Ahtna
Engineering Services, LLC

BROWNFIELD CLEANUP REPORT
FORMER HEADSTART BUILDING
RUBY, ALASKA

FINAL

SEPTEMBER 2017

Alaska Department of Environmental Conservation
Reuse & Redevelopment Initiative
Brownfield Assessment

Prepared For:
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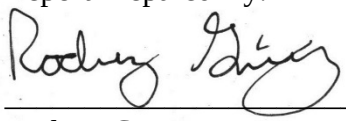
APPROVAL PAGE

This Brownfield Cleanup Report for the Former Headstart Building site in Ruby, Alaska has been prepared for the Alaska Department of Environmental Conservation by Ahtna Engineering Services, LLC, with support from their teaming partners Arctic Data Services, LLC and Geosyntec Consultants, Inc.

ADEC Hazard ID: 26137
ADEC File ID: 870.38.004

Report Prepared By:



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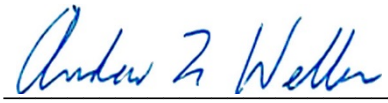

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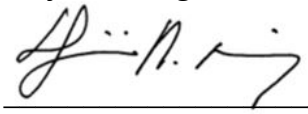

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ACRONYMS AND ABBREVIATIONS

AAC .....Alaska Administrative Code
ACM .....asbestos containing material
ADEC.....Alaska Department of Environmental Conservation
ADNR .....Alaska Department of Natural Resources
ADS.....Arctic Data Services, LLC
Ahtna.....Ahtna Engineering Services, LLC
Al.....aluminum
AST .....above-ground storage tank
B.....boron
bgs .....below ground surface
BFB .....bromofluorobenzene
BLM.....U.S. Bureau of Land Management
BTEX .....benzene, toluene, ethylbenzene, and xylenes
Ca .....calcium
City.....City of Ruby
COPC .....contaminant of potential concern
CSM .....Conceptual Site Model
Cu.....copper
cy.....cubic yards
DBAC .....ADEC Brownfield Assessment and Cleanup
DL .....detection limit
DRO .....diesel range organics
FAA.....Federal Aviation Administration
Fe.....iron
ft .....foot/feet
FSWCD.....Fairbanks Soil and Water Conservation District
GAC .....granular activated carbon
GRO .....gasoline range organics
HBM .....hazardous building material
IBC.....intermediate bulk container
IC.....institutional control
ISM .....incremental sampling methodology
LEL .....lower explosive limit
LOD .....limit of detection
LOQ .....limit of quantitation
Mg.....magnesium
mg/kg .....milligrams per kilogram
Mn.....manganese
Na.....sodium
NRC .....NRC Alaska, LLC
NTP.....Notice to Proceed
PACP.....Property Assessment and Cleanup Plan
PAH.....polycyclic aromatic hydrocarbon

PID .....photoionization detector
PPE.....personal protective equipment
ppm .....parts per million
QA.....quality assurance
QC.....quality control
RFP .....request for proposals
RPD.....relative percent difference
RSD.....relative standard deviation
RTC.....Ruby Tribal Council
SCL .....soil cleanup level
SDG.....sample delivery group
SGS .....SGS North America, Inc.
SHPO .....State Historic Preservation Office
sq ft.....square feet
UCL.....upper confidence limit
UST .....underground storage tank
VOC .....volatile organic compound
WP.....Work Plan
Zn .....zinc

1.0 INTRODUCTION

Under Notice-to-Proceed (NTP) CT 17-0000090 and Contract Number 18-8036-13 from the Alaska Department of Environmental Conservation (ADEC), Ahtna Engineering Services, LLC (Ahtna) has conducted a cleanup at the Ruby Former Headstart Building Brownfield site in Ruby, Alaska to remove and remediate fuel oil-contaminated soil from the property. The site is located near the center of Ruby, between Good Time Road and Airport Road, about 700 feet (ft) south of the bank of the Yukon River (Figure 1). The legal description of the property is Lot 3, Block 4, Tract A, US Survey 5088, Section 4, Township 9S, Range 17E.

This report describes cleanup activities that were completed in September 2016, as well as phytoremediation of the contaminated soil that was initiated in October 2016. It includes this introductory section, a summary of field activities and results, a quality assurance review, a summary of findings, conclusions, and recommendations for follow-up investigation and monitoring at the site and the phytoremediation plot. This cleanup followed the general guidelines from the Property Assessment and Cleanup Plan (PACP) conducted the previous year for the site (Ahtna, 2016a) , as well as detailed methods and procedures from the Brownfield Property Cleanup Work Plan (WP) (Ahtna, 2016b).

1.1 Property History

Use of the property for a school site dates back prior to 1963, potentially as far back as 1917. The current building on the site was constructed in 1963 as an addition to an existing school building. According to local interviews, the State of Alaska operated the school in 1963 and constructed the buildings on the site. Review of title records on file with the Alaska Department of Natural Resources (ADNR) indicated that the U.S. Bureau of Land Management (BLM) conveyed the land and the buildings to the State of Alaska in 1976. The property was subsequently leased to the City of Ruby (City) from 1981 to 2006. In the 1980s, the original school building and outbuildings were demolished or moved off site, leaving the current structure. Former and current building footprints are shown on Figure 2. For most of the 25-year lease period, the current building was used by the Tanana Chiefs Conference Headstart program as a preschool. During much of the site's early history, potentially continuing during the City's lease, fuel oil was stored in an underground storage tank (UST) supplying the school's furnace and two above-ground storage tanks (ASTs) supplying the former on-site generator. According to local residents, the UST and ASTs were filled from 55-gallon drums delivered to the site from summer barges. A more detailed history of property use is provided in the PACP.

1.2 Previous Investigations

Prior to the PACP, previous investigations had been limited to a site visit by ADNR, where a fuel odor and a crushed filler pipe associated with the UST were observed. The ADNR reported the observations to the ADEC and began working with the Ruby Tribal Council (RTC) to pursue funding to assess and clean up the site. The ADNR and RTC were successful in applying for the ADEC Brownfield Assessment and Cleanup (DBAC) service in 2015. The ADEC then contracted Ahtna to conduct the PACP.

The PACP included a hazardous building material (HBM) survey of the building and a soils investigation at the site. The HBM survey was performed in August 2015 and identified numerous building materials containing asbestos above the regulatory threshold of one percent. Identified asbestos-containing material (ACM) was non-friable, meaning in its current condition; it is not releasing asbestos fibers and thus not presenting an exposure risk. However, the building interior is in generally poor condition, and may require renovation prior to reuse by the community. Any future building renovation or demolition work must include safe practices to abate or manage the ACM to prevent exposure.

The PACP also included a site investigation (conducted in September 2015) that involved field-screening and sampling two test pits (one in each potential source area), 16 hand-augered soil borings, and 11 shallow hand-dug test pits in the building crawlspace. Petroleum contaminants were detected above ADEC soil cleanup levels (SCLs) in both source areas. Contaminated soil was present at higher concentrations and extended beneath the building in the vicinity of the UST. Air sampling conducted in March 2016 identified trace levels of fuel-related contaminants in building air, though results suggested vapor intrusion from soil contamination was not occurring (rather, vapors were from an indoor source).

Detailed findings from the HBM survey and soils investigation can be found in the PACP. Recommendations were made for removal of contaminated soil from the site and subsequent treatment of the soil via phytoremediation. Recommendations for management of building hazards were also provided.

1.3 Contaminants of Potential Concern

Contamination at the site is attributable to releases of heating oil/diesel fuel. The contaminants of potential concern (COPCs) in soil are:

- Diesel range organics (DRO)
- Gasoline range organics (GRO)
- Benzene, toluene, ethylbenzene, and xylenes (BTEX)
- Polycyclic aromatic hydrocarbons (PAH)

GRO is listed only as a potential component of diesel fuel or heating oil due to its detections in 2015 soil samples; there are no reports of gasoline being stored at the site. Volatile organic compounds (VOCs), other than BTEX, are not considered COPCs for the site because no VOCs were detected in 2015 soil or air samples.

1.4 Project Objectives

Based on the ADEC request for proposals (RFP) dated July 5, 2016, the objectives for this Brownfield Property Cleanup are:

- Identify a suitable location for soil treatment by phytoremediation, and coordinate with ADEC, ADNR, and the landowner to obtain access to the soil treatment site.

- Develop a work plan for site cleanup (including UST removal), confirmation sampling, and phytoremediation of contaminated soil.
- Implement the work plan in coordination with project stakeholders.
- Prepare this report documenting the cleanup and providing recommendations for further site work and ongoing phytoremediation of contaminated soil.

1.5 Scope of Work

Ahtna executed the following tasks to meet the project objectives:

- Selected and coordinated permission to use a treatment site for phytoremediation of contaminated soil.
- Prepared the treatment site by clearing, leveling, and constructing soil berms to contain contaminated soil for phytoremediation treatment.
- Removed the heating oil UST from the site and properly disposed of the tank and its contents.
- Excavated approximately 400 cubic yards (cy) of diesel-contaminated soil from the project site.
- Transported contaminated soil to the treatment site, spread it in a 1.5-ft lift, and planted it with native willows and grasses.
- Prepared this report documenting field observations, findings, analytical results, conclusions, and recommendations for additional characterization of potential exposure pathways, ongoing soil remediation, and institutional controls.

The treatment plots will be monitored and fertilizer will be applied in late September of 2017. An addendum to this report will be submitted following the monitoring event.

1.6 Regulatory Framework

A regulatory framework for this project has been developed by consideration of the following regulations and guidance documents:

- 18 Alaska Administrative Code (AAC) 75, Oil and Other Hazardous Substances Pollution Control, July 1, 2017.
- Policy Guidance on Developing Conceptual Site Models, ADEC Division of Spill Prevention and Response, Contaminated Sites Program, January 2017.
- Site Characterization Work Plan and Reporting Guidance for Investigation of Contaminated Sites, ADEC Division of Spill Prevention and Response, Contaminated Sites Program, March 7, 2017.
- Field Sampling Guidance, ADEC Division of Spill Prevention and Response, Contaminated Sites Program, August 2017.

Soil analytical results are compared to Method Two SCLs from Tables B1 and B2 of 18 AAC 75.341 (ADEC, 2017a). Both the “Under 40 Inch Zone” human health (or ingestion/inhalation for GRO and DRO) and “migration-to-groundwater” SCLs are listed; the lower of the two is considered applicable at this site. Table 1 lists the cleanup levels for the COPCs associated with

soil contamination at the site. For PAHs, only those previously detected above cleanup levels are listed for brevity.

TABLE 1: SOIL CLEANUP LEVELS FOR CONTAMINANTS OF POTENTIAL CONCERN

Compound	Human Health SCL[1] (mg/kg)	Migration to Groundwater SCL (mg/kg)
Gasoline Range Organics (GRO)	1,400	300
Diesel Range Organics (DRO)	10,250	250
Benzene	11	0.022
Toluene	200	6.7
Ethylbenzene	49	0.13
Xylenes (total)	57	1.5
1-Methylnaphthalene	68	0.41
2-Methylnaphthalene	310	1.3
Naphthalene	29	0.038

[1] Lower of Ingestion or Inhalation cleanup levels listed under Human Health column for GRO and DRO.
mg/kg = milligrams per kilogram
SCL = soil cleanup level

1.7 Treatment Site Selection, Access, and Approvals

Following the PACP, Ahtna assisted the ADEC with the Analysis of the Brownfields Cleanup Alternatives process, which included coordinating with key local stakeholders and obtaining input from the community on the cleanup plan through a public meeting hosted in Ruby on June 16, 2016. During the public meeting, a suitable treatment site was recommended by a local elder. This treatment site was out of town past the landfill, located near the top of a hill and a long distance from any surface water bodies. This location was recommended as an alternative to the gravel pit sites originally recommended in the PACP, which were close to a small seasonal creek.

The newly recommended treatment site also proved not feasible. The recommended treatment site was on property owned by the Dineega Corporation (the local village corporation), with subsurface mineral rights owned by Doyon Ltd. (the regional corporation). The ADNR, ADEC, and the Alaska Department of Law began an internal review prior to coordinating access to the site with the landowners. This internal review concluded that the proposed treatment site was not acceptable, due to liability issues.

Instead, access to a City-owned property near the airport was selected as a treatment site, and access to that property was coordinated with the City. It is understood that the City may share potential responsibility for contamination at the Ruby Former Headstart site, given some of the contamination may have occurred during the period of their lease. The City granted ADEC (and their contractors) access to their property near the airport by signing a Limited Right of Entry agreement on September 13, 2016. A copy of the signed agreement is included in Appendix A.

Ahtna also coordinated access to the subject property for the cleanup action. The ADNR issued ADEC (and their contractors) an extension and modification to land use permit LAS 30423 in a Memorandum of Decision dated September 23, 2016. The ADEC coordinated a State Historic Preservation Office (SHPO) review of the soil treatment site; ADEC received a "no historic properties affected" determination from SHPO on September 15, 2016. The ADEC signed an approval for transport, treatment, and disposal of contaminated media on September 23, 2016. Copies of these approval documents are included in Appendix A.

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2.0 FIELD ACTIVITIES AND OBSERVATIONS

The following sections describe the field activities performed by Ahtna and teaming partner Arctic Data Services, LLC (ADS) in September and October 2016. Preparation of the treatment site and removal of the UST and contaminated soil was accomplished from September 26 to 30, 2016. Ahtna subcontracted local contractor Ruby Construction, Inc. to conduct earthmoving activities and to assist with removal of the UST. Ahtna/ADS also subcontracted Rescon Alaska, LLC to assist with the UST removal and disposal effort. Fieldwork during the removal effort was conducted by Rodney Guritz (of ADS). The phytoremediation plots were planted from October 3 to 7, 2016. ADS subcontracted a local crew of three laborers to assist with the planting effort. Mr. Guritz coordinated and supervised the planting effort. Mr. Guritz is a qualified environmental professional as defined in 18 AAC 75.333.

The field logbook documents all field activities and is included as Appendix B. Photographs of field activities are presented in Appendix C.

2.1 Treatment Site Preparation and Baseline Sampling

The selected treatment site on City property near the airport was visited immediately upon arrival in Ruby, to select a location for phytoremediation plot construction. The presence of a large gravel pad housing Federal Aviation Administration (FAA) buildings and instrumentation complicated treatment site preparation. The gravel pad was substantially larger than the footprint of the FAA buildings that appeared in aerial photographs, and along with a large soil berm that potentially contained underground utility lines, the pad encroached on the area proposed for the phytoremediation treatment plot (Figure 3). Level ground available for treatment plot construction was further constrained by a steep downslope to the north and west, and the property boundaries to the south and east. Ahtna coordinated with the FAA to ensure soil transport activities would not interfere with operation of the FAA facility, and truck and equipment traffic was routed away from FAA utility lines.

Initially, one treatment plot was prepared to the southwest of the FAA pad (Plot A), and later, two additional treatment plots were prepared to the north and south of the FAA pad (Plots B and C, respectively) to accommodate additional soil. The treatment plots were prepared by scraping off surface vegetation using a bulldozer, and constructing soil berms (approximately 2 to 3 ft high) on the downhill sides of the plots using soil obtained from the site. The natural slope of the hill comprised the southeast (uphill) berm of Plot A; the edge of the FAA pad comprised the northwest berm of Plot C (see Figure 3).

Baseline soil samples were collected from the freshly exposed ground surface at Plot A to check for the potential presence of soil contamination at the treatment site prior to placement of contaminated soil during the cleanup. First, field screening was conducted throughout the treatment plot areas using a photoionization detector (PID) and headspace screening methods specified in the WP. Next, baseline soil samples were collected from a depth of 0.5 ft (the top several inches of the newly exposed ground surface) for analysis of DRO, GRO, and BTEX, by methods specified in the WP. A total of four baseline soil samples and one field duplicate were collected. Subsequent plots, opened to accommodate additional soil once Plot A could no longer

be accessed (see Section 2.4), were field screened (all readings were below 1 part per million [ppm]) but no analytical soil samples were collected (see Section 2.7).

2.2 UST Removal

Once treatment plots were prepared to accept contaminated soil, excavation began in the vicinity of the UST, on the northwest side of the Former Headstart Building (Figure 4). Soil above the UST was carefully removed using an excavator and by hand-digging along the exposed UST fill/vent pipe to determine the depth of the tank. The top of the tank was encountered at 4.5 ft below ground surface (bgs). A second fill/vent pipe was encountered below the ground surface at the opposite end of the tank. This second fill/vent pipe was completely detached from the tank, and oil was observed at the top of the tank in the opening where the fill/vent pipe had attached. There was no damage to the threads, suggesting this pipe was already loose or detached when excavation began. Supply and return lines (3/8-inch copper) were also encountered. These were drained back into the tank and cut at their connections to the tank.

Liquids were pumped from the tank into three 275-gallon intermediate bulk containers (IBCs) using a pneumatic diaphragm pump. Approximately 400 gallons of fuel oil and 100 gallons of water were removed from the UST. Most of the fuel oil was pumped directly into two of the IBC tanks, and a mix of diesel and water from the bottom of the UST was pumped into the third IBC tank for later processing (Section 2.6.1).

Following removal of tank liquids, excavation continued to expose the entire top half of the tank, as well as the entire north face of the tank; tank dimensions were consistent with a 500-gallon total volume. The tank was then loosened using the excavator bucket and pulled using straps and chains with the excavator arm as a boom. The tank was placed in a diked containment area set up on-site to the south of the building. The tank appeared intact with no major corrosion, pitting, or other obvious signs of damage. The paint was still in good shape on the outside of the tank. The tank was bedded in moss. The tank was rendered unusable and processed for local recycling the day after its removal (Section 2.6.2).

2.3 Contaminated Soil Excavation – UST Area

A majority of soil removed to access the UST was contaminated, based on PID field screening readings over 20 ppm. Contamination was present immediately below the ground surface, indicating surface releases were a major contributor to soil contamination in this area. A total of four truckloads (approximately 40 cy) of contaminated soil was removed in order to access the UST. All contaminated soil removed from the UST area excavation was transported to the treatment site and placed in the first phytoremediation plot (Plot A).

Following removal of the UST, excavation proceeded based on in-situ PID field screening readings. At least one headspace sample was collected and field screened per 10 cy of soil removed. Headspace PID readings were recorded in the field logbook. Soil was deemed contaminated where headspace PID readings exceeded the threshold of 20 ppm.

Excavation continued vertically until headspace PID readings were below 20 ppm at the base of excavation. Frozen soil was encountered at roughly 9 ft bgs, directly below the bottom of the tank. The excavation was continued slightly into the frozen layer, where headspace PID readings at the base of excavation were below 20 ppm. The final depth of the excavation ranged from 9 to 10 ft bgs (slightly deeper on the west side).

Excavation continued horizontally to the west, north, and east until clean limits were reached, based on the 20 ppm headspace PID threshold. However, soil contamination extended beneath the footprint of the building to the south, and no further soil could be removed without undermining the building foundation. A total of 14 truckloads of contaminated soil were removed from the UST area. This represents approximately 140 loose cy of soil. Plot A was filled to approximately half of its capacity, with soil spread in the treatment plot to an average depth of approximately 1.5 ft.

Once all contaminated soil was removed, based on the headspace PID 20 ppm threshold, the excavation was measured and prepared for confirmation sampling. The finished excavation was approximately 15 ft wide, 20 ft long, and 10 ft deep. The excavation sidewalls and floor were field screened using headspace field screening methods at the required frequencies specified in the WP. Four sidewall samples (plus one field duplicate) and two base-of-excavation samples were collected from screening locations with the highest readings, in accordance with the sampling frequency specified in the WP, with at least one confirmation sample per excavation sidewall. Samples were collected using a hand trowel on the end of aluminum pipe extensions, to allow safe collection of undisturbed soil at the limits of excavation without entering the excavation or using the excavator. Samples for volatile analysis (GRO, BTEX) were immediately preserved with laboratory-supplied methanol; samples for semi-volatile analysis (DRO, PAH) were then placed in jars, filling completely with zero headspace.

Once the excavation was complete and confirmation samples were collected, the excavation was backfilled using pit run gravel from the 3-mile gravel pit (on Ruby-Poorman Road). Backfill was spread and compacted in 1-ft lifts using the excavator bucket until the excavation was brought back to approximately the original grade. The excavation was then dressed with additional pit run gravel, smoothed to a finished grade using a bulldozer, and compacted with a large roller-compactor.

2.4 Contaminated Soil Excavation – AST Area

Excavation in the vicinity of the former generator building AST began in the location of the 2015 source-area test pit (the approximate location of the former AST; see Figure 5). Excavating to an initial depth of 4 ft bgs, the excavation was extended horizontally until in-situ PID field screening of excavation sidewalls consistently yielded readings below 20 ppm. A total of 21 sidewall samples were collected and field screened using headspace screening methods to confirm in-situ field screening results. This shallow excavation extended to a greater area than was originally estimated based on 2015 test pit and shallow soil boring samples. The excavation had a footprint of approximately 1,100 ft, and was irregular in shape (Figure 5).

Most of the excavation floor at the 4 ft. depth still exceeded 20 ppm using in situ PID field screening. Excavation was continued vertically at the locations of the highest readings, attempting

to remove as much of the contaminated material as possible, given constraints on plot size at the soil treatment site. All soil from the AST area excavation was hauled and placed in phytoremediation plots B and C (Figure 3), as Plot A had become inaccessible due to wet soil conditions following a rain event. A total of 26 truckloads of contaminated soil was removed from the AST area, or approximately 260 loose cy of soil. This filled Plots B and C to their capacity, with soil spread to an average depth of approximately 1.5 ft. The final depth throughout the AST area excavation varied from 4 to 6 ft, deeper on the uphill (east) side of the excavation.

Once excavation was complete, the excavation sidewalls and floor were field screened using headspace field screening methods at the required frequency specified in the WP. Five sidewall samples and six base-of-excavation samples (plus one field duplicate) were collected from screening locations with the highest readings, in accordance with the sampling frequency specified in the WP, with at least one confirmation sample per excavation sidewall. Samples for volatile analysis (GRO, BTEX) were immediately preserved with laboratory-supplied methanol; samples for semi-volatile analysis (DRO, PAH) were then placed in jars, filling completely with zero headspace.

Once the excavation was complete and confirmation samples were collected, the excavation was backfilled, compacted, and finished with the same methods as for the UST area (see above).

2.5 Phytoremediation Plot Setup

2.5.1 Plot Finishing

Once all soil was placed in the three phytoremediation plots, the plots were smoothed to a finished grade using a bulldozer, then compacted slightly using the bulldozer tracks. The indentations created by the tracks help trap surface runoff, preventing grass seed from washing away and providing a microenvironment that facilitates grass-seed germination. The edges of the plots were sloped gently to the original grade, leaving space between the edge of the plot and the surrounding soil berm in most locations.

2.5.2 Pre-Treatment ISM Sampling

Pre-treatment soil samples were collected from each plot using incremental sampling methodology (ISM) as specified in the WP. Each plot was considered a decision unit, and from each decision unit three ISM replicates were collected. Each ISM replicate consisted of between 30 to 32 discrete sample increments, collected from random locations within a grid laid out over the plot (systematic random sampling). Increments were collected using a soil probe to obtain a soil core from each increment location. The core was subsampled immediately upon bringing it to the surface using a Terra Core® sampler for GRO/BTEX analysis, then the remaining soil was placed in an aluminum tray and subsequently a Ziploc® bag for later homogenization and subsampling for DRO/PAH analysis. Sampling methods followed procedures from the WP, with exceptions noted in Section 2.7.

2.5.3 Soil Nutrient Sampling

In addition to sampling for petroleum contaminants, two subsamples (one sample of soil from each source area – Plots A and C) were collected for determination of soil nutrients. Subsample collection procedures for soil nutrients were consistent with those used for the DRO/PAH subsamples. These samples were submitted to the Fairbanks Soil and Water Conservation District (FSWCD) and in turn Brookside Laboratories, Inc. where they were analyzed for pH, soil organic matter, cation exchange capacity, available nitrogen, soluble sulfur, and extractable phosphorus, potassium, and trace metals (manganese [Mn], zinc [Zn], boron [B], copper [Cu], iron [Fe], aluminum [Al], calcium [Ca], magnesium [Mg], and sodium [Na]).

2.5.4 Planting

Contaminated soil in the phytoremediation plots was planted with a combination of native Alaskan willows and grasses. Planting took place the week after the removal action, from October 3 to October 6, 2017. Mr. Guritz led the planting effort, with assistance from a local crew of three laborers.

Dormant willows were harvested from two locations – the riverbank directly north of Ruby across the Yukon River, and from a gravel bar approximately one mile upstream of Ruby on the Yukon River. The second site (referred to as "Big Creek willow bar" by the local boat driver) provided willows of more consistent diameter with less branching, ideal for planting. The willows were transported to the treatment site by boat and pickup truck. They were then trimmed and processed into 18-inch long cuttings. Cuttings were planted by using the soil probe to remove a core to a depth of 12-14 inches as a pilot hole for each cutting. Care was taken to ensure all cuttings were planted right-side-up. Planting density was consistent with the Soil Remediation Plan (Appendix B of the WP), at an approximate 1.5-ft spacing.

Once willow cuttings had been planted, the site was seeded with a native Alaskan grass seed mix, with a seeding density slightly greater than the proposed rate of 40 pounds per acre in the Soil Remediation Plan. Approximately 10 pounds of grass seed was applied evenly over the 7,400 square feet (sq ft) of plot area, equating to 58 pounds per acre. The grass seed mix was obtained from Alaska Mill and Feed, and consisted of the following cultivars: Nortran tufted hairgrass (~40%), Glaucous Tundra bluegrass (~30%), and Gruening Alpine bluegrass (~30%).

2.5.5 Fertilizing

The plots were fertilized on May, 12 2017, using fertilizer recommendations from FSWCD determined from the results of soil nutrient samples (Section 3.5.1). Additionally a game camera, set up to record hourly photos during the day, was installed to monitor Plot A. The plots will be fertilized again in late September 2017.

2.6 Waste Management and Decontamination

Excavated bulk soil is to be treated using phytoremediation, in accordance with the Soil Remediation Plan. Investigative derived waste consisted of heating oil and oily water from the

UST, the UST itself, and disposable personal protective equipment (PPE) and sampling supplies. The following sections describe on-site treatment of oily water and local recycling of the heating oil and tank. Disposable PPE and sampling supplies were placed in the active cell of the Ruby landfill upon completing the cleanup. Heavy equipment was decontaminated in accordance with the WP.

2.6.1 UST Liquids On-Site Treatment

The heating oil and water in the third IBC tank were allowed to separate for a day. A 12-volt submersible pump was used to pump heating oil from on top of the water layer into one of the other two IBC tanks on site (containing straight heating oil). Heating oil was removed from the site later the same week by Ruby Construction, Inc. for use in a waste oil burner at their shop building. Water was removed from below the oil layer using the same submersible 12-volt pump, and treated by passing it through sorbent material and a granular activated carbon (GAC) filter. Treated water was discharged to a grassy area on site after confirming it was free of sheen. The oily water mix remaining after separation of heating oil and water was transferred to a 55-gallon drum for off-site disposal.

2.6.2 Tank Recycling

On the morning following tank removal, the tank was processed for local reuse. First, the tank atmosphere was monitored using a MultiRAE multi-gas detector. Lower explosive limit (LEL) was measured at 0%. Two holes approximately 2 ft square were cut in either end of the tank. The tank was then tilted to one side and remaining liquids and sludge were removed using a shovel and sorbent pads. Sorbent pads and sludge were placed in an open-top 55-gallon drum for off-site disposal. Once all liquids and sludge were removed, and LEL confirmed at 0%, the tank was cut into three 2-ft sections (bands). These were then further scrubbed with sorbent pads until free of oil residue, for local reuse as fire pits.

2.6.3 Off-Site Waste Disposal

The drum of oily water and the drum of spent sorbents were transported from Ruby to Fairbanks via barge in July 2017. This waste was disposed of by NRC Alaska, LLC (NRC). Copies of disposal confirmation are shown in Appendix D.

2.7 Work Plan Deviations and Anomalies

This section documents deviations from the work plan, as well as unforeseen anomalies that occurred during the field work.

- A total of three plots were constructed to contain the contaminated soil for treatment via phytoremediation, instead of the single plot proposed in the WP. This was due to space and access constraints at the soil treatment site (see Section 2.1). Given this change:

  - Our scope of services was modified on November 1, 2016 as Amendment 2 to the original NTP, to add the costs of additional ISM samples for the two additional plots.

  - Baseline analytical soil samples were collected from the location of Plot A; Plots B and C were field screened only, as all available jars had been used to collect Plot A samples.

  - Total area of the three treatment plots was approximately 7,400 sq ft (the Soil Remediation Plan assumed 11,610 sq ft to treat up to 500 cy of contaminated soil).

  - Soil was spread to 1.5 ft, instead of the 1-ft thickness specified in the Soil Remediation Plan. A total of approximately 400 cy was removed from the site and placed in the three treatment plots.

  - Only the exposed/accessible sides of the plots were roped off and flagged.

- Deviations from planned ISM sampling procedures were as follows:

  - When collecting GRO/BTEX increments from soil cores, numerous (5-6) plugs of soil were collected throughout the full length of the core, instead of two plugs at random intervals. This approach was required to collect sufficient sample mass, and should result in better representation of the full depth of the treatment plots.

  - Soil increments for DRO and PAH analyses were sieved and homogenized at the office, as the sampler failed to bring a sieve to the project site for immediate homogenization of the samples per the WP. After homogenizing, ISM subsampling proceeded in accordance with the WP. However, this procedure deviated slightly from standard practice, where a single jar would have been submitted for each analysis (DRO and PAH) and extracted by the laboratory in its entirety. The laboratory noted this on sample receipt forms and proceeded to analyze the samples as grab samples. This may explain higher than expected relative standard deviation (RSD) for the ISM replicates (Section 4.7).

- During the UST excavation and soil hauling, approximately 1 cy of soil was released onto the road surface immediately uphill of the site due to a faulty tailgate latch. The soil was immediately removed using a loader, and the location was field screened and one analytical soil sample collected to confirm complete removal (*16-RBY-RS-01*).

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3.0 RESULTS AND DISCUSSION

This section summarizes analytical results for baseline soil samples from the soil treatment site, confirmation samples collected from the two excavations, pre-treatment ISM samples collected from the three phytoremediation plots, and the one soil sample collected from the roadway following removal of spilled soil. Tabulated results are presented in Tables 2 through 7 (attached); field screening results and analytical sample locations for the two excavations are shown in Figures 4 and 5 (attached). Analytical laboratory results are included as Appendix E. Soil nutrient analysis results and fertilizer recommendations are provided in Appendix F.

3.1 Treatment Site Baseline Soil Samples

DRO was detected at low levels in four of the five baseline soil samples collected from the soil treatment site; all DRO concentrations were well below the most stringent SCL, and likely represent background levels attributable to organic matter in the native soils. GRO and BTEX were not detected. Analytical results for the baseline soil samples are presented in Table 2 (attached).

3.2 UST Area Excavation Confirmation Samples

DRO, GRO, and BTEX results were below ADEC migration-to-groundwater and human health or ingestion/inhalation SCLs for confirmation samples collected from the UST excavation floor. DRO, GRO, and BTEX results were also below all relevant SCLs for the north, east, and west sidewall samples. However, the sample and duplicate from the south sidewall (*16-RBY-CS-04/05*), where excavation was halted to avoid undermining the building foundation, contained DRO above inhalation/ingestion SCLs, and ethylbenzene, total xylenes, 1-methylnaphthalene, and 2-methyl-naphthalene above migration-to-groundwater SCLs. This sample was collected from a depth of 4 ft, roughly level with the top of the UST at the horizon of greatest contamination (as determined by field screening). Sample locations and DRO results for the UST area excavation are shown on Figure 4, and analytical results for DRO, GRO, and BTEX are presented in Table 3 (attached). PAH results for excavation confirmation samples from both UST and AST areas are presented in Table 5 (attached).

3.3 Former AST Area Excavation Confirmation Samples

DRO, GRO, and BTEX results for samples from the southern half of the AST excavation and the south, east, and west sidewalls were below all relevant SCLs. However, samples from the north sidewalls (*16-RBY-CS-08* and *16-RBY-CS-09*) and one excavation floor sample from the northern half of the excavation (*16-RBY-CS-19*) contained DRO above the migration-to-groundwater SCL. One excavation floor sample and duplicate collected from near the center of the excavation (*16-RBY-CS-16/17*) contained DRO, GRO, and select BTEX and PAH analytes above migration-to-groundwater SCLs. One sample collected from the excavation floor near the footprint of the former UST (*16-RBY-CS-18*) contained DRO above the human-health SCL, as well as GRO and select BTEX analytes above migration-to-groundwater SCLs. Sample locations and DRO results for the former AST area excavation are shown on Figure 5, and complete analytical results for DRO, GRO, and BTEX are presented in Table 4 (attached). PAH results for excavation confirmation samples from both UST and AST areas are presented in Table 5 (attached).

3.4 Road Sample

Results of the sample collected from the road surface following removal of spilled contaminated soil (Section 2.7) confirmed complete removal, with no analytes detected above the most stringent SCLs. Analytical results for the road sample are presented in Table 6 (attached).

3.5 Phytoremediation Pre-Treatment ISM Samples

Results from the pre-treatment ISM samples collected from the phytoremediation plots showed varying levels of soil contamination. For each plot, using the results of the three ISM replicates, an upper confidence limit (UCL) was calculated at the 95% confidence threshold. This 95% UCL was used to compare results to SCLs. Plot A had the highest concentrations of soil contaminants. DRO, benzene, ethylbenzene, xylenes (total), 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene exceeded the migration-to-groundwater SCL in Plot A. Plot B had the next highest levels of contamination, with DRO, ethylbenzene, xylenes (total), 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene exceeding migration-to-groundwater SCLs. Plot C had the lowest levels, with only DRO, xylenes (total), 1-methylnaphthalene, and 2-methylnaphthalene exceeding migration-to-groundwater SCLs. Results for all three plots were below human health and ingestion/inhalation SCLs. Analytical results for pre-treatment ISM samples, as well as calculated 95% upper confidence limits for each ISM replicate, are presented in Table 7 (attached).

3.5.1 Soil Nutrient Samples

The FSWCD reviewed the soil nutrient sample results for Plots A and C, and used them to develop custom fertilizer recommendations for the phytoremediation treatment. Plot C is considered representative of Plot B, as both plots contained soil removed from the former AST area. For both soil samples, nitrogen, phosphorus, and potassium were in the “low” or “very low” category. Both samples also had low sulfur levels. Soil organic matter was relatively low, at 2.31% (Plot A) and 1.30% (Plot C). Other soil quality indicators, including pH, cation exchange capacity, and trace minerals were within normal ranges for both samples. The Brookside Laboratories, Inc. analytical data and the FSWCD soil sample analysis report (including fertilizer recommendations) are provided in Appendix F.

4.0 QUALITY ASSURANCE REVIEW

ADS conducted a quality assurance review of analytical data for this project. ADS evaluated the precision, accuracy, sensitivity, representativeness, comparability, and completeness of the data by reviewing laboratory-supplied quality control (QC) information as well as conducting independent quality assurance (QA) checks on the data. Soil sample results were reported by SGS North America, Inc. (SGS) of Anchorage, Alaska. Excavation confirmation samples were submitted as sample delivery group (SDG) 1168665, and pre-treatment ISM samples were submitted as SDG 1168704. In addition to chemical analysis of COPCs, samples from Plots A and C were submitted to Brookside Laboratories, Inc. (via FSWCD) for analysis of soil nutrients; soil nutrient analyses were not part of this quality assurance review. Analytical laboratory reports and ADEC data review checklists are provided in Appendix E.

ADS completed an ADEC data review checklist for each SGS SDG. The following sections provide a brief summary of data quality for this project; QC anomalies not affecting data quality are discussed in the checklists, and are not further described here.

4.1 Sample Preservation, Handling, Custody, and Holding Times

Samples were received in good condition within or slightly below the acceptable temperature range. Sample-custody paperwork was complete and custody seals were intact (or samples were hand delivered). Method holding times for reported data were met for each sample and analysis.

4.2 Analytical Sensitivity

Analytical sensitivity was acceptable, with the exception of several PAH analytes for which limits of detection (LODs) exceeded the most stringent SCL. In each case, the sample contained other analytes well above SCLs, so impact to data usability was minimal.

4.3 Blanks

Method blank results were below limits of quantitation (LOQs). However, GRO was detected between the detection limit (DL) and the LOQ in several method blanks associated with project samples in both SDGs. GRO was also detected between the DL and the LOQ in the trip blank associated with excavation confirmation samples. GRO results for 13 excavation confirmation samples were qualified due to contamination identified in a corresponding blank sample; a ‘UB’ flag or ‘JH’ flag was applied depending on the degree of impact to the sample results (see checklist for details). In each case, the affected results were at least an order of magnitude below the most stringent SCL, so impact to data usability was minimal.

4.4 Laboratory Control Samples

There was a laboratory control sample duplicate recovery failure for one batch of DRO samples. This batch contained the five treatment-area baseline soil samples. DRO results for samples in the batch are qualified ‘JL’ (detections) or ‘UJ’ (non-detects) to indicate the low bias. DRO

results for these samples were below the LOQ or not detected, and at least an order of magnitude below the most stringent SCL, so impact to data usability was minimal.

4.5 Matrix Spikes

There was one matrix spike recovery failure for p&m-xylenes. Results for the parent sample (*16-RBY-ISM-09*) were qualified 'JL' to indicate the potential low bias due to matrix interference.

4.6 Surrogate Recovery

There were a number of surrogate recovery failures that affected project-sample data quality. For excavation confirmation samples, GRO surrogate 4-bromofluorobenzene (4-BFB) was recovered above control limits for the following samples, due to matrix interference: *16-RBY-CS-05*, *16-RBY-CS-04*, *16-RBY-CS-14*, *16-RBY-CS-15*, *16-RBY-CS-17*, *16-RBY-CS-16*, *16-RBY-CS-18*, and *16-RBY-CS-19*. GRO surrogate 4-BFB was also recovered above control limits for each of the nine pre-treatment ISM samples. Affected results are qualified 'JH' (where detected) to indicate the potential high bias.

4.7 Field Duplicates

Field-duplicate relative percent differences (RPDs) were below the data quality objective of 50% for excavation confirmation samples. Field-duplicate RPD calculations were not relevant for the pre-treatment ISM samples. However, RSDs were higher than expected, ranging from 1% to 95% (all but two RSDs were less than 50%). No flagging is required given the use of a 95% UCL to represent soil concentrations, thereby accounting for variance and imprecision in the data. However, future ISM sampling should conform to standard practices in an attempt to achieve lower RSDs and thus more accurate 95% UCLs for comparison to project SCLs.

4.8 Data Quality Summary

Overall impact to data quality and usability from the QC anomalies described above was minimal. Precision, accuracy, sensitivity, representativeness, comparability, and completeness goals were met, with exceptions flagged with data qualifiers. The dataset is considered complete (100%), with no data rejected in the course of the review. The data are usable for the purposes of the project, with the affected data qualified as described above.

5.0 CONCEPTUAL SITE MODEL

The CSM was revised following the cleanup based on the analytical sampling results presented in this report. The ADEC CSM Graphic and Scoping Forms are included in Appendix G. The CSM does not include hazardous materials not regulated by ADEC, such as ACM in the building. Instead, information regarding ACM exposure risks is summarized in the PACP.

5.1 Contaminants of Potential Concern

The COPCs include petroleum hydrocarbons (DRO and GRO) and related compounds (BTEX and PAHs). Contaminants of concern that were measured above cleanup levels in the 2015 PACP investigation included DRO, GRO, benzene, toluene, ethylbenzene, o-xylene, p&m-xylenes, 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene. Following this cleanup action, DRO remains above inhalation/ingestion SCLs in both source areas, and DRO, GRO, benzene, ethylbenzene, and xylenes remain above migration-to-groundwater SCLs. Confirmation sampling indicates that all volatile contaminants (GRO and BTEX) exceeding human health or ingestion/inhalation SCLs were removed from both source areas.

5.2 Exposure Pathways

The following exposure pathways are considered complete or potentially complete.

- **Incidental soil ingestion.** Contaminants (DRO) are present in soil within 15 ft of the ground surface above ingestion cleanup levels. However, surface soil (to at least 4 ft bgs) exceeding ingestion cleanup levels (DRO) and human-health SCLs (BTEX and PAHs) was successfully removed. This pathway is considered complete, but only for potential future receptors if subsurface DRO contamination is disturbed.

- **Dermal absorption of contaminants from soil.** PAHs are the only petroleum-related contaminant posing a potential risk of dermal absorption. PAHs exceeding human-health SCLs (accounting for the dermal absorption pathway) were successfully removed during this cleanup. However, this pathway is considered potentially complete due to the remaining presence of PAHs, albeit below human-health SCLs.

- **Ingestion of groundwater.** While considered unlikely due to anticipated groundwater depth and observed distribution of soil contamination, contaminants remain present in soil above migration-to-groundwater cleanup levels. Groundwater contamination may be present and groundwater may be a current or future source of drinking water. Ingestion of groundwater is considered a potentially complete pathway.

- **Dermal absorption of contaminants in groundwater.** PAHs remain present in soil above migration-to-groundwater cleanup levels, may be present in groundwater, and can be dermally absorbed. Dermal absorption of groundwater is considered a potentially complete pathway.

- **Inhalation of volatile compounds in tap water.** Volatile contaminants are present in soil above migration-to-groundwater cleanup levels, may be present in groundwater, and could be inhaled if groundwater is used for household purposes (bathing, drinking, etc.). Inhalation of volatile compounds in tap water is considered a potentially complete pathway.

- **Inhalation of outdoor air.** Volatile contaminants above human-health SCLs (BTEX) or inhalation SCLs (GRO) were successfully removed from the site during this cleanup action. However, DRO remains above the inhalation SCL within 15 ft of the surface in both source areas. While DRO volatilization from the subsurface is likely to be minimal, this pathway is considered complete.

- **Inhalation of indoor air.** Volatile contaminants above human-health SCLs (BTEX) or inhalation SCLs (GRO) were successfully removed from the site during this cleanup action. However, DRO remains above the inhalation SCL within 50 ft of the building. Vapor intrusion is considered unlikely due to the small affected area, low volatility of remaining contaminants, and the passive ventilation of the crawlspace. It should not be ruled out until additional air sampling is conducted to confirm the results of the March 2016 air sampling, where all crawlspace and indoor air results were below ADEC target levels under an unheated building-in-winter scenario (Ahtna, 2016a). Therefore, the vapor intrusion pathway is potentially complete.

5.3 Current and Future Receptors

Potential future receptors for soil exposure pathways include commercial or industrial workers and construction workers that could come into contact with excavated subsurface soil. Current receptors for air exposure pathways include site visitors, trespassers, or recreational users; potential future receptors also include residents, commercial or industrial workers, construction workers, and farmers or subsistence harvesters. Current receptors for groundwater exposure pathways include nearby residents who may rely on groundwater as a drinking-water source; potential future receptors also include workers or site visitors, in the event that a well was installed at the site for non-residential use.

5.4 CSM Summary

Potential future exposure to contaminated subsurface soil via the incidental soil ingestion and inhalation of outdoor air exposure pathways likely present the greatest risk of exposure to contaminants remaining at the site. Such an exposure scenario could arise during future excavation into subsurface soil, for example as part of construction or utility installation activities. The groundwater exposure pathways and inhalation of outdoor and indoor air pathways are potentially complete, though current understanding of contaminant distribution, hydrologic conditions, and site/area use suggest these pathways currently present minimal risk.

6.0 CONCLUSIONS

Two source areas were addressed during this cleanup: the UST area and the former generator building AST area. At both locations, a majority of contaminated soil was removed, including all accessible surface soil, defined by 18 AAC 75.990 as soil 2 ft bgs or shallower, that was contaminated above human health or ingestion/inhalation SCLs. All contaminated soil above human health or ingestion/inhalation SCLs was removed to at least 4 ft bgs at both locations. A total of 400 cy of contaminated soil was removed from the site and relocated to City of Ruby property near the airport for treatment via phytoremediation. As described in the conceptual site model (CSM) summary, exposure to contaminated soil has successfully been mitigated for current receptors, and the risk of exposure to volatile contaminants through air inhalation exposure pathways has been reduced.

6.1 UST Area

In the UST area, contaminated soil extended beneath the building footprint. Excavation was halted to avoid undermining the building foundation. Confirmation samples collected from the excavation sidewall closest to the building contained DRO above human-health SCLs and other petroleum-related contaminants above migration-to-groundwater SCLs. However, the area impacted to this degree is likely to be small and confined to the subsurface (greater than 2 ft bgs), based on observations during the cleanup and limited sampling results. Soil samples collected from beneath the building in the crawlspace near the UST in 2015 contained no petroleum-related contaminants above SCLs.

6.2 Former AST Area

In the former AST area, all surface soil that exceeded human health or ingestion/inhalation SCLs was removed for treatment. However, surface soil exceeding migration-to-groundwater SCLs remains to the north of the excavation, and subsurface soil exceeding ingestion/inhalation SCLs (for DRO) remains in one location near the footprint of the former AST, at a depth of approximately 5 ft bgs. DRO concentrations at the north sidewall of the excavation at 3 ft bgs ranged from 1,900 milligrams per kilogram (mg/kg) to 5,050 mg/kg, despite field screening readings below 20 ppm. GRO and BTEX were not detected in these samples, suggesting the diesel was highly weathered and explaining the low PID response.

Complete removal of contaminated soil from this area was not feasible due to space constraints at the treatment site. The horizontal extent of contamination in the AST area was significantly greater than predicted, with contamination extending further north than anticipated. Given the greater horizontal extent of contamination, removal of contaminated surface soil was prioritized over extending the excavation vertically in the source area. This decision was made in coordination and with the approval of the ADEC project manager. The cleanup did succeed in removing surface soil (to at least 4 ft bgs) that exceeded human health or ingestion/inhalation SCLs from the former AST area.

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7.0 RECOMMENDATIONS

While this cleanup successfully mitigated surface soil exposure pathways, contaminated soil remains on site. Excavation of additional contaminated soil from the subsurface is not likely to substantially reduce the risk of exposure to onsite contaminants via direct exposure pathways, given that the presence of the building precludes complete removal of all soil contamination. Potential groundwater impacts remain unknown, though the distribution of soil contaminants and the anticipated depth of groundwater suggest that contaminant migration-to-groundwater is unlikely. Further, with the removal of volatile contaminants above human health or ingestion/inhalation SCLs, inhalation exposure pathways, while potentially complete (for DRO), are also likely to present minimal risk. Therefore, recommendations presented below are focused on ruling out groundwater and air exposure pathways, remediating the contaminated soil that was removed during cleanup, and implementing institutional controls to prevent or minimize the potential for future exposure to remaining contamination.

7.1 Additional Characterization

Given the continued presence of soil above migration-to-groundwater SCLs, additional investigation of the groundwater exposure pathway is warranted. While local utility operators and community leaders have suggested no drinking water wells have been installed in the vicinity of the site, this has yet to be confirmed through a formal well search. We recommend conducting a formal well search to identify whether any drinking water wells are present downgradient of the property. We also recommend installing and sampling a monitoring well near the onsite source areas to identify whether groundwater has been impacted at the site. Ideally, through this approach, groundwater can be eliminated as an exposure concern, and residual soil exceeding migration-to-groundwater SCLs can be left in place.

We also recommend conducting additional air sampling in the building crawlspace and interior to better evaluate the vapor intrusion pathway. Preliminary sampling suggest vapor intrusion is not occurring, but sampling should be repeated under more realistic building use conditions (e.g. when the building is heated and in use, as would be the case in most reuse scenarios). This air sampling should take place prior to or immediately following any future use of the building.

7.2 Phytoremediation Recommendations

A Soil Remediation Plan was included in the WP that provides guidance for ongoing treatment of contaminated soils by phytoremediation, including detailed recommendations for monitoring, maintenance, progress sampling, and closure. In late September 2017, the phytoremediation plots will be fertilized according to recommendations made based on soil nutrient sample results (Appendix F). Also at that time, photos from the game camera overseeing Plot A will be downloaded and reviewed to determine if any disturbances have occurred at the plot.

The Soil Remediation Plan will be revised to include the following additional recommendations:

- Future progress sampling events should include collection of one ISM triplicate from each plot, for analysis of DRO, GRO, BTEX, PAH, and soil nutrients. Specific

sampling methodology will be added to the Soil Remediation Plan so it can stand alone as a guide to future monitoring.

- Site monitoring should be conducted annually to qualitatively evaluate plant growth, monitor the general condition of the site, and check for signs of uncontrolled runoff. Annual monitoring visits should also be used as an opportunity to report to the community on remediation progress and any future activities planned for the site.

An updated version of the Soil Remediation Plan will be included as an addendum to this report, following the late September 2017 site visit.

7.3 Institutional Controls

Institutional controls (ICs) should be implemented to reduce the risk of future exposure to residual contamination at the site. ICs should take into account the potential for the property to be transferred out of state ownership to a local organization, a stated goal of the property owner (ADNR). A deed restriction is one way ADEC and/or ADNR could stipulate property use restrictions for potential future property owners. Additional ICs could include a local ordinance or zoning to protect against residential development of the property and limit the kinds of activities that could be conducted at the property to prevent disturbance of contaminated subsurface soil. Regardless of the ICs selected, they should be implemented with careful coordination between the stakeholder agencies (ADEC/ADNR) and any community entities with which the State may enter into a future property transfer agreement.

In addition to ICs to protect against exposure to residual soil contamination, the ADNR should implement site controls in cooperation with the community to protect against exposure to ACM present in the building interior. Recommendations for ACM management were provided in the PACP. An asbestos management plan should be developed for the building, prior to any future use or redevelopment of the building.

8.0 REFERENCES

Ahtna Engineering Services, LLC (Ahtna), 2016a. *Property Assessment and Cleanup Plan, Former Headstart Building, Ruby, Alaska.* June 13.

Ahtna, 2016b. *Brownfield Property Cleanup Work Plan, Former Headstart Building, Ruby, Alaska.* September.

Alaska Department of Environmental Conservation (ADEC), 2017a. *Oil and Other Hazardous Substances Pollution Control*. Title 18 Alaska Administrative Code, Chapter 75. July 1.

ADEC, 2017b. *Guidance on Developing Conceptual Site Models*. Division of Spill Prevention and Response, Contaminated Sites Program, January.

ADEC, 2017c. *Site Characterization Work Plan and Reporting Guidance for Investigation of Contaminated Sites.* ADEC Division of Spill Prevention and Response, Contaminated Sites Program, March 7.

ADEC, 2017d. *Field Sampling Guidance*. ADEC Division of Spill Prevention and Response, Contaminated Sites Program, August.

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TABLES

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Table 2: Treatment Site Baseline Soil Sample Results
Brownfield Cleanup Report Former Headstart Building
Ruby, Alaska

				Sample ID	16-RBY-BS-01	16-RBY-BS-02	16-RBY-BS-03	16-RBY-BS-04	16-RBY-BS-05
				Description	Treatment area baseline soil samples				
				Sample Depth (ft)	0.5	0.5	0.5	0.5	0.5
				Percent Solids	81.2	79.7	81.3	81.1	79.8
				Headspace PID (ppm)	<1.0	<1.0	<1.0	<1.0	<1.0
				Date Sampled	9/27/2016	9/27/2016	9/27/2016	9/27/2016	9/27/2016
Analyte	Analysis	HH SCL[1]	MTGW SCL[1]	Units					
Benzene	AK101 / 8021B	11,000	22	µg/kg	8.10 U	8.90 U	10.1 U	8.75 U	9.25 U
Ethylbenzene		49,000	130	µg/kg	16.2 U	17.8 U	20.2 U	17.5 U	18.6 U
o-Xylene		57,000	1,500	µg/kg	16.2 U	17.8 U	20.2 U	17.5 U	18.6 U
P & M -Xylene		(total)	(total)	µg/kg	32.4 U	35.6 U	40.3 U	34.9 U	37.1 U
Toluene		200,000	6,700	µg/kg	16.2 U	17.8 U	20.2 U	17.5 U	18.6 U
Gasoline Range Organics		1,400	300	mg/kg	3.24 UB	3.55 UB	2.02 U	1.75 U	1.86 U
Diesel Range Organics	AK102	10,250	250	mg/kg	12.3 UJ	**7.89 JL**	**8.57 JL**	**11.0 JL**	**10.8 JL**

Notes:

Results above MTGW SCLs are **bold** and shaded blue.

Results above HH SCLs are **bold** and shaded orange.

LODs above most stringent cleanup levels **bold** and shaded green.

Detected analytes are in **bold**.

[1]18 AAC 75.341, Tables B1 and B2 (Under 40-inch Zone)

Acronyms and Abbreviations:

ft = feet

HH SCL = human health soil cleanup level

LOD = limit of detection

mg/kg = milligrams per kilogram

MTGW SCL = migration to groundwater soil cleanup level

PID = photoionization detector

ppm = parts per million

µg/kg = micrograms per kilogram

U = The analyte was not detected; value shown is the LOD.

UB = Result considered not detected due to contamination identified at a similar concentration in a corresponding blank sample.

UJ = Analyte was not detected but the listed reporting limit may not be valid due to QC failures or sample-receiving anomalies.

JL = Result qualified as estimated and biased low.

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Table 3: UST Area Excavation Confirmation Sample Results
Brownfield Cleanup Report Former Headstart Building
Ruby, Alaska

				Sample ID	16-RBY-CS-01	16-RBY-CS-02	16-RBY-CS-03	16-RBY-CS-04	16-RBY-CS-05	16-RBY-CS-06	16-RBY-CS-07
				Description	E sidewall	N sidewall	W sidewall	S sidewall	Dup of CS-04	Base of exc.	Base of exc.
				Sample Depth (ft)	3	3	5	4	4	9	10
				Percent Solids	80.5	81.4	79.6	79.2	80.2	75.3	74.4
				Headspace PID (ppm)	7	4	14	315	315		
				Date Sampled	9/27/2016	9/27/2016	9/27/2016	9/27/2016	9/27/2016	9/27/2016	9/27/2016
Analyte	Analysis	HH SCL[1]	MTGW SCL[1]	Units							
Benzene	AK101 / 8021B	11,000	22	µg/kg	10.5 U	9.15 U	13.3 U	10.4 U	10.3 U	10.3 U	12.4 U
Ethylbenzene		49,000	130	µg/kg	21.0 U	18.3 U	26.7 U	**204**	**189**	20.6 U	24.7 U
o-Xylene		57,000	1,500	µg/kg	21.0 U	18.3 U	**200**	**4,600**	**4,350**	**73.2**	**29.6 J**
P & M -Xylene		(total)	(total)	µg/kg	42.0 U	36.6 U	**35.7 J**	**1,030**	**989**	41.2 U	49.4 U
Toluene		200,000	6,700	µg/kg	21.0 U	18.3 U	26.7 U	20.7 U	20.7 U	20.6 U	24.7 U
Gasoline Range Organics		1,400	300	mg/kg	2.10 U	3.66 UB	**5.33 JH**	**153 JH**	**151 JH**	4.11 UB	4.94 UB
Diesel Range Organics	AK102	10,250	250	mg/kg	12.4 U	**7.65 J**	**181**	**32,900**	**33,400**	**20.5 J**	**18.2 J**

Notes:

Results above MTGW SCLs are **bold** and shaded blue.

Results above HH SCLs are **bold** and shaded orange.

LODs above most stringent cleanup levels **bold** and shaded green.

Detected analytes are in **bold**.

[1]18 AAC 75.341, Tables B1 and B2 (Under 40-inch Zone)

Acronyms and Abbreviations:

ft = feet

HH SCL = human health soil cleanup level

LOD = limit of detection

mg/kg = milligrams per kilogram

MTGW SCL = migration to groundwater soil cleanup level

PID = photoionization detector

ppm = parts per million

UST = underground storage tank

µg/kg = micrograms per kilogram

U = The analyte was not detected; value shown is the LOD.

UB = Result considered not detected due to contamination identified at a similar concentration in a corresponding blank sample.

J = Result qualified as estimated because it is less than the limit of quantification.

JH = Result qualified as estimated and biased high.

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Table 4: AST Area Excavation Confirmation Sample Results
Brownfield Cleanup Report Former Headstart Building
Ruby, Alaska

				Sample ID	16-RBY-CS-08	16-RBY-CS-09	16-RBY-CS-10	16-RBY-CS-11	16-RBY-CS-12	16-RBY-CS-13	16-RBY-CS-14	16-RBY-CS-15	16-RBY-CS-16	16-RBY-CS-17	16-RBY-CS-18	16-RBY-CS-19
				Description	N sidewall	N sidewall	E sidewall	W sidewall	S sidewall	Base of exc.	Base of exc.	Base of exc.	Base of exc.	Dup of CS-16	Base of exc.	Base of exc.
				Sample Depth (ft)	3	3	3	3	4	6	6	5	5	5	5	4
				Percent Solids	85.1	76.8	83.2	81.5	80.1	85.9	89.2	90.1	90.2	90.4	88.7	84.6
				Headspace PID (ppm)	19	11	20	16	12	176	162	149	564	564	466	203
				Date Sampled	9/29/2016	9/29/2016	9/29/2016	9/29/2016	9/29/2016	9/29/2016	9/29/2016	9/29/2016	9/29/2016	9/29/2016	9/29/2016	9/29/2016
Analyte	Analysis	HH SCL[1]	MTGW SCL[1]	Units												
Benzene	AK101 / 8021B	11,000	22	µg/kg	8.65 U	11.8 U	9.50 U	11.1 U	10.3 U	9.10 U	7.95 U	8.50 U	**11.6 J**	**11.9 J**	**28.3**	8.75 U
Ethylbenzene		49,000	130	µg/kg	17.3 U	23.7 U	19.0 U	22.1 U	20.5 U	18.2 U	**10.5 J**	**16.0 J**	**980**	**876**	**1,400**	**67.1**
o-Xylene		57,000	1,500	µg/kg	17.3 U	23.7 U	19.0 U	22.1 U	20.5 U	**18.6 J**	**52.7**	**99.7**	**6,410**	**5,530**	**14,700**	**416**
P & M -Xylene		(total)	(total)	µg/kg	34.6 U	47.3 U	38.0 U	44.2 U	41.0 U	**24.1 J**	**55.5 J**	**177**	**9,290**	**8,050**	**20,800**	**257**
Toluene		200,000	6,700	µg/kg	17.3 U	23.7 U	19.0 U	22.1 U	20.5 U	18.2 U	15.9 U	17.0 U	**520**	**477**	**871**	**15.0 J**
Gasoline Range Organics		1,400	300	mg/kg	1.73 U	4.73 UB	3.80 UB	2.21 U	4.10 UB	**5.53 JH**	**8.56 JH**	**18.9 JH**	**429 JH**	**463 JH**	**533 JH**	**38.5 JH**
Diesel Range Organics	AK102	10,250	250	mg/kg	**5,050**	**1,900**	**48.1**	**9.94 J**	**9.23 J**	**121**	**159**	**121**	**7,530**	**8,810**	**15,400**	**713**

Notes:

Results above MTGW SCLs are **bold** and shaded blue.

Results above HH SCLs are **bold** and shaded orange.

LODs above most stringent cleanup levels **bold** and shaded green.

Detected analytes are in **bold**.

[1]18 AAC 75.341, Tables B1 and B2 (Under 40-inch Zone)

Acronyms and Abbreviations:

AST = above-ground storage tank

ft = feet

HH SCL = human health soil cleanup level

LOD = limit of detection

mg/kg = milligrams per kilogram

MTGW SCL = migration to groundwater soil cleanup level

PID = photoionization detector

ppm = parts per million

µg/kg = micrograms per kilogram

U = The analyte was not detected; value shown is the LOD.

UB = Result considered not detected due to contamination identified at a similar concentration in a corresponding blank sample.

J = Result qualified as estimated because it is less than the limit of quantification.

JH = Result qualified as estimated and biased high.

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Table 5: Excavation Confirmation Samples - PAH Results
Brownfield Cleanup Report Former Headstart Building
Ruby, Alaska

				Sample ID	16-RBY-CS-04	16-RBY-CS-05	16-RBY-CS-16
				Excavation	UST area	UST area	AST area
				Description	S sidewall	Dup of CS-04	Base of exc.
				Sample Depth (ft)	4	4	5
				Percent Solids	79.2	80.2	90.2
				Headspace PID (ppm)	315	315	564
				Date Sampled	9/27/2016	9/27/2016	9/29/2016
Analyte	Analysis	HH SCL[1]	MTGW SCL[1]	Unit			
1-Methylnaphthalene	8270D SIM (PAH)	68,000	410	µg/kg	**47,100**	**48,600**	**24,900**
2-Methylnaphthalene		310,000	1,300	µg/kg	**3,190**	**3,240**	**29,600**
Acenaphthene		4,600,000	37,000	µg/kg	1,580 U	1,550 U	275 U
Acenaphthylene		2,300,000	18,000	µg/kg	1,580 U	1,550 U	275 U
Anthracene		23,000,000	390,000	µg/kg	1,580 U	1,550 U	275 U
Benzo(a)anthracene		2,000	280	µg/kg	1,580 U	1,550 U	**239 J**
Benzo(a)pyrene		200	270	µg/kg	1,580 U	1,550 U	275 U
Benzo(b)fluoranthene		2,000	2,700	µg/kg	1,580 U	1,550 U	275 U
Benzo(g,h,i)perylene		2,300,000	15,000,000	µg/kg	1,580 U	1,550 U	275 U
Benzo(k)fluoranthene		20,000	27,000	µg/kg	1,580 U	1,550 U	275 U
Chrysene		200,000	82,000	µg/kg	1,580 U	1,550 U	275 U
Dibenzo(a,h)anthracene		200	870	µg/kg	1,580 U	1,550 U	275 U
Fluoranthene		3,100,000	590,000	µg/kg	1,580 U	1,550 U	**2,700**
Fluorene		3,100,000	36,000	µg/kg	**2,820 J**	**2,780 J**	275 U
Indeno(1,2,3-c,d)pyrene		2,000	8,800	µg/kg	1,580 U	1,550 U	275 U
Naphthalene		29,000	38	µg/kg	1,580 U	1,550 U	**16,000**
Phenanthrene		2,300,000	39,000	µg/kg	1,580 U	1,550 U	5,310
Pyrene		2,300,000	87,000	µg/kg	1,580 U	1,550 U	**345 J**

Notes:

Results above MTGW SCLs are **bold** and shaded blue.

Results above HH SCLs are **bold** and shaded orange.

LODs above most stringent cleanup levels **bold** and shaded green.

Detected analytes are in **bold**.

[1]18 AAC 75.341, Table B1 (Under 40-inch Zone)

Acronyms and Abbreviations:

AST = above-ground storage tank

ft = feet

HH SCL = human health soil cleanup level

LOD = limit of detection

MTGW SCL = migration to groundwater soil cleanup level

PAH = polycyclic aromatic hydrocarbon

PID = photoionization detector

ppm = parts per million

UST = underground storage tank

µg/kg = micrograms per kilogram

U = The analyte was not detected; value shown is the LOD.

J = Result qualified as estimated because it is less than the limit of quantification.

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Table 6: Soil Sample Following Cleanup of Soil in Roadway
Brownfield Cleanup Report Former Headstart Building
Ruby, Alaska

				Sample ID	16-RBY-RS-01
				Description	Road Surface
				Percent Solids	91.3
				Headspace PID (ppm)	11
				Date Sampled	9/27/2016
Analyte	Analysis	HH SCL[1]	MTGW SCL[1]	Units	
Benzene	AK101 / 8021B	11,000	22	µg/kg	5.85 U
Ethylbenzene		49,000	130	µg/kg	11.7 U
o-Xylene		57,000 (total)	1,500 (total)	µg/kg	**10.3 J**
P & M -Xylene				µg/kg	**16.6 J**
Toluene		200,000	6,700	µg/kg	11.7 U
Gasoline Range Organics		1,400	300	mg/kg	2.34 UB
Diesel Range Organics	AK102	10,250	250	mg/kg	**65.0**

Notes:

Results above MTGW SCLs are **bold** and shaded blue.

Results above HH SCLs are **bold** and shaded orange.

LODs above most stringent cleanup levels **bold** and shaded green.

Detected analytes are in **bold**.

[1]18 AAC 75.341, Tables B1 and B2 (Under 40-inch Zone)

Acronyms and Abbreviations:

HH SCL = human health soil cleanup level

LOD = limit of detection

mg/kg = milligrams per kilogram

MTGW SCL = migration to groundwater soil cleanup level

PID = photoionization detector

ppm = parts per million

µg/kg = micrograms per kilogram

U = The analyte was not detected; value shown is the LOD.

UB = Result considered not detected due to contamination identified at a similar concentration in a corresponding blank sample.

J = Result qualified as estimated because it is less than the limit of quantification.

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Table 7: Pre-Treatment ISM Sample Results
Brownfield Cleanup Report Former Headstart Building
Ruby, Alaska

				Sample ID	16-RBY-ISM-01	16-RBY-ISM-02	16-RBY-ISM-03	Plot B	Plot B	16-RBY-ISM-04	16-RBY-ISM-05	16-RBY-ISM-06	Plot C	Plot C	16-RBY-ISM-07	16-RBY-ISM-08	16-RBY-ISM-09	Plot A	Plot A
				Phytoremediation Plot	B	B	B			C	C	C			A	A	A		
				Percent Solids	82.8	82.5	82.5			83.2	83.3	83.2			80.3	80.1	80.2		
				Date Sampled	10/3/2016	10/3/2016	10/3/2016			10/4/2016	10/4/2016	10/4/2016			10/6/2016	10/6/2016	10/6/2016		
Analyte	Analysis	HH SCL[1]	MTGW SCL[1]	Units				%RSD	95% Upper Confidence Limit				%RSD	95% Upper Confidence Limit				%RSD	95% Upper Confidence Limit
Benzene	AK101 / 8021B	11,000	22	µg/kg	8.70 U	8.70 U	8.40 U	2%	8.89 U	8.55 U	8.90 U	9.10 U	3%	9.32 U	33.0	23.7	29.5	16%	**36.7**
Ethylbenzene		49,000	130	µg/kg	193	150	169	13%	**207**	77.6	61.5	103	26%	**116**	421	471	383	10%	**499**
o-Xylene		57,000	1,500	µg/kg	2,070	1,910	1,900	5%	**2,120**	716	602	839	16%	**919**	2,550	2,950	2,150	16%	**3,220**
P & M -Xylene		(total)	(total)	µg/kg	2,810	2,350	2,490	9%	**2,950**	1,090	784	1,310	25%	**1,510**	3,130 JL	3,620 JL	2,720 JL	14%	**3,920 JL**
Toluene		200,000	6,700	µg/kg	90.6	72.6	72.8	13%	**96.1**	27.0 J	22.0 J	27.7 J	12%	**30.8 J**	218	177	164	15%	**234**
Gasoline Range Organics		1,400	300	mg/kg	128 JH	97.8 JH	82.3 JH	23%	**142 JH**	60.7 JH	34.1 JH	79.4 JH	39%	**96.4 JH**	99.5 JH	144 JH	131 JH	18%	**163 JH**
Diesel Range Organics	AK102	10,250	250	mg/kg	8,200	8,080	6,860	10%	**8,960**	2,970	2,870	2,730	4%	**3,060**	9,140	6,940	8,150	14%	**9,930**
1-Methylnaphthalene	8270D SIM (PAH)	68,000	410	µg/kg	10,700	9,320	8,780	10%	**11,300**	3,520	4,110	4,000	8%	**4,410**	31,600	22,900	24,800	17%	**34,100**
2-Methylnaphthalene		310,000	1,300	µg/kg	12,800	6,650	6,820	40%	**14,700**	1,530	2,030	1,620	15%	**2,180**	30,700	21,200	22,300	21%	**33,500**
Acenaphthene		4,600,000	37,000	µg/kg	30.0 U	30.1 U	30.3 U	1%	30.4 U	29.8 U	30.0 U	60.0 U	44%	69.2 U	62.0 U	61.5 U	62.0 U	0%	62.3 U
Acenaphthylene		2,300,000	18,000	µg/kg	30.0 U	30.1 U	30.3 U	1%	30.4 U	29.8 U	30.0 U	60.0 U	44%	69.2 U	62.0 U	61.5 U	62.0 U	0%	62.3 U
Anthracene		23,000,000	390,000	µg/kg	19.3 J	22.4 J	30.3 U	24%	**33.6 J**	29.8 U	30.0 U	60.0 U	44%	69.2 U	62.0 U	61.5 U	43.7 J	19%	**73.3 J**
Benzo(a)anthracene		2,000	280	µg/kg	30.0 U	22.7 J	30.3 U	16%	**34.9 J**	29.8 U	30.0 U	60.0 U	44%	69.2 U	25.3	13.1	14.9	37%	**28.9**
Benzo(a)pyrene		200	270	µg/kg	30.0 U	30.1 U	30.3 U	1%	30.4 U	29.8 U	30.0 U	60.0 U	44%	69.2 U	27.1	20.0	18.9	20%	**29.5**
Benzo(b)fluoranthene		2,000	2,700	µg/kg	38.8 J	44.7 J	30.7 J	18%	**49.9 J**	28.0 J	28.8 J	60.0 U	47%	**69.7 J**	46.9	30.9	32.6	24%	**51.6**
Benzo(g,h,i)perylene		2,300,000	15,000,000	µg/kg	30.0 U	30.1 U	30.3 U	1%	30.4 U	29.8 U	30.0 U	60.0 U	44%	69.2 U	20.1	13.9	14.8	21%	**21.9**
Benzo(k)fluoranthene		20,000	27,000	µg/kg	30.0 U	30.1 U	30.3 U	1%	30.4 U	29.8 U	30.0 U	60.0 U	44%	69.2 U	15.6	8.34	9.52	35%	**17.7**
Chrysene		200,000	82,000	µg/kg	108	121	86.3	17%	**135**	71.0	72.8	69.7 J	2%	**73.8**	47.0	11.9	17.4	74%	**57.3**
Dibenzo(a,h)anthracene		200	870	µg/kg	30.0 U	30.1 U	30.3 U	1%	30.4 U	29.8 U	30.0 U	60.0 U	44%	69.2 U	6.92	4.67 J	4.83 J	23%	**7.59 J**
Fluoranthene		3,100,000	590,000	µg/kg	803	827	604	16%	**951**	482	515	522	4%	**542**	53.9	30.3	37.7	30%	**61.0**
Fluorene		3,100,000	36,000	µg/kg	30.0 U	30.1 U	30.3 U	1%	30.4 U	29.8 U	30.0 U	60.0 U	44%	69.2 U	580	572	686	10%	**720**
Indeno(1,2,3-c,d)pyrene		2,000	8,800	µg/kg	30.0 U	30.1 U	30.3 U	1%	30.4 U	29.8 U	30.0 U	60.0 U	44%	69.2 U	18.7	13.1	14.2	19%	**20.3**
Naphthalene		29,000	38	µg/kg	2,960	598	682	95%	**3,670**	29.8 U	30.0 U	60.0 U	44%	69.2 U	11,800	7,140	7,540	29%	**13,200**
Phenanthrene		2,300,000	39,000	µg/kg	1,110	1,050	984	6%	**1,150**	754	846	910	9%	**969**	371	357	385	4%	**395**
Pyrene		2,300,000	87,000	µg/kg	276	340	206	24%	**387**	219	225	215	2%	**228**	56.8	34.3	48.0	24%	**65.5**

Notes:

Results above MTGW SCLs are **bold** and shaded blue.

Results above HH SCLs are **bold** and shaded orange.

LODs above most stringent cleanup levels **bold** and shaded green.

Note: Only 95% UCL results are highlighted, as these are used for comparison to SCLs.

Detected analytes are in **bold**.

[1]18 AAC 75.341, Table B1 (Under 40-inch Zone)

Acronyms and Abbreviations:

HH SCL = human health soil cleanup level

ISM = incremental sampling methodology

LOD = limit of detection

mg/kg = milligrams per kilogram

MTGW SCL = migration to groundwater soil cleanup level

PAH = polycyclic aromatic hydrocarbon

PID = photoionization detector

ppm = parts per million

RSD = relative standard deviation

µg/kg = micrograms per kilogram

U = The analyte was not detected; value shown is the LOD.

J = Result qualified as estimated because it is less than the limit of quantification.

JH = Result qualified as estimated and biased high.

JL = Result qualified as estimated and biased low.

ISM Calculations were performed using the Student's-t method, with the following formula:

$$UCL = \overline{X} + t_{(1-\alpha)(r-1)} \times \frac{S_{\overline{X}}}{\sqrt{r}}$$

Where:

$\overline{X}$ = arithmetic mean of all ISM samples
$S_{\overline{X}}$ = standard deviation of all ISM samples
r = number of ISM samples
t = $(1-\alpha)^{th}$ quantile of the Student's-t distribution with $(r-1)$ degrees of freedom

Source: Incremental Sampling Methodology, Interstate Technology and Regulatory Council, February 2012

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FIGURES

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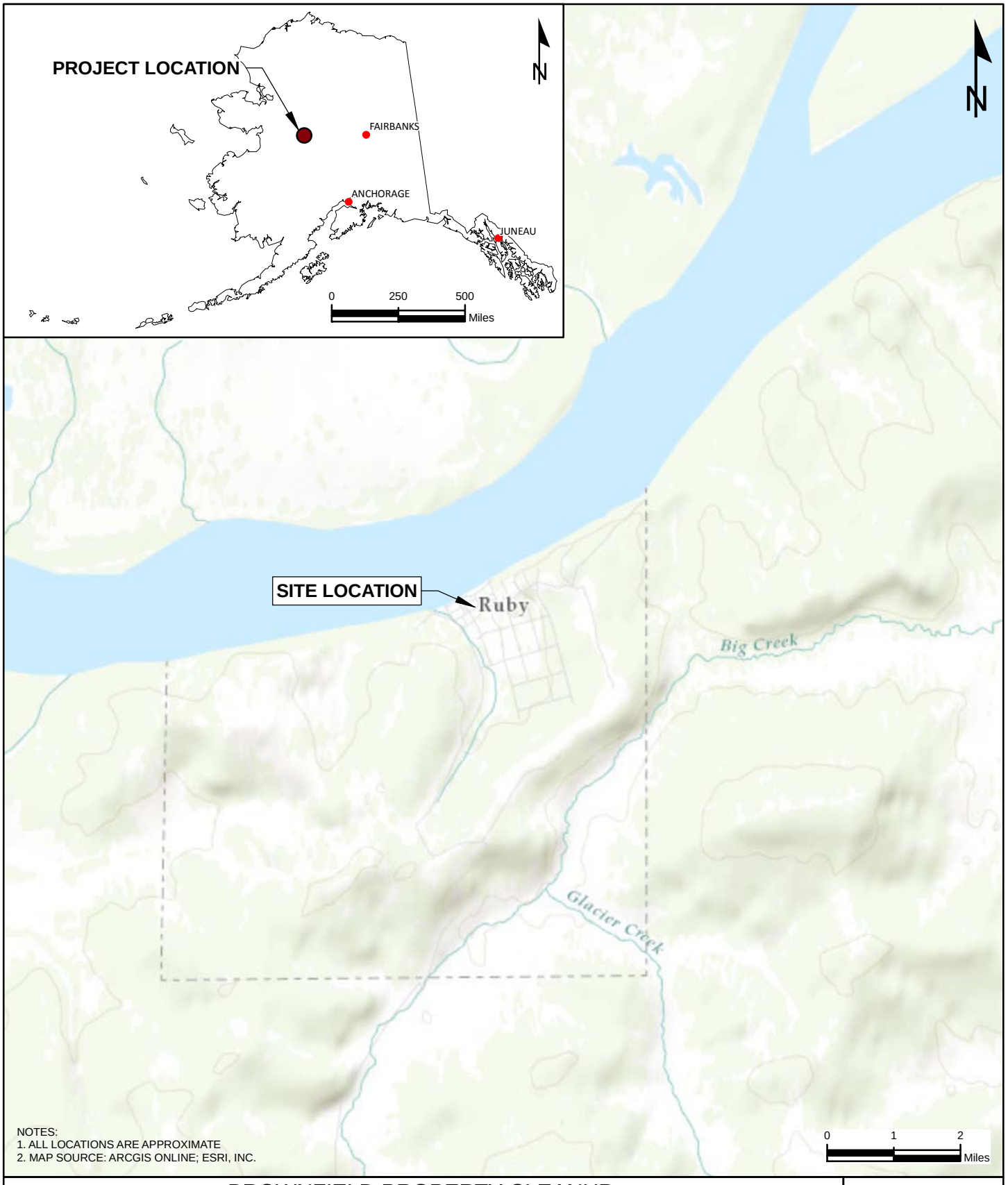

NOTES:
1. ALL LOCATIONS ARE APPROXIMATE
2. MAP SOURCE: ARCGIS ONLINE; ESRI, INC.

BROWNFIELD PROPERTY CLEANUP
FORMER HEADSTART BUILDING
RUBY, ALASKA

Ahtna Engineering Services, LLC

STATE AND SITE VICINITY

Project Number:	Figure Number:
20266.020	1
Date: 3/16/2017	
Drafted By: sfox	

Prepared by sfox, 3/17/2017; C:\Users\sfox\Documents\GIS\RubyPACP\Projects\04_CleanupReport\Fig1_RubyStateVicinity.mxd

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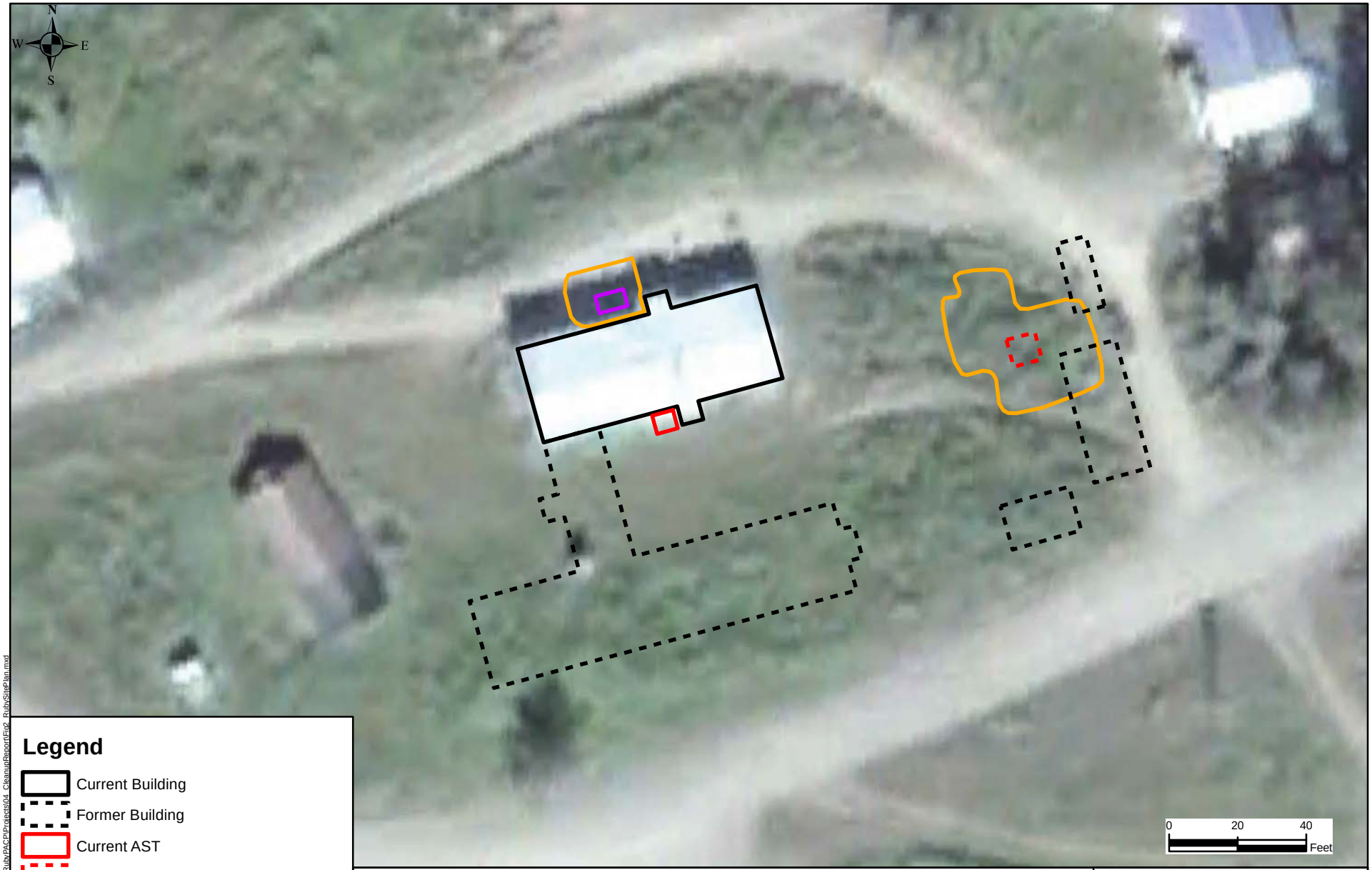

Legend

- Current Building
- Former Building
- Current AST
- Former AST
- UST Location
- 2016 Excavation Boundaries

NOTES:
Aerial image from Google Earth, 2006.

BROWNFIELD PROPERTY CLEANUP
FORMER HEADSTART BUILDING
RUBY, ALASKA

Ahtna Engineering Services, LLC

SITE PLAN

Project Number:	Figure Number:
20266.020	2
Date: 3/29/2017	
Drafted By: sfox	

Document Path: C:\Users\sfox\Documents\GIS\Ruby\PACP\Projects\04_CleanupReport\Fig2_RubySitePlan.mxd

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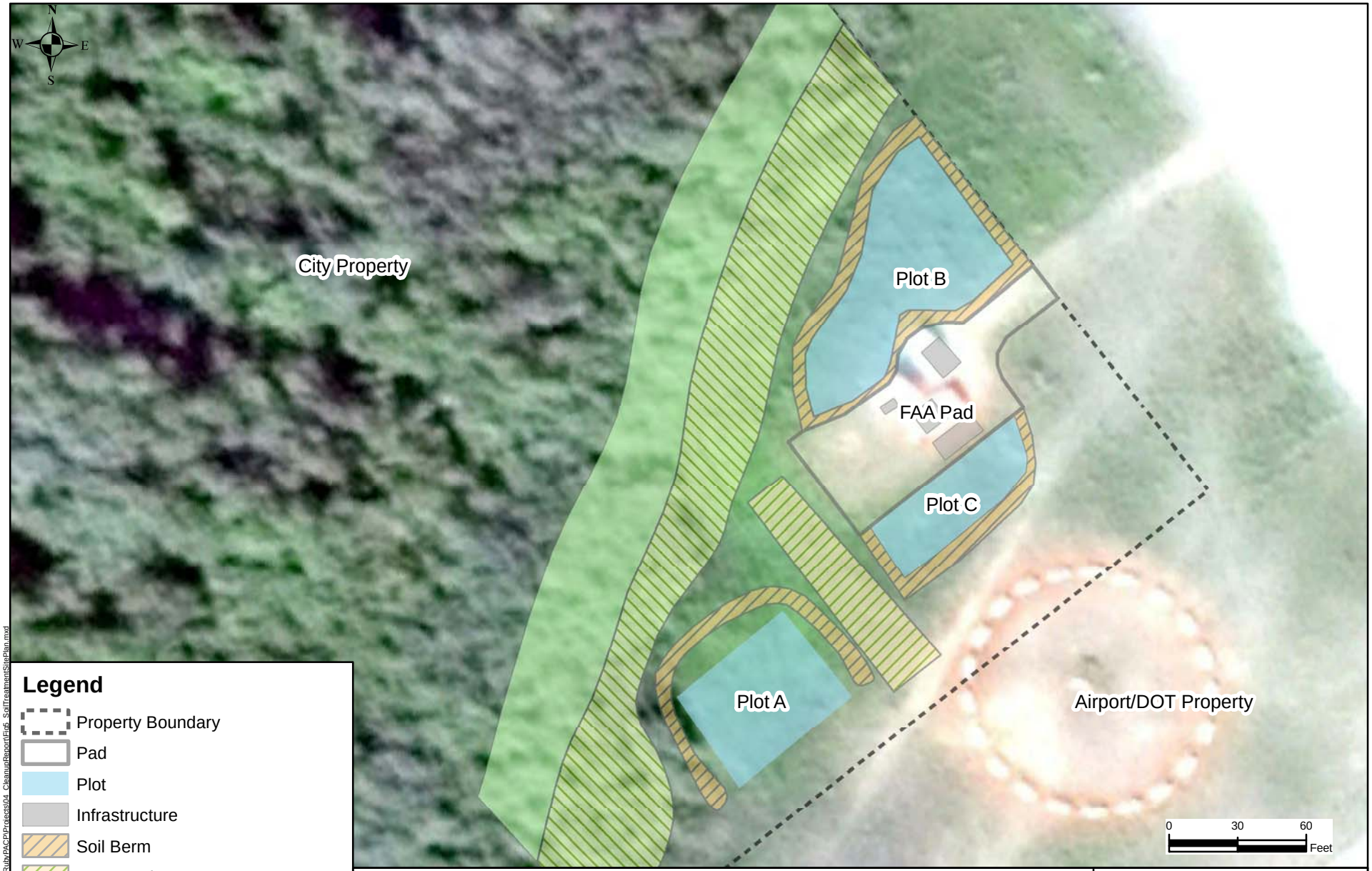

Legend

- Property Boundary
- Pad
- Plot
- Infrastructure
- Soil Berm
- Vegetated Berm
- Steep Slope
- Lower Trail

NOTES:
Aerial image from Google Earth, 2006.

Document Path: C:\Users\sfox\Documents\GIS\Ruby\PACP\Projects\04_CleanupReport\Fig5_SoilTreatmentSitePlan.mxd

BROWNFIELD PROPERTY CLEANUP
FORMER HEADSTART BUILDING
RUBY, ALASKA

Ahtna Engineering Services, LLC

SOIL TREATMENT SITE PLAN

Project Number:	Figure Number:
20266.020	3
Date: 3/17/2017	
Drafted By: sfox	

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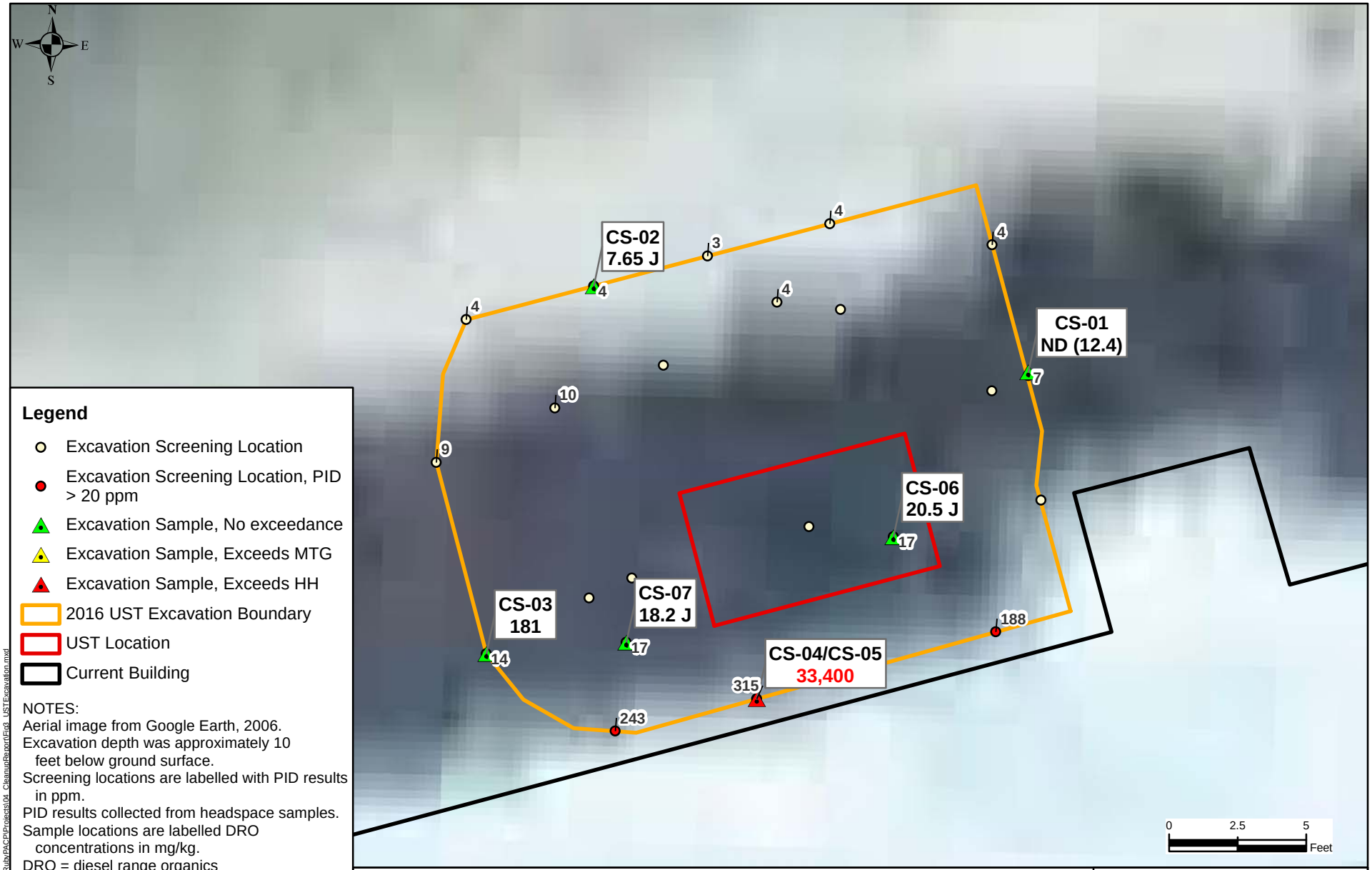

Legend

- Excavation Screening Location
- Excavation Screening Location, PID > 20 ppm
- Excavation Sample, No exceedance
- Excavation Sample, Exceeds MTG
- Excavation Sample, Exceeds HH
- 2016 UST Excavation Boundary
- UST Location
- Current Building

NOTES:
Aerial image from Google Earth, 2006.
Excavation depth was approximately 10 feet below ground surface.
Screening locations are labelled with PID results in ppm.
PID results collected from headspace samples.
Sample locations are labelled DRO concentrations in mg/kg.
DRO = diesel range organics
HH = ADEC Human Health Screening Criteria
mg/kg = milligram/kilogram
MTG = ADEC Migration to Groundwater
PID = photoionization detector
ppm = parts per million
Orange text indicates DRO concentrations exceed MTG criteria.
Red text indicates DRO concentrations exceed HH criteria.

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BROWNFIELD PROPERTY CLEANUP
FORMER HEADSTART BUILDING
RUBY, ALASKA

Ahtna Engineering Services, LLC

UST AREA EXCAVATION

Project Number:	Figure Number:
20266.020	4
Date: 3/29/2017	
Drafted By: sfox	

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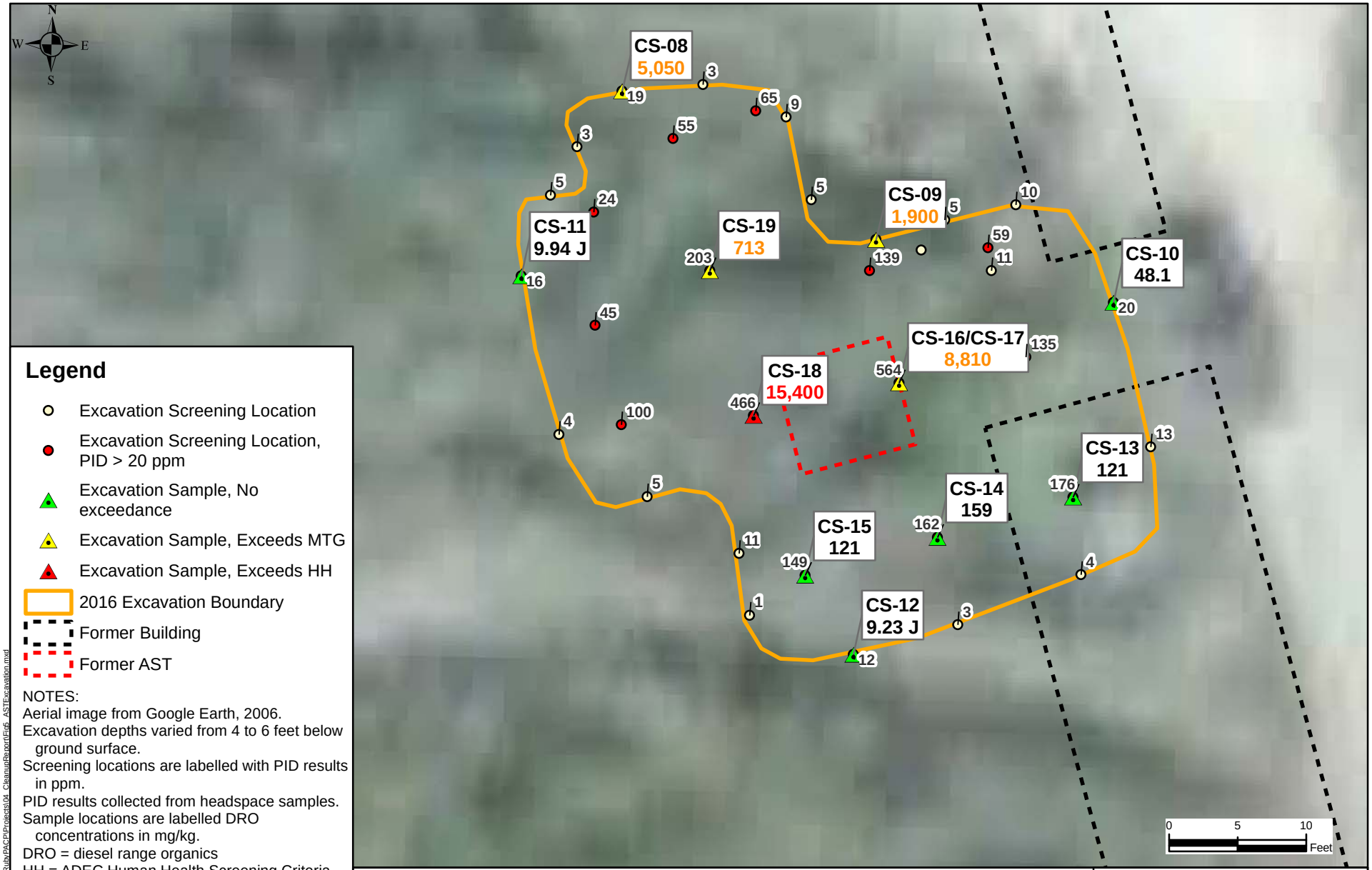

Legend

- Excavation Screening Location
- Excavation Screening Location, PID > 20 ppm
- Excavation Sample, No exceedance
- Excavation Sample, Exceeds MTG
- Excavation Sample, Exceeds HH
- 2016 Excavation Boundary
- Former Building
- Former AST

NOTES:
Aerial image from Google Earth, 2006.
Excavation depths varied from 4 to 6 feet below ground surface.
Screening locations are labelled with PID results in ppm.
PID results collected from headspace samples.
Sample locations are labelled DRO concentrations in mg/kg.
DRO = diesel range organics
HH = ADEC Human Health Screening Criteria
mg/kg = milligram/kilogram
MTG = ADEC Migration to Groundwater
PID = photoionization detector
ppm = parts per million
Orange text indicates DRO concentrations exceed MTG criteria.
Red text indicates DRO concentrations exceed HH criteria.

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BROWNFIELD PROPERTY CLEANUP
FORMER HEADSTART BUILDING
RUBY, ALASKA

Ahtna Engineering Services, LLC

AST AREA EXCAVATION

Project Number:	Figure Number:
20266.020	5
Date: 3/29/2017	
Drafted By: sfox	

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APPENDIX A

ACCESS AGREEMENTS AND APPROVALS

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CITY OF RUBY
P.O Box 68090
Ruby, Alaska 99768
Ph# 907-468-4401
Fax # 907-468-4443

870.38.004

FAX TRANSMITTAL FORM

To: Robert Burgess

From: Jennie Peter
Date: 9/14/16
Number of Pages: 12+ Cover Page

Message: If there is anything else that I can do let me know.

Thank you,
Jennie Peter
Ruby City Clerk

Alaska Department of Environmental Conservation
Contaminated Sites Investigation - 2016

Limited Right of Entry for Hazardous Substances Investigation

STATE OF ALASKA
Project Reference: Hazard ID No: 26137 Database Name: ADNR Former Headstart Building

Permission is hereby granted to the STATE OF ALASKA, Department of Environmental Conservation, its contractors, agents and employees, to enter upon our land in and/or in the vicinity of Ruby ANCSA 14(c) Tract A, Township 9 South, Range 17 East, Kateel River Meridian, for the purpose of treating contaminated soil from cleanup of the Former Headstart Building site in Ruby.

This permission shall include the right to take samples of materials, including but not limited to soil, air and water; to place diesel-contaminated soil on the land and initiate phytoremediation treatment of the soil; to monitor treatment progress through site inspections and sampling; and to bring onto said lands such equipment, personnel, and supplies necessary for the accomplishment thereof.

The State shall take all reasonable precautions to avoid damaging said lands and the appurtenances thereon.

Prior to entering upon land pursuant to this Limited Right of Entry, the State or any of its contractors or employees shall (1) notify the undersigned of the time and place of the anticipated entry, and (2) afford the undersigned an opportunity to have one or more of its officials, employees, agents, or attorneys present during such entry.

This permission shall terminate one hundred twenty (120) months from the date of execution of this Limited Right of Entry, unless extended or previously terminated in writing.

Date: 09/13/16

By: Elizabeth Captain
Signature
circle as applicable: (property owner) operator

By: _____
Signature
circle as applicable: property owner operator

Elizabeth Captain
Printed Name(s)

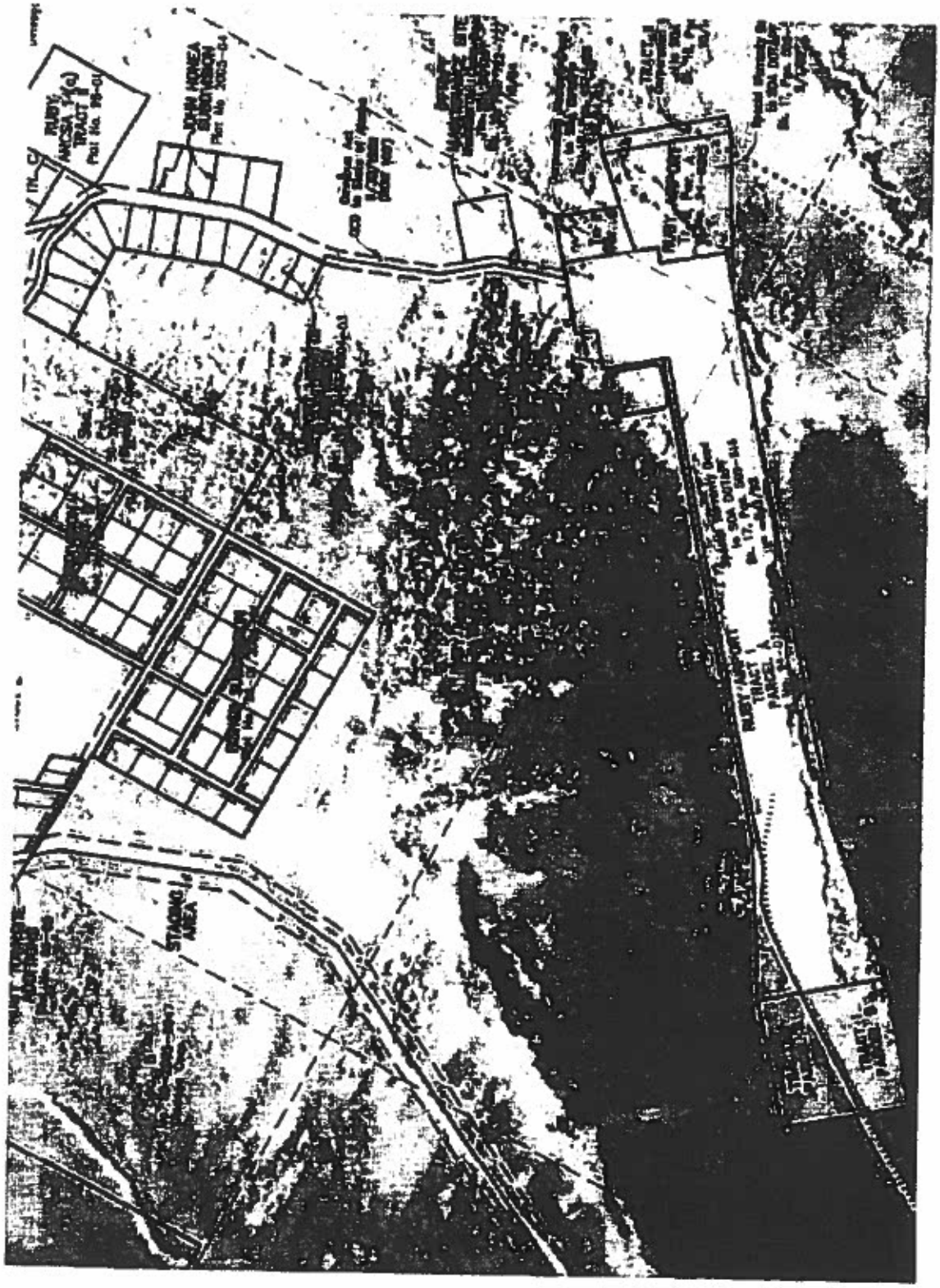
_____

Mailing Address:
P.O Box 90
Ruby, AK 99768

Telephone: 468-4401

Email Address: jennie.hopson@gmail.com

Rev.11/17/2009


STANDARD
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STATE OF ALASKADEPARTMENT OF NATURAL RESOURCES
Division of Mining, Land and Water
Northern Regional Office

MEMORANDUM OF DECISION

Alaska Department of Environmental Conservation
Brownfields Assessment and Cleanup
Ruby Old Head Start Building
Adjudication Summary
LAS 30423

Proposed Actions

The Alaska Department of Environmental Conservation (DEC) requested reissuance of their land use permit (LUP) LAS 30423. Proposed activities were requested by the Department of Natural Resources/Division of Mining, Land and Water (DNR/DMLW) and the Ruby Tribe in their joint request for DEC Brownfield Assessment and Cleanup (DBAC) services to facilitate reuse of the Old Head Start building in Ruby, also known as the old school site. Proposed activities include:

- Removal and disposal of the (reportedly) 500-gallon underground heating oil tank (UST) and its contents.
- Excavation of approximately 500 cubic yards of diesel-contaminated soil from the location of the UST and the former generator building above-ground fuel storage tanks.
- Backfilling and site restoration (smoothing to original grade) with gravel hauled from a local materials source (likely the 3-mile Doyon/Dineega pit)

The DNR/DMLW intends to extend the permit duration and modify it to include the activities described above.

Administrative Record

The administrative record for the proposed action consists of this case file. The administrative record for this case is comprised of this file, LAS 30423, ADL 419968 (documenting actions related to contamination at the site), ADL 419247 (the City of Ruby's recently closed lease application), ADL 403954 (the City of Ruby's expired lease), ADL 79782 (a closed DOT ILMT application with DNR), and ADL 400009 (the file documents a lease between DOT and BLM for the purpose of "legalizing" the Ruby School during the land transfer process).

Authority

This permit is being adjudicated pursuant to Alaska Statutes 38.05.850 (Permits) and 38.05.035(a) (Powers and Duties of the Director), and 11 AAC 96 (Miscellaneous Land Use).

Location and Legal Description

The site is located in the Kateel River Meridian, Township 9 South, Range 17 East, Section 4, at the following coordinates: 64.73923° North Latitude, -155.48927° West Longitude.

The access is via main road into Ruby from the Airport. See Attachment A.

Borough/ Municipality: Ruby is incorporated as a second class city and is not in within a Borough. No municipal lands are impacted.

Regional Corporation: Doyon Regional Corporation. No corporation lands are impacted.

Background

The application and stipulations contained in the resulting Land Use Permit address all State concerns, and the proposed activities will further State objectives of natural resource development and conservation. Therefore, no alternatives to the application were considered.

Agency Review

No agency review was conducted since there were no major changes to the permit.

Public Notice

The City of Ruby, Ruby Tribe, Ruby Village Corporation (Dineega), and community members have been involved in project meetings and project work over the past year and have helped guide the approach to the overall project. As a result, additional public notice is not necessary at this time.

Environmental Risk

The environmental risks associated with this project are primarily from fuels, lubricants, and other fluids that may drip from vehicles that are associated with the project and from the drained UST during removal. These volumes should be low, and the site will be inspected to ensure that any spills or contaminants are cleaned up.

Performance Guaranty and Insurance

As the DEC is a state agency that is self-insured and bonded, and as the state government guarantees compliance with statues and regulations, no performance guarantee or insurance will be required.

Permit Fees

The permit will be issued to DEC, a state agency. Pursuant to 11 AAC 05.010(c), the fee is waived for state agencies upon demonstration that the waiver is in the public interest. Authorizing activities related to assessment and cleanup of contamination associated with past operations at the site in the public interest.

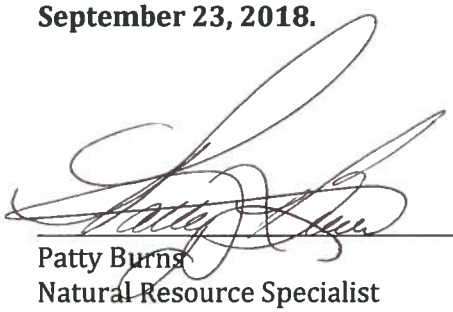
Discussion

During 2015 and 2016 DEC's contractor successfully conducted DBAC services to determine the magnitude and extent of contamination and develop a corrective action plan that will facilitate reuse of the Old Head Start building in Ruby. In the process, contamination posing a potential risk to human health and the environment was identified. As a result, DNR/DMLW and the Ruby Tribe requested and received additional DBAC services to continue work on site to remove contamination and facilitate its reuse.

DEC proposes to remove a UST and excavate associated contaminated and additional contaminated soil elsewhere on site and restore the site to its original grade. Contaminated soil will be phytoremediated off-site on land owned by the City of Ruby. DEC has negotiated an access agreement for the phytoremediation plot.

Adjudicator Recommendation

The current proposed activities will further state objectives of natural resource development, conservation, and enhancement. Therefore, no alternatives to the application were considered. It is my recommendation to extend permit LAS 30423 to DEC for assessment and cleanup work on state-owned land through **September 23, 2018.**



September 23, 2016

Patty Burns — Date
Natural Resource Specialist

Appeal

A person affected by this decision may appeal it in accordance with 11 AAC 02. Any appeal must be received within 20 calendar days after the date of "issuance" of this decision, as defined in 11 AAC 02.040(c) and (d) and may be mailed or delivered to the Commissioner, Department of Natural Resources, 550 W. 7th Avenue, Suite 1400, Anchorage, Alaska 99501; faxed to 1-907-269-8918, or sent by e-mail to dnr.appeals@alaska.gov. This decision takes effect immediately. If no appeal is filed by the appeal deadline, this decision becomes a final administrative order and decision of the department on the 31st calendar day after issuance. An eligible person must first appeal this decision in accordance with 11 AAC 02 before appealing this decision to the Superior Court. A copy of 11 AAC 02 may be obtained from any regional information office of the Department of Natural Resources.

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9.15.16 3130.2R DEC

THE STATE of ALASKA
GOVERNOR BILL WALKER

Department of Environmental Conservation

DIVISION OF SPILL PREVENTION AND RESPONSE
Contaminated Sites Program

610 University Ave
Fairbanks, AK 99709-3643
Main: 907-451-2143
Fax: 907-451-5105

File No: 870.57.002
870.38.004

September 12, 2016

Ms. Judith E. Bittner
State Historic Preservation Officer
Office of History and Archeology, Department of Natural Resources
550 West 7th Avenue, Suite 1310
Anchorage, AK 99501

Re: Corresponding remediation plot for the Ruby Former Headstart Building; Ruby, Alaska

Dear Ms. Bittner:

The Alaska Department of Environmental Conservation (DEC) has received a determination of "no historical properties affected" for the Former Ruby Headstart Building in Ruby, Alaska. However, the cleanup plan for contaminated soil at this property recommends excavation of soil followed by off-site remediation (plant based soil remediation) in order to reduce contaminant concentrations in the soil to acceptable levels. Funding for this project is from the United States Environmental Protection Agency. For purposes of the National Historic Preservation Act, we are initiating this consultation with you to assist us in identifying historic properties that may be affected by the off-site remediation plot.

The subject site is located within the Section 4, Township 9 South, Range 17 East, Kateel River Meridian. The legal description of the site is Ruby ANCSA 14(c) Tract A. The latitude and longitude of the site are 64.7302 and -155.4637, respectively. The City of Ruby owns the property. The location in question is adjacent to the air strip, and is roughly outlined in red on the attached property map (figure 1.) The remediation plot area is approximately 100x150 feet in size.

In 2015, DNR and the Ruby Tribal Council applied for a second DEC Brownfield Assessment & Cleanup service, this time with the intent to follow through on the recommendation in the Property Assessment and Cleanup Plan. At this time, AHTNA and DEC are planning the cleanup activities, which included locating a piece of land that is suitable for a phytoremediation plot. We believe this site owned by the City of Ruby is suitable for this purpose.

No Historic Properties Affected SHPO
Alaska State Historic Preservation Officer
Date: 9.15.16 File No.: 3130-2R DEC
Please review: 36 CFR 800.13 / A.S. 41.35.070(d)

2016-01226

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

Transport, Treatment, & Disposal Approval Form for Contaminated Media

DEC HAZARD/SPILL ID #	NAME OF SPILL OR CONTAMINATED SITE	
26137	Ruby Former Headstart Building	
SITE OR SPILL LOCATION		
Lot 3, Block 4, Tract A, US Survey 5088, Section 4, Township 9S, Range 17E		
CURRENT LOCATION AND TYPE OF CONTAMINATED MEDIA		**SOURCE OF THE CONTAMINATION**
soil, in situ, yet to be excavated		leaking heating oil UST and AST
COMPOUNDS OF CONCERN	**ESTIMATED VOLUME**	**DATE(S) GENERATED**
GRO, DRO, BTEX, naphthalene	500 cys	September 2016
POST TREATMENT ANALYSIS REQUIRED *(such as GRO, DRO, RRO, BTEX, and/or Chlorinated Solvents)*		
DRO, GRO, BTEX, PAHs		
COMMENTS		
Soil to be phytoremediated, See Former Headstart Building Brownfield Property Cleanup Work Plan (Ahtna Engineering Services, September 2016)		

Facility Accepting the Contaminated Media

NAME OF THE FACILITY	PHYSICAL ADDRESS/PHONE NUMBER
Phytoremediation Cell (adjacent to Ruby Airstrip)	Ruby ANCSA 14(c) Tract A, Township 9 South, Range 17 East, Kateel River Meridian / 907-468-4401

Responsible Party and Contractor Information

BUSINESS/NAME	ADDRESS/PHONE NUMBER
RP: Alaska Dept. of Natural Resources	3700 Airport Way, Fairbanks, AK 99709 / 907-451-3014
Contractor: Ahtna Engineering Services	1896 Marika Road, Suite 8, Fairbanks, AK 99709 / 907-374-4750

Andrew Weller, PE
Name of the Person Requesting Approval (printed)

Andrew J Weller
Digitally signed by Andrew Weller
DN: cn=Andrew Weller, o=Ahtna Engineering, ou, email=aweller@ahtna.net, c=US
Date: 2016.09.26 08:28:30 -08'00'
Signature

Engineer, Ahtna Engineering Services
Title/Association

9/26/16
Date

907-374-4750
Phone Number

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

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

Robert A. Burgess
DEC Project Manager Name (printed)

EPS III
Project Manager Title

Robt A. Burgess
Signature

9/23/16
Date

(907) 451-2153
Phone Number

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APPENDIX B

FIELD NOTES

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Ruby Farmer Headstart Cleanup

07:20 Met Tom Ginn at Wrights
07:30 Checked in at Wrights
08:30 Flew FAI → TAL
Stuck in TAL for ~1 hr waiting for fog to clear in RBY
~11:30 Arrived in RBY
Met Shaelene at the tribal offices. Rented her pickup. Brought gear to site.
Looked at proposed treatment site at the airport. Smaller area than we expected is level. FAA pad encroaches on treatment area.
Met Butch - airport maint. contractor - at the treatment site. He has no problems with the plan. Andrew contacted Rusty Karella of FAA, who noted approx. locations of their buried cable. We located a marker likely for their cable running

Scale: 1 square = _____

to their ⊠ runway approach lights and will avoid the area. Andrew is shipping a cable locator out so we can verify the cable location if we need to expand the treatment plot.
~16:00 Met Gary at the site. Went over approach to the treatment site prep.
~1620 Checked in at B&B
~1640 Met Gary back onsite he began grading the treatment site, just removing the top 2-3 inches & veg to build berms.
~1736 Gary almost done, bermed area is ~65×85 ft. There is another area ~60×110 ft. triangle just N of FAA pad that could be developed and used
1800 Dinner break

Scale: 1 square = _____

Rite in the Rain

Ruby Former Headstart Cleanup (9/26 ROG)

1400 Swapping trucks. Shadene's heater on her truck is not working. Heading to site to sort through equipment and sample kits.

1430 Done for the day.

9/27/16 ROG

0800 Met on site. Safety briefing with Tom, Gary, and crew. See daily form

0845 Calibrating PID

0900 Beginning excavation to uncover top of tank. Removed 1 load of contaminated soil from former test pit location. Removed four loads, exposed both ends of tank, SW face of tank.

1000 Encountered vent pipe, completely free of tank

Scale: 1 square = _____

Load Log

Load #	Time	Vol. (cy)	PID (in-situ)
01	0900	~10	280
02	0915	~10	126
03	0925	~10	112
04	~0940	~10	196

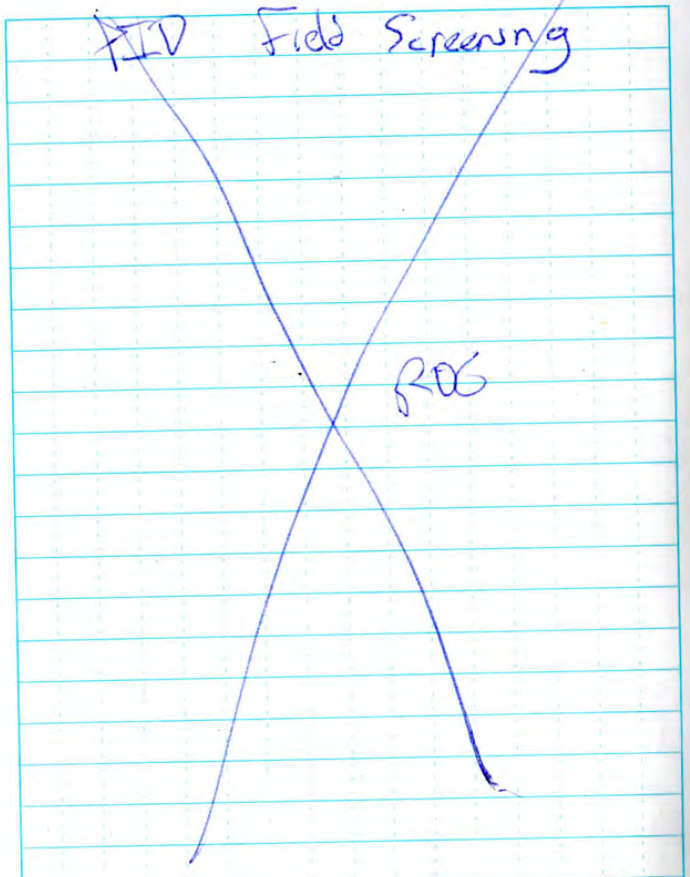
0900 Grabbing baseline samples from treatment site area before dumping first load - PID screened grid on ~15 ft centers All <1 ppm (in-situ). Collecting analytical samples

Sample	Depth (ft)	PID (ppm)	Time
16-RBY-BS-01	0.5	<1	0905
16-RBY-BS-02	0.5	<1	0906
16-RBY-BS-03	0.5	<1	0907
16-RBY-BS-04	0.5	<1	0908
16-RBY-BS-05	(dup. of -04)		0910

Scale: 1 square = _____

Rite in the Rain

PID Field Screening



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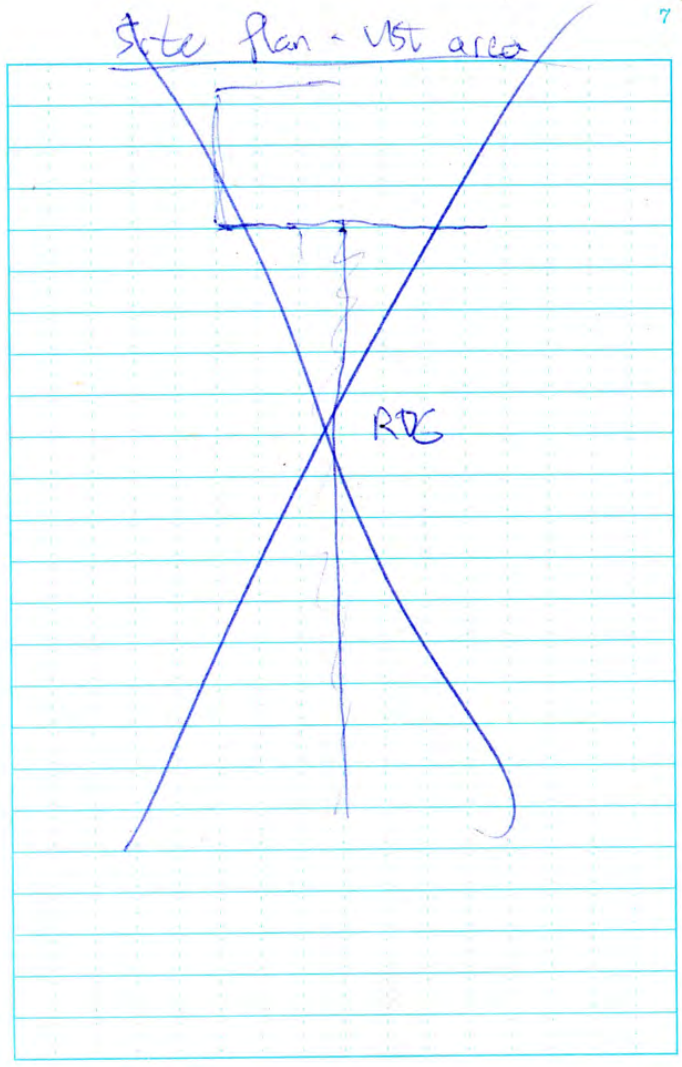
Site plan - UST area



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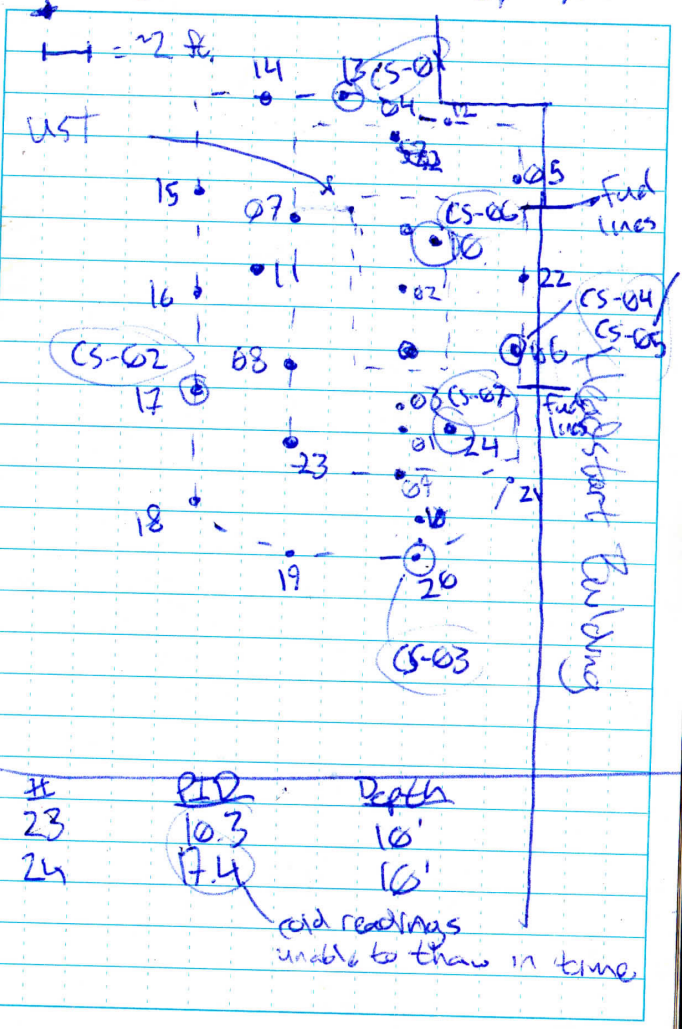
Ruby Headstart 9/27 RDG

PID Field Screening

Headspace

Sample #	PID (ppm)	Depth
01	389	~3 ft.
02	396	~4 ft.
03	95.6	~8 ft.
04	57.2	~8 ft.
05	188	
06	315	
07	134	~8 ft.
08	190	~8 ft.
09	157	~6 ft.
~~10~~	~~32.5~~	~~6 ft.~~ RDG
10	17.4	~9 ft. (Frozen)
11	3.8	~9 ft.
12	32.5	~6 ft.
13	7.1	~5 ft.
14	3.5	
15	3.8	
16	2.8	
17	4.4	
18	4.0	
19	9.3	
20	14.2	
21	243	
22	108	

Scale: 1 square = _____



#	PID	Depth
23	10.3	16'
24	7.4	16'

cold readings unable to thaw in time

Scale: 1 square = 2 ft.

Ruby Headstart 9/27/16 RDC

Hand digging to tank top
~1005 Exposed vent pipe hole in tank. No signs of damage from vent pipe caving ~~off~~. It was already ~~off~~ most likely. Tank is full to the top, diesel at surface. Soaked up free fuel with sorbents.
Fuel to 2.7 ft., fuel/water to 3.0 ft., water to 3.8 ft., sediment at bottom.
Gary and Tom got 2x 275-gal. tanks from the Tribe.
Gary running to get compressor.
Top of tank is at 4.5 ft bgs
Tank is ~5 ft diameter and ~6 ft long
Pumped ~375 gal. of diesel from tank into 275-gal IBC tanks on site.
1130 Tom grabbing third tank

Scale: 1 square = _____

~1210 Pumped out remaining fluids from the tank into 3rd IBC
~100 gal. water + 50 gal. more diesel
1215 Lunch break
1300 Arrived back on site
Resuming excavation around the tank. Digging to below the tank on the NW side
Hand-dug soil from on top of tank. Tank is bedded in moss

Load log cont.

Load #	Vol (cy)	Time	PID (ppm)
5	~10	1305	75
6	~10	1315	156
7	~10	1330	195
8	~10	1345	82
9	~10	~1400	120
10	~10	1420	157
11	~10	1440	50.6
12	~10	1458	27.2
13	~10	1500	32.5
14	~10	1515	51.2

Scale: 1 square = _____

Rite in the Rain

1310 Multi RAE shuts off during bootup sequence. Charged all night last night. Not sure what's wrong. Will pull tank but won't do any cutting until we can verify O%LEL

1350 Pulled tank and placed in containment on site to the SE of bldg. Continuing excavation. Soil is frozen at 8-9 ft.

1500 Began to prep for confirmation sampling. Final excavation area is ~15' x 17', ~9' deep. Per ADEC FSG, need 4 sidewall samples and 2 base-of-excavation samples

1505 Learned from Gary that ~~lost load~~ driver of load 12 lost ~1 cy of soil from an unlatched tailgate on the road near site

Scale: 1 square = _____

1520 Gary removing spilled pile from roadway, will field screen and sample it later.

Resumed sidewall field screening 1 FS per min. 10 ft.

Confirmation Sampling

Sample ID	Depth	Time	Soil
16-RBY-CS-01	~3	1545	brn silt trc. veg.
16-RBY-CS-02	~3	1550	" "
16-RBY-CS-03	~5	1555	
16-RBY-CS-04	~4	1600	
16-RBY-CS-05	dup. of CS-04	1605	
16-RBY-CS-06	~9	1608	
16-RBY-CS-07	~10	1612	

1620 Finished confirmation sampling, began backfilling the excavation.

Tom is running the excavator compacting & spreading backfill with the excavator bucket

Scale: 1 square = _____

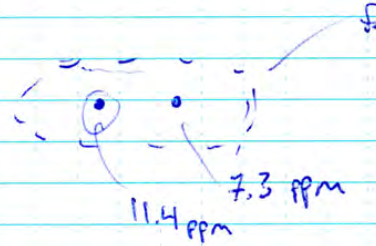
Rite in the Rain

Back fill truck load log

Load #	Vol. (cy)	Time
01	~10	1628
02	~10	1625
03	~10	1640
04	~10	1650
05	~10	1710
06	~10	~~1730~~ 1720
07	~10	~~1740~~ 1730
08	~10	1740
09	~10	1750
10	~10	1800
11	~10	1805

Scale: 1 square = _____

1655 Headed up to field screen and sample location in the road where ~1 cy of soil fell out of the dump truck. Collected 2 field screening samples.



Gary scraped the area and scooped up soil with loader. Collected analytical sample from location w/PID = 11.4 ppm

Sample ID	Depth	Time
16-RBY-RS-01	0-2 in.	1705

Went up to check on treatment site while Tom coordinates the backfill

Scale: 1 square = _____

9/27/16 ROC Ruby Headstart

1800 Finished backfilling
Roughly graded site.
Didn't need last two loads,
stockpiled for tomorrow.
1830 Dinner break
~1930 Headed out Ruby-Poorman
road to look for willow
cutting areas. Only found
one area of moderately dense
S. Alaxensis at 16 mi.,
turn around at ~15 mi.
~2000 At airport, used cable locator
to locate phone and power lines
coming onto FAA pad. Both run
along ~~the edge of~~ ROC NW edge
of gravel driveway into the pad.
No lines run off pad to the N.
Unable to locate PAPI/REIL lines
as the hookups were in a secure
monument

Scale: 1 square = _____

9/28/16 ROC Ruby Headstart

0800 Called Gary, he wants to
wait to resume excavation
until rain stops.
Weather - ~45°F, raining, overcast
Tom and I went down to the
site to clean and cut the
tank. MultiRAE working after
a full night on the charger.
Measured LEL in tank using
long tubing extension.
Reading = 0% LEL
Cut access hole in uphill side
of tank using hot-saw.
Cut access hole in downhill side.
Using a pitcher, scooped remaining
~2-3 gal. of oily water into
bung-top drum. Scooped sludge
into open-top drum with sorbents.
Cleaned tank by scraping sludge
to one end with a shovel, then
scooping and mopping up with
sorbents. Once tank was
free of sludge and liquids, we
moved it out of containment
for cutting.

Scale: 1 square = _____

~1000 Using hot-saw, cut tank into 2-ft. sections (x3) Further cleaned inside of the tank using sorbents. Baled water from containment into bung-top 55-gal. drum.

1100 Lunch break

1205 Dropped Tom off at plane for Fairbanks, shipped out cable locater. ~~Fred is last ROG~~ ~~night~~ ROG

1230 Returned to site to begin treating water from tank through GAC filter. Pumped off more of the diesel layer from the mixed tank first. ~400 gal. of diesel recovered total. Set up GAC filter with outlet hose running to vegetated area on site to the N of building. Set pump to bottom of tank in water layer, began pumping through GAC filter. Slow.....

Scale: 1 square = _____

1330 Strong SW wind picking up. Calling guys on Tribe's list of laborers

Melvin Captain - 371-8753
left message

Allen McCarty 468-4473
left message

William Captain 468-1069
on board for next week!

Eric Peters 328-9618

Melvin called back, he's in.

1500 Done treating as much water as can reasonably be separated from oil layer. Pumping remaining liquids into 55-gal. drum.

1530 Finished transferring oil/water. Ran up to treatment site, flagged off the area with caution tape and stakes.

1626 Dump run

1706 Dinner break

1830-1930 Back on site to clean up and label drums

Scale: 1 square = _____

Weather - ~35°F, clear

0730 Calibrated PID, reading = 1000 ppm

0800 On site prepping equipment

Gary & crew came down, said the treatment site from yesterday access trail is too wet & muddy. Need to develop second plot to the N of the FAA pad. Gary is going to get a couple loads of gravel to build ramp off of FAA pad & driveway to protect the buried cable along the edge.

0830 Gary prepped new site with dozer. Decided to back trucks directly off ramp over land to the treatment site, avoiding buried cable altogether.

- Safety meeting with crew while Gary prepped site

0930 Began excavating AST area at the site. Delineating horizontal extent to 4 ft bgs first

Scale: 1 square = _____

AST Area - Load Log

Load	Vol (cy)	Time	PID sample # ~~PID (ppm)~~
(1st truck) 1	~10	0937	25
(driving truck) 2	~10	0945	26
3	~10	0957	27
4	~10	1005	28
5	~10	1020	29
6	~10	1025	30
7	~10	1036	31
8	~10	1040	32
9	~10	1054	33
10	~10	1106	34
11	~10	1118	34
12	~10	1123	34
13	~10	1135	35
14	~10	1146	36
15	~10	1200	36
Lunch			
16	~10	1305	–
17	~10	1310	–
18	~10	1344	37
19	~10	1350	–
20	~10	1420	–
21	~10	1440	–
22	~10	1445	–

Scale: 1 square = _____

Rite in the Rain

9/29/16 RDC Ruby Headstart

PID field screening (headspace)

Sample	Depth (ft.)	PID (ppm)	vapor
25	~3	229	477
26	~3	308	468
27	~4	204	357
28	~3.5	59.4	160
29	↓	178	313
30	↓	184	267
31	~3	69.0	206
32	~3	110	214
33	~3	86.8	123
34	~3	97.0	207
35	~3	214	245
36	~3	133	236 — lunch
37	~3	154	weather warmed up
38	~3.5	196	~50°F

~1068

Plots B and C Field screened on 15-ft. centers. All readings less than 1 ppm.
Truck drivers starting to dump at W end of Plot B first, will use Plot C if needed.

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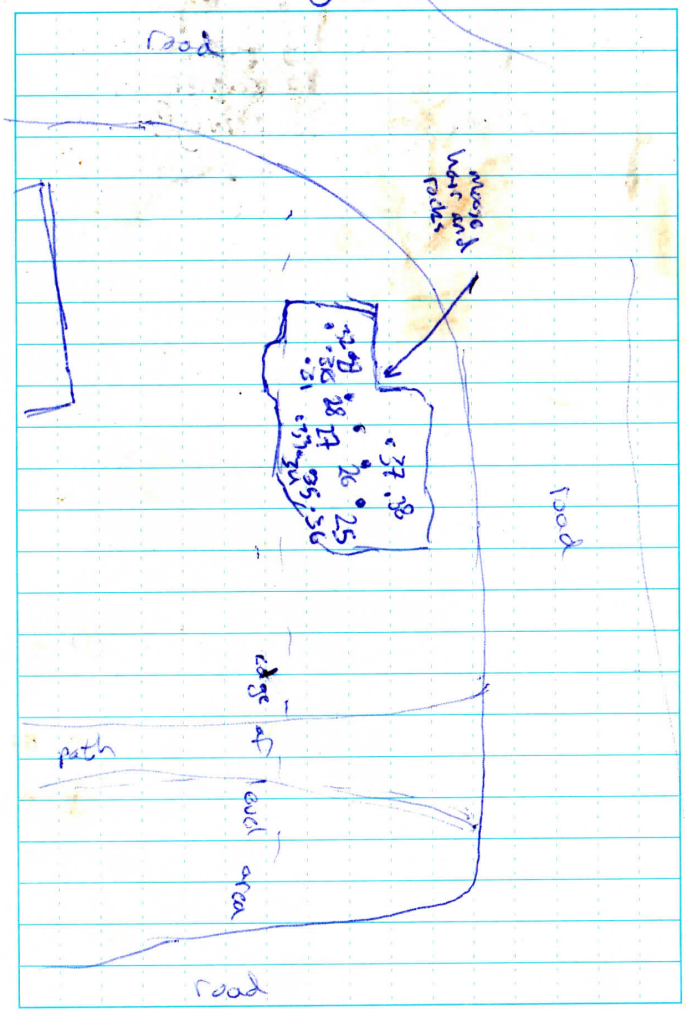


Scale: 1 square = n.t.s.

~1000 Encountered big rocks and moose hair in one corner of excavation. Old privy?

~~1200~~ 1230 Ran up to look at treatment plot with ~~[illegible]~~ Gary. Starting to fill up. ~~[illegible]~~ Old spot still too muddy. Think we can fit another 10 loads in current spot. May need more space.

1330 Called and spoke with ADEC PM Robert Burgess. Informed him AST area is looking like 500 cy alone and complete excavation to 10 ft. may not be feasible given space constraints at treatment site. He directed us to remove all surface contamination to 4 ft. and to remove what we could fit at the treatment site. Continuing excavation of surface soil to the SE.

~1410 Began sidewall confirmation field screening. In-situ screening 2 ft. intervals, headspace sample from hottest interval
Excavation depth varies from 4-6 ft., considering excavation to have 4 sidewalls although some are staggered
SW, NW, NE, and SE

1430 Removing hot spot at 506, 507 now clean (510, 511)

1445 began sampling SW sidewall 2 samples to be conservative

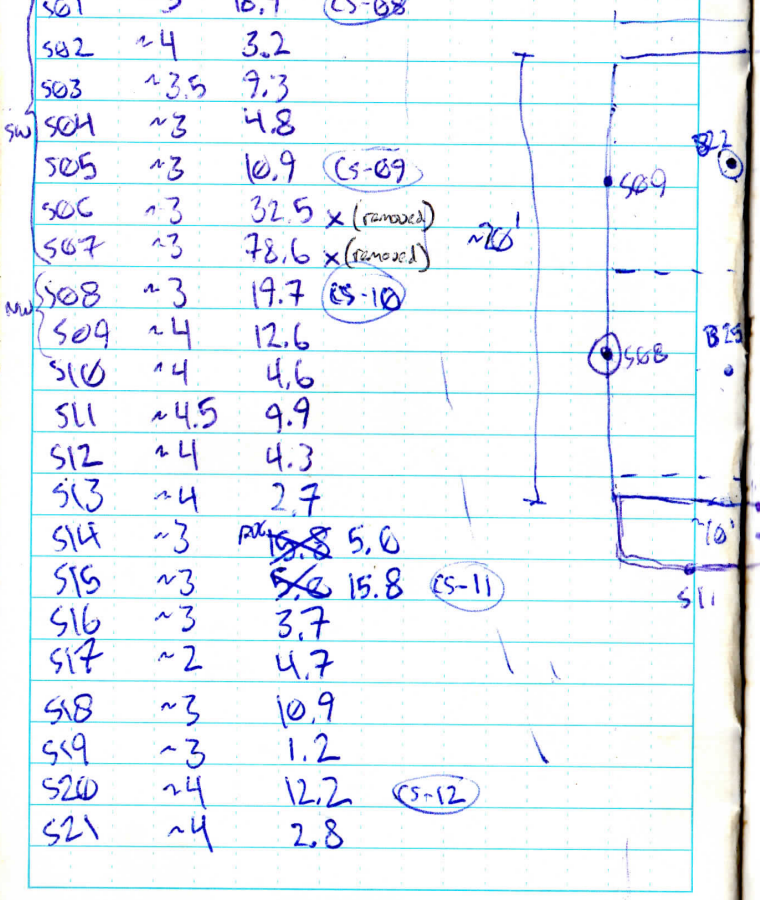
1510 Ran up to check on stockpiles ~~At~~ Both areas are full. 2 more loads coming, will fit on second area just barely.

1530 Back to excavation. Marked out 10' x 10' grid for base-of-excavation field screening
Base of excavation is about 1,100 ft^2 = 6 conf. samples + 1 dup.

9/29/16 Ruby Headstart RDG

Sidewall/base Field screening

Sample	Depth (ft)	PID (ppm)	
SW	S01	~3	18.9 (CS-08)
	S02	~4	3.2
	S03	~3.5	9.3
	S04	~3	4.8
	S05	~3	10.9 (CS-09)
	S06	~3	32.5 x (removed)
	S07	~3	78.6 x (removed)
NW	S08	~3	19.7 (CS-10)
	S09	~4	12.6
	S10	~4	4.6
	S11	~4.5	9.9
	S12	~4	4.3
	S13	~4	2.7
	S14	~3	~~15.8~~ 5.6
	S15	~3	~~5.6~~ 15.8 (CS-11)
	S16	~3	3.7
	S17	~2	4.7
	S18	~3	10.9
	S19	~3	1.2
	S20	~4	12.2 (CS-12)
	S21	~4	2.8



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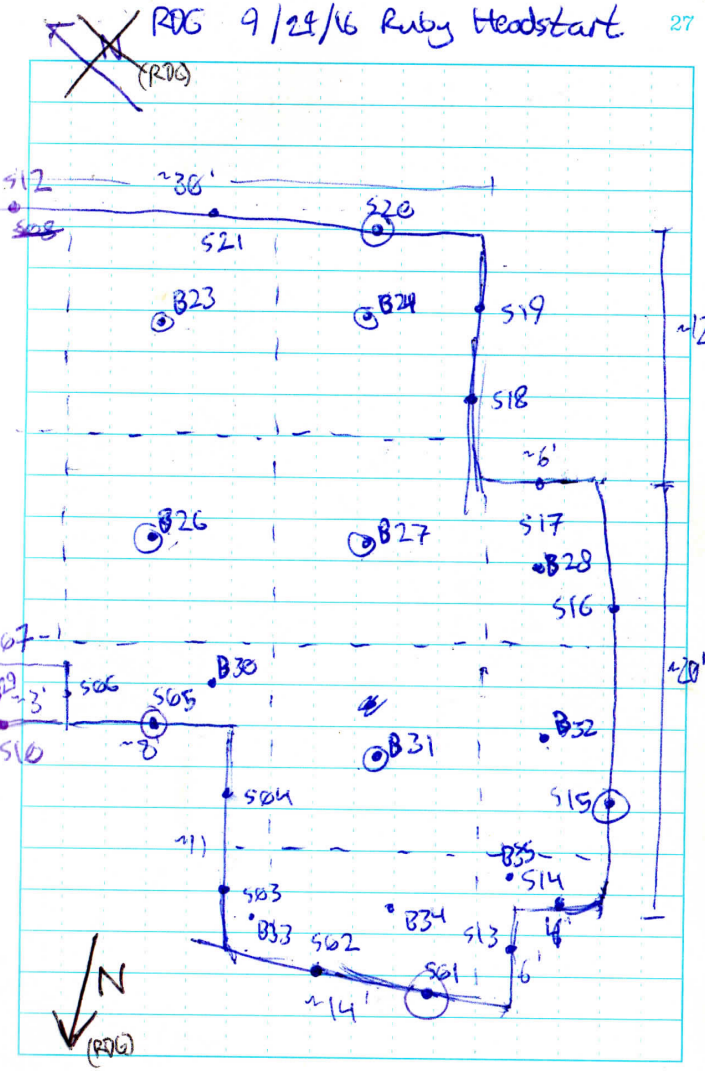
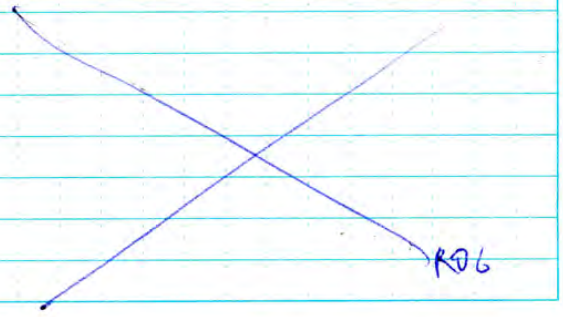


Scale: 1 square = 2 Ft.

AST Area Confirmation Sampling

Sample ID	Depth (ft)	Time	PID Sample
16-RBY-CS-08	3	1445	501
16-RBY-CS-09	3	1450	505
16-RBY-CS-10	3	1455	508
16-RBY-CS-11	3	1505	515
16-RBY-CS-12	4	1550	520
16-RBY-CS-13	6	1600	322
16-RBY-CS-14	6	1602	323
16-RBY-CS-15	5	1604	324
16-RBY-CS-16	dup. of CS-17	Time: 1606	
16-RBY-CS-17	5	1608	326
16-RBY-CS-18	5	1610	327
16-RBY-CS-19	4	1612	331



Scale: 1 square = _____

AST Area Load Log Cont'd.

Load	Vol (cy)	Time	~~PID Sample~~ ROC
23	~10	1455	–
24	~10	1500	–
25	~10	1520	–
26	~10	1530	–

done - treatment sites are full - 400 cy total between Tues. and today

1600 Sampling base of excavation at highest field-screening locations

1630 Done sampling, began backfilling. Cleaning up site, put drums on a pallet. Picked up trash and creosote beams.

1745 Went up to treatment site roped off all three treatment plots with caution tape. Tested soil probe - works great, easy to tell when you hit bottom of pile.

Scale: 1 square = _____

Base of excavation (AST area)
field screening

Sample	Depth (ft)	PID (ppm)	
B22	~6	176	✓ CS-13
B23	~6	162	✓ CS-14
B24	~5	149	✓ CS-15
B25	~6	135	
B26	~5	564	✓ SS-16/17 dup.
B27	~5	466	✓ CS-18
B28	~4	99.5	
B29	~6	59.6	
B30	~5	134	
B31	~4	263	✓ CS-19
B32	~4	44.5	
B33	~4	64.7	
B34	~4	54.9	
B35	~4	24.0	

RDG

Scale: 1 square = _____

1900 Dinner break
2000 Went back down to site to organize equipment for next week and pack freight for tomorrow
2030 Packing and processing samples
2200 Done for the day

9/30/16 RDG

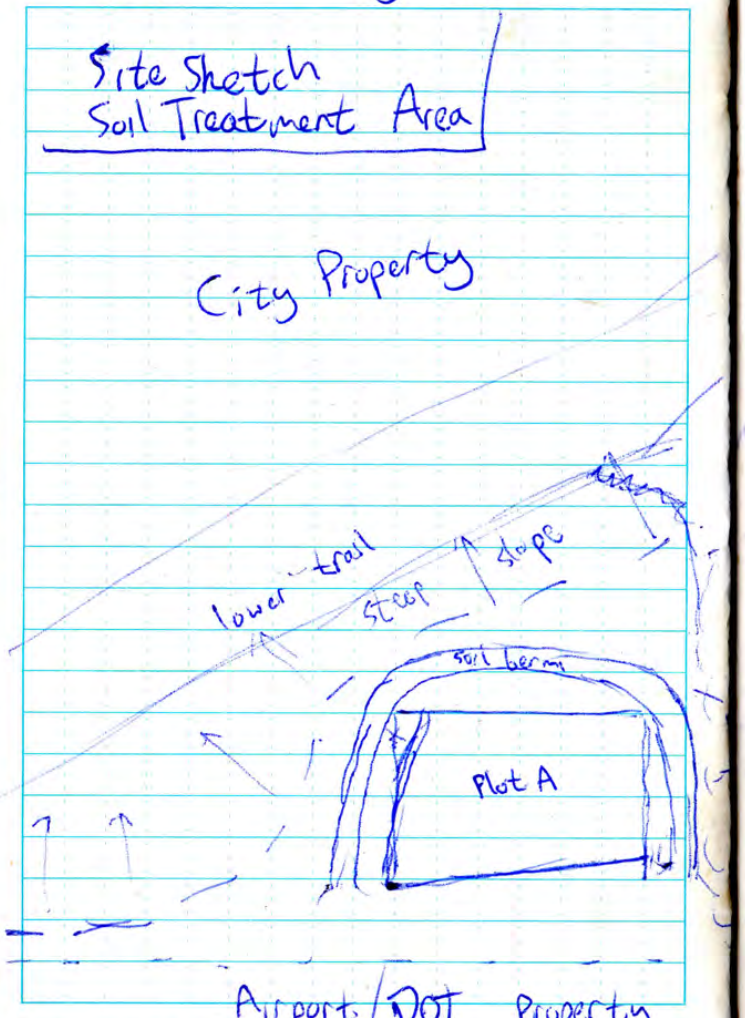
0800 Met Gary on site. He is going to final-grade & compact both excavation areas. Has a huge roller compactor for the job. Gary is having Chris put final berms around contaminated soil at the airport.
~~0820~~ 0820 Met with Brenda and Shaelene, gave brief update on cleanup progress, offered to provide update at tribal council meeting next week.
0840 Met Ilan to get gas for truck

Scale: 1 square = _____

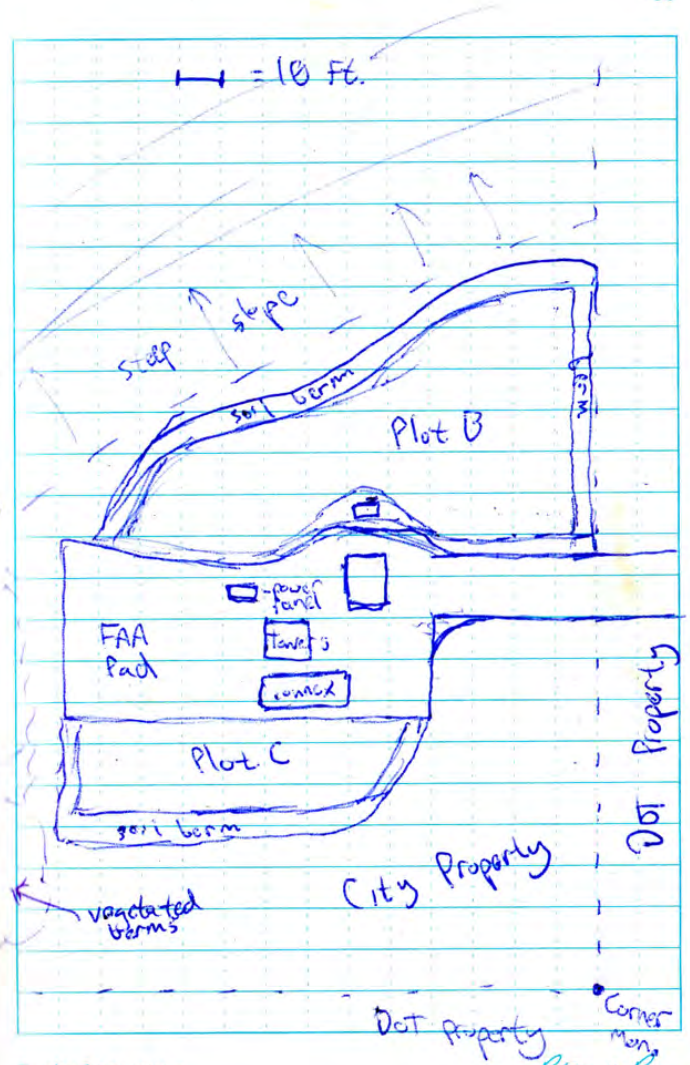
Rite in the Rain

9/30/16 RDC Ruby Headstart

Site Sketch
Soil Treatment Area



Scale: 1 square = ~~10~~ Ft.



Scale: 1 square = _____

9/30/16

1060 Went to airport to sketch out treatment plots

Plot areas

Plot A	~40'×60'	= 2,400 ft²
Plot B	~60'×120'×½	= 3,600 ft²
Plot C	~20'×70'	= 1,400 ft²
		7,400 ft²

A total of ~400 loose cy was hauled to the three plots.
= 10,800 ft³

This means average thickness of plots should be 1.5 ft, consistent with dozer operator's discretions.

Plot A ISM grid 5×6 (8'×10' cells)
Plot B ISM grid 6×10(.½) (10'×12' cells)
Plot C ISM grid 3×10 (6.67'×7' cells)

1210 Flew RBY → FAI
1400 Back at office, drop gear, deliver samples, returned equip.
1700 Done for the day

Scale: 1 square = _____

10/3/16

0730 check in at Wright Air flight delayed
1030 Flew FAI → RBY
1130 Arrived in RBY, got truck from Shaelene, got gas and freight from tribal office
1300 Met Allen, William, and Melvin at tribal office.
Safety meeting at airport site.
1310 Installing fence posts, ~~tape~~ signs, marking out sampling grids.
Using willows as grid nodes.
Plot B is more like 66'×100'

Actual Grid spacing:

Plot B	10'×10'	32 full cells
Plot C	7'×7'	30 cells
Plot A	8'×10'	30 cells

Roped plots A & C
1700 Dinner break
1800 Prepping kit for ISM sampling.

Scale: 1 square = _____

1815 Began sampling Plot B using ISM 32 full grid cells, each divided into 4 quadrants: NW, NE, SW, SE. rolled dice to determine quadrant to sample for each replicate.

~~Sample ID~~ Note: each TeraCore plug
~~Plot B_rep1~~ weighs ~3 g, taking them
~~Plot B_rep2~~ From 8 evenly spaced
Plot RDG intervals from ~~bore~~ probe core

Plot	Rep	Sample ID	Time	Quad
B	1	16-RBY-ISM-01	1910	NE
B	2	16-RBY-ISM-02	2000	NW
B	3	16-RBY-ISM-03	2056	SE

Note: 2:1 soil:extract volume will result in non-submerged soil (low density soil) shooting for ~~1:1~~ 1:1
~5 ~~7.5~~ g soil per interval RDG

~~Soil mass~~ Sample weights
~~ISM-01~~
~~IS~~

Noticed that SGS bottle + MeOH weights appear very approximate (300 g each, even, on labels)
Field-weighing jars + MeOH

Sample	~~Jar + MeOH (g)~~	Final mass (g)
ISM-01	not measured	497.5
ISM-02	255.7	500.1 ~~497.5~~
ISM-03	255.9	512.3

Forgot sieve. Storing soil in ziplocs for sieving upon return to FBX. for DRO/PAH analysis
2100 Finished ISM sampling at Plot B. Getting dark

10/4/16

0900 Met crew at the boat landing. Went across river cut 2 boat loads of salix alaxensis. Stand was not ideal, too many big willows, too branchy. Tried a spot ~5 mi. upriver. Big Creek willow bar. Much better cutting. Got ~1 cord.

10/4/16

1300 Lunch break
1400 Hauled willows up from boat landing. Began processing them into 18-in. cuttings and planting in Plot B.
1800 Done for the day. Processed ~1/3 of the willows and planted ~1000 ft² of Plot B.
1800 Dinner break.
1900 Back at site to resume ISM sampling. Sampling plot C on 7'x7' grid, 30 cells.

Plot	Rep	Sample	Time	Quad.
C	1	16-RBY-ISM-04	1950	NW
C	2	16-RBY-ISM-05	2050	NE
C	3	16-RBY-ISM-06	2140	SW

Jar weights	pre	post
ISM-04	404.5	776.3
ISM-05	399.0	754.5
ISM-06	404.4	

* apparently scale was off last night

Scale: 1 square = _____

10/5/16

0900 Picked up crew, headed up to site. Processing willows and planting.
~~1200~~
1300 Lunch break
1400 Back at site, resumed planting
~1630 Finished planting Plot B Started on Plot C
1630 Finished planting Plot C Willow spacing ~1.5 ft. throughout.
Put rope up on posts around front sides of Plot B
1700 done for the day brought crew home

Scale: 1 square = _____

10/6/16 RDG

0900 Picked up crew, headed to site
0910 Safety meeting
Allen & Melvin trimming willows.
Working with William on ISM sampling of plot A

Plot	Rep	Sample	Time	Quad
A	1	16-RDG-ISM-07	0945	NW
A	2	16-RDG-ISM-08	1015	SE
A	3	16-RDG-ISM-09	1130	SW

Jar weights	Pre	Post
ISM-07	348.9	369.5
ISM-08	379.2	732.4
ISM-09	348.5	767.3

1145 Started planting Plot A
1300 Lunch break
1400 Resumed planting plot A. Getting very muddy in the sun.
~1630 Finished planting, bringing excess willows to the

Scale: 1 square = _____

10/6/16 RDG

brush pile at the dump
1700 Finished cleaning up, done for the day.
1900-2000 At headstart organizing equipment to ship out tomorrow.
2000 Filling out COC and prepping samples for shipment
2100 Done for the day

10/7/16 RDG

0900 Met Crew on site started planting grass.
Seeded plots A, B, and C at recommended rate ~40 lbs/acre
Seeder won't work with clumpy seeds from our custom mix, so we seeded plots by hand.
Seeded area in front of Plot A with Arctared Fescue

Scale: 1 square = _____

Rite in the Rain

10/7/16

1636 Cleaning sampling and planting tools on site. Decon water spread on ~~the~~ plots.
Moved last fire ring to east of the way location on the headstart site.
Got gas for rental truck.
Paid ~~$~~ Shadene for rental truck. Paid ~~$~~ labor crew.
Went back up to airport, took final photos of the site.

Scale: 1 square = _____

Scale: 1 square = _____

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APPENDIX C

SITE PHOTOGRAPHS

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Photo 1. Preparing soil treatment site (Plot A).

Photo 2. Beginning excavation at UST location.

Photo 3. Second fill/vent opening in tank uncovered during hand-excavation.

Photo 4. Liquids being pumped from the tank. Interface probe used to monitor oil-water interface.

Photo 5. Transferring heating oil from UST to IBC tanks.

Photo 6. Excavation following tank removal. Note moss bedding around tank.

Photo 7. UST removed and transported for temporary on-site storage.

Photo 8. Removing additional soil from UST area excavation.

Photo 9. Collecting sidewall excavation confirmation samples using trowel extension.

Photo 10. Spreading and compacting gravel backfill in UST area excavation.

Photo 11. Finished grade following backfill (prior to final compaction).

Photo 12. Liquids removed from UST. Tanks on right contain heating oil, tank on left contains a mix of oil and water.

Photo 13. Soil sampling in roadway following cleanup of spilled soil.

Photo 14. Gas monitoring of tank interior prior to cutting.

Photo 15. Cutting opening in end of tank.

Photo 16. Finished opening. A similar opening was cut in the opposite end.

Photo 17. Tank interior following initial cleaning.

Photo 18. Final cleaning of tank sections to be recycled as fire pits.

Photo 19. Fire pit at community park.

Photo 20. On-site treatment of UST water via granular activated carbon filtration.

Photo 21. Preparing phytoremediation Plot B.

Photo 22. Muddy conditions prevented further access to Plot A.

Photo 23. Starting AST-area excavation.

Photo 24. AST-area excavation. Note treated timber in excavation near excavator track.

Photo 25. AST area excavation completed to 4 foot depth (still numerous hot spots at excavation floor).

Photo 26. Removing additional soil from excavation.

Photo 27. Sampling base of excavation (empty jars staged at sample locations).

Photo 28. Backfilling AST area excavation.

Photo 29. Finished grade, AST area, following final compaction.

Photo 30. Finished grade, UST area, following final compaction.

Photo 31. Phytoremediation Plot A.

Photo 32. Phytoremediation Plot B.

Photo 33. Phytoremediation Plot C.

Photo 34. Signs and flagging installed, Plot C.

Photo 35. Soil probe used to obtain ISM soil cores (increments).

Photo 36. Subsampling ISM core using Terra-core (for GRO/BTEX).

Photo 37. Primary willow harvest site ("Big Creek willow bar").

Photo 38. Transporting harvested willows to Ruby.

Photo 39. Staging harvested willows for transport to treatment site.

Photo 40. Using jig to process willows into 18-inch cuttings.

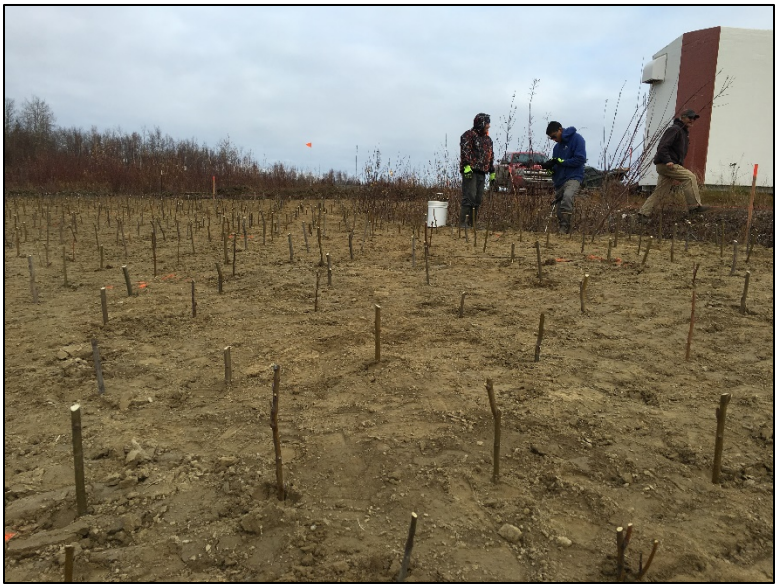

Photo 41. Planting willow cuttings (Plot B).

Photo 42. Distributing grass seed, Plot B.

Photo 43. Finished planting, Plot A.

Photo 44. Finished planting, Plot C.

Photo 45. Finished planting, Plot B.

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APPENDIX D

DISPOSAL DOCUMENTS

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*** IN CASE OF EMERGENCY CALL 1-800-899-4672 ***

115658-KS

NON-HAZARDOUS WASTE MANIFEST

Please print or type (Form designed for use on elite (12 pitch) typewriter)

NON-HAZARDOUS WASTE

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: CESQG

Manifest Document No.: 115658A

2. Page 1 of 1

3. Generator's Name and Mailing Address

ADEC - GAFFNEY ROAD WEST
610 UNIVERSITY AVENUE
FAIRBANKS, AK 99709

ADEC - RUBY HEADSTART
610 UNIVERSITY AVENUE
FAIRBANKS, AK 99709

4. Generator's Phone ( )

5. Transporter 1 Company Name: NRC ALASKA LLC

6. US EPA ID Number: AKR000004184

A. State Transporter's ID

B. Transporter 1 Phone: (907) 258-1558

7. Transporter 2 Company Name

8. US EPA ID Number

C. State Transporter's ID

D. Transporter 2 Phone

9. Designated Facility Name and Site Address

NRC ALASKA LLC
2020 VIKING DRIVE
ANCHORAGE, AK 99501

10. US EPA ID Number: AKR000004184

E. State Facility's ID

F. Facility's Phone: (907) 258-1558

HM	11. WASTE DESCRIPTION	Containers No.	Containers Type	13. Total Quantity	14. Unit Wt./Vol.
a.	Material Not Regulated by DOT	1	DM	55	G
b.	Material Not Regulated by DOT	1	DM	150	P
c.					
d.					

GENERATOR

G. Additional Descriptions for Materials Listed Above

1) EA0301 OILY WATER
2) EA0505 ABSORBENTS/RAGS WITH NO FREE LIQUIDS

H. Handling Codes for Wastes Listed Above

D10435

15. Special Handling Instructions and Additional Information

Shipper's Certification: This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation

16. **GENERATOR'S CERTIFICATION:** I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations.

Printed/Typed Name	Signature	Date (Month Day Year)
Robert A. Burgess	Robert A. Burgess	7 7 2017

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date (Month Day Year)
James Simons		7 21 17

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date (Month Day Year)

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of the waste materials covered by this manifest, except as noted in item 19.

Printed/Typed Name	Signature	Date (Month Day Year)
Patricia L Beasley	Patricia L Beasley	09 22 17

CERTIFICATE OF DISPOSAL/RECYCLE

GENERATOR: ADEC - RUBY HEADSTART
610 UNIVERSITY AVENUE
FAIRBANKS, AK 99709

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

EPA ID NUMBER: CESQG
MANIFEST/DOCUMENT #: 115658A
DATE OF DISPOSAL/RECYCLE: SEP-22-2017

LINE	WASTE DESCRIPTION	CONTAINERS	TYPE	QUANTITY	UOM
1	OILY WATER	1	DM	55	G
2	ABSORBENTS/RAGS WITH NO FREE LIQUIDS	1	DM	150	P

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

PREPARED BY: PLB

SIGNATURE: _____ **DATE:** SEP 22 2017

APPENDIX E

ANALYTICAL LABORATORY REPORTS AND DATA REVIEW CHECKLISTS

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Laboratory Data Review Checklist

Completed by: Rodney Guritz

Title: Chemist Date: March 17, 2017

CS Report Name: Ruby Former Headstart Cleanup Report Date: March 2017

Consultant Firm: Arctic Data Services, LLC

Laboratory Name: SGS Anchorage Laboratory Report Number: 1168665

ADEC File Number: 870.38.004 ADEC RecKey Number:

1. Laboratory
   a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?
      ■Yes No NA (Please explain.) Comments:

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?
      Yes No ■NA (Please explain.) Comments:

      No samples were transferred to other laboratories.

2. Chain of Custody (COC)
   a. COC information completed, signed, and dated (including released/received by)?
      ■Yes No NA (Please explain.) Comments:

   b. Correct analyses requested?
      ■Yes No NA (Please explain.) Comments:

3. Laboratory Sample Receipt Documentation
   a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?
      ■Yes No NA (Please explain.) Comments:

      The samples were received between 0 °C and 6 °C, the acceptable temperature range listed in EPA SW-846 and adopted by reference by ADEC (18 AAC 78.090).

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

■Yes No NA (Please explain.) Comments:

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

■Yes No NA (Please explain.) Comments:

Samples were received in good condition.

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 ■ NA (Please explain.) Comments:

There were no sample-receiving discrepancies.

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

Comments:

Data quality and usability were not affected.

4. Case Narrative

a. Present and understandable?

■Yes No NA (Please explain.) Comments:

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

■Yes No NA (Please explain.) Comments:

The laboratory provided a detailed case narrative noting a number of QC anomalies, including surrogate recovery failures, holding time exceedances, and MS/MSD recovery and RPD failures. The following sections of this checklist address these anomalies in detail. The laboratory failed to note an LCSD recovery failure for one DRO analysis, but they did document corrective action taken in response to the failure.

c. Were all corrective actions documented?

■ Yes No NA (Please explain.) Comments:

Samples in DRO prep batch XXX36481 were reanalyzed (outside holding time) due to a low LCSD recovery in the original analysis. Results were confirmed; original results were reported. See Section 6.b. for more information.

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

Comments:

The case narrative notes no effect on sample data quality or usability. Refer to the following sections for our discussion of data quality and usability for the QC anomalies noted.

5. Samples Results
   a. Correct analyses performed/reported as requested on COC?
      ■Yes No NA (Please explain.) Comments:

   b. All applicable holding times met?
      ■Yes No NA (Please explain.) Comments:

   c. All soils reported on a dry weight basis?
      ■Yes No NA (Please explain.) Comments:

   d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?
      ■Yes No NA (Please explain.) Comments:

LODs were below relevant soil cleanup levels for each non-detect result.

   e. Data quality or usability affected?

Comments:

Data quality and usability were not affected.

6. QC Samples
   a. Method Blank
      i. One method blank reported per matrix, analysis and 20 samples?
      ■Yes No NA (Please explain.) Comments:

      ii. All method blank results less than PQL?
      ■Yes No NA (Please explain.) Comments:

However, the following analytes were detected below the LOQ:

Prep batch	Analyte	Method	Result (mg/kg)
VXX29741	GRO	AK101	0.954 J
VXX29762	GRO	AK101	0.909 J
VXX29759	GRO	AK101	0.825 J

iii. If above PQL, what samples are affected?

Comments:

Results within 5x the MB concentration are qualified 'UB' at the LOQ or the sample concentration, whichever is higher. Results between 5-10x the MB concentration are considered estimated, biased high and qualified 'JH.' The following results were affected:

Sample	Batch	Analyte	Method	Result (mg/kg)	Flag
16-RBY-BS-01	VXX29741	GRO	AK101	1.20	UB
16-RBY-BS-02	VXX29741	GRO	AK101	1.09	UB
16-RBY-CS-02	VXX29741	GRO	AK101	1.44	UB
16-RBY-CS-03	VXX29741	GRO	AK101	4.93	UB
16-RBY-CS-13	VXX29759	GRO	AK101	5.53	JH

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

■ Yes No NA (Please explain.) Comments:

See above

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

Comments:

Data quality affected as described above. Impact to data usability was minimal, as results were at least an order of magnitude below the relevant soil cleanup levels.

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

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

■Yes No NA (Please explain.) Comments:

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

Yes No ■NA (Please explain.) Comments:

There were no metals/inorganic analyses.

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

Yes ■No NA (Please explain.) Comments:

LCSD recovery of DRO (63.7%) was below laboratory control limits (75%) for prep batch XXX36481. LCS recovery was within control limits. The laboratory re-extracted and re-analyzed project samples from this batch outside of holding times, confirming results. However, DRO results for these samples (baseline soil samples from treatment area) are conservatively flagged 'JL' (detections) or 'UJ' (non-detects) to indicate a potential low bias.

There were a number of MS/MSD recovery failures, but the parent samples were not in our project sample set, so our results were not affected.

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 NA (Please explain.) Comments:

LCS/LCSD RPDs were within control limits. There was one MS/MSD RPD failure, but the parent sample was not in our project sample set, so our results were not affected.

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

Comments:

See above.

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

■ Yes No NA (Please explain.) Comments:

See above.

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

Comments:

Data quality affected as described above. Affected results were at least an order of magnitude below the relevant soil cleanup level, so impact to data usability was minimal.

c. Surrogates – Organics Only

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

■Yes No NA (Please explain.) Comments:

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

Yes ■No NA (Please explain.) Comments:

DRO surrogate 5a-androstane and PAH surrogates 2-fluorobiphenyl and/or terphenyl-d14 were recovered outside control limits for samples 16-RBY-CS-04 and 16-RBY-CS-05. These recovery failures were due to dilution of the samples. Results are not considered affected.
GRO surrogate 4-Bromofluorobenzene was recovered above control limits for the following samples, due to matrix interference:
16-RBY-CS-05
16-RBY-CS-04
16-RBY-CS-14
16-RBY-CS-15
16-RBY-CS-17
16-RBY-CS-16
16-RBY-CS-18
16-RBY-CS-19
GRO results for these samples are considered estimated, biased high, and flagged 'JH.'

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

■Yes No NA (Please explain.) Comments:

See above.

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

Comments:

Data quality affected as described above. Impact to data usability was minimal, as results were at least an order of magnitude below the relevant soil cleanup levels.

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

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

■ Yes No NA (Please explain.) Comments:

Soil trip blanks were submitted for GRO/BTEX analysis.

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

Yes No ■NA (Please explain.) Comments:

Samples were submitted in a single cooler.

iii. All results less than PQL?

■Yes No NA (Please explain.) Comments:

However, GRO was detected below the LOQ, at 1.01 mg/kg.

iv. If above PQL, what samples are affected?

Comments:

Affected samples include those listed in Section 6.a. (method blank), as well as the following samples:

Sample	Analyte	Method	Result (mg/kg)	Flag
16-RBY-CS-06	GRO	AK101	2.96	UB
16-RBY-CS-07	GRO	AK101	1.99	UB
16-RBY-CS-09	GRO	AK101	1.60	UB
16-RBY-CS-10	GRO	AK101	1.50	UB
16-RBY-CS-12	GRO	AK101	1.52	UB
16-RBY-CS-14	GRO	AK101	8.56	JH
16-RBY-RS-01	GRO	AK101	1.97	UB

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

Comments:

Data quality and usability were not affected.

e. Field Duplicate

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

■Yes No NA (Please explain.) Comments:

Field duplicate pairs 16-RBY-CS-04/16-RBY-CS-05 and 16-RBY-CS-16/16-RBY-CS-17 were reported in this work order.

ii. Submitted blind to lab?

■Yes No NA (Please explain.) Comments:

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

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

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

■Yes No NA (Please explain.) Comments:

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

Comments:

Data quality and usability were not affected.

f. Decontamination or Equipment Blank (If not used explain why).

Yes No ■NA (Please explain.) Comments:

Soil samples were collected using disposable sampling equipment; an equipment blank was not required.

i. All results less than PQL?

Yes No ■NA (Please explain.) Comments:

ii. If above PQL, what samples are affected?

Comments:

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

Comments:

Not applicable (see above).

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

a. Defined and appropriate?

Yes No ■NA (Please explain.) Comments:

There were no other data flags or qualifiers.

Laboratory Report of Analysis

To: Ahtna Engineering Svs
305 34th Ave
Fairbanks, AK 99701
907-455-5953

Report Number: **1168665**

Client Project: **Ruby Headstart Cleanup**

Dear Andrew Weller,

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 Justin 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.

SGS North America Inc.
Environmental Services – Alaska Division
Project Manager

Justin Nelson
2016.10.20
16:42:49 -08'00'

Justin Nelson Date
Project Manager
Justin.Nelson@sgs.com

Print Date: 10/19/2016 4:07:34PM

Case Narrative

SGS Client: **Ahtna Engineering Svs**
SGS Project: **1168665**
Project Name/Site: **Ruby Headstart Cleanup**
Project Contact: **Andrew Weller**

Refer to sample receipt form for information on sample condition.

16-RBY-BS-01 (1168665001) PS

AK102/103 - The sample was re-extracted past the 14 day hold time. Reanalysis confirmed the original results.

16-RBY-BS-02 (1168665002) PS

AK102/103 - The sample was re-extracted past the 14 day hold time. Reanalysis confirmed the original results.

16-RBY-BS-03 (1168665003) PS

AK102/103 - The sample was re-extracted past the 14 day hold time. Reanalysis confirmed the original results.

16-RBY-BS-04 (1168665004) PS

AK102/103 - The sample was re-extracted past the 14 day hold time. Reanalysis confirmed the original results.

16-RBY-BS-05 (1168665005) PS

AK102/103 - The sample was re-extracted past the 14 day hold time. Reanalysis confirmed the original results.

16-RBY-CS-01 (1168665006) PS

AK102/103 - The sample was re-extracted past the 14 day hold time. Reanalysis confirmed the original results.

16-RBY-CS-02 (1168665007) PS

AK102/103 - The sample was re-extracted past the 14 day hold time. Reanalysis confirmed the original results.

16-RBY-CS-04 (1168665009) PS

AK101 - Surrogate recovery for 4-bromofluorobenzene (614%) does not meet QC criteria due to matrix interference.
8270D SIM - PAH surrogate recovery for terphenyl-d14 (0%) and 2-fluorobiphenyl (1240%) do not meet QC criteria due to sample dilution (100X).
AK102 - Surrogate recovery for 5a-androstane (0%) does not meet QC criteria due to sample dilution (10X).

16-RBY-CS-05 (1168665010) PS

AK101 - Surrogate recovery for 4-bromofluorobenzene (588%) does not meet QC criteria due to matrix interference.
8270D SIM - PAH surrogate recovery for 2-fluorobiphenyl (1160%) do not meet QC criteria due to sample dilution (100X).
AK102 - Surrogate recovery for 5a-androstane (0%) does not meet QC criteria due to sample dilution (10X).

16-RBY-CS-14 (1168665020) PS

AK101 - Surrogate recovery for 4-bromofluorobenzene (163%) does not meet QC criteria due to matrix interference.

16-RBY-CS-15 (1168665021) PS

AK101 - Surrogate recovery for 4-bromofluorobenzene (231%) does not meet QC criteria due to matrix interference.

16-RBY-CS-16 (1168665022) PS

AK101 - Surrogate recovery for 4-bromofluorobenzene (4800%) does not meet QC criteria due to matrix interference.

16-RBY-CS-17 (1168665023) PS

AK101 - Surrogate recovery for 4-bromofluorobenzene (5360%) does not meet QC criteria due to matrix interference.

16-RBY-CS-18 (1168665024) PS

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Case Narrative

SGS Client: **Ahtna Engineering Svs**
SGS Project: **1168665**
Project Name/Site: **Ruby Headstart Cleanup**
Project Contact: **Andrew Weller**

AK101 - Surrogate recovery for 4-bromofluorobenzene (6550%) does not meet QC criteria due to matrix interference.

16-RBY-CS-19 (1168665025) PS

AK101 - Surrogate recovery for 4-bromofluorobenzene (589%) does not meet QC criteria due to matrix interference.

1165874001MS (1357704) MS

8270D SIM - PAH MS recovery for several analytes does not meet QC criteria. Refer to the LCS for accuracy requirements.

1165874001MSD (1357705) MSD

8270D SIM - PAH MSD recovery for Fluoranthene (140%) and Pyrene (142%) does not meet QC criteria. Refer to the LCS for accuracy requirements.
8270D SIM - PAH MS/MSD RPD for Benzo[g,h,i]perylene (28.6%) does not meet QC criteria. Results for this analyte are considered estimated 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.

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Report of Manual Integrations

Laboratory ID	Client Sample ID	Analytical Batch	Analyte	Reason
8270D SIM (PAH)				
1165874001	LABREFQC	XMS9690	Benzo[k]fluoranthene	RP

Manual Integration Reason Code Descriptions

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

All DRO/RRO analysis are integrated per SOP.

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Laboratory Qualifiers

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

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

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

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

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
D	The analyte concentration is the result of a dilution.
DF	Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
F	Indicates value that is greater than or equal to the DL
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
JL	The analyte was positively identified, but the quantitation is a low estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
M	A matrix effect was present.
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
Q	QC parameter out of acceptance range.
R	Rejected
RPD	Relative Percent Difference
U	Indicates the analyte was analyzed for but not detected.

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

Sample Summary

Client Sample ID	Lab Sample ID	Collected	Received	Matrix
16-RBY-BS-01	1168665001	09/27/2016	10/04/2016	Soil/Solid (dry weight)
16-RBY-BS-02	1168665002	09/27/2016	10/04/2016	Soil/Solid (dry weight)
16-RBY-BS-03	1168665003	09/27/2016	10/04/2016	Soil/Solid (dry weight)
16-RBY-BS-04	1168665004	09/27/2016	10/04/2016	Soil/Solid (dry weight)
16-RBY-BS-05	1168665005	09/27/2016	10/04/2016	Soil/Solid (dry weight)
16-RBY-CS-01	1168665006	09/27/2016	10/04/2016	Soil/Solid (dry weight)
16-RBY-CS-02	1168665007	09/27/2016	10/04/2016	Soil/Solid (dry weight)
16-RBY-CS-03	1168665008	09/27/2016	10/04/2016	Soil/Solid (dry weight)
16-RBY-CS-04	1168665009	09/27/2016	10/04/2016	Soil/Solid (dry weight)
16-RBY-CS-05	1168665010	09/27/2016	10/04/2016	Soil/Solid (dry weight)
16-RBY-CS-06	1168665011	09/27/2016	10/04/2016	Soil/Solid (dry weight)
16-RBY-CS-07	1168665012	09/27/2016	10/04/2016	Soil/Solid (dry weight)
16-RBY-RS-01	1168665013	09/27/2016	10/04/2016	Soil/Solid (dry weight)
16-RBY-CS-08	1168665014	09/29/2016	10/04/2016	Soil/Solid (dry weight)
16-RBY-CS-09	1168665015	09/29/2016	10/04/2016	Soil/Solid (dry weight)
16-RBY-CS-10	1168665016	09/29/2016	10/04/2016	Soil/Solid (dry weight)
16-RBY-CS-11	1168665017	09/29/2016	10/04/2016	Soil/Solid (dry weight)
16-RBY-CS-12	1168665018	09/29/2016	10/04/2016	Soil/Solid (dry weight)
16-RBY-CS-13	1168665019	09/29/2016	10/04/2016	Soil/Solid (dry weight)
16-RBY-CS-14	1168665020	09/29/2016	10/04/2016	Soil/Solid (dry weight)
16-RBY-CS-15	1168665021	09/29/2016	10/04/2016	Soil/Solid (dry weight)
16-RBY-CS-16	1168665022	09/29/2016	10/04/2016	Soil/Solid (dry weight)
16-RBY-CS-17	1168665023	09/29/2016	10/04/2016	Soil/Solid (dry weight)
16-RBY-CS-18	1168665024	09/29/2016	10/04/2016	Soil/Solid (dry weight)
16-RBY-CS-19	1168665025	09/29/2016	10/04/2016	Soil/Solid (dry weight)
Trip Blank	1168665026	09/27/2016	10/04/2016	Soil/Solid (dry weight)

Method	Method Description
8270D SIM (PAH)	8270 PAH SIM Semi-Volatiles GC/MS
AK101	AK101/8021 Combo. (S)
SW8021B	AK101/8021 Combo. (S)
AK102	Diesel Range Organics (S)
SM21 2540G	Percent Solids SM2540G

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Detectable Results Summary

Client Sample ID: **16-RBY-BS-01**
Lab Sample ID: 1168665001
Volatile Fuels

Parameter	Result	Units
Gasoline Range Organics	1.20J	mg/Kg

Client Sample ID: **16-RBY-BS-02**
Lab Sample ID: 1168665002
Semivolatile Organic Fuels
Volatile Fuels

Parameter	Result	Units
Diesel Range Organics	7.89J	mg/Kg
Gasoline Range Organics	1.09J	mg/Kg

Client Sample ID: **16-RBY-BS-03**
Lab Sample ID: 1168665003
Semivolatile Organic Fuels

Parameter	Result	Units
Diesel Range Organics	8.57J	mg/Kg

Client Sample ID: **16-RBY-BS-04**
Lab Sample ID: 1168665004
Semivolatile Organic Fuels

Parameter	Result	Units
Diesel Range Organics	11.0J	mg/Kg

Client Sample ID: **16-RBY-BS-05**
Lab Sample ID: 1168665005
Semivolatile Organic Fuels

Parameter	Result	Units
Diesel Range Organics	10.8J	mg/Kg

Client Sample ID: **16-RBY-CS-02**
Lab Sample ID: 1168665007
Semivolatile Organic Fuels
Volatile Fuels

Parameter	Result	Units
Diesel Range Organics	7.65J	mg/Kg
Gasoline Range Organics	1.44J	mg/Kg

Client Sample ID: **16-RBY-CS-03**
Lab Sample ID: 1168665008
Semivolatile Organic Fuels
Volatile Fuels

Parameter	Result	Units
Diesel Range Organics	181	mg/Kg
Gasoline Range Organics	4.93J	mg/Kg
o-Xylene	200	ug/Kg
P & M -Xylene	35.7J	ug/Kg

Client Sample ID: **16-RBY-CS-04**
Lab Sample ID: 1168665009
Polynuclear Aromatics GC/MS

Semivolatile Organic Fuels
Volatile Fuels

Parameter	Result	Units
1-Methylnaphthalene	47100	ug/Kg
2-Methylnaphthalene	3190	ug/Kg
Fluorene	2820J	ug/Kg
Diesel Range Organics	32900	mg/Kg
Ethylbenzene	204	ug/Kg
Gasoline Range Organics	153	mg/Kg
o-Xylene	4600	ug/Kg
P & M -Xylene	1030	ug/Kg

Detectable Results Summary

Client Sample ID: **16-RBY-CS-05**
Lab Sample ID: 1168665010

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	48600	ug/Kg
	2-Methylnaphthalene	3240	ug/Kg
	Fluorene	2780J	ug/Kg
Semivolatile Organic Fuels	Diesel Range Organics	33400	mg/Kg
Volatile Fuels	Ethylbenzene	189	ug/Kg
	Gasoline Range Organics	151	mg/Kg
	o-Xylene	4350	ug/Kg
	P & M -Xylene	989	ug/Kg

Client Sample ID: **16-RBY-CS-06**
Lab Sample ID: 1168665011

	Parameter	Result	Units
Semivolatile Organic Fuels	Diesel Range Organics	20.5J	mg/Kg
Volatile Fuels	Gasoline Range Organics	2.96J	mg/Kg
	o-Xylene	73.2	ug/Kg

Client Sample ID: **16-RBY-CS-07**
Lab Sample ID: 1168665012

	Parameter	Result	Units
Semivolatile Organic Fuels	Diesel Range Organics	18.2J	mg/Kg
Volatile Fuels	Gasoline Range Organics	1.99J	mg/Kg
	o-Xylene	29.6J	ug/Kg

Client Sample ID: **16-RBY-RS-01**
Lab Sample ID: 1168665013

	Parameter	Result	Units
Semivolatile Organic Fuels	Diesel Range Organics	65.0	mg/Kg
Volatile Fuels	Gasoline Range Organics	1.97J	mg/Kg
	o-Xylene	10.3J	ug/Kg
	P & M -Xylene	16.6J	ug/Kg

Client Sample ID: **16-RBY-CS-08**
Lab Sample ID: 1168665014

	Parameter	Result	Units
Semivolatile Organic Fuels	Diesel Range Organics	5050	mg/Kg

Client Sample ID: **16-RBY-CS-09**
Lab Sample ID: 1168665015

	Parameter	Result	Units
Semivolatile Organic Fuels	Diesel Range Organics	1900	mg/Kg
Volatile Fuels	Gasoline Range Organics	1.60J	mg/Kg

Client Sample ID: **16-RBY-CS-10**
Lab Sample ID: 1168665016

	Parameter	Result	Units
Semivolatile Organic Fuels	Diesel Range Organics	48.1	mg/Kg
Volatile Fuels	Gasoline Range Organics	1.50J	mg/Kg

Client Sample ID: **16-RBY-CS-11**
Lab Sample ID: 1168665017

	Parameter	Result	Units
Semivolatile Organic Fuels	Diesel Range Organics	9.94J	mg/Kg

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Detectable Results Summary

Client Sample ID: **16-RBY-CS-12**
Lab Sample ID: 1168665018

	Parameter	Result	Units
Semivolatile Organic Fuels	Diesel Range Organics	9.23J	mg/Kg
Volatile Fuels	Gasoline Range Organics	1.52J	mg/Kg

Client Sample ID: **16-RBY-CS-13**
Lab Sample ID: 1168665019

	Parameter	Result	Units
Semivolatile Organic Fuels	Diesel Range Organics	121	mg/Kg
Volatile Fuels	Gasoline Range Organics	5.53	mg/Kg
	o-Xylene	18.6J	ug/Kg
	P & M -Xylene	24.1J	ug/Kg

Client Sample ID: **16-RBY-CS-14**
Lab Sample ID: 1168665020

	Parameter	Result	Units
Semivolatile Organic Fuels	Diesel Range Organics	159	mg/Kg
Volatile Fuels	Ethylbenzene	10.5J	ug/Kg
	Gasoline Range Organics	8.56	mg/Kg
	o-Xylene	52.7	ug/Kg
	P & M -Xylene	55.5J	ug/Kg

Client Sample ID: **16-RBY-CS-15**
Lab Sample ID: 1168665021

	Parameter	Result	Units
Semivolatile Organic Fuels	Diesel Range Organics	121	mg/Kg
Volatile Fuels	Ethylbenzene	16.0J	ug/Kg
	Gasoline Range Organics	18.9	mg/Kg
	o-Xylene	99.7	ug/Kg
	P & M -Xylene	177	ug/Kg

Client Sample ID: **16-RBY-CS-16**
Lab Sample ID: 1168665022

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	24900	ug/Kg
	2-Methylnaphthalene	29600	ug/Kg
	Benzo(a)Anthracene	239J	ug/Kg
	Fluoranthene	2700	ug/Kg
	Naphthalene	16000	ug/Kg
	Phenanthrene	5310	ug/Kg
	Pyrene	345J	ug/Kg
Semivolatile Organic Fuels	Diesel Range Organics	7530	mg/Kg
Volatile Fuels	Benzene	11.6J	ug/Kg
	Ethylbenzene	980	ug/Kg
	Gasoline Range Organics	429	mg/Kg
	o-Xylene	6410	ug/Kg
	P & M -Xylene	9290	ug/Kg
	Toluene	520	ug/Kg

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Detectable Results Summary

Client Sample ID: **16-RBY-CS-17**
Lab Sample ID: 1168665023
Semivolatile Organic Fuels
Volatile Fuels

Parameter	Result	Units
Diesel Range Organics	8810	mg/Kg
Benzene	11.9J	ug/Kg
Ethylbenzene	876	ug/Kg
Gasoline Range Organics	463	mg/Kg
o-Xylene	5530	ug/Kg
P & M -Xylene	8050	ug/Kg
Toluene	477	ug/Kg

Client Sample ID: **16-RBY-CS-18**
Lab Sample ID: 1168665024
Semivolatile Organic Fuels
Volatile Fuels

Parameter	Result	Units
Diesel Range Organics	15400	mg/Kg
Benzene	28.3	ug/Kg
Ethylbenzene	1400	ug/Kg
Gasoline Range Organics	533	mg/Kg
o-Xylene	14700	ug/Kg
P & M -Xylene	20800	ug/Kg
Toluene	871	ug/Kg

Client Sample ID: **16-RBY-CS-19**
Lab Sample ID: 1168665025
Semivolatile Organic Fuels
Volatile Fuels

Parameter	Result	Units
Diesel Range Organics	713	mg/Kg
Ethylbenzene	67.1	ug/Kg
Gasoline Range Organics	38.5	mg/Kg
o-Xylene	416	ug/Kg
P & M -Xylene	257	ug/Kg
Toluene	15.0J	ug/Kg

Client Sample ID: **Trip Blank**
Lab Sample ID: 1168665026
Volatile Fuels

Parameter	Result	Units
Gasoline Range Organics	1.01J	mg/Kg

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Results of **16-RBY-BS-01**

Client Sample ID: **16-RBY-BS-01**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665001
Lab Project ID: 1168665

Collection Date: 09/27/16 09:05
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):81.2
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	12.3	U	24.6	7.61	mg/Kg	1		10/09/16 20:38
Surrogates								
5a Androstane (surr)	75.3		50-150		%	1		10/09/16 20:38

Batch Information

Analytical Batch: XFC12940
Analytical Method: AK102
Analyst: CRA
Analytical Date/Time: 10/09/16 20:38
Container ID: 1168665001-A

Prep Batch: XXX36481
Prep Method: SW3550C
Prep Date/Time: 10/07/16 18:06
Prep Initial Wt./Vol.: 30.081 g
Prep Extract Vol: 1 mL

Print Date: 10/19/2016 4:07:43PM

J flagging is activated

Results of **16-RBY-BS-01**

Client Sample ID: **16-RBY-BS-01**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665001
Lab Project ID: 1168665

Collection Date: 09/27/16 09:05
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):81.2
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.20	J	3.24	0.971	mg/Kg	1		10/10/16 16:05
Surrogates								
4-Bromofluorobenzene (surr)	125		50-150		%	1		10/10/16 16:05

Batch Information

Analytical Batch: VFC13364
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/10/16 16:05
Container ID: 1168665001-B

Prep Batch: VXX29741
Prep Method: SW5035A
Prep Date/Time: 09/27/16 09:05
Prep Initial Wt./Vol.: 73.983 g
Prep Extract Vol: 38.894 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	8.10	U	16.2	5.18	ug/Kg	1		10/10/16 16:05
Ethylbenzene	16.2	U	32.4	10.1	ug/Kg	1		10/10/16 16:05
o-Xylene	16.2	U	32.4	10.1	ug/Kg	1		10/10/16 16:05
P & M -Xylene	32.4	U	64.7	19.4	ug/Kg	1		10/10/16 16:05
Toluene	16.2	U	32.4	10.1	ug/Kg	1		10/10/16 16:05
Surrogates								
1,4-Difluorobenzene (surr)	86.7		72-119		%	1		10/10/16 16:05

Batch Information

Analytical Batch: VFC13364
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/10/16 16:05
Container ID: 1168665001-B

Prep Batch: VXX29741
Prep Method: SW5035A
Prep Date/Time: 09/27/16 09:05
Prep Initial Wt./Vol.: 73.983 g
Prep Extract Vol: 38.894 mL

Results of **16-RBY-BS-02**

Client Sample ID: **16-RBY-BS-02**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665002
Lab Project ID: 1168665

Collection Date: 09/27/16 09:06
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):79.7
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	7.89	J	25.0	7.74	mg/Kg	1		10/09/16 20:48
Surrogates								
5a Androstane (surr)	73.7		50-150		%	1		10/09/16 20:48

Batch Information

Analytical Batch: XFC12940
Analytical Method: AK102
Analyst: CRA
Analytical Date/Time: 10/09/16 20:48
Container ID: 1168665002-A

Prep Batch: XXX36481
Prep Method: SW3550C
Prep Date/Time: 10/07/16 18:06
Prep Initial Wt./Vol.: 30.168 g
Prep Extract Vol: 1 mL

Print Date: 10/19/2016 4:07:43PM

J flagging is activated

Results of **16-RBY-BS-02**

Client Sample ID: **16-RBY-BS-02**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665002
Lab Project ID: 1168665

Collection Date: 09/27/16 09:06
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):79.7
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.09	J	3.55	1.07	mg/Kg	1		10/10/16 17:56
Surrogates								
4-Bromofluorobenzene (surr)	116		50-150		%	1		10/10/16 17:56

Batch Information

Analytical Batch: VFC13364
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/10/16 17:56
Container ID: 1168665002-B

Prep Batch: VXX29741
Prep Method: SW5035A
Prep Date/Time: 09/27/16 09:06
Prep Initial Wt./Vol.: 68.746 g
Prep Extract Vol: 38.9557 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	8.90	U	17.8	5.69	ug/Kg	1		10/10/16 17:56
Ethylbenzene	17.8	U	35.5	11.1	ug/Kg	1		10/10/16 17:56
o-Xylene	17.8	U	35.5	11.1	ug/Kg	1		10/10/16 17:56
P & M -Xylene	35.5	U	71.1	21.3	ug/Kg	1		10/10/16 17:56
Toluene	17.8	U	35.5	11.1	ug/Kg	1		10/10/16 17:56
Surrogates								
1,4-Difluorobenzene (surr)	87.6		72-119		%	1		10/10/16 17:56

Batch Information

Analytical Batch: VFC13364
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/10/16 17:56
Container ID: 1168665002-B

Prep Batch: VXX29741
Prep Method: SW5035A
Prep Date/Time: 09/27/16 09:06
Prep Initial Wt./Vol.: 68.746 g
Prep Extract Vol: 38.9557 mL

Results of **16-RBY-BS-03**

Client Sample ID: **16-RBY-BS-03**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665003
Lab Project ID: 1168665

Collection Date: 09/27/16 09:07
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):81.3
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	8.57	J	24.5	7.58	mg/Kg	1		10/09/16 20:58
Surrogates								
5a Androstane (surr)	79.9		50-150		%	1		10/09/16 20:58

Batch Information

Analytical Batch: XFC12940
Analytical Method: AK102
Analyst: CRA
Analytical Date/Time: 10/09/16 20:58
Container ID: 1168665003-A

Prep Batch: XXX36481
Prep Method: SW3550C
Prep Date/Time: 10/07/16 18:06
Prep Initial Wt./Vol.: 30.163 g
Prep Extract Vol: 1 mL

Print Date: 10/19/2016 4:07:43PM

J flagging is activated

Results of **16-RBY-BS-03**

Client Sample ID: **16-RBY-BS-03**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665003
Lab Project ID: 1168665

Collection Date: 09/27/16 09:07
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):81.3
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	2.02	U	4.03	1.21	mg/Kg	1		10/10/16 16:23
Surrogates								
4-Bromofluorobenzene (surr)	111		50-150		%	1		10/10/16 16:23

Batch Information

Analytical Batch: VFC13364
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/10/16 16:23
Container ID: 1168665003-B

Prep Batch: VXX29741
Prep Method: SW5035A
Prep Date/Time: 09/27/16 09:07
Prep Initial Wt./Vol.: 53.38 g
Prep Extract Vol: 34.9691 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	10.1	U	20.1	6.44	ug/Kg	1		10/10/16 16:23
Ethylbenzene	20.1	U	40.3	12.6	ug/Kg	1		10/10/16 16:23
o-Xylene	20.1	U	40.3	12.6	ug/Kg	1		10/10/16 16:23
P & M -Xylene	40.3	U	80.6	24.2	ug/Kg	1		10/10/16 16:23
Toluene	20.1	U	40.3	12.6	ug/Kg	1		10/10/16 16:23
Surrogates								
1,4-Difluorobenzene (surr)	87.1		72-119		%	1		10/10/16 16:23

Batch Information

Analytical Batch: VFC13364
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/10/16 16:23
Container ID: 1168665003-B

Prep Batch: VXX29741
Prep Method: SW5035A
Prep Date/Time: 09/27/16 09:07
Prep Initial Wt./Vol.: 53.38 g
Prep Extract Vol: 34.9691 mL

Results of **16-RBY-BS-04**

Client Sample ID: **16-RBY-BS-04**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665004
Lab Project ID: 1168665

Collection Date: 09/27/16 09:08
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):81.1
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	11.0	J	24.6	7.62	mg/Kg	1		10/09/16 21:07
Surrogates								
5a Androstane (surr)	81.1		50-150		%	1		10/09/16 21:07

Batch Information

Analytical Batch: XFC12940
Analytical Method: AK102
Analyst: CRA
Analytical Date/Time: 10/09/16 21:07
Container ID: 1168665004-A

Prep Batch: XXX36481
Prep Method: SW3550C
Prep Date/Time: 10/07/16 18:06
Prep Initial Wt./Vol.: 30.119 g
Prep Extract Vol: 1 mL

Print Date: 10/19/2016 4:07:43PM

J flagging is activated

Results of **16-RBY-BS-04**

Client Sample ID: **16-RBY-BS-04**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665004
Lab Project ID: 1168665

Collection Date: 09/27/16 09:08
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):81.1
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.75	U	3.49	1.05	mg/Kg	1		10/10/16 16:42
Surrogates								
4-Bromofluorobenzene (surr)	113		50-150		%	1		10/10/16 16:42

Batch Information

Analytical Batch: VFC13364
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/10/16 16:42
Container ID: 1168665004-B

Prep Batch: VXX29741
Prep Method: SW5035A
Prep Date/Time: 09/27/16 09:08
Prep Initial Wt./Vol.: 66.362 g
Prep Extract Vol: 37.5613 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	8.75	U	17.5	5.59	ug/Kg	1		10/10/16 16:42
Ethylbenzene	17.4	U	34.9	10.9	ug/Kg	1		10/10/16 16:42
o-Xylene	17.4	U	34.9	10.9	ug/Kg	1		10/10/16 16:42
P & M -Xylene	34.9	U	69.8	20.9	ug/Kg	1		10/10/16 16:42
Toluene	17.4	U	34.9	10.9	ug/Kg	1		10/10/16 16:42
Surrogates								
1,4-Difluorobenzene (surr)	88.2		72-119		%	1		10/10/16 16:42

Batch Information

Analytical Batch: VFC13364
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/10/16 16:42
Container ID: 1168665004-B

Prep Batch: VXX29741
Prep Method: SW5035A
Prep Date/Time: 09/27/16 09:08
Prep Initial Wt./Vol.: 66.362 g
Prep Extract Vol: 37.5613 mL

Results of **16-RBY-BS-05**

Client Sample ID: **16-RBY-BS-05**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665005
Lab Project ID: 1168665

Collection Date: 09/27/16 09:10
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):79.8
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	10.8	J	24.8	7.70	mg/Kg	1		10/09/16 21:17
Surrogates								
5a Androstane (surr)	77.2		50-150		%	1		10/09/16 21:17

Batch Information

Analytical Batch: XFC12940
Analytical Method: AK102
Analyst: CRA
Analytical Date/Time: 10/09/16 21:17
Container ID: 1168665005-A

Prep Batch: XXX36481
Prep Method: SW3550C
Prep Date/Time: 10/07/16 18:06
Prep Initial Wt./Vol.: 30.301 g
Prep Extract Vol: 1 mL

Print Date: 10/19/2016 4:07:43PM

J flagging is activated

Results of **16-RBY-BS-05**

Client Sample ID: **16-RBY-BS-05**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665005
Lab Project ID: 1168665

Collection Date: 09/27/16 09:10
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):79.8
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.86	U	3.71	1.11	mg/Kg	1		10/10/16 19:10
Surrogates								
4-Bromofluorobenzene (surr)	116		50-150		%	1		10/10/16 19:10

Batch Information

Analytical Batch: VFC13364
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/10/16 19:10
Container ID: 1168665005-B

Prep Batch: VXX29741
Prep Method: SW5035A
Prep Date/Time: 09/27/16 09:10
Prep Initial Wt./Vol.: 64.28 g
Prep Extract Vol: 38.0138 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	9.25	U	18.5	5.93	ug/Kg	1		10/10/16 19:10
Ethylbenzene	18.6	U	37.1	11.6	ug/Kg	1		10/10/16 19:10
o-Xylene	18.6	U	37.1	11.6	ug/Kg	1		10/10/16 19:10
P & M -Xylene	37.0	U	74.1	22.2	ug/Kg	1		10/10/16 19:10
Toluene	18.6	U	37.1	11.6	ug/Kg	1		10/10/16 19:10
Surrogates								
1,4-Difluorobenzene (surr)	85.2		72-119		%	1		10/10/16 19:10

Batch Information

Analytical Batch: VFC13364
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/10/16 19:10
Container ID: 1168665005-B

Prep Batch: VXX29741
Prep Method: SW5035A
Prep Date/Time: 09/27/16 09:10
Prep Initial Wt./Vol.: 64.28 g
Prep Extract Vol: 38.0138 mL

Results of **16-RBY-CS-01**

Client Sample ID: **16-RBY-CS-01**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665006
Lab Project ID: 1168665

Collection Date: 09/27/16 15:45
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):80.5
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	12.4	U	24.7	7.65	mg/Kg	1		10/09/16 21:27
Surrogates								
5a Androstane (surr)	82.7		50-150		%	1		10/09/16 21:27

Batch Information

Analytical Batch: XFC12940
Analytical Method: AK102
Analyst: CRA
Analytical Date/Time: 10/09/16 21:27
Container ID: 1168665006-A

Prep Batch: XXX36481
Prep Method: SW3550C
Prep Date/Time: 10/07/16 18:06
Prep Initial Wt./Vol.: 30.224 g
Prep Extract Vol: 1 mL

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Results of **16-RBY-CS-01**

Client Sample ID: **16-RBY-CS-01**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665006
Lab Project ID: 1168665

Collection Date: 09/27/16 15:45
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):80.5
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	2.10	U	4.20	1.26	mg/Kg	1		10/10/16 19:29
Surrogates								
4-Bromofluorobenzene (surr)	110		50-150		%	1		10/10/16 19:29

Batch Information

Analytical Batch: VFC13364
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/10/16 19:29
Container ID: 1168665006-B

Prep Batch: VXX29741
Prep Method: SW5035A
Prep Date/Time: 09/27/16 15:45
Prep Initial Wt./Vol.: 52.08 g
Prep Extract Vol: 35.1755 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	10.5	U	21.0	6.72	ug/Kg	1		10/10/16 19:29
Ethylbenzene	21.0	U	42.0	13.1	ug/Kg	1		10/10/16 19:29
o-Xylene	21.0	U	42.0	13.1	ug/Kg	1		10/10/16 19:29
P & M -Xylene	42.0	U	83.9	25.2	ug/Kg	1		10/10/16 19:29
Toluene	21.0	U	42.0	13.1	ug/Kg	1		10/10/16 19:29
Surrogates								
1,4-Difluorobenzene (surr)	87.4		72-119		%	1		10/10/16 19:29

Batch Information

Analytical Batch: VFC13364
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/10/16 19:29
Container ID: 1168665006-B

Prep Batch: VXX29741
Prep Method: SW5035A
Prep Date/Time: 09/27/16 15:45
Prep Initial Wt./Vol.: 52.08 g
Prep Extract Vol: 35.1755 mL

Results of **16-RBY-CS-02**

Client Sample ID: **16-RBY-CS-02**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665007
Lab Project ID: 1168665

Collection Date: 09/27/16 15:50
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):81.4
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	7.65	J	24.3	7.54	mg/Kg	1		10/09/16 21:36
Surrogates								
5a Androstane (surr)	79.8		50-150		%	1		10/09/16 21:36

Batch Information

Analytical Batch: XFC12940
Analytical Method: AK102
Analyst: CRA
Analytical Date/Time: 10/09/16 21:36
Container ID: 1168665007-A

Prep Batch: XXX36481
Prep Method: SW3550C
Prep Date/Time: 10/07/16 18:06
Prep Initial Wt./Vol.: 30.303 g
Prep Extract Vol: 1 mL

Print Date: 10/19/2016 4:07:43PM

J flagging is activated

Results of **16-RBY-CS-02**

Client Sample ID: **16-RBY-CS-02**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665007
Lab Project ID: 1168665

Collection Date: 09/27/16 15:50
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):81.4
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.44	J	3.66	1.10	mg/Kg	1		10/10/16 19:47
Surrogates								
4-Bromofluorobenzene (surr)	117		50-150		%	1		10/10/16 19:47

Batch Information

Analytical Batch: VFC13364
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/10/16 19:47
Container ID: 1168665007-B

Prep Batch: VXX29741
Prep Method: SW5035A
Prep Date/Time: 09/27/16 15:50
Prep Initial Wt./Vol.: 60.92 g
Prep Extract Vol: 36.306 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	9.15	U	18.3	5.85	ug/Kg	1		10/10/16 19:47
Ethylbenzene	18.3	U	36.6	11.4	ug/Kg	1		10/10/16 19:47
o-Xylene	18.3	U	36.6	11.4	ug/Kg	1		10/10/16 19:47
P & M -Xylene	36.6	U	73.2	22.0	ug/Kg	1		10/10/16 19:47
Toluene	18.3	U	36.6	11.4	ug/Kg	1		10/10/16 19:47
Surrogates								
1,4-Difluorobenzene (surr)	87.6		72-119		%	1		10/10/16 19:47

Batch Information

Analytical Batch: VFC13364
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/10/16 19:47
Container ID: 1168665007-B

Prep Batch: VXX29741
Prep Method: SW5035A
Prep Date/Time: 09/27/16 15:50
Prep Initial Wt./Vol.: 60.92 g
Prep Extract Vol: 36.306 mL

Results of **16-RBY-CS-03**

Client Sample ID: **16-RBY-CS-03**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665008
Lab Project ID: 1168665

Collection Date: 09/27/16 15:55
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):79.6
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	181		24.9	7.72	mg/Kg	1		10/09/16 18:03
Surrogates								
5a Androstane (surr)	83.1		50-150		%	1		10/09/16 18:03

Batch Information

Analytical Batch: XFC12931
Analytical Method: AK102
Analyst: CRA
Analytical Date/Time: 10/09/16 18:03
Container ID: 1168665008-A

Prep Batch: XXX36480
Prep Method: SW3550C
Prep Date/Time: 10/07/16 16:00
Prep Initial Wt./Vol.: 30.283 g
Prep Extract Vol: 1 mL

Results of **16-RBY-CS-03**

Client Sample ID: **16-RBY-CS-03**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665008
Lab Project ID: 1168665

Collection Date: 09/27/16 15:55
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):79.6
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	4.93	J	5.33	1.60	mg/Kg	1		10/10/16 20:06
Surrogates								
4-Bromofluorobenzene (surr)	127		50-150		%	1		10/10/16 20:06

Batch Information

Analytical Batch: VFC13364
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/10/16 20:06
Container ID: 1168665008-B

Prep Batch: VXX29741
Prep Method: SW5035A
Prep Date/Time: 09/27/16 15:55
Prep Initial Wt./Vol.: 38.864 g
Prep Extract Vol: 32.9405 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	13.3	U	26.6	8.52	ug/Kg	1		10/10/16 20:06
Ethylbenzene	26.6	U	53.3	16.6	ug/Kg	1		10/10/16 20:06
o-Xylene	200		53.3	16.6	ug/Kg	1		10/10/16 20:06
P & M -Xylene	35.7	J	107	32.0	ug/Kg	1		10/10/16 20:06
Toluene	26.6	U	53.3	16.6	ug/Kg	1		10/10/16 20:06
Surrogates								
1,4-Difluorobenzene (surr)	86.5		72-119		%	1		10/10/16 20:06

Batch Information

Analytical Batch: VFC13364
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/10/16 20:06
Container ID: 1168665008-B

Prep Batch: VXX29741
Prep Method: SW5035A
Prep Date/Time: 09/27/16 15:55
Prep Initial Wt./Vol.: 38.864 g
Prep Extract Vol: 32.9405 mL

Results of **16-RBY-CS-04**

Client Sample ID: **16-RBY-CS-04**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665009
Lab Project ID: 1168665

Collection Date: 09/27/16 16:00
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):79.2
Location:

Results by **Polynuclear Aromatics GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	47100		3150	946	ug/Kg	100		10/12/16 17:09
2-Methylnaphthalene	3190		3150	946	ug/Kg	100		10/12/16 17:09
Acenaphthene	1575	U	3150	946	ug/Kg	100		10/12/16 17:09
Acenaphthylene	1575	U	3150	946	ug/Kg	100		10/12/16 17:09
Anthracene	1575	U	3150	946	ug/Kg	100		10/12/16 17:09
Benzo(a)Anthracene	1575	U	3150	946	ug/Kg	100		10/12/16 17:09
Benzo[a]pyrene	1575	U	3150	946	ug/Kg	100		10/12/16 17:09
Benzo[b]Fluoranthene	1575	U	3150	946	ug/Kg	100		10/12/16 17:09
Benzo[g,h,i]perylene	1575	U	3150	946	ug/Kg	100		10/12/16 17:09
Benzo[k]fluoranthene	1575	U	3150	946	ug/Kg	100		10/12/16 17:09
Chrysene	1575	U	3150	946	ug/Kg	100		10/12/16 17:09
Dibenzo[a,h]anthracene	1575	U	3150	946	ug/Kg	100		10/12/16 17:09
Fluoranthene	1575	U	3150	946	ug/Kg	100		10/12/16 17:09
Fluorene	2820	J	3150	946	ug/Kg	100		10/12/16 17:09
Indeno[1,2,3-c,d] pyrene	1575	U	3150	946	ug/Kg	100		10/12/16 17:09
Naphthalene	1575	U	3150	946	ug/Kg	100		10/12/16 17:09
Phenanthrene	1575	U	3150	946	ug/Kg	100		10/12/16 17:09
Pyrene	1575	U	3150	946	ug/Kg	100		10/12/16 17:09
Surrogates								
2-Fluorobiphenyl (surr)	1240	*	46-115		%	100		10/12/16 17:09
Terphenyl-d14 (surr)	0	*	58-133		%	100		10/12/16 17:09

Batch Information

Analytical Batch: XMS9690
Analytical Method: 8270D SIM (PAH)
Analyst: BRV
Analytical Date/Time: 10/12/16 17:09
Container ID: 1168665009-A

Prep Batch: XXX36485
Prep Method: SW3550C
Prep Date/Time: 10/10/16 09:00
Prep Initial Wt./Vol.: 22.534 g
Prep Extract Vol: 5 mL

Results of **16-RBY-CS-04**

Client Sample ID: **16-RBY-CS-04**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665009
Lab Project ID: 1168665

Collection Date: 09/27/16 16:00
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):79.2
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	32900		1250	388	mg/Kg	10		10/14/16 09:32
Surrogates								
5a Androstane (surr)	0	*	50-150		%	10		10/14/16 09:32

Batch Information

Analytical Batch: XFC12948
Analytical Method: AK102
Analyst: NRO
Analytical Date/Time: 10/14/16 09:32
Container ID: 1168665009-A

Prep Batch: XXX36480
Prep Method: SW3550C
Prep Date/Time: 10/07/16 16:00
Prep Initial Wt./Vol.: 30.289 g
Prep Extract Vol: 5 mL

Print Date: 10/19/2016 4:07:43PM

J flagging is activated

Results of **16-RBY-CS-04**

Client Sample ID: **16-RBY-CS-04**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665009
Lab Project ID: 1168665

Collection Date: 09/27/16 16:00
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):79.2
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	153		4.14	1.24	mg/Kg	1		10/10/16 20:24
Surrogates								
4-Bromofluorobenzene (surr)	614	*	50-150		%	1		10/10/16 20:24

Batch Information

Analytical Batch: VFC13364
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/10/16 20:24
Container ID: 1168665009-B

Prep Batch: VXX29741
Prep Method: SW5035A
Prep Date/Time: 09/27/16 16:00
Prep Initial Wt./Vol.: 55.773 g
Prep Extract Vol: 36.6072 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	10.4 U		20.7	6.63	ug/Kg	1		10/10/16 20:24
Ethylbenzene	204		41.4	12.9	ug/Kg	1		10/10/16 20:24
o-Xylene	4600		41.4	12.9	ug/Kg	1		10/10/16 20:24
P & M -Xylene	1030		82.9	24.9	ug/Kg	1		10/10/16 20:24
Toluene	20.7 U		41.4	12.9	ug/Kg	1		10/10/16 20:24
Surrogates								
1,4-Difluorobenzene (surr)	86.1		72-119		%	1		10/10/16 20:24

Batch Information

Analytical Batch: VFC13364
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/10/16 20:24
Container ID: 1168665009-B

Prep Batch: VXX29741
Prep Method: SW5035A
Prep Date/Time: 09/27/16 16:00
Prep Initial Wt./Vol.: 55.773 g
Prep Extract Vol: 36.6072 mL

Results of **16-RBY-CS-05**

Client Sample ID: **16-RBY-CS-05**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665010
Lab Project ID: 1168665

Collection Date: 09/27/16 16:05
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):80.2
Location:

Results by **Polynuclear Aromatics GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	48600		3090	926	ug/Kg	100		10/12/16 17:29
2-Methylnaphthalene	3240		3090	926	ug/Kg	100		10/12/16 17:29
Acenaphthene	1545	U	3090	926	ug/Kg	100		10/12/16 17:29
Acenaphthylene	1545	U	3090	926	ug/Kg	100		10/12/16 17:29
Anthracene	1545	U	3090	926	ug/Kg	100		10/12/16 17:29
Benzo(a)Anthracene	1545	U	3090	926	ug/Kg	100		10/12/16 17:29
Benzo[a]pyrene	1545	U	3090	926	ug/Kg	100		10/12/16 17:29
Benzo[b]Fluoranthene	1545	U	3090	926	ug/Kg	100		10/12/16 17:29
Benzo[g,h,i]perylene	1545	U	3090	926	ug/Kg	100		10/12/16 17:29
Benzo[k]fluoranthene	1545	U	3090	926	ug/Kg	100		10/12/16 17:29
Chrysene	1545	U	3090	926	ug/Kg	100		10/12/16 17:29
Dibenzo[a,h]anthracene	1545	U	3090	926	ug/Kg	100		10/12/16 17:29
Fluoranthene	1545	U	3090	926	ug/Kg	100		10/12/16 17:29
Fluorene	2780	J	3090	926	ug/Kg	100		10/12/16 17:29
Indeno[1,2,3-c,d] pyrene	1545	U	3090	926	ug/Kg	100		10/12/16 17:29
Naphthalene	1545	U	3090	926	ug/Kg	100		10/12/16 17:29
Phenanthrene	1545	U	3090	926	ug/Kg	100		10/12/16 17:29
Pyrene	1545	U	3090	926	ug/Kg	100		10/12/16 17:29
Surrogates								
2-Fluorobiphenyl (surr)	1160	*	46-115		%	100		10/12/16 17:29
Terphenyl-d14 (surr)	130		58-133		%	100		10/12/16 17:29

Batch Information

Analytical Batch: XMS9690
Analytical Method: 8270D SIM (PAH)
Analyst: BRV
Analytical Date/Time: 10/12/16 17:29
Container ID: 1168665010-A

Prep Batch: XXX36485
Prep Method: SW3550C
Prep Date/Time: 10/10/16 09:00
Prep Initial Wt./Vol.: 22.732 g
Prep Extract Vol: 5 mL

Results of **16-RBY-CS-05**

Client Sample ID: **16-RBY-CS-05**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665010
Lab Project ID: 1168665

Collection Date: 09/27/16 16:05
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):80.2
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	33400		1240	384	mg/Kg	10		10/14/16 08:34
Surrogates								
5a Androstane (surr)	0	*	50-150		%	10		10/14/16 08:34

Batch Information

Analytical Batch: XFC12948
Analytical Method: AK102
Analyst: NRO
Analytical Date/Time: 10/14/16 08:34
Container ID: 1168665010-A

Prep Batch: XXX36480
Prep Method: SW3550C
Prep Date/Time: 10/07/16 16:00
Prep Initial Wt./Vol.: 30.174 g
Prep Extract Vol: 5 mL

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Results of **16-RBY-CS-05**

Client Sample ID: **16-RBY-CS-05**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665010
Lab Project ID: 1168665

Collection Date: 09/27/16 16:05
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):80.2
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	151		4.13	1.24	mg/Kg	1		10/11/16 02:35
Surrogates								
4-Bromofluorobenzene (surr)	588	*	50-150		%	1		10/11/16 02:35

Batch Information

Analytical Batch: VFC13364
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/11/16 02:35
Container ID: 1168665010-B

Prep Batch: VXX29742
Prep Method: SW5035A
Prep Date/Time: 09/27/16 16:05
Prep Initial Wt./Vol.: 53.947 g
Prep Extract Vol: 35.6944 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	10.3 U		20.6	6.60	ug/Kg	1		10/11/16 02:35
Ethylbenzene	189		41.3	12.9	ug/Kg	1		10/11/16 02:35
o-Xylene	4350		41.3	12.9	ug/Kg	1		10/11/16 02:35
P & M -Xylene	989		82.5	24.8	ug/Kg	1		10/11/16 02:35
Toluene	20.6 U		41.3	12.9	ug/Kg	1		10/11/16 02:35
Surrogates								
1,4-Difluorobenzene (surr)	86.1		72-119		%	1		10/11/16 02:35

Batch Information

Analytical Batch: VFC13364
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/11/16 02:35
Container ID: 1168665010-B

Prep Batch: VXX29742
Prep Method: SW5035A
Prep Date/Time: 09/27/16 16:05
Prep Initial Wt./Vol.: 53.947 g
Prep Extract Vol: 35.6944 mL

Results of **16-RBY-CS-06**

Client Sample ID: **16-RBY-CS-06**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665011
Lab Project ID: 1168665

Collection Date: 09/27/16 16:08
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):75.3
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	20.5	J	26.4	8.20	mg/Kg	1		10/09/16 18:32
Surrogates								
5a Androstane (surr)	73.3		50-150		%	1		10/09/16 18:32

Batch Information

Analytical Batch: XFC12931
Analytical Method: AK102
Analyst: CRA
Analytical Date/Time: 10/09/16 18:32
Container ID: 1168665011-A

Prep Batch: XXX36480
Prep Method: SW3550C
Prep Date/Time: 10/07/16 16:00
Prep Initial Wt./Vol.: 30.143 g
Prep Extract Vol: 1 mL

Results of **16-RBY-CS-06**

Client Sample ID: **16-RBY-CS-06**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665011
Lab Project ID: 1168665

Collection Date: 09/27/16 16:08
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):75.3
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	2.96	J	4.11	1.23	mg/Kg	1		10/11/16 02:54
Surrogates								
4-Bromofluorobenzene (surr)	127		50-150		%	1		10/11/16 02:54

Batch Information

Analytical Batch: VFC13364
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/11/16 02:54
Container ID: 1168665011-B

Prep Batch: VXX29742
Prep Method: SW5035A
Prep Date/Time: 09/27/16 16:08
Prep Initial Wt./Vol.: 67.106 g
Prep Extract Vol: 41.5784 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	10.3	U	20.6	6.58	ug/Kg	1		10/11/16 02:54
Ethylbenzene	20.6	U	41.1	12.8	ug/Kg	1		10/11/16 02:54
o-Xylene	73.2		41.1	12.8	ug/Kg	1		10/11/16 02:54
P & M -Xylene	41.1	U	82.3	24.7	ug/Kg	1		10/11/16 02:54
Toluene	20.6	U	41.1	12.8	ug/Kg	1		10/11/16 02:54
Surrogates								
1,4-Difluorobenzene (surr)	88.6		72-119		%	1		10/11/16 02:54

Batch Information

Analytical Batch: VFC13364
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/11/16 02:54
Container ID: 1168665011-B

Prep Batch: VXX29742
Prep Method: SW5035A
Prep Date/Time: 09/27/16 16:08
Prep Initial Wt./Vol.: 67.106 g
Prep Extract Vol: 41.5784 mL

Results of **16-RBY-CS-07**

Client Sample ID: **16-RBY-CS-07**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665012
Lab Project ID: 1168665

Collection Date: 09/27/16 16:12
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):74.4
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	18.2	J	26.6	8.24	mg/Kg	1		10/09/16 18:42
Surrogates								
5a Androstane (surr)	78.9		50-150		%	1		10/09/16 18:42

Batch Information

Analytical Batch: XFC12931
Analytical Method: AK102
Analyst: CRA
Analytical Date/Time: 10/09/16 18:42
Container ID: 1168665012-A

Prep Batch: XXX36480
Prep Method: SW3550C
Prep Date/Time: 10/07/16 16:00
Prep Initial Wt./Vol.: 30.349 g
Prep Extract Vol: 1 mL

Print Date: 10/19/2016 4:07:43PM

J flagging is activated

Results of **16-RBY-CS-07**

Client Sample ID: **16-RBY-CS-07**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665012
Lab Project ID: 1168665

Collection Date: 09/27/16 16:12
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):74.4
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.99	J	4.94	1.48	mg/Kg	1		10/11/16 03:12
Surrogates								
4-Bromofluorobenzene (surr)	119		50-150		%	1		10/11/16 03:12

Batch Information

Analytical Batch: VFC13364
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/11/16 03:12
Container ID: 1168665012-B

Prep Batch: VXX29742
Prep Method: SW5035A
Prep Date/Time: 09/27/16 16:12
Prep Initial Wt./Vol.: 52.228 g
Prep Extract Vol: 38.3621 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	12.4	U	24.7	7.90	ug/Kg	1		10/11/16 03:12
Ethylbenzene	24.7	U	49.4	15.4	ug/Kg	1		10/11/16 03:12
o-Xylene	29.6	J	49.4	15.4	ug/Kg	1		10/11/16 03:12
P & M -Xylene	49.4	U	98.7	29.6	ug/Kg	1		10/11/16 03:12
Toluene	24.7	U	49.4	15.4	ug/Kg	1		10/11/16 03:12
Surrogates								
1,4-Difluorobenzene (surr)	87.8		72-119		%	1		10/11/16 03:12

Batch Information

Analytical Batch: VFC13364
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/11/16 03:12
Container ID: 1168665012-B

Prep Batch: VXX29742
Prep Method: SW5035A
Prep Date/Time: 09/27/16 16:12
Prep Initial Wt./Vol.: 52.228 g
Prep Extract Vol: 38.3621 mL

Results of **16-RBY-RS-01**

Client Sample ID: **16-RBY-RS-01**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665013
Lab Project ID: 1168665

Collection Date: 09/27/16 17:05
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):91.3
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	65.0		21.9	6.78	mg/Kg	1		10/09/16 18:52
Surrogates								
5a Androstane (surr)	88.2		50-150		%	1		10/09/16 18:52

Batch Information

Analytical Batch: XFC12931
Analytical Method: AK102
Analyst: CRA
Analytical Date/Time: 10/09/16 18:52
Container ID: 1168665013-A

Prep Batch: XXX36480
Prep Method: SW3550C
Prep Date/Time: 10/07/16 16:00
Prep Initial Wt./Vol.: 30.034 g
Prep Extract Vol: 1 mL

Print Date: 10/19/2016 4:07:43PM

J flagging is activated

Results of **16-RBY-RS-01**

Client Sample ID: **16-RBY-RS-01**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665013
Lab Project ID: 1168665

Collection Date: 09/27/16 17:05
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):91.3
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.97	J	2.34	0.703	mg/Kg	1		10/11/16 04:27
Surrogates								
4-Bromofluorobenzene (surr)	136		50-150		%	1		10/11/16 04:27

Batch Information

Analytical Batch: VFC13364
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/11/16 04:27
Container ID: 1168665013-B

Prep Batch: VXX29742
Prep Method: SW5035A
Prep Date/Time: 09/27/16 17:05
Prep Initial Wt./Vol.: 73.398 g
Prep Extract Vol: 31.3984 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	5.85	U	11.7	3.75	ug/Kg	1		10/11/16 04:27
Ethylbenzene	11.7	U	23.4	7.31	ug/Kg	1		10/11/16 04:27
o-Xylene	10.3	J	23.4	7.31	ug/Kg	1		10/11/16 04:27
P & M -Xylene	16.6	J	46.9	14.1	ug/Kg	1		10/11/16 04:27
Toluene	11.7	U	23.4	7.31	ug/Kg	1		10/11/16 04:27
Surrogates								
1,4-Difluorobenzene (surr)	87.2		72-119		%	1		10/11/16 04:27

Batch Information

Analytical Batch: VFC13364
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/11/16 04:27
Container ID: 1168665013-B

Prep Batch: VXX29742
Prep Method: SW5035A
Prep Date/Time: 09/27/16 17:05
Prep Initial Wt./Vol.: 73.398 g
Prep Extract Vol: 31.3984 mL

Results of **16-RBY-CS-08**

Client Sample ID: **16-RBY-CS-08**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665014
Lab Project ID: 1168665

Collection Date: 09/29/16 14:45
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):85.1
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	5050		232	72.0	mg/Kg	10		10/14/16 08:53
Surrogates								
5a Androstane (surr)	119		50-150		%	10		10/14/16 08:53

Batch Information

Analytical Batch: XFC12948
Analytical Method: AK102
Analyst: NRO
Analytical Date/Time: 10/14/16 08:53
Container ID: 1168665014-A

Prep Batch: XXX36480
Prep Method: SW3550C
Prep Date/Time: 10/07/16 16:00
Prep Initial Wt./Vol.: 30.358 g
Prep Extract Vol: 1 mL

Print Date: 10/19/2016 4:07:43PM

J flagging is activated

Results of **16-RBY-CS-08**

Client Sample ID: **16-RBY-CS-08**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665014
Lab Project ID: 1168665

Collection Date: 09/29/16 14:45
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):85.1
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.73	U	3.46	1.04	mg/Kg	1		10/11/16 15:53
Surrogates								
4-Bromofluorobenzene (surr)	106		50-150		%	1		10/11/16 15:53

Batch Information

Analytical Batch: VFC13366
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/11/16 15:53
Container ID: 1168665014-B

Prep Batch: VXX29749
Prep Method: SW5035A
Prep Date/Time: 09/29/16 14:45
Prep Initial Wt./Vol.: 56.814 g
Prep Extract Vol: 33.4538 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	8.65	U	17.3	5.53	ug/Kg	1		10/11/16 15:53
Ethylbenzene	17.3	U	34.6	10.8	ug/Kg	1		10/11/16 15:53
o-Xylene	17.3	U	34.6	10.8	ug/Kg	1		10/11/16 15:53
P & M -Xylene	34.6	U	69.2	20.8	ug/Kg	1		10/11/16 15:53
Toluene	17.3	U	34.6	10.8	ug/Kg	1		10/11/16 15:53
Surrogates								
1,4-Difluorobenzene (surr)	87.7		72-119		%	1		10/11/16 15:53

Batch Information

Analytical Batch: VFC13366
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/11/16 15:53
Container ID: 1168665014-B

Prep Batch: VXX29749
Prep Method: SW5035A
Prep Date/Time: 09/29/16 14:45
Prep Initial Wt./Vol.: 56.814 g
Prep Extract Vol: 33.4538 mL

Results of **16-RBY-CS-09**

Client Sample ID: **16-RBY-CS-09**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665015
Lab Project ID: 1168665

Collection Date: 09/29/16 14:50
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):76.8
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	1900		129	40.0	mg/Kg	1		10/09/16 19:11
Surrogates								
5a Androstane (surr)	97.4		50-150		%	1		10/09/16 19:11

Batch Information

Analytical Batch: XFC12931
Analytical Method: AK102
Analyst: CRA
Analytical Date/Time: 10/09/16 19:11
Container ID: 1168665015-A

Prep Batch: XXX36480
Prep Method: SW3550C
Prep Date/Time: 10/07/16 16:00
Prep Initial Wt./Vol.: 30.246 g
Prep Extract Vol: 5 mL

Results of **16-RBY-CS-09**

Client Sample ID: **16-RBY-CS-09**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665015
Lab Project ID: 1168665

Collection Date: 09/29/16 14:50
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):76.8
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.60	J	4.73	1.42	mg/Kg	1		10/11/16 16:11
Surrogates								
4-Bromofluorobenzene (surr)	106		50-150		%	1		10/11/16 16:11

Batch Information

Analytical Batch: VFC13366
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/11/16 16:11
Container ID: 1168665015-B

Prep Batch: VXX29749
Prep Method: SW5035A
Prep Date/Time: 09/29/16 14:50
Prep Initial Wt./Vol.: 50.572 g
Prep Extract Vol: 36.7373 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	11.8	U	23.6	7.57	ug/Kg	1		10/11/16 16:11
Ethylbenzene	23.6	U	47.3	14.8	ug/Kg	1		10/11/16 16:11
o-Xylene	23.6	U	47.3	14.8	ug/Kg	1		10/11/16 16:11
P & M -Xylene	47.3	U	94.6	28.4	ug/Kg	1		10/11/16 16:11
Toluene	23.6	U	47.3	14.8	ug/Kg	1		10/11/16 16:11
Surrogates								
1,4-Difluorobenzene (surr)	88.6		72-119		%	1		10/11/16 16:11

Batch Information

Analytical Batch: VFC13366
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/11/16 16:11
Container ID: 1168665015-B

Prep Batch: VXX29749
Prep Method: SW5035A
Prep Date/Time: 09/29/16 14:50
Prep Initial Wt./Vol.: 50.572 g
Prep Extract Vol: 36.7373 mL

Results of **16-RBY-CS-10**

Client Sample ID: **16-RBY-CS-10**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665016
Lab Project ID: 1168665

Collection Date: 09/29/16 14:55
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):83.2
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	48.1		24.0	7.43	mg/Kg	1		10/09/16 19:21
Surrogates								
5a Androstane (surr)	94.9		50-150		%	1		10/09/16 19:21

Batch Information

Analytical Batch: XFC12931
Analytical Method: AK102
Analyst: CRA
Analytical Date/Time: 10/09/16 19:21
Container ID: 1168665016-A

Prep Batch: XXX36480
Prep Method: SW3550C
Prep Date/Time: 10/07/16 16:00
Prep Initial Wt./Vol.: 30.077 g
Prep Extract Vol: 1 mL

Results of **16-RBY-CS-10**

Client Sample ID: **16-RBY-CS-10**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665016
Lab Project ID: 1168665

Collection Date: 09/29/16 14:55
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):83.2
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.50	J	3.80	1.14	mg/Kg	1		10/11/16 16:30
Surrogates								
4-Bromofluorobenzene (surr)	108		50-150		%	1		10/11/16 16:30

Batch Information

Analytical Batch: VFC13366
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/11/16 16:30
Container ID: 1168665016-B

Prep Batch: VXX29749
Prep Method: SW5035A
Prep Date/Time: 09/29/16 14:55
Prep Initial Wt./Vol.: 53.832 g
Prep Extract Vol: 34.038 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	9.50	U	19.0	6.08	ug/Kg	1		10/11/16 16:30
Ethylbenzene	19.0	U	38.0	11.9	ug/Kg	1		10/11/16 16:30
o-Xylene	19.0	U	38.0	11.9	ug/Kg	1		10/11/16 16:30
P & M -Xylene	38.0	U	76.0	22.8	ug/Kg	1		10/11/16 16:30
Toluene	19.0	U	38.0	11.9	ug/Kg	1		10/11/16 16:30
Surrogates								
1,4-Difluorobenzene (surr)	86.7		72-119		%	1		10/11/16 16:30

Batch Information

Analytical Batch: VFC13366
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/11/16 16:30
Container ID: 1168665016-B

Prep Batch: VXX29749
Prep Method: SW5035A
Prep Date/Time: 09/29/16 14:55
Prep Initial Wt./Vol.: 53.832 g
Prep Extract Vol: 34.038 mL

Results of **16-RBY-CS-11**

Client Sample ID: **16-RBY-CS-11**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665017
Lab Project ID: 1168665

Collection Date: 09/29/16 15:05
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):81.5
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	9.94	J	24.3	7.52	mg/Kg	1		10/09/16 19:31
Surrogates								
5a Androstane (surr)	87.4		50-150		%	1		10/09/16 19:31

Batch Information

Analytical Batch: XFC12931
Analytical Method: AK102
Analyst: CRA
Analytical Date/Time: 10/09/16 19:31
Container ID: 1168665017-A

Prep Batch: XXX36480
Prep Method: SW3550C
Prep Date/Time: 10/07/16 16:00
Prep Initial Wt./Vol.: 30.323 g
Prep Extract Vol: 1 mL

Results of **16-RBY-CS-11**

Client Sample ID: **16-RBY-CS-11**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665017
Lab Project ID: 1168665

Collection Date: 09/29/16 15:05
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):81.5
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	2.21	U	4.42	1.32	mg/Kg	1		10/11/16 16:48
Surrogates								
4-Bromofluorobenzene (surr)	105		50-150		%	1		10/11/16 16:48

Batch Information

Analytical Batch: VFC13366
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/11/16 16:48
Container ID: 1168665017-B

Prep Batch: VXX29749
Prep Method: SW5035A
Prep Date/Time: 09/29/16 15:05
Prep Initial Wt./Vol.: 46.701 g
Prep Extract Vol: 33.623 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	11.1	U	22.1	7.06	ug/Kg	1		10/11/16 16:48
Ethylbenzene	22.1	U	44.2	13.8	ug/Kg	1		10/11/16 16:48
o-Xylene	22.1	U	44.2	13.8	ug/Kg	1		10/11/16 16:48
P & M -Xylene	44.1	U	88.3	26.5	ug/Kg	1		10/11/16 16:48
Toluene	22.1	U	44.2	13.8	ug/Kg	1		10/11/16 16:48
Surrogates								
1,4-Difluorobenzene (surr)	87.3		72-119		%	1		10/11/16 16:48

Batch Information

Analytical Batch: VFC13366
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/11/16 16:48
Container ID: 1168665017-B

Prep Batch: VXX29749
Prep Method: SW5035A
Prep Date/Time: 09/29/16 15:05
Prep Initial Wt./Vol.: 46.701 g
Prep Extract Vol: 33.623 mL

Results of **16-RBY-CS-12**

Client Sample ID: **16-RBY-CS-12**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665018
Lab Project ID: 1168665

Collection Date: 09/29/16 15:50
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):80.1
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	9.23	J	24.9	7.72	mg/Kg	1		10/09/16 19:40
Surrogates								
5a Androstane (surr)	77.5		50-150		%	1		10/09/16 19:40

Batch Information

Analytical Batch: XFC12931
Analytical Method: AK102
Analyst: CRA
Analytical Date/Time: 10/09/16 19:40
Container ID: 1168665018-A

Prep Batch: XXX36480
Prep Method: SW3550C
Prep Date/Time: 10/07/16 16:00
Prep Initial Wt./Vol.: 30.088 g
Prep Extract Vol: 1 mL

Print Date: 10/19/2016 4:07:43PM

J flagging is activated

Results of **16-RBY-CS-12**

Client Sample ID: **16-RBY-CS-12**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665018
Lab Project ID: 1168665

Collection Date: 09/29/16 15:50
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):80.1
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.52	J	4.10	1.23	mg/Kg	1		10/11/16 17:07
Surrogates								
4-Bromofluorobenzene (surr)	119		50-150		%	1		10/11/16 17:07

Batch Information

Analytical Batch: VFC13366
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/11/16 17:07
Container ID: 1168665018-B

Prep Batch: VXX29749
Prep Method: SW5035A
Prep Date/Time: 09/29/16 15:50
Prep Initial Wt./Vol.: 54.755 g
Prep Extract Vol: 35.9222 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	10.3	U	20.5	6.56	ug/Kg	1		10/11/16 17:07
Ethylbenzene	20.5	U	41.0	12.8	ug/Kg	1		10/11/16 17:07
o-Xylene	20.5	U	41.0	12.8	ug/Kg	1		10/11/16 17:07
P & M -Xylene	41.0	U	82.0	24.6	ug/Kg	1		10/11/16 17:07
Toluene	20.5	U	41.0	12.8	ug/Kg	1		10/11/16 17:07
Surrogates								
1,4-Difluorobenzene (surr)	85.6		72-119		%	1		10/11/16 17:07

Batch Information

Analytical Batch: VFC13366
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/11/16 17:07
Container ID: 1168665018-B

Prep Batch: VXX29749
Prep Method: SW5035A
Prep Date/Time: 09/29/16 15:50
Prep Initial Wt./Vol.: 54.755 g
Prep Extract Vol: 35.9222 mL

Results of **16-RBY-CS-13**

Client Sample ID: **16-RBY-CS-13**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665019
Lab Project ID: 1168665

Collection Date: 09/29/16 16:00
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):85.9
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	121		23.2	7.20	mg/Kg	1		10/09/16 19:50
Surrogates								
5a Androstane (surr)	77		50-150		%	1		10/09/16 19:50

Batch Information

Analytical Batch: XFC12931
Analytical Method: AK102
Analyst: CRA
Analytical Date/Time: 10/09/16 19:50
Container ID: 1168665019-A

Prep Batch: XXX36480
Prep Method: SW3550C
Prep Date/Time: 10/07/16 16:00
Prep Initial Wt./Vol.: 30.041 g
Prep Extract Vol: 1 mL

Results of **16-RBY-CS-13**

Client Sample ID: **16-RBY-CS-13**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665019
Lab Project ID: 1168665

Collection Date: 09/29/16 16:00
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):85.9
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	5.53		3.64	1.09	mg/Kg	1		10/12/16 23:04
Surrogates								
4-Bromofluorobenzene (surr)	133		50-150		%	1		10/12/16 23:04

Batch Information

Analytical Batch: VFC13370
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/12/16 23:04
Container ID: 1168665019-B

Prep Batch: VXX29759
Prep Method: SW5035A
Prep Date/Time: 09/29/16 16:00
Prep Initial Wt./Vol.: 51.462 g
Prep Extract Vol: 32.2335 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	9.10 U		18.2	5.83	ug/Kg	1		10/12/16 23:04
Ethylbenzene	18.2 U		36.4	11.4	ug/Kg	1		10/12/16 23:04
o-Xylene	18.6 J		36.4	11.4	ug/Kg	1		10/12/16 23:04
P & M -Xylene	24.1 J		72.9	21.9	ug/Kg	1		10/12/16 23:04
Toluene	18.2 U		36.4	11.4	ug/Kg	1		10/12/16 23:04
Surrogates								
1,4-Difluorobenzene (surr)	86.1		72-119		%	1		10/12/16 23:04

Batch Information

Analytical Batch: VFC13370
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/12/16 23:04
Container ID: 1168665019-B

Prep Batch: VXX29759
Prep Method: SW5035A
Prep Date/Time: 09/29/16 16:00
Prep Initial Wt./Vol.: 51.462 g
Prep Extract Vol: 32.2335 mL

Results of **16-RBY-CS-14**

Client Sample ID: **16-RBY-CS-14**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665020
Lab Project ID: 1168665

Collection Date: 09/29/16 16:02
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):89.2
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	159		22.4	6.93	mg/Kg	1		10/09/16 20:00
Surrogates								
5a Androstane (surr)	86.9		50-150		%	1		10/09/16 20:00

Batch Information

Analytical Batch: XFC12931
Analytical Method: AK102
Analyst: CRA
Analytical Date/Time: 10/09/16 20:00
Container ID: 1168665020-A

Prep Batch: XXX36480
Prep Method: SW3550C
Prep Date/Time: 10/07/16 16:00
Prep Initial Wt./Vol.: 30.076 g
Prep Extract Vol: 1 mL

Results of **16-RBY-CS-14**

Client Sample ID: **16-RBY-CS-14**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665020
Lab Project ID: 1168665

Collection Date: 09/29/16 16:02
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):89.2
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	8.56		3.17	0.952	mg/Kg	1		10/13/16 00:00
Surrogates								
4-Bromofluorobenzene (surr)	163	*	50-150		%	1		10/13/16 00:00

Batch Information

Analytical Batch: VFC13370
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/13/16 00:00
Container ID: 1168665020-B

Prep Batch: VXX29759
Prep Method: SW5035A
Prep Date/Time: 09/29/16 16:02
Prep Initial Wt./Vol.: 54.507 g
Prep Extract Vol: 30.8701 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	7.95	U	15.9	5.08	ug/Kg	1		10/13/16 00:00
Ethylbenzene	10.5	J	31.7	9.90	ug/Kg	1		10/13/16 00:00
o-Xylene	52.7		31.7	9.90	ug/Kg	1		10/13/16 00:00
P & M -Xylene	55.5	J	63.5	19.0	ug/Kg	1		10/13/16 00:00
Toluene	15.9	U	31.7	9.90	ug/Kg	1		10/13/16 00:00
Surrogates								
1,4-Difluorobenzene (surr)	85.7		72-119		%	1		10/13/16 00:00

Batch Information

Analytical Batch: VFC13370
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/13/16 00:00
Container ID: 1168665020-B

Prep Batch: VXX29759
Prep Method: SW5035A
Prep Date/Time: 09/29/16 16:02
Prep Initial Wt./Vol.: 54.507 g
Prep Extract Vol: 30.8701 mL

Results of **16-RBY-CS-15**

Client Sample ID: **16-RBY-CS-15**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665021
Lab Project ID: 1168665

Collection Date: 09/29/16 16:04
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):90.1
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	121		22.2	6.88	mg/Kg	1		10/09/16 20:29
Surrogates								
5a Androstane (surr)	77.1		50-150		%	1		10/09/16 20:29

Batch Information

Analytical Batch: XFC12931
Analytical Method: AK102
Analyst: CRA
Analytical Date/Time: 10/09/16 20:29
Container ID: 1168665021-A

Prep Batch: XXX36480
Prep Method: SW3550C
Prep Date/Time: 10/07/16 16:00
Prep Initial Wt./Vol.: 30.006 g
Prep Extract Vol: 1 mL

Results of **16-RBY-CS-15**

Client Sample ID: **16-RBY-CS-15**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665021
Lab Project ID: 1168665

Collection Date: 09/29/16 16:04
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):90.1
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	18.9		3.40	1.02	mg/Kg	1		10/13/16 00:18
Surrogates								
4-Bromofluorobenzene (surr)	231	*	50-150		%	1		10/13/16 00:18

Batch Information

Analytical Batch: VFC13370
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/13/16 00:18
Container ID: 1168665021-B

Prep Batch: VXX29759
Prep Method: SW5035A
Prep Date/Time: 09/29/16 16:04
Prep Initial Wt./Vol.: 48.668 g
Prep Extract Vol: 29.8272 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	8.50	U	17.0	5.44	ug/Kg	1		10/13/16 00:18
Ethylbenzene	16.0	J	34.0	10.6	ug/Kg	1		10/13/16 00:18
o-Xylene	99.7		34.0	10.6	ug/Kg	1		10/13/16 00:18
P & M -Xylene	177		68.0	20.4	ug/Kg	1		10/13/16 00:18
Toluene	17.0	U	34.0	10.6	ug/Kg	1		10/13/16 00:18
Surrogates								
1,4-Difluorobenzene (surr)	86.3		72-119		%	1		10/13/16 00:18

Batch Information

Analytical Batch: VFC13370
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/13/16 00:18
Container ID: 1168665021-B

Prep Batch: VXX29759
Prep Method: SW5035A
Prep Date/Time: 09/29/16 16:04
Prep Initial Wt./Vol.: 48.668 g
Prep Extract Vol: 29.8272 mL

Results of **16-RBY-CS-16**

Client Sample ID: **16-RBY-CS-16**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665022
Lab Project ID: 1168665

Collection Date: 09/29/16 16:06
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):90.2
Location:

Results by **Polynuclear Aromatics GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	24900		2750	824	ug/Kg	500		10/13/16 14:57
2-Methylnaphthalene	29600		2750	824	ug/Kg	500		10/13/16 14:57
Acenaphthene	275	U	549	165	ug/Kg	100		10/12/16 17:50
Acenaphthylene	275	U	549	165	ug/Kg	100		10/12/16 17:50
Anthracene	275	U	549	165	ug/Kg	100		10/12/16 17:50
Benzo(a)Anthracene	239	J	549	165	ug/Kg	100		10/12/16 17:50
Benzo[a]pyrene	275	U	549	165	ug/Kg	100		10/12/16 17:50
Benzo[b]Fluoranthene	275	U	549	165	ug/Kg	100		10/12/16 17:50
Benzo[g,h,i]perylene	275	U	549	165	ug/Kg	100		10/12/16 17:50
Benzo[k]fluoranthene	275	U	549	165	ug/Kg	100		10/12/16 17:50
Chrysene	275	U	549	165	ug/Kg	100		10/12/16 17:50
Dibenzo[a,h]anthracene	275	U	549	165	ug/Kg	100		10/12/16 17:50
Fluoranthene	2700		549	165	ug/Kg	100		10/12/16 17:50
Fluorene	275	U	549	165	ug/Kg	100		10/12/16 17:50
Indeno[1,2,3-c,d] pyrene	275	U	549	165	ug/Kg	100		10/12/16 17:50
Naphthalene	16000		2750	824	ug/Kg	500		10/13/16 14:57
Phenanthrene	5310		549	165	ug/Kg	100		10/12/16 17:50
Pyrene	345	J	549	165	ug/Kg	100		10/12/16 17:50
Surrogates								
2-Fluorobiphenyl (surr)	96.1		46-115		%	100		10/12/16 17:50
Terphenyl-d14 (surr)	124		58-133		%	100		10/12/16 17:50

Batch Information

Analytical Batch: XMS9690
Analytical Method: 8270D SIM (PAH)
Analyst: BRV
Analytical Date/Time: 10/12/16 17:50
Container ID: 1168665022-A

Prep Batch: XXX36485
Prep Method: SW3550C
Prep Date/Time: 10/10/16 09:00
Prep Initial Wt./Vol.: 22.701 g
Prep Extract Vol: 1 mL

Analytical Batch: XMS9692
Analytical Method: 8270D SIM (PAH)
Analyst: BRV
Analytical Date/Time: 10/13/16 14:57
Container ID: 1168665022-A

Prep Batch: XXX36485
Prep Method: SW3550C
Prep Date/Time: 10/10/16 09:00
Prep Initial Wt./Vol.: 22.701 g
Prep Extract Vol: 1 mL

Results of **16-RBY-CS-16**

Client Sample ID: **16-RBY-CS-16**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665022
Lab Project ID: 1168665

Collection Date: 09/29/16 16:06
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):90.2
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	7530		442	137	mg/Kg	20		10/14/16 09:03
Surrogates								
5a Androstane (surr)	116		50-150		%	20		10/14/16 09:03

Batch Information

Analytical Batch: XFC12948
Analytical Method: AK102
Analyst: NRO
Analytical Date/Time: 10/14/16 09:03
Container ID: 1168665022-A

Prep Batch: XXX36480
Prep Method: SW3550C
Prep Date/Time: 10/07/16 16:00
Prep Initial Wt./Vol.: 30.111 g
Prep Extract Vol: 1 mL

Results of **16-RBY-CS-16**

Client Sample ID: **16-RBY-CS-16**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665022
Lab Project ID: 1168665

Collection Date: 09/29/16 16:06
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):90.2
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	429		62.8	18.8	mg/Kg	20		10/13/16 13:04
Surrogates								
4-Bromofluorobenzene (surr)	4800	*	50-150		%	20		10/13/16 13:04

Batch Information

Analytical Batch: VFC13373
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/13/16 13:04
Container ID: 1168665022-B

Prep Batch: VXX29762
Prep Method: SW5035A
Prep Date/Time: 09/29/16 16:06
Prep Initial Wt./Vol.: 53.372 g
Prep Extract Vol: 30.2248 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	11.6	J	15.7	5.02	ug/Kg	1		10/13/16 00:37
Ethylbenzene	980		31.4	9.79	ug/Kg	1		10/13/16 00:37
o-Xylene	6410		31.4	9.79	ug/Kg	1		10/13/16 00:37
P & M -Xylene	9290		62.8	18.8	ug/Kg	1		10/13/16 00:37
Toluene	520		31.4	9.79	ug/Kg	1		10/13/16 00:37
Surrogates								
1,4-Difluorobenzene (surr)	85.6		72-119		%	1		10/13/16 00:37

Batch Information

Analytical Batch: VFC13370
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/13/16 00:37
Container ID: 1168665022-B

Prep Batch: VXX29759
Prep Method: SW5035A
Prep Date/Time: 09/29/16 16:06
Prep Initial Wt./Vol.: 53.372 g
Prep Extract Vol: 30.2248 mL

Results of **16-RBY-CS-17**

Client Sample ID: **16-RBY-CS-17**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665023
Lab Project ID: 1168665

Collection Date: 09/29/16 16:08
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):90.4
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	8810		442	137	mg/Kg	20		10/14/16 09:12
Surrogates								
5a Androstane (surr)	131		50-150		%	20		10/14/16 09:12

Batch Information

Analytical Batch: XFC12948
Analytical Method: AK102
Analyst: NRO
Analytical Date/Time: 10/14/16 09:12
Container ID: 1168665023-A

Prep Batch: XXX36480
Prep Method: SW3550C
Prep Date/Time: 10/07/16 16:00
Prep Initial Wt./Vol.: 30.06 g
Prep Extract Vol: 1 mL

Results of **16-RBY-CS-17**

Client Sample ID: **16-RBY-CS-17**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665023
Lab Project ID: 1168665

Collection Date: 09/29/16 16:08
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):90.4
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	463		62.5	18.7	mg/Kg	20		10/13/16 13:22
Surrogates								
4-Bromofluorobenzene (surr)	5360	*	50-150		%	20		10/13/16 13:22

Batch Information

Analytical Batch: VFC13373
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/13/16 13:22
Container ID: 1168665023-B

Prep Batch: VXX29762
Prep Method: SW5035A
Prep Date/Time: 09/29/16 16:08
Prep Initial Wt./Vol.: 53.378 g
Prep Extract Vol: 30.1415 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	11.9 J		15.6	5.00	ug/Kg	1		10/13/16 01:33
Ethylbenzene	876		31.2	9.75	ug/Kg	1		10/13/16 01:33
o-Xylene	5530		31.2	9.75	ug/Kg	1		10/13/16 01:33
P & M -Xylene	8050		62.5	18.7	ug/Kg	1		10/13/16 01:33
Toluene	477		31.2	9.75	ug/Kg	1		10/13/16 01:33
Surrogates								
1,4-Difluorobenzene (surr)	84.3		72-119		%	1		10/13/16 01:33

Batch Information

Analytical Batch: VFC13370
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/13/16 01:33
Container ID: 1168665023-B

Prep Batch: VXX29759
Prep Method: SW5035A
Prep Date/Time: 09/29/16 16:08
Prep Initial Wt./Vol.: 53.378 g
Prep Extract Vol: 30.1415 mL

Results of **16-RBY-CS-18**

Client Sample ID: **16-RBY-CS-18**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665024
Lab Project ID: 1168665

Collection Date: 09/29/16 16:10
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):88.7
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	15400		895	278	mg/Kg	40		10/14/16 09:22
Surrogates								
5a Androstane (surr)	114		50-150		%	40		10/14/16 09:22

Batch Information

Analytical Batch: XFC12948
Analytical Method: AK102
Analyst: NRO
Analytical Date/Time: 10/14/16 09:22
Container ID: 1168665024-A

Prep Batch: XXX36480
Prep Method: SW3550C
Prep Date/Time: 10/07/16 16:00
Prep Initial Wt./Vol.: 30.212 g
Prep Extract Vol: 1 mL

Print Date: 10/19/2016 4:07:43PM

J flagging is activated

Results of **16-RBY-CS-18**

Client Sample ID: **16-RBY-CS-18**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665024
Lab Project ID: 1168665

Collection Date: 09/29/16 16:10
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):88.7
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	533		60.9	18.3	mg/Kg	20		10/13/16 13:41
Surrogates								
4-Bromofluorobenzene (surr)	6550	*	50-150		%	20		10/13/16 13:41

Batch Information

Analytical Batch: VFC13373
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/13/16 13:41
Container ID: 1168665024-B

Prep Batch: VXX29762
Prep Method: SW5035A
Prep Date/Time: 09/29/16 16:10
Prep Initial Wt./Vol.: 58.522 g
Prep Extract Vol: 31.5988 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	28.3		15.2	4.87	ug/Kg	1		10/13/16 01:52
Ethylbenzene	1400		30.4	9.49	ug/Kg	1		10/13/16 01:52
o-Xylene	14700		609	190	ug/Kg	20		10/13/16 13:41
P & M -Xylene	20800		1220	365	ug/Kg	20		10/13/16 13:41
Toluene	871		30.4	9.49	ug/Kg	1		10/13/16 01:52
Surrogates								
1,4-Difluorobenzene (surr)	86.5		72-119		%	1		10/13/16 01:52

Batch Information

Analytical Batch: VFC13370
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/13/16 01:52
Container ID: 1168665024-B

Prep Batch: VXX29759
Prep Method: SW5035A
Prep Date/Time: 09/29/16 16:10
Prep Initial Wt./Vol.: 58.522 g
Prep Extract Vol: 31.5988 mL

Analytical Batch: VFC13373
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/13/16 13:41
Container ID: 1168665024-B

Prep Batch: VXX29762
Prep Method: SW5035A
Prep Date/Time: 09/29/16 16:10
Prep Initial Wt./Vol.: 58.522 g
Prep Extract Vol: 31.5988 mL

Results of **16-RBY-CS-19**

Client Sample ID: **16-RBY-CS-19**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665025
Lab Project ID: 1168665

Collection Date: 09/29/16 16:12
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):84.6
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	713		23.5	7.28	mg/Kg	1		10/09/16 21:07
Surrogates								
5a Androstane (surr)	89.5		50-150		%	1		10/09/16 21:07

Batch Information

Analytical Batch: XFC12931
Analytical Method: AK102
Analyst: CRA
Analytical Date/Time: 10/09/16 21:07
Container ID: 1168665025-A

Prep Batch: XXX36480
Prep Method: SW3550C
Prep Date/Time: 10/07/16 16:00
Prep Initial Wt./Vol.: 30.193 g
Prep Extract Vol: 1 mL

Results of **16-RBY-CS-19**

Client Sample ID: **16-RBY-CS-19**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665025
Lab Project ID: 1168665

Collection Date: 09/29/16 16:12
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):84.6
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	38.5		3.49	1.05	mg/Kg	1		10/13/16 02:10
Surrogates								
4-Bromofluorobenzene (surr)	589	*	50-150		%	1		10/13/16 02:10

Batch Information

Analytical Batch: VFC13370
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/13/16 02:10
Container ID: 1168665025-B

Prep Batch: VXX29759
Prep Method: SW5035A
Prep Date/Time: 09/29/16 16:12
Prep Initial Wt./Vol.: 57.201 g
Prep Extract Vol: 33.8051 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	8.75	U	17.5	5.59	ug/Kg	1		10/13/16 02:10
Ethylbenzene	67.1		34.9	10.9	ug/Kg	1		10/13/16 02:10
o-Xylene	416		34.9	10.9	ug/Kg	1		10/13/16 02:10
P & M -Xylene	257		69.9	21.0	ug/Kg	1		10/13/16 02:10
Toluene	15.0	J	34.9	10.9	ug/Kg	1		10/13/16 02:10
Surrogates								
1,4-Difluorobenzene (surr)	89.2		72-119		%	1		10/13/16 02:10

Batch Information

Analytical Batch: VFC13370
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/13/16 02:10
Container ID: 1168665025-B

Prep Batch: VXX29759
Prep Method: SW5035A
Prep Date/Time: 09/29/16 16:12
Prep Initial Wt./Vol.: 57.201 g
Prep Extract Vol: 33.8051 mL

Results of **Trip Blank**

Client Sample ID: **Trip Blank**
Client Project ID: **Ruby Headstart Cleanup**
Lab Sample ID: 1168665026
Lab Project ID: 1168665

Collection Date: 09/27/16 09:06
Received Date: 10/04/16 11:55
Matrix: Soil/Solid (dry weight)
Solids (%):
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.01	J	2.57	0.771	mg/Kg	1		10/10/16 23:29
Surrogates								
4-Bromofluorobenzene (surr)	106		50-150		%	1		10/10/16 23:29

Batch Information

Analytical Batch: VFC13364
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/10/16 23:29
Container ID: 1168665026-A

Prep Batch: VXX29742
Prep Method: SW5035A
Prep Date/Time: 09/27/16 09:06
Prep Initial Wt./Vol.: 48.653 g
Prep Extract Vol: 25 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	6.40	U	12.8	4.11	ug/Kg	1		10/10/16 23:29
Ethylbenzene	12.9	U	25.7	8.02	ug/Kg	1		10/10/16 23:29
o-Xylene	12.9	U	25.7	8.02	ug/Kg	1		10/10/16 23:29
P & M -Xylene	25.7	U	51.4	15.4	ug/Kg	1		10/10/16 23:29
Toluene	12.9	U	25.7	8.02	ug/Kg	1		10/10/16 23:29
Surrogates								
1,4-Difluorobenzene (surr)	86.6		72-119		%	1		10/10/16 23:29

Batch Information

Analytical Batch: VFC13364
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/10/16 23:29
Container ID: 1168665026-A

Prep Batch: VXX29742
Prep Method: SW5035A
Prep Date/Time: 09/27/16 09:06
Prep Initial Wt./Vol.: 48.653 g
Prep Extract Vol: 25 mL

Method Blank

Blank ID: MB for HBN 1744729 [SPT/10015]
Blank Lab ID: 1356716

Matrix: Soil/Solid (dry weight)

QC for Samples:
1168665001, 1168665002, 1168665003, 1168665004, 1168665005, 1168665006, 1168665007, 1168665008, 1168665009, 1168665010, 1168665011, 1168665012, 1168665013, 1168665014, 1168665015, 1168665016, 1168665017, 1168665018, 1168665019, 1168665020, 1168665021, 1168665022, 1168665023, 1168665024, 1168665025

Results by **SM21 2540G**

Parameter	Results	LOQ/CL	DL	Units
Total Solids	100			%

Batch Information

Analytical Batch: SPT10015
Analytical Method: SM21 2540G
Instrument:
Analyst: RJA
Analytical Date/Time: 10/5/2016 5:58:00PM

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Duplicate Sample Summary

Original Sample ID: 1168665006
Duplicate Sample ID: 1356912
Analysis Date: 10/05/2016 17:58
Matrix: Soil/Solid (dry weight)

QC for Samples:

1168665001, 1168665002, 1168665003, 1168665004, 1168665005, 1168665006, 1168665007

Results by **SM21 2540G**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Solids	80.5	80.5	%	0.01	(< 15)

Batch Information

Analytical Batch: SPT10015
Analytical Method: SM21 2540G
Instrument:
Analyst: RJA

Print Date: 10/19/2016 4:08:01PM

Duplicate Sample Summary

Original Sample ID: 1168665007
Duplicate Sample ID: 1356913
Analysis Date: 10/05/2016 17:58
Matrix: Soil/Solid (dry weight)

QC for Samples:

1168665007, 1168665008, 1168665009, 1168665010, 1168665011, 1168665012, 1168665013, 1168665014

Results by **SM21 2540G**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Solids	81.4	81.7	%	0.31	(< 15)

Batch Information

Analytical Batch: SPT10015
Analytical Method: SM21 2540G
Instrument:
Analyst: RJA

Print Date: 10/19/2016 4:08:01PM

Duplicate Sample Summary

Original Sample ID: 1168665014
Duplicate Sample ID: 1356914

Analysis Date: 10/05/2016 17:58
Matrix: Soil/Solid (dry weight)

QC for Samples:

1168665008, 1168665009, 1168665010, 1168665011, 1168665012, 1168665013, 1168665014, 1168665015, 1168665016, 1168665017, 1168665018, 1168665019, 1168665020, 1168665021, 1168665022, 1168665023,

Results by **SM21 2540G**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Solids	85.1	85.3	%	0.16	(< 15)

Batch Information

Analytical Batch: SPT10015
Analytical Method: SM21 2540G
Instrument:
Analyst: RJA

Print Date: 10/19/2016 4:08:01PM

Duplicate Sample Summary

Original Sample ID: 1168662001
Duplicate Sample ID: 1356915

Analysis Date: 10/05/2016 17:58
Matrix: Soil/Solid (dry weight)

QC for Samples:

1168665015, 1168665016, 1168665017, 1168665018, 1168665019, 1168665020, 1168665021, 1168665022, 1168665023, 1168665024, 1168665025

Results by **SM21 2540G**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Solids	97.7	97.8	%	0.03	(< 15)

Batch Information

Analytical Batch: SPT10015
Analytical Method: SM21 2540G
Instrument:
Analyst: RJA

Print Date: 10/19/2016 4:08:01PM

Method Blank

Blank ID: MB for HBN 1745391 [VXX/29741]
Blank Lab ID: 1357996

Matrix: Soil/Solid (dry weight)

QC for Samples:
1168665001, 1168665002, 1168665003, 1168665004, 1168665005, 1168665006, 1168665007, 1168665008, 1168665009

Results by **AK101**

Parameter	Results	LOQ/CL	DL	Units
Gasoline Range Organics	1.25U	2.50	0.750	mg/Kg
Surrogates				
4-Bromofluorobenzene (surr)	109	50-150		%

Batch Information

Analytical Batch: VFC13364
Analytical Method: AK101
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 10/10/2016 12:42:00PM

Prep Batch: VXX29741
Prep Method: SW5035A
Prep Date/Time: 10/10/2016 12:30:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1168665 [VXX29741]
Blank Spike Lab ID: 1357999
Date Analyzed: 10/10/2016 11:46

Spike Duplicate ID: LCSD for HBN 1168665 [VXX29741]
Spike Duplicate Lab ID: 1358000
Matrix: Soil/Solid (dry weight)

QC for Samples: 1168665001, 1168665002, 1168665003, 1168665004, 1168665005, 1168665006, 1168665007, 1168665008, 1168665009

Results by **AK101**

	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Gasoline Range Organics	12.5	13.5	108	12.5	12.1	97	(60-120)	10.80	(< 20)
Surrogates									
4-Bromofluorobenzene (surr)	1.25	120	120	1.25	114	114	(50-150)	5.50	

Batch Information

Analytical Batch: **VFC13364**
Analytical Method: **AK101**
Instrument: **Agilent 7890A PID/FID**
Analyst: **ST**

Prep Batch: **VXX29741**
Prep Method: **SW5035A**
Prep Date/Time: **10/10/2016 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

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Method Blank

Blank ID: MB for HBN 1745391 [VXX/29741]
Blank Lab ID: 1357996

Matrix: Soil/Solid (dry weight)

QC for Samples:
1168665001, 1168665002, 1168665003, 1168665004, 1168665005, 1168665006, 1168665007, 1168665008, 1168665009

Results by **SW8021B**

Parameter	Results	LOQ/CL	DL	Units
Benzene	6.25U	12.5	4.00	ug/Kg
Ethylbenzene	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
Toluene	12.5U	25.0	7.80	ug/Kg
Surrogates				
1,4-Difluorobenzene (surr)	91.2	72-119		%

Batch Information

Analytical Batch: VFC13364
Analytical Method: SW8021B
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 10/10/2016 12:42:00PM

Prep Batch: VXX29741
Prep Method: SW5035A
Prep Date/Time: 10/10/2016 12:30:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1168665 [VXX29741]
Blank Spike Lab ID: 1357997
Date Analyzed: 10/10/2016 11:09

Spike Duplicate ID: LCSD for HBN 1168665 [VXX29741]
Spike Duplicate Lab ID: 1357998
Matrix: Soil/Solid (dry weight)

QC for Samples: 1168665001, 1168665002, 1168665003, 1168665004, 1168665005, 1168665006, 1168665007, 1168665008, 1168665009

Results by **SW8021B**

	Blank Spike (ug/Kg)			Spike Duplicate (ug/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	1250	1270	101	1250	1340	108	(75-125)	6.10	(< 20)
Ethylbenzene	1250	1240	99	1250	1360	109	(75-125)	9.30	(< 20)
o-Xylene	1250	1250	100	1250	1350	108	(75-125)	7.80	(< 20)
P & M -Xylene	2500	2540	102	2500	2770	111	(80-125)	8.80	(< 20)
Toluene	1250	1250	100	1250	1370	110	(70-125)	9.00	(< 20)
Surrogates									
1,4-Difluorobenzene (surr)	1250	96.1	96	1250	96.1	96	(72-119)	0.04	

Batch Information

Analytical Batch: **VFC13364**
Analytical Method: **SW8021B**
Instrument: **Agilent 7890A PID/FID**
Analyst: **ST**

Prep Batch: **VXX29741**
Prep Method: **SW5035A**
Prep Date/Time: **10/10/2016 00:30**
Spike Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL
Dupe Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL

Matrix Spike Summary

Original Sample ID: 1168665002
MS Sample ID: 1358001 MS
MSD Sample ID: 1358002 MSD

Analysis Date: 10/10/2016 17:56
Analysis Date: 10/10/2016 18:15
Analysis Date: 10/10/2016 18:33
Matrix: Soil/Solid (dry weight)

QC for Samples: 1168665001, 1168665002, 1168665003, 1168665004, 1168665005, 1168665006, 1168665007, 1168665008, 1168665009

Results by **SW8021B**

		Matrix Spike (ug/Kg)			Spike Duplicate (ug/Kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	8.90U	1141	1139	100	1141	1187	104	75-125	4.00	(< 20)
Ethylbenzene	17.8U	1141	1157	101	1141	1206	106	75-125	4.20	(< 20)
o-Xylene	17.8U	1141	1051	92	1141	1198	105	75-125	13.00	(< 20)
P & M -Xylene	35.5U	2284	2146	94	2284	2422	106	80-125	12.00	(< 20)
Toluene	17.8U	1141	1213	106	1141	1193	105	70-125	1.60	(< 20)
Surrogates										
1,4-Difluorobenzene (surr)		1141	1014	89	1141	1031	90	72-119	1.80	

Batch Information

Analytical Batch: VFC13364
Analytical Method: SW8021B
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 10/10/2016 6:15:00PM

Prep Batch: VXX29741
Prep Method: AK101 Extraction (S)
Prep Date/Time: 10/10/2016 12:30:00AM
Prep Initial Wt./Vol.: 68.75g
Prep Extract Vol: 25.00mL

Print Date: 10/19/2016 4:08:14PM

Method Blank

Blank ID: MB for HBN 1745393 [VXX/29742]
Blank Lab ID: 1358005

Matrix: Soil/Solid (dry weight)

QC for Samples:
1168665010, 1168665011, 1168665012, 1168665013, 1168665026

Results by **AK101**

Parameter	Results	LOQ/CL	DL	Units
Gasoline Range Organics	0.954J	2.50	0.750	mg/Kg
Surrogates				
4-Bromofluorobenzene (surr)	113	50-150		%

Batch Information

Analytical Batch: VFC13364
Analytical Method: AK101
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 10/10/2016 11:11:00PM

Prep Batch: VXX29742
Prep Method: SW5035A
Prep Date/Time: 10/10/2016 12:30:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1168665 [VXX29742]
Blank Spike Lab ID: 1358008
Date Analyzed: 10/10/2016 22:15

Spike Duplicate ID: LCSD for HBN 1168665 [VXX29742]
Spike Duplicate Lab ID: 1358009
Matrix: Soil/Solid (dry weight)

QC for Samples: 1168665010, 1168665011, 1168665012, 1168665013, 1168665026

Results by **AK101**

	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Gasoline Range Organics	12.5	11.6	93	12.5	12.5	100	(60-120)	7.50	(< 20)
Surrogates									
4-Bromofluorobenzene (surr)	1.25	113	113	1.25	112	112	(50-150)	0.99	

Batch Information

Analytical Batch: **VFC13364**
Analytical Method: **AK101**
Instrument: **Agilent 7890A PID/FID**
Analyst: **ST**

Prep Batch: **VXX29742**
Prep Method: **SW5035A**
Prep Date/Time: **10/10/2016 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

Method Blank

Blank ID: MB for HBN 1745393 [VXX/29742]
Blank Lab ID: 1358005

Matrix: Soil/Solid (dry weight)

QC for Samples:
1168665010, 1168665011, 1168665012, 1168665013, 1168665026

Results by **SW8021B**

Parameter	Results	LOQ/CL	DL	Units
Benzene	6.25U	12.5	4.00	ug/Kg
Ethylbenzene	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
Toluene	12.5U	25.0	7.80	ug/Kg
Surrogates				
1,4-Difluorobenzene (surr)	89.5	72-119		%

Batch Information

Analytical Batch: VFC13364
Analytical Method: SW8021B
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 10/10/2016 11:11:00PM

Prep Batch: VXX29742
Prep Method: SW5035A
Prep Date/Time: 10/10/2016 12:30:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1168665 [VXX29742]
Blank Spike Lab ID: 1358006
Date Analyzed: 10/10/2016 21:39

Spike Duplicate ID: LCSD for HBN 1168665 [VXX29742]
Spike Duplicate Lab ID: 1358007
Matrix: Soil/Solid (dry weight)

QC for Samples: 1168665010, 1168665011, 1168665012, 1168665013, 1168665026

Results by **SW8021B**

	Blank Spike (ug/Kg)			Spike Duplicate (ug/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	1250	1290	103	1250	1340	107	(75-125)	4.00	(< 20)
Ethylbenzene	1250	1330	107	1250	1340	107	(75-125)	0.45	(< 20)
o-Xylene	1250	1370	110	1250	1370	109	(75-125)	0.42	(< 20)
P & M -Xylene	2500	2800	112	2500	2790	111	(80-125)	0.65	(< 20)
Toluene	1250	1300	104	1250	1320	106	(70-125)	1.90	(< 20)
Surrogates									
1,4-Difluorobenzene (surr)	1250	92.5	93	1250	95.7	96	(72-119)	3.40	

Batch Information

Analytical Batch: **VFC13364**
Analytical Method: **SW8021B**
Instrument: **Agilent 7890A PID/FID**
Analyst: **ST**

Prep Batch: **VXX29742**
Prep Method: **SW5035A**
Prep Date/Time: **10/10/2016 00:30**
Spike Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL
Dupe Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL

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Matrix Spike Summary

Original Sample ID: 1168640006
MS Sample ID: 1358010 MS
MSD Sample ID: 1358011 MSD

Analysis Date: 10/11/2016 1:39
Analysis Date: 10/11/2016 1:58
Analysis Date: 10/11/2016 2:16
Matrix: Soil/Solid (dry weight)

QC for Samples: 1168665010, 1168665011, 1168665012, 1168665013, 1168665026

Results by **SW8021B**

		Matrix Spike (ug/Kg)			Spike Duplicate (ug/Kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	11.8U	1908	1908	100	1908	1943	102	75-125	1.50	(< 20)
Ethylbenzene	23.6U	1908	1908	100	1908	1955	102	75-125	2.10	(< 20)
o-Xylene	15.5J	1908	1767	92	1908	1908	99	75-125	7.50	(< 20)
P & M -Xylene	47.0U	3816	3651	96	3816	3922	103	80-125	7.20	(< 20)
Toluene	23.6U	1908	1979	104	1908	1955	102	70-125	1.40	(< 20)
Surrogates										
1,4-Difluorobenzene (surr)		1908	1720	90	1908	1743	91	72-119	1.30	

Batch Information

Analytical Batch: VFC13364
Analytical Method: SW8021B
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 10/11/2016 1:58:00AM

Prep Batch: VXX29742
Prep Method: AK101 Extraction (S)
Prep Date/Time: 10/10/2016 12:30:00AM
Prep Initial Wt./Vol.: 38.62g
Prep Extract Vol: 25.00mL

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Method Blank

Blank ID: MB for HBN 1745497 [VXX/29749]
Blank Lab ID: 1358194

Matrix: Soil/Solid (dry weight)

QC for Samples:
1168665014, 1168665015, 1168665016, 1168665017, 1168665018

Results by **AK101**

Parameter	Results	LOQ/CL	DL	Units
Gasoline Range Organics	1.25U	2.50	0.750	mg/Kg
Surrogates				
4-Bromofluorobenzene (surr)	109	50-150		%

Batch Information

Analytical Batch: VFC13366
Analytical Method: AK101
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 10/11/2016 1:24:00PM

Prep Batch: VXX29749
Prep Method: SW5035A
Prep Date/Time: 10/11/2016 12:30:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1168665 [VXX29749]
Blank Spike Lab ID: 1358197
Date Analyzed: 10/11/2016 12:29

Spike Duplicate ID: LCSD for HBN 1168665 [VXX29749]
Spike Duplicate Lab ID: 1358198
Matrix: Soil/Solid (dry weight)

QC for Samples: 1168665014, 1168665015, 1168665016, 1168665017, 1168665018

Results by **AK101**

	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Gasoline Range Organics	12.5	12.1	97	12.5	12.3	98	(60-120)	1.70	(< 20)
Surrogates									
4-Bromofluorobenzene (surr)	1.25	116	116	1.25	115	115	(50-150)	0.80	

Batch Information

Analytical Batch: **VFC13366**
Analytical Method: **AK101**
Instrument: **Agilent 7890A PID/FID**
Analyst: **ST**

Prep Batch: **VXX29749**
Prep Method: **SW5035A**
Prep Date/Time: **10/11/2016 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

Method Blank

Blank ID: MB for HBN 1745497 [VXX/29749]
Blank Lab ID: 1358194

Matrix: Soil/Solid (dry weight)

QC for Samples:
1168665014, 1168665015, 1168665016, 1168665017, 1168665018

Results by **SW8021B**

Parameter	Results	LOQ/CL	DL	Units
Benzene	6.25U	12.5	4.00	ug/Kg
Ethylbenzene	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
Toluene	12.5U	25.0	7.80	ug/Kg
Surrogates				
1,4-Difluorobenzene (surr)	91.3	72-119		%

Batch Information

Analytical Batch: VFC13366
Analytical Method: SW8021B
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 10/11/2016 1:24:00PM

Prep Batch: VXX29749
Prep Method: SW5035A
Prep Date/Time: 10/11/2016 12:30:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1168665 [VXX29749]
Blank Spike Lab ID: 1358195
Date Analyzed: 10/11/2016 11:33

Spike Duplicate ID: LCSD for HBN 1168665 [VXX29749]
Spike Duplicate Lab ID: 1358196
Matrix: Soil/Solid (dry weight)

QC for Samples: 1168665014, 1168665015, 1168665016, 1168665017, 1168665018

Results by **SW8021B**

	Blank Spike (ug/Kg)			Spike Duplicate (ug/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	1250	1300	104	1250	1360	109	(75-125)	4.50	(< 20)
Ethylbenzene	1250	1330	106	1250	1380	110	(75-125)	3.60	(< 20)
o-Xylene	1250	1310	105	1250	1390	111	(75-125)	5.40	(< 20)
P & M -Xylene	2500	2700	108	2500	2860	114	(80-125)	5.60	(< 20)
Toluene	1250	1350	108	1250	1370	110	(70-125)	1.90	(< 20)
Surrogates									
1,4-Difluorobenzene (surr)	1250	92	92	1250	94.1	94	(72-119)	2.20	

Batch Information

Analytical Batch: **VFC13366**
Analytical Method: **SW8021B**
Instrument: **Agilent 7890A PID/FID**
Analyst: **ST**

Prep Batch: **VXX29749**
Prep Method: **SW5035A**
Prep Date/Time: **10/11/2016 00:30**
Spike Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL
Dupe Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL

Matrix Spike Summary

Original Sample ID: 1168648003
MS Sample ID: 1358199 MS
MSD Sample ID: 1358200 MSD

Analysis Date: 10/11/2016 14:20
Analysis Date: 10/11/2016 14:39
Analysis Date: 10/11/2016 14:57
Matrix: Soil/Solid (dry weight)

QC for Samples: 1168665014, 1168665015, 1168665016, 1168665017, 1168665018

Results by **SW8021B**

		Matrix Spike (ug/Kg)			Spike Duplicate (ug/Kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	22.0U	1540	1604	104	1540	1692	109	75-125	5.50	(< 20)
Ethylbenzene	44.0U	1540	1641	106	1540	1705	110	75-125	3.80	(< 20)
o-Xylene	44.0U	1540	1641	106	1540	1730	112	75-125	5.00	(< 20)
P & M -Xylene	88.0U	3093	3371	109	3093	3561	115	80-125	5.30	(< 20)
Toluene	44.0U	1540	1604	104	1540	1641	106	70-125	2.30	(< 20)
Surrogates										
1,4-Difluorobenzene (surr)		1540	1402	91	1540	1452	94	72-119	3.00	

Batch Information

Analytical Batch: VFC13366
Analytical Method: SW8021B
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 10/11/2016 2:39:00PM

Prep Batch: VXX29749
Prep Method: AK101 Extraction (S)
Prep Date/Time: 10/11/2016 12:30:00AM
Prep Initial Wt./Vol.: 51.12g
Prep Extract Vol: 25.00mL

Print Date: 10/19/2016 4:08:35PM

Method Blank

Blank ID: MB for HBN 1745597 [VXX/29759]
Blank Lab ID: 1358557

Matrix: Soil/Solid (dry weight)

QC for Samples:
1168665019, 1168665020, 1168665021, 1168665022, 1168665023, 1168665024, 1168665025

Results by **AK101**

Parameter	Results	LOQ/CL	DL	Units
Gasoline Range Organics	0.825J	2.50	0.750	mg/Kg
Surrogates				
4-Bromofluorobenzene (surr)	109	50-150		%

Batch Information

Analytical Batch: VFC13370
Analytical Method: AK101
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 10/12/2016 10:45:00PM

Prep Batch: VXX29759
Prep Method: SW5035A
Prep Date/Time: 10/12/2016 12:30:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1168665 [VXX29759]
Blank Spike Lab ID: 1358560
Date Analyzed: 10/12/2016 22:08

Spike Duplicate ID: LCSD for HBN 1168665 [VXX29759]
Spike Duplicate Lab ID: 1358561
Matrix: Soil/Solid (dry weight)

QC for Samples: 1168665019, 1168665020, 1168665021, 1168665022, 1168665023, 1168665024, 1168665025

Results by **AK101**

	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Gasoline Range Organics	12.5	12.9	103	12.5	12.7	102	(60-120)	1.40	(< 20)
Surrogates									
4-Bromofluorobenzene (surr)	1.25	117	117	1.25	111	111	(50-150)	5.80	

Batch Information

Analytical Batch: **VFC13370**
Analytical Method: **AK101**
Instrument: **Agilent 7890A PID/FID**
Analyst: **ST**

Prep Batch: **VXX29759**
Prep Method: **SW5035A**
Prep Date/Time: **10/12/2016 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

Method Blank

Blank ID: MB for HBN 1745597 [VXX/29759]
Blank Lab ID: 1358557

Matrix: Soil/Solid (dry weight)

QC for Samples:
1168665019, 1168665020, 1168665021, 1168665022, 1168665023, 1168665024, 1168665025

Results by **SW8021B**

Parameter	Results	LOQ/CL	DL	Units
Benzene	6.25U	12.5	4.00	ug/Kg
Ethylbenzene	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
Toluene	12.5U	25.0	7.80	ug/Kg
Surrogates				
1,4-Difluorobenzene (surr)	88.9	72-119		%

Batch Information

Analytical Batch: VFC13370
Analytical Method: SW8021B
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 10/12/2016 10:45:00PM

Prep Batch: VXX29759
Prep Method: SW5035A
Prep Date/Time: 10/12/2016 12:30:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1168665 [VXX29759]
Blank Spike Lab ID: 1358558
Date Analyzed: 10/12/2016 21:31

Spike Duplicate ID: LCSD for HBN 1168665 [VXX29759]
Spike Duplicate Lab ID: 1358559
Matrix: Soil/Solid (dry weight)

QC for Samples: 1168665019, 1168665020, 1168665021, 1168665022, 1168665023, 1168665024, 1168665025

Results by **SW8021B**

	Blank Spike (ug/Kg)			Spike Duplicate (ug/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	1250	1210	97	1250	1150	92	(75-125)	4.70	(< 20)
Ethylbenzene	1250	1210	97	1250	1150	92	(75-125)	4.80	(< 20)
o-Xylene	1250	1180	94	1250	1030	82	(75-125)	13.60	(< 20)
P & M -Xylene	2500	2380	95	2500	2080	83	(80-125)	13.40	(< 20)
Toluene	1250	1280	102	1250	1280	103	(70-125)	0.33	(< 20)
Surrogates									
1,4-Difluorobenzene (surr)	1250	94.4	94	1250	92.1	92	(72-119)	2.40	

Batch Information

Analytical Batch: **VFC13370**
Analytical Method: **SW8021B**
Instrument: **Agilent 7890A PID/FID**
Analyst: **ST**

Prep Batch: **VXX29759**
Prep Method: **SW5035A**
Prep Date/Time: **10/12/2016 00:30**
Spike Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL
Dupe Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL

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Matrix Spike Summary

Original Sample ID: 1168665019
MS Sample ID: 1358562 MS
MSD Sample ID: 1358563 MSD

Analysis Date: 10/12/2016 23:04
Analysis Date: 10/12/2016 23:22
Analysis Date: 10/12/2016 23:41
Matrix: Soil/Solid (dry weight)

QC for Samples: 1168665019, 1168665020, 1168665021, 1168665022, 1168665023, 1168665024, 1168665025

Results by **SW8021B**

		Matrix Spike (ug/Kg)			Spike Duplicate (ug/Kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	9.10U	1409	1397	99	1409	1397	99	75-125	0.18	(< 20)
Ethylbenzene	18.2U	1409	1409	99	1409	1385	98	75-125	1.50	(< 20)
o-Xylene	18.6J	1409	1397	98	1409	1327	92	75-125	5.80	(< 20)
P & M -Xylene	24.1J	2829	2806	98	2829	2654	93	80-125	5.70	(< 20)
Toluene	18.2U	1409	1432	101	1409	1455	103	70-125	2.00	(< 20)
Surrogates										
1,4-Difluorobenzene (surr)		1409	1315	93	1409	1304	92	72-119	0.97	

Batch Information

Analytical Batch: VFC13370
Analytical Method: SW8021B
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 10/12/2016 11:22:00PM

Prep Batch: VXX29759
Prep Method: AK101 Extraction (S)
Prep Date/Time: 10/12/2016 12:30:00AM
Prep Initial Wt./Vol.: 51.46g
Prep Extract Vol: 25.00mL

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Method Blank

Blank ID: MB for HBN 1745691 [VXX/29762]
Blank Lab ID: 1358859

Matrix: Soil/Solid (dry weight)

QC for Samples:
1168665022, 1168665023, 1168665024

Results by **AK101**

Parameter	Results	LOQ/CL	DL	Units
Gasoline Range Organics	0.909J	2.50	0.750	mg/Kg
Surrogates				
4-Bromofluorobenzene (surr)	77.2	50-150		%

Batch Information

Analytical Batch: VFC13373
Analytical Method: AK101
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 10/13/2016 12:45:00PM

Prep Batch: VXX29762
Prep Method: SW5035A
Prep Date/Time: 10/13/2016 12:30:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1168665 [VXX29762]
Blank Spike Lab ID: 1358862
Date Analyzed: 10/13/2016 10:48

Spike Duplicate ID: LCSD for HBN 1168665 [VXX29762]
Spike Duplicate Lab ID: 1358863
Matrix: Soil/Solid (dry weight)

QC for Samples: 1168665022, 1168665023, 1168665024

Results by **AK101**

	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Gasoline Range Organics	12.5	14.6	117	12.5	12.9	103	(60-120)	12.10	(< 20)
Surrogates									
4-Bromofluorobenzene (surr)	1.25	89.9	90	1.25	79.6	80	(50-150)	12.20	

Batch Information

Analytical Batch: **VFC13373**
Analytical Method: **AK101**
Instrument: **Agilent 7890A PID/FID**
Analyst: **ST**

Prep Batch: **VXX29762**
Prep Method: **SW5035A**
Prep Date/Time: **10/13/2016 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

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Method Blank

Blank ID: MB for HBN 1745691 [VXX/29762]
Blank Lab ID: 1358859

Matrix: Soil/Solid (dry weight)

QC for Samples:
1168665022, 1168665023, 1168665024

Results by **SW8021B**

Parameter	Results	LOQ/CL	DL	Units
o-Xylene	12.5U	25.0	7.80	ug/Kg
P & M -Xylene	25.0U	50.0	15.0	ug/Kg
Surrogates				
1,4-Difluorobenzene (surr)	102	72-119		%

Batch Information

Analytical Batch: VFC13373
Analytical Method: SW8021B
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 10/13/2016 12:45:00PM

Prep Batch: VXX29762
Prep Method: SW5035A
Prep Date/Time: 10/13/2016 12:30:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

Print Date: 10/19/2016 4:08:52PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1168665 [VXX29762]
Blank Spike Lab ID: 1358860
Date Analyzed: 10/13/2016 11:44

Spike Duplicate ID: LCSD for HBN 1168665 [VXX29762]
Spike Duplicate Lab ID: 1358861
Matrix: Soil/Solid (dry weight)

QC for Samples: 1168665022, 1168665023, 1168665024

Results by **SW8021B**

	Blank Spike (ug/Kg)			Spike Duplicate (ug/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
o-Xylene	1250	1340	107	1250	1420	114	(75-125)	5.80	(< 20)
P & M -Xylene	2500	2740	109	2500	2920	117	(80-125)	6.30	(< 20)
Surrogates									
1,4-Difluorobenzene (surr)	1250	109	109	1250	108	108	(72-119)	1.50	

Batch Information

Analytical Batch: **VFC13373**
Analytical Method: **SW8021B**
Instrument: **Agilent 7890A PID/FID**
Analyst: **ST**

Prep Batch: **VXX29762**
Prep Method: **SW5035A**
Prep Date/Time: **10/13/2016 00:30**
Spike Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL
Dupe Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL

Print Date: 10/19/2016 4:08:54PM

Matrix Spike Summary

Original Sample ID: 1165867001
MS Sample ID: 1358864 MS
MSD Sample ID: 1358865 MSD

Analysis Date: 10/13/2016 14:00
Analysis Date: 10/13/2016 14:18
Analysis Date: 10/13/2016 14:37
Matrix: Soil/Solid (dry weight)

QC for Samples: 1168665022, 1168665023, 1168665024

Results by **SW8021B**

		Matrix Spike (ug/Kg)			Spike Duplicate (ug/Kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
o-Xylene	19.7J	1039	1155	109	1039	1144	108	75-125	0.90	(< 20)
P & M -Xylene	36.9J	2081	2354	111	2081	2354	112	80-125	0.21	(< 20)
Surrogates										
1,4-Difluorobenzene (surr)		1039	1118	108	1039	1109	107	72-119	0.84	

Batch Information

Analytical Batch: VFC13373
Analytical Method: SW8021B
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 10/13/2016 2:18:00PM

Prep Batch: VXX29762
Prep Method: AK101 Extraction (S)
Prep Date/Time: 10/13/2016 12:30:00AM
Prep Initial Wt./Vol.: 78.27g
Prep Extract Vol: 25.00mL

Print Date: 10/19/2016 4:08:56PM

Method Blank

Blank ID: MB for HBN 1744931 [XXX/36480]
Blank Lab ID: 1357419

Matrix: Soil/Solid (dry weight)

QC for Samples:
1168665008, 1168665009, 1168665010, 1168665011, 1168665012, 1168665013, 1168665014, 1168665015, 1168665016, 1168665017, 1168665018, 1168665019, 1168665020, 1168665021, 1168665022, 1168665023, 1168665024, 1168665025

Results by **AK102**

Parameter	Results	LOQ/CL	DL	Units
Diesel Range Organics	10.0U	20.0	6.20	mg/Kg
Surrogates				
5a Androstane (surr)	82.1	60-120		%

Batch Information

Analytical Batch: XFC12931
Analytical Method: AK102
Instrument: Agilent 7890B R
Analyst: CRA
Analytical Date/Time: 10/9/2016 5:34:00PM

Prep Batch: XXX36480
Prep Method: SW3550C
Prep Date/Time: 10/7/2016 4:00:06PM
Prep Initial Wt./Vol.: 30 g
Prep Extract Vol: 1 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1168665 [XXX36480]
Blank Spike Lab ID: 1357420
Date Analyzed: 10/09/2016 17:44

Spike Duplicate ID: LCSD for HBN 1168665 [XXX36480]
Spike Duplicate Lab ID: 1357421
Matrix: Soil/Solid (dry weight)

QC for Samples: 1168665008, 1168665009, 1168665010, 1168665011, 1168665012, 1168665013, 1168665014, 1168665015, 1168665016, 1168665017, 1168665018, 1168665019, 1168665020, 1168665021, 1168665022, 1168665023, 1168665024, 1168665025

Results by **AK102**

	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Diesel Range Organics	167	168	101	167	167	100	(75-125)	0.40	(< 20)
Surrogates									
5a Androstane (surr)	3.33	110	110	3.33	107	107	(60-120)	3.50	

Batch Information

Analytical Batch: **XFC12931**
Analytical Method: **AK102**
Instrument: **Agilent 7890B R**
Analyst: **CRA**

Prep Batch: **XXX36480**
Prep Method: **SW3550C**
Prep Date/Time: **10/07/2016 16:00**
Spike Init Wt./Vol.: 167 mg/Kg Extract Vol: 1 mL
Dupe Init Wt./Vol.: 167 mg/Kg Extract Vol: 1 mL

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Method Blank

Blank ID: MB for HBN 1744955 [XXX/36481]
Blank Lab ID: 1357529

Matrix: Soil/Solid (dry weight)

QC for Samples:
1168665001, 1168665002, 1168665003, 1168665004, 1168665005, 1168665006, 1168665007

Results by **AK102**

Parameter	Results	LOQ/CL	DL	Units
Diesel Range Organics	10.0U	20.0	6.20	mg/Kg
Surrogates				
5a Androstane (surr)	72.6	60-120		%

Batch Information

Analytical Batch: XFC12940
Analytical Method: AK102
Instrument: Agilent 7890B F
Analyst: CRA
Analytical Date/Time: 10/9/2016 5:44:00PM

Prep Batch: XXX36481
Prep Method: SW3550C
Prep Date/Time: 10/7/2016 6:06:01PM
Prep Initial Wt./Vol.: 30 g
Prep Extract Vol: 1 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1168665 [XXX36481]
Blank Spike Lab ID: 1357530
Date Analyzed: 10/12/2016 18:44

Spike Duplicate ID: LCSD for HBN 1168665 [XXX36481]
Spike Duplicate Lab ID: 1357531
Matrix: Soil/Solid (dry weight)

QC for Samples: 1168665001, 1168665002, 1168665003, 1168665004, 1168665005, 1168665006, 1168665007

Results by **AK102**

	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Diesel Range Organics	167	129	78	167	106	64	* (75-125)	19.50	(< 20)
Surrogates									
5a Androstane (surr)	3.33	88.5	89	3.33	72.1	72	(60-120)	20.40	

Batch Information

Analytical Batch: **XFC12941**
Analytical Method: **AK102**
Instrument: **Agilent 7890B F**
Analyst: **NRO**

Prep Batch: **XXX36481**
Prep Method: **SW3550C**
Prep Date/Time: **10/07/2016 18:06**
Spike Init Wt./Vol.: 167 mg/Kg Extract Vol: 1 mL
Dupe Init Wt./Vol.: 167 mg/Kg Extract Vol: 1 mL

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Method Blank

Blank ID: MB for HBN 1745293 [XXX/36485]
Blank Lab ID: 1357702

Matrix: Soil/Solid (dry weight)

QC for Samples:
1168665009, 1168665010, 1168665022

Results by **8270D SIM (PAH)**

Parameter	Results	LOQ/CL	DL	Units
1-Methylnaphthalene	2.50U	5.00	1.50	ug/Kg
2-Methylnaphthalene	2.50U	5.00	1.50	ug/Kg
Acenaphthene	2.50U	5.00	1.50	ug/Kg
Acenaphthylene	2.50U	5.00	1.50	ug/Kg
Anthracene	2.50U	5.00	1.50	ug/Kg
Benzo(a)Anthracene	2.50U	5.00	1.50	ug/Kg
Benzo[a]pyrene	2.50U	5.00	1.50	ug/Kg
Benzo[b]Fluoranthene	2.50U	5.00	1.50	ug/Kg
Benzo[g,h,i]perylene	2.50U	5.00	1.50	ug/Kg
Benzo[k]fluoranthene	2.50U	5.00	1.50	ug/Kg
Chrysene	2.50U	5.00	1.50	ug/Kg
Dibenzo[a,h]anthracene	2.50U	5.00	1.50	ug/Kg
Fluoranthene	2.50U	5.00	1.50	ug/Kg
Fluorene	2.50U	5.00	1.50	ug/Kg
Indeno[1,2,3-c,d] pyrene	2.50U	5.00	1.50	ug/Kg
Naphthalene	2.50U	5.00	1.50	ug/Kg
Phenanthrene	2.50U	5.00	1.50	ug/Kg
Pyrene	2.50U	5.00	1.50	ug/Kg
Surrogates				
2-Fluorobiphenyl (surr)	89.4	46-115		%
Terphenyl-d14 (surr)	92	58-133		%

Batch Information

Analytical Batch: XMS9690
Analytical Method: 8270D SIM (PAH)
Instrument: SVA Agilent 780/5975 GC/MS
Analyst: BRV
Analytical Date/Time: 10/12/2016 1:43:00PM

Prep Batch: XXX36485
Prep Method: SW3550C
Prep Date/Time: 10/10/2016 9:00:18AM
Prep Initial Wt./Vol.: 22.5 g
Prep Extract Vol: 1 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1168665 [XXX36485]
Blank Spike Lab ID: 1357703
Date Analyzed: 10/12/2016 14:04

Matrix: Soil/Solid (dry weight)

QC for Samples: 1168665009, 1168665010, 1168665022

Results by **8270D SIM (PAH)**

Blank Spike (ug/Kg)

Parameter	Spike	Result	Rec (%)	CL
1-Methylnaphthalene	22.2	20.2	91	(43-111)
2-Methylnaphthalene	22.2	19.5	88	(39-114)
Acenaphthene	22.2	22.8	103	(44-111)
Acenaphthylene	22.2	19.1	86	(39-116)
Anthracene	22.2	17.2	78	(50-114)
Benzo(a)Anthracene	22.2	19.5	88	(54-122)
Benzo[a]pyrene	22.2	19.8	89	(50-125)
Benzo[b]Fluoranthene	22.2	20.4	92	(53-128)
Benzo[g,h,i]perylene	22.2	21.9	99	(49-127)
Benzo[k]fluoranthene	22.2	20.5	92	(56-123)
Chrysene	22.2	21.1	95	(57-118)
Dibenzo[a,h]anthracene	22.2	23.3	105	(50-129)
Fluoranthene	22.2	21.1	95	(55-119)
Fluorene	22.2	19.8	89	(47-114)
Indeno[1,2,3-c,d] pyrene	22.2	22.7	102	(49-130)
Naphthalene	22.2	20.9	94	(38-111)
Phenanthrene	22.2	17.4	78	(49-113)
Pyrene	22.2	22.3	100	(55-117)
Surrogates				
2-Fluorobiphenyl (surr)	22.2	97.7	98	(46-115)
Terphenyl-d14 (surr)	22.2	96.9	97	(58-133)

Batch Information

Analytical Batch: **XMS9690**
Analytical Method: **8270D SIM (PAH)**
Instrument: **SVA Agilent 780/5975 GC/MS**
Analyst: **BRV**

Prep Batch: **XXX36485**
Prep Method: **SW3550C**
Prep Date/Time: **10/10/2016 09:00**
Spike Init Wt./Vol.: 22.2 ug/Kg Extract Vol: 1 mL
Dupe Init Wt./Vol.: Extract Vol:

Matrix Spike Summary

Original Sample ID: 1165874001
MS Sample ID: 1357704 MS
MSD Sample ID: 1357705 MSD

Analysis Date: 10/12/2016 14:25
Analysis Date: 10/12/2016 14:45
Analysis Date: 10/12/2016 15:06
Matrix: Soil/Solid (dry weight)

QC for Samples: 1168665009, 1168665010, 1168665022

Results by **8270D SIM (PAH)**

		Matrix Spike (ug/Kg)				Spike Duplicate (ug/Kg)					
Parameter	Sample	Spike	Result	Rec (%)		Spike	Result	Rec (%)		CL	RPD (%)	RPD CL
1-Methylnaphthalene	2.73U	24.3	24.4	101		24.7	22.6	92		43-111	7.60	(< 20)
2-Methylnaphthalene	2.73U	24.3	22.6	93		24.7	22.0	89		39-114	2.80	(< 20)
Acenaphthene	2.73U	24.3	25.2	104		24.7	26.0	105		44-111	3.30	(< 20)
Acenaphthylene	2.73U	24.3	21.2	87		24.7	22.2	90		39-116	5.00	(< 20)
Anthracene	2.73U	24.3	20.7	85		24.7	23.5	95		50-114	12.80	(< 20)
Benzo(a)Anthracene	2.63J	24.3	28.9	108		24.7	28.9	106		54-122	0.05	(< 20)
Benzo[a]pyrene	3.59J	24.3	36.2	134	*	24.7	31.7	114		50-125	13.20	(< 20)
Benzo[b]Fluoranthene	5.34J	24.3	32.9	113		24.7	31.4	105		53-128	4.50	(< 20)
Benzo[g,h,i]perylene	4.19J	24.3	37.9	139	*	24.7	28.4	98		49-127	28.60	* (< 20)
Benzo[k]fluoranthene	1.74J	24.3	25.4	98		24.7	25.9	98		56-123	1.80	(< 20)
Chrysene	3.94J	24.3	34.6	126	*	24.7	32.0	113		57-118	7.80	(< 20)
Dibenzo[a,h]anthracene	2.73U	24.3	26.1	108		24.7	25.3	102		50-129	3.20	(< 20)
Fluoranthene	6.15	24.3	37.6	129	*	24.7	40.8	140	*	55-119	8.30	(< 20)
Fluorene	2.73U	24.3	21.6	89		24.7	22.6	91		47-114	4.60	(< 20)
Indeno[1,2,3-c,d] pyrene	3.34J	24.3	29.9	110		24.7	27.9	99		49-130	7.10	(< 20)
Naphthalene	2.73U	24.3	22.6	93		24.7	23.6	96		38-111	4.50	(< 20)
Phenanthrene	2.51J	24.3	25.9	97		24.7	26.6	98		49-113	2.70	(< 20)
Pyrene	5.42J	24.3	37.9	134	*	24.7	40.6	142	*	55-117	6.60	(< 20)
Surrogates												
2-Fluorobiphenyl (surr)		24.3	22.0	91		24.7	23.2	94		46-115	5.40	
Terphenyl-d14 (surr)		24.3	22.6	93		24.7	23.9	97		58-133	5.50	

Batch Information

Analytical Batch: XMS9690
Analytical Method: 8270D SIM (PAH)
Instrument: SVA Agilent 780/5975 GC/MS
Analyst: BRV
Analytical Date/Time: 10/12/2016 2:45:00PM

Prep Batch: XXX36485
Prep Method: Sonication Extraction Soil 8270 PAH SIM
Prep Date/Time: 10/10/2016 9:00:18AM
Prep Initial Wt./Vol.: 22.98g
Prep Extract Vol: 1.00mL

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

Section 1

CLIENT: Antea Engineering Services

CONTACT: Andrew Weller / Rodney Gurtz PHONE NO: 457-3147

PROJECT NAME: Ruby Headstart Cleanup PROJECT/ PWSID/ PERMIT#:

REPORTS TO: Rodney E-MAIL: rodney@arcticdataservices.com

INVOICE TO: QUOTE #: P.O. #:

Section 2

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	# CONTAINERS	Type C = COMP G = GRAB MI = Multi Incre-mental Soils	Preservative: —	MeOH							REMARKS/ LOC ID
							DRO (AK102)	GRO/BTEX (AK101/8021)	PAH (8270SIM)						
1 A-B	16-RBY-BS-01	09/27/16	0905	Soil	2	G	X	X							
2 A-B	16-RBY-BS-02	09/27/16	0906				X	X							
3 A-B	16-RBY-BS-03	09/27/16	0907				X	X							
4 A-B	16-RBY-BS-04	09/27/16	0908				X	X							
5 A-B	16-RBY-BS-05	09/27/16	0910				X	X							
6 A-B	16-RBY-CS-01		1545				X	X							
7 A-B	16-RBY-CS-02		1550				X	X							
8 A-B	16-RBY-CS-03		1555				X	X							
9 A-B	16-RBY-CS-04		1600				X	X	X						
10 A-B	16-RBY-CS-05		1605				X	X	X						

Section 5

	Date	Time	
Relinquished By: (1) Rody Thy	9/30/16	0800	Received By: 9-30-16 1455
Relinquished By: (2)	10/3/16	1500	Received By:
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	10/4/16	11:55	Received For Laboratory By:

Section 4

DOD Project? Yes (No)

Cooler ID: 01

Data Deliverable Requirements: Std. Level II

Requested Turnaround Time and/or Special Instructions: Standard TAT

Temp Blank °C: 4.5 or Ambient [ ] (See attached Sample Receipt Form)

Chain of Custody Seal: (Circle) (INTACT) BROKEN ABSENT (See attached Sample Receipt Form)

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

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

Section 1

CLIENT: See pg. 1

CONTACT: PHONE NO:

PROJECT NAME: PROJECT/ PWSID/ PERMIT#:

REPORTS TO: E-MAIL:

INVOICE TO: QUOTE #: P.O. #:

Section 2

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	Section 3 # CONTAINERS	Section 3 Type C = COMP G = GRAB MI = Multi Incremental Soils	Preservative: —	Preservative: Methanol	Preservative: —	REMARKS/ LOC ID
							DRO (AK102)	GRO/BTEX (AK101/8021)	PAH (8270 SIM)	
(11) AB	16-RBY-CS-06	09/27/16	1608	Soil	2	G	X	X		
(12) AB	16-RBY-CS-07	09/27/16	1612				X	X		
(13) AB	16-RBY-RS-01	09/27/16	1705				X	X		
(14) AB	16-RBY-CS-08	09/29/16	1445	Soil	2	G	X	X		
(15) AB	16-RBY-CS-09		1450				X	X		
(16) AB	16-RBY-CS-10		1455				X	X		
(17) AB	16-RBY-CS-11		1505				X	X		
(18) AB	16-RBY-CS-12		1550				X	X		
(19) AB	16-RBY-CS-13		1600				X	X		
(20) AB	16-RBY-CS-14		1602				X	X		

Section 5

	Date	Time		
Relinquished By: (1)	9/30/16	0800	Received By:	9-30-16 1455
Relinquished By: (2)	10-3-16	1508	Received By:	
Relinquished By: (3)			Received By:	
Relinquished By: (4)	10/4/16	11:55	Received For Laboratory By:	

Section 4

DOD Project? Yes (No)

Cooler ID: 01

Data Deliverable Requirements: Level II

Requested Turnaround Time and/or Special Instructions:

Standard TAT

Temp Blank °C: 4.5

or Ambient [ ]

(See attached Sample Receipt Form)

Chain of Custody Seal: (Circle)

INTACT BROKEN ABSENT

(See attached Sample Receipt Form)

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[ ] 5500 Business Drive Wilmington, NC 28405 Tel: (910) 350-1903 Fax: (910) 350-1557

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Locations Nationwide

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

Section 1

CLIENT: See pg. 1

CONTACT: PHONE NO:

PROJECT NAME: PROJECT/ PWSID/ PERMIT#:

REPORTS TO: E-MAIL:

INVOICE TO: QUOTE #: P.O. #:

Section 2

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	# CONTAINERS	Type C = COMP G = GRAB MI = Multi Incre-mental Soils	Preservative: —	Preservative: MeOH	Preservative: —	REMARKS/ LOC ID
							DRO (AK102)	GRO/BTEX (AK101/8021)	PAH (8270 SIM)	
(21) AB	16-RBY-CS-15	09/29/16	1604	Soil	2	G	X	X		
(22) AB	16-RBY-CS-16		1606				X	X	X	
(23) AB	16-RBY-CS-17		1608				X	X		
(24) AB	16-RBY-CS-18		1610				X	X		
(25) AB	16-RBY-CS-19		1612				X	X		
(26) AB	Trip Blank	—	—		1	—		X		

Section 5

	Date	Time		
Relinquished By: (1) Rodrigo Z	9/30/16	0800	Received By:	9-30-16 1455
Relinquished By: (2)	10-3-16	1500	Received By:	
Relinquished By: (3)			Received By:	
Relinquished By: (4)	10/4/16	11:55	Received For Laboratory By:	

Section 4

DOD Project? Yes (No)

Cooler ID: 01

Data Deliverable Requirements: Level II

Requested Turnaround Time and/or Special Instructions: Standard TAT

Temp Blank °C: 4.5

or Ambient [ ]

(See attached Sample Receipt Form)

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

(See attached Sample Receipt Form)

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

SGS

1168665

FAIRBANKS SAMPLE RECEIPT FORM

Note: This form is to be completed by Fairbanks Receiving Staff for all samples

Review Criteria:	Condition:	Comments/Actions Taken
Were **custody seals** intact? Note # & location, if applicable. COC accompanied samples?	Yes No N/A Yes No N/A	□*Exemption permitted if sampler hand carries/delivers.*
Temperature blank compliant* (i.e., 0-6°C) *If >6°C, were samples collected <8 hours ago?* *If <0°C, were all sample containers ice free?* Cooler ID: 1 @ 4.5 w/Therm. ID: 71 Cooler ID:____ @____ w/Therm. ID:____ Cooler ID:____ @____ w/Therm. ID:____ Cooler ID:____ @____ w/Therm. ID:____ Cooler ID:____ @____ w/Therm. ID:____ If samples are received without a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank and "**COOLER TEMP**" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note ambient ( ) or chilled ( ). Please check one.	Yes No Yes No N/A Yes No N/A	□*Exemption permitted if chilled & collected <8hrs ago* *Note: Identify containers received at non-compliant temperature. Use form FS-0029 if more space is needed.*
Delivery Method: Client (hand carried) Other:____	Tracking/AB# : Or see attached Or N/A	
→For samples received with payment, note amount ($) and whether cash / check / CC (**circle one**) was received.		
Were samples in **good condition** (no leaks/cracks/breakage)? Packing material used (specify all that apply): Bubble Wrap Separate plastic bags Vermiculite Other:____	Yes No N/A	*Note: some samples are sent to Anchorage without inspection by SGS Fairbanks personnel.*
Were **Trip Blanks** (i.e., VOAs, LL-Hg) in cooler with samples?	Yes No N/A	
For **RUSH/SHORT Hold Time**, were COC/Bottles flagged accordingly? Was Rush/Short HT email sent, if applicable?	Yes No N/A Yes No N/A	

Additional notes (if applicable):

Profile #: existing for A. Weller

Note to Client: any "no" circled above indicates non-compliance with standard procedures and may impact data quality.

SGS

e-SAMPLE RECEIPT FORM

1168665

Review Criteria	Y/N (yes/no)	Exceptions Noted below
		exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	Y	1F, 1B
COC accompanied samples?	Y	
**exemption permitted if chilled & collected <8hrs ago or chlling not required (i.e., waste, oil)		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	Y	Cooler ID: 1 @ 1.8 °C Therm ID: D10
		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?		
If <0°C, were sample containers ice free?		
If samples received without a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "**COOLER TEMP**" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note "ambient" or "chilled".		
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
		Note: Refer to form F-083 "Sample Guide" for hold times.
Were samples received within hold time?	Y	
Do samples **match COC**** (i.e.,sample IDs,dates/times collected)?	Y	
**Note: If times differ <1hr, record details & login per COC.		
Were analyses requested unambiguous?	Y	
		***Exemption permitted for metals (e.g,200.8/6020A).
Were proper containers (type/mass/volume/preservative***)used?	Y	
IF APPLICABLE		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	Y	
Were all VOA vials free of headspace (i.e., bubbles ≤ 6mm)?		
Were all soil VOAs field extracted with MeOH+BFB?	Y	

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

Container Id	Preservative	Container Condition
1168665001-A	No Preservative Required	OK
1168665001-B	Methanol field pres. 4 C	OK
1168665002-A	No Preservative Required	OK
1168665002-B	Methanol field pres. 4 C	OK
1168665003-A	No Preservative Required	OK
1168665003-B	Methanol field pres. 4 C	OK
1168665004-A	No Preservative Required	OK
1168665004-B	Methanol field pres. 4 C	OK
1168665005-A	No Preservative Required	OK
1168665005-B	Methanol field pres. 4 C	OK
1168665006-A	No Preservative Required	OK
1168665006-B	Methanol field pres. 4 C	OK
1168665007-A	No Preservative Required	OK
1168665007-B	Methanol field pres. 4 C	OK
1168665008-A	No Preservative Required	OK
1168665008-B	Methanol field pres. 4 C	OK
1168665009-A	No Preservative Required	OK
1168665009-B	Methanol field pres. 4 C	OK
1168665010-A	No Preservative Required	OK
1168665010-B	Methanol field pres. 4 C	OK
1168665011-A	No Preservative Required	OK
1168665011-B	Methanol field pres. 4 C	OK
1168665012-A	No Preservative Required	OK
1168665012-B	Methanol field pres. 4 C	OK
1168665013-A	No Preservative Required	OK
1168665013-B	Methanol field pres. 4 C	OK
1168665014-A	No Preservative Required	OK
1168665014-B	Methanol field pres. 4 C	OK
1168665015-A	No Preservative Required	OK
1168665015-B	Methanol field pres. 4 C	OK
1168665016-A	No Preservative Required	OK
1168665016-B	Methanol field pres. 4 C	OK
1168665017-A	No Preservative Required	OK
1168665017-B	Methanol field pres. 4 C	OK
1168665018-A	No Preservative Required	OK
1168665018-B	Methanol field pres. 4 C	OK
1168665019-A	No Preservative Required	OK
1168665019-B	Methanol field pres. 4 C	OK
1168665020-A	No Preservative Required	OK
1168665020-B	Methanol field pres. 4 C	OK
1168665021-A	No Preservative Required	OK
1168665021-B	Methanol field pres. 4 C	OK
1168665022-A	No Preservative Required	OK
1168665022-B	Methanol field pres. 4 C	OK
1168665023-A	No Preservative Required	OK
1168665023-B	Methanol field pres. 4 C	OK
1168665024-A	No Preservative Required	OK
1168665024-B	Methanol field pres. 4 C	OK
1168665025-A	No Preservative Required	OK
1168665025-B	Methanol field pres. 4 C	OK
1168665026-A	Methanol field pres. 4 C	OK
1168665026-B	Methanol field pres. 4 C	OK

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition

Container Condition Glossary

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

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

Laboratory Data Review Checklist

Completed by: Rodney Guritz

Title: Chemist Date: March 23, 2017

CS Report Name: Ruby Former Headstart Cleanup Report Date: March 2017

Consultant Firm: Arctic Data Services, LLC

Laboratory Name: SGS Anchorage Laboratory Report Number: 1168704

ADEC File Number: 870.38.004 ADEC RecKey Number:

1. Laboratory
   a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?
      ■Yes No NA (Please explain.) Comments:

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?
      Yes No ■NA (Please explain.) Comments:

      No samples were transferred to other laboratories.

2. Chain of Custody (COC)
   a. COC information completed, signed, and dated (including released/received by)?
      ■Yes No NA (Please explain.) Comments:

   b. Correct analyses requested?
      ■Yes No NA (Please explain.) Comments:

3. Laboratory Sample Receipt Documentation
   a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?
      ■Yes No NA (Please explain.) Comments:

      The samples were received at the Fairbanks receiving office between 0 °C and 6 °C, the acceptable temperature range listed in EPA SW-846 and adopted by reference by ADEC (18 AAC 78.090). Samples were received slightly below range at the Anchorage laboratory. Data quality for soil samples in unaffected by low sample temperatures.

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

■Yes No NA (Please explain.) Comments:

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

■Yes No NA (Please explain.) Comments:

Samples were received in good condition.

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 NA (Please explain.) Comments:

The laboratory noted some anomalies regarding ISM collection methods; otherwise, there were no sample-receiving discrepancies.

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

Comments:

Data quality and usability were not affected.

4. Case Narrative

a. Present and understandable?

■Yes No NA (Please explain.) Comments:

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

■Yes No NA (Please explain.) Comments:

The laboratory provided a detailed case narrative noting a number of QC anomalies, including surrogate recovery failures and MS/MSD recovery failures. The following sections of this checklist address these anomalies in detail.

c. Were all corrective actions documented?

Yes No ■NA (Please explain.) Comments:

No corrective actions were required or performed.

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

Comments:

The case narrative notes no effect on sample data quality or usability. Refer to the following sections for our discussion of data quality and usability for the QC anomalies documented.

5. Samples Results
   a. Correct analyses performed/reported as requested on COC?
      ■Yes No NA (Please explain.) Comments:

   b. All applicable holding times met?
      ■Yes No NA (Please explain.) Comments:

   c. All soils reported on a dry weight basis?
      ■Yes No NA (Please explain.) Comments:

   d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?
      ■Yes No NA (Please explain.) Comments:

LODs were below the most stringent SCLs for all excavation confirmation samples, with the exception of several PAH analytes for samples collected from contaminated areas ("hot spots") remaining following the cleanup. One PAH result for the pre-treatment ISM replicate for Plot C also had an elevated LOD. LODs that exceed the most stringent SCL are identified in report tables using a green highlight.

   e. Data quality or usability affected?
      Comments:

Data quality and usability were not affected.

6. QC Samples
   a. Method Blank
      i. One method blank reported per matrix, analysis and 20 samples?
         ■Yes No NA (Please explain.) Comments:

      ii. All method blank results less than PQL?
         ■Yes No NA (Please explain.) Comments:

However, the following analytes were detected below the LOQ:

Prep batch	Analyte	Method	Result (mg/kg)
VXX29775	GRO	AK101	1.11 J
VXX29810	GRO	AK101	0.781 J

iii. If above PQL, what samples are affected?

Comments:

No sample results were affected, as GRO results for each corresponding project sample were greater than ten times the concentration in the method blanks.

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

Yes No ■ NA (Please explain.) Comments:

See above

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

Comments:

Data quality and usability were not affected.

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

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

■Yes No NA (Please explain.) Comments:

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

Yes No ■NA (Please explain.) Comments:

There were no metals/inorganic analyses.

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

Yes ■No NA (Please explain.) Comments:

LCS/LCSD recoveries were within control limits. MS/MSD recovery of P&M-xylene was below control limits for the MS/MSD of sample 16-RBY-ISM-09. P&M-xylene results for this sample and the other ISM replicates from the same plot (considered to have similar matrices) are qualified with a 'JL' flag to indicate the potential low bias.

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 NA (Please explain.) Comments:

LCS/LCSD and MS/MSD RPDs were within control limits.

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

See above.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?
■ Yes No NA (Please explain.) Comments:

See above.

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

Data quality affected as described above. The affected results were still above the migration to groundwater SCL (total xylenes) despite the potential low bias, so impact to data usability was minimal.

c. Surrogates – Organics Only

i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?
■Yes No NA (Please explain.) Comments:

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)
Yes ■No NA (Please explain.) Comments:

Recovery of GRO surrogate 4-bromofluorobenzene was above control limits for each of the nine project samples, due to matrix interference. All GRO results, where detected, are qualified 'JH' to indicate the potential high bias. Recovery of PAH surrogate 2-fluorobiphenyl was above control limits for each of the nine project samples, due to sample dilution. Surrogate recovery failures due to dilution are not considered to affect results.

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?
■Yes No NA (Please explain.) Comments:

See above.

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

Data quality affected as described above. Impact to data usability was minimal, as results were below the migration to groundwater SCL despite the high bias.

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

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)
■ Yes No NA (Please explain.) Comments:

Soil trip blanks were submitted for GRO/BTEX analysis.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)
Yes No ■NA (Please explain.) Comments:

Samples were submitted in a single cooler.

iii. All results less than PQL?
■Yes No NA (Please explain.) Comments:

However, GRO was detected below the LOQ, at 1.01 mg/kg.

iv. If above PQL, what samples are affected?
Comments:

The GRO detection in the trip blank was attributable to laboratory-based sample contamination (see Section 6.b.), and GRO concentrations in project samples were greater than 10 times the concentration in the trip blank, so project-sample results were not affected.

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

Data quality and usability were not affected.

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?
■Yes No NA (Please explain.) Comments:

Thee ISM replicates were submitted for each phytoremediation plot. Refer to project reporting tables for 95% UCL calculations.

ii. Submitted blind to lab?

■Yes No NA (Please explain.) Comments:

ISM replicates were submitted blind.

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

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

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

Yes No ■NA (Please explain.) Comments:

A 95% UCL was calculated for each ISM replicate, and used for project decision making. Calculation of a 95% UCL theoretically accounts for variance in the data, thus data qualification based on %RPD or %RSD failures is not relevant.

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

Comments:

Data quality and usability were not affected.

f. Decontamination or Equipment Blank (If not used explain why).

Yes No ■NA (Please explain.) Comments:

Soil samples were collected using disposable sampling equipment; an equipment blank was not required.

i. All results less than PQL?

Yes No ■NA (Please explain.) Comments:

ii. If above PQL, what samples are affected?

Comments:

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

Comments:

Not applicable (see above).

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)
   a. Defined and appropriate?
      Yes No ■NA (Please explain.) Comments:

There were no other data flags or qualifiers.

Laboratory Report of Analysis

To: Ahtna Engineering Svs
305 34th Ave
Fairbanks, AK 99701
907-455-5953

Report Number: **1168704**

Client Project: **Ruby Former Headstart**

Dear Andrew Weller,

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 Justin 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.

SGS North America Inc.
Environmental Services – Alaska Division
Project Manager

Justin Nelson
2016.10.25
16:02:24 -08'00'

Justin Nelson Date
Project Manager
Justin.Nelson@sgs.com

Print Date: 10/24/2016 3:53:05PM

Case Narrative

SGS Client: **Ahtna Engineering Svs**
SGS Project: **1168704**
Project Name/Site: **Ruby Former Headstart**
Project Contact: **Andrew Weller**

Refer to sample receipt form for information on sample condition.

16-RBY-ISM-01 (1168704001) PS

AK101 - Surrogate recovery for 4-bromofluorobenzene (967%) does not meet QC criteria due to matrix interference.
8270D SIM - PAH surrogate recovery for 2-fluorobiphenyl (200%) does not meet QC criteria due to sample dilution (10X).

16-RBY-ISM-02 (1168704002) PS

AK101 - Surrogate recovery for 4-bromofluorobenzene (809%) does not meet QC criteria due to matrix interference.
8270D SIM - PAH surrogate recovery for 2-fluorobiphenyl (195%) does not meet QC criteria due to sample dilution (10X).

16-RBY-ISM-03 (1168704003) PS

AK101 - Surrogate recovery for 4-bromofluorobenzene (1010%) does not meet QC criteria due to matrix interference.
8270D SIM - PAH surrogate recovery for 2-fluorobiphenyl (202%) does not meet QC criteria due to sample dilution (10X).

16-RBY-ISM-04 (1168704004) PS

AK101 - Surrogate recovery for 4-bromofluorobenzene (534%) does not meet QC criteria due to matrix interference.
8270D SIM - PAH surrogate recovery for 2-fluorobiphenyl (162%) does not meet QC criteria due to sample dilution (10X).

16-RBY-ISM-05 (1168704005) PS

AK101 - Surrogate recovery for 4-bromofluorobenzene (323%) does not meet QC criteria due to matrix interference.
8270D SIM - PAH surrogate recovery for 2-fluorobiphenyl (169%) does not meet QC criteria due to sample dilution (10X).

16-RBY-ISM-06 (1168704006) PS

AK101 - Surrogate recovery for 4-bromofluorobenzene (621%) does not meet QC criteria due to matrix interference.
8270D SIM - PAH surrogate recovery for 2-fluorobiphenyl (180%) does not meet QC criteria due to sample dilution (20X).

16-RBY-ISM-07 (1168704007) PS

8270D SIM - PAH surrogate recovery for 2-fluorobiphenyl (278%) does not meet QC criteria due to sample dilution (20X).
AK101 - Surrogate recovery for 4-bromofluorobenzene (1010%) does not meet QC criteria due to matrix interference.

16-RBY-ISM-08 (1168704008) PS

8270D SIM - PAH surrogate recovery for 2-fluorobiphenyl (271%) does not meet QC criteria due to sample dilution (20X).
AK101 - Surrogate recovery for 4-bromofluorobenzene (1270%) does not meet QC criteria due to matrix interference.

16-RBY-ISM-09 (1168704009) PS

8270D SIM - PAH surrogate recovery for 2-fluorobiphenyl (294%) does not meet QC criteria due to sample dilution (20X).
AK101 - Surrogate recovery for 4-bromofluorobenzene (1510%) does not meet QC criteria due to matrix interference.

1168704009MS (1360812) MS

8021B - MS recovery for P&M-xylene (68%) does not meet QC criteria. See LCS for accuracy requirements.

1168704009MSD (1360813) MSD

8021B - MSD recovery for P&M-xylene (71.5%) does not meet QC criteria. See LCS for accuracy requirements.

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

Report of Manual Integrations

Laboratory ID	Client Sample ID	Analytical Batch	Analyte	Reason
8270D SIM (PAH)				
1168704001	16-RBY-ISM-01	XMS9701	Benzo[k]fluoranthene	RP
1168704002	16-RBY-ISM-02	XMS9701	Benzo[k]fluoranthene	RP
1168704003	16-RBY-ISM-03	XMS9701	Benzo(a)Anthracene	RP
1168704003	16-RBY-ISM-03	XMS9701	Benzo[k]fluoranthene	RP
1168704004	16-RBY-ISM-04	XMS9701	Benzo[k]fluoranthene	RP
1168704005	16-RBY-ISM-05	XMS9701	Benzo[k]fluoranthene	RP
1168704006	16-RBY-ISM-06	XMS9701	Benzo[k]fluoranthene	RP
1168704007	16-RBY-ISM-07	XMS9698	Benzo[k]fluoranthene	RP
1168704008	16-RBY-ISM-08	XMS9698	Benzo[k]fluoranthene	RP
1168704009	16-RBY-ISM-09	XMS9698	Benzo[k]fluoranthene	RP

Manual Integration Reason Code Descriptions

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

All DRO/RRO analysis are integrated per SOP.

Print Date: 10/24/2016 3:53:07PM

Laboratory Qualifiers

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

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

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

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

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
D	The analyte concentration is the result of a dilution.
DF	Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
F	Indicates value that is greater than or equal to the DL
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
JL	The analyte was positively identified, but the quantitation is a low estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
M	A matrix effect was present.
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
Q	QC parameter out of acceptance range.
R	Rejected
RPD	Relative Percent Difference
U	Indicates the analyte was analyzed for but not detected.

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

Sample Summary

Client Sample ID	Lab Sample ID	Collected	Received	Matrix
16-RBY-ISM-01	1168704001	10/03/2016	10/08/2016	Soil/Solid (dry weight)
16-RBY-ISM-02	1168704002	10/03/2016	10/08/2016	Soil/Solid (dry weight)
16-RBY-ISM-03	1168704003	10/03/2016	10/08/2016	Soil/Solid (dry weight)
16-RBY-ISM-04	1168704004	10/04/2016	10/08/2016	Soil/Solid (dry weight)
16-RBY-ISM-05	1168704005	10/04/2016	10/08/2016	Soil/Solid (dry weight)
16-RBY-ISM-06	1168704006	10/04/2016	10/08/2016	Soil/Solid (dry weight)
16-RBY-ISM-07	1168704007	10/06/2016	10/08/2016	Soil/Solid (dry weight)
16-RBY-ISM-08	1168704008	10/06/2016	10/08/2016	Soil/Solid (dry weight)
16-RBY-ISM-09	1168704009	10/06/2016	10/08/2016	Soil/Solid (dry weight)
Trip Blanks	1168704010	10/03/2016	10/08/2016	Soil/Solid (dry weight)

Method	Method Description
8270D SIM (PAH)	8270 PAH SIM Semi-Volatiles GC/MS
AK101	AK101/8021 Combo. (S)
SW8021B	AK101/8021 Combo. (S)
AK102	Diesel Range Organics (S)
SM21 2540G	Percent Solids SM2540G

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Detectable Results Summary

Client Sample ID: **16-RBY-ISM-01**
Lab Sample ID: 1168704001

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	10700	ug/Kg
	2-Methylnaphthalene	12800	ug/Kg
	Anthracene	19.3J	ug/Kg
	Benzo[b]Fluoranthene	38.8J	ug/Kg
	Chrysene	108	ug/Kg
	Fluoranthene	803	ug/Kg
	Naphthalene	2960	ug/Kg
	Phenanthrene	1110	ug/Kg
	Pyrene	276	ug/Kg
Semivolatile Organic Fuels	Diesel Range Organics	8200	mg/Kg
Volatile Fuels	Ethylbenzene	193	ug/Kg
	Gasoline Range Organics	128	mg/Kg
	o-Xylene	2070	ug/Kg
	P & M -Xylene	2810	ug/Kg
	Toluene	90.6	ug/Kg

Client Sample ID: **16-RBY-ISM-02**
Lab Sample ID: 1168704002

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	9320	ug/Kg
	2-Methylnaphthalene	6650	ug/Kg
	Anthracene	22.4J	ug/Kg
	Benzo(a)Anthracene	22.7J	ug/Kg
	Benzo[b]Fluoranthene	44.7J	ug/Kg
	Chrysene	121	ug/Kg
	Fluoranthene	827	ug/Kg
	Naphthalene	598	ug/Kg
	Phenanthrene	1050	ug/Kg
	Pyrene	340	ug/Kg
Semivolatile Organic Fuels	Diesel Range Organics	8080	mg/Kg
Volatile Fuels	Ethylbenzene	150	ug/Kg
	Gasoline Range Organics	97.8	mg/Kg
	o-Xylene	1910	ug/Kg
	P & M -Xylene	2350	ug/Kg
	Toluene	72.6	ug/Kg

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Detectable Results Summary

Client Sample ID: **16-RBY-ISM-03**
Lab Sample ID: 1168704003

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	8780	ug/Kg
	2-Methylnaphthalene	6820	ug/Kg
	Benzo[b]Fluoranthene	30.7J	ug/Kg
	Chrysene	86.3	ug/Kg
	Fluoranthene	604	ug/Kg
	Naphthalene	682	ug/Kg
	Phenanthrene	984	ug/Kg
	Pyrene	206	ug/Kg
Semivolatile Organic Fuels	Diesel Range Organics	6860	mg/Kg
Volatile Fuels	Ethylbenzene	169	ug/Kg
	Gasoline Range Organics	82.3	mg/Kg
	o-Xylene	1900	ug/Kg
	P & M -Xylene	2490	ug/Kg
	Toluene	72.8	ug/Kg

Client Sample ID: **16-RBY-ISM-04**
Lab Sample ID: 1168704004

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	3520	ug/Kg
	2-Methylnaphthalene	1530	ug/Kg
	Benzo[b]Fluoranthene	28.0J	ug/Kg
	Chrysene	71.0	ug/Kg
	Fluoranthene	482	ug/Kg
	Phenanthrene	754	ug/Kg
	Pyrene	219	ug/Kg
Semivolatile Organic Fuels	Diesel Range Organics	2970	mg/Kg
Volatile Fuels	Ethylbenzene	77.6	ug/Kg
	Gasoline Range Organics	60.7	mg/Kg
	o-Xylene	716	ug/Kg
	P & M -Xylene	1090	ug/Kg
	Toluene	27.0J	ug/Kg

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Detectable Results Summary

Client Sample ID: **16-RBY-ISM-05**
Lab Sample ID: 1168704005

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	4110	ug/Kg
	2-Methylnaphthalene	2030	ug/Kg
	Benzo[b]Fluoranthene	28.8J	ug/Kg
	Chrysene	72.8	ug/Kg
	Fluoranthene	515	ug/Kg
	Phenanthrene	846	ug/Kg
	Pyrene	225	ug/Kg
Semivolatile Organic Fuels	Diesel Range Organics	2870	mg/Kg
Volatile Fuels	Ethylbenzene	61.5	ug/Kg
	Gasoline Range Organics	34.1	mg/Kg
	o-Xylene	602	ug/Kg
	P & M -Xylene	784	ug/Kg
	Toluene	22.0J	ug/Kg

Client Sample ID: **16-RBY-ISM-06**
Lab Sample ID: 1168704006

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	4000	ug/Kg
	2-Methylnaphthalene	1620	ug/Kg
	Chrysene	69.7J	ug/Kg
	Fluoranthene	522	ug/Kg
	Phenanthrene	910	ug/Kg
	Pyrene	215	ug/Kg
Semivolatile Organic Fuels	Diesel Range Organics	2730	mg/Kg
Volatile Fuels	Ethylbenzene	103	ug/Kg
	Gasoline Range Organics	79.4	mg/Kg
	o-Xylene	839	ug/Kg
	P & M -Xylene	1310	ug/Kg
	Toluene	27.7J	ug/Kg

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Detectable Results Summary

Client Sample ID: **16-RBY-ISM-07**
Lab Sample ID: 1168704007

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	31600	ug/Kg
	2-Methylnaphthalene	30700	ug/Kg
	Benzo(a)Anthracene	25.3	ug/Kg
	Benzo[a]pyrene	27.1	ug/Kg
	Benzo[b]Fluoranthene	46.9	ug/Kg
	Benzo[g,h,i]perylene	20.1	ug/Kg
	Benzo[k]fluoranthene	15.6	ug/Kg
	Chrysene	47.0	ug/Kg
	Dibenzo[a,h]anthracene	6.92	ug/Kg
	Fluoranthene	53.9	ug/Kg
	Fluorene	580	ug/Kg
	Indeno[1,2,3-c,d] pyrene	18.7	ug/Kg
	Naphthalene	11800	ug/Kg
	Phenanthrene	371	ug/Kg
	Pyrene	56.8	ug/Kg
Semivolatile Organic Fuels	Diesel Range Organics	9140	mg/Kg
Volatile Fuels	Benzene	33.0	ug/Kg
	Ethylbenzene	421	ug/Kg
	Gasoline Range Organics	99.5	mg/Kg
	o-Xylene	2550	ug/Kg
	P & M -Xylene	3130	ug/Kg
	Toluene	218	ug/Kg

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Detectable Results Summary

Client Sample ID: **16-RBY-ISM-08**
Lab Sample ID: 1168704008

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	22900	ug/Kg
	2-Methylnaphthalene	21200	ug/Kg
	Benzo(a)Anthracene	13.1	ug/Kg
	Benzo[a]pyrene	20.0	ug/Kg
	Benzo[b]Fluoranthene	30.9	ug/Kg
	Benzo[g,h,i]perylene	13.9	ug/Kg
	Benzo[k]fluoranthene	8.34	ug/Kg
	Chrysene	11.9	ug/Kg
	Dibenzo[a,h]anthracene	4.67J	ug/Kg
	Fluoranthene	30.3	ug/Kg
	Fluorene	572	ug/Kg
	Indeno[1,2,3-c,d] pyrene	13.1	ug/Kg
	Naphthalene	7140	ug/Kg
	Phenanthrene	357	ug/Kg
	Pyrene	34.3	ug/Kg
Semivolatile Organic Fuels	Diesel Range Organics	6940	mg/Kg
Volatile Fuels	Benzene	23.7	ug/Kg
	Ethylbenzene	471	ug/Kg
	Gasoline Range Organics	144	mg/Kg
	o-Xylene	2950	ug/Kg
	P & M -Xylene	3620	ug/Kg
	Toluene	177	ug/Kg

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Detectable Results Summary

Client Sample ID: **16-RBY-ISM-09**
Lab Sample ID: 1168704009

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	24800	ug/Kg
	2-Methylnaphthalene	22300	ug/Kg
	Anthracene	43.7J	ug/Kg
	Benzo(a)Anthracene	14.9	ug/Kg
	Benzo[a]pyrene	18.9	ug/Kg
	Benzo[b]Fluoranthene	32.6	ug/Kg
	Benzo[g,h,i]perylene	14.8	ug/Kg
	Benzo[k]fluoranthene	9.52	ug/Kg
	Chrysene	17.4	ug/Kg
	Dibenzo[a,h]anthracene	4.83J	ug/Kg
	Fluoranthene	37.7	ug/Kg
	Fluorene	686	ug/Kg
	Indeno[1,2,3-c,d] pyrene	14.2	ug/Kg
	Naphthalene	7540	ug/Kg
	Phenanthrene	385	ug/Kg
	Pyrene	48.0	ug/Kg
Semivolatile Organic Fuels	Diesel Range Organics	8150	mg/Kg
Volatile Fuels	Benzene	29.5	ug/Kg
	Ethylbenzene	383	ug/Kg
	Gasoline Range Organics	131	mg/Kg
	o-Xylene	2150	ug/Kg
	P & M -Xylene	2720	ug/Kg
	Toluene	164	ug/Kg

Client Sample ID: **Trip Blanks**
Lab Sample ID: 1168704010

	Parameter	Result	Units
Volatile Fuels	Gasoline Range Organics	0.896J	mg/Kg

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Results of **16-RBY-ISM-01**

Client Sample ID: **16-RBY-ISM-01**
Client Project ID: **Ruby Former Headstart**
Lab Sample ID: 1168704001
Lab Project ID: 1168704

Collection Date: 10/03/16 19:10
Received Date: 10/08/16 10:04
Matrix: Soil/Solid (dry weight)
Solids (%):82.8
Location:

Results by **Polynuclear Aromatics GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	10700		3000	900	ug/Kg	500		10/21/16 12:33
2-Methylnaphthalene	12800		600	180	ug/Kg	100		10/19/16 18:31
Acenaphthene	30.0 U		60.0	18.0	ug/Kg	10		10/17/16 19:51
Acenaphthylene	30.0 U		60.0	18.0	ug/Kg	10		10/17/16 19:51
Anthracene	19.3 J		60.0	18.0	ug/Kg	10		10/17/16 19:51
Benzo(a)Anthracene	30.0 U		60.0	18.0	ug/Kg	10		10/17/16 19:51
Benzo[a]pyrene	30.0 U		60.0	18.0	ug/Kg	10		10/17/16 19:51
Benzo[b]Fluoranthene	38.8 J		60.0	18.0	ug/Kg	10		10/17/16 19:51
Benzo[g,h,i]perylene	30.0 U		60.0	18.0	ug/Kg	10		10/17/16 19:51
Benzo[k]fluoranthene	30.0 U		60.0	18.0	ug/Kg	10		10/17/16 19:51
Chrysene	108		60.0	18.0	ug/Kg	10		10/17/16 19:51
Dibenzo[a,h]anthracene	30.0 U		60.0	18.0	ug/Kg	10		10/17/16 19:51
Fluoranthene	803		60.0	18.0	ug/Kg	10		10/17/16 19:51
Fluorene	30.0 U		60.0	18.0	ug/Kg	10		10/17/16 19:51
Indeno[1,2,3-c,d] pyrene	30.0 U		60.0	18.0	ug/Kg	10		10/17/16 19:51
Naphthalene	2960		600	180	ug/Kg	100		10/19/16 18:31
Phenanthrene	1110		60.0	18.0	ug/Kg	10		10/17/16 19:51
Pyrene	276		60.0	18.0	ug/Kg	10		10/17/16 19:51
Surrogates								
2-Fluorobiphenyl (surr)	200	*	46-115		%	10		10/17/16 19:51
Terphenyl-d14 (surr)	103		58-133		%	10		10/17/16 19:51

Results of **16-RBY-ISM-01**

Client Sample ID: **16-RBY-ISM-01**
Client Project ID: **Ruby Former Headstart**
Lab Sample ID: 1168704001
Lab Project ID: 1168704

Collection Date: 10/03/16 19:10
Received Date: 10/08/16 10:04
Matrix: Soil/Solid (dry weight)
Solids (%):82.8
Location:

Results by **Polynuclear Aromatics GC/MS**

Batch Information

Analytical Batch: XMS9701
Analytical Method: 8270D SIM (PAH)
Analyst: S.G
Analytical Date/Time: 10/17/16 19:51
Container ID: 1168704001-A

Prep Batch: XXX36508
Prep Method: SW3550C
Prep Date/Time: 10/12/16 14:15
Prep Initial Wt./Vol.: 22.655 g
Prep Extract Vol: 1 mL

Analytical Batch: XMS9705
Analytical Method: 8270D SIM (PAH)
Analyst: BRV
Analytical Date/Time: 10/19/16 18:31
Container ID: 1168704001-A

Prep Batch: XXX36508
Prep Method: SW3550C
Prep Date/Time: 10/12/16 14:15
Prep Initial Wt./Vol.: 22.655 g
Prep Extract Vol: 1 mL

Analytical Batch: XMS9711
Analytical Method: 8270D SIM (PAH)
Analyst: S.G
Analytical Date/Time: 10/21/16 12:33
Container ID: 1168704001-A

Prep Batch: XXX36508
Prep Method: SW3550C
Prep Date/Time: 10/12/16 14:15
Prep Initial Wt./Vol.: 22.655 g
Prep Extract Vol: 1 mL

Results of **16-RBY-ISM-01**

Client Sample ID: **16-RBY-ISM-01**
Client Project ID: **Ruby Former Headstart**
Lab Sample ID: 1168704001
Lab Project ID: 1168704

Collection Date: 10/03/16 19:10
Received Date: 10/08/16 10:04
Matrix: Soil/Solid (dry weight)
Solids (%):82.8
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	8200		480	149	mg/Kg	20		10/17/16 23:41
Surrogates								
5a Androstane (surr)	133		50-150		%	20		10/17/16 23:41

Batch Information

Analytical Batch: XFC12970
Analytical Method: AK102
Analyst: NRO
Analytical Date/Time: 10/17/16 23:41
Container ID: 1168704001-A

Prep Batch: XXX36510
Prep Method: SW3550C
Prep Date/Time: 10/12/16 18:20
Prep Initial Wt./Vol.: 30.195 g
Prep Extract Vol: 1 mL

Print Date: 10/24/2016 3:53:11PM

J flagging is activated

Results of **16-RBY-ISM-01**

Client Sample ID: **16-RBY-ISM-01**
Client Project ID: **Ruby Former Headstart**
Lab Sample ID: 1168704001
Lab Project ID: 1168704

Collection Date: 10/03/16 19:10
Received Date: 10/08/16 10:04
Matrix: Soil/Solid (dry weight)
Solids (%):82.8
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	128		3.47	1.04	mg/Kg	1		10/16/16 01:44
Surrogates								
4-Bromofluorobenzene (surr)	967	*	50-150		%	1		10/16/16 01:44

Batch Information

Analytical Batch: VFC13383
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/16/16 01:44
Container ID: 1168704001-B

Prep Batch: VXX29775
Prep Method: SW5035A
Prep Date/Time: 10/03/16 19:10
Prep Initial Wt./Vol.: 372.48 g
Prep Extract Vol: 214.084 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	8.70 U		17.4	5.55	ug/Kg	1		10/16/16 01:44
Ethylbenzene	193		34.7	10.8	ug/Kg	1		10/16/16 01:44
o-Xylene	2070		34.7	10.8	ug/Kg	1		10/16/16 01:44
P & M -Xylene	2810		69.4	20.8	ug/Kg	1		10/16/16 01:44
Toluene	90.6		34.7	10.8	ug/Kg	1		10/16/16 01:44
Surrogates								
1,4-Difluorobenzene (surr)	107		72-119		%	1		10/16/16 01:44

Batch Information

Analytical Batch: VFC13383
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/16/16 01:44
Container ID: 1168704001-B

Prep Batch: VXX29775
Prep Method: SW5035A
Prep Date/Time: 10/03/16 19:10
Prep Initial Wt./Vol.: 372.48 g
Prep Extract Vol: 214.084 mL

Print Date: 10/24/2016 3:53:11PM

J flagging is activated

Results of **16-RBY-ISM-02**

Client Sample ID: **16-RBY-ISM-02**
Client Project ID: **Ruby Former Headstart**
Lab Sample ID: 1168704002
Lab Project ID: 1168704

Collection Date: 10/03/16 20:00
Received Date: 10/08/16 10:04
Matrix: Soil/Solid (dry weight)
Solids (%):82.5
Location:

Results by **Polynuclear Aromatics GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	9320		602	181	ug/Kg	100		10/19/16 18:51
2-Methylnaphthalene	6650		602	181	ug/Kg	100		10/19/16 18:51
Acenaphthene	30.1 U		60.2	18.1	ug/Kg	10		10/17/16 20:12
Acenaphthylene	30.1 U		60.2	18.1	ug/Kg	10		10/17/16 20:12
Anthracene	22.4 J		60.2	18.1	ug/Kg	10		10/17/16 20:12
Benzo(a)Anthracene	22.7 J		60.2	18.1	ug/Kg	10		10/17/16 20:12
Benzo[a]pyrene	30.1 U		60.2	18.1	ug/Kg	10		10/17/16 20:12
Benzo[b]Fluoranthene	44.7 J		60.2	18.1	ug/Kg	10		10/17/16 20:12
Benzo[g,h,i]perylene	30.1 U		60.2	18.1	ug/Kg	10		10/17/16 20:12
Benzo[k]fluoranthene	30.1 U		60.2	18.1	ug/Kg	10		10/17/16 20:12
Chrysene	121		60.2	18.1	ug/Kg	10		10/17/16 20:12
Dibenzo[a,h]anthracene	30.1 U		60.2	18.1	ug/Kg	10		10/17/16 20:12
Fluoranthene	827		60.2	18.1	ug/Kg	10		10/17/16 20:12
Fluorene	30.1 U		60.2	18.1	ug/Kg	10		10/17/16 20:12
Indeno[1,2,3-c,d] pyrene	30.1 U		60.2	18.1	ug/Kg	10		10/17/16 20:12
Naphthalene	598		60.2	18.1	ug/Kg	10		10/17/16 20:12
Phenanthrene	1050		60.2	18.1	ug/Kg	10		10/17/16 20:12
Pyrene	340		60.2	18.1	ug/Kg	10		10/17/16 20:12
Surrogates								
2-Fluorobiphenyl (surr)	195	*	46-115		%	10		10/17/16 20:12
Terphenyl-d14 (surr)	97.9		58-133		%	10		10/17/16 20:12

Batch Information

Analytical Batch: XMS9701
Analytical Method: 8270D SIM (PAH)
Analyst: S.G
Analytical Date/Time: 10/17/16 20:12
Container ID: 1168704002-A

Prep Batch: XXX36508
Prep Method: SW3550C
Prep Date/Time: 10/12/16 14:15
Prep Initial Wt./Vol.: 22.652 g
Prep Extract Vol: 1 mL

Analytical Batch: XMS9705
Analytical Method: 8270D SIM (PAH)
Analyst: BRV
Analytical Date/Time: 10/19/16 18:51
Container ID: 1168704002-A

Prep Batch: XXX36508
Prep Method: SW3550C
Prep Date/Time: 10/12/16 14:15
Prep Initial Wt./Vol.: 22.652 g
Prep Extract Vol: 1 mL

Results of **16-RBY-ISM-02**

Client Sample ID: **16-RBY-ISM-02**
Client Project ID: **Ruby Former Headstart**
Lab Sample ID: 1168704002
Lab Project ID: 1168704

Collection Date: 10/03/16 20:00
Received Date: 10/08/16 10:04
Matrix: Soil/Solid (dry weight)
Solids (%):82.5
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	8080		482	150	mg/Kg	20		10/17/16 23:51
Surrogates								
5a Androstane (surr)	129		50-150		%	20		10/17/16 23:51

Batch Information

Analytical Batch: XFC12970
Analytical Method: AK102
Analyst: NRO
Analytical Date/Time: 10/17/16 23:51
Container ID: 1168704002-A

Prep Batch: XXX36510
Prep Method: SW3550C
Prep Date/Time: 10/12/16 18:20
Prep Initial Wt./Vol.: 30.151 g
Prep Extract Vol: 1 mL

Results of **16-RBY-ISM-02**

Client Sample ID: **16-RBY-ISM-02**
Client Project ID: **Ruby Former Headstart**
Lab Sample ID: 1168704002
Lab Project ID: 1168704

Collection Date: 10/03/16 20:00
Received Date: 10/08/16 10:04
Matrix: Soil/Solid (dry weight)
Solids (%):82.5
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	97.8		3.48	1.04	mg/Kg	1		10/16/16 02:02
Surrogates								
4-Bromofluorobenzene (surr)	809	*	50-150		%	1		10/16/16 02:02

Batch Information

Analytical Batch: VFC13383
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/16/16 02:02
Container ID: 1168704002-B

Prep Batch: VXX29775
Prep Method: SW5035A
Prep Date/Time: 10/03/16 20:00
Prep Initial Wt./Vol.: 376.13 g
Prep Extract Vol: 215.747 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	8.70	U	17.4	5.56	ug/Kg	1		10/16/16 02:02
Ethylbenzene	150		34.8	10.8	ug/Kg	1		10/16/16 02:02
o-Xylene	1910		34.8	10.8	ug/Kg	1		10/16/16 02:02
P & M -Xylene	2350		69.5	20.9	ug/Kg	1		10/16/16 02:02
Toluene	72.6		34.8	10.8	ug/Kg	1		10/16/16 02:02
Surrogates								
1,4-Difluorobenzene (surr)	108		72-119		%	1		10/16/16 02:02

Batch Information

Analytical Batch: VFC13383
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/16/16 02:02
Container ID: 1168704002-B

Prep Batch: VXX29775
Prep Method: SW5035A
Prep Date/Time: 10/03/16 20:00
Prep Initial Wt./Vol.: 376.13 g
Prep Extract Vol: 215.747 mL

Print Date: 10/24/2016 3:53:11PM

J flagging is activated

Results of **16-RBY-ISM-03**

Client Sample ID: **16-RBY-ISM-03**
Client Project ID: **Ruby Former Headstart**
Lab Sample ID: 1168704003
Lab Project ID: 1168704

Collection Date: 10/03/16 20:50
Received Date: 10/08/16 10:04
Matrix: Soil/Solid (dry weight)
Solids (%):82.5
Location:

Results by **Polynuclear Aromatics GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	8780		606	182	ug/Kg	100		10/17/16 20:53
2-Methylnaphthalene	6820		606	182	ug/Kg	100		10/17/16 20:53
Acenaphthene	30.3 U		60.6	18.2	ug/Kg	10		10/17/16 20:32
Acenaphthylene	30.3 U		60.6	18.2	ug/Kg	10		10/17/16 20:32
Anthracene	30.3 U		60.6	18.2	ug/Kg	10		10/17/16 20:32
Benzo(a)Anthracene	30.3 U		60.6	18.2	ug/Kg	10		10/17/16 20:32
Benzo[a]pyrene	30.3 U		60.6	18.2	ug/Kg	10		10/17/16 20:32
Benzo[b]Fluoranthene	30.7 J		60.6	18.2	ug/Kg	10		10/17/16 20:32
Fluoranthene	604		60.6	18.2	ug/Kg	10		10/17/16 20:32
Benzo[g,h,i]perylene	30.3 U		60.6	18.2	ug/Kg	10		10/17/16 20:32
Benzo[k]fluoranthene	30.3 U		60.6	18.2	ug/Kg	10		10/17/16 20:32
Chrysene	86.3		60.6	18.2	ug/Kg	10		10/17/16 20:32
Dibenzo[a,h]anthracene	30.3 U		60.6	18.2	ug/Kg	10		10/17/16 20:32
Fluorene	30.3 U		60.6	18.2	ug/Kg	10		10/17/16 20:32
Indeno[1,2,3-c,d] pyrene	30.3 U		60.6	18.2	ug/Kg	10		10/17/16 20:32
Naphthalene	682		60.6	18.2	ug/Kg	10		10/17/16 20:32
Phenanthrene	984		60.6	18.2	ug/Kg	10		10/17/16 20:32
Pyrene	206		60.6	18.2	ug/Kg	10		10/17/16 20:32
Surrogates								
2-Fluorobiphenyl (surr)	202	*	46-115		%	10		10/17/16 20:32
Terphenyl-d14 (surr)	110		58-133		%	10		10/17/16 20:32

Batch Information

Analytical Batch: XMS9701
Analytical Method: 8270D SIM (PAH)
Analyst: S.G
Analytical Date/Time: 10/17/16 20:53
Container ID: 1168704003-A

Prep Batch: XXX36508
Prep Method: SW3550C
Prep Date/Time: 10/12/16 14:15
Prep Initial Wt./Vol.: 22.525 g
Prep Extract Vol: 1 mL

Print Date: 10/24/2016 3:53:11PM

J flagging is activated

Results of **16-RBY-ISM-03**

Client Sample ID: **16-RBY-ISM-03**
Client Project ID: **Ruby Former Headstart**
Lab Sample ID: 1168704003
Lab Project ID: 1168704

Collection Date: 10/03/16 20:50
Received Date: 10/08/16 10:04
Matrix: Soil/Solid (dry weight)
Solids (%):82.5
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	6860		481	149	mg/Kg	20		10/18/16 00:01
Surrogates								
5a Androstane (surr)	127		50-150		%	20		10/18/16 00:01

Batch Information

Analytical Batch: XFC12970
Analytical Method: AK102
Analyst: NRO
Analytical Date/Time: 10/18/16 00:01
Container ID: 1168704003-A

Prep Batch: XXX36510
Prep Method: SW3550C
Prep Date/Time: 10/12/16 18:20
Prep Initial Wt./Vol.: 30.225 g
Prep Extract Vol: 1 mL

Results of **16-RBY-ISM-03**

Client Sample ID: **16-RBY-ISM-03**
Client Project ID: **Ruby Former Headstart**
Lab Sample ID: 1168704003
Lab Project ID: 1168704

Collection Date: 10/03/16 20:50
Received Date: 10/08/16 10:04
Matrix: Soil/Solid (dry weight)
Solids (%):82.5
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	82.3		3.37	1.01	mg/Kg	1		10/16/16 02:58
Surrogates								
4-Bromofluorobenzene (surr)	1010	*	50-150		%	1		10/16/16 02:58

Batch Information

Analytical Batch: VFC13383
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/16/16 02:58
Container ID: 1168704003-B

Prep Batch: VXX29775
Prep Method: SW5035A
Prep Date/Time: 10/03/16 20:50
Prep Initial Wt./Vol.: 394.491 g
Prep Extract Vol: 219.175 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	8.40	U	16.8	5.39	ug/Kg	1		10/16/16 02:58
Ethylbenzene	169		33.7	10.5	ug/Kg	1		10/16/16 02:58
o-Xylene	1900		33.7	10.5	ug/Kg	1		10/16/16 02:58
P & M -Xylene	2490		67.4	20.2	ug/Kg	1		10/16/16 02:58
Toluene	72.8		33.7	10.5	ug/Kg	1		10/16/16 02:58
Surrogates								
1,4-Difluorobenzene (surr)	111		72-119		%	1		10/16/16 02:58

Batch Information

Analytical Batch: VFC13383
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/16/16 02:58
Container ID: 1168704003-B

Prep Batch: VXX29775
Prep Method: SW5035A
Prep Date/Time: 10/03/16 20:50
Prep Initial Wt./Vol.: 394.491 g
Prep Extract Vol: 219.175 mL

Results of **16-RBY-ISM-04**

Client Sample ID: **16-RBY-ISM-04**
Client Project ID: **Ruby Former Headstart**
Lab Sample ID: 1168704004
Lab Project ID: 1168704

Collection Date: 10/04/16 19:50
Received Date: 10/08/16 10:04
Matrix: Soil/Solid (dry weight)
Solids (%):83.2
Location:

Results by **Polynuclear Aromatics GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	3520		596	179	ug/Kg	100		10/17/16 21:34
2-Methylnaphthalene	1530		596	179	ug/Kg	100		10/17/16 21:34
Acenaphthene	29.8 U		59.6	17.9	ug/Kg	10		10/17/16 21:13
Acenaphthylene	29.8 U		59.6	17.9	ug/Kg	10		10/17/16 21:13
Anthracene	29.8 U		59.6	17.9	ug/Kg	10		10/17/16 21:13
Benzo(a)Anthracene	29.8 U		59.6	17.9	ug/Kg	10		10/17/16 21:13
Benzo[a]pyrene	29.8 U		59.6	17.9	ug/Kg	10		10/17/16 21:13
Benzo[b]Fluoranthene	28.0 J		59.6	17.9	ug/Kg	10		10/17/16 21:13
Benzo[g,h,i]perylene	29.8 U		59.6	17.9	ug/Kg	10		10/17/16 21:13
Benzo[k]fluoranthene	29.8 U		59.6	17.9	ug/Kg	10		10/17/16 21:13
Chrysene	71.0		59.6	17.9	ug/Kg	10		10/17/16 21:13
Dibenzo[a,h]anthracene	29.8 U		59.6	17.9	ug/Kg	10		10/17/16 21:13
Fluoranthene	482		59.6	17.9	ug/Kg	10		10/17/16 21:13
Fluorene	29.8 U		59.6	17.9	ug/Kg	10		10/17/16 21:13
Indeno[1,2,3-c,d] pyrene	29.8 U		59.6	17.9	ug/Kg	10		10/17/16 21:13
Naphthalene	29.8 U		59.6	17.9	ug/Kg	10		10/17/16 21:13
Phenanthrene	754		59.6	17.9	ug/Kg	10		10/17/16 21:13
Pyrene	219		59.6	17.9	ug/Kg	10		10/17/16 21:13
Surrogates								
2-Fluorobiphenyl (surr)	162	*	46-115		%	10		10/17/16 21:13
Terphenyl-d14 (surr)	103		58-133		%	10		10/17/16 21:13

Batch Information

Analytical Batch: XMS9701
Analytical Method: 8270D SIM (PAH)
Analyst: S.G
Analytical Date/Time: 10/17/16 21:34
Container ID: 1168704004-A

Prep Batch: XXX36508
Prep Method: SW3550C
Prep Date/Time: 10/12/16 14:15
Prep Initial Wt./Vol.: 22.701 g
Prep Extract Vol: 1 mL

Print Date: 10/24/2016 3:53:11PM

J flagging is activated

Results of **16-RBY-ISM-04**

Client Sample ID: **16-RBY-ISM-04**
Client Project ID: **Ruby Former Headstart**
Lab Sample ID: 1168704004
Lab Project ID: 1168704

Collection Date: 10/04/16 19:50
Received Date: 10/08/16 10:04
Matrix: Soil/Solid (dry weight)
Solids (%):83.2
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	2970		239	74.2	mg/Kg	10		10/18/16 00:11
Surrogates								
5a Androstane (surr)	116		50-150		%	10		10/18/16 00:11

Batch Information

Analytical Batch: XFC12970
Analytical Method: AK102
Analyst: NRO
Analytical Date/Time: 10/18/16 00:11
Container ID: 1168704004-A

Prep Batch: XXX36510
Prep Method: SW3550C
Prep Date/Time: 10/12/16 18:20
Prep Initial Wt./Vol.: 30.129 g
Prep Extract Vol: 1 mL

Print Date: 10/24/2016 3:53:11PM

J flagging is activated

Results of **16-RBY-ISM-04**

Client Sample ID: **16-RBY-ISM-04**
Client Project ID: **Ruby Former Headstart**
Lab Sample ID: 1168704004
Lab Project ID: 1168704

Collection Date: 10/04/16 19:50
Received Date: 10/08/16 10:04
Matrix: Soil/Solid (dry weight)
Solids (%):83.2
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	60.7		3.42	1.03	mg/Kg	1		10/16/16 03:17
Surrogates								
4-Bromofluorobenzene (surr)	534	*	50-150		%	1		10/16/16 03:17

Batch Information

Analytical Batch: VFC13383
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/16/16 03:17
Container ID: 1168704004-B

Prep Batch: VXX29775
Prep Method: SW5035A
Prep Date/Time: 10/04/16 19:50
Prep Initial Wt./Vol.: 374.45 g
Prep Extract Vol: 212.981 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	8.55 U		17.1	5.47	ug/Kg	1		10/16/16 03:17
Ethylbenzene	77.6		34.2	10.7	ug/Kg	1		10/16/16 03:17
o-Xylene	716		34.2	10.7	ug/Kg	1		10/16/16 03:17
P & M -Xylene	1090		68.4	20.5	ug/Kg	1		10/16/16 03:17
Toluene	27.0 J		34.2	10.7	ug/Kg	1		10/16/16 03:17
Surrogates								
1,4-Difluorobenzene (surr)	106		72-119		%	1		10/16/16 03:17

Batch Information

Analytical Batch: VFC13383
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/16/16 03:17
Container ID: 1168704004-B

Prep Batch: VXX29775
Prep Method: SW5035A
Prep Date/Time: 10/04/16 19:50
Prep Initial Wt./Vol.: 374.45 g
Prep Extract Vol: 212.981 mL

Print Date: 10/24/2016 3:53:11PM

J flagging is activated

Results of **16-RBY-ISM-05**

Client Sample ID: **16-RBY-ISM-05**
Client Project ID: **Ruby Former Headstart**
Lab Sample ID: 1168704005
Lab Project ID: 1168704

Collection Date: 10/04/16 20:50
Received Date: 10/08/16 10:04
Matrix: Soil/Solid (dry weight)
Solids (%):83.3
Location:

Results by **Polynuclear Aromatics GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	4110		599	180	ug/Kg	100		10/17/16 22:15
2-Methylnaphthalene	2030		599	180	ug/Kg	100		10/17/16 22:15
Acenaphthene	29.9	U	59.9	18.0	ug/Kg	10		10/17/16 21:54
Acenaphthylene	29.9	U	59.9	18.0	ug/Kg	10		10/17/16 21:54
Anthracene	29.9	U	59.9	18.0	ug/Kg	10		10/17/16 21:54
Benzo(a)Anthracene	29.9	U	59.9	18.0	ug/Kg	10		10/17/16 21:54
Benzo[a]pyrene	29.9	U	59.9	18.0	ug/Kg	10		10/17/16 21:54
Benzo[b]Fluoranthene	28.8	J	59.9	18.0	ug/Kg	10		10/17/16 21:54
Benzo[g,h,i]perylene	29.9	U	59.9	18.0	ug/Kg	10		10/17/16 21:54
Benzo[k]fluoranthene	29.9	U	59.9	18.0	ug/Kg	10		10/17/16 21:54
Chrysene	72.8		59.9	18.0	ug/Kg	10		10/17/16 21:54
Dibenzo[a,h]anthracene	29.9	U	59.9	18.0	ug/Kg	10		10/17/16 21:54
Fluoranthene	515		59.9	18.0	ug/Kg	10		10/17/16 21:54
Fluorene	29.9	U	59.9	18.0	ug/Kg	10		10/17/16 21:54
Indeno[1,2,3-c,d] pyrene	29.9	U	59.9	18.0	ug/Kg	10		10/17/16 21:54
Naphthalene	29.9	U	59.9	18.0	ug/Kg	10		10/17/16 21:54
Phenanthrene	846		59.9	18.0	ug/Kg	10		10/17/16 21:54
Pyrene	225		59.9	18.0	ug/Kg	10		10/17/16 21:54
Surrogates								
2-Fluorobiphenyl (surr)	169	*	46-115		%	10		10/17/16 21:54
Terphenyl-d14 (surr)	105		58-133		%	10		10/17/16 21:54

Batch Information

Analytical Batch: XMS9701
Analytical Method: 8270D SIM (PAH)
Analyst: S.G
Analytical Date/Time: 10/17/16 22:15
Container ID: 1168704005-A

Prep Batch: XXX36508
Prep Method: SW3550C
Prep Date/Time: 10/12/16 14:15
Prep Initial Wt./Vol.: 22.574 g
Prep Extract Vol: 1 mL

Print Date: 10/24/2016 3:53:11PM

J flagging is activated

Results of **16-RBY-ISM-05**

Client Sample ID: **16-RBY-ISM-05**
Client Project ID: **Ruby Former Headstart**
Lab Sample ID: 1168704005
Lab Project ID: 1168704

Collection Date: 10/04/16 20:50
Received Date: 10/08/16 10:04
Matrix: Soil/Solid (dry weight)
Solids (%):83.3
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	2870		237	73.5	mg/Kg	10		10/18/16 00:20
Surrogates								
5a Androstane (surr)	113		50-150		%	10		10/18/16 00:20

Batch Information

Analytical Batch: XFC12970
Analytical Method: AK102
Analyst: NRO
Analytical Date/Time: 10/18/16 00:20
Container ID: 1168704005-A

Prep Batch: XXX36510
Prep Method: SW3550C
Prep Date/Time: 10/12/16 18:20
Prep Initial Wt./Vol.: 30.396 g
Prep Extract Vol: 1 mL

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Results of **16-RBY-ISM-05**

Client Sample ID: **16-RBY-ISM-05**
Client Project ID: **Ruby Former Headstart**
Lab Sample ID: 1168704005
Lab Project ID: 1168704

Collection Date: 10/04/16 20:50
Received Date: 10/08/16 10:04
Matrix: Soil/Solid (dry weight)
Solids (%):83.3
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	34.1		3.55	1.07	mg/Kg	1		10/16/16 05:26
Surrogates								
4-Bromofluorobenzene (surr)	323	*	50-150		%	1		10/16/16 05:26

Batch Information

Analytical Batch: VFC13383
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/16/16 05:26
Container ID: 1168704005-B

Prep Batch: VXX29775
Prep Method: SW5035A
Prep Date/Time: 10/04/16 20:50
Prep Initial Wt./Vol.: 353.447 g
Prep Extract Vol: 209.147 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	8.90 U		17.8	5.69	ug/Kg	1		10/16/16 05:26
Ethylbenzene	61.5		35.5	11.1	ug/Kg	1		10/16/16 05:26
o-Xylene	602		35.5	11.1	ug/Kg	1		10/16/16 05:26
P & M -Xylene	784		71.1	21.3	ug/Kg	1		10/16/16 05:26
Toluene	22.0 J		35.5	11.1	ug/Kg	1		10/16/16 05:26
Surrogates								
1,4-Difluorobenzene (surr)	102		72-119		%	1		10/16/16 05:26

Batch Information

Analytical Batch: VFC13383
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/16/16 05:26
Container ID: 1168704005-B

Prep Batch: VXX29775
Prep Method: SW5035A
Prep Date/Time: 10/04/16 20:50
Prep Initial Wt./Vol.: 353.447 g
Prep Extract Vol: 209.147 mL

Results of **16-RBY-ISM-06**

Client Sample ID: **16-RBY-ISM-06**
Client Project ID: **Ruby Former Headstart**
Lab Sample ID: 1168704006
Lab Project ID: 1168704

Collection Date: 10/04/16 21:40
Received Date: 10/08/16 10:04
Matrix: Soil/Solid (dry weight)
Solids (%):83.2
Location:

Results by **Polynuclear Aromatics GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	4000		599	180	ug/Kg	100		10/19/16 19:12
2-Methylnaphthalene	1620		120	35.9	ug/Kg	20		10/17/16 22:35
Acenaphthene	60.0 U		120	35.9	ug/Kg	20		10/17/16 22:35
Acenaphthylene	60.0 U		120	35.9	ug/Kg	20		10/17/16 22:35
Anthracene	60.0 U		120	35.9	ug/Kg	20		10/17/16 22:35
Benzo(a)Anthracene	60.0 U		120	35.9	ug/Kg	20		10/17/16 22:35
Benzo[a]pyrene	60.0 U		120	35.9	ug/Kg	20		10/17/16 22:35
Benzo[b]Fluoranthene	60.0 U		120	35.9	ug/Kg	20		10/17/16 22:35
Benzo[g,h,i]perylene	60.0 U		120	35.9	ug/Kg	20		10/17/16 22:35
Benzo[k]fluoranthene	60.0 U		120	35.9	ug/Kg	20		10/17/16 22:35
Chrysene	69.7 J		120	35.9	ug/Kg	20		10/17/16 22:35
Dibenzo[a,h]anthracene	60.0 U		120	35.9	ug/Kg	20		10/17/16 22:35
Fluoranthene	522		120	35.9	ug/Kg	20		10/17/16 22:35
Fluorene	60.0 U		120	35.9	ug/Kg	20		10/17/16 22:35
Indeno[1,2,3-c,d] pyrene	60.0 U		120	35.9	ug/Kg	20		10/17/16 22:35
Naphthalene	60.0 U		120	35.9	ug/Kg	20		10/17/16 22:35
Phenanthrene	910		120	35.9	ug/Kg	20		10/17/16 22:35
Pyrene	215		120	35.9	ug/Kg	20		10/17/16 22:35
Surrogates								
2-Fluorobiphenyl (surr)	180	*	46-115		%	20		10/17/16 22:35
Terphenyl-d14 (surr)	108		58-133		%	20		10/17/16 22:35

Batch Information

Analytical Batch: XMS9701
Analytical Method: 8270D SIM (PAH)
Analyst: S.G
Analytical Date/Time: 10/17/16 22:35
Container ID: 1168704006-A

Prep Batch: XXX36508
Prep Method: SW3550C
Prep Date/Time: 10/12/16 14:15
Prep Initial Wt./Vol.: 22.576 g
Prep Extract Vol: 1 mL

Analytical Batch: XMS9705
Analytical Method: 8270D SIM (PAH)
Analyst: BRV
Analytical Date/Time: 10/19/16 19:12
Container ID: 1168704006-A

Prep Batch: XXX36508
Prep Method: SW3550C
Prep Date/Time: 10/12/16 14:15
Prep Initial Wt./Vol.: 22.576 g
Prep Extract Vol: 1 mL

Results of **16-RBY-ISM-06**

Client Sample ID: **16-RBY-ISM-06**
Client Project ID: **Ruby Former Headstart**
Lab Sample ID: 1168704006
Lab Project ID: 1168704

Collection Date: 10/04/16 21:40
Received Date: 10/08/16 10:04
Matrix: Soil/Solid (dry weight)
Solids (%):83.2
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	2730		239	74.0	mg/Kg	10		10/18/16 00:30
Surrogates								
5a Androstane (surr)	115		50-150		%	10		10/18/16 00:30

Batch Information

Analytical Batch: XFC12970
Analytical Method: AK102
Analyst: NRO
Analytical Date/Time: 10/18/16 00:30
Container ID: 1168704006-A

Prep Batch: XXX36510
Prep Method: SW3550C
Prep Date/Time: 10/12/16 18:20
Prep Initial Wt./Vol.: 30.202 g
Prep Extract Vol: 1 mL

Results of **16-RBY-ISM-06**

Client Sample ID: **16-RBY-ISM-06**
Client Project ID: **Ruby Former Headstart**
Lab Sample ID: 1168704006
Lab Project ID: 1168704

Collection Date: 10/04/16 21:40
Received Date: 10/08/16 10:04
Matrix: Soil/Solid (dry weight)
Solids (%):83.2
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	79.4		3.65	1.09	mg/Kg	1		10/16/16 05:44
Surrogates								
4-Bromofluorobenzene (surr)	621	*	50-150		%	1		10/16/16 05:44

Batch Information

Analytical Batch: VFC13383
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/16/16 05:44
Container ID: 1168704006-B

Prep Batch: VXX29775
Prep Method: SW5035A
Prep Date/Time: 10/04/16 21:40
Prep Initial Wt./Vol.: 341.304 g
Prep Extract Vol: 207.195 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	9.10	U	18.2	5.83	ug/Kg	1		10/16/16 05:44
Ethylbenzene	103		36.5	11.4	ug/Kg	1		10/16/16 05:44
o-Xylene	839		36.5	11.4	ug/Kg	1		10/16/16 05:44
P & M -Xylene	1310		72.9	21.9	ug/Kg	1		10/16/16 05:44
Toluene	27.7	J	36.5	11.4	ug/Kg	1		10/16/16 05:44
Surrogates								
1,4-Difluorobenzene (surr)	106		72-119		%	1		10/16/16 05:44

Batch Information

Analytical Batch: VFC13383
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/16/16 05:44
Container ID: 1168704006-B

Prep Batch: VXX29775
Prep Method: SW5035A
Prep Date/Time: 10/04/16 21:40
Prep Initial Wt./Vol.: 341.304 g
Prep Extract Vol: 207.195 mL

Print Date: 10/24/2016 3:53:11PM

J flagging is activated

Results of **16-RBY-ISM-07**

Client Sample ID: **16-RBY-ISM-07**
Client Project ID: **Ruby Former Headstart**
Lab Sample ID: 1168704007
Lab Project ID: 1168704

Collection Date: 10/06/16 09:45
Received Date: 10/08/16 10:04
Matrix: Soil/Solid (dry weight)
Solids (%):80.3
Location:

Results by **Polynuclear Aromatics GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	31600		2490	746	ug/Kg	400		10/19/16 19:32
2-Methylnaphthalene	30700		2490	746	ug/Kg	400		10/19/16 19:32
Acenaphthene	62.0 U		124	37.3	ug/Kg	20		10/17/16 22:56
Acenaphthylene	62.0 U		124	37.3	ug/Kg	20		10/17/16 22:56
Anthracene	62.0 U		124	37.3	ug/Kg	20		10/17/16 22:56
Benzo(a)Anthracene	25.3		6.21	1.86	ug/Kg	1		10/14/16 17:30
Benzo[a]pyrene	27.1		6.21	1.86	ug/Kg	1		10/14/16 17:30
Benzo[b]Fluoranthene	46.9		6.21	1.86	ug/Kg	1		10/14/16 17:30
Benzo[g,h,i]perylene	20.1		6.21	1.86	ug/Kg	1		10/14/16 17:30
Benzo[k]fluoranthene	15.6		6.21	1.86	ug/Kg	1		10/14/16 17:30
Chrysene	47.0		6.21	1.86	ug/Kg	1		10/14/16 17:30
Dibenzo[a,h]anthracene	6.92		6.21	1.86	ug/Kg	1		10/14/16 17:30
Fluoranthene	53.9		6.21	1.86	ug/Kg	1		10/14/16 17:30
Fluorene	580		124	37.3	ug/Kg	20		10/17/16 22:56
Indeno[1,2,3-c,d] pyrene	18.7		6.21	1.86	ug/Kg	1		10/14/16 17:30
Naphthalene	11800		2490	746	ug/Kg	400		10/19/16 19:32
Phenanthrene	371		124	37.3	ug/Kg	20		10/17/16 22:56
Pyrene	56.8		6.21	1.86	ug/Kg	1		10/14/16 17:30
Surrogates								
2-Fluorobiphenyl (surr)	278	*	46-115		%	20		10/17/16 22:56
Terphenyl-d14 (surr)	109		58-133		%	1		10/14/16 17:30

Results of **16-RBY-ISM-07**

Client Sample ID: **16-RBY-ISM-07**
Client Project ID: **Ruby Former Headstart**
Lab Sample ID: 1168704007
Lab Project ID: 1168704

Collection Date: 10/06/16 09:45
Received Date: 10/08/16 10:04
Matrix: Soil/Solid (dry weight)
Solids (%):80.3
Location:

Results by **Polynuclear Aromatics GC/MS**

Batch Information

Analytical Batch: XMS9698
Analytical Method: 8270D SIM (PAH)
Analyst: S.G
Analytical Date/Time: 10/14/16 17:30
Container ID: 1168704007-A

Prep Batch: XXX36508
Prep Method: SW3550C
Prep Date/Time: 10/12/16 14:15
Prep Initial Wt./Vol.: 22.553 g
Prep Extract Vol: 1 mL

Analytical Batch: XMS9701
Analytical Method: 8270D SIM (PAH)
Analyst: S.G
Analytical Date/Time: 10/17/16 22:56
Container ID: 1168704007-A

Prep Batch: XXX36508
Prep Method: SW3550C
Prep Date/Time: 10/12/16 14:15
Prep Initial Wt./Vol.: 22.553 g
Prep Extract Vol: 1 mL

Analytical Batch: XMS9705
Analytical Method: 8270D SIM (PAH)
Analyst: BRV
Analytical Date/Time: 10/19/16 19:32
Container ID: 1168704007-A

Prep Batch: XXX36508
Prep Method: SW3550C
Prep Date/Time: 10/12/16 14:15
Prep Initial Wt./Vol.: 22.553 g
Prep Extract Vol: 1 mL

Results of **16-RBY-ISM-07**

Client Sample ID: **16-RBY-ISM-07**
Client Project ID: **Ruby Former Headstart**
Lab Sample ID: 1168704007
Lab Project ID: 1168704

Collection Date: 10/06/16 09:45
Received Date: 10/08/16 10:04
Matrix: Soil/Solid (dry weight)
Solids (%):80.3
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	9140		497	154	mg/Kg	20		10/18/16 00:40
Surrogates								
5a Androstane (surr)	124		50-150		%	20		10/18/16 00:40

Batch Information

Analytical Batch: XFC12970
Analytical Method: AK102
Analyst: NRO
Analytical Date/Time: 10/18/16 00:40
Container ID: 1168704007-A

Prep Batch: XXX36510
Prep Method: SW3550C
Prep Date/Time: 10/12/16 18:20
Prep Initial Wt./Vol.: 30.102 g
Prep Extract Vol: 1 mL

Print Date: 10/24/2016 3:53:11PM

J flagging is activated

Results of **16-RBY-ISM-07**

Client Sample ID: **16-RBY-ISM-07**
Client Project ID: **Ruby Former Headstart**
Lab Sample ID: 1168704007
Lab Project ID: 1168704

Collection Date: 10/06/16 09:45
Received Date: 10/08/16 10:04
Matrix: Soil/Solid (dry weight)
Solids (%):80.3
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	99.5		3.51	1.05	mg/Kg	1		10/19/16 02:12
Surrogates								
4-Bromofluorobenzene (surr)	1010	*	50-150		%	1		10/19/16 02:12

Batch Information

Analytical Batch: VFC13393
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/19/16 02:12
Container ID: 1168704007-B

Prep Batch: VXX29796
Prep Method: SW5035A
Prep Date/Time: 10/06/16 09:45
Prep Initial Wt./Vol.: 408.355 g
Prep Extract Vol: 230.485 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	33.0		17.6	5.62	ug/Kg	1		10/19/16 02:12
Ethylbenzene	421		35.1	11.0	ug/Kg	1		10/19/16 02:12
o-Xylene	2550		35.1	11.0	ug/Kg	1		10/19/16 02:12
P & M -Xylene	3130		70.3	21.1	ug/Kg	1		10/19/16 02:12
Toluene	218		35.1	11.0	ug/Kg	1		10/19/16 02:12
Surrogates								
1,4-Difluorobenzene (surr)	91.3		72-119		%	1		10/19/16 02:12

Batch Information

Analytical Batch: VFC13393
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/19/16 02:12
Container ID: 1168704007-B

Prep Batch: VXX29796
Prep Method: SW5035A
Prep Date/Time: 10/06/16 09:45
Prep Initial Wt./Vol.: 408.355 g
Prep Extract Vol: 230.485 mL

Results of **16-RBY-ISM-08**

Client Sample ID: **16-RBY-ISM-08**
Client Project ID: **Ruby Former Headstart**
Lab Sample ID: 1168704008
Lab Project ID: 1168704

Collection Date: 10/06/16 10:15
Received Date: 10/08/16 10:04
Matrix: Soil/Solid (dry weight)
Solids (%):80.1
Location:

Results by **Polynuclear Aromatics GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	22900		2470	741	ug/Kg	400		10/19/16 19:53
2-Methylnaphthalene	21200		2470	741	ug/Kg	400		10/19/16 19:53
Acenaphthene	61.5	U	123	37.0	ug/Kg	20		10/17/16 23:16
Acenaphthylene	61.5	U	123	37.0	ug/Kg	20		10/17/16 23:16
Anthracene	61.5	U	123	37.0	ug/Kg	20		10/17/16 23:16
Benzo(a)Anthracene	13.1		6.17	1.85	ug/Kg	1		10/14/16 17:51
Benzo[a]pyrene	20.0		6.17	1.85	ug/Kg	1		10/14/16 17:51
Benzo[b]Fluoranthene	30.9		6.17	1.85	ug/Kg	1		10/14/16 17:51
Benzo[g,h,i]perylene	13.9		6.17	1.85	ug/Kg	1		10/14/16 17:51
Benzo[k]fluoranthene	8.34		6.17	1.85	ug/Kg	1		10/14/16 17:51
Chrysene	11.9		6.17	1.85	ug/Kg	1		10/14/16 17:51
Dibenzo[a,h]anthracene	4.67	J	6.17	1.85	ug/Kg	1		10/14/16 17:51
Fluoranthene	30.3		6.17	1.85	ug/Kg	1		10/14/16 17:51
Fluorene	572		123	37.0	ug/Kg	20		10/17/16 23:16
Indeno[1,2,3-c,d] pyrene	13.1		6.17	1.85	ug/Kg	1		10/14/16 17:51
Naphthalene	7140		2470	741	ug/Kg	400		10/19/16 19:53
Phenanthrene	357		123	37.0	ug/Kg	20		10/17/16 23:16
Pyrene	34.3		6.17	1.85	ug/Kg	1		10/14/16 17:51
Surrogates								
2-Fluorobiphenyl (surr)	271	*	46-115		%	20		10/17/16 23:16
Terphenyl-d14 (surr)	103		58-133		%	1		10/14/16 17:51

Results of **16-RBY-ISM-08**

Client Sample ID: **16-RBY-ISM-08**
Client Project ID: **Ruby Former Headstart**
Lab Sample ID: 1168704008
Lab Project ID: 1168704

Collection Date: 10/06/16 10:15
Received Date: 10/08/16 10:04
Matrix: Soil/Solid (dry weight)
Solids (%):80.1
Location:

Results by **Polynuclear Aromatics GC/MS**

Batch Information

Analytical Batch: XMS9698
Analytical Method: 8270D SIM (PAH)
Analyst: S.G
Analytical Date/Time: 10/14/16 17:51
Container ID: 1168704008-A

Prep Batch: XXX36508
Prep Method: SW3550C
Prep Date/Time: 10/12/16 14:15
Prep Initial Wt./Vol.: 22.749 g
Prep Extract Vol: 1 mL

Analytical Batch: XMS9701
Analytical Method: 8270D SIM (PAH)
Analyst: S.G
Analytical Date/Time: 10/17/16 23:16
Container ID: 1168704008-A

Prep Batch: XXX36508
Prep Method: SW3550C
Prep Date/Time: 10/12/16 14:15
Prep Initial Wt./Vol.: 22.749 g
Prep Extract Vol: 1 mL

Analytical Batch: XMS9705
Analytical Method: 8270D SIM (PAH)
Analyst: BRV
Analytical Date/Time: 10/19/16 19:53
Container ID: 1168704008-A

Prep Batch: XXX36508
Prep Method: SW3550C
Prep Date/Time: 10/12/16 14:15
Prep Initial Wt./Vol.: 22.749 g
Prep Extract Vol: 1 mL

Results of **16-RBY-ISM-08**

Client Sample ID: **16-RBY-ISM-08**
Client Project ID: **Ruby Former Headstart**
Lab Sample ID: 1168704008
Lab Project ID: 1168704

Collection Date: 10/06/16 10:15
Received Date: 10/08/16 10:04
Matrix: Soil/Solid (dry weight)
Solids (%):80.1
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	6940		498	154	mg/Kg	20		10/18/16 00:49
Surrogates								
5a Androstane (surr)	117		50-150		%	20		10/18/16 00:49

Batch Information

Analytical Batch: XFC12970
Analytical Method: AK102
Analyst: NRO
Analytical Date/Time: 10/18/16 00:49
Container ID: 1168704008-A

Prep Batch: XXX36510
Prep Method: SW3550C
Prep Date/Time: 10/12/16 18:20
Prep Initial Wt./Vol.: 30.081 g
Prep Extract Vol: 1 mL

Print Date: 10/24/2016 3:53:11PM

J flagging is activated

Results of **16-RBY-ISM-08**

Client Sample ID: **16-RBY-ISM-08**
Client Project ID: **Ruby Former Headstart**
Lab Sample ID: 1168704008
Lab Project ID: 1168704

Collection Date: 10/06/16 10:15
Received Date: 10/08/16 10:04
Matrix: Soil/Solid (dry weight)
Solids (%):80.1
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	144		4.08	1.22	mg/Kg	1		10/19/16 02:31
Surrogates								
4-Bromofluorobenzene (surr)	1270	*	50-150		%	1		10/19/16 02:31

Batch Information

Analytical Batch: VFC13393
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/19/16 02:31
Container ID: 1168704008-B

Prep Batch: VXX29796
Prep Method: SW5035A
Prep Date/Time: 10/06/16 10:15
Prep Initial Wt./Vol.: 329.753 g
Prep Extract Vol: 215.608 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	23.7		20.4	6.53	ug/Kg	1		10/19/16 02:31
Ethylbenzene	471		40.8	12.7	ug/Kg	1		10/19/16 02:31
o-Xylene	2950		40.8	12.7	ug/Kg	1		10/19/16 02:31
P & M -Xylene	3620		81.6	24.5	ug/Kg	1		10/19/16 02:31
Toluene	177		40.8	12.7	ug/Kg	1		10/19/16 02:31
Surrogates								
1,4-Difluorobenzene (surr)	93.5		72-119		%	1		10/19/16 02:31

Batch Information

Analytical Batch: VFC13393
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/19/16 02:31
Container ID: 1168704008-B

Prep Batch: VXX29796
Prep Method: SW5035A
Prep Date/Time: 10/06/16 10:15
Prep Initial Wt./Vol.: 329.753 g
Prep Extract Vol: 215.608 mL

Print Date: 10/24/2016 3:53:11PM

J flagging is activated

Results of **16-RBY-ISM-09**

Client Sample ID: **16-RBY-ISM-09**
Client Project ID: **Ruby Former Headstart**
Lab Sample ID: 1168704009
Lab Project ID: 1168704

Collection Date: 10/06/16 11:30
Received Date: 10/08/16 10:04
Matrix: Soil/Solid (dry weight)
Solids (%):80.2
Location:

Results by **Polynuclear Aromatics GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	24800		2480	744	ug/Kg	400		10/19/16 20:13
2-Methylnaphthalene	22300		2480	744	ug/Kg	400		10/19/16 20:13
Acenaphthene	62.0	U	124	37.2	ug/Kg	20		10/17/16 23:37
Acenaphthylene	62.0	U	124	37.2	ug/Kg	20		10/17/16 23:37
Anthracene	43.7	J	124	37.2	ug/Kg	20		10/17/16 23:37
Benzo(a)Anthracene	14.9		6.20	1.86	ug/Kg	1		10/14/16 18:11
Benzo[a]pyrene	18.9		6.20	1.86	ug/Kg	1		10/14/16 18:11
Benzo[b]Fluoranthene	32.6		6.20	1.86	ug/Kg	1		10/14/16 18:11
Benzo[g,h,i]perylene	14.8		6.20	1.86	ug/Kg	1		10/14/16 18:11
Benzo[k]fluoranthene	9.52		6.20	1.86	ug/Kg	1		10/14/16 18:11
Chrysene	17.4		6.20	1.86	ug/Kg	1		10/14/16 18:11
Dibenzo[a,h]anthracene	4.83	J	6.20	1.86	ug/Kg	1		10/14/16 18:11
Fluoranthene	37.7		6.20	1.86	ug/Kg	1		10/14/16 18:11
Fluorene	686		124	37.2	ug/Kg	20		10/17/16 23:37
Indeno[1,2,3-c,d] pyrene	14.2		6.20	1.86	ug/Kg	1		10/14/16 18:11
Naphthalene	7540		2480	744	ug/Kg	400		10/19/16 20:13
Phenanthrene	385		124	37.2	ug/Kg	20		10/17/16 23:37
Pyrene	48.0		6.20	1.86	ug/Kg	1		10/14/16 18:11
Surrogates								
2-Fluorobiphenyl (surr)	294	*	46-115		%	20		10/17/16 23:37
Terphenyl-d14 (surr)	103		58-133		%	1		10/14/16 18:11

Results of **16-RBY-ISM-09**

Client Sample ID: **16-RBY-ISM-09**
Client Project ID: **Ruby Former Headstart**
Lab Sample ID: 1168704009
Lab Project ID: 1168704

Collection Date: 10/06/16 11:30
Received Date: 10/08/16 10:04
Matrix: Soil/Solid (dry weight)
Solids (%):80.2
Location:

Results by **Polynuclear Aromatics GC/MS**

Batch Information

Analytical Batch: XMS9698
Analytical Method: 8270D SIM (PAH)
Analyst: S.G
Analytical Date/Time: 10/14/16 18:11
Container ID: 1168704009-A

Prep Batch: XXX36508
Prep Method: SW3550C
Prep Date/Time: 10/12/16 14:15
Prep Initial Wt./Vol.: 22.611 g
Prep Extract Vol: 1 mL

Analytical Batch: XMS9701
Analytical Method: 8270D SIM (PAH)
Analyst: S.G
Analytical Date/Time: 10/17/16 23:37
Container ID: 1168704009-A

Prep Batch: XXX36508
Prep Method: SW3550C
Prep Date/Time: 10/12/16 14:15
Prep Initial Wt./Vol.: 22.611 g
Prep Extract Vol: 1 mL

Analytical Batch: XMS9705
Analytical Method: 8270D SIM (PAH)
Analyst: BRV
Analytical Date/Time: 10/19/16 20:13
Container ID: 1168704009-A

Prep Batch: XXX36508
Prep Method: SW3550C
Prep Date/Time: 10/12/16 14:15
Prep Initial Wt./Vol.: 22.611 g
Prep Extract Vol: 1 mL

Results of **16-RBY-ISM-09**

Client Sample ID: **16-RBY-ISM-09**
Client Project ID: **Ruby Former Headstart**
Lab Sample ID: 1168704009
Lab Project ID: 1168704

Collection Date: 10/06/16 11:30
Received Date: 10/08/16 10:04
Matrix: Soil/Solid (dry weight)
Solids (%):80.2
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	8150		493	153	mg/Kg	20		10/18/16 00:59
Surrogates								
5a Androstane (surr)	119		50-150		%	20		10/18/16 00:59

Batch Information

Analytical Batch: XFC12970
Analytical Method: AK102
Analyst: NRO
Analytical Date/Time: 10/18/16 00:59
Container ID: 1168704009-A

Prep Batch: XXX36510
Prep Method: SW3550C
Prep Date/Time: 10/12/16 18:20
Prep Initial Wt./Vol.: 30.351 g
Prep Extract Vol: 1 mL

Print Date: 10/24/2016 3:53:11PM

J flagging is activated

Results of **16-RBY-ISM-09**

Client Sample ID: **16-RBY-ISM-09**
Client Project ID: **Ruby Former Headstart**
Lab Sample ID: 1168704009
Lab Project ID: 1168704

Collection Date: 10/06/16 11:30
Received Date: 10/08/16 10:04
Matrix: Soil/Solid (dry weight)
Solids (%):80.2
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	131		3.78	1.13	mg/Kg	1		10/20/16 21:05
Surrogates								
4-Bromofluorobenzene (surr)	1510	*	50-150		%	1		10/20/16 21:05

Batch Information

Analytical Batch: VFC13397
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/20/16 21:05
Container ID: 1168704009-B

Prep Batch: VXX29810
Prep Method: SW5035A
Prep Date/Time: 10/06/16 11:30
Prep Initial Wt./Vol.: 366.845 g
Prep Extract Vol: 222.452 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	29.5		18.9	6.05	ug/Kg	1		10/20/16 21:05
Ethylbenzene	383		37.8	11.8	ug/Kg	1		10/20/16 21:05
o-Xylene	2150		37.8	11.8	ug/Kg	1		10/20/16 21:05
P & M -Xylene	2720		75.6	22.7	ug/Kg	1		10/20/16 21:05
Toluene	164		37.8	11.8	ug/Kg	1		10/20/16 21:05
Surrogates								
1,4-Difluorobenzene (surr)	97.7		72-119		%	1		10/20/16 21:05

Batch Information

Analytical Batch: VFC13397
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/20/16 21:05
Container ID: 1168704009-B

Prep Batch: VXX29810
Prep Method: SW5035A
Prep Date/Time: 10/06/16 11:30
Prep Initial Wt./Vol.: 366.845 g
Prep Extract Vol: 222.452 mL

Results of **Trip Blanks**

Client Sample ID: **Trip Blanks**
Client Project ID: **Ruby Former Headstart**
Lab Sample ID: 1168704010
Lab Project ID: 1168704

Collection Date: 10/03/16 19:00
Received Date: 10/08/16 10:04
Matrix: Soil/Solid (dry weight)
Solids (%):
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	0.896	J	2.54	0.762	mg/Kg	1		10/16/16 08:32
Surrogates								
4-Bromofluorobenzene (surr)	111		50-150		%	1		10/16/16 08:32

Batch Information

Analytical Batch: VFC13383
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/16/16 08:32
Container ID: 1168704010-A

Prep Batch: VXX29775
Prep Method: SW5035A
Prep Date/Time: 10/03/16 19:00
Prep Initial Wt./Vol.: 49.188 g
Prep Extract Vol: 25 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	6.35	U	12.7	4.07	ug/Kg	1		10/16/16 08:32
Ethylbenzene	12.7	U	25.4	7.93	ug/Kg	1		10/16/16 08:32
o-Xylene	12.7	U	25.4	7.93	ug/Kg	1		10/16/16 08:32
P & M -Xylene	25.4	U	50.8	15.2	ug/Kg	1		10/16/16 08:32
Toluene	12.7	U	25.4	7.93	ug/Kg	1		10/16/16 08:32
Surrogates								
1,4-Difluorobenzene (surr)	87.4		72-119		%	1		10/16/16 08:32

Batch Information

Analytical Batch: VFC13383
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/16/16 08:32
Container ID: 1168704010-A

Prep Batch: VXX29775
Prep Method: SW5035A
Prep Date/Time: 10/03/16 19:00
Prep Initial Wt./Vol.: 49.188 g
Prep Extract Vol: 25 mL

Method Blank

Blank ID: MB for HBN 1745503 [SPT/10020]
Blank Lab ID: 1358227

Matrix: Soil/Solid (dry weight)

QC for Samples:
1168704001, 1168704002, 1168704003, 1168704004, 1168704005, 1168704006, 1168704007, 1168704008, 1168704009

Results by **SM21 2540G**

Parameter	Results	LOQ/CL	DL	Units
Total Solids	100			%

Batch Information

Analytical Batch: SPT10020
Analytical Method: SM21 2540G
Instrument:
Analyst: RJA
Analytical Date/Time: 10/11/2016 6:54:00PM

Print Date: 10/24/2016 3:53:14PM

Duplicate Sample Summary

Original Sample ID: 1166075031
Duplicate Sample ID: 1358231
QC for Samples:

Analysis Date: 10/11/2016 18:54
Matrix: Soil/Solid (dry weight)

Results by **SM21 2540G**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Solids	92.4	92.6	%	0.16	(< 15)

Batch Information

Analytical Batch: SPT10020
Analytical Method: SM21 2540G
Instrument:
Analyst: RJA

Print Date: 10/24/2016 3:53:15PM

Duplicate Sample Summary

Original Sample ID: 1166075032
Duplicate Sample ID: 1358232

Analysis Date: 10/11/2016 18:54
Matrix: Soil/Solid (dry weight)

QC for Samples:

1168704001, 1168704002, 1168704003, 1168704004, 1168704005, 1168704006, 1168704007, 1168704008, 1168704009

Results by **SM21 2540G**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Solids	92.9	92.7	%	0.23	(< 15)

Batch Information

Analytical Batch: SPT10020
Analytical Method: SM21 2540G
Instrument:
Analyst: RJA

Print Date: 10/24/2016 3:53:15PM

Method Blank

Blank ID: MB for HBN 1745900 [VXX/29775]
Blank Lab ID: 1359310

Matrix: Soil/Solid (dry weight)

QC for Samples:
1168704001, 1168704002, 1168704003, 1168704004, 1168704005, 1168704006, 1168704010

Results by **AK101**

Parameter	Results	LOQ/CL	DL	Units
Gasoline Range Organics	1.11J	2.50	0.750	mg/Kg
Surrogates				
4-Bromofluorobenzene (surr)	79.5	50-150		%

Batch Information

Analytical Batch: VFC13383
Analytical Method: AK101
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 10/16/2016 5:07:00AM

Prep Batch: VXX29775
Prep Method: SW5035A
Prep Date/Time: 10/15/2016 12:30:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1168704 [VXX29775]
Blank Spike Lab ID: 1359313
Date Analyzed: 10/15/2016 21:05

Spike Duplicate ID: LCSD for HBN 1168704 [VXX29775]
Spike Duplicate Lab ID: 1359314
Matrix: Soil/Solid (dry weight)

QC for Samples: 1168704001, 1168704002, 1168704003, 1168704004, 1168704005, 1168704006, 1168704010

Results by **AK101**

	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Gasoline Range Organics	12.5	12.9	103	12.5	14.6	117	(60-120)	12.20	(< 20)
Surrogates									
4-Bromofluorobenzene (surr)	1.25	81.9	82	1.25	91.3	91	(50-150)	10.90	

Batch Information

Analytical Batch: **VFC13383**
Analytical Method: **AK101**
Instrument: **Agilent 7890A PID/FID**
Analyst: **ST**

Prep Batch: **VXX29775**
Prep Method: **SW5035A**
Prep Date/Time: **10/15/2016 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

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Matrix Spike Summary

Original Sample ID: 1165970003
MS Sample ID: 1359315 MS
MSD Sample ID: 1359316 MSD

Analysis Date: 10/16/2016 7:36
Analysis Date: 10/16/2016 4:12
Analysis Date: 10/16/2016 4:30
Matrix: Soil/Solid (dry weight)

QC for Samples: 1168704001, 1168704002, 1168704003, 1168704004, 1168704005, 1168704006, 1168704010

Results by **AK101**

		Matrix Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Gasoline Range Organics	5.96U	16.6	17.8	107	16.6	16.6	100	60-120	7.30	(< 20)
Surrogates										
4-Bromofluorobenzene (surr)		1.66	1.04	62	1.66	0.998	60	50-150	4.10	

Batch Information

Analytical Batch: VFC13383
Analytical Method: AK101
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 10/16/2016 4:12:00AM

Prep Batch: VXX29775
Prep Method: AK101 Extraction (S)
Prep Date/Time: 10/15/2016 12:30:00AM
Prep Initial Wt./Vol.: 57.19g
Prep Extract Vol: 25.00mL

Print Date: 10/24/2016 3:53:17PM

Method Blank

Blank ID: MB for HBN 1745900 [VXX/29775]
Blank Lab ID: 1359310

Matrix: Soil/Solid (dry weight)

QC for Samples:
1168704001, 1168704002, 1168704003, 1168704004, 1168704005, 1168704006, 1168704010

Results by **SW8021B**

Parameter	Results	LOQ/CL	DL	Units
Benzene	6.25U	12.5	4.00	ug/Kg
Ethylbenzene	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
Toluene	12.5U	25.0	7.80	ug/Kg
Surrogates				
1,4-Difluorobenzene (surr)	88.7	72-119		%

Batch Information

Analytical Batch: VFC13383
Analytical Method: SW8021B
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 10/16/2016 5:07:00AM

Prep Batch: VXX29775
Prep Method: SW5035A
Prep Date/Time: 10/15/2016 12:30:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1168704 [VXX29775]
Blank Spike Lab ID: 1359311
Date Analyzed: 10/15/2016 20:28

Spike Duplicate ID: LCSD for HBN 1168704 [VXX29775]
Spike Duplicate Lab ID: 1359312
Matrix: Soil/Solid (dry weight)

QC for Samples: 1168704001, 1168704002, 1168704003, 1168704004, 1168704005, 1168704006, 1168704010

Results by **SW8021B**

	Blank Spike (ug/Kg)			Spike Duplicate (ug/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	1250	1210	96	1250	1430	115	(75-125)	17.20	(< 20)
Ethylbenzene	1250	1230	98	1250	1440	115	(75-125)	15.60	(< 20)
o-Xylene	1250	1190	95	1250	1420	113	(75-125)	17.80	(< 20)
P & M -Xylene	2500	2380	95	2500	2880	115	(80-125)	19.10	(< 20)
Toluene	1250	1400	112	1250	1490	119	(70-125)	5.90	(< 20)
Surrogates									
1,4-Difluorobenzene (surr)	1250	77.3	77	1250	96.5	97	(72-119)	22.20	

Batch Information

Analytical Batch: **VFC13383**
Analytical Method: **SW8021B**
Instrument: **Agilent 7890A PID/FID**
Analyst: **ST**

Prep Batch: **VXX29775**
Prep Method: **SW5035A**
Prep Date/Time: **10/15/2016 00:30**
Spike Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL
Dupe Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL

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Matrix Spike Summary

Original Sample ID: 1165970003
MS Sample ID: 1359315 MS
MSD Sample ID: 1359316 MSD

Analysis Date: 10/16/2016 7:36
Analysis Date: 10/16/2016 3:35
Analysis Date: 10/16/2016 3:54
Matrix: Soil/Solid (dry weight)

QC for Samples: 1168704001, 1168704002, 1168704003, 1168704004, 1168704005, 1168704006, 1168704010

Results by **SW8021B**

		Matrix Spike (ug/Kg)			Spike Duplicate (ug/Kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	29.8U	1662	1905	114	1662	1905	115	75-125	0.12	(< 20)
Ethylbenzene	59.6U	1662	1860	112	1662	1875	113	75-125	0.82	(< 20)
o-Xylene	59.6U	1662	1799	108	1662	1799	108	75-125	0.22	(< 20)
P & M -Xylene	119U	3338	3643	109	3338	3704	111	80-125	1.60	(< 20)
Toluene	59.6U	1662	1982	119	1662	1982	119	70-125	0.13	(< 20)
Surrogates										
1,4-Difluorobenzene (surr)		1662	1514	91	1662	1506	90	72-119	0.49	

Batch Information

Analytical Batch: VFC13383
Analytical Method: SW8021B
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 10/16/2016 3:35:00AM

Prep Batch: VXX29775
Prep Method: AK101 Extraction (S)
Prep Date/Time: 10/15/2016 12:30:00AM
Prep Initial Wt./Vol.: 57.19g
Prep Extract Vol: 25.00mL

Print Date: 10/24/2016 3:53:20PM

Method Blank

Blank ID: MB for HBN 1746125 [VXX/29796]
Blank Lab ID: 1360078

Matrix: Soil/Solid (dry weight)

QC for Samples:
1168704007, 1168704008

Results by **AK101**

Parameter	Results	LOQ/CL	DL	Units
Gasoline Range Organics	1.25U	2.50	0.750	mg/Kg
Surrogates				
4-Bromofluorobenzene (surr)	88.6	50-150		%

Batch Information

Analytical Batch: VFC13393
Analytical Method: AK101
Instrument: Agilent 7890 PID/FID
Analyst: ST
Analytical Date/Time: 10/18/2016 8:48:00PM

Prep Batch: VXX29796
Prep Method: SW5035A
Prep Date/Time: 10/18/2016 12:30:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1168704 [VXX29796]
Blank Spike Lab ID: 1360081
Date Analyzed: 10/18/2016 20:10

Spike Duplicate ID: LCSD for HBN 1168704 [VXX29796]
Spike Duplicate Lab ID: 1360082
Matrix: Soil/Solid (dry weight)

QC for Samples: 1168704007, 1168704008

Results by **AK101**

	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Gasoline Range Organics	12.5	10.6	85	12.5	11.1	89	(60-120)	4.00	(< 20)
Surrogates									
4-Bromofluorobenzene (surr)	1.25	88.9	89	1.25	86.2	86	(50-150)	3.20	

Batch Information

Analytical Batch: **VFC13393**
Analytical Method: **AK101**
Instrument: **Agilent 7890 PID/FID**
Analyst: **ST**

Prep Batch: **VXX29796**
Prep Method: **SW5035A**
Prep Date/Time: **10/18/2016 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

Method Blank

Blank ID: MB for HBN 1746125 [VXX/29796]
Blank Lab ID: 1360078

Matrix: Soil/Solid (dry weight)

QC for Samples:
1168704007, 1168704008

Results by **SW8021B**

Parameter	Results	LOQ/CL	DL	Units
Benzene	6.25U	12.5	4.00	ug/Kg
Ethylbenzene	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
Toluene	12.5U	25.0	7.80	ug/Kg
Surrogates				
1,4-Difluorobenzene (surr)	85.1	72-119		%

Batch Information

Analytical Batch: VFC13393
Analytical Method: SW8021B
Instrument: Agilent 7890 PID/FID
Analyst: ST
Analytical Date/Time: 10/18/2016 8:48:00PM

Prep Batch: VXX29796
Prep Method: SW5035A
Prep Date/Time: 10/18/2016 12:30:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1168704 [VXX29796]
Blank Spike Lab ID: 1360079
Date Analyzed: 10/18/2016 19:31

Spike Duplicate ID: LCSD for HBN 1168704 [VXX29796]
Spike Duplicate Lab ID: 1360080
Matrix: Soil/Solid (dry weight)

QC for Samples: 1168704007, 1168704008

Results by **SW8021B**

	Blank Spike (ug/Kg)			Spike Duplicate (ug/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	1250	1100	88	1250	1180	94	(75-125)	6.80	(< 20)
Ethylbenzene	1250	1090	87	1250	1170	94	(75-125)	7.00	(< 20)
o-Xylene	1250	1070	85	1250	1150	92	(75-125)	7.50	(< 20)
P & M -Xylene	2500	2190	88	2500	2350	94	(80-125)	7.10	(< 20)
Toluene	1250	1070	85	1250	1140	91	(70-125)	6.40	(< 20)
Surrogates									
1,4-Difluorobenzene (surr)	1250	91.7	92	1250	97.2	97	(72-119)	5.90	

Batch Information

Analytical Batch: **VFC13393**
Analytical Method: **SW8021B**
Instrument: **Agilent 7890 PID/FID**
Analyst: **ST**

Prep Batch: **VXX29796**
Prep Method: **SW5035A**
Prep Date/Time: **10/18/2016 00:30**
Spike Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL
Dupe Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL

Matrix Spike Summary

Original Sample ID: 1168703002
MS Sample ID: 1360083 MS
MSD Sample ID: 1360084 MSD

Analysis Date: 10/18/2016 21:26
Analysis Date: 10/18/2016 21:45
Analysis Date: 10/18/2016 22:04
Matrix: Soil/Solid (dry weight)

QC for Samples: 1168704007, 1168704008

Results by **SW8021B**

		Matrix Spike (ug/Kg)			Spike Duplicate (ug/Kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	8.50U	1466	1324	90	1466	1357	93	75-125	2.70	(< 20)
Ethylbenzene	17.1U	1466	1346	91	1466	1346	91	75-125	0.02	(< 20)
o-Xylene	17.1U	1466	1313	89	1466	1324	90	75-125	0.76	(< 20)
P & M -Xylene	34.1U	2943	2691	91	2943	2681	91	80-125	0.32	(< 20)
Toluene	17.1U	1466	1291	88	1466	1324	90	70-125	2.30	(< 20)
Surrogates										
1,4-Difluorobenzene (surr)		1466	1291	88	1466	1422	96	72-119	9.00	

Batch Information

Analytical Batch: VFC13393
Analytical Method: SW8021B
Instrument: Agilent 7890 PID/FID
Analyst: ST
Analytical Date/Time: 10/18/2016 9:45:00PM

Prep Batch: VXX29796
Prep Method: AK101 Extraction (S)
Prep Date/Time: 10/18/2016 12:30:00AM
Prep Initial Wt./Vol.: 46.50g
Prep Extract Vol: 25.00mL

Print Date: 10/24/2016 3:53:23PM

Method Blank

Blank ID: MB for HBN 1746277 [VXX/29810]
Blank Lab ID: 1360605

Matrix: Soil/Solid (dry weight)

QC for Samples:
1168704009

Results by **AK101**

Parameter	Results	LOQ/CL	DL	Units
Gasoline Range Organics	0.781J	2.50	0.750	mg/Kg
Surrogates				
4-Bromofluorobenzene (surr)	103	50-150		%

Batch Information

Analytical Batch: VFC13397
Analytical Method: AK101
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 10/20/2016 3:50:00PM

Prep Batch: VXX29810
Prep Method: SW5035A
Prep Date/Time: 10/20/2016 12:30:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1168704 [VXX29810]
Blank Spike Lab ID: 1360608
Date Analyzed: 10/20/2016 15:13

Spike Duplicate ID: LCSD for HBN 1168704 [VXX29810]
Spike Duplicate Lab ID: 1360609
Matrix: Soil/Solid (dry weight)

QC for Samples: 1168704009

Results by **AK101**

	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Gasoline Range Organics	12.5	12.8	102	12.5	12.9	103	(60-120)	1.20	(< 20)
Surrogates									
4-Bromofluorobenzene (surr)	1.25	107	107	1.25	108	108	(50-150)	1.50	

Batch Information

Analytical Batch: **VFC13397**
Analytical Method: **AK101**
Instrument: **Agilent 7890A PID/FID**
Analyst: **ST**

Prep Batch: **VXX29810**
Prep Method: **SW5035A**
Prep Date/Time: **10/20/2016 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

Method Blank

Blank ID: MB for HBN 1746277 [VXX/29810]
Blank Lab ID: 1360605

Matrix: Soil/Solid (dry weight)

QC for Samples:
1168704009

Results by **SW8021B**

Parameter	Results	LOQ/CL	DL	Units
Benzene	6.25U	12.5	4.00	ug/Kg
Ethylbenzene	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
Toluene	12.5U	25.0	7.80	ug/Kg
Surrogates				
1,4-Difluorobenzene (surr)	91.5	72-119		%

Batch Information

Analytical Batch: VFC13397
Analytical Method: SW8021B
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 10/20/2016 3:50:00PM

Prep Batch: VXX29810
Prep Method: SW5035A
Prep Date/Time: 10/20/2016 12:30:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1168704 [VXX29810]
Blank Spike Lab ID: 1360606
Date Analyzed: 10/20/2016 14:36

Spike Duplicate ID: LCSD for HBN 1168704 [VXX29810]
Spike Duplicate Lab ID: 1360607
Matrix: Soil/Solid (dry weight)

QC for Samples: 1168704009

Results by **SW8021B**

	Blank Spike (ug/Kg)			Spike Duplicate (ug/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	1250	1250	100	1250	1200	96	(75-125)	4.50	(< 20)
Ethylbenzene	1250	1250	100	1250	1190	96	(75-125)	4.50	(< 20)
o-Xylene	1250	1150	92	1250	1100	88	(75-125)	4.40	(< 20)
P & M -Xylene	2500	2360	94	2500	2240	90	(80-125)	4.90	(< 20)
Toluene	1250	1310	105	1250	1270	101	(70-125)	3.70	(< 20)
Surrogates									
1,4-Difluorobenzene (surr)	1250	95.6	96	1250	94.7	95	(72-119)	1.00	

Batch Information

Analytical Batch: **VFC13397**
Analytical Method: **SW8021B**
Instrument: **Agilent 7890A PID/FID**
Analyst: **ST**

Prep Batch: **VXX29810**
Prep Method: **SW5035A**
Prep Date/Time: **10/20/2016 00:30**
Spike Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL
Dupe Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Matrix Spike Summary

Original Sample ID: 1168704009
MS Sample ID: 1360812 MS
MSD Sample ID: 1360813 MSD

QC for Samples: 1168704009

Analysis Date: 10/20/2016 21:05
Analysis Date: 10/20/2016 21:24
Analysis Date: 10/20/2016 21:42
Matrix: Soil/Solid (dry weight)

Results by **SW8021B**

		Matrix Spike (ug/Kg)				Spike Duplicate (ug/Kg)					
Parameter	Sample	Spike	Result	Rec (%)		Spike	Result	Rec (%)		CL	RPD (%)	RPD CL
Benzene	29.5	1908	1970	102		1908	2007	104		75-125	2.00	(< 20)
Ethylbenzene	383	1908	2170	94		1908	2219	97		75-125	2.20	(< 20)
o-Xylene	2150	1908	4202	108		1908	4289	113		75-125	2.20	(< 20)
P & M -Xylene	2720	3803	5312	68	*	3803	5436	72	*	80-125	2.50	(< 20)
Toluene	164	1908	2057	99		1908	2095	101		70-125	1.70	(< 20)
Surrogates												
1,4-Difluorobenzene (surr)		1908	1833	97		1908	1833	96		72-119	0.23	

Batch Information

Analytical Batch: VFC13397
Analytical Method: SW8021B
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 10/20/2016 9:24:00PM

Prep Batch: VXX29810
Prep Method: AK101 Extraction (S)
Prep Date/Time: 10/20/2016 12:30:00AM
Prep Initial Wt./Vol.: 366.85g
Prep Extract Vol: 222.45mL

Print Date: 10/24/2016 3:53:27PM

Method Blank

Blank ID: MB for HBN 1745531 [XXX/36508]
Blank Lab ID: 1358428

Matrix: Soil/Solid (dry weight)

QC for Samples:
1168704001, 1168704002, 1168704003, 1168704004, 1168704005, 1168704006, 1168704007, 1168704008, 1168704009

Results by **8270D SIM (PAH)**

Parameter	Results	LOQ/CL	DL	Units
1-Methylnaphthalene	2.50U	5.00	1.50	ug/Kg
2-Methylnaphthalene	2.50U	5.00	1.50	ug/Kg
Acenaphthene	2.50U	5.00	1.50	ug/Kg
Acenaphthylene	2.50U	5.00	1.50	ug/Kg
Anthracene	2.50U	5.00	1.50	ug/Kg
Benzo(a)Anthracene	2.50U	5.00	1.50	ug/Kg
Benzo[a]pyrene	2.50U	5.00	1.50	ug/Kg
Benzo[b]Fluoranthene	2.50U	5.00	1.50	ug/Kg
Benzo[g,h,i]perylene	2.50U	5.00	1.50	ug/Kg
Benzo[k]fluoranthene	2.50U	5.00	1.50	ug/Kg
Chrysene	2.50U	5.00	1.50	ug/Kg
Dibenzo[a,h]anthracene	2.50U	5.00	1.50	ug/Kg
Fluoranthene	2.50U	5.00	1.50	ug/Kg
Fluorene	2.50U	5.00	1.50	ug/Kg
Indeno[1,2,3-c,d] pyrene	2.50U	5.00	1.50	ug/Kg
Naphthalene	2.50U	5.00	1.50	ug/Kg
Phenanthrene	2.50U	5.00	1.50	ug/Kg
Pyrene	2.50U	5.00	1.50	ug/Kg
Surrogates				
2-Fluorobiphenyl (surr)	97.3	46-115		%
Terphenyl-d14 (surr)	97.5	58-133		%

Batch Information

Analytical Batch: XMS9698
Analytical Method: 8270D SIM (PAH)
Instrument: SVA Agilent 780/5975 GC/MS
Analyst: S.G
Analytical Date/Time: 10/14/2016 1:24:00PM

Prep Batch: XXX36508
Prep Method: SW3550C
Prep Date/Time: 10/12/2016 2:15:41PM
Prep Initial Wt./Vol.: 22.5 g
Prep Extract Vol: 1 mL

Print Date: 10/24/2016 3:53:28PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1168704 [XXX36508]
Blank Spike Lab ID: 1358429
Date Analyzed: 10/14/2016 13:44

Spike Duplicate ID: LCSD for HBN 1168704 [XXX36508]
Spike Duplicate Lab ID: 1358436
Matrix: Soil/Solid (dry weight)

QC for Samples: 1168704001, 1168704002, 1168704003, 1168704004, 1168704005, 1168704006, 1168704007, 1168704008, 1168704009

Results by **8270D SIM (PAH)**

	Blank Spike (ug/Kg)			Spike Duplicate (ug/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1-Methylnaphthalene	22.2	19.2	87	22.2	18.6	84	(43-111)	3.10	(< 20)
2-Methylnaphthalene	22.2	18.5	83	22.2	18.2	82	(39-114)	1.90	(< 20)
Acenaphthene	22.2	21.9	99	22.2	21.0	94	(44-111)	4.50	(< 20)
Acenaphthylene	22.2	18.3	82	22.2	18.0	81	(39-116)	1.70	(< 20)
Anthracene	22.2	19.4	87	22.2	18.8	84	(50-114)	3.50	(< 20)
Benzo(a)Anthracene	22.2	19.7	89	22.2	19.0	86	(54-122)	3.40	(< 20)
Benzo[a]pyrene	22.2	21.3	96	22.2	21.0	95	(50-125)	1.60	(< 20)
Benzo[b]Fluoranthene	22.2	20.5	92	22.2	19.6	88	(53-128)	4.40	(< 20)
Benzo[g,h,i]perylene	22.2	21.7	98	22.2	21.0	95	(49-127)	3.20	(< 20)
Benzo[k]fluoranthene	22.2	21.3	96	22.2	20.2	91	(56-123)	5.30	(< 20)
Chrysene	22.2	21.7	98	22.2	21.0	95	(57-118)	3.00	(< 20)
Dibenzo[a,h]anthracene	22.2	22.2	100	22.2	21.9	98	(50-129)	1.70	(< 20)
Fluoranthene	22.2	20.1	90	22.2	19.6	88	(55-119)	2.50	(< 20)
Fluorene	22.2	20.0	90	22.2	19.5	88	(47-114)	2.50	(< 20)
Indeno[1,2,3-c,d] pyrene	22.2	22.0	99	22.2	21.5	97	(49-130)	2.00	(< 20)
Naphthalene	22.2	18.6	84	22.2	18.4	83	(38-111)	0.99	(< 20)
Phenanthrene	22.2	18.6	84	22.2	18.1	81	(49-113)	3.00	(< 20)
Pyrene	22.2	21.1	95	22.2	20.5	92	(55-117)	2.90	(< 20)
Surrogates									
2-Fluorobiphenyl (surr)	22.2	95.5	96	22.2	93.7	94	(46-115)	1.90	
Terphenyl-d14 (surr)	22.2	97.5	98	22.2	96.3	96	(58-133)	1.20	

Batch Information

Analytical Batch: **XMS9698**
Analytical Method: **8270D SIM (PAH)**
Instrument: **SVA Agilent 780/5975 GC/MS**
Analyst: **S.G**

Prep Batch: **XXX36508**
Prep Method: **SW3550C**
Prep Date/Time: **10/12/2016 14:15**
Spike Init Wt./Vol.: 22.2 ug/Kg Extract Vol: 1 mL
Dupe Init Wt./Vol.: 22.2 ug/Kg Extract Vol: 1 mL

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Method Blank

Blank ID: MB for HBN 1745549 [XXX/36510]
Blank Lab ID: 1358478

Matrix: Soil/Solid (dry weight)

QC for Samples:
1168704001, 1168704002, 1168704003, 1168704004, 1168704005, 1168704006, 1168704007, 1168704008, 1168704009

Results by **AK102**

Parameter	Results	LOQ/CL	DL	Units
Diesel Range Organics	10.0U	20.0	6.20	mg/Kg
Surrogates				
5a Androstane (surr)	87.5	60-120		%

Batch Information

Analytical Batch: XFC12971
Analytical Method: AK102
Instrument: Agilent 7890B R
Analyst: NRO
Analytical Date/Time: 10/17/2016 10:59:00AM

Prep Batch: XXX36510
Prep Method: SW3550C
Prep Date/Time: 10/12/2016 6:20:33PM
Prep Initial Wt./Vol.: 30 g
Prep Extract Vol: 1 mL

Print Date: 10/24/2016 3:53:30PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1168704 [XXX36510]
Blank Spike Lab ID: 1358479
Date Analyzed: 10/17/2016 09:59

Spike Duplicate ID: LCSD for HBN 1168704 [XXX36510]
Spike Duplicate Lab ID: 1358480
Matrix: Soil/Solid (dry weight)

QC for Samples: 1168704001, 1168704002, 1168704003, 1168704004, 1168704005, 1168704006, 1168704007, 1168704008, 1168704009

Results by **AK102**

	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Diesel Range Organics	167	166	100	167	139	84	(75-125)	17.80	(< 20)
Surrogates									
5a Androstane (surr)	3.33	108	108	3.33	93.2	93	(60-120)	14.80	

Batch Information

Analytical Batch: **XFC12971**
Analytical Method: **AK102**
Instrument: **Agilent 7890B R**
Analyst: **NRO**

Prep Batch: **XXX36510**
Prep Method: **SW3550C**
Prep Date/Time: **10/12/2016 18:20**
Spike Init Wt./Vol.: 167 mg/Kg Extract Vol: 1 mL
Dupe Init Wt./Vol.: 167 mg/Kg Extract Vol: 1 mL

SGS

CI 1168704

Locations Nationwide

Alaska	Maryland
New Jersey	New York
North Carolina	Indiana
West Virginia	Kentucky

www.us.sgs.com

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

Section 1

CLIENT: Ahtna Engineering Services

CONTACT: Andrew Weller, Rodney Gurnitz PHONE NO: 596-7979, 457-3147

PROJECT NAME: Ruby Former Headstart PROJECT/ PWSID/ PERMIT#:

REPORTS TO: rodney@arcticdataservices.com E-MAIL:

INVOICE TO: Ahtna QUOTE #: P.O. #:

Section 2

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	# CONTAINERS	Type C = COMP G = GRAB MI = Multi Incre-mental Soils	Preservative: GRO/BTEX (AK101/8021)	DRO (AK102)	PAH (8270D SIM)	REMARKS/ LOC ID
1 A-B	16-RBY-ISM-01	10/3/16	1910	soil	2	MI	X	X	X	500 mL jar w/ 15mL Fr. GRO/BTEX
2 A-B	16-RBY-ISM-02	↓	2000				X	X	X	
3 A-B	16-RBY-ISM-03	↓	2050				X	X	X	
4 A-B	16-RBY-ISM-04	10/4/16	1950				X	X	X	
5 A-B	16-RBY-ISM-05	↓	2050				X	X	X	
6 A-B	16-RBY-ISM-06	↓	2140				X	X	X	
7 A-B	16-RBY-ISM-07	10/6/16	0945				X	X	X	
8 A-B	16-RBY-ISM-08	↓	1015				X	X	X	
9 A-B	16-RBY-ISM-09	↓	1130		↓	↓	X	X	X	↓
10 A-B	Trip Blank	—	—		—	—	X			

Section 5

	Date	Time		
Relinquished By: (1) Rodney	10/7/16	0800	Received By:	10/7/16 1540
Relinquished By: (2)	10/7/16	1545	Received By:	
Relinquished By: (3)			Received By:	
Relinquished By: (4)	10/8/16	10:04	Received For Laboratory By:	

Section 4

DOD Project? Yes (No)

Cooler ID: 61

Data Deliverable Requirements: Standard Level II

Requested Turnaround Time and/or Special Instructions: Standard TAT

Temp Blank °C: 1.0 or Ambient [ ]

(See attached Sample Receipt Form)

Chain of Custody Seal: (Circle) INTACT BROKEN (ABSENT)

(See attached Sample Receipt Form)

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

ANC1F, 1B

ANC: -0.3 #200

SGS

1168704

FAIRBANKS SAMPLE RECEIPT FORM

Note: This form is to be completed by Fairbanks Receiving Staff for all samples

Review Criteria:	Condition:	Comments/Actions Taken
Were **custody seals** intact? Note # & location, if applicable. COC accompanied samples?	Yes No (N/A) (Yes) No N/A	□*Exemption permitted if sampler hand carries/delivers.*
Temperature blank compliant* (i.e., 0-6°C) *If >6°C, were samples collected <8 hours ago?* *If <0°C, were all sample containers ice free?* Cooler ID: 1 @ 1.0 w/Therm. ID: 238 Cooler ID:____ @____ w/Therm. ID:____ Cooler ID:____ @____ w/Therm. ID:____ Cooler ID:____ @____ w/Therm. ID:____ Cooler ID:____ @____ w/Therm. ID:____ If samples are received without a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank and "**COOLER TEMP**" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note ambient ( ) or chilled ( ). Please check one.	(Yes) No Yes No (N/A) Yes No (N/A)	□*Exemption permitted if chilled & collected <8hrs ago* ***Note: Identify containers received at non-compliant temperature. Use form FS-0029 if more space is needed.***
Delivery Method: (Client (hand carried)) Other:____	Tracking/AB# : Or see attached Or N/A	
→For samples received with payment, note amount ($) and whether cash / check / CC (**circle one**) was received.		
Were samples in **good condition** (no leaks/cracks/breakage)? Packing material used (specify all that apply): (Bubble Wrap) Separate plastic bags Vermiculite Other:____	(Yes) No N/A	***Note: some samples are sent to Anchorage without inspection by SGS Fairbanks personnel.***
Were **Trip Blanks** (i.e., VOAs, LL-Hg) in cooler with samples?	(Yes) No N/A	
For **RUSH/SHORT Hold Time**, were COC/Bottles flagged accordingly? Was Rush/Short HT email sent, if applicable?	Yes No (N/A) Yes No (N/A)	
Additional notes (if applicable):		

Profile #: 33942

Note to Client: any "no" circled above indicates non-compliance with standard procedures and may impact data quality.

SGS

e-SAMPLE RECEIPT FORM

1168704

Review Criteria	Y/N (yes/no)	Exceptions Noted below
		exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	Y	1-F, 1-B
COC accompanied samples?	Y	
**exemption permitted if chilled & collected <8hrs ago or chlling not required (i.e., waste, oil)		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	Y	Cooler ID: 1 @ -0.3 °C Therm ID: 200
		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?		
If <0°C, were sample containers ice free?	Y	
If samples received without a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "**COOLER TEMP**" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note "ambient" or "chilled".		
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
		Note: Refer to form F-083 "Sample Guide" for hold times.
Were samples received within hold time?	Y	
Do samples **match COC**** (i.e.,sample IDs,dates/times collected)?	Y	
**Note: If times differ <1hr, record details & login per COC.		
Were analyses requested unambiguous?	Y	
		***Exemption permitted for metals (e.g,200.8/6020A).
Were proper containers (type/mass/volume/preservative***)used?	N	
IF APPLICABLE		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	Y	
Were all VOA vials free of headspace (i.e., bubbles ≤ 6mm)?		
Were all soil VOAs field extracted with MeOH+BFB?	Y	

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

Additional notes (if applicable):

MI sampling was done incorrectly. Samples will be analyzed as normal grab samples.

Containers for GRO/BTEX analyses areincorrect. There is 300 grams of soil and 150 mL of MeOH in each sample. Analysts will do a dilution before analyzing the samples.

Sample Containers and Preservatives

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1168704001-A	No Preservative Required	OK			
1168704001-B	Methanol field pres. 4 C	OK			
1168704002-A	No Preservative Required	OK			
1168704002-B	Methanol field pres. 4 C	OK			
1168704003-A	No Preservative Required	OK			
1168704003-B	Methanol field pres. 4 C	OK			
1168704004-A	No Preservative Required	OK			
1168704004-B	Methanol field pres. 4 C	OK			
1168704005-A	No Preservative Required	OK			
1168704005-B	Methanol field pres. 4 C	OK			
1168704006-A	No Preservative Required	OK			
1168704006-B	Methanol field pres. 4 C	OK			
1168704007-A	No Preservative Required	OK			
1168704007-B	Methanol field pres. 4 C	OK			
1168704008-A	No Preservative Required	OK			
1168704008-B	Methanol field pres. 4 C	OK			
1168704009-A	No Preservative Required	OK			
1168704009-B	Methanol field pres. 4 C	OK			
1168704010-A	Methanol field pres. 4 C	OK			
1168704010-B	Methanol field pres. 4 C	OK			

Container Condition Glossary

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

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

APPENDIX F

SOIL NUTRIENT ANALYSIS REPORTS AND FERTILIZER RECOMMENDATIONS

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FAIRBANKS SOIL & WATER CONSERVATION DISTRICT

Soil Sample Analysis Report

Recommendation date: 11/18/2016
Sample Date: 10/12/2016

Name: Rodney Guritz Phone: 457-3147

Email: rodney@arcticdataservices.com

Mailing Address: P.O. Box 345
Ester, AK 99725

Physical Address: 1896 Marika Road, Ste. 8
Fairbanks, AK 99709

New Ground: No

Crops: Nortran Tufted Hairgrass, Glaucous Tundra Blue, Gruening Alpine Bluegrass, and Salix alaxensis (willow)

Sample/Field: **Plot A**

Soil Type	
pH range	Alkaline 7-10
	Acidic 4-6
pH reading	6.1
Buffer	7.1
Sulfur	8ppm- low
Calcium	1213ppm
Magnesium	270ppm
Boron	0.28ppm
Organic Matter %	2.31
C.E.C	10.58
E.C. (Salt Level)	

Sample Results

	N (ppm)	P (ppm)	K (ppm)
Very High			
High			
Medium			
Low		31	
Very Low	1.7		48

[N=Nitrogen, P=(P_2O_5)Phosphorus, K=(K_2O)Potassium, ppm= parts per million]

Recommendations: (i.e. lime, fertilizer rate, ratio, blend, placement, and timing)

Fertilizer:
Actual lbs. N-P-K-S per 2,400 ft^2: 3.3-1.65-4.4-0.55
Application method & timing: **Below are 2 options for fertilizer:**

1. **Apply 17lbs of 20-10-10 *plus* 5lbs of 0-0-50 *plus* 0.5lbs of Sulfur**
2. **Apply 17lbs of 20-10-10 *plus* 12lbs of Langbeinite (0-0-22-22S)**

Comments: N-P-K written on the fertilizer container is the percentage by weight of that nutrient (i.e. 20-10-10 would have .2 lbs of N, .1 lbs of P (P_2O_5), and .1 lbs of K (K_2O) per 1 lb. of fertilizer). You may have to mix different blends of fertilizers to meet the recommendation. If you have any questions, please contact me at 479-1213 ext. 108 or jlguritz@gmail.com.

590 University Avenue, Suite 2 • Fairbanks, Alaska 99709
Phone: (907) 479-1213 • Fax: (907) 374-4922 • E-mail: fswcd@gci.net

FAIRBANKS SOIL & WATER CONSERVATION DISTRICT

Soil Sample Analysis Report

Recommendation date: 11/18/2016
Sample Date: 10/12/2016

Name: Rodney Guritz Phone: 457-3147

Email: rodney@arcticdataservices.com

Mailing Address: P.O. Box 345
Ester, AK 99725

Physical Address: 1896 Marika Road, Ste. 8
Fairbanks, AK 99709

New Ground: No

Crops: Nortran Tufted Hairgrass, Glaucous Tundra Blue, Gruening Alpine Bluegrass, and Salix alaxensis (willow)

Sample/Field: **Plot C**

Soil Type	
pH range	Alkaline 7-10
	Acidic 4-6
pH reading	6.5
Buffer	7.3
Sulfur	8ppm- low
Calcium	1284ppm
Magnesium	359ppm
Boron	<0.20ppm
Organic Matter %	1.30
C.E.C	11.11
E.C. (Salt Level)	

Sample Results

	N (ppm)	P (ppm)	K (ppm)
Very High			
High			
Medium			
Low			
Very Low	1.7	11	35

[N=Nitrogen, P=(P_2O_5)Phosphorus, K=(K_2O)Potassium, ppm= parts per million]

Recommendations: (i.e. lime, fertilizer rate, ratio, blend, placement, and timing)

Fertilizer:
Actual lbs. N-P-K-S per 1,400 ft^2: 1.9-1.45-2.57-0.32
Application method & timing: **Below are 2 options for fertilizer:**

1. **Apply 10lbs of 20-10-10 *plus* 3lbs of 0-0-50 *plus* 0.3lbs of Sulfur**
2. **Apply 10lbs of 20-10-10 *plus* 7lbs of Langbeinite (0-0-22-22S)**

Comments: N-P-K written on the fertilizer container is the percentage by weight of that nutrient (i.e. 20-10-10 would have .2 lbs of N, .1 lbs of P (P_2O_5), and .1 lbs of K (K_2O) per 1 lb. of fertilizer). You may have to mix different blends of fertilizers to meet the recommendation. If you have any questions, please contact me at 479-1213 ext. 108 or jlguritz@gmail.com.

590 University Avenue, Suite 2 • Fairbanks, Alaska 99709
Phone: (907) 479-1213 • Fax: (907) 374-4922 • E-mail: fswcd@gci.net

lb/A

44880-302

BROOKSIDE LABORATORIES, INC.

SOIL AUDIT AND INVENTORY REPORT

Name Fairbanks Soil and Water City Fairbanks State AK

Independent Consultant Home Office Date 10/18/2016

Sample Location		GURITZ	PLOT A	PLOT C			
Sample Identification			10/6/16	10/5/16			
Lab Number			0113-1	0114-1			
Total Exchange Capacity (ME/100 g)			10.58	11.11			
pH	Buffer (SMP/Sikora)		7.1	7.3			
	H_2O (1:1)		6.1	6.5			
Organic Matter (humus) %			2.31	1.30			
Estimated Nitrogen Release		lb/A	66	46			
ANIONS	SOLUBLE SULFUR*	ppm	8	8			
ANIONS / PHOSPHORUS	MEHLICH III	lb/A P as P_2O_5	142	50			
		ppm of P	31	11			
	BRAY II	lb/A P as P_2O_5					
		ppm of P					
	OLSEN	lb/A P as P_2O_5					
		ppm of P					
EXCHANGEABLE CATIONS	CALCIUM*	lb/A	2426	2568			
		ppm	1213	1284			
	MAGNESIUM*	lb/A	540	718			
		ppm	270	359			
	POTASSIUM*	lb/A	96	70			
		ppm	48	35			
	SODIUM*	lb/A	76	106			
		ppm	38	53			
BASE SATURATION PERCENT							
	Calcium	%	57.33	57.79			
	Magnesium	%	21.27	26.93			
	Potassium	%	1.16	0.81			
	Sodium	%	1.56	2.07			
	Other Bases	%	5.20	4.90			
	Hydrogen	%	13.50	7.50			
EXTRACTABLE MINORS							
	Boron* (ppm)		0.28	< 0.20			
	Iron* (ppm)		517	268			
	Manganese* (ppm)		69	20			
	Copper* (ppm)		4.31	4.11			
	Zinc* (ppm)		4.67	1.69			
	Aluminum* (ppm)		694	556			
OTHER TESTS	Soluble Salts (mmhos/cm)						
	Chlorides (ppm)						
	NO_3-N (ppm)		< 0.5	< 0.5			
	NH_4-N (ppm)		1.2	1.2			

* Mehlich III Extractable

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APPENDIX G

CONCEPTUAL SITE MODEL – SCOPING AND GRAPHIC FORMS

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Print Form

HUMAN HEALTH CONCEPTUAL SITE MODEL GRAPHIC FORM

Site: Ruby Former Headstart Building
870.38.004

Completed By: Rodney Guritz, ADS for Ahtna
Date Completed: 3/24/2017

***Instructions*: Follow the numbered directions below. Do not consider contaminant concentrations or engineering/land use controls when describing pathways.**

(1)
Check the media that could be directly affected by the release.

(2)
For each medium identified in (1), follow the top arrow and check possible transport mechanisms. Check additional media under (1) if the media acts as a secondary source.

(3)
Check all exposure media identified in (2).

(4)
*Check all pathways that could be complete. The pathways identified in this column **must** agree with Sections 2 and 3 of the Human Health CSM Scoping Form.*

(5)
Identify the receptors potentially affected by each exposure pathway: Enter "C" for current receptors, "F" for future receptors, "C/F" for both current and future receptors, or "I" for insignificant exposure.

Current & Future Receptors

Media	Transport Mechanisms	Exposure Media	Exposure Pathway/Route	Residents (adults or children)	Commercial or industrial workers	Site visitors, trespassers, or recreational users	Construction workers	Farmers or subsistence harvesters	Subsistence consumers	Other
☑ Surface Soil (0-2 ft bgs)	☑ Direct release to surface soil — check soil	☑ soil	☑ Incidental Soil Ingestion		F		F			
	☑ Migration to subsurface — check soil		☑ Dermal Absorption of Contaminants from Soil		F		F			
	☑ Migration to groundwater — check groundwater		☐ Inhalation of Fugitive Dust							
	☑ Volatilization — check air									
	☐ Runoff or erosion — check surface water									
	☐ Uptake by plants or animals — check biota									
	☐ Other (list):									
☑ Subsurface Soil (2-15 ft bgs)	☑ Direct release to subsurface soil — check soil	☑ groundwater	☑ Ingestion of Groundwater	C/F	F	F				
	☑ Migration to groundwater — check groundwater		☑ Dermal Absorption of Contaminants in Groundwater	C/F	F	F				
	☑ Volatilization — check air		☑ Inhalation of Volatile Compounds in Tap Water	C/F	F	F				
	☐ Uptake by plants or animals — check biota									
	☐ Other (list):									
☐ Ground-water	☐ Direct release to groundwater — check groundwater	☑ air	☑ Inhalation of Outdoor Air	F	F	C/F	F	F		
	☐ Volatilization — check air		☑ Inhalation of Indoor Air	F	F	C/F	F	F		
	☐ Flow to surface water body — check surface water		☐ Inhalation of Fugitive Dust							
	☐ Flow to sediment — check sediment									
	☐ Uptake by plants or animals — check biota									
	☐ Other (list):									
☐ Surface Water	☐ Direct release to surface water — check surface water	☐ surface water	☐ Ingestion of Surface Water							
	☐ Volatilization — check air		☐ Dermal Absorption of Contaminants in Surface Water							
	☐ Sedimentation — check sediment		☐ Inhalation of Volatile Compounds in Tap Water							
	☐ Uptake by plants or animals — check biota									
	☐ Other (list):									
☐ Sediment	☐ Direct release to sediment — check sediment	☐ sediment	☐ Direct Contact with Sediment							
	☐ Resuspension, runoff, or erosion — check surface water									
	☐ Uptake by plants or animals — check biota	☐ biota	☐ Ingestion of Wild or Farmed Foods							
	☐ Other (list):									

Revised, 10/01/2010

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Print Form

Appendix A - Human Health Conceptual Site Model Scoping Form and Standardized Graphic

Site Name: Ruby Former Headstart Building

File Number: 870.38.004

Completed by: Rodney Guritz

Introduction

The form should be used to reach agreement with the Alaska Department of Environmental Conservation (DEC) about which exposure pathways should be further investigated during site characterization. From this information, summary text about the CSM and a graphic depicting exposure pathways should be submitted with the site characterization work plan and updated as needed in later reports.

General Instructions: Follow the italicized instructions in each section below.

1. General Information:

Sources *(check potential sources at the site)*

- ☒ USTs
- ☒ ASTs
- ☐ Dispensers/fuel loading racks
- ☒ Drums
- ☐ Vehicles
- ☐ Landfills
- ☐ Transformers
- ☒ Other: Boilers, furnaces, and associated piping in building and former buildings

Release Mechanisms *(check potential release mechanisms at the site)*

- ☒ Spills
- ☒ Leaks
- ☐ Direct discharge
- ☐ Burning
- ☐ Other:

Impacted Media *(check potentially-impacted media at the site)*

- ☒ Surface soil (0-2 feet bgs*)
- ☒ Subsurface soil (>2 feet bgs)
- ☒ Air
- ☐ Sediment
- ☒ Groundwater
- ☐ Surface water
- ☐ Biota
- ☐ Other:

Receptors *(check receptors that could be affected by contamination at the site)*

- ☒ Residents (adult or child)
- ☐ Commercial or industrial worker
- ☒ Construction worker
- ☐ Subsistence harvester (i.e. gathers wild foods)
- ☐ Subsistence consumer (i.e. eats wild foods)
- ☒ Site visitor
- ☒ Trespasser
- ☒ Recreational user
- ☐ Farmer
- ☐ Other:

* bgs - below ground surface

2. Exposure Pathways: *(The answers to the following questions will identify complete exposure pathways at the site. Check each box where the answer to the question is "yes".)*

a) Direct Contact -

1. Incidental Soil Ingestion

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site-specific basis.) ☒

If the box is checked, label this pathway complete: Complete

Comments:

Surface soil contaminated above human health (direct contact) cleanup levels has successfully been removed for treatment. Subsurface soil contamination remains above human health cleanup levels. Potential for direct contact exposure is limited to future scenarios where subsurface soil might be disturbed.

2. Dermal Absorption of Contaminants from Soil

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.) ☒

Can the soil contaminants permeate the skin (see Appendix B in the guidance document)? ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

The only contaminants present at the site with the potential for dermal absorption are PAHs. Contaminated soil containing PAHs above human health SCLs was successfully removed from the site.

b) Ingestion -

1. Ingestion of Groundwater

Have contaminants been detected or are they expected to be detected in the groundwater, or are contaminants expected to migrate to groundwater in the future? ☒

Could the potentially affected groundwater be used as a current or future drinking water source? Please note, only leave the box unchecked if DEC has determined the ground-water is not a currently or reasonably expected future source of drinking water according to 18 AAC 75.350. ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

Soil contamination has been vertically delineated and does not extend to GW. GW is anticipated to be deep at this site. However, we have no firm evidence of a confining layer or other feature preventing potential future migration of contaminants to GW. This pathway is considered open pending further investigation.

2. Ingestion of Surface Water

Have contaminants been detected or are they expected to be detected in surface water, or are contaminants expected to migrate to surface water in the future? ☐

Could potentially affected surface water bodies be used, currently or in the future, as a drinking water source? Consider both public water systems and private use (i.e., during residential, recreational or subsistence activities). ☐

If both boxes are checked, label this pathway complete: Incomplete

Comments:

The site is over 600 feet from the nearest water body, the Yukon River. Contaminants, even if present in groundwater, are not expected to migrate to surface water due to the distance and soil type.

3. Ingestion of Wild and Farmed Foods

Is the site in an area that is used or reasonably could be used for hunting, fishing, or harvesting of wild or farmed foods? ☒

Do the site contaminants have the potential to bioaccumulate (see Appendix C in the guidance document)? ☒

Are site contaminants located where they would have the potential to be taken up into biota? (i.e. soil within the root zone for plants or burrowing depth for animals, in groundwater that could be connected to surface water, etc.) ☐

If all of the boxes are checked, label this pathway complete: Incomplete

Comments:

The site is in the middle of town and could possibly used for gardening. However, only a single contaminant (benzo(a)anthracene) was detected that has the potential to bioaccumulate (according to Appendix C in the guidance document) which was located at 5 feet below ground surface.

c) Inhalation-

1. Inhalation of Outdoor Air

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.) ☒

Are the contaminants in soil volatile (see Appendix D in the guidance document)? ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

BTEX exceeding human health SCLs (includes the inhalation of outdoor air pathway) was successfully removed during the cleanup. However, DRO remains above inhalation cleanup levels near the surface (4-5 ft.) in both source areas.

2. Inhalation of Indoor Air

Are occupied buildings on the site or reasonably expected to be occupied or placed on the site in an area that could be affected by contaminant vapors? (within 30 horizontal or vertical feet of petroleum contaminated soil or groundwater; within 100 feet of non-petroleum contaminted soil or groundwater; or subject to "preferential pathways," which promote easy airflow like utility conduits or rock fractures) ☒

Are volatile compounds present in soil or groundwater (see Appendix D in the guidance document)? ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

DRO is present in close proximity to the building (immediately adjacent at 4 feet bgs) above inhalation cleanup levels. However, BTEX is no longer present above human health cleanup levels. Air sample results from 2016 in the building crawlspace and interior were all below ADEC target levels, during an unheated building-in-winter condition.

3. **Additional Exposure Pathways:** *(Although there are no definitive questions provided in this section, these exposure pathways should also be considered at each site. Use the guidelines provided below to determine if further evaluation of each pathway is warranted.)*

Dermal Exposure to Contaminants in Groundwater and Surface Water

Dermal exposure to contaminants in groundwater and surface water may be a complete pathway if:

- Climate permits recreational use of waters for swimming.
- Climate permits exposure to groundwater during activities, such as construction.
- Groundwater or surface water is used for household purposes, such as bathing or cleaning.

Generally, DEC groundwater cleanup levels in 18 AAC 75, Table C, are assumed to be protective of this pathway.

Check the box if further evaluation of this pathway is needed: ☒

Comments:

See ingestion of groundwater pathway, above.

Groundwater could be used for household purposes, such as bathing or cleaning.

Inhalation of Volatile Compounds in Tap Water

Inhalation of volatile compounds in tap water may be a complete pathway if:

- The contaminated water is used for indoor household purposes such as showering, laundering, and dish washing.
- The contaminants of concern are volatile (common volatile contaminants are listed in Appendix D in the guidance document.)

Generally, DEC groundwater cleanup levels in 18 AAC 75, Table C, are assumed to be protective of this pathway.

Check the box if further evaluation of this pathway is needed: ☒

Comments:

See ingestion of groundwater pathway, above.

Groundwater could be used for household purposes, such as bathing or cleaning.

Inhalation of Fugitive Dust

Inhalation of fugitive dust may be a complete pathway if:

- Nonvolatile compounds are found in the top 2 centimeters of soil. The top 2 centimeters of soil are likely to be dispersed in the wind as dust particles.
- Dust particles are less than 10 micrometers (Particulate Matter - PM_{10}). Particles of this size are called respirable particles and can reach the pulmonary parts of the lungs when inhaled.
- Chromium is present in soil that can be dispersed as dust particles of any size.

Generally, DEC direct contact soil cleanup levels in Table B1 of 18 AAC 75 are protective of this pathway because it is assumed most dust particles are incidentally ingested instead of inhaled to the lower lungs. The inhalation pathway only needs to be evaluated when very small dust particles are present (e.g., along a dirt roadway or where dusts are a nuisance). This is not true in the case of chromium. Site specific cleanup levels will need to be calculated in the event that inhalation of dust containing chromium is a complete pathway at a site.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

Clean fill was placed over the site in 2011, and clean fill was used to backfill excavations following the 2016 cleanup. Contamination is not present in the top 2 cm of soil.

Direct Contact with Sediment

This pathway involves people's hands being exposed to sediment, such as during some recreational, subsistence, or industrial activity. People then incidentally ingest sediment from normal hand-to-mouth activities. In addition, dermal absorption of contaminants may be of concern if the the contaminants are able to permeate the skin (see Appendix B in the guidance document). This type of exposure should be investigated if:

- Climate permits recreational activities around sediment.
- The community has identified subsistence or recreational activities that would result in exposure to the sediment, such as clam digging.

Generally, DEC direct contact soil cleanup levels in 18 AAC 75, Table B1, are assumed to be protective of direct contact with sediment.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

4. Other Comments *(Provide other comments as necessary to support the information provided in this form.)*

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Anchorage, AK 99503
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Design-Build • Construction • Environmental • Government Services

September 29, 2017

Mr. Robert Burgess
Alaska Department of Environmental Conservation
610 University Avenue
Fairbanks, AK 99709

Subject: Brownfield Cleanup Report Addendum
Ruby Former Headstart Brownfield Cleanup

Dear Mr. Burgess:

This letter presents the field activities, observations, conclusions, and recommendations from two follow-up monitoring visits to the phytoremediation soil treatment site associated with the Former Headstart Brownfield cleanup in Ruby, Alaska. Soil removal and phytoremediation plot setup were conducted in September to October, 2016. A draft Brownfield Cleanup Report was provided to the Alaska Department of Environmental Conservation (ADEC) in March 2017, and finalized recently following receipt of ADEC's comments in September 2017. This letter serves as an addendum to this report, summarizing the activities and findings of the 2017 field season. Photographs from the two monitoring visits are included in the attached photograph log.

MAY 2017 – SPRING SITE VISIT

Rodney Guritz of Ahtna teaming partner Arctic Data Services, LLC (ADS) visited Ruby on May 12-13, 2017. The two source areas restored following the 2016 removal action appeared in good condition with no signs of erosion or stormwater issues. Two drums of investigative derived waste (IDW) were still present at the barge landing; cleanup was completed too late for IDW shipment on the last barge of 2016. Arrangements were made to load the drums on the first Ruby Marine barge of the 2017 season.

At the soil treatment site near the Ruby airport, the three phytoremediation plots were inspected. Security stakes, ropes, and signs were present and in good condition at each plot. Soil berms were in good condition, and appeared to have contained spring snowmelt and runoff. The following summarizes the conditions of vegetation at each plot:

- **Plot A**. Roughly the south quadrant of Plot A was dry, but soil conditions were relatively moist throughout the remainder of the plot. There were signs of new growth (leaf buds) on roughly 20% of the willows in this plot. It was too early to determine willow mortality. Grass seed had not yet germinated.

- **Plot B**. Soil along the south side of Plot B were moist, in a 10-foot width near a low point where snow had accumulated between the plot and the Federal Aviation Administration (FAA) pad. The remainder of the plot was very dry. There were signs of new growth (leaf buds) on roughly 10% of the willows in this plot. It was too early to determine willow mortality. Grass seed had not yet germinated.

- **Plot C**. Nearly the entirety of Plot C was very dry. There were signs of new growth (leaf buds) on roughly 5% of the willows in this plot. It was too early to determine willow mortality. Grass seed had not yet germinated.

Willow cuttings obtained from across the Yukon River from Ruby showed substantially more leaf buds than willow cuttings obtained from the "Big Creek willow bar" upstream of Ruby. The conformation of the cuttings was notably different – the former had green/yellow bark and were heavily branched, likely due to heavy moose browsing in this area (evidence of heavy moose browse was observed when obtaining the cuttings); the latter had grey/brown bark and were uniform and straight, and appeared to be older growth, though diameters were similar.

Fertilizer was applied to the three plots at the rates specified in the fertilizer recommendations included in Appendix F of the Brownfield Cleanup Report using a broadcast spreader.

A game camera was installed on a tree close to the southwest edge of Plot A, with a view of Plot A and limited views of Plot C and B. The camera was set to record still photographs at 1-hour intervals.

Photographs from the spring site visit are included in the attached photograph log.

SEPTEMBER 2017 – FALL SITE VISIT

Tim Thomas of ADS visited Ruby on September 26-28, 2017, for a follow-up site visit and replanting effort. The new phytoremediation site monitoring form (Attachment 1 of the revised Soil Remediation Plan) was used to document site conditions. The following summarizes phytoremediation plot conditions upon his arrival:

- **Plot A**. Security stakes, rope, and signs were in good condition. The downhill berm was intact. Estimated grass coverage was 41-60%. Estimated willow survival was 21-40%. Average height of new willow shoots was 1.5 feet; max height was 2.5 feet. Average number of shoots per live willow was 3; average diameter of shoots was approximately 0.25 inches. Soil moisture was 6-8 on a scale of 10 (moist). Natural revegetation was extending into the southeast corner of the plot.

- **Plot B**. Security stakes, rope, and signs were in good condition. The downhill berm was intact and appeared to have contained all runoff, but some sedimentation was noted. Estimated grass coverage was 0-20%. Estimated willow survival was 0-20%. Average height of new willow shoots was 0.5 feet; max height was 0.5 feet. Average number of shoots per live willow was 1; average diameter of shoots was approximately 0.25 inches. Soil moisture was 8-10 on a scale of 10 (wet to saturated). In general, this was the least vegetated plot, with very little grass and very low willow survival.

- **Plot C**. Security stakes, rope, and signs were in good condition. Estimated grass coverage was 61-80%. Estimated willow survival was 0-20%. Average height of new willow shoots was 1 foot; max height was 1.5 feet. Average number of shoots per live willow was 1; average diameter of shoots was approximately 0.25 inches. Soil moisture was 8-9 on a scale of 10 (wet). Erosion of Plot C soils was observed along the south side of the plot.

Working with a local laborer, Mr. Thomas obtained *Salix alaxensis* (felt-leaf willow) cuttings from along the waterfront in downtown Ruby, with the permission of the Ruby Tribal Council. A majority of dead willows at each of the plots were replanted with the fresh dormant cuttings, generally trying to reuse the same holes for efficiency. Mr. Thomas spread fresh grass seed (mix of the original seed mix used in October 2016, with some drought-resistant Arctared fescue added) over each plot, and spread additional fertilizer on each plot (50 lbs. of 20-10-10 fertilizer distributed over the 7,400 square feet of total plot area).

The memory card and batteries in the game camera were swapped, and photographs downloaded upon return to Fairbanks. Photographs from the field visit and select game-camera photographs are included in the attached photograph log.

CONCLUSIONS AND RECOMMENDATIONS

Given the high mortality rate of the willows and the low germination rate for the grasses during the field season, we recommend installing and operating an irrigation system at the phytoremediation plots in 2018 to increase the survivability of the willows and grasses that were replanted in September 2017. Once grasses and willows have established a robust root system, the irrigation system can be decommissioned (likely after 2 seasons of operation).

Ahtna teaming partner ADS is prepared to install the irrigation system next summer. We have encouraged the Ruby Tribal Council and Alaska Department of Natural Resources to reapply for ADEC Brownfield Assessment and Cleanup (DBAC) service to conduct follow-up work at this site, including installing the irrigation and conducting progress sampling. However, in the event DBAC services are not awarded, ADS will install the irrigation system at no additional cost to the ADEC. ADS will work with the Ruby Tribal Council and the City of Ruby to identify tanks to stage at the site as a water supply for the irrigation system, a water truck to periodically fill the tanks, and an operator to run the system. ADS will supply the pump needed to run the system. Hoses and sprinklers will be purchased in the spring, and will be used to install a dedicated irrigation system for the site. ADS will work with the Ruby Tribal Council to irrigate the plots at a recommended frequency of up to 3 times per week during dry periods (anticipated to be May through July).

We recommend continued monitoring at the site, and have developed a site monitoring form and instructions to facilitate ongoing monitoring. Mr. Thomas trained the Ruby IGAP coordinator on completing this form during his site visit. We encourage the ADEC to maintain regular contact with the IGAP coordinator and the Ruby Tribal Council administrator to obtain updates on the status of the plots.

Thank you,

Ahtna Engineering Services, LLC

Andrew Weller, PE
Project Manager

Attachment:
1. Photograph Log
2. Phytoremediation Site Monitoring Form – September 26, 2017

MAY 2017 – SPRING SITE VISIT

Photo 1. AST Area Restored

Photo 2. UST Area Restored

Photo 3. Plot A

Photo 4. Plot B

Photo 5. Plot C

Photo 6. Closeup of dry, cracked ground, Plot C

Photo 7. Willow cutting starting to leaf out, Plot B

Photo 8. Closeup, Plot B; note no grass seed has germinated yet.

Photo 9. Investigative derived waste drums staged at barge landing

Photo 10. Game camera mounted on tree, Plot A

SEPTEMBER 2017 – FALL SITE VISIT

Photo 11. Plot A

Photo 12. Plot B

Photo 13. Plot C

Photo 14. Plot A; dead willows removed for replanting

Photo 15. Plot A, SE corner (native vegetation encroaching)

Photo 16. Plot A, showing west berm

Photo 17. Plot B, dead willows removed

Photo 18. Plot B, after replanting

Photo 19. Plot B, siltation along N berm

Photo 20. Plot C, erosive feature (it appears the berm captured the eroded soil)

Photo 21. Plot C before replanting – note grass growing in dozer-track divots

Photo 22. Plot C after replanting

SUMMER 2017 - SELECT GAME CAMERA PHOTOS

Photo 23. Initial view after setup

Photo 24. Late spring snow

Photo 25. First signs of grass growth

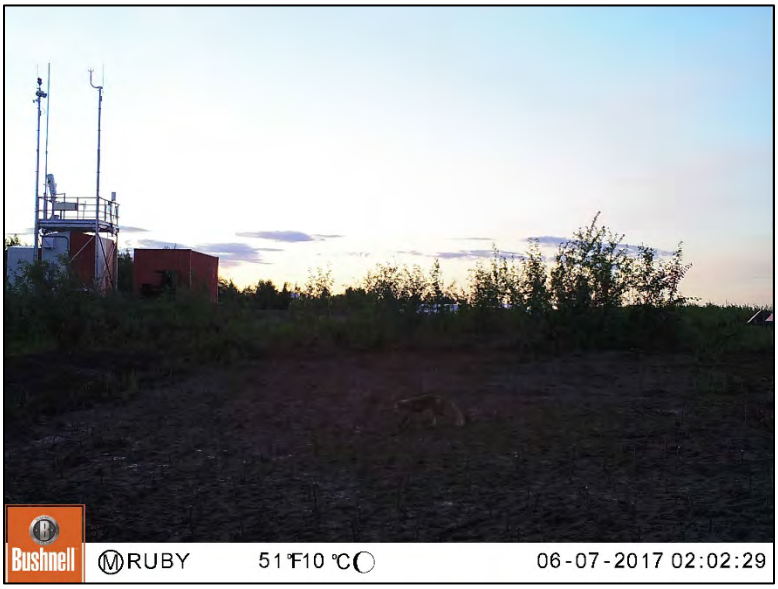

Photo 26. Red fox investigating Plot A

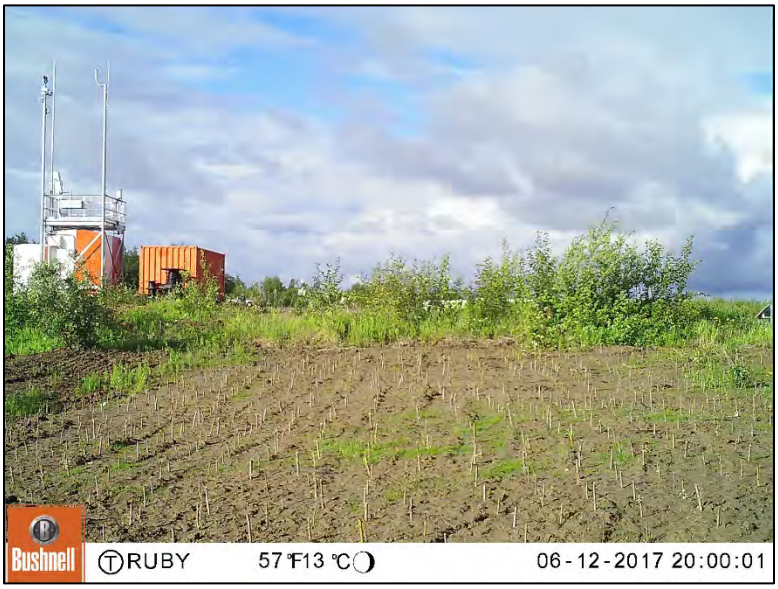

Photo 27. More grass growing

Photo 28. Tie-dyed visitor

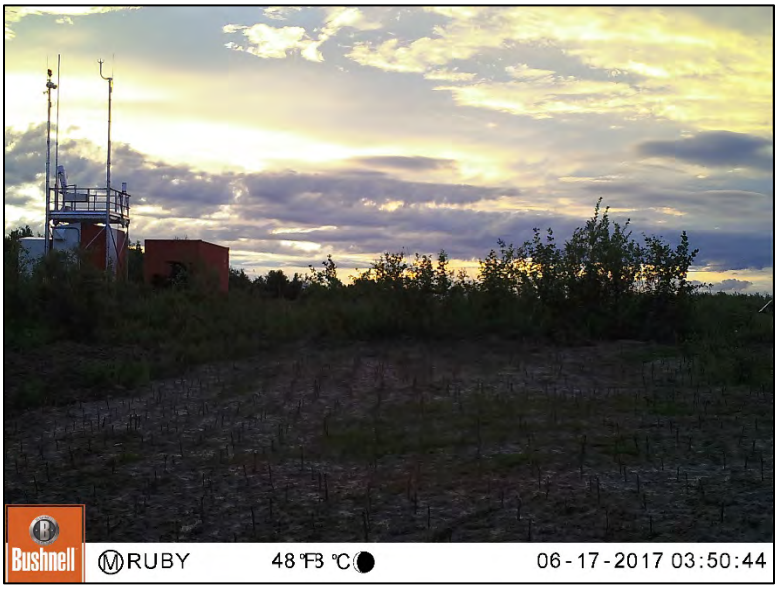

Photo 29. Epic sunset

Photo 30. Leaf in foreground (lower right) setting off motion capture every minute

Photo 31. Branch interfering with motion capture has grown

Photo 32. Last photo before memory was full – someone please cut this branch!

Ruby Former Headstart Brownfield Cleanup
Phytoremediation Site Monitoring Form

Date: 9/26/2017
Time started: 1400
Name: Tim Thomas

Plot A (downhill southwest of FAA pad)

1) Stakes, rope, and sign condition (describe any damage):

Stakes, rope, and sign in excellent condition

2) Downhill berm condition (describe - is berm intact, and will it contain runoff?):

Berm has not been damaged.

3) Estimated grass coverage (circle one):

0-20% | 21-40% | (41-60%) | 61-80% | 81-100%

4) Willow survival (% living willows)

0-20% | (21-40%) | 41-60% | 61-80% | 81-100%

5) Willow growth (living willows only)

Avg. height (ft): 1.5 Max height (ft): 2.5

Avg. # of shoots: 3 Avg. diameter of shoots: 0.25 inches

6) Soil moisture Reading 1: 6 Reading 2: 8 Reading 3: 8

7) Other observations

Natural revegetation extending into test plot on S.E corner / side.

Plot B (toward town from FAA pad)

1) Stakes, rope, and sign condition (describe any damage):

Stakes, rope, and sign in excellent condition.

2) Downhill berm condition (describe - is berm intact, and will it contain runoff?):

Berm intact and containing all runoffs.

3) Estimated grass coverage (circle one):

(0-20%) | 21-40% | 41-60% | 61-80% | 81-100%

4) Willow survival (% living willows)

(0-20%) | 21-40% | 41-60% | 61-80% | 81-100%

Ruby Former Headstart Brownfield Cleanup Date: 9/26/2017

Phytoremediation Site Monitoring Form Time started: 1400

Plot B (contd.)

5) Willow growth (living willows only)

Avg. height (ft): 0.5 Max height (ft): 0.5

Avg. # of shoots: ~~1~~ Avg. diameter of shoots: 0.25 inches

6) Soil moisture Reading 1: 8 Reading 2: 10 Reading 3: 10

7) Other observations

The trough between berm and test plot is filling with silt.

Plot C (toward runway from FAA pad)

1) Stakes, rope, and sign condition (describe any damage):

Stakes, rope, and sign are in excellent condition.

3) Estimated grass coverage (circle one):

0-20% 21-40% 41-60% (61-80%) 81-100%

4) Willow survival (% living willows)

(0-20%) 21-40% 41-60% 61-80% 81-100%

5) Willow growth (living willows only)

Avg. height (ft): 1 Max height (ft): 1.5

Avg. # of shoots: 1 Avg. diameter of shoots: 0.25 inches

6) Soil moisture Reading 1: 8 Reading 2: 8.7 Reading 3: 9

7) Other observations

~~Scooter~~ TRIPOD Erosion into the standing water along south side of test plot.

Ruby Former Headstart Brownfield Cleanup
Phytoremediation Site Monitoring Form

Date: 9/26/17
Time started: 1400

General Observations

The plots have not been vandalized, encroached, or tampered. Willow survival has been poor. There has been some development of grass cover in plots A and C, but more in plot B. B is the least remediated plot so far judging by willow and grass cover.

Swap game camera SD card and batteries (check box when completed).

SD Card [X] Batteries [X]

Photographs (check boxes when taken)

Plot A	X
Plot B	X
Plot C	X
Downhill berm Plot B	X
Downhill berm Plot A	X
Game camera	X
Signs, stakes, and rope on each plot	X
Encroachment of any native vegetation	X
Closeup of veg in Plot A	X
Closeup of veg in Plot B	X
Closeup of veg in Plot C	X
Any erosion of berms or plots	X
Any other damage to plots	X