FINAL

SITE CHARACTERIZATION REPORT
SS113 – HATCHERY NORTH

JOINT BASE ELMENDORF-RICHARDSON, ALASKA

Prepared for
Air Force Civil Engineer Center

Contract No. FA8903-08-D-8769 / Task Order 0383

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Executive Summary

Site Overview

SS113 is an area of soil and groundwater contamination located in a vegetated area between Post Road and the Alaska Railroad Corporation (ARRC) tracks, just west of the Post Road access gate to Joint Base Elmendorf-Richardson (JBER), near Anchorage, Alaska. The area is owned by the ARRC. The source of petroleum contamination at SS113 has not been identified, but the source area has been delineated.

In 2013 and 2014, the United States Air Force (USAF) conducted a site investigation of an area of petroleum contamination (Site CS506) northeast of the Alaska Department of Fish and Game William Jack Hernandez Fish Hatchery Building (Hatchery Building). The CS506 investigation found an unrelated source of petroleum contamination north of Post Road. To further investigate and delineate the source of the contamination, SS113 was created.

This site characterization report presents 2016 site characterization activities and the results of the 2016 and previous investigations and evaluates potential risks to human health and the environment at SS113. Site characterization activities were performed under the *Uniform Federal Policy-Quality Assurance Project Plan, Site Characterization Unknown Sources, Joint Base Elmendorf-Richardson* (UFP-QAPP) (USAF, 2016a), including the site-specific *Appendix SS113 – Hatchery North Site Characterization Work Plan*, which was approved by the Alaska Department of Environmental Conservation (ADEC) in May 2016. An addendum to the work plan, *Uniform Federal Policy-Quality Assurance Project Plan - Addendum, Site Characterization Unknown Source Areas Phase 2 Work Plan, for Sites CG111, CG112, and SS113* (UFP-QAPP Addendum) (USAF, 2016b) was approved by ADEC in September 2016 to guide Phase 2 of the investigation.

Work was conducted by CH2M HILL, Inc. (CH2M) and has been authorized by the Air Force Civil Engineer Center under Contract Number FA8903-08-D-8769/Task Order 0383.

Summary of Site Characterization Activities

Ten soil borings (SS113-SB01 through SS113-SB10) were advanced and sampled for both soil and groundwater as part of a two-phase investigation. Borings were advanced to 10 to 15 feet below ground surface (bgs) to assess the extent of contamination. Groundwater samples were collected via temporary well points installed at each soil boring location. All soil and groundwater samples were analyzed for petroleum hydrocarbons (diesel range organics [DRO], gasoline range organics [GRO], and residual range organics [RRO]); polycyclic aromatic hydrocarbons [PAHs], petroleum-related volatile organic compounds (VOCs), and lead. Select samples had additional analysis including polychlorinated biphenyls (PCBs), full suites of metals, and the full suite of VOCs (including low level analysis in soil).

Surface water parameters, total aromatic hydrocarbons (TAH), and total aqueous hydrocarbons (TAqH) were calculated for the groundwater sample from SS113-SB02, the sample location closest to Ship Creek.

Nature and Extent

The petroleum-related source area includes the area encompassing locations SS113-SB05, SS113-SB06, SS113-SB07, SS113-SB08, CS506-SB18, CS506-SB20, and CS506-SB25. The extent of contamination is delineated by borings to the north (SS113-SB09), northeast (13CS506-SB27), west (CS506-SB26), southeast (SS113-SB02), and southwest (SS113-SB01). The soil source area (defined by the area with concentrations

of DRO greater than 1,025 milligrams per kilogram [mg/kg]) is approximately 90 by 150 feet and extends from the surface to the water table (approximately 5 feet bgs) (an approximate volume of 67,500 cubic feet, or 2,500 cubic yards). Soil samples have not been collected from within the ARRC right-of-way; therefore, it is unknown whether the shallow soil contamination extends into this area.

The highest concentrations of DRO and other petroleum-related constituents were detected in the shallow soils (0 to 5 feet bgs) in borings SS113-SB06, -SB07, and -SB08, and 13CS506-SB18, within the source area located south of the ARRC tracks and north of Post Road. The maximum concentrations of DRO, GRO, PAHs, and VOCs were detected in the 0- to 5-foot bgs interval at SS113-SB07 (Figure 4-1 and Table 4-1). DRO is above the ADEC maximum allowable concentration in SS113-SB07 (60,000 mg/kg) and 13CS506-SB18 (110,000 mg/kg).

DRO was detected above the project screening level (PSL) in upgradient boring SS113-SB10 at a concentration of 1,100 J mg/kg (5 to 10 feet bgs). SS113-SB10 had the highest concentrations of several additional constituents (1-methylnaphthalene, naphthalene, and 2-hexanone) in groundwater. The first two are petroleum-related, and 2-hexanone is a ketone used as a general solvent and in paints. SS113-SB10 is located adjacent to the OU5 wetland remediation system Pump Station #3 groundwater collection pond. Because groundwater flows southeast from SS113-SB10 to Ship Creek beneath SS113 and the contaminant of potential concern (COPC) concentrations in soil at SS113-SB10 are lower than within the SS113 source area, the contamination in SS113-SB10 is likely related to the collection pond and not directly related to site SS113.

Concentrations of DRO in groundwater are above the PSLs in the samples collected from SS113-SB03 through -SB08 and -SB10. The highest concentration detected in groundwater (23,000 micrograms per liter [µg/L]) was from boring SS113-SB08, located within the delineated SS113 surface spill source area.

Risk Evaluation

Risk evaluation identifies potential risks posed by site contamination, provides a basis for determining site contaminants of concern (COCs), and assists in future site remediation decision making.

The ADEC Cumulative Risk Calculator was used to assess compliance of COPCs at SS113 with the ADEC risk standard for the human receptor exposure pathways, with the exception of the vapor intrusion (VI) exposure pathway. The Cumulative Risk Calculator evaluates human health risks for soil and groundwater exposure pathways using site-specific soil properties. Although risk through the VI pathway is not quantitatively evaluated by the ADEC Cumulative Risk Calculator, volatile COPCs detected at concentrations exceeding the minimum ADEC Method Two Clean Up Levels (CULs) are considered COCs because of potential risk to future receptors through the VI pathway.

In addition, for COPCs in soil, the ADEC Method Three Cleanup Levels Calculator and Petroleum Cleanup Levels Calculator were used to evaluate petroleum hydrocarbon criteria and migration to groundwater criteria using site-specific soil properties, hydrogeologic conditions, and climatic conditions.

The results of the risk evaluation are summarized as follows:

- For COPCs in soil, the rounded cumulative cancer risk for the residential exposure scenario is 6E-05, which is above the regulatory risk standard of 1E-05. Benzo(a)pyrene is identified as a COC in soil.
- For COPCs in groundwater, the rounded cumulative cancer risk for the residential exposure scenario is 5E-04, which is above the regulatory risk standard of 1E-05. Naphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-c,d)pyrene are identified as COCs in groundwater.

- For COPCs in soil and groundwater, cumulative noncancer hazard index (HI) estimates for the residential exposure scenario do not exceed the regulatory risk standard of 1.
- DRO, GRO benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)pyrene, dibenzo(a,h)anthracene, indeno(1,2,3-c,d)pyrene, and naphthalene exceed the ADEC Table C CUL, and are therefore COCs in groundwater.
- DRO does not meet Method Three criteria for ingestion and migration to groundwater and is a COC in soil. DRO also exceeds the ADEC Table B2 maximum allowable concentration.
- GRO does not meet Method Three criteria for migration to groundwater and is a COC in soil.
- Naphthalene, 1-methylnaphthalene, 2-methylnaphthalene, , benzo(a)anthracene, and benzo(a)pyrene do not meet Method Three criteria for migration to groundwater and are COCs in soil.
- Because concentrations exceed the minimum ADEC Method Two CULs, naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene are also COCs in soil because of potential risk to future receptors through the VI pathway.

Conclusions

The following conclusions can be made regarding SS113:

- The source of contamination at SS113 is a surface spill of unknown origin in the area south of the ARRC tracks and north of Post Road. The highest concentrations of DRO in shallow soil (greater than 100 times the CUL) were detected in the 0- to 5-foot bgs interval at locations SS113-SB07 and 13CS506-SB18.
- Contamination extends to groundwater in the source area. The highest concentration of DRO in groundwater (23,000 µg/L) is from the sample at SS113-SB08.
- The estimated soil source area is approximately 90 by 150 feet and extends from the surface to the water table (approximately 5 feet bgs) (an approximate volume of 67,500 cubic feet, or 2,500 cubic yards).
- Using the ADEC Cumulative Risk Calculator for contaminated soil within the site exposure area, the rounded cumulative cancer risk estimate for the residential exposure scenario is 6E-05, which exceeds the regulatory risk standard of 1E-05, and the cumulative noncancer HI estimate for the residential exposure scenarios is 0.3, which is below the regulatory risk standard of 1.
- Using the ADEC Cumulative Risk Calculator for contaminated groundwater, the rounded cumulative cancer risk estimate for the residential exposure scenario is 5E-04, which exceeds the regulatory risk standard of 1E-05, and the cumulative noncancer HI estimate for the residential exposure scenarios is 1, which does not exceed the regulatory risk standard of 1.
- Using the ADEC Petroleum Cleanup Levels Calculator for contaminated soil, DRO does not meet Method Three criteria for ingestion and migration to groundwater. DRO also exceeds the ADEC Table B2 maximum allowable concentration. Therefore DRO is a COC in soil.
- Using the ADEC Petroleum Cleanup Levels Calculator for contaminated soil, GRO does not meet Method Three criteria for migration to groundwater. Therefore GRO is a COC in soil.

- Using the ADEC Cleanup Levels Calculator for contaminated soil, naphthalene, 1-methylnaphthalene, 2-methylnaphthalene, benzo(a)anthracene, and benzo(a)pyrene do not meet the Method Three criteria for migration to groundwater and are therefore COCs in soil.
- Because concentrations exceed the minimum ADEC Method Two CULs, naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene are also COCs in soil because of potential risk to future receptors through the VI pathway
- No potential risks to the environment/ecological receptors were observed, and petroleum hydrocarbon contamination in surface soil is considered insignificant (less than 0.5 acre).

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Acronyms and Abbreviations

°F	degree(s) Fahrenheit
µg/L	microgram(s) per liter
AAC	*Alaska Administrative Code*
ADEC	Alaska Department of Environmental Conservation
ARRC	Alaska Railroad Corporation
bgs	below ground surface
CH2M	CH2M HILL, Inc.
COC	contaminant of concern
COPC	contaminant of potential concern
CSM	conceptual site model
CUL	cleanup level
DQE	data quality evaluation
DRO	diesel-range organics
EB	equipment blank
EDB	ethylene dibromide
EPA	United States Environmental Protection Agency
EPC	exposure point concentration
ESF	Environmental Staging Facility
FD	field duplicate
FFA	Federal Facility Agreement
GPS	global positioning system
GRO	gasoline-range organics
Hatchery Building	Alaska Department of Fish and Game William Jack Hernandez Fish Hatchery Building
HI	hazard index
IDW	investigation-derived waste
JBER	Joint Base Elmendorf-Richardson
JBER-E	JBER-Elmendorf
JBER-R	JBER-Richardson
mg/kg	milligram(s) per kilogram
MS	matrix spike
MSD	matrix spike duplicate
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl

PSL	project screening levels
QC	quality control
RPD	relative percent difference
RRO	residual-range organics
RSL	regional screening level
TAH	total aromatic hydrocarbons
TAqH	total aqueous hydrocarbons
TB	trip blank
TR	target cancer risk
UFP-QAPP	Uniform Federal Policy-Quality Assurance Project Plan
USAF	United States Air Force
VI	vapor intrusion
VOC	volatile organic compound

SECTION 1

Introduction

This site characterization report presents the results of the 2016 site characterization activities (conducted in 2 phases), and evaluates potential risks to human health and the environment at SS113, Hatchery North. SS113 is located between Post Road and the Alaska Railroad (ARRC) tracks, just west of the Post Road access gate to Joint Base Elmendorf-Richardson (JBER) Elmendorf (JBER-E), in Anchorage, Alaska. Site characterization activities were performed under the *Uniform Federal Policy-Quality Assurance Project Plan, Site Characterization Unknown Sources, Joint Base Elmendorf-Richardson* (UFP-QAPP) (USAF, 2016a), including the site-specific *Appendix SS113 – Hatchery North Site Characterization Work Plan*, which was approved by the Alaska Department of Environmental Conservation (ADEC) in May 2016. An addendum to the work plan, *Uniform Federal Policy-Quality Assurance Project Plan - Addendum, Site Characterization Unknown Source Areas Phase 2 Work Plan, for Sites CG111, CG112, and SS113*(UFP-QAPP Addendum) (USAF, 2016b) was approved by ADEC in September 2016 to guide Phase 2 of the investigation.

Work was conducted by CH2M HILL, Inc. (CH2M) as authorized by the Air Force Civil Engineer Center under Contract Number FA8903-08-D-8769, Task Order 0383.

1.1 Purpose

The purpose of this report is to present the results of the 2016 site investigation, characterize the nature and extent of petroleum hydrocarbon contamination at SS113, and evaluate potential risks to human health and the environment within the framework of the ADEC site cleanup rules (Title 18, Chapter 75 of the *Alaska Administrative Code* [18 AAC 75] Sections 325 to 390 [ADEC, 2017a], and 18 AAC 78 Section 600 [ADEC, 2017b]).

In 2016, soil samples were collected from ten soil borings advanced to groundwater within and around the suspected source area to assess the nature and extent of contamination, and to provide sufficient representative data for evaluation of risk. Monitoring wells were not installed; however, ten groundwater samples were collected via temporary well points during the investigation.

1.2 Organization of Report

This report is organized as follows:

- **Section 1.0: Introduction** – presents the purpose of this report and report organization.
- **Section 2.0: Site Description and Background** – presents the installation and site-specific features; general geology, hydrogeology, and hydrology; and the regulatory framework for investigating and remediating the site. Summarizes the previous investigations conducted at the site.
- **Section 3.0: Field Methods** – presents the qualified personnel that performed site characterization activities, summarizes site characterization activities, and identifies deviations from the UFP-QAPP (USAF, 2016a).
- **Section 4.0: Results and Findings** – presents the site-specific geology, hydrogeology, and soil and groundwater analytical results from the 2016 site investigation; identifies data limitations; describes the nature and extent of contaminants of potential concern (COPCs); and provides a site-specific conceptual site model (CSM).

- **Section 5.0: Risk Evaluation** – describes the process used to evaluate potential site-specific risks to human health and the environment within the framework of the ADEC cleanup process and presents the site-specific risk evaluation results and identification of contaminants of concern (COCs).
- **Section 6.0: Conclusions and Recommendations** – presents the conclusions of the report based on the nature and extent of COPCs and risk evaluation results.
- **Section 7.0: References** – lists reference material used in preparation of this report.

Tables, figures, and appendixes follow Section 7.0.

SECTION 2

Site Description and Background

2.1 JBER Overview

2.1.1 Location and Description

JBER comprises the former Fort Richardson Army Post (JBER-R) and former Elmendorf Air Force Base (JBER-E) and is located adjacent to the city of Anchorage, Alaska. At 74,000 acres, JBER is the largest United States Air Force (USAF) installation in Alaska. The 673d Air Base Wing is the host unit at JBER. JBER is also home to headquarters, Alaskan Command, Alaskan NORAD Region and 11th Air Force; headquarters, U.S. Army Alaska; headquarters, Alaska Department of Military and Veterans Affairs, Alaska National Guard; 3rd Wing; 176th Wing; 4th Infantry Brigade Combat Team (Airborne), 25th Infantry Division; 477th Fighter Group; and more than 40 other mission partners. Because of the 2005 Department of Defense Base Realignment and Closure Commission recommendations, the two installations were merged to form JBER in 2010.

2.1.2 Physical Characteristics

JBER-E is bordered on the east by JBER-R, on the south by the Municipality of Anchorage, and on the north and west by the Knik Arm of Cook Inlet. The Base encompasses approximately 13,103 acres, of which approximately 6,000 acres have been developed for airfield operations, base support operations, personnel housing, and recreational facilities.

JBER-E experiences a temperate maritime climate, moderated by Cook Inlet and the surrounding mountain ranges, which generally protect the area from extremes in temperature and precipitation. The highest average monthly temperature is 58.7 degrees Fahrenheit (°F) in July, and the lowest average monthly temperature is 14.0°F in January. Average annual precipitation is 15.29 inches, with most precipitation occurring June through August. Snowfall averages 80.4 inches annually (Alaska Climate Research Center, 2012).

2.1.3 Geology and Soils

Glacial deposits, including terminal moraines, ground moraines, and outwash plains, are the dominant regional landforms on JBER and in the surrounding area. The most distinctive landform on JBER is the Elmendorf Moraine, a southwest-northeast trending terminal moraine visible as a low ridge to the north of the JBER-E airfield. The moraine consists of horizontally and vertically discontinuous, unconsolidated glacial till with poorly sorted deposits of boulders, gravel, sand, and silt. Finer-grained clay lenses found throughout the moraine may result in zones of perched groundwater. Moraine elevations range from 200 to 300 feet above mean sea level (USAF, 2012).

Glacial landforms, including drumlins, eskers, kame terraces, and kettle lakes, occur to the north of the Elmendorf Moraine. Elevations in this area range from 125 to 210 feet and gently slope to the east. Alluvium of the glacial outwash plain lies to the south of the Elmendorf Moraine. These deposits consist of unconsolidated fine- to medium-grained, poorly sorted sand and gravel. Elevations range from 100 to 225 feet above mean sea level. Relief is generally low, gently sloping to the south-southwest. Most of the developed areas on JBER-E are built on the outwash plain, and over 90 percent of the contaminated sites are located in this area (USAF, 2012).

Underlying the glacial moraine and outwash deposits are shallow marine deposits of the Bootlegger Cove Formation, a fine-grained glacio-estuarine deposit consisting of silt and clay. This formation crops out in the intertidal zone along Knik Arm and is typically encountered at depths of 60 to 100 feet below ground surface in boreholes throughout the base. Overall, the formation is thought to be at least 125 feet thick and may be more than 250 feet thick in certain locations (USAF, 2012).

2.1.4 Hydrology

JBER-E has four surface-water drainage basins: Ship Creek, Sixmile Creek, Explosive Ordnance Disposal Creek, and Cherry Hill Ditch. Ship Creek is the largest drainage system, originating in the Chugach Mountains to the east and running along the southern boundary of JBER-E to Knik Arm. The upper Ship Creek basin is an important recharge area for the deep aquifer, providing approximately one-quarter of its total recharge. Sixmile Creek, located north of the Elmendorf Moraine, originates as springs near the boundary between JBER-E and JBER-R. Explosive Ordnance Disposal Creek drains a small area of the northernmost portion of the base before flowing east onto JBER-R. Cherry Hill Ditch is the major stormwater drainage system for the main base area south of the Elmendorf Moraine, running southwest from the airfield to discharge into Knik Arm (USAF, 2012).

West of the Elmendorf Moraine and south of Sixmile Creek, drainage is via groundwater rather than surface water. In this area, wetlands, ponds, and lakes have neither inlet nor outlet streams and some groundwater discharges as seeps on the bluffs overlooking Knik Arm, feeding creeks that run into Knik Arm (USAF, 2012).

JBER-E has 12 natural and manmade lakes and ponds ranging in size from 1 to 123 acres. Ten of these lie north of the Elmendorf Moraine and two lie along Ship Creek (USAF, 2012).

2.1.5 Hydrogeology and Groundwater Use

Two principal groundwater aquifers have been identified in the glacial outwash plain alluvium and on the Elmendorf Moraine: an unconfined shallow aquifer in the glacial deposits and a deep regional aquifer confined by the Bootlegger Cove Formation. In general, the topography of the water table closely matches the surface topography. Shallow groundwater flow is generally to the northwest along the north limb of the moraine and to the southeast along the south limb, with a groundwater divide along the crest of the moraine. The shallow aquifer on JBER-E is not used for drinking water. Groundwater contamination on JBER-E has been found in specific portions of the shallow aquifer (USAF, 2012).

The deep aquifer underlies all of JBER-E and is regional in extent. Groundwater flow is westerly from the Chugach Mountains toward Knik Arm. The Bootlegger Cove Formation appears to be an effective aquitard between the shallow and deep aquifers, limiting hydraulic connection between the two aquifers. Thus, the deep aquifer has not been contaminated by the shallow sources on JBER-E. Groundwater from the deep aquifer primarily serves as a standby drinking water supply on JBER-E, to be used when surface water supplies cannot meet demand. The municipal area to the south, however, extracts deep groundwater for industrial, commercial, domestic, and public uses (USAF, 2012).

2.2 Site Overview

2.2.1 Site Location and Description

SS113 is located in a vegetated area between Post Road and the ARRC tracks, just west of the Post Road access gate to JBER, as shown on Figure 2-1. The area is owned by the ARRC.

In 2013 and 2014, USAF conducted a site investigation of an area of petroleum contamination (Site CS506) northeast of the Alaska Department of Fish and Game William Jack Hernandez Fish Hatchery Building (Hatchery Building). The CS506 investigation found an unrelated source of petroleum contamination north of Post Road. To further investigate and delineate the source of the contamination, SS113 was created. Table 2-1 provides additional location information for SS113.

2.2.2 Regulatory Framework

JBER-E was added to the National Priorities List in 1990 and has a Federal Facility Agreement (FFA) signed in 1991. The FFA provides legally enforceable stipulations for the installation to comply with and provides the substance and structure to execute complicated, multi-year cleanup programs that consider all current and future regulatory requirements. Investigation and remediation activities at JBER are being conducted by the USAF under the Environmental Restoration Program, funded by the Defense Environmental Restoration Program. The ADEC Contaminated Sites Program and Underground Storage Tank Program regulate petroleum hydrocarbons and other environmental contaminants in accordance with Alaska Statutes Title 18 *Alaska Administrative Code*, Chapter 78 (18 AAC 75), and 18 AAC 78.

SS113 is listed under State of Alaska Contaminated Sites Database Hazard Identification Number 26541 as Active.

2.3 Summary of Previous Investigations

This section summarizes the results of previous investigations into soil and groundwater contamination in the vicinity of SS113. Tables 2-2 and 2-3 provide historical data for soil and groundwater, respectively. Figure 2-2 shows the locations of previous and 2016 sample locations.

2.3.1 Soil

In 2007, as part of pre-construction activities for the hatchery, the Alaska Department of Fish and Game completed an environmental assessment that included soil sampling on the east side of the planned hatchery building (Shannon & Wilson, 2007). Soil samples were collected and submitted for laboratory analysis of diesel range organics (DRO), gasoline range organics (GRO), residual range organics (RRO), benzene, toluene, ethylbenzene, xylenes, metals, volatile organic compounds (VOCs), and polychlorinated biphenyls (PCBs). A soil sample from BH25, located northeast of the Hatchery Building (Figure 2-2) exceeded the ADEC Method Two migration-to-groundwater cleanup level (CUL) for DRO of 250 milligrams per kilogram (mg/kg) (3,630 mg/kg, collected from 8 to 9 feet below ground surface [bgs]) (Shannon & Wilson, 2007). Soil samples also exceeded ADEC CULs for arsenic and chromium; however, the concentrations detected were comparable to background concentrations and did not require further investigation (USAF, 2014). All other analytes were below the ADEC Tables B1 and B2 soil CULs (ADEC, 2017a).

In 2011, seven additional soil borings were drilled to determine the extent of contamination both northeast of and west of the Hatchery Building (USAF, 2014). DRO was detected northeast of the Hatchery Building at 3,200 mg/kg from 6 to 6.5 feet bgs in boring FH-SP04 (BH04). Results from all other borings were below the 18 AAC 75 soil CULs.

In 2013 and 2014, 28 more soil borings were drilled to further determine the extent of DRO contamination. DRO was detected at 110,000 mg/kg from 4.5 to 5 feet bgs in a sample located in boring 13CS506-SB18 on the north side of Post Road (USAF, 2014). Because of its location north of Post Road, this DRO result was assumed to be associated with a different, unknown source, which would be investigated as SS113.

2.3.2 Groundwater

A temporary monitoring well (B25MW) was installed northeast of the Hatchery Building in 2007 (Shannon & Wilson, 2007). One groundwater sample was collected from well B25MW and submitted for laboratory analysis of DRO, GRO, RRO, and VOCs. Only DRO exceeded the 18 AAC 75 Table C Groundwater CUL (Table C CUL) of 1,500 micrograms per liter (µg/L) with a concentration of 69,700 µg/L, collected from the screened interval (10 to 15 feet bgs) (Shannon & Wilson, 2007).

In 2011, four groundwater samples were collected from boreholes in the area northeast of the Hatchery Building and analyzed for DRO, benzene, toluene, ethylbenzene, xylenes, and polycyclic aromatic hydrocarbons (PAHs) (USAF, 2014). All samples were below ADEC Table C CULs.

SECTION 3

Field Methods

Site characterization activities were performed at SS113 in June and September 2016. Phase 1 activities were conducted in accordance with the UFP-QAPP (USAF, 2016a). Phase 2 activities were conducted in accordance with the UFP-QAPP Addendum (USAF, 2016b). Soil and groundwater sampling activities were supervised by Morgan Bruno and Annika Seay of CH2M, who meet the requirements of qualified persons as defined in 18 AAC 75.990 (100).

The field logs and data collection forms are provided as Appendix A-1. Field logbooks are provided in Appendix A-2. Soil boring logs are provided in Appendix A-3. Chain-of-custody forms are provided in Appendix A-4, and a photo log is provided in Appendix A-5.

3.1 Pre- and Post-Investigation Activities

An initial site visit was performed by CH2M field personnel during May 2016 to identify and mark soil boring locations based on global positioning system (GPS) coordinates. Locations were field-checked against proposed soil boring locations provided in the UFP-QAPP (USAF, 2016a). Potential hazards and access restraints were also assessed at that time.

A JBER dig permit was acquired before drilling began to identify potential current and abandoned utilities or pipelines. An ARRC Entry Permit to conduct fieldwork within property owned by ARRC and within the ARRC rail-right-of-way was also obtained.

The soil boring and groundwater sample locations were surveyed by The Boutet Company, Inc. on June 8 and October 13, 2016. Survey results are provided in Table 3-1.

3.2 Soil Sampling

Nine soil borings were drilled during Phase 1 and one soil boring was drilled during Phase 2 by GeoTek Alaska, Inc. using a Geoprobe 6610DT drill rig. The soil borings were drilled using a direct-push method by advancing a 5-foot-long, 1.6-inch-inside-diameter stainless steel barrel (macrocore) lined with a disposable acetate liner ahead of the casing using hydraulic down-pressure and down-hole hammer. This method collects a continuous soil core from the surface to the total depth of the boring. Soil samples were collected at 5-foot intervals from the continuous cores using the methods described in the UFP-QAPP (USAF, 2016a). The continuous soil core was screened in the field using a photoionization detector. These readings were recorded on the boring logs (Appendix A-3).

Table 3-2 presents the soil samples collected during the 2016 investigation and submitted to EMAX Laboratories for analysis. Samples collected are described further below:

- Soil boring SS113-SB05 was advanced to 15 feet bgs to collect samples from the location where high DRO concentrations were previously detected (the suspected source area). Samples were analyzed for GRO, DRO, RRO, metals, PCBs, the full suite of VOCs (low-level), ethylene dibromide (EDB), and PAHs.
- Seven soil borings (SS113-SB01, -SB02, -SB03, -SB04, -SB06, -SB07, and -SB08) were drilled to delineate the extent of contamination and were analyzed for GRO, DRO, RRO, petroleum-related VOCs, lead, and PAHs. With the exception of SS113-SB01, all extent borings were advanced to 10 feet bgs; SS113-SB01 was advanced to only 6.25 feet bgs because of refusal.

- Soil borings SS113-SB09 and SS113-SB10 were drilled in areas upgradient of the source area. SS113-SP09 was advanced to 10 feet bgs and SS113-SB10 was advanced to 15 feet bgs. SS113-SB09 (Phase 1) was analyzed for GRO, DRO, RRO, petroleum-related VOCs, lead, and PAHs. SS113-SB10 (Phase 2) was analyzed for DRO, RRO, GRO, metals, VOCs (full suite including EDB and low-level VOCs), PCBs, and PAHs.

Four types of field quality control (QC) samples were also collected to meet data quality standards: three field duplicates (FDs), two matrix spike/matrix spike duplicate (MS/MSD) sets, two equipment blanks (EBs), and nine trip blanks (TBs) were submitted for analysis.

3.3 Groundwater Sampling

Temporary groundwater sampling points were installed, sampled, and removed during both phases of the 2016 site investigation. Screen Point 16 Groundwater Samplers were installed at each soil boring location to depths ranging from 4 to 10 feet bgs (3 feet below the observed water table). The Screen Point 16 Groundwater Samplers were installed with the Geoprobe 6610DT, in accordance with Standard Operating Procedure 19 from the UFP-QAPP.

Table 3-3 presents the groundwater samples collected during the 2016 investigation and submitted to EMAX Laboratories for analyses. Samples collected are described below:

- All groundwater samples were collected just below the water table and analyzed for GRO, DRO, RRO, petroleum-related VOCs, PAHs, and lead.
- The sample from SS113-SB02 (the boring in closest proximity to Ship Creek [approximately 100 feet away]) was also analyzed for surface water parameters, total aromatic hydrocarbons (TAH) and total aqueous hydrocarbons (TAqH).
- The samples from SS113-SB05 and SS113-SB10 were also analyzed for the full list of metals, the full suite of VOCs (including low-level and EDB analysis), and PCBs.

Groundwater samples were collected using a peristaltic pump and disposable tubing. Three types of field QC samples were also collected and submitted for analysis to meet data quality standards: These included two FD samples, three TBs, and two MS/MSDs. As discussed in the data quality evaluation (DQE) report included in Appendix B-1, EBs were not required for the groundwater samples because dedicated equipment was used.

3.4 Waste Handling and Disposal

Wastes generated during site characterization activities include general refuse (expended personal protective equipment, paper towels, plastic bags, and plastic water containers) and investigation-derived waste (IDW) (soil drill cuttings, purge water, and wastewater from decontamination activities).

Consistent with the UFP-QAPP (USAF, 2016a), wastes were taken to the JBER Environmental Staging Facility (ESF), which is located on JBER-R at Warehouse Street near the intersection with Loop Road. Specific wastes were handled as described below:

- General refuse and expended personal protective equipment was disposed of daily in JBER refuse waste containers at the ESF.
- Soil cuttings were placed into labeled 55-gallon drums during soil boring advancement and transported to the ESF. The drums were labeled with date, project name, well/boring number,

contents, depths of material, corresponding analytical sample numbers, analysis to be performed, and the contractor point of contact. Waste quantities delivered to the ESF were tracked by CH2M field personnel.

- Composite samples were collected from each IDW soil drum and sent for analysis. Results were compared to ADEC CULs for decisions on disposal. The IDW soil drums were transported to Alaska Soil Recycling in April 2017 for disposal, in accordance with the UFP-QAPP (USAF, 2016a). Disposal records were sent to ADEC on May 10, 2017.
- Decontamination and purge water was collected in 15-gallon containers, transported to the ESF, transferred into open-top 55-gallon drums, sealed, and labeled. As is standard for water disposal at the ESF, decontamination water was then batch treated with other IDW water by the facility operator. After treatment, the water was sampled for constituents in the JBER water discharge permit and discharged to the storm drain after verifying that constituents were below permit requirements.

3.5 Site Restoration

Soil borings and temporary groundwater sampling points were abandoned using 3/8-inch bentonite chips installed from the bottom of the boring to the ground surface.

3.6 Deviations from the Work Plan

Field activities were conducted in accordance with the UFP-QAPP (USAF, 2016a) with no deviations.

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SECTION 4

Results and Findings

This section presents site-specific geology, hydrogeology, the soil and groundwater analytical results from the 2016 investigation, a summary of nature and extent of COPCs in soil and groundwater, and a CSM for the site.

4.1 Physical Characteristics

The subsurface at SS113 consists primarily of well-graded fine to coarse sand with gravel, silt, and sand to approximately 10 feet bgs. Clay (the Bootlegger Cove formation) was encountered at two deeper interval boring locations (SS113-SB03 and SS113-SB05) at approximately 12 feet bgs. Subsurface deposits at SS113-SB10 varied from the other borings, with fine- to medium-grained, round to sub-angular silty gravel in the upper 5 feet and fine to coarse grained, well graded silty sand in the lower 10 feet. Soil boring logs are provided in Appendix A-3.

The site is relatively flat south of the railroad tracks; the area north of the tracks (including borings SS113-SB09 and –SB10) is approximately 5 feet above the area to the south of the railroad tracks. The railroad tracks and Post Road are also slightly elevated above the adjacent ground surface. The north side of Post Road is bordered by a drainage ditch. No apparent surface water runoff or sediment transport from the site was observed.

Groundwater was encountered between 5 to 6.5 feet bgs during the 2016 investigation. Groundwater flows from the site toward Ship Creek, which is approximately 200 feet southeast of the site, as is typical of the shallow groundwater south of the Elmendorf Bluffs. In the elevated areas north of the Elmendorf Bluffs (the location of the closest monitoring wells), groundwater flows toward the southwest.

Two drinking water wells are located within 0.5 mile of SS113: Well #2 (0.4 mile west/crossgradient of SS113) is used as a backup drinking water source for JBER, and Well #52 (0.3 mile east/crossgradient of SS113) is used as a drinking water source for the golf course.

4.2 Analytical Results

Table 4-1 presents a summary of the soil data and Table 4-2 presents a summary of the groundwater data for samples collected from SS113

A DQE report (including ADEC checklists) and laboratory data packages are presented in Appendix B-1 and B-2, respectively. Tables of nondetect exceedances of analytes in soil and groundwater that were above the limit of detection are provided as Appendix B-3 and B-4, respectively.

4.2.1 Project Screening Levels

Consistent with the UFP-QAPP (USAF, 2016a), analytical data were initially compared with project screening levels (PSLs) to confirm the presence and characterize the nature and extent of COPCs in soil. Although most of the PSLs are derived from human health-based exposure assumptions, the PSLs are intended for screening purposes only. Detections above a screening level are not an indication of unacceptable risk. Rather, the risk evaluation (Section 5.0) identifies potential risks at a site and provides the basis for risk management decisions.

Soil screening levels in the UFP-QAPP are based on 18 AAC 75 Method Two soil CUL tables. Specifically, soil screening levels (for sites with less than 40 inches of precipitation) are the most stringent of (1) one-tenth of the Table B1 inhalation/direct contact CULs, (2) the direct value of Table B1 migration to groundwater CULs, or (3) the direct value of Table B2 soil CULs. If an ADEC cleanup criterion does not exist for a given compound in soil, the screening level for this compound is the latest version of the U.S. Environmental Protection Agency (EPA) regional screening level (RSL) (EPA, 2018). However, as agreed to by the EPA, Air Force Civil Engineer Center, and ADEC in the November 3, 2016, JBER FFA Meeting, soil PSLs on JBER are now based on the EPA RSLs for residential soil (target cancer risk (TR) =1E-06 and total hazard quotient =0.1) and the direct value of ADEC 18 AAC 75 Table B2 soil cleanup levels (for sites with less than 40 inches of precipitation) (ADEC, 2017a). For analytes for which an EPA RSL does not exist, one-tenth of the ADEC 18 AAC 75 Table B1 human health cleanup level (ADEC, 2017a) is used. Groundwater PSLs are the EPA RSLs for tap water (TR =1E-06 and total hazard quotient =0.1). In the cases for which an EPA RSL for tap water does not exist, one-tenth of the ADEC 18 AAC 75 Table C groundwater cleanup levels (ADEC, 2017a) is used. These JBER-wide PSLs are used in this report.

Since the UFP-QAPP was final in May 2016, before the new CULs in November 2016, the UFP-QAPP itself has not been revised.

4.3 Soil

Soil samples were analyzed for petroleum hydrocarbons, VOCs, PAHs, metals, and PCBs during the 2016 investigation. SS113-SB05 was installed to characterize the suspected source area, but results suggest the source area extends to a larger area including SS113-SB06, -SB07, and –SB08. No visible staining of surface soils, odors, or stunted vegetation was noted at the site during the 2013 field investigation. Figure 4-1 presents the soil analytical results above PSLs.

4.3.1 Petroleum Hydrocarbons

In accordance with the UFP-QAPP (USAF, 2016a) and UFP-QAPP Addendum (USAF, 2016b), all soil samples were analyzed for petroleum hydrocarbons. DRO was detected above the screening level (1,025 mg/kg) in six borings, and GRO was detected above the screening level (140 mg/kg) in just one location. RRO was below the PSL in all samples. Observations of DRO and GRO in soil include the following:

- The highest concentrations of both DRO (60,000 mg/kg) and GRO (660 J mg/kg) were found in the 0- to 5-foot bgs depth interval from boring SS113-SB07. GRO was only detected above the PSL (140 mg/kg) in SS113-SB07. (Results that were flagged “J” indicate that the analyte was positively identified but the result is estimated).
- DRO concentrations exceed the screening level (1,025 mg/kg) in the 0- to 5-foot bgs interval in borings SS113-SB06, -SB07, and -SB08.
- DRO concentrations exceed the screening level in the 5- to 10-foot bgs interval in borings SS113-SB03, -SB05, -SB06, -SB07, -SB08, and -SB10.
- The DRO concentration in the 5- to 10-foot bgs interval at upgradient location SS113-SB10 is lower than the DRO concentrations within the source area. DRO was not detected above the screening level in upgradient location SS113-SB09.

Figure 4-3 provides a cross section showing DRO (soil and groundwater) sample results for 2016 borings.

4.3.2 Volatile Organic Compounds

In accordance with the UFP-QAPP (USAF, 2016a) and UFP-QAPP Addendum (USAF, 2016b), soil samples from borings SS113-SB05 and SS113-SB10 were analyzed for the full suite of VOCs, and samples from the remaining borings were sampled for petroleum-related VOCs only.

Naphthalene was the only petroleum-related VOC that was detected above the PSL (3.8 mg/kg). The 0- to 5-feet bgs interval from boring SS113-SB07 had a detection of 15 J mg/kg.

4.3.3 PAHs

In accordance with the UFP-QAPP (USAF, 2016a) and UFP-QAPP Addendum (USAF, 2016b), all soil samples were analyzed for PAHs. Seven PAHs including 1- and 2-methylnaphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene exceeded PSLs, shown in parenthesis, as follows:

- SS113-SB07:
  - 0- to 5-feet bgs interval:
    - 1-Methylnaphthalene (18 mg/kg) at a concnetarion of 47 J mg/kg
    - 2-Methylnapthalene (24 mg/kg) at a concentration of 53 J mg/kg
    - Benzo(a)anthracene (1.1 mg/kg) at a concentration of 1.6 J mg/kg
    - Benzo(b)fluoranthene (1.1 mg/kg) at a concentration of 1.6 J mg/kg
    - Benzo(a)pyrene (0.11 mg/kg) at a concentration of 0.84 J mg/kg
- SS113-SB09:
  - 5- to 10-feet bgs interval:
    - Benzo(a)pyrene (0.11 mg/kg) at a concentration of 0.15 mg/kg

4.3.4 Metals

In accordance with the UFP-QAPP (USAF, 2016a) and UFP-QAPP Addendum (USAF, 2016b), soil samples from SS113-SB05 and SS113-SB10 were analyzed for the full suite of metals, and samples from the remaining borings were sampled for lead only.

Lead was detected in all samples at concentrations ranging from 2.86 mg/kg to 23.9 mg/kg (below the PSL of 400 mg/kg). Six metals were detected above screening levels: aluminum, arsenic, cobalt, iron, manganese, and vanadium. For these six metals, only arsenic was above background levels for JBER-E. Arsenic was detected at concentrations up to 15 mg/kg (in both the 5- to 10- and 10- to 15-feet bgs intervals at SS113-SB05). However, the concentrations of arsenic are within the background range for Alaska soils. Table 4-3 provides a comparison of metals detected at SS113 with established background metals concentrations. Since metals are within the background concentration range, they are not shown on Figure 4-1.

4.3.5 PCBs

In accordance with the UFP-QAPP (USAF, 2016a) and UFP-QAPP Addendum (USAF, 2016b), soil samples from SS113-SB05 and SS113-SB10 were analyzed for PCBs. Only one PCB, Aroclor 1260, was detected above the sample quantitation limit at 0.071 J mg/kg (below the screening level of 0.24 mg/kg).

4.4 Groundwater

Groundwater samples were analyzed for petroleum hydrocarbons, VOCs, PAHs, metals, and PCBs during the 2016 investigation. Figure 4-2 presents the groundwater analytical results above PSLs.

4.4.1 Petroleum Hydrocarbons

In accordance with the UFP-QAPP (USAF, 2016a) and UFP-QAPP Addendum (USAF, 2016b), all groundwater samples were analyzed for petroleum hydrocarbons. DRO, GRO, and RRO were detected above screening levels, as summarized below.

- DRO exceeded the screening level (150 µg/L) at seven locations (SS113-SB03 through -SB08, and -SB10), at concentrations ranging from 360 J µg/L to 23,000 µg/L.
- GRO exceeded the screening level (220 µg/L) at two locations (SS113-SB05 and -SB08), at concentrations of 240 µg/L and 2,400 µg/L, respectively.
- RRO exceeded the screening level (110 µg/L) at two locations (SS113-SB03 and -SB10), at concentrations of 170 J µg/L and 220 J µg/L, respectively.
- The highest detected concentrations for both DRO and GRO were found in the sample from SS113-SB08; the DRO result was 23,000 µg/L, and the GRO result was 2,400 µg/L.
- The highest detected RRO concentration was 220 J µg/L in the sample from SS113-SB10.

Results that were flagged "J" indicate that the analyte was positively identified but the result is estimated.

4.4.2 Volatile Organic Compounds

In accordance with the UFP-QAPP (USAF, 2016a) and UFP-QAPP Addendum (USAF, 2016b), the groundwater samples from SS113-SB05 and SS113-SB10 were analyzed for the full suite of VOCs; all other groundwater samples were analyzed for petroleum-related VOCs only.

Petroleum-related VOCs were detected above PSLs, including 2-hexanone (2-hexanone is also a solvent typically usd as a paint thinner) and naphthalene. Both VOCs were detected above screening levels in upgradient location SS113-SB10. Locations SS113-SB04, -SB05, -SB06, -SB07, and -SB08 also had VOCs detected above screening levels. The following is a summary of VOCs detected above screening levels:

- 2-hexanone exceeded the PSL of 3.8 µg/L in the sample from SS113-SB10 at 11 J µg/L.
- Napthalene exceeded the PSL of 0.17 µg/L in samples from five borings (SS113-SB04 through SS113-SB06 and SS113-SB10). The maximum concentration detected was 5.8 J mg/kg in the sample from SS113-SB10.

Because of the use of a peristaltic pump for collection of the VOC samples in groundwater, the VOC results are considered to be biased low.

4.4.3 PAHs

In accordance with the UFP-QAPP (USAF, 2016a) and UFP-QAPP Addendum (USAF, 2016b), all groundwater samples were analyzed for PAHs. Nine PAHs—including 1-methylnaphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene—exceeded PSLs at a total of five locations

(SS113-SB03, -SB06, -SB07, -SB08, and -SB10). All nine PAHs were detected above screening levels at SS113-SB07. A summary of the locations and maximum concentrations is summarized below:

- 1-Methylnaphthalene was above the PSL of 1.1 µg/L in the samples collected from SS113-SB06, SS113-SB07, and SS113-SB10. The maximum concentration of 4.2 J µg/L was detected in the sample from SS113-SB10.
- Benzo(a)anthracene was above the PSL of 0.012 µg/L in the samples collected from SS113-SB03, SS113-SB07, and SS113-SB08. The maximum concentration of 1.1 J µg/L was detected in the sample from SS113-SB07.
- Benzo(b)fluoranthene was above the PSL of 0.034 µg/L in the samples collected from SS113-SB03 and SS113-SB07. The maximum concentration of 1.3 J µg/L was detected in the sample from SS113-SB07.
- Chrysene was above the PSL of 0.2 µg/L at SS113-SB07 and SS113-SB08. The maximum concentration of 0.89 J µg/L was detected in the sample from SS113-SB07.
- The following PAHs were detected above screening levels, shown in parenthesis, at SS113-SB07 only:
  - Benzo(a)pyrene (0.0034 µg/L) at 0.9 J µg/L
  - Benzo(g,h,i)perylene (0.026 µg/L) at 0.48 J µg/L
  - Benzo(k)fluoranthene (0.08 µg/L) at 0.58 J µg/L
  - Dibenz(a,h)anthracene (0.0034 µg/L) at 0.12 J µg/L
  - Indeno(1,2,3-cd)pyrene (0.0019 µg/L) at 0.46 J µg/L

4.4.4 Metals

In accordance with the UFP-QAPP (USAF, 2016a) and UFP-QAPP Addendum (USAF, 2016b), the groundwater samples from SS113-SB05 and SS113-SB10 were analyzed for the full suite of metals, while all other groundwater samples were analyzed for lead only.

Lead was detected in all samples at concentrations ranging from 0.0768 µg/L to 8.32 µg/L. Samples from six locations had concentrations exceeding the screening level of 1.5 µg/L, with the highest concentration detected in the sample from SS113-SB08.

Six additional metals (the same metals that exceeded PSLs for soil) were detected in groundwater above screening levels and include aluminum, arsenic, cobalt, iron, manganese, and vanadium. The following summarizes the locations of the maximum concentrations of metals detected in groundwater, with the respective PSL shown in parenthesis, from SS113-SB05 and SS113-SB10:

- SS113-SB05
  - Arsenic (0.052 µg/L) at a concentration of 5.05 µg/L
  - Cobalt (0.6 µg/L) at a concentration of 2.61 µg/L
  - Manganese (43 µg/L) at a concentration of 3,350 µg/L
  - Vanadium (8.6 µg/L) at a concentration of 12.5 µg/L
- SS113-SB10
  - Aluminum (2,000 µg/L) at a concentration of 3,290 µg/L
  - Iron (1,400 µg/L) at a concentration of 10,800 µg/L

As is stated in Section 4.3.2, the concentrations of aluminum, arsenic, cobalt, iron, manganese, and vanadium in soil are within the expected background metals concentration range for JBER-E (Table 4-3).

Because groundwater samples for metals were unfiltered and preserved with nitric acid in the field, the detections of these metals as well as lead in groundwater are assumed to be related to the soil concentrations.

4.4.5 PCBs

In accordance with the UFP-QAPP (USAF, 2016a) and UFP-QAPP Addendum (USAF, 2016b), the groundwater samples from SS113-SB05 and SS113-SB10 were analyzed for PCBs. PCBs were not detected in the groundwater samples.

4.4.6 Total Aromatic Hydrocarbons and Total Aqueous Hydrocarbons

In accordance with the UFP-QAPP (USAF, 2016a), the surface water parameters of TAH and TAqH were calculated for the groundwater sample at SS113-SB02, since it is the location closest to Ship Creek. The TAH concentration is 1.25 B µg/L, and the TAqH is 3.45 B µg/L. Low-level blank contamination was detected for only one of the TAH and TAqH constituents (toluene), resulting in a "B" qualifier. There are no screening criteria for TAH and TAqH; however, CULs were determined in the 1995 OU5 Record of Decision related to seeps and surface water in the vicinity of SS113 (USAF, 1995). Those CULs are 10 µg/L for TAH, and 15 µg/L for TAqH, both of which are above the calculated concentrations at SS113-SB02.

4.5 Data Quality Evaluation

Sample receipt forms, laboratory data review checklists, and a comprehensive DQE report are included in Appendix B. The goal of the DQE is to demonstrate that a sufficient number of representative samples were collected, and the resulting analytical data can be used to support the decision-making process. The following summary highlights the DQE findings:

- One soil acenaphthylene result and one soil anthracene result were rejected because of low surrogate recovery. These two method/matrix/analyte combinations still met the completeness objective of 90 percent with completeness of 96.2 percent. Completeness for all other method/matrix/analyte combinations was 100 percent.
- Approximately 2 percent of the soil SW6020A data were qualified because of low-level detections in the method blanks. The degree of blank contamination observed is within reasonable method expectations.
- Approximately 2 percent of the groundwater SW8260B data were qualified because of low-level detections in the TBs. The degree of blank contamination observed is within reasonable method expectations.
- Approximately 2.7 percent of the soil SW68260B-Low data were qualified because of low-level detections in the TBs and EBs. The degree of blank contamination observed is within reasonable method expectations.
- Continuing calibration verification recovery exceedances were observed for Method SW8260B; three results were qualified as estimated.
- FD relative percent difference (RPD) exceedances were observed for Methods AK101, AK102/103, SW6020A, SW8260B, SW8260B-Low, and SW8270C-SIM; 76 results were qualified as estimated.
- Internal standard recovery exceedances were observed for Method SW8260B-Low; three results were qualified as estimated.

- Laboratory control sample RPD exceedances were observed for Method SW8270C-SIM; seven results were qualified as estimated.
- Cyclohexane was reported from a secondary quantitation ion in four groundwater samples; four results were qualified as estimated.
- MS/MSD recovery and RPD exceedances were observed for Methods AK102/103, SW8270C-SIM, and SW6020A; 14 results were qualified as estimated.
- Serial dilution RPD exceedances were observed for Method SW6020A; 10 results were qualified as estimated.
- Surrogate recovery exceedances were observed for Methods AK101, SW8260B, SW8260B-Low, and SW8270C-SIM; 222 results were qualified as estimated.
- Thirteen samples were received with leaking containers; 390 results were qualified as estimated.
- Because of the use of a peristaltic pump for collection of the VOC samples in groundwater, the VOC results are considered to be biased low.

Although data were qualified as estimated because of QC exceedances as noted, overall precision and accuracy of the data, as measured by field and laboratory QC indicators, indicate that data are usable for project objectives.

4.6 Conceptual Site Model

A site-specific CSM identifies the source and release mechanisms, distribution of COPCs in soil and groundwater, and potential receptors and exposure pathways. The CSM also forms the basis from which the environmental questions that need to be addressed are answered.

The distribution of COPCs in soil at SS113 was evaluated using data collected in 2014 and 2016. Data are considered sufficient to define the nature and extent of contamination.

4.6.1 Source and Release Mechanisms

The actual source of petroleum contamination at SS113 is unknown; however, the source area was delineated during the site characterization, and is located north of Post Road and south of the railroad tracks (Figure 4-1). The source area includes the area encompassing locations SS113-SB05, -SB06, -SB07, and -SB08 and CS506-SB18, -SB20, and -SB25 and appears to be related to an unknown surface spill. The highest concentrations of DRO and PAHs are within the shallow (0- to 5-foot bgs interval) soil sample at SS113-SB07, located approximately 25 feet south of the edge of the railroad tracks. Based on the concentrations and depths of petroleum-related contamination at SS113, the source does not appear to be coming from upgradient locations within JBER-E (as verified from the previous assumption in the Site CS506 Site Characterization Report (USAF, 2014).

Groundwater was encountered between 5 and 6.5 feet bgs across the site. DRO and other petroleum-related compounds are present in groundwater in the area and appear to be related to the surface spill.

When a hydrocarbon release occurs on the surface of unfrozen soils, the product tends to spread laterally across the ground surface and then infiltrates into the soil. The extent of lateral spreading across the ground surface is a function of quantity and rate of release and the permeability of the surface. In the vadose zone, the infiltrating product from a release tends to flow primarily vertically under the influence of gravity through larger air-filled soil pores, although capillary forces may cause some lateral spreading. If a relatively small volume of product is spilled, the product will likely be

immobilized in the soil above the water table. If a sufficient quantity of fuel is spilled, the infiltrating fuel reaches the saturated capillary fringe, displaces some water from the saturated soil pores, and tends to migrate laterally as a mound of free product develops near the water table.

No significant surface water runoff or sediment transport from the site to surface water bodies was observed. The nearest surface water body is Ship Creek, which is approximately 200 feet southeast of the site. Surface water quality parameters (TAH and TAqH) were calculated from data collected at location SS113-SB02, the groundwater sample collected closest to Ship Creek. The TAH and TAqH values do need exceed the CULs specified in the Record of Decision for Operable Unit 5, which pertains to sites and seeps located in the vicinity of SS113.

4.6.2 Nature and Extent

Based on data collected from 2013 through 2016, the source area includes the area encompassing locations SS113-SB05, -SB06, -SB07, and -SB08, CS506-SB18, CS506-SB20, and 13CS506-SB25. The extent of petroleum-related contamination is delineated by borings to the north (SS113-SB09), northeast (13CS506-SB27), west (13CS506-SB26), southeast (SS113-SB02), and southwest (SS113-SB01) (Figure 4-1). The soil source area (defined by the area with concentrations of DRO greater than 1,025 mg/kg) is approximately 90 by 150 feet, and extends from the surface to the water table (approximately 5 feet bgs) (an approximate volume of 67,500 cubic feet, or 2,500 cubic yards). Because soil samples have not been collected from within the ARRC right-of-way, it is unknown whether the shallow soil contamination extends into this area.

In total, three hydrocarbons (DRO, GRO, and RRO), ten PAHs (1-methylnaphthalene, 2-methylnaphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene), three VOCs (1,2,4-trimethylbenzene, 2-hexanone, and naphthalene), and seven metals (aluminum, arsenic, cobalt, iron, lead, manganese, and vanadium) were detected above PSLs at SS113 in soil and groundwater. However, the detected metals concentrations are within the background range for JBER-E soils, and groundwater concentrations for all metals are believed to be related to soil concentrations.

The highest concentrations of DRO and other petroleum-related constituents were detected in the shallow soils (0 to 5 feet bgs) in source area borings SS113-SB06, -SB07, and -SB08 and 13CS506-SB18, located south of the ARRC tracks and north of Post Road. The maximum concentrations of DRO, GRO, PAHs, and VOCs were detected in the 0- to 5-foot bgs interval at SS113-SB07 (Figure 4-1 and Table 4-1). DRO is above the ADEC maximum allowable concentration in SS113-SB07 and 13CS506-SB18. Of the petroleum-related constituents, only benzo(a)pyrene was detected above PSLs in shallow soils outside the source area, in the sample from SS113-SB09.

Soil samples from the 5 to 10 foot bgs intervals were collected from just below the water table. DRO concentrations ranging from 1,200 to 3,800 mg/kg were measured in soils at the water table within the SS113 source area (borings SS113-SB05, -SB06, -SB07, and -SB08). Benzo(a)pyrene and naphthalene also exceeded PSLs in this interval (no other petroleum-related compounds exceeded screening levels in this interval within the source area).

DRO was detected above the PSL in upgradient boring SS113-SB10, at a concentration of 1,100 J mg/kg (5 to 10 feet bgs). SS113-SB10 had the highest concentrations of several additional constituents (1-methylnaphthalene, naphthalene, and 2-hexanone) in groundwater. The first two are petroleum-related, and 2-hexanone is a ketone used as a general solvent and in paints. SS113-SB10 is located adjacent to the OU5 wetland remediation system Pump Station #3 groundwater collection pond. Since groundwater flows southeast from SS113-SB10 to Ship Creek beneath SS113, and the COPC

concentrations in soil at SS113-SB10 are lower than within the SS113 source area, the contamination in SS113-SB10 is likely related to the collection pond and not directly related to SS113.

Concentrations of DRO in groundwater are above PSLs for locations SS113-SB03 through -SB08 and -SB10. The highest concentration detected in groundwater (23,000 µg/L) was from boring SS113-SB08, located within the SS113 surface spill source area. Groundwater samples from the other source area borings, SS113-SB05, -SB06, and -SB07, were also above PSLs (ranging from 1,100 to 8,200 µg/L). Boring SS113-SB03, located within Site CS506, had a DRO concentration of 14,000 µg/L.

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SECTION 5

Risk Evaluation

Risk evaluation identifies potential risks posed by site contamination, provides a basis for determining site COCs, and assists in future site remediation decision-making processes.

This section describes the process used to evaluate potential site-specific risks to human health under ADEC Method Three guidance (ADEC, 2015), and the environment within the framework of the ADEC cleanup process (18 AAC 75 Sections 325 to 390, and 18 AAC 78 Section 600), and presents the site-specific risk evaluation results. The procedures used to evaluate risks are consistent with the following guidance:

- *Final Risk Assessment Procedures Manual* (ADEC, 2015)
- *Procedures for Calculating Cumulative Ris*k (ADEC, 2016)
- *Ecoscoping Guidance, A Tool for Developing an Ecological Conceptual Site Model* (ADEC, 2014)

5.1 Potential Receptors and Exposure Pathways

Potential exposure pathways—the means by which people, animals, and plants might come into contact with COPCs in environmental media—at SS113 were evaluated in accordance with the ADEC *Policy Guidance on Developing Conceptual Site Models* (ADEC, 2017c). The results of this evaluation are presented in Table 5-1.

Potential exposure pathways for human receptors are based on current and potential future land and groundwater uses. The current land use for SS113 is industrial. Land use in the foreseeable future will be industrial. A hypothetical future residential land use scenario was also considered to support site closure decisions, if applicable.

The following land use scenarios and exposure pathways were considered for characterizing risks to human health from soil and groundwater:

- **Commercial/Industrial scenarios** assume that current workers could potentially be exposed to COPCs through incidental ingestion and dermal contact with soil (0 to 15 feet bgs), inhalation of dust and volatiles in outdoor air (from soil 0 to 15 feet bgs), and inhalation of volatiles migrating from soil or groundwater into indoor air within overlying buildings (vapor intrusion [VI]). No buildings currently exist within 30 feet of the site; therefore, the VI pathway is considered incomplete for current workers. Because a building could be constructed at the site in the future, the VI pathway is potentially complete for future workers. Although there is no current onsite use of groundwater as a drinking water source, onsite groundwater could be used as a future drinking water source. Because there are drinking water wells located within 0.5 mile from the site, constituents in groundwater could potentially impact offsite wells. Therefore, current offsite commercial/industrial workers and future onsite commercial/industrial workers could potentially be exposed to COPCs through ingestion of groundwater.
- **Residential scenarios** assume that future residents could potentially be exposed to COPCs through incidental ingestion and dermal contact with soil (0 to 15 feet bgs), inhalation of dust and volatiles in outdoor air (from soil 0 to 15 feet bgs), and inhalation of volatiles migrating from soil or groundwater into indoor air within overlying buildings (VI). Although there is no current onsite use of groundwater as a drinking water source, onsite groundwater could be used in the future for drinking water and household purposes. Because there are drinking water wells located within

0.5 mile from the site, constituents in groundwater could potentially impact offsite wells. Therefore, current offsite residents and future onsite residents could potentially be exposed to COPCs through household use and ingestion of groundwater.

Exposure pathways and routes for ecological receptors are considered insignificant. Receptors are unlikely to be affected by the minimal volume or concentrations of remaining COPCs. Petroleum hydrocarbon-contaminated surface soil is less than 0.5 acre.

5.2 Human Health Risk Evaluation

The ADEC Cumulative Risk Calculator (2016 version) was used to assess compliance of COPCs at SS113 with the ADEC risk standard for the human receptor exposure pathways discussed in Section 5.1, with the exception of the VI exposure pathway. The Cumulative Risk Calculator evaluates human health risks for soil and groundwater exposure pathways using site-specific soil properties. Although risk through the VI pathway is not quantitatively evaluated by the ADEC Cumulative Risk Calculator, volatile COPCs detected at concentrations exceeding the minimum ADEC Method Two CULs are considered COCs because of potential risk to future receptors through the VI pathway.

In addition, for COPCs in soil, the ADEC Method Three Cleanup Levels Calculator and Petroleum Cleanup Levels Calculator were used to evaluate petroleum hydrocarbon criteria and migration to groundwater criteria using site-specific soil properties, hydrogeologic conditions, and climatic conditions.

COPCs in groundwater were compared with ADEC Table C CULs (ADEC, 2017a).

The ADEC Cumulative Risk Calculator, Method Three Cleanup Levels Calculator, and Petroleum Cleanup Levels Calculator results are provided in Appendix D.

5.2.1 Methodology

Consistent with human health risk assessment methodology (ADEC, 2015), evaluation of risk consisted of the following components, discussed in the following sections:

- 5.2.1.1 Data Evaluation
- 5.2.1.2 Exposure Assessment
- 5.2.1.3 Toxicity Assessment
- 5.2.1.4 Risk Characterization
- 5.2.3 Uncertainty Analysis

5.2.1.1 Data Evaluation

Data evaluation is the process for evaluating available data to assess the type, quantity, and quality of suitable data for risk assessment.

Soil and groundwater data collected in 2016 from SS113 were considered suitable to characterize the nature of the contamination and were considered for risk evaluation. Soil and groundwater data used to characterize risk are summarized in Tables 4-1 and 4-2. The data were compared with PSLs and background values (Table 4-3) to determine the COPCs to be included in the risk evaluation.

Data collected from SS113 during the 2016 field investigation were initially compared with PSLs. DRO, GRO, RRO, naphthalene, 1-methylnaphthalene, 2-methylnaphthalene, and PAHs (benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene) were detected in soil above PSLs (see Section 4) and are COPCs in soil at SS113.

DRO, GRO, RRO, naphthalene, 1-methylnaphthalene, 2-hexanone, and PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chysene, dibenzo(a,h)anthracene, and indeno(1,2,3-c,d)pyrene were detected in groundwater at a concentration exceeding PSLs and are COPCs in groundwater.

Although metals were detected above PSLs, concentrations in soil are within the expected background metals concentration range for JBER-E (Section 4.3.2). The detections of metals in groundwater are assumed to be related to the soil concentrations, and therefore related to background, not site-related, sources. Therefore, metals are not COPCs in soil or groundwater at SS113.

5.2.1.2 Exposure Assessment

Exposure assessment is the process of evaluating magnitude, frequency, duration, and route of exposure to a chemical or physical agent. In accordance with the ADEC October 2010 *Policy Guidance on Developing Conceptual Site Models* (ADEC, 2017c), pathways through which people might come into contact with contaminants at the site were evaluated and presented in Table 5-1. The exposure parameters used to assess the magnitude, frequency, and duration of exposure are the default parameters in the ADEC Cumulative Risk Calculator, the Method Three Cleanup Levels Calculator, and the Petroleum Cleanup Levels Calculator and are presented in Appendix D.

ADEC requires consideration of both current and future exposure scenarios. Therefore, risks to human health for current commercial/industrial and hypothetical future residential (unrestricted use) exposure scenarios were evaluated.

Exposure Area

The exposure area considered for SS113 is the soil source area, defined as the area where concentrations exceed PSLs. Because the maximum concentrations of all analytes detected at SS113 are within the soil source area, using the source area as the exposure area is a conservative approach to evaluating site risks.

Exposure Point Concentrations

Exposure point concentrations (EPCs) are estimated concentrations of contaminants that a receptor might contact, and are specific to each exposure area and medium (soil, groundwater). The EPCs for soil are calculated using the best statistical estimate of an upper-bound on the average exposure concentrations in accordance with EPA recommendations for statistical analysis of monitoring data (EPA, 2002; 2013). Upper-bound exposure assumptions are used to estimate reasonable maximum exposure conditions to provide a bounding estimate on exposure.

At SS113, for each COPC in soil and groundwater, the EPC is the maximum concentration detected within the source area.

5.2.1.3 Toxicity Assessment

The toxicity factors used in the ADEC calculators are based on the hierarchy of toxicity values and MCLs presented in the *Procedures for Calculating Cumulative Risk* (ADEC, 2016) and are presented in Appendix D.

5.2.1.4 Risk Characterization

COPCs can be divided into two broad groups (carcinogens and noncarcinogens) based on their tendency to cause cancer or adverse health effects. Carcinogenic risk and noncarcinogenic hazard effects are calculated separately. Some compounds can cause both effects and are included in both risk calculations. Estimates of potential cancer risks and noncancer health effects were calculated for each

pathway for each COPC in each media of interest (soil and groundwater). Cumulative risk, which is the summation of risks for all currently complete and potentially complete exposure pathways for each exposure scenario (commercial/industrial and residential), are also calculated.

Because carcinogenic (cancer) and noncarcinogenic (noncancer) COPCs act differently, the level of risk from exposure is expressed differently. Carcinogenic risks are usually expressed using scientific notation, where one-in-one-hundred-thousand is expressed as 1×10^{-5} or 1E-05. Carcinogenic risk estimates indicate the incremental increase in the probability of developing cancer during one's lifetime in addition to the background probability of developing cancer. A carcinogenic risk estimate of 1×10^{-5} means that, for every 1 million people exposed to the carcinogens throughout their lifetimes, the average incidence of cancer might increase by 10 cases of cancer (ADEC, 2016). For noncarcinogenic health effects, the body's protective mechanisms must be overcome before an adverse effect is manifested; these are expressed as a hazard quotient. A hazard index (HI) exceeding 1 indicates that there is some potential for adverse noncancer health effects associated with exposure to the contaminants of concern (ADEC, 2016; EPA, 1989).

5.2.2 Site-Specific Risk Summary

This section presents the results of the human health risk evaluation for SS113. Only the more conservative residential exposure scenarios were evaluated quantitatively. The following Appendix D attachments provide the inputs and results of the ADEC calculators:

- Appendix D-1: Cumulative Risk Calculator, Soil, Residential Exposure Scenario
- Appendix D-2: Cumulative Risk Calculator, Groundwater, Residential Exposure Scenario
- Appendix D-3: Cleanup Levels Calculator, Soil, Human Health
- Appendix D-4: Cleanup Levels Calculator, Soil, Migration to Groundwater
- Appendix D-5: Petroleum Cleanup Levels Calculator, Soil and Groundwater

5.2.2.1 Non-Contaminant Input Parameters

Non-contaminant parameters include soil properties, hydrogeologic conditions, and climatic conditions. These parameters are either ADEC default values or derived from the laboratory testing of site-specific samples. Non-contaminant parameters entered into the ADEC Calculators are presented in Appendix D (D-1 through D-5). The following site-specific values were used:

- Infiltration rate: 0.081 meters per year based on 16 inches of average annual precipitation per year
- Source length parallel to groundwater flow: 30 meters

5.2.2.2 Human Health Risk Evaluation Results

The results of the human health risk evaluation for COPCs in soil and groundwater are shown in Table 5-2 and Table 5-3, respectively, and risk results calculated by the ADEC Cumulative Risk Calculator are summarized below. The ADEC Cleanup Levels Calculator and Petroleum Cleanup Levels Calculator do not calculate risk but provide site-specific Method Three CULs. These site-specific CULs are summarized in Tables 5-2 and 5-3 for COPCs in soil and groundwater, respectively. The maximum concentration of COPCs in soil was compared to the site-specific CULs to evaluate compliance with ADEC migration to groundwater criteria and petroleum ingestion and inhalation criteria.

- For COPCs in soil, the rounded cumulative cancer risk for the residential exposure scenario is 6E-05, which is above the regulatory risk standard of 1E-05. Benzo(a)pyrene is identified as a COC in soil.
- For COPCs in groundwater, the rounded cumulative cancer risk for the residential exposure scenario is 5E-04, which is above the regulatory risk standard of 1E-05. Naphthalene, benzo(a)anthracene,

benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-c,d)pyrene are identified as COCs in groundwater.

- For COPCs in soil and groundwater, cumulative noncancer HI estimates for the residential exposure scenario do not exceed the regulatory risk standard of 1.
- DRO, GRO, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)pyrene, dibenzo(a,h)anthracene, indeno(1,2,3-c,d)pyrene, and naphthalene exceed the ADEC Table C CUL, and are therefore COCs in groundwater.
- DRO does not meet Method Three criteria for ingestion and migration to groundwater and is a COC in soil. DRO also exceeds the ADEC Table B2 maximum allowable concentration.
- GRO does not meet Method Three criteria for migration to groundwater and is a COC in soil.
- Naphthalene, 1-methylnaphthalene, 2-methylnaphthalene, benzo(a)anthracene, and benzo(a)pyrene do not meet Method Three criteria for migration to groundwater and are COCs in soil.
- Because concentrations exceed the minimum ADEC Method Two CULs, naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene are also COCs in soil because of potential risk to future receptors through the VI pathway.

5.2.3 Uncertainty Analysis

The estimation of exposure requires many assumptions to describe potential exposure situations. There are uncertainties regarding the likelihood of exposure, frequency of contact with contaminated media, the concentration of contaminants at exposure points, and the period of exposure. These tend to simplify and approximate actual site conditions. In general, these assumptions are upper-bound assumptions intended to be conservative and yield an overestimate of the true risk or hazard.

Maximum concentrations were used as EPCs. Because EPCs are supposed to represent an upper-bound of the average concentrations for an entire exposure area, use of maximum concentrations is likely to result in EPCs that are biased high. At SS113, because the bulk of contamination is at one location with many lower concentrations or non-detected results at other locations, risk estimates for the overall exposure area are likely to be overestimated.

Future soil EPCs were assumed to be equal to existing concentrations. This assumption does not account for fate and transport processes likely to occur in the future. Because some of the COPCs are VOCs, the volatiles will likely be released from soil over time; therefore, risk estimates are likely to be overestimated for future exposure scenarios.

The toxicological database used in the ADEC calculators is also a source of uncertainty. EPA has outlined some of the sources of uncertainty in the *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual, Part A* (Interim Final) (EPA, 1989). These sources might include or result from the extrapolation of toxicities from high to low doses and from animals to humans; the species, gender, age, and strain differences in a toxin's uptake; metabolism, organ distribution, and target site susceptibility; and the human population's variability with respect to diet, environment, activity patterns, and cultural factors.

In the risk characterization, the assumption was made that the total risk of developing cancer from exposure to site contaminants is the sum of the risk attributed to each individual contaminant. Likewise, the potential for the development of noncancer adverse effects is the sum of the noncarcinogenic risks estimated for exposure to each individual contaminant. This approach is consistent with EPA guidance;

however, the approach does not account for the possibility that constituents act synergistically or antagonistically. Therefore, there is uncertainty associated with the estimated cumulative risks for carcinogens and HIs for noncarcinogens.

For this evaluation, the noncarcinogenic risks from all COPCs were summed to obtain the HI. The hazard quotients for individual chemicals were not segregated based on target organs; therefore, the HI could overestimate the potential for one type of noncancer effect because all COPCs do not affect the same target organ.

5.3 Ecological Risk Evaluation

In accordance with 18 AAC 75.325 and the ADEC ecological risk guidance (ADEC, 2014), SS113 is considered protective of the environment based on the following criteria and conclusions:

- **Visible staining of surface soils**: No visible staining of surface soils was observed at the site.
- **Observed stunted vegetation**: Plants do not significantly take up or accumulate hydrocarbons in their tissues. No stunted vegetation was observed at the site.
- **Surface water runoff or sediment transport from the site to surface water bodies**: No significant surface water runoff or sediment transport from the site to surface water bodies was observed. The nearest surface water body is Ship Creek, located approximately 200 feet southeast of the site.
- **Groundwater violations of the water quality standards in 18 AAC 70 for surface water or sediment**: Contaminants in groundwater are not likely to violate water quality standards in 18 AAC 70 for surface water or sediment. Surface water parameters TAH and TAqH were evaluated and detected at low levels at location SS113-SB02.
- **Petroleum hydrocarbon–area/significance of contamination in soil**: Petroleum hydrocarbon contamination in soil is less than 0.5 acre and is therefore considered insignificant.

The ADEC Ecoscoping form was completed for SS113 and is presented in Appendix C. SS113 achieved the "off-ramp" in Part 2 Habitat of the Ecoscoping form, indicating that exposure pathways and routes for ecological receptors are incomplete, which demonstrates that ecological risk is not of concern.

5.4 Risk Evaluation Conclusions

This section presents the conclusions of this risk evaluation based on the nature and extent of COPCs at the site, and identifies the risks preventing site closure.

- Using the ADEC Cumulative Risk Calculator for contaminated soil within the site exposure area, the rounded cumulative cancer risk estimate for the residential exposure scenario is 6E-05, which exceeds the regulatory risk standard of 1E-05 for the dermal contact, incidental ingestion and outdoor air inhalation exposure pathways. Benzo(a)pyrene is a COC in soil. Because the maximum detected concentration of benzo(a)pyrene was used as the EPC and the majority of the site comprises considerably lower or non-detected results, the risk estimate poses considerable uncertainty and likely overestimates risk over the exposure area.
- Using the ADEC Cumulative Risk Calculator for contaminated soil within the site exposure area, the cumulative noncancer HI estimate for the residential exposure scenarios is 0.3, which is below the regulatory risk standard of 1 for the dermal contact, incidental ingestion, and outdoor air inhalation exposure pathways.

- Using the ADEC Cumulative Risk Calculator for contaminated groundwater, the rounded cumulative cancer risk estimate for the residential exposure scenario is 5E-04, which exceeds the regulatory risk standard of 1E-05 for the ingestion, dermal contact, and inhalation exposure pathways. Naphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-c,d)pyrene are COCs in groundwater. Because the distribution of COCs in groundwater is not widespread and maximum detected concentrations were used as EPCs, the risk is likely overestimated.
- Using the ADEC Cumulative Risk Calculator for contaminated soil within the site exposure area, the cumulative noncancer HI estimate for the residential exposure scenarios is 1, which does not exceed the regulatory risk standard of 1 for the ingestion, dermal contact, and inhalation exposure pathways.
- Using the ADEC Petroleum Cleanup Levels Calculator for contaminated soil, DRO does not meet Method Three criteria for ingestion and migration to groundwater. DRO also exceeds the ADEC Table B2 maximum allowable concentration. Therefore DRO is a COC in soil.
- Using the ADEC Petroleum Cleanup Levels Calculator for contaminated soil, GRO does not meet Method Three criteria for migration to groundwater. Therefore GRO is a COC in soil.
- Using the ADEC Cleanup Levels Calculator for contaminated soil, naphthalene, 1-methylnaphthalene, 2-methylnaphthalene, benzo(a)anthracene, and benzo(a)pyrene do not meet the Method Three criteria for migration to groundwater and are COCs in soil.
- Because concentrations exceed the minimum ADEC Method Two CULs, naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene are also COCs in soil because of potential risk to future receptors through the VI pathway.
- No potential risks to ecological receptors were observed, and petroleum hydrocarbon contamination in surface soil is considered insignificant (less than 0.5 acre). Exposure pathways and routes for ecological receptors are considered insignificant, and receptors are unlikely to be affected by the minimal volume or concentrations of remaining COPCs.

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SECTION 6

Conclusions

The following conclusions can be made regarding SS113:

- The source of contamination at SS113 is a surface spill of unknown origin in the area south of the ARRC tracks and north of Post Road. The highest concentrations of DRO in shallow soil (greater than 100 times the CUL) were detected in the 0- to 5-foot bgs interval at locations SS113-SB07 and CS506-SB18.
- Contamination extends to groundwater in the source area. The highest concentration of DRO in groundwater (23,000 µg/L) is from the sample at SS113-SB08.
- The estimated soil source area is approximately 90 by 150 feet and extends from the surface to the water table (approximately 5 feet bgs) (an approximate volume of 67,500 cubic feet, or 2,500 cubic yards).
- Using the ADEC Cumulative Risk Calculator for contaminated soil within the site exposure area, the rounded cumulative cancer risk estimate for the residential exposure scenario is 6E-05, which exceeds the regulatory risk standard of 1E-05, and the cumulative noncancer HI estimate for the residential exposure scenarios is 0.3, which is below the regulatory risk standard of 1.
- Using the ADEC Cumulative Risk Calculator for contaminated groundwater, the rounded cumulative cancer risk estimate for the residential exposure scenario is 5E-04, which exceeds the regulatory risk standard of 1E-05, and the cumulative noncancer HI estimate for the residential exposure scenarios is 1, which does not exceed the regulatory risk standard of 1.
- Using the ADEC Petroleum Cleanup Levels Calculator for contaminated soil, DRO does not meet Method Three criteria for ingestion and migration to groundwater. DRO also exceeds the ADEC Table B2 maximum allowable concentration. Therefore DRO is a COC in soil.
- Using the ADEC Petroleum Cleanup Levels Calculator for contaminated soil, GRO does not meet Method Three criteria for migration to groundwater. Therefore GRO is a COC in soil.
- Using the ADEC Cleanup Levels Calculator for contaminated soil, naphthalene, 1-methylnaphthalene, 2-methylnaphthalene, benzo(a)anthracene, and benzo(a)pyrene do not meet the Method Three criteria for migration to groundwater and are therefore COCs in soil.
- Because concentrations exceed the minimum ADEC Method Two CULs, naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene are also COCs in soil because of potential risk to future receptors through the VI pathway
- No potential risks to the environment/ecological receptors were observed, and petroleum hydrocarbon contamination in surface soil is considered insignificant (less than 0.5 acre).

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SECTION 7

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Tables

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Table 2-1 SS113 Location Information

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

Latitude (NAD 83)	Longitude (NAD 83)	Date of Collection	Method of Collection	Reference Point for Which the Coordinates Were Established	Scale of Map Used to Acquire Coordinates	Estimated Accuracy and Associated Unit of Measure
61.23222147	-149.82748965	9/16/16	Esri ArcGIS conversion tool	North of Hatchery Site CS506	Not applicable	Not applicable

Notes:

GIS = geographic information system
NAD = North American Datum

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Table 2-2 Historical Soil Data

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

Soil Boring	Depth to groundwater in the boring feet bgs	Sample Depth feet bgs	Date	DRO mg/kg
		18 AAC 75 Migration to Groundwater CUL		*250*
		18 AAC 75 Ingestion or Direct Contact CUL		*10,250*
B25	12	8 to 9	9/25/2007	**3,630**
BH04	--	6 to 6.5	2011	**3,200**
13CS506-SB01	6	6 to 6.5	6/19/2013	**1,800**
		9 to 9.5	6/19/2013	**4,900**
		11 to 11.5	6/19/2013	**28**
13CS506-SB02	5	8 to 8.5	6/19/2013	**2,700**
		11 to 11.5	6/19/2013	**990**
		14 to 14.5	6/19/2013	**4.8**
13CS506-SB03	8.5	13 to 13.5	6/19/2013	**2,800**
13CS506-SB04	9	12 to 12.5	6/19/2013	**4,900**
13CS506-SB05	9.5	14 to 14.5	6/19/2013	**3,400**
		15.5 to 16	6/19/2013	**15**
13CS506-SB06	10	14 to 14.5	6/20/2013	**4,100**
13CS506-SB07	10.5	11 to 11.5	6/20/2013	**9.8**
		15.5 to 16	6/20/2013	**2.1**
13CS506-SB08	8	8 to 8.5	6/20/2013	**2,600**
13CS506-SB09	6	6 to 6.5	6/20/2013	**3,500**
13CS506-SB10	8	9 to 9.5	6/20/2013	**1.3**
13CS506-SB11	7.5	2.5 to 3	6/20/2013	**44**
		7.5 to 8	6/20/2013	**3,100**
13CS506-SB12	5	3 to 3.5	6/20/2013	**2.5**
		4.5 to 5	6/20/2013	**1.7**
		6 to 6.5	6/20/2013	**1.9**
13CS506-SB13	10	9 to 9.5	6/28/2013	**1,800**
		11 to 11.5	6/28/2013	**12,000**
13CS506-SB14	5.5	7 to 7.5	6/28/2013	**320**
13CS506-SB15	4.5	7 to 7.5	6/28/2013	**3,200**

Table 2-2 Historical Soil Data

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

Soil Boring	Depth to groundwater in the boring feet bgs	Sample Depth feet bgs	Date	DRO mg/kg
13CS506-SB16	6.5	7 to 7.5	6/28/2013	**8.4**
13CS506-SB17	6	10 to 10.5	6/28/2013	**1.1 J,B**
13CS506-SB18	6	4.5 to 5	7/1/2013	**110,000**
13CS506-SB19	5	5.5 to 6	7/1/2013	**710**
13CS506-SB20	7	3 to 3.5	7/1/2013	**2,900 J**
		7 to 7.5	7/1/2013	**7,900**
13CS506-SB21	4	7 to 7.5	7/1/2013	**2,200**
		14.5 to 15	7/1/2013	**130**
13CS506-SB22	4	6 to 6.5	7/1/2013	**1,200**
13CS506-SB23	11	13 to 13.5	7/1/2013	**1,900**
13CS506-SB24	5	7 to 7.5	7/1/2013	**7**
13CS506-SB25	0	7 to 7.5	1/19/2014	**3,800 J**
13CS506-SB26	NA	9 to 9.5	1/19/2014	**100**
13CS506-SB27	1	9 to 9.5	1/19/2014	**2.1 J**
13CS506-SB28	0.5	7 to 7.5	1/19/2014	**1.5 J**

Data Sources: Shannon & Wilson, 2007; USAF, 2014

Notes:

This table only presents historical data for analytes that were detected at concentrations above screening levels.

-- = data not available
AAC = *Alaska Administrative Code*
ADEC = Alaska Department of Environmental Conservation
bgs = below ground surface
CUL = cleanup level
DRO = diesel-range organics
mg/kg = milligram(s) per kilogram
NA = analyte not analyzed

Bold = detection

Bold/Shading = concentration detected above ADEC Method Two Migration-to-Groundwater CUL

Bold/Shading = concentration detected above ADEC Method Two Ingestion (DRO) CUL

Table 2-3 Historical Groundwater Data

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

Monitoring Well [a]	Screen Depth feet bgs	Date	DRO µg/L	GRO µg/L	RRO µg/L
	18 AAC 75 Table C Groundwater CUL		1,500	1,300	1,100
B25MW	10 to 15	9/25/2007	**69,700**	**317**	**ND (5,950)**

Data Source: Shannon & Wilson, 2008

Notes:

[a.] Well was temporary and has been abandoned.

µg/L = microgram(s) per liter
AAC = *Alaska Administrative Code*
ADEC = Alaska Department of Environmental Conservation
CUL = cleanup level
DRO = diesel-range organics
GRO = gasoline-range organics
ND = analyte not detected (method reporting limit)
RRO = residual-range organics

Bold = detection

Bold/Shading = concentration detected above ADEC Table C Groundwater CUL

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Table 3-1 Survey Elevation Measurements and Coordinates

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

Location	Ground Surface Elevation (feet amsl)	Northing	Easting
SS113-SB01	105.44	2642165.57	1670815.23
SS113-SB02	103.76	2642291.77	1670946.86
SS113-SB03	103.19	2642267.9	1670837.93
SS113-SB04	104.64	2642326.89	1670745.39
SS113-SB05	104.39	2642366.04	1670812.41
SS113-SB06	103.14	2642415.07	1670890.55
SS113-SB07	105.21	2642402.14	1670797.09
SS113-SB08	105.06	2642441.85	1670852.62
SS113-SB09	110.41	2642592.19	1670803.57
SS113-SB10	110.37	2642491.19	1670729.9

Notes:

Survey data were provided in the Alaska State Plane coordinate system, Zone 4. Horizontal data are referenced to NAD83 (Latest Adjustment). The unit of measure for NAD83, Alaska State Plane, Zone 4 is U.S. Survey Feet. Vertical data are referenced to NAVD88. The unit of measure for NAVD88 is U.S. Survey Feet.

amsl = above mean sea level
NAD83 = North American Datum 1983
NAVD88 = North American Vertical Datum of 1988

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Table 3-2 Soil Sample Summary

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

Location	Sample ID	Matrix	Sample Type	Depth (feet)	Collection Date	AK 101 (GRO)	AK102/103 (DRO/RRO)	SW8260B-LOW (low-level VOCs)	SW8260B-SIM (low-level EDB)	SW8270C-SIM (PAHs)	SW 7471A (Mercury)	SW 8082 (PCBs)	SW 8260B (petroleum-related VOCs)	SW 6020A (metals)
SS113-SB01	16Q2SS113-SB0101-S0-0	Soil	N	0-5	6-Jun-16	X	X			X			X	X*
SS113-SB01	16Q2SS113-SB0102-S0-0	Soil	N	5-10	6-Jun-16	X	X			X			X	X*
SS113-SB02	16Q2SS113-SB0201-S0-0	Soil	N	0-5	6-Jun-16	X	X			X			X	X*
SS113-SB02	16Q2SS113-SB0202-S0-0	Soil	N	5-10	6-Jun-16	X	X			X			X	X*
SS113-SB03	16Q2SS113-SB0301-S0-0	Soil	N	0-5	7-Jun-16	X	X			X			X	X*
SS113-SB03	16Q2SS113-SB0302-S0-0	Soil	N	5-10	7-Jun-16	X	X			X			X	X*
SS113-SB03	16Q2SS113-SB0302-S0-1	Soil	FD	5-10	7-Jun-16	X	X			X			X	X*
SS113-SB03	16Q2SS113-SB0303-S0-0	Soil	N	10-15	7-Jun-16	X	X			X			X	X*
SS113-SB03	16Q2SS113-SB0303-S0-0MS	Soil	MS	10-15	7-Jun-16	X	X			X			X	X*
SS113-SB03	16Q2SS113-SB0303-S0-0SD	Soil	SD	10-15	7-Jun-16	X	X			X			X	X*
SS113-SB04	16Q2SS113-SB0401-S0-0	Soil	N	0-5	7-Jun-16	X	X			X			X	X*
SS113-SB04	16Q2SS113-SB0402-S0-0	Soil	N	5-10	7-Jun-16	X	X			X			X	X*
SS113-SB05	16Q2SS113-SB0501-S0-0	Soil	N	0-5	7-Jun-16	X	X	X	X	X	X	X	X	X
SS113-SB05	16Q2SS113-SB0502-S0-0	Soil	N	5-10	7-Jun-16	X	X	X	X	X	X	X	X	X
SS113-SB05	16Q2SS113-SB0502-S0-1	Soil	FD	5-10	7-Jun-16	X	X	X	X	X	X	X	X	X
SS113-SB05	16Q2SS113-SB0503-S0-0	Soil	N	10-15	7-Jun-16	X	X	X	X	X	X	X	X	X
SS113-SB06	16Q2SS113-SB0601-S0-0	Soil	N	0-5	7-Jun-16	X	X			X			X	X*
SS113-SB06	16Q2SS113-SB0602-S0-0	Soil	N	5-10	7-Jun-16	X	X			X			X	X*
SS113-SB07	16Q2SS113-SB0701-S0-0	Soil	N	0-5	6-Jun-16	X	X			X			X	X*
SS113-SB07	16Q2SS113-SB0702-S0-0	Soil	N	5-10	6-Jun-16	X	X			X			X	X*
SS113-SB08	16Q2SS113-SB0801-S0-0	Soil	N	0-5	6-Jun-16	X	X			X			X	X*
SS113-SB08	16Q2SS113-SB0802-S0-0	Soil	N	5-10	6-Jun-16	X	X			X			X	X*
SS113-SB09	16Q2SS113-SB0901-S0-0	Soil	N	0-5	6-Jun-16	X	X			X			X	X*
SS113-SB09	16Q2SS113-SB0902-S0-0	Soil	N	5-10	6-Jun-16	X	X			X			X	X*
SS113-SB10	16Q2SS113-SB1001-S0-0	Soil	N	0-5	28-Sep-16	X	X	X	X	X	X	X	X	X
SS113-SB10	16Q2SS113-SB1002-S0-0	Soil	N	5-10	28-Sep-16	X	X	X	X	X	X	X	X	X
SS113-SB10	16Q2SS113-SB1002-S0-1	Soil	FD	5-10	28-Sep-16	X	X	X	X	X	X	X	X	X
SS113-SB10	16Q2SS113-SB1003-S0-0	Soil	N	10-15	28-Sep-16	X	X	X	X	X	X	X	X	X
SS113-SB10	16Q2SS113-SB1003-S0-0MS	Soil	MS	10-15	28-Sep-16	X	X	X	X	X	X	X	X	X
SS113-SB10	16Q2SS113-SB1003-S0-0SD	Soil	SD	10-15	28-Sep-16	X	X	X	X	X	X	X	X	X

Notes:

*SW 6020A for lead only

DRO = diesel-range organics
EDB = ethylene dibromide
FD = field duplicate
GRO = gasoline-range organics
ID = Identification
MS = matrix spike
N = normal sample
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
RRO = residual-range organics
SD = matrix spike duplicate
SIM =selected ion monitoring
SW = southwest
VOC = volatile organic compound

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Table 3-3 Groundwater Sample Summary

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

Location	Sample ID	Matrix	Sample Type	Depth (feet)	Collection Date	AK101 (GRO)	AK102/103 (DRO/RRO)	SW 8270C-SIM (PAHs)	SW 7470A (Mercury)	SW 8082 (PCBs)	SW8260B - SIM (EDB)	SW 8260B	SW 6020A (metals)
SS113-SB01	16Q2SS113-SB0102-GW-0	Groundwater	N	5.25	7-Jun-16	X	X	X				X+	X*
SS113-SB01	16Q2SS113-SB0102-GW-1	Groundwater	FD	5.25	7-Jun-16	X	X	X				X+	X*
SS113-SB01	16Q2SS113-SB0102-GW-0MS	Groundwater	MS	5.25	7-Jun-16	X	X	X				X+	X*
SS113-SB01	16Q2SS113-SB0102-GW-0SD	Groundwater	SD	5.25	7-Jun-16	X	X	X				X+	X*
SS113-SB02	16Q2SS113-SB0202-GW-0	Groundwater	N	5.0	7-Jun-16	X	X	X#				X+	X*
SS113-SB03	16Q2SS113-SB0302-GW-0	Groundwater	N	8.7	8-Jun-16	X	X	X				X+	X*
SS113-SB04	16Q2SS113-SB0402-GW-0	Groundwater	N	6.0	8-Jun-16	X	X	X				X+	X*
SS113-SB05	16Q2SS113-SB0502-GW-0	Groundwater	N	5.0	7-Jun-16	X	X	X	X	X	X	X	X
SS113-SB06	16Q2SS113-SB0602-GW-0	Groundwater	N	6.0	8-Jun-16	X	X	X				X+	X*
SS113-SB07	16Q2SS113-SB0702-GW-0	Groundwater	N	7.6	6-Jun-16	X	X	X				X+	X*
SS113-SB08	16Q2SS113-SB0802-GW-0	Groundwater	N	6.2	6-Jun-16	X	X	X				X+	X*
SS113-SB09	16Q2SS113-SB0902-GW-0	Groundwater	N	5.5	6-Jun-16	X	X	X				X+	X*
SS113-SB10	16Q2SS113-SB1001-GW-0	Groundwater	N	7.0	28-Sep-16	X	X	X	X	X		X	X
SS113-SB10	16Q2SS113-SB1001-GW-1	Groundwater	FD	7.0	28-Sep-16	X	X	X	X	X		X	X
SS113-SB10	16Q2SS113-SB1001-GW-0MS	Groundwater	MS	7.0	28-Sep-16	X	X	X	X	X		X	X
SS113-SB10	16Q2SS113-SB1001-GW-0SD	Groundwater	SD	7.0	28-Sep-16	X	X	X	X	X		X	X

Notes:

+ SW8260B (petroleum-related compounds only)

* SW6020A metals (lead only)

SW8270C-SIM (PAHs) and TAH/TAqH

DRO = diesel-range organics
EDB = ethylene dibromide
FD = field duplicate
GRO = gasoline-range organics
ID = Identification
MS = matrix spike
N = normal sample
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
RRO = residual-range organics
SD = matrix spike duplicate
SIM =selected ion monitoring
SW = southwest
TAH = total aromatic hydrocarbons
TAqH = total aqueous hydrocarbons

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Table 4-1 Summary of Chemicals Detected in Soil

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

	Location	SS113-SB01		SS113-SB02	
	Sample ID	16Q2SS113-SB0101-SO-0	16Q2SS113-SB0102-SO-0	16Q2SS113-SB0201-SO-0	16Q2SS113-SB0202-SO-0
	Sample Depth (ft)	0 - 2	5 - 6.25	0 - 5	5 - 10
	Sample Date	6/6/2016	6/6/2016	6/6/2016	6/6/2016
Analyte	**Screening Level**				
Hydrocarbons (mg/kg)					
GRO	140	0.45 UJ	0.57 UJ	**1.1 J**	**0.99 J**
DRO	1025	**15**	5.7 U	**47**	**8 J**
RRO	1000	**78**	11 U	**32**	**31**
Metals (mg/kg)					
Aluminum	7700	- -	- -	- -	- -
Antimony	3.1	- -	- -	- -	- -
Arsenic	0.68	- -	- -	- -	- -
Barium	1500	- -	- -	- -	- -
Beryllium	16	- -	- -	- -	- -
Cadmium	7.1	- -	- -	- -	- -
Calcium	NA	- -	- -	- -	- -
Chromium	12000	- -	- -	- -	- -
Cobalt	2.3	- -	- -	- -	- -
Copper	310	- -	- -	- -	- -
Iron	5500	- -	- -	- -	- -
Lead	400	**6.82**	**5.08**	**10.2**	**4.98**
Magnesium	NA	- -	- -	- -	- -
Manganese	180	- -	- -	- -	- -
Nickel	150	- -	- -	- -	- -
Potassium	NA	- -	- -	- -	- -
Selenium	39	- -	- -	- -	- -
Silver	39	- -	- -	- -	- -
Sodium	NA	- -	- -	- -	- -
Thallium	0.078	- -	- -	- -	- -
Vanadium	39	- -	- -	- -	- -
Zinc	2300	- -	- -	- -	- -
Mercury	1.1	- -	- -	- -	- -
PCBs (mg/kg)					
Aroclor 1016	0.41	- -	- -	- -	- -
Aroclor 1221	0.2	- -	- -	- -	- -
Aroclor 1232	0.17	- -	- -	- -	- -
Aroclor 1242	0.23	- -	- -	- -	- -
Aroclor 1248	0.23	- -	- -	- -	- -
Aroclor 1254	0.12	- -	- -	- -	- -
Aroclor 1260	0.24	- -	- -	- -	- -
SVOCs (mg/kg)					
1-Methylnaphthalene	18	**0.0031 J**	0.0028 U	**0.037 J**	**0.0034 J**
2-Methylnaphthalene	24	**0.0034 J**	0.0028 U	**0.048 J**	**0.0031 J**
Acenaphthene	360	0.0027 U	0.0028 U	0.0028 UJ	**0.0026 J**
Acenaphthylene	230	0.0027 U	0.0028 U	0.0028 UJ	0.003 U
Anthracene	1800	0.0027 U	0.0028 U	**0.0099 J**	0.003 U
Benzo(a)anthracene	1.1	**0.0033 J**	0.0057 U	**0.011 J**	0.006 U
Benzo(a)pyrene	0.11	0.0027 U	0.0028 U	**0.015 J**	0.003 U
Benzo(b)fluoranthene	1.1	0.0027 U	0.0028 U	**0.029 J**	0.003 U
Benzo(g,h,i)perylene	230	**0.0021 J**	0.0028 U	**0.014 J**	0.003 U
Benzo(k)fluoranthene	11	0.0027 U	0.0028 U	**0.011 J**	0.003 U
Chrysene	110	0.0054 U	0.0057 U	**0.023 J**	0.006 U
Dibenz(a,h)anthracene	0.11	0.0027 U	0.0028 U	0.0028 UJ	0.003 U
Fluoranthene	240	**0.0036 J**	0.0028 U	**0.031 J**	**0.0052 J**
Fluorene	240	0.0027 U	0.0028 U	**0.028 J**	**0.0024 J**
Indeno(1,2,3-cd)pyrene	1.1	0.0027 U	0.0028 U	**0.01 J**	0.003 U
Naphthalene	3.8	0.0027 U	0.0028 U	**0.015 J**	0.003 U
Phenanthrene	230	**0.0032 J**	0.0028 U	**0.054 J**	**0.0021 J**
Pyrene	180	**0.0039 J**	0.0028 U	**0.045 J**	**0.0047 J**

Table 4-1 Summary of Chemicals Detected in Soil

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

	Location	SS113-SB01		SS113-SB02	
	Sample ID	16Q2SS113-SB0101-SO-0	16Q2SS113-SB0102-SO-0	16Q2SS113-SB0201-SO-0	16Q2SS113-SB0202-SO-0
	Sample Depth (ft)	0 - 2	5 - 6.25	0 - 5	5 - 10
	Sample Date	6/6/2016	6/6/2016	6/6/2016	6/6/2016
Analyte	**Screening Level**				
Low-Level VOCs (mg/kg)					
1,1,1,2-Tetrachloroethane	2	- -	- -	- -	- -
1,1,1-Trichloroethane	810	- -	- -	- -	- -
1,1,2,2-Tetrachloroethane	0.6	- -	- -	- -	- -
1,1,2-Trichloroethane	0.15	- -	- -	- -	- -
1,1-Dichloroethane	3.6	- -	- -	- -	- -
1,1-Dichloroethene	23	- -	- -	- -	- -
1,1-Dichloropropene	NA	- -	- -	- -	- -
1,2,3-Trichlorobenzene	6.3	- -	- -	- -	- -
1,2,3-Trichloropropane	0.0051	- -	- -	- -	- -
1,2,4-Trichlorobenzene	5.8	- -	- -	- -	- -
1,2,4-Trimethylbenzene	30	- -	- -	- -	- -
1,2-Dibromo-3-Chloropropane	0.0053	- -	- -	- -	- -
1,2-Dichlorobenzene	180	- -	- -	- -	- -
1,2-Dichloroethane	0.46	- -	- -	- -	- -
1,2-Dichloropropane	1.6	- -	- -	- -	- -
1,3,5-Trimethylbenzene	27	- -	- -	- -	- -
1,3-Dichlorobenzene	6.2	- -	- -	- -	- -
1,3-Dichloropropane	160	- -	- -	- -	- -
1,4-Dichlorobenzene	2.6	- -	- -	- -	- -
2,2-Dichloropropane	NA	- -	- -	- -	- -
2-Butanone (MEK)	2700	- -	- -	- -	- -
2-Chlorotoluene	160	- -	- -	- -	- -
2-Hexanone	20	- -	- -	- -	- -
4-Chlorotoluene	160	- -	- -	- -	- -
4-Methyl-2-Pentanone (MIBK)	3300	- -	- -	- -	- -
Acetone	6100	- -	- -	- -	- -
Benzene	1.2	- -	- -	- -	- -
Bromobenzene	29	- -	- -	- -	- -
Bromochloromethane	15	- -	- -	- -	- -
Bromodichloromethane	0.29	- -	- -	- -	- -
Bromoform	19	- -	- -	- -	- -
Bromomethane	0.68	- -	- -	- -	- -
Carbon Disulfide	77	- -	- -	- -	- -
Carbon Tetrachloride	0.65	- -	- -	- -	- -
Chlorobenzene	28	- -	- -	- -	- -
Chloroethane	1400	- -	- -	- -	- -
Chloroform	0.32	- -	- -	- -	- -
Chloromethane	11	- -	- -	- -	- -
cis-1,2-Dichloroethene	16	- -	- -	- -	- -
cis-1,3-Dichloropropene	1.8	- -	- -	- -	- -
Cyclohexane	650	- -	- -	- -	- -
Dibromochloromethane	8.3	- -	- -	- -	- -
Dibromomethane	2.4	- -	- -	- -	- -
Dichlorodifluoromethane	8.7	- -	- -	- -	- -
Ethylbenzene	5.8	- -	- -	- -	- -
Ethylene Dibromide (EDB)	0.036	- -	- -	- -	- -
Hexachlorobutadiene	1.2	- -	- -	- -	- -
Isopropylbenzene	190	- -	- -	- -	- -
m- & p-Xylene	55	- -	- -	- -	- -
Methyl tert-Butyl Ether (MTBE)	47	- -	- -	- -	- -
n-Butylbenzene	390	- -	- -	- -	- -
n-Propylbenzene	380	- -	- -	- -	- -
Naphthalene	3.8	- -	- -	- -	- -
o-Xylene	65	- -	- -	- -	- -
p-Isopropyltoluene	NA	- -	- -	- -	- -
sec-Butylbenzene	780	- -	- -	- -	- -
Styrene	600	- -	- -	- -	- -
tert-Butylbenzene	780	- -	- -	- -	- -
Tetrachloroethene (PCE)	8.1	- -	- -	- -	- -
Toluene	490	- -	- -	- -	- -
trans-1,2-Dichloroethene	160	- -	- -	- -	- -
trans-1,3-Dichloropropene	1.8	- -	- -	- -	- -
Trichloroethene (TCE)	0.41	- -	- -	- -	- -
Trichlorofluoromethane	2300	- -	- -	- -	- -
Vinyl Acetate	91	- -	- -	- -	- -
Vinyl Chloride	0.059	- -	- -	- -	- -

Table 4-1 Summary of Chemicals Detected in Soil

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

	Location	SS113-SB01		SS113-SB02	
	Sample ID	16Q2SS113-SB0101-SO-0	16Q2SS113-SB0102-SO-0	16Q2SS113-SB0201-SO-0	16Q2SS113-SB0202-SO-0
	Sample Depth (ft)	0 - 2	5 - 6.25	0 - 5	5 - 10
	Sample Date	6/6/2016	6/6/2016	6/6/2016	6/6/2016
Analyte	**Screening Level**				
Methanol VOCs (mg/kg)					
1,1,1,2-Tetrachloroethane	2	- -	- -	- -	- -
1,1,1-Trichloroethane	810	- -	- -	- -	- -
1,1,2,2-Tetrachloroethane	0.6	- -	- -	- -	- -
1,1,2-Trichloroethane	0.15	- -	- -	- -	- -
1,1-Dichloroethane	3.6	- -	- -	- -	- -
1,1-Dichloroethene	23	- -	- -	- -	- -
1,1-Dichloropropene	NA	- -	- -	- -	- -
1,2,3-Trichlorobenzene	6.3	- -	- -	- -	- -
1,2,3-Trichloropropane	0.0051	- -	- -	- -	- -
1,2,4-Trichlorobenzene	5.8	- -	- -	- -	- -
1,2,4-Trimethylbenzene	30	0.089 UJ	0.11 UJ	0.11 UJ	0.083 UJ
1,2-Dibromo-3-Chloropropane	0.0053	- -	- -	- -	- -
1,2-Dichlorobenzene	180	- -	- -	- -	- -
1,2-Dichloroethane	0.46	- -	- -	- -	- -
1,2-Dichloropropane	1.6	- -	- -	- -	- -
1,3,5-Trimethylbenzene	27	0.089 UJ	0.11 UJ	0.11 UJ	0.083 UJ
1,3-Dichlorobenzene	6.2	- -	- -	- -	- -
1,3-Dichloropropane	160	- -	- -	- -	- -
1,4-Dichlorobenzene	2.6	- -	- -	- -	- -
2,2-Dichloropropane	NA	- -	- -	- -	- -
2-Butanone (MEK)	2700	0.22 UJ	0.28 UJ	0.26 UJ	0.21 UJ
2-Chlorotoluene	160	- -	- -	- -	- -
2-Hexanone	20	0.22 UJ	0.28 UJ	0.26 UJ	0.21 UJ
4-Chlorotoluene	160	- -	- -	- -	- -
4-Methyl-2-Pentanone (MIBK)	3300	0.22 UJ	0.28 UJ	0.26 UJ	0.21 UJ
Acetone	6100	0.22 UJ	0.28 UJ	0.26 UJ	0.21 UJ
Benzene	1.2	0.045 UJ	0.057 UJ	0.053 UJ	0.041 UJ
Bromobenzene	29	0.045 UJ	0.057 UJ	0.053 UJ	0.041 UJ
Bromochloromethane	15	- -	- -	- -	- -
Bromodichloromethane	0.29	- -	- -	- -	- -
Bromoform	19	0.089 UJ	0.11 UJ	0.11 UJ	0.083 UJ
Bromomethane	0.68	0.089 UJ	0.11 UJ	0.11 UJ	0.083 UJ
Carbon Disulfide	77	0.045 UJ	0.057 UJ	0.053 UJ	0.041 UJ
Carbon Tetrachloride	0.65	- -	- -	- -	- -
Chlorobenzene	28	- -	- -	- -	- -
Chloroethane	1400	- -	- -	- -	- -
Chloroform	0.32	- -	- -	- -	- -
Chloromethane	11	- -	- -	- -	- -
cis-1,2-Dichloroethene	16	- -	- -	- -	- -
cis-1,3-Dichloropropene	1.8	- -	- -	- -	- -
Cyclohexane	650	0.22 UJ	0.28 UJ	0.26 UJ	0.21 UJ
Dibromochloromethane	8.3	- -	- -	- -	- -
Dibromomethane	2.4	0.045 UJ	0.057 UJ	0.053 UJ	0.041 UJ
Dichlorodifluoromethane	8.7	- -	- -	- -	- -
Ethylbenzene	5.8	0.045 UJ	0.057 UJ	0.053 UJ	0.041 UJ
Ethylene Dibromide (EDB)	0.036	0.045 UJ	0.057 UJ	0.053 UJ	0.041 UJ
Hexachlorobutadiene	1.2	- -	- -	- -	- -
Isopropylbenzene	190	0.089 UJ	0.11 UJ	0.11 UJ	0.083 UJ
m- & p-Xylene	55	0.089 UJ	0.11 UJ	0.11 UJ	0.083 UJ
Methyl tert-Butyl Ether (MTBE)	47	0.045 UJ	0.057 UJ	0.053 UJ	0.041 UJ
n-Butylbenzene	390	0.045 UJ	0.057 UJ	0.053 UJ	0.041 UJ
n-Propylbenzene	380	0.045 UJ	0.057 UJ	0.053 UJ	0.041 UJ
Naphthalene	3.8	0.089 UJ	0.11 UJ	0.11 UJ	0.083 UJ
o-Xylene	65	0.045 UJ	0.057 UJ	0.053 UJ	0.041 UJ
p-Isopropyltoluene	NA	0.045 UJ	0.057 UJ	0.053 UJ	0.041 UJ
sec-Butylbenzene	780	0.045 UJ	0.057 UJ	0.053 UJ	0.041 UJ
Styrene	600	0.045 UJ	0.057 UJ	0.053 UJ	0.041 UJ
tert-Butylbenzene	780	0.045 UJ	0.057 UJ	0.053 UJ	0.041 UJ
Tetrachloroethene (PCE)	8.1	- -	- -	- -	- -
Toluene	490	0.045 UJ	0.057 UJ	**0.059 J**	0.041 UJ
Total Xylenes	58	0.045 UJ	0.057 UJ	0.053 UJ	0.041 UJ
trans-1,2-Dichloroethene	160	- -	- -	- -	- -
trans-1,3-Dichloropropene	1.8	- -	- -	- -	- -
Trichloroethene (TCE)	0.41	- -	- -	- -	- -
Trichlorofluoromethane	2300	- -	- -	- -	- -
Vinyl Acetate	91	0.22 UJ	0.28 UJ	0.26 UJ	0.21 UJ
Vinyl Chloride	0.059	- -	- -	- -	- -
Low-Level EDB (mg/kg)					
Ethylene Dibromide (EDB)	0.036	- -	- -	- -	- -

Table 4-1 Summary of Chemicals Detected in Soil

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

	Location	SS113-SB03			
	Sample ID	16Q2SS113-SB0301-SO-0	16Q2SS113-SB0303-SO-0	16Q2SS113-SB0302-SO-0	16Q2SS113-SB0302-SO-1
	Sample Depth (ft)	0 - 5	10 - 15	5 - 10	5 - 10
	Sample Date	6/7/2016	6/7/2016	6/7/2016	6/7/2016
Analyte	**Screening Level**				
Hydrocarbons (mg/kg)					
GRO	140	0.95 U	**0.85 J**	**56**	**91**
DRO	1025	**110 J**	**3.5 J**	**4200**	**3500**
RRO	1000	**4300**	12 U	**200 J**	**53 J**
Metals (mg/kg)					
Aluminum	7700	- -	- -	- -	- -
Antimony	3.1	- -	- -	- -	- -
Arsenic	0.68	- -	- -	- -	- -
Barium	1500	- -	- -	- -	- -
Beryllium	16	- -	- -	- -	- -
Cadmium	7.1	- -	- -	- -	- -
Calcium	NA	- -	- -	- -	- -
Chromium	12000	- -	- -	- -	- -
Cobalt	2.3	- -	- -	- -	- -
Copper	310	- -	- -	- -	- -
Iron	5500	- -	- -	- -	- -
Lead	400	**23.9**	**3.72**	**6.67**	**4.5**
Magnesium	NA	- -	- -	- -	- -
Manganese	180	- -	- -	- -	- -
Nickel	150	- -	- -	- -	- -
Potassium	NA	- -	- -	- -	- -
Selenium	39	- -	- -	- -	- -
Silver	39	- -	- -	- -	- -
Sodium	NA	- -	- -	- -	- -
Thallium	0.078	- -	- -	- -	- -
Vanadium	39	- -	- -	- -	- -
Zinc	2300	- -	- -	- -	- -
Mercury	1.1	- -	- -	- -	- -
PCBs (mg/kg)					
Aroclor 1016	0.41	- -	- -	- -	- -
Aroclor 1221	0.2	- -	- -	- -	- -
Aroclor 1232	0.17	- -	- -	- -	- -
Aroclor 1242	0.23	- -	- -	- -	- -
Aroclor 1248	0.23	- -	- -	- -	- -
Aroclor 1254	0.12	- -	- -	- -	- -
Aroclor 1260	0.24	- -	- -	- -	- -
SVOCs (mg/kg)					
1-Methylnaphthalene	18	**0.012 J**	0.0029 UJ	**0.12 J**	**0.22 J**
2-Methylnaphthalene	24	0.02 U	0.0029 U	**0.11 J**	**0.2 J**
Acenaphthene	360	0.02 U	0.0029 U	**0.052 J**	**0.021 J**
Acenaphthylene	230	0.02 U	0.0029 U	0.0033 UJ	**0.013 J**
Anthracene	1800	0.02 U	0.0029 U	0.0033 U	0.003 U
Benzo(a)anthracene	1.1	0.041 U	0.0058 U	**0.085 J**	**0.017 J**
Benzo(a)pyrene	0.11	**0.067 J**	0.0029 U	**0.039 J**	**0.0078 J**
Benzo(b)fluoranthene	1.1	0.02 U	0.0029 U	**0.074 J**	**0.014 J**
Benzo(g,h,i)perylene	230	**0.07 J**	0.0029 U	**0.018 J**	**0.004 J**
Benzo(k)fluoranthene	11	0.02 U	0.0029 U	**0.023 J**	**0.0055 J**
Chrysene	110	0.041 U	0.0058 UJ	**0.085 J**	**0.012 J**
Dibenz(a,h)anthracene	0.11	0.02 U	0.0029 U	0.0033 U	0.003 U
Fluoranthene	240	0.02 U	**0.0051 J**	**0.33 J**	**0.048 J**
Fluorene	240	0.02 U	0.0029 U	0.0033 UJ	**0.073 J**
Indeno(1,2,3-cd)pyrene	1.1	**0.026 J**	0.0029 U	**0.02 J**	**0.0036 J**
Naphthalene	3.8	**0.011 J**	0.0029 U	**0.054**	**0.037**
Phenanthrene	230	0.02 U	0.0029 U	**0.068**	**0.051**
Pyrene	180	**0.024 J**	**0.0042 J**	**0.29 J**	**0.045 J**

Table 4-1 Summary of Chemicals Detected in Soil

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

	Location	SS113-SB03			
	Sample ID	16Q2SS113-SB0301-SO-0	16Q2SS113-SB0303-SO-0	16Q2SS113-SB0302-SO-0	16Q2SS113-SB0302-SO-1
	Sample Depth (ft)	0 - 5	10 - 15	5 - 10	5 - 10
	Sample Date	6/7/2016	6/7/2016	6/7/2016	6/7/2016
Analyte	**Screening Level**				
Low-Level VOCs (mg/kg)					
1,1,1,2-Tetrachloroethane	2	--	--	--	--
1,1,1-Trichloroethane	810	--	--	--	--
1,1,2,2-Tetrachloroethane	0.6	--	--	--	--
1,1,2-Trichloroethane	0.15	--	--	--	--
1,1-Dichloroethane	3.6	--	--	--	--
1,1-Dichloroethene	23	--	--	--	--
1,1-Dichloropropene	NA	--	--	--	--
1,2,3-Trichlorobenzene	6.3	--	--	--	--
1,2,3-Trichloropropane	0.0051	--	--	--	--
1,2,4-Trichlorobenzene	5.8	--	--	--	--
1,2,4-Trimethylbenzene	30	--	--	--	--
1,2-Dibromo-3-Chloropropane	0.0053	--	--	--	--
1,2-Dichlorobenzene	180	--	--	--	--
1,2-Dichloroethane	0.46	--	--	--	--
1,2-Dichloropropane	1.6	--	--	--	--
1,3,5-Trimethylbenzene	27	--	--	--	--
1,3-Dichlorobenzene	6.2	--	--	--	--
1,3-Dichloropropane	160	--	--	--	--
1,4-Dichlorobenzene	2.6	--	--	--	--
2,2-Dichloropropane	NA	--	--	--	--
2-Butanone (MEK)	2700	--	--	--	--
2-Chlorotoluene	160	--	--	--	--
2-Hexanone	20	--	--	--	--
4-Chlorotoluene	160	--	--	--	--
4-Methyl-2-Pentanone (MIBK)	3300	--	--	--	--
Acetone	6100	--	--	--	--
Benzene	1.2	--	--	--	--
Bromobenzene	29	--	--	--	--
Bromochloromethane	15	--	--	--	--
Bromodichloromethane	0.29	--	--	--	--
Bromoform	19	--	--	--	--
Bromomethane	0.68	--	--	--	--
Carbon Disulfide	77	--	--	--	--
Carbon Tetrachloride	0.65	--	--	--	--
Chlorobenzene	28	--	--	--	--
Chloroethane	1400	--	--	--	--
Chloroform	0.32	--	--	--	--
Chloromethane	11	--	--	--	--
cis-1,2-Dichloroethene	16	--	--	--	--
cis-1,3-Dichloropropene	1.8	--	--	--	--
Cyclohexane	650	--	--	--	--
Dibromochloromethane	8.3	--	--	--	--
Dibromomethane	2.4	--	--	--	--
Dichlorodifluoromethane	8.7	--	--	--	--
Ethylbenzene	5.8	--	--	--	--
Ethylene Dibromide (EDB)	0.036	--	--	--	--
Hexachlorobutadiene	1.2	--	--	--	--
Isopropylbenzene	190	--	--	--	--
m- & p-Xylene	55	--	--	--	--
Methyl tert-Butyl Ether (MTBE)	47	--	--	--	--
n-Butylbenzene	390	--	--	--	--
n-Propylbenzene	380	--	--	--	--
Naphthalene	3.8	--	--	--	--
o-Xylene	65	--	--	--	--
p-Isopropyltoluene	NA	--	--	--	--
sec-Butylbenzene	780	--	--	--	--
Styrene	600	--	--	--	--
tert-Butylbenzene	780	--	--	--	--
Tetrachloroethene (PCE)	8.1	--	--	--	--
Toluene	490	--	--	--	--
trans-1,2-Dichloroethene	160	--	--	--	--
trans-1,3-Dichloropropene	1.8	--	--	--	--
Trichloroethene (TCE)	0.41	--	--	--	--
Trichlorofluoromethane	2300	--	--	--	--
Vinyl Acetate	91	--	--	--	--
Vinyl Chloride	0.059	--	--	--	--

Table 4-1 Summary of Chemicals Detected in Soil

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

	Location	SS113-SB03			
	Sample ID	16Q2SS113-SB0301-SO-0	16Q2SS113-SB0303-SO-0	16Q2SS113-SB0302-SO-0	16Q2SS113-SB0302-SO-1
	Sample Depth (ft)	0 - 5	10 - 15	5 - 10	5 - 10
	Sample Date	6/7/2016	6/7/2016	6/7/2016	6/7/2016
Analyte	**Screening Level**				
Methanol VOCs (mg/kg)					
1,1,1,2-Tetrachloroethane	2	- -	- -	- -	- -
1,1,1-Trichloroethane	810	- -	- -	- -	- -
1,1,2,2-Tetrachloroethane	0.6	- -	- -	- -	- -
1,1,2-Trichloroethane	0.15	- -	- -	- -	- -
1,1-Dichloroethane	3.6	- -	- -	- -	- -
1,1-Dichloroethene	23	- -	- -	- -	- -
1,1-Dichloropropene	NA	- -	- -	- -	- -
1,2,3-Trichlorobenzene	6.3	- -	- -	- -	- -
1,2,3-Trichloropropane	0.0051	- -	- -	- -	- -
1,2,4-Trichlorobenzene	5.8	- -	- -	- -	- -
1,2,4-Trimethylbenzene	30	0.19 U	0.14 UJ	**0.44**	**0.49**
1,2-Dibromo-3-Chloropropane	0.0053	- -	- -	- -	- -
1,2-Dichlorobenzene	180	- -	- -	- -	- -
1,2-Dichloroethane	0.46	- -	- -	- -	- -
1,2-Dichloropropane	1.6	- -	- -	- -	- -
1,3,5-Trimethylbenzene	27	0.19 U	0.14 UJ	**0.049 J**	0.12 U
1,3-Dichlorobenzene	6.2	- -	- -	- -	- -
1,3-Dichloropropane	160	- -	- -	- -	- -
1,4-Dichlorobenzene	2.6	- -	- -	- -	- -
2,2-Dichloropropane	NA	- -	- -	- -	- -
2-Butanone (MEK)	2700	0.48 U	0.35 UJ	0.36 U	0.29 U
2-Chlorotoluene	160	- -	- -	- -	- -
2-Hexanone	20	0.48 U	0.35 UJ	0.36 U	0.29 U
4-Chlorotoluene	160	- -	- -	- -	- -
4-Methyl-2-Pentanone (MIBK)	3300	0.48 U	0.35 UJ	0.36 U	0.29 U
Acetone	6100	**0.32 J**	0.35 UJ	0.36 U	**0.24 J**
Benzene	1.2	0.095 U	0.07 UJ	0.071 U	0.059 U
Bromobenzene	29	0.095 U	0.07 UJ	0.071 U	0.059 U
Bromochloromethane	15	- -	- -	- -	- -
Bromodichloromethane	0.29	- -	- -	- -	- -
Bromoform	19	0.19 U	0.14 UJ	0.14 U	0.12 U
Bromomethane	0.68	0.19 U	0.14 UJ	0.14 U	0.12 U
Carbon Disulfide	77	0.095 U	0.07 UJ	0.071 U	0.059 U
Carbon Tetrachloride	0.65	- -	- -	- -	- -
Chlorobenzene	28	- -	- -	- -	- -
Chloroethane	1400	- -	- -	- -	- -
Chloroform	0.32	- -	- -	- -	- -
Chloromethane	11	- -	- -	- -	- -
cis-1,2-Dichloroethene	16	- -	- -	- -	- -
cis-1,3-Dichloropropene	1.8	- -	- -	- -	- -
Cyclohexane	650	0.48 U	0.35 UJ	0.36 U	0.29 U
Dibromochloromethane	8.3	- -	- -	- -	- -
Dibromomethane	2.4	0.095 U	0.07 UJ	0.071 U	0.059 U
Dichlorodifluoromethane	8.7	- -	- -	- -	- -
Ethylbenzene	5.8	0.095 U	0.07 UJ	0.071 U	**0.034 J**
Ethylene Dibromide (EDB)	0.036	0.095 U	0.07 UJ	0.071 U	0.059 U
Hexachlorobutadiene	1.2	- -	- -	- -	- -
Isopropylbenzene	190	0.19 U	0.14 UJ	0.14 U	**0.041 J**
m- & p-Xylene	55	0.19 U	0.14 UJ	0.14 U	**0.076 J**
Methyl tert-Butyl Ether (MTBE)	47	0.095 U	0.07 UJ	0.071 U	0.059 U
n-Butylbenzene	390	0.095 U	0.07 UJ	**0.13 J**	**0.11 J**
n-Propylbenzene	380	0.095 U	0.07 UJ	**0.092 J**	**0.095 J**
Naphthalene	3.8	0.19 U	0.14 UJ	**0.18 J**	**0.16 J**
o-Xylene	65	0.095 U	0.07 UJ	0.071 U	0.059 U
p-Isopropyltoluene	NA	0.095 U	0.07 UJ	**0.12 J**	**0.13 J**
sec-Butylbenzene	780	0.095 U	0.07 UJ	**0.075 J**	**0.093 J**
Styrene	600	0.095 U	0.07 UJ	0.071 U	0.059 U
tert-Butylbenzene	780	0.095 U	0.07 UJ	0.071 U	**0.075 J**
Tetrachloroethene (PCE)	8.1	- -	- -	- -	- -
Toluene	490	0.095 U	0.07 UJ	0.071 U	0.059 U
Total Xylenes	58	0.095 U	0.07 UJ	0.071 U	**0.076 J**
trans-1,2-Dichloroethene	160	- -	- -	- -	- -
trans-1,3-Dichloropropene	1.8	- -	- -	- -	- -
Trichloroethene (TCE)	0.41	- -	- -	- -	- -
Trichlorofluoromethane	2300	- -	- -	- -	- -
Vinyl Acetate	91	0.48 U	0.35 UJ	0.36 U	0.29 U
Vinyl Chloride	0.059	- -	- -	- -	- -
Low-Level EDB (mg/kg)					
Ethylene Dibromide (EDB)	0.036	- -	- -	- -	- -

Table 4-1 Summary of Chemicals Detected in Soil

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

	Location	SS113-SB04		SS113-SB05		
	Sample ID	16Q2SS113-SB0401-SO-0	16Q2SS113-SB0402-SO-0	16Q2SS113-SB0501-SO-0	16Q2SS113-SB0503-SO-0	16Q2SS113-SB0502-SO-0
	Sample Depth (ft)	0 - 5	5 - 10	0 - 5	10 - 15	5 - 10
	Sample Date	6/7/2016	6/7/2016	6/7/2016	6/7/2016	6/7/2016
Analyte	**Screening Level**					
Hydrocarbons (mg/kg)						
GRO	140	**8**	**12 J**	**0.54 J**	**0.46 J**	**3.9**
DRO	1025	**200**	**4 J**	**69**	6 U	**110 J**
RRO	1000	**110**	**25**	**370**	12 U	**7.6 J**
Metals (mg/kg)						
Aluminum	7700	- -	- -	**14600**	**17900**	**15800**
Antimony	3.1	- -	- -	**0.492 B**	**0.31 B**	**0.256 B**
Arsenic	0.68	- -	- -	**4.05**	**15**	**9.26**
Barium	1500	- -	- -	**68.5**	**61.3**	**55.8**
Beryllium	16	- -	- -	**0.339 J**	**0.501 J**	**0.397 J**
Cadmium	7.1	- -	- -	**0.176 J**	**0.2 J**	**0.16 J**
Calcium	NA	- -	- -	**11700**	**8770**	**7490**
Chromium	12000	- -	- -	**26.9**	**39.9**	**33.2**
Cobalt	2.3	- -	- -	**8.46**	**13.8**	**11.9**
Copper	310	- -	- -	**22.2**	**28.4**	**22.1 J**
Iron	5500	- -	- -	**21200**	**36700**	**33500**
Lead	400	**6.93**	**2.86**	**4.9**	**5.54**	**4.26**
Magnesium	NA	- -	- -	**6410**	**10100**	**9700**
Manganese	180	- -	- -	**330**	**532**	**498**
Nickel	150	- -	- -	**22.6**	**37.5**	**30.1 J**
Potassium	NA	- -	- -	**653**	**764**	**673**
Selenium	39	- -	- -	**1.3**	**0.183 J**	**0.101 J**
Silver	39	- -	- -	0.15 U	**0.0638 J**	0.12 U
Sodium	NA	- -	- -	**249**	**217**	**187**
Thallium	0.078	- -	- -	0.15 U	0.12 U	0.12 U
Vanadium	39	- -	- -	**49.5**	**68.8**	**63.4**
Zinc	2300	- -	- -	**60**	**69.5**	**57.4**
Mercury	1.1	- -	- -	**0.0739 J**	**0.0312 J**	**0.0318 J**
PCBs (mg/kg)						
Aroclor 1016	0.41	- -	- -	0.025 U	0.02 U	0.02 U
Aroclor 1221	0.2	- -	- -	0.025 U	0.02 U	0.02 U
Aroclor 1232	0.17	- -	- -	0.025 U	0.02 U	0.02 U
Aroclor 1242	0.23	- -	- -	0.025 U	0.02 U	0.02 U
Aroclor 1248	0.23	- -	- -	0.025 U	0.02 U	0.02 U
Aroclor 1254	0.12	- -	- -	0.025 U	0.02 U	0.02 U
Aroclor 1260	0.24	- -	- -	**0.071 J**	0.02 U	0.02 U
SVOCs (mg/kg)						
1-Methylnaphthalene	18	**0.057**	**0.004 J**	**0.016**	**0.0026 J**	**0.0029 J**
2-Methylnaphthalene	24	**0.059**	**0.006 J**	**0.015**	**0.004 J**	**0.0078 J**
Acenaphthene	360	0.0035 U	**0.0056 J**	0.0037 U	0.003 U	0.003 U
Acenaphthylene	230	0.0035 U	0.0028 U	0.0037 U	0.003 U	0.003 U
Anthracene	1800	0.0035 U	0.0028 U	**0.0025 J**	0.003 U	0.003 U
Benzo(a)anthracene	1.1	**0.006 J**	0.0057 U	**0.0095 J**	0.006 U	0.0059 U
Benzo(a)pyrene	0.11	0.0035 U	0.0028 U	**0.01 J**	0.003 U	0.003 U
Benzo(b)fluoranthene	1.1	**0.01 J**	0.0028 U	**0.017**	0.003 U	0.003 U
Benzo(g,h,i)perylene	230	**0.0044 J**	0.0028 U	**0.0078 J**	0.003 U	0.003 U
Benzo(k)fluoranthene	11	**0.0028 J**	0.0028 U	**0.0058 J**	0.003 U	0.003 U
Chrysene	110	**0.0056 J**	0.0057 U	**0.01 J**	0.006 U	0.0059 U
Dibenz(a,h)anthracene	0.11	0.0035 U	0.0028 U	0.0037 U	0.003 U	0.003 U
Fluoranthene	240	**0.014**	**0.0031 J**	**0.019**	0.003 U	**0.0028 J**
Fluorene	240	**0.012 J**	**0.01 J**	0.0037 U	0.003 U	0.003 U
Indeno(1,2,3-cd)pyrene	1.1	**0.0039 J**	0.0028 U	**0.0059 J**	0.003 U	0.003 U
Naphthalene	3.8	**0.043**	**0.006 J**	**0.0092 J**	**0.0038 J**	**0.0041 J**
Phenanthrene	230	**0.015**	**0.014**	**0.011 J**	0.003 U	**0.0025 J**
Pyrene	180	**0.012 J**	**0.0024 J**	**0.018**	0.003 U	**0.0024 J**

Table 4-1 Summary of Chemicals Detected in Soil

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

	Location	SS113-SB04		SS113-SB05		
	Sample ID	16Q2SS113-SB0401-SO-0	16Q2SS113-SB0402-SO-0	16Q2SS113-SB0501-SO-0	16Q2SS113-SB0503-SO-0	16Q2SS113-SB0502-SO-0
	Sample Depth (ft)	0 - 5	5 - 10	0 - 5	10 - 15	5 - 10
	Sample Date	6/7/2016	6/7/2016	6/7/2016	6/7/2016	6/7/2016
Analyte	Screening Level					
Low-Level VOCs (mg/kg)						
1,1,1,2-Tetrachloroethane	2	- -	- -	0.0019 U	0.0011 U	0.0011 U
1,1,1-Trichloroethane	810	- -	- -	0.0019 U	0.0011 U	0.0011 U
1,1,2,2-Tetrachloroethane	0.6	- -	- -	0.0019 U	0.0011 U	0.0011 U
1,1,2-Trichloroethane	0.15	- -	- -	0.0019 U	0.0011 U	0.0011 U
1,1-Dichloroethane	3.6	- -	- -	0.0019 U	0.0011 U	0.0011 U
1,1-Dichloroethene	23	- -	- -	0.0019 U	0.0011 U	0.0011 U
1,1-Dichloropropene	NA	- -	- -	0.0019 U	0.0011 U	0.0011 U
1,2,3-Trichlorobenzene	6.3	- -	- -	0.0037 U	0.0021 U	0.0022 U
1,2,3-Trichloropropane	0.0051	- -	- -	0.0037 U	0.0021 U	0.0022 U
1,2,4-Trichlorobenzene	5.8	- -	- -	0.0037 U	0.0021 U	0.0022 U
1,2,4-Trimethylbenzene	30	- -	- -	**0.011 J**	**0.00098 J**	**0.0033 J**
1,2-Dibromo-3-Chloropropane	0.0053	- -	- -	0.0037 U	0.0021 U	0.0022 U
1,2-Dichlorobenzene	180	- -	- -	0.0019 U	0.0011 U	0.0011 U
1,2-Dichloroethane	0.46	- -	- -	0.0019 U	0.0011 U	0.0011 U
1,2-Dichloropropane	1.6	- -	- -	0.0019 U	0.0011 U	0.0011 U
1,3,5-Trimethylbenzene	27	- -	- -	**0.014 J**	**0.00099 J**	**0.00066 J**
1,3-Dichlorobenzene	6.2	- -	- -	0.0019 U	0.0011 U	0.0011 U
1,3-Dichloropropane	160	- -	- -	0.0019 U	0.0011 U	0.0011 U
1,4-Dichlorobenzene	2.6	- -	- -	0.0019 U	0.0011 U	0.0011 U
2,2-Dichloropropane	NA	- -	- -	0.0037 U	0.0021 U	0.0022 U
2-Butanone (MEK)	2700	- -	- -	**0.048 J**	0.0054 U	0.0054 U
2-Chlorotoluene	160	- -	- -	0.0019 U	0.0011 U	0.0011 U
2-Hexanone	20	- -	- -	0.0093 U	0.0054 U	0.0054 U
4-Chlorotoluene	160	- -	- -	0.0093 U	0.0054 U	0.0054 U
4-Methyl-2-Pentanone (MIBK)	3300	- -	- -	0.0093 U	0.0054 U	0.0054 U
Acetone	6100	- -	- -	**0.34 J**	**0.0081 B**	**0.015 B**
Benzene	1.2	- -	- -	**0.0043 J**	**0.00086 J**	**0.0012 J**
Bromobenzene	29	- -	- -	0.0019 U	0.0011 U	0.0011 U
Bromochloromethane	15	- -	- -	0.0019 U	0.0011 U	0.0011 U
Bromodichloromethane	0.29	- -	- -	0.0019 U	0.0011 U	0.0011 U
Bromoform	19	- -	- -	0.0037 U	0.0021 U	0.0022 U
Bromomethane	0.68	- -	- -	0.0037 U	0.0021 U	0.0022 U
Carbon Disulfide	77	- -	- -	0.0019 U	**0.0052 J**	**0.0023 J**
Carbon Tetrachloride	0.65	- -	- -	0.0019 U	0.0011 U	0.0011 U
Chlorobenzene	28	- -	- -	0.0019 U	0.0011 U	0.0011 U
Chloroethane	1400	- -	- -	0.0037 U	0.0021 U	0.0022 U
Chloroform	0.32	- -	- -	0.0019 U	0.0011 U	0.0011 U
Chloromethane	11	- -	- -	0.0037 U	0.0021 U	0.0022 U
cis-1,2-Dichloroethene	16	- -	- -	0.0019 U	0.0011 U	0.0011 U
cis-1,3-Dichloropropene	1.8	- -	- -	0.0019 U	0.0011 U	0.0011 U
Cyclohexane	650	- -	- -	**0.1 J**	0.0054 U	**0.0022 J**
Dibromochloromethane	8.3	- -	- -	0.0019 U	0.0011 U	0.0011 U
Dibromomethane	2.4	- -	- -	0.0019 U	0.0011 U	0.0011 U
Dichlorodifluoromethane	8.7	- -	- -	0.0037 U	0.0021 U	0.0022 U
Ethylbenzene	5.8	- -	- -	0.0019 U	**0.00058 B**	**0.00069 B**
Ethylene Dibromide (EDB)	0.036	- -	- -	0.0019 U	0.0011 U	0.0011 U
Hexachlorobutadiene	1.2	- -	- -	0.0037 U	0.0021 U	0.0022 U
Isopropylbenzene	190	- -	- -	**0.0065 J**	0.0021 U	0.0022 U
m- & p-Xylene	55	- -	- -	**0.011 B**	0.0021 U	**0.0017 J**
Methyl tert-Butyl Ether (MTBE)	47	- -	- -	0.0019 U	0.0011 U	0.0011 U
n-Butylbenzene	390	- -	- -	0.0019 U	0.0011 U	**0.00097 J**
n-Propylbenzene	380	- -	- -	0.0019 U	0.0011 U	**0.00079 J**
Naphthalene	3.8	- -	- -	0.0037 U	**0.0014 J**	**0.005 J**
o-Xylene	65	- -	- -	**0.0028 J**	0.0011 U	**0.00055 B**
p-Isopropyltoluene	NA	- -	- -	0.0019 U	0.0011 U	0.0011 U
sec-Butylbenzene	780	- -	- -	0.0019 U	0.0011 U	**0.0013 J**
Styrene	600	- -	- -	0.0019 U	0.0011 U	0.0011 U
tert-Butylbenzene	780	- -	- -	0.0019 U	0.0011 U	0.0011 U
Tetrachloroethene (PCE)	8.1	- -	- -	0.0019 U	0.0011 U	0.0011 U
Toluene	490	- -	- -	**0.0013 B**	0.0011 U	0.0011 U
trans-1,2-Dichloroethene	160	- -	- -	0.0019 U	0.0011 U	0.0011 U
trans-1,3-Dichloropropene	1.8	- -	- -	0.0019 U	0.0011 U	0.0011 U
Trichloroethene (TCE)	0.41	- -	- -	0.0019 U	0.0011 U	0.0011 U
Trichlorofluoromethane	2300	- -	- -	0.0037 U	0.0021 U	0.0022 U
Vinyl Acetate	91	- -	- -	0.0093 U	0.0054 U	0.0054 U
Vinyl Chloride	0.059	- -	- -	0.0037 U	0.0021 U	0.0022 U

Table 4-1 Summary of Chemicals Detected in Soil

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

	Location	SS113-SB04		SS113-SB05		
	Sample ID	16Q2SS113-SB0401-SO-0	16Q2SS113-SB0402-SO-0	16Q2SS113-SB0501-SO-0	16Q2SS113-SB0503-SO-0	16Q2SS113-SB0502-SO-0
	Sample Depth (ft)	0 - 5	5 - 10	0 - 5	10 - 15	5 - 10
	Sample Date	6/7/2016	6/7/2016	6/7/2016	6/7/2016	6/7/2016
Analyte	**Screening Level**					
Methanol VOCs (mg/kg)						
1,1,1,2-Tetrachloroethane	2	- -	- -	- -	- -	- -
1,1,1-Trichloroethane	810	- -	- -	- -	- -	- -
1,1,2,2-Tetrachloroethane	0.6	- -	- -	- -	- -	- -
1,1,2-Trichloroethane	0.15	- -	- -	- -	- -	- -
1,1-Dichloroethane	3.6	- -	- -	- -	- -	- -
1,1-Dichloroethene	23	- -	- -	- -	- -	- -
1,1-Dichloropropene	NA	- -	- -	- -	- -	- -
1,2,3-Trichlorobenzene	6.3	- -	- -	- -	- -	- -
1,2,3-Trichloropropane	0.0051	- -	- -	- -	- -	- -
1,2,4-Trichlorobenzene	5.8	- -	- -	- -	- -	- -
1,2,4-Trimethylbenzene	30	**0.55**	**0.066 J**	0.19 UJ	**0.049 J**	**0.042 J**
1,2-Dibromo-3-Chloropropane	0.0053	- -	- -	- -	- -	- -
1,2-Dichlorobenzene	180	- -	- -	- -	- -	- -
1,2-Dichloroethane	0.46	- -	- -	- -	- -	- -
1,2-Dichloropropane	1.6	- -	- -	- -	- -	- -
1,3,5-Trimethylbenzene	27	**0.15 J**	0.14 UJ	0.19 UJ	0.14 U	0.13 U
1,3-Dichlorobenzene	6.2	- -	- -	- -	- -	- -
1,3-Dichloropropane	160	- -	- -	- -	- -	- -
1,4-Dichlorobenzene	2.6	- -	- -	- -	- -	- -
2,2-Dichloropropane	NA	- -	- -	- -	- -	- -
2-Butanone (MEK)	2700	0.41 U	0.36 UJ	0.47 UJ	0.35 U	0.33 U
2-Chlorotoluene	160	- -	- -	- -	- -	- -
2-Hexanone	20	0.41 U	0.36 UJ	0.47 UJ	0.35 U	0.33 U
4-Chlorotoluene	160	- -	- -	- -	- -	- -
4-Methyl-2-Pentanone (MIBK)	3300	0.41 U	0.36 UJ	0.47 UJ	0.35 U	0.33 U
Acetone	6100	**0.33 J**	**0.33 J**	0.47 UJ	0.35 U	0.33 U
Benzene	1.2	0.081 U	0.072 UJ	0.094 UJ	0.069 U	0.066 U
Bromobenzene	29	0.081 U	0.072 UJ	0.094 UJ	0.069 U	0.066 U
Bromochloromethane	15	- -	- -	- -	- -	- -
Bromodichloromethane	0.29	- -	- -	- -	- -	- -
Bromoform	19	0.16 U	0.14 UJ	0.19 UJ	0.14 U	0.13 U
Bromomethane	0.68	0.16 U	0.14 UJ	0.19 UJ	0.14 U	0.13 U
Carbon Disulfide	77	0.081 U	0.072 UJ	0.094 UJ	0.069 U	0.066 U
Carbon Tetrachloride	0.65	- -	- -	- -	- -	- -
Chlorobenzene	28	- -	- -	- -	- -	- -
Chloroethane	1400	- -	- -	- -	- -	- -
Chloroform	0.32	- -	- -	- -	- -	- -
Chloromethane	11	- -	- -	- -	- -	- -
cis-1,2-Dichloroethene	16	- -	- -	- -	- -	- -
cis-1,3-Dichloropropene	1.8	- -	- -	- -	- -	- -
Cyclohexane	650	**0.2 J**	0.36 UJ	0.47 UJ	0.35 U	0.33 U
Dibromochloromethane	8.3	- -	- -	- -	- -	- -
Dibromomethane	2.4	0.081 U	0.072 UJ	0.094 UJ	0.069 U	0.066 U
Dichlorodifluoromethane	8.7	- -	- -	- -	- -	- -
Ethylbenzene	5.8	0.081 U	**0.041 J**	0.094 UJ	**0.038 J**	0.066 U
Ethylene Dibromide (EDB)	0.036	0.081 U	0.072 UJ	0.094 UJ	0.069 U	0.066 U
Hexachlorobutadiene	1.2	- -	- -	- -	- -	- -
Isopropylbenzene	190	**0.062 J**	0.14 UJ	0.19 UJ	0.14 U	0.13 U
m- & p-Xylene	55	**0.26 J**	**0.14 J**	0.19 UJ	0.14 U	0.13 U
Methyl tert-Butyl Ether (MTBE)	47	0.081 U	0.072 UJ	0.094 UJ	0.069 U	0.066 U
n-Butylbenzene	390	0.081 U	0.072 UJ	0.094 UJ	0.069 U	0.066 U
n-Propylbenzene	380	**0.094 J**	**0.074 J**	0.094 UJ	0.069 U	0.066 U
Naphthalene	3.8	**0.32 J**	0.14 UJ	0.19 UJ	0.14 U	0.13 U
o-Xylene	65	**0.044 J**	0.072 UJ	0.094 UJ	0.069 U	0.066 U
p-Isopropyltoluene	NA	0.081 U	0.072 UJ	0.094 UJ	0.069 U	0.066 U
sec-Butylbenzene	780	0.081 U	0.072 UJ	0.094 UJ	0.069 U	0.066 U
Styrene	600	0.081 U	0.072 UJ	0.094 UJ	0.069 U	0.066 U
tert-Butylbenzene	780	0.081 U	0.072 UJ	0.094 UJ	0.069 U	0.066 U
Tetrachloroethene (PCE)	8.1	- -	- -	- -	- -	- -
Toluene	490	**0.058 J**	0.072 UJ	0.094 UJ	0.069 U	0.066 U
Total Xylenes	58	**0.3 J**	**0.14 J**	0.094 UJ	0.069 U	0.066 U
trans-1,2-Dichloroethene	160	- -	- -	- -	- -	- -
trans-1,3-Dichloropropene	1.8	- -	- -	- -	- -	- -
Trichloroethene (TCE)	0.41	- -	- -	- -	- -	- -
Trichlorofluoromethane	2300	- -	- -	- -	- -	- -
Vinyl Acetate	91	0.41 U	0.36 UJ	0.47 UJ	0.35 U	0.33 U
Vinyl Chloride	0.059	- -	- -	- -	- -	- -
Low-Level EDB (mg/kg)						
Ethylene Dibromide (EDB)	0.036	- -	- -	0.0003 U	0.00023 U	0.00022 U

Table 4-1 Summary of Chemicals Detected in Soil

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

	Location	SS113-SB05 (cont.)	SS113-SB06		SS113-SB07	
	Sample ID	16Q2SS113-SB0502-SO-1	16Q2SS113-SB0601-SO-0	16Q2SS113-SB0602-SO-0	16Q2SS113-SB0701-SO-0	16Q2SS113-SB0702-SO-0
	Sample Depth (ft)	5 - 10	0 - 5	5 - 10	0 - 5	5 - 10
	Sample Date	6/7/2016	6/7/2016	6/7/2016	6/6/2016	6/6/2016
Analyte	**Screening Level**					
Hydrocarbons (mg/kg)						
GRO	140	**3.6**	**37**	**99**	**660 J**	**120 J**
DRO	1025	**1400 J**	**8100**	**2100**	**60000**	**1200**
RRO	1000	12 U	**120 J**	**13 J**	**640 J**	**16 J**
Metals (mg/kg)						
Aluminum	7700	**15900**	- -	- -	- -	- -
Antimony	3.1	**0.241 B**	- -	- -	- -	- -
Arsenic	0.68	**15**	- -	- -	- -	- -
Barium	1500	**75.7**	- -	- -	- -	- -
Beryllium	16	**0.416 J**	- -	- -	- -	- -
Cadmium	7.1	**0.194 J**	- -	- -	- -	- -
Calcium	NA	**7330**	- -	- -	- -	- -
Chromium	12000	**33.5**	- -	- -	- -	- -
Cobalt	2.3	**11**	- -	- -	- -	- -
Copper	310	**24.6 J**	- -	- -	- -	- -
Iron	5500	**33100**	- -	- -	- -	- -
Lead	400	**4.36**	**6.48**	**4.63**	**8.66**	**4.66**
Magnesium	NA	**9200**	- -	- -	- -	- -
Manganese	180	**480**	- -	- -	- -	- -
Nickel	150	**28.9 J**	- -	- -	- -	- -
Potassium	NA	**745**	- -	- -	- -	- -
Selenium	39	**0.122 J**	- -	- -	- -	- -
Silver	39	**0.0588 J**	- -	- -	- -	- -
Sodium	NA	**172**	- -	- -	- -	- -
Thallium	0.078	0.11 U	- -	- -	- -	- -
Vanadium	39	**62.3**	- -	- -	- -	- -
Zinc	2300	**57**	- -	- -	- -	- -
Mercury	1.1	**0.026 J**	- -	- -	- -	- -
PCBs (mg/kg)						
Aroclor 1016	0.41	0.02 U	- -	- -	- -	- -
Aroclor 1221	0.2	0.02 U	- -	- -	- -	- -
Aroclor 1232	0.17	0.02 U	- -	- -	- -	- -
Aroclor 1242	0.23	0.02 U	- -	- -	- -	- -
Aroclor 1248	0.23	0.02 U	- -	- -	- -	- -
Aroclor 1254	0.12	0.02 U	- -	- -	- -	- -
Aroclor 1260	0.24	0.02 U	- -	- -	- -	- -
SVOCs (mg/kg)						
1-Methylnaphthalene	18	**0.0042 J**	**0.75**	**0.0093 J**	**47 J**	0.0029 U
2-Methylnaphthalene	24	**0.0062 J**	**0.69**	**0.0089 J**	**53 J**	0.0029 U
Acenaphthene	360	0.0029 U	0.016 U	**0.012 J**	**3.7 J**	**0.067**
Acenaphthylene	230	0.0029 U	0.016 U	**0.012 J**	0.042 R	0.0029 U
Anthracene	1800	0.0029 U	0.016 U	0.0031 U	0.042 R	0.0029 U
Benzo(a)anthracene	1.1	0.0058 U	**0.026 J**	**0.016**	**1.6 J**	**0.064**
Benzo(a)pyrene	0.11	0.0029 U	**0.019 J**	**0.0082 J**	**0.84 J**	**0.047**
Benzo(b)fluoranthene	1.1	0.0029 U	**0.036 J**	**0.015**	**1.6 J**	**0.08**
Benzo(g,h,i)perylene	230	0.0029 U	**0.013 J**	**0.0042 J**	**0.38 J**	**0.022**
Benzo(k)fluoranthene	11	0.0029 U	**0.011 J**	**0.0044 J**	**0.53 J**	**0.021**
Chrysene	110	0.0058 U	**0.02 J**	**0.0097 J**	**1.8 J**	**0.061**
Dibenz(a,h)anthracene	0.11	0.0029 U	0.016 U	0.0031 U	**0.11 J**	**0.0068 J**
Fluoranthene	240	**0.006 J**	**0.047 J**	**0.023**	**5.2 J**	**0.14**
Fluorene	240	**0.0033 J**	**0.13**	0.0031 U	**8.9 J**	0.0029 U
Indeno(1,2,3-cd)pyrene	1.1	0.0029 U	0.016 U	**0.004 J**	**0.42 J**	**0.022**
Naphthalene	3.8	**0.0033 J**	**0.14**	**0.004 J**	**15 J**	**0.06**
Phenanthrene	230	**0.0061 J**	**0.097**	**0.0088 J**	**6.2 J**	**0.057**
Pyrene	180	**0.0048 J**	**0.083**	**0.02**	**5.2 J**	**0.12**

Table 4-1 Summary of Chemicals Detected in Soil

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

	Location	SS113-SB05 (cont.)	SS113-SB06		SS113-SB07	
	Sample ID	16Q2SS113-SB0502-SO-1	16Q2SS113-SB0601-SO-0	16Q2SS113-SB0602-SO-0	16Q2SS113-SB0701-SO-0	16Q2SS113-SB0702-SO-0
	Sample Depth (ft)	5 - 10	0 - 5	5 - 10	0 - 5	5 - 10
	Sample Date	6/7/2016	6/7/2016	6/7/2016	6/6/2016	6/6/2016
Analyte	Screening Level					
Low-Level VOCs (mg/kg)						
1,1,1,2-Tetrachloroethane	2	0.0011 U	- -	- -	- -	- -
1,1,1-Trichloroethane	810	0.0011 U	- -	- -	- -	- -
1,1,2,2-Tetrachloroethane	0.6	0.0011 U	- -	- -	- -	- -
1,1,2-Trichloroethane	0.15	0.0011 U	- -	- -	- -	- -
1,1-Dichloroethane	3.6	0.0011 U	- -	- -	- -	- -
1,1-Dichloroethene	23	0.0011 U	- -	- -	- -	- -
1,1-Dichloropropene	NA	0.0011 U	- -	- -	- -	- -
1,2,3-Trichlorobenzene	6.3	0.0022 U	- -	- -	- -	- -
1,2,3-Trichloropropane	0.0051	0.0022 U	- -	- -	- -	- -
1,2,4-Trichlorobenzene	5.8	0.0022 U	- -	- -	- -	- -
1,2,4-Trimethylbenzene	30	**0.0025 J**	- -	- -	- -	- -
1,2-Dibromo-3-Chloropropane	0.0053	0.0022 U	- -	- -	- -	- -
1,2-Dichlorobenzene	180	0.0011 U	- -	- -	- -	- -
1,2-Dichloroethane	0.46	0.0011 U	- -	- -	- -	- -
1,2-Dichloropropane	1.6	0.0011 U	- -	- -	- -	- -
1,3,5-Trimethylbenzene	27	0.0022 U	- -	- -	- -	- -
1,3-Dichlorobenzene	6.2	0.0011 U	- -	- -	- -	- -
1,3-Dichloropropane	160	0.0011 U	- -	- -	- -	- -
1,4-Dichlorobenzene	2.6	0.0011 U	- -	- -	- -	- -
2,2-Dichloropropane	NA	0.0022 U	- -	- -	- -	- -
2-Butanone (MEK)	2700	0.0056 U	- -	- -	- -	- -
2-Chlorotoluene	160	0.0011 U	- -	- -	- -	- -
2-Hexanone	20	0.0056 U	- -	- -	- -	- -
4-Chlorotoluene	160	0.0056 U	- -	- -	- -	- -
4-Methyl-2-Pentanone (MIBK)	3300	0.0056 U	- -	- -	- -	- -
Acetone	6100	**0.012 B**	- -	- -	- -	- -
Benzene	1.2	**0.00096 J**	- -	- -	- -	- -
Bromobenzene	29	0.0011 U	- -	- -	- -	- -
Bromochloromethane	15	0.0011 U	- -	- -	- -	- -
Bromodichloromethane	0.29	0.0011 U	- -	- -	- -	- -
Bromoform	19	0.0022 U	- -	- -	- -	- -
Bromomethane	0.68	0.0022 U	- -	- -	- -	- -
Carbon Disulfide	77	**0.0019 J**	- -	- -	- -	- -
Carbon Tetrachloride	0.65	0.0011 U	- -	- -	- -	- -
Chlorobenzene	28	0.0011 U	- -	- -	- -	- -
Chloroethane	1400	0.0022 U	- -	- -	- -	- -
Chloroform	0.32	0.0011 U	- -	- -	- -	- -
Chloromethane	11	0.0022 U	- -	- -	- -	- -
cis-1,2-Dichloroethene	16	0.0011 U	- -	- -	- -	- -
cis-1,3-Dichloropropene	1.8	0.0011 U	- -	- -	- -	- -
Cyclohexane	650	0.0056 U	- -	- -	- -	- -
Dibromochloromethane	8.3	0.0011 U	- -	- -	- -	- -
Dibromomethane	2.4	0.0011 U	- -	- -	- -	- -
Dichlorodifluoromethane	8.7	0.0022 U	- -	- -	- -	- -
Ethylbenzene	5.8	**0.00061 B**	- -	- -	- -	- -
Ethylene Dibromide (EDB)	0.036	0.0011 U	- -	- -	- -	- -
Hexachlorobutadiene	1.2	0.0022 U	- -	- -	- -	- -
Isopropylbenzene	190	0.0022 U	- -	- -	- -	- -
m- & p-Xylene	55	**0.0014 B**	- -	- -	- -	- -
Methyl tert-Butyl Ether (MTBE)	47	0.0011 U	- -	- -	- -	- -
n-Butylbenzene	390	0.0011 U	- -	- -	- -	- -
n-Propylbenzene	380	0.0011 U	- -	- -	- -	- -
Naphthalene	3.8	**0.0044 J**	- -	- -	- -	- -
o-Xylene	65	0.0011 U	- -	- -	- -	- -
p-Isopropyltoluene	NA	0.0011 U	- -	- -	- -	- -
sec-Butylbenzene	780	**0.00095 J**	- -	- -	- -	- -
Styrene	600	0.0011 U	- -	- -	- -	- -
tert-Butylbenzene	780	0.0011 U	- -	- -	- -	- -
Tetrachloroethene (PCE)	8.1	0.0011 U	- -	- -	- -	- -
Toluene	490	0.0011 U	- -	- -	- -	- -
trans-1,2-Dichloroethene	160	0.0011 U	- -	- -	- -	- -
trans-1,3-Dichloropropene	1.8	0.0011 U	- -	- -	- -	- -
Trichloroethene (TCE)	0.41	0.0011 U	- -	- -	- -	- -
Trichlorofluoromethane	2300	0.0022 U	- -	- -	- -	- -
Vinyl Acetate	91	0.0056 U	- -	- -	- -	- -
Vinyl Chloride	0.059	0.0022 U	- -	- -	- -	- -

Table 4-1 Summary of Chemicals Detected in Soil

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

	Location	SS113-SB05 (cont.)	SS113-SB06		SS113-SB07	
	Sample ID	16Q2SS113-SB0502-SO-1	16Q2SS113-SB0601-SO-0	16Q2SS113-SB0602-SO-0	16Q2SS113-SB0701-SO-0	16Q2SS113-SB0702-SO-0
	Sample Depth (ft)	5 - 10	0 - 5	5 - 10	0 - 5	5 - 10
	Sample Date	6/7/2016	6/7/2016	6/7/2016	6/6/2016	6/6/2016
Analyte	**Screening Level**					
Methanol VOCs (mg/kg)						
1,1,1,2-Tetrachloroethane	2	- -	- -	- -	- -	- -
1,1,1-Trichloroethane	810	- -	- -	- -	- -	- -
1,1,2,2-Tetrachloroethane	0.6	- -	- -	- -	- -	- -
1,1,2-Trichloroethane	0.15	- -	- -	- -	- -	- -
1,1-Dichloroethane	3.6	- -	- -	- -	- -	- -
1,1-Dichloroethene	23	- -	- -	- -	- -	- -
1,1-Dichloropropene	NA	- -	- -	- -	- -	- -
1,2,3-Trichlorobenzene	6.3	- -	- -	- -	- -	- -
1,2,3-Trichloropropane	0.0051	- -	- -	- -	- -	- -
1,2,4-Trichlorobenzene	5.8	- -	- -	- -	- -	- -
1,2,4-Trimethylbenzene	30	**0.034 J**	**0.22 J**	0.084 U	**14 J**	0.095 UJ
1,2-Dibromo-3-Chloropropane	0.0053	- -	- -	- -	- -	- -
1,2-Dichlorobenzene	180	- -	- -	- -	- -	- -
1,2-Dichloroethane	0.46	- -	- -	- -	- -	- -
1,2-Dichloropropane	1.6	- -	- -	- -	- -	- -
1,3,5-Trimethylbenzene	27	0.12 U	**0.21 J**	0.084 U	**9.1 J**	0.095 UJ
1,3-Dichlorobenzene	6.2	- -	- -	- -	- -	- -
1,3-Dichloropropane	160	- -	- -	- -	- -	- -
1,4-Dichlorobenzene	2.6	- -	- -	- -	- -	- -
2,2-Dichloropropane	NA	- -	- -	- -	- -	- -
2-Butanone (MEK)	2700	0.31 U	0.36 U	0.21 U	0.58 UJ	0.24 UJ
2-Chlorotoluene	160	- -	- -	- -	- -	- -
2-Hexanone	20	0.31 U	0.36 U	0.21 U	0.58 UJ	0.24 UJ
4-Chlorotoluene	160	- -	- -	- -	- -	- -
4-Methyl-2-Pentanone (MIBK)	3300	0.31 U	0.36 U	0.21 U	0.58 UJ	0.24 UJ
Acetone	6100	0.31 U	0.36 U	0.21 U	0.58 UJ	0.24 UJ
Benzene	1.2	0.061 U	0.071 U	0.042 U	**0.12 J**	0.047 UJ
Bromobenzene	29	0.061 U	0.071 U	0.042 U	0.12 UJ	0.047 UJ
Bromochloromethane	15	- -	- -	- -	- -	- -
Bromodichloromethane	0.29	- -	- -	- -	- -	- -
Bromoform	19	0.12 U	0.14 U	0.084 U	0.23 UJ	0.095 UJ
Bromomethane	0.68	0.12 U	0.14 U	0.084 U	0.23 UJ	0.095 UJ
Carbon Disulfide	77	0.061 U	0.071 U	0.042 U	0.12 UJ	0.047 UJ
Carbon Tetrachloride	0.65	- -	- -	- -	- -	- -
Chlorobenzene	28	- -	- -	- -	- -	- -
Chloroethane	1400	- -	- -	- -	- -	- -
Chloroform	0.32	- -	- -	- -	- -	- -
Chloromethane	11	- -	- -	- -	- -	- -
cis-1,2-Dichloroethene	16	- -	- -	- -	- -	- -
cis-1,3-Dichloropropene	1.8	- -	- -	- -	- -	- -
Cyclohexane	650	0.31 U	0.36 U	0.21 U	**5.7 J**	0.24 UJ
Dibromochloromethane	8.3	- -	- -	- -	- -	- -
Dibromomethane	2.4	0.061 U	0.071 U	0.042 U	0.12 UJ	0.047 UJ
Dichlorodifluoromethane	8.7	- -	- -	- -	- -	- -
Ethylbenzene	5.8	0.061 U	0.071 U	0.042 U	**0.59 J**	0.047 UJ
Ethylene Dibromide (EDB)	0.036	0.061 U	0.071 U	0.042 U	0.12 UJ	0.047 UJ
Hexachlorobutadiene	1.2	- -	- -	- -	- -	- -
Isopropylbenzene	190	0.12 U	0.14 U	0.084 U	**0.61 J**	0.095 UJ
m- & p-Xylene	55	0.12 U	0.14 U	0.084 U	**4.7 J**	0.095 UJ
Methyl tert-Butyl Ether (MTBE)	47	0.061 U	0.071 U	0.042 U	0.12 UJ	0.047 UJ
n-Butylbenzene	390	0.061 U	0.071 U	0.042 U	**1.4 J**	0.047 UJ
n-Propylbenzene	380	0.061 U	0.071 U	0.042 U	**0.81 J**	0.047 UJ
Naphthalene	3.8	0.12 U	0.14 U	0.084 U	**8.5 J**	0.095 UJ
o-Xylene	65	0.061 U	0.071 U	0.042 U	**0.097 J**	0.047 UJ
p-Isopropyltoluene	NA	0.061 U	**0.11 J**	0.042 U	**2.8 J**	0.047 UJ
sec-Butylbenzene	780	0.061 U	0.071 U	0.042 U	0.12 UJ	0.047 UJ
Styrene	600	0.061 U	0.071 U	0.042 U	0.12 UJ	0.047 UJ
tert-Butylbenzene	780	0.061 U	0.071 U	0.042 U	**0.49 J**	0.047 UJ
Tetrachloroethene (PCE)	8.1	- -	- -	- -	- -	- -
Toluene	490	0.061 U	**0.044 J**	0.042 U	0.12 UJ	0.047 UJ
Total Xylenes	58	0.061 U	0.071 U	0.042 U	**4.8 J**	0.047 UJ
trans-1,2-Dichloroethene	160	- -	- -	- -	- -	- -
trans-1,3-Dichloropropene	1.8	- -	- -	- -	- -	- -
Trichloroethene (TCE)	0.41	- -	- -	- -	- -	- -
Trichlorofluoromethane	2300	- -	- -	- -	- -	- -
Vinyl Acetate	91	0.31 U	0.36 U	0.21 U	0.58 UJ	0.24 UJ
Vinyl Chloride	0.059	- -	- -	- -	- -	- -
Low-Level EDB (mg/kg)						
Ethylene Dibromide (EDB)	0.036	0.0002 U	- -	- -	- -	- -

Table 4-1 Summary of Chemicals Detected in Soil

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

	Location	SS113-SB08		SS113-SB09	
	Sample ID	16Q2SS113-SB0801-SO-0	16Q2SS113-SB0802-SO-0	16Q2SS113-SB0901-SO-0	16Q2SS113-SB0902-SO-0
	Sample Depth (ft)	0 - 5	5 - 10	0 - 5	5 - 10
	Sample Date	6/6/2016	6/6/2016	6/6/2016	6/6/2016
Analyte	**Screening Level**				
Hydrocarbons (mg/kg)					
GRO	140	**8.5 J**	**70 J**	**3.3 J**	**1.3 J**
DRO	1025	**3400**	**1800**	**28**	**31**
RRO	1000	**130**	**12 J**	**56**	**170**
Metals (mg/kg)					
Aluminum	7700	- -	- -	- -	- -
Antimony	3.1	- -	- -	- -	- -
Arsenic	0.68	- -	- -	- -	- -
Barium	1500	- -	- -	- -	- -
Beryllium	16	- -	- -	- -	- -
Cadmium	7.1	- -	- -	- -	- -
Calcium	NA	- -	- -	- -	- -
Chromium	12000	- -	- -	- -	- -
Cobalt	2.3	- -	- -	- -	- -
Copper	310	- -	- -	- -	- -
Iron	5500	- -	- -	- -	- -
Lead	400	**7.2**	**4.8**	**8.55**	**6.53**
Magnesium	NA	- -	- -	- -	- -
Manganese	180	- -	- -	- -	- -
Nickel	150	- -	- -	- -	- -
Potassium	NA	- -	- -	- -	- -
Selenium	39	- -	- -	- -	- -
Silver	39	- -	- -	- -	- -
Sodium	NA	- -	- -	- -	- -
Thallium	0.078	- -	- -	- -	- -
Vanadium	39	- -	- -	- -	- -
Zinc	2300	- -	- -	- -	- -
Mercury	1.1	- -	- -	- -	- -
PCBs (mg/kg)					
Aroclor 1016	0.41	- -	- -	- -	- -
Aroclor 1221	0.2	- -	- -	- -	- -
Aroclor 1232	0.17	- -	- -	- -	- -
Aroclor 1242	0.23	- -	- -	- -	- -
Aroclor 1248	0.23	- -	- -	- -	- -
Aroclor 1254	0.12	- -	- -	- -	- -
Aroclor 1260	0.24	- -	- -	- -	- -
SVOCs (mg/kg)					
1-Methylnaphthalene	18	**1.4**	**0.045**	**0.038**	**0.026**
2-Methylnaphthalene	24	**0.95**	**0.056**	**0.042**	**0.031**
Acenaphthene	360	**0.43**	0.003 U	0.0031 U	0.0034 U
Acenaphthylene	230	0.003 U	0.003 U	0.0031 U	0.0034 U
Anthracene	1800	0.003 U	0.003 U	**0.0056 J**	**0.0099 J**
Benzo(a)anthracene	1.1	**0.025**	**0.035**	**0.032**	**0.086**
Benzo(a)pyrene	0.11	**0.011 J**	**0.022**	**0.059**	**0.15**
Benzo(b)fluoranthene	1.1	**0.04**	**0.033**	**0.12**	**0.29**
Benzo(g,h,i)perylene	230	**0.0085 J**	**0.0117 J**	**0.088**	**0.19**
Benzo(k)fluoranthene	11	**0.008 J**	**0.0116 J**	**0.031**	**0.09**
Chrysene	110	**0.042**	**0.022**	**0.031**	**0.097**
Dibenz(a,h)anthracene	0.11	0.003 U	0.003 U	**0.0118 J**	**0.027**
Fluoranthene	240	**0.12**	**0.04**	**0.028**	**0.079**
Fluorene	240	0.003 U	0.003 U	0.0031 U	0.0034 U
Indeno(1,2,3-cd)pyrene	1.1	**0.011 J**	**0.01 J**	**0.083**	**0.18**
Naphthalene	3.8	0.003 U	**0.044**	**0.024**	**0.019**
Phenanthrene	230	**0.3**	**0.035**	**0.015**	**0.032**
Pyrene	180	**0.11**	**0.037**	**0.027**	**0.073**

Table 4-1 Summary of Chemicals Detected in Soil

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

	Location	SS113-SB08		SS113-SB09	
	Sample ID	16Q2SS113-SB0801-SO-0	16Q2SS113-SB0802-SO-0	16Q2SS113-SB0901-SO-0	16Q2SS113-SB0902-SO-0
	Sample Depth (ft)	0 - 5	5 - 10	0 - 5	5 - 10
	Sample Date	6/6/2016	6/6/2016	6/6/2016	6/6/2016
Analyte	Screening Level				
Low-Level VOCs (mg/kg)					
1,1,1,2-Tetrachloroethane	2	- -	- -	- -	- -
1,1,1-Trichloroethane	810	- -	- -	- -	- -
1,1,2,2-Tetrachloroethane	0.6	- -	- -	- -	- -
1,1,2-Trichloroethane	0.15	- -	- -	- -	- -
1,1-Dichloroethane	3.6	- -	- -	- -	- -
1,1-Dichloroethene	23	- -	- -	- -	- -
1,1-Dichloropropene	NA	- -	- -	- -	- -
1,2,3-Trichlorobenzene	6.3	- -	- -	- -	- -
1,2,3-Trichloropropane	0.0051	- -	- -	- -	- -
1,2,4-Trichlorobenzene	5.8	- -	- -	- -	- -
1,2,4-Trimethylbenzene	30	- -	- -	- -	- -
1,2-Dibromo-3-Chloropropane	0.0053	- -	- -	- -	- -
1,2-Dichlorobenzene	180	- -	- -	- -	- -
1,2-Dichloroethane	0.46	- -	- -	- -	- -
1,2-Dichloropropane	1.6	- -	- -	- -	- -
1,3,5-Trimethylbenzene	27	- -	- -	- -	- -
1,3-Dichlorobenzene	6.2	- -	- -	- -	- -
1,3-Dichloropropane	160	- -	- -	- -	- -
1,4-Dichlorobenzene	2.6	- -	- -	- -	- -
2,2-Dichloropropane	NA	- -	- -	- -	- -
2-Butanone (MEK)	2700	- -	- -	- -	- -
2-Chlorotoluene	160	- -	- -	- -	- -
2-Hexanone	20	- -	- -	- -	- -
4-Chlorotoluene	160	- -	- -	- -	- -
4-Methyl-2-Pentanone (MIBK)	3300	- -	- -	- -	- -
Acetone	6100	- -	- -	- -	- -
Benzene	1.2	- -	- -	- -	- -
Bromobenzene	29	- -	- -	- -	- -
Bromochloromethane	15	- -	- -	- -	- -
Bromodichloromethane	0.29	- -	- -	- -	- -
Bromoform	19	- -	- -	- -	- -
Bromomethane	0.68	- -	- -	- -	- -
Carbon Disulfide	77	- -	- -	- -	- -
Carbon Tetrachloride	0.65	- -	- -	- -	- -
Chlorobenzene	28	- -	- -	- -	- -
Chloroethane	1400	- -	- -	- -	- -
Chloroform	0.32	- -	- -	- -	- -
Chloromethane	11	- -	- -	- -	- -
cis-1,2-Dichloroethene	16	- -	- -	- -	- -
cis-1,3-Dichloropropene	1.8	- -	- -	- -	- -
Cyclohexane	650	- -	- -	- -	- -
Dibromochloromethane	8.3	- -	- -	- -	- -
Dibromomethane	2.4	- -	- -	- -	- -
Dichlorodifluoromethane	8.7	- -	- -	- -	- -
Ethylbenzene	5.8	- -	- -	- -	- -
Ethylene Dibromide (EDB)	0.036	- -	- -	- -	- -
Hexachlorobutadiene	1.2	- -	- -	- -	- -
Isopropylbenzene	190	- -	- -	- -	- -
m- & p-Xylene	55	- -	- -	- -	- -
Methyl tert-Butyl Ether (MTBE)	47	- -	- -	- -	- -
n-Butylbenzene	390	- -	- -	- -	- -
n-Propylbenzene	380	- -	- -	- -	- -
Naphthalene	3.8	- -	- -	- -	- -
o-Xylene	65	- -	- -	- -	- -
p-Isopropyltoluene	NA	- -	- -	- -	- -
sec-Butylbenzene	780	- -	- -	- -	- -
Styrene	600	- -	- -	- -	- -
tert-Butylbenzene	780	- -	- -	- -	- -
Tetrachloroethene (PCE)	8.1	- -	- -	- -	- -
Toluene	490	- -	- -	- -	- -
trans-1,2-Dichloroethene	160	- -	- -	- -	- -
trans-1,3-Dichloropropene	1.8	- -	- -	- -	- -
Trichloroethene (TCE)	0.41	- -	- -	- -	- -
Trichlorofluoromethane	2300	- -	- -	- -	- -
Vinyl Acetate	91	- -	- -	- -	- -
Vinyl Chloride	0.059	- -	- -	- -	- -

Table 4-1 Summary of Chemicals Detected in Soil

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

	Location	SS113-SB08		SS113-SB09	
	Sample ID	16Q2SS113-SB0801-SO-0	16Q2SS113-SB0802-SO-0	16Q2SS113-SB0901-SO-0	16Q2SS113-SB0902-SO-0
	Sample Depth (ft)	0 - 5	5 - 10	0 - 5	5 - 10
	Sample Date	6/6/2016	6/6/2016	6/6/2016	6/6/2016
Analyte	**Screening Level**				
Methanol VOCs (mg/kg)					
1,1,1,2-Tetrachloroethane	2	- -	- -	- -	- -
1,1,1-Trichloroethane	810	- -	- -	- -	- -
1,1,2,2-Tetrachloroethane	0.6	- -	- -	- -	- -
1,1,2-Trichloroethane	0.15	- -	- -	- -	- -
1,1-Dichloroethane	3.6	- -	- -	- -	- -
1,1-Dichloroethene	23	- -	- -	- -	- -
1,1-Dichloropropene	NA	- -	- -	- -	- -
1,2,3-Trichlorobenzene	6.3	- -	- -	- -	- -
1,2,3-Trichloropropane	0.0051	- -	- -	- -	- -
1,2,4-Trichlorobenzene	5.8	- -	- -	- -	- -
1,2,4-Trimethylbenzene	30	0.13 UJ	0.093 UJ	**0.041 J**	**0.043 J**
1,2-Dibromo-3-Chloropropane	0.0053	- -	- -	- -	- -
1,2-Dichlorobenzene	180	- -	- -	- -	- -
1,2-Dichloroethane	0.46	- -	- -	- -	- -
1,2-Dichloropropane	1.6	- -	- -	- -	- -
1,3,5-Trimethylbenzene	27	**0.095 J**	0.093 UJ	0.14 UJ	0.15 UJ
1,3-Dichlorobenzene	6.2	- -	- -	- -	- -
1,3-Dichloropropane	160	- -	- -	- -	- -
1,4-Dichlorobenzene	2.6	- -	- -	- -	- -
2,2-Dichloropropane	NA	- -	- -	- -	- -
2-Butanone (MEK)	2700	0.34 UJ	0.23 UJ	0.34 UJ	0.38 UJ
2-Chlorotoluene	160	- -	- -	- -	- -
2-Hexanone	20	0.34 UJ	0.23 UJ	0.34 UJ	0.38 UJ
4-Chlorotoluene	160	- -	- -	- -	- -
4-Methyl-2-Pentanone (MIBK)	3300	0.34 UJ	0.23 UJ	0.34 UJ	0.38 UJ
Acetone	6100	0.34 UJ	0.23 UJ	0.34 UJ	0.38 UJ
Benzene	1.2	0.067 UJ	0.046 UJ	0.068 UJ	0.076 UJ
Bromobenzene	29	0.067 UJ	0.046 UJ	0.068 UJ	0.076 UJ
Bromochloromethane	15	- -	- -	- -	- -
Bromodichloromethane	0.29	- -	- -	- -	- -
Bromoform	19	0.13 UJ	0.093 UJ	0.14 UJ	0.15 UJ
Bromomethane	0.68	0.13 UJ	0.093 UJ	0.14 UJ	0.15 UJ
Carbon Disulfide	77	0.067 UJ	0.046 UJ	0.068 UJ	0.076 UJ
Carbon Tetrachloride	0.65	- -	- -	- -	- -
Chlorobenzene	28	- -	- -	- -	- -
Chloroethane	1400	- -	- -	- -	- -
Chloroform	0.32	- -	- -	- -	- -
Chloromethane	11	- -	- -	- -	- -
cis-1,2-Dichloroethene	16	- -	- -	- -	- -
cis-1,3-Dichloropropene	1.8	- -	- -	- -	- -
Cyclohexane	650	0.34 UJ	0.23 UJ	0.34 UJ	0.38 UJ
Dibromochloromethane	8.3	- -	- -	- -	- -
Dibromomethane	2.4	0.067 UJ	0.046 UJ	0.068 UJ	0.076 UJ
Dichlorodifluoromethane	8.7	- -	- -	- -	- -
Ethylbenzene	5.8	0.067 UJ	0.046 UJ	0.068 UJ	0.076 UJ
Ethylene Dibromide (EDB)	0.036	0.067 UJ	0.046 UJ	0.068 UJ	0.076 UJ
Hexachlorobutadiene	1.2	- -	- -	- -	- -
Isopropylbenzene	190	0.13 UJ	0.093 UJ	0.14 UJ	0.15 UJ
m- & p-Xylene	55	0.13 UJ	0.093 UJ	0.14 UJ	0.15 UJ
Methyl tert-Butyl Ether (MTBE)	47	0.067 UJ	0.046 UJ	0.068 UJ	0.076 UJ
n-Butylbenzene	390	0.067 UJ	0.046 UJ	0.068 UJ	0.076 UJ
n-Propylbenzene	380	0.067 UJ	0.046 UJ	0.068 UJ	0.076 UJ
Naphthalene	3.8	0.13 UJ	0.093 UJ	0.14 UJ	0.15 UJ
o-Xylene	65	0.067 UJ	0.046 UJ	**0.054 J**	**0.041 J**
p-Isopropyltoluene	NA	**0.061 J**	0.046 UJ	0.068 UJ	0.076 UJ
sec-Butylbenzene	780	0.067 UJ	0.046 UJ	0.068 UJ	0.076 UJ
Styrene	600	0.067 UJ	0.046 UJ	0.068 UJ	0.076 UJ
tert-Butylbenzene	780	0.067 UJ	0.046 UJ	0.068 UJ	0.076 UJ
Tetrachloroethene (PCE)	8.1	- -	- -	- -	- -
Toluene	490	0.067 UJ	0.046 UJ	**0.043 J**	**0.051 J**
Total Xylenes	58	0.067 UJ	0.046 UJ	**0.054 J**	**0.041 J**
trans-1,2-Dichloroethene	160	- -	- -	- -	- -
trans-1,3-Dichloropropene	1.8	- -	- -	- -	- -
Trichloroethene (TCE)	0.41	- -	- -	- -	- -
Trichlorofluoromethane	2300	- -	- -	- -	- -
Vinyl Acetate	91	0.34 UJ	0.23 UJ	0.34 UJ	0.38 UJ
Vinyl Chloride	0.059	- -	- -	- -	- -
Low-Level EDB (mg/kg)					
Ethylene Dibromide (EDB)	0.036	- -	- -	- -	- -

Table 4-1 Summary of Chemicals Detected in Soil

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

	Location	SS113-SB10			
	Sample ID	16Q3SS113-SB1001-SO-0	16Q3SS113-SB1003-SO-0	16Q3SS113-SB1002-SO-0	16Q3SS113-SB1002-SO-1
	Sample Depth (ft)	0 - 5	10 - 15	5 - 10	5 - 10
	Sample Date	9/28/2016	9/28/2016	9/28/2016	9/28/2016
Analyte	**Screening Level**				
Hydrocarbons (mg/kg)					
GRO	140	**0.51 J**	**4.7**	**11 J**	**39 J**
DRO	1025	**230**	**33**	**1100 J**	**440 J**
RRO	1000	**40**	12 U	**88 J**	**41 J**
Metals (mg/kg)					
Aluminum	7700	**8390**	**13500**	**10700**	**12100**
Antimony	3.1	**0.217 J**	**0.231 J**	**0.159 J**	**0.181 J**
Arsenic	0.68	**3.7**	**4.82**	**4.2**	**5.69**
Barium	1500	**53.8**	**57 J**	**59.4**	**80**
Beryllium	16	**0.194 J**	**0.334 J**	**0.223 J**	**0.278 J**
Cadmium	7.1	**0.133 J**	**0.189 J**	**0.137 J**	**0.261 J**
Calcium	NA	**3580**	**5400 J**	**5060**	**6920**
Chromium	12000	**22**	**39.4 J**	**21.4**	**24.9**
Cobalt	2.3	**6.11**	**10.9 J**	**8.74**	**10**
Copper	310	**14.7**	**23.4 J**	**17.7**	**23.8**
Iron	5500	**14400**	**30600**	**21500**	**24700**
Lead	400	**8.69**	**4.87**	**4.78**	**5.61**
Magnesium	NA	**3880**	**8220 J**	**6260**	**6970**
Manganese	180	**320**	**480**	**372**	**496**
Nickel	150	**16.1**	**33.4 J**	**21.8**	**25.5**
Potassium	NA	**422**	**666 J**	**443**	**474**
Selenium	39	**0.116 J**	**0.138 J**	**0.0945 J**	**0.159 J**
Silver	39	0.12 U	0.117 U	0.116 U	0.119 U
Sodium	NA	**112 J**	**165**	**104 J**	**131**
Thallium	0.078	0.12 U	0.117 U	0.116 U	0.119 U
Vanadium	39	**31.8**	**49.2 J**	**41**	**45.5**
Zinc	2300	**30.9**	**54.4**	**42.2**	**48.6**
Mercury	1.1	**0.0308 J**	**0.0468 J**	**0.0269 J**	**0.0241 J**
PCBs (mg/kg)					
Aroclor 1016	0.41	0.021 U	0.02 U	0.02 U	0.021 U
Aroclor 1221	0.2	0.021 U	0.02 U	0.02 U	0.021 U
Aroclor 1232	0.17	0.021 U	0.02 U	0.02 U	0.021 U
Aroclor 1242	0.23	0.021 U	0.02 U	0.02 U	0.021 U
Aroclor 1248	0.23	0.021 U	0.02 U	0.02 U	0.021 U
Aroclor 1254	0.12	0.021 U	0.02 U	0.02 U	0.021 U
Aroclor 1260	0.24	0.021 U	0.02 U	0.02 U	0.021 U
SVOCs (mg/kg)					
1-Methylnaphthalene	18	**0.0032 J**	**0.0063 J**	**0.25 J**	**0.56 J**
2-Methylnaphthalene	24	**0.0045 J**	**0.0073 J**	**0.032 J**	**0.12 J**
Acenaphthene	360	0.0031 U	0.003 U	**0.037 J**	**0.085 J**
Acenaphthylene	230	0.0031 U	0.003 U	**0.033 J**	**0.078 J**
Anthracene	1800	0.0031 U	0.003 U	0.003 U	0.0031 U
Benzo(a)anthracene	1.1	**0.0034 J**	0.0059 U	**0.0036 J**	**0.008 J**
Benzo(a)pyrene	0.11	0.0031 U	0.003 U	**0.002 J**	**0.0058 J**
Benzo(b)fluoranthene	1.1	**0.004 J**	0.003 U	**0.0036 J**	**0.011 J**
Benzo(g,h,i)perylene	230	0.0031 U	0.003 U	0.003 U	**0.0055 J**
Benzo(k)fluoranthene	11	0.0031 U	0.003 U	0.003 U	**0.0024 J**
Chrysene	110	0.0062 U	0.0059 U	0.006 U	**0.006 J**
Dibenz(a,h)anthracene	0.11	0.0031 U	0.003 U	0.003 U	0.0031 U
Fluoranthene	240	**0.0032 J**	0.003 U	**0.0082 J**	**0.024 J**
Fluorene	240	0.0031 U	**0.0035 J**	**0.083 J**	**0.19 J**
Indeno(1,2,3-cd)pyrene	1.1	0.0031 U	0.003 U	0.003 U	**0.0041 J**
Naphthalene	3.8	**0.0044 J**	**0.0076 J**	**0.051 J**	**0.16 J**
Phenanthrene	230	**0.0074 J**	**0.0026 J**	**0.044 J**	**0.12 J**
Pyrene	180	**0.0029 J**	0.003 U	**0.0071 J**	**0.019 J**

Table 4-1 Summary of Chemicals Detected in Soil

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

	Location	SS113-SB10			
	Sample ID	16Q3SS113-SB1001-SO-0	16Q3SS113-SB1003-SO-0	16Q3SS113-SB1002-SO-0	16Q3SS113-SB1002-SO-1
	Sample Depth (ft)	0 - 5	10 - 15	5 - 10	5 - 10
	Sample Date	9/28/2016	9/28/2016	9/28/2016	9/28/2016
Analyte	**Screening Level**				
Low-Level VOCs (mg/kg)					
1,1,1,2-Tetrachloroethane	2	0.0018 U	0.0014 U	0.0014 U	0.0013 U
1,1,1-Trichloroethane	810	0.0018 U	0.0014 U	0.0014 U	0.0013 U
1,1,2,2-Tetrachloroethane	0.6	0.0018 U	0.0014 U	0.0014 U	0.0013 U
1,1,2-Trichloroethane	0.15	0.0018 U	0.0014 U	0.0014 U	0.0013 U
1,1-Dichloroethane	3.6	0.0018 U	0.0014 U	0.0014 U	0.0013 U
1,1-Dichloroethene	23	0.0018 U	0.0014 U	0.0014 U	0.0013 U
1,1-Dichloropropene	NA	0.0018 U	0.0014 U	0.0014 U	0.0013 U
1,2,3-Trichlorobenzene	6.3	0.0035 U	0.0028 U	0.0028 U	0.0027 U
1,2,3-Trichloropropane	0.0051	0.0035 U	0.0028 U	0.0028 U	0.0027 U
1,2,4-Trichlorobenzene	5.8	0.0035 U	0.0028 U	0.0028 U	0.0027 U
1,2,4-Trimethylbenzene	30	0.0035 U	0.0028 U	**0.0057 J**	**0.013 J**
1,2-Dibromo-3-Chloropropane	0.0053	0.0035 U	0.0028 U	0.0028 U	0.0027 U
1,2-Dichlorobenzene	180	0.0018 U	0.0014 U	0.0014 U	0.0013 U
1,2-Dichloroethane	0.46	0.0018 U	0.0014 U	0.0014 U	0.0013 U
1,2-Dichloropropane	1.6	0.0018 U	0.0014 U	0.0014 U	0.0013 U
1,3,5-Trimethylbenzene	27	0.0035 U	0.0028 U	**0.0013 J**	**0.0027 J**
1,3-Dichlorobenzene	6.2	0.0018 U	0.0014 U	0.0014 U	0.0013 U
1,3-Dichloropropane	160	0.0018 U	0.0014 U	0.0014 U	0.0013 U
1,4-Dichlorobenzene	2.6	0.0018 U	0.0014 U	0.0014 U	0.0013 U
2,2-Dichloropropane	NA	0.0035 U	0.0028 U	0.0028 U	0.0027 U
2-Butanone (MEK)	2700	**0.029**	0.007 U	0.0069 U	0.0067 U
2-Chlorotoluene	160	0.0018 U	0.0014 U	0.0014 U	0.0013 U
2-Hexanone	20	0.0088 U	0.007 U	0.0069 U	0.0067 U
4-Chlorotoluene	160	0.0088 U	0.007 U	0.0069 U	0.0067 U
4-Methyl-2-Pentanone (MIBK)	3300	0.0088 U	0.007 U	0.0069 U	0.0067 U
Acetone	6100	**0.064 B**	**0.045 B**	**0.031 B**	**0.048 B**
Benzene	1.2	0.0018 U	**0.0009 J**	0.0014 U	**0.00089 J**
Bromobenzene	29	0.0018 U	0.0014 U	0.0014 U	0.0013 U
Bromochloromethane	15	0.0018 U	0.0014 U	0.0014 U	0.0013 U
Bromodichloromethane	0.29	0.0018 U	0.0014 U	0.0014 U	**0.0012 J**
Bromoform	19	0.0035 U	0.0028 U	0.0028 U	0.0027 U
Bromomethane	0.68	0.0035 U	0.0028 U	0.0028 U	0.0027 U
Carbon Disulfide	77	0.0018 U	**0.0016 J**	**0.0054 J**	**0.01 J**
Carbon Tetrachloride	0.65	0.0018 U	0.0014 U	0.0014 U	0.0013 U
Chlorobenzene	28	0.0018 U	0.0014 U	0.0014 U	0.0013 U
Chloroethane	1400	0.0035 U	0.0028 U	0.0028 U	0.0027 U
Chloroform	0.32	0.0018 U	0.0014 U	0.0014 U	0.0013 U
Chloromethane	11	0.0035 U	0.0028 U	0.0028 U	0.0027 U
cis-1,2-Dichloroethene	16	0.0018 U	0.0014 U	0.0014 U	0.0013 U
cis-1,3-Dichloropropene	1.8	0.0018 U	0.0014 U	0.0014 U	0.0013 U
Cyclohexane	650	0.0088 U	0.007 U	0.0069 U	0.0067 U
Dibromochloromethane	8.3	0.0018 U	0.0014 U	0.0014 U	0.0013 U
Dibromomethane	2.4	0.0018 U	0.0014 U	0.0014 U	0.0013 U
Dichlorodifluoromethane	8.7	0.0035 U	0.0028 U	0.0028 U	0.0027 U
Ethylbenzene	5.8	0.0018 U	0.0014 U	0.0014 U	**0.00071 J**
Ethylene Dibromide (EDB)	0.036	0.0018 U	0.0014 U	0.0014 U	0.0013 U
Hexachlorobutadiene	1.2	0.0035 U	0.0028 U	0.0028 U	0.0027 U
Isopropylbenzene	190	0.0035 U	0.0028 U	0.0028 U	0.0027 U
m- & p-Xylene	55	0.0035 U	0.0028 U	0.0028 U	**0.0017 J**
Methyl tert-Butyl Ether (MTBE)	47	0.0018 U	0.0014 U	0.0014 U	0.0013 U
n-Butylbenzene	390	0.0018 U	0.0014 U	0.0014 U	0.0013 U
n-Propylbenzene	380	0.0018 U	0.0014 U	0.0014 U	**0.001 J**
Naphthalene	3.8	0.0035 U	**0.0023 J**	**0.0064 J**	**0.012 J**
o-Xylene	65	0.0018 U	0.0014 U	0.0014 U	**0.00072 J**
p-Isopropyltoluene	NA	0.0018 U	0.0014 U	**0.0024 J**	**0.0043 J**
sec-Butylbenzene	780	0.0018 U	0.0014 U	0.0014 U	**0.0045 J**
Styrene	600	0.0018 U	0.0014 U	0.0014 U	0.0013 U
tert-Butylbenzene	780	0.0018 U	0.0014 U	0.0014 U	**0.0016 J**
Tetrachloroethene (PCE)	8.1	0.0018 U	0.0014 U	0.0014 U	0.0013 U
Toluene	490	**0.0055 J**	0.0014 U	**0.00081 J**	**0.0012 J**
trans-1,2-Dichloroethene	160	0.0018 U	0.0014 U	0.0014 U	0.0013 U
trans-1,3-Dichloropropene	1.8	0.0018 U	0.0014 U	0.0014 U	0.0013 U
Trichloroethene (TCE)	0.41	0.0018 U	0.0014 U	0.0014 U	0.0013 U
Trichlorofluoromethane	2300	0.0035 U	0.0028 U	0.0028 U	0.0027 U
Vinyl Acetate	91	0.0088 U	0.007 U	0.0069 U	0.0067 U
Vinyl Chloride	0.059	0.0035 U	0.0028 U	0.0028 U	0.0027 U

Table 4-1 Summary of Chemicals Detected in Soil

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

	Location	SS113-SB10			
	Sample ID	16Q3SS113-SB1001-SO-0	16Q3SS113-SB1003-SO-0	16Q3SS113-SB1002-SO-0	16Q3SS113-SB1002-SO-1
	Sample Depth (ft)	0 - 5	10 - 15	5 - 10	5 - 10
	Sample Date	9/28/2016	9/28/2016	9/28/2016	9/28/2016
Analyte	**Screening Level**				
Methanol VOCs (mg/kg)					
1,1,1,2-Tetrachloroethane	2	0.073 U	0.077 U	0.073 U	0.078 U
1,1,1-Trichloroethane	810	0.073 U	0.077 U	0.073 U	0.078 U
1,1,2,2-Tetrachloroethane	0.6	0.073 U	0.077 U	0.073 U	0.078 U
1,1,2-Trichloroethane	0.15	0.073 U	0.077 U	0.073 U	0.078 U
1,1-Dichloroethane	3.6	0.073 U	0.077 U	0.073 U	0.078 U
1,1-Dichloroethene	23	0.073 U	0.077 U	0.073 U	0.078 U
1,1-Dichloropropene	NA	0.073 U	0.077 U	0.073 U	0.078 U
1,2,3-Trichlorobenzene	6.3	0.15 U	0.15 U	0.15 U	0.16 U
1,2,3-Trichloropropane	0.0051	0.15 U	0.15 U	0.15 U	0.16 U
1,2,4-Trichlorobenzene	5.8	0.15 U	0.15 U	0.15 U	0.16 U
1,2,4-Trimethylbenzene	30	0.15 U	**0.05 J**	0.15 U	**0.095 J**
1,2-Dibromo-3-Chloropropane	0.0053	0.15 U	0.15 U	0.15 U	0.16 U
1,2-Dichlorobenzene	180	0.073 U	0.077 U	0.073 U	0.078 U
1,2-Dichloroethane	0.46	0.073 U	0.077 U	0.073 U	0.078 U
1,2-Dichloropropane	1.6	0.073 U	0.077 U	0.073 U	0.078 U
1,3,5-Trimethylbenzene	27	0.15 U	0.15 U	0.15 U	0.16 U
1,3-Dichlorobenzene	6.2	0.073 U	0.077 U	0.073 U	0.078 U
1,3-Dichloropropane	160	0.073 U	0.077 U	0.073 U	0.078 U
1,4-Dichlorobenzene	2.6	0.073 U	0.077 U	0.073 U	0.078 U
2,2-Dichloropropane	NA	0.15 U	0.15 U	0.15 U	0.16 U
2-Butanone (MEK)	2700	0.36 U	0.39 U	0.36 U	0.39 U
2-Chlorotoluene	160	0.073 U	0.077 U	0.073 U	0.078 U
2-Hexanone	20	0.36 U	0.39 U	0.36 U	0.39 U
4-Chlorotoluene	160	0.36 U	0.39 U	0.36 U	0.39 U
4-Methyl-2-Pentanone (MIBK)	3300	0.36 U	0.39 U	0.36 U	0.39 U
Acetone	6100	0.36 U	0.39 U	0.36 U	0.39 U
Benzene	1.2	0.073 U	0.077 U	0.073 U	0.078 U
Bromobenzene	29	0.073 U	0.077 U	0.073 U	0.078 U
Bromochloromethane	15	0.073 U	0.077 U	0.073 U	0.078 U
Bromodichloromethane	0.29	0.073 U	0.077 U	0.073 U	0.078 U
Bromoform	19	0.15 U	0.15 U	0.15 U	0.16 U
Bromomethane	0.68	0.15 U	0.15 U	0.15 U	0.16 U
Carbon Disulfide	77	0.073 U	0.077 U	0.073 U	0.078 U
Carbon Tetrachloride	0.65	0.073 U	0.077 U	0.073 U	0.078 U
Chlorobenzene	28	0.073 U	0.077 U	0.073 U	0.078 U
Chloroethane	1400	0.15 U	0.15 U	0.15 U	0.16 U
Chloroform	0.32	0.073 U	0.077 U	0.073 U	0.078 U
Chloromethane	11	0.15 U	0.15 U	0.15 U	0.16 U
cis-1,2-Dichloroethene	16	0.073 U	0.077 U	0.073 U	0.078 U
cis-1,3-Dichloropropene	1.8	0.073 U	0.077 U	0.073 U	0.078 U
Cyclohexane	650	0.36 U	**0.19 J**	0.36 U	0.39 U
Dibromochloromethane	8.3	0.073 U	0.077 U	0.073 U	0.078 U
Dibromomethane	2.4	0.073 U	0.077 U	0.073 U	0.078 U
Dichlorodifluoromethane	8.7	0.15 U	0.15 U	0.15 U	0.16 U
Ethylbenzene	5.8	0.073 U	**0.06 J**	0.073 U	0.078 U
Ethylene Dibromide (EDB)	0.036	0.073 U	0.077 U	0.073 U	0.078 U
Hexachlorobutadiene	1.2	0.15 U	0.15 U	0.15 U	0.16 U
Isopropylbenzene	190	0.15 U	0.15 U	0.15 U	0.16 U
m- & p-Xylene	55	0.15 U	0.15 U	0.15 U	0.16 U
Methyl tert-Butyl Ether (MTBE)	47	0.073 U	0.077 U	0.073 U	0.078 U
n-Butylbenzene	390	0.073 U	0.077 U	0.073 U	**0.06 J**
n-Propylbenzene	380	0.073 U	0.077 U	0.073 U	0.078 U
Naphthalene	3.8	0.15 U	**0.2 J**	0.15 U	**0.093 J**
o-Xylene	65	0.073 U	0.077 U	0.073 U	0.078 U
p-Isopropyltoluene	NA	0.073 U	0.077 U	0.073 U	0.078 U
sec-Butylbenzene	780	0.073 U	0.077 U	0.073 U	**0.054 J**
Styrene	600	0.073 U	0.077 U	0.073 U	0.078 U
tert-Butylbenzene	780	0.073 U	0.077 U	0.073 U	0.078 U
Tetrachloroethene (PCE)	8.1	0.073 U	0.077 U	0.073 U	0.078 U
Toluene	490	0.073 U	0.077 U	0.073 U	**0.053 J**
Total Xylenes	58	- -	- -	- -	- -
trans-1,2-Dichloroethene	160	0.073 U	0.077 U	0.073 U	0.078 U
trans-1,3-Dichloropropene	1.8	0.073 U	0.077 U	0.073 U	0.078 U
Trichloroethene (TCE)	0.41	0.073 U	0.077 U	0.073 U	0.078 U
Trichlorofluoromethane	2300	0.15 U	0.15 U	0.15 U	0.16 U
Vinyl Acetate	91	0.36 U	0.39 U	0.36 U	0.39 U
Vinyl Chloride	0.059	0.15 U	0.15 U	0.15 U	0.16 U
Low-Level EDB (mg/kg)					
Ethylene Dibromide (EDB)	0.036	0.00035 U	0.00027 U	0.00022 U	0.00021 U

Table 4-1 Summary of Chemicals Detected in Soil

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

Notes:
The screening levels are based on the JBER PSLs established during the November 2016 FAA meeting

"- -" = not analyzed
B = The analyte was detected in the associated method and/or calibration blank.
J = The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample
mg/kg = milligrams per kilogram
NA = screening level not available
R = The sample results are rejected due to serious deficiencies in the ability to analyze the sample and to meet the quality control criteria. The presence or absence of the analyte cannot be verified
U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
UJ = The analyte was below the reported sample quantitation limit. However, the reported value is approximate.

Bold indicates the analyte was detected
Shading indicates the result exceeded screening criteria

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Table 4-2 Summary of Chemicals Detected in Groundwater

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

Analyte	Location / Sample ID / Sample Depth (ft) / Sample Date / Screening Level	SS113-SB01		SS113-SB02	SS113-SB03
	Sample ID	16Q2SS113-SB0102-GW-0	16Q2SS113-SB0102-GW-1	16Q2SS113-SB0202-GW-0	16Q2SS113-SB0302-GW-0
	Sample Depth (ft)	4.75 - 5.25	4.75 - 5.25	4.5 - 5	5.3 - 5.8
	Sample Date	6/7/2016	6/7/2016	6/7/2016	6/8/2016
Hydrocarbons (µg/L)					
GRO	220	50 U	50 U	50 U	**110**
DRO	150	220 U	210 U	**130 J**	**14000**
RRO	110	220 U	210 U	210 U	**170 J**
Metals (µg/L)					
Aluminum	2000	- -	- -	- -	- -
Antimony	0.78	- -	- -	- -	- -
Arsenic	0.052	- -	- -	- -	- -
Barium	380	- -	- -	- -	- -
Beryllium	2.5	- -	- -	- -	- -
Cadmium	0.92	- -	- -	- -	- -
Calcium	NA	- -	- -	- -	- -
Chromium	2200	- -	- -	- -	- -
Cobalt	0.6	- -	- -	- -	- -
Copper	80	- -	- -	- -	- -
Iron	1400	- -	- -	- -	- -
Lead	1.5	**0.147 J**	**0.211 J**	**2.65**	**0.846 J**
Magnesium	NA	- -	- -	- -	- -
Manganese	43	- -	- -	- -	- -
Nickel	39	- -	- -	- -	- -
Potassium	NA	- -	- -	- -	- -
Selenium	10	- -	- -	- -	- -
Silver	9.4	- -	- -	- -	- -
Sodium	NA	- -	- -	- -	- -
Thallium	0.02	- -	- -	- -	- -
Vanadium	8.6	- -	- -	- -	- -
Zinc	600	- -	- -	- -	- -
Mercury	0.063	- -	- -	- -	- -
PCBs (µg/L)					
Aroclor 1016	0.05	- -	- -	- -	- -
Aroclor 1221	0.0047	- -	- -	- -	- -
Aroclor 1232	0.0047	- -	- -	- -	- -
Aroclor 1242	0.0078	- -	- -	- -	- -
Aroclor 1248	0.0078	- -	- -	- -	- -
Aroclor 1254	0.0078	- -	- -	- -	- -
Aroclor 1260	0.0078	- -	- -	- -	- -
PAHs (µg/L)					
1-Methylnaphthalene	1.1	0.11 U	**0.061 J**	0.11 UJ	0.1 UJ
2-Methylnaphthalene	3.6	0.11 U	0.12 U	0.11 UJ	0.1 UJ
Acenaphthene	53	0.11 U	0.12 U	0.11 UJ	**0.46 J**
Acenaphthylene	26	0.11 U	0.12 U	0.11 UJ	0.1 UJ
Anthracene	4.3	0.11 U	0.12 U	0.11 UJ	0.1 UJ
Benzo(a)anthracene	0.012	0.22 U	0.24 U	0.22 UJ	**0.1 J**
Benzo(a)pyrene	0.0034	0.11 U	0.12 U	0.11 UJ	**0.067 J**
Benzo(b)fluoranthene	0.034	0.11 U	0.12 U	0.11 UJ	**0.13 J**
Benzo(g,h,i)perylene	0.026	0.11 U	0.12 U	0.11 UJ	0.1 UJ
Benzo(k)fluoranthene	0.08	0.11 U	0.12 U	0.11 UJ	0.1 UJ
Chrysene	0.2	0.22 U	0.24 U	0.22 UJ	**0.1 J**
Dibenz(a,h)anthracene	0.0034	0.11 U	0.12 U	0.11 UJ	0.1 UJ
Fluoranthene	26	0.11 U	0.12 U	0.11 UJ	**0.36 J**
Fluorene	29	0.11 U	0.12 U	0.11 UJ	0.1 UJ
Indeno(1,2,3-cd)pyrene	0.0019	0.11 U	0.12 U	0.11 UJ	0.1 UJ
Naphthalene	0.17	0.11 U	**0.088 J**	0.11 UJ	0.1 UJ
Phenanthrene	17	0.11 U	0.12 U	0.11 UJ	0.1 UJ
Pyrene	12	0.11 U	0.12 U	0.11 UJ	**0.4 J**

Table 4-2 Summary of Chemicals Detected in Groundwater

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

Analyte	Location	SS113-SB01		SS113-SB02	SS113-SB03
	Sample ID	16Q2SS113-SB0102-GW-0	16Q2SS113-SB0102-GW-1	16Q2SS113-SB0202-GW-0	16Q2SS113-SB0302-GW-0
	Sample Depth (ft)	4.75 - 5.25	4.75 - 5.25	4.5 - 5	5.3 - 5.8
	Sample Date	6/7/2016	6/7/2016	6/7/2016	6/8/2016
	Screening Level				
VOCs (µg/L)					
1,1,1,2-Tetrachloroethane	0.57	- -	- -	- -	- -
1,1,1-Trichloroethane	800	- -	- -	- -	- -
1,1,2,2-Tetrachloroethane	0.076	- -	- -	- -	- -
1,1,2-Trichloroethane	0.041	- -	- -	- -	- -
1,1-Dichloroethane	2.8	- -	- -	- -	- -
1,1-Dichloroethene	28	- -	- -	- -	- -
1,1-Dichloropropene	0.47	- -	- -	- -	- -
1,2,3-Trichlorobenzene	0.7	- -	- -	- -	- -
1,2,3-Trichloropropane	0.00075	- -	- -	- -	- -
1,2,4-Trichlorobenzene	0.4	- -	- -	- -	- -
1,2,4-Trimethylbenzene	5.6	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dibromo-3-Chloropropane	0.00033	- -	- -	- -	- -
1,2-Dichlorobenzene	30	- -	- -	- -	- -
1,2-Dichloroethane	0.17	- -	- -	- -	- -
1,2-Dichloropropane	0.82	- -	- -	- -	- -
1,3,5-Trimethylbenzene	6	0.2 U	0.2 U	0.2 U	0.2 U
1,3-Dichlorobenzene	30	- -	- -	- -	- -
1,3-Dichloropropane	37	- -	- -	- -	- -
1,4-Dichlorobenzene	0.48	- -	- -	- -	- -
2,2-Dichloropropane	0.14	- -	- -	- -	- -
2-Butanone (MEK)	560	5 U	5 U	5 U	5 U
2-Chlorotoluene	24	- -	- -	- -	- -
2-Hexanone	3.8	5 U	5 U	5 U	5 U
4-Chlorotoluene	25	- -	- -	- -	- -
4-Methyl-2-Pentanone (MIBK)	630	5 U	5 U	5 U	5 U
Acetone	1400	5 U	5 U	5 U	5 U
Benzene	0.46	0.2 U	0.2 U	0.2 U	0.2 U
Bromobenzene	6.2	0.2 U	0.2 U	0.2 U	0.2 U
Bromochloromethane	8.3	- -	- -	- -	- -
Bromodichloromethane	0.13	- -	- -	- -	- -
Bromoform	3.3	0.3 U	0.3 U	0.3 U	0.3 U
Bromomethane	0.75	0.3 U	0.3 U	0.3 U	0.3 U
Carbon Disulfide	81	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	0.46	- -	- -	- -	- -
Chlorobenzene	7.8	- -	- -	- -	- -
Chloroethane	2100	- -	- -	- -	- -
Chloroform	0.22	- -	- -	- -	- -
Chloromethane	19	- -	- -	- -	- -
cis-1,2-Dichloroethene	3.6	- -	- -	- -	- -
cis-1,3-Dichloropropene	0.47	- -	- -	- -	- -
Cyclohexane	1300	0.5 U	0.5 U	0.5 U	**0.43 J**
Dibromochloromethane	0.87	- -	- -	- -	- -
Dibromomethane	0.83	0.2 U	0.2 U	0.2 U	0.2 U
Dichlorodifluoromethane	20	- -	- -	- -	- -
Ethylbenzene	1.5	0.2 U	0.2 U	0.2 U	0.2 U
Ethylene Dibromide (EDB)	0.0075	0.2 U	0.2 U	0.2 U	0.2 U
Hexachlorobutadiene	0.14	- -	- -	- -	- -
Isopropylbenzene	45	0.2 U	0.2 U	0.2 U	0.2 U
m- & p-Xylene	19	0.4 U	0.4 U	0.4 U	0.4 U
Methyl tert-Butyl Ether (MTBE)	14	0.2 U	0.2 U	0.2 U	0.2 U
n-Butylbenzene	100	0.2 U	0.2 U	0.2 U	0.2 U
n-Propylbenzene	66	0.2 U	0.2 U	0.2 U	0.2 U
Naphthalene	0.17	1 U	1 U	1 U	1 U
o-Xylene	19	0.2 U	0.2 U	0.2 U	0.2 U
p-Isopropyltoluene	NA	0.2 U	0.2 U	0.2 U	**0.17 J**
sec-Butylbenzene	200	0.2 U	0.2 U	0.2 U	**0.25 J**
Styrene	120	0.5 U	0.5 U	0.5 U	0.5 U
tert-Butylbenzene	69	0.2 U	0.2 U	0.2 U	**0.44 J**
Tetrachloroethene (PCE)	4.1	- -	- -	- -	- -
Toluene	110	**0.18 B**	**0.2 B**	**0.25 B**	**0.13 B**
Total Xylenes	19	0.2 U	0.2 U	0.2 U	0.2 U
trans-1,2-Dichloroethene	36	- -	- -	- -	- -
trans-1,3-Dichloropropene	0.47	- -	- -	- -	- -
Trichloroethene (TCE)	0.28	- -	- -	- -	- -
Trichlorofluoromethane	520	- -	- -	- -	- -
Vinyl Acetate	41	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Chloride	0.019	- -	- -	- -	- -
Low-Level EDB (µg/L)					
Ethylene Dibromide (EDB)	0.0075	- -	- -	- -	- -
TAH TAqH (µg/L)					
TAH	NA	- -	- -	**1.25 B**	- -
TAqH	NA	- -	- -	**3.45 B**	- -

Table 4-2 Summary of Chemicals Detected in Groundwater

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

Analyte	Location / Sample ID / Sample Depth (ft) / Sample Date / Screening Level	SS113-SB04	SS113-SB05	SS113-SB06	SS113-SB07
	Sample ID	16Q2SS113-SB0402-GW-0	16Q2SS113-SB0502-GW-0	16Q2SS113-SB0602-GW-0	16Q2SS113-SB0702-GW-0
	Sample Depth (ft)	4.5 - 5	4.5 - 5	4.5 - 5	6 - 6.5
	Sample Date	6/8/2016	6/7/2016	6/8/2016	6/6/2016
Hydrocarbons (µg/L)					
GRO	220	**30 J**	**240**	**66 J**	**64 J**
DRO	150	**360 J**	**7100**	**1100**	**8200**
RRO	110	190 U	200 U	210 U	220 U
Metals (µg/L)					
Aluminum	2000	- -	**3160**	- -	- -
Antimony	0.78	- -	**0.528 J**	- -	- -
Arsenic	0.052	- -	**5.05**	- -	- -
Barium	380	- -	**55.8**	- -	- -
Beryllium	2.5	- -	**0.0839 J**	- -	- -
Cadmium	0.92	- -	0.2 U	- -	- -
Calcium	NA	- -	**123000**	- -	- -
Chromium	2200	- -	**9.48**	- -	- -
Cobalt	0.6	- -	**2.61**	- -	- -
Copper	80	- -	**9.82**	- -	- -
Iron	1400	- -	**8040**	- -	- -
Lead	1.5	**6.39**	**1.95**	**0.0768 J**	**0.242 J**
Magnesium	NA	- -	**18300**	- -	- -
Manganese	43	- -	**3350**	- -	- -
Nickel	39	- -	**8.9**	- -	- -
Potassium	NA	- -	**1750**	- -	- -
Selenium	10	- -	0.3 U	- -	- -
Silver	9.4	- -	0.2 U	- -	- -
Sodium	NA	- -	**8600**	- -	- -
Thallium	0.02	- -	0.2 U	- -	- -
Vanadium	8.6	- -	**12.5**	- -	- -
Zinc	600	- -	**83.7**	- -	- -
Mercury	0.063	- -	0.1 U	- -	- -
PCBs (µg/L)					
Aroclor 1016	0.05	- -	0.47 U	- -	- -
Aroclor 1221	0.0047	- -	0.47 U	- -	- -
Aroclor 1232	0.0047	- -	0.47 U	- -	- -
Aroclor 1242	0.0078	- -	0.47 U	- -	- -
Aroclor 1248	0.0078	- -	0.47 U	- -	- -
Aroclor 1254	0.0078	- -	0.47 U	- -	- -
Aroclor 1260	0.0078	- -	0.47 U	- -	- -
PAHs (µg/L)					
1-Methylnaphthalene	1.1	0.12 U	**0.24 J**	**1.9**	**2 J**
2-Methylnaphthalene	3.6	0.12 U	**0.11 J**	**2**	**0.95 J**
Acenaphthene	53	**0.25 J**	**0.26 J**	**0.51 J**	**2 J**
Acenaphthylene	26	0.12 U	0.12 UJ	0.12 U	0.11 U
Anthracene	4.3	0.12 U	0.12 UJ	0.12 U	0.11 U
Benzo(a)anthracene	0.012	0.23 U	0.24 UJ	0.23 U	**1.1 J**
Benzo(a)pyrene	0.0034	0.12 U	0.12 UJ	0.12 U	**0.9 J**
Benzo(b)fluoranthene	0.034	0.12 U	0.12 UJ	0.12 U	**1.3 J**
Benzo(g,h,i)perylene	0.026	0.12 U	0.12 UJ	0.12 U	**0.48 J**
Benzo(k)fluoranthene	0.08	0.12 U	0.12 UJ	0.12 U	**0.58 J**
Chrysene	0.2	0.23 U	0.24 UJ	0.23 U	**0.89 J**
Dibenz(a,h)anthracene	0.0034	0.12 U	0.12 UJ	0.12 U	**0.12 J**
Fluoranthene	26	0.12 U	0.12 UJ	**0.083 J**	**2.5 J**
Fluorene	29	0.12 U	**0.092 J**	**0.2 J**	**0.91 J**
Indeno(1,2,3-cd)pyrene	0.0019	0.12 U	0.12 UJ	0.12 U	**0.46 J**
Naphthalene	0.17	**0.3 J**	**0.2 J**	**0.75**	**1.8 J**
Phenanthrene	17	0.12 U	**0.084 J**	**0.12 J**	**1.5 J**
Pyrene	12	0.12 U	0.12 UJ	**0.065 J**	**2 J**

Table 4-2 Summary of Chemicals Detected in Groundwater

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

Analyte	Location / Screening Level	SS113-SB04	SS113-SB05	SS113-SB06	SS113-SB07
	Sample ID	16Q2SS113-SB0402-GW-0	16Q2SS113-SB0502-GW-0	16Q2SS113-SB0602-GW-0	16Q2SS113-SB0702-GW-0
	Sample Depth (ft)	4.5 - 5	4.5 - 5	4.5 - 5	6 - 6.5
	Sample Date	6/8/2016	6/7/2016	6/8/2016	6/6/2016
VOCs (µg/L)					
1,1,1,2-Tetrachloroethane	0.57	- -	0.2 U	- -	- -
1,1,1-Trichloroethane	800	- -	0.2 U	- -	- -
1,1,2,2-Tetrachloroethane	0.076	- -	0.2 U	- -	- -
1,1,2-Trichloroethane	0.041	- -	0.2 U	- -	- -
1,1-Dichloroethane	2.8	- -	0.2 U	- -	- -
1,1-Dichloroethene	28	- -	0.2 U	- -	- -
1,1-Dichloropropene	0.47	- -	0.2 U	- -	- -
1,2,3-Trichlorobenzene	0.7	- -	0.3 U	- -	- -
1,2,3-Trichloropropane	0.00075	- -	0.5 U	- -	- -
1,2,4-Trichlorobenzene	0.4	- -	0.3 U	- -	- -
1,2,4-Trimethylbenzene	5.6	0.2 U	**0.32 J**	**1.2**	0.2 U
1,2-Dibromo-3-Chloropropane	0.00033	- -	0.5 U	- -	- -
1,2-Dichlorobenzene	30	- -	0.2 U	- -	- -
1,2-Dichloroethane	0.17	- -	0.2 U	- -	- -
1,2-Dichloropropane	0.82	- -	0.2 U	- -	- -
1,3,5-Trimethylbenzene	6	0.2 U	0.2 U	**0.91 J**	0.2 U
1,3-Dichlorobenzene	30	- -	0.2 U	- -	- -
1,3-Dichloropropane	37	- -	0.2 U	- -	- -
1,4-Dichlorobenzene	0.48	- -	0.2 U	- -	- -
2,2-Dichloropropane	0.14	- -	0.2 U	- -	- -
2-Butanone (MEK)	560	5 U	5 U	5 U	5 U
2-Chlorotoluene	24	- -	0.2 U	- -	- -
2-Hexanone	3.8	5 U	5 U	5 U	5 U
4-Chlorotoluene	25	- -	0.2 U	- -	- -
4-Methyl-2-Pentanone (MIBK)	630	5 U	5 U	5 U	5 U
Acetone	1400	5 U	5 U	5 U	5 U
Benzene	0.46	**0.15 J**	**0.21 J**	0.2 U	0.2 U
Bromobenzene	6.2	0.2 U	0.2 U	0.2 U	0.2 U
Bromochloromethane	8.3	- -	0.2 U	- -	- -
Bromodichloromethane	0.13	- -	0.2 U	- -	- -
Bromoform	3.3	0.3 U	0.3 U	0.3 U	0.3 U
Bromomethane	0.75	0.3 U	0.3 U	0.3 U	0.3 U
Carbon Disulfide	81	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	0.46	- -	0.2 U	- -	- -
Chlorobenzene	7.8	- -	0.2 U	- -	- -
Chloroethane	2100	- -	0.3 U	- -	- -
Chloroform	0.22	- -	0.2 U	- -	- -
Chloromethane	19	- -	0.3 U	- -	- -
cis-1,2-Dichloroethene	3.6	- -	0.2 U	- -	- -
cis-1,3-Dichloropropene	0.47	- -	0.2 U	- -	- -
Cyclohexane	1300	0.5 UJ	**0.51 J**	**0.55 J**	0.5 U
Dibromochloromethane	0.87	- -	0.2 U	- -	- -
Dibromomethane	0.83	0.2 U	0.2 U	0.2 U	0.2 U
Dichlorodifluoromethane	20	- -	0.3 U	- -	- -
Ethylbenzene	1.5	0.2 U	0.2 U	**0.1 J**	0.2 U
Ethylene Dibromide (EDB)	0.0075	0.2 U	0.2 U	0.2 U	0.2 U
Hexachlorobutadiene	0.14	- -	0.3 U	- -	- -
Isopropylbenzene	45	0.2 U	0.2 U	**0.17 J**	0.2 U
m- & p-Xylene	19	0.4 U	**0.26 J**	**0.34 J**	0.4 U
Methyl tert-Butyl Ether (MTBE)	14	0.2 U	0.2 U	0.2 U	0.2 U
n-Butylbenzene	100	0.2 U	0.2 U	0.2 U	0.2 U
n-Propylbenzene	66	0.2 U	0.2 U	**0.14 J**	0.2 U
Naphthalene	0.17	**0.82 J**	**0.92 J**	**2.4**	1 U
o-Xylene	19	0.2 U	0.2 U	**0.13 J**	0.2 U
p-Isopropyltoluene	NA	0.2 U	0.2 U	**0.39 J**	0.2 U
sec-Butylbenzene	200	0.2 U	0.2 U	**0.31 J**	0.2 U
Styrene	120	0.5 U	0.5 U	0.5 U	0.5 U
tert-Butylbenzene	69	**0.18 J**	0.2 U	**0.37 J**	0.2 U
Tetrachloroethene (PCE)	4.1	- -	0.2 U	- -	- -
Toluene	110	**0.19 B**	**0.1 B**	**0.12 B**	0.2 U
Total Xylenes	19	0.2 U	- -	**0.47 J**	0.2 U
trans-1,2-Dichloroethene	36	- -	0.2 U	- -	- -
trans-1,3-Dichloropropene	0.47	- -	0.2 U	- -	- -
Trichloroethene (TCE)	0.28	- -	0.2 U	- -	- -
Trichlorofluoromethane	520	- -	0.3 U	- -	- -
Vinyl Acetate	41	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Chloride	0.019	- -	0.2 U	- -	- -
Low-Level EDB (µg/L)					
Ethylene Dibromide (EDB)	0.0075	- -	0.025 U	- -	- -
TAH TAqH (µg/L)					
TAH	NA	- -	- -	- -	- -
TAqH	NA	- -	- -	- -	- -

Table 4-2 Summary of Chemicals Detected in Groundwater

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

Analyte	Location / Sample ID / Sample Depth (ft) / Sample Date / Screening Level	SS113-SB08	SS113-SB09	SS113-SB10	
	Sample ID	16Q2SS113-SB0802-GW-0	16Q2SS113-SB0902-GW-0	16Q3SS113-SB1001-GW-0	16Q3SS113-SB1001-GW-1
	Sample Depth (ft)	6 - 6.5	4.5 - 5	5 - 8	5 - 8
	Sample Date	6/6/2016	6/6/2016	9/28/2016	9/28/2016
	Screening Level				
Hydrocarbons (µg/L)					
GRO	220	**2400**	50 U	**32 J**	**46 J**
DRO	150	**23000**	210 U	**3100 J**	**15000 J**
RRO	110	**98 J**	210 U	200 U	**220 J**
Metals (µg/L)					
Aluminum	2000	- -	- -	**3290**	**2730**
Antimony	0.78	- -	- -	**0.285 J**	0.5 U
Arsenic	0.052	- -	- -	**3.17**	**2.98**
Barium	380	- -	- -	**224**	**218**
Beryllium	2.5	- -	- -	**0.102 J**	**0.073 J**
Cadmium	0.92	- -	- -	0.2 U	0.2 U
Calcium	NA	- -	- -	**109000 J**	**111000**
Chromium	2200	- -	- -	**4.62**	**4.73**
Cobalt	0.6	- -	- -	**1.95**	**1.76**
Copper	80	- -	- -	**7.47 J**	**9.68**
Iron	1400	- -	- -	**10800**	**10400**
Lead	1.5	**8.32**	**2.85**	**2.84**	**2.87**
Magnesium	NA	- -	- -	**17700**	**18600**
Manganese	43	- -	- -	**2550 J**	**2540**
Nickel	39	- -	- -	**5.69**	**5.79**
Potassium	NA	- -	- -	**1760**	**1910**
Selenium	10	- -	- -	0.3 U	0.3 U
Silver	9.4	- -	- -	0.2 U	0.2 U
Sodium	NA	- -	- -	**8630**	**9040**
Thallium	0.02	- -	- -	0.2 U	0.2 U
Vanadium	8.6	- -	- -	**10.8**	**9.17**
Zinc	600	- -	- -	**24.3 J**	**48.6 J**
Mercury	0.063	- -	- -	0.1 U	0.1 U
PCBs (µg/L)					
Aroclor 1016	0.05	- -	- -	0.49 U	0.49 U
Aroclor 1221	0.0047	- -	- -	0.49 U	0.49 U
Aroclor 1232	0.0047	- -	- -	0.49 U	0.49 U
Aroclor 1242	0.0078	- -	- -	0.49 U	0.49 U
Aroclor 1248	0.0078	- -	- -	0.49 U	0.49 U
Aroclor 1254	0.0078	- -	- -	0.49 U	0.49 U
Aroclor 1260	0.0078	- -	- -	0.49 U	0.49 U
PAHs (µg/L)					
1-Methylnaphthalene	1.1	**0.1 J**	0.11 UJ	**2.2 J**	**4.2 J**
2-Methylnaphthalene	3.6	0.12 UJ	0.11 UJ	**0.79 J**	**1.4 J**
Acenaphthene	53	**0.19 J**	0.11 UJ	**0.12 J**	**0.27 J**
Acenaphthylene	26	0.12 UJ	0.11 UJ	0.12 U	**0.2 J**
Anthracene	4.3	0.12 UJ	0.11 UJ	0.12 U	0.11 U
Benzo(a)anthracene	0.012	**0.23 J**	0.22 UJ	0.24 U	0.22 U
Benzo(a)pyrene	0.0034	0.12 UJ	0.11 UJ	0.12 U	0.11 U
Benzo(b)fluoranthene	0.034	0.12 UJ	0.11 UJ	0.12 U	0.11 U
Benzo(g,h,i)perylene	0.026	0.12 UJ	0.11 UJ	0.12 U	0.11 U
Benzo(k)fluoranthene	0.08	0.12 UJ	0.11 UJ	0.12 U	0.11 U
Chrysene	0.2	**0.23 J**	0.22 UJ	0.24 U	0.22 U
Dibenz(a,h)anthracene	0.0034	0.12 UJ	0.11 UJ	0.12 U	0.11 U
Fluoranthene	26	**0.062 J**	0.11 UJ	0.12 U	0.11 U
Fluorene	29	**0.061 J**	0.11 UJ	**0.17 J**	**0.49 J**
Indeno(1,2,3-cd)pyrene	0.0019	0.12 UJ	0.11 UJ	0.12 U	0.11 U
Naphthalene	0.17	**0.14 J**	0.11 UJ	**0.47 J**	**0.83 J**
Phenanthrene	17	**0.081 J**	0.11 UJ	**0.063 J**	**0.29 J**
Pyrene	12	**0.061 J**	0.11 UJ	0.12 U	0.11 U

Table 4-2 Summary of Chemicals Detected in Groundwater

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

	Location	SS113-SB08	SS113-SB09	SS113-SB10	
	Sample ID	16Q2SS113-SB0802-GW-0	16Q2SS113-SB0902-GW-0	16Q3SS113-SB1001-GW-0	16Q3SS113-SB1001-GW-1
	Sample Depth (ft)	6 - 6.5	4.5 - 5	5 - 8	5 - 8
	Sample Date	6/6/2016	6/6/2016	9/28/2016	9/28/2016
Analyte	Screening Level				
VOCs (µg/L)					
1,1,1,2-Tetrachloroethane	0.57	- -	- -	0.2 U	0.2 U
1,1,1-Trichloroethane	800	- -	- -	0.2 U	0.2 U
1,1,2,2-Tetrachloroethane	0.076	- -	- -	0.2 U	0.2 U
1,1,2-Trichloroethane	0.041	- -	- -	0.2 U	0.2 U
1,1-Dichloroethane	2.8	- -	- -	0.2 U	0.2 U
1,1-Dichloroethene	28	- -	- -	0.2 U	0.2 U
1,1-Dichloropropene	0.47	- -	- -	0.2 U	0.2 U
1,2,3-Trichlorobenzene	0.7	- -	- -	0.3 U	0.3 U
1,2,3-Trichloropropane	0.00075	- -	- -	0.5 U	0.5 U
1,2,4-Trichlorobenzene	0.4	- -	- -	0.3 U	0.3 U
1,2,4-Trimethylbenzene	5.6	**1.9 J**	0.2 U	**2.2**	**2.5**
1,2-Dibromo-3-Chloropropane	0.00033	- -	- -	0.5 U	0.5 U
1,2-Dichlorobenzene	30	- -	- -	0.2 U	0.2 U
1,2-Dichloroethane	0.17	- -	- -	0.2 U	0.2 U
1,2-Dichloropropane	0.82	- -	- -	0.2 U	0.2 U
1,3,5-Trimethylbenzene	6	**0.7 J**	0.2 U	**0.2 J**	**0.2 J**
1,3-Dichlorobenzene	30	- -	- -	0.2 U	0.2 U
1,3-Dichloropropane	37	- -	- -	0.2 U	0.2 U
1,4-Dichlorobenzene	0.48	- -	- -	0.2 U	0.2 U
2,2-Dichloropropane	0.14	- -	- -	0.2 U	0.2 U
2-Butanone (MEK)	560	5 U	5 U	5 U	5 U
2-Chlorotoluene	24	- -	- -	0.2 U	0.2 U
2-Hexanone	3.8	5 U	5 U	**6.6 J**	**11 J**
4-Chlorotoluene	25	- -	- -	0.2 U	0.2 U
4-Methyl-2-Pentanone (MIBK)	630	5 U	5 U	5 U	5 U
Acetone	1400	5 U	5 U	5 U	5 U
Benzene	0.46	**0.11 J**	0.2 U	0.2 U	0.2 U
Bromobenzene	6.2	0.2 U	0.2 U	0.2 U	0.2 U
Bromochloromethane	8.3	- -	- -	0.2 U	0.2 U
Bromodichloromethane	0.13	- -	- -	0.2 U	0.2 U
Bromoform	3.3	0.3 U	0.3 U	0.3 U	0.3 U
Bromomethane	0.75	0.3 U	0.3 U	0.3 U	0.3 U
Carbon Disulfide	81	**0.9 J**	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	0.46	- -	- -	0.2 U	0.2 U
Chlorobenzene	7.8	- -	- -	0.2 U	0.2 U
Chloroethane	2100	- -	- -	0.3 U	0.3 U
Chloroform	0.22	- -	- -	0.2 U	0.2 U
Chloromethane	19	- -	- -	0.3 U	0.3 U
cis-1,2-Dichloroethene	3.6	- -	- -	0.2 U	0.2 U
cis-1,3-Dichloropropene	0.47	- -	- -	0.2 U	0.2 U
Cyclohexane	1300	**2.6 J**	0.5 U	0.5 U	0.5 U
Dibromochloromethane	0.87	- -	- -	0.2 U	0.2 U
Dibromomethane	0.83	0.2 U	0.2 U	0.2 U	0.2 U
Dichlorodifluoromethane	20	- -	- -	0.3 U	0.3 U
Ethylbenzene	1.5	0.2 U	0.2 U	0.2 U	0.2 U
Ethylene Dibromide (EDB)	0.0075	0.2 U	0.2 U	0.2 U	0.2 U
Hexachlorobutadiene	0.14	- -	- -	0.3 U	0.3 U
Isopropylbenzene	45	**0.42 J**	0.2 U	**0.18 J**	**0.21 J**
m- & p-Xylene	19	**1.2 J**	0.4 U	0.4 U	0.4 U
Methyl tert-Butyl Ether (MTBE)	14	0.2 U	0.2 U	0.2 U	0.2 U
n-Butylbenzene	100	0.2 U	0.2 U	**1.3 J**	**1.9 J**
n-Propylbenzene	66	0.2 U	0.2 U	**0.23 J**	**0.31 J**
Naphthalene	0.17	1 U	1 U	1 UJ	**5.8 J**
o-Xylene	19	0.2 U	0.2 U	**0.11 J**	**0.1 J**
p-Isopropyltoluene	NA	**0.41 J**	0.2 U	**0.92 J**	**1.1**
sec-Butylbenzene	200	0.2 U	0.2 U	**0.7 J**	**0.86 J**
Styrene	120	0.5 U	0.5 U	0.5 U	0.5 U
tert-Butylbenzene	69	**0.52 J**	0.2 U	**0.34 J**	0.2 U
Tetrachloroethene (PCE)	4.1	- -	- -	0.2 U	0.2 U
Toluene	110	**0.18 B**	0.2 U	**0.11 B**	0.2 U
Total Xylenes	19	**1.2 J**	0.2 U	- -	- -
trans-1,2-Dichloroethene	36	- -	- -	0.2 U	0.2 U
trans-1,3-Dichloropropene	0.47	- -	- -	0.2 U	0.2 U
Trichloroethene (TCE)	0.28	- -	- -	0.2 U	0.2 U
Trichlorofluoromethane	520	- -	- -	0.3 U	0.3 U
Vinyl Acetate	41	0.5 U	0.5 U	0.5 UJ	0.5 UJ
Vinyl Chloride	0.019	- -	- -	0.2 U	0.2 U
Low-Level EDB (µg/L)					
Ethylene Dibromide (EDB)	0.0075	- -	- -	- -	- -
TAH TAqH (µg/L)					
TAH	NA	- -	- -	- -	- -
TAqH	NA	- -	- -	- -	- -

Table 4-2 Summary of Chemicals Detected in Groundwater

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

Notes:
The screening levels are based on the JBER PSLs established during the November 2016 FAA meeting.
The VOC results are considered to be biased low due to sampling via a peristatlic pump
"- -" = not analyzed
µg/L = micrograms per liter
B = The analyte was detected in the associated method and/or calibration blank.
J = The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample
NA = screening level not available
U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
UJ = The analyte was below the reported sample quantitation limit. However, the reported value is approximate.

Bold indicates the analyte was detected
Shading indicates the result exceeded screening criteria

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Table 4-3 Comparison of Detected Soil Metal Concentrations above Screening Levels to JBER-E Soil Concentrations

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

Analyte	Screening Level (mg/kg)	SS113 Detected Concentration (mg/kg)		Background Data Set					
				JBER-E Background (mg/kg)[a]					
		Minimum	Maximum	Minimum Root Zone (0.5 - 3 ft bgs)	Maximum Root Zone (0.5 - 3 ft bgs)	95%UTL Root Zone Soils	Minimum Deep Soil (>3 ft bgs)	Maximum Deep Soil (>3 ft bgs)	95%UTL Deep Soil
Aluminum	7,700	8,390	17,900	14,850	23,800	31,655	9,830	16,600	18,013
Arsenic	0.68	3.7	**15**	4.70	9.60	11.40	3.50	8.35	9.24
Cobalt	2.3	6.11	13.8	7.20	14.30	20.20	7.20	16.60	17.50
Iron	5500	14,400	36,700	23,450	32,000	38,818	18,500	38,000	38,210
Manganese	NA	320	532	193.50	742.50	970.50	375.00	640.00	705.80
Vanadium	39	31.8	68.8	46.90	76.60	91.30	33.20	59.90	84.80

Notes:

[a] Soil background values from USAF, 1993.

ADEC = Alaska Department of Environmental Conservation
EPA = U.S. Environmental Protection Agency
ft bgs = feet below ground surface
mg/kg = milligram(s) per kilogram
UTL = upper tolerance limit

Bold = above screening level and available background data values

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Table 5-1 Exposure Pathway Evaluation

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

Pathway	Result[a]	Explanation
Soil contact	Pathway potentially complete	Contaminants were detected in soil between 0 and 15 feet bgs at concentrations above project screening levels.
		This pathway is considered potentially complete for current and future commercial/industrial and future residential land use scenarios.
Inhalation – outdoor air	Pathway potentially complete	Volatile contaminants, including DRO, were detected in soil between 0 and 15 feet bgs at concentrations above project screening levels.
		This pathway is considered potentially complete for current and future commercial/industrial and future residential land use scenarios.
Inhalation – indoor air (vapor intrusion)	Pathway potentially complete	This pathway is considered incomplete for a current commercial/ industrial land use scenario because there are no buildings within 30 feet of the site.
		Because buildings could be constructed in the future and VOC concentrations exceed 18 AAC 75 Table C and/or Table B1 levels, this pathway is considered potentially complete for future land use scenarios.
Groundwater ingestion and household exposure	Pathway potentially complete	Although there is no current onsite use of groundwater as a drinking water source, onsite groundwater could be used as a future drinking water source. Because there are drinking water wells located within 0.5 mile from the site, constituents in groundwater could potentially impact offsite wells.
		This pathway is considered potentially complete for current offsite commercial/industrial workers and residents and future onsite commercial/industrial workers and residents.
Surface water ingestion	Pathway incomplete	The nearest surface water body is Ship Creek, which is approximately 200 feet southeast from the site. There are no exposed, eroding soils at the site. Sheet flow typically does not come into contact with subsurface soil contaminants. Petroleum hydrocarbons tend to be biodegraded relatively close to the source area.
Wild foods ingestion	Insignificant exposure	The site is not used for hunting, fishing, or harvesting of wild or farmed foods, and such activities are not anticipated in the future.
Exposure to ecological receptors	Insignificant exposure	Area of petroleum hydrocarbon-contaminated soil is considered insignificant (less than 0.5 acre).

Notes:

[a] Results:

"Pathway incomplete" means contamination has no potential to contact receptors.

"Pathway potentially complete" means contamination has the potential to contact receptors.

"Insignificant exposure" means the pathway is complete. However, receptors are unlikely to be affected by the minimal volume or concentration of remaining contamination.

AAC = Alaska Administrative Code
bgs = below ground surface
DRO = diesel-range organic
VOC = volatile organic compound

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Table 5-2 Risk Evaluation Results for COPCs in Soil

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

oooh	Maximum Detected Concentration (mg/kg)[a]	ADEC Table B2 MAC (mg/kg)	ELCR, Residential Scenario (Att D1)	HQ, Residential Scenario (Att D1)	Method Three Residential Human Health CUL (mg/kg) (Atts D3 and D5)[b]	Method Three Migration to Groundwater CUL (mg/kg) (Atts D4 and D5)	COC	COC Rationale
DRO	60,000	**12,500**	---	---	**10,300**	**250**	**Yes**	Exceeds Table B2 MAC and Method 3 CULs
GRO	660	1,400	---	---	3,600	**300**	**Yes**	Exceeds Method 3 CUL for migration to groundwater
RRO	4,300	22,000	---	---	10,000	11,000	No	
1-Methylnaphthalene	47	---	2.1E-06	8.7E-03	68	**0.62**	**Yes**	Exceeds Method 3 CUL for migration to groundwater
2-Methylnaphthalene	53	---	---	1.7E-01	310	**1.9**	**Yes**	Exceeds Method 3 CUL for migration to groundwater
Benzo(a)anthracene	1.6	---	7.9E-06	---	2	**0.42**	**Yes**	Exceeds Method 3 CUL for migration to groundwater
Benzo(a)pyrene	0.84	---	**4.1E-05**	---	**0.2**	**0.4**	**Yes**	ELCR exceeds ADEC Method 3 human health CUL (and the Method 3 CUL for migration to groundwater).
Benzo(b)fluoranthene	1.6	---	7.9E-06	---	2	4.1	No	
Naphthalene	15	---	5.2E-06	1.5E-01	29	**0.057**	**Yes**	Exceeds Method 3 CUL for migration to groundwater
Cumulative Risk/ Hazard Index:			**6E-05**	3E-01				

Notes:

[a]Maximum detected concentration from soil samples collected in 2016.

[b]CUL for <40 inches precipitation zone.

--- = not applicable
ADEC = Alaska Department of Environmental Conservation
COC = contaminant of concern
COPC = contaminant of potential concern
CUL = cleanup level
DRO = diesel-range organics
ELCR = excess lifetime cancer risk
GRO = gasoline-range organics
HQ = hazard quotient
MAC = maximum allowable concentration
mg/kg = milligram(s) per kilogram

Bold indicates risk criteria (MAC, CUL, ELCR = 1E-05, HQ = 1) is exceeded

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Table 5-3 Risk Evaluation Results for COPCs in Groundwater

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

COPC	Maximum Detected Concentration (µg/L)[a]	ADEC Table C CUL	ELCR, Residential Scenario (Att D2)	HQ, Residential Scenario (Att D2)	COC	COC Rationale
DRO	23,000	**1,500**	---	---	**Yes**	Exceeds Table C CUL
GRO	2,400	**2,200**	---	---	**Yes**	Exceeds Table C CUL
RRO	220	1,100	---	---	No	
1-Methylnaphthalene	2	11	1.8E-06	3.2E-03	No	
Benzo(a)anthracene	1.1	**0.12**	**9.2E-05**	---	**Yes**	Exceeds Table C CUL; Exceeds ELCR of 1E-05.
Benzo(a)pyrene	0.9	**0.034**	**2.6E-04**	---	**Yes**	Exceeds Table C CUL; Exceeds ELCR of 1E-05.
Benzo(b)fluoranthene	1.3	**0.34**	**3.8E-05**	---	**Yes**	Exceeds Table C CUL; Exceeds ELCR of 1E-05.
Benzo(g,h,i)perylene	0.48	**0.26**	---	8.0E-04	**Yes**	Exceeds Table C CUL
Benzo(k)fluoranthene	0.58	0.80	1.7E-06	---	No	
Chrysene	0.89	2	2.6E-07	---	No	
Dibenz(a,h)anthracene	0.12	**0.034**	**3.5E-05**	---	**Yes**	Exceeds Table C CUL; Exceeds ELCR of 1E-05.
Indeno(1,2,3-c,d)pyrene	0.46	**0.19**	**1.3E-05**	---	**Yes**	Exceeds Table C CUL; Exceeds ELCR of 1E-05.
Naphthalene	5.8	**1.7**	**3.5E-05**	9.5E-01	**Yes**	Exceeds Table C CUL; Exceeds ELCR of 1E-05.
2-Hexanone	11	38	---	4.0E-03	No	
Cumulative Risk/Hazard Quotient:			**5E-04**	1E+00		

Notes:

[a]Maximum detected concentration from groundwater samples collected in 2016.

--- = Not applicable
µg/L = microgram(s) per liter
ADEC = Alaska Department of Environmental Conservation
COC = contaminant of concern
COPC = contaminant of potential concern
CUL = cleanup level
DRO = diesel-range organics
ELCR = excess lifetime cancer risk
GRO = gasoline-range organics
HQ = hazard quotient
RRO = residual-range organics

Bold indicates risk criteria (CUL, ELCR = 1E-05, HQ = 1) is exceeded

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Figures

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SITE LOCATION
SS113 - HATCHERY NORTH

Site Characterization Report
Joint Base Elmendorf-Richardson, Alaska

Figure
2-1

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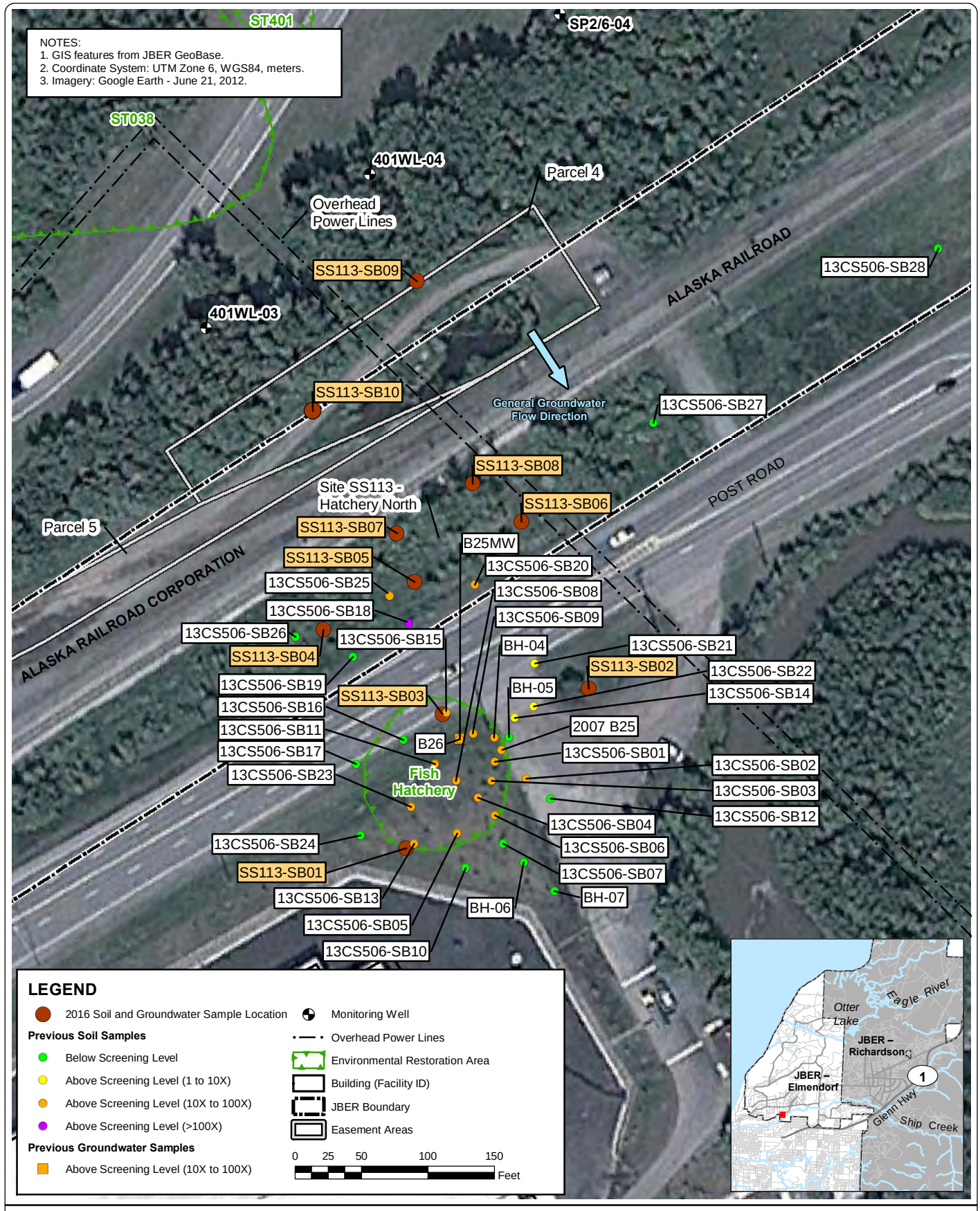

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SAMPLE LOCATIONS IN THE VICINITY OF SITE SS113 - HATCHERY NORTH

Figure

2-2

Site Characterization Report
Joint Base Elmendorf-Richardson, Alaska

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Notes:
1. Features digitized from Not-to-Scale elements.
2. Coordinate System: UTM Zone 6, WGS84, meters.
3. DRO = diesel-range organics
   ft bgs = feet below ground surface
   GRO = gasoline-range organics
   Hwy = Highway
   J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample
   JBER = Joint Base Elmendorf-Richardson
   mg/kg = milligrams per kilogram
   SB = soil boring
   SS = surface spill
4. Soil screening levels (mg/kg; source):
   DRO = 1,025; GRO = 140; 1-methylnaphthalene = 18; 2-methylnaphthalene = 24; benzo(a)anthracene = 1.1; benzo(a)pyrene = 0.11; naphthalene = 3.8 (The screening levels are based on the JBER PSLs established during the November 2016 Federal Facility Agreement).
5. **Bold** results indicate result was above the screening level.

CG506 ST401
SP2/6-04
CG506 ST038
Overhead Power Lines
401WL-04
ALASKA RAILROAD
SS113-SB09 (mg/kg)
5-10 ft bgs Benzo(a)pyrene **0.15**
SS113-SB10 (mg/kg)
5-10 ft bgs DRO **1,100 J**
A
401WL-03
SS113-SB07 (mg/kg)

0-5 ft bgs	DRO	**60,000**
	GRO	**660 J**
	1-Methylnaphthalene	**47 J**
	2-Methylnaphthalene	**53 J**
	Benzo(a)anthracene	**1.6 J**
	Benzo(a)pyrene	**0.84 J**
	Benzo(b)fluoranthene	**1.6 J**
	Dibenz(a,h)anthracene	**0.11 J**
	Naphthalene	**15 J**
5-10 ft bgs	DRO	**1,200**

Parcel 4
General Groundwater Flow Direction
13CS506-SB27
Pease Avenue
CG506 OT092
SS113-SB08 (mg/kg)
0-5 ft bgs DRO **3,400**
5-10 ft bgs DRO **1,800**
SS113-SB06 (mg/kg)
0-5 ft bgs DRO **8,100**
SP2/6-05
Parcel 5
Site SS113 - Hatchery North
13CS506-SB20 (mg/kg)
3.0-3.5 ft bgs DRO **2,900**
7.0-7.5 ft bgs DRO **7,900**
SS113-SB04
13CS506-SB26
SS113-SB05 (mg/kg)
5-10 ft bgs DRO **1,400 J**
13CS506-SB25 (mg/kg)
7.0-7.5 ft bgs DRO **3,800**
SS113-SB02
13CS506-SB19
13CS506-SB18 (mg/kg)
4.5-5.0 ft bgs DRO **110,000**
CG506 Fish Hatchery
2007 B25
SS113-SB03 (mg/kg)
5-10 ft bgs DRO **4,200**
A'
SS113-SB01

LEGEND

2016 Soil Samples
- Below Screening Level
- Above Screening Level (1X to 10X)
- Above Screening Level (10X to 100X)
- Above Screening Level (>100X)

Previous Soil Samples
- Below Screening Level
- Above Screening Level (1X to 10X)
- Above Screening Level (10X to 100X)
- Above Screening Level (>100X)

- Monitoring Well
- Cross-section Line
- Overhead Power Lines
- JBER Boundary
- Approximate Location of Source Area
- Environmental Restoration Area
- Railroad Right-of-Way
- Easement Areas

N W E S

0 50 100 200 Feet

SOIL RESULTS
SS113 - HATCHERY NORTH
Site Characterization Report
Joint Base Elmendorf-Richardson, Alaska

Figure
4-1

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Notes:
1. Features digitized from Not-To-Scale elements.
2. Coordinate System: UTM Zone 6, WGS84, meters.
3. µg/L = micrograms per liter
   DRO = diesel-range organics
   ft bgs = feet below ground surface
   GRO = gasoline-range organics
   Hwy = Highway
   J = the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample
   JBER = Joint Base Elmendorf-Richardson
   PSL = project screening level
   RRO = residual-range organics
   SB = soil boring
4. Groundwater screening levels (µg/L; source): DRO = 150; GRO = 220; RRO = 110; 1-methylnaphthalene = 1.1; naphthalene = 0.17; 2-hexanone = 3.8; benzo(a)anthracene = 0.012; benzo(a)pyrene = 0.0034; benzo(b)fluoranthene = 0.034; dibenz(a,h)anthracene = 0.0034; indeno(1,2,3-cd)pyrene = 0.0019; benzo(g,h,i)perylene = 0.026; benzo(k)fluoranthene = 0.08; chrysene = 0.2 (The screening levels are based on the JBER PSLs established during the November 2016 Federal Facility Agreement).
5. **Bold** result indicates that result is above screening level.

CG506 ST401
CG506 ST038
CG506 OT092
SP2/6-04
Overhead Power Lines
401WL-04 (µg/L)
JUL 03 - *DRO* ***290***
401WL-03 (µg/L)
2012 - *DRO* ***850***
SS113-SB09
ALASKA RAILROAD
Pease Avenue
Parcel 4
Parcel 5
General Groundwater Flow Direction
Site SS113 - Hatchery North
CG506 Fish Hatchery
OU5MW-12
SS113-SB01
SS113-SB02

SS113-SB10 (µg/L)

7 ft bgs	DRO	**15,000 J**
	RRO	**220 J**
	1-Methylnaphthalene	**4.2 J**
	Naphthalene	**5.8 J**
	2-Hexanone	**11 J**

SS113-SB07 (µg/L)

6.5 ft bgs	DRO	**8,200**
	1-Methylnaphthalene	**2 J**
	Benzo(a)anthracene	**1.1 J**
	Benzo(a)pyrene	**0.9 J**
	Benzo(b)fluoranthene	**1.3 J**
	Dibenz(a,h)anthracene	**0.12 J**
	Indeno(1,2,3-cd)pyrene	**0.46 J**
	Benzo(g,h,i)perylene	**0.48 J**
	Benzo(k)fluoranthene	**0.58 J**
	Chrysene	**0.89 J**
	Naphthalene	**1.8 J**

SS113-SB04 (µg/L)

5 ft bgs	DRO	**360 J**
	Naphthalene	**0.82 J**

SS113-SB03 (µg/L)

5.8 ft bgs	DRO	**14,000**
	RRO	**170 J**
	Benzo(a)pyrene	**0.067 J**
	Benzo(b)fluoranthene	**0.13 J**
	Benzo(a)anthracene	**0.1 J**

SS113-SB08 (µg/L)

6.5 ft bgs	DRO	**23,000**
	GRO	**2,400**
	Benzo(a)anthracene	**0.23 J**
	Chrysene	**0.23 J**

SS113-SB06 (µg/L)

5 ft bgs	DRO	**1,100**
	Naphthalene	**2.4**
	1-Methylnaphthalene	**1.9**

SS113-SB05 (µg/L)

5 ft bgs	DRO	**7,100**
	GRO	**240**
	Naphthalene	**0.92 J**

Eagle River
Otter Lake
JBER – Richardson
JBER – Elmendorf
1
Glenn Hwy
Ship Creek

LEGEND

2016 Groundwater Samples
- Below Screening Level
- Above Screening Level (1X to 10X)
- Above Screening Level (10X to 100X)
- Above Screening Level (>100X)
- Monitoring Well
- Overhead Power Lines
- JBER Boundary
- Approximate Location of Source Area
- Environmental Restoration Area
- Railroad Right-of-Way
- Easement Areas

N
W E
S

0 50 100 200
Feet

R:\ENBG\00_Proj\AAirForce\AFCEE_JBER_20001102\MapFiles\SCR\SS113\SS113_Figure 4-2_Phase1_Grab_GW_Results.mxd 5/17/2018 AESPEJO

GROUNDWATER RESULTS SS113 - HATCHERY NORTH

Site Characterization Report
Joint Base Elmendorf-Richardson, Alaska

Figure **4-2**

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NORTH
A

SOUTH
A'

SS113-SB09
SS113-SB10
APPROXIMATE GROUND SURFACE
POND
RAILROAD TRACKS
SS113-SB08
SS113-SB07
SS113-SB06
SS113-SB05
POST ROAD
SS113-SB03
SS113-SB02

28 0.3
230 0.4
210 U
15,000 J
31 0.0
1,100 J 7.4
33 0.0
3,400 0.2
60,000 42.9
8,100 3.3
69 0.0
110 J 0.0
47 0.0
23,000
8,200
1,100
7,100
14,000
130 J
1,800 0.0
1,200 30.5
2,100 0.4
1,400 J 9.0
4,200 57.0
8 J 0.0
6 U 0.0
3.5 J 0.0

Elevation (feet above mean sea level)
110
105
100
95
90

0
100
200
300
400
Distance (feet)

VICINITY MAP
A
A'
SS113-SB09
SS113-SB10
POND
SS113-SB08
SS113-SB07
SS113-SB06
SS113-SB05
SS113-SB03
SS113-SB02
Post Rd.

LEGEND

SS113_SB05 Sample Location
1.3 PID Reading (ppm)
DRO above 250 mg/kg (estimated extent)
Water Level

Sample below screening level
Sample above screening level (1 to 10x)
Sample above screening level (greater than 10x)
Groundwater samples below screening level
Groundwater samples above screening level

Screening level (mg/kg; source): DRO = 1025 2017 ADEC Table B2 Method 2-Under 40 Human Health
Groundwater screening level (µg/L): DRO = 150, 1/10th 2017 ADEC Table C Groundwater Cleanup Levels

DRO = diesel-range organics
J = The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
mg/kg = milligrams per kilogram
U = Not Detected above screening level.

PID = Photoionization Detector
ppm = parts per million

SOIL AND RELATIVE PERMEABILITY

RELATIVE PERMEABILITY

GW, GP, GW-GM, GP-GM, GW-GC, GP-GC, SW, SP, SW-SM, SP-SM, SP-SC
GM, GC, SM, SC
ML, MH, CL, CH, OL

CROSS SECTION A–A' DRO RESULTS
SS113 - HATCHERY NORTH
Site Characterization Report
Joint Base Elmendorf-Richardson, Alaska

Figure
4-3

ES062612224557SAC SS113_Figure_4-3_V2.ai tdaus 01.24.2017

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Appendix A
Field Documentation and Photo Log

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Appendix A-1
Field Logs and Calibration Forms

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WELL PURGE AND SAMPLING FIELD SHEET

Well ID: SS113-SB01

Project: TO383

Date: 6/7/16

Start Time: 1155

Field Team: K. Stevens

End Time: 1410

Sample ID: 16Q2SS113-SB01Ø2-GW-Ø — Time: 1310 — primary dup other: N/A

Sample ID: 16Q2SS113-SB01Ø2-GW-1 — Time: 1320 — primary dup other: N/A

Sample ID: 16Q2SS113-SB01Ø2-GW-ØMS — Time: 1310 — primary dup other: MS/MSD

16Q2SS113-SB01Ø2-GW-ØSD — Filtered? Y/N — 0.45um/1.0um

Depth to Top of Product (FTOC):			NA	Depth to Water (FTOC):	5.93'
Depth to Oil/Water Interface (FTOC):			NA	Total Depth (FTOC):	7.82
Casing diameter:	1 in.	2 in.	4 in.	Water Column (Ft):	1.89
gal/Ft of casing:	0.041	0.163	0.653	Casing Volume (gal)	0.08
Pump Intake Depth			6.Ø	Screen Interval	4.5 to 6.5 ft bgs
Stable DTW (FTOC):			NA	Measured Stickup	Ø.55

Method of Purging (circle one)

Pump: SUB BLDR PERIST OTHER:	Bailer: TEFLON SS OTHER:
Pump Type: Flow Rate (gpm):	Required Pulls: Bailer Vol. (gals): 0.25/ 0.33
Pump Time: 1200 Vol. Purged (gals): 4.Ø	Vol Purged (gals):

Criteria for Stable Parameters

Parameter	*Working Range*	*Stability Criteria*	*Depth to Water Stabilization*
Temperature	>0.00 °C	± 3% or min 0.2 °C	Time DTW
pH	0-14	± 0.1	
Conductivity	0-9.99 S/m	± 3%	
Dissolved Oxygen	0-19.99 mg/L	± 10%	
Turbidity	0-800 NTU	± 10% (≥10 NTU)	

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Cond (mS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*
1	1205	—	Ø.5	6.66	866	over	1.21	7.Ø	106.4
2	1210	—	0.75	6.69	857	920	Ø.91	7.Ø	104.8
3	1215	—	1.1	6.71	851	967	1.Ø8	7.Ø	103.7
4	1220	—	1.4	6.71	853	224	Ø.85	6.9	104.1
5	1225	—	1.6	6.70	839	105	1.Ø2	7.Ø	105.5
6	1230	—	1.8	6.70	840	77.3	Ø.88	6.6	106.6
7	1235	—	2.1	6.68	833	51.4	1.15	6.4	108.8
8	1240	—	2.4	6.64	826	25.6	Ø.91	6.4	111.6
9	1245	—	2.6	6.64	818	25.3	1.14	7.Ø	111.5

Notes: Draw-down should ideally be less than 0.3 feet from the original depth to groundwater.
Minimal draw-down achieved and measured by: 1) pumping at a low rate (approximately 1 liter/ 3 minutes or .1 gal/min) and 2) continually measuring water levels in the well.

Sensory Observations

Color: (Clear) Amber, (Tan), Brown, Grey, Milky White, Other:

Odor: (None), (Low), Medium, High, Very Strong, H2S, (Fuel Like), Chemical ?, Unknown

Turbidity: (None), Low, Medium, High, Very Turbid, Heavy Silts

Comments:

MD 6/7/16

ch2m:

WELL PURGE AND SAMPLING FIELD SHEET, cntd.

Well ID: SS13 - SB01

Instrument Observations

Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Cond (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (C)	ORP (mV)
1	1250	—	2.9	6.66	823	17.0	1.12	7.5	109.7
2	1255	—	3.1	6.66	820	12.9	1.10	7.0	110.8
3	1300	—	3.4	6.66	819	26.8	1.12	6.6	112.0
4	1305	—	3.75	6.66	817	24.0	1.10	6.5	112.5
5	1410	5.93'	4.00	POST SAMPLING				—	—
6									
7									
8									
9									

Notes: Draw-down should ideally be less than 0.3 feet from the original depth to groundwater.
Minimal draw-down achieved and measured by: 1) pumping at a low rate (approximately 1 liter/ 3 minutes or .1 gal/min) and 2) continually measuring water levels in the well.

Sample Containers

Quantity	Size	Bottle Type	Laboratory Analysis
12	40ml	VOA	AK101
8	1L	Amber	AK102/AK103
4	250ml	Poly	SW6020A (Lead only)
12	40ml	VOA	SW8260B (Petro only)
8	1L	Amber	SW8270C-SIM (PAH)

Additional Comments: (decon procedures, purge waster disposal, other)

WELL PURGE AND SAMPLING FIELD SHEET

Well ID: SS113-SB02

Project: T0383 Date: 6/7/16

Start Time: 1000

Field Team: K. Stevens End Time: 1105

Sample ID: 16Q2SS113-SB0202-GW-0 Time: 1050 primary dup other: NA

Sample ID: NA Time: NA primary dup other: NA

Sample ID: NA Time: NA primary dup other: NA

Filtered? Y/N 0.45um/1.0um

Depth to Top of Product (FTOC):			NA	Depth to Water (FTOC):	2.57'
Depth to Oil/Water Interface (FTOC):			NA	Total Depth (FTOC):	7.65'
Casing diameter:	1 in.	2 in.	4 in.	Water Column (Ft):	5.08
gal/Ft of casing:	0.041	0.163	0.653	Casing Volume (gal)	0.008
Pump Intake Depth			5.00	Screen Interval	
Stable DTW (FTOC):			NA	Measured Stickup	0.85

Method of Purging (circle one)

Pump: SUB BLDR PERIST OTHER: Bailer: TEFLON SS OTHER:

Pump Type: Geo pump Flow Rate (gpm): 0.06 Required Pulls: Bailer Vol. (gals): 0.25/ 0.33

Pump Time: 1005 Vol. Purged (gals): 3.0 Vol Purged (gals):

Criteria for Stable Parameters

Parameter	*Working Range*	*Stability Criteria*	*Depth to Water Stabilization*
Temperature	>0.00 °C	± 3% or min 0.2 °C	Time DTW
pH	0-14	± 0.1	
Conductivity	0-9.99 S/m	± 3%	
Dissolved Oxygen	0-19.99 mg/L	± 10%	
Turbidity	0-800 NTU	± 10% (≥10 NTU)	

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Cond (mS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*
1	1010	—	0.5	7.01	632.5	over	0.27	7.0	-32.5
2	1015	—	0.8	6.88	623.7	over	0.21	7.2	-45.0
3	1020	—	1.1	6.80	621.2	over	0.18	7.2	-40.2
4	1025	—	1.4	6.82	617.8	996	0.31	7.4	-44.3
5	1030	—	1.7	6.87	617.2	857	0.36	7.3	-50.4
6	1035	—	2.0	6.92	615.1	748	0.16	7.2	-45.6
7	1040	—	2.3	6.90	612.7	465	0.08	7.1	-45.9
8	1045	—	2.6	6.91	612.1	416	0.07	7.0	-48.7
9	1110	2.57	3.0	POST	SAMPLING				

Notes: Draw-down should ideally be less than 0.3 feet from the original depth to groundwater.
Minimal draw-down achieved and measured by: 1) pumping at a low rate (approximately 1 liter/ 3 minutes or .1 gal/min) and 2) continually measuring water levels in the well.

Sensory Observations

Color: Clear, Amber, (Tan), Brown, (Grey), Milky White, Other:

Odor: (None), Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown

Turbidity: None, (Low), Medium, High, Very Turbid, Heavy Silts

Comments: WH - 0.0ppm BZ - 0.0ppm

MB 6/7/16

ch2m

WELL PURGE AND SAMPLING FIELD SHEET, cntd.

Well ID: SS113-SB02

Instrument Observations

Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Cond (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (C)	ORP (mV)
1									
2									
3									
4									
5									
6									
7									
8									
9									

Notes: Draw-down should ideally be less than 0.3 feet from the original depth to groundwater.
Minimal draw-down achieved and measured by: 1) pumping at a low rate (approximately 1 liter/ 3 minutes or .1 gal/min) and 2) continually measuring water levels in the well.

Sample Containers

Quantity	Size	Bottle Type	Laboratory Analysis
3	40ml	VOA	AK101
2	1L	Amber	AK102/AK103
1	250ml	Poly	SW6020A
3	40ml	VOA	SW8260B
2	1L	Amber	SW8270C-SIM (PAH & TAH/TAqH)

Additional Comments: (decon procedures, purge waster disposal, other)

ch2m:

WELL PURGE AND SAMPLING FIELD SHEET

Well ID: 55113-SB03S

Project: TO 383

Date: 6-8-16

Start Time: 0925

Field Team: M. LAWSON / K. STEVENS

End Time: 1105

Sample ID: 1392-55113-SB0302-GW-0 Time: 1030 primary dup other: -

Sample ID: - Time: - primary dup other: -

Sample ID: - Time: - primary dup other: -

Filtered? Y/N 0.45um/1.0um

Depth to Top of Product (FTOC):			-	Depth to Water (FTOC):	7.69
Depth to Oil/Water Interface (FTOC):			-	Total Depth (FTOC):	9.09
Casing diameter:	1 in.	2 in.	4 in.	Water Column (Ft):	1.40'
gal/Ft of casing:	0.041	0.163	0.653	Casing Volume (gal)	0.06
Pump Intake Depth			8.69	Screen Interval	4'-8' BGS
Stable DTW (FTOC):			7.59	Measured Stickup	4.10'

Method of Purging (circle one)

Pump: SUB BLDR PERIST OTHER:
Pump Type: Flow Rate (gpm): ~0.07
Pump Time: 0940 Vol. Purged (gals): 3.16

Bailer: TEFLON SS OTHER:
Required Pulls: X Bailer Vol. (gals): 0.25/ 0.33
Vol Purged (gals):

Criteria for Stable Parameters

Parameter	*Working Range*	*Stability Criteria*	*Depth to Water Stabilization*
Temperature	>0.00 °C	± 3% or min 0.2 °C	Time DTW
pH	0-14	± 0.1	
Conductivity	0-9.99 S/m	± 3%	X
Dissolved Oxygen	0-19.99 mg/L	± 10%	
Turbidity	0-800 NTU	± 10% (≥10 NTU)	

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Cond (mS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*
1	0940	-	0.01	7.99	684.5	>1000	0.3	9.1	-82.0
2	0950	-	0.71	6.88	683.4	700	0.6	8.6	-82.0
3	0955	-	1.06	6.83	681.1	390	0.5	8.5	-81.1
4	1000	-	1.41	6.83	679.9	363	0.3	8.6	-80.8
5	1005	-	1.76	6.83	679.0	239	0.2	8.6	-82.2
6	1015	-	2.46	6.84	680.5	380	0.1	8.7	-85.1
7	1020	-	2.81	6.85	680.3	364	0.1	8.5	-88.7
8	1025	-	3.16	6.84	678.6	343	0.1	8.6	-89.5
9	1030	7.59			SAMPLE COLLECTION				

Notes: Draw-down should ideally be less than 0.3 feet from the original depth to groundwater.
Minimal draw-down achieved and measured by: 1) pumping at a low rate (approximately 1 liter/ 3 minutes or .1 gal/min) and 2) continually measuring water levels in the well.

Sensory Observations

Color: Clear, Amber, Tan, Brown, Grey, Milky White, Other:
Odor: None, Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown
Turbidity: None, Low, Medium, High, Very Turbid, Heavy Silts

Comments:

MB 6/8/16

ch2m:

WELL PURGE AND SAMPLING FIELD SHEET, cntd.

Well ID: SS13-SB03

Instrument Observations

Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Cond (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (C)	ORP (mV)
1									
2									
3									
4									
5									
6									
7									
8									
9									

Notes: Draw-down should ideally be less than 0.3 feet from the original depth to groundwater.
Minimal draw-down achieved and measured by: 1) pumping at a low rate (approximately 1 liter/ 3 minutes or .1 gal/min) and 2) continually measuring water levels in the well.

Sample Containers

Quantity	Size	Bottle Type	Laboratory Analysis
3		40mL VOA	AK101 (GRO)
2		1L AMBER	AK102/103 (DRO/RRO)
1		250mL Poly	SW6020A (LEAD ONLY)
3		40mL VOA	SW8260B (PETRO. COMPOUNDS ONLY)
2		1L AMBER	SW8270C-SIM (PAH)

Additional Comments: (decon procedures, purge waster disposal, other)

ch2m:

WELL PURGE AND SAMPLING FIELD SHEET

Well ID: SS113 - SB04

Project: T0383

Date: 6/8/16

Start Time: 920

End Time: 1010

Field Team: K. Stevens

Sample ID: 16Q2SS113-SB0402-GW-0 Time: 0950 primary dup other: NA

Sample ID: NA Time: NA primary dup other: NA

Sample ID: NA Time: NA primary dup other: NA

Filtered? Y/(N) 0.45um/1.0um

Depth to Top of Product (FTOC):			NA	Depth to Water (FTOC):	0.0 (+0.70)
Depth to Oil/Water Interface (FTOC):			NA	Total Depth (FTOC):	7.47
Casing diameter:	(1 in.)	2 in.	4 in.	Water Column (Ft):	8.17
gal/Ft of casing:	(0.041)	0.163	0.653	Casing Volume (gal)	0.005
Pump Intake Depth			6.0	Screen Interval	4-8
Stable DTW (FTOC):			NA	Measured Stickup	0.70'

Method of Purging (circle one)

Pump: SUB BLDR (PERIST) OTHER:

Pump Type: GeoPump II Flow Rate (gpm): 0.08

Pump Time: 922 Vol. Purged (gals): 2.1

Bailer: TEFLON SS OTHER:

Required Pulls: Bailer Vol. (gals): 0.25/ 0.33

Vol Purged (gals):

Criteria for Stable Parameters

Parameter	*Working Range*	*Stability Criteria*	*Depth to Water Stabilization*
Temperature	>0.00 °C	± 3% or min 0.2 °C	Time DTW
pH	0-14	± 0.1	
Conductivity	0-9.99 S/m	± 3%	
Dissolved Oxygen	0-19.99 mg/L	± 10%	
Turbidity	0-800 NTU	± 10% (≥10 NTU)	

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Cond (mS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*
1	0925	—	0.25	6.98	728.0	329	0.46	7.1	-31.1
2	0930	—	0.6	6.77	712.2	138	0.25	7.1	-42.2
3	0935	—	1.0	6.70	709.3	85.9	0.18	7.5	-46.3
4	0940	—	1.25	6.80	709.4	19.7	0.15	7.4	-48.4
5	0945	—	1.5	6.82	705.6	9.67	0.10	7.4	-52.2
6	0950	SAMPLE							
7	1015	0.0	2.1	POST SAMPLING					
8									
9									

Notes: Draw-down should ideally be less than 0.3 feet from the original depth to groundwater.
Minimal draw-down achieved and measured by: 1) pumping at a low rate (approximately 1 liter/ 3 minutes or .1 gal/min) and 2) continually measuring water levels in the well.

Sensory Observations

Color: (Clear), Amber, (Tan), Brown, Grey, Milky White, Other:

Odor: (None), Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown

Turbidity: (None), (Low), Medium, High, Very Turbid, Heavy Silts

Comments: WH - 0.0 ppm BZ - 0.0 ppm
Artesian well GW above ground 0.70 above surface.

MB 6/8/16

ch2m

WELL PURGE AND SAMPLING FIELD SHEET, cntd.

Well ID: SS113-SB04

Instrument Observations

Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Cond (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (C)	ORP (mV)
1									
2									
3									
4									
5									
6									
7									
8									
9									

Notes: Draw-down should ideally be less than 0.3 feet from the original depth to groundwater.
Minimal draw-down achievec and measured by: 1) pumping at a low rate (approximately 1 liter/ 3 minutes or .1 gal/min) and 2) continually measuring water levels in the well.

Sample Containers

Quantity	Size	Bottle Type	Laboratory Analysis
3	40ml	VOA	AK101
2	1L	Amber	AK102/AK103
1	250ml	Poly	SW6020A
3	40ml	VOA	SW8260B Petro only
2	1L	Amber	SW8270C-SIM

Additional Comments: (decon procedures, purge waster disposal, other)

ch2m:

WELL PURGE AND SAMPLING FIELD SHEET

Well ID: SS113-SB05

Project: TO383

Date: 6/7/16

Start Time: 1640

Field Team: K. Stevens

End Time: 1755

Sample ID: 16Q2SS113-SB0502-GW-0 Time: 1735 primary dup other: NA

Sample ID: NA Time: NA primary dup other: NA

Sample ID: NA Time: NA primary dup other: NA

Filtered? Y/N 0.45um/1.0um

Depth to Top of Product (FTOC):			NA	Depth to Water (FTOC):	+0.3' * 0.1 BTOC
Depth to Oil/Water Interface (FTOC):			NA	Total Depth (FTOC):	7.83'
Casing diameter:	1 in.	2 in.	4 in.	Water Column (Ft):	8.13
gal/Ft of casing:	0.041	0.163	0.653	Casing Volume (gal)	0.005
Pump Intake Depth			5.00	Screen Interval	4 to 8 ft bgs
Stable DTW (FTOC):			NA	Measured Stickup	0.40

Method of Purging (circle one)

Pump: SUB BLDR PERIST OTHER:	Bailer: TEFLON SS OTHER:
Pump Type: Flow Rate (gpm):	Required Pulls: Bailer Vol. (gals): 0.25/ 0.33
Pump Time: 1645 Vol. Purged (gals): 3.0	Vol Purged (gals):

Criteria for Stable Parameters

Parameter	*Working Range*	*Stability Criteria*	*Depth to Water Stabilization*
Temperature	>0.00 °C	± 3% or min 0.2 °C	Time DTW
pH	0-14	± 0.1	
Conductivity	0-9.99 S/m	± 3%	
Dissolved Oxygen	0-19.99 mg/L	± 10%	
Turbidity	0-800 NTU	± 10% (≥10 NTU)	

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Cond (mS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*
1	1650	—	0.5	7.09	708.9	over	0.29	8.0	-87.8
2	1655	—	0.75	7.03	707.8	over	0.16	8.1	-88.9
3	1700	—	1.0	7.01	707.0	over	0.11	8.4	-89.0
4	1705	—	1.25	7.01	706.1	985	0.10	8.3	-88.4
5	1710	—	1.5	7.01	705.3	816	0.08	8.4	-88.4
6	1715	—	1.75	7.01	705.1	489	0.05	8.1	-87.2
7	1720	—	2.0	6.99	703.3	278	0.03	8.1	-86.8
8	1725	—	2.3	6.99	703.8	161	0.03	8.0	-85.6
9	1730	—	2.6	7.00	703.0	110	0.04	8.0	-85.7

Notes: Draw-down should ideally be less than 0.3 feet from the original depth to groundwater.
Minimal draw-down achieved and measured by: 1) pumping at a low rate (approximately 1 liter/ 3 minutes or .1 gal/min) and 2) continually measuring water levels in the well.

Sensory Observations

Color:	Clear, Amber, Tan, Brown, Grey, Milky White, Other:
Odor:	None, Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown
Turbidity:	None, Low, Medium, High, Very Turbid, Heavy Silts

Comments: WH - 4.3ppm BZ - 0.0ppm
DTW @ 0.1 BTOC in artesian well gw above ground.

mg 6/7/16

ch2m:

WELL PURGE AND SAMPLING FIELD SHEET, cntd.

Well ID: SS113-SB05

Instrument Observations

Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Cond (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (C)	ORP (mV)
1	1755 +	0.3	3.0	POST	SAMPLING				
2									
3									
4									
5									
6									
7									
8									
9									

Notes: Draw-down should ideally be less than 0.3 feet from the original depth to groundwater.
Minimal draw-down achieved and measured by: 1) pumping at a low rate (approximately 1 liter/ 3 minutes or .1 gal/min) and 2) continually measuring water levels in the well.

Sample Containers

Quantity	Size	Bottle Type	Laboratory Analysis
3	40ml	VOA	AK101
2	1L	Amber	AK102/AK103
1	250ml	Poly	SW6020A / SW7470A (Full list Mercury)
2	1L	Amber	SW8082 (PCB)
3	40ml	VOA	SW8260B (Full Suite)
3	40ml	VOA	SW8260B-SIM (EDB)
2	1L	Amber	SW8270C-SIM (PAH)

Additional Comments: (decon procedures, purge waster disposal, other)

WELL PURGE AND SAMPLING FIELD SHEET

Well ID: SS113-SB06

Project: T0383 Date: 6/8/16

Start Time: 1100

Field Team: K. Stevens End Time: 1200

Sample ID: 16Q2.SS113-SB0602-GW-0 Time: 1140 (primary) dup other: NA

Sample ID: NA Time: NA primary dup other: NA

Sample ID: NA Time: NA primary dup other: NA

Filtered? Y/(N) 0.45um/1.0um

Depth to Top of Product (FTOC):			NA	Depth to Water (FTOC):	4.80'
Depth to Oil/Water Interface (FTOC):			NA	Total Depth (FTOC):	8.11'
Casing diameter:	(1 in.)	2 in.	4 in.	Water Column (Ft):	3.31
gal/Ft of casing:	0.041	0.163	0.653	Casing Volume (gal)	0.012
Pump Intake Depth			6.0	Screen Interval	4-8
Stable DTW (FTOC):			NA	Measured Stickup	3.05

Method of Purging (circle one)

Pump: SUB BLDR (PERIST) OTHER:

Pump Type: Geo Pump II Flow Rate (gpm): 0.06

Pump Time: 1105 Vol. Purged (gals): 2.5

Bailer: TEFLON SS OTHER:

Required Pulls: Bailer Vol. (gals): 0.25/ 0.33

Vol Purged (gals):

Criteria for Stable Parameters

Parameter	*Working Range*	*Stability Criteria*	*Depth to Water Stabilization*
Temperature	>0.00 °C	± 3% or min 0.2 °C	Time DTW
pH	0-14	± 0.1	
Conductivity	0-9.99 S/m	± 3%	
Dissolved Oxygen	0-19.99 mg/L	± 10%	
Turbidity	0-800 NTU	± 10% (≥10 NTU)	

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Cond (mS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*
1	1110	—	0.25	6.95	710.8	103	0.35	6.5	-38.9
2	1115	—	0.5	6.94	695.2	57.6	0.24	6.6	-40.7
3	1120	—	0.8	6.92	694.3	17.6	0.17	6.7	-42.2
4	1125	—	1.1	6.92	690.3	11.0	0.12	7.1	-44.5
5	1130	—	1.4	6.92	693.3	5.7	0.10	7.2	-46.6
6	1135	—	1.7	6.93	693.1	5.31	0.09	7.0	-49.3
7	1205	4.80'	2.5	POST	SAMPLING				
8									
9									

Notes: Draw-down should ideally be less than 0.3 feet from the original depth to groundwater.
Minimal draw-down achieved and measured by: 1) pumping at a low rate (approximately 1 liter/ 3 minutes or .1 gal/min) and 2) continually measuring water levels in the well.

Sensory Observations

Color: (Clear), Amber, (Tan), Brown, Grey, Milky White, Other:

Odor: None, (Low), Medium, High, Very Strong, H2S, (Fuel Like), Chemical ?, Unknown

Turbidity: (None), Low, Medium, High, Very Turbid, Heavy Silts

Comments: PID Error

MB 6/8/16

ch2m:

WELL PURGE AND SAMPLING FIELD SHEET, cntd.

Well ID: SS113-SB06

Instrument Observations

Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Cond (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (C)	ORP (mV)
1									
2									
3									
4									
5									
6									
7									
8									
9									

Notes: Draw-down should ideally be less than 0.3 feet from the original depth to groundwater.
Minimal draw-down achieved and measured by: 1) pumping at a low rate (approximately 1 liter/ 3 minutes or .1 gal/min) and 2) continually measuring water levels in the well.

Sample Containers

Quantity	Size	Bottle Type	Laboratory Analysis
3	40ml	VOA	AK101
2	1L	Amber	AK102/AK103
3	40ml	VOA	SW8260B (Petro only)
1	250ml	Poly	SW8320A
2	1L	Amber	SW8270C-SIM

Additional Comments: (decon procedures, purge waster disposal, other)

ch2m:

WELL PURGE AND SAMPLING FIELD SHEET

Well ID: SS113 - SB07

Project: TO 383

Date: 6/6/16

Start Time: 1105

Field Team: M. LANDON / M. BRUNO

End Time: 1140

Sample ID: 160265113-SB0702-GW-0 Time: 1125 primary dup other: —

Sample ID: — Time: — primary dup other: —

Sample ID: — Time: — primary dup other: —

Filtered? Y/N 0.45um/1.0um

Depth to Top of Product (FTOC):			—	Depth to Water (FTOC):	3.55'
Depth to Oil/Water Interface (FTOC):			—	Total Depth (FTOC):	8.55'
Casing diameter:	1 in.	2 in.	4 in.	Water Column (Ft):	5
gal/Ft of casing:	0.041	0.163	0.653	Casing Volume (gal)	0.205
Pump Intake Depth			7.55	Screen Interval	6-9' BGS
Stable DTW (FTOC):			~~7.55~~	Measured Stickup	3.3'

Method of Purging (circle one)

Pump: SUB BLDR PERIST OTHER:	Bailer: TEFLON SS OTHER:
Pump Type: Flow Rate (gpm): 0.06	Required Pulls: Bailer Vol. (gals): 0.25/ 0.33
Pump Time: Vol. Purged (gals): 1.19	Vol Purged (gals):

Criteria for Stable Parameters

Parameter	*Working Range*	*Stability Criteria*	*Depth to Water Stabilization*
Temperature	>0.00 °C	± 3% or min 0.2 °C	Time DTW
pH	0-14	± 0.1	
Conductivity	0-9.99 S/m	± 3%	
Dissolved Oxygen	0-19.99 mg/L	± 10%	
Turbidity	0-800 NTU	± 10% (≥10 NTU)	

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Cond (mS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*
1	1120	3.45	0.01	7.26	720.9	71000	0.72	8.9	-79.7
2									
3									
4									
5									
6									
7									
8									
9									

Notes: Draw-down should ideally be less than 0.3 feet from the original depth to groundwater.
Minimal draw-down achieved and measured by: 1) pumping at a low rate (approximately 1 liter/ 3 minutes or .1 gal/min) and 2) continually measuring water levels in the well.

Sensory Observations

Color: Clear, Amber, Tan, Brown, Grey, Milky White, Other:

Odor: None, Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown

Turbidity: None, Low, Medium, High, Very Turbid, Heavy Silts

Comments:

No purge sampling due to ARRC flagger time ~~limits~~ constraints

mrz 6/6/16

ch2m:

WELL PURGE AND SAMPLING FIELD SHEET, cntd.

Well ID: SS113-SB07

Instrument Observations

Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Cond (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (C)	ORP (mV)
1									
2									
3									
4									
5									
6									
7									
8									
9									

Notes: Draw-down should ideally be less than 0.3 feet from the original depth to groundwater.
Minimal draw-down achieved and measured by: 1) pumping at a low rate (approximately 1 liter/ 3 minutes or .1 gal/min) and 2) continually measuring water levels in the well.

Sample Containers

Quantity	Size	Bottle Type	Laboratory Analysis
3	40 mL VOA	HCl	AK101
3	40 mL VOA	HCl	SW8260B petro
2	1 L amber	HCl	AK102/103
2	1 L amber	unpres	SW8270C-SIM
1	250 mL poly	HNO3	SW6020A

Additional Comments: (decon procedures, purge waster disposal, other)

WELL PURGE AND SAMPLING FIELD SHEET

Well ID: SS113-SB08

Project: To 383

Date: 6/6/16

Start Time: 1020

Field Team: M. LANDON / M. BRUNO

End Time: 1055

Sample ID: 16G255113-SB0802-GW-0 Time: 1035 primary dup other: —

Sample ID: — Time: — primary dup other: —

Sample ID: — Time: — primary dup other: —

Filtered? Y/N 0.45um/1.0um

Depth to Top of Product (FTOC):			—	Depth to Water (FTOC):	4.42'
Depth to Oil/Water Interface (FTOC):			—	Total Depth (FTOC):	7.22'
Casing diameter:	1 in.	2 in.	4 in.	Water Column (Ft):	2.80'
gal/Ft of casing:	0.041	0.163	0.653	Casing Volume (gal)	0.115
Pump Intake Depth			6.22	Screen Interval	6-9'
Stable DTW (FTOC):			—	Measured Stickup	2.3'

Method of Purging (circle one)

Pump: SUB BLDR PERIST OTHER:	Bailer: TEFLON SS OTHER:
Pump Type: Flow Rate (gpm): ~~0.06~~ 0.06	Required Pulls: Bailer Vol. (gals): 0.25/ 0.33
Pump Time: Vol. Purged (gals): 1.19	Vol Purged (gals):

Criteria for Stable Parameters

Parameter	*Working Range*	*Stability Criteria*	*Depth to Water Stabilization*
Temperature	>0.00 °C	± 3% or min 0.2 °C	Time DTW
pH	0-14	± 0.1	
Conductivity	0-9.99 S/m	± 3%	
Dissolved Oxygen	0-19.99 mg/L	± 10%	
Turbidity	0-800 NTU	± 10% (≥10 NTU)	

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Cond (mS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*
1	1030	4.35	0.01	7.48	766	71000	0.33	7.5	-119.6
2									
3									
4									
5									
6									
7									
8									
9									

Notes: Draw-down should ideally be less than 0.3 feet from the original depth to groundwater.
Minimal draw-down achieved and measured by: 1) pumping at a low rate (approximately 1 liter/ 3 minutes or .1 gal/min) and 2) continually measuring water levels in the well.

Sensory Observations

Color:	Clear, Amber, Tan, Brown, Grey, Milky White, Other:
Odor:	None, Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown
Turbidity:	None, Low, Medium, High, Very Turbid, Heavy Silts

Comments: SHEEN IN PURGE BUCKET PRESENT
No purge sampling due to ARRC flagger time constraints

MB 6/6/16

ch2m:

WELL PURGE AND SAMPLING FIELD SHEET, cntd.

Well ID: SS113-SB003

Instrument Observations

Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Cond (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (C)	ORP (mV)
1									
2									
3									
4									
5									
6									
7									
8									
9									

Notes: Draw-down should ideally be less than 0.3 feet from the original depth to groundwater.
Minimal draw-down achieved and measured by: 1) pumping at a low rate (approximately 1 liter/ 3 minutes or .1 gal/min) and 2) continually measuring water levels in the well.

Sample Containers

Quantity	Size	Bottle Type	Laboratory Analysis
3	40mL	VOA HCl	AK101
3	40mL	VOA HCl	SW8260B petrol
2	1L	amber HCl	AK102/103
2	1L	amber unpres	SW8270C-SIM
1	250mL	poly HNO_3	SW6020A (Pb)

Additional Comments: (decon procedures, purge waster disposal, other)

ch2m:

WELL PURGE AND SAMPLING FIELD SHEET

Well ID: SS113-SB09

Project: TO383

Date: 6/6/16

Start Time: 1345

Field Team: K. Stevens

End Time: 1410

Sample ID: 16Q2SS113-SB0902-GW-0 Time: 1350 primary dup other: NA

Sample ID: NA Time: NA primary dup other: NA

Sample ID: NA Time: NA primary dup other: NA

Filtered? Y/N 0.45um/1.0um

Depth to Top of Product (FTOC):			NA	Depth to Water (FTOC):	2.22
Depth to Oil/Water Interface (FTOC):			NA	Total Depth (FTOC):	7.75
Casing diameter:	1 in.	2 in.	4 in.	Water Column (Ft):	5.65
gal/Ft of casing:	0.041	0.163	0.653	Casing Volume (gal)	0.23
Pump Intake Depth			5.5'	Screen Interval	~~0.85~~ 4.5' - 7.5' bgs
Stable DTW (FTOC):			NA	Measured Stickup	0.85

Method of Purging (circle one)

Pump: SUB BLDR PERIST OTHER:	Bailer: TEFLON SS OTHER:
Pump Type: Flow Rate (gpm):	Required Pulls: Bailer Vol. (gals): 0.25/ 0.33
Pump Time: Vol. Purged (gals): 0.5	Vol Purged (gals):

Criteria for Stable Parameters

Parameter	*Working Range*	*Stability Criteria*	*Depth to Water Stabilization*
Temperature	>0.00 °C	± 3% or min 0.2 °C	Time DTW
pH	0-14	± 0.1	
Conductivity	0-9.99 S/m	± 3%	
Dissolved Oxygen	0-19.99 mg/L	± 10%	
Turbidity	0-800 NTU	± 10% (≥10 NTU)	

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Cond (mS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*
1	1350	2.22	0.25	6.76	6406	198	1.03	8.8	-44
2									
3									
4									
5									
6									
7									
8									
9									

Notes: Draw-down should ideally be less than 0.3 feet from the original depth to groundwater.
Minimal draw-down achieved and measured by: 1) pumping at a low rate (approximately 1 liter/ 3 minutes or .1 gal/min) and 2) continually measuring water levels in the well.

Sensory Observations

Color: Clear, Amber, Tan, Brown, Grey, Milky White, Other:

Odor: ~~None~~, Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown

Turbidity: None, Low, Medium, High, Very Turbid, Heavy Silts

Comments:

No purge sampling due to ARRC flagger time constraints

mrs 6/6/16

ch2m

WELL PURGE AND SAMPLING FIELD SHEET, cntd.

Well ID: SS113--SB09

Instrument Observations

Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Cond (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (C)	ORP (mV)
1									
2									
3									
4									
5									
6									
7									
8									
9									

Notes: Draw-down should ideally be less than 0.3 feet from the original depth to groundwater.
Minimal draw-down achieved and measured by: 1) pumping at a low rate (approximately 1 liter/ 3 minutes or .1 gal/min) and 2) continually measuring water levels in the well.

Sample Containers

Quantity	Size	Bottle Type	Laboratory Analysis
3	40ml	VOA	AK101
2	1L	Amber	AK102/AK103
1	250ml	Poly	SW6020A
3	40ml	VOA	SW8260B
2	1L	Amber	SW8270C-SIM

Additional Comments: (decon procedures, purge waster disposal, other)

WELL PURGE AND SAMPLING FIELD SHEET

Well ID: SS113 - SB10

Project: T0393 Phase II
658348. 02. 04. 05. 13

Date: 9/23/16

Field Team: A Seay / S Stibich / M Bruno

Start Time: 1115

End Time: 1255

Sample ID: 160355113-SB1001-GW-0 Time: 1135 (primary) dup other: NA

Sample ID: 160355113-SB1001-GW-1 Time: 1140 primary (dup) other: NA

Sample ID: 160355113-SB1001-GW-0MS Time: 1135 primary dup other: MS

Sample ID: 160355113-SB1001-GW-0SD Filtered? Y/N 0.45um/1.0um (other) SD
Time: 1135

Depth to Top of Product (FTOC):			N/A	Depth to Water (FTOC):	2.02
Depth to Oil/Water Interface (FTOC):			NA	Total Depth (FTOC):	8.00
Casing diameter:	(1 in.)	2 in.	4 in.	Water Column (Ft):	5.98
gal/Ft of casing:	(0.041)	0.163	0.653	Casing Volume (gal)	0.25
Pump Intake Depth			7 ft bgs	Screen Interval	5-8 ft bgs
Stable DTW (FTOC):			NA	Measured Stickup	0.1

Method of Purging (circle one)

Pump: SUB BLDR (PERIST) OTHER:
Pump Type: GeoPump II Flow Rate (gpm): NA
Pump Time: 1125 Vol. Purged (gals): 2.5

Bailer: TEFLON SS OTHER: (WB)
Required Pulls: Bailer Vol. (gals): 0.25/ 0.33
Vol Purged (gals):

Criteria for Stable Parameters

Parameter	*Working Range*	*Stability Criteria*	*Depth to Water Stabilization*
Temperature	>0.00 °C	± 3% or min 0.2 °C	Time DTW
pH	0-14	± 0.1	1245 2.15
Conductivity	0-9.99 S/m	± 3%	
Dissolved Oxygen	0-19.99 mg/L	± 10%	
Turbidity	0-800 NTU	± 10% (≥10 NTU)	

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Cond (mS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*	
1	1130	WTM	0.8	8.78	0.74	71000	5.46	9.0	104.9	Pre-sample
2	1245 1255 AS	2.15	2.5	7.55	0.71	51	3.20	10.7	75.4	Post-sample
3										
4										
5										
6										
7										
8										
9										

Notes: Draw-down should ideally be less than 0.3 feet from the original depth to groundwater.
Minimal draw-down achieved and measured by: 1) pumping at a low rate (approximately 1 liter/ 3 minutes or .1 gal/min) and 2) continually measuring water levels in the well.

Sensory Observations

Color: (Clear), Amber, Tan, Brown, Grey, Milky White, Other: sheen on water AS
Odor: None, Low, (Medium), High, Very Strong, H2S, (Fuel Like), Chemical ?, Unknown (Stiffus)
Turbidity: None, Low, (Medium), High, Very Turbid, Heavy Silts

Comments: Initial water dark brown & turbid. Purged to allow turbidity to decrease before taking parameter readings

mg 9/23/16

ch2m:

PROJECT NUMBER 658348

MultiRAE CALIBRATION LOG

Project: T0383

MultiRae

Anticipated Location(s): SS113 Date: 6/6/16 0630

Team: M Bruno/M Landon

Make and Model: MultiRAE Serial Number: C103208

Standard	Ambient Air	Reads: 0.0		Calibrated to: 0.0	
Standard	Isobutylene	Reads: 100.0		Calibrated to: 100.0	
ISOBUTYLENE Lot No: IS-5260	Cyl:	Concentration: 100		Exp. 1/7/17	
Standard	Hydrogen Sulfide	Bottle Conc. 10.0	Reads: 10.1	Cal to: 10.0	
Standard	Carbon Monoxide	Bottle Conc. 50	Reads: 51	Cal to: 50	
Standard	LEL	Bottle Conc. 50	Reads: 50	Cal to: 50	
Standard	Oxygen	Bottle Conc. 18.0	Reads: 18.0	Cal to: 18.0	
Standard	VOC	Bottle Conc. 100.0	Reads: 100.6	Cal to: 100.0	

Calibration Gas Lot No: JAP-413-18-27 UN: 1956 Exp. 1/20/17

Calibrator: MB SIGNED: MB

MultiRae

Anticipated Location(s): SS113 Date: 6/7/16 0730

Team: M Bruno, K Stevens, M Landon

Make and Model: MultiRAE Serial Number: C103208

Standard	Ambient Air	Reads: 0.0		Calibrated to: 0.0	
Standard	Isobutylene	Reads: 100.0		Calibrated to: 100.0	
ISOBUTYLENE Lot No: IS-5260	Cyl:	Concentration: 100		Exp. 1/7/17	
Standard	Hydrogen Sulfide	Bottle Conc. 10	Reads: 10.1	Cal to: 10.0	
Standard	Carbon Monoxide	Bottle Conc. 50	Reads: 51	Cal to: 50	
Standard	LEL	Bottle Conc. 50	Reads: 50	Cal to: 50	
Standard	Oxygen	Bottle Conc. 18.0	Reads: 18.0	Cal to: 18.0	
Standard	VOC	Bottle Conc. 100	Reads: 100.4	Cal to: 100.0	

Calibration Gas Lot No: JAP-413-18-27 UN: 1956 Exp. 1/20/17

Calibrator: M Bruno SIGNED: MB

MultiRae

Anticipated Location(s): SS113, CC111 Date: 6/8/16 0630

Team: M Landon, K Stevens

Make and Model: MultiRAE Serial Number: C103208

Standard	Ambient Air	Reads: 0.0		Calibrated to: 0.0	
Standard	Isobutylene	Reads: 100.0		Calibrated to: 100.0	
ISOBUTYLENE Lot No: IS-5260	Cyl:	Concentration: 100		Exp. 1/7/17	
Standard	Hydrogen Sulfide	Bottle Conc. 10.0	Reads: 10.1	Cal to: 10.0	
Standard	Carbon Monoxide	Bottle Conc. 50	Reads: 50	Cal to: 50	
Standard	LEL	Bottle Conc. 50	Reads: 50	Cal to: 50	
Standard	Oxygen	Bottle Conc. 18.0	Reads: 18.0	Cal to: 18.0	
Standard	VOC	Bottle Conc. 100.0	Reads: 100.4	Cal to: 100.0	

Calibration Gas Lot No: JAP-413-18-27 UN: 1956 Exp. 1/20/17

Calibrator: M Bruno SIGNED: MB

SOP-04 Attachment 1: Organic Vapor and Air Monitoring

Field Calibration Sheet

CH2MHILL Project Number: 658348 Page 4 of

Calibration Event	1	2	3	4
Date and Time:	~~6/6/16~~ 6/4/16 0930	~~6/7/16~~ 0630 6/6/16 (MB)	6/7/16 0730	6/8/16 0635
Instrument	(MB)			
Instrument Type:	PID	PID	PID	PID
Instrument Name:	MiniRAE 2000	MiniRAE 2000	MiniRAE 2000	MiniRAE 2000
Serial Number:	C1624Ø9	C1624Ø9	C1624Ø9	C162409
Owner of Instrument:	CH2M	CH2M	CH2M	CH2M
Lamp Type (PID only):	10.6 eV	10.6 eV	10.6 eV	10.6 eV
Type of Regulator:	0.5 LPM	0.5 LPM	0.5 LPM	0.5 LPM
Type of Tubing:	T-tubing	T-tubing	T-tubing	T-tubing
Calibration Gas				
Gas Type:	100 ppm Isobutylene	100 ppm Isobutylene	100 ppm Isobutylene	100 ppm Isobutylene
Canister Lot Number:	15-5260	15-5260	15-5260	15-5260
Canister Expiration Date:	1/7/17	1/7/17	1/7/17	1/7/17
Observations				
Zero Gas Reading:	0.0	0.0	0.0	0.0
Calibration Reading:	101	102	103	102
Ambient Weather Conditions:	~54 °F, overcast, breezy	~50°F, raining, overcast	~50°F, overcast, calm	~48°F, clear, calm
Operators Initials:	MB	MB	MB	MB
Notes/Comments:				

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Appendix A-2
Field Logbooks

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JBER-E T0383 SS113 6/6/16

Personnel: M Bruno/FTL, scribe, qualified sampler — T Bowers/Geotek-driller
M Landon/Tech & qualified sampler — T Beckner/Geotek-helper

Conditions: ~50°F, overcast, raining

Objective: Complete soil sampling, install & sample SP-16 GW points, pull points at points near RR tracks (SS113-SB07, SB08, SB09)

0640 M Bruno arrives onsite & calibrates MultiRAE (see cal form).
~~0700~~ T Bowers arrives onsite.
0705 M Landon arrives onsite. Load equipment in vehicles. Check extinguishers, tires, oil
0730 Move outside Post Rd gate.
0805 T Beckner arrives onsite
0810 T Bowers gets ahold of ARRC flagger - relays he will be onsite in ~15 minutes
0815 H&S kickoff - review HASP, AHAs w/ T. Beckner
0825 Begin setup @ SS113. PPE level D. Geotek has 2 of 3 SP-16 points needed. All other req'd materials are onsite.
0830 H&S tailgate meeting. Railroad, noise, wildlife, traffic.
0835 Speak to A. Beauvang - confirm that Geotek found alternate helper to send out this morning.
0845 Check SB07, SB08 for utilities. NO utilities marked on ground. Sign near SB0 says "shunt". Check w/ flagger, he says Shunt is electrical signaling equipment. Flagger calls signalman out to look at drill sites.
0925 Signal man arrives onsite - walks site w/ M Bruno, confirms no signal lines in area of borings. "Shunt" refers to electrical signal lines that lie next to tracks up on elevated railbed. We are clear of shunt lines.
0930 T Bowers begins advancing core at SS113-SB08
0935 Screen 0-5 ft bgs interval. PID = 0.2 ppm BZ = 0.0 ppm
0940 Collect [16Q2SS113-SB0801-SO-0] for analysis of AK101, AK102/103, SW8260B (petro compds), SW6020A (pbs), SW8270C
0950 Screen 5-10 ft bgs interval. PID = 0.0 ppm Brea. Zone = 0.0
0955 Collect [16Q2SS113-SB08-SO-0] for analysis of AK101, AK102/103, SW8260B (petro), SW6020A (pb), SW8270C
Collected from 6.5 to 8.0 ft bgs. GW @ 6.5 ft bgs
1000 A Beauvang arrives onsite. Checks in. Discuss shunt issue.
1005 A Geotek begins advancing SS113-SB07. A. Beauvang departs
1000 Late entry - Geotek installs temporary GW point from 6-9 ft bgs.
1015 M Landon begins setup for grab GW sampling at SS113-SB08

GW

1010 Late entry - Screen SS113-SBΦ7 core from 0-5 ft bgs PID = 42.9 ppm BZ=0.0 ppm

1015 Collect [16Q2SS113-SBΦ7Φ1-SO-Φ] for Atk101, Atk102/103, SW8260B (petro.), SW6020A (pb), SW8270C-SIM

1025 Screen 5-10 ft bgs interval. PID = 30.5 ppm BZ=0.0 ppm

1030 Collect [16Q2SS113-SBΦ7Φ2-SO-Φ] from 6.5-8.5 ft bgs for Atk101, Atk102/103, SW8260B (petro), SW6020A (Pb), SW8270C-SIM. Geotek installs temporary GW point from 6-9 ft bgs (GW @ 6.5 ft bgs)

1035 ML Collects [16Q2SS113-SBΦ8Φ2-GW-Φ] for Atk101, SW8260B (petro), Atk102/103, SW6020A (Pb), SW8270C-SIM

1045 ML begins setup @ SS113-SBΦ7.

1125 ML collects [16Q2SS113-SBΦ7Φ2-GW-Φ] for Atk101, Atk102/103, SW8260B (petro), SW6020A (Pb), SW8270C-SIM

1145 Geotek pulls temporary point SS113-SBΦ7

1150 Geotek pulls temporary point SS113-SBΦ8

1200 Geotek loads rig onto trailer.

1205 K Stevens arrives onsite.

1215 Mobe to other side of tracks, set up @ SS113-SBΦ9

1245 Geotek begins advancing boring SS113-SBΦ9

1250 Screen 0-5 ft bgs interval. PID=0.3 ppm BZ=0.0 ppm.

1255 Collect [16Q2SS113-SBΦ9Φ1-SO-Φ] for Atk101, Atk102/103, SW8260B (petro.), SW8270C-SIM, SW6020A (Pb)

1300 Screen 5-10 ft bgs interval. PID 20.0 BZ=0.0

1340 Late entry - site walk - borehole location clear of utility markings.

1305 ~~Screen~~ Poor recovery in 5-10 ft bgs interval, could not determine GW level. Geotek steps over & redrills.

1308 Screen 5-10 ft step over. PID=0.0 ppm, BZ=0.0 ppm GW @ 5.0 ft bgs

1310 Collect [16Q2SS113-SBΦ9Φ2-SO-Φ] from 5 to 7 ft bgs. for Atk101, Atk102/103, SW6020A (Pb) SW8270C-SIM, SW8260B (Petro)
Geotek pulls temporary GW point from 4.5 to 7.5 ft bgs

1315 K Stevens sets up to sample temporary GW point @ SS113-SBΦ9. see GW field book.

1325 K Stevens notifies M Bruno screen is set @ incorrect depth - set 0.6-3.6 ft bgs. (Above GW table)

1330 Geotek pulls screen, resets from 4.5-7.5 ft bgs.

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- my 6/6/16 -

1340 K Stevens resumes GW sampling.
1410 K Stevens done sampling. Geotek pulls temporary GW point.
1420 Mobe out through railyard & off ARRL property. Flagger remains behind on ARRL property.
1440 Notify A. Beausang that we are done w/ all locations requiring flagger & flagger has departed. Geotek notifies M. Bruno that they do not have any additional temporary GW points they can install today. K Stevens departs to begin prepping previous days' coolers for shipping
1450 Geotek begins advancing soil core @ SS113-SB02
1455 Screen 0-5 ft bgs interval. PID = 0.0 ppm BZ = 0.0 ppm
1500 Collect 16Q2SS113-SB02Φ1-SO-Φ for AK101, AK102/103, SW8260B (petro), SW8270C-SIM, SW6020A (Pb)
1505 Screen 5-10 ft bgs interval. PID = 0.0 ppm BZ = 0.0 ppm GW @ 5 ft bgs.
1510 Collect 16Q2SS113-SB02Φ2-SO-Φ for AK101, AK102/103, SW8260B (petro), SW8270C-SIM, SW6020A (Pb)
Late entry 1445 Site walk - SS113-SB02 & SB03 > 5 ft from nearest marked utilities.
1525 Site walk - verify no utilities marked around SS113-SB01.
1530 Geotek sets up at SS113-SB01.
1533 Geotek begins pushing boring SB01.
1536 Screen SS113-SB01- 0 to 5 ft bgs interval. PID = 0.0 BZ = 0.0 ppm
1540 Collect 16Q2SS113-SB01Φ1-SO-Φ for AK101, AK102/103, SW8260B (petro), SW6020A, SW8270C-SIM
1545 Screen 5-10 ft bgs interval. ~~Grab~~ (FB) PID = 0.0 BZ = 0.0
1550 Collect 16Q2SS113-SB01Φ2-SO-Φ for AK101, AK102/103, SW8260B (petro), SW6020A (Pb), SW8270C-SIM from 5.25-6.25 ft bgs, GW @ 5.75 ft bgs
1600 Geotek loading drill rig, packing up for day.
1610 T. Beckner departs for day. Mobe to POL yard.
1630 Return to field office. Finalize paperwork.
1730 M Landon departs for day. M. Bruno completing paperwork - see FTL ~~Fieldwork~~ Fieldbook (FB)

MB 6/6/16

SBEG-E TO383 SS113 6/7/16

Personnel: M Bruno/ANC - FTL + qualified sampler T Bowers/Geotek - driller
M London/ANC - Tech + qualified sampler C. Blizzaillon - Geotek - helper

Objective: Continue sampling @ SS113, install temporary GW points.

Conditions: ~52° F, overcast, cloudy

PPE: Level D. See Daily safety form for details.

0850 Arrive at SS113, discuss plan for day. Geotek has all needed equipment on hand. Check fire extinguisher - pin in place

0900 T Bowers informs M Bruno Geotek is low on water & may not have enough to make it through the day.

0905 Has tailgate meeting - wildlife, muster in vehicles, PPE, slips, trips & falls

0915 Geotek pushes ~~temporary~~ (MW) temporary GW point at SS113-SBØ2. Screen set from 4' to 8 ft bgs.
Geotek pushes temporary GW point at SS113-SBØ1. Screen set 4.5 to 8.5 ft bgs.

0945 Geotek mobs rig & sets up at SS113-SBØ6

0955 Screen 0-5 ft interval SS113-SBØ6 PID=3.3 ppm BZ=0.0 ppm
Geotek moves rig to set up @ SS113-SBØ5

1000 Collect 16Q2SS113-SBØ6Ø1-SO-Ø for Ak101, Ak102/103, SW8260B (petro), SW6020A (pb only), SW8270C-SIM

1005 Screen 5 to 10 ft bgs interval. PID=0.4 BZ=0.0
+(MB) GW @ 5.0 ft bgs

1010 Collect 16Q2SS113-SBØ6Ø2-SO-Ø (MB) for Ak101, Ak102/103, SW8260B (petro), SW6020A (Pb only), SW8270C-SIM from 5 to 7 ft bgs

1015 Screen 0 to 5 ft interval from SS113-SBØ5, PID=0.0 ppm BZ=0.0 ppm

1020 Collect 16Q2SS113-SBØ5Ø1-SO-Ø for Ak101, SW8260B (petro), Ak102/103, SW6020A (full list), SW747HA (Hg), SW8082, SW8260B-low, SW8260B-SIM, SW8270C-SIM

1030 Screen 5 to 10 ft bgs interval. PID=9.0 ppm BZ=0.0 ppm

1040 Collect 16Q2SS113-SBØ5Ø2-SO-Ø for Ak101, SW8260B (petro), Ak102/103, SW6020A (full list), SW747HA (Hg), SW8082, SW8260B-low, SW8260B-SIM, SW8270C-SIM from 5 to 7 ft bgs GW @ 5.0 ft bgs

1050 Collect 16Q2SS113-SBØ5Ø2-SO-T for same analytes as parent compound above from 5 to 7 ft bgs

1055 Screen 10 to 15 ft interval PID=0.0 ppm BZ=0.0 ppm
Clay layer @ 12.25.

1100 Collect 16Q2SS113-SBØ5Ø3-SO-Ø from 10 to 12.25 ft bgs (do not sample clay layer) for Ak101, SW8260B (petro)

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- MB 6/7/16 -

T0303 JAGS-E

SS113

6/7/16 cont.

AK102/103, SW6020A (full list), SW7471A (Hg), SW8082, SW8260B-low, SW8260B-SIM, SW8270C-SIM

1110 Screen SS113 - SBØ4 0 to 5 ft bgs PID= 0.0 ppm BZ= 0.0 ppm

1115 Collect 1602SS113-SBØ4Ø1-SO-Ø for AK101, AK102/103, SW8260B (petro), SW6020A (Pb only), SW8270C-SIM.

Geotek pulls temporary point at SS113 - SBØ2.

1105 Screen 5 to 10 ft interval. GW @ 5.0 ft bgs. PID=0.0 ppm BZ=0.0

Geotek installs temporary GW point at SS113 - SBØ4 - screen set 4 to 9 ft bgs.

1130 Collect 1602SS113 - SBØ4Ø2 - SO-Ø for AK101, AK102/103, SW6020A (Pb), SW8270C-SIM, SW8260B (petro) from 5 to 7 ft bgs.

Geotek mobes to shop to pick up additional water for decon/bentonite.

1245 Geotek arrives back onsite, Confirm that K Stevens still has installed points to sample.

1250 Geotek departs for lunch.

1320 Geotek arrives back onsite, deconning rods & filing rod threads

1400 Check w/ T Bowers if they are ready to set screens at SS113-SBØ5, SS113-SBØ6. T Bowers reports that they only have the two screens currently installed at SBØ1, SBØ4. Wastewater crew shows up to clear wastewater line near SBØ3. Location >10 ft from wastewater line.

1410 WW crew departs. Geotek pulls temporary GW point at SBØ1 and decons.

1425 Geotek installs temporary GW point (MS) from 4 to 8 ft bgs @ SS113-SBØ5.

1435 Geotek sets up at SS113-SBØ3 & begins advancing soil (MS) boring

1440 Screen 0 to 5 ft bgs interval. PID=0.0 ppm BZ=0.0

1445 Collect 1602SS113-SBØ3Ø1-SO-Ø for AK101, AK102/103, SW8260B (petro), SW8270C-SIM, SW6020A (Pb only)

1450 Screen (MS) 5 to 10 ft interval. PID=7.6 ppm BZ=0.0 ppm GW @ 5.8 ft bgs.

1455 Collect 1602SS113-SBØ3Ø2-SO-Ø from 5.8 to 7.6 ft bgs for AK101, AK102/103, SW8260B (petro), SW8270C-SIM, SW6020A (Pb only)

1505 Collect FD 1602SS113-SBØ3Ø2-SO-1 from 5.8 to 7.6 ft bgs for same suite of analytes as parent sample above.

1507 Screen 10 to 15 ft bgs interval. PID=0.0 BZ=0.0 [illegible] recovery for planned MS/MSD; Geotek steps over & collects 10 to 15 ft bgs interval.

1510 Screen stepover. PID=0.0 ppm BZ=0.0 ppm

stepover had 4.0 ft recovery.

—MB 6/7/16—

TO383 SBER-E

55113 / CG112

6/7/16 cont

1515 Collect 16Q255113-SB03-S0-0 from 10.8 to 11.4 ft bgs (Clay layer began at 11.4 ft bgs for AK101, AK102/103, SW8260B (petro), SW6020A (pb only), SW8270C-SIM.
Collect 16Q255113-SB03-S0-0MS and 16Q255113-SB03-S0-0SD for some analytes as parent sample above.

1525 Pack up equipment. Geotek loads drill rig.

1535 Mobe to CG112. Geotek pulls temporary GW points at CG112-SB04 and CG112-SB06 and backfills holes.

1615 Mobe to POL yard, transfer soil to drum #4.

1635 Collect 16Q2-IDW04-S0 for AK101, AK102/103, SW6020A (full) SW7471A (Hg), SW8082, SW8260B-low, SW8270C-SIM

1655 Drillers and M Landon depart for day. M Bruno done w/ drilling tasks. See ETL book for rest of day.

6/7/16

AS TO 383 Phase II 9.27.16

1620 - Begin site cleanup. Boring will be covered, but not filled, for the return on Thursday to auger and set the well. MB offsite w/ SS.

1650 - Crew mobes to POL yard.

1700 - Arrive at POL yard. Transfer soil to new drum (Drum #7); add a label. Transfer water to labeled drum.

1715 - AS checks out w/ airfield management. Crew mobes to CH2M field office.

1720 - Arrive at the office. AS signs the DQR; copies for MB. Drillers leave. AS reiles the samples from today and completes the day's paperwork.

1750 - End of day.

Annika Seay 9.27.16

mb 9/27/16

TO 383 Phase II 9.28.16

0900 - Annika Seay (AS) arrives at the CH2M field office. Morgan Bruno (MB) and the subcontractor are prepping for the day's work. (See calibration logs for the air monitoring and water quality monitoring equipment)

- Project: TO383 Phase II
- Task/activity for the day: advance soil borings, collect samples, collect grab GW samples
- personnel:
  Morgan Bruno (MB) (field team lead)
  Annika Seay (AS) (geologist, qualified sampler, logbook scribe)
  Scott Stibrich (technician)
- Subcontractors:
  GeoTek Alaska, Inc.
  Chris Bizaillon (CB) (driller)
  David North (DN) (helper)

mb 9/08/16 - Rite in the Rain AS 9.28.16

TO383 Phase II 9.28.16

0800 (cont'd) - PN: 658348.02 04.05.12
- weather: 31°F, clear

0815 - TB01L (Soil)
16Q355113-SB50-TB01L
for analysis of:
- SW8260B
(low level TB full suite)
- SW8260B-SIM (EDB)

0820 - TB01M (soil)
16Q355113-SB50-TB01M
for analysis of:
- SW8260B, AK101
(full suite VOCs, GRO)

0825 - TB01 (groundwater)
16Q355113-SBGW-TB01
for analysis of:
- AK101 (GRO)
- SW8260B (full suite VOCs)

0830 - crew mobes to SS113 to meet railroad escort.

0900 - crew arrives at site and is escorted to SS113-SB10

0920 - Set up at SS113-SB10 hold health and safety meeting.

AJS 9.28.16

mb 9/30/16

TO383 Phase II 9.28.16

0920 (cont'd) - (see PTSP for details)
Railroad escort Jacob Kern discusses railway safety during HS meeting:

- hard hats must be worn at all times
- stay 20 ft from tracks
- look both ways before crossing tracks (all tracks are live)
- do not stop on tracks when crossing
- use a spotter when taking the rig across tracks

Additional H&S topics:
- watch for slick surfaces due to morning frost
- Wear PPE at all times (Level D: hard hat, safety glasses, hearing protection, hi-vi, vests/clothing, long pants/sleeves, gloves (nitrile and/or work gloves, steel toe boots)

AJS 9.28.16

mb 9/30/16

TO383 Phase II 9.28.16

0955 – Begin drilling SS113-SB10

1000 – Screen 0-5 ft bgs interval
PID = 0.0 ppm throughout the entire interval. BZ = 0.0 ppm
BZ@ rig = 0.0 ppm
Poor recovery will require additional volume to complete
Sample requirements
collect sample
16Q3SS113-SB1001-SO-0
for analysis of:
- AK102/103, SW6020A, SW7471B
(DRO/RRO, full list Metals, Mercury)
- SW8082 (PCB)
- SW8260B, AK101
(full ~~suite~~ list AFS VOCs, GRO)
- SW8260B-low
(full suite low level VOCs)
- SW8260B-SIM (EDB)
- SW8270C-SIM (PAH)

1035 – Two attempts at additional volume for 0-5 ft bgs are made. the first did not collect volume. AFS 9.28.16

mb 9/28/16

TO383 Phase II 9.28.16

1035 (cont'd) – second attempt produces ~1ft of recovery. PID = 0.4 ppm and a fuel-like odor is present in the recovery.

1045 – screen 5-10 ft bgs interval. initial recovery produces ~3" of rock only, no soil. Additional volume is pulled PID = 7.4 @ 6 ft bgs. BZ = 0.0 ppm BZ@ rig = 0.0 ppm
1050 collect sample
16Q3SS113-SB1002-SO-0
for analysis of:
~~16Q3SS113-SB1002-SO-0~~ AFS
- AK102/103, SW6020A, SW7471B
(DRO/RRO, full list metals, Mercury)
- SW8082 (PCB)
- SW8260B, AK101
full list VOCs, GRO
- SW8260B-low
(full suite low level VOCs)
- SW8260B-SIM (EDB)
- SW8270C-SIM (PAH)
AFS 9.28.16

mb 9/28/16

TO383 Phase II 9.28.16

1055 - Collect sample duplicate 16Q3SS113-SB1002-SO-1 for analysis of:
- AK1002/1003, SW6020A, SW7471B (DRO/RRO, full list metals, Mercury)
- SW8082 (PCB)
- SW8260B, AK1001 (full suite VOCs, GRO)
- SW8260B-low (full suite low level VOCs)
- SW8260B-SIM (EDB)
- SW8270C-SIM (PAH)

1110 - Begin setting temporary GW sampling point. GW@ ~5 ft bgs. Bottom of the screen will be placed at 8 ft bgs. See GW logbook for details. BZ@ rig = 0.0 ppm

1125 - Screen 10-15 ft bgs interval PID = 0.0 ppm throughout the entire interval. BZ = 0.0 ppm

AH 9.28.16

mB 9/28/16

TO383 Phase II 9.28.16

1130 - Collect sample 16Q3SS113-SB1003-SO-0 for analysis of:
- AK1002/1003, SW6020A, SW7471B (DRO/RRO, full list metals, mercury)
- SW8082 (PCB)
- SW8260B, AK1001 (full suite VOCs, GRO)
- SW8260B-low (full suite low level VOCs)
- SW8260B-SIM (EDB)
- SW8270C-SIM (PAH)

Collect sample MS and SD 16Q3SS113-SB1003-SO-0MS and 16Q3SS113-SB1003-SO-0SD at same interval and same time for same analysis.

Drillers break for lunch off site

1135 - Collect GW samples from temp. sampling point (see GW logbook for details)

1300 - GW sampling complete. Begin site cleanup.

AH 9.28.16

mB 9/28/16

Rite in the Rain

To 383 Phase II 9.28.16

~~1415~~ 1320 Atj - Drillers pull the SP and continue site cleanup. The boring and stepovers are filled w/ bentonite.

1415 - Jacob Kern back on site to spot for the drillers as they mobe the rig across the railroad tracks.

1440 - Crew mobes back to JBER Post Road gate.

1500 - Crew meets FTL MB @ CG111-MW01

1520 - Hold health and safety meeting. Discuss (see PTSP)
- Utilities cleared at boring location; be alert for any changes
- PPE should be worn at all times
- Watch for traffic

1525 - Begin drilling CG111-MW01

1530 - Screen 0-5 ft bgs. PID = 0.0 ppm. No sample per the workplan.

Atj 9.28.16

mb 9/28/16

To 383 Phase II 9.28.16

1535 - Screen 5-10 ft bgs interval PID = 0.0 ppm throughout interval. No sample per the workplan. BZ = 0.0 ppm

1540 - Screen 10-15 ft bgs. PID = 7.0 @ 10-11 ft bgs. BZ = 0.0 ppm. BZ @ rig = 0.0 ppm. No sample collected per the workplan.

1550 - Screen 15-20 ft bgs interval. PID = 137 ppm @ 16 ft bgs. GW @ 16 ft bgs. PID readings reduce to ~~10~~ 28 ppm at the bottom of the interval. Terminate the boring @ 20 ft bgs

1555 - Collect sample 10/Atj 1603CG111-MW01-SO-0 for analysis of:
- AK102/103, SW6020A, SW7471B (DRO/RRO, SW6020A, SW7471B)
- NWEPH (EPH)

Atj 9.28.16

Rite in the Rain

mb 9/28/16

TO 383 Phase II 9.28.16

1555 (cont'd) – NWVPH (VPH)
– SW8082 (PCB)
– SW8260B, AK101
(full suite VOCs, GRO)
– SW8260B - low
(full suite low level VOCs)
– SW8260B - SIM (EDB)
– SW8270C - SIM (PAH)

* late entry *

1510 – CG111 TB01M
I16Q3CG111-SB50-TB01M
for analysis of:
– NWVPH (VPH)
– SW8260B, AK101
(full suite VOCs, GRO)

1515 CG111 TB01L
I16Q3CG111-SB50-TB01L
for analysis of:
– SW8260B
(low level TB, full suite)
– SW8260B-SIM (EDB)

1600 – Clean up site.
1645 – Mobe to POL yard
1655 – Arrive at POL yard.
Transfer soil and GW. AJS 9.28.16

MB 9/28/16

TO 383 Phase II 9.28.16

1715 – return to CH2M field office.
Re-ice samples and complete paperwork. SS offsite.
1845 – End of day.

9.28.16

MB 9/28/16

Appendix A-3
Soil Boring Logs

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PROJECT NUMBER: 658348.02.04.05.13	BORING NUMBER: SS113-SB01 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : JBER TO383 - Site SS113 Site Characterization LOCATION: JBER-E - Site SS113

DRILLING CONTRACTOR : GeoTek AK, Inc. EASTING (NAD83 SPZN4 feet): 1670815.23 (ft) NORTHING (NAD83 SPZN4 feet): 2642165.57 (ft)

DRILLING METHOD AND EQUIPMENT : Direct Push with Geoprobe 6610 DT GROUND SURFACE ELEVATION: 105.44 (ft)

WATER LEVEL:5 ft bgs START : 6/6/16 15:33 END : 6/6/16 15:45 LOGGER : M. Bruno

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION	PID (ppm)	LOGGING NOTES
		1602SS113-SB0101-SO-0		**Well-Graded Sand with Gravel (SW)** brown, fine to coarse sand, subangular, loose, moist, gravel maximum size 1.5 inches	0.0	
					0.0	
5		1602SS113-SB0102-SO-0		**Well-Graded Sand with Gravel (SW)** brown, fine to coarse sand, subangular, loose, wet, gravel maximum size 1.5 inches	0.0	Groundwater at 5.25 ft bgs
				Boring terminated at 6.25 feet bgs		

PROJECT NUMBER: 658348.02.04.05.13	BORING NUMBER: SS113-SB02 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : JBER TO383 - Site SS113 Site Characterization LOCATION: JBER-E - Site SS113

DRILLING CONTRACTOR : GeoTek AK, Inc. EASTING (NAD83 SPZN4 feet): 1670946.86 (ft) NORTHING (NAD83 SPZN4 feet): 2642291.77 (ft)

DRILLING METHOD AND EQUIPMENT : Direct Push with Geoprobe 6610 DT GROUND SURFACE ELEVATION: 103.76 (ft)

WATER LEVEL:5 ft bgs START : 6/6/16 14:50 END : 6/6/16 14:55 LOGGER : M. Bruno

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION	PID (ppm)	LOGGING NOTES
		1602SS113-SB0201-SO-0		**Well-Graded Sand with Gravel (SW)** reddish brown, fine to medium sand, loose, moist, gravel maximum size 0.5 inch, gray staining bottom 0.25 ft bgs	0.0	
					0.0	
5		1602SS113-SB0202-SO-0		**Well-Graded Sand with Gravel (SW)** olive gray, fine to medium sand, gravel maximum size 1.5 inches, increasing gravel below 6.0 ft bgs	0.0	Groundwater at 5.0 ft bgs ▼
					0.0	
					0.0	
10				Boring terminated at 10 feet bgs		

PROJECT NUMBER: 658348.02.04.05.13	BORING NUMBER: SS113-SB03 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : JBER TO383 - Site SS113 Site Characterization LOCATION: JBER-E - Site SS113

DRILLING CONTRACTOR : GeoTek AK, Inc. EASTING (NAD83 SPZN4 feet): 1670837.93 (ft) NORTHING (NAD83 SPZN4 feet): 2642267.90 (ft)

DRILLING METHOD AND EQUIPMENT : Direct Push with Geoprobe 6610 DT GROUND SURFACE ELEVATION: 103.19 (ft)

WATER LEVEL:6 ft bgs START : 6/7/16 14:35 END : 6/7/16 15:10 LOGGER : M. Bruno

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION	PID (ppm)	LOGGING NOTES
		1602SS113-SB0301-SO-0		**Well-Graded Sand with Gravel (SW)** brown, fine to coarse sand, subangular gravel, moist, firm, gravel maximum size 1 inch	0.0 0.0	
5		1602SS113-SB0302-SO-0 1602SS113-SB0302-SO-1		**Silty Sand with Gravel (SM)** brown, fine to medium sad, subrounded gravel, moist, loose, with interbedded wood layer	57.0	Groundwater at 5.8 ft bgs Strong odor, sheen FD collected here
				Well-Graded Sand (SW) olive gray, fine to coarse sand, wet, loose, with trace gravel at bottom	7.6	
10		1602SS113-SB0303-SO-0 1602SS113-SB0303-SO-0MS 1602SS113-SB0303-SO-0SD		**Well-Graded Sand with Gravel (SW)** olive gray, fine to coarse sand, subrounded to subangular gravel, wet, loose, gravel maximum size 0.2 inch, increasing gravel with depth	0.0	MS/MSD collected from stepover Stepover recovery 4.0 ft MS/MSD Collected from stepover Stepover recovery 4.0 ft
				Clay (CL) olive gray, wet, firm, plastic	0.0	
15				Boring terminated at 15 feet bgs		

PROJECT NUMBER: 658348.02.04.05.13	BORING NUMBER: SS113-SB04 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : JBER TO383 - Site SS113 Site Characterization LOCATION: JBER-E - Site SS113

DRILLING CONTRACTOR : GeoTek AK, Inc. EASTING (NAD83 SPZN4 feet): 1670745.39 (ft) NORTHING (NAD83 SPZN4 feet): 2642326.89 (ft)

DRILLING METHOD AND EQUIPMENT : Direct Push with Geoprobe 6610 DT GROUND SURFACE ELEVATION: 104.64 (ft)

WATER LEVEL:5 ft bgs START : 6/7/16 10:45 END : 6/7/16 11:00 LOGGER : M. Bruno

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION	PID (ppm)	LOGGING NOTES
		1602SS113-SB0401-SO-0		**Silty Sand with Gravel (SM)** olive gray, fine to medium sand, subrounded gravel, moist, loose, gravel maximum size 0.5 inch	0.0	
5		1602SS113-SB0402-SO-0		**Well Graded Sand (SW)** olive gray, fine to coarse sand, wet	0.0 0.0	Groundwater at 5.0 ft bgs
				Well Graded Sand with Gravel (SW) olive gray, fine to coarse sand, subrounded gravel, wet, loose, gravel maximum size 0.5 inch	0.0	
10				Boring terminated at 10 feet bgs		

PROJECT NUMBER: 658348.02.04.05.13	BORING NUMBER: SS113-SB05 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : JBER TO383 - Site SS113 Site Characterization LOCATION: JBER-E - Site SS113

DRILLING CONTRACTOR : GeoTek AK, Inc. EASTING (NAD83 SPZN4 feet): 1670812.41 (ft) NORTHING (NAD83 SPZN4 feet): 2642366.04 (ft)

DRILLING METHOD AND EQUIPMENT : Direct Push with Geoprobe 6610 DT GROUND SURFACE ELEVATION: 104.39 (ft)

WATER LEVEL:5 ft bgs START : 6/7/16 10:05 END : 6/7/16 10:31 LOGGER : M. Bruno

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION	PID (ppm)	LOGGING NOTES
		1602SS113-SB0501-SO-0		**Silt (ML)** brown, loose, moist		
				Well Graded Sand with Gravel (SW) olive gray, fine to coarse sand, subrounded to subangular gravel, moist, loose, gravel maximum size 0.5 inch, interbedded silt layers	0.0	
					0.0	
5		1602SS113-SB0502-SO-0 1602SS113-SB0502-SO-1		**Well Graded Sand (SW)** olive gray, medium to coarse sand, wet, loose		Groundwater at 5.0 ft bgs
				Well Graded Sand with Gravel (SW) olive gray, fine to coarse sand, subrounded to subangular gravel, wet, loose, gravel maximum size 0.6 inch	2.3	
					4.9	
					9.0	
					0.4	
10						
				Well Graded Sand with Gravel (SW) olive gray, medium to coarse sand, subrounded gravel, wet, loose, gravel maximum size 0.3 inch		
		1602SS113-SB0503-SO-0			0.0	
				Clay (CL) olive gray, wet, firm	0.0	Clay at 12.25 ft bgs
					0.0	
15						
				Boring terminated at 15 feet bgs		

PROJECT NUMBER: 658348.02.04.05.13	BORING NUMBER: SS113-SB06 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : JBER TO383 - Site SS113 Site Characterization LOCATION: JBER-E - Site SS113

DRILLING CONTRACTOR : GeoTek AK, Inc. EASTING (NAD83 SPZN4 feet): 1670890.55 (ft) NORTHING (NAD83 SPZN4 feet): 2642415.07 (ft)

DRILLING METHOD AND EQUIPMENT : Direct Push with Geoprobe 6610 DT GROUND SURFACE ELEVATION: 103.14 (ft)

WATER LEVEL:5 ft bgs START : 6/7/16 09:49 END : 6/7/16 09:55 LOGGER : M. Bruno

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION	PID (ppm)	LOGGING NOTES
		1602SS113-SB0601-SO-0		**Well Graded Sand with Gravel (SW)** olive gray, fine to coarse sand, subround, gravel maximum size 0.5 inch, moist, loose, interbedded silt layers	3.3	
5		1602SS113-SB0602-SO-0		**Well Graded Sand with Gravel (SW)** olive gray, fine to coarse sand, subround, subrounded to subangular gravel, gravel maximum size 0.5 inch, wet, loose	0.4 0.3 0.1	Groundwater at 5.0 ft bgs
10				Boring terminated at 10 feet bgs		

PROJECT NUMBER: 658348.02.04.05.13	BORING NUMBER: SS113-SB07 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : JBER TO383 - Site SS113 Site Characterization LOCATION: JBER-E - Site SS113

DRILLING CONTRACTOR : GeoTek AK, Inc. EASTING (NAD83 SPZN4 feet): 1670797.09 (ft) NORTHING (NAD83 SPZN4 feet): 2642402.14 (ft)

DRILLING METHOD AND EQUIPMENT : Direct Push with Geoprobe 6610 DT GROUND SURFACE ELEVATION: 105.21 (ft)

WATER LEVEL:7 ft bgs START : 6/6/16 10:05 END : 6/6/16 10:20 LOGGER : M. Bruno

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION	PID (ppm)	LOGGING NOTES
		1602SS113-SB0701-SO-0		**Well-Graded Sand with Gravel (SW)** olive gray, fine to coarse sand, subangular, interbedded reddish wood layers, moist, loose	0.0	
					42.9	Strong odor
5		1602SS113-SB0702-SO-0		**Well-Graded Sand with Gravel (SW)** olive gray, fine to coarse sand, subangular, moist, loose, wet below 6.5 ft bgs	30.5	Strong odor and groundwater at 6.5 ft bgs ▼
					6.0	
					2.7	
					0.0	
10				Boring terminated at 10 feet bgs		

PROJECT NUMBER: 658348.02.04.05.13	BORING NUMBER: SS113-SB08 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : JBER TO383 - Site SS113 Site Characterization LOCATION: JBER-E - Site SS113

DRILLING CONTRACTOR : GeoTek AK, Inc. EASTING (NAD83 SPZN4 feet): 1670852.62 (ft) NORTHING (NAD83 SPZN4 feet): 2642441.85 (ft)

DRILLING METHOD AND EQUIPMENT : Direct Push with Geoprobe 6610 DT GROUND SURFACE ELEVATION: 105.06 (ft)

WATER LEVEL:7 ft bgs START : 6/6/16 09:30 END : 6/6/16 09:50 LOGGER : M. Bruno

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION	PID (ppm)	LOGGING NOTES
		1602SS113-SB0801-SO-0		**Well-Graded Sand with Gravel (SW)** olive gray, fine to medium sand, subangular, moist, firm, gravel maximum size 1 inch	0.0	
					0.2	
5		1602SS113-SB0802-SO-0		**Well-Graded Sand with Gravel (SW)** olive gray, fine to medium sand, subangular, moist, firm, gravel maximum size 0.5 inch, wet below 6.5 ft	0.0	Sheen, odor Groundwater at 6.5 ft bgs ▼
					0.0	
					0.0	
10				Boring terminated at 10 feet bgs		

PROJECT NUMBER: 658348.02.04.05.13	BORING NUMBER: SS113-SB09 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : JBER TO383 - Site SS113 Site Characterization LOCATION: JBER-E - Site SS113

DRILLING CONTRACTOR : GeoTek AK, Inc. EASTING (NAD83 SPZN4 feet): 1670797.09 (ft) NORTHING (NAD83 SPZN4 feet): 2642402.14 (ft)

DRILLING METHOD AND EQUIPMENT : Direct Push with Geoprobe 6610 DT GROUND SURFACE ELEVATION: 110.41 (ft)

WATER LEVEL:Not Encountered START : 6/6/16 10:05 END : 6/6/16 13:00 LOGGER : M. Bruno

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION	PID (ppm)	LOGGING NOTES
		1602SS113-SB0901-SO-0		**Well-Graded Sand with Gravel (SW)** olive gray, fine to coarse sand, subangular, moist, loose, gravel maximum size 1 inch, black staining below 1.5 ft bgs	0.3	
					0.2	
5		1602SS113-SB0902-SO-0		**Well-Graded Sand with Gravel (SW)**	0.0	Groundwater at 5.0 ft bgs
					0.0	
10				Boring terminated at 10 feet bgs		

PROJECT NUMBER: 658348.02.04.05.13	BORING NUMBER: SS113-SB10 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : JBER TO383 - Site SS113 Site Characterization LOCATION: JBER-E - Site SS113

DRILLING CONTRACTOR : GeoTek AK, Inc. EASTING (NAD83 SPZN4 feet): --- (ft) NORTHING (NAD83 SPZN4 feet): --- (ft)

DRILLING METHOD AND EQUIPMENT : Direct Push with 6610 DT GROUND SURFACE ELEVATION: (ft)

WATER LEVEL:~5 ft bgs START : 9/28/16 09:55 END : 9/28/16 10:10 LOGGER : A. Seay

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION	PID (ppm)	LOGGING NOTES
		16Q3SS113-SB1001-SO-0		**Silty gravel (GM)** olive gray, fine to medium grained, round to sub-angular, loose, moist, low plasticity, gravel maximum size 1.5 inches, roots in the first 3 inches of the interval	0.4	
5				**Silty sand (SM)** olive gray, fine to coarse grained, well graded, round to angular, loose/soft, wet, low plasticity, roots at 6.5 feet bgs, fuel-like odor (POL) present throughout interval	7.4	Groundwater at 5 feet bgs
		16Q3SS113-SB1002-SO-0; 16Q3SS113-SB1002-SO-1			7.0 3.0	Duplicate sample collected here
10				**Silty sand (GW)** olive gray, fine to coarse grained, well graded, round to angular, loose/soft, wet, low plasticity, fuel-like odor (POL) present throughout interval	0.0	
		16Q3SS113-SB1003-SO-0; 16Q3SS113-SB1003-SO-MS; 16Q3SS113-SB1003-SO-SD			0.0 0.0	MS and SD sampled collected here
15				Boring terminated at 15 feet bgs		

Appendix A-4
Photo Log

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Photo A-4-1: Soil Boring SS113-SB02

Photo A-4-2: Soil Boring SS113-SB03; Interval 00-05 ft bgs

Photo A-4-3: Soil Boring SS113-SB03; Interval 05-10 ft bgs

Photo A-4-4: Soil Boring SS113-SB03; Interval 10-15 ft bgs

Photo A-4-5: Soil Boring SS113-SB04; Interval 00-05 ft bgs

Photo A-4-6: Soil Boring SS113-SB04; Interval 05-10 ft bgs

Photo A-4-7: Soil Boring SS113-SB05; Interval 05-10 ft bgs

Photo A-4-8: Soil Boring SS113-SB06; Interval 00-05 ft bgs

Photo A-4-9: Soil Boring SS113-SB07

Photo A-4-10: Soil Boring SS113-SB08

Photo A-4-11: Soil Boring SS113-SB09

Appendix B
Laboratory Reports and Data Quality Review

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Appendix B-1
Data Quality Evaluation Report

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JBER-Elmendorf SS113 – Hatchery North Site Characterization 2016 Data Quality Evaluation Report

Introduction

The objective of this data quality evaluation (DQE) report is to assess the data quality of analytical results for groundwater and soil samples collected at Joint Base Elmendorf-Richardson, Alaska, Site SS113. Samples were collected and analyzed in support of the Site Characterization. The data may be used to support future activities such as feasibility studies, risk assessments, fate and transport modeling, and remedial actions. Individual method requirements and guidelines from the *United States Air Force, Joint Base Elmendorf-Richardson, Alaska, Environmental Restoration Program, Uniform Federal Policy-Quality Assurance Project Plan, Site Characterization Work Plan, SS113 – Hatchery North* (CH2M, March 2016) (Work Plan) were used in this assessment.

This report is intended as a general data quality assessment designed to summarize data issues.

Analytical Data

This DQE report covers 10 primary groundwater samples, 23 primary soil samples, two groundwater field duplicates (FDs), three soil FDs, three equipment blanks (EBs) associated with the soil samples, and nine trip blanks (TBs). Samples were collected between June 6 and September 28, 2016. A list of samples associated with this DQE is included in Attachment 1.

The Work Plan requires a collection frequency of 10 percent for FDs and 5 percent for matrix spike/ matrix spike duplicate (MS/MSD) sets and EBs; collection frequencies are outlined by method in Table 1. The required frequency was met for each method/matrix combination with the following exceptions:

- An EB was not required for the groundwater samples because dedicated equipment was used.

Table 1 Percentage of FD, EB and MS/MSD Collected by Method

Method	Matrix	Count of Primary Samples	Count of FD	Percent of FD	Count of MS/MSD	Percent of MS/MSD	Count of EB	Percent of EB
AK101	Groundwater	10	2	20	2	20	0	0
AK102/103	Groundwater	10	2	20	2	20	0	0
SW6020A	Groundwater	10	2	20	2	20	0	0
SW7470A	Groundwater	2	1	50	1	50	0	0
SW8082	Groundwater	2	1	50	1	50	0	0
SW8260B	Groundwater	10	2	20	2	20	0	0
SW8270C-SIM	Groundwater	10	2	20	2	20	0	0
AK101	Soil	23	3	13	2	8.7	2	8.7
AK102/103	Soil	23	3	13	2	8.7	2	8.7
SW6020A	Soil	23	3	13	2	8.7	2	8.7
SW7471B	Soil	6	2	33	2	33	2	33
SW8082	Soil	6	2	33	2	33	2	33

Table 1 Percentage of FD, EB and MS/MSD Collected by Method

Method	Matrix	Count of Primary Samples	Count of FD	Percent of FD	Count of MS/MSD	Percent of MS/MSD	Count of EB	Percent of EB
SW8260B	Soil	23	3	13	2	8.7	3	13
SW8260B-Low	Soil	6	2	33	1	17	2	33
SW8260B-SIM	Soil	6	2	33	1	17	2	33
SW8270C-SIM	Soil	23	3	13	2	8.7	2	8.7

Notes:

EB = equipment blank
FD = field duplicate
MS = matrix spike
MSD = matrix spike duplicate

The sample results were reported as six sample delivery groups (SDGs), presented in Table 2. The analyses were performed by EMAX Laboratories in Torrance, California (EMXT, Department of Defense Environmental Laboratory Accreditation Program Certification #L2278). Samples were collected and shipped via overnight carrier to EMXT.

Table 2 Sample Delivery Groups

16F063
16F064
16F103
16F104
16I272
16I292

Ten methods were used to analyze the environmental samples. Selected samples were analyzed for one or more of the following analytes/methods in Table 3.

Table 3 Analytical Parameters

Parameter	Method
GRO	AK101
DRO/RRO	AK102/103
Metals	SW6020A
Mercury	SW7470A/SW7471B
Polychlorinated biphenyls	SW8082
VOC	SW8260B
Low-level VOC	SW8260B-Low
Low-level ethylene dibromide	SW8260B-SIM
Polynuclear aromatic hydrocarbons	SW8270C-SIM

Notes:

DRO = diesel-range organics
GRO = gasoline-range organics
RRO = residual-range organics
VOC = volatile organic compound

The assessment of data includes a review of: (1) the chain-of-custody (COC) documentation; (2) holding-time compliance; (3) the required quality control (QC) samples at the specified frequencies; (4) method blanks; (5) laboratory control sample/laboratory control sample duplicates (LCS/LCSD); (6) surrogate spike recoveries; (7) MS/MSD samples; and (8) initial and continuing calibration information and other method-specific criteria as defined by the Work Plan.

Field samples were also reviewed to ascertain field compliance and data quality issues. This included a review of FDs and EBs.

Data flags were assigned according to the Work Plan. Multiple flags are routinely applied to specific sample method/matrix/analyte combinations, but there will be only one final flag. A final flag is applied to the data and is the most conservative of the applied validation flags. The final flag also includes matrix and blank sample impacts.

The data flags are defined below:

- J = The analyte was positively identified, and the quantitation is an estimation because of discrepancies in meeting certain analyte-specific quality control criteria. Or the analyte was positively identified, but the associated concentration is estimated above the method detection limit and below the limit of quantitation (LOQ).
- B = The analyte was detected in the sample at a concentration less than or equal to 5 times (10 times for common laboratory contaminants) the blank concentration.
- R = The data are rejected because of deficiencies in meeting QC criteria and may not be used for decision making.
- U = The analyte was analyzed for but not detected.
- UJ = The analyte was not detected; however, the result is estimated because of discrepancies in meeting certain analyte-specific QC criteria.

Findings

The overall summaries of the data validation findings are contained in the following sections and Table 4.

Also included as documentation of data validation findings is the Alaska Department of Environmental Conservation Laboratory Data Review Checklist (Version 2.7, January 2010). A checklist is provided for each laboratory SDG and can be found in Attachment 2 to this DQE.

Holding Times

All holding-time criteria were met.

Calibration

All initial and continuing calibration criteria were met.

The recovery of vinyl acetate was less than Work Plan criteria in a continuing calibration verification (CCV) for Method SW8260B, indicating associated samples results are possibly biased low. Two associated nondetected groundwater results were qualified as estimated and flagged “UJ”.

The recovery of cyclohexane was greater than Work Plan criteria in a CCV for Method SW8260B, indicating associated samples results are possibly biased high. One associated detected groundwater result was qualified as estimated and flagged “J”.

Method Blanks

Method blanks were analyzed at the required frequency and were free of contamination that would affect the sample results with one exception.

Antimony was detected less than the LOQ in a method blank for Method SW6020A. Four associated soil results detected less than 5 times the blank concentration were qualified as estimated and flagged “B”.

Equipment Blanks

Three EBs were collected and were free of contamination that would affect the sample results with the following exceptions:

- Acetone, toluene, ethylbenzene, o-xylene and m,p-xylenes were detected less than the LOQ in the EBs for Method SW8260B-Low. Fourteen associated soil results detected less than 5 times (10 times for acetone) the blank concentrations were qualified as estimated and flagged “B”.

Trip Blanks

Nine TBs were collected and were free of contamination that would affect the sample results with the following exceptions:

- Toluene was detected less than the LOQ in a TB associated with the groundwater samples for Method SW8260B. Nine associated samples detected less than 5 times the blank concentration were qualified as estimated and flagged "B".
- Acetone was detected less than the LOQ in a TB associated with the soil samples for Method SW8260B-Low. One associated soil result detected less than 10 times the blank concentration was qualified as estimated and flagged “B”.

Field Duplicates

Two groundwater FD sets and three soil FD sets were collected and precision was acceptable with the following exceptions:

- The relative percent difference (RPD) of GRO was greater than Work Plan criteria in soil FD set 16Q3SS113-SB1002-SO-0/16Q3SS113-SB1002-SO-1 for Method AK101. Two associated detected results were qualified as estimated and flagged “J”.
- The RPD of DRO was greater than Work Plan criteria in groundwater FD set 16Q3SS113-SB1001-GW-0/ 16Q3SS113-SB1001-GW-1 for Method AK102/103. Two associated detected results were qualified as estimated and flagged “J”.
- The RPD of DRO was greater than Work Plan criteria in soil FD set 16Q2SS113-SB0502-SO-0/ 16Q2SS113-SB0502-SO-1 for Method AK102/103. Two associated detected results were qualified as estimated and flagged “J”.
- The RPD of RRO was greater than Work Plan criteria in soil FD set 16Q2SS113-SB0302-SO-0/ 16Q2SS113-SB0302-SO-1 for Method AK102/103. Two associated detected results were qualified as estimated and flagged “J”.
- The RPDs of RRO and DRO were greater than Work Plan criteria in soil FD set 16Q3SS113-SB1002-SO-0/ 16Q3SS113-SB1002-SO-1 for Method AK102/103. Four associated detected results were qualified as estimated and flagged “J”.
- The RPD of zinc was greater than Work Plan criteria in groundwater FD set 16Q3SS113-SB1001-GW-0/ 16Q3SS113-SB1001-GW-1 for Method SW6020A. Two associated detected results were qualified as estimated and flagged “J”.

- The RPDs of 2-hexanone, naphthalene, and n-butylbenzene were greater than Work Plan criteria in groundwater FD set 16Q3SS113-SB1001-GW-0/16Q3SS113-SB1001-GW-1 for Method SW8260B. Five associated detected results were qualified as estimated and flagged "J"; one associated nondetected result was qualified as estimated and flagged "UJ".
- The RPDs of 1,2,4-trimethylbeznene and carbon disulfide were greater than Work Plan criteria in soil FD set 16Q3SS113-SB1002-SO-0/16Q3SS113-SB1002-SO-1 for Method SW8260B-Low. Four associated detected results were qualified as estimated and flagged "J".
- The RPDs of 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene were greater than Work Plan criteria in groundwater FD set 16Q3SS113-SB1001-GW-0/16Q3SS113-SB1001-GW-1 for Method SW8270C-SIM. Six associated detected results were qualified as estimated and flagged "J".
- The RPDs of 1-methylnaphthalene, 2-methylnaphthalene, acenaphthene, acenaphthylene, fluoranthene, fluorene, naphthalene, phenanthrene, and pyrene were greater than Work Plan criteria in soil FD set 16Q3SS113-SB1002-SO-0/16Q3SS113-SB1002-SO-1 for Method SW8270C-SIM. Eighteen associated detected results were qualified as estimated and flagged "J".
- The RPDs of 1-methylnaphthalene, 2-methylnaphthalene, acenaphthene, acenaphthylene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, and pyrene were greater than Work Plan criteria in soil FD set 16Q2SS113-SB0302-SO-0/ 16Q2SS113-SB0302-SO-1 for Method SW8270C-SIM. Twenty-six associated detected results were qualified as estimated and flagged "J"; two associated nondetected results were qualified as estimated and flagged "UJ".

Matrix Spike Samples

The results of MS/MSD analyses provide information about the possible influence of the matrix on either accuracy or precision of the measurements. The field crew designated samples for MS/MSD analysis and the laboratories chose additional samples for MS/MSD analysis. Accuracy and precision criteria were met with the following exceptions:

- The recovery of DRO was less than Work Plan criteria in the MS and MSD of groundwater sample 16Q3SS113-SB1001-GW-0 for Method AK102/103, indicating the associated parent sample result is possibly biased low. The associated detected result was qualified as estimated and flagged "J".
- The recovery of calcium was less than Work Plan criteria in the MS of groundwater sample 16Q3SS113-SB1001-GW-0 for Method SW6020A, indicating the associated parent sample result is possibly biased low. The associated detected result was qualified as estimated and flagged "J".
- The recovery of manganese was greater than Work Plan criteria in the MSD of groundwater sample 16Q3SS113-SB1001-GW-0 for Method SW6020A, indicating the associated parent sample result is possibly biased high. The associated detected result was qualified as estimated and flagged "J".
- The recoveries of barium, calcium, chromium, copper, magnesium, nickel, and vanadium were less than Work Plan criteria in the MS and/or MSD of soil sample 16Q3SS113-SB1003-SO-0 for Method SW6020A, indicating the associated parent sample results are possibly biased low. Seven associated detected results were qualified as estimated and flagged "J".
- The recoveries of 1-methylnaphthalene and chrysene were less than Work Plan criteria in the MS or MSD of soil sample 16Q2SS113-SB0303-SO-0, indicating the associated parent sample results are possibly biased low. Additionally, the RPDs of fluoranthene and pyrene were greater than Work Plan criteria in this same MS/MSD set. Two associated detected results were qualified as estimated and flagged "J"; two associated nondetected results were qualified as estimated and flagged "UJ".

Serial Dilutions

The serial dilution RPDs of copper and nickel were greater than Work Plan criteria in soil sample 16Q2SS113-SB0502-SO-0 for Method SW6020A. The detected result in the primary and FD samples were qualified as estimated and flagged "J".

The serial dilution RPD of copper was greater than Work Plan criteria in groundwater sample 16Q3SS113-SB1001-GW-0 for Method SW6020A. The associated detected result was qualified as estimated and flagged "J".

The serial dilution RPDs of copper, cobalt, calcium, nickel, and potassium were greater than Work Plan criteria in soil sample 16Q3SS113-SB1003-SO-0 for Method SW6020A. The associated detected results were qualified as estimated and flagged "J".

Matrix Interference

The cyclohexane results from groundwater samples 16Q2SS113-SB0302-GW-0, 16Q2SS113-SB0402-GW-0, 16Q2SS113-SB0502-GW-0, and 16Q2SS113-SB0602-GW-0 were reported from a secondary quantitation ion because of matrix interference with the primary ion, and the results are possibly biased. Three associated detected results were qualified as estimated and flagged "J"; one associated nondetected result was qualified as estimated and flagged "UJ".

Internal Standards

Internal standard recoveries were less than Work Plan criteria in soil sample 16Q2SS113-SB0501-SO-0 for Method SW8260B-Low, indicating associated sample results are possibly biased high. Three associated detected results were qualified as estimated and flagged "J".

Surrogates

Surrogates were added to all samples for the methods requiring their use. Surrogate recoveries met criteria with the following exceptions:

- Surrogate recovery was less than Work Plan criteria in soil sample 16Q2SS113-SB0902-SO-0 for Method AK101, indicating associated sample results are possibly biased low. The associated detected result was qualified as estimated and flagged "J".
- Surrogate recoveries were less than Work Plan criteria in soil samples 16Q2SS113-SB0901-SO-0 and 16Q2SS113-SB0902-SO-0 for Method SW8260B, indicating associated sample results are possibly biased low. Eight associated detected results were qualified as estimated and flagged "J"; 50 associated nondetected results were qualified as estimated and flagged "UJ".
- Surrogate recovery was greater than Work Plan criteria in groundwater sample 16Q2SS113-SB0802-GW-0 for Method SW8260B, indicating associated sample results are possibly biased high. Eleven associated detected sample results were qualified as estimated and flagged "J".
- Surrogate recovery was greater than Work Plan criteria in soil sample 16Q2SS113-SB0501-SO-0 for Method SW8260B-Low, indicating associated sample results are possibly biased high. Ten associated detected sample results were qualified as estimated and flagged "J".
- Surrogate recoveries were less than Work Plan criteria in soil sample 16Q2SS113-SB0201-SO-0 for Method SW8270C-SIM, indicating associated sample results are possibly biased low. Fifteen associated detected results were qualified as estimated and flagged "J"; three associated nondetected results were qualified as estimated and flagged "UJ".
- Surrogate recoveries were less than 10 percent in soil sample 16Q2SS113-SB0701-SO-0 for Method SW8270C-SIM, indicating associated sample results are possibly biased significantly low. Sixteen

associated detected results were qualified as estimated and flagged “J”; two associated nondetected results were rejected for project use and flagged “R”.

- Surrogate recoveries were less than Work Plan criteria in groundwater samples 16Q2SS113-SB0202-GW-0, 16Q2SS113-SB0302-GW-0, 16Q2SS113-SB0502-GW-0, 16Q2SS113-SB0802-GW-0, and 16Q2SS113-SB0902-GW-0 for Method SW8270C-SIM, indicating associated sample results are possibly biased low. Twenty-two associated detected results were qualified as estimated and flagged “J”; 68 associated nondetected results were qualified as estimated and flagged “UJ”.
- Surrogate recovery was greater than Work Plan criteria in groundwater sample 16Q2SS113-SB0702-GW-0 for Method SW8270C-SIM, indicating associated sample results are possibly biased high. Sixteen associated detected sample results were qualified as estimated and flagged “J”.

Laboratory Control Samples

LCS/LCSDs were analyzed and all accuracy and precision criteria were met with the following exceptions:

- The RPDs of 1-methylnaphthalene, 2-methylnaphthalene, acenaphthene, naphthalene, and phenanthrene were greater than Work Plan criteria in the LCS/LCSD sets for Method SW8270C-SIM. Seven associated nondetected results were qualified as estimated and flagged “UJ”.

Chain of Custody and Sample Receipt Discrepancies

SDG 16F063

Some sample containers were received broken; sufficient volume remained for analysis.

Some sample container labels were missing times; samples were logged in per the COC.

There were no dates or initials on corrections to the sample labels.

A container was received with no label; the container was not used for analysis.

There were sample name discrepancies between the COC and container labels; samples were logged in per the COC.

SDG 16F064

There were no dates or initials on corrections to the sample labels.

Samples 16Q2SS113-SB0101-SO-0, 16Q2SS113-SB0102-SO-0, 16Q2SS113-SB0201-SO-0, 16Q2SS113-SB0202-SO-0, 16Q2SS113-SB0701-SO-0, 16Q2SS113-SB0702-SO-0, 16Q2SS113-SB0801-SO-0, 16Q2SS113-SB0802-SO-0, 16Q2SS113-SB0901-SO-0, and 16Q2SS113-SB0902-SO-0 were received with leaking methanol containers for methods AK101 and SW8260B. Associated results were qualified as estimated; nondetected results were flagged "UJ" and detected results were flagged "J".

SDG 16F103

There were sample name discrepancies between the COC and container labels, samples were logged in per the COC.

SDG 16F104

There were no dates or initials on corrections to the sample labels.

There were some dates missing from the COC.

Samples 16Q2SS113-SB0303-SO-0, 16Q2SS113-SB0402-SO-0, 16Q2SS113-SB0501-SO-0 were received with leaking methanol containers for methods AK101 and SW8260B. Associated results were qualified as estimated; nondetected results were flagged "UJ" and detected results were flagged "J".

SDG 16I272

There were no dates or initials on corrections to the sample labels.

SDG 16I292

There were sample name discrepancies between the COC and container labels; samples were logged in per the COC.

There were no dates or initials on corrections to the sample labels.

Overall Assessment

The final activity in the data quality evaluation is an assessment of whether the data meet the data quality objectives. The goal of this assessment is to demonstrate that a sufficient number of representative samples were collected and the resulting analytical data can be used to support the decision-making process. The precision, accuracy, representativeness, completeness, and comparability are addressed in the Work Plan. The following summary highlights the data evaluation findings for the above defined events:

1. One soil acenaphthylene result and one soil anthracene result were rejected because of low surrogate recovery. These two method/matrix/analyte combinations still met the completeness objective of 90 percent with completeness of 96.2 percent. Completeness for all other method/matrix/analyte combinations was 100 percent.
2. Approximately 2 percent of the soil SW6020A data were qualified because of low-level detections in the method blanks. The degree to which blank contamination was observed is within reasonable method expectations.
3. Approximately 2 percent of the groundwater SW8260B data were qualified because of low-level detections in the TBs. The degree to which blank contamination was observed is within reasonable method expectations.
4. Approximately 2.7 percent of the soil SW68260B-Low data were qualified because of low-level detections in the TBs and EBs. The degree to which blank contamination was observed is within reasonable method expectations.
5. CCV recovery exceedances was observed for Method SW8260B; three results were qualified as estimated.
6. FD RPD exceedances were observed for Methods AK101, AK102/103, SW6020A, SW8260B, SW8260B-Low, and SW8270C-SIM; 76 results were qualified as estimated.
7. Internal standard recovery exceedances were observed for Method SW8260B-Low; three results were qualified as estimated.
8. LCS RPD exceedances were observed for Method SW8270C-SIM; seven results were qualified as estimated.
9. Cyclohexane was reported from a secondary quantitation ion in four groundwater samples; four results were qualified as estimated.
10. MS/MSD recovery and RPD exceedances were observed for Methods AK102/103, SW8270C-SIM, and SW6020A; 14 results were qualified as estimated.
11. Serial dilution RPD exceedances were observed for Method SW6020A; 10 results were qualified as estimated.

12. Surrogate recovery exceedances were observed for Methods AK101, SW8260B, SW8260B-Low, and SW8270C-SIM; 222 results were qualified as estimated.

13. Thirteen samples were received with leaking containers; 390 results were qualified as estimated.

14. Although data were qualified as estimated because of QC exceedances as noted, overall precision and accuracy of the data, as measured by field and laboratory QC indicators, suggest that data are usable for projects objectives with the exception of the rejected data.

Table 4 Validation Flags

Sample ID	Method	Analyte	Final Result	Units	Final Flag	Reason
16Q2SS113-SB0101-SO-0	AK101	GRO	0.45	mg/kg	UJ	MethLeak
16Q2SS113-SB0101-SO-0	SW8260B	1,2,4-Trimethylbenzene	0.089	mg/kg	UJ	MethLeak
16Q2SS113-SB0101-SO-0	SW8260B	1,2-Dibromoethane	0.045	mg/kg	UJ	MethLeak
16Q2SS113-SB0101-SO-0	SW8260B	1,3,5-Trimethylbenzene	0.089	mg/kg	UJ	MethLeak
16Q2SS113-SB0101-SO-0	SW8260B	2-Butanone	0.22	mg/kg	UJ	MethLeak
16Q2SS113-SB0101-SO-0	SW8260B	2-Hexanone	0.22	mg/kg	UJ	MethLeak
16Q2SS113-SB0101-SO-0	SW8260B	4-Methyl-2-Pentanone	0.22	mg/kg	UJ	MethLeak
16Q2SS113-SB0101-SO-0	SW8260B	Acetone	0.22	mg/kg	UJ	MethLeak
16Q2SS113-SB0101-SO-0	SW8260B	Benzene	0.045	mg/kg	UJ	MethLeak
16Q2SS113-SB0101-SO-0	SW8260B	Bromobenzene	0.045	mg/kg	UJ	MethLeak
16Q2SS113-SB0101-SO-0	SW8260B	Bromoform	0.089	mg/kg	UJ	MethLeak
16Q2SS113-SB0101-SO-0	SW8260B	Bromomethane	0.089	mg/kg	UJ	MethLeak
16Q2SS113-SB0101-SO-0	SW8260B	Carbon Disulfide	0.045	mg/kg	UJ	MethLeak
16Q2SS113-SB0101-SO-0	SW8260B	Cyclohexane	0.22	mg/kg	UJ	MethLeak
16Q2SS113-SB0101-SO-0	SW8260B	Dibromomethane	0.045	mg/kg	UJ	MethLeak
16Q2SS113-SB0101-SO-0	SW8260B	Ethylbenzene	0.045	mg/kg	UJ	MethLeak
16Q2SS113-SB0101-SO-0	SW8260B	Isopropylbenzene	0.089	mg/kg	UJ	MethLeak
16Q2SS113-SB0101-SO-0	SW8260B	M,P-Xylenes	0.089	mg/kg	UJ	MethLeak
16Q2SS113-SB0101-SO-0	SW8260B	Naphthalene	0.089	mg/kg	UJ	MethLeak
16Q2SS113-SB0101-SO-0	SW8260B	N-Butylbenzene	0.045	mg/kg	UJ	MethLeak
16Q2SS113-SB0101-SO-0	SW8260B	N-Propylbenzene	0.045	mg/kg	UJ	MethLeak
16Q2SS113-SB0101-SO-0	SW8260B	O-Xylene	0.045	mg/kg	UJ	MethLeak
16Q2SS113-SB0101-SO-0	SW8260B	P-Isopropyltoluene	0.045	mg/kg	UJ	MethLeak
16Q2SS113-SB0101-SO-0	SW8260B	Sec-Butylbenzene	0.045	mg/kg	UJ	MethLeak
16Q2SS113-SB0101-SO-0	SW8260B	Styrene	0.045	mg/kg	UJ	MethLeak
16Q2SS113-SB0101-SO-0	SW8260B	Tert-Butyl Methyl Ether	0.045	mg/kg	UJ	MethLeak
16Q2SS113-SB0101-SO-0	SW8260B	Tert-Butylbenzene	0.045	mg/kg	UJ	MethLeak
16Q2SS113-SB0101-SO-0	SW8260B	Toluene	0.045	mg/kg	UJ	MethLeak
16Q2SS113-SB0101-SO-0	SW8260B	Vinyl Acetate	0.22	mg/kg	UJ	MethLeak
16Q2SS113-SB0101-SO-0	SW8260B	Xylenes, Total	0.045	mg/kg	UJ	MethLeak
16Q2SS113-SB0102-GW-0	SW8260B	Toluene	0.18	µg/L	B	TB<LOQ

Table 4 Validation Flags

Sample ID	Method	Analyte	Final Result	Units	Final Flag	Reason
16Q2SS113-SB0102-GW-1	SW8260B	Toluene	0.2	µg/L	B	TB<LOQ
16Q2SS113-SB0102-SO-0	AK101	GRO	0.57	mg/kg	UJ	MethLeak
16Q2SS113-SB0102-SO-0	SW8260B	1,2,4-Trimethylbenzene	0.11	mg/kg	UJ	MethLeak
16Q2SS113-SB0102-SO-0	SW8260B	1,2-Dibromoethane	0.057	mg/kg	UJ	MethLeak
16Q2SS113-SB0102-SO-0	SW8260B	1,3,5-Trimethylbenzene	0.11	mg/kg	UJ	MethLeak
16Q2SS113-SB0102-SO-0	SW8260B	2-Butanone	0.28	mg/kg	UJ	MethLeak
16Q2SS113-SB0102-SO-0	SW8260B	2-Hexanone	0.28	mg/kg	UJ	MethLeak
16Q2SS113-SB0102-SO-0	SW8260B	4-Methyl-2-Pentanone	0.28	mg/kg	UJ	MethLeak
16Q2SS113-SB0102-SO-0	SW8260B	Acetone	0.28	mg/kg	UJ	MethLeak
16Q2SS113-SB0102-SO-0	SW8260B	Benzene	0.057	mg/kg	UJ	MethLeak
16Q2SS113-SB0102-SO-0	SW8260B	Bromobenzene	0.057	mg/kg	UJ	MethLeak
16Q2SS113-SB0102-SO-0	SW8260B	Bromoform	0.11	mg/kg	UJ	MethLeak
16Q2SS113-SB0102-SO-0	SW8260B	Bromomethane	0.11	mg/kg	UJ	MethLeak
16Q2SS113-SB0102-SO-0	SW8260B	Carbon Disulfide	0.057	mg/kg	UJ	MethLeak
16Q2SS113-SB0102-SO-0	SW8260B	Cyclohexane	0.28	mg/kg	UJ	MethLeak
16Q2SS113-SB0102-SO-0	SW8260B	Dibromomethane	0.057	mg/kg	UJ	MethLeak
16Q2SS113-SB0102-SO-0	SW8260B	Ethylbenzene	0.057	mg/kg	UJ	MethLeak
16Q2SS113-SB0102-SO-0	SW8260B	Isopropylbenzene	0.11	mg/kg	UJ	MethLeak
16Q2SS113-SB0102-SO-0	SW8260B	M,P-Xylenes	0.11	mg/kg	UJ	MethLeak
16Q2SS113-SB0102-SO-0	SW8260B	Naphthalene	0.11	mg/kg	UJ	MethLeak
16Q2SS113-SB0102-SO-0	SW8260B	N-Butylbenzene	0.057	mg/kg	UJ	MethLeak
16Q2SS113-SB0102-SO-0	SW8260B	N-Propylbenzene	0.057	mg/kg	UJ	MethLeak
16Q2SS113-SB0102-SO-0	SW8260B	O-Xylene	0.057	mg/kg	UJ	MethLeak
16Q2SS113-SB0102-SO-0	SW8260B	P-Isopropyltoluene	0.057	mg/kg	UJ	MethLeak
16Q2SS113-SB0102-SO-0	SW8260B	Sec-Butylbenzene	0.057	mg/kg	UJ	MethLeak
16Q2SS113-SB0102-SO-0	SW8260B	Styrene	0.057	mg/kg	UJ	MethLeak
16Q2SS113-SB0102-SO-0	SW8260B	Tert-Butyl Methyl Ether	0.057	mg/kg	UJ	MethLeak
16Q2SS113-SB0102-SO-0	SW8260B	Tert-Butylbenzene	0.057	mg/kg	UJ	MethLeak
16Q2SS113-SB0102-SO-0	SW8260B	Toluene	0.057	mg/kg	UJ	MethLeak
16Q2SS113-SB0102-SO-0	SW8260B	Vinyl Acetate	0.28	mg/kg	UJ	MethLeak
16Q2SS113-SB0102-SO-0	SW8260B	Xylenes, Total	0.057	mg/kg	UJ	MethLeak
16Q2SS113-SB0201-SO-0	AK101	GRO	1.1	mg/kg	J	MethLeak
16Q2SS113-SB0201-SO-0	SW8260B	1,2,4-Trimethylbenzene	0.11	mg/kg	UJ	MethLeak
16Q2SS113-SB0201-SO-0	SW8260B	1,2-Dibromoethane	0.053	mg/kg	UJ	MethLeak
16Q2SS113-SB0201-SO-0	SW8260B	1,3,5-Trimethylbenzene	0.11	mg/kg	UJ	MethLeak
16Q2SS113-SB0201-SO-0	SW8260B	2-Butanone	0.26	mg/kg	UJ	MethLeak
16Q2SS113-SB0201-SO-0	SW8260B	2-Hexanone	0.26	mg/kg	UJ	MethLeak

Table 4 Validation Flags

Sample ID	Method	Analyte	Final Result	Units	Final Flag	Reason
16Q2SS113-SB0201-SO-0	SW8260B	4-Methyl-2-Pentanone	0.26	mg/kg	UJ	MethLeak
16Q2SS113-SB0201-SO-0	SW8260B	Acetone	0.26	mg/kg	UJ	MethLeak
16Q2SS113-SB0201-SO-0	SW8260B	Benzene	0.053	mg/kg	UJ	MethLeak
16Q2SS113-SB0201-SO-0	SW8260B	Bromobenzene	0.053	mg/kg	UJ	MethLeak
16Q2SS113-SB0201-SO-0	SW8260B	Bromoform	0.11	mg/kg	UJ	MethLeak
16Q2SS113-SB0201-SO-0	SW8260B	Bromomethane	0.11	mg/kg	UJ	MethLeak
16Q2SS113-SB0201-SO-0	SW8260B	Carbon Disulfide	0.053	mg/kg	UJ	MethLeak
16Q2SS113-SB0201-SO-0	SW8260B	Cyclohexane	0.26	mg/kg	UJ	MethLeak
16Q2SS113-SB0201-SO-0	SW8260B	Dibromomethane	0.053	mg/kg	UJ	MethLeak
16Q2SS113-SB0201-SO-0	SW8260B	Ethylbenzene	0.053	mg/kg	UJ	MethLeak
16Q2SS113-SB0201-SO-0	SW8260B	Isopropylbenzene	0.11	mg/kg	UJ	MethLeak
16Q2SS113-SB0201-SO-0	SW8260B	M,P-Xylenes	0.11	mg/kg	UJ	MethLeak
16Q2SS113-SB0201-SO-0	SW8260B	Naphthalene	0.11	mg/kg	UJ	MethLeak
16Q2SS113-SB0201-SO-0	SW8260B	N-Butylbenzene	0.053	mg/kg	UJ	MethLeak
16Q2SS113-SB0201-SO-0	SW8260B	N-Propylbenzene	0.053	mg/kg	UJ	MethLeak
16Q2SS113-SB0201-SO-0	SW8260B	O-Xylene	0.053	mg/kg	UJ	MethLeak
16Q2SS113-SB0201-SO-0	SW8260B	P-Isopropyltoluene	0.053	mg/kg	UJ	MethLeak
16Q2SS113-SB0201-SO-0	SW8260B	Sec-Butylbenzene	0.053	mg/kg	UJ	MethLeak
16Q2SS113-SB0201-SO-0	SW8260B	Styrene	0.053	mg/kg	UJ	MethLeak
16Q2SS113-SB0201-SO-0	SW8260B	Tert-Butyl Methyl Ether	0.053	mg/kg	UJ	MethLeak
16Q2SS113-SB0201-SO-0	SW8260B	Tert-Butylbenzene	0.053	mg/kg	UJ	MethLeak
16Q2SS113-SB0201-SO-0	SW8260B	Toluene	0.059	mg/kg	J	MethLeak
16Q2SS113-SB0201-SO-0	SW8260B	Vinyl Acetate	0.26	mg/kg	UJ	MethLeak
16Q2SS113-SB0201-SO-0	SW8260B	Xylenes, Total	0.053	mg/kg	UJ	MethLeak
16Q2SS113-SB0201-SO-0	SW8270C-SIM	1-Methylnaphthalene	0.037	mg/kg	J	Sur<LCL
16Q2SS113-SB0201-SO-0	SW8270C-SIM	2-Methylnaphthalene	0.048	mg/kg	J	Sur<LCL
16Q2SS113-SB0201-SO-0	SW8270C-SIM	Acenaphthene	0.0028	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0201-SO-0	SW8270C-SIM	Acenaphthylene	0.0028	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0201-SO-0	SW8270C-SIM	Anthracene	0.0099	mg/kg	J	Sur<LCL
16Q2SS113-SB0201-SO-0	SW8270C-SIM	Benzo (a) Anthracene	0.011	mg/kg	J	Sur<LCL
16Q2SS113-SB0201-SO-0	SW8270C-SIM	Benzo (a) Pyrene	0.015	mg/kg	J	Sur<LCL
16Q2SS113-SB0201-SO-0	SW8270C-SIM	Benzo (b) Fluoranthene	0.029	mg/kg	J	Sur<LCL
16Q2SS113-SB0201-SO-0	SW8270C-SIM	Benzo (g,h,i) Perylene	0.014	mg/kg	J	Sur<LCL
16Q2SS113-SB0201-SO-0	SW8270C-SIM	Benzo(k)Fluoranthene	0.011	mg/kg	J	Sur<LCL
16Q2SS113-SB0201-SO-0	SW8270C-SIM	Chrysene	0.023	mg/kg	J	Sur<LCL
16Q2SS113-SB0201-SO-0	SW8270C-SIM	Dibenzo (a,h) Anthracene	0.0028	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0201-SO-0	SW8270C-SIM	Fluoranthene	0.031	mg/kg	J	Sur<LCL

Table 4 Validation Flags

Sample ID	Method	Analyte	Final Result	Units	Final Flag	Reason
16Q2SS113-SB0201-SO-0	SW8270C-SIM	Fluorene	0.028	mg/kg	J	Sur<LCL
16Q2SS113-SB0201-SO-0	SW8270C-SIM	Indeno (1,2,3-c,d) Pyrene	0.01	mg/kg	J	Sur<LCL
16Q2SS113-SB0201-SO-0	SW8270C-SIM	Naphthalene	0.015	mg/kg	J	Sur<LCL
16Q2SS113-SB0201-SO-0	SW8270C-SIM	Phenanthrene	0.054	mg/kg	J	Sur<LCL
16Q2SS113-SB0201-SO-0	SW8270C-SIM	Pyrene	0.045	mg/kg	J	Sur<LCL
16Q2SS113-SB0202-GW-0	SW8260B	Toluene	0.25	µg/L	B	TB<LOQ
16Q2SS113-SB0202-GW-0	SW8270C-SIM	1-Methylnaphthalene	0.11	µg/L	UJ	Sur<LCL
16Q2SS113-SB0202-GW-0	SW8270C-SIM	2-Methylnaphthalene	0.11	µg/L	UJ	Sur<LCL
16Q2SS113-SB0202-GW-0	SW8270C-SIM	Acenaphthene	0.11	µg/L	UJ	Sur<LCL
16Q2SS113-SB0202-GW-0	SW8270C-SIM	Acenaphthylene	0.11	µg/L	UJ	Sur<LCL
16Q2SS113-SB0202-GW-0	SW8270C-SIM	Anthracene	0.11	µg/L	UJ	Sur<LCL
16Q2SS113-SB0202-GW-0	SW8270C-SIM	Benzo (a) Anthracene	0.22	µg/L	UJ	Sur<LCL
16Q2SS113-SB0202-GW-0	SW8270C-SIM	Benzo (a) Pyrene	0.11	µg/L	UJ	Sur<LCL
16Q2SS113-SB0202-GW-0	SW8270C-SIM	Benzo (b) Fluoranthene	0.11	µg/L	UJ	Sur<LCL
16Q2SS113-SB0202-GW-0	SW8270C-SIM	Benzo (g,h,i) Perylene	0.11	µg/L	UJ	Sur<LCL
16Q2SS113-SB0202-GW-0	SW8270C-SIM	Benzo(k)Fluoranthene	0.11	µg/L	UJ	Sur<LCL
16Q2SS113-SB0202-GW-0	SW8270C-SIM	Chrysene	0.22	µg/L	UJ	Sur<LCL
16Q2SS113-SB0202-GW-0	SW8270C-SIM	Dibenzo (a,h) Anthracene	0.11	µg/L	UJ	Sur<LCL
16Q2SS113-SB0202-GW-0	SW8270C-SIM	Fluoranthene	0.11	µg/L	UJ	Sur<LCL
16Q2SS113-SB0202-GW-0	SW8270C-SIM	Fluorene	0.11	µg/L	UJ	Sur<LCL
16Q2SS113-SB0202-GW-0	SW8270C-SIM	Indeno (1,2,3-c,d) Pyrene	0.11	µg/L	UJ	Sur<LCL
16Q2SS113-SB0202-GW-0	SW8270C-SIM	Naphthalene	0.11	µg/L	UJ	Sur<LCL
16Q2SS113-SB0202-GW-0	SW8270C-SIM	Phenanthrene	0.11	µg/L	UJ	Sur<LCL
16Q2SS113-SB0202-GW-0	SW8270C-SIM	Pyrene	0.11	µg/L	UJ	Sur<LCL
16Q2SS113-SB0202-SO-0	AK101	GRO	0.99	mg/kg	J	MethLeak
16Q2SS113-SB0202-SO-0	SW8260B	1,2,4-Trimethylbenzene	0.083	mg/kg	UJ	MethLeak
16Q2SS113-SB0202-SO-0	SW8260B	1,2-Dibromoethane	0.041	mg/kg	UJ	MethLeak
16Q2SS113-SB0202-SO-0	SW8260B	1,3,5-Trimethylbenzene	0.083	mg/kg	UJ	MethLeak
16Q2SS113-SB0202-SO-0	SW8260B	2-Butanone	0.21	mg/kg	UJ	MethLeak
16Q2SS113-SB0202-SO-0	SW8260B	2-Hexanone	0.21	mg/kg	UJ	MethLeak
16Q2SS113-SB0202-SO-0	SW8260B	4-Methyl-2-Pentanone	0.21	mg/kg	UJ	MethLeak
16Q2SS113-SB0202-SO-0	SW8260B	Acetone	0.21	mg/kg	UJ	MethLeak
16Q2SS113-SB0202-SO-0	SW8260B	Benzene	0.041	mg/kg	UJ	MethLeak
16Q2SS113-SB0202-SO-0	SW8260B	Bromobenzene	0.041	mg/kg	UJ	MethLeak
16Q2SS113-SB0202-SO-0	SW8260B	Bromoform	0.083	mg/kg	UJ	MethLeak
16Q2SS113-SB0202-SO-0	SW8260B	Bromomethane	0.083	mg/kg	UJ	MethLeak
16Q2SS113-SB0202-SO-0	SW8260B	Carbon Disulfide	0.041	mg/kg	UJ	MethLeak

Table 4 Validation Flags

Sample ID	Method	Analyte	Final Result	Units	Final Flag	Reason
16Q2SS113-SB0202-SO-0	SW8260B	Cyclohexane	0.21	mg/kg	UJ	MethLeak
16Q2SS113-SB0202-SO-0	SW8260B	Dibromomethane	0.041	mg/kg	UJ	MethLeak
16Q2SS113-SB0202-SO-0	SW8260B	Ethylbenzene	0.041	mg/kg	UJ	MethLeak
16Q2SS113-SB0202-SO-0	SW8260B	Isopropylbenzene	0.083	mg/kg	UJ	MethLeak
16Q2SS113-SB0202-SO-0	SW8260B	M,P-Xylenes	0.083	mg/kg	UJ	MethLeak
16Q2SS113-SB0202-SO-0	SW8260B	Naphthalene	0.083	mg/kg	UJ	MethLeak
16Q2SS113-SB0202-SO-0	SW8260B	N-Butylbenzene	0.041	mg/kg	UJ	MethLeak
16Q2SS113-SB0202-SO-0	SW8260B	N-Propylbenzene	0.041	mg/kg	UJ	MethLeak
16Q2SS113-SB0202-SO-0	SW8260B	O-Xylene	0.041	mg/kg	UJ	MethLeak
16Q2SS113-SB0202-SO-0	SW8260B	P-Isopropyltoluene	0.041	mg/kg	UJ	MethLeak
16Q2SS113-SB0202-SO-0	SW8260B	Sec-Butylbenzene	0.041	mg/kg	UJ	MethLeak
16Q2SS113-SB0202-SO-0	SW8260B	Styrene	0.041	mg/kg	UJ	MethLeak
16Q2SS113-SB0202-SO-0	SW8260B	Tert-Butyl Methyl Ether	0.041	mg/kg	UJ	MethLeak
16Q2SS113-SB0202-SO-0	SW8260B	Tert-Butylbenzene	0.041	mg/kg	UJ	MethLeak
16Q2SS113-SB0202-SO-0	SW8260B	Toluene	0.041	mg/kg	UJ	MethLeak
16Q2SS113-SB0202-SO-0	SW8260B	Vinyl Acetate	0.21	mg/kg	UJ	MethLeak
16Q2SS113-SB0202-SO-0	SW8260B	Xylenes, Total	0.041	mg/kg	UJ	MethLeak
16Q2SS113-SB0302-GW-0	SW8260B	Cyclohexane	0.43	µg/L	J	CCV>UCL
16Q2SS113-SB0302-GW-0	SW8260B	Cyclohexane	0.43	µg/L	J	MI
16Q2SS113-SB0302-GW-0	SW8260B	Toluene	0.13	µg/L	B	TB<LOQ
16Q2SS113-SB0302-GW-0	SW8270C-SIM	1-Methylnaphthalene	0.1	µg/L	UJ	Sur<LCL
16Q2SS113-SB0302-GW-0	SW8270C-SIM	2-Methylnaphthalene	0.1	µg/L	UJ	Sur<LCL
16Q2SS113-SB0302-GW-0	SW8270C-SIM	Acenaphthene	0.46	µg/L	J	Sur<LCL
16Q2SS113-SB0302-GW-0	SW8270C-SIM	Acenaphthylene	0.1	µg/L	UJ	Sur<LCL
16Q2SS113-SB0302-GW-0	SW8270C-SIM	Anthracene	0.1	µg/L	UJ	Sur<LCL
16Q2SS113-SB0302-GW-0	SW8270C-SIM	Benzo (a) Anthracene	0.1	µg/L	J	Sur<LCL
16Q2SS113-SB0302-GW-0	SW8270C-SIM	Benzo (a) Pyrene	0.067	µg/L	J	Sur<LCL
16Q2SS113-SB0302-GW-0	SW8270C-SIM	Benzo (b) Fluoranthene	0.13	µg/L	J	Sur<LCL
16Q2SS113-SB0302-GW-0	SW8270C-SIM	Benzo (g,h,i) Perylene	0.1	µg/L	UJ	Sur<LCL
16Q2SS113-SB0302-GW-0	SW8270C-SIM	Benzo(k)Fluoranthene	0.1	µg/L	UJ	Sur<LCL
16Q2SS113-SB0302-GW-0	SW8270C-SIM	Chrysene	0.1	µg/L	J	Sur<LCL
16Q2SS113-SB0302-GW-0	SW8270C-SIM	Dibenzo (a,h) Anthracene	0.1	µg/L	UJ	Sur<LCL
16Q2SS113-SB0302-GW-0	SW8270C-SIM	Fluoranthene	0.36	µg/L	J	Sur<LCL
16Q2SS113-SB0302-GW-0	SW8270C-SIM	Fluorene	0.1	µg/L	UJ	Sur<LCL
16Q2SS113-SB0302-GW-0	SW8270C-SIM	Indeno (1,2,3-c,d) Pyrene	0.1	µg/L	UJ	Sur<LCL
16Q2SS113-SB0302-GW-0	SW8270C-SIM	Naphthalene	0.1	µg/L	UJ	Sur<LCL
16Q2SS113-SB0302-GW-0	SW8270C-SIM	Phenanthrene	0.1	µg/L	UJ	Sur<LCL

Table 4 Validation Flags

Sample ID	Method	Analyte	Final Result	Units	Final Flag	Reason
16Q2SS113-SB0302-GW-0	SW8270C-SIM	Pyrene	0.4	µg/L	J	Sur<LCL
16Q2SS113-SB0302-SO-0	AK102/103	RRO	200	mg/kg	J	FD>RPD
16Q2SS113-SB0302-SO-0	SW8270C-SIM	1-Methylnaphthalene	0.12	mg/kg	J	FD>RPD
16Q2SS113-SB0302-SO-0	SW8270C-SIM	2-Methylnaphthalene	0.11	mg/kg	J	FD>RPD
16Q2SS113-SB0302-SO-0	SW8270C-SIM	Acenaphthene	0.052	mg/kg	J	FD>RPD
16Q2SS113-SB0302-SO-0	SW8270C-SIM	Acenaphthylene	0.0033	mg/kg	UJ	FD>RPD
16Q2SS113-SB0302-SO-0	SW8270C-SIM	Benzo (a) Anthracene	0.085	mg/kg	J	FD>RPD
16Q2SS113-SB0302-SO-0	SW8270C-SIM	Benzo (a) Pyrene	0.039	mg/kg	J	FD>RPD
16Q2SS113-SB0302-SO-0	SW8270C-SIM	Benzo (b) Fluoranthene	0.074	mg/kg	J	FD>RPD
16Q2SS113-SB0302-SO-0	SW8270C-SIM	Benzo (g,h,i) Perylene	0.018	mg/kg	J	FD>RPD
16Q2SS113-SB0302-SO-0	SW8270C-SIM	Benzo(k)Fluoranthene	0.023	mg/kg	J	FD>RPD
16Q2SS113-SB0302-SO-0	SW8270C-SIM	Chrysene	0.085	mg/kg	J	FD>RPD
16Q2SS113-SB0302-SO-0	SW8270C-SIM	Fluoranthene	0.33	mg/kg	J	FD>RPD
16Q2SS113-SB0302-SO-0	SW8270C-SIM	Fluorene	0.0033	mg/kg	UJ	FD>RPD
16Q2SS113-SB0302-SO-0	SW8270C-SIM	Indeno (1,2,3-c,d) Pyrene	0.02	mg/kg	J	FD>RPD
16Q2SS113-SB0302-SO-0	SW8270C-SIM	Pyrene	0.29	mg/kg	J	FD>RPD
16Q2SS113-SB0302-SO-1	AK102/103	RRO	53	mg/kg	J	FD>RPD
16Q2SS113-SB0302-SO-1	SW8270C-SIM	1-Methylnaphthalene	0.22	mg/kg	J	FD>RPD
16Q2SS113-SB0302-SO-1	SW8270C-SIM	2-Methylnaphthalene	0.2	mg/kg	J	FD>RPD
16Q2SS113-SB0302-SO-1	SW8270C-SIM	Acenaphthene	0.021	mg/kg	J	FD>RPD
16Q2SS113-SB0302-SO-1	SW8270C-SIM	Acenaphthylene	0.013	mg/kg	J	FD>RPD
16Q2SS113-SB0302-SO-1	SW8270C-SIM	Benzo (a) Anthracene	0.017	mg/kg	J	FD>RPD
16Q2SS113-SB0302-SO-1	SW8270C-SIM	Benzo (a) Pyrene	0.0078	mg/kg	J	FD>RPD
16Q2SS113-SB0302-SO-1	SW8270C-SIM	Benzo (b) Fluoranthene	0.014	mg/kg	J	FD>RPD
16Q2SS113-SB0302-SO-1	SW8270C-SIM	Benzo (g,h,i) Perylene	0.004	mg/kg	J	FD>RPD
16Q2SS113-SB0302-SO-1	SW8270C-SIM	Benzo(k)Fluoranthene	0.0055	mg/kg	J	FD>RPD
16Q2SS113-SB0302-SO-1	SW8270C-SIM	Chrysene	0.012	mg/kg	J	FD>RPD
16Q2SS113-SB0302-SO-1	SW8270C-SIM	Fluoranthene	0.048	mg/kg	J	FD>RPD
16Q2SS113-SB0302-SO-1	SW8270C-SIM	Fluorene	0.073	mg/kg	J	FD>RPD
16Q2SS113-SB0302-SO-1	SW8270C-SIM	Indeno (1,2,3-c,d) Pyrene	0.0036	mg/kg	J	FD>RPD
16Q2SS113-SB0302-SO-1	SW8270C-SIM	Pyrene	0.045	mg/kg	J	FD>RPD
16Q2SS113-SB0303-SO-0	AK101	GRO	0.85	mg/kg	J	MethLeak
16Q2SS113-SB0303-SO-0	SW8260B	1,2,4-Trimethylbenzene	0.14	mg/kg	UJ	MethLeak
16Q2SS113-SB0303-SO-0	SW8260B	1,2-Dibromoethane	0.07	mg/kg	UJ	MethLeak
16Q2SS113-SB0303-SO-0	SW8260B	1,3,5-Trimethylbenzene	0.14	mg/kg	UJ	MethLeak
16Q2SS113-SB0303-SO-0	SW8260B	2-Butanone	0.35	mg/kg	UJ	MethLeak
16Q2SS113-SB0303-SO-0	SW8260B	2-Hexanone	0.35	mg/kg	UJ	MethLeak

Table 4 Validation Flags

Sample ID	Method	Analyte	Final Result	Units	Final Flag	Reason
16Q2SS113-SB0303-SO-0	SW8260B	4-Methyl-2-Pentanone	0.35	mg/kg	UJ	MethLeak
16Q2SS113-SB0303-SO-0	SW8260B	Acetone	0.35	mg/kg	UJ	MethLeak
16Q2SS113-SB0303-SO-0	SW8260B	Benzene	0.07	mg/kg	UJ	MethLeak
16Q2SS113-SB0303-SO-0	SW8260B	Bromobenzene	0.07	mg/kg	UJ	MethLeak
16Q2SS113-SB0303-SO-0	SW8260B	Bromoform	0.14	mg/kg	UJ	MethLeak
16Q2SS113-SB0303-SO-0	SW8260B	Bromomethane	0.14	mg/kg	UJ	MethLeak
16Q2SS113-SB0303-SO-0	SW8260B	Carbon Disulfide	0.07	mg/kg	UJ	MethLeak
16Q2SS113-SB0303-SO-0	SW8260B	Cyclohexane	0.35	mg/kg	UJ	MethLeak
16Q2SS113-SB0303-SO-0	SW8260B	Dibromomethane	0.07	mg/kg	UJ	MethLeak
16Q2SS113-SB0303-SO-0	SW8260B	Ethylbenzene	0.07	mg/kg	UJ	MethLeak
16Q2SS113-SB0303-SO-0	SW8260B	Isopropylbenzene	0.14	mg/kg	UJ	MethLeak
16Q2SS113-SB0303-SO-0	SW8260B	M,P-Xylenes	0.14	mg/kg	UJ	MethLeak
16Q2SS113-SB0303-SO-0	SW8260B	Naphthalene	0.14	mg/kg	UJ	MethLeak
16Q2SS113-SB0303-SO-0	SW8260B	N-Butylbenzene	0.07	mg/kg	UJ	MethLeak
16Q2SS113-SB0303-SO-0	SW8260B	N-Propylbenzene	0.07	mg/kg	UJ	MethLeak
16Q2SS113-SB0303-SO-0	SW8260B	O-Xylene	0.07	mg/kg	UJ	MethLeak
16Q2SS113-SB0303-SO-0	SW8260B	P-Isopropyltoluene	0.07	mg/kg	UJ	MethLeak
16Q2SS113-SB0303-SO-0	SW8260B	Sec-Butylbenzene	0.07	mg/kg	UJ	MethLeak
16Q2SS113-SB0303-SO-0	SW8260B	Styrene	0.07	mg/kg	UJ	MethLeak
16Q2SS113-SB0303-SO-0	SW8260B	Tert-Butyl Methyl Ether	0.07	mg/kg	UJ	MethLeak
16Q2SS113-SB0303-SO-0	SW8260B	Tert-Butylbenzene	0.07	mg/kg	UJ	MethLeak
16Q2SS113-SB0303-SO-0	SW8260B	Toluene	0.07	mg/kg	UJ	MethLeak
16Q2SS113-SB0303-SO-0	SW8260B	Vinyl Acetate	0.35	mg/kg	UJ	MethLeak
16Q2SS113-SB0303-SO-0	SW8260B	Xylenes, Total	0.07	mg/kg	UJ	MethLeak
16Q2SS113-SB0303-SO-0	SW8270C-SIM	1-Methylnaphthalene	0.0029	mg/kg	UJ	SD<LCL
16Q2SS113-SB0303-SO-0	SW8270C-SIM	Chrysene	0.0058	mg/kg	UJ	MS<LCL
16Q2SS113-SB0303-SO-0	SW8270C-SIM	Fluoranthene	0.0051	mg/kg	J	MSRPD
16Q2SS113-SB0303-SO-0	SW8270C-SIM	Pyrene	0.0042	mg/kg	J	MSRPD
16Q2SS113-SB0402-GW-0	SW8260B	Cyclohexane	0.5	µg/L	UJ	MI
16Q2SS113-SB0402-GW-0	SW8260B	Toluene	0.19	µg/L	B	TB<LOQ
16Q2SS113-SB0402-SO-0	AK101	GRO	12	mg/kg	J	MethLeak
16Q2SS113-SB0402-SO-0	SW8260B	1,2,4-Trimethylbenzene	0.066	mg/kg	J	MethLeak
16Q2SS113-SB0402-SO-0	SW8260B	1,2-Dibromoethane	0.072	mg/kg	UJ	MethLeak
16Q2SS113-SB0402-SO-0	SW8260B	1,3,5-Trimethylbenzene	0.14	mg/kg	UJ	MethLeak
16Q2SS113-SB0402-SO-0	SW8260B	2-Butanone	0.36	mg/kg	UJ	MethLeak
16Q2SS113-SB0402-SO-0	SW8260B	2-Hexanone	0.36	mg/kg	UJ	MethLeak
16Q2SS113-SB0402-SO-0	SW8260B	4-Methyl-2-Pentanone	0.36	mg/kg	UJ	MethLeak

Table 4 Validation Flags

Sample ID	Method	Analyte	Final Result	Units	Final Flag	Reason
16Q2SS113-SB0402-SO-0	SW8260B	Acetone	0.33	mg/kg	J	MethLeak
16Q2SS113-SB0402-SO-0	SW8260B	Benzene	0.072	mg/kg	UJ	MethLeak
16Q2SS113-SB0402-SO-0	SW8260B	Bromobenzene	0.072	mg/kg	UJ	MethLeak
16Q2SS113-SB0402-SO-0	SW8260B	Bromoform	0.14	mg/kg	UJ	MethLeak
16Q2SS113-SB0402-SO-0	SW8260B	Bromomethane	0.14	mg/kg	UJ	MethLeak
16Q2SS113-SB0402-SO-0	SW8260B	Carbon Disulfide	0.072	mg/kg	UJ	MethLeak
16Q2SS113-SB0402-SO-0	SW8260B	Cyclohexane	0.36	mg/kg	UJ	MethLeak
16Q2SS113-SB0402-SO-0	SW8260B	Dibromomethane	0.072	mg/kg	UJ	MethLeak
16Q2SS113-SB0402-SO-0	SW8260B	Ethylbenzene	0.041	mg/kg	J	MethLeak
16Q2SS113-SB0402-SO-0	SW8260B	Isopropylbenzene	0.14	mg/kg	UJ	MethLeak
16Q2SS113-SB0402-SO-0	SW8260B	M,P-Xylenes	0.14	mg/kg	J	MethLeak
16Q2SS113-SB0402-SO-0	SW8260B	Naphthalene	0.14	mg/kg	UJ	MethLeak
16Q2SS113-SB0402-SO-0	SW8260B	N-Butylbenzene	0.072	mg/kg	UJ	MethLeak
16Q2SS113-SB0402-SO-0	SW8260B	N-Propylbenzene	0.074	mg/kg	J	MethLeak
16Q2SS113-SB0402-SO-0	SW8260B	O-Xylene	0.072	mg/kg	UJ	MethLeak
16Q2SS113-SB0402-SO-0	SW8260B	P-Isopropyltoluene	0.072	mg/kg	UJ	MethLeak
16Q2SS113-SB0402-SO-0	SW8260B	Sec-Butylbenzene	0.072	mg/kg	UJ	MethLeak
16Q2SS113-SB0402-SO-0	SW8260B	Styrene	0.072	mg/kg	UJ	MethLeak
16Q2SS113-SB0402-SO-0	SW8260B	Tert-Butyl Methyl Ether	0.072	mg/kg	UJ	MethLeak
16Q2SS113-SB0402-SO-0	SW8260B	Tert-Butylbenzene	0.072	mg/kg	UJ	MethLeak
16Q2SS113-SB0402-SO-0	SW8260B	Toluene	0.072	mg/kg	UJ	MethLeak
16Q2SS113-SB0402-SO-0	SW8260B	Vinyl Acetate	0.36	mg/kg	UJ	MethLeak
16Q2SS113-SB0402-SO-0	SW8260B	Xylenes, Total	0.14	mg/kg	J	MethLeak
16Q2SS113-SB0501-SO-0	AK101	GRO	0.54	mg/kg	J	MethLeak
16Q2SS113-SB0501-SO-0	SW6020	Antimony	0.492	mg/kg	B	LB<LOQ
16Q2SS113-SB0501-SO-0	SW8260B	1,2,4-Trimethylbenzene	0.19	mg/kg	UJ	MethLeak
16Q2SS113-SB0501-SO-0	SW8260B	1,2-Dibromoethane	0.094	mg/kg	UJ	MethLeak
16Q2SS113-SB0501-SO-0	SW8260B	1,3,5-Trimethylbenzene	0.19	mg/kg	UJ	MethLeak
16Q2SS113-SB0501-SO-0	SW8260B	2-Butanone	0.47	mg/kg	UJ	MethLeak
16Q2SS113-SB0501-SO-0	SW8260B	2-Hexanone	0.47	mg/kg	UJ	MethLeak
16Q2SS113-SB0501-SO-0	SW8260B	4-Methyl-2-Pentanone	0.47	mg/kg	UJ	MethLeak
16Q2SS113-SB0501-SO-0	SW8260B	Acetone	0.47	mg/kg	UJ	MethLeak
16Q2SS113-SB0501-SO-0	SW8260B	Benzene	0.094	mg/kg	UJ	MethLeak
16Q2SS113-SB0501-SO-0	SW8260B	Bromobenzene	0.094	mg/kg	UJ	MethLeak
16Q2SS113-SB0501-SO-0	SW8260B	Bromoform	0.19	mg/kg	UJ	MethLeak
16Q2SS113-SB0501-SO-0	SW8260B	Bromomethane	0.19	mg/kg	UJ	MethLeak
16Q2SS113-SB0501-SO-0	SW8260B	Carbon Disulfide	0.094	mg/kg	UJ	MethLeak

Table 4 Validation Flags

Sample ID	Method	Analyte	Final Result	Units	Final Flag	Reason
16Q2SS113-SB0501-SO-0	SW8260B	Cyclohexane	0.47	mg/kg	UJ	MethLeak
16Q2SS113-SB0501-SO-0	SW8260B	Dibromomethane	0.094	mg/kg	UJ	MethLeak
16Q2SS113-SB0501-SO-0	SW8260B	Ethylbenzene	0.094	mg/kg	UJ	MethLeak
16Q2SS113-SB0501-SO-0	SW8260B	Isopropylbenzene	0.19	mg/kg	UJ	MethLeak
16Q2SS113-SB0501-SO-0	SW8260B	M,P-Xylenes	0.19	mg/kg	UJ	MethLeak
16Q2SS113-SB0501-SO-0	SW8260B	Naphthalene	0.19	mg/kg	UJ	MethLeak
16Q2SS113-SB0501-SO-0	SW8260B	N-Butylbenzene	0.094	mg/kg	UJ	MethLeak
16Q2SS113-SB0501-SO-0	SW8260B	N-Propylbenzene	0.094	mg/kg	UJ	MethLeak
16Q2SS113-SB0501-SO-0	SW8260B	O-Xylene	0.094	mg/kg	UJ	MethLeak
16Q2SS113-SB0501-SO-0	SW8260B	P-Isopropyltoluene	0.094	mg/kg	UJ	MethLeak
16Q2SS113-SB0501-SO-0	SW8260B	Sec-Butylbenzene	0.094	mg/kg	UJ	MethLeak
16Q2SS113-SB0501-SO-0	SW8260B	Styrene	0.094	mg/kg	UJ	MethLeak
16Q2SS113-SB0501-SO-0	SW8260B	Tert-Butyl Methyl Ether	0.094	mg/kg	UJ	MethLeak
16Q2SS113-SB0501-SO-0	SW8260B	Tert-Butylbenzene	0.094	mg/kg	UJ	MethLeak
16Q2SS113-SB0501-SO-0	SW8260B	Toluene	0.094	mg/kg	UJ	MethLeak
16Q2SS113-SB0501-SO-0	SW8260B	Vinyl Acetate	0.47	mg/kg	UJ	MethLeak
16Q2SS113-SB0501-SO-0	SW8260B	Xylenes, Total	0.094	mg/kg	UJ	MethLeak
16Q2SS113-SB0501-SO-0	SW8260B-Low	1,2,4-Trimethylbenzene	0.011	mg/kg	J	IS<LCL
16Q2SS113-SB0501-SO-0	SW8260B-Low	1,2,4-Trimethylbenzene	0.011	mg/kg	J	Sur>UCL
16Q2SS113-SB0501-SO-0	SW8260B-Low	1,3,5-Trimethylbenzene	0.014	mg/kg	J	IS<LCL
16Q2SS113-SB0501-SO-0	SW8260B-Low	1,3,5-Trimethylbenzene	0.014	mg/kg	J	Sur>UCL
16Q2SS113-SB0501-SO-0	SW8260B-Low	2-Butanone	0.048	mg/kg	J	Sur>UCL
16Q2SS113-SB0501-SO-0	SW8260B-Low	Acetone	0.34	mg/kg	J	Sur>UCL
16Q2SS113-SB0501-SO-0	SW8260B-Low	Benzene	0.0043	mg/kg	J	Sur>UCL
16Q2SS113-SB0501-SO-0	SW8260B-Low	Cyclohexane	0.1	mg/kg	J	Sur>UCL
16Q2SS113-SB0501-SO-0	SW8260B-Low	Isopropylbenzene	0.0065	mg/kg	J	IS<LCL
16Q2SS113-SB0501-SO-0	SW8260B-Low	Isopropylbenzene	0.0065	mg/kg	J	Sur>UCL
16Q2SS113-SB0501-SO-0	SW8260B-Low	M,P-Xylenes	0.011	mg/kg	B	EB<LOQ
16Q2SS113-SB0501-SO-0	SW8260B-Low	M,P-Xylenes	0.011	mg/kg	B	Sur>UCL
16Q2SS113-SB0501-SO-0	SW8260B-Low	O-Xylene	0.0028	mg/kg	J	Sur>UCL
16Q2SS113-SB0501-SO-0	SW8260B-Low	Toluene	0.0013	mg/kg	B	EB<LOQ
16Q2SS113-SB0501-SO-0	SW8260B-Low	Toluene	0.0013	mg/kg	B	Sur>UCL
16Q2SS113-SB0502-GW-0	SW8260B	Cyclohexane	0.51	µg/L	J	MI
16Q2SS113-SB0502-GW-0	SW8260B	Toluene	0.1	µg/L	B	TB<LOQ
16Q2SS113-SB0502-GW-0	SW8270C-SIM	1-Methylnaphthalene	0.24	µg/L	J	Sur<LCL
16Q2SS113-SB0502-GW-0	SW8270C-SIM	2-Methylnaphthalene	0.11	µg/L	J	Sur<LCL
16Q2SS113-SB0502-GW-0	SW8270C-SIM	Acenaphthene	0.26	µg/L	J	Sur<LCL

Table 4 Validation Flags

Sample ID	Method	Analyte	Final Result	Units	Final Flag	Reason
16Q2SS113-SB0502-GW-0	SW8270C-SIM	Acenaphthylene	0.12	µg/L	UJ	Sur<LCL
16Q2SS113-SB0502-GW-0	SW8270C-SIM	Anthracene	0.12	µg/L	UJ	Sur<LCL
16Q2SS113-SB0502-GW-0	SW8270C-SIM	Benzo (a) Anthracene	0.24	µg/L	UJ	Sur<LCL
16Q2SS113-SB0502-GW-0	SW8270C-SIM	Benzo (a) Pyrene	0.12	µg/L	UJ	Sur<LCL
16Q2SS113-SB0502-GW-0	SW8270C-SIM	Benzo (b) Fluoranthene	0.12	µg/L	UJ	Sur<LCL
16Q2SS113-SB0502-GW-0	SW8270C-SIM	Benzo (g,h,i) Perylene	0.12	µg/L	UJ	Sur<LCL
16Q2SS113-SB0502-GW-0	SW8270C-SIM	Benzo(k)Fluoranthene	0.12	µg/L	UJ	Sur<LCL
16Q2SS113-SB0502-GW-0	SW8270C-SIM	Chrysene	0.24	µg/L	UJ	Sur<LCL
16Q2SS113-SB0502-GW-0	SW8270C-SIM	Dibenzo (a,h) Anthracene	0.12	µg/L	UJ	Sur<LCL
16Q2SS113-SB0502-GW-0	SW8270C-SIM	Fluoranthene	0.12	µg/L	UJ	Sur<LCL
16Q2SS113-SB0502-GW-0	SW8270C-SIM	Fluorene	0.092	µg/L	J	Sur<LCL
16Q2SS113-SB0502-GW-0	SW8270C-SIM	Indeno (1,2,3-c,d) Pyrene	0.12	µg/L	UJ	Sur<LCL
16Q2SS113-SB0502-GW-0	SW8270C-SIM	Naphthalene	0.2	µg/L	J	Sur<LCL
16Q2SS113-SB0502-GW-0	SW8270C-SIM	Phenanthrene	0.084	µg/L	J	Sur<LCL
16Q2SS113-SB0502-GW-0	SW8270C-SIM	Pyrene	0.12	µg/L	UJ	Sur<LCL
16Q2SS113-SB0502-SO-0	AK102/103	DRO	110	mg/kg	J	FD>RPD
16Q2SS113-SB0502-SO-0	SW6020	Antimony	0.256	mg/kg	B	LB<LOQ
16Q2SS113-SB0502-SO-0	SW6020	Copper	22.1	mg/kg	J	SerDilOut
16Q2SS113-SB0502-SO-0	SW6020	Nickel	30.1	mg/kg	J	SerDilOut
16Q2SS113-SB0502-SO-0	SW8260B-Low	Acetone	0.015	mg/kg	B	EB<LOQ
16Q2SS113-SB0502-SO-0	SW8260B-Low	Ethylbenzene	0.00069	mg/kg	B	EB<LOQ
16Q2SS113-SB0502-SO-0	SW8260B-Low	O-Xylene	0.00055	mg/kg	B	EB<LOQ
16Q2SS113-SB0502-SO-1	AK102/103	DRO	1400	mg/kg	J	FD>RPD
16Q2SS113-SB0502-SO-1	SW6020	Antimony	0.241	mg/kg	B	LB<LOQ
16Q2SS113-SB0502-SO-1	SW6020	Copper	24.6	mg/kg	J	SerDilOut
16Q2SS113-SB0502-SO-1	SW6020	Nickel	28.9	mg/kg	J	SerDilOut
16Q2SS113-SB0502-SO-1	SW8260B-Low	Acetone	0.012	mg/kg	B	EB<LOQ
16Q2SS113-SB0502-SO-1	SW8260B-Low	Ethylbenzene	0.00061	mg/kg	B	EB<LOQ
16Q2SS113-SB0502-SO-1	SW8260B-Low	M,P-Xylenes	0.0014	mg/kg	B	EB<LOQ
16Q2SS113-SB0503-SO-0	SW6020	Antimony	0.31	mg/kg	B	LB<LOQ
16Q2SS113-SB0503-SO-0	SW8260B-Low	Acetone	0.0081	mg/kg	B	EB<LOQ
16Q2SS113-SB0503-SO-0	SW8260B-Low	Ethylbenzene	0.00058	mg/kg	B	EB<LOQ
16Q2SS113-SB0602-GW-0	SW8260B	Cyclohexane	0.55	µg/L	J	MI
16Q2SS113-SB0602-GW-0	SW8260B	Toluene	0.12	µg/L	B	TB<LOQ
16Q2SS113-SB0701-SO-0	AK101	GRO	660	mg/kg	J	MethLeak
16Q2SS113-SB0701-SO-0	SW8260B	1,2,4-Trimethylbenzene	14	mg/kg	J	MethLeak
16Q2SS113-SB0701-SO-0	SW8260B	1,2-Dibromoethane	0.12	mg/kg	UJ	MethLeak

Table 4 Validation Flags

Sample ID	Method	Analyte	Final Result	Units	Final Flag	Reason
16Q2SS113-SB0701-SO-0	SW8260B	1,3,5-Trimethylbenzene	9.1	mg/kg	J	MethLeak
16Q2SS113-SB0701-SO-0	SW8260B	2-Butanone	0.58	mg/kg	UJ	MethLeak
16Q2SS113-SB0701-SO-0	SW8260B	2-Hexanone	0.58	mg/kg	UJ	MethLeak
16Q2SS113-SB0701-SO-0	SW8260B	4-Methyl-2-Pentanone	0.58	mg/kg	UJ	MethLeak
16Q2SS113-SB0701-SO-0	SW8260B	Acetone	0.58	mg/kg	UJ	MethLeak
16Q2SS113-SB0701-SO-0	SW8260B	Benzene	0.12	mg/kg	J	MethLeak
16Q2SS113-SB0701-SO-0	SW8260B	Bromobenzene	0.12	mg/kg	UJ	MethLeak
16Q2SS113-SB0701-SO-0	SW8260B	Bromoform	0.23	mg/kg	UJ	MethLeak
16Q2SS113-SB0701-SO-0	SW8260B	Bromomethane	0.23	mg/kg	UJ	MethLeak
16Q2SS113-SB0701-SO-0	SW8260B	Carbon Disulfide	0.12	mg/kg	UJ	MethLeak
16Q2SS113-SB0701-SO-0	SW8260B	Cyclohexane	5.7	mg/kg	J	MethLeak
16Q2SS113-SB0701-SO-0	SW8260B	Dibromomethane	0.12	mg/kg	UJ	MethLeak
16Q2SS113-SB0701-SO-0	SW8260B	Ethylbenzene	0.59	mg/kg	J	MethLeak
16Q2SS113-SB0701-SO-0	SW8260B	Isopropylbenzene	0.61	mg/kg	J	MethLeak
16Q2SS113-SB0701-SO-0	SW8260B	M,P-Xylenes	4.7	mg/kg	J	MethLeak
16Q2SS113-SB0701-SO-0	SW8260B	Naphthalene	8.5	mg/kg	J	MethLeak
16Q2SS113-SB0701-SO-0	SW8260B	N-Butylbenzene	1.4	mg/kg	J	MethLeak
16Q2SS113-SB0701-SO-0	SW8260B	N-Propylbenzene	0.81	mg/kg	J	MethLeak
16Q2SS113-SB0701-SO-0	SW8260B	O-Xylene	0.097	mg/kg	J	MethLeak
16Q2SS113-SB0701-SO-0	SW8260B	P-Isopropyltoluene	2.8	mg/kg	J	MethLeak
16Q2SS113-SB0701-SO-0	SW8260B	Sec-Butylbenzene	0.12	mg/kg	UJ	MethLeak
16Q2SS113-SB0701-SO-0	SW8260B	Styrene	0.12	mg/kg	UJ	MethLeak
16Q2SS113-SB0701-SO-0	SW8260B	Tert-Butyl Methyl Ether	0.12	mg/kg	UJ	MethLeak
16Q2SS113-SB0701-SO-0	SW8260B	Tert-Butylbenzene	0.49	mg/kg	J	MethLeak
16Q2SS113-SB0701-SO-0	SW8260B	Toluene	0.12	mg/kg	UJ	MethLeak
16Q2SS113-SB0701-SO-0	SW8260B	Vinyl Acetate	0.58	mg/kg	UJ	MethLeak
16Q2SS113-SB0701-SO-0	SW8260B	Xylenes, Total	4.8	mg/kg	J	MethLeak
16Q2SS113-SB0701-SO-0	SW8270C-SIM	1-Methylnaphthalene	47	mg/kg	J	Sur<LCL
16Q2SS113-SB0701-SO-0	SW8270C-SIM	2-Methylnaphthalene	53	mg/kg	J	Sur<LCL
16Q2SS113-SB0701-SO-0	SW8270C-SIM	Acenaphthene	3.7	mg/kg	J	Sur<LCL
16Q2SS113-SB0701-SO-0	SW8270C-SIM	Acenaphthylene	0.042	mg/kg	R	Sur<LCL
16Q2SS113-SB0701-SO-0	SW8270C-SIM	Anthracene	0.042	mg/kg	R	Sur<LCL
16Q2SS113-SB0701-SO-0	SW8270C-SIM	Benzo (a) Anthracene	1.6	mg/kg	J	Sur<LCL
16Q2SS113-SB0701-SO-0	SW8270C-SIM	Benzo (a) Pyrene	0.84	mg/kg	J	Sur<LCL
16Q2SS113-SB0701-SO-0	SW8270C-SIM	Benzo (b) Fluoranthene	1.6	mg/kg	J	Sur<LCL
16Q2SS113-SB0701-SO-0	SW8270C-SIM	Benzo (g,h,i) Perylene	0.38	mg/kg	J	Sur<LCL
16Q2SS113-SB0701-SO-0	SW8270C-SIM	Benzo(k)Fluoranthene	0.53	mg/kg	J	Sur<LCL

Table 4 Validation Flags

Sample ID	Method	Analyte	Final Result	Units	Final Flag	Reason
16Q2SS113-SB0701-SO-0	SW8270C-SIM	Chrysene	1.8	mg/kg	J	Sur<LCL
16Q2SS113-SB0701-SO-0	SW8270C-SIM	Dibenzo (a,h) Anthracene	0.11	mg/kg	J	Sur<LCL
16Q2SS113-SB0701-SO-0	SW8270C-SIM	Fluoranthene	5.2	mg/kg	J	Sur<LCL
16Q2SS113-SB0701-SO-0	SW8270C-SIM	Fluorene	8.9	mg/kg	J	Sur<LCL
16Q2SS113-SB0701-SO-0	SW8270C-SIM	Indeno (1,2,3-c,d) Pyrene	0.42	mg/kg	J	Sur<LCL
16Q2SS113-SB0701-SO-0	SW8270C-SIM	Naphthalene	15	mg/kg	J	Sur<LCL
16Q2SS113-SB0701-SO-0	SW8270C-SIM	Phenanthrene	6.2	mg/kg	J	Sur<LCL
16Q2SS113-SB0701-SO-0	SW8270C-SIM	Pyrene	5.2	mg/kg	J	Sur<LCL
16Q2SS113-SB0702-GW-0	SW8270C-SIM	1-Methylnaphthalene	2	µg/L	J	LCSRPD
16Q2SS113-SB0702-GW-0	SW8270C-SIM	1-Methylnaphthalene	2	µg/L	J	Sur>UCL
16Q2SS113-SB0702-GW-0	SW8270C-SIM	2-Methylnaphthalene	0.95	µg/L	J	LCSRPD
16Q2SS113-SB0702-GW-0	SW8270C-SIM	2-Methylnaphthalene	0.95	µg/L	J	Sur>UCL
16Q2SS113-SB0702-GW-0	SW8270C-SIM	Acenaphthene	2	µg/L	J	LCSRPD
16Q2SS113-SB0702-GW-0	SW8270C-SIM	Acenaphthene	2	µg/L	J	Sur>UCL
16Q2SS113-SB0702-GW-0	SW8270C-SIM	Benzo (a) Anthracene	1.1	µg/L	J	Sur>UCL
16Q2SS113-SB0702-GW-0	SW8270C-SIM	Benzo (a) Pyrene	0.9	µg/L	J	Sur>UCL
16Q2SS113-SB0702-GW-0	SW8270C-SIM	Benzo (b) Fluoranthene	1.3	µg/L	J	Sur>UCL
16Q2SS113-SB0702-GW-0	SW8270C-SIM	Benzo (g,h,i) Perylene	0.48	µg/L	J	Sur>UCL
16Q2SS113-SB0702-GW-0	SW8270C-SIM	Benzo(k)Fluoranthene	0.58	µg/L	J	Sur>UCL
16Q2SS113-SB0702-GW-0	SW8270C-SIM	Chrysene	0.89	µg/L	J	Sur>UCL
16Q2SS113-SB0702-GW-0	SW8270C-SIM	Dibenzo (a,h) Anthracene	0.12	µg/L	J	Sur>UCL
16Q2SS113-SB0702-GW-0	SW8270C-SIM	Fluoranthene	2.5	µg/L	J	Sur>UCL
16Q2SS113-SB0702-GW-0	SW8270C-SIM	Fluorene	0.91	µg/L	J	Sur>UCL
16Q2SS113-SB0702-GW-0	SW8270C-SIM	Indeno (1,2,3-c,d) Pyrene	0.46	µg/L	J	Sur>UCL
16Q2SS113-SB0702-GW-0	SW8270C-SIM	Naphthalene	1.8	µg/L	J	LCSRPD
16Q2SS113-SB0702-GW-0	SW8270C-SIM	Naphthalene	1.8	µg/L	J	Sur>UCL
16Q2SS113-SB0702-GW-0	SW8270C-SIM	Phenanthrene	1.5	µg/L	J	Sur>UCL
16Q2SS113-SB0702-GW-0	SW8270C-SIM	Pyrene	2	µg/L	J	Sur>UCL
16Q2SS113-SB0702-SO-0	AK101	GRO	120	mg/kg	J	MethLeak
16Q2SS113-SB0702-SO-0	SW8260B	1,2,4-Trimethylbenzene	0.095	mg/kg	UJ	MethLeak
16Q2SS113-SB0702-SO-0	SW8260B	1,2-Dibromoethane	0.047	mg/kg	UJ	MethLeak
16Q2SS113-SB0702-SO-0	SW8260B	1,3,5-Trimethylbenzene	0.095	mg/kg	UJ	MethLeak
16Q2SS113-SB0702-SO-0	SW8260B	2-Butanone	0.24	mg/kg	UJ	MethLeak
16Q2SS113-SB0702-SO-0	SW8260B	2-Hexanone	0.24	mg/kg	UJ	MethLeak
16Q2SS113-SB0702-SO-0	SW8260B	4-Methyl-2-Pentanone	0.24	mg/kg	UJ	MethLeak
16Q2SS113-SB0702-SO-0	SW8260B	Acetone	0.24	mg/kg	UJ	MethLeak
16Q2SS113-SB0702-SO-0	SW8260B	Benzene	0.047	mg/kg	UJ	MethLeak

Table 4 Validation Flags

Sample ID	Method	Analyte	Final Result	Units	Final Flag	Reason
16Q2SS113-SB0702-SO-0	SW8260B	Bromobenzene	0.047	mg/kg	UJ	MethLeak
16Q2SS113-SB0702-SO-0	SW8260B	Bromoform	0.095	mg/kg	UJ	MethLeak
16Q2SS113-SB0702-SO-0	SW8260B	Bromomethane	0.095	mg/kg	UJ	MethLeak
16Q2SS113-SB0702-SO-0	SW8260B	Carbon Disulfide	0.047	mg/kg	UJ	MethLeak
16Q2SS113-SB0702-SO-0	SW8260B	Cyclohexane	0.24	mg/kg	UJ	MethLeak
16Q2SS113-SB0702-SO-0	SW8260B	Dibromomethane	0.047	mg/kg	UJ	MethLeak
16Q2SS113-SB0702-SO-0	SW8260B	Ethylbenzene	0.047	mg/kg	UJ	MethLeak
16Q2SS113-SB0702-SO-0	SW8260B	Isopropylbenzene	0.095	mg/kg	UJ	MethLeak
16Q2SS113-SB0702-SO-0	SW8260B	M,P-Xylenes	0.095	mg/kg	UJ	MethLeak
16Q2SS113-SB0702-SO-0	SW8260B	Naphthalene	0.095	mg/kg	UJ	MethLeak
16Q2SS113-SB0702-SO-0	SW8260B	N-Butylbenzene	0.047	mg/kg	UJ	MethLeak
16Q2SS113-SB0702-SO-0	SW8260B	N-Propylbenzene	0.047	mg/kg	UJ	MethLeak
16Q2SS113-SB0702-SO-0	SW8260B	O-Xylene	0.047	mg/kg	UJ	MethLeak
16Q2SS113-SB0702-SO-0	SW8260B	P-Isopropyltoluene	0.047	mg/kg	UJ	MethLeak
16Q2SS113-SB0702-SO-0	SW8260B	Sec-Butylbenzene	0.047	mg/kg	UJ	MethLeak
16Q2SS113-SB0702-SO-0	SW8260B	Styrene	0.047	mg/kg	UJ	MethLeak
16Q2SS113-SB0702-SO-0	SW8260B	Tert-Butyl Methyl Ether	0.047	mg/kg	UJ	MethLeak
16Q2SS113-SB0702-SO-0	SW8260B	Tert-Butylbenzene	0.047	mg/kg	UJ	MethLeak
16Q2SS113-SB0702-SO-0	SW8260B	Toluene	0.047	mg/kg	UJ	MethLeak
16Q2SS113-SB0702-SO-0	SW8260B	Vinyl Acetate	0.24	mg/kg	UJ	MethLeak
16Q2SS113-SB0702-SO-0	SW8260B	Xylenes, Total	0.047	mg/kg	UJ	MethLeak
16Q2SS113-SB0801-SO-0	AK101	GRO	8.5	mg/kg	J	MethLeak
16Q2SS113-SB0801-SO-0	SW8260B	1,2,4-Trimethylbenzene	0.13	mg/kg	UJ	MethLeak
16Q2SS113-SB0801-SO-0	SW8260B	1,2-Dibromoethane	0.067	mg/kg	UJ	MethLeak
16Q2SS113-SB0801-SO-0	SW8260B	1,3,5-Trimethylbenzene	0.095	mg/kg	J	MethLeak
16Q2SS113-SB0801-SO-0	SW8260B	2-Butanone	0.34	mg/kg	UJ	MethLeak
16Q2SS113-SB0801-SO-0	SW8260B	2-Hexanone	0.34	mg/kg	UJ	MethLeak
16Q2SS113-SB0801-SO-0	SW8260B	4-Methyl-2-Pentanone	0.34	mg/kg	UJ	MethLeak
16Q2SS113-SB0801-SO-0	SW8260B	Acetone	0.34	mg/kg	UJ	MethLeak
16Q2SS113-SB0801-SO-0	SW8260B	Benzene	0.067	mg/kg	UJ	MethLeak
16Q2SS113-SB0801-SO-0	SW8260B	Bromobenzene	0.067	mg/kg	UJ	MethLeak
16Q2SS113-SB0801-SO-0	SW8260B	Bromoform	0.13	mg/kg	UJ	MethLeak
16Q2SS113-SB0801-SO-0	SW8260B	Bromomethane	0.13	mg/kg	UJ	MethLeak
16Q2SS113-SB0801-SO-0	SW8260B	Carbon Disulfide	0.067	mg/kg	UJ	MethLeak
16Q2SS113-SB0801-SO-0	SW8260B	Cyclohexane	0.34	mg/kg	UJ	MethLeak
16Q2SS113-SB0801-SO-0	SW8260B	Dibromomethane	0.067	mg/kg	UJ	MethLeak
16Q2SS113-SB0801-SO-0	SW8260B	Ethylbenzene	0.067	mg/kg	UJ	MethLeak

Table 4 Validation Flags

Sample ID	Method	Analyte	Final Result	Units	Final Flag	Reason
16Q2SS113-SB0801-SO-0	SW8260B	Isopropylbenzene	0.13	mg/kg	UJ	MethLeak
16Q2SS113-SB0801-SO-0	SW8260B	M,P-Xylenes	0.13	mg/kg	UJ	MethLeak
16Q2SS113-SB0801-SO-0	SW8260B	Naphthalene	0.13	mg/kg	UJ	MethLeak
16Q2SS113-SB0801-SO-0	SW8260B	N-Butylbenzene	0.067	mg/kg	UJ	MethLeak
16Q2SS113-SB0801-SO-0	SW8260B	N-Propylbenzene	0.067	mg/kg	UJ	MethLeak
16Q2SS113-SB0801-SO-0	SW8260B	O-Xylene	0.067	mg/kg	UJ	MethLeak
16Q2SS113-SB0801-SO-0	SW8260B	P-Isopropyltoluene	0.061	mg/kg	J	MethLeak
16Q2SS113-SB0801-SO-0	SW8260B	Sec-Butylbenzene	0.067	mg/kg	UJ	MethLeak
16Q2SS113-SB0801-SO-0	SW8260B	Styrene	0.067	mg/kg	UJ	MethLeak
16Q2SS113-SB0801-SO-0	SW8260B	Tert-Butyl Methyl Ether	0.067	mg/kg	UJ	MethLeak
16Q2SS113-SB0801-SO-0	SW8260B	Tert-Butylbenzene	0.067	mg/kg	UJ	MethLeak
16Q2SS113-SB0801-SO-0	SW8260B	Toluene	0.067	mg/kg	UJ	MethLeak
16Q2SS113-SB0801-SO-0	SW8260B	Vinyl Acetate	0.34	mg/kg	UJ	MethLeak
16Q2SS113-SB0801-SO-0	SW8260B	Xylenes, Total	0.067	mg/kg	UJ	MethLeak
16Q2SS113-SB0802-GW-0	SW8260B	1,2,4-Trimethylbenzene	1.9	µg/L	J	Sur>UCL
16Q2SS113-SB0802-GW-0	SW8260B	1,3,5-Trimethylbenzene	0.7	µg/L	J	Sur>UCL
16Q2SS113-SB0802-GW-0	SW8260B	Benzene	0.11	µg/L	J	Sur>UCL
16Q2SS113-SB0802-GW-0	SW8260B	Carbon Disulfide	0.9	µg/L	J	Sur>UCL
16Q2SS113-SB0802-GW-0	SW8260B	Cyclohexane	2.6	µg/L	J	Sur>UCL
16Q2SS113-SB0802-GW-0	SW8260B	Isopropylbenzene	0.42	µg/L	J	Sur>UCL
16Q2SS113-SB0802-GW-0	SW8260B	M,P-Xylenes	1.2	µg/L	J	Sur>UCL
16Q2SS113-SB0802-GW-0	SW8260B	P-Isopropyltoluene	0.41	µg/L	J	Sur>UCL
16Q2SS113-SB0802-GW-0	SW8260B	Tert-Butylbenzene	0.52	µg/L	J	Sur>UCL
16Q2SS113-SB0802-GW-0	SW8260B	Toluene	0.18	µg/L	B	Sur>UCL
16Q2SS113-SB0802-GW-0	SW8260B	Toluene	0.18	µg/L	B	TB<LOQ
16Q2SS113-SB0802-GW-0	SW8260B	Xylenes, Total	1.2	µg/L	J	Sur>UCL
16Q2SS113-SB0802-GW-0	SW8270C-SIM	1-Methylnaphthalene	0.1	µg/L	J	LCSRPD
16Q2SS113-SB0802-GW-0	SW8270C-SIM	1-Methylnaphthalene	0.1	µg/L	J	Sur<LCL
16Q2SS113-SB0802-GW-0	SW8270C-SIM	2-Methylnaphthalene	0.12	µg/L	UJ	Sur<LCL
16Q2SS113-SB0802-GW-0	SW8270C-SIM	Acenaphthene	0.19	µg/L	J	LCSRPD
16Q2SS113-SB0802-GW-0	SW8270C-SIM	Acenaphthene	0.19	µg/L	J	Sur<LCL
16Q2SS113-SB0802-GW-0	SW8270C-SIM	Acenaphthylene	0.12	µg/L	UJ	Sur<LCL
16Q2SS113-SB0802-GW-0	SW8270C-SIM	Anthracene	0.12	µg/L	UJ	Sur<LCL
16Q2SS113-SB0802-GW-0	SW8270C-SIM	Benzo (a) Anthracene	0.23	µg/L	J	Sur<LCL
16Q2SS113-SB0802-GW-0	SW8270C-SIM	Benzo (a) Pyrene	0.12	µg/L	UJ	Sur<LCL
16Q2SS113-SB0802-GW-0	SW8270C-SIM	Benzo (b) Fluoranthene	0.12	µg/L	UJ	Sur<LCL
16Q2SS113-SB0802-GW-0	SW8270C-SIM	Benzo (g,h,i) Perylene	0.12	µg/L	UJ	Sur<LCL

Table 4 Validation Flags

Sample ID	Method	Analyte	Final Result	Units	Final Flag	Reason
16Q2SS113-SB0802-GW-0	SW8270C-SIM	Benzo(k)Fluoranthene	0.12	µg/L	UJ	Sur<LCL
16Q2SS113-SB0802-GW-0	SW8270C-SIM	Chrysene	0.23	µg/L	J	Sur<LCL
16Q2SS113-SB0802-GW-0	SW8270C-SIM	Dibenzo (a,h) Anthracene	0.12	µg/L	UJ	Sur<LCL
16Q2SS113-SB0802-GW-0	SW8270C-SIM	Fluoranthene	0.062	µg/L	J	Sur<LCL
16Q2SS113-SB0802-GW-0	SW8270C-SIM	Fluorene	0.061	µg/L	J	Sur<LCL
16Q2SS113-SB0802-GW-0	SW8270C-SIM	Indeno (1,2,3-c,d) Pyrene	0.12	µg/L	UJ	Sur<LCL
16Q2SS113-SB0802-GW-0	SW8270C-SIM	Naphthalene	0.14	µg/L	J	LCSRPD
16Q2SS113-SB0802-GW-0	SW8270C-SIM	Naphthalene	0.14	µg/L	J	Sur<LCL
16Q2SS113-SB0802-GW-0	SW8270C-SIM	Phenanthrene	0.081	µg/L	J	Sur<LCL
16Q2SS113-SB0802-GW-0	SW8270C-SIM	Pyrene	0.061	µg/L	J	Sur<LCL
16Q2SS113-SB0802-SO-0	AK101	GRO	70	mg/kg	J	MethLeak
16Q2SS113-SB0802-SO-0	SW8260B	1,2,4-Trimethylbenzene	0.093	mg/kg	UJ	MethLeak
16Q2SS113-SB0802-SO-0	SW8260B	1,2-Dibromoethane	0.046	mg/kg	UJ	MethLeak
16Q2SS113-SB0802-SO-0	SW8260B	1,3,5-Trimethylbenzene	0.093	mg/kg	UJ	MethLeak
16Q2SS113-SB0802-SO-0	SW8260B	2-Butanone	0.23	mg/kg	UJ	MethLeak
16Q2SS113-SB0802-SO-0	SW8260B	2-Hexanone	0.23	mg/kg	UJ	MethLeak
16Q2SS113-SB0802-SO-0	SW8260B	4-Methyl-2-Pentanone	0.23	mg/kg	UJ	MethLeak
16Q2SS113-SB0802-SO-0	SW8260B	Acetone	0.23	mg/kg	UJ	MethLeak
16Q2SS113-SB0802-SO-0	SW8260B	Benzene	0.046	mg/kg	UJ	MethLeak
16Q2SS113-SB0802-SO-0	SW8260B	Bromobenzene	0.046	mg/kg	UJ	MethLeak
16Q2SS113-SB0802-SO-0	SW8260B	Bromoform	0.093	mg/kg	UJ	MethLeak
16Q2SS113-SB0802-SO-0	SW8260B	Bromomethane	0.093	mg/kg	UJ	MethLeak
16Q2SS113-SB0802-SO-0	SW8260B	Carbon Disulfide	0.046	mg/kg	UJ	MethLeak
16Q2SS113-SB0802-SO-0	SW8260B	Cyclohexane	0.23	mg/kg	UJ	MethLeak
16Q2SS113-SB0802-SO-0	SW8260B	Dibromomethane	0.046	mg/kg	UJ	MethLeak
16Q2SS113-SB0802-SO-0	SW8260B	Ethylbenzene	0.046	mg/kg	UJ	MethLeak
16Q2SS113-SB0802-SO-0	SW8260B	Isopropylbenzene	0.093	mg/kg	UJ	MethLeak
16Q2SS113-SB0802-SO-0	SW8260B	M,P-Xylenes	0.093	mg/kg	UJ	MethLeak
16Q2SS113-SB0802-SO-0	SW8260B	Naphthalene	0.093	mg/kg	UJ	MethLeak
16Q2SS113-SB0802-SO-0	SW8260B	N-Butylbenzene	0.046	mg/kg	UJ	MethLeak
16Q2SS113-SB0802-SO-0	SW8260B	N-Propylbenzene	0.046	mg/kg	UJ	MethLeak
16Q2SS113-SB0802-SO-0	SW8260B	O-Xylene	0.046	mg/kg	UJ	MethLeak
16Q2SS113-SB0802-SO-0	SW8260B	P-Isopropyltoluene	0.046	mg/kg	UJ	MethLeak
16Q2SS113-SB0802-SO-0	SW8260B	Sec-Butylbenzene	0.046	mg/kg	UJ	MethLeak
16Q2SS113-SB0802-SO-0	SW8260B	Styrene	0.046	mg/kg	UJ	MethLeak
16Q2SS113-SB0802-SO-0	SW8260B	Tert-Butyl Methyl Ether	0.046	mg/kg	UJ	MethLeak
16Q2SS113-SB0802-SO-0	SW8260B	Tert-Butylbenzene	0.046	mg/kg	UJ	MethLeak

Table 4 Validation Flags

Sample ID	Method	Analyte	Final Result	Units	Final Flag	Reason
16Q2SS113-SB0802-SO-0	SW8260B	Toluene	0.046	mg/kg	UJ	MethLeak
16Q2SS113-SB0802-SO-0	SW8260B	Vinyl Acetate	0.23	mg/kg	UJ	MethLeak
16Q2SS113-SB0802-SO-0	SW8260B	Xylenes, Total	0.046	mg/kg	UJ	MethLeak
16Q2SS113-SB0901-SO-0	AK101	GRO	3.3	mg/kg	J	MethLeak
16Q2SS113-SB0901-SO-0	SW8260B	1,2,4-Trimethylbenzene	0.041	mg/kg	J	MethLeak
16Q2SS113-SB0901-SO-0	SW8260B	1,2,4-Trimethylbenzene	0.041	mg/kg	J	Sur<LCL
16Q2SS113-SB0901-SO-0	SW8260B	1,2-Dibromoethane	0.068	mg/kg	UJ	MethLeak
16Q2SS113-SB0901-SO-0	SW8260B	1,2-Dibromoethane	0.068	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0901-SO-0	SW8260B	1,3,5-Trimethylbenzene	0.14	mg/kg	UJ	MethLeak
16Q2SS113-SB0901-SO-0	SW8260B	1,3,5-Trimethylbenzene	0.14	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0901-SO-0	SW8260B	2-Butanone	0.34	mg/kg	UJ	MethLeak
16Q2SS113-SB0901-SO-0	SW8260B	2-Butanone	0.34	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0901-SO-0	SW8260B	2-Hexanone	0.34	mg/kg	UJ	MethLeak
16Q2SS113-SB0901-SO-0	SW8260B	2-Hexanone	0.34	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0901-SO-0	SW8260B	4-Methyl-2-Pentanone	0.34	mg/kg	UJ	MethLeak
16Q2SS113-SB0901-SO-0	SW8260B	4-Methyl-2-Pentanone	0.34	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0901-SO-0	SW8260B	Acetone	0.34	mg/kg	UJ	MethLeak
16Q2SS113-SB0901-SO-0	SW8260B	Acetone	0.34	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0901-SO-0	SW8260B	Benzene	0.068	mg/kg	UJ	MethLeak
16Q2SS113-SB0901-SO-0	SW8260B	Benzene	0.068	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0901-SO-0	SW8260B	Bromobenzene	0.068	mg/kg	UJ	MethLeak
16Q2SS113-SB0901-SO-0	SW8260B	Bromobenzene	0.068	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0901-SO-0	SW8260B	Bromoform	0.14	mg/kg	UJ	MethLeak
16Q2SS113-SB0901-SO-0	SW8260B	Bromoform	0.14	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0901-SO-0	SW8260B	Bromomethane	0.14	mg/kg	UJ	MethLeak
16Q2SS113-SB0901-SO-0	SW8260B	Bromomethane	0.14	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0901-SO-0	SW8260B	Carbon Disulfide	0.068	mg/kg	UJ	MethLeak
16Q2SS113-SB0901-SO-0	SW8260B	Carbon Disulfide	0.068	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0901-SO-0	SW8260B	Cyclohexane	0.34	mg/kg	UJ	MethLeak
16Q2SS113-SB0901-SO-0	SW8260B	Cyclohexane	0.34	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0901-SO-0	SW8260B	Dibromomethane	0.068	mg/kg	UJ	MethLeak
16Q2SS113-SB0901-SO-0	SW8260B	Dibromomethane	0.068	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0901-SO-0	SW8260B	Ethylbenzene	0.068	mg/kg	UJ	MethLeak
16Q2SS113-SB0901-SO-0	SW8260B	Ethylbenzene	0.068	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0901-SO-0	SW8260B	Isopropylbenzene	0.14	mg/kg	UJ	MethLeak
16Q2SS113-SB0901-SO-0	SW8260B	Isopropylbenzene	0.14	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0901-SO-0	SW8260B	M,P-Xylenes	0.14	mg/kg	UJ	MethLeak

Table 4 Validation Flags

Sample ID	Method	Analyte	Final Result	Units	Final Flag	Reason
16Q2SS113-SB0901-SO-0	SW8260B	M,P-Xylenes	0.14	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0901-SO-0	SW8260B	Naphthalene	0.14	mg/kg	UJ	MethLeak
16Q2SS113-SB0901-SO-0	SW8260B	Naphthalene	0.14	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0901-SO-0	SW8260B	N-Butylbenzene	0.068	mg/kg	UJ	MethLeak
16Q2SS113-SB0901-SO-0	SW8260B	N-Butylbenzene	0.068	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0901-SO-0	SW8260B	N-Propylbenzene	0.068	mg/kg	UJ	MethLeak
16Q2SS113-SB0901-SO-0	SW8260B	N-Propylbenzene	0.068	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0901-SO-0	SW8260B	O-Xylene	0.054	mg/kg	J	MethLeak
16Q2SS113-SB0901-SO-0	SW8260B	O-Xylene	0.054	mg/kg	J	Sur<LCL
16Q2SS113-SB0901-SO-0	SW8260B	P-Isopropyltoluene	0.068	mg/kg	UJ	MethLeak
16Q2SS113-SB0901-SO-0	SW8260B	P-Isopropyltoluene	0.068	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0901-SO-0	SW8260B	Sec-Butylbenzene	0.068	mg/kg	UJ	MethLeak
16Q2SS113-SB0901-SO-0	SW8260B	Sec-Butylbenzene	0.068	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0901-SO-0	SW8260B	Styrene	0.068	mg/kg	UJ	MethLeak
16Q2SS113-SB0901-SO-0	SW8260B	Styrene	0.068	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0901-SO-0	SW8260B	Tert-Butyl Methyl Ether	0.068	mg/kg	UJ	MethLeak
16Q2SS113-SB0901-SO-0	SW8260B	Tert-Butyl Methyl Ether	0.068	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0901-SO-0	SW8260B	Tert-Butylbenzene	0.068	mg/kg	UJ	MethLeak
16Q2SS113-SB0901-SO-0	SW8260B	Tert-Butylbenzene	0.068	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0901-SO-0	SW8260B	Toluene	0.043	mg/kg	J	MethLeak
16Q2SS113-SB0901-SO-0	SW8260B	Toluene	0.043	mg/kg	J	Sur<LCL
16Q2SS113-SB0901-SO-0	SW8260B	Vinyl Acetate	0.34	mg/kg	UJ	MethLeak
16Q2SS113-SB0901-SO-0	SW8260B	Vinyl Acetate	0.34	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0901-SO-0	SW8260B	Xylenes, Total	0.054	mg/kg	J	MethLeak
16Q2SS113-SB0901-SO-0	SW8260B	Xylenes, Total	0.054	mg/kg	J	Sur<LCL
16Q2SS113-SB0902-GW-0	SW8270C-SIM	1-Methylnaphthalene	0.11	µg/L	UJ	Sur<LCL
16Q2SS113-SB0902-GW-0	SW8270C-SIM	2-Methylnaphthalene	0.11	µg/L	UJ	Sur<LCL
16Q2SS113-SB0902-GW-0	SW8270C-SIM	Acenaphthene	0.11	µg/L	UJ	Sur<LCL
16Q2SS113-SB0902-GW-0	SW8270C-SIM	Acenaphthylene	0.11	µg/L	UJ	Sur<LCL
16Q2SS113-SB0902-GW-0	SW8270C-SIM	Anthracene	0.11	µg/L	UJ	Sur<LCL
16Q2SS113-SB0902-GW-0	SW8270C-SIM	Benzo (a) Anthracene	0.22	µg/L	UJ	Sur<LCL
16Q2SS113-SB0902-GW-0	SW8270C-SIM	Benzo (a) Pyrene	0.11	µg/L	UJ	Sur<LCL
16Q2SS113-SB0902-GW-0	SW8270C-SIM	Benzo (b) Fluoranthene	0.11	µg/L	UJ	Sur<LCL
16Q2SS113-SB0902-GW-0	SW8270C-SIM	Benzo (g,h,i) Perylene	0.11	µg/L	UJ	Sur<LCL
16Q2SS113-SB0902-GW-0	SW8270C-SIM	Benzo(k)Fluoranthene	0.11	µg/L	UJ	Sur<LCL
16Q2SS113-SB0902-GW-0	SW8270C-SIM	Chrysene	0.22	µg/L	UJ	Sur<LCL
16Q2SS113-SB0902-GW-0	SW8270C-SIM	Dibenzo (a,h) Anthracene	0.11	µg/L	UJ	Sur<LCL

Table 4 Validation Flags

Sample ID	Method	Analyte	Final Result	Units	Final Flag	Reason
16Q2SS113-SB0902-GW-0	SW8270C-SIM	Fluoranthene	0.11	µg/L	UJ	Sur<LCL
16Q2SS113-SB0902-GW-0	SW8270C-SIM	Fluorene	0.11	µg/L	UJ	Sur<LCL
16Q2SS113-SB0902-GW-0	SW8270C-SIM	Indeno (1,2,3-C,D) Pyrene	0.11	µg/L	UJ	Sur<LCL
16Q2SS113-SB0902-GW-0	SW8270C-SIM	Naphthalene	0.11	µg/L	UJ	Sur<LCL
16Q2SS113-SB0902-GW-0	SW8270C-SIM	Phenanthrene	0.11	µg/L	UJ	Sur<LCL
16Q2SS113-SB0902-GW-0	SW8270C-SIM	Pyrene	0.11	µg/L	UJ	Sur<LCL
16Q2SS113-SB0902-SO-0	AK101	GRO	1.3	mg/kg	J	MethLeak
16Q2SS113-SB0902-SO-0	AK101	GRO	1.3	mg/kg	J	Sur<LCL
16Q2SS113-SB0902-SO-0	SW8260B	1,2,4-Trimethylbenzene	0.043	mg/kg	J	MethLeak
16Q2SS113-SB0902-SO-0	SW8260B	1,2,4-Trimethylbenzene	0.043	mg/kg	J	Sur<LCL
16Q2SS113-SB0902-SO-0	SW8260B	1,2-Dibromoethane	0.076	mg/kg	UJ	MethLeak
16Q2SS113-SB0902-SO-0	SW8260B	1,2-Dibromoethane	0.076	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0902-SO-0	SW8260B	1,3,5-Trimethylbenzene	0.15	mg/kg	UJ	MethLeak
16Q2SS113-SB0902-SO-0	SW8260B	1,3,5-Trimethylbenzene	0.15	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0902-SO-0	SW8260B	2-Butanone	0.38	mg/kg	UJ	MethLeak
16Q2SS113-SB0902-SO-0	SW8260B	2-Butanone	0.38	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0902-SO-0	SW8260B	2-Hexanone	0.38	mg/kg	UJ	MethLeak
16Q2SS113-SB0902-SO-0	SW8260B	2-Hexanone	0.38	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0902-SO-0	SW8260B	4-Methyl-2-Pentanone	0.38	mg/kg	UJ	MethLeak
16Q2SS113-SB0902-SO-0	SW8260B	4-Methyl-2-Pentanone	0.38	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0902-SO-0	SW8260B	Acetone	0.38	mg/kg	UJ	MethLeak
16Q2SS113-SB0902-SO-0	SW8260B	Acetone	0.38	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0902-SO-0	SW8260B	Benzene	0.076	mg/kg	UJ	MethLeak
16Q2SS113-SB0902-SO-0	SW8260B	Benzene	0.076	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0902-SO-0	SW8260B	Bromobenzene	0.076	mg/kg	UJ	MethLeak
16Q2SS113-SB0902-SO-0	SW8260B	Bromobenzene	0.076	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0902-SO-0	SW8260B	Bromoform	0.15	mg/kg	UJ	MethLeak
16Q2SS113-SB0902-SO-0	SW8260B	Bromoform	0.15	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0902-SO-0	SW8260B	Bromomethane	0.15	mg/kg	UJ	MethLeak
16Q2SS113-SB0902-SO-0	SW8260B	Bromomethane	0.15	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0902-SO-0	SW8260B	Carbon Disulfide	0.076	mg/kg	UJ	MethLeak
16Q2SS113-SB0902-SO-0	SW8260B	Carbon Disulfide	0.076	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0902-SO-0	SW8260B	Cyclohexane	0.38	mg/kg	UJ	MethLeak
16Q2SS113-SB0902-SO-0	SW8260B	Cyclohexane	0.38	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0902-SO-0	SW8260B	Dibromomethane	0.076	mg/kg	UJ	MethLeak
16Q2SS113-SB0902-SO-0	SW8260B	Dibromomethane	0.076	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0902-SO-0	SW8260B	Ethylbenzene	0.076	mg/kg	UJ	MethLeak

Table 4 Validation Flags

Sample ID	Method	Analyte	Final Result	Units	Final Flag	Reason
16Q2SS113-SB0902-SO-0	SW8260B	Ethylbenzene	0.076	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0902-SO-0	SW8260B	Isopropylbenzene	0.15	mg/kg	UJ	MethLeak
16Q2SS113-SB0902-SO-0	SW8260B	Isopropylbenzene	0.15	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0902-SO-0	SW8260B	M,P-Xylenes	0.15	mg/kg	UJ	MethLeak
16Q2SS113-SB0902-SO-0	SW8260B	M,P-Xylenes	0.15	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0902-SO-0	SW8260B	Naphthalene	0.15	mg/kg	UJ	MethLeak
16Q2SS113-SB0902-SO-0	SW8260B	Naphthalene	0.15	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0902-SO-0	SW8260B	N-Butylbenzene	0.076	mg/kg	UJ	MethLeak
16Q2SS113-SB0902-SO-0	SW8260B	N-Butylbenzene	0.076	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0902-SO-0	SW8260B	N-Propylbenzene	0.076	mg/kg	UJ	MethLeak
16Q2SS113-SB0902-SO-0	SW8260B	N-Propylbenzene	0.076	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0902-SO-0	SW8260B	O-Xylene	0.041	mg/kg	J	MethLeak
16Q2SS113-SB0902-SO-0	SW8260B	O-Xylene	0.041	mg/kg	J	Sur<LCL
16Q2SS113-SB0902-SO-0	SW8260B	P-Isopropyltoluene	0.076	mg/kg	UJ	MethLeak
16Q2SS113-SB0902-SO-0	SW8260B	P-Isopropyltoluene	0.076	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0902-SO-0	SW8260B	Sec-Butylbenzene	0.076	mg/kg	UJ	MethLeak
16Q2SS113-SB0902-SO-0	SW8260B	Sec-Butylbenzene	0.076	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0902-SO-0	SW8260B	Styrene	0.076	mg/kg	UJ	MethLeak
16Q2SS113-SB0902-SO-0	SW8260B	Styrene	0.076	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0902-SO-0	SW8260B	Tert-Butyl Methyl Ether	0.076	mg/kg	UJ	MethLeak
16Q2SS113-SB0902-SO-0	SW8260B	Tert-Butyl Methyl Ether	0.076	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0902-SO-0	SW8260B	Tert-Butylbenzene	0.076	mg/kg	UJ	MethLeak
16Q2SS113-SB0902-SO-0	SW8260B	Tert-Butylbenzene	0.076	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0902-SO-0	SW8260B	Toluene	0.051	mg/kg	J	MethLeak
16Q2SS113-SB0902-SO-0	SW8260B	Toluene	0.051	mg/kg	J	Sur<LCL
16Q2SS113-SB0902-SO-0	SW8260B	Vinyl Acetate	0.38	mg/kg	UJ	MethLeak
16Q2SS113-SB0902-SO-0	SW8260B	Vinyl Acetate	0.38	mg/kg	UJ	Sur<LCL
16Q2SS113-SB0902-SO-0	SW8260B	Xylenes, Total	0.041	mg/kg	J	MethLeak
16Q2SS113-SB0902-SO-0	SW8260B	Xylenes, Total	0.041	mg/kg	J	Sur<LCL
16Q3SS113-SB1001-GW-0	AK102/103	DRO	3100	µg/L	J	FD>RPD
16Q3SS113-SB1001-GW-0	AK102/103	DRO	3100	µg/L	J	MS<LCL
16Q3SS113-SB1001-GW-0	AK102/103	DRO	3100	µg/L	J	SD<LCL
16Q3SS113-SB1001-GW-0	SW6020	Calcium	109000	µg/L	J	MS<LCL
16Q3SS113-SB1001-GW-0	SW6020	Copper	7.47	µg/L	J	SerDilOut
16Q3SS113-SB1001-GW-0	SW6020	Manganese	2550	µg/L	J	SD>UCL
16Q3SS113-SB1001-GW-0	SW6020	Zinc	24.3	µg/L	J	FD>RPD
16Q3SS113-SB1001-GW-0	SW8260B	2-Hexanone	6.6	µg/L	J	FD>RPD

Table 4 Validation Flags

Sample ID	Method	Analyte	Final Result	Units	Final Flag	Reason
16Q3SS113-SB1001-GW-0	SW8260B	Naphthalene	1	µg/L	UJ	FD>RPD
16Q3SS113-SB1001-GW-0	SW8260B	N-Butylbenzene	1.3	µg/L	J	FD>RPD
16Q3SS113-SB1001-GW-0	SW8260B	Toluene	0.11	µg/L	B	TB<LOQ
16Q3SS113-SB1001-GW-0	SW8260B	Vinyl Acetate	0.5	µg/L	UJ	CCV<LCL
16Q3SS113-SB1001-GW-0	SW8270C-SIM	1-Methylnaphthalene	2.2	µg/L	J	FD>RPD
16Q3SS113-SB1001-GW-0	SW8270C-SIM	2-Methylnaphthalene	0.79	µg/L	J	FD>RPD
16Q3SS113-SB1001-GW-0	SW8270C-SIM	Naphthalene	0.47	µg/L	J	FD>RPD
16Q3SS113-SB1001-GW-0	SW8270C-SIM	Phenanthrene	0.063	µg/L	J	LCSRPD
16Q3SS113-SB1001-GW-1	AK102/103	DRO	15000	µg/L	J	FD>RPD
16Q3SS113-SB1001-GW-1	SW6020	Zinc	48.6	µg/L	J	FD>RPD
16Q3SS113-SB1001-GW-1	SW8260B	2-Hexanone	11	µg/L	J	FD>RPD
16Q3SS113-SB1001-GW-1	SW8260B	Naphthalene	5.8	µg/L	J	FD>RPD
16Q3SS113-SB1001-GW-1	SW8260B	N-Butylbenzene	1.9	µg/L	J	FD>RPD
16Q3SS113-SB1001-GW-1	SW8260B	Vinyl Acetate	0.5	µg/L	UJ	CCV<LCL
16Q3SS113-SB1001-GW-1	SW8270C-SIM	1-Methylnaphthalene	4.2	µg/L	J	FD>RPD
16Q3SS113-SB1001-GW-1	SW8270C-SIM	2-Methylnaphthalene	1.4	µg/L	J	FD>RPD
16Q3SS113-SB1001-GW-1	SW8270C-SIM	Naphthalene	0.83	µg/L	J	FD>RPD
16Q3SS113-SB1001-GW-1	SW8270C-SIM	Phenanthrene	0.29	µg/L	J	LCSRPD
16Q3SS113-SB1001-SO-0	SW8260B-Low	Acetone	0.064	mg/kg	B	EB<LOQ
16Q3SS113-SB1002-SO-0	AK101	GRO	11	mg/kg	J	FD>RPD
16Q3SS113-SB1002-SO-0	AK102/103	DRO	1100	mg/kg	J	FD>RPD
16Q3SS113-SB1002-SO-0	AK102/103	RRO	88	mg/kg	J	FD>RPD
16Q3SS113-SB1002-SO-0	SW8260B-Low	1,2,4-Trimethylbenzene	0.0057	mg/kg	J	FD>RPD
16Q3SS113-SB1002-SO-0	SW8260B-Low	Acetone	0.031	mg/kg	B	EB<LOQ
16Q3SS113-SB1002-SO-0	SW8260B-Low	Acetone	0.031	mg/kg	B	TB<LOQ
16Q3SS113-SB1002-SO-0	SW8260B-Low	Carbon Disulfide	0.0054	mg/kg	J	FD>RPD
16Q3SS113-SB1002-SO-0	SW8270C-SIM	1-Methylnaphthalene	0.25	mg/kg	J	FD>RPD
16Q3SS113-SB1002-SO-0	SW8270C-SIM	2-Methylnaphthalene	0.032	mg/kg	J	FD>RPD
16Q3SS113-SB1002-SO-0	SW8270C-SIM	Acenaphthene	0.037	mg/kg	J	FD>RPD
16Q3SS113-SB1002-SO-0	SW8270C-SIM	Acenaphthylene	0.033	mg/kg	J	FD>RPD
16Q3SS113-SB1002-SO-0	SW8270C-SIM	Fluoranthene	0.0082	mg/kg	J	FD>RPD
16Q3SS113-SB1002-SO-0	SW8270C-SIM	Fluorene	0.083	mg/kg	J	FD>RPD
16Q3SS113-SB1002-SO-0	SW8270C-SIM	Naphthalene	0.051	mg/kg	J	FD>RPD
16Q3SS113-SB1002-SO-0	SW8270C-SIM	Phenanthrene	0.044	mg/kg	J	FD>RPD
16Q3SS113-SB1002-SO-0	SW8270C-SIM	Pyrene	0.0071	mg/kg	J	FD>RPD
16Q3SS113-SB1002-SO-1	AK101	GRO	39	mg/kg	J	FD>RPD
16Q3SS113-SB1002-SO-1	AK102/103	DRO	440	mg/kg	J	FD>RPD

Table 4 Validation Flags

Sample ID	Method	Analyte	Final Result	Units	Final Flag	Reason
16Q3SS113-SB1002-SO-1	AK102/103	RRO	41	mg/kg	J	FD>RPD
16Q3SS113-SB1002-SO-1	SW8260B-Low	1,2,4-Trimethylbenzene	0.013	mg/kg	J	FD>RPD
16Q3SS113-SB1002-SO-1	SW8260B-Low	Acetone	0.048	mg/kg	B	EB<LOQ
16Q3SS113-SB1002-SO-1	SW8260B-Low	Carbon Disulfide	0.01	mg/kg	J	FD>RPD
16Q3SS113-SB1002-SO-1	SW8270C-SIM	1-Methylnaphthalene	0.56	mg/kg	J	FD>RPD
16Q3SS113-SB1002-SO-1	SW8270C-SIM	2-Methylnaphthalene	0.12	mg/kg	J	FD>RPD
16Q3SS113-SB1002-SO-1	SW8270C-SIM	Acenaphthene	0.085	mg/kg	J	FD>RPD
16Q3SS113-SB1002-SO-1	SW8270C-SIM	Acenaphthylene	0.078	mg/kg	J	FD>RPD
16Q3SS113-SB1002-SO-1	SW8270C-SIM	Fluoranthene	0.024	mg/kg	J	FD>RPD
16Q3SS113-SB1002-SO-1	SW8270C-SIM	Fluorene	0.19	mg/kg	J	FD>RPD
16Q3SS113-SB1002-SO-1	SW8270C-SIM	Naphthalene	0.16	mg/kg	J	FD>RPD
16Q3SS113-SB1002-SO-1	SW8270C-SIM	Phenanthrene	0.12	mg/kg	J	FD>RPD
16Q3SS113-SB1002-SO-1	SW8270C-SIM	Pyrene	0.019	mg/kg	J	FD>RPD
16Q3SS113-SB1003-SO-0	SW6020	Barium	57	mg/kg	J	MS<LCL
16Q3SS113-SB1003-SO-0	SW6020	Barium	57	mg/kg	J	SD<LCL
16Q3SS113-SB1003-SO-0	SW6020	Calcium	5400	mg/kg	J	MS<LCL
16Q3SS113-SB1003-SO-0	SW6020	Calcium	5400	mg/kg	J	SerDilOut
16Q3SS113-SB1003-SO-0	SW6020	Chromium	39.4	mg/kg	J	MS<LCL
16Q3SS113-SB1003-SO-0	SW6020	Chromium	39.4	mg/kg	J	SD<LCL
16Q3SS113-SB1003-SO-0	SW6020	Cobalt	10.9	mg/kg	J	SerDilOut
16Q3SS113-SB1003-SO-0	SW6020	Copper	23.4	mg/kg	J	MS<LCL
16Q3SS113-SB1003-SO-0	SW6020	Copper	23.4	mg/kg	J	SerDilOut
16Q3SS113-SB1003-SO-0	SW6020	Magnesium	8220	mg/kg	J	MS<LCL
16Q3SS113-SB1003-SO-0	SW6020	Magnesium	8220	mg/kg	J	SD<LCL
16Q3SS113-SB1003-SO-0	SW6020	Nickel	33.4	mg/kg	J	MS<LCL
16Q3SS113-SB1003-SO-0	SW6020	Nickel	33.4	mg/kg	J	SD<LCL
16Q3SS113-SB1003-SO-0	SW6020	Nickel	33.4	mg/kg	J	SerDilOut
16Q3SS113-SB1003-SO-0	SW6020	Potassium	666	mg/kg	J	SerDilOut
16Q3SS113-SB1003-SO-0	SW6020	Vanadium	49.2	mg/kg	J	MS<LCL
16Q3SS113-SB1003-SO-0	SW8260B-Low	Acetone	0.045	mg/kg	B	EB<LOQ

Notes:

µg/L = micrograms per liter
CCV<LCL = Continuing calibration verification recovery less than the lower control limit
CCV>LCL = Continuing calibration verification recovery greater than the upper control limit
DRO = diesel-range organics
EB<LOQ = Analyte detected in the equipment blank at a concentration less than the limit of quantitation
FD>RPD = Field duplicate relative percent difference exceeded acceptance criterion
GRO = gasoline-range organics
IS<LCL = Internal standard recovery less than the lower control limit
LB<LOQ = Analyte detected in the laboratory blank at a concentration less than the limit of quantitation

Table 4 Validation Flags

Sample ID	Method	Analyte	Final Result	Units	Final Flag	Reason

LCSRPD = Laboratory control sample/laboratory control sample duplicate relative percent difference exceedance
MI = Matrix interference
MethLeak = Leaking methanol container
mg/kg = milligrams per kilogram
MS<LCL = Matrix spike recovery less than the lower control limit
MSRPD = Matrix spike/matrix spike duplicate relative percent difference exceedance
RRO = residual-range organics
SD<LCL = Matrix spike duplicate recovery less than the lower control limit
SD>UCL = Matrix spike duplicate recovery greater than the upper control limit
SerDilOut = Serial dilution relative percent difference exceedance
Sur<LCL = Surrogate recovery less than the lower control limit
Sur>UCL = Surrogate recovery greater than the upper control limit
TB<LOQ = Analyte detected in the trip blank at a concentration less than the limit of quantitation

Attachment 1
Samples Associated with DQE

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Attachment 1 Samples Associated with DQE

Sample ID	Collection Date	Sample Type	Matrix
16Q2SS113-SBSO-EB01	09-Jun-16	EB	Water
16Q2SS113-SBSO-EB02	09-Jun-16	EB	Water
16Q3SS113-SBSO-EB01	28-Sep-16	EB	Water
16Q2SS113-SB0102-GW-1	07-Jun-16	FD	Groundwater
16Q2SS113-SB0302-SO-1	07-Jun-16	FD	Soil
16Q2SS113-SB0502-SO-1	07-Jun-16	FD	Soil
16Q3SS113-SB1001-GW-1	28-Sep-16	FD	Groundwater
16Q3SS113-SB1002-SO-1	28-Sep-16	FD	Soil
16Q2SS113-SB0101-SO-0	06-Jun-16	N	Soil
16Q2SS113-SB0102-SO-0	06-Jun-16	N	Soil
16Q2SS113-SB0201-SO-0	06-Jun-16	N	Soil
16Q2SS113-SB0202-SO-0	06-Jun-16	N	Soil
16Q2SS113-SB0701-SO-0	06-Jun-16	N	Soil
16Q2SS113-SB0702-GW-0	06-Jun-16	N	Groundwater
16Q2SS113-SB0702-SO-0	06-Jun-16	N	Soil
16Q2SS113-SB0801-SO-0	06-Jun-16	N	Soil
16Q2SS113-SB0802-GW-0	06-Jun-16	N	Groundwater
16Q2SS113-SB0802-SO-0	06-Jun-16	N	Soil
16Q2SS113-SB0901-SO-0	06-Jun-16	N	Soil
16Q2SS113-SB0902-GW-0	06-Jun-16	N	Groundwater
16Q2SS113-SB0902-SO-0	06-Jun-16	N	Soil
16Q2SS113-SB0102-GW-0	07-Jun-16	N	Groundwater
16Q2SS113-SB0202-GW-0	07-Jun-16	N	Groundwater
16Q2SS113-SB0301-SO-0	07-Jun-16	N	Soil
16Q2SS113-SB0302-SO-0	07-Jun-16	N	Soil
16Q2SS113-SB0303-SO-0	07-Jun-16	N	Soil
16Q2SS113-SB0401-SO-0	07-Jun-16	N	Soil
16Q2SS113-SB0402-SO-0	07-Jun-16	N	Soil
16Q2SS113-SB0501-SO-0	07-Jun-16	N	Soil
16Q2SS113-SB0502-GW-0	07-Jun-16	N	Groundwater
16Q2SS113-SB0502-SO-0	07-Jun-16	N	Soil
16Q2SS113-SB0503-SO-0	07-Jun-16	N	Soil
16Q2SS113-SB0601-SO-0	07-Jun-16	N	Soil
16Q2SS113-SB0602-SO-0	07-Jun-16	N	Soil
16Q2SS113-SB0302-GW-0	08-Jun-16	N	Groundwater
16Q2SS113-SB0402-GW-0	08-Jun-16	N	Groundwater
16Q2SS113-SB0602-GW-0	08-Jun-16	N	Groundwater
16Q3SS113-SB1001-GW-0	28-Sep-16	N	Groundwater

Attachment 1 Samples Associated with DQE

Sample ID	Collection Date	Sample Type	Matrix
16Q3SS113-SB1001-SO-0	28-Sep-16	N	Soil
16Q3SS113-SB1002-SO-0	28-Sep-16	N	Soil
16Q3SS113-SB1003-SO-0	28-Sep-16	N	Soil
16Q2SS113-GWTB01	06-Jun-16	TB	Water
16Q2SS113-SBSO-TB01M	06-Jun-16	TB	Soil
16Q2SS113-GWTB02	07-Jun-16	TB	Water
16Q2SS113-SBSOTB02L	07-Jun-16	TB	Water
16Q2SS113-SBSOTB02M	07-Jun-16	TB	Soil
16Q2SS113-GWTB03	08-Jun-16	TB	Water
16Q3SS113-SBGW-TB01	28-Sep-16	TB	Water
16Q3SS113-SBSO-TB01L	28-Sep-16	TB	Water
16Q3SS113-SBSO-TB01M	28-Sep-16	TB	Soil

Notes:

EB = equipment blank
FD= field duplicate
N = primary sample
TB = trip blank

Attachment 2
ADEC Checklists

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Laboratory Data Review Checklist

CompletedBy	Berney Kidd		
Title	Project Chemist	Date	12/15/2016
CS Report Name		ReportDate	9/22/2016
Consultant Firm	CH2M Hill		
Laboratory Name	EMAX Laboratories	Laboratory Report Number	16F063
ADEC File Number		ADECRecKeyNumber	

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:

NWEPH and NWVPH transferred to Eurofins Lancaster in Lancaster, PA

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:

2.3C, 5.0C, 4.1C, 2.9C, 5.0C, 4.7C

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:

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

Some sample containers broken, sufficient volume remained for analysis.
Sample container labels missing times, samples logged per COC.
No date or initials on corrections to sample labels.
A container was received with no label, not used for analysis.
Sample ID mismatch between COC and container labels, samples logged per COC.

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

Comments:

All data are usable as reported.

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:

Surrogate recovery exceedances.
LCS recovery exceedances.

c. Were all corrective actions documented?

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

Comments:

Some data qualified as estimated.

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:

No soil samples reported.

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:

See site-specific report for details.

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

Comments:

All data are usable as reported.

6. QC Samples

a. Method Blank

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

ii. All method blank results less than PQL?

◉ Yes ○ No ○ NA (Please explain.) Comments:

iii. If above PQL, what samples are affected?

Comments:

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

○ Yes ○ No ◉ NA (Please explain.) Comments:

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

Comments:

All data are usable as reported.

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:

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:

Naphthalene was recovered less than the lower control limit in a LCS for SW8270C-SIM,

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

○ Yes ◉ No ○ NA (Please explain.) Comments:

Relative Percent Difference of 1-METHYLNAPHTHALENE, 2-METHYLNAPHTHALENE, ACENAPHTHENE, NAPHTHALENE was above the limit for Method SW8270C-SIM.

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

Comments:

16Q2CG111-SB0201-GW-0, 16Q2CG111-SB0201-GW-1, 16Q2CG111-SB0501-GW-0, 16Q2CG111-SB0601-GW-0, 16Q2SS113-SB0702-GW-0, 16Q2SS113-SB0802-GW-0

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

For RPD exceedances, associated detects were flagged "J". For low LCS recovery, associated nondetects were flagged "UJ".

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

Comments:

Some data qualified as estimated.

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:

These surrogates were out of control with high recovery: 4-BROMOFLUOROBENZENE (16Q2SS113-SB0802-GW-0) for SW8260B.

These surrogates were out of control with low recovery: 2-FLUOROBIPHENYL (16Q2CG111-SB0901-GW-0), 2-FLUOROBIPHENYL (16Q2CG111-SB1001-GW-0), 2-FLUOROBIPHENYL (16Q2SS113-SB0802-GW-0), 2-FLUOROBIPHENYL (16Q2SS113-SB0902-GW-0), NITROBENZENE-D5 (16Q2CG111-SB1001-GW-0), NITROBENZENE-D5 (16Q2SS113-SB0802-GW-0), NITROBENZENE-D5 (16Q2SS113-SB0902-GW-0) for SW8270C-SIM.

These surrogates were out of control with high recovery: NITROBENZENE-D5 (16Q2SS113-SB0702-GW-0) for SW8270C-SIM.

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:

For low recoveries, associated detected results were flagged "J" and non-detects were flagged "UJ". For high recoveries, associated detected results were flagged "J".

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

Comments:

Some data qualified as estimated.

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

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

iii. All results less than PQL?

○ Yes ◉ No ○ NA (Please explain.) Comments:

These analytes had Trip Blank detects: TOLUENE for SW8260B.

iv. If above PQL, what samples are affected?

Comments:

16Q2CG111-SB0201-GW-1, 16Q2CG111-SB0501-GW-0, 16Q2CG111-SB0601-GW-0, 16Q2CG111-SB0901-GW-0, 16Q2CG111-SB1001-GW-0, 16Q2SS113-SB0802-GW-0

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

Comments:

Associated sample results less than five times the blank concentration were qualified as estimated and flagged "B".

e. Field Duplicate

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

ii. Submitted blind to lab?

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

$$RPD\ (\%) = \text{Absolute Value of: } \frac{(R1 - R2) \times 100}{((R1 + R2)/2)}$$

Where R1 = Sample Concentration
R2 = Field Duplicate Concentration

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

○ Yes ○ No ◉ NA (Please explain.) Comments:

No field duplicate Relative Percent Difference exceedences.

f. Decontamination or Equipment Blank (if applicable)

◉ Yes ○ No ○ NA (Please explain.) Comments:

i. All results less than PQL?

○ Yes ◉ No ○ NA (Please explain.) Comments:

No sample results were affected by EB detections.

ii. If above PQL, what samples are affected?

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

No data affected.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)
a. Defined and appropriate?

○ Yes ○ No ◉ NA (Please explain.) Comments:

No other flags applied.

Laboratory Data Review Checklist

CompletedBy	Berney Kidd		
Title	Project Chemist	Date	12/15/2016
CS Report Name		ReportDate	9/22/2016
Consultant Firm	CH2M Hill		
Laboratory Name	EMAX Laboratories	Laboratory Report Number	16F064
ADEC File Number		ADECRecKeyNumber	

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 transferred.

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:

3.4C

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:

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

No date or initials on corrections to sample container labels.

The following samples were received with leaking methanol containers for AK101 and SW8260B: 16Q2SS113-SB0101-SO-0, 16Q2SS113-SB0102-SO-0, 16Q2SS113-SB0201-SO-0, 16Q2SS113-SB0202-SO-0, 16Q2SS113-SB0701-SO-0, 16Q2SS113-SB0702-SO-0, 16Q2SS113-SB0801-SO-0, 16Q2SS113-SB0802-SO-0, 16Q2SS113-SB0901-SO-0, 16Q2SS113-SB0902-SO-0. Associated results were qualified as estimated; nondetected results were flagged "UJ" and detected results were flagged "J".

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

Comments:

Some data qualified as estimated.

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:

Surrogate recovery exceedances.

c. Were all corrective actions documented?

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

Comments:

Some data qualified as estimated.

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:

See site-specific report for details.

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

Comments:

All data are usable as reported.

6. QC Samples

a. Method Blank

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

ii. All method blank results less than PQL?

◉ Yes ○ No ○ NA (Please explain.) Comments:

iii. If above PQL, what samples are affected?

Comments:

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

○ Yes ○ No ◉ NA (Please explain.) Comments:

No data affected.

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

Comments:

All data are usable as reported.

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:

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

Comments:

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

○ Yes ○ No ◉ NA (Please explain.) Comments:

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

Comments:

All data are usable.

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:

These surrogates were out of control with low recovery: 4-BROMOFLUOROBENZENE (16Q2SS113-SB0902-SO-0) for AK101.

These surrogates were out of control with low recovery: 4-BROMOFLUOROBENZENE (16Q2SS113-SB0901-SO-0), 4-BROMOFLUOROBENZENE (16Q2SS113-SB0902-SO-0) for SW8260B.

These surrogates were out of control with low recovery: NITROBENZENE-D5 (16Q2SS113-SB0201-SO-0), NITROBENZENE-D5 (16Q2SS113-SB0701-SO-0) for SW8270C-SIM.

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:

For low recoveries, associated detected results were flagged "J" and non-detects were flagged "UJ".

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

Comments:

Some data qualified as estimated.

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

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

iii. All results less than PQL?

◉ Yes ○ No ○ NA (Please explain.) Comments:

iv. If above PQL, what samples are affected?

Comments:

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

Comments:

No data affected.

e. Field Duplicate

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

○ Yes ○ No ◉ NA (Please explain.) Comments:

A FD was not reported in this sample delivery group.

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)

$$RPD\ (\%) = \text{Absolute Value of: } \frac{(R1 - R2) \times 100}{((R1 + R2)/2)}$$

Where R1 = Sample Concentration
R2 = Field Duplicate Concentration

○ Yes ○ No ◉ NA (Please explain.) Comments:

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

○ Yes ○ No ◉ NA (Please explain.) Comments:

f. Decontamination or Equipment Blank (if applicable)

◉ Yes ○ No ○ NA (Please explain.) Comments:

i. All results less than PQL?

○ Yes ◉ No ○ NA (Please explain.) Comments:

No sample results affected by EB detections.

ii. If above PQL, what samples are affected?

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

No data affected.

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

a. Defined and appropriate?

○ Yes ○ No ◉ NA (Please explain.) Comments:

No other flag applied.

Laboratory Data Review Checklist

CompletedBy	Berney Kidd		
Title	Project Chemist	Date	12/15/2016
CS Report Name		ReportDate	9/22/2016
Consultant Firm	CH2M Hill		
Laboratory Name	EMAX Laboratories	Laboratory Report Number	16F103
ADEC File Number		ADECRecKeyNumber	

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:

NWEPH and NWVPH transferred to Eurofins Lancaster in Lancaster, PA

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:

5.0C, 5.0C 4.9C, 4.5C, 4.8C, 5.2C, 5.3C, 5.2C, 4.7C, 4.8C

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:

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

Sample ID mismatch between COC and container labels, samples logged per the COC.

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

Comments:

All data are usable as reported.

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:

Surrogate recovery exceedances.
Method blank detections.
Holding time exceedances.
LCS recovery exceedances.
Matrix interference for cyclohexane, secondary quant ion used.
MS/MSD recovery exceedances.
CCV recovery exceedances.

c. Were all corrective actions documented?

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

Comments:

Some data qualified as estimated.

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:

Sample 16Q2CG112-MW01-GW-0 extracted six days past holding time for SW8270C-SIM. Associated detected results flagged "J" and nondetected results flagged "UJ".

c. All soils reported on a dry weight basis?

○ Yes ○ No ◉ NA (Please explain.) Comments:

No soil samples reported.

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:

See site-specific report for details.

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

Comments:

Some data qualified as estimated.

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:

These analytes had Method Blank detects: COPPER for SW6020.

iii. If above PQL, what samples are affected?

Comments:

16Q2CG111-SB0101-GW-0

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

Associated sample detect less than five times the blank concentration was flagged 'B'.

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

Comments:

Some data qualified as estimated.

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:

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:

C10-C12 Aliphatics was recovered less than the lower control limit in a LCS and LCSD for NWEPH.

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

Comments:

16Q2CG112-MW01-GW-0, 16Q2CG111-SB0101-GW-0, 16Q2CG112-MW01-GW-1

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

Associated detected results flagged "J" and nondetected results flagged "UJ".

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

Comments:

Some data qualified as estimated.

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:

These surrogates were out of contro with high recovery: TRIFLUOROTOLUENE (16Q2CG112-MW01-GW-0), TRIFLUOROTOLUENE (16Q2CG112-MW01-GW-1) for NWVPH.

These surrogates were out of control with high recovery: 1,2-DICHLOROETHANE-D4 (16Q2CG111-SB0701-GW-0), 1,2-DICHLOROETHANE-D4 (16Q2CG112-MW01-GW-0), 1,2-DICHLOROETHANE-D4 (16Q2CG112-MW01-GW-1), 4-BROMOFLUOROBENZENE (16Q2CG112-MW01-GW-0) for SW8260B.

These surrogates were out of control with high recovery : TOLUENE-D8 (16Q2CG112-MW01-GW-0) for SW8260B-SIM.

These surrogates were out of control with low recovery: 2-FLUOROBIPHENYL (16Q2CG111-SB0101-GW-0), 2-FLUOROBIPHENYL (16Q2CG111-SB0701-GW-0), 2-FLUOROBIPHENYL (16Q2CG112-

MW01-GW-0), 2-FLUOROBIPHENYL (16Q2CG112-MW01-GW-1), 2-FLUOROBIPHENYL (16Q2SS113-SB0202-GW-0), NITROBENZENE-D5 (16Q2CG111-SB0101-GW-0), NITROBENZENE-D5 (16Q2CG111-SB0701-GW-0), NITROBENZENE-D5 (16Q2CG112-MW01-GW-0), NITROBENZENE-D5 (16Q2CG112-MW01-GW-1), NITROBENZENE-D5 (16Q2SS113-SB0202-GW-0), NITROBENZENE-D5 (16Q2SS113-SB0302-GW-0), NITROBENZENE-D5 (16Q2SS113-SB0502-GW-0), TERPHENYL-D14 (16Q2CG111-SB0101-GW-0), TERPHENYL-D14 (16Q2CG111-SB0701-GW-0) for SW8270C-SIM.

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:

For low recoveries, associated detected results were flagged "J" and non-detects were flagged "UJ". For high recoveries, associated detected results were flagged "J".

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

Comments:

Some data qualified as estimated.

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

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

iii. All results less than PQL?

○ Yes ◉ No ○ NA (Please explain.) Comments:

These analytes had Trip Blank detects: TOLUENE for SW8260B.

iv. If above PQL, what samples are affected?

Comments:

16Q2CG111-SB0101-GW-0, 16Q2CG111-SB0701-GW-0, 16Q2SS113-SB0102-GW-0, 16Q2SS113-SB0102-GW-1, 16Q2SS113-SB0202-GW-0, 16Q2SS113-SB0302-GW-0, 16Q2SS113-SB0402-GW-0, 16Q2SS113-SB0502-GW-0, 16Q2SS113-SB0602-GW-0

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

Comments:

Associated sample detects less than five times the blank concentration were qualified as estimated and flagged 'B'.

e. Field Duplicate

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

ii. Submitted blind to lab?

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

$$RPD\ (\%) = \text{Absolute Value of: } \frac{(R1 - R2) \times 100}{((R1 + R2)/2)}$$

Where R1 = Sample Concentration
R2 = Field Duplicate Concentration

○ Yes ◉ No ○ NA (Please explain.) Comments:

These samples were out of control for SW6020: ALUMINUM (16Q2CG112-MW01-GW-0/16Q2CG112-MW01-GW-0, %RPD 32.67 vs 30), associated sample results were flagged J.

These samples were out of control for SW8270C-SIM: 1-METHYLNAPHTHALENE (16Q2CG112-MW01-GW-0/16Q2CG112-MW01-GW-1, %RPD = 42.42 vs 30), associated sample results were flagged J.

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

Data qualified as estimated.

f. Decontamination or Equipment Blank (if applicable)

◉ Yes ○ No ○ NA (Please explain.) Comments:

i. All results less than PQL?

○ Yes ◉ No ○ NA (Please explain.) Comments:

These analytes had Equipment Blank detects: ALUMINUM, COPPER for SW6020.

These analytes had Equipment Blank detects: 1,2,4-TRIMETHYLBENZENE, TOLUENE for SW8260B.

ii. If above PQL, what samples are affected?

16Q2CG112-MW01-GW-0, 16Q2CG112-MW01-GW-1

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

Associated sample detects less than five times the blank concentrations were qualified as estimated and flagged 'B'.

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

a. Defined and appropriate?

◉ Yes ○ No ○ NA (Please explain.) Comments:

Calibration:

These samples were flagged for Continuing calibration recovery greater than the upper control limit: CYCLOHEXANE %D +20.7 vs. 20 (16Q2CG111-SB0701-GW-0, 16Q2SS113-SB0302-GW-0) for SW8260B. Associated detected results were qualified as estimated and flagged "J".

Matrix:

These samples were flagged for Matrix interference:
CYCLOHEXANE was reported from a secondary quant ion (16Q2CG111-SB0101-GW-0, 16Q2CG111-SB0701-GW-0, 16Q2CG112-MW01-GW-0, 16Q2CG112-MW01-GW-1, 16Q2SS113-SB0302-GW-0, 16Q2SS113-SB0402-GW-0, 16Q2SS113-SB0502-GW-0, 16Q2SS113-SB0602-GW-0 for SW8260B. Associated detected results were qualified as estimated and flagged "J", one nondetected result was flagged "UJ".

These samples were flagged for Matrix spike duplicate recovery criteria greater than the upper control limit:
C8-C10 Aliphatics (16Q2CG111-SB0101-GW-0, %R = 341 LCL=70 UCL=130), C8-C10 Aliphatics (16Q2CG112-MW01-GW-0, %R = 353 LCL=70 UCL=130) for NWVPH. Associated detected results were qualified as estimated and flagged "J".

These samples were flagged for Matrix spike duplicate recovery criteria less than the lower control limit:
C10-C12 Aliphatics (16Q2CG112-MW01-GW-0, %R = 46 LCL=70 UCL=130) for NWEPH. Associated detected result was qualified as estimated and flagged "J".

C5-C6 Aliphatics (16Q2CG112-MW01-GW-0, %R = 48 LCL=70 UCL=130) for NWVPH. Associated detected result was qualified as estimated and flagged "J".

1,2,4-TRIMETHYLBENZENE (16Q2CG111-SB0101-GW-0, %R = 71 LCL=75 UCL=130), 1,3,5-TRIMETHYLBENZENE (16Q2CG112-MW01-GW-0, %R = 13 LCL=75 UCL=130), ETHYLBENZENE (16Q2CG112-MW01-GW-0, %R = -68 LCL=75 UCL=125), M,P-XYLENES (16Q2CG112-MW01-GW-0, %R = -219 LCL=75 UCL=130), N-PROPYLBENZENE (16Q2CG112-MW01-GW-0, %R = -62 LCL=70 UCL=130), SEC-BUTYLBENZENE (16Q2CG112-MW01-GW-0, %R = 67 LCL=70 UCL=125) for SW8260B. Associated detected results were qualified as estimated and flagged "J".

1-METHYLNAPHTHALENE (16Q2CG112-MW01-GW-0, %R = 39 LCL = 41 UCL = 115), 2-METHYLNAPHTHALENE (16Q2CG112-MW01-GW-0, %R = 37 LCL=39 UCL=114), 2-METHYLNAPHTHALENE (16Q2CG112-MW01-GW-0, %R 17 LCL = 43 UCL = 114) for SW8270C-SIM. Associated detected results were qualified as estimated and flagged "J".

These samples were flagged for Matrix spike recovery greater than the upper control limit:
C6-C8 Aliphatics (16Q2CG111-SB0101-GW-0, %R = 142 LCL=70 UCL=130), C8-C10 Aliphatics (16Q2CG111-SB0101-GW-0, %R = 332 LCL=70 UCL=130), C8-C10 Aliphatics (16Q2CG112-MW01-GW-0, %R = 436 LCL=70 UCL=130), C8-C10 Aromatics (16Q2CG112-MW01-GW-0, %R = 237 LCL=70 UCL=130) for NWVPH. Associated detected results were qualified as estimated and flagged "J".

These samples were flagged for Matrix spike recovery less than the lower control limit:
C10-C12 Aliphatics (16Q2CG112-MW01-GW-0, %R = 66 LCL=70 UCL=130) for NWEPH. Associated detected result was qualified as estimated and flagged "J".

C5-C6 Aliphatics (16Q2CG112-MW01-GW-0, %R = 54 LCL=70 UCL=130) for NWVPH.

Associated detected result was qualified as estimated and flagged "J".

1,2,4-TRIMETHYLBENZENE (16Q2CG111-SB0101-GW-0, %R = 71 LCL=75 UCL=130), 1,3,5-TRIMETHYLBENZENE (16Q2CG112-MW01-GW-0, %R = 4 LCL=75 UCL=130), ETHYLBENZENE (16Q2CG112-MW01-GW-0, %R = -65 LCL=75 UCL=125), M,P-XYLENES (16Q2CG112-MW01-GW-0, %R = -203 LCL=75 UCL=130), N-PROPYLBENZENE (16Q2CG112-MW01-GW-0, %R = -60 LCL=70 UCL=130), SEC-BUTYLBENZENE (16Q2CG112-MW01-GW-0, %R = 61 LCL=70 UCL=125) for SW8260B. Associated detected results were qualified as estimated and flagged "J".

NAPHTHALENE (16Q2CG112-MW01-GW-0, %R = 17 LCL=43 UCL=114) for SW8270C-SIM. Associated detected result was qualified as estimated and flagged "J".

Laboratory Data Review Checklist

CompletedBy	Berney Kidd		
Title	Project Chemist	Date	12/15/2016
CS Report Name		ReportDate	9/22/2016
Consultant Firm	CH2M Hill		
Laboratory Name	EMAX Laboratories	Laboratory Report Number	16F104
ADEC File Number		ADECRecKeyNumber	

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 transferred.

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:

3.9C, 3.5C

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:

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

Some dates missing from COC.
Date and initial not included for corrections to sample container labels.
The following samples were received with methanol leaking from the AK101 and SW8260C containers: 16Q2SS113-SB0303-SO-0, 16Q2SS113-SB0402-SO-0, 16Q2SS113-SB0501-SO-0. Associated results were qualified as estimated, detected results were flagged "J" and nondetected results were flagged "UJ".

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

Comments:

Some data qualified as estimated.

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:

Internal standard recovery exceedances.
Method blank detections.
Surrogate recovery exceedances.
Serial dilution precision exceedances.
MS/MSD recovery exceedances.

c. Were all corrective actions documented?

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

Comments:

Some data qualified as estimated.

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:

See site-specific report for details.

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

Comments:

All data are usable as reported.

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:

These analytes had Method Blank detects: ANTIMONY for SW6020.

iii. If above PQL, what samples are affected?

Comments:

16Q2SS113-SB0501-SO-0, 16Q2SS113-SB0502-SO-0, 16Q2SS113-SB0502-SO-1, 16Q2SS113-SB0503-SO-0

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

Associated sample detects less than five times the blank concentration were flagged 'B'.

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

Comments:

Some data qualified as estimated.

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:

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

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

○ Yes ○ No ◉ NA (Please explain.) Comments:

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

All data are usable as reported.

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:

These surrogates were out of control with high recovery: 4-BROMOFLUOROBENZENE (16Q2SS113-SB0501-SO-0) TOLUENE-D8 (16Q2SS113-SB0501-SO-0) for SW8260B-Low.

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:

For high recoveries, associated detected results were flagged "J".

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

Some data qualified as estimated.

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

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

iii. All results less than PQL?

◉ Yes ○ No ○ NA (Please explain.) Comments:

iv. If above PQL, what samples are affected?

Comments:

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

Comments:

No data affected.

e. Field Duplicate

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

ii. Submitted blind to lab?

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

$$RPD\ (\%) = \text{Absolute Value of: } \frac{(R1 - R2) \times 100}{((R1 + R2)/2)}$$

Where R1 = Sample Concentration
R2 = Field Duplicate Concentration

○ Yes ◉ No ○ NA (Please explain.) Comments:

These samples were out of control for AK102/103: DRO (16Q2SS113-SB0502-SO-0/16Q2SS113-SB0502-SO-1, %RPD = 170.86 vs 50), RRO (16Q2SS113-SB0302-SO-0/16Q2SS113-SB0302-SO-1, %RPD 116.21 vs 50), associated sample results were flagged J.

These samples were out of control for SW8270C-SIM in 16Q2SS113-SB0302-SO-0/16Q2SS113-SB0302-SO-1: 1-METHYLNAPHTHALENE (%RPD = 58.82 vs 50), 2-METHYLNAPHTHALENE (%RPD = 58.06 vs 50), ACENAPHTHENE (%RPD 84.93 vs 50), ACENAPHTHYLENE (%RPD 156.16 vs 50), BENZO (A) ANTHRACENE (%RPD 133.33 vs 50), BENZO (A) PYRENE (%RPD 133.33 vs 50), BENZO (B) FLUORANTHENE (%RPD 136.36 vs 50), BENZO (G,H,I) PERYLENE (%RPD 127.27 vs 50), BENZO(K)FLUORANTHENE (%RPD 122.81 vs 50), CHRYSENE (%RPD 150.52 vs 50), FLUORANTHENE (%RPD 149.21 vs 50), FLUORENE (%RPD 191.42 vs 50), INDENO (1,2,3-C,D) PYRENE (%RPD 138.98 vs 50), PYRENE (%RPD 146.27 vs 50), associated sample results were flagged J.

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

Data qualified as estimated.

f. Decontamination or Equipment Blank (if applicable)

◉ Yes ○ No ○ NA (Please explain.) Comments:

i. All results less than PQL?

○ Yes ◉ No ○ NA (Please explain.) Comments:

These analytes had Equipment Blank detects: ACETONE, ETHYLBENZENE, M,P-XYLENES, O-XYLENE, TOLUENE for SW8260B-Low.

ii. If above PQL, what samples are affected?

16Q2SS113-SB0501-SO-0, 16Q2SS113-SB0502-SO-0, 16Q2SS113-SB0502-SO-1, 16Q2SS113-SB0503-SO-0

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

Associated sample detects less than five times (10 times for acetone) the blank concentrations were flagged 'B'.

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

a. Defined and appropriate?

◉ Yes ○ No ○ NA (Please explain.) Comments:

Serial dilution:

These samples were flagged for Serial Dilution and post digest spike exceeded acceptance criteria: COPPER (16Q2SS113-SB0502-SO-0, %D in FD 12% vs 10%), COPPER (16Q2SS113-SB0502-SO-1, %D in FD 12% vs 10%), NICKEL (16Q2SS113-SB0502-SO-0, %D in FD 11% vs 10%), NICKEL (16Q2SS113-SB0502-SO-1, %D in FD 11% vs 10%) for SW6020. Associated detected results were qualified as estimated and flagged "J".

InternalStandard:

Internal standard recovery was less than the lower control limit in sample 16Q2SS113-SB0501-SO-0 for SW8260B-Low. Associated detected results were qualified as estimated and flagged "J".

Matrix:

These samples were flagged for Matrix spike duplicate recovery criteria less than the lower control limit: 1-METHYLNAPHTHALENE (16Q2SS113-SB0303-SO-0, %R = 33 LCL = 43 UCL = 111) for SW8270C-SIM. Associated nondetected result was qualified as estimated and flagged "UJ".

These samples were flagged for Matrix spike recovery less than the lower control limit: CHRYSENE (16Q2SS113-SB0303-SO-0, %R = 54 LCL=57 UCL=118) for SW8270C-SIM. Associated nondetected result was qualified as estimated and flagged "UJ".

These samples were flagged for Matrix spike RPD criteria exceeded: FLUORANTHENE (16Q2SS113-SB0303-SO-0, MSRPD = 31.58 Limit =20), PYRENE (16Q2SS113-SB0303-SO-0, MSRPD = 31.63 Limit =20) for SW8270C-SIM. Associated detected results were qualified as estimated and flagged "J".

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Laboratory Data Review Checklist

CompletedBy	Berney Kidd		
Title	Project Chemist	Date	12/16/2016
CS Report Name		ReportDate	10/25/2016
Consultant Firm	CH2M Hill		
Laboratory Name	EMAX Laboratories	Laboratory Report Number	16I272
ADEC File Number		ADECRecKeyNumber	

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 transferred.

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:

3.4C, 3.7C, 3.5C

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:

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

No initials or dates on corrections to container labels.

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

Comments:

All data are usable as reported.

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:

MS/MSD recovery exceedances.
Serial dilution precision exceedances.
Calibration check recovery exceedances.
LCS precision exceedances.

c. Were all corrective actions documented?

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

Comments:

Some data qualified as estimated.

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:

No soil samples reported.

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:

See site-specific report for details.

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

Comments:

All data are usable as reported.

6. QC Samples

a. Method Blank

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

ii. All method blank results less than PQL?

◉ Yes ○ No ○ NA (Please explain.) Comments:

iii. If above PQL, what samples are affected?

Comments:

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

○ Yes ○ No ◉ NA (Please explain.) Comments:

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

Comments:

All data are usable as reported.

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:

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

○ Yes ◉ No ○ NA (Please explain.) Comments:

Relative Percent Difference of PHENANTHRENE was above the limit for Method SW8270C-SIM.

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

16Q3SS113-SB1001-GW-0, 16Q3SS113-SB1001-GW-1

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

For RPD exceedances, associated detects were flagged "J".

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

Some data qualified as estimated.

c. Surrogates - Organics Only

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

○ Yes ○ No ◉ NA (Please explain.) Comments:

No surrogate exceedances.

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

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

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

iii. All results less than PQL?

○ Yes ◉ No ○ NA (Please explain.) Comments:

These analytes had Trip Blank detects: TOLUENE for SW8260B.

iv. If above PQL, what samples are affected?

Comments:

16Q3SS113-SB1001-GW-0

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

Comments:

Associated sample result less than five times the blank concentration was qualified as estimated and flagged "B".

e. Field Duplicate

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

ii. Submitted blind to lab?

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

$$RPD\ (\%) = \text{Absolute Value of: } \frac{(R1 - R2) \times 100}{((R1 + R2)/2)}$$

Where R1 = Sample Concentration
R2 = Field Duplicate Concentration

○ Yes ◉ No ○ NA (Please explain.) Comments:

These samples were out of control for AK102/103: DRO (16Q3SS113-SB1001-GW-0/16Q3SS113-SB1001-GW-1, %RPD = 131.49 vs 30), associated sample results were flagged J.

These samples were out of control for SW6020: ZINC (16Q3SS113-SB1001-GW-0/16Q3SS113-SB1001-GW-1, %RPD 66.67 vs 30), associated sample results were flagged J.

These samples were out of control for SW8260B in 16Q3SS113-SB1001-GW-0/16Q3SS113-SB1001-GW-1: 2-HEXANONE (%RPD 50 vs 30), NAPHTHALENE (%RPD 168.25 30), N-BUTYLBENZENE

(%RPD 37.5 vs 30), associated sample results were flagged J and nondetects were flagged "UJ".

These samples were out of control for SW8270C-SIM in 16Q3SS113-SB1001-GW-0/16Q3SS113-SB1001-GW-1: 1-METHYLNAPHTHALENE (%RPD 62.5 vs 30), 2-METHYLNAPHTHALENE (%RPD 55.71 vs 30), NAPHTHALENE (%RPD 55.38 vs 30), associated sample results were flagged J.

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

Data qualified as estimated.

f. Decontamination or Equipment Blank (if applicable)

◉ Yes ○ No ○ NA (Please explain.) Comments:

i. All results less than PQL?

○ Yes ◉ No ○ NA (Please explain.) Comments:

ii. If above PQL, what samples are affected?

No sample results affected by EB detections.

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

No data affected.

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

a. Defined and appropriate?

◉ Yes ○ No ○ NA (Please explain.) Comments:

Calibration:

These samples were flagged for Continuing calibration recovery less than the lower control limit:
VINYL ACETATE (16Q3SS113-SB1001-GW-0, Vinyl acetate %D -21.7 vs. 20), VINYL ACETATE (16Q3SS113-SB1001-GW-1, Vinyl acetate %D -21.7 vs. 20) for SW8260B. Associated nondetected results were qualified as estimated and flagged "UJ".

Serial Dilution:

These samples were flagged for Serial Dilution exceeded acceptance criteria:
COPPER (16Q3SS113-SB1001-GW-0, %RPD 29 vs 10) for SW6020. Associated detected result was qualified as estimated and flagged "J".

Matrix:

These samples were flagged for Matrix spike duplicate recovery criteria greater than the upper control limit:
MANGANESE (16Q3SS113-SB1001-GW-0, %R = 200 LCL=87 UCL=115) for SW6020. Associated detected result was qualified as estimated and flagged "J".

These samples were flagged for Matrix spike duplicate recovery criteria less than the lower control limit: DRO (16Q3SS113-SB1001-GW-0, %R = 60 LCL=75 UCL=125) for AK102/103. Associated detected result was qualified as estimated and flagged "J".

These samples were flagged for Matrix spike recovery less than the lower control limit: DRO (16Q3SS113-SB1001-GW-0, %R = 56 LCL=75 UCL=125) for AK102/103. Associated detected result was qualified as estimated and flagged "J".

CALCIUM (16Q3SS113-SB1001-GW-0, %R = 67 LCL=87 UCL=118) for SW6020. Associated detected result was qualified as estimated and flagged "J".

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Laboratory Data Review Checklist

CompletedBy	Berney Kidd		
Title	Project Chemist	Date	12/16/2016
CS Report Name		ReportDate	11/30/2016
Consultant Firm	CH2M Hill		
Laboratory Name	EMAX Laboratories	Laboratory Report Number	16I292
ADEC File Number		ADECRecKeyNumber	

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:

NWEPH and NWVPH transferred to Eurofins Lancaster in Lancaster, PA

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:

3.0C, 4.5C

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:

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

Sample 16Q3CG111-MW0101-SO-0 was received leaking for AK101. Associated detected result was qualified as estimated and flagged "J".

Sample ID mismatch between COC and container labels, samples logged in per COC.

No date or initials on corrections to sample ID labels.

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

Comments:

Some data qualified as estimated.

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:

Holding time exceedances.
Internal standard recovery exceedances.
MS/MSD recovery exceedances.
Serial dilution precision exceedances.
Surrogate recovery exceedances.

c. Were all corrective actions documented?

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

Comments:

Some data qualified as estimated.

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:

Sample 16Q3CG111-MW0101-SO-0 was analyzed five days past holding time for NWVPH. Associated results were qualified as estimated; detected results were flagged "J" and nondetected results were flagged "UJ".

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:

See site-specific report for details.

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

Comments:

Some data qualified as estimated.

6. QC Samples

a. Method Blank

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

ii. All method blank results less than PQL?

◉ Yes ○ No ○ NA (Please explain.) Comments:

iii. If above PQL, what samples are affected?

Comments:

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

○ Yes ○ No ◉ NA (Please explain.) Comments:

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

Comments:

Data are usable as reported.

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:

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

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

○ Yes ○ No ◉ NA (Please explain.) Comments:

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

All data are usable.

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:

These surrogates were out of control with low recovery: 1-CHLOROOCTADECANE (16Q3CG111-MW0101-SO-0) for NWEPH.

These surrogates were out of control with low recovery: 1,2-DICHLOROETHANE-D4 (16Q3CG111-MW0101-SO-0), 4-BROMOFLUOROBENZENE (16Q3CG111-MW0101-SO-0), TOLUENE-D8 (16Q3CG111-MW0101-SO-0) for SW8260B-Low.

These surrogates were out of control with high recovery: TOLUENE-D8 (16Q3CG111-MW0101-SO-0) for SW8260B-SIM.

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:

For low recoveries, associated detected results were flagged "J" and non-detects were flagged "UJ". For high recoveries, associated detected results were flagged "J".

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

Comments:

Some data qualified as estimated.

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

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

iii. All results less than PQL?

○ Yes ◉ No ○ NA (Please explain.) Comments:

These analytes had Trip Blank detects: ACETONE for SW8260B-Low.

iv. If above PQL, what samples are affected?

Comments:

16Q3SS113-SB1002-SO-0

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

Comments:

Associated sample result detected less than 10 times the blank concentration was qualified as estimated and flagged "B".

e. Field Duplicate

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

ii. Submitted blind to lab?

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

$$RPD\ (\%) = \text{Absolute Value of: } \frac{(R1 - R2) \times 100}{((R1 + R2)/2)}$$

Where R1 = Sample Concentration
R2 = Field Duplicate Concentration

○ Yes ◉ No ○ NA (Please explain.) Comments:

These samples were out of control for AK101: GRO (16Q3SS113-SB1002-SO-0/16Q3SS113-SB1002-SO-1, %RPD = 112 vs 50), associated sample results were flagged J.

These samples were out of control for AK102/103 in 16Q3SS113-SB1002-SO-0/16Q3SS113-SB1002-SO-1: DRO (%RPD = 85.71 vs 50), RRO (%RPD = 72.87 vs 50), associated sample results were flagged J.

These samples were out of control for SW8260B-Low in 16Q3SS113-SB1002-SO-0/16Q3SS113-SB1002-SO-1: 1,2,4-TRIMETHYLBENZENE (%RPD 78.08 vs 50), CARBON DISULFIDE (%RPD 59.74 vs 50), associated sample results were flagged J.

These samples were out of control for SW8270C-SIM 16Q3SS113-SB1002-SO-0/16Q3SS113-SB1002-SO-1: 1-METHYLNAPHTHALENE (%RPD = 76.54 vs 50), 2-METHYLNAPHTHALENE (%RPD = 115.79 vs 50), ACENAPHTHENE (%RPD = 78.69 vs 50), ACENAPHTHYLENE (%RPD = 81.08 vs 50), FLUORANTHENE (%RPD = 98.14 vs 50), FLUORENE (%RPD = 78.39 vs 50), NAPHTHALENE (%RPD = 103.32 vs 50), PHENANTHRENE (%RPD = 92.68 vs 50), PYRENE (%RPD = 91.19 vs 50), associated sample results were flagged J.

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

Data qualified as estimated.

f. Decontamination or Equipment Blank (if applicable)

◉ Yes ○ No ○ NA (Please explain.) Comments:

i. All results less than PQL?

○ Yes ◉ No ○ NA (Please explain.) Comments:

These analytes had Equipment Blank detects: ACETONE for SW8260B-Low.

ii. If above PQL, what samples are affected?

16Q3SS113-SB1001-SO-0, 16Q3SS113-SB1002-SO-0, 16Q3SS113-SB1002-SO-1, 16Q3SS113-SB1003-SO-0

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

Associated sample results detected less than 10 times the blank concentration were qualified as estimated and flagged "B".

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)
   a. Defined and appropriate?

◉ Yes ○ No ○ NA (Please explain.) Comments:

Serial Dilution:

These samples were flagged for Serial Dilution exceeded acceptance criteria:
CALCIUM (16Q3SS113-SB1003-SO-0, RPD 11 vs 10), COBALT (16Q3SS113-SB1003-SO-0, RPD 11 vs 10), COPPER (16Q3SS113-SB1003-SO-0, RPD 12 vs 10), NICKEL (16Q3SS113-SB1003-SO-0, RPD 12 vs 10), POTASSIUM (16Q3SS113-SB1003-SO-0, RPD 12 vs 10) for SW6020. Associated detected results were qualified as estimated and flagged "J".

InternalStandard:

Internal standard recovery was less than the lower control limit in sample 16Q3CG111-MW0101-SO-0 for SW8260B-Low. Associated detected results were qualified as estimated and flagged "J".

Matrix:

These samples were flagged for Matrix spike duplicate recovery criteria less than the lower control limit:
BARIUM (16Q3SS113-SB1003-SO-0, %R = 54 LCL=86 UCL=116), CHROMIUM (16Q3SS113-SB1003-SO-0, %R = 61 LCL=83 UCL=119), MAGNESIUM (16Q3SS113-SB1003-SO-0, %R = 75 LCL=80 UCL=123), NICKEL (16Q3SS113-SB1003-SO-0, %R = 81 LCL=84 UCL=119) for SW6020. Associated detected results were qualified as estimated and flagged "J".

These samples were flagged for Matrix spike recovery less than the lower control limit:
BARIUM (16Q3SS113-SB1003-SO-0, %R = 52 LCL=86 UCL=116), CALCIUM (16Q3SS113-SB1003-SO-0, %R = 84 LCL=86 UCL=118), CHROMIUM (16Q3SS113-SB1003-SO-0, %R = 63 LCL=83 UCL=119), COPPER (16Q3SS113-SB1003-SO-0, %R = 83 LCL=84 UCL=119), MAGNESIUM (16Q3SS113-SB1003-SO-0, %R = 63 LCL=80 UCL=123), NICKEL (16Q3SS113-SB1003-SO-0, %R = 81 LCL=84 UCL=119), VANADIUM (16Q3SS113-SB1003-SO-0, %R = 78 LCL=82 UCL=116) for SW6020. Associated detected results were qualified as estimated and flagged "J".

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Appendix B-2
Laboratory Data Packages

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Appendix B-2, Laboratory Data Packages, will be provided as electronic files only.

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Appendix B-3
Nondetect Exceedances in Soil

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Appendix B-3 Nondetect Exceedances in Soil

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

Location Name	Sample Name	Sample Date Only	Analytical Method	Analyte Name	Result Value	Result Units	Result Flag	PSL	PSL Source	LOD Exceeds PSL?
SS113-SB01	16Q2SS113-SB0102-SO-0	6-Jun-16	SW8260B	Ethylene Dibromide (EDB)	0.057	mg/kg	UJ	0.036	EPA Residential Soil RSL May 2018	Y
SS113-SB03	16Q2SS113-SB0301-SO-0	7-Jun-16	SW8260B	Ethylene Dibromide (EDB)	0.095	mg/kg	U	0.036	EPA Residential Soil RSL May 2018	Y
SS113-SB03	16Q2SS113-SB0302-SO-0	7-Jun-16	SW8260B	Ethylene Dibromide (EDB)	0.071	mg/kg	U	0.036	EPA Residential Soil RSL May 2018	Y
SS113-SB06	16Q2SS113-SB0601-SO-0	7-Jun-16	SW8260B	Ethylene Dibromide (EDB)	0.071	mg/kg	U	0.036	EPA Residential Soil RSL May 2018	Y
SS113-SB06	16Q2SS113-SB0602-SO-0	7-Jun-16	SW8260B	Ethylene Dibromide (EDB)	0.042	mg/kg	U	0.036	EPA Residential Soil RSL May 2018	Y
SS113-SB07	16Q2SS113-SB0702-SO-0	6-Jun-16	SW8260B	Ethylene Dibromide (EDB)	0.047	mg/kg	UJ	0.036	EPA Residential Soil RSL May 2018	Y
SS113-SB09	16Q2SS113-SB0901-SO-0	6-Jun-16	SW8260B	Ethylene Dibromide (EDB)	0.068	mg/kg	UJ	0.036	EPA Residential Soil RSL May 2018	Y
SS113-SB09	16Q2SS113-SB0902-SO-0	6-Jun-16	SW8260B	Ethylene Dibromide (EDB)	0.076	mg/kg	UJ	0.036	EPA Residential Soil RSL May 2018	Y
SS113-SB01	16Q2SS113-SB0101-SO-0	6-Jun-16	SW8260B	Ethylene Dibromide (EDB)	0.045	mg/kg	UJ	0.036	EPA Residential Soil RSL May 2018	Y
SS113-SB02	16Q2SS113-SB0202-SO-0	6-Jun-16	SW8260B	Ethylene Dibromide (EDB)	0.041	mg/kg	UJ	0.036	EPA Residential Soil RSL May 2018	Y
SS113-SB03	16Q2SS113-SB0303-SO-0	7-Jun-16	SW8260B	Ethylene Dibromide (EDB)	0.07	mg/kg	UJ	0.036	EPA Residential Soil RSL May 2018	Y
SS113-SB07	16Q2SS113-SB0701-SO-0	6-Jun-16	SW8260B	Ethylene Dibromide (EDB)	0.12	mg/kg	UJ	0.036	EPA Residential Soil RSL May 2018	Y
SS113-SB04	16Q2SS113-SB0401-SO-0	7-Jun-16	SW8260B	Ethylene Dibromide (EDB)	0.081	mg/kg	U	0.036	EPA Residential Soil RSL May 2018	Y
SS113-SB08	16Q2SS113-SB0801-SO-0	6-Jun-16	SW8260B	Ethylene Dibromide (EDB)	0.067	mg/kg	UJ	0.036	EPA Residential Soil RSL May 2018	Y
SS113-SB08	16Q2SS113-SB0802-SO-0	6-Jun-16	SW8260B	Ethylene Dibromide (EDB)	0.046	mg/kg	UJ	0.036	EPA Residential Soil RSL May 2018	Y
SS113-SB02	16Q2SS113-SB0201-SO-0	6-Jun-16	SW8260B	Ethylene Dibromide (EDB)	0.053	mg/kg	UJ	0.036	EPA Residential Soil RSL May 2018	Y
SS113-SB03	16Q2SS113-SB0302-SO-1	7-Jun-16	SW8260B	Ethylene Dibromide (EDB)	0.059	mg/kg	U	0.036	EPA Residential Soil RSL May 2018	Y
SS113-SB04	16Q2SS113-SB0402-SO-0	7-Jun-16	SW8260B	Ethylene Dibromide (EDB)	0.072	mg/kg	UJ	0.036	EPA Residential Soil RSL May 2018	Y
SS113-SB05	16Q2SS113-SB0501-SO-0	7-Jun-16	SW6020	Thallium	0.15	mg/kg	U	0.078	EPA Residential Soil RSL May 2018	Y
SS113-SB05	16Q2SS113-SB0502-SO-1	7-Jun-16	SW6020	Thallium	0.11	mg/kg	U	0.078	EPA Residential Soil RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-SO-0	28-Sep-16	SW6020	Thallium	0.12	mg/kg	U	0.078	EPA Residential Soil RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1002-SO-0	28-Sep-16	SW6020	Thallium	0.116	mg/kg	U	0.078	EPA Residential Soil RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1003-SO-0	28-Sep-16	SW6020	Thallium	0.117	mg/kg	U	0.078	EPA Residential Soil RSL May 2018	Y
SS113-SB05	16Q2SS113-SB0502-SO-0	7-Jun-16	SW6020	Thallium	0.12	mg/kg	U	0.078	EPA Residential Soil RSL May 2018	Y
SS113-SB05	16Q2SS113-SB0503-SO-0	7-Jun-16	SW6020	Thallium	0.12	mg/kg	U	0.078	EPA Residential Soil RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1002-SO-1	28-Sep-16	SW6020	Thallium	0.119	mg/kg	U	0.078	EPA Residential Soil RSL May 2018	Y

Notes:
EPA = United States Environmental Protection Agency
mg/kg = milligrams per kilogram
PSL = project screening leve
RSL = regional screening level
U = not detected
UJ = The analyte was below the reported sample quantitation limit. However, the reported value is approximate.
Y = yes

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Appendix B-4
Nondetect Exceedances in Groundwater

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Appendix B-4 Nondetect Exceedances in Groundwater

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

Location Name	Sample Name	Sample Date Only	Analytical Method	Analyte Name	Result Value	Result Units	Result Flag	PSL	PSL Source	Exceeds PSL?
SS113-SB01	16Q2SS113-SB0102-GW-0	07-Jun-16	AK102/3	DRO	220	µg/L	U	150	1/10th 2016 ADEC Table C GW	Y
SS113-SB01	16Q2SS113-SB0102-GW-0	07-Jun-16	AK102/3	RRO	220	µg/L	U	110	1/10th 2016 ADEC Table C GW	Y
SS113-SB01	16Q2SS113-SB0102-GW-0	07-Jun-16	BNASIM	Benzo(a)anthracene	0.22	µg/L	U	0.012	EPA Tapwater RSL May 2018	Y
SS113-SB01	16Q2SS113-SB0102-GW-0	07-Jun-16	BNASIM	Benzo(a)pyrene	0.11	µg/L	U	0.0034	EPA Tapwater RSL May 2018	Y
SS113-SB01	16Q2SS113-SB0102-GW-0	07-Jun-16	BNASIM	Benzo(b)fluoranthene	0.11	µg/L	U	0.034	EPA Tapwater RSL May 2018	Y
SS113-SB01	16Q2SS113-SB0102-GW-0	07-Jun-16	BNASIM	Benzo(g,h,i)perylene	0.11	µg/L	U	0.026	EPA Tapwater RSL May 2018	Y
SS113-SB01	16Q2SS113-SB0102-GW-0	07-Jun-16	BNASIM	Benzo(k)fluoranthene	0.11	µg/L	U	0.08	EPA Tapwater RSL May 2018	Y
SS113-SB01	16Q2SS113-SB0102-GW-0	07-Jun-16	BNASIM	Chrysene	0.22	µg/L	U	0.2	EPA Tapwater RSL May 2018	Y
SS113-SB01	16Q2SS113-SB0102-GW-0	07-Jun-16	BNASIM	Dibenz(a,h)anthracene	0.11	µg/L	U	0.0034	EPA Tapwater RSL May 2018	Y
SS113-SB01	16Q2SS113-SB0102-GW-0	07-Jun-16	BNASIM	Indeno(1,2,3-cd)pyrene	0.11	µg/L	U	0.0019	EPA Tapwater RSL May 2018	Y
SS113-SB01	16Q2SS113-SB0102-GW-0	07-Jun-16	SW8260B	2-Hexanone	5	µg/L	U	3.8	EPA Tapwater RSL May 2018	Y
SS113-SB01	16Q2SS113-SB0102-GW-0	07-Jun-16	SW8260B	Ethylene Dibromide (EDB)	0.2	µg/L	U	0.0075	EPA Tapwater RSL May 2018	Y
SS113-SB01	16Q2SS113-SB0102-GW-1	07-Jun-16	AK102/3	DRO	210	µg/L	U	150	1/10th 2016 ADEC Table C GW	Y
SS113-SB01	16Q2SS113-SB0102-GW-1	07-Jun-16	AK102/3	RRO	210	µg/L	U	110	1/10th 2016 ADEC Table C GW	Y
SS113-SB01	16Q2SS113-SB0102-GW-1	07-Jun-16	BNASIM	Benzo(a)anthracene	0.24	µg/L	U	0.012	EPA Tapwater RSL May 2018	Y
SS113-SB01	16Q2SS113-SB0102-GW-1	07-Jun-16	BNASIM	Benzo(a)pyrene	0.12	µg/L	U	0.0034	EPA Tapwater RSL May 2018	Y
SS113-SB01	16Q2SS113-SB0102-GW-1	07-Jun-16	BNASIM	Benzo(b)fluoranthene	0.12	µg/L	U	0.034	EPA Tapwater RSL May 2018	Y
SS113-SB01	16Q2SS113-SB0102-GW-1	07-Jun-16	BNASIM	Benzo(g,h,i)perylene	0.12	µg/L	U	0.026	EPA Tapwater RSL May 2018	Y
SS113-SB01	16Q2SS113-SB0102-GW-1	07-Jun-16	BNASIM	Benzo(k)fluoranthene	0.12	µg/L	U	0.08	EPA Tapwater RSL May 2018	Y
SS113-SB01	16Q2SS113-SB0102-GW-1	07-Jun-16	BNASIM	Chrysene	0.24	µg/L	U	0.2	EPA Tapwater RSL May 2018	Y
SS113-SB01	16Q2SS113-SB0102-GW-1	07-Jun-16	BNASIM	Dibenz(a,h)anthracene	0.12	µg/L	U	0.0034	EPA Tapwater RSL May 2018	Y
SS113-SB01	16Q2SS113-SB0102-GW-1	07-Jun-16	BNASIM	Indeno(1,2,3-cd)pyrene	0.12	µg/L	U	0.0019	EPA Tapwater RSL May 2018	Y
SS113-SB01	16Q2SS113-SB0102-GW-1	07-Jun-16	SW8260B	2-Hexanone	5	µg/L	U	3.8	EPA Tapwater RSL May 2018	Y
SS113-SB01	16Q2SS113-SB0102-GW-1	07-Jun-16	SW8260B	Ethylene Dibromide (EDB)	0.2	µg/L	U	0.0075	EPA Tapwater RSL May 2018	Y
SS113-SB02	16Q2SS113-SB0202-GW-0	07-Jun-16	AK102/3	RRO	210	µg/L	U	110	1/10th 2016 ADEC Table C GW	Y
SS113-SB02	16Q2SS113-SB0202-GW-0	07-Jun-16	BNASIM	Benzo(a)anthracene	0.22	µg/L	UJ	0.012	EPA Tapwater RSL May 2018	Y
SS113-SB02	16Q2SS113-SB0202-GW-0	07-Jun-16	BNASIM	Benzo(a)pyrene	0.11	µg/L	UJ	0.0034	EPA Tapwater RSL May 2018	Y
SS113-SB02	16Q2SS113-SB0202-GW-0	07-Jun-16	BNASIM	Benzo(b)fluoranthene	0.11	µg/L	UJ	0.034	EPA Tapwater RSL May 2018	Y
SS113-SB02	16Q2SS113-SB0202-GW-0	07-Jun-16	BNASIM	Benzo(g,h,i)perylene	0.11	µg/L	UJ	0.026	EPA Tapwater RSL May 2018	Y
SS113-SB02	16Q2SS113-SB0202-GW-0	07-Jun-16	BNASIM	Benzo(k)fluoranthene	0.11	µg/L	UJ	0.08	EPA Tapwater RSL May 2018	Y
SS113-SB02	16Q2SS113-SB0202-GW-0	07-Jun-16	BNASIM	Chrysene	0.22	µg/L	UJ	0.2	EPA Tapwater RSL May 2018	Y
SS113-SB02	16Q2SS113-SB0202-GW-0	07-Jun-16	BNASIM	Dibenz(a,h)anthracene	0.11	µg/L	UJ	0.0034	EPA Tapwater RSL May 2018	Y
SS113-SB02	16Q2SS113-SB0202-GW-0	07-Jun-16	BNASIM	Indeno(1,2,3-cd)pyrene	0.11	µg/L	UJ	0.0019	EPA Tapwater RSL May 2018	Y
SS113-SB02	16Q2SS113-SB0202-GW-0	07-Jun-16	SW8260B	2-Hexanone	5	µg/L	U	3.8	EPA Tapwater RSL May 2018	Y
SS113-SB02	16Q2SS113-SB0202-GW-0	07-Jun-16	SW8260B	Ethylene Dibromide (EDB)	0.2	µg/L	U	0.0075	EPA Tapwater RSL May 2018	Y
SS113-SB02	16Q2SS113-SB0202-GW-0	07-Jun-16	SW8260B	Naphthalene	1	µg/L	U	0.17	EPA Tapwater RSL May 2018	Y
SS113-SB03	16Q2SS113-SB0302-GW-0	08-Jun-16	BNASIM	Benzo(g,h,i)perylene	0.1	µg/L	UJ	0.026	EPA Tapwater RSL May 2018	Y
SS113-SB03	16Q2SS113-SB0302-GW-0	08-Jun-16	BNASIM	Benzo(k)fluoranthene	0.1	µg/L	UJ	0.08	EPA Tapwater RSL May 2018	Y
SS113-SB03	16Q2SS113-SB0302-GW-0	08-Jun-16	BNASIM	Dibenz(a,h)anthracene	0.1	µg/L	UJ	0.0034	EPA Tapwater RSL May 2018	Y
SS113-SB03	16Q2SS113-SB0302-GW-0	08-Jun-16	BNASIM	Indeno(1,2,3-cd)pyrene	0.1	µg/L	UJ	0.0019	EPA Tapwater RSL May 2018	Y
SS113-SB03	16Q2SS113-SB0302-GW-0	08-Jun-16	SW8260B	2-Hexanone	5	µg/L	U	3.8	EPA Tapwater RSL May 2018	Y
SS113-SB03	16Q2SS113-SB0302-GW-0	08-Jun-16	SW8260B	Ethylene Dibromide (EDB)	0.2	µg/L	U	0.0075	EPA Tapwater RSL May 2018	Y
SS113-SB03	16Q2SS113-SB0302-GW-0	08-Jun-16	SW8260B	Naphthalene	1	µg/L	U	0.17	EPA Tapwater RSL May 2018	Y
SS113-SB04	16Q2SS113-SB0402-GW-0	08-Jun-16	AK102/3	RRO	190	µg/L	U	110	1/10th 2016 ADEC Table C GW	Y
SS113-SB04	16Q2SS113-SB0402-GW-0	08-Jun-16	BNASIM	Benzo(a)anthracene	0.23	µg/L	U	0.012	EPA Tapwater RSL May 2018	Y
SS113-SB04	16Q2SS113-SB0402-GW-0	08-Jun-16	BNASIM	Benzo(a)pyrene	0.12	µg/L	U	0.0034	EPA Tapwater RSL May 2018	Y

Appendix B-4 Nondetect Exceedances in Groundwater

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

Location Name	Sample Name	Sample Date Only	Analytical Method	Analyte Name	Result Value	Result Units	Result Flag	PSL	PSL Source	Exceeds PSL?
SS113-SB04	16Q2SS113-SB0402-GW-0	08-Jun-16	BNASIM	Benzo(b)fluoranthene	0.12	µg/L	U	0.034	EPA Tapwater RSL May 2018	Y
SS113-SB04	16Q2SS113-SB0402-GW-0	08-Jun-16	BNASIM	Benzo(g,h,i)perylene	0.12	µg/L	U	0.026	EPA Tapwater RSL May 2018	Y
SS113-SB04	16Q2SS113-SB0402-GW-0	08-Jun-16	BNASIM	Benzo(k)fluoranthene	0.12	µg/L	U	0.08	EPA Tapwater RSL May 2018	Y
SS113-SB04	16Q2SS113-SB0402-GW-0	08-Jun-16	BNASIM	Chrysene	0.23	µg/L	U	0.2	EPA Tapwater RSL May 2018	Y
SS113-SB04	16Q2SS113-SB0402-GW-0	08-Jun-16	BNASIM	Dibenz(a,h)anthracene	0.12	µg/L	U	0.0034	EPA Tapwater RSL May 2018	Y
SS113-SB04	16Q2SS113-SB0402-GW-0	08-Jun-16	BNASIM	Indeno(1,2,3-cd)pyrene	0.12	µg/L	U	0.0019	EPA Tapwater RSL May 2018	Y
SS113-SB04	16Q2SS113-SB0402-GW-0	08-Jun-16	SW8260B	2-Hexanone	5	µg/L	U	3.8	EPA Tapwater RSL May 2018	Y
SS113-SB04	16Q2SS113-SB0402-GW-0	08-Jun-16	SW8260B	Ethylene Dibromide (EDB)	0.2	µg/L	U	0.0075	EPA Tapwater RSL May 2018	Y
SS113-SB05	16Q2SS113-SB0502-GW-0	07-Jun-16	AK102/3	RRO	200	µg/L	U	110	1/10th 2016 ADEC Table C GW	Y
SS113-SB05	16Q2SS113-SB0502-GW-0	07-Jun-16	BNASIM	Benzo(a)anthracene	0.24	µg/L	UJ	0.012	EPA Tapwater RSL May 2018	Y
SS113-SB05	16Q2SS113-SB0502-GW-0	07-Jun-16	BNASIM	Benzo(a)pyrene	0.12	µg/L	UJ	0.0034	EPA Tapwater RSL May 2018	Y
SS113-SB05	16Q2SS113-SB0502-GW-0	07-Jun-16	BNASIM	Benzo(b)fluoranthene	0.12	µg/L	UJ	0.034	EPA Tapwater RSL May 2018	Y
SS113-SB05	16Q2SS113-SB0502-GW-0	07-Jun-16	BNASIM	Benzo(g,h,i)perylene	0.12	µg/L	UJ	0.026	EPA Tapwater RSL May 2018	Y
SS113-SB05	16Q2SS113-SB0502-GW-0	07-Jun-16	BNASIM	Benzo(k)fluoranthene	0.12	µg/L	UJ	0.08	EPA Tapwater RSL May 2018	Y
SS113-SB05	16Q2SS113-SB0502-GW-0	07-Jun-16	BNASIM	Chrysene	0.24	µg/L	UJ	0.2	EPA Tapwater RSL May 2018	Y
SS113-SB05	16Q2SS113-SB0502-GW-0	07-Jun-16	BNASIM	Dibenz(a,h)anthracene	0.12	µg/L	UJ	0.0034	EPA Tapwater RSL May 2018	Y
SS113-SB05	16Q2SS113-SB0502-GW-0	07-Jun-16	BNASIM	Indeno(1,2,3-cd)pyrene	0.12	µg/L	UJ	0.0019	EPA Tapwater RSL May 2018	Y
SS113-SB05	16Q2SS113-SB0502-GW-0	07-Jun-16	SW6020	Thallium	0.2	µg/L	U	0.02	EPA Tapwater RSL May 2018	Y
SS113-SB05	16Q2SS113-SB0502-GW-0	07-Jun-16	SW8082	Aroclor 1016	0.47	µg/L	U	0.05	EPA Tapwater RSL May 2018	Y
SS113-SB05	16Q2SS113-SB0502-GW-0	07-Jun-16	SW8082	Aroclor 1221	0.47	µg/L	U	0.0047	EPA Tapwater RSL May 2018	Y
SS113-SB05	16Q2SS113-SB0502-GW-0	07-Jun-16	SW8082	Aroclor 1232	0.47	µg/L	U	0.0047	EPA Tapwater RSL May 2018	Y
SS113-SB05	16Q2SS113-SB0502-GW-0	07-Jun-16	SW8082	Aroclor 1242	0.47	µg/L	U	0.0078	EPA Tapwater RSL May 2018	Y
SS113-SB05	16Q2SS113-SB0502-GW-0	07-Jun-16	SW8082	Aroclor 1248	0.47	µg/L	U	0.0078	EPA Tapwater RSL May 2018	Y
SS113-SB05	16Q2SS113-SB0502-GW-0	07-Jun-16	SW8082	Aroclor 1254	0.47	µg/L	U	0.0078	EPA Tapwater RSL May 2018	Y
SS113-SB05	16Q2SS113-SB0502-GW-0	07-Jun-16	SW8082	Aroclor 1260	0.47	µg/L	U	0.0078	EPA Tapwater RSL May 2018	Y
SS113-SB05	16Q2SS113-SB0502-GW-0	07-Jun-16	SW8260B	1,1,2,2-Tetrachloroethane	0.2	µg/L	U	0.076	EPA Tapwater RSL May 2018	Y
SS113-SB05	16Q2SS113-SB0502-GW-0	07-Jun-16	SW8260B	1,1,2-Trichloroethane	0.2	µg/L	U	0.041	EPA Tapwater RSL May 2018	Y
SS113-SB05	16Q2SS113-SB0502-GW-0	07-Jun-16	SW8260B	1,2,3-Trichloropropane	0.5	µg/L	U	0.00075	EPA Tapwater RSL May 2018	Y
SS113-SB05	16Q2SS113-SB0502-GW-0	07-Jun-16	SW8260B	1,2-Dibromo-3-Chloropropane	0.5	µg/L	U	0.00033	EPA Tapwater RSL May 2018	Y
SS113-SB05	16Q2SS113-SB0502-GW-0	07-Jun-16	SW8260B	1,2-Dichloroethane	0.2	µg/L	U	0.17	EPA Tapwater RSL May 2018	Y
SS113-SB05	16Q2SS113-SB0502-GW-0	07-Jun-16	SW8260B	2,2-Dichloropropane	0.2	µg/L	U	0.14	EPA Tapwater RSL May 2018	Y
SS113-SB05	16Q2SS113-SB0502-GW-0	07-Jun-16	SW8260B	2-Hexanone	5	µg/L	U	3.8	EPA Tapwater RSL May 2018	Y
SS113-SB05	16Q2SS113-SB0502-GW-0	07-Jun-16	SW8260B	Bromodichloromethane	0.2	µg/L	U	0.13	EPA Tapwater RSL May 2018	Y
SS113-SB05	16Q2SS113-SB0502-GW-0	07-Jun-16	SW8260B	Hexachlorobutadiene	0.3	µg/L	U	0.14	EPA Tapwater RSL May 2018	Y
SS113-SB05	16Q2SS113-SB0502-GW-0	07-Jun-16	SW8260B	Vinyl Chloride	0.2	µg/L	U	0.019	EPA Tapwater RSL May 2018	Y
SS113-SB05	16Q2SS113-SB0502-GW-0	07-Jun-16	VOCSIMB	Ethylene Dibromide (EDB)	0.025	µg/L	U	0.0075	EPA Tapwater RSL May 2018	Y
SS113-SB06	16Q2SS113-SB0602-GW-0	08-Jun-16	AK102/3	RRO	210	µg/L	U	110	1/10th 2016 ADEC Table C GW	Y
SS113-SB06	16Q2SS113-SB0602-GW-0	08-Jun-16	BNASIM	Benzo(a)anthracene	0.23	µg/L	U	0.012	EPA Tapwater RSL May 2018	Y
SS113-SB06	16Q2SS113-SB0602-GW-0	08-Jun-16	BNASIM	Benzo(a)pyrene	0.12	µg/L	U	0.0034	EPA Tapwater RSL May 2018	Y
SS113-SB06	16Q2SS113-SB0602-GW-0	08-Jun-16	BNASIM	Benzo(b)fluoranthene	0.12	µg/L	U	0.034	EPA Tapwater RSL May 2018	Y
SS113-SB06	16Q2SS113-SB0602-GW-0	08-Jun-16	BNASIM	Benzo(g,h,i)perylene	0.12	µg/L	U	0.026	EPA Tapwater RSL May 2018	Y
SS113-SB06	16Q2SS113-SB0602-GW-0	08-Jun-16	BNASIM	Benzo(k)fluoranthene	0.12	µg/L	U	0.08	EPA Tapwater RSL May 2018	Y
SS113-SB06	16Q2SS113-SB0602-GW-0	08-Jun-16	BNASIM	Chrysene	0.23	µg/L	U	0.2	EPA Tapwater RSL May 2018	Y
SS113-SB06	16Q2SS113-SB0602-GW-0	08-Jun-16	BNASIM	Dibenz(a,h)anthracene	0.12	µg/L	U	0.0034	EPA Tapwater RSL May 2018	Y
SS113-SB06	16Q2SS113-SB0602-GW-0	08-Jun-16	BNASIM	Indeno(1,2,3-cd)pyrene	0.12	µg/L	U	0.0019	EPA Tapwater RSL May 2018	Y
SS113-SB06	16Q2SS113-SB0602-GW-0	08-Jun-16	SW8260B	2-Hexanone	5	µg/L	U	3.8	EPA Tapwater RSL May 2018	Y

Appendix B-4 Nondetect Exceedances in Groundwater

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

Location Name	Sample Name	Sample Date Only	Analytical Method	Analyte Name	Result Value	Result Units	Result Flag	PSL	PSL Source	Exceeds PSL?
SS113-SB06	16Q2SS113-SB0602-GW-0	08-Jun-16	SW8260B	Ethylene Dibromide (EDB)	0.2	µg/L	U	0.0075	EPA Tapwater RSL May 2018	Y
SS113-SB07	16Q2SS113-SB0702-GW-0	06-Jun-16	AK102/3	RRO	220	µg/L	U	110	1/10th 2016 ADEC Table C GW	Y
SS113-SB07	16Q2SS113-SB0702-GW-0	06-Jun-16	SW8260B	2-Hexanone	5	µg/L	U	3.8	EPA Tapwater RSL May 2018	Y
SS113-SB07	16Q2SS113-SB0702-GW-0	06-Jun-16	SW8260B	Ethylene Dibromide (EDB)	0.2	µg/L	U	0.0075	EPA Tapwater RSL May 2018	Y
SS113-SB08	16Q2SS113-SB0802-GW-0	06-Jun-16	BNASIM	Benzo(a)pyrene	0.12	µg/L	UJ	0.0034	EPA Tapwater RSL May 2018	Y
SS113-SB08	16Q2SS113-SB0802-GW-0	06-Jun-16	BNASIM	Benzo(b)fluoranthene	0.12	µg/L	UJ	0.034	EPA Tapwater RSL May 2018	Y
SS113-SB08	16Q2SS113-SB0802-GW-0	06-Jun-16	BNASIM	Benzo(g,h,i)perylene	0.12	µg/L	UJ	0.026	EPA Tapwater RSL May 2018	Y
SS113-SB08	16Q2SS113-SB0802-GW-0	06-Jun-16	BNASIM	Benzo(k)fluoranthene	0.12	µg/L	UJ	0.08	EPA Tapwater RSL May 2018	Y
SS113-SB08	16Q2SS113-SB0802-GW-0	06-Jun-16	BNASIM	Dibenz(a,h)anthracene	0.12	µg/L	UJ	0.0034	EPA Tapwater RSL May 2018	Y
SS113-SB08	16Q2SS113-SB0802-GW-0	06-Jun-16	BNASIM	Indeno(1,2,3-cd)pyrene	0.12	µg/L	UJ	0.0019	EPA Tapwater RSL May 2018	Y
SS113-SB08	16Q2SS113-SB0802-GW-0	06-Jun-16	SW8260B	2-Hexanone	5	µg/L	U	3.8	EPA Tapwater RSL May 2018	Y
SS113-SB08	16Q2SS113-SB0802-GW-0	06-Jun-16	SW8260B	Ethylene Dibromide (EDB)	0.2	µg/L	U	0.0075	EPA Tapwater RSL May 2018	Y
SS113-SB09	16Q2SS113-SB0902-GW-0	06-Jun-16	AK102/3	DRO	210	µg/L	U	150	1/10th 2016 ADEC Table C GW	Y
SS113-SB09	16Q2SS113-SB0902-GW-0	06-Jun-16	AK102/3	RRO	210	µg/L	U	110	1/10th 2016 ADEC Table C GW	Y
SS113-SB09	16Q2SS113-SB0902-GW-0	06-Jun-16	BNASIM	Benzo(a)anthracene	0.22	µg/L	UJ	0.012	EPA Tapwater RSL May 2018	Y
SS113-SB09	16Q2SS113-SB0902-GW-0	06-Jun-16	BNASIM	Benzo(a)pyrene	0.11	µg/L	UJ	0.0034	EPA Tapwater RSL May 2018	Y
SS113-SB09	16Q2SS113-SB0902-GW-0	06-Jun-16	BNASIM	Benzo(b)fluoranthene	0.11	µg/L	UJ	0.034	EPA Tapwater RSL May 2018	Y
SS113-SB09	16Q2SS113-SB0902-GW-0	06-Jun-16	BNASIM	Benzo(g,h,i)perylene	0.11	µg/L	UJ	0.026	EPA Tapwater RSL May 2018	Y
SS113-SB09	16Q2SS113-SB0902-GW-0	06-Jun-16	BNASIM	Benzo(k)fluoranthene	0.11	µg/L	UJ	0.08	EPA Tapwater RSL May 2018	Y
SS113-SB09	16Q2SS113-SB0902-GW-0	06-Jun-16	BNASIM	Chrysene	0.22	µg/L	UJ	0.2	EPA Tapwater RSL May 2018	Y
SS113-SB09	16Q2SS113-SB0902-GW-0	06-Jun-16	BNASIM	Dibenz(a,h)anthracene	0.11	µg/L	UJ	0.0034	EPA Tapwater RSL May 2018	Y
SS113-SB09	16Q2SS113-SB0902-GW-0	06-Jun-16	BNASIM	Indeno(1,2,3-cd)pyrene	0.11	µg/L	UJ	0.0019	EPA Tapwater RSL May 2018	Y
SS113-SB09	16Q2SS113-SB0902-GW-0	06-Jun-16	SW8260B	2-Hexanone	5	µg/L	U	3.8	EPA Tapwater RSL May 2018	Y
SS113-SB09	16Q2SS113-SB0902-GW-0	06-Jun-16	SW8260B	Ethylene Dibromide (EDB)	0.2	µg/L	U	0.0075	EPA Tapwater RSL May 2018	Y
SS113-SB09	16Q2SS113-SB0902-GW-0	06-Jun-16	SW8260B	Naphthalene	1	µg/L	U	0.17	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-0	28-Sep-16	AK102/3	RRO	200	µg/L	U	110	1/10th 2016 ADEC Table C GW	Y
SS113-SB10	16Q3SS113-SB1001-GW-0	28-Sep-16	BNASIM	Benzo(a)anthracene	0.24	µg/L	U	0.012	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-0	28-Sep-16	BNASIM	Benzo(a)pyrene	0.12	µg/L	U	0.0034	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-0	28-Sep-16	BNASIM	Benzo(b)fluoranthene	0.12	µg/L	U	0.034	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-0	28-Sep-16	BNASIM	Benzo(g,h,i)perylene	0.12	µg/L	U	0.026	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-0	28-Sep-16	BNASIM	Benzo(k)fluoranthene	0.12	µg/L	U	0.08	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-0	28-Sep-16	BNASIM	Chrysene	0.24	µg/L	U	0.2	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-0	28-Sep-16	BNASIM	Dibenz(a,h)anthracene	0.12	µg/L	U	0.0034	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-0	28-Sep-16	BNASIM	Indeno(1,2,3-cd)pyrene	0.12	µg/L	U	0.0019	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-0	28-Sep-16	SW6020	Thallium	0.2	µg/L	U	0.02	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-0	28-Sep-16	SW8082	Aroclor 1016	0.49	µg/L	U	0.05	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-0	28-Sep-16	SW8082	Aroclor 1221	0.49	µg/L	U	0.0047	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-0	28-Sep-16	SW8082	Aroclor 1232	0.49	µg/L	U	0.0047	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-0	28-Sep-16	SW8082	Aroclor 1242	0.49	µg/L	U	0.0078	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-0	28-Sep-16	SW8082	Aroclor 1248	0.49	µg/L	U	0.0078	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-0	28-Sep-16	SW8082	Aroclor 1254	0.49	µg/L	U	0.0078	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-0	28-Sep-16	SW8082	Aroclor 1260	0.49	µg/L	U	0.0078	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-0	28-Sep-16	SW8260B	1,1,2,2-Tetrachloroethane	0.2	µg/L	U	0.076	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-0	28-Sep-16	SW8260B	1,1,2-Trichloroethane	0.2	µg/L	U	0.041	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-0	28-Sep-16	SW8260B	1,2,3-Trichloropropane	0.5	µg/L	U	0.00075	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-0	28-Sep-16	SW8260B	1,2-Dibromo-3-Chloropropane	0.5	µg/L	U	0.00033	EPA Tapwater RSL May 2018	Y

Appendix B-4 Nondetect Exceedances in Groundwater

SS113 – Hatchery North Site Characterization Report, Joint Base Elmendorf-Richardson, Alaska

Location Name	Sample Name	Sample Date Only	Analytical Method	Analyte Name	Result Value	Result Units	Result Flag	PSL	PSL Source	Exceeds PSL?
SS113-SB10	16Q3SS113-SB1001-GW-0	28-Sep-16	SW8260B	1,2-Dichloroethane	0.2	µg/L	U	0.17	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-0	28-Sep-16	SW8260B	2,2-Dichloropropane	0.2	µg/L	U	0.14	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-0	28-Sep-16	SW8260B	Bromodichloromethane	0.2	µg/L	U	0.13	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-0	28-Sep-16	SW8260B	Ethylene Dibromide (EDB)	0.2	µg/L	U	0.0075	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-0	28-Sep-16	SW8260B	Hexachlorobutadiene	0.3	µg/L	U	0.14	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-0	28-Sep-16	SW8260B	Vinyl Chloride	0.2	µg/L	U	0.019	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-1	28-Sep-16	BNASIM	Benzo(a)anthracene	0.22	µg/L	U	0.012	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-1	28-Sep-16	BNASIM	Benzo(a)pyrene	0.11	µg/L	U	0.0034	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-1	28-Sep-16	BNASIM	Benzo(b)fluoranthene	0.11	µg/L	U	0.034	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-1	28-Sep-16	BNASIM	Benzo(g,h,i)perylene	0.11	µg/L	U	0.026	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-1	28-Sep-16	BNASIM	Benzo(k)fluoranthene	0.11	µg/L	U	0.08	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-1	28-Sep-16	BNASIM	Chrysene	0.22	µg/L	U	0.2	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-1	28-Sep-16	BNASIM	Dibenz(a,h)anthracene	0.11	µg/L	U	0.0034	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-1	28-Sep-16	BNASIM	Indeno(1,2,3-cd)pyrene	0.11	µg/L	U	0.0019	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-1	28-Sep-16	SW6020	Thallium	0.2	µg/L	U	0.02	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-1	28-Sep-16	SW8082	Aroclor 1016	0.49	µg/L	U	0.05	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-1	28-Sep-16	SW8082	Aroclor 1221	0.49	µg/L	U	0.0047	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-1	28-Sep-16	SW8082	Aroclor 1232	0.49	µg/L	U	0.0047	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-1	28-Sep-16	SW8082	Aroclor 1242	0.49	µg/L	U	0.0078	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-1	28-Sep-16	SW8082	Aroclor 1248	0.49	µg/L	U	0.0078	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-1	28-Sep-16	SW8082	Aroclor 1254	0.49	µg/L	U	0.0078	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-1	28-Sep-16	SW8082	Aroclor 1260	0.49	µg/L	U	0.0078	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-1	28-Sep-16	SW8260B	1,1,2,2-Tetrachloroethane	0.2	µg/L	U	0.076	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-1	28-Sep-16	SW8260B	1,1,2-Trichloroethane	0.2	µg/L	U	0.041	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-1	28-Sep-16	SW8260B	1,2,3-Trichloropropane	0.5	µg/L	U	0.00075	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-1	28-Sep-16	SW8260B	1,2-Dibromo-3-Chloropropane	0.5	µg/L	U	0.00033	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-1	28-Sep-16	SW8260B	1,2-Dichloroethane	0.2	µg/L	U	0.17	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-1	28-Sep-16	SW8260B	2,2-Dichloropropane	0.2	µg/L	U	0.14	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-1	28-Sep-16	SW8260B	Bromodichloromethane	0.2	µg/L	U	0.13	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-1	28-Sep-16	SW8260B	Ethylene Dibromide (EDB)	0.2	µg/L	U	0.0075	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-1	28-Sep-16	SW8260B	Hexachlorobutadiene	0.3	µg/L	U	0.14	EPA Tapwater RSL May 2018	Y
SS113-SB10	16Q3SS113-SB1001-GW-1	28-Sep-16	SW8260B	Vinyl Chloride	0.2	µg/L	U	0.019	EPA Tapwater RSL May 2018	Y

Notes:
µg/L = micrograms per Liter
ADEC = Alaska Department of Environmental Conservation
DRO = diesel-range organics
EPA = United States Environmental Protection Agency
PSL = project screening level
RRO = residual-range organics
RSL = regional screening level
U = not detected
UJ = The analyte was beow the reported sample quantitation limit. However, the reported value is approximate.
Y = yes

Appendix C
ADEC Ecoscoping Form

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ADEC Ecoscoping Form

Site Name: SS113 - Hatchery North
Completed by: CH2M
Date: June 15, 2016

Instructions: Follow the italicized instructions in each section below. "Off-ramps," where the evaluation ends before completing all of the sections, can be taken when indicated by the instructions. Comment boxes should be used to help support your answers.

1. Direct Visual Impacts and Acute Toxicity

Are direct impacts that may result from the site contaminants evident, or is acute toxicity from high contaminant concentrations suspected? C*heck the appropriate box.*

☐ Yes – D*escribe observations below and evaluate all of the remaining sections <u>without taking any off-ramps</u>.*
☒ No – *Go to next section.*

Comments:

2. Terrestrial and Aquatic Exposure Routes

Check each terrestrial and aquatic route that could occur at the site.

<u>Terrestrial Exposure Routes</u>

☐ Exposure to water-borne contaminants as a result of wading or swimming in contaminated waters or ingesting contaminated water.
☐ Contaminant uptake in terrestrial plants whose roots are in contact with contaminated surface water.
☐ Contaminant migration via saturated or unsaturated groundwater zones and discharge at upland "seep" locations (not associated with a wetland or waterbody).
☒ Contaminant uptake by terrestrial plants whose roots are in contact with soil moisture or groundwater present within the root zone (generally no more than 4 feet below ground surface.
☐ Particulates deposited on plants directly or from rain splash.
☐ Incidental ingestion and/or exposure while animals grub for food, burrow (up to 2 feet for small animals or 6 feet for large animals), or groom.

☐ Inhalation of fugitive dust or vapors disturbed by foraging or burrowing activities.

☐ Bioaccumulatives (other than PAHs, which bioaccumulate more readily in aquatic environments) taken up by soil invertebrates, which are in turn eaten by higher food chain organisms (see the *Policy Guidance on Developing Conceptual Site Models*).

☐ Other site-specific exposure pathways.

Aquatic Exposure Routes

☐ Contaminated surface runoff migration to water bodies through swales, drainage ditches, or overland flow.

☐ Aquatic receptors exposed through osmotic exchange, respiration, or ventilation of surface waters.

☐ Contaminant migration via saturated or unsaturated groundwater zones and discharge at "seep" locations along banks or directly to surface water.

☐ Deposition into sediments from upwelling of contaminated groundwater.

☐ Aquatic receptors may be exposed directly to contaminated sediments through foraging or burrowing, or indirectly exposed due to osmotic exchange, respiration, or ventilation of sediment pore water.

☐ Aquatic plants rooted in contaminated sediments.

☐ Bioaccumulatives (see the *Policy Guidance on Developing Conceptual Site Models*) taken up by sediment invertebrates, which are in turn eaten by higher food chain organisms.

☐ Other site-specific exposure pathways.

If any of the above boxes are checked, go on to the next section. If none are checked, end the evaluation and check the box below.

☐ OFF-RAMP: NO FURTHER ECOLOGICAL EVALUATION NECESSARY

Comments:

3. Habitat

Check all that may apply. See Ecoscoping Guidance for additional help.

☐ Habitat that could be affected by the contamination supports valued species (i.e., species that are regulated, used for subsistence, have ceremonial importance, have commercial value, or provide recreational opportunity).

☐ Critical habitat or anadromous stream in an area that could be affected by the contamination.

☐ Habitat that is important to the region that could be affected by the contamination.

☐ Contamination is in a park, preserve, or wildlife refuge.

If any of the above boxes are checked, go on to the next scoping factor. If none are checked, end the evaluation and check the box below.

☒ OFF-RAMP: NO FURTHER ECOLOGICAL EVALUATION NECESSARY

Comments:

4. Contaminant Quantity

Check all that may apply. See Ecoscoping Guidance for additional help.

☐ Endangered or threatened species are present.

☐ The aquatic environment is or could be affected.

☐ Non-petroleum contaminants may be present, or the total area of petroleum-contaminated surface soil exceeds one-half acre.

If any of the above boxes are checked, go on to the next scoping factor. If none are checked, end the evaluation and check the box below.

☐ OFF-RAMP: NO FURTHER ECOLOGICAL EVALUATION NECESSARY

Comments:

5. Toxicity Determination

Check all that apply.

☐ Bioaccumulative chemicals are present (see *Policy Guidance on Developing Conceptual Site Models*).

☐ Contaminants exceed benchmark levels (see the Ecological Benchmark Tool in RAIS, available at: http://rais.ornl.gov/tools/eco_search.php).

If either box is checked, complete a detailed Ecological Conceptual Site Model (see DEC's Policy Guidance on Developing Conceptual Site Models*) and submit it with the form to your DEC project manager.*

If neither box is checked, check the box below and submit this form to your DEC project manager.

☐ OFF-RAMP: NO FURTHER ECOLOGICAL EVALUATION NECESSARY

Comments:

Appendix D
Risk Evaluation Calculations

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Appendix D-1
Cumulative Risk Calculator, Soil, Residential Exposure Scenario

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Site-specific Risk Models
Resident Equation Inputs
Soil (<40" Precipitation Zone)

Variable	Value
ED_{ress} (exposure duration - resident) yr	26
ED_{ressc} (exposure duration - child) yr	6
ED_{ressa} (exposure duration - adult) yr	20
ET_{ress} (exposure time - resident) hr/day	24
ET_{ressc} (exposure time - child) hr/day	24
ET_{ressa} (exposure time - adult) hr/day	24
BW_{ressa} (body weight - adult) kg	80
BW_{ressc} (body weight - child) kg	15
SA_{ressa} (skin surface area - adult) cm^2/day	6032
SA_{ressc} (skin surface area - child) cm^2/day	2373
LT (lifetime - resident) yr	70
$EF_{ress<40"}$ (exposure frequency - resident) day/yr	270
$EF_{ressc<40"}$ (exposure frequency - child) day/yr	270
$EF_{ressa<40"}$ (exposure frequency - adult) day/yr	270
IRS_{ressa} (soil intake rate - adult) mg/day	100
IRS_{ressc} (soil intake rate - child) mg/day	200
AF_{ressa} (skin adherence factor - adult) mg/cm^2	0.07
AF_{ressc} (skin adherence factor - child) mg/cm^2	0.2
$IFS_{ress<40"-adj}$ (age-adjusted soil ingestion factor) mg/kg	28350
$DFS_{ress<40"-adj}$ (age-adjusted soil dermal factor) mg/kg	79758
$IFSM_{ress<40"-adj}$ (mutagenic age-adjusted soil ingestion factor) mg/kg	128700
$DFSM_{ress<40"-adj}$ (mutagenic age-adjusted soil dermal factor) mg/kg	330372
AF_{0-2} (skin adherence factor) mg/cm^2	0.2
AF_{2-6} (skin adherence factor) mg/cm^2	0.2
AF_{6-16} (skin adherence factor) mg/cm^2	0.07
AF_{16-30} (skin adherence factor) mg/cm^2	0.07
BW_{0-2} (body weight) kg	15
BW_{2-6} (body weight) kg	15
BW_{6-16} (body weight) kg	80
BW_{16-30} (body weight) kg	80
ED_{0-2} (exposure duration) yr	2

Output generated 29MAY2018:16:33:50

Site-specific Risk Models
Resident Equation Inputs
Soil (<40" Precipitation Zone)

Variable	Value
ED_{2-6} (exposure duration) yr	4
ED_{6-16} (exposure duration) yr	10
ED_{16-30} (exposure duration) yr	10
$EF_{0-2<40"}$ (exposure frequency) day/yr	270
$EF_{2-6<40"}$ (exposure frequency) day/yr	270
$EF_{6-16<40"}$ (exposure frequency) day/yr	270
$EF_{16-30<40"}$ (exposure frequency) day/yr	270
ET_{0-2} (exposure time) hr/day	24
ET_{2-6} (exposure time) hr/day	24
ET_{6-16} (exposure time) hr/day	24
ET_{16-30} (exposure time) hr/day	24
IRS_{0-2} (soil intake rate) mg/day	200
IRS_{2-6} (soil intake rate) mg/day	200
IRS_{6-16} (soil intake rate) mg/day	100
IRS_{16-30} (soil intake rate) mg/day	100
SA_{0-2} (skin surface area) cm^2/day	2373
SA_{2-6} (skin surface area) cm^2/day	2373
SA_{6-16} (skin surface area) cm^2/day	6032
SA_{16-30} (skin surface area) cm^2/day	6032
A_c (acres)	0.5
Q/C_{wp} (g/m^2-s per kg/m^3)	93.7736
PEF (particulate emission factor) m^3/kg	1.36E+09
A (PEF Dispersion Constant)	16.2302
B (PEF Dispersion Constant)	18.7762
C (PEF Dispersion Constant)	216.108
V (fraction of vegetative cover) unitless	0.5
U_m (mean annual wind speed) m/s	4.69
U_t (equivalent threshold value)	11.32
F(x) (function dependent on U_m/U_t) unitless	0.194
A_c (acres)	0.5
Q/C_{wp} (g/m^2-s per kg/m^3)	93.7736

Output generated 29MAY2018:16:33:50

Site-specific Risk Models
Resident Equation Inputs
Soil (<40" Precipitation Zone)

Variable	Value
foc (fraction organic carbon in soil) g/g	0.001
p_b (dry soil bulk density) g/cm ^{3}	1.5
p_s (soil particle density) g/cm ^{3}	2.65
θ $_w$ (water-filled soil porosity) L_{water}/L_{soil}	0.15
θ $_a$ (air-filled soil porosity) L_{air}/L_{soil}	0.28396
n (total soil porosity) L_{pore}/L_{soil}	0.43396
T (exposure interval) s	819936000
A (VF Dispersion Constant)	16.2302
B (VF Dispersion Constant)	18.7762
C (VF Dispersion Constant)	216.108

Site-specific Risk Models
Resident Cumulative Risk
Soil (<40" Precipitation Zone)

ca=Cancer, nc=Noncancer, ca* (Where nc CL < 100 x ca CL), ca** (Where nc CL < 10 x ca CL),
max=CL exceeds ceiling limit (see User's Guide), sat=CL exceeds csat, sol=CL exceeds Solubility
I=IRIS; D=Drinking Water/Health Advisory Goals; P=PPRTV; A=ATSDR; C=Cal EPA; X=APPENDIX PPRTV SCREEN; H=HEAST; S=SURROGATE

Chemical	Mutagen?	Volatile?	Chronic RfD (mg/kg-day)	Chronic RfD Ref	Chronic RfC (mg/m^3)	Chronic RfC Ref	Ingestion SF $(mg/kg\text{-}day)^{-1}$	SFO Ref	Inhalation Unit Risk $(ug/m^3)^{-1}$	IUR Ref	GIABS	ABS	MW	ρ (g/cm^3)
Benz[a]anthracene (56-55-3)	Yes	Yes	-		-		7.30E-01	S	1.10E-04	C	1	0.13	228.3	1.27E+00
Benzo[a]pyrene (50-32-8)	Yes	No	-		-		7.30E+00	I	1.10E-03	C	1	0.13	252.32	-
Benzo[b]fluoranthene (205-99-2)	Yes	No	-		-		7.30E-01	S	1.10E-04	C	1	0.13	252.32	-
Methylnaphthalene, 1- (90-12-0)	No	Yes	7.00E-02	A	-		2.90E-02	P	-		1	0.13	142.2	1.02E+00
Methylnaphthalene, 2- (91-57-6)	No	Yes	4.00E-03	I	-		-		-		1	0.13	142.2	1.01E+00
Naphthalene (91-20-3)	No	Yes	2.00E-02	I	3.00E-03	I	-		3.40E-05	C	1	0.13	128.18	1.03E+00
**Total Risk/HI*			-		-		-		-		-	-	-	-

Site-specific Risk Models
Resident Cumulative Risk
Soil (<40" Precipitation Zone)

ca=Cancer, nc=Noncancer, ca* (Where nc CL < 100 x ca CL), ca** (Where nc CL < 10 x ca CL),
max=CL exceeds ceiling limit (see User's Guide), sat=CL exceeds csat, sol=CL exceeds Solubility
I=IRIS; D=Drinking Water/Health Advisory Goals; P=PPRTV; A=ATSDR; C=Cal EPA; X=APPENDIX PPRTV SCREEN; H=HEAST; S=SURROGATE

Chemical	D_{ia} (cm^2/s)	D_{iw} (cm^2/s)	H`	Volatilization Factor (m^3/kg)	K_{oc} (cm^3/g)	K_d (cm^3/g)	Particulate Emission Factor (m^3/kg)	RBA	Concentration (mg/kg)	Ingestion Noncarcinogenic CDI Child
Benz[a]anthracene (56-55-3)	2.61E-02	6.75E-06	4.91E-04	2.48E+06	1.77E+05	1.77E+02	1.36E+09	1.00E+00	1.60E+00	-
Benzo[a]pyrene (50-32-8)	4.76E-02	5.56E-06	1.87E-05	-	5.87E+05	-	1.36E+09	1.00E+00	8.40E-01	-
Benzo[b]fluoranthene (205-99-2)	4.76E-02	5.56E-06	2.69E-05	-	5.99E+05	-	1.36E+09	1.00E+00	1.60E+00	-
Methylnaphthalene, 1- (90-12-0)	5.28E-02	7.85E-06	2.10E-02	3.35E+04	2.53E+03	2.53E+00	1.36E+09	1.00E+00	4.70E+01	4.64E-04
Methylnaphthalene, 2- (91-57-6)	5.24E-02	7.78E-06	2.12E-02	3.31E+04	2.48E+03	2.48E+00	1.36E+09	1.00E+00	5.30E+01	5.23E-04
Naphthalene (91-20-3)	6.05E-02	8.38E-06	1.80E-02	2.67E+04	1.54E+03	1.54E+00	1.36E+09	1.00E+00	1.50E+01	1.48E-04
**Total Risk/HI*	-	-	-	-	-	-	-	-	-	-

Site-specific Risk Models
Resident Cumulative Risk
Soil (<40" Precipitation Zone)

ca=Cancer, nc=Noncancer, ca* (Where nc CL < 100 x ca CL), ca** (Where nc CL < 10 x ca CL),
max=CL exceeds ceiling limit (see User's Guide), sat=CL exceeds csat, sol=CL exceeds Solubility
I=IRIS; D=Drinking Water/Health Advisory Goals; P=PPRTV; A=ATSDR; C=Cal EPA; X=APPENDIX PPRTV SCREEN; H=HEAST; S=SURROGATE

Chemical	Inhalation Noncarcinogenic (Volatiles) CDI Child	Inhalation Noncarcinogenic (Particulates) CDI Child	Dermal Noncarcinogenic CDI Child	Ingestion Carcinogenic CDI	Inhalation (Volatiles) Carcinogenic CDI	Inhalation (Particulates) Carcinogenic CDI	Dermal Carcinogenic CDI	Ingestion HI Child
Benz[a]anthracene (56-55-3)	-	-	-	8.06E-06	4.91E-04	8.95E-07	2.69E-06	-
Benzo[a]pyrene (50-32-8)	-	-	-	4.23E-06	-	4.70E-07	1.41E-06	-
Benzo[b]fluoranthene (205-99-2)	-	-	-	8.06E-06	-	8.95E-07	2.69E-06	-
Methylnaphthalene, 1- (90-12-0)	-	-	1.43E-04	5.22E-05	-	-	1.91E-05	6.62E-03
Methylnaphthalene, 2- (91-57-6)	-	-	1.61E-04	-	-	-	-	1.31E-01
Naphthalene (91-20-3)	4.15E-04	8.16E-09	4.56E-05	-	1.54E-01	3.03E-06	-	7.40E-03
**Total Risk/HI*	-	-	-	-	-	-	-	*1.45E-01*

Site-specific Risk Models
Resident Cumulative Risk
Soil (<40" Precipitation Zone)

ca=Cancer, nc=Noncancer, ca* (Where nc CL < 100 x ca CL), ca** (Where nc CL < 10 x ca CL),
max=CL exceeds ceiling limit (see User's Guide), sat=CL exceeds csat, sol=CL exceeds Solubility
I=IRIS; D=Drinking Water/Health Advisory Goals; P=PPRTV; A=ATSDR; C=Cal EPA; X=APPENDIX PPRTV SCREEN; H=HEAST; S=SURROGATE

Chemical	Inhalation (Volatiles) HI Child	Inhalation (Particulates) HI Child	Dermal HI Child	Noncarcinogenic HI Child	Ingestion Risk	Inhalation (Volatiles) Risk	Inhalation (Particulates) Risk	Dermal Risk	Carcinogenic Risk
Benz[a]anthracene (56-55-3)	-	-	-	**-**	5.88E-06	5.41E-08	9.85E-11	1.96E-06	**7.90E-06**
Benzo[a]pyrene (50-32-8)	-	-	-	**-**	3.09E-05	-	5.17E-10	1.03E-05	**4.12E-05**
Benzo[b]fluoranthene (205-99-2)	-	-	-	**-**	5.88E-06	-	9.85E-11	1.96E-06	**7.85E-06**
Methylnaphthalene, 1- (90-12-0)	-	-	2.04E-03	**8.67E-03**	1.51E-06	-	-	5.53E-07	**2.07E-06**
Methylnaphthalene, 2- (91-57-6)	-	-	4.03E-02	**1.71E-01**	-	-	-	-	**-**
Naphthalene (91-20-3)	1.38E-01	2.72E-06	2.28E-03	**1.48E-01**	-	5.24E-06	1.03E-10	-	**5.24E-06**
**Total Risk/HI*	*1.38E-01*	*2.72E-06*	*4.46E-02*	***3.28E-01***	*4.42E-05*	*5.30E-06*	*8.17E-10*	*1.48E-05*	***6.43E-05***

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Appendix D-2
Cumulative Risk Calculator, Groundwater, Residential Exposure Scenario

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Site-specific Risk Models
Equation Inputs
Groundwater

Variable	Value
LT (lifetime - resident) year	70
K (volatilization factor of Andelman) L/m^3	0.5
l_{sc} (apparent thickness of stratum corneum) cm	0.001
ED_{resw} (exposure duration - resident) year	26
ED_{reswc} (exposure duration - child) year	6
ED_{reswa} (exposure duration - adult) year	20
ED_{0-2} (mutagenic exposure duration first phase) year	2
ED_{2-6} (mutagenic exposure duration second phase) year	4
ED_{6-16} (mutagenic exposure duration third phase) year	10
ED_{16-26} (mutagenic exposure duration fourth phase) year	10
EF_{resw} (exposure frequency) day/year	350
EF_{reswc} (exposure frequency - child) day/year	350
EF_{reswa} (exposure frequency - adult) day/year	350
EF_{0-2} (mutagenic exposure frequency first phase) day/year	350
EF_{2-6} (mutagenic exposure frequency second phase) day/year	350
EF_{6-16} (mutagenic exposure frequency third phase) day/year	350
EF_{16-26} (mutagenic exposure frequency fourth phase) day/year	350
$ET_{resw-adj}$ (age-adjusted exposure time) hour/event	0.67077
$ET_{resw-madj}$ (mutagenic age-adjusted exposure time) hour/event	0.67077
ET_{resw} (exposure time) hour/day	24
ET_{reswc} (dermal exposure time - child) hour/event	0.54
ET_{reswa} (dermal exposure time - adult) hour/event	0.71
ET_{reswc} (inhalation exposure time - child) hour/day	24
ET_{reswa} (inhalation exposure time - adult) hour/day	24
ET_{0-2} (mutagenic inhalation exposure time first phase) hour/day	24
ET_{2-6} (mutagenic inhalation exposure time second phase) hour/day	24
ET_{6-16} (mutagenic inhalation exposure time third phase) hour/day	24
ET_{16-26} (mutagenic inhalation exposure time fourth phase) hour/day	24
ET_{0-2} (mutagenic dermal exposure time first phase) hour/event	0.54
ET_{2-6} (mutagenic dermal exposure time second phase) hour/event	0.54
ET_{6-16} (mutagenic dermal exposure time third phase) hour/event	0.71
ET_{16-26} (mutagenic dermal exposure time fourth phase) hour/event	0.71

Output generated 29MAY2018:16:21:52

Site-specific Risk Models
Equation Inputs
Groundwater

Variable	Value
BW_{reswa} (body weight - adult) kg	80
BW_{reswc} (body weight - child) kg	15
BW_{0-2} (mutagenic body weight) kg	15
BW_{2-6} (mutagenic body weight) kg	15
BW_{6-16} (mutagenic body weight) kg	80
BW_{16-26} (mutagenic body weight) kg	80
$IFW_{res-adj}$ (adjusted intake factor) L/kg	327.95
$IFWM_{res-adj}$ (mutagenic adjusted intake factor) L/kg	1019.9
IRW_{reswc} (water intake rate - child) L/day	0.78
IRW_{reswa} (water intake rate - adult) L/day	2.5
IRW_{0-2} (mutagenic water intake rate) L/day	0.78
IRW_{2-6} (mutagenic water intake rate) L/day	0.78
IRW_{6-16} (mutagenic water intake rate) L/day	2.5
IRW_{16-26} (mutagenic water intake rate) L/day	2.5
EV_{reswa} (events - adult) per day	1
EV_{reswc} (events - child) per day	1
EV_{0-2} (mutagenic events) per day	1
EV_{2-6} (mutagenic events) per day	1
EV_{6-16} (mutagenic events) per day	1
EV_{16-26} (mutagenic events) per day	1
$DFW_{res-adj}$ (age-adjusted dermal factor) cm^2-event/kg	2610650
$DFWM_{res-adj}$ (mutagenic age-adjusted dermal factor) cm^2-event/kg	8191633
SA_{reswc} (skin surface area - child) cm^2	6365
SA_{reswa} (skin surface area - adult) cm^2	19652
SA_{0-2} (mutagenic skin surface area) cm^2	6365
SA_{2-6} (mutagenic skin surface area) cm^2	6365
SA_{6-16} (mutagenic skin surface area) cm^2	19652
SA_{16-26} (mutagenic skin surface area) cm^2	19652

Site-specific Risk Models
Cumulative Risk
Groundwater

ca=Cancer, nc=Noncancer, ca* (Where nc CL < 100 x ca CL), ca** (Where nc CL < 10 x ca CL),
max=CL exceeds ceiling limit (see User's Guide), sat=CL exceeds csat, sol=CL exceeds Solubility
I=IRIS; D=Drinking Water/Health Advisory Goals; P=PPRTV; A=ATSDR; C=Cal EPA; X=APPENDIX PPRTV SCREEN; H=HEAST; S=SURROGATE

Chemical	Mutagen?	Volatile?	Chronic RfD (mg/kg-day)	Chronic RfD Ref	Chronic RfC (mg/m^3)	Chronic RfC Ref	Ingestion SF $(mg/kg\text{-}day)^{-1}$	SFO Ref	Inhalation Unit Risk $(ug/m^3)^{-1}$	IUR Ref	GIABS	MW
Benz[a]anthracene (56-55-3)	Yes	Yes	-		-		7.30E-01	S	1.10E-04	C	1	228.3
Benzo[a]pyrene (50-32-8)	Yes	No	-		-		7.30E+00	I	1.10E-03	C	1	252.32
Benzo[b]fluoranthene (205-99-2)	Yes	No	-		-		7.30E-01	S	1.10E-04	C	1	252.32
Benzo[g,h,i]perylene (191242)	No	No	3.00E-02	S	-		-		-		1	276.34
Benzo[k]fluoranthene (207-08-9)	Yes	No	-		-		7.30E-02	S	1.10E-04	C	1	252.32
Chrysene (218-01-9)	Yes	No	-		-		7.30E-03	S	1.10E-05	C	1	228.3
Dibenz[a,h]anthracene (53-70-3)	Yes	No	-		-		7.30E+00	S	1.20E-03	C	1	278.36
Hexanone, 2- (591-78-6)	No	Yes	5.00E-03	I	3.00E-02	I	-		-		1	100.16
Indeno[1,2,3-cd]pyrene (193-39-5)	Yes	No	-		-		7.30E-01	S	1.10E-04	C	1	276.34
Methylnaphthalene, 1- (90-12-0)	No	Yes	7.00E-02	A	-		2.90E-02	P	-		1	142.2
Naphthalene (91-20-3)	No	Yes	2.00E-02	I	3.00E-03	I	-		3.40E-05	C	1	128.18
**Total Risk/HI*			-		-		-		-		-	-

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Site-specific Risk Models
Cumulative Risk
Groundwater

ca=Cancer, nc=Noncancer, ca* (Where nc CL < 100 x ca CL), ca** (Where nc CL < 10 x ca CL),
max=CL exceeds ceiling limit (see User's Guide), sat=CL exceeds csat, sol=CL exceeds Solubility
I=IRIS; D=Drinking Water/Health Advisory Goals; P=PPRTV; A=ATSDR; C=Cal EPA; X=APPENDIX PPRTV SCREEN; H=HEAST; S=SURROGATE

Chemical	log K_{ow} (unitless)	In EPD?	Concentration (μg/L)	Ingestion Noncarcinogenic CDI Child	Inhalation Noncarcinogenic (Volatiles) CDI Child	Dermal Noncarcinogenic CDI Child	Ingestion Carcinogenic CDI	Inhalation (Volatiles) Carcinogenic CDI
Benz[a]anthracene (56-55-3)	5.76E+00	No	1.10E+00	-	-	-	4.39E-05	5.42E-01
Benzo[a]pyrene (50-32-8)	6.13E+00	No	9.00E-01	-	-	-	3.59E-05	-
Benzo[b]fluoranthene (205-99-2)	5.78E+00	No	1.30E+00	-	-	-	5.19E-05	-
Benzo[g,h,i]perylene (191242)	6.63E+00	No	4.80E-01	2.39E-05	-	-	-	-
Benzo[k]fluoranthene (207-08-9)	6.11E+00	No	5.80E-01	-	-	-	2.32E-05	-
Chrysene (218-01-9)	5.81E+00	No	8.90E-01	-	-	-	3.55E-05	-
Dibenz[a,h]anthracene (53-70-3)	6.75E+00	No	1.20E-01	-	-	-	4.79E-06	-
Hexanone, 2- (591-78-6)	1.38E+00	Yes	1.10E+01	5.48E-04	5.27E-03	2.00E-05	-	-
Indeno[1,2,3-cd]pyrene (193-39-5)	6.70E+00	No	4.60E-01	-	-	-	1.84E-05	-
Methylnaphthalene, 1- (90-12-0)	3.87E+00	Yes	2.00E+00	9.97E-05	-	1.25E-04	2.57E-05	-
Naphthalene (91-20-3)	3.30E+00	Yes	5.80E+00	2.89E-04	2.78E-03	1.66E-04	7.44E-05	1.03E+00
**Total Risk/HI*	-		-	-	-	-	-	-

Site-specific Risk Models
Cumulative Risk
Groundwater

ca=Cancer, nc=Noncancer, ca* (Where nc CL < 100 x ca CL), ca** (Where nc CL < 10 x ca CL),
max=CL exceeds ceiling limit (see User's Guide), sat=CL exceeds csat, sol=CL exceeds Solubility
I=IRIS; D=Drinking Water/Health Advisory Goals; P=PPRTV; A=ATSDR; C=Cal EPA; X=APPENDIX PPRTV SCREEN; H=HEAST; S=SURROGATE

Chemical	Dermal Carcinogenic CDI	Ingestion HI Child	Inhalation (Volatiles) HI Child	Dermal HI Child	Noncarcinogenic HI Child	Ingestion Risk	Inhalation (Volatiles) Risk	Dermal Risk	Carcinogenic Risk
Benz[a]anthracene (56-55-3)	-	-	-	-	**-**	3.21E-05	5.97E-05	-	**9.17E-05**
Benzo[a]pyrene (50-32-8)	-	-	-	-	**-**	2.62E-04	-	-	**2.62E-04**
Benzo[b]fluoranthene (205-99-2)	-	-	-	-	**-**	3.79E-05	-	-	**3.79E-05**
Benzo[g,h,i]perylene (191242)	-	7.98E-04	-	-	**7.98E-04**	-	-	-	**-**
Benzo[k]fluoranthene (207-08-9)	-	-	-	-	**-**	1.69E-06	-	-	**1.69E-06**
Chrysene (218-01-9)	-	-	-	-	**-**	2.59E-07	-	-	**2.59E-07**
Dibenz[a,h]anthracene (53-70-3)	-	-	-	-	**-**	3.50E-05	-	-	**3.50E-05**
Hexanone, 2- (591-78-6)	-	1.10E-01	1.76E-01	3.99E-03	**2.89E-01**	-	-	-	**-**
Indeno[1,2,3-cd]pyrene (193-39-5)	-	-	-	-	**-**	1.34E-05	-	-	**1.34E-05**
Methylnaphthalene, 1- (90-12-0)	3.49E-05	1.42E-03	-	1.78E-03	**3.21E-03**	7.44E-07	-	1.01E-06	**1.76E-06**
Naphthalene (91-20-3)	4.63E-05	1.45E-02	9.27E-01	8.28E-03	**9.50E-01**	-	3.51E-05	-	**3.51E-05**
**Total Risk/HI*	*-*	*1.26E-01*	*1.10E+00*	*1.41E-02*	***1.24E+00***	*3.83E-04*	*9.48E-05*	*1.01E-06*	***4.79E-04***

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Appendix D-3
Cleanup Levels Calculator, Soil, Human Health

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Site-specific
Resident Equation Inputs
Soil (<40" Precipitation Zone)

Variable	Value
TR (target cancer risk) unitless	1e-05
ED_{ress} (exposure duration - resident) yr	26
ED_{ressc} (exposure duration - child) yr	6
ED_{ressa} (exposure duration - adult) yr	20
ET_{ress} (exposure time - resident) hr/day	24
ET_{ressc} (exposure time - child) hr/day	24
ET_{ressa} (exposure time - adult) hr/day	24
BW_{ressa} (body weight - adult) kg	80
BW_{ressc} (body weight - child) kg	15
SA_{ressa} (skin surface area - adult) cm^2/day	6032
SA_{ressc} (skin surface area - child) cm^2/day	2373
THQ (target hazard quotient) unitless	1
LT (lifetime - resident) yr	70
$EF_{ress<40"}$ (exposure frequency - resident) day/yr	270
$EF_{ressc<40"}$ (exposure frequency - child) day/yr	270
$EF_{ressa<40"}$ (exposure frequency - adult) day/yr	270
IRS_{ressa} (soil intake rate - adult) mg/day	100
IRS_{ressc} (soil intake rate - child) mg/day	200
AF_{ressa} (skin adherence factor - adult) mg/cm^2	0.07
AF_{ressc} (skin adherence factor - child) mg/cm^2	0.2
$IFS_{ress<40"-adj}$ (age-adjusted soil ingestion factor) mg/kg	28350
$DFS_{ress<40"-adj}$ (age-adjusted soil dermal factor) mg/kg	79758
$IFSM_{ress<40"-adj}$ (mutagenic age-adjusted soil ingestion factor) mg/kg	128700
$DFSM_{ress<40"-adj}$ (mutagenic age-adjusted soil dermal factor) mg/kg	330372
AF_{0-2} (skin adherence factor) mg/cm^2	0.2
AF_{2-6} (skin adherence factor) mg/cm^2	0.2
AF_{6-16} (skin adherence factor) mg/cm^2	0.07
AF_{16-30} (skin adherence factor) mg/cm^2	0.07
BW_{0-2} (body weight) kg	15
BW_{2-6} (body weight) kg	15
BW_{6-16} (body weight) kg	80

Output generated 29MAY2018:18:30:26

Site-specific
Resident Equation Inputs
Soil (<40" Precipitation Zone)

Variable	Value
BW_{16-30} (body weight) kg	80
ED_{0-2} (exposure duration) yr	2
ED_{2-6} (exposure duration) yr	4
ED_{6-16} (exposure duration) yr	10
ED_{16-30} (exposure duration) yr	10
$EF_{0-2<40"}$ (exposure frequency) day/yr	270
$EF_{2-6<40"}$ (exposure frequency) day/yr	270
$EF_{6-16<40"}$ (exposure frequency) day/yr	270
$EF_{16-30<40"}$ (exposure frequency) day/yr	270
ET_{0-2} (exposure time) hr/day	24
ET_{2-6} (exposure time) hr/day	24
ET_{6-16} (exposure time) hr/day	24
ET_{16-30} (exposure time) hr/day	24
IRS_{0-2} (soil intake rate) mg/day	200
IRS_{2-6} (soil intake rate) mg/day	200
IRS_{6-16} (soil intake rate) mg/day	100
IRS_{16-30} (soil intake rate) mg/day	100
SA_{0-2} (skin surface area) cm^2/day	2373
SA_{2-6} (skin surface area) cm^2/day	2373
SA_{6-16} (skin surface area) cm^2/day	6032
SA_{16-30} (skin surface area) cm^2/day	6032
A_s (acres)	0.5
Q/C_{wp} (g/m^2-s per kg/m^3)	93.7736
PEF (particulate emission factor) m^3/kg	1.36E+09
A (PEF Dispersion Constant)	16.2302
B (PEF Dispersion Constant)	18.7762
C (PEF Dispersion Constant)	216.108
V (fraction of vegetative cover) unitless	0.5
U_m (mean annual wind speed) m/s	4.69
U_t (equivalent threshold value)	11.32
F(x) (function dependent on U_m/U_t) unitless	0.194

Output generated 29MAY2018:18:30:26

Site-specific
Resident Equation Inputs
Soil (<40" Precipitation Zone)

Variable	Value
A_c (acres)	0.5
Q/C_{wp} (g/m^2-s per kg/m^3)	93.7736
foc (fraction organic carbon in soil) g/g	0.001
p_b (dry soil bulk density) g/cm^3	1.5
p_s (soil particle density) g/cm^3	2.65
θ$_w$ (water-filled soil porosity) L_{water}/L_{soil}	0.15
θ$_a$ (air-filled soil porosity) L_{air}/L_{soil}	0.28396
n (total soil porosity) L_{pore}/L_{soil}	0.43396
T (exposure interval) s	819936000
A (VF Dispersion Constant)	16.2302
B (VF Dispersion Constant)	18.7762
C (VF Dispersion Constant)	216.108

Site-specific
Resident Cleanup Levels
Soil (<40" Precipitation Zone)

ca=Cancer, nc=Noncancer, ca* (Where nc CL < 100 x ca CL), ca** (Where nc CL < 10 x ca CL),
max=CL exceeds ceiling limit (see User's Guide), sat=CL exceeds csat, sol=CL exceeds Solubility
I=IRIS; D=Drinking Water/Health Advisory Goals; P=PPRTV; A=ATSDR; C=Cal EPA; X=APPENDIX PPRTV SCREEN; H=HEAST; S=SURROGATE

Substitution for threshold maximum in soil has been enabled.

Chemical	CAS Number	Mutagen?	Volatile?	Ingestion SF (mg/kg-day)$^{-1}$	SFO Ref	Inhalation Unit Risk (ug/m^3)$^{-1}$	IUR Ref	Chronic RfD (mg/kg-day)	Chronic RfD Ref	Chronic RfC (mg/m^3)	Chronic RfC Ref	GIABS	ABS
Benz[a]anthracene	56-55-3	Yes	Yes	7.30E-01	S	1.10E-04	C	-		-		1	0.13
Benzo[a]pyrene	50-32-8	Yes	No	7.30E+00	I	1.10E-03	C	-		-		1	0.13
Benzo[b]fluoranthene	205-99-2	Yes	No	7.30E-01	S	1.10E-04	C	-		-		1	0.13
Methylnaphthalene, 1-	90-12-0	No	Yes	2.90E-02	P	-		7.00E-02	A	-		1	0.13
Methylnaphthalene, 2-	91-57-6	No	Yes	-		-		4.00E-03	I	-		1	0.13
Naphthalene	91-20-3	No	Yes	-		3.40E-05	C	2.00E-02	I	3.00E-03	I	1	0.13

Site-specific
Resident Cleanup Levels
Soil (<40" Precipitation Zone)

ca=Cancer, nc=Noncancer, ca* (Where nc CL < 100 x ca CL), ca** (Where nc CL < 10 x ca CL),
max=CL exceeds ceiling limit (see User's Guide), sat=CL exceeds csat, sol=CL exceeds Solubility
I=IRIS; D=Drinking Water/Health Advisory Goals; P=PPRTV; A=ATSDR; C=Cal EPA; X=APPENDIX PPRTV SCREEN; H=HEAST; S=SURROGATE

Substitution for threshold maximum in soil has been enabled.

Chemical	RBA	D_{ia} (cm^2/s)	D_{iw} (cm^2/s)	Volatilization Factor (m^3/kg)	K_{oc} (cm^3/g)	K_d (cm^3/g)	H`	Soil Saturation Concentration (mg/kg)	Water Solubility (mg/L)	Particulate Emission Factor (m^3/kg)	Ingestion CL TR=1e-05 (mg/kg)
Benz[a]anthracene	1.00E+00	2.61E-02	6.75E-06	2.48E+06	1.77E+05	1.77E+02	4.91E-04	-	9.40E-03	1.36E+09	2.72E+00
Benzo[a]pyrene	1.00E+00	4.76E-02	5.56E-06	-	5.87E+05	-	1.87E-05	-	1.62E-03	1.36E+09	2.72E-01
Benzo[b]fluoranthene	1.00E+00	4.76E-02	5.56E-06	-	5.99E+05	-	2.69E-05	-	1.50E-03	1.36E+09	2.72E+00
Methylnaphthalene, 1-	1.00E+00	5.28E-02	7.85E-06	3.35E+04	2.53E+03	2.53E+00	2.10E-02	6.79E+01	2.58E+01	1.36E+09	3.11E+02
Methylnaphthalene, 2-	1.00E+00	5.24E-02	7.78E-06	3.31E+04	2.48E+03	2.48E+00	2.12E-02	-	2.46E+01	1.36E+09	-
Naphthalene	1.00E+00	6.05E-02	8.38E-06	2.67E+04	1.54E+03	1.54E+00	1.80E-02	-	3.10E+01	1.36E+09	-

Site-specific
Resident Cleanup Levels
Soil (<40" Precipitation Zone)

ca=Cancer, nc=Noncancer, ca* (Where nc CL < 100 x ca CL), ca** (Where nc CL < 10 x ca CL),
max=CL exceeds ceiling limit (see User's Guide), sat=CL exceeds csat, sol=CL exceeds Solubility
I=IRIS; D=Drinking Water/Health Advisory Goals; P=PPRTV; A=ATSDR; C=Cal EPA; X=APPENDIX PPRTV SCREEN; H=HEAST; S=SURROGATE

Substitution for threshold maximum in soil has been enabled.

Chemical	Dermal CL TR=1e-05 (mg/kg)	Inhalation CL TR=1e-05 (mg/kg)	Carcinogenic CL TR=1e-05 (mg/kg)	Ingestion CL HQ=1 (Child) (mg/kg)	Dermal CL HQ=1 (Child) (mg/kg)	Inhalation CL HQ=1 (Child) (mg/kg)	Noncarcinogenic CL HQ=1 (Child) (mg/kg)	Cleanup Level (mg/kg)
Benz[a]anthracene	8.15E+00	2.95E+02	2.03E+00	-	-	-	-	2.0E+00 ca
Benzo[a]pyrene	8.15E-01	1.62E+04	2.04E-01	-	-	-	-	2.0E-01 ca
Benzo[b]fluoranthene	8.15E+00	1.62E+05	2.04E+00	-	-	-	-	2.0E+00 ca
Methylnaphthalene, 1-	8.50E+02	-	2.28E+02	7.10E+03	2.30E+04	-	5.42E+03	6.8E+01 ca
Methylnaphthalene, 2-	-	-	-	4.06E+02	1.31E+03	-	3.10E+02	3.1E+02 nc
Naphthalene	-	2.86E+01	2.86E+01	2.03E+03	6.57E+03	1.08E+02	1.01E+02	2.9E+01 ca

Appendix D-4
Cleanup Levels Calculator, Soil, Migration to Groundwater

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Site-specific
Equation Inputs
Migration to Groundwater

Variable	Value
TR (target cancer risk) unitless	1e-05
THQ (target hazard quotient) unitless	1
LT (lifetime - resident) year	70
K (volatilization factor of Andelman) L/m^3	0.5
l_{sc} (apparent thickness of stratum corneum) cm	0.001
ED_{resw} (exposure duration - resident) year	26
ED_{reswc} (exposure duration - child) year	6
ED_{reswa} (exposure duration - adult) year	20
ED_{0-2} (mutagenic exposure duration first phase) year	2
ED_{2-6} (mutagenic exposure duration second phase) year	4
ED_{6-16} (mutagenic exposure duration third phase) year	10
ED_{16-26} (mutagenic exposure duration fourth phase) year	10
EF_{resw} (exposure frequency) day/year	350
EF_{reswc} (exposure frequency - child) day/year	350
EF_{reswa} (exposure frequency - adult) day/year	350
EF_{0-2} (mutagenic exposure frequency first phase) day/year	350
EF_{2-6} (mutagenic exposure frequency second phase) day/year	350
EF_{6-16} (mutagenic exposure frequency third phase) day/year	350
EF_{16-26} (mutagenic exposure frequency fourth phase) day/year	350
$ET_{reswadj}$ (age-adjusted exposure time) hour/event	0.67077
$ET_{reswmadj}$ (mutagenic age-adjusted exposure time) hour/event	0.67077
ET_{resw} (exposure time) hour/day	24
ET_{reswc} (dermal exposure time - child) hour/event	0.54
ET_{reswa} (dermal exposure time - adult) hour/event	0.71
ET_{reswc} (inhalation exposure time - child) hour/day	24
ET_{reswa} (inhalation exposure time - adult) hour/day	24
ET_{0-2} (mutagenic inhalation exposure time first phase) hour/day	24
ET_{2-6} (mutagenic inhalation exposure time second phase) hour/day	24
ET_{6-16} (mutagenic inhalation exposure time third phase) hour/day	24
ET_{16-26} (mutagenic inhalation exposure time fourth phase) hour/day	24
ET_{0-2} (mutagenic dermal exposure time first phase) hour/event	0.54
ET_{2-6} (mutagenic dermal exposure time second phase) hour/event	0.54

Output generated 29MAY2018:18:32:47

Site-specific
Equation Inputs
Migration to Groundwater

Variable	Value
ET_{6-16} (mutagenic dermal exposure time third phase) hour/event	0.71
ET_{16-26} (mutagenic dermal exposure time fourth phase) hour/event	0.71
BW_{reswa} (body weight - adult) kg	80
BW_{reswc} (body weight - child) kg	15
BW_{0-2} (mutagenic body weight) kg	15
BW_{2-6} (mutagenic body weight) kg	15
BW_{6-16} (mutagenic body weight) kg	80
BW_{16-26} (mutagenic body weight) kg	80
$IFW_{res-adj}$ (adjusted intake factor) L/kg	327.95
$IFWM_{res-adj}$ (mutagenic adjusted intake factor) L/kg	1019.9
IRW_{reswc} (water intake rate - child) L/day	0.78
IRW_{reswa} (water intake rate - adult) L/day	2.5
IRW_{0-2} (mutagenic water intake rate) L/day	0.78
IRW_{2-6} (mutagenic water intake rate) L/day	0.78
IRW_{6-16} (mutagenic water intake rate) L/day	2.5
IRW_{16-26} (mutagenic water intake rate) L/day	2.5
EV_{reswa} (events - adult) per day	1
EV_{reswc} (events - child) per day	1
EV_{0-2} (mutagenic events) per day	1
EV_{2-6} (mutagenic events) per day	1
EV_{6-16} (mutagenic events) per day	1
EV_{16-26} (mutagenic events) per day	1
$DFW_{res-adj}$ (age-adjusted dermal factor) cm^2-event/kg	2610650
$DFWM_{res-adj}$ (mutagenic age-adjusted dermal factor) cm^2-event/kg	8191633
SA_{reswc} (skin surface area - child) cm^2	6365
SA_{reswa} (skin surface area - adult) cm^2	19652
SA_{0-2} (mutagenic skin surface area) cm^2	6365
SA_{2-6} (mutagenic skin surface area) cm^2	6365
SA_{6-16} (mutagenic skin surface area) cm^2	19652
SA_{16-26} (mutagenic skin surface area) cm^2	19652
DF (dilution factor) unitless	4.96543209

Output generated 29MAY2018:18:32:47

Site-specific
Equation Inputs
Migration to Groundwater

Variable	Value
AF (attenuation factor) unitless	4
f_{oc} (fraction organic carbon in soil) unitless	0.001
d_a (aquifer thickness) m - site-specific	10
d (mixing zone depth) m - site-specific	5.5
L (source length parallel to ground water flow) m	30
i (hydraulic gradient) m/m	0.002
K (aquifer hydraulic conductivity) m/yr	876
I (Infiltration Rate) m/yr	0.081
p_s (soil particle density) kg/L	2.65
p_b (dry soil bulk density) kg/L	1.5
θ $_w$ (water-filled soil porosity) L_{water}/L_{soil}	0.3
foc (fraction organic carbon in soil) g/g	0.001

Site-specific Cleanup Levels Migration to Groundwater

ca=Cancer, nc=Noncancer, ca* (Where nc CL < 100 x ca CL), ca** (Where nc CL < 10 x ca CL),
max=CL exceeds ceiling limit (see User's Guide), sat=CL exceeds csat, sol=CL exceeds Solubility
I=IRIS; D=Drinking Water/Health Advisory Goals; P=PPRTV; A=ATSDR; C=Cal EPA; X=APPENDIX PPRTV SCREEN; H=HEAST; S=SURROGATE

Chemical	CAS Number	Mutagen?	Volatile?	Ingestion SF (mg/kg-day) $^{-1}$	SFO Ref	Inhalation Unit Risk (ug/m^3)$^{-1}$	IUR Ref	Chronic RfD (mg/kg-day)	Chronic RfD Ref	Chronic RfC (mg/m^3)	Chronic RfC Ref	K_d (cm^3/g)
Benz[a]anthracene	56-55-3	Yes	Yes	7.30E-01	S	1.10E-04	C	-		-		1.77E+02
Benzo[a]pyrene	50-32-8	Yes	No	7.30E+00	I	1.10E-03	C	-		-		5.87E+02
Benzo[b]fluoranthene	205-99-2	Yes	No	7.30E-01	S	1.10E-04	C	-		-		5.99E+02
Methylnaphthalene, 1-	90-12-0	No	Yes	2.90E-02	P	-		7.00E-02	A	-		2.53E+00
Methylnaphthalene, 2-	91-57-6	No	Yes	-		-		4.00E-03	I	-		2.48E+00
Naphthalene	91-20-3	No	Yes	-		3.40E-05	C	2.00E-02	I	3.00E-03	I	1.54E+00

Site-specific Cleanup Levels Migration to Groundwater

ca=Cancer, nc=Noncancer, ca* (Where nc CL < 100 x ca CL), ca** (Where nc CL < 10 x ca CL),
max=CL exceeds ceiling limit (see User's Guide), sat=CL exceeds csat, sol=CL exceeds Solubility
I=IRIS; D=Drinking Water/Health Advisory Goals; P=PPRTV; A=ATSDR; C=Cal EPA; X=APPENDIX PPRTV SCREEN; H=HEAST; S=SURROGATE

Chemical	K_{oc} (cm^3/g)	H`	Dilution Attenuation Factor (DAF) (unitless)	Noncarcinogenic CL HQ=1 (Child) (ug/L)	Carcinogenic CL TR=1e-05 (ug/L)	Water Concentration (Child CL × DAF) (ug/L)	Water Concentration (Cancer CL × DAF) (ug/L)	MCL
Benz[a]anthracene	1.77E+05	4.91E-04	19.861728	-	1.20E-01	-	2.38E+00	-
Benzo[a]pyrene	5.87E+05	1.87E-05	19.861728	-	3.43E-02	-	6.82E-01	2.00E-01
Benzo[b]fluoranthene	5.99E+05	2.69E-05	19.861728	-	3.43E-01	-	6.82E+00	-
Methylnaphthalene, 1-	2.53E+03	2.10E-02	19.861728	6.23E+02	1.14E+01	1.24E+04	2.26E+02	-
Methylnaphthalene, 2-	2.48E+03	2.12E-02	19.861728	3.59E+01	-	7.14E+02	-	-
Naphthalene	1.54E+03	1.80E-02	19.861728	6.11E+00	1.65E+00	1.21E+02	3.28E+01	-

Site-specific Cleanup Levels Migration to Groundwater

ca=Cancer, nc=Noncancer, ca* (Where nc CL < 100 x ca CL), ca** (Where nc CL < 10 x ca CL),
max=CL exceeds ceiling limit (see User's Guide), sat=CL exceeds csat, sol=CL exceeds Solubility
I=IRIS; D=Drinking Water/Health Advisory Goals; P=PPRTV; A=ATSDR; C=Cal EPA; X=APPENDIX PPRTV SCREEN; H=HEAST; S=SURROGATE

Chemical	Water Concentration (MCL × DAF) (ug/L)	Cleanup Level (MCL-based) (mg/kg)	Cleanup Level (Non-Carcinogenic Child) (mg/kg)	Cleanup Level (Carcinogenic) (mg/kg)	Cleanup Level (Risk-based) (mg/kg)
Benz[a]anthracene	-	-	-	4.22E-01	4.2E-01
Benzo[a]pyrene	3.97E+00	2.33E+00	-	4.01E-01	4.0E-01
Benzo[b]fluoranthene	-	-	-	4.09E+00	4.1E+00
Methylnaphthalene, 1-	-	-	3.38E+01	6.17E-01	6.2E-01
Methylnaphthalene, 2-	-	-	1.91E+00	-	1.9E+00
Naphthalene	-	-	2.12E-01	5.73E-02	5.7E-02

Appendix D-5
Petroleum Cleanup Levels Calculator, Soil and Groundwater

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Petroleum Cleanup Level Calculator

JBER SS113

Site zone and exposure scenario: Under 40-inch Zone - Residential Exposures

Cleanup Level Calculations

5/29/2018

Chemical	CAS	Type	Calculations	
DRO Aliphatic		Organic Non-Carcinogenic Petroleum	Ingestion Cleanup Level:	10100 mg/kg
			Inhalation Cleanup Level:	25800 mg/kg
			Groundwater Cleanup Level:	3.7 mg/L
			Migration to Groundwater:	7200 mg/kg
DRO Aromatic		Organic Non-Carcinogenic Petroleum	Ingestion Cleanup Level:	4100 mg/kg
			Inhalation Cleanup Level:	8000 mg/kg
			Groundwater Cleanup Level:	1.5 mg/L
			Migration to Groundwater:	100 mg/kg
DRO (Total)		Organic Non-Carcinogenic Petroleum	Ingestion Cleanup Level:	10300 mg/kg
			Inhalation Cleanup Level:	20000 mg/kg
			Groundwater Cleanup Level:	1.5 mg/L
			Migration to Groundwater:	250 mg/kg
GRO Aliphatic		Organic Non-Carcinogenic Petroleum	Ingestion Cleanup Level:	507000 mg/kg
			Inhalation Cleanup Level:	34600 mg/kg
			Groundwater Cleanup Level:	180 mg/L
			Migration to Groundwater:	270 mg/kg
GRO Aromatic		Organic Non-Carcinogenic Petroleum	Ingestion Cleanup Level:	20300 mg/kg
			Inhalation Cleanup Level:	1800 mg/kg
			Groundwater Cleanup Level:	7.3 mg/L
			Migration to Groundwater:	150 mg/kg
GRO (Total)		Organic Non-Carcinogenic Petroleum	Ingestion Cleanup Level:	40600 mg/kg
			Inhalation Cleanup Level:	3600 mg/kg
			Groundwater Cleanup Level:	2.2 mg/L
			Migration to Groundwater:	300 mg/kg
RRO Aliphatic		Organic Non-Carcinogenic Petroleum	Ingestion Cleanup Level:	203000 mg/kg
			Inhalation Cleanup Level:	20000 mg/kg
			Groundwater Cleanup Level:	73 mg/L
			Migration to Groundwater:	$> 10^6$ mg/kg
RRO Aromatic		Organic Non-Carcinogenic Petroleum	Ingestion Cleanup Level:	3000 mg/kg
			Inhalation Cleanup Level:	10000 mg/kg
			Groundwater Cleanup Level:	1.1 mg/L
			Migration to Groundwater:	3300 mg/kg
RRO (Total)		Organic Non-Carcinogenic Petroleum	Ingestion Cleanup Level:	10000 mg/kg
			Inhalation Cleanup Level:	22200 mg/kg
			Groundwater Cleanup Level:	1.1 mg/L

			Migration to Groundwater:	11000 mg/kg

Please Note

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

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

Volatilization Pathway Parameters

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

Groundwater Pathway Parameters

Symbol	Description	Value	Default	Units
Θ_w	Water-filled soil porosity	0.3	0.3	L_{water}/L_{soil}
Θ_a	Air-filled soil porosity	0.13	0.13	L_{air}/L_{soil}
w	Average soil moisture content	0.1	0.1	g_{water}/g_{soil}
K	Aquifer hydraulic conductivity	876	876	m/yr
i	Hydraulic gradient	0.002	0.002	m/m
L	Source length parallel to groundwater flow	30	32	m
I	Infiltration rate	0.081	0.13	m/yr
d_a	Aquifer thickness	10	10	m