/NA

Client Sample ID: FTA-6-SW

Lab Sample ID: 280-72684-6

No Detections.

Client Sample ID: FTA-7-SW

Lab Sample ID: 280-72684-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.79	J	0.89	0.13	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorohexane Sulfonate (PFHxS)	1.2		0.89	0.31	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorohexanoic acid (PFHxA)	2.1		0.89	0.17	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorooctane Sulfonate (PFOS)	0.84	J	0.89	0.16	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorooctanoic acid (PFOA)	1.3		0.89	0.25	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoropentanoic acid (PFPA)	2.3		0.89	0.27	ug/Kg	1	✱	DV-LC-0012	Total/NA

Client Sample ID: FTA-8-SW

Lab Sample ID: 280-72684-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutane Sulfonate (PFBS)	0.53	J	0.87	0.15	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorobutanoic acid (PFBA)	1.1		0.87	0.13	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorodecanoic acid (PFDA)	0.30	J	0.87	0.30	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.9		0.87	0.13	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorohexane Sulfonate (PFHxS)	1.5		0.87	0.31	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorohexanoic acid (PFHxA)	5.1		0.87	0.16	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorononanoic acid (PFNA)	8.9		0.87	0.24	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorooctane Sulfonate (PFOS)	5.9		0.87	0.15	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorooctanoic acid (PFOA)	0.70	J	0.87	0.25	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoropentanoic acid (PFPA)	4.5		0.87	0.26	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.64	J	0.87	0.35	ug/Kg	1	✱	DV-LC-0012	Total/NA

Client Sample ID: FTA-9-SW

Lab Sample ID: 280-72684-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutane Sulfonate (PFBS)	0.49	J	0.87	0.15	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorobutanoic acid (PFBA)	1.2		0.87	0.13	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorodecanoic acid (PFDA)	0.83	J	0.87	0.29	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.0		0.87	0.13	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorohexane Sulfonate (PFHxS)	12		0.87	0.30	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorohexanoic acid (PFHxA)	5.8		0.87	0.16	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorononanoic acid (PFNA)	94		0.87	0.24	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorooctane Sulfonate (PFOS)	250		0.87	0.15	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorooctanoic acid (PFOA)	9.5		0.87	0.25	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoropentanoic acid (PFPA)	5.8		0.87	0.26	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorotridecanoic Acid (PFTrIA)	1.2		0.87	0.35	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoroundecanoic acid (PFUnA)	4.3		0.87	0.35	ug/Kg	1	✱	DV-LC-0012	Total/NA

Client Sample ID: FTA-10-SW

Lab Sample ID: 280-72684-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexane Sulfonate (PFHxS)	0.56	J	0.91	0.32	ug/Kg	1	✱	DV-LC-0012	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Denver

Detection Summary

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-10-SW (Continued)

Lab Sample ID: 280-72684-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorononanoic acid (PFNA)	0.70	J	0.91	0.25	ug/Kg	1	☼	DV-LC-0012	Total/NA
Perfluorooctane Sulfonate (PFOS)	1.1		0.91	0.16	ug/Kg	1	☼	DV-LC-0012	Total/NA
Perfluorooctanoic acid (PFOA)	0.60	J	0.91	0.26	ug/Kg	1	☼	DV-LC-0012	Total/NA

Client Sample ID: FTA-FRB-1

Lab Sample ID: 280-72684-11

No Detections.

Client Sample ID: FTA-11-SW

Lab Sample ID: 280-72684-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.71	J	0.93	0.14	ug/Kg	1	☼	DV-LC-0012	Total/NA
Perfluorohexane Sulfonate (PFHxS)	0.79	J	0.93	0.33	ug/Kg	1	☼	DV-LC-0012	Total/NA
Perfluorohexanoic acid (PFHxA)	0.47	J	0.93	0.17	ug/Kg	1	☼	DV-LC-0012	Total/NA
Perfluorononanoic acid (PFNA)	2.3		0.93	0.26	ug/Kg	1	☼	DV-LC-0012	Total/NA
Perfluorooctane Sulfonate (PFOS)	0.40	J	0.93	0.16	ug/Kg	1	☼	DV-LC-0012	Total/NA
Perfluorooctanoic acid (PFOA)	4.3		0.93	0.27	ug/Kg	1	☼	DV-LC-0012	Total/NA
Perfluoropentanoic acid (PFPA)	0.36	J	0.93	0.28	ug/Kg	1	☼	DV-LC-0012	Total/NA

Client Sample ID: FTA-12-SW

Lab Sample ID: 280-72684-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.18	J	0.81	0.12	ug/Kg	1	☼	DV-LC-0012	Total/NA
Perfluorohexane Sulfonate (PFHxS)	2.6		0.81	0.28	ug/Kg	1	☼	DV-LC-0012	Total/NA
Perfluorooctane Sulfonate (PFOS)	0.27	J	0.81	0.14	ug/Kg	1	☼	DV-LC-0012	Total/NA
Perfluorooctanoic acid (PFOA)	1.9		0.81	0.23	ug/Kg	1	☼	DV-LC-0012	Total/NA

Client Sample ID: FTA-13-SW

Lab Sample ID: 280-72684-14

No Detections.

Client Sample ID: FTA-14-SW

Lab Sample ID: 280-72684-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.71	J	0.86	0.13	ug/Kg	1	☼	DV-LC-0012	Total/NA
Perfluorohexanoic acid (PFHxA)	0.38	J	0.86	0.16	ug/Kg	1	☼	DV-LC-0012	Total/NA
Perfluorooctanoic acid (PFOA)	0.42	J	0.86	0.25	ug/Kg	1	☼	DV-LC-0012	Total/NA
Perfluoropentanoic acid (PFPA)	0.58	J	0.86	0.26	ug/Kg	1	☼	DV-LC-0012	Total/NA
Perfluorotridecanoic Acid (PFTriA)	0.43	J	0.86	0.34	ug/Kg	1	☼	DV-LC-0012	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.37	J	0.86	0.34	ug/Kg	1	☼	DV-LC-0012	Total/NA

Client Sample ID: FTA-15-SW

Lab Sample ID: 280-72684-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.35	J	0.84	0.13	ug/Kg	1	☼	DV-LC-0012	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.1		0.84	0.13	ug/Kg	1	☼	DV-LC-0012	Total/NA
Perfluorohexanoic acid (PFHxA)	1.8		0.84	0.16	ug/Kg	1	☼	DV-LC-0012	Total/NA
Perfluorooctanoic acid (PFOA)	0.45	J	0.84	0.24	ug/Kg	1	☼	DV-LC-0012	Total/NA
Perfluoropentanoic acid (PFPA)	1.3		0.84	0.25	ug/Kg	1	☼	DV-LC-0012	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Denver

Detection Summary

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-16-SW

Lab Sample ID: 280-72684-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutane Sulfonate (PFBS)	0.33	J	0.82	0.14	ug/Kg	1		✖	DV-LC-0012	Total/NA
Perfluorobutanoic acid (PFBA)	0.89		0.82	0.12	ug/Kg	1		✖	DV-LC-0012	Total/NA
Perfluoroheptanoic acid (PFHpA)	6.2		0.82	0.12	ug/Kg	1		✖	DV-LC-0012	Total/NA
Perfluorohexane Sulfonate (PFHxS)	74		0.82	0.29	ug/Kg	1		✖	DV-LC-0012	Total/NA
Perfluorohexanoic acid (PFHxA)	4.2		0.82	0.15	ug/Kg	1		✖	DV-LC-0012	Total/NA
Perfluorononanoic acid (PFNA)	3.7		0.82	0.22	ug/Kg	1		✖	DV-LC-0012	Total/NA
Perfluorooctanoic acid (PFOA)	41		0.82	0.23	ug/Kg	1		✖	DV-LC-0012	Total/NA
Perfluoropentanoic acid (PFPA)	3.9		0.82	0.24	ug/Kg	1		✖	DV-LC-0012	Total/NA
Perfluoroundecanoic acid (PFUnA)	2.5		0.82	0.33	ug/Kg	1		✖	DV-LC-0012	Total/NA

Client Sample ID: FTA-17-SW

Lab Sample ID: 280-72684-18

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	1.9		0.88	0.13	ug/Kg	1		✖	DV-LC-0012	Total/NA
Perfluorohexane Sulfonate (PFHxS)	11		0.88	0.31	ug/Kg	1		✖	DV-LC-0012	Total/NA
Perfluorohexanoic acid (PFHxA)	0.32	J	0.88	0.16	ug/Kg	1		✖	DV-LC-0012	Total/NA
Perfluorononanoic acid (PFNA)	18		0.88	0.24	ug/Kg	1		✖	DV-LC-0012	Total/NA
Perfluorooctane Sulfonate (PFOS)	1.8		0.88	0.15	ug/Kg	1		✖	DV-LC-0012	Total/NA
Perfluorooctanoic acid (PFOA)	11		0.88	0.25	ug/Kg	1		✖	DV-LC-0012	Total/NA
Perfluoropentanoic acid (PFPA)	0.68	J	0.88	0.26	ug/Kg	1		✖	DV-LC-0012	Total/NA

Client Sample ID: FTA-18-SW

Lab Sample ID: 280-72684-19

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	1.6		0.84	0.13	ug/Kg	1		✖	DV-LC-0012	Total/NA
Perfluorohexane Sulfonate (PFHxS)	3.0		0.84	0.29	ug/Kg	1		✖	DV-LC-0012	Total/NA
Perfluorohexanoic acid (PFHxA)	1.2		0.84	0.16	ug/Kg	1		✖	DV-LC-0012	Total/NA
Perfluorononanoic acid (PFNA)	2.3		0.84	0.23	ug/Kg	1		✖	DV-LC-0012	Total/NA
Perfluorooctane Sulfonate (PFOS)	1.2		0.84	0.15	ug/Kg	1		✖	DV-LC-0012	Total/NA
Perfluorooctanoic acid (PFOA)	4.2		0.84	0.24	ug/Kg	1		✖	DV-LC-0012	Total/NA
Perfluoropentanoic acid (PFPA)	0.74	J	0.84	0.25	ug/Kg	1		✖	DV-LC-0012	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.42	J	0.84	0.33	ug/Kg	1		✖	DV-LC-0012	Total/NA

Client Sample ID: FTA-19-SW

Lab Sample ID: 280-72684-20

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorodecanoic acid (PFDA)	1.2		0.81	0.27	ug/Kg	1		✖	DV-LC-0012	Total/NA
Perfluoroheptanoic acid (PFHpA)	3.7		0.81	0.12	ug/Kg	1		✖	DV-LC-0012	Total/NA
Perfluorohexane Sulfonate (PFHxS)	9.7		0.81	0.28	ug/Kg	1		✖	DV-LC-0012	Total/NA
Perfluorohexanoic acid (PFHxA)	1.5		0.81	0.15	ug/Kg	1		✖	DV-LC-0012	Total/NA
Perfluorononanoic acid (PFNA)	52		0.81	0.22	ug/Kg	1		✖	DV-LC-0012	Total/NA
Perfluorooctane Sulfonate (PFOS)	9.1		0.81	0.14	ug/Kg	1		✖	DV-LC-0012	Total/NA
Perfluorooctanoic acid (PFOA)	5.4		0.81	0.23	ug/Kg	1		✖	DV-LC-0012	Total/NA
Perfluoropentanoic acid (PFPA)	0.82		0.81	0.24	ug/Kg	1		✖	DV-LC-0012	Total/NA
Perfluorotridecanoic Acid (PFTriA)	0.46	J	0.81	0.32	ug/Kg	1		✖	DV-LC-0012	Total/NA
Perfluoroundecanoic acid (PFUnA)	2.2		0.81	0.32	ug/Kg	1		✖	DV-LC-0012	Total/NA

Client Sample ID: FTA-20-SW

Lab Sample ID: 280-72684-21

This Detection Summary does not include radiochemical test results.

TestAmerica Denver

Detection Summary

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-20-SW (Continued)

Lab Sample ID: 280-72684-21

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.37	J	0.90	0.13	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorodecanoic acid (PFDA)	0.91		0.90	0.30	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.0		0.90	0.13	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorohexane Sulfonate (PFHxS)	9.0		0.90	0.31	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorohexanoic acid (PFHxA)	1.6		0.90	0.17	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorooctanoic acid (PFOA)	6.6		0.90	0.26	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoropentanoic acid (PFPA)	1.4		0.90	0.27	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoroundecanoic acid (PFUnA)	1.3		0.90	0.36	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorononanoic acid (PFNA) - DL	520		4.5	1.2	ug/Kg	5	✱	DV-LC-0012	Total/NA
Perfluorooctane Sulfonate (PFOS) - DL	300		4.5	0.78	ug/Kg	5	✱	DV-LC-0012	Total/NA

Client Sample ID: FTA-FRB-2

Lab Sample ID: 280-72684-22

No Detections.

Client Sample ID: FTA-21-SW

Lab Sample ID: 280-72684-23

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutane Sulfonate (PFBS)	1.4		0.79	0.14	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorobutanoic acid (PFBA)	0.55	J	0.79	0.12	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoroheptanoic acid (PFHpA)	3.3		0.79	0.12	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorohexane Sulfonate (PFHxS)	29	F1	0.79	0.28	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorohexanoic acid (PFHxA)	4.5		0.79	0.15	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorononanoic acid (PFNA)	2.6		0.79	0.22	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorooctane Sulfonate (PFOS)	0.60	J	0.79	0.14	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorooctanoic acid (PFOA)	14		0.79	0.23	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoropentanoic acid (PFPA)	3.3		0.79	0.24	ug/Kg	1	✱	DV-LC-0012	Total/NA

Client Sample ID: FTA-22-SW

Lab Sample ID: 280-72684-24

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutane Sulfonate (PFBS)	0.26	J	0.86	0.15	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorobutanoic acid (PFBA)	0.13	J	0.86	0.13	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.1		0.86	0.13	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorohexane Sulfonate (PFHxS)	7.2		0.86	0.30	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorohexanoic acid (PFHxA)	1.5		0.86	0.16	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorooctanoic acid (PFOA)	2.4		0.86	0.25	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoropentanoic acid (PFPA)	2.2		0.86	0.26	ug/Kg	1	✱	DV-LC-0012	Total/NA

Client Sample ID: FTA-23-SW

Lab Sample ID: 280-72684-25

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.53	J	0.88	0.13	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorohexane Sulfonate (PFHxS)	1.2		0.88	0.31	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorohexanoic acid (PFHxA)	0.38	J	0.88	0.16	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorononanoic acid (PFNA)	1.2		0.88	0.24	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorooctane Sulfonate (PFOS)	0.91		0.88	0.15	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorooctanoic acid (PFOA)	1.7		0.88	0.25	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoropentanoic acid (PFPA)	0.78	J	0.88	0.26	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoroundecanoic acid (PFUnA)	1.9		0.88	0.35	ug/Kg	1	✱	DV-LC-0012	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Denver

Detection Summary

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-24-SW

Lab Sample ID: 280-72684-26

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.65	J	0.88	0.13	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluorodecanoic acid (PFDA)	100		0.88	0.30	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.1		0.88	0.13	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluorohexane Sulfonate (PFHxS)	7.2		0.88	0.31	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluorohexanoic acid (PFHxA)	2.9		0.88	0.16	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluorooctane Sulfonamide (FOSA)	0.53	J	0.88	0.11	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluorooctanoic acid (PFOA)	6.7		0.88	0.25	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluoropentanoic acid (PFPA)	1.3		0.88	0.26	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluorotridecanoic Acid (PFTriA)	2.1		0.88	0.35	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluoroundecanoic acid (PFUnA)	10		0.88	0.35	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluorononanoic acid (PFNA) - DL	950		18	4.8	ug/Kg	20		✱	DV-LC-0012	Total/NA
Perfluorooctane Sulfonate (PFOS) - DL	2600		18	3.1	ug/Kg	20		✱	DV-LC-0012	Total/NA

Client Sample ID: FTA-25-SW

Lab Sample ID: 280-72684-27

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.50	J	0.84	0.13	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluorodecanoic acid (PFDA)	22		0.84	0.28	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.4		0.84	0.13	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluorohexane Sulfonate (PFHxS)	12		0.84	0.29	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluorohexanoic acid (PFHxA)	3.7		0.84	0.16	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluorooctane Sulfonamide (FOSA)	0.22	J	0.84	0.10	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluorooctanoic acid (PFOA)	8.1		0.84	0.24	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluoropentanoic acid (PFPA)	2.2		0.84	0.25	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluorotridecanoic Acid (PFTriA)	0.37	J	0.84	0.33	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.93		0.84	0.33	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluorononanoic acid (PFNA) - DL	920		8.4	2.3	ug/Kg	10		✱	DV-LC-0012	Total/NA
Perfluorooctane Sulfonate (PFOS) - DL	1000		8.4	1.5	ug/Kg	10		✱	DV-LC-0012	Total/NA

Client Sample ID: FTA-26-SW

Lab Sample ID: 280-72684-28

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutane Sulfonate (PFBS)	0.36	J	0.84	0.15	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluorobutanoic acid (PFBA)	1.1		0.84	0.13	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluorodecanoic acid (PFDA)	11		0.84	0.28	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluoroheptanoic acid (PFHpA)	4.7		0.84	0.13	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluorohexane Sulfonate (PFHxS)	36		0.84	0.30	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluorohexanoic acid (PFHxA)	10		0.84	0.16	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluorooctane Sulfonamide (FOSA)	0.15	J	0.84	0.10	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluorooctanoic acid (PFOA)	20		0.84	0.24	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluoropentanoic acid (PFPA)	6.9		0.84	0.25	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluorotridecanoic Acid (PFTriA)	2.1		0.84	0.34	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluoroundecanoic acid (PFUnA)	15		0.84	0.34	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluorononanoic acid (PFNA) - DL	3800		17	4.6	ug/Kg	20		✱	DV-LC-0012	Total/NA
Perfluorooctane Sulfonate (PFOS) - DL	2400		17	3.0	ug/Kg	20		✱	DV-LC-0012	Total/NA

Client Sample ID: FTA-27-SW

Lab Sample ID: 280-72684-29

This Detection Summary does not include radiochemical test results.

TestAmerica Denver

Detection Summary

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-27-SW (Continued)

Lab Sample ID: 280-72684-29

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutane Sulfonate (PFBS)	4.1		0.86	0.15	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorobutanoic acid (PFBA)	4.9		0.86	0.13	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorodecanoic acid (PFDA)	5.5		0.86	0.29	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoroheptanoic acid (PFHpA)	19		0.86	0.13	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorohexane Sulfonate (PFHxS)	83		0.86	0.30	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorohexanoic acid (PFHxA)	41		0.86	0.16	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorooctane Sulfonamide (FOSA)	0.12	J	0.86	0.11	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorooctanoic acid (PFOA)	48		0.86	0.25	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoropentanoic acid (PFPA)	29		0.86	0.26	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorotridecanoic Acid (PFTriA)	3.1		0.86	0.35	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoroundecanoic acid (PFUnA)	12		0.86	0.35	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorononanoic acid (PFNA) - DL	410		8.6	2.4	ug/Kg	10	✱	DV-LC-0012	Total/NA
Perfluorooctane Sulfonate (PFOS) - DL	1400		8.6	1.5	ug/Kg	10	✱	DV-LC-0012	Total/NA

Client Sample ID: FTA-28-SW

Lab Sample ID: 280-72684-30

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutane Sulfonate (PFBS)	0.19	J	0.83	0.14	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorobutanoic acid (PFBA)	1.2		0.83	0.12	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorodecane sulfonate (PFDS)	5.2		0.83	0.31	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorodecanoic acid (PFDA)	66		0.83	0.28	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorododecanoic acid (PFDoA)	3.5		2.1	0.59	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.7		0.83	0.12	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorohexane Sulfonate (PFHxS)	5.8		0.83	0.29	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorohexanoic acid (PFHxA)	5.2		0.83	0.16	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorooctane Sulfonamide (FOSA)	3.5		0.83	0.10	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorooctanoic acid (PFOA)	4.4		0.83	0.24	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoropentanoic acid (PFPA)	3.4		0.83	0.25	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.71	J	2.1	0.71	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorotridecanoic Acid (PFTriA)	33		0.83	0.33	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorononanoic acid (PFNA) - DL	250		8.3	2.3	ug/Kg	10	✱	DV-LC-0012	Total/NA
Perfluorooctane Sulfonate (PFOS) - DL	760		8.3	1.4	ug/Kg	10	✱	DV-LC-0012	Total/NA
Perfluoroundecanoic acid (PFUnA) - DL	370		8.3	3.3	ug/Kg	10	✱	DV-LC-0012	Total/NA

Client Sample ID: FTA-29-SW

Lab Sample ID: 280-72684-31

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutane Sulfonate (PFBS)	2.1		0.89	0.16	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorobutanoic acid (PFBA)	4.4		0.89	0.13	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorodecanoic acid (PFDA)	91		0.89	0.30	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoroheptanoic acid (PFHpA)	11		0.89	0.13	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorohexane Sulfonate (PFHxS)	28		0.89	0.31	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorohexanoic acid (PFHxA)	29		0.89	0.17	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorooctane Sulfonamide (FOSA)	0.26	J	0.89	0.11	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorooctanoic acid (PFOA)	23		0.89	0.26	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoropentanoic acid (PFPA)	27		0.89	0.27	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorotridecanoic Acid (PFTriA)	0.95		0.89	0.36	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoroundecanoic acid (PFUnA)	2.5		0.89	0.36	ug/Kg	1	✱	DV-LC-0012	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Denver

Detection Summary

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-29-SW (Continued)

Lab Sample ID: 280-72684-31

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorononanoic acid (PFNA) - DL	2200		44	12	ug/Kg	50	✱	DV-LC-0012	Total/NA
Perfluorooctane Sulfonate (PFOS) - DL	3000		44	7.8	ug/Kg	50	✱	DV-LC-0012	Total/NA

Client Sample ID: FTA-30-SW

Lab Sample ID: 280-72684-32

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutane Sulfonate (PFBS)	2.8		0.90	0.16	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorobutanoic acid (PFBA)	7.6		0.90	0.14	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorodecanoic acid (PFDA)	8.5		0.90	0.30	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorododecanoic acid (PFDoA)	1.6	J	2.3	0.64	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoroheptanoic acid (PFHpA)	15		0.90	0.14	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorohexane Sulfonate (PFHxS)	32		0.90	0.32	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorohexanoic acid (PFHxA)	43		0.90	0.17	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorooctane Sulfonamide (FOSA)	0.34	J	0.90	0.11	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorooctanoic acid (PFOA)	38		0.90	0.26	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoropentanoic acid (PFPA)	41		0.90	0.27	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorotridecanoic Acid (PFTriA)	11		0.90	0.36	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoroundecanoic acid (PFUnA)	22		0.90	0.36	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorononanoic acid (PFNA) - DL	480	D	9.0	2.5	ug/Kg	10	✱	DV-LC-0012	Total/NA
Perfluorooctane Sulfonate (PFOS) - DL	750	D	9.0	1.6	ug/Kg	10	✱	DV-LC-0012	Total/NA

Client Sample ID: FTA-FRB-3

Lab Sample ID: 280-72684-33

No Detections.

Client Sample ID: FTA-BD-1

Lab Sample ID: 280-72684-34

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorononanoic acid (PFNA)	0.63	J	0.86	0.24	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorooctane Sulfonate (PFOS)	1.1		0.86	0.15	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorooctanoic acid (PFOA)	0.31	J	0.86	0.25	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorotridecanoic Acid (PFTriA)	1.0		0.86	0.34	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoroundecanoic acid (PFUnA)	2.0		0.86	0.34	ug/Kg	1	✱	DV-LC-0012	Total/NA

Client Sample ID: FTA-BD-2

Lab Sample ID: 280-72684-35

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorodecanoic acid (PFDA)	0.97		0.88	0.30	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.7		0.88	0.13	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorohexane Sulfonate (PFHxS)	7.5		0.88	0.31	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorohexanoic acid (PFHxA)	1.2		0.88	0.17	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorooctanoic acid (PFOA)	6.9		0.88	0.25	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoropentanoic acid (PFPA)	1.0		0.88	0.26	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorotridecanoic Acid (PFTriA)	0.48	J	0.88	0.35	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluoroundecanoic acid (PFUnA)	1.6		0.88	0.35	ug/Kg	1	✱	DV-LC-0012	Total/NA
Perfluorononanoic acid (PFNA) - DL	520		8.8	2.4	ug/Kg	10	✱	DV-LC-0012	Total/NA
Perfluorooctane Sulfonate (PFOS) - DL	290		8.8	1.5	ug/Kg	10	✱	DV-LC-0012	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Denver

Detection Summary

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-BD-3

Lab Sample ID: 280-72684-36

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutane Sulfonate (PFBS)	3.0		0.83	0.15	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluorobutanoic acid (PFBA)	7.2		0.83	0.12	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluorodecanoic acid (PFDA)	8.2		0.83	0.28	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluorododecanoic acid (PFDoA)	1.7	J	2.1	0.59	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluoroheptanoic acid (PFHpA)	15		0.83	0.12	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluorohexane Sulfonate (PFHxS)	35		0.83	0.29	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluorohexanoic acid (PFHxA)	46		0.83	0.16	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluorooctane Sulfonamide (FOSA)	0.45	J	0.83	0.10	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluorooctanoic acid (PFOA)	38		0.83	0.24	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluoropentanoic acid (PFPA)	42		0.83	0.25	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluorotridecanoic Acid (PFTriA)	11		0.83	0.33	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluoroundecanoic acid (PFUnA)	22		0.83	0.33	ug/Kg	1		✱	DV-LC-0012	Total/NA
Perfluorononanoic acid (PFNA) - DL	490		8.3	2.3	ug/Kg	10		✱	DV-LC-0012	Total/NA
Perfluorooctane Sulfonate (PFOS) - DL	810		8.3	1.5	ug/Kg	10		✱	DV-LC-0012	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Denver

Method Summary

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Method	Method Description	Protocol	Laboratory
DV-LC-0012	Perfluorinated Hydrocarbons	TAL-DEN	TAL DEN
PFC -FOSA	FOSA in Water (LC/MS/MS)	TAL-DEN	TAL DEN
Moisture	Percent Moisture	EPA	TAL DEN

Protocol References:

EPA = US Environmental Protection Agency
TAL-DEN = TestAmerica Laboratories, Denver, Facility Standard Operating Procedure.

Laboratory References:

TAL DEN = TestAmerica Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100

Sample Summary

Client: ARCADIS U.S., Inc.

TestAmerica Job ID: 280-72684-1

Project/Site: FHR North Pole Refinery Phase III - FTA

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
280-72684-1	FTA-1-SW	Solid	07/30/15 18:50	08/05/15 09:15
280-72684-2	FTA-2-SW	Solid	07/30/15 18:58	08/05/15 09:15
280-72684-3	FTA-3-SW	Solid	07/30/15 19:06	08/05/15 09:15
280-72684-4	FTA-4-SW	Solid	07/30/15 19:14	08/05/15 09:15
280-72684-5	FTA-5-SW	Solid	07/30/15 19:22	08/05/15 09:15
280-72684-6	FTA-6-SW	Solid	07/30/15 19:30	08/05/15 09:15
280-72684-7	FTA-7-SW	Solid	07/30/15 19:38	08/05/15 09:15
280-72684-8	FTA-8-SW	Solid	07/30/15 19:46	08/05/15 09:15
280-72684-9	FTA-9-SW	Solid	07/30/15 19:54	08/05/15 09:15
280-72684-10	FTA-10-SW	Solid	07/30/15 20:02	08/05/15 09:15
280-72684-11	FTA-FRB-1	Water	07/30/15 20:03	08/05/15 09:15
280-72684-12	FTA-11-SW	Solid	07/30/15 20:10	08/05/15 09:15
280-72684-13	FTA-12-SW	Solid	07/30/15 20:18	08/05/15 09:15
280-72684-14	FTA-13-SW	Solid	07/30/15 20:26	08/05/15 09:15
280-72684-15	FTA-14-SW	Solid	07/30/15 20:34	08/05/15 09:15
280-72684-16	FTA-15-SW	Solid	07/30/15 20:42	08/04/15 09:45
280-72684-17	FTA-16-SW	Solid	07/30/15 20:50	08/04/15 09:45
280-72684-18	FTA-17-SW	Solid	07/30/15 20:58	08/04/15 09:45
280-72684-19	FTA-18-SW	Solid	07/30/15 21:06	08/04/15 09:45
280-72684-20	FTA-19-SW	Solid	07/30/15 21:14	08/04/15 09:45
280-72684-21	FTA-20-SW	Solid	07/30/15 21:22	08/04/15 09:45
280-72684-22	FTA-FRB-2	Water	07/30/15 21:23	08/04/15 09:45
280-72684-23	FTA-21-SW	Solid	07/30/15 21:27	08/04/15 09:45
280-72684-24	FTA-22-SW	Solid	07/30/15 21:30	08/04/15 09:45
280-72684-25	FTA-23-SW	Solid	07/30/15 21:38	08/04/15 09:45
280-72684-26	FTA-24-SW	Solid	07/30/15 21:46	08/04/15 09:45
280-72684-27	FTA-25-SW	Solid	07/30/15 21:54	08/04/15 09:45
280-72684-28	FTA-26-SW	Solid	07/30/15 22:02	08/04/15 09:45
280-72684-29	FTA-27-SW	Solid	07/30/15 22:10	08/04/15 09:45
280-72684-30	FTA-28-SW	Solid	07/30/15 22:18	08/04/15 09:45
280-72684-31	FTA-29-SW	Solid	07/30/15 22:26	08/04/15 09:45
280-72684-32	FTA-30-SW	Solid	07/30/15 22:34	08/04/15 09:45
280-72684-33	FTA-FRB-3	Water	07/30/15 22:35	08/04/15 09:45
280-72684-34	FTA-BD-1	Solid	07/30/15 00:00	08/05/15 09:15
280-72684-35	FTA-BD-2	Solid	07/30/15 00:00	08/04/15 09:45
280-72684-36	FTA-BD-3	Solid	07/30/15 00:00	08/04/15 09:45

TestAmerica Denver

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-1-SW

Date Collected: 07/30/15 18:50

Date Received: 08/05/15 09:15

Lab Sample ID: 280-72684-1

Matrix: Solid

Percent Solids: 93.9

Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	ND		0.84	0.15	ug/Kg	☼	08/11/15 11:20	08/13/15 18:55	1
Perfluorobutanoic acid (PFBA)	ND		0.84	0.13	ug/Kg	☼	08/11/15 11:20	08/13/15 18:55	1
Perfluorodecane sulfonate (PFDS)	ND		0.84	0.31	ug/Kg	☼	08/11/15 11:20	08/13/15 18:55	1
Perfluorodecanoic acid (PFDA)	3.4		0.84	0.28	ug/Kg	☼	08/11/15 11:20	08/13/15 18:55	1
Perfluorododecanoic acid (PFDoA)	ND		2.1	0.60	ug/Kg	☼	08/11/15 11:20	08/13/15 18:55	1
Perfluoroheptanoic acid (PFHpA)	ND		0.84	0.13	ug/Kg	☼	08/11/15 11:20	08/13/15 18:55	1
Perfluorohexane Sulfonate (PFHxS)	0.51	J	0.84	0.29	ug/Kg	☼	08/11/15 11:20	08/13/15 18:55	1
Perfluorohexanoic acid (PFHxA)	0.45	J	0.84	0.16	ug/Kg	☼	08/11/15 11:20	08/13/15 18:55	1
Perfluorononanoic acid (PFNA)	200	F2	0.84	0.23	ug/Kg	☼	08/11/15 11:20	08/13/15 18:55	1
Perfluorooctane Sulfonamide (FOSA)	0.13	J	0.84	0.10	ug/Kg	☼	08/11/15 11:20	08/13/15 18:55	1
Perfluorooctane Sulfonate (PFOS)	170		0.84	0.15	ug/Kg	☼	08/11/15 11:20	08/13/15 18:55	1
Perfluorooctanoic acid (PFOA)	3.0		0.84	0.24	ug/Kg	☼	08/11/15 11:20	08/13/15 18:55	1
Perfluoropentanoic acid (PFPA)	0.38	J	0.84	0.25	ug/Kg	☼	08/11/15 11:20	08/13/15 18:55	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.1	0.72	ug/Kg	☼	08/11/15 11:20	08/13/15 18:55	1
Perfluorotridecanoic Acid (PFTriA)	ND		0.84	0.34	ug/Kg	☼	08/11/15 11:20	08/13/15 18:55	1
Perfluoroundecanoic acid (PFUnA)	1.5		0.84	0.34	ug/Kg	☼	08/11/15 11:20	08/13/15 18:55	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 PFOA	100		57 - 153	08/11/15 11:20	08/13/15 18:55	1
13C8 PFOS	103		70 - 130	08/11/15 11:20	08/13/15 18:55	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	6.1		0.10	0.10	%			08/05/15 19:46	1
Percent Solids	94		0.10	0.10	%			08/05/15 19:46	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-2-SW

Date Collected: 07/30/15 18:58

Date Received: 08/05/15 09:15

Lab Sample ID: 280-72684-2

Matrix: Solid

Percent Solids: 94.5

Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	ND		0.78	0.14	ug/Kg	☼	08/11/15 11:20	08/13/15 20:09	1
Perfluorobutanoic acid (PFBA)	0.33	J	0.78	0.12	ug/Kg	☼	08/11/15 11:20	08/13/15 20:09	1
Perfluorodecane sulfonate (PFDS)	ND		0.78	0.29	ug/Kg	☼	08/11/15 11:20	08/13/15 20:09	1
Perfluorodecanoic acid (PFDA)	9.5		0.78	0.26	ug/Kg	☼	08/11/15 11:20	08/13/15 20:09	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.55	ug/Kg	☼	08/11/15 11:20	08/13/15 20:09	1
Perfluoroheptanoic acid (PFHpA)	0.35	J	0.78	0.12	ug/Kg	☼	08/11/15 11:20	08/13/15 20:09	1
Perfluorohexane Sulfonate (PFHxS)	1.6		0.78	0.27	ug/Kg	☼	08/11/15 11:20	08/13/15 20:09	1
Perfluorohexanoic acid (PFHxA)	1.3		0.78	0.15	ug/Kg	☼	08/11/15 11:20	08/13/15 20:09	1
Perfluorononanoic acid (PFNA)	220		0.78	0.21	ug/Kg	☼	08/11/15 11:20	08/13/15 20:09	1
Perfluorooctane Sulfonamide (FOSA)	ND		0.78	0.095	ug/Kg	☼	08/11/15 11:20	08/13/15 20:09	1
Perfluorooctanoic acid (PFOA)	3.7		0.78	0.22	ug/Kg	☼	08/11/15 11:20	08/13/15 20:09	1
Perfluoropentanoic acid (PFPA)	1.3		0.78	0.23	ug/Kg	☼	08/11/15 11:20	08/13/15 20:09	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.67	ug/Kg	☼	08/11/15 11:20	08/13/15 20:09	1
Perfluorotridecanoic Acid (PFTriA)	ND		0.78	0.31	ug/Kg	☼	08/11/15 11:20	08/13/15 20:09	1
Perfluoroundecanoic acid (PFUnA)	ND		0.78	0.31	ug/Kg	☼	08/11/15 11:20	08/13/15 20:09	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 PFOA	101		57 - 153	08/11/15 11:20	08/13/15 20:09	1
13C8 PFOS	100		70 - 130	08/11/15 11:20	08/13/15 20:09	1

Method: DV-LC-0012 - Perfluorinated Hydrocarbons - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctane Sulfonate (PFOS)	750		7.8	1.4	ug/Kg	☼	08/11/15 11:20	08/13/15 20:21	10

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 PFOA	89	D	57 - 153	08/11/15 11:20	08/13/15 20:21	10
13C8 PFOS	91	D	70 - 130	08/11/15 11:20	08/13/15 20:21	10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	5.5		0.10	0.10	%	—		08/05/15 19:46	1
Percent Solids	94		0.10	0.10	%			08/05/15 19:46	1

TestAmerica Denver

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-3-SW

Date Collected: 07/30/15 19:06

Date Received: 08/05/15 09:15

Lab Sample ID: 280-72684-3

Matrix: Solid

Percent Solids: 95.7

Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	ND		0.77	0.13	ug/Kg	☼	08/11/15 11:20	08/13/15 20:46	1
Perfluorobutanoic acid (PFBA)	ND		0.77	0.12	ug/Kg	☼	08/11/15 11:20	08/13/15 20:46	1
Perfluorodecane sulfonate (PFDS)	ND		0.77	0.29	ug/Kg	☼	08/11/15 11:20	08/13/15 20:46	1
Perfluorodecanoic acid (PFDA)	ND		0.77	0.26	ug/Kg	☼	08/11/15 11:20	08/13/15 20:46	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.55	ug/Kg	☼	08/11/15 11:20	08/13/15 20:46	1
Perfluoroheptanoic acid (PFHpA)	1.3		0.77	0.12	ug/Kg	☼	08/11/15 11:20	08/13/15 20:46	1
Perfluorohexane Sulfonate (PFHxS)	1.4		0.77	0.27	ug/Kg	☼	08/11/15 11:20	08/13/15 20:46	1
Perfluorohexanoic acid (PFHxA)	0.49	J	0.77	0.14	ug/Kg	☼	08/11/15 11:20	08/13/15 20:46	1
Perfluorononanoic acid (PFNA)	4.6		0.77	0.21	ug/Kg	☼	08/11/15 11:20	08/13/15 20:46	1
Perfluorooctane Sulfonamide (FOSA)	ND		0.77	0.094	ug/Kg	☼	08/11/15 11:20	08/13/15 20:46	1
Perfluorooctane Sulfonate (PFOS)	13		0.77	0.13	ug/Kg	☼	08/11/15 11:20	08/13/15 20:46	1
Perfluorooctanoic acid (PFOA)	6.1		0.77	0.22	ug/Kg	☼	08/11/15 11:20	08/13/15 20:46	1
Perfluoropentanoic acid (PFPA)	0.40	J	0.77	0.23	ug/Kg	☼	08/11/15 11:20	08/13/15 20:46	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.67	ug/Kg	☼	08/11/15 11:20	08/13/15 20:46	1
Perfluorotridecanoic Acid (PFTriA)	ND		0.77	0.31	ug/Kg	☼	08/11/15 11:20	08/13/15 20:46	1
Perfluoroundecanoic acid (PFUnA)	ND		0.77	0.31	ug/Kg	☼	08/11/15 11:20	08/13/15 20:46	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	99		57 - 153				08/11/15 11:20	08/13/15 20:46	1
13C8 PFOS	94		70 - 130				08/11/15 11:20	08/13/15 20:46	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	4.3		0.10	0.10	%			08/05/15 19:46	1
Percent Solids	96		0.10	0.10	%			08/05/15 19:46	1

TestAmerica Denver

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-4-SW

Date Collected: 07/30/15 19:14

Date Received: 08/05/15 09:15

Lab Sample ID: 280-72684-4

Matrix: Solid

Percent Solids: 96.0

Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	ND		0.76	0.13	ug/Kg	☼	08/11/15 11:20	08/13/15 20:58	1
Perfluorobutanoic acid (PFBA)	ND		0.76	0.11	ug/Kg	☼	08/11/15 11:20	08/13/15 20:58	1
Perfluorodecane sulfonate (PFDS)	ND		0.76	0.28	ug/Kg	☼	08/11/15 11:20	08/13/15 20:58	1
Perfluorodecanoic acid (PFDA)	ND		0.76	0.26	ug/Kg	☼	08/11/15 11:20	08/13/15 20:58	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.54	ug/Kg	☼	08/11/15 11:20	08/13/15 20:58	1
Perfluoroheptanoic acid (PFHpA)	ND		0.76	0.11	ug/Kg	☼	08/11/15 11:20	08/13/15 20:58	1
Perfluorohexane Sulfonate (PFHxS)	ND		0.76	0.27	ug/Kg	☼	08/11/15 11:20	08/13/15 20:58	1
Perfluorohexanoic acid (PFHxA)	ND		0.76	0.14	ug/Kg	☼	08/11/15 11:20	08/13/15 20:58	1
Perfluorononanoic acid (PFNA)	0.25	J	0.76	0.21	ug/Kg	☼	08/11/15 11:20	08/13/15 20:58	1
Perfluorooctane Sulfonamide (FOSA)	ND		0.76	0.093	ug/Kg	☼	08/11/15 11:20	08/13/15 20:58	1
Perfluorooctane Sulfonate (PFOS)	0.34	J	0.76	0.13	ug/Kg	☼	08/11/15 11:20	08/13/15 20:58	1
Perfluorooctanoic acid (PFOA)	ND		0.76	0.22	ug/Kg	☼	08/11/15 11:20	08/13/15 20:58	1
Perfluoropentanoic acid (PFPA)	ND		0.76	0.23	ug/Kg	☼	08/11/15 11:20	08/13/15 20:58	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.66	ug/Kg	☼	08/11/15 11:20	08/13/15 20:58	1
Perfluorotridecanoic Acid (PFTriA)	ND		0.76	0.30	ug/Kg	☼	08/11/15 11:20	08/13/15 20:58	1
Perfluoroundecanoic acid (PFUnA)	0.42	J	0.76	0.30	ug/Kg	☼	08/11/15 11:20	08/13/15 20:58	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	100		57 - 153				08/11/15 11:20	08/13/15 20:58	1
13C8 PFOS	104		70 - 130				08/11/15 11:20	08/13/15 20:58	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	4.0		0.10	0.10	%			08/05/15 19:46	1
Percent Solids	96		0.10	0.10	%			08/05/15 19:46	1

TestAmerica Denver

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-5-SW

Date Collected: 07/30/15 19:22

Date Received: 08/05/15 09:15

Lab Sample ID: 280-72684-5

Matrix: Solid

Percent Solids: 95.5

Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	ND		0.80	0.14	ug/Kg	☼	08/11/15 11:20	08/13/15 21:11	1
Perfluorobutanoic acid (PFBA)	ND		0.80	0.12	ug/Kg	☼	08/11/15 11:20	08/13/15 21:11	1
Perfluorodecane sulfonate (PFDS)	ND		0.80	0.30	ug/Kg	☼	08/11/15 11:20	08/13/15 21:11	1
Perfluorodecanoic acid (PFDA)	ND		0.80	0.27	ug/Kg	☼	08/11/15 11:20	08/13/15 21:11	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.57	ug/Kg	☼	08/11/15 11:20	08/13/15 21:11	1
Perfluoroheptanoic acid (PFHpA)	0.85		0.80	0.12	ug/Kg	☼	08/11/15 11:20	08/13/15 21:11	1
Perfluorohexane Sulfonate (PFHxS)	1.7		0.80	0.28	ug/Kg	☼	08/11/15 11:20	08/13/15 21:11	1
Perfluorohexanoic acid (PFHxA)	ND		0.80	0.15	ug/Kg	☼	08/11/15 11:20	08/13/15 21:11	1
Perfluorononanoic acid (PFNA)	12		0.80	0.22	ug/Kg	☼	08/11/15 11:20	08/13/15 21:11	1
Perfluorooctane Sulfonamide (FOSA)	ND		0.80	0.098	ug/Kg	☼	08/11/15 11:20	08/13/15 21:11	1
Perfluorooctane Sulfonate (PFOS)	0.85		0.80	0.14	ug/Kg	☼	08/11/15 11:20	08/13/15 21:11	1
Perfluorooctanoic acid (PFOA)	1.6		0.80	0.23	ug/Kg	☼	08/11/15 11:20	08/13/15 21:11	1
Perfluoropentanoic acid (PFPA)	ND		0.80	0.24	ug/Kg	☼	08/11/15 11:20	08/13/15 21:11	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.69	ug/Kg	☼	08/11/15 11:20	08/13/15 21:11	1
Perfluorotridecanoic Acid (PFTriA)	1.3		0.80	0.32	ug/Kg	☼	08/11/15 11:20	08/13/15 21:11	1
Perfluoroundecanoic acid (PFUnA)	0.83		0.80	0.32	ug/Kg	☼	08/11/15 11:20	08/13/15 21:11	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 PFOA	99		57 - 153	08/11/15 11:20	08/13/15 21:11	1
13C8 PFOS	101		70 - 130	08/11/15 11:20	08/13/15 21:11	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	4.5		0.10	0.10	%	—		08/05/15 19:46	1
Percent Solids	96		0.10	0.10	%	—		08/05/15 19:46	1

TestAmerica Denver

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-6-SW

Date Collected: 07/30/15 19:30

Date Received: 08/05/15 09:15

Lab Sample ID: 280-72684-6

Matrix: Solid

Percent Solids: 96.2

Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	ND		0.83	0.15	ug/Kg	✱	08/11/15 11:20	08/13/15 21:23	1
Perfluorobutanoic acid (PFBA)	ND		0.83	0.12	ug/Kg	✱	08/11/15 11:20	08/13/15 21:23	1
Perfluorodecane sulfonate (PFDS)	ND		0.83	0.31	ug/Kg	✱	08/11/15 11:20	08/13/15 21:23	1
Perfluorodecanoic acid (PFDA)	ND		0.83	0.28	ug/Kg	✱	08/11/15 11:20	08/13/15 21:23	1
Perfluorododecanoic acid (PFDoA)	ND		2.1	0.59	ug/Kg	✱	08/11/15 11:20	08/13/15 21:23	1
Perfluoroheptanoic acid (PFHpA)	ND		0.83	0.12	ug/Kg	✱	08/11/15 11:20	08/13/15 21:23	1
Perfluorohexane Sulfonate (PFHxS)	ND		0.83	0.29	ug/Kg	✱	08/11/15 11:20	08/13/15 21:23	1
Perfluorohexanoic acid (PFHxA)	ND		0.83	0.16	ug/Kg	✱	08/11/15 11:20	08/13/15 21:23	1
Perfluorononanoic acid (PFNA)	ND		0.83	0.23	ug/Kg	✱	08/11/15 11:20	08/13/15 21:23	1
Perfluorooctane Sulfonamide (FOSA)	ND		0.83	0.10	ug/Kg	✱	08/11/15 11:20	08/13/15 21:23	1
Perfluorooctane Sulfonate (PFOS)	ND		0.83	0.15	ug/Kg	✱	08/11/15 11:20	08/13/15 21:23	1
Perfluorooctanoic acid (PFOA)	ND		0.83	0.24	ug/Kg	✱	08/11/15 11:20	08/13/15 21:23	1
Perfluoropentanoic acid (PFPA)	ND		0.83	0.25	ug/Kg	✱	08/11/15 11:20	08/13/15 21:23	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.1	0.72	ug/Kg	✱	08/11/15 11:20	08/13/15 21:23	1
Perfluorotridecanoic Acid (PFTrIA)	ND		0.83	0.33	ug/Kg	✱	08/11/15 11:20	08/13/15 21:23	1
Perfluoroundecanoic acid (PFUnA)	ND		0.83	0.33	ug/Kg	✱	08/11/15 11:20	08/13/15 21:23	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	98		57 - 153				08/11/15 11:20	08/13/15 21:23	1
13C8 PFOS	100		70 - 130				08/11/15 11:20	08/13/15 21:23	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	3.8		0.10	0.10	%			08/05/15 19:46	1
Percent Solids	96		0.10	0.10	%			08/05/15 19:46	1

TestAmerica Denver

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-7-SW

Date Collected: 07/30/15 19:38

Date Received: 08/05/15 09:15

Lab Sample ID: 280-72684-7

Matrix: Solid

Percent Solids: 86.9

Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	ND		0.89	0.16	ug/Kg	☼	08/11/15 11:20	08/13/15 21:35	1
Perfluorobutanoic acid (PFBA)	ND		0.89	0.13	ug/Kg	☼	08/11/15 11:20	08/13/15 21:35	1
Perfluorodecane sulfonate (PFDS)	ND		0.89	0.33	ug/Kg	☼	08/11/15 11:20	08/13/15 21:35	1
Perfluorodecanoic acid (PFDA)	ND		0.89	0.30	ug/Kg	☼	08/11/15 11:20	08/13/15 21:35	1
Perfluorododecanoic acid (PFDoA)	ND		2.2	0.63	ug/Kg	☼	08/11/15 11:20	08/13/15 21:35	1
Perfluoroheptanoic acid (PFHpA)	0.79	J	0.89	0.13	ug/Kg	☼	08/11/15 11:20	08/13/15 21:35	1
Perfluorohexane Sulfonate (PFHxS)	1.2		0.89	0.31	ug/Kg	☼	08/11/15 11:20	08/13/15 21:35	1
Perfluorohexanoic acid (PFHxA)	2.1		0.89	0.17	ug/Kg	☼	08/11/15 11:20	08/13/15 21:35	1
Perfluorononanoic acid (PFNA)	ND		0.89	0.24	ug/Kg	☼	08/11/15 11:20	08/13/15 21:35	1
Perfluorooctane Sulfonamide (FOSA)	ND		0.89	0.11	ug/Kg	☼	08/11/15 11:20	08/13/15 21:35	1
Perfluorooctane Sulfonate (PFOS)	0.84	J	0.89	0.16	ug/Kg	☼	08/11/15 11:20	08/13/15 21:35	1
Perfluorooctanoic acid (PFOA)	1.3		0.89	0.25	ug/Kg	☼	08/11/15 11:20	08/13/15 21:35	1
Perfluoropentanoic acid (PFPA)	2.3		0.89	0.27	ug/Kg	☼	08/11/15 11:20	08/13/15 21:35	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.2	0.76	ug/Kg	☼	08/11/15 11:20	08/13/15 21:35	1
Perfluorotridecanoic Acid (PFTriA)	ND		0.89	0.35	ug/Kg	☼	08/11/15 11:20	08/13/15 21:35	1
Perfluoroundecanoic acid (PFUnA)	ND		0.89	0.35	ug/Kg	☼	08/11/15 11:20	08/13/15 21:35	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	99		57 - 153				08/11/15 11:20	08/13/15 21:35	1
13C8 PFOS	99		70 - 130				08/11/15 11:20	08/13/15 21:35	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	13		0.10	0.10	%			08/05/15 19:46	1
Percent Solids	87		0.10	0.10	%			08/05/15 19:46	1

TestAmerica Denver

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-8-SW

Date Collected: 07/30/15 19:46

Date Received: 08/05/15 09:15

Lab Sample ID: 280-72684-8

Matrix: Solid

Percent Solids: 85.8

Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	0.53	J	0.87	0.15	ug/Kg	☼	08/11/15 11:20	08/13/15 21:47	1
Perfluorobutanoic acid (PFBA)	1.1		0.87	0.13	ug/Kg	☼	08/11/15 11:20	08/13/15 21:47	1
Perfluorodecane sulfonate (PFDS)	ND		0.87	0.33	ug/Kg	☼	08/11/15 11:20	08/13/15 21:47	1
Perfluorodecanoic acid (PFDA)	0.30	J	0.87	0.30	ug/Kg	☼	08/11/15 11:20	08/13/15 21:47	1
Perfluorododecanoic acid (PFDoA)	ND		2.2	0.62	ug/Kg	☼	08/11/15 11:20	08/13/15 21:47	1
Perfluoroheptanoic acid (PFHpA)	1.9		0.87	0.13	ug/Kg	☼	08/11/15 11:20	08/13/15 21:47	1
Perfluorohexane Sulfonate (PFHxS)	1.5		0.87	0.31	ug/Kg	☼	08/11/15 11:20	08/13/15 21:47	1
Perfluorohexanoic acid (PFHxA)	5.1		0.87	0.16	ug/Kg	☼	08/11/15 11:20	08/13/15 21:47	1
Perfluorononanoic acid (PFNA)	8.9		0.87	0.24	ug/Kg	☼	08/11/15 11:20	08/13/15 21:47	1
Perfluorooctane Sulfonamide (FOSA)	ND		0.87	0.11	ug/Kg	☼	08/11/15 11:20	08/13/15 21:47	1
Perfluorooctane Sulfonate (PFOS)	5.9		0.87	0.15	ug/Kg	☼	08/11/15 11:20	08/13/15 21:47	1
Perfluorooctanoic acid (PFOA)	0.70	J	0.87	0.25	ug/Kg	☼	08/11/15 11:20	08/13/15 21:47	1
Perfluoropentanoic acid (PFPA)	4.5		0.87	0.26	ug/Kg	☼	08/11/15 11:20	08/13/15 21:47	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.2	0.75	ug/Kg	☼	08/11/15 11:20	08/13/15 21:47	1
Perfluorotridecanoic Acid (PFTriA)	ND		0.87	0.35	ug/Kg	☼	08/11/15 11:20	08/13/15 21:47	1
Perfluoroundecanoic acid (PFUnA)	0.64	J	0.87	0.35	ug/Kg	☼	08/11/15 11:20	08/13/15 21:47	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	100		57 - 153				08/11/15 11:20	08/13/15 21:47	1
13C8 PFOS	109		70 - 130				08/11/15 11:20	08/13/15 21:47	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	14		0.10	0.10	%			08/05/15 19:46	1
Percent Solids	86		0.10	0.10	%			08/05/15 19:46	1

TestAmerica Denver

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-9-SW

Date Collected: 07/30/15 19:54

Date Received: 08/05/15 09:15

Lab Sample ID: 280-72684-9

Matrix: Solid

Percent Solids: 92.2

Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	0.49	J	0.87	0.15	ug/Kg	☼	08/11/15 11:20	08/13/15 22:00	1
Perfluorobutanoic acid (PFBA)	1.2		0.87	0.13	ug/Kg	☼	08/11/15 11:20	08/13/15 22:00	1
Perfluorodecane sulfonate (PFDS)	ND		0.87	0.32	ug/Kg	☼	08/11/15 11:20	08/13/15 22:00	1
Perfluorodecanoic acid (PFDA)	0.83	J	0.87	0.29	ug/Kg	☼	08/11/15 11:20	08/13/15 22:00	1
Perfluorododecanoic acid (PFDoA)	ND		2.2	0.62	ug/Kg	☼	08/11/15 11:20	08/13/15 22:00	1
Perfluoroheptanoic acid (PFHpA)	2.0		0.87	0.13	ug/Kg	☼	08/11/15 11:20	08/13/15 22:00	1
Perfluorohexane Sulfonate (PFHxS)	12		0.87	0.30	ug/Kg	☼	08/11/15 11:20	08/13/15 22:00	1
Perfluorohexanoic acid (PFHxA)	5.8		0.87	0.16	ug/Kg	☼	08/11/15 11:20	08/13/15 22:00	1
Perfluorononanoic acid (PFNA)	94		0.87	0.24	ug/Kg	☼	08/11/15 11:20	08/13/15 22:00	1
Perfluorooctane Sulfonamide (FOSA)	ND		0.87	0.11	ug/Kg	☼	08/11/15 11:20	08/13/15 22:00	1
Perfluorooctane Sulfonate (PFOS)	250		0.87	0.15	ug/Kg	☼	08/11/15 11:20	08/13/15 22:00	1
Perfluorooctanoic acid (PFOA)	9.5		0.87	0.25	ug/Kg	☼	08/11/15 11:20	08/13/15 22:00	1
Perfluoropentanoic acid (PFPA)	5.8		0.87	0.26	ug/Kg	☼	08/11/15 11:20	08/13/15 22:00	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.2	0.75	ug/Kg	☼	08/11/15 11:20	08/13/15 22:00	1
Perfluorotridecanoic Acid (PFTriA)	1.2		0.87	0.35	ug/Kg	☼	08/11/15 11:20	08/13/15 22:00	1
Perfluoroundecanoic acid (PFUnA)	4.3		0.87	0.35	ug/Kg	☼	08/11/15 11:20	08/13/15 22:00	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	98		57 - 153				08/11/15 11:20	08/13/15 22:00	1
13C8 PFOS	101		70 - 130				08/11/15 11:20	08/13/15 22:00	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	7.8		0.10	0.10	%			08/05/15 19:46	1
Percent Solids	92		0.10	0.10	%			08/05/15 19:46	1

TestAmerica Denver

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-10-SW

Date Collected: 07/30/15 20:02

Date Received: 08/05/15 09:15

Lab Sample ID: 280-72684-10

Matrix: Solid

Percent Solids: 86.9

Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	ND		0.91	0.16	ug/Kg	☼	08/11/15 11:20	08/13/15 22:12	1
Perfluorobutanoic acid (PFBA)	ND		0.91	0.14	ug/Kg	☼	08/11/15 11:20	08/13/15 22:12	1
Perfluorodecane sulfonate (PFDS)	ND		0.91	0.34	ug/Kg	☼	08/11/15 11:20	08/13/15 22:12	1
Perfluorodecanoic acid (PFDA)	ND		0.91	0.31	ug/Kg	☼	08/11/15 11:20	08/13/15 22:12	1
Perfluorododecanoic acid (PFDoA)	ND		2.3	0.65	ug/Kg	☼	08/11/15 11:20	08/13/15 22:12	1
Perfluoroheptanoic acid (PFHpA)	ND		0.91	0.14	ug/Kg	☼	08/11/15 11:20	08/13/15 22:12	1
Perfluorohexane Sulfonate (PFHxS)	0.56	J	0.91	0.32	ug/Kg	☼	08/11/15 11:20	08/13/15 22:12	1
Perfluorohexanoic acid (PFHxA)	ND		0.91	0.17	ug/Kg	☼	08/11/15 11:20	08/13/15 22:12	1
Perfluorononanoic acid (PFNA)	0.70	J	0.91	0.25	ug/Kg	☼	08/11/15 11:20	08/13/15 22:12	1
Perfluorooctane Sulfonamide (FOSA)	ND		0.91	0.11	ug/Kg	☼	08/11/15 11:20	08/13/15 22:12	1
Perfluorooctane Sulfonate (PFOS)	1.1		0.91	0.16	ug/Kg	☼	08/11/15 11:20	08/13/15 22:12	1
Perfluorooctanoic acid (PFOA)	0.60	J	0.91	0.26	ug/Kg	☼	08/11/15 11:20	08/13/15 22:12	1
Perfluoropentanoic acid (PFPA)	ND		0.91	0.27	ug/Kg	☼	08/11/15 11:20	08/13/15 22:12	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.3	0.79	ug/Kg	☼	08/11/15 11:20	08/13/15 22:12	1
Perfluorotridecanoic Acid (PFTriA)	ND		0.91	0.36	ug/Kg	☼	08/11/15 11:20	08/13/15 22:12	1
Perfluoroundecanoic acid (PFUnA)	ND		0.91	0.36	ug/Kg	☼	08/11/15 11:20	08/13/15 22:12	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	100		57 - 153				08/11/15 11:20	08/13/15 22:12	1
13C8 PFOS	109		70 - 130				08/11/15 11:20	08/13/15 22:12	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	13		0.10	0.10	%			08/05/15 19:46	1
Percent Solids	87		0.10	0.10	%			08/05/15 19:46	1

TestAmerica Denver

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-FRB-1
Date Collected: 07/30/15 20:03
Date Received: 08/05/15 09:15

Lab Sample ID: 280-72684-11
Matrix: Water

Method: PFC -FOSA - FOSA in Water (LC/MS/MS)									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctane Sulfonamide (FOSA)	ND		0.049	0.0056	ug/L		08/10/15 10:45	08/14/15 07:25	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-11-SW

Date Collected: 07/30/15 20:10

Date Received: 08/05/15 09:15

Lab Sample ID: 280-72684-12

Matrix: Solid

Percent Solids: 83.9

Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	ND		0.93	0.16	ug/Kg	☼	08/11/15 11:20	08/13/15 22:24	1
Perfluorobutanoic acid (PFBA)	ND		0.93	0.14	ug/Kg	☼	08/11/15 11:20	08/13/15 22:24	1
Perfluorodecane sulfonate (PFDS)	ND		0.93	0.35	ug/Kg	☼	08/11/15 11:20	08/13/15 22:24	1
Perfluorodecanoic acid (PFDA)	ND		0.93	0.31	ug/Kg	☼	08/11/15 11:20	08/13/15 22:24	1
Perfluorododecanoic acid (PFDoA)	ND		2.3	0.66	ug/Kg	☼	08/11/15 11:20	08/13/15 22:24	1
Perfluoroheptanoic acid (PFHpA)	0.71	J	0.93	0.14	ug/Kg	☼	08/11/15 11:20	08/13/15 22:24	1
Perfluorohexane Sulfonate (PFHxS)	0.79	J	0.93	0.33	ug/Kg	☼	08/11/15 11:20	08/13/15 22:24	1
Perfluorohexanoic acid (PFHxA)	0.47	J	0.93	0.17	ug/Kg	☼	08/11/15 11:20	08/13/15 22:24	1
Perfluorononanoic acid (PFNA)	2.3		0.93	0.26	ug/Kg	☼	08/11/15 11:20	08/13/15 22:24	1
Perfluorooctane Sulfonamide (FOSA)	ND		0.93	0.11	ug/Kg	☼	08/11/15 11:20	08/13/15 22:24	1
Perfluorooctane Sulfonate (PFOS)	0.40	J	0.93	0.16	ug/Kg	☼	08/11/15 11:20	08/13/15 22:24	1
Perfluorooctanoic acid (PFOA)	4.3		0.93	0.27	ug/Kg	☼	08/11/15 11:20	08/13/15 22:24	1
Perfluoropentanoic acid (PFPA)	0.36	J	0.93	0.28	ug/Kg	☼	08/11/15 11:20	08/13/15 22:24	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.3	0.80	ug/Kg	☼	08/11/15 11:20	08/13/15 22:24	1
Perfluorotridecanoic Acid (PFTriA)	ND		0.93	0.37	ug/Kg	☼	08/11/15 11:20	08/13/15 22:24	1
Perfluoroundecanoic acid (PFUnA)	ND		0.93	0.37	ug/Kg	☼	08/11/15 11:20	08/13/15 22:24	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	103		57 - 153				08/11/15 11:20	08/13/15 22:24	1
13C8 PFOS	101		70 - 130				08/11/15 11:20	08/13/15 22:24	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	16		0.10	0.10	%			08/05/15 19:46	1
Percent Solids	84		0.10	0.10	%			08/05/15 19:46	1

TestAmerica Denver

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-12-SW

Date Collected: 07/30/15 20:18

Date Received: 08/05/15 09:15

Lab Sample ID: 280-72684-13

Matrix: Solid

Percent Solids: 95.2

Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	ND		0.81	0.14	ug/Kg	☼	08/11/15 11:20	08/13/15 22:37	1
Perfluorobutanoic acid (PFBA)	ND		0.81	0.12	ug/Kg	☼	08/11/15 11:20	08/13/15 22:37	1
Perfluorodecane sulfonate (PFDS)	ND		0.81	0.31	ug/Kg	☼	08/11/15 11:20	08/13/15 22:37	1
Perfluorodecanoic acid (PFDA)	ND		0.81	0.27	ug/Kg	☼	08/11/15 11:20	08/13/15 22:37	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.58	ug/Kg	☼	08/11/15 11:20	08/13/15 22:37	1
Perfluoroheptanoic acid (PFHpA)	0.18	J	0.81	0.12	ug/Kg	☼	08/11/15 11:20	08/13/15 22:37	1
Perfluorohexane Sulfonate (PFHxS)	2.6		0.81	0.28	ug/Kg	☼	08/11/15 11:20	08/13/15 22:37	1
Perfluorohexanoic acid (PFHxA)	ND		0.81	0.15	ug/Kg	☼	08/11/15 11:20	08/13/15 22:37	1
Perfluorononanoic acid (PFNA)	ND		0.81	0.22	ug/Kg	☼	08/11/15 11:20	08/13/15 22:37	1
Perfluorooctane Sulfonamide (FOSA)	ND		0.81	0.10	ug/Kg	☼	08/11/15 11:20	08/13/15 22:37	1
Perfluorooctane Sulfonate (PFOS)	0.27	J	0.81	0.14	ug/Kg	☼	08/11/15 11:20	08/13/15 22:37	1
Perfluorooctanoic acid (PFOA)	1.9		0.81	0.23	ug/Kg	☼	08/11/15 11:20	08/13/15 22:37	1
Perfluoropentanoic acid (PFPA)	ND		0.81	0.24	ug/Kg	☼	08/11/15 11:20	08/13/15 22:37	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.70	ug/Kg	☼	08/11/15 11:20	08/13/15 22:37	1
Perfluorotridecanoic Acid (PFTriA)	ND		0.81	0.33	ug/Kg	☼	08/11/15 11:20	08/13/15 22:37	1
Perfluoroundecanoic acid (PFUnA)	ND		0.81	0.33	ug/Kg	☼	08/11/15 11:20	08/13/15 22:37	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	98		57 - 153				08/11/15 11:20	08/13/15 22:37	1
13C8 PFOS	107		70 - 130				08/11/15 11:20	08/13/15 22:37	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	4.8		0.10	0.10	%			08/05/15 19:46	1
Percent Solids	95		0.10	0.10	%			08/05/15 19:46	1

TestAmerica Denver

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-13-SW

Date Collected: 07/30/15 20:26

Date Received: 08/05/15 09:15

Lab Sample ID: 280-72684-14

Matrix: Solid

Percent Solids: 95.2

Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	ND		0.81	0.14	ug/Kg	☼	08/11/15 11:20	08/13/15 23:01	1
Perfluorobutanoic acid (PFBA)	ND		0.81	0.12	ug/Kg	☼	08/11/15 11:20	08/13/15 23:01	1
Perfluorodecane sulfonate (PFDS)	ND		0.81	0.30	ug/Kg	☼	08/11/15 11:20	08/13/15 23:01	1
Perfluorodecanoic acid (PFDA)	ND		0.81	0.27	ug/Kg	☼	08/11/15 11:20	08/13/15 23:01	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.58	ug/Kg	☼	08/11/15 11:20	08/13/15 23:01	1
Perfluoroheptanoic acid (PFHpA)	ND		0.81	0.12	ug/Kg	☼	08/11/15 11:20	08/13/15 23:01	1
Perfluorohexane Sulfonate (PFHxS)	ND		0.81	0.28	ug/Kg	☼	08/11/15 11:20	08/13/15 23:01	1
Perfluorohexanoic acid (PFHxA)	ND		0.81	0.15	ug/Kg	☼	08/11/15 11:20	08/13/15 23:01	1
Perfluorononanoic acid (PFNA)	ND		0.81	0.22	ug/Kg	☼	08/11/15 11:20	08/13/15 23:01	1
Perfluorooctane Sulfonamide (FOSA)	ND		0.81	0.099	ug/Kg	☼	08/11/15 11:20	08/13/15 23:01	1
Perfluorooctane Sulfonate (PFOS)	ND		0.81	0.14	ug/Kg	☼	08/11/15 11:20	08/13/15 23:01	1
Perfluorooctanoic acid (PFOA)	ND		0.81	0.23	ug/Kg	☼	08/11/15 11:20	08/13/15 23:01	1
Perfluoropentanoic acid (PFPA)	ND		0.81	0.24	ug/Kg	☼	08/11/15 11:20	08/13/15 23:01	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.70	ug/Kg	☼	08/11/15 11:20	08/13/15 23:01	1
Perfluorotridecanoic Acid (PFTrIA)	ND		0.81	0.32	ug/Kg	☼	08/11/15 11:20	08/13/15 23:01	1
Perfluoroundecanoic acid (PFUnA)	ND		0.81	0.32	ug/Kg	☼	08/11/15 11:20	08/13/15 23:01	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	100		57 - 153				08/11/15 11:20	08/13/15 23:01	1
13C8 PFOS	105		70 - 130				08/11/15 11:20	08/13/15 23:01	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	4.8		0.10	0.10	%			08/05/15 19:46	1
Percent Solids	95		0.10	0.10	%			08/05/15 19:46	1

TestAmerica Denver

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-14-SW

Date Collected: 07/30/15 20:34

Date Received: 08/05/15 09:15

Lab Sample ID: 280-72684-15

Matrix: Solid

Percent Solids: 90.0

Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	ND		0.86	0.15	ug/Kg	☼	08/11/15 11:20	08/13/15 23:13	1
Perfluorobutanoic acid (PFBA)	ND		0.86	0.13	ug/Kg	☼	08/11/15 11:20	08/13/15 23:13	1
Perfluorodecane sulfonate (PFDS)	ND		0.86	0.32	ug/Kg	☼	08/11/15 11:20	08/13/15 23:13	1
Perfluorodecanoic acid (PFDA)	ND		0.86	0.29	ug/Kg	☼	08/11/15 11:20	08/13/15 23:13	1
Perfluorododecanoic acid (PFDoA)	ND		2.2	0.61	ug/Kg	☼	08/11/15 11:20	08/13/15 23:13	1
Perfluoroheptanoic acid (PFHpA)	0.71	J	0.86	0.13	ug/Kg	☼	08/11/15 11:20	08/13/15 23:13	1
Perfluorohexane Sulfonate (PFHxS)	ND		0.86	0.30	ug/Kg	☼	08/11/15 11:20	08/13/15 23:13	1
Perfluorohexanoic acid (PFHxA)	0.38	J	0.86	0.16	ug/Kg	☼	08/11/15 11:20	08/13/15 23:13	1
Perfluorononanoic acid (PFNA)	ND		0.86	0.24	ug/Kg	☼	08/11/15 11:20	08/13/15 23:13	1
Perfluorooctane Sulfonamide (FOSA)	ND		0.86	0.11	ug/Kg	☼	08/11/15 11:20	08/13/15 23:13	1
Perfluorooctane Sulfonate (PFOS)	ND		0.86	0.15	ug/Kg	☼	08/11/15 11:20	08/13/15 23:13	1
Perfluorooctanoic acid (PFOA)	0.42	J	0.86	0.25	ug/Kg	☼	08/11/15 11:20	08/13/15 23:13	1
Perfluoropentanoic acid (PFPA)	0.58	J	0.86	0.26	ug/Kg	☼	08/11/15 11:20	08/13/15 23:13	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.2	0.74	ug/Kg	☼	08/11/15 11:20	08/13/15 23:13	1
Perfluorotridecanoic Acid (PFTriA)	0.43	J	0.86	0.34	ug/Kg	☼	08/11/15 11:20	08/13/15 23:13	1
Perfluoroundecanoic acid (PFUnA)	0.37	J	0.86	0.34	ug/Kg	☼	08/11/15 11:20	08/13/15 23:13	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	99		57 - 153				08/11/15 11:20	08/13/15 23:13	1
13C8 PFOS	106		70 - 130				08/11/15 11:20	08/13/15 23:13	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	10		0.10	0.10	%			08/05/15 19:46	1
Percent Solids	90		0.10	0.10	%			08/05/15 19:46	1

TestAmerica Denver

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-15-SW

Date Collected: 07/30/15 20:42

Date Received: 08/04/15 09:45

Lab Sample ID: 280-72684-16

Matrix: Solid

Percent Solids: 93.4

Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	ND		0.84	0.15	ug/Kg	☼	08/11/15 11:20	08/13/15 23:26	1
Perfluorobutanoic acid (PFBA)	0.35	J	0.84	0.13	ug/Kg	☼	08/11/15 11:20	08/13/15 23:26	1
Perfluorodecane sulfonate (PFDS)	ND		0.84	0.32	ug/Kg	☼	08/11/15 11:20	08/13/15 23:26	1
Perfluorodecanoic acid (PFDA)	ND		0.84	0.28	ug/Kg	☼	08/11/15 11:20	08/13/15 23:26	1
Perfluorododecanoic acid (PFDoA)	ND		2.1	0.60	ug/Kg	☼	08/11/15 11:20	08/13/15 23:26	1
Perfluoroheptanoic acid (PFHpA)	1.1		0.84	0.13	ug/Kg	☼	08/11/15 11:20	08/13/15 23:26	1
Perfluorohexane Sulfonate (PFHxS)	ND		0.84	0.29	ug/Kg	☼	08/11/15 11:20	08/13/15 23:26	1
Perfluorohexanoic acid (PFHxA)	1.8		0.84	0.16	ug/Kg	☼	08/11/15 11:20	08/13/15 23:26	1
Perfluorononanoic acid (PFNA)	ND		0.84	0.23	ug/Kg	☼	08/11/15 11:20	08/13/15 23:26	1
Perfluorooctane Sulfonamide (FOSA)	ND		0.84	0.10	ug/Kg	☼	08/11/15 11:20	08/13/15 23:26	1
Perfluorooctane Sulfonate (PFOS)	ND		0.84	0.15	ug/Kg	☼	08/11/15 11:20	08/13/15 23:26	1
Perfluorooctanoic acid (PFOA)	0.45	J	0.84	0.24	ug/Kg	☼	08/11/15 11:20	08/13/15 23:26	1
Perfluoropentanoic acid (PFPA)	1.3		0.84	0.25	ug/Kg	☼	08/11/15 11:20	08/13/15 23:26	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.1	0.73	ug/Kg	☼	08/11/15 11:20	08/13/15 23:26	1
Perfluorotridecanoic Acid (PFTrIA)	ND		0.84	0.34	ug/Kg	☼	08/11/15 11:20	08/13/15 23:26	1
Perfluoroundecanoic acid (PFUnA)	ND		0.84	0.34	ug/Kg	☼	08/11/15 11:20	08/13/15 23:26	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	101		57 - 153				08/11/15 11:20	08/13/15 23:26	1
13C8 PFOS	97		70 - 130				08/11/15 11:20	08/13/15 23:26	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	6.6		0.10	0.10	%			08/05/15 19:46	1
Percent Solids	93		0.10	0.10	%			08/05/15 19:46	1

TestAmerica Denver

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-16-SW

Date Collected: 07/30/15 20:50

Date Received: 08/04/15 09:45

Lab Sample ID: 280-72684-17

Matrix: Solid

Percent Solids: 93.8

Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	0.33	J	0.82	0.14	ug/Kg	☼	08/11/15 11:20	08/13/15 23:38	1
Perfluorobutanoic acid (PFBA)	0.89		0.82	0.12	ug/Kg	☼	08/11/15 11:20	08/13/15 23:38	1
Perfluorodecane sulfonate (PFDS)	ND		0.82	0.31	ug/Kg	☼	08/11/15 11:20	08/13/15 23:38	1
Perfluorodecanoic acid (PFDA)	ND		0.82	0.28	ug/Kg	☼	08/11/15 11:20	08/13/15 23:38	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.58	ug/Kg	☼	08/11/15 11:20	08/13/15 23:38	1
Perfluoroheptanoic acid (PFHpA)	6.2		0.82	0.12	ug/Kg	☼	08/11/15 11:20	08/13/15 23:38	1
Perfluorohexane Sulfonate (PFHxS)	74		0.82	0.29	ug/Kg	☼	08/11/15 11:20	08/13/15 23:38	1
Perfluorohexanoic acid (PFHxA)	4.2		0.82	0.15	ug/Kg	☼	08/11/15 11:20	08/13/15 23:38	1
Perfluorononanoic acid (PFNA)	3.7		0.82	0.22	ug/Kg	☼	08/11/15 11:20	08/13/15 23:38	1
Perfluorooctane Sulfonamide (FOSA)	ND		0.82	0.10	ug/Kg	☼	08/11/15 11:20	08/13/15 23:38	1
Perfluorooctane Sulfonate (PFOS)	ND		0.82	0.14	ug/Kg	☼	08/11/15 11:20	08/13/15 23:38	1
Perfluorooctanoic acid (PFOA)	41		0.82	0.23	ug/Kg	☼	08/11/15 11:20	08/13/15 23:38	1
Perfluoropentanoic acid (PFPA)	3.9		0.82	0.24	ug/Kg	☼	08/11/15 11:20	08/13/15 23:38	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.70	ug/Kg	☼	08/11/15 11:20	08/13/15 23:38	1
Perfluorotridecanoic Acid (PFTriA)	ND		0.82	0.33	ug/Kg	☼	08/11/15 11:20	08/13/15 23:38	1
Perfluoroundecanoic acid (PFUnA)	2.5		0.82	0.33	ug/Kg	☼	08/11/15 11:20	08/13/15 23:38	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	96		57 - 153				08/11/15 11:20	08/13/15 23:38	1
13C8 PFOS	101		70 - 130				08/11/15 11:20	08/13/15 23:38	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	6.2		0.10	0.10	%	—		08/05/15 19:46	1
Percent Solids	94		0.10	0.10	%	—		08/05/15 19:46	1

TestAmerica Denver

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-17-SW

Date Collected: 07/30/15 20:58

Date Received: 08/04/15 09:45

Lab Sample ID: 280-72684-18

Matrix: Solid

Percent Solids: 88.5

Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	ND		0.88	0.15	ug/Kg	☼	08/11/15 11:20	08/13/15 23:50	1
Perfluorobutanoic acid (PFBA)	ND		0.88	0.13	ug/Kg	☼	08/11/15 11:20	08/13/15 23:50	1
Perfluorodecane sulfonate (PFDS)	ND		0.88	0.33	ug/Kg	☼	08/11/15 11:20	08/13/15 23:50	1
Perfluorodecanoic acid (PFDA)	ND		0.88	0.30	ug/Kg	☼	08/11/15 11:20	08/13/15 23:50	1
Perfluorododecanoic acid (PFDoA)	ND		2.2	0.62	ug/Kg	☼	08/11/15 11:20	08/13/15 23:50	1
Perfluoroheptanoic acid (PFHpA)	1.9		0.88	0.13	ug/Kg	☼	08/11/15 11:20	08/13/15 23:50	1
Perfluorohexane Sulfonate (PFHxS)	11		0.88	0.31	ug/Kg	☼	08/11/15 11:20	08/13/15 23:50	1
Perfluorohexanoic acid (PFHxA)	0.32	J	0.88	0.16	ug/Kg	☼	08/11/15 11:20	08/13/15 23:50	1
Perfluorononanoic acid (PFNA)	18		0.88	0.24	ug/Kg	☼	08/11/15 11:20	08/13/15 23:50	1
Perfluorooctane Sulfonamide (FOSA)	ND		0.88	0.11	ug/Kg	☼	08/11/15 11:20	08/13/15 23:50	1
Perfluorooctane Sulfonate (PFOS)	1.8		0.88	0.15	ug/Kg	☼	08/11/15 11:20	08/13/15 23:50	1
Perfluorooctanoic acid (PFOA)	11		0.88	0.25	ug/Kg	☼	08/11/15 11:20	08/13/15 23:50	1
Perfluoropentanoic acid (PFPA)	0.68	J	0.88	0.26	ug/Kg	☼	08/11/15 11:20	08/13/15 23:50	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.2	0.76	ug/Kg	☼	08/11/15 11:20	08/13/15 23:50	1
Perfluorotridecanoic Acid (PFTriA)	ND		0.88	0.35	ug/Kg	☼	08/11/15 11:20	08/13/15 23:50	1
Perfluoroundecanoic acid (PFUnA)	ND		0.88	0.35	ug/Kg	☼	08/11/15 11:20	08/13/15 23:50	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	98		57 - 153				08/11/15 11:20	08/13/15 23:50	1
13C8 PFOS	102		70 - 130				08/11/15 11:20	08/13/15 23:50	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	12		0.10	0.10	%			08/05/15 19:46	1
Percent Solids	88		0.10	0.10	%			08/05/15 19:46	1

TestAmerica Denver

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-18-SW

Date Collected: 07/30/15 21:06

Date Received: 08/04/15 09:45

Lab Sample ID: 280-72684-19

Matrix: Solid

Percent Solids: 92.2

Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	ND		0.84	0.15	ug/Kg	☼	08/11/15 11:20	08/14/15 00:03	1
Perfluorobutanoic acid (PFBA)	ND		0.84	0.13	ug/Kg	☼	08/11/15 11:20	08/14/15 00:03	1
Perfluorodecane sulfonate (PFDS)	ND		0.84	0.31	ug/Kg	☼	08/11/15 11:20	08/14/15 00:03	1
Perfluorodecanoic acid (PFDA)	ND		0.84	0.28	ug/Kg	☼	08/11/15 11:20	08/14/15 00:03	1
Perfluorododecanoic acid (PFDoA)	ND		2.1	0.60	ug/Kg	☼	08/11/15 11:20	08/14/15 00:03	1
Perfluoroheptanoic acid (PFHpA)	1.6		0.84	0.13	ug/Kg	☼	08/11/15 11:20	08/14/15 00:03	1
Perfluorohexane Sulfonate (PFHxS)	3.0		0.84	0.29	ug/Kg	☼	08/11/15 11:20	08/14/15 00:03	1
Perfluorohexanoic acid (PFHxA)	1.2		0.84	0.16	ug/Kg	☼	08/11/15 11:20	08/14/15 00:03	1
Perfluorononanoic acid (PFNA)	2.3		0.84	0.23	ug/Kg	☼	08/11/15 11:20	08/14/15 00:03	1
Perfluorooctane Sulfonamide (FOSA)	ND		0.84	0.10	ug/Kg	☼	08/11/15 11:20	08/14/15 00:03	1
Perfluorooctane Sulfonate (PFOS)	1.2		0.84	0.15	ug/Kg	☼	08/11/15 11:20	08/14/15 00:03	1
Perfluorooctanoic acid (PFOA)	4.2		0.84	0.24	ug/Kg	☼	08/11/15 11:20	08/14/15 00:03	1
Perfluoropentanoic acid (PFPA)	0.74	J	0.84	0.25	ug/Kg	☼	08/11/15 11:20	08/14/15 00:03	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.1	0.72	ug/Kg	☼	08/11/15 11:20	08/14/15 00:03	1
Perfluorotridecanoic Acid (PFTriA)	ND		0.84	0.33	ug/Kg	☼	08/11/15 11:20	08/14/15 00:03	1
Perfluoroundecanoic acid (PFUnA)	0.42	J	0.84	0.33	ug/Kg	☼	08/11/15 11:20	08/14/15 00:03	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	100		57 - 153				08/11/15 11:20	08/14/15 00:03	1
13C8 PFOS	106		70 - 130				08/11/15 11:20	08/14/15 00:03	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	7.8		0.10	0.10	%	—		08/05/15 19:46	1
Percent Solids	92		0.10	0.10	%	—		08/05/15 19:46	1

TestAmerica Denver

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-19-SW

Date Collected: 07/30/15 21:14

Date Received: 08/04/15 09:45

Lab Sample ID: 280-72684-20

Matrix: Solid

Percent Solids: 89.9

Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	ND		0.81	0.14	ug/Kg	☼	08/11/15 11:20	08/14/15 00:15	1
Perfluorobutanoic acid (PFBA)	ND		0.81	0.12	ug/Kg	☼	08/11/15 11:20	08/14/15 00:15	1
Perfluorodecane sulfonate (PFDS)	ND		0.81	0.30	ug/Kg	☼	08/11/15 11:20	08/14/15 00:15	1
Perfluorodecanoic acid (PFDA)	1.2		0.81	0.27	ug/Kg	☼	08/11/15 11:20	08/14/15 00:15	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.58	ug/Kg	☼	08/11/15 11:20	08/14/15 00:15	1
Perfluoroheptanoic acid (PFHpA)	3.7		0.81	0.12	ug/Kg	☼	08/11/15 11:20	08/14/15 00:15	1
Perfluorohexane Sulfonate (PFHxS)	9.7		0.81	0.28	ug/Kg	☼	08/11/15 11:20	08/14/15 00:15	1
Perfluorohexanoic acid (PFHxA)	1.5		0.81	0.15	ug/Kg	☼	08/11/15 11:20	08/14/15 00:15	1
Perfluorononanoic acid (PFNA)	52		0.81	0.22	ug/Kg	☼	08/11/15 11:20	08/14/15 00:15	1
Perfluorooctane Sulfonamide (FOSA)	ND		0.81	0.099	ug/Kg	☼	08/11/15 11:20	08/14/15 00:15	1
Perfluorooctane Sulfonate (PFOS)	9.1		0.81	0.14	ug/Kg	☼	08/11/15 11:20	08/14/15 00:15	1
Perfluorooctanoic acid (PFOA)	5.4		0.81	0.23	ug/Kg	☼	08/11/15 11:20	08/14/15 00:15	1
Perfluoropentanoic acid (PFPA)	0.82		0.81	0.24	ug/Kg	☼	08/11/15 11:20	08/14/15 00:15	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.70	ug/Kg	☼	08/11/15 11:20	08/14/15 00:15	1
Perfluorotridecanoic Acid (PFTriA)	0.46 J		0.81	0.32	ug/Kg	☼	08/11/15 11:20	08/14/15 00:15	1
Perfluoroundecanoic acid (PFUnA)	2.2		0.81	0.32	ug/Kg	☼	08/11/15 11:20	08/14/15 00:15	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	100		57 - 153				08/11/15 11:20	08/14/15 00:15	1
13C8 PFOS	105		70 - 130				08/11/15 11:20	08/14/15 00:15	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	10		0.10	0.10	%	—		08/05/15 19:46	1
Percent Solids	90		0.10	0.10	%	—		08/05/15 19:46	1

TestAmerica Denver

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-20-SW

Date Collected: 07/30/15 21:22

Date Received: 08/04/15 09:45

Lab Sample ID: 280-72684-21

Matrix: Solid

Percent Solids: 85.7

Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	ND		0.90	0.16	ug/Kg	☼	08/11/15 11:20	08/14/15 00:27	1
Perfluorobutanoic acid (PFBA)	0.37	J	0.90	0.13	ug/Kg	☼	08/11/15 11:20	08/14/15 00:27	1
Perfluorodecane sulfonate (PFDS)	ND		0.90	0.34	ug/Kg	☼	08/11/15 11:20	08/14/15 00:27	1
Perfluorodecanoic acid (PFDA)	0.91		0.90	0.30	ug/Kg	☼	08/11/15 11:20	08/14/15 00:27	1
Perfluorododecanoic acid (PFDoA)	ND		2.2	0.64	ug/Kg	☼	08/11/15 11:20	08/14/15 00:27	1
Perfluoroheptanoic acid (PFHpA)	2.0		0.90	0.13	ug/Kg	☼	08/11/15 11:20	08/14/15 00:27	1
Perfluorohexane Sulfonate (PFHxS)	9.0		0.90	0.31	ug/Kg	☼	08/11/15 11:20	08/14/15 00:27	1
Perfluorohexanoic acid (PFHxA)	1.6		0.90	0.17	ug/Kg	☼	08/11/15 11:20	08/14/15 00:27	1
Perfluorooctane Sulfonamide (FOSA)	ND		0.90	0.11	ug/Kg	☼	08/11/15 11:20	08/14/15 00:27	1
Perfluorooctanoic acid (PFOA)	6.6		0.90	0.26	ug/Kg	☼	08/11/15 11:20	08/14/15 00:27	1
Perfluoropentanoic acid (PFPA)	1.4		0.90	0.27	ug/Kg	☼	08/11/15 11:20	08/14/15 00:27	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.2	0.77	ug/Kg	☼	08/11/15 11:20	08/14/15 00:27	1
Perfluorotridecanoic Acid (PFTriA)	ND		0.90	0.36	ug/Kg	☼	08/11/15 11:20	08/14/15 00:27	1
Perfluoroundecanoic acid (PFUnA)	1.3		0.90	0.36	ug/Kg	☼	08/11/15 11:20	08/14/15 00:27	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	101		57 - 153				08/11/15 11:20	08/14/15 00:27	1
13C8 PFOS	104		70 - 130				08/11/15 11:20	08/14/15 00:27	1

Method: DV-LC-0012 - Perfluorinated Hydrocarbons - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorononanoic acid (PFNA)	520		4.5	1.2	ug/Kg	☼	08/11/15 11:20	08/14/15 00:40	5
Perfluorooctane Sulfonate (PFOS)	300		4.5	0.78	ug/Kg	☼	08/11/15 11:20	08/14/15 00:40	5
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	102	D	57 - 153				08/11/15 11:20	08/14/15 00:40	5
13C8 PFOS	93	D	70 - 130				08/11/15 11:20	08/14/15 00:40	5

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	14		0.10	0.10	%			08/05/15 19:46	1
Percent Solids	86		0.10	0.10	%			08/05/15 19:46	1

TestAmerica Denver

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-FRB-2
Date Collected: 07/30/15 21:23
Date Received: 08/04/15 09:45

Lab Sample ID: 280-72684-22
Matrix: Water

Method: PFC -FOSA - FOSA in Water (LC/MS/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctane Sulfonamide (FOSA)	ND		0.047	0.0054	ug/L	-	08/10/15 10:45	08/14/15 07:37	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-21-SW

Date Collected: 07/30/15 21:27

Date Received: 08/04/15 09:45

Lab Sample ID: 280-72684-23

Matrix: Solid

Percent Solids: 92.9

Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	1.4		0.79	0.14	ug/Kg	☼	08/11/15 11:20	08/14/15 01:29	1
Perfluorobutanoic acid (PFBA)	0.55	J	0.79	0.12	ug/Kg	☼	08/11/15 11:20	08/14/15 01:29	1
Perfluorodecane sulfonate (PFDS)	ND		0.79	0.30	ug/Kg	☼	08/11/15 11:20	08/14/15 01:29	1
Perfluorodecanoic acid (PFDA)	ND		0.79	0.27	ug/Kg	☼	08/11/15 11:20	08/14/15 01:29	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.56	ug/Kg	☼	08/11/15 11:20	08/14/15 01:29	1
Perfluoroheptanoic acid (PFHpA)	3.3		0.79	0.12	ug/Kg	☼	08/11/15 11:20	08/14/15 01:29	1
Perfluorohexane Sulfonate (PFHxS)	29	F1 JL	0.79	0.28	ug/Kg	☼	08/11/15 11:20	08/14/15 01:29	1
Perfluorohexanoic acid (PFHxA)	4.5		0.79	0.15	ug/Kg	☼	08/11/15 11:20	08/14/15 01:29	1
Perfluorononanoic acid (PFNA)	2.6		0.79	0.22	ug/Kg	☼	08/11/15 11:20	08/14/15 01:29	1
Perfluorooctane Sulfonamide (FOSA)	ND		0.79	0.097	ug/Kg	☼	08/11/15 11:20	08/14/15 01:29	1
Perfluorooctane Sulfonate (PFOS)	0.60	J	0.79	0.14	ug/Kg	☼	08/11/15 11:20	08/14/15 01:29	1
Perfluorooctanoic acid (PFOA)	14		0.79	0.23	ug/Kg	☼	08/11/15 11:20	08/14/15 01:29	1
Perfluoropentanoic acid (PFPA)	3.3		0.79	0.24	ug/Kg	☼	08/11/15 11:20	08/14/15 01:29	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.68	ug/Kg	☼	08/11/15 11:20	08/14/15 01:29	1
Perfluorotridecanoic Acid (PFTriA)	ND		0.79	0.32	ug/Kg	☼	08/11/15 11:20	08/14/15 01:29	1
Perfluoroundecanoic acid (PFUnA)	ND		0.79	0.32	ug/Kg	☼	08/11/15 11:20	08/14/15 01:29	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	105		57 - 153				08/11/15 11:20	08/14/15 01:29	1
13C8 PFOS	103		70 - 130				08/11/15 11:20	08/14/15 01:29	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	7.1		0.10	0.10	%			08/05/15 19:46	1
Percent Solids	93		0.10	0.10	%			08/05/15 19:46	1

TestAmerica Denver

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-22-SW

Date Collected: 07/30/15 21:30

Date Received: 08/04/15 09:45

Lab Sample ID: 280-72684-24

Matrix: Solid

Percent Solids: 90.1

Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	0.26	J	0.86	0.15	ug/Kg	☼	08/11/15 11:20	08/14/15 02:06	1
Perfluorobutanoic acid (PFBA)	0.13	J	0.86	0.13	ug/Kg	☼	08/11/15 11:20	08/14/15 02:06	1
Perfluorodecane sulfonate (PFDS)	ND		0.86	0.32	ug/Kg	☼	08/11/15 11:20	08/14/15 02:06	1
Perfluorodecanoic acid (PFDA)	ND		0.86	0.29	ug/Kg	☼	08/11/15 11:20	08/14/15 02:06	1
Perfluorododecanoic acid (PFDoA)	ND		2.2	0.62	ug/Kg	☼	08/11/15 11:20	08/14/15 02:06	1
Perfluoroheptanoic acid (PFHpA)	1.1		0.86	0.13	ug/Kg	☼	08/11/15 11:20	08/14/15 02:06	1
Perfluorohexane Sulfonate (PFHxS)	7.2		0.86	0.30	ug/Kg	☼	08/11/15 11:20	08/14/15 02:06	1
Perfluorohexanoic acid (PFHxA)	1.5		0.86	0.16	ug/Kg	☼	08/11/15 11:20	08/14/15 02:06	1
Perfluorononanoic acid (PFNA)	ND		0.86	0.24	ug/Kg	☼	08/11/15 11:20	08/14/15 02:06	1
Perfluorooctane Sulfonamide (FOSA)	ND		0.86	0.11	ug/Kg	☼	08/11/15 11:20	08/14/15 02:06	1
Perfluorooctane Sulfonate (PFOS)	ND		0.86	0.15	ug/Kg	☼	08/11/15 11:20	08/14/15 02:06	1
Perfluorooctanoic acid (PFOA)	2.4		0.86	0.25	ug/Kg	☼	08/11/15 11:20	08/14/15 02:06	1
Perfluoropentanoic acid (PFPA)	2.2		0.86	0.26	ug/Kg	☼	08/11/15 11:20	08/14/15 02:06	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.2	0.75	ug/Kg	☼	08/11/15 11:20	08/14/15 02:06	1
Perfluorotridecanoic Acid (PFTriA)	ND		0.86	0.35	ug/Kg	☼	08/11/15 11:20	08/14/15 02:06	1
Perfluoroundecanoic acid (PFUnA)	ND		0.86	0.35	ug/Kg	☼	08/11/15 11:20	08/14/15 02:06	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	98		57 - 153				08/11/15 11:20	08/14/15 02:06	1
13C8 PFOS	99		70 - 130				08/11/15 11:20	08/14/15 02:06	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	9.9		0.10	0.10	%			08/05/15 19:46	1
Percent Solids	90		0.10	0.10	%			08/05/15 19:46	1

TestAmerica Denver

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-23-SW

Date Collected: 07/30/15 21:38

Date Received: 08/04/15 09:45

Lab Sample ID: 280-72684-25

Matrix: Solid

Percent Solids: 85.8

Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	ND		0.88	0.15	ug/Kg	☼	08/11/15 11:20	08/14/15 02:18	1
Perfluorobutanoic acid (PFBA)	ND		0.88	0.13	ug/Kg	☼	08/11/15 11:20	08/14/15 02:18	1
Perfluorodecane sulfonate (PFDS)	ND		0.88	0.33	ug/Kg	☼	08/11/15 11:20	08/14/15 02:18	1
Perfluorodecanoic acid (PFDA)	ND		0.88	0.30	ug/Kg	☼	08/11/15 11:20	08/14/15 02:18	1
Perfluorododecanoic acid (PFDoA)	ND		2.2	0.63	ug/Kg	☼	08/11/15 11:20	08/14/15 02:18	1
Perfluoroheptanoic acid (PFHpA)	0.53	J	0.88	0.13	ug/Kg	☼	08/11/15 11:20	08/14/15 02:18	1
Perfluorohexane Sulfonate (PFHxS)	1.2		0.88	0.31	ug/Kg	☼	08/11/15 11:20	08/14/15 02:18	1
Perfluorohexanoic acid (PFHxA)	0.38	J	0.88	0.16	ug/Kg	☼	08/11/15 11:20	08/14/15 02:18	1
Perfluorononanoic acid (PFNA)	1.2		0.88	0.24	ug/Kg	☼	08/11/15 11:20	08/14/15 02:18	1
Perfluorooctane Sulfonamide (FOSA)	ND		0.88	0.11	ug/Kg	☼	08/11/15 11:20	08/14/15 02:18	1
Perfluorooctane Sulfonate (PFOS)	0.91		0.88	0.15	ug/Kg	☼	08/11/15 11:20	08/14/15 02:18	1
Perfluorooctanoic acid (PFOA)	1.7		0.88	0.25	ug/Kg	☼	08/11/15 11:20	08/14/15 02:18	1
Perfluoropentanoic acid (PFPA)	0.78	J	0.88	0.26	ug/Kg	☼	08/11/15 11:20	08/14/15 02:18	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.2	0.76	ug/Kg	☼	08/11/15 11:20	08/14/15 02:18	1
Perfluorotridecanoic Acid (PFTriA)	ND		0.88	0.35	ug/Kg	☼	08/11/15 11:20	08/14/15 02:18	1
Perfluoroundecanoic acid (PFUnA)	1.9		0.88	0.35	ug/Kg	☼	08/11/15 11:20	08/14/15 02:18	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	102		57 - 153				08/11/15 11:20	08/14/15 02:18	1
13C8 PFOS	100		70 - 130				08/11/15 11:20	08/14/15 02:18	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	14		0.10	0.10	%	—		08/05/15 19:46	1
Percent Solids	86		0.10	0.10	%	—		08/05/15 19:46	1

TestAmerica Denver

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-24-SW

Date Collected: 07/30/15 21:46

Date Received: 08/04/15 09:45

Lab Sample ID: 280-72684-26

Matrix: Solid

Percent Solids: 88.3

Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	ND		0.88	0.15	ug/Kg	☼	08/11/15 11:20	08/14/15 02:30	1
Perfluorobutanoic acid (PFBA)	0.65	J	0.88	0.13	ug/Kg	☼	08/11/15 11:20	08/14/15 02:30	1
Perfluorodecane sulfonate (PFDS)	ND		0.88	0.33	ug/Kg	☼	08/11/15 11:20	08/14/15 02:30	1
Perfluorodecanoic acid (PFDA)	100		0.88	0.30	ug/Kg	☼	08/11/15 11:20	08/14/15 02:30	1
Perfluorododecanoic acid (PFDoA)	ND		2.2	0.63	ug/Kg	☼	08/11/15 11:20	08/14/15 02:30	1
Perfluoroheptanoic acid (PFHpA)	1.1		0.88	0.13	ug/Kg	☼	08/11/15 11:20	08/14/15 02:30	1
Perfluorohexane Sulfonate (PFHxS)	7.2		0.88	0.31	ug/Kg	☼	08/11/15 11:20	08/14/15 02:30	1
Perfluorohexanoic acid (PFHxA)	2.9		0.88	0.16	ug/Kg	☼	08/11/15 11:20	08/14/15 02:30	1
Perfluorooctane Sulfonamide (FOSA)	0.53	J	0.88	0.11	ug/Kg	☼	08/11/15 11:20	08/14/15 02:30	1
Perfluorooctanoic acid (PFOA)	6.7		0.88	0.25	ug/Kg	☼	08/11/15 11:20	08/14/15 02:30	1
Perfluoropentanoic acid (PFPA)	1.3		0.88	0.26	ug/Kg	☼	08/11/15 11:20	08/14/15 02:30	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.2	0.76	ug/Kg	☼	08/11/15 11:20	08/14/15 02:30	1
Perfluorotridecanoic Acid (PFTriA)	2.1		0.88	0.35	ug/Kg	☼	08/11/15 11:20	08/14/15 02:30	1
Perfluoroundecanoic acid (PFUnA)	10		0.88	0.35	ug/Kg	☼	08/11/15 11:20	08/14/15 02:30	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	98		57 - 153				08/11/15 11:20	08/14/15 02:30	1
13C8 PFOS	120		70 - 130				08/11/15 11:20	08/14/15 02:30	1

Method: DV-LC-0012 - Perfluorinated Hydrocarbons - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorononanoic acid (PFNA)	950		18	4.8	ug/Kg	☼	08/11/15 11:20	08/14/15 02:42	20
Perfluorooctane Sulfonate (PFOS)	2600		18	3.1	ug/Kg	☼	08/11/15 11:20	08/14/15 02:42	20
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	75	D	57 - 153				08/11/15 11:20	08/14/15 02:42	20
13C8 PFOS	103	D	70 - 130				08/11/15 11:20	08/14/15 02:42	20

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	12		0.10	0.10	%			08/05/15 19:46	1
Percent Solids	88		0.10	0.10	%			08/05/15 19:46	1

TestAmerica Denver

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-25-SW

Date Collected: 07/30/15 21:54

Date Received: 08/04/15 09:45

Lab Sample ID: 280-72684-27

Matrix: Solid

Percent Solids: 88.1

Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	ND		0.84	0.15	ug/Kg	☼	08/11/15 11:20	08/14/15 02:55	1
Perfluorobutanoic acid (PFBA)	0.50	J	0.84	0.13	ug/Kg	☼	08/11/15 11:20	08/14/15 02:55	1
Perfluorodecane sulfonate (PFDS)	ND		0.84	0.31	ug/Kg	☼	08/11/15 11:20	08/14/15 02:55	1
Perfluorodecanoic acid (PFDA)	22		0.84	0.28	ug/Kg	☼	08/11/15 11:20	08/14/15 02:55	1
Perfluorododecanoic acid (PFDoA)	ND		2.1	0.60	ug/Kg	☼	08/11/15 11:20	08/14/15 02:55	1
Perfluoroheptanoic acid (PFHpA)	2.4		0.84	0.13	ug/Kg	☼	08/11/15 11:20	08/14/15 02:55	1
Perfluorohexane Sulfonate (PFHxS)	12		0.84	0.29	ug/Kg	☼	08/11/15 11:20	08/14/15 02:55	1
Perfluorohexanoic acid (PFHxA)	3.7		0.84	0.16	ug/Kg	☼	08/11/15 11:20	08/14/15 02:55	1
Perfluorooctane Sulfonamide (FOSA)	0.22	J	0.84	0.10	ug/Kg	☼	08/11/15 11:20	08/14/15 02:55	1
Perfluorooctanoic acid (PFOA)	8.1		0.84	0.24	ug/Kg	☼	08/11/15 11:20	08/14/15 02:55	1
Perfluoropentanoic acid (PFPA)	2.2		0.84	0.25	ug/Kg	☼	08/11/15 11:20	08/14/15 02:55	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.1	0.72	ug/Kg	☼	08/11/15 11:20	08/14/15 02:55	1
Perfluorotridecanoic Acid (PFTriA)	0.37	J	0.84	0.33	ug/Kg	☼	08/11/15 11:20	08/14/15 02:55	1
Perfluoroundecanoic acid (PFUnA)	0.93		0.84	0.33	ug/Kg	☼	08/11/15 11:20	08/14/15 02:55	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	101		57 - 153				08/11/15 11:20	08/14/15 02:55	1
13C8 PFOS	103		70 - 130				08/11/15 11:20	08/14/15 02:55	1

Method: DV-LC-0012 - Perfluorinated Hydrocarbons - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorononanoic acid (PFNA)	920		8.4	2.3	ug/Kg	☼	08/11/15 11:20	08/14/15 03:07	10
Perfluorooctane Sulfonate (PFOS)	1000		8.4	1.5	ug/Kg	☼	08/11/15 11:20	08/14/15 03:07	10
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	93	D	57 - 153				08/11/15 11:20	08/14/15 03:07	10
13C8 PFOS	95	D	70 - 130				08/11/15 11:20	08/14/15 03:07	10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	12		0.10	0.10	%			08/05/15 19:46	1
Percent Solids	88		0.10	0.10	%			08/05/15 19:46	1

TestAmerica Denver

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-26-SW

Date Collected: 07/30/15 22:02

Date Received: 08/04/15 09:45

Lab Sample ID: 280-72684-28

Matrix: Solid

Percent Solids: 89.5

Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	0.36	J	0.84	0.15	ug/Kg	☼	08/11/15 11:20	08/14/15 03:32	1
Perfluorobutanoic acid (PFBA)	1.1		0.84	0.13	ug/Kg	☼	08/11/15 11:20	08/14/15 03:32	1
Perfluorodecane sulfonate (PFDS)	ND		0.84	0.32	ug/Kg	☼	08/11/15 11:20	08/14/15 03:32	1
Perfluorodecanoic acid (PFDA)	11		0.84	0.28	ug/Kg	☼	08/11/15 11:20	08/14/15 03:32	1
Perfluorododecanoic acid (PFDoA)	ND		2.1	0.60	ug/Kg	☼	08/11/15 11:20	08/14/15 03:32	1
Perfluoroheptanoic acid (PFHpA)	4.7		0.84	0.13	ug/Kg	☼	08/11/15 11:20	08/14/15 03:32	1
Perfluorohexane Sulfonate (PFHxS)	36		0.84	0.30	ug/Kg	☼	08/11/15 11:20	08/14/15 03:32	1
Perfluorohexanoic acid (PFHxA)	10		0.84	0.16	ug/Kg	☼	08/11/15 11:20	08/14/15 03:32	1
Perfluorooctane Sulfonamide (FOSA)	0.15	J	0.84	0.10	ug/Kg	☼	08/11/15 11:20	08/14/15 03:32	1
Perfluorooctanoic acid (PFOA)	20		0.84	0.24	ug/Kg	☼	08/11/15 11:20	08/14/15 03:32	1
Perfluoropentanoic acid (PFPA)	6.9		0.84	0.25	ug/Kg	☼	08/11/15 11:20	08/14/15 03:32	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.1	0.73	ug/Kg	☼	08/11/15 11:20	08/14/15 03:32	1
Perfluorotridecanoic Acid (PFTriA)	2.1		0.84	0.34	ug/Kg	☼	08/11/15 11:20	08/14/15 03:32	1
Perfluoroundecanoic acid (PFUnA)	15		0.84	0.34	ug/Kg	☼	08/11/15 11:20	08/14/15 03:32	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	101		57 - 153				08/11/15 11:20	08/14/15 03:32	1
13C8 PFOS	98		70 - 130				08/11/15 11:20	08/14/15 03:32	1

Method: DV-LC-0012 - Perfluorinated Hydrocarbons - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorononanoic acid (PFNA)	3800		17	4.6	ug/Kg	☼	08/11/15 11:20	08/14/15 03:44	20
Perfluorooctane Sulfonate (PFOS)	2400		17	3.0	ug/Kg	☼	08/11/15 11:20	08/14/15 03:44	20
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	102	D	57 - 153				08/11/15 11:20	08/14/15 03:44	20
13C8 PFOS	127	D	70 - 130				08/11/15 11:20	08/14/15 03:44	20

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	11		0.10	0.10	%			08/05/15 19:46	1
Percent Solids	89		0.10	0.10	%			08/05/15 19:46	1

TestAmerica Denver

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-27-SW

Date Collected: 07/30/15 22:10

Date Received: 08/04/15 09:45

Lab Sample ID: 280-72684-29

Matrix: Solid

Percent Solids: 87.2

Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	4.1		0.86	0.15	ug/Kg	☼	08/11/15 11:20	08/14/15 03:56	1
Perfluorobutanoic acid (PFBA)	4.9		0.86	0.13	ug/Kg	☼	08/11/15 11:20	08/14/15 03:56	1
Perfluorodecane sulfonate (PFDS)	ND		0.86	0.32	ug/Kg	☼	08/11/15 11:20	08/14/15 03:56	1
Perfluorodecanoic acid (PFDA)	5.5		0.86	0.29	ug/Kg	☼	08/11/15 11:20	08/14/15 03:56	1
Perfluorododecanoic acid (PFDoA)	ND		2.2	0.62	ug/Kg	☼	08/11/15 11:20	08/14/15 03:56	1
Perfluoroheptanoic acid (PFHpA)	19		0.86	0.13	ug/Kg	☼	08/11/15 11:20	08/14/15 03:56	1
Perfluorohexane Sulfonate (PFHxS)	83		0.86	0.30	ug/Kg	☼	08/11/15 11:20	08/14/15 03:56	1
Perfluorohexanoic acid (PFHxA)	41		0.86	0.16	ug/Kg	☼	08/11/15 11:20	08/14/15 03:56	1
Perfluorooctane Sulfonamide (FOSA)	0.12	J	0.86	0.11	ug/Kg	☼	08/11/15 11:20	08/14/15 03:56	1
Perfluorooctanoic acid (PFOA)	48		0.86	0.25	ug/Kg	☼	08/11/15 11:20	08/14/15 03:56	1
Perfluoropentanoic acid (PFPA)	29		0.86	0.26	ug/Kg	☼	08/11/15 11:20	08/14/15 03:56	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.2	0.75	ug/Kg	☼	08/11/15 11:20	08/14/15 03:56	1
Perfluorotridecanoic Acid (PFTriA)	3.1		0.86	0.35	ug/Kg	☼	08/11/15 11:20	08/14/15 03:56	1
Perfluoroundecanoic acid (PFUnA)	12		0.86	0.35	ug/Kg	☼	08/11/15 11:20	08/14/15 03:56	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	102		57 - 153				08/11/15 11:20	08/14/15 03:56	1
13C8 PFOS	106		70 - 130				08/11/15 11:20	08/14/15 03:56	1

Method: DV-LC-0012 - Perfluorinated Hydrocarbons - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorononanoic acid (PFNA)	410		8.6	2.4	ug/Kg	☼	08/11/15 11:20	08/14/15 04:09	10
Perfluorooctane Sulfonate (PFOS)	1400		8.6	1.5	ug/Kg	☼	08/11/15 11:20	08/14/15 04:09	10
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	90	D	57 - 153				08/11/15 11:20	08/14/15 04:09	10
13C8 PFOS	109	D	70 - 130				08/11/15 11:20	08/14/15 04:09	10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	13		0.10	0.10	%			08/05/15 19:46	1
Percent Solids	87		0.10	0.10	%			08/05/15 19:46	1

TestAmerica Denver

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-28-SW

Date Collected: 07/30/15 22:18

Date Received: 08/04/15 09:45

Lab Sample ID: 280-72684-30

Matrix: Solid

Percent Solids: 93.2

Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	0.19	J	0.83	0.14	ug/Kg	☼	08/11/15 11:20	08/14/15 04:21	1
Perfluorobutanoic acid (PFBA)	1.2		0.83	0.12	ug/Kg	☼	08/11/15 11:20	08/14/15 04:21	1
Perfluorodecane sulfonate (PFDS)	5.2		0.83	0.31	ug/Kg	☼	08/11/15 11:20	08/14/15 04:21	1
Perfluorodecanoic acid (PFDA)	66		0.83	0.28	ug/Kg	☼	08/11/15 11:20	08/14/15 04:21	1
Perfluorododecanoic acid (PFDoA)	3.5		2.1	0.59	ug/Kg	☼	08/11/15 11:20	08/14/15 04:21	1
Perfluoroheptanoic acid (PFHpA)	1.7		0.83	0.12	ug/Kg	☼	08/11/15 11:20	08/14/15 04:21	1
Perfluorohexane Sulfonate (PFHxS)	5.8		0.83	0.29	ug/Kg	☼	08/11/15 11:20	08/14/15 04:21	1
Perfluorohexanoic acid (PFHxA)	5.2		0.83	0.16	ug/Kg	☼	08/11/15 11:20	08/14/15 04:21	1
Perfluorooctane Sulfonamide (FOSA)	3.5		0.83	0.10	ug/Kg	☼	08/11/15 11:20	08/14/15 04:21	1
Perfluorooctanoic acid (PFOA)	4.4		0.83	0.24	ug/Kg	☼	08/11/15 11:20	08/14/15 04:21	1
Perfluoropentanoic acid (PFPA)	3.4		0.83	0.25	ug/Kg	☼	08/11/15 11:20	08/14/15 04:21	1
Perfluorotetradecanoic acid (PFTeA)	0.71	J	2.1	0.71	ug/Kg	☼	08/11/15 11:20	08/14/15 04:21	1
Perfluorotridecanoic Acid (PFTriA)	33		0.83	0.33	ug/Kg	☼	08/11/15 11:20	08/14/15 04:21	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	101		57 - 153				08/11/15 11:20	08/14/15 04:21	1
13C8 PFOS	104		70 - 130				08/11/15 11:20	08/14/15 04:21	1

Method: DV-LC-0012 - Perfluorinated Hydrocarbons - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorononanoic acid (PFNA)	250		8.3	2.3	ug/Kg	☼	08/11/15 11:20	08/18/15 14:59	10
Perfluorooctane Sulfonate (PFOS)	760		8.3	1.4	ug/Kg	☼	08/11/15 11:20	08/18/15 14:59	10
Perfluoroundecanoic acid (PFUnA)	370		8.3	3.3	ug/Kg	☼	08/11/15 11:20	08/18/15 14:59	10
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	100	D	57 - 153				08/11/15 11:20	08/18/15 14:59	10
13C8 PFOS	91	D	70 - 130				08/11/15 11:20	08/18/15 14:59	10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	6.8		0.10	0.10	%			08/05/15 19:46	1
Percent Solids	93		0.10	0.10	%			08/05/15 19:46	1

TestAmerica Denver

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-29-SW

Date Collected: 07/30/15 22:26

Date Received: 08/04/15 09:45

Lab Sample ID: 280-72684-31

Matrix: Solid

Percent Solids: 89.4

Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	2.1		0.89	0.16	ug/Kg	☼	08/11/15 11:20	08/14/15 04:33	1
Perfluorobutanoic acid (PFBA)	4.4		0.89	0.13	ug/Kg	☼	08/11/15 11:20	08/14/15 04:33	1
Perfluorodecane sulfonate (PFDS)	ND		0.89	0.33	ug/Kg	☼	08/11/15 11:20	08/14/15 04:33	1
Perfluorodecanoic acid (PFDA)	91		0.89	0.30	ug/Kg	☼	08/11/15 11:20	08/14/15 04:33	1
Perfluorododecanoic acid (PFDoA)	ND		2.2	0.63	ug/Kg	☼	08/11/15 11:20	08/14/15 04:33	1
Perfluoroheptanoic acid (PFHpA)	11		0.89	0.13	ug/Kg	☼	08/11/15 11:20	08/14/15 04:33	1
Perfluorohexane Sulfonate (PFHxS)	28		0.89	0.31	ug/Kg	☼	08/11/15 11:20	08/14/15 04:33	1
Perfluorohexanoic acid (PFHxA)	29		0.89	0.17	ug/Kg	☼	08/11/15 11:20	08/14/15 04:33	1
Perfluorooctane Sulfonamide (FOSA)	0.26	J	0.89	0.11	ug/Kg	☼	08/11/15 11:20	08/14/15 04:33	1
Perfluorooctanoic acid (PFOA)	23		0.89	0.26	ug/Kg	☼	08/11/15 11:20	08/14/15 04:33	1
Perfluoropentanoic acid (PFPA)	27		0.89	0.27	ug/Kg	☼	08/11/15 11:20	08/14/15 04:33	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.2	0.77	ug/Kg	☼	08/11/15 11:20	08/14/15 04:33	1
Perfluorotridecanoic Acid (PFTriA)	0.95		0.89	0.36	ug/Kg	☼	08/11/15 11:20	08/14/15 04:33	1
Perfluoroundecanoic acid (PFUnA)	2.5		0.89	0.36	ug/Kg	☼	08/11/15 11:20	08/14/15 04:33	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	102		57 - 153				08/11/15 11:20	08/14/15 04:33	1
13C8 PFOS	122		70 - 130				08/11/15 11:20	08/14/15 04:33	1

Method: DV-LC-0012 - Perfluorinated Hydrocarbons - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorononanoic acid (PFNA)	2200		44	12	ug/Kg	☼	08/11/15 11:20	08/18/15 15:11	50
Perfluorooctane Sulfonate (PFOS)	3000		44	7.8	ug/Kg	☼	08/11/15 11:20	08/18/15 15:11	50
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	74	D	57 - 153				08/11/15 11:20	08/18/15 15:11	50
13C8 PFOS	83	D	70 - 130				08/11/15 11:20	08/18/15 15:11	50

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	11		0.10	0.10	%			08/05/15 19:46	1
Percent Solids	89		0.10	0.10	%			08/05/15 19:46	1

TestAmerica Denver

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-30-SW

Date Collected: 07/30/15 22:34

Date Received: 08/04/15 09:45

Lab Sample ID: 280-72684-32

Matrix: Solid

Percent Solids: 85.2

Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	2.8		0.90	0.16	ug/Kg	☼	08/11/15 11:20	08/14/15 04:45	1
Perfluorobutanoic acid (PFBA)	7.6		0.90	0.14	ug/Kg	☼	08/11/15 11:20	08/14/15 04:45	1
Perfluorodecane sulfonate (PFDS)	ND		0.90	0.34	ug/Kg	☼	08/11/15 11:20	08/14/15 04:45	1
Perfluorodecanoic acid (PFDA)	8.5		0.90	0.30	ug/Kg	☼	08/11/15 11:20	08/14/15 04:45	1
Perfluorododecanoic acid (PFDoA)	1.6	J	2.3	0.64	ug/Kg	☼	08/11/15 11:20	08/14/15 04:45	1
Perfluoroheptanoic acid (PFHpA)	15		0.90	0.14	ug/Kg	☼	08/11/15 11:20	08/14/15 04:45	1
Perfluorohexane Sulfonate (PFHxS)	32		0.90	0.32	ug/Kg	☼	08/11/15 11:20	08/14/15 04:45	1
Perfluorohexanoic acid (PFHxA)	43		0.90	0.17	ug/Kg	☼	08/11/15 11:20	08/14/15 04:45	1
Perfluorooctane Sulfonamide (FOSA)	0.34	J	0.90	0.11	ug/Kg	☼	08/11/15 11:20	08/14/15 04:45	1
Perfluorooctanoic acid (PFOA)	38		0.90	0.26	ug/Kg	☼	08/11/15 11:20	08/14/15 04:45	1
Perfluoropentanoic acid (PFPA)	41		0.90	0.27	ug/Kg	☼	08/11/15 11:20	08/14/15 04:45	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.3	0.78	ug/Kg	☼	08/11/15 11:20	08/14/15 04:45	1
Perfluorotridecanoic Acid (PFTriA)	11		0.90	0.36	ug/Kg	☼	08/11/15 11:20	08/14/15 04:45	1
Perfluoroundecanoic acid (PFUnA)	22		0.90	0.36	ug/Kg	☼	08/11/15 11:20	08/14/15 04:45	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 PFOA	97		57 - 153	08/11/15 11:20	08/14/15 04:45	1
13C8 PFOS	100		70 - 130	08/11/15 11:20	08/14/15 04:45	1

Method: DV-LC-0012 - Perfluorinated Hydrocarbons - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorononanoic acid (PFNA)	480	D	9.0	2.5	ug/Kg	☼	08/11/15 11:20	08/18/15 15:24	10
Perfluorooctane Sulfonate (PFOS)	750	D	9.0	1.6	ug/Kg	☼	08/11/15 11:20	08/18/15 15:24	10

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 PFOA	89	D	57 - 153	08/11/15 11:20	08/18/15 15:24	10
13C8 PFOS	98	D	70 - 130	08/11/15 11:20	08/18/15 15:24	10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	15		0.10	0.10	%			08/05/15 19:46	1
Percent Solids	85		0.10	0.10	%			08/05/15 19:46	1

TestAmerica Denver

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-FRB-3
Date Collected: 07/30/15 22:35
Date Received: 08/04/15 09:45

Lab Sample ID: 280-72684-33
Matrix: Water

Method: PFC -FOSA - FOSA in Water (LC/MS/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctane Sulfonamide (FOSA)	ND		0.048	0.0054	ug/L	-	08/10/15 10:45	08/14/15 07:50	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-BD-1

Date Collected: 07/30/15 00:00

Date Received: 08/05/15 09:15

Lab Sample ID: 280-72684-34

Matrix: Solid

Percent Solids: 86.4

Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	ND		0.86	0.15	ug/Kg	☼	08/11/15 11:20	08/14/15 04:58	1
Perfluorobutanoic acid (PFBA)	ND		0.86	0.13	ug/Kg	☼	08/11/15 11:20	08/14/15 04:58	1
Perfluorodecane sulfonate (PFDS)	ND		0.86	0.32	ug/Kg	☼	08/11/15 11:20	08/14/15 04:58	1
Perfluorodecanoic acid (PFDA)	ND		0.86	0.29	ug/Kg	☼	08/11/15 11:20	08/14/15 04:58	1
Perfluorododecanoic acid (PFDoA)	ND		2.2	0.61	ug/Kg	☼	08/11/15 11:20	08/14/15 04:58	1
Perfluoroheptanoic acid (PFHpA)	ND		0.86	0.13	ug/Kg	☼	08/11/15 11:20	08/14/15 04:58	1
Perfluorohexane Sulfonate (PFHxS)	ND		0.86	0.30	ug/Kg	☼	08/11/15 11:20	08/14/15 04:58	1
Perfluorohexanoic acid (PFHxA)	ND		0.86	0.16	ug/Kg	☼	08/11/15 11:20	08/14/15 04:58	1
Perfluorononanoic acid (PFNA)	0.63	J	0.86	0.24	ug/Kg	☼	08/11/15 11:20	08/14/15 04:58	1
Perfluorooctane Sulfonamide (FOSA)	ND		0.86	0.11	ug/Kg	☼	08/11/15 11:20	08/14/15 04:58	1
Perfluorooctane Sulfonate (PFOS)	1.1		0.86	0.15	ug/Kg	☼	08/11/15 11:20	08/14/15 04:58	1
Perfluorooctanoic acid (PFOA)	0.31	J	0.86	0.25	ug/Kg	☼	08/11/15 11:20	08/14/15 04:58	1
Perfluoropentanoic acid (PFPA)	ND		0.86	0.26	ug/Kg	☼	08/11/15 11:20	08/14/15 04:58	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.2	0.74	ug/Kg	☼	08/11/15 11:20	08/14/15 04:58	1
Perfluorotridecanoic Acid (PFTriA)	1.0		0.86	0.34	ug/Kg	☼	08/11/15 11:20	08/14/15 04:58	1
Perfluoroundecanoic acid (PFUnA)	2.0		0.86	0.34	ug/Kg	☼	08/11/15 11:20	08/14/15 04:58	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	98		57 - 153				08/11/15 11:20	08/14/15 04:58	1
13C8 PFOS	106		70 - 130				08/11/15 11:20	08/14/15 04:58	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	14		0.10	0.10	%			08/05/15 19:46	1
Percent Solids	86		0.10	0.10	%			08/05/15 19:46	1

TestAmerica Denver

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-BD-2

Date Collected: 07/30/15 00:00

Date Received: 08/04/15 09:45

Lab Sample ID: 280-72684-35

Matrix: Solid

Percent Solids: 86.4

Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	ND		0.88	0.15	ug/Kg	☼	08/11/15 11:20	08/14/15 05:10	1
Perfluorobutanoic acid (PFBA)	ND		0.88	0.13	ug/Kg	☼	08/11/15 11:20	08/14/15 05:10	1
Perfluorodecane sulfonate (PFDS)	ND		0.88	0.33	ug/Kg	☼	08/11/15 11:20	08/14/15 05:10	1
Perfluorodecanoic acid (PFDA)	0.97		0.88	0.30	ug/Kg	☼	08/11/15 11:20	08/14/15 05:10	1
Perfluorododecanoic acid (PFDoA)	ND		2.2	0.63	ug/Kg	☼	08/11/15 11:20	08/14/15 05:10	1
Perfluoroheptanoic acid (PFHpA)	1.7		0.88	0.13	ug/Kg	☼	08/11/15 11:20	08/14/15 05:10	1
Perfluorohexane Sulfonate (PFHxS)	7.5		0.88	0.31	ug/Kg	☼	08/11/15 11:20	08/14/15 05:10	1
Perfluorohexanoic acid (PFHxA)	1.2		0.88	0.17	ug/Kg	☼	08/11/15 11:20	08/14/15 05:10	1
Perfluorooctane Sulfonamide (FOSA)	ND		0.88	0.11	ug/Kg	☼	08/11/15 11:20	08/14/15 05:10	1
Perfluorooctanoic acid (PFOA)	6.9		0.88	0.25	ug/Kg	☼	08/11/15 11:20	08/14/15 05:10	1
Perfluoropentanoic acid (PFPA)	1.0		0.88	0.26	ug/Kg	☼	08/11/15 11:20	08/14/15 05:10	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.2	0.76	ug/Kg	☼	08/11/15 11:20	08/14/15 05:10	1
Perfluorotridecanoic Acid (PFTriA)	0.48	J	0.88	0.35	ug/Kg	☼	08/11/15 11:20	08/14/15 05:10	1
Perfluoroundecanoic acid (PFUnA)	1.6		0.88	0.35	ug/Kg	☼	08/11/15 11:20	08/14/15 05:10	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	102		57 - 153				08/11/15 11:20	08/14/15 05:10	1
13C8 PFOS	101		70 - 130				08/11/15 11:20	08/14/15 05:10	1

Method: DV-LC-0012 - Perfluorinated Hydrocarbons - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorononanoic acid (PFNA)	520		8.8	2.4	ug/Kg	☼	08/11/15 11:20	08/18/15 15:36	10
Perfluorooctane Sulfonate (PFOS)	290		8.8	1.5	ug/Kg	☼	08/11/15 11:20	08/18/15 15:36	10
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	100	D	57 - 153				08/11/15 11:20	08/18/15 15:36	10
13C8 PFOS	83	D	70 - 130				08/11/15 11:20	08/18/15 15:36	10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	14		0.10	0.10	%	—		08/05/15 19:46	1
Percent Solids	86		0.10	0.10	%	—		08/05/15 19:46	1

TestAmerica Denver

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: FHR North Pole Refinery Phase III - FTA

TestAmerica Job ID: 280-72684-1

Client Sample ID: FTA-BD-3

Date Collected: 07/30/15 00:00

Date Received: 08/04/15 09:45

Lab Sample ID: 280-72684-36

Matrix: Solid

Percent Solids: 88.6

Method: DV-LC-0012 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutane Sulfonate (PFBS)	3.0		0.83	0.15	ug/Kg	☼	08/11/15 11:20	08/14/15 05:22	1
Perfluorobutanoic acid (PFBA)	7.2		0.83	0.12	ug/Kg	☼	08/11/15 11:20	08/14/15 05:22	1
Perfluorodecane sulfonate (PFDS)	ND		0.83	0.31	ug/Kg	☼	08/11/15 11:20	08/14/15 05:22	1
Perfluorodecanoic acid (PFDA)	8.2		0.83	0.28	ug/Kg	☼	08/11/15 11:20	08/14/15 05:22	1
Perfluorododecanoic acid (PFDoA)	1.7	J	2.1	0.59	ug/Kg	☼	08/11/15 11:20	08/14/15 05:22	1
Perfluoroheptanoic acid (PFHpA)	15		0.83	0.12	ug/Kg	☼	08/11/15 11:20	08/14/15 05:22	1
Perfluorohexane Sulfonate (PFHxS)	35		0.83	0.29	ug/Kg	☼	08/11/15 11:20	08/14/15 05:22	1
Perfluorohexanoic acid (PFHxA)	46		0.83	0.16	ug/Kg	☼	08/11/15 11:20	08/14/15 05:22	1
Perfluorooctane Sulfonamide (FOSA)	0.45	J	0.83	0.10	ug/Kg	☼	08/11/15 11:20	08/14/15 05:22	1
Perfluorooctanoic acid (PFOA)	38		0.83	0.24	ug/Kg	☼	08/11/15 11:20	08/14/15 05:22	1
Perfluoropentanoic acid (PFPA)	42		0.83	0.25	ug/Kg	☼	08/11/15 11:20	08/14/15 05:22	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.1	0.72	ug/Kg	☼	08/11/15 11:20	08/14/15 05:22	1
Perfluorotridecanoic Acid (PFTriA)	11		0.83	0.33	ug/Kg	☼	08/11/15 11:20	08/14/15 05:22	1
Perfluoroundecanoic acid (PFUnA)	22		0.83	0.33	ug/Kg	☼	08/11/15 11:20	08/14/15 05:22	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	99		57 - 153				08/11/15 11:20	08/14/15 05:22	1
13C8 PFOS	103		70 - 130				08/11/15 11:20	08/14/15 05:22	1

Method: DV-LC-0012 - Perfluorinated Hydrocarbons - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorononanoic acid (PFNA)	490		8.3	2.3	ug/Kg	☼	08/11/15 11:20	08/18/15 15:48	10
Perfluorooctane Sulfonate (PFOS)	810		8.3	1.5	ug/Kg	☼	08/11/15 11:20	08/18/15 15:48	10
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 PFOA	91	D	57 - 153				08/11/15 11:20	08/18/15 15:48	10
13C8 PFOS	111	D	70 - 130				08/11/15 11:20	08/18/15 15:48	10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	11		0.10	0.10	%			08/05/15 19:46	1
Percent Solids	89		0.10	0.10	%			08/05/15 19:46	1

TestAmerica Denver

Phone (303) 736-0100 Fax (303) 431-7171

Chain of Custody Record

280-772684 Chain of Custody



TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

THE LEADER IN ENVIRONMENTAL TESTING

Client Information		Sampler: <u>David Brackin</u>		Lab PM: <u>Johnston, Michelle A</u>		Carrier Tracking No(s): <u>280-44547-16570.2</u>	
Client Contact: <u>Rebecca Andresen</u>		Phone: <u>907.744.7693</u>		E-Mail: <u>michele.johnston@testamericainc.com</u>		Page: <u>1</u> of <u>4</u>	
Company: <u>ARCADIS U.S. Inc</u>		Due Date Requested:		Analysis Requested		Job #:	
Address: <u>1100 Olive Way Suite 800</u>		City: <u>Seattle</u>		State, Zip: <u>WA, 98101</u>		Phone: <u>206.726.4717</u>	
Email: <u>rebecca.andresen@arcadis-us.com</u>		Project Name: <u>FHR North Pole Refinery Phase III</u>		SSOW#:		Preservation Codes:	
Site: <u>SWA FTA</u>		Sample Date		Sample Time		Sample Type (C=Comp, G=grab) B/T=Tissue, J=Air	
Sample Identification		Sample Date		Sample Time		Sample Type (C=Comp, G=grab) B/T=Tissue, J=Air	
FTA - 1 - SW		07.30.15		1850		G S	
FTA - 2 - SW		07.30.15		1858		G S	
FTA - 3 - SW		07.30.15		1906		G S	
FTA - 4 - SW		07.30.15		1914		G S	
FTA - 5 - SW		07.30.15		1922		G S	
FTA - 6 - SW		07.30.15		1930		G S	
FTA - 7 - SW		07.30.15		1938		G S	
FTA - 8 - SW		07.30.15		1946		G S	
FTA - 9 - SW		07.30.15		1954		G S	
FTA - 10 - SW		07.30.15		2002		G S	
FTA - FRA-1		07.30.15		2003		G W	
Possible Hazard Identification		Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological <input type="checkbox"/>		Field Filtered Sample (Yes or No)		Perform MS/MSD (Yes or No)	
Deliverable Requested: I, II, III, IV, Other (specify)		Empty Kit Relinquished by:		Date:		Time:	
Relinquished by: <u>[Signature]</u>		Date/Time: <u>07.31.15/0800</u>		Company: <u>ARCADIS</u>		Received by: <u>[Signature]</u>	
Relinquished by:		Date/Time:		Company:		Received by:	
Custody Seals Intact: <u>Δ Yes Δ No</u>		Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks: <u>24, 10, 5, 11, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 54</u>			

Chain of Custody Record

Client Information		Sampler: <u>David R. Anderson</u>		Lab PM: <u>Johnston, Michelle A</u>		Carrier Tracking No(s):		COC No: <u>280-44547-16570.2</u>	
Client Contact: <u>Rebecca Andresen</u>		Phone: <u>907.744.7693</u>		E-Mail: <u>michelle.johnston@testamericainc.com</u>				Page: <u>2</u> of <u>4</u>	
Company: <u>ARCADIS U.S. Inc</u>		Due Date Requested:		Analysis Requested				Job #:	
Address: <u>1100 Olive Way Suite 800</u>		TAT Requested (days):						Preservation Codes:	
City: <u>Seattle</u>		<u>Stand. 1</u>						A - HCL M - Hexane	
State Zip: <u>WA, 98101</u>								B - NaOH N - None	
Phone: <u>206.726.4717</u>		PO #: <u>NPR-TA-April 2015</u>						C - Zn Acetate O - AsNaO2	
Email: <u>rebecca.andresen@arcadis-us.com</u>		WO #: <u>B0081981.0037.00001</u>						D - Nitric Acid P - Na2O4S	
Project Name: <u>FHR North Pole Refinery Phase III</u>		Project #: <u>28009120</u>						E - NaHSO4 Q - Na2SO3	
Site: <u>FTA</u>		SSOW#:						F - MeOH R - Na2S2SO3	
								G - Amnolir T - TSP Dodecahydrate	
								H - Ascorbic Acid U - Acetone	
								I - Ice V - MCAA	
								J - DI Water W - pH 4-5	
								K - EDTA Z - other (specify)	
								Other:	
Sample Identification		Sample Date		Sample Time		Sample Type (C=comp, G=grab)		Matrix (W=water, S=solid, O=wasteoil, B=trans, A=air)	
FTA-11-SW		07.30.15		20:10		G		S	
FTA-12-SW		07.30.15		20:18		G		S	
FTA-13-SW		07.30.15		20:26		G		S	
FTA-14-SW		07.30.15		20:34		G		S	
FTA-15-SW		07.30.15		20:42		G		S	
FTA-16-SW		07.30.15		20:50		G		S	
FTA-17-SW		07.30.15		20:58		G		S	
FTA-18-SW		07.30.15		21:06		G		S	
FTA-19-SW		07.30.15		21:14		G		S	
FTA-20-SW		07.30.15		21:22		G		S	
FTA-FRB-2		07.30.15		21:23		G		W	
Possible Hazard Identification		<input checked="" type="checkbox"/> Non-Hazard		<input type="checkbox"/> Flammable		<input type="checkbox"/> Skin Irritant		<input type="checkbox"/> Poison B	
		<input type="checkbox"/> Unknown		<input type="checkbox"/> Radiological					
Deliverable Requested: I, II, III, IV, Other (specify)									
Empty Kit Relinquished by:		Date:		Time:		Method of Shipment:			
Relinquished by: <u>[Signature]</u>		Date/Time: <u>07.31.15/0800</u>		Company: <u>ARCADIS</u>		Received by: <u>[Signature]</u>		Date/Time: <u>07.31.15/0545</u>	
Relinquished by:		Date/Time:		Company:		Received by:		Date/Time:	
Custody Seals Intact: <u>Δ Yes Δ No</u>		Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:					

TestAmerica

CLIP ID: 9171006, QUALITY: 99.99% (100%)

THE LEADER IN ENVIRONMENTAL TESTING

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Flint Hill Resources Alaska, LLC

North Pole Refinery Site

Data Review

NORTH POLE, ALASKA

Sulfolane Analysis

SDG #: 1158618

Analyses Performed By:
SGS North America, Inc.
Anchorage, Alaska

Review Level: Tier II
Project: B0081981.0084.00002

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #1158618 for samples collected in association with the North Pole Refinery site. The review was conducted as a Tier II evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis				
					VOC	SVOC	Sulfolane	MET	MISC
SWA-1-S	1158618001	Soil	9/12/2015	--			X		
SWA-2-S	1158618002	Soil	9/12/2015	--			X		
SWA-3-S	1158618003	Soil	9/12/2015	--			X		
SWA-4-S	1158618004	Soil	9/12/2015	--			X		
SWA-5-S	1158618005	Soil	9/12/2015	--			X		
SWA-6-S	1158618006	Soil	9/12/2015	--			X		
SWA-7-S	1158618007	Soil	9/12/2015	--			X		
SWA-8-S	1158618008	Soil	9/12/2015	--			X		
SWA-9-S	1158618009	Soil	9/12/2015	--			X		
SWA-10-S	1158618010	Soil	9/12/2015	--			X		
SWA-11-S	1158618011	Soil	9/12/2015	--			X		
SWA-12-S	1158618012	Soil	9/12/2015	--			X		
BD-1-S	1158618013	Soil	9/12/2015	SWA-11-S			X		

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X	X		
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

QA - Quality Assurance

Note: As stated in the SGS North America Sample Receipt Form: “*Lids are switched between samples 12 and 13.”

ORGANIC ANALYSIS INTRODUCTION

A United States Environmental Protection Agency (USEPA)-approved method does not exist for sulfolane. A method (Sulfolane-SW8270D M) has been developed with input from the Alaska Department of Environmental Conservation (ADEC) using USEPA-approved 8270D analytical method with SW846 preparation 3550C (Shannon & Wilson, Inc. 2015). Data were reviewed in accordance with USEPA National Functional Guidelines of June 2008 (USEPA 2008).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

- U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
- B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

- E The compound was quantitated above the calibration range.
- D Concentration is based on a diluted sample analysis.
- Q QC parameter out of acceptance range.

- Validation Qualifiers

- J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
- JH The result is an estimated quantity, and may be biased high.
- JL The result is an estimated quantity, and may be biased low
- JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.
- UB Compound considered non-detect at the listed value due to associated blank contamination.
- UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
- R The sample results are rejected as unusable. The compound may or may not be present in the sample.

- * Qualifier applied by reviewer.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

SULFOLANE ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8270D	Soil	14 days from collection to extraction and 40 days from extraction to analysis	Cool to <6 °C

All applicable holding times were met.

2. Blank Contamination

Quality assurance (QA) blanks (i.e. laboratory method blanks and equipment rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the estimated detection limit (EDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Sulfolane was detected between the detection limit (DL) and the limit of quantitation (LOQ) in one method blank (Lab ID: 1292512); however, sulfolane was not detected at or above the limit of detection (LOD) in the second method blank (Lab ID: 1293329). Any samples requiring qualification as a result of the detection in the first method blank will not require qualification due to the second, clean method blank. All compounds were not associated with blank contamination.

3. Surrogate Internal Standard Compounds

All field samples, blanks, LCS, and MS/MSD are spiked with surrogate internal standard compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique.

All surrogate internal standard recoveries were within the control limits.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The spiked compounds used in the MS/MSD analysis must exhibit recoveries within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS and MSD results must be within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of two or greater. Sample results associated with MS/MSD exceedances where the parent samples are not site-specific are not qualified.

The MS/MSD analysis exhibited recovery outside the control limits for sulfolane; however, qualification is not required since the sample concentration is greater than two times the MS/MSD spiking concentration.

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD (also called Ongoing Precision and Recovery (OPR)) analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The spiked compounds used in the LCS/LCSD analysis must exhibit recoveries within the laboratory-established acceptance limits.

The LCS/LCSD analyses exhibited recoveries within the control limits for sulfolane.

6. Field Duplicate Sample Analysis

Field duplicate sample analysis is used to assess the precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices and 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. An RPD will only be calculated if at least one of the sample results is above the Limit of Quantitation (LOQ; synonymous with reporting limit).

Field duplicate samples are summarized in the table, below.

Sample ID / Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
SWA-11-S / BD-1-S	Sulfolane	0.00546 J	0.488	195%

J – The quantitation is an estimation.

The sulfolane results for the field duplicate samples SWA-11-S and BD-1-S exhibited an RPD greater than the control limit. The criteria used to evaluate the RPD recoveries are presented in the following table. The sample results are qualified as documented in the table below.

Criteria	Action	
	Detected Analytes	Not Detected Analytes
$RPD \leq CL$	No qualification	
$RPD > CL$	J	UJ

CL – control limit

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

8. References

Shannon & Wilson, Inc. 2015. Data Validation Program Plan, Flint Hills Resources Alaska, LLC, North Pole, Alaska. June.

USEPA. 2008. National Functional Guidelines for Organic Methods Data Review. Guidance document, United States Environmental Protection Agency. June.

DATA VALIDATION CHECKLIST FOR SULFOLANE

Sulfolane: SW-846 8270D	Reported		Performance Acceptable		Not Required	
	No	Yes	No	Yes		
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)						
Tier II Validation						
Holding Times		X		X		
Reporting limits (units)		X		X		
Blanks						
A. Method Blanks		X		X		
B. Trip Blanks					X	
C. Equipment Blanks					X	
Laboratory Control Sample (LCS) Accuracy (%R)		X		X		
Laboratory Control Sample Duplicate (LCSD) Accuracy (%R)		X		X		
LCS/LCSD Precision (RPD)		X		X		
Matrix Spike (MS) Accuracy (%R)		X		X		
Matrix Spike Duplicate (MSD) Accuracy (%R)		X		X		
MS/MSD Precision (RPD)		X		X		
Field/Laboratory Duplicate Sample RPD		X		X		
Surrogate Internal Standard Spike (%R)		X		X		
Recovery Surrogate Standard Spike (%R)		X		X		

%R – Percent Recovery
 RPD – Relative Percent Difference

Validation Performed By: Kylie Kegerreis

Date: October 13, 2015

Peer Review: Cassandra McCloud

Date: October 27, 2015

**ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
LABORATORY DATA REVIEW CHECKLIST**

Laboratory Data Review Checklist

Completed by:	Kylie Kegerreis		
Title:	Environmental Engineering Specialist II	Date:	10/13/2015
CS Report Name:	NPT - FTA Exc.	Report Date:	10/6/2015
Consultant Firm:	ARCADIS US, Inc.		
Laboratory Name:	SGS North America, Inc.	Laboratory Report Number:	1158618
ADEC File Number:		ADEC RecKey Number:	

1. Laboratory

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

☒ Yes ☐ No ☐ NA (Please explain.) Comments:

Project-specific ADEC chemistry subgroup has approved SGS for sulfolane analysis. ADEC's website does not list sulfolane under the "Analytes" menu nor sulfolane analysis by isotope dilution under the "Methods menu"

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 ☐ NA (Please explain) Comments:

Samples transferred from Fairbanks, Alaska location to Anchorage, Alaska location.

2. Chain of Custody (COC)

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

☒ Yes ☐ No ☐ NA (Please explain) Comments:

b. Correct analyses requested?

☒ Yes ☐ No ☐ NA (Please explain) Comments:

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt ($4^{\circ} \pm 2^{\circ} \text{C}$)?

☒ Yes ☐ No ☐ NA (Please explain) Comments:

Temperature = 2.4 °C

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

☐ Yes ☐ No ☒ NA (Please explain)

Comments:

Samples maintained within acceptable temperature range. Additional preservation not required for sulfolane analysis.

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

Samples in good condition - no leaks/cracks/breakage

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

Per Sample Receipt Form "*Lids are switched between samples 12 and 13."

e. Data quality or usability affected? (Please explain)

Comments:

Data quality or usability not affected.

4. Case Narrative

a. Present and understandable?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

Detections in method blanks greater than the LOD, but less than the LOQ (discussed in Section 6a).

c. Were all corrective actions documented?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

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

Comments:

None.

5. Samples Results

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

b. All applicable holding times met?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

Hold time: Extraction w/in 14 days, Analysis w/in 40 days of extraction.

Collection date: 9/12/15

Prepped: 9/22/15 and 9/25/15

Analyzed: 9/23/15, 9/24/15, and 9/26/15

c. All soils reported on a dry weight basis?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

mg/kg

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

☐ Yes ☐ No ☒ NA (Please explain)

Comments:

A Cleanup Level has not been established for this site.

e. Data quality or usability affected? (Please explain)

Comments:

Data quality or usability not affected.

6. QC Samples

a. Method Blank

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

ii. All method blank results less than PQL?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

MB#1 (Lab ID: 1292512) Below PQL but above DL.

MB#2 (Lab ID: 1293329) Not detected

iii. If above PQL, what samples are affected?

Comments:

All samples affected by detection in MB#1 are okay based on MB#2.

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

☐ Yes ☐ No ☒ NA (Please explain)

Comments:

v. Data quality or usability affected? (Please explain)

Comments:

Data quality or usability not affected.

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 ☐ NA (Please explain)

Comments:

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

☐ Yes ☐ No ☒ NA (Please explain)

Comments:

Metals/Inorganics analyses not performed.

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 ☐ NA (Please explain)

Comments:

LCS: %R = 105 (limits = 70 - 120) - Okay

MS/MSD: %R = 4950/3460 (limits = 60 - 140); No qualification required because the native concentration is greater than twice the spiking concentration.

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/DMSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

MS/MSD: %RPD = 2.70 (limit < 25) - Okay

Lab duplicate: %RPD = 0.06 (limit < 25) - Okay

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

Comments:

N/A

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

☐ Yes ☐ No ☒ NA (Please explain)

Comments:

vii. Data quality or usability affected? (Please explain)

Comments:

Data quality or usability not affected.

c. Surrogates - Organics Only

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

☒ Yes ☐ No ☐ NA (Please explain)

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 ☐ NA (Please explain)

Comments:

Limits = 50 - 120%

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

☐ Yes ☐ No ☒ NA (Please explain)

Comments:

No failed surrogate recoveries.

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

Comments:

Data quality or usability not affected.

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 ☒ NA (Please explain.)

Comments:

Trip blank is not required for sulfolane analysis.

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 ☒ NA (Please explain.)

Comments:

iii. All results less than PQL?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

iv. If above PQL, what samples are affected?

Comments:

N/A

v. Data quality or usability affected? (Please explain.)

Comments:

N/A

e. Field Duplicate

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

☐ Yes ☒ No ☐ NA (Please explain)

Comments:

One field duplicate submitted per 13 samples.

ii. Submitted blind to lab?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

"BD-1-S" is duplicate of "SWA-11-S"

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 ☐ NA (Please explain)

Comments:

Field Duplicate: Parent = 0.00546 J mg/kg; Duplicate = 0.488 mg/kg; %RPD = 195 (limit = 50%);
Qualify detections as "J"

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

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

Data requires qualification, but is still usable:
"SWA-11-S" (Parent Sample): Result = 0.00546 J mg/kg
"BD-1-S" (Duplicate Sample): Result = 0.488 J mg/kg

f. Decontamination or Equipment Blank (if applicable)

☐ Yes ☐ No ☒ NA (Please explain)

Comments:

Decontamination or Equipment Blank not required.

i. All results less than PQL?

☐ Yes ☐ No ☒ NA (Please explain)

Comments:

ii. If above PQL, what samples are affected?

Comments:

N/A

iii. Data quality or usability affected? (Please explain.)

Comments:

Data quality or usability not affected.

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

a. Defined and appropriate?

☒ Yes ☐ No ☐ NA (Please explain)

Comments:

The following results were detected between the DL and the LOQ and were qualified "J" to indicate trace detection: "SWA-2-S": 0.00656 J mg/kg, "SWA-11-S": 0.00546 J mg/kg, "SWA-12-S": 0.00508 J mg/kg

Reset Form

**CHAIN OF CUSTODY /
LABORATORY QUALIFIERS /
CORRECTED SAMPLE ANALYSIS DATA SHEETS**



Laboratory Report of Analysis

To: Flint Hills Resources- North Pole
1100 H & H Lane
North Pole, AK 99705
(907)488-0723

Report Number: **1158618**

Client Project: **NPT-FTA Exc.**

Dear Loren Garner,

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 Jennifer 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.

Jennifer Dawkins
Project Manager

Date

Print Date: 10/06/2015 10:10:54AM

SGS North America Inc.

200 West Potter Drive, Anchorage, AK 99518
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Member of SGS Group

Case Narrative

SGS Client: **Flint Hills Resources- North Pole**

SGS Project: **1158618**

Project Name/Site: **NPT-FTA Exc.**

Project Contact: **Loren Garner**

Refer to sample receipt form for information on sample condition.

SWA-7-S (1158618007) PS

1625B - Result for sulfolane in the MB is greater than the LOD, but less than the LOQ. Sample result for sulfolane is greater than 10X the result in the MB.

SWA-8-S (1158618008) PS

1625B - Result for sulfolane in the MB is greater than the LOD, but less than the LOQ. Sample result for sulfolane is greater than 10X the result in the MB.

SWA-10-S (1158618010) PS

1625B - Result for sulfolane in the MB is greater than the LOD, but less than the LOQ. Sample result for sulfolane is less than the DL.

BD-1-S (1158618013) PS

1625B - Result for sulfolane in the MB is greater than the LOD, but less than the LOQ. Sample result for sulfolane is greater than 10X the result in the MB.

MB for HBN 1720955 [XXX/34207] (1292512) MB

1625B - Result for sulfolane in the MB is greater than the LOD, but less than the LOQ.

1158618001MS (1292513) MS

1625B - MS recovery for sulfolane (4950%) does not meet QC criteria. Refer to the LCS for accuracy requirements.

1158618001MSD (1292514) MSD

1625B - MSD recovery for sulfolane (3460%) does not meet QC criteria. Refer to the LCS for accuracy requirements.

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

Print Date: 10/06/2015 10:10:56AM

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, indemnification and jurisdiction issues defined therein.

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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, 8021B, 8082A, 8260B, 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
D	The analyte concentration is the result of a dilution.
DF	Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
F	Indicates value that is greater than or equal to the DL
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
JL	The analyte was positively identified, but the quantitation is a low estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
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
M	A matrix effect was present.
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
Q	QC parameter out of acceptance range.
R	Rejected
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.

Sample Summary

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Collected</u>	<u>Received</u>	<u>Matrix</u>
SWA-1-S	1158618001	09/12/2015	09/15/2015	Soil/Solid (dry weight)
SWA-2-S	1158618002	09/12/2015	09/15/2015	Soil/Solid (dry weight)
SWA-3-S	1158618003	09/12/2015	09/15/2015	Soil/Solid (dry weight)
SWA-4-S	1158618004	09/12/2015	09/15/2015	Soil/Solid (dry weight)
SWA-5-S	1158618005	09/12/2015	09/15/2015	Soil/Solid (dry weight)
SWA-6-S	1158618006	09/12/2015	09/15/2015	Soil/Solid (dry weight)
SWA-7-S	1158618007	09/12/2015	09/15/2015	Soil/Solid (dry weight)
SWA-8-S	1158618008	09/12/2015	09/15/2015	Soil/Solid (dry weight)
SWA-9-S	1158618009	09/12/2015	09/15/2015	Soil/Solid (dry weight)
SWA-10-S	1158618010	09/12/2015	09/15/2015	Soil/Solid (dry weight)
SWA-11-S	1158618011	09/12/2015	09/15/2015	Soil/Solid (dry weight)
SWA-12-S	1158618012	09/12/2015	09/15/2015	Soil/Solid (dry weight)
BD-1-S	1158618013	09/12/2015	09/15/2015	Soil/Solid (dry weight)

Method

SM21 2540G

Sulfolane-SW8270D M w/IsoDI 5

Method Description

Percent Solids SM2540G

Sulfolane SW8270D-M w/IsoDil(S)

Detectable Results Summary

Client Sample ID: SWA-1-S Lab Sample ID: 1158618001 Semivolatile Organic GC/MS	<u>Parameter</u> Sulfolane	<u>Result</u> 25.2	<u>Units</u> mg/Kg
Client Sample ID: SWA-2-S Lab Sample ID: 1158618002 Semivolatile Organic GC/MS	<u>Parameter</u> Sulfolane	<u>Result</u> 0.00656J	<u>Units</u> mg/Kg
Client Sample ID: SWA-3-S Lab Sample ID: 1158618003 Semivolatile Organic GC/MS	<u>Parameter</u> Sulfolane	<u>Result</u> 0.0168	<u>Units</u> mg/Kg
Client Sample ID: SWA-7-S Lab Sample ID: 1158618007 Semivolatile Organic GC/MS	<u>Parameter</u> Sulfolane	<u>Result</u> 1.34	<u>Units</u> mg/Kg
Client Sample ID: SWA-8-S Lab Sample ID: 1158618008 Semivolatile Organic GC/MS	<u>Parameter</u> Sulfolane	<u>Result</u> 0.532	<u>Units</u> mg/Kg
Client Sample ID: SWA-9-S Lab Sample ID: 1158618009 Semivolatile Organic GC/MS	<u>Parameter</u> Sulfolane	<u>Result</u> 5.57	<u>Units</u> mg/Kg
Client Sample ID: SWA-11-S Lab Sample ID: 1158618011 Semivolatile Organic GC/MS	<u>Parameter</u> Sulfolane	<u>Result</u> 0.00546J	<u>Units</u> mg/Kg
Client Sample ID: SWA-12-S Lab Sample ID: 1158618012 Semivolatile Organic GC/MS	<u>Parameter</u> Sulfolane	<u>Result</u> 0.00508J	<u>Units</u> mg/Kg
Client Sample ID: BD-1-S Lab Sample ID: 1158618013 Semivolatile Organic GC/MS	<u>Parameter</u> Sulfolane	<u>Result</u> 0.488	<u>Units</u> mg/Kg

Print Date: 10/06/2015 10:10:59AM

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Results of SWA-1-S

Client Sample ID: **SWA-1-S**
 Client Project ID: **NPT-FTA Exc.**
 Lab Sample ID: 1158618001
 Lab Project ID: 1158618

Collection Date: 09/12/15 08:00
 Received Date: 09/15/15 09:15
 Matrix: Soil/Solid (dry weight)
 Solids (%):89.3
 Location:

Results by Semivolatile Organic GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	25.2	0.222	0.0689	mg/Kg	20		09/24/15 13:25
Surrogates							
Sulfolane-d8	80.7	50-120		%	20		09/24/15 13:25

Batch Information

Analytical Batch: XMS8947
 Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
 Analyst: DSH
 Analytical Date/Time: 09/24/15 13:25
 Container ID: 1158618001-A

Prep Batch: XXX34207
 Prep Method: SW3550C
 Prep Date/Time: 09/22/15 11:52
 Prep Initial Wt./Vol.: 30.221 g
 Prep Extract Vol: 1 mL



Results of **SWA-2-S**

Client Sample ID: **SWA-2-S**
Client Project ID: **NPT-FTA Exc.**
Lab Sample ID: 1158618002
Lab Project ID: 1158618

Collection Date: 09/12/15 08:10
Received Date: 09/15/15 09:15
Matrix: Soil/Solid (dry weight)
Solids (%):90.9
Location:

Results by **Semivolatile Organic GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	0.00656 J	0.0109	0.00339	mg/Kg	1		09/26/15 18:05
Surrogates							
Sulfolane-d8	71.7	50-120		%	1		09/26/15 18:05

Batch Information

Analytical Batch: XMS8949
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Analyst: DSH
Analytical Date/Time: 09/26/15 18:05
Container ID: 1158618002-A

Prep Batch: XXX34240
Prep Method: SW3550C
Prep Date/Time: 09/25/15 16:35
Prep Initial Wt./Vol.: 30.146 g
Prep Extract Vol: 1 mL



Results of **SWA-3-S**

Client Sample ID: **SWA-3-S**
Client Project ID: **NPT-FTA Exc.**
Lab Sample ID: 1158618003
Lab Project ID: 1158618

Collection Date: 09/12/15 08:20
Received Date: 09/15/15 09:15
Matrix: Soil/Solid (dry weight)
Solids (%):71.4
Location:

Results by **Semivolatile Organic GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	0.0168	0.0140	0.00434	mg/Kg	1		09/26/15 18:55
Surrogates							
Sulfolane-d8	75.8	50-120		%	1		09/26/15 18:55

Batch Information

Analytical Batch: XMS8949
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Analyst: DSH
Analytical Date/Time: 09/26/15 18:55
Container ID: 1158618003-A

Prep Batch: XXX34240
Prep Method: SW3550C
Prep Date/Time: 09/25/15 16:35
Prep Initial Wt./Vol.: 30.018 g
Prep Extract Vol: 1 mL



Results of **SWA-4-S**

Client Sample ID: **SWA-4-S**
Client Project ID: **NPT-FTA Exc.**
Lab Sample ID: 1158618004
Lab Project ID: 1158618

Collection Date: 09/12/15 08:30
Received Date: 09/15/15 09:15
Matrix: Soil/Solid (dry weight)
Solids (%):77.4
Location:

Results by **Semivolatile Organic GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	0.00645 U	0.0129	0.00400	mg/Kg	1		09/26/15 19:20
Surrogates							
Sulfolane-d8	80.7	50-120		%	1		09/26/15 19:20

Batch Information

Analytical Batch: XMS8949
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Analyst: DSH
Analytical Date/Time: 09/26/15 19:20
Container ID: 1158618004-A

Prep Batch: XXX34240
Prep Method: SW3550C
Prep Date/Time: 09/25/15 16:35
Prep Initial Wt./Vol.: 30.013 g
Prep Extract Vol: 1 mL

Print Date: 10/06/2015 10:11:00AM

J flagging is activated



Results of **SWA-5-S**

Client Sample ID: **SWA-5-S**
Client Project ID: **NPT-FTA Exc.**
Lab Sample ID: 1158618005
Lab Project ID: 1158618

Collection Date: 09/12/15 08:40
Received Date: 09/15/15 09:15
Matrix: Soil/Solid (dry weight)
Solids (%):75.5
Location:

Results by **Semivolatile Organic GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	0.00655 U	0.0131	0.00405	mg/Kg	1		09/26/15 19:45
Surrogates							
Sulfolane-d8	56.5	50-120		%	1		09/26/15 19:45

Batch Information

Analytical Batch: XMS8949
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Analyst: DSH
Analytical Date/Time: 09/26/15 19:45
Container ID: 1158618005-A

Prep Batch: XXX34240
Prep Method: SW3550C
Prep Date/Time: 09/25/15 16:35
Prep Initial Wt./Vol.: 30.406 g
Prep Extract Vol: 1 mL



Results of **SWA-6-S**

Client Sample ID: **SWA-6-S**
Client Project ID: **NPT-FTA Exc.**
Lab Sample ID: 1158618006
Lab Project ID: 1158618

Collection Date: 09/12/15 08:50
Received Date: 09/15/15 09:15
Matrix: Soil/Solid (dry weight)
Solids (%):76.0
Location:

Results by **Semivolatile Organic GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	0.00655 U	0.0131	0.00407	mg/Kg	1		09/26/15 20:10
Surrogates							
Sulfolane-d8	72.4	50-120		%	1		09/26/15 20:10

Batch Information

Analytical Batch: XMS8949
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Analyst: DSH
Analytical Date/Time: 09/26/15 20:10
Container ID: 1158618006-A

Prep Batch: XXX34240
Prep Method: SW3550C
Prep Date/Time: 09/25/15 16:35
Prep Initial Wt./Vol.: 30.104 g
Prep Extract Vol: 1 mL



Results of **SWA-7-S**

Client Sample ID: **SWA-7-S**
Client Project ID: **NPT-FTA Exc.**
Lab Sample ID: 1158618007
Lab Project ID: 1158618

Collection Date: 09/12/15 09:00
Received Date: 09/15/15 09:15
Matrix: Soil/Solid (dry weight)
Solids (%):73.5
Location:

Results by **Semivolatile Organic GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	1.34	0.0135	0.00419	mg/Kg	1		09/23/15 17:07
Surrogates							
Sulfolane-d8	76.7	50-120		%	1		09/23/15 17:07

Batch Information

Analytical Batch: XMS8946
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Analyst: DSH
Analytical Date/Time: 09/23/15 17:07
Container ID: 1158618007-A

Prep Batch: XXX34207
Prep Method: SW3550C
Prep Date/Time: 09/22/15 11:52
Prep Initial Wt./Vol.: 30.178 g
Prep Extract Vol: 1 mL



Results of **SWA-8-S**

Client Sample ID: **SWA-8-S**
Client Project ID: **NPT-FTA Exc.**
Lab Sample ID: 1158618008
Lab Project ID: 1158618

Collection Date: 09/12/15 09:10
Received Date: 09/15/15 09:15
Matrix: Soil/Solid (dry weight)
Solids (%):78.3
Location:

Results by **Semivolatile Organic GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	0.532	0.0127	0.00395	mg/Kg	1		09/23/15 17:32
Surrogates							
Sulfolane-d8	73.9	50-120		%	1		09/23/15 17:32

Batch Information

Analytical Batch: XMS8946
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Analyst: DSH
Analytical Date/Time: 09/23/15 17:32
Container ID: 1158618008-A

Prep Batch: XXX34207
Prep Method: SW3550C
Prep Date/Time: 09/22/15 11:52
Prep Initial Wt./Vol.: 30.118 g
Prep Extract Vol: 1 mL



Results of **SWA-9-S**

Client Sample ID: **SWA-9-S**
Client Project ID: **NPT-FTA Exc.**
Lab Sample ID: 1158618009
Lab Project ID: 1158618

Collection Date: 09/12/15 09:20
Received Date: 09/15/15 09:15
Matrix: Soil/Solid (dry weight)
Solids (%):81.6
Location:

Results by **Semivolatile Organic GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	5.57	0.0611	0.0189	mg/Kg	5		09/24/15 14:40
Surrogates							
Sulfolane-d8	78.9	50-120		%	5		09/24/15 14:40

Batch Information

Analytical Batch: XMS8947
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Analyst: DSH
Analytical Date/Time: 09/24/15 14:40
Container ID: 1158618009-A

Prep Batch: XXX34207
Prep Method: SW3550C
Prep Date/Time: 09/22/15 11:52
Prep Initial Wt./Vol.: 30.092 g
Prep Extract Vol: 1 mL



Results of **SWA-10-S**

Client Sample ID: **SWA-10-S**
Client Project ID: **NPT-FTA Exc.**
Lab Sample ID: 1158618010
Lab Project ID: 1158618

Collection Date: 09/12/15 09:30
Received Date: 09/15/15 09:15
Matrix: Soil/Solid (dry weight)
Solids (%):89.4
Location:

Results by **Semivolatile Organic GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	0.00550 U	0.0110	0.00342	mg/Kg	1		09/23/15 18:22
Surrogates							
Sulfolane-d8	71.6	50-120		%	1		09/23/15 18:22

Batch Information

Analytical Batch: XMS8946
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Analyst: DSH
Analytical Date/Time: 09/23/15 18:22
Container ID: 1158618010-A

Prep Batch: XXX34207
Prep Method: SW3550C
Prep Date/Time: 09/22/15 11:52
Prep Initial Wt./Vol.: 30.421 g
Prep Extract Vol: 1 mL



Results of **SWA-11-S**

Client Sample ID: **SWA-11-S**
Client Project ID: **NPT-FTA Exc.**
Lab Sample ID: 1158618011
Lab Project ID: 1158618

Collection Date: 09/12/15 09:40
Received Date: 09/15/15 09:15
Matrix: Soil/Solid (dry weight)
Solids (%):91.3
Location:

Results by **Semivolatile Organic GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	0.00546 J	0.0109	0.00339	mg/Kg	1		09/26/15 20:35
Surrogates							
Sulfolane-d8	71.4	50-120		%	1		09/26/15 20:35

Batch Information

Analytical Batch: XMS8949
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Analyst: DSH
Analytical Date/Time: 09/26/15 20:35
Container ID: 1158618011-A

Prep Batch: XXX34240
Prep Method: SW3550C
Prep Date/Time: 09/25/15 16:35
Prep Initial Wt./Vol.: 30.026 g
Prep Extract Vol: 1 mL



Results of **SWA-12-S**

Client Sample ID: **SWA-12-S**
Client Project ID: **NPT-FTA Exc.**
Lab Sample ID: 1158618012
Lab Project ID: 1158618

Collection Date: 09/12/15 09:50
Received Date: 09/15/15 09:15
Matrix: Soil/Solid (dry weight)
Solids (%):91.4
Location:

Results by **Semivolatile Organic GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfolane	0.00508 J	0.0109	0.00338	mg/Kg	1		09/26/15 20:59
Surrogates							
Sulfolane-d8	73.4	50-120		%	1		09/26/15 20:59

Batch Information

Analytical Batch: XMS8949
Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
Analyst: DSH
Analytical Date/Time: 09/26/15 20:59
Container ID: 1158618012-A

Prep Batch: XXX34240
Prep Method: SW3550C
Prep Date/Time: 09/25/15 16:35
Prep Initial Wt./Vol.: 30.114 g
Prep Extract Vol: 1 mL

Results of BD-1-S

Client Sample ID: **BD-1-S**
 Client Project ID: **NPT-FTA Exc.**
 Lab Sample ID: 1158618013
 Lab Project ID: 1158618

Collection Date: 09/12/15 08:00
 Received Date: 09/15/15 09:15
 Matrix: Soil/Solid (dry weight)
 Solids (%):88.2
 Location:

Results by Semivolatile Organic GC/MS

<u>Parameter</u>	<u>Result</u> <u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable</u> <u>Limits</u>	<u>Date Analyzed</u>
Sulfolane	0.488 J	0.0113	0.00351	mg/Kg	1		09/23/15 19:37
Surrogates							
Sulfolane-d8	77.9	50-120		%	1		09/23/15 19:37

Batch Information

Analytical Batch: XMS8946
 Analytical Method: Sulfolane-SW8270D M w/IsoDI SI
 Analyst: DSH
 Analytical Date/Time: 09/23/15 19:37
 Container ID: 1158618013-A

Prep Batch: XXX34207
 Prep Method: SW3550C
 Prep Date/Time: 09/22/15 11:52
 Prep Initial Wt./Vol.: 30.049 g
 Prep Extract Vol: 1 mL



1158618



SGS NORTH AMERIC

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DY RECORD

CLIENT: Flint Hills Resources		PHONE #: (907) 488-5122		SECTION 3		PRESERVATIVE		INSTRUCTIONS: SECTIONS 1-5 MUST BE FILLED OUT! OMISSIONS MAY DELAY THE ONSET OF ANALYSIS.		Page 1 of 2	
CONTACT: Loren Garner		PROJECT/ PWSID/ PERMIT #:		SAMPLE TYPE:		CONTAINERS		REMARKS/ LOC ID			
REPORTS TO: Rebecca Andresen		E-MAIL: Rebecca.Andresen@arcadis-us.com		Comp		Grab		MI (Multi-incremental)			
INVOICE TO: Flint Hills Resources		QUOTE #: P.O. #:		DATE		TIME		MATRIX/ MATRIX CODE			
RESERVED FOR LAB USE		SAMPLE IDENTIFICATION		DATE		TIME		MATRIX/ MATRIX CODE			
1A	SWA-1-S	09/12/15	0800	SOIL	1	Grab	✓	✓	✓	✓	✓
2A	SWA-2-S	09/12/15	0810	SOIL	1	Grab	✓	✓	✓	✓	✓
3A	SWA-3-S	09/12/15	0820	SOIL	1	Grab	✓	✓	✓	✓	✓
4A	SWA-4-S	09/12/15	0830	SOIL	1	Grab	✓	✓	✓	✓	✓
5A	SWA-5-S	09/12/15	0840	SOIL	1	Grab	✓	✓	✓	✓	✓
6A	SWA-6-S	09/12/15	0850	SOIL	1	Grab	✓	✓	✓	✓	✓
7A	SWA-7-S	09/12/15	0900	SOIL	1	Grab	✓	✓	✓	✓	✓
8A	SWA-8-S	09/12/15	0910	SOIL	1	Grab	✓	✓	✓	✓	✓
9A	SWA-9-S	09/12/15	0920	SOIL	1	Grab	✓	✓	✓	✓	✓
10A	SWA-10-S	09/12/15	0930	SOIL	1	Grab	✓	✓	✓	✓	✓
RELINQUISHED BY: (1)		DATE		TIME		RECEIVED BY:		SECTION 4 DOD Project?		DATA DELIVERABLE REQUIREMENTS:	
RELINQUISHED BY: (2)		DATE		TIME		RECEIVED BY:		COC ID:		Cooler ID:	
RELINQUISHED BY: (3)		DATE		TIME		RECEIVED BY:		REQUESTED TURNAROUND TIME AND/OR SPECIAL INSTRUCTIONS			
RELINQUISHED BY: (4)		DATE		TIME		RECEIVED BY:		TEMPERATURE: C		OR AMBIENT (F)	
		DATE		TIME		RECEIVED BY:		CHAIN OF CUSTODY SEAL (CIRCLE)		INTACT BROKEN	
		DATE		TIME		RECEIVED BY:				(See attached Sample Receipt Form)	

http://www.sgs.com/terms-and-conditions

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A decorative graphic consisting of three thin orange lines. One line is horizontal, starting from the left edge and extending across the page. Two other lines are diagonal, starting from the bottom left and extending towards the top right, intersecting the horizontal line.