



**US Army Corps
of Engineers**

Alaska District

2018 Groundwater Sampling Report

Wildwood Air Force Station Formerly Used Defense Site
Former Tank Farm -- F10AK025105
Kenai, Alaska

September 2018



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LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|--------|---|
| ADEC | Alaska Department of Environmental Conservation |
| ADNR | Alaska Department of Natural Resources |
| AFS | Air Force Station |
| AST | aboveground storage tank |
| AS/SVE | air sparge/soil vapor extraction |
| BLM | Bureau of Land Management |
| °C | degrees Celsius |
| CDQR | Chemical Data Quality Review |
| COC | contaminant of concern |
| DCA | 1,2-dichloroethane |
| DO | dissolved oxygen |
| DOD | Department of Defense |
| DRO | diesel range organics |
| °F | Degrees Fahrenheit |
| FUDS | Formerly Used Defense Site |
| GRO | gasoline range organics |
| IDW | investigation-derived waste |
| HCl | hydrochloric acid |
| KNA | Kenai Natives Association Inc. |
| mg/L | milligrams per liter |
| mL | milliliter |
| MW | monitoring well |
| QC | quality control |
| QSM | Quality Systems Manual |
| RI | Remedial Investigation |
| USACE | United States Army Corps of Engineers |
| USAF | United States Air Force |
| UST | underground storage tank |
| VOC | volatile organic compound |

EXECUTIVE SUMMARY

Groundwater samples were collected from eight monitoring wells (MWs) at the Former Wildwood Air Force Station (AFS) Tank Farm Area project location. Groundwater monitoring was conducted to evaluate groundwater contaminant trends and to monitor the effectiveness of contaminated soil remediation efforts completed at the site between 1997 and 2006. The December 2013 Decision Document outlines annual groundwater monitoring on site for at least five years for the nine monitoring wells present onsite. Field work was conducted by U.S. Army Corps of Engineers (USACE) personnel on August 14-16, 2018 and marks the third sampling event. A total of eleven water samples were submitted for analysis including eight primary samples, one field duplicate, one equipment blank, and one trip blank. Free product was observed in MW-16 and the well was not sampled. All other project wells were sampled. Project groundwater samples were submitted for analysis of diesel-range organics (DRO) and 1,2-dichloroethane (DCA).

DRO was detected at the site in excess of applicable cleanup criteria established in the 2013 Wildwood Decision Document (USACE, 2013). DRO was detected in four monitoring wells (MW-3, MW-4, MW-6, and MW-11) at a concentration equal to or exceeding the Decision Document criteria of 1.5 milligrams per liter (mg/L). A thin layer of free product (0.03 feet) was observed in MW-16. DCA was not detected in any well in excess of the Decision Document established cleanup criteria of 0.005 mg/L.

Continued annual groundwater monitoring is recommended to determine if natural attenuation of site contaminants is occurring and to meet the requirements of the Decision Document. Sampling should occur annually for a minimum of five consecutive years. All wells should be sampled and analyzed for DRO and DCA.

1.0 INTRODUCTION

This report describes chemical results of groundwater samples collected from wells at the Former Wildwood Air Force Station Tank Farm Formerly Used Defense Site (FUDS) in Kenai, Alaska. The Alaska Department of Environmental Conservation (ADEC) file number is 2320.38.051 and the hazard ID is 25199.

1.1 Project Overview

The project objective is to conduct groundwater sampling to monitor natural attenuation of site contaminants in accordance with the 2013 Decision Document (USACE, 2013). This document requires annual sampling of nine monitoring wells (MWs) for diesel range organics (DRO) and 1,2-dichloroethane (DCA) for at least five years. Due to problems in obtaining a right of entry at the project site, the 2016 sampling event was the first sampling event, and will be repeated annually until 2020. In order to achieve the objective, the following wells were sampled and analyzed for DRO and DCA: MW-3, MW-4, MW-6, MW-11, MW-16, MW-23, MW-24, MW-30, and AP-397.

1.2 Site Description and Background

1.2.1 Site Location

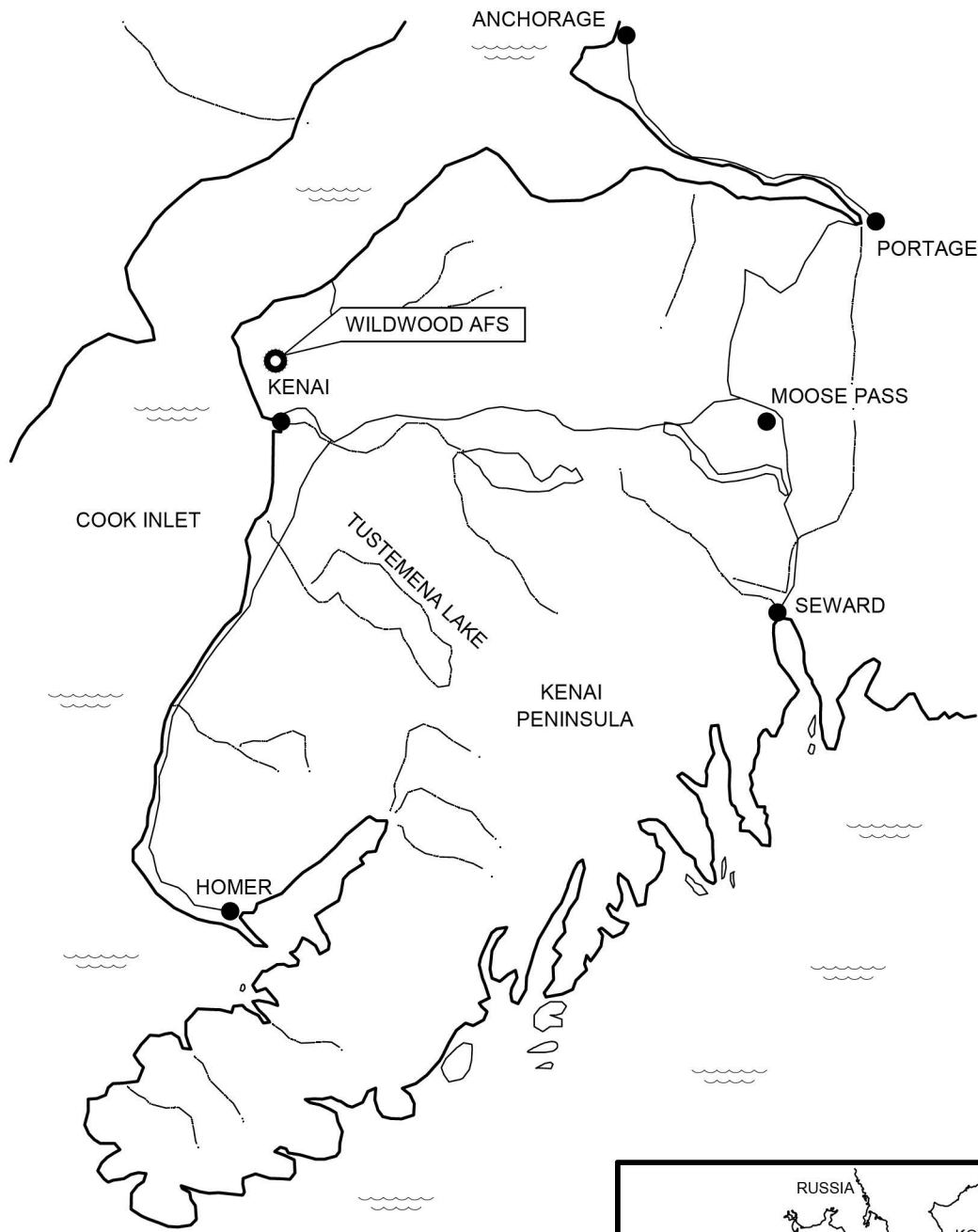
The former Wildwood Air Force Station (AFS) is located 3.5 miles northwest of Kenai, Alaska, accessed via Wildwood Drive East of the Kenai Spur Highway (Figures 1 and 2). The site is located at 60° 35' North (N) latitude and 151° 17.8' West (W) longitude, in Sections 24 and 25, Township 6N, Range 12W, of the Seward Meridian.

1.2.2 Site History

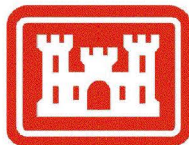
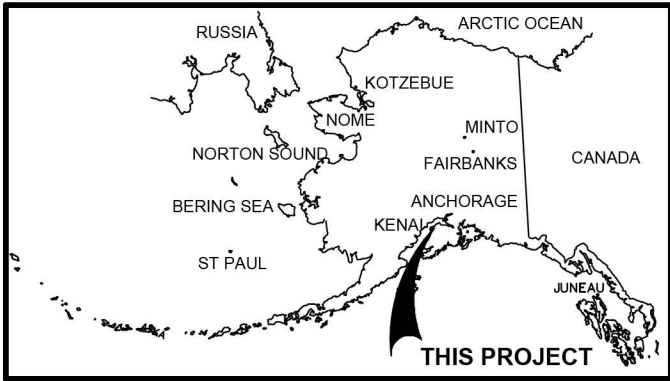
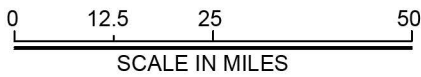
Wildwood AFS, originally named Seward Station, was constructed as a communications station and activated in 1953 by the United States Army. The total area of the station was approximately 5,300 acres; however, military construction was confined to a 125-acre tract. In May 1954, the station was renamed Wildwood Station, and in 1966 the property was transferred to the U.S. Air Force (USAF). Wildwood AFS was closed by the USAF in July 1972.

During military use, several aboveground storage tanks (AST) and underground storage tanks (UST) containing petroleum products were present. The site also included a network of underground piping that supplied the petroleum products to a power plant, pump house, and fuel dispensing stations.

Following closure, the entire 5,300 acres were transferred to the U.S. Department of the Interior, Bureau of Land Management (BLM). The Bureau of Land Management transferred 4,300 acres to the Kenai Natives Association Inc. (KNA) during 1974. KNA sold the 125-acre tract of land that the former Wildwood AFS was located on to the Alaska Department of Natural Resources (ADNR) in 1994 (USACE, 2011). The Alaska Department of Corrections currently operates the Wildwood



SOURCE:
 PSI ANNUAL REPORT
 WILDWOOD AS/SVE SYSTEM
 JUNE 2006

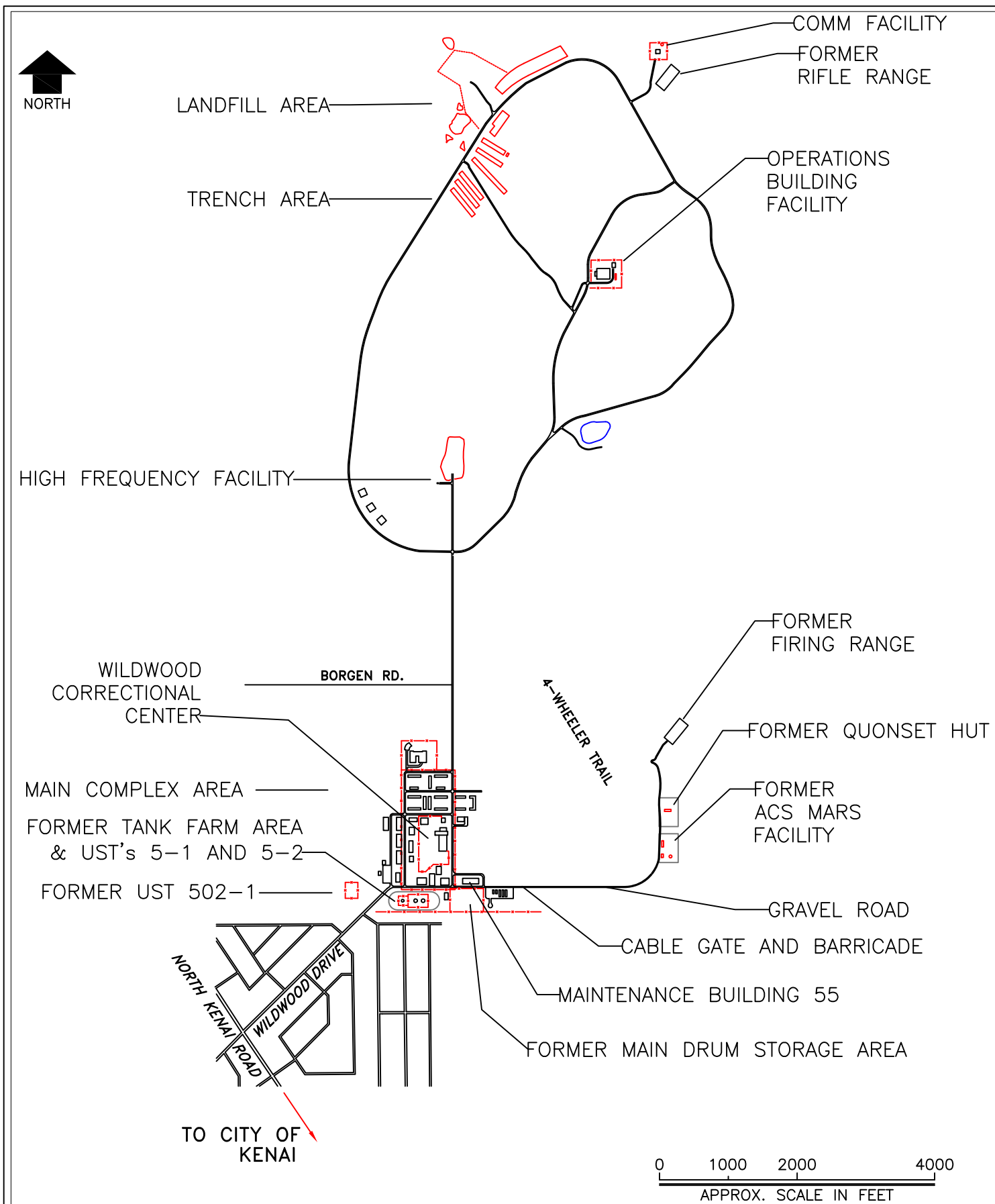


U.S. Army Corps
 of Engineers
 Alaska District

Wildwood Air Force Station
 FUDS F10AK0251-05
Location and Vicinity

27 July 2011
 Revision 0
 Scale: Noted

Figure
 1



NOTES

1. THIS FIGURE WAS ADAPTED FROM HLA/WILDER JV FIGURE 2, SITE PLAN, WILDWOOD AS/VE EXTENSION-GROUNDWATER MONITORING, KENAI, ALASKA, JANUARY 2002.

| | |
|---------------------|---------|
| DATE: November 2014 | |
| FILE NAME: | |
| DWN BY: GNO | RWV BY: |
| SCALE: AS NOTED | |

**SOURCE AREA LOCATION MAP
FORMER WILDWOOD AIR FORCE STATION
KENAI, ALASKA**



FIGURE 2

Correctional Center on a portion of this tract, immediately north of the former Wildwood AFS Tank Farm site.

1.2.3 Site Environmental Setting

Geology and Land Surface

The former Wildwood AFS is located within the northwest region of the Kenai Peninsula, which extends approximately 150 miles into the Gulf of Alaska. The region is characterized by flat to undulating terrain with abundant wetlands, lakes, and streams. The western portion of Wildwood AFS, which includes the areas impacted by military construction, is generally well-drained, forested, and characterized by flat to gently sloping terrain.

Soils in the vicinity of Wildwood AFS are derived from glacial and fluvial deposits. On terraces and outwash plains, the well-drained soils consist of a surface mat of forest litter overlying silt loam. In depressions, the poorly drained soils consist of a surface layer of decomposed sphagnum moss overlying moss and sedge peat. These soils are approximately 2 to 10 feet thick. Sediments in the vicinity of Wildwood AFS consist of inter-bedded Quaternary-age glacial, fluvial, lacustrine, and marine deposits and underlie the soils described above. Bedrock beneath Wildwood AFS consists of the Tertiary-age Kenai Formation, which is composed of alternating strata of semi consolidated silt, sand, and gravel, and is locally coal-bearing (E&E, 1995).

Climate

Wildwood AFS is located in the transition climate zone of Alaska and experiences cool summers and cold winters. January temperatures typically range from 10 and 30 degrees Fahrenheit (°F) and July temperatures from 40 to 60 °F. Average annual precipitation is approximately 20 inches; average snowfall is approximately 70 inches.

1.2.4 Summary of Previous Investigations and Removal Actions

Between 1993 and 1995, the Tank Farm infrastructure was removed and a remedial investigation (RI) was initiated. Subsurface soil beneath the former ASTs and adjacent to the former pump house was contaminated with petroleum. Groundwater contamination was also identified directly beneath and downgradient of the Tank Farm. This contamination was attributed to oiled sands used as foundation for the ASTs, as well as probable tank and piping releases. The upper 2 feet of oiled sand was removed from the former AST berm area during demolition of the ASTs.

The primary contaminants detected at the Tank Farm were DRO, gasoline range organics (GRO), and the volatile organic compound (VOC) DCA. These contaminants were discovered in surface soils, subsurface soils, and groundwater (E&E, 1995) at concentrations exceeding ADEC cleanup levels.

An air sparge/soil vapor extraction (AS/SVE) system was installed in 1996 and 1997. The system was modified and operated between 1997 and 2006. Several new monitoring wells were also

installed during this time period for more extensive groundwater sampling. As of 2002, approximately 10,115 pounds of hydrocarbon (1,501 gallons of gasoline equivalent) had been removed via vadose zone biodegradation. An additional estimated 24,962 pounds of hydrocarbon (3,704 gallons as gasoline) was removed by vapor extraction. Operation of the AS/SVE treatment system was discontinued in 2006, and the AS/VE system was decommissioned in 2008 (USACE, 2011).

The remaining contaminants of concern (COCs) at the site above the ADEC Method Two cleanup level are DRO in subsurface soil and groundwater, and DCA in the groundwater. All other COCs were remediated to a level below the ADEC cleanup level (USACE, 2011).

Groundwater samples were collected from eight existing monitoring wells (those not containing product) located at the Tank Farm site in May 2011 (FES, 2011). In addition, one abandoned well located upgradient of the former Tank Farm area was decommissioned. Groundwater samples could not be collected from well MW-16 due to the presence of free product. DRO was above ADEC screening levels in five wells.

A Decision Document was completed in October 2013 and signed in December 2013 that outlined the path forward at the Tank Farm Site. The Decision Document stated that residual contaminated soil present at >15 feet below ground surface will be left in place. It also required that groundwater monitoring at the Tank Farm Site be conducted annually for at least five years to monitor contaminant degradation. Nine wells (MW-3, MW-4, MW-6, MW-11, MW-16, MW-23, MW-24, MW-30 and AP-397) were identified to be sampled for DRO and DCA (FES, 2011; USACE, 2013).

The first groundwater sampling event was conducted in August 2016. Right-of-entry complications with ADNR had previously resulted in no annual groundwater monitoring since the Decision Document was signed. All project wells were sampled with the exception of MW-16 which had free product (0.03 feet). DRO was detected in four monitoring wells (MW-3, MW-4, MW-6, and MW-11) at a concentration equal to or exceeding the Decision Document criteria of 1.5 milligrams per liter (mg/L). DCA as not detected in any well in excess of the Decision Document established cleanup criteria of 0.005 mg/L.

A second groundwater sampling event was conducted in August 2017. All project wells were sampled with the exception of MW-16 which had free product (0.02 feet). DRO was detected in four monitoring wells (MW-3, MW-4, MW-6, and MW-11) at a concentration equal to or exceeding the Decision Document criteria of 1.5 mg/L. DCA as not detected in any well in excess of the Decision Document established cleanup criteria of 0.005 mg/L.

2.0 FIELD ACTIVITIES AND OBSERVATIONS

Groundwater sampling was conducted according to procedures identified in the July 2016 *Wildwood AFS Former Tank Farm and Partly Mitigated Sites Groundwater Sampling Work Plan F10AK025104/05 HTRW* (USACE, 2016) and the February 2018 *Groundwater Sampling Work Plan Addendum F10AK025104/05* (USACE, 2018).

2.1 Groundwater Sampling

Static water levels were measured to the nearest 0.01 feet, relative to the top of the monitoring well casing. Water levels and total well depths were measured using an electronic oil/water interface probe. Groundwater samples were collected by ADEC-qualified environmental professionals, Jake Sweet and William Mangano from a total of eight wells.

Bladder pumps were used to sample all monitoring wells. Bladder pumps were set in the well within the screened interval. Bladder pumps were connected to dedicated sample tubing inside each well, and the flow rate was set to 150 milliliters (mL)/minute. Groundwater parameters were measured in a flow-through cell prior to sampling. Measured parameters included pH, temperature, specific conductivity, turbidity, dissolved oxygen (DO) concentration, and oxidation/reduction potential. Water levels were also monitored and the pump flow rate was controlled to prevent excessive drawdown. Field parameters were recorded in the field logbook for each well. A copy of the field logbooks can be found in Attachment A. Once the parameters stabilized, the flow-through cell was disconnected and samples were collected using the pump set at a low flow rate. Sample containers were filled in order of volatility with DCA collected first into hydrochloric acid (HCl) preserved 40 mL vials. DRO samples were collected by filling 250 mL HCl preserved containers. After sampling, the bladder pumps were disassembled, decontaminated, and a new bladder installed for the next well.

The groundwater samples were stored in coolers containing frozen gel ice or in a hotel fridge. Ice was changed out when needed to keep samples at the proper holding temperature of 0-6 degrees Celsius (°C). Full sample coolers were stored in a hotel room. The samples were hand delivered in two coolers to TestAmerica Laboratories in Anchorage, Alaska on August 17, 2018. Samples were then shipped to TestAmerica Laboratories in Sacramento, California, where they were received on August 18, 2018.

Eight primary groundwater samples, one field duplicate, one trip blank, and one equipment blank associated with the Wildwood Former Tank Farm were shipped to the laboratory in two coolers. These coolers also contained samples from the Wildwood Operations Facility, a project that was sampled concurrently with this one. Cooler "DRO" contained all DRO sample containers and was measured at 3.5° C upon receipt in Sacramento, California. Cooler "VOC" contained all sample containers for DCA and was measured at 5.4° C upon receipt in Sacramento, California. All temperature and preservation requirements were met.

Section 3.0 discusses the chemical data results for the Wildwood Tank Farm sampling effort. Groundwater samples were analyzed for DRO and DCA. Sample tracking and analytical summary

tables are presented in Attachment B. Field and laboratory data quality are evaluated in the Chemical Data Quality Review (CDQR) included in Attachment C along with the ADEC laboratory data review checklists.

Work Plan Deviations

Monitoring well MW-16 was not sampled due to the presence of a thin layer of product (0.03 feet) on top of the water. This is consistent with the measurements made during the previous sampling events in 2011, 2016, and 2017.

2.2 Photographic Log

A photographic log is provided in Attachment D. The photographic log includes pictures that are representative of groundwater sampling activities conducted during the August 2018 field effort.

2.3 Investigation-Derived Waste Handling and Disposal

Decontamination and purge water was collected, filtered through a carbon filtration unit, and discharged into a designated vegetation area. Solid non-hazardous investigation-derived waste (IDW) produced during sampling activities was comprised of sampling gloves, paper towels, and sample tubing. At the end of the sampling event, USACE personnel disposed of this solid waste in local trash receptacles.

3.0 RESULTS OF CHEMICAL ANALYSIS

3.1 Groundwater Elevations and Flow Direction

Groundwater elevations were collected prior to groundwater sampling and were generally consistent with historical groundwater measurements. The groundwater flow direction for the site is to the southwest.

3.2 Chemical Data Quality

A USACE chemist performed a review of project and quality control (QC) data in order to assess whether analytical data met data quality objectives and were acceptable for use. The project data were reviewed for deviations to the requirements presented in the Sampling and Analysis Plan; ADEC Technical Memorandum Data Quality Objectives, Checklists, Quality Assurance Requirements for Laboratory Data, and Sample Handling; and the Department of Defense (DOD) Quality Systems Manual (QSM), version 5.1. The results of the review are included in the CDQR and the ADEC Checklists in Attachment C. Overall, the review process deemed the groundwater project data acceptable for use. Several results were qualified; however, no data were rejected pursuant to the data quality review.

3.3 Sample Results

Samples collected from the Wildwood Tank Farm project site were analyzed by TestAmerica, an analytical laboratory located in Sacramento, California for DRO and DCA. The results of the chemical analyses were compared to the cleanup criteria specified in the project Decision Document. Contaminant concentrations exceeding groundwater criteria are summarized in Figure 3. Complete analytical results are presented in Attachment B. Groundwater sample results are summarized below:

- DRO was detected in MW-3 at a concentration of 4.4 mg/L QL, in MW-4 at a concentration of 5.0 mg/L QL, in MW-6 at 1.9 mg/L QL and in MW-11 at a concentration of 5.2 mg/L QL, all equal to or exceeding the Decision Document criteria of 1.5 mg/L.
- Free product was measured in MW-16 at a thickness of 0.03 feet which is consistent with previous monitoring events.
- DCA was not detected above project screening criteria in any well.

X:\Projects\FUDS\WILDWOOD_GIS01_MXD\Figure_3_Tank_Farm_2018Results1_103.mxd, 13 Sep 2018

| MW-3 | JUNE 2011 | AUGUST 2016 | AUGUST 2017 | AUGUST 2018 |
|------|-----------|-------------|-------------|-------------|
| DRO | 2.1 | 2.5 | 4.6 QL | 4.4 QL |
| DCA | NS | ND (0.005) | ND (0.0005) | 0.00022 J |

| MW-16 | JUNE 2011 | AUGUST 2016 | AUGUST 2017 | AUGUST 2018 |
|-------|---------------------------|---------------------------|---------------------------|---------------------------|
| DRO | NOT SAMPLED DUE TO | NOT SAMPLED DUE TO | NOT SAMPLED DUE TO | NOT SAMPLED DUE TO |
| DCA | PRODUCT (1.13 FEET THICK) | PRODUCT (0.03 FEET THICK) | PRODUCT (0.02 FEET THICK) | PRODUCT (0.03 FEET THICK) |

| MW-4 | JUNE 2011 | AUGUST 2016 | AUGUST 2017 | AUGUST 2018 |
|------|-----------|-------------|-------------|-------------|
| DRO | 4.6 | 7.8 | 7.6 QL | 5.0 QL |
| DCA | NS | ND (0.005) | 0.00091 | 0.00083 J |

| MW-23 | JUNE 2011 | AUGUST 2016 | AUGUST 2017 | AUGUST 2018 |
|-------|-----------|-------------|-------------|-------------|
| DRO | 0.2 | 0.16 B | 0.39 QL, B | 0.3 QL |
| DCA | NS | ND (0.005) | ND (0.0005) | ND (0.0005) |

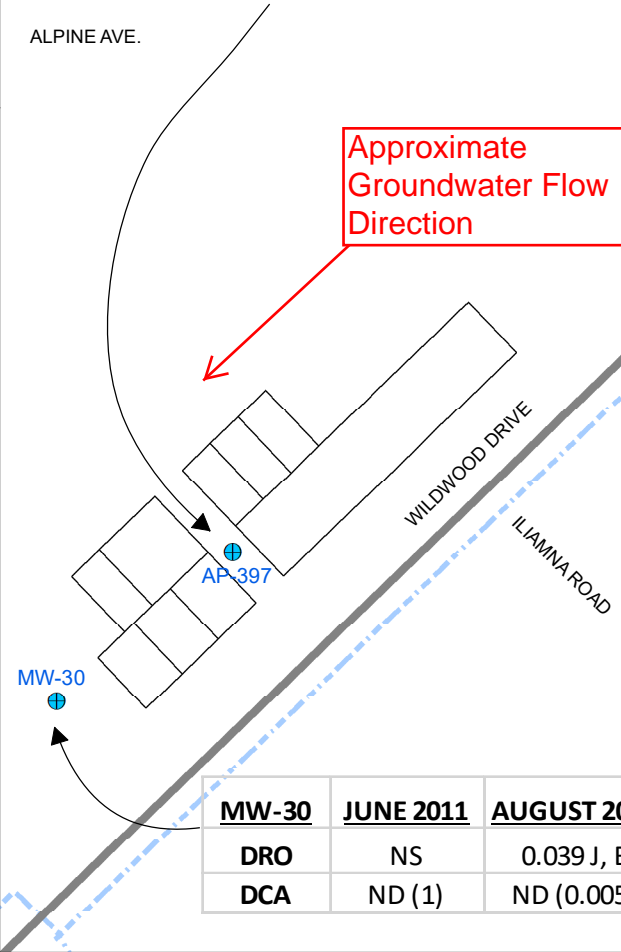
| MW-6 | JUNE 2011 | AUGUST 2016 | AUGUST 2017 | AUGUST 2018 |
|------|-----------|-------------|-------------|-------------|
| DRO | 2.6 | 1.5 | 3.4 QL | 1.9 QL |
| DCA | NS | ND (0.005) | ND (0.0005) | 0.00038 J |

| MW-11 | JUNE 2011 | AUGUST 2016 | AUGUST 2017 | AUGUST 2018 |
|-------|-----------|-------------|-------------|-------------|
| DRO | 4.5 | 5.7 | 9.2 QL | 5.2 QL |
| DCA | NS | ND (0.005) | 0.0011 | 0.00086 J |

| AP-397 | JUNE 2011 | AUGUST 2016 | AUGUST 2017 | AUGUST 2018 |
|--------|-----------|-------------|----------------|--------------|
| DRO | NS | 0.024 J, B | 0.057 J, QL, B | ND (0.13) QL |
| DCA | 0.010 | 0.0025 | 0.0036 | 0.0046 |

| MW-24 | JUNE 2011 | AUGUST 2016 | AUGUST 2017 | AUGUST 2018 |
|-------|-----------|-------------|-------------|-------------|
| DRO | 2.5 | 0.68 | 1.1 QL | 0.39 QL |
| DCA | NS | ND (0.0005) | ND (0.0005) | ND (0.0005) |

| MW-30 | JUNE 2011 | AUGUST 2016 | AUGUST 2017 | AUGUST 2018 |
|-------|-----------|-------------|----------------|--------------|
| DRO | NS | 0.039 J, B | 0.096 J, QL, B | ND (0.12) QL |
| DCA | ND (1) | ND (0.005) | ND (0.0005) | ND (0.0005) |



LEGEND

- ⊕ MONITORING WELL
- ESTIMATED EXTENT OF PLUME
- ROAD OWNED AND MAINTAINED BY CITY OF KENAI
- - - WATER LINE - APPROX.

DRO = DIESEL RANGE ORGANICS
DCA = 1,2-DICHLOROETHANE
BTEX = BENZENE, TOLUENE, ETHYLBENZENE, XYLENES
ND = NOT DETECTED
LOD = LIMIT OF DETECTION
B = ANALYTE RESULT IS CONSIDERED A HIGH ESTIMATED VALUE DUE TO CONTAMINATION PRESENT IN THE METHOD BLANK
J = ANALYTE RESULT IS CONSIDERED AN ESTIMATED VALUE BECAUSE THE LEVEL IS BELOW THE LABORATORY LIMIT OF QUANTITATION BUT ABOVE THE DETECTION LIMIT
QL = ANALYTE RESULT IS CONSIDERED AN ESTIMATED VALUE BIASED LOW DUE TO A QUALITY CONTROL FAILURE

mg/L = MILLIGRAMS PER LITER

| DECISION DOCUMENT (2013) | |
|--------------------------|--|
| CLEANUP LEVELS IN mg/L | |
| 1.5 DRO | |
| 0.005 DCA | |

MONITORING WELL KEY

| MONITORING WELL | DATE | CONCENTRATIONS IN MILLIGRAMS PER LITER (mg/L) |
|-----------------|-------|---|
| MW-24 | 9-May | |
| GRO | | ND (0.05) |
| DRO | | 1.9 |
| BENZENE | | 0.37 |

CONCENTRATIONS EXCEEDING DECISION DOCUMENT CLEANUP LEVELS ARE SHOWN IN RED

SEE LEGEND FOR ABBREVIATIONS

NOTES:

- This figure based on Figure 3 in the Decision Document, dated October 2013.
- The highest value is reported for sample locations where parent and duplicate samples were collected.

Former Tank Farm Area - Groundwater Contaminant Concentrations

U.S. ARMY
CORPS OF ENGINEERS
ALASKA DISTRICT

WILDWOOD AFS - F10AK0251-05

KENAI, ALASKA

FIGURE 3

4.0 SUMMARY AND CONCLUSIONS

The following summarizes the evaluation of contaminant concentrations detected in groundwater samples collected from eight monitoring wells at the Wildwood AFS Tank Farm site in 2018 and provides recommendations and conclusions. DRO was detected in wells at levels exceeding Decision Document cleanup criteria. No other compounds were found above cleanup criteria.

4.1 Groundwater Contaminant Evaluation

4.1.1 Extent of Groundwater Contamination

Free product has been consistently measured in MW-16 which is upgradient from the other monitoring wells.

DRO was detected in MW-3 at a concentration of 4.4 mg/L QL, in MW-4 at a concentration of 5.0 mg/L QL, in MW-6 at 1.9 mg/L QL, and in MW-11 at a concentration of 5.2 mg/L QL, above the Decision Document criteria of 1.5 mg/L. Based on these results, the DRO contaminant plume extends approximately 1,200 feet to the southwest of the former tank farm. This was the third sampling event to occur since the Decision Document was approved. Data trends will be developed at the end of the five year monitoring plan.

4.2 Groundwater Monitoring Recommendations

This sampling event was conducted to evaluate groundwater contaminant trends and to monitor the effectiveness of contaminated soil remediation efforts completed at the site between 1997 and 2006. The October 2013 Decision Document outlines annual groundwater monitoring on site for at least five years to monitor the remaining contaminant degradation. Continued annual groundwater sampling is recommended to determine contaminant trends and to determine if natural attenuation of the remaining contaminant mass is sufficient to meet the goals stated in the Decision Document.

5.0 REFERENCES

- Alaska Department of Environmental Conservation (ADEC), 2017. 18 AAC 75, *Oil and Other Hazardous Substances, Pollution Control*. November.
- ADEC, 2017. *Technical Memorandum Data Quality Objectives, Checklists, Quality Assurance Requirements for Laboratory Data, and Sample Handling*. March.
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- Ecology and Environmental, Inc. (E&E), 1995. *Remedial Investigation Report, Phase III – Cleanup Design, Wildwood Air Force Station, Kenai, Alaska*. August.
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- USACE, 2013. *Decision Document, Hazardous Toxic and Radioactive Waste Project #F10AK0251-05, Former Tank Farm and USTs 5-1 & 5-2, Formerly Used Defense Site, Wildwood Air Force Station*. October. F10AK025105_05.09_0500_a
- USACE, 2016. *Groundwater Sampling Work Plan, Wildwood AFS Former Tank Farm and Partly Mitigated Sites*. July. F10AK025105_07.04_0503_p
- USACE, 2018. *Groundwater Sampling Work Plan Addendum, Wildwood AFS Former Tank Farm and Partly Mitigated Sites, FUDS, F10AK025104/05 HTRW*. February. F10AK025104_07.04_0502_a

Attachment A

Field Logbook

==DEFYING==
MOTHER NATURE®

SINCE 1916



All components of
this product are recyclable

Rite in the Rain

A patented, environmentally responsible, all-weather writing paper that sheds water and enables you to write anywhere, in any weather.

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ALL-WEATHER

FIELD

Nº 351FX

2018
WILDWOOD GW
Sampling

(18-044)

1 of 2

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— SINCE 1916 —

Rite in the Rain®

— DEFYING MOTHER NATURE —

Name USALEAddress PO Box 6878JBER, AKPhone 907 350 5430Project 2018 Wildwood GW
Sampling

RiteintheRain.com

CONTENTS

| PAGE | REFERENCE | DATE |
|------|--|------|
| | PM: Rena Flint 753-2680 cell 907-201-3108 | |
| | FAA Gate Code 2020 | |
| | Josh Barsis (ADEC) 907 398 6153 | |
| | Wildwood Security Office # 907 260 7236 POC Casey Desiena | |
| | Jake Sweet Cell 907 350 5430 | |
| | NPDL 18-044 | |

2
8/14/18 60°F overcast, windy

0800 leave USAEC. Head to ITT
to pick up rentals.

0930 - Head to Kenda.

1430 - arrive @ Wildwood operations
site

Josh Barsis (ADEL)

Jacob Sweet (USAEC)

William Mangano (USAEC)

1509 setup on MW-1 @ OPS Facility

DTW - 4.50' BTOL ^{low rate}
150 mL/min.

DTB - 12.39' BTOL

| Time | Temp (°F) | Cond | pH | DO | ORP | Turb |
|------|-----------|-------|------|------|-------|-------|
| 1545 | 49.1 | 0.062 | 4.74 | 0.52 | 7.6 | 20.95 |
| 1550 | 49.8 | 0.059 | 4.74 | 0.16 | -16.5 | 19 |
| 1555 | 49.8 | 0.058 | 4.80 | 0.10 | -29.2 | 20.1 |
| 1600 | 49.7 | 0.058 | 4.81 | 0.09 | -58.5 | 17.8 |

3
8/14/18 60°F overcast wind.

1601 Parameters stable @ OF-MW1

1615 - Sample OF-03 taken

1615 18WWOF-03GW taken from OF MW1

2x 250 mL DRO

3x 40 mL GRB

3x 40 mL BTEX

water clear. sulfur odor.

8/15/18 50°F sunny calm

0700 - meet @ hotel to try to
repair ITT air compressor &
USAEC water meter. Took both
apart. Bad air release fitting on
compressor. Visited several stores
unable to find replacement
water meter not working
will get by with one.

Rite in the Rain

8/15/18 60°F sunny calm.

1242 - Setup on TF-MW AP 397

DTW - 38.84' Flow rate 150^{ml}/min

PTB - 44.51' Water clear, no odor

Time Temp Cond pH DO ORP TURB.

1310 6.37 0.200 5.57 6.79 141.6 19.0

1315 5.95 0.213 5.74 3.38 144.3 15.0

1320 5.81 0.200 5.78 3.13 141.4 12.7

1325 5.77 0.195 5.81 2.92 139.4 10.8

1330 5.76 0.193 5.83 2.72 137.7 9.8

1335 5.81 0.192 5.84 2.54 136.7 9.3

1340 5.83 0.193 5.83 2.37 135.1 8.9

- parameters stable, water clear, no odor.

1350 - sample # 18WWTf-036W from AP 397 TF

2 x 250 mL DRB

3 x 40 mL DCA

8/15/18 60°F clear, calm.

1400 - Setup on well TF MW-11

DTW: 23.05' Fuel odor, light

DTB: 31.92' orange color, clear.

Time Temp Cond pH D.O ORP Turb

1427 7.28 0.628 5.82 3.94 35.1 12.3

1432 7.04 0.592 5.93 2.49 11.9 12.4

1437 6.90 0.575 5.97 2.06 3.8 12.9

1442 6.78 0.557 5.98 1.84 0.0 13.3

1447 6.69 0.546 6.01 1.72 -2.3 13.4

1452 6.65 0.538 6.02 1.58 -3.3 12.7

1457 6.63 0.524 6.03 1.5 -3.9 11.2

1510 - Sample 18WWTf-046W

from MW-11 TF

2 x 250 mL DRB

3 x 40 mL DCA

1600 - Head back to hotel to pack/label samples etc. Will complete all

Prison site wells on 8/16/18 *Rite in the Rain*

6 8/16/18 50°F Rain, calm.

0822 - Setup on TF-MW 24

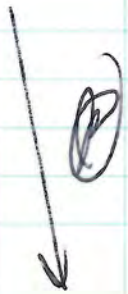
DTW - 26.23' BTDL Flow rate 150 mL/min
water clear, no odor.
DTB - 39.95' BTDL

| TIME | TEMP ^(of) | COND | PH | DO | ORP | Turb |
|------|----------------------|-------|------|------|------|------|
| 0845 | 45.072 | 265.8 | 5.79 | 0.96 | 47.2 | 5.84 |
| 0850 | 44.760 | 218.3 | 5.86 | 0.49 | 44.8 | 4.34 |
| 0855 | 44.601 | 214.4 | 5.88 | 0.33 | 43.7 | 5.18 |
| 0900 | 44.626 | 213.8 | 5.89 | 0.24 | 43.1 | 5.22 |

- parameters stable -

0915 - Sample 18WWTF-056W TF-MW 24

2x 250 mL ORC
3x 40 mL DCA



7 8/16/18 60°F cloudy, calm.

0928 - Setup on TF-MW 6

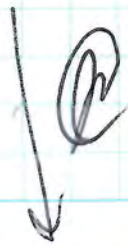
DTW - 28.29' BTDL clear water
DTB - 39.61' BTDL fuel odor
Flow rate 150 mL/min

| TIME | TEMP ^{of} | COND | PH | DO | ORP | Turb |
|------|--------------------|-------|------|------|-------|-------|
| 0950 | 46.109 | 452.1 | 6.00 | 1.88 | 120 | 11.56 |
| 0955 | 45.381 | 395.4 | 6.17 | 0.63 | -10.3 | 30.78 |
| 1000 | 45.609 | 374.8 | 6.17 | 0.37 | -20.3 | 37.95 |
| 1005 | 45.120 | 358.4 | 6.08 | 0.48 | -10.9 | 14.92 |
| 1010 | 45.108 | 356.0 | 6.06 | 0.54 | -8.2 | 17.69 |
| 1015 | 45.149 | 353.2 | 6.06 | 0.67 | -6.1 | 12.42 |

- parameters stable -

1025 - Sample 18WWTF-076W

2x 250 mL DCA
3x 40 mL DCA



Rite in the Rain

8/16/18 60°F overcast, breeze

1033 - Setup on TF MW 3

no tubing in well. put in new tubing.

OTW - 27.52' BTOL flow rate - 150 ml/min

DTB - 40.25' BTOL water clear. Fuel odor.

(°F)
Time Temp Cloud pH DO ORP Turb

1103 47.392 338.8 5.98 3.05 5.3 28.21

1107 47.243 333.2 5.99 3.44 7.1 30.27

1111 46.999 328.0 5.99 3.89 10.9 49.86

- turbidity meter is off. water is very clear *

1115 47.562 327.3 5.99 4.28 14.2 85.26*

1119 47.292 324.9 5.99 4.48 19.5 85.91

1123 47.376 327.4 5.99 4.51 16.1 86.11

- turb readings off water is very clear. parameters stable.

1130 - Sample # 18WWTF-096W from TF MW 3

2x 250 mL DRO

3x 40 mL DLA

8/16/18

1355 - collect sample # 18WWTF-1061W

Equipment blank collected by pumping distilled water through bladder pump into sample containers

2x 250 mL DRO

3x 40 mL BTEX + DCA / GEO

PUCK samples / equipment

1600 - Sample # 18WWTF-1001TB

3x 40 mL GEO

3x 40 mL BTEX + DCA

PROJECT trip blank placed in cooler "VOC"

all ORO containers in cooler "DRO"

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Rite in the Rain

ALL-WEATHER

FIELD

Nº 351FX

2018

WILDWOOD GW
Sampling

(18-044)

2 of 2

MADE IN TACOMA
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Sampling.

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CONTENTS

| PAGE | REFERENCE | DATE |
|------|--|------|
| | FAA code: 2020 | |
| | Wildwood Security office 907 260 7236 POC Casey Desiena (D) Desiena | |
| | NPD # 18-044 | |
| | Josh Bavis 907 398 6153 | |

2 8/14/2018 WIDWOOD AFS OPS Facility Partly Sunny ~55°F

0700 - @ office preparing to make to Kemi. Will Mangum + Jake Sweet.

1430 - @ OPS Facility setting up on wells. Josh Barz's (ADEC) onsite observing field effort.

1450. Setting up @ OPS MW-2.

NTW - 5.68' Flow ~180 ml/min
DTB - 12.62' No Drawdown clear

| Time | Temp °C | Cond. | pH | ORP | D.O | Turb |
|------|---------|-------|------|-------|-------|------|
| 1528 | 10.42 | 0.174 | 4.71 | 167.7 | 99.2 | 2.5 |
| 1533 | 9.76 | 0.122 | 5.08 | 129.6 | 99.2 | 2.3 |
| 1538 | 9.63 | 0.112 | 5.32 | 130.3 | 99.2 | 2.0 |
| 1543 | 9.58 | 0.104 | 5.33 | 123.2 | 100.7 | 1.9 |
| 1548 | 9.64 | 0.105 | 5.38 | 120.3 | 100.7 | 1.8 |

Parameters stable

3 8/14/2018 OPS Facility

1616 Sample 18WOWF-016W

From OF MW-2
2x250 mL DRO 3x40 mL BTX
3x40 mL BRO

1630 Sample 18WOWF-026W
Dupe of -016W

From OF MW-2
2x250 mL DRO 3x40 mL BTX
3x40 mL BRO

1634 Setting up @ OPS MW-3

NTW - 5.44' Flow rate 150 ml/min
DTB - 12.23' 54 liter water

Time Temp Cond pH ORP D.O. Turb

| | | | | | | |
|------|------|-------|------|-------|-------|-----|
| 1700 | 9.46 | 0.053 | 5.10 | 165.2 | 50.13 | 5.1 |
| 1705 | 9.05 | 0.117 | 5.31 | 146.8 | 1.93 | 3.8 |
| 1710 | 9.16 | 0.097 | 5.37 | 131.1 | 1.66 | 3.2 |
| 1715 | 9.16 | 0.093 | 5.38 | 132.3 | 1.49 | 2.3 |
| 1720 | 9.00 | 0.046 | 5.38 | 130.3 | 1.40 | 1.8 |

Rate in the rain

4
8/14/2018 OPS Facility
Continued OPS MW3

Time Temp Cond pH ORP DO Turb

1725 9.00 0.462 5.39 128.6 1.30 1.4

1730 8.99 0.600 5.39 127.1 1.22 1.2

1732 - Start collecting sample from OPS MW3

1736 - Sample 18WWOF-046W collected

2x 250 mL ORO

5x 40 mL GRC

3x 40 mL BTEX

AD&L Depart
this evening.

~~End of Day~~

5
Sunny ~ 55°F Tank
8/15/2018 W. Wood AFS Farm
Area

1011 Mangamp / Lake Sweet
0730 - Troubleshoot compressor + water-
meter. Walnut AYH to (L)D
tools + pressure relief valve.

0945 - @ W. Wood Tank Farm area
setting up on TF MW-30

DTW - 42.08'

DTB - 48.65'

~ 150 mL/m
Light orange
color water
No draw down.

Time Temp Cond pH ORP DO Turb

1016 6.61 0.406 6.06 87.0 63.61 113.4

1021 6.46 0.357 6.19 50.1 51.18 97.0

1026 6.38 0.333 6.17 37.1 2.49 78.0

1031 6.34 0.321 6.15 23.9 2.33 58.0

1036 6.31 0.315 6.16 20.3 2.16 46.9

1041 6.30 0.311 6.17 16.3 2.00 39.8

1046 6.35 0.306 6.16 14.9 1.85 29.3

1051 6.32 0.304 6.18 12.9 1.69 20.6

1056 6.34 0.304 6.17 11.0 1.63 17.4

1101 6.37 0.303 6.18 10.4 1.54 15.3

1106 6.40 0.302 6.19 9.3 1.45 12.4

1111 6.40 0.301 6.19 9.2 1.34 10.9

Rite in the Rain

8/15/18 60°F Sun, Calm.

1137 - continue Tank Farm MW-30

1145 - Sample 18WWT-01GW collected from TF MW 30

6x 250 mL DRD

9x 40 mL DCA (+ATX MS/MSD)

9x 40 mL ~~ATX~~ (MS/MSD only) ~~ARO~~

~~4x ~~ATX~~~~ *MS/MSD

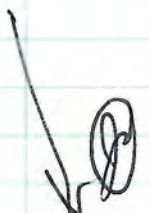
1150 Sample # 18WWT-02GW collected

fake

time 3x 40 mL DCA

2x 250 mL DRD *Dupl of TF - 01

1155 - Down @ MW-30 fake ladder



8/16/18 50°F light Rain Calm

0700 - Meet up @ Hotel pack up. Call Correctional facility & let them know we are coming.

0809 - Setup on TF MW-23

DTW: 25.46' ATOL

DTB: 40.10' BTOL

~150 mL/min Turbid, no fuel odor

| TIME | Temp | Cond | pH | DO | ORP | Turb |
|------|------|-------|------|------|-------|-------|
| 0843 | 7.13 | 0.330 | 5.85 | 8.49 | 143.0 | 126.7 |
| 0848 | 7.02 | 0.283 | 5.87 | 3.01 | 115.0 | 110.3 |
| 0853 | 6.96 | 0.268 | 5.88 | 2.61 | 105.0 | 100.2 |
| 0858 | 6.92 | 0.258 | 5.91 | 2.39 | 96.7 | 87.6 |
| 0903 | 6.94 | 0.252 | 5.92 | 2.19 | 89.0 | 77.3 |
| 0908 | 6.90 | 0.248 | 5.94 | 2.02 | 83.4 | 63.3 |
| 0913 | 6.92 | 0.247 | 5.95 | 1.92 | 80.2 | 57.0 |
| 0918 | 7.01 | 0.246 | 5.96 | 1.86 | 76.5 | 49.2 |
| 0923 | 7.09 | 0.244 | 5.97 | 1.70 | 74.0 | 45.6 |
| 0933 | 7.25 | 0.241 | 5.98 | 1.55 | 71.0 | 38.7 |
| 0938 | 7.34 | 0.241 | 5.98 | 1.50 | 68.6 | 34.2 |
| 0943 | 7.39 | 0.242 | 5.98 | 1.49 | 67.9 | 30.7 |
| 0948 | 7.39 | 0.241 | 5.99 | 1.46 | 66.5 | 29.6 |

stable

Return in rain

8/16/2018 Winwood Tank Farm Area

0950 - Begin sampling TF MW-23

1000 - Sample 18WWTF-066W

from TF MW-23
2x 250mL DRD
3x 40mL DCA

1005 - Setting up @ TF MW-4

NTW - 27.72' ~180mL/min
DTB - 40.25' fairly clear, slight fuel odor.

| Time | Temp | Cond | pH | ORP | DO | Turb |
|------|------|-------|------|------|------|------|
| 1041 | 7.85 | 0.356 | 5.77 | 79.1 | 5.87 | 14.5 |
| 1046 | 7.73 | 0.342 | 5.83 | 68.7 | 2.44 | 13.0 |
| 1051 | 7.74 | 0.340 | 5.85 | 63.6 | 2.11 | 11.9 |
| 1056 | 7.70 | 0.341 | 5.85 | 59.9 | 1.95 | 11.2 |
| 1101 | 7.67 | 0.343 | 5.86 | 56.8 | 1.82 | 10.6 |

Parameters Stable

8/16/2018 WWTF Area

1120 - Sample 18WWTF-086W

from TF MW-04
2x 250mL DRD
3x 40mL DCA

1142 - ^{TF} @ MW-16

NTW - 21.65' → 0.03' Product
DTW - 21.68' No Sample

Attachment B

Complete Data Tables with Sample Summary Table

Attachment B: Table 1 - 2018 Groundwater Sample Summary Table

Wildwood FUDS

Wildwood, Alaska

| Sample Name | Location | Date and Time | Matrix | SW8260B/C (BTEX) ¹ | SW8260B/C (DCA) ¹ | AK101 (GRO) ¹ | AK102/(DRO) ² | QC Type | Lab | Sample Delivery Group | Cooler Name | Sampler Initials |
|---------------|------------|---------------------|--------|-------------------------------|------------------------------|--------------------------|--------------------------|-----------------|------|-----------------------|-------------|------------------|
| 18WWTF-01GW | TF MW-30 | 08/15/2018 11:45:00 | Water | | X | | X | Primary, MS/MSD | TASC | 320-42271-1 | DRO/VOC | JS |
| 18WWTF-02GW | TF MW-30 | 08/15/2018 11:45:00 | Water | | X | | X | Dupe of TF-01GW | TASC | 320-42271-1 | DRO/VOC | JS |
| 18WWTF-03GW | TF AP-397 | 08/15/2018 13:50:00 | Water | | X | | X | Primary | TASC | 320-42271-1 | DRO/VOC | JS |
| 18WWTF-04GW | TF MW-11 | 08/15/2018 15:10:00 | Water | | X | | X | Primary | TASC | 320-42271-1 | DRO/VOC | WM |
| 18WWTF-05GW | TF MW-24 | 08/16/2018 09:15:00 | Water | | X | | X | Primary | TASC | 320-42271-1 | DRO/VOC | JS |
| 18WWTF-06GW | TF MW-23 | 08/16/2018 10:00:00 | Water | | X | | X | Primary | TASC | 320-42271-1 | DRO/VOC | WM |
| 18WWTF-07GW | TF MW-6 | 08/16/2018 10:25:00 | Water | | X | | X | Primary | TASC | 320-42271-1 | DRO/VOC | JS |
| 18WWTF-08GW | TF MW-4 | 08/16/2018 11:20:00 | Water | | X | | X | Primary | TASC | 320-42271-1 | DRO/VOC | WM |
| 18WWTF-09GW | TF MW-3 | 08/16/2018 11:30:00 | Water | | X | | X | Primary | TASC | 320-42271-1 | DRO/VOC | JS |
| 18WWTF-1001TB | Trip Blank | 08/16/2018 16:00:00 | Water | X | X | X | | Trip Blank | TASC | 320-42271-1 | DRO/VOC | JS |
| 18WWTF10GW | E.Blank | 08/16/2018 13:55:00 | Water | X | X | X | X | Equipment Blank | TASC | 320-42271-1 | DRO/VOC | JS |

Note: The standard 28-day turnaround time was requested for all analysis. All samples were stored at 0-6 °C.

All volatile analysis samples (8260/AK101) were shipped in cooler "VOC". All other analysis samples shipped in cooler "DRO".

All analysis was performed at TestAmerica in West Sacramento.

1 - Water samples are collected in three HCl-preserved 40mL glass vials.

2 - Water samples are collected in two HCl-preserved 250 mL glass bottles.

BTEX - benzene, toluene, ethylbenzene, xylene

DRO - diesel range organics

GRO - gasoline range organics

GW - groundwater

HCL - hydrochloric acid

WM - William Mangano

JS - Jake Sweet

mL - milliliter

MS/MSD - Matrix Spike/Matrix Spike Duplicate

QC - quality control

TASC - TestAmerica West Sacramento, California

TB - Trip Blank

| Sample ID | Location ID | Collection Date | Lab Sample ID | Matrix | 18WWTF-01GW TF MW-30 | 18WWTF-02GW TF MW-30 | 18WWTF-03GW TF AP-397 | 18WWTF-04GW TF MW-11 | 18WWTF-05GW TF MW-24 | 18WWTF-06GW TF MW-23 |
|-----------|-------------|---------------------------------|---------------|--------------|-------------------------|-------------------------|--------------------------|-------------------------|-------------------------|-------------------------|
| | | 08/15/2018 11:45 | 320-42271-5 | Groundwater | 08/15/2018 11:45 | 08/15/2018 11:45 | 08/15/2018 13:50 | 08/15/2018 15:10 | 08/16/2018 09:15 | 08/16/2018 10:00 |
| | | | | | 320-42271-5 | 320-42271-6 | 320-42271-7 | 320-42271-8 | 320-42271-9 | 320-42271-10 |
| | | | | | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater |
| Method | Units | Analyte | SL | MS/MSD | Dupe of TF-01GW | | | | | |
| 8260C | mg/L | 1,2-Dichloroethane | 0.005 | ND [0.0005] | ND [0.0005] | 0.0046 [0.0005] | 0.00086 [0.0005] J | ND [0.0005] | ND [0.0005] | |
| AK102 | mg/L | Diesel Range Organics (C10-C25) | 1.5 | ND [0.12] QL | ND [0.12] QL | ND [0.13] QL | 5.2 [0.13] QL | 0.39 [0.12] QL | 0.3 [0.13] QL | |

SL - Screening Level determined in the October 2013 Wildwood Decision Document

[] - Laboratory LOD

Solid shade indicates screening value exceedance

Data Flags are defined at the end of the table

| | | | | Sample ID | 18WWTF-07GW | 18WWTF-08GW | 18WWTF-09GW | 18WWTF-1001TB | 18WWTF-10GW |
|--------|-------|---------------------------------|-------|--------------------|--------------------|--------------------|------------------|------------------|------------------|
| | | | | Location ID | TF MW-6 | TF MW-4 | TF MW-3 | Trip Blank | E_Blank |
| | | | | Collection Date | 08/16/2018 10:25 | 08/16/2018 11:20 | 08/16/2018 11:30 | 08/16/2018 16:00 | 08/16/2018 13:55 |
| | | | | Lab Sample ID | 320-42271-11 | 320-42271-12 | 320-42271-13 | 320-42271-15 | 320-42271-14 |
| | | | | Matrix | Groundwater | Groundwater | Groundwater | Groundwater | Groundwater |
| Method | Units | Analyte | SL | | | | Trip Blank | Equip. Blank | |
| 8260C | mg/L | 1,2-Dichloroethane | 0.005 | 0.00038 [0.0005] J | 0.00083 [0.0005] J | 0.00022 [0.0005] J | ND [0.0005] | ND [0.0005] | |
| AK102 | mg/L | Diesel Range Organics (C10-C25) | 1.5 | 1.9 [0.12] QL | 5 [0.13] QL | 4.4 [0.13] QL | | ND [0.13] | |

SL - Screening Level determined in the October 2013 Wildwood Decision Document

[] - Laboratory LOD

Solid shade indicates screening value exceedance

Data Flags are defined at the end of the table

Data Flag Explanations

ND - Analyte is not detected; [] - Laboratory Limit of Detection (LOD)

| | |
|------------------|--|
| | Analyte LOD is greater than the screening criteria |
| | Analyte was detected at a concentration greater than the screening criteria. |
| Qualifier | Definition |
| J | Analyte result is considered an estimated value because the level is below the laboratory LOQ but above the DL |
| B | Analyte result is considered a high estimated value due to contamination present in the method blank. |
| QH, QL, QN | Analyte result is considered an estimated value biased (high, low, uncertain) due to a quality control failure |
| R | Analyte result is rejected - result is not usable. |

Flags may be combined when more than one quality deficiency exists

Attachment C

CDQR and Laboratory Data Review Checklists



**US Army Corps
of Engineers**

Alaska District

Chemical Data Quality Review

**Wildwood Former Air Force Station Formerly Used
Defense Site (FUDS)
Former Tank Farm – F10AK025105**

Wildwood, Alaska

September 2018



Prepared By:
U.S. Army Corps of Engineers - Alaska District
Environmental Engineering Branch
P.O. Box 6898
Joint Base Elmendorf Richardson, Alaska 99506-0898



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1. Introduction

- 1.1. The U.S. Army Corps of Engineers Alaska District (USACE-AK), Engineering and Construction Division, Environmental Engineering Branch (CEPOA-EC-EE) prepared this data review at the request of the USACE Environmental and Special Programs (CEPOA-PM-ESP) branch. This report presents a review of the results from the 2018 groundwater investigation conducted by USACE-AK personnel at Wildwood Former Air Force Station project site located in Wildwood, Alaska (18-044). This CDQR covers a single SDG (320-42771) that contained samples from both the Former Tank Farm, and the Partly Mitigated Operations Building Site. This CDQR will only focus on data impacts to samples from the Former Tank Farm Site.

2. Project Description

- 2.1. See Section 1.2 of the Former Tank Farm 2018 Groundwater Sampling Report for a complete site description and history. The purpose of sampling was to determine contaminant concentrations in groundwater wells at the project locations. The results of the chemical analyses at the Former Tank Farm were screened against the groundwater cleanup values established in the October 2013 Former Tank Farm Decision Document (ref 5.2).
- 2.2. To that end, eight primary groundwater samples, one equipment blank, one trip blank, and one duplicate sample were collected during the time period 14-16 August 2018 at the Former Tank Farm. Groundwater samples were collected by Alaska Department of Environmental Conservation (ADEC) qualified environmental professionals, Jake Sweet and William Mangano from a total of eight wells. Bladder pumps were used to collect samples from all monitoring wells. One equipment blank was also collected by running distilled water through the bladder pump into sample containers.
- 2.3. A total of 15 groundwater samples (including two duplicates, one equipment rinsate blank and one trip blank) were hand delivered in this Sample Delivery Group (SDG) to TestAmerica Laboratory in Anchorage, Alaska with proper custody procedures. All sample containers were repacked and shipped to TestAmerica Laboratory in Sacramento, California for analysis. Eight primary samples and one duplicate were from the Wildwood Tank Farm Site and are discussed in this CDQR. This lab is approved by ADEC through the Underground Storage Tank (UST) Program and is certified by the Department of Defense (DOD) Environmental Laboratory Accreditation Program (ELAP) for all analytical methods utilized under this project.
- 2.4. The analytical methods utilized for the Former Tank Farm project site are as follows: AK102 diesel range organics (DRO) and SW8260C 1,2-dichloroethane (DCA). Table 1, located in Attachment B of the Sampling Report, presents the field identification of collected samples and the analyses performed at the laboratory. Table 2, also located in Attachment B, presents a comprehensive data tabulation with data qualifiers as detailed herein.
- 2.5. The project data was reviewed for deviations to the requirements presented in the Sampling and Analysis Plan, the DOD-QSM (Version 5.1), and the ADEC Technical Memorandum Data Quality Objectives, Checklists, Quality Assurance Requirements for Laboratory Data, and Sample Handling (dated March 2017) in the following areas – precision, accuracy, representativeness, comparability, completeness, and sensitivity (PARCCS). Elements reviewed include sample handling, holding times, method and trip blanks, laboratory control sample/laboratory control sample duplicate (LCS/LCSD) recoveries and relative percent differences (RPDs), matrix spikes and matrix spike duplicates (MS/MSD) recoveries and RPDs, surrogate recovery, and field duplicate comparability. Calibration curves and continuing calibration standard recoveries were not specifically reviewed; however, laboratories are required to document such failures in the appropriate case narratives. These narratives were reviewed for each sample delivery group.
- 2.6. The laboratory electronic data format (EDF) for this project was used to generate this report. When discrepancies between the hardcopy data and the EDF are found, the EDF has been

modified to reflect values from the hardcopy, unless the hardcopy is found to be in error. Results used to generate this report are deemed to be accurate.

- 2.7. The following qualifiers, listed below in order of increasing severity, are used in the data tables to indicate quality control deficiencies. With the exception of J and B which provide additional usability information, the most severe flag will be utilized when quality issues indicate the use of more than one qualifier.

| Qualifier | Definition |
|------------|---|
| J | Analyte result is considered an estimated value because the level is below the laboratory LOQ but above the DL. |
| B | Analyte result is considered a high estimated value due to contamination present in the method or trip blank. |
| H | Analyte result is considered a low estimated value due to being analyzed outside of holding time. |
| QH, QL, QN | Analyte result is considered an estimated value (biased high, low, indeterminate) due to a quality control failure. |
| R | Analyte result is rejected - result is not usable. |

2.8. Details of the data review are presented by SDG below:

3. SDG 320-42771

- 3.1. Collection and Preservation: Eight primary groundwater samples, one duplicate, one trip blank and one equipment blank associated with the Wildwood Tank Farm were shipped to the laboratory in two coolers. Cooler "VOC" contained the project trip blank and was measured at 5.4° C upon receipt. Cooler "DRO" was received with a temperature of 3.5° C. All temperatures met criteria and all preservation requirements were met. No data were impacted. All sample handling criteria were met.
- 3.2. Holding times: All reported sample analyses for the Tank Farm were completed within applicable holding times.
- 3.3. Method, equipment and trip blanks were analyzed at the required frequency and/or target analytes were not detected in any blank or detections do not impact data quality (sample results are at least 10 times greater than any associated blank concentration) in Tank Farm samples.
- 3.4. LCS/LCSDs were analyzed at the required frequency and recoveries were within the QSM acceptance limits for all analytes in Tank Farm samples.
- 3.5. LCS precision: The LCS precision as measured by RPD was within QSM or method acceptance limits or any deviations do not impact data quality.
- 3.6. Surrogate recoveries for all samples were within method and/or QSM acceptance limits or deviations do not impact data usability for Operations Facility primary samples.
- 3.7. MS/MSDs were analyzed at the required frequency and recoveries were within the QSM acceptance limits or did not affect data quality with the following exceptions:
- Due to insufficient sample volume there is no MS/MSD for lab batch 320-242629. The LCS/LCSD provides precision information for this batch.
- 3.8. The MS/MSD precision did not exceed QSM acceptance limits or did not affect data quality with the exception of the following:

- DRO was recovered marginally (73% vs.75%) low in the MS/MSD of lab batch 320-24291. All DRO results in this batch are potentially biased low. All project samples are impacted and are flagged "QL". There is no impact to the majority of the results as they are either over screening criteria, or were detected at a concentration far below screening criteria.

3.9. There were two duplicate pairs of site samples reported in this SDG, meeting the 10% frequency requirement. Sample OF-02GW was a duplicate of OF-01GW. Sample TF-02GW was a duplicate of TF-01GW. For comparison purposes, the limit of detection (LOD) is used for a nondetect result. All results are compliant with the criteria specified in ADEC Tech Memo.

3.10. Reporting/detection limits are defined by the QSM as follows: the Limit of Quantification (LOQ) is the lowest concentration that produces a quantitative result within specified limits of precision and bias. For DOD projects, the LOQ shall be set at or above the concentration of the lowest initial calibration standard corrected for sample preparation, dilution and moisture (if applicable). Laboratories can often detect analytes at levels less than the LOQ, albeit less quantitatively; therefore, the Limit of Detection (LOD) is defined as the smallest amount or concentration of a substance that must be present in a sample in order to be detected at a high level of confidence (99%). At the LOD, the false positive rate is 1%. Consequently, any nondetect result with an LOD greater than the associated cleanup limit cannot be used to prove the absence of that analyte at that limit. The laboratory reporting limits meet or exceed ADEC regulatory requirements for all analytes.

4. Overall Assessment

All results for this project are usable as reported and flagged. The overall completeness goal of 95% was met.

5. References

- 5.1. ADEC, Technical Memorandum, Data Quality Objectives, Checklists, Quality Assurance Requirements for Laboratory Data, and Sample Handling, March 2017.
- 5.2. USACE, Decision Document, HTRW Project #F10AK0251-05, Former Tank Farm and USTs 5-1 & 5-2, FUDS, Wildwood Air Force Station, Kenai, Alaska, October, 2013.
F10AK02105_05.09_0500_a.
- 5.3. Department of Defense, Quality Systems Manual for Environmental Laboratories, Final Version 5.1, January 2017.
- 5.4. Test America Sacramento, Analytical Report; Job # 320-42771-1, Wildwood, September 2018.

Laboratory Data Review Checklist

Completed By:

Jake Sweet

Title:

USACE Chemist

Date:

9/11/18

CS Report Name:

2018 Wildwood Groundwater Monitoring Report

Report Date:

September, 2018

Consultant Firm:

US Army Corps of Engineers

Laboratory Name:

Test America, Sacramento

Laboratory Report Number:

320-42271

ADEC File Number:

2320.38.051

Hazard Identification Number:

25199 (Tank Farm), 25213
(Operations Facility)

1. Laboratory

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

 Yes No

Comments:

All analysis was performed at Test America Sacramento which holds both ADEC and ELAP certification for all analytes.

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

 Yes No

Comments:

Not applicable, no samples were transferred.

2. Chain of Custody (CoC)

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

 Yes No

Comments:

- b. Correct Analyses requested?

 Yes No

Comments:

3. Laboratory Sample Receipt Documentation

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

 Yes No

Comments:

Samples were hand delivered to the laboratory satellite office in Anchorage, AK. All samples were in two coolers. Cooler “DRO” had a cooler temperature of 3.5 °C. Cooler “VOC” had a cooler temperature of 5.4 °C.

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

 Yes No

Comments:

All sample containers were HCl preserved and pH measurements were collected by the lab to verify adequate preservative was present.--

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

 Yes No

Comments:

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

Yes No

Comments:

The container label for the following sample did not match the information listed on the Chain-of-Custody (COC): 18WWOF-04GW (320-42271-4). Three of six vials labels list 1738 as the collection time, while the COC lists 1736 for the collection time. The samples were logged in per the COC. There were no impacts to data.

- e. Data quality or usability affected?

Comments:

None.

4. Case Narrative

- a. Present and understandable?

Yes No

Comments:

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

Yes No

Comments:

Internal standard (ISTD) response for Dioxane-d8 for the following samples were outside acceptance criteria: 18WWOF-02GW (320-42271-2) and 18WWTF-01GW (320-42271-5[MSD]). This ISTD does not correspond to any of the requested target compounds; therefore, the data have been reported.

The following samples were analyzed outside of analytical holding time, the original analysis in analytical batch 320-242233 did not have laboratory control sample/laboratory control sample duplicate (LCS/LCSD) or closing continuing calibration verification (CCV). The results confirm the original analysis, both results are reported: 18WWOF-01GW (320-42271-1), 18WWOF-02GW (320-42271-2), 18WWOF-03GW (320-42271-3) and 18WWOF-04GW (320-42271-4).

The following samples in analytical batch 320-242233 were analyzed with no laboratory control sample/laboratory control sample duplicate, closing continuing calibration verification and no Trifluorotoluene surrogate due to analyst oversight. The samples are re-analyzed in analytical batch 320-242645. Both analyses are reported and the re-analysis is past sample hold time. 18WWOF-01GW (320-42271-1), 18WWOF-02GW (320-42271-2), 18WWOF-03GW (320-42271-3) and 18WWOF-04GW (320-42271-4)

- c. Were all corrective actions documented?

Yes No

Comments:

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

Comments:

The case narrative does not discuss data usability. See this checklist and the CDQR for the data usability discussion.

5. Samples Results

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

Yes No

Comments:

b. All applicable holding times met?

Yes No

Comments:

The following samples were analyzed outside of analytical holding time, the original analysis in analytical batch 320-242233 did not have laboratory control sample/laboratory control sample duplicate (LCS/LCSD) or closing continuing calibration verification (CCV). The results confirm the original analysis, both results are reported: 18WWOF-01GW (320-42271-1), 18WWOF-02GW (320-42271-2), 18WWOF-03GW (320-42271-3) and 18WWOF-04GW (320-42271-4).

Since the results were confirmed by re-analysis, the original in hold results were reported. There is no impact to data usability.

c. All soils reported on a dry weight basis?

Yes No

Comments:

Not applicable. All samples were water samples.

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

Yes No

Comments:

e. Data quality or usability affected?

Yes No

Comments:

There are no impacts to data quality or usability.

6. QC Samples

a. Method Blank

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

Yes No

Comments:

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

Yes No

Comments:

iii. If above LOQ, what samples are affected?

Comments:

Not applicable.

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

Yes No

Comments:

Not applicable.

v. Data quality or usability affected?

Comments:

None.

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

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

Yes No

Comments:

The following samples in analytical batch 320-242233 were analyzed with no laboratory control sample/laboratory control sample duplicate, closing continuing calibration verification and no Trifluorotoluene surrogate due to analyst oversight. The samples are re-analyzed in analytical batch 320-242645. Both analyses are reported and the re-analysis is marginally past sample hold time. 18WWOF-01GW (320-42271-1), 18WWOF-02GW (320-42271-2), 18WWOF-03GW (320-42271-3) and 18WWOF-04GW (320-42271-4). There is no impact to data as all results were comparable and the out of hold samples were less than 1 day out of hold.

Due to insufficient sample volume there is no MS/MSD for lab batch 320-242629. The LCS/LCSD provides precision information for this batch.

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

Yes No

Comments:

Not applicable, no inorganics were analyzed.

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

Yes No

Comments:

All LCS/LCSD recoveries were within lab limits.

DRO was recovered marginally (73% vs.75%) low in the MS/MSD of lab batch 320-24291. All DRO results in this batch are potentially biased low. All project samples are impacted and are flagged “QL”.

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

Yes No

Comments:

All LCS/LCSD and MS/MSD RPDs are within laboratory limits.

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

Comments:

Not applicable.

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

Yes No

Comments:

All MS/MSD low recovery impacted samples are flagged “QL”.

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

Comments:

There is no impact to the majority of the results as they are either over screening criteria, or were detected at a concentration far below screening criteria. The DRO result for sample 18WWOF-03GW should be used with caution as it is potentially low biased and is just below the screening criteria.

- c. Surrogates – Organics Only

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

Yes No

Comments:

All primary reported results have surrogates associated with them.

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

Yes No

Comments:

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

Yes No

Comments:

Not applicable, there were no surrogate failures.

- iv. Data quality or usability affected?

Comments:

None.

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

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

Yes No

Comments:

Sample 18WWTF-1001TB was the project trip blank.

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

Yes No

Comments:

The trip blank was transported to the lab in cooler “VOC” with all of the project VOA samples.

- iii. All results less than LOQ?

Yes No

Comments:

- iv. If above LOQ, what samples are affected?

Comments:

Not applicable

v. Data quality or usability affected?

Comments:

Not applicable

e. Field Duplicate

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

 Yes No

Comments:

There were two field duplicate samples collected and 11 project samples collected, meeting the 10% frequency requirement.

Sample 18WWOF-02GW was a duplicate of sample 18WWOF-01GW. Sample 18WWTF-02GW was a duplicate of sample 18WWTF-01GW.

ii. Submitted blind to lab?

 Yes No

Comments:

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

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

Where R_1 = Sample Concentration
 R_2 = Field Duplicate Concentration

 Yes No

Comments:

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

Comments:

None.

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

 Yes No Not Applicable

An equipment blank was collected by running deionized water through the decontaminated bladder pump and collecting the water in sample containers.

i. All results less than LOQ?

 Yes No

Comments:

GRO was detected at a concentration of 0.1 mg/L in the equipment blank.

ii. If above LOQ, what samples are affected?

Comments:

All GRO sample results were within 10X of the detected equipment blank and are flagged "B".

iii. Data quality or usability affected?

Comments:

Data usability is not impacted. All GRO results are far below screening criteria and are potentially biased high.

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

a. Defined and appropriate?

Yes No

Comments:

All data flags are defined at the end of the data tables.

Attachment D

Site Photographs



Photo #1: Sampling setup at Tank Farm MW-30, view W (8/15/18)



Photo #2: Sampling setup at Tank Farm AP-397, view NW (8/15/18)



Photo #3: Sampling setup at Tank Farm MW-11, view SE (8/15/18)



Photo #4: Tank Farm MW-4 with MW-6 in background, view SW (8/15/18)



Photo #5: Tank Farm MW-23 with MW-24 in the background, facing W (8/15/18)



Photo #6: Collecting equipment blank by pumping DI water through decontaminated bladder pump, facing south (8/15/18)

Attachment E

ADEC Comments