

January 28, 2020

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RESTORATION

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Subject: ARRC Locomotive Refueling Facility Landfarm Plan, Revision 2
ADEC File No. 2100.38.039

Mr. Grandel:

On behalf of the Alaska Railroad Corporation (ARRC), Restoration Science & Engineering, LLC (RSE) is providing the following soil landfarm plan for management of soil stockpiled at the Railroad Bluff Area. The stockpiled soil was generated during excavation of hydrocarbon impacted soil at the Truck Fill Stand at the ARRC Locomotive Refueling Facility, Anchorage, Alaska, 99501 (hereafter referred to as the subject property). Soil was excavated from the southern portion of the truck fill stand footprint to prepare the subgrade for installation of new foundation footings at the Truck Fill Stand site and transported to the Railroad Bluff Area for characterization and future management pending sample results. Approximately 130 cubic yards of soil was excavated and placed in the stockpile. Excavation and sampling was conducted in accordance with an Alaska Department of Environmental Conservation (ADEC) approved soil management plan.

On September 4, 2019 RSE collected soil samples for field screening and laboratory analyses from the soil stockpile. Thirty-nine (39) field screening samples were collected from the stockpile and readings ranged from 1.5 to 6.6 parts per million by volume (ppmv). Three soil samples were collected for laboratory analyses from the stockpile and analyzed for diesel range organics (DRO), gasoline range organics (GRO), volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons by select ion monitoring (PAH SIMS), resource conservation and recovery act (RCRA) metals, and polychlorinated biphenyls (PCBs). All laboratory sample results were below ADEC Method 2 Migration to Groundwater soil cleanup (MTG) levels with the exception of elevated results from at least one of the three samples for benzene, 1,2,4-trimethylbenzene, naphthalene, trichloroethylene, and arsenic. The arsenic results are in the range of typical background levels found in surficial soils in Alaska. Full photoionization detector (PID) field screening and laboratory soil sample results from the stockpile sampling are provided in Attachment A.

PROPOSED LANDFARM

The objective of the work described within this plan is to conduct landfarm treatment of the existing stockpiled soil to below MTG soil cleanup levels. The existing stockpile is situated on a 12-mil petroleum resistant liner and covered with 6-mil polyethylene. In early summer 2020, the stockpile will be thin spread approximately 6-8 inches thick in depth on a liner a minimum of 100 feet from any surface water. It is estimated that the landfarm will be approximately 7,000 square feet in size. The landfarm will be fertilized with a small amount of nitrogen fertilizer to elevated soil nitrogen (N) to between 50 to 150 mg/Kg of N, and the surface planted with grass seed to further break down the contaminants via phyto-remediation. RSE notes that the covered stockpile is situated on a 12-mil liner and will sit for greater than 180 days at this location prior to landfarming. Due to the cover and liner, and low levels of contaminants found in the soil, RSE believes the stockpiled soil does not pose a risk to the environment.

The landfarm area will be surrounded with silt fence to clearly demarcate the location of the landfarm, to limit runoff from the soil and prevent any erosion transport of soil from the treatment area. The silt fence and remote and ARRC access-controlled location of the site will minimize the risk of human contact with the soil during the treatment process. RSE will provide a short letter report documenting the landfarm activity shortly after establishment in summer 2020.

RSE proposes to have a qualified environmental professional (QEP) or qualified sampler (QS) mobilize to the site in late summer 2020 to collect laboratory samples of the landfarm soil to determine if the landfarmed soil is below MTG soil cleanup levels. Closure sampling will be performed in accordance with the following protocol.

Closure Field Screening

A QEP or QS will collect soil field screening samples from landfarmed soil. Field screening samples will be collected from the landfarm in accordance with Table 2A of the 2019 ADEC Field Sampling Guidance (14 field screening samples collected from the 130 cubic yard stockpile).

Samples will be collected mid depth of the landfarm (approximately 4 inches below ground surface) using a clean stainless steel spoon or nitrile gloved hand and placed into a Ziploc™ quart-sized bag. Field personnel will warm the bag to approximately 60° F, and measure the head space within the bag using a PID calibrated with 100 ppmv isobutylene. Stainless steel spoons will be decontaminated using Alconox wash and distilled water rinse. RSE field personnel will note the sample ID, location, depth, soil classification, and the PID reading for each sample location.

Closure Soil Sample Collection

Soil closure samples for laboratory analysis will be collected from the landfarm in accordance with Table 2A of the 2019 ADEC Field Sampling Guidance (4 Laboratory samples plus 1 blind

duplicate sample). Samples for laboratory analysis will be collected from locations yielding the highest PID readings.

Soil closure samples will be collected mid depth (approximately 4 inches below ground surface) from the landfarmed soil using clean stainless steel spoons into method-specific containers provided by the contract laboratory and analyzed for VOCs and PAH SIMs. Blind duplicate samples will be collected and submitted for each analytical method on a 10% frequency. Soil samples will be collected using a dedicated stainless steel spoon and placed into method specific containers, stored in a clean sample cooler chilled to between 0° and 6° C, and transported under chain-of-custody to ADEC-approved laboratory, SGS North America in Anchorage. Table 1 presents analytical method sample jars, preservatives, and holding times.

Each soil sample will be collected and analyzed for COPCs in accordance with Table 1 below.

Table 1. Contaminants of Potential Concern in Soil

COPC	Matrix	COPC Abbreviation	ADEC-Approved Lab Method	ADEC Soil Cleanup Level ¹
Volatile Organic Compounds	Soil	VOCs	EPA 8260C	Varies
Polynuclear Aromatic Hydrocarbons by Select Ion Monitoring	Soil	PAH SIMs	EPA 8270D	Varies

¹18 AAC 75 ADEC Method 2 soil cleanup level for migration to groundwater Tables B1 and B2

INVESTIGATIVE DERIVED WASTE

Consumables such as plastic bags and gloves will be placed into a trash receptacle for disposal. Non-consumables such as the spoons will be decontaminated back at the RSE field room.

QUALITY ASSURANCE AND QUALITY CONTROL

RSE will collect each soil sample in general accordance with applicable ADEC regulation and guidance documents. An ADEC Laboratory Review checklist will be prepared for each laboratory report.

Once analytical results are available, RSE will prepare a Landfarm Closure Report in accordance with ADEC requirements to include the following key elements:

- A narrative description of the landfarm and soil sampling efforts
- Discussion of deviations from the approved landfarm plan, if any
- Sample location map showing sample locations
- Selected photographs of field activities and observations
- Soil field-screening, descriptions, and laboratory analytical results summary tables
- Summary of investigation derived materials generated

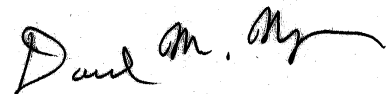
- Signed laboratory reports and sample chain-of-custodies
- Copy of field notes
- ADEC Laboratory Data Review Checklist
- Data Quality Assessment
- Recommendations

Upon receipt of sample data showing the landfarm is below ADEC MTG cleanup levels, RSE will request cleanup complete status for the landfarm area. The silt fence will be removed and the landfarm soil will remain in place at the location of the landfarm area or used for beneficial use in other areas of the ARRC property.

This Landfarm Management Plan was prepared and reviewed by:



Neil Waggoner, PE, QEP



David Nyman, PE, QEP

ATTACHMENTS

Attachment A – Stockpile Soil Sample Data Tables

Attachment B – SGS North America Laboratory Report 119185

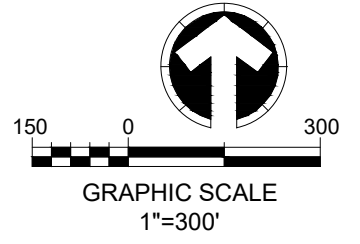
Attachment C – ADEC Laboratory Data Review Checklist

Attachment D – Landfarming Checklist



ARRC FUELING RACK TANK PAD
SOIL EXCAVATION AREA

STOCKPILE &
LANDFARM AREA



**ARRC LOCOMOTIVE REFUELING FACILITY
LANDFARM PLAN**

**SOIL EXCAVATION &
LANDFARM LOCATION MAP**

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FIGURE 1

RESTORATION SCIENCE & ENGINEERING, LLC

Attachment A: Stockpile Soil Sample Data Tables



**TABLE 1
FIELD SCREENING RESULTS
STOCKPILE SAMPLES - RAILROAD BLUFF AREA
TRUCK FILL STAND - ARRC FUELING RACK EXCAVATION**

FELD-SCREENING RESULTS IN SOIL				
SAMPLE ID	DATE	DEPTH (FEET)	PID RESULT (PPMV)	NOTES
StockPile				
RSE-1	9/4/2019	2	3.3	Dark Grey Fine Sand with Silt and Gravel
RSE-2	9/4/2019	2	3.6	Dark Grey Fine Sand with Silt and Gravel
RSE-3	9/4/2019	2	1.8	Dark Grey Fine Sand with Silt and Gravel
RSE-4	9/4/2019	2	4.7	Dark Grey Fine Sand with Silt and Gravel
RSE-5	9/4/2019	2	4.1	Dark Grey Fine Sand with Silt and Gravel
RSE-6	9/4/2019	2	3.6	Dark Grey Fine Sand with Silt and Gravel
RSE-7	9/4/2019	2	4.6	Dark Grey Fine Sand with Silt and Gravel
RSE-8	9/4/2019	2	2.5	Dark Grey Fine Sand with Silt and Gravel
RSE-9	9/4/2019	2	5.6	Dark Grey Fine Sand with Silt and Gravel
RSE-10	9/4/2019	2	2.5	Dark Grey Fine Sand with Silt and Gravel
RSE-11	9/4/2019	2	1.8	Dark Grey Fine Sand with Silt and Gravel
RSE-12	9/4/2019	2	3.5	Dark Grey Fine Sand with Silt and Gravel
RSE-13	9/4/2019	2	2.1	Dark Grey Fine Sand with Silt and Gravel
RSE-14	9/4/2019	2	2.4	Dark Grey Fine Sand with Silt and Gravel
RSE-15	9/4/2019	2	3.5	Dark Grey Fine Sand with Silt and Gravel
RSE-16	9/4/2019	2	2.1	Dark Grey Fine Sand with Silt and Gravel
RSE-17	9/4/2019	2	4.4	Dark Grey Fine Sand with Silt and Gravel
RSE-18	9/4/2019	2	1.6	Dark Grey Fine Sand with Silt and Gravel
RSE-19	9/4/2019	2	4.4	Dark Grey Fine Sand with Silt and Gravel
RSE-20	9/4/2019	2	2.3	Dark Grey Fine Sand with Silt and Gravel
RSE-21	9/4/2019	2	1.5	Dark Grey Fine Sand with Silt and Gravel
RSE-22	9/4/2019	2	5.8	Dark Grey Fine Sand with Silt and Gravel
RSE-23	9/4/2019	2	4.6	Dark Grey Fine Sand with Silt and Gravel
RSE-24	9/4/2019	2	6.2	Dark Grey Fine Sand with Silt and Gravel
RSE-25	9/4/2019	2	5.0	Dark Grey Fine Sand with Silt and Gravel
RSE-26	9/4/2019	2	4.6	Dark Grey Fine Sand with Silt and Gravel
RSE-27	9/4/2019	2	5.8	Dark Grey Fine Sand with Silt and Gravel
RSE-28	9/4/2019	2	6.6	Dark Grey Fine Sand with Silt and Gravel
RSE-29	9/4/2019	2	3.5	Dark Grey Fine Sand with Silt and Gravel
RSE-30	9/4/2019	2	4.5	Dark Grey Fine Sand with Silt and Gravel
RSE-31	9/4/2019	2	2.5	Dark Grey Fine Sand with Silt and Gravel
RSE-32	9/4/2019	2	3.8	Dark Grey Fine Sand with Silt and Gravel
RSE-33	9/4/2019	2	5.2	Dark Grey Fine Sand with Silt and Gravel
RSE-34	9/4/2019	2	3.5	Dark Grey Fine Sand with Silt and Gravel
RSE-35	9/4/2019	2	3.4	Dark Grey Fine Sand with Silt and Gravel
RSE-36	9/4/2019	2	3.8	Dark Grey Fine Sand with Silt and Gravel
RSE-37	9/4/2019	2	3.4	Dark Grey Fine Sand with Silt and Gravel
RSE-38	9/4/2019	2	3.5	Dark Grey Fine Sand with Silt and Gravel
RSE-39	9/4/2019	2	3.0	Dark Grey Fine Sand with Silt and Gravel

NOTES:

- 1) PID field-screening samples measured with a RAE Systems PID calibrated to 100 ppmv isobutylene
- 2) **Bolded** PID field-screening samples were submitted for laboratory analyses
- 3) ppmv = parts per million by volume

**TABLE 2
HYDROCARBON CONCENTRATIONS IN SOIL
STOCKPILE SAMPLES - RAILROAD BLUFF AREA
TRUCK FILL STAND - ARRC FUELING RACK EXCAVATION**

HYDROCARBON CONCENTRATIONS IN SOIL											
SAMPLE	DATE	DEPTH (FEET BGS)	PID RESULTS (PPMV)	PERCENT SOLIDS (%)	DIESEL RANGE ORGANICS (mg/Kg)	GASOLINE RANGE ORGANICS (mg/Kg)	BENZENE (ug/Kg)	TOLUENE (ug/Kg)	ETHYL- BENZENE (ug/Kg)	TOTAL XYLENES (ug/Kg)	SGS LABORATORY REPORT
StockPile											1195185
RSE-24	9/4/2019	2	6.2	91.9	135	4.64 J	31.9	214	62.8	555	
RSE-27	9/4/2019	2	5.8	89.0	137	11.0	22.0 J	162	53.0 J	462	
RSE-28	9/4/2019	2	6.6	90.6	139	3.40 J	16.0 J	105	31.5 J	255	
Trip Blank	9/4/2019	-	-	-	-	<i>1.26 U</i>	<i>6.30 U</i>	<i>12.6 U</i>	<i>12.6 U</i>	<i>37.8 U</i>	
18 AAC 75 ADEC METHOD 2 MIGRATION TO GROUNDWATER LEVELS					250	300	22	6,700	130	1,500	

NOTES:

- 1) Diesel Range Organics (DRO) samples analyzed by AK Method 102;
- Gasoline Range Organics (GRO) samples analyzed by AK Method 101; BTEX samples analyzed by EPA 8260D
- 2) "mg/Kg" means "milligrams per kilogram"; "ug/Kg" means "micrograms per kilogram".
- 3) Bold font indicates the analyte was detected above the laboratory Detection Limit (DL)
- 4) *Italicized* font with a U-flag indicates the analyte was not detected at the DL; the value presented is the limit of detection (LOD)
- 5) J flag indicates the result is an estimated value above the Detection Limit (DL) but less than the limit of quantitation (LOQ)
- 6) Yellow highlighting indicates the analyte was detected above the ADEC Method 2 Migration to Groundwater Cleanup Level

TABLE 3
VOLATILE ORGANIC COMPOUND CONCENTRATIONS IN SOIL
STOCKPILE SAMPLES - RAILROAD BLUFF AREA
TRUCK FILL STAND - ARRC FUELING RACK EXCAVATION

VOLATILE ORGANIC COMPOUND CONCENTRATIONS IN SOIL					
SAMPLE ID	RSE-24	RSE-27	RSE-28	Trip Blank	ADEC METHOD 2 MIGRATION TO GROUNDWATER SOIL CLEANUP LEVELS (µg/Kg)
DATE	9/4/2019	9/4/2019	9/4/2019	9/4/2019	
UNITS	(ug/Kg)	(ug/Kg)	(ug/Kg)	(ug/Kg)	
PERCENT SOLIDS	91.9	89.0	90.6	-	
1,1,1,2-Tetrachloroethane	23.1 U	29.9 U	19.5 U	10.1 U	22
1,1,1-Trichloroethane	28.9 U	37.3 U	24.4 U	12.6 U	32,000
1,1,2,2-Tetrachloroethane	2.31 U	2.98 U	1.95 U	1.00 U	3.0
1,1,2-Trichloroethane	0.925 U	1.20 U	0.780 U	0.403 U	1.4
1,1-Dichloroethane	28.9 U	37.3 U	24.4 U	12.6 U	92
1,1-Dichloroethene	28.9 U	37.3 U	24.4 U	12.6 U	1,200
1,1-Dichloropropene	28.9 U	37.3 U	24.4 U	12.6 U	--
1,2,3-Trichlorobenzene	58.0 U	74.5 U	48.7 U	25.1 U	150
1,2,3-Trichloropropane	1.16 U	1.49 U	0.975 U	0.505 U	0.031
1,2,4-Trichlorobenzene	28.9 U	37.3 U	24.4 U	12.6 U	82
1,2,4-Trimethylbenzene	196	154	81.2 J	25.1 U	160
1,2-Dibromo-3-chloropropane	116 U	149 U	97.5 U	50.5 U	--
1,2-Dibromoethane	1.16 U	1.49 U	0.975 U	0.505 U	0.24
1,2-Dichlorobenzene	28.9 U	37.3 U	24.4 U	12.6 U	2,400
1,2-Dichloroethane	2.31 U	2.98 U	1.95 U	1.00 U	5.5
1,2-Dichloropropane	11.6 U	14.9 U	9.75 U	5.05 U	16
1,3,5-Trimethylbenzene	42.2 J	34.4 J	16.4 J	12.6 U	1,300
1,3-Dichlorobenzene	28.9 U	37.3 U	24.4 U	12.6 U	2,300
1,3-Dichloropropane	11.6 U	14.9 U	9.75 U	5.05 U	18
1,4-Dichlorobenzene	28.9 U	37.3 U	24.4 U	12.6 U	37
2,2-Dichloropropane	28.9 U	37.3 U	24.4 U	12.6 U	--
2-Butanone (MEK)	289 U	373 U	244 U	126 U	15,000
2-Chlorotoluene	28.9 U	37.3 U	24.4 U	12.6 U	--
2-Hexanone	116 U	149 U	97.5 U	50.5 U	110
4-Chlorotoluene	28.9 U	37.3 U	24.4 U	12.6 U	--
4-Isopropyltoluene	105 J	76.4 J	97.5 U	50.5 U	--
4-Methyl-2-pentanone (MIBK)	289 U	373 U	244 U	126 U	18,000
Acetone	289 U	373 U	244 U	126 U	38,000
Benzene	31.9	22.0 J	16.0 J	6.30 U	22
Bromobenzene	28.9 U	37.3 U	24.4 U	12.6 U	360
Bromochloromethane	28.9 U	37.3 U	24.4 U	12.6 U	--
Bromodichloromethane	2.31 U	2.98 U	1.95 U	1.00 U	4.3
Bromoform	28.9 U	37.3 U	24.4 U	12.6 U	100
Bromomethane	23.1 U	29.9 U	19.5 U	10.1 U	24
Carbon disulfide	116 U	149 U	97.5 U	50.5 U	2,900
Carbon tetrachloride	14.4 U	18.6 U	12.2 U	6.30 U	21
Chlorobenzene	28.9 U	37.3 U	24.4 U	12.6 U	460
Chloroethane	231 U	299 U	195 U	101 U	72,000
Chloroform	2.31 U	2.98 U	1.95 U	1.00 U	7.1
Chloromethane	28.9 U	37.3 U	24.4 U	12.6 U	610
Dibromochloromethane	2.31 U	2.98 U	1.95 U	1.00 U	2.7
Dibromomethane	28.9 U	37.3 U	24.4 U	12.6 U	25
Dichlorodifluoromethane	58.0 U	74.5 U	48.7 U	25.1 U	3,900
Ethylbenzene	62.8	53.0 J	31.5 J	12.6 U	130
Freon-113	116 U	149 U	97.5 U	50.5 U	1,700,000
Hexachlorobutadiene	23.1 U	29.9 U	19.5 U	10.1 U	20
Isopropylbenzene (Cumene)	22.9 J	37.3 U	24.4 U	12.6 U	5,600
Methyl-t-butyl ether	116 U	149 U	97.5 U	50.5 U	400
Methylene chloride	116 U	149 U	97.5 U	50.5 U	330
Naphthalene	184	148	83.9	12.6 U	38
P & M -Xylene	336	286	157	25.1 U	See Total Xylenes
Styrene	28.9 U	37.3 U	24.4 U	12.6 U	10,000
Tetrachloroethene	26.3 J	36.3 J	16.4 J	6.30 U	190
Toluene	214	162	105	12.6 U	6,700
Trichloroethene	20.9	23.7	16.9	2.52 U	11
Trichlorofluoromethane	58.0 U	74.5 U	29.5 J	371	41,000
Vinyl acetate	116 U	149 U	97.5 U	50.5 U	1,100
Vinyl chloride	0.925 U	1.20 U	0.780 U	0.403 U	0.8
Xylenes (total)	555	462	255	37.8 U	1,500
cis-1,2-Dichloroethene	28.9 U	37.3 U	24.4 U	12.6 U	120
cis-1,3-Dichloropropene	14.4 U	18.6 U	12.2 U	6.30 U	18
n-Butylbenzene	28.9 U	37.3 U	24.4 U	12.6 U	23,000
n-Propylbenzene	18.3 J	37.3 U	24.4 U	12.6 U	9,100
o-Xylene	218	176	97.6	12.6 U	See Total Xylenes
sec-Butylbenzene	28.9 U	37.3 U	24.4 U	12.6 U	42,000
tert-Butylbenzene	28.9 U	37.3 U	24.4 U	12.6 U	11,000
trans-1,2-Dichloroethene	28.9 U	37.3 U	24.4 U	12.6 U	1,300
trans-1,3-Dichloropropene	14.4 U	18.6 U	12.2 U	6.30 U	18

NOTES:

- 1) Volatile organic compounds (VOC) analyses by Method EPA SW8260C
- 2) "ug/Kg" means "micrograms per kilogram"
- 3) Bold font indicates the analyte was detected above the laboratory Detection Limit (DL)
- 4) *Italicized* font with a U-qualifier indicates the analyte was not detected above the DL; the value presented is the limit of detection (LOD)
- 5) J flag indicates the result is an estimated value above the DL but less than the limit of quantitation (LOQ)
- 6) Yellow highlighting indicates the analyte was detected above the ADEC Method 2 Migration to Groundwater Soil Cleanup Level
- 7) Blue highlighting indicates the method Detection Limit (DL) is above the ADEC Method 2 Migration to Groundwater Cleanup Level

**TABLE 4
POLYNUCLEAR AROMATIC HYDROCARBON CONCENTRATIONS IN SOIL
STOCKPILE SAMPLES - RAILROAD BLUFF AREA
TRUCK FILL STAND - ARRC FUELING RACK EXCAVATION**

POLYNUCLEAR AROMATIC HYDROCARBON CONCENTRATIONS IN SOIL				
SAMPLE ID	RSE-24	RSE-27	RSE-28	ADEC METHOD 2 MIGRATION TO GROUNDWATER SOIL CLEANUP LEVELS (µg/Kg)
DATE	9/4/2019	9/4/2019	9/4/2019	
UNITS	(ug/Kg)	(ug/Kg)	(ug/Kg)	
PERCENT SOLIDS	91.9	89.0	90.6	
1-Methylnaphthalene	83.7 J	66.7 J	74.8 J	410
2-Methylnaphthalene	114 J	90.3 J	105 J	1,300
Acenaphthene	<i>66.5 U</i>	<i>69.0 U</i>	<i>68.5 U</i>	37,000
Acenaphthylene	<i>66.5 U</i>	<i>69.0 U</i>	<i>68.5 U</i>	18,000
Anthracene	132	74.5 J	118 J	390,000
Benzo(a)Anthracene	146	85.1 J	116 J	280
Benzo[a]pyrene	242	91.9 J	125 J	270
Benzo[b]Fluoranthene	383	179	222	2,700
Benzo[g,h,i]perylene	630	132 J	131 J	15,000,000
Benzo[k]fluoranthene	83.0 J	<i>69.0 U</i>	<i>68.5 U</i>	27,000
Chrysene	205	131 J	171	82,000
Dibenzo[a,h]anthracene	75.5 J	<i>69.0 U</i>	<i>68.5 U</i>	870
Fluoranthene	245	164	238	590,000
Fluorene	<i>66.5 U</i>	<i>69.0 U</i>	<i>68.5 U</i>	36,000
Indeno[1,2,3-c,d] pyrene	346	90.8 J	98.9 J	8,800
Naphthalene	59.6 J	51.3 J	58.6 J	38
Phenanthrene	254	115 J	188	39,000
Pyrene	340	181	295	87,000

NOTES:

- 1) PAH SIM analyses by Method EPA 8270D
- 2) Bold font indicates the analyte was detected above the laboratory Detection Limit (DL)
- 3) *Italicized* font with a U-qualifier indicates the analyte was not detected above the DL; the value presented is the limit of detection (LOD)
- 4) J flag indicates the result is an estimated value above the Detection Limit (DL) but less than the limit of quantitation (LOQ)
- 5) Yellow highlighting indicates the analyte was detected above the ADEC Method 2 Migration to Groundwater Soil Cleanup Level
- 6) "ug/Kg" means "micrograms per kilogram".

**TABLE 5
METAL CONCENTRATIONS IN SOIL
STOCKPILE SAMPLES - RAILROAD BLUFF AREA
TRUCK FILL STAND - ARRC FUELING RACK EXCAVATION**

METAL CONCENTRATIONS IN SOIL												
SAMPLE ID	DATE	DEPTH (FEET)	TOTAL SOLIDS (%)	ARSENIC (mg/Kg)	BARIUM (mg/Kg)	CADMIUM (mg/Kg)	CHROMIUM (mg/Kg)	LEAD (mg/Kg)	MERCURY (mg/Kg)	SELENIUM (mg/Kg)	SILVER (mg/Kg)	SGS WORK
<i>Stockpile</i>												
RSE-24	9/4/2019	2	91.9	6.44	408	0.295	34.2	69.6	0.0735 J	1.23	0.135 J	1195185
RSE-27	9/4/2019	2	89.0	6.28	414	0.293	33.0	66.3	0.0718 J	1.27	0.135 J	
RSE-28	9/4/2019	2	90.6	7.80	353	0.304	30.0	70.1	0.0643 J	1.20	0.165 J	
ADEC Method 2 Soil Cleanup Levels for Migration to Groundwater (mg/Kg)				0.20	2,100	9.1	1 x 10⁵	400	0.36	6.9	11	
Typical Background Values in Surficial Soils in Alaska				6.7	595	--	50	12	--	--	28	

- 1) All metals analyzed by EPA SW6020A at SGS North America; Total solids samples analyzed by EPA SM 2540G.
- 2) "mg/Kg" means "milligrams per kilogram"
- 3) **Bold** font indicates the analyte was detected above the laboratory detection limit (DL)
- 4) J flag indicates the result is an estimated value
- 5) *Italicized* font with a U-qualifier indicates the analyte was not detected above the DL; the value presented is the limit of detection (LOD)
- 6) Yellow highlighting indicates the analyte was detected above the ADEC Method 2 - Soil Cleanup Level, but are consistent with typical background concentrations in Alaska soil (Gough et. al)
- 7) For arsenic, the cleanup concentration at a site will be natural background values unless anthropogenic contribution, through an activity, or mobilization via another introduced contaminant has been identified or suspected.
- 8) Chromium cleanup value is for trivalent chromium. The trivalent chromium cleanup level applies at a site unless a hexavalent source has been identified or suspected.
- 9) No migration to groundwater cleanup standard exists for lead. The value presented is based upon land use specifications in 18 AAC 75.340.

**TABLE 6
PCBS IN SOIL
STOCKPILE SAMPLES - RAILROAD BLUFF AREA
TRUCK FILL STAND - ARRC FUELING RACK EXCAVATION**

POLYCHLORINATED BIPHENYLS IN SOIL										
SAMPLE ID	SAMPLE DEPTH (feet)	PID RESULTS (ppmv)	AROCLOR 1016 (ug/Kg)	AROCLOR 1221 (ug/Kg)	AROCLOR 1232 (ug/Kg)	AROCLOR 1242 (ug/Kg)	AROCLOR 1248 (ug/Kg)	AROCLOR 1254 (ug/Kg)	AROCLOR 1260 (ug/Kg)	TOTAL PCBs (ug/Kg)
Stockpile										
RSE-24	2	6.2	<i>27.1 U</i>	<i>54.5 U</i>	<i>27.1 U</i>	<i>27.1 U</i>	<i>27.1 U</i>	<i>27.1 U</i>	16.2 J	16.2
RSE-27	2	5.8	<i>27.9 U</i>	<i>56.0 U</i>	<i>27.9 U</i>	<i>27.9 U</i>	<i>27.9 U</i>	<i>27.9 U</i>	17.1 J	17.1
RSE-28	2	6.6	<i>27.4 U</i>	<i>55.0 U</i>	<i>27.4 U</i>	<i>27.4 U</i>	<i>27.4 U</i>	<i>27.4 U</i>	17.8 J	17.8
ADEC Human Health Soil Cleanup Level										1,000

NOTES:

- 1) Polychlorinated biphenyls by Method EPA 8082.
- 2) Italicized font with a U-flag indicates the analyte was not detected at the detection limit; value given is the limit of detection.
- 3) Bold font indicates the analyte was detected above the laboratory detection limit (DL).
- 4) J-flag indicates the result is an estimated value.
- 5) "ug/Kg" means "micrograms per kilogram"
- 6) Yellow highlighting indicates that the Total PCB summation exceeds the ADEC Method 2 Human Health soil cleanup value.
- 7) ND in the TOTAL PCB column indicates that all PCB congeners for that sample were not detected at the laboratory DL.
- 8) Total PCBs determined by summation estimated results, non detects were not included in summation.

**Attachment B: SGS North America
Lab Report 119185**





Laboratory Report of Analysis

To: Restoration Science & Eng
911 West 8th Ave Suite 100
Anchorage, AK 99501
(907)278-1023

Report Number: **1195185**

Client Project: **19-2082 ARRC Fuel Rack Stock**

Dear Lisa Koeneman,

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 Chuck 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.

Chuck Homestead
Project Manager
Charles.Homestead@sgs.com

Date

Case Narrative

SGS Client: **Restoration Science & Eng**
SGS Project: **1195185**
Project Name/Site: **19-2082 ARRC Fuel Rack Stock**
Project Contact: **Lisa Koeneman**

Refer to sample receipt form for information on sample condition.

1195110021(1530454MS) (1530455) MS

6020A - Metals MS recoveries for barium and arsenic do not meet QC criteria. The post digestion spike was successful.

1195185001MS (1530717) MS

8260C - MS recovery for trichlorofluoromethane does not meet QC criteria. Refer to LCS for accuracy requirements.

1195185001MSD (1530718) MSD

8260C - MSD RPD for trichlorofluoromethane and 1,2,3-trichlorobenzene do not meet QC criteria. These analytes were not detected above the LOQ in the parent sample.

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

Print Date: 09/12/2019 5:03:57PM

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)				
1195185001	RSE-24	XMS11700	Benzo[k]fluoranthene	RP
1195185001	RSE-24	XMS11700	Chrysene	BLC
1195185002	RSE-27	XMS11700	Chrysene	BLC
1195185003	RSE-28	XMS11700	Benzo(a)Anthracene	RP
1195185003	RSE-28	XMS11700	Chrysene	BLC
1531516	CVC for HBN 1799347 [XMS/11700	XMS11700	Benzo[k]fluoranthene	BLC
SW8082A				
1530905	LCS for HBN 1799213 [XXX/42227	XGC10501	Aroclor-1016	SP
1530906	1195282008MS	XGC10501	Aroclor-1016	SP

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 & Microbiology) & 17-021 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8015C, 8021B, 8082A, 8260C, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). SGS is only certified for the analytes listed on our Drinking Water Certification, 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 authorities.

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

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

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

Sample Summary

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Collected</u>	<u>Received</u>	<u>Matrix</u>
RSE-24	1195185001	09/04/2019	09/05/2019	Soil/Solid (dry weight)
RSE-27	1195185002	09/04/2019	09/05/2019	Soil/Solid (dry weight)
RSE-28	1195185003	09/04/2019	09/05/2019	Soil/Solid (dry weight)
Trip Blank	1195185004	09/04/2019	09/05/2019	Soil/Solid (dry weight)

<u>Method</u>	<u>Method Description</u>
8270D SIM (PAH)	8270 PAH SIM Semi-Volatiles GC/MS
AK102	Diesel Range Organics (S)
AK101	Gasoline Range Organics (S)
SW6020A	Metals by ICP-MS (S)
SM21 2540G	Percent Solids SM2540G
SW8082A	SW8082 PCB's
SW8260C	VOC 8260 (S) Field Extracted

Print Date: 09/12/2019 5:04:00PM

Detectable Results Summary

Client Sample ID: **RSE-24**
 Lab Sample ID: 1195185001

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Arsenic	6.44	mg/Kg
Barium	408	mg/Kg
Cadmium	0.295	mg/Kg
Chromium	34.2	mg/Kg
Lead	69.6	mg/Kg
Mercury	0.0735J	mg/Kg
Selenium	1.23	mg/Kg
Silver	0.135J	mg/Kg

Polychlorinated Biphenyls

Polynuclear Aromatics GC/MS

Aroclor-1260	16.2J	ug/Kg
1-Methylnaphthalene	83.7J	ug/Kg
2-Methylnaphthalene	114J	ug/Kg
Anthracene	132	ug/Kg
Benzo(a)Anthracene	146	ug/Kg
Benzo[a]pyrene	242	ug/Kg
Benzo[b]Fluoranthene	383	ug/Kg
Benzo[g,h,i]perylene	630	ug/Kg
Benzo[k]fluoranthene	83.0J	ug/Kg
Chrysene	205	ug/Kg
Dibenzo[a,h]anthracene	75.5J	ug/Kg
Fluoranthene	245	ug/Kg
Indeno[1,2,3-c,d] pyrene	346	ug/Kg
Naphthalene	59.6J	ug/Kg
Phenanthrene	254	ug/Kg
Pyrene	340	ug/Kg

Semivolatile Organic Fuels

Volatile Fuels

Volatile GC/MS

Diesel Range Organics	135	mg/Kg
Gasoline Range Organics	4.64J	mg/Kg
1,2,4-Trimethylbenzene	196	ug/Kg
1,3,5-Trimethylbenzene	42.2J	ug/Kg
4-Isopropyltoluene	105J	ug/Kg
Benzene	31.9	ug/Kg
Ethylbenzene	62.8	ug/Kg
Isopropylbenzene (Cumene)	22.9J	ug/Kg
Naphthalene	184	ug/Kg
n-Propylbenzene	18.3J	ug/Kg
o-Xylene	218	ug/Kg
P & M -Xylene	336	ug/Kg
Tetrachloroethene	26.3J	ug/Kg
Toluene	214	ug/Kg
Trichloroethene	20.9	ug/Kg
Xylenes (total)	555	ug/Kg

Detectable Results Summary

Client Sample ID: **RSE-27**
 Lab Sample ID: 1195185002

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Arsenic	6.28	mg/Kg
Barium	414	mg/Kg
Cadmium	0.293	mg/Kg
Chromium	33.0	mg/Kg
Lead	66.3	mg/Kg
Mercury	0.0718J	mg/Kg
Selenium	1.27	mg/Kg
Silver	0.135J	mg/Kg

Polychlorinated Biphenyls

Polynuclear Aromatics GC/MS

Aroclor-1260	17.1J	ug/Kg
1-Methylnaphthalene	66.7J	ug/Kg
2-Methylnaphthalene	90.3J	ug/Kg
Anthracene	74.5J	ug/Kg
Benzo(a)Anthracene	85.1J	ug/Kg
Benzo[a]pyrene	91.9J	ug/Kg
Benzo[b]Fluoranthene	179	ug/Kg
Benzo[g,h,i]perylene	132J	ug/Kg
Chrysene	131J	ug/Kg
Fluoranthene	164	ug/Kg
Indeno[1,2,3-c,d] pyrene	90.8J	ug/Kg
Naphthalene	51.3J	ug/Kg
Phenanthrene	115J	ug/Kg
Pyrene	181	ug/Kg

Semivolatile Organic Fuels

Volatile Fuels

Volatile GC/MS

Diesel Range Organics	137	mg/Kg
Gasoline Range Organics	11.0	mg/Kg
1,2,4-Trimethylbenzene	154	ug/Kg
1,3,5-Trimethylbenzene	34.4J	ug/Kg
4-Isopropyltoluene	76.4J	ug/Kg
Benzene	22.0J	ug/Kg
Ethylbenzene	53.0J	ug/Kg
Naphthalene	148	ug/Kg
o-Xylene	176	ug/Kg
P & M -Xylene	286	ug/Kg
Tetrachloroethene	36.3J	ug/Kg
Toluene	162	ug/Kg
Trichloroethene	23.7	ug/Kg
Xylenes (total)	462	ug/Kg

Detectable Results Summary

Client Sample ID: **RSE-28**
 Lab Sample ID: 1195185003

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Arsenic	7.80	mg/Kg
Barium	353	mg/Kg
Cadmium	0.304	mg/Kg
Chromium	30.0	mg/Kg
Lead	70.1	mg/Kg
Mercury	0.0643J	mg/Kg
Selenium	1.20	mg/Kg
Silver	0.165J	mg/Kg

Polychlorinated Biphenyls

Polynuclear Aromatics GC/MS

Aroclor-1260	17.8J	ug/Kg
1-Methylnaphthalene	74.8J	ug/Kg
2-Methylnaphthalene	105J	ug/Kg
Anthracene	118J	ug/Kg
Benzo(a)Anthracene	116J	ug/Kg
Benzo[a]pyrene	125J	ug/Kg
Benzo[b]Fluoranthene	222	ug/Kg
Benzo[g,h,i]perylene	131J	ug/Kg
Chrysene	171	ug/Kg
Fluoranthene	238	ug/Kg
Indeno[1,2,3-c,d] pyrene	98.9J	ug/Kg
Naphthalene	58.6J	ug/Kg
Phenanthrene	188	ug/Kg
Pyrene	295	ug/Kg

Semivolatile Organic Fuels

Volatile Fuels

Volatile GC/MS

Diesel Range Organics	139	mg/Kg
Gasoline Range Organics	3.40J	mg/Kg
1,2,4-Trimethylbenzene	81.2J	ug/Kg
1,3,5-Trimethylbenzene	16.4J	ug/Kg
Benzene	16.0J	ug/Kg
Ethylbenzene	31.5J	ug/Kg
Naphthalene	83.9	ug/Kg
o-Xylene	97.6	ug/Kg
P & M -Xylene	157	ug/Kg
Tetrachloroethene	16.4J	ug/Kg
Toluene	105	ug/Kg
Trichloroethene	16.9	ug/Kg
Trichlorofluoromethane	29.5J	ug/Kg
Xylenes (total)	255	ug/Kg

Client Sample ID: **Trip Blank**
 Lab Sample ID: 1195185004

Volatile GC/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Trichlorofluoromethane	371	ug/Kg



Results of RSE-24

Client Sample ID: **RSE-24**
Client Project ID: **19-2082 ARRC Fuel Rack Stock**
Lab Sample ID: 1195185001
Lab Project ID: 1195185

Collection Date: 09/04/19 15:00
Received Date: 09/05/19 12:28
Matrix: Soil/Solid (dry weight)
Solids (%):91.9
Location:

Results by Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Arsenic	6.44	1.07	0.333	mg/Kg	10		09/09/19 17:35
Barium	408	0.322	0.101	mg/Kg	10		09/09/19 17:35
Cadmium	0.295	0.215	0.0665	mg/Kg	10		09/09/19 17:35
Chromium	34.2	0.429	0.140	mg/Kg	10		09/09/19 17:35
Lead	69.6	0.215	0.0665	mg/Kg	10		09/09/19 17:35
Mercury	0.0735 J	0.0859	0.0215	mg/Kg	10		09/09/19 17:35
Selenium	1.23	1.07	0.333	mg/Kg	10		09/09/19 17:35
Silver	0.135 J	0.215	0.0665	mg/Kg	10		09/09/19 17:35

Batch Information

Analytical Batch: MMS10616
Analytical Method: SW6020A
Analyst: DMM
Analytical Date/Time: 09/09/19 17:35
Container ID: 1195185001-A

Prep Batch: MX32775
Prep Method: SW3050B
Prep Date/Time: 09/09/19 10:32
Prep Initial Wt./Vol.: 1.014 g
Prep Extract Vol: 50 mL



Results of RSE-24

Client Sample ID: **RSE-24**
Client Project ID: **19-2082 ARRC Fuel Rack Stock**
Lab Sample ID: 1195185001
Lab Project ID: 1195185

Collection Date: 09/04/19 15:00
Received Date: 09/05/19 12:28
Matrix: Soil/Solid (dry weight)
Solids (%):91.9
Location:

Results by Polychlorinated Biphenyls

<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>
Aroclor-1016	27.1 U	54.3	13.6	ug/Kg	1		09/11/19 15:20
Aroclor-1221	54.5 U	109	27.1	ug/Kg	1		09/11/19 15:20
Aroclor-1232	27.1 U	54.3	13.6	ug/Kg	1		09/11/19 15:20
Aroclor-1242	27.1 U	54.3	13.6	ug/Kg	1		09/11/19 15:20
Aroclor-1248	27.1 U	54.3	13.6	ug/Kg	1		09/11/19 15:20
Aroclor-1254	27.1 U	54.3	13.6	ug/Kg	1		09/11/19 15:20
Aroclor-1260	16.2 J	54.3	13.6	ug/Kg	1		09/11/19 15:20
Surrogates							
Decachlorobiphenyl (surr)	75.3	60-125		%	1		09/11/19 15:20

Batch Information

Analytical Batch: XGC10501
Analytical Method: SW8082A
Analyst: BMZ
Analytical Date/Time: 09/11/19 15:20
Container ID: 1195185001-A

Prep Batch: XXX42227
Prep Method: SW3550C
Prep Date/Time: 09/10/19 14:56
Prep Initial Wt./Vol.: 22.569 g
Prep Extract Vol: 5 mL



Results of RSE-24

Client Sample ID: RSE-24
Client Project ID: 19-2082 ARRC Fuel Rack Stock
Lab Sample ID: 1195185001
Lab Project ID: 1195185

Collection Date: 09/04/19 15:00
Received Date: 09/05/19 12:28
Matrix: Soil/Solid (dry weight)
Solids (%):91.9
Location:

Results by Polynuclear Aromatics GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various polynuclear aromatic hydrocarbons and their surrogate compounds with associated quality and detection data.

Batch Information

Analytical Batch: XMS11700
Analytical Method: 8270D SIM (PAH)
Analyst: DSD
Analytical Date/Time: 09/12/19 02:11
Container ID: 1195185001-A

Prep Batch: XXX42225
Prep Method: SW3550C
Prep Date/Time: 09/10/19 10:35
Prep Initial Wt./Vol.: 22.966 g
Prep Extract Vol: 5 mL



Results of RSE-24

Client Sample ID: **RSE-24**
Client Project ID: **19-2082 ARRC Fuel Rack Stock**
Lab Sample ID: 1195185001
Lab Project ID: 1195185

Collection Date: 09/04/19 15:00
Received Date: 09/05/19 12:28
Matrix: Soil/Solid (dry weight)
Solids (%):91.9
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	135	21.5	6.67	mg/Kg	1		09/11/19 22:17
Surrogates							
5a Androstane (surr)	95.9	50-150		%	1		09/11/19 22:17

Batch Information

Analytical Batch: XFC15316
Analytical Method: AK102
Analyst: CMS
Analytical Date/Time: 09/11/19 22:17
Container ID: 1195185001-A

Prep Batch: XXX42228
Prep Method: SW3550C
Prep Date/Time: 09/10/19 16:28
Prep Initial Wt./Vol.: 30.339 g
Prep Extract Vol: 5 mL



Results of RSE-24

Client Sample ID: **RSE-24**
Client Project ID: **19-2082 ARRC Fuel Rack Stock**
Lab Sample ID: 1195185001
Lab Project ID: 1195185

Collection Date: 09/04/19 15:00
Received Date: 09/05/19 12:28
Matrix: Soil/Solid (dry weight)
Solids (%):91.9
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	4.64 J	5.78	1.73	mg/Kg	1		09/10/19 01:31
Surrogates							
4-Bromofluorobenzene (surr)	103	50-150		%	1		09/10/19 01:31

Batch Information

Analytical Batch: VFC14918
Analytical Method: AK101
Analyst: NRB
Analytical Date/Time: 09/10/19 01:31
Container ID: 1195185001-C

Prep Batch: VXX34834
Prep Method: SW5035A
Prep Date/Time: 09/04/19 15:00
Prep Initial Wt./Vol.: 25.505 g
Prep Extract Vol: 27.0706 mL



Results of RSE-24

Client Sample ID: **RSE-24**
 Client Project ID: **19-2082 ARRC Fuel Rack Stock**
 Lab Sample ID: 1195185001
 Lab Project ID: 1195185

Collection Date: 09/04/19 15:00
 Received Date: 09/05/19 12:28
 Matrix: Soil/Solid (dry weight)
 Solids (%):91.9
 Location:

Results by Volatile GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,1,1,2-Tetrachloroethane	23.1 U	46.2	14.3	ug/Kg	1		09/08/19 22:57
1,1,1-Trichloroethane	28.9 U	57.8	18.0	ug/Kg	1		09/08/19 22:57
1,1,2,2-Tetrachloroethane	2.31 U	4.62	1.43	ug/Kg	1		09/08/19 22:57
1,1,2-Trichloroethane	0.925 U	1.85	0.578	ug/Kg	1		09/08/19 22:57
1,1-Dichloroethane	28.9 U	57.8	18.0	ug/Kg	1		09/08/19 22:57
1,1-Dichloroethene	28.9 U	57.8	18.0	ug/Kg	1		09/08/19 22:57
1,1-Dichloropropene	28.9 U	57.8	18.0	ug/Kg	1		09/08/19 22:57
1,2,3-Trichlorobenzene	58.0 U	116	34.7	ug/Kg	1		09/08/19 22:57
1,2,3-Trichloropropane	1.16 U	2.31	0.716	ug/Kg	1		09/08/19 22:57
1,2,4-Trichlorobenzene	28.9 U	57.8	18.0	ug/Kg	1		09/08/19 22:57
1,2,4-Trimethylbenzene	196	116	34.7	ug/Kg	1		09/08/19 22:57
1,2-Dibromo-3-chloropropane	116 U	231	71.6	ug/Kg	1		09/08/19 22:57
1,2-Dibromoethane	1.16 U	2.31	0.716	ug/Kg	1		09/08/19 22:57
1,2-Dichlorobenzene	28.9 U	57.8	18.0	ug/Kg	1		09/08/19 22:57
1,2-Dichloroethane	2.31 U	4.62	1.43	ug/Kg	1		09/08/19 22:57
1,2-Dichloropropane	11.6 U	23.1	7.16	ug/Kg	1		09/08/19 22:57
1,3,5-Trimethylbenzene	42.2 J	57.8	18.0	ug/Kg	1		09/08/19 22:57
1,3-Dichlorobenzene	28.9 U	57.8	18.0	ug/Kg	1		09/08/19 22:57
1,3-Dichloropropane	11.6 U	23.1	7.16	ug/Kg	1		09/08/19 22:57
1,4-Dichlorobenzene	28.9 U	57.8	18.0	ug/Kg	1		09/08/19 22:57
2,2-Dichloropropane	28.9 U	57.8	18.0	ug/Kg	1		09/08/19 22:57
2-Butanone (MEK)	289 U	578	180	ug/Kg	1		09/08/19 22:57
2-Chlorotoluene	28.9 U	57.8	18.0	ug/Kg	1		09/08/19 22:57
2-Hexanone	116 U	231	71.6	ug/Kg	1		09/08/19 22:57
4-Chlorotoluene	28.9 U	57.8	18.0	ug/Kg	1		09/08/19 22:57
4-Isopropyltoluene	105 J	231	57.8	ug/Kg	1		09/08/19 22:57
4-Methyl-2-pentanone (MIBK)	289 U	578	180	ug/Kg	1		09/08/19 22:57
Acetone	289 U	578	180	ug/Kg	1		09/08/19 22:57
Benzene	31.9	28.9	9.01	ug/Kg	1		09/08/19 22:57
Bromobenzene	28.9 U	57.8	18.0	ug/Kg	1		09/08/19 22:57
Bromochloromethane	28.9 U	57.8	18.0	ug/Kg	1		09/08/19 22:57
Bromodichloromethane	2.31 U	4.62	1.43	ug/Kg	1		09/08/19 22:57
Bromoform	28.9 U	57.8	18.0	ug/Kg	1		09/08/19 22:57
Bromomethane	23.1 U	46.2	14.3	ug/Kg	1		09/08/19 22:57
Carbon disulfide	116 U	231	71.6	ug/Kg	1		09/08/19 22:57
Carbon tetrachloride	14.4 U	28.9	9.01	ug/Kg	1		09/08/19 22:57
Chlorobenzene	28.9 U	57.8	18.0	ug/Kg	1		09/08/19 22:57

Print Date: 09/12/2019 5:04:02PM

J flagging is activated



Results of RSE-24

Client Sample ID: **RSE-24**
 Client Project ID: **19-2082 ARRC Fuel Rack Stock**
 Lab Sample ID: 1195185001
 Lab Project ID: 1195185

Collection Date: 09/04/19 15:00
 Received Date: 09/05/19 12:28
 Matrix: Soil/Solid (dry weight)
 Solids (%):91.9
 Location:

Results by Volatile GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Chloroethane	231 U	462	143	ug/Kg	1		09/08/19 22:57
Chloroform	2.31 U	4.62	1.43	ug/Kg	1		09/08/19 22:57
Chloromethane	28.9 U	57.8	18.0	ug/Kg	1		09/08/19 22:57
cis-1,2-Dichloroethene	28.9 U	57.8	18.0	ug/Kg	1		09/08/19 22:57
cis-1,3-Dichloropropene	14.4 U	28.9	9.01	ug/Kg	1		09/08/19 22:57
Dibromochloromethane	2.31 U	4.62	1.43	ug/Kg	1		09/08/19 22:57
Dibromomethane	28.9 U	57.8	18.0	ug/Kg	1		09/08/19 22:57
Dichlorodifluoromethane	58.0 U	116	34.7	ug/Kg	1		09/08/19 22:57
Ethylbenzene	62.8	57.8	18.0	ug/Kg	1		09/08/19 22:57
Freon-113	116 U	231	71.6	ug/Kg	1		09/08/19 22:57
Hexachlorobutadiene	23.1 U	46.2	14.3	ug/Kg	1		09/08/19 22:57
Isopropylbenzene (Cumene)	22.9 J	57.8	18.0	ug/Kg	1		09/08/19 22:57
Methylene chloride	116 U	231	71.6	ug/Kg	1		09/08/19 22:57
Methyl-t-butyl ether	116 U	231	71.6	ug/Kg	1		09/08/19 22:57
Naphthalene	184	57.8	18.0	ug/Kg	1		09/08/19 22:57
n-Butylbenzene	28.9 U	57.8	18.0	ug/Kg	1		09/08/19 22:57
n-Propylbenzene	18.3 J	57.8	18.0	ug/Kg	1		09/08/19 22:57
o-Xylene	218	57.8	18.0	ug/Kg	1		09/08/19 22:57
P & M -Xylene	336	116	34.7	ug/Kg	1		09/08/19 22:57
sec-Butylbenzene	28.9 U	57.8	18.0	ug/Kg	1		09/08/19 22:57
Styrene	28.9 U	57.8	18.0	ug/Kg	1		09/08/19 22:57
tert-Butylbenzene	28.9 U	57.8	18.0	ug/Kg	1		09/08/19 22:57
Tetrachloroethene	26.3 J	28.9	9.01	ug/Kg	1		09/08/19 22:57
Toluene	214	57.8	18.0	ug/Kg	1		09/08/19 22:57
trans-1,2-Dichloroethene	28.9 U	57.8	18.0	ug/Kg	1		09/08/19 22:57
trans-1,3-Dichloropropene	14.4 U	28.9	9.01	ug/Kg	1		09/08/19 22:57
Trichloroethene	20.9	11.6	3.47	ug/Kg	1		09/08/19 22:57
Trichlorofluoromethane	58.0 U	116	34.7	ug/Kg	1		09/08/19 22:57
Vinyl acetate	116 U	231	71.6	ug/Kg	1		09/08/19 22:57
Vinyl chloride	0.925 U	1.85	0.578	ug/Kg	1		09/08/19 22:57
Xylenes (total)	555	173	52.7	ug/Kg	1		09/08/19 22:57
Surrogates							
1,2-Dichloroethane-D4 (surr)	106	71-136		%	1		09/08/19 22:57
4-Bromofluorobenzene (surr)	92.2	55-151		%	1		09/08/19 22:57
Toluene-d8 (surr)	99.6	85-116		%	1		09/08/19 22:57

Results of RSE-24

Client Sample ID: **RSE-24**
Client Project ID: **19-2082 ARRC Fuel Rack Stock**
Lab Sample ID: 1195185001
Lab Project ID: 1195185

Collection Date: 09/04/19 15:00
Received Date: 09/05/19 12:28
Matrix: Soil/Solid (dry weight)
Solids (%):91.9
Location:

Results by Volatile GC/MS

Batch Information

Analytical Batch: VMS19422
Analytical Method: SW8260C
Analyst: NRO
Analytical Date/Time: 09/08/19 22:57
Container ID: 1195185001-C

Prep Batch: VXX34830
Prep Method: SW5035A
Prep Date/Time: 09/04/19 15:00
Prep Initial Wt./Vol.: 25.505 g
Prep Extract Vol: 27.0706 mL



Results of RSE-27

Client Sample ID: **RSE-27**
Client Project ID: **19-2082 ARRC Fuel Rack Stock**
Lab Sample ID: 1195185002
Lab Project ID: 1195185

Collection Date: 09/04/19 15:18
Received Date: 09/05/19 12:28
Matrix: Soil/Solid (dry weight)
Solids (%):89.0
Location:

Results by Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Arsenic	6.28	1.10	0.341	mg/Kg	10		09/09/19 17:40
Barium	414	0.330	0.103	mg/Kg	10		09/09/19 17:40
Cadmium	0.293	0.220	0.0682	mg/Kg	10		09/09/19 17:40
Chromium	33.0	0.440	0.143	mg/Kg	10		09/09/19 17:40
Lead	66.3	0.220	0.0682	mg/Kg	10		09/09/19 17:40
Mercury	0.0718 J	0.0880	0.0220	mg/Kg	10		09/09/19 17:40
Selenium	1.27	1.10	0.341	mg/Kg	10		09/09/19 17:40
Silver	0.135 J	0.220	0.0682	mg/Kg	10		09/09/19 17:40

Batch Information

Analytical Batch: MMS10616
Analytical Method: SW6020A
Analyst: DMM
Analytical Date/Time: 09/09/19 17:40
Container ID: 1195185002-A

Prep Batch: MX32775
Prep Method: SW3050B
Prep Date/Time: 09/09/19 10:32
Prep Initial Wt./Vol.: 1.022 g
Prep Extract Vol: 50 mL



Results of RSE-27

Client Sample ID: **RSE-27**
Client Project ID: **19-2082 ARRC Fuel Rack Stock**
Lab Sample ID: 1195185002
Lab Project ID: 1195185

Collection Date: 09/04/19 15:18
Received Date: 09/05/19 12:28
Matrix: Soil/Solid (dry weight)
Solids (%):89.0
Location:

Results by Polychlorinated Biphenyls

<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>
Aroclor-1016	27.9 U	55.8	14.0	ug/Kg	1		09/11/19 15:31
Aroclor-1221	56.0 U	112	27.9	ug/Kg	1		09/11/19 15:31
Aroclor-1232	27.9 U	55.8	14.0	ug/Kg	1		09/11/19 15:31
Aroclor-1242	27.9 U	55.8	14.0	ug/Kg	1		09/11/19 15:31
Aroclor-1248	27.9 U	55.8	14.0	ug/Kg	1		09/11/19 15:31
Aroclor-1254	27.9 U	55.8	14.0	ug/Kg	1		09/11/19 15:31
Aroclor-1260	17.1 J	55.8	14.0	ug/Kg	1		09/11/19 15:31
Surrogates							
Decachlorobiphenyl (surr)	76.9	60-125		%	1		09/11/19 15:31

Batch Information

Analytical Batch: XGC10501
Analytical Method: SW8082A
Analyst: BMZ
Analytical Date/Time: 09/11/19 15:31
Container ID: 1195185002-A

Prep Batch: XXX42227
Prep Method: SW3550C
Prep Date/Time: 09/10/19 14:56
Prep Initial Wt./Vol.: 22.641 g
Prep Extract Vol: 5 mL



Results of RSE-27

Client Sample ID: **RSE-27**
 Client Project ID: **19-2082 ARRC Fuel Rack Stock**
 Lab Sample ID: 1195185002
 Lab Project ID: 1195185

Collection Date: 09/04/19 15:18
 Received Date: 09/05/19 12:28
 Matrix: Soil/Solid (dry weight)
 Solids (%):89.0
 Location:

Results by Polynuclear Aromatics GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1-Methylnaphthalene	66.7 J	138	34.5	ug/Kg	5		09/12/19 02:31
2-Methylnaphthalene	90.3 J	138	34.5	ug/Kg	5		09/12/19 02:31
Acenaphthene	69.0 U	138	34.5	ug/Kg	5		09/12/19 02:31
Acenaphthylene	69.0 U	138	34.5	ug/Kg	5		09/12/19 02:31
Anthracene	74.5 J	138	34.5	ug/Kg	5		09/12/19 02:31
Benzo(a)Anthracene	85.1 J	138	34.5	ug/Kg	5		09/12/19 02:31
Benzo[a]pyrene	91.9 J	138	34.5	ug/Kg	5		09/12/19 02:31
Benzo[b]Fluoranthene	179	138	34.5	ug/Kg	5		09/12/19 02:31
Benzo[g,h,i]perylene	132 J	138	34.5	ug/Kg	5		09/12/19 02:31
Benzo[k]fluoranthene	69.0 U	138	34.5	ug/Kg	5		09/12/19 02:31
Chrysene	131 J	138	34.5	ug/Kg	5		09/12/19 02:31
Dibenzo[a,h]anthracene	69.0 U	138	34.5	ug/Kg	5		09/12/19 02:31
Fluoranthene	164	138	34.5	ug/Kg	5		09/12/19 02:31
Fluorene	69.0 U	138	34.5	ug/Kg	5		09/12/19 02:31
Indeno[1,2,3-c,d] pyrene	90.8 J	138	34.5	ug/Kg	5		09/12/19 02:31
Naphthalene	51.3 J	110	27.6	ug/Kg	5		09/12/19 02:31
Phenanthrene	115 J	138	34.5	ug/Kg	5		09/12/19 02:31
Pyrene	181	138	34.5	ug/Kg	5		09/12/19 02:31
Surrogates							
2-Methylnaphthalene-d10 (surr)	74.5	58-103		%	5		09/12/19 02:31
Fluoranthene-d10 (surr)	79.3	54-113		%	5		09/12/19 02:31

Batch Information

Analytical Batch: XMS11700
 Analytical Method: 8270D SIM (PAH)
 Analyst: DSD
 Analytical Date/Time: 09/12/19 02:31
 Container ID: 1195185002-A

Prep Batch: XXX42225
 Prep Method: SW3550C
 Prep Date/Time: 09/10/19 10:35
 Prep Initial Wt./Vol.: 22.92 g
 Prep Extract Vol: 5 mL



Results of RSE-27

Client Sample ID: **RSE-27**
Client Project ID: **19-2082 ARRC Fuel Rack Stock**
Lab Sample ID: 1195185002
Lab Project ID: 1195185

Collection Date: 09/04/19 15:18
Received Date: 09/05/19 12:28
Matrix: Soil/Solid (dry weight)
Solids (%):89.0
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	137	22.5	6.96	mg/Kg	1		09/11/19 22:26
Surrogates							
5a Androstane (surr)	111	50-150		%	1		09/11/19 22:26

Batch Information

Analytical Batch: XFC15316
Analytical Method: AK102
Analyst: CMS
Analytical Date/Time: 09/11/19 22:26
Container ID: 1195185002-A

Prep Batch: XXX42228
Prep Method: SW3550C
Prep Date/Time: 09/10/19 16:28
Prep Initial Wt./Vol.: 30.022 g
Prep Extract Vol: 5 mL



Results of RSE-27

Client Sample ID: **RSE-27**
Client Project ID: **19-2082 ARRC Fuel Rack Stock**
Lab Sample ID: 1195185002
Lab Project ID: 1195185

Collection Date: 09/04/19 15:18
Received Date: 09/05/19 12:28
Matrix: Soil/Solid (dry weight)
Solids (%):89.0
Location:

Results by Volatile Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Gasoline Range Organics	11.0	7.46	2.24	mg/Kg	1		09/10/19 02:24
Surrogates							
4-Bromofluorobenzene (surr)	99.1	50-150		%	1		09/10/19 02:24

Batch Information

Analytical Batch: VFC14918
Analytical Method: AK101
Analyst: NRB
Analytical Date/Time: 09/10/19 02:24
Container ID: 1195185002-C

Prep Batch: VXX34834
Prep Method: SW5035A
Prep Date/Time: 09/04/19 15:18
Prep Initial Wt./Vol.: 20.531 g
Prep Extract Vol: 27.2592 mL



Results of RSE-27

Client Sample ID: RSE-27
Client Project ID: 19-2082 ARRC Fuel Rack Stock
Lab Sample ID: 1195185002
Lab Project ID: 1195185

Collection Date: 09/04/19 15:18
Received Date: 09/05/19 12:28
Matrix: Soil/Solid (dry weight)
Solids (%):89.0
Location:

Results by Volatile GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various chemical compounds and their detection results.

Results of RSE-27

Client Sample ID: **RSE-27**
 Client Project ID: **19-2082 ARRC Fuel Rack Stock**
 Lab Sample ID: 1195185002
 Lab Project ID: 1195185

Collection Date: 09/04/19 15:18
 Received Date: 09/05/19 12:28
 Matrix: Soil/Solid (dry weight)
 Solids (%):89.0
 Location:

Results by Volatile GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Chloroethane	299 U	597	185	ug/Kg	1		09/08/19 23:13
Chloroform	2.98 U	5.97	1.85	ug/Kg	1		09/08/19 23:13
Chloromethane	37.3 U	74.6	23.3	ug/Kg	1		09/08/19 23:13
cis-1,2-Dichloroethene	37.3 U	74.6	23.3	ug/Kg	1		09/08/19 23:13
cis-1,3-Dichloropropene	18.6 U	37.3	11.6	ug/Kg	1		09/08/19 23:13
Dibromochloromethane	2.98 U	5.97	1.85	ug/Kg	1		09/08/19 23:13
Dibromomethane	37.3 U	74.6	23.3	ug/Kg	1		09/08/19 23:13
Dichlorodifluoromethane	74.5 U	149	44.8	ug/Kg	1		09/08/19 23:13
Ethylbenzene	53.0 J	74.6	23.3	ug/Kg	1		09/08/19 23:13
Freon-113	149 U	298	92.5	ug/Kg	1		09/08/19 23:13
Hexachlorobutadiene	29.9 U	59.7	18.5	ug/Kg	1		09/08/19 23:13
Isopropylbenzene (Cumene)	37.3 U	74.6	23.3	ug/Kg	1		09/08/19 23:13
Methylene chloride	149 U	298	92.5	ug/Kg	1		09/08/19 23:13
Methyl-t-butyl ether	149 U	298	92.5	ug/Kg	1		09/08/19 23:13
Naphthalene	148	74.6	23.3	ug/Kg	1		09/08/19 23:13
n-Butylbenzene	37.3 U	74.6	23.3	ug/Kg	1		09/08/19 23:13
n-Propylbenzene	37.3 U	74.6	23.3	ug/Kg	1		09/08/19 23:13
o-Xylene	176	74.6	23.3	ug/Kg	1		09/08/19 23:13
P & M -Xylene	286	149	44.8	ug/Kg	1		09/08/19 23:13
sec-Butylbenzene	37.3 U	74.6	23.3	ug/Kg	1		09/08/19 23:13
Styrene	37.3 U	74.6	23.3	ug/Kg	1		09/08/19 23:13
tert-Butylbenzene	37.3 U	74.6	23.3	ug/Kg	1		09/08/19 23:13
Tetrachloroethene	36.3 J	37.3	11.6	ug/Kg	1		09/08/19 23:13
Toluene	162	74.6	23.3	ug/Kg	1		09/08/19 23:13
trans-1,2-Dichloroethene	37.3 U	74.6	23.3	ug/Kg	1		09/08/19 23:13
trans-1,3-Dichloropropene	18.6 U	37.3	11.6	ug/Kg	1		09/08/19 23:13
Trichloroethene	23.7	14.9	4.48	ug/Kg	1		09/08/19 23:13
Trichlorofluoromethane	74.5 U	149	44.8	ug/Kg	1		09/08/19 23:13
Vinyl acetate	149 U	298	92.5	ug/Kg	1		09/08/19 23:13
Vinyl chloride	1.20 U	2.39	0.746	ug/Kg	1		09/08/19 23:13
Xylenes (total)	462	224	68.0	ug/Kg	1		09/08/19 23:13
Surrogates							
1,2-Dichloroethane-D4 (surr)	105	71-136		%	1		09/08/19 23:13
4-Bromofluorobenzene (surr)	87.2	55-151		%	1		09/08/19 23:13
Toluene-d8 (surr)	97.5	85-116		%	1		09/08/19 23:13

Results of RSE-27

Client Sample ID: **RSE-27**
Client Project ID: **19-2082 ARRC Fuel Rack Stock**
Lab Sample ID: 1195185002
Lab Project ID: 1195185

Collection Date: 09/04/19 15:18
Received Date: 09/05/19 12:28
Matrix: Soil/Solid (dry weight)
Solids (%):89.0
Location:

Results by Volatile GC/MS

Batch Information

Analytical Batch: VMS19422
Analytical Method: SW8260C
Analyst: NRO
Analytical Date/Time: 09/08/19 23:13
Container ID: 1195185002-C

Prep Batch: VXX34830
Prep Method: SW5035A
Prep Date/Time: 09/04/19 15:18
Prep Initial Wt./Vol.: 20.531 g
Prep Extract Vol: 27.2592 mL



Results of RSE-28

Client Sample ID: **RSE-28**
Client Project ID: **19-2082 ARRC Fuel Rack Stock**
Lab Sample ID: 1195185003
Lab Project ID: 1195185

Collection Date: 09/04/19 15:39
Received Date: 09/05/19 12:28
Matrix: Soil/Solid (dry weight)
Solids (%):90.6
Location:

Results by Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Arsenic	7.80	1.09	0.337	mg/Kg	10		09/09/19 17:54
Barium	353	0.326	0.102	mg/Kg	10		09/09/19 17:54
Cadmium	0.304	0.217	0.0673	mg/Kg	10		09/09/19 17:54
Chromium	30.0	0.434	0.141	mg/Kg	10		09/09/19 17:54
Lead	70.1	0.217	0.0673	mg/Kg	10		09/09/19 17:54
Mercury	0.0643 J	0.0869	0.0217	mg/Kg	10		09/09/19 17:54
Selenium	1.20	1.09	0.337	mg/Kg	10		09/09/19 17:54
Silver	0.165 J	0.217	0.0673	mg/Kg	10		09/09/19 17:54

Batch Information

Analytical Batch: MMS10616
Analytical Method: SW6020A
Analyst: DMM
Analytical Date/Time: 09/09/19 17:54
Container ID: 1195185003-A

Prep Batch: MX32775
Prep Method: SW3050B
Prep Date/Time: 09/09/19 10:32
Prep Initial Wt./Vol.: 1.017 g
Prep Extract Vol: 50 mL



Results of RSE-28

Client Sample ID: **RSE-28**
Client Project ID: **19-2082 ARRC Fuel Rack Stock**
Lab Sample ID: 1195185003
Lab Project ID: 1195185

Collection Date: 09/04/19 15:39
Received Date: 09/05/19 12:28
Matrix: Soil/Solid (dry weight)
Solids (%):90.6
Location:

Results by Polychlorinated Biphenyls

<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>
Aroclor-1016	27.4 U	54.8	13.7	ug/Kg	1		09/11/19 15:41
Aroclor-1221	55.0 U	110	27.4	ug/Kg	1		09/11/19 15:41
Aroclor-1232	27.4 U	54.8	13.7	ug/Kg	1		09/11/19 15:41
Aroclor-1242	27.4 U	54.8	13.7	ug/Kg	1		09/11/19 15:41
Aroclor-1248	27.4 U	54.8	13.7	ug/Kg	1		09/11/19 15:41
Aroclor-1254	27.4 U	54.8	13.7	ug/Kg	1		09/11/19 15:41
Aroclor-1260	17.8 J	54.8	13.7	ug/Kg	1		09/11/19 15:41
Surrogates							
Decachlorobiphenyl (surr)	77	60-125		%	1		09/11/19 15:41

Batch Information

Analytical Batch: XGC10501
Analytical Method: SW8082A
Analyst: BMZ
Analytical Date/Time: 09/11/19 15:41
Container ID: 1195185003-A

Prep Batch: XXX42227
Prep Method: SW3550C
Prep Date/Time: 09/10/19 14:56
Prep Initial Wt./Vol.: 22.656 g
Prep Extract Vol: 5 mL



Results of RSE-28

Client Sample ID: RSE-28
Client Project ID: 19-2082 ARRC Fuel Rack Stock
Lab Sample ID: 1195185003
Lab Project ID: 1195185

Collection Date: 09/04/19 15:39
Received Date: 09/05/19 12:28
Matrix: Soil/Solid (dry weight)
Solids (%):90.6
Location:

Results by Polynuclear Aromatics GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various polynuclear aromatic hydrocarbons and their surrogate compounds with associated quality and detection data.

Batch Information

Analytical Batch: XMS11700
Analytical Method: 8270D SIM (PAH)
Analyst: DSD
Analytical Date/Time: 09/12/19 02:52
Container ID: 1195185003-A

Prep Batch: XXX42225
Prep Method: SW3550C
Prep Date/Time: 09/10/19 10:35
Prep Initial Wt./Vol.: 22.717 g
Prep Extract Vol: 5 mL



Results of RSE-28

Client Sample ID: **RSE-28**
Client Project ID: **19-2082 ARRC Fuel Rack Stock**
Lab Sample ID: 1195185003
Lab Project ID: 1195185

Collection Date: 09/04/19 15:39
Received Date: 09/05/19 12:28
Matrix: Soil/Solid (dry weight)
Solids (%):90.6
Location:

Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	139	22.1	6.84	mg/Kg	1		09/11/19 22:36
Surrogates							
5a Androstane (surr)	112	50-150		%	1		09/11/19 22:36

Batch Information

Analytical Batch: XFC15316
Analytical Method: AK102
Analyst: CMS
Analytical Date/Time: 09/11/19 22:36
Container ID: 1195185003-A

Prep Batch: XXX42228
Prep Method: SW3550C
Prep Date/Time: 09/10/19 16:28
Prep Initial Wt./Vol.: 30.012 g
Prep Extract Vol: 5 mL



Results of RSE-28

Client Sample ID: **RSE-28**
Client Project ID: **19-2082 ARRC Fuel Rack Stock**
Lab Sample ID: 1195185003
Lab Project ID: 1195185

Collection Date: 09/04/19 15:39
Received Date: 09/05/19 12:28
Matrix: Soil/Solid (dry weight)
Solids (%):90.6
Location:

Results by Volatile Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Gasoline Range Organics	3.40 J	4.87	1.46	mg/Kg	1		09/10/19 02:42
Surrogates							
4-Bromofluorobenzene (surr)	99.2	50-150		%	1		09/10/19 02:42

Batch Information

Analytical Batch: VFC14918
Analytical Method: AK101
Analyst: NRB
Analytical Date/Time: 09/10/19 02:42
Container ID: 1195185003-C

Prep Batch: VXX34834
Prep Method: SW5035A
Prep Date/Time: 09/04/19 15:39
Prep Initial Wt./Vol.: 31.722 g
Prep Extract Vol: 27.9914 mL



Results of RSE-28

Client Sample ID: **RSE-28**
 Client Project ID: **19-2082 ARRC Fuel Rack Stock**
 Lab Sample ID: 1195185003
 Lab Project ID: 1195185

Collection Date: 09/04/19 15:39
 Received Date: 09/05/19 12:28
 Matrix: Soil/Solid (dry weight)
 Solids (%):90.6
 Location:

Results by Volatile GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,1,1,2-Tetrachloroethane	19.5 U	39.0	12.1	ug/Kg	1		09/08/19 23:28
1,1,1-Trichloroethane	24.4 U	48.7	15.2	ug/Kg	1		09/08/19 23:28
1,1,2,2-Tetrachloroethane	1.95 U	3.90	1.21	ug/Kg	1		09/08/19 23:28
1,1,2-Trichloroethane	0.780 U	1.56	0.487	ug/Kg	1		09/08/19 23:28
1,1-Dichloroethane	24.4 U	48.7	15.2	ug/Kg	1		09/08/19 23:28
1,1-Dichloroethene	24.4 U	48.7	15.2	ug/Kg	1		09/08/19 23:28
1,1-Dichloropropene	24.4 U	48.7	15.2	ug/Kg	1		09/08/19 23:28
1,2,3-Trichlorobenzene	48.7 U	97.4	29.2	ug/Kg	1		09/08/19 23:28
1,2,3-Trichloropropane	0.975 U	1.95	0.604	ug/Kg	1		09/08/19 23:28
1,2,4-Trichlorobenzene	24.4 U	48.7	15.2	ug/Kg	1		09/08/19 23:28
1,2,4-Trimethylbenzene	81.2 J	97.4	29.2	ug/Kg	1		09/08/19 23:28
1,2-Dibromo-3-chloropropane	97.5 U	195	60.4	ug/Kg	1		09/08/19 23:28
1,2-Dibromoethane	0.975 U	1.95	0.604	ug/Kg	1		09/08/19 23:28
1,2-Dichlorobenzene	24.4 U	48.7	15.2	ug/Kg	1		09/08/19 23:28
1,2-Dichloroethane	1.95 U	3.90	1.21	ug/Kg	1		09/08/19 23:28
1,2-Dichloropropane	9.75 U	19.5	6.04	ug/Kg	1		09/08/19 23:28
1,3,5-Trimethylbenzene	16.4 J	48.7	15.2	ug/Kg	1		09/08/19 23:28
1,3-Dichlorobenzene	24.4 U	48.7	15.2	ug/Kg	1		09/08/19 23:28
1,3-Dichloropropane	9.75 U	19.5	6.04	ug/Kg	1		09/08/19 23:28
1,4-Dichlorobenzene	24.4 U	48.7	15.2	ug/Kg	1		09/08/19 23:28
2,2-Dichloropropane	24.4 U	48.7	15.2	ug/Kg	1		09/08/19 23:28
2-Butanone (MEK)	244 U	487	152	ug/Kg	1		09/08/19 23:28
2-Chlorotoluene	24.4 U	48.7	15.2	ug/Kg	1		09/08/19 23:28
2-Hexanone	97.5 U	195	60.4	ug/Kg	1		09/08/19 23:28
4-Chlorotoluene	24.4 U	48.7	15.2	ug/Kg	1		09/08/19 23:28
4-Isopropyltoluene	97.5 U	195	48.7	ug/Kg	1		09/08/19 23:28
4-Methyl-2-pentanone (MIBK)	244 U	487	152	ug/Kg	1		09/08/19 23:28
Acetone	244 U	487	152	ug/Kg	1		09/08/19 23:28
Benzene	16.0 J	24.4	7.60	ug/Kg	1		09/08/19 23:28
Bromobenzene	24.4 U	48.7	15.2	ug/Kg	1		09/08/19 23:28
Bromochloromethane	24.4 U	48.7	15.2	ug/Kg	1		09/08/19 23:28
Bromodichloromethane	1.95 U	3.90	1.21	ug/Kg	1		09/08/19 23:28
Bromoform	24.4 U	48.7	15.2	ug/Kg	1		09/08/19 23:28
Bromomethane	19.5 U	39.0	12.1	ug/Kg	1		09/08/19 23:28
Carbon disulfide	97.5 U	195	60.4	ug/Kg	1		09/08/19 23:28
Carbon tetrachloride	12.2 U	24.4	7.60	ug/Kg	1		09/08/19 23:28
Chlorobenzene	24.4 U	48.7	15.2	ug/Kg	1		09/08/19 23:28

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J flagging is activated



Results of RSE-28

Client Sample ID: **RSE-28**
 Client Project ID: **19-2082 ARRC Fuel Rack Stock**
 Lab Sample ID: 1195185003
 Lab Project ID: 1195185

Collection Date: 09/04/19 15:39
 Received Date: 09/05/19 12:28
 Matrix: Soil/Solid (dry weight)
 Solids (%):90.6
 Location:

Results by Volatile GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Chloroethane	195 U	390	121	ug/Kg	1		09/08/19 23:28
Chloroform	1.95 U	3.90	1.21	ug/Kg	1		09/08/19 23:28
Chloromethane	24.4 U	48.7	15.2	ug/Kg	1		09/08/19 23:28
cis-1,2-Dichloroethene	24.4 U	48.7	15.2	ug/Kg	1		09/08/19 23:28
cis-1,3-Dichloropropene	12.2 U	24.4	7.60	ug/Kg	1		09/08/19 23:28
Dibromochloromethane	1.95 U	3.90	1.21	ug/Kg	1		09/08/19 23:28
Dibromomethane	24.4 U	48.7	15.2	ug/Kg	1		09/08/19 23:28
Dichlorodifluoromethane	48.7 U	97.4	29.2	ug/Kg	1		09/08/19 23:28
Ethylbenzene	31.5 J	48.7	15.2	ug/Kg	1		09/08/19 23:28
Freon-113	97.5 U	195	60.4	ug/Kg	1		09/08/19 23:28
Hexachlorobutadiene	19.5 U	39.0	12.1	ug/Kg	1		09/08/19 23:28
Isopropylbenzene (Cumene)	24.4 U	48.7	15.2	ug/Kg	1		09/08/19 23:28
Methylene chloride	97.5 U	195	60.4	ug/Kg	1		09/08/19 23:28
Methyl-t-butyl ether	97.5 U	195	60.4	ug/Kg	1		09/08/19 23:28
Naphthalene	83.9	48.7	15.2	ug/Kg	1		09/08/19 23:28
n-Butylbenzene	24.4 U	48.7	15.2	ug/Kg	1		09/08/19 23:28
n-Propylbenzene	24.4 U	48.7	15.2	ug/Kg	1		09/08/19 23:28
o-Xylene	97.6	48.7	15.2	ug/Kg	1		09/08/19 23:28
P & M -Xylene	157	97.4	29.2	ug/Kg	1		09/08/19 23:28
sec-Butylbenzene	24.4 U	48.7	15.2	ug/Kg	1		09/08/19 23:28
Styrene	24.4 U	48.7	15.2	ug/Kg	1		09/08/19 23:28
tert-Butylbenzene	24.4 U	48.7	15.2	ug/Kg	1		09/08/19 23:28
Tetrachloroethene	16.4 J	24.4	7.60	ug/Kg	1		09/08/19 23:28
Toluene	105	48.7	15.2	ug/Kg	1		09/08/19 23:28
trans-1,2-Dichloroethene	24.4 U	48.7	15.2	ug/Kg	1		09/08/19 23:28
trans-1,3-Dichloropropene	12.2 U	24.4	7.60	ug/Kg	1		09/08/19 23:28
Trichloroethene	16.9	9.74	2.92	ug/Kg	1		09/08/19 23:28
Trichlorofluoromethane	29.5 J	97.4	29.2	ug/Kg	1		09/08/19 23:28
Vinyl acetate	97.5 U	195	60.4	ug/Kg	1		09/08/19 23:28
Vinyl chloride	0.780 U	1.56	0.487	ug/Kg	1		09/08/19 23:28
Xylenes (total)	255	146	44.4	ug/Kg	1		09/08/19 23:28
Surrogates							
1,2-Dichloroethane-D4 (surr)	106	71-136		%	1		09/08/19 23:28
4-Bromofluorobenzene (surr)	90.2	55-151		%	1		09/08/19 23:28
Toluene-d8 (surr)	97.9	85-116		%	1		09/08/19 23:28



Results of RSE-28

Client Sample ID: **RSE-28**
Client Project ID: **19-2082 ARRC Fuel Rack Stock**
Lab Sample ID: 1195185003
Lab Project ID: 1195185

Collection Date: 09/04/19 15:39
Received Date: 09/05/19 12:28
Matrix: Soil/Solid (dry weight)
Solids (%):90.6
Location:

Results by Volatile GC/MS

Batch Information

Analytical Batch: VMS19422
Analytical Method: SW8260C
Analyst: NRO
Analytical Date/Time: 09/08/19 23:28
Container ID: 1195185003-C

Prep Batch: VXX34830
Prep Method: SW5035A
Prep Date/Time: 09/04/19 15:39
Prep Initial Wt./Vol.: 31.722 g
Prep Extract Vol: 27.9914 mL



Results of Trip Blank

Client Sample ID: **Trip Blank**
Client Project ID: **19-2082 ARRC Fuel Rack Stock**
Lab Sample ID: 1195185004
Lab Project ID: 1195185

Collection Date: 09/04/19 15:39
Received Date: 09/05/19 12:28
Matrix: Soil/Solid (dry weight)
Solids (%):
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	1.26 U	2.52	0.755	mg/Kg	1		09/09/19 21:55
Surrogates							
4-Bromofluorobenzene (surr)	115	50-150		%	1		09/09/19 21:55

Batch Information

Analytical Batch: VFC14918
Analytical Method: AK101
Analyst: NRB
Analytical Date/Time: 09/09/19 21:55
Container ID: 1195185004-A

Prep Batch: VXX34834
Prep Method: SW5035A
Prep Date/Time: 09/04/19 15:39
Prep Initial Wt./Vol.: 49.656 g
Prep Extract Vol: 25 mL



Results of Trip Blank

Client Sample ID: **Trip Blank**
 Client Project ID: **19-2082 ARRC Fuel Rack Stock**
 Lab Sample ID: 1195185004
 Lab Project ID: 1195185

Collection Date: 09/04/19 15:39
 Received Date: 09/05/19 12:28
 Matrix: Soil/Solid (dry weight)
 Solids (%):
 Location:

Results by Volatile GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,1,1,2-Tetrachloroethane	10.1 U	20.1	6.24	ug/Kg	1		09/08/19 22:11
1,1,1-Trichloroethane	12.6 U	25.2	7.85	ug/Kg	1		09/08/19 22:11
1,1,2,2-Tetrachloroethane	1.00 U	2.01	0.624	ug/Kg	1		09/08/19 22:11
1,1,2-Trichloroethane	0.403 U	0.806	0.252	ug/Kg	1		09/08/19 22:11
1,1-Dichloroethane	12.6 U	25.2	7.85	ug/Kg	1		09/08/19 22:11
1,1-Dichloroethene	12.6 U	25.2	7.85	ug/Kg	1		09/08/19 22:11
1,1-Dichloropropene	12.6 U	25.2	7.85	ug/Kg	1		09/08/19 22:11
1,2,3-Trichlorobenzene	25.1 U	50.3	15.1	ug/Kg	1		09/08/19 22:11
1,2,3-Trichloropropane	0.505 U	1.01	0.312	ug/Kg	1		09/08/19 22:11
1,2,4-Trichlorobenzene	12.6 U	25.2	7.85	ug/Kg	1		09/08/19 22:11
1,2,4-Trimethylbenzene	25.1 U	50.3	15.1	ug/Kg	1		09/08/19 22:11
1,2-Dibromo-3-chloropropane	50.5 U	101	31.2	ug/Kg	1		09/08/19 22:11
1,2-Dibromoethane	0.505 U	1.01	0.312	ug/Kg	1		09/08/19 22:11
1,2-Dichlorobenzene	12.6 U	25.2	7.85	ug/Kg	1		09/08/19 22:11
1,2-Dichloroethane	1.00 U	2.01	0.624	ug/Kg	1		09/08/19 22:11
1,2-Dichloropropane	5.05 U	10.1	3.12	ug/Kg	1		09/08/19 22:11
1,3,5-Trimethylbenzene	12.6 U	25.2	7.85	ug/Kg	1		09/08/19 22:11
1,3-Dichlorobenzene	12.6 U	25.2	7.85	ug/Kg	1		09/08/19 22:11
1,3-Dichloropropane	5.05 U	10.1	3.12	ug/Kg	1		09/08/19 22:11
1,4-Dichlorobenzene	12.6 U	25.2	7.85	ug/Kg	1		09/08/19 22:11
2,2-Dichloropropane	12.6 U	25.2	7.85	ug/Kg	1		09/08/19 22:11
2-Butanone (MEK)	126 U	252	78.5	ug/Kg	1		09/08/19 22:11
2-Chlorotoluene	12.6 U	25.2	7.85	ug/Kg	1		09/08/19 22:11
2-Hexanone	50.5 U	101	31.2	ug/Kg	1		09/08/19 22:11
4-Chlorotoluene	12.6 U	25.2	7.85	ug/Kg	1		09/08/19 22:11
4-Isopropyltoluene	50.5 U	101	25.2	ug/Kg	1		09/08/19 22:11
4-Methyl-2-pentanone (MIBK)	126 U	252	78.5	ug/Kg	1		09/08/19 22:11
Acetone	126 U	252	78.5	ug/Kg	1		09/08/19 22:11
Benzene	6.30 U	12.6	3.93	ug/Kg	1		09/08/19 22:11
Bromobenzene	12.6 U	25.2	7.85	ug/Kg	1		09/08/19 22:11
Bromochloromethane	12.6 U	25.2	7.85	ug/Kg	1		09/08/19 22:11
Bromodichloromethane	1.00 U	2.01	0.624	ug/Kg	1		09/08/19 22:11
Bromoform	12.6 U	25.2	7.85	ug/Kg	1		09/08/19 22:11
Bromomethane	10.1 U	20.1	6.24	ug/Kg	1		09/08/19 22:11
Carbon disulfide	50.5 U	101	31.2	ug/Kg	1		09/08/19 22:11
Carbon tetrachloride	6.30 U	12.6	3.93	ug/Kg	1		09/08/19 22:11
Chlorobenzene	12.6 U	25.2	7.85	ug/Kg	1		09/08/19 22:11

Print Date: 09/12/2019 5:04:02PM

J flagging is activated



Results of Trip Blank

Client Sample ID: **Trip Blank**
 Client Project ID: **19-2082 ARRC Fuel Rack Stock**
 Lab Sample ID: 1195185004
 Lab Project ID: 1195185

Collection Date: 09/04/19 15:39
 Received Date: 09/05/19 12:28
 Matrix: Soil/Solid (dry weight)
 Solids (%):
 Location:

Results by Volatile GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Chloroethane	101 U	201	62.4	ug/Kg	1		09/08/19 22:11
Chloroform	1.00 U	2.01	0.624	ug/Kg	1		09/08/19 22:11
Chloromethane	12.6 U	25.2	7.85	ug/Kg	1		09/08/19 22:11
cis-1,2-Dichloroethene	12.6 U	25.2	7.85	ug/Kg	1		09/08/19 22:11
cis-1,3-Dichloropropene	6.30 U	12.6	3.93	ug/Kg	1		09/08/19 22:11
Dibromochloromethane	1.00 U	2.01	0.624	ug/Kg	1		09/08/19 22:11
Dibromomethane	12.6 U	25.2	7.85	ug/Kg	1		09/08/19 22:11
Dichlorodifluoromethane	25.1 U	50.3	15.1	ug/Kg	1		09/08/19 22:11
Ethylbenzene	12.6 U	25.2	7.85	ug/Kg	1		09/08/19 22:11
Freon-113	50.5 U	101	31.2	ug/Kg	1		09/08/19 22:11
Hexachlorobutadiene	10.1 U	20.1	6.24	ug/Kg	1		09/08/19 22:11
Isopropylbenzene (Cumene)	12.6 U	25.2	7.85	ug/Kg	1		09/08/19 22:11
Methylene chloride	50.5 U	101	31.2	ug/Kg	1		09/08/19 22:11
Methyl-t-butyl ether	50.5 U	101	31.2	ug/Kg	1		09/08/19 22:11
Naphthalene	12.6 U	25.2	7.85	ug/Kg	1		09/08/19 22:11
n-Butylbenzene	12.6 U	25.2	7.85	ug/Kg	1		09/08/19 22:11
n-Propylbenzene	12.6 U	25.2	7.85	ug/Kg	1		09/08/19 22:11
o-Xylene	12.6 U	25.2	7.85	ug/Kg	1		09/08/19 22:11
P & M -Xylene	25.1 U	50.3	15.1	ug/Kg	1		09/08/19 22:11
sec-Butylbenzene	12.6 U	25.2	7.85	ug/Kg	1		09/08/19 22:11
Styrene	12.6 U	25.2	7.85	ug/Kg	1		09/08/19 22:11
tert-Butylbenzene	12.6 U	25.2	7.85	ug/Kg	1		09/08/19 22:11
Tetrachloroethene	6.30 U	12.6	3.93	ug/Kg	1		09/08/19 22:11
Toluene	12.6 U	25.2	7.85	ug/Kg	1		09/08/19 22:11
trans-1,2-Dichloroethene	12.6 U	25.2	7.85	ug/Kg	1		09/08/19 22:11
trans-1,3-Dichloropropene	6.30 U	12.6	3.93	ug/Kg	1		09/08/19 22:11
Trichloroethene	2.52 U	5.03	1.51	ug/Kg	1		09/08/19 22:11
Trichlorofluoromethane	371	50.3	15.1	ug/Kg	1		09/11/19 01:51
Vinyl acetate	50.5 U	101	31.2	ug/Kg	1		09/08/19 22:11
Vinyl chloride	0.403 U	0.806	0.252	ug/Kg	1		09/08/19 22:11
Xylenes (total)	37.8 U	75.5	23.0	ug/Kg	1		09/08/19 22:11
Surrogates							
1,2-Dichloroethane-D4 (surr)	106	71-136		%	1		09/08/19 22:11
4-Bromofluorobenzene (surr)	99.3	55-151		%	1		09/08/19 22:11
Toluene-d8 (surr)	98.3	85-116		%	1		09/08/19 22:11



Results of Trip Blank

Client Sample ID: **Trip Blank**
Client Project ID: **19-2082 ARRC Fuel Rack Stock**
Lab Sample ID: 1195185004
Lab Project ID: 1195185

Collection Date: 09/04/19 15:39
Received Date: 09/05/19 12:28
Matrix: Soil/Solid (dry weight)
Solids (%):
Location:

Results by Volatile GC/MS

Batch Information

Analytical Batch: VMS19424
Analytical Method: SW8260C
Analyst: NRO
Analytical Date/Time: 09/11/19 01:51
Container ID: 1195185004-A

Prep Batch: VXX34841
Prep Method: SW5035A
Prep Date/Time: 09/04/19 15:39
Prep Initial Wt./Vol.: 49.656 g
Prep Extract Vol: 25 mL

Analytical Batch: VMS19422
Analytical Method: SW8260C
Analyst: NRO
Analytical Date/Time: 09/08/19 22:11
Container ID: 1195185004-A

Prep Batch: VXX34830
Prep Method: SW5035A
Prep Date/Time: 09/04/19 15:39
Prep Initial Wt./Vol.: 49.656 g
Prep Extract Vol: 25 mL



Method Blank

Blank ID: MB for HBN 1799107 [MXX/32775]
Blank Lab ID: 1530452

Matrix: Soil/Solid (dry weight)

QC for Samples:
1195185001, 1195185002, 1195185003

Results by SW6020A

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Arsenic	0.500U	1.00	0.310	mg/Kg
Barium	0.150U	0.300	0.0940	mg/Kg
Cadmium	0.100U	0.200	0.0620	mg/Kg
Chromium	0.132J	0.400	0.130	mg/Kg
Lead	0.100U	0.200	0.0620	mg/Kg
Mercury	0.0400U	0.0800	0.0200	mg/Kg
Selenium	0.500U	1.00	0.310	mg/Kg
Silver	0.100U	0.200	0.0620	mg/Kg

Batch Information

Analytical Batch: MMS10616
Analytical Method: SW6020A
Instrument: Perkin Elmer Nexlon P5
Analyst: DMM
Analytical Date/Time: 9/9/2019 4:58:18PM

Prep Batch: MXX32775
Prep Method: SW3050B
Prep Date/Time: 9/9/2019 10:32:33AM
Prep Initial Wt./Vol.: 1 g
Prep Extract Vol: 50 mL

Print Date: 09/12/2019 5:04:04PM

Duplicate Sample Summary

Original Sample ID: 1530454
Duplicate Sample ID: 1530458

Analysis Date: 09/09/2019 17:26
Matrix: Solid/Soil (Wet Weight)

QC for Samples:

1195185001, 1195185002, 1195185003

Results by SW6020A

<u>NAME</u>	<u>Original</u>	<u>Duplicate</u>	<u>Units</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Barium	33.8	36.0	mg/Kg	6.18	(< 20)

Batch Information

Analytical Batch: MMS10616
Analytical Method: SW6020A
Instrument: Perkin Elmer Nexlon P5
Analyst: DMM

Prep Batch: MXX32775
Prep Method: SW3050B
Prep Date/Time: 9/9/2019 10:32:33AM

Print Date: 09/12/2019 5:04:05PM



Blank Spike Summary

Blank Spike ID: LCS for HBN 1195185 [MXX32775]

Blank Spike Lab ID: 1530453

Date Analyzed: 09/09/2019 17:02

Matrix: Soil/Solid (dry weight)

QC for Samples: 1195185001, 1195185002, 1195185003

Results by SW6020A

Parameter	Blank Spike (mg/Kg)			CL
	Spike	Result	Rec (%)	
Arsenic	50	48.9	98	(82-118)
Barium	50	49.6	99	(86-116)
Cadmium	5	5.03	101	(84-116)
Chromium	20	19.8	99	(83-119)
Lead	50	52.1	104	(84-118)
Mercury	0.5	0.499	100	(74-126)
Selenium	50	50.5	101	(80-119)
Silver	5	5.28	106	(83-118)

Batch Information

Analytical Batch: MMS10616

Analytical Method: SW6020A

Instrument: Perkin Elmer Nexlon P5

Analyst: DMM

Prep Batch: MXX32775

Prep Method: SW3050B

Prep Date/Time: 09/09/2019 10:32

Spike Init Wt./Vol.: 50 mg/Kg Extract Vol: 50 mL

Dupe Init Wt./Vol.: Extract Vol:

Print Date: 09/12/2019 5:04:06PM



Matrix Spike Summary

Original Sample ID: 1530454
MS Sample ID: 1530455 MS
MSD Sample ID: 1530456 MSD

Analysis Date: 09/09/2019 17:07
Analysis Date: 09/09/2019 17:12
Analysis Date: 09/09/2019 17:17
Matrix: Solid/Soil (Wet Weight)

QC for Samples: 1195185001, 1195185002, 1195185003

Results by SW6020A

Parameter	Sample	Matrix Spike (mg/Kg)			Spike Duplicate (mg/Kg)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Arsenic	117	46.5	177	130 *	49.1	148	63 *	82-118	18.20	(< 20)
Barium	33.8	46.5	93.3	128 *	49.1	73.8	81 *	86-116	23.40	* (< 20)
Cadmium	0.925U	4.65	5.04	108	4.91	4.85	99	84-116	3.82	(< 20)
Chromium	13.8	18.6	36	119	19.6	30.5	85	83-119	16.30	(< 20)
Lead	14.4	46.5	62.7	104	49.1	59.5	92	84-118	5.25	(< 20)
Mercury	0.371U	0.465	.457J	98	0.491	0.345J	70 *	74-126	27.90	* (< 20)
Selenium	4.63U	46.5	46.3	100	49.1	46.3	94	80-119	0.03	(< 20)
Silver	0.925U	4.65	4.99	107	4.91	4.99	102	83-118	0.04	(< 20)

Batch Information

Analytical Batch: MMS10616
Analytical Method: SW6020A
Instrument: Perkin Elmer NexIon P5
Analyst: DMM
Analytical Date/Time: 9/9/2019 5:12:22PM

Prep Batch: MXX32775
Prep Method: Soils/Solids Digest for Metals by ICP-MS
Prep Date/Time: 9/9/2019 10:32:33AM
Prep Initial Wt./Vol.: 1.08g
Prep Extract Vol: 50.00mL

Print Date: 09/12/2019 5:04:07PM



Bench Spike Summary

Original Sample ID: 1530454
MS Sample ID: 1530457 BND
MSD Sample ID:

Analysis Date: 09/09/2019 17:07
Analysis Date: 09/09/2019 17:21
Analysis Date:
Matrix: Solid/Soil (Wet Weight)

QC for Samples: 1195185001, 1195185002, 1195185003

Results by SW6020A

Parameter	Sample	Matrix Spike (mg/Kg)			Spike Duplicate (mg/Kg)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Arsenic	117	116	238	105				80-120		
Barium	33.8	2320	2380	101				80-120		

Batch Information

Analytical Batch: MMS10616
Analytical Method: SW6020A
Instrument: Perkin Elmer Nexlon P5
Analyst: DMM
Analytical Date/Time: 9/9/2019 5:21:45PM

Prep Batch: MXX32775
Prep Method: Soils/Solids Digest for Metals by ICP-MS
Prep Date/Time: 9/9/2019 10:32:33AM
Prep Initial Wt./Vol.: 1.08g
Prep Extract Vol: 50.00mL

Print Date: 09/12/2019 5:04:07PM



Method Blank

Blank ID: MB for HBN 1799095 [SPT/10878]

Blank Lab ID: 1530384

QC for Samples:

1195185001, 1195185002, 1195185003

Matrix: Soil/Solid (dry weight)

Results by SM21 2540G

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Total Solids	100			%

Batch Information

Analytical Batch: SPT10878

Analytical Method: SM21 2540G

Instrument:

Analyst: MER

Analytical Date/Time: 9/7/2019 3:08:00PM

Print Date: 09/12/2019 5:04:08PM

Duplicate Sample Summary

Original Sample ID: 1195110007

Duplicate Sample ID: 1530386

QC for Samples:

Analysis Date: 09/07/2019 15:08

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	87.1	87.7	%	0.66	(< 15)

Batch Information

Analytical Batch: SPT10878

Analytical Method: SM21 2540G

Instrument:

Analyst: MER

Print Date: 09/12/2019 5:04:08PM



Duplicate Sample Summary

Original Sample ID: 1195136007

Duplicate Sample ID: 1530387

QC for Samples:

1195185001, 1195185002, 1195185003

Analysis Date: 09/07/2019 15:08

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	95.2	94.7	%	0.52	(< 15)

Batch Information

Analytical Batch: SPT10878

Analytical Method: SM21 2540G

Instrument:

Analyst: MER

Print Date: 09/12/2019 5:04:08PM

Duplicate Sample Summary

Original Sample ID: 1195215007

Duplicate Sample ID: 1530388

QC for Samples:

1195185001, 1195185002, 1195185003

Analysis Date: 09/07/2019 15:08

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	87.4	86.8	%	0.64	(< 15)

Batch Information

Analytical Batch: SPT10878

Analytical Method: SM21 2540G

Instrument:

Analyst: MER

Print Date: 09/12/2019 5:04:08PM



Method Blank

Blank ID: MB for HBN 1799171 [VXX/34830]

Blank Lab ID: 1530715

QC for Samples:

1195185001, 1195185002, 1195185003, 1195185004

Matrix: Soil/Solid (dry weight)

Results by SW8260C

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
1,1,1,2-Tetrachloroethane	10.0U	20.0	6.20	ug/Kg
1,1,1-Trichloroethane	12.5U	25.0	7.80	ug/Kg
1,1,2,2-Tetrachloroethane	1.00U	2.00	0.620	ug/Kg
1,1,2-Trichloroethane	0.400U	0.800	0.250	ug/Kg
1,1-Dichloroethane	12.5U	25.0	7.80	ug/Kg
1,1-Dichloroethene	12.5U	25.0	7.80	ug/Kg
1,1-Dichloropropene	12.5U	25.0	7.80	ug/Kg
1,2,3-Trichlorobenzene	25.0U	50.0	15.0	ug/Kg
1,2,3-Trichloropropane	0.500U	1.00	0.310	ug/Kg
1,2,4-Trichlorobenzene	12.5U	25.0	7.80	ug/Kg
1,2,4-Trimethylbenzene	25.0U	50.0	15.0	ug/Kg
1,2-Dibromo-3-chloropropane	50.0U	100	31.0	ug/Kg
1,2-Dibromoethane	0.500U	1.00	0.310	ug/Kg
1,2-Dichlorobenzene	12.5U	25.0	7.80	ug/Kg
1,2-Dichloroethane	1.00U	2.00	0.620	ug/Kg
1,2-Dichloropropane	5.00U	10.0	3.10	ug/Kg
1,3,5-Trimethylbenzene	12.5U	25.0	7.80	ug/Kg
1,3-Dichlorobenzene	12.5U	25.0	7.80	ug/Kg
1,3-Dichloropropane	5.00U	10.0	3.10	ug/Kg
1,4-Dichlorobenzene	12.5U	25.0	7.80	ug/Kg
2,2-Dichloropropane	12.5U	25.0	7.80	ug/Kg
2-Butanone (MEK)	125U	250	78.0	ug/Kg
2-Chlorotoluene	12.5U	25.0	7.80	ug/Kg
2-Hexanone	50.0U	100	31.0	ug/Kg
4-Chlorotoluene	12.5U	25.0	7.80	ug/Kg
4-Isopropyltoluene	50.0U	100	25.0	ug/Kg
4-Methyl-2-pentanone (MIBK)	125U	250	78.0	ug/Kg
Acetone	125U	250	78.0	ug/Kg
Benzene	6.25U	12.5	3.90	ug/Kg
Bromobenzene	12.5U	25.0	7.80	ug/Kg
Bromochloromethane	12.5U	25.0	7.80	ug/Kg
Bromodichloromethane	1.00U	2.00	0.620	ug/Kg
Bromoform	12.5U	25.0	7.80	ug/Kg
Bromomethane	10.0U	20.0	6.20	ug/Kg
Carbon disulfide	50.0U	100	31.0	ug/Kg
Carbon tetrachloride	6.25U	12.5	3.90	ug/Kg
Chlorobenzene	12.5U	25.0	7.80	ug/Kg
Chloroethane	100U	200	62.0	ug/Kg

Print Date: 09/12/2019 5:04:11PM



Method Blank

Blank ID: MB for HBN 1799171 [VXX/34830]

Blank Lab ID: 1530715

QC for Samples:

1195185001, 1195185002, 1195185003, 1195185004

Matrix: Soil/Solid (dry weight)

Results by SW8260C

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Chloroform	1.00U	2.00	0.620	ug/Kg
Chloromethane	12.5U	25.0	7.80	ug/Kg
cis-1,2-Dichloroethene	12.5U	25.0	7.80	ug/Kg
cis-1,3-Dichloropropene	6.25U	12.5	3.90	ug/Kg
Dibromochloromethane	1.00U	2.00	0.620	ug/Kg
Dibromomethane	12.5U	25.0	7.80	ug/Kg
Dichlorodifluoromethane	25.0U	50.0	15.0	ug/Kg
Ethylbenzene	12.5U	25.0	7.80	ug/Kg
Freon-113	50.0U	100	31.0	ug/Kg
Hexachlorobutadiene	10.0U	20.0	6.20	ug/Kg
Isopropylbenzene (Cumene)	12.5U	25.0	7.80	ug/Kg
Methylene chloride	50.0U	100	31.0	ug/Kg
Methyl-t-butyl ether	50.0U	100	31.0	ug/Kg
Naphthalene	12.5U	25.0	7.80	ug/Kg
n-Butylbenzene	12.5U	25.0	7.80	ug/Kg
n-Propylbenzene	12.5U	25.0	7.80	ug/Kg
o-Xylene	12.5U	25.0	7.80	ug/Kg
P & M -Xylene	25.0U	50.0	15.0	ug/Kg
sec-Butylbenzene	12.5U	25.0	7.80	ug/Kg
Styrene	12.5U	25.0	7.80	ug/Kg
tert-Butylbenzene	12.5U	25.0	7.80	ug/Kg
Tetrachloroethene	6.25U	12.5	3.90	ug/Kg
Toluene	12.5U	25.0	7.80	ug/Kg
trans-1,2-Dichloroethene	12.5U	25.0	7.80	ug/Kg
trans-1,3-Dichloropropene	6.25U	12.5	3.90	ug/Kg
Trichloroethene	2.50U	5.00	1.50	ug/Kg
Trichlorofluoromethane	25.0U	50.0	15.0	ug/Kg
Vinyl acetate	50.0U	100	31.0	ug/Kg
Vinyl chloride	0.400U	0.800	0.250	ug/Kg
Xylenes (total)	37.5U	75.0	22.8	ug/Kg
Surrogates				
1,2-Dichloroethane-D4 (surr)	105	71-136		%
4-Bromofluorobenzene (surr)	109	55-151		%
Toluene-d8 (surr)	99.3	85-116		%

Print Date: 09/12/2019 5:04:11PM



Method Blank

Blank ID: MB for HBN 1799171 [VXX/34830]
Blank Lab ID: 1530715

Matrix: Soil/Solid (dry weight)

QC for Samples:
1195185001, 1195185002, 1195185003, 1195185004

Results by SW8260C

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
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Batch Information

Analytical Batch: VMS19422
Analytical Method: SW8260C
Instrument: VRA Agilent GC/MS 7890B/5977A
Analyst: NRO
Analytical Date/Time: 9/8/2019 7:50:00PM

Prep Batch: VXX34830
Prep Method: SW5035A
Prep Date/Time: 9/8/2019 6:00:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

Print Date: 09/12/2019 5:04:11PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1195185 [VXX34830]

Blank Spike Lab ID: 1530716

Date Analyzed: 09/08/2019 20:05

Matrix: Soil/Solid (dry weight)

QC for Samples: 1195185001, 1195185002, 1195185003, 1195185004

Results by SW8260C

Parameter	Blank Spike (ug/Kg)			CL
	Spike	Result	Rec (%)	
1,1,1,2-Tetrachloroethane	750	819	109	(78-125)
1,1,1-Trichloroethane	750	835	111	(73-130)
1,1,2,2-Tetrachloroethane	750	734	98	(70-124)
1,1,2-Trichloroethane	750	726	97	(78-121)
1,1-Dichloroethane	750	768	102	(76-125)
1,1-Dichloroethene	750	811	108	(70-131)
1,1-Dichloropropene	750	794	106	(76-125)
1,2,3-Trichlorobenzene	750	824	110	(66-130)
1,2,3-Trichloropropane	750	775	103	(73-125)
1,2,4-Trichlorobenzene	750	833	111	(67-129)
1,2,4-Trimethylbenzene	750	751	100	(75-123)
1,2-Dibromo-3-chloropropane	750	810	108	(61-132)
1,2-Dibromoethane	750	764	102	(78-122)
1,2-Dichlorobenzene	750	771	103	(78-121)
1,2-Dichloroethane	750	755	101	(73-128)
1,2-Dichloropropane	750	774	103	(76-123)
1,3,5-Trimethylbenzene	750	760	101	(73-124)
1,3-Dichlorobenzene	750	750	100	(77-121)
1,3-Dichloropropane	750	764	102	(77-121)
1,4-Dichlorobenzene	750	759	101	(75-120)
2,2-Dichloropropane	750	911	121	(67-133)
2-Butanone (MEK)	2250	2260	100	(51-148)
2-Chlorotoluene	750	745	99	(75-122)
2-Hexanone	2250	2320	103	(53-145)
4-Chlorotoluene	750	759	101	(72-124)
4-Isopropyltoluene	750	770	103	(73-127)
4-Methyl-2-pentanone (MIBK)	2250	2480	110	(65-135)
Acetone	2250	2250	100	(36-164)
Benzene	750	721	96	(77-121)
Bromobenzene	750	749	100	(78-121)
Bromochloromethane	750	780	104	(78-125)
Bromodichloromethane	750	873	116	(75-127)
Bromoform	750	844	112	(67-132)
Bromomethane	750	736	98	(53-143)

Print Date: 09/12/2019 5:04:12PM



Blank Spike Summary

Blank Spike ID: LCS for HBN 1195185 [VXX34830]

Blank Spike Lab ID: 1530716

Date Analyzed: 09/08/2019 20:05

Matrix: Soil/Solid (dry weight)

QC for Samples: 1195185001, 1195185002, 1195185003, 1195185004

Results by SW8260C

Parameter	Blank Spike (ug/Kg)			CL
	Spike	Result	Rec (%)	
Carbon disulfide	1130	1330	118	(63-132)
Carbon tetrachloride	750	870	116	(70-135)
Chlorobenzene	750	741	99	(79-120)
Chloroethane	750	775	103	(59-139)
Chloroform	750	787	105	(78-123)
Chloromethane	750	710	95	(50-136)
cis-1,2-Dichloroethene	750	762	102	(77-123)
cis-1,3-Dichloropropene	750	880	117	(74-126)
Dibromochloromethane	750	903	120	(74-126)
Dibromomethane	750	806	107	(78-125)
Dichlorodifluoromethane	750	800	107	(29-149)
Ethylbenzene	750	732	98	(76-122)
Freon-113	1130	1270	113	(66-136)
Hexachlorobutadiene	750	697	93	(61-135)
Isopropylbenzene (Cumene)	750	758	101	(68-134)
Methylene chloride	750	777	104	(70-128)
Methyl-t-butyl ether	1130	1170	104	(73-125)
Naphthalene	750	813	108	(62-129)
n-Butylbenzene	750	778	104	(70-128)
n-Propylbenzene	750	758	101	(73-125)
o-Xylene	750	725	97	(77-123)
P & M -Xylene	1500	1450	97	(77-124)
sec-Butylbenzene	750	754	101	(73-126)
Styrene	750	769	103	(76-124)
tert-Butylbenzene	750	741	99	(73-125)
Tetrachloroethene	750	802	107	(73-128)
Toluene	750	705	94	(77-121)
trans-1,2-Dichloroethene	750	768	102	(74-125)
trans-1,3-Dichloropropene	750	891	119	(71-130)
Trichloroethene	750	772	103	(77-123)
Trichlorofluoromethane	750	1010	135	(62-140)
Vinyl acetate	750	874	117	(50-151)
Vinyl chloride	750	689	92	(56-135)
Xylenes (total)	2250	2170	97	(78-124)

Print Date: 09/12/2019 5:04:12PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1195185 [VXX34830]

Blank Spike Lab ID: 1530716

Date Analyzed: 09/08/2019 20:05

Matrix: Soil/Solid (dry weight)

QC for Samples: 1195185001, 1195185002, 1195185003, 1195185004

Results by SW8260C

Parameter	Blank Spike (ug/Kg)			CL
	Spike	Result	Rec (%)	
Surrogates				
1,2-Dichloroethane-D4 (surr)	750	104	104	(71-136)
4-Bromofluorobenzene (surr)	750	101	101	(55-151)
Toluene-d8 (surr)	750	98.9	99	(85-116)

Batch Information

Analytical Batch: VMS19422

Analytical Method: SW8260C

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

Analyst: NRO

Prep Batch: VXX34830

Prep Method: SW5035A

Prep Date/Time: 09/08/2019 06:00

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

Dupe Init Wt./Vol.: Extract Vol:

Print Date: 09/12/2019 5:04:12PM



Matrix Spike Summary

Original Sample ID: 1195185001
 MS Sample ID: 1530717 MS
 MSD Sample ID: 1530718 MSD

Analysis Date: 09/08/2019 22:57
 Analysis Date: 09/08/2019 20:54
 Analysis Date: 09/08/2019 21:09
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1195185001, 1195185002, 1195185003, 1195185004

Results by SW8260C

Parameter	Sample	Matrix Spike (ug/Kg)			Spike Duplicate (ug/Kg)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
1,1,1,2-Tetrachloroethane	23.1U	1600	1697	106	1600	1774	111	78-125	4.10	(< 20)
1,1,1-Trichloroethane	28.9U	1600	1785	112	1600	1839	115	73-130	3.10	(< 20)
1,1,2,2-Tetrachloroethane	2.31U	1600	1545	97	1600	1589	99	70-124	2.30	(< 20)
1,1,2-Trichloroethane	0.925U	1600	1556	97	1600	1632	102	78-121	5.10	(< 20)
1,1-Dichloroethane	28.9U	1600	1632	102	1600	1697	106	76-125	3.60	(< 20)
1,1-Dichloroethene	28.9U	1600	1795	112	1600	1785	112	70-131	0.24	(< 20)
1,1-Dichloropropene	28.9U	1600	1687	105	1600	1719	108	76-125	2.30	(< 20)
1,2,3-Trichlorobenzene	58.0U	1600	1164	73	1600	1502	94	66-130	25.00	* (< 20)
1,2,3-Trichloropropane	1.16U	1600	1654	103	1600	1665	104	73-125	1.10	(< 20)
1,2,4-Trichlorobenzene	28.9U	1600	1317	82	1600	1523	95	67-129	14.60	(< 20)
1,2,4-Trimethylbenzene	196	1600	1719	95	1600	1697	94	75-123	1.40	(< 20)
1,2-Dibromo-3-chloropropane	116U	1600	1556	97	1600	1687	105	61-132	8.00	(< 20)
1,2-Dibromoethane	1.16U	1600	1545	97	1600	1632	102	78-122	5.60	(< 20)
1,2-Dichlorobenzene	28.9U	1600	1513	94	1600	1523	95	78-121	0.72	(< 20)
1,2-Dichloroethane	2.31U	1600	1567	98	1600	1643	103	73-128	4.80	(< 20)
1,2-Dichloropropane	11.6U	1600	1610	101	1600	1687	105	76-123	4.70	(< 20)
1,3,5-Trimethylbenzene	42.2J	1600	1600	97	1600	1610	98	73-124	0.76	(< 20)
1,3-Dichlorobenzene	28.9U	1600	1513	95	1600	1502	94	77-121	0.54	(< 20)
1,3-Dichloropropane	11.6U	1600	1556	98	1600	1654	103	77-121	5.50	(< 20)
1,4-Dichlorobenzene	28.9U	1600	1534	96	1600	1502	94	75-120	2.30	(< 20)
2,2-Dichloropropane	28.9U	1600	1948	122	1600	2002	125	67-133	2.80	(< 20)
2-Butanone (MEK)	289U	4799	4483	93	4799	4995	104	51-148	10.90	(< 20)
2-Chlorotoluene	28.9U	1600	1600	100	1600	1578	98	75-122	1.30	(< 20)
2-Hexanone	116U	4799	4570	95	4799	4973	104	53-145	8.60	(< 20)
4-Chlorotoluene	28.9U	1600	1578	98	1600	1545	97	72-124	1.90	(< 20)
4-Isopropyltoluene	105J	1600	1621	95	1600	1632	96	73-127	0.39	(< 20)
4-Methyl-2-pentanone (MIBK)	289U	4799	4842	101	4799	5277	110	65-135	8.60	(< 20)
Acetone	289U	4799	4440	93	4799	4886	102	36-164	9.60	(< 20)
Benzene	31.9	1600	1556	96	1600	1610	99	77-121	3.00	(< 20)
Bromobenzene	28.9U	1600	1567	98	1600	1567	98	78-121	0.20	(< 20)
Bromochloromethane	28.9U	1600	1654	103	1600	1708	107	78-125	3.10	(< 20)
Bromodichloromethane	2.31U	1600	1806	113	1600	1882	117	75-127	4.10	(< 20)
Bromoform	28.9U	1600	1676	105	1600	1795	112	67-132	7.10	(< 20)
Bromomethane	23.1U	1600	1708	107	1600	1708	107	53-143	0.10	(< 20)
Carbon disulfide	116U	2405	3079	128	2405	2971	124	63-132	3.60	(< 20)
Carbon tetrachloride	14.4U	1600	1872	117	1600	1915	120	70-135	2.20	(< 20)
Chlorobenzene	28.9U	1600	1513	95	1600	1589	99	79-120	4.70	(< 20)

Print Date: 09/12/2019 5:04:13PM



Matrix Spike Summary

Original Sample ID: 1195185001
 MS Sample ID: 1530717 MS
 MSD Sample ID: 1530718 MSD

Analysis Date: 09/08/2019 22:57
 Analysis Date: 09/08/2019 20:54
 Analysis Date: 09/08/2019 21:09
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1195185001, 1195185002, 1195185003, 1195185004

Results by SW8260C

Parameter	Sample	Matrix Spike (ug/Kg)			Spike Duplicate (ug/Kg)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Chloroethane	231U	1600	1708	107	1600	1697	106	59-139	0.76	(< 20)
Chloroform	2.31U	1600	1654	103	1600	1719	108	78-123	4.10	(< 20)
Chloromethane	28.9U	1600	1643	102	1600	1632	102	50-136	0.69	(< 20)
cis-1,2-Dichloroethene	28.9U	1600	1610	101	1600	1687	105	77-123	4.30	(< 20)
cis-1,3-Dichloropropene	14.4U	1600	1817	114	1600	1904	119	74-126	4.40	(< 20)
Dibromochloromethane	2.31U	1600	1839	115	1600	1937	121	74-126	5.20	(< 20)
Dibromomethane	28.9U	1600	1654	104	1600	1741	109	78-125	5.20	(< 20)
Dichlorodifluoromethane	58.0U	1600	1730	108	1600	1741	109	29-149	0.52	(< 20)
Ethylbenzene	62.8	1600	1545	93	1600	1610	97	76-122	4.30	(< 20)
Freon-113	116U	2405	2742	114	2405	2764	115	66-136	0.82	(< 20)
Hexachlorobutadiene	23.1U	1600	1589	100	1600	1578	99	61-135	0.95	(< 20)
Isopropylbenzene (Cumene)	22.9J	1600	1545	95	1600	1632	101	68-134	5.50	(< 20)
Methylene chloride	116U	1600	1676	105	1600	1730	108	70-128	3.30	(< 20)
Methyl-t-butyl ether	116U	2405	2372	99	2405	2535	106	73-125	6.80	(< 20)
Naphthalene	184	1600	1436	78	1600	1741	97	62-129	19.00	(< 20)
n-Butylbenzene	28.9U	1600	1491	93	1600	1469	92	70-128	1.10	(< 20)
n-Propylbenzene	18.3J	1600	1589	98	1600	1578	97	73-125	0.95	(< 20)
o-Xylene	218	1600	1654	90	1600	1730	94	77-123	4.50	(< 20)
P & M -Xylene	336	3199	3177	89	3199	3308	93	77-124	4.10	(< 20)
sec-Butylbenzene	28.9U	1600	1513	94	1600	1502	94	73-126	0.60	(< 20)
Styrene	28.9U	1600	1545	97	1600	1610	100	76-124	3.80	(< 20)
tert-Butylbenzene	28.9U	1600	1556	97	1600	1556	98	73-125	0.31	(< 20)
Tetrachloroethene	26.3J	1600	1632	100	1600	1774	109	73-128	8.50	(< 20)
Toluene	214	1600	1643	89	1600	1708	93	77-121	4.00	(< 20)
trans-1,2-Dichloroethene	28.9U	1600	1893	118	1600	1872	117	74-125	1.40	(< 20)
trans-1,3-Dichloropropene	14.4U	1600	1817	114	1600	1926	121	71-130	6.00	(< 20)
Trichloroethene	20.9	1600	1643	102	1600	1708	105	77-123	3.40	(< 20)
Trichlorofluoromethane	58.0U	1600	2949	184 *	1600	2078	130	62-140	34.50 *	(< 20)
Vinyl acetate	116U	1600	1763	110	1600	1882	118	50-151	6.40	(< 20)
Vinyl chloride	0.925U	1600	1523	95	1600	1545	97	56-135	1.90	(< 20)
Xylenes (total)	555	4799	4831	89	4799	5038	93	78-124	4.20	(< 20)
Surrogates										
1,2-Dichloroethane-D4 (surr)		1600	1610	101	1600	1665	104	71-136	2.90	
4-Bromofluorobenzene (surr)		2666	2285	86	2666	2242	84	55-151	1.70	
Toluene-d8 (surr)		1600	1589	99	1600	1567	98	85-116	0.80	

Print Date: 09/12/2019 5:04:13PM



Matrix Spike Summary

Original Sample ID: 1195185001
MS Sample ID: 1530717 MS
MSD Sample ID: 1530718 MSD

Analysis Date:
Analysis Date: 09/08/2019 20:54
Analysis Date: 09/08/2019 21:09
Matrix: Soil/Solid (dry weight)

QC for Samples: 1195185001, 1195185002, 1195185003, 1195185004

Results by SW8260C

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

Batch Information

Analytical Batch: VMS19422
Analytical Method: SW8260C
Instrument: VRA Agilent GC/MS 7890B/5977A
Analyst: NRO
Analytical Date/Time: 9/8/2019 8:54:00PM

Prep Batch: VXX34830
Prep Method: Vol. Extraction SW8260 Field Extracted L
Prep Date/Time: 9/8/2019 6:00:00AM
Prep Initial Wt./Vol.: 25.51g
Prep Extract Vol: 25.00mL

Print Date: 09/12/2019 5:04:13PM



Method Blank

Blank ID: MB for HBN 1799216 [VXX/34834]
Blank Lab ID: 1530920

Matrix: Soil/Solid (dry weight)

QC for Samples:
1195185001, 1195185002, 1195185003, 1195185004

Results by AK101

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Gasoline Range Organics	0.780J	2.50	0.750	mg/Kg
Surrogates				
4-Bromofluorobenzene (surr)	95.2	50-150		%

Batch Information

Analytical Batch: VFC14918
Analytical Method: AK101
Instrument: Agilent 7890A PID/FID
Analyst: NRB
Analytical Date/Time: 9/9/2019 9:19:00PM

Prep Batch: VXX34834
Prep Method: SW5035A
Prep Date/Time: 9/9/2019 12:30:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

Print Date: 09/12/2019 5:04:14PM



Blank Spike Summary

Blank Spike ID: LCS for HBN 1195185 [VXX34834]
Blank Spike Lab ID: 1530923
Date Analyzed: 09/09/2019 20:43

Spike Duplicate ID: LCSD for HBN 1195185 [VXX34834]
Spike Duplicate Lab ID: 1530924
Matrix: Soil/Solid (dry weight)

QC for Samples: 1195185001, 1195185002, 1195185003, 1195185004

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	13.5	108	12.5	13.8	110	(60-120)	1.80	(< 20)

Surrogates

4-Bromofluorobenzene (surr)	1.25	92.7	93	1.25	92.8	93	(50-150)	0.08	
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Batch Information

Analytical Batch: **VFC14918**
Analytical Method: **AK101**
Instrument: **Agilent 7890A PID/FID**
Analyst: **NRB**

Prep Batch: **VXX34834**
Prep Method: **SW5035A**
Prep Date/Time: **09/09/2019 00:30**
Spike Init Wt./Vol.: 12.5 mg/Kg Extract Vol: 25 mL
Dupe Init Wt./Vol.: 12.5 mg/Kg Extract Vol: 25 mL

Print Date: 09/12/2019 5:04:15PM



Method Blank

Blank ID: MB for HBN 1799254 [VXX/34841]
Blank Lab ID: 1531131

Matrix: Soil/Solid (dry weight)

QC for Samples:
1195185004

Results by SW8260C

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Trichlorofluoromethane	25.0U	50.0	15.0	ug/Kg
Surrogates				
1,2-Dichloroethane-D4 (surr)	107	71-136		%
4-Bromofluorobenzene (surr)	94.9	55-151		%
Toluene-d8 (surr)	99.5	85-116		%

Batch Information

Analytical Batch: VMS19424
Analytical Method: SW8260C
Instrument: VQA 7890/5975 GC/MS
Analyst: NRO
Analytical Date/Time: 9/10/2019 11:58:00PM

Prep Batch: VXX34841
Prep Method: SW5035A
Prep Date/Time: 9/10/2019 6:00:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

Print Date: 09/12/2019 5:04:16PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1195185 [VXX34841]
 Blank Spike Lab ID: 1531132
 Date Analyzed: 09/11/2019 00:15

Matrix: Soil/Solid (dry weight)

QC for Samples: 1195185004

Results by SW8260C

Blank Spike (ug/Kg)

Parameter	Spike	Result	Rec (%)	CL
Trichlorofluoromethane	750	697	93	(62-140)

Surrogates

1,2-Dichloroethane-D4 (surr)	750	94.6	95	(71-136)
4-Bromofluorobenzene (surr)	750	92.8	93	(55-151)
Toluene-d8 (surr)	750	99.6	100	(85-116)

Batch Information

Analytical Batch: **VMS19424**
 Analytical Method: **SW8260C**
 Instrument: **VQA 7890/5975 GC/MS**
 Analyst: **NRO**

Prep Batch: **VXX34841**
 Prep Method: **SW5035A**
 Prep Date/Time: **09/10/2019 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: 1531215
MS Sample ID: 1531133 MS
MSD Sample ID: 1531134 MSD

Analysis Date: 09/11/2019 2:40
Analysis Date: 09/11/2019 0:31
Analysis Date: 09/11/2019 0:47
Matrix: Soil/Solid (dry weight)

QC for Samples: 1195185004

Results by SW8260C

Parameter	Sample	Matrix Spike (ug/Kg)			Spike Duplicate (ug/Kg)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Trichlorofluoromethane	13.1U	391	355	91	391	428	109	62-140	18.60	(< 20)
Surrogates										
1,2-Dichloroethane-D4 (surr)		391	371	95	391	377	97	71-136	1.70	
4-Bromofluorobenzene (surr)		509	540	106	509	608	120	55-151	11.90	
Toluene-d8 (surr)		391	391	100	391	388	99	85-116	0.76	

Batch Information

Analytical Batch: VMS19424
Analytical Method: SW8260C
Instrument: VQA 7890/5975 GC/MS
Analyst: NRO
Analytical Date/Time: 9/11/2019 12:31:00AM

Prep Batch: VXX34841
Prep Method: Vol. Extraction SW8260 Field Extracted L
Prep Date/Time: 9/10/2019 6:00:00AM
Prep Initial Wt./Vol.: 122.83g
Prep Extract Vol: 32.03mL

Print Date: 09/12/2019 5:04:19PM



Method Blank

Blank ID: MB for HBN 1799188 [XXX/42225]

Blank Lab ID: 1530802

QC for Samples:

1195185001, 1195185002, 1195185003

Matrix: Soil/Solid (dry weight)

Results by 8270D SIM (PAH)

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
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)	79.9	58-103		%
Fluoranthene-d10 (surr)	83.1	54-113		%

Batch Information

Analytical Batch: XMS11700
Analytical Method: 8270D SIM (PAH)
Instrument: Agilent GC 7890B/5977A SWA
Analyst: DSD
Analytical Date/Time: 9/12/2019 1:30:00AM

Prep Batch: XXX42225
Prep Method: SW3550C
Prep Date/Time: 9/10/2019 10:35:43AM
Prep Initial Wt./Vol.: 22.5 g
Prep Extract Vol: 5 mL

Print Date: 09/12/2019 5:04:20PM



Blank Spike Summary

Blank Spike ID: LCS for HBN 1195185 [XXX42225]

Blank Spike Lab ID: 1530803

Date Analyzed: 09/12/2019 01:50

Matrix: Soil/Solid (dry weight)

QC for Samples: 1195185001, 1195185002, 1195185003

Results by 8270D SIM (PAH)

Blank Spike (ug/Kg)

Parameter	Spike	Result	Rec (%)	CL
1-Methylnaphthalene	111	89.3	80	(43-111)
2-Methylnaphthalene	111	89.2	80	(39-114)
Acenaphthene	111	90.7	82	(44-111)
Acenaphthylene	111	98.3	89	(39-116)
Anthracene	111	100	90	(50-114)
Benzo(a)Anthracene	111	102	92	(54-122)
Benzo[a]pyrene	111	105	94	(50-125)
Benzo[b]Fluoranthene	111	105	95	(53-128)
Benzo[g,h,i]perylene	111	108	97	(49-127)
Benzo[k]fluoranthene	111	106	96	(56-123)
Chrysene	111	101	91	(57-118)
Dibenzo[a,h]anthracene	111	110	99	(50-129)
Fluoranthene	111	103	93	(55-119)
Fluorene	111	97.8	88	(47-114)
Indeno[1,2,3-c,d] pyrene	111	115	103	(49-130)
Naphthalene	111	86.5	78	(38-111)
Phenanthrene	111	97.3	88	(49-113)
Pyrene	111	106	95	(55-117)

Surrogates

2-Methylnaphthalene-d10 (surr)	111	80.4	80	(58-103)
Fluoranthene-d10 (surr)	111	84.4	84	(54-113)

Batch Information

Analytical Batch: XMS11700

Analytical Method: 8270D SIM (PAH)

Instrument: Agilent GC 7890B/5977A SWA

Analyst: DSD

Prep Batch: XXX42225

Prep Method: SW3550C

Prep Date/Time: 09/10/2019 10:35

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

Dupe Init Wt./Vol.: Extract Vol:

Print Date: 09/12/2019 5:04:22PM



Matrix Spike Summary

Original Sample ID: 1195110021
 MS Sample ID: 1530804 MS
 MSD Sample ID: 1530805 MSD

Analysis Date: 09/12/2019 8:00
 Analysis Date: 09/12/2019 8:21
 Analysis Date: 09/12/2019 8:41
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1195185001, 1195185002, 1195185003

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	41.6	134	136	71	133	136	71	43-111	0.44	(< 20)
2-Methylnaphthalene	52.0	134	139	65	133	136	63	39-114	1.80	(< 20)
Acenaphthene	14.9U	134	104	78	133	104	78	44-111	0.04	(< 20)
Acenaphthylene	14.9U	134	110	83	133	110	83	39-116	0.09	(< 20)
Anthracene	14.9U	134	114	86	133	116	87	50-114	1.40	(< 20)
Benzo(a)Anthracene	14.9U	134	112	84	133	111	84	54-122	0.95	(< 20)
Benzo(a)pyrene	14.9U	134	111	83	133	111	84	50-125	0.30	(< 20)
Benzo(b)Fluoranthene	14.9U	134	116	87	133	114	86	53-128	1.10	(< 20)
Benzo(g,h,i)perylene	14.9U	134	111	83	133	111	83	49-127	0.25	(< 20)
Benzo(k)fluoranthene	14.9U	134	116	87	133	116	88	56-123	0.04	(< 20)
Chrysene	14.9U	134	110	83	133	110	83	57-118	0.16	(< 20)
Dibenzo(a,h)anthracene	14.9U	134	111	84	133	113	85	50-129	1.20	(< 20)
Fluoranthene	14.9U	134	111	84	133	111	83	55-119	0.77	(< 20)
Fluorene	14.9U	134	114	86	133	115	86	47-114	0.37	(< 20)
Indeno[1,2,3-c,d] pyrene	14.9U	134	117	88	133	117	88	49-130	0.24	(< 20)
Naphthalene	10.7J	134	105	71	133	106	71	38-111	0.10	(< 20)
Phenanthrene	14.9U	134	114	85	133	113	85	49-113	1.20	(< 20)
Pyrene	14.9U	134	116	87	133	114	86	55-117	1.40	(< 20)
Surrogates										
2-Methylnaphthalene-d10 (surr)		134	100	75	133	101	76	58-103	0.94	
Fluoranthene-d10 (surr)		134	105	78	133	104	78	54-113	0.81	

Batch Information

Analytical Batch: XMS11700
 Analytical Method: 8270D SIM (PAH)
 Instrument: Agilent GC 7890B/5977A SWA
 Analyst: DSD
 Analytical Date/Time: 9/12/2019 8:21:00AM

Prep Batch: XXX42225
 Prep Method: Sonication Extr Soil 8270 PAH SIM 5ml
 Prep Date/Time: 9/10/2019 10:35:43AM
 Prep Initial Wt./Vol.: 22.57g
 Prep Extract Vol: 5.00mL

Print Date: 09/12/2019 5:04:22PM

Method Blank

Blank ID: MB for HBN 1799213 [XXX/42227]

Blank Lab ID: 1530904

QC for Samples:

1195185001, 1195185002, 1195185003

Matrix: Soil/Solid (dry weight)

Results by SW8082A

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Aroclor-1016	25.0U	50.0	12.5	ug/Kg
Aroclor-1221	50.0U	100	25.0	ug/Kg
Aroclor-1232	25.0U	50.0	12.5	ug/Kg
Aroclor-1242	25.0U	50.0	12.5	ug/Kg
Aroclor-1248	25.0U	50.0	12.5	ug/Kg
Aroclor-1254	25.0U	50.0	12.5	ug/Kg
Aroclor-1260	25.0U	50.0	12.5	ug/Kg

Surrogates

Decachlorobiphenyl (surr)	76.6	60-125		%
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Batch Information

Analytical Batch: XGC10501
 Analytical Method: SW8082A
 Instrument: Agilent 7890B GC ECD SW F
 Analyst: BMZ
 Analytical Date/Time: 9/11/2019 12:15:00PM

Prep Batch: XXX42227
 Prep Method: SW3550C
 Prep Date/Time: 9/10/2019 2:56:38PM
 Prep Initial Wt./Vol.: 22.5 g
 Prep Extract Vol: 5 mL

Print Date: 09/12/2019 5:04:23PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1195185 [XXX42227]

Blank Spike Lab ID: 1530905

Date Analyzed: 09/11/2019 12:25

Matrix: Soil/Solid (dry weight)

QC for Samples: 1195185001, 1195185002, 1195185003

Results by SW8082A

Parameter	Blank Spike (ug/Kg)			CL
	Spike	Result	Rec (%)	
Aroclor-1016	222	209	94	(47-134)
Aroclor-1260	222	237	106	(53-140)
Surrogates				
Decachlorobiphenyl (surr)	222	74.8	75	(60-125)

Batch Information

Analytical Batch: XGC10501

Analytical Method: SW8082A

Instrument: Agilent 7890B GC ECD SW F

Analyst: BMZ

Prep Batch: XXX42227

Prep Method: SW3550C

Prep Date/Time: 09/10/2019 14:56

Spike Init Wt./Vol.: 222 ug/Kg Extract Vol: 5 mL

Dupe Init Wt./Vol.: Extract Vol:

Print Date: 09/12/2019 5:04:25PM



Matrix Spike Summary

Original Sample ID: 1195282008
MS Sample ID: 1530906 MS
MSD Sample ID: 1530907 MSD

Analysis Date: 09/11/2019 13:17
Analysis Date: 09/11/2019 13:27
Analysis Date: 09/11/2019 13:37
Matrix: Soil/Solid (dry weight)

QC for Samples: 1195185001, 1195185002, 1195185003

Results by SW8082A

Parameter	Sample	Matrix Spike (ug/Kg)			Spike Duplicate (ug/Kg)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Aroclor-1016	292U	260	311	120	261	302	116	47-134	2.82	(< 30)
Aroclor-1260	292U	260	451	174 *	261	463	177 *	53-140	2.56	(< 30)
Surrogates										
Decachlorobiphenyl (surr)		260	189	73	261	188	72	60-125	0.81	

Batch Information

Analytical Batch: XGC10501
Analytical Method: SW8082A
Instrument: Agilent 7890B GC ECD SW F
Analyst: BMZ
Analytical Date/Time: 9/11/2019 1:27:00PM

Prep Batch: XXX42227
Prep Method: Sonication Extraction Soil SW8082 PCB
Prep Date/Time: 9/10/2019 2:56:38PM
Prep Initial Wt./Vol.: 22.67g
Prep Extract Vol: 5.00mL

Print Date: 09/12/2019 5:04:26PM



Method Blank

Blank ID: MB for HBN 1799224 [XXX/42228]

Blank Lab ID: 1531003

QC for Samples:

1195185001, 1195185002, 1195185003

Matrix: Soil/Solid (dry weight)

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)	94.3	60-120		%

Batch Information

Analytical Batch: XFC15316

Analytical Method: AK102

Instrument: Agilent 7890B R

Analyst: CMS

Analytical Date/Time: 9/11/2019 9:08:00PM

Prep Batch: XXX42228

Prep Method: SW3550C

Prep Date/Time: 9/10/2019 4:28:32PM

Prep Initial Wt./Vol.: 30 g

Prep Extract Vol: 5 mL

Print Date: 09/12/2019 5:04:27PM



Blank Spike Summary

Blank Spike ID: LCS for HBN 1195185 [XXX42228]
 Blank Spike Lab ID: 1531004
 Date Analyzed: 09/11/2019 21:37

Spike Duplicate ID: LCSD for HBN 1195185 [XXX42228]
 Spike Duplicate Lab ID: 1531005
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1195185001, 1195185002, 1195185003

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	833	880	106	833	976	117	(75-125)	10.40	(< 20)
Surrogates									
5a Androstane (surr)	16.7	106	106	16.7	117	117	(60-120)	10.50	

Batch Information

Analytical Batch: **XFC15316**
 Analytical Method: **AK102**
 Instrument: **Agilent 7890B R**
 Analyst: **CMS**

Prep Batch: **XXX42228**
 Prep Method: **SW3550C**
 Prep Date/Time: **09/10/2019 16:28**
 Spike Init Wt./Vol.: 833 mg/Kg Extract Vol: 5 mL
 Dupe Init Wt./Vol.: 833 mg/Kg Extract Vol: 5 mL

Print Date: 09/12/2019 5:04:29PM



e-Sample Receipt Form

SGS Workorder #:

1195185



1 1 9 5 1 8 5

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	N/A	Absent
COC accompanied samples?	Yes	
DOD: Were samples received in COC corresponding coolers?	N/A	
N/A **Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	Yes	Cooler ID: 1 @ 5.9 °C Therm. ID: D21
		Cooler ID: @ °C Therm. ID:
		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	N/A ***Exemption permitted for metals (e.g, 200.8/6020A).
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>
1195185001-A	No Preservative Required	OK			
1195185001-B	No Preservative Required	OK			
1195185001-C	Methanol field pres. 4 C	OK			
1195185002-A	No Preservative Required	OK			
1195185002-B	No Preservative Required	OK			
1195185002-C	Methanol field pres. 4 C	OK			
1195185003-A	No Preservative Required	OK			
1195185003-B	No Preservative Required	OK			
1195185003-C	Methanol field pres. 4 C	OK			
1195185004-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.

Attachment C: ADEC Laboratory Data Review Checklist



Laboratory Data Review Checklist

Completed By:

Neil Waggoner, PE

Title:

Qualified Environmental Professional

Date:

11/25/2019

CS Report Name:

ARRC Locomotive Refueling Facility Landfarm Plan

Report Date:

11/25/2019

Consultant Firm:

Restoration Science & Engineering, LLC

Laboratory Name:

SGS North America

Laboratory Report Number:

1195185

ADEC File Number:

2100.38.039

Hazard Identification Number:

1. Laboratory

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

 Yes No

Comments:

SGS performed all analyses

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

 Yes No

Comments:

NA, Samples not transferred

2. Chain of Custody (CoC)

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

 Yes No

Comments:

COC completed appropriately

- b. Correct Analyses requested?

 Yes No

Comments:

Samples analyzed for DRO, GRO, VOCs, and PAH SIMs

3. Laboratory Sample Receipt Documentation

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

 Yes No

Comments:

Cooler temp 5.9 degrees C

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

 Yes No

Comments:

Samples preserved appropriately

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

 Yes No

Comments:

Sample condition noted with no issues

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

Yes No

Comments:

NA, No discrepancies

- e. Data quality or usability affected?

Comments:

Data quality and usability are unaffected.

4. Case Narrative

- a. Present and understandable?

Yes No

Comments:

Case narrative present and understandable

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

Yes No

Comments:

MS recoveries outside of QC for 3 analytes. MSD RPD for 2 analytes outside of QC

- c. Were all corrective actions documented?

Yes No

Comments:

Corrective actions documented.

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

Comments:

Data quality and usability are not affected.

5. Samples Results

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

Yes No

Comments:

Samples analyzed for DRO, GRO, VOCs, and PAH SIMs

- b. All applicable holding times met?

Yes No

Comments:

All holding times met

c. All soils reported on a dry weight basis?

Yes No

Comments:

Samples reported on dry weight basis

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

Yes No

Comments:

Detection limits for several VOCs are above ADEC MTG Cleanup Level.

e. Data quality or usability affected?

Yes No

Comments:

Data quality and usability are not affected.

6. QC Samples

a. Method Blank

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

Yes No

Comments:

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

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

Yes No

Comments:

All MB results less than LOQs.

iii. If above LOQ, what samples are affected?

Comments:

No samples are affected.

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

Yes No

Comments:

NA

v. Data quality or usability affected?

Comments:

Data quality and usability are unaffected.

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

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

Yes No

Comments:

One LCS reported per matrix, analysis and 20 organics samples.

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

Yes No

Comments:

One LCS reported per matrix, analysis and 20 inorganics samples.

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

Yes No

Comments:

Matrix spike LCS %R for trichlorofluoromethane, and MS %R for Arsenic and Barium outside of QC criteria.

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

Yes No

Comments:

Matrix spike LCS RPD for trichlorofluoromethane and 1,2,3-trichlorobenzene outside of QC criteria

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

Comments:

LCS and MS were QC for all submitted samples. Sample results are not affected.

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

Yes No

Comments:

MS pages of lab report indicates MS are QC for all submitted samples. Sample data is not affected.

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

Comments:

Sample data is not affected.

c. Surrogates – Organics Only

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

 Yes No

Comments:

Surrogate recoveries reported.

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

 Yes No

Comments:

All surrogate %R reported and within limits.

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

 Yes No

Comments:

NA, no failed surrogate recoveries.

- iv. Data quality or usability affected?

Comments:

Data quality and usability are not affected

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

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

 Yes No

Comments:

Trip blank submitted.

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

 Yes No

Comments:

Cooler documented on COC.

- iii. All results less than LOQ?

 Yes No

Comments:

All results less than LOQ with the exception of Trichlorofluoromethane which was found at 371 mg/Kg (Non-detect in all soil samples).

iv. If above LOQ, what samples are affected?

Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality and usability are not affected.

e. Field Duplicate

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

Yes No

Comments:

Duplicate sample not submitted.

ii. Submitted blind to lab?

Yes No

Comments:

NA, duplicate sample not submitted.

iii. Precision – All relative percent differences (RPD) less than specified DQOs?

(Recommended: 30% water, 50% soil)

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

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

Yes No

Comments:

NA duplicate not submitted.

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

Comments:

Data quality and usability are not affected.

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

Yes No Not Applicable

Dedicated sampling equipment used.

i. All results less than LOQ?

Yes No

Comments:

NA, no equipment blank.

ii. If above LOQ, what samples are affected?

Comments:

NA

iii. Data quality or usability affected?

Comments:

NA

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

a. Defined and appropriate?

Yes No

Comments:

No additional data flags.

Attachment D: Landfarming Checklist



Attachment A-Landfarming Checklist

Project Name ARRC Truck Fill Stand - Fueling Rack Landfarm

- Workplan with detailed specifications for the landfarming project (18 AAC 78.250(e)(3)).
- Adequate site characterization data that identifies contaminants of concern and target cleanup levels.
Stockpile Characterization Information and data provided in Workplan
- Design plan that will provide prevention of contamination migration to previously unaffected areas unless otherwise approved by the department in a corrective action plan (18 AAC 78.250(e)(4)).
- Contaminant concentrations are at low enough levels such that 6-inch landspread will not risk migration to subsurface
Workplan schedule for conducting field work, monitoring, corrective action performance, and submittal of interim and final corrective action reports (18 AAC 78.250(e)(1)).
- Schedule provided in workplan for landspread construction, and sampling
Site control plan (18 AAC 78.250(e)(8)).
- Site Control information provided in workplan
Wastewater discharge permit for any discharge of regulated wastewater (18 AAC 72).
- No wastewater will be generated or discharged. Wastewater discharge permit not necessary for project
Project complies with air quality standards and requirements (18 AAC 78.250(e)(9) and 18 AAC 50).
- Nondomestic wastewater system plan approval for the construction, alteration, installation, modification, or operation of any nondomestic wastewater treatment works or disposal system under 18 AAC 72.600 (18 AAC 78.250(e)(11) and 18 AAC 72).
Not applicable to this project
- Project maintains appropriate separation distance from surface water, water supply wells, and groundwater
(18 AAC 78.274(a)(2)). 100 foot separation from surface water will be maintained.
- If applicable, description of cultured microbes, any additives, breakdown products, and oxygen source with their rate of application and biodegradation (18 AAC 78.250(e)(12)(E)).
- High nitrogen fertilizer application rate discussed in workplan
If landfarm is constructed off-site, department approval before moving contaminated soil to the treatment site (18 AAC 78.274(b)). Landfarm to be constructed on ARRC property where stockpile is currently located
- If applicable, compliance with the treatment facility requirements (18 AAC 78.273).
No treatment facility to be used.
- Information submitted that addresses leachate (18 AAC 78.250(e)(12)(A)).
Contaminant concentrations are at low enough levels such that 6-inch landfarm will not risk migration to subsurface
- Post-treatment sampling to ensure cleanup standards have been met (18 AAC 78.605(b)).
Post treatment sampling described in workplan in accordance with 18 AAC 75/78
- Cleanup standards achieved (18 AAC 78.600 - 18 AAC 78.625).
Cleanup standards (ADEC Method 2 Migration to Groundwater) listed in workplan
- Treated soils returned to original site or disposed of properly in accordance with department approval (18 AAC 78.274(b)). Treated soil to remain in place at landfarm location, or used for beneficial reuse on ARRC property.

I certify that I have personally reviewed the above checklist and that all information noted is contained in the attached report.

Name NEIL WAGGONER Signature 

Title PE, QEP Date 10/21/19