UNITED STATES AIR FORCE
JOINT BASE ELMENDORF-RICHARDSON
ALASKA

SITE INSPECTION REPORT FOR
AQUEOUS FILM FORMING FOAM AREAS

FINAL

MAY 2018

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Acronyms and Abbreviations

µg/L	microgram(s) per liter
AAC	*Alaska Administrative Code*
ADEC	Alaska Department of Environmental Conservation
AFB or Base	Air Force Base
AFCEC	Air Force Civil Engineer Center
AFFF	aqueous film forming foam
amsl	above mean sea level
AOC	area of concern
Army	United States Army
ARRC	Alaska Railroad Corporation
AWACS	Airborne Warning and Control System
bgs	below ground surface
bmpe	below measuring point elevation
BRAC	Base Realignment and Closure
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CES	Civil Engineer Squadron
CH2M	CH2M HILL, Inc.
DoD	United States Department of Defense
DQE	data quality evaluation
DQO	data quality objective
E&E	Ecology and Environment, Inc.
EB	equipment blank
EC	emerging contaminant
EPA	United States Environmental Protection Agency
FD	field duplicate
FTA	fire training area
FtS	fluorotelomer sulfonate
HA	health advisory
HH	human health
ID	identifier
IDW	investigation-derived waste
JBER	Joint Base Elmendorf-Richardson
JBER-E	Joint Base Elmendorf-Richardson-Elmendorf

JBER-R	Joint Base Elmendorf-Richardson-Richardson
mg/kg	milligram(s) per kilogram
MS	matrix spike
MSD	matrix spike duplicate
MTGW	migration to groundwater
No.	number
PCB	polychlorinated biphenyl
PFAS	per- and polyfluorinated alkyl substances
PFBS	perfluorobutane sulfonate
PFC	perfluorinated compound, a component of AFFF
PFOA	perfluorooctanoic acid, also known as perfluorooctanoate
PFOS	perfluorooctane sulfonate, also known as perfluorooctane sulfonic acid
PID	photoionization detector
POL	petroleum, oil, and lubricants
QC	quality control
RCRA	Resource Conservation and Recovery Act
RBSL	risk-based screening level
RSL	regional screening level
SI	site inspection
SOP	standard operating procedure
TCE	trichloroethene
USACE	United States Army Corps of Engineers
USAF	United States Air Force
UTM	Universal Transverse Mercator
VOC	volatile organic compound
Work Plan	*Final Work Plan for Perfluorinated Compounds (PFCs) Site Inspections, Joint Base Elmendorf-Richardson, Alaska*

Title and Approval Page

Project Name and Site Location:	Perfluorinated Compounds (PFCs) Site Inspections at Joint Base Elmendorf-Richardson, Alaska
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This report was prepared by qualified persons, as required by Title 18 *Alaska Administrative Code* Chapter 75.355(c)(1) (18 AAC 75.355[c][1]) and 18 AAC 75.380(a) and as defined in 18 AAC 75.990(100).

Reporting Organization Project Manager: Signature: 

Leah Waller, CH2M HILL, Inc.

SECTION 1

Introduction

CH2M under contract to USACE Alaska District (Contract No. W9128A-12-D-0009, Task Order ZJ01) has conducted site inspections (SIs) for 26 aqueous film forming foam (AFFF) areas at Joint Base Elmendorf-Richardson (JBER), Alaska (referred to as areas of concern [AOCs] in the *Final Work Plan for Perfluorinated Compounds (PFCs) Site Inspections, Joint Base Elmendorf-Richardson, Alaska* [Work Plan] [USAF, 2016a]). SI field activities were conducted in June through November 2016 in accordance with the Work Plan. Additional surface water and groundwater sampling of seeps at LF004 and ST037 was completed in November 2016, with approval by email (Halstead, 2016a; Howard, 2016).

The purpose of the SIs was to determine the presence or absence of perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) in the environment. These compounds are a class of synthetic fluorinated chemicals used in industrial and consumer products, including defense-related applications. This class of compounds is also referred to as per- and polyfluorinated alkyl substances (PFAS).

In 1970, the United States Air Force (USAF) began using AFFF firefighting agents containing PFOS and PFOA to extinguish petroleum fires. AFFF may have entered the environment during routine fire training, equipment maintenance, storage, and use. EPA continues to permit the use of PFOS-based AFFF; however, manufacturers have reformulated AFFF to eliminate PFOS. USAF has an excess inventory of PFOS-based AFFF. As of this report, the USAF is actively removing PFOS-based AFFF from their inventory and is replacing it with formulations free of PFOS, which contain little or no PFOA and are less persistent and bioaccumulative in the environment.

Per United States Department of Defense (DoD) Instruction 4715.18, "Emerging Contaminants (ECs)" (DoD, 2009), and the *Interim USAF Guidance on Sampling and Response Actions for Perfluorinated Compounds at Active and Base Realignment and Closure (BRAC) Installations* (USAF, 2012a), and the *SAF/IE Policy on Perfluorinated Compounds of Concern* (USAF, 2016b), the USAF will do the following:

- Identify locations where there is a reasonable expectation that there may have been a release of PFOA/PFOS associated with USAF actions.
- Determine whether there is unacceptable risk to human health and the environment.
- Address releases that pose an unacceptable risk, including offsite migration.

1.1 Project Objectives

The objectives of the SI are as follows:

- Determine whether a confirmed release of PFOS and PFOA has occurred at AFFF areas selected for inspection.
- Determine whether relevant PFAS (PFOS, PFOA, and perfluorobutane sulfonate [PFBS]) are present in groundwater, soil, or surface water/sediments at each AFFF area at concentrations exceeding the EPA lifetime health advisory (HA) levels, EPA regional screening levels (RSLs), EPA risk-based screening levels (RBSLs) (calculated in the absence of RSL values), and ADEC cleanup levels.
- Identify potential receptor pathways with immediate impacts to human health.

In accordance with *Interim AF Guidance on Sampling and Response Actions for Perfluorinated Compounds at Active and BRAC Installations* (USAF, 2012a), EPA lifetime drinking water HAs (EPA, 2016a

and 2016b) and EPA calculated RBSLs (https://epa-prgs.ornl.gov/cgibin/chemicals/csl_search), a release will be considered to be confirmed if exceedances of the following concentrations are identified:

- PFOS:
  - 0.07 microgram per liter (µg/L) in groundwater/surface water that is used as or contributes to a drinking water source (combined with PFOA value) (EPA drinking water HA)
  - 1.26 milligrams per kilogram (mg/kg) in soil (EPA calculated RBSL)
  - 1.26 mg/kg in sediment (EPA calculated RBSL)
- PFOA:
  - 0.07 µg/L in groundwater/surface water that is used as or contributes to a drinking water source (combined with PFOS value) (EPA drinking water HA)
  - 1.26 mg/kg in soil (EPA calculated RBSL)
  - 1.26 mg/kg in sediment (EPA calculated RBSL)

While PFOA and PFOS are the focus of the HA and provide specific targets for the USAF to address in this SI, EPA has also derived RSL values for PFBS (EPA, 2016c), for which there is a Tier 2 toxicity value (Provisional Peer-Review Toxicity Value). USAF will also consider a release to be confirmed if exceedances of the following concentrations are identified:

- PFBS:
  - 380 µg/L in groundwater/surface water (EPA tap water RSL)
  - 1,600 mg/kg in soil/sediment (EPA residential RSL)

ADEC Cleanup Levels

ADEC adopted cleanup levels (18 AAC 75 Table B-1 and Table C) for PFOS and PFOA in soil and groundwater on November 6, 2016 (ADEC, 2016). USAF will also consider a release to be confirmed if exceedances of the following concentrations are identified:

- 1.6 mg/kg PFOS and PFOA in soil or sediment (human health cleanup level)
- 0.0030 and 0.0017 mg/kg for PFOS and PFOA in soil or sediment (migration to groundwater [MTGW] cleanup level)
- 0.40 µg/L for PFOS and PFOA in groundwater or surface water (groundwater cleanup level)
- PFBS is not included in Alaska Cleanup Levels

To better facilitate reporting and discussion of the investigation, sampling, and analysis of PFOA/PFOS/PFBS in this report, these compounds will hereafter be referred to collectively as PFAS.

Table 1-1 presents the screening levels for comparing the analytical results for each of the PFAS compounds.

1.2 Project Scope

The AFFF areas were selected for further inspection at Eielson AFB in the *Preliminary Assessment Report for Perfluorinated Compounds at Joint Base Elmendorf-Richardson, Alaska* (AFCEC, 2015). Field activities were conducted for soil, sediment, surface water, and groundwater at the following 26 AFFF areas:

- AT029 Ruff Road Fire Training Area
- AT052 Landfill Fire Training Area
- Fire Station 4 (Building 654)
- Fire Station 5 (Building 48010)
- SS044 (Building 35-752)
- C-17 Debris Storage Yard
- Current AFFF Spray Test Area
- Corrosion Control Hangar (Building 6263)
- Current Fire Training Area
- Cherry Hill Ditch
- E3/ Airborne Warning and Control System (AWACS) Crash Location
- Former AFFF Spray Test Area
- Fire Station 1 (Building 11415)
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- Fire Suppression Foam Storage (Building 6210)
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- Hangar 10 (Building 15455)
- Hangar 16 (Building 15658)
- Hangar 17 (Building 16670)
- Hangar 18 (Building 17470)
- SS108 C-17 Crash Site
- UC-35A Cessna Crash Location

Additional sampling of seeps at the following locations near the Air Force Base (AFB or Base) boundaries was also conducted:

- LF004
- ST037

SECTION 2

AFFF Area Background

2.1 Site Location and Setting

2.1.1 Location and Description

JBER comprises Joint Base Elmendorf-Richardson – Elmendorf (JBER-E) and former Fort Richardson (JBER-R), located adjacent to the city of Anchorage, Alaska (Figure 2-1). JBER is bounded by the city of Anchorage to the south, Knik Arm (an inlet of Cook Inlet) to the north and west, and primarily undeveloped land to the east. Most of the surrounding undeveloped land is part of Chugach State Park and the Chugach Mountain Range. The installation encompasses 74,000 acres, with elevations ranging from sea level along the Knik Arm shoreline to 3,800 feet above mean sea level (amsl) in the Chugach Mountains to the south and east. The main cantonment areas for JBER-R and JBER-E are north and east of the Glenn Highway. The installation property extends south of the highway; that area is largely unpopulated but includes the water treatment plant, active range areas, a former missile location, a golf course, and a ski area.

Fort Richardson was established with the signing of Executive Orders 8102, 8343, and 8755 signed between 1939 and 1945, resulting in a total of approximately 151,180 acres of public land, formally part of the Chugach National forest, reclassified for military use. In 1950, approximately 9,042 acres of land was transferred to the Department of Air Force from the Department of Army for the establishment of Elmendorf Air Force Base. Because of the 2005 DoD BRAC Commission recommendations, the two bases were merged to form JBER in 2010.

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.

2.1.2 Physical Characteristics

Elmendorf Moraine, the largest physiographic feature of JBER, bisects the installation in a northeast-to-southwest direction. North of the Elmendorf Moraine, elevations decrease over a smoother surface ground moraine to the Six Mile Creek drainage, which flows westward into Knik Arm. South of the Elmendorf Moraine, a glacial outwash plain forms the southern portion of JBER-E. Ship Creek drainage bisects JBER and flows west and north from headwaters in the Chugach Mountains, through the outwash plain to Knik Arm.

Topography of JBER can be separated into three broad subdivisions that resulted from the last glaciation (Rothe et al., 1983). These include (1) the ridges that run northeast to southwest through the central portion of the Base, forming the terminal moraine (called Elmendorf Moraine); (2) smooth-surface elongated hills, linear valleys, and small lakes that characterize the ground moraine north of the Elmendorf Moraine; and (3) a broad surface of sand and gravel (the outwash plain) that extends southward from the Elmendorf Moraine. Soils on the moraines and over much of the outwash plain are shallow and well drained. Depressions and shallow basins typically have poorly drained soils that include coarse, fibrous peat.

In most places, the southern slope of the Elmendorf Moraine is steep, whereas the northern slope is gentle. Many kettles (depressions) and kames (conical hills or short irregular ridges) are on the moraine

surface. Many of the kettles contain ponds and lakes such as Triangle, Gwen, and Fish Lakes, while others contain bogs.

The ground moraine forms steep bluffs along Knik Arm where slopes range from 25 to 90 degrees. Away from Knik Arm, the surface is pitted with kettles and drumlins (elongated gravel hills parallel to glacial movement) that are oriented to the southwest. The ground moraine is an area of relatively low relief, seldom exceeding an elevation of 50 to 75 feet (Rothe et al., 1983). Many of the kettles on the ground moraine are shallow depressions forming bog lakes or unfilled depressions, but some contain lakes such as Green, Spring, Otter, Clunie, and Hillberg Lakes.

2.1.3 Geology and Soils

2.1.3.1 Geology – JBER-E

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 amsl (USAF, 2012b).

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 amsl. 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, 2012b).

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 (bgs) 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, 2012b).

The geotechnical properties of several of the primary JBER-E soil types have been characterized during location investigations. The data show that the outwash and glacio-fluvial soils have relatively low fines content, high bulk densities, and low moisture content, while the Elmendorf Moraine soils have higher silt and clay content, higher moisture content, and relatively high bulk densities (AFCEC, 2015).

2.1.3.2 Geology – JBER-R

The surficial and subsurface geology and stratigraphy of JBER-R are complex because the area is covered by glacial, glacial-marine, and glacio-fluvial deposits of Quaternary age (Hunter et al., 1999). The geology underlying JBER-R consists of glacial deposits, alluvial deposits, and metamorphic rock. The northern and central portions of JBER-R are made up of glacial sediments deposited in the Cook Inlet basin during a number of glacial periods. The sediment deposits range in thickness from 230 to 320 feet thick (USAF, 2013a). Specifically, terminal moraine deposits (the Elmendorf Moraine) are directly northwest of the main cantonment area. These soils are composed of fine-grained, poorly sorted glacial materials with interbedded heterogeneous layers of boulders, cobbles, gravel, sand, silt, and clays. Alluvial deposits on the cantonment area are bounded by the Elmendorf Moraine to the northwest and metamorphic bedrock terrain to the southeast. Glacial outwash, alluvial fan, and fluvial deposits constitute the alluvial sediments that range from gravel in the eastern portion of the plain to sand in the

southwestern portion. The cantonment area is composed of deposits with well-bedded and well-sorted gravel (Hunter et al., 1999).

The Bootlegger Cove Formation was deposited in this region via glacial outwash deposits, and consists primarily of thinly bedded gray to light gray silt clay to clayey silt. The Bootlegger Cove Formation is a common aquitard and confining unit in the area. The ground moraine and the Bootlegger Cove Formation form an irregular surface upon which the younger alluvial sediments were deposited (Hunter et al., 1999). The depth and thickness of the formation vary widely, with depths from 30 to 175 feet, and thicknesses are suspected to be around 30 feet in the southern area of JBER-R and absent north of Davis Highway (the northern portion of the JBER-R cantonment area) (USAF, 2013a).

The Mountain View Fan is the uppermost stratigraphic unit beneath JBER-R. This formation is a large alluvial fan ranging from 40 to 60 feet thick that emanates from the Eagle River Valley and extends under the JBER-R cantonment area (Hunter et al., 1999; USAF, 2013a). The Elmendorf Moraine borders the fan to the north while low hills that protrude through younger glacial sediment border the fan to the south. These hills consist of ground moraine. The fan slopes to the west-southwest and extends beyond the AFB. The fan was likely deposited by ice-marginal, glacially fed streams, based on its composition (stratified outwash) during outburst flooding events from ice-dammed lakes in the Eagle River Valley. Beneath the Mountain View Fan lie older glacial and glacio-marine deposits (Hunter et al., 1999).

Mountains composed of metamorphic bedrock make up the south-central and southern areas of JBER-R (Hunter et al., 1999).

2.1.4 Hydrology

The most significant stream channels within JBER are Eagle River, Ship Creek, Six Mile Creek (including Upper and Lower Six Mile Lakes), and Chester Creek. The Cherry Hill Ditch is also a significant drainage channel within JBER-E. Eagle River, Ship Creek, and Chester Creek all headwater in the Chugach Mountains with flows generally to the north and west, and bisect the Elmendorf Moraine and outwash plain (Rothe et al., 1983). The headwaters of Eagle River are at the base of Eagle Glacier located in the Chugach Mountains to the south and east of JBER and the city of Anchorage. Eagle River passes through the eastern portions of JBER-R, generally flowing to the north across the outwash plains, ground moraine, and terminal moraine before flowing into the Eagle River Flats estuary.

The headwater area of Ship Creek is located to the south and east of JBER in the Chugach Mountains. Ship Creek is predominantly fed by a combination of snow melt and numerous springs located along its course. Ship Creek passes through JBER-R before entering JBER-E. Ship Creek then flows downstream from JBER-E through the Alaska Railroad Terminal Reserve (an industrialized area) before flowing into Knik Arm. Ship Creek provides the most data of all surface water flows for JBER and the Municipality of Anchorage. A gauging station was established on Ship Creek in 1946, and has continuously operated since then. Since 1912, Ship Creek has been impounded in various locations as the water source for the Municipality of Anchorage and JBER. Currently, JBER operates Ship Creek Dam, which provides raw water to the JBER-R Water Treatment Plant and remains an alternate raw water source for the Municipality of Anchorage.

Ship Creek is a “gaining” water course until it enters the outwash plain downstream from Ship Creek Dam, where it becomes a “losing” water course (AFCEC, 2015). In this general area, it is thought that the Bootlegger Clay is thinning out. It has been hypothesized that flows from Ship Creek, along with snowmelt and rainwater that flow off the western flanks of the Chugach Mountains, are the sources of water found in the deep aquifer that lies beneath JBER. However, because of insufficient data, this hypothesis cannot be confirmed. Ship Creek surface flows historically become subsurface flows between the western portions of JBER-R and eastern portions of JBER-E during the winter months because of insufficient flow of water upstream from Ship Creek Dam.

Ship Creek becomes a “gaining” water course again in the lower portions as it exits JBER and enters the Alaska Railroad Terminal Reserve area. It is suspected that this “gaining” results from groundwater flow that is exiting the outwash plain and bluffs located to the north and south of Ship Creek Valley. Six Mile Creek is a small watershed on the ground moraine in the northern part of Elmendorf AFB. The headwaters are near the JBER-E and JBER-R boundary, and the creek flows west into Knik Arm. Two man-made lakes, Upper and Lower Six Mile Lakes, receive most of the drainage. The primary source of water is a spring that is located on JBER-R, just to the west of Otter Lake.

The Cherry Hill Ditch is an artificial drainage channel that flows westward from the east-west runway at JBER-E toward the Knik Arm of the Cook Inlet. As a whole, the drainage system is composed of a network of closed pipe and open ditch drainage pathways, and is used to direct surface water runoff to the bluff above Knik Arm. From there, the network is combined into a single outflow, with a final surface sample point at the Port of Anchorage before the flow is directed to the subsurface until daylighting, approximately 1,500 feet out into the Knik Arm (Haas, 2014).

2.1.5 Hydrogeology and Groundwater Use

2.1.5.1 Hydrogeology – JBER-E

JBER-E is underlain by two aquifers: a shallow water table aquifer (approximately 20 to 45 feet bgs and 15 to 40 feet thick) and a deeper, confined aquifer (occurring anywhere from 50 to 300 feet bgs and 100 to 300 feet thick). These aquifers are separated by the Bootlegger Cove Formation, which functions as an aquitard separating the shallow water table aquifer from the deeper confined aquifer across most of JBER-E. Water use on the AFB is either supplied from the Ship Creek Dam or from the deep aquifer. There is no known communication between shallow and deep aquifers in the areas of investigation, which are north of the flightline and south of the Elmendorf Moraine. Groundwater flow in the outwash plain is generally toward the south or southwest, while groundwater flow in the moraine areas is more variable and is best characterized using localized data.

Data regarding the hydraulic conductivity of sediments underlying JBER-E indicate that the outwash soils, the glacio-fluvial soils north of the Elmendorf Moraine, the Ship Creek alluvium, and the Ship Creek alluvial fan have relatively high hydraulic conductivity values, while the moraine has variable but significantly lower hydraulic conductivity values. The Bootlegger Cove Formation may generally be characterized as having a very low hydraulic conductivity (although some interbedded sand layers expected to have higher hydraulic conductivity values are in the formation) (AFCEC, 2015).

On JBER-E, 17 drinking water supply wells are screened in the deeper, confined aquifer, including four that provide a backup supply to supplement surface water (Class A), five that provide drinking water for at least 25 people for at least 60 days of the year (Class B), and eight that serve small populations (fewer than 25 people) or transient populations, or are active fewer than 60 days per year (Class C) (Tomlinson, 2015).

Well 2, a class A well screened in the deeper, confined aquifer, is located a significant distance (approximately 1 mile) downgradient of the C-17 Debris Storage Yard AFFF area, where the shallow aquifer was investigated as part of this SI. Wells 7 (Class B), 24 (Class C), 49 (Class C), and 55 (Class C) are downgradient of the E3/AWACS Crash Location and SS108 C-17 Crash Location AFFF areas, and are screened in the deep aquifer that was investigated at these AFFF areas as part of this SI; the backup wells are located between 2.5 and 3.25 miles downgradient from the AFFF areas. The remaining JBER-E supply wells are not located downgradient of the AFFF areas investigated as part of this SI based on the current understanding of groundwater flow directions.

2.1.5.2 Hydrogeology – JBER-R

One shallow and one deep groundwater system have been identified in the area of JBER-R; however, three separate aquifer systems exist in the cantonment area, including a shallow unconfined system, a locally confined system, and a deeper confined system (Freethey, 1976).

The shallow system occurs under unconfined conditions in the Anchorage Plain deposits and in unconfined to semiconfined conditions in the till of the Elmendorf Moraine. Shallow perched groundwater of limited volume and extent exists in localized areas within the Elmendorf Moraine till deposits. Groundwater in the Anchorage Plain deposits occurs between 10 and 20 feet bgs. Flow in the Anchorage Plain is westerly and parallel to Ship Creek.

Groundwater occurs in the locally confined aquifer system at a depth of about 80 feet within the central part of the cantonment area. The locally confined aquifer changes from confined to semiconfined to unconfined, moving from south to north across the cantonment area. The upper confining unit pinches out north of Davis Highway (in the northern half of the cantonment area), causing the shallow unconfined and locally confined aquifers to merge. Overall, the direction of flow in the locally confined aquifer tends to be to the northwest. Evidence suggests, however, that flow within the locally confined aquifer is also influenced by discontinuous fine-grained units that result in local groundwater flow directions that diverge from the regional pattern. Groundwater flow directions vary widely in the central part of the cantonment area, where the hydraulic gradient is shallower, and discontinuous fine-grained units are present at depth (Astley et al., 2000).

Groundwater in the deeper confined system is at its shallowest depth (130 feet bgs) in the northern area of JBER-R. The flow in the deeper confined system is generally toward Knik Arm in a westerly to northwesterly direction, with a hydraulic gradient between 0.02 and 0.0025 foot per foot. The deeper confined system occurs under confined conditions beneath areas where the Bootlegger Cove Formation is present. When the Bootlegger Cove Formation is intermittently present or absent (as it is in the northern half of the cantonment area), the underlying aquifer can be described as a leaky confined system.

The deeper, confined aquifer serves as a secondary drinking water source for JBER when there is low stream flow in Ship Creek (Freethey, 1976), which is the primary drinking water source. On JBER-R, three standby water supply wells supplement the surface water system with a maximum of two of the wells in use at a time during peak demand. The water source for the standby wells is a confined aquifer in the Knik outwash deposit. A drinking water well with a single service connection to the Otter Lake recreational facility also serves a transient population. This well is located in the upper aquifer, and is screened from approximately 45 to 48 feet bgs (Sommerville Well Drilling, 1972). The overall hydrogeology of this location is not well documented. None of these four water supply wells are located downgradient of any of the investigated AFFF areas.

2.2 Site History

This section describes the 26 AFFF areas (referred to as AOCs in the Work Plan) and an overview of the seeps investigated as part of the SIs. The locations of the AFFF areas are shown on Figure 2-2. The AFFF area closest to the Base boundary is Cherry Hill Ditch, which is located on the western edge of JBER-E and extends to the Base boundary east of Terminal Road before discharging outside the Base boundary in Knik Arm.

2.2.1 AFFF Area #1 - AT029 Ruff Road Fire Training Area

AT029 Ruff Road Fire Training Area (AT029) is a Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) site (Hazard ID 2777) located on JBER-R east of Bryant Airfield. The area was used between the 1940s and 1980s to conduct fire training exercises in conjunction with activities at the nearby airfields, and it includes a fire training area (FTA), which was a circular area

approximately 50 feet in diameter. Currently, the site includes a small pull-off/staging area, and the rest of the area is vegetated by grasses and shrubs that are periodically mown. The geographic coordinates (North American Datum 1983) of AT029 are 61°16'11.04"N and -149°38'45.06"W. It is estimated that 85,500 gallons of fuels and waste liquids were burned and disposed of at the site from 1940 until the 1980s (Ecology and Environment, Inc. [E&E], 1996). Fire training exercises were historically conducted by saturating an unlined area with water, pumping fuel into the depression, and igniting the fuel. Materials that were burned included jet fuel, waste oil, diesel, brake fluid, and solvents (E&E, 1996). In 1991, the original road in the area was demolished and the current Ruff Road was constructed. Charred debris associated with the FTA was removed at that time, although the fate of the material is unknown. According to the Assistant Fire Chief (involved with JBER fire safety since 2003), AFFF has not been used to extinguish fires during training events now or in the past (Bakker, 2014a). Petroleum-related compounds and solvents have been detected in soil and groundwater at AT029 (USAF, 2014). Land use controls are in place for soil and groundwater (USAF, 2011).

There are no observed overland flow pathways to local waterbodies. Surface water in the area most likely percolates quickly into the ground and ultimately to groundwater, or is lost to evapotranspiration. The nearest surface waterbody to AT029 is a small drainage wetland/pond approximately 600 feet southwest. Groundwater occurs from approximately 149 to 153 feet bgs in a deep confined aquifer.

2.2.2 AFFF Area #2 - AT052 Landfill Fire Training Area

AT052 Landfill Fire Training Area (Hazard ID 2793) is located within the closed JBER-R landfill, north of the main cantonment area, approximately 0.5 mile from Davis Highway. Fire training exercises were conducted in the area from 1985 until 1988. AT052 was closed under CERCLA (United States Army [Army], 2000), and was closed under the Resource Conservation and Recovery Act (RCRA) as part of the landfill. As part of the ADEC Solid Waste Program's compliance monitoring and landfill post-closure care, land use controls are in place to prevent access or damage to landfill cover. The area is currently used for Army training exercises. The geographic coordinates are 61°16'31.79"N and -149°41'22.89"W.

Fire training exercises involved filling a bermed area with water and then emptying waste petroleum products, solvents, or petroleum-contaminated soils into the pit and igniting them. Fluids were stored at the site until they were burned. An estimated 1,500 to 2,300 gallons of waste petroleum products were burned at the pit each year. After 1988, the fire training pit was covered with an estimated 3 to 6 feet of petroleum, oil, and lubricants (POL)-contaminated soil originating from other locations on the Base (United States Army Engineer District, 2000). According to the Assistant Fire Chief, AFFF was not used to extinguish fires during training events now or in the past (Bakker, 2014a).

There are no observed overland flow pathways to local waterbodies. Surface water in the area most likely percolates quickly into the ground and ultimately to groundwater, or is lost to evapotranspiration. Groundwater has been encountered between 174 and 180 feet bgs in a deep confined aquifer.

2.2.3 AFFF Area #3 - Fire Station 4 (Building 654)

Fire Station 4 is located on the western side of Sixth Street, and serves as the main fire station on JBER-R. It is surrounded by a paved/concrete area with small grassy areas bordering to the northwest and southeast. The site geographical coordinates are 61°15'15.07"N and -149°41'5.13"W.

Fire Station 4 houses four emergency response vehicles, one of which (Crash 9) carries AFFF concentrate. This fire station also has a skid unit containing Class A foam (used on combustible material fires) for fighting wildland fires. At Fire Station 4, the only storage of AFFF is in fire engine Crash 9, totaling approximately 56 gallons of AFFF concentrate. Cleaning of the vehicle is conducted inside Fire Station 4, where floor drains are present to capture any runoff and feed it into the Anchorage Water & Wastewater Utility system for treatment. It is possible that small-scale nozzle testing may have

also been performed outside of the station in the past, resulting in minor releases. Refilling of the fire engine's AFFF tank occurs from stock supply housed at Building 6210 (which is evaluated separately).

Surface water in the area most likely percolates quickly into the ground and ultimately to groundwater, or is lost to evapotranspiration. In times of high-volume flow, drainage in that area is generally to the west and south, and overflow from the area would likely become part of the main stormwater drainage flowing south and west and ultimately collecting in a large retention area west of Arctic Valley Road. Overflow from the retention area, while rarely observed, flows to Ship Creek located 1.2 miles southwest of the location, which ultimately drains to the Knik Arm of the Cook Inlet. Groundwater has been encountered between 59 and 62 feet bgs in a shallow aquifer.

2.2.4 AFFF Area #4 - Fire Station 5 (Building 48010)

Fire Station 5 serves the Bryant Army National Guard Airfield Station, and is located on the eastern side of the airfield, west of Runway 35 on JBER-R. It is surrounded by a paved/concrete area with small grassy areas bordering to the west and east. Several other buildings are in the immediate vicinity, including Buildings 47427, 47428, and 47429. The geographical coordinates are 61°15'46.50"N and -149°39'36.79"W.

Fire Station 5 houses two emergency response vehicles, one of which (Crash 10) carries AFFF concentrate (Bakker, 2014a). At Fire Station 5, the only storage of AFFF is in emergency response vehicle Crash 10, totaling approximately 210 gallons of concentrate. Vehicle cleaning is conducted inside Fire Station 5, where floor drains are present to capture any runoff and direct it into the Anchorage Water & Wastewater Utility system for treatment. It is possible that small-scale AFFF testing also may have been performed outside of the station in the past, in which case the surrounding vegetated areas may have received AFFF in runoff. Refilling of the fire engine's AFFF tank occurs from stock supply housed at Building 6210 (Bakker, 2014a).

Surface water in the area most likely percolates quickly into the ground and ultimately to groundwater, or is lost to evapotranspiration. In times of high-volume flow, drainage in that area is generally to the south where there is a small retention area. Overflow from the area would likely become part of the main stormwater drainage flowing south and west and ultimately collecting in a larger retention area west of Arctic Valley Road. Overflow from the retention area, while rarely observed, flows to Ship Creek located approximately 2 miles southwest of the station, and ultimately to the Knik Arm of the Cook Inlet. The nearest large surface waterbodies are a wetland 0.9 mile south (across the Glenn Highway) and Ship Creek, which is more than 2 miles southwest. Groundwater has been encountered between 122 and 123 feet bgs in a deep aquifer.

2.2.5 AFFF Area #5 - SS044 (Building 35-752)

SS044 is located in a relatively undeveloped part of JBER-R, south of Davis Highway, off of Transmitter Road. It is a CERCLA site (ADEC Hazard ID 2773) associated with a transformer mounting pad, a pit where waste oil was burned, a peripheral road where contaminated soil was used as a base, and a stockpile area for polychlorinated biphenyl (PCB)-contaminated soil. The area currently consists of a combination of large grassy areas with some trees, paved roads, and buildings. The location of the former burn pit is now a paved parking area. Active high-frequency radio transmitter antennas surround the site. The site geographical coordinates are 61°14'50.18'N and -149°43'20.12"W.

A temporary burn pit located at SS044 was used in a one-time disposal effort in 1982 to dispose of PCB oil that had been drained from four transformers. The contents of the pit (PCB oil and 200 gallons of diesel fuel) were allowed to burn to completion prior to being extinguished with AFFF (United States Army Cold Regions Research and Engineering Laboratory, 2000). The volume of AFFF applied to the area was not documented. Subsequently, the contaminated soil was stockpiled in an unlined location southwest of the building, and the soil also was used to repair the road that circles Building 35-752.

The AFFF applied to the location may have been partially removed and stockpiled with the PCB-impacted soil, as well as applied to the local loop road around the building.

Historically, trichloroethene (TCE) was detected in one shallow monitoring well (AP-3231); however, concentrations of TCE have decreased to below the maximum contaminant level. PCBs remain in soil at concentrations above the levels for high-occupancy areas (1 mg/kg unrestricted), but below the Toxic Substances Control Act Cleanup Level for low-occupancy areas (25 mg/kg). No further action was selected in the Operable Unit E Record of Decision (Army, 2005). Internal USAF administrative controls limit land use. Groundwater continues to be monitored in conjunction with 5-year reviews to ensure that the remedy remains protective (USAF, 2013a).

There are no observed overland flow pathways to local waterbodies. Surface water in the area most likely percolates quickly into the ground and ultimately to groundwater, or is lost to evapotranspiration. Groundwater has been encountered between 13 and 15 feet bgs in a shallow aquifer.

2.2.6 AFFF Area #6 - C-17 Debris Storage Yard

The C-17 Debris Storage Yard is located on the southeastern corner of Gibson Avenue and 9th Street on JBER-E. Plane parts that were covered with an AFFF blanket during the 2010 C-17 crash response were transported to this area (see Section 2.2.25). The yard is gravel, fully fenced, and locked against unauthorized access. Geographical coordinates are 61°14’10.19”N and -149°50’16.31”W.

C-17 debris piles within the yard are partially covered with liners. However, the liners have been damaged over time.

Surface water in the area most likely percolates quickly into the ground and ultimately to groundwater, or is lost to evapotranspiration. Surface water drainage in the area is expected to infiltrate primarily into onsite gravel. In times of high-volume flow, drainage in the area would likely be to the west, where the local stormwater drainage flows north along Gibson Avenue and then west along Arctic Warrior Drive, and ultimately to the Cherry Hill Ditch and into the Knik Arm of the Cook Inlet. The nearest large surface waterbodies are Knik Arm located 1.7 miles west, and Ship Creek located 0.5 mile southeast. Groundwater has been encountered between 27 and 28 feet bgs in a shallow aquifer.

2.2.7 AFFF Area #7 - Current AFFF Spray Test Area

The Current AFFF Spray Test Area is located south of the western end of the flightline, south of 23rd Street. All current AFFF spray testing for the emergency response vehicles at JBER-E is conducted at this location. The trapezoidal-shaped area has a perimeter berm and a graveled surface; the area also is used as a snow dump. The geographical coordinates are 61°14’37.28”N and -149°50’32.33”W.

Each emergency response vehicle is tested annually, and approximately 5 to 10 gallons of AFFF concentrate are generally discharged in the process at the current AFFF spray testing area. AFFF spray nozzle testing has occurred in this area since January 2012. Spray nozzle testing occurs annually at the designated berm area or just north of the berm area, dependent on snow and soil conditions. No more than 10 gallons of AFFF concentrate per vehicle are released during AFFF testing for each vehicle. Eight emergency response vehicles are currently equipped with AFFF and undergo annual testing (Bakker, 2015). This equates to the release of up to 80 gallons of AFFF concentrate during annual testing. Additional AFFF testing may be performed for maintenance purposes throughout the year.

There are no observed overland flow pathways to local waterbodies. Surface water in the area most likely percolates quickly into the ground and ultimately to groundwater, or is lost to evapotranspiration. Groundwater has been encountered between 10 and 15 feet bgs in a shallow aquifer.

2.2.8 AFFF Area #8 - Corrosion Control Hangar (Building 6263)

The Corrosion Control Hangar (Hazard ID 2771) is located south of the main flightline on Gibson Avenue at JBER-E. It was built in 1944, is used for F-15 exterior paint maintenance, and is equipped with an AFFF fire-suppression system. The hangar has grassy areas to the north and south as well as pavement to the east and west. A paved access to the taxiway opens along the western side of the building. The geographical coordinates for the site are 61°14'20.28"N and -49°50'17.08"W.

The Corrosion Control Hangar AFFF fire-suppression system includes a 400-gallon AFFF tank and one oscillating AFFF cannon within the hangar. Prior to 2001, fire-suppression system maintenance was the responsibility of individual building custodians, and there was no established procedure or schedule for performing or documenting system maintenance. As a result, less is known about discharges and system maintenance issues prior to 2001. Since 2001, general practices at the hangars where AFFF systems are installed include (1) annual testing to determine whether the system is responding as designed (without releasing foam) and (2) biennial testing that includes the discharge of 5 to 10 gallons of AFFF concentrate to observe and adjust spray patterns. Foam discharged during testing is primarily collected in hangar drainage systems, although some may be dispersed onto paved surfaces outside the hangar (Ellis, 2015).

In addition to the regular system tests described above, the system has had one known (accidental) activation since 2000. This activation occurred in 2001, and emptied the 400-gallon tank (Ellis, 2015). After discharge, some of the AFFF was directed to floor drains (connected to an oil-water separator and subsequently to the wastewater system), while some AFFF was allowed to flow out the hangar door on the eastern side of the building (Ellis, 2015), and likely was released to nearby grassy areas.

There are no observed overland flow pathways to local waterbodies. Surface water in the area most likely percolates quickly into the ground and ultimately to groundwater, or is lost to evapotranspiration. Groundwater has been encountered at approximately 33 feet bgs in a shallow aquifer.

2.2.9 AFFF Area #9 - Current Fire Training Area

The Current FTA is located approximately 0.3 mile east of the northern end of the flightline at JBER-E. It currently consists of a circular, lined burn area protected by a berm, and is surrounded by gravel roads, parking lots, a mock building, and an onsite pump system. The other primary activity in the area is gravel mining, and the Alaska Railroad tracks run along the eastern side of this area. The geographic coordinates are 61°15'40.20"N and -149°46'2.15"W.

This FTA has been in use since the mid-1990s (Bakker, 2015). The area consists of a 125-foot-diameter bermed circular area with a large mock aircraft (composed primarily of large sections of pipe and plate steel) as well as a building used for structural fire training. A drain located in the mock plane area runs to an onsite holding pond where excess fluids generated during training are held. If the holding area becomes too full, water is pumped onto the ground and allowed to drain to the east along the railroad tracks. Fire training exercises are conducted by saturating a lined area with water, pumping liquid propane fuel into the area, and igniting the fuel.

Although the system is primarily contained by the lined berm area and holding pond, when the water volume in the holding area becomes too high as a result of gaining water from rain/snow events, excess water is discharged to the ground east of the area, and has been observed to drain to the east along the railroad tracks (Bakker, 2015).

Fire training occurs at this location approximately 20 times per year, during which 18,500 gallons of liquid propane are used to ignite the training fires. According to the Assistant Fire Chief, AFFF has not been used to extinguish fires during training events now or in the past (Bakker, 2014a). However, a separate account from Frontier Emergency Equipment Services (performing maintenance of mobile foam units that were used at Hangar 6 [Building 9311]) indicates that AFFF testing may have occurred at

the Current FTA. If so, the AFFF testing discharge would release 3.5 gallons of concentrate per event for each of three units annually (10.5 gallons each year) (Green, 2015).

There are no observed overland flow pathways to local waterbodies. Surface water in the area most likely percolates quickly into the ground and ultimately to groundwater, or is lost to evapotranspiration. Groundwater has been encountered between 69 and 71 feet bgs in a deep confined aquifer.

2.2.10 AFFF Area #10 - Cherry Hill Ditch (SD052)

Cherry Hill Ditch is an artificial drainage system that flows westward from the east-west runway at JBER-E toward the Knik Arm of the Cook Inlet. This drainage network runs adjacent to or near, and receives runoff from, many of the hangars, training areas, and other locations where releases of AFFF may have occurred, including the following AFFF areas:

- C-17 Debris Storage Yard
- Former AFFF Spray Test Area
- Fire Station 1
- Fire Station 6
- Fire Station 7
- Fire Suppression Foam Storage
- Hangar 5 Former AFFF Spray Test Area
- Hangar 8
- Hangar 10
- Hangar 16
- Hangar 17
- Hangar 18
- UC35A Cessna Crash Location

As a whole, the drainage system is composed of a network of closed pipe and open ditch drainage pathways, and is used to direct surface water runoff to the bluff above Knik Arm. From there, the network is combined into a single outflow, with a final surface sample point at the Port of Anchorage before the flow is directed back to the subsurface drainage system, which daylights approximately 1,500 feet out into the Knik Arm (Haas, 2014). Until reaching the western end of the flightline area, the majority of the drainage system is subsurface; however, stretches of open ditch are present primarily along the western end of JBER-E.

The last 6,150 feet of Cherry Hill Ditch were historically designated as a CERCLA site, SD052 (Hazard ID 644). Historically pesticides and PCBs have been detected in a localized segment of Cherry Hill Ditch between Fighter Drive and Arnold Avenue. The site was closed in 1994 (cleanup complete with institutional controls[1]) following excavation of sediment from an area approximately 10 feet long by 2 feet wide by 30 inches deep in the area of the localized PCB contamination (USAF, 2014).

[1] 7.7.3 Actions Taken at SD052: "After excavation, samples were collected from the surrounding sediment in three sections to confirm that the area of highest contamination was removed. Sample results ranged from 3.38 to 8.63 mglkg PCB-1260. The sample results were included in the evaluation of current risk at the site." (USAF, 1995a and USAF, 1995b Pages 15 [3.38 mg/kg], 16 [8.63 mg/kg] and 17 [3.43 mg/kg]) 7.11.1 Areas Recommended for No Further Action: "The two groundwater areas at OU3, OU3 east groundwater area and OU3 west groundwater area, have carcinogenic risks in the range of 1.0E-05. However, there are currently no receptors of groundwater within the operable unit. A groundwater model performed as a part of the OU5 investigation predicts that migration of constituents from OU3 will naturally attenuate before reaching OU5, causing no increased impact to sensitive receptors. Continued monitoring will be necessary to ensure that there will not be impacts outside of OU3. A basewide groundwater monitoring plan has been developed and outlines the monitoring locations, sampling frequency, analytical parameters, and reporting format of the monitoring program." (USAF, 1995a)

An oily sheen and “an emulsion that creates foam” have historically (date not specified) been observed on the water in the Cherry Hill Ditch (Battelle, 1991). Historical accounts also indicate that up to 2 feet of foam has been observed in the ditch south of the west ramp in 1988 (Black & Veatch, Engineers-Architects, 1990). In 2011, foam was observed in the drainage system of the west ramp, when AFFF testing was conducted in the former AFFF test area. A release from the west ramp through the stormwater drainage system via the Cherry Hill Ditch is suspected (Bakker, 2014a). Quantities of AFFF reaching various portions of the drainage system are unknown.

Three open, unlined ditch sections receive runoff from areas where releases of AFFF are suspected and allow for direct access by receptors. The first section runs from Fairchild Avenue south through a section of woods, and then continues south along Craw Avenue. The section along Fairchild Avenue likely receives runoff from the Former AFFF Spray Test Area on the West Ramp. Where Craw Avenue meets Fighter Drive, the system goes back underground. Along Fighter Drive, the system resurfaces as an open ditch paralleling Fighter Drive. This flowpath receives additional drainage from other areas around the end of Fighter Drive before going back underground just east of Arnold Avenue. The system then resurfaces as an open ditch for the final 1,200 feet, entering the Port of Anchorage.

2.2.11 AFFF Area #11 - E3/AWACS Crash Location

On September 2, 1995, a Boeing E-3A Sentry/AWACS crashed approximately 2,000 feet northeast of the JBER-E east-west runway. The aircraft crashed on the southeastern side of the Alaska Railroad Corporation (ARRC) tracks. The crash location is undeveloped except for ARRC tracks. Outside of the cleared and leveled railroad corridor, the location consists of forested rolling hills of the Elmendorf Moraine (USAF, 2013b). The site geographical coordinates are 61°15’59.38”N and -149°45’38.97”W.

The JBER Fire Department responded to the E3/AWACS crash. An AFFF blanket was maintained to isolate vapors, and the AFFF was then allowed to dissipate in place. The volume of AFFF used in the emergency response is unknown (Bakker, 2015). Residual AFFF is likely to have infiltrated the ground in the local area.

There are no observed overland flow pathways to local waterbodies. Surface water in the area most likely percolates quickly into the ground and ultimately to groundwater, or is lost to evapotranspiration. Groundwater has been encountered between 82 and 86 feet bgs in a deep confined aquifer.

2.2.12 AFFF Area #12 - Former AFFF Spray Test Area

The former AFFF spray test area is located on the west ramp of the JBER-E flightline. The former AFFF spray test area was used from prior to 2000 until 2010 to test AFFF nozzle spray patterns for emergency response vehicles (Bakker, 2015). The testing area is an unbermed, paved surface surrounded by gravel and grass. The site geographical coordinates are 61°14’44.34”N and -149°50’39.76”W.

Testing occurred annually at the former AFFF spray test area and occasionally when maintenance activities required additional spray nozzle adjustments. Tests were conducted on the designated paved surface. No more than 10 gallons of AFFF concentrate per each emergency response vehicle were released during annual AFFF testing (Bakker, 2015). During this period, generally eight emergency response vehicles were equipped with AFFF systems; as a result, it is estimated that up to 80 gallons of concentrate were released during annual testing during that time. Historical accounts indicate that foam was observed in the drainage south of the former AFFF spray test area, and a release through the stormwater drainage system via the Cherry Hill ditch is suspected (Bakker, 2014a).

Surface water in the area most likely percolates quickly into the ground and ultimately to groundwater, or is lost to evapotranspiration. Surface runoff and foam from the test area has been observed to flow to the northeast into the drainage ditch at the intersection of Kenney Avenue and 15th Street. Once the runoff reaches the ditch, it is likely that the surface water would tend to flow to the southwest, and would likely be captured in the drainage to the Cherry Hill Ditch and ultimately the Knik Arm of the

Cook Inlet. The nearest large surface waterbodies are Knik Arm located 1.3 miles west, and Ship Creek located 1.3 miles south of the spray test area. Groundwater has been encountered between 11 and 24 feet bgs in a shallow aquifer.

2.2.13 AFFF Area #13 - Fire Station 1 (Building 11415)

Fire Station 1 (Hazard ID 23393) is located on the western side of 20th Street, north of Fighter Drive, and is the main fire station on JBER-E. The fire station is on a relatively flat surface, and is surrounded by pavement and grass. The geographical coordinates are 61°14'54.89"N and -149°49'6.16"W.

Fire Station 1 houses four engines, three of which carry AFFF (Crash 8, Crash 14, and Crash 16). In addition to the fire engines onsite, an underground storage tank that is known to have housed AFFF in the past is onsite (Bakker, 2014b). The combined total of AFFF that can be stored in the three engines at Fire Station 1 is 896 gallons of concentrate (Bakker, 2014a). The underground storage tank onsite may also house AFFF and, because the contents and condition of the tank are unknown, a release to the subsurface cannot be discounted. The former fill system that included the tank had an overhead fill pipe. Vehicle cleaning is conducted inside Fire Station 1 where floor drains are present to capture any runoff and feed it into the Anchorage Water & Wastewater Utility system for treatment. Annual AFFF testing (involving the discharge of 5 to 10 gallons of AFFF concentrate for each emergency vehicle) was performed in the grassy area on the northwestern side of the station from 2010 to 2012. During this time, the annual testing of a maximum of eight emergency vehicles was divided between this location and Hangar 5. Refilling of the emergency vehicles' AFFF tanks occurs at Building 6210 where stock supply is stored (Bakker, 2014a). The grassy area where annual discharge testing was performed is considered the most likely release location.

Surface water in the area most likely percolates quickly into the ground and ultimately to groundwater, or is lost to evapotranspiration. In times of high-volume flow, drainage in that area is generally to the south and southwest, and overflow from the area would likely become part of the main stormwater drainage on the northern side of Fighter Drive, which ultimately flows to the Cherry Hill Ditch and into the Knik Arm of the Cook Inlet. The nearest large surface waterbodies are Knik Arm located 2 miles west, and Ship Creek located 0.9 mile south. Groundwater has been encountered between 22 and 24 feet bgs in a shallow aquifer.

2.2.14 AFFF Area #14 - Fire Station 6 (Building 16673)

Fire Station 6 is located on the western side of Talley Avenue off of the eastern end of the flightline on JBER-E. Fire Station 6 serves the flightline, and houses one emergency response vehicle (Crash 11). It is surrounded by a paved/concrete area with a small grassy/gravel area bordering to the south. The geographical coordinates are 61°15'32.31"N and -149°49'46.76"W.

Emergency response vehicle (Crash 11) carries AFFF concentrate. The only storage of AFFF is in the fire engine, totaling approximately 500 gallons of concentrate. After a response that requires the application of AFFF, vehicle cleaning is conducted inside Fire Station 6, where runoff is captured by drains connected to the sanitary sewer system. Small-scale nozzle testing has been conducted outside of Fire Station 6 (Bakker, 2015). Refilling of the fire engine's AFFF tank occurs from stock supply housed at Building 6210 (Bakker, 2014a).

Surface water in the area most likely percolates quickly into the ground and ultimately to groundwater, or is lost to evapotranspiration. In times of high-volume flow, drainage in the general area to the south and southwest as well as overflow from the area may become part of the main stormwater drainage on the northern side of Taxiway Mike, which flows to the Cherry Hill Ditch and into the Knik Arm of the Cook Inlet. The nearest large surface waterbodies are Triangle and Fish Lakes (each approximately 1.4 miles northwest), Knik Arm (located 2.6 miles northwest), and Ship Creek (located 1.5 miles south of Fire Station 6). Groundwater has been encountered between 48 and 50 feet bgs in a shallow aquifer.

2.2.15 AFFF Area #15 - Fire Station 7 (Building 14431)

Fire Station 7 is located on the northern side of the flightline, south of Airlifter Drive on JBER-E. Fire Station 7 serves the flightline, and houses one emergency response vehicle. It is surrounded by a paved/concrete area with small grassy areas bordering to the south and west. The station is set off from the flightline and is relatively isolated, with the nearest development approximately 300 feet to the west. The geographical coordinates are 61°15'18.96"N and 149°48'59.14"W.

The emergency response vehicle carries AFFF concentrate. The only storage of AFFF is in the fire engine, totaling approximately 210 gallons of concentrate. After a response that requires the application of AFFF, the worker primarily flushes the nozzle at the scene; however, small-scale AFFF testing also may have been performed at the station, which may have been released to nearby grassy areas. Vehicle cleaning is conducted inside Fire Station 7, where runoff is captured by drains connected to the sanitary sewer system. Refilling of the fire engine's AFFF tank occurs from stock supply stored at Building 6210 (Bakker, 2014a).

Surface water in the area most likely percolates quickly into the ground and ultimately to groundwater, or is lost to evapotranspiration. In times of high-volume flow, drainage in that area of the flightline is generally to the south and southwest, and overflow from the area would likely become part of the main stormwater drainage on the northern side of Taxiway Mike, which flows to the Cherry Hill Ditch and ultimately into the Knik Arm of Cook Inlet. The nearest large surface waterbodies are Knik Arm located 1.7 miles northwest, and Ship Creek located 1.4 miles south of the location. Groundwater has been encountered between 27 and 30 feet bgs in a shallow aquifer.

2.2.16 AFFF Area #16 - Fire Suppression Foam Storage (Building 6210)

The Fire Suppression Foam Storage AFFF Area (Hazard ID 1231) is located on the corner of Arctic Warrior Drive and Femoyer Avenue on JBER-E. When emergency vehicle drivers need to replenish their onboard supplies of AFFF-containing fire suppression foam, they park at the southeastern corner of the building, and use a hand pump to transfer the AFFF into the vehicle holding tank. Some small-scale testing of nozzles has also occurred in this area outside the building. The geographical coordinates of the facility are 61°14'12.65"N and -149°50'47.51"W.

The JBER Fire Department uses Building 6210 for AFFF storage (as well as other firefighting foams and materials) and for transfer of the reserve AFFF to resupply the emergency response vehicles for both JBER-R and JBER-E. The AFFF concentrate is stored in 55-gallon drums on pallets inside the building; there is no secondary containment. The total quantity that is stocked onsite must be enough to refill all emergency vehicles, which is currently 990 gallons of concentrate (Bakker, 2014a).

Small-scale nozzle tests at the facility have resulted in discharges to the pavement south of Fire Suppression Foam Storage (Building 6210), and these discharges then pooled in a low area of the pavement. These tests used approximately 5 to 10 gallons of AFFF concentrate, which were allowed to dry up after pooling on the pavement. Observations by fire department staff indicate that the AFFF discharged during these tests has not been observed to drain away from the building beyond the low spot in the paved area, even during rain events (Bakker, 2014a). Although the AFFF-contaminated runoff was generally observed to dry up after pooling on the pavement, runoff from the area to nearby grassy or gravel areas may have occurred.

Surface water in the area most likely percolates quickly into the ground and ultimately to groundwater, or is lost to evapotranspiration. In times of high rainfall or snowmelt rates, it is possible that surface water sheet flow reached the grassy area south of the building (across 9th Avenue) or possibly the Cherry Hill Ditch and ultimately the Knik Arm of the Cook Inlet. The nearest large surface waterbodies are Knik Arm located 1.4 miles west, and Ship Creek located 0.7 mile south of the AFFF Area. Groundwater has been encountered between 24 and 28 feet bgs in a shallow aquifer.

2.2.17 AFFF Area #17 - FT023 Fire Training Area

FT023 is a CERCLA site (Hazard ID 1798) located at JBER-E, north of 33rd Street and east of Airlifter Drive. The site was used as an FTA from approximately 1940 until 1983. It currently consists primarily of paved parking lots and roads surrounded by buildings to the south. The geographic coordinates are 61°15'49.40"N and -149°48'15.09"W.

The site historically consisted of a bermed fire training pit area, which was an approximate 50-foot-diameter circular area in which fire training exercises were performed from approximately 1940 until 1983 (USAF, 2006). From approximately 1940 until 1960, each training exercise included burning an estimated 250 to 3,000 gallons (USAF, 2006) of oils, fuels, and solvents (USAF, 2015). According to the Assistant Fire Chief, AFFF was not used to extinguish the fires during training events now or in the past (Bakker, 2014a).

There are no observed overland flow pathways to local waterbodies. Surface water in the area drains toward unpaved areas surrounding the paved parking area at FT023, and most likely percolates quickly into the ground and ultimately to groundwater, or is lost to evapotranspiration. Groundwater has been encountered between 40 and 42 feet bgs in a shallow aquifer.

2.2.18 AFFF Area #18 - Hangar 5 (Building 7309) Former AFFF Spray Test Area

The Hangar 5 Former AFFF Spray Test Area is a CERCLA site (Hazard ID 636), located north of Arctic Warrior Drive and west of Kenney Avenue off of the northeastern corner of the building at JBER-E. The test area was used from 2010 to 2012 for annual testing of the AFFF systems on emergency vehicles. The testing area is an unbermed, paved surface surrounded by gravel. Site geographical coordinates are 61°14'22.93"N and -149°49'52.48"W.

From 2010 to 2012, annual testing of the AFFF systems on eight emergency vehicles with AFFF was split between the Hangar 5 Former AFFF Spray Test Area and Fire Station 1 (Building 11415). Testing occurred on the designated, paved surface. Annual testing using 5 to 10 gallons of AFFF concentrate was conducted on the eight emergency vehicles equipped with AFFF in two locations, and the total volume (up to 80 gallons of concentrate annually) of AFFF is believed to have been divided between the two areas during this time. Other additional small-scale testing may have been performed as needed in both of these areas. Following testing at the Hangar 5 AFFF Area, foam was observed in the drainage ditch located along the northern side of 15th Avenue (Bakker, 2015).

Surface water in the area most likely percolates quickly into the ground and ultimately to groundwater, or is lost to evapotranspiration. Surface runoff and foam from the test area has been observed flowing to the northeast into the drainage ditch at the intersection of Kenney Avenue and 15th Street. Once the runoff reaches the ditch, it is likely that the surface water would tend to flow to the southwest, and would likely be captured in the drainage to the Cherry Hill Ditch and ultimately the Knik Arm of the Cook Inlet. The nearest large surface waterbodies are Knik Arm located 1.8 miles west-northwest, and Ship Creek located 0.5 mile south of the AFFF Area. Groundwater has been encountered between 19 and 24 feet bgs in a shallow aquifer.

2.2.19 AFFF Area #19 - Hangar 6 (Building 9311)

Hangar 6 (Hazard ID 24851) is located on JBER-E south of the main flightline toward the northern end of Jerstadt Avenue. It was constructed in 1944, and the Alaska National Guard operates the Army's Regional Flight Center within this hangar. The location has small grassy areas immediately adjacent to the north, east, and south of the building, and paved access to the taxiway opening along the western side of the building. Site geographical coordinates are 61°14'39.74"N and -149°49'59.30"W.

Hangar 6 currently has three portable fire suppression systems containing AFFF. These systems were purchased in 2009 but were later determined not to be necessary to meet safety requirements. They were taken out of service in late 2014. The units never had any accidental activations or use in

emergency responses; however, testing of the AFFF spray patterns was performed annually. A total of 3.5 gallons of AFFF concentrate was contained in each of three portable fire suppression units, which were tested annually. During testing, the AFFF tanks on each unit were emptied completely, for a total of 10.5 gallons discharged during each annual test. The fire suppression system units are still stored at Hangar 6, but they have been depressurized and decommissioned, and are currently awaiting disposal through the Defense Reutilization and Marketing Office.

Until approximately 2012, fire suppression systems (containing AFFF) testing was performed on the pavement to the west of the hangar; subsequently, the fire suppression system units were transported to the current FTA for testing (Green, 2015).

There are no observed overland flow pathways to local waterbodies. Surface water in the area most likely percolates quickly into the ground and ultimately to groundwater, or is lost to evapotranspiration. Groundwater has been encountered at approximately 13 feet bgs in a shallow aquifer.

2.2.20 AFFF Area #20 - Hangar 8 (Building 14410)

Hangar 8 is a CERCLA site (Hazard ID 633), located on JBER-E on the northern side of the main flightline on Taxiway Bravo. The hangar was built in 1957, and is the home of the 703 Aircraft Maintenance Unit and the 962 Aircraft Maintenance Unit. It is primarily surrounded by paved surfaces but has small grass areas immediately adjacent to the mechanical room on the southern end. The hangar has grassy areas surrounding the adjacent paved surfaces in most directions. A paved access to the taxiway opens along the western side of the building. Site geographical coordinates are 61°15’18.56”N and -149°49’10.56”W.

Hangar 8 is a large aircraft maintenance hangar for the E-3/AWACS, and has an AFFF fire suppression system (installed in 1987) that is still in use. The AFFF system includes a 1,500-gallon tank, an overhead sprinkler network, and three foam cannons in the hangar that are located on the northwestern, central eastern, and southwestern sides.

Prior to 2001, fire suppression system maintenance was the responsibility of individual building custodians, and there was no established procedure or schedule for performing or documenting system maintenance. As a result, less is known about discharges and system maintenance issues prior to 2001. Since 2001, general practices at the hangars where AFFF systems are installed include (1) annual testing to determine whether the system is responding as designed (without releasing foam) and (2) biennial testing that includes the discharge of 5 to 10 gallons of AFFF concentrate to observe and adjust spray patterns. Foam discharged during testing is primarily collected in hangar drainage systems, although some may be dispersed onto paved surfaces outside the hangar (Ellis, 2015).

The cannon on the northwestern side of the hangar had three accidental activations between 2000 and 2004 (each approximately 100 to 200 gallons of AFFF concentrate). AFFF was collected in floor drains, and was allowed to flow out the door at the northwestern corner (facing west) of the hangar (Ellis, 2015).

Surface water in the area most likely percolates quickly into the ground and ultimately to groundwater, or is lost to evapotranspiration. In times of high-volume flow, drainage in that area of the flightline is generally to the south and southwest. Overflow from the hangar area would likely become part of the main stormwater drainage on the northern side of Taxiway Mike, which flows to the Cherry Hill Ditch and into the Knik Arm of the Cook Inlet. The nearest large surface waterbodies are Knik Arm located 1.7 miles northwest, and Ship Creek located 1.4 miles south of the location. Groundwater has been encountered at approximately 36 feet bgs in a shallow aquifer.

2.2.21 AFFF Area #21 - Hangar 10 (Building 15455)

Hangar 10 (Building 15455) and support Building 15444 is a CERCLA site (Hazard ID 641), located on JBER-E on the northern side of the main flightline, on Taxiway Kilo. Hangar 10 was built in 1957 as a heavy aircraft fuel maintenance hangar, and is the home of the 176th Air National Guard. The hangar is surrounded

immediately to the north and south by paved surfaces but has small grass and gravel areas immediately adjacent to the mechanical room on the western end, along the eastern side, and beyond the immediately adjacent paved surfaces in most directions. A paved access to the taxiway opens along the southern side of the building. The site geographical coordinates are 61°15'26.48N and -149°48'49.75"W.

The Hangar 10 AFFF fire suppression system has been converted to a high-expansion foam system. The original AFFF fire suppression system at the hangar was installed in 1971. The AFFF system included a 1,500-gallon AFFF tank, an overhead sprinkler network, and three oscillating AFFF cannons located inside along the northern side of the hangar.

Prior to 2001, fire suppression system maintenance was the responsibility of individual building custodians, and there was no established procedure or schedule for performing or documenting system maintenance. As a result, less is known about discharges and system maintenance issues prior to 2001. Since 2001, general practices at the hangars where AFFF systems are installed include (1) annual testing to determine whether the system is responding as designed (without releasing foam) and (2) biennial testing that includes the discharge of 5 to 10 gallons of AFFF concentrate to observe and adjust spray patterns. Foam discharged during testing is primarily collected in hangar drainage systems, although some may be dispersed onto paved surfaces outside the hangar (Ellis, 2015).

In addition to regular system testing described above, the westernmost and central cannons have had an estimated five to six accidental activations since 2000 (sometimes one and sometimes both the westernmost and central cannons, with approximately 100 to 200 gallons of AFFF concentrate for each cannon). Some of the AFFF was collected in floor drains, and some AFFF was allowed to flow out the door at the northeastern corner (facing east) of the hangar (Ellis, 2014). At the time of the preliminary assessment site visit in December 2014, the AFFF concentrate from the tank had been removed and placed into six, 250-gallon totes outside of the mechanical room to await shipment to the contiguous United States for disposal (Galvez, 2014). The totes have since been removed from the site and disposed.

Surface water in the area most likely percolates quickly into the ground and ultimately to groundwater, or is lost to evapotranspiration. In times of high-volume flow, drainage in that area of the flightline is generally to the south and southwest, and overflow from the hangar area would likely become part of the main stormwater drainage on the northern side of Taxiway Mike, which flows to the Cherry Hill Ditch and into the Knik Arm of the Cook Inlet. The nearest large surface waterbodies are Knik Arm (located 1.7 miles northwest), Triangle Lake (0.9 mile north), and Ship Creek (1.5 miles south). Groundwater has been encountered between 27 and 30 feet bgs in a shallow aquifer.

2.2.22 AFFF Area #22 - Hangar 16 (Building 15658)

Hangar 16 is located on JBER-E on the northern side of the main flightline on Taxiway Foxtrot. It was constructed in 1945, and is the home of the F-22 Combat Alert Cell. The hangar consists of eight separate bays in a single line. The hangar is completely surrounded by paved surfaces but has grassy areas beyond the immediately adjacent paved surfaces in most directions. A paved access to the taxiway opens along the southern side of the hangar. Site geographical coordinates are 61°15'24.57"N and -149°47.8.10"W.

The Hangar 16 AFFF system was installed in the mid-1990s. The AFFF system consists of two fixed AFFF cannons in each of the eight bays. The system is designed so that the eight bays are independent from one another; therefore, a discharge in one bay does not result in discharges in any of the other bays.

Prior to 2001, fire suppression system maintenance was the responsibility of individual building custodians, and there was no established procedure or schedule for performing or documenting system maintenance. As a result, less is known about discharges and system maintenance issues prior to 2001.

Since 2001, general practices at the hangars where AFFF systems are installed include (1) annual testing to determine whether the system is responding as designed (without releasing foam) and (2) biennial testing that includes the discharge of 5 to 10 gallons of AFFF concentrate to observe and adjust spray patterns. Foam discharged during testing is primarily collected in hangar drainage systems, although some may be dispersed onto paved surfaces outside the hangar (Ellis, 2015).

Two known activations of the AFFF system have occurred since 2000, each of which completely emptied the 325-gallon AFFF tank. Around 2007, the AFFF system in Bay 5 was accidentally activated when a sensor was triggered by a cigarette lighter flash. Bay 5 has since been converted to an exercise/storage room because it is adjacent to Combat Alert Cell sleeping quarters. In 2007 or 2008, an aircraft fire in Bay 7 resulted in another complete discharge of the 325-gallon AFFF tank. In each discharge, some AFFF was collected in floor drains, but most of the AFFF was pushed out of each hangar's respective bay door onto the paved pad, and was left to evaporate. As part of the cleanup after the activation in Bay 7, the airfield sweeper vehicles spread the AFFF around the pad in front of Bays 4, 5, 6, and 7 (Ellis, 2014). Much of this volume may have reached surrounding grassy areas after precipitation events. This volume may have also been collected by the stormwater drainage system to the southwest that runs along the northern side of Taxiway Mike and eventually to the Cherry Hill Ditch, which ultimately discharges to the Knik Arm to the west.

Surface water in the area most likely percolates quickly into the ground and ultimately to groundwater, or is lost to evapotranspiration. In times of high-volume flow, drainage in that area of the flightline is generally to the south and southwest, and overflow from the hangar area would likely become part of the main stormwater drainage on the northern side of Taxiway Mike, which flows to the Cherry Hill Ditch and into the Knik Arm of the Cook Inlet. The nearest large surface waterbodies are Triangle Lake and Fish Lake (located 1.2 and 1.3 miles northwest, respectively), Ship Creek (located 1.3 miles south of the location), and the Knik Arm of the Cook Inlet (located 2.6 miles west-northwest). Groundwater has been encountered between 40 and 47 feet bgs in a shallow aquifer.

2.2.23 AFFF Area #23 - Hangar 17 (Building 16670)

Hangar 17 is located on JBER-E on the eastern side of the main flightline on Taxiway Foxtrot. The hangar was built in 1996, and is the home of the 90th Aircraft Maintenance Unit for F-22s. It consists of eight separate bays in a single line. The hangar is completely surrounded by paved surfaces but has grassy areas to the south and west beyond the immediately adjacent paved surfaces in most directions. Hangar access to the taxiway opens along the western side of the building. Site geographical coordinates are 61°15'33.40"N and -149°49'59.40"W.

Hangar 17 has an AFFF system that was installed around the time the building was constructed. The AFFF system includes a 300-gallon tank and fixed-head sprinkler system in each of the eight bays. The system is designed so that the bays are independent from one another; therefore, a discharge in one bay does not result in discharges in any of the other bays.

Prior to 2001, fire suppression system maintenance was the responsibility of individual building custodians, and there was not an established procedure or schedule for performing or documenting system maintenance. As a result, less is known about discharges and system maintenance issues prior to 2001. Since 2001, general practices at the hangars where AFFF systems are installed include (1) annual testing to determine whether the system is responding as designed (without releasing foam) and (2) biennial testing that includes the discharge of 5 to 10 gallons of AFFF concentrate to observe and adjust spray patterns. Foam discharged during testing is primarily collected in hangar drainage systems, although some may be dispersed onto paved surfaces outside the hangar (Ellis, 2015).

Three or four accidental system activations have occurred since 2000, each of which discharged approximately 5 gallons of AFFF concentrate. In each discharge, some AFFF was collected in floor drains but much of the AFFF drained onto the paved pad approximately halfway down the eastern side of the

building, and was left to evaporate. Runoff has been observed to collect and run along a north-south depression in the asphalt approximately 30 feet in front of the hangar (Ellis, 2014). Some of the AFFF discharged during accidental activations is likely to have escaped from the eastern side drain during the three or four discharges since 2000. Much of the escaped volume may have been released to the surrounding grassy areas to the west and south after precipitation events.

Surface water in the area most likely percolates quickly into the ground and ultimately to groundwater, or is lost to evapotranspiration. In times of high-volume flow, drainage is generally to the south and southwest, and overflow from the hangar area could potentially become part of the main stormwater drainage on the northern side of Taxiway Mike, which flows to the Cherry Hill Ditch and ultimately to the Knik Arm of the Cook Inlet. The nearest large surface waterbodies are Triangle Lake and Fish Lake (located 1.3 and 1.4 miles northwest, respectively), Ship Creek (located 1.5 miles south), and the Knik Arm of the Cook Inlet (located 2.6 miles west-northwest). Groundwater has been encountered between 44 and 47 feet bgs in a shallow aquifer.

2.2.24 AFFF Area #24 - Hangar 18 (Building 17470)

Hangar 18 is located on JBER-E on the northern side of the main flightline on Taxiway Joker, and is the home of the 176th Air National Guard. Built in 1999, this is a large aircraft maintenance hangar with a AFFF fire suppression system. The hangar is surrounded on all sides by paved surfaces with small grass and gravel areas located to the southeast, southwest, and north. A paved access to the taxiway opens along the southern side of the building. The geographical coordinates are 61°15’42.66”N and -149°48’39.80”W.

The AFFF fire suppression system includes two 750-gallon AFFF tanks and four oscillating AFFF cannons within the hangar along the along the middle line from east to west. In 2001, the 773rd Civil Engineer Squadron (CES) took over maintenance of the fire suppression systems; prior to this time, fire suppression system maintenance was the responsibility of individual building custodians, and there was no established procedure or schedule for performing or documenting system maintenance. As a result, less is known about discharges and system maintenance issues between the time of building construction in 1999 and 2001. Since the 773rd CES took over, general practices at the hangars where foam systems are installed (including AFFF systems) include (1) annual testing to determine whether the system is responding as designed (without releasing foam) and (2) biennial testing that includes the discharge of 5 to 10 gallons of AFFF concentrate to observe and adjust spray patterns. Foam discharged during testing is primarily collected in hangar drainage systems, although some may be dispersed onto paved surfaces outside the hangar (Ellis, 2015).

Several accidental activations of the AFFF fire suppression system occurred around 2005, including at least one instance when all four cannons activated simultaneously, and a number of other instances where one or both cannons in the eastern or western end activated. The estimated maximum volume for each of these discharges is 1,000 gallons of AFFF concentrate. AFFF was collected in floor drains and was allowed to flow out the door at the southern side of the west bay of the hangar (Ellis, 2014). The area immediately outside the door is paved, but grassy areas to the southeast and farther southwest may receive runoff. The volume of AFFF that may have escaped from the hangar door is unknown (Ellis, 2014).

Surface water in the area most likely percolates quickly into the ground and ultimately to groundwater, or is lost to evapotranspiration. In times of high-volume flow, drainage is generally to the south and southwest, and overflow from the hangar area would likely become part of the main stormwater drainage on the northern side of Taxiway Mike, which flows to the Cherry Hill Ditch and into the Knik Arm of the Cook Inlet. The nearest large surface waterbodies are Triangle Lake and Fish Lake (located 0.6 and 0.7 mile north, respectively), Knik Arm (located 1.7 miles northwest), and Ship Creek (located 1.8 miles south). Groundwater has been encountered at 35 feet bgs in a shallow aquifer.

2.2.25 AFFF Area #25 - SS108 C-17 Crash Location

SS108 is the location where a C-17 aircraft crashed about 2,000 feet northeast of the JBER-E east-west runway in July 2010. The aircraft initially impacted on the northwestern side of the ARRC tracks, crossed the tracks, and came to rest on the southeastern side of the tracks. The crash location is undeveloped except for ARRC tracks that cross the site from the southwest to the northeast. Outside of the cleared and leveled railroad corridor, which is parallel to the west by a gravel road in this area, the site consists of forested rolling hills of the Elmendorf Moraine (USAF, 2013a). The site geographical coordinates are 61°16'5.9"N and-149°45'38.54"W.

The crash released approximately 4,000 gallons of jet fuel, but most of the fuel was consumed in the fire resulting from the crash. The JBER Fire Department responded to the crash of the C-17 aircraft. An AFFF blanket was maintained in order to isolate all fuel vapors. After the fire was put out, the AFFF was allowed to dissipate in place. Approximately 220 gallons of AFFF concentrate were used for the emergency response, although it is unknown which type of AFFF was applied (Bakker, 2015).

In October 2012, a removal action was conducted to remove fuel-contaminated soils from the crash site to return the site to unrestricted use. A total of 1,544 cubic yards of fuel-contaminated soil was removed and disposed of offsite in accordance with state regulations. Confirmation samples for diesel-range organic compounds, volatile organic compounds (VOCs), and semivolatile organic compounds indicated that all concentrations were below ADEC Method 2 Cleanup Levels (USAF, 2013a). Because AFFF distribution would likely be primarily associated with the fuel-contaminated areas, much of the residual AFFF may have been removed along with the fuel-contaminated soil during the 2012 removal action.

There are no observed overland flow pathways to local waterbodies. Surface water in the area most likely percolates quickly into the ground and ultimately to groundwater, or is lost to evapotranspiration. Groundwater has been encountered between 71 and 76 feet bgs in a deep confined aquifer.

2.2.26 AFFF Area #26 - UC-35A Cessna Crash Location

The exact location of the UC-35A Cessna crash is unknown. On October 6, 2009, a Cessna UC-35A (Cessna 560 Citation V Ultra) crashed in the central portion of the JBER-E east-west runway. The approximate location is on the southern side of Airlifter Drive, which is a paved area directly on the flightline. The approximate geographical coordinates are 61°15'5.31"N and 149°48'39.31"W.

The JBER Fire Department responded to the plane crash on the runway, and sprayed AFFF in the crash area as a precautionary measure. The AFFF was then allowed to dissipate in place. The quantity of AFFF used during the response is unknown (Bakker, 2015). Because the AFFF was allowed to dissipate in place, it is likely that AFFF-contaminated runoff reached the grass and gravel areas adjacent to the runway.

Surface water in the area most likely percolates quickly into the ground and ultimately to groundwater, or is lost to evapotranspiration. In times of high-volume flow, drainage in that area of the flightline is generally to the south and southwest, and overflow from the crash site would likely become part of the main stormwater drainage on the southern side of Taxiway November, which flows to the Cherry Hill Ditch and ultimately into the Knik Arm of the Cook Inlet. The nearest surface waterbodies to the Cessna Crash AFFF Area are some small ponds and wetlands starting approximately 0.8 mile south of the location along the Ship Creek corridor, and Ship Creek itself approximately 1 mile south. The Knik Arm of the Cook Inlet is approximately 2.3 miles west. Groundwater has been encountered between 22 and 30 feet bgs in a shallow aquifer.

2.3 Seep Overview

Investigative activities were completed at the following groundwater seep locations where groundwater was suspected to have potentially contained PFAS. Although there is no known source of PFAS at these seep locations, they are located near the down hydraulic gradient side of JBER (west side) and were investigated to assess if PFAS migration in groundwater from upgradient AFFF Areas has occurred.

2.3.1 LF004

LF004 is a landfill (also known as the Knik Bluff Landfill) and a CERCLA site (Hazard ID 1804) situated on a bluff above a narrow beach area on the southwestern side of JBER-E. The landfill parallels Knik Arm for approximately 3,000 feet, and is roughly 600 feet wide. The shallow aquifer and the deeper aquifer (from about 70 to 110 feet bgs) discharge as seeps along the bluff face (USAF, 2016c). Two seep locations, LF04SP-02 (shallow aquifer) and LF04SP-02DG (deep aquifer) near the base of the bluff, are currently monitored for VOCs and polycyclic aromatic hydrocarbons. Additional seeps, LF04SP-03 and LF04-04, located to the north at lower elevations and associated with WP014 are also monitored for VOCs.

LF004 was used as a surface dump between 1945 and 1957, and possibly as late as 1965, for discarded automobiles, construction debris, 55-gallon drums, and general refuse (USAF, 2005). Much of the waste was burned in place. The landfill was originally situated some distance from the edge of the bluff. Tidal action along the base of the bluff has eroded it and has exposed portions of the landfill. Expansion work at the Port of Anchorage conducted between 2006 and 2009 filled most of the beach adjacent to LF004, eliminating tidal influence and erosion along the base of the bluff for most of the length of LF004.

2.3.2 ST037

ST037 is a CERCLA site (Hazard ID 631) located along the southern boundary of JBER-E, north of Ship Creek. It consists of seven groundwater plumes and seeps, where groundwater discharges along a steep bluff. Depth to water above the bluff is approximately 30 feet bgs. At the base of the bluff, the depth to water varies from about 0 to 8 feet.

A constructed wetland remediation system was installed in 1997, and currently passively treats seeps contaminated with TCE, benzene, and fuel hydrocarbons. Effluent of the wetland remediation system is discharged to Ship Creek via a culvert under the ARRC yard. Concentrations of contaminants of concern in water are currently monitored within the Wetland Treatment Cell at three locations (WCSW-02, WCSW-03, and WCSW-04) and at two locations at the Pump Station #1 seep collection area (OU5CP-01 and OU5CP-02) to gauge the effectiveness of the passive operations of the Wetland Remediation System (USAF, 2016c).

2.4 Previous Investigations

The use and potential release of AFFF at JBER was researched as part of a preliminary assessment (AFCEC, 2015). Table 2-1 presents the rationale for conducting SIs at the 26 AFFF areas. No previous investigations into the presence or absence of PFAS have been conducted at JBER.

SECTION 3

Field Activities and Analytical Protocol

Soil, sediment, surface water, and groundwater field activities were performed at JBER in June through October 2016 in accordance with the approved Work Plan (USAF, 2016a). Additional surface water and groundwater sampling of seeps at LF004 and ST037 was completed in November 2016, with approval by email (Halstead, 2016a; Howard, 2016). Oversight of soil borings and installation of monitoring wells by GeoTek Alaska was provided by Jasin Olsen/CH2M, Kenji Butler/CH2M, or Renee Caird/CH2M, who all meet the requirements of a "qualified professional" and "qualified person" as defined in 18 AAC 75.990 (100) (ADEC, 2016). Monitoring well development was performed by Michael Landon/CH2M, who meets the requirements of a "qualified person" as defined in 18 AAC 75.990 (100). Groundwater sampling was performed by Kristen Stevens/CH2M, Michael Landon/CH2M, or Annika Seay/CH2M, who all meet the requirements of a "qualified person" as defined in 18 AAC 75.990 (100). Oversight was performed by the field managers Morgan Bruno/CH2M, Jennifer Ulrich/CH2M, and David Lubell/CH2M, who all meet the requirements of a "qualified professional." Morgan Bruno/CH2M also conducted sediment and surface water sampling, along with performing some groundwater well development and sampling.

Field logbooks, field forms, soil boring logs, monitoring well completion diagrams, chain-of-custody forms, photo logs, and survey data are provided in Appendix A; laboratory reports and data quality review forms are provided in Appendix B; and waste tracking information is provided in Appendix C.

3.1 Pre- and Post-Investigation Activities

An initial site visit was performed in May 2016 to identify and mark sample locations provided in the Work Plan (USAF, 2016a). Locations were marked based on global positioning system coordinates taken from the site maps in the Work Plan. Dig permits were issued between June 20 and August 4, 2016.

Before intrusive field activities began, third-party utility locates were performed by GeoTek Alaska using ground-penetrating radar and magnetometer surveys in accordance with Standard Operating Procedure (SOP)-03. After sampling efforts were complete, monitoring well locations were surveyed by Boutet Company on August 25 and October 13, 2016, in accordance with SOP-15. Survey elevations and coordinates are provided in Appendix A.

3.2 Soil Sampling

Between June 22 and August 25, 2016, 33 soil samples (primary and field duplicate [FD]) were collected from 29 soil borings (at 24 of the AFFF areas) drilled by GeoTek Alaska using a Geoprobe™ 8040 DT drill rig. Soil borings were co-located with the monitoring wells. The Geoprobe™ 8040DT drill rig was equipped with dual-tube Macro-Cores for soil sampling consistent with SOP-05. Soil was collected from each boring by Geoprobe Macro-Core in continuous 5-foot cores.

Soil cores were logged in accordance with ASTM International 2488; included soil type, lithology, moisture or groundwater, visual observations, and photoionization detector (PID) readings; and were recorded in the field in accordance with SOP-06. Generally, a mixture of silt, sands, and gravels were encountered to a depth of 15 feet bgs (maximum depth advanced with continuous core collection, except at location E3-1). PID readings were obtained through direct readings of soil along the length of the soil core with the maximum reading recorded in the field notes and soil boring logs (Appendix A-2). PID readings of up to 20 parts per million were detected in boring UC35A-1 (maximum reading over 15-foot sampled interval in cores).

Soil samples were collected from the 0- to 15-foot intervals at each sample location with the following exceptions, in accordance with the Work Plan (USAF, 2016a):

- SS044-1 (SS044) was sampled from 0.5 to 13 feet bgs because of wet soil encountered at 13 feet bgs.
- CHD-1 (Cherry Hill Ditch) was sampled from 0 to 5 feet bgs because a drill rig could not gain safe access to the sampling location. Samples were collected with a hand auger, and could not be collected below 5 feet bgs.
- CHD-2 (Cherry Hill Ditch) was sampled from 0 to 4.5 feet bgs because a drill rig could not gain safe access to the sampling location. Samples were collected with a hand auger, and refusal was reached at 4.5 feet bgs.
- CHD-3 (Cherry Hill Ditch) was sampled from 0 to 1 foot bgs because of wet soil encountered at 5 feet bgs and lack of recovery below 1 foot bgs attributable to coarse gravel lithology.
- CHD-4 (Cherry Hill Ditch) was sampled from 0 to 2 feet bgs because of wet soil encountered at 2 feet bgs.
- E3-1 (E3/AWACS Crash Location) was sampled from 15 to 30 feet bgs because of the presence of clean fill from 0 to 15 feet bgs.

With the exception of the hand auger soil samples at Cherry Hill Ditch, soil samples were collected using the core wedge Incremental Sampling Methodology sampling procedures, in accordance with SOP-21. The core wedge sample was collected utilizing two decontaminated stainless steel putty knives to retrieve the wedge along the length of the 15-foot-long sample interval. The retrieved sample was placed into a decontaminated stainless steel bowl and mixed with a stainless-steel spoon. Any gravel larger than approximately 3/8 inch was removed using a stainless-steel putty knife, and was not included in the sample. The sample (approximately 1 kilogram) was then placed into two laboratory-provided 16-ounce poly containers, and was placed in a chilled cooler with GelPak ice. Subsequent sieving and subsampling was conducted by the laboratory (Test America of West Sacramento, California) prior to analysis.

For the hand-augered soil samples, soil recovered over the entire sample interval was transferred to a stainless-steel bowl, and was homogenized with a stainless-steel spoon. A portion of the homogenized soil material was transferred to labeled sample containers. All soil samples were submitted to TestAmerica for PFAS analysis using DoD-certified Laboratory SOP WS-LC-0025 (Method 537 Modified). Sample handling procedures outlined in SOP-16 and SOP-17 were reviewed daily by samplers and drilling personnel to avoid potential contamination of samples from other sources.

Three types of field quality control (QC) samples for soil were collected to meet data quality standards: FDs, matrix spike/matrix spike duplicate (MS/MSD), and equipment blanks (EBs) (Appendix A-3). EBs were collected by pouring Type II Reagent water over decontaminated, reusable soil sampling equipment (i.e., stainless steel putty knife, stainless steel bowl and spoon, macro knife, drill sample liner, and drilling shoe). As described in the data quality evaluation (DQE) report provided in Appendix B-1, the FD, MS/MSD, and EB frequencies met the criteria and requirements established in the Work Plan (USAF, 2016a).

Table 3-1 summarizes the soil samples collected during this SI. A total of 33 soil samples (29 primary and four FD) were collected and submitted for PFAS analysis. In addition, two MS/MSDs and six EBs were submitted to the laboratory for PFAS analysis. The laboratory ran an additional 10 MS/MSDs on soil samples. Results are provided in Appendix B-2.

3.3 Sediment Sampling

On July 21, 2016, two sediment samples (primary and FD) were collected from one location in the downgradient most open section of Cherry Hill Ditch. Sediment samples were collected at a depth of 0 to 6 inches bgs using a trowel, in accordance with SOP-22. Sediment samples were submitted to TestAmerica for PFAS analysis using DoD-certified Laboratory SOP WS-LC-0025 (Method 537 Modified).

Three types of field QC samples for sediment were collected to meet data quality standards: FD and MS/MSD and EBs. EBs were collected by pouring Type II Reagent water over decontaminated, sediment sampling equipment (i.e., stainless steel bowl and trowel). As described in the data quality evaluation (DQE) report provided in Appendix B-1, the FD, MS/MSD, and EB frequencies met the criteria and requirements established in the Work Plan (USAF, 2016a).

Table 3-4 summarizes the sediment samples collected during this SI. Two sediment samples (one primary and one FD) were collected and submitted to the laboratory for analysis. In addition, one MS/MSD and one EB were submitted to the laboratory for PFAS analysis. Analytical results are provided in Appendix B-2.

3.4 Surface Water Sampling

On July 21, 2016, two surface water samples (primary and FD) were collected from one location in the downgradient-most open section of Cherry Hill Ditch. On November 22, 2016, two surface water samples (primary and FD) were collected from one location (WCSW-02) within the ST037 Wetland Treatment Cell. This location is one of three locations (WCSW-02, WCSW-03, and WCSW-04) used to monitor water for other site contaminants of concern. Surface water samples were collected in accordance with SOP-23 by using the direct grab sampling method. All surface water samples were submitted to TestAmerica for PFAS analysis using DoD-certified Laboratory SOP WS-LC-0025 (Method 537 Modified).

Two types of field QC samples for surface water were collected to meet data quality standards: FD and MS/MSD. No EBs were collected because the direct grab sampling methodology was employed and nothing other than the sample containers came in contact with the samples. As described in the DQE report provided in Appendix B-1, the FD and MS/MSD frequencies met the criteria and requirements established in the Work Plan (USAF, 2016a).

Table 3-1 summarizes the surface water samples collected during this SI. Four surface water samples (two primary and two FD) were collected and submitted to the laboratory for analysis. In addition, two MS/MSDs were submitted for analysis. Analytical results are provided in Appendix B-2.

3.5 Monitoring Well Installation and Groundwater Sampling

Twenty-nine monitoring wells were installed through either direct push or hollow-stem auger techniques using a Geoprobe™ 8040 DT in accordance with SOP-08. Monitoring wells were constructed of new, 2-inch-diameter Schedule 40 polyvinyl chloride casing and 10 feet of pre-packed 0.01-inch slotted well screen filled with 20-40 sand (Appendix A-2), except as described in the Work Plan (USAF, 2016a) deviations section (Section 3.6). PID readings were obtained through direct readings of soil cuttings from along the length of the soil boring with the maximum reading recorded in the field notes and soil boring logs (Appendix A-2). PID readings of up to 191.4 parts per million were detected in boring H5-1 (maximum reading over entire length of borings).

Monitoring well screens were placed with the top of the screen at the identified water table, which ranged from 7 to 188 feet bgs. Well construction details are provided in Table 3-2. The screen placement depth was based on historical groundwater levels from nearby monitoring wells and determination of

groundwater interface from hollow-stem auger cuttings during monitoring well installation. All wells were constructed with a 10-foot-long screen with the exception of CHD-4A, which was constructed with a 20-foot-long screen, as discussed further below and in Section 3.6.

Monitoring wells were developed between August 8 and October 3, 2016, in accordance with SOP-09. Wells were considered adequately developed after the water quality parameters stabilized or after a minimum of 10 well casing volumes were purged. Between 10 and 176 gallons of water were purged from each monitoring well, meeting the minimum well casing volume purge requirement (10). All monitoring wells except CHD-4 and FS4-1 were able to be developed until parameter stabilization using manual surge/purge methodology. Wells CHD-4 and FS4-1 did not meet parameter stabilization after manual surging because of limited recharge rates in low-permeability formations at these locations. After manual surging was performed and did not result in parameter stabilization, mechanical surging was performed by means of a surge block connected to the wire line on a Geoprobe 6610 DT drill rig. After mechanical surging was performed, the wells were purged in a series of steps involving purging the well dry and then allowing the well to fully recharge before purging was resumed. Using this combination of methods, well FS4-1 was able to meet stabilization criteria. Well CHD-4 was still unable to meet stabilization parameters.

On August 27, 2016, the original monitoring well CHD-4 was abandoned, and a new well CHD-4A was installed. The new well was constructed with a longer 20-foot-long screen interval and 20/40 silica sand filter pack material (as discussed in Section 3.6) because it was thought that this modified construction technique would improve the chances of successful development. The reinstalled well CHD-4A was developed using a combination of mechanical surging and stages of purging the well dry, and then allowing the well to fully recover before resuming purging. Well development was considered complete after more than 10 well volumes had been purged from the well, although the redeveloped well still did not meet stabilization criteria for water level or turbidity.

Thirty-seven groundwater samples (primary and FD) were collected from the 29 new monitoring wells and three existing wells between August 8 and October 3, 2016, and were submitted to TestAmerica for PFAS analysis using DoD-certified Laboratory SOP WS-LC-0025 (Method 537 Modified). In accordance with SOP-12, water levels were recorded using an electronic water level probe before and during well sampling. Water levels and the total depth of the wells were measured using a water level indicator, and are summarized in Table 3-2. The water levels were used to calculate groundwater elevations, and the results were used to prepare a potentiometric surface map (Figure 3-1). Water quality parameters (i.e., pH, temperature, conductivity, dissolved oxygen, oxidation-reduction potential, and turbidity) were measured with a multi-meter equipped with a flow-through cell. Well purging continued until parameters stabilized at all wells except CHD-4A (stabilization parameters are summarized in Table A-1). Because of excess water level drawdown at well CHD-4A, sampling procedures for low-permeability formations were used as outlined in SOP-12. The data quality from CHD-4A was not affected by the use of this alternate sampling procedure. Groundwater samples were collected using bladder pump with new tubing, with the exception of well CHD-4A located in the Cherry Hill Ditch. CHD-4A was sampled using a peristaltic pump with new tubing because of the low recharge rate of the well in accordance with SOP 12.

Five groundwater samples (primary) were collected from five groundwater seep locations at ST037 and LF004 on November 22, 2016, and were submitted to TestAmerica for PFAS analysis using DoD-certified Laboratory SOP WS-LC-0025 (Method 537 Modified). Samples collected from seeps OU5SP-01, OU5SP-02, and OU5SP-11 were collected using a peristaltic pump with new tubing placed down an existing 1-inch polyvinyl chloride casing installed into the seep. Samples collected from LF004 (LF04SP-02) and the Pump Station #1 seep collection area (OU5CP-02), which daylighted above ground, were collected following the direct grab surface water sampling methodology from SOP-23.

Three types of field QC samples for groundwater were collected to meet data quality standards: FDs, MS/MSDs, and EBs. The EB was collected by pumping Type II Reagent water through the decontaminated bladder pump and new tubing. As described in the DQE report provided in Appendix B-1, the FD, MS/MSD, and EB frequencies met the criteria and requirements established in the Work Plan (USAF, 2016a).

Table 3-1 summarizes the groundwater samples collected during this SI. During July through October 2016, 42 groundwater samples (37 primary and five FDs) were collected and submitted to the laboratory for PFAS analysis. In addition, three MS/MSD and three EB samples were submitted to the laboratory for PFAS analysis. All results are provided in Appendix B-2.

3.6 Waste Handling and Disposal

Wastes generated during field activities include general refuse (e.g., expended personal protective equipment, paper towels, plastic bags, and plastic water containers) and investigation-derived waste (IDW) (e.g., soil drill cuttings, well development water, purge water from groundwater sampling, and wastewater from decontamination activities).

Consistent with the Project-specific Waste Management Plan (Appendix B of the Work Plan [USAF, 2016a]), IDW drums were staged in the waste accumulation area located at the POL/dewatering facility (also known as the Contractor Staging Area).

Soil characterization samples were collected for each AFFF area. Twenty-five soil characterization samples were collected in July and August 2016. Water from similar AFFF areas was combined, and 16 composite liquid characterization samples were collected in August and September 2016. Waste characterization sample results indicated that both soil and liquid IDW are nonhazardous. The Waste Tracking Log is provided in Appendix C.

Specific wastes were handled as follows:

- Soil cuttings were placed into 102 55-gallon drums during soil boring advancement and monitoring well installation. The drums were labeled with the accumulation date, project name, well/boring number, contents, and the contractor point of contact.
- Four soil drums originating from the SS108 C-17 Crash Location were returned to the AFFF area and were spread atop the surface soil on January 12, 2017. In accordance with the Work Plan (USAF, 2016a), SS108 C-17 Crash Location drums met the ADEC criteria to be spread onsite.
- The remaining nonhazardous soil drums were picked up on December 23, 2016, and were transported to Chemical Waste Management of the Northwest in Arlington, Oregon.
- Liquids were contained in 68, 55-gallon drums. The drums were labeled with the accumulation date, project name, well/boring number, contents, and the contractor point of contact. These nonhazardous drums were picked up on January 13, 2017, and were transported to Chemical Waste Management of the Northwest in Arlington, Oregon.

Manifests are provided in Appendix C.

General refuse and expended personal protective equipment were disposed of daily in JBER municipal waste containers.

3.7 Deviations from the Work Plan

The following deviations from the Work Plan (USAF, 2016a) occurred during implementation of SI field activities:

- Monitoring wells CHD-1 and CHD-2 located in the Cherry Hill Ditch were moved approximately 76 feet southwest and 10 feet south of the original location, respectively, to provide safe access for the drill rig. The original locations were at the bottom of a steep ravine. To allow soil sample collection from the original locations in the open portions of the ditch, soil samples from CHD-1 and CHD-2 were collected with a hand auger from 0 to 5 feet bgs at the original location. All soil recovered from 0 to 5 feet bgs was homogenized in a decontaminated stainless steel bowl, and then a 1-kilogram subsample was collected from the homogenized material for PFAS analysis. These changes were approved on July 20, 2016 (Halstead, 2016b).
- Boring CHD-4 in Cherry Hill Ditch was moved approximately 515 feet to the southwest to provide safe access for the drill rig. The original locations were located at the bottom of a steep ravine. This change was approved on July 20, 2016 (Halstead, 2016b).
- Initial monitoring well CHD-4 in the Cherry Hill Ditch was decommissioned, and a new monitoring well CHD-4A was installed with a 20-foot-long screen. Due to the low recharge rates resulting from silty lithology in the water-bearing zone at CHD-4A, the longer screen was installed to provide greater opportunity to develop and sample the well without purging the screen interval dry. Additionally, the well was installed with a thicker sand pack, and the sand pack was constructed with 20/40 sand instead of the 10/20 sand installed around the prepack screens in all other monitoring well construction. This greater volume of finer-grained sand pack was intended to aid in development of the well in the silty formation.
- Groundwater was collected from monitoring well CHD-4A in the Cherry Hill Ditch following the low permeability formation sampling protocol in SOP-12 using a peristaltic pump. A bladder pump was not used to avoid pumping the well dry during sampling because of the pump and tubing volume of a bladder pump.
- Additional surface water and groundwater samples were collected from six locations at seeps at LF004 and ST037 in November 2016, with approval by email (Halstead, 2016a; Howard, 2016). Seep location OU5SP-10 at ST037 was not sampled because the seep was frozen. Due to the nature of the sampling points, water quality measurements were not collected. One FD was collected for surface water (WCSW-02), and one MS/MSD was collected for groundwater (LF04SP-02). Although samples collected from five of the six locations are considered groundwater because groundwater seeps through the bluff at these locations, the samples were collected in a similar manner to surface water samples.
- Groundwater and surface water samples were collected in a 250-milliliter bottle provided by the laboratory, rather than a 1-liter bottle noted in Table 19-1 of the Work Plan.

3.8 Analytical Results

Soil, sediment, surface water, and groundwater analytical results from the 2016 SIs are summarized for each of the AFFF areas and seep locations in Sections 3.7.1 through 3.7.27. PFOS and PFOA groundwater and surface water data are compared to the EPA drinking water HAs and ADEC groundwater cleanup levels; PFOS and PFOA soil and sediment data are compared to the EPA calculated RBSL and ADEC MTGW and human health cleanup levels. PFBS groundwater and surface water data are compared to the EPA tap water RSL; PFBS soil and sediment data are compared to the EPA residential RSL. Data

validation followed the Level III requirements outlined in Worksheet #36 of the Work Plan (USAF, 2016a); 100 percent of the data were validated.

Boring logs are included in Appendix A. Sample receipt forms, laboratory data review checklists, and a comprehensive DQE report are provided in Appendix B. The goal of the DQE is to demonstrate that a sufficient number of representative samples was collected and that the resulting analytical data can be used to support the decision-making process. Overall data precision and accuracy as measured by field and laboratory QC indicators suggest that data are usable for project objectives.

A summary of soil analytical results is presented in Table 3-3, and PFOA/PFOS results are shown on Figure 3-2. Detailed maps of PFOA/PFOS soil results are shown on Figures 3-3A to 3-3H.

A summary of sediment analytical results is presented in Table 3-4, and PFOA/PFOS results are shown on Figure 3-2. Detailed maps of PFOA/PFOS results are shown on Figure 3-3H.

A summary of groundwater analytical results is presented in Table 3-5, and PFOA/PFOS results are shown on Figure 3-4. Detailed maps of PFOA/PFOS results are shown on Figures 3-5A to 3-5I.

A summary of surface water analytical results is presented in Table 3-6, and PFOA/PFOS results are shown on Figure 3-4. Detailed maps of PFOA/PFOS results are shown on Figures 3-5H to 3-5I.

All PFBS results are below EPA RSLs; the data are consequently not presented on the figures.

3.8.1 AFFF Area #1 - AT029 Ruff Road Fire Training Area

3.8.1.1 Soil Results

Soil boring AT029-1 was continuously logged to a depth of 15 feet bgs. From ground surface, AT029-1 encountered well-graded sands with gravel and well-graded gravels with sand, interbedded with a 2-foot-thick layer of silty sand from 5 to 7 feet bgs.

One soil sample from ground surface to 15 feet bgs was collected. PFBS was not detected in soil. PFOA was detected in soil at concentrations below the EPA RBSL and ADEC cleanup levels. PFOS was detected in soil at concentrations below the EPA RBSL and the ADEC human health cleanup level but above the ADEC MTGW cleanup level.

3.8.1.2 Groundwater Results

One permanent groundwater well was installed. The groundwater flow direction could not be confirmed from this single well, but groundwater flow is thought to be to the west-northwest based on existing potentiometric surface maps.

One groundwater sample was collected from 150 to 160 feet bgs in new monitoring well AT029-1. PFBS and PFOS were not detected in groundwater. PFOA was detected in groundwater at concentrations above the EPA HA but below the ADEC cleanup level.

3.8.2 AFFF Area #2 - AT052 Landfill Fire Training Area

3.8.2.1 Soil Results

Soil boring AT052-1 was continuously logged to a depth of 15 feet bgs. From ground surface, AT052-1 encountered well-graded sands with gravel and well-graded gravels with sand.

One soil sample from ground surface to 15 feet bgs was collected. PFBS was not detected in soil. PFOA and PFOS were detected in soil at concentrations below the EPA RBSLs and ADEC cleanup levels.

3.8.2.2 Groundwater Results

One permanent groundwater well was installed. The groundwater flow direction could not be confirmed from this single well, but groundwater flow is thought to be to the west-southwest based on existing potentiometric surface maps.

One groundwater sample was collected from 189.5 to 199.5 feet bgs in new monitoring well AT052-1. PFBS was detected at concentrations below the RSL. Neither PFOA nor PFOS were detected in groundwater.

3.8.3 AFFF Area #3 - Fire Station 4 (Building 654)

3.8.3.1 Soil Results

Soil boring FS4-1 was continuously logged to a depth of 15 feet bgs. From ground surface, FS4-1 encountered well-graded sands with gravel, with a 2.5-foot-thick layer of well-graded sands with silt and gravel from 2.5 to 5 feet bgs.

One soil sample from ground surface to 15 feet bgs was collected. PFBS was not detected in soil. PFOA and PFOS were detected at concentrations below the EPA RBSLs and ADEC cleanup levels.

3.8.3.2 Groundwater Results

One permanent groundwater well was installed. The groundwater flow direction could not be confirmed from this single well, but groundwater flow is thought to be to the north-northwest based on existing potentiometric surface maps.

One groundwater sample was collected from 62 to 72 feet bgs in new monitoring well FS4-1. PFOS was not detected in groundwater. PFOA was detected at concentrations below both the EPA HA and the ADEC cleanup level, while PFBS was detected at a concentration below the EPA RSL.

3.8.4 AFFF Area #4 - Fire Station 5 (Building 48010)

3.8.4.1 Soil Results

Soil boring FS5-1 was continuously logged to a depth of 20 feet bgs. From ground surface, FS5-1 encountered primarily well-graded sands gravel and well-graded sands with gravel or silt. A layer of silty sand was present from 3 to 6 feet bgs.

One soil sample from ground surface to 15 feet bgs was collected. PFBS was not detected. PFOA was detected at concentrations below the EPA RBSL and ADEC cleanup levels. PFOS was detected at concentrations below the EPA RBSL and ADEC human health cleanup level but above the ADEC MTGW cleanup level.

3.8.4.2 Groundwater Results

One permanent groundwater well was installed. The groundwater flow direction could not be confirmed from this single well, but groundwater flow is thought to be to the north-northwest based on existing potentiometric surface maps.

One groundwater sample was collected from 122.75 to 132.75 feet bgs. PFOS was not detected in groundwater. PFOA was detected at concentrations below both the EPA HA and the ADEC cleanup level, while PFBS was detected at a concentration below the EPA RSL.

3.8.5 AFFF Area #5 - SS044 (Building 35-752)

3.8.5.1 Soil Results

Soil boring SS044-1 was continuously logged to a depth of 15 feet bgs. From ground surface, SS044-1 encountered well-graded sands with gravel and silt to 1.5 feet bgs, silty sand with gravel from 1.5 to 5 feet bgs, and well-graded gravel with sand from 5 to 15 feet bgs.

One soil sample from 0.5 to 13 feet bgs was collected. PFBS was not detected in soil. PFOA and PFOS were detected at concentrations below the EPA RBSLs and ADEC cleanup levels.

3.8.5.2 Groundwater Results

One permanent groundwater well was installed at SS044. The groundwater flow direction could not be confirmed from this single well, but groundwater flow is thought to be to the west-northwest based on existing potentiometric surface maps.

One groundwater sample was collected from 13 to 23 feet bgs in new monitoring well SS044-1. PFBS was detected at concentrations below the EPA RSL. PFOA was detected at a concentration below the EPA HA and the ADEC cleanup level. PFOS was detected at concentrations above the EPA HA but below the ADEC cleanup level.

3.8.6 AFFF Area #6 - C-17 Debris Storage Yard

No soil borings were completed at the C17 Debris Storage Yard.

One existing monitoring well was sampled downgradient of the C-17 Debris Storage Yard. The groundwater flow direction could not be confirmed from this single well, but groundwater flow is thought to be to the south-southwest based on existing potentiometric surface maps.

One groundwater sample was collected from 29 to 39 feet bgs from existing monitoring well OU3MW-02. PFBS was detected at a concentration below the EPA RSL. PFOA and PFOS were detected at concentrations above the EPA HA and the ADEC cleanup level.

3.8.7 AFFF Area #7 - Current AFFF Spray Test Area

3.8.7.1 Soil Results

Soil boring CASTA-1 was continuously logged to a depth of 15 feet bgs. From ground surface, CASTA-1 encountered generally well-graded sands with gravel and well-graded gravels with sand. A thin layer of silty sand was observed just below the ground surface.

One soil sample from ground surface to 15 feet bgs was collected. PFBS was detected at a concentration below the EPA RSL. PFOA and PFOS were detected at concentrations below the EPA RBSLs and the ADEC human health cleanup level, but above the ADEC MTGW cleanup level.

3.8.7.2 Groundwater Results

One permanent groundwater well was installed, and one existing monitoring well cross-gradient to the AFFF area was sampled. The groundwater flow direction could not be confirmed from these two wells, but groundwater flow is thought to be to the south-southwest based on existing potentiometric surface maps.

Two groundwater samples were collected. One sample was collected from 15 to 25 feet bgs in new monitoring well CASTA-1, and one sample was collected from 12 to 22 feet bgs in existing well OU5MW-39. PFBS was detected at concentrations below the EPA RSL. PFOA and PFOS were detected at concentrations above the EPA HA and the ADEC cleanup level in new well CASTA-1. In existing well OU5MW-39, PFOA was detected at a concentration greater than the EPA HA but below the

ADEC cleanup level, while PFOS was detected at a concentration above the EPA HA and the ADEC cleanup level.

3.8.8 AFFF Area #8 - Corrosion Control Hangar (Building 6263)

3.8.8.1 Soil Results

Soil boring CCH-1 was continuously logged to a depth of 15 feet bgs. From ground surface, CCH-1 encountered a 2-foot layer of silty sand, and then generally encountered well-graded gravels with silt and sand or with sand. An interbedded layer of poorly graded sands was observed from 13 to 14 feet bgs.

One soil sample was collected from ground surface to 15 feet bgs. PFBS was not detected in soil. PFOA and PFOS were detected at concentrations below the EPA RBSLs and ADEC cleanup levels.

3.8.8.2 Groundwater Results

One permanent groundwater well was installed. The groundwater flow direction could not be confirmed from this single well, but groundwater flow is thought to be to the south-southwest based on existing potentiometric surface maps.

One groundwater sample was collected from 33 to 43 feet bgs in new monitoring well CCH-1. PFBS was detected in groundwater at the Corrosion Control Hangar at a concentration less than the EPA RSL. PFOA and PFOS were detected at concentrations above the EPA HA and ADEC cleanup level.

3.8.9 AFFF Area #9 - Current Fire Training Area

3.8.9.1 Soil Results

Soil borings CFTA-1, CFTA-2, and CFTA-3 were each continuously logged to a depth of 15 feet bgs. From ground surface, CFTA-1 encountered well-graded sands with gravel to 15 feet bgs. CFTA-2 encountered 1 foot of lean clay with sand and gravel, transitioning to well-graded sand with silt and gravel from 1 to 15 feet bgs. CFTA-3 encountered silty sand with gravel from ground surface to 15 feet bgs.

Three soil samples from ground surface to 15 feet bgs were collected. PFBS was detected at a concentration below the EPA RBSL in boring CFTA-1, and was not detected in soil at CFTA-2 or CFTA-3. PFOA was detected at a concentration below the EPA RBSL and ADEC human health cleanup level but above the ADEC MTGW cleanup level in CFTA-1, and was detected at concentrations below the EPA RBSL and ADEC cleanup levels in CFTA-2 and CFTA-3. PFOS was detected at a concentration below the EPA RBSL and ADEC human health cleanup level but above the ADEC MTGW cleanup level in CFTA-1 and CFTA-3, and was detected at concentrations below the EPA RBSL and ADEC cleanup levels in CFTA-2.

3.8.9.2 Groundwater Results

Three permanent groundwater wells were installed. Based on the groundwater elevations measured during the SI, groundwater flow is to the west-northwest towards the Knik Arm.

Three groundwater samples were collected from 70 to 80 feet bgs, from 71 to 81 feet bgs, and from 69 to 79 feet bgs at new monitoring wells CFTA-1, CFTA-2, and CFTA-3, respectively. PFBS was detected in all three samples at concentrations below the EPA RSL. PFOA and PFOS were not detected in groundwater at CFTA-1 or CFTA-3. At CFTA-2, PFOA was detected at a concentration above the EPA HA and the ADEC cleanup level, while PFOS was detected at a concentration above the EPA HA but below the ADEC cleanup level.

3.8.10 AFFF Area #10 - Cherry Hill Ditch

3.8.10.1 Soil Results

Soil borings CHD-1 and CHD-2 were logged from hollow stem auger cuttings to a total depth of 21 feet bgs. CHD-3 was continuously logged to a depth of 15 feet bgs, while CHD-4a was logged from hollow stem auger cuttings to a depth of 29 feet bgs. From ground surface, CHD-1 encountered well-graded sands with gravel and well-graded sands with some surficial organic soil. CHD-2 encountered silty sands with gravel to 6 feet bgs and well-graded sands below 6 feet bgs. CHD-3 encountered surficial organic soils, and then intermittent layers of gravely silt with sand, well-graded gravels, and silty gravels with sand and silty sands with gravel to 10 feet bgs, followed by well-graded sands below 10 feet bgs. CHD-4a encountered silty sands and silty sands with gravel to 3.5 feet bgs, and silt below 3.5 feet bgs.

Four soil samples were collected at the Cherry Hill Ditch AFFF area. Boring CHD-1 was sampled from 0 to 5 feet bgs; CHD-2 was sampled from 0 to 4.5 feet bgs; CHD-3 was sampled from 0 to 1 foot bgs; and CHD-4 was sampled from 0 to 2 feet bgs. PFBS was not detected in soil at the Cherry Hill Ditch AFFF area. PFOA was detected at concentrations below the EPA RBSL and ADEC cleanup levels in all Cherry Hill Ditch soil samples. PFOS was detected at concentrations below the EPA RBSL and ADEC human health cleanup level, but above the ADEC MTGW cleanup level at locations CHD-1, CHD-2, and CHD-4. PFOS was detected at a concentration below the EPA RBSL and ADEC cleanup levels in CHD-3.

3.8.10.2 Sediment Results

One sediment sample was collected. PFBS and PFOS were not detected in the Cherry Hill Ditch sediment sample. PFOA was detected at a concentration below the EPA RBSL and ADEC soil cleanup levels.

3.8.10.3 Groundwater Results

Four permanent groundwater wells were installed. Based on groundwater elevations measured during the SI, groundwater flow is to the west-southwest following the ground surface contours towards CHD-4A, which is approximately 100 feet lower than CHD-1, -2 and -3.

Four groundwater samples were collected from the new monitoring wells. Sample depths for CHD-1, CHD-2, CHD-3, and CHD-4 were 10 to 20 feet bgs, 10 to 20 feet bgs, 7 to 17 feet bgs, and 8.6 to 28.6 feet bgs, respectively. PFBS was detected at concentrations below the EPA RSL at locations CHD-1, CHD-2, and CHD-3; PFBS was not detected in groundwater at CHD-4. PFOA was detected at a concentration below the EPA HA and the ADEC cleanup level in groundwater at CHD-1; PFOA was detected at a concentration above the EPA HA but below the ADEC cleanup level at CHD-2 and CHD-3. PFOS was detected at concentrations above the EPA HA but below the ADEC cleanup level at CHD-1, CHD-2, and CHD-3. Neither PFOS nor PFOA were detected in groundwater at CHD-4.

3.8.10.4 Surface Water Results

One surface water sample was collected, co-located with the sediment sample. PFOA was detected at a concentration above the EPA HA but below the ADEC groundwater cleanup level. PFOS was detected at a concentration above both the EPA HA and the ADEC cleanup level.

3.8.11 AFFF Area #11 - E3/ Airborne Warning and Control System (AWACS) Crash Location

One permanent groundwater well was installed at the E3/AWACS Crash Location AFFF area. The groundwater flow direction could not be confirmed from this single well, but groundwater flow is thought to be to the west.

3.8.11.1 Soil Results

Soil boring E3-1 was logged from auger cuttings to a depth of 15 feet bgs, and was continuously logged from 15 to 30 feet bgs. From ground surface, E3-1 encountered fill material to 15 feet bgs; native material below 15 feet bgs consisted of silt, gravelly silt, and silty gravel.

One soil sample from 15 to 30 feet bgs was collected at the E3/AWACS Crash Location. PFBS and PFOA were not detected in soil at the E3/AWACS Crash Location AFFF area. PFOS was detected at a concentration below the EPA RBSL and ADEC cleanup levels.

3.8.11.2 Groundwater Results

One permanent groundwater well was installed. The groundwater flow direction could not be confirmed from this single well, but groundwater flow is thought to be to the west based on existing potentiometric surface maps.

One groundwater sample was collected from 82 to 92 feet bgs in new monitoring well E3-1, and was analyzed using method WC-LS-0025 (Method 537 Modified). None of the PFAS compounds were detected in groundwater at the E3/AWACS Crash Location AFFF area.

3.8.12 AFFF Area #12 - Former AFFF Spray Test Area

3.8.12.1 Soil Results

Soil boring FASTA-1 was continuously logged to a depth of 15 feet bgs. From ground surface, FASTA-1 encountered primarily well-graded sands with gravel or with silt and gravel and well-graded gravels with sand to 13 feet bgs, and silt from 13 to 15 feet bgs.

One soil sample from ground surface to 15 feet bgs was collected. PFBS was not detected in soil at the Former AFFF Spray Test Area. PFOA was detected at concentrations below the EPA RBSL and ADEC cleanup levels. PFOS was detected at concentrations below the EPA RBSL and ADEC human health cleanup level but above the ADEC MTGW cleanup level.

3.8.12.2 Groundwater Results

One permanent groundwater well was installed. The groundwater flow direction could not be confirmed from this single well, but groundwater flow is thought to be to the south-southwest based on existing potentiometric surface maps.

One groundwater sample was collected from 24 to 34 feet bgs in new monitoring well FASTA-1. PFBS was detected in groundwater at a concentration below the EPA RSL. PFOA and PFOS were detected at concentrations above the EPA HA and the ADEC cleanup level.

3.8.13 AFFF Area #13 - Fire Station 1 (Building 11415)

3.8.13.1 Soil Results

Soil boring FS1-1 was continuously logged to a depth of 15 feet bgs. From ground surface, FS1-1 encountered primarily well-graded sands with gravel and well-graded gravels with sand, with an interbedded layer of silt with sand from 1 to 2 feet bgs.

One soil sample from ground surface to 15 feet bgs was collected. PFBS was detected at a concentration below the EPA RSL. PFOA was detected at a concentration below the EPA RBSL and ADEC human health cleanup level but above the ADEC MTGW cleanup level. PFOS was detected at a concentration above the EPA RBSL and ADEC cleanup levels.

3.8.13.2 Groundwater Results

One permanent groundwater well was installed. The groundwater flow direction could not be confirmed from this single well, but groundwater flow is thought to be to the south-southwest based on existing potentiometric surface maps.

One groundwater sample was collected from 24 to 34 feet bgs in new monitoring well FS1-1. PFBS was detected at a concentration below the EPA RSL. PFOA and PFOS were detected at concentrations above the EPA HA and ADEC cleanup levels.

3.8.14 AFFF Area #14 - Fire Station 6 (Building 16673)

3.8.14.1 Soil Results

Soil boring FS6-1 was continuously logged to a depth of 15 feet bgs. From ground surface, FS6-1 encountered surficial organic soils, followed by well-graded sands with gravel to 15 feet bgs.

One soil sample from ground surface to 15 feet bgs was collected. PFBS was not detected in soil at Fire Station 6. PFOA was detected at concentrations below the EPA RBSL and ADEC cleanup levels. PFOS was detected at concentrations below the EPA RBSL and ADEC human health cleanup level but above the ADEC MTGW cleanup level.

3.8.14.2 Groundwater Results

One permanent groundwater well was installed. The groundwater flow direction could not be confirmed from this single well, but groundwater flow is thought to be to the west based on existing potentiometric surface maps.

One groundwater sample was collected from 51.4 to 61.4 feet bgs in new monitoring well FS6-1. PFBS was not detected in groundwater at Fire Station 6. PFOA was detected at a concentration below the EPA HA and the ADEC cleanup level. PFOS was detected at a concentration above the EPA HA and the ADEC Cleanup level.

3.8.15 AFFF Area #15 - Fire Station 7 (Building 14431)

3.8.15.1 Soil Results

Soil boring FS7-1 was continuously logged to a depth of 15 feet bgs. From ground surface, FS7-1 encountered primarily well-graded sands with gravel and well-graded gravels with sand, interbedded with a 1-foot layer of sandy silt from 6 to 7 feet bgs.

One soil sample from ground surface to 15 feet bgs was collected. PFBS was not detected in soil at Fire Station 7. PFOA was detected at concentrations below the EPA RBSL and ADEC cleanup levels. PFOS was detected at concentrations below the EPA RBSL and ADEC human health cleanup level but above the ADEC MTGW cleanup level.

3.8.15.2 Groundwater Results

One permanent groundwater well was installed. The groundwater flow direction could not be confirmed from this single well, but groundwater flow is thought to be to the south-southwest based on existing potentiometric surface maps.

One groundwater sample was collected from 30.6 to 40.6 feet bgs in new monitoring well FS7-1. PFBS was detected at a concentration below the EPA RSL. PFOA and PFOS were detected concentrations above the EPA HA and ADEC cleanup level.

3.8.16 AFFF Area #16 - Fire Suppression Foam Storage (Building 6210)

3.8.16.1 Soil Results

Soil boring FSFS-1 was continuously logged to a depth of 15 feet bgs. From ground surface, FSFS-1 encountered silty sands to 1 foot bgs, and then well-graded gravels with sand and well-graded sands with gravel.

One soil sample from ground surface to 15 feet bgs was collected. PFBS was detected at a concentration below the EPA RSL. PFOA was detected at concentrations below the EPA RBSL and ADEC human health cleanup level but above the ADEC MTGW cleanup level. PFOS was detected at concentrations below the EPA RBSL and ADEC cleanup levels.

3.8.16.2 Groundwater Results

One permanent groundwater well was installed. The groundwater flow direction could not be confirmed from this single well, but groundwater flow is thought to be to the south-southwest based on existing potentiometric surface maps.

One groundwater sample was collected from 30 to 40 feet bgs in new monitoring well FSFS-1. PFBS was detected at a concentration below the EPA RSL. PFOA and PFOS were detected at concentrations above the EPA HA and ADEC cleanup level.

3.8.17 AFFF Area #17 - FT023 Fire Training Area

No soil borings were completed at FT023, so lithology could not be confirmed.

One existing monitoring well was sampled. The groundwater flow direction could not be confirmed from this single well, but groundwater flow is thought to be to the south-southwest based on existing potentiometric surface maps.

One groundwater sample was collected from 40 to 50 feet bgs in existing monitoring well FP-56. PFBS and PFOS were not detected in groundwater at FT023. PFOA was detected at concentrations below the EPA HA and ADEC cleanup level.

3.8.18 AFFF Area #18 - Hangar 5 (Building 7309) AFFF Spray Test Area

3.8.18.1 Soil Results

Soil boring H5-1 was continuously logged to a depth of 15 feet bgs. From ground surface, H5-1 encountered primarily well-graded gravels with sand and silty gravel, with an interbedded layer of poorly graded gravels with sand and poorly graded sand from 10 to 14 feet bgs.

One soil sample from ground surface to 15 feet bgs was collected. PFBS was detected at a concentration below the EPA RSL. PFOA was detected at a concentration below the EPA RBSL and ADEC cleanup levels. PFOS was detected at concentrations below EPA RBSL and ADEC human health cleanup level but above the ADEC MTGW cleanup level.

3.8.18.2 Groundwater Results

One permanent groundwater well was installed. The groundwater flow direction could not be confirmed from this single well, but groundwater flow is thought to be to the south-southwest based on existing potentiometric surface maps.

One groundwater sample was collected from 27 to 37 feet bgs in new monitoring well H5-1. PFBS was detected at a concentration below the EPA RSL. PFOA and PFOS were detected at concentrations above the EPA HA and the ADEC cleanup level.

3.8.19 AFFF Area #19 - Hangar 6 (Building 9311)

3.8.19.1 Soil Results

Soil boring H6-1 was continuously logged to a depth of 15 feet bgs. From ground surface, H6-1 encountered well-graded sands with silt, interbedded with a 6-inch layer of poorly graded sand from 13 to 13.5 feet bgs.

One soil sample was collected from ground surface to 15 feet bgs. PFBS was not detected in soil. PFOA and PFOS were detected at concentrations below the EPA RBSLs and ADEC cleanup levels.

3.8.19.2 Groundwater Results

One permanent groundwater well was installed. The groundwater flow direction could not be confirmed from this single well, but groundwater flow is thought to be to the south-southwest based on existing potentiometric surface maps.

One groundwater sample was collected from 14 to 24 feet bgs in new monitoring well H6-1. PFBS was detected at a concentration below the EPA RSL. PFOA was detected at a concentration above the EPA HA but below the ADEC cleanup level. PFOS was detected at a concentration above the EPA HA and the ADEC cleanup level.

3.8.20 AFFF Area #20 - Hangar 8 (Building 14410)

3.8.20.1 Soil Results

Soil boring H8-1 was continuously logged to a depth of 15 feet bgs. From ground surface, H8-1 encountered well-graded sands and well-graded sands with gravel.

One soil sample from ground surface to 15 feet bgs was collected. PFBS and PFOA were not detected in soil. PFOS was detected at concentrations below the EPA RBSL and ADEC cleanup levels.

3.8.20.2 Groundwater Results

One permanent groundwater well was installed. The groundwater flow direction could not be confirmed from this single well, but groundwater flow is thought to be to the south-southwest based on existing potentiometric surface maps.

One groundwater sample was collected from 34.5 to 44.5 feet bgs in new monitoring well H8-1. PFBS was detected at concentrations below the EPA RSL. PFOA was detected at concentrations below the EPA HA and ADEC cleanup level. PFOS was detected at concentrations above the EPA HA but below the ADEC cleanup level.

3.8.21 AFFF Area #21 - Hangar 10 (Building 15455)

3.8.21.1 Soil Results

Soil boring H10-1 was continuously logged to a depth of 15 feet bgs. From ground surface, H10-1 encountered well-graded gravels with sand and well-graded sands with gravel.

One soil sample from ground surface to 15 feet bgs was collected. PFBS was detected at a concentration below the EPA RSL. PFOA was detected at a concentration below the EPA RBSL and ADEC cleanup levels. PFOS was not detected in soils at Hangar 10.

3.8.21.2 Groundwater Results

One permanent groundwater well was installed. The groundwater flow direction could not be confirmed from this single well, but groundwater flow is thought to be to the south-southwest based on existing potentiometric surface maps.

One groundwater sample was collected from 30 to 40 feet bgs in new monitoring well H10-1. PFBS was detected at concentrations below the EPA RSL. PFOA and PFOS were detected at concentrations above the EPA HA but below the ADEC cleanup level.

3.8.22 AFFF Area #22 - Hangar 16 (Building 15658)

3.8.22.1 Soil Results

Soil boring H16-1 was continuously logged to a depth of 15 feet bgs. From ground surface, H16-1 encountered primarily well-graded sands, well-graded sands with gravel, and well-graded gravels with sand, with surficial organic soils and an interbedded layer of sandy silt from 1.25 to 3.5 feet bgs.

One soil sample from ground surface to 15 feet bgs was collected. PFBS and PFOA were not detected in soil. PFOS was detected at a concentration below the EPA RBSL and ADEC cleanup levels.

3.8.22.2 Groundwater Results

One permanent groundwater well was installed. The groundwater flow direction could not be confirmed from this single well, but groundwater flow is thought to be to the west based on existing potentiometric surface maps.

One groundwater sample was collected from 47 to 57 feet bgs in new monitoring well H16-1. PFBS was detected at a concentration below the EPA RSL. PFOA was detected at a concentration below the EPA HA and ADEC cleanup level. PFOS was detected at a concentration above the EPA HA but below the ADEC cleanup level.

3.8.23 AFFF Area #23 - Hangar 17 (Building 16670)

3.8.23.1 Soil Results

Soil boring H17-1 was continuously logged to a depth of 15 feet bgs. From ground surface, H17-1 encountered well-graded sands and well-graded gravels with sand to 2.5 feet bgs. Below these surficial soils, layers of silty gravel, sandy silt, and silty gravels with sand were encountered.

One soil sample from ground surface to 15 feet bgs was collected. PFBS was not detected in soil. PFOA was detected at concentrations below the EPA RBSL and ADEC cleanup levels. PFOS was detected at concentrations below EPA RBSL and the ADEC human health cleanup level but above the ADEC MTGW cleanup level.

3.8.23.2 Groundwater Results

One permanent groundwater well was installed. The groundwater flow direction could not be confirmed from this single well, but groundwater flow is thought to be to the west based on existing potentiometric surface maps.

One groundwater sample was collected from 47 to 57 feet bgs in new monitoring well H17-1. PFBS was detected at a concentration below the EPA RSL. PFOA was detected at a concentration below the EPA HA and ADEC cleanup level. PFOS was detected at a concentration above the EPA HA but below the ADEC cleanup level.

3.8.24 AFFF Area #24 - Hangar 18 (Building 17470)

3.8.24.1 Soil Results

Soil boring H18-1 was continuously logged to a depth of 15 feet bgs. From ground surface, H18-1 encountered primarily well-graded sands and well-graded sands with gravel, with surficial organic soil and silty gravel to 3.5 feet bgs and an interbedded sandy silt layer from a 0.5-foot layer of sandy silt from 11.5 to 12 feet bgs.

One soil sample from ground surface to 15 feet bgs was collected. PFBS was not detected in soil. PFOA was detected at concentrations below the EPA RBSL and ADEC cleanup levels. PFOS was detected at concentrations below EPA RBSL and ADEC human health cleanup level but above the ADEC MTGW cleanup level.

3.8.24.2 Groundwater Results

One permanent groundwater well was installed. The groundwater flow direction could not be confirmed from this single well, but groundwater flow is thought to be to the west-southwest based on existing potentiometric surface maps.

One groundwater sample was collected from 36 to 46 feet bgs in new monitoring well H18-1. PFBS was detected at a concentration below the EPA RSL. PFOA was detected at a concentration above the EPA HA but below the ADEC cleanup level. PFOS was detected at a concentration above the EPA HA and the ADEC cleanup level.

3.8.25 AFFF Area #25 - SS108 C-17 Crash Site

3.8.25.1 Soil Results

Soil boring SS108-1 was continuously logged to a depth of 15 feet bgs. From ground surface, SS108-1 encountered primarily well-graded sands with gravel and well-graded gravels, with interbedded thin layers of poorly graded sand, silty sand, and sandy silt with gravel.

One soil sample from ground surface to 15 feet bgs was collected. PFBS and PFOA were not detected in soil. PFOS was detected at a concentration below the EPA RBSL and ADEC cleanup levels.

3.8.25.2 Groundwater Results

One permanent groundwater well was installed. The groundwater flow direction could not be confirmed from this single well, but groundwater flow is thought to be to the west based on existing potentiometric surface maps.

One groundwater sample was collected from 71 to 81 feet bgs in new monitoring well SS108-1. PFBS was detected at a concentration below the EPA RSL. PFOA was detected at a concentration below the EPA HA and ADEC cleanup level. PFOS was not detected in groundwater.

3.8.26 AFFF Area #26 - UC-35A Cessna Crash Location

3.8.26.1 Soil Results

Soil boring UC35A-1 was continuously logged to a depth of 15 feet bgs. From ground surface, UC35A-1 encountered fill to 1 foot bgs, followed by well-graded sands with gravel and well-graded gravels with sand.

One soil sample from ground surface to 15 feet bgs was collected. PFBS and PFOA were not detected in soil. PFOS was detected at a concentration below the EPA RBSL and the ADEC cleanup levels.

3.8.26.2 Groundwater Results

One permanent groundwater well was installed. The groundwater flow direction could not be confirmed from this single well, but groundwater flow is thought to be to the south-southwest based on existing potentiometric surface maps.

One groundwater sample was collected from 30 to 40 feet bgs in new monitoring well UC35A-1. PFBS was detected at a concentration below the EPA RSL. PFOA and PFOS were detected at concentrations above the EPA HA but below the ADEC cleanup level.

3.8.27 Seep Locations

The results of samples collected from seep locations are as follows. No soil borings were installed at the seeps; therefore, no soil samples were collected or analyzed.

3.8.27.1 LF004

One groundwater sample was collected from a surface seep. The groundwater flow direction could not be confirmed from this single sample location, but groundwater flow is thought to be to the west-northwest based on existing potentiometric surface maps.

PFBS was detected at a concentration below the EPA RSL. PFOA was detected at a concentration below the EPA HA and the ADEC cleanup level. PFOS was detected at a concentration above the EPA HA and the ADEC cleanup level.

3.8.27.2 ST037

Four groundwater samples were collected from four surface seeps, and one surface water sample was collected from a surface water location. The groundwater flow direction could not be confirmed from these daylighting seeps, but the groundwater flow direction is thought to be to the southwest based on existing potentiometric surface maps.

3.8.27.3 Groundwater Results

Four groundwater samples were collected from surface seeps OU5SP-01, OU5SP-02, OU5CP-02, and OU5SP-11. PFBS was detected at concentrations below the EPA RSL. PFOA was detected at concentrations above the EPA HA but below the ADEC cleanup level at OU5SP-01, OU5SP-02, and OU5CP-02, and at a concentration above the EPA HA and the ADEC cleanup level at OU5SP-11. PFOS was detected at a concentration below the EPA HA and ADEC cleanup levels at OU5SP-01, above the EPA HA but below the ADEC cleanup level at OU5SP-02 and OU5CP-02, and above the EPA HA and ADEC cleanup level at OU5SP-11.

3.8.27.4 Surface Water Results

One surface water sample was collected from surface water location WCSW-02 at ST037. PFBS was detected at a concentration below the EPA RSL. PFOA and PFOS were detected at concentrations above the EPA HA and the ADEC groundwater cleanup level.

SECTION 4

Migration/Exposure Pathways and Targets

PFAs were released to soil, sediment, surface water, and groundwater at JBER through fire training, unplanned releases, and fire suppression testing and training. Laboratory analyses conducted as part of the SIs included 12 per- and polyfluorinated compounds, including the following three PFAS compounds:

- PFBS
- PFOA
- PFOS

PFAS analytes were all detected at least once in soil and at least once in groundwater. Much of the mass of PFAS released in AFFF is expected to accumulate at or near the point of release near the ground surface, with only the more mobile compounds migrating through the soil column and to the water table. These more mobile compounds may be present in the release area, or they may be created after the release by conversion of precursor compounds to detectable compounds by biological activity. Note that the compounds analyzed are biased to mobile compounds since the Unregulated Contaminant Monitoring Regulation 3 list compounds were listed because they were detected in water (EPA, 2012); and the two fluorotelomer sulfonates are included because they are also commonly detected in groundwater at AFFF areas. The subsurface geology at JBER, which primarily consists of sands and gravels, may contribute to the widespread detection of these compounds in groundwater because it may not retain contaminants as readily as more fine-grained soils.

4.1 Soil (Surface and Subsurface) and Sediment Exposure Pathway

Twenty-nine primary soil samples and four FDs were collected from 29 soil borings within 24 of the 26 AFFF areas. Soil samples were not collected from C-17 Debris Storage Yard and FT023. PFOS and PFOA were not detected above screening levels in soil from the following 11 AFFF areas: AT052 (AT052-1), Fire Station 4 (FS4-1), SS044 (SS044-1), Corrosion Control Hangar (CCH-1 [primary and duplicate]), E3/AWACS Crash Location (E3-1), Hangar 6 (H6-1), Hangar 8 (H8-1), Hangar 10 (H10-1), Hangar 16 (H16-1), SS108 C-17 Crash Location (SS108-1), and the UC35A Cessna Crash Location (UC35A-1).

PFOA and/or PFOS concentrations were detected above the ADEC MTGW cleanup levels in 13 of the 24 AFFF areas, and PFOS was detected above the EPA RBSL and human health soil cleanup level in one soil sample from Fire Station 1 (FS1-1). PFOS and PFOA were detected at concentrations up to 8.9 and 0.025 mg/kg, respectively, at FS1-1.

Two sediment samples (one primary and one FD) were collected from one location in the downgradient-most open segment of the Cherry Hill Ditch (CHD-SD01). PFOS and PFOA were not detected above the EPA RBSLs or the ADEC cleanup levels.

PFAS were likely released to soil at concentrations posing potential risks to groundwater. Concentrations in soil are highest in the samples associated with Fire Station 1 (PFOS at 8.9J mg/kg), which are above the human health cleanup level. However, these highest soil concentrations do not coincide with the highest concentrations of PFAS in groundwater, which were detected at Fire Station 7 (PFOs at 24 µg/L), an order of magnitude higher than groundwater concentrations at Fire Station 1 (PFOS at 2.9 J µg/L). Fire Station 1 is located downgradient from Fire Station 7.

4.2 Groundwater Migration Pathway

Thirty-seven primary groundwater samples and five FD samples were collected from 29 new monitoring wells, three existing monitoring wells, and five seep locations. PFOS and PFOA were not detected above screening levels in groundwater from the following six of 26 AFFF areas: AT052, Fire Station 4, Fire Station 5, E3/AWACS Crash Location, FT023 Fire Training Area, and SS108 C-17 Crash Location. PFAS were also not detected above screening levels in selected wells within the Current Fire Training Area (CFTA-1 and CFTA-3) and Cherry Hill Ditch near the Base boundary (CHD-4A). These wells are screened at the shallowest depth that groundwater was encountered, with the top of screen depths ranging from 10.2 to 188.4 feet bgs because the depth to groundwater varies greatly across JBER.

PFOS and/or PFOA were detected above the EPA HA (0.07 µg/L) in groundwater from 20 AFFF areas (23 of 32 wells), and above the ADEC cleanup level (0.40 µg/L) in groundwater from 12 AFFF areas. The AFFF area with the highest concentrations of PFAS is Fire Station 7. PFOS was detected at an estimated concentration of 24 µg/L, and PFOA was detected at 5.1 µg/L. The AFFF area with the second highest concentrations of PFAS is Hangar 18, upgradient of Fire Station 7, with PFOS detected at 8.1 µg/L and PFOA detected at 0.23 µg/L (H18-1). The AFFF area with the third highest PFAS concentrations is the C-17 Debris Storage Yard, downgradient of Fire Station 7, with PFOS detected at an estimated concentration of 6.4 J µg/L and PFOA at 0.86 J µg/L (OU3MW-02). PFOS and PFOA were detected in groundwater at Cherry Hill Ditch monitoring well CHD-1, located approximately 4,700 feet upgradient of CHD-4A, at concentrations of 0.24 and 0.047 µg/L, respectively.

PFAS were detected at concentrations above the EPA HA at all five seep locations and above the ADEC cleanup level at OU5SP-11 and LF04SP-02. The highest concentrations of PFOS and PFOA were detected at OU5SP-11 at concentrations of 5 and 2.1 µg/L, respectively. PFOS and PFOA were detected at LF04SP-02 at concentrations of 0.42 and 0.39 µg/L, respectively.

PFAS were likely released to groundwater in these areas through fire training, unplanned releases, extinguishing fires, or AFFF system testing. The areas with the highest concentrations are Fire Station 7, Hangar 18 (approximately 2,200 feet upgradient of Fire Station 7), and C-17 Debris Storage Yard (approximately 8,300 feet downgradient of Fire Station 7) located at JBER-E. It is unknown whether upgradient AFFF areas are potentially impacting groundwater in downgradient AFFF areas or whether each AFFF area represents a separate affected area.

Groundwater at JBER is used as a backup drinking water source, and PFAS are present in groundwater above screening levels. None of the four JBER-R water supply wells and 12 of the 17 JBER-E water supply wells are located downgradient of the AFFF areas based on our current understanding of groundwater flow directions. Five JBER-E backup water supply wells are located downgradient of the AFFF areas based on our current understanding of groundwater flow directions. One well (Well 2) is located downgradient of the C-17 Debris Storage Yard, but it is screened in the deeper confined aquifer and is unlikely to be affected by the PFAS detected above screening levels in the shallow aquifer at the AFFF area because of the presence of a confining unit between the deeper and shallow aquifers. Wells 7, 24, 59, and 55 are also screened in the deep aquifer downgradient of the E3/AWACS Crash Location and SS108 C-17 Crash Location AFFF areas. As part of a separate effort from this SI, 18 water supply wells were sampled. Raw (pre-treatment) samples were collected at 16 of the wells and treated samples were collected at 14 of the wells. PFBS, PFOA, and PFOS were not detected in any of the 30 water supply well samples (Aide, 2016).

4.3 Surface Water Migration Pathway

Two surface water samples (primary and FD) were collected from one location in the downgradient-most open portion of the Cherry Hill Ditch (CHD-SW01), co-located with sediment sample location CHD-SD01 and approximately 300 feet upgradient from the western Base boundary. Two surface water samples (primary and FD) were also collected from one location within the Wetland Treatment Cell at ST037 (WCSW-02). PFOS was detected above the EPA HA and the ADEC cleanup level at both locations, with concentrations up to an estimated 4.9 µg/L (WCSW-02). PFOA was detected above the EPA HA and the ADEC cleanup level at one location, with concentrations up to 2.7 µg/L (WCSW-02).

Cherry Hill Ditch flows out the western side of the Base into the Knik Arm of the Cook Inlet. Data indicate that PFAS impacts to surface water likely originate from contaminated runoff. The ditch receives overland runoff from sheet flow and minor drainage channels from the flightline and most of the main JBER -E area, including the majority of the AFFF areas investigated on JBER-E. In addition to overland runoff, shallow groundwater could potentially be discharging into the ditch. PFASs were detected in groundwater at monitoring wells located near the upgradient open sections of the Cherry Hill Ditch (CHD-1, CHD-2, and CHD-3). A better understanding of the groundwater-surface water interaction is required to assess the potential impact from groundwater on Cherry Hill Ditch.

Data indicate that ST037 and LF004 seeps, located at the southern and southwestern Base boundaries, have been impacted by PFASs in groundwater and may be migrating offbase in groundwater and surface water. At ST037, depth to water above the bluff is approximately 30 feet bgs; and at the base of the bluff, the depth to water varies from about 0 to 8 feet bgs. At LF004, the shallow aquifer and the deeper aquifer from about 70 to 110 feet bgs discharge as seeps along the bluff face. A better understanding of the fate of groundwater from upgradient AFFF areas is required to assess the impacts from contaminants in groundwater.

SECTION 5

Summary and Conclusions

SIs were completed for 26 AFFF areas based on known or suspected releases of AFFF as documented in the Preliminary Assessment (AFCEC, 2015), and additional surface water and groundwater sampling of two seep locations near the Base boundaries was completed. Soil, sediment, groundwater, and surface water were sampled as specified in Section 3. All samples were analyzed for PFAS using method WS-LC-0025 (Method 537 Modified). Analytical results were compared with screening levels provided in Section 1.1.

Table 5-1 presents a summary of the PFBS, PFOA, and PFOS results for each media at the AFFF areas.

Conclusions for this SI at JBER are as follows:

- PFBS was not detected in any media above screening levels.
- PFOS and PFOA were not detected above screening levels in soil at the following 11 AFFF areas:
  - AT052
  - Fire Station 4
  - SS044
  - Corrosion Control Hangar
  - E3/AWACs Crash Location
  - Hangar 6
  - Hangar 8
  - Hangar 10
  - Hangar 16
  - SS108 C-17 Crash Location
  - UC-35A Cessna Crash Location
- PFOS and/or PFOA were detected in soil at concentrations above the ADEC MTGW cleanup levels at the following 13 AFFF areas:
  - AT029
  - Fire Station 5
  - Current AFFF Spray Test Area
  - Current Fire Training Area
  - Cherry Hill Ditch
  - Former AFFF Spray Test Area
  - Fire Station 1
  - Fire Station 6
  - Fire Station 7
  - Fire Suppression Foam Storage
  - Hangar 5
  - Hangar 17
  - Hangar 18
- PFOS was detected in soil at concentrations above the ADEC human health cleanup level and EPA RBSL at Fire Station 1.
- PFAS were not detected above screening levels in sediment in the downgradient-most open segment of Cherry Hill Ditch, but were detected at concentrations above screening levels in surface water collected from the same location, approximately 300 feet upgradient from the Base boundary.

- Cherry Hill Ditch does not appear to be a primary source of PFAS contamination. Impacts to the ditch are likely a result of overland flow from upgradient AFFF areas.
- PFAS were not detected at concentrations above the screening levels in groundwater at the following six AFFF areas:
  - AT052 Landfill Fire Training Area
  - Fire Station 4
  - Fire Station 5
  - E3/AWACS Crash Location
  - FT023 Fire Training Area
  - SS108 C-17 Crash Location
- PFAS were detected in groundwater at concentrations above the EPA HAs at the following 20 AFFF areas:
  - AT029
  - SS044
  - C-17 Debris Storage Yard
  - Current AFFF Spray Test Area
  - Corrosion Control Hangar
  - Current Fire Training Area
  - Cherry Hill Ditch
  - Former AFFF Spray Test Area
  - Fire Station 1
  - Fire Station 6
  - Fire Station 7
  - Fire Suppression Foam Storage
  - Hangar 5 Former AFFF Spray Test Area
  - Hangar 6
  - Hangar 8
  - Hangar 10
  - Hangar 16
  - Hangar 17
  - Hangar 18
  - UC35A Cessna Crash Location
- PFOA and/or PFOS were detected in groundwater at concentrations above the ADEC cleanup level at the following 12 AFFF areas:
  - C-17 Debris Storage Yard
  - Current AFFF Spray Test Area
  - Corrosion Control Hangar
  - Current Fire Training Area
  - Former AFFF Spray Test Area
  - Fire Station 1
  - Fire Station 6
  - Fire Station 7
  - Fire Suppression Foam Storage
  - Hangar 5 Former AFFF Spray Test Area
  - Hangar 6
  - Hangar 18

- Data indicate that ST037 and LF004 seeps, located at the southern and southwestern Base boundaries, have been impacted by PFAS in groundwater and may be migrating offbase in groundwater and surface water.
- No further action is required for the following four AFFF areas: AT052, Fire Station 4, E3/AWACS Crash Location, and SS108. PFAS were not detected in groundwater at concentrations above the screening levels or in soil at concentrations above ADEC MTGW soil cleanup levels or other, less stringent soil screening criteria.

SECTION 6

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Tables

Table 1-1. Regulatory Screening Levels

Site Inspection Report for Aqueous Film Forming Foam Areas at Joint Base Elmendorf-Richardson, Alaska

		EPA Screening Levels				ADEC Cleanup Levels		
Analyte	**Chemical Abstract Number**	**RSL [a] (mg/kg) *(soil/sediment)***	**RSL [a] (µg/L) *(groundwater/ surface water)***	**Risk-based (RBSL) [b] (mg/kg) *(soil/sediment)***	**HA [c, d] (µg/L) *(groundwater/ surface water)***	**HH [e] (mg/kg) *(soil/sediment)***	**MTGW [f] (mg/kg) *(soil/sediment)***	**Groundwater [g] (µg/L) *(groundwater/ surface water)***
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	NA	NA	1.26	0.07	1.6	0.003	0.40
Perfluorooctanoic acid (PFOA)	335-67-1	NA	NA	1.26	0.07	1.6	0.0017	0.40
Perfluorobutanesulfonic acid (PFBS)	375-73-5	1,600	380	NA	NA	NA	NA	NA

[a] EPA. 2016c. Regional Screening Levels. May. (https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-may- 2016)

[b] EPA risk-based screening levels calculated using the EPA Regional Screening Level calculator (https://epa-prgs.ornl.gov/cgi- bin/chemicals/csl_search).

[c] EPA. 2016a. "Drinking Water Health Advisory for Perfluorooctane Sulfonate (PFOS)." May. and EPA. 2016b. "Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA)." May.

[d] When both PFOA and PFOS are both present, the combined concentrations of PFOA and PFOS should be compared with the drinking water Health Advisory level.

[e] Alaska Department of Environment and Conservation. 2016. Table B1, Method Two Under-40-inch Zone Human Health Soil Cleanup Level. November.

[f] Alaska Department of Environment and Conservation. 2016. Table B1, Method Two Migration-to-Groundwater Soil Cleanup Level. November.

[g] Alaska Department of Environment and Conservation. 2016. Table C Groundwater Cleanup Level. November.

Notes:

µg/L = microgram(s) per liter
ADEC = Alaska Department of Environmental Conservation
EPA = United States Environmental Protection Agency
HA = Health Advisory
HH = human health
mg/kg = milligram(s) per kilogram
MTGW = migration to groundwater
NA = not applicable
RBSL = Risk Based Screening Level
RSL = Regional Screening Level

Table 2-1. AFFF Areas and Selection Rationale for Site Inspections

Site Inspection Report for Aqueous Film Forming Foam Areas at Joint Base Elmendorf-Richardson, Alaska

AFFF Area	Description	Area Selection Rationale
1	AT029 Ruff Road Fire Training Area	• Fire Training Area active 1940s to 1980s. • Unknown if AFFF used for training.
2	AT052 Landfill Fire Training Area	• Fire Training Area active 1985-1988. • Unknown if AFFF used for training.
3	Fire Station 4	• One response unit with 56 gallons AFFF concentration onsite. • No confirmed released of AFFF. • Small-scale nozzle testing possible outside of building.
4	Fire Station 5	• One response unit with 210 gallons AFFF concentration onsite. • No confirmed released of AFFF. • Small-scale nozzle testing possible outside of building.
5	SS044	• AFFF may have been used once to extinguish a waste oil disposal fire. • Conflicting accounts whether AFFF was used or not. • Volume of AFFF (if used) unknown.
6	C-17 Debris Storage Yard	• Debris from C-17 Crash location stored in gravel yard. • All debris piles covered in liners, but liners are in disrepair. • Unknown if debris was cleaned prior to transfer to storage yard.
7	Current AFFF Spray Test Area	• Nozzle testing area is unlined, gravel, bermed (snow dump). • 40 to 80 gallons of AFFF concentration estimated to be discharged to this area annually during the testing of systems on eight emergency response vehicles. • Has been used as AFFF spray test area since 2012.
8	Corrosion Control Hangar	• Has AFFF System. • One AFFF system activation since 2000; some AFF released outside hangar; some captured in building drains. • Volume of AFFF released outside unknown.
9	Current Fire Training Area	• Fire Training Area active since mid-1990s. • Unknown if AFFF used for training (but not suspected). • Possible location of testing portable AFFF units from Hangar 6.
10	Cherry Hill Ditch	• Receives stormwater runoff from flightline and majority of Elmendorf.
11	E3/AWACS Crash Location	• Located in uninhabited area 2,000 feet northeast of the runway. • AFFF used during emergency resonse (volume unknown). • Fate of AFFF used during response unknown, but likely was allowed to dissipate in place.

Table 2-1. AFFF Areas and Selection Rationale for Site Inspections

Site Inspection Report for Aqueous Film Forming Foam Areas at Joint Base Elmendorf-Richardson, Alaska

AFFF Area	Description	Area Selection Rationale
12	Former AFFF Spray Test Area	• Located on paved west ramp of flightline. • 40 to 80 gallons of AFFF concentrate estimated to be discharged to this area annually (from pre-2000 to 2010) during the testing of AFFF systems on eight emergency response vehicles. • AFFF allowed to dissipate onsite.
13	Fire Station 1	• AFFF testing previously performed in grassy area outside station. • Annual testing of eight trucks; estimates a total volume of 40 to 80 gallons of AFFF concentrate used annually. • UST previously used for AFFF storage beneath ruck bay; volume, contents, and condition unknown. • 896 gallons of AFFF concentrate onsite among three response vehicles.
14	Fire Station 6	• One response unit with 500 gallons AFFF concentration onsite. • Small-scale nozzle testing has been conducted outside of building.
15	Fire Station 7	• One response unit with 210 gallons AFFF concentration onsite. • No confirmed released of AFFF. • Small-scale nozzle testinghas been conducted outside of building.
16	Fire Suppression Foam Storage	• Some nozzle testing conducted southeast of building from 2010-2012; AFFF allowed to dissipate from low area on pavement. • Houses enough AFFF (in 55-gallon drums) to restock all emergency vehicles (current total 2,765 gallons AFFF concentrate). • Emergency vehicles re-stocked using hand pump from 55-gallon drum.
17	FT023 Fire Training Area	• Fire Training Area active early 1940s to 1980s. • Unknown if AFFF used for training.
18	Hangar 5 Former AFFF Spray Test Area	• On paved area southest of Hangar 5. • Runoff observed to "foam" in ditch north of intersection of 9th and Kenney Avenue. • Used from 2010 to 2012.
19	Hangar 6	• Three mobile AFFF system units (trailers). • Mobile AFFF units tested annually (discharging full 3.5 gallons concentrate each unit).
20	Hangar 8	• Current AFFF system. • Three known activations of AFFF system since 2000. • Total volume discharged 100 to 200 gallons AFFF concentrate each event. • AFFF captured by wastewater drain or released to pavement outside (unknown volume).
21	Hangar 10	• Fire suppression system currently being converted to HEF from AFFF. • Five or six activations of AFFF system since 2000. • Total volume discharged 100 to 400 gallons AFFF concentrate each event. • AFFF captured by wastewater drain or released to pavement outside (unknown volume).

Table 2-1. AFFF Areas and Selection Rationale for Site Inspections

Site Inspection Report for Aqueous Film Forming Foam Areas at Joint Base Elmendorf-Richardson, Alaska

AFFF Area	Description	Area Selection Rationale
22	Hangar 16	• Current AFFF system installed in mid-1990s. • Two activations of AFFF system since 2000. • Total volume discharged 325 gallons AFFF concentrate each event. • AFFF captured by wastewater drain or released to pavement outside (unknown volume).
23	Hangar 17	• Current AFFF system installed in mid-1990s. • Three or four activations of AFFF system since 2000. • Total volume discharged 5 gallons AFFF concentrate each event. • AFFF captured by wastewater drain or released to pavement outside (unknown volume).
24	Hangar 18	• Current AFFF system installed in mid-1990s. • Three to five activations of AFFF system since 2000. • Maximum volume discharged during one event was approximately 1,000 gallons AFFF concentrate. • AFFF captured by wastewater drain or released to pavement outside (unknown volume).
25	SS108 C-17 Crash Location	• Location is on both sides of railroad tracks in uninhabited area; 1,500 feet to nearest structure. • 220 gallons of AFFF concentrate used during response action. • No attempt to contain or clean up AFFF following response. • Remedial action in 2012 included removal of 1,544 cubic yards of fuel-contaminated soil from the location.
26	UC-35A Cessna Crash Location	• Located on east-west runway. • AFFF used as a precautionary measure during response (volume unknown). • AFFF was allowed to dissipate in place.

Notes:

AFFF = aqueous film forming foam
AWACS = Airborne Warning and Control System

Table 3-1. Summary of Samples Collected

Site Inspection Report for Aqueous Film Forming Foam Areas at Joint Base Elmendorf-Richardson, Alaska

AFFF Area	DQO	Location	Sample ID	Matrix	Sample Type	Depth (feet bgs)	Collection Date	WS-LC-0025
AFFF Area #1 - AT029	Downgradient shallow soil	AT029-1	16Q3AT029-1-SO-0	Soil	N	0 to 15	15-Jul-16	X
	Downgradient shallow soil	AT029-1	16Q3AT029-1-SO-1	Soil	FD	0 to 15	15-Jul-16	X
	Downgradient	AT029-1	16Q3AT029-1-GW-0	Groundwater	N	150 to 160	24-Aug-16	X
AFFF Area #2 - AT052	Downgradient shallow soil	AT052-1	16Q3AT052-1-SO-0	Soil	N	0 to 15	05-Jul-16	X
	Downgradient	AT052-1	16Q3AT052-1-GW-0	Groundwater	N	189.5 to 199.5	22-Aug-16	X
	Downgradient	AT052-1	16Q3AT052-1-GW-1	Groundwater	FD	189.5 to 199.5	22-Aug-16	X
AFFF Area #3 - Fire Station 4	Downgradient shallow soil	FS4-1	16Q3FS4-1-SO-0	Soil	N	0 to 15	06-Jul-16	X
	Downgradient	FS4-1	16Q3FS4-1-GW-0	Groundwater	N	62 to 72	19-Sep-16	X
	Downgradient	FS4-1	16Q3FS4-1-GW-1	Groundwater	FD	62 to 72	19-Sep-16	X
AFFF Area #4 - Fire Station 5	Downgradient shallow soil	FS5-1	16Q3FS5-1-SO-0	Soil	N	0 to 15	12-Jul-16	X
	Downgradient	FS5-1	16Q3FS5-1-GW-0	Groundwater	N	122.75 to 132.75	22-Aug-16	X
AFFF Area #5 - SS044	Downgradient shallow soil	SS044-1	16Q3SS044-1-SO-0	Soil	N	0.5 to 13	09-Jul-16	X
	Downgradient	SS044-1	16Q3SS044-1-GW-0	Groundwater	N	13 to 23	19-Aug-16	X
AFFF Area #6 - C-17 Debris Storage Yard	Downgradient	OU3MW-02	16Q3OU3MW-02-GW-0	Groundwater	N	29 to 39	23-Aug-16	X
AFFF Area #7 - Current AFFF Spray Test Area	Downgradient	CASTA-1	16Q3CASTA-1-GW-0	Groundwater	N	15 to 25	11-Aug-16	X
	Downgradient shallow soil	CASTA-1	16Q3CASTA-1-SO-0	Soil	N	0 to 15	13-Jul-16	X
	Crossgradient	OU5MW-39	16Q3OU5MW-39-GW-0	Groundwater	N	12 to 22	10-Aug-16	X
AFFF Area #8 - Corrosion Control Hangar	Downgradient shallow soil	CCH-1	16Q3CCH-1-SO-0	Soil	N	0 to 15	07-Jul-16	X
	Downgradient shallow soil	CCH-1	16Q3CCH-1-SO-1	Soil	FD	0 to 15	07-Jul-16	X
	Downgradient	CCH-1	16Q3CCH-1-GW-0	Groundwater	N	33 to 43	11-Aug-16	X
	Downgradient	CCH-1	16Q3CCH-1-GW-1	Groundwater	FD	33 to 43	11-Aug-16	X
AFFF Area #9 - Current Fire Training Area	Downgradient shallow soil	CFTA-1	16Q2CFTA-1-SO-0	Soil	N	0 to 15	29-Jun-16	X
	Downgradient shallow soil	CFTA-2	16Q2CFTA-2-SO-0	Soil	N	0 to 15	22-Jun-16	X
	Downgradient shallow soil	CFTA-3	16Q2CFTA-3-SO-0	Soil	N	0 to 15	24-Jun-16	X
	Downgradient	CFTA-1	16Q3CFTA-1-GW-0	Groundwater	N	70 to 80	10-Aug-16	X
	Downgradient	CFTA-2	16Q3CFTA-2-GW-0	Groundwater	N	71 to 81	08-Aug-16	X
	Downgradient	CFTA-3	16Q3CFTA-3-GW-0	Groundwater	N	69 to 79	10-Aug-16	X

Table 3-1. Summary of Samples Collected

Site Inspection Report for Aqueous Film Forming Foam Areas at Joint Base Elmendorf-Richardson, Alaska

AFFF Area	DQO	Location	Sample ID	Matrix	Sample Type	Depth (feet bgs)	Collection Date	WS-LC-0025
AFFF Area #10 - Cherry Hill Ditch	Downgradient	CHD-1	16Q3CHD-1-GW-0	Groundwater	N	10 to 20	18-Aug-16	X
	Downgradient	CHD-2	16Q3CHD-2-GW-0	Groundwater	N	10 to 20	18-Aug-16	X
	Downgradient	CHD-3	16Q3CHD-3-GW-0	Groundwater	N	7 to 17	18-Aug-16	X
	Downgradient	CHD-4A	16Q3CHD-4-GW-0	Groundwater	N	8.6 to 28.6	03-Oct-16	X
	Downgradient	CHD-4A	16Q3CHD-4-GW-1	Groundwater	FD	8.6 to 28.6	03-Oct-16	X
	Downgradient shallow soil	CHD-1	16Q3CHD-HA-1-SO-0	Soil	N	0 to 5	25-Aug-16	X
	Downgradient shallow soil	CHD-2	16Q3CHD-HA-2-SO-0	Soil	N	0 to 4.5	25-Aug-16	X
	Downgradient shallow soil	CHD-3	16Q3CHD-3-SO-0	Soil	N	0 to 1	28-Jul-16	X
	Downgradient shallow soil	CHD-3	16Q3CHD-3-SO-1	Soil	FD	0 to 1	28-Jul-16	X
	Downgradient shallow soil	CHD-4	16Q3CHD-4-SO-0	Soil	N	0 to 2	30-Jul-16	X
	Downgradient	CHD-SD01	16Q3CHD-SD01-SD-0	Sediment	N	0 to 0.5	21-Jul-16	X
	Downgradient	CHD-SD01	16Q3CHD-SD01-SD-1	Sediment	FD	0 to 0.5	21-Jul-16	X
	Downgradient	CHD-SW01	16Q3CHD-SW01-SW-0	Surface Water	N	0 to 0	21-Jul-16	X
	Downgradient	CHD-SW01	16Q3CHD-SW01-SW-1	Surface Water	FD	0 to 0	21-Jul-16	X
AFFF Area #11 - E3/AWACS Crash Location	Downgradient shallow soil	E3-1	16Q3E3-1-SO-0	Soil	N	15 to 30	12-Aug-16	X
	Downgradient	E3-1	16Q3E3-1-GW-0	Groundwater	N	82 to 92	23-Aug-16	X
AFFF Area #12 - Former AFFF Spray Test Area	Downgradient shallow soil	FASTA-1	16Q3FASTA-1-SO-0	Soil	N	0 to 15	11-Jul-16	X
	Downgradient	FASTA-1	16Q3FASTA-1-GW-0	Groundwater	N	24 to 34	09-Aug-16	X
AFFF Area #13 - Fire Station 1	Downgradient shallow soil	FS1-1	16Q3FS1-1-SO-0	Soil	N	0 to 15	20-Jul-16	X
	Downgradient	FS1-1	16Q3FS1-1-GW-0	Groundwater	N	24 to 34	15-Aug-16	X
AFFF Area #14 - Fire Station 6	Downgradient shallow soil	FS6-1	16Q3FS6-1-SO-0	Soil	N	0 to 15	09-Aug-16	X
	Downgradient	FS6-1	16Q3FS6-1-GW-0	Groundwater	N	51.4 to 61.4	12-Aug-16	X
AFFF Area #15 - Fire Station 7	Downgradient shallow soil	FS7-1	16Q3FS7-1-SO-0	Soil	N	0 to 15	18-Jul-16	X
	Downgradient	FS7-1	16Q3FS7-1-GW-0	Groundwater	N	30.6 to 40.6	17-Aug-16	X
AFFF Area #16 - Fire Suppression Foam Storage	Downgradient shallow soil	FSFS-1	16Q3FSFS-1-SO-0	Soil	N	0 to 15	14-Jul-16	X
	Downgradient	FSFS-1	16Q3FSFS-1-GW-0	Groundwater	N	30 to 40	19-Aug-16	X
AFFF Area #17 - FT023	Downgradient	FP56	16Q3FP56-GW-0	Groundwater	N	40to50	24-Aug-16	X
AFFF Area #18 - Hangar 5 AFFF Spray Test Area	Downgradient shallow soil	H5-1	16Q3H5-1-SO-0	Soil	N	0 to 15	13-Jul-16	X
	Downgradient	H5-1	16Q3H5-1-GW-0	Groundwater	N	27 to 37	11-Aug-16	X
AFFF Area #19 - Hangar 6	Downgradient shallow soil	H6-1	16Q3H6-1-SO-0	Soil	N	0 to 15	01-Aug-16	X
	Downgradient	H6-1	16Q3H6-1-GW-0	Groundwater	N	14 to 24	16-Aug-16	X

Table 3-1. Summary of Samples Collected

Site Inspection Report for Aqueous Film Forming Foam Areas at Joint Base Elmendorf-Richardson, Alaska

AFFF Area	DQO	Location	Sample ID	Matrix	Sample Type	Depth (feet bgs)	Collection Date	WS-LC-0025
AFFF Area #20 - Hangar 8	Downgradient shallow soil	H8-1	16Q3H8-1-SO-0	Soil	N	0 to 15	25-Jul-16	X
	Downgradient	H8-1	16Q3H8-1-GW-0	Groundwater	N	34.5 to 44.5	16-Aug-16	X
	Downgradient	H8-1	16Q3H8-1-GW-1	Groundwater	FD	34.5 to 44.5	16-Aug-16	X
AFFF Area #21 - Hangar 10	Downgradient shallow soil	H10-1	16Q3H10-1-SO-0	Soil	N	0 to 15	19-Jul-16	X
	Downgradient	H10-1	16Q3H10-1-GW-0	Groundwater	N	30 to 40	17-Aug-16	X
AFFF Area #22 - Hangar 16	Downgradient shallow soil	H16-1	16Q3H16-1-SO-0	Soil	N	0 to 15	26-Jul-16	X
	Downgradient	H16-1	16Q3H16-1-GW-0	Groundwater	N	47 to 57	12-Aug-16	X
AFFF Area #23 - Hangar 17	Downgradient shallow soil	H17-1	16Q3H17-1-SO-0	Soil	N	0 to 15	27-Jul-16	X
	Downgradient	H17-1	16Q3H17-1-GW-0	Groundwater	N	47 to 57	12-Aug-16	X
AFFF Area #24 - Hangar 18	Downgradient shallow soil	H18-1	16Q3H18-1-SO-0	Soil	N	0 to 15	23-Jul-16	X
	Downgradient shallow soil	H18-1	16Q3H18-1-SO-1	Soil	FD	0 to 15	23-Jul-16	X
	Downgradient	H18-1	16Q3H18-1-GW-0	Groundwater	N	36 to 46	17-Aug-16	X
AFFF Area #25 - SS108 C-17 Crash Site	Downgradient shallow soil	SS108-1	16Q3SS108-1-SO-0	Soil	N	0 to 15	11-Aug-16	X
	Downgradient	SS108-1	16Q3SS108-1-GW-0	Groundwater	N	71 to 81	22-Aug-16	X
AFFF Area #26 - Cessna UC-35A Crash Location	Downgradient shallow soil	UC35A-1	16Q3UC35A-1-SO-0	Soil	N	0 to 15	03-Aug-16	X
	Downgradient	UC35A-1	16Q3UC35A-1-GW-0	Groundwater	N	30 to 40	15-Aug-16	X
LF004	Downgradient	LF04SP-02	16Q4LF04SP-02-SP-0	Groundwater	N	0 to 0.1	11/22/2016	X
ST037	Downgradient	OU5SP-01	16Q4OU5SP-01-SP-0	Groundwater	N	0 to 0.1	11/22/2016	X
	Downgradient	OU5SP-02	16Q4OU5SP-02-SP-0	Groundwater	N	0 to 0.1	11/22/2016	X
	Downgradient	OU5CP-02	16Q4OU5CP-02-SP-0	Groundwater	N	0 to 0.1	11/22/2016	X
	Downgradient	OU5SP-11	16Q4OU5SP-11-SP-0	Groundwater	N	0 to 0.1	11/22/2016	X
	Downgradient	WCSW-02	16Q4WCSW-02-SP-0	Surface Water	N	0 to 0.1	11/22/2016	X
	Downgradient	WCSW-02	16Q4WCSW-02-SP-1	Surface Water	FD	0 to 0.1	11/22/2016	X

Notes:

AFFF = Aqueous Film Forming Foam
AWACS = Airborne Warning and Control System
bgs = below ground surface
DQO = data quality objective
FD = field duplciate
ID = identifier
N = primary sample
WS-LC-0025 = perfluorinated compounds

Table 3-2. Well Construction Details

Site Inspection Report for Aqueous Film Forming Foam Areas at Joint Base Elmendorf-Richardson, Alaska

AFFF Area	Monitoring Well ID	WGS84 (G1762) UTM Zone 6N		Ground Elevation (feet NAVD88)	Measuring Point Elevation (feet NAVD88)	Total Depth (feet bgs)	Screen Interval (feet bgs)	Depth to Groundwater (feet bmpe)	Groundwater Elevation (feet amsl)
		North (feet)	East (feet)						
AFFF Area #1 - AT029	AT029-1	6795707.261	358096.821	395.6	395.04	163.00	150.00 to 160.00	152.84	242.2
AFFF Area #2 - AT052	AT052-1	6796479.069	355814.636	342.3	341.75	199.50	189.5 to 199.5	173.68	168.07
AFFF Area #3 - Fire Station 4	FS4-1	6794086.110	355963.141	317.3	316.40	73.00	62.00 to 72.00	62.55	253.85
AFFF Area #4 - Fire Station 5	FS5-1	6794990.408	357330.135	358.8	357.67	134.00	122.75 to 132.75	122.35	235.32
AFFF Area #5 - SS044	SS044-1	6793375.186	353922.705	265.4	265.12	23.40	13.00 to 23.00	13.77	251.35
AFFF Area #6 - C-17 Debris Storage Yard	OU3MW-02	6792277.325	347632.147	Unknown	142.66	39.00	29.00 to 39.00	27.98	114.68
AFFF Area #7 - Current AFFF Spray Test Area	CASTA-1	6793165.605	347376.236	152.4	151.74	25.40	15.00 to 25.00	13.77	137.97
	OU5MW-39	6793351.518	347612.011	Unknown	169.76	22.72	12.00 to 22.00	12.05	157.71
AFFF Area #8 - Corrosion Control Hangar	CCH-1	6792695.173	347727.553	151.6	151.25	43.50	33.00 to 43.00	22.33	128.92
AFFF Area #9 - Current Fire Training Area	CFTA-1	6795018.489	351561.091	245.5	245.14	82.00	70.00 to 80.00	73.02	172.12
	CFTA-2	6795114.347	351537.084	242.3	242.13	82.00	71.00 to 81.00	74.65	167.48
	CFTA-3	6794908.207	351596.088	240.7	240.31	80.00	69.00 to 79.00	67.5	172.81
AFFF Area #10 - Cherry Hill Ditch	CHD-1	6793265.388	346432.911	143.3	142.84	21.00	10.00 to 20.00	10.96	131.88
	CHD-2	6792927.994	346451.983	140.6	143.70	21.00	10.00 to 20.00	11.59	132.11
	CHD-3	6792518.079	346047.328	130.6	133.53	17.50	7.00 to 17.00	8.89	124.64
	CHD-4	6792395.230	345487.570	30.9	30.32	21.00	10.00 to 20.00	9.00	21.32
	CHD-4A	6792394.776	345487.45	30.5	31.65	29.00	8.60 to 28.60	2.13	29.52
AFFF Area #11 - E3/AWACS Crash Location	E3-1	6795651.114	351890.657	252.3	252.10	93.00	82.00 to 92.00	85.79	166.31
AFFF Area #12 - Former AFFF Spray Test Area	FASTA-1	6793252.843	347119.774	151.3	150.57	34.50	24.00 to 34.00	11.55	139.02
AFFF Area #13 - Fire Station 1	FS1-1	6793775.905	348725.708	177.5	176.98	34.00	24.00 to 34.00	21.02	155.96
AFFF Area #14 - Fire Station 6	FS6-1	6794814.243	350886.873	218.6	218.19	63.00	51.40 to 61.40	48.22	169.97
AFFF Area #15 - Fire Station 7	FS7-1	6794462.954	348910.670	189.7	189.39	42.00	30.60 to 40.60	27.29	162.1
AFFF Area #16 - Fire Suppression Foam Storage	FSFS-1	6792460.335	347188.893	146.6	145.93	41.00	30.00 to 40.00	27.33	118.6

Table 3-2. Well Construction Details

Site Inspection Report for Aqueous Film Forming Foam Areas at Joint Base Elmendorf-Richardson, Alaska

AFFF Area	Monitoring Well ID	WGS84 (G1762) UTM Zone 6N		Ground Elevation (feet NAVD88)	Measuring Point Elevation (feet NAVD88)	Total Depth (feet bgs)	Screen Interval (feet bgs)	Depth to Groundwater (feet bmpe)	Groundwater Elevation (feet amsl)
		North (feet)	East (feet)						
AFFF Area #17 - FT023	FP56	6795414.189	349599.12	Unknown	207.9	50.00	40.00 to 50.00	41.46	166.44
AFFF Area #18 - Hangar 5 AFFF Spray Test Area	H5-1	6792748.091	348001.072	155.2	154.63	37.50	27.00 to 37.00	24.03	130.6
AFFF Area #19 - Hangar 6	H6-1	6793244.621	347928.993	157.7	157.50	24.50	14.00 to 24.00	12.59	144.91
AFFF Area #20 - Hangar 8	H8-1	6794378.740	348699.268	184.0	183.67	47.00	34.50 to 44.50	23.53	160.14
AFFF Area #21 - Hangar 10	H10-1	6794672.199	349179.437	192.0	191.38	43.00	30.00 to 40.00	27.63	163.75
AFFF Area #22 - Hangar 16	H16-1	6794577.395	350451.813	209.2	209.21	58.00	47.00 to 57.00	40.43	168.78
AFFF Area #23 - Hangar 17	H17-1	6794841.412	350632.531	214.3	214.27	58.00	47.00 to 57.00	44.94	169.33
AFFF Area #24 - Hangar 18	H18-1	6795114.565	349190.507	198.3	198.07	46.00	36.00 to 46.00	33.17	164.9
AFFF Area #25 - SS108 C-17 Crash Site	SS108-1	6795747.346	351881.654	242.7	242.22	85.50	71.00 to 81.00	75.67	166.55
AFFF Area #26 - Cessna UC-35A Crash Location	UC35A-1	6793995.473	349166.052	183.5	183.01	41.00	30.00 to 40.00	22.48	160.53

Notes:

amsl = above mean sea level
AFFF = aqueous film forming foam
AWACS = Airborne Warning and Control System
bgs = below ground surface
bmpe = below measuring point elevation
FTA = Fire Training Area
ID = identifier
UTM = Universal Transverse Mercator

Table 3-3. Summary of Perfluorinated Compounds Detected in Soil

Site Inspection Report for Aqueous Film Forming Foam Areas at Joint Base Elmendorf-Richardson, Alaska

Analyte	EPA RBSL	EPA RSL	ADEC HH Cleanup Level	ADEC MTGW Cleanup Level	AFFF Area:	AFFF Area #1 – AT029		AFFF Area #2 – AT052	AFFF Area #3 – Fire Station 4	AFFF Area #4 – Fire Station 5	AFFF Area #5 – SS044	AFFF Area #7 – Current AFFF Spray Test Area	AFFF Area #8 – Corrosion Control Hangar		AFFF Area #9 – Current Fire Training Area			AFFF Area #10 – Cherry Hill Ditch (SD052)				
					Location:	*AT029-1*		*AT052-1*	*FS4-1*	*FS5-1*	*SS044-1*	*CASTA-1*	*CCH-1*		*CFTA-1*	*CFTA-2*	*CFTA-3*	*CHD-1*	*CHD-2*	*CHD-3*		*CHD-4*
					Sample ID:	*16Q3AT029-1-SO-0*	*16Q3AT029-1-SO-1*	*16Q3AT052-1-SO-0*	*16Q3FS4-1-SO-0*	*16Q3FS5-1-SO-0*	*16Q3SS044-1-SO-0*	*16Q3CASTA-1-SO-0*	*16Q3CCH-1-SO-0*	*16Q3CCH-1-SO-1*	*16Q2CFTA-1-SO-0*	*16Q2CFTA-2-SO-0*	*16Q2CFTA-3-SO-0*	*16Q3CHD-HA-1-SO-0*	*16Q3CHD-HA-2-SO-0*	*16Q3CHD-3-SO-0*	*16Q3CHD-3-SO-1*	*16Q3CHD-4-SO-0*
					Sample Depth (feet bgs):	*0 to 15*	*0 to 15*	*0 to 15*	*0 to 15*	*0 to 15*	*0.5 to 13*	*0 to 15*	*0 to 15*	*0 to 15*	*0 to 15*	*0 to 15*	*0 to 15*	*0 to 5*	*0 to 4.5*	*0 to 1*	*0 to 1*	*0 to 2*
					Sample Date:	*7/15/2016*	*7/15/2016*	*7/5/2016*	*7/6/2016*	*7/12/2016*	*7/9/2016*	*7/13/2016*	*7/7/2016*	*7/7/2016*	*6/29/2016*	*6/22/2016*	*6/24/2016*	*8/25/2016*	*8/25/2016*	*7/28/2016*	*7/28/2016*	*7/30/2016*
PFC (mg/kg)																						
6:2FtS	--	--	--	--		0.001 UJ	0.001 UJ	0.001 U	0.001 U	0.0011 U	0.001 UJ	0.001 U	**0.033 J**	**0.034**	**0.019 J**	0.001 U	0.001 U	**0.0035 J**	**0.0032 J**	0.001 U	0.001 U	0.001 U
8:2FtS	--	--	--	--		**0.0066 J**	**0.0073 J**	0.002 U	0.002 U	0.0021 U	0.002 UJ	0.002 U	**0.0025 J**	**0.0028 J**	0.002 U	0.002 U	0.002 U	**0.0035 J**	**0.0045 J**	0.002 U	0.002 U	0.002 U
Perfluorobutanesulfonic acid (PFBS)	--	1,600[B]	--	--		0.00013 U	0.00013 U	0.00011 U	0.00012 U	**0.00016 J**	0.00014 UJ	**0.00045**	0.00015 U	0.00014 U	**0.00019 J**	0.0003 U	0.0003 U	0.00024 U	0.00022 U	0.00022 U	0.00024 U	0.00018 U
Perfluorodecanoic acid (PFDA)	--	--	--	--		0.0002 UJ	0.0002 UJ	0.0002 U	0.0002 U	0.00021 U	0.0002 UJ	**0.000088 J**	**0.000063 J**	**0.000067 J**	0.0002 U	**0.000091 J**	0.0002 U	**0.00079**	**0.00038**	**0.0001 J**	**0.000079 J**	**0.00049**
Perfluorododecanoic acid (PFDoA)	--	--	--	--		0.0003 UJ	0.0003 UJ	0.0003 U	0.0003 U	0.00032 U	0.0003 UJ	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	**0.00023 J**	**0.00099**	**0.00086**	0.0003 U	0.0003 UJ	**0.00026 J**
Perfluoroheptanoic acid (PFHpA)	--	--	--	--		0.0003 UJ	0.0003 UJ	0.0003 U	**0.000094 J**	**0.00024 J**	0.0003 UJ	**0.00035 J**	**0.00029 J**	**0.00027 J**	**0.00011 J**	0.0003 U	**0.00013 J**	**0.00038 J**	**0.00026 J**	**0.00015 J**	**0.00017 J**	**0.0045**
Perfluorohexanoic acid (PFHxA)	--	--	--	--		**0.0001 J**	**0.000097 J**	0.0002 U	**0.00011 J**	**0.00028 J**	0.0002 UJ	**0.0012**	**0.00047**	**0.00048**	**0.0017**	**0.00009 J**	**0.00031 J**	**0.00064**	**0.00045**	**0.00023 J**	**0.00021 J**	**0.00013 J**
Perfluorohexanesulfonic acid (PFHxS)	--	--	--	--		**0.00026 J**	**0.0003 J**	**0.00013 J**	**0.001**	**0.0009**	**0.00079 J**	**0.016**	**0.00058**	**0.00055**	**0.0061**	0.0003 U	**0.0011**	**0.00054**	**0.00058**	**0.00076**	**0.00071**	**0.00094**
Perfluorononanoic acid (PFNA)	--	--	--	--		0.0003 UJ	0.0003 UJ	0.0003 U	**0.000084 J**	**0.00046 J**	0.0003 UJ	**0.00012 J**	**0.00029 J**	**0.0003 J**	0.0003 U	**0.000095 J**	0.0003 U	**0.0002 J**	**0.00014 J**	**0.00016 J**	**0.00016 J**	**0.00024 J**
Perfluorooctanoic acid (PFOA)	1.26[A]	--	1.6[C]	0.0017[D]		**0.00034 J**	**0.00031 J**	**0.00016 J**	**0.00065**	**0.00065**	**0.0017 J**	**0.0032**	**0.00071**	**0.00067**	**0.0029 J**	**0.00015 J**	**0.00019 J**	**0.00064**	**0.0004 J**	**0.00024 J**	**0.00023 J**	**0.00048 J**
Perfluorooctanesulfonic acid (PFOS)	1.26[A]	--	1.6[C]	0.003[D]		**0.0034 J**	**0.0035 J**	**0.00035 J**	**0.0013**	**0.0071**	**0.00063 J**	**0.03**	**0.0021**	**0.0019**	**0.22 J**	**0.00021 J**	**0.0055**	**0.0038**	**0.0034**	**0.0025**	**0.0026**	**0.0047**
Perfluorotetradecanoic acid (PFTeA)	--	--	--	--		0.0002 UJ	0.0002 UJ	0.0002 U	0.0002 U	0.00021 U	0.0002 UJ	0.0001 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.00042 U	0.00022 U	0.0002 U	0.0002 U	**0.00014 J**
Perfluorotridecanoic acid (PFTriA)	--	--	--	--		0.0002 UJ	0.0002 UJ	0.0002 U	0.0002 U	0.00021 U	0.0002 UJ	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	**0.00011 J**	**0.00012 J**	0.0002 U	0.0002 U	0.0002 UJ	0.0002 U
Perfluoroundecanoic acid (PFUnA)	--	--	--	--		0.0003 UJ	0.0003 UJ	0.0003 U	0.0003 U	0.00032 U	0.0003 UJ	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	**0.00036 J**	**0.00032 J**	0.0003 U	0.0003 UJ	0.0003 U

Notes:

Bold indicates that the analyte was detected.

Very dark shading indicates that the result is above EPA RBSL.

Dark shading indicates that the result is above the ADEC HH Cleanup Level.

Light shading indicates that the result is above the ADEC MTGW Cleanup Level.

-- = screening level not established

ADEC = Alaska Department of Environmental Conservation

AFFF = aqueous film-forming foam

EPA = United States Environmental Protection Agency

FTA = Fire Training Area

FtS = fluorotelomer sulfonates

HH = human health

ID = identifier

J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

mg/kg = milligram(s) per kilogram

MTGW = migration to groundwater

PFC = perfluorinated compound

RBSL = Risk Based Screening Level

RSL = Regional Screening Level

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

Screening Level Sources:

[A] = EPA risk-based screening levels calculated using the EPA Regional Screening Level calculator (https://epa-prgs.ornl.gov/cgi- bin/chemicals/csl_search).

[B] = EPA Regional Screening Levels. 2016C. (https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-may-2016). May.

[C] = Alaska Department of Environment and Conservation. 2016. Table B1, Method Two Under-40-inch Zone Human Health Soil Cleanup Level. November.

[D]= Alaska Department of Environment and Conservation. 2016. Table B1, Method Two Migration-to-Groundwater Soil Cleanup Level. November.

Table 3-3. Summary of Perfluorinated Compounds Detected in Soil

Site Inspection Report for Aqueous Film Forming Foam Areas at Joint Base Elmendorf-Richardson, Alaska

Analyte	EPA RBSL	EPA RSL	ADEC HH Cleanup Level	ADEC MTGW Cleanup Level	AFFF Area:	AFFF Area #11 – E3/AWACS Crash Location	AFFF Area #12 – Former AFFF Spray Test Area	AFFF Area #13 – Fire Station 1	AFFF Area #14 – Fire Station 6	AFFF Area #15 – Fire Station 7	AFFF Area #16 – Fire Suppression Foam Storage	AFFF Area #18 – Hangar 5 Former AFFF Spray Test Area	AFFF Area #19 - Hangar 6	AFFF Area #20 – Hangar 8	AFFF Area #21 – Hangar 10	AFFF Area #22 – Hangar 16	AFFF Area #23 – Hangar 17	AFFF Area #24 – Hangar 18		AFFF Area #25 – SS108 C-17 Crash Location	AFFF Area #26 – UC35A Cessna Crash Location
					Location:	*E3-1*	*FASTA-1*	*FS1-1*	*FS6-1*	*FS7-1*	*FSFS-1*	*H5-1*	*H6-1*	*H8-1*	*H10-1*	*H16-1*	*H17-1*	*H18-1*		*SS108-1*	*UC35A-1*
					Sample ID:	*16Q3E3-1-SO-0*	*16Q3FASTA-1-SO-0*	*16Q3FS1-1-SO-0*	*16Q3FS6-1-SO-0*	*16Q3FS7-1-SO-0*	*16Q3FSFS-1-SO-0*	*16Q3H5-1-SO-0*	*16Q3H6-1-SO-0*	*16Q3H8-1-SO-0*	*16Q3H10-1-SO-0*	*16Q3H16-1-SO-0*	*16Q3H17-1-SO-0*	*16Q3H18-1-SO-0*	*16Q3H18-1-SO-1*	*16Q3SS108-1-SO-0*	*16Q3UC35A-1-SO-0*
					Sample Depth (feet bgs):	*15 to 30*	*0 to 15*	*0 to 15*	*0 to 15*	*0 to 15*	*0 to 15*	*0 to 15*	*0 to 15*	*0 to 15*	*0 to 15*	*0 to 15*	*0 to 15*	*0 to 15*	*0 to 15*	*0 to 15*	*0 to 15*
					Sample Date:	*8/12/2016*	*7/11/2016*	*7/20/2016*	*8/9/2016*	*7/18/2016*	*7/14/2016*	*7/13/2016*	*8/1/2016*	*7/25/2016*	*7/19/2016*	*7/26/2016*	*7/27/2016*	*7/23/2016*	*7/23/2016*	*8/11/2016*	*8/3/2016*
PFC (mg/kg)																					
6:2FtS	--	--	--	--		0.001 U	**0.0022 J**	**0.11 J**	**0.012**	0.00099 UJ	**0.027**	**0.002**	0.001 U	0.001 U	**0.00069 J**	0.001 U	0.001 U	**0.0017 J**	**0.002**	0.001 U	0.001 U
8:2FtS	--	--	--	--		0.002 U	**0.0058 J**	**0.16 J**	**0.0095**	0.002 UJ	**0.0014 J**	0.002 U	0.002 U	0.002 U	**0.001 J**	0.002 U	**0.00087 J**	**0.001 J**	**0.0013 J**	0.002 U	0.002 U
Perfluorobutanesulfonic acid (PFBS)	--	1,600[B]	--	--		0.00017 U	0.00014 UJ	**0.0057**	0.00062 U	0.00028 U	**0.0015**	**0.00038 J**	0.00017 U	0.00016 U	**0.0007**	0.00016 U	0.00018 U	0.00016 U	0.00016 U	0.00015 U	0.00015 U
Perfluorodecanoic acid (PFDA)	--	--	--	--		0.0002 U	0.0002 UJ	**0.0022**	**0.00021 J**	**0.000062 J**	**0.0015**	0.0002 U	**0.000066 J**	0.0002 U	**0.00087**	0.0002 U	**0.00019 J**	**0.00014 J**	**0.00017 J**	0.0002 U	0.0002 U
Perfluorododecanoic acid (PFDoA)	--	--	--	--		0.0003 U	0.0003 UJ	**0.00036 J**	0.0003 U	0.0003 UJ	**0.0013**	0.0003 U	0.0003 U	0.0003 U	**0.0014**	0.0003 U	**0.00023 J**	0.0003 U	0.0003 U	0.0003 U	0.0003 U
Perfluoroheptanoic acid (PFHpA)	--	--	--	--		**0.00022 J**	0.0003 UJ	**0.0041**	**0.00021 J**	**0.00016 J**	**0.0014**	**0.00026 J**	**0.00074**	0.0003 U	**0.00058**	0.0003 U	**0.00014 J**	**0.000089 J**	0.0003 U	**0.00011 J**	**0.00075**
Perfluorohexanoic acid (PFHxA)	--	--	--	--		0.0002 U	**0.00023 J**	**0.03**	**0.0021**	**0.00061 J**	**0.0016**	**0.00046**	0.0002 U	0.0002 U	**0.00057**	**0.000082 J**	**0.00012 J**	**0.0002 J**	**0.00022 J**	0.0002 U	0.0002 U
Perfluorohexanesulfonic acid (PFHxS)	--	--	--	--		0.0003 U	**0.00089 J**	**0.098**	**0.0098**	**0.0025 J**	**0.0029**	**0.0041**	**0.00014 J**	0.0003 U	**0.00052**	**0.00028 J**	**0.00038 J**	**0.00077**	**0.00091**	0.0003 U	0.0003 U
Perfluorononanoic acid (PFNA)	--	--	--	--		0.0003 U	0.0003 UJ	**0.0012 J**	**0.00026 J**	0.0003 UJ	**0.0014**	**0.0001 J**	0.0003 U	0.0003 U	**0.00065**	0.0003 U	**0.00014 J**	**0.00025 J**	**0.00031 J**	0.0003 U	0.0003 U
Perfluorooctanoic acid (PFOA)	1.26[A]	--	1.6[C]	0.0017[D]		0.0003 U	**0.00046 J**	**0.025**	**0.0009**	**0.00041 J**	**0.0021**	**0.00065**	**0.00017 J**	0.0003 U	**0.00076**	0.0003 U	**0.00018 J**	**0.00021 J**	**0.00024 J**	0.0003 U	0.0003 U
Perfluorooctanesulfonic acid (PFOS)	1.26[A]	--	1.6[C]	0.003[D]		**0.00027 J**	**0.015 J**	**8.9 J**	**0.27**	**0.0037 J**	**0.0018**	**0.024**	**0.0012**	**0.00087**	0.0017 U	**0.00054**	**0.012**	**0.027**	**0.033**	**0.00086**	**0.00042 J**
Perfluorotetradecanoic acid (PFTeA)	--	--	--	--		0.0002 U	0.0002 UJ	0.0002 U	0.0002 U	0.0002 UJ	**0.0012**	0.0002 U	0.0002 U	0.0002 U	**0.0012**	0.0002 U	**0.000065 J**	0.0002 U	0.0002 U	0.0002 U	**0.00014 J**
Perfluorotridecanoic acid (PFTriA)	--	--	--	--		0.0002 U	0.0002 UJ	0.0002 U	0.0002 U	0.0002 UJ	**0.001**	0.0002 U	0.0002 U	0.0002 U	**0.0011**	0.0002 U	0.0002 UJ	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Perfluoroundecanoic acid (PFUnA)	--	--	--	--		0.0003 U	0.0003 UJ	**0.00034 J**	**0.00013 J**	0.0003 UJ	**0.0015**	0.0003 U	0.0003 U	0.0003 U	**0.00092**	0.0003 U	**0.00016 J**	0.0003 U	0.0003 U	0.0003 U	0.0003 U

Notes:

Bold indicates that the analyte was detected.

Very dark shading indicates that the result is above EPA RBSL.

Dark shading indicates that the result is above the ADEC HH Cleanup Level.

Light shading indicates that the result is above the ADEC MTGW Cleanup Level.

-- = screening level not established

ADEC = Alaska Department of Environmental Conservation

AFFF = aqueous film-forming foam

EPA = United States Environmental Protection Agency

FTA = Fire Training Area

FtS = fluorotelomer sulfonates

HH = human health

ID = identifier

J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

mg/kg = milligram(s) per kilogram

MTGW = migration to groundwater

PFC = perfluorinated compound

RBSL = Risk Based Screening Level

RSL = Regional Screening Level

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

Screening Level Sources:

[A] = EPA risk-based screening levels calculated using the EPA Regional Screening Level calculator (https://epa-prgs.ornl.gov/cgi- bin/chemicals/csl_search).

[B] = EPA Regional Screening Levels. 2016C. (https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-may-2016). May.

[C] = Alaska Department of Environment and Conservation. 2016. Table B1, Method Two Under-40-inch Zone Human Health Soil Cleanup Level. November.

[D]= Alaska Department of Environment and Conservation. 2016. Table B1, Method Two Migration-to-Groundwater Soil Cleanup Level. November.

Table 3-4. Summary of Perfluorinated Compounds Detected in Sediment

Site Inspection Report for Aqueous Film Forming Foam Areas at Joint Base Elmendorf-Richardson, Alaska

					AFFF Area #10 - Cherry Hill Ditch (SD052)	
				Location:	*CHD-SD01*	
				Sample ID:	*16Q3CHD-SD01-SD-0*	*16Q3CHD-SD01-SD-1*
				Sample Depth (feet bgs):	*0 to 0.5*	*0 to 0.5*
				Sample Date:	*7/21/2016*	*7/21/2016*
Analyte	**EPA RBSL**	**EPA RSL**	**ADEC HH Cleanup Level**	**ADEC MTGW Cleanup Level**		
PFC (mg/kg)						
6:2FtS	--	--	--	--	0.001 U	0.00099 U
8:2FtS	--	--	--	--	0.002 U	0.002 U
Perfluorobutanesulfonic acid (PFBS)	--	1,600[B]	--	--	0.00013 U	0.00013 U
Perfluorodecanoic acid (PFDA)	--	--	--	--	0.0002 U	0.0002 U
Perfluorododecanoic acid (PFDoA)	--	--	--	--	0.0003 U	0.0003 U
Perfluoroheptanoic acid (PFHpA)	--	--	--	--	0.0003 U	0.0003 U
Perfluorohexanoic acid (PFHxA)	--	--	--	--	0.0002 U	0.0002 U
Perfluorohexanesulfonic acid (PFHxS)	--	--	--	--	**0.00013 J**	**0.00012 J**
Perfluorononanoic acid (PFNA)	--	--	--	--	0.0003 U	0.0003 U
Perfluorooctanoic acid (PFOA)	1.26[A]	--	1.6[C]	0.0017[D]	**0.00014 J**	**0.00023 J**
Perfluorooctanesulfonic acid (PFOS)	1.26[A]	--	1.6[C]	0.003[D]	0.0017 U	0.0017 U
Perfluorotetradecanoic acid (PFTeA)	--	--	--	--	0.0002 U	0.0002 U
Perfluorotridecanoic acid (PFTriA)	--	--	--	--	0.0002 U	0.0002 U
Perfluoroundecanoic acid (PFUnA)	--	--	--	--	0.0003 U	0.0003 U

Notes:

Bold indicates that the analyte was detected.

-- = screening level not established
ADEC = Alaska Department of Environmental Conservation
AFFF = aqueous film forming foam
bgs = below ground surface
EPA = United States Environmental Protection Agency
FtS = fluorotelomer sulfonates
HH = human health
ID = identifier
J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
mg/kg = milligram(s) per kilogram
MTGW = migration to groundwater
PFC = perfluorinated compound
RBSL = Risk Based Screening Level
RSL = Regional Screening Level
U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

Screening Level Sources:

[A] = EPA risk-based screening levels calculated using the EPA Regional Screening Level calculator (https://epa-prgs.ornl.gov/cgi- bin/chemicals/csl_search).

[B] = EPA Regional Screening Levels. 2016C. (https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-may-2016). May.

[C] = Alaska Department of Environment and Conservation. 2016. Table B1, Method Two Under-40-inch Zone Human Health Soil Cleanup Level. November.

[D]= Alaska Department of Environment and Conservation. 2016. Table B1, Method Two Migration-to-Groundwater Soil Cleanup Level. November.

Table 3-5. Summary of Perfluorinated Compounds Detected in Surface Water

Site Inspection Report for Aqueous Film Forming Foam Areas at Joint Base Elmendorf-Richardson, Alaska

			AFFF Area:	AFFF Area #10 – Cherry Hill Ditch (SD052)		ST037	
			Location:	*CHD-SW01*		*WCSW-02*	
			Sample ID:	*16Q3CHD-SW01-SW-0*	*16Q3CHD-SW01-SW-1*	*16Q4WCSW-02-SP-0*	*16Q4WCSW-02-SP-1*
			Sample Depth (feet bgs):	*0 to 0*	*0 to 0*	*0 to 0.1*	*0 to 0.1*
			Sample Date:	*7/21/2016*	*7/21/2016*	*11/22/2016*	*11/22/2016*
Analyte	**EPA HA**	**EPA RSL**	**ADEC Cleanup Level**				
PFC (µg/L)							
6:2FtS	--	--	--	0.0093 U	0.0097 U	**1.2 J**	**1.1 J**
8:2FtS	--	--	--	0.0093 U	0.0097 U	**0.021**	**0.021**
Perfluorobutanesulfonic acid (PFBS)	--	380[C]	--	**0.03 J**	**0.029**	**1**	**0.91**
Perfluorodecanoic acid (PFDA)	--	--	--	**0.0027 J**	**0.003**	**0.00091 J**	**0.00099 J**
Perfluorododecanoic acid (PFDoA)	--	--	--	**0.00055 J**	0.0019 U	0.0021 U	0.002 U
Perfluoroheptanoic acid (PFHpA)	--	--	--	**0.03 J**	**0.028**	**0.7**	**0.62**
Perfluorohexanoic acid (PFHxA)	--	--	--	**0.088 J**	**0.084**	**3.5**	**3.1**
Perfluorohexanesulfonic acid (PFHxS)	--	--	--	**0.24 J**	**0.24**	**5.4**	**5**
Perfluorononanoic acid (PFNA)	--	--	--	**0.004 J**	**0.0044**	**0.015**	**0.013**
Perfluorooctanoic acid (PFOA)	0.07[A]	--	0.40[D]	**0.093 J**	**0.1**	**2.7**	**2.4**
Perfluorooctanesulfonic acid (PFOS)	0.07[B]	--	0.40[D]	**0.44**	**0.48**	**4.9**	**4.4**
PFOS + PFOA (calculation)	0.07	--	--	**0.533 J**	**0.58**	**7.6**	**6.8**
Perfluorotetradecanoic acid (PFTeA)	--	--	--	0.00093 UJ	0.00097 U	**0.001 J**	**0.00042 J**
Perfluorotridecanoic acid (PFTriA)	--	--	--	0.0019 UJ	0.0019 U	0.0021 U	0.002 U
Perfluoroundecanoic acid (PFUnA)	--	--	--	**0.00089 J**	**0.00085 J**	0.0021 U	0.002 U

Notes:

Bold indicates that the analyte was detected.

Dark shading indicates that the result is above the ADEC Cleanup Level.

Light shading indicates that the result is above the EPA HA.

-- = screening level not established
µg/L = microgram(s) per liter
ADEC = Alaska Department of Environmental Conservation
AFFF = Aqueous Film Forming Foam
bgs = below ground surface
EPA = United States Environmental Protection Agency
FtS = fluorotelomer sulfonates
HA = health advisory
ID = identifier
PFC = perfluorinated compound
RSL = Regional Screening Level
J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

Screening Level and Cleanup Level Sources

[A] = United States Environmental Protection Agency (EPA). 2016. Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA), EPA 822-R-16-005. Washington, DC. Office of Water Health and Ecological Criteria Division.

[B] = United States Environmental Protection Agency (EPA). 2016. Drinking Water Health Advisory for Perfluorooctane Sulfonate (PFOS), EPA 822-R-16-004. Washington, DC. Office of Water Health and Ecological Criteria Division.

[C] = EPA. 2016c. Regional Screening Levels. May. (https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-may-2016)

[D] = Alaska Department of Environment and Conservation. 2016. Table C Groundwater Cleanup Level. November.

Table 3-6. Summary of Perfluorinated Compounds Detected in Groundwater

Site Inspection Report for Aqueous Film Forming Foam Areas at Joint Base Elmendorf-Richardson, Alaska

				AFFF Area:	**AFFF Area #1 – AT029**	**AFFF Area #2 – AT052**		**AFFF Area #3 – Fire Station 4**		**AFFF Area #4 – Fire Station 5**	**AFFF Area #5 – SS044**	**AFFF Area #6 – C-17 Debris Storage Yard**	**AFFF Area #7 – Current AFFF Spray Test Area**		**AFFF Area #8 – Corrosion Control Hangar**		**AFFF Area #9 – Current Fire Training Area**			**AFFF Area #10 – Cherry Hill Ditch (SD052)**					**AFFF Area #11 – E3/AWACS Crash Location**
				Location:	*AT029-1*	*AT052-1*		*FS4-1*		*FS5-1*	*SS044-1*	*OU3MW-02*	*CASTA-1*	*OU5MW-39*	*CCH-1*		*CFTA-1*	*CFTA-2*	*CFTA-3*	*CHD-1*	*CHD-2*	*CHD-3*	*CHD-4A*		*E3-1*
				Sample ID:	*16Q3AT029-1-GW-0*	*16Q3AT052-1-GW-0*	*16Q3AT052-1-GW-1*	*16Q3FS4-1-GW-0*	*16Q3FS4-1-GW-1*	*16Q3FS5-1-GW-0*	*16Q3SS044-1-GW-0*	*16Q3OU3MW-02-GW-0*	*16Q3CASTA-1-GW-0*	*16Q3OU5MW-39-GW-0*	*16Q3CCH-1-GW-0*	*16Q3CCH-1-GW-1*	*16Q3CFTA-1-GW-0*	*16Q3CFTA-2-GW-0*	*16Q3CFTA-3-GW-0*	*16Q3CHD-1-GW-0*	*16Q3CHD-2-GW-0*	*16Q3CHD-3-GW-0*	*16Q3CHD-4-GW-0*	*16Q3CHD-4-GW-1*	*16Q3E3-1-GW-0*
				Sample Depth (feet bgs):	*150 to 160*	*189.5 to 199.5*	*189.5 to 199.5*	*62 to 72*	*62 to 72*	*122.75 to 132.75*	*13 to 23*	*29 to 39*	*15 to 25*	*12 to 22*	*33 to 43*	*33 to 43*	*70 to 80*	*71 to 81*	*69 to79*	*10 to 20*	*10 to 20*	*7 to 17*	*8.6 to 28.6*	*8.6 to 28.6*	*82 to 92*
				Sample Date:	*8/24/2016*	*8/22/2016*	*8/22/2016*	*9/19/2016*	*9/19/2016*	*8/22/2016*	*8/19/2016*	*8/23/2016*	*8/11/2016*	*8/10/2016*	*8/11/2016*	*8/11/2016*	*8/10/2016*	*8/8/2016*	*8/10/2016*	*8/18/2016*	*8/18/2016*	*8/18/2016*	*10/3/2016*	*10/3/2016*	*8/23/2016*
Analyte	**EPA HA**	**EPA RSL**	**ADEC Cleanup Level**																						
PFC (µg/L)																									
6:2FtS	--	--	--		0.0089 U	0.0089 U	0.009 U	0.0098 U	0.0098 U	**0.035**	0.0088 U	**0.79 J**	**1.6 J**	**0.05**	**0.6 J**	**0.57 J**	0.0092 U	**0.56 J**	0.0091 U	**0.013 J**	**0.016 J**	**0.022**	0.0099 UJ	0.0099 UJ	0.009 UJ
8:2FtS	--	--	--		0.0089 U	0.0089 U	0.009 U	0.0098 U	0.0098 U	0.0085 U	0.0088 U	**0.0043 J**	**0.13**	**0.011 J**	**0.006 J**	**0.0056 J**	0.0092 U	**0.0061 J**	0.0091 U	0.0097 U	0.01 U	0.0096 U	0.0099 UJ	0.0099 UJ	0.009 U
Perfluorobutanesulfonic acid (PFBS)	--	380[C]	--		0.0024 U	**0.029**	**0.044**	**0.0092**	**0.0093**	**0.063**	**0.012**	**0.31**	**0.13**	**0.015**	**0.14**	**0.14**	**0.012**	**0.1**	**0.0098**	**0.014**	**0.013**	**0.062**	0.0019 U	0.00089 U	0.0053 U
Perfluorodecanoic acid (PFDA)	--	--	--		0.00089 U	0.00089 U	0.0009 U	0.00098 U	0.00098 U	0.00085 U	**0.0075**	**0.00041 J**	**0.027**	**0.0079**	0.00092 U	0.0009 U	0.00092 U	0.0009 U	0.00091 U	0.00097 U	**0.0083**	**0.0024**	**0.0028**	**0.0029**	0.0009 U
Perfluorododecanoic acid (PFDoA)	--	--	--		0.0018 U	0.0018 U	0.0018 U	0.002 U	0.002 U	0.0017 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	0.0019 U	0.00069 U	0.0019 U	0.0019 U	0.0019 U	0.0018 U
Perfluoroheptanoic acid (PFHpA)	--	--	--		**0.0032**	**0.0074**	**0.0078**	**0.0053**	**0.0053**	**0.023**	**0.032**	**0.3**	**0.27**	**0.086**	**0.19**	**0.19**	**0.001 J**	**0.025**	**0.0045**	**0.012**	**0.021**	**0.06**	**0.0027**	**0.0026**	**0.0025**
Perfluorohexanoic acid (PFHxA)	--	--	--		**0.013**	**0.079**	**0.082**	**0.013**	**0.012**	**0.079**	**0.048**	**1.5 J**	**1.3**	**0.22**	**0.81**	**0.85**	**0.011**	**0.2**	**0.022**	**0.029**	**0.067**	**0.18**	0.0046 U	0.0047 U	**0.0092**
Perfluorohexanesulfonic acid (PFHxS)	--	--	--		**0.053**	0.0038 U	0.0027 U	**0.041**	**0.043**	**0.35**	**0.093**	**2.2 J**	**1.4**	**0.15**	**0.91**	**0.95**	**0.012**	**0.31**	**0.028**	**0.12**	**0.11**	**0.34**	**0.013**	**0.013**	**0.025**
Perfluorononanoic acid (PFNA)	--	--	--		0.0018 U	0.0018 U	0.0018 U	0.002 U	0.002 U	0.0017 U	**0.0059**	**0.0087**	**0.03**	**0.0082**	**0.0048**	**0.0045**	0.0018 U	**0.0033**	0.0018 U	**0.0016 J**	**0.0048**	**0.0069**	**0.0016 J**	**0.0015 J**	0.0018 U
Perfluorooctanoic acid (PFOA)	0.07[A]	--	0.40[D]		**0.11**	0.0023 U	0.0019 U	**0.014**	**0.014**	**0.023**	**0.055**	**0.86 J**	**0.61**	**0.18**	**0.52**	**0.56**	0.00075 U	**0.044**	0.0023 U	**0.047**	**0.078**	**0.19**	0.0069 U	0.0073 U	0.0044 U
Perfluorooctanesulfonic acid (PFOS)	0.07[B]	--	0.40[D]		0.0027 U	0.0019 U	0.0011 U	0.013 U	0.014 U	0.018 U	**0.22**	**6.4 J**	**3.3**	**0.52**	**1.5**	**1.5**	0.0021 U	**1.4**	0.002 U	**0.24**	**0.21**	**0.34**	0.03 U	0.03 U	0.0051 U
PFOS + PFOA (calculation)	0.07	--	--		**0.11**	0.0023 U	0.0019 U	**0.014**	**0.014**	**0.023**	**0.275**	**7.26 J**	**3.91**	**0.7**	**2.02**	**2.06**	0.0021 U	**1.444**	0.002 U	**0.287**	**0.288**	**0.53**	0.03 U	0.03 U	0.0051 U
Perfluorotetradecanoic acid (PFTeA)	--	--	--		0.00073 U	0.0015 U	0.0038 U	0.00053 U	0.0013 U	0.002 U	0.0026 U	0.00065 U	0.00091 U	0.00092 U	0.0024 U	0.0009 U	0.00092 U	0.0009 U	0.00091 U	0.00097 U	0.001 U	0.00096 U	0.00075 U	0.0008 U	0.00056 U
Perfluorotridecanoic acid (PFTriA)	--	--	--		0.0018 U	0.0018 U	0.0018 U	0.002 U	0.002 U	0.0017 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	0.0019 U	0.002 U	0.0019 U	0.0019 U	0.0019 U	0.0018 U
Perfluoroundecanoic acid (PFUnA)	--	--	--		0.0018 U	0.0018 U	0.0018 U	0.002 U	0.002 U	0.0017 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	0.0019 U	**0.0014 J**	0.0019 U	0.0019 U	0.0019 U	0.0018 U

Notes:

Bold indicates that the analyte was detected.

Dark shading indicates that the result is above the ADEC Cleanup Level.

Light shading indicates that the result is above the EPA HA.

-- = screening level not established
µg/L = microgram(s) per liter
ADEC = Alaska Department of Environmental Conservation
AFFF = aqueous film-forming foam
AWACS = Airborne Warning and Control System
bgs = below ground surface
EPA = United States Environmental Protection Agency
FtS = fluorotelomer sulfonates
HA = health advisory
ID = identifier
PFC = perfluorinated compound
RSL = Regional Screening Level
J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample
U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit

Screening Level and Cleanup Level Sources

[A] = United States Environmental Protection Agency (EPA). 2016. Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA), EPA 822-R-16-005. Washington, DC. Office of Water Health and Ecological Criteria Division.
[B] = United States Environmental Protection Agency (EPA). 2016. Drinking Water Health Advisory for Perfluorooctane
[C] = EPA. 2016c. Regional Screening Levels. May. (https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-may-2016)
[D] = Alaska Department of Environment and Conservation. 2016. Table C Groundwater Cleanup Level. November.

Table 3-6. Summary of Perfluorinated Compounds Detected in Groundwater

Site Inspection Report for Aqueous Film Forming Foam Areas at Joint Base Elmendorf-Richardson, Alaska

			AFFF Area:	**AFFF Area #12 – Former AFFF Spray Test Area**	**AFFF Area #13 – Fire Station 1**	**AFFF Area #14 – Fire Station 6**	**AFFF Area #15 – Fire Station 7**	**AFFF Area #16 – Fire Suppression Foam Storage**	**AFFF Area #17 – FT023**	**AFFF Area #18 – Hangar 5 Former AFFF Spray Test Area**	**AFFF Area #19 – Hangar 6**	**AFFF Area #20 – Hangar 8**		**AFFF Area #21 – Hangar 10**	**AFFF Area #22 – Hangar 16**	**AFFF Area #23 – Hangar 17**	**AFFF Area #24 – Hangar 18**	**AFFF Area #25 – SS108 C-17 Crash Location**	**AFFF Area #26 – UC35A Cessna Crash Location**	**ST037**				**LF004**
			Location:	*FASTA-1*	*FS1-1*	*FS6-1*	*FS7-1*	*FSFS-1*	*FP56*	*H5-1*	*H6-1*	*H8-1*		*H10-1*	*H16-1*	*H17-1*	*H18-1*	*SS108-1*	*UC35A-1*	*OU5SP-01*	*OU5SP-02*	*OU5SP-11*	*OU5CP-02*	*LF04SP-02*
			Sample ID:	*16Q3FASTA-1-GW-0*	*16Q3FS1-1-GW-0*	*16Q3FS6-1-GW-0*	*16Q3FS7-1-GW-0*	*16Q3FSFS-1-GW-0*	*16Q3FP56-GW-0*	*16Q3H5-1-GW-0*	*16Q3H6-1-GW-0*	*16Q3H8-1-GW-0*	*16Q3H8-1-GW-1*	*16Q3H10-1-GW-0*	*16Q3H16-1-GW-0*	*16Q3H17-1-GW-0*	*16Q3H18-1-GW-0*	*16Q3SS108-1-GW-0*	*16Q3UC35A-1-GW-0*	*16Q4OU5SP-01-SP-0*	*16Q4OU5SP-02-SP-0*	*16Q4OU5SP-11-SP-0*	*16Q4OU5CP-02-SP-0*	*16Q4LF04SP-02-SP-0*
			Sample Depth (feet bgs):	*24 to 34*	*24 to 34*	*51.4 to 61.4*	*30.6 to 40.6*	*30 to 40*	*40 to 50*	*27 to 37*	*14 to 24*	*34.5 to 44.5*	*34.5 to 44.5*	*30 to 40*	*47 to 57*	*47 to 57*	*36 to 46*	*71 to 81*	*30 to 40*	*0 to 0.1*	*0 to 0.1*	*0 to 0.1*	*0 to 0.1*	*0 to 0.1*
			Sample Date:	*8/9/2016*	*8/15/2016*	*8/12/2016*	*8/17/2016*	*8/19/2016*	*8/24/2016*	*8/11/2016*	*8/16/2016*	*8/16/2016*	*8/16/2016*	*8/17/2016*	*8/12/2016*	*8/12/2016*	*8/17/2016*	*8/22/2016*	*8/15/2016*	*11/22/2016*	*11/22/2016*	*11/22/2016*	*11/22/2016*	*11/22/2016*
Analyte	**EPA HA**	**EPA RSL**	**ADEC Cleanup Level**																					
PFC (µg/L)																								
6:2FtS	--	--	--	**0.5 J**	**0.22**	**0.02**	**1.7 J**	**0.19 J**	**0.057 J**	**1.3 J**	**0.11**	**0.14**	**0.15**	**0.061**	0.0099 U	0.0099 U	**1.5 J**	0.0089 U	0.0092 U	**0.0097 J**	**0.027 J**	**0.93 J**	**0.013 J**	**0.056 J**
8:2FtS	--	--	--	0.009 U	**0.085**	0.0095 U	**0.53 J**	0.0087 U	0.0087 U	**0.012 J**	0.0095 U	**0.011 J**	**0.0099 J**	0.0099 U	0.0099 U	0.0099 U	**0.006 J**	0.0089 U	0.0092 U	0.01 U	0.01 U	**0.019 J**	0.01 U	0.01 U
Perfluorobutanesulfonic acid (PFBS)	--	380[C]	--	**0.29**	**0.098**	0.006 U	**1**	**0.48**	0.007 U	**0.63**	**0.025**	**0.0096**	**0.012**	**0.025**	**0.084**	**0.018**	**0.14**	**0.0083**	**0.023**	**0.098**	**0.096**	**0.46**	**0.081**	**0.047**
Perfluorodecanoic acid (PFDA)	--	--	--	0.0009 U	**0.00058 J**	**0.00043 J**	**0.0044**	**0.0026**	**0.00052 J**	**0.0036**	0.0012 U	0.001 U	0.00095 U	0.00099 U	**0.00044 J**	0.00099 U	0.00096 U	0.00089 U	0.00092 U	0.001 U	0.001 U	**0.00062 J**	0.001 U	0.001 U
Perfluorododecanoic acid (PFDoA)	--	--	--	0.0018 U	0.0019 U	0.0019 U	0.002 U	0.0017 U	0.0017 U	0.0018 U	0.0019 U	0.0021 U	0.0019 U	0.002 U	0.002 U	0.002 U	0.0019 U	0.0018 U	0.0018 U	0.002 U	0.002 U	0.0021 U	0.002 U	0.002 U
Perfluoroheptanoic acid (PFHpA)	--	--	--	**0.18**	**0.22**	**0.0076**	**0.97**	**0.2**	**0.0084**	**0.45**	**0.15**	**0.068**	**0.069**	**0.075**	**0.021**	**0.013**	**0.092**	**0.0058**	**0.05**	**0.17**	**0.22**	**0.46**	**0.22**	**0.033**
Perfluorohexanoic acid (PFHxA)	--	--	--	**1.1**	**0.77**	**0.018 J**	**4.7**	**1.1**	**0.02**	**2.5**	**0.34**	**0.18**	**0.18**	**0.17**	**0.086**	**0.038**	**0.93**	**0.018**	**0.15**	**0.63**	**0.81**	**1.8**	**0.69**	**0.13**
Perfluorohexanesulfonic acid (PFHxS)	--	--	--	**1.4 J**	**0.75 J**	**0.042**	**8.5 J**	**2.1**	**0.052**	**2.5**	**0.31**	**0.1**	**0.11**	**0.33**	**0.28**	**0.074**	**1.5 J**	**0.057**	**0.14**	**0.3**	**0.5**	**4.2**	**0.46**	**0.22**
Perfluorononanoic acid (PFNA)	--	--	--	**0.0026**	**0.012**	**0.00067 J**	**0.028 J**	**0.0078**	0.0017 U	**0.0075**	**0.0067**	**0.0017 J**	**0.0017 J**	**0.0013 J**	**0.00084 J**	**0.00088 J**	**0.0045**	0.0018 U	**0.0037**	0.002 U	**0.0014 J**	**0.011**	**0.0014 J**	**0.0022 J**
Perfluorooctanoic acid (PFOA)	0.07[A]	--	0.40[D]	**1.7 J**	**0.72**	**0.0097 J**	**5.1**	**0.62**	**0.03**	**1.1**	**0.26**	**0.037**	**0.038**	**0.2**	**0.033**	**0.015**	**0.23**	**0.0089**	**0.11**	**0.12**	**0.19**	**2.1**	**0.19**	**0.039**
Perfluorooctanesulfonic acid (PFOS)	0.07[B]	--	0.40[D]	**1.8 J**	**2.9 J**	**0.54 J**	**24**	**0.95**	0.035 U	**1.9**	**0.95**	**0.14**	**0.17**	**0.28**	**0.23**	**0.27**	**8.1**	0.0099 U	**0.37**	**0.02**	**0.20**	**5.0**	**0.25**	**0.42**
PFOS + PFOA (calculation)	0.07	--	--	**3.5 J**	**3.62 J**	**0.5497 J**	**29.1**	**1.57**	**0.03**	**3**	**1.21**	**0.177**	**0.208**	**0.48**	**0.243**	**0.285**	**8.33**	**0.0089**	**0.48**	**0.14**	**0.39**	**7.1**	**0.44**	**0.459**
Perfluorotetradecanoic acid (PFTeA)	--	--	--	0.0009 U	0.00096 U	0.00095 U	0.001 U	0.0014 U	0.00089 U	0.00091 U	0.00095 U	**0.0064**	0.00095 U	0.00099 U	0.0055 U	0.00099 U	0.00096 U	0.0036 U	0.00092 U	**0.00049 J**	**0.00073 J**	**0.00054 J**	**0.00067 J**	**0.00044 J**
Perfluorotridecanoic acid (PFTriA)	--	--	--	0.0018 U	0.0019 U	**0.00063 J**	0.002 U	0.0017 U	0.0017 U	0.0018 U	0.0019 U	0.0021 U	0.0019 U	0.002 U	**0.00059 J**	0.002 U	0.0019 U	**0.00066 J**	0.0018 U	0.002 U	0.002 U	0.0021 U	0.002 U	0.002 U
Perfluoroundecanoic acid (PFUnA)	--	--	--	0.0018 U	0.0019 U	0.0019 U	0.002 U	0.0017 U	0.0017 U	0.0018 U	0.0019 U	0.0021 U	0.0019 U	0.002 U	0.002 U	0.002 U	0.0019 U	0.0018 U	0.0018 U	0.002 U	0.002 U	0.0021 U	0.002 U	0.002 U

Notes:

Bold indicates that the analyte was detected.

Dark shading indicates that the result is above the ADEC Cleanup Level.

Light shading indicates that the result is above the EPA HA.

-- = screening level not established
µg/L = microgram(s) per liter
ADEC = Alaska Department of Environmental Conservation
AFFF = aqueous film-forming foam
AWACS = Airborne Warning and Control System
bgs = below ground surface
EPA = United States Environmental Protection Agency
FtS = fluorotelomer sulfonates
HA = health advisory
ID = identifier
PFC = perfluorinated compound
RSL = Regional Screening Level
J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample
U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit

Screening Level and Cleanup Level Sources

[A] = United States Environmental Protection Agency (EPA). 2016. Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA), EPA 822-R-16-005. Washington, DC. Office of Water Health and Ecological Criteria Division.
[B] = United States Environmental Protection Agency (EPA). 2016. Drinking Water Health Advisory for Perfluorooctane
[C] = EPA. 2016c. Regional Screening Levels. May. (https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-may-2016)
[D] = Alaska Department of Environment and Conservation. 2016. Table C Groundwater Cleanup Level. November.

Table 5-1. Summary of Detections and Screening Level Exceedances

Site Inspection Report for Aqueous Film Forming Foam Areas at Joint Base Elmendorf-Richardson, Alaska

AFFF Area	Location Type	Media and Parameter	Maximum Detected Concentration	Screening Level[a]	Number of Primary Samples/ Number of Exceedances[g]	Exceeds Screening Level?
AFFF Area #1 - AT029	Fire Training Area	Shallow Subsurface Soil	(mg/kg)			
		PFBS	ND	1,600[b]	1/0	No
		PFOA	0.00034 J	0.0017[c]	1/0	No
		PFOS	0.0035 J	0.003[c]	1/1	Yes
		Groundwater	(µg/L)			
		PFBS	ND	380[d]	1/0	No
		PFOA	0.11	0.07[e]	1/1	Yes
		PFOS	ND	0.07[f]	1/0	No
AFFF Area #2 - AT052	Fire Training Area	Shallow Subsurface Soil	(mg/kg)			
		PFBS	ND	1,600[b]	1/0	No
		PFOA	0.00016 J	0.0017[c]	1/0	No
		PFOS	0.00035 J	0.003[c]	1/0	No
		Groundwater	(µg/L)			
		PFBS	0.044	380[d]	1/0	No
		PFOA	ND	0.07[e]	1/0	No
		PFOS	ND	0.07[f]	1/0	No
AFFF Area #3 - Fire Station 4	Fire Station	Shallow Subsurface Soil	(mg/kg)			
		PFBS	ND	1,600[b]	1/0	No
		PFOA	0.00065	0.0017[c]	1/0	No
		PFOS	0.0013	0.003[c]	1/0	No
		Groundwater	(µg/L)			
		PFBS	0.0093	380[d]	1/0	No
		PFOA	0.014	0.07[e]	1/0	No
		PFOS	ND	0.07[f]	1/0	No
AFFF Area #4 - Fire Station 5	Fire Station	Shallow Subsurface Soil	(mg/kg)			
		PFBS	0.00016 J	1,600[b]	1/0	No
		PFOA	0.00065	0.0017[c]	1/0	No
		PFOS	0.0071	0.003[c]	1/1	Yes
		Groundwater	(µg/L)			
		PFBS	0.063	380[d]	1/0	No
		PFOA	0.023	0.07[e]	1/0	No
		PFOS	ND	0.07[f]	1/0	No

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AFFF Area	Location Type	Media and Parameter	Maximum Detected Concentration	Screening Level[a]	Number of Primary Samples/ Number of Exceedances[g]	Exceeds Screening Level?
AFFF Area #5- SS044	Other	Shallow Subsurface Soil	(mg/kg)			
		PFBS	ND	1,600[b]	1/0	No
		PFOA	0.0017 J	0.0017[c]	1/0	No
		PFOS	0.00063 J	0.003[c]	1/0	No
		Groundwater	(µg/L)			
		PFBS	0.012	380[d]	1/0	No
		PFOA	0.055	0.07[e]	1/0	No
		PFOS	0.22	0.07[f]	1/1	Yes
AFFF Area #6 - C-17 Debris Storage Yard	Other	Groundwater	(µg/L)			
		PFBS	0.31	380[d]	1/0	No
		PFOA	0.86 J	0.07[e]	1/1	Yes
		PFOS	6.4 J	0.07[f]	1/1	Yes
AFFF Area #7 - Current AFFF Spray Test Area	AFFF Spray Test Area	Shallow Subsurface Soil	(mg/kg)			
		PFBS	0.00045	1,600[b]	1/0	No
		PFOA	0.0032	0.0017[c]	1/1	Yes
		PFOS	0.03	0.003[c]	1/1	Yes
		Groundwater	(µg/L)			
		PFBS	0.13	380[d]	2/0	No
		PFOA	0.61	0.07[e]	2/2	Yes
		PFOS	3.3	0.07[f]	2/2	Yes
AFFF Area #8 - Corrosion Control Hangar	Hangar	Shallow Subsurface Soil	(mg/kg)			
		PFBS	ND	1,600[b]	1/0	No
		PFOA	0.00071	0.0017[c]	1/0	No
		PFOS	0.0021	0.003[c]	1/0	No
		Groundwater	(µg/L)			
		PFBS	0.14	380[d]	2/0	No
		PFOA	0.56	0.07[e]	2/2	Yes
		PFOS	1.5	0.07[f]	2/2	Yes

Table 5-1. Summary of Detections and Screening Level Exceedances

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AFFF Area	Location Type	Media and Parameter	Maximum Detected Concentration	Screening Level[a]	Number of Primary Samples/ Number of Exceedances[g]	Exceeds Screening Level?
AFFF Area #9 - Current Fire Training Area	Fire Training Area	Shallow Subsurface Soil	(mg/kg)			
		PFBS	0.0029 J	1,600[b]	3/0	No
		PFOA	0.0029 J	0.0017[c]	3/1	Yes
		PFOS	0.22 J	0.003[c]	3/2	Yes
		Groundwater	(µg/L)			
		PFBS	0.1	380[d]	3/0	No
		PFOA	0.044	0.07[e]	3/0	No
		PFOS	1.4	0.07[f]	3/1	Yes
AFFF Area #10 - Cherry Hill Ditch	Other	Shallow Subsurface Soil	(mg/kg)			
		PFBS	ND	1,600[b]	4/0	No
		PFOA	0.00064	0.0017[c]	4/0	No
		PFOS	0.0047	0.003[c]	4/3	Yes
		Sediment	(mg/kg)			
		PFBS	ND	1,600[b]	1/0	No
		PFOA	0.00023 J	0.0017[c]	1/0	No
		PFOS	ND	0.003[c]	1/0	No
		Groundwater	(µg/L)			
		PFBS	0.062	380[d]	4/0	No
		PFOA	0.19	0.07[e]	4/2	Yes
		PFOS	0.34	0.07[f]	4/3	Yes
		Surface Water	(µg/L)			
		PFBS	0.03 J	380[d]	1/0	No
		PFOA	0.1	0.07[e]	1/1	Yes
		PFOS	0.48	0.07[f]	1/1	Yes
AFFF Area #11 - E3/AWACS Crash	Emergency Response	Shallow Subsurface Soil	(mg/kg)			
		PFBS	ND	1,600[b]	1/0	No
		PFOA	ND	0.0017[c]	1/0	No
		PFOS	0.00027 J	0.003[c]	1/0	No
		Groundwater	(µg/L)			
		PFBS	ND	380[d]	1/0	No
		PFOA	ND	0.07[e]	1/0	No
		PFOS	ND	0.07[f]	1/0	No

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AFFF Area #12 - Former AFFF Spray Test Area	AFFF Spray Test Area	Shallow Subsurface Soil	(mg/kg)			
		PFBS	ND	1,600[b]	1/0	No
		PFOA	0.00046 J	0.0017[c]	1/0	No
		PFOS	0.015 J	0.003[c]	1/0	No
		Groundwater	(µg/L)			
		PFBS	0.29	380[d]	1/0	No
		PFOA	1.7 J	0.07[e]	1/1	Yes
		PFOS	1.8 J	0.07[f]	1/1	Yes
AFFF Area #13 - Fire Station 1	Fire Station	Shallow Subsurface Soil	(mg/kg)			
		PFBS	0.0057	1,600[b]	1/0	No
		PFOA	0.025	0.0017[c]	1/1	Yes
		PFOS	8.9 J	0.003[c]	1/1	Yes
		Groundwater	(µg/L)			
		PFBS	0.098	380[d]	1/0	No
		PFOA	0.72	0.07[e]	1/1	Yes
		PFOS	2.9 J	0.07[f]	1/1	Yes
AFFF Area #14 - Fire Station 6	Fire Station	Shallow Subsurface Soil	(mg/kg)			
		PFBS	ND	1,600[b]	1/0	No
		PFOA	0.0009	0.0017[c]	1/0	No
		PFOS	0.27	0.003[c]	1/1	Yes
		Groundwater	(µg/L)			
		PFBS	ND	380[d]	1/0	No
		PFOA	0.0097 J	0.07[e]	1/0	No
		PFOS	0.54 J	0.07[f]	1/1	Yes
AFFF Area #15 - Fire Station 7	Fire Station	Shallow Subsurface Soil	(mg/kg)			
		PFBS	ND	1,600[b]	1/0	No
		PFOA	0.00041 J	0.0017[c]	1/0	No
		PFOS	0.0037 J	0.003[c]	1/1	Yes
		Groundwater	(µg/L)			
		PFBS	1	380[d]	1/0	No
		PFOA	5.1	0.07[e]	1/1	Yes
		PFOS	24	0.07[f]	1/1	Yes

Table 5-1. Summary of Detections and Screening Level Exceedances

Site Inspection Report for Aqueous Film Forming Foam Areas at Joint Base Elmendorf-Richardson, Alaska

AFFF Area	Location Type	Media and Parameter	Maximum Detected Concentration	Screening Level[a]	Number of Primary Samples/ Number of Exceedances[g]	Exceeds Screening Level?
AFFF Area #16 - Fire Suppression Foam Storage	Other	Shallow Subsurface Soil	(mg/kg)			
		PFBS	0.0015	1,600[b]	1/0	No
		PFOA	0.0021	0.0017[c]	1/1	Yes
		PFOS	0.0018	0.003[c]	1/0	No
		Groundwater	(µg/L)			
		PFBS	0.48	380[d]	1/0	No
		PFOA	0.62	0.07[e]	1/1	Yes
		PFOS	0.95	0.07[f]	1/1	Yes
AFFF Area #17 - FT023	Fire Training Area	Groundwater	(µg/L)			
		PFBS	ND	380[d]	1/0	No
		PFOA	0.03	0.07[e]	1/0	No
		PFOS	ND	0.07[f]	1/0	No
AFFF Area #18 - Hangar 5 Former AFFF Spray Test Area	AFFF Spray Test Area	Shallow Subsurface Soil	(mg/kg)			
		PFBS	0.00038 J	1,600[b]	1/0	No
		PFOA	0.00065	0.0017[c]	1/0	No
		PFOS	0.024	0.003[c]	1/1	Yes
		Groundwater	(µg/L)			
		PFBS	0.63	380[d]	1/0	No
		PFOA	1.1	0.07[e]	1/1	Yes
		PFOS	1.9	0.07[f]	1/1	Yes
AFFF Area #19 - Hangar 6	Hangar	Shallow Subsurface Soil	(mg/kg)			
		PFBS	ND	1,600[b]	1/0	No
		PFOA	0.00017 J	0.0017[c]	1/0	No
		PFOS	0.0012	0.003[c]	1/0	No
		Groundwater	(µg/L)			
		PFBS	0.025	380[d]	1/0	No
		PFOA	0.26	0.07[e]	1/1	Yes
		PFOS	0.95	0.07[f]	1/1	Yes

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AFFF Area	Location Type	Media and Parameter	Maximum Detected Concentration	Screening Level[a]	Number of Primary Samples/ Number of Exceedances[g]	Exceeds Screening Level?
AFFF Area #20 - Hangar 8	Hangar	Shallow Subsurface Soil	(mg/kg)			
		PFBS	ND	1,600[b]	1/0	No
		PFOA	ND	0.0017[c]	1/0	No
		PFOS	0.00087	0.003[c]	1/0	No
		Groundwater	(µg/L)			
		PFBS	0.012	380[d]	1/0	No
		PFOA	0.038	0.07[e]	1/0	No
		PFOS	0.17	0.07[f]	1/1	Yes
AFFF Area #21 - Hangar 10	Hangar	Shallow Subsurface Soil	(mg/kg)			
		PFBS	0.0007	1,600[b]	1/0	No
		PFOA	0.00076	0.0017[c]	1/0	No
		PFOS	ND	0.003[c]	1/0	No
		Groundwater	(µg/L)			
		PFBS	0.025	380[d]	1/0	No
		PFOA	0.2	0.07[e]	1/1	Yes
		PFOS	0.28	0.07[f]	1/1	Yes
AFFF Area #22 - Hangar 16	Hangar	Shallow Subsurface Soil	(mg/kg)			
		PFBS	ND	1,600[b]	1/0	No
		PFOA	ND	0.0017[c]	1/0	No
		PFOS	0.00054	0.003[c]	1/0	No
		Groundwater	(µg/L)			
		PFBS	0.084	380[d]	1/0	No
		PFOA	0.033	0.07[e]	1/0	No
		PFOS	0.21	0.07[f]	1/1	Yes
AFFF Area #23 - Hangar 17	Hangar	Shallow Subsurface Soil	(mg/kg)			
		PFBS	ND	1,600[b]	1/0	No
		PFOA	0.00018 J	0.0017[c]	1/0	No
		PFOS	0.012	0.003[c]	1/1	Yes
		Groundwater	(µg/L)			
		PFBS	0.018	380[d]	1/0	No
		PFOA	0.015	0.07[e]	1/0	No
		PFOS	0.27	0.07[f]	1/1	Yes

Table 5-1. Summary of Detections and Screening Level Exceedances

Site Inspection Report for Aqueous Film Forming Foam Areas at Joint Base Elmendorf-Richardson, Alaska

AFFF Area	Location Type	Media and Parameter	Maximum Detected Concentration	Screening Level[a]	Number of Primary Samples/ Number of Exceedances[g]	Exceeds Screening Level?
AFFF Area #24 - Hangar 18	Hangar	Shallow Subsurface Soil	(mg/kg)			
		PFBS	ND	1,600[b]	1/0	No
		PFOA	0.00024 J	0.0017[c]	1/0	No
		PFOS	0.033	0.003[c]	1/1	Yes
		Groundwater	(µg/L)			
		PFBS	0.14	380[d]	1/0	No
		PFOA	0.23	0.07[e]	1/1	Yes
		PFOS	8.1	0.07[f]	1/1	Yes
AFFF Area #25 - SS108 C-17 Crash Site	Emergency Response	Shallow Subsurface Soil	(mg/kg)			
		PFBS	ND	1,600[b]	1/0	No
		PFOA	ND	0.0017[c]	1/0	No
		PFOS	0.00086	0.003[c]	1/0	No
		Groundwater	(µg/L)			
		PFBS	0.0083	380[d]	1/0	No
		PFOA	0.0089	0.07[e]	1/0	No
		PFOS	ND	0.07[f]	1/0	No
AFFF Area #26 - Cessna UC-35A Crash Location	Emergency Response	Shallow Subsurface Soil	(mg/kg)			
		PFBS	ND	1,600[b]	1/0	No
		PFOA	ND	0.0017[c]	1/0	No
		PFOS	0.00042 J	0.003[c]	1/0	No
		Groundwater	(µg/L)			
		PFBS	0.023	380[d]	1/0	No
		PFOA	0.11	0.07[e]	1/1	Yes
		PFOS	0.37	0.07[f]	1/1	Yes
LF004	Other	Groundwater	(µg/L)			
		PFBS	0.047	380[d]	1/0	No
		PFOA	0.039	0.07[e]	1/0	No
		PFOS	0.42	0.07[f]	1/1	Yes

Table 5-1. Summary of Detections and Screening Level Exceedances

Site Inspection Report for Aqueous Film Forming Foam Areas at Joint Base Elmendorf-Richardson, Alaska

AFFF Area	Location Type	Media and Parameter	Maximum Detected Concentration	Screening Level[a]	Number of Primary Samples/ Number of Exceedances[g]	Exceeds Screening Level?
ST037	Other	Groundwater	(µg/L)			
		PFBS	0.46	380[d]	4/0	No
		PFOA	2.1	0.07[e]	4/4	Yes
		PFOS	5	0.07[f]	4/3	Yes
		Surface Water	(µg/L)			
		PFBS	1	380[d]	1/0	No
		PFOA	2.7	0.07[e]	1/1	Yes
		PFOS	4.9	0.07[f]	1/1	Yes

Notes:

Shading indicates that no further action is required for the AFFF Area based on analytical results.

AFFF = aqueous film forming foam

mg/kg = milligram(s) per kilogram

µg/L = microgram(s) per liter

[a] Screening Level presented is most conservative of project Screening Levels applicable to media of interest.

[b] = EPA Regional Screening Levels. 2016c. (https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-may-2016). May.

[c] = Alaska Department of Environment and Conservation. 2016. Table B1, Method Two Migration-to-Groundwater Soil Cleanup Level. November.

[d] = EPA. 2016c. Regional Screening Levels. May. (https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-may-2016)

[d] = United States Environmental Protection Agency (EPA). 2016. Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA). (PFOA), EPA 822-R-16-005. Washington, DC. Office of Water Health and Ecological Criteria Division.

[f] = United States Environmental Protection Agency (EPA). 2016. Drinking Water Health Advisory for Perfluorooctane Sulfonate (PFOS). EPA 822-R-16-004. Washington, DC. Office of Water Health and Ecological Criteria Division.

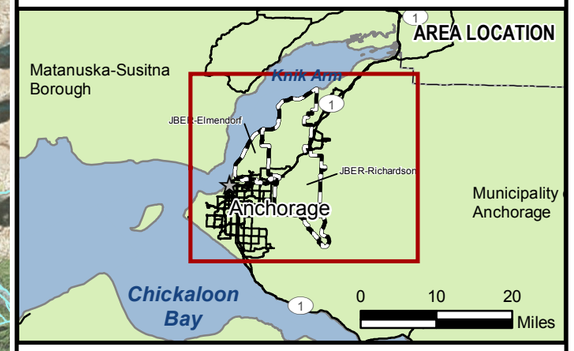
[g] = Sample result is listed as exceedance if it exceeds any of the project Screening Levels applicable to media of interest.

Figures

Figure 2-1
Location Map
Site Inspection for AFFF Areas
Joint Base Elmendorf-Richardson, Alaska

Legend

- Stream/River
- Road Centerline
- Area of Possible Release
- Area of Daylighting Seeps
- Base Boundary
- Building
- Freshwater Forested/Shrub Wetland
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Pond
- Lake
- Riverine Wetland



Notes:
AFFF = aqueous film-forming foam
FTA = fire training area

\\brookside\GIS_SHARE\ENBG\00_Proj\U\USACE\666984_PFCSiteInspections\Maps\Report\SI_Report\JBER\Figure_2-1_LocationMap.mxd
10/3/2017 AR
Source: Wetland, National Wetlands Inventory - Wetland Polygons, Published September 2012, U.S. Fish and Wildlife Service, Division of Habitat and Resource Conservation, Washington, D.C. http://www.fws.gov/wetlands/

Figure 2-2
AFFF Area Location Map
Site Inspection for AFFF Areas
Joint Base Elmendorf-Richardson, Alaska

Fire Station 7 (Building 14431)
Hangar 10 (Building 15455)
Hangar 8 (Building 14410)
Hangar 18 (Building 17470)
Hangar 6 (Building 9311)
FT023 Fire Training Area
Current AFFF Spray Test Area
Current Fire Training Area
SS108 C-17 Crash Location
Former AFFF Spray Test Area
E3/AWACS Crash Location
Cherry Hill Ditch (SD052)
LF004
Fire Station 6 (Building 16673)
Hangar 17 (Building 16670)
Hangar 16 (Building 15658)
SS044 (Building 35-752)
UC-35A Cessna Crash Location
Fire Station 1 (Building 11415)
Hangar 5 (Bldg 7309) Former AFFF Spray Test Area
Corrosion Control Hangar (Building 6263)
C-17 Debris Storage Yard
ST037
Fire Suppression Foam Storage (Building 6210)
AT029 Ruff Road Fire Training Area
AT052 Landfill Fire Training Area
Fire Station 5 (Building 48010)
Fire Station 4 (Building 654)

46TH ST
VANDENBERG AVE
35TH ST
28TH ST
31ST ST
ACCESS RD
CIRCLE RD
WAREHOUSE ST
OTTER LAKE RD
1ST ST
2ND ST
5TH ST
6TH ST
D ST
TUMA RD
NOONE RD
ROOSEVELT RD
DAVIS HWY
RUFF RD
POLE LINE RD
BEAR RUN LN
RICHARDSON DR
D/E AVE
JUNEAU AVE
4TH ST
TAXIWAY ROW
UNNAMED RD
KUTER AVE
MUNDY AVE
15TH ST
FIGHTER DR
TERMINAL RD
TIDEWATER RD
E BLUFF DR
E LOOP RD
E WHITNEY RD
PARSONS AVE
GOODWIN AVE
GLENN HWY
ACCESS ROAD
SHIP CREEK
OIL WELL RD
ARCTIC VALLEY RD
BOUNDARY AVE
E 4TH AVE
E 3RD AVE
E 5TH AVE
E 7TH AVE
E 9TH AVE
E 10TH AVE
E 6TH AVE
FIELD DR
MERRILL
INGRA ST
MEDFRA ST
A ST
B ST
C ST
DEBARR RD
REKA DR
E 20TH AVE
BEAVER PL
OTTER ST
MULDOON RD
BULLDOG TRL

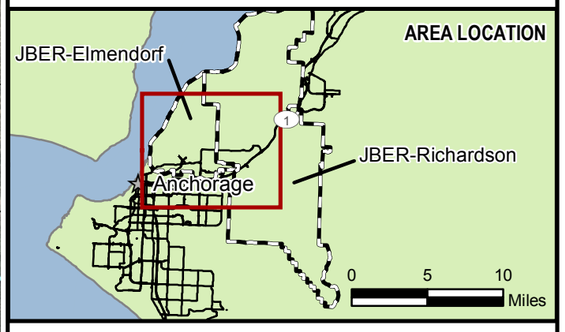
N

0 2,000 4,000
Feet

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

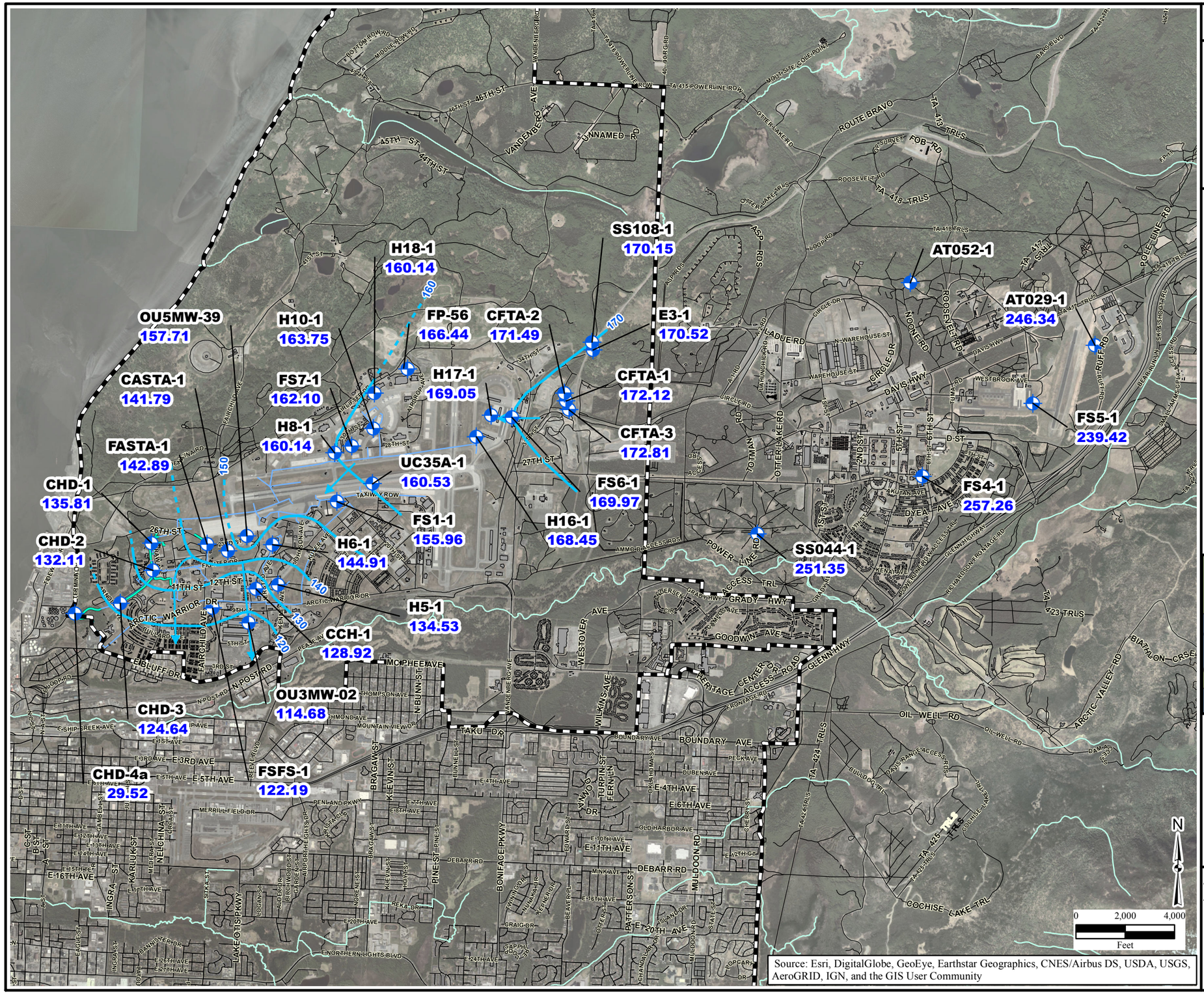
- Shallow Aquifer Groundwater Flow Direction
- Combined Aquifer Groundwater Flow Direction
- Deep Aquifer Groundwater Flow Direction
- Stream/River
- Road Centerline
- Stormwater Line
- Area of Possible Release
- Area of Daylighting Seeps
- Base Boundary
- Building
- Freshwater Forested/Shrub Wetland
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Pond
- Lake
- Riverine Wetland



Notes:
AFFF = aqueous film-forming foam
FTA = fire training area

\\brookside\GIS_SHARE\ENBG\00_Proj\U\USACE\666984_PFCSiteInspections\Maps\Report\SI_Report\JBER\Figure_2-2_AOCMap.mxd
10/3/2017 AR
Source: Wetland, National Wetlands Inventory - Wetland Polygons, Published September 2012, U.S. Fish and Wildlife Service, Division of Habitat and Resource Conservation, Washington, D.C. http://www.fws.gov/wetlands/

Figure 3-1
Potentiometric Surface Map
Site Inspection for AFFF Areas
Joint Base Elmendorf-Richardson, Alaska



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

- Stream/River
- Cherry Hill Ditch/Drainage System Open Channel
- Cherry Hill Ditch/Drainage System Closed Conduit
- Road Centerline
- Groundwater Flow Direction
- Groundwater Elevation Contour (dashed where inferred)
- Base Boundary
- Building
- Monitoring Well
- 168.45 Groundwater Elevation, Feet above NAVD 88

Notes:
AFFF = aqueous film forming foam

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7/26/2017 AR
Source: Wetland, National Wetlands Inventory - Wetland Polygons, Published September 2012, U.S. Fish and Wildlife Service, Division of Habitat and Resource Conservation, Washington, D.C. http://www.fws.gov/wetlands/

Figure 3-2
PFOA and PFOS Soil and Sediment Results
Site Inspection for AFFF Areas
Joint Base Elmendorf-Richardson, Alaska

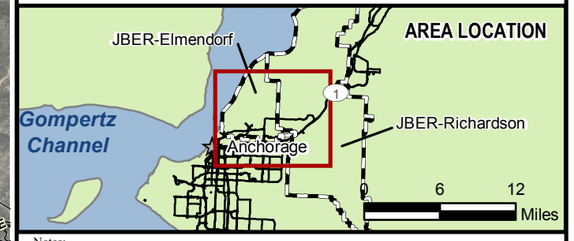
Fire Station 7 (Building 14431)
Hangar 10 (Building 15455)
Hangar 8 (Building 14410)
Hangar 18 (Building 17470)
Hangar 6 (Building 9311)
FT023 Fire Training Area
AT029 Ruff Road Fire Training Area
AT052 Landfill Fire Training Area
Current AFFF Spray Test Area
Current Fire Training Area
SS108 C-17 Crash Location
Former AFFF Spray Test Area
E3/AWACS Crash Location
Cherry Hill Ditch (SD052)
Fire Station 6 (Building 16673)
Fire Station 5 (Building 48010)
Hangar 17 (Building 16670)
Fire Station 4 (Building 654)
Hangar 16 (Building 15658)
SS044 (Building 35-752)
UC-35A Cessna Crash Location
Fire Station 1 (Building 11415)
Hangar 5 (Bldg 7309) Former AFFF Spray Test Area
Corrosion Control Hangar (Building 6263)
C-17 Debris Storage Yard
Fire Suppression Foam Storage (Building 6210)

CASTA-1, FASTA-1, CHD-1, CHD-2, CHD-3, CHD-4, CHD-SD-01, FSFS-1, CCH-1, H8-1, H10-1, H18-1, H16-1, H17-1, FS6-1, FS7-1, FS1-1, UC35A-1, H6-1, H5-1, CFTA-1, CFTA-2, CFTA-3, SS108-1, E3-1, AT052-1, AT029-1, FS5-1, FS4-1, SS04-1

Legend

- Shallow Aquifer Groundwater Flow Direction
- Combined Aquifer Groundwater Flow Direction
- Deep Aquifer Groundwater Flow Direction
- Stream/River
- Cherry Hill Ditch/Drainage System Open Channel
- Cherry Hill Ditch/Drainage System Closed Conduit
- Road Centerline
- Area of Possible Release
- Base Boundary
- Building
- Sediment Sample Location
- Below ADEC MTGW cleanup levels (0.0030 and 0.0017 mg/kg)
- Above ADEC MTGW cleanup levels and below ADEC HH cleanup levels (0.0030 or 0.0017 mg/kg and 1.6 mg/kg)
- Higher than EPA Risk-based Screening Level (RBSL) (above 16 or 6 mg/kg)

AREA LOCATION



Notes:
ADEC = Alaska Department of Environmental Conservation
AFFF = aqueous film-forming foam
AWACS = Airborne Warning and Control System
FTA = fire training area
HH = human health
mg/kg = milligrams per kilogram
MTGW = migration to groundwater
PFOS = perfluorooctanesulfonic acid
PFOA = perfluorooctanoic acid
RBSL = risk based screening level
-United States Environmental Protection Agency (EPA). 2016. Risk-based screening levels (RSBL) calculated using the EPA Regional Screening Level calculator (https://epa-prgs.ornl.gov/cgi- bin/chemicals/csl_search).
-Alaska Department of Environment and Conservation. 2016. Table B1, Method Two Under 40-inch Zone, Human Health Soil Cleanup Level. November.
-Alaska Department of Environment and Conservation. 2016. Table B1, Method Two Migration to Groundwater Soil Cleanup Level. November.
-In general, deep aquifer groundwater flow on Elmendorf is to the west.

N

0 2,000 4,000
Feet

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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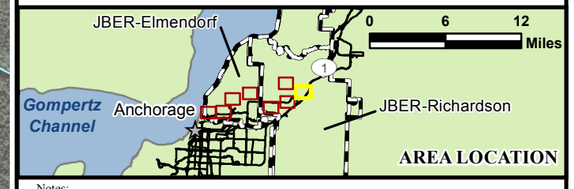
10/3/2017 AR
Source: Wetland, National Wetlands Inventory - Wetland Polygons, Published September 2012, U.S. Fish and Wildlife Service, Division of Habitat and Resource Conservation, Washington, D.C. http://www.fws.gov/wetlands/

Figure 3-3A
PFOA and PFOS Soil Results
Site Inspection for AFFF Areas
Joint Base Elmendorf-Richardson, Alaska

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

- Monitoring Well (existing)
- Shallow Aquifer Groundwater Flow Direction
- Combined Aquifer Groundwater Flow Direction
- Deep Aquifer Groundwater Flow Direction
- Stream/River
- Stormwater Line
- Road Centerline
- Area of Possible Release
- Base Boundary
- Building
- Above ADEC MTGW cleanup levels and below ADEC HH cleanup levels (0.0030 or 0.0017 mg/kg and 1.6 mg/kg)



Notes:
ADEC = Alaska Department of Environmental Conservation
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AFFF = aqueous film-forming foam
AWACS = Airborne Warning and Control System
FTA = fire training area
HH = human health
mg/kg = milligrams per kilogram
MTGW = migration to groundwater
PFOS = perfluorooctanesulfonic acid
PFOA = perfluorooctanoic acid
RBSL = risk based screening level
-Data are compared with November 2016 ADEC Cleanup Levels. Concentrations of PFOA and PFOS are below EPA RBSLs.
-United States Environmental Protection Agency (EPA). 2016. Risk-based screening levels (RBSL) calculated using the EPA Regional Screening Level calculator (https://epa-prgs.ornl.gov/cgi- bin/chemicals/csl_search).
-Alaska Department of Environment and Conservation. 2016. Table B1, Method Two Under 40-inch Zone, Human Health Soil Cleanup Level. November.
-Alaska Department of Environment and Conservation. 2016. Table B1, Method Two Migration to Groundwater Soil Cleanup Level. November.
-In general, deep aquifer groundwater flow on Elmendorf is to the west.

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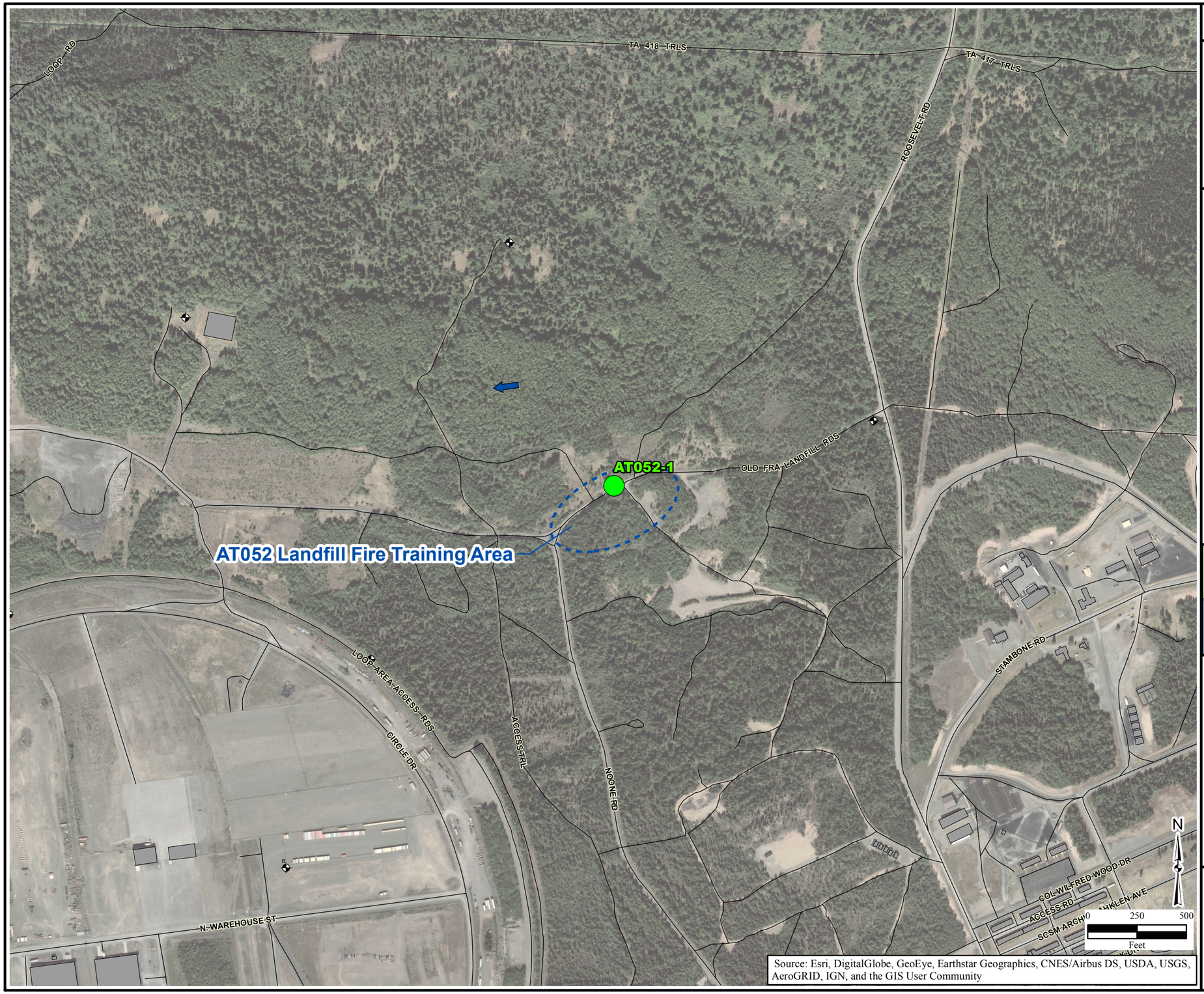
5/18/2017 AR
Source: Wetland, National Wetlands Inventory - Wetland Polygons, Published September 2012, U.S. Fish and Wildlife Service, Division of Habitat and Resource Conservation, Washington, D.C. http://www.fws.gov/wetlands/

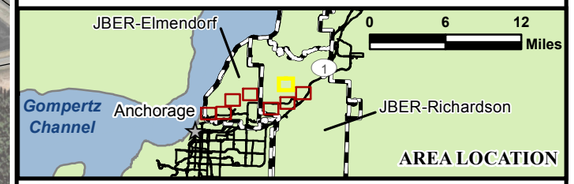
Figure 3-3B
PFOA and PFOS Soil Results
Site Inspection for AFFF Areas
Joint Base Elmendorf-Richardson, Alaska



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

- Monitoring Well (existing)
- Shallow Aquifer Groundwater Flow Direction
- Combined Aquifer Groundwater Flow Direction
- Deep Aquifer Groundwater Flow Direction
- Road Centerline
- Area of Possible Release
- Base Boundary
- Building
- Below ADEC MTGW cleanup levels (0.0030 and 0.0017 mg/kg)



Notes:
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AFB = Air Force Base
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AWACS = Airborne Warning and Control System
FTA = fire training area
HH = human health
mg/kg = milligrams per kilogram
MTGW = migration to groundwater
PFOS = perfluorooctanesulfonic acid
PFOA = perfluorooctanoic acid
RBSL = risk based screening level
-Data are compared with November 2016 ADEC Cleanup Levels. Concentrations of PFOA and PFOS are below EPA RBSLs.
-United States Environmental Protection Agency (EPA). 2016. Risk-based screening levels (RBSL) calculated using the EPA Regional Screening Level calculator (https://epa-prgs.ornl.gov/cgi- bin/chemicals/csl_search).
-Alaska Department of Environment and Conservation. 2016. Table B1, Method Two Under 40-inch Zone, Human Health Soil Cleanup Level. November.
-Alaska Department of Environment and Conservation. 2016. Table B1, Method Two Migration to Groundwater Soil Cleanup Level. November.
-In general, deep aquifer groundwater flow on Elmendorf is to the west.

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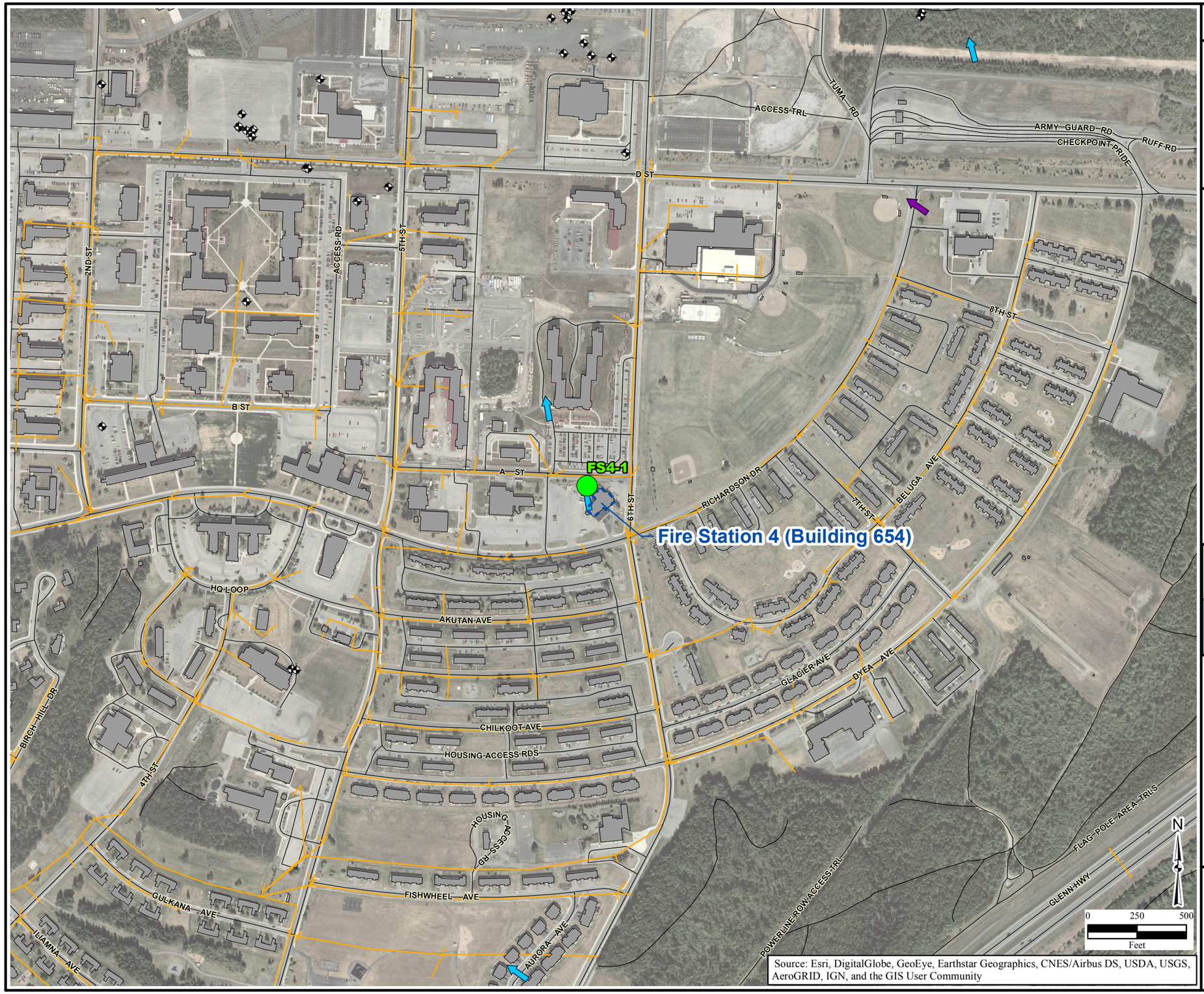
5/18/2017 AR
Source: Wetland, National Wetlands Inventory - Wetland Polygons, Published September 2012, U.S. Fish and Wildlife Service, Division of Habitat and Resource Conservation, Washington, D.C. http://www.fws.gov/wetlands/

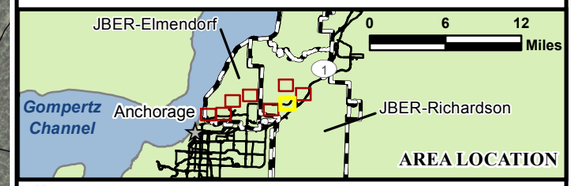
Figure 3-3C
PFOA and PFOS Soil Results
Site Inspection for AFFF Areas
Joint Base Elmendorf-Richardson, Alaska



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

- Monitoring Well (existing)
- Shallow Aquifer Groundwater Flow Direction
- Combined Aquifer Groundwater Flow Direction
- Deep Aquifer Groundwater Flow Direction
- Stormwater Line
- Road Centerline
- Area of Possible Release
- Base Boundary
- Building
- Below ADEC MTGW cleanup levels (0.0030 and 0.0017 mg/kg)



Notes:
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AFB = Air Force Base
AFFF = aqueous film-forming foam
AWACS = Airborne Warning and Control System
FTA = fire training area
HH = human health
mg/kg = milligrams per kilogram
MTGW = migration to groundwater
PFOS = perfluorooctanesulfonic acid
PFOA = perfluorooctanoic acid
RBSL = risk based screening level
-Data are compared with November 2016 ADEC Cleanup Levels. Concentrations of PFOA and PFOS are below EPA RBSLs.
-United States Environmental Protection Agency (EPA). 2016. Risk-based screening levels (RBSL) calculated using the EPA Regional Screening Level calculator (https://epa-prgs.ornl.gov/cgi- bin/chemicals/csl_search).
-Alaska Department of Environment and Conservation. 2016. Table B1, Method Two Under 40-inch Zone, Human Health Soil Cleanup Level. November.
-Alaska Department of Environment and Conservation. 2016. Table B1, Method Two Migration to Groundwater Soil Cleanup Level. November.
-In general, deep aquifer groundwater flow on Elmendorf is to the west.

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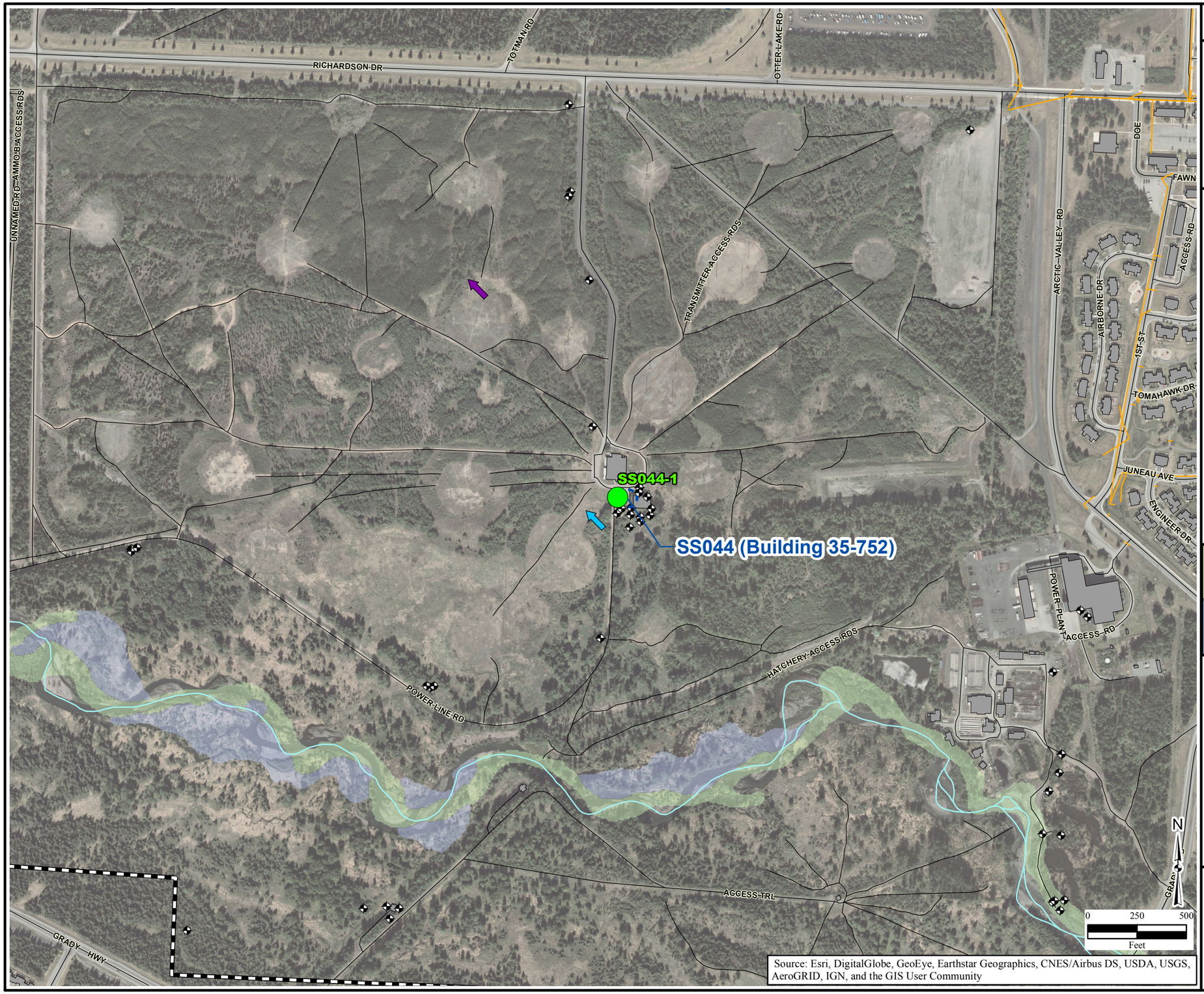
5/18/2017 AR
Source: Wetland, National Wetlands Inventory - Wetland Polygons, Published September 2012, U.S. Fish and Wildlife Service, Division of Habitat and Resource Conservation, Washington, D.C. http://www.fws.gov/wetlands/

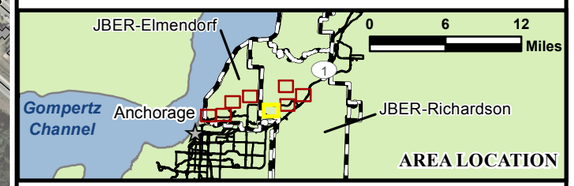
Figure 3-3D
PFOA and PFOS Soil Results
Site Inspection for AFFF Areas
Joint Base Elmendorf-Richardson, Alaska



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

- Monitoring Well (existing)
- Shallow Aquifer Groundwater Flow Direction
- Combined Aquifer Groundwater Flow Direction
- Deep Aquifer Groundwater Flow Direction
- Stream/River
- Stormwater Line
- Road Centerline
- Area of Possible Release
- Base Boundary
- Building
- Freshwater Forested/Shrub Wetland
- Riverine Wetland
- Below ADEC MTGW cleanup levels (0.0030 and 0.0017 mg/kg)



Notes:
ADEC = Alaska Department of Environmental Conservation
AFB = Air Force Base
AFFF = aqueous film-forming foam
AWACS = Airborne Warning and Control System
FTA = fire training area
HH = human health
mg/kg = milligrams per kilogram
MTGW = migration to groundwater
PFOS = perfluorooctanesulfonic acid
PFOA = perfluorooctanoic acid
RBSL = risk based screening level
-Data are compared with November 2016 ADEC Cleanup Levels. Concentrations of PFOA and PFOS are below EPA RBSLs.
-United States Environmental Protection Agency (EPA). 2016. Risk-based screening levels (RBSL) calculated using the EPA Regional Screening Level calculator (https://epa-prgs.ornl.gov/cgi- bin/chemicals/csl_search).
-Alaska Department of Environment and Conservation. 2016. Table B1, Method Two Under 40-inch Zone, Human Health Soil Cleanup Level. November.
-Alaska Department of Environment and Conservation. 2016. Table B1, Method Two Migration to Groundwater Soil Cleanup Level. November.
-In general, deep aquifer groundwater flow on Elmendorf is to the west.

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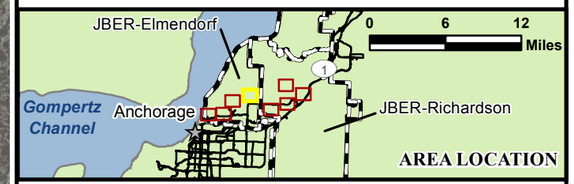
5/18/2017 AR
Source: Wetland, National Wetlands Inventory - Wetland Polygons, Published September 2012, U.S. Fish and Wildlife Service, Division of Habitat and Resource Conservation, Washington, D.C. http://www.fws.gov/wetlands/

Figure 3-3E
PFOA and PFOS Soil Results
Site Inspection for AFFF Areas
Joint Base Elmendorf-Richardson, Alaska

Legend

- Monitoring Well (existing)
- Shallow Aquifer Groundwater Flow Direction
- Combined Aquifer Groundwater Flow Direction
- Deep Aquifer Groundwater Flow Direction
- Cherry Hill Ditch/Drainage System Closed Conduit
- Stormwater Line
- Road Centerline
- Area of Possible Release
- Base Boundary
- Building
- Freshwater Forested/Shrub Wetland
- Below ADEC MTGW cleanup levels (0.0030 and 0.0017 mg/kg)
- Above ADEC MTGW cleanup levels and below ADEC HH cleanup levels (0.0030 or 0.0017 mg/kg and 1.6 mg/kg)



Notes:
ADEC = Alaska Department of Environmental Conservation
AFB = Air Force Base
AFFF = aqueous film-forming foam
AWACS = Airborne Warning and Control System
FTA = fire training area
HH = human health
mg/kg = milligrams per kilogram
MTGW = migration to groundwater
PFOS = perfluorooctanesulfonic acid
PFOA = perfluorooctanoic acid
RBSL = risk based screening level
-Data are compared with November 2016 ADEC Cleanup Levels. Concentrations of PFOA and PFOS are below EPA RBSLs.
-United States Environmental Protection Agency (EPA). 2016. Risk-based screening levels (RBSL) calculated using the EPA Regional Screening Level calculator (https://epa-prgs.ornl.gov/cgi- bin/chemicals/csl_search).
-Alaska Department of Environment and Conservation. 2016. Table B1, Method Two Under 40-inch Zone, Human Health Soil Cleanup Level. November.
-Alaska Department of Environment and Conservation. 2016. Table B1, Method Two Migration to Groundwater Soil Cleanup Level. November.
-In general, deep aquifer groundwater flow on Elmendorf is to the west.

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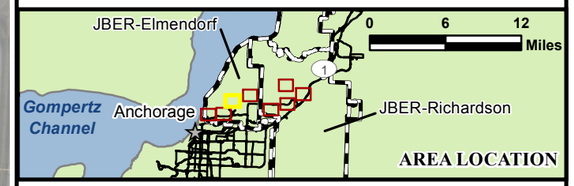
5/18/2017 AR
Source: Wetland, National Wetlands Inventory - Wetland Polygons, Published September 2012, U.S. Fish and Wildlife Service, Division of Habitat and Resource Conservation, Washington, D.C. http://www.fws.gov/wetlands/

Figure 3-3F
PFOA and PFOS Soil Results
Site Inspection for AFFF Areas
Joint Base Elmendorf-Richardson, Alaska

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

- Monitoring Well (existing)
- Shallow Aquifer Groundwater Flow Direction
- Combined Aquifer Groundwater Flow Direction
- Deep Aquifer Groundwater Flow Direction
- Cherry Hill Ditch/Drainage System Closed Conduit
- Stormwater Line
- Road Centerline
- Area of Possible Release
- Base Boundary
- Building
- Freshwater Pond
- Below ADEC MTGW cleanup levels (0.0030 and 0.0017 mg/kg)
- Above ADEC MTGW cleanup levels and below ADEC HH cleanup levels (0.0030 or 0.0017 mg/kg and 1.6 mg/kg)
- Higher than EPA RBSL (above 1.26 mg/kg)



Notes:
ADEC = Alaska Department of Environmental Conservation
AFB = Air Force Base
AFFF = aqueous film-forming foam
AWACS = Airborne Warning and Control System
FTA = fire training area
HH = human health
mg/kg = milligrams per kilogram
MTGW = migration to groundwater
PFOS = perfluorooctanesulfonic acid
PFOA = perfluorooctanoic acid
RBSL = risk based screening level
-Data are compared with November 2016 ADEC Cleanup Levels.
-United States Environmental Protection Agency (EPA). 2016. Risk-based screening levels (RBSL) calculated using the EPA Regional Screening Level calculator (https://epa-prgs.ornl.gov/cgi- bin/chemicals/csl_search).
-Alaska Department of Environment and Conservation. 2016. Table B1, Method Two Under 40-inch Zone, Human Health Soil Cleanup Level. November.
-Alaska Department of Environment and Conservation. 2016. Table B1, Method Two Migration to Groundwater Soil Cleanup Level. November.
-In general, deep aquifer groundwater flow on Elmendorf is to the west.

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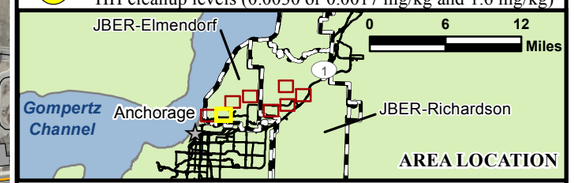
5/18/2017 AR
Source: Wetland, National Wetlands Inventory - Wetland Polygons, Published September 2012, U.S. Fish and Wildlife Service, Division of Habitat and Resource Conservation, Washington, D.C. http://www.fws.gov/wetlands/

Figure 3-3G
PFOA and PFOS Soil Results
Site Inspection for AFFF Areas
Joint Base Elmendorf-Richardson, Alaska

Legend

- Monitoring Well (existing)
- Shallow Aquifer Groundwater Flow Direction
- Combined Aquifer Groundwater Flow Direction
- Deep Aquifer Groundwater Flow Direction
- Stream/River
- Cherry Hill Ditch/Drainage System Open Channel
- Cherry Hill Ditch/Drainage System Closed Conduit
- Stormwater Line
- Road Centerline
- Area of Possible Release
- Base Boundary
- Building
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine Wetland
- Below ADEC MTGW cleanup levels (0.0030 and 0.0017 mg/kg)
- Above ADEC MTGW cleanup levels and below ADEC HH cleanup levels (0.0030 or 0.0017 mg/kg and 1.6 mg/kg)



Notes:
ADEC = Alaska Department of Environmental Conservation
AFB = Air Force Base
AFFF = aqueous film-forming foam
AWACS = Airborne Warning and Control System
FTA = fire training area
HH = human health
mg/kg = milligrams per kilogram
MTGW = migration to groundwater
PFOS = perfluorooctanesulfonic acid
PFOA = perfluorooctanoic acid
RBSL = risk based screening level
-Data are compared with November 2016 ADEC Cleanup Levels. Concentrations of PFOA and PFOS are below EPA RBSLs.
-United States Environmental Protection Agency (EPA). 2016. Risk-based screening levels (RBSL) calculated using the EPA Regional Screening Level calculator (https://epa-prgs.ornl.gov/cgi- bin/chemicals/csl_search).
-Alaska Department of Environment and Conservation. 2016. Table B1, Method Two Under 40-inch Zone, Human Health Soil Cleanup Level. November.
-Alaska Department of Environment and Conservation. 2016. Table B1, Method Two Migration to Groundwater Soil Cleanup Level. November.
-In general, deep aquifer groundwater flow on Elmendorf is to the west.

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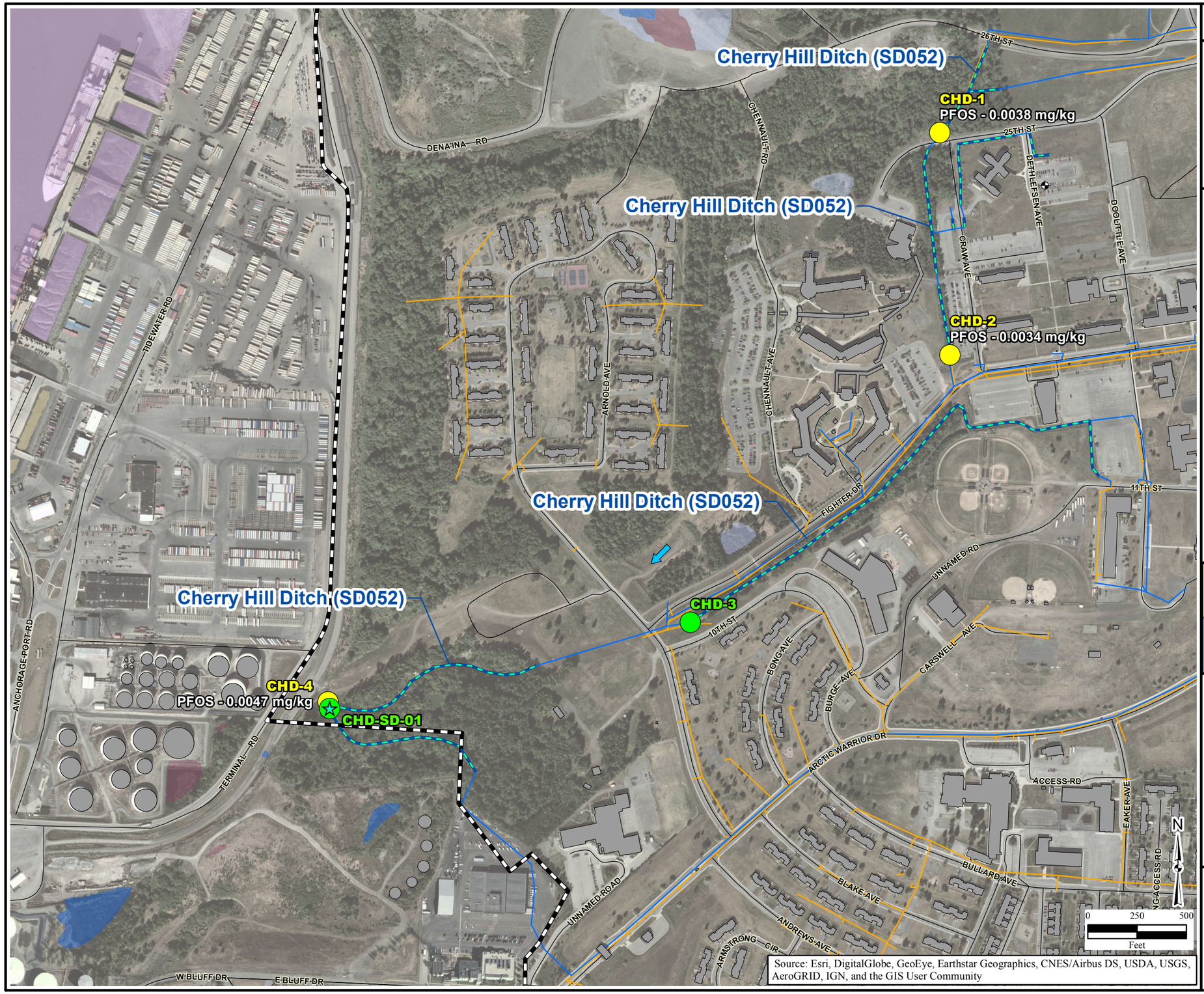
5/18/2017 AR
Source: Wetland, National Wetlands Inventory - Wetland Polygons, Published September 2012, U.S. Fish and Wildlife Service, Division of Habitat and Resource Conservation, Washington, D.C. http://www.fws.gov/wetlands/

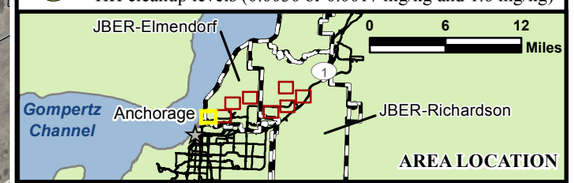
Figure 3-3H
PFOA and PFOS Soil and Sediment Results
Site Inspection for AFFF Areas
Joint Base Elmendorf-Richardson, Alaska



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

- Monitoring Well (existing)
- Shallow Aquifer Groundwater Flow Direction
- Combined Aquifer Groundwater Flow Direction
- Deep Aquifer Groundwater Flow Direction
- Cherry Hill Ditch/Drainage System Open Channel
- Cherry Hill Ditch/Drainage System Closed Conduit
- Stormwater Line
- Road Centerline
- Area of Possible Release
- Base Boundary
- Building
- Freshwater Forested/Shrub Wetland
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Pond
- Sediment Sample Location
- Below ADEC MTGW cleanup levels (0.0030 and 0.0017 mg/kg)
- Above ADEC MTGW cleanup levels and below ADEC HH cleanup levels (0.0030 or 0.0017 mg/kg and 1.6 mg/kg)



Notes:
ADEC = Alaska Department of Environmental Conservation
AFB = Air Force Base
AFFF = aqueous film-forming foam
AWACS = Airborne Warning and Control System
FTA = fire training area
HH = human health
mg/kg = milligrams per kilogram
MTGW = migration to groundwater
PFOS = perfluorooctanesulfonic acid
PFOA = perfluorooctanoic acid
RBSL = risk based screening level
-Data are compared with November 2016 ADEC Cleanup Levels. Concentrations of PFOA and PFOS are below EPA RBSLs.
-United States Environmental Protection Agency (EPA). 2016. Risk-based screening levels (RBSL) calculated using the EPA Regional Screening Level calculator (https://epa-prgs.ornl.gov/cgi- bin/chemicals/csl_search).
-Alaska Department of Environment and Conservation. 2016. Table B1, Method Two Under 40-inch Zone, Human Health Soil Cleanup Level. November.
-Alaska Department of Environment and Conservation. 2016. Table B1, Method Two Migration to Groundwater Soil Cleanup Level. November.
-In general, deep aquifer groundwater flow on Elmendorf is to the west.

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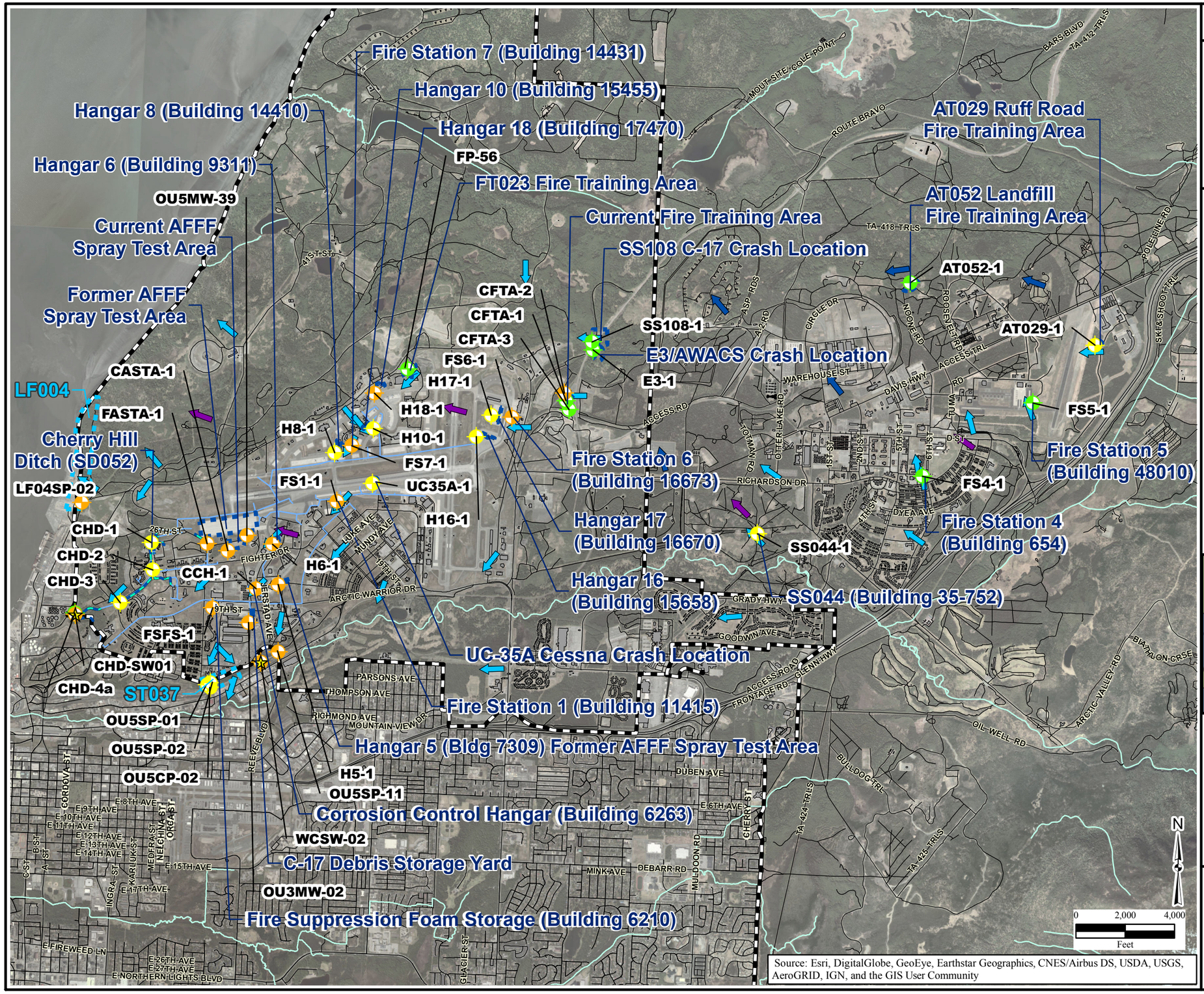
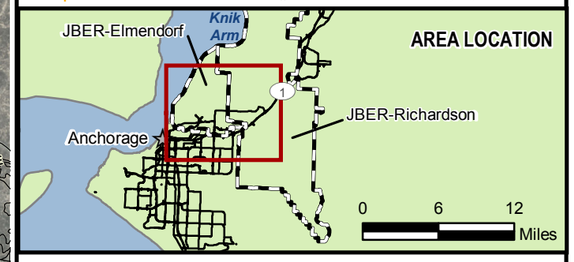
5/18/2017 AR
Source: Wetland, National Wetlands Inventory - Wetland Polygons, Published September 2012, U.S. Fish and Wildlife Service, Division of Habitat and Resource Conservation, Washington, D.C. http://www.fws.gov/wetlands/

Figure 3-4
PFOA and PFOS Groundwater and Surface Water Results
Site Inspection for AFFF Areas
Joint Base Elmendorf-Richardson, Alaska



Legend

- Shallow Aquifer Groundwater Flow Direction
- Combined Aquifer Groundwater Flow Direction
- Deep Aquifer Groundwater Flow Direction
- Stream/River
- Cherry Hill Ditch/Drainage System Open Channel
- Cherry Hill Ditch/Drainage System Closed Conduit
- Road Centerline
- Area of Possible Release
- Area of Daylighting Seeps
- Base Boundary
- Building
- Surface Water Result
- Below EPA HA of 0.07 µg/L
- Above EPA HA and below ADEC cleanup level (0.07 to 0.40 µg/L)
- Above ADEC cleanup level (0.40 to 40 µg/L)



Notes:
ADEC = Alaska Department of Environmental Conservation
AFFF = aqueous film-forming foam
AWACS = Airborne Warning and Control System
EPA = United States Environmental Protection Agency
FTA = fire training area
HA = health advisory
PFOS = perfluorooctanesulfonic acid
PFOA = perfluorooctanoic acid
µg/L - micrograms per liter
1. Data are compared with the May 2016 EPA Drinking Water Health Advisories and the November 2016 ADEC Table C Groundwater Cleanup Levels.
2. In general, deep aquifer groundwater flow on Elmendorf is to the west.

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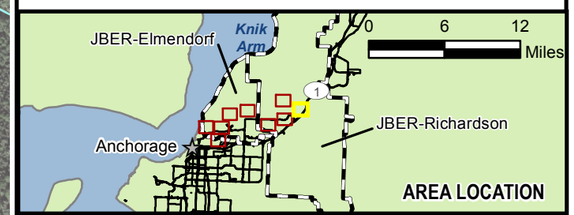
10/3/2017 AR
Source: Wetland, National Wetlands Inventory - Wetland Polygons, Published September 2012, U.S. Fish and Wildlife Service, Division of Habitat and Resource Conservation, Washington, D.C. http://www.fws.gov/wetlands/

Figure 3-5A
PFOA and PFOS Groundwater Results
Site Inspection for AFFF Areas
Joint Base Elmendorf-Richardson, Alaska

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

- Monitoring Well (existing)
- Shallow Aquifer Groundwater Flow Direction
- Combined Aquifer Groundwater Flow Direction
- Deep Aquifer Groundwater Flow Direction
- Stream/River
- Stormwater Line
- Road Centerline
- Area of Possible Release
- Area of Daylighting Seeps
- Base Boundary
- Building
- Below EPA HA of 0.07 µg/L
- Above EPA HA and below ADEC cleanup level (0.07 to 0.40 µg/L)



Notes:
ADEC = Alaska Department of Environmental Conservation
AFFF = aqueous film-forming foam
AWACS = Airborne Warning and Control System
EPA = United States Environmental Protection Agency
FTA = fire training area
HA = health advisory
PFOS = perfluorooctanesulfonic acid
PFOA = perfluorooctanoic acid
µg/L - micrograms per liter
1. Data are compared with the May 2016 EPA Drinking Water Health Advisories and the November 2016 ADEC Table C Groundwater Cleanup Levels.
2. In general, deep aquifer groundwater flow on Elmendorf is to the west.

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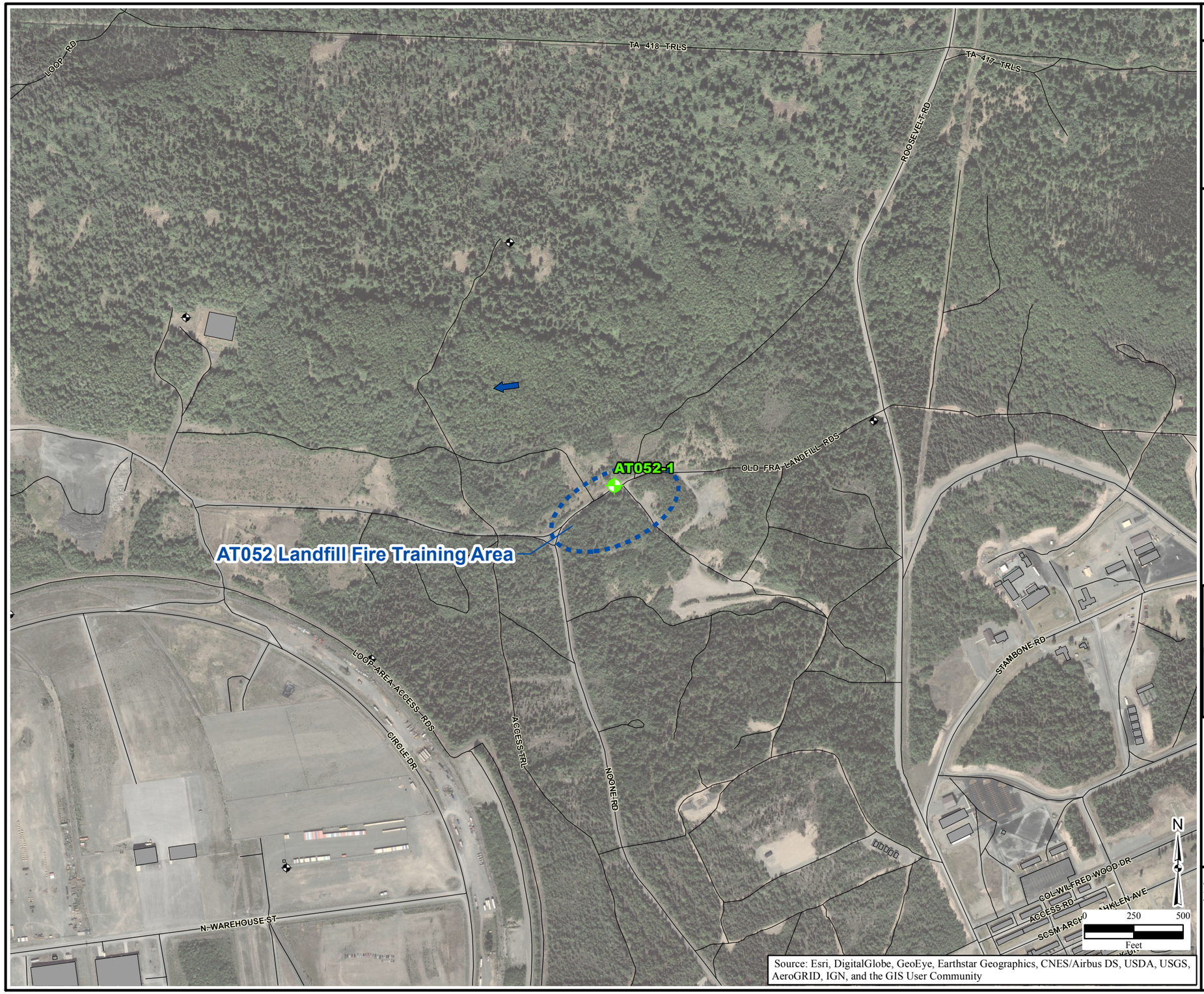
5/16/2017 AR
Source: Wetland, National Wetlands Inventory - Wetland Polygons, Published September 2012, U.S. Fish and Wildlife Service, Division of Habitat and Resource Conservation, Washington, D.C. http://www.fws.gov/wetlands/

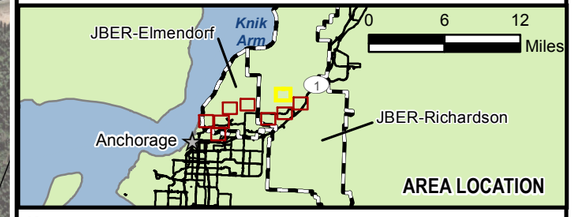
Figure 3-5B
PFOA and PFOS Groundwater Results
Site Inspection for AFFF Areas
Joint Base Elmendorf-Richardson, Alaska



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

- Monitoring Well (existing)
- Shallow Aquifer Groundwater Flow Direction
- Combined Aquifer Groundwater Flow Direction
- Deep Aquifer Groundwater Flow Direction
- Road Centerline
- Area of Possible Release
- Area of Daylighting Seeps
- Base Boundary
- Building
- Below EPA HA of 0.07 µg/L



Notes:
ADEC = Alaska Department of Environmental Conservation
AFFF = aqueous film-forming foam
AWACS = Airborne Warning and Control System
EPA = United States Environmental Protection Agency
FTA = fire training area
HA = health advisory
PFOS = perfluorooctanesulfonic acid
PFOA = perfluorooctanoic acid
µg/L - micrograms per liter
1. Data are compared with the May 2016 EPA Drinking Water Health Advisories and the November 2016 ADEC Table C Groundwater Cleanup Levels.
2. In general, deep aquifer groundwater flow on Elmendorf is to the west.

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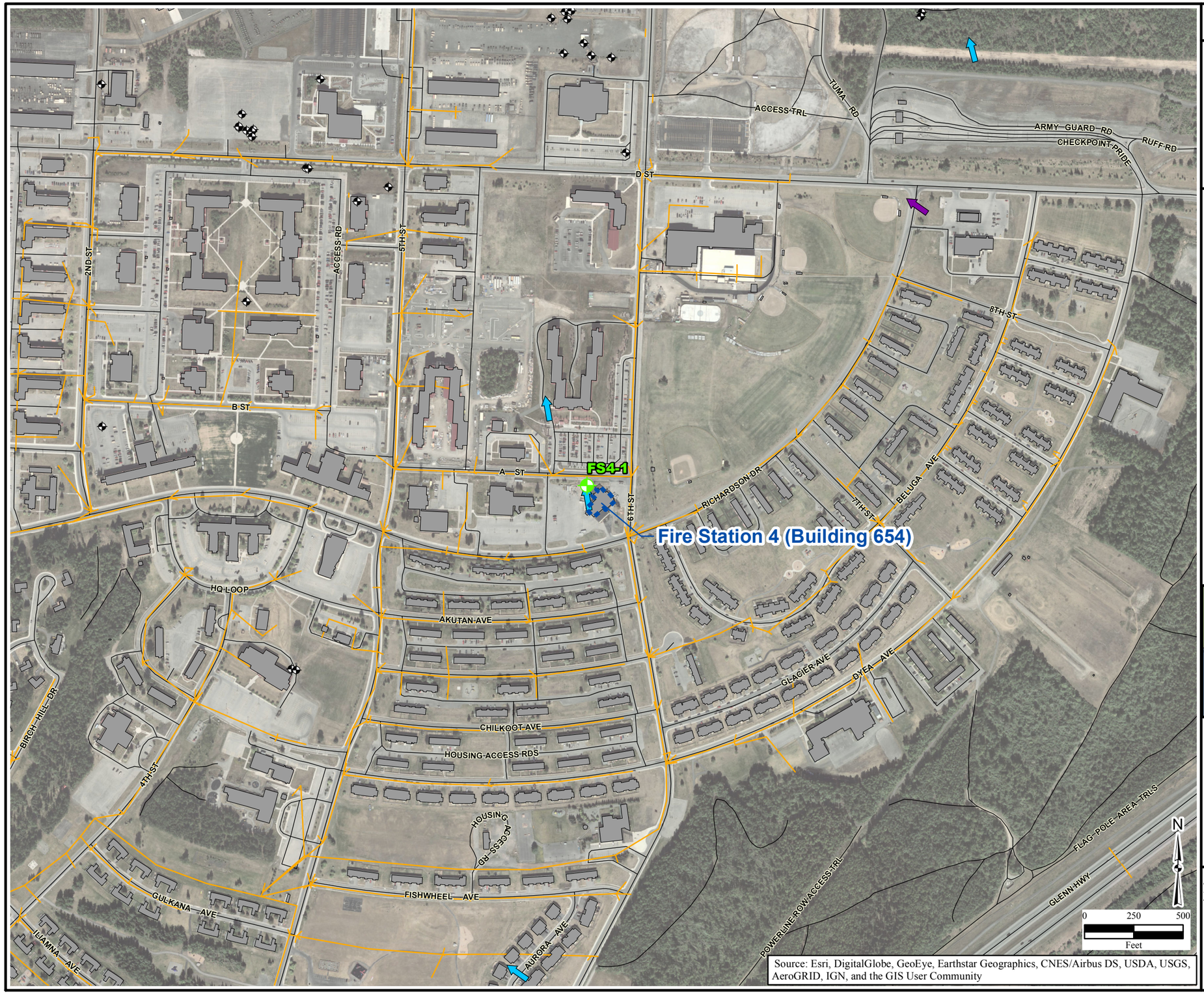
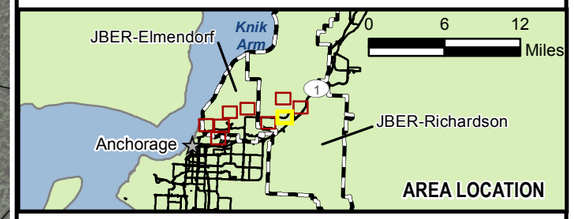
5/16/2017 AR
Source: Wetland, National Wetlands Inventory - Wetland Polygons, Published September 2012, U.S. Fish and Wildlife Service, Division of Habitat and Resource Conservation, Washington, D.C. http://www.fws.gov/wetlands/

Figure 3-5C
PFOA and PFOS Groundwater Results
Site Inspection for AFFF Areas
Joint Base Elmendorf-Richardson, Alaska



Legend

- Monitoring Well (existing)
- Shallow Aquifer Groundwater Flow Direction
- Combined Aquifer Groundwater Flow Direction
- Deep Aquifer Groundwater Flow Direction
- Stormwater Line
- Road Centerline
- Area of Possible Release
- Area of Daylighting Seeps
- Base Boundary
- Building
- Below EPA HA of 0.07 µg/L



Notes:
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AWACS = Airborne Warning and Control System
EPA = United States Environmental Protection Agency
FTA = fire training area
HA = health advisory
PFOS = perfluorooctanesulfonic acid
PFOA = perfluorooctanoic acid
µg/L - micrograms per liter
1. Data are compared with the May 2016 EPA Drinking Water Health Advisories and the November 2016 ADEC Table C Groundwater Cleanup Levels.
2. In general, deep aquifer groundwater flow on Elmendorf is to the west.

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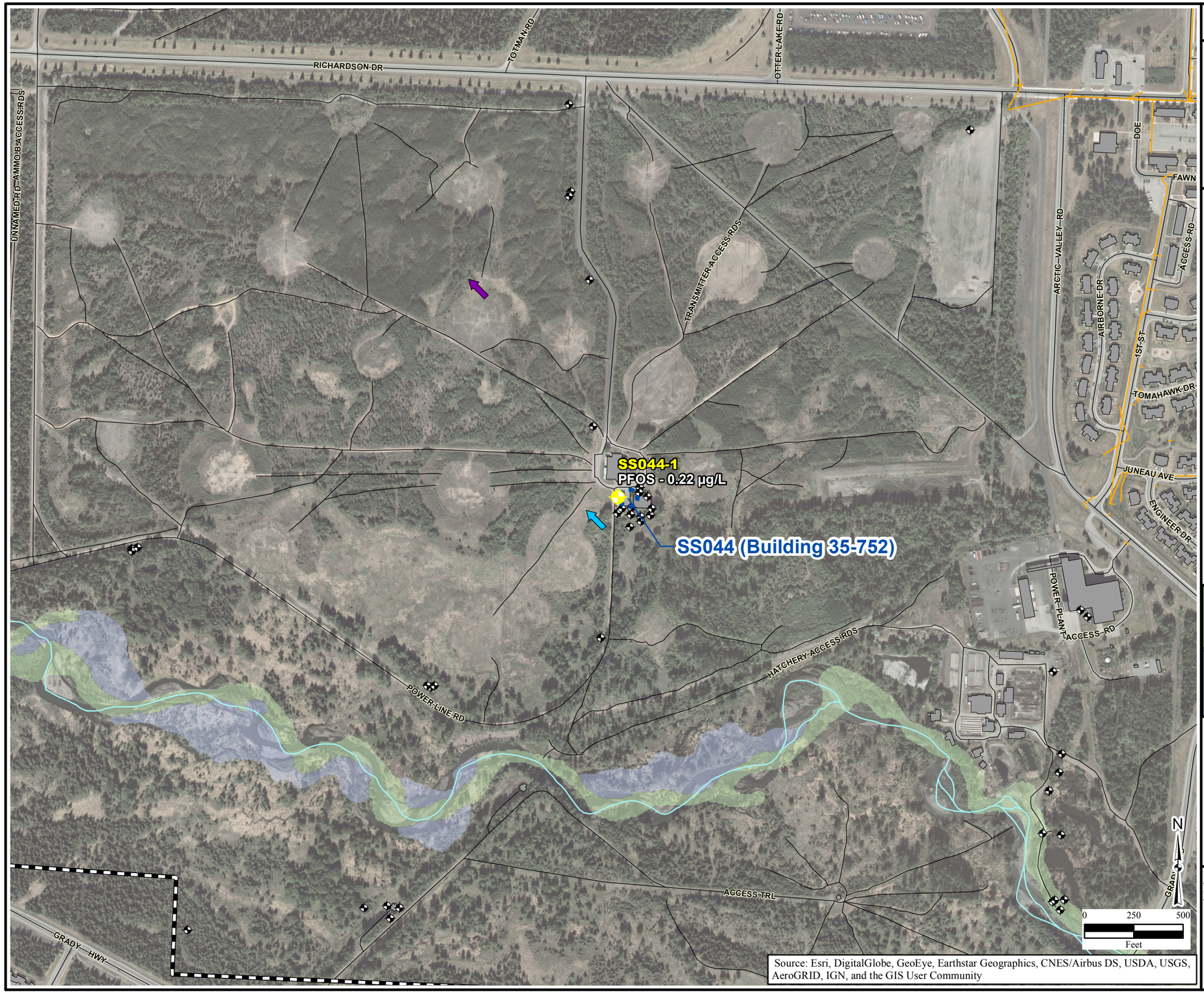
5/16/2017 AR
Source: Wetland, National Wetlands Inventory - Wetland Polygons, Published September 2012, U.S. Fish and Wildlife Service, Division of Habitat and Resource Conservation, Washington, D.C. http://www.fws.gov/wetlands/

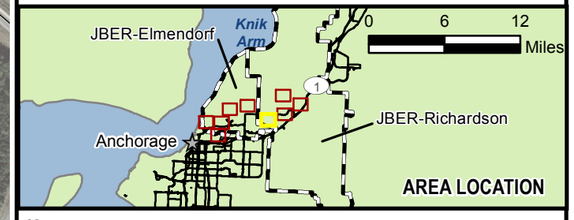
Figure 3-5D
PFOA and PFOS Groundwater Results
Site Inspection for AFFF Areas
Joint Base Elmendorf-Richardson, Alaska



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

- Monitoring Well (existing)
- Shallow Aquifer Groundwater Flow Direction
- Combined Aquifer Groundwater Flow Direction
- Deep Aquifer Groundwater Flow Direction
- Stream/River
- Stormwater Line
- Road Centerline
- Area of Possible Release
- Area of Daylighting Seeps
- Base Boundary
- Building
- Freshwater Forested/Shrub Wetland
- Riverine Wetland
- Above EPA HA and below ADEC cleanup level (0.07 to 0.40 µg/L)



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EPA = United States Environmental Protection Agency
FTA = fire training area
HA = health advisory
PFOS = perfluorooctanesulfonic acid
PFOA = perfluorooctanoic acid
µg/L - micrograms per liter
1. Data are compared with the May 2016 EPA Drinking Water Health Advisories and the November 2016 ADEC Table C Groundwater Cleanup Levels.
2. In general, deep aquifer groundwater flow on Elmendorf is to the west.

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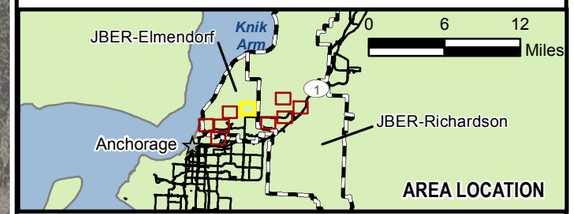
5/16/2017 AR
Source: Wetland, National Wetlands Inventory - Wetland Polygons, Published September 2012, U.S. Fish and Wildlife Service, Division of Habitat and Resource Conservation, Washington, D.C. http://www.fws.gov/wetlands/

Figure 3-5E
PFOA and PFOS Groundwater Results
Site Inspection for AFFF Areas
Joint Base Elmendorf-Richardson, Alaska

Legend

- Monitoring Well (existing)
- Shallow Aquifer Groundwater Flow Direction
- Combined Aquifer Groundwater Flow Direction
- Deep Aquifer Groundwater Flow Direction
- Cherry Hill Ditch/Drainage System Closed Conduit
- Stormwater Line
- Road Centerline
- Area of Possible Release
- Area of Daylighting Seeps
- Base Boundary
- Building
- Freshwater Forested/Shrub Wetland
- Below EPA HA of 0.07 µg/L
- Above EPA HA and below ADEC cleanup level (0.07 to 0.40 µg/L)
- Above ADEC cleanup level (0.40 to 40 µg/L)



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FTA = fire training area
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PFOS = perfluorooctanesulfonic acid
PFOA = perfluorooctanoic acid
µg/L - micrograms per liter
1. Data are compared with the May 2016 EPA Drinking Water Health Advisories and the November 2016 ADEC Table C Groundwater Cleanup Levels.
2. In general, deep aquifer groundwater flow on Elmendorf is to the west.

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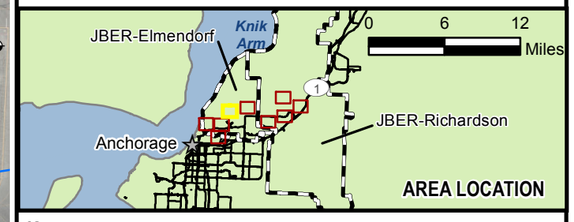
5/16/2017 AR
Source: Wetland, National Wetlands Inventory - Wetland Polygons, Published September 2012, U.S. Fish and Wildlife Service, Division of Habitat and Resource Conservation, Washington, D.C. http://www.fws.gov/wetlands/

Figure 3-5F
PFOA and PFOS Groundwater Results
Site Inspection for AFFF Areas
Joint Base Elmendorf-Richardson, Alaska

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

- Monitoring Well (existing)
- Shallow Aquifer Groundwater Flow Direction
- Combined Aquifer Groundwater Flow Direction
- Deep Aquifer Groundwater Flow Direction
- Cherry Hill Ditch/Drainage System Closed Conduit
- Stormwater Line
- Road Centerline
- Area of Possible Release
- Area of Daylighting Seeps
- Base Boundary
- Building
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Below EPA HA of 0.07 µg/L
- Above EPA HA and below ADEC cleanup level (0.07 to 0.40 µg/L)
- Above ADEC cleanup level (0.40 to 40 µg/L)



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EPA = United States Environmental Protection Agency
FTA = fire training area
HA = health advisory
PFOS = perfluorooctanesulfonic acid
PFOA = perfluorooctanoic acid
µg/L - micrograms per liter
1. Data are compared with the May 2016 EPA Drinking Water Health Advisories and the November 2016 ADEC Table C Groundwater Cleanup Levels.
2. In general, deep aquifer groundwater flow on Elmendorf is to the west.

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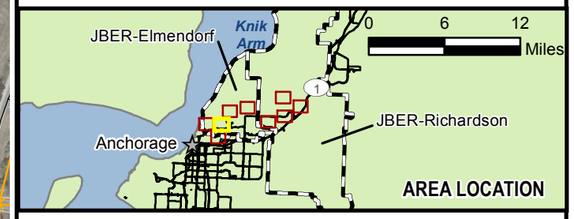
5/16/2017 AR
Source: Wetland, National Wetlands Inventory - Wetland Polygons, Published September 2012, U.S. Fish and Wildlife Service, Division of Habitat and Resource Conservation, Washington, D.C. http://www.fws.gov/wetlands/

Figure 3-5G
PFOA and PFOS Groundwater Results
Site Inspection for AFFF Areas
Joint Base Elmendorf-Richardson, Alaska

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

- Monitoring Well (existing)
- Shallow Aquifer Groundwater Flow Direction
- Combined Aquifer Groundwater Flow Direction
- Deep Aquifer Groundwater Flow Direction
- Cherry Hill Ditch/Drainage System Open Channel
- Cherry Hill Ditch/Drainage System Closed Conduit
- Stormwater Line
- Road Centerline
- Area of Possible Release
- Area of Daylighting Seeps
- Base Boundary
- Building
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine Wetland
- Above ADEC cleanup level (0.40 to 40 µg/L)



Notes:
ADEC = Alaska Department of Environmental Conservation
AFFF = aqueous film-forming foam
AWACS = Airborne Warning and Control System
EPA = United States Environmental Protection Agency
FTA = fire training area
HA = health advisory
PFOS = perfluorooctanesulfonic acid
PFOA = perfluorooctanoic acid
µg/L - micrograms per liter
1. Data are compared with the May 2016 EPA Drinking Water Health Advisories and the November 2016 ADEC Table C Groundwater Cleanup Levels.
2. In general, deep aquifer groundwater flow on Elmendorf is to the west.

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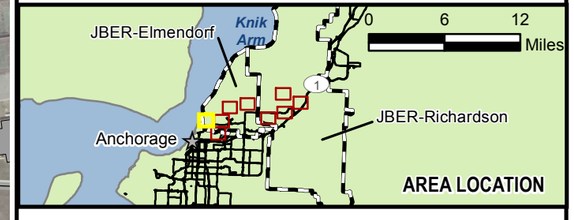
5/16/2017 AR
Source: Wetland, National Wetlands Inventory - Wetland Polygons, Published September 2012, U.S. Fish and Wildlife Service, Division of Habitat and Resource Conservation, Washington, D.C. http://www.fws.gov/wetlands/

Figure 3-5H
PFOA and PFOS Groundwater and Surface Water Results
Site Inspection for AFFF Areas
Joint Base Elmendorf-Richardson, Alaska

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

- Monitoring Well (existing)
- Shallow Aquifer Groundwater Flow Direction
- Combined Aquifer Groundwater Flow Direction
- Deep Aquifer Groundwater Flow Direction
- Cherry Hill Ditch/Drainage System Open Channel
- Cherry Hill Ditch/Drainage System Closed Conduit
- Stormwater Line
- Road Centerline
- Area of Possible Release
- Area of Daylighting Seeps
- Base Boundary
- Building
- Freshwater Forested/Shrub Wetland
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Pond
- Surface Water Result
- Below EPA HA of 0.07 µg/L
- Above EPA HA and below ADEC cleanup level (0.07 to 0.40 µg/L)
- Above ADEC cleanup level (0.40 to 40 µg/L)



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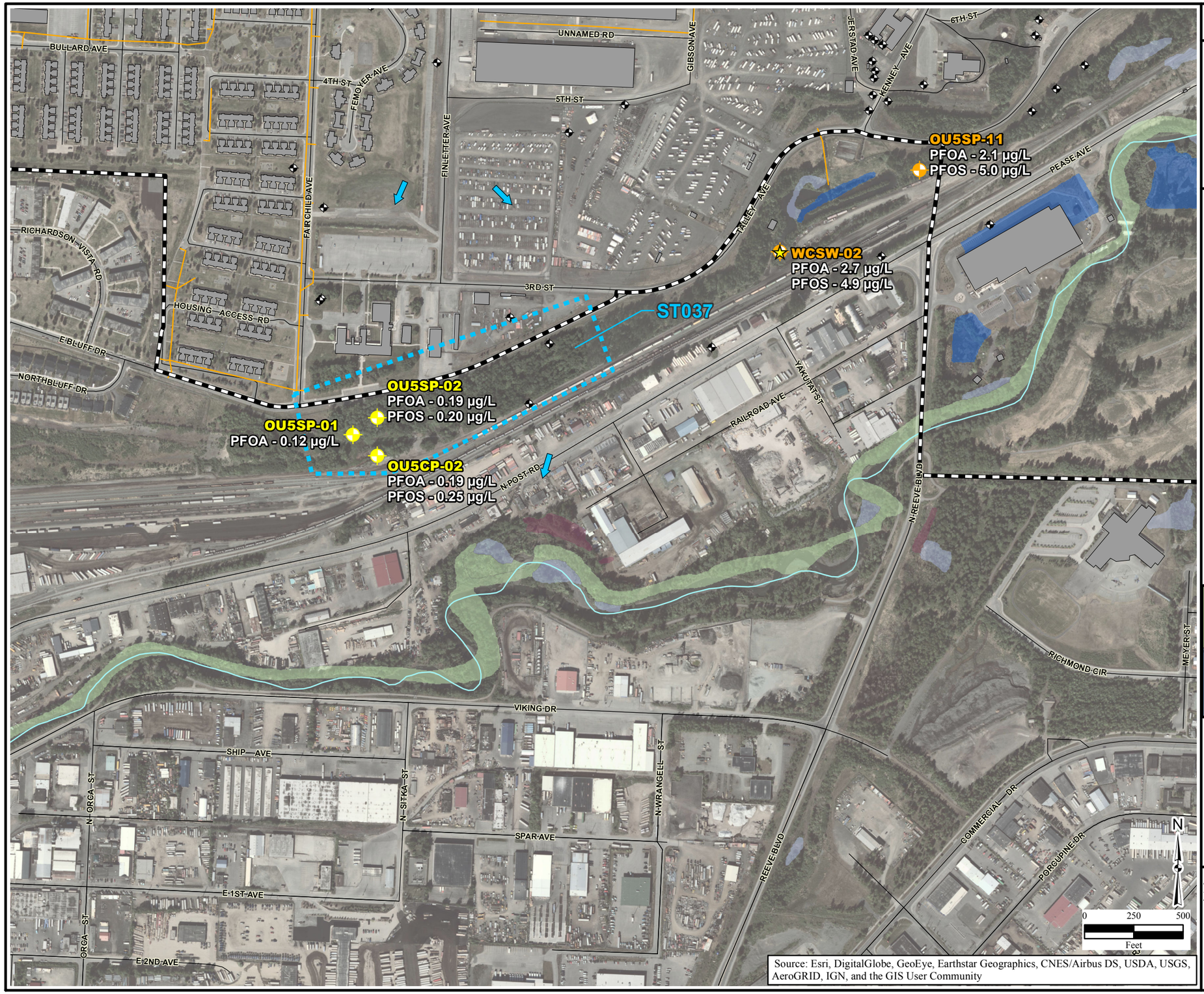
5/16/2017 AR
Source: Wetland, National Wetlands Inventory - Wetland Polygons, Published September 2012, U.S. Fish and Wildlife Service, Division of Habitat and Resource Conservation, Washington, D.C. http://www.fws.gov/wetlands/

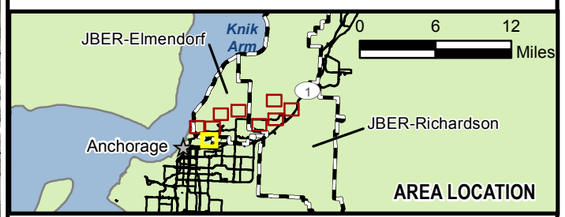
Figure 3-5I
PFOA and PFOS Groundwater and Surface Water Results
Site Inspection for AFFF Areas
Joint Base Elmendorf-Richardson, Alaska



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

- Monitoring Well (existing)
- Shallow Aquifer Groundwater Flow Direction
- Combined Aquifer Groundwater Flow Direction
- Deep Aquifer Groundwater Flow Direction
- Stream/River
- Stormwater Line
- Road Centerline
- Area of Possible Release
- Area of Daylighting Seeps
- Base Boundary
- Building
- Freshwater Forested/Shrub Wetland
- Freshwater Emergent Wetland
- Freshwater Pond
- Riverine Wetland
- Surface Water Result
- Above EPA HA and below ADEC cleanup level (0.07 to 0.40 µg/L)
- Above ADEC cleanup level (0.40 to 40 µg/L)



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Source: Wetland, National Wetlands Inventory - Wetland Polygons, Published September 2012, U.S. Fish and Wildlife Service, Division of Habitat and Resource Conservation, Washington, D.C. http://www.fws.gov/wetlands/

Appendix A
Field Logs and Data Collection Forms

Appendix A-1
Field Documentation and Groundwater Purge and Sample Forms

Table A-1. Stabilized Field Parameters

Site Inspection Report for Aqueous Film Forming Foam Areas at Joint Base Elmendorf-Richardson, Alaska

AOC	Monitoring Well ID	Date	Time	Volume Purged (gallons)	pH	Conductivity (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (°C)	ORP (mV)
AT029	AT029-1	8/24/2016	13:10	2.10	7.54	0.269	9.73	11.01	9.90	181.1
AT052	AT052-1	8/22/2016	17:30	6.60	7.58	1.010	250	16.93	7.10	129.2
Fire Station 4	FS4-1	9/19/2016	13:05	3.25	8.00	0.436	18	4.54	8.20	-7.70
Fire Station 5	FS5-1	8/22/2016	10:15	1.90	6.45	0.267	3.02	6.62	7.70	213.8
SS044	SS044-1	8/19/2016	13:55	4.10	5.82	0.132	8.4	10.53	9.70	183.7
Fire Station 1	FS1-1	8/15/2016	10:15	1.90	6.45	0.267	3.02	6.62	7.70	213.8
Fire Station 6	FS6-1	8/12/2016	15:00	8.90	7.39	0.440	18.9	4.49	7.30	70.0
Fire Station 7	FS7-1	8/17/2016	10:25	4.30	6.83	0.950	29.5	0.27	8.80	-29.0
Hangar 5	H5-1	8/11/2016	16:15	5.40	6.73	0.763	49.5	0.82	8.59	-26.8
Hangar 6	H6-1	8/16/2016	11:50	7.25	6.73	0.524	77.9	0.35	11.00	125.9
Hangar 8	H8-1	8/16/2016	16:05	7.80	7.18	0.477	30.1	0.13	10.80	0.20
Hangar 10	H10-1	8/17/2016	14:00	7.40	7.09	1.030	28.5	0.10	6.90	-82.6
Hangar 16	H16-1	8/12/2016	11:20	6.60	7.21	0.432	55	3.27	6.96	133.0
Hangar 17	H17-1	8/12/2016	19:25	9.60	7.07	0.465	45.7	4.33	7.09	-24.1
Hangar 18	H18-1	8/17/2016	17:50	6.70	7.02	0.910	59.1	0.38	8.70	-16.0
Corrosion Control Hangar	CCH-1	8/11/2016	10:35	5.00	6.91	0.737	139	1.35	8.38	95.6
Current Fire Training Area	CFTA-1	8/10/2016	14:35	4.50	7.25	0.362	104	7.16	7.72	59.6
	CFTA-2	8/8/2016	15:50	2.00	5.57	0.346	5.2	--	6.90	224.1
	CFTA-3	8/10/2016	11:30	6.25	6.93	0.345	41.6	7.59	6.59	71.3
Current AFFF Spray Test Area	CASTA-1	8/11/2016	13:20	5.75	6.52	0.922	9.67	1.70	7.77	-27.5
	OU5MW-39	8/10/2016	18:15	5.00	6.96	0.930	7.25	1.05	8.28	-56.7
Former AFFF Spray Test Area	FASTA-1	8/19/2016	15:10	12.60	6.36	0.749	20.7	--	10.23	-145.7
Fire Suppression Foam Storage	FSFS-1	8/19/2016	10:30	8.20	6.50	0.730	18	0.13	9.90	100.5
FT023	FP56	8/24/2016	17:25	6.50	5.99	0.034	38.2	6.53	10.20	125.5
C-17 Debris Storage Yard	OU3MW-02	8/23/2016	12:30	1.60	6.83	0.586	5.05	0.17	9.70	165.3

Table A-1. Stabilized Field Parameters

Site Inspection Report for Aqueous Film Forming Foam Areas at Joint Base Elmendorf-Richardson, Alaska

AOC	Monitoring Well ID	Date	Time	Volume Purged (gallons)	pH	Conductivity (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (°C)	ORP (mV)
E3/AWACS Crash	E3-1	8/23/2016	10:25	3.00	7.26	0.263	3.49	10.41	6.90	167.3
SS108 C-17 Crash Site	SS108-1	8/22/2016	12:20	2.70	7.15	0.338	6.15	9.93	6.40	186.4
Cessna UC-35A Crash Location	UC35A-1	8/15/2016	12:15	5.75	6.79	0.844	23	0.12	7.89	139.9
Cherry Hill Ditch	CHD-1	8/18/2016	10:35	3.60	6.38	0.663	8.7	0.15	11.10	6.9
	CHD-2	8/18/2016	12:40	2.70	6.49	0.498	14.1	0.27	12.90	27.3
	CHD-3	8/18/2016	15:30	5.70	6.34	0.489	16.5	0.12	9.40	40.5
	CHD-4*	9/29/2016	10:40	2.00	8.92	0.910	165	9.31	8.90	150.7

*Parameters were not stabilized; well sampled following low permeability protocol. Recorded values were parameters at time of sample collection

Notes

-- = DO probe issue; parameter not recorded
°C = degree(s) Celsius
AOC = area of concern
DO = dissolved oxygen
ID = identification number
mg/L = milligram(s) per liter
mS/cm = millisiemen(s) per centimeter
MV = millivolt(s)
NTU = nephelometric turbidity unit
ORP = oxygen reduction potential

6/22/2016 JBER-PFC J. Olm

Weather: Clear 73,58

Crew: Geotek - Mick, Bobby CH2M - Jason, Tara, Morgan

Daily Log

0800: Arrived @ CH2M Trailer. Held H&S meeting. Pulled supplies

0830: Leave for CFTA-2 site.

0845: Arrive @ site. Do site walk w/ the drillers.

0900: Drillers begin to unload/set up to drill.

0910: Morgan left to find water hydrant utility clearance.

0915: Take pre drilling site photos

1000: Set up on site. Go through drill safety. Check all fall protection. Begin drilling CFTA-2.

1115: Collect Sample 16Q2CFTA-2-SO-6 @ 0-5' on CFTA-2.

1230: Stopped drilling because rods are getting too hot. Oil is seeping onto the hammer & smoking slightly.

1240: Driller states that his mechanic said the grease is from a bearing that was recently repacked and should begin to go away. Resume drilling.

1345: Stop work because bear came through site.

1400: Resume work

1710: Drilled CFTA-2 to 70'. Begin site clean up for the day.

1730: Left site to return to the trailer

MB 6/30/16

6/23/2016 PFC-JBER J. Oberts

Weather: 60's, P.C.

Crew: GT Alaska - Mark Bobby, CH2M - Jason, Tara, Megan

Daily Log

0800: Arrive @ CH2M Trailer. Hold daily H&S meeting. Get supplies.

0830: Leave for CFTA-2 site

0845: Arrive @ site. Begin setting up. Take WL of CFTA-2. Dry @ 70'.

0920: Resume drilling CFTA-2.

1100: Drilled to 75', no recovery - sampler. Water was on the outside of the sample. Drilled to 80'. 2' recovery. Sample was wet. Called Megan Bruno, she said to screen from 75-85'.

1140: Drilled CFTA-2 to 85'. Began setting up to construct the well.

1150: Drillers begin adding pvc to well
2 x 6' 20 slot, 10/20 sand prepack. 8 x 10' 2" sch. 40 blank.

1200: ~~Pull casing to 73'~~ 10' shoe appears to be plugged. PVC want drop while pushing the pvc with the rig. The drop piece broke. Pull 10' of casing & pull all PVC out.

1215: Use drill rods with pipe to knock blockage out of shoe.

1415: Driller removed blockage & water & sediment came into the casing. WL = 60.3 TD = 83.

1430: Water level in well is dropping. Waiting to see what final WL will be when stable.

1525: WL appears to stabilize around 71'. M. Bruno says ok to screen 71-81. TD = 83' sand from 83-81.

1530: Begin adding PVC to well. Inspected all PVC for damage. Any damaged PVC was discarded.

MB 6/23/16

6/23/16 Continued

1530: Add 2x5' prepack PVC screens, 8x10' 2" sch 40 PVC,
Bottom cap of 10' Screen CFTA-3 @ 71-81'. Remove 10' of casing
pull casing to 2' above the screen (69')
1550: Begin adding 10/20 sand.
Use ½ bag of 10/20 sand tag sand @ 69'.
Pull casing to 65'.
1555: Begin adding bentonite chips. Add ½ bag chips
1605: Pull casing to 60'. Pull casing to 58'. Add chips.
1615: Pull casing to 50'. Add chips. (1 bag total).
Tag chips @ 50.
1630: Pull casing to 40'. Add 1 bag of chips (2 total)
1640: Pull casing to 35'. Add chips. (3 total)
1650: Pull casing to 25'. Add chips. (4 total)
1700: Pull casing to 20'. Add chips, (5½ total)
1710: Pull casing to 12'. Add chips (7 total) [illegible]
1725: Tag chips @ 12'. Add 1½ bags of pea gravel.
Tag pea gravel @ 2½'. Begin clean-up of site.
1750: Left site for the IDW storage.
1810: Returned to ~~site~~ trailer for the day after dropping
off IDW drum

MB 6/23/16

6/24/16 JBER-PFC T. Callear

Weather: rainy & 65F

Crew: Bristol AK: Mick, Bobby CHZM: Tara (scribe), Jason

0800 Meet @ CH trailer; H&S meting held; supplies gathered; yesterday's 'lesson learned'; calibrate MultiRAE (see cal form) (MD)

0830 arrived at CFTA-2 to allcon (GTAK); scoped out CFTA-3 site layout; GTAK refueled; confirmed safety w/ users of training area

0900 discussed strategy w/ GTAK

0930 loaded rods and relocated to CFTA-3; plane at fire training area ignited; decision made to set concrete for all three CFTA wells at once - for efficiency and due to heavy conditions; set traffic safety cones

1000 started recon of rods @ new site near building; took pre site photos and set up sampling station

1030 finished site set up; rain died down; GTAK cut pavement to begin drilling; 4 inch thick asphalt

1100 began drilling w/ 8040-2

1200 liner for 0→5ft got stuck so unable to follow core wedge method not followed; poured contents all into bowl; called FTL to advise

1230 sampled 5→10ft; no problems; Morgan asked that we redrill 0→5ft to get proper sample; GTAK may do macro core in new spot by end of day

1245 sampled 10→15ft; no problems; need to wait to bottle sample until the 0-5ft is drilled again; Kept MultiRAE near sample & drill area

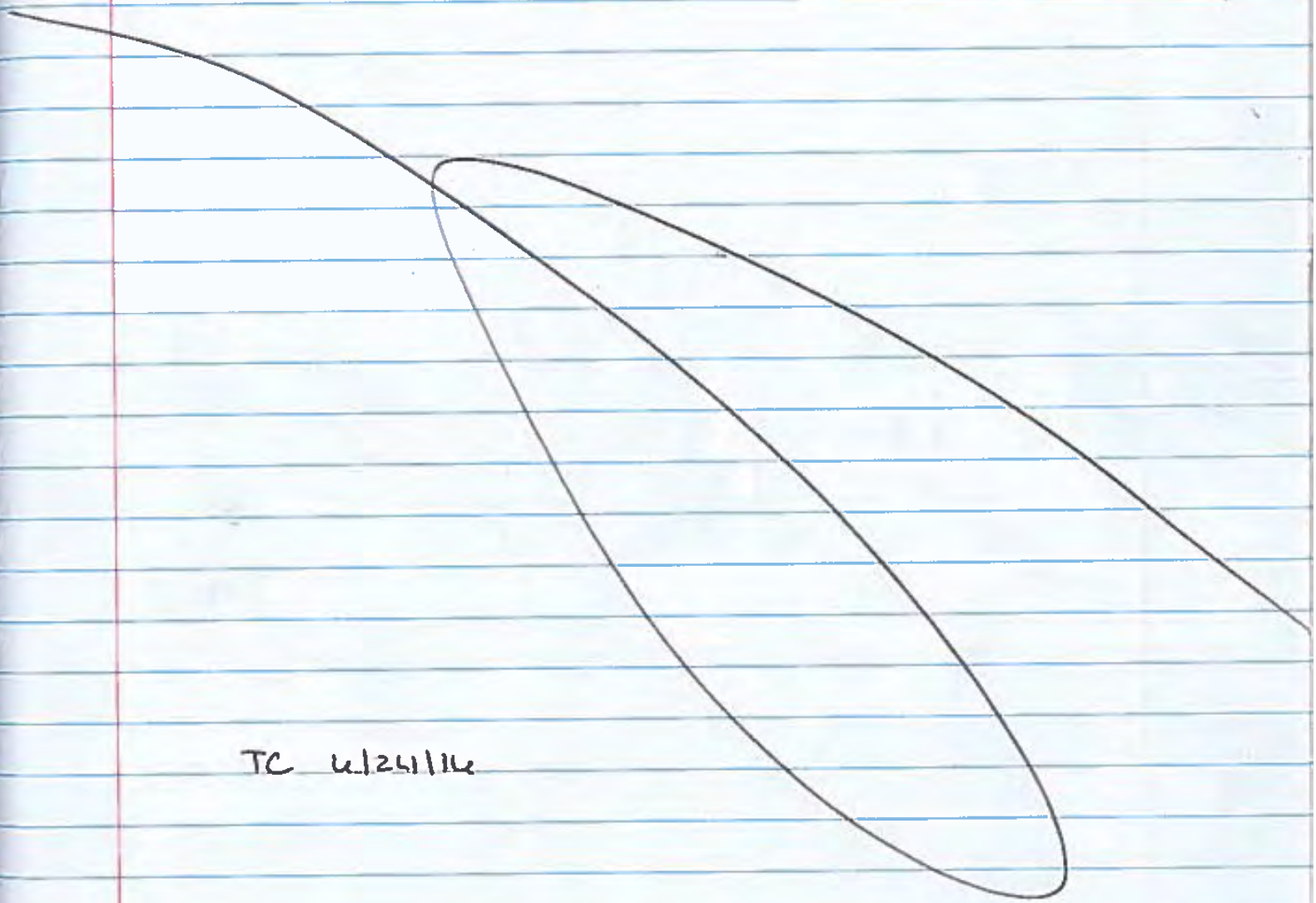
1350 Pushed macro core from 0-5ft @ 1ft NW of CFTA-3 hole.

~~1350~~ TC collected and consolidated w/ 5-10ft and 10-15ft

1400 samples and prepared for shipment to Test America for analysis WS-LC-0035

6/24/16 JBER-PFC T. Callear

1500 stopped drilling - hammer too hot, need to cool
1520 resumed drilling
1700 stopped drilling for day @ 55 ft; site clear up and LOW. Transfer soil cuttings to Drum 0001
1745 back to CH trailer to demob and debrief
1800 done for today ☺



TC 6/24/16

6/25/16 JBER-PFC scribe: T. Callear

weather: 59°F partly cloudy, chance of rain PPE: ear protect; hard hat, safety vest, eye

crew: gotek AK: Mick, Bobby CH2M: Tara, Jason

objective: finish drilling 55 ft → BOH, install well, possibly start CFTA-1

0800 met @ CH trailer for health & safety ↑

0845 safe behavior observation - unload rig (see form) CFTA-1

0900 set up sample station

0920 began to drill @ 55ft

1100 decision was made by driller to change approach bic of slow progress; instead of using point to push through @ 60+ft → water, the sampler rod was put in place to (hopefully) speed up

1200 sampled core at 60 → 65 ft and 65 → 70 ft to look for wetes; moist at 68ft but WLI did not signal for presence of water

1300 sampled 70 → 75ft; very moist but no signal on WLI yet; switched drill from core sampler to direct push

1345 drilling continued while drill helper went for fuel; fire tainy arrived and discussed site safety; sampled EB for spoon, bowl and putty knife for analysis at TA for PFC (see sample worksheet) (MB) EB-02 EB-01 EB-03

1405 Drilled down to 80ft; began construct well; screen from 69 → 79ft; refueled rig quickly

1420 installing PVC prepack 2 x 5ft each 0.020 in slot 10/20 sand; 8 x 10ft each of schedule 40 2 in. blank PVC (no screen); asked drillers to remove possibly contaminated gloves for install

1430 began adding sand

TC 6/25 hrs

MB 6/25/16

6/25/16 continued — scribe: T. Callear & J. Olsen

1445 difficulty removing casing w/out pulling PVC well casing along w/ it; tried using rig to push PVC through the shoe; while pushing PVC it broke 15ft down; may need to remove all casing and PVC - TBD

1500 did not push through shoe - actually broke @ 20ft

1520: Pull remaining drill casing. Drillers to replace shoe with expendable point.

1545: Removed casing. Shoe is oval shaped. Driller replace shoe with expendable point.

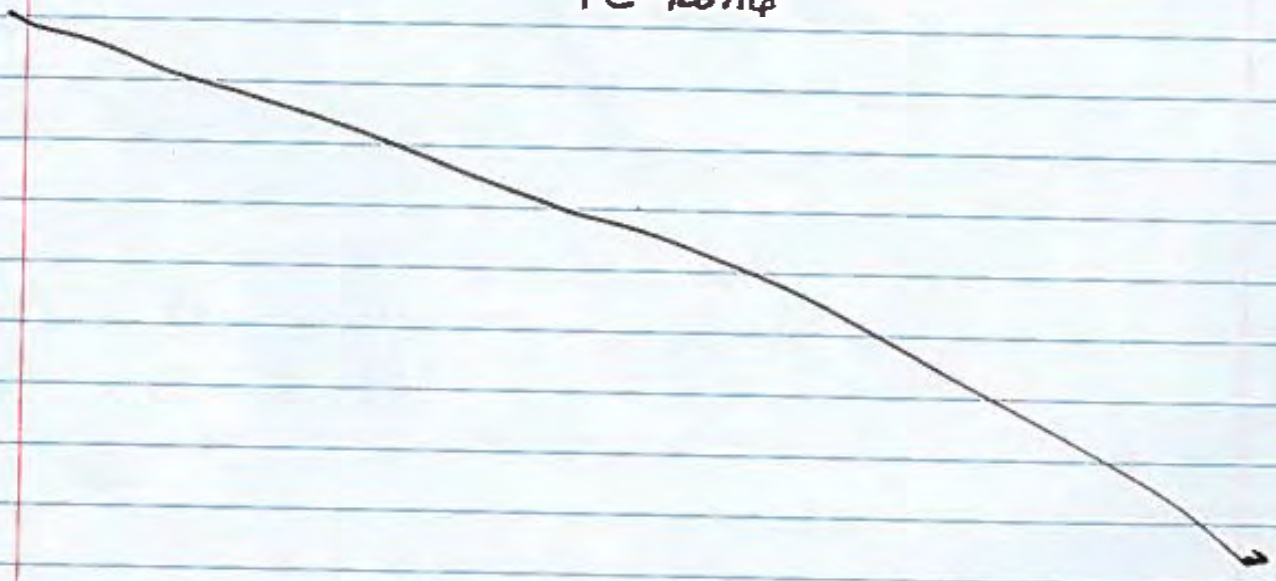
1550 Put drill casing back down to 80'.

1600 slow redrill likely due to cave in from above - need up the bottom; discussed possibly using auger tomorrow

1700 stopped at 54ft and cleaned out, packed van and loaded rig

1730 dropped off 1.5 buckets of waste soil at IDW barrel and returned to CH2M trailer (Drum D001) MB

1800 demob and debrief TC 6/25/16



MB 6/25/16

6/27/16 scribe: T. Callear

weather: 65°F sunny

crew: CH: Tara Callear & Jason Olsen GT: Mick & Orlin

PPE: hearing protection, safety vest, hard hat, eye protection

0900 calibrated MultiRAE; charged ice packs loaded van and held health and safety brief

0930 departed CH trailer for job site; fueled rig (full) set up sampling tent

1015 drill rig in place Begin pulling DT-45 casing

1115: Mick has to leave to meet his wife @ the gate. Orlin to stay & set up for auger drilling.

1200 finished setting up for drilling

1215 Mick returned and resumed drilling w/ hollow stem augers

1230 prepped drum for IDW soil (D-002).

1420: Drilled CFTA-3 to 80ft with auger. Driller stated that he needed to add water to the borehole because it is heaving into the bottom of the casing.

1510: Pull center rod & start adding water. Begin adding PVC to bore. Add 2x5' 0.020 slot screen, 8x10' 2" sch. 40 blank screen pipe

1515: Pull casing to 68 ft. Tag TD

Begin adding 10/20 sand. Tag sand @ 66 ft.

1525: Pull casing to 63 ft. Tag sand @ 62 ft. Used 1/2 bag of sand total. hole is collapsing in as they pull out.

1535: Begin adding bentonite chips. Alternate pulling casing & adding chips.

1550: Pulled well up ~2ft when pulling casing

1555: Well casing is locked into the auger and comes up or goes

6/27/16 Continued

down with the auger.

1605: Bentonite likely got stuck between the well casing and auger locking the pipe in. Driller add water to try to flush bentonite down & out of the auger. Already had 25ft of auger removed from well.

1620: Adding water didn't fix the problem. Total volume of water added to well is 100 gallons so. Begin pulling remaining auger & well casing

1700: Pulled remaining casing. 2x10ft of 2" blank pvc & 2x5ft of prepack screen stayed in the boring. Begin cleaning up for the day. Driller will back fill the boring and step over to drill the new well. cleaned up site and packed up.

~~1715 depart for CH trailer~~ JO

1725: Backfilled the boring with cuttings. Most of the boring had caved in. Caved to ~5-7'. Cold patch the asphalt.

1750: Load IDW drums D002 & D003 onto trailer to store ~~dispose of~~ JO at FDW yard.

1830 return to CH trailer and demob

TK 6/27/16

MB 6/28

6/28/16 JBER-PFC scribe: Kenji Butler

weather: 55°F, Cloudy Low of 54, High of 69

CH: T. Callear, K. Butler GTAK: O. Sutliff M. McHarley

PPE: same - level D same as yesterday

0800 met at trailer for safety brief; packed van; calibrated MultiRAE; discussed lessons learned from 6/27 and plan for today

0900 fuel for drill rig and headed for CFTA

0935 Arrive at site to install well at CFTA-3, Start off loading rig & equipment

0945 Offsetting well ~5 ft south of original attempt at installing well. Start using chop saw to cut asphalt

1010 Finish removing 4' x 4' x 1' square that was cut out. Start setting up to Auger in new well

1015 Scott from the fire department stopped by to make sure we will be working tomorrow and him that we will be here today and will move to CFTA-1 tomorrow. Fire crews may perform training today in

1030 Start drilling w/ Geoprobe 8040 DT rig using 9¼ ID, 6¼ OD augers, going to 80 ft BGS with well being set at 79 ft with 10 ft of pre-packed screen

1055 Auger has advanced to 28 ft BGS, continue drilling

1137 At 58 ft BGS, stopping here for a moment, GeoTek crew needs to meet up for supplies being dropped off

1150 Supplies arrive onsite. 4 drums, 4 buckets of ¼" TR30 Pel-Plugs, 6 bags of Quik-Grout, 5 bags of Gold

1155 Incoming drum Inspection Form completed for 4 drums received

1200 Continue drilling from 58 ft BGS

1230 Depth of 80 ft reached with the augers, continue shoveling cuttings in to drums

1240 Start removing Geotek rods and installing the well, water being added to change well due to heave

1315 Start installing well w/ 2X 5 ft section of 20 slot (0.020 in) pre-packed screen, 8X 10 ft sections blank screen, all 2" and Schedule 40 PVC.

1335 Used ½ bag of Bentonite to come up to ~66 ft BGS, well is set closer to 74 ft due to shifting

1345 Start adding ¼ TR30 Pel Plugs from 66 ft - 61 ft BGS, will hydrate once poured in.

1350 1 bucket of ¼ TR30 Pel Plugs used.

1355 Hydrated Pel plugs, Mick starts setting up to mix quick grout in buckets

1415 Start pouring in quick-grout and pulling up augers

1515 Used ~ ¾ bag of quick grout to make ~15 gallons of grout mix surface poured in, up to 22 BGS

6-28-2016

JBEC PFC 6/28/16

1530 Crew continue to mix quik grout and start putting lids on drums
1630 Total of 3 bags of Quik grout used to make ~30 gallons of grout to each 12 ft BGS. Continue to work on loading drums onto flatbed trailer
1750 left CFTA-3 to drop IDW - 4 total barrels D004 - D007 + 4 buckets added to D001
1805 arrive at trailer to demob & debrief

6-28-2016

6-29-2016 JBER-PFC Scribe: K. Butler

0740 Onsite to prep for todays fieldwork
Weather: Partly Cloudy, Low of 52°, High of 70°, Currently 57°
Objective: Decon equipment used at CFTA-3, Finish surface completion of CFTA-3, mob to CFTA-1 and start drilling well boring.
Crew: T. Callear/ANC & K. Butler/ANC for CH2M; O. Sutliff & M. McHenry for GeoTek
PPE: Sun protection, Level D
Air Monitoring: MultiRAE calibrated at 0745, See calibration log for details
0820 Start tailgate/H_2S meeting. Discussed well boring adjustments & Decon.
0830 Finish meeting. Crew heads out to start decoming of augers & rig
0845 Issues with getting the sump pump to draw water out of tank. Trying to resolve issue
0905 O. Sutliff leaves site to pickup new sump-pump
1000 O. Sutliff back onsite w/pump & additional water
1005 GeoTek crew heads to gas station then onto site
1030 Arrive at CFTA-1 location. Crew starts setting up to decon & drill at location
1110 Start direct pushing 2 1/4" Macro Core sampler
1115 0-5 ft section recovered continue on w/ 5-10 ft & 10-15 ft
1145 Sampled 16Q2 CFTA-1-SO-0, 16Q2 CFTA-1-SO-0MS, 16Q2 CFTA-1-SO-0SD from 0-15 ft BGS for PFC analysis. Used 2 1/4" macro core system to collect Soil
1147 Crew switches to Augers to advance down to 80 ft to install well
1215 Augers have advanced to 25" BGS
1240 At 49 ft BGS, continue augering
1430 At 82 ft BGS, This is TD, start removing center rod and installing well to 79 ft BGS.
1431 Auger is jammed up, not rotating. Clockwise to clear the hole, pulling back 5 ft & trying and make rams/brian grind to get augers spinning again
1440 Still having issues with the augers, pulling up another 5 ft to un jam the augers
1540 55 ft of auger had to be removed before augers were freed up to spin again. Crew is taking a break before attempting to go back down
1550 Start re installing inner rod into augers
1615 Inner rod got jammed into the bull cap and slightly deformed the tap. Grinding will be needed to fix

MB 6/29

6-29-2016 JBER-PFC

1615 Walked through Hot Work form with GeoTek crew after calling morgan. Orbin will do the grinding while Mick will do the fire watch.

1617 Start grinding on inner drill rod (Grinding on metal inner rod)

1627 Grinding complete. Crew continues to advance augers

1711 Stopped at 48 ft BGS, 50 ft is at top of auger sticking out of the ground 2 ft. 4 drums of soil generated

1725 Empty decon tub out into drum, ~20 gallon of water in the drum (DP12)

1733 Start loading up drums onto trailer to take over to the IDW storage location. Drum D008-D012

1750 Finished loading up drums and clearing out site for the day. Head to IDW storage area to drop off 5 drums

1800 Arrive at IDW storage are. Start working on dropping off drums

1830 All 5 drums have been offloaded at the IDW storage area. Drums are labeled accordingly Crew heads back to field trailer

1835 Back at field trailer to complete paperwork

1845 Finished for the day. Back at it tomorrow at 0800

6-24-2016

MB
CMG

6-30-2016 JBER-PFC Scribe: K. Butler/HNL

0750 Morgan Calibrates the Multi RAE, See Calibration log for details
Weather: Partly Cloudy, Low of 52 High of 69 w/ Chance of afternoon showers
Objective: Finish install of CFTA-1 & CFTA-3 and surface completions. This includes drilling from 50-80' w/ Geoprobe 8040 DT Rig at CFTA-1
Crew: K. Butler/HNL, T. Collier/AMC Chem, O. Sutliff & M. McKinney
PPE: Same as before, Level D
Air monitoring: Multi RAE, calibrated, See above
0815 Start tailgate/HPS meeting.
0825 Finished tailgate meeting, discussed well completions and possible next well location
0835 Crew all packed up and ready to head out. Stop by gas station for fuel on the way out
0900 Arrive onsite. GeoTek starts setting up on CFTA-1 to center drilling from 50' to 80' BGS
0925 Start drilling with augers. Office heads out to CFTA-3 to pressure Pea gravel & work on surface completion
1035 Down to 73 ft and backed up again
1050 Going to start pulling out augers and switch to DT-45 for well installation
1155 Augers have been removed from CFTA-1, Teeth on cutting head have been worn away. Start prepping rig to use DT-45 rods for well install
1210 Start drilling with DT-45 rod. Will advance to ~82 ft BGS and attempt to set well at 74 ft BGS
2 bags of Hole plug used to get the grout, which had settled down to 12 ft BGS, up to 10 ft BGS. It was hydrated and given time to swell up. 2½ bags of pea gravel used to go from 10 ft to 2 ft BGS. Used 3 bags of Multi-purpose concrete mix to go from 2 ft to 4" BGS, currently setting, Will use cold patch to go from 4" to ground surface to complete construction around the 8" monument
1430 Still drilling, at 35 ft BGS. Finished cold patching pad at CFTA-3
1545 Sampled 16Q2-SOEB-JB05 Equipment Blank for cutting shoe & macrocore liner for PFCs analysis
1550 Sampled 16Q2-SOEB-JB04 Equipment Blank for liner cutter for PFCs analysis.
1555 Morgan Brown takes sample cooler to be shipped
1710 Reached 50 ft BGS w/ DT-45 rods
1740 At ~52 ft BGS, stopping for today.
1950 depart for CH trailer
1605 demob & debrief

6-30-2016

MB 6/30/16

7-1-2016 JBER-PFC Scribe: K. Butler/HNL

0750 Arrive at field trailer to prep for todays activities. M. Bruno has already calibrated the MultiRAE SN#C-102717, See calibration log for details

0755 Went over some notes from quality review. Will make adjustments accordingly

0800 GeoTek crew onsite, Start Tailgate/Hand S meeting

Weather: Overcast. Some drizzle, Low of 53°F, High of 64°F

Objective: Finish drilling down to ~82 ft BGS at CFTA-1 and install the well at ~74ft BGS
Finish surface completion and transport all equipment back to the field trailer

Crew: CH2M: K. Butler/HNL, GeoTek Alaska: O. Sutliff, M. McHaney

PPE: Same as before, Level D

Air Monitoring: MultiRAE, Calibrated, see notes above

0815 Finish Tailgate/Hand S meeting, discussed, Trigger states (mainly Complacency on fridays)

0820 Field crew heads to gas station to fuel up GeoProbe rig

0835 Leave gas station to head to CFTA site

0850 Arrive at site. Start offloading GeoProbe rig and setting up to continue drilling w/ DT-45

0855 Start drilling for today, at ~52ft BGS

1235 Have been continously drilling, now at 64ft BGS, Upper most section of DT-45 rod broke at the threads crew is working to remove broken thread part from the ~~lower~~ rod

1245 Crew pulled up on DT-45 string to remove lower section of rod to remove the broken off thread section. Checked to see if plug (expendable tip) was still in place. It is not. Tape measure went beyond where the tip should be, Start pulling out drill string

1255 Pulling out drill string. Another section has broken. Have possibly lost 45ft of rod in the ground

1300 Updated Morgan by phone. Discussed the need to grout and abandon the hole just drilled before going to the next one

1305 GeoTek crew starts working on switching to 6½ inch OD Augers to try and install this well.

1315 Open hole was tagged to 45ft BGS, Start pouring bble Plug into open hole

1325 11 x 50lb bags used to go from 45ft to 10ft BGS. will use pea gravel to complete to surface.

1415 Crew finishes setting up to start augering again. Moving well location to the South 5ft. Start drilling

1525 At 45ft BGS with 6½ inch OD augers, continue drilling. Cutting are going into drums

1615 Reached 82ft BGS, Start taking out inner rod to set well

1645 Finished putting in 2x5ft schedule 40 PVC Pre packed screen and 8 section of Schedule 40 pvc riser, 4 1/2 inch

7-1-2016 MB 7/1/16

7-1-2016 JBER- PFC

1710 Start adding sand used ½ 50 lbs bag of ~~quartz~~ Silica Sand (10/20) to come up to 65 ft. will put in Pel-Plug to make seal before mixing up grout.

1720 Start adding Pel-Plug and mixing Quikgrout in 5 gallon bucket batches. Bucket used to come up to 60 ft BGS

1745 Start pouring in grout into the augers and pulling up rod

1850 With 15 ft of auger left to pull out, auger string slipped back down the hole. Top of hoisting collar at ~5 ft BGS, Crew attempts to retrieve the augers

1950 Crew was able to retrieve the augers at the expense of the well. Crew unscrewed the PVC riser and it came off 20 ft BGS. They were then able to get their hook onto the hoisting roller and pull out the augers while trying to rethread the riser, ~2 ft of soil had fallen on top of the riser in the well. Crew was unable to rethread the riser back on.

2000 Called Morgan with an update. Crew starts breaking down and loading up for the weekend.

2055 Crew wrapped up and headed back to field trailer.

2110 Back at field trailer, will come back in at 9am to attempt well install again

7-1-2016

MS 7/1/16

7-2-2016 JBER-PFC Scribe: K.Butler/HNL

0850 Arrive onsite to prep for todays activities
0910 Calibration of the MultiRAE SN# C-102717, See calibration log for details
0920 Start Tailgate / H&S meeting
Weather: Mostly Cloudy, Low of 50, High of 67°F
Objective: Install CFTA-1
Crew: CH2M: K.Butler/HNL GeoTEK: D.Sutliff & M.McHaney
PPE: Same as before, Level D
Air Monitoring: MultiRAE, calibrated, see calibration log for details
0925 Crew starts loading up equipment / Supplies for the day
0935 Head over to IDW Storage area to drop of 4 drums of soil cuttings from yesterdays well install attempt
0943 Arrive at IDW Storage area, start work on offloading drums
1015 Finished dropping off 4 drums (D013 - D016). Head to CFTA site
1025 Arrive at CFTA site, start offloading GeoProbe 8040 Rig, New well location will be 5ft North of original
1030 Orlin heads offsite to pick up drums for todays drilling
1040 Used 2 bags of pea gravel to fill to the top of the original boring location 24 bags total used to fill from 10ft to surface. there was a void at 10ft. Used 7 bags of hole plug (3/8 inch chips) to come up to 10ft BGS. Used 4 bags of pea gravel to come to surface on South step at location. Continue setting up
1130 Start drilling w/ 3¼ inch ID augers at North 5ft stepout. Using Geoprobe 8040 DT rig
1210 Have reached 20 ft BGS continue drilling
1255 Orlin back on site w/ 3 drums and a few other items
1350 At 70ft BGS, crew continuing on to ~80ft BGS
1410 At 82ft BGS, TD of boring. Setup to start removing inner rod and install well
1417 Start pulling inner rod from augers
1435 Start installing the 2x 5ft section of Schedule 40 prepacked PVC Screen 2 inches in diameter with 8x 10ft sections of Schedule 40 PVC Riser 2 inches in diameter
1620 Used ½ bag of 10/20 sand to come up to 65ft BGS. Used 1 bucket of Pel plugs (¼ inch TR30) to come up to 60ft. Mixed 1 bag of Quick grout w/ 35 gallons of water to bring grout to ~10ft BGS, will top off ~~tomorrow~~ Wednesday
1705 Leave Site and head to drop off 3 drums at IDW Storage area
1720 Arrive at Storage area, start offloading drums D017 - D019
1740 Head back to field trailer for end of the day

[signature] 7-2-2016 MB 7/2/16

JBER-PFC

Scribe: K.Butler/HNL

7-5-2016

0730 Drive onsite to prep for todays activities

0800 Start calibration of MultiRAE SN# 102717, See calibration log for details

0823 Start Tailgate/H&S meeting w/GeoTek crew

Weather: Light rain, Low of 53, High of 64

Objective: Finish installation of CFTA-1 surface mount. Decon and move to AT052

Crew: CH2M K.Butler/HNL, R.Laird/SAL, GeoTek, O.Staff, M.Hay

PPE: Same as before Level D

Air Monitoring: MultiRAE, Calibrated, see note above

0835 Finish meeting start backing up vehicle and GeoTek looks at getting down and decon.

0945 COMPLETE DECON. MOB TO IDW STAGING AREA. DRILLERS GET FUELS FOR TRUCKS/RIG

1005 DRILLERS AT SITE AT IDW STAGING AREA. PREPARE TO OFFLOAD DECON WATER FROM CFTA-1 INTO DRUM #012

1008 ADDED 16 GAL DECON WATER TO DRUM #012

1012 MOB TO CFTA-1 TO COMPLETE SURFACE COMPLETION

1023 AT CFTA-1, PREPARE TO ADD PEA GRAVEL. BENTONITE SEAL TO 10 FT BGS AT CFTA-1

1028 ADD 3 BAGS (60 lbs) OF PEA GRAVEL. PREPARE SURFACE COMPLETION-FLUSH MOUNT

1040 INSTALL SONDE TUBE AND CUT DOWN CASING FOR FLUSH MOUNT

1045 INSTALL WELL BOX, BEGIN MIXING CONCRETE FOR SURFACE COMPLETION

1057 ADDED 10 GAL CONCRETE, COMPLETE FLUSH MOUNT SURFACE COMPLETION.

1105 MOB TO AT052 TO DRILL

1135 SET UP RIG GEOPROBE 8040DT AT AT052-1, PREPARE SAMPLE STATION

1150 BEGIN DRILLING WITH 2" x 5' LONG MACRO CORER WITH ACETATE LINERS

1225 COLLECT SAMPLE 16Q3AT052-1-SO-0 FROM 0 TO 15 FEET BGS AT LOCATION AT052-1 FOR ANALYSIS OF PFCs (WS-LC-0025) WITH 2 x 16 oz POLY UNPRESERVED CONTAINERS.

1230 BEGIN DRILLING WITH 6 1/2 INCH OD AUGERS

1245 AT 15 FEET BGS WITH 6 1/2" AUGERS

mjh 7/5/16

7-5-16 JBER - PFC SCRIBE: KENJI BUTLER/HNL RENEE CAIRD/S4C

1325 REACHED TD ~ 40 FEET BGS. BEGIN ~~TRIPPING~~ TRIPPING OUT CENTER DRILL RODS

1350 TAGGED DEPTH TO WATER (DTW). BORING DRY. ALLOW BORING TO RECHARGE (IF NECESSARY)

1400 TAGGED DTW AT AT052 - DRY. DECIDE TO DRILL ADDITIONAL 10 FEET TO 50' BGS

1415 BEGIN TRIPPING IN DRILL ROD AT AT052-1. K. BUTLER TEXTED M. BRUNO ON PLAN FOR AT052-1

1445 TD BORING AT 50 FEET BGS. BEGIN TRIPPING OUT DRILL ROD.

1450 TAGGED DTW AT CLOSE WELL ~~AB~~ RC AE-5782 = 147.89 FEET ~~BGS~~ BTOC RC. M. BRUNO ONSITE RELAYS NOTE THAT WE WERE EXPECTING A PERCHED AQUIFER AT AT052-1 WHICH WAS NOT ENCOUNTERED. AQUIFER AT OTHER WELLS AT AT052 FOUND AT APPROX. 150 FT BGS. WAIT TO HEAR C. HINDS (CH2M) ON PLAN FOR WELL INSTALL. WILL NEED TO DRILL LOCATION WITH AN ALTERNATE METHOD OF DRILLING TO GO 150'

1455 M. BRUNO MOB BACK TO FIELD OFFICE.

1510 TAG DTW AT BORING AT052-1. BORING DRY. TRIP OUT AUGERS. WILL DRILL DEEPER WELL WITH ALTERNATE METHOD. START CLEANING SITE.

1525 RYAN BECK RC ~~GEOTECH~~ GEOTEK EMPLOYEE ONSITE, DROPPED OFF DRUMS TO FIELD OFFICE / CONNEX DROPPED OFF FIRE HYDRANT CONNECTION KIT

1535 R. BECK OFFSITE.

1540 COMPLETE TRIP OUT OF AUGERS, TOWER DOWN RIG. PREPARE TO BACKFILL WITH 3/8" BENTONITE CHIPS.

$$50\text{ FT} \times 1.72\text{ GAL/FT} = 86\text{ GAL} \times \frac{1\text{ BAG}}{5\text{ GAL}} = 17.2 \times 50\text{ lb BAGS}$$

1548 ADDED 6 BAGS BENTONITE, TAG BOTTOM AT 12 FEET BGS. ~~WILL COME BACK~~ HYDRATE CHIPS RC

1555 ~~TO CONTINUE BACKFILL (NEED MORE MATERIALS) AND~~ RC ADD PEA GRAVEL FROM 12FT BGS. BORING NATURALLY BACKFILLED.

1600 ADDED 6 BAGS OF PEA GRAVEL. AT052-1 BACKFILLED.

1615 MOB TO FIELD OFFICE.

1625 AT FIELD OFFICE DRILLERS PREPARE TO DECON EQUIPT. AND CONTAINERIZE SOIL FROM AT052.

~~1715~~ 1815 RC MOB TO IDW STAGING AREA.

- MB 7/5/16 -

7-5-2016 JBER - PFC SCRIBE: R. CAIRD/SAC

1750 STAGED 3 DRUMS (D020, D021 - SOIL & D022 WATER) ON PALLETS FROM AT052-1. DRILLERS MOB TO FIELD OFFICE TO STAGE VEHICLES. K. BUTLER / R. CAIRD LOCK IDW YARD. MOB TO FIELD OFFICE. APPROX. 65 gal SOIL / 15 gal DECON WATER STORED FROM AT052

1800 EOD. WILL MEET DRILLERS TOMORROW 7-6-16 AT 0800

R. Caird
7-5-2016

mb

7-6-16 JBER - PFC SCRIBE: R.CAIRD / SAC

0740 ONSITE TO PREPARE FOR DAILY ACTIVITIES

0745 START CALIBRATION OF MULTIRAE #C102717. SEE CALIBRATION LOG FOR RESULTS

WEATHER: MOSTLY CLOUDY, COOL - 57° F (AM)

OBJECTIVES: DRILL / INSTALL WELL AT ~~FS-4~~ FS4-1 RC, SOIL SAMPLING, DECON / IDW MANAGEMENT

CREW: CH2M K.BUTLER / HNL, R.CAIRD / SAC; GEOTEK: O. SCTLIFF, M.MCHANEY

PPE: LEVEL D (AS BEFORE)

AIR MONITORING: MULTIRAE, CALIBRATED (SEE ABOVE / CALIBRATION LOG)

0810 GEOTEK ONSITE.

0815 HOLD H&S TAILGATE / DAILY BRIEFING. TOPICS: TRAFFIC SAFETY, PROPER PPE.

0830 MOB TO FS-4. DRILLERS REFUEL RIG / VEHICLES

0840 COMPLETE SITE WALK. STEP OUT FS4-1 3.5 FT NW OF FENCE / ORIGINAL MARKED LOCATION AND 8.5 FEET AWAY FROM MARKED COMMUNICATIONS LINE.

0845 INFORM FIRE STATION 4 CREW WE WILL BE WORKING AT THIS SITE, SHOW LOCATION. THEY WILL MOVE FIRE TRUCK 7 TO ALLOW US TO ACCESS WELL LOCATION FROM PARKING LOT.

0847 DRILLERS ONSITE AT FS4

0851 BEGIN SETTING UP DRILL EQUIPT. AT FS4-1

0918 BEGIN DRILLING WITH A 5 FT LONG x 2" OD MACRO CORER WITH ACETATE LINERS COLLECTING CONTINUOUS CORE FROM 0 TO 15' ~~BGS~~ FOR LITHOLOGIC LOGGING AND TO COLLECT SOIL SAMPLE. AT FS4-1

0939 COMPLETE DRILLING TO 15' BGS WITH MACRO CORER. PREPARE TO DRILL WITH 6.5" OD AUGERS TO TD OF 83' BGS.

0950 COLLECT SAMPLE 1603FS4-1-S0-0 FROM 0 TO 15 FEET BGS AT LOCATION FS4-1 FOR ANALYSIS OF PFCS (METHOD WS-LC-0025) WITH 2 x 16 OZ POLY UNPRESERVED, HOMOGENIZED OVER SAMPLE INTERVAL

1009 BEGIN DRILLING WITH 6.5" OD AUGERS FROM SURFACE, WITH 4-PRONG DRILL BIT AND CENTER DRILL RODS.

1200 R.BECK (GEOTEK) ONSITE. BREAK.

1215 BREAK OVER. R.BECK OFFSITE.

mB 7/6/16 RC 7-6-16

7-6-2016 JBER - PFC SCRIBE: R. CAIRD/S...

1237 TD BORING FS4-1 AT 83.5' BGS, BEGIN TO TRIP OUT CENTER DRILL ROD. DRILLER B. Z. PID = 0.0 ppm THROUGHOUT DRILLING.

1248 TAGGED DTW: 67.25' BGS. DTB = 83.5' BGS, FS4-1

1300 TAGGED DTW = 63.00' BGS. CALL M. BRUNO TO DISCUSS WELL DESIGN. K. BUTLER / M. BRUNO DISCUSS WATER LEVEL, DECIDE TO SCREEN WELL AT TOP OF WATER TABLE. AT FS4-1

1308 TAG DTW = 62.09' BGS

1310 TAG DTW = 62.01' BGS. STABLE. WILL SCREEN 62 TO 72' BGS, K. BUTLER DISCUSSED WITH M. BRUNO.

1320 BEGIN TRIPPING OUT AUGERS ALLOW BORING TO NATURALLY BACKFILL BOTTOM 10 FEET.

1336 BEGIN ADDING 10/20 SAND AT 72.5' BGS.

1338 INSTALL WELL CASING, 0.5 FT BOTTOM CAP TAPPERED SCHD 40 PVC 10 FEET PREPACKED 0.010-INCH SLOT SCREEN SCHD 40 PVC, WITH 62 SCHD 40 PVC RISER.

1350 TOO MUCH STICK UP AFTER INSTALLING CASING. PULL CASING FROM WELL TO DRILL OUT HEAVE WITH 6.5-INCH OD AUGERS.

1400 UNABLE TO REAM OUT HEAVE WITH AUGERS ALONE. TRIP IN CENTER DRILL TO PUSH OUT HEAVED MATERIAL AND SAND.

1420 TRIP OUT CENTER DRILL RODS.

1428 BEGIN INSTALLING CASING AS ABOVE.

1432 BOTTOM OF CASING AT 73 FT BGS. WILL ADJUST TO 72 FT BGS

1447 CASING STILL STUCK IN AUGERS, ADD 2.5 GAL WATER (POTABLE) TO AUGERS

1455 UNABLE TO PUSH CASING BACK TO 72 FT. TRIP OUT CASING AND TRIP CENTER DRILL ROD. POSSIBLE THAT AUGERS WERE NOT COMPLETELY CLEANED OUT FIRST ATTEMPT AND ONE 5 FT AUGER MAY BE FULL OF HEAVED MATERIAL. ATTEMPT TO CLEAN OUT WITH CENTER RODS

1545 TRIPPED OUT CENTER ROD. TAGGED AT 72' BGS BUT MATERIAL IS COMING UP WITH AUGERS - POSSIBLE BLOCKAGE WITHIN AUGER. WILL TRIP OUT ...

MB 7/6/16

7-6-2016 JBER - PFC SCRIBE: R. CAIRD / SAC

TO TROUBLESHOOT AND REDRILL LOCATION

1620 COMPLETE TRIP OUT, NO BLOCKAGE OBSERVED. PREPARE TO REDRILL TO 75 FEET BGS WITH PLASTIC PLUG IN AUGER.

1625 BEGIN REDRILLING FS4-1 WITH 6.5 INCH OD AUGERS.

1650 TD AT 73 FEET BGS. INSTALL WELL CASING

1700 WELL CASING INSTALLED, KNOCKED OUT PLASTIC PLUG. BEGIN TRIPPING OUT AUGERS

1714 INSTALLED FILTER PACK SAND (#10/20) TO 59 FT BGS. CONTINUE TO TRIP OUT AUGERS.

1717 TAGGED TOP OF FILTER PACK AT 55 FEET BGS, APPROX. 4 FEET NATIVE SANDS FELL ONTO SAND PACK. TOTAL 1 BAG (50 lb) SAND ADDED.

1719 ADD 1/4 INCH BENTONITE PELLETS

1720 1 x 5 GAL BUCKET PELLETS ADDED. UNABLE TO TAG TOP BECAUSE PELLETS STUCK TO SIDE OF AUGER AT 25 FT BGS. WILL ATTEMPT TO POUR BENTONITE GROUT TO PUSH THROUGH PELLETS / GROUT PAST BLOCK. MAY NEED TO POUR GROUT THROUGH OPEN HOLE RATHER THAN TREMIE THROUGH AUGERS

1740 POUR 5 GAL BENTONITE GROUT THROUGH AUGERS. CONTINUE TO TRIP OUT AUGERS

1745 CONTINUE GROUTING THROUGH AUGERS.

1817 POURED 40 GALS GROUT (1 x 50 lb BAGS QUICK GROUT) AND TRIPPED OUT REMAINING. GROUT REMAINING (TO 10 FT BGS) WITH 3/8-INCH HOLE PLUG

1830 ADDED 6 x 50 lb BAGS OF 3/8-INCH BENTONITE CHIPS (HOLE PLUG). HELPER WENT TO PICK UP MORE BAGS. DRILLER STARTS TO CLEAN SITE.

1855 ADDED 7 x 50 lb BAGS (TOTAL: 13 BAGS) OF HOLE PLUG (3/8-IN BENTONITE CHIPS) TO 14 FEET BGS. HELPER MOB TO PICK UP ADDITIONAL BAGS OF HOLEPLUG.

1915 BEGIN LOADING 55-gal DRUMS ONTO TRAILER

1931 LOADED FOUR DRUMS (DΦ23 - DΦ26) ONTO TRAILER

1935 ADDITIONAL 3 BAGS HOLEPLUG ADDED (TOTAL: 16 BAGS) TO 10 FT BGS. ADDED 3 x 60 lbs BAGS 3/8-PEA GRAVEL FROM 10 FT TO 2 FT BGS. WILL FINISH SURFACE COMPLETION TOMORROW ~~7-6-2016~~ 7-7-2016 RC AS MONUMENT.

1945 MOB TO FIELD OFFICE.

RC 7-6-16

MA 7/6/16

7-6-2016 JBER - PFC SCRIBE: R. CAIRO/SC

1955 AT FIELD OFFICE COMPLETE PAPERWORK WITH DRILLER

1959 DRILLERS OFFSITE EOD. MEETING GEOTEK TOMORROW 7-7-2016 AT

7-6-2016

7-7-2016 JBER-PFC SCRIBE: R.CAIRD/SAC

0745 ONSITE, PREPARE FOR TODAYS ACTIVITES

0750 CALIBRATE MULTIRAE #C102717, SEE CALIBRATION LOG FOR RESULTS

WEATHER: COOL, CLOUDY - 56°F (AM)

OBJECTIVES ~~ACTIVITIES~~: COMPLETE SURFACE COMPLETION AT FS4-1, DECON EQUIPT., STAGE IDW DRUMS, DRILL/INSTALL WELL ~~HS-1~~ CCH-1 RC, COLLECT SOIL SAMPLE AT ~~HS-1~~ CCH-1 RC

CREW: CH2M: K.BUTLER/HNL, R.CAIRD/SAC; GEOTEK: M.MCHANEY, O.SCTLIFF

PPE: LEVEL D (AS BEFORE)

AIR MONITORING: MULTIRAE, CALIBRATED (SEE ABOVE/CALIBRATION LOG)

0810 O.SCTLIFF ONSITE

0815 HOLD TAILGATE SAFETY MEETING. TOPICS: TRAFFIC, PROPER EQUIPT./METHODS, SLIPS, TRIPS, FALLS.

0822 M.MCHANEY (GEOTEK) ONSITE. GO OVER H&S DISCUSSED/TAILGATE.

0825 R.CAIRD AND O.SCTLIFF MOB TO FS4 TO FINISH SURFACE COMPLETION AT FS4-1. K.BUTLER AND M.MCHANEY MOB TO IDW STAGING AREA TO OFFLOAD DRUMS FROM FS4-1.

0830 ARRIVE AT FS4, PREPARE SURFACE COMPLETION, STOVEPIPE MONUMENT WITH SONOTUBE BASE.

0845 CUT OFF TOP OF CASING WITH BROKEN SLIP CAP, REPACE WITH NEW, FUNCTIONAL SLIP CAP (LOCKING). WELL CASING APPROX. 2.5 FEET ABOVE GROUND, INSTALL STOVEPIPE MONUMENT APPROX. 3.4 FEET ABOVE GROUND.

0852 BEGIN MIXING CONCRETE FOR SURFACE COMPLETION

0900 POURED APPROX. 10 GAL CEMENT, USED TWO x 60 lb BAGS CONCRETE MIX 4000 PSI

0905 TAGGED DTW AT FS4-1 AT 62.92' BTOC

0910 NEED TO PICK UP SAND TO FILL MONUMENT AND COVER FOR MONUMENT. MOB BACK TO FIELD TRAILER.

NOTE: BEFORE/AFTER PHOTOS OF FS4-1 - SEE PHOTO LOG.

0925 DRILLERS MOB TO ADD SAND TO MONUMENT, FILL UP WATER TOTE.

NOTES FROM KENJI BUTLER:

0830 ARRIVE AT IDW STAGING AREA

0840 BEGIN OFFLOADING DRUMS, LABELS FOR D023 | D026 LOST ADHESIVE. WILL NEED

RC 7-7-16

mg 7/7/16

7-7-2016 JBER-PFC SCRIBE: R. CAIRD/S

NEW LABELS

0910 WRAPPED UP, MOB TO FIELD TRAILER.

0920 ALL CREW MEMBERS ONSITE AT FIELD TRAILER.

0925 DRILLERS MOB TO GET WATER FOR TOTE.

0930 OBJECTIVE CHANGE: WILL BE DRILLING AND INSTALLING MW AT CCH-1 INSTEAD OF ~~H5~~ H5

0945 R. CAIRD OFFSITE TO PUT LOCK ON FS4-1 MONUMENT

1000 DRILLERS ONSITE, PREPARE TO DECON EQUIPMENT WITH PRESSURE WASHER.

1005 R. CAIRD AT FIELD TRAILER

1007 BEGIN DECONING EQUIPMENT. WATER USED TO DECON (OBTAINED FROM ONBASE FIRE HYDRANT) IS BROWN, NO ODOR.

1110 COMPLETE DECONING EQUIPMENT. LOAD VEHICLES / RIG.

1112 MOB TO CCH. STOP TO FUEL VIHICLES/RIG.

1153 ARRIVE AT CCH-1. BEGIN SETTING UP AT LOCATION

1213 BEGIN DRILLING WITH 2INCH MACRO CORE WITH ACETATE LINERS. CONTINUOUS CORE COLLECTED FROM 0 TO 15 FT BGS FOR LITHOLOGIC LOGGING AND SOIL SAMP. AT CCH-1

1245 M. BRUNO (CH2M) ONSITE. COMPLETE DRILLING WITH MACROCORER AT 15 FT BGS. PREPAR TO DRILL WITH HOLLOW STEM, WILL CONT. LOGGING CUTTINGS.

1248 BEGIN DRILLING WITH 6-INCH OD AUGERS AND 2 INCH CENTER DRILL ROD.

1250 COLLECT SAMPLE 1603CCH-1-SO-0 FROM 0 TO 15 FT BGS, HOMOGENIZED CCH-1 FOR ANALYSIS OF PFC (METHOD WS-LC-0025) WITH 2x(500ml) UNPRESERVED POLYS

1255 COLLECT FIELD DUPLICATE 1603CCH-1-SO-1 FROM SAME INTERVAL AND SAME ANAYSES AS ABOVE WITH 2x16OZ UNPRESERVED POLYS CCH-1

1305 M. BRUNO OFFSITE, TOOK SAMPLES / COC TO DROP OFF ~~FOR~~ SHIPMENT TO LAB

1315 DRILLED TO 33.5 FT BGS. TRIP OUT CENTER DRILL ROD TO TAG DTW

1335 TAGGED DEPTH TO WATER (DTW). DRY AT 33.5 FEET BGS. CONTINUE DRILLING 43FEET BGS AT CCH-1

JC 7-7-16

MB 7/7/16

7-7-2016 JBER - PFC SCRIBE: R.CAIRD/SAC

1350 DRILLED TO 43 FEET BGS. TRIP OUT CENTER DRILL ROD TO TAG DTW AT CCH-1

1355 HAVING DIFFICULTIES TRIPPING OUT CENTER DRILL ROD, SEEMS STUCK NEAR BASE AS ITS ATTEMPTING TO DRAG AUGERS UP AS WELL.

1405 CENTER DRILL RODS REMOVED, ALLOW BORING TO RECHARGE, IF NECESSARY, APPROX. 9FT OF HEAVED MATERIAL

1415 TAGGED DTW = 15.8 FEET BGS, BUT 9 FEET HEAVED MATERIAL

1420 DRILLER ATTEMPTING TO REMOVE HEAVE, TRIP BACK IN CENTER ROD. K.BUTLER CALL M.BRUNO TO DISCUSS WELL DESIGN. WILL ATTEMPT TO REMOVE HEAVE TO INSTALL WELL.

1437 ADDED 7 GALLONS POTABLE WATER TO CCH-1

1440 BEGIN TRIPPING OUT CENTER DRILL ROD.

1455 UNABLE TO GET ACCURATE DTW READING WITH HEAVE INAUGERS, 4 FT OF HEAVE AT 36 FT BGS. PULL AUGERS AND WILL TAG DTW IN OPEN HOLE.

1520 TAG DEPTH TO WATER AT 11.12 FEET BGS. RC WITH AUGERS AT 20 FEET BGS WILL TRIP OUT REMAINING 20 FEET OF AUGER AND TAG DTW

1530 PULLED AUGERS, OPEN BORING TD = 36 FEET BGS, DTW = 11 FEET BGS. K.BUTLER CALL TO DISCUSS WITH M. BRUNO. M.BRUNO WILL DISCUSS WITH C HINDS (CH2M)

1544 M.BRUNO DISCUSSED WELL DESIGN WITH C.HINDS (CH2M) WILL SET WELL AT 43 FT BGS, SCREENED ~~38~~ 33 RC TO 43 FT BGS WITH 2 INCH SCHD 40 PVC 0.010 IN SLOT SCREEN WITH PREPACKED FILTER PACKS, AND 33 FEET OF RISER. WELL DESIGN WILL HAVE #10/20 FILTER PACK SAND TO 2 FT ABOVE SCREEN (31 FT BGS), 3 TO 5 FT BENTONITE SEAL, AND BENTONITE GROUT TO 10 FT BGS, PEA GRAVEL FROM 10 FT TO 2 FT BGS AND MONUMENT SURFACE COMPLETION.

1550 DRILLERS BEGIN TRIPPING IN WITH PLUG AT END OF AUGERS.

1619 TD BORING CCH-1 AT 43 FEET BGS PREPARE TO INSTALL WELL CASING AS ABOVE.

1625 INSTALL WELL CASING AT CCH-1 BEGIN TRIPPING OUT AUGERS.

1645 ADDED 12.5 GAL POTABLE WATER TO WELL TO MAINTAIN HEAVE. CONTINUE TRIPPING OUT AUGERS

1658 HEAVED MATERIAL STILL COMING THROUGH AUGERS. ADD WATER TO BORING TO FLUSH OUT.

1714 ADDED ADD. 20 GAL POTABLE WATER. CONTINUE PULLING AUGERS. TOTAL VOL. POTABLE WATER INJECTED IS APPROX. 40 GALLONS CCH-1

7-7-16

7/7/16

7-7-2016 JBER - PFC SCRIBE: R. CAIRD

1717 HEAVED MATERIALS STILL STUCK IN AUGER. TRIP AUGERS OUT.

1730 TRIPPED OUT TAGGED BOTTOM AT 34 FT BGS. ADDED 1.75 x 50 lb BAGS OF # SAND. SAND NOT SETTLING THROUGH WATER, TAGGED AT 12 FT. WILL LET SETTLE OVERNIGHT. COVER WELL WITH DRUM. * BEGIN CLEANING SITE.

1800 MOB TO IDW STAGING AREA TO DROP OFF DRUMS.

1825 ARRIVE AT IDW STAGING AREA. PREPARE TO OFFLOAD DRUMS. R. MOB TO FIELD TRAILER TO GET MORE LABELS

1829 R. CAIRD BACK ONSITE WITH LABELS. UPDATE DRUMS + WASTE TR LOG AS NECESSARY.

1845 OFFLOADED 2 x 55 gal DRUMS ONTO PALLETS AT IDW STAGING AREA (D027, D APPROX. 25 GALLONS ADDED TO D012 FROM DECON OF SITES FS4-1, EE

1848 MOB TO FIELD TRAILER

1855 COMPLETE PAPERWORK WITH DRILLERS

1900 GEOTEK OFFSITE. EOD.

R. Caird
7-7-2016

7-8-2016 JBER - PFC SCRIBE: R.CAIRD/SAC

0720 O.SCHLIFF (GEOTEK) AND M.BRUNO (CH2M) ONSITE. GEOTEK BEGINS DECONING EQUIPMENT WITH PRESSURE WASHER.

0745 R.CAIRD AND K.BUTLER (CH2M) ONSITE PREPARE FOR TODAY'S WORK.

0755 CALIBRATE MULTIRAE C102717, SEE CALBRATION LOG FOR RESULTS

WEATHER: COOL, MOSTLY CLEAR, SUN, 60°F (AM), HOT, SUNNY, SLIGHT BREEZE - 73°F (PM)

OBJECTIVES: DECON EQUIPMENT, COMPLETE WELL INSTALLATION AT CCH-1, DRILL/INSTALL WELL AT FSS, IDW SAMPLE CONTAINMENT, SOIL SAMPLE COLLECTION

CREW: CH2M: R.CAIRD/SAC, K.BUTLER/HNL; GEOTEK: M.MCHANEY, O.SCHLIFF

PPE: LEVEL D, AS BEFORE.

AIR MONITORING: MULTIRAE, CALIBRATED SEE RESULTS ABOVE / IN CALIBRATION LOG

0813 M.MCHANEY ONSITE. COMPLETE DECONING EQUIPMENT

0815 HOLD SAFETY TAILGATE. TOPICS: SAFE WORKING PACE, FOLLOWING AHAS

0820 LOAD VEHICLES, PREPARE TO COMPLETE CCH-1

0846 MOB TO CCH, STOP TO REFUEL RIG AT GAS STATION

0915 ONSITE AT CCH. TAG DTW AT CCH-1 = 7.9 FT BGS PREPARE TO FINISH WELL INSTALL. NOTE WATER TAGGED AROUND WELL CASING

0919 TAG WELL = 16 FT BGS. SAND APPROX. 15 FT ABOVE TOP OF SCREEN. CALL M.BRUNO

0922 DRILLERS BEGIN ADDING HOLE PLUG (3/8 IN MEDIUM BENTONITE CHIPS)

0925 ASK DRILLERS TO WAIT TO CONTINUE ADDING BENTONITE UNTIL WE HEAR BACK FROM M.BRUNO. TAGGED DTW INSIDE CASING = 17.2 FEET BGS.

0930 M.BRUNO CALLED. WE NEED TO REDRILL THE WELL BECAUSE THERE IS EXCESS SAND ABOVE TOP OF SCREEN. POSSIBLE BRIDGING. WILL ATTEMPT TO ABANDON WELL, PULL CASING. MOVE LOCATION 5 FEET EAST OF ORIGINAL LOCATION. SEE PHOTO LOG FOR PHOTO DOCUMENTATION. SAME WELL DESIGN AS NOTED YESTERDAY FOR CCH-1 (7-7-2016)

0943 ATTEMPT TO PULL CASING FROM ORIGINAL CCH-1 LOCATION.

0945 RECOVER 23.4 FT WELL CASING. BEGIN ADDING HOLEPLUG TO ABANDON WELL.

0947 ADDED TOTAL 3 x 50 lb BAGS HOLEPLUG TO 8 FT BGS. BEGIN ADDING PEA GRAVEL

0950 ADDED 7 x 60 lb BAGS PEA GRAVEL TO SURFACE. BEGIN SETTING UP TO DRILL AT CCH-1 STEPPED OUT 5 FT EAST OF ORIGINAL LOCATION.

RC 7-8-16

mrf 7/8/16

7-8-16 JBER-PFC

0955 BEGIN DRILLING WITH 6.5 INCH OD AUGERS WITH [illegible] PLUG AND FIVE PRONG DRILL BIT. SUGGESTED USING CENTER DRILL BIT BUT DANGER THINKS THE PLUG WILL WORK TO 43 FEET BGS. PID BREATHING ZONE (BZ) = 0.0 ppm

1038 ~~WET~~ RC WET CUTTINGS OBSERVED AT ~33 FEET BGS

1053 TD BORING AT 45 FEET BGS. PREPARE TO INSTALL WELL CASING. RECOMMEND BORING BE CHARGED WITH POTABLE WATER PRIOR TO KNOCKING OUT PLUG TO MINIMIZE RISK OF HEAVING MATERIALS IN AUGERS

1056 ADD POTABLE WATER TO CHARGE AUGERS.

1105 ADDED 32 GALLONS POTABLE WATER TO AUGERS PRIOR TO KNOCKING OUT PLUG. PREPARE TO INSTALL WELL CASING AT CCH-1

1115 INSTALL CASING AT CCH-1 SET AT 43 FT BGS, ALLOW BENTONITE TO NATURALLY BACKFILL

1126 KNOCK OUT PLUG WITH WELL CASING. BEGIN PULLING AUGERS

1142 TAG WELL AT 31.5 FEET BGS. BEGIN ADDING #10/20 SAND

1150 ADDED 0.5 x 50 lb BAG #10/20 SAND. ~~TAGGED~~ RC UNABLE TO GET TAPE THROUGH AUGERS TO TAG SAND. ADD ~2 GALLONS POTABLE WATER TO WASH DOWN SAND POTENTIALLY CLOGGING AUGERS

1205 ATTEMPT TO FIX WEIGHT AT END OF MEASURING TAPE TO ADD WEIGHT

1214 BEGIN PUMPING WATER INTO AUGERS

1215 PUMPED 2 GAL WATER INTO AUGERS, ATTEMPT TO TAG

1218 GLENN ROSSIN (GEOTEK) ONSITE TO HELP TROUBLESHOOT

1235 ADDED 3 GAL WATER INTO AUGERS (TOTAL 39 GAL)

1244 UNABLE TO GET ACCURATE TAG. CONTINUE TO TRIP OUT AUGERS

1310 TRIPPED OUT AUGERS. TAG DEPTH TO SAND AT 9 FEET BGS. REMOVE AND COLLAPSE.

1314 CALL M. BRUND (CH2M) TO DISCUSS PLAN FOR CCH-1

1316 PREPARE TO ABANDON LOCATION

1318 BEGIN ADDING 3/8 INCH BENTONITE CHIPS (HOLE PLUG) TO BOREHOLE FROM 9 FT

1320 ADDED 2 x 50 lb BAGS HOLEPLUG TO 6 FT BGS. BEGIN ADDING PEA GRAVEL

1325 ADDED 6 x 60 lb BAGS PEA GRAVEL FROM 6 FT TO SURFACE. PREPARE TO SET OUT BORING 5 FT EAST (10 FT EAST OF ORIGINAL BORING)

7-8-2016 JBER - PFC SCRIBE: R CAIRD/SAC

1340 SET UP RIG TO DRILL STEPOUT#2 (10 FEET EAST OF ORIGINAL LOCATION)

1345 BEGIN DRILLING STEP OUT #2 WITH 6.5 INCH O.D. AUGERS, WOOD PLUG IN FOUR PRONG DRILL BIT

1430 TD BORING AT 43 FEET BGS. CHARGE AUGERS WITH POTABLE WATER

1439 ADDED ~25 GALLONS OF POTABLE WATER. PREPARE TO INSTALL WELL CASING.

1440 INSTALL WELL CASING AT CCH-1, 2nd STEPOUT 10FT EAST OF ORIGINAL BORING, BASE OF CASING AT 43.5FT, KNOCK OUT WOOD PLUG.

1445 UNABLE TO KNOCK OUT PLUG WITH WELL CASING, PULL CASING, BEGIN TRIPPING IN ROD TO KNOCK OUT WOOD PLUG FROM DRILL BIT.

1450 KNOCKED OUT WOOD PLUG. TRIP OUT CENTER ROD AND RE-INSTALL WELL CASING. BASE OF WELL CASING AT 43.5 FT BGS, SCREEN 33 TO 43 FT BGS.

1500 BEGIN TRIPPING OUT AUGERS

1510 PULLED 2 FLIGHTS OF AUGER (10FT) TAGGED 35 FT BGS BEGIN ADDING SAND SLOWLY USING A CUP. AND TAGGING

1630 ADDED 1.75 x 50 lb BAGS #10/20 SAND FOR FILTER PACK TO ~30.8 ~~INCHES~~ FEET BGS. BEGIN ADDING 1/4 INCH BENTONITE PELLETS (PEL-PLUG) FROM 30.8 FT.

1652 ADDED 0.25 x 5 GAL BUCKET PEL-PLUG TO 28.1 FEET BGS. PREPARE TO GROUT USING QUICKGROUT MIX.

1700 BEGIN MIXING BENTONITE GROUT

1735 POURED APPROX. 30 GALLONS BENTONITE GROUT THROUGH AUGERS. FINISH TRIPPING OUT AUGERS. ALLOW GROUT TO SETTLE. GROUT AT 5 FEET BGS ALLOW GROUT TO SETTLE OVERNIGHT. BEGIN CLEANING SITE.

1805 MOB TO IDW STAGING AREA TO DROP OFF DRUMS FROM DRILLING.

1823 ARRIVE AT IDW STAGING AREA. OFFLOAD DRUMS.

1855 OFFLOADED 4x55 gal DRUMS (DØ29 THROUGH DØ32) WITH SOIL CUTTINGS FROM CCH-1, AND 1x55 gal DRUM (DØ33) WITH DECON WATER FROM CCH-1, APPROX 20 GAL DECON WATER CONTAINED IN DRUM DØ33.

1856 MOB TO FIELD TRAILER COMPLETE PAPERWORK.

1905 DRILLERS OFFSITE.

7-8-2016

mb 7/8/16

7-9-2016 JBER - PFC SCRIBE: R. CAIRD / SAC

0750 R. CAIRD AND K. BITLER (CH2M) ONSITE, PREPARE FOR TODAY'S ACTIVITIES.

0755 CALIBRATE MULTIRAE [illegible], SEE CALIBRATION LOG FOR RESULTS

WEATHER: SUNNY, WARM - 62°F (AM)

OBJECTIVES: COMPLETE SURFACE COMPLETION AT CCH-1, DRILL / INSTALL SS044-1, COLLECT SOIL SAMPLE, DECON AND [illegible] STORAGE

CREW: CH2M: R. CAIRD / SAC, K. BITLER / [illegible]; [illegible] M. MCHANEY, D. SCHUFF

PPE: LEVEL D, AS BEFORE

AIR MONITORING: MULTIRAE, CALIBRATED SEE ABOVE / CALIBRATION LOG

0800 BEGIN DECONING EQUIPMENT, D. SCHUFF

0805 M. MCHANEY ONSITE

0810 HOLD PTSP TAILGATE TOPICS: [illegible] DANGERS, [illegible] PCBs + SOLVENTS, PROPER PPE + MONITORING FOR SIGNS OF HEAT STRESS

0905 MOB TO CCH-1, DRILLERS [illegible] RIG

0930 ARRIVE AT CCH-1. SITE CONDITIONS AS LEFT YESTERDAY 7-8-16 - GOOD

0935 PREPARE TO FINISH WELL INSTALLATION AT CCH-1 [illegible] AT 5 FT BGS BEGIN ADD 3/8 PEA GRAVEL

0940 ADDED 4 × 60 lb BAGS PEA GRAVEL FROM 5 FT TO 2 FT BGS. PREPARE TO CONSTRUCT SURFACE COMPLETION, [illegible] PICKUP

0950 INSTALL SONOTUBE AND MONUMENT, UNABLE TO POUR CONCRETE BECAUSE ABOUT 0.5 FEET OF BENTONITE GROUT CAME TO SURFACE, NEED TO WAIT FOR GROUT TO SET TO PLACE CONCRETE AND [illegible] FOR SURFACE COMPLETION.

1000 MOB TO SS044.

1010 ARRIVE AT SS044. SITE CONDITIONS AS EXPECTED BUT NEED TO MOVE BORING SS044-1 APPROX. 12.5 FEET SOUTH OF MARKED LOCATION TO AVOID [illegible] UTILITIES LINES AROUND MARKED LOCATION. M. BRUNO ONSITE. [illegible] FOR SITE COND.

1021 TAG DTW AT AP 2982 = 12.94 FEET BTOC (~15.5 FT BGS)

1030 M. BRUNO OFFSITE.

1032 BEGIN SETTING UP RIG AT SS044-1, WILL NEED TO [illegible] AS THEY GO SET UP TEMPORARY DECON STATION.

R[illegible] [illegible] 7/9/16

7-9-2016 JBER - PFC SCRIBE: R.CAIRD/SAC

1058 BEGIN CUTTING THROUGH ASHALT WITH HAND HELD SAW STIHL TS470

1105 O. SCHLIFF OFFSITE TO GET FUEL ADDITIVE FOR SAW. HAULT WORK UNTIL HE IS BACK.

1142 O. SCHLIFF ONSITE. PREPARE TO CONTINUE CUTTING THROUGH ASPHALT AND TO DRILL SSØ44-1

1145 REFUEL AND CONTINUE CUTTING THROUGH ASPHALT

1153 BROKE OUT ASPHALT, 2.5 INCHES THICK, 1.5 x 1.5 FT SQUARE REMOVED.

1207 BEGIN DRILLING AT SSØ44-1 WITH ~~2~~ 4.5 RC INCH OD X 5 FOOT ~~MACROCORER~~ DUEL TUBE (DT4.5) RC COUPLED WITH ACETATE LINERS FROM 2.5 INCHES BGS, DIRECTLY BENEATH ASPHALT, CONTINUOUS CORES COLLECTED FROM 2.5 IN BGS TO 15 FT BGS FOR LITHOLOGIC LOGGING AND SOIL SAMPLING

1217 CORE WET FROM 2.5 TO 6 FT BGS. SEE BORING LOG FOR PID MONITORING.

1246 GROUNDWATER OBSERVED AT 13 FT BGS. STOP CORING AT 15 FT BGS CONTINUE DRILLING WITH DIRECT PUSH WITH DT4.5 NO CUTTINGS GENERATED FROM 15 FT BGS.

1310 COLLECT SAMPLE 160735SØ44-1-SO-Ø FROM 0.5 FT TO 13 FT BGS AT SSØ44-1 FOR ANALYSIS OF PFCs (METHOD WB-LC-ØØ25) WITH 2 x 16 OZ UNPRESERVED POLYS, HOMOGENIZED OVER SAMPLE INTERVAL.

1311 BREAK FROM DP TO ALLOW RODS TO COOL, WILL CONTINUE HAMMERING FROM ~20 FT

1322 CONTINUE HAMMERING DT4.5 ROD FROM 20 FT BGS AT SSØ44-1

1350 TD SSØ44-1 AT 23.5 FT BGS. BEGIN TRIPPING OUT CENTER ROD AND PREPARE TO INSTALL 2 INCH MONITORING WELL SCHD 40 PVC SCREENED 13 TO 23 FT BGS WITH 2 INCH SCHD 40 0.010-IN SLOT SCREEN WITH PRE-PACKED FILTER PACK. WILL INSTALL #10/20 FILTER PACK SAND FROM 23 TO 11 FT BGS, BENTONITE SEAL FOR ~~2 FEET AND BENTON~~ 11 (MD) FEET TO 6 FT BGS LC, AND PEA GRAVEL FROM 6 FT TO 2 FT BGS. WILL COMPLETE WITH FLUSH MOUNT SURFACE COMPLETION

1359 BEGIN INSTALLING WELL CASING

1405 WELL CASING INSTALLED AT 23.4 FT BGS, WITH 0.4 FT END CAP (SCHD 40 PVC) BEGIN TRIPPING OUT OUTTER DRILL CASING (DT4.5)

1420 BEGIN ADDING #10/20 SAND TO SSØ44-1, INITIAL TAG AT ~~23.00~~ 18.00 RC FT BGS.

1445 ADDED 2.25 x 50 lb BAGS #10/20 SAND TO 11 FT BGS LC. BEGIN ADDING 1/4 INCH BENTONITE PELLETS FROM 11 FT BGS, SO PELLETS WILL FIT THROUGH SHOE OF OUTTER DRILL CASING, CONTINUE PULLING DRILL CASING RODS.

LC 7-9-16 mo 7/9/16

7-9-2016 JBER-PFC SCRIBE: R.CAIRD/SAC

1515 ADDED APPROX. 2 GALLONS 1/4 INCH BENTONITE PELLETS TO 6 FT BGS. PULL REMAINING AUGERS.

1520 HYDRATE BENTONITE PELLETS WITH 2 GALLONS WATER. ALLOW PELLETS TO HYDRATE AT LEAST 30 MINS.

1550 NATIVE SOIL COLLARED ON BENTONITE SEAL FROM 6 FT TO 2 FT BGS WILL PREPARE FLUSH MOUNT SURFACE COMPLETION AT SS044-1

1600 BEGIN MIXING CONCRETE (MULTIPURPOSE CONCRETE MIX 4000 PSI ASTM)

1615 POURED 10 GALS (1.75 x 60 lb BAGS) CONCRETE FOR 22 IN x 19 IN SURFACE COMPLETION. CUT DOWN WELL CASING.

1625 FINISH WELL INSTALLATION AT SS044-1. SEE PHOTO LOG FOR PHOTO DOCUMENTATION. CLEAN SITE.

1640 MOB TO CCH-1 TO SEE IF GROUT SET. O. SCHLIFF MOB TO OBTAIN CONES TO DELINEATE NEWLY INSTALLED SS044-1.

1652 AT CCH-1 PREPARE TO COMPLETE SURFACE COMPLETION CONCRETE.

1657 BEGIN MIXING CONCRETE.

1717 POURED 10 GALS (2 x 60 lb BAGS) CONCRETE FOR SURFACE COMPLETION AT CCH-1, ABOVE-GROUND STOVEPIPE MONUMENT WITH 16 INCH SONOTUBE BASE.

1720 CUT DOWN WELL CASING, ADDED ~~0.5~~ 1.5 ft x 50 lb BAGS #10/20 SAND INTO MONUMENT. SURFACE COMPLETION FINISHED AT CCH-1. LOCKING CAP INSTALLED

1729 MOB TO FIELD TRAILER

1750 AT FIELD TRAILER. BEGIN DECONING AUGERS AND DT 4.5. DECON WATER KEPT SEPARATE FOR SITE SS044.

1755 COMPLETE PAPERWORK WITH DRILLER.

1835 COMPLETE DECONING EQUIPMENT. GEOTEK OFFSITE. EOD.

R Caird 7-9-2016

MB 7/9/16

7-11-2016 JBER-PFC SCRIBE: R.CAIRD/SAC

0745 ONSITE PREPARE FOR TODAYS ACTIVITIES

0750 CALIBRATE MULTIRAE C102717 - SEE CALIBRATION LOG FOR RESULTS.

WEATHER: OVERCAST, COOL: 55°F (AM), OVERCAST, WARM - 64°F (PM), SLIGHT DRIZZLE

OBJECTIVES: DECON EQUIPMENT, IDW STORAGE / SAMPLING, DRILLING / WELL INSTALLATION AT FASTA-1, SOIL SAMPLING

CREW: CH2M: K.BUTLER / HNL, R.CAIRD / SAC, ~~T.CALLEAR / ANC~~ RC, GEOTEK: M.MCHANEY, O.SCHLIFF

PPE: LEVEL D, AS BEFORE

AIR MONITORING: MULTIRAE C102717, CALIBRATED, SEE RESULTS ON CALIBRATION LOG.

0815 M.MCHANEY ONSITE.

0830 O.SCHLIFF ONSITE.

0831 HOLD PTSP, TAILGATE TOPICS: SLIPS, TRIPS, FALLS.

0835 BEGIN DECONING DT45 AND LOADING TRUCK FOR DRILLING

0905 COMPLETE DECON / LOADING MOB TO FUEL RIG AND TO IDW STAGING AREA.

0937 AT IDW STAGING AREA. BEGIN OFFLOADING IDW FROM SSØ44 (SOIL + WATER)

0950 APPROX. 7.5 gal SOIL AND APPROX. 3 GAL WATER FROM SSØ44 ~~AND~~ RC (DØ34, DØ35) AND 30 GALS WATER ADDED TO DØ33 FROM CCH-1

0954 MOB TO FASTA-1

1015 AT FASTA. BEGIN SETTING UP EQUIPMENT. SITE CONDITIONS AS EXPECTED. OBSERVED MARKED WATER LINE >5 FT EAST OF BORING FASTA-1

1045 TROUBLESHOOTING PROBLEMS WITH RIG (GEOTEK)

1100 DRILLER POINTS OUT PROBLEM: DURING RIG INSPECTION HE NOTICE BLACK SOOT INSIDE THE RIG AND THAT THE MUFFLER TO THE EXHAUST SYSTEM WAS DAMAGED. WILL NEED TO FIX BEFORE WE BEGIN DRILLING WITH THE RIG (GEOPROBE 8040DT #2)

1115 GEOTEK WILL TAKE THE CATALYTIC CONVERTER (EXHAUST SYSTEM) TO THEIR SHOP TO WELD NEW BRACKETS TO SECURE IT BACK IN PLACE.

NOTE: SEE PHOTO LOG FOR SITE CONDITIONS / FIELD PHOTOS.

1130 GEOTEK MOB TO ANC SHOP. TO FIX CATALYTIC CONVERTER. K.BUTLER / R.CAIRD MOB TO COMPLETE IDW SOIL SAMPLE COLLECTION, COLLECT SUPPLIES FROM TRAILER

1150 MOB TO IDW ~~STAGING AREA~~

RC 7-11-16

-MM 7/11/16

7-11-2016 JBER-PFC SCRIBE: R.CAIRD

1300 BEGIN COLLECTING IDW SAMPLES

1315 COLLECTED SOIL IDW [1603-JB-IDW01-SO] FROM DRUMS DØØ1 THROUGH [illegible] FOR VOCS, SVOCs, PH, METALS, PCBS, SEE SAMPLE WORKSHEET.

1330 M.BRUNO (CH2M) ONSITE TO FINISH IDW SAMPLE COLLECTION. R.CAIRD [illegible]

~~13~~ MOB TO FASTA TO MEET GEOTEK AT SITE

1350 AT FASTA. DRILLERS FIXING RIG WITH REPAIRED CATALYTIC CONVERTER

1425 RIG FIXED. BEGIN DRILLING WITH 2 INCH MACROCORER WITH ACETATE LINERS COLLECT CONTINUOUS CORE FROM 0 TO 15 FT BGS FOR LITHOLOGIC LOGGING AND SOIL SAMPLING AT FASTA-1.

1500 SAMPLED TO 15 FT BGS WITH MACROCORER PREPARE TO DRILL WITH HOLLOW AUGER, 6 INCH OUTER DIAMETER (OD) AUGERS WITH 4 PRONGED DRILL BIT AUGER PLUG (TO PREVENT HEAVING)

1505 COLLECT SOIL SAMPLE [1603 FASTA-1-SO-Ø] FROM Ø TO 15 FT BGS, HOMOGEN OVER INTERVAL, FOR PFC (METHOD WS-LC-0025) WITH 2x16oz UNPRESERVE POLYS FROM FASTA-1

1507 BEGIN DRILLING WITH 6 INCH OD AUGERS

NOTE: PERCHED GROUNDWATER OBSERVED FROM 10 TO 13 FT BGS AT FASTA-1

1550 DRILLED TO 40 FT BGS. GW OBSERVED IN CUTTINGS AT APPROX. 24 FT, EXPECT AROUND 27 FT BGS. DRILLERS MORE COMFORTABLE LEAVING AUGERS IN GROUND, KNOCKING OUT PLUG AND INSTALLING THE WELL TO PREVENT BACKFILL/HEAVING

1555 CALL M.BRUNO WITH PLAN. SHE IS OK LEAVING AUGERS IN OVERNIGHT. SUGGESTS [illegible] SOIL IDW PRIOR TO CLOSING DRUM. WILL WAIT FOR M.BRUNO TO BRING IDW SAMPLING CONTAINERS TO SITE FASTA.

1620 M.BRUNO ONSITE.

NOTE: BEGINS RAINING AT ~1620

1630 INFORMED BY DRILLER HE NEEDS TO FILL AUGERS WITH WATER. DECIDE TO FILL TO WHERE SATURATED CUTTINGS WERE OBSERVED

1639 ADDED POTABLE WATER TO 25.5 FT BGS IN AUGERS

1640 BEGIN LOADING EQUIPMENT ONTO TRAILER.

7-11-16

MB

7-11-2016 JBER-PFC SCRIBE: R. CAIRD/SAC

17 02 MOB TO FIELD TRAILER.

1727 AT FIELD OFFICE. GO THROUGH DRILLERS PAPERWORK.

1730 GEOTEK OFFSITE. EOD.

7-11-2016

mg 7/11/16

7-12-2016 JBER-PFC SCRIBE: R.CAIRD/SAC

0750 ONSITE PREPARE FOR TODAY

0800 CALIBRATE MULTIRAE C102717 SEE CALIBRATION LOG FOR RESULTS

WEATHER: SUNNY, WARM-61°F (AM)

OBJECTIVES: FINISH INSTALLING WELL AT FASTA (FASTA-1), DECON EQUIPMENT, IDW STO AND SAMPLE

CREW: CH2M: R.CAIRD/SAC, T. CALLEAR/ANC; GEOTEK: O SCTLIFF, M.MCHANEY

PPE: LEVEL D, AS BEFORE.

AIR MONITORING: MULTIRAE, CALIBRATED, SEE CALIBRATION LOG FOR RESULTS.

0815 O. SCTLIFF ONSITE.

0820 M.MCHANEY ONSITE.

0825 HOLD PTSP, TAILGATE TOPICS: SITE SECURITY, WASP SAFETY.

0835 MOB TO FASTA TO INSTALL FASTA-1. DRILLERS REFUEL RIG

0850 ARRIVE AT FASTA

0910 DRILLERS ARRIVE ONSITE, BEGIN SETTING UP RIG AT FASTA-1 TO INSTALL WELL. FASTA-1 DRILLED TO 40 FT BGS, WATER/WET CUTTINGS OBSERVED AT 24 FT AND POTABLE WATER ADDED TO AUGERS TO 25.5 FT BGS ON 7-11-2016.

0927 TAGGED DTW AT FASTA-1 = 24.5 FT BGS, WITH PLUG STILL IN AUGER

0930 DISCUSS WITH M.BRUNO. WILL INSTALL 2 INCH SCHD 40 PVC MONITORING WELL W/ 10 FT SCHD 40 PVC 0.010 IN SLOT SCREEN FROM 24 TO 34 FT BGS. INSTALL FILTER PACK (PREPACKED) + #10/20 SAND FROM 34 FT TO 22 FT BGS, BENTONITE SEAL AND BENTONITE GROUT TO 10 FT BGS. PEA GRAVEL FROM 10 FT TO 2 FT BGS. AND FINISH WITH STICK-UP MONUMENT SURFACE COMPLETION

0938 DRILLERS PULL BACK AUGERS TO 35 FT, PREPARE TO INSTALL CASING.

0945 INSTALL WELL CASING AND KNOCK OUT PLUG FROM AUGERS.

0955 BEGIN ADDING #10/20 SAND AND TRIPPING OUT AUGERS. TAGGED AT 32 FT BGS. ADD SAND BY CUP AND TAGGING TO PREVENT HEAVE. BREATHING ZONE PID AT FASTA = 0

1100 FINISH INSTALLING #10/20 SAND (3 x 50 lb BAGS) TO 21 FT BGS. CONT. TRIPPING AUGERS PREPARE TO POUR PEL-PLUG BENTONITE SEAL.

1107 BEGIN ADDING 1/4 INCH PEL-PLUG BENTONITE PELLETS.

RC 7-12-16

-MB 7/12/16-

7-12-2016 JBER - PFC SCRIBE: R.CAIRD/SAC

1115 ADDED 2 GALLONS OF 1/4-INCH BENTONITE PELLETS TO 18 FEET BGS. PREPARE GROUT (QUICK GROUT, BENTONITE)

1137 MIXED ~~30~~ 15 RC GAL OF GROUT WITH 0.5 BAGS QUIK-GROUT

1143 BEGIN POURING GROUT THROUGH AUGERS AT FASTA-1, AND TRIP OUT REMAINING AUGERS.

1158 ADDED 15 GALLONS GROUT TO 10 FT BGS AT FASTA-1

1200 CALL M. BRUNO TO GET GAME PLAN. WILL CLEAN UP AT FASTA-1 AND MOB TO FS5. WILL FINISH SURFACE COMPLETION AT FASTA-1 ONCE GROUT HAS HAD A CHANCE TO SETTLE. BEGIN CLEANING SITE.

1230 COLLECT IDW SOIL SAMPLE FROM FASTA, 1603-JB-IDW05-S0 FROM DRUMS DØ36 AND DØ37 FOR GRO, VOCs, DRO/RRO, Herbicides, RCRA METALS, MERCURY, PESTICIDES, PCBs, SVOCs, AND pH WITH 1x4oz JAR PRESERVED WITH MeOH AND 5x4oz UNPRESERVED JARS.

1250 MOB TO FIELD TRAILER

1315 AT FIELD TRAILER. GEOTEK DECONS RIG AND SWITCHES OUT ~~CLEAR~~ RC CLEAN AUGERS FOR DIRTY AUGERS.

1345 COMPLETE DECON / LOADING.

1350 MOB TO FS5. CHECK IN WITH ~~AIRFIELD MANAGEMENT~~ BUILDING 47420 RC

1405 COMPLETE SITE WALK. SITE AS EXPECTED. FS5-1 MARKED 4 FT SOUTH OF GAS LINE MOVE BORING 5 FT SOUTH OF MARKED LOCATION (~9 FT SOUTH OF GAS LINE)

1414 BEGIN SETTING UP EQUIPMENT AT FS5-1, SEE PHOTO LOG FOR SITE CONDITIONS

1430 M.MCHANEY HEARD FROM SHOP, THEY HAVE 4.25 INCH INNER DIAMETER AUGERS. O.SCTLIFF WILL MOB TO PICK UP FROM SHOP WHILE M.MCHANEY MACROCORES FS5-1

1440 BEGIN DRILLING AT FS5-1 WITH 2 INCH MACROCORER WITH ACETATE LINERS. COLLECT CONTINUOUS CORE FROM 0 TO 15 FT BGS FOR LITHOLOGIC LOGGING AND SOIL SAMPLING

1457 GW OBSERVED FROM 3.5 FT TO 7 FT BGS AT FS5-1. DISCUSS WITH M. BRUNO.

1459 CONT. SAMPLING CONT. CORE TO 15 FT BGS AT FS5-1 w/ MACROCORER.

1515 CORED TO 15 FT BGS. DISCUSS WITH M. BRUNO GW OBSERVED FROM 3.5 FT TO 7 FT BGS AND IN 2 IN LENSES FROM 10 TO 13 FEET BGS. DECIDE TO SAMPLE

RC 7-12-16

-MB 7/13/16

7-12-2016 JBER-PFC SCRIBE: RENEE CARD

15 FT TO 20 FEET BGS WITH MACROCORER. IF NO GW OBSERVED FROM 15 TO 20 FT, WILL ABANDON BORING. WILL COLLECT SOIL SAMPLE FROM 0 TO 3.5 FT BGS, JUST ABOVE SATURATED INTERVAL.

1525 CONT. SAMPLING WITH MACROCORER TO 20 FT

1530 COLLECT SAMPLE ~~FRO~~ RC 160SFSS-1-SO-0 FROM 0 TO 3.5 FT BGS, HOMOGEN OVER SAMPLE INTERVAL, FOR ANALYSIS OF PFCs (METHOD WS-LC-0025) WITH 4 x 8oz UNPRESERVED POLYS AT FSS-1

1535 GW OBSERVED AT 17 FEET BGS, END OF CONTINUOUS CORE AT 20 FEET BGS

1540 DISCUSS WITH M. BRUNO TO INSTALL WELL (MONITORING) WITH SCREEN FROM 17 TO 27 FT BGS. O. SCILIFF BACK ONSITE WITH 8 INCH OD AUGERS.

1547 BEGIN DRILLING WITH 8INCH OD AUGERS WITH WOOD PLUG. PLAN: INSTALL 2 INCH MONITORING WELL AT 27 FT BGS SCREEN 17 TO 27 FT BGS WITH 2 INCH SCH 40 PVC 0.010 IN SLOT SCREEN AND 17 FT SCH 40 PVC RISER AT FSS-1. SC HAS PREPACK FILTER PACKS AND WILL BE SUPPORTED WITH #10/20 SAND TO 2FT AB SCREEN (TOP) TO 15 FT BGS. BENTONITE SEAL AND GROUT WITH PEA GRAVEL FR TO 2FT BGS. SEE WELL COMPLETION DIAGRAM FOR DETAILS.

1620 AT 20 FEET BGS NO WET CUTTINGS. TALK TO M. BRUNO ABOUT CUTTINGS.

1625 NO WET CUTTINGS AT 27 FT BGS AT FSS-1 RC 7-12 DUE TO LACK OF WET CUTTINGS, GW INTE NOT LARGE ENOUGH, WILL ABANDON BORING AND DEPENDING ON CLIENTS WISHES WILL DRILL AT DEEPER WELL AT FSS. TD FSS-1 AT 27 FT BGS.

1630 RELAY PLAN TO ABANDON WELL TO DRILLERS.

1640 BEGIN PULLING AUGERS TO ABANDON FSS-1

1652 TRIPPED OUT AUGERS. BEGIN ADDING 3/8 IN BENTONITE CHIPS

1655 ADDED 3 x 50 lb BAGS 3/8 BENTONITE CHIPS

1700 HYDRATE CHIPS. WAIT 10 MINS TO HYDRATE.

1710 BEGIN ADDING PEA GRAVEL FROM 10 FT BGS

1715 ADDED 5.5 x 60 lb BAGS PEA GRAVEL TO SURFACE. BEGIN CLEANING/LOADING EQU

1730 MOB TO FASTA TO FINISH SURFACE COMPLETION AT FASTA-1

1752 AT FASTA TO FINISH SURFACE COMPLETION AT FASTA-1

RC 7-12-16

- MB 7/12/16

7-12-2016 JBER. PFC SCRIBE: R.CAIRD/SAC

1755 GROUT NOT SET, UNABLE TO FINISH SURFACE COMPLETION FASTA-1. MOB TO FIELD TRAILER

1815 BACK AT FIELD TRAILER, GEOTEK WILL DECON / IDW TOMORROW MORNING. EOD.

O. SCHUFF WILL BE ONSITE AT 0700 TO DECON.

7-12-2016

7/12/16

7-13-2016 JBER - PFC SCRIBE: R. CAIRD

0745 ONSITE PREPARE FOR TODAYS ACTIVITIES. O. SCHLIFF ONSITE [illegible] EQUIPMENT / LOADING TRUCK FOR TODAY.

0755 CALIBRATE MULTIRAE C102717. SEE CALIBRATION LOG FOR RESULTS

WEATHER: CLEAR, SUNNY, WARM - 63°F (AM), CLEAR, HOT - 76°F (PM)

OBJECTIVES: FINISH SURFACE COMPLETION AT FASTA-1, DECON / IDW SAMPLE + STORAGE [illegible] AND INSTALL CASTA-1 MONITORING WELL, COLLECT SOIL SAMPLE.

CREW: CH2M: R. CAIRD / SAC, T. CALLEAR / ANC; GEOTEK: O. SCHLIFF, M. MCHANEY

PPE: LEVEL D, AS BEFORE

AIR MONITORING: MULTIRAE, SEE ABOVE / CALIBRATION LOG FOR RESULTS.

0830 M. MCHANEY RUNNING LATE. HOLD PTSP TAILGATE TOPICS: HEAT STRESS

0835 MOB TO FASTA TO FINISH FASTA-1

0855 ARRIVE AT FASTA.

0910 O. SCHLIFF ARRIVES AT FASTA - BEGIN SETTING UP TO FINISH [illegible] SURFACE COMPLETION.

0915 GROUT NOT SET, ADD 6.5 X 50 lb BAGS 3/8 IN BENTONITE CHIPS

0922 M. MCHANEY ONSITE.

0928 MOB TO CASTA. WILL FINISH SURFACE COMPLETION AT FASTA [illegible] GROUT SETS.

0937 COMPLETE SITE WALK AT CASTA. CASTA-1 LOCATION AS EXPECTED. NO [illegible] MARKED. WILL SET UP ON LOCATION AS MARKED.

0947 BEGIN SETTING UP RIG AT CASTA-1

1024 BEGIN DRILLING WITH 2 INCH MACROCORER WITH ACETATE LINERS. COLLECT SAMPLE (CONTINUOUS CORES) 0 TO 15 FT BGS FOR LITHOLOGIC LOGGING AND SOIL SAMPLE AT CASTA-1.

1055 GW OBSERVED FROM 11.5 FT TO 15 FT.

1100 BEGIN DRILLING WITH 8 INCH OD AUGERS WITH WOOD PLUG. L. HINDS [illegible] OUT OF EXCLUSION ZONE.

1110 COLLECT SAMPLE 1603CASTA-1-SO-0 FROM 0 TO 10 FT BGS (ABOVE SAT. HOMOGENIZED OVER SAMPLE INTERNAL FOR ANALYSIS OF PFC (METHOD [illegible]

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WITH 2 x 16 OZ UNPRESERVED POLYS AT CASTA-1

1111 C.HINDS OFFSITE

1130 TD BORING CASTA-1 AT 25 FT BGS, SATURATED CUTTINGS OBSERVED FROM 15 FT BGS WILL INSTALL 2 INCH SCHD 40 PVC MONITORING WELL, SCREEN IS TO 25 WITH 0.010 IN SLOT SCREEN AT CASTA-1. PREPACKED FILTER PACKS AND #10/20 SAND TO 2 FT ABOVE TOP OF SCREEN (13 FT BGS)

1135 INSTALL WELL CASING AT CASTA-1, SEE ABOVE, KNOCK OUT WOOD PLUG

1144 BEGIN TRIPPING OUT AUGERS AND ADDING #10/20 SAND.

1150 ADDED 1.5 BAGS (50 lbs) of #10/20 SAND. TO 13 FT BGS. CONTINUE TRIP OUT AUGERS AND BEGIN ADDING 3/8 INCH BENTONITE CHIPS

1155 ADDED 0.5 x 50 lb BAGS 3/8 BENTONITE CHIPS TO 10 FT BGS. TRIP OUT REMAINING AUGERS.

1200 ALL AUGERS TRIPPED OUT, ALLOW BENTONITE TO HYDRATE.

1210 BEGIN ADDING PEA GRAVEL FROM APPROX. 10 FT ~~BGS~~ BGS RC
ADDED 4.5 x 60 lb BAGS PEA GRAVEL TO 2 FT BGS. BEGIN PREPARING MONUMENT SURFACE COMPLETION AT CASTA-1. APPROX. 60 GALLONS SOIL CUTTINGS REMOVED FROM CASTA-1 STORED IN DRUMS DØ40 AND DØ41.

1221 INSTALL 16-INCH SONOTUBE AT BASE OF MONUMENT. BEGIN CLEANING SITE AND MIXING CONCRETE FOR SURFACE COMPLETION AT CASTA-1

1250 ADDED 3 x 60 lb BAGS OF CONCRETE MIX ~~AND~~ FOR RC 10 GALLONS CONCRETE PLACED IN SONOTUBE AROUND MONUMENT, MONUMENT ~ 3 FT ABOVE GS

1255 ADDED 1.5 x 50 lb BAGS #10/20 SAND TO CASTA-1 MONUMENT, ~~ADDED~~ TO ~2.5 FT ABOVE GS RC 7-13-16

1300 COMPLETE SURFACE COMPLETION AT CASTA-1. SEE PHOTO LOG FOR BEFORE/AFTER PHOTOS OF SITE AND SOIL CORE. MOB TO FASTA-1 TO FINISH SURFACE COMPLETION.

1315 GROUT SET AT APPROX. 10 FT BGS. BEGIN ADDING PEA GRAVEL AT FASTA-1.

1317 PEA GRAVEL (3/8 INCH) 3 x 60 lb BAGS ADDED FROM 10 FT TO 3 FT BGS PREPARE MONUMENT SURFACE COMP.

1538 ADDED APPROX 2 x 60 lb BAGS CONCRETE MIX FOR 6 GALLONS CONCRETE FASTA-1, MONUMENT INSTALLED APPROX. 4 FT ABOVE GROUND SURFACE

1542 ADDED 1.25 x 50 lb BAGS OF #10/20 SAND FROM 2 FT ~~BGS~~ TO 3 FT ABOVE GS IN MONU.

RC 7-13-16

MG 7/13/16

7-13 2016 JBER - PFC SCRIBE: R. CAIRD

1350 FINISH STOVEPIPE MONUMENT AT FASTA-1. MOB TO IDW STAGING AREA

1410 AT IDW STAGING AREA. PREP TO STORE DRUMS / COLLECT IDW SAMPLE

1415 BEGIN OFFLOADING DRUMS FROM FASTA, FSS, AND CASTA.
APPROX. 85 GALLONS SOIL FROM FASTA-1, 55 GALLONS SOIL FROM FSS AND 60 GALLONS FROM CASTA STORED IN DRUMS D036, D037 (FASTA) D038, D039 (FSS), AND D040, D041 (CASTA)

1450 COLLECT SOIL IDW SAMPLE 1603-JB-IDW06-SO FROM DRUMS D040, D041, SITE CASTA, FOR ANALYSIS OF GRO, VOCs, DRO, RRO, Herbicides, RCRA METALS, Mercury, Pesticides, PCBs, SVOCs, pH

1500 MOB TO FIELD TRAILER, BEGIN DECONING AUGERS / EQUIPMENT.

OBJECTIVES: DECON, DRILL AND INSTALL WELL AT HS (Hangar 5) HS-1, COLLECT SOIL SAMPLE.

1535 FINISH DECON. MOB TO HANGAR 5. STOP AT GAS STATION TO FUEL GEN

1602 ARRIVE AT HS, COMPLETE SITE WALK. SITE AS EXPECTED, BUT WATER MARKED TO WEST OF HS-1 AND NO ELECTRICAL LINES MARKED

1605 BEGIN SETTING UP EQUIPMENT AT HANGAR 5 TO DRILL HS-1

1620 BEGIN DRILLING HS-1 WITH MACROCORER (2 INCH) WITH ACETATE LINERS. COLLECT CORE FROM 0 TO 15 FT BGS FOR LITHOLOGIC LOGGING AND SOIL SAMPLING.

1640 COMPLETE SAMPLING CONTINUOUS CORE TO 15 FT BGS

1643 BEGIN DRILLING WITH 8 INCH OD AUGERS WITH 4 PRONG DRILL BIT AND LITHOLOGIC LOGGING (DRILL) SOIL CUTTINGS FROM 15 FT BGS.

1649 COLLECT SOIL SAMPLE 1603HS-1-SO-0 FROM 0 TO 15 FT BGS HOMOGENIZED ACROSS SAMPLE INTERVAL, FOR ANALYSIS OF PFCs (ME-WS-LC-0025) WITH 2x 160Z UNPRESERVED POLYS.

1711 SATURATED CUTTINGS OBSERVED AT APPROX. 30 FT BGS. MODERATE HYDROCARBON ODOR. BREATHING ZONE PID = 0.1 ppm, HIGHEST PID HEAD SPACE = 19.1 ppm. DISCUSS WELL DESIGN WITH M. BRUNO. SCREEN 30 TO 40 FT. WELL SPECS SAME AS CASTA1. ~~AR~~ RR FOR HS-1

1720 TD BORING AT HS-1, PREPARE TO INSTALL MONITORING WELL HS-1 RR

7-13-2016 JBER-PFC SCRIBE: R. CAIRD / SAC

1726 INSTALL 2INCH SCHD 40 PVC CASING AT HS-1, SCREENED 30 TO 40 FT BGS WITH PREPACKED FILTER 0.010 INCH SLOT SCREEN. BEGIN TRIPPING OUT AUGERS, KNOCK OUT WOOD PLUG.

1730 BEGIN ADDING #10/20 SAND, TAGGED AT 32 FT BGS.

1740 T. CALLEAR OFFSITE.

1743 ADDED 1 x 50 lb BAG #10/20 SAND TO ~~27~~ 27 RR FT BGS (2 FT ABOVE TOP OF SCREEN), BEGIN ADDING 3/8 INCH BENTONITE CHIPS FROM 28 FT BGS. CONTINUE TRIP OUT AUGERS

1803 ADDED ~18 GALLONS WATER TO HELP CLEAR AUGERS. BENTONITE CHIPS BRIDGING, ATTEMPTING TO PULL AUGERS BUT CASING IS PULLING UP WITH AUGERS.

1830 PULL REMAINING AUGERS, BREAK BRIDGE. CASING WAS JACKED UP 3 FT, MOVING SCREEN TO 27 TO 37 FT BGS CHECK INTEGRITY OF WELL CASING - INTACT. TAGGED DTW ~ 21.5 FT BGS. CALL M. BRUNO TO DISCUSS NEW PLACEMENT. DETERMINED NEW SCREEN INTERVAL OK SINCE STILL IN WATER TABLE. COMPLETE WELL WITH NEW DESIGN (SCREEN 27-37 FT)

1835 ADDED 5 x 50 lb BAGS BENTONITE CHIPS (HOLE PLUG) TO 10 FT BGS, CHIPS HYDRATED WITH GW IN WELL.

1839 ADDED 10 x 60 lb BAGS PEA GRAVEL FROM 10 FT BGS TO 2 FT BGS. PREPARE SURFACE COMPLETION. O. SCHLIFF OFFSITE TO PICK UP MONUMENT FOR SURFACE COMPLETION. CLEAN SITE / LOAD RIG.

1840 COLLECT IDW SOIL SAMPLE 1603-JB-IDW07-SO FROM DRUMS DØ42, DØ43, AND DØ44 AT SITE HS-1 FOR SAME ANALYSES AS 1603-JB-IDW06-SO.

1907 O. SCHLIFF ONSITE, BEGIN SURFACE COMPLETION, STOVEPIPE MONUMENT AT HS-1

1920 M. MCHANEY MOB TO FIELD TRAILER.

1930 ADDED 2 x 60 lb BAGS OF CONCRETE MIX TO 4 GAL WATER, FOR SURFACE COMPLETION, 16 INCH SONOTUBE.

1932 ADDED 2 x 50 lb BAGS #10/20 SAND TO MONUMENT FROM ~2 FT BGS TO

1935 COMPLETE WELL INSTALLATION AT HS-1.

1938 MOB TO FIELD OFFICE.

2000 COMPLETE PAPERWORK (DRILLERS). EOD.

7-13-2016

MB 7/13/16

7-14-2016 JBER-PFC SCRIBE: R[illegible]

0730 ONSITE, PREP FOR TODAY.

0800 CALIBRATE MULTIRAE C102717, SEE CALIBRATION LOG FOR RESULTS

WEATHER: SUNNY, WARM 64°F (AM)

CREW: CH2M: R. CAIRO / SAC, T. CALLEAR / ANC; GEOTEK: M. MCHANEY, O. SCTLIFF

OBJECTIVES: DECON, IDW STORAGE / SAMPLING, DRILL AND INSTALL MONITORING WELL FSFS-1, SOIL SAMPLING.

PPE: LEVEL D, AS BEFORE.

AIR MONITORING: MULTIRAE, CALIBRATED, SEE CAL LOG FOR RESULTS

0755 T. CALLEAR ONSITE

0800 M. MCHANEY ONSITE

0815 HOLD PTSP TAILGATE TOPICS: WORKING CLOSE TO USTs, TRAFFIC, PPE

0820 O. SCTLIFF ONSITE. BRIEF HIM ON HEALTH AND SAFETY.

0822 T. CALLEAR MOB OFFSITE TO BUY DELINEATORS TO MARK WORK ZONES.

0825 BEGIN DECONING EQUIPMENT, BRAKE OUT STARTED LEAKING HYDRAULIC F- NO SIGNS OF A SPILL BUT WILL REMOVE BRAKE OUT FROM RIG ~~TO~~ KC TO U- FIXED. BEGIN REMOVING.

0940 T. CALLEAR ONSITE WITH DELINEATORS FOR TODAYS TRAFFIC CONTROL

1000 APPROX. 120 gal SOIL CUTTINGS FROM H5-1 STORED IN DRUMS D042 D044. TO BE STORED AT IDW STAGING AREA.

1010 FINISHED DECONING, LOADING TRUCK AND WAITING FOR GEOTE- TO PICK UP BRAKE OUT FOR REPAIR.

1018 ~~O. SCTLIFF OFFSITE TO FILL UP WATER TOTE.~~ KC 7-14-16 B. ERNST (GEOTEK) C- GO THROUGH H&S. BEGIN LOADING BREAKOUT ONTO GEOTEK TRUCK, T- TAKEN OFFSITE ~~FS~~ KC FOR REPAIR

1045 COMPLETE LOADING BREAK OUT. B. ERNST OFFSITE. MOB TO IDW STORAG- AREA TO STAGE DRUMS.

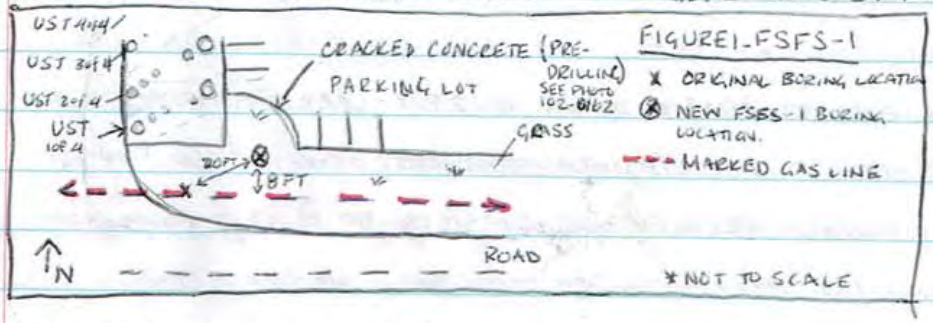
1120 STAGED DRUMS D042 THROUGH D044. DECON WATER (APPROX. 19 GALLON- FROM ~~DFC~~ CASTA, H5, AND FSS STORED IN D045.

1126 MOB TO FSFS. DRILLERS REFUEL RIG

KC 7-14-16

7-14-2016 JBER-PFC SCRIBE: R. CAIRD

1145 ONSITE. COMPLETE SITE WALK. GAS LINE MARKED DIRECTLY BELOW BORING LOCATION FSFS-1. FIBERGLASS TANKS NORTH OF MARKED BORING ORIENTATED SW-NE. MOVE BORING 20 FEET NE PUTTING IT 8 FEET NORTH OF GAS LINE AND APPROX. 10-12 FT SOUTHEAST OF FIBERGLASS TANKS. SEE FIGURE 1_FSFS1 / PHOTO LOG FOR PICTURES.



1159 BEGIN SETTING UP EQUIPMENT AT FSFS-1

1227 BEGIN DRILLING WITH 2 INCH MACROCORER WITH ACETATE LINERS COLLECT CONTINUOUS CORE AT FSFS-1 FROM 0 TO 15 FT BGS FOR LITHOLOGIC LOGGING AND SOIL SAMPLING.

1253 BE COMPLETE DRILLING WITH MACROCORE TO 15 FT BGS. PREPARE TO DRILL WITH AUGERS.

1300 BEGIN DRILLING WITH 6 INCH OD AUGERS WITH ~3 INCH DIAMETER CENTER DRILL ROD FROM SURFACE AT FSFS-1, BREATHING ZONE PID: 0.0ppm

1310 COLLECT SOIL SAMPLE 1603FSFS-1-SO-0 FROM 0 TO 15 FT BGS AT FSFS-1, HOMOGENIZED ACCROSS SAMPLE INTERVAL, FOR ANALYSIS OF PFCs (METHOD WS-LC-0025) WITH 2 x 16 OZ UNPRESERVED POLYS.

1330 M. BRUNO ONSITE TO PICK UP SAMPLES FOR SHIPMENT, OFFSITE.

1400 DRILLED TO 40 FT BGS. ALLOW WATER TO RECHARGE IN AUGERS AT FSFS-1

1410 TAG DTW FSFS-1 = 26.5 FTBG AFTER 10 MINS OF RECHARGE FROM DRILLING. CALL M. BRUNO TO DISCUSS WELL DESIGN. MOIST TO WET CUTTINGS OBSERVED FROM ~30 FT BGS. WILL SCREEN WELL FSFS-1 FROM 30 TO 40 FT BGS, TD BORING AT 40 ~~FT~~ RC 41 FT BGS

1420 TD BORING FSFS-1. PREPARE TO INSTALL MONITORING WELL FSFS-1, 2 INCH SCHD 40 PVC CASING WITH 10 FT X 2 INCH SCHD 40 PVC 0.010 IN SLOT SCREEN.

1432 TRIPPED OUT CENTER DRILL ROD, PREPARE TO INSTALL CASING AT FSFS-1

1435 2 INCH SCHD 40 PVC WELL CASING WITH 0.010 INCH SLOT SCREEN WITH PREPACK FILTER INSTALLED FROM 30 TO 40 FT BGS (SCREEN). BEGIN TO TRIP OUT AUGERS.

1450 BEGIN ADDING #10/20 SAND TO FSFS-1, ADJUST WELL CASING.

RC 7-14-16

MB 7/15/16

7-14-2016 JBER-PFC SCRIBE: R.CAIRD

1450 SET WELL AT 40.5Ft (SCREEN 30 TO 40 FT BGS). CONT. SANDING.

1455 CROWLEY ALASKA LLC ARRIVES AT USTs. TALK WITH JEFF FROM CROWLEY, AS LONG AS WE KEEP OUR DISTANCE AND REFRAIN FROM SPARKING ACTIVITIES WE WILL BE SAFE TO CONTINUE INSTALLING WELL FSFS-1 WHILE HE REFUELS USTs NEXT TO (WEST/NW) SITE FSFS.

1515 ADDED 5.5 x 50 lb BAGS OF #10/20 SAND TO 28 FT BGS. CONTINUE TRIPPING OUT AUGERS. PREPARE TO ADD 1/4" INCH BENTONITE PELLETS (PEL-PLUG)

NOTE: BREATHING ZONE PID WHILE CROWLEY REFUELS USTs UP TO 17.2 ppm, NOT SUSTAINED >1 ppm FOR MORE THAN 30 SECS, WIND NATURAL VENT.

1533 BEGIN ADDING PEL-PLUG

1537 CROWLEY ALASKA LLC COMPLETED FILLING USTs. OFFSITE.

1545 ADDED 1 x 5 gal BUCKET PEL-PLUG TO 25 FT BGS CONTINUE TO TRIP OUT AUGERS

1546 BEGIN ADDING 3/8 INCH BENTONITE CHIPS, PULL REMAINING AUGERS.

1600 COLLECT IDW SAMPLE 1603-JB-IDW08-SO FROM DRUMS DØ46 FROM SITE FSFS FOR ANALYSIS OF GRO, VOCs, DRO/RRO, HERBICIDES, RCRA METALS MERCURY, PESTICIDES, PCBs, SVOCs, AND pH. SEE SAMPLE WORKSHEET FOR DETAILS

1601 TRIPPED OUT AUGERS TAG BENTONITE AT 20 FT BGS, CONTINUE ADDING CHIPS (HOLE F

1609 ADDED 4.5 x 50 lb BAGS 3/8 IN BENTONITE CHIPS TO 10 FT BGS, ALLOW TO HYDRATE

1618 O.SCTLIFF OFFSITE TO OBTAIN STICKUP MONUMENT FOR SURFACE COMPLETION

1624 BEGIN ADDING 3/8 INCH PEA GRAVEL TO FSFS-1

1629 ADDED 4 x 60 lb BAGS PEA GRAVEL FROM 10 FT TO 2 FT BGS. BEGIN CLEANING SITE PREPARING SURFACE COMPLETION, STICKUP MONUMENT.

1655 O.SCTLIFF ONSITE. BEGIN SURFACE COMPLETION AT FSFS-1.

1658 FORGOT SONOTUBE AT STAGING AREA. O.SCTLIFF OFFSITE TO OBTAIN SONOTUBE

1715 R.CAIRD TAGGED DTW AT FASTA-1 = 13.4 FT BTOC (~10.25 FT BGS)

1730 O.SCTLIFF ONSITE. BEGIN SURFACE COMPLETION.

1741 INSTALL 16 INCH SONO TUBE AND 6 INCH DIAMETER MONUMENT 3.5 FT ABOVE GS

1759 ADDED 2 x 60 lb BAGS CONCRETE MIX 4000 PSI / 8 GALLONS, FOR SURFACE COMPLETION

1800 ADDED 1.5 x 50 lb BAGS #10/20 SAND FROM 2 FT BGS TO 2.75 FT ABOVE GS

mB

7-14-2016 JBER - PFC SCRIBE: R. CAIRD

1805 TAG DEPTH TO WATER AT FSFS-1 = 27.95 FT BTOC (~ 25.15 FT BGS). COMPLETE STOVEPIPE MONUMENT SURFACE COMPLETION AT FSFS-1. SEE PHOTO LOG FOR BEFORE / AFTER DRILLING SITE CONDITIONS.

1811 MOB TO IDW STORAGE AREA.

1828 T. CALLEAC OFFSITE FOR DAY.

1830 MEET GEOTEK AT IDW STORAGE. BEGIN OFFLOADING DRUMS D0046 AND D0047, APPROX. 100 GALLONS SOIL CUTTINGS IN DRUMS FROM FSFS-1

1845 FINISH OFFLOADING DRUMS, MOB TO FIELD TRAILER.

1849 AT FIELD TRAILER. GO THROUGH PAPERWORK WITH DRILLERS.

1900 GEOTEK OFFSITE. EOD.

Ron Caird
7-14-2016

MD 7/15/16

7-15-2016 JBER PFC SCRIBE: R. CAIRD

0750 ONSITE, PREPARE FOR DAILY TASKS

0805 CALIBRATE MULTIRAE C102717, SEE CALIBRATION LOG FOR RESULTS

WEATHER: CLOUDY, COOL, 61°F (AM), CLOUDY, WARM, PARTSUN - 68°F (PM)

OBJECTIVES: DRILL / INSTALL AT029-1, COLLECT SOIL SAMPLE, DECON / IDW STOR-

CREW: CH2M: R. CAIRD | SAC, T. CALLEAR | ANC, GEOTEK: G. RAWSON, M. MCHANEY, O. SUTLIFF

PPE: LEVEL D, AS BEFORE, ADD DUST MASKS AS NECESSARY

AIR MONITORING: MULTIRAE, CALIBRATED SEE CAL. LOG FOR RESULTS.

NOTE. T. CALLEAR, G. RAWSON ONSITE BEFORE 0750

0813 M. MCHANEY ONSITE

0815 HOLD PTSP MEETING. TOPICS: DUST FROM DOWNHOLE HAMMER, H-

0820 BEGIN LOADING TRUCK / WAIT FOR O. SUTLIFF TO ARRIVE WITH ~~GEOTEK~~ COMPRE-

0855 MOB TO AT029.

0903 COMPLETE SITE WALK WITH M. BRUNO. NO MARKED UTILITIES. SITE AS-

0910 GEOTEK BEGINS UNLOADING EQUIPMENT, SET UP RIG AT AT029-1, M-S-

0930 O. SUTLIFF ONSITE WITH COMPRESSOR. (ATLAS COPCO XAVS 650 #IC2220)

0949 BEGIN DRILLING AT AT029-1 WITH 2 INCH MACROCORER. COLLECT CONTINUOUS -
FROM 0 TO 15 FT BGS FOR LITHOLOGIC LOGGING AND SOIL SAMPLING.

1011 COMPLETE DRILLING WITH MACROCORER. NO LITHOLOGIC LOGGING FROM -
BECAUSE GEOTEK IS USING A DRUM COVER TO CATCH CUTTINGS FROM DOWN-

1030 COLLECT SOIL SAMPLE 1603AT029-1-SO-0 AND FIELD DUPLICATE
1603AT029-1-SO-1 FROM AT029-1 FROM 0 TO 15 FT BGS, HOMOGE-
ACROSS SAMPLE INTERVAL, FOR ANALYSIS OF PFCs (METHOD WS-LC-
WITH 4 x 16 OZ UNPRESERVED POLYs.

1035 BEGIN DRILLING AT AT029-1 WITH DOWNHOLE HAMMER AND 4 INCH OD ~~4 INCH~~ DR-

1041 TAG DTW AT AP 3657 = 142.88 FEET BGS.

1217 G. RAWSON OFFSITE TO FILL WATER TOTE. CONTINUE DRILLING WITH DOWN-
HAMMER.

NOTE: DRILLERS OBSERVED DESIEL ODOR FROM BORING AT APPROX. 40 FT BGS
ZONE PID AT 40 FT BGS = 0.0 ppm. NO ODOR AT 45 FT BGS

7-15-2016 JBER-PFC SCRIBE: R. CAIRD/SAC

1230 OCCASIONAL SEWAGE ODOR PRESENT APPROX. 40 FT FROM DRILLING ACTIVITIES, NOT ~~OBSERVED~~ RE OBSERVED AT BOREHOLE, OBSERVED IN BREATHING ZONE. VOCs (Bz.) = 0.0ppm. DRILLING AT APPROX. 50 FT BGS, ODOR NOT SUSTAINED.

1245 HYDROCARBON ODOR OBSERVED FROM 55 FT TO 57 FT BGS. BREATHING ZONE PID VOCs = 0.7 ppm, NOT SUSTAINED. ODOR NOT DETECTED AFTER 57 FT, VOCs = 0.0ppm

1305 G. RAWSON BACK ONSITE. BREAK FROM DRILLING AT 63 FT BGS.

1325 CONTINUE DRILLING FROM 63 FT BGS AT AT029-1

NOTE: POTABLE WATER USED TO FILL TOTE HAS BROWN COLORATION, NO ODOR.

1524 ALASKA HYDRO-AX ~~MOWING~~ MOWING RE AREA NEAR WORKSITE. THEY WILL BE MINDFUL TO STEER CLEAR OF OUR WORKSPACE AND I INFORMED TODD (REP/WORKER) WE SHOULD BE FINISHED WORK AT THIS SITE BEFORE MONDAY, 7-18-2016.

1615 ~~HAULT~~ HALT RE DRILLING AT 138 FT BGS. WILL LEAVE RODS IN BORING OVERNIGHT AND RESUME DRILLING FROM 138 FT BGS TOMORROW, 7-16-2016. HAULT BEFORE DRILLING INTO WATER TABLE TO PREVENT HEAVE WITHIN DRIVE CASING, PREP TO LEAVE AUGERS IN BORING AND CLEAN/SECURE SITE. RIG AND IDW WASTE WILL BE MOBED AND STORED OFFSITE (AT STAGING AREA/IDW STORAGE, RESPECTFULLY). AT029-1

1650 G. RAWSON OFFSITE FOR DAY.

1700 MOB TO IDW STORAGE. SITE AT029 SECURED.

1715 AT IDW STAGING AREA, BEGIN OFFLOADING DRUMS D048 AND D049 FROM AT029-1 APPROX. 90 GALLONS SOIL CUTTINGS REMOVED FROM AT029-1 IN DRUMS D048, D049

1735 DRUMS STAGED ON PALLETS. MOB TO FIELD OFFICE, DRILLERS MOB TO REFUEL RIG.. EOD.

R. Caird
7-15-16

TMB 7/15/16

7-16-2016 JBER. PFC SCRIBE: R. CA

0745 ONSITE, PREPARE FOR TODAYS ACTIVITIES.

0755 CALIBRATE MULTIRAE C102717, SEE CALIBRATION LOG FOR RESULTS.

WEATHER: OVERCAST, WARM - 62°F (AM)

OBJECTIVES: DRILL AND INSTALL WELL AT029-1, DECON, IDW STORAGE.

CREW: CH2M: R. CAIRD / SAC. GEOTEK: G. RAWSON, M. MCHANEY, O. SUTLIFF

PPE: LEVEL D, AS BEFORE WITH DUST MASKS.

AIR MONITORING MULTIRAE, CALBRATED, SEE CALIBRATION LOG.

0750 G. RAWSON ONSITE.

0800 O. SUTLIFF ONSITE

0810 M. MCHANEY ONSITE

0812 HOLD PTSP, TAILGATE TOPICS: SLIPS, TRIPS, FALLS; WILDLIFE.

0820 KEYS LOCKED IN VAN. CALL ENTERPRISE TO UNLOCK.

0825 CALIBRATE MINIRAE FOR AIR MONITORING (TEMP.) WHILE WAITING FOR BE UNLOCKED. SEE CALIBRATION LOG FOR #C

0830 MOB TO AT029

0839 AT AT029. BEGIN OFFLOADING EQUIPMENT AND SET BACK UP AT AT029, S CONDITIONS ARE SAME AS YESTERDAY. AT029-1 DRILLED TO 138 FT BGS

0910 RESUME DRILLING AT029-1 FROM 138 WITH DOWNHOLE HAMMER AND OD DRIVE CASING. BREATHING ZONE PID = 0.0ppm

0955 DRILLED TO 158 FT BGS. ALLOW GW TO RECHARGE (IF NECESSARY)

1000 G. RAWSON MOB TO FIELD TRAILER TO PICK UP ADDITIONAL WELL CASING

1018 G RAWSON ONSITE WITH CASING. M. BRUNO DROPPED OFF FIELD VAN.

1025 BEGIN SURGING TO SEE IF GROUNDWATER HAS FILLED BORING. GROUNDWATER BUT UNABLE TO DETERMINE WHERE / ~~WHAT~~ DEPTH GW IS AT IN BORING AT0

1036 ATTEMPT TO TAG WITH WATER LEVEL METER THROUGH CENTER DRILL ROD

1045 UNABLE TO TAG DTW BECAUSE SENSOR IS MALFUNCTIONING. SOUNDER DID NOT OFF BUT TAPE IS WET. TRY CHANGING BATTERIES, STILL DID NOT WORK NOTE CUTTINGS CHANGED AROUND 150 FT BGS, POORLY GRADED SAND WITH CUTTINGS MOIST TO WET BUT POTENTIALLY DRIED WITH AIR FROM DRILL

7-16-2016 JBER-PFC SCRIBE: R CAIRD/SAC

1051 CALL M. BRUNO TO DISCUSS WELL DESIGN. WILL ATTEMPT TO DRILL TO 163 FT BGS AND SEE IF CUTTINGS REMAIN WET.

1107 CUTTINGS INITIALLY WET AT 158 FT BGS

1130 CUTTINGS BEGAN TO DRY OUT AT APPROX. 162 FT BGS. DISCUSS WITH M. BRUNO. WILL PLAN TO SET WELL AT 160 FT BGS, SCREENED 150 TO 160 FT BGS WITH 2 INCH SCHD 40 PVC WELL CASING AND 0.020 INCH SLOT SCREEN; SCHD 40 PVC. SCREEN HAS PREPACKED FILTER PACKS AND WELL WILL BE COMPLETED WITH #10/20 SAND (FILTER), 1/4 INCH BENTONITE PELLETS (SEAL) AND BENTONITE GROUT SEE WELL COMPLETION DIAGRAM FOR DETAILS, ATØ29-1 TD ATØ29-1 AT 163 FT BGS

1140 BEGIN TRIPPING OUT CENTER DRILL ROD AND PREPARE TO INSTALL WELL ATØ29-1

1215 TRIPPED OUT CENTER ROD, TAGGED DEPTH TO BOTTOM AT 163 FT BGS, NO HEAVE. PREPARE TO INSTALL WELL CASING.

1226 ADDED 0.5 x 50 lb BAGS OF #10/20 SAND FROM 163 TO 160.3 FT BGS.

1228 BEGIN INSTALLING 2 INCH SCHD 40 PVC CASING. 10 FT OF SCREEN 160 TO 150 FT BGS AND ~~155~~ 150 FT OF RISER.

1234 WELL CASING INSTALLED WITH SCREEN AT 150 TO 160 FT BGS BEGIN ADDING #10/20 SAND, AND BEGIN TRIPPING OUT DRIVE CASING.

1249 ADDED 0.5 x 50 lb BAGS SAND (1 BAG TOTAL) TO 148 FT BGS BEGIN ADDING 1/4 INCH BENTONITE PELLETS (PEL PLUG) FROM 148 FT BGS. NOTE: SLUFF

1303 ADDED 2.5 x 5 gal BUCKET PEL-PLUG TO 145 FT BGS. HYDRATE, ALLOW PEL-PLUG TO HYDRATE MIN 30 MINS. PREPARE GROUT, QUIK-GROUT

1335 BEGIN ADDING BENTONITE GROUT, POUR THROUGH DRIVE CASING. FIRST BATCH 1 x 50 lb BAG QUIK-GROUT / 50 GALLONS GROUT. CONTINUE TO PULL CASING.

1341 ADDED 50 GALLONS GROUT. BEGIN MIXING SECOND BATCH.

1400 BEGIN ADDING SECOND BATCH, APPROX. 40 GALLONS / 1 x 50 lb BAG.

1405 ADDED TOTAL 2 x 50 lb BAGS / 90 GAL GROUT TO ATØ29-1, TRIP OUT REMAINING DRIVE CASING.

1440 TRIPPED OUT CASING. TAGGED TOP OF GROUT AT 30 FT BGS. BEGIN ADDING 3/8 IN BENTONITE CHIPS

7-16-16

MB

7-16-2016 JBER-PFC SCRIBE: R. CAIRD/S

1455 ADDED 4 x 50 lb BAGS BENTONITE CHIPS WILL NEED TO OBTAIN MORE FROM TRAILER. BEGIN PACKING UP / LOADING EQUIPMENT.

1500 O. SUTLIFF OFFSITE TO GET MORE HOLEPLUG

1518 O. SUTLIFF BACK ONSITE.

1520 CONTINUE ADDING 3/8 INCH BENTONITE CHIPS

1525 ADDED ADD. 4 x 50 lb BAGS HOLEPLUG. 8 x 50 lb BAGS TOTAL. HYDRATE. TD

NOTE: APPROX. ~~55~~ 50 RC GAL SOIL STORED IN DRUM DØ5Ø FROM ATØ29-1

1535 BEGIN ADDING 3/8 INCH PEA GRAVEL FROM 10 FT BGS ~~TO~~

1536 ADDED 2 x 60 lb BAGS PEA GRAVEL FROM 10 FT TO 1 FT BGS BEGIN FI SURFACE COMPLETION, STICKUP MONUMENT WITH 16 IN. SONOTUBE CONC

1545 O. SUTLIFF OFFSITE TO OBTAIN MONUMENT FOR SURFACE COMP.

1550 G. RAWSON OFFSITE FOR DAY. DEMOBED COMPRESSOR

1555 O. SUTLIFF ONSITE. BEGIN MIXING CONCRETE FOR SURFACE COMPLETION

1601 DID NOT BRING ENOUGH CONCRETE FOR SURFACE COMPLETION. O. SUTLIFF TO PICK UP MORE CONCRETE MIX. BEGIN LOADING RIG / DRUMS ONTO TRA

1615 O. SUTLIFF BACK ONSITE. CONT. SURFACE COMPLETION AT ATØ29-1

1650 COMPLETE SURFACE COMPLETION AT ATØ29-1. ADDED 2 x 60 lb BAGS / 6 GAL MIX. 6 INCH OD x 4 FT ABOVE GS MONUMENT INSTALLED.

1700 ADDED 1.5 x 50 lbs #10/20 SAND TO MONUMENT TO 3 FT ABOVE GS

1712 MOB TO FIELD OFFICE / TRAILER. SEE PHOTO LOG FOR BEFORE / AFTER SITE

1720 AT FIELD TRAILER.

1730 O. SUTLIFF ONSITE.

1744 O. SUTLIFF MOB TO FILL WATER TOTE FOR DECONING.

1800 END OF DAY.

7-16-2016

7-18-2016 JBER-PFC SCRIBE: R.CAIRD/SAC

0745 ONSITE PREPARE FOR TODAY

0755 CALIBRATE MULTIRAE, C102717, SEE CALIBRATION LOG FOR RESULTS.

WEATHER: MOSTLY CLEAR, WARM · 63°F(AM),

OBJECTIVES: DECON/IDW STORAGE. DRILL AND INSTALL WELLS AT FS7, H10, COLLECT SOIL SAMPLES

CREW: CH2M: R.CAIRD/SAC, T.CALLEAR/ANC; GEOTEK: M.MCHANEY, O.SUTLIFF

PPE: LEVEL D, AS BEFORE, NO DUST MASKS REQUIRED.

AIR MONITORING: MULTIRAE, CALIBRATED, SEE RESULTS IN CALIBRATION LOG.

0807 M.MCHANEY ONSITE

0815 O.SUTLIFF ONSITE.

0820 HOLD HEALTH AND SAFETY MEETING, TAILGATE TOPICS: FLIGHTLINE SAFETY, HOUSEKEEPING

0823 BEGIN DECONING EQUIPT, FROM AT029-1.

0840 T.CALLEAR ONSITE WITH NEW WATER LEVEL METER (TTT 12.001112)

0852. T.CALLEAR MOB TO REFUEL VAN. R.CAIRD MOB TO AT029.

0911 TAG DTW AT AT029-1 = 149.07 FEET BGS (152.7 FEET BTOC)

0915 MOB TO FIELD TRAILER

0920 T.CALLEAR AND R.CAIRD AT FIELD TRAILER.

0944 COMPLETE DECONING. BEGIN LOADING MATERIALS ONTO ~~TRLA~~ RC TRAILER

1015 MOB TO FS7, REFUEL RIG, INFORM AIR MNGT WE ARE ONSITE AT FS7.

1100 AT FS7, SITE WALK, FS7-1 LOCATION MOVED 5 FT NW OF PROPOSED LOCATION TO AVOID UNKNOWN MARKINGS, POSSIBLE UTILITY LINE. RIG >14 FT FROM OVERHEAD POWER LINES AND >12 FT FROM MARKED ELECTRICAL LINES.

1107 BEGIN SETTING UP RIG AT FS7-1

1130 FIRE STATION CREW OF FIRE STATION 7 ONSITE. REQUIRES WE RELOCATE THE DRILL RIG TRAILER SO THEY CAN BACK THE FIRE TRUCK ~~NOT~~ INTO RC STATION. SET UP TO ALLOW THEM SPACE AND MOVE TRAILER.

1141 RC BEGIN DRILLING FS7-1 WITH 2 INCH OD MACROCORE WITH ACETATE LINES. COLLECT ~~HAT~~ CONTINUOUS CORE FROM 0 TO 15 FEET BGS FOR LITHOLOGIC LOGGING AND SOIL SAMPLING.

1215 FINISH MACROCORE AND CONTINUOUS CORE SAMPLING TO 15 FT AT FS7-1

1229 BEGIN DRILLING AT FS7-1 WITH 8 INCH OD AUGERS WITH 6 PRONG BIT AND WOOD PLUG.

RC 7-18-16

MB 7/18/16

7-18-2016 JBER-PFC SCRIBE: R. CAIRD/SAC

LITHOLOGIC LOGGING FROM 15 FT BGS WITH SOIL CUTTINGS.

1235 COLLECT SOIL SAMPLE AT FS7-1, 1603FS~~7~~7cc-1-SO-Ø FROM 0 TO 15 FT BGS, HOMOGENIZED ACROSS SAMPLE INTERVAL, FOR ANALYSIS OF PFCs (METHOD WS-LC-0025) WITH 2x 16 OZ UNPRESERVED POLYS.

1320 MOIST TO WET CUTTINGS OBSERVED IN FS7-1 at approx. 31 FEET BGS. DRILL TO 40 FEET BGS

1325 DRILLED FS7-1 TO 40 FT BGS. TAG DTW = 36.8 FEET BGS. ALLOW WELL TO CHARGE; NOTE: WOOD PLUG STILL IN AUGERS

1335 DTW FS7-1 = 36.7 FEET BGS. CALL M. BRUNO TO DISCUSS. WILL SET WELL SCREEN 31 TO 41 FEET BGS.

1340 CONTINUE DRILLING TO 41 FT BGS TO SET 2INCH MONITORING WELL.

1345 TD BORING FS7-1 AT 42 FEET BGS PREPARE TO INSTALL MONITORING WELL.

1348 INSTALL 2 INCH SCHD 40 PVC MONITORING WELL WITH 2x 5 FT SCHD 40 PVC 0.020IN SLOT SCREEN, SCREENED 31 TO 41 FT BGS. ATTEMPT TO KNOCK OUT WOOD PLUG.

1356 UNABLE TO KNOCK OUT WOOD PLUG, REMOVE WELL CASING AND TRIP IN CENTER ROD.

1405 KNOCKED OUT WOOD PLUG. TRIP OUT CENTER ROD. DTW = 29.1 FEET BGS.

1415 REINSTALL WELL CASING AT FS7-1, AS ABOVE.

1424 WELL CASING INSTALLED. SCREEN SET AT 40.6 FT BGS DUE TO HEAVE, SCREEN 30.6 TO 40.6 FEET BGS. BEGIN TRIPPING OUT AUGERS AT FS7-1

1439 ADDED 0.5 x 50 lb BAGS OF #10/20 SAND TO 28 FT BGS. FORMATION CAVED IN WHILE TRIPPING OUT AUGERS. CONTINUE TO TRIP OUT AUGERS AT FS7-1

1444 BEGIN ADDING 3/8 INCH BENTONITE CHIPS TO FS7-1

1527 ADDED 10.5 x 50 lb BAGS BENTONITE CHIPS TO FS7-1 ~~TRIP~~ TO 10 FT BGS. TRIP OUT REMAINING AUGERS FROM FS7-1.

1535 HYDRATE BENTONITE CHIPS WITH 5 GALLONS POTABLE WATER.

1550 COLLECT IDW SOIL SAMPLE 1603-JB-IDW89-SO FROM DRUMS DØ51, DØ52, AND DØ53 FROM FS7-1 FOR ANALYSIS OF ~~GRO~~ CROcc, VOCs, RRO/DRO, Herbicides, Pesticides, PCBs, METALS, MERCURY, SVOCs, AND pH. SEE SAMPLE WORKSHEET FOR DETAILS.

1553 BEGIN CLEANING SITE AND PREPARING FLUSH MOUNT SURFACE COMPLETION AT FS7-1

cc 7-18-16

mb 7/18/16

7-18-2016 JBER-PFC SCRIBE: R. CAIRD/SAC

1617 BEGIN ADDING 3/8 INCH PEA GRAVEL.

1019 ADDED 3 x 60 lb BAGS 3/8 PEA GRAVEL FROM 10 FT TO 2FT BGS. PREPARE FOR FLUSH MOUNT SURFACE COMPLETION AT FS7-1

1650 DTW = 27.97 FT BTOC AT FS7-1, FLUSH MOUNT.

1707 FINISH INSTALLING FLUSH MOUNT SURFACE COMP. AT FS7-1.

1712 MOB TO IDW WASTE STORAGE AREA. CALL AIRFIELD MANAGEMENT TO INFORM THEM WE ARE OFFSITE, GATE LOCKED. SEE PHOTO LOG FOR BEFORE/AFTER DRILLING SITE CONDITIONS.

1727 AT IDW STAGING AREA PREPARE TO OFFLOAD DRUMS. APPROX. 115 GALLONS SOIL FROM FS7-1 STORED IN DRUMS DØ51, DØ52, DØ53.

1759 OFFLOADED DØ50 (50 gal FROM SITE ATØ29) AND DRUMS DØ51 THROUGH DØ53 (115 gal FROM SITE FS7), ADDED 20 GALLONS DECON WATER FROM SITE FSFS TO DØ45. O. SUTLIFF MOB TO PICK UP 55 gal drum

1807 O. SUTLIFF ONSITE. STORE 10 GALLONS DECON WATER IN DRUM DØ54 FROM SITE ATØ29.

1820 MOB TO FIELD TRAILER

1826 AT FIELD TRAILER. COMPLETE PAPERWORK WITH GEOTEK AND BEGIN DECONING AUGERS FROM FS7.

END OF DAY.

Ryan Caird
7-18-2016

7-19-2016 JBER-PFC SCRIBE: R.CAIRD/SAC

0750 ONSITE PREPARE FOR TODAYS ACTIVITIES.

0755 CALIBRATE MULTIRAE C102717, SEE CALIBRATION LOG FOR RESULTS.

WEATHER: MOSTLY CLEAR, WARM - 69°F (AM), MOSTLY - CLEAR, HOT, SLIGHT BREEZE - 78°F (PM)

OBJECTIVES: DRILL/INSTALL WELLS AT HIØ AND HI8, SOIL SAMPLING, IDW WASTE STORAGE / SAMPLING DERIVING EQUIPT.

CREW: CH2M: R.CAIRD/SAC, ~~B.ERNST~~ T.CALLEAR/ANC, GEOTEK: M.MCHANEY, B.ERNST.

PPE: LEVEL D, SAME AS BEFORE.

AIR MONITORING: MULTIRAE, CALIBRATED SEE CALIBRATION LOG

0805 M.MCHANEY AND B.ERNST ONSITE.

0812 HEALTH AND SAFETY MEETING, TAILGATE TOPICS: FLIGHTLINE SAFETY, SLIPS, TRIPS, FALLS.

0815 BEGIN LOADING EQUIPMENT ON TRAILERS.

0835 MOB TO HIØ, REFUEL RIG

0910 AT HIØ, CALL AIRFIELD MANAGEMENT TO INFORM THEM WE ARE ONSITE

0917 COMPLETE SITE WALK OF HIO. HIØ-1 AS EXPECTED. CLEAR OF UTILITIES.

0920 BEGIN SETTING UP RIG/EQUIPT. AT HIØ-1. SEE PHOTO LOG FOR BEFORE SITE COND.

1005 BEGIN DRILLING WITH 2 INCH MACROCORER AT HIØ-1. COLLECT CONTINUOUS CORES FROM Ø TO 15 FT BGS FOR LITHOLOGIC LOGGING AND SOIL SAMPLING.

1025 COMPLETE MACROCORE CONTINUOUS CORING. TO 15 FT AT HIØ-1. PREPARE TO DRILL WITH HOLLOW STEM AUGERS. INSTALL NEW TEETH ON DRILL BIT.

1050 ~~1050~~ COLLECT SAMPLE 1603HIØ-1-SO-Ø FROM 0 TO 15 FT BGS, HOMOGENIZED ACROSS SAMPLE INTERVAL FROM HIØ-1 FOR ANALYSIS OF PFCs (METHOD WS-LC-0025) WITH 2 x 16 OZ UNPRESERVED POLYS

1055 DRILL BIT REPAIRED. BEGIN DRILLING WITH 8 INCH OD AUGERS WITH 6 INCH DRILL BIT AND WOOD PLUG. LITHOLOGIC LOGGING FROM 15 FT BGS WITH SOIL CUTTINGS. AT HIØ-1 SEE BORING LOG FOR AIR MONITORING RESULTS.

1150 CUTTINGS STILL DAMP WITH AUGERS TO ~ 38 FT BGS. CALL M. MCHANEY. TAGGED APPROX. 0.5 FT WATER INSIDE AUGER WITH PLUG STILL IN. WILL DRILL TO APPROX. 40 FT BGS, KNOCK OUT PLUG AND MEASURE DTW AT HIØ-1

1205 CUTTINGS MOIST AT APPROX. 38 FT BGS.

7/19/16

RC
7-19-2016 JBER-PFC SCRIBE: R. CAIRD/SAC

1210 DRILLED TO 43 FT BGS. BEGIN TRIPPING IN CENTER ROD TO KNOCK OUT WOOD PLUG. DRILLER HESITANT TO DRILL TO 45 FT BGS AND HAVE 5 FT AUGER STICKING OUT OF GROUND.

1217 KNOCK OUT WOOD PLUG. ALLOW WATER TO RECHARGE.

1223 TAGGED DTW AT 29.7 FT BGS AT H1Ø-1 WILL INSTALL WELL FROM 30 TO 40 FT BGS (SCREEN) AS DISCUSSED WITH M. BRUNO.

1235 TAGGED BOTTOM AT 41.5 FT BGS. INSTALL 2 INCH SCHD 40 PVC WELL CASING WITH PREPACK FILTER SCREENED 30 TO 40 FT BGS. BEGIN ADDING #10/20 SAND TO SET WELL BASE AT APPROX 40.4 FT BGS FOR MONITORING WELL H1Ø-1

1240 ADDED 0.5 x 50 lb BAGS SAND. BEGIN TRIPPING OUT AUGERS, CONT. ADDING #10/20 SAND

1250 ADDED TOTAL 1 x 50 lb BAGS SAND TO 28 FT BGS PULL AUGER.

1257 SAND FEEL / BORING COLLAPSED TO 26 FT BGS. BEGIN ADDING 3/8 INCH BENTONITE CHIPS FROM 26 FT

1310 COLLECT IDW SOIL SAMPLE 1603-JB-IDW1Ø-SO FROM DRUMS DØ55, DØ56, DØ57 AT SITE H1Ø, FROM BORING H1Ø-1 FOR ANALYSIS OF GRO, VOC, DRO/RRO, Herbicides, Pesticides, RCRA METALS, MERCURY, PCBs, SVOCs, pH. SEE SAMPLE WORKSHEET FOR DETAILS

NOTE: TRIP BLANK PREPARED AT 0800 1603-IDW-JB-TBØ4-SO FOR VOCs and GRO

1340 ADDED 10 x 50 lb BAGS HOLEPLUG TO 10 FT BGS H1Ø-1. TRIP OUT REMAING AUGERS. HYDRATE CHIPS WITH 5 GALLONS POTABLE WATER.

1348 AFTER PULLING FINAL AUGER FLIGHT, NATIVE SOIL BACKFILLED BORING FROM 10 FT TO 1 FT BGS (WELL GRADED SAND WITH GRAVEL / WELL GRADED GRAVEL WITH SAND) BEGIN PREPARING FLUSH MOUNT SURFACE COMPLETION AT H1Ø-1 AND CLEAN SITE.

1500 CUT DOWN WELL CASING FOR FLUSH MOUNT AT H1Ø-1. DTW = 28.26 FT BTOC

1505 16 INCH SONOTUBE INSTALLED. BEGIN MIXING CONCRETE (CONCRETE MIX 4000 PSI)

1519 FINISH 8 INCH FLUSH MOUNT SURFACE COMP. WITH 16 SONOTUBE CONCRETE PAD (2 x 60 lb BAGS CONCRETE MIX / 6 GALLONS)

1524 MOB TO FIELD TRAILER. LOCK GATE 6, CALL AIR FIELD MANAGEMENT TO INFORM THEM WE ARE OFFSITE FOR THE DAY.

1544 AT FIELD OFFICE. GEOTEK BEGINS DECONING EQUIPT.

RC 7-19-16
MB 7/19/16

7-19-2016 JBER-PFC SCRIBE: R. CAIRD /SAR

1610 T. CALLEAR OFFSITE.

1726 COMPLETE DECON. MOB TO IDW STORAGE AREA.

1735 AT IDW STORAGE AREA. BEGIN OFFLOADING DRUMS DØ55, DØ56, DØ57 FROM HIØ-1 WITH APPROX. 130 gal SOIL WASTE

1813 ADDED 20 GALLONS DECON WATER FROM FS7-1 AND HIØ-1 TO DØ45 DRUMS OFFLOADED. MOB TO FIELD TRAILER. GATE LOCKED.

END OF DAY.

7-19-2016

mj 7/19/16

7-20-2016 JBER-PFC SCRIBE: R.CAIRD/SAC

0745 R.CAIRD ONSITE, PREPARE FOR TODAY.

0750 CALIBRATE MULTIRAE C102717, SEE CALIBRATION LOG FOR RESULTS.

WEATHER: PARTLY CLOUDY, WARM - 67°F (AM), HOT, OVERCAST - 75°F (PM)

OBJECTIVES: DRILL/INSTALL MWs AT FS1, FS5, COLLECT SOIL SAMPLES, DECON/IDW STORAGE.

CREW: CH2M: R.CAIRD/SAC, T.CALLEAR/ANC, GEOTEK: M.MCHANEY, O.SUTLIFF

PPE: LEVEL D, AS BEFORE

AIR MONITORING: MULTIRAE, CALIBRATED. SEE CALIBRATION LOG FOR RSULTS.

0800 M. MCHANEY ONSITE.

0805 O. SUTLIFF ONSITE.

0808 HOLD PTSP, TAILGATE TOPICS: FLIGHTLINE SAFETY, SLIPS, TRIPS, FALLS.

0830 MOB TO FS1. (FIRE STATION 1)

0847 AT FS1. CALL AIRFIELD MANAGEMENT TO INFORM THEM WE ARE ONSITE.

0850 CHECK IN WITH FS CREW. ASSISTED OUT TO SITE.

0859 AT FS1-1. COMPLETE SITE WALK. ORANGE UTILITY LINE MARKED 1 FT SOUTHEAST ~~NORTHWEST~~ OF BORING RUNNING ~~SOUTHWEST~~ NORTHEAST - ~~NORTHEAST~~ SOUTHWEST, CHANGING TO NW-SE APPROX. 3 FT W OF BORING. MOVE FS1-1 5 FT ~~SOUTH~~ NORTHEAST TO AVOID UTILITIES.

0920 SET UP DRILL RIG AT FS1-1, SEE PHOTO LOG FOR BEFORE/AFTER PHOTOS.

0930 BEGIN DRILLING AT FS1-1 WITH 2 INCH OD MACROCORE WITH ACETATE LINERS. COLLECT CONTINUOUS CORE FROM 0 TO 15 FT BGS FOR LITHOLOGIC LOGGING AND SOIL SAMPLING.

0950 COMPLETE MACROCORE SAMPLING. AT 15 FT BGS AT FS1-1. PREPARE TO DRILL WITH HOLLOW STEM AUGERS. LITHOLOGIC LOGGING FROM 15 FT WITH SOIL CUTTINGS.

1000 COLLECT SOIL SAMPLE 1003FS1-1-SO-Ø FROM 0 TO 15 FT BGS AT FS1-1, HOMOGENIZED ACROSS SAMPLE INTERVAL; FOR ANALYSIS OF PFC (METHOD WS-LC-0025) WITH 2 x 1602 UNPRESERVED POLYS.

1004 BEGIN DRILLING WITH 8 INCH OD AUGERS FROM SURFACE AT FS1-1, WITH 6 PRONG DRILL BIT AND WOOD PLUG. BREATHING ZONE PID: 0.0 ppm. SEE BORING LOG FOR DETAILS.

1048 DRILLED TO 35, TAGGED WATER IN AUGERS AT APPROX 31 FT BGS, WOOD PLUG IN AUGERS CUTTINGS SATURATED AT APPROX. 35 FT ±. WILL DRILL TO 40 FT BGS

1051 TD BORING AT 41 FT BGS PREPARE TO KNOCK OUT WOOD PLUG / ALLOW GW TO RECHARGE FS1-1

AC 7-20-16

MB 7/20/16

7-20-2016 JBER - PFC SCRIBE: R.CAIRD / SAC

1056 DISCUSS WELL DESIGN FOR FS1-1 WITH M.BRUNO. WILL TAG DTW

1110 KNOCK OUT WOOD PLUG AT FS1-1 WITH CENTER ROD.

1115 DTW = 23.1 FT BGS THROUGH AUGERS AT FS1-1. WILL INSTALL MONITORING WELL SCREEN 25 TO 35 FT BGS AS DISCUSSED WITH M. BRUNO. BEGIN PULLING AUGERS BACK FROM 41 FT. TO SET WELL AT 35 FT.

1125 INSTALL 2 INCH SCHD 40 PVC WELL CASING WITH 2 x 5 ft PREPACK FILTER SCREEN (2 INCH SCHD 40 PVC) FROM 25 TO 35 FT BGS. NATIVE SOIL BACKFILLED FROM 41 TO 35 FT BGS.

1129 SOIL HEAVED, WELL SCREEN SET 24 TO 34 FT BGS. UNABLE TO PUSH CASING TO 35 FT BEGIN PULLING AUGER FLIGHTS AND ADDING #10/20 SAND. FS1-1

1134 ADDED 0.5 x 50 lb BAGS #10/20 SAND TO ~~22~~ 22 FT BGS. BEGIN ADDING 3/8 INCH BENTONITE CHIPS (HOLE PLUG) FS1-1

1200 ADDED 0.5 x 50 lb BAGS HOLEPLUG TO 10 FT BGS FS1-1

1206 PULLED REMAINING AUGER FLIGHTS AND HYDRATE BENTONITE WITH 5 GALLONS POTABLE H_2O

1216 DRILLERS FORCE OF TO BRING SONOTUBE. T. CALLEAR MOB TO PICK ONE UP FROM TRAILER

1219 ADDED 3 x 60 lb BAGS PEA GRAVEL FROM 10 FT TO 2 FT BGS BEGIN PREPARING SURFACE COMPLETION

1220 COLLECT IDW SOIL SAMPLE 16Q3-JB-IDW11-SO FROM DRUMS D#58, D#59 AT SITE FS1-1 FOR ANALYSIS OF VOC, GRO, DRO/RRO, Herbicides, Pesticides, PCBs, Mercury, RCRA Metals, SVOC, pH. SEE SAMPLE WORKSHEET FOR DETAILS

1223 DRILLERS SHOW ME PIECE OF REBAR ENCOUNTERED 0.5 FT BGS WHILE DIGGING OUT FOR SURFACE COMPLETION. NO SIGNS OF DISTURBANCE OR PIPES WHILE DRILLING

1245 TAG DTW = 21.7 FT BTOC (~22 FT BGS)

1250 RIG AND DRUMS LOADED ON TRAILER. CLEAN SITE.

1255 T. CALLEAR ONSITE. PREPARE SURFACE COMPLETION, 8-INCH FLUSH MOUNT WITH 1.6 IN SONOTUBE CONCRETE PAD.

1318 COMPLETE FLUSH MOUNT SURFACE COMP. AT FS1-1. SEE PHOTO LOG

1320 CHECK OUT WITH FS CREW. CHECK OUT WITH AIRFIELD MANAGEMENT

1324 MOB TO IDW STORAGE AREA.

RC 7-20-16

mB 7/30/16

7-20-2016 JBER-PFC SCRIBE: R.CAIRD/SAC

1340 AT IDW. PREPARE TO OFFLOAD DRUMS DØ58 AND DØ59 FROM FS1, APPROX. 105 gal SOIL CUTTINGS STORED FROM FS1-1.

1354 STORED DØ58 AND DØ59 ON PALLETS MOB TO FIELD TRAILER. IDW GATE LOCKED.

1400 AT FIELD TRAILER. MEET G. RAWSON (GEOTEK) ONSITE WITH COMPRESSOR AND TOOLS FOR DOWNHOLE HAMMER. T. CALLEAR HANDLES SAMPLES FROM TODAY.

1408 R. CAIRD AND GEOTEK MOB TO FSS

1415 CHECK IN WITH BUILDING 47420. GIVEN OK TO PROCEED.

1418 AT FSS, CHECK IN WITH STATION CREW.

1423 COMPLETE SITE WALK, BORING ABANDONED WAS STEPPED OUT 5 FT FROM ORIGINAL LOCATION DUE TO GAS LINE WILL STEP OUT ADDITIONAL 3 FT SOUTH-SOUTHWEST TO AVOID GAS LINE. NEW MONITORING WELL TO BE INSTALLED AT ~150 FT BGS USING DOWNHOLE HAMMER. SAMPLE ALREADY COLLECTED 7-12-2016. NO CUTTINGS VISIBLE DURING DOWNHOLE HAMMERING SO NO LITHOLOGY WILL BE LOGGED AT STEP OUT FS5-1 SEE PHOTO LOG FOR BEFORE/AFTER PHOTOS OF SITE.

1427 BEGIN SETTING UP RIG AT STEPOUT FS5-1

1447 BEGIN DRILLING WITH DOWNHOLE HAMMER AND 4 INCH DRIVE CASING. AT FS5-1 BREATHING ZONE PID = 0.0ppm.

1624 HALT DRILLING AT 53 FT BGS. BEGIN CLEANING SITE AND LOADING TRAILER. NO BREATHING ZONE OR BOREHOLE PID HITS. WILL CONTINUE DOWNHOLE HAMMER AT FSS-1 STEP OUT TOMORROW FROM 53 FT AND INSTALL MONITORING WELL. APPROX. 30 GAL SOIL CUTTINGS FROM FSS-1 PLACED IN 55-gal DRUM, DØ6Ø

1643 G.RAWSON MOB TO REFUEL COMPRESSOR AND STAGE IT AT FIELD TRAILER. NOTE SAME COMPRESSOR AS AT ATØ29, 7-15-2016.

1650 DRILLERS REFUEL RIG.

1700 G. RAWSON AT FIELD TRAILER

1710 M. MCHANEY + O. SUTLIFF ONSITE. BEGIN PREPPING TRAILER WITH SUPPLIES FOR TOMORROW AND DECONING AUGERS FROM FS1

1755 COLLECT GW SAMPLE 1603-GWEB-JBØ1 FROM DRILLERS POTABLE HYDRANT WATER FOR PFCS

1800 DRILLERS FINISHED DECONING. OFFSITE. EOD.

R. Caird 7-20-2016

mg 7/30/16

7-21-2016 JBER-PFC SCRIBE: R. CAIRD/SAC

0747 ONSITE, PREPARE FOR TODAYS ACTIVITIES

0750 CALIBRATE MULTIRAE C102717 SEE CAL LOG FOR RESULTS

WEATHER: OVERCAST, WARM - 60° F (AM), RAINED BEFORE 0800 TODAY, GROUND WET.
OVERCAST, WARM - 68° F (PM)

OBJECTIVES: CONT. DOWNHOLE HAMMER / WELL INSTALLATION AT FSS, IDW STORAGE / SAMPLING, DECON EQUIPMENT.

CREW: CH2M: R. CAIRD/SAC GEOTEK: G. RAWSON, O. SUTLIFF, M. MCHANEY

PPE: LEVEL D, ADD DUST MASKS WHILE HAMMERING.

AIR MONITORING: MULTIRAE, CALIBRATED, SEE LOG FOR RESULTS.

0800 G. RAWSON & O. SUTLIFF ONSITE.

0815 M. MCHANEY ONSITE.

0816 HOLD HEALTH AND SAFETY MEETING, TAILGATE TOPICS: DUST, TIGHT QUARTERS

0820 BEGIN LOADING TRUCKS FOR FSS, WILL INSTALL MONUMENT SURFACE COMP.

0830 MOB TO FSS (FIRE STATION 5)

0839 CHECK IN WITH BUILDING 47420, PROCEED TO SITE.

0845 CHECK IN WITH FSS CREW, BEGIN SETTING UP ON FSS-1 STEP OUT, DRILLED TO 53 FT BGS 7-20-2016

NOTE: WEATHER UPDATE: light rain started at ~ 0840

0920 RESUME DRILLING FROM 53 FT AT FSS-1 WITH DOWNHOLE HAMMER AND 4 INCH DRIVE CASING, BREATHING ZONE PID: 0.0 ppm

0945 G. RAWSON OFFSITE TO PICK UP GROUT MIXER

1011 RAG STUCK IN INNER ROD. TRIP OUT INNER ROD TO ENSURE HAMMER IS CLEAR

1030 REPLACE BLOCKED HAMMER WITH NEW HAMMER BIT. TRIP CENTER ROD BACK IN, BORING AT APPROX. 73 FT BGS. FSS-1, NEED NEW RAG TO USE.

1055 CONTINUE DRILLING FROM 73 FT BGS FSS-1, B.Z. PID - 0.0 ppm

1138 G. RAWSON ONSITE WITH CONCRETE / GROUT MIXER. AT ~ 90 FT BGS FSS-1

1145 G. RAWSON MOB TO FILL WATER TOTE.

1158 G. RAWSON ONSITE. B.Z. PID: 0.0 ppm

1255 K. BUTLER (CH2M) ONSITE.

7-21-2016

MB 7/21/16

7-21-2016 JBER-PFC SCRIBE: R.CAIRD/SAC

1258 WATER OBSERVED AT 123 FT BGS, COMING UP DRIVE CASING. ~~CALL~~ TALK TO M. BRUNO, WILL INSTALL WELL AT 133, SCREENED 123 TO 133 FT BGS, MONITORING WELL FS5-1, 2 INCH SCHD 40 PVC WITH PREPACKED FILTER PACKS.

1308 CONTINUE DRILLING FROM 123 FT BGS. AT FS5-1.

1334 TD BORING FS5-1 AT 134 FT BGS. BEGIN TO TRIP OUT CENTER ROD, MAX PID = 0.0ppm

NOTE: NEW INTERFACE METER (SOLINST MODEL 122 C102664)

1410 TRIPPED OUT CENTER ROD. TAG DEPTH TO BOTTOM = 133.8 FT BGS, DTW = 122.2 FT BGS AT FS5-1 PREPARE TO INSTALL MONITORING WELL CASING.

1425 BEGIN INSTALLING 2 IN. SCHD 40 PVC WELL CASING AT FS5-1

1431 WELL CASING INSTALLED, SCREEN SET AT 122.75 FT TO 132.75 FT BGS. BEGIN TRIPPING OUT ~~AUGERS~~ & DRIVE CASING.

1437 BEGIN ADDING #10/20 SAND. FS5-1

1449 ADDED 0.5 x 50 lb BAGS #10/20 SAND TO 120 FT BGS. BEGIN ADDING 1/4 INCH BENTONITE PELLETS.

1500 ADDED 0.5 x 5 gal BUCKETS PEL PLUG TO 117.5 FT BGS. FS5-1.

1505 HYDRATE BENTONITE PELLETS WITH 5 GAL POTABLE WATER.

1535 BEGIN ADDING FIRST BATCH BENTONITE GROUT (1 x 50 lb BAGS QUIKGROUT / 45 GAL)

1540 ADDED 45 gal GROUT. CONT. TO TRIP OUT DRIVE CASING. MIX ADD. GROUT FS5-1

1855 SECOND BATCH GROUT (1 x 50 lb BAG / 30 GAL) BEGIN POURING THROUGH DRIVE CASING

1600 ADDED SECOND BATCH, ~~BEGIN~~ CONT. & TRIPPING OUT REMAINING AUGERS. FS5-1

1630 COMPLETE TRIPPING OUT DRIVE CASING AT FS5-1, APPROX. 75 GAL GROUT ADDED.

1642 BEGIN CLEANING SITE.

1710 C. RAWSON OFFSITE WITH ~~GENERATOR~~ & COMPRESSOR.

1715 SITE FS5 SECURED.

1720 MOB TO FIELD TRAILER. WILL FINISH SURFACE COMP AT FS5-1 TOMORROW.

1730 AT FIELD TRAILER. EOD.

R. Caird
7-21-2016

MD 7/21/16

7-22-2016 JBER-PFC Scribe: K. Butler/HNL

0748 Onsite, start prepping for todays activities
0800 Calibrate MultiRAE CI02717, see Calibration Log for details
0810 O. Sutliff onsite, Stat morning Tailgate/H&S meeting; discuss todays varias tasks
Weather: Overcast w/slight rain. Expected Low of 55°, High of 68°
Objective: Complete surface completion at FS5-1 well location. Decon Rig and tooling used during FS5-1 well install. Drop off drums at IDW Storage area, take FS5 IDW analysis
General maintanance on Geoprobe rig
Crew: CH2M: K Butler/HNL; GeoTek: O. Sutliff, M. McHaney
PPE: Level D, no addition of dust masks today now that down hole hammering is complete
Air Monitoring: MultiRAE CI02717
0815 OSutliff gathers supplies for surface completion at FS5-1
0835 Mob to site Fire Station 5
0840 Check in at Bldg 47420. Given all clear to head to site
0848 Arrive onsite at FS5, tagged grout at 29ft BGS. Adding bentonite chips to come up to 10ft BGS
0850 Used 1½ x 50 lbs bag of 3/8 inch hole plug to come up to 10ft BGS, Hydrating the hole plug w/ 5 gallons of water
0900 Prepping Sonotube and begin digging out surface material to install stove pipe casing and cement pad
0930 1x 60lbs bag of pea gravel from 7ft to 1ft bgs. Notice material fell in when water was added
1045 Finish installation of stickup well. Used 2X bags of concrete used w/ 5 gallons of water, 1x 50lb bag of 10/20 sand added inside stickup casing. There is still rain coming down onsite so a garbage bag was cut up and used to try and protect the cement surface completion
1055 Leave site to head back to field trailer. O. Sutliff heads to gas station
1100 Back at the field trailer.
1345 O. Sutliff back onsite. Start prepping to decon equipment
1355 M. McHaney back onsite. Starts performing maintanace on GeoProbe Rig
1525 Head over to IDW storage area to drop off 2 soil drums D060 & D061 and decon water drum D062 (~20 gallons)
1555 GeoTek crew Finishes dropping off drums. Start opening lids for IDW sample
1600 Sample 16Q3-SB-IDW12-50 taken for VOCs, GRO, DRO, RRO, Herbicides, Metals, Pesticides, PCBs, SVOCs, & pH. GeoTek crew heads back to the field trailer

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7-22-2016 JBER-PFC Scribe: K. Butler

1630 Finish Closing all the drum lids, wiping the drums down and relabeling them. Head back to field trailer

1635 Back at field trailer. D. Stiff is deconing FSS-1 equipment

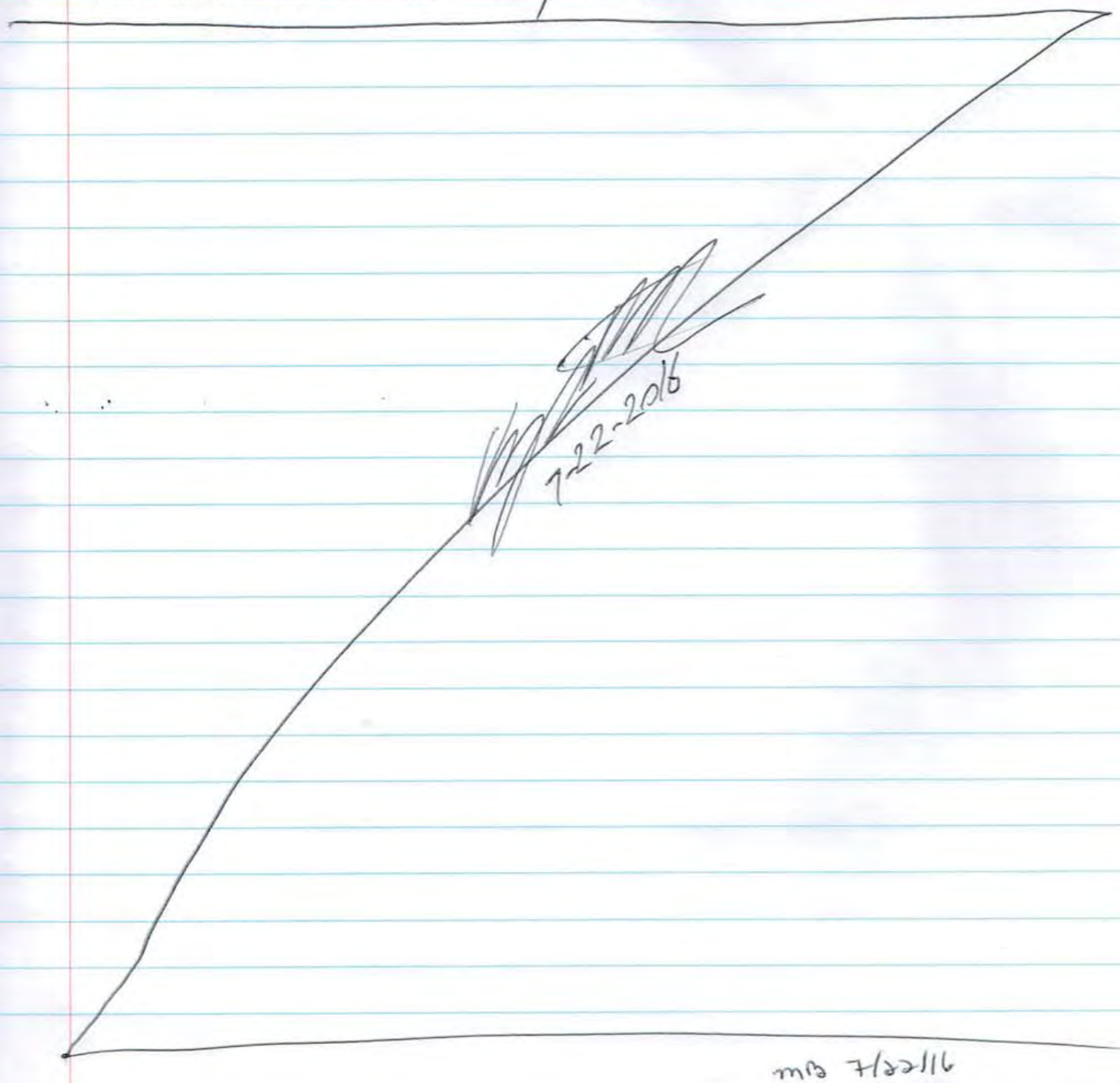
1720 M. McHaney offsite for the day

1725 Head to IDW storage area to add decon water to DØ62 drum from FSS-1 equipment decon

1730 Dropping off ~15 gallons into DØ62, ~35 gallons total in the drum now

1735 Drum is closed back up, head back to field trailer for end of day

1740 Back at the field trailer, End of day. 8am start tomorrow.



mrb 7/22/16

7-23-2016 JBER-PFC Scribe: K. Butler/HNL

0745 Arrive onsite, start prepping for todays activities
0750 Calibrate MultiRAE C102717, See Calibration Log for details
Weather: Mostly cloudy all day. Low of 53°, High of 73°
Objective: Well installation at H18. Collect soil sample w Field Duplicate, and IDW sample
Crew: CH2M: K. Butler/HNL & T. Callear/ANC GeoTek: M. McHaney & O. Sutliff
PPE: Level D, Same as before.
Air Monitoring: MultiRAE C102717
0820 Start morning Tailgate/H&S meeting. Discuss working near the runway/hanger areas
0825 GeoTek crew starts loading supplies for todays activities
0840 Leave field trailer with GeoTek crew to head to the gas station
0855 Leave the gas Station to head out to the site
0908 Arrive at Gate 7 to airfield. Called Airfield Manager for access.
0910 Arrive at H18 location, M. Bruno onsite.
0915 Well location looks like it should. Abandoned line in area going from N to S. will move location of H18-1 over 5ft to the east
0920 GeoTek crew starts setting up. There is a well located near by. Tagged DTW at 36.25 BTOC and TD = 45.5 ft BTOC. TOC is ~ 1ft above ground surface
0947 Begin drilling at H18-1 w/ 2inch macro core. will collect continuous cores from 0 to 15 ft bgs for logging & Sampling
1010 10-15 ft section of boring retrieved, crew starts setting up to auger w/ 8inch OD augers
1025 Sampled 16Q3H18-1-SO-0 and 16Q3H18-1-SO-1 (native & FD) analyzed for PFC using method WS-LC-0025. FD Time will be 1030
1027 GeoTek crew begins augering w/ 8inch OD augers and 3inch Cutter tool down to 46ft BGS
1135 TD at 46ft BGS at H18-1 well location. Start adding water to well to saturate bearing
1145 Changed the augers w/ ~ 15 gallons of water, start pulling out center rod in order to set the well
1155 Start installation of 2inch monitoring well with 10ft (2x5ft section) of 2inch Schd 40 PVC, Prepacks and 40ft of Schd 40 PVC riser, Screen set at 35-45 ft bgs
1205 Adding 10/20 Silica Sand to come up to 33ft BGS. 1x 50 lbs bag used to reach 33ft BGS
1215 Start adding 3/8 Hole plug for bentonite seal. 5x 50lb bag used to go from 33-10ft BGS

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7-23-2016 JBER-PFC Scribe: K. Butler / HNL

1245 Sampled 16Q3-JB-IDW13-50 for VOCs, GRO, DRO, RRO, Herbicides, RCRA Metals, Mercury, Pesticides, PCBs, SVOCs, & pH taken from 3 soil drums from HIS-1. (DØ63, DØ64, DØ65)
GeoTek finished removing the augers. Poured 5 gallons of water to hydrate bentonite
1318 Start adding 3/8 Pea Gravel to go from 10 ft bgs to 2ft bgs. 6 1/2 X 60lb bags used
1325 Start loading 3 drums onto trailer to take over to the IDW storage area
1335 Start work on surface completion of HIS-1
1420 Used 2X 60lbs bags of cement mix to complete well surface completion
1425 Head off site and head to IDW storage area to drop off 3 drums
1426 Called Airfield Manager when we were at the gate ready to exit
1444 Arrive at the IDW Storage area & Dropping off DØ63, DØ64, & DØ65
1510 Finish dropping off drums, Head back to field trailer for end of day
1515 Back at field trailer to finish out the day

7-23-2016

7-25-2016 JBER-PFC Scribe: K. Butler/HNL

0750 Arrive onsite, start prepping for today activities

0800 Calibrate MultiRAE C102717. See Calibration Log for details

Weather: Overcast, light rain all day. Low of 52, high of 66

Objective: Well installation at H8. Collect Soil Sample and IDW Sample

Crew: CH2M: K. Butler/HNL T Callear/ANC Geotek: M. McHaney & O. Schiff

PPE: Level D, same as before

Air Monitoring: MultiRAE C102717

0815 Start Tailgate/H&S meeting. Discussed working in restricted area by Hanger 8

0820 Finish with meeting, M. Bruno heads out to pick up todays dig permit. Crew preps to install H8 with estimated TD of ~45 ft BGS

0845 Morgan is back w/ the dig permit. Head out to meet up w/ Geotek crew at the gas station

0915 Arrive at Gate 5, call Airfield Manager for access, perform FOD check on vehicles

0925 Looking for H8-1 location, Call M. Bruno for assistance

0926 Find H8-1 location. Area looks like it should. No utilities in area except cathodic protection 20+ ft to the SouthEast of the point

0930 Crew starts off loading geoprobe rig from the trailer

0957 Start drilling at H8-1 w/ 2 inch Macrocore sampler. Continuous sample collection from 0-15 ft BGS

1015 Reached 15 ft BGS with Macrocore, switch out equipment to start using 8 inch augers

1030 Sampled 16Q3 H8-1-50-0 from 0-15 ft from macrocore liners for PFCs.

1032 Geotek crew starts using 8 inch OD augers to install H8-1 monitoring well

1125 Reached ~38 ft BGS w/ 8 inch OD augers, will give it ~15 mins and check to see if we hit water

1140 Tagged water at ~36 ft BGS, will set well at 36-46 ft BGS for the 10 ft screen

1153 TD at 47 ft BGS at H8-1 well location. Start adding water to charge casing, used ~20 gallons

1210 Start work removing the inner rod in order to set ~~the well~~

1225 Start tripping out 8" OD augers and adding 10/20 Sand.

1255 Used 6½ bags of 10/20 sand. Crew has sand bridging in the augers, working to break it up.

1345 M Bruno onsite for K. Butler, who departs for Flightline training. Sand bridge in augers broken up, ~~sand to~~ (46) screen pulled up slightly to 34.5-44.5 while sand bridge

-mB 7/25/16-

mB 7/25/16

7/25/16

JBER PFC

in augers was being broken up. Sand added to 33.5 ft bgs. Native material sloughed into hole to 15 ft bgs before bentonite seal could be added.

1400 Call C. Hinds & discuss issue w/ well. C. Hinds directs to have drillers install bentonite seal above sloughed native materials & proceed w/ well installation. Will install seal from 15 to 10 ft bgs and then proceed w/ installation as usual.

1410 Collect IDW sample 16Q3-JB-IDW14-SO from drums DP66 and DP67 for AK101, AK102/103, SW8260B, SW8151A, SW8270C, SW7471A, SW6010B, SW ~~8030~~ (MB) 8082, SW8081A, SW9045. Geotek has added bentonite, hydrating seal.

1415 Geotek loading drums onto trailer.

1435 O Sutliff adds pea gravel to ~~5~~ (MB) 2 ft bgs. M McHaney loading equipment.

1440 Talk w/ M McHaney about planned TD for HL6 well tomorrow (~70 ft bgs). Geotek only has 65 ft of auger right now. M McHaney calling Scott to try to get additional auger onsite.

1500 O Sutliff working on flush mount surface completion installation.

1520 Finished w/ installation. Perform FOD checks, Check out w/ airfield management. M Bruno offsite.

1525 Meet crew at Gate 6, Head to IDW Storage area to drop off drums

1540 Arrive at IDW Storage area to drop off drums DP66 and DP67.

1600 Finished offloading drums, head back to Field trailer

1610 O. Sutliff leaves site to pickup 2 sump pumps & additional 4¼ augers from Geotek's shop

1740 O. Sutliff back onsite, start work on decoming equipment, 3 x 4¼ augers brought onsite

1815 SBO written on crew members decoming equipment used today.

1830 Crew finishes decoming, End of day

7-25-2016

MB 7/25/16

7-26-2016 JBER-PFC Scribe: K.B. Hes/HNL

0745 Arrive onsite, start prepping for todays activities

0750 Calibrate MultiRAE C102717. See Calibration log for details

Weather: Mostly Cloudy Low 52, high of 69

Objective: Well istallation at H16, Collect Soil sample and IDW sample

Crew: CH2M: K. Butler/HNL T. Callear/AAI GeoTek: M. McHaney + B. Ernst

PPE: Level D Same as before

Air Monitoring: MultiRAE C102717

0830 Start tailgate/HSS meeting, discuss operations in restricted areas around Hanger-16/CAC

0845 Finish safety brief, GeoTek crew starts loading up equipment

0910 Haul to gas station w/ Geotek before heading to the site.

0943 Arrive at CAC gate. Call Airfield manager for access.

0955 Located H16-1 well location. Start setting up around the point. Site looks as it should

1027 Start drilling at H16-1, starting w/ 2 inch macro core, 5 ft liners down to 15 ft

1100 Crew completed macrocore sampling down to 15 ft BGS, Have switched to 8 inch hollow stem augers and have started drilling

1105 Sampled [16Q3H16-1-50-0] from 0-15 ft from macro core liner for pFCs

1220 Reached ~48 ft BGS w/ augers, Driller asks us to tag inside augers to see if we are at water yet. Tag water at 46.5 ft BGS between auger & center rod. will let it sit for 5 minuts to see if there is any change, Some wire came up with the cutting at ~45 ft.

1225 Tag water at 46.8 ft BGS, will Set well from 47-57 ft screen interval. Drillers continue onto 58 ft

1243 Reached TD for this boring 58 ft BGS, Adding water to augers to charge them before removing the center rod inorder to reduce heave ~20 gallons added

1315 Crew installs well and starts to pull up augers while adding 10/20 Sand up to 45 ft BGS, Security forces personal drove over and talked to Tara. Said we set off alarms and wanted to see a base badge Said they may stop back.

1324 Slight rain starting to come down onsite

1330 Start construction of the monitoring well. See well completion diagram for details

1415 Bentonite Hole plug up to 10 ft BGS, hydrating w/ water ~5 gallons

1420 Sample [16Q3-JB-IDW15-50] taken for VOCs, GRO, DRO, RRO, Pesticides, PCBs, herbicides RCRA Metals + mercury, SVOCs + PH

7-26-2016

7-26-2016 JBER-PFC Scritchfield, Butler/HNC

1425 Looking down the borehole, 3-4 lines can be seen coming off the side wall at ~3 ft BGS. Lines Look to begoing ~~AGW~~ N-S in direction. Called D. Lahall about the wires

1435 Start adding 3/8 pea gravel to the hole

1500 Finish adding 10 bags of pea gravel to come up to 2ft BGS.

1515 Start making concrete for surface completion

1525 Only one bag of concrete mix brought onsite, T. Cullen & B. Ernest head back to trailer to pick-up more

1610 Crew back onsite. Start mixing 2nd bag of concrete mix to finish surface completion

1620 Surface completion is complete. Preparing to leave site.

1625 Roll onto asphalt and start working on FOD check. Airplanes are exiting the CAC hanger and we are needing to wait in order to get out of area.

1645 Head at from H16 and head to the IDW storage area. 4 drums: D068, D069, D070, & D071

1655 Arrive at IDW storage area to drop of 4 drums

1737 Finished dropping off drums D068 - D071 (4 drums) Adding 12 gallon of decon water to D062 from H8 Heading back to field trailer.

1741 Back at trailer for deconing and end of day paperwork

1920 Mr. McHenry back onsite with 15 drums. Drum inspection form completed. All in good shape

1928 Finished decon of augers, crew works on finishing up for the day

1937 Crew leave for the day. End of day

7-26-2016

7-27-2016 JBER-PFC Scribe: K. Butler/HNL

0750 Arrive onsite, start prepping for todays activities

0755 Calibrate MultiRAE C102717, see Calibration Log for details

Weather: Mostly Cloudy Low of 53, High of 67, slight chance of rain all day

Objective: Well installation at H17, Collect soil sample and IDW Sample

Crew: CH2M. K. Butler/HNL T. Callew/ANC GeoTek: M. McHuney & B. Ernst

PPE: Level D, Same as before

Air Monitoring: MultiRAE C102717

0810 Start Tailgate & H&S meeting. Review Working in restricted area

0827 Finish meeting, crew starts loading up supplies for todays work.

0848 Head to gass station before heading to CAL gate and west side of Hanger 17

0913 Arrive at CAL gate, Call airfield manager of our work behind Hange-17 and our use of taxi way Echo. Informed that planes will be taxiing on taxi way Foxtrot

0930 Arrive at H17-1 location. Slight delay waiting on planes to taxi on Taxiway Foxtrot. Crew starts setting up at location

1002 Start drilling with 2 inch MacroCore in 5ft increments down to 15 ft

1035 Reached 15ft BGS w/macro core liner, Start switching to Hollow stem augers

1047 Start drilling w/ 8 inch OD Hollow Stem Augers to install H17-1 well

1045 Sample 16Q3H17-1-SO-0 fm 0-15ft BGS for PFCs.

1110 Walk over to tag H18-1 well for depth to water.

1120 Tagged well H18-1 at 45.25 ft BTOC, Close up well & head back to H17-1 well

1127 Back at current well being drilled. Call D. Lobell to discuss

1135 pulled center rod out to tag water in the augers. No water found

1145 Waited 10 mins and tagged the augers again, no water.

1155 Talk to D. Lobell again. will advance 10 ft and check again

1225 Reached ~35ft BGS, will tag augers again for water. No water present after recently center rod. Continue drilling

1255 Reached ~50 ft BGS, Tag water at ~47ft BGS will go down and set well from 57-47ft BGS

1325 Reached 58ft TD of boring, tagged water in the well at ~47 ft BGS. Start adding water to change augers

1335 Added ~25 gallons of water to augers, start setting the well. See Well installation diagram for details

1430 While pouring the bentonite 3/8 chips in, material bridged in the auger. Attempting to break through now.

7-27-2016

7-27-2016 JBER-PFC Scribe: KBuhr/JHNL

1500 Unable to remove material from the augers. Calling D. Lubell to discuss options.

1505 Crew starts tripping out augers and attempting to unplug bridge

1516 D. Lubell calls back for additional information on well install conditions. No real seal installed w/bentonite. Native material is back filling in the hole

1525 Augers have been removed from the hole. 3'x3'x5ft deep void at the surface. Appears to be a pipe North/South in direction. It is on the East side of where we were drilling. Call DLubell to come out to the site. D. Lubell is on his way out.

01545 D. Lubell onsite. Looking at open hole and pipe in the hole. Well will need to be pulled out and reinstalled

1600 GeoTek was able to pull out the full well screen from the whole. Move rig back to get a better look & pictures of the pipe. Pipe actual appears to be corigated pipe with geotextile around.

1605 Pipe is 3ft BGS, Appears to be 8inch in diameter with geotextile underneath. The pipe is approx 6ft west of the edge of the paved area.

1615 Crew starts work on backfilling the hole, use ~4½ bags of hole plug to fill ¾-st under the pipe. Used native material to fill on top of the pipe to about 1ft BGS

1625 D. Lubell & T. Callear leave the site to head back to field trailer

1630 Used 4x60lbs of pea gravel at the surface to complete the back filling

1635 GeoTek crew begins loading up 2 drums onto the trailer.

1700 All loaded up. Head out to CAC gate then off to IDW storage area to drop off 2 drums

1720 Arrived at IDW storage area. Start work to drop off DØ72 & DØ73. DØ74 is being generated for decon water.

1750 Finish off loading drums, head back to trailer for end of day

1755 Back at trail to submit paper work. Crew will decon in the morning

7-27-2016

7-28-2016 JBER- PFC Scribe: K. Butler/HNL

0755 Arrive onsite, Start prepping for todays activites

0800 Calibrate MultiRAE C102717. See Calibration Log for details

Weather: Cloudy Low of 55, High of 67

Objective: Well installation at CHD3, collect Soil sample and FDW sample. Possibly CHD2 as well

Crew: CH2M K. Butler/HNL T. Callear/ANC GeoTek: M. McHaney & B. Ernst

PPE: Level D, same as before

Air Monitoring: MultiRAE C102717

0815 Start Tailgate/H&S meeting. Review new procedure for clearing utilities w/hand auger, Incident Reporting

0835 Crew starts prepping for todays activities. Set up to start clearing augers from H17-1

1020 Crew still working on decon. D. Lubell will oversee working trailer area. Head to CHD3 location to start hand augering at location

1045 Arrive at site. Looks as it's staked. start prep for hand augering 3 holes to 5ft BGS in a triangle pattern to check for utilities

1050 Start Hand augering at CHD3 location

1155 D. Lubell onsite with post hole digger. Have only been able to auger down through gravel down to 2 ft 8 inch BGS

1215 D. Lubell offsite. Still not able to advance beyond 2 ft 6 inch due to gravel continuely caving into hole. Called Cory and he said it was ok to drill, we gave it our best effort

1340 GeoTek crew arrive onsite. Talk to M. McHaney abt driving in. Find a route to drive strait in at the corner of Arnold and Fighter Dr. Delay due to onbase traffic

1345 Start work off loading rig from the trailer.

1405 D. Lubell onsite to pick up sample for shipping

1420 Start using macro core to sample and describe 0-5 ft BGS

1425 Less than 15 inches of recovery move over and attempt to sample 0-5ft again

1430 25 inch of recovery for second attempt, continue down with macro core

1455 Finish reaching 15ft, Core is not from 6ft on, will call Cory to confirm sample depth

1500 Will hand auger 0-1 ft to complete Sample & FD for bottom.

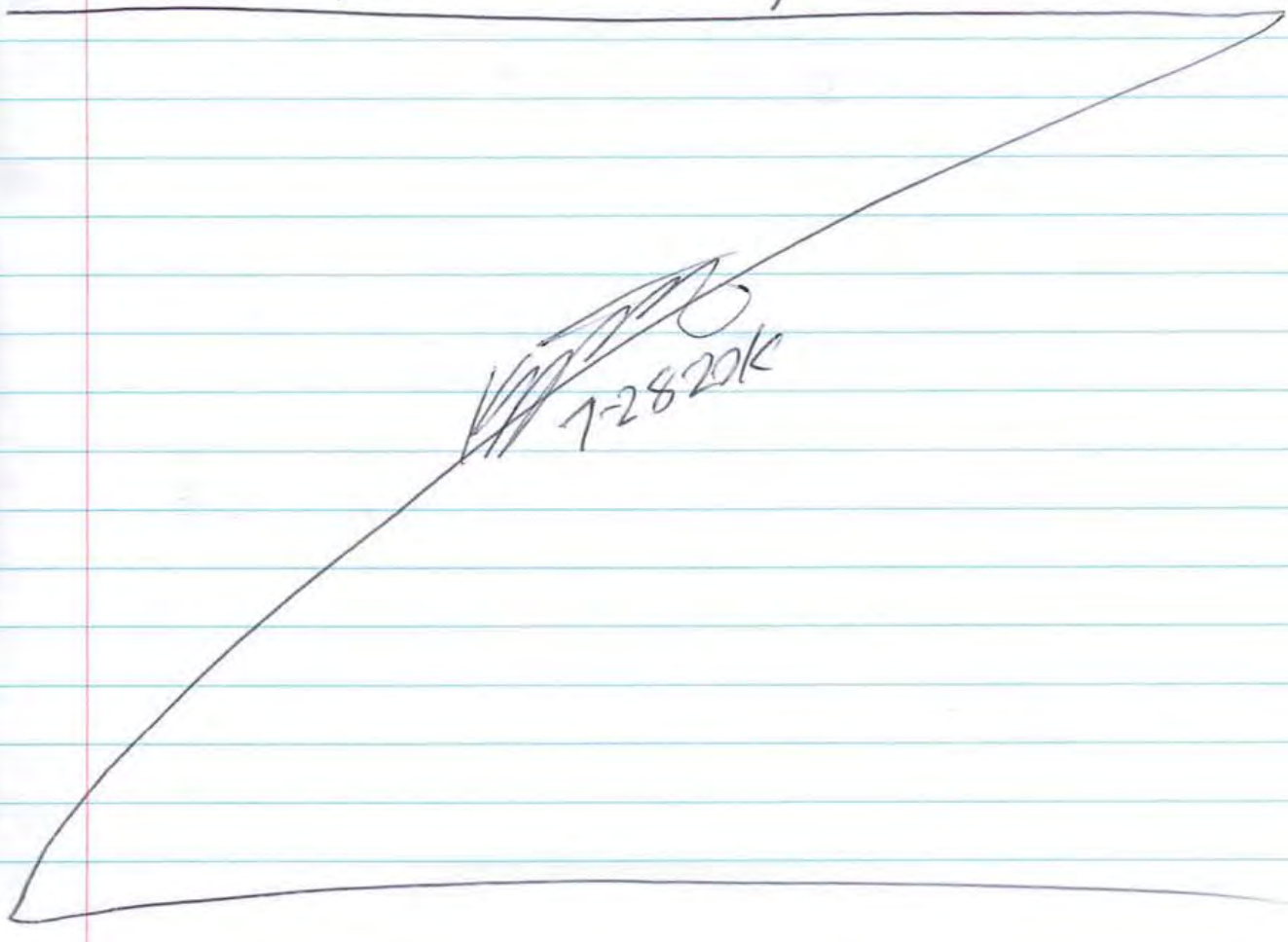
1520 Sample | 16Q3CHD-3-SO-0 | for PFCs from 0-1ft

1525 Sample | 16Q3CHD-3-SO-1 | for PFCs (Field Duplicate) from 0-1ft

7-28-2016

7-28-2016 JBER-PFC Scribe: K. Butler/HNL

1527 Geotech starts drilling w/ 8 inch augers to 18 ft to install well screen at 7-17 ft BGS
1540 Reached 17.5 Ft TD with augers, start work on installing the well
1545 D. Lubell & T. Cullen offsite to take care of shippers samples
1550 Installing well, see well installation diagram for details
1600 Finished installing bentonite seal up to 2.5 ft BGS. Hydrating bentonite w/ 5 gallons of water
1635 Start working on surface completion (stick up) at CHD3
1720 Finished w/ surface completion and loading up. Head out to IDW Storage area to drop off drum
1742 Arrive at IDW Storage area to drop of drum D078
1806 Finish dropping of drum. Geotek crew head over to fill up water from their permitted fire hydrant
1810 Arrive back at field trailer to wrap up paperwork
1823 M. McHaney back at the field trailer
1826 B. Ernst back at the field trailer from getting water. Crew will decon augers today before leaving
1900 Crew starts deconing augers for today
1925 B. Ernst Finished w/ decon heads offsite for the day



7-29-2016 JBER-PFC Scribe: K.Butler/ANC

0745 Arrive onsite, Start prepping for todays activities
0750 Calibrate MultiRAE C102717. See Calibration Log for details
Weather: Overcast Low 57, High 67 small chance of rain all day
Objective: Well installation at CHD1 and CHD2.
Crew: CH2M K. Butler/ANC, T. Callew/ANC GeoTek: M. McHenry + B. Frost
PPE: Level D, Same as before
Air Monitoring: MultiRAE C102717
0805 Start Tailgate/H&S meeting. Discuss spotter while backing up vehicle. Tight working areas and underground utilities
0815 Finished with meeting prep to head to CHD-1 location
0825 CH2M Crew heads to site to start hand augering while GeoTek gets set up
0845 Arrive at CHD-1 well location. Garret Knapp from GeoTek onsite going over site markings
0847 Location for the well is 9ft away from the gas line marking that parallels the road
0850 Tom Callew leaves with G. Knapp to check out CHD-2 location. Start hand augering for utilities
0917 GeoTek crew arrives onsite. Parks and put out cones
0935 Call D.Lobell, Only able to reach ~2ft 10inch with hand auger before not being able to continue
Will proceed with drilling. Inform GeoTek crew, Start off loading equipment
0945 G. Knapp and T.Callew back at CHD-1 location
1000 Crew Starts augering w/ 8inch OD Hollow stem augers
1010 Reach 18ft BGS with augers, Go to tag
1015 Tag water in the augers. No water present. Drillers drilled w/ plug in place installed center rod
Water appears to be ~8ft down the bank, will set well at 10-20ft
1020 Start drilling to 21ft TD.
1027 Finish drilling to 21ft BGS to set well screen at 10-20ft
1033 Start installing well, see well installation diagram for details
1054 Sand up to 8ft BGS. Start work on bentonite seal
1105 D.Lobell onsite to check on progress
1115 T. Callew and D.Lobell head to CHD-2 location to start hand augering next location
1125 Finished with installing pea gravel to 2ft BGS. Start work on surface completion

[signature] 7-29-2016

7-29-2016 JBER-PFC Scribe: K. Bath/HNL

1220 D. Lubell on site to talk about CHD-2 location and progress of hand augering

1225 D. Lubell heads back out to CHD-2 ~~location~~ LOCA Location. GeoTek crew uses geoprobe rig to dig out holes for bollards

1315 Finished placing cement mix for bollard bases and surface completion at CHD-1 well.

1325 GeoTek Crew only brought out 6 bags of concrete mix. Used two for surface completion. one for each one of the bollards bases, and now planning on using the last ~~two~~ to fill bollards. Crew member will need to go back to trailer to get additional bags of concrete mix to use for surface completion at CHD-2 location

1340 Finish with filling the bollards w/ concrete. Head over to CHD-2 location

1345 Arrive at CHD-2 location

1407 D. Lubell, T. Cullen, & B. Ernst head back to field trailer. Start off loading rig to start work on CHD-2 Location. See D. Lubell log book about hand digging observations

1420 Set up 5ft North of anomaly marked out by geophysics

1425 Start drilling to install CHD-2 monitoring well, no soil samples here

1457 B. Ernst back onsite after picking up additional bags of concrete mix

1500 ~~Reached~~ Reached TD of 21 ft BGS. M. McHenry takes a smoke break

1510 Start backup. Working on setting screen from 10-20 ft BGS See well installation diagram for details

1618 Finish filling in hole up to surface completion. Crew starts working on digging out area for sonotube

1710 Finish surface completion at CHD-2. Head over to IDW storage area to drop off 3 drums

1733 Arrive at IDW storage area, Start off loading drums DØ80, DØ81, & DØ82

1759 Crew finishes dropping off drums. Head back to field trailer to pick up decon water and bring it back.

1816 GeoTek crew back with decon water. Generate DØ83 with CHD decon water

1830 Leave IDW Area to return to field trailer for end of day

1835 Back at field trailer

1850 GeoTek crew out for the day. Start at 7am tomorrow

7-29-2016

7-30-2016 JBER-PFC Scribe: K. Butler/HNL

0645 Arrive onsite, Start prepping for todays activities
0650 Calibrate MultiRAE C102717. See Calibration Log for details
Weather: Mostly Cloudy, Low of 56, High of 66
Objective: Install CHD-4 location, Take soil sample & 1 DW sample for CHD location
Crew: CH2M K. Butler/HNL GeoTek: M McHenry, & B. Ernst
PPE: Level D, Same as before
Air monitoring: MultiRAE C102717
0709 Start Tailgate/H&S meeting. Discuss rushing on last day of the week, rough terrain today, bears, cats
0722 Finish meeting, GeoTek crew starts loading up for todays well and offloading rods off of rig rack.
0740 B. Ernst starts decoming auger and hand drill bit for use today
0800 Leave Field trailer for gas station before heading to CHD-4
0844 Arrive at the top of hill at CHD-4 location. Start offloading rig & prepping to go down the hill
0905 Start heading down the hill w/ Geoprobe rig and support truck
0935 Reach the bottom. Make an attempt to drive to well location
0945 Was able to reach well location. Bees nest ~~nest~~ near secondary location. B. Ernst Stung twice. Feeling ok.
0948 Start hand augering at CHD-4 location. GeoTek crew sit in car. B. Ernst will monitor himself
1000 Reached 2ft 5inch BGS with hand auger. Wet soil encountered at that depth. Let the drill team know they can drill & install a 15ft well here Screen from 5-15ft BGS
1005 Sample [16Q3CHD-4-SO-0] taken for PFCs from 0-2ft BGS w/ hand auger
1020 Check B. Ernst. He is feeling alright. Got stung on lower back and left ankle
1028 Called D. Liddell to let him know about the bee stings. He'll inform J. Colby and C. Hinds
1030 Start using 8 inch hollow Stem augers w/ wood plug to drill down to ~ ft BGS
1045 Reached 16ft BGS, Cuttings are not looking saturated, check auger, no water yet
1050 Called D. Liddell, will drill a little deeper ~~and~~ current elevation is ~22ft ~~BGS~~ will need more augers to continue drilling, GeoTek drives back up the hill to get more augers
1110 GeoTek back w/ augers, Taking them to the rig to continue drilling
1117 At 18ft BGS will give it 20 min and see if water is coming in
1137 Only ~1ft of water in the auger. See water seeping in at the 5ft mark on the tape ~13ft BGS will set the well from 0-20ft BGS with screen at 10-20ft BGS

7-30-2016 JBER-PFC Scribe: K. Butler/HNL

1138 Crew continue drilling from 18ft to 21ft TD

1142 Reach 21ft, TD of boring. Start installing well. See well installation diagram for details

1150 PVC riser broke in the augers, ~10 ft below ground, will need to trip out 2 or 3 augers and remove the PVC from well, redrill and try again to install well

1200 PVC also broke at the top of the prepack screen. Will need to replace that in order to install well. Call D. Lubell, he is at the field trailer and will bubble to bring screen to us. Crew breaks for lunch.

1220 Crew heads down to advance augers back down to 21ft BGS

1240 D. Lubell on site w/ screen, GeoTek crew start well install of CHD-4

1300 Start adding sand to cave up to 8ft BGS

1410 D. Lubell off site, crew is waiting for sand to settle in the silty water, currently at 15ft BGS w/ sand

1507 Sand is still settling. Currently at ~14.5 ft BGS, have added 6 x 50lbs of sand (10/20). Called D. Lubell, we will leave the well as is to settle until monday. We don't want to add bentonite seal currently due to the fear of bridging it with the sand still settling. Packing up equipment and heading back to the top of the hill. Covering well with bucket and placing a 60lb of pea gravel on top

1524 All backed up and ready to head to IDW storage area to drop of drum DØ85

1622 Arrive at IDW Storage area, was forced to exit base and re enter at the Richardson Gate where we were screened at the checkpoint

1645 Sample 1603-JB-IDW16-SO for VOCs, GRO, DRO, RRO, Pesticides, PCBs, Herbicides RCRA Metals & mercury, SVOCs, & pH. from drums CHD drums: DØ76, DØ80, DØ81, DØ82, DØ85

1647 GeoTek crew head back to field trailer for end of day.

1700 Back at field trailer for end of day paperwork & putting away samples

7-30-2016

8-1-2016 JBER-PFC Scott K. B. Hu/HNL

0650 Arrive onsite. Start prepping for todays activities.

0655 Calibrate MultiRAE C102717. See calibration Log for details

Weather: Over cast with chance of afternoon light rain Low 51, High 65

Objective: Install H6-1 location, Take Soil & FD or Sample for location

Crew: CH2M: K. Butler/HNL T. Gallear/ANC Geotek: M. McHenry & B. Ernest

PPE: Level D. Same as before

Air Monitoring: MultiRAE C102717.

0710 B. Ernest onsite, also HSS talk with him before he starts decon

0827 Start HSS meeting w/ CH2M Crew. Talk about driving to Hangar 6 and activities

0857 Finish w/ Safety meeting, head over to start hand auger at site

0845 Leave field trailer for H6 site

0915 Arrive at H6 site through Gate 4. Called A. Field manager on the way in

Site looks as it should. Store mate marks 11ft N. of that hole. Start work on hand augering

0925 Location marked has what appears to be asphalt at 3.5 inch BGS. Will move 5 ft South

0927 5ft south location also appears to have asphalt at 3.5 in, move 5ft more to the South

1015 Driller arrive onsite, CH crew continue hand augering at new location/offset

1020 D. Lubell Stops by to discuss location

1037 D. Lubell Leaves to head over to CHD-4 location to check how the Sand has settled

1055 Reached 3ft 3inch with hand auger and post hole digger, Gravel has gotten too much to continue

Inform geotek crew they can setup at location to Macro core 0-15 ft BGS & Hollow stem auger

1058 Geotek starts off loading the Geoprobe rig from trailer

1111 Start DPTing down to 15 ft BGS at H6-1 location

1124 D. Lubell back onsite after seeing CHD-4. Sand bridged at top of water but was able to get through

will call ~~him~~ Kim Corey to discuss how to finish well

1132 D. Lubell off site, heading back to field trailer

1135 Finished Macro Coring to 15ft. Set up on auger hole to continue w/ Hollow stem augering

1145 Start augering for installation of H6-1, Sample 16Q3H6-1-SO-0 for PFCs from 0-13.5ft BGS

1206 Water seen in macro core liners at ~13 ft BGS, Having M. McHenry stop at 23ft BGS to see if water is present on the augers, Measured water at 24.5 ft to the top of augers, will wait 15 min and measure again

8-1-2016

8-1-2016 JBER-PFC Scribe: K.Butler/HNL

1226 Tagged water in augers at 20 ft BGS with center rod in place. will set well from 24-14 ft BGS for the screen

1230 GeoTek crew works to TD the well at 24.5 ft BGS. Tried pulling out center rod. will need to add water

1233 Start adding water to the augers. 12 gallons added to the augers

1238 Start removing center rods out of the augers

1240 Start prepping for well installation

1246 Installed screen & riser, start pulling augers, See well installation diagram for details

1325 Finish adding sand, continue on with bentonite seal

1340 Reach top of bentonite seal. Pouring in peagravel

1345 Sampled 16Q3-JB-IDW17-SO from 2 drums for VOCs, GRO, DRO, RRO, Herbicides, RCRA Metals & Mercury, Pesticides, PCBs, SVOCs, & PH for drums DØ86 and DØ87

1425 While M.McHaney was loading augers onto the trailer, 4 augers rolled off the pallet they were on and dropped to the ground. M.McHaney was able to move and not be struck by the augers. With the help of B.Ernst, crew was able to reload the augers and strap them down.

1443 Finished surface completion at HG-1. Head over to CHD-4 to try and complete that well

1505 Talked to D.Lobell about final installation of CHD-4 after arriving at top of Hill, Will add peagravel up to 8 ft BGS, then a small layer of sand before bentoniting up a 2 ft seal

1515 Reach well location at the bottom of the hill, break the bridged sand with PVC before pouring in peagravel

1525 1 bag of peagravel set at 3 ft 6 inch BGS, will put 6 inch of sand on top (1/2 bag) before putting bentonite chips again (1.75 bags) bring it up to 1 ft BGS

1535 Start work on surface completion

1605 Start pouring cement mix into dug out 16 inch Sono tube

1625 D.Lobell at the top of the hill. Finished with surface completion, head up

1630 Start heading back up the hill

1645 Head to IDW storage area to drop off 2 drums

1708 Arrive at IDW Storage area, start off loading rig and Drums DØ86 & DØ87

1740 Head back to field trailer for end of day paperwork

1745 B.Ernst starts deconning equipment used today at HG-1

1845 B.Ernst Finished deconning rods/augers. offsite for the day.

[signature] 8-1-2016

6-2-2016 JBER-PFC Scribe: K Butler/HNC

0755 Arrive onsite, start prepping for todays activities
0800 Calibrate MultiRAE CI02717. See CalibrationLog for details
Weather: Overcast w/light rain, Low of 54, High of 66
Objective: Install H17 to 57ft (Bottom of screen), Take IDW Sample
Crew: K Butler/HNC (Chem, GeoTek: M. McHenry & B. Ernst
PPE: Level D same as before
Air Monitoring: MultiRAE CI02717
0810 GeoTek crew arrive onsite
0820 Start Safety/Tailgate meeting. Discuss augers falling, flight line access, removal of H17
0835 Crew Starts loading up equipment/Supplies for today
0850 Leave field trailer, crew heads to gas station before heading to H17-1 location
0915 Arrive at C&C gate, Call Airfield Manager to access given
0930 Arrive at C Hangar 17) H17-1 location. Mark new location of well, 5ft west of original location (12ft off the asphalt edge). Measured distance from asphalt to Electrical conduit at 27.5ft.
0940 GeoTek crew begins off loading geoprobe rig off the trailer to stage in new location
1008 GeoTek crew begins drilling at new H17-1 location
1030 At 13 FBG, cutting have a slight hydrocarbon/fuel odor. MultiRAE Reads 0.0 ppm to 0.1 ppm on cuttings. will continue to monitor cuttings. Call D.L. ball to give him a heads up of the pod hits
1050 Got a hold of D.L. ball and let him know about the PID hit. No readings above background after 15ft.
1155 Reached TD of 58ft BGS, start adding water to augers to prevent sand coming in
1156 Received call from M. Brown. Some drums from well development were staged in the wrong area will need to move them with rig when we go to the IDW Staging area
1215 ~20 gallons was provided to the augers to change them, Crew sets up to install well
1240 Start installation of the well, see Well completion Diagram for details
1300 Augers pulled back up to 45ft BGS, start tagging
1321 While pulling off 45-5oft section of auger with the wrench, The top of the auger (Top left) got caught on the lifting collar still clamped to the side of the drill head. This caused the auger to kick to the right and go towards the drill operator.
1322 Noticed a spray coming off the back of GeoProbe hose clamp and alerted A. McHenry

6-2-2016

8-2-2016 JBER-PFL Scribe: KBA/HML

1328 Called and informed D. Lobell about the hydraulic leak. He will inform Gary & J. Colley. Was reminded to have them drum up any hydraulic fluid impacted soil. Rig is to be shut down until it can be repaired.

1350 GeoTek crew have removed the part that broke and pictures have been taken. Crew leaves the site to see if they have a replacement at the shop or will need to make a new one. Given an estimate of an hour to take care of. Crew has not yet shoveled up hydraulic spray impacted soil from the ground. Estimated area covered by spray to be ~2-3ft wide by ~11ft long. Approximately 2-3 oz released based on it spraying 3 times.

1522 GeoTek crew back onsite with replacement parts and zipties to button up a few items on the rig

1546 Hydraulic line on the geoprobe 8040 DT Rig #2 has been replaced, crew goes on with well installation

1550 Start making bentonite grout mix w/ water and quick grout

1558 Start pouring grout down augers, Made 25 gallons using 7/8 x 50lbs bag of Quick grout

1608 Start pulling augers from the hole. 45ft should still be remaining on the drill string

1648 Augers have been removed from the bore hole

1650 Sample | 16Q3-JB-IDW18-SO | Taken for VOCs, GRO, DRO, RRO, Herbicides, RCRA Metals & Mercury, Pesticides, PCBs, SVOCs, pH

1655 GeoTek mixes additional batches of grout to come up to 10 ft BGS ~15 gallons & 1/2 bag of Quick grout

1729 Start loading drums onto the trailer using the Geoprobe rig winches. 4 drums generated today: D

1741 Finish loading the drums onto the trailer and now backing the geoprobe rig

1742 Start pouring the bentonite pellets on top of the grout (Hole plug used). Used 1.5 bags and came up to 8ft BGS

1746 Start adding peagravel from 8ft to 2ft BGS

1755 Used 7 1/2 bags of peagravel from 8-2ft BGS

1758 Start working on surface completion (Flush mount well)

1804 Start cleaning up hydraulic fluid impacted soil

1813 Showed additional area that needs to be shoveled from hydraulic leak. Only scraped up a total of 5 gallons of soil

1840 Finish surface completion. Head offsite and head to IDW storage area

1900 Arrive at IDW storage area, will need to move 5 drums placed incorrectly yesterday by development crew and off load our 4 drums D098, D099, D100, D101.

1940 G. Ernst leaves IDW area for hydrant water to fill up their water tote

1950 M. McHenry finished backing up Geoprobe rig and heads back to field trailer for end of day

[signature] 8-2-2016

6-3-2016 JBER-PFC Scribe: K. Butler/HNC

0750 Arrive onsite, start prepping for todays activities.

0800 Calibrate MultiRAE C102717. See calibration Log for details

Weather: Partly cloudy Low of 53, high of 70

Objective: Install UC35A well location, collect soil sample and IDW sample

Crew: K. Butler/ANC & T. Gallear/ANC GeoTek: M. McHenry & B Ernst

PPE: Level D Same as before

Air Monitoring: MultiRAE C102717

0823 GeoTek crew onsite, Start Safety/tailgate meeting. Talk about flightline access & yesterday hydraulic leak

0842 Finish Safety meeting, crew starts prepping for today, mark out will need to decon augers from yesterday

0907 Head out to AE3/AWACS crash location to double check gps point for new sample location

0918 Arrive at berm south of site, load up and walk to site

0935 Take GPS point at E3/AWACS location.

0938 Head back to vehicle

1000 Back at vehicle, finish up packing up, head back to field trailer

1011 Back at field trailer

1050 Leave field trailer for UC35A well location. Drillers will make a stop at the gyro station

1105 Arrive at site, everything looks as it should

1125 GeoTek crew onsite at UC35A

1130 Crew realized that they did not load up Chop saw. call D.L. Hall to see if he can bring it out.

1205 Picked up the chop saw from D.L. Hall and back onsite. Crew starts cutting asphalt at ~~E3/AWACS~~ UC35A-1 location

1215 Finish cutting through asphalt, Set up to start macro boring to 15 ft BGS

1222 Start DPSing to 15ft w/ macro core system

1255 Finish macro coring to 15ft, GeoTek starts switching to Hollow stem augering

1305 Sample 1603 UC35A-1-50-0 for PFCs from 1-15 ft from Macrocore liners. 0-1 was fill material so was not sampled. GeoTek starts augering at UC35-1 location. Expect water ~35ft BGS

1350 Reach 33ft BGS, Tagging to see if there is any water. Water appears to be at ~ 30ft. Will set well from 30-40ftBGS

1407 TD at 41ft BGS at UC35A-1 location. Start pulling up center rod

1420 Tag water again after center rod removed. Water at 29.5 ft BGS, will install well for 0-40ftBGS with screen from 30-40 ft.

6-3-2016

8-3-2016 JBER-PFC Scribe: K. Butler/HNL

1426 Start installing well UC35-1 See well installation diagram for details

1451 Sand and native fill backfilled to 2ft BGS, will use Pel/Plug to seal on top

1500 Start mixing quikgrout mix and pulling augers

1521 20 gallons using 3/4 x 50 lbs bag of quikgrout used so far

1530 Augers out of the ground Sample: 16Q3-JB-IDW19-SO for VOCs, GRO, DRO, RRO, Herbicides, RCRA Metals & Mercury, Pesticide, PCBs, SVOCs, pH from drums

1542 Augers creeped over to the saw cut of the cut out asphalt. Cutting additional asphalt to center well vault over the well location. Using the Chop Saw again to cut the asphalt

1600 12 more gallons w/ 3/8 x 50 lbs of quikgrout used to come up to 10ft BGS.

1610 Used 4 bags of Pengrout to come up to 2ft BGS

1625 D. Lubell onsite to pickup samples and take T. Callear back to field trailer

1628 D. Lubell & T. Callear offsite. Geotek crew starts loading the 3 drums generated today

1640 Start work on surface completion

1710 Realizing that the 3 bags of concrete is not going to be enough call D. Lubell to see if they can drop off more

1736 T. Callear brings 5 additional bags to the gate, B. Ernst picks them up

1740 Continue work on surface completion

1805 Finish Surface completion & Finished loading up. Head to IDW area to drop off drums

1813 at the gate call air field manager to let them know we are off

1830 Arrive at IDW Staging area. Start of loading rig to move 3 drums generated today

1930 Finish off loading DI02, DI03, DI04 & making decon drum DI05. Head back to field trailer

1935 Back at field trailer for end of day

8-3-2016

8-5-2016 JBER-PFC Scribe: KBatt/HNL

0800 Arrive onsite, Start prepping for todays activities
0805 Calibrate MultiRAE C102717, See calibration log for details
Weather: Overcast, light rain Low of 55, High of 65
Objective: Continue work on AT052. Attempt to finish it today
Crew: K.Batt/HNL GeoTek: B.Ernst & M.McHaney
PPE: Level D w/ option of dust mask while down hole hammering
Air Monitoring: MultiRAE C102717
0820 Start safety/tailgate meeting. Talk about big boards, flight line access, & trigger state
0845 Finish H&S/tailgate meeting. GeoTek crew starts loading up supplies for today
0910 B.Ernst heads out to get water from hydrant, M.McHaney and I head to AT052 location
0920 Stop at well AP-5782 to tag water level in area, Rain has stopped.
0925 Tagged water at 143.5 ft BGS at AP-5782, Head to AT052
0930 Arrive at AT052 location. Start offloading Geoprobe rig
0952 B.Ernst arrives onsite with compressor. Start positioning rig to position
0955 Continue setting up down hole hammering equipment
1014 Mike onsite w/ GeoTek crew to drop off drums. GeoTek crew starts adding water to drill string ~125 gallons
1025 Mike and geotek guy off site after dropping off 2 drums onsite
1028 GeoTek crew continue work on regaining circulation for the down hole hammer
1034 Adding additional water down the center rod. ~25 gallons. Continue trying to regain circulation
1046 Adding additional water down the center rod. ~ 25 gallons
1055 Regain circulation. Clearing out drill string
1057 Continue down to 58 ft BGS
1105 Reach 58 ft BGS, add next section of rod
1107 Starting to advance from 58 ft to 63 ft, circulation lost again
1113 Adding water down the center rod ~25 gallons added

8-5-2016 JBER-PFC Scott K. Potts/HWE

1210 Use water level meter to see if there is water in the DT45 rod.

1215 No water present, tape stopped at 60ft BGS. Drill String is 63ft BGS (last 3ft is the hammering bit.

1235 After M. McHenry made a few calls, folks in the shop think he is in hearing sounds start tripping out center rod again and will tag depth to water again.

1245 Center rod tripped out, Tag bottom again, no water. M. McHenry brings up the DT45 a foot

1250 Tag the bottom again, still no water at the bottom of the drill string. Start tripping down center rod and continue drilling.

1258 Center rob backin place, continue with drilling at AT052 site. Light rain starting up again

1307 Add water to center rod, ~ 15 gallons added, continue drilling from 63 to 68 ft section

1335 GeoTek crew is starting to look at compressor and hear the fix from it.

1400 Appears that the valve at the compressor wasn't opening all the way. Crew thinks they isolated the issue and are trying to cement it now

1415 Start down hole hammering again. Continue trying to advance to 68ft BGS

1445 Reached 78ft BGS, First drum is full, switch to second drum

1500 Reached 83ft BGS, continue drilling, No circulation issues.

1545 Reached 103 ft BGS, still dry, continue drilling

1703 Reached 128 ft BGS, still dry, cuttings still look the same, will drill one more set section today

1725 Reached 133ft BGS, start packing up for the day

1814 Finish up with breaking down site and packing up. Head back to the field trailer

1824 Back at field trailer for end of day paper work.

8-6-2016 JBER-DFC Scribe: K. Butler/HNL

0750 Arrive onsite, Start prepping for todays activities

0800 Calibrate MultiRAE CI02717. See Calibration Log for details

Weather: Overcast with chance of rain Low of 57, High of 65

Objectives: Complete installation of AT052, Sample IDW, & decon/prep for Monday's well

Crew: CH2M: K. Butler/HNL GeoTek: B. Ernst & M. McHaney

PPE: Level D w/option of dust masks while down hole hammering

Air Monitoring: MultiRAE CI02717

0835 Start Tailgate/HSS Meeting Discuss Flight line access and muster points

0850 Finish meeting, Prep to head out to show crew where HS, HIS, ect well locations

0855 Head out to North part of runway area

1020 Back at field trailer. Head out to AT052 location to catch up with GeoTek crew

1027 Arrive at AT052, GeoTek crew starts offloading Geoprobe rig off trailer

1055 GeoTek crew finishes connecting Compressor and lines, Set to start drilling

1059 Start drilling, currently at 153ft BGS, still dry

1202 Reached 148ft. Seeing slight signs of moisture. Crew takes a break. Rain is starting to fall, No water

1310 Reached 158ft BGS, will wait and give water a chance to enter if present. Head to field trailer to talk to J. Ulrich

1340 Back onsite, will blow out hole and see if we have water

1341 J. Ulrich calls, Lets me know the TD of AP-5782 was 167ft BGS

1348 Still dry at 158ft BGS, Continue drilling at AT052

1500 At 178ft BGS, will wait a few minutes & check for water

1530 Push air back down the center rod after trying to tag water w/water level meter. No water

1545 Continue drilling to 183ft BGS

1750 Reached 197ft BGS, Clearing out cuttings with compressor, Still no water observed from drillings

1806 Water is now coming in at 198ft while trying to clear drillstring while Talking to J. Ulrich

8-6-2016 JBER-PFC Scribe: K.Butler/AM

2003 Start removing 200ft of inner rod from inside the dt45 outer casing
Talked with J. Ulrich. Will set well at 190-180 (screen) and bring it back up to 188 w/sand
Will put a bentonite seal from 176-178 and call it for the day

2122 Finish removing inner rod and installing screen & riser to 190 ft BGS, Start pulling outer casing up and working on placing bentonite seal

2208 Bentonite seal is being put in place, using Pel-Plug to make seal

2252 Finished making the seal and pulling DT45 out of water. Leave site now to head back to field trailer
Leaving Geoprobe rig & truck/trailer at the site

2320 Off site for the night, will start again on monday

8-6-2016

8-8-2016 JBER-PPC Scribe: K. Butler/HWL

0800 Arrive onsite, Start prepping for todays activities

0810 Calibrate MultiRAE CI02717. See Calibration Log for details

Weather: Overcast with chance of rain Low 54, High 61

Objective: Complete AT052, Sample TDW, demob/prep for Tuesdays well

Crew: CH2M K. Butler/HWL GeoTek: B. Ernst & M. McHaney

PPE: Level D

Air Monitoring: MultiRAE CI02717

0820 Start Tailgate/H&S meeting. Discuss biologicals, well completion

0840 Finish Tailgate meeting, Crew starts prepping to finish well

0900 Leave field trailer for site. GeoTek crew stop by gas station and will meet up at site

0910 Arrive at the site. Everything looks as we left it.

0920 GeoTek crew arrive onsite, start prepping to grout the hole

0950 Measured bentonite at 147ft BGS, There is 158ft of DT45 in the ground, calculated ~90.74 gallons of grout to come up to 10ft BGS.

0955 Start making first 45gallon mix

1017 Start pumping in first 45gallon bentonite grout mix into the DT45 rod.

1100 Pull out 2x5ft sections of DT45, Continue on with Second batch of grout

1145 B. Ernst Leaves site to return compass & pickup drums from GeoTek's shop. Start pulling out DT45 rod.

1157 All 90gallons of grout are in the rod, Continue pulling DT45 rods ~ 135' still left in the ground

1218 K. Butler was Stung by a hornet or bee, just below the jaw line on the right side of the face

1220 Treat area with items in our first aid kit starting w/ Sting relief wipe followed by antiseptic Towelette.

1226 Called J. Ulrich to notify her of the sting, She will contact C. Hinds & J. Colley

1230 Called The operations Manager to document the sting & to find out additional first aid

8-8-2016 JBER-PFC Scribe: K. Rather

1315 Talked again w/ C. Hinds, Reminded that there is also a Alaska specific Occupational Nurse number to call and provided it along w/ location of it in the HASP ($1\text{-}H_{PS}$)

1330 DT45 rod completely removed from the ground set up to drop TD & DTW. Need to shovel material away from hole

1345 J. Ulrich offsite w/ canopy

1350 Start work on tagging the wells

1355 DTW = 170.57 BGS, TD = 195.20 ft BGS, Top of casing is at ground surface currently

1410 B. Ernst arrive back onsite, start work on cleaning up the site and loading rig back up

1450 Start work on moving IDW drums onto trailer, 4 drums secured

1520 Finish loading drums onto trailer. Loading Geoprobe rig on now

1540 Continue cleaning up drilling area

1605 Finish at AT052 area for today leave for IDW Storage area

1625 Arrive at IDW Storage area, start offloading rig to move 5 drums

1639 J. Culley calls to talk about the staging earlier today. Walked him through todays events

1720 Finish dropping off 5 drums D115-D119 at IDW storage area, head back to field trailer

1725 Back at field trailer

1755 B. Ernst starts work on deconing 8 inch OD augers to prep for tomorrow

1758 M. McHenry heading offsite to see if he can't pick up 2 or 3 additional augers

8-8-2016

8-9-2016 JBER-PFC Scribe: K.Butler/AML

0800 Arrive onsite, start prepping for todays activities

0805 Calibrate MultiRAE C102717, See Calibration Log for details

Weather: Overcast w/chance of rain throughout the day 53 for a Low, 65 for a High

Objective: Work on installing FS6-1, sample IDW and Soil sample. Decon of HSA rods

Crew: CHEM: K.Butler/AML T.Callear/AML GeoTek: B.Ernst & M.McHenry

PPE: Level D, Same as before

Air Monitoring: MultiRAE C102717

0820 Start tailgate meeting with crew. Go over hazards, Occupational Nurse number, flight line access

0845 Finish Tailgate/HAS meeting, Geotek crew preps for decon & to take IDW water to storage area

0908 Leave for IDW Storage area to drop off IDW decon water

0935 Head back after generating IDW Drum: D122 with decon water. Leaving T.Callear to take IDW Sample

0940 Head out to H16 & H17 with J.Ulrich to show development crew well locations

1035 Back at field Trailer

1040 Head back to IDW Storage area to pick up T.Callear from there

1045 Work on closing up drums used for IDW sample

* 0950 Sampled 16Q3-JB-IDW20-SO from drums D115, D116, D117, D118, & D119 Sampled for GRO, VOCs, DRO, RRO, RCRA Metals & Mercury, SVOCs, Dioxins, & Furans. for AT052 soil drums

1109 Head back to field trailer. Check progress of Geotek.

1205 Leave field trailer to meet up with drillers to head to FS6-1 location

1215 Arrive at CAC Gate, Call airfield manager to let them know of our entry

1220 Arrive at FS6-1 location, start setting up

1245 Start using Macro core to continuously sample down to 15ft BGS in 5ft intervals

1310 Reached 15ft BGS with macrocore, start switching out to Hollowstem auger tooling

1315 Sample 16Q3FS6-1-SO-Ø for PFCs

8-9-2016 JBER-PFC Scribe: KB+HV/HVC

1505 Reached TD of 63ft BGS, start tripping out the center rods
1510 DTW was 50ft BGS, will set the well at 52-62ft BGS
1530 ~~Attempt~~ Screen was only able to be set from 61.4 to 51.4ft BGS. Start adding Sand to 49.4ft BGS
See Well Construction diagram for details
1600 start adding bentonite to create seal above the sand pack, hydrate for 30 mins
1630 Start pulling augers and adding grout
1650 Augers out of the hole, mix up additional grout to set to 10ft BGS
1700 Sample 16Q3-JB-FDW-21-50 for VOCs, GRO, DRO, RRO, Herbicides, Pesticides, PCBs, SVOCs, pH RCRA Metals & mercury. from drums D126, D127, & D128
1730 Pea gravel just poured in, start work on surface completion
1810 Finish surface completion, start work on clearing upsite and loading drums on trailer
1845 All loaded up, head to IDW storage area
1857 Arrive at IDW area to drop off 3 drums D126, D127, & D128
1927 Finish dropping off the 3 drums, head back to Field Trailer
2015 M. McHenry & B. Frost offsite for the day return in the morning at 7am to decon
2045 offsite for the day

8-9-2016

8-10-2016 JBER-PFC Scribe: K. Bath/AMEC

0700 Arrive onsite. Mick already onsite. Start unhitching trailer & take truck to shop for equipment
0707 M. McHenry off site with truck.
0710 B. Ernst onsite, go over this morning tasks & quick H&S talk for the morning tasks
0720 Leave field trailer for IDW storage area to drop down water
0740 Leaving IDW area after creating drum ID129 for AT052 decon water. Head back to field trailer to start deconing rods
0750 Calibrate MultiRAE CH02717
0810 Hold a quick H&S meeting, start deconing
0825 GeoTek crew finish trouble shooting sump pump. Start off loading rod to start deconing them
0840 M. McHenry back onsite from picking up equipment from the site

Weather: Overcast, Low of 52, High of 64

Objective: Work on E3/AWACS location

Crew: CH2M K. Bath/AMEC GeoTek: M. McHenry & B. Ernst

PPE: Level D, same as before

Air Monitoring: MultiRAE CH02717

Additional H&S needs: E3/AWACS is off the right of way of the railroad tracks. A flagger will be needed for the time at at the site. Jen has left to meet with them.

0922 GeoTek is loaded up, headed to the site
0935 Arrive at the site, called J. Ulrich to let her know we are here.
0940 Start H&S/tailgate meeting, with Grant Gerhart (ARR), GeoTek & J. Ulrich
0950 Finish H&S/meeting finished. Discussed bears & biologists (bear watch during meeting) & working next to railroad.
0953 Start driving over dirt mound and heading over to the site
1000 Arrive at point and discussed Hazards & setup with crew. Site looks as it should.
1010 Drive J. Ulrich & T. Calleo back to dirt embankment, They will head back to the field trailer

8-10-2016 JBER - PFC Scottwick Butler/HVE

1107 Broke through what ever was down there.
1150 At 38ft BGS, Gus Tek crew stops to take a break
1210 Start augering again, Continuing on from 38ft BGS
1230 Reached 50ft BGS, continue drilling
1255 Reached 58ft BGS, Attempt to tag water in augers, No water present. Continue drilling
1345 At 63ft BGS, Hot work permit needed to grind top of center rod as to add an adapter
1350 Hot work (grinding) performed after filling out the Hot work permit
1355 Grinding is complete, continue with drilling operations.
1358 Stoppage at 65ft BGS to let the rod cool down
1415 Continue drilling, center rod cap has had a chance to cool down
1423 At ~ 66ft BGS stop to check center rod, still heating up
1430 Start pulling out all of the center rod
1500 Finish pulling out rods, start work on gaining depth to water
1505 Depth to water is at ~54ft bgs, will install screen from 54 to 64ft BGS
1515 Start installation of the well. See well installation diagram for details
1730 Finish bringing sand up to 53ft BGS, well screen is at 55 to 65ft BGS
1745 Pulled augers up 5ft, having issues getting tape back down to 53ft. Trouble shooting by adding water & pulling auger up and down.
1755 Try pulling up 5 more ft of auger. Originally tagging at 27 BGS, now 22ft BGS. Try putting down 1¼ rod down to bust at what was in the augers
1800 Sounds like metal on metal according to M. McElroy, crew starts tripping out augers
1808 Call J. Ulrich to give her an update
1817 Pulled up all the augers, 25ft is in the hole still, appears that the bolts broke
1832 Talk with J. Ulrich. Appears they only have 60ft of 8inch auger remaining onhand. Start work on battening up equipment, waiting on an answer about how to proceed

8-10-2016 JBER-PFC Scribe: K Bittle/AMC

1915 M. McHenry off the phone, start moving rig to finish removal of cuttings and prep for moving drums

1935 Informed by M. McHenry that 2x 50lbs bags of bentonite chips (Hole Plug) were placed in the open hole. Appears to be from 10ft BGS to 8ft BGS. Crew continues cleanup, loading last drum onto trailer

1950 All loaded up, start driving off site.

1957 Cleared the bump and at the railroad right of way. Think Grant Gerhart from ARR and let him know Some one will update him on the schedule.

2000 Head to IDW Storage area to drop off 3 drums

2010 Arrive at IDW Storage area to drop off 3 Drums: D134, D135, & D136

2027 B. Ernst leaves IDW Storage area to get water from the fire hydrant they are allowed to use.

2039 Finished at IDW area, head back to field trailer

2042 Back at field trailer

2050 B. Ernst back at the field trailer location with filled tank of water

2110 M. McHenry off site for the day

2120 B. Ernst start work on decon pads

2215 B. Ernst Finishes decon, heads home for the evening, will not be in tomorrow, another crew member will take his place (Lyle Cook) from Geotek

8-10-2016

8-11-2016 JBER-PFC Scribe: K.Butler/HNL

0800 Arrive onsite, Start prepping for todays activities.
Weather: Overcast, slight drizzle, Low of 51, High of 61
Objective: Install well SS108-1, Soil sample & IDW sample
Crew: CH2M K.Butler/HNL T.Collear/ANC GeoTek: M.McHenry & Lyle Cain
PPE: Level D, Same as before
Air Monitoring: MultiRAE CI02717
0815 M.McHenry onsite, at the field trailer to discuss possible paths forward
0825 Tailgate/H&S meeting w/M.McHenry while J.Ulrich goes over HASP with L.Cain
0845 Calibrate MultiRAE CI02717, See Calibration log for details
0900 GeoTek crew works on loading rods for todays activities & load up other supplies for today's well
0950 Leave for IDW Storage are to drop off Decon water
1030 Finished at IDW area, geared D137 with E3/AVMC decanter, Head out to site
1040 Arrive at SS108-1 location, Look at location, every thing seems normal, Ask J.Ulrich if point can be set on level ground
1050 L.Cain heads back to field trailer to pick up drilling cutting head for 8" augers
1110 L.Cain back onsite with parts, continue setting up to drill
1132 Start hammering the macrocore sampler down, will do continuous sampling from 0-15ft in 5ft increments
1200 Finish Macro core operations, start switching out tooling to start augering
1210 Sampled 16Q3SS108-1-SO-0 16Q3SS108-1-SO-0MS, 16Q3SS108-1-SO-0SD for PFCs
1213 Start augering with 8inch hollow stem augers
1315 At 25ft BGS, crew breaks to let bit cool after augering through gravel since 16ft BGS
1325 Start drilling, again, Soft drilling after 25ft BGS
1330 Wet cuttings coming out from 25-28ft BGS run
1353 At 36 ft BGS, will wait 10 mins for the center rod to cool down & water to come into the rod before trying to take a depth to water
1430 Try to measure for water at 36 ft BGS, No water coming into the augers, start tripping out the center

8-11-2016 JBER-PFC Scribe: K. Ruth/HHL

1547 T. Cullen & J. Ulrich off site with todays sample, Crew trips down center rod and continues drilling

1630 AT 58ft BGS, try to tag water but WLI gets stuck at 37 Ft BTOC. Geoprobe will need to pull out center rod a few feet and I will try again

1635 Rod pulled out a few feet but still getting stuck at 37ft. ~~Inside~~ Inner rod doesn't go all the way down. Several feet of head in the auger. First signs of water flow in the augers, will push center rod back in, drill 5 more ft to 63ft BGS and set the well at 62-52ft for the screen

1647 Call J. Ulrich to talk about the plans. Crew told to drill to 63ft BGS

1705 Start adding water to the augers after reaching 63ft BGS, Used ~ 50 gallons

1720 Start pulling out ~~augers~~ center rod from the augers.

1800 Had a center rod that didn't want to unthread, Sent tools after extra ones to break apart. Center rods are out and 10ft of screen w/ 60ft of riser in the hole. Set with screen at 63 to 53 ft

1810 Measure water bottom auger and well, start pulling back augers 10ft, Measure water at ~ 57ft BGS

1835 Pulled augers up to 53ft, retag water within well, water at 57 ft BGS

1845 Start adding sand, See well construction diagram for details

1955 Finished removing the augers from the hole, Continue to mix grout and Surface pour down the hole

2000 Sample 16Q3-JB-IDW22-SO for drums D142, D143, & D144. Sample taken for

2125 Finish adding pea gravel up to 2ft bgs, Start loading up drums onto trailer

2135 Finish loading 3 drums onto trailer. Drums D142, D143, D144

2137 Start loading up Geoprobe rig onto trailer

2157 Finish loading up Geoprobe, head to IDW

2209 Arrive at IDW storage area, Start off loading rig and drums

2240 Finish dropping off drums and loading rig, head back to field trailer

2245 Back at Field trailer for end of day

8-12-2016 JBER-PFC Scribe: K. Butler/HNL

0655 Arrive onsite, Start prepping for todays activities

0705 Calibrate MultiRAE C102717, See Calibration Log for details

Weather: Overcast, slight drizzle, Low of 52, High of 64

Objective: Abandon 1st attempt at E3/AWACS, Soil Sample, Install new E3/AWACS well, IDW sample

Crew: K. Butler/HNL GeoTek M. McHaney, O. Stliff

PPE: Level D, Same as before

Air Monitoring: MultiRAE C102717

0730 M. McHaney onsite

0745 O. Stliff onsite, go over PTSP with drill crew

0755 O. Stliff Leave sight after HASmeeting to go get water from fire hydrant they are permitted to use

0815 O Stliff back, Starts work on decon, wages from SS108 location

0920 GeoTek crew done with decon & finishing up loading up. Head to site which Geotek crew heads to gas station before heading to the site

0937 Arrive at hom at E3/AWACS entrance, Head in w/ Grant Gabert from ARR

0945 At site, Work on marking off distance to new well location. New well 11 ft South of old location

1000 Tag depth to water in the well. Well is dry except for water in bottom cap

1010 T. Culler & J. Ulrich head offsite to check SS108 well & see what depth to water is

1015 GeoTek crew onsite

1025 O. Stliff runs offsite to meet with guys delivering material to site

1040 J. Becker onsite with supplies, Geotek crew start off loading gear

1055 T. Culler & J. Ulrich back onsite, Water at SS108 is at 61.30 ft ~~TOC~~ BGS

1100 TD was 68 ft BTOC, using 1/4 TR30 PEL Plug ~2 gallons to come up to 56ft BTOC

1110 Adding 5 gallons of water to hydrate Pel Plug

1119 T. Culler takes J. Ulrich back to her vehicle

1125 T. Culler back onsite, M. McHaney leaves site to go back to Bretels yard for supplies. J. Becker will

8-12-2016 JBER-PFC Scribe K. Baker/HNL

1220 Pulled Top 8 ft section of PVC off (3ft above ground 5ft below). Continue pumping the grout through the PVC, Hole is taking the grout as fast as we can pump it

1225 First batch completed, start mixing 2nd batch (each batch is approximately 45 gallons)

1235 Start pumping in 2nd batch

1238 pull up 10 ft after grout came out the top

1245 Finish grouting up to ~0ft BGS, Used gallons of grout (1½ X 50lbs sacks of Quick grout), 28ft of riser removed (~25ft BGS). Start Cleaning up and moving trailer out of the way. Used ~ 90 gallon of grout.

1300 Position Rig to new well spot to start soil sampling from 15-30ft BGS

1313 O. Sutliff heads off site due to family emergency. J. Baker is driving him to his vehicle at field trailer

1345 J. Baker & M. McHenry back on site, finishing prep to DPT to 30ft BGS, Sampling from ~15ft to 30ft BGS

1355 Start Hammering down the Macro core 5 units to 15ft BGS

1400 J. Ulrich on site with lunch

1415 Start collecting soil from 15-30ft BGS in 5ft increments.

1425 Zero recovery on first attempt, will step over and try again

1440 Start 2nd round at 15-30ft. Reached 15ft with no problem, proceed will taking 15-20ft increment

1448 Full recovery 60/60 on this 15-20 ft increment

1510 20-25 ft interval had 57/60 inch of recovery.

1527 Resumed 25-30ft 53/60 inches of recovery. Clean switches gears and sets up for down hole hammering

1535 Sampled 16Q3E3-1-SO-Ø for PFCs from depth of 15ft - 30ft BGS, 15ft of fill on top of native soil

1557 Start air hammering E3-1 well location

1750 Finish air hammering for the day, Currently ~ 50ft BGS, 53ft Below top of rod. Start packing up for today. Tidying up the site. Allowed to leave trailers & Geoprobe rig on site for the night

1807 All wrapped up for the day at the site, Headed back to the field trailer

1825 Arrive back at field trailer for end of day. J. Beckner starts work on decon of DPT 45

1835 M. McHenry offsite for the day

8-13-2016 JBER-DFC Scribe: K. Butler/HNC

0830 Arrive onsite, Start prepping for todays activities
0835 Calibrate MultiRAE C102717, See Calibration Log for details
Weather: Partly cloudy, Low of 53, High of 64
Objective: Complete E3/AWACs well, IDW sampling & Management
Crew: K. Butler/HNC GeoTek: J. Bakner & M. McHenry
PPE: Level D, with option for dust masks while down hole hammering
Air Monitoring: MultiRAE C102717
0845 M. McHenry & J. Bakner onsite. Hold tailgate/H&S meeting before ~~they~~ start loading up equipment for today
0905 Leave field trailer after loading up
0915 Arrive at entrance of E3/AWACs access road. Met up with J. Ulrich & G. Gerheart
0920 Arrive at the E3/AWACs well location, Start Setting up for today's drillings
0938 Start down hole hammering at ~53 ft BGS, First cutting still dry
0940 J. Ulrich leaves site to head back to field trailer
0945 Noticed a small drip of fluid at the back of the breakout clamps as the geotek crew was drilling. Signaled to the helper to check if it was condensation or a possible hydraulic leak. Crew stops and takes a look. Appears to be a small hydraulic leak. Approximately 2 or 3 oz of hydraulic fluid lost. Crew gets their spill kit and shovel up possibly impacted soil
0948 Called J. Ulrich to inform her of the leak. Crew continues working on finding the source.
1045 Appears to have been a pinched O-ring from previous installation, spill has been cleaned up and new o-ring put in place. Checked all hydraulics behind the breakout clamps and no signs of additional leaks, ~8 gallons of soil was scrapped up. GeoTek will handle disposal
1105 Back up and drilling currently at ~58 ft BGS
1210 Reached ~88 ft ft BGS saw water from ~84-85 ft BGS Set at the 85, cutting were dry as we Stopping for a few minutes to see if they layer produces water
1225 Start back-up on 88-93 ft run, water shut up at start, but drew up as we continued drilling
1235 Reached 93 ft BGS, will wait a few mins and see if we have water again
1245 J. Ulrich onsite, discuss where we are at & Hydraulic leak
1258 Tag well depth to water, Water at 82.72, will install well screen from 82-92 ft BGS
1310 J. Ulrich offsite, Crew starts make remaining center rod to install well

8-13-2016

8-13-2016 JBER-PFC Scribe: K.Ruth/AWC

1348 Center rod out and well screen riser in place. 9X 10ft Sched 40 PVC + 2X5 ft Sched 40 prepack Pre-screen
1350 Start pulling up the DT45 casing rod and installing the well. See well installation diagram for details
1400 After starting to pull up DT45 rod, well doesn't stay down. GeoTek is working on freeing the screen
1455 Screen is finally free, Crew starts tripping back down the down hole hammer center rod to clean the hole and try installing the well again.
1508 Back down to 93 ft, blowing out material in the drill string
1527 Finished cleaning the hole, start work on adding water to the inside of the drill string before pulling out center rod & re installing the well.
1601 Start installing the 10ft of Screen & 90ft of riser again
1606 Well put in place, start work completing the well install.
1610 Well is staying in place this go around
1630 D.Sutliff on site, Sent out to get water from fire hydrant
1700 Returned back from getting water. GeoTek crew finished getting up to the bentonite seal, 3.5 ft hydrated
1725 Sampled 16Q3-JB-IDW23-SO For VOCs, GRO, DRO, RRO, Pesticides, PCBs, RCRA Metals & Mercury, SVOCs & PH from Drum D149
1730 Start pumping in 45 gallons of grout mix, 37 gallons of water w/ 1X50 lbs bag of quickgrout
1740 Start pulling out DT45 rods out of the ground
1806 J.Ulrich onsite to check in on crew and to take water level meter and check well SS108-1
1819 J.Ulrich & I head to gauge SS108-1
1830 Arrive at SS108-1 location, Tagging well
1832 DTW = 61.6' BGS, See FTL logbook for additional details
1910 Leave SS108-1 location
1925 Arrive back at E3/AWACs location, GeoTek working on surface completion
1945 J.Ulrich offsite for the day. GeoTek used ~20 gallons of grout & 3 bags of pureseal to finish abandonment at original E3-1 location
2005 Leave site and start heading to IDW Storage area to drop off Drum D149
2010 Thank G.Gerheart for staying late, everyone leaves the entrance to site.
2018 Arrive at IDW, start offloading rig and dropping off drum
2040 Head back to Field trailer for end of day
2045 Back at Field Trailer, end of day

[signature] 8-13-2016

8-15-2016 JBER-PFC Scribe: K. Butler/HNL

0830 Arrive onsite, start prepping for todays activities
Weather: Partly cloudy
Objective: Abandon and reinstall SS108 well location
Crew: K Butler/HNL GeoTek: M. McMcHaney & L. Hermans
PPE: Level D, with option of using dust masks while air hammering
Air monitoring: MultiRAE C-102717
0840 Will help get ground mutring crew to locations, see FTL log for details
1130 Back at field trailer, GeoTek crew already out at the site, head over to start todays work
1145 Arrive onsite, start well abandonment, using pel plugs to cover the screen, then grout to surface
1200 Only able to remove top 5 ft section, used ~ 1/2 x 5 gallon bucket of pel plugs and hydrated it with 5 gallons of water
Grouted it to 3 ft bgs and used 2 1/2 bags of pergrout to finish to ground surface
1295 Move rig to New SS108 location 10 ft North of original. Start prepping to drill at location
1238 Start drilling at new SS108 location
1535 Reached 73 ft BGS, May have been a water layer at ~70 ft, will let this sit for 10-15 mins and see if
1548 Blow out inside of the rod, water present, drill down to 78 ft and see how much water comes out after
1600 Reach 78 ft BGS, add a 1st 5 ft run of rod and see how much water is in the rod when started up
1604 Ample water present coming out the top of the diverter, will set well screen from 80-70 ft BGS
1609 Reaches ~ 80.5 ft BGS, start work setting up for well install. See Well completion diagram for details
1628 L Cain onsite to help finish up the well & to have a 3rd vehicle to haul off equipment from the site
1635 Finish removing center rod, start adding water to rod in the hole. Used 25 gallons
1650 M. Bruno onsite w/ water level meter
1700 Finish placing screen & riser into rod, Measurements were 5 ft deeper than thought.
1757 M. Bruno offsite
1806 J. Ulrich offsite
1835 Tag well, water at 77.32 ft BTOC, 72.87 ft BGS, but used ~ 135 gals of water to reinstall
Will pull up Outer rod and install well, will check DTW again after outer rod is completly out. TD = 85.50 BTOC
, 81.05 BGS
1948 L. Cain offsite with compressor, Re tag well, water at 77.32 BTOC again
1950 T. Collier onsite to drop off paper work.

8-15-2016

8-15-2016 JBER-PFC Scribe: KBJW/ANC

1955 T. Callew offsite, Heads out to ship samples
2030 DT45 rod out of the ground, finish grouting and adding pea gravel
2115 Finish picking up, Head over to IDW storage area to dropoff D152
2128 Arrive at IDW storage area, Start offloading rig to dropoff drum
2145 Finished dropping off drum. Head back to field trailer for end of day
2150 Back at Field trailer to finish up paperwork

8-15-2016

JBER PFC 666984.02.03.01 AUGUST 25TH, 2016

WEATHER: RAIN 55°F

PERSONNEL: M. LANDON/ANL & A. WIELAND/ANL

TASK: PETROSOCK CHANGEOUTS, HAND AUGER SAMPLING

0745 - ARRIVE @ FIELD TRAILER: GATHER EQUIPMENT, PTSP

0825 - MOBE TO SG000

0852 - ARRIVE @ AP-SO14: REPLACE SOCK / DTW: 69.44 BTOC / PID: 0.0 ppm / NO PRODUCT DETECTED / SOCK SET @ ~68.00 TOP

0915 - FLIP SOCK @ AP-SO8: PID = 4.6 ppm / DTW: 69.49 BTOC / NO PROD. DETECTED SOCK SET @ ~~68.55~~ 68.48 TOP

0930 - DEMOBE, MOBE TO IDW STORAGE

0943 - ARRIVE @ IDW STORAGE: SOCK TRACKING SHEET IS WET, SET ON VAN HEATER TO DRY, REPLACE ZIPLOCK BAG & OUT TAPE

0954 - MOBE TO FIELD TRAILER

1000 - ~~MOBE~~ LOAD UP FOR HAND AUGERING @ CHD 1+2

1017 - MOBE TO CHD-HA1

1035 - ARRIVE @ CHD-HA1

1105 - COLLECT SAMPLE 16Q3CHD-HA-1-SO-0

1120 - MOBE TO CHD-HA2

1140 - COLLECT SAMPLE 16Q3CHD-HA-2-SO-0

1151 - MOBE TO IDW STORAGE

1226 - ARRIVE @ FIELD OFFICE: UNPACK EQUIP

1240 - COLLECT SAMPLE 16QS-SOEB-JB06

1300 - PREP OUTGOING SAMPLES FOR SHIPMENT

1400 - END OF FIELD DAY

8.25.16

MA 8/25/16

(110)

JBER PFC SI 8/27/16

Personnel: M Bruno / ANC - FTL & scribe
M McHaney / Geotek - Driller
B Ernst / Geotek - Helper

Conditions: ~ 57 °F, partly cloudy, calm

Objective: Reinstall well CHD-4 w/ 20/40 sand pack & 2[illegible] ft screen; abandon original well CHD-4

0750 Arrive onsite. Check temp in sample cooler (IDW G[illegible] held overnight in locked field trailer. Temp = 3.5 °C S[illegible] out sample ice.

0800 Calibrate MultiRAE; see cal logs.

0820 Geotek arrives onsite. H&S tailgate meeting - frustration, heavy (larger) augers, bees & slips, t[illegible]

0840 Mobe to CHD-4, jet setup

0925 Begin abandoning CHD-4 - pull protective casing. B Ernst mixing grout. Plug popped. M McHaney tries to pull casing/screen, screen not moving. M McHaney fills screen interval w/ sand - sand to 11 ft btoc.

0950 Call C. Hinds to discuss well design - Geotek does not have the larger pre-packs as previously discussed, only standard-size 20/40 prepacks. Using larger augers (6.25" - ID), so they will be installing [illegible] sand pack around pre-pack. C. Hinds concurs that we should proceed w/ the standard size pre-packs they have on hand.

1000 Geotek adds grout to top of casing, pull casing - casing breaks off @ top of screen, screen abandoned in place.

1030 Move rig over ~ 3 ft closer to CHD, Geotek begins setting rig up to drill. Confirm with [illegible]

-MB 8/27/16-

JBER PFC SI 8/27/16 cont.

permit there are no utilities @ new location. Also confirm no utilities marked on ground.

★Late entry - Level D PPE★

1450 Geotek begins drilling w/ 6.25"-ID HSA. Targeting setting well @ 29 ft bgs, screen from 9 to 29 ft bgs.

1220 Reach TD = 29 ft bgs in CHD-4a borehole. Geotek fills borehole w/ potable water

1240 Geotek begins ~~ins~~ constructing well - see construction diagram

1345 Wooden plug stuck @ bottom of auger - Geotek having problems popping plug.

1420 Start tripping 3.5" rod down hole to use to pop plug - had to trip out PVC to make room for 3.5-inch rod

1450 Plug popped. Geotek trips out 3.5-inch rod, resets PVC

1500 Geotek starts pulling auger. Trip out top 5 ft - M McHaney tries to tag TD - tape hanging up on silt inside augers. Cannot ~~tag~~ tag (bs) TD. M McHaney relates that he will not be able to tag sand because of soil stuck in augers - proposes pulling all augers & hoping hole stays open to be able to tag sand as it is added.

1515 Geotek begins tripping out rest of augers after adding clean water inside augers.

1635 Done tripping out augers - hole is collapsed to 18 ft bgs. Some heave while tripping out augers - screen @ 6 to 26 ft bgs. Call C. Hinds to discuss - C. Hinds wants to make sure we get larger diameter sand pack around well as previously discussed - directs to have drillers pull casing/screen & re-drill to TD, set PVC back at TD & construct inside augers.

1645 Casing/screen successfully pulled from borehole. Geotek

- MB 8/27/16 -

(12)

8/27/16 cont

JBER PFC ST

trying to clean soil blockages out of inside of augers

1705 Geotek begins re-advancing augers w/ wood plug in bottom. B. Ernst working on cleaning up site while M. McHenry advances augers. BZ readings during auger advancement all 0.0 ppm.

1755 Augers advanced to TD ≈ 29 ft bgs. Inside of augers plugged up again. - Geotek cannot tag TD. Geotek begins tripping out augers to clean silt mud out augers

1815 Augers tripped out of hole - large rock stuck in end of auger. Rock split plug, which allowed water/silt in, clogging up inside of augers.

1830 Geotek gets rock out of drilling bit.

1850 Bear onsite - stop work, muster to vehicles, blow air horn out window. Bear runs away.

1900 Resume work

1915 At TD ≈ 29 ft bgs. Geotek fills augers w/ water, adds screen / casing

1925 Geotek begins trying to pop plug @ bottom of augers.

1950 Geotek cannot pop plug w/ 1¼-inch rods. Trip PVC out of hole to try to pop plug w/ 3.5-inch rod. Discuss that we will have to construct well once plug is popped; starting to lose light. Direct Geotek to pull PVC, then leave plug in place. Will come back in the morning & see if we can pop plug w/ 3.5-inch rod. Geotek starts cleaning up site.

2010 ~~2100~~ MB Mobe back to field trailer.

2030 Geotek offsite. Scan field docs.

2045 Finished for day; depart site

MB 8/27/16

(113)

JBER PFC SI 8/28/16

Personnel: M Bruno/ANC - FTL & scribe
M McHaney/Geotek - Driller
B Ernst/Geotek - Helper

Conditions: ~50°F, clear, calm

Objective: Continue re-install of MW CHD-4a

PPE: Level D (see PTSP)

0745 Arrive onsite. Check temp in IDW GW sample cooler Held overnight in locked field trailer. Temp = 4.0 °C. Switch out sample ice.

0750 Calibrate multiRAE - see calibration sheet.

0940 Geotek arrives onsite. HTJ tailgate meeting - wildlife, bees, pinch points, PPE, slips, trips, & falls

0950 B Ernst mobs to get fuel. M Bruno & M McHaney mobe to CHD-4a, M. McHaney performs rig inspection

1030 B Ernst arrives onsite. No additional heave entered borehole since last night, Geotek will try to pop plug w/ 3.5-inch rod.

1040 Geotek begins advancing 3.5-inch rod - plug popped.

1115 Geotek installs pre-pack screen & casing.

1155 Wooden plug only broke in center - edges of plug still intact. cannot add sand pack, Geotek pulls PVC casing/screen, then pulls augers

1225 Reinstall attempt #4, will use different approach. Geotek switching to plastic plug instead of wood in hopes it will pop out instead of breaking into pieces. will put 3.5-inch rod down center of augers as they drill down to prevent plug from being pushed up into augers during drilling

1300 Auger/3.5-inch rod @ TD, Geotek filling rod/auger up w/ water

1315 Geotek installs prepack screen/casing

-mB 8/28/16-

(114)

JBER PFC SI 8/28/16

1325 Geotek starts adding 20/40 silica sand around casing, pull auger slowly while adding sand

1355 4.5 bags 20/40 sand added

1425 6.0 bags 20/40 sand added

1545 13.5 bags 20/40 sand added

1620 Bear approaches drill rig from up CHD. Staff move to trucks, discharge air horn out window until bear departs site.

1640 Work resumes. 18 bags 20/40 sand added, at ~~16.0~~ 15.0 ft

1720 20 bags of 20/40 sand added, at 15.0 ft bgs. Only have 4 bags of sand left. B. Ernst mobes to Geotek shop to load more sand.

1855 B. Ernst back onsite w/ additional sand.

2000 25 bags of 20/40 sand added. Sand @ 14 Ft bgs Sand is settling very slowly.

2025 Based on volume calcs, should have enough sand in borehole Will leave sand to settle overnight, before check depth tomorrow morning. Geotek begins packing up site for day

2040 Mobe to field office

2100 Geotek offsite. QC & scan field docs.

2115 Depart site for day.

8/28/16

(115)

JBER PIC SI 8/24/16

Personnel: M Bruno / ANC - FTL & scribe
M McHaney / Geotek - Driller
B Ernst / Geotek - Helper

Objective: Continue MW CHD-4a install

Conditions: ~56°F, sunny, calm. PPE: Level D

0950 Arrive at CHD-4a (see FTL back for HSE tailgate info)
Sand at CHD-4a has settled to 10 ft bgs.
Very thick "quicksand" like texture of suspended sand from 3 to 10 ft bgs.

1000 Direct Geotek to start cleaning up auger, etc. while we wait to talk to STC G. Colgan.

1030 call w/ L Waller, C Hinds, G Colgan. G Colgan directs to have Geotek pump out annular space to try to dry it out & see if we can get last needed 4 ft sand in hole.

1100 Geotek setting up peristaltic pump. Open well to measure DTW - well pressurized w/ air, cap blows off top.
DTW = 16.45 ft ~~bgs.~~ btoc (~15.45 ft ~~btoc~~ bgs)

1110 Geotek begins pumping out annular space.

1125 Peristaltic pump keeps clogging. Begin bailing annular space while Geotek moves IDW soil drums & auger to top of hill w/ rig

1310 Water baled from annular space. Sand has further settled during bailing. Sand at 7.5 ft bgs. Add sand pack to 6.0 ft bgs (1.5 bags 20/40 sand)
Add 2 x 50 lb bags hole plug for annular seal.

1400 Mobe to POL yard, drop off soil IDW drums D162-D165.

1500 ~~Geotek~~ Geotek drops auger off @ CH2M field trailer for the

522 Geotek offsite for day

JBER PFC ' 666984.02.03.01

WEATHER: PARTLY SUNNY 60°F

PERSONNEL: M. LANDON/ANC SUB: GEOTEK / CHRIS B.

TASK: GW DEVELOPMENT

1000 - ARRIVE @ FIELD TRAILER: GATHER EQUIPMENT / SUPPLIES

1030 - CHRIS B./GEOTEK ARRIVES @ FIELD OFFICE: DISCUSS PLAN OF ATTACK

1045 - D. LUBBEN/DGN ARRIVES @ FIELD OFFICE: AHA's, PTSI, CALIBRATE YSI

1240 - MOBE TO PICKUP WLM FROM DRILLING CREW

- STOP TO GET LUNCH ON THE WAY

1330 - PICKUP WLM FROM DRILLING CREW:

1340 - MOBE TO FORMER AFFF SITE

1355 - SETUP TO DEVELOP FOSTA-1: SEE "WELL DEVELOPMENT DATASHEET"

1420 - PVC RISER PIPE IS 1" DIAMETER: TOO LARGE FOR DEVELOPMENT TOOL TO THREAD INTO SECURELY - USE PUMP AS SURGE BLOCK FOR TODAY.

1700 - TURBIDITY SHOWING NO SIGNS OF CLEARING UP: RUNNING OUT OF TIME FOR DAY. SHUT PUMP OFF, DEMOBE. PLAN TO START TOMORROW W/ PROPER SURGING EQUIPMENT.

1723 - MOBE TO POL YARD TO DROP IDW DRUMS

1800 - MOBE TO FIELD OFFICE - CHRIS B./GEOTEK OFF-SITE

1805 - UNLOAD EQUIPMENT & SUPPLIES - TURN IN PAPERWORK / FIELD FORMS

1820 - EOD

7.27.16

(2)

JBER PFC 666984.02.03.01

WEATHER: Cloudy 59°F

PERSONNEL: M. LANDON/ANL SUB: GEOTEK / CHRIS B.

TASK: GW DEVELOPMENT

0850 - ARRIVE @ FIELD OFFICE: GATHER & CALIBRATE EQUIPMENT SEE "FIELD CALIBRATION DATASHEET", PTSP

0950 - MOBE TO POL YARD: PICKUP DRUMS FOR DAY.

0957 - MOBE TO ~~FORMER~~ FASTA-1 FOR WELL DEVELOPMENT ATTEMPT #2

1011 - ARRIVE @ FASTA-1: SETUP TO DEVELOP SEE "WELL DEVELOPMENT DATA-SHEET."

1235 ~~1230~~ GEOTEK OFF-SITE FOR LUNCH

1247 - GEOTEK BACK ON SITE

1426 - STOP PURGE/DEVELOPMENT COMPLETE: DEMOBE

1445 - MOBE TO POL YARD (IDW STORAGE) TO DROP PURGE WATER

1505 - ARRIVE @ IDW STORAGE: TRANSFER IDW WATER

1535 - MOBE TO FIELD OFFICE: GIVEN TODAYS CIRCUMSTANCES - DO NOT THINK THERES ADEQUATE TIME LEFT TO START & FINISH DEVELOPMENT OF A SECOND WELL. FIGURED OUT A BETTER METHOD WITHIN REGULATIONS TO DEVELOP MONITORING WELLS, GOING TO CONTINUE TOMORROW USING SUCH METHOD. WILL FEEL MORE CONFIDENT IN DEVELOPING AT LEAST TWO WELLS STARTING TOMORROW MORNING.

1545 - ARRIVE @ FIELD OFFICE: DROP EQUIPMENT, FIELD FORMS, LOGBOOK

1630 - EOD

7.28.16

668984.02.03.01 JBER PFC July 29th, 2016

WEATHER: CLOUDY 65°F

PERSONNEL: M. LONDON / AWL SUB: GEOTEK / CHRIS. B.

TASK: GW DEVELOPMENT

0835 - ARRIVE @ FIELD OFFICE. PTSP, CALIBRATE EQUIP, LOAD EQUIP/SUPPLIES.

0935 - MOBE TO CFTA-3

0947 - ARRIVE @ CFTA-3 SEE "WELL DEVELOPMENT DATASHEET"

1044 - PUMP VOLTAGE WILL NOT SURPASS 10 VOLTS, NO WATER @ SURFACE: pull PUMP TO TROUBLESHOOT. WL NOT DROPPING / WATER IN LINE

1059 - SPOKE W/ STEVE @ TTT, ADVISED TO TRY ALT. BATTERY SOURCE IF THAT DOESN'T WORK SWAP ~~PUMP~~ (4) PUMP MOTOR OUT.

1110 - ALT. POWER SOURCE DID NOT FIX problem, PROBABLY NEED ANOTHER MOTOR FOR PUMP - GEOTEK DOES NOT HAVE ON HAND, ABORT WELL.

1141 - GEOTEK GOES TO TAKE LUNCH & DISCUSS TROUBLESHOOTING W/ PM

1145 - MOBE TO FIELD TRAILER - EAT LUNCH, GO OVER FIELDSHEETS, DISCUSS DISCREPANCY W/ FTL

1200 - ARRIVE @ FIELD OFFICE, FTL NOT PRESENT: ~~SPEAK~~ (5) DISCUSS @ LATER TIME. SPEAK W/ GEOTEK, ADVISED THEY ARE LOCATING A NEW MOTOR.

1300 - MOBE BACK TO CFTA-3 TO MEET GEOTEK

1318 - ARRIVE @ CFTA-3 GEOTEK ON SITE: REPLACE MOTOR ON PUMP.

1330 - REPLACED MOTOR, PUMP SEEMS TO BE FUNCTIONING PROPERLY SEE "WELL DEVELOPMENT DATASHEET"

1415 - TURBIDIMETER VIAL MISSING: MOBE TO FIELD OFFICE TO RETRIEVE ANOTHER WHILE GEOTEK SURGES WELL.

1440 - ARRIVE BACK @ SITE

1546 - FINISH DEVELOPMENT of CFTA-3: DEMOBE

1615 - MOBE TO IDW STORAGE:

1625 - ARRIVE @ IDW STORAGE: TRANSFER IDW WATER

JBER PFC 666964.02.03.01 July 29th CONT...

1648 - MOBE TO FIELD TRAILER ; DROP FIELD FORMS, EQUIPMENT

1700 - EOD

7.29.16

(5)

JBER PFC 666984.02.03.01 July 30th, 2016

WEATHER: Cloudy 63°F

PERSONNEL: M. LANDON / AWL SUB: GEOTEK (CHRIS B.)

TASK: GW DEVELOPMENT

0630 - ARRIVE @ FIELD OFFICE, PTSP, CALIBRATE EQUIP, LOAD EQUIPMENT

0910 - MOBE TO CFTA SITE: STOP BY IDW STORAGE TO PICKUP 55 GAL DRUMS

0930 - ARRIVE @ CFTA-1 SEE "WELL DEVELOPMENT DATASHEET"

1152 - CFTA-1 DEVELOPMENT COMPLETE: DEMOBE

1215 - MOBE TO CFTA-2

1225 - ARRIVE @ CFTA-2 SEE "WELL DEVELOPMENT DATASHEET"

1347 - FINISH CFTA-2 DEVELOPMENT: DEMOBE

1412 - MOBE TO IDW STORAGE

1425 - ARRIVE @ IDW STORAGE, TRANSFER DEV. WATER

1431 - MOBE TO FIELD TRAILER

1453 - ARRIVE @ FIELD TRAILER: UNLOAD EQUIP, ~~STUFF~~ SCAN FIELD DOCS.

1505 - EOD

7.30.16

JBER PFC 666984.02.03.01 AUGUST 1ST 2016

WEATHER: CLOUDY 56°F

PERSONNEL: M. LANDON / NAME SUB: GEOTEK / CHRIS B.

TASK: GW DEVELOPMENT

0655 - ARRIVE @ FIELD TRAILER: PTSP, CALIBRATE, GATHER SUPPLIES/EQUIP

0720 - MOBE TO FSFS-1: STOP BY IDW STORAGE TO GRAB DRUMS.

* LATE ENTRY * 0900 - PID CALIBRATION SPAN SET TO 45 ppm INSTEAD OF 100 ppm. D. LUBELL CALLS DWH TO TRY AND CONSULT A TECH. NO ANSWER.

0944 - ARRIVE @ FSFS-1 SEE "WELL DEVELOPMENT DATASHEET"

1202 - DEVELOPMENT COMPLETE: DEMOBE

1222 - MOBE TO CASTA-MW01: GEOTEK picks up lunch ~~EN~~

1251 - GEOTEK BACK ON-SITE: MOBE TO CASTA-MW01

1256 - ARRIVE @ CASTA-MW01: SEE "WELL DEVELOPMENT DATASHEET"

1452 - CASTA-MW01 DEVELOPMENT COMPLETE: DEMOBE

1516 - MOBE TO IDW STORAGE TO PICKUP 55 GAL DRUM

1533 - ARRIVE @ IDW STORAGE:

1540 - MOBE TO FS-1

1605 - ARRIVE @ FS-1 SEE "WELL DEVELOPMENT DATASHEET"

1740 - DEVELOPMENT COMPLETE (FS-1): DEMOBE

1800 - MOBE TO IDW STORAGE

1830 - ARRIVE @ IDW STORAGE: TRANSFER IDW WATER.

~~OA~~ 1911 - MOBE TO FIELD TRAILER

1915 - ARRIVE @ FIELD TRAILER: PUT UP EQUIP, SCAN FIELDWORK

1930 - GOIN

8.1.16

JBER PFC 666984.02.03.01 AUGUST 2ND, 2016

WEATHER: SHOWERS 56°F

PERSONNEL: M. LANDON/ANL SUB: GEOTEK/CHRIS. B.

TASK: GW DEVELOPMENT

0515 - ARRIVE @ FIELD TRAILER: PTSP, CALIBRATE EQUIP, LOAD EQUIP

0607 - MOBE TO IDW STORAGE TO PICK UP DRUMS

0616 - MOBE TO CCH-1

0930 - ARRIVE @ CCH-1: SEE "WELL DEVELOPMENT DATASHEET"

1326 - CCH-1 DEVELOPMENT COMPLETE: DEMOBE

1346 - MOBE TO GBI IDW

1406 - MOBE TO IDW STORAGE; STOP BY FIELD TRAILER TO PICK UP EMPTY DRUMS

1430 - ARRIVE @ IDW; TRANSFER IDW WATER

1513 - MOBE TO SS044-1

1520 - ARRIVE @ SS044-1: SEE "WELL DEVELOPMENT DATASHEET"

1555 - SS044-1 RAN DRY, WAIT ~ 20 MIN TO RECHARGE

1615 - ~~RECHARGE~~ FORMATION WATER RECOVERY RATE IS TOO SLOW, ADD 1 WELL CASING VOLUME OF DI WATER TO WELL, SURGE + PURGE

1644 - SS044-1 DEVELOPMENT COMPLETE: DEMOBE

1702 - MOBE TO IDW STORAGE

1712 - ARRIVE @ IDW STORAGE: TRANSFER IDW WATER

1720 - MOBE TO FIELD TRAILER

1725 - ARRIVE @ FIELD TRAILER: SCAN FIELDFORMS, DROP EQUIP

1750 - EOD

8.2.16

JBOR PFL 666948.02.03.01 AUGUST 3RD, 2016

WEATHER: PARTLY SUNNY 56°F

PERSONNEL: M. LANDON / ANL SUB: GEOTEK / CHRIS B.

TASK: GW DEVELOPMENT

0750 - ARRIVE @ FIELD TRAILER: PTSP, CALIBRATE, GATHER EQUIP.

0850 - TALK TO CHRIS B. GEOTEK: ADVISED THAT HE IS ON THE WAY W/ DRUMS & SURGE BLOCK

0940 - GEOTEK / CHRIS B. ON SITE: COMPLETE NEW DRUM INSPECTIONS

1011 - MOBE TO IDW STORAGE TO OBTAIN 55-GAL DRUMS.

1017 - MOBE TO FS4-1

1028 - ARRIVE @ FS4-1: SEE "WELL DEVELOPMENT DATASHEET"

1112 - HAVING PROBLEMS W/ WLM & PUMP TUBING: TROUBLESHOOT

1128 - FS4-1 RUN DRY, WAIT 20 MIN FOR FORMATION RECHARGE ~80%

1149 - FS4-1 FORMATION RECOVERY @ 54%: ADD DI WATER TO WELL

1157 - ADDED 1 CASING VOLUME TO WELL: SURGE: SEE "DATASHEET"

1220 - FS4-1 DEVELOPMENT COMPLETE: RAN DRY 2x, DEMOBE

1243 - MOBE TO GDS STATION TO USE BATHROOM

1250 - MOBE TO FS5-1

1311 - ARRIVE @ FS5-1: SEE "WELL DEVELOPMENT DATASHEET"

1441 - FS5-1 DEVELOPMENT COMPLETE: DEMOBE

1515 - MOBE TO AT029-1

1522 - ARRIVE @ AT029-1: SEE "WELL #(6) DEVELOPMENT DATASHEET"

1600 (6) 1610 - ISSUES W/ PUMP STUCK IN WELL: TROUBLESHOOT.

1641 - NO WATER @ SURFACE, FUSE BLOWN ON CONTROLLER. CALL TIT TO FIND OUT DEPTH RATING ON PUMP. 150' MAX - OUT OF RANGE! DEMOBE.

1702 - MOBE TO IDW STORAGE:

1712 - ARRIVE @ IDW: DROP OFF DRUMS

JBER PFC 666984.02.03.01 AUGUST 3RD CONT...

1735 - DEPART TO FIELD TRAILER

1740 - ARRIVE @ FIELD OFFICE: PUT UP EQUIP, SCAN FIELD FORMS/ROCK

1750 - EOD

8.3.16

(10)

JBER PFC 666984.02.03.01 AUGUST 4th, 2016

WEATHER: RAIN 59°F

PERSONNEL: M. LANDON / ANL SUB: GROTEK / CLARK B.

TASK: GW DEVELOPMENT

0755 - ARRIVE @ FIELD TRAILER: PTSP, CALIBRATE LOGG EQUIPMENT

0845 ~~0935~~ (2) - MOBE TO IDW STORAGE

0902 - MOBE TO CHD-4

0935 - ARRIVE @ CHD-4: SEE "WELL DEVELOPMENT DATASHEET"

1032 - CHD-4 RAN DRY, WAIT @ ~20MIN FOR 80% RECHARGE

1057 - WL @ 17.74: ADD 1 CASING VOLUME OF DI + SURGE

1138 - CHD-4 DRY, DEMOBE

1200 ~~1155~~ (3) - MOBE TO HS-1: GROTEK STOPS TO GET LUNCH ON THE WAY

1235 - MOBE TO HS-1

1242 - ARRIVE @ HS-1: SEE "WELL DEVELOPMENT DATASHEET"

1325 - MOTOR ON PUMP OUT: VOLTAGE WILL NOT GO OVER 10V, PULL PUMP & REPLACE

1400 - FINISH REBUILDING PUMP: RESUME DEVELOPMENT

1530 - HS-1 DEVELOPMENT COMPLETE: DEMOBE

1545 - MOBE TO SS044-1

1556 - ARRIVE @ SS044-1: SEE "WELL DEVELOPMENT DATASHEET"

1700 - SS044-1 DRY - DEMOBE (SECOND ATTEMPT)

1717 - MOBE TO IDW STORAGE

1720 - ARRIVE @ IDW: TRANSFER IDW

1803 - MOBE TO FIELD TRAILER

1812 - ARRIVE FIELD TRAILER: UNLOAD EQUIP, SCAN FIELD FORMS, DISCUSS DEVELOPMENT PROCEDURES W/ J. FRAME.

1815 - END OF FIELD DAY

8.4.16

(20)

8/16/16 666984.02.03.01 JBER PFC

Personnel: M Bruno /ANC - Engr. + FTL

C. Bizaillon / Geotek - Developer

Objective: Continue developing MWs (AT052; FS4)

Conditions: ~55°F, partly cloudy, calm

0800 M Bruno arrives onsite. Calibrate YSI, Turbidimeter & PID. See calibration logs. C. Bizaillon texts to notify that he is picking up drums this morning & expects to be onsite at ~0900.

0910 C. Bizaillon arrives onsite. H+S tailgate meeting - (MB) ~~0930 J Ultr.~~ (MB) Pinchpoints, ergonomics, Dioxin potential @ AT052.

0930 J Ulrich arrives back at field office. Discuss plan for day - Drillers still need to install monument @ AT052, will ~~X~~ (MB) start at FS4.

1000 Mobe to FS4, PPE = level D. See development form for details.

1044 Water level has dropped ~6 ft during surging. Call J. Ulrich to discuss. J. Ulrich will call STC G. Colgan & get back to me - J. Ulrich directs us to continue w/ development until we hear back.

1126 WL dropped ~4.7 ft in 4 minutes of purging @ lowest rate (.083 gpm) pump would discharge water. WL below pump intake. Call J Ulrich to discuss. She will discuss w/ G Colgan / L Waller. J Ulrich directs us to move on to SS044 while we wait.

1145 Done cleaning up site. C Bizaillon mobes to grab lunch. Return to field trailer, pick up additional bailers

-MB 8/16/16

SBER PFC SI 8/16/16 cont.

1245 Mobe to SS044. Approach w/ "modified" development approach - aggressively surge each interval for 10 minutes, bail 3 bailer volumes, then begin low-flow purging.

1600 Weather change - begins raining.

1605 Development complete; begin site cleanup.

1620 Mobe to POL yard, transfer SS044 water to D035; transfer FB4 water to D153.

1715 Arrive back @ field trailer, Scan & upload documents.

1915 Finished for day, depart site.

my
8/16/16

(27)

JBER PFC SI 666984.02.03.01 8/17/16

Personnel: M Bruno / ANC - sonbe
C Bizaillon / Geotek - developer

Objective: Continue MW developing (AT052, CHD4)

Conditions: ~55° F, partly cloudy, calm

0700 Arrive onsite, calibrate WQ & PID instruments See calibration logs. PID # 111 would not calibrate - using MultiRAE as PID instead

0805 C Bizaillon arrives onsite. H&S tailgate meeting - ergonomics, slips, trips, & falls; manual lifting; traffic control.

0815 Mobe to POL yard to pick up drums.

0830 Mobe to AT052 to begin development. See development field form, PPE = level D.

0835 C Bizaillon notifies M Bruno he does not have sufficient rope length - will have to use same rope & switch it back & forth between surge block & pump.

1030 Bladder pump controller (GeoControl II) loses power. Check (MB) ~~fuse in~~ control unit - fuse ok. Check connection to battery terminal - connection ok. C. Bizaillon adjusts male end of power cord - getting power to controller again. Resume purging @ 1045.

1220 MW Develop complete. Begin cleaning up stc.

1315 Cleanup complete. C Bizallion mobes to get lunch. M Bruno returns to field office, scan & upload docs.

1345 C Bizaillon arrives back @ field office. Mobe to CHD-4, to redevelop using alt. method - 10 minutes surging @ each ~3 ft screen interval, bail 3+,

-MB 8/17/16-

(23)

(24)

8/17/16

JBER PFC SI

Purge @ lowest possible flow rate.

1720 Alternate method not working - well purged dry within minutes of beginning purge @ lowest rate. Discuss w/ J. Ulrich, she directs to continue surge/purge.

1730 Call it for the day; will have to revisit well. Begin site cleanup.

1735 Mobe to POL yard, transfer AT052 development water to drums D156 (full), D157 (2 1/3 full). Transfer CHD-4 water to D141.

1815 Return to field office, QC, scan, upload paperwork.

1835 C Bizaillon departs site for day.

1945 Finished for day, depart from site.

8/17/16

JBER PFC SI 666984.02.03.01 8/18/16

Personnel: M Bruno/ANC - Scribe
C Bizaillon/Geotek - Developer

Objective: Continue MW Development (E3, SS108)

Conditions: ~55° F, overcast, calm

0700 arrive onsite, calibrate WQ instruments & air quality instruments. See calibration logs.

0800 C. Bizaillon arrives onsite. H&S tailgate meeting ergonomics, slips, trips, & falls, wildlife, proximity to railroad.

0810 Mobe to POL yard +

0825 Mobe to RR entrance, meet w/ Grant Gerhart/ARRC

0840 G. Gerhart/ARRC escorts team to E3-1.
Check in w/ G. Gerhart on RR specific safety only consideration - do not approach tracks.

0850 Begin development - see development log.

1035 MW Development complete - begin site cleanup

1110 Mobe off E3-1. G. Gerhart offsite.
C. Bizaillon offsite for lunch. Return to field trailer, join conference call discussing path forward on FS4-1 and CHD-4.

1210 Mobe to SS108-1, meet C. Bizaillon onsite for development. See development log for deta

1407 Development complete. Begin site cleanup.

1425 Mobe to POL yard. Transfer development water from E3-1 to drums 149 & 158.
Transfer water from SS108 to drums 155 and 159.

1510 Return to field trailer.

1515 C Bizaillon offsite. Call C. Hinds to discuss

-MB 8/18/16-

JBER PFC SI 8/18/16 cont.

plan for redevelopment attempt @ ~~GHD-4~~ tomorrow.
Plan is to not surge, just try pumping w/ peristaltic pump at lowest possible flow rate, see if we can pump out silt w/out drawing down well.

1530 Scan & upload field docs.

1545 Mobe to pick up ~~field~~ cargo van from having tire repaired.

1650 Return to field office, scan & upload field docs.

1725 S. Halstead / EDA stops by field office to get gel ice.

1730 S. Halstead departs.

1745 Finished for day. depart from site.

8/18/16

(26)

SBER PFC SI 8/19/16

Personnel: M Bruno /ANC - Scribe
C Bizaillon /Geotek - developer

Conditions: ~55 °F, partly cloudy, calm

Objective: Attempt development w/ peristaltic @ CHD-4

0730 Arrive onsite. Calibrate instruments - see cal form.

0800 C. Bizaillon arrives onsite.

0825 Mobe to POL yard, pick up drums.

0835 Mobe to CHD-4. H+S Tailgate meeting - complacency, ergonomics, slips, trips, + falls, bees. See development form (attempt #4).

0953 Begin purging.

1035 Talk to S. Ulrich - she suggests we may want to stop purging & let well recharge before WL draws down below top of screen.

1055 Water level nearing top of screen, shut off pump. Talk to C. Hinds - he clarifies that we should continue purging, even if WL decreases below top of screen. Continue purging until either a) well begins to clear or b) well purges dry.

1059 Resume purging.

1125 Speak w/ G. Colgan re: observation of well CHD-4 behavior so far during purging. G. Colgan suggests moving peristaltic pump inlet up & down through screen interval as we purge, just making sure it stays submerged.

1423 Well purges dry. TD now measuring 23.26 ft btoc - silt removed from well bottom. Call C. Hinds & notify him of situation. He directs that team will need to discuss & decide on path

-MB 8/19/16-

JBER PFC SI 8/19/16 cont

forward, so no need for further development activities today. Begin site cleanup

1500 Mobe to POL yard. Transfer CHD-4 development water to D141.

1515 Return to field office.

1530 C. Bizaillon offsite for day. Development activities complete - see FTL book for rest of day.

8/19/16

(28)

JBER PFL 666984.02.03.01 AUGUST 26th, 2016

WEATHER: RAIN 55°F
PERSONNEL: M. LANDON / AML
TASK: GW DEVELOPMENT

1000 - ARRIVE @ FIELD TRAILER: PTSP, CALIBRATED WQIs, LOAD EQUIPMENT
1112 - MOBE TO IDW STORAGE TO GRAB DRUMS
1122 - MOBE TO GAS STATION
1155 - ARRIVE @ CHD-4
1252 - MECHANICAL SURGE BLOCK GETTING HUNG UP ABOUT ~5-10' INSIDE PVC PIPING. TROUBLESHOOT. - ABLE TO GET BLOCK DOWNHOLE BY ASSISTING W/ ADDITIONAL ROD.
1655 - ADDED CASING VOLUME of DI: WL IS NOT ABOVE SCREEN INTERVAL ADVISED TO ADD MORE DI WATER TO WELL HEAD. ADDED 1.1 GAL of DI FOR TOTAL of 4 GAL, ~~WE~~ DTW = ~~NOT MEASURED~~ ~2.2' BTOC ~~WLM~~ WLM IS NOW INACCURATE. CAN VISIBLY SEE WATER IN WELL, HOWEVER WLM DOES NOT INDICATE WATER @ PROPER LEVEL.
1710 3RD ROUND of SURGING. START - INTERVAL #3 (19.23 - 22.23)
1730 SURGE INTERVAL #2 (16.23 - 19.23)
1750 ~~SURGE INTERVAL #1 (13.23 - 16.23).~~ M. BRUNO TAKES OVER FOR CA
1800 Surge Interval #1 (13.23 - 16.23). M Landon offsite for
1820 DTW = 15.92 ft btoc TD = 23.06 ft btoc
Bail ~3.5 buckets full (~ 2.0 gals). TD = 23.
ft btoc DTW = 22.35 ft btoc Water NTU
1830 Call C. Hinds to discuss. Well still drawing down significantly after bailing, water still very turbid, looks essentially the same as when mechanical surging began.

—MB 8/26/16—

JBER PFC JI 8/26/16 cont.

Per C. Hinds, we will stop attempts at mechanical surging. Plan to redrill well tomorrow - will put top of screen @ same depth, but will install a 20 ft screen instead of 10 ft screen. C. Hinds requests I email summary of days activities/results to L. Waller, G. Colgan, & S. Vojta/Geotek.

(MB) ~~CC~~ 1840 Pack up site, Geotek leaving rig & auger rack in place at CHD-4 for the night due to difficulty getting in & out of location.

1855 Return to field office.

1920 Geotek offsite for day

8/26/16

JBER - PFC 666984.02.03.01 AUG. ~~30~~ 31, 2016 MB

WEATHER: SUNNY, 60° F

PERSONNEL: B. ERNST; T. CALLEAR; M. BRUNO

TASK: MW DEVELOPMENT

1230 - ARRIVED ONSITE @ CHD-41A W/ GEOTEK AND UNLOADED RIG; MEASURED DEPTH (TOTAL) 29.33 ft btoc DEPTH TO WATER 6.95 ft btoc WH = 0.5 ppm BZ = 0.0 ppm

1255 - HAD INCORRECT TUBING SIZE FOR PERI PUMP; M. BR TALKED TO LEAH WALLER AND SHE WILL SPEAK W/ SCOTT AT GEOTEK TO RESCHEDULE.

1300 - B. ERNST ADDED 1 BAG SAND TO FILL TO TOP OF stovepipe monument ~~PVC WELL~~. LOADED TRUCK. MB

1315 DEPART FOR FIELD TRAIL

JBER PFC 666984.02.03.01 Sept. 20, 2016

0930 - Annika Seay (AS) arrives at the CH2M field office. Michael Landon (ML) arrives shortly thereafter. Begin prep. for the day's work.

- Project: JBER PFC
- Task/Activity for the day: Purge CHD-4
- Personnel:
  Morgan Bruno (MB) (field team lead)
  Annika Seay (AS) (geologist, qualified sampler, logbook scribe)
  Michael Landon (ML) (environmental technician)
- PN: 666948.02.03.01
- Weather: high 40s, windy (high wind advisory for today)

1000 - MB returns to field office from dig permit meeting. Hold health and safety meeting. (See PTSP) Discuss:

- Driving to well
- Safety at well (wildlife)
- PPE
- communication.

1020 - AS and ML mobe to CHD-4

AJS 9.20.16

JBER PFC 666984.02.03.01 Sept. 20, 20

1040 – Arrive at the site. Begin set up.
PID = 0.0 ppm.

1045 – Take DTW and TD:
-DTW = 2.19 ft FTOC
-TD = 30.25 ft FTOC
(casing = ~2 ft)

1050 – lower pump to 26 ft ~~bgs~~ ATS FTOC

1105 – start pump. Water drawn immediately
~0.5 gpm = flow rate
turbidity = 918 NTU
DTW = 10.80

Recording measurements:

Time	DTW (ft FTOC)	Volume purged (gallons)	turbidity (NTU)
1110	12.15	2.5 ATS	931
1115	12.66	~~3.0~~ 2.75	overrange
1120	12.68	3.0	overrange
1125	12.68	3.25	overrange
(increase flowrate to 0.3 gpm) 1130	16.35	5.00	overrange
1135	19.53	6.50	overrange
1140	20.70 below pump	6.75	overrange
1145	dry	8.00	overrange
1150			

1150 – well goes dry. Stop pump; begin cleanup.
1200 – Move to POL yard.
1210 – Arrive at POL ATS yard. No drums available for purge water. Move to CH2M field office.
1230 – Arrive at CH2M field office. ~~Begin~~ complete ATS LTM inventory.

ATS 9.20

JBER PFC666984.0203.01 Sept. 20, 2016

1245 - Mobe to ~~JB~~ AFJ POL yard. Fill new drum #170 w/ purge water from CHD-4.
1310 - break
1410 - return to CHD-4
1430 - set up. PID = 0.0 ppm. DTW = 3.9 ft FTOC, TD = 24.65 ft FTOC
1450 - Begin purging. Flow rate = 0.4 gpm

Time	DTW (ft FTOC)	Volume (gal) purged	turbidity (NTU)	flow rate (gpm)
1455 ~~1450~~	15.45	2.5	out of range	0.2
1500	18.38	3.5	865	0.2
1505	19.82	4.25	overrange	0.2
1510	20.50	5.50	overrange	0.2
1515	23.65	6.25	overrange	0.2

1520 → dry

1520 - pump stopped. Begin clean up.
1530 - Mobe to CH2M ~~field office~~ AFJ POL yard to drop off purge water.
1555 - Mobe back to CH2M field office. Drop off equipment and paperwork.
1600 - End of day.

9.20.16

JBER PFC 666984.02.03.01 9/23/16

800 JEREMIAH KNUTH AND MEMO CASTILLO ARRIVE @ JBER FISCA TRAILER. MEET MARCAN BRUNO AND GATHER FISCA EQUIPMENT TO PURGE + DEVELOP WELL CHD-4. DRIVE TO WELL HEAD

835 ARRIVE @ WELL CHD-4 AND SETUP TO PURGE WELL.

840 MEASURE DEPTH TO WATER, TD = 30.7' BTOC
DTW = 1.97' BTOC

855 BEGIN PURGE

TIME	DTW FT BTOC	Vol. Purge (gal)	TURBIDITY (NTU)	SOBROK FLOW RATE (LPM)
855	1.97'	0	857	0.4 (MIN POWER)
9:15	DRY TURN PUMP OFF	3.5	NR	0.4 (min power)
TURN PUMP OFF AND ALLOW TO RECHARGE				
943	7.16	3.5	OVER-RANGE	0.4 (min power)
1014	14.23	7.0	OVER RANGE	0.4
1044	18.57	10.5	OR	0.4
1120	18.90	12.75	962	0.4 min power
1230	28.25	15.00	—	PURGE DRY Let recharge over night.

1235 PACK UP GEAR + PUMP

1241 LEAVE WELL HEAD TO GO BACK TO JBER TRAILER

1300 ARRIVE @ JBER TRAILER. LEAVE EQUIPMENT AND TRUCK. JK + GC OFF SITE

MA 9/23/16

JBER PFC 666984.02.03.01 AUGUST 16th 2016

WEATHER: Cloudy 55°F

PERSONNEL: M. LANDON / HNL ~~SGS~~ (2)

TASK: GW Sampling

0730 - ARRIVE @ FIELD TRAILER: PTSP, Calibrate, load EQUIP.

0840 - MOBE TO H6-1

0905 - ARRIVE @ H6-1: SGE "well purge & Sample Datasheet"

1155 - COLLECT SAMPLE 16Q3H6-1-GW-0 : DEMOBE

1215 - MOBE TO H8-1

1252 - ARRIVE @ H8-1: SGE "well purge & Sample Datasheet"

1610 - COLLECT SAMPLE 16Q3H8-1-GW-0

1615 - COLLECT SAMPLE 16Q3H8-1-GW-D : DEMOBE

1650 - MOBE TO IDW STORAGE

1706 - ARRIVES @ IDW: TRANSFER PURGE WATER

1724 - ARRIVE @ FIELD office: UNLOAD EQUIP, TURN IN FIELD DOCS, RE-ICE SAMPLES.

1740 - END of FIELD DAY

8.16.16

MB 8/16/16

JBER PTL 666984.02.03.01 AUGUST ~~16~~ 17, 2016

WEATHER: CLOUDY 55°F.
PERSONNEL: M. LANDRUM/ANL & D. WIGLAND/ANL
TASK: GW SAMPLING

0730 ARRIVE @ FIELD TRAILER: PTSP, CALIBRATE, LOAD EQUIP.
0821 ARRIVE @ FS7-1: SEE "WELL PURGE & SAMPLE DATASHEET"
~~1035~~ 1030 COLLECT SAMPLE 16Q3FS7-1-GW-0
1037 EPA FINISHED COLLECTING THEIR SAMPLES: DEMOBE
1051 - MOBE TO H10-1
1053 - ARRIVE @ H10-1 - SEE "WELL PURGE & SAMPLE DATASHEET"
1405 COLLECT SAMPLE 16Q3H10-1-GW-0
1410 EPA FINISHED COLLECTING THEIR SAMPLES: DEMOBE
1425 - MOBE TO H16-1
1435 - ARRIVE @ H16-1: SEE "WELL PURGE & SAMPLE DATASHEET"
1755 - COLLECT SAMPLE 16Q3H16-1-GW-0
1805 - EPA FINISHED COLLECTING THEIR SAMPLES: DEMOBE
1820 - MOBE TO IDW STORAGE
1832 - ARRIVE @ IDW STORAGE: TRANSFER IDW WATER & DEION WATER
1847 - ARRIVE @ FIELD TRAILER: UNLOAD EQUIP, DROP FIELD DOCS, RE-ICE SAMPLES.
1900 - END OF FIELD DAY

8.17.16

MB 8/17/16

JBER PFC 666984.0203.01 AUGUST 16, 2016

WEATHER: Cloudy 55°F

PERSONNEL: M. LANDON/AMEC + A. WIELAND/AMEC

TASK: GW Sampling

0730 - ARRIVE @ FIELD TRAILER: PTSP, CALIBRATE, LOAD EQUIPMENT

0814 - MOBE TO CHD-1

0830 - ARRIVE @ CHD-1: SEE "WELL ~~PURGE~~ SAMPLING DATASHEET"

1048 - COLLECT SAMPLE 1603CHD-1-GW-0

1053 - EPA FINISHED COLLECTING THEIR SAMPLES: DEMOBE

1105 - MOBE TO CHD-2

1112 - ARRIVE @ CHD-2: SEE "WELL PURGE & SAMPLE DATASHEET"

1245 - COLLECT SAMPLE 1603CHD-2-GW-0

1251 - EPA FINISHED COLLECTING THEIR SAMPLES: DEMOBE

1305 - MOBE TO CHD-3

1317 - ARRIVE @ CHD-3: SEE "WELL PURGE & SAMPLE DATASHEET"

1535 - COLLECT SAMPLE 1605CHD-3-GW-0

1543 - EPA FINISHED COLLECTING THEIR SAMPLES: DEMOBE

1555 - MOBE TO IDW STORAGE

1612 - ARRIVE @ IDW STORAGE: TRANSFER IDW

1630 - ARRIVE @ FIELD TRAILER: UNLOAD EQUIP, TURN IN FIELD DOCS, PACK SAMPLES FOR SHIPMENT

1700 - END OF FIELD DAY

8.18.16

MB 8/18/16

JBER PFL 666784.02.03.01 August 19th, 2016

WEATHER: Cloudy 55°F

PERSONNEL: M. Landon/ANL + A. Wieland/ANL

TASK: GW Sampling

0730 - Arrive @ Field Trailer: PTSP, Calibrate, load equipment

0815 - Mobe to FSFS-1

0835 - Arrive @ FSFS-1: See "Well Purge & Sampling Datasheet"

1035 - Collect sample [16Q3FSFS-1-GW-0]

1044 - EPA finished collecting their samples: Demobe

1057 - Mobe to FSS-1

1127 - Arrive @ FSS-1: See "Well Purge & Sample Datasheet"

1146 - Unable to setup on FSS-1 due to testing of high PSI holes in vicinity of well: Mobe to SS044-1

1156 - Arrive @ SS044-1: See "Purge & Sample Datasheet"

1400 - Collect sample [16Q3SS044-1-GW-0]

1423 - Mobe to IDW storage

1444 - Arrive @ Field office: Unload equip, turn in paperwork, take EB

1500 - Collect ~~sample~~ (1) [Equipment Blank] [16Q3-GWEB-JB01]

1510 - End of Field Day

8.19.16

JBER PFL 666984.02.03.01 AUGUST 22ND, 2016

WEATHER: RAIN 55°F

PERSONNEL: M. LANDON/ANL + A. WIEGAND/ANL

TASK: GW SAMPLING

0810 - ARRIVE @ FIELD OFFICE: PTSP, CALIBRATE, LOAD KGPIP

0846 - MOBE TO FS5-1

0855 - ARRIVE @ FS6-1: SGS "WELL PURGE + SAMPLE DATASHEET"

1020 - COLLECT SAMPLE 1603FS5-1-GW-0

1023 - EPA FINISHED COLLECTING THEIR SAMPLES: DEMOBE

1040 - MOBE TO SS108-1

1045 - ARRIVE @ SS108-1: SGS "WELL PURGE + SAMPLE DATASHEET"

1225 - COLLECT SAMPLE 1603SS108-1GW-0

1233 - EPA FINISHED COLLECTING THEIR SAMPLE! DEMOBE

1243 - MOBE TO FIELD TRAILER TO PICKUP BINDERS FOR PUMP.

1300 - ARRIVED @ FIELD TRAILER: EPA AWAITING IF THEY ARE GOING TO COLLECT SAMPLES FROM AT052 OR NOT PRIOR TO HEADING TO AT052.

1327 - MOBE TO AT052-1

1333 - ARRIVE @ AT052-1: SGS "WELL ~~DEVELOPMENT~~ PURGE + SAMPLE DATASHEET"

1735 - COLLECT SAMPLE 1603AT052-1-GW-0

1740 - COLLECT SAMPLE 1603AT052-1-GW-1: DEMOBE

1756 - MOBE TO FDW STORAGE

1826 - ARRIVE @ FIELD TRAILER: TURN IN FIELD DOCS, RE-ICE SAMPLES, DROP EQUIPMENT.

1830 - END OF FIELD DAY

8.22.16

MB 8/22/16

(2)

IBOL PKL 666-984.02.03.01 AUGUST 23RD, 2016

WEATHER: RAIN 55°F

PERSONNEL: M. LANDON/ANL & A. WILLAND/AUC

TASK: GW SAMPLING

0800 - ARRIVE @ FIELD TRAILER: PTSP, CALIBRATE, LOAD EQUIP.

0855 - MOBE TO E3-1

0907 - ARRIVE @ E3-1: SGG "WELL PURGE & SAMPLE DATASHEET"

1030 - COLLECT SAMPLE 1663E3-1-GW-0 + MS/MSD

1045 - EPA FINISHED COLLECTING TRIP SAMPLES: DEMOBE

1102 - MOBE TO ~~@~~ FIELD TRAILER

1126 - MOBE TO OU3MW-02

1140 - ARRIVE @ OU3MW-02: VEHICLE PARKED ON TOP OF WELL, GATOR BLOCK 5250 TO SEE IF WE CAN GET VEHICLE MOVED.

1146 - SGG "PURGE & SAMPLE DATASHEET"

1246 - MOBE TO IDW STORAGE

1315 COLLECT SAMPLE 1663-GWEB-SB02

1350 - EOD

8.23.16

MB 8/23

JBER PFC 666984.02.03.01 August 24th, 2016

0930 – Annika Seay (AS) meets field team lead Morgan Bruno (MB) and environmental technician Tara Callear (TC) at JBER CH2M field office. Waiting for tubing delivery from FedEx before work can start. MB briefs AS on health and safety; AS signs paperwork.

1000 – Allison Wicland (AW) arrives at CH2M field office. Begin prep for the day. See calibration logs for air monitoring and water quality measurement instruments.

- Project: PFCSI - JBER
- Task / Activity for the day: groundwater monitoring well sampling
- Personnel:
  Morgan Bruno (MB)
  (field team lead)
  Annika Seay (AS)
  (geologist, qualified sampler, logbook scribe)
  Allison Wicland
  (environmental technician)

1045 – Mobe to AT029a-1 Ruff Road. Begin set up.

1130 – Some troubleshooting involving setting the pump at the correct depth. DTW = 152.84 ft bgs FTOC; TD = 164.40 ft bgs FTOC. PID = 0.0 ppm

1155 – Pump set; start pumping. EPA Sandy Halstead on site.

AJS 8.24.16

MB 8/24/16

JBER PFC 666984.02.03.01 August 24th, 2016

1215 – Water is produced. Flow rate = 200 mL/min
turbidity = Out of range.
Continue purge to allow water to clear.

1225 – turbidity = 295 NTU
Continue purge.

1235 – turbidity = 80 NTU
Hook up YSI to begin readings.

1240 – Begin recording YSI readings
(see well purge and sampling datasheet for details)

1310 – parameters stabilize:

WL (ft bgs)	(pH)	conductivity (mS/cm)	turbidity (NTU)	DO (mg/L)	Temp (°C)	ORP (mV)
152.84	7.54	0.269	9.73	11.01	9.9	181.1

1315 – Collect sample 1603AT029-1-GW-0 for analysis of:
-WS-LC-0025 (PFCs)

AH Sandy Halstead collects samples following completion of CH2M samples.

1330 – pump stopped. Decon sample equipment.
Pack up site.

1400 – Mobe to next location. FT023 well FP56

1425 – location is in the road. Set up cones as a barricade. Flush well.

1430 – PID = 0.0 ppm at well.
Take ~~TD~~ DTW and TD:
-DTW = 41.46 ft bgs
-TD = 49.26 ft bg

1455 – Begin pumping. AFS 8-24-16

mB 8/24/16

JBER PFCs 666984.02.03.01 August 24th, 2016

1510 – Water is produced.
Flow rate = 200 mL/min
turbidity = 55.9 NTU

1525 – Begin recording YSI measurements
(see well purge and sample datasheet for details)

1725 – parameters stabilize:

WL (Ft bgs)	pH	Cond. (ms/cm)	turbidity (NTU)	DO (mg/L)	Temp- (°C)	ORP (mV)
42.15	5.99	0.034	38.2	6.53	10.2	125.5

1730 – Collect sample 16Q3FP56-GW-0 for Analysis of:
-WS-CC-0025 (PFCs)

1735 – Stop pump. Decon Sample equipment.
Pack up site.

1800 – Mobe to ~~IDW~~ POL yard.

1810 – Arrive at POL yard; conduct IDW management.

1835 – Arrive back at CATZU field office after IDW management.

1900 – End of Day.

8.24.16

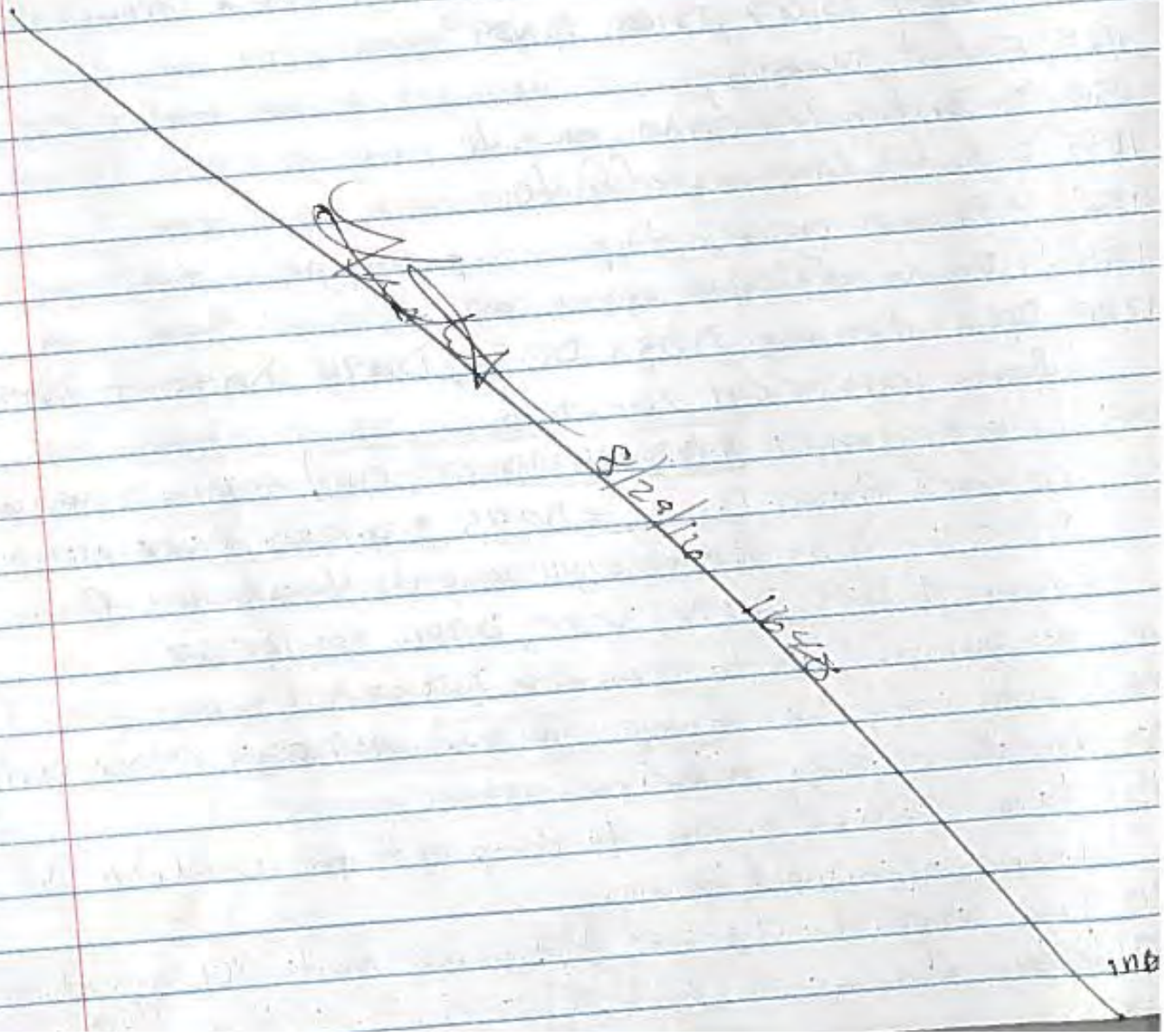
MB 8/24/16

JBER PFC 666984.02.03.01 8/29/16
Task: IDW GW Sampling
Personnel: Kristen Stevens (CH2M Qualified Sampler)
Weather: Sunny low 60's - High 60's

0900 Arrive @ field trailer. Load equipment.
0950 Arrive @ POL yard. Set up for IDW sampling.
1045 Collect sample [16Q3-JB-IDW14-GW] Location IDW HS AK101 & SW8260B collected from D108. AK102/AK103, SW7470A SW8010B, SW8081A SW8082A, SW8151A, SW8270C & SW9040 collected from Drum # ~~D07~~ D107, D108, D109.
1125 End of sampling.
1130 D. Britch/AECOM onsite.
1135 D. Britch/AECOM offsite.
1150 M. Bruno onsite to pick up equipment.
1155 M. Bruno offsite.
1200 Open drums D033, D093, D094, D095, & D096 from IDW-CCH Location.
1235 Collect sample [16Q3-JB-IDW09-GW] AK101 & SW8260B Collected from Drum # D095. DRO/RRO, RCRA Metals Mercury Pesticides PCBs, Herbicides, SVOC, & pH collected from Drums # D093, D094, D095, D096, or D033.
1310 Stop pump. Mob to Drum # D033.
1320 Finish composite sample @ Drum # D033. Close drum
1410 Finish closing all drums.
1415 Tara Callear onsite to drop off power drill & drum opening/closing.
1420 Tara leave. Drillers & M. Bruno onsite POL
1440 Open drums # D012, # D074, # D024.

JBER PFC 666984 02.03.01

1520 Collect sample 1603-JB-1DW07-GW7
AK101 & VOC collected from #D125
AK102/AK103, SW7470A SW6010B, & SW8081A SW8082A,
SW8151A, SW8270C, and SW9040 collected
from Drum # D012, D079, D084, D125.
1615 End of sample. Close drums. Demob
1625 Leave POL yard.
1630 Arrive at field trailer.
1640 End of day.



JBER PFC 6666984.02.03.01 8.30.2016

0800 - Annika Seay (AS) and Michael Landon (ML) arrive at CH2M JBER field office.

0830 - AS and ML join field team lead (FTL) Jennifer Frame (JF) and FTL Morgan Bruno (MB) on LTM groundwater sampling kick off call.

0900 - Complete kick off call. Prep for day's work. (See calibration log for air monitoring instrument)

- Project: JBER PBR LTM; Site CH039
- Task/activity for the day: groundwater monitoring Well Survey (water level) and well inspections
- Personnel:
  - Jennifer Frame (JF) (remote field team lead)
  - Morgan Bruno (MB) (field team lead)
  - Annika Seay (geologist, qualified sampler, logbook scribe)
  - Michael Landon (environmental technician, qualified sampler)
- PN:
- Weather: low 50s, clear

0930 - ~~Mini RAE~~ (AS) MultiRAE does not have a functioning LEL sensor, which is required for some wells due to methane. Also, Range Control briefing

mg 8/31/16

AS 8 30 16

JBER PFC 666984.0203.01 8.30.2016

0930 (cont'd) - is tomorrow and the site for today requires range control to access. MB calls JF to clarify.

1000 - No word from JF yet. ML makes to mark out sites. AS preps for UTM work (printer setup).

1130 - ML back on site. Still no word from JF. AS and ML prep to IDW sample PFC drums.

1200 - Make to POL yard, Set up to sample drums D054 and D110 (AT029).

1215 - Collect sample 16Q3-JB-IDW04-GW for analysis of:
- AK101 (GRO)
- AK102/103 (DRO/RRO)
- SW7470A/SW6010B (RCRA Metals/Mercury)
- SW8260B (VOC)
- SW8270C (SVOC)

1315 - Collect sample 16Q3-JB-IDW08-GW for analysis of:
- AK101 (GRO)
- SW9040 (pH)
- AK102/103 (DRO/RRO)
- SW7470A/SW6010B (RCRA Metals/Mercury)
- SW8081A (Pesticides)
- SW8151A (Herbicides)
- SW8260B (VOC)
- SW8270C (SVOC)

MB 8/30/16

AS 8 30 16

JBER PFC 666984.02.03.01 8.30.2016

late entry 0915 - hold health and safety meeting (See HASP). Discuss:

- PPE: hi-vis clothing/vests; eye protection, hand protection
- slips/trips/falls
- lifting
- Working on Poleline Rd (wooded area, animals)
- stay hydrated

1400 - AS and ML call in to ORR meeting for PBR LTM sampling at CG039.

1500 - Return to CH2M field office. Drop off samples. Complete paperwork

1530 - End of day.

8.30.16

JBER PFC 666984.02.03.01 9.19.2

1000 - Annika Seay and Mike Landon arrive at CH2M field office for TO383 HSE meeting.

1100 - meeting concludes. Annika Seay and Mike Landon prep for the day's work.
- Project: JBER PFCs
- Task/Activity for the day: groundwater monitoring well sampling
- Personnel:
  Morgan Bruno (MB) (field team lead)
  Annika Seay (AS) (geologist, qualified sampler, logbook scribe)
  Michael Landon (ML) (environmental technician, ~~logbook~~ AS ~~so~~ qualified sampler
- PN: 666984.02.03.02
- weather: 50s, clear

1130 - AS and ML mobe to Fire Station 4 well FS4-1

1135 - Hold health and safety meeting (see PTSP for details) Discuss:
- PFC handling
- watch for traffic in area
- wear proper PPE
- watch for pedestrian traffic

AS 9.

JBER PFC 666984.02.03.01 9.19.2016

1145 – set up at ES4-1 PID = 0.0 ppm
1155 – start pump.
1200 – water is drawn. Turbidity = 71 NTU
flow rate = 0.05 gpm
continue purge to lower turbidity
1215 – turbidity = 37.6 NTU
continue purge
DTW = 62.60 ft bgs
1230 – turbidity = 28.7 NTU
connect YSI to begin recording readings
1240 – Begin YSI readings (see well purge and sampling field sheet for details)
1305 – parameters stabilize:

WL (ft TOC)	pH	cond. (mS/cm)	turb. (NTU)	DO mg/L	temp. (C)	ORP (mV)
62.60	8.00	0.436	18.0	4.54	8.2	-7.7

1310 – collect sample 16Q3ES4-1-GW-0 for analysis of:
-WS-LC-0025 (PFCs)
1315 – collect sample 16Q3ES4-1-GW-1 for analysis of:
-WS-LC-0025 (PFCs)
1320 – Pump stopped. Begin cleanup.
1340 – AS checks in with Range Control and AS and ML mobe to Poleline Road to check lock on gate.
1350 – lock is OK. AS and ML mobe to POL yard to drop off IDW water. AS checks out with Range Control.
Ats +3 1400 – Arrive at POL yard. Drop off water. Ats 9.1

JBER PFC 666984.02.03 01 9.19.20

1420 – Mobe to CH2M field office. Unpack samples, equipment, and complete paperwork.

1425 – End of day.

Amanda Brady 9.19.16

JBER PFC SI 9/29/16

Personnel: M Bruno/FTL, scribe, & qual sampler
S Stibrich/ANC - Tech

Objective: Sample CHD-4a following low-permeability SOP

Conditions: ~40°F, clear, calm

0900 Meet @ field trailer. Load truck

0700 Late entry - M Bruno arrives onsite. Calibrate Multi #C102-717 (Vol only), YSI #C103144, Hach #C102790, See calibration logs.

0920 Mobe to CHD-4a HDS tailgate meeting - slips, trips, & falls; wildlife; PPE

0946 DTW = 2.11 ft btoc, Bz=0.0 WH=0.0 (MB) Begin purging @ ~0.8 gpm

Time	DTW	Vol Purged (gals)	NTU
0950	19.75	3.25	71000
0952	21.22	5.25	71000
(MB) ~~0954~~ 0955	24.68	6.25	71000
0957	25.73	6.50	71000
1000	726.5*	6.75	71000

1000 * Water (MB) level below top of pump (pump intake @ 27.5 ft btoc). Pump stops pumping - well purged dry. Will allow well to recharge, then will return & collect GW sample.

1020 Depart CHD-4a for field office.

1030 S Stibrich offsite.

1430 Mobe to POL yard, transfer purge water to D170

MB 9/29/16

(34)

JBER PFC SI 10/3/16

Personnel: M Bruno/ANC - FTL & scribe & qual sampler
M Landon/ANC - Tech & qual sampler.

Conditions: ~ °F,

Objective: Collect GW sample & FD following low-permeability sampling protocol.

M Landon arrives onsite & calibrates WQ instruments. YSI # C103144, Turbidimeter # C102790. See cal form.

0940 Mobe to CHD-4a. HHS tailgate meeting en route - wildlife, manual lifting, slips, trips, & falls.

0955 WH=0.0 ppm BZ=0.0 ppm DTW=2.13 ft btoc.

1001 Peristaltic intake @ 19 ft btoc. See purge and sample form.

1033 Collect 16Q3CHD-4-GW-Φ for PFCs (WS-LC-ΦΦ25)

1038 Collect 16Q3CHD-4-GW-1 for PFCs (WS-LC-ΦΦ25)

1045 Pack up site.

1055 Mobe to POL yard, transfer purge water to DI7Φ.

1110 Return to field trailer, other projects.
Receive email from L. Waller directing to ship samples today w/ standard TAT specified.
Pack samples for shipment.

1930 Depart for Goldstreak to ship samples.

10/3/16

JBER PFC SI 0660984.02.~~04.03~~ 03.01 11/17/16

Task: Seep sampling site walk @ LF004.

Personnel: ~~Kristen Stevens/ANC~~ & Michael Landon/ANC

Weather: Mostly cloudy, 20° F

~~1000 Meet at field trailer.~~

1230 Safety briefing call with C. Hinds, A. Seay, M. Landon & K. Stevens. Discuss site locations. Dress warm, wear proper PPE, use snow/ice traction cleats if needed.

1400 M. Landon + K. Stevens arrive on base. Mob to site location LF004.

1420 Arrive on Site LF004.

1430 Monitoring well OU6MW-63 located. Continue to search for PVC pipe seep location for LF04SP-02.

1445 Monitoring well OU6MW-61 located.

1500 Survey flagging tape located trail down bluff. Rope to aid in climbing down/up the hill.

1510 ~~We~~ Hike down bluff, seep/surface water stream visible and not frozen. Two survey stakes in seep area. Vegetation near seep orange in color, slight POL odor.

1525 Unable to locate PVC pipe to sample from. Decide team will be able to sample from seep stream using surface water sampling method.

1545 Leave site. Mob to field trailer to check ice supply.

1600 Arrive at field trailer, unable to access due to frozen key lock.

1605 End of day.

Kristen 11/17/16 1632

(36)

11/18/16 JBER PFC SI 6166984-02.03.01
Task: Seep sampling site walk @ ST037
Personnel: Kristin Stevens + Michael Landon
Weather: Mostly Cloudy, 20°F
900 M. Landon + K. Stevens arrive at Alaska Railroad warehouse / yard to meet Peter Blake to escort team to ST037/OU5 site.
920 Peter Blake arrives, escorts team to OU5 site.
930 Arrive at seep location OU5CP-02. Determine sample can be taken from surface water area.
0935 OU5SP-01 located. P. Blake leaves site, requests sign out of RR yard by calling P. Blake when leaving.
0945 OU5SP-01 frozen, stick broken inside PVC pipe.
0950 OU5SP-02 located. Unable to determine if frozen.
1000 Mob to next seep location.
1010 Arrive at location.
1020 Locate OU5SP-10 and OU5SP-11. Unable to determine if frozen due to frozen caps on PVC pipes. Mob to next location.
1035 Locate WCSW-02. Survey stake labeled with sample location ID. Water from wetland area streaming over concrete weir. Waterfall aprox. 3' x 7" wide. Wire fence surrounding area. Determine surface water sample can be collected from water streaming down.
1100 Check out with Peter Blake.
1105 End of day.

11/18/16 1130

JBER PFC SI 666984.02.03.01 11/22/16
Task: Seep & surface water sampling @ LF004 & ST037.
Personnel: Kristen Stevens, Michael Landon, Annika Seay (CH2M) & Sandy Halstead (EPA).
Weather: Sunny, clear 10°F
1000 Meet at field trailer. Calibrate YSI & MultiRae. See Calibration log. Load rental car with sampling equipment.
1100 S. Halstead (EPA) meet A. Seay, M. Landon + K. Stevens at field trailer for safety briefing.
1120 Mob to ST037/OU5 site.
1136 Arrive at ST037/OU5 site.
1142 Set up at seep OU5SP-11. (PVC pipe) Break ice with stick.
1144 Collect sample 16Q4OU5SP-11-SP-0 2 250 mL Poly
Analysis: WS-LC-0025. ~~Local~~ Duo Photo See photo log.
GPS coordinates: 611354.953"N 1494953.967"W
1145 Mob to OU5SP-10. Send wooden tool down PVC pipe. Did not collect sample due to frozen condition.
1146 S. Halstead collect sample @ OU5SP-11.
1147 Finish collecting sample. Demob. Mob to WCSW-02.
~~1200~~ 1150 Arrive at WCSW-02 site, surface water location.
1200 Collect sample 16Q4WCSW-02-SP-0 2 250mL poly
analysis WS-LC-0025.
1202 Collect sample 16Q4WCSW-02-SP-1 Same analysis as parent.
Clear stream of water falling from about 3', 6" wide.
GPS coordinates: 611350.526"N 1495008.092"W
Temp: 0.70°C Cond: 0.414 mS/cm DO: 5.95 mg/L
pH: 7.44 ORP: 79.4 mV BT: 0.0 ppm
1205 EPA S. Halstead collect sample.
1210 Mob to vehicle.
1215 Mob to next ST037 seep area.

cont →

11/22/16 JBER PFC SI 666984.02.03.01
1220 Arrive @ ST037 seep area.
1225 Set up at seep OU5CP-02. Surface water
1228 Collect sample [16Q40U5CP-02-SP-0] Analysis: WS-LC-002
GPS coordinates: 611339.482" N 1495049.180" W
6" wide low flow stream, orange colored streambank,
clear water, slight POL odor. Sheen in area next to locati
Temp: 0.24°C Cond: 0.267 ms/cm DO: 3.74 mg/L
pH: 7.35 ORP: -25.6 mV BZ: 0.0 ppm
1230 EPA collect sample. Mob to OU5SP-02.
1232 Set up at OU5SP-02. (PVC Pipe)
1235 Collect sample [16Q40U5SP-02-0] Analysis: WS-LC-0025
Clear water, Dark grey colored sediment. 0.0 ppm
GPS coordinates: 611341.315" N 149.5049.168" W
1240 EPA collect sample. Photo taken, see photo log.
1245 Demob. Mob to OU5SP-01.
1250 Set up at OU5SP-01 PVC pipe. Break ice with stick
1253 Collect sample [16Q40U5SP-01-SP-0] Analysis: WS-LC-0025
tan/orange colored water, some sediment, slight POL odor
GPS coordinates: 611340.417"N 149°5050.863" W BZ: 0.0 ppm
1255 EPA collect sample.
1300 Sample complete. Demob. Mob to vehicle
1325 Mob to LF004. Callout of RR yard, leave ~~Perlet~~ Pet
Blake message.
1345 Arrive onsite LF004. Mob to LF04SP-02
1355 Arrive at LF04SP-02 site. Surface water location
mostly covered with ice. Only location available
for 250 mL poly bottle turbidity of water exceeded
~~turb~~ 1000 NTU. EPA sampled next to location, water
had a smaller stream of water, but was clear.

JBER PFC SI 666984.02Ø301 11/22/16

1400 Collect sample 16Q4LF04SP-02-SP-02 Analysis WS-LC-0025
Collect sample 16Q4LF04SP-02-SP-0MS same analysis as parent
Collect sample 16Q4LF04SP-02-SP-0SD same analysis as parent.
BZ: 0.0ppm orange sediment, turbidity over 1000 NTUs, POL odor, low flow stream, ice coverage.
GPS coordinates: 61 14 51.245"N 149 52 41.972"W
Temp: 1.92°C Cond: 0.442 ms/cm DO: 1.98 mg/L
pH: 6.98 ORP: -97.0 mV

1405 EPA collected sample from different location 4' South of sample location LF04SP-02, due to lower turbidity. Did not collect GPS coordinates.

1410 Mob to vehicle.

1416 Arrive at vehicle. Demob.

1420 Mob to field trailer office.

1440 Arrive at field trailer office. Pack samples and equipment to ship.

1600 M. Landon leave field trailer to ship samples.

1645 A. Seay & K. Stevens leave field trailer to main office.

1700 End of day

11/22/16

AJS 11-22-16

(351)

JBER FFC SI 8/30/16

Personnel: M Bruno /ANC - FTL & scribe
T Callear/ANC - Tech
B Ernst/ Geotek
C Rancourt/ Geotek

Objective: Complete MW CHD-4a; develop CHD-4a; decon augers

Conditions: ~ 52 °F, clear, calm

0830 Arrive at field office from dig permit meeting.
B Ernst & C Rancourt onsite. H&S tailgate meeting - slips, trips, & falls, wildlife, hydration, ergonomics

0845 B Ernst & C Rancourt deconning augers from CHD-4a.

1010 T Callear arrives onsite.

1030 T Callear switches to other projects.

1050 Mobe to POL yard, add Decon water to D166.

1110 Return to field office, Geotek resumes deconning.

1210 Mobe to POL yard, add rest of decon water to D166.

1225 Geotek leaves for lunch.

☆ 1000 - Late entry - Talk to B. Ernst about plan for development - B. Ernst does not have pump, surge block, or drums with him to do development. Direct him to touch base w/ Scott & figure out a plan to procure these items.

☆ Late entry 1210 - M Landon & A Seay mobe to POL yard to collect ~~IDW~~ GW samples.

1345 Meet Geotek @ CHD-4a to install monument

B Ernst informs me ~~re~~ (MB) S. Vojta wants to move CHD-4a development to tomorrow to give time for Geotek to assemble required supplies/equipment. Tell him we do not have staff to oversee development tomorrow until after 1100. B. Ernst leaves message about this w/ S Vojta.

- MB 8/30/16 -

8/30/16 cont

JBER PFC SI

1400 Geotek proceeds w/ installation of monument @ CHD-4a.
1415 Geotek bumps expansion cap on well while installing stove pipe monument- cap shot off top of well & fell into annular space. Well is still pressurized.
1500 Geotek done w/ well install, cleaning up site. Lock monument.
1530 Geotek departs to round up materials for development tomorrow. Return to field trailer.
1550 Back @ field trailer - pack GW IDW samples for shipment to lab. T Collier texts, departing site for day.

A 0900 - Late entry - Check temps in GW IDW sample coolers held overnight in locked field trailer.
Cooler #1 = 4.0 °C
Cooler #2 = 3.5 °C
Cooler #3 = 4.0 °C
Switch out sample ice

(MB) ~~TS~~ 1720 QC & scan days field docs.
1800 Depart to ship IDW GW samples.

8/30/16

259

JBER PFC SI 9/8/16

Personnel: M Bruno/ANC - FTL & scribe
M McHarey / Geotek - Driller
B Ernst / Geotek - Helper

Objective: Mechanically develop well CHD-4a

Conditions: ~ 50 °F, cloudy, calm

0700 Arrive onsite, calibrate equipment. See calibration Logs.

0730 unload equipment from PFC rental truck.

0800 M McHarey arrives onsite. He relays that B Ernst is in line e vehicle inspection

0845 B Ernst finally arrives onsite - 45 minutes after agreed-upon meeting time. Geotek mobes to gas station to fuel generator. Mobe to CHD-4a.

0925 Geotek arrives @ CHD-4a. H&S tailgate meeting - bees, wildlife, slips, trips, & falls, frustration.

0950 Rig set up @ CHD-4a. TD = 29.42 ft btoc DTW = 2.41 ft btoc

1030 Begin surging 24-28 ft btoc interval w/ mechanical surge block.

1051 Geotek begins surging 20-24 ft btoc interval

1116 Geotek begins surging 16-20 ft btoc interval

A1106 Late entry - talk to L. Waller RE: Geotek bringing inappropriate type bailer (poly, sampling style) rather than a flat bottom, stainless bailer as discussed on the kickoff call yesterday. L Waller will talk to G. Edgar about this.

1142 Geotek begins surging 12-16 ft btoc interval

1200 L Waller calls back - discuss that Geotek should be sent home if they can't remove sediment from well due to bringing the wrong bailer to site. L Waller requests I call S. Vojta to discuss.

- MB 9/8/16 -

(260)

9/8/16 cont

→ BER PPC SI

1203 Call S. Vojta. He relays that they could not find a stainless bailer available locally, but they have one being overnighted that should arrive tomorrow. Relay to Scott that they should have informed me they didn't have the agreed upon equipment prior to mobing to the site. Discuss that poly bailer they brought won't work because it isn't heavy enough to get to bottom of well - just bails water from the top of the water column. S. Vojta proposes weighting bailer line to add weight, or using pump to remove sediment from bottom of well. Relay to S. Vojta that we can try his suggested approach on the first round, but if it isn't working we need to stop work until the proper equipment is obtained.

1210 Geotek begins surging 9.0-12 ft btoc interval.

1233 DTW = 10.45 ft btoc TD = 29.85 ft btoc
Geotek using inertial pump to remove sediment from well

1255 ~2.0 gals H_2O removed - very silty. TD = 30.50 ft btoc. DTW = 17.20 ft btoc.

(MB) ~~1300 Geotek adds potable water to well (~~

1312 Water has recharge to 15.00 ft btoc

1318 Geotek adds ~3.5 gals potable water, Water at top of casing

1321 Geotek begins second round of surging w/ 9-12 ft btoc interval.

1341 Geotek begins surging 12-16 ft btoc interval

1401 Geotek begins surging 16-20 ft btoc interval

- MB 9/8/16 -

JBER PFC SI 9/8/16 cont

1415 Weather change - begins raining.
1421 Geotek begins surging 20-24 ft btoc interval
1441 Geotek begins surging 24-28 ft btoc interval
1503 DTW = 6.92 ft btoc TD = 30.42 ft btoc
1515 Pump out ~1.5 gals w/ inertial pump. DTW = 10.70 TD = 30.5 ft btoc
1520 Appears silt off bottom of well. Switch to peristaltic pump. Water table drawing down, but not as quickly as previously. Still very turbid / silty.
1535 Switch to third round of surging.
1545 Geotek begins surging 24-28 ft btoc interval.
Late entry 1543 Geotek adds ~3.0 gals potable water to bring water to top of casing.
1605 Geotek begins surging 20-24 ft btoc interval.
1625 Geotek begins surging 16-20 ft btoc interval
1645 Geotek begins surging 12-16 ft btoc interval.
1705 Geotek begins surging 9-12 ft btoc interval
1725 DTW = 9.70 TD = 30.0 ft btoc, Remove sediment w/ inertial pump
1740 Switch to peristaltic pump. Now beginning to purge sand as well as silt. Water level still drawing down, but not as fast as previously.
1820 Call G. Colgan to discuss, get his voicemail. Call C. Schwabenlander. Discuss what well is doing - C. Schwabenlander suggests if well seems to be improving, it is worth coming back tomorrow & spending additional time surging.
1845 Begin packing up site for day.
1900 Mobe back to field trailer.
1925 Depart site for day; Geotek offsite as well.

MJ D 9/8/16

(262)

JBER PRC SI 9/9/16

Personnel: M Bruno/ANC - FTL & scribe
M McHaney/~~ANC~~ Geotek - Driller
B Ernst/Geotek - Helper

Objective: Continue development @ CHD-4a

Conditions: 46°F, foggy, calm

Equipment: MultiRAE # 610717, Turb # C103200, YSI # 609758

0730 Arrive onsite. Calibrate MultiRAE & turbidimeter. See cal log.

0755 Mobe to next base electric for another project.

0815 Mobe to CHD-4. Geotek not onsite yet.

0825 M McHaney arrives at CHD-4.

0850 B Ernst arrives @ CHD-4, Hld S tailgate meeting - wildlife, hydration, slips, trips, & falls, ergonomics

0853 DTW = 3.08 ft btoc TD = 30.50 ft btoc
No sediment accumulation on bottom of well. Will try pumping again before resuming surging.

0908 Have pumped ~1 gal, drawn down 3.22 ft, only silt purging out. Switch back to surging.

0912 Geotek begins surging 9-12 ft btoc interval

0915 Calibrate YSI. See calibration log.

1123 C. Schwabelander calls. Discuss well - no longer getting sediment build up in bottom after surging, but still getting significant drawdown at low (0.1 gpm) pumping rates. C. Schwabenlander will talk to G. Colgan & get back to me.

1133 G. Colgan calls - discuss well behavior. He suggs continuing to surge, but intervals can be reduced to 10 minutes per interval. Will discuss w/ C. Schwabenlander & get back to me.

-MB 9/9/16-

(263)

JBER PFC SI 9/9/16 cont

1156 G. Colgan calls back - he suggests we do one additional cycle of surging & try pumping again. If well still pumps dry @ reasonable flow rate, we should call it & move on to FS4. Should continue w/ ~~2 hrs~~ 20 mins / interval surging to be thorough.

1205 B Ernst begins final round of surging. See development log.

1255 Call L Waller to confirm plan to move on after this round of surging/purging. L Waller agrees - deferring to G Colgan & C Schwabenlander from a technical standpoint.

1440 Well purged dry after 49 minutes of purging @ 0.3 gpm. Stop development attempts per C. Schwabenlander & G. Colgan. Will sample well following low-permeability sampling protocol from WP SOP. Geotek begins packing up site.

1520 Depart CHD-4 for JBER-R.

1605 Arrive @ FS-4. Discuss plan - due to late hour, will not start FS4 today. Will start FS4 first thing tomorrow

1620 Geotek departs for day.

1630 ~~Scan & out~~ Arrive @ field trailer. Scan & post field docs.

1645 Finished for day. Depart site.

9/9/16

(264)

JBER PFC SI 9/10/16

Personnel: M Bruno/ANC - FTL & scribe
M McHaney/Geotek - Driller
B Ernst/Geotek - Helper

Objective: Mechanical development @ ES-4

Conditions: ~39 °F, clear, calm

0700 Arrive onsite, Calibrate instruments - see cal log.
Multirae #C102717 Hach #C103200 YSI #C102758

0750 B Ernst arrives onsite.

0830 M McHaney arrives onsite. Ht S tailgate meeting - traffic, pedestrian potential, slips, trips, falls, pinch points.

0840 ~~Geotek unloading rig & setting~~ (MB) Mobe to ES4-1. Geotek unloads rig & sets up bailer/surge block line DTW = 62.63 TD = 76.10 TD reported on boring log is 75.60 ft btoc, so unable to determine thickness of sediment on bottom of well, but bottom feels soft.

0915 ~~PSE~~ (MB) Geotek begins bailing well - see development log

0935 Surge block sticking at ~65 ft bgs - cannot get surge block to TD. Geotek begins pulling surge block, will swap out wiper for smaller diameter wiper to see if that will get it past blockage.

0950 Geotek putting ~~bailer~~ surge block back down well - M McHaney had rope around top of monument to hold weight (MB) B Ernst started using rig to lift rope - did not realize rope was around top of monument. Upward force from winchline caused rope to snap, bailer fell down well. Bailer now stuck ~~65~~ ft btoc, Geotek cannot get bailer out of well.

-MB 9/16/16

JBER PFC SI 9/10/16 cont

1005 M McHaney calling S Vojta to discuss issue w/ lost surge block stuck in well.

1015 S Vojta wants Geotek to construct something to try to fish surge block out of well. Geotek mobes to their shop to build device. Pick up site - housekeeping. Geotek will call when they are en route back to base.

1147 M McHaney calls - they are @ Post Rd gate coming back onto base. Mobe to FS4 to meet Geotek.

1210 Geotek arrives back @ FS4, begin trying to hook rope on surge block w/ small rods w/ hook welded on end.

1230 Geotek successfully fishes surge block out of FS4-1.

1240 Rope repaired @ prior break, Geotek resumes trying to lower surge block to depth. Using 1-1/4-inch rods on top of surge block to try to push it past sticking point @ ~65 ft bgs.

1308 DTW = 61.85 ~~BE~~ (MB) Geotek begins surging 72-75 ft btoc interval.

1644 Call G Colgan to discuss what is happening w/ FS4-1 - everytime we surge, DTW decreases to ~69.3 ft btoc. Checked log from last manual development attempt - DTW also decreased to ~69.3 ft btoc after 45 minutes of manual surging. G. Colgan directs to not bail well after this round of surging - just slowly lower pump down & try pumping @ low flow rate. If no change (well purges dry), G. Colgan suggests we stop development.

1704 Call L Waller & discuss FS4-1, relay G. Colgan's recommendation. L. Waller agrees w/ approach, & co

- MB 9/10/16 -

(266)

9/10/16

JBER PFC SI

a fourth round of surging isn't worth doing if we see no improvement after current (third) round.

1814 No observed improvement w/ third round of surging. Well purged dry in 9 minutes w/ pumping @ lowest possible flow rate (0.08 gpm). Called development - no further efforts to develop per G. Edgan & L. Waller

1820 Geotek begins packing up site.

1840 Mobe to POL yard - drop off Drum D167 (CHD-4a), transfer FS4-1 water to existing Drum D153.

1900 Return to field office. Geotek leaving rig at field office until Monday (9/12) am.

1910 Geotek departs site for day. Scan & upload paperwork. Finished for day, depart from site.

1945

(267)

(BJS)

JBER PFC SI 9/12/16

Personnel: M Bruno / ANC - FTL & scribe

Objective: Prep FS4-1 & CHD-4a for ~~tone~~ (na) low permeability GW sampling

Conditions: ~58 °F, overcast, calm

0800 Arrive at field office.

0920 Talk to C. Schwabenlander about low-permeability GW sampling protocol. Prior to beginning this protocol, need to purge wells dry & let them recover 3x, plus purge out however much water volume was added during development. Need to use a pump, not bailer, to avoid stirring up sediments in wells to hopefully allow wells to clear up.

0945 Talk to L Waller, get ok to rent a submersible pump from TTT for purging FS4-1.

0955 Arrive @ CHD4a. WH=0.0 BZ=0.0

* Late entry - 0830 - calibrate multiRAE #C102717 See calibration log.

0955 DTW = 2.40 ft btoc Set up peri pump, intake @ ft btoc.

1028 Begin purging well @ ~0.05 gpm.

1033 DTW = 4.48 ft btoc, NTU = >1000, vol purged = 0.25 gal

1038 DTW = 7.02 ft btoc NTU = 71000, vol purged = 1.00 gal

1048 DTW = 10.95 ft btoc NTU = 71000, vol purged = 2.25 gal

1058 DTW = 14.02 ft btoc NTU 71000, vol purged = 3.25 gal

1108 DTW = 16.00 ft btoc NTU 71000, vol purged = 4.3 gal

1118 DTW = 18.97 ft btoc NTU 71000, vol purged = 6.5 gal

1128 DTW = 22.48 ft btoc NTU 71000 vol purged ≈ 8.5 gal

1138 DTW = 25.15 ft btoc NTU 71000 vol purged ≈ 9.75 gal

1150 DTW = 29.5 ft btoc NTU >1000 vol purged = 10.75 gal well purged dry

- MB 9/12/16 -

(268)

JBER PFC SI 9/12/16 cont

1200 Pack up site.

1210 ~~Call~~ Call TTT; they have Monsoon pump available for FS4-1. Will pick up pump & tubing this afternoon.

1215 J Ulrich calls - LTM van has flat - asks if I can deal w/ tow company.

1230 Mobe to deal w/ LTM van.

1335 Mobe to TTT to pick up FS4-1 pump.

1515 Arrive @ FS4-1. Bz=0.0 wtr=0.0 DTW = 62.80 ft btoc
Set up Monsoon pump - intake at ~~-6~~ (NB) 72.5 ft btoc

1530 Pump not working - try switching out fuse & battery - still not working. Call TTT to troubleshoot. TTT suggests swapping out motor assembly for spare.

1550 Do not have tools on hand; mobe back to field office to swap out motor assembly.

1600 Switch out motor assembly - pump working dry. Return to FS4-1.

1614 Begin pumping - pump working DTW = 62.80

1619 DTW = 70.23 NTU >1000 Vol purged = 2.0 gal
Cannot reduce flow rate (NB) flow ~~pump~~ shuts off below 14.7V on controller

1624 DTW = 72.08 ft btoc NTU >1000 vol purged = 2.75 gal

1630 Well purged dry - DTW 73.50. vol purged = 3.4 gal

1645 Return to field trailer.

1700 Mobe to POL yard, transfer water from FS4-1 to Drum D53.

1730 Return to field trailer, switch to other projects for rest of day.

MP 9/12/16

269

JBER PFC SI 9/13/16

Personnel: M Bruno /ANC - FTL & scribe

Objective: Purge FS4-1 & CHD-4a dry in preparation for low-permeability sampling protocol

Conditions: ~57 °F, clear, windy

0730 Arrive onsite. Calibrate ~~YSI~~ MultiRAE #C102717 & turbidimeter #C103200. See calibration forms.

0745 Load truck.

0810 Dig permit meeting for another project.

0910 Mobe to FS4-1. DTW = 62.61. Set up Monsoon pump. WH=0.0 BZ=0.0
Pump intake @ 72.5 ft btoc

0918 Begin purging. DTW = 62.25 ft btoc. Purging @ ~0.2 gpm

0928 DTW = 71.95 ft btoc vol purged = 2.25 gal NTU >1000

0930 Well purged dry. DTW > 72.5 ft btoc vol purged = 2.6 gals
Begin picking up site.

0940 Mobe to CHD-4a.

1010 CHD-4a WH=0. BZ = 0.0 DTW = 2.30
Set up to purge well w/ peristaltic Intake @ 29.50 ft btoc

1016 Begin purging @ ~0.25 gpm

1021 DTW = 7.33 ft btoc vol purged = 1.25 gals NTU >1000

1031 DTW = 14.44 ft btoc vol purged = 3.25 gals NTU >1000

1041 DTW = 18.95 ft btoc vol purged = 5.25 gals NTU >1000

1051 DTW = 21.69 ft btoc vol purged = 7.25 gals NTU >1000

1101 DTW = 25.16 ft btoc vol purged = 9.00 gals NTU >1000

1111 DTW = 28.00 ft btoc vol purged = 9.50 gals NTU >1000

1121 DTW = 29.30 ft btoc vol purged = 10.50 gals NTU >1000

1125 Well purged dry DTW > 29.50 ft btoc vol purged = 11.20

1145 Return to field trailer - switching to other projects.

1350 Mobe to FS4-1. WH = 0.0 BZ = 0.0 DTW = 62.60
Need to purge additional 13.5 gals now that well has been purged dry & allowed to recharge 3 times.

- MB 9/13/16 -

271

JBER PFC SI 9/14/16

Personnel: M Bruno/ANC - FTL & scribe

Objective: Purge out vols equal to potable water added during development @ FS4-1 & CHD-4a.

Conditions: ~47°F, partly cloudy, calm

Equipment: MultiRAE #C107717 Turbidimeter #C103200

0745 Arrive onsite. Calibrate multiRAE & turbidimeter. See cal form.

0845 Mobe to FS4-1. WL=0.0 BZ=0.0 DTW=62.60 ft btoc

0850 Begin purging @ ~0.15 gpm.

0855 DTW=66.00 ft btoc NTU >1000 Vol purged=0.75 gals

0900 DTW=69.44 ft btoc NTU=623 Vol purged=2.0 gals

0905 DTW=71.25 ft btoc NTU=265 Vol purged=2.25 gals

0906 Well purged dry. DTW > 72.50 ft btoc. Volpurged=2.5 gals
total purged=7.5/13.5 gals

0940 Arrive at CHD-4a. WL=0.0 BZ=0.0 DTW=2.32 ft btoc

0944 Begin (MB) purging @ ~0.20 gpm

0949 DTW=7.80 ft btoc Vol purged=1.0 gals NTU >1000

0954 DTW=11.11 ft btoc Vol purged=2.25 gals NTU >1000

1004 DTW=16.03 ft btoc Vol purged=4.25 gals NTU >1000

1014 DTW=19.12 ft btoc Vol purged=5.75 gals NTU >1000

1024 DTW=20.52 ft btoc Vol purged=7.75 gals NTU >1000

1034 DTW=25.62 ft btoc Vol purged=8.75 gals NTU >1000

1044 DTW=28.41 ft btoc Vol purged=9.75 gals NTU >1000

1051 DTW=31.47 ft btoc Vol purged=10.50 gals NTU >1000

All added water volume purged out. Stop purging & let well recharge in preparation for low-permeability sampling protocol.

1125 Arrive back @ FS4-1. WL=0.0 BZ=0.0 DTW=62.57 ft btoc

1134 Begin purging @ ~0.20 gpm.

1139 DTW=67.02 ft btoc Vol purged=1.0 gals NTU=>1000

– MB 9/14/16 –

JBER PFC SI 9/14/16 Cont.

1144 DTW = 71.44 ft btoc Vol purged = 2.25 gals NTU = 701

1149 DTW = 72.48 ft btoc Vol purged = 3.25 gals NTU = >1000

1151 Well purges dry DTW > 72.50 ft btoc Vol purged = 3.50 gals
Total = 11.0/13.5 required

1210 Return to Conex - other projects work while waiting for wells to recharge.

1505 Arrive back @ FS4-1. WL = 0.0 BZ = 0.0 DTW = 62.56 ft btoc

1513 Begin purging FS4-1 @ ~ 0.20 gpm

1518 DTW = 67.00 ft btoc Vol purged = 1.0 gals NTU = 546

1523 DTW = 67.20 ft btoc Vol purged = 1.75 gals NTU = 393

1528 DTW = 68.87 ft btoc Vol purged = 2.6 gals NTU = 523
13.6 gallons total purged; more than volume of potable water added during development. Stop purging.

1545 Try calling L Waller to discuss low-permeability sampling protocol. No answer - send email asking about sampling method.

1600 Mobe to POL yard, Transfer CHD-4s purge water to D168.

1630 Return to trailer, switch to other projects for rest of day.

9/14/16

(273)

JBER PFC JJ 9/15/16

Personnel: M Bruno /ANC - FTL & scribe

Objective: Continue purging FS4-1, CHD-4a to try to decrease turbidity

Conditions: ~ 50° F, partly cloudy, calm

0900 Receive direction via email from L Waller to continue pumping & see if FS4-1 & CHD-4a will clean up more prior to sampling.

0910 Calibrate MultiRAE #C103717 & turbidimeter #C103200. See calibration log.

0945 Arrive @ CHD-4a. Other contractors onsite measuring DTW & TD - may have stirred up sediment in bottom of well.

0950 Contractors depart. WH = 0.0 BZ = 0.0
DTW = 2.29 ft btoc

0955 Begin purging CHD-4a @ ~ 0.2 gpm

1005 DTW = 10.87 ft btoc Vol purged = 2.25 gal NTU = 745

1015 DTW = 15.98 ft btoc Vol purged = 4.00 gal NTU > 1000

1025 DTW = 17.94 ft btoc Vol purged = 5.50 gal NTU > 1000

1035 DTW = 20.11 ft btoc Vol purged = 6.75 gal NTU > 1000

1045 DTW = 22.18 ft btoc Vol purged = 8.00 gal NTU > 1000

1055 DTW = 24.65 ft btoc Vol purged = 9.25 gal NTU > 1000

1105 DTW = 27.62 ft btoc Vol purged = 10.25 gal NTU > 1000

1115 DTW = 28.65 ft btoc Vol purged = 10.75 gal NTU > 1000

1125 DTW = 29.35 ft btoc Vol purged = 11.00 gal NTU > 1000

1131 Well purged dry - DTW > 29.50. Vol purged = 11.25 gals
Pick up site, move to FS4-1.

1200 Arrive @ FS4-1. WH = 0.0 BZ = 0.0 DTW = 62.57

1209 Begin purging @ ~ 0.20 gpm

1212 DTW = 65.29 ft btoc Vol purged = 0.5 gals NTU = > 1000

1217 DTW = 67.83 ft btoc Vol purged = 1.75 gals NTU = 456

~ MB 9/15/16 ~

JBER PFC SJ 9/15/16 cont

1220 DTW = 64.23 ft btoc Vol purged = 2.25 gals NTU = 341
1224 well purged dry (DTW > 72.5 ft btoc). Pack up site.
1340 Return to field office, pick up sample bottles/labels.
1300 Mobe to refuel rental truck.
1350 Arrive at CHD-4g. with = 0.0 BZ = 0.0 DTW = 7.10 ft btoc
WL not fully recovered from earlier purging.
Set up site while waiting for well to finish recharging.
1430 DTW = 4.81 ft btoc ; > 90% recharged. Begin purging at 0.2
1440 DTW = 11.11 ft btoc Vol purged = 1.25 gals NTU > 1000
1450 DTW = 18.36 ft btoc Vol purged = 3.50 gals NTU = 455
1500 DTW = 20.13 ft btoc Vol purged = 5.00 gals NTU > 1000
1510 DTW = 22.23 ft btoc Vol purged = 6.25 gals NTU > 1000
1515 Weather change - begins raining
1520 DTW = 24.21 ft btoc Vol purged = 7.25 gals NTU > 1000
1530 DTW = 28.18 ft btoc Vol purged = 8.25 gals NTU > 1000
1538 Well purged dry (DTW > 29.50). Vol purged = 8.75 gals
1605 Arrive at FS4-1. with = 0.0 BZ = 0.0 DTW = 62.53 ft btoc
1615 Begin purging FS4-1 @ ~ 0.2 gpm.
1618 DTW = 64.63 ft btoc Vol purged = 0.50 gals NTU = 979
1621 DTW = 64.64 ft btoc Vol purged = 1.00 gals NTU = 7000
↑ 1616 - Late entry - pump not working, giving low voltage reading on controller. Pull pump to troubleshoot. Silt jammed under impeller, preventing ~~pump~~ impeller from spinning. Clean out, put back down well,
1624 DTW = 64.72 ft btoc Vol purged = 1.50 gals NTU = 7000
1627 DTW = 64.96 ft btoc Vol purged = 2.25 gals NTU = 452
1630 DTW = 65.61 ft btoc Vol purged = 2.75 gals NTU = 179
1633 DTW = 65.79 ft btoc Vol purged = 3.25 gals NTU = 127
1638 DTW = 66.00 ft btoc Vol purged = 4.25 gals NTU = 118

- MB 9/15/16 -

275

JBER PFC SI 9/15/16 cont

1640 Recharge rate appears to have improved - water level not decreasing quickly, as previously seen. ~~B~~ MB will try to take parameter readings & see if readings stabilize. Begin calibrating YSI # C103140. See cal log.

1710 Calibration complete - pump controller voltage drops to 10.8V & water stops flowing. Pull pump to troubleshoot - pump still running, just at lower speed. Try switching battery, tightening electrical connections - unable to resolve issue. Will continue troubleshooting pump in the am.

1745 Return to field office, bring all monsoon components in to dry out.

1800 Depart site for day.

MB 9/15/16

276

JBER PFC SJ 9/16/16

Personnel: M Bruno/ANC - FTL & scribe

Objective: Continue purging FS4-1 & CHD-4a until turbidity decreases

Conditions: ~ 49 °F, overcast, calm

0800 Arrive onsite. Calibrate YSI #C103140, turbidimeter #C103200, MultiRAE #C102717. See cal forms.

0840 - Dealing w/ other projects.

1145 Mobe to POL yard; transfer CHD-4a purge water to D168; transfer FS4-1 purge water to D169.

1150 - Late entry - Try to troubleshoot FS4-1 pump. Cannot resolve issue. Call TTT to troubleshoot - TTT requests I bring pump in & swap it out for a different pump.

1210 - Mobe to TTT to swap out pumps.

1225 Arrive at CHD-4a. VOC=0.0 BZ=0.0 DTW = 2.24 ft btoc

1233 Begin purging @ ~ 0.30 gpm.

1243 DTW = 10.67 ft btoc Vol purged = 2.25 gals NTU = 71000

1253 DTW = 15.29 ft btoc Vol purged = 3.50 gals NTU = 451

1303 DTW = 18.04 ft btoc Vol purged = 5.00 gals NTU = 672

1313 DTW = 19.31 ft btoc Vol purged = 6.25 gals NTU = 71000

(MB) ~~1323~~ 1323 DTW = 20.14 ft btoc Vol purged = 7.25 gals NTU = 71000

1333 DTW = 23.35 ft btoc Vol purged = 8.50 gals NTU = 71000

1343 DTW = 25.18 ft btoc Vol purged = 9.50 gals NTU = 71000

1353 DTW = 26.95 ft btoc Vol purged = 10.25 gals NTU = 71000

1403 DTW = 27.75 ft btoc Vol purged = 11.00 gals NTU = >1000

1413 DTW = 28.65 ft btoc Vol purged = 11.50 gals NTU = 71000

1423 DTW = 29.04 ft btoc Vol purged: (MB) 12.25 ~~11.75~~ gals NTU = >1000

1433 DTW = 29.48 ft btoc Vol purged = 12.50 gals NTU = 71000

1439 Well purged dry (DTW > 29.50). Vol purged = 12.70 gals

Pack up sik, mobe to FS4.

- MB 9/16/16 -

277

JBER PFC SI 9/16/16 cont.

1530 Arrive @ FS4-1. BZ = 0.0 WH = 0.0 DTW = 62.55 ft btoc
Install replacement pump in well; intake @ 72.5 ft btoc
1534 Begin purging @ ~ 0.15 gpm.
1539 DTW not changing substantially & water is clearing up - see MW Development log for details.
1610 Call L. Waller to check in on plan for weekend. No answer, leave voicemail requesting call back.
1645 Parameters stable, turbidity <10, DTW stable. FS4-1 development complete.
1700 Mobe to POL yard. Transfer FS4 purge water to D169.
Transfer CHD-4a purge water to D168.
1800 Return to field office, finish daily reports
1830 Depart site for day

MP
9/16/16

278

JBER PFC SI 9/19/16

Personnel: M Bruno / ANC - FTL & scribe
A Seay / ANC - Geo & qual sampler
M Landon / ANC - Tech & qual sampler

Objective: Collect PFC GW sample from FS4-1; continue purging CHD-4a to decrease turbidity.

Conditions: ~50°F, partly cloudy; breezy

1100 A Seay & M Landon prep for GW sampling; M Landon calibrates instruments. See cal sheet. M Bruno prep for purging, calibrates multiRAE #C & turbidimeter #C . See cal sheets.

1110 M Landon & A Seay mobe to FS4-1.

1120 Mobe to CHD-4a.

1200 WL=0.0 BZ=0.0 DTW=2.24 ft btoc. Swap out peri tubing for submersible (monsoon) development pump to increase flow rates. Initiate

1206 Begin purging CHD-4a @ ~0.4 gpm

1211 DTW=11.00 ft btoc Vol purged=2.75 gal NTU=

1216 DTW=18.21 ft btoc Vol purged=3.75 gals NTU=7100

1221 DTW=20.37 ft btoc Vol purged=5.75 gals NTU=7100

1226 DTW=20.41 ft btoc Vol purged=6.50 gals NTU=7100

1229 Well purged dry (>26.0 ft btoc) Vol purged=6.75

1235 Mobe back to field office.

1330 Call w/ L. Waller & C. Schwabenlander to discuss path forward on CHD-4a. C. Schwabenlander recommends purging CHD-4a until 10 well volumes have been removed, then check back on status. L. Waller will talk to C Hinds about staff availability.

1400 A Seay & M Landon arrive back at field to

-MB 9/19/16-

279

JBER PFC SI 9/19/16 cont.

1420 A Seay & M Landon depart for day.

1550 Return to CHD-4a. WH= 0.0 BZ=0.0 DTW= 2.18 ft btoc

1601 Begin purging well CHD-4a @ ~0.5 gpm

1606 DTW= 14.38 ft btoc Vol purged=2.5 gals NTU= 4137

1611 DTW= 20.61 ft btoc Vol purged=4.75 gals NTU= >1000

1616 DTW= 22.81 ft btoc Vol purged=6.0 gals NTU= >1000

1619 Well purged dry - DTW > 26.0 ft btoc. Vol purged = 6.25 gals
Pack up site.

1630 Depart CHD-4a for the day.

MJ A
9/19/16

SOP-12 Attachment 3

WELL PURGE AND SAMPLING DATASHEET

CH2MHILL

Well ID: C,FTA-2

Project: JBER PFC SI — Date: 8/8/16

Project #: 666984.02.0301 — Start Time: 1500

Field Team: K Stevens/ANC AWieland/ANC — End Time: 1600

Sample ID: 1608CFTA-2-GW-0 — Time: 15:55 primary dup other: NA

Sample ID: ~~1608CFTA-1-GW-0~~ ARW — Time: NA primary dup other: NA

Sample ID: NA — Time: primary dup other:

Filtered? Y/N 0.45um/1.0um

Well Information

Depth to Top of Product (FTOC):	NA	Depth to Water (FTOC):	74.65
Depth to Oil/Water Interface (FTOC):	NA	Total Depth (FTOC):	85.78
Casing diameter:	(2 in.) 4 in.	Water Column (Ft):	11.13
gal/Ft of casing:	(0.163) 0.653	Casing Volume (gal)	1.81
Pump Intake Depth	80.0'	Screen Interval	71'-81'
Stable DTW (FTOC):	NA	Measured Stickup	3.9'

Method of Purging (circle one)

Pump: SUB BLDR PERIST OTHER:

Pump Type: Flow Rate (mL/min):

Pump Time: 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 (YSI 556MPS)*	*Stability Criteria*	*Depth to Water Stabilization* Time	DTW
Temperature	-5 to 45°C	± 1.0 °C		
pH	0 to 14 NTU	± 0.1		
Conductivity	0 to 200 mS/cm	± 3%		
ORP	~~-999 to +999 mV~~	± 10 mV		
Dissolved Oxygen	~~0 to 50 mg/L~~	± 10%		
Turbidity	0 to 1000 NTU	± 10% (≤10 NTU)		

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Conductivity (µS/cm)* 0.347	*Turbidity (NTU)*	*DO (mg/L)* *	*Temp (C)*	*ORP (mV)*
1	1515	74.64	0.5	7.82	~~235~~	—	100.77	7.8	222.0
2	1520	74.64	0.65	7.32	0.346	34.2	99.36	7.28	211.1
3	1525	74.64	0.75	7.19	0.346	25.8	98.39	7.27	224.8
4	1530	74.64	0.1.0	7.23	0.346	22.1	98.66	7.23	220.8
5	1535	74.64	1.2	5.46	0.346	14.8	98.44	7.01	221.2
6	1540	74.63	1.45	5.45	0.346	9.5	98.26	7.00	221.4
7	1545	74.63	1.65	5.51	0.346	6.7	97.93	6.91	222.4
8	1550	74.63	2.0	5.57	0346	5.2	98.02	6.90	224.1
9	1600	74.63	2.5	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: BZ: 0.1ppm WH: 0.0ppm Turbidity meter was not calibrated 8/8.

Analysis: ~~AK101~~ ~~AK102~~ ~~AK103~~ ~~8260B~~ PFCs WS-LC-0025

Add or remove analyses as needed.

* DO probe not functioning properly. ks

SOP-12 Attachment 3

WELL PURGE AND SAMPLING DATASHEET

CH2MHILL

Well ID: FASTA-1

Project: JBER PFC SI

Project #: 606984 02.03.01

Field Team: K. Stevens/ANC A. Wieland/ANC

Date: 8/9/16

Start Time: 1240

End Time: 1520

Sample ID: 16Q3FASTA-1-GW-0 Time: 1515 (primary) dup other: NA

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

Sample ID: NA Time: primary dup other:

Filtered? Y/N 0.45um/1.0um

Well Information

Depth to Top of Product (FTOC):		NA	Depth to Water (FTOC):	11.55'
Depth to Oil/Water Interface (FTOC):		NA	Total Depth (FTOC):	37.73'
Casing diameter:	(2 in.)	4 in.	Water Column (Ft):	26.18
gal/Ft of casing:	(0.163)	0.653	Casing Volume (gal)	4.26
Pump Intake Depth		~30'	Screen Interval	27'-37'
Stable DTW (FTOC):		12.64' NA	Measured Stickup	4.9'

Method of Purging (circle one)

Pump: SUB (BLDR) PERIST OTHER:

Pump Type: Flow Rate (mL/min):

Pump Time: Vol. Purged (gals): 6.4

Bailer: TEFLON SS OTHER:

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

Vol Purged (gals):

Criteria for Stable Parameters

Parameter	*Working Range (YSI 556MPS)*	*Stability Criteria*	*Depth to Water Stabilization*	
			Time	DTW
Temperature	-5 to 45°C	± 1.0 °C		
pH	0 to 14 NTU	± 0.1		
Conductivity	0 to 200 mS/cm	± 3%		
ORP	-999 to +999 mV	± 10 mV		
Dissolved Oxygen	0 to 50 mg/L	± 10%		
Turbidity	0 to 1000 NTU	± 10% (≤10 NTU)		

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Conductivity (µS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*
1	1255	12.85	1.0	7.36	0.700	320.1	—	8.44	16.4
2	1300	12.85	1.4	5.02	0.716	301.0	unk	9.03	-78.1
3	1305	12.85	1.6	5.12	0.697	227.0	unk	8.17	-123.5
4	1310	12.85	1.8	5.13	0.695	211.4	unk	8.07	-163.9
5	1315	12.9	2.0	5.19	0.693	177.7	unk	7.96	-184.5
6	1320	12.9	2.2	5.29	0.693	168.7	unk	8.03	-216.3
7	1325	12.9	2.6	5.41	0.698	128.5	unk	8.09	-248.6
8	1330	12.9	2.9	5.68	0.702	95.0	unk	8.30	-261.5
9	1335	12.6	3.1	5.74	0.708	91.2	unk	9.09	-64.1

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: DO not working. Turbidity meter not calibrated 8/9/16.

Analysis: ~~AK101~~ AK102 ~~AK103~~ ~~8260B~~

Add or remove analyses as needed.

ch2m

WELL DEVELOPMENT, ~~cntd.~~

Purge and Sampling datasheet

Well ID: FASTA-1

Instrument Observations

Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Cond (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (C)	ORP (mV)
10	1340	12.57	3.2	5.92	Ø.729	81.8	unk	9.88	-70.5
11	1345	12.53	3.25	6.11	Ø.742	74.1	unk	10.41	-145.5
12	1350	12.50	~~3.4~~ 3.3	6.24	Ø.749	66.7	unk	10.78	-82.1
1355 13	~~1350~~	12.50	3.45	6.33	Ø.758	62.4	unk	11.22	-63.8
1400 14	~~1355~~	12.59	3.60	6.36	Ø.751	53.1	unk	10.35	-177.2
15	1405	12.65	3.75	6.33	Ø.742	48.9	unk	9.94	-201.1
16	1410	12.63	3.9	6.31	Ø.738	46.2	unk	9.74	-212.1
17	1415	12.64	4.1	6.32	Ø.739	42.2	unk	9.84	-205.7
18	1420	12.64	4.25	6.33	Ø.741	40.0	unk	9.96	-198.4
19	1425	12.67	4.4	6.35	Ø.737	39.0	unk	9.66	-225.7
20	1430	12.63	4.6 ARW	~~7.39~~	Ø.735	~~32.4~~ ARW	unk	9.39	-228.6
21	1435	12.63	4.8	6.32 6.33	Ø.738	30.2 31.5	unk	9.68	-186.8
22	1440	12.65	5.0	6.31	Ø.741	26.8	unk	9.76	-187.1
23	1445	12.68	5.1	6.31	Ø.738	26.3	unk	9.54	-204.7
24	1450	12.64	5.25	6.29	Ø.732	24.4	unk	9.29	-208.5
25	1455	12.65	5.5	6.29	Ø.735	21.9	unk	9.53	-191.5

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.

Sample Containers

Quantity	Size	Bottle Type	Laboratory Analysis
2	250ml	poly	PFCs WS-LC-0025

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

ch2m

WELL ~~DEVELOPMENT, cntd.~~
Purge and Sampling datasheet

Well ID: FASTA-1

Instrument Observations

	Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Cond (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (C)	ORP (mV)
26	~~10~~	1500	12.65	5.65	6.31	0.739	22.4	unk	9.76	-155.8
27	~~11~~	1505	12.6	5.75	6.34	0.745	~~19.2~~ 20.6	unk	10.02	-147.0
28	~~12~~	1510	12.6	6.0	6.36	0.749	20.7	unk	10.23	-145.7
29	~~13~~	1520	12.45	6.4	POST SAMPLING					
	14									
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									
	25									

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

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

SOP-12 Attachment 3

WELL PURGE AND SAMPLING DATASHEET

CH2MHILL

Well ID: CFTA-1

Project: JBER PFC SI

Project #: 660984 02.03.01

Field Team: K. STEVENS/ANC, A. WIELAND/ANC

Sample ID: 16Q3CFTA-1-GW-0 Time: 1437 primary dup other: NA

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

Sample ID: NA Time: primary dup other:

Date: 8/10/16

Start Time: ~~12:53~~ 1256

End Time: 1440

Filtered? Y/N 0.45um/1.0um

Well Information

Depth to Top of Product (FTOC):	NA	Depth to Water (FTOC):	73.02
Depth to Oil/Water Interface (FTOC):	NA	Total Depth (FTOC):	80.60
Casing diameter:	2 in. (4 in.)	Water Column (Ft):	7.58
gal/Ft of casing:	0.163 (0.653)	Casing Volume (gal)	1.24
Pump Intake Depth	~76.8	Screen Interval	70'-80'
Stable DTW (FTOC):	~~73.04~~ NA	Measured Stick~~up down~~	flush

Method of Purging (circle one)

Pump: SUB (BLDR) PERIST OTHER:

Pump Type: Flow Rate (mL/min):

Pump Time: Vol. Purged (gals):

Bailer: TEFLON SS OTHER:

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

~~Vol Purged (gals):~~

Criteria for Stable Parameters

Parameter	*Working Range (YSI 556MPS)*	*Stability Criteria*	*Depth to Water Stabilization* Time	DTW
Temperature	-5 to 45°C	± 1.0 °C		
pH	0 to 14 NTU	± 0.1		
Conductivity	0 to 200 mS/cm	± 3%		
ORP	-999 to +999 mV	± 10 mV		
Dissolved Oxygen	0 to 50 mg/L	± 10%		
Turbidity	0 to 1000 NTU	± 10% (≤10 NTU)		

Instrument Observations

Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Conductivity (µS/cm)	Turbidity (NTU)	DO (mg/L) 8.44	Temp (C)	ORP (mV)
1	1310	73.05	0.75	7.47	0.362	71000	~~9.57~~	8.77	96.1
2	1315	73.05	.90	7.37	0.361	71000	8.07	7.47	94.2
3	1320	73.05	1.25	7.98	0.361	71000	7.61	7.94	88.8
4	1325	73.05	1.5	7.41	0.360	903	7.50	8.14	74.8
5	1330	73.05	1.7	7.40	0.362	653	7.43	8.36	68.3
6	1335	73.05	1.9	7.37	0.363	501	7.41	8.14	67.1
7	1340	73.05	2.1	7.27	0.361	398	7.27	7.95	70.7
8	1345	73.05	2.25	7.30	0.362	306	7.24	8.12	66.1
9	1350	73.05	2.5	7.28	0 361	248	7.24	8.09	65.9

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: ~~DTW~~ DO .5PPM Purge at 1256, Water at surface 1300 BZ 0.0ppm WH ARW

Analysis: ~~AK101~~ ~~AK102~~ ~~AK103~~ ~~8260B~~ PFCs WS-LC-0025

Add or remove analyses as needed.

ch2m

WELL ~~DEVELOPMENT, cntd.~~

Purge and Sampling datasheet

Well ID: CFTA-1

Instrument Observations

Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Cond (mS/cm)	Turbidity (NTU)	DO (mg/L) %	Temp (C)	ORP (mV)
10	1355	73.05	2.8Ø	7.3Ø	Ø.357	2Ø8	7.51	7.95	67.3
11	~~1340~~ 1400 ARW	73.05	3.Ø	7.21	Ø.359	172	7.21	7.73	72.Ø
12	1405	73.Ø4	3.25	7.22	Ø.360	164	7.Ø2	7.9Ø	69.8
13	141Ø	73.Ø4	3.5	7.Ø2	Ø.362	152	7.8Ø	~~7~~7Ø.4 ARW	7Ø.4
14	1415	73.Ø4	3.7	7.24	Ø.360	14Ø	7.22	7.59	66.7
15	142Ø	73.Ø4	4.Ø	7.28	Ø.363	129	7.07	7.66	62.1
16	1425	73.Ø4	4.2	7.24	Ø.36Ø	112	7.16	7.57	62.7
17	143Ø	73.Ø4	4.35	7.26	Ø.362	1ØØ	7.06	7.75	60.7
18	1435	73Ø4	4.5	7.25	Ø.362	1Ø4	7.16	7.72	59.6
19	144Ø	73.Ø3	4.6	POST SAMPLING					
20									
21									
22									
23									
24									
25									

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
2	250ml	Poly	PFCs WS-LC-0025

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

SOP-12 Attachment 3

WELL PURGE AND SAMPLING DATASHEET

CH2MHILL

Well ID: CFTA-3

Project: JBER PFC - SI

Project #: 666984 02.03.01

Field Team: K. STEVENS/ANC A. WIELAND/ANC

Date: 8/10/16

Start Time: 1010

End Time: 1135

Sample ID: 16Q3CFTA-3-GW-0 Time: 1133 primary dup other: NA

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

Sample ID: NA Time: primary dup other:

Filtered? Y(N) 0.45um/1.0um

Well Information

Depth to Top of Product (FTOC):		NA	Depth to Water (FTOC):	67.50'
Depth to Oil/Water Interface (FTOC):		NA	Total Depth (FTOC):	78.10'
Casing diameter:	(2 in.)	4 in.	Water Column (Ft):	10.6
gal/Ft of casing:	(0.163)	0.653	Casing Volume (gal)	1.72
Pump Intake Depth		62'	Screen Interval	68-78'
Stable DTW (FTOC):		67.50	Measured Stickup	Flush

Method of Purging (circle one)

Pump: SUB (BLDR) PERIST OTHER:

Pump Type: Flow Rate (mL/min):

Pump Time: Vol. Purged (gals): 7.0

Bailer: TEFLON SS OTHER:

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

Vol Purged (gals):

Criteria for Stable Parameters

Parameter	*Working Range (YSI 556MPS)*	*Stability Criteria*	*Depth to Water Stabilization*	
			Time	DTW
Temperature	-5 to 45°C	± 1.0 °C		
pH	0 to 14 NTU	± 0.1		
Conductivity	0 to 200 mS/cm	± 3%		
ORP	-999 to +999 mV	± 10 mV		
Dissolved Oxygen	0 to 50 mg/L	± 10%		
Turbidity	0 to 1000 NTU	± 10% (≤10 NTU)		

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Conductivity (µS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*
1	1035	67.50	1.75	7.58	0.360	>1000	10.85	7.59	104.7
2	1040	67.50	2.1	7.02	0.344	553	9.32	7.11	99.8
3	1045	67.50	2.65	7.02	0.346	315	8.01	7.04	90.8
4	1050	67.50	3.1	6.64	0.346	185	7.82	6.70	107.7
5	1055	67.50	3.5	6.79	0.346	132	7.68	6.60	94.3
6	1100	67.50	4.0	6.60	0.347	79.1	7.67	6.63	78.1
7	1105	67.50	4.3	7.00	0.347	73.8	7.63	6.72	75.9
8	1110	67.50	5.0	6.99	0.342	56.6	7.64	6.61	73.8
9	1115	67.50	5.2	6.97	0.343	48.9	7.63	6.62	72.7

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: BZ: 0.0ppm WH: 0.0ppm

Analysis: ~~AK101~~ ~~AK102~~ ~~AK103~~ ~~8260B~~ PFCs WS-LC-0025

Add or remove analyses as needed.

ch2m

WELL ~~DEVELOPMENT~~, cntd.

Purge and Sample Data sheet

Well ID: CFTA-3

Instrument Observations

Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Cond (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (C)	ORP (mV)
10	1120	67.50	5.5	6.97	Ø.346	41.6	7.69	6.66	71.4
11	1125	67.50	6.0	6.97	Ø.342	43.2	7.69	6.63	70.1
12	1130	67.50	6.25	6.93	Ø.345	41.6	7.59	6.59	71.3
13	1135	67.40	7.Ø	POST	SAMPLING				
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									

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
2	250ml	Poly	PFCS / WSLC-0025

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

SOP-12 Attachment 3

WELL PURGE AND SAMPLING DATASHEET

CH2MHILL

Well ID: OU5MW-39

Project: JBER PFC SI — Date: 8/10/16

Project #: 666984 02.03.01 — Start Time: 1653

Field Team: A WIELAND/ANC K. STEVENS/ANC — End Time: 1820

Sample ID: 160805MW-39-GW-0 — Time: 1817 primary dup other: NA

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

Sample ID: NA — Time: primary dup other:

Filtered? Y/N 0.45um/1.0um

Well Information

Depth to Top of Product (FTOC):		NA	Depth to Water (FTOC):	12.05
Depth to Oil/Water Interface (FTOC):		NA	Total Depth (FTOC):	22.72
Casing diameter:	2 in.	4 in.	Water Column (Ft):	10.67
gal/Ft of casing:	0.163	0.653	Casing Volume (gal)	1.739
Pump Intake Depth		17.0	Screen Interval	22'-12'
Stable DTW (FTOC):		12.12	Measured Stickup	Flush

Method of Purging (circle one)

Pump: SUB (BLDR) PERIST OTHER:

Pump Type: Flow Rate (mL/min):

Pump Time: Vol. Purged (gals): 5.2

Bailer: TEFLON SS OTHER:

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

~~Vol~~ Purged (gals):

Criteria for Stable Parameters

Parameter	*Working Range (YSI 556MPS)*	*Stability Criteria*	*Depth to Water Stabilization* Time	DTW
Temperature	-5 to 45°C	± 1.0 °C		
pH	0 to 14 NTU	± 0.1		
Conductivity	0 to 200 mS/cm	± 3%		
ORP	-999 to +999 mV	± 10 mV		
Dissolved Oxygen	0 to 50 mg/L	± 10%		
Turbidity	0 to 1000 NTU	± 10% (≤10 NTU)		

Instrument Observations

Time	Round	Time ARW	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Conductivity (µS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (C)	ORP (mV)
1705	1	~~1505~~	12.12	.5	6.90	0.944	234	3.52	8.67	-1.5
1710	2	~~1510~~	12.12	.8	6.82	0.940	178	1.28	8.52	-3.8
1715	3	~~1515~~	12.10	1.2	6.93	0.937	99.2	1.13	8.40	-16.8
1720	4	~~1520~~	12.11	1.6	6.97	0.934	73.3	1.06	8.74	-31.6
1725	5	~~1525~~	12.12	1.8	7.03	0.933	63.8	0.96	8.41	-38.4
1730	6	~~1530~~	12.13	2.0	7.01	0.931	46.5	0.94	8.38	-39.5
1735	7	~~1535~~	12.11	2.5	7.01	0.931	38.0	0.93	8.35	-43.7
	8	1740	12.12	2.9	7.01	0.930	27.5	0.99	8.33	-47.9
	9	1745	12.12	3.2	7.00	0.931	30.6	1.00	8.29	-49.7

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: ~~PID~~ 0.0 ppm 1653 pump on, 1654 water to surface ARW WH BZ 0.0PPM

Analysis: ~~AK101~~ ~~AK102~~ ~~AK103~~ ~~8260B~~ PFCs

Add or remove analyses as needed.

ch2m

WELL ~~DEVELOPMENT~~, cntd.

Purge and sampling Datasheet

Well ID: OU5 MW-39

Instrument Observations

Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Cond (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (C)	ORP (mV)
10	1750	12.12	3.5	6.97	0.931	19.7	1.01	8.21	-50.8
11	1755	12.07	4.0	6.95	0.930	16.2	1.05	8.24	-52.
12	1800	12.07	4.25	6.95	0.930	17.4	1.21	8.29	-53.7
13	1805	12.12	4.5	6.98	0.930	11.9	1.07	8.31	-55.2
14	1810	12.12	4.75	6.98	0.930	9.98	1.04	8.25	-56.2
15	1815	12.12	5.0	6.96	0.930	7.25	1.05	8.28	-56.7
16	1820	12.12	5.2	POST SAMPLING					
17									
18									
19									
20									
21									
22									
23									
24									
25									

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
2	250ml	Poly	PFCs WS-LC-0025

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

SOP-12 Attachment 3

WELL PURGE AND SAMPLING DATASHEET

CH2MHILL

Well ID: H5-1

Project: JBER PFC SI

Date: 8/11/16

Project #: 666984.02.03.01

Start Time: 1445

Field Team: K. Stevens / A. Wieland

End Time: 1622

Sample ID: 16Q3H5-1-GW-0 Time: 1620 (primary) dup other: NA

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

Sample ID: NA Time: primary dup other:

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

Well Information

Depth to Top of Product (FTOC):	NA	Depth to Water (FTOC):	24.03
Depth to Oil/Water Interface (FTOC):	NA	Total Depth (FTOC):	40.1
Casing diameter: (2 in.) 4 in.		Water Column (Ft):	16.07
gal/Ft of casing: (0.163) 0.653		Casing Volume (gal)	2.62
Pump Intake Depth	35.0	Screen Interval	30'-40'
Stable DTW (FTOC):	24.04 ~~NA~~	Measured Stickup	4.6

Method of Purging (circle one)

Pump: SUB (BLDR) PERIST OTHER:

Pump Type: Flow Rate (mL/min):

Pump Time: Vol. Purged (gals): 5.9

Bailer: TEFLON SS OTHER:

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

~~Vol Purged (gals):~~

Criteria for Stable Parameters

Parameter	*Working Range (YSI 556MPS)*	*Stability Criteria*	*Depth to Water Stabilization*	
			Time	DTW
Temperature	-5 to 45°C	± 1.0 °C		
pH	0 to 14 NTU	± 0.1		
Conductivity	0 to 200 mS/cm	± 3%		
ORP	-999 to +999 mV	± 10 mV		
Dissolved Oxygen	0 to 50 mg/L	± 10%		
Turbidity	0 to 1000 NTU	± 10% (≤10 NTU)		

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Conductivity (µS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*
1	1455	24.03	0.5	6.68	0.757	overrange	1.71	9.12	-9.4
2	1500	24.04	0.75	6.67	0.761	~~overrange~~ 930 NTU	1.22	8.93	-15.3
3	1505	24.04	1.0	6.70	0.762	656	1.03	8.86	-19.5
4	1510	24.04	1.25	6.71	0.763	495	1.02	8.81	-21.4
5	1515	24.04	1.6	6.71	0.763	362	.96	8.64	-23.1
6	1520	24.04	1.8	6.72	0.763	307	.97	8.61	-24.4
7	1525	24.03	2.25	6.72	0.763	242	.93	8.57	-25.5
8	1530	24.03	2.5	6.72	0.763	192	.93	8.58	-26.0
9	1535	24.03	2.8	6.72	0.764	146	.91	8.54	-26.4

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 4.1 ppm BZ 0.0 ppm

Analysis: ~~AK101~~ ~~AK102~~ ~~AK103~~ ~~8260B~~ PFCs

Add or remove analyses as needed.

ch2m

WELL ~~DEVELOPMENT~~, cntd.

Well ID: H5-1

Instrument Observations

Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Cond (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (C)	ORP (mV)
10	1540	24.04	3.25	NR	NR	153	NR	NR	NR
11	1545	24.04	3.4	6.74	0.763	84.2	.89	8.70	-26.0
12	1550	24.04	3.7	6.73	0.763	63.5	.90	8.54	-25.6
13	1555	24.04	4.0	6.72	0.762	72.9	.83	8.69	-25.7
14	1600	24.04	~~4.4~~ 4.4	6.73	0.763	65.6	.80	8.68	-26.1
15	1605	24.04	ARW 4.6	6.73	0.763	55.0	.75	8.79	-26.5
16	1610	24.04	5.0	6.73	0.763	52.3	.82	8.66	-27.0
17	1615	24.04	5.4	6.73	0.763	49.5	.82	8.59	-26.8
18	1625	24.05	5.9	POST	SAMPLING				
19									
20									
21									
22									
23									
24									
25									

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
2	250ml	Poly	PFCs WS-LC-0025

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

1540 - Pump stopped - switched to car battery - some parameters not recorded
Battery died.

SOP-12 Attachment 3

WELL PURGE AND SAMPLING DATASHEET

CH2MHILL

Well ID: CASTA-1

Project: JBER PFC

Date: 8/11/16

Project #: 666984.02.03.01

Start Time: 1142

Field Team: K. Stevens + A. Wieland

End Time: 1326

Sample ID: 1623CASTA-1-GW-0 Time: 1322 primary dup other: NA

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

Sample ID: NA Time: primary dup other:

Filtered? Y/N 0.45um/1.0um

Well Information

Depth to Top of Product (FTOC):		NA	Depth to Water (FTOC):	13.77'
Depth to Oil/Water Interface (FTOC):		NA	Total Depth (FTOC):	28.50'
Casing diameter:	2 in.	4 in.	Water Column (Ft):	14.73
gal/Ft of casing:	0.163	0.653	Casing Volume (gal)	2.40
Pump Intake Depth		23'	Screen Interval	28'-18'
Stable DTW (FTOC):		13.80	Measured Stickup	3.8'

Method of Purging (circle one)

Pump: SUB BLDR PERIST OTHER:

Pump Type: Flow Rate (mL/min):

Pump Time: Vol. Purged (gals): 6.0

Bailer: TEFLON SS OTHER:

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

~~Vol Purged (gals):~~

Criteria for Stable Parameters

Parameter	*Working Range (YSI 556MPS)*	*Stability Criteria*	*Depth to Water Stabilization*	
			Time	DTW
Temperature	-5 to 45°C	± 1.0 °C		
pH	0 to 14 NTU	± 0.1		
Conductivity	0 to 200 mS/cm	± 3%		
ORP	-999 to +999 mV	± 10 mV		
Dissolved Oxygen	0 to 50 mg/L	± 10%		
Turbidity	0 to 1000 NTU	± 10% (≤10 NTU)		

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Conductivity (µS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*
1	1153	13.80	0.7	6.54	0.891	overrange	2.21	7.67	-10.2
2	1158	13.80	1.0	6.39	0.924	overrange	1.55	7.67	-14.9
3	1204	13.80	1.5	6.49	0.941	629	2.00	8.64	-19.0
4	1209	13.80	1.75	6.49	0.943	348	1.95	8.15	-22.6
5	1215	13.80	2.4	6.47	0.930	184	1.60	7.62	-23.4
6	1220	13.80	2.75	6.48	0.927	125	1.93	8.14	-24.4
7	1225	13.80	2.8	6.51	0.927	106	1.98	8.47	-25.0
8	1230	13.80	3.0	6.52	0.921	93.4	1.96	8.51	-23.4
9	1235	13.80	3.2	6.51	0.921	74.5	1.68	8.48	-23.2

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: BZ 0.1 ppm WH 0.0 ppm Slight sheen

Analysis: ~~AK101~~ ~~AK102~~ ~~AK103~~ ~~8260B~~ PFCs

Add or remove analyses as needed.

ch2m:

WELL ~~DEVELOPMENT, cntd.~~

Well ID: CASTA-1

Instrument Observations

Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Cond (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (C)	ORP (mV)
10	1240	13.80	3.5	6.52	0.919	55.8	1.91	8.47	-22.6
11	1245	13.80	3.75	6.52	0.920	~~46.3~~	1.81	8.05	-21.8
12	1250	13.76	4.0	6.51	0.920	40.6 51.1	1.81	7.86	-21.3
13	1255	13.77	4.25	6.50	0.922	28.6	1.75	7.91	-21.1
14	1300	13.77	4.50	6.51	0.923	24.8	1.59	7.91	-21.8
15	1305	13.77	4.8	6.52	0.923	21.9	1.56	7.93	-23.4
16	1310	13.77	5.25	6.52	0.923	16.1	1.69	7.88	-24.5
17	1315	13.80	5.5	6.52	0.922	12	1.53	7.80	-25.9
18	1320	13.77	5.75	6.52	0.922	9.67	1.70	7.77	-27.5
19	1326	13.81	6.0	POST SAMPLING					
20									
21									
22									
23									
24									
25									

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
2	250ml	Poly	PFCs WS-LC-0025

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

SOP-12 Attachment 3

WELL PURGE AND SAMPLING DATASHEET

CH2MHILL

Well ID: CCH-1

Project: JBER PFC — Date: 8/11/16

Project #: 666987 02.03.01 — Start Time: 855

Field Team: K. Stevens + A. Wieland — End Time: 1042

Sample ID: 16Q3CCH-1-GW-0 — Time: 1037 (primary) dup other: NA

Sample ID: 16Q3CCH-1-GW-1 — Time: 1040 primary (dup) other: NA

Sample ID: NA — Time: primary dup other:

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

Well Information

Depth to Top of Product (FTOC):	NA	Depth to Water (FTOC):	22.33
Depth to Oil/Water Interface (FTOC):	NA	Total Depth (FTOC):	46.15
Casing diameter: (2 in.) 4 in.		Water Column (Ft):	23.82
gal/Ft of casing: 0.163 0.653		Casing Volume (gal)	3.88
Pump Intake Depth	41	Screen Interval	36-46
Stable DTW (FTOC):	22.33	Measured Stickup	2.15

Method of Purging (circle one)

Pump: SUB (BLDR) PERIST OTHER:

Pump Type: Flow Rate (mL/min):

Pump Time: Vol. Purged (gals): 5.25

Bailer: TEFLON SS OTHER:

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

~~Vol Purged (gals):~~

Criteria for Stable Parameters

Parameter	*Working Range (YSI 556MPS)*	*Stability Criteria*	*Depth to Water Stabilization* Time	DTW
Temperature	-5 to 45°C	± 1.0 °C		
pH	0 to 14 NTU	± 0.1		
Conductivity	0 to 200 mS/cm	± 3%		
ORP	-999 to +999 mV	± 10 mV		
Dissolved Oxygen	0 to 50 mg/L	± 10%		
Turbidity	0 to 1000 NTU	± 10% (≤10 NTU)		

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Conductivity (µS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*
1	0905	22.34	0.3	6.88	0.769	overrange	1.94	9.00	116.4
2	910	22.35	0.5	6.69	0.748	overrange	1.61	8.74	115.8
3	915	22.33	0.75	6.70	0.745	over range	1.72	8.52	113.8
4 ARW 920	~~916~~	22.33	1.15	6.74	0.744	overrange	1.50	8.39	111.9
5	925	22.33	1.35	6.75	0.741	overrange	1.49	8.24	109.9
6	930	22.33	1.65	6.78	0.740	905	1.46	8.23	107.6
7	935	22.34	1.95	6.80	0.740	739	1.55	8.15	105.4
8	940	22.34	2.15	6.81	0.739	548	1.47	8.16	104.4
9	945	22.34	2.45	6.84	0.739	414	1.42	8.18	102.1

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: BZ 0.0ppm WH 0.0ppm

Analysis: ~~AK101~~ ~~AK102~~ ~~AK103~~ ~~8260B~~ PFCs WS-LC-0025

Add or remove analyses as needed.

ch2m

WELL ~~DEVELOPMENT~~, cntd.

Well ID: CCH-1

Instrument Observations

Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Cond (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (C)	ORP (mV)
10	950	22.33	2.7	6.85	0.739	349	1.48	8.25	100.7
11	955	22.33	2.9	6.87	0.738	282	1.51	8.26	99.6
12	1000	22.34	3.2	6.88	0.738	273	1.39	8.23	99.3
13	1005	22.34	3.35	6.88	0.738	242	1.47	8.23	98.3
14	1010	22.34	3.7	6.88	0.737	211	1.33	8.26	97.3
15	1015	22.33	4.0	6.89	0.737	182	1.46	8.26	96.7
16	1020	22.33	4.25	6.89	0.736	168	1.44	8.33	96.2
17	1025	22.33	4.5	6.90	0.737	144	1.38	8.36	95.4
18	1030	22.33	4.7	6.90	0.737	141	1.30	8.42	95.5
19	1035	22.33	5.0	6.91	0.737	139	1.35	8.38	95.6
20	1042	22.35	5.25	POST SAMPLING					
21									
22									
23									
24									
25									

3.5
1.2

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
4	250ml	Poly	PFCs WS-LC-0025

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

SOP-12 Attachment 3

WELL PURGE AND SAMPLING DATASHEET

CH2MHILL

Well ID: FS6-1

Project: JBER PFC SI

Project #: 606984 03.02.01

Field Team: K. STEVENS/ANC A. WIELAND / ANC

Sample ID: 16Q3FS6-1-GW-0 Time: 1502 primary dup other: NA

Sample ID: 16Q3FS6-1-GW-0MS Time: 1502 primary dup other: MS

Sample ID: 16Q3FS6-1-GW-0SD Time: 1502 primary dup other: SD

Date: 8/12/16

Start Time: 1250

End Time: 1508

Filtered? Y/N 0.45um/1.0um

Well Information

Depth to Top of Product (FTOC):		NA	Depth to Water (FTOC):	48.22
Depth to Oil/Water Interface (FTOC):		NA	Total Depth (FTOC):	61.60
Casing diameter:	2 in.	4 in.	Water Column (Ft):	13.38
gal/Ft of casing:	0.163	0.653	Casing Volume (gal)	2.18
Pump Intake Depth		56.6	Screen Interval	51-61
Stable DTW (FTOC):		48.21	Measured Stickup	Flush

Method of Purging (circle one)

Pump: SUB BLDR PERIST OTHER: ARW

Pump Type: Flow Rate (mL/min): ~~.066~~ 350

Pump Time: Vol. Purged (gals): 9.0

Bailer: TEFLON SS OTHER:

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

Vol Purged (gals):

Criteria for Stable Parameters

Parameter	*Working Range (YSI 556MPS)*	*Stability Criteria*	*Depth to Water Stabilization*	
			Time	DTW
Temperature	-5 to 45°C	± 1.0 °C		
pH	0 to 14 NTU	± 0.1		
Conductivity	0 to 200 mS/cm	± 3%		
ORP	-999 to +999 mV	± 10 mV		
Dissolved Oxygen	0 to 50 mg/L	± 10%		
Turbidity	0 to 1000 NTU	± 10% (≤10 NTU)		

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Conductivity (µS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*
1	1300	48.21	0.5	7.46	0.437	Overrange	5.24	8.42	124.2
2	1305	48.21	0.8	7.26	0.437	overrange	4.30	7.92	90.8
3	1310	48.21	1.25	7.33	0.439	902	4.09	7.67	71.0
4	1315	48.21	1.6	7.37	0.439	693	3.99	7.61	63.0
5	1320	48.21	1.9	7.39	0.440	522	3.94	7.54	59.2
6	1325	48.21	2.2	7.40	0.440	407	3.96	7.52	59.2
7	1330	48.21	2.5	7.40	0.439	287	4.02	7.41	58.0
8	1335	48.21	2.8	7.40	0.440	220	4.09	7.35	58.2
9	1340	48.21	3.2	7.40	0.439	166	4.23	7.34	61.2

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 2.8 ppm BZ 0.0 ppm

Analysis: ~~AK101~~ ~~AK102~~ ~~AK103~~ ~~8260B~~ PFCs

Add or remove analyses as needed.

ch2m

WELL ~~DEVELOPMENT~~, cntd.
Purge + Sampling Datasheet

Well ID: FS6-1

Instrument Observations

Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Cond (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (C)	ORP (mV)
10	1345	48.21	3.6	7.40	0.439	131	4.37	7.38	65.1
11	1350	48.21	4.0	7.40	0.439	112	4.38	7.34	66.0
12	1355	48.21	4.3	7.40	0.439	92.2	4.42	7.33	67.1
13	1400	48.21	4.75	7.40	0.438	73.1	4.49	7.23	68.8
14	1405	Battery died or flow through cell rinse.							
15	1410	48.21	5.3	7.43	0.430	80.8	5.0	8.18	83.0
16	1415	48.21	5.75	7.39	0.438	67.4	4.59	7.39	75.0
17	1420	48.21	6.0	7.38	0.437	59.0	4.64	7.42	72.8
18	1425	48.21	6.5	7.38	0.438	39.2	4.65	7.20	73.4
19	1430	48.21	6.7	7.38	0.439	36.7	4.61	7.14	73.2
20	1435	48.21	7.0	7.38	0.438	29.6	4.64	7.18	73.0
21	1440	48.21	7.4	7.40	0.440	~~27.5~~	4.55	7.23	71.0
22	1445	48.21	7.75	7.39	0.440	ARW 27.5 23.3	4.57	7.16	70.8
23	1450	48.21	8.0	7.39	0.440	18.0	4.53	7.15	71.2
24	1455	48.21	8.5	7.39	0.440	17.7	4.54	7.22	70.2
25	1500	48.21	8.9	7.39	0.440	18.9	4.49	7.30	70.0

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
6	250ml	Poly	PFCs WS-LC-0025

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

Post sampling DTW: 48.22

SOP-12 Attachment 3

WELL PURGE AND SAMPLING DATASHEET

CH2MHILL

Well ID: H16-1

Project: JBER PFC

Date: 8/12/16

Project #: 666984.02.03.01

Start Time: 957

Field Team: K Stevens/ANC, A Wieland/ANC

End Time: 1125

Sample ID: 16Q3H16-1-GW-0 Time: 1122 primary dup other: NA

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

Sample ID: NA Time: primary dup other:

Filtered? Y/N 0.45um/1.0um

Well Information

Depth to Top of Product (FTOC):	NA	Depth to Water (FTOC):	40.43'
Depth to Oil/Water Interface (FTOC):	NA	Total Depth (FTOC):	57.18'
Casing diameter:	~~2 in.~~ 4 in.	Water Column (Ft):	16.75
gal/Ft of casing:	0.163 0.653	Casing Volume (gal)	2.73
Pump Intake Depth	52.0'	Screen Interval	47-57
Stable DTW (FTOC):	4043 ~~NA~~	Measured Stickup	flush

Method of Purging (circle one)

Pump: SUB BLDR PERIST OTHER:

Pump Type: Flow Rate (mL/min):

Pump Time: Vol. Purged (gals): 7.0

Bailer: TEFLON SS OTHER:

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

~~Vol Purged (gals):~~

Criteria for Stable Parameters

Parameter	*Working Range (YSI 556MPS)*	*Stability Criteria*	*Depth to Water Stabilization*	
			Time	DTW
Temperature	-5 to 45°C	± 1.0 °C		
pH	0 to 14 NTU	± 0.1		
Conductivity	0 to 200 mS/cm	± 3%		
ORP	-999 to +999 mV	± 10 mV		
Dissolved Oxygen	0 to 50 mg/L	± 10%		
Turbidity	0 to 1000 NTU	± 10% (≤10 NTU)		

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Conductivity (µS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*
1	1010	40.45	0.75	6.89	0.426	overrange	4.31	7.30	181.3
2	1015	40.42	1.2	6.94	0.441	overrange	3.62	7.13	168.3
3	1020	40.43	1.6	7.00	0.446	overrange	3.40	7.05	154.2
4	1025	40.43	2.1	7.05	0.446	694	3.31	6.93	145.3
5	1030	40.43	2.6	7.09	0.445	352	3.30	7.04	139.6
6	1035	40.43	3.0	7.12	0.443	273	3.30	6.97	137.8
7	1040	40.43	3.4	7.14	0.441	214	3.26	6.97	136.5
8	1045	40.43	3.7	7.16	0.441	166	3.23	7.05	134.1
9	1050	40.43	4.0	7.17	0.441	119	3.20	7.10	133.0

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

Analysis: ~~AK101~~ ~~AK102~~ ~~AK103~~ ~~8260B~~ PFCs WS-LC-0025

Add or remove analyses as needed.

ch2m

WELL DEVELOPMENT, cntd.

Well ID: H16-1

Instrument Observations

Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Cond (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (C)	ORP (mV)
10	1055	40.43	4.5	7.18	0.440	141	3.21	7.05	133.0
11	1100	40.43	5.0	7.19	0.442	85.7	3.16	7.04	131.0
12	1105	40.43	5.4	7.20	0.435	68.4	3.24	7.02	130.6
13	1110	40.43	5.75	7.20	0.438	58.2	3.22	6.96	132.5
14	1115	40.43	6.25	7.20	0.439	56.3	3.19	6.91	131.5
15	1120	40.43	6.6	7.21	0.432	55.0	3.27	6.96	133.0
16	1125	40.43	7.0	POST	SAMPLING				
17									
18									
19									
20									
21									
22									
23									
24									
25									

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
2	250ml	Poly	PFCs WS-LC-0025

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

SOP-12 Attachment 3

WELL PURGE AND SAMPLING DATASHEET

CH2MHILL

Well ID: H17-1

Project: JBER PFC

Date: 8/12/16

Project #: 666984.02.03.01

Start Time: 1715

Field Team: K. Stevens/ANC, A. Wieland/ANC

End Time: 1930

Sample ID: 16Q3H17-1-GW-0 Time: 1928 primary dup other: NA

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

Sample ID: NA Time: primary dup other:

Filtered? Y/N 0.45um/1.0um

Well Information

Depth to Top of Product (FTOC):		NA	Depth to Water (FTOC):	~~44.96~~ 44.94
Depth to Oil/Water Interface (FTOC):		NA	Total Depth (FTOC):	57.64
Casing diameter:	2 in.	4 in.	Water Column (Ft):	12.7
gal/Ft of casing:	0.163	0.653	Casing Volume (gal)	2.07
Pump Intake Depth		52.64	Screen Interval	47-57
Stable DTW (FTOC):		~~44.95~~ NA	Measured Stickup	Flush

Method of Purging (circle one)

Pump: SUB (BLDR) PERIST OTHER:

Pump Type: Flow Rate (mL/min):

Pump Time: Vol. Purged (gals): 10.0

Bailer: TEFLON SS OTHER:

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

Vol Purged (gals):

Criteria for Stable Parameters

Parameter	*Working Range (YSI 556MPS)*	*Stability Criteria*	*Depth to Water Stabilization* Time	DTW
Temperature	-5 to 45°C	± 1.0 °C		
pH	0 to 14 NTU	± 0.1		
Conductivity	0 to 200 mS/cm	± 3%		
ORP	-999 to +999 mV	± 10 mV		
Dissolved Oxygen	0 to 50 mg/L	± 10%		
Turbidity	0 to 1000 NTU	± 10% (≤10 NTU)		

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Conductivity (µS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*
1	1730	44.96	1.0	6.93	0.468	>1000	5.39	7.74	19.1
2	1735	44.96	1.25	6.99	0.468	>1000	4.82	7.66	18.8
3	1740	44.95	1.5	7.03	0.468	>1000	4.61	7.57	13.2
4	1745	44.95	2.0	7.05	0.468	>1000	4.51	7.60	7.1
5	1750	44.95	2.5	7.12	0.464	>1000	5.81	7.66	-13.4
6	1755	44.95	2.75	7.04	0.467	~~>1000~~	4.63	7.43	0.8
7	1800	44.95	3.2	7.04	0.467	ARW 878 680	4.49	7.41	1.6
8	1805	44.95	3.6	7.05	0.466	557	4.42	7.36	0.8
9	1810	44.95	4.0	7.06	0.467	456	4.38	7.28	-0.3

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

Analysis: ~~AK101~~ ~~AK102~~ ~~AK103~~ ~~8260B~~

Add or remove analyses as needed.

ch2m

WELL ~~DEVELOPMENT~~, cntd.
PURGE + SAMPLING DATASHEET

Well ID: H17-1

Instrument Observations

	Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Cond (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (C)	ORP (mV)
	10	1815	44.95	4.4	7.06	0.466	406	4.37	7.21	-0.2
	11	1820	44.95	4.8	7.05	0.466	353	4.35	7.05	-2.5
	12	1825	44.95	5.3 ARW	7.11	0.467	270	4.97	7.10	-17.9
	13	1830	44.95	5.7	7.08	0.467	251	4.52	7.39	-22.5
	14	1835	44.95	6.0	7.09	0.467	213	4.38	7.36	-24.0
	15	1840	44.95	6.4	7.09	0.467	180	4.33	7.85	-26.0
	16	1845	44.95	6.75	7.09	0.466	132	4.33	7.53	-27.2
	17	1850	44.95	7.15	7.08	0.466	118	4.33	7.40	-26.6
	18	1855	44.95	~~7.6~~ 7.4 ARW	7.08	0.466	99.1	4.29	7.28	-26.2
1900	19 ARW	~~1860~~	44.95	7.7	7.07	0.466	81.3	4.34	7.25	-26.0
1905	20 ARW	~~1865~~	44.95	8.0	7.08	0.466	78.4	4.28	7.21	-25.1
	21	1910	44.95	8.5	7.07	0.466	70.3	4.34	7.15	-25.2
	22	1915	44.95	9.0	7.07	0.465	54.3	4.36	7.07	-25.3
	23	1920	44.94	9.25	7.07	0.465	50.5	4.33	6.98	-25.5
	24	1925	44.94	9.6	7.07	0.465	45.7	4.33	7.09	-24.1
	25	1930	44.94	10.0	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.

Sample Containers

Quantity	Size	Bottle Type	Laboratory Analysis
2	250ml	Poly	PFCs WS-LC-~~0025~~

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

SOP-12 Attachment 3

WELL PURGE AND SAMPLING DATASHEET

CH2MHILL

Well ID: FS1-1

Project: JBER PFC SI

Project #: 666984 02.03.01

Field Team: K. Stevens /ANC A. Wieland /ANC

Sample ID: 16Q3FS1-1-GW-0 Time: 1532 (primary) dup other: NA

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

Sample ID: NA Time: primary dup other:

Filtered? Y(N) 0.45um/1.0um

Date: 8/15/16

Start Time: 1340

End Time: 1537

Well Information

Depth to Top of Product (FTOC):		NA	Depth to Water (FTOC):	21.02
Depth to Oil/Water Interface (FTOC):		NA	Total Depth (FTOC):	33.98
Casing diameter:	(2 in.)	4 in.	Water Column (Ft):	12.96
gal/Ft of casing:	(0.163)	0.653	Casing Volume (gal)	2.11
Pump Intake Depth		28.98	Screen Interval	2398- 33.98
Stable DTW (FTOC):		21.01	Measured Stickup	flush

Method of Purging (circle one)

Pump: SUB (BLDR) PERIST OTHER:

Pump Type: Flow Rate (mL/min): 175

Pump Time: 117 min Vol. Purged (gals): 5.4

Bailer: TEFLON SS OTHER: NA

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

~~Vol Purged (gals):~~

Criteria for Stable Parameters

Parameter	*Working Range (YSI 556MPS)*	*Stability Criteria*	*Depth to Water Stabilization*	
			Time	DTW
Temperature	-5 to 45°C	± 1.0 °C		
pH	0 to 14 NTU	± 0.1		
Conductivity	0 to 200 mS/cm	± 3%		
ORP	-999 to +999 mV	± 10 mV		
Dissolved Oxygen	0 to 50 mg/L	± 10%		
Turbidity	0 to 1000 NTU	± 10% (≤10 NTU)		

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Conductivity (µS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*
1	1345	21.02	0.25	6.76	0.972	overrange	1.15	13.01	105.1
2	1350	21.03	0.5	6.82	1.118	over range	2.14	8.98	114.6
1355 3	~~1400~~	21.03	0.75	6.80	1.121	over range	1.28	8.86	111.0
1400 4	~~1405~~	21.02	1.0	6.86	1.122	over range	1.95	8.71	112.5
5	1405	21.02	1.25	6.82	1.120	708	1.14	8.62	112.2
6	1410	21.02	1.4	6.85	1.124	413	1.43	8.62	117.3
7	1415	21.01	1.6	6.84	1.121	314	2.14	8.47	119.5
8	1420	21.01	1.8	6.84	1.128	219	1.69	8.83	117.2
9	1425	21.01	2.0	6.85	1.116	163	1.03	9.32	110.6

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: W/H 0.0 ppm BZ 0.2 ppm Virgin poly bladder + tubing

Analysis: ~~AK101~~ ~~AK102~~ ~~AK103~~ ~~8260B~~

Add or remove analyses as needed.

ch2m

WELL ~~DEVELOPMENT~~, cntd.

Purge and sampling datasheet

Well ID: FS1-1

Instrument Observations

Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Cond (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (C)	ORP (mV)
10	1430	21.01	2.2	6.82	1.116	142	0.45	8.87	100.0
11	1435	21.01	2.4	6.81	1.120	129	0.33	8.66	88.8
12	1440	21.01	2.55	6.81	1.118	103	0.30	8.48	80.5
13	1445	21.01	2.8	6.83	1.120	84.7	0.26	8.42	74.4
14	1450	21.01	3.0	6.83	1.119	82.5	0.24	8.65	70.7
15	1455	21.01	3.2	6.84	1.120	61.7	0.23	8.69	67.5
16	1500	21.01	3.3	6.85	1.117	57.2	0.23	9.16	65.3
17	1505	21.01 (3.5 ADV)	~~3.75~~	6.83	1.124	55.4	0.24	8.87	63.3
18	1510	21.01	3.75	6.83	1.124	49.7	0.21	8.66	61.5
19	1515	21.02	4.0	6.83	1.123	40.3	0.23	8.59	58.0
20	1520	21.02	4.25	6.84	1.124	30.6	0.19	8.36	54.8
21	1525	21.02	4.4	6.84	1.125	30.0	0.18	8.46	52.6
22	1530	21.02	4.6	6.84	1.125	27.7	0.17	8.26	50.6
23	1540	21.00	5.4	POST	Sampling				
24									
25									

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
2	250ml	Poly	PFC WS-LC-0025

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

EPA collected Sample.

SOP-11 Attachment 3

WELL PURGE AND SAMPLING DATASHEET

CH2MHILL

Well ID: MC35A-1

Project: JBER PFC

Date: 8/15/16

Project #: 666984.02.03.01

Start Time: 1112

Field Team: K. Stevens + A. Wieland

End Time: 1225

Sample ID: 16Q3UC35A-1-GW-0 Time: 1220 (primary) dup other: NA

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

Sample ID: NA Time: primary dup other:

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

Well Information

Depth to Top of Product (FTOC):	NA	Depth to Water (FTOC):	22.48
Depth to Oil/Water Interface (FTOC):	NA	Total Depth (FTOC):	39.90
Casing diameter: (2 in.) 4 in.		Water Column (Ft):	17.42
gal/Ft of casing: (0.163) 0.653		Casing Volume (gal)	2.84
Pump Intake Depth	34.90	Screen Interval	29.90 - 39.90
Stable DTW (FTOC):	24.48	Measured Stickup	flush

Method of Purging (circle one)

Pump: SUB (BLDR) PERIST OTHER:

Pump Type: Geo pump Flow Rate (mL/min): 350

Pump Time: 73 min Vol. Purged (gals): 6.5

Bailer: TEFLON SS OTHER:

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

Vol Purged (gals):

Criteria for Stable Parameters

Parameter	*Working Range (YSI 556MPS)*	*Stability Criteria*	*Depth to Water Stabilization*	
			Time	DTW
Temperature	-5 to 45°C	± 1.0 °C		
pH	0 to 14 NTU	± 0.1		
Conductivity	0 to 200 mS/cm	± 3%		
ORP	-999 to +999 mV	± 10 mV		
Dissolved Oxygen	0 to 50 mg/L	± 10%		
Turbidity	0 to 1000 NTU	± 10% (≤10 NTU)		

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Conductivity (µS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*
1	1118	22.50	0.6	6.99	0.846	overrange	2.32	9.87	166.6
2	1123	22.50	1.25	6.80	0.850	446	3.77	8.74	164.4
3	1128	22.50	1.75	6.69	0.851	210	2.46	8.51	168.7
4	1135	22.47	2.1	6.72	0.841	122	1.04	8.06	169.7
5	1140	22.48	2.6	6.64	0.844	91.8	0.38	7.82	168.2
6	1145	22.48	3.0	6.67	0.844	61.7	0.30	7.77	164.4
7	1150	22.48	3.5	6.70	0.844	47.9	0.26	7.87	158.0
8	1155	22.48	4.0	6.74	0.845	39.4	0.22	7.84	153.0
9	1200	22.48	4.4	6.75	0.845	30.7	0.18	7.82	148.4

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 0.1 ppm

Analysis: ~~AK101~~ ~~AK102~~ ~~AK103~~ ~~8260B~~ PFCs WS-LC-0025

Add or remove analyses as needed.

ch2m

WELL DEVELOPMENT, cntd.

Well ID: UC35A-1

Instrument Observations

Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Cond (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (C)	ORP (mV)
10	1205	22.48	5.0	6.77	0.844	23.7	0.16	7.88	144.5
11	1210	24.48	~~5.25~~	6.76	0.844	24.0	0.14	7.89	141.9
12	1215	24.48 ARW	~~5.75~~ 5.4	6.79	0.844	23.0	0.12	7.89	139.9
13	1225	24.48	6.5	POST Sampling					
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									

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
2	250ml	Poly	PFCs WS-LC-0025

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

1222 EPA collected sample

SOP-12 Attachment 3

WELL PURGE AND SAMPLING DATASHEET 1 of 2

CH2MHILL

Well ID: 126-1

Project: JBER PFC — Date: 8/16/16

Project #: 666984.02.03.01 — Start Time: 0905

Field Team: M. LANDON/ANC & A WIGLAND/ANC — End Time: 1155

Sample ID: 16G3HG-1-GW-0 — Time: 1155 — primary dup other: —

Sample ID: ~~16G3HG-1-GW-1~~ (D) — Time: — — primary ~~dup~~ (E) other: —

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

Filtered? Y/N — 0.45um/1.0um

Well Information

Depth to Top of Product (FTOC):		—	Depth to Water (FTOC):		12.59
Depth to Oil/Water Interface (FTOC):		—	Total Depth (FTOC):		24.20
Casing diameter:	2 in.	4 in.	Water Column (Ft):		11.61
gal/Ft of casing:	0.163	0.653	Casing Volume (gal)		1.89
Pump Intake Depth		~19.20	Screen Interval		14.20 - 24.20
Stable DTW (FTOC):		12.56	Measured Stickup		FLUSH

Method of Purging (circle one)

Pump: SUB BLDR PERIST OTHER:

Pump Type: QED sample pro FLO — Flow Rate (mL/min): 0.06

Pump Time: 151 min — Vol. Purged (gals): 7.25

Bailer: TEFLON SS OTHER:

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

Vol Purged (gals):

Criteria for Stable Parameters

Parameter	*Working Range (YSI 556MPS)*	*Stability Criteria*	*Depth to Water Stabilization*	
			Time	DTW
Temperature	-5 to 45°C	± 1.0 °C		
pH	0 to 14 NTU	± 0.1		
Conductivity	0 to 200 mS/cm	± 3%		
ORP	-999 to +999 mV	± 10 mV		
Dissolved Oxygen	0 to 50 mg/L	± 10%		
Turbidity	0 to 1000 NTU	± 10% (≤10 NTU)		

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Conductivity (µS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*
1	0940	12.60	0.4	-	-	>1000	-	-	-
2	0950	12.60	1.0	-	-	>1000	-	-	-
3	1000	12.57	1.5	-	-	897	-	-	-
4	1010	12.56	2.0	-	-	617	-	-	-
5	1020	12.60	2.7	-	-	427	-	-	-
6	1030	12.57	3.20	-	-	242	-	-	-
7	1040	12.57	4.00	-	-	156	-	-	-
8	1050	12.56	4.30	-	-	125	-	-	-
9	1100	12.56	4.80	-	-	104	-	-	-

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: 1.8 ppm initial (WH) / 0.0 ppm (BZ) - 0930 pump on - 1201 pump off

Analysis: ~~AK101~~ ~~AK102~~ ~~AK103~~ ~~8260B~~ WS-LL-0025 (PFCs)

Add or remove analyses as needed.

Revised February 2010.

mb 8/17/16

ch2m

WELL DEVELOPMENT, cntd.

Well ID: H6-1

Instrument Observations

Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Cond (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (C)	ORP (mV)	
10	1110	12.56	5.20	-	-	82.8	-	-	-	~ HOOK UP CELL
11	1115	12.56	5.50	8.01	0.542	90.0	0.62	11.3	195.3	
12	1120	12.56	5.80	7.33	0.528	87.4	0.46	11.3	184.3	
13	1125	12.56	6.00	6.89	0.524	82.5	0.35	11.3	161.3	~ CLEAN CELL
14	1130	12.56	6.40	6.71	0.522	84.5	0.57	11.0	159.0	
15	1135	12.56	6.50	6.69	0.523	81.2	0.42	11.1	148.8	
16	1140	12.56	6.80	6.71	0.525	76.8	0.37	11.1	139.1	
17	1145	12.56	7.00	6.72	0.524	81.7	0.36	11.1	131.1	
18	1150	12.56	7.25	6.73	0.524	77.9	0.35	11.0	125.7	
19										
20										
21										
22										
23										
24										
25										

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
~~4~~ 2	250 m	Poly	WS-LC-0025 (PFCs)

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

SOP-12 Attachment 3

WELL PURGE AND SAMPLING DATASHEET

1 of 2

CH2MHILL

Well ID: 148-1

Project: JBGL PFC

Date: 8.16.16

Project #: 666984.02.03.01

Start Time: 1752

Field Team: M. LANDON/ANC & A. WIELAND/ANC

End Time: 1615

Sample ID: 1623H8-1-GW-0 Time: 1610 primary dup other: -

Sample ID: 1623H8-1-GW-1 Time: 1615 primary dup other: -

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

Filtered? Y/N 0.45um/1.0um

Well Information

Depth to Top of Product (FTOC):		N/A	Depth to Water (FTOC):		23.53
Depth to Oil/Water Interface (FTOC):		N/A	Total Depth (FTOC):		44.35
Casing diameter:	2 in.	4 in.	Water Column (Ft):		20.82
gal/Ft of casing:	0.163	0.653	Casing Volume (gal)		3.39
Pump Intake Depth		39.35	Screen Interval		34.35 - 44.35
Stable DTW (FTOC):		23.50	Measured Stickup		FLUSH

Method of Purging (circle one)

Pump: SUB BLDR PERIST OTHER:

Pump Type: GRO SAMP PRO Flow Rate (mL/min): ~0.04

Pump Time: 184 MW Vol. Purged (gals): 7.8

Bailer: TEFLON SS OTHER:

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

Vol Purged (gals):

Criteria for Stable Parameters

Parameter	*Working Range (YSI 556MPS)*	*Stability Criteria*	*Depth to Water Stabilization*	
			Time	DTW
Temperature	-5 to 45°C	± 1.0 °C		
pH	0 to 14 NTU	± 0.1		
Conductivity	0 to 200 mS/cm	± 3%		
ORP	-999 to +999 mV	± 10 mV		
Dissolved Oxygen	0 to 50 mg/L	± 10%		
Turbidity	0 to 1000 NTU	± 10% (≤10 NTU)		

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Conductivity (µS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*
1	1325	23.56	0.25	-	-	71000	-	-	-
2	1335	23.58	0.70	-	-	71000	-	-	-
3	1345	23.60	1.00	-	-	71000	-	-	-
4	1355	23.66	1.60	-	-	554	-	-	-
5	1405	23.60	2.20	-	-	306	-	-	-
6	1415	23.59	2.60	-	-	206	-	-	-
7	1425	23.60	3.00	-	-	148	-	-	-
8	1435	23.57	3.50	-	-	125	-	-	-
9	1445	24.07	4.50	-	-	130	-	-	-

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: 0.4ppm initial (WH) 0.0ppm (BZ) - 1306 pump on - 1630 pump off

Analysis: ~~AK101~~ ~~AK102~~ ~~AK103~~ ~~8260B~~ WS-LC-0025 (PFCs)

Add or remove analyses as needed.

Revised February 2010.

MA 8/17/16

ch2m

WELL DEVELOPMENT, cntd.

Well ID: W8-1

Instrument Observations

Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Cond (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (C)	ORP (mV)
10	1455	24.20	5.0	-	-	205	-	-	-
11	1505	23.56	5.5	-	-	179	-	-	-
12	1515	23.53	5.9	-	-	136	-	-	-
13	1525	23.41	6.2	-	-	63.8	-	-	-
14	1530	23.51	6.4	8.37	0.481	41.0	0.51	11.0	133.5
15	1535	23.~~45~~50	6.6	7.66	0.481	39.7	0.25	11.0	55.6
16	1540	23.50	6.8	7.35	0.480	36.1	0.19	10.8	21.2
17	1545	23.49	~~6~~7.0	7.27	0.477	33.7	0.18	10.9	14.8
18	1550	23.50	7.2	7.22	0.475	35.7	0.17	11.0	8.2
19	1555	23.50	7.4	7.23	0.478	32.3	0.18	11.6	1.5
20	1600	23.46	7.6	7.21	0.478	31.0	0.15	11.1	-0.2
21	1605	23.45	7.8	7.18	0.477	30.1	0.13	10.8	0.2
22					Complete				
23									
24									
25									

- Hook up to cell

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
4	250 mL	Poly	WS-LC-0025 (PFCs)

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

SOP-12 Attachment 3

WELL PURGE AND SAMPLING DATASHEET 1 of 2

CH2MHILL

Well ID: FS7-1

Project: JBER PFC

Project #: 666944.02.0301

Field Team: M. LANDON/ANC & A. WIBLAND/ANC

Date: 8.17.16

Start Time: 0821

End Time: 1034

Sample ID: 1623FS7-1-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

Well Information

Depth to Top of Product (FTOC):		-	Depth to Water (FTOC):		27.29
Depth to Oil/Water Interface (FTOC):		-	Total Depth (FTOC):		40.50
Casing diameter:	2 in.	4 in.	Water Column (Ft):		13.21
gal/Ft of casing:	0.163	0.653	Casing Volume (gal)		2.15
Pump Intake Depth		~ 34.50	Screen Interval		30.50 - 40.50
Stable DTW (FTOC):		27.29	Measured Stickup		FLUSH

Method of Purging (circle one)

Pump: SUB BLDR PERIST OTHER:

Pump Type: QED Sample Pro Flow Rate (mL/min): ~ 0.03

Pump Time: 117 Vol. Purged (gals): 4.30

Bailer: TEFLON SS OTHER:

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

Vol Purged (gals):

Criteria for Stable Parameters

Parameter	*Working Range (YSI 556MPS)*	*Stability Criteria*	*Depth to Water Stabilization*	
			Time	DTW
Temperature	-5 to 45°C	± 1.0 °C		
pH	0 to 14 NTU	± 0.1		
Conductivity	0 to 200 mS/cm	± 3%		
ORP	-999 to +999 mV	± 10 mV		
Dissolved Oxygen	0 to 50 mg/L	± 10%		
Turbidity	0 to 1000 NTU	± 10% (≤10 NTU)		

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Conductivity (µS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*	
1	0850	27.29	0.5	-	-	411	-	-	-	
2	0900	27.29	0.9	-	-	291	-	-	-	
3	0910	27.29	1.25	-	-	238	-	-	-	
4	0920	27.29	1.75	-	-	133	-	-	-	
5	0930	27.29	2.20	-	-	97.3	-	-	-	
6	0935	27.29	2.25	6.95	0.95	88.0	0.53	8.3	6.6	Hook up cable
7	0940	27.29	2.50	6.72	0.95	83.3	0.29	8.2	-13.0	
8	0945	27.29	2.70	6.68	0.95	73.1	0.26	8.2	-19.2	
9	0950	27.29	2.90	6.71	0.95	64.9	0.25	8.2	-20.6	

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: 0.3ppm (WH) 0.0ppm (BZ) / 0840 pump on - 1037 pump off

Analysis: AK101 AK102 ~~AK103~~ ~~8260B~~ WS-LL-0025 (PFCs)

Add or remove analyses as needed.

Revised February 2010.

mmr 8/17/16

ch2m.

WELL DEVELOPMENT, cntd.

Well ID: FS7-1

Instrument Observations

Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Cond (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (C)	ORP (mV)
10	0955	27.29	3.10	6.71	0.95	52.5	0.22	8.2	-24.0
11	1000	27.29	3.30	6.73	0.95	55.0	0.22	8.2	-25.1
12	1005	27.29	3.50	6.75	0.95	46.0	0.21	8.2	-27.1
13	1010	27.29	3.70	6.77	0.95	37.3	0.25	8.4	-26.5
14	1015	27.29	3.90	6.79	0.95	31.6	0.23	9.0	-28.9
15	1020	27.29	4.10	6.83	0.95	53.9	0.27	8.8	-29.0
16	1025	27.29	4.30	6.83	0.95	29.5	0.27	8.8	-29.6
17	1030				sample collected				
18									
19									
20									
21									
22									
23									
24									
25									

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
2	250 m	Poly	WS-LC-0025 (PFCs)

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

SOP-12 Attachment 3

WELL PURGE AND SAMPLING DATASHEET 1 of 2

CH2MHILL

Well ID: 210-1

Project: JBER PFC — Date: 8.17.16

Project #: 666981.02.03.01 — Start Time: 1053

Field Team: M. LANDON/ANC + A. WIELAND/ANC — End Time: 1410

Sample ID: 16R3N10-1-GW-0 — Time: 1405 primary dup other: -

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

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

Filtered? Y/N 0.45um/1.0um

Well Information

Depth to Top of Product (FTOC):		-	Depth to Water (FTOC):	27.63
Depth to Oil/Water Interface (FTOC):		-	Total Depth (FTOC):	40.58
Casing diameter:	2 in.	4 in.	Water Column (Ft):	12.95
gal/Ft of casing:	0.163	0.653	Casing Volume (gal)	2.11
Pump Intake Depth		≈34.58	Screen Interval	30.58 - 40.58
Stable DTW (FTOC):		27.65	Measured Stickup	FLUSH

Method of Purging (circle one)

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

Pump Type: GRP SMP STD — Flow Rate (mL/min): ~0.04 — Required Pulls: — Bailer Vol. (gals): 0.25/ 0.33

Pump Time: 174 — Vol. Purged (gals): 7.4 — Vol Purged (gals):

Criteria for Stable Parameters

Parameter	*Working Range (YSI 556MPS)*	*Stability Criteria*	*Depth to Water Stabilization* Time	DTW
Temperature	-5 to 45°C	± 1.0 °C		
pH	0 to 14 NTU	± 0.1		
Conductivity	0 to 200 mS/cm	± 3%		
ORP	-999 to +999 mV	± 10 mV		
Dissolved Oxygen	0 to 50 mg/L	± 10%		
Turbidity	0 to 1000 NTU	± 10% (≤10 NTU)		

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Conductivity (µS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*
1	1115	27.65	0.25	-	-	>1000	-	-	-
2	1125	27.65	0.50	-	-	>1000	-	-	-
3	1135	27.65	0.70	-	-	892	-	-	-
4	1145	27.65	0.90	-	-	737	-	-	-
5	1155	27.65	1.10	-	-	639	-	-	-
6	1205	27.65	1.30	-	-	507	-	-	-
7	1215	27.65	1.70	-	-	441	-	-	-
8	1225	27.65	2.20	-	-	342	-	-	-
9	1235	27.65	2.75	-	-	256	-	-	-

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: 000ppm (WH) 0.0ppm (BZ) / 1108 pump on - 1410 pump off

Analysis: ~~AK101~~ ~~AK102~~ AK103 ~~8260B~~ WS-LC-0029 (PFCs)

Add or remove analyses as needed.

Revised February 2010.

MB 8/17/16

ch2m

WELL DEVELOPMENT, cntd.

Well ID: MW-1

Instrument Observations

Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Cond (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (C)	ORP (mV)	
10	1245	27.65	3.25	-	-	~~179~~	-	-	-	
11	1255	27.65	3.60	-	-	137	-	-	-	
12	1305	27.65	4.00	-	-	91.5	-	-	-	
13	1315	27.65	4.25	-	-	76.9	-	-	-	
14	1325	27.65	4.60	-	-	67.6	-	-	-	
15	1335	27.65	5.00	-	-	52.9	-	-	-	
16	1340	27.65	5.50	7.67	1.03	37.6	0.53	7.1	-72.2	HOOK UP CELL
17	1345	27.65	5.90	7.25	1.03	37.2	0.19	7.0	-77.6	
18	1350	27.65	5.90	7.09	1.03	32.4	0.14	7.0	-79.7	
19	1355	27.65	6.75	7.05	1.03	28.6	0.11	6.9	-81.3	
20	1400	27.65	7.4	7.04	1.03	28.5	0.10	6.9	-82.6	
21	1405				COLLECT SAMPLE 3x CASING VOLUME					
22										
23										
24										
25										

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
2	250 ml	Poly	EVS-LC-0025 (PFCs)

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

CH2MHILL

SOP-12 Attachment 3

WELL PURGE AND SAMPLING DATASHEET

Well ID: H18-1

Project: JBER PFC | Date: 8-17-16

Project #: 666984.02.03.01 | Start Time: 1435

Field Team: M. Landon/HAL + A. Wieland/HAL | End Time: 1805

Sample ID: 1603H18-1-GW-0 | Time: 1755 | (primary) dup other: –

Sample ID: – | Time: – | primary dup other: –

Sample ID: – | Time: – | primary dup other: –

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

Well Information

Depth to Top of Product (FTOC):	–	Depth to Water (FTOC):	33.17
Depth to Oil/Water Interface (FTOC):	–	Total Depth (FTOC):	45.10
Casing diameter: (2 in.) 4 in.		Water Column (Ft):	11.93
gal/Ft of casing: (0.163) 0.653		Casing Volume (gal)	1.94
Pump Intake Depth	~39.10	Screen Interval	35.10 - 45.10
Stable DTW (FTOC):	33.18	Measured Stickup	Flush

Method of Purging (circle one)

Pump: SUB (BLDR) PERIST OTHER:
Pump Type: QED Sample Pro | Flow Rate (mL/min): 0.05
Pump Time: 178 | Vol. Purged (gals): 6.70

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

Criteria for Stable Parameters

Parameter	*Working Range (YSI 556MPS)*	*Stability Criteria*	*Depth to Water Stabilization* Time	DTW
Temperature	-5 to 45°C	± 1.0 °C		
pH	0 to 14 NTU	± 0.1		
Conductivity	0 to 200 mS/cm	± 3%		
ORP	-999 to +999 mV	± 10 mV		
Dissolved Oxygen	0 to 50 mg/L	± 10%		
Turbidity	0 to 1000 NTU	± 10% (≤10 NTU)		

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Conductivity (μS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*
1	1500	33.20	0.4	–	–	>1000	–	–	–
2	1510	33.20	1.1	–	–	>1000	–	–	–
3	1520	33.20	1.7	–	–	>1000	–	–	–
4	1530	33.20	2.1	–	–	>1000	–	–	–
5	1540	33.19	2.3	–	–	>1000	–	–	–
6	1550	33.19	~~2.8~~ 2.5	–	–	776	–	–	–
7	1600	33.19	2.7	–	–	640	–	–	–
8	1610	33.18	3.0	–	–	470	–	–	–
9	1620	33.18	3.3	–	–	439	–	–	–

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: 0.0 ppm (WH) 0.0 ppm (BZ) / 1453 pump ON - 1805 pump off

Analysis: ~~AK101~~ ~~AK102~~ ~~AK103~~ ~~8260B~~ WS-LL-0028 (PFCs)

Add or remove analyses as needed.

Revised February 2010.

MR 8/17/16

ch2m·

WELL DEVELOPMENT, cntd.

Well ID: LL16-1

Instrument Observations

Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Cond (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (C)	ORP (mV)	
10	1650	33.18	3.60	-	-	330	-	-	-	
11	1640	33.18	4.00	-	-	262	-	-	-	
12	1650	33.18	4.40	-	-	192	-	-	-	
13	1700	33.18	4.90	-	-	178	-	-	-	~~Hook up cell~~ (2)
14	1710	33.18	5.10	-	-	121	-	-	-	
15	1720	33.18	5.50	-	-	110	-	-	-	Hook up cell
16	1725	33.18	5.70	7.03	0.90	99.1	2.18	9.3	75.3	
17	1730	33.18	5.90	6.94	0.90	88.0	0.57	8.9	9.9	
18	1735	33.18	6.10	6.99	0.90	78.0	0.40	8.8	0.3	
19	1740	33.14	6.30	7.00	0.91	69.9	0.40	8.8	-8.4	
20	1745	33.18	6.50	7.01	0.91	73.4	0.44	8.7	-13.6	
21	1750	33.18	6.70	7.02	0.91	59.1	0.38	8.7	-16.0	
22	1755			Sample collection			3x Volume			
23										
24										
25										

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
2	250mL	Poly	WS-LL-0025 (PFCs)

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

SOP-12 Attachment 3

WELL PURGE AND SAMPLING DATASHEET 1 of 2

CH2MHILL

Well ID: CHD-1

Project: JBER PFC — Date: 8.18.16

Project #: 666984.0203.01 — Start Time: 0830

Field Team: M. LANDON / ANL & A. WIGLAND / ANL — End Time: 1045

Sample ID: 16083CHD-1-GW-0 — Time: 1040 — primary dup other: -

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

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

Filtered? Y/N — 0.45um/1.0um

Well Information

Depth to Top of Product (FTOC):		-	Depth to Water (FTOC):		10.96
Depth to Oil/Water Interface (FTOC):		-	Total Depth (FTOC):		23.62
Casing diameter:	2 in.	4 in.	Water Column (Ft):		12.66
gal/Ft of casing:	0.163	0.653	Casing Volume (gal)		2.06
Pump Intake Depth		18.62	Screen Interval		13.62 - 23.62
Stable DTW (FTOC):		10.95	Measured Stickup		3.5'

Method of Purging (circle one)

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

Pump Type: (2000 SAMPLE PRO) — Flow Rate (mL/min): 0.03 — Required Pulls: — Bailer Vol. (gals): 0.25/ 0.33

Pump Time: 105 — Vol. Purged (gals): 3.6 — Vol Purged (gals):

Criteria for Stable Parameters

Parameter	*Working Range (YSI 556MPS)*	*Stability Criteria*	*Depth to Water Stabilization* Time	DTW
Temperature	-5 to 45°C	± 1.0 °C		
pH	0 to 14 NTU	± 0.1		
Conductivity	0 to 200 mS/cm	± 3%		
ORP	-999 to +999 mV	± 10 mV		
Dissolved Oxygen	0 to 50 mg/L	± 10%		
Turbidity	0 to 1000 NTU	± 10% (≤10 NTU)		

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Conductivity (µS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*	
1	0850	10.95	0.1	-	-	272	-	-	-	
2	0900	10.95	0.4	-	-	191	-	-	-	
3	0910	10.95	0.75	-	-	160	-	-	-	
4	0920	10.95	1.10	-	-	131	-	-	-	
5	0930	10.95	1.40	-	-	82.5	-	-	-	
6	0940	10.95	1.70	-	-	52.5	-	-	-	Hook up cell
7	0945	10.95	1.90	6.56	0.673	46.9	6.46	10.3	35.8	
8	0950	10.95	2.10	6.28	0.669	36.2	0.30	10.2	26.6	
9	0955	10.95	2.30	6.22	0.666	29.8	0.19	10.1	19.7	

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: PID: 0.1 ppm (WH) 0.0 (BZ) / 0846 pump on - 1053 pump off

Analysis: ~~AK101~~ ~~AK102~~ ~~AK103~~ ~~8260B~~ WS-LC-0025 (PFCs)

Add or remove analyses as needed.

Revised February 2010.

mb 8/18/16

ch2m.

WELL DEVELOPMENT, cntd.

Well ID: CAD-1

Instrument Observations

Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Cond (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (C)	ORP (mV)
10	1000	10.95	2.50	6.22	0.667	26.0	0.16	10.2	17.5
11	1005	10.95	2.70	6.24	0.665	23.6	0.14	10.7	15.4
12	1010	10.95	2.80	6.28	0.663	21.3	0.15	11.6	11.6
13	1015	10.95	2.90	6.34	0.664	18.5	0.15	11.0	8.6
14	1020	10.95	3.10	6.38	0.665	17.1	0.15	11.0	9.4
15	1025	10.95	3.20	6.35	0.665	16.1	0.15	11.0	8.1
16	1030	10.95	3.40	6.36	0.664	12.5	0.15	11.0	7.7
17	1035	10.95	3.60	6.36	0.663	8.7	0.15	11.1	6.9
18	1040	SAMPLE COLLECTION							
19									
20									
21									
22									
23									
24									
25									

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
2	250ml	Poly	WS-LC-0025 (PFCs)

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

SOP-12 Attachment 3

WELL PURGE AND SAMPLING DATASHEET

CH2MHILL

Well ID: CHD-2

Project: JBER PFC

Project #: 666484.02.03.01

Date: 8.18.16

Start Time: 1112

End Time: 1251

Field Team: M. LANDON/ANC + A. WIGLAND/ANC

Sample ID: 161230HD-2-GW-0 Time: 1245 primary dup other: -

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

Sample ID: - Time: primary dup other:

Filtered? Y/N 0.45um/1.0um

Well Information

Depth to Top of Product (FTOC):	-	Depth to Water (FTOC):	11.59
Depth to Oil/Water Interface (FTOC):	-	Total Depth (FTOC):	23.30
Casing diameter:	2 in. (4 in.)	Water Column (Ft):	11.71
gal/Ft of casing:	0.163 0.653	Casing Volume (gal)	1.90
Pump Intake Depth	17.30	Screen Interval	13.30 - 23.30
Stable DTW (FTOC):	11.59	Measured Stickup	3.0'

Method of Purging (circle one)

Pump: SUB BLDR PERIST OTHER:

Pump Type: QED Sample Pro Flow Rate (mL/min): ~0.03

Pump Time: 77 min Vol. Purged (gals): 2.7

Bailer: TEFLON SS OTHER:

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

Vol Purged (gals):

Criteria for Stable Parameters

Parameter	*Working Range (YSI 556MPS)*	*Stability Criteria*	*Depth to Water Stabilization* Time	DTW
Temperature	-5 to 45°C	± 1.0 °C		
pH	0 to 14 NTU	± 0.1		
Conductivity	0 to 200 mS/cm	± 3%		
ORP	-999 to +999 mV	± 10 mV		
Dissolved Oxygen	0 to 50 mg/L	± 10%		
Turbidity	0 to 1000 NTU	± 10% (≤10 NTU)		

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Conductivity (µS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*	
1	1130	11.59	0.1	-	-	106.0	-	-	-	
2	1140	11.59	0.4	-	-	127.0	-	-	-	
3	1150	11.59	0.7	-	-	94.2	-	-	-	
4	1200	11.59	1.0	-	-	54.3	-	-	-	
5	1205	11.59	1.3	6.45	0.496	37.9	0.38	13.7	43.2	HOOK UP CELL
6	1210	11.59	1.5	6.45	0.500	36.1	0.30	13.6	33.9	
7	1215	11.59	1.7	6.42	0.499	28.6	0.29	13.9	31.7	
8	1220	11.59	1.9	6.44	0.500	25.0	0.28	13.8	29.1	
9	1225	11.59	2.1	6.43	0.500	21.7	0.29	13.6	29.0	

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: 0.0 ppm (WA) 0.0 (BZ) / 1126 pump on - 1251 pump off

Analysis: AK~~101~~ ~~AK102~~ AK103 ~~8260B~~

Add or remove analyses as needed.

Revised February 2010.

mb 8/18/16

ch2m.

WELL DEVELOPMENT, cntd.

2 of 2

Well ID: CMD-2

Instrument Observations

Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Cond (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (C)	ORP (mV)
10	1230	11.59	2.3	6.46	0.499	14.8	0.26	13.9	25.9
11	1235	11.59	2.5	6.50	0.501	13.9	0.29	13.8	23.5
12	1240	11.59	2.7	6.47	0.498	14.1	0.27	12.9	27.3
13	1245	SAMPLE COLLECTION							
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									

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
2	250ml	Poly	WS-LC-0025 (PFCs)

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

SOP-12 Attachment 3

WELL PURGE AND SAMPLING DATASHEET 1 of 2

CH2MHILL

Well ID: FSFS-1

Project: JBER PFC — Date: 8.19.16

Project #: 666884.02.0301 — Start Time: 0835

Field Team: M. LENNON/CH2M + A. WIGLAND/AECOM — End Time: 1044

Sample ID:	16083FSFS-1-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

Well Information

Depth to Top of Product (FTOC):		-	Depth to Water (FTOC):	27.33
Depth to Oil/Water Interface (FTOC):		-	Total Depth (FTOC):	43.30
Casing diameter:	2 in.	4 in.	Water Column (Ft):	15.97
gal/Ft of casing:	0.163	0.653	Casing Volume (gal)	2.60
Pump Intake Depth		37.30	Screen Interval	33.30 - 43.30
Stable DTW (FTOC):		27.40	Measured Stickup	3.0"

Method of Purging (circle one)

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

Pump Type: QED sample pro — Flow Rate (mL/min): 0.05 — Required Pulls: — Bailer Vol. (gals): 0.25/ 0.33

Pump Time: 103 — Vol. Purged (gals): 5.2 — Vol Purged (gals):

Criteria for Stable Parameters

Parameter	*Working Range (YSI 556MPS)*	*Stability Criteria*	*Depth to Water Stabilization* Time	DTW
Temperature	-5 to 45°C	± 1.0 °C		
pH	0 to 14 NTU	± 0.1		
Conductivity	0 to 200 mS/cm	± 3%		
ORP	-999 to +999 mV	± 10 mV		
Dissolved Oxygen	0 to 50 mg/L	± 10%		
Turbidity	0 to 1000 NTU	± 10% (≤10 NTU)		

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Conductivity (µS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*	
1	0820	27.36	0.3	-	-	71000	-	-	-	
2	0910	27.40	0.8	-	-	71000	-	-	-	
3	0920	27.40	1.4	-	-	224	-	-	-	
4	0930	27.40	1.9	-	-	123	-	-	-	
5	0940	27.40	2.5	-	-	57.3	-	-	-	
6	0945	27.40	2.7	6.60	0.74	44.3	0.60	9.4	159.6	← Hook up leak
7	0950	27.40	2.9	6.43	0.74	56.9	0.31	9.9	147.9	
8	0955	27.40	3.2	6.40	0.74	44.7	0.22	10.2	133.7	
9	1000	27.40	3.5	6.41	0.74	39.7	0.18	10.1	125.1	

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: DIO: 0.02ppm / 0851 pump ON - 1044 pump off

Analysis: AK101 ~~AK102~~ ~~AK103~~ ~~8260B~~ WS-LC-0025 (PFCs)

Add or remove analyses as needed.

Revised February 2010.

MB 8/19/16

ch2m·

WELL DEVELOPMENT, cntd.

Well ID: FSFS-1

Instrument Observations

Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Cond (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (C)	ORP (mV)
10	1005	27.40	3.8	6.43	0.74	27.6	0.19	10.0	117.7
11	1010	27.40	4.10	6.45	0.74	27.7	0.15	9.8	111.7
12	1015	27.40	4.40	6.47	0.73	21.8	0.14	9.9	106.0
13	1020	27.40	4.60	6.46	0.73	17.5	0.14	9.9	105.8
14	1025	27.40	4.90	6.49	0.73	18.7	0.14	9.9	103.2
15	1030	27.40	5.20	6.50	0.73	18.0	0.13	9.9	100.5
16	1035	Sample collection							
17									
18									
19									
20									
21									
22									
23									
24									
25									

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
2	250m	Poly	WS-LC-0025 (PFCs)

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

SOP-12 Attachment 3
WELL PURGE AND SAMPLING DATASHEET

CH2MHILL

Well ID: SS044-1

Project: JBER PFC Date: 8.19.16

Project #: 666984.02.03.01 Start Time: 1156

Field Team: M. Landon Farm & A. Wiblano End Time: 1415

Sample ID: 16BSS044-1-GW-0 Time: 1400 (primary) dup other: -

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

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

Filtered? Y (N) 0.45um/1.0um

Well Information

Depth to Top of Product (FTOC):	-	Depth to Water (FTOC):	13.77
Depth to Oil/Water Interface (FTOC):	-	Total Depth (FTOC):	23.25
Casing diameter: (2 in.) 4 in.		Water Column (Ft):	9.48
gal/Ft of casing: (0.163) 0.653		Casing Volume (gal)	1.54
Pump Intake Depth	17.25	Screen Interval	13.25 - 23.25
Stable DTW (FTOC):	13.80	Measured Stickup	Flush

Method of Purging (circle one)

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

Pump Type: QED Flow Rate (mL/min): 0.03 Required Pulls: Bailer Vol. (gals): 0.25/ 0.33

Pump Time: 108 Vol. Purged (gals): 4.1 Vol Purged (gals):

Criteria for Stable Parameters

Parameter	*Working Range (YSI 556MPS)*	*Stability Criteria*	*Depth to Water Stabilization* Time	DTW
Temperature	-5 to 45°C	± 1.0 °C		
pH	0 to 14 NTU	± 0.1		
Conductivity	0 to 200 mS/cm	± 3%		
ORP	-999 to +999 mV	± 10 mV		
Dissolved Oxygen	0 to 50 mg/L	± 10%		
Turbidity	0 to 1000 NTU	± 10% (≤10 NTU)		

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Conductivity (µS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*
1	1220	13.81	0.4	-	-	741	-	-	-
2	1230	13.80	6.6	-	-	302	-	-	-
3	1240	13.81	1.1	-	-	190	-	-	-
4	1250	13.81	1.5	-	-	115	-	-	-
5	1300	13.80	1.8	-	-	63.8	-	-	-
6	1310	13.80	2.2	-	-	55.7	-	-	-
7	1320	13.80	2.6	-	-	38.9	-	-	- (Hook up cell)
8	1325	13.80	2.8	6.62	0.133	26.7	11.43	9.2	175.2
9	1330	13.80	3.1	6.21	0.133	27.3	11.08	9.3	176.6

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: 0.0 ppm / 1212 pump on - 1415 pump off

Analysis: ~~AK101~~ ~~AK102~~ ~~AK103~~ ~~8260B~~ WS-LC-0025 (PFCs)

Add or remove analyses as needed.

MB 8/19/16

ch2m

WELL DEVELOPMENT, cntd.

Well ID: SS044-1

Instrument Observations

Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Cond (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (C)	ORP (mV)
10	1335	13.80	3.3	6.02	0.132	21.1	10.84	9.5	176.8
11	1340	13.40	3.5	5.90	0.132	18.5	10.84	9.3	182.2
12	1345	13.80	3.7	5.84	0.132	13.0	10.89	9.2	184.5
13	1350	13.80	3.9	5.82	0.132	11.5	10.80	9.4	184.3
14	1355	13.80	4.1	5.82	0.132	8.4	10.53	9.7	183.7
15	1400	SAMPLE COLLECTED							
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									

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
2	250ml	Poly	WS-LC-0025 (PFCs)

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

SOP-12 Attachment 3

WELL PURGE AND SAMPLING DATASHEET

1 of 2

CH2MHILL

Well ID: AT052-1

Project: JBER PFC

Project #: 666984.02.03.01

Field Team: M. LANDON/AWL + A. WIELAND/AWL

Date: 8.22.16

Start Time: 1333

End Time: 1745

Sample ID: 1623 AT052-1-GW-0 Time: 1735 primary dup other: -

Sample ID: 1623 AT052-1-GW-1 Time: 1740 primary dup other: -

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

Filtered? Y/N 0.45um/1.0um

Well Information

Depth to Top of Product (FTOC):		-	Depth to Water (FTOC):	173.68
Depth to Oil/Water Interface (FTOC):		-	Total Depth (FTOC):	198.40
Casing diameter:	2 in.	4 in.	Water Column (Ft):	24.72
gal/Ft of casing:	0.163	0.653	Casing Volume (gal)	4.02
Pump Intake Depth		~192.4	Screen Interval	188.4 - 198.4
Stable DTW (FTOC):		173.90	Measured Stickup	~3.0'

Method of Purging (circle one)

Pump: SUB BLDR PERIST OTHER:

Pump Type: QED Flow Rate (mL/min): ~0.03

Pump Time: 220 Vol. Purged (gals): 6.6

Bailer: TEFLON SS OTHER:

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

Vol Purged (gals):

Criteria for Stable Parameters

Parameter	*Working Range (YSI 556MPS)*	*Stability Criteria*	*Depth to Water Stabilization*	
			Time	DTW
Temperature	-5 to 45°C	± 1.0 °C		
pH	0 to 14 NTU	± 0.1		
Conductivity	0 to 200 mS/cm	± 3%		
ORP	-999 to +999 mV	± 10 mV		
Dissolved Oxygen	0 to 50 mg/L	± 10%		
Turbidity	0 to 1000 NTU	± 10% (≤10 NTU)		

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Conductivity (µS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*	
1	1420	173.85	0.1	-	-	17.1	-	-	-	
2	1425	173.89	0.2	7.54	0.96	48.5	13.27	8.1	168.1	HOOKE UP CELL
3	1430	173.89	0.4	7.55	0.97	544	13.40	8.0	166.3	ON AGGIE CELL
4	1440	173.89	0.7	-	-	>1000	-	-	-	
5	1450	173.89	1.0	-	-	>1000	-	-	-	
6	1500	173.86	1.3	-	-	>1000	-	-	-	
7	1510	173.98	1.7	-	-	>1000	-	-	-	
8	1520	173.90	2.1	-	-	>1000	-	-	-	
9	1530	173.90	2.3	-	-	>1000	-	-	-	

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: 0.0 ppm / pump on 1400 - 1740 pump off

Analysis: ~~AK101~~ ~~AK102~~ ~~AK103~~ ~~8260B~~ WS-LC-0025 (PFCs)

Add or remove analyses as needed.

Revised February 2010.

mB 8/22/16

ch2m·

WELL DEVELOPMENT, cntd.

Well ID: AT052-1

Instrument Observations

Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Cond (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (C)	ORP (mV)	
10	1540	~~2.6~~ 173.9	2.6	-	-	835	-	-	-	
11	1550	173.91	3.0	-	-	727	-	-	-	
12	1600	173.90	3.4	-	-	770	-	-	-	
13	1610	173.90	3.9	-	-	525	-	-	-	
14	1620	173.90	4.1	-	-	464	-	-	-	
15	1630	173.90	4.4	-	-	440	-	-	-	
16	1640	173.90	4.7	-	-	338	-	-	-	
17	1650	173.90	5.1	-	-	352	-	-	-	
18	1700	173.90	5.4	-	-	330	-	-	-	
19	1710	173.90	5.8	-	-	276	-	-	-	
20	1715	173.90	6.0	7.33	1.00	260	17.14	7.3	153.6	← Hook up Cell
21	1720	173.90	6.20	7.46	1.01	269	16.27	7.2	138.3	
22	1725	173.90	6.4	7.55	1.01	253	16.94	7.1	131.2	
23	1730	173.90	6.6	7.58	1.01	250	16.93	7.1	129.2	
24	1735				COLLECT	SAMPLE				
25										

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
4	250mL	PolY	WS-LC-0025 (PFCs)

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

SOP-12 Attachment 3

WELL PURGE AND SAMPLING DATASHEET

1 of 1

CH2MHILL

Well ID: 66355108-1

Project: JBER PFC

Date: 8.22.16

Project #: 666984.02.03.01

Start Time: 1056

Field Team: M. LANDON/AJC - A. WIGLAND/AWL

End Time: 1233

Sample ID: 166355108-1-GW-0	Time: 1225	primary	dup	other: -
Sample ID: -	Time: -	primary	dup	other: -
Sample ID: -	Time: -	primary	dup	other: -
-	Filtered? Y/N	0.45um/1.0um		

Well Information

Depth to Top of Product (FTOC):	-	Depth to Water (FTOC):	75.96 75.67
Depth to Oil/Water Interface (FTOC):	-	Total Depth (FTOC):	85.91
Casing diameter:	2 in. 4 in.	Water Column (Ft):	8.24
gal/Ft of casing:	0.163 0.653	Casing Volume (gal)	1.34
Pump Intake Depth	~80	Screen Interval	73.91 - 85.91
Stable DTW (FTOC):	75.66	Measured Stickup	~3.0'

Method of Purging (circle one)

Pump: SUB BLDR PERIST OTHER:

Pump Type: QED Flow Rate (mL/min): 0.03

Pump Time: 78 Vol. Purged (gals): 2.7

Bailer: TEFLON SS OTHER:

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

Vol Purged (gals):

Criteria for Stable Parameters

Parameter	*Working Range (YSI 556MPS)*	*Stability Criteria*	*Depth to Water Stabilization* Time	DTW
Temperature	-5 to 45°C	± 1.0 °C		
pH	0 to 14 NTU	± 0.1		
Conductivity	0 to 200 mS/cm	± 3%		
ORP	-999 to +999 mV	± 10 mV		
Dissolved Oxygen	0 to 50 mg/L	± 10%		
Turbidity	0 to 1000 NTU	± 10% (≤10 NTU)		

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Conductivity (µS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*	
1	1125	75.67	0.2	-	-	>1000	-	-	-	
2	1135	75.66	0.50	-	-	425	-	-	-	
3	1145	75.68	1.00	-	-	84.9	-	-	-	
4	1155	75.66	1.50	-	-	22.2	-	-	-	HOOK UP CELL
5	1200	75.66	1.70	6.97	0.338	3800	11.46	6.3	204.3	
6	1205	75.66	1.90	7.00	0.339	15.2	10.15	6.2	200.6	
7	1210	75.66	2.10	7.07	0.339	11.1	10.03	6.4	193.1	
8	1215	75.66	2.40	7.12	0.339	7.84	10.01	6.2	189.4	
9	1220	75.66	2.70	7.15	0.338	6.15	9.93	6.4	186.4	

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: 0.1 ppm (WH) 0.0 ppm (BZ) / 1115 pump on - 1225 pump off

Analysis: ~~AK101~~ ~~AK102~~ ~~AK103~~ ~~8260B~~ WS-LL-0025 (PFCs)

Add or remove analyses as needed.

Revised February 2010.

MB 8/22/16

SOP-12 Attachment 3

WELL PURGE AND SAMPLING DATASHEET

1 of 1

CH2MHILL

Well ID: FSS-1

Project: JBEL PFC

Project #: 666984.02.03.01

Field Team: M. LONDON/ANL & A. WIGLAND/DNL

Date: 8.22.16

Start Time: 0855

End Time: 1023

Sample ID: 16Q3FSS-1-GW-0 Time: 1020 primary dup other: -

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

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

Filtered? Y/N 0.45um/1.0um

Well Information

Depth to Top of Product (FTOC):	-	Depth to Water (FTOC):	122.35
Depth to Oil/Water Interface (FTOC):	-	Total Depth (FTOC):	136.05
Casing diameter:	2 in. (circled) / 4 in.	Water Column (Ft):	13.7
gal/Ft of casing:	0.163 / 0.653	Casing Volume (gal)	2.23
Pump Intake Depth	~130.05	Screen Interval	126.05 - 136.05
Stable DTW (FTOC):	122.35	Measured Stickup	-3.0'

Method of Purging (circle one)

Pump: SUB BLDR PERIST OTHER:

Pump Type: QED Flow Rate (mL/min): ~0.03

Pump Time: 65 Vol. Purged (gals): 1.90

Bailer: TEFLON SS OTHER:

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

Vol Purged (gals):

Criteria for Stable Parameters

Parameter	*Working Range (YSI 556MPS)*	*Stability Criteria*	*Depth to Water Stabilization* Time	DTW
Temperature	-5 to 45°C	± 1.0 °C		
pH	0 to 14 NTU	± 0.1		
Conductivity	0 to 200 mS/cm	± 3%		
ORP	-999 to +999 mV	± 10 mV		
Dissolved Oxygen	0 to 50 mg/L	± 10%		
Turbidity	0 to 1000 NTU	± 10% (≤10 NTU)		

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Conductivity (µS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*	
1	0935	122.34	0.25	-	-	77.0	-	-	-	
2	0945	122.38	0.66	-	-	6.58	-	-	-	
3	0950	122.36	0.90	6.35	0.267	3.76	6.99	8.1	250.5	Hook up Cell
4	0955	122.36	1.10	6.33	0.267	3.20	6.85	7.9	235.6	
5	1000	122.35	1.30	6.35	0.268	3.41	6.81	7.9	227.8	
6	1005	122.35	1.50	6.39	0.267	8.00	6.60	7.9	220.4	
7	1010	122.35	1.70	6.42	0.267	5.19	6.51	8.0	215.8	
8	1015	122.35	1.90	6.45	0.267	3.02	6.62	7.7	213.8	
9	1020				Sampling Collected					

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: 0.0ppm (WH) / Pump on 0910 - 1023 pump off

Analysis: ~~AK101~~ ~~AK102~~ ~~AK103~~ ~~8260B~~ WS-LL-0025 2 250mL Poly

Add or remove analyses as needed.

Revised February 2010.

MB 8/22/16

SOP-12 Attachment 3

WELL PURGE AND SAMPLING DATASHEET

1 of 1

CH2MHILL

Well ID: GS-1

Project: JBER PFC

Project #: 666984.02.03.01

Field Team: M. LANDON/MNL & A. WILLIAMS

Date: 8.23.16

Start Time: 0907

End Time: 1045

Sample ID: 166363-1-GW-0 Time: 1030 primary dup other: -

Sample ID: 166363-1-GW-DMS Time: 1030 primary dup other: MS

Sample ID: 166363-1-GW-DSD Time: 1030 primary dup other: MSD

Filtered? Y/N 0.45um/1.0um

Well Information

Depth to Top of Product (FTOC):	-	Depth to Water (FTOC):	85.79
Depth to Oil/Water Interface (FTOC):	-	Total Depth (FTOC):	96.40
Casing diameter:	2 in. / 4 in.	Water Column (Ft):	10.61
gal/Ft of casing:	0.163 / 0.653	Casing Volume (gal)	1.72
Pump Intake Depth	~90.4	Screen Interval	86.4 - 96.4
Stable DTW (FTOC):	85.80	Measured Stickup	~3.0'

Method of Purging (circle one)

Pump: SUB BLDR PERIST OTHER:

Pump Type: QED Flow Rate (mL/min): ~0.04

Pump Time: 61 Vol. Purged (gals): 3.0

Bailer: TEFLON SS OTHER:

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

Vol Purged (gals):

Criteria for Stable Parameters

Parameter	*Working Range (YSI 556MPS)*	*Stability Criteria*	*Depth to Water Stabilization* Time	DTW
Temperature	-5 to 45°C	± 1.0 °C		
pH	0 to 14 NTU	± 0.1		
Conductivity	0 to 200 mS/cm	± 3%		
ORP	-999 to +999 mV	± 10 mV		
Dissolved Oxygen	0 to 50 mg/L	± 10%		
Turbidity	0 to 1000 NTU	± 10% (≤10 NTU)		

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Conductivity (µS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*	
1	0935	85.82	0.4	-	-	821	-	-	-	
2	0945	85.80	0.9	-	-	256	-	-	-	
3	0955	85.80	1.4	-	-	48.4	-	-	-	
4	1000	~~85.80~~	1.6	8.24	0.262	26.5	10.76	6.9	156.8	← Hook up Leak
5	1005	85.80	1.9	7.62	0.262	14.3	10.44	6.9	161.1	
6	1010	85.80	2.1	7.47	0.263	12.3	10.45	6.9	163.3	
7	1015	85.80	2.4	7.34	0.263	11.5	10.39	6.8	165.2	
8	1020	85.80	2.7	7.29	0.263	7.00	10.41	6.8	166.3	
9	1025	85.80	3.0	7.26	0.263	3.99	10.41	6.9	167.3	

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: 0.1 ppm (WH) 0.0 (BZ) / 0924 pump on - 1045 pump off

Analysis: ~~AK101 AK102 AK103 8260B~~ WS-LC-0025 (PFCs)

Add or remove analyses as needed.

Revised February 2010.

MB 8/23/16

SOP-12 Attachment 3

WELL PURGE AND SAMPLING DATASHEET

1 of 1

CH2MHILL

Well ID: OU3MW-02 (CC-17 Debris Storage Yard)

Project: JBEL PFC

Project #: 666184.02.03.01

Field Team: M. LANDON/ANL + A. WIELAND/ANL

Sample ID: 1603OU3MW-02-GW-0

Sample ID: –

Sample ID: –

Date: 8.23.16

Start Time: 1146

End Time: 1235

Time: 1235 primary dup other: –

Time: – primary dup other: –

Time: – primary dup other: –

Filtered? Y/N 0.45um/1.0um

Well Information

Depth to Top of Product (FTOC):	–	Depth to Water (FTOC):	27.98
Depth to Oil/Water Interface (FTOC):	–	Total Depth (FTOC):	38.92
Casing diameter: 2 in. 4 in.		Water Column (Ft):	10.94
gal/Ft of casing: 0.163 0.653		Casing Volume (gal)	1.78
Pump Intake Depth	~35.0	Screen Interval	29-39
Stable DTW (FTOC):	27.98	Measured Stickup	FLUSH

Method of Purging (circle one)

Pump: SUB BLDR PERIST OTHER:

Pump Type: QED Flow Rate (mL/min): 0.04

Pump Time: 1205 Vol. Purged (gals): 1.6

Bailer: TEFLON SS OTHER:

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

Vol Purged (gals):

Criteria for Stable Parameters

Parameter	*Working Range (YSI 556MPS)*	*Stability Criteria*	*Depth to Water Stabilization* Time	DTW
Temperature	-5 to 45°C	± 1.0 °C		
pH	0 to 14 NTU	± 0.1		
Conductivity	0 to 200 mS/cm	± 3%		
ORP	-999 to +999 mV	± 10 mV		
Dissolved Oxygen	0 to 50 mg/L	± 10%		
Turbidity	0 to 1000 NTU	± 10% (≤10 NTU)		

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Conductivity (µS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*
1	1205	27.98	0.3	–	–	14.1	–	–	–
2	1210	27.98	0.6	7.67	0.589	9.62	0.63	9.7	173.9
3	1215	27.98	0.8	7.12	0.589	8.10	0.42	9.6	170.6
4	1220	27.98	1.1	6.92	0.588	7.78	0.28	9.6	167.9
5	1225	27.98	1.4	6.86	0.586	6.04	0.21	9.8	166.4
6	1230	27.98	1.6	6.83	0.586	5.05	0.17	9.7	165.3
7	1235				Sample collection				
8									
9									

Hook up Low

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: 0.0ppm / 1201 pump on - 1235 pump off

Analysis: ~~AK101~~ ~~AK102~~ ~~AK103~~ ~~8260B~~ WS-LC-0025 (PFCs)

Add or remove analyses as needed.

Revised February 2010.

MRB 8/23/16

SOP-12 Attachment 3

WELL PURGE AND SAMPLING DATASHEET

CH2MHILL

Well ID: AT029-1

Project: PFCSI- JBER, AT029 Date: 8.24.16

Project #: 666984.02.03.01 Start Time: 1155

Field Team: Annika Seay and Allison Wieland End Time: 1330

Sample ID: 16Q3AT029-1-GW-0 Time: 1315 (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

Well Information

Depth to Top of Product (FTOC):		NA	Depth to Water (FTOC):	152.84
Depth to Oil/Water Interface (FTOC):		NA	Total Depth (FTOC):	164.40
Casing diameter:	(2 in.)	4 in.	Water Column (Ft):	11.56
gal/Ft of casing:	0.163	0.653	Casing Volume (gal)	1.9
Pump Intake Depth (ft bgs FTOC)		~158	Screen Interval	154-164
Stable DTW (FTOC):		152.84	Measured Stickup	3 ft

Method of Purging (circle one)

Pump: SUB (BLDR) PERIST OTHER:

Pump Type: QED Well Wizard Flow Rate (mL/min): ~200

Pump Time: Vol. Purged (gals): ~2.10

Bailer: TEFLON SS OTHER:

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

~~Vol Purged (gals):~~

Criteria for Stable Parameters

Parameter	*Working Range (YSI 556MPS)*	*Stability Criteria*	*Depth to Water Stabilization* Time	DTW
Temperature	-5 to 45°C	± 1.0 °C		
pH	0 to 14 NTU	± 0.1	1250	152.82
Conductivity	0 to 200 mS/cm	± 3%	1255	152.84
ORP	-999 to +999 mV	± 10 mV	1300	152.82
Dissolved Oxygen	0 to 50 mg/L	± 10%	1305	152.86
Turbidity	0 to 1000 NTU	± 10% (≤10 NTU)	1310	152.84

Instrument Observations

Round	*Time*	*Water Level (ft BTOC)*	*Volume Purged (gallons)*	*pH*	*Conductivity (µS/cm)*	*Turbidity (NTU)*	*DO (mg/L)*	*Temp (C)*	*ORP (mV)*
1	1240	152.84	0.60	7.78	0.266	62.2	16.98	9.8	215.2
2	1245	152.80	0.85	7.58	0.268	40.3	10.24	10.0	204.7
3	1250	152.82	1.10	7.51	0.268	31.1	10.28	10.0	198.8
4	1255	152.84	1.35	7.48	0.268	22.4	10.58	10.0	190.3
5	1300	152.82	1.60	7.50	0.269	18.4	10.99	9.8	186.0
6	1305	152.86	1.85	7.51	0.268	11.0	11.00	9.9	183.7
7	1310	152.84	2.10	7.54	0.269	9.73	11.01	9.9	181.1
8	1315								sample
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: ~0.6 gallons purged before YSI readings began

Analysis: AK101 AK102 AK103 8260B (WS-LC-0025 (PFCs))

Add or remove analyses as needed.

Revised February 2010.

mB 8/24/16

CH2MHILL

SOP-12 Attachment 3

WELL PURGE AND SAMPLING DATASHEET

Well ID: FP56

Project: PFCSI-JBER, FTØ23 Date: 8.24.16

Project #: 666984.02.03.01 Start Time: 1455

Field Team: Annika Seay and Allison Wieland End Time:

Sample ID: 16Q3FP56-GW-Ø Time: 173Ø (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

Well Information

Depth to Top of Product (FTOC):		NA	Depth to Water (FTOC):	41.46
Depth to Oil/Water Interface (FTOC):		NA	Total Depth (FTOC):	~~49.29~~ 49.29
Casing diameter:	2 in.	(4 in.)	Water Column (Ft):	7.83
gal/Ft of casing:	0.163	(0.653)	Casing Volume (gal)	5.11
Pump Intake Depth		~44.29	Screen Interval	NA
Stable DTW (FTOC):		42.15	Measured Stickup	flush

Method of Purging (circle one)

Pump: SUB (BLDR) PERIST OTHER: Bailer: ~~TEFLON SS OTHER:~~

Pump Type: QED Well Wizard Flow Rate (mL/min): ~200 ~~Required Pulls: Bailer Vol. (gals): 0.25/0.33~~

Pump Time: Vol. Purged (gals): ~~Vol Purged (gals):~~

Criteria for Stable Parameters

Parameter	Working Range (YSI 556MPS)	Stability Criteria	Depth to Water Stabilization Time	DTW
Temperature	-5 to 45°C	± 1.0 °C	1705	42.15
pH	0 to 14 NTU	± 0.1	1710	42.15
Conductivity	0 to 200 mS/cm	± 3%	1715	42.15
ORP	-999 to +999 mV	± 10 mV	1720	42.15
Dissolved Oxygen	0 to 50 mg/L	± 10%	1725	42.15
Turbidity	0 to 1000 NTU	± 10% (≤10 NTU)		

Instrument Observations

Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Conductivity (µS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (C)	ORP (mV)
1	1525	42.~~14~~ Ø8	Ø.5	7.66	Ø.Ø26	44.8	1Ø.~~Ø4~~ 64	11.7	168.6
2	153Ø	42.~~14~~ Ø8	Ø.75	7.29	Ø.Ø25	5Ø.3	1Ø.64	11.3	178.1
3	1535	42.Ø8	1.ØØ	7.Ø2	Ø.Ø26	75.9	1Ø.64	11.6	187.3
4	154Ø	42.15	1.25	6.95	Ø.Ø26	72.4	1Ø.64	11.4	187.5
5	1545	42.15	1.5Ø	6.85	Ø.Ø26	7Ø.9	1Ø.22	1Ø.5	189.1
6	155Ø	42.15	1.75	6.7Ø	Ø.Ø26	68.7	1Ø.Ø1	1Ø.3	185.Ø
7	1555	42.15	2.ØØ	6.6Ø	Ø.Ø27	63.3	9.78	1Ø.2	173.4
8	16ØØ	42.15	2.25	6.51	Ø.Ø27	58.2	9.5Ø	1Ø.2	168
9	16Ø5	42.15	2.5Ø	6.37	Ø.Ø27	7Ø.Ø	8.67	1Ø.3	162.8

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: ~ Ø.5 gallons purged before readings were recorded

Analysis: AK101 AK102 AK103 8260B (WS-LC-ØØ25 (PFCs))

Add or remove analyses as needed.

MB 8/24/16

ch2m

WELL DEVELOPMENT, cntd.

Well ID: FP5L

Instrument Observations

Round	Time	Water Level (ft BTOC)	Volume Purged (gallons)	pH	Cond (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (C)	ORP (mV)
10	1610	42.15	2.75	6.31	0.028	60.7	8.67	10.3	161.9
11	1615	42.15	3.00	6.28	0.028	57.5	8.67	10.2	159.0
12	1620	42.15	3.25	6.21	0.028	52.8	8.15	10.2	157.6
13	1625	42.15	3.50	6.21	0.028	51.1	8.04	10.2	155.0
14	1630	42.15	3.75	6.17	0.029	46.3	7.65	10.2	153.3
15	1635	42.15	4.00	6.14	0.029	46.9	7.66	10.3	151.5
16	1640	42.15	4.25	6.07	0.029	47.4	7.62	10.4	149.4
17	1645	42.15	4.50	~~5.73~~ 5.11	0.029	51.5	7.16	10.8	139.0
18	1650	42.15	4.75	6.11	0.030	47.5	7.16	10.3	140.5
19	1655	42.15	5.00	5.89	0.031	45.8	7.15	10.0	136.2
20	1700	42.15	5.25	5.95	0.031	44.1	6.53	10.1	135.4
21	1705	42.15	5.50	5.99	0.032	41.9	6.54	10.3	134.1
22	1710	42.15	5.75	5.97	0.032	41.8	6.54	10.3	129.8
23	1715	42.15	6.00	5.94	0.033	38.8	6.54	10.4	129.9
24	1720	42.15	6.25	5.87	0.033	38.3	6.53	10.3	133.1
25	1725	42.15	6.50	5.99	0.034	38.2	6.53	10.2	125.5

Notes: Draw-down should ideally be less than 0.3 feet from the original depth to groundwater. 1730 → sample
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
2	250mL	Poly	WS-LC-0025 (PFCs)

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

WELL PURGE AND SAMPLING FIELD SHEET

Well ID: FS4-1

Project: JBER PFCS - Fire Station 4

Date: 9.19.16 ~~AJS~~

Start Time: ~~1154~~ ~~AJS~~ 1155

Field Team: ~~16Q3FS4-1-GW-Ø AJS~~ Annika Seay & Mike Landon

End Time: 1320

Sample ID: 16Q3FS4-1-GW-Ø — Time: 1310 (primary) dup other: NA

Sample ID: 16Q3FS4-1-GW-1 — Time: 1315 primary (dup) other: NA

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

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

Depth to Top of Product (FTOC):			NA	Depth to Water (FTOC):	62.55
Depth to Oil/Water Interface (FTOC):			NA	Total Depth (FTOC):	75.84
Casing diameter:	1 in.	(2 in.)	4 in.	Water Column (Ft):	13.29
gal/Ft of casing:	0.041	(0.163)	0.653	Casing Volume (gal)	~~2.16~~ AJS 2.16
Pump Intake Depth			~~70.84~~	Screen Interval	66-76
Stable DTW (FTOC):			62.60	Measured Stickup	3 ft

Method of Purging (circle one)

Pump: SUB (BLDR) PERIST OTHER:

Pump Type: QED well wizard

Pump Time: 1 hr 25 min

Flow Rate (gpm): Ø.Ø5

Vol. Purged (gals): 3.25

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* Time	DTW
Temperature	>0.00 °C	± 3% or min 0.2 °C	1250	62.60
pH	0-14	± 0.1	1255	62.60
Conductivity	0-9.99 S/m	± 3%	1300	62.60
Dissolved Oxygen	0-19.99 mg/L	± 10%	1305	62.60
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	1240	6276.0	2.0	8.47	Ø.438	25.2	7.45	7.9	126.6
2	1245	62.60	2.25	8.13	Ø.437	23.6	6.72	7.9	119.8
3	1250	62.60	2.50	7.99	Ø.436	21.5	5.97	8.0	101.6
4	1255	62.60	2.75	7.98	Ø.435	20.1	4.56	8.1	100.4
5	1300	62.60	3.0	7.99	Ø.435	20.0	4.54	8.2	16.0
6	1305	62.60	3.25	8.00	Ø.436	18.0	4.54	8.2	-7.7
7	1310								→ sample
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: ~ 2 gallons purged by first YSI reading

MB 9/19/16

ch2m

WELL PURGE AND SAMPLING FIELD SHEET

Well ID: CHD-4

Project: JBER PFC SI
b66984.02.03.01

Date: 9/29/16 (MB) ~~10/4/16~~ 10/3

Start Time: 0920 (9/29/16)

Field Team: M Bruno / S Stibrich / M Landon

End Time: 1045 ~~10/4/16~~ 10/3/16 (MB)

Sample ID: 16Q3 CHD-4-GW-Φ — Time: 1033 (primary) dup other: N/A

Sample ID: 16Q3 CHD-4-GW-1 — Time: 1038 primary (dup) other: N/A

Sample ID: N/A — Time: N/A primary dup other: N/A

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

Depth to Top of Product (FTOC):		N/A	Depth to Water (FTOC):	2.13
Depth to Oil/Water Interface (FTOC):		N/A	Total Depth (FTOC):	30.20
Casing diameter:	1 in.	(2 in.) 4 in.	Water Column (Ft):	28.07
gal/Ft of casing:	0.041	(0.163) 0.653	Casing Volume (gal)	4.58
Pump Intake Depth ~~ft btoc~~		19	Screen Interval ~~ft btoc~~	10.20 - 30.20
Stable DTW (FTOC):		N/A	Measured Stickup	1.20

Method of Purging (circle one)

Pump: SUB BLDR (PERIST) OTHER:
Pump Type: Geo pump II Flow Rate (gpm): 0.10
Pump Time: 1001 Vol. Purged (gals): 2.0

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

Criteria for Stable Parameters

Parameter	*Working Range*	*Stability Criteria*	*Depth to Water Stabilization* Time	DTW
Temperature	>0.00 °C	± 3% or min 0.2 °C		
pH	0-14	± 0.1		
Conductivity	0-9.99 S/m	± 3%		
Dissolved Oxygen	0-19.99 mg/L	± 10%		(MB)
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)*
9/29/16 1	0946	2.11	Φ	Begin purging well		1000	dry		
9/29/16 2	1000	726.5	6.75				well	purged dry	
10/4/16 3	0955	2.13							
4	1001	Begin	purging						
5	1032		1.5	9.73	0.92	171	7.96	7.9	145.3
6	1033	collect sample & FD							
7	1040		2.0	8.92	0.91	165	9.31	8.9	150.7
8									
9									

Allow well to recharge
well recharged

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:

Appendix A-2
Boring Logs, Well Construction Diagrams, and Well Development Logs

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	AT029-1	SHEET 1 OF 7

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Ruff Road Fire Training Area

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1702609.90 — NORTHING (NAD83 SPZN4 feet): 2656179.90

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Downhole Hammer, Geoprobe 8040DT — GROUND SURFACE ELEVATION: 395.6 (ft)

WATER LEVEL: 149.1 feet bgs — START : 7/15/2016 — END : 7/16/2016 — LOGGER : R. Caird

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
				WELL-GRADED SAND WITH GRAVEL (SW), dark brown, poorly graded fine, rounded to angular, granite gravel, fine to coarse dry, loose, subangular sand, no cementation, no staining, no odor **WELL-GRADED GRAVEL WITH SAND (GW)**, olive gray, fine to coarse, subangular, dry to damp, weak to moderate cementation, medium dense, lenses of dense, coarse, platy gravel, no odor, fine to coarse, angular to rounded gravel	0.0	0.0	Begin drilling with 2" Macrocorer; 0-15 ft bgs described from Macrocore sample
				No recovery			
5				**SILTY SAND (SM)**, dark yellowish brown, fine to coarse, well-graded, subangular to subrounded sand, low plasticity, rapid dilatancy, moist to wet, loose, weak cementation, homogenous fines, no staining, no odor **WELL-GRADED GRAVEL WITH SAND (GW)**, olive gray, dry to damp, medium dense, fine to coarse, subangular, weak to moderate cementation, lenses of dense, coarse, platy gravel, no odor, fine to coarse, angular to rounded gravel	0.0	0.0	
		16Q3AT029-1-SO-0, 16Q3AT029-1-SO-1					Collect ISM wedge core sample and field duplicate from 0-15 ft bgs
10				**WELL-GRADED SAND WITH GRAVEL (SW)**, olive gray, damp, medium dense to dense, weak to strong cementation, lenses of well-graded gravel with sand (gravel fine to coarse well-rounded to angular, 3-6" thick), no staining, no odor with fine, rounded to angular, poorly graded gravel - as above, dry to damp	0.0	0.0	
15					0.0	0.0	No lithologic logging from 15 ft bgs to 125 ft bgs, unable to log drill cuttings after switching to downhole hammer.
20					0.0		
25							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	AT029-1	SHEET 2 OF 7

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Ruff Road Fire Training Area

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1702609.90 — NORTHING (NAD83 SPZN4 feet): 2656179.90

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Downhole Hammer, Geoprobe 8040DT — GROUND SURFACE ELEVATION: 395.6 (ft)

WATER LEVEL: 149.1 feet bgs — START : 7/15/2016 — END : 7/16/2016 — LOGGER : R. Caird

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
					0.0		
30					0.0		No lithologic logging from 15 ft bgs to 125 ft bgs, unable to log drill cuttings
35					0.0		
40					0.0		Weak to moderate hydrocarbon odor observed from 40-45 ft bgs
45					0.0		
50							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	AT029-1	SHEET 3 OF 7

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Ruff Road Fire Training Area

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1702609.90 — NORTHING (NAD83 SPZN4 feet): 2656179.90

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Downhole Hammer, Geoprobe 8040DT — GROUND SURFACE ELEVATION: 395.6 (ft)

WATER LEVEL: 149.1 feet bgs — START : 7/15/2016 — END : 7/16/2016 — LOGGER : R. Caird

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
					0.0		No lithologic logging from 15 ft bgs to 125 ft bgs, unable to log drill cuttings
55					0.0		Moderate hydrocarbon odor observed from 55 to 57 ft bgs
60					0.0		
65					0.0		
70					0.0		
75							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	AT029-1	SHEET 4 OF 7

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Ruff Road Fire Training Area

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1702609.90 — NORTHING (NAD83 SPZN4 feet): 2656179.90

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Downhole Hammer, Geoprobe 8040DT — GROUND SURFACE ELEVATION: 395.6 (ft)

WATER LEVEL: 149.1 feet bgs — START : 7/15/2016 — END : 7/16/2016 — LOGGER : R. Caird

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
					0.0		
80					0.0		No lithologic logging from 15 ft bgs to 125 ft bgs, unable to log drill cuttings
85					0.0		
90					0.0		
95					0.0		
100							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	AT029-1	SHEET 5 OF 7

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Ruff Road Fire Training Area

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1702609.90 — NORTHING (NAD83 SPZN4 feet): 2656179.90

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Downhole Hammer, Geoprobe 8040DT — GROUND SURFACE ELEVATION: 395.6 (ft)

WATER LEVEL: 149.1 feet bgs — START : 7/15/2016 — END : 7/16/2016 — LOGGER : R. Caird

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
					0.0		No lithologic logging from 15 ft bgs to 125 ft bgs, unable to log drill cuttings
105					0.0		
110					0.0		
115					0.0		
120					0.0		
125							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	AT029-1	SHEET 6 OF 7

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Ruff Road Fire Training Area

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1702609.90 — NORTHING (NAD83 SPZN4 feet): 2656179.90

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Downhole Hammer, Geoprobe 8040DT — GROUND SURFACE ELEVATION: 395.6 (ft)

WATER LEVEL: 149.1 feet bgs — START : 7/15/2016 — END : 7/16/2016 — LOGGER : R. Caird

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
				WELL-GRADED GRAVEL WITH SAND (GW), olive gray, dry to damp sand, fine to coarse, rounded to angular gravel	0.0		Cuttings observed from hammer. Unable to determine density, cementation and structure
130					0.0		
135				- as above, damp	0.0		
							Stopped drilling at 138 ft bgs on 7/15/16 at 16:15 and resumed 7/16/16 at 09:10
					0.1		Resume drilling with downhole hammer and 4" OD casing
140					0.2		
145					0.2		
							Groundwater encountered at 149.1 ft bgs
150							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	AT029-1	SHEET 7 OF 7

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Ruff Road Fire Training Area

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1702609.90 — NORTHING (NAD83 SPZN4 feet): 2656179.90

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Downhole Hammer, Geoprobe 8040DT — GROUND SURFACE ELEVATION: 395.6 (ft)

WATER LEVEL: 149.1 feet bgs — START : 7/15/2016 — END : 7/16/2016 — LOGGER : R. Caird

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
155				**POORLY GRADED SAND WITH GRAVEL (SP)**, olive gray, fine to medium, subangular to subrounded, moist to wet sand with no staining and no odor fine, round, poorly graded gravel	0.2 0.2		Monitoring well installed at this location. Screened interval from 150-160 ft bgs. See monitoring well construction diagram for further details.
160					0.2		
				WELL-GRADED GRAVEL WITH SAND (GW), olive gray, damp sand, fine, rounded to angular gravel	0.0		
165				Boring terminated at 163 feet.			
170							
175							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	AT052-1	SHEET 1 OF 3

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Landfill Fire Training Area

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1695013.70 — NORTHING (NAD83 SPZN4 feet): 2658365.80

DRILLING METHOD AND EQUIPMENT : Direct Push/Hollow Stem Auger (6.5"), Downhole Hammer (4.5") Geoprobe 8040DT — GROUND SURFACE ELEVATION: 342.3 (ft)

WATER LEVEL: 180.0 feet bgs — START : 7/5/2016 — END : 8/6/2016 — LOGGER : K. Butler

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
0				**WELL-GRADED SAND WITH GRAVEL (SW)**, very dark brown, moist - as above, dark gray, fine to coarse sand with gray gravel up to 2"	0.0	0.0	Begin drilling with 2.25" Macrocorer; 0-15 ft described from Macrocore sample
5				**WELL-GRADED GRAVEL WITH SAND (GW)**, dark greenish gray, slightly moist, fine to coarse sand, round gravel from 1/2 to over 2"	0.0	0.0	
10		16Q3AT052-1-SO-0			0.0	0.0	Collect ISM wedge core sample from 0-15 ft bgs
15				- as above	0.0	0.0	Switched to hollow stem auger, observations from 15-50 ft described from cuttings
20					0.0	0.0	
25					0.0	0.0	
30					0.0	0.0	
35					0.0	0.0	
40					0.0	0.0	
45					0.0	0.0	
50				- as above	0.0	0.0	Boring terminated at 50 ft bgs on 7/5/16; 8/4/16 Reattempt well installation using down hole hammering; 8/6/16 Well installation begins again
55					0.0	0.0	
60					0.0	0.0	Observations from downhole hammer cuttings
65							
70							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	AT052-1	SHEET 2 OF 3

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Landfill Fire Training Area

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1695013.70 — NORTHING (NAD83 SPZN4 feet): 2658365.80

DRILLING METHOD AND EQUIPMENT : Direct Push/Hollow Stem Auger (6.5"), Downhole Hammer (4.5"), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 342.3 (ft)

WATER LEVEL: 180.0 feet bgs — START : 7/5/2016 — END : 8/6/2016 — LOGGER : K. Butler

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
75					0.0	0.0	
80				**WELL-GRADED GRAVEL WITH SAND (GW)**, dark greenish gray, slightly moist, fine to coarse sand, round gravel from 1/2 to over 2"	0.0	0.0	Observations from downhole hammer cuttings
85							
90					0.0	0.0	
95							
100					0.0	0.0	
105							
110					0.0	0.0	
115							
120					0.0	0.0	
125							
130					0.0	0.0	
135							
140							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	AT052-1	SHEET 3 OF 3

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Landfill Fire Training Area

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1695013.70 — NORTHING (NAD83 SPZN4 feet): 2658365.80

DRILLING METHOD AND EQUIPMENT : Direct Push, Downhole Hammer and Hollow Stem Auger (6.5 inch), Geoprobe 8040DTGROUND SURFACE ELEVATION: 342.3 (ft)

WATER LEVEL: 180.0 feet bgs — START : 7/5/2016 — END : 8/6/2016 — LOGGER : K. Butler

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
145					0.0	0.0	
				SILT (ML), gray, nonplastic, noncohesive, loose, no staining, no odor with fine, moist, subangular, poorly graded sand			
150					0.0	0.0	Observations from downhole hammer cuttings
155							
160					0.0	0.0	
165				**POORLY GRADED SAND (SP)**, very dark gray, moist, medium grained, no staining, no odor, medium density, with trace fines			
170					0.0	0.0	
175							
180					0.0	0.0	Groundwater encountered at 180 ft bgs
185				**SILTY SAND (SM)**, light olive brown, fine grained, poorly graded, subangular sand with nonplastic, noncohesive, medium density fines with no staining, no color			
190					0.0	0.0	Monitoring well installed at this location. Screened interval from 189.5-199.5 ft bgs. See monitoring well construction diagram for further details.
				SILT (ML), olive brown, nonplastic, noncohesive, loose, moist fines with no staining, no odor			
195							
200					0.0	0.0	
				Boring terminated at 199.5 feet.			
205							
210							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	CASTA-1	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Current AFFF Spray Test Area

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1667856.01 — NORTHING (NAD83 SPZN4 feet): 2646235.21

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (6 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 152.4 (ft)

WATER LEVEL: 11.5 feet bgs — START : 7/13/2016 — END : 7/13/2016 — LOGGER : R. Caird

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
				SILTY SAND (SM), dark brown, fine to coarse, subangular to subround sand with fine, poorly graded, subround gravel and low plasticity, dry, loose fines with no cementation, no staining, no odor	0.0	0.0	
				WELL-GRADED SAND WITH GRAVEL (SW), olive gray, fine to coarse, dry, subangular to subround, loose sand, no cementation, no staining, no odor, fine to coarse, well-graded, subangular to angular gravel			
5		16Q3CASTA-1-SO-0		**WELL-GRADED GRAVEL WITH SAND (GW)**, olive gray, fine to coarse, subround to angular gravel, fine to coarse, damp, subangular to subround, loose to medium dense sand, lenses (3" thick) of well-graded sand, no staining, no odor	0.0	0.0	Collected ISM wedge core sample from 0-10 ft bgs
				- as above, moist			
10					0.0	0.0	
				WELL-GRADED SAND WITH GRAVEL (SW), dark olive gray, fine to coarse, damp, subangular to subround, loose to medium dense sand, lenses (3" thick) of well-graded, wet to saturated sand, fine to coarse, angular to subangular gravel, no staining, no odor			Groundwater observed from 11.5-15 ft bgs (end of continuous core)
				- as above, wet to saturated, no lenses, fine, poorly graded gravel, no cementation, 6" lense of well-graded sand			
15				- as above, saturated	0.0	0.0	Switched to hollow stem auger - observations from cuttings Monitoring well installed at this location. Screened interval from 15-25 ft bgs. See monitoring well construction diagram for further details.
20					0.0	0.0	
25					0.0	0.0	
				Boring terminated at 25 feet.			
30							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	CCH-1	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Corrosion Control Hangar (Building 6263)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1669078.30 — NORTHING (NAD83 SPZN4 feet): 2644746.30

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (6 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 151.6 (ft)

WATER LEVEL: 33.0 feet bgs — START : 7/7/2016 — END : 7/7/2016 — LOGGER : R. Caird

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
				SILTY SAND (SM), dark brown, fine to coarse sand, well-graded, subround to rounded, loose, dry, no plasticity, rapid dilatancy, no cementation, homogenous, no odor, no staining, roots and organic material present first 3"	0.0	0.0	Begin drilling with 2" Macrocorer; 0-15 ft described from Macrocore sample
				WELL-GRADED GRAVEL WITH SILT AND SAND (GW-GM), olive gray, fine to coarse, well-graded, subangular to rounded, medium dense sand, no plasticity, weak to no cementation, no staining, no odor, fine to medium gravel			
5				**WELL-GRADED GRAVEL WITH SAND (GW)**, olive gray, dry, very fine to coarse, well-graded, subround to rounded, medium dense to dense, weak to strongly cemented sand lensed with pockets of well-graded sand, no odor, no staining, fine to coarse, angular to subround gravel	0.0	0.0	
		16Q3CCH-1-SO-0, 16Q3CCH-1-SO-1					Collect ISM wedge core sample and duplicate from 0-15 ft bgs
10					0.0	0.0	
				- as above, damp			
				POORLY GRADED SAND (SP), olive gray, fine to medium grained, poorly graded, subrounded sand, very loose, moist, no cementation, homogeneous, no staining, no odor			
15				**WELL-GRADED GRAVEL WITH SAND (GW)**, olive gray, damp, very fine to coarse, well-graded, subround to rounded, medium dense to dense, weak to strongly cemented sand lensed with pockets of well-graded sand, no odor, no staining, fine to coarse, angular to subround gravel	0.0	0.0	Switched to hollow stem auger, observations described from cuttings
				- as above, contains cobbles			
20					0.0	0.0	
25							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	CCH-1	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Corrosion Control Hangar (Building 6263)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1669078.30 — NORTHING (NAD83 SPZN4 feet): 2644746.30

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (6 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 151.6 (ft)

WATER LEVEL: 33.0 feet bgs — START : 7/7/2016 — END : 7/7/2016 — LOGGER : R. Caird

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
				WELL-GRADED GRAVEL WITH SAND (GW), as above, fine to coarse, well rounded to angular gravel with cobbles up to 4"	0.0	0.0	
30					0.0	0.0	
				- as above, wet			Groundwater encountered at 33 ft bgs; Monitoring well installed at this location. Screened interval from 33-43 ft bgs. See monitoring well construction diagram for further details.
35					0.0	0.0	
40					0.0	0.0	
				WELL-GRADED GRAVEL WITH SILT AND SAND (GW-GM), olive gray, saturated, fine to medium gravel with fine to coarse grained, well-graded, subangular to round, medium dense, more silt with no plasticity, rapid dilatancy, weak to no cementation, no staining/odor	0.0	0.0	
45				Boring terminated at 43 feet.			
50							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	CFTA-1	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Current Fire Training Area

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1681292.60 — NORTHING (NAD83 SPZN4 feet): 2652938.10

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (6.5 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 245.5 (ft)

WATER LEVEL: 70.0 feet bgs — START : 6/29/2016 — END : 7/2/2016 — LOGGER : K. Butler

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
				WELL-GRADED SAND WITH GRAVEL (SW), very dark gray, moist, fine to coarse, angular sand, medium density, gravel up to 1.5", rounded, fines	0.0	0.0	Begin drilling with 2" Macrocorer; 0-15 ft described from Macrocore sample
5					0.0	0.0	Slight color change to dark brown
		16Q2CFTA-1-SO-0, 16Q2CFTA-1-SO-0MS, 16Q2CFTA-1-SO-0SD					Collect ISM wedge core sample, MS, and SD from 0-15 ft bgs
10				- as above, gravel up to 2"	0.0	0.0	
15					0.0	0.0	Used auger from 15-80 ft bgs to set well
20				- as above, gravel up to 3"	0.0	0.0	
25					0.0	0.0	
				WELL-GRADED GRAVEL (GW), gray, dry, gravel up to 2", rounded	0.0	0.0	Rough patch of drilling
30					0.0	0.0	Slightly easier drilling
35				- as above, moist, gravel up to 1"			
40							
45							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	CFTA-1	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Current Fire Training Area

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1681292.60 — NORTHING (NAD83 SPZN4 feet): 2652938.10

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (6.5 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 245.5 (ft)

WATER LEVEL: 70.0 feet bgs — START : 6/29/2016 — END : 7/2/2016 — LOGGER : K. Butler

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
50				**WELL-GRADED GRAVEL (GW)**, gray, moist, gravel up to 1", rounded	0.0	0.0	
55							
60					0.0	0.0	
65							
70							▼ Groundwater encountered at 70 ft bgs; Monitoring well installed at this location. Screened interval from 70-80 ft bgs. See monitoring well construction diagram for further details.
75							
80							
				Boring terminated at 82 feet.	0.0	0.0	
85							
90							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	CFTA-2	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Current Fire Training Area

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1681199.50 — NORTHING (NAD83 SPZN4 feet): 2653248.70

DRILLING METHOD AND EQUIPMENT : Direct Push, Geoprobe 8040DT — GROUND SURFACE ELEVATION: 242.3 (ft)

WATER LEVEL: 71.0 feet bgs — START : 6/22/2016 — END : 6/23/2016 — LOGGER : J. Olsen

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
				LEAN CLAY WITH SAND AND GRAVEL (CL), moist, firm, medium/low plasticity, high organic material present **WELL-GRADED SAND WITH SILT AND GRAVEL (SW)**, olive gray, fine to coarse sand, loose, dry, occasional cobble larger than macrocore liner diameter (3 in)	0.0		
5				**WELL-GRADED SAND WITH SILT AND GRAVEL (SW)**, increasing gravel, fine to coarse gravel, subrounded to subangular cobbles	0.0		
		16Q3CFTA-2-SO-0					Collect wedge sample 0-15 bgs
10				- as above, gravel quanity and size decrease, no cobbles	0.0		
15				Not sampled from 15-55 ft bgs			Drilling same as above
							Hard drilling
20							Softer drilling
25							Hard drilling
30							
35							
40							
45							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	CFTA-2	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Current Fire Training Area

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1681199.50 — NORTHING (NAD83 SPZN4 feet): 2653248.70

DRILLING METHOD AND EQUIPMENT : Direct Push, Geoprobe 8040DT — GROUND SURFACE ELEVATION: 242.3 (ft)

WATER LEVEL: 71.0 feet bgs — START : 6/22/2016 — END : 6/23/2016 — LOGGER : J. Olsen

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
50				Not sampled from 15-55 ft bgs			
55				**SILTY SAND WITH GRAVEL (SM)**, olive gray, dry, very dense, well-graded sand, well-graded, fine to medium, subrounded to subangular gravel	0.0		
60				- as above, moist	0.0		
65				- as above	0.0		Very little recovery. Drilling similar to above
70				No recovery	0.0		Drilling much faster than above. Pushed rock in shoe. Liner had water on it; No water observed when water level measured. ▼ Groundwater encountered at 71 ft bgs; Monitoring well installed at this location. Screened interval from 71-81 ft bgs. See monitoring well construction diagram for further details.
75				**SILTY SAND WITH GRAVEL (SM)**, olive gray, wet, dense, well-graded sand, well-graded subrounded to subangular gravel			Drilling similar to 70-75 ft bgs
80					0.0		
85				Boring terminated at 85 feet.			
90							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	CFTA-3	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Current Fire Training Area

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1681424.00 — NORTHING (NAD83 SPZN4 feet): 2652582.00

DRILLING METHOD AND EQUIPMENT : Direct Push, Geoprobe 8040DT — GROUND SURFACE ELEVATION: 240.7 (ft)

WATER LEVEL: 69.0 feet bgs — START : 6/24/2016 — END : 6/25/2016 — LOGGER : J. Olsen

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
				SILTY SAND WITH GRAVEL (SM), olive gray, dry, dense, well-graded, subrounded to subangular gravel, occassional cobbles larger than sampler	0.0		4" of asphalt; Liner was stuck in sampler. Will resample with macrocorer
		16Q3CFTA-3-SO-0					Collect ISM wedge core sample from 0-5 ft bgs, 1 ft NW of CFTA-3 with macrocorer
5					0.0		
							2" rust colored layer
10					0.0		1" rust colored layer
15				Not sampled from 15-65 ft bgs			Drilled similar to above
20							
25							
30							
35							
40							Drilled slightly faster 40-45 ft bgs
45							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	CFTA-3	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Current Fire Training Area

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1681424.00 — NORTHING (NAD83 SPZN4 feet): 2652582.00

DRILLING METHOD AND EQUIPMENT : Direct Push, Geoprobe 8040DT — GROUND SURFACE ELEVATION: 240.7 (ft)

WATER LEVEL: 69.0 feet bgs — START : 6/24/2016 — END : 6/25/2016 — LOGGER : J. Olsen

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
50				Not sampled from 15-65 ft bgs			Drilled similar to above
55							Drilled very slow
							Stopped drilling on 6/24/16, resumed 6/25/16
60				**SILTY SAND WITH GRAVEL (SM)**, olive gray, dry, very dense, well-graded sand, well-graded subrounded to subangular gravel with occasional cobble larger than sampler	0.0		Driller switched to macrocorer because drilling was too slow at 60 ft bgs
65				- as above			Began driling much faster; CH2M decision to sample beginning at 65 ft to determine water table
70					0.0		Groundwater encountered at 69 ft bgs; Monitoring well installed at this location. Screened interval from 69-79 ft bgs. See monitoring well construction diagram for further details.
75							Change back to point to keep shoe from getting plugged to set well
80				Boring terminated at 80 feet.			
85							
90							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	CHD-1	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Cherry Hill Ditch (SD052)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1664749.31 — NORTHING (NAD83 SPZN4 feet): 2646420.20

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (8 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 143.3 (ft)

WATER LEVEL: 10.0 feet bgs — START : 7/29/2016 — END : 7/29/2016 — LOGGER : K. Butler

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
		NO SAMPLES		**SANDY ORGANIC SOIL (OL-OH)**, black, well-graded, fine to coarse, loose, moist sand with organic material present throughout, nonplastic, noncohesive **WELL-GRADED SAND WITH GRAVEL (SW)**, dark olive brown, fine to coarse, loose, subangular, moist sand, fine to medium, subround gravel, no staining, no odor	0.0	0.0	Soil logged from auger cuttings from 0 ft bgs to total depth
5				**WELL-GRADED SAND (SW)**, very dark gray, fine to coarse, loose, subangular, moist sand, no staining, no odor	0.0	0.0	
10					0.0	0.0	Groundwater encountered at 10 ft bgs; Monitoring well installed at this location. Screened interval from 10-20 ft bgs. See monitoring well construction diagram for further details.
15					0.0	0.0	
20					0.0	0.0	
					0.0	0.0	
				Boring terminated at 21 feet.			
25							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	CHD-2	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Cherry Hill Ditch (SD052)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1664862.61 — NORTHING (NAD83 SPZN4 feet): 2645317.29

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (8 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 140.6 (ft)

WATER LEVEL: 10.0 feet bgs — START : 7/29/2016 — END : 7/29/2016 — LOGGER : K. Butler

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
				SILTY SAND WITH GRAVEL (SM), dark olive brown, moist, fine to coarse, subangular, loose sand, nonplastic, noncohesive fines, fine to medium, subround gravel, no staining, no odor	0.0	0.0	Soil logged from auger cuttings from 0 ft bgs to total depth
		NO SAMPLES					
5					0.0	0.0	
				WELL-GRADED SAND (SW), very dark gray, moist, fine to coarse, subangular, loose sand, fine, subround gravel, no staining, no odor			
10					0.0	0.0	Groundwater encountered at 10 ft bgs; Monitoring well installed at this location. Screened interval from 10-20 ft bgs. See monitoring well construction diagram for further details.
15					0.0	0.0	
20					0.0	0.0	
					0.0	0.0	
				Boring terminated at 21 feet.			
25							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	CHD-3	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Cherry Hill Ditch (SD052)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1663598.12 — NORTHING (NAD83 SPZN4 feet): 2643912.90

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (8 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 130.6 (ft)

WATER LEVEL: 6.0 feet bgs — START : 7/28/2016 — END : 7/28/2016 — LOGGER : K. Butler

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
		16Q3CHD-3-SO-0, 16Q3CHD-3-SO-1		**SANDY ORGANIC SOIL (OL-OH)**, very dark grayish brown, moist, fine to coarse, subangular, loose sand with root material throughout, no staining, no odor	0.0	0.0	0-5 ft bgs recovered less than 16" of material on 1st attempt with macrocorer; Step over and retry Collect ISM wedge core sample from 0-1 ft bgs
				GRAVELY SILT WITH SAND (ML), very dark gray, nonplastic, noncohesive, moist, medium density, fine to coarse, subangular, well-graded sand, fine, subround to subangular, poorly sorted gravel, no staining, no odor			
				WELL-GRADED GRAVEL (GW), gray, fine to medium, subround, loose gravel, no staining, no odor No recovery			
5				**WELL-GRADED GRAVEL (GW)**, as above	0.0	0.0	
				SILTY GRAVEL WITH SAND (GM), very dark grayish brown, fine, subround, medium density gravel, fine to coarse, well-graded, subangular sand, no staining, no odor			
				SILTY SAND WITH GRAVEL (SM), very dark gray, fine to coarse, wet, subround to subangular, medium density sand, fine, subround, poorly graded gravel, nonplastic, noncohesive fines, no staining, no odor No recovery			Monitoring well installed at this location. Screened interval from 7-17 ft bgs. See monitoring well construction diagram for further details.
10				**WELL-GRADED SAND (SW)**, very dark gray, fine to coarse, wet, subangular, medium density sand, no staining, no odor	0.0	0.0	
15					0.0	0.0	15 to 17.5 ft bgs described from cuttings
					0.0	0.0	
				Boring terminated at 17.5 feet.			
20							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	CHD-4	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Cherry Hill Ditch (SD052)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1661782.05 — NORTHING (NAD83 SPZN4 feet): 2643426.00

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (8 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 30.9 (ft)

WATER LEVEL: 9.0 feet bgs — START : 7/30/2016 — END : 7/30/2016 — LOGGER : K. Butler

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
		16Q3CHD-4-SO-0		**SILTY SAND (SM)**, very dark gray, fine grained, moist, angular, loose to medium density sand, nonplastic, noncohesive fines, no staining, no odor **SILTY SAND WITH GRAVEL (SM)**, very dark gray, fine to coarse, moist, subangular, medium density sand with nonplastic, noncohesive fines and fine to medium, subround gravel with no staining, no odor - as above, wet	0.0	0.0	Lithology described from auger cuttings from 0-21 ft bgs Collect hand augered sample from 0-2 ft bgs
5				**SILT (ML)**, very dark greenish gray, nonplastic, noncohesive, moist, loose to medium density fines, fine grained, angular to subangular sand, fine to medium, subround gravel	0.0	0.0	
							Groundwater encountered at 9 ft bgs
10					0.0	0.0	Monitoring well installed at this location. Screened interval from 10-20 ft bgs. See monitoring well construction diagram for further details.
15					0.0	0.0	
20					0.0	0.0	
					0.0	0.0	
				Boring terminated at 21 feet.			
25							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	CHD-4a	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Cherry Hill Ditch (SD052)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1661781.73 — NORTHING (NAD83 SPZN4 feet): 2643424.50

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (6.25 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 30.5 (ft)

WATER LEVEL: Not Encountered — START : 8/27/2016 — END : 8/27/2016 — LOGGER : M. Bruno

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
				SILTY SAND (SM), very dark gray, moist, fine grain sand, no staining, no odor	0.0	0.0	Lithology described from hollow stem auger cuttings
				SILTY SAND WITH GRAVEL (SM), very dark gray, moist, fine to medium sand, fine to coarse, subround gravel, no staining, no odor			
				SILT (ML), very dark greenish gray, moist, noncohesive, nonplastic silt, fine sand, fine to coarse, subround gravel			
5					0.0	0.0	
							Monitoring well installed at this location. Screened interval from 8.6-28.6 ft bgs. See monitoring well construction diagram for further details.
10				- as above, fine to medium gravel	0.0	0.0	
15				**SILT (ML)**, very dark greenish gray, wet, cohesive, nonplastic silt, fine sand, fine to medium, subround gravel	0.0	0.0	
20					0.0	0.0	
							Hard/slow drilling
25					0.0	0.0	
					0.0	0.0	Easier drilling
					0.0	0.0	
30				Boring terminated at 29 feet.			
35							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	E3-1	SHEET 1 OF 3

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site E3/AWACS Crash Location

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1682277.50 — NORTHING (NAD83 SPZN4 feet): 2655061.20

DRILLING METHOD AND EQUIPMENT : Direct Push,Hollow Stem Auger (8 inch), Downhole Hammer, Geoprobe 8040DT — GROUND SURFACE ELEVATION: 252.3 (ft)

WATER LEVEL: 82.5 feet bgs — START : 8/10/2016 — END : 8/13/2016 — LOGGER : K. Butler

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
				FILL, WELL-GRADED GRAVEL WITH SAND (GW), very dark grayish brown, moist, medium to loose, fine to coarse, angular to subround gravel, fine to coarse, angular to subangular, well-graded sand, trace fines, no staining, no odor, few cobbles	0.0	0.0	Lithology described from auger cuttings from surface to total depth Fill material from 0-15 ft bgs
5					0.0	0.0	
10					0.0	0.0	
15				**SILT (ML)**, brown, moist, loose, low plasticity, noncohesive fines, fine to medium, poorly graded sand, no staining, no odor	0.0	0.0	Very hard drilling from 14.5-15 ft bgs (15 minutes for 0.5 ft) Transition from fill to native material
20					0.0	0.0	
		16Q3E3-1-SO-0					Collect ISM wedge core sample from 15-30 ft bgs
25				**GRAVELLY SILT (ML)**, brown, moist, medium density, nonplastic, noncohesive fines, fine to coarse, subround gravel, fine to medium, subangular sand, no odor, no staining	0.0	0.0	
30				**SILTY GRAVEL (GM)**, very dark grayish brown, moist, medium density, fine to coarse, subround, well-graded gravel, fine to coarse, subangular, well-graded sand, nonplastic, noncohesive fines, no staining, no odor	0.0	0.0	Intermittent hard drilling from 30-66 ft bgs
35							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	E3-1	SHEET 2 OF 3

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site E3/AWACS Crash Location

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1682277.50 — NORTHING (NAD83 SPZN4 feet): 2655061.20

DRILLING METHOD AND EQUIPMENT : Direct Push,Hollow Stem Auger (8 inch), Downhole Hammer, Geoprobe 8040DT — GROUND SURFACE ELEVATION: 252.3 (ft)

WATER LEVEL: 82.5 feet bgs — START : 8/10/2016 — END : 8/13/2016 — LOGGER : K. Butler

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
					0.0	0.0	
40				**SILTY GRAVEL (GM)**, as above	0.0	0.0	
45					0.0	0.0	
50					0.0	0.0	
55					0.0	0.0	Very little cuttings, possibly in water
60					0.0	0.0	
65					0.0	0.0	
70							Original boring terminated at 66 ft bgs on 8/10/16 8/13/16 - Well redrilled using down hole hammer, from 66-93 ft bgs

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	E3-1	SHEET 3 OF 3

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site E3/AWACS Crash Location

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1682277.50 — NORTHING (NAD83 SPZN4 feet): 2655061.20

DRILLING METHOD AND EQUIPMENT : Direct Push,Hollow Stem Auger (8 inch), Downhole Hammer, Geoprobe 8040DT — GROUND SURFACE ELEVATION: 252.3 (ft)

WATER LEVEL: 82.5 feet bgs — START : 8/10/2016 — END : 8/13/2016 — LOGGER : K. Butler

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
					0.0	0.0	
75					0.0	0.0	
80					0.0	0.0	
85				**SILTY GRAVEL (GM)**, very dark grayish brown, wet, medium density, fine to coarse, subround, well-graded gravel, fine to coarse, subangular, well-graded sand, nonplastic, noncohesive fines, no staining, no odor	0.0	0.0	Monitoring well installed at this location. Screened interval from 82-92 ft bgs. See monitoring well construction diagram for further details. Moist at 82.5 ft bgs with groundwater coming out with cuttings after letting the well sit for a few minutes
90					0.0	0.0	
					0.0	0.0	
95				Boring terminated at 93 feet.			
100							
105							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	FASTA-1	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Former AFFF Spray Test Area

DRILLING CONTRACTOR : GeoTek Alaska, Inc — NORTHING (NAD83 AKSPZ8, feet): 2646482.51 — EASTING (NAD83 AKSPZ8, feet): 1667002.34

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (6 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 151.3 (ft)

WATER LEVEL: 24.0 feet bgs — START : 7/11/2016 — END : 7/11/2016 — LOGGER : R. Caird

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
				WELL-GRADED SAND WITH SILT AND GRAVEL (SM), olive gray, fine to coarse subangular sand, fine to coarse, subround, well-graded gravel, low plasticity, dry, loose, weak cementation fines, no odor, no staining	0.0	0.0	Begin drilling with 2" Macrocorer; 0-15 ft described from Macrocore sample
				WELL-GRADED GRAVEL WITH SAND (GW), olive gray, dry, fine to coarse, subangular, medium density sand, weak cementation, fine to coarse, angular to subround gravel			
5				- as above, dark yellowish brown, Mno staining and organic material present - as above, olive gray, no Mno staining or organic material present	0.0	0.0	
		16Q3FASTA-1-SO-0		**WELL-GRADED SAND WITH GRAVEL (SW)**, dark olive gray, damp to moist, fine to coarse, angular to subangular, medium density, medium cementation, lenses of well-graded gravel, FeO and MnO staining, no odor, fine to coarse (up to 0.75"), angular to subround, well-graded gravel			Collect ISM wedge core sample from 0-15 ft bgs
10				- as above, moist to wet **WELL-GRADED SAND WITH SILT AND GRAVEL (SW-SM)**, olive gray, wet to saturated, fine to coarse subangular sand, lenses of well-graded gravel, fine to coarse, subround, well-graded gravel, low plasticity, loose, weak cementation fines, no odor, no staining	0.0	0.0	
				SILT (ML), very dark gray, very fine, poorly graded, subround, medium soft to firm, low plasticity, medium dilatancy, damp to moist fines, moderate cementation, no staining, no odor, massive			
15					0.0	0.0	Switched to hollow-stem auger - observations from cuttings
20				**WELL-GRADED GRAVEL WITH SAND (GW)**, olive gray, wet to saturated, fine to coarse, well-graded, subangular to subround, wet to saturated sand, no odor, fine to coarse, angular to rounded gravel up to 2"	0.0	0.0	

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	FASTA-1	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Former AFFF Spray Test Area

DRILLING CONTRACTOR : GeoTek Alaska, Inc — NORTHING (NAD83 AKSPZ8, feet): 2646482.51 — EASTING (NAD83 AKSPZ8, feet): 1667002.34

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (6 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 151.3 (ft)

WATER LEVEL: 24.0 feet bgs — START : 7/11/2016 — END : 7/11/2016 — LOGGER : R. Caird

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
25				**WELL-GRADED SAND WITH GRAVEL AND SILT (SW-SM)**, olive gray, wet to saturated, fine to coarse, loose, well-graded, subround sand, fine to coarse, subangular to round gravel up to 1.75", no odor	0.0	0.0	Groundwater encountered in cuttings at 24 ft bgs; Monitoring well installed at this location. Screened interval from 24-34 ft bgs. See monitoring well construction diagram for further details.
30				- as above, saturated	0.0	0.0	
35				**WELL-GRADED SAND WITH SILT (SW-SM)**, olive gray, saturated, fine to coarse, loose, well-graded, subround sand, no odor Boring terminated at 34.5 feet.	0.0	0.0	
					0.0	0.0	
40					0.0	0.0	Original boring terminated at 40 ft bgs; Backfilled with native soil from 40-34.5 ft bgs.

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	FS1-1	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Fire Station 1 (Building 11415)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1672186.91 — NORTHING (NAD83 SPZN4 feet): 2648438.63

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (8 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 177.5 (ft)

WATER LEVEL: 23.1 feet bgs — START : 7/20/2016 — END : 7/20/2016 — LOGGER : R. Caird

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
				WELL-GRADED SAND WITH GRAVEL (SW), dark olive gray, fine to coarse, damp, very loose, homogenous sand, fine to coarse, subround gravel, no staining, no odor	0.0	0.0	0-15 ft bgs logged and sampled from Macrocore sampler
				SILT WITH SAND (ML), dark grayish brown, low plasticity, rapid dilatency, soft, weak cementation, moist, homogenous fines, very fine to fine, poorly graded, subround sand, no odor			
				WELL-GRADED GRAVEL WITH SAND (GW), olive gray, dry, fine to coarse, well-graded, angular to subangular, medium dense sand, FeO staining (trace), weak cementation, no odor, fine to coarse, round to angular gravel			
				No recovery			
5				**WELL-GRADED GRAVEL WITH SAND (GW)**, olive gray, damp to moist, lenses (4" thick) of fine to coarse, well-graded, subangular to subround, loose, homogenous sand, weak cementation, no odor, fine to coarse, round to angular gravel	0.0	0.0	
							Collect ISM wedge core sample from 0-15 ft bgs
10					0.0	0.0	
				- as above, damp, and lenses (3" thick) of FeO staining throughout			
				- as above, angular to subangular sand and angular to subangular gravel			
15					0.0	0.0	Switched to hollow stem auger - observations from cuttings
				WELL-GRADED GRAVEL WITH SAND (GW), dark olive brown, damp, fine to coarse, well-graded, rounded to subangular, loose, homogenous sand, lenses (4" thick), weak cementation, no odor, lense (3" thick) of FeO staining throughout, fine to coarse, rounded to subangular gravel			
20				- as above	0.0	0.0	

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	FS1-1	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Fire Station 1 (Building 11415)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1672186.91 — NORTHING (NAD83 SPZN4 feet): 2648438.63

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (8 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 177.5 (ft)

WATER LEVEL: 23.1 feet bgs — START : 7/20/2016 — END : 7/20/2016 — LOGGER : R. Caird

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
							Groundwater encountered at 23.1 ft bgs
25					0.0	0.0	Monitoring well installed at this location. Screened interval from 24-34 ft bgs. See monitoring well construction diagram for further details.
30				**WELL-GRADED GRAVEL WITH SAND (GW)**, dark olive brown, moist, lenses (4" thick) of fine to coarse, well-graded, rounded to subangular, loose, homogenous sand, weak cementation, no odor, lenses (3" thick) of FeO staining throughout, fine to coarse, well-rounded to subrounded gravel	0.0	0.0	
35				Boring terminated at 34 feet.	0.0	0.0	Boring backfilled with native soil from 41-34 ft bgs
40					0.0	0.0	
					0.0	0.0	Original boring terminated at 41 ft bgs

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	FS4-1	SHEET 1 OF 3

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Fire Station 4 (Building 654)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1695860.80 — NORTHING (NAD83 SPZN4 feet): 2650545.20

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (6.5 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 317.3 (ft)

WATER LEVEL: 62.0 feet bgs — START : 7/6/2016 — END : 7/6/2016 — LOGGER : K. Butler

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
				ORGANIC SOIL WITH SAND (OL/OH), moist **WELL-GRADED SAND WITH GRAVEL (SW)**, brown, moist, fine to medium sand, gravel up to 1.5"	0.0	0.0	0-15 ft described from Macrocore liners
				WELL-GRADED SAND WITH SILT AND GRAVEL (SW-SM), brown, moist, fine to medium sand, nonplastic fines			
5				**WELL-GRADED SAND WITH GRAVEL (SW)**, dark gray, dry, fine to coarse sand with dark greenish gray gravel up to 2"	0.0	0.0	
		16Q3FS4-1-SO-0					Collect ISM wedge core sample from 0-15 ft bgs
10					0.0	0.0	
15				- as above	0.0	0.0	Switched to hollow stem auger, observations from cuttings from 15-83 ft bgs
20							
25							
30							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	FS4-1	SHEET 2 OF 3

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Fire Station 4 (Building 654)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1695860.80 — NORTHING (NAD83 SPZN4 feet): 2650545.20

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (6.5 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 317.3 (ft)

WATER LEVEL: 62.0 feet bgs — START : 7/6/2016 — END : 7/6/2016 — LOGGER : K. Butler

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
35				**WELL-GRADED SAND WITH GRAVEL (SW)**, as above	0.0	0.0	
40							
45				- as above	0.0	0.0	
50							
55				**WELL-GRADED SAND WITH GRAVEL (SW)**, dark gray, dry, fine to coarse sand with dark greenish gray gravel up to 1"	0.0	0.0	
60							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	FS4-1	SHEET 3 OF 3

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Fire Station 4 (Building 654)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1695860.80 — NORTHING (NAD83 SPZN4 feet): 2650545.20

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (6.5 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 317.3 (ft)

WATER LEVEL: 62.0 feet bgs — START : 7/6/2016 — END : 7/6/2016 — LOGGER : K. Butler

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
				- as above	0.0	0.0	
							Groundwater encountered at 62 ft bgs. Monitoring well installed at this location 7/6/16-7/7/16 . Screened interval from 62-72 ft bgs. See monitoring well construction diagram for further details.
65							
70					0.0	0.0	
				SANDY SILT (ML), dark grayish brown, moist, fine to course grain sand, non-low plastic fines			
					0.0	0.0	Original boring abandoned, step over and redrilled to 73 ft bgs
				Boring terminated at 73 feet.			
75							
80					0.0	0.0	
							Original boring terminated at 83.5 ft bgs
85							
90							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	FS5-1	SHEET 1 OF 3

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Fire Station 5 (Building 48010)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1700205.02 — NORTHING (NAD83 SPZN4 feet): 2653714.93

DRILLING METHOD AND EQUIPMENT : Direct Push, Hollow Stem Auger (8 inch), Downhole Hammer, Geoprobe 8040DT — GROUND SURFACE ELEVATION: 358.8 (ft)

WATER LEVEL: 122.2 feet bgs — START : 7/12/2016 — END : 7/12/2016 — LOGGER : R. Caird

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
		16Q3FS5-1-SO-0		**WELL-GRADED SAND WITH SILT (SW-SM)**, dark yellowish brown, fine to coarse, subangular to subround sand, fine, poorly graded, subround gravel, dry, loose fines, no plasticity, no cementation, no staining, no odor	0.0	0.0	0-15 ft bgs logged and sampled from Macrocore sampler Collect ISM wedge core sample from 0-3.5 ft bgs
				WELL-GRADED SAND WITH GRAVEL (SW), as above, fine to coarse, well-graded, angular to round gravel			Groundwater observed from 3.5-7 ft bgs
5				**SILTY SAND (SM)**, olive brown, fine to coarse, subangular to subround sand, no plasticity, wet, loose, weak cementation, MnO staining, no odor	0.0	0.0	
				WELL-GRADED GRAVEL (GW), olive gray, fine to coarse, subangular to subround sand, fine to coarse, angular to subangular gravel, dry, medium dense, moderate cementation, no staining, no odor			
10				- as above, FeO and MnO staining, 2" thick water (wet) lenses	0.0	0.0	
				- as above, no lenses			
15				- as above	0.0	0.0	
				WELL-GRADED SAND WITH GRAVEL (SW), olive, fine to coarse, subangular to subround sand, wet, loose, weak cementation, MnO staining			Groundwater observed from 17-20 ft bgs, end of continuous cores
20				- as above, moist	0.0	0.0	Observations from cuttings
25					0.0	0.0	
					0.0	0.0	Original boring terminated at 27 ft bgs; Abandon boring backfill with bentonite chips Switched to downhole hammer to total depth
30							
35							Cuttings not observed 27 ft bgs to 134 ft bgs
40							
45							
50							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	FS5-1	SHEET 2 OF 3

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Fire Station 5 (Building 48010)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1700205.02 — NORTHING (NAD83 SPZN4 feet): 2653714.93

DRILLING METHOD AND EQUIPMENT : Direct Push, Hollow Stem Auger (8 inch), Downhole Hammer, Geoprobe 8040DT — GROUND SURFACE ELEVATION: 358.8 (ft)

WATER LEVEL: 122.2 feet bgs — START : 7/12/2016 — END : 7/12/2016 — LOGGER : R. Caird

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
55							Cuttings not observed to 134 ft bgs
60							
65							
70							
75							
80							
85							
90							
95							
100							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	FS5-1	SHEET 3 OF 3

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Fire Station 5 (Building 48010)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1700205.02 — NORTHING (NAD83 SPZN4 feet): 2653714.93

DRILLING METHOD AND EQUIPMENT : Direct Push, Hollow Stem Auger (8 inch), Downhole Hammer, Geoprobe 8040DT — GROUND SURFACE ELEVATION: 358.8 (ft)

WATER LEVEL: 122.2 feet bgs — START : 7/12/2016 — END : 7/12/2016 — LOGGER : R. Caird

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
105							Cuttings not observed to 134 ft bgs
110							
115							
120							
125							Water encountered at 122.2 ft bgs Monitoring well installed at this location. Screened interval from 122.75-132.75 ft bgs. See monitoring well construction diagram for further details.
130							
135				Boring terminated at 134 feet.			
140							
145							
150							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	FS6-1	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Fire Station 6 (Building 9311)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1679113.68 — NORTHING (NAD83 SPZN4 feet): 2652167.19

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (8 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 218.6 (ft)

WATER LEVEL: 50.0 feet bgs — START : 8/9/2016 — END : 8/9/2016 — LOGGER : K. Butler

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
				ORGANIC SOIL (OL-OH), very dark gray, organic soil, moist, nonplastic, noncohesive	0.0	0.0	0-15 ft bgs logged and sampled from Macrocore sampler
				WELL-GRADED SAND WITH GRAVEL (SW), olive brown, moist, fine to coarse, subangular, loose sand, fine to medium, subround gravel, no staining, no odor			
				- as above, dry			
				No recovery			
5				**WELL-GRADED SAND WITH GRAVEL (SW)**, olive brown, dry, fine to coarse, subangular, medium density sand, fine to coarse, subround gravel, no staining, no odor	0.0	0.0	
		16Q3FS6-1-SO-0					Collect ISM wedge core sample from 0-15 ft bgs
10				- as above, moist	0.0	0.0	
15				- as above, dry	0.0	0.0	Switched to hollow stem auger - observations from cuttings
20					0.0	0.0	
				WELL-GRADED GRAVEL WITH SAND (GW), very dark grayish brown, moist, fine to coarse, subangular sand, fine to medium, subround, loose gravel, no staining, no odor			
25					0.0	0.0	
30				- as above, coarse gravel	0.0	0.0	
35							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	FS6-1	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Fire Station 6 (Building 9311)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1679113.68 — NORTHING (NAD83 SPZN4 feet): 2652167.19

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (8 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 218.6 (ft)

WATER LEVEL: 50.0 feet bgs — START : 8/9/2016 — END : 8/9/2016 — LOGGER : K. Butler

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
					0.0	0.0	
40				**WELL-GRADED GRAVEL WITH SAND (GW)**, as above	0.0	0.0	
45					0.0	0.0	
50					0.0	0.0	Groundwater encountered at 50 ft bgs Monitoring well installed at this location. Screened interval from 51.4-61.4 ft bgs. See monitoring well construction diagram for further details.
55					0.0	0.0	
60					0.0	0.0	
					0.0	0.0	
65				Boring terminated at 63 feet.			
70							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	FS7-1	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Fire Station 7 (Building 14431)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1672689.65 — NORTHING (NAD83 SPZN4 feet): 2650718.25

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (8 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 189.7 (ft)

WATER LEVEL: 29.1 feet bgs — START : 7/18/2016 — END : 7/18/2016 — LOGGER : R. Caird

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
				WELL-GRADED SAND WITH GRAVEL (SW), olive gray, fine to coarse, subangular to subround, dry, weak cementation, loose sand, fine to coarse, well-graded, angular to subround gravel, no staining, no odor - as above, with medium dense to loose, damp to moist lenses of well-graded gravel with sand	0.0	0.0	0-15 ft bgs logged and sampled from Macrocore sampler
5				**WELL-GRADED GRAVEL WITH SAND (GW)**, olive brown, fine to coarse, angular to subround gravel, fine to coarse, subangular to subround, moist, loose to medium dense sand, weak cementation, FeO staining, no odor	0.0	0.0	
				SANDY SILT (ML), olive brown, fine to medium, poorly graded, subround sand, low plasticity, rapid dilatancy, soft weak cementation, wet, no staining, no odor			Groundwater observed from 6-7 ft bgs
		16Q3FS7-1-SO-0		**WELL-GRADED GRAVEL WITH SAND (GW)**, olive gray to olive brown, damp to moist, fine to coarse, angular to rounded gravel, fine to coarse, well-graded, subround, loose to medium dense sand, weak cementation, lenses (~4-6" thick) of well-graded sand (10G/90S) (olive brown, fine to coarse, subround to round, moist to wet, minor FeO staining, no odor			Collect ISM wedge core sample from 0-15 ft bgs
10					0.0	0.0	
15				- as above	0.0	0.0	Switched to hollow stem auger - observations from cuttings from 15-42 ft bgs
20					0.0	0.0	
25							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	FS7-1	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Fire Station 7 (Building 14431)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1672689.65 — NORTHING (NAD83 SPZN4 feet): 2650718.25

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (8 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 189.7 (ft)

WATER LEVEL: 29.1 feet bgs — START : 7/18/2016 — END : 7/18/2016 — LOGGER : R. Caird

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
					0.0	0.0	
				WELL-GRADED GRAVEL WITH SAND (GW), olive brown, damp, fine to coarse, angular to rounded gravel, fine to coarse, well-graded, subround, loose to medium dense sand, weak cementation, lenses (~4-6" thick) of well-graded sand (10G/90S) (olive brown, fine to coarse, subround to round, moist to wet, minor FeO staining, no odor			Groundwater encountered at 29.1 ft bgs
30					0.0	0.0	
				WELL-GRADED SAND WITH SILT AND GRAVEL (SW-SM), dark grayish brown, moist to wet, fine to coarse, subangular to subround sand, fine, poorly graded, subround gravel, no odor			Monitoring well installed at this location. Screened interval from 30.6-40.6 ft bgs. See monitoring well construction diagram for further details. Moist to wet cuttings observed at 31 ft bgs
35					0.0	0.0	
				WELL-GRADED GRAVEL WITH SAND (GW), as above from 27-31 ft bgs, moist			
					0.0	0.0	
40					0.0	0.0	
					0.0	0.0	
				Boring terminated at 42 feet.			
45							
50							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	FSFS-1	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Fire Suppression Foam Storage (Building 6210)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1667348.20 — NORTHING (NAD83 SPZN4 feet): 2643895.53

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (8 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 146.6 (ft)

WATER LEVEL: 26.5 feet bgs — START : 7/14/2016 — END : 7/14/2016 — LOGGER : R. Caird

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
				SILTY SAND (SM), dark brown, dry, loose, fine to medium, poorly graded, subround sand with >15% fines, low plasticity, rapid dilatancy, no cementation, no staining, no odor	0.0	0.0	0-15 ft bgs logged and sampled from Macrocore sampler
				WELL-GRADED GRAVEL WITH SAND (GW), olive gray, dry, medium dense, fine to coarse, well-graded, subangular to subround sand, fine to coarse, subangular gravel, weak cementation, trace FeO staining, no odor No recovery			
5				**WELL-GRADED GRAVEL WITH SAND (GW)**, olive gray, moist to damp, loose, fine to coarse, well-graded, angular to subangular sand, weak cementation, fine to coarse, well rounded to angular gravel, homogenous, trace FeO staining, no odor	0.0	0.0	
		16Q3FSFS-1-SO-0					Collect ISM wedge core sample from 0-15 ft bgs
10				- as above, loose to medium dense	0.0	0.0	
				WELL-GRADED SAND WITH GRAVEL (SW), dark olive brown, moist, loose, fine to coarse, subangular to subrounded sand, fine, poorly graded, rounded to subrounded gravel, homogenous, trace organic matter and FeO staining, no odor			
15				- as above	0.0	0.0	Switched to hollow stem auger - observations from cuttings from 15-41 ft bgs
20					0.0	0.0	

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	FSFS-1	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Fire Suppression Foam Storage (Building 6210)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1667348.20 — NORTHING (NAD83 SPZN4 feet): 2643895.53

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (8 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 146.6 (ft)

WATER LEVEL: 26.5 feet bgs — START : 7/14/2016 — END : 7/14/2016 — LOGGER : R. Caird

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
25				**WELL-GRADED SAND WITH GRAVEL (SW)**, dark olive brown, moist, fine to coarse, subangular to subrounded sand, well-graded, fine to coarse, rounded gravel	0.0	0.0	Groundwater encountered at 26.5 ft bgs
30				- as above, moist to wet	0.0	0.0	Monitoring well installed at this location. Screened interval from 30-40 ft bgs. See monitoring well construction diagram for further details.
35					0.0	0.0	
40					0.0	0.0	
				Boring terminated at 41 feet.			

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	H5-1	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Hangar 5 (Building 7309) Former AFFF Spray Test

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1669966.72 — NORTHING (NAD83 SPZN4 feet): 2644960.92

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (8 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 155.2 (ft)

WATER LEVEL: 21.5 feet bgs — START : 7/13/2016 — END : 7/13/2016 — LOGGER : R. Caird

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
				WELL-GRADED SAND WITH GRAVEL (SW), dark olive gray, dry, loose, fine to coarse, subangular sand, fine, poorly graded, angular to subangular gravel, no cementation, no staining, no odor **SILTY GRAVEL (GM)**, olive, dry, loose, fine to coarse, subangular sand, fine, poorly graded, angular to subangular gravel, no cementation, no plasticity, MnO staining, no odor	0.0	0.0	0-15 ft bgs logged and sampled from Macrocore sampler
5				**WELL-GRADED GRAVEL WITH SAND (GW)**, olive gray, dry, medium dense, fine to coarse, angular gravel up to 0.75", fine to coarse, subangular, well-graded sand, weak cementation, no staining, no odor - as above, damp, lenses of well-graded sand with gravel	0.0	0.0	
		16Q3H5-1-SO-0					Collect ISM wedge core sample from 0-15 ft bgs
10				**POORLY GRADED GRAVEL WITH SAND (GP)**, fine, subangular to angular gravel	0.0	0.0	
				POORLY GRADED SAND (SP), dark olive gray, moist, very loose, fine to medium, subround, no cementation, no staining, no odor **WELL-GRADED GRAVEL WITH SAND (GW)**, olive gray, damp, medium dense, fine to coarse, angular to well-rounded gravel up to 1.25", fine to coarse, subangular, well-graded sand, weak cementation, FeO and MnO staining, no odor	0.0	0.0	Switched to hollow stem auger - observations from cuttings from 15-40 ft bgs
15							
20					0.0	0.0	
							New groundwater level after reinstall at 21.5 ft bgs
25							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	H5-1	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Hangar 5 (Building 7309) Former AFFF Spray Test

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1669966.72 — NORTHING (NAD83 SPZN4 feet): 2644960.92

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (8 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 155.2 (ft)

WATER LEVEL: 21.5 feet bgs — START : 7/13/2016 — END : 7/13/2016 — LOGGER : R. Caird

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
				- as above, very dark grayish brown, moist	0.0	0.0	
							Monitoring well installed at this location. Screened interval from 27-37 ft bgs. See monitoring well construction diagram for further details.
30				**WELL-GRADED GRAVEL WITH SAND (GW)**, very dark grayish brown, wet to saturated, medium dense, fine to coarse (up to 30mm), angular to well rounded gravel, fine to coarse, subangular, well-graded sand, weak cementation, FeO and MnO staining, moderate hydrocarbon odor	0.1	62.9	Groundwater encountered at 30 ft bgs during initial boring
35					0.1	21.0	
				Boring terminated at 37 feet.			
					0.1	191.4	
40							Original boring terminated at 40 ft bgs. Well initially installed with screen 30-40 ft bgs but was pulled up 3 ft due to bridging with bentonite chips
45							
50							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	H6-1	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Hangar 6 (Building 9311)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1669655.72 — NORTHING (NAD83 SPZN4 feet): 2646577.41

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (8 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 157.7 (ft)

WATER LEVEL: 13.0 feet bgs — START : 8/1/2016 — END : 8/1/2016 — LOGGER : K. Butler

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION (SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
				WELL-GRADED SAND WITH SILT (SW-SM), very dark grayish brown, moist, loose, fine to coarse, subangular sand, fine to medium, subround, well-graded gravel, non plastic, noncohesive fines, no staining, no odor	0.0	0.0	0-15 ft bgs logged and sampled from Macrocore sampler
5					0.0	0.0	
		16Q3H6-1-SO-0					Collect ISM wedge core sample from 0-15 ft bgs
10					0.0	0.0	
				POORLY GRADED SAND (SP), black, wet, loose, medium to coarse, subangular, no staining, no odor			Groundwater encountered at 13 ft bgs
15				**WELL-GRADED SAND WITH SILT (SW-SM)**, as above, wet	0.0	0.0	Monitoring well installed at this location. Screened interval from 14-24 ft bgs. See monitoring well construction diagram for further details. Switched to hollow stem auger - observations from cuttings from 15-24.5 ft bgs
20					0.0	0.0	
					0.0	0.0	
					0.0	0.0	
25				Boring terminated at 24.5 feet.			
30							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	H8-1	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Hangar 8 (Building 14410)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1672009.48 — NORTHING (NAD83 SPZN4 feet): 2650410.41

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (8 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 184.0 (ft)

WATER LEVEL: 36.0 feet bgs — START : 7/25/2016 — END : 7/25/2016 — LOGGER : K. Butler

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
				WELL-GRADED SAND (SW), dark olive brown, moist, loose, fine to coarse, subangular sand, fine, poorly graded, subround gravel, no staining, no odor	0.0	0.0	0-15 ft bgs logged and sampled from Macrocore sampler
				WELL-GRADED SAND WITH GRAVEL (SW), very dark gray, moist, loose to medium density, fine to coarse, subangular sand, fine, poorly graded, subround gravel, no staining, no odor			
5					0.0	0.0	
		16Q3H8-1-SO-0		- as above, gray			Collect ISM wedge core sample from 0-15 ft bgs
10					0.0	0.0	
				WELL-GRADED SAND (SW), very dark gray, moist, loose to medium density, fine to coarse, subangular to subround sand, trace fines, poorly graded, subround to subangular gravel, no staining, no odor			
15					0.0	0.0	Switched to hollow stem auger - observations from cuttings from 15-46 ft bgs
				WELL-GRADED SAND WITH GRAVEL (SW), very dark grayish brown, moist, fine to coarse, subangular sand, fine to medium, well-graded, subround gravel, no staining, no odor			
20					0.0	0.0	
25							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	H8-1	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Hangar 8 (Building 14410)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1672009.48 — NORTHING (NAD83 SPZN4 feet): 2650410.41

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (8 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 184.0 (ft)

WATER LEVEL: 36.0 feet bgs — START : 7/25/2016 — END : 7/25/2016 — LOGGER : K. Butler

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
					0.0	0.0	
30				**WELL-GRADED SAND WITH GRAVEL (SW)**, as above	0.0	0.0	
35					0.0	0.0	▼ Groundwater encountered at 36 ft bgs; Monitoring well installed at this location. Screened interval from 34.5-44.5 ft bgs. See monitoring well construction diagram for further details.
40					0.0	0.0	
45					0.0	0.0	
					0.0	0.0	
				Boring terminated at 47 feet.			
50							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	H10-1	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Hangar 10 (Building 15455)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1673539.01 — NORTHING (NAD83 SPZN4 feet): 2651444.51

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (8 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 192.0 (ft)

WATER LEVEL: 29.7 feet bgs — START : 7/19/2016 — END : 7/19/2016 — LOGGER : R. Caird

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
				WELL-GRADED GRAVEL WITH SAND (GW), dark yellowish brown, dry, very loose, fine to coarse, well-graded, subangular sand, no cementation, fine to coarse, rounded gravel, homogenous, no staining, no odor	0.0	0.0	0-15 ft bgs logged and sampled from Macrocore sampler
				WELL-GRADED SAND WITH GRAVEL (SW), olive brown, dry to damp, loose to medium dense, subangular sand, weak cementation, fine, poorly graded, subround to angular gravel, FeO and MnO staining, no odor			
				No recovery			
5				**WELL-GRADED SAND WITH GRAVEL (SW)**, as above, fine to coarse, well-graded gravel	0.0	0.0	
		16Q3H10-1-SO-0		**WELL-GRADED GRAVEL WITH SAND (GW)**, olive gray, damp, loose to medium dense, subangular sand, weak cementation, fine to coarse, well-graded, subround to angular gravel, lenses (6" thick) of well-graded sand (10/85/5) dark olive gray, damp to moist, loose, homogenous, no odor			Collect ISM wedge core sample from 0-15 ft bgs
10					0.0	0.0	
				No recovery			
15				**WELL-GRADED GRAVEL WITH SAND (GW)**, as above	0.0	0.0	Switched to hollow stem auger - observations from cuttings from 15-41 ft bgs
20				- as above, dark olive brown, damp, gravel and sand subangular to angular	0.0	0.0	
25							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	H10-1	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Hangar 10 (Building 15455)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1673539.01 — NORTHING (NAD83 SPZN4 feet): 2651444.51

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (8 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 192.0 (ft)

WATER LEVEL: 29.7 feet bgs — START : 7/19/2016 — END : 7/19/2016 — LOGGER : R. Caird

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
				WELL-GRADED GRAVEL WITH SAND (GW), dark olive brown, damp, loose, fine to coarse, subangular to angular sand, rounded to angular, fine to very coarse gravel	0.0	0.0	
30					0.0	0.0	Groundwater encountered at 29.7 ft bgs Monitoring well installed at this location. Screened interval from 30-40 ft bgs. See monitoring well construction diagram for further details.
35					0.0	0.0	
40					0.0	0.0	
					0.0	0.0	
				Boring terminated at 43 feet.			
45							
50							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	H16-1	SHEET 1 OF 3

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Hangar 16 (Building 15658)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1677723.45 — NORTHING (NAD83 SPZN4 feet): 2651325.41

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (8 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 209.2 (ft)

WATER LEVEL: 46.5 feet bgs — START : 7/26/2016 — END : 7/26/2016 — LOGGER : K. Butler

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
				SANDY ORGANIC SOIL (OL-OH), black, poorly graded, fine grained sand, moist, loose, nonplastic, no staining, no odor, root material present (O60/S40)	0.0	0.0	0-15 ft bgs logged and sampled from Macrocore sampler
				WELL-GRADED SAND (SW), dark olive brown, moist, loose, fine to coarse, subangular sand, fine, poorly graded, subround gravel, no staining, no odor			
				SANDY SILT (ML), dark brown, moist, medium dense, fine grained, poorly graded, subangular sand, nonplastic, noncohesive fines, no staining, no odor			
				WELL GRADED SAND WITH GRAVEL (SW), dark brown, dry, medium density, fine to coarse, subangular sand, fine to medium, well-graded, subround gravel, no staining, no odor			
5					0.0	0.0	
		16Q3H16-1-SO-0					Collect ISM wedge core sample from 0-15 ft bgs
				- as above, grayish brown			
10					0.0	0.0	
15					0.0	0.0	Switched to hollow stem auger - observations from cuttings from 15-58 ft bgs
				WELL-GRADED GRAVEL WITH SAND (GW), very dark grayish brown, dry, fine to medium, subround gravel, medium density, fine to coarse, subangular sand, no staining, no odor			
20							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	H16-1	SHEET 2 OF 3

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Hangar 16 (Building 15658)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1677723.45 — NORTHING (NAD83 SPZN4 feet): 2651325.41

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (8 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 209.2 (ft)

WATER LEVEL: 46.5 feet bgs — START : 7/26/2016 — END : 7/26/2016 — LOGGER : K. Butler

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
					0.0	0.0	
25				- as above, fine to coarse gravel	0.0	0.0	
30					0.0	0.0	
35					0.0	0.0	
40							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	H16-1	SHEET 3 OF 3

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Hangar 16 (Building 15658)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1677723.45 — NORTHING (NAD83 SPZN4 feet): 2651325.41

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (8 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 209.2 (ft)

WATER LEVEL: 46.5 feet bgs — START : 7/26/2016 — END : 7/26/2016 — LOGGER : K. Butler

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
					0.0	0.0	
45				**WELL-GRADED GRAVEL WITH SAND (GW)**, as above, very dark grayish brown, dry, fine to coarse, subround gravel, medium density, fine to coarse, subangular sand, no staining, no odor	0.0	0.0	Groundwater encountered at 46.5 ft bgs Monitoring well installed at this location. Screened interval from 47-57 ft bgs. See monitoring well construction diagram for further details.
50					0.0	0.0	
55					0.0	0.0	
					0.0	0.0	
				Boring terminated at 58 feet.			
60							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	H17-1	SHEET 1 OF 3

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Hangar 17 (Building 16670)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1678275.98 — NORTHING (NAD83 SPZN4 feet): 2652217.93

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (8 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 214.3 (ft)

WATER LEVEL: 47.0 feet bgs — START : 7/27/2016 — END : 7/27/2016 — LOGGER : K. Butler

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
				WELL-GRADED SAND (SW), black, moist, loose, fine to coarse, subangular, no staining, no odor, root material throughout **WELL-GRADED GRAVEL WITH SAND (GW)**, dark olive brown, moist, loose to medium density, fine to medium, subangular to subround gravel, fine to coarse, subangular, medium density sand, no staining, no odor	0.0	0.0	0-15 ft bgs logged and sampled from Macrocore sampler
				No recovery			
5				**SILTY GRAVEL (GM)**, dark olive brown, wet, loose, fine to medium, subangular to subround gravel, fine to coarse, subangular sand, and nonplastic, noncohesive fines, no staining, no odor	0.0	0.0	
		16Q3H17-1-SO-0		**SANDY SILT (ML)**, very dark grayish brown, moist, nonplastic, noncohesive, medium density silt, fine grain, poorly graded, subangular sand, fine, poorly graded, subangular to subround gravel, no staining, no odor **SILTY GRAVEL (GM)**, as above, moist			Collect ISM wedge core sample from 0-15 ft bgs
				No recovery			
10				**SILTY GRAVEL (GM)**, as above	0.0	0.0	
				SANDY SILT (ML), as above			
				SILTY GRAVEL WITH SAND (GM), dark olive brown, moist, fine to medium, subround to subangular gravel, fine to coarse, subangular sand, nonplastic, noncohesive fines, no staining, no odor			
15				- as above	0.0	0.0	Switched to hollow stem auger - observations from cuttings from 15-58 ft bgs
20							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	H17-1	SHEET 2 OF 3

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Hangar 17 (Building 16670)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1678275.98 — NORTHING (NAD83 SPZN4 feet): 2652217.93

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (8 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 214.3 (ft)

WATER LEVEL: 47.0 feet bgs — START : 7/27/2016 — END : 7/27/2016 — LOGGER : K. Butler

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
					0.0	0.0	
25				**SILTY GRAVEL WITH SAND (GM)**, as above, dark olive brown, moist, fine to medium, subround to subangular gravel, fine to coarse, subangular sand, nonplastic, noncohesive fines, no staining, no odor	0.0	0.0	
30					0.0	0.0	
35					0.0	0.0	
40							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	H17-1	SHEET 3 OF 3

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Hangar 17 (Building 16670)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1678275.98 — NORTHING (NAD83 SPZN4 feet): 2652217.93

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (8 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 214.3 (ft)

WATER LEVEL: 47.0 feet bgs — START : 7/27/2016 — END : 7/27/2016 — LOGGER : K. Butler

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
					0.0	0.0	
45				**SILTY GRAVEL WITH SAND (GM)**, as above, dark olive brown, moist, fine to medium, subround to subangular gravel, fine to coarse, subangular sand, nonplastic, noncohesive fines, no staining, no odor	0.0	0.0	Groundwater encountered at 47 ft bgs; Monitoring well installed at this location. Screened interval from 47-57 ft bgs. See monitoring well construction diagram for further details.
50					0.0	0.0	
55					0.0	0.0	
					0.0	0.0	
60				Boring terminated at 58 feet.			

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	H18-1	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Hangar 18 (Building 17470)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1673508.68 — NORTHING (NAD83 SPZN4 feet): 2652896.01

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (8 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 198.3 (ft)

WATER LEVEL: 35.0 feet bgs — START : 7/23/2016 — END : 7/23/2016 — LOGGER : K. Butler

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
				ORGANIC SOIL WITH SAND (OL-OH), very dark gray, moist, loose, fine, subangular sand, nonplastic, no staining, no odor, with root material	0.0	0.0	0-15 ft bgs logged and sampled from Macrocore sampler
				SILTY GRAVEL (GM), light olive brown, dry, loose, fine to coarse, subangular sand, fine, poorly graded subround gravel, no staining, no odor			
				- as above, dark olive brown, loose to medium density, subangular to angular sand, subround to angular gravel			
				WELL-GRADED SAND (SW), dark gray, dry, loose to medium density, fine to coarse, subround to angular sand, fine to medium, subround gravel, no staining, no odor			
				No recovery			
5				**WELL-GRADED SAND WITH GRAVEL (SW)**, very dark grayish brown, moist, medium density, fine to coarse, subround to angular sand, fine to medium, subround gravel, no staining, no odor	0.0	0.0	
		16Q3H18-1-SO-0, 16Q3H18-1-SO-1					Collect ISM wedge core sample and duplicate from 0-15 ft bgs
10					0.0	0.0	
				SANDY SILT (ML), dark yellowish brown, medium to dense, nonplastic, noncohesive, fine grain, subround sand, no staining, no odor			
				WELL-GRADED SAND WITH GRAVEL (SW), as above			
				WELL-GRADED SAND (SW), very dark grayish brown, moist, medium density, fine to coarse, subround to angular sand, fine, subround gravel, no staining, no odor			
15					0.0	0.0	Switched to hollow stem auger - observations from cuttings from 15-46 ft bgs
				- as above, fine to medium sand			
20					0.0	0.0	
25							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	H18-1	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site Hangar 18 (Building 17470)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1673508.68 — NORTHING (NAD83 SPZN4 feet): 2652896.01

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (8 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 198.3 (ft)

WATER LEVEL: 35.0 feet bgs — START : 7/23/2016 — END : 7/23/2016 — LOGGER : K. Butler

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
					0.0	0.0	
30				**WELL-GRADED SAND (SW)**, as above, very dark grayish brown, moist, medium density, fine to medium, subround to angular sand, fine, subround gravel, no staining, no odor	0.0	0.0	
35					0.0	0.0	Groundwater encountered at 35 ft bgs; Monitoring well installed at this location. Screened interval from 35-45 ft bgs. See monitoring well construction diagram for further details.
40					0.0	0.0	
45					0.0	0.0	
				Boring terminated at 46 feet.			
50							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	SS044-1	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site SS044 (Building 35-752)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1689280.29 — NORTHING (NAD83 SPZN4 feet): 2647907.86

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Downhole Hammer (4.5"), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 265.4 (ft)

WATER LEVEL: 13.0 feet bgs — START : 7/9/2016 — END : 7/9/2016 — LOGGER : R. Caird

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
				Asphalt	0.0	0.0	Begin drilling with 4.5" Dueltube (DT4.5) Asphalted location 2.5" thick
				WELL-GRADED SAND WITH GRAVEL AND SILT (SW-SM), dark grayish brown, fine to coarse, subround, dry sand, no cementation, fine, poorly graded subrounded gravel, fines with no plasticity, no odor			
				SILTY SAND WITH GRAVEL (SM), olive brown, fine to coarse, well-graded, subround to angular sand, fine, poorly graded subround gravel and low plasticity, moist, laminated fines, weak to moderate cementation, FeO and MnO staining			
				- as above, wet			Wet from 2.5 ft to 6 ft bgs
				- as above, increasing gravel, decreasing fines			
				SILTY SAND WITH GRAVEL (SM), olive brown, fine to coarse, well-graded, subround to angular sand, fine, poorly graded subround gravel and low plasticity, wet, laminated fines, weak to moderate cementation, FeO and MnO staining			
5				**WELL-GRADED GRAVEL WITH SAND (GW)**, olive brown, wet to moist, fine to coarse, well-graded, angular to subround, homogenous sand, no cementation, no odor, no staining, fine, subround to angular gravel, cobbles up to 3.5"	0.0	0.0	
		16Q3SS044-1-SO-0		- as above, dry to damp			Collect ISM wedge core sample .5 ft to 13 ft bgs
10				- as above, damp	0.0	0.0	
				WELL-GRADED GRAVEL WITH SAND (GW), olive brown, wet to saturated, fine to coarse, well-graded, angular to subround, homogenous sand with no cementation, no odor, no staining, fine to coarse, rounded to subangular gravel up to 2"			Groundwater observed from 13 ft to 15 ft Monitoring well installed at this location. Screened interval from 13-23 ft bgs. See monitoring well construction diagram for further details.
15							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	SS044-1	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site SS044 (Building 35-752)

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1689280.29 — NORTHING (NAD83 SPZN4 feet): 2647907.86

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (6 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 265.4 (ft)

WATER LEVEL: 13.0 feet bgs — START : 7/9/2016 — END : 7/9/2016 — LOGGER : R. Caird

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
					0.0		No cuttings generated from 15 ft bgs
20					0.0		
				Boring terminated at 23.5 feet.			
25							
30							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	SS108-1	SHEET 1 OF 4

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site SS108 C-17 Crash Location

DRILLING CONTRACTOR : GeoTek Alaska, Inc — NORTHING (NAD83 AKSPZ8, feet): 2655375.23 — EASTING (NAD83 AKSPZ8, feet): 1682233.52

DRILLING METHOD AND EQUIPMENT : Direct Push/Hollow Stem Auger (8")/Downhole Hammer (DT45), Geoprobe 8040 — GROUND SURFACE ELEVATION: 242.7 (ft)

WATER LEVEL: 71.0 feet bgs — START : 8/11/2016 — END : 8/15/2016 — LOGGER : K. Butler

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
				WELL-GRADED SAND WITH GRAVEL (SW), dark gray, moist, medium density, fine to course, subangular sand, fine to coarse, subround, well-graded gravel, no staining, no odor	0.0	0.0	0-15 ft bgs logged and sampled from Macrocore sampler
				No recovery			
5				**WELL-GRADED SAND WITH GRAVEL (SW)**, as above	0.0	0.0	
				POORLY GRADED SAND (SP), dark grayish brown, moist, loose, fine to medium, sugangular, no staining, no odor			
				SILTY SAND (SM), very dark grayish brown, wet, loose, fine grained, poorly graded, subangular sand, nonplastic, noncohesive silt, no staining, no odor			
		16Q3SS108-1-SO-0, 16Q3SS108-1-SO-0MS, 16Q3SS108-1-SO-0SD		**WELL-GRADED GRAVEL (GW)**, light bluish gray, moist, dense, fine to coarse, subround gravel, fine to coarse, subangular, well-graded sand			Collect ISM wedge core sample, MS and SD from 0-15 ft bgs
10				**WELL-GRADED SAND WITH GRAVEL (SW)**, as above, dark gray, moist, medium density, fine to course, subangular sand, fine to coarse, subround, well-graded gravel, no staining, no odor	0.0	0.0	
				No recovery			
15				**WELL-GRADED GRAVEL (GW)**, dark brown, moist, dense, fine to coarse, subround, no staining, no odor	0.0	0.0	Switched to hollow stem auger - observations from cuttings from 15-63 ft bgs
20					0.0	0.0	
25				**SANDY SILT WITH GRAVEL (ML)**, dark brown, moist, loose, nonplastic, noncohesive fines, fine to coarse, subangular sand, fine to coarse, subround gravel, no staining, no odor	0.0	0.0	

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	SS108-1	SHEET 2 OF 4

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site SS108 C-17 Crash Location

DRILLING CONTRACTOR : GeoTek Alaska, Inc — NORTHING (NAD83 AKSPZ8, feet): 2655375.23 — EASTING (NAD83 AKSPZ8, feet): 1682233.52

DRILLING METHOD AND EQUIPMENT : Direct Push, Hollow Stem Auger (8 inch), Downhole Hammer (DT45), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 242.7 (ft)

WATER LEVEL: 71.0 feet bgs — START : 8/11/2016 — END : 8/15/2016 — LOGGER : K. Butler

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
30				**WELL-GRADED GRAVEL WITH SAND (GW)**, very dark grayish brown, moist, medium density, fine to coarse, subround gravel, fine to coarse, subangular sand, nonplastic, noncohesive fines, no staining, no odor	0.0	0.0	Moist cuttings throughout. Checked for water several times, but no saturated zone observed
35					0.0	0.0	
40					0.0	0.0	
45					0.0	0.0	
50					0.0	0.0	
55					0.0	0.0	

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	SS108-1	SHEET 3 OF 4

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site SS108 C-17 Crash Location

DRILLING CONTRACTOR : GeoTek Alaska, Inc — NORTHING (NAD83 AKSPZ8, feet): 2655375.23 — EASTING (NAD83 AKSPZ8, feet): 1682233.52

DRILLING METHOD AND EQUIPMENT : Direct Push, Hollow Stem Auger (8 inch), Downhole Hammer (DT45), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 242.7 (ft)

WATER LEVEL: 71.0 feet bgs — START : 8/11/2016 — END : 8/15/2016 — LOGGER : K. Butler

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
60				**WELL-GRADED GRAVEL WITH SAND (GW)**, as above	0.0	0.0	Groundwater encountered at 57 ft bgs on first drilling
65					0.0	0.0	Original boring terminated at 63 ft bgs on 8/11/16; Well redrill 8/15/16 with downhole hammer. No observations from 63-81 ft bgs
70					0.0	0.0	▼ Groundwater encountered at 71 ft bgs; Monitoring well installed at this location 8/15/16, screened interval from 71-81 ft bgs. See monitoring well construction diagram for further details.
75					0.0	0.0	
80					0.0	0.0	

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	SS108-1	SHEET 4 OF 4

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site SS108 C-17 Crash Location

DRILLING CONTRACTOR : GeoTek Alaska, Inc — NORTHING (NAD83 AKSPZ8, feet): 2655375.23 — EASTING (NAD83 AKSPZ8, feet): 1682233.52

DRILLING METHOD AND EQUIPMENT : Direct Push, Hollow Stem Auger (8 inch), Downhole Hammer (DT45), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 242.7 (ft)

WATER LEVEL: 71.0 feet bgs — START : 8/11/2016 — END : 8/15/2016 — LOGGER : K. Butler

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
85					0.0	0.0	
				Boring terminated at 85.5 feet.			
90							
95							
100							
105							
110							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	UC35A-1	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site UC-35A Cessna Crash Location

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1673597.05 — NORTHING (NAD83 SPZN4 feet): 2649224.56

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (8 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 183.5 (ft)

WATER LEVEL: 30.0 feet bgs — START : 8/3/2016 — END : 8/3/2016 — LOGGER : K. Butler

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
				Asphalt	0.0	0.0	0-15 ft bgs logged and sampled from Macrocore sampler
				FILL, WELL-GRADED SAND (SW), dark grayish brown, moist, medium density, fine to coarse, subangular sand, subangular, fine to medium gravel			
				WELL-GRADED SAND WITH GRAVEL (SW), very dark grayish brown, dry, medium density, fine to coarse, subangular sand, fine to coarse, subround gravel, slight odor, no staining			
					0.0	0.5	
5					0.0	9.6	
					0.0	11.2	
					0.0	20.0	
		16Q3UC35A-1-SO-0					Collect ISM wedge core sample from 0-15 ft bgs
					0.0	2.0	
					0.0	0.0	
10					0.0	0.0	
				- as above, moist			
15				- as above, moist	0.0	0.0	Switched to hollow stem auger - observations from cuttings from 15-41 ft bgs
20					0.0	0.0	
				WELL-GRADED GRAVEL WITH SAND (GW), very dark grayish brown, medium density, fine to coarse, subround gravel, fine to coarse, subangular, well-graded sand, no odor, no staining			
25							

PROJECT NUMBER:	BORING NUMBER:	
666984.02.03.01	UC35A-1	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : JBER PFCs Site Inspections — LOCATION: JBER - Site UC-35A Cessna Crash Location

DRILLING CONTRACTOR : GeoTek Alaska, Inc — EASTING (NAD83 SPZN4 feet): 1673597.05 — NORTHING (NAD83 SPZN4 feet): 2649224.56

DRILLING METHOD AND EQUIPMENT : Combined Direct Push and Hollow Stem Auger (8 inch), Geoprobe 8040DT — GROUND SURFACE ELEVATION: 183.5 (ft)

WATER LEVEL: 30.0 feet bgs — START : 8/3/2016 — END : 8/3/2016 — LOGGER : K. Butler

DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (feet)	SAMPLE ID	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	PID (ppm) BREATHING ZONE	PID (ppm) HEAD SPACE	LOGGING NOTES
					0.0	0.0	
30				- as above, wet	0.0	0.0	Groundwater encountered at 30 ft bgs; Monitoring well installed at this location. Screened interval from 30-40 ft bgs. See monitoring well construction diagram for further details.
35							
40				Boring terminated at 41 feet.			
45							
50							

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
666984	CFTA-2	SHEET 1 OF 1

WELL CONSTRUCTION DATASHEET

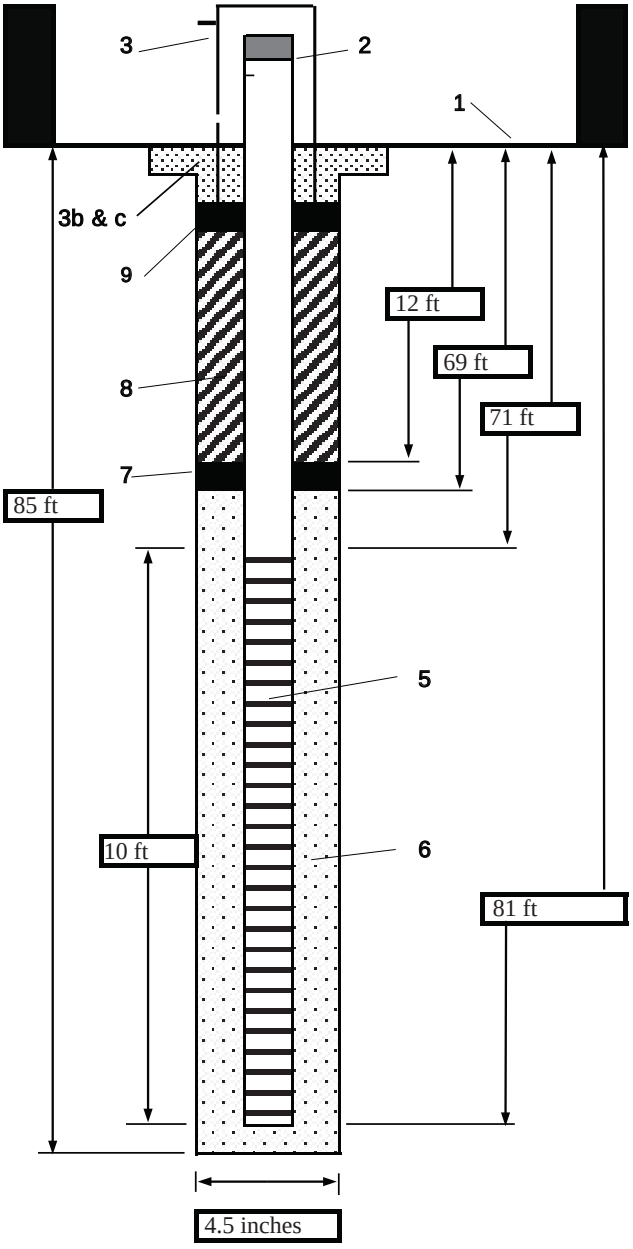
PROJECT : JBER PFCs Site Inspection LOCATION : Current Fire Training Area

DRILLING CONTRACTOR : GeoTek Alaska, Inc.

DRILLING METHOD AND EQUIPMENT USED : Geoprobe 8040DT/ DT45 Down-hole hammer (4.5 in. OD)

WATER LEVELS : 71 ft bgs START : 6/22/2016 END : 6/23/2016 LOGGER : J. Olsen/SLC

WELL MONUMENT TYPE: ABOVE-GROUND



1-	Ground elevation at well	242.31 ft (NAVD88) amsl
2-	Top of casing elevation	246.32 ft (NAVD88) amsl
	a) vent hole?	No
	b) locking cap installed?	Yes
3-	Wellhead protection cover type	6-inch steel casing
	a) weep hole?	No
	b) concrete type	Concrete mix
	c) concrete pad dimensions	2 ft diameter Sonotube
4-	Dia./type of well casing	2-inch / SCH 40 PVC
5-	Type/slot size of screen filter	0.010-inch slot screen - #20/40 prepack
6-	Material added to screen filter	#10/20 silica sand
	a) Quantity used	0.5 x 50lb bags
7-	Type of annular seal	3/8-inch bentonite chips
	a) Quantity used	7 x 50lb bags
8-	Grout or native backfill	
	a) Material/Grout mix used	N/A
	b) Method of placement	N/A
	c) Vol. of well casing grout	N/A
9-	Frost protection	3/8-inch pea gravel
	a) Quantity used	1.5 x 60lb bags
10-	Well protection bollards?	No
	a) Quantity used	N/A
	Development method	Manual surge/ Electric submersible
	Development time	93 min.
	Estimated purge volume	29 gal

Comments

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
666984	CFTA-3	SHEET 1 OF 1

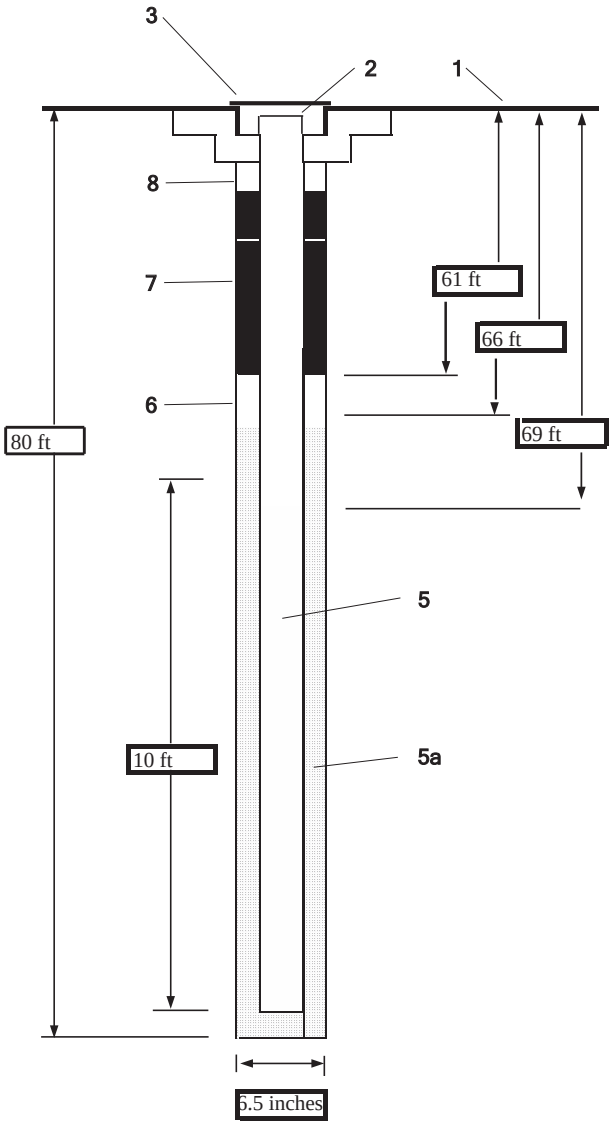
WELL COMPLETION DIAGRAM

PROJECT : JBER PFCs Site Inspection LOCATION : Current Fire Training Area

DRILLING CONTRACTOR : GeoTek Alaska, Inc.

DRILLING METHOD AND EQUIPMENT USED : Geoprobe 8040DT- Macrocore (4 in. OD) / Hollow stem auger (6.5 in. OD)

WATER LEVELS : 69 ft bgs START : 6/28/2016 END : 6/30/2016 LOGGER : K. Butler/HNL



1-	Ground elevation at well	240.68 ft (NAVD88) amsl
2-	Top of casing elevation	240.68 ft (NAVD88) amsl
3-	Wellhead protection cover type	8 in. x 12 in.steel cover
	a) Concrete pad dimensions	16-inch Sonotube
	b) Drain tube?	No
4-	Dia./type of well casing	2-inch / SCH 40 PVC
5-	Type/slot size of screen filter	0.010-inch slot screen-#20/40 prepack
	a) Material added to filter	#10/20 silica sand
	b) Quantity used	0.5 x 50 lb bag
6-	Type of annular seal	1/4-inch bentonite pellets/hydrated
	a) Quantity used	1 x 5 gal bucket
7-	Grout/Native backfill material	Bentonite grout
	a) Quantity used	Surface pour via augers
	b) Method of placement	10 gal water / 1.5 x 50 lb bag
8-	Frost protection	3/8-inch pea gravel (10 ft to 2 ft bgs)
	a) Quantity used	2.5 x 60 lb bags
9-	Well Development	
	a) Development method	Manual surge/ Electric submersible
	b) Development time	80 min.
	c) Estimated purge volume	17 gal

Comments

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
666984	CFTA-1	SHEET 1 OF 1

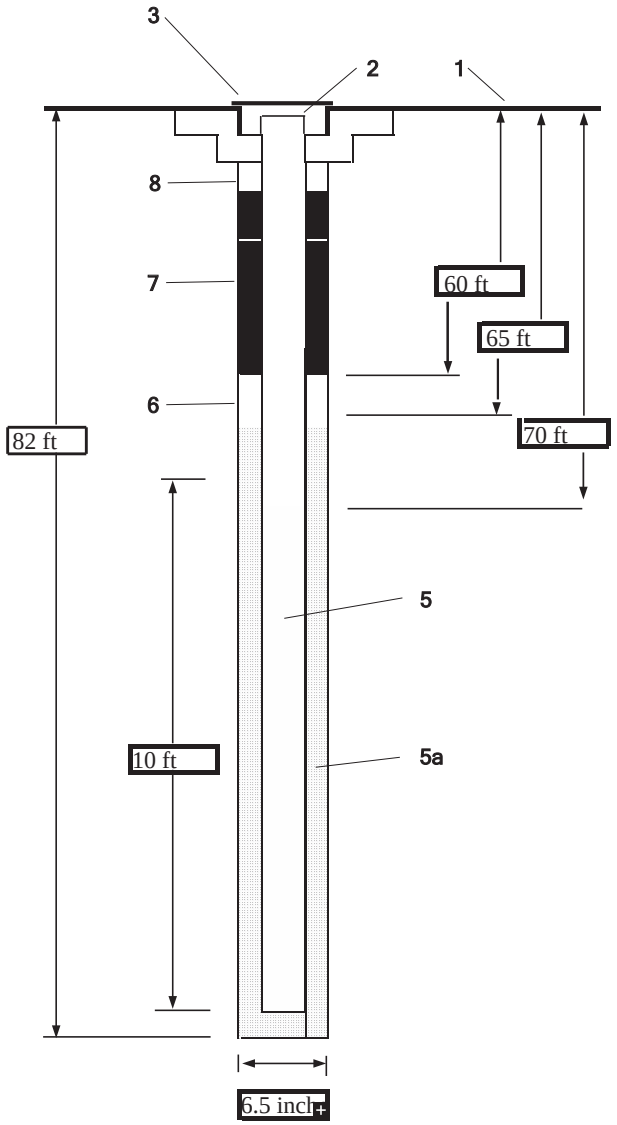
WELL COMPLETION DIAGRAM

PROJECT : JBER PFCs Site Inspection LOCATION : Current Fire Training Area

DRILLING CONTRACTOR : GeoTek Alaska, Inc.

DRILLING METHOD AND EQUIPMENT USED : Geoprobe 8040DT- Macrocore (4 in. OD) / Hollow stem auger (6.5 in. OD)

WATER LEVELS : 70 ft bgs START : 7/2/2016 END : 7/5/2016 LOGGER : K. Butler/HNL



1- Ground elevation at well: 245.46 ft (NAVD88) amsl

2- Top of casing elevation: 245.46 ft (NAVD88) amsl

3- Wellhead protection cover type: 8 in. x 12 in.steel cover
- a) Concrete pad dimensions: 16-inch Sonotube
- b) Drain tube?: No

4- Dia./type of well casing: 2-inch / SCH 40 PVC

5- Type/slot size of screen filter: 0.010-inch slot screen-#20/40 prepack
- a) Material added to filter: #10/20 silica sand
- b) Quantity used: 0.5 x 50 lb bag

6- Type of annular seal: 1/4-inch bentonite pellets/hydrated
- a) Quantity used: 1 x 5 gal bucket

7- Grout/Native backfill material: Bentonite grout
- a) Quantity used: 35 gal water / 1 x 50 lb bags
- b) Method of placement: Surface pour via augers

8- Frost protection: 3/8-inch pea gravel (10 ft to 2 ft bgs)
- a) Quantity used: 3 x 60 lb bags

9- Well Development
- a) Development method: Manual surge/ Electric submersible
- b) Development time: 60 min.
- c) Estimated purge volume: 70 gal

Comments

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
666984	FS4-1	SHEET 1 OF 1

WELL CONSTRUCTION DATASHEET

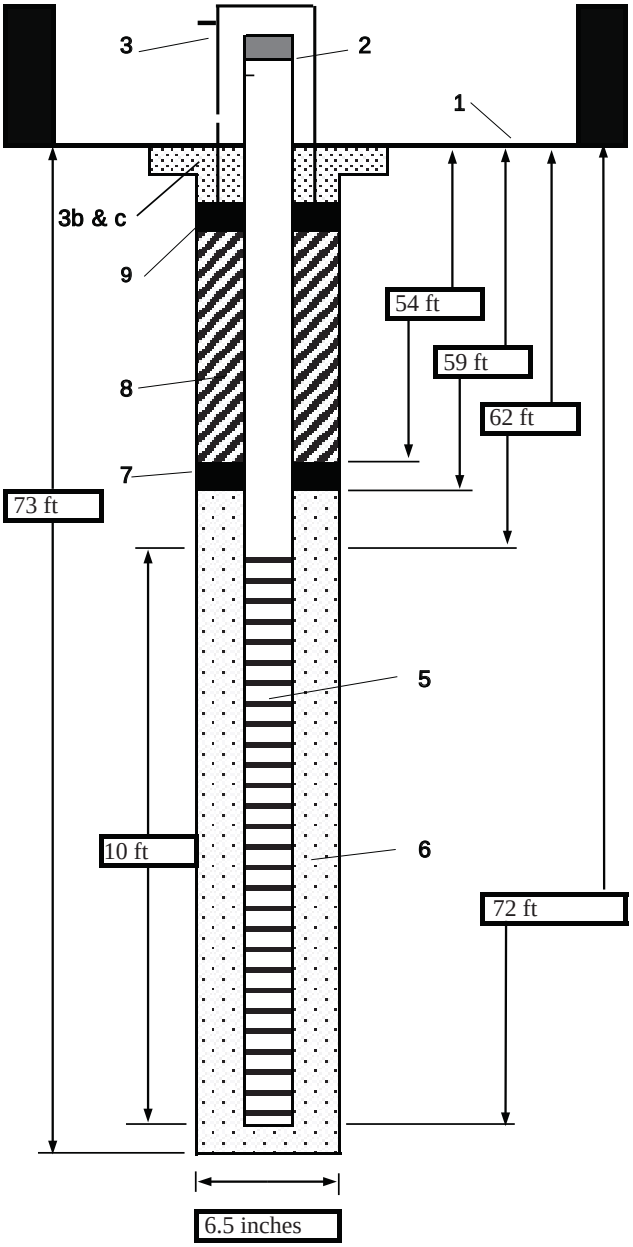
PROJECT : JBER PFCs Site Inspection LOCATION : Fire Station 4 (Building 654)

DRILLING CONTRACTOR : GeoTek Alaska, Inc.

DRILLING METHOD AND EQUIPMENT USED : Geoprobe 8040DT / Hollow stem auger (6.5 in. OD)

WATER LEVELS : 62 ft bgs START : 7/6/2016 END : 7/7/2016 LOGGER : R. Caird/SAC

WELL MONUMENT TYPE: ABOVE-GROUND



1-	Ground elevation at well	317.27 ft (NAVD88) amsl
2-	Top of casing elevation	320.68 ft (NAVD88) amsl
	a) vent hole?	No
	b) locking cap installed?	Yes
3-	Wellhead protection cover type	6-inch steel casing
	a) weep hole?	No
	b) concrete type	Concrete mix (10 gal water/2 x 60 lb bags)
	c) concrete pad dimensions	16-inch Sonotube
4-	Dia./type of well casing	2-inch / SCH 40 PVC
5-	Type/slot size of screen filter	0.010-inch slot screen-#20/40 prepack
6-	Material added to screen filter	#10/20 silica sand
	a) Quantity used	1 x 50 lb bag
7-	Type of annular seal	1/4-inch bentonite pellets
	a) Quantity used	1 x 5 gal bucket
8-	Grout or native backfill	
	a) Material/Grout mix used	Bentonite grout/3/8-inch bentonite chips
	b) Method of placement	Surface pour via augers
	c) Vol. of well casing grout	3 x 60 lb bags / 16 x 50 lb bags
9-	Frost protection	3/8-inch pea gravel
	a) Quantity used	3 x 60 lb bags
10-	Well protection bollards?	No
	a) Quantity used	N/A
	Development method	Manual surge/ Electric submersible
	Development time	661 min.
	Estimated purge volume	27 gal

Comments

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
666984	CCH-1	SHEET 1 OF 1

WELL CONSTRUCTION DATASHEET

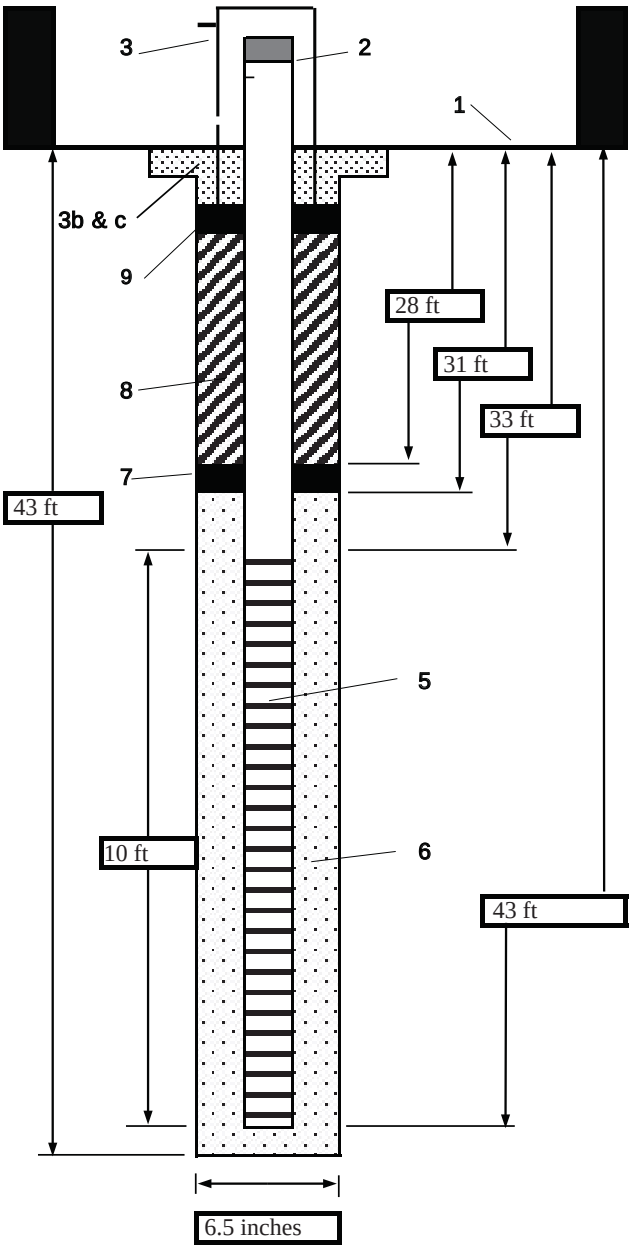
PROJECT : JBER PFCs Site Inspection LOCATION : Corrosion Control Hangar (Building 6263)

DRILLING CONTRACTOR : GeoTek Alaska, Inc.

DRILLING METHOD AND EQUIPMENT USED : Geoprobe 8040DT - Macrocore (2 in. OD) / Hollow stem auger (6.5 in. OD)

WATER LEVELS : 23 ft bgs START : 7/7/2016 END : 7/8/2016 LOGGER : R. Caird/SAC

WELL MONUMENT TYPE: ABOVE-GROUND



1-	Ground elevation at well	151.55 ft (NAVD88) amsl
2-	Top of casing elevation	154.08 ft (NAVD88) amsl
	a) vent hole?	No
	b) locking cap installed?	Yes
3-	Wellhead protection cover type	6-inch steel casing
	a) weep hole?	No
	b) concrete type	Concrete mix (10 gal water/2 x 60 lb bags)
	c) concrete pad dimensions	16-inch Sonotube
4-	Dia./type of well casing	2-inch / SCH 40 PVC
5-	Type/slot size of screen filter	0.010-inch slot screen-#20/40 prepack
6-	Material added to screen filter	#10/20 silica sand
	a) Quantity used	1.75 x 50 lb bags
7-	Type of annular seal	1/4-inch bentonite pellets
	a) Quantity used	0.25 x 5 gal bucket
8-	Grout or native backfill	
	a) Material/Grout mix used	Bentonite grout
	b) Method of placement	Surface pour via augers
	c) Vol. of well casing grout	30 gal water / 0.75 x 50 lb bag
9-	Frost protection	3/8-inch pea gravel
	a) Quantity used	4 x 60 lb bags
10-	Well protection bollards?	No
	a) Quantity used	N/A
	Development method	Manual surge/ Electric submersible
	Development time	183 min.
	Estimated purge volume	176 gal

Comments

PROJECT NUMBER	WELL NUMBER	
666984	SS044-1	SHEET 1 OF 1

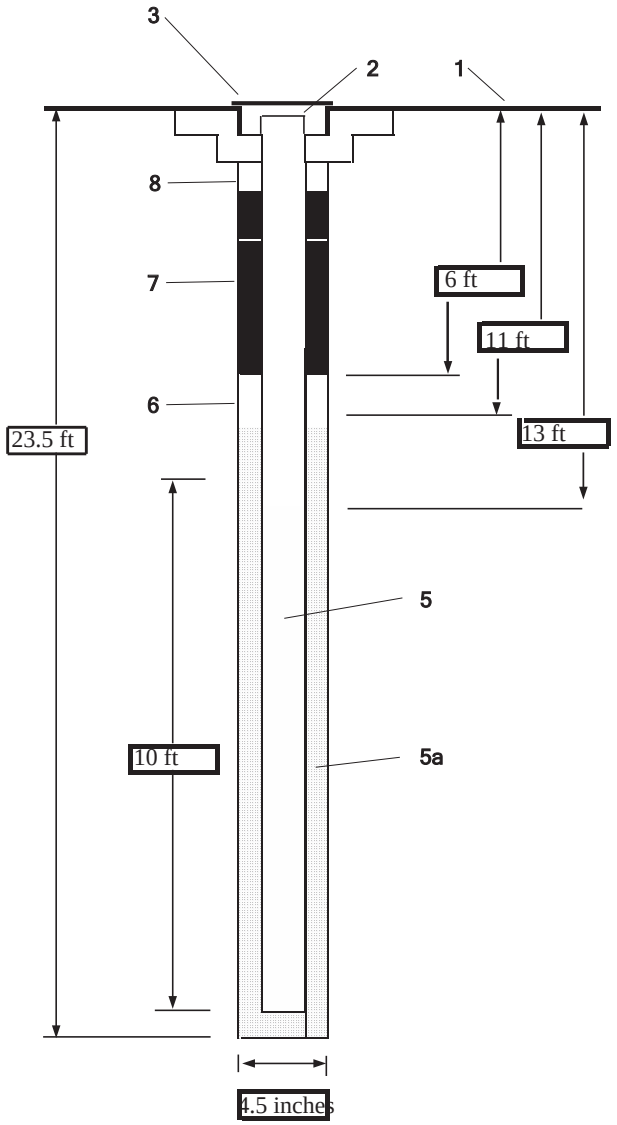
WELL COMPLETION DIAGRAM

PROJECT : JBER PFCs Site Inspection LOCATION : SS044 (Building 35-752)

DRILLING CONTRACTOR : GeoTek Alaska, Inc.

DRILLING METHOD AND EQUIPMENT USED : Geoprobe 8040DT / DT45 Downhole hammer (4.5 in. OD)

WATER LEVELS : 15 ft bgs START : 7/9/2016 END : 7/9/2016 LOGGER : R. Caird/SAC



1- Ground elevation at well: 265.39 ft (NAVD88) amsl

2- Top of casing elevation: 265.39 ft (NAVD88) amsl

3- Wellhead protection cover type: 8 in. x 12 in.steel cover
- a) Concrete pad dimensions: 16-inch Sonotube
- b) Drain tube?: No

4- Dia./type of well casing: 2-inch / SCH 40 PVC

5- Type/slot size of screen filter: 0.010-inch slot screen-#20/40 prepack
- a) Material added to filter: #10/20 silica sand
- b) Quantity used: 2.25 x 50 lb bags

6- Type of annular seal: 1/4-inch bentonite pellets/hydrated
- a) Quantity used: 0.4 x 5 gal bucket

7- Grout/Native backfill material: Native soil (6 ft to 2 ft bgs)
- a) Quantity used: N/A
- b) Method of placement: N/A

8- Frost protection: 3/8-inch pea gravel (11 ft to 6 ft bgs)
- a) Quantity used: 3 x 60 lb bags

9- Well Development
- a) Development method: Manual surge/ Electric submersible
- b) Development time: 200 min.
- c) Estimated purge volume: 30 gal

Comments

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
666984	CASTA-1	SHEET 1 OF 1

WELL CONSTRUCTION DATASHEET

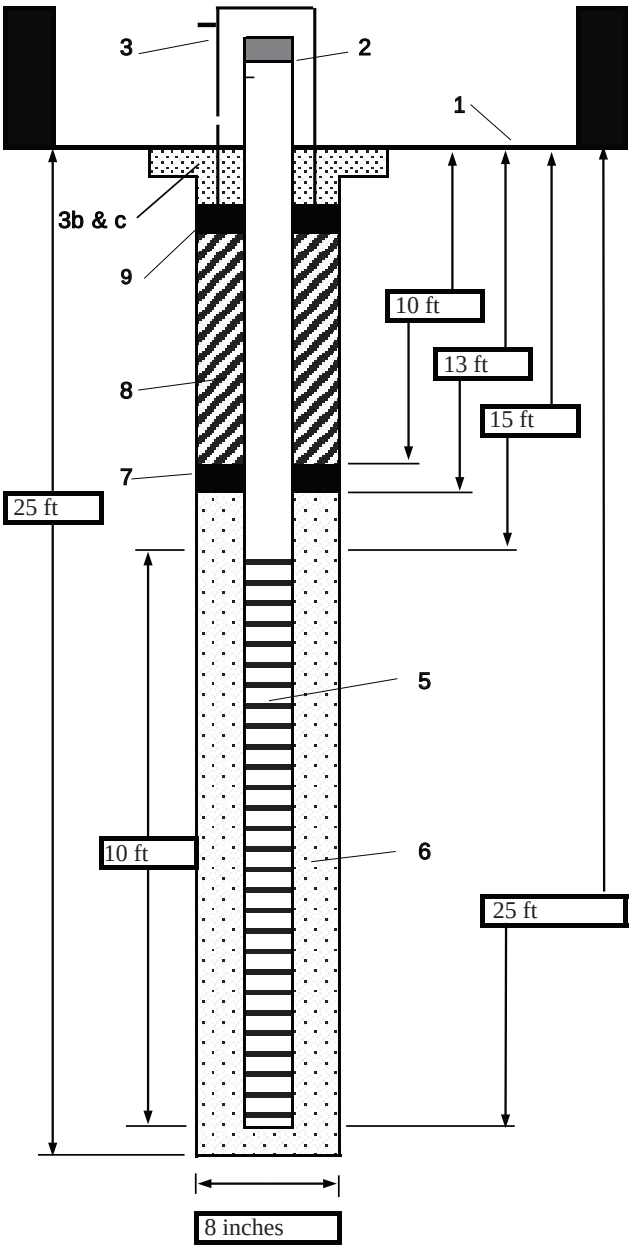
PROJECT : JBER PFCs Site Inspection LOCATION : Current AFFF Spray Test Area

DRILLING CONTRACTOR : GeoTek Alaska, Inc.

DRILLING METHOD AND EQUIPMENT USED : Geoprobe 8040DT - Macrocore (2 in. OD) / Hollow stem auger (8 in. OD)

WATER LEVELS : 15 ft bgs START : 7/13/2016 END : 7/13/2016 LOGGER : R. Caird/SAC

WELL MONUMENT TYPE: ABOVE-GROUND



1-	Ground elevation at well	152.43 ft (NAVD88) amsl
2-	Top of casing elevation	156.25 ft (NAVD88) amsl
	a) vent hole?	No
	b) locking cap installed?	Yes
3-	Wellhead protection cover type	6-inch steel casing
	a) weep hole?	No
	b) concrete type	Concrete mix (10 gal water/3 x 60 lb bags)
	c) concrete pad dimensions	16-inch Sonotube
4-	Dia./type of well casing	2-inch / SCH 40 PVC
5-	Type/slot size of screen filter	0.010-inch slot screen- #20/40 prepack
6-	Material added to screen filter	#10/20 silica sand
	a) Quantity used	1.5 x 50 lb bags
7-	Type of annular seal	3/8-inch bentonite chips
	a) Quantity used	0.5 x 50 lb bag
8-	Grout or native backfill	
	a) Material/Grout mix used	N/A
	b) Method of placement	N/A
	c) Vol. of well casing grout	N/A
9-	Frost protection	3/8-inch pea gravel
	a) Quantity used	4.5 x 60 lb bags
10-	Well protection bollards?	No
	a) Quantity used	N/A
	Development method	Manual surge/ Electric submersible
	Development time	80 min.
	Estimated purge volume	68 gal

Comments

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
666984	FASTA-1	SHEET 1 OF 1

WELL CONSTRUCTION DATASHEET

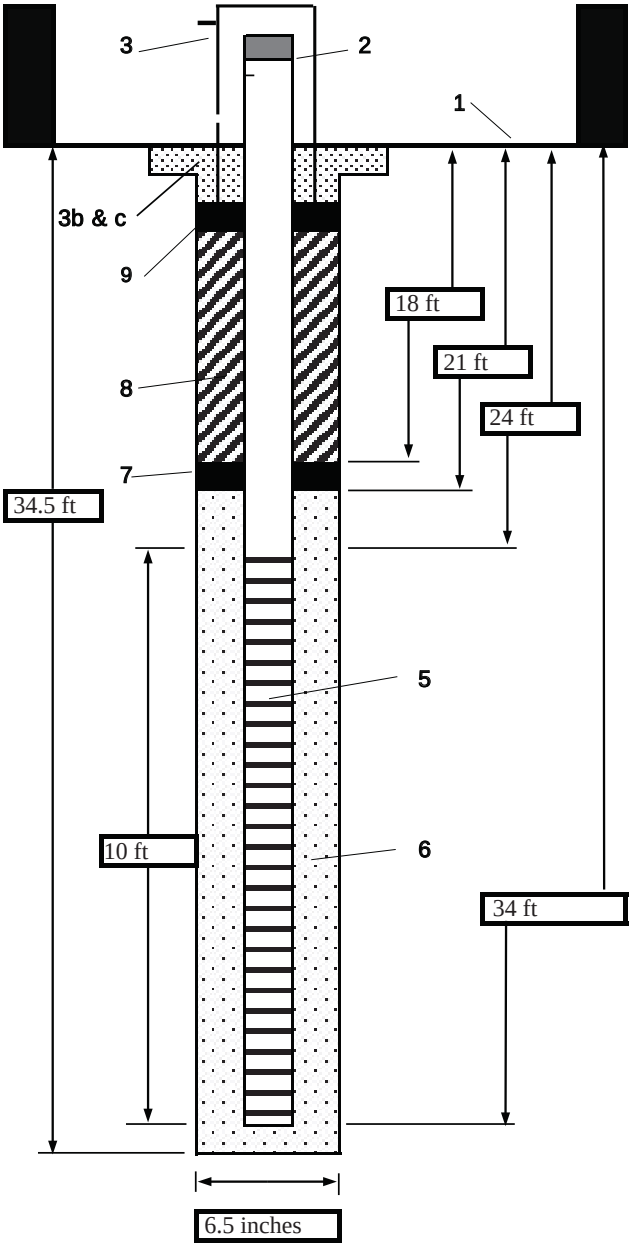
PROJECT : JBER PFCs Site Inspection LOCATION : Former AFFF Spray Test Area

DRILLING CONTRACTOR : GeoTek Alaska, Inc.

DRILLING METHOD AND EQUIPMENT USED : Geoprobe 8040DT / Hollow stem auger (6.5 in. OD)

WATER LEVELS : 13 ft bgs START : 7/12/2016 END : 7/13/2016 LOGGER : R. Caird/SAC

WELL MONUMENT TYPE: ABOVE-GROUND



1-	Ground elevation at well	151.34 ft (NAVD88) amsl
2-	Top of casing elevation	155.21 ft (NAVD88) amsl
	a) vent hole?	No
	b) locking cap installed?	Yes
3-	Wellhead protection cover type	6-inch steel pipe
	a) weep hole?	No
	b) concrete type	Concrete mix (6 gal water/2 x 60 lb bags)
	c) concrete pad dimensions	16-inch Sonotube
4-	Dia./type of well casing	2-inch / SCH 40 PVC
5-	Type/slot size of screen filter	0.010-inch slot screen- #20/40 prepack
6-	Material added to screen filter	#10/20 silica sand
	a) Quantity used	3 x 50 lb bags
7-	Type of annular seal	1/4-inch bentonite pellets
	a) Quantity used	0.5 x 50 lb bag
8-	Grout or native backfill	
	a) Material/Grout mix used	Bentonite grout/3/8-inch bentonite chips
	b) Method of placement	Surface pour via augers
	c) Vol. of well casing grout	0.5 x 50 lb bag / 0.5 x 50 lb bag
9-	Frost protection	3/8-inch pea gravel
	a) Quantity used	3 x 60 lb bags
10-	Well protection bollards?	No
	a) Quantity used	N/A
	Development method	Manual surge/ Electric submersible
	Development time	138 min.
	Estimated purge volume	21 gal

Comments

CH2MHILL

PROJECT NUMBER 666984

WELL NUMBER H5-1

WELL CONSTRUCTION DATASHEET

PROJECT : JBER PFCs Site Inspection

LOCATION : Hangar 5 (Building 7309)

DRILLING CONTRACTOR : GeoTek Alaska, Inc.

DRILLING METHOD AND EQUIPMENT USED : Geoprobe 8040DT - Macrocore (2 in. OD) / Hollow stem auger (8 in. OD)

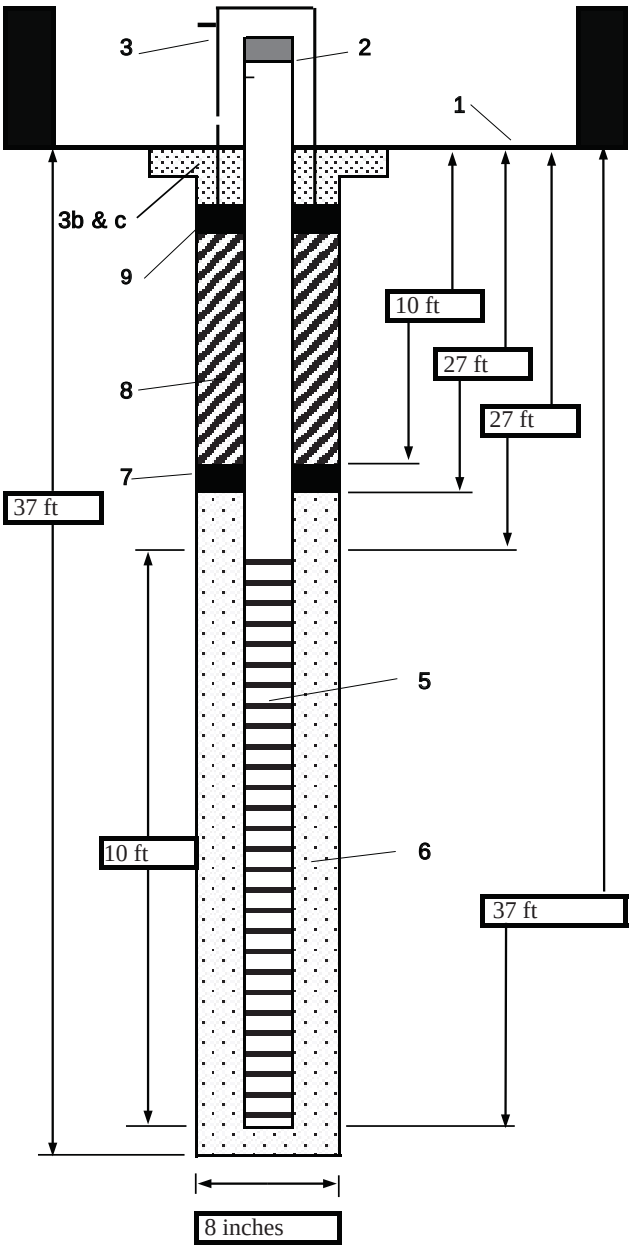
WATER LEVELS : 24 ft bgs

START : 7/13/2016

END : 7/13/2016

LOGGER : R. Caird/SAC

WELL MONUMENT TYPE: ABOVE-GROUND



1-	Ground elevation at well	155.19 ft (NAVD88) amsl
2-	Top of casing elevation	159.12 ft (NAVD88) amsl
	a) vent hole?	No
	b) locking cap installed?	Yes
3-	Wellhead protection cover type	6-inch steel casing
	a) weep hole?	No
	b) concrete type	Concrete mix (4 gal water/2 x 60 lb bags)
	c) concrete pad dimensions	16-inch Sonotube
4-	Dia./type of well casing	2-inch / SCH 40 PVC
5-	Type/slot size of screen	0.010-inch slot screen- #20/40 prepack
6-	Type screen filter	#10/20 silica sand
	a) Quantity used	1 x 50 lb bag
7-	Type of annular seal	3/8-inch bentonite chips
	a) Quantity used	5 x 50 lb bags
8-	Grout or native backfill	
	a) Material/Grout mix used	N/A
	b) Method of placement	N/A
	c) Vol. of well casing grout	N/A
9-	Frost protection	3/8-inch pea gravel
	a) Quantity used	6 x 60 lb bags
10-	Well protection bollards?	No
	a) Quantity used	N/A
	Development method	Manual surge/ Electric submersible
	Development time	168 min.
	Estimated purge volume	124 gal

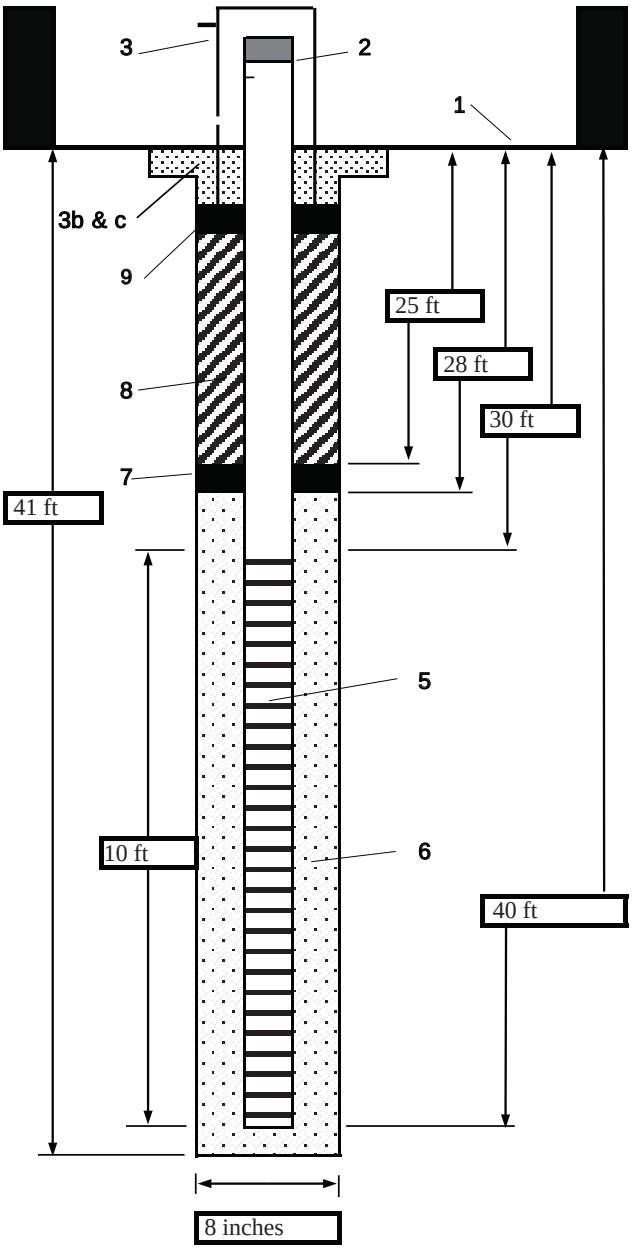
Comments

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
666984	FSFS-1	SHEET 1 OF 1

WELL CONSTRUCTION DATASHEET

PROJECT : JBER PFCs Site Inspection
LOCATION : Fire Suppression Foam Storage (Building 6210)
DRILLING CONTRACTOR : GeoTek Alaska, Inc.
DRILLING METHOD AND EQUIPMENT USED : Geoprobe 8040DT - Macrocore (2 in. OD) / Hollow stem auger (8 in. OD)
WATER LEVELS : 28 ft bgs
START : 7/14/2016
END : 7/14/2016
LOGGER : R. Caird/SAC
WELL MONUMENT TYPE: ABOVE-GROUND



1- Ground elevation at well: 146.6 ft (NAVD88) amsl

2- Top of casing elevation: 150.19 ft (NAVD88) amsl
a) vent hole?: No
b) locking cap installed?: Yes

3- Wellhead protection cover type: 6-inch steel casing
a) weep hole?: No
b) concrete type: Concrete mix (8 gal water / 2 x 60 lb bags)
c) concrete pad dimensions: 16-inch Sonotube

4- Dia./type of well casing: 2-inch / SCH 40 PVC

5- Type/slot size of screen filter: 0.010-inch slot screen - #20/40 prepack

6- Material added to screen filter: #10/20 silica sand
a) Quantity used: 5.5 x 50 lb bags

7- Type of annular seal: 1/4-inch bentonite pellets
a) Quantity used: 1 x 5 gal bucket

8- Grout or native backfill
a) Material/Grout mix used: 3/8-inch bentonite chips
b) Method of placement: Surface pour
c) Vol. of well casing grout: 5.5 x 50 lb bags

9- Frost protection: 3/8-inch pea gravel
a) Quantity used: 4 x 60 lb bags

10- Well protection bollards?: No
a) Quantity used: N/A

Development method: Manual surge/ Electric submersible

Development time: 97 min.

Estimated purge volume: 66 gal

Comments

CH2MHILL

PROJECT NUMBER 666984

WELL NUMBER AT029-1

SHEET 1 OF 1

WELL CONSTRUCTION DATASHEET

PROJECT : JBER PFCs Site Inspection

LOCATION : AT029 Ruff Road Fire Training Area

DRILLING CONTRACTOR : GeoTek Alaska, Inc.

DRILLING METHOD AND EQUIPMENT USED : Geoprobe 8040DT - DT45 Down-hole hammer (4.5 inch OD)

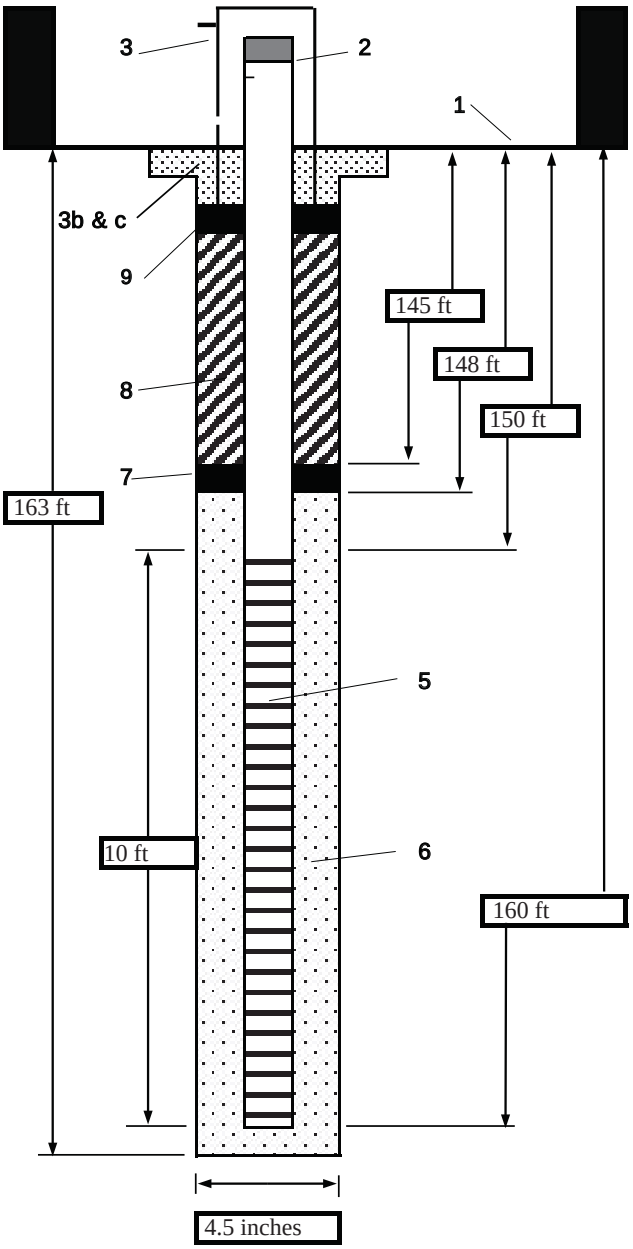
WATER LEVELS : 153 ft bgs

START : 7/16/2016

END : 7/16/2016

LOGGER : R. Caird/SAC

WELL MONUMENT TYPE: ABOVE-GROUND



1-	Ground elevation at well	395.63 ft (NAVD88) amsl
2-	Top of casing elevation	399.77 ft (NAVD88) amsl
	a) vent hole?	No
	b) locking cap installed?	Yes
3-	Wellhead protection cover type	6-inch steel casing
	a) weep hole?	No
	b) concrete type	Concrete mix (6 gal water/2 x 60 lb bags)
	c) concrete pad dimensions	16-inch Sonotube
4-	Dia./type of well casing	2-inch / SCH 40 PVC
5-	Type/slot size of screen filter	0.010-inch slot screen- #20/40 prepack
6-	Material added to screen filter	#10/20 silica sand
	a) Quantity used	1 x 50 lb bag
7-	Type of annular seal	1/4-inch bentonite pellets
	a) Quantity used	2.5 x 5 gal buckets
8-	Grout or native backfill	
	a) Material/Grout mix used	Bentonite grout/3/8-inch bentonite chips
	b) Method of placement	Surface pour via augers
	c) Vol. of well casing grout	1 x 50 lb bags / 8 x 50 lb bags
9-	Frost protection	3/8-inch pea gravel
	a) Quantity used	2 x 60 lb bags
10-	Well protection bollards?	No
	a) Quantity used	N/A
	Development method	Manual surge/ Electric submersible
	Development time	22 min.
	Estimated purge volume	25 gal

Comments

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
666984	FS7-1	SHEET 1 OF 1

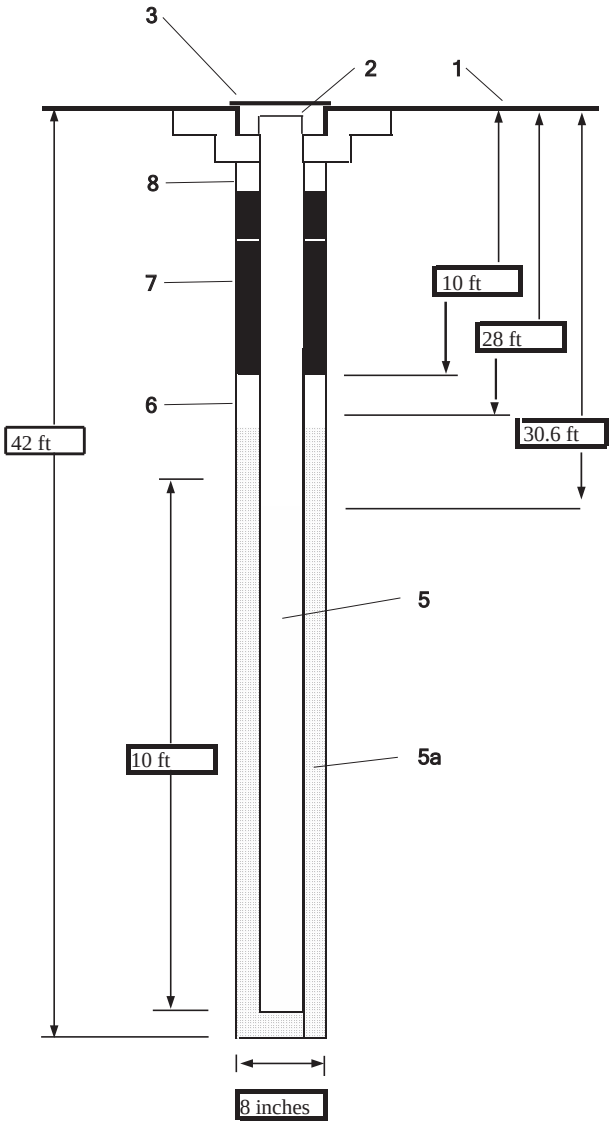
WELL COMPLETION DIAGRAM

PROJECT : JBER PFCs Site Inspection LOCATION : Fire Station 7 (Building 14431)

DRILLING CONTRACTOR : GeoTek Alaska, Inc.

DRILLING METHOD AND EQUIPMENT USED : Geoprobe 8040DT - Macrocore (2 in. OD)/Hollow stem auger (8 in. OD)

WATER LEVELS : 28 ft bgs START : 7/18/2016 END : 7/18/2016 LOGGER : R. Caird/SAC



1- Ground elevation at well: 189.67 ft (NAVD88) amsl

2- Top of casing elevation: 189.67 ft (NAVD88) amsl

3- Wellhead protection cover type: 8 in. x 12 in.steel cover
- a) Concrete pad dimensions: 16-inch Sonotube
- b) Drain tube?: No

4- Dia./type of well casing: 2-inch / SCH 40 PVC

5- Type/slot size of screen filter: 0.010-inch slot screen-#20/40 prepack
- a) Material added to filter: #10/20 silica sand
- b) Quantity used: 0.5 x 50lb bag

6- Type of annular seal: 3/8-inch bentonite chips/hydrated
- a) Quantity used: 10.5 x 50 lb bags

7- Grout/Native backfill material: N/A
- a) Quantity used: N/A
- b) Method of placement: N/A

8- Frost protection: 3/8-inch pea gravel (10 ft to 2 ft bgs)
- a) Quantity used: 3 x 60 lb bags

9- Well Development
- a) Development method: Manual surge/ Electric submersible
- b) Development time: 85 min.
- c) Estimated purge volume: 97 gal

Comments

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
666984	H10-1	SHEET 1 OF 1

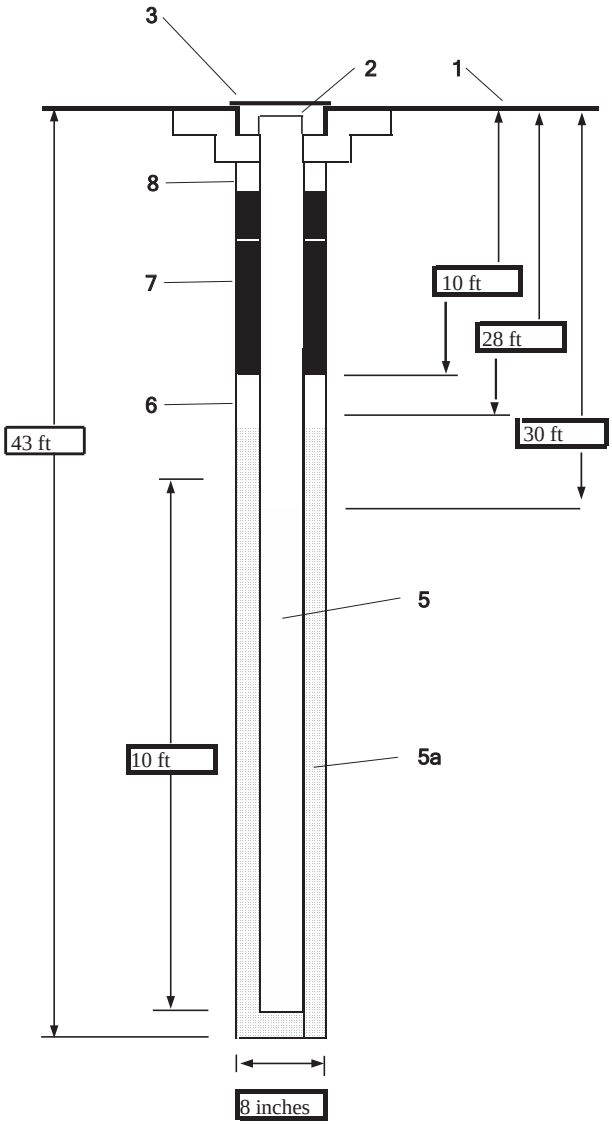
WELL COMPLETION DIAGRAM

PROJECT : JBER PFCs Site Inspection LOCATION : Hangar 10 (Building 15455)

DRILLING CONTRACTOR : GeoTek Alaska, Inc.

DRILLING METHOD AND EQUIPMENT USED : Geoprobe 8040DT - Macrocore (2 in. OD)/Hollow stem auger (8 in. OD)

WATER LEVELS : 28 ft bgs START : 7/19/2016 END : 7/20/2016 LOGGER : R. Caird/SAC



1- Ground elevation at well: 192.01 ft (NAVD88) amsl

2- Top of casing elevation: 192.01 ft (NAVD88) amsl

3- Wellhead protection cover type: 8 in. x 12 in.steel cover
- a) Concrete pad dimensions: 16-inch Sonotube
- b) Drain tube?: No

4- Dia./type of well casing: 2-inch / SCH 40 PVC

5- Type/slot size of screen filter: 0.010-inch slot screen-#20/40 prepack
- a) Material added to filter: #10/20 silica sand
- b) Quantity used: 0.5 x 50lb bag

6- Type of seal: 3/8-inch bentonite chips/hydrated
- a) Quantity used: 10 x 50 lb bags

7- Grout/Native backfill material: Native soil (10 ft to 1 ft bgs)
- a) Quantity used: N/A
- b) Method of placement: N/A

8- Frost protection: 3/8-inch pea gravel (10 ft to 2 ft bgs)
- a) Quantity used: 3 x 60 lb bags

9- Well Development
- a) Development method: Manual surge/ Electric submersible
- b) Development time: 72 min.
- c) Estimated purge volume: 58 gal

Comments

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
666984	FS1-1	SHEET 1 OF 1

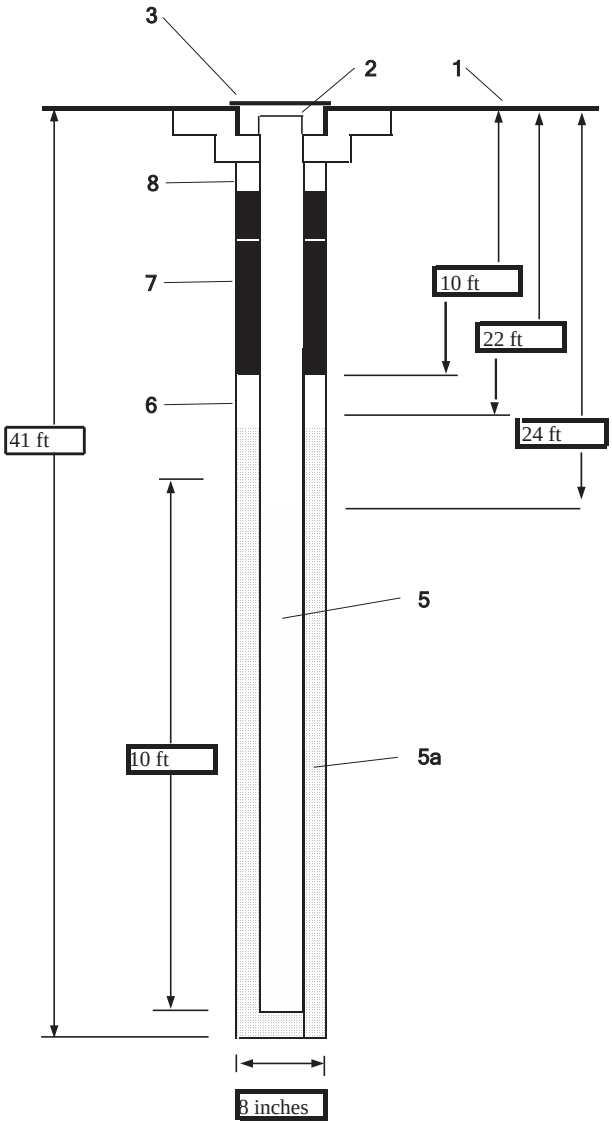
WELL COMPLETION DIAGRAM

PROJECT : JBER PFCs Site Inspection LOCATION : Fire Station 1 (Building 11415)

DRILLING CONTRACTOR : GeoTek Alaska, Inc.

DRILLING METHOD AND EQUIPMENT USED : Geoprobe 8040DT - Macrocore (2 in. OD)/Hollow stem auger (8 in. OD)

WATER LEVELS : 22 ft bgs START : 7/20/2016 END : 7/20/2016 LOGGER : R. Caird/SAC



1- Ground elevation at well: 177.54 ft (NAVD88) amsl

2- Top of casing elevation: 177.54 ft (NAVD88) amsl

3- Wellhead protection cover type: 8 in. x 12 in.steel cover
- a) Concrete pad dimensions: 16-inch Sonotube
- b) Drain tube?: No

4- Dia./type of well casing: 2-inch / SCH 40 PVC

5- Type/slot size of screen filter: 0.010-inch slot screen-#20/40 prepack
- a) Material added to filter: #10/20 silica sand
- b) Quantity used: 0.5 x 50 lb bag

6- Type of annular seal: 3/8-inch bentonite chips/hydrated
- a) Quantity used: 6.5 x 50 lb bags

7- Grout/Native backfill material: N/A
- a) Quantity used: N/A
- b) Method of placement: N/A

8- Frost protection: 3/8-inch pea gravel (10 ft to 2 ft bgs)
- a) Quantity used: 3 x 60 lb bags

9- Well Development
- a) Development method: Manual surge/ Electric submersible
- b) Development time: 60 min.
- c) Estimated purge volume: 70 gal

Comments: The borehole was overdrilled, so native soil was allowed to collapse back into borehole from TD (41 ft bgs) to planned bottom of screen at 35 ft bgs. Heave pushed the bottom of screen to 34 ft bgs, so screen was set from 34 to 24 ft bgs.

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
666984	FS5-1	SHEET 1 OF 1

WELL CONSTRUCTION DATASHEET

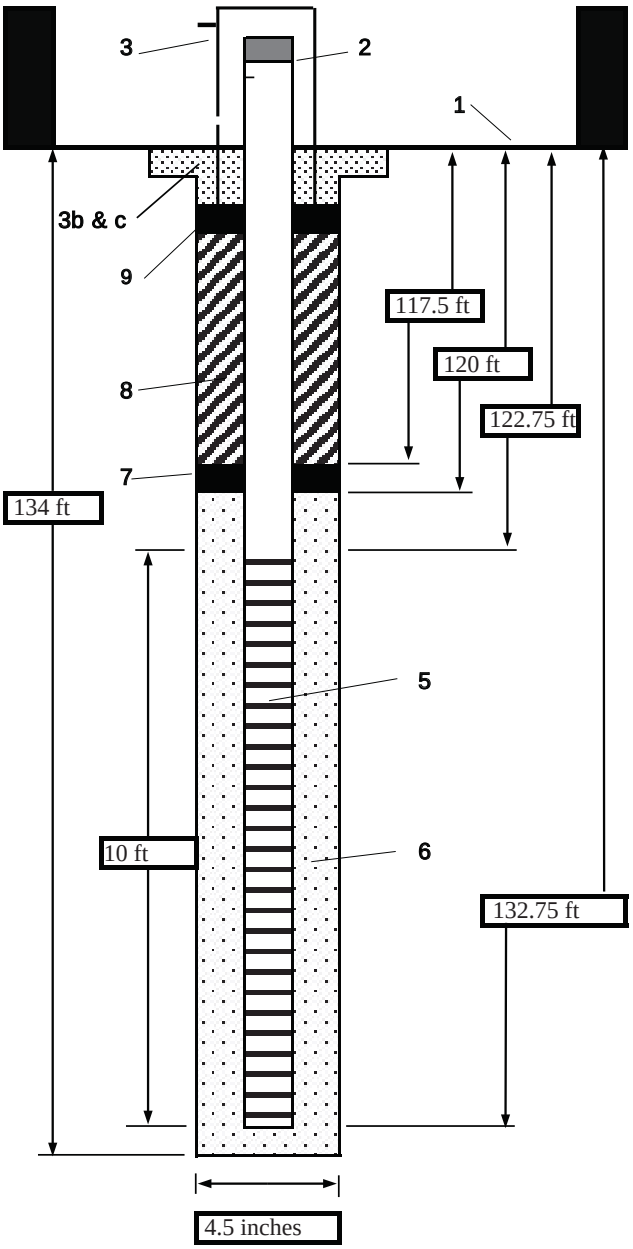
PROJECT : JBER PFCs Site Inspection LOCATION : Fire Station 5 (Building 48010)

DRILLING CONTRACTOR : GeoTek Alaska, Inc.

DRILLING METHOD AND EQUIPMENT USED : Geoprobe 8040DT/ DT45 Down-hole hammer (4.5 in. OD)

WATER LEVELS : 122 ft bgs START : 7/21/2016 END : 7/22/2016 LOGGER : R. Caird/SAC

WELL MONUMENT TYPE: ABOVE-GROUND



1-	Ground elevation at well	358.78 ft (NAVD88) amsl
2-	Top of casing elevation	362.88 ft (NAVD88) amsl
	a) vent hole?	No
	b) locking cap installed?	Yes
3-	Wellhead protection cover type	6-inch steel casing
	a) weep hole?	No
	b) concrete type	Concrete mix (5 gal water/2 x 60 lb bags)
	c) concrete pad dimensions	16-inch Sonotube
4-	Dia./type of well casing	2-inch / SCH 40 PVC
5-	Type/slot size of screen filter	0.010-inch slot screen-#20/40 prepack
6-	Material added to screen filter	#10/20 silica sand
	a) Quantity used	0.5 x 50lb bags
7-	Type of annular seal	1/4-inch bentonite pellets
	a) Quantity used	0.5 x 50 lb bag
8-	Grout or native backfill	
	a) Material/Grout mix used	Bentonite grout
	b) Method of placement	Surface pour via drive casing
	c) Vol. of well casing grout	75 gal water / 2 x 50 lb bags
9-	Frost protection	3/8-inch pea gravel (10 to 2 ft bgs)
	a) Quantity used	1 x 60 lb bag
10-	Well protection bollards?	No
	a) Quantity used	N/A
	Development method	Manual surge/ Electric submersible
	Development time	10 min.
	Estimated purge volume	40 gal

Comments

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
666984	H18-1	SHEET 1 OF 1

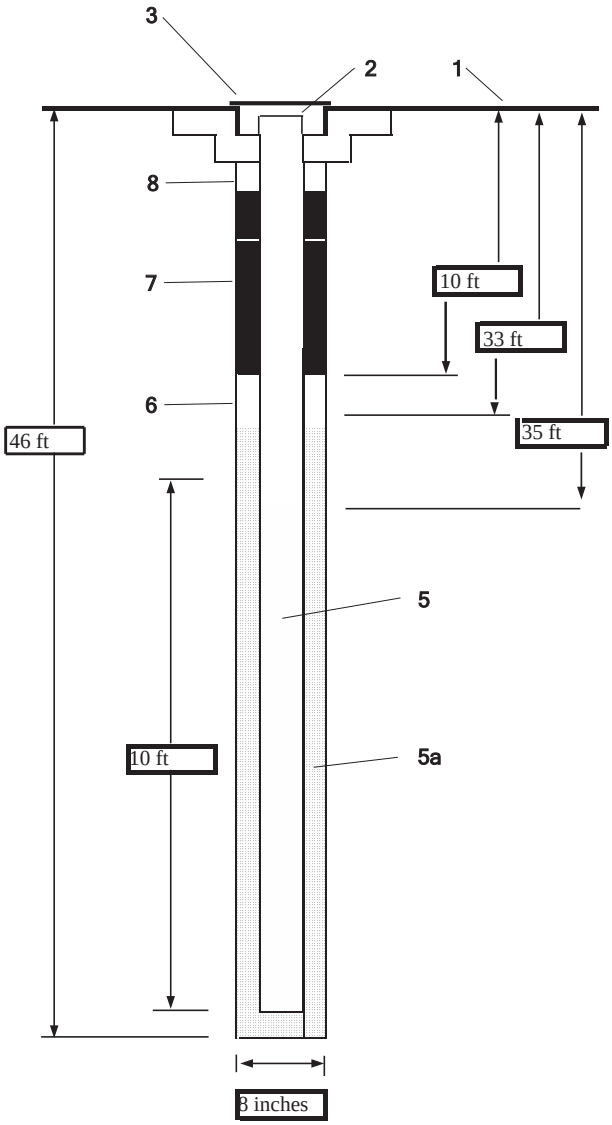
WELL COMPLETION DIAGRAM

PROJECT : JBER PFCs Site Inspection LOCATION : Hangar 18 (Building 17470)

DRILLING CONTRACTOR : GeoTek Alaska, Inc.

DRILLING METHOD AND EQUIPMENT USED : Geoprobe 8040DT - Macrocore (2 in. OD)/Hollow stem auger (8 in. OD)

WATER LEVELS : 35 ft bgs START : 7/23/2016 END : 7/23/2016 LOGGER : K. Butler/HNL



1- Ground elevation at well: 198.3 ft (NAVD88) amsl

2- Top of casing elevation: 198.3 ft (NAVD88) amsl

3- Wellhead protection cover type: 8 in. x 12 in.steel cover
- a) Concrete pad dimensions: 16-inch Sonotube
- b) Drain tube?: No

4- Dia./type of well casing: 2-inch / SCH 40 PVC

5- Type/slot size of screen filter: 0.010-inch slot screen-#20/40 prepack
- a) Material added to filter: #10/20 silica sand
- b) Quantity used: 1 x 50 lb bag

6- Type of annular seal: 3/8-inch bentonite chips/hydrated
- a) Quantity used: 5 x 50 lb bags

7- Grout/Native backfill material: N/A
- a) Quantity used: N/A
- b) Method of placement: N/A

8- Frost protection: 3/8-inch pea gravel (10 ft to 2 ft bgs)
- a) Quantity used: 6.5 x 60 lb bags

9- Well Development
- a) Development method: Manual surge/ Electric submersible
- b) Development time: 110 min.
- c) Estimated purge volume: 108 gal

Comments

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
666984	H8-1	SHEET 1 OF 1

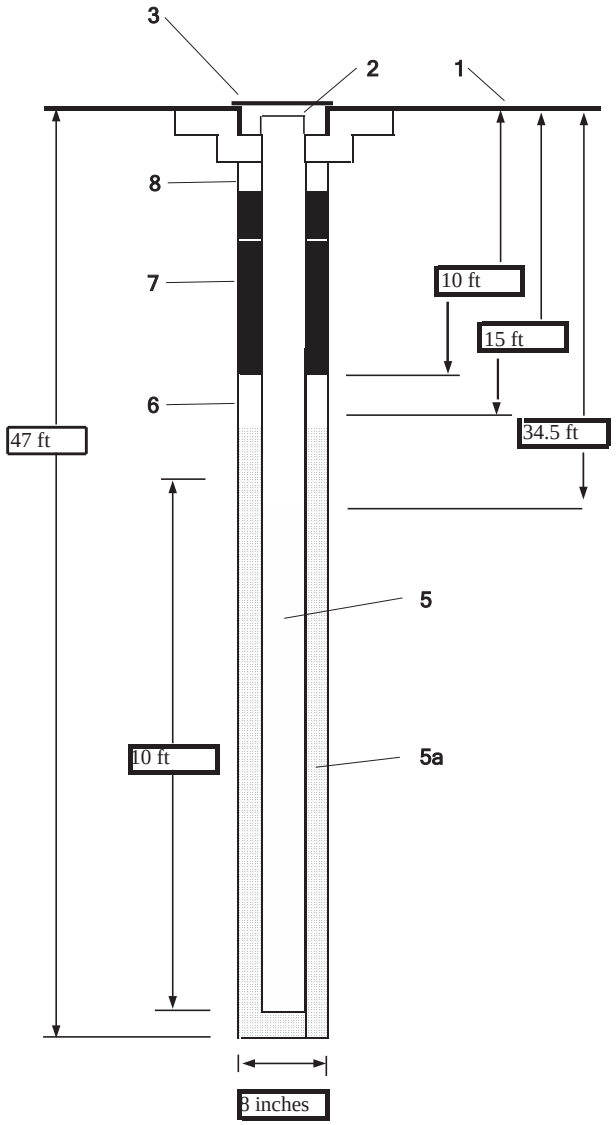
WELL COMPLETION DIAGRAM

PROJECT : JBER AFB PFCs Site Inspection LOCATION : Hangar 8 (Building 14410)

DRILLING CONTRACTOR : GeoTek Alaska, Inc.

DRILLING METHOD AND EQUIPMENT USED : Geoprobe 8040DT - Macrocore (2 in. OD)/Hollow stem auger (8 in. OD)

WATER LEVELS : 36 ft bgs START : 7/25/2016 END : 7/25/2016 LOGGER : K. Butler/HNL



1- Ground elevation at well: 183.96 ft (NAVD88) amsl

2- Top of casing elevation: 183.96 ft (NAVD88) amsl

3- Wellhead protection cover type: 8 in. x 12 in.steel cover
- a) Concrete pad dimensions: 16-inch Sonotube
- b) Drain tube?: No

4- Dia./type of well casing: 2-inch / SCH 40 PVC

5- Type/slot size of screen filter: 0.010-inch slot screen-#20/40 prepack
- a) Material added to filter: #10/20 silica sand
- b) Quantity used: 6.5 X 50 lb bags

6- Type of annular seal: 3/8-inch bentonite chips/hydrated
- a) Quantity used: 2.5 x 50 lb bags

7- Grout/Native backfill material: Native soil (33.5 ft to 15 ft bgs)
- a) Quantity used: N/A
- b) Method of placement: N/A

8- Frost protection: 3/8-inch pea gravel (15 to 10 ft bgs)
- a) Quantity used: 4.5 x 60 lb bags

9- Well Development
- a) Development method: Manual surge/ Electric submersible
- b) Development time: 199 min.
- c) Estimated purge volume: 45 gal

Comments

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
666984	H16-1	SHEET 1 OF 1

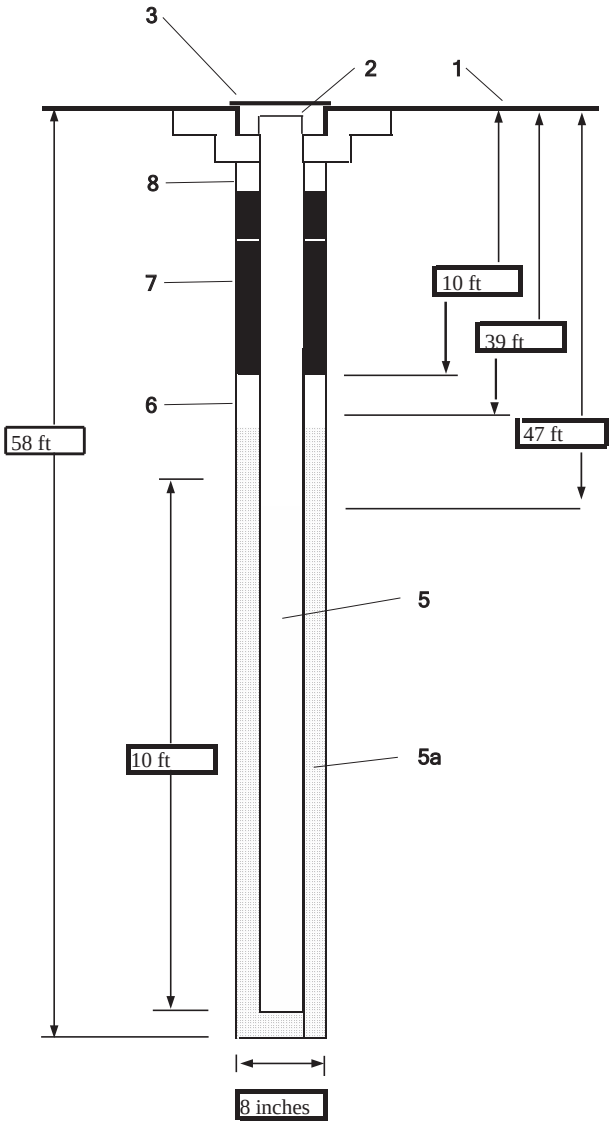
WELL COMPLETION DIAGRAM

PROJECT : JBER PFCs Site Inspection LOCATION : Hangar 16 (Building 15658)

DRILLING CONTRACTOR : GeoTek Alaska, Inc.

DRILLING METHOD AND EQUIPMENT USED : Geoprobe 8040DT - Macrocore (2 in. OD)/Hollow stem auger (8 in. OD)

WATER LEVELS : 47 ft bgs START : 7/26/2016 END : 7/26/2016 LOGGER : K. Butler/HNL



1- Ground elevation at well: 209.21 ft (NAVD88) amsl

2- Top of casing elevation: 209.21 ft (NAVD88) amsl

3- Wellhead protection cover type: 8 in. x 12 in.steel cover
- a) Concrete pad dimensions: 16-inch Sonotube
- b) Drain tube?: No

4- Dia./type of well casing: 2-inch / SCH 40 PVC

5- Type/slot size of screen filter: 0.010-inch slot screen-#20/40 prepack
- a) Material added to screen: #10/20 silica sand
- b) Quantity used: Unknown

6- Type of annular seal: 3/8-inch bentonite chips/hydrated
- a) Quantity used: 5 x 50 lb bags

7- Grout/Native backfill material: Native backfill (57 ft to 39 ft bgs)
- a) Quantity used: N/A
- b) Method of placement: N/A

8- Frost protection: 3/8-inch pea gravel (10 to 2 ft bgs)
- a) Quantity used: 10 x 60 lb bags

9- Well Development
- a) Development method: Manual surge/ Electric submersible
- b) Development time: 155 min.
- c) Estimated purge volume: 153 gal

Comments

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
666984	CHD-3	SHEET 1 OF 1

WELL CONSTRUCTION DATASHEET

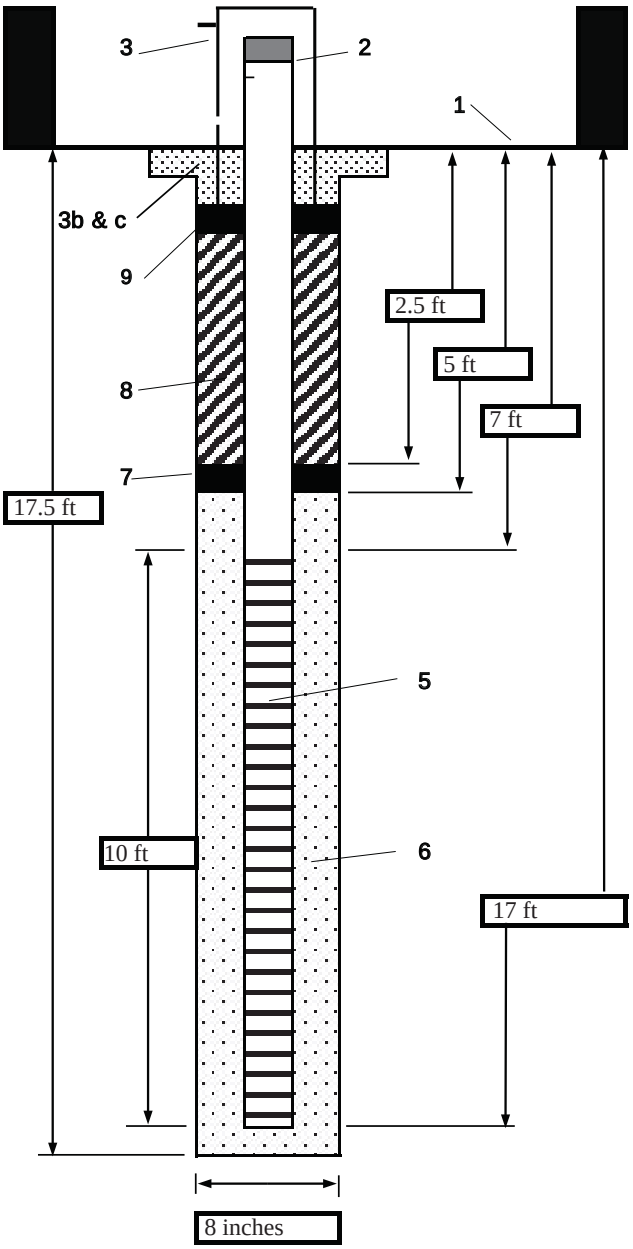
PROJECT : JBER PFCs Site Inspection LOCATION : Cherry Hill Ditch (SD052)

DRILLING CONTRACTOR : GeoTek Alaska, Inc.

DRILLING METHOD AND EQUIPMENT USED : Geoprobe 8040DT - Macrocore (2 in. OD) / Hollow stem auger (8 in. OD)

WATER LEVELS : 6 ft bgs START : 7/28/2016 END : 7/28/2016 LOGGER : K. Butler/HNL

WELL MONUMENT TYPE: ABOVE-GROUND



1-	Ground elevation at well	130.56 ft (NAVD88) amsl
2-	Top of casing elevation	133.96 ft (NAVD88) amsl
	a) vent hole?	No
	b) locking cap installed?	Yes
3-	Wellhead protection cover type	6-inch steel casing
	a) weep hole?	No
	b) concrete type	Concrete mix (5 gal water/2 x 60 lb bags)
	c) concrete pad dimensions	16-inch Sonotube
4-	Dia./type of well casing	2-inch / SCH 40 PVC
5-	Type/slot size of screen filter	0.010-inch slot screen- #20/40 prepack
6-	Material added to screen filter	#10/20 silica sand
	a) Quantity used	0.25 x 50 lb bag
7-	Type of annular seal	3/8-inch bentonite chips
	a) Quantity used	0.5 x 50 lb bag
8-	Grout or native backfill	
	a) Material/Grout mix used	N/A
	b) Method of placement	N/A
	c) Vol. of well casing grout	N/A
9-	Frost protection	N/A
	a) Quantity used	N/A
10-	Well protection bollards?	No
	a) Quantity used	N/A
	Development method	Manual surge/ Electric submersible
	Development time	81 min.
	Estimated purge volume	52 gal

Comments

CH2MHILL

PROJECT NUMBER 666984

WELL NUMBER CHD-1

SHEET 1 OF 1

WELL CONSTRUCTION DATASHEET

PROJECT : JBER PFCs Site Inspection

LOCATION : Cherry Hill Ditch (SD052)

DRILLING CONTRACTOR : GeoTek Alaska, Inc.

DRILLING METHOD AND EQUIPMENT USED : Geoprobe 8040DT - Macrocore (2 in. OD) / Hollow stem auger (8 in. OD)

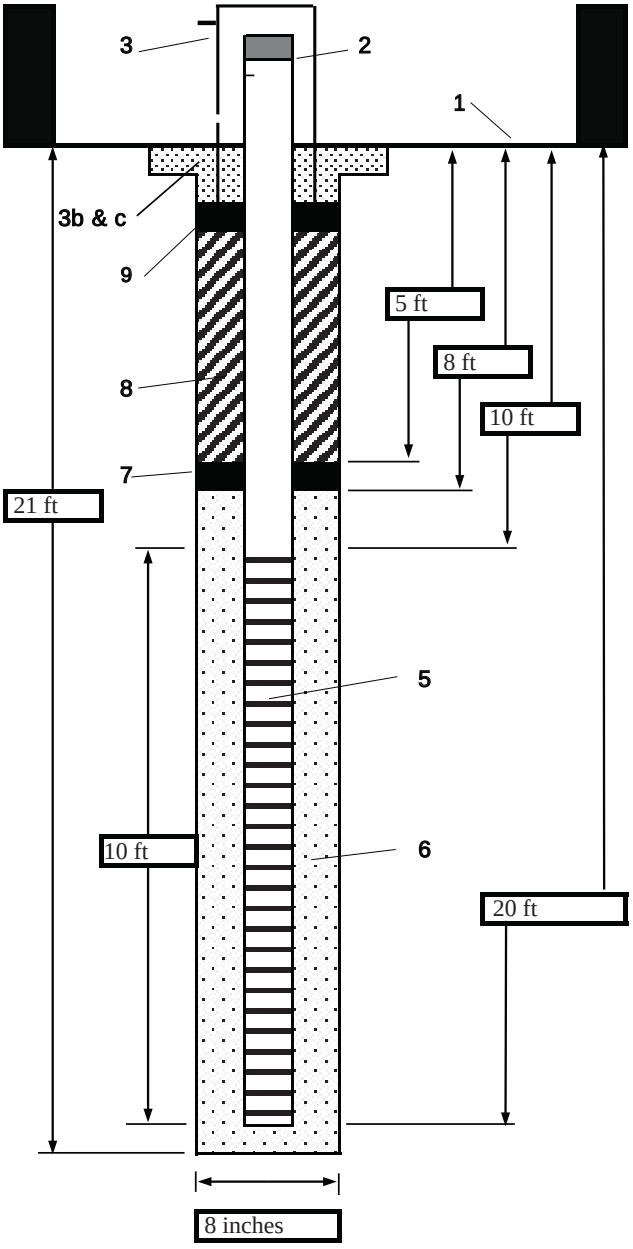
WATER LEVELS : 11 ft bgs

START : 7/29/2016

END : 7/29/2016

LOGGER : K. Butler/HNL

WELL MONUMENT TYPE: ABOVE-GROUND



1-	Ground elevation at well	143.31 ft (NAVD88) amsl
2-	Top of casing elevation	147.24 ft (NAVD88) amsl
	a) vent hole?	No
	b) locking cap installed?	Yes
3-	Wellhead protection cover type	6-inch steel casing
	a) weep hole?	No
	b) concrete type	Concrete mix (5 gal water/2 x 60 lb bags
	c) concrete pad dimensions	16-inch Sonotube
4-	Dia./type of well casing	2-inch / SCH 40 PVC
5-	Type/slot size of screen filter	0.010-inch slot screen- #20/40 prepack
6-	Material added to screen filter	#10/20 silica sand
	a) Quantity used	1 x 50 lb bag
7-	Type of annular seal	1/4-inch bentonite pellets
	a) Quantity used	0.25 x 5 gal bucket
8-	Grout or native backfill	
	a) Material/Grout mix used	3/8-inch bentonite chips
	b) Method of placement	Surface pour via augers
	c) Vol. of well casing grout	3 x 50 lb bags
9-	Frost protection	3/8-inch pea gravel
	a) Quantity used	1 x 60 lb bag
10-	Well protection bollards?	Yes
	a) Quantity used	2
	Development method	Manual surge/ Electric submersible
	Development time	40 min.
	Estimated purge volume	51.5 gal

Comments

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
666984	CHD-2	SHEET 1 OF 1

WELL CONSTRUCTION DATASHEET

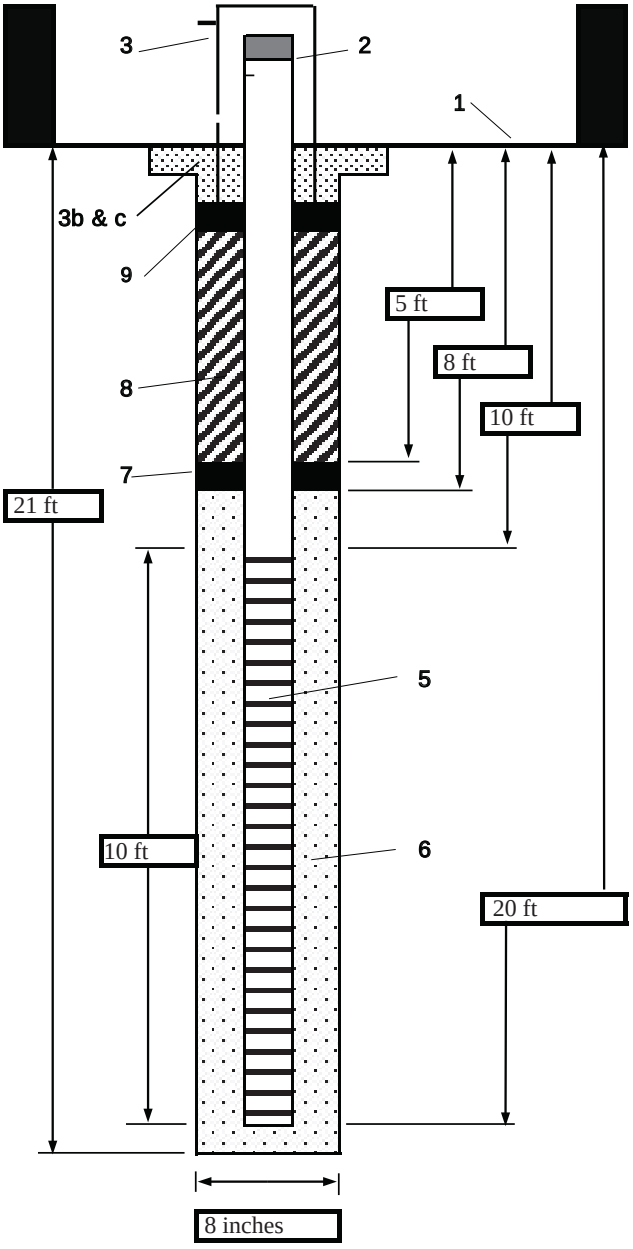
PROJECT : JBER PFCs Site Inspection LOCATION : Cherry Hill Ditch (SD052)

DRILLING CONTRACTOR : GeoTek Alaska, Inc.

DRILLING METHOD AND EQUIPMENT USED : Geoprobe 8040DT - Macrocore (2 in. OD) / Hollow stem auger (8 in. OD)

WATER LEVELS : 11 ft bgs START : 7/29/2016 END : 7/29/2016 LOGGER : K. Butler/HNL

WELL MONUMENT TYPE: ABOVE-GROUND



1- Ground elevation at well: 140.55 ft (NAVD88) amsl

2- Top of casing elevation: 144.54 ft (NAVD88) amsl
- a) vent hole?: No
- b) locking cap installed?: Yes

3- Wellhead protection cover type: 6-inch steel casing
- a) weep hole?: No
- b) concrete type: Concrete mix
- c) concrete pad dimensions: 16-inch Sonotube

4- Dia./type of well casing: 2-inch / SCH 40 PVC

5- Type/slot size of screen filter: 0.010-inch slot screen- #20/40 prepack

6- Material added to screen filter: #10/20 silica sand
- a) Quantity used: 2 x 50 lb bags

7- Type of annular seal: 1/4-inch bentonite pellets
- a) Quantity used: 0.75 x 5 gal bucket

8- Grout or native backfill
- a) Material/Grout mix used: 3/8 inch bentonite chips
- b) Method of placement: Surface pour via augers
- c) Vol. of well casing grout: 2 x 50 lb bags

9- Frost protection: 3/8-inch pea gravel
- a) Quantity used: 0.5 x 60 lb bag

10- Well protection bollards?: No
- a) Quantity used: N/A

Development method: Manual surge/ Electric submersible

Development time: 121 min.

Estimated purge volume: 45 gal

Comments

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
666984	CHD-4	SHEET 1 OF 1

WELL CONSTRUCTION DATASHEET

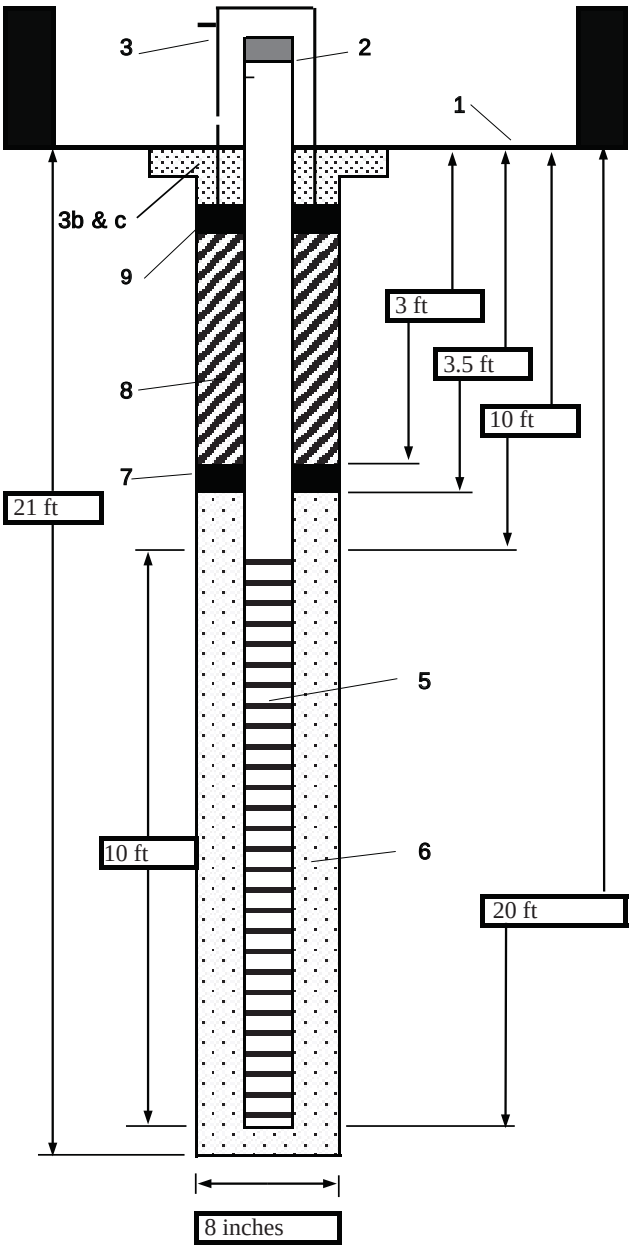
PROJECT : JBER PFCs Site Inspection LOCATION : Cherry Hill Ditch (SD052)

DRILLING CONTRACTOR : GeoTek Alaska, Inc.

DRILLING METHOD AND EQUIPMENT USED : Geoprobe 8040DT - Macrocore (2 in. OD) / Hollow stem auger (8 in. OD)

WATER LEVELS : 9 ft bgs START : 7/30/16 END : 7/30/16 LOGGER : K. Butler/HNL

WELL MONUMENT TYPE: ABOVE-GROUND



1-	Ground elevation at well	30.9 ft (NAVD88) amsl
2-	Top of casing elevation	34.99 ft (NAVD88) amsl
	a) vent hole?	No
	b) locking cap installed?	Yes
3-	Wellhead protection cover type	6-inch steel casing
	a) weep hole?	No
	b) concrete type	Concrete mix (5 gal water/2 x 60 lb bags)
	c) concrete pad dimensions	16-inch Sonotube
4-	Dia./type of well casing	2-inch / SCH 40 PVC
5-	Type/slot size of screen filter	0.010-inch slot screen-#20/40 prepack
6-	Material added to screen filter	#10/20 silica sand
	a) Quantity used	0.25 x 50 lb bag
7-	Type of annular seal	#10/20 silica sand
	a) Quantity used	0.25 x 50 lb bag
8-	Grout or native backfill	
	a) Material/Grout mix used	3/8-inch bentonite chips
	b) Method of placement	Surface pour
	c) Vol. of well casing grout	2 x 50 lb bags
9-	Frost protection	N/A
	a) Quantity used	N/A
10-	Well protection bollards?	Yes
	a) Quantity used	2
	Development method	Manual surge/ Electric submersible
	Development time	28 min.
	Estimated purge volume	27 gal

Comments

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
666984	H6-1	SHEET 1 OF 1

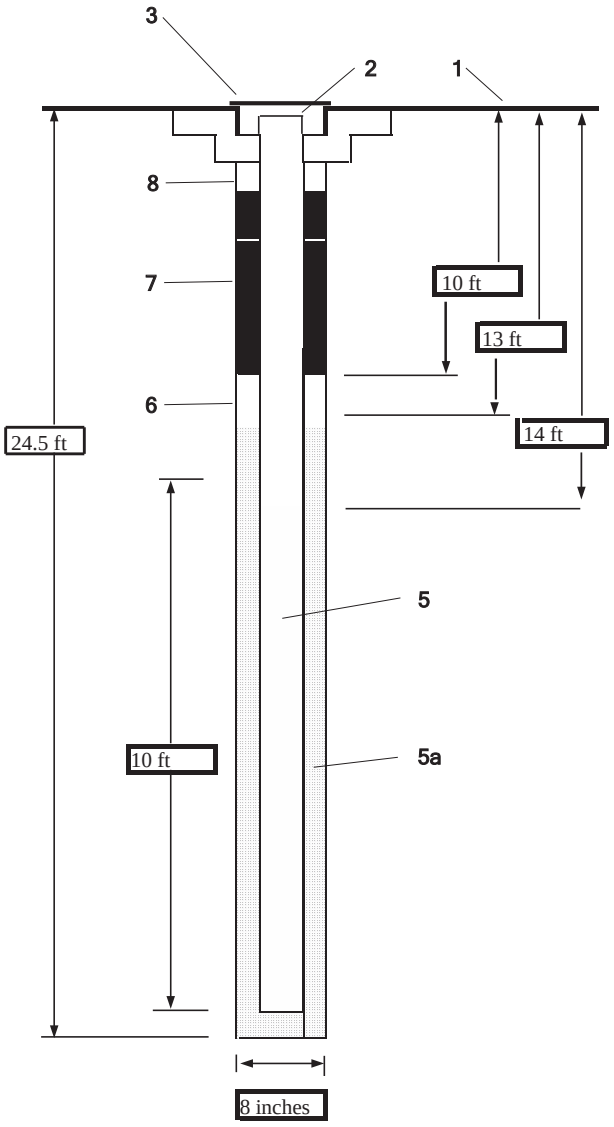
WELL COMPLETION DIAGRAM

PROJECT : JBER PFCs Site Inspection LOCATION : Hangar 6 (Building 9311)

DRILLING CONTRACTOR : GeoTek Alaska, Inc.

DRILLING METHOD AND EQUIPMENT USED : Geoprobe 8040DT - Macrocore (2 in. OD)/Hollow stem auger (8 in. OD)

WATER LEVELS : 13 ft bgs START : 8/1/2016 END : 8/1/2016 LOGGER : K. Butler/HNL



1- Ground elevation at well: 157.67 ft (NAVD88) amsl

2- Top of casing elevation: 157.67 ft (NAVD88) amsl

3- Wellhead protection cover type: 8 in. x 12 in.steel cover
- a) Concrete pad dimensions: 16-inch Sonotube
- b) Drain tube?: No

4- Dia./type of well casing: 2-inch / SCH 40 PVC

5- Type/slot size of screen: 0.010-inch slot screen - prepack
- a) Material used: #10/20 silica sand
- b) Quantity used: 4.5 x 50 lb bags

6- Type of seal: 3/8-inch bentonite chips/hydrated
- a) Quantity used: 1 x 50 lb bag

7- Grout/Native backfill material: N/A
- a) Quantity used: N/A
- b) Method of placement: N/A

8- Frost protection: 3/8-inch pea gravel
- a) Quantity used: 2 x 60 lb bags

9- Well Development
- a) Development method: Manual surge/ Electric submersible
- b) Development time: 195 min.
- c) Estimated purge volume: 140 gal

Comments

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
666984	H17-1	SHEET 1 OF 1

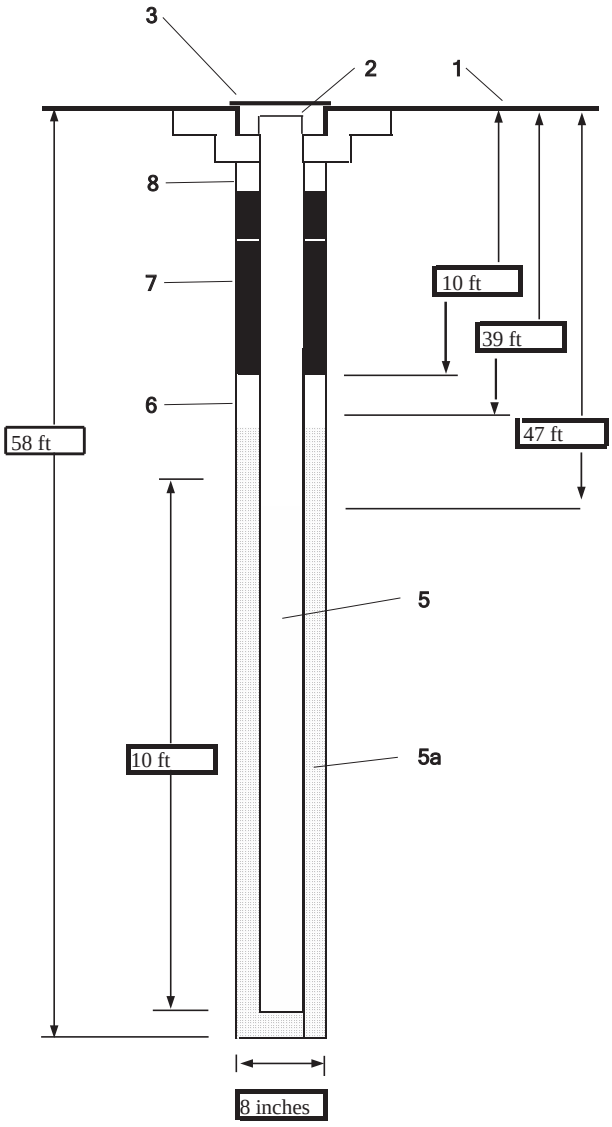
WELL COMPLETION DIAGRAM

PROJECT : JBER PFCs Site Inspection LOCATION : Hangar 17 (Building 16670)

DRILLING CONTRACTOR : GeoTek Alaska, Inc.

DRILLING METHOD AND EQUIPMENT USED : Geoprobe 8040DT - Macrocore (2 in. OD)/Hollow stem auger (8 in. OD)

WATER LEVELS : 45 ft bgs START : 8/2/2016 END : 8/2/2016 LOGGER : K. Butler/HNL



1- Ground elevation at well: 214.27 ft (NAVD88) amsl

2- Top of casing elevation: 214.27 ft (NAVD88) amsl

3- Wellhead protection cover type: 8 in. x 12 in.steel cover
- a) Concrete pad dimensions: 16-inch Sonotube
- b) Drain tube?: No

4- Dia./type of well casing: 2-inch / SCH 40 PVC

5- Type/slot size of screen filter: 0.010-inch slot screen-#20/40 prepack
- a) Material added to screen: #10/20 silica sand
- b) Quantity used: 0.5 x 50 lb bag

6- Type of annular seal: 1/4-inch bentonite pellets/hydrated
- a) Quantity used: 0.5 x 5 gal bucket

7- Grout/Native backfill material: Bentonite grout/3/8-inch betonite chips
- a) Quantity used: 1.5 x 50 lb bags / 1.5 x 50 lb bags
- b) Method of placement: Surface pour via augers

8- Frost protection: 3/8-inch pea gravel (8 ft to 2 ft bgs)
- a) Quantity used: 7.5 x 60 lb bags

9- Well Development
- a) Development method: Manual surge/ Electric submersible
- b) Development time: 183 min.
- c) Estimated purge volume: 104 gal

Comments

PROJECT NUMBER	WELL NUMBER	
666984	UC35A-1	SHEET 1 OF 1

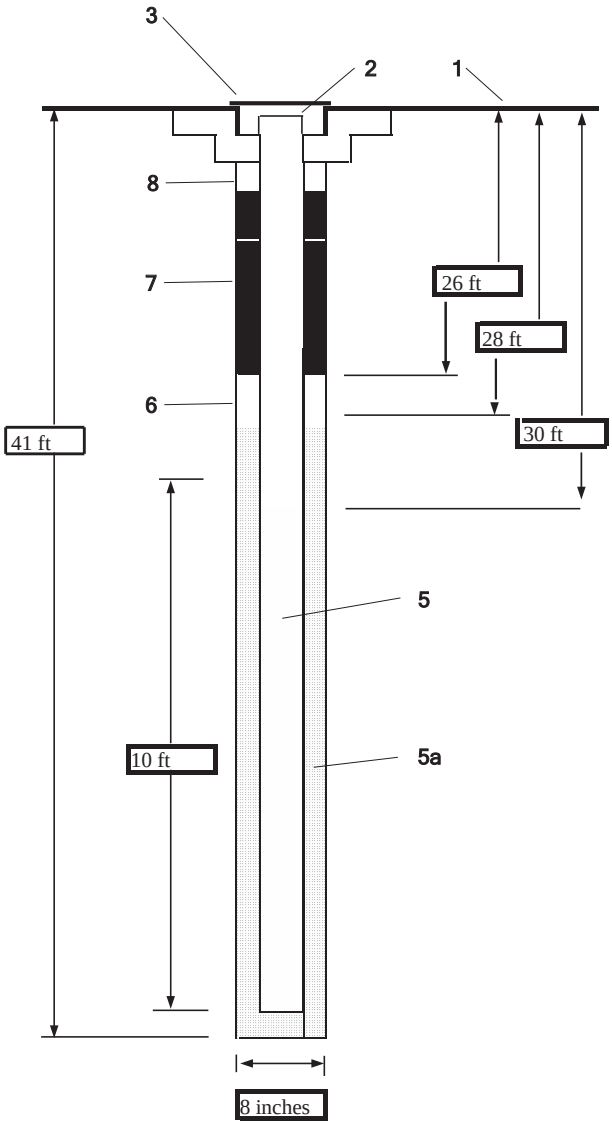
WELL COMPLETION DIAGRAM

PROJECT : JBER PFCs Site Inspection LOCATION : UC-35A Cessna Crash Location

DRILLING CONTRACTOR : GeoTek Alaska, Inc.

DRILLING METHOD AND EQUIPMENT USED : Geoprobe 8040DT - Macrocore (2 in. OD)/Hollow stem auger (8 in. OD)

WATER LEVELS : 23 ft bgs START : 8/3/2016 END : 8/3/2016 LOGGER : K. Butler/HNL



1-	Ground elevation at well	183.47 ft (NAVD88) amsl
2-	Top of casing elevation	183.47 ft (NAVD88) amsl
3-	Wellhead protection cover type	8 in. x 12 in.steel cover
	a) Concrete pad dimensions	16-inch Sonotube
	b) Drain tube?	No
4-	Dia./type of well casing	2-inch / SCH 40 PVC
5-	Type/slot size of screen filter	0.010-inch slot screen-#20/40 prepack
	a) Material added to screen	#10/20 silica sand
	b) Quantity used	0.25 x 50 lb (w/ native fill)
6-	Type of seal	1/4-inch bentonite pellets/hydrated
	a) Quantity used	0.25 x 5 gal bucket
7-	Grout/Native backfill material	Bentonite grout
	a) Quantity used	26 gal water / 1 x 50 lb bag
	b) Method of placement	Surface pour via augers
8-	Frost protection	3/8-inch pea gravel (10 ft to 2 t bgs)
	a) Quantity used	4 x 60 lb bags
9-	Well Development	
	a) Development method	Manual surge/ Electric submersible
	b) Development time	74 min.
	c) Estimated purge volume	89 gal

Comments

PROJECT NUMBER	WELL NUMBER	
666984	AT052-1	SHEET 1 OF 1

CH2MHILL

WELL CONSTRUCTION DATASHEET

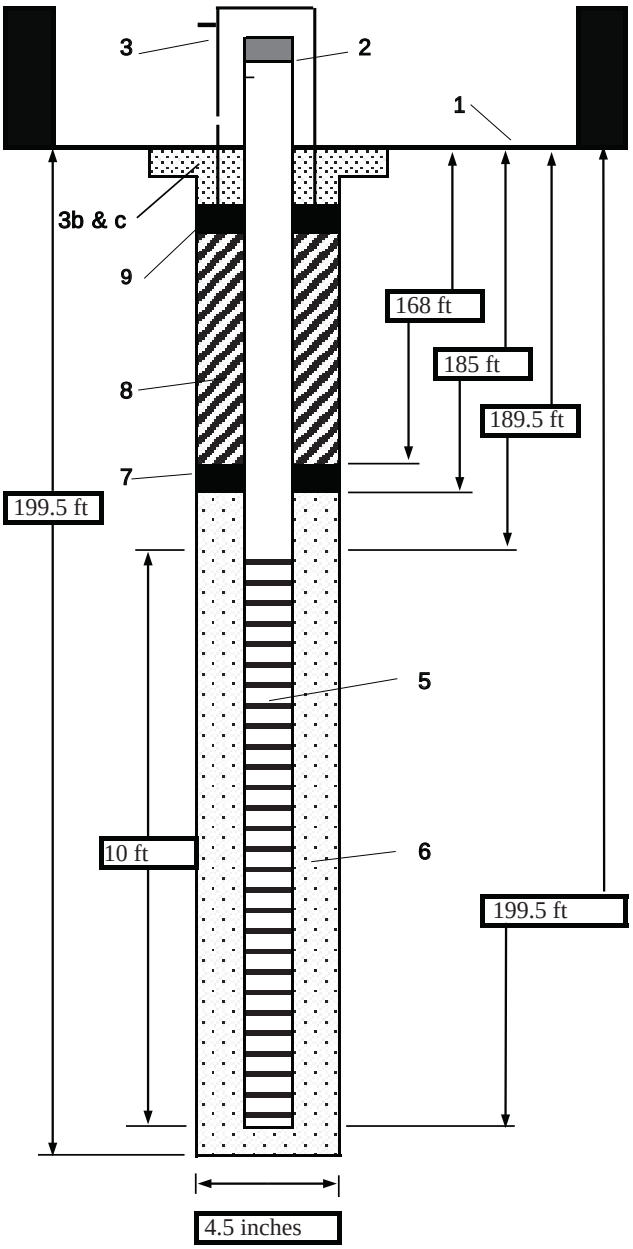
PROJECT : JBER PFCs Site Inspection LOCATION : AT052 Landfill Fire Training Area

DRILLING CONTRACTOR : GeoTek Alaska, Inc.

DRILLING METHOD AND EQUIPMENT USED : Geoprobe 8040DT / DT45 Downhole hammer (4.5 in. OD)

WATER LEVELS : 174 ft bgs START : 8/6/2016 END : 8/8/2016 LOGGER : K. Butler/HNL

WELL MONUMENT TYPE: ABOVE-GROUND



1-	Ground elevation at well	342.31 ft (NAVD88) amsl
2-	Top of casing elevation	346.11 ft (NAVD88) amsl
	a) vent hole?	No
	b) locking cap installed?	Yes
3-	Wellhead protection cover type	6-inch steel casing
	a) weep hole?	No
	b) concrete type	Concrete mix
	c) concrete pad dimensions	16-inch Sonotube
4-	Dia./type of well casing	2-inch / SCH 40 PVC
5-	Type/slot size of screen	0.010-inch slot screen- #20/40 prepack
6-	Material added to screen filter	Native backfill
	a) Quantity used	N/A
7-	Type of annular seal	1/4-inch bentonite pellets
	a) Quantity used	1 x 5 gal bucket
8-	Grout or native backfill	
	a) Material/Grout mix used	Bentonite grout
	b) Method of placement	Surface pour via drive casing
	c) Vol. of well casing grout	90 gal water/2 x 50 lb bags
9-	Frost protection	3/8-inch pea gravel
	a) Quantity used	4 x 60 lb bags
10-	Well protection bollards?	Yes
	a) Quantity used	2
	Development method	Manual surge/ Electric submersible
	Development time	30 min.
	Estimated purge volume	198 gal

Comments This was a redrill of original boring completed 7/5/2016.

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
666984	FS6-1	SHEET 1 OF 1

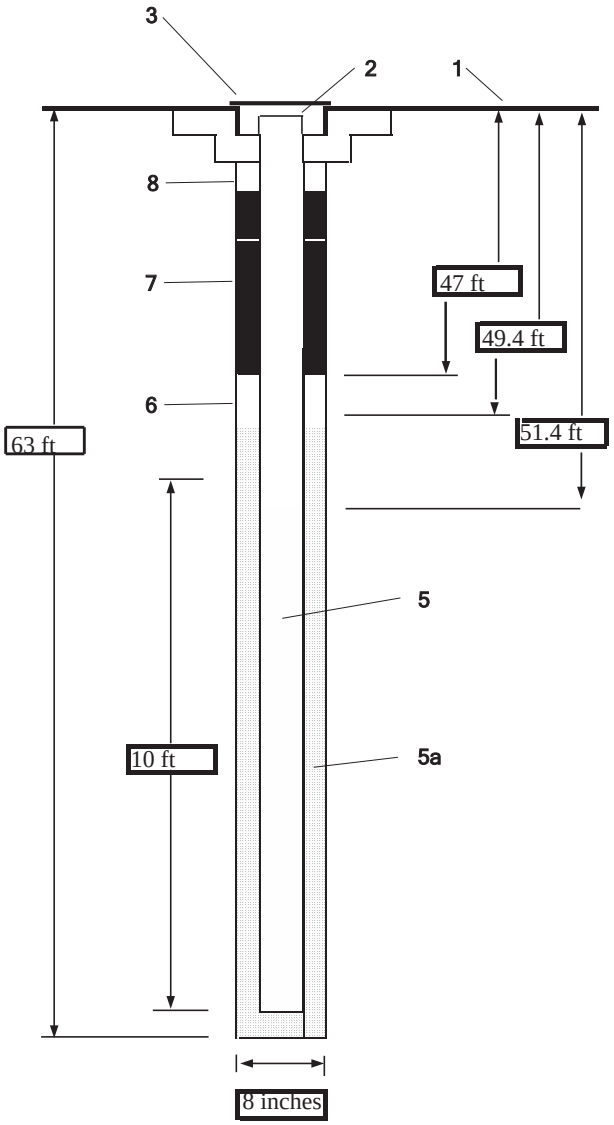
WELL COMPLETION DIAGRAM

PROJECT : JBER PFCs Site Inspection LOCATION : Fire Station 6 (Building 9311)

DRILLING CONTRACTOR : GeoTek Alaska, Inc.

DRILLING METHOD AND EQUIPMENT USED : Geoprobe 8040DT - Macrocore (2 in. OD)/Hollow stem auger (8 in. OD)

WATER LEVELS : 48 ft bgs START : 8/9/2016 END : 8/9/2016 LOGGER : K. Butler/HNL



1- Ground elevation at well: 218.63 ft (NAVD88) amsl

2- Top of casing elevation: 218.63 ft (NAVD88) amsl

3- Wellhead protection cover type: 8 in. x 12 in.steel cover
- a) Concrete pad dimensions: 16-inch Sonotube
- b) Drain tube?: No

4- Dia./type of well casing: 2-inch / SCH 40 PVC

5- Type/slot size of screen filter: 0.010-inch slot screen-#20/40 prepack
- a) Material added to screen: #10/20 silica sand
- b) Quantity used: 0.25 x 50 lb bag

6- Type of annular seal: 3/8-inch bentonite chips/hydrated
- a) Quantity used: 0.5 x 50 lb bag

7- Grout/Native backfill material: Bentonite grout/3/8-inch betonite chips
- a) Quantity used: 15 x 50 lb bags / 2 x 50 lb bags
- b) Method of placement: Surface pour via augers

8- Frost protection: 3/8-inch pea gravel (9 ft to 2 ft bgs)
- a) Quantity used: 6 x 60 lb bags

9- Well Development
- a) Development method: Manual surge/ Electric submersible
- b) Development time: 58 min.
- c) Estimated purge volume: 44 gal

Comments

CH2MHILL

PROJECT NUMBER 666984

WELL NUMBER E3-1

WELL CONSTRUCTION DATASHEET

PROJECT : JBER PFCs Site Inspection

LOCATION : E3/AWACS Crash Location

DRILLING CONTRACTOR : GeoTek Alaska, Inc.

DRILLING METHOD AND EQUIPMENT USED : Geoprobe 8040DT / DT45 Downhole hammer (4.5 in. OD)

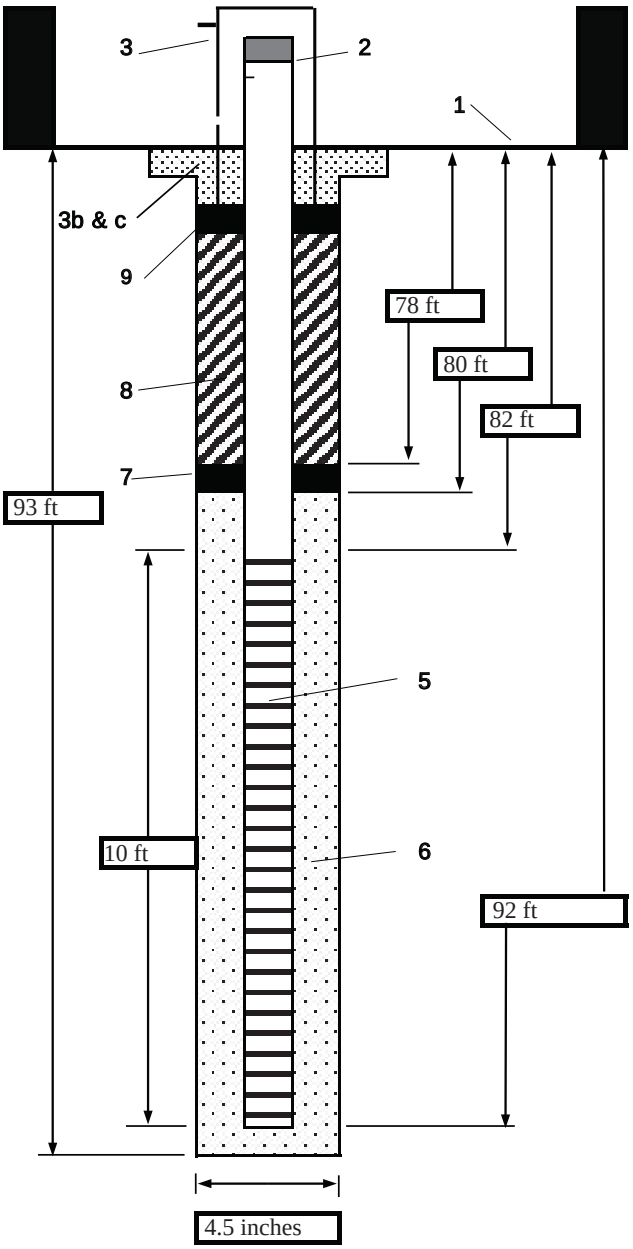
WATER LEVELS : 86 ft bgs

START : 8/13/2016

END : 8/13/2016

LOGGER : K. Butler/HNL

WELL MONUMENT TYPE: ABOVE-GROUND



1- Ground elevation at well: 252.34 ft (NAVD88) amsl

2- Top of casing elevation: 256.55 ft (NAVD88) amsl
- a) vent hole?: No
- b) locking cap installed?: Yes

3- Wellhead protection cover type: 6-inch steel casing
- a) weep hole?: No
- b) concrete type: Concrete mix (2 x 60 lb bags)
- c) concrete pad dimensions: 16-inch Sonotube

4- Dia./type of well casing: 2-inch / SCH 40 PVC

5- Type/slot size of screen: 0.010-inch slot screen - #20/40 prepack

6- Material added to screen filter: #10/20 silica sand
- a) Quantity used: 1 x 50 lb bag

7- Type of annular seal: 1/4-inch bentonite pellets
- a) Quantity used: 0.25 gal bucket

8- Grout or native backfill
- a) Material/Grout mix used: Bentonite grout
- b) Method of placement: Surface pour via drive casing
- c) Vol. of well casing grout: 37 gal water/ 1 x 50 lb bag

9- Frost protection: 3/8-inch pea gravel
- a) Quantity used: 4 x 60 lb bags

10- Well protection bollards?: Yes
- a) Quantity used: 2

Development method: Manual surge/ Electric submersible

Development time: 59 min.

Estimated purge volume: 39 gal

Comments

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
666984	SS108-1	SHEET 1 OF 1

WELL CONSTRUCTION DATASHEET

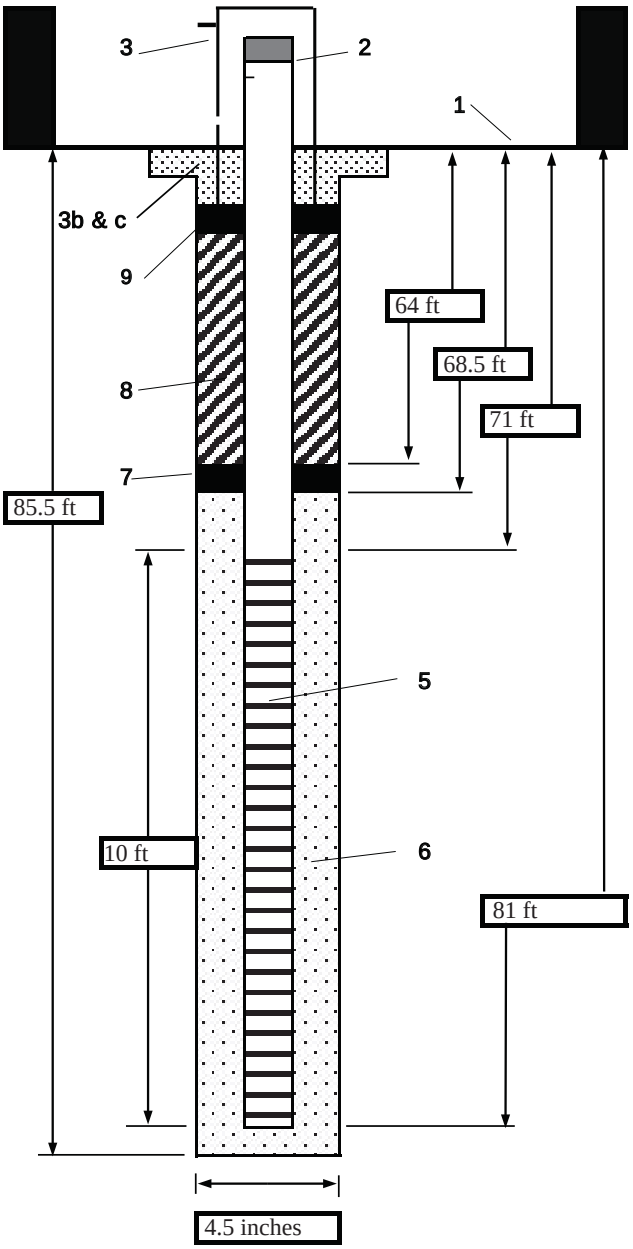
PROJECT : JBER PFCs Site Inspection LOCATION : SS108 C-17 Crash Location

DRILLING CONTRACTOR : GeoTek Alaska, Inc.

DRILLING METHOD AND EQUIPMENT USED : Geoprobe 8040DT/ DT45 Down-hole hammer (4.5 in. OD)

WATER LEVELS : 76 ft bgs START : 8/15/2016 END : 8/15/2016 LOGGER : K. Butler/HNL

WELL MONUMENT TYPE: ABOVE-GROUND



1- Ground elevation at well: 242.73 ft (NAVD88) amsl

2- Top of casing elevation: 246.33 ft (NAVD88) amsl
a) vent hole? No
b) locking cap installed? Yes

3- Wellhead protection cover type: 6-inch steel casing
a) weep hole? No
b) concrete type: Concrete mix
c) concrete pad dimensions: 16-inch Sonotube

4- Dia./type of well casing: 2-inch / SCH 40 PVC

5- Type/slot size of screen filter: 0.010-inch slot screen - #20/40 prepack

6- Material added to screen filter: #10/20 silica sand
a) Quantity used: 1.5 x 50 lb bags

7- Type of annular seal: 1/4-inch bentonite pellets
a) Quantity used: 0.5 x 5 gal bucket

8- Grout or native backfill
a) Material/Grout mix used: Bentonite grout/3/8-inch bentonite chips
b) Method of placement: Surface pour via drive casing
c) Vol. of well casing grout: 1 x 50 lb bag / 1 x 50 lb bag

9- Frost protection: 3/8-inch pea gravel (10 to 2 ft bgs)
a) Quantity used: 4 X 60 lb bags

10- Well protection bollards? Yes
a) Quantity used: 2

Development method: Manual surge/ Electric submersible

Development time: 110 min.

Estimated purge volume: 108 gal

Comments

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
666984	CHD-4a	SHEET 1 OF 1

WELL CONSTRUCTION DATASHEET

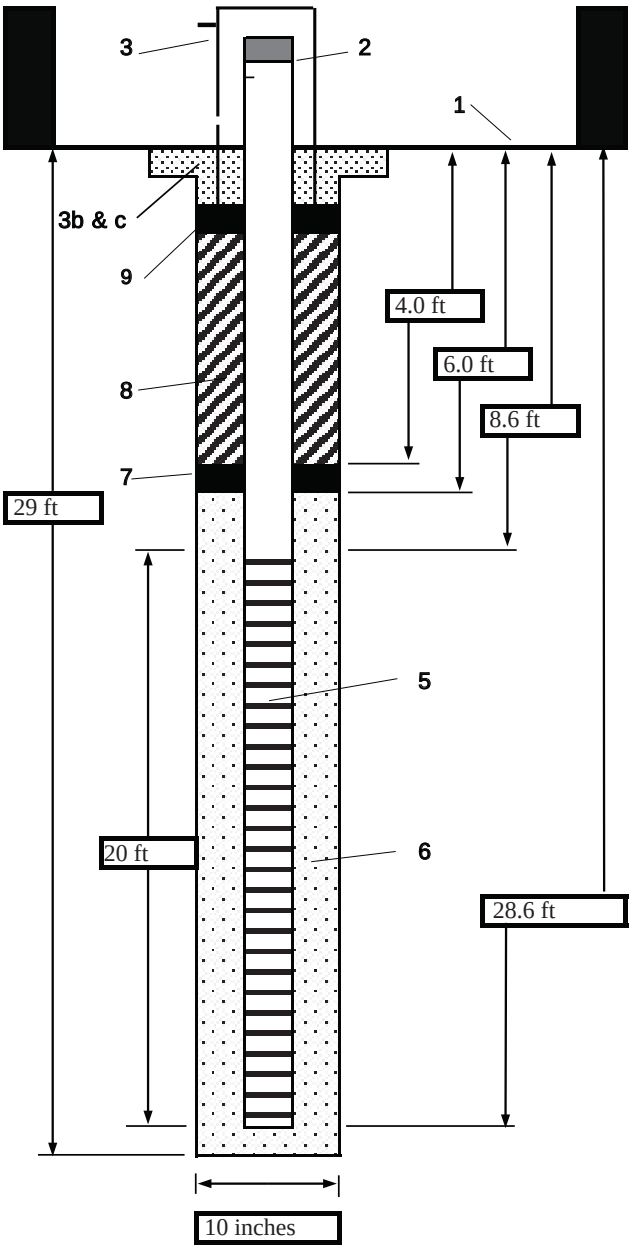
PROJECT : JBER PFCs Site Inspection LOCATION : Cherry Hill Ditch (SD052)

DRILLING CONTRACTOR : GeoTek Alaska, Inc.

DRILLING METHOD AND EQUIPMENT USED : Geoprobe 8040DT - Hollow stem auger (6.25 inch ID/ 10 inch.OD)

WATER LEVELS : 2.41 ft BTOC START : 8/28/2016 END : 8/30/2016 LOGGER : M. Bruno/ANC

WELL MONUMENT TYPE: ABOVE-GROUND



1-	Ground elevation at well	30.50 ft (NAVD88) amsl
2-	Top of casing elevation	32.47 ft (NAVD88) amsl
	a) vent hole?	No
	b) locking cap installed?	Yes
3-	Wellhead protection cover type	6-inch steel casing
	a) weep hole?	No
	b) concrete type	Concrete mix (5 gal water/2 x 60 lb bags)
	c) concrete pad dimensions	16-inch Sonotube
4-	Dia./type of well casing	2-inch / SCH 40 PVC
5-	Type/slot size of screen filter	0.010-inch slot screen - #20/40 prepack
6-	Material added to screen filter	#10/20 silica sand
	a) Quantity used	26.5 x 50 lb bags
7-	Type of annular seal	3/8-inch bentonite chips
	a) Quantity used	2 x 50 lb bags
8-	Grout or native backfill	
	a) Material/Grout mix used	N/A
	b) Method of placement	N/A
	c) Vol. of well casing grout	N/A
9-	Frost protection	3/8-inch pea gravel
	a) Quantity used	1 x 60 lb bag
10-	Well protection bollards?	No
	a) Quantity used	N/A
	Development method	Manual surge/ Electric submersible
	Development time	1316 min.
	Estimated purge volume	142 gal

Comments

Appendix A-3
Chain-of-Custody Forms

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

5755 8th Street East, Tacoma, WA 98424-1317 253-922-2310 FAX 922-5047
11922 E. First Ave., Spokane WA 99206-5302 509-924-9200 FAX 924-9290
9405 SW Nimbus Ave., Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: CH2M

REPORT TO: ~~bernice~~ (me), kidd@ch2m.com
ADDRESS: bernice.

PHONE: FAX:

INVOICE TO:

P.O. NUMBER:

TURNAROUND REQUEST in Business Days *

Organic & Inorganic Analyses: 10 STD. | 7 | 5 | 4 | 3 | 2 | 1 | <1

Petroleum Hydrocarbon Analyses: 5 STD. | 4 | 3 | 2 | 1 | <1

OTHER Specify: STD

* Turnaround Requests less than standard may incur Rush Charges.

PROJECT NAME: JBER

PROJECT NUMBER: 666984.02.03-01

SAMPLED BY: Jason Olds

PRESERVATIVE: 4°C

REQUESTED ANALYSES: WS-LC-0025 PFCs

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME		MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1	16Q2CFTA-2SO-~~JB~~	6/22/16	1115	S	2		
2	16Q2CFTA-3-SO-~~JB~~	6/24/16	1400	S	2		
3	~~16Q2CFTA~~						
4	16Q2-SOEB-JB01	6/25/16	1315	W	2		
5	16Q2-SOEB-JB02	6/25/16	1315	W	2		
6	16Q2-SOEB-JB03	6/25/16	1315	W	2		
7							
8							
9							
10							

RELEASED BY: [signature] DATE: 6/26/16
PRINT NAME: Morgan Bruno FIRM: CH2M TIME: 1800

RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:

RELEASED BY: DATE:
PRINT NAME: FIRM: TIME:

RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:

ADDITIONAL REMARKS:

TEMP:

PAGE 1 OF 1

TAL-1000 (0612)

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

5755 8th Street East, Tacoma, WA 98424-1317 253-922-2310 FAX 922-5047 ☐
11922 E. First Ave., Spokane WA 99206-5302 509-924-9200 FAX 924-9290 ☐
9405 SW Nimbus Ave., Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210 ☐
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210 ☒

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: CH2M

REPORT TO: bernice.kidd@ch2m.com
ADDRESS:

PHONE: FAX:

INVOICE TO:

P.O. NUMBER:

PROJECT NAME: JBER - PFC SI

PROJECT NUMBER: 660984.02.03.01

SAMPLED BY: Kenji Butler

TURNAROUND REQUEST
in Business Days *

Organic & Inorganic Analyses: [10] STD. [7] [5] [4] [3] [2] [1] [<1]

Petroleum Hydrocarbon Analyses: [5] STD. [4] [3] [2] [1] [<1]

[OTHER] Specify: STD

* Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	PRESERVATIVE: 4°C	REQUESTED ANALYSES: WSLL-0025	MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1	16Q2CFTA-1-SO-Ø	6/29/16 11:45	X	X	S	2		
2	16Q2CFTA-1-SD-ØMS	6/29/16 11:45	X	X	S	2		
3	16Q2CFTA-1-SO-ØSD	6/29/16 11:45	X	X	S	2		
4	16Q2-SOEB-JBØ4	6/30/16 1550	X	X	W	2		
5	16Q2-SOEB-JBØ5	6/30/16 1545	X	X	W	2		
6								
7								
8								
9								
10								

RELEASED BY:	DATE: 6/29/16 6/30/16	RECEIVED BY:	DATE:
PRINT NAME: MB Kenji Butler Morgan Blum FIRM: CH2M	TIME: 1430 1730	PRINT NAME: FIRM:	TIME:
RELEASED BY:	DATE:	RECEIVED BY:	DATE:
PRINT NAME: FIRM:	TIME:	PRINT NAME: FIRM:	TIME:

ADDITIONAL REMARKS:

TEMP:

PAGE 1 OF 1

TAL-1000 (0612)

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2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: CH2M

REPORT TO: BERNICE KIDD
ADDRESS: BERNICE.KIDD@CH2M.COM

PHONE: 530-229-3203 FAX:

INVOICE TO:

P.O. NUMBER:

PROJECT NAME: JBER - PFC SI

PROJECT NUMBER: 666984.02.03.01

SAMPLED BY: K. BUTLER / R. CAIRD

TURNAROUND REQUEST
in Business Days *

Organic & Inorganic Analyses
10 STD. | 7 | 5 | 4 | 3 | 2 | 1 | <1

Petroleum Hydrocarbon Analyses
5 STD. | 4 | 3 | 2 | 1 | <1

OTHER Specify: STD

* Turnaround Requests less than standard may incur Rush Charges.

PRESERVATIVE: 4°C

REQUESTED ANALYSES: PFCs WS-LC-0025

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	PFCs WS-LC-0025	MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1	16Q3AT052-1-SO-ϕ	7-5-2016 / 1225	✓	S	2	AT052-1	
2	16Q3FS4-1-SO-ϕ	7-6-2016 / 0950	✓	S	2	FS4-1	
3	16Q3CCH-1-SO-ϕ	7-7-2016 / 1250	✓	S	2	CCH-1	
4	16Q3CCH-1-SO-1	7-7-2016 / 1255	✓	S	2	CCH-1	
5							
6							
7							
8							
9							
10							

RELEASED BY:	DATE: 7/7/16	RECEIVED BY:	DATE:
PRINT NAME: (MB) Kenji Butler / Morgan Brund FIRM: CH2M	TIME: (KB) 1630 1530	PRINT NAME: FIRM:	TIME:
RELEASED BY:	DATE:	RECEIVED BY:	DATE:
PRINT NAME: FIRM:	TIME:	PRINT NAME: FIRM:	TIME:

ADDITIONAL REMARKS:

TEMP:

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2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: CH2M

INVOICE TO:

REPORT TO: BERNICE KIDD
ADDRESS: BERNICE.KIDD@CH2M.COM

PHONE: 530-229-3203 FAX:

P.O. NUMBER:

PROJECT NAME: JBER - PFC

PROJECT NUMBER: 666984.02.03.01

SAMPLED BY: K.BUTLER/HNL, M.BRUNO/ANC, R.CAIRD/SAC

TURNAROUND REQUEST

in Business Days *

Organic & Inorganic Analyses

10 (STD.) | 7 | 5 | 4 | 3 | 2 | 1 | <1

Petroleum Hydrocarbon Analyses

5 (STD.) | 4 | 3 | 2 | 1 | <1

OTHER Specify: STD

* Turnaround Requests less than standard may incur Rush Charges.

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	PRESERVATIVE	PFCs (MS-LC-0025)	GRO (AK101)	VOC (SW8260B)	DRO/RRO (AK102/AK103)	Herbicides (SW8151A)	RCRA Metals (SW7471A)	Mercury (SW6010B)	Pesticides (SW8082)	PCBs (SW8082A)	SVOCs (SW8270C)	pH (SW9045)			MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
			4°C	4°C	4°C HCl + Surr	4°C	4°C	4°C	4°C	4°C	4°C	4°C	4°C						
		REQUESTED ANALYSES																	
1 1603SS044-1-SO-0	7-9-2016 / 1310		✓													S	2	SS044-1	
2 1603FASTA-1-SO-0	7-11-2016 / 1505		✓													S	2	FASTA-1	
3 1603-JB-IDW01-SO	7-11-2016 / 1315			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	S	6	IDW D01 - D10	
4 1603-JB-IDW02-SO	7-11-2016 / 1405			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	S	6	IDW D011, D013 - D019	
5 1603-JB-IDW03-SO	7-11-2016 / 1445			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	S	6	IDW D023 - D026	
6 1603-JB-IDW04-SO	7-11-2016 / 1500			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	S	6	IDW D027 - D032	
7 1603-IDW-JB-TB01-SO	7-11-2016 / 0700			✓	✓											O	1	TRIP BLANK	
8 1603-JB-IDW05-SO	7-12-2016 / 1230			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	S	6	IDW D036 - D037	
9																			
10																			

RELEASED BY:		DATE: 7/12/16	RECEIVED BY:		DATE:
PRINT NAME: Morgan Brown	FIRM: CH2M	TIME: 1700	PRINT NAME:	FIRM:	TIME:
RELEASED BY:		DATE:	RECEIVED BY:		DATE:
PRINT NAME:	FIRM:	TIME:	PRINT NAME:	FIRM:	TIME:

ADDITIONAL REMARKS:

TEMP:

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2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: CH2M

INVOICE TO:

REPORT TO:
ADDRESS: bernice.kidd@ch2m.com

PHONE: 530-229-3303 FAX:

P.O. NUMBER:

PROJECT NAME: JBER PFC SI

PROJECT NUMBER: 666984.02.03.01

SAMPLED BY: R. Caird / M Bruno

TURNAROUND REQUEST
in Business Days *

Organic & Inorganic Analyses: 10 STD. | 7 | 5 | 4 | 3 | 2 | 1 | <1

Petroleum Hydrocarbon Analyses: 5 STD. | 4 | 3 | 2 | 1 | <1

OTHER Specify: STD

* Turnaround Requests less than standard may incur Rush Charges.

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	PRESERVATIVE	REQUESTED ANALYSES												MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
			PFCs ws-LC-0035	AK101 (GRO)	SW8260B (VOCs)	DRO/RRO AK102/103	Herbicides SW8151A	PCBs SW7471A	Hg SW7470A	Pesticides SW8082A	PCBs SW8082A	SVOCs SW8270C	pH SW9045D					
		4°C	MeOH	MeOH	4°C	4°C	4°C	4°C	4°C	4°C	4°C	4°C						
1	16Q3FS5-1-SO-0	7/12/16 1530	✓												S	4	Collect 60g EPA split	
2	16Q3CASTA-1-SO-0	7/13/16 1110	✓												S	2	Collect 60g EPA split	
3	16Q3-JB-IDW06-SO	7/13/16 1450		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		S	6		
4	16Q3H5-1-SO-0	7/13/16 1649	✓												S	2	Collect 60g EPA Split	
5	16Q3-JB-IDW07-SO	7/13/16 1840		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		S	6		
6	16Q3-IDW-JB02-SO	7/13/16 1400		✓	✓										O	1	Matrix = MeOH	
7	16Q3FSFS-1-SO-0	7/14/16 1310	✓												S	2	Collect 60g EPA split	
8																		
9																		
10																		

RELEASED BY: [signature]
PRINT NAME: Morgan Bruno FIRM: CH2M DATE: 7/14/16 TIME: 1600

RECEIVED BY:
PRINT NAME: FIRM: DATE: TIME:

RELEASED BY:
PRINT NAME: FIRM: DATE: TIME:

RECEIVED BY:
PRINT NAME: FIRM: DATE: TIME:

ADDITIONAL REMARKS:

TEMP:

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9405 SW Nimbus Ave., Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: CH2M

REPORT TO: BERNICE KIDD
ADDRESS: BERNICE.KIDD@CH2M.COM

PHONE: 530-229-3303 FAX:

INVOICE TO:

P.O. NUMBER:

PROJECT NAME: JBER-PFC

PROJECT NUMBER: 666484.02.03.01

SAMPLED BY: R.CAIRD/SAC

TURNAROUND REQUEST
in Business Days *
Organic & Inorganic Analyses: [10] STD. [7] [5] [4] [3] [2] [1] [<1]
Petroleum Hydrocarbon Analyses: [5] STD. [4] [3] [2] [1] [<1]
[OTHER] Specify: STD
* Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	PRESERVATIVE	PFCs (WS-LC-0025)	GRO (AK101)	VOC (SW8260B)	DRO/RRO (AK102/AK103)	Herbicides (SW8151A)	RCRA Metals (SW6010B)	Mercury (SW7471A)	Pesticides (SW8082)	PCBs (SW8082A)	SVOC (SW8270C)	PH (SW9045)	MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
				4°C	4°C MeOH +SURR	4°C MeOH +SURR	4°C	4°C	4°C	4°C	4°C	4°C	4°C	4°C				
			REQUESTED ANALYSES															
1	16Q3-JB-IDW08-SO	7-14-2016 / 1600			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	W	6	DØ46, DØ47	
2	16Q3-IDW-JB-TB03-SO	7-14-2016 / 0700			✓	✓									O	1		
3	16Q3ATØ29-1-SO-Ø ~~16Q3-IDW~~ RC	7-15-2016 / 1030		✓											S	2	COLLECT 60g EPA SPLIT	
4	16Q3ATØ29-1-SO-1	7-15-2016 / 1033		✓											S	2	COLLECT 60g EPA SPLIT	
5	16Q3FS7-1-SO-Ø	7/18/16 1235		✓											S	2	Collect 60g EPA SPLIT	
6	16Q3-JB-IDWØ9-SO	7/18/16 1550			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	S	6		
7																		
8																		
9																		
10																		

RELEASED BY: [signature] DATE: ~~6/16~~ 7/18/16
PRINT NAME: Morgan Bruno FIRM: CH2M TIME: 2030

RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:

RELEASED BY: DATE:
PRINT NAME: FIRM: TIME:

RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:

ADDITIONAL REMARKS:

TEMP:

PAGE 1 OF 1

TAL-1000 (0612)

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

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2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: CH2M

INVOICE TO:

REPORT TO: Berney Kidd
ADDRESS: bernice.kidd@cham.com

PHONE: 530-229-3303 FAX:

P.O. NUMBER:

PROJECT NAME: JBER PFC SI

PROJECT NUMBER: 666484.02.03.01

SAMPLED BY: R Caird / M Bruno / K Butler

TURNAROUND REQUEST
in Business Days *
Organic & Inorganic Analyses: 10 STD. | 7 | 5 | 4 | 3 | 2 | 1 | <1
Petroleum Hydrocarbon Analyses: 5 STD. | 4 | 3 | 2 | 1 | <1
OTHER Specify: STD
* Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	PRESERVATIVE	REQUESTED ANALYSES: PFC (MS-LC-0005)	GRO (AK101)	VOC (SW8260B)	RCRA/DRO (AK102/103)	Herbicides SW 8151A	RCRA Metals (SW6020A)	1-Hg (SW7470A)	Pesticides (SW8081B)	PCBs (SW8082A)	SVOCs (SW8270C)	pH (SW9045)	MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
			4°C	MeOH	MeOH	4°C	4°C	4°C	4°C	4°C	4°C	4°C	4°C					
1	16Q3-1DW-JB-TB01-SO	7/19/16 0800			X	X									O	1		
2	16Q3-JB-1DW10-SO	7/19/16 1310			X	X	X	X	X	X	X	X	X	X	S	6	D056-D057	
3	16Q3-JB-1DW11-SO	7/20/16 1220			X	X	X	X	X	X	X	X	X	X	S	6	D058, D059	
4	16Q3-JB-1DW12-SO	7/22/16 1600			X	X	X	X	X	X	X	X	X	X	S	6	D038, D039, D060, D061	
5	16Q3-JB-1DW13-SO	7/23/16 1245			X	X	X	X	X	X	X	X	X	X	S	6	D063, D064, D065	
6	16Q3-GWEB-JB01	7/20/16 1755	X												W	2	Drillers H2O	
7	16Q3-SDEB-JB01	7/21/16 1115	X												W	2	Bowl & spoon	
8	16Q3CHD-SW01-SW-0	7/21/16 0940	X												W	2		
9	16Q3CHD-SW01-SW-0MS	7/21/16 0940	X												W	2		
10	16Q3CHD-SW01-SW-0SD	7/21/16 0940	X												W	2		

RELEASED BY:		DATE: 7/24/16	RECEIVED BY:		DATE:
PRINT NAME: Maryen Bruno	FIRM: CH2M	TIME: 1600	PRINT NAME:	FIRM:	TIME:
RELEASED BY:		DATE:	RECEIVED BY:		DATE:
PRINT NAME:	FIRM:	TIME:	PRINT NAME:	FIRM:	TIME:

ADDITIONAL REMARKS:

TEMP:

PAGE 2 OF 2

TAL-1000 (0612)

Cooler 1 of 2

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

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9405 SW Nimbus Ave., Beaverton, OR 97008-7145 | 503-906-9200 | FAX 906-9210
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 | 907-563-9200 | FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: CH2M

REPORT TO: Berney kidd

ADDRESS: bernice.kidd@ ch2m.com

PHONE: 530-229-3203 FAX:

INVOICE TO:

P.O. NUMBER:

PROJECT NAME: JBER PFC SI

PROJECT NUMBER: 666984.02.03.01

SAMPLED BY: M Bruno

PRESERVATIVE: 4°C

TURNAROUND REQUEST in Business Days *

Organic & Inorganic Analyses: 10 (STD.) 7 5 4 3 2 1 <1

Petroleum Hydrocarbon Analyses: 5 (STD.) 4 3 2 1 <1

OTHER Specify: STD

* Turnaround Requests less than standard may incur Rush Charges.

REQUESTED ANALYSES

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	PFCs (WS-LC) 0025												MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1	16Q3CHD-SW01-SW-1	7/21/16 0950	X												W	2		
2	16Q3CHD-SD01-SD-0	7/21/16 0955	X												O	2	Collect 60g EPA split	
3	16Q3CHD-SD01-SD-0MS	7/21/16 0955	X												O	2	Collect 60g EPA split	
4	16Q3CHD-SD01-SD-0SD	7/21/16 0955	X												O	2	Collect 60g EPA split	
5	16Q3CHD-SD01-SD-1	7/21/16 1005	X												O	2	Collect 60g EPA split	
6																		
7																		
8																		
9																		
10																		

RELEASED BY: [signature] DATE: 7/24/16

PRINT NAME: Morgan Bruno FIRM: CH2M TIME: 1600

RECEIVED BY: DATE:

PRINT NAME: FIRM: TIME:

RELEASED BY: DATE:

PRINT NAME: FIRM: TIME:

RECEIVED BY: DATE:

PRINT NAME: FIRM: TIME:

ADDITIONAL REMARKS: Matrix O = Sediment

TEMP:

PAGE 2 OF 2

TAL-1000 (0612)

Cooler 1 of 2

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

5755 8th Street East, Tacoma, WA 98424-1317 253-922-2310 FAX 922-5047
11922 E. First Ave., Spokane WA 99206-5302 509-924-9200 FAX 924-9290
9405 SW Nimbus Ave., Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: CH2M

INVOICE TO:

REPORT TO: Berney Kidd
ADDRESS: bernice.kidd@ch2m.com

PHONE: 530-229-3303 FAX:

P.O. NUMBER:

TURNAROUND REQUEST in Business Days *

Organic & Inorganic Analyses: 10 STD. | 7 | 5 | 4 | 3 | 2 | 1 | <1

Petroleum Hydrocarbon Analyses: 5 STD. | 4 | 3 | 2 | 1 | <1

OTHER Specify: STD

* Turnaround Requests less than standard may incur Rush Charges

PROJECT NAME: SBER PFC SI

PROJECT NUMBER: 666484.02.03.01

SAMPLED BY: R Card / K Butler

PRESERVATIVE: 4°C

REQUESTED ANALYSES: PFC (537 Modified)

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	PFC (537 Modified)	MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1	16Q3H10-1-SO-0	7/19/16 1050	X	S	2	Collect 60g EPA Split	
2	16Q3FS1-1-SO-0	7/20/16 1000	X	S	2	Collect 60g EPA Split	
3	16Q3H18-1-SO-0	7/23/16 1025	X	S	2	Collect 60g EPA Split	
4	16Q3H18-1-SO-1	7/23/16 1030	X	S	2	Collect 60g EPA split	
5							
6							
7							
8							
9							
10							

RELEASED BY: [signature] DATE: 7/24/16
PRINT NAME: Morgan Bruno FIRM: CH2M TIME: 1600

RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:

RELEASED BY: DATE:
PRINT NAME: FIRM: TIME:

RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:

ADDITIONAL REMARKS:

TEMP:

PAGE 1 OF 1

TAL-1000 (0612)

Cooler 2 of 2

Chain of Custody Record

TestAmerica Sacramento
POC: David Alltucker
880 Riverside Parkway
West Sacramento, CA 95605
916.374.4383

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Regulatory Program: ☐DW ☐NPDES ☐RCRA ☐Other:

Client Contact	Project Manager: Cory Hinds/ANC	Site Contact: Berney Kidd	Date: 7/28/16	COC No: JBER-PFC-072816-01
CH2M HILL	Tel: 907-762-1369	Lab Contact: D. ALLTUCKER	Carrier: GOLDSTREAK	1 of 2 COCs PAGE
949 E 36th Ave	Analysis Turnaround Time			Sampler: KENJI BUTLER / TARA
Anchorage, AK 99508	☑CALENDAR DAYS ☐WORKING DAYS			For Lab Use Only: COLLEAR
530.229.3203 Phone	TAT if different from Below ___STD_____			Walk-in Client:
bernice.kidd@ch2m.com Email	☐ 2 weeks			Lab Sampling:
Project Name: JBER PFC Site Inspections	☐ 1 week			Job / SDG No.:
Site: JBER - Anchorage, AK	☐ 2 days			
PN# 666984.02.03.01	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	PFCs (WS-LC-0025)	GRO (AK101)	VOC (SW8260B)	DRO/RRO (AK102/AK103)	Herbicides (SW8151A)	RCRA Metals (SW7471A)	Mercury (SW6010B)	Pesticides (SW8082)	PCBs (SW8081A)	SVOCs (SW8270C)	pH (SW9045)	Sample Specific Notes:
								1	6	6	1	1	1	1	1	1	1	1	
16Q3-IDW-JB-TB05-SO	7/25/16	0700	G	Mequ	1	N	N		✓	✓									
16Q3H8-1-SO-0	7/25/16	1030	G (LAB)	S	2	N	N	✓											collect 60g EPA split
16Q3-JB-IDW14-SO	7/25/16	1410	G	S	6	N	N		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
16Q3/H17-1-SO-0 (MS)	7-27-16	1045	G	S	2	N	N	✓											collect 60g for EPA split

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= Other _Methanol_____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑Non-Hazard ☐Flammable ☐Skin Irritant ☐Poison B ☐Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐Return to Client ☑Disposal by Lab ☐Archive for_____ Months

Special Instructions/QC Requirements & Comments:
Report to: Bernice Kidd/CH2M 530.229.3203

Custody Seals Intact: ☐Yes ☐No	Custody Seal No.:		Cooler Temp. (°C): Obs'd:_____ Corr'd:_____ Therm ID No.:_____		
Relinquished by: David Alltucker	Company: CH2M	Date/Time: 7/28/16 1700	Received by: GOLDSTREAK	Company: 7/28/16	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Chain of Custody Record

TestAmerica Sacramento
POC: David Alltucker
880 Riverside Parkway
West Sacramento, CA 95605
916.374.4383

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program: ☐DW ☐NPDES ☐RCRA ☐Other:

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: Cory Hinds/ANC	Site Contact: Berney Kidd	Date: 7/28/16	COC No: JBER-PFC-072816-01
CH2M HILL	Tel: 907-762-1369	Lab Contact: D. ALLTUCKER	Carrier: GOLDSTREAK	2 of 2 COCs PAGE
949 E 36th Ave	Analysis Turnaround Time			Sampler: KENJI BUTLER / TARA
Anchorage, AK 99508	☑CALENDAR DAYS ☐WORKING DAYS			For Lab Use Only: COOLER
530.229.3203 Phone	TAT if different from Below ___STD_____			Walk-in Client:
bernice.kidd@ch2m.com Email	☐ 2 weeks			Lab Sampling:
Project Name: JBER PFC Site Inspections	☐ 1 week			Job / SDG No.:
Site: JBER - Anchorage, AK	☐ 2 days			
PN# 666984.02.03.01	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	PFCs (WS-LC-0025)	GRO (AK101)	VOC (SW8260B)	DRO/RRO (AK102/AK103)	Herbicides (SW8151A)	RCRA Metals (SW7471A)	Mercury (SW6010B)	Pesticides (SW8082)	PCBs (SW8081A)	SVOCs (SW8270C)	pH (SW9045)	Sample Specific Notes:
								1	6	6	1	1	1	1	1	1	1	1	
16Q3HI6-1-SO-Ø	7-26-16	1105	G	SO	2	N	N	X											Collect 60g EPA split
16Q3-JB-IDW15-SO	7-26-16	1420	C	SO	6	N	N		X	X	X	X	X	X	X	X	X	X	DØ68, DØ69, DØ70, DØ71
16Q3CHD-3-SO-1	7/28/16	1525	G	SO	2	N	N	X											Collect 60g EPA split
16Q3CHD-3-SO-Ø	7/28/16	1520	G	SO	2	N	N	X											Collect 60g EPA split

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= Other _Methanol_____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☑Non-Hazard ☐Flammable ☐Skin Irritant ☐Poison B ☐Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐Return to Client ☑Disposal by Lab ☐Archive for _____ Months

Special Instructions/QC Requirements & Comments:
Report to: Bernice Kidd/CH2M 530.229.3203

Custody Seals Intact: ☐Yes ☐No	Custody Seal No.:		Cooler Temp. (°C): Obs'd:_____ Corr'd:_____		Therm ID No.:_____
Relinquished by: David Tubbell	Company: CH2M	Date/Time: 7/28/16 1700	Received by: GOLDSTREAK	Company: 7/28/16	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.8, dated 11/04/2015

Chain of Custody Record

TestAmerica Sacramento
POC: David Alltucker
880 Riverside Parkway
West Sacramento, CA 95605
916.374.4383

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program: ☐DW ☐NPDES ☐RCRA ☐Other:

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: Cory Hinds/ANC	Site Contact: Berney Kidd	Date: ~~7/28/16~~ 08-04-16	COC No: JBER-PFC-080416-01
CH2M HILL	Tel: 907-762-1369	Lab Contact: DAVID ALLTUCKER	Carrier: Goldstreak	1 of 1 PAGE
949 E 36th Ave	Analysis Turnaround Time			Sampler: K. BUTLER + T. CALLEAR/CH2M
Anchorage, AK 99508	☑ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
530.229.3203 Phone	TAT if different from Below ___STD_____			Walk-in Client:
bernice.kidd@ch2m.com Email	☐ 2 weeks			Lab Sampling:
Project Name: JBER PFC Site Inspections	☐ 1 week			Job / SDG No.:
Site: JBER - Anchorage, AK	☐ 2 days			
PN# 666984.02.03.01	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	PFCs (WS-LC-0025) 1	GRO (AK101) 6	VOC (SW8260B) 6	DRO/RRO (AK102/AK103) 1	Herbicides (SW8151A) 1	RCRA Metals (SW7471A) 1	Mercury (SW6010B) 1	Pesticides (SW8082) 1	PCBs (SW8081A) 1	SVOCs (SW8270C) 1	pH (SW9045) 1	Dioxins/Furans (SW8290) 1	Sample Specific Notes:
16Q3 H6-1-SO-Ø	8-1-16	1145	G	S	2	N	N	X												Collect 60g EPA Split
16Q3-JB-IDW17-SO	8-1-16	1345	C	S	6	N	N		X	X	X	X	X	X	X	X	X	X	X	D086 & D087 drums
16Q3-JB-IDW16-SO	7-30-16	1645	C	S	6	N	N		X	X	X	X	X	X	X	X	X	X	X	D078, D080, D081, D082, D085 drums
16Q3 CHD-4-SO-Ø	7-30-16	1005	G	S	2	N	N	X												Collect 60g EPA Split
16Q3-JB-IDW18-SO	8-2-16	1650	C	S	6	N	N		X	X	X	X	X	X	X	X	X	X	X	D072, D073, D098, D099, D100, D101 drums
16Q3 UC35A-1-SO-Ø	8-3-16	0805	G	S	2	N	N	X												Collect 60g EPA split
16Q3-JB-IDW19-SO	8-3-16	1530	C	S	6	N	N		X	X	X	X	X	X	X	X	X	X	X	D102, D103, D104
16Q3-IDW-JB-TB016-SO	8-4-16	1030	G	MeOH	1	N	N		X	X										

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= Other _Methanol_____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:
Report to: Bernice Kidd/CH2M 530.229.3203

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C): Obs'd:_____ Corr'd:_____ Therm ID No.:_____			
Relinquished by:	Company: CH2M	Date/Time: 8/4/16 @ 1200	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.8, dated 11/04/2015

Chain of Custody Record

TestAmerica Sacramento
POC: David Alltucker
880 Riverside Parkway
West Sacramento, CA 95605
916.374.4383

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: Cory Hinds/ANC	Site Contact: Berney Kidd	Date: ~~7/28/16~~	COC No:
CH2M HILL	Tel: 907-762-1369	Lab Contact:	Carrier: Goldstreak	1 of 1 PAGE
949 E 36th Ave	Analysis Turnaround Time			Sampler:
Anchorage, AK 99508	☑ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
530.229.3203 Phone	TAT if different from Below ___STD___			Walk-in Client:
bernice.kidd@ch2m.com Email	☐ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day			Lab Sampling:
Project Name: JBER PFC Site Inspections				Job / SDG No.:
Site: JBER - Anchorage, AK				
PN# 666984.02.03.01				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	PFCs (WS-LC-0025)	GRO (AK101)	VOC (SW8260B)	DRO/RRO (AK102/AK103)	Herbicides (SW8151A)	RCRA Metals (SW7471A)	Mercury (SW6010B)	Pesticides (SW8082)	PCBs (SW8081A)	SVOCs (SW8270C)	pH (SW9045)	Dioxins/Furans (SW8290)	Sample Specific Notes:
								1	6	6	1	1	1	1	1	1	1	1	1	
16Q3CFTA-2-GW-Ø	8/8/16	1555	G	W	2	N	N	X												
16Q3FASTA-1-GW-Ø	8/9/16	1515	G	W	2	N	N	X												
16Q3CFTA-3-GW-Ø	8/10/16	1133	G	W	2	N	N	X												
16Q3CFTA-1-GW-Ø	8/10/16	1437	G	W	2	N	N	X												
16Q30U5MW-39-GW-Ø	8/10/16	1817	G	W	2	N	N	X												
16Q3CCH-1-GW-Ø	8/11/16	1037	G	W	2	N	N	X												
16Q3CCH-1-GW-1	8/11/16	1040	G	W	2	N	N	X												
16Q3CASTA-1-GW-Ø	8/11/16	1322	G	W	2	N	N	X												
16Q3H5-1-GW-Ø	8/11/16	1620	G	W	2	N	N	X												

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other Methanol

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☑ Disposal by Lab ☐ Archive for ___ Months

Special Instructions/QC Requirements & Comments:
Report to: Bernice Kidd/CH2M 530.229.3203

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd:___ Corr'd:___ Therm ID No.:___

Relinquished by:	Company: CH2M	Date/Time: 1800 8/11/16	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Chain of Custody Record

TestAmerica Sacramento
POC: David Alltucker
880 Riverside Parkway
West Sacramento, CA 95605
916.374.4383

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Regulatory Program: ☐DW ☐NPDES ☐RCRA ☐Other:

Client Contact	Project Manager: Cory Hinds/ANC	Site Contact: Berney Kidd	Date: 7/28/16	COC No:
CH2M HILL	Tel: 907-762-1369	Lab Contact:	Carrier: Goldstreak	1 of _____ PAGE
949 E 36th Ave	Analysis Turnaround Time			Sampler:
Anchorage, AK 99508	☑ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
530.229.3203 Phone	TAT if different from Below ___STD_____			Walk-in Client:
bernice.kidd@ch2m.com Email	☐ 2 weeks			Lab Sampling:
Project Name: JBER PFC Site Inspections	☐ 1 week			Job / SDG No.:
Site: JBER - Anchorage, AK	☐ 2 days			
PN# 666984.02.03.01	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	PFCs (WS-LC-0025)	GRO (AK101)	VOC (SW8260B)	DRO/RRO (AK102/AK103)	Herbicides (SW8151A)	RCRA Metals (SW7471A)	Mercury (SW6010B)	Pesticides (SW8082)	PCBs (SW8081A)	SVOCs (SW8270C)	pH (SW9045)	Dioxins/Furans (SW8290)	Sample Specific Notes:
								1	6	6	1	1	1	1	1	1	1	1	1	
16Q3-JB-FDW-20-SO	8-9-2016	0950	C	S	5	N	N		✓	✓	✓		✓	✓			✓		✓	D115, D116, D117, D118, D119 drums sampled
16Q3FS6-1-SO-Ø	8-9-2016	1315	G	S	2	N	N	✓												60s EPA Split
16Q3-JB-FDW-21-SO	8-9-2016	1700	C	S	6	N	N		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		D126, D127, D128 drums sampled
16Q3SS108-1-SO-Ø	8-11-2016	1210	G	S	2	N	N	✓												60s EPA Split
16Q3SS108-1-SO-ØMS	8-11-2016	1210	G	S	2	N	N	✓												
16Q3SS108-1-SO-ØSD	8-11-2016	1210	G	S	2	✓	✓	✓												
16Q3-IDW-JB-TBØ7-SO	8-9-16	0800	G	S	~~2~~ 1 TC				✓	✓										

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= Other _Methanol_____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:
Report to: Bernice Kidd/CH2M 530.229.3203

Custody Seals Intact: ☒ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C): Obs'd:_____ Corr'd:_____	Therm ID No.:_____
Relinquished by: Sara Calleen	Company: CH2M	Date/Time: 8/11/16 16:00	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

5755 8th Street East, Tacoma, WA 98424-1317 253-922-2310 FAX 922-5047
11922 E. First Ave., Spokane WA 99206-5302 509-924-9200 FAX 924-9290
9405 SW Nimbus Ave., Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: CH2M HILL

INVOICE TO: Bernice Kidd
bernice.kidd@ch2m.com

REPORT TO:
ADDRESS:

PHONE: 530-229-3203 FAX:

P.O. NUMBER: 666984.02.03.01

PROJECT NAME: JBER PFC Site Inspection

PROJECT NUMBER: 666984.02.03.01

SAMPLED BY: K.B.

TURNAROUND REQUEST
in Business Days *
Organic & Inorganic Analyses: 10 STD. | 7 | 5 | 4 | 3 | 2 | 1 | <1
Petroleum Hydrocarbon Analyses: 5 STD. | 4 | 3 | 2 | 1 | <1
OTHER Specify:
* Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	PRESERVATIVE													MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
			NA	MeOH	MeOH	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA				
			REQUESTED ANALYSES																
			PFCs WS-LC-0015	GRO AK101	VOC SW8260B	DRO/RRO AK102/AK103	Herbicides SW8151A	RCRA Metals SW7471A	Mercury SW6010B	Pesticides SW8082	PCBs SW8082A	SVOCs SW8270C	PH SW9045	Dioxins/ Furans SW8290					
1	16Q3-JB-IDW22-SO	8/11/16 2000		X	X	X						X				S	3		
2	16Q3E3-1-SO-0	8/12/16 1535	X													S	2	Collect 60g EPA Split	
3	16Q3-JB-IDW23-SO	8/13/16 1725		X	X	X		X	X	X	X	X	X			S	6		
4																			
5																			
6																			
7																			
8																			
9																			
10																			

RELEASED BY:
PRINT NAME: Jennifer Ulrich FIRM: CH2M DATE: 8/15/16 TIME: 1930

RECEIVED BY:
PRINT NAME: FIRM: DATE: TIME:

RELEASED BY:
PRINT NAME: FIRM: DATE: TIME:

RECEIVED BY:
PRINT NAME: FIRM: DATE: TIME:

ADDITIONAL REMARKS:

TEMP:

PAGE: OF

TAL-1000 (0612)

Chain of Custody Record

TestAmerica Sacramento
POC: David Alltucker
880 Riverside Parkway
West Sacramento, CA 95605
916.374.4383

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Regulatory Program: ☐DW ☐NPDES ☐RCRA ☐Other:

Client Contact	Project Manager: Cory Hinds/ANC	Site Contact: Berney Kidd	Date: ~~7/28/16~~ 8/15/16	COC No:
CH2M HILL	Tel: 907-762-1369	Lab Contact:	Carrier: Goldstreak	1 of 1 PAGE
949 E 36th Ave	Analysis Turnaround Time			Sampler:
Anchorage, AK 99508	☑ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
530.229.3203 Phone	TAT if different from Below ___STD_____			Walk-in Client:
bernice.kidd@ch2m.com Email	☐ 2 weeks			Lab Sampling:
Project Name: JBER PFC Site Inspections	☐ 1 week			Job / SDG No.:
Site: JBER - Anchorage, AK	☐ 2 days			
PN# 666984.02.03.01	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	PFCs (WS-LC-0025) 1	GRO (AK101) 6	VOC (SW8260B) 6	DRO/RRO (AK102/AK103) 1	Herbicides (SW8151A) 1	RCRA Metals (SW7471A) 1	Mercury (SW6010B) 1	Pesticides (SW8082) 1	PCBs (SW8081A) 1	SVOCs (SW8270C) 1	pH (SW9045) 1	Dioxins/Furans (SW8290) 1	Sample Specific Notes:
~~8~~ 16Q3H16-1-GW-0	8/12/16	1122	G	W	2	N	N	X												
16Q3FS6-1-GW-0	8/12/16	1502	G	W	2	N	N	X												
16Q3FS6-1-GW-0MS	8/12/16	1502	G	W	2	N	N	X												
16Q3FS6-1-GW-0SD	8/12/16	1502	G	W	2	N	N	X												
16Q3H17-1-GW-0	8/12/16	1928	G	W	2	N	N	X												
16Q3UC35A-1-GW-0	8/15/16	1220	G	W	2	N	N	X												
16Q3FS1-1-GW-0	8/15/16	1532	G	W	2	N	N	X												

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other Methanol

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:
Report to: Bernice Kidd/CH2M 530.229.3203

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd:_____ Corr'd:_____ Therm ID No.:_____

Relinquished by: Jennifer Ulrich	Company: CH2M	Date/Time: 8/12/16 1700	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

5755 8th Street East, Tacoma, WA 98424-1317 253-922-2310 FAX 922-504
11922 E. First Ave., Spokane WA 99206-5302 509-924-9200 FAX 924-929
9405 SW Nimbus Ave., Beaverton, OR 97008-7145 503-906-9200 FAX 906-921
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-921

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: CH2M

INVOICE TO: BERNIE.KIDD@CH2M.COM

REPORT TO: BERNIE KIDD
ADDRESS: BERNIE.KIDD@CH2M.COM
PHONE: 530-229-3203 FAX:

P.O. NUMBER:

PROJECT NAME: JBGR PFC SI
PROJECT NUMBER: 666984.02.03.01
SAMPLED BY: M. LANDON/CH2M + A. WIGLAND/CH2M

TURNAROUND REQUEST
in Business Days *
Organic & Inorganic Analyses: [10] STD. [7] [5] [4] [3] [2] [1] [<
Petroleum Hydrocarbon Analyses: [5] STD. [4] [3] [2] [1] [<1]
[OTHER] Specify: STANDARD
* Turnaround Requests less than standard may incur Rush Ch

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	PRESERVATIVE: 4°C	REQUESTED ANALYSES: WS-LL-005 (PFCs)	MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS
1	1603H6-1-GW-0	8-16-16 1610	2	2	W	2	
2	1603H6-1-GW-1	8-16-16 1615	2	2	W	2	
3	1603H6-1-GW-0	8-16-16 1155	2	2	W	2	
4	1603FS7-1-GW-0	8-17-16 1030	2	2	W	2	
5	1603H10-1-GW-0	8-17-16 1405	2	2	W	2	
6	1603H16-1-GW-0	8-17-16 1755	2	2	W	2	
7	1603CHD-1-GW-0	8-18-16 1040	2	2	W	2	
8	1603CHD-2-GW-0	8-18-16 ~~1245~~ 1245	2	2	W	2	
9	1603CHD-3-GW-0	8-18-16 1535	2	2	W	2	
10							

RELEASED BY: [signature] DATE: 8-18-16
PRINT NAME: MICHAEL LANDON FIRM: CH2M TIME: 1700

RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:

RELEASED BY: DATE:
PRINT NAME: FIRM: TIME:

RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:

ADDITIONAL REMARKS:

TEMP:

PAGE 1 OF

TAL-1000 (

CMS

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Address	Phone	Fax	
5755 8th Street East, Tacoma, WA 98424-1317	253-922-2310	FAX 922-5047	☐
11922 E. First Ave., Spokane WA 99206-5302	509-924-9200	FAX 924-9290	☐
9405 SW Nimbus Ave., Beaverton, OR 97008-7145	503-906-9200	FAX 906-9210	☐
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119	907-563-9200	FAX 563-9210	☐

CHAIN OF COUSTODY REPORT

Work Order #:

CLIENT: CH2M

REPORT TO: Berney Kidd

ADDRESS: bernice.kidd@CH2M.com

PHONE: 530-229-3203 FAX:

INVOICE TO: BERNICE.KIDD@CH2M.COM

P.O. NUMBER:

PROJECT NAME: JBER PFC SI

PROJECT NUMBER: 666984.02.03.01

SAMPLED BY: ~~M. Bruno / K. Butler~~ M. LANDON A. WIELAND

TURNAROUND REQUEST

in Business Days *

Organic & Inorganic Analyses: 10 (STD.) | 7 | 5 | 4 | 3 | 2 | 1 | <1

Petroleum Hydrocarbon Analyses: 5 (STD.) | 4 | 3 | 2 | 1 | <1

~~OTHER~~ Specify: STANDARD

* Turnaround Requests less than standard may incur Rush Charges.

PRESERVATIVE: 4°C

REQUESTED ANALYSES

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	PFCs (WS-2G-0025)	~~GRO (AK101)~~	MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1 16Q3FSFS-1-GW-0	8.19.16 / 1035	2		W	2		
2 16Q3SS044-1-GW-0	8.19.16 / 1400	2		W	2		
3 16Q3-GWEB-JB01	8.19.16 / 1500	2		W	2		
4 16Q3FSS-1-GW-0	8.22.16 / 1020	2		W	2		
5 16Q3 ~~SS~~108-1-GW-0	8.22.16 / 1225	2		W	2		
6 16Q3AT052-1-GW-0	8.22.16 / 1735	2		W	2		
7 16Q3AT052-1-GW-1	8.22.16 / 1740	2		W	2		
8 16Q3C3-1-GW-0	8.23.16 / 1030	2		W	2		
9 16Q3C3-1-GW-0MS	8.23.16 / 1030	2		W	2		
10 16Q3C3-1-GW-0SD	8.23.16 / 1030	2		W	2		

RELEASED BY: [signature]	DATE: 8.23.16	RECEIVED BY:	DATE:
PRINT NAME: MICHAEL LANDON FIRM: CH2M	TIME: 1400	PRINT NAME: FIRM:	TIME:
RELEASED BY:	DATE:	RECEIVED BY:	DATE:
PRINT NAME: FIRM:	TIME:	PRINT NAME: FIRM:	TIME:

ADDITIONAL REMARKS:

TEMP:

TAL-1000 (0612)

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THE LEADER IN ENVIRONMENTAL TESTING

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2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: CH2M

REPORT TO: Bernice.kidde ch2m.com

ADDRESS:

PHONE: (MB) 5 5 530 229 3303 FAX:

INVOICE TO: BERNICE.KIDD@CH2M.COM

P.O. NUMBER:

PROJECT NAME: JBER PFC SI

PROJECT NUMBER: 666984.02.03.01

SAMPLED BY: M.LANDON & A. WIELAND

TURNAROUND REQUEST in Business Days *

Organic & Inorganic Analyses: 10 STD. | 7 | 5 | 4 | 3 | 2 | 1 | <1

Petroleum Hydrocarbon Analyses: 5 STD. | 4 | 3 | 2 | 1 | <1

OTHER Specify: STD

* Turnaround Requests less than standard may incur Rush Charges.

PRESERVATIVE: 4°C

REQUESTED ANALYSES: PFCs (WS-LC-0025)

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	PFCs (WS-LC-0025)	MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1	~~16Q3E3-1-GW-1~~	~~8.23.16 / 1040~~	~~2~~	~~W~~	~~2~~	(MB)	
2	16Q3003MW-02-GW-0	8.23.16 / 1235	2	W	2		
3	16Q3-GWEB-SB02	8.23.16 / 1315	2	W	2		
4	18311-001	8/23/16 / 1530	2	W	2		
5							
6							
7							
8							
9							
10							

RELEASED BY: [signature] DATE: 8.23.16
PRINT NAME: MICHAEL LANDON FIRM: CH2M TIME: 1400

RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:

RELEASED BY: DATE:
PRINT NAME: FIRM: TIME:

RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:

ADDITIONAL REMARKS:

TEMP:

PAGE 2 OF 2

TAL-1000 (0714)

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Certified Reference Materials

Chain of Custody — Double Blind PEs

REPORT RESULTS TO:	SAMPLES SUBMITTED TO:	PROJECT SPECIFIC REQUESTS:
Gloria Beilke (gloriab@ageiss-inc.com) John Gillette (john.gillette.1@us.af.mil)	Morgan Bruno CH2MHill TCT 845 Circle Drive Job Site Ft. Richardson JBER, AK 99505 907-762-7737	Turnaround: Standard Project Reference: 18311 JBER PFC Site E3 C17 Samples Submitted by: Ty Garber, Phenova, Inc. 303-940-0033

Sample Description					Analyses Requested	Special Instructions/Comments
Sample Identification	Sampling Date and Time	Matrix	Sample Size	Preservative		
18311-001	8/22/16 3:30 pm	Water	2x125mL polys	4°C	PFCs for JBER PFC Site E3 C17	Polys provided by lab, temp blank and all other paperwork included with original container shipment was returned

	Printed Name:	Signature:	Company:	Date:	Time
Relinquished by:	Ty Garber		Phenova, Inc.	8/22/16	5:00 pm
Received by:	Morgan Bruno		CH2M	8/23/16	1030 am

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THE LEADER IN ENVIRONMENTAL TESTING

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2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: CH2M

REPORT TO: Berney Kidd
ADDRESS: bernice.kidd@ch2m.com

PHONE: 530-229-3203 FAX:

INVOICE TO:

P.O. NUMBER:

PROJECT NAME: JBER - PFC SI

PROJECT NUMBER: 666984.02.03.01

SAMPLED BY: M. Bruno / M Landon

TURNAROUND REQUEST
in Business Days *
Organic & Inorganic Analyses: 10 STD. | 7 | 5 | 4 | 3 | 2 | 1 | <1
Petroleum Hydrocarbon Analyses: 5 STD. | 4 | 3 | 2 | 1 | <1
~~OTHER~~ Specify: STD
* Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	PRESERVATIVE	AK101 GRO	SW8260B VOCs	AK102/103 DRO/RRO	SW7471A RCRA metals	SW6010B Hg	SW8151A Herbicides	SW8082 PCBs	SW8081A Pesticides	SW8270C SVOCs	SW9045 pH	SW8290 Dioxins/Furans	WS-LL-0025 (D422)	MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
			MeOH MeOH 4° 4° 4° 4° 4° 4° 4° 4° 4°C	REQUESTED ANALYSES															
1	1603-IDW-JB-TB08-SO	8/23/16 0800		X	X														
2	1603-JB-IDW25-SO	8/23/16 1555		X	X	X	X	X		X		X		X			S	5	D034
3	1603-JB-IDW24-SO	8/23/16 1610		X	X	X	X	X				X					S	4	D048, D049, D050
4	1603CHD-HA-1-50-Ø	8/25/16 1105													2		S	2	
5	1603CHD-HA-2-50-Ø	8.25.16 1110													2		S	2	
6	1603-50GB-5806	8.25.16 1240													2		W	2	
7																			
8																			
9																			
10																			

RELEASED BY: [signature] DATE: 8/25/16
PRINT NAME: Morgan Bruno FIRM: CH2M TIME: 1900

RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:

RELEASED BY: DATE:
PRINT NAME: FIRM: TIME:

RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:

ADDITIONAL REMARKS:

TEMP:

PAGE 1 OF 1

TAL-1000 (0714)

IDW Soil Cooler #1

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

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2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: CH2M

INVOICE TO:

REPORT TO: Berney Kidd
ADDRESS: berney.kidd@ch2m.com

PHONE: 530-229-3303 FAX:

P.O. NUMBER:

PROJECT NAME: JBER PFC SI

PROJECT NUMBER: 666984.02.03.01

SAMPLED BY: Morgan Bruno

TURNAROUND REQUEST
in Business Days *

Organic & Inorganic Analyses: 10 (STD.) | 7 | 5 | 4 | 3 | 2 | 1 | <1

Petroleum Hydrocarbon Analyses: 5 (STD.) | 4 | 3 | 2 | 1 | <1

OTHER Specify: STD

* *Turnaround Requests less than standard may incur Rush Charges.*

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	PRESERVATIVE												MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
			HCl	4°C	4°C	4°C	4°C											
			REQUESTED ANALYSES															
			AK101/ 103	SW8081A Pest.	SW8151A Herb	SW8270C SVOCs	SW8082A PCBs											
1	1603-JB-IDW13-GW	8/24/16 1050	X	X	X	X	X								W	10		
2	1603-JB-IDW02-GW	8/24/16 1530	X												W	2		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

RELEASED BY:		DATE: 8/25/16	RECEIVED BY:		DATE:
PRINT NAME: Morgan Bruno	FIRM: CH2M	TIME: 1900	PRINT NAME:	FIRM:	TIME:
RELEASED BY:		DATE:	RECEIVED BY:		DATE:
PRINT NAME:	FIRM:	TIME:	PRINT NAME:	FIRM:	TIME:

ADDITIONAL REMARKS:

TEMP:

PAGE 1 OF 1

TAL-1000 (0714)

IDW GW Cooler #1
COC #1 of 1

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THE LEADER IN ENVIRONMENTAL TESTING

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2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: CH2M

REPORT TO: Bernice Kidd

ADDRESS: ~~bernay.kidd~~ bernice.kidde ch2m.com

PHONE: 530-229-3303 FAX:

INVOICE TO:

P.O. NUMBER:

PROJECT NAME: PFCS1-JBER SI

PROJECT NUMBER: 666984.02.03.01

SAMPLED BY: Annika Seay

TURNAROUND REQUEST

in Business Days *

Organic & Inorganic Analyses: [10] STD. [7] [5] [4] [3] [2] [1] [<1]

Petroleum Hydrocarbon Analyses: [5] STD. [4] [3] [2] [1] [<1]

[~~OTHER~~] Specify: STD

* *Turnaround Requests less than standard may incur Rush Charges.*

PRESERVATIVE: 4°C

REQUESTED ANALYSES: WS-LC 8025 (PFCs)

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	WS-LC 8025 (PFCs)	MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1	16Q3AT029-1-GW-0	8.24.16/1315	X	W	2		
2	16Q3FP56-GW-0	8.24.16/1730	X	W	2		
3							
4							
5							
6							
7							
8							
9							
10							

RELEASED BY: [signature] DATE: ~~8/24/16~~ 8/25/16 (MB)

PRINT NAME: Morgan Bruno FIRM: CH2M TIME: 1900

RECEIVED BY: DATE:

PRINT NAME: FIRM: TIME:

RELEASED BY: DATE:

PRINT NAME: FIRM: TIME:

RECEIVED BY: DATE:

PRINT NAME: FIRM: TIME:

ADDITIONAL REMARKS:

TEMP:

PAGE 1 OF 1

TAL-1000 (0714)

IDW Cooler #2

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

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2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: CH2M

REPORT TO: Berney Kidd
ADDRESS: bernice.kidde chm.com

PHONE: 530-229-3303 FAX:

INVOICE TO:

P.O. NUMBER:

PROJECT NAME: JBER PFC SI

PROJECT NUMBER: 666984.02.03.01

SAMPLED BY: Morgan Bruno

TURNAROUND REQUEST
in Business Days *
Organic & Inorganic Analyses: [10] STD. [7] [5] [4] [3] [2] [1] [<1]
Petroleum Hydrocarbon Analyses: [5] STD. [4] [3] [2] [1] [<1]
~~OTHER~~ Specify: STD
* *Turnaround Requests less than standard may incur Rush Charges.*

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	PRESERVATIVE													MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
		REQUESTED ANALYSES																
		Alkalinity/ 103 DRO/RRO	SW8081A Pesticides	SW8151A Herbicides	SW8260C SVOCs	SW8082A PCBs												
1 KQ3-JB-IDW03-GW	8/24/16 1450	X			X										W	4		
2 KQ3-JB-IDW02-GW	8/24/16 1530				X	X									W	4		
3 KQ3-JB-IDW16-GW	8/24/16 1610	X			X										W	4		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

RELEASED BY:		DATE: 8/25/16	RECEIVED BY:		DATE:
PRINT NAME: Morgan Bruno	FIRM: CH2M	TIME: 1900	PRINT NAME:	FIRM:	TIME:
RELEASED BY:		DATE:	RECEIVED BY:		DATE:
PRINT NAME:	FIRM:	TIME:	PRINT NAME:	FIRM:	TIME:

ADDITIONAL REMARKS:

TEMP:

PAGE 1 OF 1

TAL-1000 (0714)

IDW GW Cooler #3

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

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9405 SW Nimbus Ave., Beaverton, OR 97008-7145 | 503-906-9200 | FAX 906-9210
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 | 907-563-9200 | FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: CH2M
REPORT TO: Berney Kidd
ADDRESS: bernice.kidd@ch2m.com
PHONE: 530-229-3203 FAX:
INVOICE TO:
P.O. NUMBER:
PROJECT NAME: JBER PFC SI
PROJECT NUMBER: 666984.02.03.01
SAMPLED BY: Morgan Bruno

TURNAROUND REQUEST in Business Days *
Organic & Inorganic Analyses: 10 (STD.) 7 5 4 3 2 1 <1
Petroleum Hydrocarbon Analyses: 5 (STD.) 4 3 2 1 <1
~~OTHER~~ Specify: STD
* Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME		AK101 GRO	SW8260B VOCs	SW7470A/SW6010B	SW9040 pH									MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
			PRESERVATIVE	HCl	HCl	HNO3	4°												
1	16Q3-JB-IDW13-GW	8/24/16	1050	X	X	X	X									W	8		
2	16Q3-IDW-JB-TB01-GW	8/24/16	1000	X	X											W	6		
3	16Q3-JB-IDW02-GW	8/24/16	1530	X	X	X										W	7		
4	16Q3-JB-IDW03-GW	8/24/16	1450	X	X											W	6		
5	16Q3-JB-IDW05-GW	8/24/16	1650	X	X	X	X									W	8		
6	16Q3-JB-IDW16-GW	8/24/16	1810	X	X	X										W	7		
7																			
8																			
9																			
10																			

RELEASED BY: [signature]		DATE: ~~8/24/16~~ 8/25/16	RECEIVED BY:		DATE:
PRINT NAME: Morgan Bruno	FIRM: CH2M	TIME: 1900	PRINT NAME:	FIRM:	TIME:
RELEASED BY:		DATE:	RECEIVED BY:		DATE:
PRINT NAME:	FIRM:	TIME:	PRINT NAME:	FIRM:	TIME:

ADDITIONAL REMARKS:

TEMP:

PAGE 1 OF 1

TAL-1000 (0714)

IDW GW Cooler #2

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

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2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: CH2M
REPORT TO: Berney Kidd
ADDRESS: bernice.kidd@ch2m.com
PHONE: 530-229-3203 FAX:
INVOICE TO:
P.O. NUMBER:
PROJECT NAME: JBER PFC SI
PROJECT NUMBER: 666984.02.03.01
SAMPLED BY: Morgan Bruno

TURNAROUND REQUEST in Business Days *
Organic & Inorganic Analyses: 10 (STD.) 7 5 4 3 2 1 <1
Petroleum Hydrocarbon Analyses: 5 (STD.) 4 3 2 1 <1
~~OTHER~~ Specify: Standard
* Turnaround Requests less than standard may incur Rush Charges.

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	AK102/103 DRO/RRO (HCl)	SW8081A Pesticides (4°C)	SW8082A PCBs (4°C)	SW8151A Herbicides (4°C)	SW8270C SVOCs (4°C)	MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1 16Q3-JB-IDW15-GW	8/24/16 1650	X	X	X	X	X	W	8		
2 16Q3-JB-IDW16-GW	8/24/16 1810		X	X			W	3		
3										
4										
5										
6										
7										
8										
9										
10										

RELEASED BY: [signature] DATE: ~~8/24/16~~ 8/25/16
PRINT NAME: Morgan Bruno FIRM: CH2M TIME: 1900
RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:
RELEASED BY: DATE:
PRINT NAME: FIRM: TIME:
RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:
ADDITIONAL REMARKS:
TEMP: 1
PAGE 1 OF 1

TAL-1000 (0714)

COC #1 of 1
IDW GW Cooler #4

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

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2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

320-21366 Chain of Custody

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: CH2M

REPORT TO: Berney Kidd
ADDRESS: bernice.kidd@ch2m.com

PHONE: 530-229-3303 FAX:

INVOICE TO:

P.O. NUMBER:

PROJECT NAME: JBER DFC SI

PROJECT NUMBER: 666984.02.03.01

SAMPLED BY: M Bruno / A Say / M Landon / K Stevens

TURNAROUND REQUEST
in Business Days *
Organic & Inorganic Analyses: 10 STD. | 7 | 5 | 4 | 3 | 2 | 1 | <1
Petroleum Hydrocarbon Analyses: 5 STD. | 4 | 3 | 2 | 1 | <1
~~OTHER~~ Specify: STD
* Turnaround Requests less than standard may incur Rush Charges.

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	PRESERVATIVE													REQUESTED ANALYSES													MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
		HCl	HCl	HNO_3	4°C	HCl	4°C	4°C							AK101	GRO	BTEX	VOCs	SVOCs	Metals	pH	AK103	DRO/RRO	SVOCs	SVOCs						
1 1603-IDW-SB-TBD-GW	8/26/16	1600	X	X																								W	6		
2 1603-SB-IDW01-GW	8/26/16	1635	X	X	X		X	X																				W	11	MS	
3 1603-SB-IDW14-GW	8/29/16	1045	X	X	X	X																						W	8		
4 1603-SB-IDW09-GW	8/29/16	1235	X	X	X	X																						W	8		
5 1603-SB-IDW07-GW	8/29/16	1520	X	X	X	X																						W	9		
6 1603-SB-IDW04-GW	8/30/16	1215	X	X	X				X																			W	9		
7 1603-SB-IDW08-GW	8/30/16	1315	X	X	X	X																						W	8		
8 ~~1603-SB-IDW11-GW~~	8/30/16																											~~W~~	~~7~~	MB	
9																															
10																															

RELEASED BY: Morgan Bruno
PRINT NAME: FIRM: CH2M
DATE: 8/30/16
TIME: 1900

RECEIVED BY: Cindy Trek
PRINT NAME: FIRM: TDW
DATE: 8-31-16
TIME: 912

RELEASED BY:
PRINT NAME: FIRM:
DATE:
TIME:

RECEIVED BY:
PRINT NAME: FIRM:
DATE:
TIME:

ADDITIONAL REMARKS:

TEMP:

PAGE 1 OF 1

TAL-1000 (0714)

IDW GW Cooler # 5
COC 1 of 1

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

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9405 SW Nimbus Ave., Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210 ☐
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210 ☐

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: CH2M

REPORT TO: Berney Kidd
ADDRESS: bernice.kidd@ch2m.com

PHONE: 530 229 3303 FAX:

INVOICE TO:

P.O. NUMBER:

PROJECT NAME: JBER PFC SI

PROJECT NUMBER: 666984.02.03.01

SAMPLED BY: M Bruno / K. Stevens

TURNAROUND REQUEST in Business Days *

Organic & Inorganic Analyses: 10 (STD.) 7 5 4 3 2 1 <1

Petroleum Hydrocarbon Analyses: 5 (STD.) 4 3 2 1 <1

OTHER Specify: STD

* Turnaround Requests less than standard may incur Rush Charges.

		PRESERVATIVE: HCl	4°C	4°C	4°C	4°C	4°C										
CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	AK102/103 DRO/RRO	SW8081A Pesticides	SW8082A PCBs	SW8151A Herbicide	SW8270C SVOCs	SW8290A Dioxins/Furans							MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1663-JB-IDW01-GW	8/26/16 1635						X							W	2		
1663-JB-IDW14-GW	8/29/16 1045	X	X	X	X	X								W	8		
1663-JB-IDW09-GW	8/29/16 1235	X												W	2		
4																	
5																	
6																	
7																	
8																	
9																	
10																	

RELEASED BY: [signature] DATE: 8/30/16
PRINT NAME: Morgan Bruno FIRM: CH2M TIME: 1900

RECEIVED BY: [illegible] DATE: 8-31-16
PRINT NAME: Cathy Heck FIRM: HSWS TIME: 912

RELEASED BY: DATE:
PRINT NAME: FIRM: TIME:

RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:

ADDITIONAL REMARKS:

TEMP:

PAGE 1 OF 1

TAL-1000 (0714)

IDW GW cooler #6
COC 1 of 1

318312

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THE LEADER IN ENVIRONMENTAL TESTING

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2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 | 907-563-9200 | FAX 563-9210 | ☐

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: CH2M

REPORT TO: Berney kidd
ADDRESS: bernice.kidd@ch2m.com

PHONE: 530 229 3203 FAX:

INVOICE TO:

P.O. NUMBER:

PROJECT NAME: JBER PFC SI

PROJECT NUMBER: 666984 02.03.01

SAMPLED BY: K Stevens

TURNAROUND REQUEST in Business Days *

Organic & Inorganic Analyses: 10 (STD.) 7 5 4 3 2 1 <1

Petroleum Hydrocarbon Analyses: 5 (STD.) 4 3 2 1 <1

~~OTHER~~ Specify: STD

* Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	AK102/103 DRO/RRO	SW8081A pest.	SW8082A PCBs	SW8151A Herb.	SW8270C SVOCs								MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
PRESERVATIVE			HCl	4°C	4°C	4°C	4°C											
1	16Q3-JB-IDW09-GW	8/29/16 1235		X	X	X	X								W	6		
2	16Q3-JB-IDW07-GW	8/29/16 1520	X			X									W	4		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

RELEASED BY: [signature]		DATE: 8/30/16	RECEIVED BY:		DATE:
PRINT NAME: Morgan Bruno	FIRM: CH2M	TIME: 1900	PRINT NAME:	FIRM:	TIME:
RELEASED BY:		DATE:	RECEIVED BY:		DATE:
PRINT NAME:	FIRM:	TIME:	PRINT NAME:	FIRM:	TIME:

ADDITIONAL REMARKS:

TEMP:

PAGE 1 OF

TAL-1000 (0714)

IDW GW Cooler #7
COC 1 of 1

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THE LEADER IN ENVIRONMENTAL TESTING

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2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: CH2M

REPORT TO: Bernie Kidd

ADDRESS: bernie.kidd@ch2m.com

PHONE: 530 229 (MS) 3303 FAX:

INVOICE TO:

P.O. NUMBER:

PROJECT NAME: JBER PFC SI

PROJECT NUMBER: 666984.02.03.01

SAMPLED BY: KStevens / M Landon (A Seay)

TURNAROUND REQUEST

in Business Days *

Organic & Inorganic Analyses: 10 STD. | 7 | 5 | 4 | 3 | 2 | 1 | <1

Petroleum Hydrocarbon Analyses: 5 STD. | 4 | 3 | 2 | 1 | <1

OTHER Specify: STD

* Turnaround Requests less than standard may incur Rush Charges.

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	PRESERVATIVE: HCl	4°C	4°C	4°C	4°C	REQUESTED ANALYSES: Alkalinity	DRO/RRO	SW8082A Aroclors	SW8082A PCBs	SW8151A Herb	SW8270C SVOCs	MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1 16GB-JB-FDW07-GW	8/29/16 1520								X	X			W	2		
2 16GB-JB-FDW08-GW	8/30/16 1315						X		X	X	X	X	W	8		
3 16GB-JB-FDW04-GW	8/30/16 1215						X						W	2		
4																
5																
6																
7																
8																
9																
10																

RELEASED BY: Morgan Bruns FIRM: CH2M DATE: 8/30/16 TIME: 1900

PRINT NAME:

RELEASED BY: DATE: TIME:

PRINT NAME: FIRM:

RECEIVED BY: DATE:

PRINT NAME: FIRM: TIME:

RECEIVED BY: DATE:

PRINT NAME: FIRM: TIME:

ADDITIONAL REMARKS:

TEMP:

PAGE 1 OF 1

TAL-1000 (0714)

FDW GW cooler # 8

COC 1 of 1

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THE LEADER IN ENVIRONMENTAL TESTING

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2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: CH2M

REPORT TO: Berney Kidd
ADDRESS: bernice.kidd@ch2m.com

PHONE: 530-229-3303 FAX:

INVOICE TO:

P.O. NUMBER:

PROJECT NAME: JBER PFC SI
PROJECT NUMBER: 666984.02.03.01
SAMPLED BY: M Bruno

TURNAROUND REQUEST in Business Days *

Organic & Inorganic Analyses: 10 (STD.) | 7 | 5 | 4 | 3 | 2 | 1 | <1

Petroleum Hydrocarbon Analyses: 5 (STD.) | 4 | 3 | 2 | 1 | <1

OTHER Specify: STD

* Turnaround Requests less than standard may incur Rush Charges.

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	AK101 GRO (HCl)	SW8260B VOCs (HCl)	SW7470A/SW6020B Metals+Hg (HNO3)	SW9040 pH (4°C)	AK102/103 DRO/RRO (HCl)	SW8081A Pest. (4°C)	SW8082A PCBs (4°C)	SW8151A Herb. (4°C)	SW8270C SVOCs (4°C)				MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
16CB-TDW-SB-TRP3-GW (~~16CB-TDW-TRP3~~)	8/31/16 1600	X	X											W	6		
16CB-SB-FDW06-GW	8/31/16 1640	X	X	X	X	X	X	X	X	X				W	16		
16CB-SB-FDW15-GW	8/31/16 1720	X	X	X	X									W	8		
4																	
5																	
6																	
7																	
8																	
9																	
10																	

RELEASED BY: [signature]	DATE: ~~8~~ 9/1/16 (MB)	RECEIVED BY:	DATE:
PRINT NAME: Morgan Bruno FIRM: CH2M	TIME: 2000	PRINT NAME: FIRM:	TIME:
RELEASED BY:	DATE:	RECEIVED BY:	DATE:
PRINT NAME: FIRM:	TIME:	PRINT NAME: FIRM:	TIME:

ADDITIONAL REMARKS:

TEMP:

PAGE 1 OF 1

TAL-1000 (0714)

GW ^FDW cooler #9

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

11922 E. First Ave., Spokane WA 99206-5302 509-924-9200 FAX 924-9290
9405 SW Nimbus Ave., Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: CH2M
REPORT TO: Berney Kidd
ADDRESS: bernice.kidd@ch2m.com
PHONE: 630 334 3203 FAX:
PROJECT NAME: JBER PFC SI
PROJECT NUMBER: 666984.02.03.01
SAMPLED BY: M Bruno

INVOICE TO:

P.O. NUMBER:

TURNAROUND REQUEST in Business Days *
Organic & Inorganic Analyses: 10 (STD.) 7 5 4 3 2 1 <1
Petroleum Hydrocarbon Analyses: 5 (STD.) 4 3 2 1 <1
~~OTHER~~ Specify: STD
* Turnaround Requests less than standard may incur Rush Charges.

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	AK102/103 DRO/RRO	SW8081A pest.	SW8082A PCBs	SW8151A herb.	SW8270C SVOCs								MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
PRESERVATIVE		HCl	4°C	4°C	4°C	4°C											
1 666-JB-IDW15-GW	8/31/16 1720	X	X	X	X	X								W	8		
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

RELEASED BY: [signature]		DATE: 9/1/16	RECEIVED BY:		DATE:
PRINT NAME: Morgan Bruno	FIRM: CH2M	TIME: 2000	PRINT NAME:	FIRM:	TIME:
RELEASED BY:		DATE:	RECEIVED BY:		DATE:
PRINT NAME:	FIRM:	TIME:	PRINT NAME:	FIRM:	TIME:

ADDITIONAL REMARKS:

TEMP:

PAGE 1 OF 1

TAL-1000 (0714)

GW IDW cooler # 10

318312

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THE LEADER IN ENVIRONMENTAL TESTING

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2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: CH2M

REPORT TO: Berney Kidd
ADDRESS: bernice.kidd@ch2m.com

PHONE: 530-229-3303 FAX:

INVOICE TO:

P.O. NUMBER:

PROJECT NAME: JBER PFC SI

PROJECT NUMBER: 666484.02.03.01

SAMPLED BY: M Bruno

TURNAROUND REQUEST in Business Days *

Organic & Inorganic Analyses: 10 (STD.) 7 5 4 3 2 1 <1

Petroleum Hydrocarbon Analyses: 5 (STD.) 4 3 2 1 <1

~~OTHER~~ Specify: STD

* Turnaround Requests less than standard may incur Rush Charges.

		PRESERVATIVE: HCl	HCl	4°C	HNO3	HCl	4°C	4°C									
CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	AK101 GRO	SW8260B VOCs	SW9040 pH	SW6010B SW7470A Metals/Hg	AK102/103 DRO/RRO	SW8151A Herb.	SW8270C SVOCs						MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1 16Q3-FDW-JB-TB14-GW	9/13/16 1500	X	X											W	6		
2 16Q3-JB-FDW12-GW	9/13/16 1515	X	X	X	X	X	X	X						W	14		
3 16Q3-JB-FDW11-GW	9/13/16 1615	X	X	X	X									W	8		
4 16Q3-JB-FDW10-GW	9/13/16 1705	X	X	X	X									W	8		
5																	
6																	
7																	
8																	
9																	
10																	

RELEASED BY: [signature] DATE: 9/5/16
PRINT NAME: Morgan Bruno FIRM: CH2M TIME: 2000

RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:

RELEASED BY: DATE:
PRINT NAME: FIRM: TIME:

RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:

ADDITIONAL REMARKS:

TEMP:

TAL-1000 (0714)

GW IDW cooler #11

CMS

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

11922 E. First Ave., Spokane WA 99206-5302 509-924-9200 FAX 924-9290 ☐
9405 SW Nimbus Ave., Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210 ☐
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210 ☐

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: CH2M

REPORT TO: Berney Kidd

ADDRESS: bernice.kidd@ch2m.com

PHONE: 630-229-3203 FAX:

INVOICE TO:

P.O. NUMBER:

PROJECT NAME: JBER PFC SI

PROJECT NUMBER: 666984.02.03.01

SAMPLED BY: M Bruno

TURNAROUND REQUEST in Business Days *

Organic & Inorganic Analyses: 10 (STD.) | 7 | 5 | 4 | 3 | 2 | 1 | <1

Petroleum Hydrocarbon Analyses: 5 (STD.) | 4 | 3 | 2 | 1 | <1

~~OTHER~~ Specify: STD

* Turnaround Requests less than standard may incur Rush Charges.

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	SW8081A Pest (Preservative: 4°C)	SW8082A PCBs (Preservative: 4°C)	AK102/103 DRO/RRO (Preservative: HCl)	SW8270C SVOCs (Preservative: 4°C)	SW8151A Herb. (Preservative: 4°C)	MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1 16Q3-JB-IDW12-GW	9/13/16 1515	X	X				W	2		
2 16Q3-JB-IDW11-GW	9/13/16 1615	X	X	X	X	X	W	8		
3										
4										
5										
6										
7										
8										
9										
10										

RELEASED BY: [signature]	DATE: 9/15/16	RECEIVED BY:	DATE:
PRINT NAME: Morgan Bruno FIRM: CH2M	TIME: 2000	PRINT NAME: FIRM:	TIME:
RELEASED BY:	DATE:	RECEIVED BY:	DATE:
PRINT NAME: FIRM:	TIME:	PRINT NAME: FIRM:	TIME:

ADDITIONAL REMARKS:

TEMP:

PAGE 1 OF

TAL-1000 (0714)

GW IDW Cooler #12

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

11922 E. First Ave., Spokane WA 99206-5302 509-924-9200 FAX 924-9290 ☐
9405 SW Nimbus Ave., Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210 ☐
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210 ☐

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: CH2M

REPORT TO: Berney Kidd
ADDRESS: bernice.kidd@ch2m.com

PHONE: 530-229-3303 FAX:

INVOICE TO:

P.O. NUMBER:

PROJECT NAME: JBER OFC SI

PROJECT NUMBER: 666984.02.03.01

SAMPLED BY: M Bruno

TURNAROUND REQUEST
in Business Days *

Organic & Inorganic Analyses: 10 (STD.) | 7 | 5 | 4 | 3 | 2 | 1 | <1

Petroleum Hydrocarbon Analyses: 5 (STD.) | 4 | 3 | 2 | 1 | <1

~~OTHER~~ Specify: STD

* Turnaround Requests less than standard may incur Rush Charges.

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	AK102/103 DRO/RRO	SW8081A Pest.	SW8082A PCBs	SW8270C SVOCs	SW8151A Herb.								MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
PRESERVATIVE		HCl	4°C	4°C	4°C	4°C											
1 1603-SB-JDW14-GW	9/3/16 1705	X	X	X	X	X								W	8		
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

RELEASED BY: [signature]		DATE: 9/5/16	RECEIVED BY: DATE:
PRINT NAME: Morgan Bruno	FIRM: CH2M	TIME: 2000	PRINT NAME: FIRM: TIME:
RELEASED BY:		DATE:	RECEIVED BY: DATE:
PRINT NAME:	FIRM:	TIME:	PRINT NAME: FIRM: TIME:

ADDITIONAL REMARKS:

TEMP:

PAGE 1 OF

TAL-1000 (0714)

IDW GW cooler #13

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

11922 E. First Ave., Spokane WA 99206-5302 509-924-9200 FAX 924-9290
9405 SW Nimbus Ave., Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: CH2M

INVOICE TO:

REPORT TO: ~~444 E. 36th Ave~~ Anchorage, ~~AK 99577~~ Bernice.Kidd@ch2m.com
ADDRESS:

PHONE: ~~530.229.3203~~ FAX:

P.O. NUMBER: 666984.02.03.~~07~~ 01 (MB)

PROJECT NAME: JBER PFC SI

PROJECT NUMBER: 666984.02.03.~~07~~ 01 (MB)

SAMPLED BY: Annika Seay

TURNAROUND REQUEST
in Business Days *
Organic & Inorganic Analyses: 10 STD. | 7 | 5 | 4 | 3 | 2 | 1 | <1
Petroleum Hydrocarbon Analyses: 5 STD. | 4 | 3 | 2 | 1 | <1
~~OTHER~~ Specify: per contract
* Turnaround Requests less than standard may incur Rush Charges.

PRESERVATIVE: 4°C

REQUESTED ANALYSES: WS-LC-0025 (PFCs)

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	WS-LC-0025 (PFCs)	MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1	16Q3FS4-1-GW-0	9.19.16 / 1310	X	W	2		
2	16Q3FS4-1-GW-1	9.19.16 / 1315	X	W	2		
3							
4							
5							
6							
7							
8							
9							
10							

RELEASED BY: [signature] DATE: 9/22/16
PRINT NAME: Morgan Bruno FIRM: CH2M TIME: 2000

RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:

RELEASED BY: DATE:
PRINT NAME: FIRM: TIME:

RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:

ADDITIONAL REMARKS:

TEMP:

PAGE 1 OF 1

TAL-1000 (0714)

mb 9/19/16

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

11922 E. First Ave., Spokane WA 99206-5302 509-924-9200 FAX 924-9290
9405 SW Nimbus Ave., Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: CH2M
REPORT TO: Berney Kidd
ADDRESS: bernice.kidde ch2m.com
PHONE: 530-229-3303 FAX:
INVOICE TO:
P.O. NUMBER: 666984.02.03.01
PROJECT NAME: JBER PFC SI
PROJECT NUMBER: 666984.02.03.01
SAMPLED BY: M Bruno

TURNAROUND REQUEST in Business Days *
Organic & Inorganic Analyses: 10 (STD.) 7 5 4 3 2 1 <1
Petroleum Hydrocarbon Analyses: 5 (STD.) 4 3 2 1 <1
~~OTHER~~ Specify: STD
* Turnaround Requests less than standard may incur Rush Charges.

PRESERVATIVE: 4°C

REQUESTED ANALYSES: PFCs (WS-LC-0025)

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME		PFCs (WS-LC-0025)												MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1	16Q3CHD-4-GW-0	10/3/16	1033	X												W	2		
2	16Q3CHD-4-GW-1	10/3/16	1038	X												W	2		
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

RELEASED BY: [signature] DATE: 10/3/16 RECEIVED BY: DATE:
PRINT NAME: Morgan Bruno FIRM: CH2M TIME: 2000 PRINT NAME: FIRM: TIME:
RELEASED BY: DATE: RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME: PRINT NAME: FIRM: TIME:
ADDITIONAL REMARKS:
TEMP:

TAL-1000 (0714)

TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Phone (916) 373-5600 Fax (916) 372-1059

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: K. Stevens	Lab PM:	Carrier Tracking No(s):	COC No: 320-13594-3114.1
Client Contact: ~~Ms. Kristin Jones~~ Bernice Kidd	Phone:	E-Mail:		Page: Page 1 of 1
Company: CH2M Hill, Inc.				Job #:
Address: ~~949 E. 36th Ave Ste 500~~ 2525 Airpark Drive	Due Date Requested:			
City: ~~Anchorage~~ Redding	TAT Requested (days): STD			
State, Zip: ~~AK, 99508~~ CA, 96001				
Phone:	PO #:			
Email: ~~Kristin.Jones@ch2m.com~~ bernice.kidd@ch2m.com	WO #:			
Project Name: JBER PFC SI	Project #: 600984.02.03.01			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	WS-LC-0025	Total Number of containers	Special Instructions/Note:
			Preservation Code:				I		
16Q40U5SP-11-SP-0	11/22/16	1144	G	W	N	N	X		
16Q4WCSW-02-SP-0	11/22/16	1200	G	W	N	N	X		
16Q4WCSW-02-SP-1	11/22/16	1202	G	W	N	N	X		
16Q40U5CP-02-SP-0	11/22/16	1228	G	W	N	N	X		
16Q40U5SP-02-SP-0	11/22/16	1235	G	W	N	N	X		
16Q40U5SP-01-SP-0	11/22/16	1253	G	W	N	N	X		
16Q4LF04SP-02-SP-0	11/22/16	1400	G	W	N	Y	X		
16Q4LF04SP-02-SP-0MS	11/22/16	1400	G	W	N	Y	X		
16Q4LF04SP-02-SP-0SD	11/22/16	1400	G	W	N	X	X		

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:
Relinquished by:	Date/Time: 11/22/16 1700	Company: CH2M	Received by:	Date/Time:	Company
Relinquished by:	Date/Time: 11-22-16 ATS	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

ATS 11-22-16

Appendix A-4
Photo Log

Photo A4-1: Location CFTA-03; Interval: 00-05 ft bgs

Photo A4-2: Location FS4-01; Above ground well completion

Photo A4-3: Location CCH-01; Interval: 10-15 ft bgs

Photo A4-4: Location SS044-01; Interval: 05-10 ft bgs

Photo A4-5: Location FASTA-01; Interval: 00-05 ft bg

Photo A4-6: Location CASTA-01; Interval: 00-05 ft bgs

Photo A4-7: Location FSFS-01; Interval: 00-05 ft bgs

Photo A4-8: Location AT028-01; Interval: 10-15 ft bgs

Photo A4-9: Location CHD-03; Interval: 05-10 ft bgs

Photo A4-10: Location CHD-01; Above ground surface completion with bollards

Photo A4-11: Location SS108-01; Interval: 00-05 ft bgs

Photo A4-12: Location E3-01; Interval: 15-20 ft bgs

Photo A4-13 (S): Site walk ST037-OU5CP-01/OU5CP-02; Surface water (11/18/16)

Photo A4-14 (SW): Site walk ST037-OU5CP-02; Power supply area/road (11/18/16)

Photo A4-15 (SW): Site walk ST037-OU5CP-02; Sheen to the east of site (11/18/16)

Photo A4-16 (S): Site walk ST037-OU5CP-02; Seep/surface water (11/18/16)

Photo A4-17 (NW): Site walk ST037-OU5SP-01; PVC pipe (11/18/16)

Photo A4-18 (S): Site walk ST037-OU5SP-01; PVC pipe/Distance from road (11/18/16)

Photo A4-19 (E): Site walk ST037-OU5SP-10; Bridge across stream to site (11/18/16)

Photo A4-20 (NW): Site walk ST037-OU5SP-10; Stream to wetland (11/18/16)

Photo A4-21 (NW): Site walk ST037-; Stream to wetland (11/18/16)

Photo A4-22 (NE): Site walk ST037-OU5SP-10/OU5SP-11; PVC (11/18/16)

Photo A4-23 (W): Site walk ST037; Bridge across stream to site (11/18/16)

Photo A4-24 (W): Site walk ST037-WCSW02; Concrete weir (11/18/16)

Photo A4-25 : Site walk ST037-WCSW02; Concrete weir (11/18/16)

Photo A4-26 (NE): Site walk ST037-WCSW02; Concrete weir (11/18/16)

Photo A4-27 (SW): Site walk ST037-; Downstream of concrete weir (11/18/16)

Photo A4-28 (NE): Site walk ST037-OU5SP-11; Downstream of concrete weir (11/18/16)

Photo A4-29 (E): Site walk ST037; Downstream of wetland (11/18/16)

Photo A4-30 (N): Sampling ST037-OU5SP-11; PVC (11/22/16)

Photo A4-31 (NW): Sampling ST037-OU5SP-10; (11/22/16)

Photo A4-32 : Sampling ST037-OU5SP-10; Frozen inside PVC (11/22/16)

Photo A4-33 (NW): Sampling ST037-WCSW02; Concrete weir (11/22/16)

Photo A4-34 (SW): Sampling ST037-OU5CP-02; (11/22/16)

Photo A4-35 (N): Sampling ST037-OU5CP-02; Set up (11/22/16)

Photo A4-26 (SW): Site walk LF04; Survey flagging to seep (11/17/16)

Photo A4-37 (E): Site walk LF04; Rope to ascend/decend hill (11/17/16)

Photo A4-38 (SW): Site walk LF04; Seep area with wooden lathes (11/17/16)

Photo A4-39 (W): Site walk LF04; Downstream from seep (11/17/16)

Photo A4-40 (E): Site walk LF04; Survey flagging/ hill path (11/17/16)

Photo A4-41 (W): Site walk LF04; Downstream of seep/ port area (11/17/16)

Photo A4-42 (E): Site walk LF04; Downstream of seep (11/17/16)

Photo A4-43 (W): Site walk LF04; Downstream of seep (11/17/16)

Photo A4-44 (W): Site walk LF04; Downstream of seep/ port area (11/17/16)

Photo A4-45 (E): Site walk LF04; Survey flagging (11/17/16)

Photo A4-46 (E): Site walk LF04; Downstream of seep/ surface water (11/17/16)

Photo A4-47 (W): Site walk LF04; Downstream of seep/ surface water (11/17/16)

Photo A4-48 (W): Sampling LF04-SP02; Seep area (11/22/16)

Photo A4-49 (SW): Sampling LF04-SP02; Wooden lathes/ frozen (11/22/16)

Photo A4-50 (W): Sampling LF04-SP02; Seep area (11/22/16)

Photo A4-51 (W): Sampling LF04-SP02; Seep area (11/22/16)

Photo A4-52 (W): Sampling LF04; Survey flagging from road to seep (11/22/16)

Appendix A-5
Survey Elevation Measurements and Coordinates

Table A5-1. Survey Elevation Measurements and Coordinates

Site Inspection Report for Aqueous Film Forming Foam Areas at Joint Base Elmendorf-Richardson, Alaska

ID	Sample Type	Sheet	Area	WGS84 (G1762) * UTM Zone 6N North (Meters)	WGS84 (G1762) * UTM Zone 6N East (Meters)	Elevation (feet) NAVD88 GND Elev	Elevation (feet) NAVD88 Top Casing	Elevation (feet) NAVD88 PVC Mark	Comments
AT052-1	Monitor Well – Stick up		AT052 Landfill Fire Training Area	6796479.069	355814.636	342.3	346.11	345.55	Stand-up
AT029-1	Monitor Well – Stick up		AT029 Ruff Road Fire Training Area	6795707.261	358096.821	395.6	399.77	399.18	Stand-up
FS5-1	Monitor Well – Stick up		Fire Station 5 (Building 48010)	6794990.408	357330.135	358.8	362.88	361.77	Stand-up
FS4-1	Monitor Well – Stick up		Fire Station 4 (Building 654)	6794086.110	355963.141	317.3	320.68	319.81	Stand-up
SS04-1	Monitor Well – Flush Mount		SS044 (Building 35-752)	6793375.186	353922.705	265.4	265.39	265.12	Flush mount
E3-1	Monitor Well – Stick up		E3/AWACS Crash Location	6795651.114	351890.657	252.3	256.55	256.31	Stand-up
CFTA-3	Monitor Well – Flush Mount		Current Fire Training Area	6794908.207	351596.088	240.7	240.68	240.31	Flush mount
CFTA-1	Monitor Well – Flush Mount		Current Fire Training Area	6795018.489	351561.091	245.5	245.46	245.14	Flush mount
CFTA-2	Monitor Well – Stick up		Current Fire Training Area	6795114.347	351537.084	242.3	246.32	246.14	Stand-up
FSFS-1	Monitor Well – Stick up		Fire Suppression Foam Storage (Building 6210)	6792460.335	347188.893	146.6	150.19	149.52	Stand-up
H5-1	Monitor Well – Stick up		Hangar 5 (Building 7309) AFFF Spray Test Area	6792748.091	348001.072	155.2	159.12	158.56	Stand-up
CCH-1	Monitor Well – Stick up		Corrosion Control Hangar (Building 6263)	6792695.173	347727.553	151.6	154.08	153.78	Stand-up
CASTA-1	Monitor Well – Stick up		Current AFFF Spray Test Area	6793165.605	347376.236	152.4	156.25	155.56	Stand-up
FASTA-1	Monitor Well – Stick up		Former AFFF Spray Test Area	6793252.843	347119.774	151.3	155.21	154.44	Stand-up
CHD-1	Monitor Well – Stick up		Cherry Hill Ditch	6793265.388	346432.911	143.3	147.24	146.77	Stand-up
CHD-HA-1	Soil Boring		Cherry Hill Ditch	6793274.693	346432.943	137.1	--	--	Soil sample
CHD-2	Monitor Well – Stick up		Cherry Hill Ditch	6792927.994	346451.983	140.6	144.54	143.70	Stand-up
CHD-HA-2	Soil Boring		Cherry Hill Ditch	6792931.112	346448.739	133.4	--	--	Soil sample
CHD-3	Monitor Well – Stick up		Cherry Hill Ditch	6792518.079	346047.328	130.6	133.96	133.53	Stand-up
CHD-4	Monitor Well – Stick up		Cherry Hill Ditch	6792394.776	345487.45	30.5	32.47	31.65	Stand-up
CHD-SD-01	Sediment		Cherry Hill Ditch	6792385.320	345490.100	29.7	--	--	Sediment sample
UC35A-1	Monitor Well – Flush Mount		Cessna UC-35A Crash Location	6793995.473	349166.052	183.5	183.47	183.01	Flush mount
FS1-1	Monitor Well – Flush Mount		Fire Station 1 (Building 11415)	6793775.905	348725.708	177.5	177.54	176.98	Flush mount
H6-1	Monitor Well – Flush Mount		Hangar 6 (Building 9311)	6793244.621	347928.993	157.7	157.67	157.50	Flush mount
H18-1	Monitor Well – Flush Mount		Hangar 18 (Building 17470)	6795114.565	349190.507	198.3	198.30	198.07	Flush mount
H8-1	Monitor Well – Flush Mount		Hangar 8 (Building 14410)	6794378.740	348699.268	184.0	183.96	183.67	Flush mount
H10-1	Monitor Well – Flush Mount		Hangar 10 (Building 15455)	6794672.199	349179.437	192.0	192.01	191.38	Flush mount
FS7-1	Monitor Well – Flush Mount		Fire Station 7 (Building 14431)	6794462.954	348910.670	189.7	189.67	189.39	Flush mount
FS6-1	Monitor Well – Flush Mount		Fire Station 6 (Building 16673)	6794814.243	350886.873	218.6	218.63	218.19	Flush mount
H16-1	Monitor Well – Flush Mount		Hangar 16 (Building 15658)	6794577.395	350451.813	209.2	209.21	208.88	Flush mount
H17-1	Monitor Well – Flush Mount		Hangar 17 (Building 16670)	6794841.412	350632.531	214.3	214.27	213.99	Flush mount
SS108-1	Monitor Well – Stick up		SS108 C-17 Crash Site	6795747.346	351881.654	242.7	246.33	245.82	Stand up

Table A5-1. Survey Elevation Measurements and Coordinates

Site Inspection Report for Aqueous Film Forming Foam Areas at Joint Base Elmendorf-Richardson, Alaska

ID	Sample Type	Sheet	Area	WGS84 (G1762) * UTM Zone 6N North (Meters)	WGS84 (G1762) * UTM Zone 6N East (Meters)	Elevation (feet) NAVD88 GND Elev	Elevation (feet) NAVD88 Top Casing	Elevation (feet) NAVD88 PVC Mark	Comments
ANGH-MW01	Monitor Well – Flush Mount	C-1.1	Air National Guard Hanger (Bldg. 1171)	7171796.215	495461.477	542.6	542.56	542.08	
ANGH-MW02	Monitor Well – Flush Mount	C-1.1	Air National Guard Hanger (Bldg. 1171)	7171894.880	495449.486	546.4	546.44	546.22	
ANGH-KC135-MW01	Monitor Well	C-2.1	Air National Guard KC-135 Hanger (Bldg. 1176)	7171572.646	495525.490	545.0	548.41	547.94	
ANGH-KC135-MW02	Monitor Well – Flush Mount	C-2.1	Air National Guard KC-135 Hanger (Bldg. 1176)	7171698.874	495428.684	544.1	544.11	543.72	
ANGH-KC135-SB01	Soil Boring	C-2.1	Air National Guard KC-135 Hanger (Bldg. 1176)	7171638.959	495435.243	542.4	NA	NA	
CCH-MW01	Monitor Well – Flush Mount	C-3.1	Corrosion Control Hanger (Bldg. 1348)	7169544.771	496894.446	551.3	551.30	550.98	
CCH-MW02	Monitor Well – Flush Mount	C-3.1	Corrosion Control Hanger (Bldg. 1348)	7169638.263	496860.139	550.0	549.97	549.43	
03UN17	Monitor Well	C-4.1	Current FTA and Former Base Landfill	7169816.823	496451.868	553.3	555.04	554.83	
03UN21	Monitor Well	C-4.1	Current FTA and Former Base Landfill	7169822.508	496537.597	550.9	554.70	554.47	
CFTA-SB01	Soil Boring	C-4.1	Current FTA and Former Base Landfill	7169781.740	496597.862	553.9	NA	NA	
CFTA-SB02	Soil Boring	C-4.1	Current FTA and Former Base Landfill	7169758.125	496455.410	552.9	NA	NA	
CFTA-SB03	Soil Boring	C-4.1	Current FTA and Former Base Landfill	7169761.151	496757.938	553.3	NA	NA	
03M04B	Monitor Well – Flush Mount	C-4.1	Current FTA and Former Base Landfill	7170064.987	496628.557	547.2	547.23	547.13	
03M05	Monitor Well	C-4.1	Current FTA and Former Base Landfill	7169925.681	496442.600	552.6	555.22	554.95	
03M06	Monitor Well	C-4.1	Current FTA and Former Base Landfill	7169927.520	496439.091	552.6	554.90	554.92	Severely jacked
03M07	Monitor Well	C-4.1	Current FTA and Former Base Landfill	7169929.348	496435.134	552.9	554.92	554.66	
O3M10	Monitor Well	C-4.1	Current FTA and Former Base Landfill	7170240.985	496972.231	546.3	549.16	549.03	
03M19	Monitor Well – Flush Mount	C-4.1	Current FTA and Former Base Landfill	7170056.944	496408.608	545.9	545.92	545.44	In water, top center PVC cap
1211MW04	Monitor Well Not Found	C-5.1	Fire Station 1 (Bldg.1206)	--	--	--	--	--	
FST1-MW01	Monitor Well	C-5.1	Fire Station 1 (Bldg.1206)	7171387.402	495611.367	546.6	546.55	546.23	
FST1-SB01	Soil Boring	C-5.1	Fire Station 1 (Bldg.1206)	7171377.381	495617.721	545.1	NA	NA	
FABF-MW01	Monitor Well	C-6.1	Former Adak Building Fire	7172823.854	495713.327	540.4	343.95	543.51	
FABF-MW02	Monitor Well	C-6.1	Former Adak Building Fire	7172610.844	495793.486	542.4	545.95	545.51	
FABF-SB01	Soil Boring	C-6.1	Former Adak Building Fire	7172773.309	495788.706	540.0	NA	NA	
FFS1-MW01	Monitor Well – Flush Mount	C-7.1	Former Fire Station 1	7170085.899	496129.789	547.6	547.61	547.38	
FFS1-MW02	Monitor Well	C-7.1	Former Fire Station 1	7170028.580	496159.138	550.5	554.37	554.06	
FFTA-ANTF-MW01	Monitor Well	C-8.1	Former FTA Near Antenna Farm	7170250.551	496399.615	552.8	556.24	555.77	
FFTA-ANTF-MW02	Monitor Well	C-8.1	Former FTA Near Antenna Farm	7170303.717	496374.404	552.6	555.78	555.33	
FFTA-ANTF-SB01	Soil Boring	C-8.1	Former FTA Near Antenna Farm	7170251.808	496402.105	552.6	NA	NA	
FFTA-ANTF-SB02	Soil Boring	C-8.1	Former FTA Near Antenna Farm	7170240.657	496447.999	550.9	NA	NA	
FFTA-ENT-MW01	Monitor Well	C-9.1	Former FTAs by Current Entomology Bldg.	7170071.880	496320.183	548.7	552.38	551.95	
FFTA-ENT-MW02	Monitor Well	C-9.1	Former FTAs by Current Entomology Bldg.	7170142.731	496371.413	551.8	555.12	554.56	
37MW06	Monitor Well	C-9.1	Former FTAs by Current Entomology Bldg.	7170111.565	496317.514	549.7	552.80	552.02	

Table A5-1. Survey Elevation Measurements and Coordinates

Site Inspection Report for Aqueous Film Forming Foam Areas at Joint Base Elmendorf-Richardson, Alaska

ID	Sample Type	Sheet	Area	WGS84 (G1762) * UTM Zone 6N North (Meters)	WGS84 (G1762) * UTM Zone 6N East (Meters)	Elevation (feet) NAVD88 GND Elev	Elevation (feet) NAVD88 Top Casing	Elevation (feet) NAVD88 PVC Mark	Comments
FFTA-ENT-SB01	Soil Boring	C-9.1	Former FTAs by Current Entomology Bldg.	7170071.019	496321.476	548.6	NA	NA	
FFTA-ENT-SB02	Soil Boring	C-9.1	Former FTAs by Current Entomology Bldg.	7170095.683	496340.478	549.5	NA	NA	
FFTA-ENT-SB03	Soil Boring	C-9.1	Former FTAs by Current Entomology Bldg.	7170123.751	496378.425	550.9	NA	NA	
13-1B	Monitor Well – Flush Mount	C-10.1	Fuel Pump House (Building 1246)	7169569.601	496315.995	550.3	550.32	550.00	
13MW13	Monitor Well – Flush Mount	C-10.1	Fuel Pump House (Building 1246)	7169675.270	496205.007	548.8	548.77	548.54	
26MW20	Monitor Well	C-10.1	Fuel Pump House (Building 1246)	7169723.392	496247.811	550.5	553.25	552.39	
GS-MW01	Monitor Well	C-11.1	Garrison Slough	7174723.338	494319.803	526.5	529.72	529.33	
GS-MW02	Monitor Well	C-11.1	Garrison Slough	7172790.661	495832.332	534.7	537.97	537.52	
GS-MW03	Monitor Well	C-11.1	Garrison Slough	7170244.035	496448.294	551.2	554.14	553.43	
GS-MW04	Monitor Well	C-11.1	Garrison Slough	7169883.855	496364.262	548.2	551.64	551.15	
GS-SB01	Soil Boring	C-11.1	Garrison Slough	7172789.729	495831.811	534.5	NA	NA	
GS-SW01/SD01	Surface Water/Sediment	C-11.1	Garrison Slough	7172791.093	495838.312	531.7	NA	NA	
GS-SW02	Surface Water	C-11.1	Garrison Slough	7170245.220	496465.628	539.7	NA	NA	
GS-SD02	Sediment	C-11.1	Garrison Slough	7170245.021	496466.167	539.2	NA	NA	
HANG-MW01	Monitor Well – Flush Mount	C-12.1	Hanger (Bldg. 1344)	7169598.773	497096.451	551.7	551.69	551.35	
HANG-MW02	Monitor Well – Flush Mount	C-12.1	Hanger (Bldg. 1344)	7169518.839	497148.699	551.1	551.09	550.74	
HANG-SB01	Soil Boring	C-12.1	Hanger (Bldg. 1344)	7169583.847	497092.740	551.3	NA	NA	
48P01 (Bldg 6200)	Power Plant Water Well	C-13.1	Power Plant Cooling Pond	7171735.658	496512.121	544.4	--	--	
48P02 (Bldg 6201)	Power Plant Water Well	C-13.1	Power Plant Cooling Pond	7171678.584	496531.227	544.1	--	--	Not in use
44M03	Monitor Well	C-14.1	Thunderdome (Building 1140)	7172513.331	495278.985	540.7	544.05	543.55	
44M040	Monitor Well – Not CH2M	C-14.1	Thunderdome (Building 1140)	7172311.964	495372.399	541.0	543.92	543.47	
44MW13	Monitor Well – Flush Mount	C-14.1	Thunderdome (Building 1140)	7172243.834	495390.021	540.2	540.22	539.81	
THDM-SB01	Soil Boring	C-14.1	Thunderdome (Building 1140)	7172453.639	495325.825	541.2	NA	NA	
32MOE	Monitor Well	C-15.1	Wastewater Treatment Plant	7174740.726	494109.697	529.7	531.61	531.21	
WWTP-SB01	Soil Boring	C-15.1	Wastewater Treatment Plant	7174126.070	494483.600	529.2	NA	NA	
WWTP-SL01	Sludge Bed	C-15.1	Wastewater Treatment Plant	7174479.144	494398.673	532.6	NA	NA	
WWTP-SW01	Surface Water	C-15.1	Wastewater Treatment Plant	7174534.112	494208.447	528.2	NA	NA	
WWTP-SD01	Sediment	C-15.1	Wastewater Treatment Plant	7174534.181	494208.695	528.7	NA	NA	

* The WGS coordinates were derived utilizing the online NGS program "Horizontal Time-Dependent Positioning (HTDP)" software. The conversion was calculated from the date of the initial survey (August 11, 2016), and the NAD83 (2011) position derived from OPUS to the most current WGS 84 coordinate (g1762).

Horizontal Control Statement:

1. The basis of horizontal control is an NGS OPUS solution (Online Positioning User System) on a set 5/8-inch rebar. The occupation was 5.5 hours in length and achieved excellent results.
2. The horizontal and vertical locations for each site were surveyed utilizing Real Time Kinematic (RTK) GPS techniques. Additional redundant measurements were taken to verify accuracy
3. The survey field work for these sites was performed from August 11 through 13, 2016.
4. The horizontal data is consistent with NGS Third Order Class 1, and the Vertical Accuracy is consistent with Third Order, as outlined in the FGDC Geospatial Positioning Accuracy Standards, Part 4: Standards for Architecture, Engineering, Construction (A/E/C) and Facility Management.
5. This survey was performed under the supervision of Anthony Hoffman, Alaska Registered Professional Land Surveyor #9020.

Vertical Control Statement:

The vertical datum is NAVD88 (feet), established by submitting static GPS data to NGS OPUS solution (Online Positioning User System) on a set 8-inch mag spike. The occupation was 5.5 hours in length and achieved excellent results.

Appendix B
Laboratory Reports and Data Quality Review

Appendix B-1
Data Quality Evaluation Report

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, surface water, sediment, and soil samples collected at Joint Base Elmendorf-Richardson, Alaska. Samples were collected and analyzed in support of the Perfluorinated Compounds Site Inspection. Individual method requirements and guidelines from the *Final Work Plan for Perfluorinated Compounds (PFCs) Site Inspections, Joint Base Elmendorf-Richardson, Alaska (*Work Plan) (United States Air Force, 2016) 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 37 primary groundwater samples, 29 primary soil samples, one primary sediment sample, two primary surface water samples, five groundwater field duplicates (FDs), four soil FDs, one sediment FD, two surface water FDs, and 10 equipment blanks (EBs). Samples were collected between June 22 and November 22, 2016. A list of samples associated with this DQE is included in Attachment B1-1.

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 B1-1. The required frequency was met for each method/matrix combination. EBs were not required for surface water sample collection.

Table B1-1. Percentage of FD, EB, and MS/MSD Collected by Method
Site Inspection Report for Aqueous Film Forming Foam Areas at Joint Base Elmendorf-Richardson, Alaska

Method	Matrix	Count of Primary Samples	Count of FDs	Percent of FDs	Count of MS/MSDs	Percent of MS/MSDs	Count of EBs	Percent of EBs
WS-LC-0025	Groundwater	37	5	13.5	3	8.1	3	8.1
WS-LC-0025	Surface water	2	2	100	1	50	0	0
WS-LC-0025	Sediment	1	1	100	1	100	1	100
WS-LC-0025	Soil	29	4	13.8	12	41.3	6	20.7

The sample results were reported as 19 sample delivery groups (SDGs) presented in Table B1-2. The analyses were performed by TestAmerica in West Sacramento, California (TAMC, Department of Defense Environmental Laboratory Accreditation Program Certification #2928.01). Samples were collected and shipped via overnight carrier to TAMC.

The samples were analyzed for perfluorinated compounds by laboratory Method WS-LC-0025. Soil samples were prepared following the incremental sampling technique as outlined in the *State of Alaska Department of Environmental Conservation, Division of Spill Prevention and Response, Contaminated Sites Program, Draft Guidance on Multi Increment Soil Sampling* (Alaska Department of Environmental Conservation, Division of Spill Prevention and Response, 2009).

Table B1-2. Sample Delivery Groups
Site Inspection Report for Aqueous Film Forming Foam Areas at Joint Base Elmendorf-Richardson, Alaska

SDG	Performing Laboratory	SDG	Performing Laboratory
320-19838-1	TAMC	320-20909-1	TAMC
320-19974-1	TAMC	320-20970-1	TAMC
320-20106-1	TAMC	320-20973-1	TAMC
320-20204-2	TAMC	320-21097-1	TAMC
320-20273-1	TAMC	320-21190-1	TAMC
320-20315-1	TAMC	320-21252-1	TAMC
320-20457-1	TAMC	320-22046-1	TAMC
320-20458-1	TAMC	320-22429-1	TAMC
320-20594-1	TAMC	320-23799-1	TAMC
320-20755-1	TAMC		

The assessment of data includes a review of (1) the chain-of-custody 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) isotope dilution analytes recoveries; (7) MS/MSD samples; and (8) summary initial and continuing calibration information and other method-specific criteria as defined in the Work Plan under Level III data validation guidelines.

Five SDGs containing water and soil samples from locations E3-1 (AFFF Area #11 – E3/AWACS Crash Location), SS108-1 (AFFF Area #25 – SS108 C-17 Crash Location), AT052-1 (AFFF Area #2 – AT052), and FS4-1 (AFFF Area #3 – Fire Station 4) included raw data review, which consisted of (1) back calculation of instrument calibration, detected sample results and beginning and ending continuing calibration verifications for all analytes; (2) review of sample chromatograms; (3) retention time verification; and (4) review of manual integrations as in the Work Plan under raw data review guidelines.

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 as follows:

- **J** = The analyte was positively identified, and the quantitation is an estimation because of discrepancies in meeting certain analyte-specific QC 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).
- **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. Or the analyte was detected in the sample at a concentration less than or equal to five times (10 times for common laboratory contaminants) the blank concentration.

- **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 in Table B1-3.

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 B1-2.

Many laboratory reports for this sampling event contain investigation-derived waste (IDW) samples. IDW samples were not validated and are not included in the text of this DQE or in the Alaska Department of Environmental Conservation Laboratory Data Review Checklists.

Holding Times

All holding-time criteria were met, with the following exceptions:

- The dilution analysis of soil sample 16Q2CFTA-1-SO-0 for perfluorooctanesulfonic acid was performed one day outside of the holding time criterion. The associated detected result was qualified as estimated and flagged “J.”
- The re-extraction of groundwater samples 16Q3CHD-4-GW-0 and 16Q3CHD-4-GW-1 was performed 2 days outside of the holding time criterion for 6:2FTS and 8:2FTS. Four associated nondetected results were qualified as estimated and flagged “UJ.”

Calibration

All initial and continuing calibration criteria were met.

The result for perfluorooctanesulfonic acid in soil sample 16Q3FS1-1-SO-0 was reported greater than the linear calibration range. A dilution performed outside of holding time showed the same concentration. The result was qualified as estimated and flagged “J.”

The recovery of 6:2FTS was less than Work Plan criteria in a continuing calibration verification (CCV) associated with the groundwater samples, indicating that associated sample results are possibly biased low. One associated nondetected result was qualified as estimated and flagged “UJ.”

The recovery of 6:2FTS was greater than Work Plan criteria in the CCVs associated with the groundwater samples, indicating that associated sample results are possibly biased high. Three associated detected results were qualified as estimated and flagged “J.”

Method Blanks

Method blanks were analyzed at the required frequency and were free of contamination, with the following exceptions:

- Perfluorobutanesulfonic acid, perfluorododecanoic acid, perfluorodecanoic acid, and perfluorotetradecanoic acid were detected less than the LOQ, and perfluorooctanoic acid and perfluorooctanesulfonic acid were detected greater than the LOQ, in the method blanks associated with the groundwater samples. Twenty-two associated results were detected less than five times the blank concentrations. The results were qualified as not detected and flagged “U.”
- Perfluorobutanesulfonic acid and perfluorotetradecanoic acid were detected less than the LOQ, and perfluorooctanesulfonic acid was detected greater than the LOQ, in the method blanks associated

with the soil samples. Thirty-two associated results were detected less than five times the blank concentrations. The results were qualified as not detected and flagged "U."

Equipment Blanks

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

- Perfluorobutanesulfonic acid, perfluorohexanesulfonic acid, perfluorohexanoic acid, perfluorooctanesulfonic acid, perfluorooctanoic acid, and perfluorotetradecanoic acid were detected less than the LOQ in the EBs associated with the groundwater samples. Forty-two associated results were detected less than five times the blank concentrations. The results were qualified as not detected and flagged "U."

Field Duplicates

Eleven FD sets were collected, and precision was acceptable.

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 laboratory chose additional samples for MS/MSD analysis. Accuracy and precision criteria were met, with the following exceptions:

- The recoveries of 6:2FTS and perfluorooctanesulfonic acid were greater than Work Plan criteria in the MS of soil sample 16Q2CFTA-1-SO-0, and less than Work Plan criteria in the MSD. The associated detected results are biased due to matrix interference; two results were qualified as estimated and flagged "J."
- The recoveries of perfluorooctanoic acid and perfluorobutanesulfonic acid were greater than Work Plan criteria in the MS and/or MSD of soil samples 16Q2CFTA-1-SO-0 and 16Q3AT029-1-SO-1; associated results are possibly biased high. Four detected results were qualified as estimated and flagged "J."
- The recovery of 6:2FTS was greater than Work Plan criteria in the MSD of soil sample 16Q3CCH-1-SO-0; the associated sample result is possibly biased high. One detected result was qualified as estimated and flagged "J."
- The recovery of 6:2FTS was greater than Work Plan criteria in the MS of groundwater sample 16Q4LF04SP-02-SP-0; the associated sample result is possibly biased high. One detected result was qualified as estimated and flagged "J."
- The recoveries of perfluorooctanoic acid, perfluorohexanoic acid, perfluoroheptanoic acid, perfluorobutanesulfonic acid, perfluorohexanesulfonic acid, perfluorononanoic acid, perfluorodecanoic acid, perfluorotridecanoic acid, perfluoroundecanoic acid, and perfluorotetradecanoic acid were less than Work Plan criteria in the MSD of surface water sample 16Q3CHD-SW01-SW-0; associated sample results are possibly biased low. Two nondetected results were qualified as estimated and flagged "UJ"; eight detected results were qualified as estimated and flagged "J."
- The recovery of perfluorotetradecanoic acid was greater than Work Plan criteria in the MS of groundwater sample 16Q3E3-1-GW-0; the associated sample result is possibly biased high. Additionally, the relative percent difference (RPD) of perfluorotetradecanoic acid was greater than Work Plan criteria in the MS/MSD of this same sample. One detected result was qualified as estimated and flagged "J."

- The recoveries of perfluorooctanesulfonic acid, perfluorohexanoic acid, perfluorooctanoic acid, perfluorobutanesulfonic acid, and perfluorotridecanoic acid were greater than Work Plan criteria in the MS and/or MSD of groundwater sample 16Q3FS6-1-GW-0; associated results are possibly biased high. Five detected results were qualified as estimated and flagged "J."

Isotope Dilution Analytes

Isotope Dilution Analytes (IDA) were added to all samples for the methods requiring their use. IDA recoveries met criteria, with the following exceptions:

- IDA recoveries were greater than Work Plan criteria in soil samples 16Q2CFTA-3-SO-0, 16Q3FS1-1-SO-0, 16Q3CHD-HA-2-SO-0, and 16Q3CHD-HA-1-SO-0, indicating that associated sample results are possibly biased high. Eight associated sample results were qualified as estimated and flagged "J."
- IDA recoveries were greater than Work Plan criteria in groundwater samples 16Q3FASTA-1-GW-0, 16Q3H5-1-GW-0, 16Q3CASTA-1-GW-0, 16Q3CCH-1-GW-0, 16Q3CCH-1-GW-1, 16Q3CFTA-2-GW-0, 16Q3FS1-1-GW-0, 16Q3CHD-1-GW-0, 16Q3FS7-1-GW-0, 16Q3H18-1-GW-0, 16Q3FSFS-1-GW-0, 16Q3OU3MW-02-GW-0, 16Q3FP56-GW-0, 16Q4OU5SP-01-SP-0, 16Q4OU5SP-02-SP-0, and 16Q4OU5SP-11-SP-0, indicating that associated sample results are possibly biased high. Twenty-six associated sample results were qualified as estimated and flagged "J."
- IDA recoveries were greater than Work Plan criteria in surface samples 16Q4WCSW-02-SP-0 and 16Q4WCSW-02-SP-1, indicating that associated sample results are possibly biased high. Two associated sample results were qualified as estimated and flagged "J."
- IDA recoveries were less than Work Plan criteria in groundwater sample 16Q3FS7-1-GW-0, indicating that associated sample results are possibly biased low. One detected result was qualified as estimated and flagged "J."
- IDA recoveries were less than Work Plan criteria in soil samples 16Q3FS1-1-SO-0, 16Q3H17-1-SO-0, and 16Q3CHD-3-SO-1, indicating that associated sample results are possibly biased low. Four detected results were qualified as estimated and flagged "J"; four nondetected results were qualified as estimated and flagged "UJ."

Laboratory Control Samples

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

- The recovery of perfluorooctanoic acid was greater than Work Plan criteria in an LCS associated with the soil samples, indicating that associated sample results are possibly biased high. One detected result was qualified as estimated and flagged "J."
- The recovery of 8:2FTS was greater than Work Plan criteria in the LCSs associated with the groundwater samples, indicating that associated sample results are possibly biased high. Nine detected results were qualified as estimated and flagged "J."

Raw Data Validation Findings

The laboratory data packages that underwent raw data validation were: 320-20106-1, 320-20909-1, 320-20973-1, 320-21190-1 and 320-22046-1. Findings are outlined below:

- All samples were analyzed undiluted
- Initial calibration for each analyte was successfully recreated based on relative response factors.

- The slope and intercept for linear calibrations for 6:2 FTS (320-20909-1, 320-20973-1, 320-21190-1, 320-22046-1) and PFOA (320-20909-1, 320-20973-1, 320-22046-1) could not be re-created exactly. Using the laboratory instrument slopes and intercepts, initial calibrations were successfully recalculated for all sample and quality control data.
- Several initial calibration summary forms were missing or incorrect, such as retention time summary forms and response factor forms. All data were available in the instrument printouts.
- The laboratory did not follow the standard operating procedure sample collection and preparation volume for groundwater samples. The SOP states 500 milliliters of sample will be extracted. The field crew collected samples in 250ml containers and the laboratory extracted this amount. The laboratory detection limits were adjusted accordingly and all detection limits still met project objectives.
- The laboratory did not provide benchsheets for incremental sample preparation of soil samples.
- Sample 16Q3SS108-1-SO-0 in 320-20909-1 is biased slightly low for PFOA because the laboratory did not perform a manual integration to reach baseline. A reintegrated result will still be less than the project cleanup level. Consultation with the laboratory confirms the reintegrated result would have no impact on the reported result.
- Sample 16Q3AT052-1-GW-0 in 320-21190-1 is biased slightly low for 8:2 FTS because the laboratory did not perform a manual integration to reach baseline. Consultation with the laboratory confirms the reintegrated result would have minimal impact on the reported result.
- Sample 16Q3AT052-1-GW-0 in 320-21190-1 appears biased slightly low for perfluorotetradecanoic acid because the laboratory did not perform a manual integration to reach baseline. Consultation with the laboratory confirms original integration is correct because there was a chromatographic interference which co-eluted with the 713>669 transition of the PFTeA peak.
- Sample 16Q3E3-1-GW-0 in 320-21190-1 is biased slightly low for 6:2 FTS because the laboratory did not perform a manual integration to include both of the dual peaks in one of the signals. Consultation with the laboratory confirms the reintegrated result would have minimal impact on the reported result.
- Sample 16Q3E3-1-GW-0 in 320-21190-1 is biased slightly low for perfluorotridecanoic acid because the laboratory integration appears to miss the analyte peak. Consultation with the laboratory confirms the peak was missed during integration but the correctly integrated result is still nondetect.
- Sample 16Q3FS4-1-GW-0 in 320-22046-1 is biased slightly low for perfluorotetradecanoic acid because the peak does not appear properly integrated. Consultation with the laboratory confirms original integration is correct because there was a chromatographic interference which co-eluted with the 713>669 transition of the PFTeA peak.

Although there were some minor discrepancies found during raw data validation, there were none that would affect the integrity of the reported results.

Laboratory Standard Operating Procedure Changes

The standard operating procedure in the Work Plan is Rev 1.7 published on 3/18/2016. Laboratory SOPs are regularly updated, and there have been several iterations Rev. 1.7 was included in the work plan.

Laboratory SOP, version 1.8 was published in 5/19/2016, which revised the following:.

- Changed water sample volume from 500 to 250 mL.
- Changed spike volumes

Laboratory SOP, version 1.9 was published in 5/27/2016, which revised the following:

- Editorial changes only, no changes to analytical procedures

Laboratory SOP, version 2.0 was published in 11/18/2016, which revised the following:

- Added new instrumentation

Laboratory SOP, version 2.1 was published in 12/9/2016, which revised the following:

- Changed the holding time for water samples from 7 to 14 days.

Chain of Custody and Sample Receipt Discrepancies

SDG 320-19838-1

Samples were received at 1.4 degrees Celsius (°C); there was no evidence of freezing, so no data were qualified.

SDG 320-19974-1

No discrepancies noted.

SDG 320-20106-1

No discrepancies noted.

SDG 320-20204-2

Samples were received at 7.4°C. The results of soil samples 16Q3SS044-1-SO-0 and 16Q3FASTA-1-SO-0 were qualified as estimated. Eleven detected results were flagged “J,” and 17 nondetected results were flagged “UJ.”

SDG 320-20273-1

No discrepancies noted.

SDG 320-20315-1

Samples were received at 6.3°C. The results of soil samples 16Q3AT029-1-SO-0, 16Q3FS7-1-SO-0, and 16Q3AT029-1-SO-1 were qualified as estimated. Nineteen detected results were flagged “J,” and 23 nondetected results were flagged “UJ.”

SDG 320-20457-1

No discrepancies noted.

SDG 320-20458-1

No discrepancies noted.

SDG 320-20594-1

Samples were received at 1.3°C; there was no evidence of freezing, so no data were qualified.

SDG 320-20755-1

No discrepancies noted.

SDG 320-20909-1

No discrepancies noted.

SDG 320-20970-1

Samples were received at 1.6°C; there was no evidence of freezing, so no data were qualified.

SDG 320-20973-1

No discrepancies noted.

SDG 320-21097-1

No discrepancies noted.

SDG 320-21190-1

Samples were received at 1.0°C; there was no evidence of freezing, so no data were qualified.

SDG 320-21252-1

No discrepancies noted.

SDG 320-22046-1

No discrepancies noted.

SDG 320-22429-1

No discrepancies noted.

SDG 320-23799-1

Samples were received at 0.4°C; there was no evidence of freezing, so no data were qualified.

Overall Assessment

The final activity in the DQE 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 that 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. Completeness for all method/matrix/analyte combinations was 100 percent.
2. Approximately 8.8 percent of the groundwater data and 6.9 percent of the soil data were qualified due to low-level detections in the method blanks or EBs. The degree to which blank contamination was observed suggests possible contamination issues during sample collection and analysis.
3. One soil dilution result exceeded the holding time criterion by 1 day; one result was qualified as estimated.
4. The re-extraction of two groundwater samples was performed 2 days past the holding time criterion; four results were qualified as estimated.
5. LCS recovery exceedances were observed; one soil result and nine groundwater results were qualified as estimated.
6. MS/MSD recovery and RPD exceedances were observed for three soil samples, one surface water sample, and three groundwater samples; 24 results were qualified as estimated.
7. One soil result was reported greater than initial calibration range; the result was qualified as estimated.

8. Five soil samples were received outside of the temperature criterion; 70 results were qualified as estimated.
9. CCV recovery exceedances were observed; four groundwater results were qualified as estimated.
10. IDA recovery exceedances were observed for 16 groundwater samples, three surface water samples, and six soil samples; 45 results were qualified as estimated.
11. Although data were qualified as estimated due to 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 project objectives.

Works Cited

Alaska Department of Environmental Conservation, Division of Spill Prevention and Response. 2009. *State of Alaska Department of Environmental Conservation, Division of Spill Prevention and Response, Contaminated Sites Program, Draft Guidance on Multi Increment Soil Sampling.* March.

United States Air Force. 2016. *Final Work Plan for Perfluorinated Compounds (PFCs) Site Inspections, Joint Base Elmendorf-Richardson, Alaska.* June.

Table B1-3. Validation Flags

Site Inspection Report for Aqueous Film Forming Foam Areas at Joint Base Elmendorf-Richardson, Alaska

Sample ID	Method	Analyte	Final Result	Units	Final Flag	Reason
16Q2CFTA-1-SO-0	WS-LC-0025	6:2FTS	19	µg/kg	J	MS>UCL
	WS-LC-0025	6:2FTS	19	µg/kg	J	SD<LCL
	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.19	µg/kg	J	MS>UCL
	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.19	µg/kg	J	SD>UCL
	WS-LC-0025	Perfluorooctanesulfonic acid (PFOS)	220	µg/kg	J	HTa>UCL
	WS-LC-0025	Perfluorooctanesulfonic acid (PFOS)	220	µg/kg	J	MS>UCL
	WS-LC-0025	Perfluorooctanesulfonic acid (PFOS)	220	µg/kg	J	SD<LCL
	WS-LC-0025	Perfluorooctanoic acid (PFOA)	2.9	µg/kg	J	MS>UCL
	WS-LC-0025	Perfluorooctanoic acid (PFOA)	2.9	µg/kg	J	LCS>UCL
16Q2CFTA-3-SO-0	WS-LC-0025	Perfluoroheptanoic acid (PFHpA)	0.13	µg/kg	J	IDA>UCL
	WS-LC-0025	Perfluorohexanoic acid (PFHxA)	0.31	µg/kg	J	IDA>UCL
	WS-LC-0025	Perfluorooctanoic acid (PFOA)	0.19	µg/kg	J	IDA>UCL
16Q3AT029-1-GW-0	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	2.4	ng/L	U	EB<LOQ
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	0.73	ng/L	U	LB<LOQ
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	0.73	ng/L	U	EB<LOQ
16Q3AT029-1-SO-0	WS-LC-0025	6:2FTS	1	µg/kg	UJ	TEMP>6C
	WS-LC-0025	8:2FTS	6.6	µg/kg	J	TEMP>6C
	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.13	µg/kg	U	LB<LOQ
	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.13	µg/kg	U	TEMP>6C
	WS-LC-0025	Perfluorodecanoic acid (PFDA)	0.2	µg/kg	UJ	TEMP>6C
	WS-LC-0025	Perfluorododecanoic acid (PFDoA)	0.3	µg/kg	UJ	TEMP>6C
	WS-LC-0025	Perfluoroheptanoic acid (PFHpA)	0.3	µg/kg	UJ	TEMP>6C
	WS-LC-0025	Perfluorohexanesulfonic acid (PFHxS)	0.26	µg/kg	J	TEMP>6C
	WS-LC-0025	Perfluorohexanoic acid (PFHxA)	0.1	µg/kg	J	TEMP>6C

Table B1-3. Validation Flags

Site Inspection Report for Aqueous Film Forming Foam Areas at Joint Base Elmendorf-Richardson, Alaska

Sample ID	Method	Analyte	Final Result	Units	Final Flag	Reason
	WS-LC-0025	Perfluorononanoic acid (PFNA)	0.3	µg/kg	UJ	TEMP>6C
	WS-LC-0025	Perfluorooctanesulfonic acid (PFOS)	3.4	µg/kg	J	TEMP>6C
	WS-LC-0025	Perfluorooctanoic acid (PFOA)	0.34	µg/kg	J	TEMP>6C
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	0.2	µg/kg	UJ	TEMP>6C
	WS-LC-0025	Perfluorotridecanoic Acid (PFTriA)	0.2	µg/kg	UJ	TEMP>6C
	WS-LC-0025	Perfluoroundecanoic acid (PFUnA)	0.3	µg/kg	UJ	TEMP>6C
16Q3AT029-1-SO-1	WS-LC-0025	6:2FTS	1	µg/kg	UJ	TEMP>6C
	WS-LC-0025	8:2FTS	7.3	µg/kg	J	TEMP>6C
	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.13	µg/kg	U	TEMP>6C
	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.13	µg/kg	U	MS>UCL
	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.13	µg/kg	U	LB<LOQ
	WS-LC-0025	Perfluorodecanoic acid (PFDA)	0.2	µg/kg	UJ	TEMP>6C
	WS-LC-0025	Perfluorododecanoic acid (PFDoA)	0.3	µg/kg	UJ	TEMP>6C
	WS-LC-0025	Perfluoroheptanoic acid (PFHpA)	0.3	µg/kg	UJ	TEMP>6C
	WS-LC-0025	Perfluorohexanesulfonic acid (PFHxS)	0.3	µg/kg	J	TEMP>6C
	WS-LC-0025	Perfluorohexanoic acid (PFHxA)	0.097	µg/kg	J	TEMP>6C
	WS-LC-0025	Perfluorononanoic acid (PFNA)	0.3	µg/kg	UJ	TEMP>6C
	WS-LC-0025	Perfluorooctanesulfonic acid (PFOS)	3.5	µg/kg	J	TEMP>6C
	WS-LC-0025	Perfluorooctanoic acid (PFOA)	0.31	µg/kg	J	MS>UCL
	WS-LC-0025	Perfluorooctanoic acid (PFOA)	0.31	µg/kg	J	TEMP>6C
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	0.2	µg/kg	UJ	TEMP>6C
	WS-LC-0025	Perfluorotridecanoic Acid (PFTriA)	0.2	µg/kg	UJ	TEMP>6C
	WS-LC-0025	Perfluoroundecanoic acid (PFUnA)	0.3	µg/kg	UJ	TEMP>6C
16Q3AT052-1-GW-0	WS-LC-0025	Perfluorohexanesulfonic acid (PFHxS)	3.8	ng/L	U	EB<LOQ
	WS-LC-0025	Perfluorooctanesulfonic acid (PFOS)	1.9	ng/L	U	EB<LOQ
	WS-LC-0025	Perfluorooctanoic acid (PFOA)	2.3	ng/L	U	EB<LOQ
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	1.5	ng/L	U	LB<LOQ
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	1.5	ng/L	U	EB<LOQ
16Q3AT052-1-GW-1	WS-LC-0025	Perfluorohexanesulfonic acid (PFHxS)	2.7	ng/L	U	EB<LOQ
	WS-LC-0025	Perfluorooctanesulfonic acid (PFOS)	1.1	ng/L	U	EB<LOQ
	WS-LC-0025	Perfluorooctanoic acid (PFOA)	1.9	ng/L	U	EB<LOQ
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	3.8	ng/L	U	EB<LOQ
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	3.8	ng/L	U	LB<LOQ
16Q3AT052-1-SO-0	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.11	µg/kg	U	LB<LOQ
16Q3CASTA-1-GW-0	WS-LC-0025	6:2FTS	1600	ng/L	J	IDA>UCL
16Q3CASTA-1-SO-0	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	0.1	µg/kg	U	LB<LOQ
16Q3CCH-1-GW-0	WS-LC-0025	6:2FTS	600	ng/L	J	IDA>UCL
16Q3CCH-1-GW-0	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	2.4	ng/L	U	EB<LOQ
16Q3CCH-1-GW-1	WS-LC-0025	6:2FTS	570	ng/L	J	IDA>UCL

Table B1-3. Validation Flags

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Sample ID	Method	Analyte	Final Result	Units	Final Flag	Reason
16Q3CCH-1-SO-0	WS-LC-0025	6:2FTS	33	µg/kg	J	SD>UCL
	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.15	µg/kg	U	LB<LOQ
16Q3CCH-1-SO-1	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.14	µg/kg	U	LB<LOQ
16Q3CFTA-1-GW-0	WS-LC-0025	Perfluorooctanesulfonic acid (PFOS)	2.1	ng/L	U	EB<LOQ
	WS-LC-0025	Perfluorooctanoic acid (PFOA)	0.75	ng/L	U	EB<LOQ
16Q3CFTA-2-GW-0	WS-LC-0025	6:2FTS	560	ng/L	J	IDA>UCL
16Q3CFTA-3-GW-0	WS-LC-0025	Perfluorooctanesulfonic acid (PFOS)	2	ng/L	U	EB<LOQ
	WS-LC-0025	Perfluorooctanoic acid (PFOA)	2.3	ng/L	U	EB<LOQ
16Q3CHD-1-GW-0	WS-LC-0025	6:2FTS	13	ng/L	J	IDA>UCL
16Q3CHD-2-GW-0	WS-LC-0025	Perfluorododecanoic acid (PFDoA)	0.69	ng/L	U	LB<LOQ
16Q3CHD-3-SO-0	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.22	µg/kg	U	LB<LOQ
16Q3CHD-3-SO-1	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.24	µg/kg	U	LB<LOQ
	WS-LC-0025	Perfluorodecanoic acid (PFDA)	0.079	µg/kg	J	IDA<LCL
	WS-LC-0025	Perfluorododecanoic acid (PFDoA)	0.3	µg/kg	UJ	IDA<LCL
	WS-LC-0025	Perfluorotridecanoic Acid (PFTriA)	0.2	µg/kg	UJ	IDA<LCL
	WS-LC-0025	Perfluoroundecanoic acid (PFUnA)	0.3	µg/kg	UJ	IDA<LCL
16Q3CHD-4-GW-0	WS-LC-0025	6:2FTS	9.9	ng/L	UJ	HTp>UCL
	WS-LC-0025	8:2FTS	9.9	ng/L	UJ	HTp>UCL
	WS-LC-0025	Perfluorohexanoic acid (PFHxA)	4.6	ng/L	U	EB<LOQ
	WS-LC-0025	Perfluorooctanesulfonic acid (PFOS)	30	ng/L	U	EB>LOQ
	WS-LC-0025	Perfluorooctanesulfonic acid (PFOS)	30	ng/L	U	LB>LOQ
	WS-LC-0025	Perfluorooctanoic acid (PFOA)	6.9	ng/L	U	LB>LOQ
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	0.75	ng/L	U	LB<LOQ
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	0.75	ng/L	U	EB<LOQ
16Q3CHD-4-GW-1	WS-LC-0025	6:2FTS	9.9	ng/L	UJ	HTp>UCL
	WS-LC-0025	8:2FTS	9.9	ng/L	UJ	HTp>UCL
	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.89	ng/L	U	EB<LOQ
	WS-LC-0025	Perfluorohexanoic acid (PFHxA)	4.7	ng/L	U	EB<LOQ
	WS-LC-0025	Perfluorooctanesulfonic acid (PFOS)	30	ng/L	U	EB>LOQ
	WS-LC-0025	Perfluorooctanesulfonic acid (PFOS)	30	ng/L	U	LB>LOQ
	WS-LC-0025	Perfluorooctanoic acid (PFOA)	7.3	ng/L	U	LB>LOQ
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	0.8	ng/L	U	LB<LOQ
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	0.8	ng/L	U	EB<LOQ
16Q3CHD-4-SO-0	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.18	µg/kg	U	LB<LOQ
16Q3CHD-HA-1-SO-0	WS-LC-0025	6:2FTS	3.5	µg/kg	J	IDA>UCL
	WS-LC-0025	8:2FTS	3.5	µg/kg	J	IDA>UCL
	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.24	µg/kg	U	LB<LOQ
	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.24	µg/kg	U	LB<LOQ

Table B1-3. Validation Flags

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Sample ID	Method	Analyte	Final Result	Units	Final Flag	Reason
	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.24	µg/kg	U	LB<LOQ
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	0.42	µg/kg	U	LB<LOQ
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	0.42	µg/kg	U	LB<LOQ
16Q3CHD-HA-2-SO-0	WS-LC-0025	6:2FTS	3.2	µg/kg	J	IDA>UCL
	WS-LC-0025	8:2FTS	4.5	µg/kg	J	IDA>UCL
	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.22	µg/kg	U	LB<LOQ
	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.22	µg/kg	U	LB<LOQ
	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.22	µg/kg	U	LB<LOQ
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	0.22	µg/kg	U	LB<LOQ
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	0.22	µg/kg	U	LB<LOQ
16Q3CHD-SD01-SD-0	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.13	µg/kg	U	LB<LOQ
	WS-LC-0025	Perfluorooctanesulfonic acid (PFOS)	1.7	µg/kg	U	LB>LOQ
16Q3CHD-SD01-SD-1	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.13	µg/kg	U	LB<LOQ
	WS-LC-0025	Perfluorooctanesulfonic acid (PFOS)	1.7	µg/kg	U	LB>LOQ
16Q3CHD-SW01-SW-0	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	30	ng/L	J	SD<LCL
	WS-LC-0025	Perfluorodecanoic acid (PFDA)	2.7	ng/L	J	SD<LCL
	WS-LC-0025	Perfluoroheptanoic acid (PFHpA)	30	ng/L	J	SD<LCL
	WS-LC-0025	Perfluorohexanesulfonic acid (PFHxS)	240	ng/L	J	SD<LCL
	WS-LC-0025	Perfluorohexanoic acid (PFHxA)	88	ng/L	J	SD<LCL
	WS-LC-0025	Perfluorononanoic acid (PFNA)	4	ng/L	J	SD<LCL
	WS-LC-0025	Perfluorooctanoic acid (PFOA)	93	ng/L	J	SD<LCL
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	0.93	ng/L	UJ	SD<LCL
	WS-LC-0025	Perfluorotridecanoic Acid (PFTriA)	1.9	ng/L	UJ	SD<LCL
	WS-LC-0025	Perfluoroundecanoic acid (PFUnA)	0.89	ng/L	J	SD<LCL
16Q3E3-1-GW-0	WS-LC-0025	6:2FTS	9	ng/L	UJ	CCV<LCL
	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	5.3	ng/L	U	LB<LOQ
	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	5.3	ng/L	U	EB<LOQ
	WS-LC-0025	Perfluorooctanesulfonic acid (PFOS)	5.1	ng/L	U	EB<LOQ
	WS-LC-0025	Perfluorooctanoic acid (PFOA)	4.4	ng/L	U	EB<LOQ
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	0.56	ng/L	U	EB<LOQ
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	0.56	ng/L	U	MSRPD
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	0.56	ng/L	U	MS>UCL
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	0.56	ng/L	U	LB<LOQ
16Q3E3-1-SO-0	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.17	µg/kg	U	LB<LOQ
16Q3FASTA-1-GW-0	WS-LC-0025	6:2FTS	500	ng/L	J	IDA>UCL
	WS-LC-0025	Perfluorohexanesulfonic acid (PFHxS)	1400	ng/L	J	IDA>UCL
	WS-LC-0025	Perfluorooctanesulfonic acid (PFOS)	1800	ng/L	J	IDA>UCL
	WS-LC-0025	Perfluorooctanoic acid (PFOA)	1700	ng/L	J	IDA>UCL
16Q3FASTA-1-SO-0	WS-LC-0025	6:2FTS	2.2	µg/kg	J	TEMP>6C

Table B1-3. Validation Flags

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Sample ID	Method	Analyte	Final Result	Units	Final Flag	Reason
	WS-LC-0025	8:2FTS	5.8	µg/kg	J	TEMP>6C
	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.14	µg/kg	UJ	TEMP>6C
	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.14	µg/kg	UJ	LB<LOQ
	WS-LC-0025	Perfluorodecanoic acid (PFDA)	0.2	µg/kg	UJ	TEMP>6C
	WS-LC-0025	Perfluorododecanoic acid (PFDoA)	0.3	µg/kg	UJ	TEMP>6C
	WS-LC-0025	Perfluoroheptanoic acid (PFHpA)	0.3	µg/kg	UJ	TEMP>6C
	WS-LC-0025	Perfluorohexanesulfonic acid (PFHxS)	0.89	µg/kg	J	TEMP>6C
	WS-LC-0025	Perfluorohexanoic acid (PFHxA)	0.23	µg/kg	J	TEMP>6C
	WS-LC-0025	Perfluorononanoic acid (PFNA)	0.3	µg/kg	UJ	TEMP>6C
	WS-LC-0025	Perfluorooctanesulfonic acid (PFOS)	15	µg/kg	J	TEMP>6C
	WS-LC-0025	Perfluorooctanoic acid (PFOA)	0.46	µg/kg	J	TEMP>6C
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	0.2	µg/kg	UJ	TEMP>6C
	WS-LC-0025	Perfluorotridecanoic Acid (PFTriA)	0.2	µg/kg	UJ	TEMP>6C
	WS-LC-0025	Perfluoroundecanoic acid (PFUnA)	0.3	µg/kg	UJ	TEMP>6C
16Q3FP56-GW-0	WS-LC-0025	6:2FTS	57	ng/L	J	IDA>UCL
	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	7	ng/L	U	EB<LOQ
	WS-LC-0025	Perfluorooctanesulfonic acid (PFOS)	35	ng/L	U	EB>LOQ
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	0.89	ng/L	U	EB<LOQ
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	0.89	ng/L	U	LB<LOQ
16Q3FS1-1-GW-0	WS-LC-0025	Perfluorohexanesulfonic acid (PFHxS)	750	ng/L	J	IDA>UCL
	WS-LC-0025	Perfluorooctanesulfonic acid (PFOS)	2900	ng/L	J	IDA>UCL
16Q3FS1-1-SO-0	WS-LC-0025	8:2FTS	160	µg/kg	J	IDA>UCL
	WS-LC-0025	Perfluorononanoic acid (PFNA)	1.2	µg/kg	J	IDA<LCL
	WS-LC-0025	Perfluorooctanesulfonic acid (PFOS)	8900	µg/kg	J	>ICLinearRange
	WS-LC-0025	Perfluorooctanesulfonic acid (PFOS)	8900	µg/kg	J	>ICLinearRange
16Q3FS4-1-GW-0	WS-LC-0025	Perfluorooctanesulfonic acid (PFOS)	13	ng/L	U	EB>LOQ
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	0.53	ng/L	U	LB<LOQ
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	0.53	ng/L	U	EB<LOQ
16Q3FS4-1-GW-1	WS-LC-0025	Perfluorooctanesulfonic acid (PFOS)	14	ng/L	U	EB>LOQ
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	1.3	ng/L	U	LB<LOQ
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	1.3	ng/L	U	EB<LOQ
16Q3FS4-1-SO-0	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.12	µg/kg	U	LB<LOQ
16Q3FS5-1-GW-0	WS-LC-0025	Perfluorooctanesulfonic acid (PFOS)	18	ng/L	U	EB<LOQ
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	2	ng/L	U	LB<LOQ
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	2	ng/L	U	EB<LOQ
16Q3FS6-1-GW-0	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	6	ng/L	U	EB<LOQ
	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	6	ng/L	U	LB<LOQ
	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	6	ng/L	U	MS>UCL
	WS-LC-0025	Perfluorohexanoic acid (PFHxA)	18	ng/L	J	MS>UCL

Table B1-3. Validation Flags

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Sample ID	Method	Analyte	Final Result	Units	Final Flag	Reason
	WS-LC-0025	Perfluorooctanesulfonic acid (PFOS)	540	ng/L	J	SD>UCL
	WS-LC-0025	Perfluorooctanesulfonic acid (PFOS)	540	ng/L	J	MS>UCL
	WS-LC-0025	Perfluorooctanoic acid (PFOA)	9.7	ng/L	J	MS>UCL
	WS-LC-0025	Perfluorotridecanoic Acid (PFTriA)	0.63	ng/L	J	MS>UCL
16Q3FS6-1-SO-0	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.62	µg/kg	U	LB<LOQ
16Q3FS7-1-GW-0	WS-LC-0025	6:2FTS	1700	ng/L	J	CCV>UCL
	WS-LC-0025	6:2FTS	1700	ng/L	J	IDA>UCL
	WS-LC-0025	8:2FTS	530	ng/L	J	LCS>UCL
	WS-LC-0025	8:2FTS	530	ng/L	J	LCS>UCL
	WS-LC-0025	Perfluorohexanesulfonic acid (PFHxS)	8500	ng/L	J	IDA>UCL
	WS-LC-0025	Perfluorononanoic acid (PFNA)	28	ng/L	J	IDA<LCL
16Q3FS7-1-SO-0	WS-LC-0025	6:2FTS	0.99	µg/kg	UJ	TEMP>6C
	WS-LC-0025	8:2FTS	2	µg/kg	UJ	TEMP>6C
	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.28	µg/kg	U	TEMP>6C
	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.28	µg/kg	U	LB<LOQ
	WS-LC-0025	Perfluorodecanoic acid (PFDA)	0.062	µg/kg	J	TEMP>6C
	WS-LC-0025	Perfluorododecanoic acid (PFDoA)	0.3	µg/kg	UJ	TEMP>6C
	WS-LC-0025	Perfluoroheptanoic acid (PFHpA)	0.16	µg/kg	J	TEMP>6C
	WS-LC-0025	Perfluorohexanesulfonic acid (PFHxS)	2.5	µg/kg	J	TEMP>6C
	WS-LC-0025	Perfluorohexanoic acid (PFHxA)	0.61	µg/kg	J	TEMP>6C
	WS-LC-0025	Perfluorononanoic acid (PFNA)	0.3	µg/kg	UJ	TEMP>6C
	WS-LC-0025	Perfluorooctanesulfonic acid (PFOS)	3.7	µg/kg	J	TEMP>6C
	WS-LC-0025	Perfluorooctanoic acid (PFOA)	0.41	µg/kg	J	TEMP>6C
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	0.2	µg/kg	UJ	TEMP>6C
	WS-LC-0025	Perfluorotridecanoic Acid (PFTriA)	0.2	µg/kg	UJ	TEMP>6C
	WS-LC-0025	Perfluoroundecanoic acid (PFUnA)	0.3	µg/kg	UJ	TEMP>6C
16Q3FSFS-1-GW-0	WS-LC-0025	6:2FTS	190	ng/L	J	IDA>UCL
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	1.4	ng/L	U	EB<LOQ
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	1.4	ng/L	U	LB<LOQ
16Q3H10-1-SO-0	WS-LC-0025	Perfluorooctanesulfonic acid (PFOS)	1.7	µg/kg	U	LB>LOQ
16Q3H16-1-GW-0	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	5.5	ng/L	U	EB<LOQ
16Q3H16-1-SO-0	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.16	µg/kg	U	LB<LOQ
16Q3H17-1-SO-0	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.18	µg/kg	U	LB<LOQ
	WS-LC-0025	Perfluorododecanoic acid (PFDoA)	0.23	µg/kg	J	IDA<LCL
	WS-LC-0025	Perfluorotridecanoic Acid (PFTriA)	0.2	µg/kg	UJ	IDA<LCL
	WS-LC-0025	Perfluoroundecanoic acid (PFUnA)	0.16	µg/kg	J	IDA<LCL
16Q3H18-1-GW-0	WS-LC-0025	6:2FTS	1500	ng/L	J	CCV>UCL
	WS-LC-0025	6:2FTS	1500	ng/L	J	IDA>UCL
	WS-LC-0025	8:2FTS	6	ng/L	J	LCS>UCL

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Sample ID	Method	Analyte	Final Result	Units	Final Flag	Reason
	WS-LC-0025	8:2FTS	6	ng/L	J	LCS>UCL
	WS-LC-0025	Perfluorohexanesulfonic acid (PFHxS)	1500	ng/L	J	IDA>UCL
16Q3H18-1-SO-0	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.16	µg/kg	U	LB<LOQ
16Q3H18-1-SO-1	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.16	µg/kg	U	LB<LOQ
16Q3H5-1-GW-0	WS-LC-0025	6:2FTS	1300	ng/L	J	IDA>UCL
16Q3H6-1-GW-0	WS-LC-0025	Perfluorodecanoic acid (PFDA)	1.2	ng/L	U	LB<LOQ
16Q3H6-1-SO-0	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.17	µg/kg	U	LB<LOQ
16Q3H8-1-GW-0	WS-LC-0025	8:2FTS	11	ng/L	J	LCS>UCL
	WS-LC-0025	8:2FTS	11	ng/L	J	LCS>UCL
16Q3H8-1-GW-1	WS-LC-0025	8:2FTS	9.9	ng/L	J	LCS>UCL
	WS-LC-0025	8:2FTS	9.9	ng/L	J	LCS>UCL
16Q3H8-1-SO-0	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.16	µg/kg	U	LB<LOQ
16Q3OU3MW-02-GW-0	WS-LC-0025	6:2FTS	790	ng/L	J	IDA>UCL
	WS-LC-0025	6:2FTS	790	ng/L	J	CCV>UCL
	WS-LC-0025	8:2FTS	4.3	ng/L	J	LCS>UCL
	WS-LC-0025	Perfluorohexanesulfonic acid (PFHxS)	2200	ng/L	J	IDA>UCL
	WS-LC-0025	Perfluorohexanoic acid (PFHxA)	1500	ng/L	J	IDA>UCL
	WS-LC-0025	Perfluorooctanesulfonic acid (PFOS)	6400	ng/L	J	IDA>UCL
	WS-LC-0025	Perfluorooctanoic acid (PFOA)	860	ng/L	J	IDA>UCL
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	0.65	ng/L	U	EB<LOQ
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	0.65	ng/L	U	LB<LOQ
16Q3SS044-1-GW-0	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	2.6	ng/L	U	LB<LOQ
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	2.6	ng/L	U	EB<LOQ
16Q3SS044-1-SO-0	WS-LC-0025	6:2FTS	1	µg/kg	UJ	TEMP>6C
	WS-LC-0025	8:2FTS	2	µg/kg	UJ	TEMP>6C
	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.14	µg/kg	UJ	LB<LOQ
	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.14	µg/kg	UJ	TEMP>6C
	WS-LC-0025	Perfluorodecanoic acid (PFDA)	0.2	µg/kg	UJ	TEMP>6C
	WS-LC-0025	Perfluorododecanoic acid (PFDoA)	0.3	µg/kg	UJ	TEMP>6C
	WS-LC-0025	Perfluoroheptanoic acid (PFHpA)	0.3	µg/kg	UJ	TEMP>6C
	WS-LC-0025	Perfluorohexanesulfonic acid (PFHxS)	0.79	µg/kg	J	TEMP>6C
	WS-LC-0025	Perfluorohexanoic acid (PFHxA)	0.2	µg/kg	UJ	TEMP>6C
	WS-LC-0025	Perfluorononanoic acid (PFNA)	0.3	µg/kg	UJ	TEMP>6C
	WS-LC-0025	Perfluorooctanesulfonic acid (PFOS)	0.63	µg/kg	J	TEMP>6C
	WS-LC-0025	Perfluorooctanoic acid (PFOA)	1.7	µg/kg	J	TEMP>6C
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	0.2	µg/kg	UJ	TEMP>6C
	WS-LC-0025	Perfluorotridecanoic Acid (PFTriA)	0.2	µg/kg	UJ	TEMP>6C
	WS-LC-0025	Perfluoroundecanoic acid (PFUnA)	0.3	µg/kg	UJ	TEMP>6C

Table B1-3. Validation Flags

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Sample ID	Method	Analyte	Final Result	Units	Final Flag	Reason
16Q3SS108-1-GW-0	WS-LC-0025	Perfluorooctanesulfonic acid (PFOS)	9.9	ng/L	U	EB<LOQ
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	3.6	ng/L	U	EB<LOQ
	WS-LC-0025	Perfluorotetradecanoic acid (PFTeA)	3.6	ng/L	U	LB<LOQ
16Q3SS108-1-SO-0	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.15	µg/kg	U	LB<LOQ
16Q3UC35A-1-SO-0	WS-LC-0025	Perfluorobutanesulfonic acid (PFBS)	0.15	µg/kg	U	LB<LOQ
16Q4LF04SP-02-SP-0	WS-LC-0025	6:2FTS	56	ng/L	J	MS>UCL
16Q4OU5SP-01-SP-0	WS-LC-0025	6:2FTS	9.7	ng/L	J	IDA>UCL
16Q4OU5SP-02-SP-0	WS-LC-0025	6:2FTS	27	ng/L	J	IDA>UCL
16Q4OU5SP-11-SP-0	WS-LC-0025	6:2FTS	930	ng/L	J	IDA>UCL
16Q4WCSW-02-SP-0	WS-LC-0025	6:2FTS	1200	ng/L	J	IDA>UCL
16Q4WCSW-02-SP-1	WS-LC-0025	6:2FTS	1100	ng/L	J	IDA>UCL

Notes:

µg/kg = microgram(s) per kilogram
ng/L = nanogram(s) per liter

>ICLinearRange = Result reported greater than initial calibration range
CCV<LCL = Continuing calibration verification recovery less than the lower control limit
CCV>UCL = Continuing calibration verification recovery greater than the upper control limit
EB<LOQ = Equipment blank concentration less than the limit of quantitation
EB>LOQ = Equipment blank concentration greater than the limit of quantitation
HTa>UCL = Analytical holding time criterion exceeded
HTp>UCL = Preparation holding time criterion exceeded
LB<LOQ = Laboratory blank concentration less than the limit of quantitation
LB>LOQ = Laboratory blank concentration greater than the limit of quantitation
LCS>UCL = Laboratory control sample recovery greater than the upper control limit
MS>UCL = Matrix spike recovery greater than the upper control limit
MSRPD = Matrix spike/matrix spike duplicate relative percent difference criterion exceeded
SD<LCL = Matrix spike duplicate recovery less than the lower control limit
SD>UCL = Matrix spike duplicate recovery greater than the upper control limit
IDA<LCL = Isotope dilution analyte recovery less than the lower control limit
IDA>UCL = Isotope dilution analyte recovery greater than the upper control limit
Temp>6C = Samples received outside of the temperature criterion

Attachment B1-1
Samples Associated with DQE

Attachment B1-1. Samples Associated with DQE

Site Inspection Report for Aqueous Film Forming Foam Areas at Joint Base Elmendorf-Richardson, Alaska

Sample ID	Collection Date	Sample Type	Matrix
16Q2-SOEB-JB01	25-Jun-16	EB	Water
16Q2-SOEB-JB02	25-Jun-16	EB	Water
16Q2-SOEB-JB03	25-Jun-16	EB	Water
16Q2-SOEB-JB04	30-Jun-16	EB	Water
16Q2-SOEB-JB05	30-Jun-16	EB	Water
16Q3-GWEB-JB01	20-Jul-16	EB	Water
16Q3-GWEB-JB02	23-Aug-16	EB	Water
16Q3-GWEB-JB03	19-Aug-16	EB	Water
16Q3-SDEB-JB01	21-Jul-16	EB	Water
16Q3-SOEB-JB06	25-Aug-16	EB	Water
16Q3AT029-1-SO-1	15-Jul-16	FD	Soil
16Q3AT052-1-GW-1	22-Aug-16	FD	Groundwater
16Q3CCH-1-GW-1	11-Aug-16	FD	Groundwater
16Q3CCH-1-SO-1	07-Jul-16	FD	Soil
16Q3CHD-3-SO-1	28-Jul-16	FD	Soil
16Q3CHD-4-GW-1	03-Oct-16	FD	Groundwater
16Q3CHD-SD01-SD-1	21-Jul-16	FD	Sediment
16Q3CHD-SW01-SW-1	21-Jul-16	FD	Surface water
16Q3FS4-1-GW-1	19-Sep-16	FD	Groundwater
16Q3H18-1-SO-1	23-Jul-16	FD	Soil
16Q3H8-1-GW-1	16-Aug-16	FD	Groundwater
16Q4WCSW-02-SP-1	22-Nov-16	FD	Surface water
16Q2CFTA-1-SO-0	29-Jun-16	N	Soil
16Q2CFTA-2-SO-0	22-Jun-16	N	Soil
16Q2CFTA-3-SO-0	24-Jun-16	N	Soil
16Q3AT029-1-GW-0	24-Aug-16	N	Groundwater
16Q3AT029-1-SO-0	15-Jul-16	N	Soil
16Q3AT052-1-GW-0	22-Aug-16	N	Groundwater
16Q3AT052-1-SO-0	05-Jul-16	N	Soil
16Q3CASTA-1-GW-0	11-Aug-16	N	Groundwater
16Q3CASTA-1-SO-0	13-Jul-16	N	Soil
16Q3CCH-1-GW-0	11-Aug-16	N	Groundwater
16Q3CCH-1-SO-0	07-Jul-16	N	Soil

Attachment B1-1. Samples Associated with DQE

Site Inspection Report for Aqueous Film Forming Foam Areas at Joint Base Elmendorf-Richardson, Alaska

Sample ID	Collection Date	Sample Type	Matrix
16Q3CFTA-1-GW-0	10-Aug-16	N	Groundwater
16Q3CFTA-2-GW-0	08-Aug-16	N	Groundwater
16Q3CFTA-3-GW-0	10-Aug-16	N	Groundwater
16Q3CHD-1-GW-0	18-Aug-16	N	Groundwater
16Q3CHD-2-GW-0	18-Aug-16	N	Groundwater
16Q3CHD-3-GW-0	18-Aug-16	N	Groundwater
16Q3CHD-3-SO-0	28-Jul-16	N	Soil
16Q3CHD-4-GW-0	03-Oct-16	N	Groundwater
16Q3CHD-4-SO-0	30-Jul-16	N	Soil
16Q3CHD-HA-1-SO-0	25-Aug-16	N	Soil
16Q3CHD-HA-2-SO-0	25-Aug-16	N	Soil
16Q3CHD-SD01-SD-0	21-Jul-16	N	Sediment
16Q3CHD-SW01-SW-0	21-Jul-16	N	Surface water
16Q3E3-1-GW-0	23-Aug-16	N	Groundwater
16Q3E3-1-SO-0	12-Aug-16	N	Soil
16Q3FASTA-1-GW-0	09-Aug-16	N	Groundwater
16Q3FASTA-1-SO-0	11-Jul-16	N	Soil
16Q3FP56-GW-0	24-Aug-16	N	Groundwater
16Q3FS1-1-GW-0	15-Aug-16	N	Groundwater
16Q3FS1-1-SO-0	20-Jul-16	N	Soil
16Q3FS4-1-GW-0	19-Sep-16	N	Groundwater
16Q3FS4-1-SO-0	06-Jul-16	N	Soil
16Q3FS5-1-GW-0	22-Aug-16	N	Groundwater
16Q3FS5-1-SO-0	12-Jul-16	N	Soil
16Q3FS6-1-GW-0	12-Aug-16	N	Groundwater
16Q3FS6-1-SO-0	09-Aug-16	N	Soil
16Q3FS7-1-GW-0	17-Aug-16	N	Groundwater
16Q3FS7-1-SO-0	18-Jul-16	N	Soil
16Q3FSFS-1-GW-0	19-Aug-16	N	Groundwater
16Q3FSFS-1-SO-0	14-Jul-16	N	Soil
16Q3H10-1-GW-0	17-Aug-16	N	Groundwater
16Q3H10-1-SO-0	19-Jul-16	N	Soil
16Q3H16-1-GW-0	12-Aug-16	N	Groundwater

Attachment B1-1. Samples Associated with DQE

Site Inspection Report for Aqueous Film Forming Foam Areas at Joint Base Elmendorf-Richardson, Alaska

Sample ID	Collection Date	Sample Type	Matrix
16Q3H16-1-SO-0	26-Jul-16	N	Soil
16Q3H17-1-GW-0	12-Aug-16	N	Groundwater
16Q3H17-1-SO-0	27-Jul-16	N	Soil
16Q3H18-1-GW-0	17-Aug-16	N	Groundwater
16Q3H18-1-SO-0	23-Jul-16	N	Soil
16Q3H5-1-GW-0	11-Aug-16	N	Groundwater
16Q3H5-1-SO-0	13-Jul-16	N	Soil
16Q3H6-1-GW-0	16-Aug-16	N	Groundwater
16Q3H6-1-SO-0	01-Aug-16	N	Soil
16Q3H8-1-GW-0	16-Aug-16	N	Groundwater
16Q3H8-1-SO-0	25-Jul-16	N	Soil
16Q3OU3MW-02-GW-0	23-Aug-16	N	Groundwater
16Q3OU5MW-39-GW-0	10-Aug-16	N	Groundwater
16Q3SS044-1-GW-0	19-Aug-16	N	Groundwater
16Q3SS044-1-SO-0	09-Jul-16	N	Soil
16Q3SS108-1-GW-0	22-Aug-16	N	Groundwater
16Q3SS108-1-SO-0	11-Aug-16	N	Soil
16Q3UC35A-1-GW-0	15-Aug-16	N	Groundwater
16Q3UC35A-1-SO-0	03-Aug-16	N	Soil
16Q4LF04SP-02-SP-0	22-Nov-16	N	Groundwater
16Q4OU5CP-02-SP-0	22-Nov-16	N	Groundwater
16Q4OU5SP-01-SP-0	22-Nov-16	N	Groundwater
16Q4OU5SP-02-SP-0	22-Nov-16	N	Groundwater
16Q4OU5SP-11-SP-0	22-Nov-16	N	Groundwater
16Q4WCSW-02-SP-0	22-Nov-16	N	Surface water

Notes:

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

Attachment B1-2
ADEC Checklists

Laboratory Data Review Checklist

CompletedBy	Berney Kidd		
Title	Project Chemist	Date	12/1/2016
CS Report Name		ReportDate	8/14/2016
Consultant Firm	CH2M Hill		
Laboratory Name	TestAmerica Sacramento	Laboratory Report Number	320-19838-1
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:

1.4C, no evidence of freezing so no data were qualified.

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 discrepancies.

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:

Detections in the method blank.

The Continuous Calibration Verifications (CCV) and associated field samples have Isotope Dilution Analyte (IDA) recoveries above the method recommended limit. Native analytes are in control for the associated CCVs and the Laboratory Control Sample (LCS). Quantitation by isotope dilution generally precludes any adverse effect on data quality due to elevated IDA recoveries. Samples were not re-analyzed as the analytical holding time had expired upon evaluation of the data.

The injection times displayed in Chrome/TALS do not match the injection times listed on A8 instrument printouts. The instrument printout listing the injection date and time can be found at the end of the run log section.

Isotope dilution analytes (surrogates) reported outside of criteria.

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:

All soil samples incrementally samples and dired prior to analysis.

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:

No inorganics reported.

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 a high recovery: 13C2 PFHxA (16Q2CFTA-3-SO-0), 13C4 PFOA (16Q2CFTA-3-SO-0), 13C4-PFHpA (16Q2CFTA-3-SO-0) for WS-LC-0025.

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:

No volatiles reported.

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:

e. Field Duplicate

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

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

No FD 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 samples affected by equipment blank detections.

ii. If above PQL, what samples are affected?

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

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	12/1/2016
CS Report Name		ReportDate	8/23/2016
Consultant Firm	CH2M Hill		
Laboratory Name	TestAmerica Sacramento	Laboratory Report Number	320-19974-1
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:

2.6C

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 discrepancies.

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:

LCS recovery exceedances.

MS/MSD exceedances.

The injection times displayed in Chrome/TALS do not match the injection times listed on A8 instrument printouts. The instrument printout listing the injection date and time can be found at the end of the run log section.

Perfluoroctanoic acid was above the calibration range in sample 16Q2CFTA-1-SO-0 (320-19974-1). The sample was analyzed at a dilution outside of analytical holding time.

Reanalysis of the following samples was performed outside of the analytical holding time due to the ICV being out of control for M2-6:2FTS and M2-8:2FTS on the previous run.

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 quailified 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:

Perfluorooctanesulfonic acid reported outside of holding time by one day in soil sample 16Q2CFTA-1-SO-0. Associated detected result was qualified as estimated and flagged "J".

c. All soils reported on a dry weight basis?

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

All soil samples were incrementally sampled and dried prior to analysis.

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 quailified 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:

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:

No inorganics reported.

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:

Recovery of Perfluorooctanoic acid (PFOA) was above the upper control limit for Method WS-LC-0025.

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:

16Q2CFTA-1-SO-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 high recoveries, associated detects were flagged "J".

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

Comments:

Some data quailified 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:

No volatiles reported.

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:

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 samples affected be equipment blank detections.

ii. If above PQL, what samples are affected?

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

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

a. Defined and appropriate?

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

Matrix:

These samples were flagged for Matrix spike duplicate recovery criteria greater than the upper control limit:
Perfluorobutanesulfonic acid (PFBS) (16Q2CFTA-1-SO-0, %R = 157 LCL=50 UCL=150) for WS-LC-0025. Associated detected result qualified as estimated and flagged "J".

These samples were flagged for Matrix spike duplicate recovery criteria less than the lower control limit:
6:2FTS (16Q2CFTA-1-SO-0, %R = 40 LCL=60 UCL=140), Perfluorooctanesulfonic acid (PFOS) (16Q2CFTA-1-SO-0, %R = -505 LCL=60 UCL=140) for WS-LC-0025. Associated detected results qualified as estimated and flagged "J".

These samples were flagged for Matrix spike recovery greater than the upper control limit:
6:2FTS (16Q2CFTA-1-SO-0, %R = 157 LCL=60 UCL=140), Perfluorobutanesulfonic acid (PFBS) (16Q2CFTA-1-SO-0, %R = 154 LCL=50 UCL=150), Perfluorooctanesulfonic acid (PFOS) (16Q2CFTA-1-SO-0, %R = 294 LCL=60 UCL=140), Perfluorooctanoic acid (PFOA) (16Q2CFTA-1-SO-0, %R = 151 LCL=60 UCL=140) for WS-LC-0025. Associated detected results qualified as estimated and flagged "J".

Laboratory Data Review Checklist

CompletedBy	Berney Kidd		
Title	Project Chemist	Date	12/1/2016
CS Report Name		ReportDate	8/25/2016
Consultant Firm	CH2M Hill		
Laboratory Name	TestAmerica Sacramento	Laboratory Report Number	320-20106-1
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:

3.5C

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 discrepancies.

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:

Method blank detections.

The injection times displayed in chrom/TALS do not match the injection times listed on A8 instrument printouts. The instrument printout listing the injection times can be found at the end of the run log section.

MS receovery 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:

All samples were incrementally sampled and dried prior to analysis.

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:

Perfluorobutanesulfonic acid was detected below the LOQ in a method blank.

iii. If above PQL, what samples are affected?

Comments:

16Q3AT052-1-SO-0, 16Q3CCH-1-SO-1, 16Q3CCH-1-SO-0, 16Q3FS4-1-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 results less than five times the blank concentration were flagged "U".

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

Comments:

Some data qualified as not detected.

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

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

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

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

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

No inorganics reported.

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:

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

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

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

Comments:

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:

No volatiles reported.

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:

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 samples affected by equipment blank detections.

ii. If above PQL, what samples are affected?

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

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

a. Defined and appropriate?

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

Matrix:

These samples were flagged for Matrix spike duplicate recovery criteria greater than the upper control limit:
6:2FTS (16Q3CCH-1-SO-0, %R = 158 LCL=60 UCL=140) for WS-LC-0025. Associated detected result was qualified as estimated and flagged "J".

Laboratory Data Review Checklist

CompletedBy	Berney Kidd		
Title	Project Chemist	Date	12/1/2016
CS Report Name		ReportDate	8/25/2016
Consultant Firm	CH2M Hill		
Laboratory Name	TestAmerica Sacramento	Laboratory Report Number	320-20204-2
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:

Samples 16Q3SS044-1-SO-0 and 16Q3FASTA-1-SO-0 received at 7.4C. Associated detected results were flagged "J" and nondetected results were flagged "UJ".

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 discrepancies.

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:

Method blank detections.

The injection times displayed in chrom/TALS do not match the injection times listed on A8 instrument printouts. The instrument printout listing the injection times can be found at the end of the run log section.

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:

Soil samples were incrementally sampled and dried prior to analysis.

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:

Perfluorobutanesulfonic acid was detected below the LOQ in a method blank.

iii. If above PQL, what samples are affected?

Comments:

16Q3SS044-1-SO-0, 16Q3FASTA-1-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 result less than five times the blank concentration was flagged "U" due to blank contamination; ultimately the "U" flag became a "UJ" flag due to the temperature exceedance.

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

Comments:

Some data qualified as not detected.

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

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

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

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

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

No inorganics reported.

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:

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:

No volatiles reported.

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:

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 samples affected by equipment blank detections.

ii. If above PQL, what samples are affected?

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

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	12/1/2016
CS Report Name		ReportDate	8/25/2016
Consultant Firm	CH2M Hill		
Laboratory Name	TestAmerica Sacramento	Laboratory Report Number	320-20273-1
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:

5.8C

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:

No discrepancies.

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:

Method blank detections.

The injection times displayed in chrom/TALS do not match the injection times listed on A8 instrument printouts. The instrument printout listing the injection times can be found at the end of the run log section.

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 not detected.

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:

Soil samples were incrementally sampled and dried prior to analysis.

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:

Perfluorotetradecanoic acid detected less than the LOQ in a method blank.

iii. If above PQL, what samples are affected?

Comments:

16Q3CASTA-1-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 result less than five times the blank concentration was flagged "U".

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

Comments:

Some data qualified as not detected.

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

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

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

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

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

No inorganics reported.

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:

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:

No volatiles reported.

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:

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 samples affected by equipment blank contamination.

ii. If above PQL, what samples are affected?

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

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	12/1/2016
CS Report Name		ReportDate	8/30/2016
Consultant Firm	CH2M Hill		
Laboratory Name	TestAmerica Sacramento	Laboratory Report Number	320-20315-1
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:

6.3C All results for soil samples 16Q3FS7-1-SO-0, 16Q3AT029-1-SO-1 and 16Q3AT029-1-SO-0 were qualified as estimated; detected results were flagged "J" and nondetected results were flagged "UJ".

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 discrepancies.

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:

The injection times displayed in chrom/TALS do not match the injection times listed on A8 instrument printouts. The instrument printout listing the injection times can be found at the end of the run log section.

Method blank detections.

Matrix spike 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:

Soil samples were incrementally sampled and dried prior to analysis.

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:

Perfluorobutanesulfonic acid detected less than the LOQ in a method blank.

iii. If above PQL, what samples are affected?

Comments:

16Q3FS7-1-SO-0, 16Q3AT029-1-SO-1, 16Q3AT029-1-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 results less than five times the blank concentration were flagged "U".

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

Comments:

Some data qualified as not detected.

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

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

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

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

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

No inorganics reported.

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:

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

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

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

Comments:

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:

No volatiles reported.

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:

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 samples affected by equipment blank detections.

ii. If above PQL, what samples are affected?

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

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

a. Defined and appropriate?

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

Matrix:

These samples were flagged for Matrix spike recovery greater than the upper control limit: Perfluorobutanesulfonic acid (PFBS) (16Q3AT029-1-SO-1, %R = 151 LCL=50 UCL=150), Perfluorooctanoic acid (PFOA) (16Q3AT029-1-SO-1, %R = 147 LCL=60 UCL=140) for WS-LC-0025. Associated detected results were qualified as estimated and flagged "J".

Laboratory Data Review Checklist

CompletedBy	Berney Kidd		
Title	Project Chemist	Date	12/1/2016
CS Report Name		ReportDate	9/15/2016
Consultant Firm	CH2M Hill		
Laboratory Name	TestAmerica Sacramento	Laboratory Report Number	320-20457-1
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:

3.2C

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 discrepancies.

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:

Method blank detections.

LCS exceedances.

MS exceedances.

The injection times displayed in chrom/TALS do not match the injection times listed on A8 instrument printouts. The instrument printout listing the injection times can be found at the end of the run log section.

Preparation batch 119400 was extracted with a duplicate instead of a Matrix Spike Duplicate. The parent sample was
re-extracted with a Matrix Spike / Matrix Spike Duplicate in preparation batch 119881. Both sets of data were reported.

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 qualifed 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:

Perfluorobutanesulfonic acid was detected less than the LOQ and Perfluorooctanesulfonic acid was detected greater than the LOQ, in a method blank.

iii. If above PQL, what samples are affected?

Comments:

16Q3CHD-SD01-SD-1, 16Q3CHD-SD01-SD-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 results less than five times the blank concentrations were flagged "U".

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

Comments:

Some data qualified as not detected.

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

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

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

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

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

No inorganics reported.

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:

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:

No volatiles reported.

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:

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 samples affected by equipment blank detections.

ii. If above PQL, what samples are affected?

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

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

a. Defined and appropriate?

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

Matrix:

These samples were flagged for Matrix spike duplicate recovery criteria less than the lower control limit: Perfluorobutanesulfonic acid (PFBS) (16Q3CHD-SW01-SW-0, %R = 0 LCL=50 UCL=150), Perfluorodecanoic acid (PFDA) (16Q3CHD-SW01-SW-0, %R = 0 LCL=60 UCL=140), Perfluoroheptanoic acid (PFHpA) (16Q3CHD-SW01-SW-0, %R = 0 LCL=60 UCL=140), Perfluorohexanesulfonic acid (PFHxS) (16Q3CHD-SW01-SW-0, %R = 55 LCL=60 UCL=140), Perfluorohexanoic acid (PFHxA) (16Q3CHD-SW01-SW-0, %R = 0 LCL=60 UCL=140), Perfluorononanoic acid (PFNA) (16Q3CHD-SW01-SW-0, %R = 0 LCL=60 UCL=140), Perfluorooctanoic acid (PFOA) (16Q3CHD-SW01-SW-0, %R = 0 LCL=60 UCL=140), Perfluorotetradecanoic acid (PFTeA) (16Q3CHD-SW01-SW-0, %R = 0 LCL=50 UCL=150), Perfluorotridecanoic Acid (PFTriA) (16Q3CHD-SW01-SW-0, %R = 0 LCL=50 UCL=150), Perfluoroundecanoic acid (PFUnA) (16Q3CHD-SW01-SW-0, %R = 0 LCL=60 UCL=140) for WS-LC-0025. Associated detected results were qualified as estimated and flagged "J", associated nondetected results were qualified as estimated and flagged "UJ".

Laboratory Data Review Checklist

CompletedBy	Berney Kidd		
Title	Project Chemist	Date	12/1/2016
CS Report Name		ReportDate	9/1/2016
Consultant Firm	CH2M Hill		
Laboratory Name	TestAmerica Sacramento	Laboratory Report Number	320-20458-1
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:

2.6C

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 discrepancies.

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:

The injection times displayed in chrom/TALS do not match the injection times listed on A8 instrument printouts. The instrument printout listing the injection times can be found at the end of the run log section.

Method blank detections.

Isotope dilution analytes (surrogate) exceedances.

Data reported above calibration range.

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:

Soil samples were incrementally sampled and dried prior to analysis.

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:

Perfluorobutanesulfonic acid detected less than the LOQ and Perfluorooctanesulfonic acid detected greater than the LOQ in a method blank.

iii. If above PQL, what samples are affected?

Comments:

16Q3H18-1-SO-0, 16Q3H18-1-SO-1, 16Q3H10-1-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 results less than five times the blank concentrations were flagged "U".

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

Comments:

Some data qualified as not detected.

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

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

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

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

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

No inorganics reported.

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 high recovery: M2-8:2FTS (16Q3FS1-1-SO-0DL) for WS-LC-0025.

These surrogates were out of control with low recovery: 13C5 PFNA (16Q3FS1-1-SO-0) for WS-LC-0025.

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 both low and 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:

No volatiles reported.

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:

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 samples affected by equipment blank detections.

ii. If above PQL, what samples are affected?

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

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

a. Defined and appropriate?

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

Perfluorooctanesulfonic acid was reported greater than calibration range in sample 16Q3FS1-1-SO-0. The detected result was qualified as estimated and flagged "J".

Laboratory Data Review Checklist

CompletedBy	Berney Kidd		
Title	Project Chemist	Date	12/1/2016
CS Report Name		ReportDate	9/13/2016
Consultant Firm	CH2M Hill		
Laboratory Name	TestAmerica Sacramento	Laboratory Report Number	320-20594-1
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:

1.3C, there was no evidence of freezing so no data were qualified.

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 discrepancies.

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 exceedances.

Isotope diltuion analyte (surrogate) recovery exceedances.

The injection times displayed in the LIM system do not match the injection times listed on the instrument printout. The instrument printout listing the injection times can be found at the end of the run log section

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:

Soil samples were increnentally sampled and dried prior to analysis.

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:

Perfluorobutanesulfonic acid was detected less than the LOQ in a method blank.

iii. If above PQL, what samples are affected?

Comments:

16Q3H17-1-SO-0, 16Q3H16-1-SO-0, 16Q3CHD-3-SO-0, 16Q3H8-1-SO-0, 16Q3CHD-3-SO-1

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 results less than five times the blank concentraion were flagged "U".

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

Comments:

Some data qualified as not detected.

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

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

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

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

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

No inorganics reported.

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: 13C2 PFDA (16Q3CHD-3-SO-1), 13C2 PFDoA (16Q3CHD-3-SO-1), 13C2 PFDoA (16Q3H17-1-SO-0), 13C2 PFUnA (16Q3CHD-3-SO-1), 13C2 PFUnA (16Q3H17-1-SO-0). for WS-LC-0025.

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:

No volatiles reported.

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:

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 samples affected by equipment blank detections.

ii. If above PQL, what samples are affected?

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

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	12/1/2016
CS Report Name		ReportDate	9/15/2016
Consultant Firm	CH2M Hill		
Laboratory Name	TestAmerica Sacramento	Laboratory Report Number	320-20755-1
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 discrepancies.

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:

Method blank detections.

The injection times displayed in chrom/TALS do not match the injection times listed on A8 instrument printouts. The instrument printout listing the injection times can be found at the end of the run log section.

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 not detected.

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:

Soil samples were incrementally sampled and dried prior to analysis.

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:

Perfluorobutanesulfonic acid was detected less than the LOQ in a method blank.

iii. If above PQL, what samples are affected?

Comments:

16Q3CHD-4-SO-0, 16Q3UC35A-1-SO-0, 16Q3H6-1-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 results less than five times the blank concentration were flagged "U".

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

Comments:

Some data qualified as not detected.

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

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

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

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

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

No inorganics reported.

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:

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:

No volatiles reported.

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:

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 samples were affected by equipment blank detections.

ii. If above PQL, what samples are affected?

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

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	12/1/2016
CS Report Name		ReportDate	9/20/2016
Consultant Firm	CH2M Hill		
Laboratory Name	TestAmerica Sacramento	Laboratory Report Number	320-20909-1
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:

2.7C, 3.2C

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 discrepancies.

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:

Method blank detections.

The injection times displayed in chrom/TALS do not match the injection times listed on A8 instrument printouts. The instrument printout listing the injection times can be found at the end of the run log section.

Isotope diltuion analytes (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 or not detected.

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:

Soil samples were incrementally sampled and dried prior to analysis.

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.

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:

Perfluorobutanesulfonic acid was detected less than the LOQ in a method blank.

iii. If above PQL, what samples are affected?

Comments:

16Q3SS108-1-SO-0, 16Q3FS6-1-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 results less than five times the blank concentration were flagged "U".

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

Comments:

Some data qualified as not detected.

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

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

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

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

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

No inorganics reported.

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: 13C4 PFOA (16Q3FASTA-1-GW-0), 13C4 PFOS (16Q3FASTA-1-GW-0), 18O2 PFHxS (16Q3FASTA-1-GW-0), M2-6:2FTS (16Q3FASTA-1-GW-0), M2-6:2FTS (16Q3CASTA-1-GW-0), M2-6:2FTS (16Q3CCH-1-GW-0), M2-6:2FTS (16Q3CCH-1-GW-1), M2-6:2FTS (16Q3CFTA-2-GW-0), M2-6:2FTS (16Q3H5-1-GW-0) for WS-LC-0025.

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:

No volatiles reported.

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:

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:

Perfluorooctanesulfonic acid, Perfluorooctanoic acid and Perfluorotetradecanoic acid detected less than the LOQ in the EBs.

ii. If above PQL, what samples are affected?

16Q3CCH-1-GW-0, 16Q3CFTA-1-GW-0, 16Q3CFTA-3-GW-0

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

Associated results less than five times the blank concentration were qualified as not detected and flagged "U".

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	12/1/2016
CS Report Name		ReportDate	9/6/2016
Consultant Firm	CH2M Hill		
Laboratory Name	TestAmerica Sacramento	Laboratory Report Number	320-20970-1
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:

1.6C, there was no evidence of freezing so no data were qualified.

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 discrepancies.

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:

The injection times displayed in chrom/TALS do not match the injection times listed on A8 instrument printouts. The instrument printout listing the injection times can be found at the end of the run log section.

Method blank detections.

Isotope diltuion analyte (surrogate) recovery exceedances.

MS/MSD 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 or not detected.

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:

Perfluorobutanesulfonic acid was detected less than the LOQ in a method blank.

iii. If above PQL, what samples are affected?

Comments:

16Q3FS6-1-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 result less than five times the blank was flagged "U".

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

Comments:

Some data qualified as not detected.

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

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

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

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

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

No inorganics reported.

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: 13C4 PFOS (16Q3FS1-1-GW-0), 18O2 PFHxS (16Q3FS1-1-GW-0) for WS-LC-0025.

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:

No volatiles reported.

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:

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:

Perfluorotetradecanoic acid and Perfluorobutanesulfonic acid were detected less than the LOQ in the EBs.

ii. If above PQL, what samples are affected?

16Q3H16-1-GW-0, 16Q3FS6-1-GW-0

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

Associated sample results less than five times the blank were qualified as not detected and flagged "U".

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

a. Defined and appropriate?

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

Matrix:

These samples were flagged for Matrix spike duplicate recovery criteria greater than the upper control limit:
Perfluorooctanesulfonic acid (PFOS) (16Q3FS6-1-GW-0, %R = 261 LCL=60 UCL=140) for WS-LC-0025. Associated detected result was qualified as estimated and flagged "J".

These samples were flagged for Matrix spike recovery greater than the upper control limit:
Perfluorobutanesulfonic acid (PFBS) (16Q3FS6-1-GW-0, %R = 167 LCL=50 UCL=150),
Perfluorohexanoic acid (PFHxA) (16Q3FS6-1-GW-0, %R = 142 LCL=60 UCL=140),
Perfluorooctanesulfonic acid (PFOS) (16Q3FS6-1-GW-0, %R = 330 LCL=60 UCL=140),
Perfluorooctanoic acid (PFOA) (16Q3FS6-1-GW-0, %R = 152 LCL=60 UCL=140),
Perfluorotridecanoic Acid (PFTriA) (16Q3FS6-1-GW-0, %R = 176 LCL=50 UCL=150) for WS-LC-0025. Associated detected results were qualified as estimated and flagged "J".

Laboratory Data Review Checklist

CompletedBy	Berney Kidd		
Title	Project Chemist	Date	12/1/2016
CS Report Name		ReportDate	9/13/2016
Consultant Firm	CH2M Hill		
Laboratory Name	TestAmerica Sacramento	Laboratory Report Number	320-20973-1
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:

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:

No discrepancies.

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:

Method blank detections.

The injection times displayed in the LIM system do not match the injection times listed on the instrument printout. The instrument printout listing the injection times can be found at the end of the run log section.

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 not detected.

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:

Soil samples were incrementally sampled and dried prior to analysis.

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:

Perfluorobutanesulfonic acid was detected less than the LOQ in a method blank.

iii. If above PQL, what samples are affected?

Comments:

16Q3E3-1-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 result less than five times the blank concentration was flagged "U".

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

Comments:

Some data qualified as not detected.

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

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

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

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

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

No inorganics reported.

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:

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

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

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

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:

No volatiles reported.

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:

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 samples affected by equipment blank detections.

ii. If above PQL, what samples are affected?

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

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	12/1/2016
CS Report Name		ReportDate	9/27/2016
Consultant Firm	CH2M Hill		
Laboratory Name	TestAmerica Sacramento	Laboratory Report Number	320-21097-1
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:

3.1C

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 discrepancies.

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:

The injection times displayed in chrom/TALS do not match the injection times listed on A8 instrument printouts. The instrument printout listing the injection times can be found at the end of the run log section.

Method blank detections.

LCS recovery exceedances.

CCV recovery exceedances.

Isotope dilution analyte (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 or not detected.

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:

Perfluorodecanoic acid and Perfluorododecanoic acid detected less than the LOQ in a method blank.

iii. If above PQL, what samples are affected?

Comments:

16Q3H6-1-GW-0, 16Q3CHD-2-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 results less than five times the blank were flagged "U".

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

Comments:

Some data qualified as not detected.

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:

Recovery of 8:2FTS was greater than the upper control limit for Method WS-LC-0025.

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:

16Q3H8-1-GW-1, 16Q3H8-1-GW-0, 16Q3FS7-1-GW-0, 16Q3H18-1-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 high recoveries, 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:

These surrogates were out of control with low recovery: 13C5 PFNA (16Q3FS7-1-GW-0).

These surrogates were out of control with high recovery: 18O2 PFHxS (16Q3FS7-1-GW-0), 18O2 PFHxS (16Q3H18-1-GW-0), M2-6:2FTS (16Q3CHD-1-GW-0), M2-6:2FTS (16Q3FS7-1-GW-0), M2-6:2FTS (16Q3H18-1-GW-0) for WS-LC-0025.

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 and 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:

No volatiles reported.

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:

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 samples affected by equipment blank detections.

ii. If above PQL, what samples are affected?

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

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: 6:2FTS (16Q3FS7-1-GW-0, 6:2FTS %D +26.9 vs. 25), 6:2FTS (16Q3H18-1-GW-0, 6:2FTS %D +26.9 vs. 25) for WS-LC-0025. The associated detected results were qualified as estimated and flagged "J".

Laboratory Data Review Checklist

CompletedBy	Berney Kidd		
Title	Project Chemist	Date	12/2/2016
CS Report Name		ReportDate	10/5/2016
Consultant Firm	CH2M Hill		
Laboratory Name	TestAmerica Sacramento	Laboratory Report Number	320-21190-1
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:

1.0C, there was no evidence of freezing so no data were qualified.

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 discrepancies.

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:

Method blank detections.

LCS, CCV and isotope dilution analyte (surrogate) recovery exceedances.

The injection times displayed in chrom/TALS do not match the injection times listed on A8 instrument printouts. The instrument printout listing the injection times can be found at the end of the run log section.

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 or not detected.

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:

Perfluorotetradecanoic acid and Perfluorobutanesulfonic acid were detected less than the LOQ in a method blank.

iii. If above PQL, what samples are affected?

Comments:

16Q3AT052-1-GW-0, 16Q3AT052-1-GW-1, 16Q3E3-1-GW-0, 16Q3FS5-1-GW-0, 16Q3OU3MW-02-GW-0, 16Q3SS044-1-GW-0, 16Q3SS108-1-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 results less than five times the blank concentrations were flagged "U".

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

Comments:

Some data qualified as not detected.

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:

Recovery of 8:2FTS was above the upper control limit for Method WS-LC-0025.

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:

16Q3OU3MW-02-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 high recoveries, associated detect was 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:

These surrogates were out of control with high recovery: 13C2 PFHxA (16Q3OU3MW-02-GW-0), 13C4 PFOA (16Q3OU3MW-02-GW-0), 13C4 PFOS (16Q3OU3MW-02-GW-0), 18O2 PFHxS (16Q3OU3MW-02-GW-0), M2-6:2FTS (16Q3FSFS-1-GW-0), M2-6:2FTS (16Q3OU3MW-02-GW-0) for WS-LC-0025.

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:

No volatiles reported.

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:

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:

Perfluorobutanesulfonic acid, Perfluorohexanesulfonic acid, Perfluorooctanesulfonic acid, Perfluorooctanoic acid and Perfluorotetradecanoic acid were detected less than the LOQ in the EBs.

ii. If above PQL, what samples are affected?

16Q3AT052-1-GW-0, 16Q3AT052-1-GW-1, 16Q3E3-1-GW-0, 16Q3FS5-1-GW-0, 16Q3FSFS-1-GW-0, 16Q3OU3MW-02-GW-0, 16Q3SS044-1-GW-0, 16Q3SS108-1-GW-0

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

Associated sample results less than five times the blank concentrations were qualified as not detected and flagged "U".

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: 6:2FTS (16Q3FSFS-1-GW-0, 6:2FTS %D +147 vs. 25), 6:2FTS (16Q3OU3MW-02-GW-0, 6:2FTS %D +147 vs. 25) for WS-LC-0025. Associated detected result was qualified as estimated and flagged "J". These samples were flagged for Continuing calibration recovery less than the lower control limit: 6:2FTS (16Q3E3-1-GW-0, 6:2FTS %D -67.1 vs. 25) for WS-LC-0025. Associated nondetected result was qualified as estimated and flagged "UJ". Matrix: These samples were flagged for Matrix spike recovery greater than the upper control limit: Perfluorotetradecanoic acid (PFTeA) (16Q3E3-1-GW-0, %R = 156 LCL=50 UCL=150) for WS-LC-0025. Associated detected result was qualified as estimated and flagged "J". These samples were flagged for Matrix spike RPD criteria exceeded: Perfluorotetradecanoic acid (PFTeA) (16Q3E3-1-GW-0, MSRPD = 45.43 Limit =30) for WS-LC-0025. Associated detected result was qualified as estimated and flagged "J".

Laboratory Data Review Checklist

CompletedBy	Berney Kidd		
Title	Project Chemist	Date	12/2/2016
CS Report Name		ReportDate	10/4/2016
Consultant Firm	CH2M Hill		
Laboratory Name	TestAmerica Sacramento	Laboratory Report Number	320-21252-1
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:

1.6C, 2.0C, 2.8C, 4.5C One cooler less than 2C, no evidence of freezing so no data were qualified.

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 discrepancies.

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:

The injection times displayed in chrom/TALS do not match the injection times listed on A8 instrument printouts. The instrument printout listing the injection times can be found at the end of the run log section.

Method blank detections.

Isotope dilution analyte (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 not detected or 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:

Soil samples were incrementally sampled and dried prior to analysis.

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:

Perfluorotetradecanoic acid and Perfluorobutanesulfonic acid were detected less than the LOQ in the method blanks.

iii. If above PQL, what samples are affected?

Comments:

16Q3AT029-1-GW-0, 16Q3CHD-HA-1-SO-0, 16Q3CHD-HA-2-SO-0, 16Q3FP56-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 results less than five times the blank concentrations were flagged "U".

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

Comments:

Some data qualified as not detected.

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

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

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

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

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

No inorganics reported.

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 high recovery: M2-6:2FTS (16Q3CHD-HA-1-SO-0), M2-6:2FTS (16Q3CHD-HA-2-SO-0), M2-6:2FTS (16Q3FP56-GW-0), M2-8:2FTS (16Q3CHD-HA-1-SO-0), M2-8:2FTS (16Q3CHD-HA-2-SO-0) for WS-LC-0025.

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:

No volatiles reported.

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:

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:

Perfluorobutanesulfonic acid, Perfluorooctanesulfonic acid and Perfluorotetradecanoic acid were detected less than five times the LOQ in the EBs.

ii. If above PQL, what samples are affected?

16Q3AT029-1-GW-0, 16Q3FP56-GW-0

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

Associated results less than five times the blank concentrations were qualified as not detected and flagged "U".

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	12/2/2016
CS Report Name		ReportDate	10/4/2016
Consultant Firm	CH2M Hill		
Laboratory Name	TestAmerica Sacramento	Laboratory Report Number	320-22046-1
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:

2.8C

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:

No discrepancies.

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

Comments:

All data are usable.

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:

Method blank detections.

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:

All data are usable as reported.

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:

Perfluorotetradecanoic acid was detected less than the LOQ in a method blank.

iii. If above PQL, what samples are affected?

Comments:

16Q3FS4-1-GW-0, 16Q3FS4-1-GW-1

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 results less than five times the blank concentration were flagged "U".

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

Comments:

Some data qualified as not detected.

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

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

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

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

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

No inorganics reported.

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:

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 that would affect sample results.

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:

No volatiles reported.

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:

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:

Perfluorooctanesulfonic acid was detected greater than the LOQ and Perfluorotetradecanoic acid was detected less than the LOQ.

ii. If above PQL, what samples are affected?

16Q3FS4-1-GW-0, 16Q3FS4-1-GW-1

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

Associated sample results less than five times the blank concentration were qualified as not detected and flagged "U".

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	12/2/2016
CS Report Name		ReportDate	10/19/2016
Consultant Firm	CH2M Hill		
Laboratory Name	TestAmerica Sacramento	Laboratory Report Number	320-22429-1
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:

2.2C

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 discrepancies.

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:

Method blank detections.

Holding time exceedances.

The injection times displayed in chrom/TALS do not match the injection times listed on A8 instrument printouts. The instrument printout listing the injection times can be found at the end of the run log section.

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 not detected or 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:

Samples 16Q3CHD-4-GW-0 and 16Q3CHD-4-GW-1 were re-extracted two days past holding time for 6:2FTS and 8:2FTS; the associated nondetected results were qualified as estimated and 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:

Perfluorotetradecanoic acid was detected less than the LOQ, Perfluorooctanoic acid and Perfluorooctanesulfonic acid were detected greater than the LOQ, in the method blanks.

iii. If above PQL, what samples are affected?

Comments:

16Q3CHD-4-GW-0, 16Q3CHD-4-GW-1

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 results less than five times the blank concentrations were flagged "U".

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

Comments:

Some data qualified as not detected.

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

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

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

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

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

No inorganics reported.

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:

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:

No volatiles reported.

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:

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:

Perfluorooctanesulfonic acid was detected greater than the LOQ; Perfluorobutanesulfonic acid, Perfluorohexanoic acid and Perfluorotetradecanoic acid were detected less than the LOQ in the EBs.

ii. If above PQL, what samples are affected?

16Q3CHD-4-GW-0, 16Q3CHD-4-GW-1

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

Associated sample results less than five times the blank concentrations were qualified as not detected and flagged "U".

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	12/28/2016
CS Report Name		ReportDate	12/15/2016
Consultant Firm	CH2M Hill		
Laboratory Name	TestAmerica Sacramento	Laboratory Report Number	320-23799-1
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:

0.4C, there was no evidence of freezing so no data were qualified.

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:

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.
Surrogate recovery exceedances.
Samples required dilution.
Sample contained sediment and wee decanted prior to processing for analysis.

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:

No inorganics were reported.

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: M2-6:2FTS (16Q4OU5SP-01-SP-0), M2-6:2FTS (16Q4OU5SP-02-SP-0), M2-6:2FTS (16Q4OU5SP-11-SP-0), M2-6:2FTS (16Q4WCSW-02-SP-0), M2-6:2FTS (16Q4WCSW-02-SP-1), for WS-LC-0025.

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:

No volatiles were reported.

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:

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:

Equipment blank not collected, not required for surface water samples.

i. All results less than PQL?

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

ii. If above PQL, what samples are affected?

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

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

a. Defined and appropriate?

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

Matrix:

These samples were flagged for Matrix spike recovery greater than the upper control limit: 6:2FTS (16Q4LF04SP-02-SP-0, %R = 144 LCL=60 UCL=140) for WS-LC-0025. The associated detected result was qualified as estimated and flagged "J".

Appendix B-2
Laboratory Data Packages
(including chromatograms)
(electronic only)

Appendix C
Waste Tracking Records

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	AK8570028649	2	907-830-1225	2016-00400

5. Generator's Name and Mailing Address: USAF JOINT BASE ELMENDORF-RICHARDSON
6328 ARCTIC WARRIOR DRIVE
JBER, AK 99506
Generator's Phone: 907-384-3269

Generator's Site Address (if different than mailing address):

6. Transporter 1 Company Name: WEAVER BROTHERS — (907) 278-4526 — U.S. EPA ID Number: AKD002848372

7. Transporter 2 Company Name: TOTEM OCEAN TRAILER EXPRESS — (907) 276-5868 — U.S. EPA ID Number: WAD070397955

8. Designated Facility Name and Site Address:
CHEMICAL WASTE MANAGEMENT OF NW
17629 CEDAR SPRINGS LANE
ARLINGTON, OR 97812
Facility's Phone: 541-454-2643 — U.S. EPA ID Number: ORD089452353

HM	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.
	1. NON-REGULATED LIQUID	~~65~~ 68 DM	DM	~~30875~~ 32300 DM	P
	2. NON REGULATED LIQUID	3	DF	1425	P
	3.				
	4.				

13. Special Handling Instructions and Additional Information
1. OR332364 17EDF0100-0167 X004 IDW WATER 42x85-gallon overpack, 1x110-gallon overpack 22x55-gallon drum
2. OR332364 IDW Water 3x95 gallon overpack
CD Required

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: WAYNE A. HUGHES — Signature: Wayne A. Hughes — Month: 01 Day: 12 Year: 17

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: S.G. NOGA — Signature — Month: 1 Day: 13 Year: 17

Transporter 2 Printed/Typed Name — Signature — Month Day Year

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name — Signature — Month Day Year

GENERATOR | INT'L | TRANSPORTER | DESIGNATED FACILITY

NON-HAZARDOUS WASTE MANIFEST (Continuation Sheet)	19. Generator ID Number AK8570028649	20. Page 2 OF 2	21. Waste Tracking Number 2016-00400

22. Generator's Name

JBER

23. Transporter 3 Company Name ALTA TRANSPORTATION — U.S. EPA ID Number WAH000042941

24. Transporter ____ Company Name — U.S. EPA ID Number

GENERATOR

HM	25. Waste Shipping Name and Description	26. Containers No.	26. Containers Type	27. Total Quantity	28. Unit Wt./Vol.	

29. Special Handling Instructions and Additional Information

TRANSPORTER

30. Transporter ____ Acknowledgment of Receipt of Materials

Printed/Typed Name | Signature | Month | Day | Year

31. Transporter ____ Acknowledgment of Receipt of Materials

Printed/Typed Name | Signature | Month | Day | Year

DESIGNATED FACILITY

32. Discrepancy

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	AK8570028649	2	907-830-1225	2016-00398

5. Generator's Name and Mailing Address: USAF JOINT BASE ELMENDORF-RICHARDSON
6326 ARCTIC WARRIOR DRIVE
JBER, AK 99506
Generator's Phone: 907-384-3269
Generator's Site Address (if different than mailing address)

6. Transporter 1 Company Name: WEAVER BROTHERS — (907) 278-4526 — U.S. EPA ID Number: AKD002848372

7. Transporter 2 Company Name: TOTEM OCEAN TRAILER EXPRESS — (907) 276-5868 — U.S. EPA ID Number: WAD070397955

8. Designated Facility Name and Site Address
CHEMICAL WASTE MANAGEMENT OF NW
17629 CEDAR SPRINGS LANE
ARLINGTON, OR 97812
Facility's Phone: 541-454-2643 — U.S. EPA ID Number: ORD089452353

HM	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.
	1. NON-REGULATED SOLID	49 ~~54~~	DM	40425 ~~42175~~	P WDS
	2.				
	3.				
	4.				

13. Special Handling Instructions and Additional Information
OR332363 17EDF0002-0051 X004 IDW SOIL
TTOZ 745004
SEA 325175
CD Required

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: WAYNE A. HUGHES — Signature: Wayne A. Hughes — Month: 12 — Day: 23 — Year: 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: HOWARD WOBIG — Signature — Month: 12 — Day: 23 — Year: 16

Transporter 2 Printed/Typed Name — Signature — Month — Day — Year

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month — Day — Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name — Signature — Month — Day — Year

GENERATOR | INT'L | TRANSPORTER | DESIGNATED FACILITY

NON-HAZARDOUS WASTE MANIFEST (Continuation Sheet)	19. Generator ID Number AK8570028649	20. Page 2 OF 2	21. Waste Tracking Number 2016-00398

22. Generator's Name

JBER

23. Transporter 3 Company Name ALTA TRANSPORTATION — U.S. EPA ID Number WAH000042941

24. Transporter ____ Company Name — U.S. EPA ID Number

GENERATOR

HM	25. Waste Shipping Name and Description	26. Containers No.	26. Containers Type	27. Total Quantity	28. Unit Wt./Vol.	

29. Special Handling Instructions and Additional Information

TRANSPORTER

30. Transporter ____ Acknowledgment of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

31. Transporter ____ Acknowledgment of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

DESIGNATED FACILITY

32. Discrepancy

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	AK8570028649	2	907-830-1225	2016-00399

GENERATOR

5. Generator's Name and Mailing Address: USAF JOINT BASE ELEMDORF-RICHARDSON
6326 ARCTIC WARRIOR DRIVE
JBER, AK 99506
Generator's Phone: 907-552-3435

Generator's Site Address (if different than mailing address):

6. Transporter 1 Company Name: WEAVER BROTHERS (907) 278-4526 — U.S. EPA ID Number: AKD002848372

7. Transporter 2 Company Name: TOTEM OCEAN TRAILER EXPRESS (907) 276-5868 — U.S. EPA ID Number: WAD070397955

8. Designated Facility Name and Site Address
CHEMICAL WASTE MANAGEMENT OF NW
17629 CEDAR SPRINGS LANE
ARLINGTON, OR 97812
Facility's Phone: 541-454-2643 — U.S. EPA ID Number: ORD089452353

HM	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
	1. NON-REGULATED SOLID	~~67~~ 49	DM	~~42875~~ 40425	P	
	2.					
	3.					
	4.					

13. Special Handling Instructions and Additional Information
1. OR332363 17EDF0053-0099,0173-0176 IAW SOIL
TTOZ 745013
SEA 325174
CD Required

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: WAYNE A. HUGHES — Signature: Wayne A. Hughes — Month: 12 Day: 23 Year: 16

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: HOWARD WORTH — Signature: [signature] — Month: 12 Day: 23 Year: 16

Transporter 2 Printed/Typed Name — Signature — Month — Day — Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month — Day — Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name — Signature — Month — Day — Year

NON-HAZARDOUS WASTE MANIFEST (Continuation Sheet)	19. Generator ID Number AK8570028649	20. Page 2 OF 2	21. Waste Tracking Number 2016-00399

22. Generator's Name

JBER

23. Transporter 3 Company Name ALTA TRANSPORTATION — U.S. EPA ID Number WAH000042941

24. Transporter Company Name — U.S. EPA ID Number

HM	25. Waste Shipping Name and Description	26. Containers No.	26. Containers Type	27. Total Quantity	28. Unit Wt./Vol.	

GENERATOR

29. Special Handling Instructions and Additional Information

TRANSPORTER

30. Transporter Acknowledgment of Receipt of Materials

Printed/Typed Name | Signature | Month | Day | Year

31. Transporter Acknowledgment of Receipt of Materials

Printed/Typed Name | Signature | Month | Day | Year

DESIGNATED FACILITY

32. Discrepancy

STRAIGHT BILL OF LADING

ORIGINAL – NOT NEGOTIABLE

Shipper No.

Carrier No.

Date 1/12/17

(Name of Carrier)

TO: Destination	JBER C-17 Crash site (SS108)	FROM: Shipper	JBER (Job: CH2M PFC SI IDW disposal)		
Street		Street	955 Warehouse Dr, JBER, AK		
Destination	JBER C-17 Crash site (SS108)	Origin			
Phone #		Emergency Response #	(907) 644-0428	Trailer #	

No. Shipping Units	HM*	Kind of Packaging, Description of Articles, Special Marks and Exceptions	Weight (subject to correction)
4		IDW soil (non-hazardous) in drums	2400
		(Drum #s D142, D143, D144, D152	

When transporting hazardous materials include the technical or chemical name for n o s (not otherwise specified) or generic description of material with appropriate UN or NA number as defined in US DOT Emergency Communication Standard (HM-126C) Provide emergency response phone # in case of incident or accident on box above

* HAZARDOUS MATERIALS MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIALS AS REFERENCED IN 49CFR § 172 202

This is to certify that the above named materials are property classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

_____ Signature

RECEIVED, subject to the classifications and lawfully filed tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to delivery to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment

Shipper hereby certifies that he is familiar with all the bill of lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

NOTICE: Freight moving under this Bill of Lading is subject to the classifications and lawfully filed tariffs in effect on the date of this Bill of Lading. This notice supersedes and negates any claimed, alleged or asserted oral or written contract, promise, representation or understanding between the parties with respect to this freight, except to the extent of any written contract which establishes lawful contract carriage and is signed by authorized representatives of both parties to the contract.

DRIVER SIGNATURE on behalf of ECC	CONSIGNEE SIGNATURE N/A
PRINT NAME Don Nelson	PRINT NAME:
DATE: 1/12/17	DATE: