



Tanana Commercial / Environmental Management LLC JV

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March 3, 2022

Jade Miller
Alaska Department of Environmental Conservation
610 University Avenue
Fairbanks, Alaska 99709

Via: jade.miller@alaska.gov

RE: Shungnak School Tank Heating Oil Release, Shungnak, Alaska; ADEC Spill ID: 20389917201

Subj: 2021 Site Characterization Report

This report describes the site characterization field activities conducted at the site of the June 20, 2020 Shungnak School Tank Heating Oil Release in Shungnak, Alaska. This report outlines the field activities conducted on July 15, 2021.

The site assessment work was conducted by Tanana Commercial and Environmental Management Joint Venture (TC-EM JV) in accordance with our June 17, 2021 work plan that was approved by the ADEC on June 21, 2021.

BACKGROUND

The site is an active Alaska Department of Environmental Conservation (ADEC) Spills site, identified as the Shungnak School Tank Heating Oil Release, ADEC File No. 20389917201. Shungnak is situated on the Kobuk River in northwest Alaska approximately 153 air miles from Kotzebue, Alaska and 466 air miles from Anchorage, Alaska. The Kobuk River lies directly southeast of the bluff where the spill occurred. The Kobuk River is the source of drinking water for Shungnak, and the drinking water collection gallery for the municipal water intake is shown on Figure 1.

According to the ADEC database, on June 20, 2020 approximately 15,000 gallons of fuel was released from the Shungnak school heating oil tank farm Tank No. 1. The release was due to a three-way valve being in the wrong position and incorrectly directing fuel from the fuel barge to the school heating oil tank farm, eventually overflowing the already partially full tank.

Fuel overtopping Tank #1 was reported to have pooled under and around the wood tank platform saturating the ground and filling a roughly 8 feet by 12 feet by 2-foot-deep depression located approximately 15 feet northwest of the tanks adjacent to the fence (Figure 5). The fuel then flowed southwest along the bluff (downgradient) and parallel to a fence for approximately 200 feet before flowing downhill into a forested slope. It was reported by personnel in Shungnak that the spill path southwest of the tanks formed a fairly consolidated channel which limited the spill footprint (Figure 2).

An initial cleanup effort included the removal the top 3 to 4 feet of fuel-contaminated soil (approximately 350 yards) from the surface of the spill area. The excavated soil is temporarily stored at the landfill and will be transported to the Blue Dot Pit for long term storage and treatment in 2021. Based on conversations with Shungnak personnel, an estimated 250 to 500 gallons of pooled free product was pumped into drums. These drums were located near the southwest corner of the school maintenance building (Figure 2). Some fuel is reported to have spilled on the ground near the school maintenance building as part of this operation.

In July 2020, TC-EM JV mobilized to the site to advance test pits to identify the extent of contamination at the site. Observations on the estimated spill path and areas where fuel was pooled after the release were also noted and shown on Figure 2. Contamination remains in the test pits that were advanced in the spill path, including on the slope towards the Kobuk River. The July 2020 sample locations are shown on Figure 3.

PURPOSE AND OBJECTIVES

The purpose of this project is to investigate the extent of contamination to develop future cleanup plans. The project objectives were to advance hand borings and/or test pits in select areas of the site. In addition, a survey was conducted of the Blue Dot Pit, the location of the future landfarm for this project. The information from the survey will be used to site and design the landfarm cells to treat the previously-generated contaminated soils and described in future cleanup plans for the site.

METHODOLOGY

Field activities were conducted on July 15, 2021. Field screening and analytical sampling was conducted in accordance with the procedures presented in the ADEC *Field Sampling Guidance*, October 2019, and our June 17, 2021 ADEC-approved work plan. Further details on the field screening and soil sampling methods, and laboratory analysis are provided below.

Field Screening Methods

Headspace field screening samples were collected in one-foot increments from the test pits. Headspace samples were collected by filling re-sealable quart size bags approximately 1/3 to 1/2 full with soil. The bags were then agitated before being allowed to develop for at least 10 minutes, but not longer than an hour. All headspace samples were at least 40 degrees Fahrenheit (°F) at the time of readings. After the samples had been allowed to develop, the probe of the MiniRAE 2000 photoionization detector (PID) was inserted into the bag and the displayed reading was recorded in the field notes along with other pertinent information including the location of the sample.

Soil Sampling Methods

Analytical soil samples were collected using clean stainless-steel spoons and placed directly into clean laboratory-provided containers. Volatile samples were collected before semi-volatile and non-volatile samples. Volatile samples were immediately preserved with 25-mL of methanol.

Analytical Methods

The analytical samples were submitted to SGS North America, Inc. (SGS) of Anchorage, Alaska. Each sample was analyzed for gasoline range organics (GRO), diesel range organics (DRO), residual range organics (RRO), petroleum-list volatile organic compounds (petro-VOCs), and polycyclic aromatic hydrocarbon (PAH) compounds.

FIELD ACTIVITIES

Field activities were conducted July 15, 2021. Field activities included soil screening and collecting analytical samples from the test pits advanced at the site. ADEC Qualified Environmental Professional, Shayla Marshall, conducted the field sampling activities and Dale Erickson conducted the drone mapping. The City of Shungnak provided a Caterpillar mini excavator and an operator to advance the test pits.

The test pits were advanced on private property owned by Henry and Willard Commick, and Matilda Cleveland. The property owners provided approval to advance the test pits and were present during the field activities.

Field notes, including GPS coordinates, are included in Attachment 1. Photographs of the field activities are provided in Attachment 2.

Work Plan Variances

The following variances from the ADEC-approved work plan are noted:

- Indication of contamination was noted in Test Pit TP7. However, TC-EM JV was unable to advance the test pit until there was no indication of contamination or to a maximum depth of 8 feet bgs, as noted in the work plan, with the tools. In addition, TC-EM JV did not advance a step out test pit from Test Pit TP7 due to time restraints.

Test Pits and Sampling

A total of eight test pits were advanced to delineate and assess the extent of the release downgradient of the source area and surrounding areas. The test pits were advanced in the following locations:

- Test Pits TP1 and TP2 were advanced near the base of the slope where the topography levels out. These two test pits were advanced on the Commick's property where a relative's cabin previously stood (Photos 8 and 9).
- Test Pit TP3 was advanced on the slope just downgradient from the spill path (Photos 10 through 12).
- Test Pit TP4 was advanced at approximately the same elevation as and to the southwest of Test Pit TP3. The property is owned by Matilda Cleveland (Photo 11).
- Test Pit TP5 was advanced at approximately the same elevation as and to the northeast of Test Pit TP3. (Photo 10)
- Test Pit TP6 was advanced immediately downgradient of Test Pit TP3. (Photo 13)
- Test Pits TP7 and TP8 were advanced on the slope, downgradient of the sorbent boom and ditch placed at the toe of the clearing in 2020 (Photos 14 and 15).

Test pit locations are shown in Figure 3. The test pits were advanced to the maximum excavator reach or until clean soil soils were documented via in-situ PID screening from the excavator bucket.

Investigative Derived Waste

Investigation derived waste was limited to personal protective equipment, including nitrile gloves, Ziploc bags used for headspace analysis and glass vials previously containing methanol sample preservative for the soil samples. This waste was transported out the community of Shungnak and disposed of as general solid waste when field personnel reached Fairbanks.

RESULTS

A total of eight analytical soil samples, plus one duplicate, were collected from the project site. Soil field screening results are presented in Table 1. The analytical results are presented in Table 2.

Soil Descriptions

The soils across the site were primarily brown silty sand with a limited amount of gravel. A red-brown gravel was observed in Test Pit TP5 only.

Layers of silt/clay was encountered at the site in 2020 and 2021. During the 2021 silt/clay was observed in Test Pit TP7 at 2 feet bgs (Photo 14). In 2020 thin lenses of this confining layer was noted in Test Pits TP-1, TP-4, and TP-7; and consolidated clay was encountered at 3 feet bgs in Test Pit TP-8 and depths greater than 8 feet bgs in Test Pits TP-9 and TP-10.

Groundwater was not encountered in any of the 2021 test pits. The only location where groundwater has been encountered was at the 2020 Test Pit TP-13, which was excavated adjacent to the Kobuk River. Permafrost was not encountered in any of the test pits.

Surface staining was not observed during the 2021 field activities. Stained soils were encountered in Test Pit TP3 at 1 and 2 feet bgs (Photo 12).

Headspace and Surface Soil Screening Results

Samples were collected and screened from each test pit. Headspace results are provided below.

Table 1 – Soil Headspace Field Screening Results

Depth (ft bgs)	Headspace Field Result (in ppmv)							
	TP-1	TP-2	TP-3	TP-4	TP-5	TP-6	TP-7	TP-8
1	0.5^	0.0	521	0.0	0.0	0.2^	214	0.0^
2	0.3	0.2^	51.5	0.0	0.0	0.0	431^	0.0
3	0.0	0.0	23.7^	0.0^	0.0^	0.0	-	-
4	0.0	0.0	40.7	0.0	0.0	0.0	-	-
5	0.0	0.0	4.1^	0.0	0.0	0.0	-	-
6	0.0	0.0	-	-	-	0.0	-	-
7	0.1	0.0	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-

Notes:

- ppmv Parts per million by volume
- bgs Below ground surface
- ^ Analytical sample collected
- No data for this sample depth
- 521** Elevated PID reading and hydrocarbon odor noted.

Analytical Soil Sample Results

A total of nine soil samples plus a duplicate were collected from test pits excavated at the site. A summary of the reported concentrations are provided in Table 2.

Of the samples collected, only one contained concentrations greater than ADEC Method 2 Migration to Groundwater (MTG) Cleanup Levels. These contaminants included DRO, 1-methylnaphthalene, 2-methylnaphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, ethylbenzene, naphthalene, and xylenes. None of the concentrations exceeded ADEC Human Health (HH) or Maximum Allowable Concentrations (MAC).

Talbe 2 - July 15, 2021 Site Characterization Soil Results

Analyte	Analysis	Unit	Action Level	18130 TP1S1	18130 TP2S2	18130 TP3S3	18130 TP3S5	18130 TP4S3	18130 TP5S3	18130 TP6S1	18130 TP6S11~	18130 TP7S2	18130 TP8S1	18130 STB
Field Headspace	PID	ppmv	-	0.5	0.2	23.7	4.1	0.0	0.0	0.2	0.2	431	0.0	-
Depth	-	ft	-	1	2	3	5	3	3	1	1	2	1	-
Gasoline Range Organics	AK101	mg/kg	300	1.90 U	2.43 U	2.42 U	2.47 U	2.66 U	1.95 U	3.03 U	2.72 U	149	3.38 U	2.53 U
Diesel Range Organics	AK102/103	mg/kg	250	20.5 U	20.8 U	20.7 U	21.0 U	20.9 U	21.2 U	21.4 U	29.1	3,310	22.6 U	-
Residual Range Organics	AK102/103	mg/kg	11000	103 U	104 U	104 U	105 U	104 U	106 U	117	352	119 U	113 U	-
Polyaromatic Hydrocarbons (PAH)														
1-Methylnaphthalene	8270D SIM (PAH)	ug/kg	410	25.5 U	26.1 U	26.1 U	26.1 U	26.2 U	26.6 U	26.6 U	26.5 U	437	27.9 U	-
2-Methylnaphthalene	8270D SIM (PAH)	ug/kg	1300	25.5 U	26.1 U	26.1 U	26.1 U	26.2 U	26.6 U	26.6 U	26.5 U	414	27.9 U	-
Naphthalene	8270D SIM (PAH)	ug/kg	38	20.4 U	20.9 U	20.9 U	20.8 U	20.9 U	21.3 U	21.3 U	21.2 U	465	22.3 U	-
Other PAHs	8270D SIM (PAH)	ug/kg	varies	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-
Volatile Organic Compounds (VOC)														
1,2,4-Trimethylbenzene	SW8260D	ug/kg	610	38.0 U	48.7 U	48.5 U	49.4 U	53.1 U	39.0 U	60.6 U	54.5 U	8,290	67.6 U	50.5 U
1,2-Dibromoethane	SW8260D	ug/kg	0.24	0.760 U	0.973 U	0.969 U	0.988 U	1.06 U	0.780 U	1.21 U	1.09 U	2.08 U	1.35 U	1.01 U
1,3,5-Trimethylbenzene	SW8260D	ug/kg	660	19.0 U	24.3 U	24.2 U	24.7 U	26.6 U	19.5 U	30.3 U	27.2 U	7,190	38.5	25.3 U
Benzene	SW8260D	ug/kg	22	9.51 U	12.2 U	12.1 U	12.4 U	13.3 U	9.75 U	15.1 U	13.6 U	26.0 U	16.9 U	12.6 U
Ethylbenzene	SW8260D	ug/kg	130	19.0 U	24.3 U	24.2 U	24.7 U	26.6 U	19.5 U	30.3 U	27.2 U	1,200	33.8 U	25.3 U
Isopropylbenzene (Cumene)	SW8260D	ug/kg	5600	19.0 U	24.3 U	24.2 U	24.7 U	26.6 U	19.5 U	30.3 U	27.2 U	1,010	33.8 U	25.3 U
Naphthalene	SW8260D	ug/kg	38	19.0 U	24.3 U	24.2 U	24.7 U	26.6 U	19.5 U	30.3 U	27.2 U	588	33.8 U	25.3 U
Toluene	SW8260D	ug/kg	6700	19.0 U	24.3 U	24.2 U	24.7 U	26.6 U	19.5 U	30.3 U	27.2 U	346	33.8 U	25.3 U
Xylenes (total)	SW8260D	ug/kg	1500	57.0 U	73.0 U	72.7 U	74.1 U	79.7 U	58.5 U	90.9 U	81.7 U	5,690	101 U	75.8 U
sec-Butylbenzene	SW8260D	ug/kg	42000	19.0 U	24.3 U	24.2 U	24.7 U	26.6 U	19.5 U	30.3 U	27.2 U	2,200	33.8 U	25.3 U
tert-Butylbenzene	SW8260D	ug/kg	11000	19.0 U	24.3 U	24.2 U	24.7 U	26.6 U	19.5 U	30.3 U	27.2 U	98.7	33.8 U	25.3 U
Other VOCs	SW8260D	ug/kg	varies	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:

*	Tables B1 or B2, Migration to Groundwater (MTG) for Under 40 Inch Zone, Method Two Soil Cleanup Levels (18 AAC 75, October 27, 2018)
~	Duplicate of proceeding sample
ND	Not detected
1.90 U	Analyte was not detected above the laboratory reporting limit of 3.77 mg/kg
149	Analyte was detected
3,310	Analyte was detected at a concentration greater than the MTG cleanup level
ppmv	Parts per million by volume
mg/kg	Milligrams per kilogram
µg/kg	Micrograms per kilogram

DISCUSSION

The purpose of the site characterization was to investigate the extent of contamination to develop future cleanup plans. Note, there are areas on the site which also need further delineation, including the area in the vicinity of the satellite dish and near the staining from the fuel transfer near the school maintenance building. These locations were not evaluated during this field effort.

Based on site observations and field screening information, the downgradient extent of impact has been identified and appears to be within approximately 145 feet from the Kobuk River. The estimated area of extent of impact has been updated from the 2020 estimate and is reflected on Figure 2.

The geology of the site and topography of the site contributes significantly to the transport of the contamination from the June 2020 spill. Much of the site is comprised of sand, however silt/clay layers have been encountered in various locations across the site. This silt/clay layer may be serving as a confining layer, minimizing the vertical migration of the contamination. However, due to the loose sand present at the site, the contamination may be migrating laterally and downgradient in the subsurface, as evidence by the presence of contamination in Test Pit TP3, located approximately 260 feet downgradient of the spill source. This silt/clay layer was not observed in the toe of the slope, where the hillside flattens from the approximately 22-degree slope. The contamination at the toe of the slope was limited to Test Pit TP3, with adjacent test pits at the same relative elevation and downgradient containing no indication of contamination (i.e., elevated field headspace readings, odor, staining).

CONCLUSIONS AND RECOMMENDATIONS

Petroleum contamination is present and remains in the location of the Shungnak School tank farm. Approximately 350 cubic yards of soil was initially excavated from the site during the 2020 initial spill response, but this investigation indicates there is additional contamination remaining at the site.

Based on the 2020 and 2021 data, petroleum contamination is greatest in the vicinity of the tank farm and area of the former tanks (2020 Test Pit TP4), and diminishes along the spill path to the southwest. Contamination remains on the slope and extends to the base of the slope towards the Kobuk River. While the initial excavation of approximately 3 to 4 feet of soil from the site (approximately 30 by 200-foot area) removed the gross contamination, additional removal of impacted soil may be necessary to limit the migration of contamination through the sandy soils present on the site. The depth of contamination ranges from greater than 9 feet near the source area, 6 feet on the top of the hill downgradient of the spill, and between 2 to 3 feet along the hillside slope.

Note, contamination was encountered in Test Pit TP4, advanced in 2020, but field screening results from the surface and the presence of stained soils indicated that the contamination is likely a result of a historic source such as the drum storage noted in historical aerial photographs.

Based on the data obtained from the July 2020 and 2021 field activities, TC-EM JV recommends the following:

- A stockpile of contaminated soil generated in 2020 remains on the site. During the July 15, 2021 site visit, portions of the stockpile were no longer covered with the liner (Photos 1 and 2). We recommend the stockpile be re-covered to minimize infiltration of rainwater into the contaminated soil and minimize members of the community, including school kids, from playing on the stockpile.
- Additional investigation is required in the following locations:
 - The area northwest of the tanks, in the area of the 3-way valve and the piping network, and near the existing satellite dish. This location is where the ADEC Spills Department's

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preliminary investigation of this area during the initial response indicated the presence of fuel contamination.

- Near the school maintenance building where during the staging of drums containing recovered fuel, splashes and spills were noted to have impacted the ground surface.
- Based on initial sample results from the drinking water sample and regular observations for the presence of sheen on the Kobuk River from Shungnak personnel, contamination from this spill does not appear to have migrated to the Kobuk River and drinking water source. Observations for the presence of sheen and periodic sampling of the drinking water source should continue.
- Contaminated soil remains on the top of the hillside, near the source area and within the former fuel pathway, along the slope, and at the toe of the hillside slope. During contaminated soil removal, the following should be considered:
 - The soils are primarily sand that slough when excavated to depths greater than 8 feet below ground surface. While there are areas where contamination may extend beyond 8 feet below ground surface, it may be possible that soils may not be able to be removed given the equipment available in the community.
 - Due to the elevated concentrations remaining in the spill area and proximity to the school, teaching housing, and elderly residences, air monitoring may be necessary during future removal efforts.
 - Contamination is present along the slope. However, heavy equipment cannot safely operate along the slope, limiting the removal actions. Installation of a barrier near the toe of the slope and into the silt/clay layer may minimize the transport of contamination downgradient.
 - Contamination is present on land owned by private parties. Coordination and approval from the landowners will be necessary prior to the removal of contaminated soil and clearing of trees at the toe of the slope.
 - Contamination is present in the vicinity of site infrastructure, including at the tanks, piping, and likely near the AT&T satellite dish. Removal of the contamination in these areas will require removal of the infrastructure and locates of utilities that may not be captured during the standard locate requests.
- Concentrations in soils at the site exceed ADEC human health/maximum allowable concentrations in several samples collected in 2020. Based on ADEC guidance for landfarm construction, the soils will require a bottom liner.

If you have any questions or wish to discuss this project further, please do not hesitate to contact the undersigned at (907) 223-3544.

Tanana Commercial/Environmental Management JV



Shayla Marshall, QEP
Project Manager

Attached:

Figure 1 – Vicinity Map

Figure 2 – Site Plan

Figure 3 – July 15, 2021 Sample Locations

Attachment 1 – Field Notes

Attachment 2 – Photo Pages

Attachment 3 – Laboratory Report and Laboratory Data Review Checklist



GRAPHIC SCALE (IN FEET)

VICINITY MAP

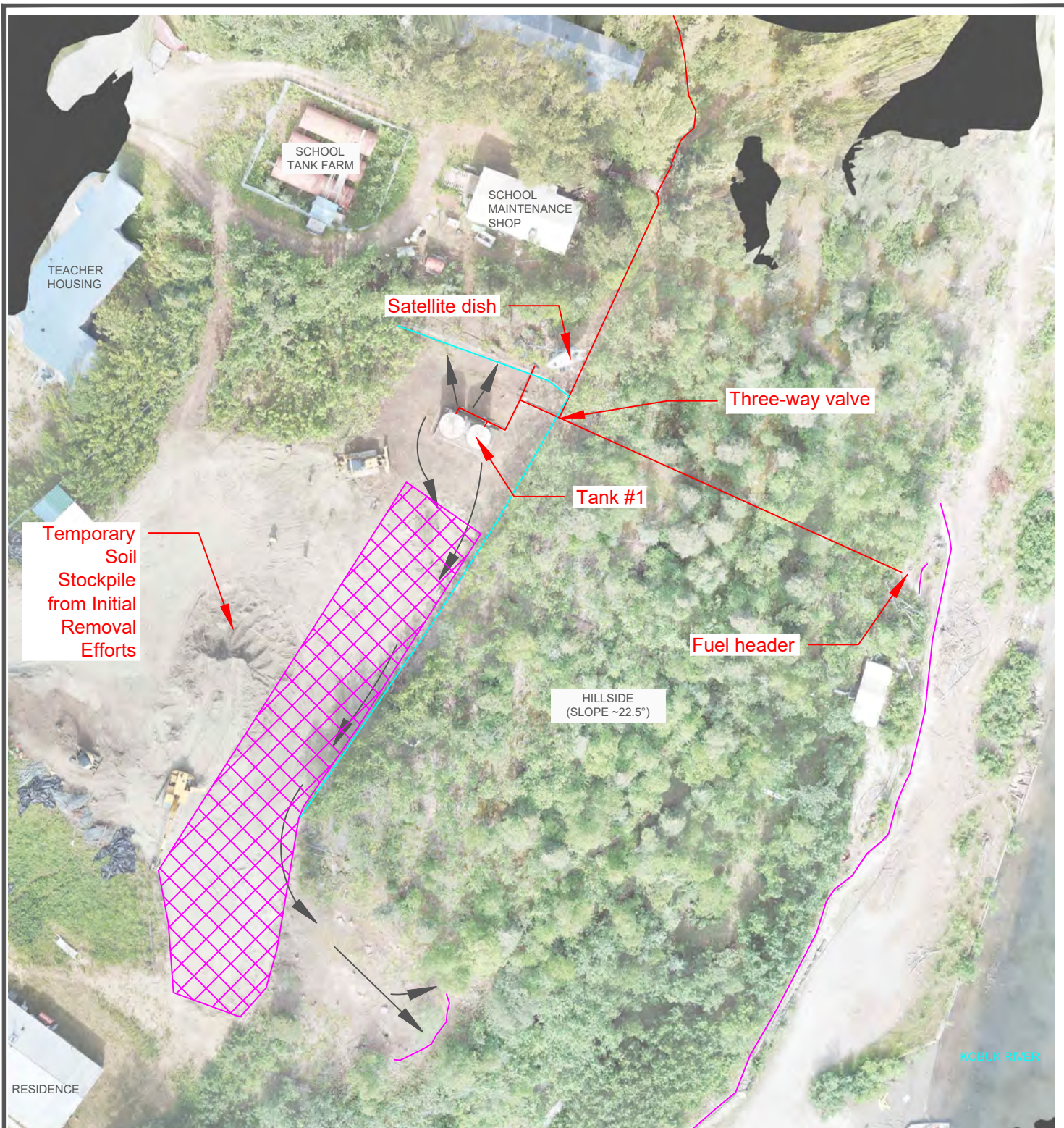
SHUNGNAK SPILL
SHUNGNAK, ALASKA

TC-EM JV

EMI JOB: 18130
DRAWN: SIM
REVIEWED: SIM
DATE: 8/5/2020

FIGURE

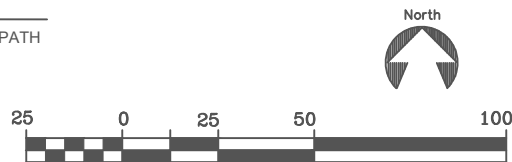
1



BACKGROUND IMAGE FROM DRONE IMAGERY COLLECTED BY TC-EM JV ON JULY 14, 2020.

LEGEND

- APPROXIMATE LOCATION OF PIPELINE
- APPROXIMATE LOCATION OF FORMER FENCE
- APPROXIMATE LOCATION OF SORBENT BOOM
- X APPROXIMATE LOCATION OF INITIAL EXCAVATION
- APPROXIMATE LOCATION OF SPILL FLOW PATH



GRAPHIC SCALE (IN FEET)

SITE PLAN

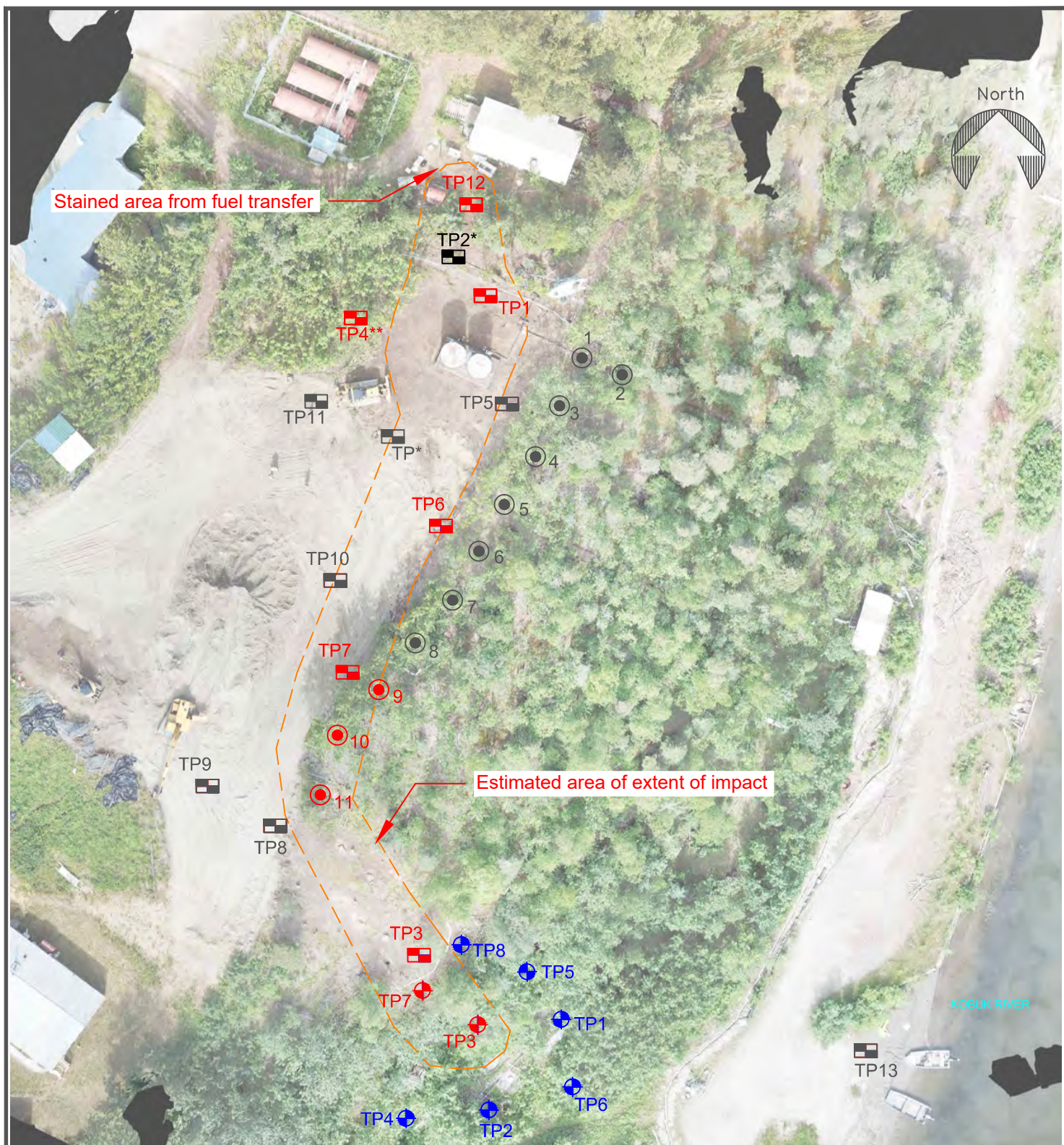
SHUNGNAK SPILL
SHUNGNAK, ALASKA

TC-EM JV

EMI JOB: 18130
DRAWN: PB
REVIEWED: SIM
DATE: 7/28/2020

FIGURE

2

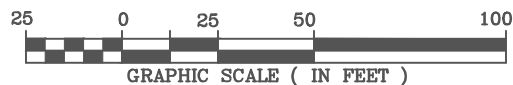


LEGEND

- ⊕ APPROXIMATE LOCATION OF JULY 15, 2021 TEST PIT LOCATION.
- ⊙ APPROXIMATE LOCATION OF SURFACE SOIL SCREENING SAMPLE (JULY 2020)
- ⊙ APPROXIMATE LOCATION OF ELEVATED SURFACE SOIL SCREENING SAMPLE (JULY 2020)
- ⊠ APPROXIMATE LOCATION OF JULY 2020 TEST PIT WITH SAMPLES ABOVE ADEC CLEANUP LEVEL
- ⊠ APPROXIMATE LOCATION OF JULY 2020 TEST PIT LOCATION BELOW ADEC CLEANUP LEVEL

BACKGROUND IMAGE FROM DRONE IMAGERY COLLECTED BY TC-EM JV ON JULY 14, 2020.

- ⊕ APPROXIMATE LOCATION OF ELEVATED TEST PIT SAMPLE (JULY 2021)
- * TEST PIT ADVANCED IN JULY 2020 BUT NO SAMPLES COLLECTED
- ** CONTAMINATION APPEARS TO BE FROM HISTORIC RELEASE



JULY 15, 2021
SAMPLE LOCATIONS

SHUNGNAK SPILL
SHUNGNAK, ALASKA

TC-EM JV

EMI JOB: 18130
DRAWN: SIM
REVIEWED: SIM
DATE: 7/16/2021

FIGURE

3

ATTACHMENT 1

Field Notes

July 15, 2021 - Shungnak Site Character

Weather - ~100° overcast w/ clouds of mosquitoes

0545 - At ANC airport to Fols

0713 - Land in Fols - Nancy picks

we up - G to SGS to pick
up case

0910 - At Car's hangar - take off

for Tanana to pick up Pale

1014 - Arrive in ~~Shungnak~~ Tanana

1200 - Hungry - time to pick up VP

(from airport + take us

(Pale + Stanley) to meet Evelyn

Arrive in Shungnak

1245 - At site walk to proposed

sample locations w/ Jerry (?)

Operator - he leaves to pick

up mini-ex -

1305 - Arrive @ Blue Dot pit - area

has been cleared of vegetation -

larger portion of water @ back

of site - appears larger than

acres taken w/ Alrene last year

- Not a lot of flat area -

may need grading + grade

away from portion where

appears to be off site

July 15, 2021 - Shungnak

1325 - At landfill - covered

Stockpiles - ~100 yd and another

out ~200 yd - 25 - around

that is west of road

1347 - At site - top of slope -

water site w/ Pale - Alrene

older @ top of slope

Stockpile covered mostly

- ground very sandy - no

areas where soil is highly stained

- some debris @ site - Pale did

not recall debris from before (2000s)

- At flange where goes down slope

some stumps in ground + w/ @ flange

part

1430 - Back @ bottom of slope to

begin test pits

- Hungry + Willard + Commack

at site - they are owner of

property where turn test pits

around

1520 - Martha + Cleo found on site -

property owner to be w/ test pits

need no adjacency test pit + tested

@ proposed pits

July 15, 2021 - Shungwan

TP1 - (R)

Depth	ID	Time Cell	Time Rd	PID	descript
* 1	TP1S1	1432	1504	0.5	Br. SAND w/ si gravel
2	TP1S2	1434	1509	0.3	
3	TP1S3	1435	1505	0.0	
4	TP1S4	1436	1506	0.0	Br. SAND w/ gravel w/ si gravel
5	TP1S5	1438	1506	0.0	
6	TP1S6	1439	1507	0.0	
7	TP1S7	1440	1507	0.1	Br. SAND w/ gravel w/ si gravel
8	TP1S8	1440	1507	0.1	

Stagnant in

Analytical:

TP1S1 - Moisture 810 - 1539

TP2 (L)

Depth	ID	Time Cell	Time Rd	PID	descript
1	TP2S1	1442	1505	0.0	Br. SAND w/ si gravel w/ si gravel
* 2	TP2S2	1443	1506	0.2	
3	TP2S3	1445	1507	0.0	
4	TP2S4	1446	1509	0.0	Br. SAND w/ gravel w/ si gravel
5	TP2S5	1448	1510	0.0	
6	TP2S6	1450	1511	0.0	
7	TP2S7	1451	1513	0.0	Br. SAND w/ gravel w/ si gravel
8	TP2S8	1451	1513	0.0	

Stagnant in

TP2S2 - 1524 - Analytical

* Moisture original larger + moisture P10

July 15, 2021 - Shungwan

TP3 - up gradient slope

Depth	ID	Cell	Read	PID	descript
1	TP3S1	1544	1600	5.21	Gray SAND w/ si gravel HC
2	TP3S2	1545	1601	5.15	
* 3	TP3S3	1546	1602	23.7	Gray SAND w/ gravel HC
4	TP3S4	1549	1603	40.1	
* 5	TP3S5	1550	1604	4.1	Gray SAND w/ gravel HC
6	TP3S6	1550	1604	4.1	

Stagnant in

TP3S3 - below H.C. elev 1620

TP3S5 - lower 1620

Analytical

- Adv. vane test pit ~ 5 ft up gradient - strong HC at bottom
 TP3 further down gradient - no samples collected from this pit.

TP4 - Mahida's - same elev as TP3 - L of SP3

Depth	ID	Cell	Read	PID	descript
1	TP4S1	1605	1627	0.0	Br. SAND w/ gravel HC
2	TP4S2	1606	1628	0.0	
* 3	TP4S3	1608	1629	0.0	Br. SAND w/ gravel HC
4	TP4S4	1611	1630	0.0	
5	TP4S5	1614	1632	0.0	Br. SAND w/ gravel HC
6	TP4S6	1614	1632	0.0	

no further - no indication of per

TP4S5 1637 - same elev as TP3S3

* per Mahida - 0.2 to more fine

played from face-line markers + leave
 test pit unfilled. (494)

* per Williams then my - due to slope, do not
 backfill TP3 - rest of TP5 were backfilled

July 15, 2021 - Shingrae

TPS (R) Right of TP3

Depth	ID	Time/Col	Rd	PID	Descript
1	TP551	1645	1655	0.0	Rd Br Gravel/road
2	TP552	1646	1655	0.0	
3	TP553	1646	1656	0.0	
4	TP554	1647	1657	0.0	↓
5	TP555	1648	1657	0.0	

Analytical: TP553 1658 - Same elev as TP353
no indication of pit so did not extend the Bat

TP4 Demographic of TP3

Depth	ID	Cell	Rd	PID	Descript
* 1	TP651	TP650	1712	0.2	Br Sand & 51 gr.
2	TP652	1700	1713	0.0	
3	TP653	1707	1713	0.0	
4	TP654	1701	1714	0.0	↓
5	TP655	1702	1715	0.0	
6	TP656	1702	1716	0.0	

Aug 1715 1718

Analytical: TP651 TP6511

No indication of pit so did not extend the Bat

July 15, 2021 - Shingrae

TP7 - Handstart Pit

Depth	ID	Cell	Rd	PID	Descript
1	TP751	1730	1741	214	Br Sand 51 etc on
2	TP752	1731	1741	431	Green Gravel 51 etc on 11th Sand

Analytical:

TP752 1748 -

* pit hard + difficult + no external beyond.

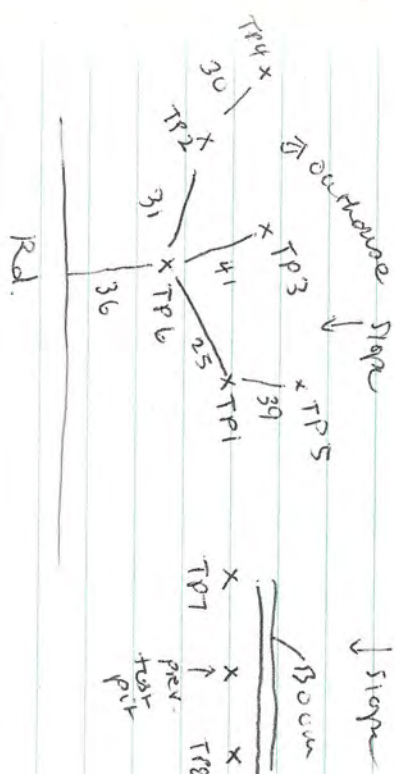
TP8 Hand Test Pit

Depth	ID	Cell	Rd	PID	Descript
* 1	TP851	1732	1750	0.0	Br Sand
2	TP852	1733	1750	0.0	Br Sand to 5111

Analytical:

TP851 - 1755

* Note: all cells meter unless indicated otherwise



July 15, 2021 Shurgash

1725 - OFFICE

- Dale calls Evelyn (764-0488 call)

OK to leave KTV @ airport

1810 - Leave Shurgash

Trinity Air - Paper

2010 - Back in Fykes - dropped off @ TC.

hanger - Religion in COC/Kester

to Dale - he will drop off to

SGS tomorrow morning.

2040 - At FAI airport - check in

2243 - Arrive @ ANC

end

Sheryl M. Anderson

Shungnak July 15, 2021 GPS Coordinates

TP 1	66°53'19.859"	-157°7'55.113"
TP 2	66°53'19.654"	-157°7'55.345"
TP 3	66°53'19.955"	-157°7'55.507"
TP 4	66°53'19.824"	-157°7'56.062"
TP 5	66°53'20.088"	-157°7'55.182"
TP 6	66°53'19.874"	-157°7'54.342"
TP 7	66°53'20.235"	-157°7'55.621"
TP8	66°53'20.165"	-157°7'55.529"

ATTACHMENT 2

Photo Pages

2021 Site Characterization Field Activities

Photo Log



Photo 1: Spill site; looking northeast. (July 15, 2021)



Photo 2: Spill site and contaminated soil stockpile; looking southwest. (July 15, 2021)

2021 Site Characterization Field Activities

Photo Log



Photo 3: Slope and spill pathway; looking southeast. (July 15, 2021)



Photo 4: Blue Dot Pit; looking southwest. (July 15, 2021)

2021 Site Characterization Field Activities

Photo Log



Photo 5: Blue Dot Pit; looking west. (July 15, 2021)



Photo 6: Standing water at Blue Dot Pit; looking northeast. (July 15, 2021)

2021 Site Characterization Field Activities

Photo Log



Photo 7: Stockpile of soil generated in 2020 stored at landfill. (July 15, 2021)



Photo 8: Test Pit TP1; looking east-northeast. (July 15, 2021)

2021 Site Characterization Field Activities

Photo Log



Photo 9: Test Pit TP2; looking west. (July 15, 2021)



Photo 10: Test Pit TP3 (left) and advancing Test Pit TP5. Back end of mini-excavator is where Test Pit TP1 was advanced; looking northwest. (July 15, 2021)

2021 Site Characterization Field Activities

Photo Log



Photo 11: Advancing Test Pit TP4 with completed Test Pit TP3 in foreground; looking west. (July 15, 2021)



Photo 12: Soil with elevated PID readings in Test Pit TP3 was from gray soil layer. (July 15, 2021)

2021 Site Characterization Field Activities

Photo Log



Photo 13: Test Pit TP6; looking east-southeast. (July 15, 2021)



Photo 14: Gray silt layer in Test Pit TP7. (July 15, 2021)

2021 Site Characterization Field Activities Photo Log



Photo 15: Advancing Test Pit TP7 and completed Test Pit TP8 in the foreground; looking southwest. (July 15, 2021)

ATTACHMENT 3

Laboratory Report and Laboratory Data Review Checklist

Laboratory Report of Analysis

To: Environmental Mgmt Inc (EMI)
206 E Fireweed Ln #201
Anchorage, AK 99503
907-275-4159

Report Number: **1214397**

Client Project: **Shungnak**

Dear Shayla Marshall,

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 Alexandra 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.



Alexandra Daniel
2021.08.09 16:47:30 -08'00'

Alexandra Daniel
Project Manager
Alexandra.Daniel@sgs.com

Date

Case Narrative

SGS Client: **Environmental Mgmt Inc (EMI)**

SGS Project: **1214397**

Project Name/Site: **Shungnak**

Project Contact: **Shayla Marshall**

Refer to sample receipt form for information on sample condition.

18130 TP7S2 (1214397009) PS

AK101 - Surrogate recovery for 4-bromofluorobenzene does not meet QC criteria, due to matrix interference.

8270D SIM - PAH surrogate recovery for 2-methylnaphthalene-d10 does not meet QC criteria due to matrix interference.

*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: 08/06/2021 4:59:24PM

Report of Manual Integrations

<u>Laboratory ID</u>	<u>Client Sample ID</u>	<u>Analytical Batch</u>	<u>Analyte</u>	<u>Reason</u>
8270D SIM (PAH)				
1214397009	18130 TP7S2	XMS12787	Naphthalene	RP
1625376	1214350007MS	XMS12787	Benzo[k]fluoranthene	RP
1625377	1214350007MSD	XMS12787	Benzo[k]fluoranthene	RP
SW8260D				
1214397009	18130 TP7S2	VMS20981	Naphthalene	RP

Manual Integration Reason Code Descriptions

Code	Description
O	Original Chromatogram
M	Modified Chromatogram
SS	Skimmed surrogate
BLG	Closed baseline gap
RP	Reassign peak name
PIR	Pattern integration required
IT	Included tail
SP	Split peak
RSP	Removed split peak
FPS	Forced peak start/stop
BLC	Baseline correction
PNF	Peak not found by software

All DRO/RRO analysis are integrated per SOP.

Laboratory Qualifiers

Enclosed are the analytical results associated with the above work order. The results apply to the samples as received. 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 (Provisionally Certified as of 05/27/2021 for Nitrate as N by SM 4500NO3-F) & Microbiology & 17-021 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020B, 7470A, 7471B, 8015C, 8021B, 8082A, 8260D, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). SGS is only certified for the analytes listed on our Drinking Water Certification (DW methods: 200.8, 2130B, 2320B, 2510B, 300.0, 4500-CN-C,E, 4500-H-B, 4500-NO3-F, 4500-P-E and 524.2) and only those analytes will be reported to the State of Alaska for compliance. 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

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

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
DF	Analytical Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LLQC/LLIQC	Low Level Quantitation Check
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
RPD	Relative Percent Difference
TNTC	Too Numerous To Count
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>
18130 TP1S1	1214397001	07/15/2021	07/20/2021	Soil/Solid (dry weight)
18130 TP2S2	1214397002	07/15/2021	07/20/2021	Soil/Solid (dry weight)
18130 TP3S3	1214397003	07/15/2021	07/20/2021	Soil/Solid (dry weight)
18130 TP3S5	1214397004	07/15/2021	07/20/2021	Soil/Solid (dry weight)
18130 TP4S3	1214397005	07/15/2021	07/20/2021	Soil/Solid (dry weight)
18130 TP5S3	1214397006	07/15/2021	07/20/2021	Soil/Solid (dry weight)
18130 TP6S1	1214397007	07/15/2021	07/20/2021	Soil/Solid (dry weight)
18130 TP6S11	1214397008	07/15/2021	07/20/2021	Soil/Solid (dry weight)
18130 TP7S2	1214397009	07/15/2021	07/20/2021	Soil/Solid (dry weight)
18130 TP8S1	1214397010	07/15/2021	07/20/2021	Soil/Solid (dry weight)
18130 STB	1214397011	07/15/2021	07/20/2021	Soil/Solid (dry weight)

<u>Method</u>	<u>Method Description</u>
8270D SIM (PAH)	8270 PAH SIM Semi-Volatiles GC/MS
AK102	Diesel/Residual Range Organics
AK103	Diesel/Residual Range Organics
AK101	Gasoline Range Organics (S)
SM21 2540G	Percent Solids SM2540G
SW8260D	VOC 8260 (S) Field Extracted

Detectable Results Summary

Client Sample ID: **18130 TP6S1**

Lab Sample ID: 1214397007

Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Residual Range Organics	117	mg/kg

Client Sample ID: **18130 TP6S11**

Lab Sample ID: 1214397008

Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Diesel Range Organics	29.1	mg/kg
Residual Range Organics	352	mg/kg

Client Sample ID: **18130 TP7S2**

Lab Sample ID: 1214397009

Polynuclear Aromatics GC/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
1-Methylnaphthalene	437	ug/kg
2-Methylnaphthalene	414	ug/kg
Naphthalene	465	ug/kg
Diesel Range Organics	3310	mg/kg
Gasoline Range Organics	149	mg/kg
1,2,4-Trimethylbenzene	8290	ug/kg
1,3,5-Trimethylbenzene	7190	ug/kg
Ethylbenzene	1200	ug/kg
Isopropylbenzene (Cumene)	1010	ug/kg
Naphthalene	588	ug/kg
o-Xylene	4130	ug/kg
P & M -Xylene	1560	ug/kg
sec-Butylbenzene	2200	ug/kg
tert-Butylbenzene	98.7	ug/kg
Toluene	346	ug/kg
Xylenes (total)	5690	ug/kg

Semivolatile Organic Fuels

Volatile Fuels

Volatile GC/MS- Petroleum VOC Group

Client Sample ID: **18130 TP8S1**

Lab Sample ID: 1214397010

Volatile GC/MS- Petroleum VOC Group

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
1,3,5-Trimethylbenzene	38.5	ug/kg

Results of 18130 TP1S1

Client Sample ID: **18130 TP1S1**
 Client Project ID: **Shungnak**
 Lab Sample ID: 1214397001
 Lab Project ID: 1214397

Collection Date: 07/15/21 15:39
 Received Date: 07/20/21 11:06
 Matrix: Soil/Solid (dry weight)
 Solids (%):96.8
 Location:

Results by Polynuclear Aromatics GC/MS

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	25.5 U	25.5	6.37	ug/kg	1		07/29/21 02:15
2-Methylnaphthalene	25.5 U	25.5	6.37	ug/kg	1		07/29/21 02:15
Acenaphthene	25.5 U	25.5	6.37	ug/kg	1		07/29/21 02:15
Acenaphthylene	25.5 U	25.5	6.37	ug/kg	1		07/29/21 02:15
Anthracene	25.5 U	25.5	6.37	ug/kg	1		07/29/21 02:15
Benzo(a)Anthracene	25.5 U	25.5	6.37	ug/kg	1		07/29/21 02:15
Benzo[a]pyrene	25.5 U	25.5	6.37	ug/kg	1		07/29/21 02:15
Benzo[b]Fluoranthene	25.5 U	25.5	6.37	ug/kg	1		07/29/21 02:15
Benzo[g,h,i]perylene	25.5 U	25.5	6.37	ug/kg	1		07/29/21 02:15
Benzo[k]fluoranthene	25.5 U	25.5	6.37	ug/kg	1		07/29/21 02:15
Chrysene	25.5 U	25.5	6.37	ug/kg	1		07/29/21 02:15
Dibenzo[a,h]anthracene	25.5 U	25.5	6.37	ug/kg	1		07/29/21 02:15
Fluoranthene	25.5 U	25.5	6.37	ug/kg	1		07/29/21 02:15
Fluorene	25.5 U	25.5	6.37	ug/kg	1		07/29/21 02:15
Indeno[1,2,3-c,d] pyrene	25.5 U	25.5	6.37	ug/kg	1		07/29/21 02:15
Naphthalene	20.4 U	20.4	5.09	ug/kg	1		07/29/21 02:15
Phenanthrene	25.5 U	25.5	6.37	ug/kg	1		07/29/21 02:15
Pyrene	25.5 U	25.5	6.37	ug/kg	1		07/29/21 02:15
Surrogates							
2-Methylnaphthalene-d10 (surr)	85.4	58-103		%	1		07/29/21 02:15
Fluoranthene-d10 (surr)	84.2	54-113		%	1		07/29/21 02:15

Batch Information

Analytical Batch: XMS12787
 Analytical Method: 8270D SIM (PAH)
 Analyst: LAW
 Analytical Date/Time: 07/29/21 02:15
 Container ID: 1214397001-B

Prep Batch: XXX45226
 Prep Method: SW3550C
 Prep Date/Time: 07/24/21 13:20
 Prep Initial Wt./Vol.: 22.815 g
 Prep Extract Vol: 5 mL

Results of 18130 TP1S1

Client Sample ID: **18130 TP1S1**
 Client Project ID: **Shungnak**
 Lab Sample ID: 1214397001
 Lab Project ID: 1214397

Collection Date: 07/15/21 15:39
 Received Date: 07/20/21 11:06
 Matrix: Soil/Solid (dry weight)
 Solids (%):96.8
 Location:

Results by Semivolatile Organic Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	20.5 U	20.5	6.36	mg/kg	1		07/30/21 21:47
Surrogates							
5a Androstane (surr)	109	50-150		%	1		07/30/21 21:47

Batch Information

Analytical Batch: XFC16024
 Analytical Method: AK102
 Analyst: A.A
 Analytical Date/Time: 07/30/21 21:47
 Container ID: 1214397001-B

Prep Batch: XXX45230
 Prep Method: SW3550C
 Prep Date/Time: 07/25/21 11:27
 Prep Initial Wt./Vol.: 30.227 g
 Prep Extract Vol: 5 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	103 U	103	44.1	mg/kg	1		07/30/21 21:47
Surrogates							
n-Triacontane-d62 (surr)	109	50-150		%	1		07/30/21 21:47

Batch Information

Analytical Batch: XFC16024
 Analytical Method: AK103
 Analyst: A.A
 Analytical Date/Time: 07/30/21 21:47
 Container ID: 1214397001-B

Prep Batch: XXX45230
 Prep Method: SW3550C
 Prep Date/Time: 07/25/21 11:27
 Prep Initial Wt./Vol.: 30.227 g
 Prep Extract Vol: 5 mL

Print Date: 08/06/2021 4:59:35PM



Results of 18130 TP1S1

Client Sample ID: **18130 TP1S1**
Client Project ID: **Shungnak**
Lab Sample ID: 1214397001
Lab Project ID: 1214397

Collection Date: 07/15/21 15:39
Received Date: 07/20/21 11:06
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	1.90 U	1.90	0.570	mg/kg	1		07/29/21 20:31
Surrogates							
4-Bromofluorobenzene (surr)	87	50-150		%	1		07/29/21 20:31

Batch Information

Analytical Batch: VFC15739
Analytical Method: AK101
Analyst: MDT
Analytical Date/Time: 07/29/21 20:31
Container ID: 1214397001-A

Prep Batch: VXX37528
Prep Method: SW5035A
Prep Date/Time: 07/15/21 15:39
Prep Initial Wt./Vol.: 74.341 g
Prep Extract Vol: 27.3653 mL

Print Date: 08/06/2021 4:59:35PM



Results of 18130 TP1S1

Client Sample ID: **18130 TP1S1**
Client Project ID: **Shungnak**
Lab Sample ID: 1214397001
Lab Project ID: 1214397

Collection Date: 07/15/21 15:39
Received Date: 07/20/21 11:06
Matrix: Soil/Solid (dry weight)
Solids (%):96.8
Location:

Results by Volatile GC/MS- Petroleum VOC Group

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	38.0 U	38.0	11.4	ug/kg	1		07/28/21 18:04
1,2-Dibromoethane	0.760 U	0.760	0.304	ug/kg	1		07/28/21 18:04
1,2-Dichloroethane	1.52 U	1.52	0.532	ug/kg	1		07/28/21 18:04
1,3,5-Trimethylbenzene	19.0 U	19.0	5.93	ug/kg	1		07/28/21 18:04
Benzene	9.51 U	9.51	2.97	ug/kg	1		07/28/21 18:04
Ethylbenzene	19.0 U	19.0	5.93	ug/kg	1		07/28/21 18:04
Isopropylbenzene (Cumene)	19.0 U	19.0	5.93	ug/kg	1		07/28/21 18:04
Methyl-t-butyl ether	76.0 U	76.0	23.6	ug/kg	1		07/28/21 18:04
Naphthalene	19.0 U	19.0	5.93	ug/kg	1		07/28/21 18:04
n-Butylbenzene	19.0 U	19.0	5.93	ug/kg	1		07/28/21 18:04
o-Xylene	19.0 U	19.0	5.93	ug/kg	1		07/28/21 18:04
P & M -Xylene	38.0 U	38.0	11.4	ug/kg	1		07/28/21 18:04
sec-Butylbenzene	19.0 U	19.0	5.93	ug/kg	1		07/28/21 18:04
tert-Butylbenzene	19.0 U	19.0	5.93	ug/kg	1		07/28/21 18:04
Toluene	19.0 U	19.0	5.93	ug/kg	1		07/28/21 18:04
Xylenes (total)	57.0 U	57.0	17.3	ug/kg	1		07/28/21 18:04
Surrogates							
1,2-Dichloroethane-D4 (surr)	110	71-136		%	1		07/28/21 18:04
4-Bromofluorobenzene (surr)	106	55-151		%	1		07/28/21 18:04
Toluene-d8 (surr)	99.3	85-116		%	1		07/28/21 18:04

Batch Information

Analytical Batch: VMS20981
Analytical Method: SW8260D
Analyst: S.S
Analytical Date/Time: 07/28/21 18:04
Container ID: 1214397001-A

Prep Batch: VXX37523
Prep Method: SW5035A
Prep Date/Time: 07/15/21 15:39
Prep Initial Wt./Vol.: 74.341 g
Prep Extract Vol: 27.3653 mL

Print Date: 08/06/2021 4:59:35PM

Results of 18130 TP2S2

Client Sample ID: **18130 TP2S2**
 Client Project ID: **Shungnak**
 Lab Sample ID: 1214397002
 Lab Project ID: 1214397

Collection Date: 07/15/21 15:24
 Received Date: 07/20/21 11:06
 Matrix: Soil/Solid (dry weight)
 Solids (%):95.4
 Location:

Results by Polynuclear Aromatics GC/MS

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	26.1 U	26.1	6.53	ug/kg	1		07/29/21 02:35
2-Methylnaphthalene	26.1 U	26.1	6.53	ug/kg	1		07/29/21 02:35
Acenaphthene	26.1 U	26.1	6.53	ug/kg	1		07/29/21 02:35
Acenaphthylene	26.1 U	26.1	6.53	ug/kg	1		07/29/21 02:35
Anthracene	26.1 U	26.1	6.53	ug/kg	1		07/29/21 02:35
Benzo(a)Anthracene	26.1 U	26.1	6.53	ug/kg	1		07/29/21 02:35
Benzo[a]pyrene	26.1 U	26.1	6.53	ug/kg	1		07/29/21 02:35
Benzo[b]Fluoranthene	26.1 U	26.1	6.53	ug/kg	1		07/29/21 02:35
Benzo[g,h,i]perylene	26.1 U	26.1	6.53	ug/kg	1		07/29/21 02:35
Benzo[k]fluoranthene	26.1 U	26.1	6.53	ug/kg	1		07/29/21 02:35
Chrysene	26.1 U	26.1	6.53	ug/kg	1		07/29/21 02:35
Dibenzo[a,h]anthracene	26.1 U	26.1	6.53	ug/kg	1		07/29/21 02:35
Fluoranthene	26.1 U	26.1	6.53	ug/kg	1		07/29/21 02:35
Fluorene	26.1 U	26.1	6.53	ug/kg	1		07/29/21 02:35
Indeno[1,2,3-c,d] pyrene	26.1 U	26.1	6.53	ug/kg	1		07/29/21 02:35
Naphthalene	20.9 U	20.9	5.23	ug/kg	1		07/29/21 02:35
Phenanthrene	26.1 U	26.1	6.53	ug/kg	1		07/29/21 02:35
Pyrene	26.1 U	26.1	6.53	ug/kg	1		07/29/21 02:35

Surrogates

2-Methylnaphthalene-d10 (surr)	83.5	58-103		%	1		07/29/21 02:35
Fluoranthene-d10 (surr)	81.3	54-113		%	1		07/29/21 02:35

Batch Information

Analytical Batch: XMS12787
 Analytical Method: 8270D SIM (PAH)
 Analyst: LAW
 Analytical Date/Time: 07/29/21 02:35
 Container ID: 1214397002-B

Prep Batch: XXX45226
 Prep Method: SW3550C
 Prep Date/Time: 07/24/21 13:20
 Prep Initial Wt./Vol.: 22.563 g
 Prep Extract Vol: 5 mL

Results of 18130 TP2S2

Client Sample ID: **18130 TP2S2**
 Client Project ID: **Shungnak**
 Lab Sample ID: 1214397002
 Lab Project ID: 1214397

Collection Date: 07/15/21 15:24
 Received Date: 07/20/21 11:06
 Matrix: Soil/Solid (dry weight)
 Solids (%):95.4
 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	20.8 U	20.8	6.44	mg/kg	1		07/30/21 22:07
Surrogates							
5a Androstane (surr)	98.5	50-150		%	1		07/30/21 22:07

Batch Information

Analytical Batch: XFC16024
 Analytical Method: AK102
 Analyst: A.A
 Analytical Date/Time: 07/30/21 22:07
 Container ID: 1214397002-B

Prep Batch: XXX45230
 Prep Method: SW3550C
 Prep Date/Time: 07/25/21 11:27
 Prep Initial Wt./Vol.: 30.29 g
 Prep Extract Vol: 5 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>
Residual Range Organics	104 U	104	44.6	mg/kg	1		07/30/21 22:07
Surrogates							
n-Triacontane-d62 (surr)	98.1	50-150		%	1		07/30/21 22:07

Batch Information

Analytical Batch: XFC16024
 Analytical Method: AK103
 Analyst: A.A
 Analytical Date/Time: 07/30/21 22:07
 Container ID: 1214397002-B

Prep Batch: XXX45230
 Prep Method: SW3550C
 Prep Date/Time: 07/25/21 11:27
 Prep Initial Wt./Vol.: 30.29 g
 Prep Extract Vol: 5 mL

Print Date: 08/06/2021 4:59:35PM



Results of 18130 TP2S2

Client Sample ID: **18130 TP2S2**
Client Project ID: **Shungnak**
Lab Sample ID: 1214397002
Lab Project ID: 1214397

Collection Date: 07/15/21 15:24
Received Date: 07/20/21 11:06
Matrix: Soil/Solid (dry weight)
Solids (%):95.4
Location:

Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	2.43 U	2.43	0.730	mg/kg	1		07/29/21 20:49
Surrogates							
4-Bromofluorobenzene (surr)	84	50-150		%	1		07/29/21 20:49

Batch Information

Analytical Batch: VFC15739
Analytical Method: AK101
Analyst: MDT
Analytical Date/Time: 07/29/21 20:49
Container ID: 1214397002-A

Prep Batch: VXX37528
Prep Method: SW5035A
Prep Date/Time: 07/15/21 15:24
Prep Initial Wt./Vol.: 59.759 g
Prep Extract Vol: 27.7451 mL

Print Date: 08/06/2021 4:59:35PM



Results of 18130 TP2S2

Client Sample ID: **18130 TP2S2**
Client Project ID: **Shungnak**
Lab Sample ID: 1214397002
Lab Project ID: 1214397

Collection Date: 07/15/21 15:24
Received Date: 07/20/21 11:06
Matrix: Soil/Solid (dry weight)
Solids (%):95.4
Location:

Results by Volatile GC/MS- Petroleum VOC Group

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	48.7 U	48.7	14.6	ug/kg	1		07/28/21 18:21
1,2-Dibromoethane	0.973 U	0.973	0.389	ug/kg	1		07/28/21 18:21
1,2-Dichloroethane	1.95 U	1.95	0.681	ug/kg	1		07/28/21 18:21
1,3,5-Trimethylbenzene	24.3 U	24.3	7.59	ug/kg	1		07/28/21 18:21
Benzene	12.2 U	12.2	3.80	ug/kg	1		07/28/21 18:21
Ethylbenzene	24.3 U	24.3	7.59	ug/kg	1		07/28/21 18:21
Isopropylbenzene (Cumene)	24.3 U	24.3	7.59	ug/kg	1		07/28/21 18:21
Methyl-t-butyl ether	97.3 U	97.3	30.2	ug/kg	1		07/28/21 18:21
Naphthalene	24.3 U	24.3	7.59	ug/kg	1		07/28/21 18:21
n-Butylbenzene	24.3 U	24.3	7.59	ug/kg	1		07/28/21 18:21
o-Xylene	24.3 U	24.3	7.59	ug/kg	1		07/28/21 18:21
P & M -Xylene	48.7 U	48.7	14.6	ug/kg	1		07/28/21 18:21
sec-Butylbenzene	24.3 U	24.3	7.59	ug/kg	1		07/28/21 18:21
tert-Butylbenzene	24.3 U	24.3	7.59	ug/kg	1		07/28/21 18:21
Toluene	24.3 U	24.3	7.59	ug/kg	1		07/28/21 18:21
Xylenes (total)	73.0 U	73.0	22.2	ug/kg	1		07/28/21 18:21
Surrogates							
1,2-Dichloroethane-D4 (surr)	110	71-136		%	1		07/28/21 18:21
4-Bromofluorobenzene (surr)	107	55-151		%	1		07/28/21 18:21
Toluene-d8 (surr)	98.3	85-116		%	1		07/28/21 18:21

Batch Information

Analytical Batch: VMS20981
Analytical Method: SW8260D
Analyst: S.S
Analytical Date/Time: 07/28/21 18:21
Container ID: 1214397002-A

Prep Batch: VXX37523
Prep Method: SW5035A
Prep Date/Time: 07/15/21 15:24
Prep Initial Wt./Vol.: 59.759 g
Prep Extract Vol: 27.7451 mL

Print Date: 08/06/2021 4:59:35PM

Results of 18130 TP3S3

Client Sample ID: **18130 TP3S3**
 Client Project ID: **Shungnak**
 Lab Sample ID: 1214397003
 Lab Project ID: 1214397

Collection Date: 07/15/21 16:20
 Received Date: 07/20/21 11:06
 Matrix: Soil/Solid (dry weight)
 Solids (%):95.1
 Location:

Results by Polynuclear Aromatics GC/MS

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	26.1 U	26.1	6.52	ug/kg	1		07/29/21 02:56
2-Methylnaphthalene	26.1 U	26.1	6.52	ug/kg	1		07/29/21 02:56
Acenaphthene	26.1 U	26.1	6.52	ug/kg	1		07/29/21 02:56
Acenaphthylene	26.1 U	26.1	6.52	ug/kg	1		07/29/21 02:56
Anthracene	26.1 U	26.1	6.52	ug/kg	1		07/29/21 02:56
Benzo(a)Anthracene	26.1 U	26.1	6.52	ug/kg	1		07/29/21 02:56
Benzo[a]pyrene	26.1 U	26.1	6.52	ug/kg	1		07/29/21 02:56
Benzo[b]Fluoranthene	26.1 U	26.1	6.52	ug/kg	1		07/29/21 02:56
Benzo[g,h,i]perylene	26.1 U	26.1	6.52	ug/kg	1		07/29/21 02:56
Benzo[k]fluoranthene	26.1 U	26.1	6.52	ug/kg	1		07/29/21 02:56
Chrysene	26.1 U	26.1	6.52	ug/kg	1		07/29/21 02:56
Dibenzo[a,h]anthracene	26.1 U	26.1	6.52	ug/kg	1		07/29/21 02:56
Fluoranthene	26.1 U	26.1	6.52	ug/kg	1		07/29/21 02:56
Fluorene	26.1 U	26.1	6.52	ug/kg	1		07/29/21 02:56
Indeno[1,2,3-c,d] pyrene	26.1 U	26.1	6.52	ug/kg	1		07/29/21 02:56
Naphthalene	20.9 U	20.9	5.22	ug/kg	1		07/29/21 02:56
Phenanthrene	26.1 U	26.1	6.52	ug/kg	1		07/29/21 02:56
Pyrene	26.1 U	26.1	6.52	ug/kg	1		07/29/21 02:56
Surrogates							
2-Methylnaphthalene-d10 (surr)	74.1	58-103		%	1		07/29/21 02:56
Fluoranthene-d10 (surr)	74.2	54-113		%	1		07/29/21 02:56

Batch Information

Analytical Batch: XMS12787
 Analytical Method: 8270D SIM (PAH)
 Analyst: LAW
 Analytical Date/Time: 07/29/21 02:56
 Container ID: 1214397003-B

Prep Batch: XXX45226
 Prep Method: SW3550C
 Prep Date/Time: 07/24/21 13:20
 Prep Initial Wt./Vol.: 22.679 g
 Prep Extract Vol: 5 mL

Results of 18130 TP3S3

Client Sample ID: **18130 TP3S3**
 Client Project ID: **Shungnak**
 Lab Sample ID: 1214397003
 Lab Project ID: 1214397

Collection Date: 07/15/21 16:20
 Received Date: 07/20/21 11:06
 Matrix: Soil/Solid (dry weight)
 Solids (%):95.1
 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	20.7 U	20.7	6.42	mg/kg	1		07/30/21 21:57
Surrogates							
5a Androstane (surr)	99.9	50-150		%	1		07/30/21 21:57

Batch Information

Analytical Batch: XFC16024
 Analytical Method: AK102
 Analyst: A.A
 Analytical Date/Time: 07/30/21 21:57
 Container ID: 1214397003-B

Prep Batch: XXX45230
 Prep Method: SW3550C
 Prep Date/Time: 07/25/21 11:27
 Prep Initial Wt./Vol.: 30.488 g
 Prep Extract Vol: 5 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>
Residual Range Organics	104 U	104	44.5	mg/kg	1		07/30/21 21:57
Surrogates							
n-Triacontane-d62 (surr)	100	50-150		%	1		07/30/21 21:57

Batch Information

Analytical Batch: XFC16024
 Analytical Method: AK103
 Analyst: A.A
 Analytical Date/Time: 07/30/21 21:57
 Container ID: 1214397003-B

Prep Batch: XXX45230
 Prep Method: SW3550C
 Prep Date/Time: 07/25/21 11:27
 Prep Initial Wt./Vol.: 30.488 g
 Prep Extract Vol: 5 mL

Print Date: 08/06/2021 4:59:35PM



Results of 18130 TP3S3

Client Sample ID: **18130 TP3S3**
Client Project ID: **Shungnak**
Lab Sample ID: 1214397003
Lab Project ID: 1214397

Collection Date: 07/15/21 16:20
Received Date: 07/20/21 11:06
Matrix: Soil/Solid (dry weight)
Solids (%):95.1
Location:

Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	2.42 U	2.42	0.727	mg/kg	1		07/29/21 21:06
Surrogates							
4-Bromofluorobenzene (surr)	84	50-150		%	1		07/29/21 21:06

Batch Information

Analytical Batch: VFC15739
Analytical Method: AK101
Analyst: MDT
Analytical Date/Time: 07/29/21 21:06
Container ID: 1214397003-A

Prep Batch: VXX37528
Prep Method: SW5035A
Prep Date/Time: 07/15/21 16:20
Prep Initial Wt./Vol.: 60.815 g
Prep Extract Vol: 28.0078 mL

Print Date: 08/06/2021 4:59:35PM

Results of 18130 TP3S3

Client Sample ID: **18130 TP3S3**
 Client Project ID: **Shungnak**
 Lab Sample ID: 1214397003
 Lab Project ID: 1214397

Collection Date: 07/15/21 16:20
 Received Date: 07/20/21 11:06
 Matrix: Soil/Solid (dry weight)
 Solids (%):95.1
 Location:

Results by Volatile GC/MS- Petroleum VOC Group

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	48.5 U	48.5	14.5	ug/kg	1		07/28/21 18:37
1,2-Dibromoethane	0.969 U	0.969	0.388	ug/kg	1		07/28/21 18:37
1,2-Dichloroethane	1.94 U	1.94	0.678	ug/kg	1		07/28/21 18:37
1,3,5-Trimethylbenzene	24.2 U	24.2	7.56	ug/kg	1		07/28/21 18:37
Benzene	12.1 U	12.1	3.78	ug/kg	1		07/28/21 18:37
Ethylbenzene	24.2 U	24.2	7.56	ug/kg	1		07/28/21 18:37
Isopropylbenzene (Cumene)	24.2 U	24.2	7.56	ug/kg	1		07/28/21 18:37
Methyl-t-butyl ether	96.9 U	96.9	30.0	ug/kg	1		07/28/21 18:37
Naphthalene	24.2 U	24.2	7.56	ug/kg	1		07/28/21 18:37
n-Butylbenzene	24.2 U	24.2	7.56	ug/kg	1		07/28/21 18:37
o-Xylene	24.2 U	24.2	7.56	ug/kg	1		07/28/21 18:37
P & M -Xylene	48.5 U	48.5	14.5	ug/kg	1		07/28/21 18:37
sec-Butylbenzene	24.2 U	24.2	7.56	ug/kg	1		07/28/21 18:37
tert-Butylbenzene	24.2 U	24.2	7.56	ug/kg	1		07/28/21 18:37
Toluene	24.2 U	24.2	7.56	ug/kg	1		07/28/21 18:37
Xylenes (total)	72.7 U	72.7	22.1	ug/kg	1		07/28/21 18:37
Surrogates							
1,2-Dichloroethane-D4 (surr)	109	71-136		%	1		07/28/21 18:37
4-Bromofluorobenzene (surr)	100	55-151		%	1		07/28/21 18:37
Toluene-d8 (surr)	99.2	85-116		%	1		07/28/21 18:37

Batch Information

Analytical Batch: VMS20981
 Analytical Method: SW8260D
 Analyst: S.S
 Analytical Date/Time: 07/28/21 18:37
 Container ID: 1214397003-A

Prep Batch: VXX37523
 Prep Method: SW5035A
 Prep Date/Time: 07/15/21 16:20
 Prep Initial Wt./Vol.: 60.815 g
 Prep Extract Vol: 28.0078 mL



Results of 18130 TP3S5

Client Sample ID: **18130 TP3S5**
Client Project ID: **Shungnak**
Lab Sample ID: 1214397004
Lab Project ID: 1214397

Collection Date: 07/15/21 16:22
Received Date: 07/20/21 11:06
Matrix: Soil/Solid (dry weight)
Solids (%):94.0
Location:

Results by Polynuclear Aromatics GC/MS

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	26.1 U	26.1	6.52	ug/kg	1		07/29/21 03:16
2-Methylnaphthalene	26.1 U	26.1	6.52	ug/kg	1		07/29/21 03:16
Acenaphthene	26.1 U	26.1	6.52	ug/kg	1		07/29/21 03:16
Acenaphthylene	26.1 U	26.1	6.52	ug/kg	1		07/29/21 03:16
Anthracene	26.1 U	26.1	6.52	ug/kg	1		07/29/21 03:16
Benzo(a)Anthracene	26.1 U	26.1	6.52	ug/kg	1		07/29/21 03:16
Benzo[a]pyrene	26.1 U	26.1	6.52	ug/kg	1		07/29/21 03:16
Benzo[b]Fluoranthene	26.1 U	26.1	6.52	ug/kg	1		07/29/21 03:16
Benzo[g,h,i]perylene	26.1 U	26.1	6.52	ug/kg	1		07/29/21 03:16
Benzo[k]fluoranthene	26.1 U	26.1	6.52	ug/kg	1		07/29/21 03:16
Chrysene	26.1 U	26.1	6.52	ug/kg	1		07/29/21 03:16
Dibenzo[a,h]anthracene	26.1 U	26.1	6.52	ug/kg	1		07/29/21 03:16
Fluoranthene	26.1 U	26.1	6.52	ug/kg	1		07/29/21 03:16
Fluorene	26.1 U	26.1	6.52	ug/kg	1		07/29/21 03:16
Indeno[1,2,3-c,d] pyrene	26.1 U	26.1	6.52	ug/kg	1		07/29/21 03:16
Naphthalene	20.8 U	20.8	5.21	ug/kg	1		07/29/21 03:16
Phenanthrene	26.1 U	26.1	6.52	ug/kg	1		07/29/21 03:16
Pyrene	26.1 U	26.1	6.52	ug/kg	1		07/29/21 03:16
Surrogates							
2-Methylnaphthalene-d10 (surr)	76.1	58-103		%	1		07/29/21 03:16
Fluoranthene-d10 (surr)	75.7	54-113		%	1		07/29/21 03:16

Batch Information

Analytical Batch: XMS12787
Analytical Method: 8270D SIM (PAH)
Analyst: LAW
Analytical Date/Time: 07/29/21 03:16
Container ID: 1214397004-B

Prep Batch: XXX45226
Prep Method: SW3550C
Prep Date/Time: 07/24/21 13:20
Prep Initial Wt./Vol.: 22.954 g
Prep Extract Vol: 5 mL

Print Date: 08/06/2021 4:59:35PM

Results of 18130 TP3S5

Client Sample ID: **18130 TP3S5**
 Client Project ID: **Shungnak**
 Lab Sample ID: 1214397004
 Lab Project ID: 1214397

Collection Date: 07/15/21 16:22
 Received Date: 07/20/21 11:06
 Matrix: Soil/Solid (dry weight)
 Solids (%):94.0
 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	21.0 U	21.0	6.52	mg/kg	1		07/30/21 22:26
Surrogates							
5a Androstane (surr)	104	50-150		%	1		07/30/21 22:26

Batch Information

Analytical Batch: XFC16024
 Analytical Method: AK102
 Analyst: A.A
 Analytical Date/Time: 07/30/21 22:26
 Container ID: 1214397004-B

Prep Batch: XXX45230
 Prep Method: SW3550C
 Prep Date/Time: 07/25/21 11:27
 Prep Initial Wt./Vol.: 30.334 g
 Prep Extract Vol: 5 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>
Residual Range Organics	105 U	105	45.2	mg/kg	1		07/30/21 22:26
Surrogates							
n-Triacontane-d62 (surr)	104	50-150		%	1		07/30/21 22:26

Batch Information

Analytical Batch: XFC16024
 Analytical Method: AK103
 Analyst: A.A
 Analytical Date/Time: 07/30/21 22:26
 Container ID: 1214397004-B

Prep Batch: XXX45230
 Prep Method: SW3550C
 Prep Date/Time: 07/25/21 11:27
 Prep Initial Wt./Vol.: 30.334 g
 Prep Extract Vol: 5 mL

Print Date: 08/06/2021 4:59:35PM

Results of 18130 TP3S5

Client Sample ID: **18130 TP3S5**
 Client Project ID: **Shungnak**
 Lab Sample ID: 1214397004
 Lab Project ID: 1214397

Collection Date: 07/15/21 16:22
 Received Date: 07/20/21 11:06
 Matrix: Soil/Solid (dry weight)
 Solids (%):94.0
 Location:

Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	2.47 U	2.47	0.741	mg/kg	1		07/29/21 21:24
Surrogates							
4-Bromofluorobenzene (surr)	85.3	50-150		%	1		07/29/21 21:24

Batch Information

Analytical Batch: VFC15739
 Analytical Method: AK101
 Analyst: MDT
 Analytical Date/Time: 07/29/21 21:24
 Container ID: 1214397004-A

Prep Batch: VXX37528
 Prep Method: SW5035A
 Prep Date/Time: 07/15/21 16:22
 Prep Initial Wt./Vol.: 61.754 g
 Prep Extract Vol: 28.6889 mL

Print Date: 08/06/2021 4:59:35PM



Results of 18130 TP3S5

Client Sample ID: **18130 TP3S5**
Client Project ID: **Shungnak**
Lab Sample ID: 1214397004
Lab Project ID: 1214397

Collection Date: 07/15/21 16:22
Received Date: 07/20/21 11:06
Matrix: Soil/Solid (dry weight)
Solids (%):94.0
Location:

Results by Volatile GC/MS- Petroleum VOC Group

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	49.4 U	49.4	14.8	ug/kg	1		07/28/21 18:54
1,2-Dibromoethane	0.988 U	0.988	0.395	ug/kg	1		07/28/21 18:54
1,2-Dichloroethane	1.98 U	1.98	0.692	ug/kg	1		07/28/21 18:54
1,3,5-Trimethylbenzene	24.7 U	24.7	7.71	ug/kg	1		07/28/21 18:54
Benzene	12.4 U	12.4	3.85	ug/kg	1		07/28/21 18:54
Ethylbenzene	24.7 U	24.7	7.71	ug/kg	1		07/28/21 18:54
Isopropylbenzene (Cumene)	24.7 U	24.7	7.71	ug/kg	1		07/28/21 18:54
Methyl-t-butyl ether	98.8 U	98.8	30.6	ug/kg	1		07/28/21 18:54
Naphthalene	24.7 U	24.7	7.71	ug/kg	1		07/28/21 18:54
n-Butylbenzene	24.7 U	24.7	7.71	ug/kg	1		07/28/21 18:54
o-Xylene	24.7 U	24.7	7.71	ug/kg	1		07/28/21 18:54
P & M -Xylene	49.4 U	49.4	14.8	ug/kg	1		07/28/21 18:54
sec-Butylbenzene	24.7 U	24.7	7.71	ug/kg	1		07/28/21 18:54
tert-Butylbenzene	24.7 U	24.7	7.71	ug/kg	1		07/28/21 18:54
Toluene	24.7 U	24.7	7.71	ug/kg	1		07/28/21 18:54
Xylenes (total)	74.1 U	74.1	22.5	ug/kg	1		07/28/21 18:54
Surrogates							
1,2-Dichloroethane-D4 (surr)	108	71-136		%	1		07/28/21 18:54
4-Bromofluorobenzene (surr)	104	55-151		%	1		07/28/21 18:54
Toluene-d8 (surr)	98.4	85-116		%	1		07/28/21 18:54

Batch Information

Analytical Batch: VMS20981
Analytical Method: SW8260D
Analyst: S.S
Analytical Date/Time: 07/28/21 18:54
Container ID: 1214397004-A

Prep Batch: VXX37523
Prep Method: SW5035A
Prep Date/Time: 07/15/21 16:22
Prep Initial Wt./Vol.: 61.754 g
Prep Extract Vol: 28.6889 mL

Print Date: 08/06/2021 4:59:35PM



Results of 18130 TP4S3

Client Sample ID: **18130 TP4S3**
Client Project ID: **Shungnak**
Lab Sample ID: 1214397005
Lab Project ID: 1214397

Collection Date: 07/15/21 16:37
Received Date: 07/20/21 11:06
Matrix: Soil/Solid (dry weight)
Solids (%):94.8
Location:

Results by Polynuclear Aromatics GC/MS

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	26.2 U	26.2	6.54	ug/kg	1		07/29/21 03:37
2-Methylnaphthalene	26.2 U	26.2	6.54	ug/kg	1		07/29/21 03:37
Acenaphthene	26.2 U	26.2	6.54	ug/kg	1		07/29/21 03:37
Acenaphthylene	26.2 U	26.2	6.54	ug/kg	1		07/29/21 03:37
Anthracene	26.2 U	26.2	6.54	ug/kg	1		07/29/21 03:37
Benzo(a)Anthracene	26.2 U	26.2	6.54	ug/kg	1		07/29/21 03:37
Benzo(a)pyrene	26.2 U	26.2	6.54	ug/kg	1		07/29/21 03:37
Benzo(b)Fluoranthene	26.2 U	26.2	6.54	ug/kg	1		07/29/21 03:37
Benzo(g,h,i)perylene	26.2 U	26.2	6.54	ug/kg	1		07/29/21 03:37
Benzo(k)fluoranthene	26.2 U	26.2	6.54	ug/kg	1		07/29/21 03:37
Chrysene	26.2 U	26.2	6.54	ug/kg	1		07/29/21 03:37
Dibenzo(a,h)anthracene	26.2 U	26.2	6.54	ug/kg	1		07/29/21 03:37
Fluoranthene	26.2 U	26.2	6.54	ug/kg	1		07/29/21 03:37
Fluorene	26.2 U	26.2	6.54	ug/kg	1		07/29/21 03:37
Indeno[1,2,3-c,d] pyrene	26.2 U	26.2	6.54	ug/kg	1		07/29/21 03:37
Naphthalene	20.9 U	20.9	5.23	ug/kg	1		07/29/21 03:37
Phenanthrene	26.2 U	26.2	6.54	ug/kg	1		07/29/21 03:37
Pyrene	26.2 U	26.2	6.54	ug/kg	1		07/29/21 03:37
Surrogates							
2-Methylnaphthalene-d10 (surr)	78.8	58-103		%	1		07/29/21 03:37
Fluoranthene-d10 (surr)	77.2	54-113		%	1		07/29/21 03:37

Batch Information

Analytical Batch: XMS12787
Analytical Method: 8270D SIM (PAH)
Analyst: LAW
Analytical Date/Time: 07/29/21 03:37
Container ID: 1214397005-B

Prep Batch: XXX45226
Prep Method: SW3550C
Prep Date/Time: 07/24/21 13:20
Prep Initial Wt./Vol.: 22.671 g
Prep Extract Vol: 5 mL

Print Date: 08/06/2021 4:59:35PM

Results of 18130 TP4S3

Client Sample ID: **18130 TP4S3**
 Client Project ID: **Shungnak**
 Lab Sample ID: 1214397005
 Lab Project ID: 1214397

Collection Date: 07/15/21 16:37
 Received Date: 07/20/21 11:06
 Matrix: Soil/Solid (dry weight)
 Solids (%):94.8
 Location:

Results by Semivolatile Organic Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	20.9 U	20.9	6.46	mg/kg	1		07/30/21 22:17
Surrogates							
5a Androstane (surr)	98.6	50-150		%	1		07/30/21 22:17

Batch Information

Analytical Batch: XFC16024
 Analytical Method: AK102
 Analyst: A.A
 Analytical Date/Time: 07/30/21 22:17
 Container ID: 1214397005-B

Prep Batch: XXX45230
 Prep Method: SW3550C
 Prep Date/Time: 07/25/21 11:27
 Prep Initial Wt./Vol.: 30.35 g
 Prep Extract Vol: 5 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	104 U	104	44.8	mg/kg	1		07/30/21 22:17
Surrogates							
n-Triacontane-d62 (surr)	99.8	50-150		%	1		07/30/21 22:17

Batch Information

Analytical Batch: XFC16024
 Analytical Method: AK103
 Analyst: A.A
 Analytical Date/Time: 07/30/21 22:17
 Container ID: 1214397005-B

Prep Batch: XXX45230
 Prep Method: SW3550C
 Prep Date/Time: 07/25/21 11:27
 Prep Initial Wt./Vol.: 30.35 g
 Prep Extract Vol: 5 mL

Print Date: 08/06/2021 4:59:35PM



Results of 18130 TP4S3

Client Sample ID: **18130 TP4S3**
Client Project ID: **Shungnak**
Lab Sample ID: 1214397005
Lab Project ID: 1214397

Collection Date: 07/15/21 16:37
Received Date: 07/20/21 11:06
Matrix: Soil/Solid (dry weight)
Solids (%):94.8
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	2.66 U	2.66	0.797	mg/kg	1		07/29/21 21:42
Surrogates							
4-Bromofluorobenzene (surr)	84	50-150		%	1		07/29/21 21:42

Batch Information

Analytical Batch: VFC15739
Analytical Method: AK101
Analyst: MDT
Analytical Date/Time: 07/29/21 21:42
Container ID: 1214397005-A

Prep Batch: VXX37528
Prep Method: SW5035A
Prep Date/Time: 07/15/21 16:37
Prep Initial Wt./Vol.: 55.349 g
Prep Extract Vol: 27.8749 mL

Print Date: 08/06/2021 4:59:35PM



Results of 18130 TP4S3

Client Sample ID: **18130 TP4S3**
Client Project ID: **Shungnak**
Lab Sample ID: 1214397005
Lab Project ID: 1214397

Collection Date: 07/15/21 16:37
Received Date: 07/20/21 11:06
Matrix: Soil/Solid (dry weight)
Solids (%):94.8
Location:

Results by Volatile GC/MS- Petroleum VOC Group

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	53.1 U	53.1	15.9	ug/kg	1		07/28/21 19:10
1,2-Dibromoethane	1.06 U	1.06	0.425	ug/kg	1		07/28/21 19:10
1,2-Dichloroethane	2.12 U	2.12	0.744	ug/kg	1		07/28/21 19:10
1,3,5-Trimethylbenzene	26.6 U	26.6	8.29	ug/kg	1		07/28/21 19:10
Benzene	13.3 U	13.3	4.14	ug/kg	1		07/28/21 19:10
Ethylbenzene	26.6 U	26.6	8.29	ug/kg	1		07/28/21 19:10
Isopropylbenzene (Cumene)	26.6 U	26.6	8.29	ug/kg	1		07/28/21 19:10
Methyl-t-butyl ether	106 U	106	32.9	ug/kg	1		07/28/21 19:10
Naphthalene	26.6 U	26.6	8.29	ug/kg	1		07/28/21 19:10
n-Butylbenzene	26.6 U	26.6	8.29	ug/kg	1		07/28/21 19:10
o-Xylene	26.6 U	26.6	8.29	ug/kg	1		07/28/21 19:10
P & M -Xylene	53.1 U	53.1	15.9	ug/kg	1		07/28/21 19:10
sec-Butylbenzene	26.6 U	26.6	8.29	ug/kg	1		07/28/21 19:10
tert-Butylbenzene	26.6 U	26.6	8.29	ug/kg	1		07/28/21 19:10
Toluene	26.6 U	26.6	8.29	ug/kg	1		07/28/21 19:10
Xylenes (total)	79.7 U	79.7	24.2	ug/kg	1		07/28/21 19:10
Surrogates							
1,2-Dichloroethane-D4 (surr)	109	71-136		%	1		07/28/21 19:10
4-Bromofluorobenzene (surr)	107	55-151		%	1		07/28/21 19:10
Toluene-d8 (surr)	98.9	85-116		%	1		07/28/21 19:10

Batch Information

Analytical Batch: VMS20981
Analytical Method: SW8260D
Analyst: S.S
Analytical Date/Time: 07/28/21 19:10
Container ID: 1214397005-A

Prep Batch: VXX37523
Prep Method: SW5035A
Prep Date/Time: 07/15/21 16:37
Prep Initial Wt./Vol.: 55.349 g
Prep Extract Vol: 27.8749 mL

Print Date: 08/06/2021 4:59:35PM

Results of 18130 TP5S3

Client Sample ID: **18130 TP5S3**
 Client Project ID: **Shungnak**
 Lab Sample ID: 1214397006
 Lab Project ID: 1214397

Collection Date: 07/15/21 16:58
 Received Date: 07/20/21 11:06
 Matrix: Soil/Solid (dry weight)
 Solids (%):93.7
 Location:

Results by Polynuclear Aromatics GC/MS

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	26.6 U	26.6	6.65	ug/kg	1		07/29/21 03:57
2-Methylnaphthalene	26.6 U	26.6	6.65	ug/kg	1		07/29/21 03:57
Acenaphthene	26.6 U	26.6	6.65	ug/kg	1		07/29/21 03:57
Acenaphthylene	26.6 U	26.6	6.65	ug/kg	1		07/29/21 03:57
Anthracene	26.6 U	26.6	6.65	ug/kg	1		07/29/21 03:57
Benzo(a)Anthracene	26.6 U	26.6	6.65	ug/kg	1		07/29/21 03:57
Benzo[a]pyrene	26.6 U	26.6	6.65	ug/kg	1		07/29/21 03:57
Benzo[b]Fluoranthene	26.6 U	26.6	6.65	ug/kg	1		07/29/21 03:57
Benzo[g,h,i]perylene	26.6 U	26.6	6.65	ug/kg	1		07/29/21 03:57
Benzo[k]fluoranthene	26.6 U	26.6	6.65	ug/kg	1		07/29/21 03:57
Chrysene	26.6 U	26.6	6.65	ug/kg	1		07/29/21 03:57
Dibenzo[a,h]anthracene	26.6 U	26.6	6.65	ug/kg	1		07/29/21 03:57
Fluoranthene	26.6 U	26.6	6.65	ug/kg	1		07/29/21 03:57
Fluorene	26.6 U	26.6	6.65	ug/kg	1		07/29/21 03:57
Indeno[1,2,3-c,d] pyrene	26.6 U	26.6	6.65	ug/kg	1		07/29/21 03:57
Naphthalene	21.3 U	21.3	5.32	ug/kg	1		07/29/21 03:57
Phenanthrene	26.6 U	26.6	6.65	ug/kg	1		07/29/21 03:57
Pyrene	26.6 U	26.6	6.65	ug/kg	1		07/29/21 03:57
Surrogates							
2-Methylnaphthalene-d10 (surr)	89.2	58-103		%	1		07/29/21 03:57
Fluoranthene-d10 (surr)	85.7	54-113		%	1		07/29/21 03:57

Batch Information

Analytical Batch: XMS12787
 Analytical Method: 8270D SIM (PAH)
 Analyst: LAW
 Analytical Date/Time: 07/29/21 03:57
 Container ID: 1214397006-B

Prep Batch: XXX45226
 Prep Method: SW3550C
 Prep Date/Time: 07/24/21 13:20
 Prep Initial Wt./Vol.: 22.552 g
 Prep Extract Vol: 5 mL

Results of 18130 TP5S3

Client Sample ID: **18130 TP5S3**
 Client Project ID: **Shungnak**
 Lab Sample ID: 1214397006
 Lab Project ID: 1214397

Collection Date: 07/15/21 16:58
 Received Date: 07/20/21 11:06
 Matrix: Soil/Solid (dry weight)
 Solids (%):93.7
 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	21.2 U	21.2	6.58	mg/kg	1		07/30/21 22:46
Surrogates							
5a Androstane (surr)	103	50-150		%	1		07/30/21 22:46

Batch Information

Analytical Batch: XFC16024
 Analytical Method: AK102
 Analyst: A.A
 Analytical Date/Time: 07/30/21 22:46
 Container ID: 1214397006-B

Prep Batch: XXX45230
 Prep Method: SW3550C
 Prep Date/Time: 07/25/21 11:27
 Prep Initial Wt./Vol.: 30.139 g
 Prep Extract Vol: 5 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>
Residual Range Organics	106 U	106	45.7	mg/kg	1		07/30/21 22:46
Surrogates							
n-Triacontane-d62 (surr)	102	50-150		%	1		07/30/21 22:46

Batch Information

Analytical Batch: XFC16024
 Analytical Method: AK103
 Analyst: A.A
 Analytical Date/Time: 07/30/21 22:46
 Container ID: 1214397006-B

Prep Batch: XXX45230
 Prep Method: SW3550C
 Prep Date/Time: 07/25/21 11:27
 Prep Initial Wt./Vol.: 30.139 g
 Prep Extract Vol: 5 mL

Print Date: 08/06/2021 4:59:35PM

Results of 18130 TP5S3

Client Sample ID: **18130 TP5S3**
 Client Project ID: **Shungnak**
 Lab Sample ID: 1214397006
 Lab Project ID: 1214397

Collection Date: 07/15/21 16:58
 Received Date: 07/20/21 11:06
 Matrix: Soil/Solid (dry weight)
 Solids (%):93.7
 Location:

Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.95 U	1.95	0.585	mg/kg	1		07/29/21 22:18
Surrogates							
4-Bromofluorobenzene (surr)	87.2	50-150		%	1		07/29/21 22:18

Batch Information

Analytical Batch: VFC15739
 Analytical Method: AK101
 Analyst: MDT
 Analytical Date/Time: 07/29/21 22:18
 Container ID: 1214397006-A

Prep Batch: VXX37528
 Prep Method: SW5035A
 Prep Date/Time: 07/15/21 16:58
 Prep Initial Wt./Vol.: 82.494 g
 Prep Extract Vol: 30.1573 mL

Print Date: 08/06/2021 4:59:35PM

Results of 18130 TP5S3

Client Sample ID: **18130 TP5S3**
 Client Project ID: **Shungnak**
 Lab Sample ID: 1214397006
 Lab Project ID: 1214397

Collection Date: 07/15/21 16:58
 Received Date: 07/20/21 11:06
 Matrix: Soil/Solid (dry weight)
 Solids (%):93.7
 Location:

Results by Volatile GC/MS- Petroleum VOC Group

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	39.0 U	39.0	11.7	ug/kg	1		07/28/21 19:27
1,2-Dibromoethane	0.780 U	0.780	0.312	ug/kg	1		07/28/21 19:27
1,2-Dichloroethane	1.56 U	1.56	0.546	ug/kg	1		07/28/21 19:27
1,3,5-Trimethylbenzene	19.5 U	19.5	6.08	ug/kg	1		07/28/21 19:27
Benzene	9.75 U	9.75	3.04	ug/kg	1		07/28/21 19:27
Ethylbenzene	19.5 U	19.5	6.08	ug/kg	1		07/28/21 19:27
Isopropylbenzene (Cumene)	19.5 U	19.5	6.08	ug/kg	1		07/28/21 19:27
Methyl-t-butyl ether	78.0 U	78.0	24.2	ug/kg	1		07/28/21 19:27
Naphthalene	19.5 U	19.5	6.08	ug/kg	1		07/28/21 19:27
n-Butylbenzene	19.5 U	19.5	6.08	ug/kg	1		07/28/21 19:27
o-Xylene	19.5 U	19.5	6.08	ug/kg	1		07/28/21 19:27
P & M -Xylene	39.0 U	39.0	11.7	ug/kg	1		07/28/21 19:27
sec-Butylbenzene	19.5 U	19.5	6.08	ug/kg	1		07/28/21 19:27
tert-Butylbenzene	19.5 U	19.5	6.08	ug/kg	1		07/28/21 19:27
Toluene	19.5 U	19.5	6.08	ug/kg	1		07/28/21 19:27
Xylenes (total)	58.5 U	58.5	17.8	ug/kg	1		07/28/21 19:27
Surrogates							
1,2-Dichloroethane-D4 (surr)	109	71-136		%	1		07/28/21 19:27
4-Bromofluorobenzene (surr)	110	55-151		%	1		07/28/21 19:27
Toluene-d8 (surr)	98.6	85-116		%	1		07/28/21 19:27

Batch Information

Analytical Batch: VMS20981
 Analytical Method: SW8260D
 Analyst: S.S
 Analytical Date/Time: 07/28/21 19:27
 Container ID: 1214397006-A

Prep Batch: VXX37523
 Prep Method: SW5035A
 Prep Date/Time: 07/15/21 16:58
 Prep Initial Wt./Vol.: 82.494 g
 Prep Extract Vol: 30.1573 mL

Results of 18130 TP6S1

Client Sample ID: **18130 TP6S1**
 Client Project ID: **Shungnak**
 Lab Sample ID: 1214397007
 Lab Project ID: 1214397

Collection Date: 07/15/21 17:15
 Received Date: 07/20/21 11:06
 Matrix: Soil/Solid (dry weight)
 Solids (%):92.9
 Location:

Results by Polynuclear Aromatics GC/MS

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	26.6 U	26.6	6.66	ug/kg	1		07/29/21 04:18
2-Methylnaphthalene	26.6 U	26.6	6.66	ug/kg	1		07/29/21 04:18
Acenaphthene	26.6 U	26.6	6.66	ug/kg	1		07/29/21 04:18
Acenaphthylene	26.6 U	26.6	6.66	ug/kg	1		07/29/21 04:18
Anthracene	26.6 U	26.6	6.66	ug/kg	1		07/29/21 04:18
Benzo(a)Anthracene	26.6 U	26.6	6.66	ug/kg	1		07/29/21 04:18
Benzo(a)pyrene	26.6 U	26.6	6.66	ug/kg	1		07/29/21 04:18
Benzo(b)Fluoranthene	26.6 U	26.6	6.66	ug/kg	1		07/29/21 04:18
Benzo(g,h,i)perylene	26.6 U	26.6	6.66	ug/kg	1		07/29/21 04:18
Benzo(k)fluoranthene	26.6 U	26.6	6.66	ug/kg	1		07/29/21 04:18
Chrysene	26.6 U	26.6	6.66	ug/kg	1		07/29/21 04:18
Dibenzo(a,h)anthracene	26.6 U	26.6	6.66	ug/kg	1		07/29/21 04:18
Fluoranthene	26.6 U	26.6	6.66	ug/kg	1		07/29/21 04:18
Fluorene	26.6 U	26.6	6.66	ug/kg	1		07/29/21 04:18
Indeno[1,2,3-c,d] pyrene	26.6 U	26.6	6.66	ug/kg	1		07/29/21 04:18
Naphthalene	21.3 U	21.3	5.33	ug/kg	1		07/29/21 04:18
Phenanthrene	26.6 U	26.6	6.66	ug/kg	1		07/29/21 04:18
Pyrene	26.6 U	26.6	6.66	ug/kg	1		07/29/21 04:18
Surrogates							
2-Methylnaphthalene-d10 (surr)	85.4	58-103		%	1		07/29/21 04:18
Fluoranthene-d10 (surr)	81.2	54-113		%	1		07/29/21 04:18

Batch Information

Analytical Batch: XMS12787
 Analytical Method: 8270D SIM (PAH)
 Analyst: LAW
 Analytical Date/Time: 07/29/21 04:18
 Container ID: 1214397007-B

Prep Batch: XXX45226
 Prep Method: SW3550C
 Prep Date/Time: 07/24/21 13:20
 Prep Initial Wt./Vol.: 22.738 g
 Prep Extract Vol: 5 mL



Results of 18130 TP6S1

Client Sample ID: **18130 TP6S1**
Client Project ID: **Shungnak**
Lab Sample ID: 1214397007
Lab Project ID: 1214397

Collection Date: 07/15/21 17:15
Received Date: 07/20/21 11:06
Matrix: Soil/Solid (dry weight)
Solids (%):92.9
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	21.4 U	21.4	6.62	mg/kg	1		07/30/21 22:36
Surrogates							
5a Androstane (surr)	98.3	50-150		%	1		07/30/21 22:36

Batch Information

Analytical Batch: XFC16024
Analytical Method: AK102
Analyst: A.A
Analytical Date/Time: 07/30/21 22:36
Container ID: 1214397007-B

Prep Batch: XXX45230
Prep Method: SW3550C
Prep Date/Time: 07/25/21 11:27
Prep Initial Wt./Vol.: 30.255 g
Prep Extract Vol: 5 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>
Residual Range Organics	117	107	45.9	mg/kg	1		07/30/21 22:36
Surrogates							
n-Triacontane-d62 (surr)	99.6	50-150		%	1		07/30/21 22:36

Batch Information

Analytical Batch: XFC16024
Analytical Method: AK103
Analyst: A.A
Analytical Date/Time: 07/30/21 22:36
Container ID: 1214397007-B

Prep Batch: XXX45230
Prep Method: SW3550C
Prep Date/Time: 07/25/21 11:27
Prep Initial Wt./Vol.: 30.255 g
Prep Extract Vol: 5 mL

Print Date: 08/06/2021 4:59:35PM



Results of 18130 TP6S1

Client Sample ID: **18130 TP6S1**
Client Project ID: **Shungnak**
Lab Sample ID: 1214397007
Lab Project ID: 1214397

Collection Date: 07/15/21 17:15
Received Date: 07/20/21 11:06
Matrix: Soil/Solid (dry weight)
Solids (%):92.9
Location:

Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	3.03 U	3.03	0.909	mg/kg	1		07/29/21 22:36
Surrogates							
4-Bromofluorobenzene (surr)	72.5	50-150		%	1		07/29/21 22:36

Batch Information

Analytical Batch: VFC15739
Analytical Method: AK101
Analyst: MDT
Analytical Date/Time: 07/29/21 22:36
Container ID: 1214397007-A

Prep Batch: VXX37528
Prep Method: SW5035A
Prep Date/Time: 07/15/21 17:15
Prep Initial Wt./Vol.: 50.902 g
Prep Extract Vol: 28.6371 mL

Print Date: 08/06/2021 4:59:35PM



Results of 18130 TP6S1

Client Sample ID: **18130 TP6S1**
Client Project ID: **Shungnak**
Lab Sample ID: 1214397007
Lab Project ID: 1214397

Collection Date: 07/15/21 17:15
Received Date: 07/20/21 11:06
Matrix: Soil/Solid (dry weight)
Solids (%):92.9
Location:

Results by Volatile GC/MS- Petroleum VOC Group

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	60.6 U	60.6	18.2	ug/kg	1		07/28/21 19:44
1,2-Dibromoethane	1.21 U	1.21	0.485	ug/kg	1		07/28/21 19:44
1,2-Dichloroethane	2.42 U	2.42	0.848	ug/kg	1		07/28/21 19:44
1,3,5-Trimethylbenzene	30.3 U	30.3	9.45	ug/kg	1		07/28/21 19:44
Benzene	15.1 U	15.1	4.73	ug/kg	1		07/28/21 19:44
Ethylbenzene	30.3 U	30.3	9.45	ug/kg	1		07/28/21 19:44
Isopropylbenzene (Cumene)	30.3 U	30.3	9.45	ug/kg	1		07/28/21 19:44
Methyl-t-butyl ether	121 U	121	37.6	ug/kg	1		07/28/21 19:44
Naphthalene	30.3 U	30.3	9.45	ug/kg	1		07/28/21 19:44
n-Butylbenzene	30.3 U	30.3	9.45	ug/kg	1		07/28/21 19:44
o-Xylene	30.3 U	30.3	9.45	ug/kg	1		07/28/21 19:44
P & M -Xylene	60.6 U	60.6	18.2	ug/kg	1		07/28/21 19:44
sec-Butylbenzene	30.3 U	30.3	9.45	ug/kg	1		07/28/21 19:44
tert-Butylbenzene	30.3 U	30.3	9.45	ug/kg	1		07/28/21 19:44
Toluene	30.3 U	30.3	9.45	ug/kg	1		07/28/21 19:44
Xylenes (total)	90.9 U	90.9	27.6	ug/kg	1		07/28/21 19:44
Surrogates							
1,2-Dichloroethane-D4 (surr)	111	71-136		%	1		07/28/21 19:44
4-Bromofluorobenzene (surr)	92.6	55-151		%	1		07/28/21 19:44
Toluene-d8 (surr)	99.3	85-116		%	1		07/28/21 19:44

Batch Information

Analytical Batch: VMS20981
Analytical Method: SW8260D
Analyst: S.S
Analytical Date/Time: 07/28/21 19:44
Container ID: 1214397007-A

Prep Batch: VXX37523
Prep Method: SW5035A
Prep Date/Time: 07/15/21 17:15
Prep Initial Wt./Vol.: 50.902 g
Prep Extract Vol: 28.6371 mL

Print Date: 08/06/2021 4:59:35PM

Results of 18130 TP6S11

Client Sample ID: **18130 TP6S11**
 Client Project ID: **Shungnak**
 Lab Sample ID: 1214397008
 Lab Project ID: 1214397

Collection Date: 07/15/21 17:18
 Received Date: 07/20/21 11:06
 Matrix: Soil/Solid (dry weight)
 Solids (%):93.2
 Location:

Results by Polynuclear Aromatics GC/MS

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	26.5 U	26.5	6.63	ug/kg	1		07/29/21 04:38
2-Methylnaphthalene	26.5 U	26.5	6.63	ug/kg	1		07/29/21 04:38
Acenaphthene	26.5 U	26.5	6.63	ug/kg	1		07/29/21 04:38
Acenaphthylene	26.5 U	26.5	6.63	ug/kg	1		07/29/21 04:38
Anthracene	26.5 U	26.5	6.63	ug/kg	1		07/29/21 04:38
Benzo(a)Anthracene	26.5 U	26.5	6.63	ug/kg	1		07/29/21 04:38
Benzo(a)pyrene	26.5 U	26.5	6.63	ug/kg	1		07/29/21 04:38
Benzo(b)Fluoranthene	26.5 U	26.5	6.63	ug/kg	1		07/29/21 04:38
Benzo(g,h,i)perylene	26.5 U	26.5	6.63	ug/kg	1		07/29/21 04:38
Benzo(k)fluoranthene	26.5 U	26.5	6.63	ug/kg	1		07/29/21 04:38
Chrysene	26.5 U	26.5	6.63	ug/kg	1		07/29/21 04:38
Dibenzo(a,h)anthracene	26.5 U	26.5	6.63	ug/kg	1		07/29/21 04:38
Fluoranthene	26.5 U	26.5	6.63	ug/kg	1		07/29/21 04:38
Fluorene	26.5 U	26.5	6.63	ug/kg	1		07/29/21 04:38
Indeno[1,2,3-c,d] pyrene	26.5 U	26.5	6.63	ug/kg	1		07/29/21 04:38
Naphthalene	21.2 U	21.2	5.31	ug/kg	1		07/29/21 04:38
Phenanthrene	26.5 U	26.5	6.63	ug/kg	1		07/29/21 04:38
Pyrene	26.5 U	26.5	6.63	ug/kg	1		07/29/21 04:38

Surrogates

2-Methylnaphthalene-d10 (surr)	83.4	58-103		%	1		07/29/21 04:38
Fluoranthene-d10 (surr)	80.3	54-113		%	1		07/29/21 04:38

Batch Information

Analytical Batch: XMS12787
 Analytical Method: 8270D SIM (PAH)
 Analyst: LAW
 Analytical Date/Time: 07/29/21 04:38
 Container ID: 1214397008-B

Prep Batch: XXX45226
 Prep Method: SW3550C
 Prep Date/Time: 07/24/21 13:20
 Prep Initial Wt./Vol.: 22.749 g
 Prep Extract Vol: 5 mL

Results of 18130 TP6S11

Client Sample ID: **18130 TP6S11**
 Client Project ID: **Shungnak**
 Lab Sample ID: 1214397008
 Lab Project ID: 1214397

Collection Date: 07/15/21 17:18
 Received Date: 07/20/21 11:06
 Matrix: Soil/Solid (dry weight)
 Solids (%):93.2
 Location:

Results by Semivolatile Organic Fuels

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	29.1		21.5	6.65	mg/kg	1		07/30/21 22:56
Surrogates								
5a Androstane (surr)	102		50-150		%	1		07/30/21 22:56

Batch Information

Analytical Batch: XFC16024
 Analytical Method: AK102
 Analyst: A.A
 Analytical Date/Time: 07/30/21 22:56
 Container ID: 1214397008-B

Prep Batch: XXX45230
 Prep Method: SW3550C
 Prep Date/Time: 07/25/21 11:27
 Prep Initial Wt./Vol.: 30.012 g
 Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	352		107	46.1	mg/kg	1		07/30/21 22:56
Surrogates								
n-Triacontane-d62 (surr)	104		50-150		%	1		07/30/21 22:56

Batch Information

Analytical Batch: XFC16024
 Analytical Method: AK103
 Analyst: A.A
 Analytical Date/Time: 07/30/21 22:56
 Container ID: 1214397008-B

Prep Batch: XXX45230
 Prep Method: SW3550C
 Prep Date/Time: 07/25/21 11:27
 Prep Initial Wt./Vol.: 30.012 g
 Prep Extract Vol: 5 mL

Print Date: 08/06/2021 4:59:35PM



Results of 18130 TP6S11

Client Sample ID: **18130 TP6S11**
Client Project ID: **Shungnak**
Lab Sample ID: 1214397008
Lab Project ID: 1214397

Collection Date: 07/15/21 17:18
Received Date: 07/20/21 11:06
Matrix: Soil/Solid (dry weight)
Solids (%):93.2
Location:

Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	2.72 U	2.72	0.817	mg/kg	1		07/29/21 22:54
Surrogates							
4-Bromofluorobenzene (surr)	74.5	50-150		%	1		07/29/21 22:54

Batch Information

Analytical Batch: VFC15739
Analytical Method: AK101
Analyst: MDT
Analytical Date/Time: 07/29/21 22:54
Container ID: 1214397008-A

Prep Batch: VXX37528
Prep Method: SW5035A
Prep Date/Time: 07/15/21 17:18
Prep Initial Wt./Vol.: 56.94 g
Prep Extract Vol: 28.8873 mL

Print Date: 08/06/2021 4:59:35PM



Results of 18130 TP6S11

Client Sample ID: **18130 TP6S11**
Client Project ID: **Shungnak**
Lab Sample ID: 1214397008
Lab Project ID: 1214397

Collection Date: 07/15/21 17:18
Received Date: 07/20/21 11:06
Matrix: Soil/Solid (dry weight)
Solids (%):93.2
Location:

Results by Volatile GC/MS- Petroleum VOC Group

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	54.5 U	54.5	16.3	ug/kg	1		07/28/21 20:00
1,2-Dibromoethane	1.09 U	1.09	0.436	ug/kg	1		07/28/21 20:00
1,2-Dichloroethane	2.18 U	2.18	0.762	ug/kg	1		07/28/21 20:00
1,3,5-Trimethylbenzene	27.2 U	27.2	8.49	ug/kg	1		07/28/21 20:00
Benzene	13.6 U	13.6	4.25	ug/kg	1		07/28/21 20:00
Ethylbenzene	27.2 U	27.2	8.49	ug/kg	1		07/28/21 20:00
Isopropylbenzene (Cumene)	27.2 U	27.2	8.49	ug/kg	1		07/28/21 20:00
Methyl-t-butyl ether	109 U	109	33.8	ug/kg	1		07/28/21 20:00
Naphthalene	27.2 U	27.2	8.49	ug/kg	1		07/28/21 20:00
n-Butylbenzene	27.2 U	27.2	8.49	ug/kg	1		07/28/21 20:00
o-Xylene	27.2 U	27.2	8.49	ug/kg	1		07/28/21 20:00
P & M -Xylene	54.5 U	54.5	16.3	ug/kg	1		07/28/21 20:00
sec-Butylbenzene	27.2 U	27.2	8.49	ug/kg	1		07/28/21 20:00
tert-Butylbenzene	27.2 U	27.2	8.49	ug/kg	1		07/28/21 20:00
Toluene	27.2 U	27.2	8.49	ug/kg	1		07/28/21 20:00
Xylenes (total)	81.7 U	81.7	24.8	ug/kg	1		07/28/21 20:00
Surrogates							
1,2-Dichloroethane-D4 (surr)	111	71-136		%	1		07/28/21 20:00
4-Bromofluorobenzene (surr)	95.5	55-151		%	1		07/28/21 20:00
Toluene-d8 (surr)	98.7	85-116		%	1		07/28/21 20:00

Batch Information

Analytical Batch: VMS20981
Analytical Method: SW8260D
Analyst: S.S
Analytical Date/Time: 07/28/21 20:00
Container ID: 1214397008-A

Prep Batch: VXX37523
Prep Method: SW5035A
Prep Date/Time: 07/15/21 17:18
Prep Initial Wt./Vol.: 56.94 g
Prep Extract Vol: 28.8873 mL

Print Date: 08/06/2021 4:59:35PM

Results of 18130 TP7S2

Client Sample ID: **18130 TP7S2**
 Client Project ID: **Shungnak**
 Lab Sample ID: 1214397009
 Lab Project ID: 1214397

Collection Date: 07/15/21 17:48
 Received Date: 07/20/21 11:06
 Matrix: Soil/Solid (dry weight)
 Solids (%):83.3
 Location:

Results by Polynuclear Aromatics GC/MS

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	437	29.7	7.42	ug/kg	1		07/29/21 04:59
2-Methylnaphthalene	414	29.7	7.42	ug/kg	1		07/29/21 04:59
Acenaphthene	29.7 U	29.7	7.42	ug/kg	1		07/29/21 04:59
Acenaphthylene	29.7 U	29.7	7.42	ug/kg	1		07/29/21 04:59
Anthracene	29.7 U	29.7	7.42	ug/kg	1		07/29/21 04:59
Benzo(a)Anthracene	29.7 U	29.7	7.42	ug/kg	1		07/29/21 04:59
Benzo[a]pyrene	29.7 U	29.7	7.42	ug/kg	1		07/29/21 04:59
Benzo[b]Fluoranthene	29.7 U	29.7	7.42	ug/kg	1		07/29/21 04:59
Benzo[g,h,i]perylene	29.7 U	29.7	7.42	ug/kg	1		07/29/21 04:59
Benzo[k]fluoranthene	29.7 U	29.7	7.42	ug/kg	1		07/29/21 04:59
Chrysene	29.7 U	29.7	7.42	ug/kg	1		07/29/21 04:59
Dibenzo[a,h]anthracene	29.7 U	29.7	7.42	ug/kg	1		07/29/21 04:59
Fluoranthene	29.7 U	29.7	7.42	ug/kg	1		07/29/21 04:59
Fluorene	29.7 U	29.7	7.42	ug/kg	1		07/29/21 04:59
Indeno[1,2,3-c,d] pyrene	29.7 U	29.7	7.42	ug/kg	1		07/29/21 04:59
Naphthalene	465	23.7	5.93	ug/kg	1		07/29/21 04:59
Phenanthrene	29.7 U	29.7	7.42	ug/kg	1		07/29/21 04:59
Pyrene	29.7 U	29.7	7.42	ug/kg	1		07/29/21 04:59
Surrogates							
2-Methylnaphthalene-d10 (surr)	112 *	58-103		%	1		07/29/21 04:59
Fluoranthene-d10 (surr)	72.5	54-113		%	1		07/29/21 04:59

Batch Information

Analytical Batch: XMS12787
 Analytical Method: 8270D SIM (PAH)
 Analyst: LAW
 Analytical Date/Time: 07/29/21 04:59
 Container ID: 1214397009-B

Prep Batch: XXX45226
 Prep Method: SW3550C
 Prep Date/Time: 07/24/21 13:20
 Prep Initial Wt./Vol.: 22.769 g
 Prep Extract Vol: 5 mL

Results of 18130 TP7S2

Client Sample ID: **18130 TP7S2**
 Client Project ID: **Shungnak**
 Lab Sample ID: 1214397009
 Lab Project ID: 1214397

Collection Date: 07/15/21 17:48
 Received Date: 07/20/21 11:06
 Matrix: Soil/Solid (dry weight)
 Solids (%):83.3
 Location:

Results by Semivolatile Organic Fuels

<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>
Diesel Range Organics	3310	23.7	7.36	mg/kg	1		07/30/21 23:06
Surrogates							
5a Androstane (surr)	97.2	50-150		%	1		07/30/21 23:06

Batch Information

Analytical Batch: XFC16024
 Analytical Method: AK102
 Analyst: A.A
 Analytical Date/Time: 07/30/21 23:06
 Container ID: 1214397009-B

Prep Batch: XXX45230
 Prep Method: SW3550C
 Prep Date/Time: 07/25/21 11:27
 Prep Initial Wt./Vol.: 30.349 g
 Prep Extract Vol: 5 mL

<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>
Residual Range Organics	119 U	119	51.1	mg/kg	1		07/30/21 23:06
Surrogates							
n-Triacontane-d62 (surr)	95.9	50-150		%	1		07/30/21 23:06

Batch Information

Analytical Batch: XFC16024
 Analytical Method: AK103
 Analyst: A.A
 Analytical Date/Time: 07/30/21 23:06
 Container ID: 1214397009-B

Prep Batch: XXX45230
 Prep Method: SW3550C
 Prep Date/Time: 07/25/21 11:27
 Prep Initial Wt./Vol.: 30.349 g
 Prep Extract Vol: 5 mL

Print Date: 08/06/2021 4:59:35PM

Results of 18130 TP7S2

Client Sample ID: **18130 TP7S2**
 Client Project ID: **Shungnak**
 Lab Sample ID: 1214397009
 Lab Project ID: 1214397

Collection Date: 07/15/21 17:48
 Received Date: 07/20/21 11:06
 Matrix: Soil/Solid (dry weight)
 Solids (%):83.3
 Location:

Results by Volatile Fuels

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	149		5.19	1.56	mg/kg	1		07/30/21 01:16
Surrogates								
4-Bromofluorobenzene (surr)	437	*	50-150		%	1		07/30/21 01:16

Batch Information

Analytical Batch: VFC15739
 Analytical Method: AK101
 Analyst: MDT
 Analytical Date/Time: 07/30/21 01:16
 Container ID: 1214397009-A

Prep Batch: VXX37529
 Prep Method: SW5035A
 Prep Date/Time: 07/15/21 17:48
 Prep Initial Wt./Vol.: 35.854 g
 Prep Extract Vol: 31.0021 mL

Print Date: 08/06/2021 4:59:35PM

Results of 18130 TP7S2

Client Sample ID: **18130 TP7S2**
 Client Project ID: **Shungnak**
 Lab Sample ID: 1214397009
 Lab Project ID: 1214397

Collection Date: 07/15/21 17:48
 Received Date: 07/20/21 11:06
 Matrix: Soil/Solid (dry weight)
 Solids (%):83.3
 Location:

Results by Volatile GC/MS- Petroleum VOC Group

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	8290	1040	312	ug/kg	10		07/29/21 20:27
1,2-Dibromoethane	2.08 U	2.08	0.831	ug/kg	1		07/28/21 20:17
1,2-Dichloroethane	4.15 U	4.15	1.45	ug/kg	1		07/28/21 20:17
1,3,5-Trimethylbenzene	7190	519	162	ug/kg	10		07/29/21 20:27
Benzene	26.0 U	26.0	8.10	ug/kg	1		07/28/21 20:17
Ethylbenzene	1200	51.9	16.2	ug/kg	1		07/28/21 20:17
Isopropylbenzene (Cumene)	1010	51.9	16.2	ug/kg	1		07/28/21 20:17
Methyl-t-butyl ether	208 U	208	64.4	ug/kg	1		07/28/21 20:17
Naphthalene	588	51.9	16.2	ug/kg	1		07/28/21 20:17
n-Butylbenzene	51.9 U	51.9	16.2	ug/kg	1		07/28/21 20:17
o-Xylene	4130	51.9	16.2	ug/kg	1		07/28/21 20:17
P & M -Xylene	1560	104	31.2	ug/kg	1		07/28/21 20:17
sec-Butylbenzene	2200	51.9	16.2	ug/kg	1		07/28/21 20:17
tert-Butylbenzene	98.7	51.9	16.2	ug/kg	1		07/28/21 20:17
Toluene	346	51.9	16.2	ug/kg	1		07/28/21 20:17
Xylenes (total)	5690	156	47.4	ug/kg	1		07/28/21 20:17

Surrogates

1,2-Dichloroethane-D4 (surr)	112	71-136	%	1		07/28/21 20:17
4-Bromofluorobenzene (surr)	96.6	55-151	%	1		07/28/21 20:17
Toluene-d8 (surr)	98.8	85-116	%	1		07/28/21 20:17

Batch Information

Analytical Batch: VMS20981
 Analytical Method: SW8260D
 Analyst: S.S
 Analytical Date/Time: 07/28/21 20:17
 Container ID: 1214397009-A

Prep Batch: VXX37523
 Prep Method: SW5035A
 Prep Date/Time: 07/15/21 17:48
 Prep Initial Wt./Vol.: 35.854 g
 Prep Extract Vol: 31.0021 mL

Analytical Batch: VMS20983
 Analytical Method: SW8260D
 Analyst: S.S
 Analytical Date/Time: 07/29/21 20:27
 Container ID: 1214397009-A

Prep Batch: VXX37526
 Prep Method: SW5035A
 Prep Date/Time: 07/15/21 17:48
 Prep Initial Wt./Vol.: 35.854 g
 Prep Extract Vol: 31.0021 mL



Results of 18130 TP8S1

Client Sample ID: **18130 TP8S1**
Client Project ID: **Shungnak**
Lab Sample ID: 1214397010
Lab Project ID: 1214397

Collection Date: 07/15/21 17:55
Received Date: 07/20/21 11:06
Matrix: Soil/Solid (dry weight)
Solids (%):88.0
Location:

Results by Polynuclear Aromatics GC/MS

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	27.9 U	27.9	6.97	ug/kg	1		07/29/21 05:19
2-Methylnaphthalene	27.9 U	27.9	6.97	ug/kg	1		07/29/21 05:19
Acenaphthene	27.9 U	27.9	6.97	ug/kg	1		07/29/21 05:19
Acenaphthylene	27.9 U	27.9	6.97	ug/kg	1		07/29/21 05:19
Anthracene	27.9 U	27.9	6.97	ug/kg	1		07/29/21 05:19
Benzo(a)Anthracene	27.9 U	27.9	6.97	ug/kg	1		07/29/21 05:19
Benzo(a)pyrene	27.9 U	27.9	6.97	ug/kg	1		07/29/21 05:19
Benzo(b)Fluoranthene	27.9 U	27.9	6.97	ug/kg	1		07/29/21 05:19
Benzo(g,h,i)perylene	27.9 U	27.9	6.97	ug/kg	1		07/29/21 05:19
Benzo(k)fluoranthene	27.9 U	27.9	6.97	ug/kg	1		07/29/21 05:19
Chrysene	27.9 U	27.9	6.97	ug/kg	1		07/29/21 05:19
Dibenzo(a,h)anthracene	27.9 U	27.9	6.97	ug/kg	1		07/29/21 05:19
Fluoranthene	27.9 U	27.9	6.97	ug/kg	1		07/29/21 05:19
Fluorene	27.9 U	27.9	6.97	ug/kg	1		07/29/21 05:19
Indeno[1,2,3-c,d] pyrene	27.9 U	27.9	6.97	ug/kg	1		07/29/21 05:19
Naphthalene	22.3 U	22.3	5.58	ug/kg	1		07/29/21 05:19
Phenanthrene	27.9 U	27.9	6.97	ug/kg	1		07/29/21 05:19
Pyrene	27.9 U	27.9	6.97	ug/kg	1		07/29/21 05:19
Surrogates							
2-Methylnaphthalene-d10 (surr)	85.3	58-103		%	1		07/29/21 05:19
Fluoranthene-d10 (surr)	82	54-113		%	1		07/29/21 05:19

Batch Information

Analytical Batch: XMS12787
Analytical Method: 8270D SIM (PAH)
Analyst: LAW
Analytical Date/Time: 07/29/21 05:19
Container ID: 1214397010-B

Prep Batch: XXX45226
Prep Method: SW3550C
Prep Date/Time: 07/24/21 13:20
Prep Initial Wt./Vol.: 22.911 g
Prep Extract Vol: 5 mL

Print Date: 08/06/2021 4:59:35PM

Results of 18130 TP8S1

Client Sample ID: **18130 TP8S1**
 Client Project ID: **Shungnak**
 Lab Sample ID: 1214397010
 Lab Project ID: 1214397

Collection Date: 07/15/21 17:55
 Received Date: 07/20/21 11:06
 Matrix: Soil/Solid (dry weight)
 Solids (%):88.0
 Location:

Results by Semivolatile Organic Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	22.6 U	22.6	7.01	mg/kg	1		07/30/21 23:26
Surrogates							
5a Androstane (surr)	102	50-150		%	1		07/30/21 23:26

Batch Information

Analytical Batch: XFC16024
 Analytical Method: AK102
 Analyst: A.A
 Analytical Date/Time: 07/30/21 23:26
 Container ID: 1214397010-B

Prep Batch: XXX45230
 Prep Method: SW3550C
 Prep Date/Time: 07/25/21 11:27
 Prep Initial Wt./Vol.: 30.138 g
 Prep Extract Vol: 5 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	113 U	113	48.6	mg/kg	1		07/30/21 23:26
Surrogates							
n-Triacontane-d62 (surr)	100	50-150		%	1		07/30/21 23:26

Batch Information

Analytical Batch: XFC16024
 Analytical Method: AK103
 Analyst: A.A
 Analytical Date/Time: 07/30/21 23:26
 Container ID: 1214397010-B

Prep Batch: XXX45230
 Prep Method: SW3550C
 Prep Date/Time: 07/25/21 11:27
 Prep Initial Wt./Vol.: 30.138 g
 Prep Extract Vol: 5 mL

Print Date: 08/06/2021 4:59:35PM

Results of 18130 TP8S1

Client Sample ID: **18130 TP8S1**
 Client Project ID: **Shungnak**
 Lab Sample ID: 1214397010
 Lab Project ID: 1214397

Collection Date: 07/15/21 17:55
 Received Date: 07/20/21 11:06
 Matrix: Soil/Solid (dry weight)
 Solids (%):88.0
 Location:

Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	3.38 U	3.38	1.01	mg/kg	1		07/30/21 01:34
Surrogates							
4-Bromofluorobenzene (surr)	86.3	50-150		%	1		07/30/21 01:34

Batch Information

Analytical Batch: VFC15739
 Analytical Method: AK101
 Analyst: MDT
 Analytical Date/Time: 07/30/21 01:34
 Container ID: 1214397010-A

Prep Batch: VXX37529
 Prep Method: SW5035A
 Prep Date/Time: 07/15/21 17:55
 Prep Initial Wt./Vol.: 52.584 g
 Prep Extract Vol: 31.2852 mL

Print Date: 08/06/2021 4:59:35PM

Results of 18130 TP8S1

Client Sample ID: **18130 TP8S1**
 Client Project ID: **Shungnak**
 Lab Sample ID: 1214397010
 Lab Project ID: 1214397

Collection Date: 07/15/21 17:55
 Received Date: 07/20/21 11:06
 Matrix: Soil/Solid (dry weight)
 Solids (%):88.0
 Location:

Results by Volatile GC/MS- Petroleum VOC Group

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	67.6 U	67.6	20.3	ug/kg	1		07/28/21 20:33
1,2-Dibromoethane	1.35 U	1.35	0.541	ug/kg	1		07/28/21 20:33
1,2-Dichloroethane	2.70 U	2.70	0.946	ug/kg	1		07/28/21 20:33
1,3,5-Trimethylbenzene	38.5	33.8	10.5	ug/kg	1		07/28/21 20:33
Benzene	16.9 U	16.9	5.27	ug/kg	1		07/28/21 20:33
Ethylbenzene	33.8 U	33.8	10.5	ug/kg	1		07/28/21 20:33
Isopropylbenzene (Cumene)	33.8 U	33.8	10.5	ug/kg	1		07/28/21 20:33
Methyl-t-butyl ether	135 U	135	41.9	ug/kg	1		07/28/21 20:33
Naphthalene	33.8 U	33.8	10.5	ug/kg	1		07/29/21 15:29
n-Butylbenzene	33.8 U	33.8	10.5	ug/kg	1		07/28/21 20:33
o-Xylene	33.8 U	33.8	10.5	ug/kg	1		07/28/21 20:33
P & M -Xylene	67.6 U	67.6	20.3	ug/kg	1		07/28/21 20:33
sec-Butylbenzene	33.8 U	33.8	10.5	ug/kg	1		07/28/21 20:33
tert-Butylbenzene	33.8 U	33.8	10.5	ug/kg	1		07/28/21 20:33
Toluene	33.8 U	33.8	10.5	ug/kg	1		07/28/21 20:33
Xylenes (total)	101 U	101	30.8	ug/kg	1		07/28/21 20:33
Surrogates							
1,2-Dichloroethane-D4 (surr)	111	71-136		%	1		07/28/21 20:33
4-Bromofluorobenzene (surr)	107	55-151		%	1		07/28/21 20:33
Toluene-d8 (surr)	99.1	85-116		%	1		07/28/21 20:33

Batch Information

Analytical Batch: VMS20983
 Analytical Method: SW8260D
 Analyst: S.S
 Analytical Date/Time: 07/29/21 15:29
 Container ID: 1214397010-A

Prep Batch: VXX37526
 Prep Method: SW5035A
 Prep Date/Time: 07/15/21 17:55
 Prep Initial Wt./Vol.: 52.584 g
 Prep Extract Vol: 31.2852 mL

Analytical Batch: VMS20981
 Analytical Method: SW8260D
 Analyst: S.S
 Analytical Date/Time: 07/28/21 20:33
 Container ID: 1214397010-A

Prep Batch: VXX37523
 Prep Method: SW5035A
 Prep Date/Time: 07/15/21 17:55
 Prep Initial Wt./Vol.: 52.584 g
 Prep Extract Vol: 31.2852 mL



Results of 18130 STB

Client Sample ID: **18130 STB**
Client Project ID: **Shungnak**
Lab Sample ID: 1214397011
Lab Project ID: 1214397

Collection Date: 07/15/21 15:00
Received Date: 07/20/21 11:06
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	2.53 U	2.53	0.758	mg/kg	1		07/30/21 00:58
Surrogates							
4-Bromofluorobenzene (surr)	80.4	50-150		%	1		07/30/21 00:58

Batch Information

Analytical Batch: VFC15739
Analytical Method: AK101
Analyst: MDT
Analytical Date/Time: 07/30/21 00:58
Container ID: 1214397011-A

Prep Batch: VXX37529
Prep Method: SW5035A
Prep Date/Time: 07/15/21 15:00
Prep Initial Wt./Vol.: 49.487 g
Prep Extract Vol: 25 mL

Print Date: 08/06/2021 4:59:35PM



Results of 18130 STB

Client Sample ID: **18130 STB**
Client Project ID: **Shungnak**
Lab Sample ID: 1214397011
Lab Project ID: 1214397

Collection Date: 07/15/21 15:00
Received Date: 07/20/21 11:06
Matrix: Soil/Solid (dry weight)
Solids (%):
Location:

Results by Volatile GC/MS- Petroleum VOC Group

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	50.5 U	50.5	15.2	ug/kg	1		07/27/21 13:39
1,2-Dibromoethane	1.01 U	1.01	0.404	ug/kg	1		07/27/21 13:39
1,2-Dichloroethane	2.02 U	2.02	0.707	ug/kg	1		07/27/21 13:39
1,3,5-Trimethylbenzene	25.3 U	25.3	7.88	ug/kg	1		07/27/21 13:39
Benzene	12.6 U	12.6	3.94	ug/kg	1		07/27/21 13:39
Ethylbenzene	25.3 U	25.3	7.88	ug/kg	1		07/27/21 13:39
Isopropylbenzene (Cumene)	25.3 U	25.3	7.88	ug/kg	1		07/27/21 13:39
Methyl-t-butyl ether	101 U	101	31.3	ug/kg	1		07/27/21 13:39
Naphthalene	25.3 U	25.3	7.88	ug/kg	1		07/27/21 13:39
n-Butylbenzene	25.3 U	25.3	7.88	ug/kg	1		07/27/21 13:39
o-Xylene	25.3 U	25.3	7.88	ug/kg	1		07/27/21 13:39
P & M -Xylene	50.5 U	50.5	15.2	ug/kg	1		07/27/21 13:39
sec-Butylbenzene	25.3 U	25.3	7.88	ug/kg	1		07/27/21 13:39
tert-Butylbenzene	25.3 U	25.3	7.88	ug/kg	1		07/27/21 13:39
Toluene	25.3 U	25.3	7.88	ug/kg	1		07/27/21 13:39
Xylenes (total)	75.8 U	75.8	23.0	ug/kg	1		07/27/21 13:39

Surrogates

1,2-Dichloroethane-D4 (surr)	111	71-136	%	1	07/27/21 13:39
4-Bromofluorobenzene (surr)	92.9	55-151	%	1	07/27/21 13:39
Toluene-d8 (surr)	99.7	85-116	%	1	07/27/21 13:39

Batch Information

Analytical Batch: VMS20977
Analytical Method: SW8260D
Analyst: S.S
Analytical Date/Time: 07/27/21 13:39
Container ID: 1214397011-A

Prep Batch: VXX37513
Prep Method: SW5035A
Prep Date/Time: 07/15/21 15:00
Prep Initial Wt./Vol.: 49.487 g
Prep Extract Vol: 25 mL

Print Date: 08/06/2021 4:59:35PM



Method Blank

Blank ID: MB for HBN 1822949 [SPT/11332]
Blank Lab ID: 1625518

Matrix: Soil/Solid (dry weight)

QC for Samples:

1214397001, 1214397002, 1214397003, 1214397004, 1214397005, 1214397006, 1214397007, 1214397008, 1214397009, 1214397010

Results by SM21 2540G

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Total Solids	99.0			%

Batch Information

Analytical Batch: SPT11332
Analytical Method: SM21 2540G
Instrument:
Analyst: TMM
Analytical Date/Time: 7/24/2021 5:00:00PM

Print Date: 08/06/2021 4:59:40PM

Duplicate Sample Summary

Original Sample ID: 1214397004

Duplicate Sample ID: 1625519

QC for Samples:

1214397001, 1214397002, 1214397003, 1214397004, 1214397005, 1214397006, 1214397007, 1214397008, 1214397009, 1214397010

Analysis Date: 07/24/2021 17:00

Matrix: Soil/Solid (dry weight)

Results by SM21 2540G

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Solids	94.0	94.2	%	0.21	(< 15)

Batch Information

Analytical Batch: SPT11332

Analytical Method: SM21 2540G

Instrument:

Analyst: TMM

Print Date: 08/06/2021 4:59:42PM



Duplicate Sample Summary

Original Sample ID: 1214496004

Duplicate Sample ID: 1625542

QC for Samples:

1214397005, 1214397006, 1214397007, 1214397008, 1214397009, 1214397010

Analysis Date: 07/26/2021 09:09

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	38.6	39.1	%	1.30	(< 15)

Batch Information

Analytical Batch: SPT11332

Analytical Method: SM21 2540G

Instrument:

Analyst: TMM

Print Date: 08/06/2021 4:59:42PM

Method Blank

Blank ID: MB for HBN 1823114 [VXX/37513]
Blank Lab ID: 1626160

Matrix: Soil/Solid (dry weight)

QC for Samples:
1214397011

Results by SW8260D

Parameter	Results	LOQ/CL	DL	Units
1,2,4-Trimethylbenzene	25.0U	50.0	15.0	ug/kg
1,2-Dibromoethane	0.500U	1.00	0.400	ug/kg
1,2-Dichloroethane	1.00U	2.00	0.700	ug/kg
1,3,5-Trimethylbenzene	12.5U	25.0	7.80	ug/kg
Benzene	6.25U	12.5	3.90	ug/kg
Ethylbenzene	12.5U	25.0	7.80	ug/kg
Isopropylbenzene (Cumene)	12.5U	25.0	7.80	ug/kg
Methyl-t-butyl ether	50.0U	100	31.0	ug/kg
Naphthalene	12.5U	25.0	7.80	ug/kg
n-Butylbenzene	12.5U	25.0	7.80	ug/kg
o-Xylene	12.5U	25.0	7.80	ug/kg
P & M -Xylene	25.0U	50.0	15.0	ug/kg
sec-Butylbenzene	12.5U	25.0	7.80	ug/kg
tert-Butylbenzene	12.5U	25.0	7.80	ug/kg
Toluene	12.5U	25.0	7.80	ug/kg
Xylenes (total)	37.5U	75.0	22.8	ug/kg

Surrogates

1,2-Dichloroethane-D4 (surr)	112	71-136	%
4-Bromofluorobenzene (surr)	92.4	55-151	%
Toluene-d8 (surr)	98.3	85-116	%

Batch Information

Analytical Batch: VMS20977
Analytical Method: SW8260D
Instrument: VRA Agilent GC/MS 7890B/5977A
Analyst: S.S
Analytical Date/Time: 7/27/2021 10:01:00AM

Prep Batch: VXX37513
Prep Method: SW5035A
Prep Date/Time: 7/27/2021 6:00:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1214397 [VXX37513]

Blank Spike Lab ID: 1626161

Date Analyzed: 07/27/2021 10:16

Matrix: Soil/Solid (dry weight)

QC for Samples: 1214397011

Results by SW8260D

Blank Spike (ug/kg)

Parameter	Spike	Result	Rec (%)	CL
1,2,4-Trimethylbenzene	750	770	103	(75-123)
1,2-Dibromoethane	750	902	120	(78-122)
1,2-Dichloroethane	750	827	110	(73-128)
1,3,5-Trimethylbenzene	750	748	100	(73-124)
Benzene	750	769	102	(77-121)
Ethylbenzene	750	757	101	(76-122)
Isopropylbenzene (Cumene)	750	797	106	(68-134)
Methyl-t-butyl ether	1130	1220	109	(73-125)
Naphthalene	750	885	118	(62-129)
n-Butylbenzene	750	768	102	(70-128)
o-Xylene	750	784	105	(77-123)
P & M -Xylene	1500	1520	101	(77-124)
sec-Butylbenzene	750	752	100	(73-126)
tert-Butylbenzene	750	751	100	(73-125)
Toluene	750	770	103	(77-121)
Xylenes (total)	2250	2300	102	(78-124)

Surrogates

1,2-Dichloroethane-D4 (surr)	750	111	(71-136)
4-Bromofluorobenzene (surr)	750	89	(55-151)
Toluene-d8 (surr)	750	101	(85-116)

Batch Information

Analytical Batch: VMS20977

Analytical Method: SW8260D

Instrument: VRA Agilent GC/MS 7890B/5977A

Analyst: S.S

Prep Batch: VXX37513

Prep Method: SW5035A

Prep Date/Time: 07/27/2021 06:00

Spike Init Wt./Vol.: 750 ug/kg Extract Vol: 25 mL

Dupe Init Wt./Vol.: Extract Vol:

Matrix Spike Summary

Original Sample ID: 1626162
MS Sample ID: 1626163 MS
MSD Sample ID: 1626164 MSD

Analysis Date: 07/27/2021 14:41
Analysis Date: 07/27/2021 12:22
Analysis Date: 07/27/2021 12:37
Matrix: Solid/Soil (Wet Weight)

QC for Samples: 1214397011

Results by SW8260D

Parameter	Sample	Matrix Spike (ug/kg)			Spike Duplicate (ug/kg)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
1,2,4-Trimethylbenzene	24.0U	720	730	102	720	743	103	75-123	1.70	(< 20)
1,2-Dibromoethane	0.479U	720	859	119	720	816	113	78-122	5.10	(< 20)
1,2-Dichloroethane	0.960U	720	791	110	720	767	107	73-128	3.10	(< 20)
1,3,5-Trimethylbenzene	12.0U	720	713	99	720	733	102	73-124	2.80	(< 20)
Benzene	6.00U	720	730	101	720	718	100	77-121	1.70	(< 20)
Ethylbenzene	12.0U	720	740	103	720	700	97	76-122	5.50	(< 20)
Isopropylbenzene (Cumene)	12.0U	720	766	106	720	736	102	68-134	4.10	(< 20)
Methyl-t-butyl ether	48.0U	1080	1170	108	1080	1160	107	73-125	0.99	(< 20)
Naphthalene	12.2J	720	880	121	720	919	126	62-129	4.40	(< 20)
n-Butylbenzene	12.0U	720	751	104	720	774	108	70-128	3.00	(< 20)
o-Xylene	12.0U	720	749	104	720	719	100	77-123	4.00	(< 20)
P & M -Xylene	24.0U	1440	1450	101	1440	1390	97	77-124	4.00	(< 20)
sec-Butylbenzene	12.0U	720	732	102	720	731	102	73-126	0.26	(< 20)
tert-Butylbenzene	12.0U	720	724	101	720	743	103	73-125	2.60	(< 20)
Toluene	12.0U	720	738	103	720	711	99	77-121	3.70	(< 20)
Xylenes (total)	36.0U	2160	2200	102	2160	2110	98	78-124	4.00	(< 20)
Surrogates										
1,2-Dichloroethane-D4 (surr)		720	795	110	720	773	107	71-136	2.80	
4-Bromofluorobenzene (surr)		1200	1020	85	1200	1030	86	55-151	1.50	
Toluene-d8 (surr)		720	732	102	720	720	100	85-116	1.60	

Batch Information

Analytical Batch: VMS20977
Analytical Method: SW8260D
Instrument: VRA Agilent GC/MS 7890B/5977A
Analyst: S.S
Analytical Date/Time: 7/27/2021 12:22:00PM

Prep Batch: VXX37513
Prep Method: Vol. Extraction SW8260 Field Extracted L
Prep Date/Time: 7/27/2021 6:00:00AM
Prep Initial Wt./Vol.: 52.12g
Prep Extract Vol: 25.00mL

Method Blank

Blank ID: MB for HBN 1823192 [VXX/37523]
Blank Lab ID: 1626498

Matrix: Soil/Solid (dry weight)

QC for Samples:

1214397001, 1214397002, 1214397003, 1214397004, 1214397005, 1214397006, 1214397007, 1214397008, 1214397009, 1214397010

Results by SW8260D

Parameter	Results	LOQ/CL	DL	Units
1,2,4-Trimethylbenzene	25.0U	50.0	15.0	ug/kg
1,2-Dibromoethane	0.500U	1.00	0.400	ug/kg
1,2-Dichloroethane	1.00U	2.00	0.700	ug/kg
1,3,5-Trimethylbenzene	12.5U	25.0	7.80	ug/kg
Benzene	6.25U	12.5	3.90	ug/kg
Ethylbenzene	12.5U	25.0	7.80	ug/kg
Isopropylbenzene (Cumene)	12.5U	25.0	7.80	ug/kg
Methyl-t-butyl ether	50.0U	100	31.0	ug/kg
Naphthalene	12.5U	25.0	7.80	ug/kg
n-Butylbenzene	12.5U	25.0	7.80	ug/kg
o-Xylene	12.5U	25.0	7.80	ug/kg
P & M -Xylene	25.0U	50.0	15.0	ug/kg
sec-Butylbenzene	12.5U	25.0	7.80	ug/kg
tert-Butylbenzene	12.5U	25.0	7.80	ug/kg
Toluene	12.5U	25.0	7.80	ug/kg
Xylenes (total)	37.5U	75.0	22.8	ug/kg

Surrogates

1,2-Dichloroethane-D4 (surr)	110	71-136	%
4-Bromofluorobenzene (surr)	108	55-151	%
Toluene-d8 (surr)	101	85-116	%

Batch Information

Analytical Batch: VMS20981
Analytical Method: SW8260D
Instrument: VQA 7890/5975 GC/MS
Analyst: S.S
Analytical Date/Time: 7/28/2021 11:30:00AM

Prep Batch: VXX37523
Prep Method: SW5035A
Prep Date/Time: 7/28/2021 6:00:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1214397 [VXX37523]

Blank Spike Lab ID: 1626499

Date Analyzed: 07/28/2021 11:47

Matrix: Soil/Solid (dry weight)

QC for Samples: 1214397001, 1214397002, 1214397003, 1214397004, 1214397005, 1214397006, 1214397007, 1214397008, 1214397009, 1214397010

Results by SW8260D

Blank Spike (ug/kg)

Parameter	Spike	Result	Rec (%)	CL
1,2,4-Trimethylbenzene	750	834	111	(75-123)
1,2-Dibromoethane	750	828	110	(78-122)
1,2-Dichloroethane	750	689	92	(73-128)
1,3,5-Trimethylbenzene	750	844	113	(73-124)
Benzene	750	765	102	(77-121)
Ethylbenzene	750	739	99	(76-122)
Isopropylbenzene (Cumene)	750	758	101	(68-134)
Methyl-t-butyl ether	1130	1030	91	(73-125)
Naphthalene	750	742	99	(62-129)
n-Butylbenzene	750	799	107	(70-128)
o-Xylene	750	756	101	(77-123)
P & M -Xylene	1500	1460	97	(77-124)
sec-Butylbenzene	750	799	107	(73-126)
tert-Butylbenzene	750	818	109	(73-125)
Toluene	750	753	100	(77-121)
Xylenes (total)	2250	2210	98	(78-124)

Surrogates

1,2-Dichloroethane-D4 (surr)	750	93	(71-136)
4-Bromofluorobenzene (surr)	750	102	(55-151)
Toluene-d8 (surr)	750	99	(85-116)

Batch Information

Analytical Batch: VMS20981

Analytical Method: SW8260D

Instrument: VQA 7890/5975 GC/MS

Analyst: S.S

Prep Batch: VXX37523

Prep Method: SW5035A

Prep Date/Time: 07/28/2021 06:00

Spike Init Wt./Vol.: 750 ug/kg Extract Vol: 25 mL

Dupe Init Wt./Vol.: Extract Vol:

Matrix Spike Summary

Original Sample ID: 1626500
MS Sample ID: 1626501 MS
MSD Sample ID: 1626502 MSD

Analysis Date: 07/28/2021 15:52
Analysis Date: 07/28/2021 13:23
Analysis Date: 07/28/2021 13:40
Matrix: Solid/Soil (Wet Weight)

QC for Samples: 1214397001, 1214397002, 1214397003, 1214397004, 1214397005, 1214397006, 1214397007, 1214397008, 1214397009, 1214397010

Results by SW8260D

Parameter	Sample	Matrix Spike (ug/kg)			Spike Duplicate (ug/kg)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
1,2,4-Trimethylbenzene	25.9U	778	814	105	778	813	105	75-123	0.06	(< 20)
1,2-Dibromoethane	0.520U	778	860	111	778	854	110	78-122	0.73	(< 20)
1,2-Dichloroethane	1.03U	778	710	91	778	694	89	73-128	2.30	(< 20)
1,3,5-Trimethylbenzene	12.9U	778	821	106	778	774	100	73-124	5.90	(< 20)
Benzene	6.50U	778	761	98	778	741	95	77-121	2.60	(< 20)
Ethylbenzene	12.9U	778	746	96	778	724	93	76-122	3.00	(< 20)
Isopropylbenzene (Cumene)	12.9U	778	753	97	778	736	95	68-134	2.40	(< 20)
Methyl-t-butyl ether	52.0U	1170	1050	90	1170	1060	91	73-125	0.83	(< 20)
Naphthalene	12.9U	778	818	105	778	843	108	62-129	2.90	(< 20)
n-Butylbenzene	12.9U	778	803	103	778	783	101	70-128	2.50	(< 20)
o-Xylene	12.9U	778	765	98	778	755	97	77-123	1.30	(< 20)
P & M -Xylene	25.9U	1560	1470	94	1560	1440	92	77-124	2.10	(< 20)
sec-Butylbenzene	12.9U	778	781	100	778	763	98	73-126	2.30	(< 20)
tert-Butylbenzene	12.9U	778	799	103	778	784	101	73-125	2.00	(< 20)
Toluene	12.9U	778	758	98	778	745	96	77-121	1.70	(< 20)
Xylenes (total)	38.9U	2330	2230	96	2330	2190	94	78-124	1.80	(< 20)
Surrogates										
1,2-Dichloroethane-D4 (surr)		778	740	95	778	729	94	71-136	1.50	
4-Bromofluorobenzene (surr)		1300	1080	83	1300	1070	82	55-151	1.30	
Toluene-d8 (surr)		778	769	99	778	771	99	85-116	0.24	

Batch Information

Analytical Batch: VMS20981
Analytical Method: SW8260D
Instrument: VQA 7890/5975 GC/MS
Analyst: S.S
Analytical Date/Time: 7/28/2021 1:23:00PM

Prep Batch: VXX37523
Prep Method: Vol. Extraction SW8260 Field Extracted L
Prep Date/Time: 7/28/2021 6:00:00AM
Prep Initial Wt./Vol.: 48.23g
Prep Extract Vol: 25.00mL

Method Blank

Blank ID: MB for HBN 1823207 [VXX/37526]

Blank Lab ID: 1626563

QC for Samples:

1214397009, 1214397010

Matrix: Soil/Solid (dry weight)

Results by SW8260D

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
1,2,4-Trimethylbenzene	25.0U	50.0	15.0	ug/kg
1,3,5-Trimethylbenzene	12.5U	25.0	7.80	ug/kg
Naphthalene	12.5U	25.0	7.80	ug/kg
Surrogates				
1,2-Dichloroethane-D4 (surr)	110	71-136		%
4-Bromofluorobenzene (surr)	99.6	55-151		%
Toluene-d8 (surr)	99.2	85-116		%

Batch Information

Analytical Batch: VMS20983
 Analytical Method: SW8260D
 Instrument: VQA 7890/5975 GC/MS
 Analyst: S.S
 Analytical Date/Time: 7/29/2021 10:21:00AM

Prep Batch: VXX37526
 Prep Method: SW5035A
 Prep Date/Time: 7/29/2021 6:00:00AM
 Prep Initial Wt./Vol.: 50 g
 Prep Extract Vol: 25 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1214397 [VXX37526]

Blank Spike Lab ID: 1626564

Date Analyzed: 07/29/2021 10:38

Matrix: Soil/Solid (dry weight)

QC for Samples: 1214397009, 1214397010

Results by SW8260D

Blank Spike (ug/kg)				
Parameter	Spike	Result	Rec (%)	CL
1,2,4-Trimethylbenzene	750	775	103	(75-123)
1,3,5-Trimethylbenzene	750	789	105	(73-124)
Naphthalene	750	758	101	(62-129)
Surrogates				
1,2-Dichloroethane-D4 (surr)	750		94	(71-136)
4-Bromofluorobenzene (surr)	750		96	(55-151)
Toluene-d8 (surr)	750		99	(85-116)

Batch Information

Analytical Batch: VMS20983

Analytical Method: SW8260D

Instrument: VQA 7890/5975 GC/MS

Analyst: S.S

Prep Batch: VXX37526

Prep Method: SW5035A

Prep Date/Time: 07/29/2021 06:00

Spike Init Wt./Vol.: 750 ug/kg Extract Vol: 25 mL

Dupe Init Wt./Vol.: Extract Vol:

Matrix Spike Summary

Original Sample ID: 1626565
MS Sample ID: 1626566 MS
MSD Sample ID: 1626567 MSD

Analysis Date: 07/29/2021 14:07
Analysis Date: 07/29/2021 12:44
Analysis Date: 07/29/2021 13:01
Matrix: Solid/Soil (Wet Weight)

QC for Samples: 1214397009, 1214397010

Results by SW8260D

Parameter	Sample	Matrix Spike (ug/kg)			Spike Duplicate (ug/kg)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
1,2,4-Trimethylbenzene	25.9U	778	815	105	778	788	101	75-123	3.40	(< 20)
1,3,5-Trimethylbenzene	12.9U	778	815	105	778	790	102	73-124	3.20	(< 20)
Naphthalene	12.9U	778	784	101	778	790	102	62-129	0.79	(< 20)
Surrogates										
1,2-Dichloroethane-D4 (surr)		778	714	92	778	708	91	71-136	0.95	
4-Bromofluorobenzene (surr)		1300	1070	82	1300	1040	80	55-151	2.70	
Toluene-d8 (surr)		778	772	99	778	776	100	85-116	0.47	

Batch Information

Analytical Batch: VMS20983
Analytical Method: SW8260D
Instrument: VQA 7890/5975 GC/MS
Analyst: S.S
Analytical Date/Time: 7/29/2021 12:44:00PM

Prep Batch: VXX37526
Prep Method: Vol. Extraction SW8260 Field Extracted L
Prep Date/Time: 7/29/2021 6:00:00AM
Prep Initial Wt./Vol.: 48.23g
Prep Extract Vol: 25.00mL

Print Date: 08/06/2021 5:00:09PM

Method Blank

Blank ID: MB for HBN 1823232 [VXX/37528]
Blank Lab ID: 1626717

Matrix: Soil/Solid (dry weight)

QC for Samples:

1214397001, 1214397002, 1214397003, 1214397004, 1214397005, 1214397006, 1214397007, 1214397008

Results by AK101

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Gasoline Range Organics	1.04J	2.50	0.750	mg/kg
Surrogates				
4-Bromofluorobenzene (surr)	81.8	50-150		%

Batch Information

Analytical Batch: VFC15739
Analytical Method: AK101
Instrument: Agilent 7890A PID/FID
Analyst: MDT
Analytical Date/Time: 7/29/2021 12:57:00PM

Prep Batch: VXX37528
Prep Method: SW5035A
Prep Date/Time: 7/29/2021 6:00:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

Print Date: 08/06/2021 5:00:12PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1214397 [VXX37528]
 Blank Spike Lab ID: 1626718
 Date Analyzed: 07/29/2021 12:22

Spike Duplicate ID: LCSD for HBN 1214397 [VXX37528]
 Spike Duplicate Lab ID: 1626719
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1214397001, 1214397002, 1214397003, 1214397004, 1214397005, 1214397006, 1214397007, 1214397008

Results by AK101

Parameter	Blank Spike (mg/kg)			Spike Duplicate (mg/kg)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Gasoline Range Organics	12.5	12.5	100	12.5	12.0	96	(60-120)	3.90	(< 20)
Surrogates									
4-Bromofluorobenzene (surr)	1.25		80	1.25		87	(50-150)	8.90	

Batch Information

Analytical Batch: **VFC15739**
 Analytical Method: **AK101**
 Instrument: **Agilent 7890A PID/FID**
 Analyst: **MDT**

Prep Batch: **VXX37528**
 Prep Method: **SW5035A**
 Prep Date/Time: **07/29/2021 06:00**
 Spike Init Wt./Vol.: 12.5 mg/Kg Extract Vol: 25 mL
 Dupe Init Wt./Vol.: 12.5 mg/Kg Extract Vol: 25 mL



Method Blank

Blank ID: MB for HBN 1823233 [VXX/37529]
Blank Lab ID: 1626720

Matrix: Soil/Solid (dry weight)

QC for Samples:
1214397009, 1214397010, 1214397011

Results by AK101

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Gasoline Range Organics	1.04J	2.50	0.750	mg/kg
Surrogates				
4-Bromofluorobenzene (surr)	83.9	50-150		%

Batch Information

Analytical Batch: VFC15739
Analytical Method: AK101
Instrument: Agilent 7890A PID/FID
Analyst: MDT
Analytical Date/Time: 7/29/2021 11:47:00PM

Prep Batch: VXX37529
Prep Method: SW5035A
Prep Date/Time: 7/29/2021 6:00:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

Print Date: 08/06/2021 5:00:19PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1214397 [VXX37529]
 Blank Spike Lab ID: 1626721
 Date Analyzed: 07/29/2021 23:11

Spike Duplicate ID: LCSD for HBN 1214397 [VXX37529]
 Spike Duplicate Lab ID: 1626722
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1214397009, 1214397010, 1214397011

Results by AK101

Parameter	Blank Spike (mg/kg)			Spike Duplicate (mg/kg)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Gasoline Range Organics	12.5	12.3	98	12.5	12.1	97	(60-120)	1.40	(< 20)
Surrogates									
4-Bromofluorobenzene (surr)	1.25		87	1.25		88	(50-150)	1.70	

Batch Information

Analytical Batch: **VFC15739**
 Analytical Method: **AK101**
 Instrument: **Agilent 7890A PID/FID**
 Analyst: **MDT**

Prep Batch: **VXX37529**
 Prep Method: **SW5035A**
 Prep Date/Time: **07/29/2021 06:00**
 Spike Init Wt./Vol.: 12.5 mg/Kg Extract Vol: 25 mL
 Dupe Init Wt./Vol.: 12.5 mg/Kg Extract Vol: 25 mL

Method Blank

Blank ID: MB for HBN 1822910 [XXX/45226]
Blank Lab ID: 1625374

Matrix: Soil/Solid (dry weight)

QC for Samples:

1214397001, 1214397002, 1214397003, 1214397004, 1214397005, 1214397006, 1214397007, 1214397008, 1214397009, 1214397010

Results by 8270D SIM (PAH)

Parameter	Results	LOQ/CL	DL	Units
1-Methylnaphthalene	12.5U	25.0	6.25	ug/kg
2-Methylnaphthalene	12.5U	25.0	6.25	ug/kg
Acenaphthene	12.5U	25.0	6.25	ug/kg
Acenaphthylene	12.5U	25.0	6.25	ug/kg
Anthracene	12.5U	25.0	6.25	ug/kg
Benzo(a)Anthracene	12.5U	25.0	6.25	ug/kg
Benzo[a]pyrene	12.5U	25.0	6.25	ug/kg
Benzo[b]Fluoranthene	12.5U	25.0	6.25	ug/kg
Benzo[g,h,i]perylene	12.5U	25.0	6.25	ug/kg
Benzo[k]fluoranthene	12.5U	25.0	6.25	ug/kg
Chrysene	12.5U	25.0	6.25	ug/kg
Dibenzo[a,h]anthracene	12.5U	25.0	6.25	ug/kg
Fluoranthene	12.5U	25.0	6.25	ug/kg
Fluorene	12.5U	25.0	6.25	ug/kg
Indeno[1,2,3-c,d] pyrene	12.5U	25.0	6.25	ug/kg
Naphthalene	10.0U	20.0	5.00	ug/kg
Phenanthrene	12.5U	25.0	6.25	ug/kg
Pyrene	12.5U	25.0	6.25	ug/kg

Surrogates

2-Methylnaphthalene-d10 (surr)	91	58-103	%
Fluoranthene-d10 (surr)	85.3	54-113	%

Batch Information

Analytical Batch: XMS12787
Analytical Method: 8270D SIM (PAH)
Instrument: SVA Agilent 780/5975 GC/MS
Analyst: LAW
Analytical Date/Time: 7/28/2021 11:31:00PM

Prep Batch: XXX45226
Prep Method: SW3550C
Prep Date/Time: 7/24/2021 1:20:17PM
Prep Initial Wt./Vol.: 22.5 g
Prep Extract Vol: 5 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1214397 [XXX45226]

Blank Spike Lab ID: 1625375

Date Analyzed: 07/28/2021 23:51

Matrix: Soil/Solid (dry weight)

QC for Samples: 1214397001, 1214397002, 1214397003, 1214397004, 1214397005, 1214397006, 1214397007, 1214397008, 1214397009, 1214397010

Results by 8270D SIM (PAH)

Blank Spike (ug/kg)

Parameter	Spike	Result	Rec (%)	CL
1-Methylnaphthalene	111	100	90	(43-111)
2-Methylnaphthalene	111	103	93	(39-114)
Acenaphthene	111	104	93	(44-111)
Acenaphthylene	111	106	95	(39-116)
Anthracene	111	108	98	(50-114)
Benzo(a)Anthracene	111	102	92	(54-122)
Benzo[a]pyrene	111	108	98	(50-125)
Benzo[b]Fluoranthene	111	108	97	(53-128)
Benzo[g,h,i]perylene	111	115	103	(49-127)
Benzo[k]fluoranthene	111	110	99	(56-123)
Chrysene	111	104	94	(57-118)
Dibenzo[a,h]anthracene	111	125	113	(50-129)
Fluoranthene	111	95.7	86	(55-119)
Fluorene	111	106	95	(47-114)
Indeno[1,2,3-c,d] pyrene	111	118	106	(49-130)
Naphthalene	111	98.6	89	(38-111)
Phenanthrene	111	105	95	(49-113)
Pyrene	111	95.7	86	(55-117)

Surrogates

2-Methylnaphthalene-d10 (surr)	111		91	(58-103)
Fluoranthene-d10 (surr)	111		85	(54-113)

Batch Information

Analytical Batch: XMS12787

Analytical Method: 8270D SIM (PAH)

Instrument: SVA Agilent 780/5975 GC/MS

Analyst: LAW

Prep Batch: XXX45226

Prep Method: SW3550C

Prep Date/Time: 07/24/2021 13:20

Spike Init Wt./Vol.: 111 ug/kg Extract Vol: 5 mL

Dupe Init Wt./Vol.: Extract Vol:

Matrix Spike Summary

Original Sample ID: 1214350007
MS Sample ID: 1625376 MS
MSD Sample ID: 1625377 MSD

Analysis Date: 07/29/2021 0:53
Analysis Date: 07/29/2021 1:13
Analysis Date: 07/29/2021 1:34
Matrix: Soil/Solid (dry weight)

QC for Samples: 1214397001, 1214397002, 1214397003, 1214397004, 1214397005, 1214397006, 1214397007, 1214397008, 1214397009, 1214397010

Results by 8270D SIM (PAH)

Parameter	Sample	Matrix Spike (ug/kg)			Spike Duplicate (ug/kg)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
1-Methylnaphthalene	9.24J	136	131	96	136	121	89	43-111	7.20	(< 20)
2-Methylnaphthalene	23.5J	136	147	108	136	138	102	39-114	6.20	(< 20)
Naphthalene	16.6J	136	137	101	136	127	94	38-111	6.70	(< 20)
Surrogates										
2-Methylnaphthalene-d10 (surr)		136	119	88	136	109	80	58-103	9.20	
Fluoranthene-d10 (surr)		136	114	84	136	106	78	54-113	7.30	

Batch Information

Analytical Batch: XMS12787
Analytical Method: 8270D SIM (PAH)
Instrument: SVA Agilent 780/5975 GC/MS
Analyst: LAW
Analytical Date/Time: 7/29/2021 1:13:00AM

Prep Batch: XXX45226
Prep Method: Sonication Extr Soil 8270 PAH SIM 5ml
Prep Date/Time: 7/24/2021 1:20:17PM
Prep Initial Wt./Vol.: 22.52g
Prep Extract Vol: 5.00mL

Print Date: 08/06/2021 5:00:32PM

Method Blank

Blank ID: MB for HBN 1822937 [XXX/45230]
Blank Lab ID: 1625497

Matrix: Soil/Solid (dry weight)

QC for Samples:

1214397001, 1214397002, 1214397003, 1214397004, 1214397005, 1214397006, 1214397007, 1214397008, 1214397009, 1214397010

Results by AK102

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Diesel Range Organics	10.0U	20.0	6.20	mg/kg
Surrogates				
5a Androstane (surr)	108	60-120		%

Batch Information

Analytical Batch: XFC16024
Analytical Method: AK102
Instrument: Agilent 7890B R
Analyst: A.A
Analytical Date/Time: 7/30/2021 8:38:00PM

Prep Batch: XXX45230
Prep Method: SW3550C
Prep Date/Time: 7/25/2021 11:27:29AM
Prep Initial Wt./Vol.: 30 g
Prep Extract Vol: 5 mL

Print Date: 08/06/2021 5:00:34PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1214397 [XXX45230]
 Blank Spike Lab ID: 1625498
 Date Analyzed: 07/30/2021 20:48

Spike Duplicate ID: LCSD for HBN 1214397 [XXX45230]
 Spike Duplicate Lab ID: 1625499
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1214397001, 1214397002, 1214397003, 1214397004, 1214397005, 1214397006, 1214397007, 1214397008, 1214397009, 1214397010

Results by AK102

Parameter	Blank Spike (mg/kg)			Spike Duplicate (mg/kg)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Diesel Range Organics	667	732	110	667	728	109	(75-125)	0.57	(< 20)
Surrogates									
5a Androstane (surr)	16.7		117	16.7		117	(60-120)	0.12	

Batch Information

Analytical Batch: **XFC16024**
 Analytical Method: **AK102**
 Instrument: **Agilent 7890B R**
 Analyst: **A.A**

Prep Batch: **XXX45230**
 Prep Method: **SW3550C**
 Prep Date/Time: **07/25/2021 11:27**
 Spike Init Wt./Vol.: 667 mg/kg Extract Vol: 5 mL
 Dupe Init Wt./Vol.: 667 mg/kg Extract Vol: 5 mL

Method Blank

Blank ID: MB for HBN 1822937 [XXX/45230]
Blank Lab ID: 1625497

Matrix: Soil/Solid (dry weight)

QC for Samples:

1214397001, 1214397002, 1214397003, 1214397004, 1214397005, 1214397006, 1214397007, 1214397008, 1214397009, 1214397010

Results by AK103

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Residual Range Organics	50.0U	100	43.0	mg/kg
Surrogates				
n-Triacontane-d62 (surr)	112	60-120		%

Batch Information

Analytical Batch: XFC16024
Analytical Method: AK103
Instrument: Agilent 7890B R
Analyst: A.A
Analytical Date/Time: 7/30/2021 8:38:00PM

Prep Batch: XXX45230
Prep Method: SW3550C
Prep Date/Time: 7/25/2021 11:27:29AM
Prep Initial Wt./Vol.: 30 g
Prep Extract Vol: 5 mL

Print Date: 08/06/2021 5:00:41PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1214397 [XXX45230]
 Blank Spike Lab ID: 1625498
 Date Analyzed: 07/30/2021 20:48

Spike Duplicate ID: LCSD for HBN 1214397 [XXX45230]
 Spike Duplicate Lab ID: 1625499
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1214397001, 1214397002, 1214397003, 1214397004, 1214397005, 1214397006, 1214397007, 1214397008, 1214397009, 1214397010

Results by AK103

Parameter	Blank Spike (mg/kg)			Spike Duplicate (mg/kg)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Residual Range Organics	667	698	105	667	700	105	(60-120)	0.32	(< 20)
Surrogates									
n-Triacontane-d62 (surr)	16.7		118	16.7		117	(60-120)	1.40	

Batch Information

Analytical Batch: **XFC16024**
 Analytical Method: **AK103**
 Instrument: **Agilent 7890B R**
 Analyst: **A.A**

Prep Batch: **XXX45230**
 Prep Method: **SW3550C**
 Prep Date/Time: **07/25/2021 11:27**
 Spike Init Wt./Vol.: 667 mg/kg Extract Vol: 5 mL
 Dupe Init Wt./Vol.: 667 mg/kg Extract Vol: 5 mL



1214397

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CHAIN OF CUSTODY RECORD

Profile # 334904 CR

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Page 1 of 2

Instructions: Sections 1 - 5 must be filled out.
Omissions may delay the onset of analysis.

Section 1				Section 2				Section 3				Section 4			
CLIENT: EMI				CONTACT: Shayla Marshall				PHONE #: 907-223-3544				Section 3			
PROJECT NAME: Shungnak				PROJECT/ PWSID/ PERMIT #: 				E-MAIL: smarshall@emi-alaska.com				Profile #: emi-alaska.com			
REPORTS TO: Shungnak				E-MAIL: smarshall@emi-alaska.com				Profile #: emi-alaska.com				QUOTE #:			
INVOICE TO: EMI				P.O. #: 18130				DATE: 07/15/21				TIME: 15:39			
RESERVED for lab use				SAMPLE IDENTIFICATION				DATE mm/dd/yy				TIME HH:MM			
MATRIX CODE				MATRIX CODE				MATRIX CODE				MATRIX CODE			
#				#				#				#			
CONTAINER				CONTAINER				CONTAINER				CONTAINER			
Grab				Grab				Grab				Grab			
MI				MI				MI				MI			
(Multi-Incremental)				(Multi-Incremental)				(Multi-Incremental)				(Multi-Incremental)			
GRO/VOCC/PAH				GRO/VOCC/PAH				GRO/VOCC/PAH				GRO/VOCC/PAH			
DRO/IRRO/PAH				DRO/IRRO/PAH				DRO/IRRO/PAH				DRO/IRRO/PAH			
Analysis*				Analysis*				Analysis*				Analysis*			
NOTE: The following analyses require specific method and/or compound list: BTEX, Metals, PFAS				NOTE: The following analyses require specific method and/or compound list: BTEX, Metals, PFAS				NOTE: The following analyses require specific method and/or compound list: BTEX, Metals, PFAS				NOTE: The following analyses require specific method and/or compound list: BTEX, Metals, PFAS			
REMARKS/LOC ID				REMARKS/LOC ID				REMARKS/LOC ID				REMARKS/LOC ID			
1A-B				18130 TP1S1				07/15/21				15:39			
2A-B				18130 TP2S2				07/15/21				15:24			
3A-B				18130 TP3S3				07/15/21				16:20			
4A-B				18130 TP3S5				07/15/21				16:22			
5A-B				18130 TP4S3				07/15/21				16:37			
10A-B				18130 TP5S3				07/15/21				16:58			
7A-B				18130 TP6S1				07/15/21				17:15			
8A-B				18130 TP6S11				07/15/21				17:18			
9A-B				18130 TP7S2				07/15/21				17:48			
10A-B				18130 TP8S1				07/15/21				17:55			
Relinquished By: (1)				Date				Time				Received By:			
Relinquished By: (2)				Date				Time				Received By:			
Relinquished By: (3)				Date				Time				Received By:			
Relinquished By: (4)				Date				Time				Received By:			
Temp Blank °C: 47				Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT				Delivery Method: Hand Delivery				Commercial Delivery N			



<http://www.sgs.com/terms-and-conditions>

Review Criteria							Chain of Custody / Temperature Requirements																		
Were Custody Seals intact? Note # & location							N/A																		
COC accompanied samples?							Yes																		
DOD: Were samples received in COC corresponding coolers?							N/A																		
Exemption permitted if chilled & collected < 8 hours ago, or for samples where chilling is not required							Yes																		
Temperature blank compliant* (i.e., 0-6 °C after CF)?							Yes																		
Cooler ID:	@	1	°C Therm. ID:	D50	Cooler ID:	@	4.7	°C Therm. ID:	D50	Cooler ID:	@	°C Therm. ID:		Cooler ID:	@	°C Therm. ID:		Cooler ID:	@	°C Therm. ID:		Cooler ID:	@	°C Therm. ID:	
If samples received without a temperature blank, the "cooler temperature" will be documented instead & "COOLER TEMP" will be noted to the right. "ambient" or "chilled" will be noted if neither is available.																									
*If >6°C, were samples collected < 8 hours ago?																									
If <0°C, were sample containers ice free?																									
Note: Identify containers received at non-compliant temperature. Use form FS-0029 if more space is needed.																									
Holding Time / Documentation / Sample Condition Requirements																									
Do samples match COC** (i.e., sample IDs, dates/times collected)?													N/C												
***Note: If sample information on containers differs from COC, SGS will default to COC information																									
Were analytical requests clear? (i.e., method is specified for analyses with multiple option for analysis (Ex: BTEX, Metals))													Yes												
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?													Yes												
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?													N/A												
Were all soil VOAs field extracted with MeOH+BF ₃ ?													N/C												
For Rush/Short Hold Time, was RUSH/Short HT email sent?													N/A												
Note to Client: Any "No", answer above indicates non-compliance with standard procedures and may impact data quality.																									
Additional notes (if applicable):																									
SGS Profile #																									
0																									



e-Sample Receipt Form

SGS Workorder #:

1214397



1 2 1 4 3 9 7

Review Criteria		Condition (Yes, No, N/A)		Exceptions Noted below	
Chain of Custody / Temperature Requirements		Yes		Exemption permitted if sampler hand carries/delivers.	
Were Custody Seals intact? Note # & location		Yes	1F, 1B		
COC accompanied samples?		Yes			
DOD: Were samples received in COC corresponding coolers?		N/A			
Yes **Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required					
Temperature blank compliant* (i.e., 0-6 °C after CF)?		N/A	Cooler ID:	1	@ 4.0 °C Therm. ID: D64
If samples received without a temperature blank, the "cooler temperature" will be documented instead & "COOLER TEMP" will be noted to the right. "ambient" or "chilled" will be noted if neither is available.			Cooler ID:		@ °C Therm. ID:
			Cooler ID:		@ °C Therm. ID:
			Cooler ID:		@ °C Therm. ID:
			Cooler ID:		@ °C Therm. ID:
*If >6°C, were samples collected <8 hours ago?		N/A			
If <0°C, were sample containers ice free?		N/A			
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.					
Holding Time / Documentation / Sample Condition Requirements		Note: Refer to form F-083 "Sample Guide" for specific holding times.			
Were samples received within holding time?		Yes			
Do samples match COC ** (i.e., sample IDs, dates/times collected)?		Yes			
**Note: If times differ <1hr, record details & login per COC.					
***Note: If sample information on containers differs from COC, SGS will default to COC information					
Were analytical requests clear? (i.e., method is specified for analyses with multiple option for analysis (Ex: BTEX, Metals)		Yes			
Were proper containers (type/mass/volume/preservative***) used?		Yes			
Volatile / LL-Hg Requirements					
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?		Yes			
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?		N/A			
Were all soil VOAs field extracted with MeOH+BFB?		Yes			
Note to Client: Any "No", answer above indicates non-compliance with standard procedures and may impact data quality.					
Additional notes (if applicable):					



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>
1214397001-A	Methanol field pres. 4 C	OK			
1214397001-B	No Preservative Required	OK			
1214397002-A	Methanol field pres. 4 C	OK			
1214397002-B	No Preservative Required	OK			
1214397003-A	Methanol field pres. 4 C	OK			
1214397003-B	No Preservative Required	OK			
1214397004-A	Methanol field pres. 4 C	OK			
1214397004-B	No Preservative Required	OK			
1214397005-A	Methanol field pres. 4 C	OK			
1214397005-B	No Preservative Required	OK			
1214397006-A	Methanol field pres. 4 C	OK			
1214397006-B	No Preservative Required	OK			
1214397007-A	Methanol field pres. 4 C	OK			
1214397007-B	No Preservative Required	OK			
1214397008-A	Methanol field pres. 4 C	OK			
1214397008-B	No Preservative Required	OK			
1214397009-A	Methanol field pres. 4 C	OK			
1214397009-B	No Preservative Required	OK			
1214397010-A	Methanol field pres. 4 C	OK			
1214397010-B	No Preservative Required	OK			
1214397011-A	Methanol field pres. 4 C	OK			

Container Condition Glossary

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

OK - The container was received at an acceptable pH for the analysis requested.

BU - The container was received with headspace greater than 6mm.

DM - The container was received damaged.

FR - The container was received frozen and not usable for Bacteria or BOD analyses.

IC - The container provided for microbiology analysis was not a laboratory-supplied, pre-sterilized container and therefore was not suitable for analysis.

NC- The container provided was not preserved or was under-preserved. The method does not allow for additional preservative added after collection.

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.

QN - Insufficient sample quantity provided.

Laboratory Data Review Checklist

Completed By:

Shayla Marshall

Title:

Qualified Environmental Professional

Date:

September 29, 2021

Consultant Firm:

Environmental Management, Inc.

Laboratory Name:

SGS North America

Laboratory Report Number:

1214397

Laboratory Report Date:

August 9, 2021

CS Site Name:

Shungnak School Tank Heating Oil Release

ADEC File Number:

Spill No. 20389917201

Hazard Identification Number:

NA

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Laboratory Report Date:

August 9, 2021

CS Site Name:

Shungnak School Tank Heating Oil Release

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

Yes ☒ No ☐ N/A ☐ 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 ☐ N/A ☒ Comments:

2. Chain of Custody (CoC)

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

Yes ☒ No ☐ N/A ☐ Comments:

- b. Correct analyses requested?

Yes ☒ No ☐ N/A ☐ Comments:

3. Laboratory Sample Receipt Documentation

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

Yes ☒ No ☐ N/A ☐ Comments:

4.0 ° C

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

Yes ☒ No ☐ N/A ☐ Comments:

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

Yes ☒ No ☐ N/A ☐ Comments:

No issues noted

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

Yes ☐ No ☐ N/A ☒ Comments:

No issues were noted.

e. Data quality or usability affected?

Comments:

No issues were noted, therefore the data is considered usable.

4. Case Narrative

a. Present and understandable?

Yes ☒ No ☐ N/A ☐ Comments:

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

Yes ☒ No ☐ N/A ☐ Comments:

For Sample TP7S2:

-AK101 - Surrogate recovery for 4-bromofluorobenzene does not meet QC criteria, due to matrix interference

-8270D SIM - PAH surrogate recovery for 2-methylnaphthalene-d10 does not meet QC criteria due to matrix interference

c. Were all corrective actions documented?

Yes ☐ No ☒ N/A ☐ Comments:

No corrective actions were documented.

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

Comments:

The case narrative did not note the effect on data quality/usability.

5. Samples Results

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

Yes ☒ No ☐ N/A ☐ Comments:

b. All applicable holding times met?

Yes ☒ No ☐ N/A ☐ Comments:

c. All soils reported on a dry weight basis?

Yes ☒ No ☐ N/A ☐ Comments:

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

Yes ☐ No ☒ N/A ☐ Comments:

1,2-Dibromoethane LOQ is greater than the Cleanup Level for each sample, including the trip blank. Benzene LOQ for Sample TP7S2 also exceeded the Cleanup Level.

e. Data quality or usability affected?

With the exception of Sample TP7S2, the sample concentrations were either non-detect or well below cleanup levels. Therefore, the data is considered usable, despite the elevated LOQ for 1,2-dibromoethane.

Although the benzene LOQ for Sample TP7S2 exceeded cleanup level, there were numerous other analytes that exceeded cleanup level. As a result, this is considered usable for this project purpose of determining of contamination is present.

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6. QC Samples

a. Method Blank

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

Yes ☒ No ☐ N/A ☐ Comments:

- ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes ☒ No ☐ N/A ☐ Comments:

- iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

Not applicable

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

Yes ☐ No ☐ N/A ☒ Comments:

No Method Blank detections above LOQ

- v. Data quality or usability affected?

Comments:

Not applicable

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 ☐ N/A ☐ Comments:

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

Yes ☐ No ☐ N/A ☒ Comments:

Metals were not analyzed

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

Yes ☒ No ☐ N/A ☐ Comments:

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

Yes ☒ No ☐ N/A ☐ Comments:

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

Comments:

Not applicable

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

Yes ☐ No ☐ N/A ☒ Comments:

LCS/LCSD all within QC criteria

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

Comments:

No QC issues so data is considered usable.

- c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

- i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes ☐ No ☐ N/A ☐ Comments:

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ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes ☐ No ☐ N/A ☐ Comments:

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes ☐ No ☐ N/A ☐ Comments:

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes ☐ No ☐ N/A ☐ Comments:

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

Comments:

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

Yes ☐ No ☐ N/A ☐ Comments:

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

Comments:

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

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

Yes ☐ No ☐ N/A ☐ Comments:

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- ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes ☐ No ☐ N/A ☐ Comments:

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

Yes ☐ No ☐ N/A ☐ Comments:

- iv. Data quality or usability affected?

Comments:

e. Trip Blanks

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

Yes ☒ No ☐ N/A ☐ 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 ☐ N/A ☐ Comments:

Only one cooler was used

- iii. All results less than LOQ and project specified objectives?

Yes ☒ No ☐ N/A ☐ Comments:

- iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

Not applicable

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v. Data quality or usability affected?

Comments:

Trip blank results within QC criteria; data is considered usable.

f. Field Duplicate

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

Yes ☒ No ☐ N/A ☐

Comments:

Samples TP6S1 and TP6S11

ii. Submitted blind to lab?

Yes ☒ No ☐ N/A ☐

Comments:

iii. Precision – All relative percent differences (RPD) less than specified project objectives?
(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 ☒ N/A ☐

Comments:

RRO – 117 mg/kg (TP6S1) and 352 mg/kg (TP6S11); RPD = 100%

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

Comments:

Both concentrations were less than ADEC Cleanup Levels, so the data is considered usable for this project purpose.

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

Yes ☐ No ☒ N/A ☐

Comments:

Disposal equipment was used for sampling

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i. All results less than LOQ and project specified objectives?

Yes ☐ No ☐ N/A ☒ Comments:

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

Not applicable

iii. Data quality or usability affected?

Comments:

Not applicable—disposable equipment was used.

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

a. Defined and appropriate?

Yes ☐ No ☐ N/A ☒ Comments:

No others noted