Final 2018
Monitoring Report

Neely Road Building 3570
Former PX Gas Station
HQAES No. 02871.1078
ADEC File No. 108.38.078 (3570)
Hazard ID No. 3691
U.S. Army Garrison Alaska

Contract No. W911KB-16-D-0005
Task Order 11

January 2019

COVER LETTERS

DEPARTMENT OF THE ARMY
INSTALLATION MANAGEMENT COMMAND
HEADQUARTERS, U.S. ARMY GARRISON ALASKA
1046 MARKS ROAD #6000
FORT WAINWRIGHT, ALASKA 99703-6000

January 24, 2019

Directorate of Public Works

SUBJECT: Submission of the Final 2018 Monitoring Report, Neely Road to the State of Alaska Department Environmental Conservation (ADEC)

Ms. Erica Blake
Environmental Program Specialist
Alaska Department of Environmental Conservation
610 University Avenue
Fairbanks, AK 99709

Dear Ms. Blake:

This letter documents transmission of the Final 2018 Monitoring Report, Neely Road, on Fort Wainwright, Alaska to the ADEC.

A digital copy of the document will be emailed to you and two Compact Discs will be delivered to the ADEC in Fairbanks, Alaska. A copy of the letter is being provided to Kevin Fraley, Environmental Program Specialist, ADEC and the U.S. Army Garrison Alaska Fort Wainwright Comprehensive Environmental Response, Compensation, and Liabilities Act Administrative Records without enclosures. If you would like to receive a hard copy of this document, please notify us.

If you have questions or concerns regarding this action please contact Remedial Program Manager Mr. Brian Adams at (907) 361-6623/ brian.m.adams18.civ@mail.mil, Ms. Tamara Scholten, Alternate Remedial Program Manager at (907) 361-3001/tamara.a.scholten.civ@mail.mil or Mr. Seth Reedy, Alternate Remedial Program Manager at (907) 361-6489/seth.a.reedy.civ@mail.mil.

Sincerely,

Richard L. Morris
Chief, Environmental Division

DEPARTMENT OF THE ARMY
INSTALLATION MANAGEMENT COMMAND
HEADQUARTERS, U.S. ARMY GARRISON ALASKA
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Richard L. Morris
Chief, Environmental Division

Final 2018 Monitoring Report

Neely Road Building 3570 Former PX Gas Station,
HQAES No. 02871.1078
ADEC File No. 108.38.078(3570)
ADEC Hazard ID 3691

For:

U.S. Army Garrison Alaska

January 2019

Prepared under contract to:

U.S. Army Corps of Engineers, Alaska District

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JBER, Alaska 99506-6898
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TABLE OF CONTENTS

Page Number

TABLES

FIGURES

GRAPHS (EMBEDDED IN THE TEXT)

APPENDICES

LIST OF ACRONYMS AND ABBREVIATIONS

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
AFCEE	Air Force Center for Environmental Excellence
AS	air sparge
bgs	below ground surface
CAP	Corrective Action Plan
CDQR	Chemical Data Quality Review
CD	compact disk
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cis-1,2-DCE	cis-1,2-dichloroethene
COC	contaminants of concern
COM	center of mass
DCA	1,2-dichloroethane
DCE	dichloroethene
DERA	Defense Environmental Restoration Account
DL	detection limit
DO	dissolved oxygen
DoD	Department of Defense
DRO	diesel range organics
ECC	Environmental Compliance Consultants
EDB	1,2-dibromoethane
EPA	Environmental Protection Agency
FES	Fairbanks Environmental Services Inc.
FFA	Federal Facility Agreement
GAC	granular activated carbon
GIS	geographic information system
GRO	gasoline range organics
GW	groundwater
HP	horsepower
IC	Institutional Control
IDW	investigation-derived waste
LOD	limit of detection
LOQ	limit of quantitation
MAROS	Monitoring and Remediation Optimization System
µg/L	micrograms per liter
mg/L	milligram per liter
NAPL	non-aqueous phase liquid
ND	not detected
NRC	National Response Corporation
ORP	oxidation reduction potential
OSR	offsite rule
PCE	tetrachloroethene
PLC	programmable logic controller

LIST OF ACRONYMS AND ABBREVIATIONS

PX	Post Exchange
QAPP	Quality Assurance Project Plan
QSM	Quality Systems Manual
RAO	Remedial Action Objective
RI	Release Investigation
RME	remote monitoring enclosure
RPM	Remedial Project Managers
SGS	SGS Environmental Services
SVE	soil vapor extraction
TCE	trichloroethene
TCLP	toxicity characteristic leaching procedure
UFP	Uniform Federal Policy
USACE	U.S. Army Corps of Engineers
USAG-AK	U. S. Army Garrison-Alaska
UST	underground storage tank
UVOST	Ultraviolet Optical Screening Tool
VOC	volatile organic compounds

EXECUTIVE SUMMARY

The Neely Road site is located at the corner of Neely Road and 11th Street on Fort Wainwright, Alaska. The site was used as the Post Exchange Gas Station between 1955 and 1981. The building was later used as the Post Automotive Skill Center until the late 1990's. These operations resulted in releases of petroleum hydrocarbons which impacted soil and groundwater at the site. The Neely Road air sparge/soil vapor extraction (AS/SVE) treatment system was installed in 2005 and its operation resulted in a significant reduction of groundwater contaminant concentrations at the site. A decision was reached by the Remedial Project Managers (RPMs) in January 2014 to shut down the treatment system and start a contaminant rebound study once concentrations of all contaminants of concern (COC), with the exception of diesel range organics (DRO), had achieved cleanup levels. The treatment system was placed into a cold storage status on January 2, 2014. This report documents the 2018 groundwater monitoring results.

Five monitoring wells were sampled during May and August 2018. Groundwater samples were analyzed for DRO, gasoline range organics (GRO), volatile organic compounds (VOC) and 1,2-dibromoethane (EDB). Samples were also analyzed for natural attenuation parameters dissolved iron/ manganese and sulfates.

The 2005 Corrective Action Plan (CAP) utilized Alaska Department of Environmental Conservation (ADEC) cleanup levels that were established at the time (ENSR, 2005). ADEC has updated cleanup levels several times; the most recent were promulgated on September 29, 2018. Comparing the 2018 groundwater sample results to the current ADEC cleanup levels, six analytes exceed cleanup levels (DRO, trichloroethene (TCE), 1,2,4-Trimethylbenzene, 1,3,5-Trimethylbenzene, ethylbenzene and naphthalene). All but one sample (August sample of downgradient well AP-9685) exceeded the new ADEC cleanup level for manganese. However as a result of the increased PCE cleanup level, tetrachloroethene (PCE) did not exceed the current ADEC cleanup level.

The Monitoring and Remediation Optimization System (MAROS) evaluation results showed that all wells were recommended for annual or biennial sampling. The sampling frequency results are based on the rate of change of contaminant concentrations relative to the cleanup level. The current sampling frequency for the Neely Road site is semiannual, and semiannual sampling is recommended due to the increasing trends in AP-9003 and the continued evaluation of solvent detections in AP-9685. The next groundwater sampling event should be conducted in spring 2019.

An Institutional Control (IC) survey was completed during May 22, 2018. The purpose of the IC inspection was to ensure that the IC's for Neely Road are being met. The IC inspection included a site visit, review of the Fort Wainwright IC geographic information system (GIS) layer, and a

review of the site-specific information in the ADEC Contaminated Sites database. The IC inspection did not identify any out of compliance concerns.

The Army is currently planning to conduct a separate investigation of the PCE source area near AP-9685 under ADEC Contaminated Sites File Number: 108.38.137, Hazard ID: 26796.

1.0 INTRODUCTION

This report documents the monitoring activities conducted during 2018 at the Neely Road - Former Building 3570 Post Exchange (PX) Gas Station (Neely Road) site on Fort Wainwright, Alaska. These activities included the collection of groundwater samples and completion of an Institutional Control (IC) inspection. This document and the associated fieldwork were completed by Fairbanks Environmental Services Inc. (FES) under U.S. Army Corps of Engineers (USACE) contract W911KB-16-D-0005, Task Order 11. The work was completed according to the 2018 Postwide Work Plan (FES, 2018) and updated Uniform Federal Policy Quality Assurance Project Plan sheets (UFP-QAPP).

1.1 Monitoring Report Organization

The 2018 field efforts included groundwater sampling, and completion of the annual IC inspection at the Neely Road site. A description of the procedures and results associated with these activities are presented in the following sections:

- Section 1 – Introduction
- Section 2 – Remedial Action Objectives (RAO) summary
- Section 3 – Groundwater sample collection, results, and discussion
- Section 4 – IC inspection, results, and discussion
- Section 5 – Conclusions
- Section 6 – References

Supporting information can be found in the appendices listed below. Additional information not provided in hard copy, such as laboratory reports and photographs, are provided in the Supplemental Data folder on the compact disc (CD) accompanying the hardcopy of this report.

- Appendix A – Groundwater Sample Summary and Analytical Result Tables
- Appendix B – Chemical Data Quality Review (CDQR) and Alaska Department of Environmental Conservation (ADEC) Laboratory Data Review Checklists
- Appendix C – Groundwater Sampling Forms, Field Notes and Field Measurement Table
- Appendix D – Photographic Log
- Appendix E – Monitoring and Remediation Optimization System (MAROS)
- Appendix F – IC Inspection

1.2 Site Description and Location

The Neely Road site is located on Fort Wainwright, Alaska, the cantonment area occupies 911,604 acres on the east side of Fairbanks, Alaska per the Federal Facilitates Agreement. Fort Wainwright was originally established in 1938 as a cold weather testing station. Currently, primary missions include training of infantry soldiers in the Arctic environment, testing of equipment in Arctic conditions, preparation of troops for defense of the Pacific Rim, and preparation of rapid deployment of troops worldwide. In 2001, Fort Wainwright was selected as the home for the third Stryker Brigade Combat Team. Fort Wainwright's mission is to deploy combat ready forces to support joint military operations worldwide and serve as the Joint Force Land Component Command to support Joint Task Force Alaska.

The Neely Road site is located at the corner of Neely Road and 11th Street. Figure 1-1 presents the site location map. Building 3570, which was the Post Exchange Gas Station, was located on the Neely Road site. The station operated between 1955 and 1981, dispensing fuel and servicing vehicles. The station used two 10,000-gallon gasoline underground storage tanks (USTs) and one 550-gallon used oil UST; all three were removed in 1987. The station was used as an Auto Skill Center before being vacated and demolished in the late 1990s. These operations resulted in releases of petroleum hydrocarbons which have impacted soil and groundwater at the site. Building 3570 was demolished in June 2002.

Release Investigations (RI) were conducted in 2002 and 2003 and identified soil and groundwater contamination at the site. A Corrective Action Plan (CAP) was prepared in 2005 that identified a Remedial Action is required to return the groundwater quality to levels meeting state and federal drinking water standards and recommended the installation of an air sparge/soil vapor extraction (AS/SVE) treatment system (ENSR, 2005). The treatment system was installed during late 2005.

1.3 Treatment System Description

The Neely Road treatment system used AS/SVE technology. AS is an *in-situ* technology for removing volatile organic compounds (VOC) dissolved in groundwater and sorbed onto or trapped in saturated zone soil. AS introduces contaminant free air below the water table through air injection probes. SVE is used for removing VOCs from contaminated soil in the vadose zone. An SVE blower introduces a vacuum at the SVE wells, drawing in contaminated vapors. AS systems are typically coupled with SVE systems to inject contaminant free air and extract contaminated air.

The system is comprised of AS and SVE blowers, 26 AS wells, 7 SVE wells, aboveground and belowground piping, and two remote monitoring enclosures (RMEs). Operation of the SVE system between 2005 and 2013 removed an estimated 28,140 pounds of hydrocarbons from the treatment area.

Since concentrations of all contaminants of concern (COC), with the exception of diesel range organics (DRO), had achieved cleanup levels, the decision was reached by the Remedial Project Managers (RPMs) to shutdown the treatment system and start a contaminant rebound study. The treatment system was placed into a cold storage status on January 2, 2014, and has not operated since. In 2014 ADEC suggested the system be restarted due to 1,2-dibromoethane (EDB) exceeding the remedial goal in AP-8211, a source area well. The treatment system did not operate in 2014. However in 2015, EDB decreased below the remedial goal in AP-8211; therefore it was recommended that the treatment system remain off and has remained off.

1.4 Treatment System Operations, Maintenance and Modifications

This section provides general information regarding installation and modifications to the treatment system. Summaries are provided for the 2005 through 2017 field seasons, as more detailed information was presented in previous reports. This section also provides a summary of operation and maintenance activities. Details of previous field seasons are presented in the 2005 through 2017 Monitoring Reports (MACTEC, 2007; FES, 2017).

2005 Field Season Activities

- Installation of the AS/SVE treatment system began on October 21, 2005.
- The initial startup of the system was delayed until December 17, 2005 to install the electric oxidizer and to collect ambient air monitoring samples to evaluate air quality concerns expressed by the workers at the Tatitlek job trailer.
- The system was shut down on December 20, 2005 because of excessive noise from the AS blower and odors reported by Tatitlek workers.

2006 Field Season Activities

- The treatment system remained off to complete an evaluation of the treatment system.
- Due to vapor migration concerns only the SVE system was restarted on March 8, 2006 for a 3-day test operation.
- On May 5, 2006 the SVE system was restarted.
- Monthly exhaust samples were collected until November 2006.
- During December 2006 the SVE system froze and could not be restarted.

2007 Field Season Activities

- The treatment system remained off until a contract was award to FES in August 2007.
- The treatment system AS/SVE was restarted on November 24, 2007.
- On November 30, 2007, the AS/SVE system was shut down due to vapor migration concerns in the nearby Tatitlek job trailer. Only the SVE system was restarted and remained in operation.

- Two monitoring wells were installed on November 17, 2007.
- SVE distribution lines were heat traced and insulated from the connex to the oxidizer.
- Monthly exhaust samples were collected November and December 2007.

2008 Field Season Activities

- The SVE treatment system operated continuously with the exception of maintenance, power outages and groundwater sampling.
- The AS system did not operate in 2008 due to vapor intrusion concerns.
- To reduce water accumulation the four SVE well total depths were reduced from 18 feet below ground surface (bgs) to 14 feet bgs. The wells were filled with silica sand with a 6-inch bentonite seal.
- Monitoring well AP-8212 was decommissioned on November 16, 2008 according to ADEC guidelines.
- The oxidizer relay control panel was rebuilt.
- Piping modifications were completed which allowed the use of the AS warm air for backflushing to the SVE piping.
- Monthly exhaust samples (pre and post oxidizer) were collected from January through December of 2008.

2009 Field Season Activities

- The SVE treatment system operated continuously with the exception of maintenance, power outages and groundwater sampling.
- Monthly exhaust samples (pre and post oxidizer) were collected from January through December of 2009.
- The Tatitlek job trailer was relocated in June and the AS portion of the treatment system was restarted on June 30. After the restart in June, the AS treatment system operated continuously with the exception of maintenance, power outages and groundwater sampling.
- The SVE system was expanded with the installation of three new SVE wells. Two of the wells were installed near the utilidor to control vapor migration. The third well was installed in the area of the former UST locations.
- The electrical transformer that controlled the heat trace was upgraded to 240v enabling more consistent operation of the system during the freezing months of operation.

2010 Field Season Activities

- The treatment system did not operate from January 4 to March 19 due to an oxidizer control panel failure. The SVE treatment system operated continuously with the exception of maintenance, power outages and groundwater sampling.

- The electrical oxidizer was removed and the SVE gases were emitted directly to the atmosphere.
- Monthly exhaust samples were collected from March through December of 2010.
- An Ultraviolet Optical Screening Tool (UVOST) investigation was conducted in May 2010 that included 40 UVOST probes across the site.
- Nine soil samples were collected as part of the 2010 UVOST investigation.
- Monitoring Wells AP-9004 and AP-8213 were decommissioned in May 2010 according to ADEC guidelines.

2011 Field Season Activities

- The SVE portion of the treatment system was shutdown on November 1, 2011 due to diminishing contaminant removal.
- An IC survey was completed during September 2011.

2012 Field Season Activities

- Four AS probes were installed for limited hot spot treatment on the north side of the utilidor near well AP-9459 in September 2012, and an additional four AS probes were installed on the northeast side of connex near well AP-9684.
- A RME was relocated from the Central Header treatment system, which was decommissioned in 2013.
- AS probes AS-03, AS-16, and AS-18 were repaired due to damage from vehicular traffic resulting in broken distribution lines.
- The AS probes which have been damaged by vehicular traffic (AS-02, AS-03, and AS-04) had the steel flushmounts set in concrete.
- An IC survey was completed during August 2012.
- Five monitoring wells were sampled in August 2012.

2013 Field Season Activities

- The programmable logic controller (PLC) had an error message due to a blown fuse, which was replaced. When it became inoperative the ventilation fan in the AS side of the connex was replaced with a reutilized fan from a recently decommissioned treatment system.
- The AS motor starter (AS1) failed and was replaced in June with a reutilized motor starter from a recently decommissioned treatment system. During the motor starter repair process the shaft on the AS blower had substantial play, which indicates a failing bearing and the blower would soon be inoperative. A used 4 horsepower (HP) blower was reutilized from the former Truck Fill Stand connex.

- AS probes AS-02 and AS-04 were repaired due to damage from vehicular traffic resulting in broken distribution lines.
- An IC survey was completed during April 2013.
- Five monitoring wells were sampled in April and August 2013.

2014 Field Season Activities

- The operation of the treatment system was shutdown on January 2, 2014
- An IC survey was completed during August 2014.
- Five monitoring wells were sampled in July and October 2014.

1.5 Groundwater Monitoring following Treatment System Shutdown

2015 Field Season Activities

- An IC survey was completed on August 11, 2015.
- Five monitoring wells were sampled in May and August 2015.

Based on the slight increase in the EDB concentration in AP-8211 and DRO exceedences in three wells during the 2014 sampling events, a decision was reached by the RPMs at the February 2015 FFA meeting to restart the treatment system. An exceedence of tetrachloroethene (PCE), however, was subsequently discovered in downgradient well AP-9685 during the data review process for the preparation of the 2014 report. As a result of the discovery of PCE contamination in the downgradient well, the system was not operated in 2015 to keep site groundwater conditions anaerobic and more conducive to the biodegradation of PCE.

2016 Field Season Activities

- An IC survey was completed on September 1, 2016. A second brief inspection was completed on September 8, 2016 to document construction activities near the downgradient well, AP-9685.
- Five monitoring wells were sampled in July and October 2016.

Due to the PCE contamination in the downgradient well, the system was not operated in 2016 to keep site groundwater conditions anaerobic and more conducive to the biodegradation of PCE.

2017 Field Season Activities

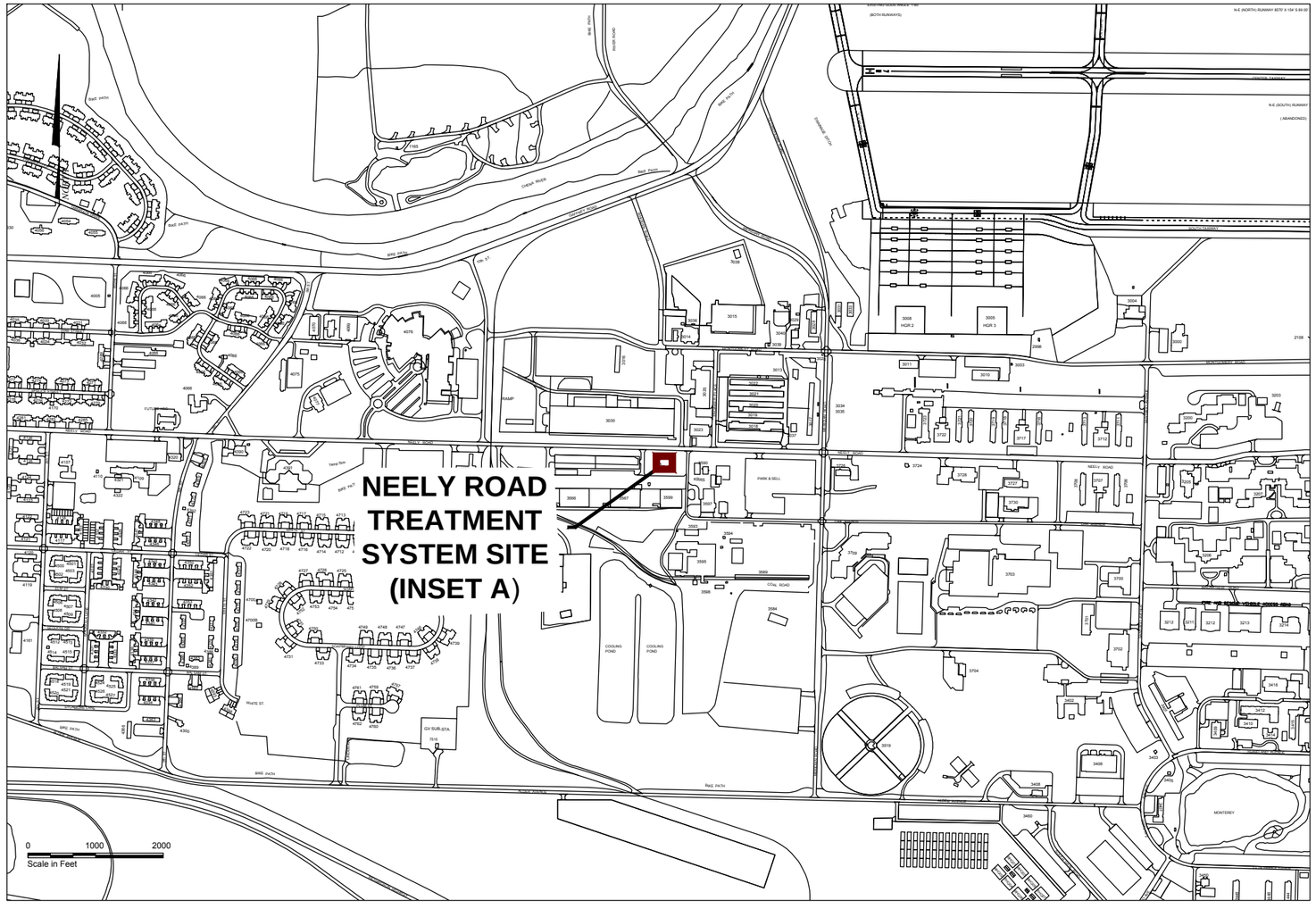
- An IC survey was completed during August 3, 2017.
- Five monitoring wells were sampled in May and August 2017.

Due to the PCE contamination in the downgradient well, the system was not operated in 2017 to keep site groundwater conditions anaerobic and more conducive to the biodegradation of PCE.

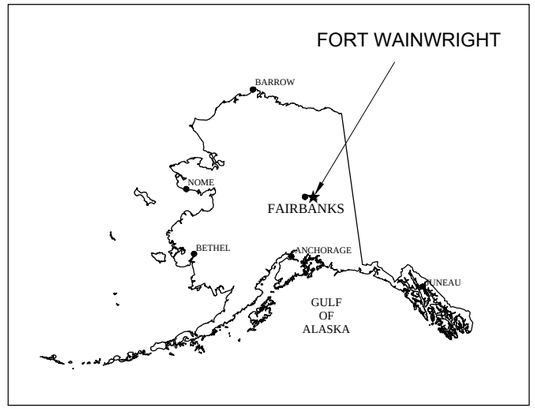
2018 Field Season Activities

- An IC survey was completed during May 22, 2018.
- Five monitoring wells were sampled in May and August 2018.

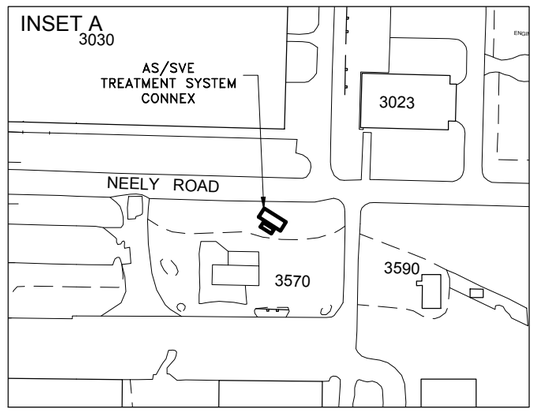
ADEC has updated cleanup levels several times; the most recent were promulgated on September 29, 2018 and the trichloroethene (TCE) concentration was detected above the ADEC cleanup level in 2018. Due to the TCE contamination in the downgradient well, the system was not operated in 2018 to keep site groundwater conditions anaerobic and more conducive to the biodegradation of TCE. PCE concentrations were below ADEC cleanup levels.



SITE VICINITY MAP



ALASKA



NEELY ROAD
TREATMENT SYSTEM

Fairbanks Environmental Services 3538 International Street Fairbanks, Alaska	USAGAK	
Site Location Map 2018 Monitoring Report Neely Road AS/SVE Treatment System U.S. Army Garrison Alaska		
USACE Contract: W911KB-16-D-0005	Figure: 1-1	Date: 1/19

2.0 REMEDIAL REQUIREMENTS

2.1 Remedial Action Objectives

The Neely Road CAP identified the following RAOs:

- Eliminate the non-aqueous phase liquid (NAPL) from the water table;
- Restore groundwater quality to federal and state drinking water standards;
- Prevent further leaching of contaminants from soil to groundwater; and
- Minimize potential migration of contaminants to the extraction wells located approximately 1,000 feet west of the site.

2.2 Promulgation of New ADEC Cleanup Levels

In November 2016, the ADEC cleanup levels were revised utilizing risk-based calculations. This resulted in a significant change in the groundwater cleanup level for many compounds (ADEC, 2017a). ADEC has updated cleanup levels several times; the most recent were promulgated on September 29, 2018 (ADEC, 2018). The revised levels will be utilized for this site to attain cleanup complete under ADEC regulations.

2.3 Remedial Action Goals

Environmental remediation is being performed under the Two-Party agreement between the U.S. Army and the ADEC. Groundwater COCs at the Neely Road site were initially identified in the 2005 CAP (ENSR, 2005) and are listed in Table 2-1. Several additional groundwater COCs were identified in subsequent groundwater monitoring and are also shown in Table 2-1. ADEC cleanup levels at the time of the CAP and current ADEC cleanup levels (ADEC, 2018) are shown for comparison in Table 2-1 on the following page.

Table 2-1 Groundwater Cleanup Goals

Analyte	2005 CAP Cleanup Goal (µg/L)	2018 ADEC Cleanup Level (µg/L)
GRO (gasoline range organics)	1,300	2,200
DRO	1,500	1,500
Benzene	5	4.6
Toluene	1,000	1,100
Ethylbenzene	700	15
Xylenes (total)	2,000	190
Naphthalene	700	1.7
1,2-Dichlorethane (DCA)	5	1.7
EDB	Not Identified at Time of CAP[1]	0.075
1,2,4-Trimethylbenzene	1,850	56
1,3,5-Trimethylbenzene	Not Identified at Time of CAP[1]	60
PCE	Not Identified at Time of CAP[1]	41
TCE	Not Identified at Time of CAP[1]	2.8

[1] Analyte was not identified as a contaminant of concern at the time of 2005 CAP (ENSR, 2005)

µg/L – micrograms per liter

3.0 GROUNDWATER MONITORING PROGRAM

This section discusses the 2018 groundwater monitoring program at the Neely Road site. The first 2018 groundwater sampling event was conducted in May and the second groundwater sampling event was conducted in August. Appendix A presents sample summary forms and tabulated analytical results for groundwater samples collected during the spring and fall 2018 sampling events. A data quality review was performed and only minor data qualifications were applied. Specific data quality issues found during the review are presented in the CDQR in Appendix B. Groundwater sampling forms, field notes, and a field measurements table (Table C-1) are included in Appendix C.

3.1 Groundwater Sample Collection

Five monitoring wells were sampled during each sampling event. Well locations are shown on Figure 3-1, Figure 3-2, and Figure 3-3. Sample collection was conducted in accordance with low-flow sampling criteria (Puls and Barcelona, 1996) and the stabilization criteria required by ADEC (ADEC, 2017c).

Low-flow methodology was used to collect water samples from all monitoring wells. The low-flow sampling method utilized variable-speed submersible pumps for all wells at least 2-inches in diameter. The low-flow sampling technique also utilized dedicated Teflon-lined tubing to purge and sample the wells. Sample tubing was placed approximately 1 foot below the water table for wells screened across the water table.

Groundwater was purged at a rate between 0.03 and 0.15 gallons per minute. Water quality measurements were recorded every five minutes and monitoring wells were purged until water quality parameters stabilized, per ADEC guidance (ADEC, 2017c). Field parameters were measured using YSI water quality meters installed in a flow through cell. The instruments were calibrated at the beginning of each day according to the manufacturer's instructions. Parameters measured included pH, temperature, specific conductivity, dissolved oxygen (DO), and oxidation-reduction potential (ORP). In addition, turbidity and drawdown were measured for each well and were recorded on sampling forms. Instrument calibration, summary of the field parameters, and sampling forms are presented in Appendix C.

Following sampling, the submersible pumps were decontaminated in accordance with the procedures described in the updated UFP-QAPP sheets (FES, 2018). The decontamination water was treated using granular activated carbon (GAC), and the treated water was disposed of at the Neely Road site. The disposal location is shown on Figure 3-1. Rinsate samples were also collected to evaluate decontamination of the re-usable pumps. The rinsate sample results are discussed in the CDQR located in Appendix B.

Groundwater samples were analyzed by SGS Environmental Services for DRO using Alaska State Method AK102, GRO using Alaska State Method AK101, VOC using Environmental Protection Agency (EPA) Method 8260C, and EDB using EPA Method 8260C. Natural attenuation parameters dissolved iron/manganese and sulfates were analyzed by methods 6020A and 300.0, respectively.

Table 3-1 presents the geochemical concentrations and field parameters. Table 3-2 and Figure 3-2 present the groundwater sampling results for site COCs.

Prior to sampling, the water level in each well was measured. Groundwater elevation data collected for the Neely Road site during 2018 are summarized in Table 3-1 and Table 3-2. Groundwater was within the screened interval of each of the monitoring wells at the time of sampling. Historic groundwater elevation results at the site show that the groundwater flow is to the northwest, consistent with the regional groundwater flow direction. Groundwater elevation contours are presented on Figure 3-1 for the August 2018 sampling event. Floating product was not detected in any of the wells during 2018. Hydrocarbon odor was observed on purge water from three wells (AP-8211, AP-9459, and AP-9684) during the spring and/or fall sampling event. Petroleum sheen was observed on purge water from one well (AP-8211) during the fall sampling event.

3.2 Groundwater Monitoring Results

To achieve site closure under the Two-Party program, groundwater concentrations must meet the cleanup levels identified in Table C of 18 AAC 75 (ADEC, 2017a). The ADEC cleanup levels were revised in 2016, 2017 and again in 2018, and the results in this section are discussed relative to the new cleanup levels. The following summarizes analytes exceeding ADEC cleanup levels in one or more wells sampled in 2018:

- DRO at AP-8211 in spring and fall events;
- 1,2,4-trimethylbenzene at AP-8211 in spring and fall events;
- 1,3,5-trimethylbenzene at AP-8211 in spring and fall events;
- Ethylbenzene at AP-8211 in the spring event and AP-9003 in the spring and fall events;
- Naphthalene at AP-8211 and AP-9003 in the spring and fall events;
- TCE at AP-9685 in the spring event.
- All but one sample (August sample of downgradient well AP-9685) exceeded the new ADEC cleanup level for manganese.

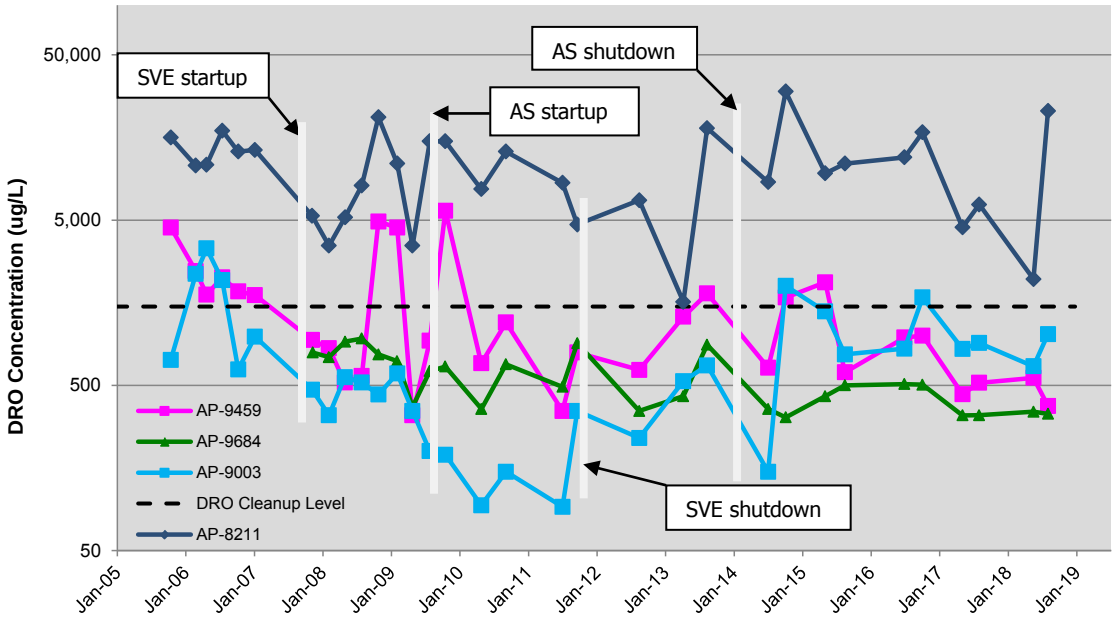
As a result of an increase in the ADEC cleanup level for PCE, all PCE detections were below the ADEC cleanup level in the 2018 sampling events.

Figure 3-3 presents the approximate DRO concentration contour associated with the 2011 through 2018 sampling events. Concentration trends for DRO, GRO, benzene and EDB are discussed and presented graphically on the following pages. Groundwater samples collected in 2018 exceeded the DRO cleanup level in one well, AP-8211 for the spring and fall sampling events.

3.2.1 Source Area Wells

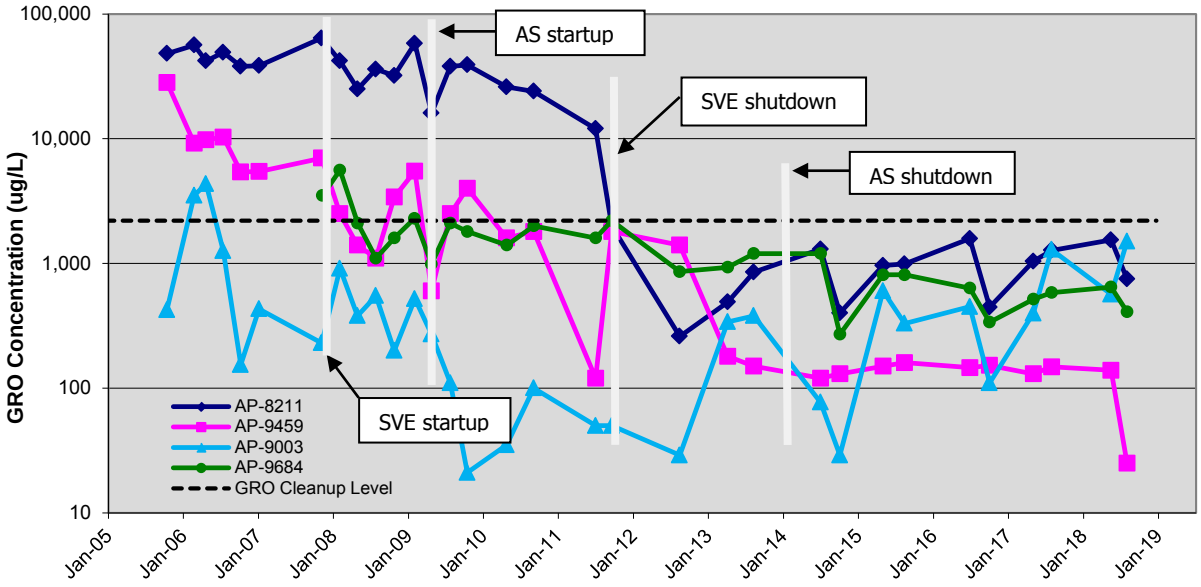
The source area wells include AP-8211, AP-9459, AP-9684, and AP-9003. DRO concentrations in AP-8211 have been above the cleanup level since sampling began; 2018 concentrations were 2,200 micrograms per liter (µg/L) and 22,900 µg/L for spring and fall, respectively. The highest DRO concentration ever observed in AP-8211 was in October 2014 at 30,000 µg/L. DRO concentrations in AP-9459 and AP-9003 did not exceed the cleanup level in 2018, for the seventh and fourth consecutive sampling events, respectively. The DRO concentration in AP-9684 has never exceeded the cleanup level. DRO concentrations for the four source area wells are shown on the Graph 3-1.

Graph 3-1 DRO in Source Area Wells



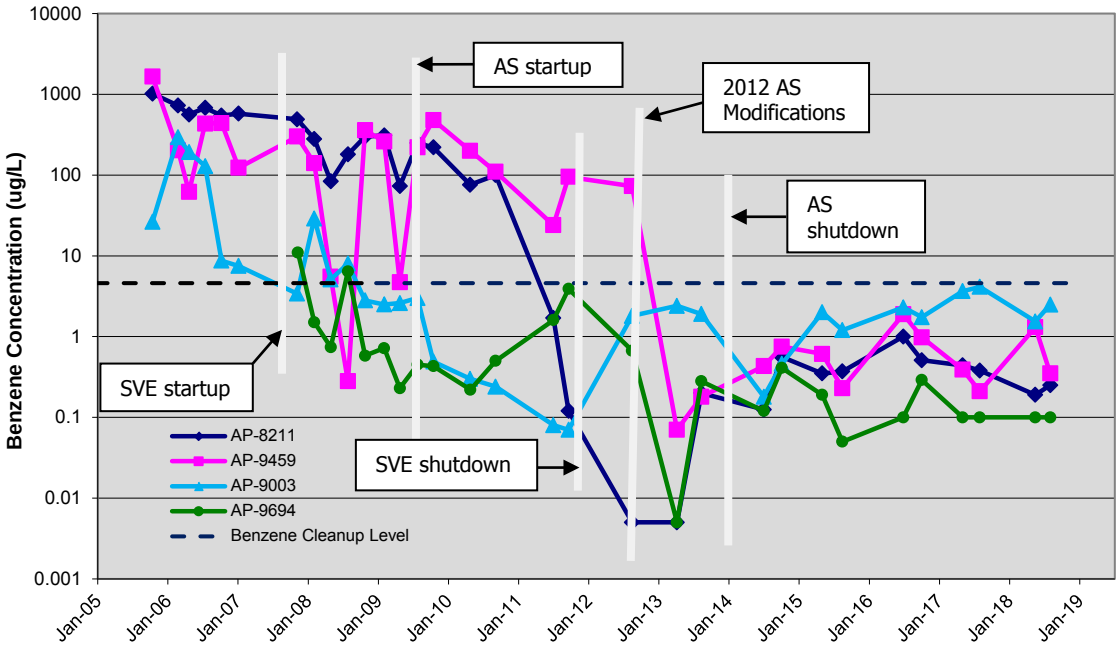
Overall, GRO concentrations have declined in all source area wells since sampling began, and all wells had GRO concentrations below the cleanup level in 2018. The GRO concentrations in the source wells show an overall decreasing trend and have been below the GRO cleanup level since 2011, as seen on Graph 3-2.

Graph 3-2 GRO in Source Area Wells



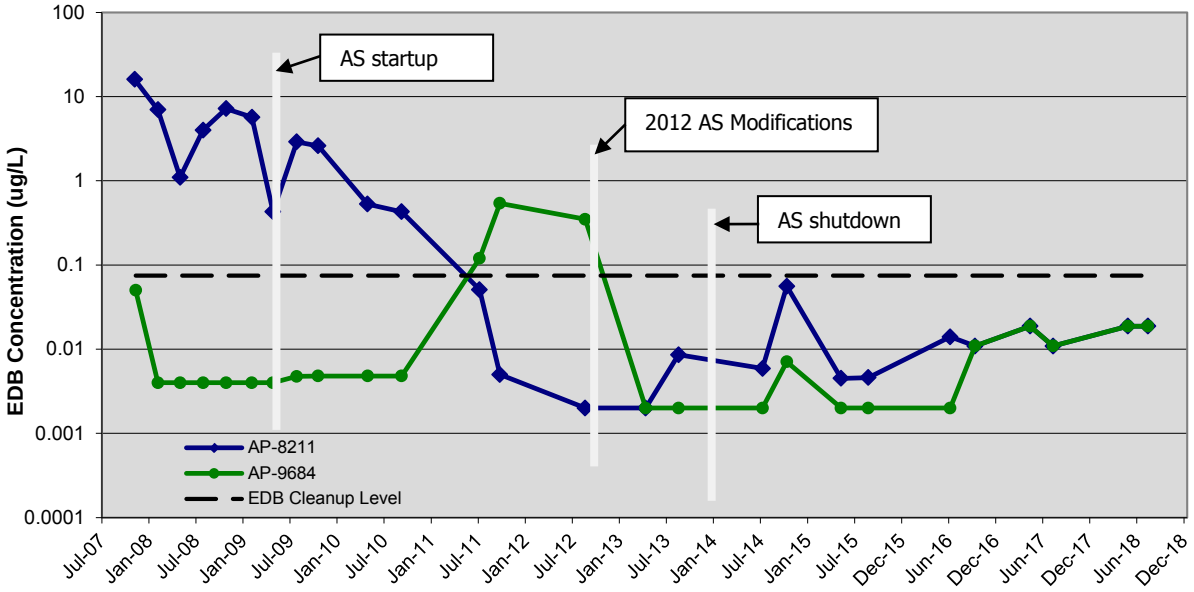
Benzene was not detected above the ADEC cleanup level in any well during 2018. The AS treatment system expansion in 2012 appears to have been successful in reducing the benzene contaminant concentrations. Benzene concentrations in the four source area wells are shown on the Graph 3-3.

Graph 3-3 Benzene in Source Area Wells



EDB was not detected in any well during both 2018 sampling events. EDB concentrations were last above the ADEC cleanup levels in September 2010 in AP-8211 and in August 2012 for well AP-9684. Graph 3-4 shows EDB concentrations in AP-8211 and AP-9684.

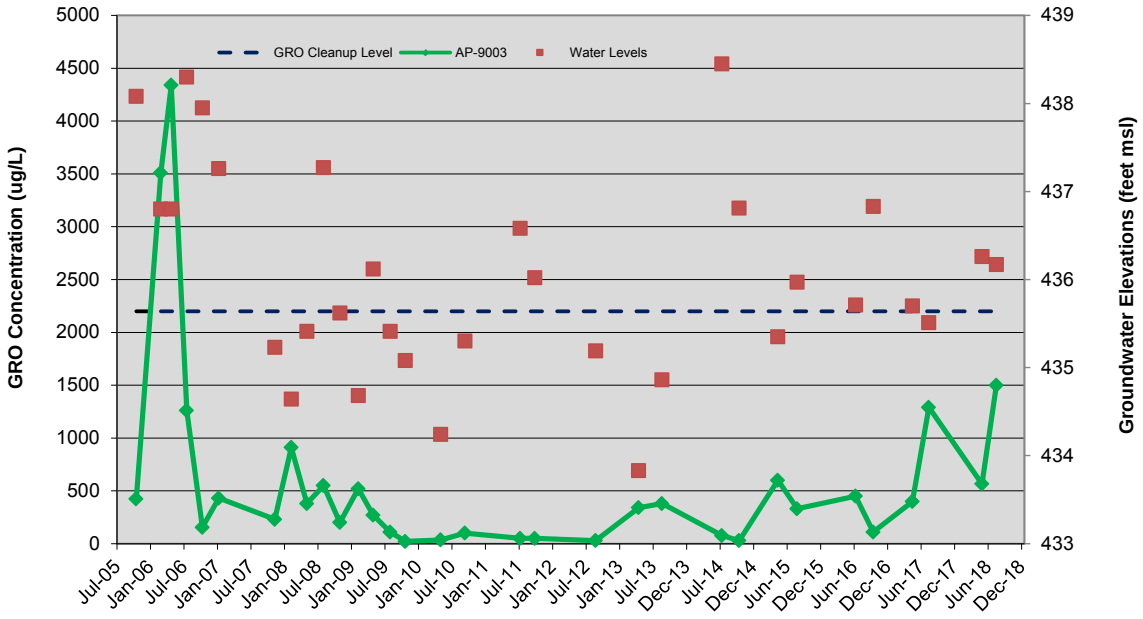
Graph 3-4 EDB in AP-8211 and AP-9684



Exceedances for additional fuel-related VOCs were observed in multiple wells in 2018, due to the newly promulgated in ADEC cleanup levels in 2016 and 2018. Table 3-2 presents the results.

An increase in volatile fuel constituents and GRO has been observed in monitoring well AP-9003 over the last few years. Graph 3-5 shows GRO concentrations and groundwater levels in AP-9003.

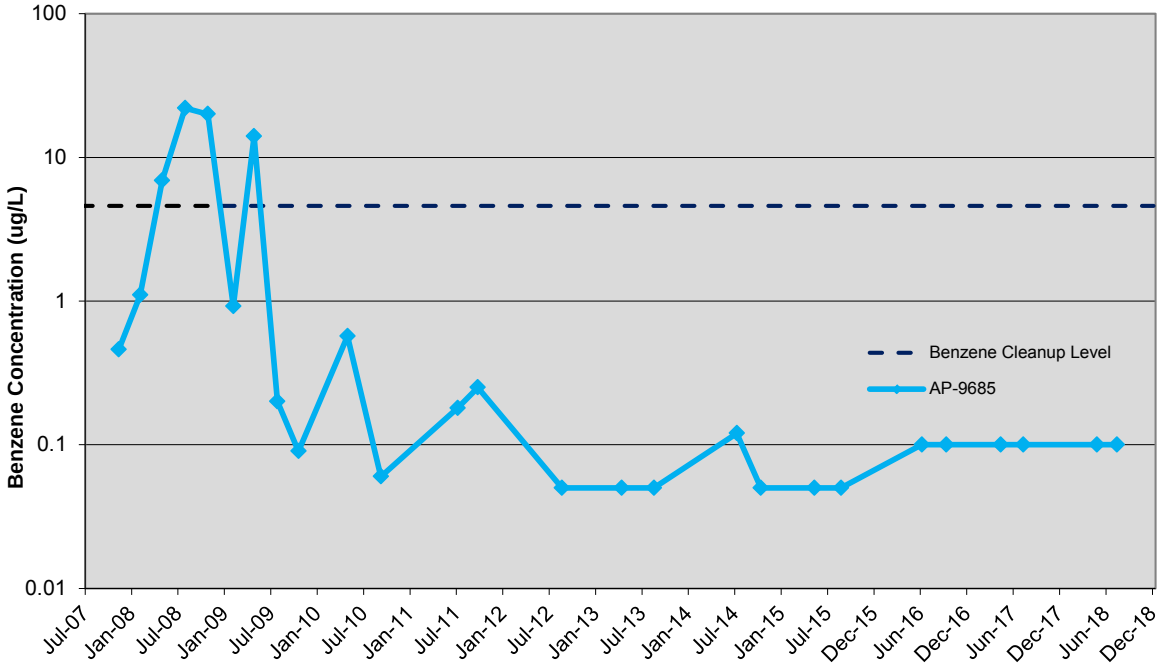
Graph 3-5 GRO and Groundwater Levels in AP-9003



3.2.2 Downgradient Well

The Neely Road site currently has only one downgradient well, AP-9685. This well was installed in November 2007 and is approximately 230 feet northwest of the treatment system connex. The benzene concentration in this well increased during each of the first four sampling events until concentrations began to decline during the November 2008 sampling event. Benzene concentrations have been below the cleanup level of 5 µg/L since July 2009 and benzene was not detected in this well during the 2018 events. Benzene concentrations in AP-9685 are shown on Graph 3-6.

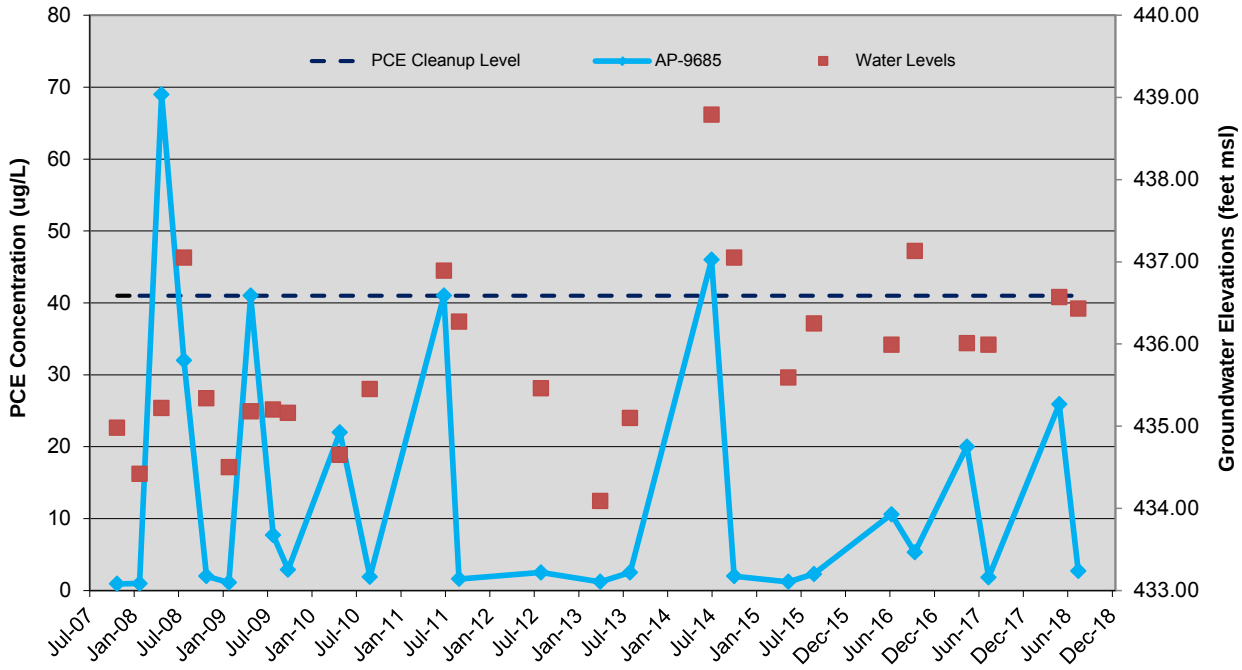
Graph 3-6 Benzene in AP-9685



During the preparation of the 2014 report, it was discovered that PCE exceeded the ADEC cleanup level in the downgradient well, AP-9685 (based on the 2008 ADEC cleanup levels). The PCE concentration in AP-9685 was 46 µg/L in July 2014, but dropped to 2.0 µg/L in October 2014. For the 2015 sampling events PCE concentrations were 1.2 µg/L and 2.3 µg/L, below the 2008 ADEC cleanup level of 5 µg/L. The PCE concentration in AP-9685 was below the current ADEC cleanup levels for sampling events in 2016, 2017 and 2018 based on the revised current ADEC cleanup level of 41 µg/L.

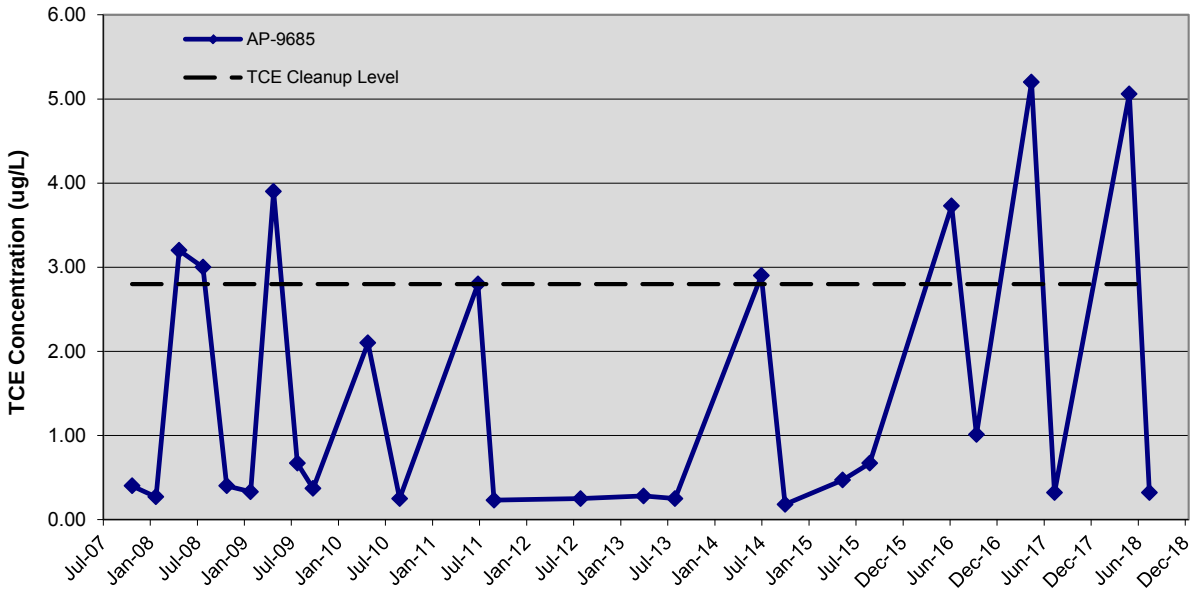
With the exception of AP-9685, PCE has only been detected in trace (below 1 µg/L) concentrations in groundwater samples collected from the Neely Road site. The Army is currently determining options for evaluation of the Building 3030, South Loading Dock-Neely Road area near well AP-9685. The scope of the investigation will be agreed upon by the Army and ADEC. Graph 3-7 displays the PCE concentration and groundwater elevations measured in AP-9685.

Graph 3-7 PCE and Groundwater Levels in AP-9685



In spring 2018, the PCE daughter product TCE was detected above the 2016 ADEC cleanup level (2.8 µg/L) with a concentration of 5.06 µg/L. In the fall 2018 sampling event, TCE was below the cleanup level at 0.32 µg/L. TCE, cis-1,2-dichloroethene (DCE), and trans-1,2-DCE have been detected periodically in AP-9685, and detected concentrations of these analytes correspond to sampling events with higher PCE concentrations. Graph 3-8 presents the historical TCE concentrations in AP-9685.

Graph 3-8 TCE Concentrations in AP-9685



3.3 Geochemical Parameter Monitoring

Geochemical parameter monitoring was performed concurrently with contaminant monitoring. In addition to collecting groundwater samples for contaminant analysis, samples were analyzed by the project laboratory for dissolved iron/manganese and sulfate. Relative changes in these geochemical indicators can provide an indirect measure of the biodegradation of petroleum hydrocarbons. A petroleum-contaminated area undergoing biodegradation would be expected to have more reduced conditions, such as elevated dissolved iron and manganese and lower sulfate concentrations, than non-contaminated areas. The AS portion of the treatment system was shut down in January 2014 to begin a contaminant rebound study. Groundwater geochemistry results at the Neely Road site are presented in Table 3-1. Additional observations regarding the geochemistry at the Neely Road site include:

- Elevated dissolved iron and manganese are evident in all source area wells, indicating iron and manganese reduction have occurred at the site. In well AP-9684, located on the northeast side of the treatment system, the dissolved iron concentration was the highest of all Neely Road wells at 10.7 milligrams per liter (mg/L) for the August sampling event. In downgradient well, AP-9685, dissolved iron was the lowest for the Neely site and was not detected in either event.

- Dissolved oxygen concentrations were generally stable across the site with the exception of an elevated concentration in AP-9685 at 5.07 mg/L in the August event. The cause of the elevated DO concentration is unknown. Low dissolved oxygen concentrations are indicative of an anaerobic environment.

- The sulfate concentrations were highest in AP-8211 at 198 mg/L in the August event. The lowest sulfate concentrations were in 35.5 mg/L in downgradient area well AP-9685, in the August event.

- The highest dissolved manganese concentration was observed in source area well, AP-8211 at 3.80 mg/L in the spring event. The lowest dissolved manganese concentration was observed in downgradient well, AP-9685 at 0.97 mg/L in the fall event.

- The September 2018 update of 18 AAC 75 (ADEC, 2018) included a groundwater cleanup level (Table C) of 430 µg/L for manganese. Background groundwater concentrations of manganese appear to be relatively high at Fort Wainwright, in part due to the naturally low dissolved oxygen concentration and slightly acidic groundwater which results in reduction and solubilization of manganese in soils. The presence of petroleum in groundwater further reduces dissolved oxygen creating an anaerobic environment that results in increasing dissolved manganese concentrations. Only one sample (August sample of downgradient well AP-9685) did not exceed the new ADEC cleanup level for manganese.

3.4 Groundwater Sample Data Quality

The Neely Road groundwater data were reviewed 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 Final 2018 Postwide Work Plan, updated Uniform Federal Policy for Quality Assurance Project Plans sheets (UFP-QAPP) (FES, 2018); Final Postwide UFP-QAPP; (FES, 2016); ADEC Data Quality Objectives, Checklists, Quality Assurance Requirements for Laboratory Data, and Sample Handling Technical Memo (ADEC, 2017); and Department of Defense (DoD) Quality Systems Manual for Environmental Laboratories (QSM), Version 5.1 (DoD, 2017).

Overall, the review process deemed the groundwater project data acceptable for use. Several results were qualified as estimates; however, data quality impact is minor and no data were rejected pursuant to FES's data quality review. 1,2,3-Trichloropropane in all samples analyzed by 8260C did not meet the applicable ADEC groundwater cleanup level listed in Title 18 of the Alaska Administrative Code (AAC), Chapter 75.345. This analyte may not be detected, if present, at the respective cleanup level. Impact to the project is not significant as this analyte is not a site COC.

All findings of the review are summarized in the CDQR and detailed in the associated ADEC Laboratory Data Review Checklists included in Appendix B. Table B-4 of the CDQR summarizes the qualified groundwater results associated with the spring and fall sampling events, including the associated sample numbers, analytes, and the reason for qualification. Analytical data presented in this report in tables were qualified based on those findings.

3.5 MAROS Evaluation

MAROS software was used to evaluate groundwater data from the Neely Road site for contaminant trends and the sufficiency of the current monitoring program. The Air Force Center for Engineering and the Environment (AFCEE) developed the MAROS software as a tool to evaluate groundwater data trend analysis and long-term monitoring optimization (AFCEE, 2006). The MAROS software utilizes site-specific inputs (e.g., groundwater monitoring data, hydrogeologic parameters, and well location information) to conduct a statistical analysis of the groundwater monitoring network. MAROS software is a tool that has been recommended for use in long-term monitoring optimization (EPA, 2005). The results of the 2018 MAROS software evaluation are summarized in this section. The complete results are presented in Appendix E.

3.5.1 MAROS Software Data Input and Assumptions

The site-specific data input for the MAROS software was taken from soil boring logs and 2018 groundwater monitoring results. Two parameters, used for inputs in the seepage velocity

calculator (hydraulic conductivity and total organic carbon), were taken from the Operable Unit 5 site (a similar site on Fort Wainwright, approximately one mile to the northwest) since these parameters had not been measured at Neely Road. Table 3-3 presents the input parameters used for the MAROS analysis.

Table 3-3 MAROS Software Input for Neely Road

Parameter	Value	Units
Current Plume Length	100[1]	Feet
Current Plume Width	60[1]	Feet
Seepage Velocity	503.4[2]	Feet/year
Groundwater Flow Direction	Northwest[1]	--
Porosity	0.33[3]	--
Aquifer Saturated Thickness	10[4]	Feet
Source Location	AP-8211	--
NAPL Present	No	--
Source Treatment	None	--

[1] Estimated using 2018 groundwater sampling results for DRO above the ADEC cleanup level

[2] Seepage velocity estimated using the EPA online calculator and hydraulic conductivity and fraction organic carbon from OU5, and hydraulic gradient from Neely Road https://www3.epa.gov/ceampubl/learn2model/part-two/onsite/seepage.html

[3] Estimated from soil type in the saturated zone identified in boring logs (gravelly Sand and fine-medium Sand)

[4] Screen lengths of monitoring wells

In addition to the input parameters listed in Table 3-3, several assumptions were made in order to complete the analysis. These assumptions were based on site characterization completed as part of the CAP as well as groundwater sampling results. The assumptions are as follows:

- Two time periods were used for analysis of the Neely Road data
  - Groundwater data from 2007 through 2013 were used to analyze trends during treatment system operation.
  - Groundwater results between 2014 and 2018 were used in the analysis after treatment system operation for the rebound evaluation.
- The limit of detection (LOD) was used in lieu of trace detections (detections between the detection limit [DL] and limit of quantitation [LOQ]) and non-detect (ND) results. This eliminated misleading trends in wells with intermittent trace detections.
- Groundwater sample results from the 2009 sampling event were used for AP-8213 and AP-9004 in the 2010 through 2018 events in order to have enough data to complete all components of the MAROS software analysis. These wells were decommissioned in 2010.
- The complete MAROS software analysis was conducted for 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, ethylbenzene, naphthalene, DRO, and GRO due to the widespread detections of these compounds at the site.

- Analysis for EDB, DCA, PCE, and TCE using the MAROS software was limited to trend analysis in individual monitoring wells. Plume analysis was not completed for DCA, EDB, PCE, or TCE due to the limited number of wells where detections have been observed. The minimum number of wells required for plume analysis within MAROS is six.

3.5.2 Contaminant Trend Results

Contaminant trends were evaluated in individual wells using the MAROS software. The MAROS software utilizes a nonparametric analysis (Mann-Kendall) and parametric analysis (linear regression) to determine contaminant trends. However, only the Mann-Kendall trend analysis was used since the concentration data trends in each well may or may not be linear. Contaminant trend results are summarized in Table 3-4.

The contaminant trends during treatment system operation (2007 and 2013) were primarily decreasing, and the concentrations of most of the contaminants were reduced below the cleanup level at the time the system was shut down in 2013. The only exceedances in the 2013 sampling event were for DRO in AP-8211 and AP-9459, ethylbenzene in AP-9003, 1,2,4-trimethylbenzene in AP-8211 and AP-9684, and naphthalene in AP-9003 and AP-9684. These results indicate the treatment system was effective at reducing contaminant concentrations in the source area at the Neely Road site.

Since the treatment system was shut down at the end of 2014, contaminant concentrations have generally remained below cleanup levels, and the concentration trends have been primarily characterized by stable trends and no trend, as shown in Table 3-4. The only contaminants that have significantly rebounded above cleanup levels are ethylbenzene and 1,3,5-trimethylbenzene in AP-8211, and ethylbenzene and naphthalene in AP-9003. Persistent exceedances of DRO, naphthalene, and 1,2,4-trimethylbenzene also remain in source area well AP-8211, and increasing trends of GRO, benzene, ethylbenzene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and naphthalene were observed in cross-gradient well AP-9003. These trends should continue to be evaluated in future sampling events.

However, contaminant concentrations have consistently remained below the cleanup level in downgradient well AP-9459, and there are no trends that indicate potential exceedances of the cleanup levels may occur in this well. In addition, contaminant concentrations were below cleanup levels in downgradient well AP-9684 in 2018, including 1,2,4-trimethylbenzene. A long-term decreasing trend for 1,2,4-trimethylbenzene is observed in this well, along with stable concentrations below cleanup levels for all other COC.

In addition to the fuel constituents detected in and around the source area, the solvents PCE and TCE have been detected above the cleanup level in AP-9685. This well is downgradient of the treatment system, but outside of the direct treatment system influence. PCE concentrations exhibit no trend, although the concentrations exhibit seasonality and are typically higher in the spring than the fall. However, the concentrations have remained below the ADEC cleanup level

since the July 2014 sampling event. TCE concentrations also exhibit no trend, but display similar seasonality as PCE. TCE has exceeded the cleanup level in at least one monitoring event since 2016, and have generally increased since 2014. Detections of TCE, along with cis-1,2-DCE and trans-1,2-DCE indicate reductive dechlorination of PCE may be occurring. However, the TCE concentration trend should continue to be evaluated following future monitoring events.

3.5.3 Plume Stability Results

The MAROS software performs several spatial moment analyses to evaluate the contaminant plume stability; zeroth moment (mass of plume based upon groundwater concentrations), 1st moment (location of COM); 2nd moment – Sigma XX (plume spread in the X direction, in the direction of groundwater flow), and 2nd moment – Sigma YY (plume spread in the Y direction, perpendicular to the direction of groundwater flow).

The MAROS software plume analysis was completed for the fuel constituents DRO, GRO, benzene, ethylbenzene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and naphthalene, since EDB, DCA, PCE, and TCE have been infrequently detected in only a few wells. The period of analysis for the plume evaluation was 2014 through 2018 to represent the conditions since treatment system shutdown. A summary of the spatial moment analysis results is presented in Table 3-5.

Table 3-5 Neely Road Spatial Moment Analysis Summary[1]

Constituent	Dissolved Mass (Zeroth Moment)	Distance from Source to COM (First Moment)	Plume Spread about the COM (Second Moment)
DRO	Probably Increasing	Stable	X – Stable Y – Stable
GRO	Probably Increasing	Stable	X – No Trend Y – No Trend
Benzene	Increasing	Stable	X – No Trend Y – Stable
Ethylbenzene	Increasing	No Trend	X – No Trend Y – No Trend
1,2,4-Trimethylbenzene	Probably Increasing	No Trend	X – No Trend Y –No Trend
1,3,5-Trimethylbenzene	No Trend	Stable	X – Stable Y –Stable
Naphthalene	Increasing	No Trend	X – No Trend Y – No Trend

[1] Spatial moment analysis based on sampling results between 2014 and 2018
[2] X indicates the direction of groundwater flow; Y indicated the direction perpendicular to groundwater flow
GW - groundwater

The zeroth moment (dissolved mass) results are summarized as follows:

- The dissolved mass trends for all fuel constituents except 1,3,5-trimethylbenzene were increasing or probably increasing. These results are consistent with contaminant concentration trends in the source area wells.
- These results indicate some contaminant rebound has occurred since treatment system shutdown. However, the rebound was limited to source area wells.

The results from the first moment analysis (trend of the distance from the source to the center of mass) showed:

- Contaminant plumes are stable or exhibit no trend.
- Although the contaminant mass has increased, the location of the center of mass relative to the source has remained stable. This is consistent with the concentration changes observed in source area wells.

The contaminant plume spread trend (second moment) analysis had the following results:

- Plume spread was stable or exhibited no trend.
- Although contaminant mass has increased, the contaminant plumes do not appear to be expanding. These results are consistent with the concentrations observed in downgradient well AP-9459, and the first moment analysis results.

3.5.4 Monitoring Well Network and Sampling Frequency Evaluation

The sampling location optimization results showed that none of the wells were recommended for elimination from the monitoring well network. The well network for the analysis included AP-8213 and AP-9004, which have not been sampled since 2009 and were decommissioned in 2010. These wells were included in order to provide a sufficient number of wells to complete the analysis. The contaminant plumes were generally characterized by small and moderate levels of uncertainty. The only contaminant with large uncertainty throughout the plume was benzene. However, benzene concentrations remain below cleanup levels across the site, and no additional wells are recommended at this time.

The sampling frequency results showed that all wells were recommended for annual or biennial sampling, with the exception of AP-9003. More frequent sampling was recommended in this well due to the change in concentration relative to the cleanup level for ethylbenzene and naphthalene. The current sampling frequency for the Neely Road site is semiannual, and semiannual sampling is recommended due to the increasing trends in AP-9003 and the continued evaluation of solvent detections in AP-9685.

3.6 Investigation Derived Waste

Investigation-derived waste (IDW) generated during field activities in 2018 included purge water and general refuse (disposable tubing, nitrile gloves, etc.) from groundwater monitoring activities. All IDW and other waste streams were managed according to the procedures outlined in the updated UFP-QAPP sheets (FES, 2018).

Purge water was containerized at the time of sampling in 15-gallon polyethylene drums. The drums were labeled with a unique ID and a form was completed documenting the ID and purge volume from each well. The drums were taken to the Fort Wainwright Defense Environmental Restoration Account (DERA) building for temporary storage. The purge water was characterized using the results from individual wells and a separate toxicity characteristic leaching procedure (TCLP) analysis, and disposed of as petroleum water by National Response Corporation (NRC) Alaska at their facility in Anchorage, Alaska. The disposal was conducted in accordance with their permit with the Anchorage Water and Wastewater Utility. The work was completed as part of a separate task in the scope of work for the Fort Wainwright contract, and copies of the manifest and sampling results will be included the 2018 IDW Technical Memorandum (anticipated in spring 2019).

The purge water from well AP-9685 was disposed of as Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) waste. Purge water from this well was segregated from purge water collected from other wells at the site and disposed of in accordance with the CERCLA offsite rule (OSR). The drums of purge water were provided to Environmental Compliance Consultants (ECC – the Fort Wainwright waste disposal contractor). The complete documentation of the CERCLA waste disposal will be provided in the 2018 IDW Technical Memorandum (anticipated in spring 2019).

Table 3-1 - Geochemical and Field Parameters in Groundwater Samples
Neely Road AS/SVE Treatment System

Location	Sample Date	Sample Number	TOC Elevation (feet)	Water Level (btoc)	Groundwater Elevation (feet)	Dissolved Oxygen (mg/L)	Dissolved Iron[1] (mg/L)	Dissolved Manganese[1] (mg/L)	Sulfate[1] (mg/L)
					ADEC Cleanup Levels Table C[3]:		NE	0.43	NE
AP-8211	4/15/13	13FWNR03WG	453.43	19.61	433.82	4.82	0.51	0.32	301.0
	4/15/13	13FWNR04WG[2]	453.43	19.61	433.82	4.82	0.49	0.31	302.0
	8/20/13	13FWNR11WG	453.43	18.00	435.43	0.12	22.70	**2.77**	302.0
	8/20/13	13FWNR12WG[2]	453.43	18.00	435.43	0.12	22.40	**2.76**	308.0
	7/11/14	14FWNR02WG	453.43	14.43	439.00	0.20	9.26	**2.22**	91.3
	7/11/14	14FWNR03WG[2]	453.43	14.43	439.00	0.20	9.21	**2.19**	92.1
	10/13/14	14FWNR09WG	453.43	16.06	437.37	0.37	49.80	**10.40**	265.0
	10/13/14	14FWNR10WG[2]	453.43	16.06	437.37	0.37	49.80	**10.40**	265.0
	5/11/15	15FWNR04WG	453.43	17.55	435.88	0.24	13.40	**7.25**	155.0
	5/11/15	15FWNR05WG[2]	453.43	17.55	435.88	0.24	13.20	**7.23**	167.0
	8/24/15	15FWNR10WG	453.43	16.85	436.58	0.25	10.90	**6.51**	132.0
	8/24/15	15FWNR11WG[2]	453.43	16.85	436.58	0.25	11.30	**6.62**	125.0
	7/6/16	16FWNR02WG	453.43	17.18	436.25	0.41	10.50	**6.43**	175.0
	7/6/16	16FWNR03WG[2]	453.43	17.18	436.25	0.41	11.00	**7.11**	180.0
	10/10/16	16FWNR11WG	453.43	16.02	437.41	0.59	10.10 J	**8.50**	295.0
	10/10/16	16FWNR12WG[2]	453.43	16.02	437.41	0.59	14.10 J	**8.88**	299.0
	5/11/17	17FWNR05WG	453.43	17.20	436.23	8.11	3.72	**6.24**	176.0
	8/8/17	17FWNR09WG	453.43	17.40	436.03	0.55	7.54	**5.78**	139.0
	5/24/18	18FWNR05WG	453.43	16.64	436.79	0.96	6.41	**3.80**	57.0
	8/10/18	18FWNR11WG	453.43	16.71	436.72	0.94	10.10	**3.40**	198.0
AP-9459	4/15/13	13FWNR02WG	452.47	18.35	434.12	0.11	2.71	**1.42**	723.0
	8/20/13	13FWNR14WG	452.47	17.14	435.33	0.18	3.89	**2.01**	512.0
	7/11/14	14FWNR01WG	452.47	13.55	438.92	0.20	4.26	**5.23**	99.3
	10/13/14	14FWNR12WG	452.47	15.24	437.23	0.38	6.40	**6.68**	154.0
	5/11/15	15FWNR02WG	452.47	16.68	435.79	0.52	5.46	**5.98**	63.4
	8/24/15	15FWNR08WG	452.47	15.98	436.49	0.21	3.61	**3.98**	48.3
	7/6/16	16FWNR04WG	452.47	16.31	436.16	0.28	3.96	**4.54**	45.0
	10/10/16	16FWNR09WG	452.47	15.18	437.29	0.29	3.81	**3.15**	33.0
	5/11/17	17FWNR01WG	452.47	16.29	436.18	0.42	2.78	**3.24**	34.3
	5/11/17	17FWNR02WG[2]	452.47	16.29	436.18	0.42	2.87	**3.18**	33.9
	8/8/17	17FWNR11WG	452.47	16.57	435.90	0.06	3.13	**3.31**	38.0
	8/8/17	17FWNR12WG[2]	452.47	16.57	435.90	0.06	3.11	**3.30**	39.0
	5/24/18	18FWNR03WG	452.47	15.71	436.76	0.82	4.25	**3.60**	31.8
	5/24/18	18FWNR04WG[2]	452.47	15.71	436.76	0.82	4.23	**3.62**	32.4
	8/10/18	18FWNR09WG	452.47	15.86	436.61	0.35	4.04	**3.12**	36.2
	8/10/18	18FWNR10WG[2]	452.47	15.86	436.61	0.35	3.95	**3.01**	36.1
AP-9003	4/15/13	13FWNR06WG	454.06	20.23	433.83	0.78	3.26	**1.44**	154.0
	8/20/13	13FWNR13WG	454.06	19.20	434.86	1.13	3.58	**1.08**	157.0
	7/11/14	14FWNR04WG	454.06	15.61	438.45	0.26	3.76	**0.94**	49.5
	10/13/14	14FWNR11WG	454.06	17.25	436.81	0.39	0.03	**0.53**	203.0
	5/11/15	15FWNR03WG	454.06	18.71	435.35	0.55	4.93	**3.61**	130.0
	8/24/15	15FWNR09WG	454.06	18.09	435.97	0.50	4.25	**2.26**	101.0
	7/6/16	16FWNR05WG	454.06	18.35	435.71	0.49	5.51	**3.59**	97.9
	10/10/16	16FWNR10WG	454.06	17.23	436.83	0.21	0.91	**2.86**	135.0
	5/11/17	17FWNR06WG	454.06	18.36	435.70	0.45	6.32	**4.34**	104.0
	8/8/17	17FWNR10WG	454.06	18.55	435.51	0.7	7.66	**4.76**	96.7
	5/24/18	18FWNR06WG	454.06	17.80	436.26	1.16	6.86	**3.04**	56.5
	8/10/18	18FWNR12WG	454.06	17.89	436.17	0.96	6.79	**3.40**	83.2
AP-9685	4/15/13	13FWNR01WG	449.39	15.30	434.09	0.38	0.38	**1.01**	66.0
	8/20/13	13FWNR09WG	449.39	14.29	435.10	2.07	0.0053 J	0.05	24.3
	7/11/14	14FWNR06WG	449.39	10.60	438.79	0.32	0.28	**1.25**	33.7
	10/13/14	14FWNR07WG	449.39	12.34	437.05	5.96	ND(0.01)	0.01	58.5
	5/11/15	15FWNR06WG	449.39	13.80	435.59	0.48	0.03	0.38	35.4
	8/24/15	15FWNR13WG	449.39	13.14	436.25	0.65	0.02	0.19	32.6
	7/6/16	16FWNR06WG	449.39	13.40	435.99	0.36	1.35	**1.72**	48.3
	10/10/16	16FWNR13WG	449.39	12.26	437.13	0.35	0.25	0.02	37.6
	5/11/17	17FWNR03WG	449.39	13.38	436.01	0.51	0.21	**1.06**	45.1
	8/8/17	17FWNR14WG	449.39	13.40	435.99	3.42	ND(0.25)	0.07	31.2
	5/24/18	18FWNR01WG	449.39	12.82	436.57	0.83	ND(0.25)	**1.18**	36.3
	8/10/18	18FWNR07WG	449.39	12.96	436.43	5.07	ND(0.25)	0.0097	35.5
AP-9684	4/15/13	13FWNR05WG	453.65	19.42	434.23	0.35	6.53	**1.47**	128.0
	8/20/13	13FWNR10WG	453.65	18.26	435.39	0.29	12.40	**2.31**	206.0
	7/11/14	14FWNR01WG	453.65	14.64	439.01	0.58	6.45	**1.72**	38.0
	10/13/14	14FWNR08WG	453.65	16.31	437.34	0.56	6.14	**1.49**	128.0
	5/11/15	15FWNR01WG	453.65	17.77	435.88	0.55	13.20	**2.32**	83.6
	8/24/15	15FWNR12WG	453.65	17.08	436.57	0.17	11.80	**2.21**	52.1
	7/6/16	16FWNR01WG	453.65	17.41	436.24	0.29	9.01	**2.06**	53.7
	10/10/16	16FWNR08WG	453.65	16.27	437.38	0.29	5.76	**1.97**	115.0
	5/11/17	17FWNR04WG	453.65	17.46	436.19	0.15	10.10	**2.37**	69.3
	8/8/17	17FWNR13WG	453.65	17.65	436.00	0.25	8.92	**2.54**	75.1
	5/24/18	18FWNR02WG	453.65	16.83	436.82	0.58	7.32	**1.94**	60.3
	8/10/18	18FWNR08WG	453.65	16.96	436.69	0.58	10.70	**2.24**	73.9

Notes:

Yellow highlighted and bold results exceed current ADEC groundwater cleanup levels

[1] Prior to 2011, iron, manganese, and sulfate samples were analyzed employing an Orion field-screening instrument. As such, non-detect results are reported to be less than the instrument detection limit.

[2] Sample is a field duplicate of the sample immediately above.

[3] Cleanup level established from 2018 ADEC Title 18, Alaska Administrative Code, Section 75.345, Table C

B - Analyte was detected in a blank at a similar concentration and may be due to cross contamination

ND - not detected at the LOQ (data prior to 2012); not detected at the LOD (2012 and later results)

J - Analyte is reported between the detection limit and LOQ

btoc - below top of casing

NE - not established

NM - not measured

LOD - limit of detection

LOQ - limit of quantitation

mg/L - milligrams per Liter

TOC - top of casing

Note that the exceedances are based on the current ADEC cleanup level and not necessarily the cleanup level in place at the time of sampling.

Table 3-2 - Contaminant Concentrations Detected in Groundwater Samples
Neely Road AS/SVE Treatment System

Location	Sample Date	Sample Number	TOC Elevation (feet)	Water Level (feet btoc)	Groundwater Elevation (feet)	Vinyl Chloride (µg/L)	TCE (µg/L)	PCE (µg/L)	1,1-DCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	DRO (µg/L)	GRO (µg/L)	Naphthalene (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	1,2,4-TMB (µg/L)	1,3,5-TMB (µg/L)	1,1,2-Trichloroethane (µg/L)	1,2-DCA (µg/L)	EDB (µg/L)
ADEC Cleanup Levels Table C[1]:						**0.19**	**2.8**	**41**	**280**	**36**	**360**	**1,500**	**2,200**	**1.7**	**4.6**	**1,100**	**15**	**190**	**56**	**60**	**0.41**	**1.7**	**0.075**
AP-8211	04/15/13	13FWNR03WG	453.43	19.61	433.82	ND(0.1)	ND(0.1)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	**1,600**	460	**22**	ND(0.1)	0.11 J	2.1	13	**92 Q**	37	ND(0.4)	ND(0.15)	ND(0.004)
	04/15/13	13FWNR04WG[2]	453.43	19.61	433.82	ND(0.1)	ND(0.1)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	**1,500**	490	**23**	ND(0.1)	0.12 J	2.3	13	**140 Q**	45	ND(0.4)	ND(0.15)	ND(0.004)
	08/20/13	13FWNR11WG	453.43	18.00	435.43	ND(0.1)	ND(0.1)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	**18,000 Q**	850	**94 QH**	0.2 J	1.50	3.4	102	**470**	**160**	ND(0.4)	ND(0.15)	0.0082 J
	08/20/13	13FWNR12WG[2]	453.43	18.00	435.43	ND(0.1)	ND(0.1)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	**16,000 Q**	740	**98 QH**	0.19 J	1.30	3.4	95	**470**	**160**	ND(0.4)	ND(0.15)	0.0086 J
	07/11/14	14FWNR02WG	453.43	14.43	439.00	ND(0.25)	ND(0.25)	ND(0.5)	ND(0.2)	ND(0.5)	ND(0.5)	**7,700**	1,300	**190 QL**	ND(0.25)	1.40	11 J	131 J	**670 J**	**160**	ND(1)	ND(0.38)	0.0059 J
	07/11/14	14FWNR03WG[2]	453.43	14.43	439.00	ND(0.25)	ND(0.25)	ND(0.5)	ND(0.2)	ND(0.5)	ND(0.5)	**8,500**	1,200	**190 QL**	ND(0.25)	1.3 J	10	131 J	**660**	**160**	ND(1)	ND(0.38)	0.0056 J
	10/13/14	14FWNR09WG	453.43	16.06	437.37	ND(0.1)	ND(0.1)	ND(0.2)	ND(0.2)	ND(0.1)	ND(0.2)	**30,000**	390	**50**	0.56	2.90	1.6	45	**120**	56	ND(0.4)	0.11 J	0.056
	10/13/14	14FWNR10WG[2]	453.43	16.06	437.37	ND(0.1)	ND(0.1)	ND(0.2)	ND(0.2)	ND(0.1)	ND(0.2)	**27,000**	400	**50**	0.55	2.90	1.6	45	**130**	55	ND(0.4)	0.13 J	0.051
	05/11/15	15FWNR04WG	453.43	17.55	435.88	ND(0.1)	ND(0.1)	0.11 J	ND(0.2)	0.07 J	ND(0.2)	**12,000**	950	**69**	0.42 J	0.74	**20 J**	96.6 J	**250**	57 J	ND(0.4)	ND(0.15)	0.0045 J
	05/11/15	15FWNR05WG[2]	453.43	17.55	435.88	ND(0.1)	ND(0.1)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	**9,600**	950	**74**	0.35 J	0.77	**18**	93	**270**	57	ND(0.4)	ND(0.15)	ND(0.004)
	08/24/15	15FWNR10WG	453.43	16.85	436.58	ND(0.1)	ND(0.1)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	**9,600**	960	**79 QL**	0.37J,MH,QL	0.75 MH,QL	**34 QL**	132.2 MH,QL	**340 QL**	48 J,QL	ND(0.4) QL	ND(0.15) QL	0.0041 J
	08/24/15	15FWNR11WG[2]	453.43	16.85	436.58	ND(0.1)	ND(0.1)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	**11,000**	990	**99 QL**	0.37J,MH,QL	0.99 MH,QL	**32 QL**	132.0 MH,QL	**340 QL**	46 QL	ND(0.4) QL	ND(0.15) QL	0.0046 J
	07/06/16	16FWNR02WG	453.43	17.18	436.25	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	**10,800**	1,340 J+	**138**	ND(2)	ND(5)	**22.8 J**	**234 J**	**449 J**	**75.5 J**	ND(5)	ND(2.5)	0.014 J-
	07/06/16	16FWNR03WG[2]	453.43	17.18	436.25	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	**12,000**	1,580 J+	**184**	ND(2)	ND(5)	**31.1 J**	**327 J**	**640 J**	**112 J**	ND(5)	1.5 J	0.014 J-
	10/10/16	16FWNR11WG	453.43	16.02	437.41	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	**17,800 J**	383	**39.4**	0.46 B,J+	2.31 B	1.62 J	46.0	**58.9 J**	33.0	ND(0.5)	ND(0.25)	ND(0.0218)[3]
	10/10/16	16FWNR12WG[2]	453.43	16.02	437.41	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	**12,200 J**	445	**46.9**	0.51 B	2.33 B	2.66 J	57.1	**81.8 J**	36.9	ND(0.5)	ND(0.25)	ND(0.022)[3]
	05/11/17	17FWNR05WG	453.43	17.20	436.23	ND(0.075)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	**4,520**	1,040	**121**	0.44	1.84 B	**18.2**	115.0	**412**	**145**	ND(0.2)	ND(0.25)	ND(0.0375)
	08/08/17	17FWNR09WG	453.43	17.40	436.03	ND(0.075)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	**6,220**	1,270	**135**	0.38 J	2.1	**16.2**	120	**524**	**150**	ND(0.2)	ND(0.25)	ND(0.0218)
	05/24/18	18FWNR05WG	453.43	16.64	436.79	ND(0.075)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	**2,200**	1,540	**121**	0.19 J	1.02 B	**22.6**	114.0	**389**	**101**	ND(0.2)	ND(0.25)	ND(0.0375)
	08/10/18	18FWNR11WG	453.43	16.71	436.72	ND(0.075)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	**22,900**	749	**100**	0.25	1.97 B	10.1	81.5	**319**	**105**	ND(0.2)	ND(0.25)	ND(0.0375)
AP-9459	04/15/13	13FWNR02WG	452.47	18.35	434.12	ND(0.1)	0.11 J,MH	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	1,300	180	0.49 J	0.070 J	0.11 J	0.55	5.8 MH	18	3.90	ND(0.4)	ND(0.15)	ND(0.004)
	08/20/13	13FWNR14WG	452.47	17.14	435.33	ND(0.1)	ND(0.1)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	**1,800 ML,Q**	150 B	1.3 J,MH,QH	0.18 J,MH	0.49 J	0.42 J	1.53 MH	10 J,MH	1.7 J,MH	ND(0.4)	ND(0.15)	ND(0.004)
	07/11/14	14FWNR01WG	452.47	13.55	438.92	ND(0.1)	ND(0.1)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	640 J	120	0.47 J,QL	0.43 J	0.69	0.19 J	0.47 J	2.70	0.25 J	ND(0.4)	ND(0.15)	ND(0.004)
	10/13/14	14FWNR12WG	452.47	15.24	437.23	ND(0.1)	ND(0.1)	ND(0.2)	ND(0.2)	ND(0.1)	ND(0.2)	**1,700**	130	1.4 J	0.75	0.10 J	0.25 J	0.7 J	8.70	7.90	ND(0.4)	0.08 J	ND(0.004)
	05/11/15	15FWNR02WG	452.47	16.68	435.79	ND(0.1)	ND(0.1)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	**2,100**	150	0.59 J,B	0.61	0.11 J	0.27 J	0.26 J	1.6 J	2.60	ND(0.4)	ND(0.15)	ND(0.004)
	08/24/15	15FWNR08WG	452.47	15.98	436.49	ND(0.1)	ND(0.1)	ND(0.2)	ND(0.2)	0.07 J	ND(0.2)	600 J	160	0.44 J,B,QL	0.23 J	0.2 J	0.13 J	0.19 J	2.5	3.60	ND(0.4)	ND(0.15)	ND(0.004)
	07/06/16	16FWNR04WG	452.47	16.31	436.16	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	973	146	ND(5)	1.89	ND(0.5)	ND(0.5)	ND(1.5)	3.01	3.88	ND(0.5)	0.24 J,B	ND(0.004)
	10/10/16	16FWNR09WG	452.47	15.18	437.29	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	1,000	152 B	ND(5)	0.98	ND(0.5)	0.32 J	ND(1.5)	6.46	5.82	ND(0.5)	ND(0.25)	ND(0.022)[3]
	05/11/17	17FWNR01WG	452.47	16.29	436.18	ND(0.075)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	339 J,B	109	0.5 J,B	0.27 J	0.46 J,B	ND(0.5)	ND(1.5)	1.91	2.64	**1.53 J**	ND(0.25)	ND(0.0375)
	05/11/17	17FWNR02WG[2]	452.47	16.29	436.18	ND(0.075)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	442 J,B	130	ND(0.5)	0.39 J	0.63 J,B	ND(0.5)	ND(1.5)	1.9	2.6	ND(0.2)	ND(0.25)	ND(0.0375)
	08/08/17	17FWNR11WG	452.47	16.57	435.90	ND(0.075)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	443 J	148	ND(0.5)	0.21 J	ND(0.5)	0.35 J	ND(1.5)	3.12	3.61	ND(0.2)	ND(0.25)	ND(0.0222)
	08/08/17	17FWNR12WG[2]	452.47	16.57	435.90	ND(0.075)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	518 J	118	ND(0.5)	0.2 J	ND(0.5)	ND(0.5)	ND(1.5)	3.05	3.45	ND(0.2)	ND(0.25)	ND(0.022)
	05/24/18	18FWNR03WG	452.47	15.71	436.76	ND(0.075)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	559 J,B	362 J	ND(0.5)	1.39	ND(0.5)	ND(0.5)	ND(1.5)	1.80	2.36	ND(0.2)	ND(0.25)	ND(0.0375)
	05/24/18	18FWNR04WG[2]	452.47	15.71	436.76	ND(0.075)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	555 J,B	139 J	ND(0.5)	1.31	ND(0.5)	ND(0.5)	ND(1.5)	1.61	2.23	ND(0.2)	ND(0.25)	ND(0.0375)
	08/10/18	18FWNR09WG	452.47	15.86	436.61	ND(0.075)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	347 J	ND(50)	0.53 J	0.35 J	ND(0.5)	ND(0.5)	ND(1.5)	2.16	2.99	ND(0.2)	ND(0.25)	ND(0.0375)
	08/10/18	18FWNR10WG[2]	452.47	15.86	436.61	ND(0.075)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	375 J	ND(50)	0.58 J	0.35 J	ND(0.5)	ND(0.5)	ND(1.5)	2.25	3.03	ND(0.2)	ND(0.25)	ND(0.0375)
AP-9003	04/15/13	13FWNR06WG	454.06	20.23	433.83	ND(0.1)	ND(0.1)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	530 J	340	0.16 J	2.4	0.67	**28**	7.2	2.10	0.29 J	ND(0.4)	ND(0.15)	ND(0.004)
	08/20/13	13FWNR13WG	454.06	19.2	434.86	ND(0.1)	ND(0.1)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	660 J,Q	380	**13 QH**	1.9	0.93	1.6	1.8	4.60	ND(0.2)	ND(0.4)	ND(0.15)	0.0044 J
	07/11/14	14FWNR04WG	454.06	15.61	438.45	ND(0.1)	ND(0.1)	ND(0.2)	ND(0.2)	0.070 J	ND(0.2)	150 J	77 J	ND(0.3) QL	0.18 J	0.61	0.090 J	0.42 J	0.41 J	ND(0.2)	ND(0.4)	ND(0.15)	ND(0.004)
	10/13/14	14FWNR11WG	454.06	17.25	436.81	ND(0.1)	ND(0.1)	ND(0.2)	ND(0.2)	0.090 J	ND(0.2)	**2,000**	29 J	0.10 J	0.46 J	0.14 J	ND(0.1)	0.78 J	1.1 J	0.36 J	ND(0.4)	ND(0.15)	ND(0.004)
	05/11/15	15FWNR03WG	454.06	18.71	435.35	ND(0.1)	ND(0.1)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	1,400	600	0.88 J,B	2	1.80	**30**	11.8	12	2.0 J	ND(0.4)	ND(0.15)	ND(0.004)
	08/24/15	15FWNR09WG	454.06	18.09	435.97	ND(0.1)	ND(0.1)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	770 J	330	**4.5**	1.2	1.4	8.1	2.7	2.6	0.6 J	ND(0.4)	0.09	ND(0.004)
	07/06/16	16FWNR05WG	454.06	18.35	435.71	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	834 B	450 J+	ND(5)	2.3	4.06 B	**67.9**	60.4	9.02	0.73 J	ND(0.5)	ND(0.25)	ND(0.004)
	10/10/16	16FWNR10WG	454.06	17.23	436.83	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	**1,700**	110 B	ND(5)	1.74	0.43 J,B	1.00	ND(1.5)	0.77 J	ND(0.5)	ND(0.5)	ND(0.25)	ND(0.0218)[3]
	05/11/17	17FWNR06WG	454.06	18.36	435.70	ND(0.075)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	831 B	398	**21.9**	3.65	2.64	**57.4**	22.7	21.6	3.72	ND(0.2)	ND(0.25)	ND(0.0218)
	08/08/17	17FWNR10WG	454.06	18.55	435.51	ND(0.075)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	902	1,290 J+	**43**	4.13	6.11	**181**	110	14.3	10.9	ND(0.2)	ND(0.25)	ND(0.0217)
	05/24/18	18FWNR06WG	454.06	17.80	436.26	ND(0.075)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	652 B	565	**5.15**	1.54	1.69 B	**78**	7.2	2.19	ND(0.5)	ND(0.2)	ND(0.25)	ND(0.0375)
	08/10/18	18FWNR12WG	454.06	17.89	436.17	ND(0.075)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	1,020	1,500 J+	**42.4**	2.49	4.54	**144**	59.7	27.8	11	ND(0.2)	ND(0.25)	ND(0.0375)

Table 3-2 - Contaminant Concentrations Detected in Groundwater Samples
Neely Road AS/SVE Treatment System

Location	Sample Date	Sample Number	TOC Elevation (feet)	Water Level (feet btoc)	Groundwater Elevation (feet)	Vinyl Chloride (µg/L)	TCE (µg/L)	PCE (µg/L)	1,1-DCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	DRO (µg/L)	GRO (µg/L)	Naphthalene (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	1,2,4-TMB (µg/L)	1,3,5-TMB (µg/L)	1,1,2-Trichloroethane (µg/L)	1,2-DCA (µg/L)	EDB (µg/L)
ADEC Cleanup Levels Table C[1]:						**0.19**	**2.8**	**41**	**280**	**36**	**360**	**1,500**	**2,200**	**1.7**	**4.6**	**1,100**	**15**	**190**	**56**	**60**	**0.41**	**1.7**	**0.075**
AP-9685	04/15/13	13FWNR01WG	449.39	15.3	434.09	ND(0.1)	0.28 J	1.2	ND(0.2)	0.19 J	ND(0.2)	110 J,B	18 J	ND(0.3)	ND(0.1)	0.18 J	ND(0.1)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.4)	ND(0.15)	ND(0.004)
	08/20/13	13FWNR09WG	449.39	14.29	435.10	ND(0.1)	0.25 J	2.5	ND(0.2)	0.14 J	ND(0.2)	64 J,Q	ND(25)	0.090 J,B,QH	ND(0.1)	0.36 J	0.06 J	0.29	ND(0.2)	ND(0.2)	ND(0.4)	ND(0.15)	ND(0.004)
	07/11/14	14FWNR06WG	449.39	10.6	438.79	ND(0.1)	**2.9**	**46**	ND(0.2)	1.3	3.1	130 J	20 J	ND(0.3)	0.12 J	0.70	0.050 J	0.20 J	0.14 J	ND(0.2)	ND(0.4)	0.080 J	ND(0.004)
	10/13/14	14FWNR07WG	449.39	12.34	437.05	ND(0.1)	0.18 J	2.0	ND(0.2)	ND(0.1)	ND(0.2)	46 J	ND(25)	0.10 J	ND(0.1)	0.090 J	ND(0.1)	ND(0.2)	0.12 J	ND(0.2)	ND(0.4)	ND(0.15)	ND(0.004)
	05/11/15	15FWNR06WG	449.39	13.8	435.59	ND(0.1)	0.47 J	1.2	ND(0.2)	0.33 J	0.25 J	140 J,B	ND(25)	ND(0.3)	ND(0.1)	0.09 J	0.07 J	ND(0.2)	0.12 J,B	ND(0.2)	ND(0.4)	0.13 J	ND(0.004)
	08/24/15	15FWNR13WG	449.39	13.14	436.25	ND(0.1)	0.7	2.3	ND(0.2)	0.37 J	0.23 J	110 J	ND(25)	0.19 J,B,QL	ND(0.1)	0.17 J	ND(0.1)	ND(0.2)	0.46 J	0.1 J	ND(0.4)	0.09 J	ND(0.004)
	07/06/16	16FWNR06WG	449.39	13.4	435.99	ND(0.5)	**3.73**	10.6	ND(0.5)	1.84	3.34	287 J,B	35.8 J	ND(5)	ND(0.2)	ND(0.5)	ND(0.5)	ND(1.5)	ND(0.5)	ND(0.5)	ND(0.5)	0.3 J,B	ND(0.004)
	10/10/16	16FWNR13WG	449.39	12.26	437.13	ND(0.5)	1.01	5.3	ND(0.5)	ND(0.5)	0.31 J	315 J,B	36.1 J,B	ND(5)	ND(0.2)	ND(0.5)	ND(0.5)	ND(1.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.25)	ND(0.0221)[3]
	05/11/17	17FWNR03WG	449.39	13.38	436.01	ND(0.075)	**5.20**	20.0	ND(0.5)	3.86	7.37	213 J,B	46.1 J	ND(0.5)	ND(0.2)	ND(0.5)	ND(0.5)	ND(1.5)	ND(0.5)	ND(0.5)	ND(0.2)	ND(0.25)	ND(0.0221)
	08/08/17	17FWNR14WG	449.39	13.40	435.99	ND(0.075)	0.32 J	1.83	ND(0.5)	ND(0.5)	ND(0.5)	ND(310)	ND(50)	ND(0.5)	ND(0.2)	ND(0.5)	ND(0.5)	ND(1.5)	ND(0.5)	ND(0.5)	ND(0.2)	ND(0.25)	ND(0.0215)
	05/24/18	18FWNR01WG	449.39	12.82	436.57	ND(0.075)	**5.06**	25.9	ND(0.5)	4.13	9.46	ND(318)	ND(50)	ND(0.5)	ND(0.2)	ND(0.5)	ND(0.5)	ND(1.5)	ND(0.5)	ND(0.5)	ND(0.2)	ND(0.25)	ND(0.0375)
	08/10/18	18FWNR07WG	449.39	12.96	436.43	ND(0.075)	0.32 J	2.70	ND(0.5)	ND(0.5)	ND(0.5)	204 J	ND(50)	ND(0.5)	ND(0.2)	ND(0.5)	ND(0.5)	ND(1.5)	ND(0.5)	ND(0.5)	ND(0.2)	ND(0.25)	ND(0.0375)
AP-9684	04/15/13	13FWNR05WG	453.65	19.42	434.23	ND(0.1)	0.43 J	ND(0.2)	ND(0.2)	0.090 J	ND(0.2)	430 J	930	0.77 J,QH	ND(0.1)	0.32	1.3	12.1	**92**	31	ND(0.4)	ND(0.15)	ND(0.004)
	08/20/13	13FWNR10WG	453.65	18.26	435.39	ND(0.1)	ND(0.35)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	880 Q	1,200	**2.1 QH**	0.28 J	0.63	2.3	6.48	**120**	27	ND(0.4)	ND(0.15)	ND(0.004)
	07/11/14	14FWNR01WG	453.65	14.64	439.01	ND(0.1)	0.22 J	ND(0.2)	ND(0.2)	0.090 J	ND(0.2)	360 J	1,200	0.80 J,QL	0.12 J	1.2	1.2	4.66 J	**75**	21	ND(0.4)	ND(0.15)	ND(0.004)
	10/13/14	14FWNR08WG	453.65	16.31	437.34	ND(0.1)	ND(0.1)	ND(0.2)	ND(0.2)	0.31 J	ND(0.2)	320 J	270	ND(0.3)	0.41 J	0.15 J	0.10 J	0.84 J	5.5	0.92 J	ND(0.4)	0.090 J	0.0071 J
	05/11/15	15FWNR01WG	453.65	17.77	435.88	ND(0.1)	0.18 J	ND(0.2)	ND(0.2)	0.09 J	ND(0.2)	430 J	810	0.54 J,B	0.19 J	0.31 J	0.55	1.8	**62**	17	ND(0.4)	ND(0.15)	ND(0.004)
	08/24/15	15FWNR12WG	453.65	17.08	436.57	ND(0.1)	ND(0.1)	ND(0.2)	ND(0.2)	0.11 J	ND(0.2)	500 J	810	**2.2 QL**	ND(0.1) QL	0.46 J,QL	0.73 QL	2.5 QL	50 QL	24 QL	ND(0.4)QL	ND(0.15)QL	ND(0.004)
	07/06/16	16FWNR01WG	453.65	17.41	436.24	ND(0.5)	0.45 J	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	509 J,B	634	ND(5)	ND(0.2)	ND(0.5)	0.34 J	2.56 J	**62.7**	24.3	ND(0.5)	ND(0.25)	ND(0.004)
	10/10/16	16FWNR08WG	453.65	16.27	437.38	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	505 J,B	338	ND(5)	0.29 J	ND(0.5)	ND(0.5)	ND(1.5)	29.7	8.66	ND(0.5)	ND(0.25)	ND(0.0219)[3]
	05/11/17	17FWNR04WG	453.65	17.46	436.19	ND(0.075)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	329 J,B	516	ND(0.5)	ND(0.2)	0.45 J,B	ND(0.5)	1.11 J	**66.5**	19.2	ND(0.2)	ND(0.25)	ND(0.0221)
	08/08/17	17FWNR13WG	453.65	17.65	436.00	ND(0.075)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	330 J	583	ND(0.5)	ND(0.2)	ND(0.5)	ND(0.5)	ND(1.5)	**62.6**	17.5	ND(0.2)	ND(0.25)	ND(0.0219)
	08/08/17	17FWNR13WG	453.65	17.65	436.00	ND(0.075)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	330 J	583	ND(0.5)	ND(0.2)	ND(0.5)	ND(0.5)	ND(1.5)	**62.6**	17.5	ND(0.2)	ND(0.25)	ND(0.0219)
	05/24/18	18FWNR02WG	453.65	16.83	436.82	ND(0.075)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	346 J,B	646	0.37 J	ND(0.2)	0.34 J,B	ND(0.5)	ND(1.5)	46.9	18.1	ND(0.2)	ND(0.25)	ND(0.0375)
	08/10/18	18FWNR08WG	453.65	16.96	436.69	ND(0.075)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	336 J	410	ND(0.5)	ND(0.2)	0.4 J,B	ND(0.5)	ND(1.5)	40.7	13.5	ND(0.2)	ND(0.25)	ND(0.0375)

Notes:

Yellow highlighted and bold results exceed current ADEC groundwater cleanup levels

[1] Cleanup level established from 2018 ADEC Title 18, Alaska Administrative Code, Section 75.345, Table C

[2] Sample is a field duplicate of the sample immediately above.

[3] Both events EDB was analyzed by 8260B-SIM has described in the 2017 Work Plan

Note that the exceedances are based on the current ADEC cleanup level and not necessarily the cleanup level in place at the time of sampling.

Data Qualifiers:

ND - Not detected at the detection limit (LOD in parentheses; LOQ in parentheses for data prior to 2012.)

B - Result is qualified as a potential high estimate due to contamination present in a blank sample

J - Result is estimated due to a QC issue or because it is less than the LOQ. If result is biased low or high, it is specified as "J-" and "J+", respectively (for 2014 data or older).

Q - Result is estimated due to a QC failure (pre-2014 data only). If direction of bias is known, it is further indicated with a "L" (low) or "H" (high) [flag discontinued after 2013].

M - Result is biased due to matrix interference (pre-2014 data only). If direction of bias is known, it is further indicated with a "L" (low) or "H" (high) [flag discontinued after 2013].

Abbreviations and Acronyms:

ADEC - Alaska Department of Environmental Conservation
btoc - below top of casing
DCA - Dichloroethane
DCE - (1,1- or cis/trans-1,2-) dichloroethene
DRO - diesel range organics
EDB - 1,2-dibromoethane
GRO - gasoline range organics
LOD - limit of detection
LOQ - limit of quantitation
µg/L - micrograms per liter
NA - not available
NM - not measured
PCE - tetrachloroethene
TCE - trichloroethene
TMB - trimethylbenzene
TOC - top of casing

Table 3-4 - Neely Road Mann-Kendall Trend Results

Well ID[1]	TREATMENT SYSTEM OPERATION[2]										
	PCE	TCE	EDB	DCA	DRO	GRO	Benzene	Ethylbenzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Naphthalene
AP-8211	--	--	**D**	**NT**	***NT***	**D**	**D**	**D**	***D***	***D***	***D***
AP-9003	--	--	--	--	**S**	D	**D**	***NT***	**PD**	PD	***PD***
AP-9459	--	--	--	**NT**	***NT***	**D**	**D**	**PD**	**D**	**D**	**PD**
AP-9684	--	--	**NT**	--	D	**D**	**D**	**D**	***D***	**D**	***D***
AP-9685	**NT**	**PD**	--	--	D	D	**D**	S	NT	NT	**NT**
Well ID	**REBOUND EVALUATION[3]**										
	PCE	**TCE**	**EDB**	**DCA**	**DRO**	**GRO**	**Benzene**	**Ethylbenzene**	**1,2,4-Trimethylbenzene**	**1,3,5-Trimethylbenzene**	**Naphthalene**
AP-8211	--	--	NT	S	***S***	NT	NT	***NT***	***S***	***NT***	***NT***
AP-9003	--	--	--	--	**NT**	**I**	**I**	***I***	**I**	PI	***I***
AP-9459	--	--	--	S	**NT**	NT	NT	I	S	S	NT
AP-9684	--	--	S	--	I	S	S	S	**S**	S	D
AP-9685	**NT**	***NT***	--	--	NT	NT	S	NT	I	NT	NT

NOTES:

D = Decreasing; PD = Probably Decreasing; S = Stable; NT = No Trend; I = Increasing; PI = Probably Increasing

Trends highlighted in **BOLD** and gray shading indicate concentrations above cleanup levels in at least one of the sampling events during the period of evaluation

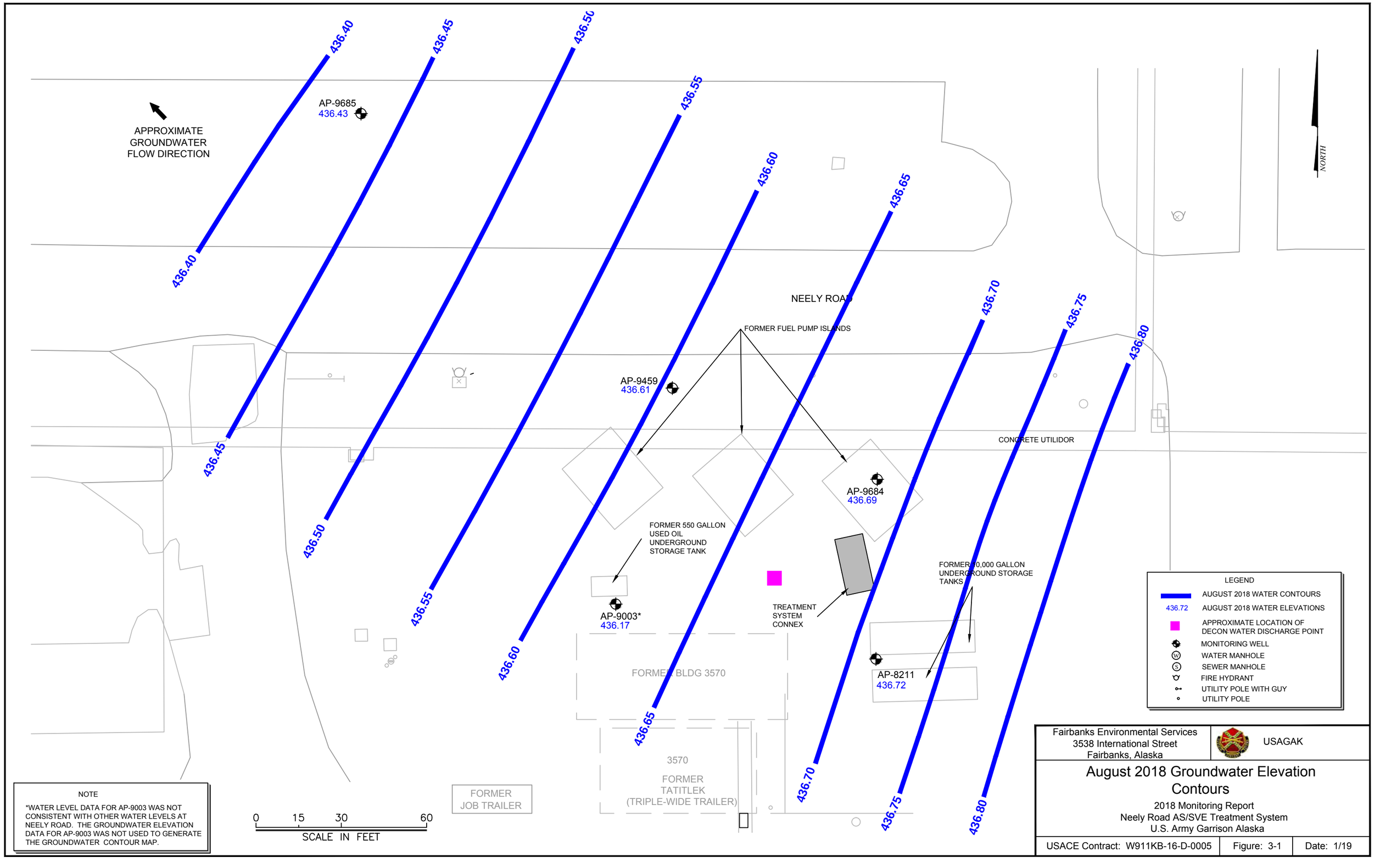
Trends shown in *italics* indicate concentrations were above the cleanup level at the end of the period of analysis (2013 or 2018 respectively)

Trends highlighted in **RED** and red shading indicate an increasing trend and concentration greater than 1/2 the cleanup level

[1] Data from AP-8213 and AP-9004 are not shown since these wells have not been sampled since 2010 and have been decommissioned

[2] Treatment system operation data evaluation includes results between 2007 and 2013

[3] Rebound evaluation includes sampling results between 2014 and 2018



NOTE

*WATER LEVEL DATA FOR AP-9003 WAS NOT CONSISTENT WITH OTHER WATER LEVELS AT NEELY ROAD. THE GROUNDWATER ELEVATION DATA FOR AP-9003 WAS NOT USED TO GENERATE THE GROUNDWATER CONTOUR MAP.

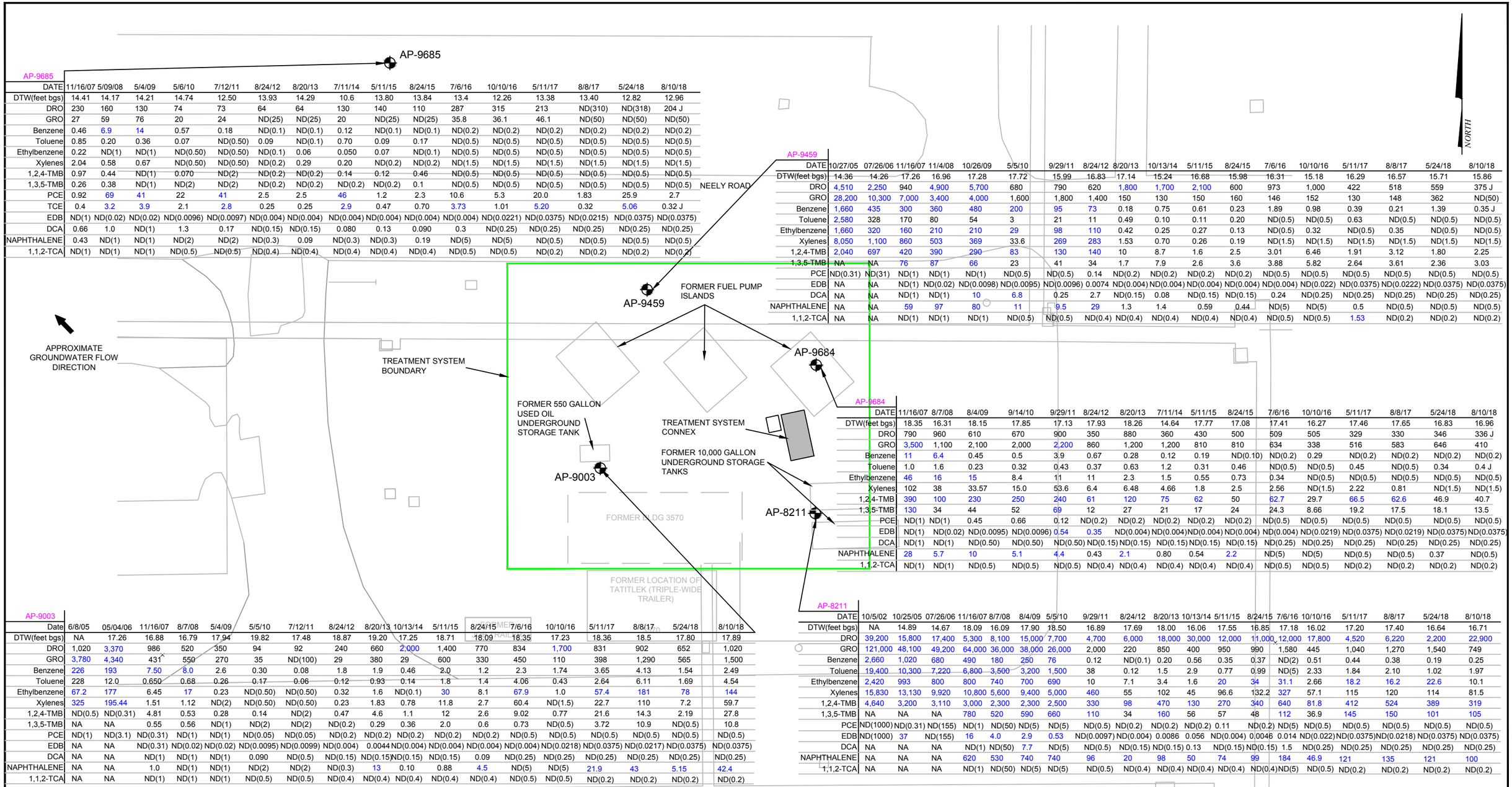
Fairbanks Environmental Services
3538 International Street
Fairbanks, Alaska

USAGAK

August 2018 Groundwater Elevation Contours

2018 Monitoring Report
Neely Road AS/SVE Treatment System
U.S. Army Garrison Alaska

USACE Contract: W911KB-16-D-0005	Figure: 3-1	Date: 1/19



AP-9685

DATE	11/16/07	5/09/08	5/4/09	5/6/10	7/12/11	8/24/12	8/20/13	7/11/14	5/11/15	8/24/15	7/6/16	10/10/16	5/11/17	8/8/17	5/24/18	8/10/18
DTW(feet bgs)	14.41	14.17	14.21	14.74	12.50	13.93	14.29	10.6	13.80	13.84	13.4	12.26	13.38	13.40	12.82	12.96
DRO	230	160	130	74	73	64	64	130	140	110	287	315	213	ND(310)	ND(318)	204 J
GRO	27	59	76	20	24	ND(25)	ND(25)	20	ND(25)	ND(25)	35.8	36.1	46.1	ND(50)	ND(50)	ND(50)
Benzene	0.46	6.9	14	0.57	0.18	ND(0.1)	ND(0.1)	0.12	ND(0.1)	ND(0.1)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)
Toluene	0.85	0.20	0.36	0.07	ND(0.50)	0.09	ND(0.1)	0.70	0.09	0.17	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
Ethylbenzene	0.22	ND(1)	ND(1)	ND(0.50)	ND(0.50)	ND(0.1)	0.06	0.050	0.07	ND(0.1)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
Xylenes	2.04	0.58	0.67	ND(0.50)	ND(0.50)	ND(0.2)	0.29	0.20	ND(0.2)	ND(0.2)	ND(1.5)	ND(1.5)	ND(1.5)	ND(1.5)	ND(1.5)	ND(1.5)
1,2,4-TMB	0.97	0.44	ND(1)	0.070	ND(2)	ND(0.2)	ND(0.2)	0.14	0.12	0.46	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
1,3,5-TMB	0.26	0.38	ND(1)	ND(2)	ND(2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	0.1	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
PCE	0.92	69	41	22	41	2.5	2.5	46	1.2	2.3	10.6	5.3	20.0	1.83	25.9	2.7
TCE	0.4	3.2	3.9	2.1	2.8	0.25	0.25	2.9	0.47	0.70	3.73	1.01	5.20	0.32	5.06	0.32 J
EDB	ND(1)	ND(0.02)	ND(0.02)	ND(0.0096)	ND(0.0097)	ND(0.004)	ND(0.004)	ND(0.004)	ND(0.004)	ND(0.004)	ND(0.004)	ND(0.0221)	ND(0.0375)	ND(0.0215)	ND(0.0375)	ND(0.0375)
DCA	0.66	1.0	ND(1)	1.3	0.17	ND(0.15)	ND(0.15)	0.080	0.13	0.090	0.3	ND(0.25)	ND(0.25)	ND(0.25)	ND(0.25)	ND(0.25)
NAPHTHALENE	0.43	ND(1)	ND(1)	ND(2)	ND(2)	ND(0.3)	0.09	ND(0.3)	ND(0.3)	0.19	ND(5)	ND(5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
1,1,2-TCA	ND(1)	ND(1)	ND(1)	ND(0.5)	ND(0.5)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.5)	ND(0.5)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)

AP-9459

DATE	10/27/05	07/26/06	11/16/07	11/4/08	10/26/09	5/5/10	9/29/11	8/24/12	8/20/13	10/13/14	5/11/15	8/24/15	7/6/16	10/10/16	5/11/17	8/8/17	5/24/18	8/10/18
DTW(feet bgs)	14.36	14.26	17.26	16.96	17.28	17.72	15.99	16.83	17.14	15.24	16.68	15.98	16.31	15.18	16.29	16.57	15.71	15.86
DRO	4,510	2,250	940	4,900	5,700	680	790	620	1,800	1,700	2,100	600	973	1,000	422	518	559	375 J
GRO	28,200	10,300	7,000	3,400	4,000	1,600	1,800	1,400	150	130	150	160	146	152	130	148	362	ND(50)
Benzene	1,660	435	300	360	480	200	95	73	0.18	0.75	0.61	0.23	1.89	0.98	0.39	0.21	1.39	0.35 J
Toluene	2,580	328	170	80	54	3	21	11	0.49	0.10	0.11	0.20	ND(0.5)	ND(0.5)	0.63	ND(0.5)	ND(0.5)	ND(0.5)
Ethylbenzene	1,660	320	160	210	210	29	98	110	0.42	0.25	0.27	0.13	ND(0.5)	0.32	ND(0.5)	0.35	ND(0.5)	ND(0.5)
Xylenes	8,050	1,100	860	503	369	33.6	269	283	1.53	0.70	0.26	0.19	ND(1.5)	ND(1.5)	ND(1.5)	ND(1.5)	ND(1.5)	ND(1.5)
1,2,4-TMB	2,040	697	420	390	290	83	130	140	10	8.7	1.6	2.5	3.01	6.46	1.91	3.12	1.80	2.25
1,3,5-TMB	NA	NA	76	87	66	23	41	34	1.7	7.9	2.6	3.6	3.88	5.82	2.64	3.61	2.36	3.03
PCE	ND(0.31)	ND(31)	ND(1)	ND(1)	ND(1)	ND(0.5)	ND(0.5)	0.14	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
EDB	NA	NA	ND(1)	ND(0.02)	ND(0.0098)	ND(0.0095)	ND(0.0096)	0.0074	ND(0.004)	ND(0.004)	ND(0.004)	ND(0.004)	ND(0.004)	ND(0.022)	ND(0.0375)	ND(0.0222)	ND(0.0375)	ND(0.0375)
DCA	NA	NA	ND(1)	ND(1)	10	6.8	0.25	2.7	ND(0.15)	0.08	ND(0.15)	ND(0.15)	0.24	ND(0.25)	ND(0.25)	ND(0.25)	ND(0.25)	ND(0.25)
NAPHTHALENE	NA	NA	59	97	80	11	9.5	29	1.3	1.4	0.59	0.44	ND(5)	ND(5)	0.5	ND(0.5)	ND(0.5)	ND(0.5)
1,1,2-TCA	NA	NA	ND(1)	ND(1)	ND(1)	ND(0.5)	ND(0.5)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.5)	ND(0.5)	1.53	ND(0.2)	ND(0.2)	ND(0.2)

AP-9684

DATE	11/16/07	8/7/08	8/4/09	9/14/10	9/29/11	8/24/12	8/20/13	7/11/14	5/11/15	8/24/15	7/6/16	10/10/16	5/11/17	8/8/17	5/24/18	8/10/18
DTW(feet bgs)	18.35	16.31	18.15	17.85	17.13	17.93	18.26	14.64	17.77	17.08	17.41	16.27	17.46	17.65	16.83	16.96
DRO	790	960	610	670	900	350	880	360	430	500	509	505	329	330	346	336 J
GRO	3,500	1,100	2,100	2,000	2,200	860	1,200	1,200	810	810	634	338	516	583	646	410
Benzene	11	6.4	0.45	0.5	3.9	0.67	0.28	0.12	0.19	ND(0.10)	ND(0.2)	0.29	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)
Toluene	1.0	1.6	0.23	0.32	0.43	0.37	0.63	1.2	0.31	0.46	ND(0.5)	ND(0.5)	0.45	ND(0.5)	0.34	0.4 J
Ethylbenzene	46	16	15	8.4	11	11	2.3	1.5	0.55	0.73	0.34	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
Xylenes	102	38	33.57	15.0	53.6	6.4	6.48	4.66	1.8	2.5	2.56	ND(1.5)	2.22	0.81	ND(1.5)	ND(1.5)
1,2,4-TMB	390	100	230	250	240	61	120	75	62	50	62.7	29.7	66.5	62.6	46.9	40.7
1,3,5-TMB	130	34	44	52	69	12	27	21	17	24	24.3	8.66	19.2	17.5	18.1	13.5
PCE	ND(1)	ND(1)	0.45	0.66	0.12	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
EDB	ND(1)	ND(0.02)	ND(0.0095)	ND(0.0096)	0.54	0.35	ND(0.004)	ND(0.004)	ND(0.004)	ND(0.004)	ND(0.004)	ND(0.0219)	ND(0.0375)	ND(0.0219)	ND(0.0375)	ND(0.0375)
DCA	ND(1)	ND(1)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.15)	ND(0.15)	ND(0.15)	ND(0.15)	ND(0.15)	ND(0.25)	ND(0.25)	ND(0.25)	ND(0.25)	ND(0.25)	ND(0.25)
NAPHTHALENE	28	5.7	10	5.1	4.4	0.43	2.1	0.80	0.54	2.2	ND(5)	ND(5)	ND(0.5)	ND(0.5)	0.37	ND(0.5)
1,1,2-TCA	ND(1)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.5)	ND(0.5)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)

AP-9003

Date	6/8/05	05/04/06	11/16/07	8/7/08	5/4/09	5/5/10	7/12/11	8/24/12	8/20/13	10/13/14	5/11/15	8/24/15	7/6/16	10/10/16	5/11/17	8/8/17	5/24/18	8/10/18
DTW(feet bgs)	NA	17.26	16.88	16.79	17.94	19.82	17.48	18.87	19.20	17.25	18.71	18.09	18.35	17.23	18.36	18.5	17.80	17.89
DRO	1,020	3,370	986	520	350	94	92	240	660	2,000	1,400	770	834	1,700	831	902	652	1,020
GRO	3,780	4,340	431	550	270	35	ND(100)	29	380	29	600	330	450	110	398	1,290	565	1,500
Benzene	226	193	7.50	8.0	2.6	0.30	0.08	1.8	1.9	0.46	2.0	1.2	2.3	1.74	3.65	4.13	1.54	2.49
Toluene	228	12.0	0.650	0.68	0.26	0.17	0.06	0.12	0.93	0.14	1.8	1.4	4.06	0.43	2.64	6.11	1.69	4.54
Ethylbenzene	67.2	177	6.45	17	0.23	ND(0.50)	ND(0.50)	0.32	1.6	ND(0.1)	30	8.1	67.9	1.0	57.4	181	78	144
Xylenes	325	195.44	1.51	1.12	ND(2)	ND(0.50)	ND(0.50)	0.23	1.83	0.78	11.8	2.7	60.4	ND(1.5)	22.7	110	7.2	59.7
1,2,4-TMB	ND(0.5)	ND(0.31)	4.81	0.53	0.28	0.14	ND(2)	0.47	4.6	1.1	12	2.6	9.02	0.77	21.6	14.3	2.19	27.8
1,3,5-TMB	NA	NA	0.55	0.56	ND(1)	ND(2)	ND(2)	ND(0.2)	0.29	0.36	2.0	0.6	0.73	ND(0.5)	3.72	10.9	ND(0.5)	10.8
PCE	ND(1)	ND(3.1)	ND(0.31)	ND(1)	ND(1)	ND(0.05)	ND(0.05)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
EDB	NA	NA	ND(0.31)	ND(0.02)	ND(0.02)	ND(0.0095)	ND(0.0099)	ND(0.004)	0.0044	ND(0.004)	ND(0.004)	ND(0.004)	ND(0.004)	ND(0.0218)	ND(0.0375)	ND(0.0217)	ND(0.0375)	ND(0.0375)
DCA	NA	NA	ND(1)	ND(1)	ND(1)	0.090	ND(0.5)	ND(0.15)	ND(0.15)	ND(0.15)	ND(0.15)	0.09	ND(0.25)	ND(0.25)	ND(0.25)	ND(0.25)	ND(0.25)	ND(0.25)
NAPHTHALENE	NA	NA	1.0	ND(1)	ND(1)	ND(2)	ND(2)	ND(0.3)	13	0.10	0.88	4.5	ND(5)	ND(5)	21.9	43	5.15	42.4
1,1,2-TCA	NA	NA	ND(1)	ND(1)	ND(1)	ND(0.5)	ND(0.5)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.5)	ND(0.5)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)

AP-8211

DATE	10/5/02	10/25/05	07/26/06	11/16/07	8/7/08	8/4/09	5/5/10	9/29/11	8/24/12	8/20/13	10/13/14	5/11/15	8/24/15	7/6/16	10/10/16	5/11/17	8/8/17	5/24/18	8/10/18
DTW(feet bgs)	NA	14.89	14.67	18.09	16.09	17.90	18.50	16.89	17.69	18.00	16.06	17.55	16.85	17.18	16.02	17.20	17.40	16.64	16.71
DRO	39,200	15,800	17,400	5,300	8,100	15,000	7,700	4,700	6,000	18,000	30,000	12,000	11,000	12,000	17,800	4,520	6,220	2,200	22,900
GRO	121,000	48,100	49,200	64,000	36,000	38,000	26,000	2,000	220	850	400	950	990	1,580	445	1,040	1,270	1,540	749
Benzene	2,660	1,020	680	490	180	250	76	0.12	ND(0.1)	0.20	0.56	0.35	0.37	ND(2)	0.51	0.44	0.38	0.19	0.25
Toluene	19,400	10,300	7,220	6,800	3,500	3,200	1,500	38	0.12	1.5	2.9	0.77	0.99	ND(5)	2.33	1.84	2.10	1.02	1.97
Ethylbenzene	2,420	993	800	800	740	700	690	10	7.1	3.4	1.6	20	34	31.1	2.66	18.2	16.2	22.6	10.1
Xylenes	15,830	13,130	9,920	10,800	5,600	9,400	5,000	460	55	102	45	96.6	132.2	327	57.1	115	120	114	81.5
1,2,4-TMB	4,640	3,200	3,110	3,000	2,300	2,300	2,500	330	98	470	130	270	340	640	81.8	412	524	389	319
1,3,5-TMB	NA	NA	NA	780	520	590	660	110	34	160	56	57	48	112	36.9	145	150	101	105
PCE	ND(1000)	ND(0.31)	ND(155)	ND(1)	ND(50)	ND(5)	ND(5)	ND(0.5)	ND(0.2)	ND(0.2)	ND(0.2)	0.11	ND(0.2)	ND(5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
EDB	ND(1000)	37	ND(155)	16	4.0	2.9	0.53	ND(0.0097)	ND(0.004)	0.0086	0.056	ND(0.004)	0.0046	0.014	ND(0.022)	ND(0.0375)	ND(0.0218)	ND(0.0375)	ND(0.0375)
DCA	NA	NA	NA	ND(1)	ND(50)	7.7	ND(5)	ND(0.5)	ND(0.15)	ND(0.15)	0.13	ND(0.15)	ND(0.15)	1.5	ND(0.25)	ND(0.25)	ND(0.25)	ND(0.25)	ND(0.25)
NAPHTHALENE	NA	NA	NA	620	530	740	740	96	20	98	50	74	99	184	46.9	121	135	121	100
1,1,2-TCA	NA	NA	NA	ND(1)	ND(50)	ND(5)	ND(5)	ND(0.5)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(5)	ND(0.5)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)

0 20 40 80

SCALE IN FEET

2018 ADEC CLEANUP LEVELS (µg/L)

DRO	1,500	Xylenes	190
GRO	2,200	1,2,4-TMB	56
Benzene	4.6	1,3,5-TMB	60
Toluene	1,100	EDB	0.075
Ethylbenzene	15	1,2-DCA	1.7
Naphthalene	1.7	PCE	41
1,1,2-TCA	0.41	TCE	2.8

NOTES:

1. THE 2012 AS EXPANSION WAS COMPLETED AND RESTARTED ON SEPTEMBER 25, 2012.
2. SAMPLE RESULTS IN BLUE EXCEED TABLE C, GROUNDWATER LEVELS FROM TITLE 18AAC75.
3. PRIOR TO NOVEMBER 2007 NON-DETECTED ANALYTES WERE REPORTED TO THE DETECTION LIMIT. AFTER NOVEMBER 2007 NON- DETECTED ANALYTES WERE REPORTED TO THE REPORTING LIMIT.
5. ALL RESULTS IN µg/L.
6. TCE RESULTS SHOWN FOR AP-9685 ONLY, THE OTHER WELLS IN THE SAMPLING PROGRAM HAVE HAD LIMITED TCE DETECTIONS.
7. DUE TO SPACE LIMITATIONS, ANALYTICAL DATA FOR ONLY ONE SAMPLE EVENT PER YEAR BETWEEN 2000 AND 2014 IS SHOWN.
8. DATA FLAGS (QUALIFIERS) ARE NOT SHOWN DUE TO SPACE LIMITATIONS.

LEGEND

	MONITORING WELL	ND	ANALYTE NOT DETECTED (METHOD DETECTION LIMIT)
bgs	BELOW GROUND SURFACE		
DCA	1,2-DICHLOROETHANE	PCE	TETRACHLOROETHENE
DRO	DIESEL RANGE ORGANICS	TCA	TRICHOROETHANE
DTW	DEPTH TO WATER	TCE	TRICHLOROETHENE
EDB	1,2-DIBROMOETHANE	TD	TOTAL DEPTH
GRO	GASOLINE RANGE ORGANICS	TMB	TRIMETHYLBENZENE
NA	NOT AVAILABLE	µg/L	MICROGRAMS PER LITER

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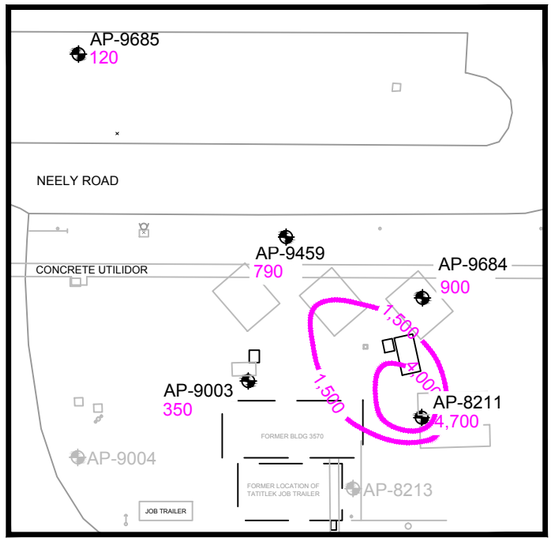
Fairbanks, Alaska

USAGAK

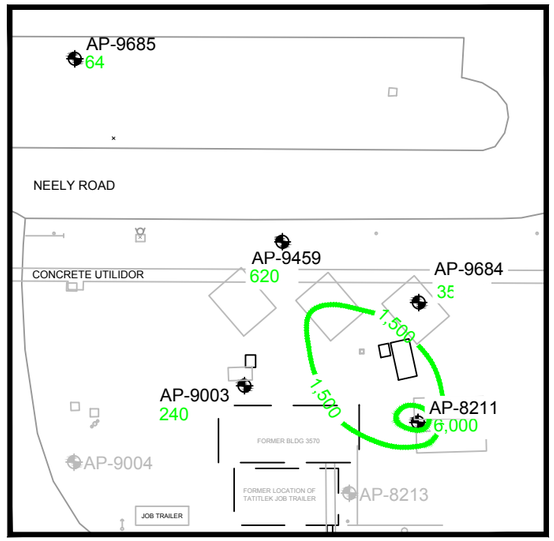
Contaminants of Concern Detected in Groundwater Samples

2018 Monitoring Report
Neely Road AS/SVE Treatment System
U.S. Army Garrison Alaska

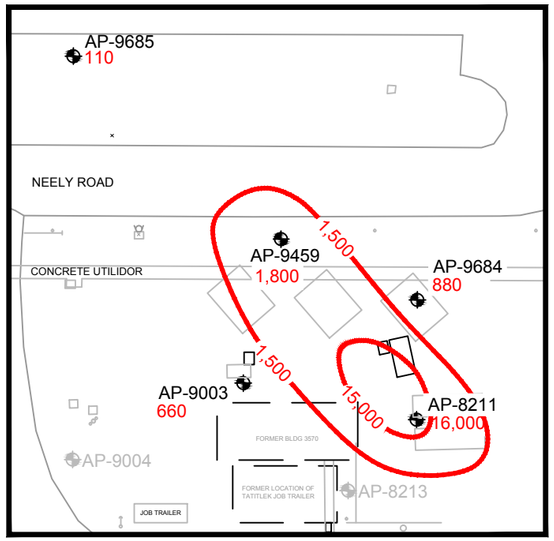
USACE Contract: W911KB-16-D-0005 | Figure: 3-2 | Date: 1/19



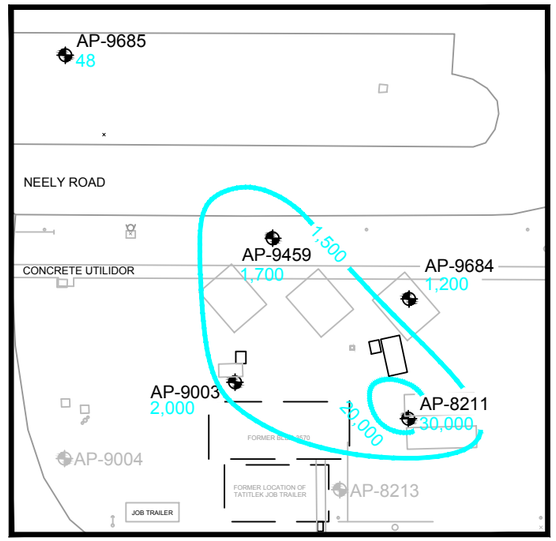
2011 Estimated DRO Concentration Contours



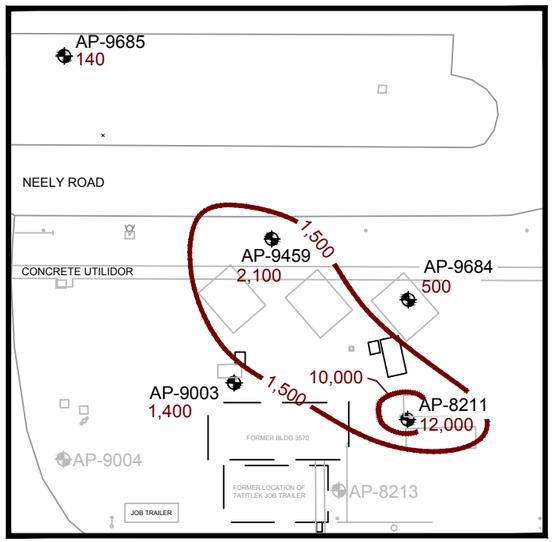
2012 Estimated DRO Concentration Contours



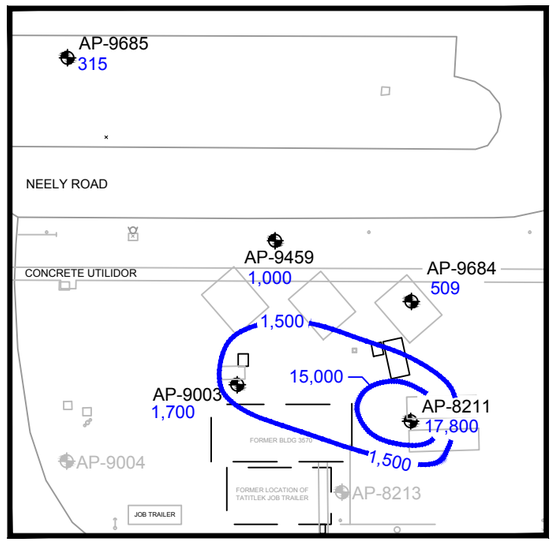
2013 Estimated DRO Concentration Contours



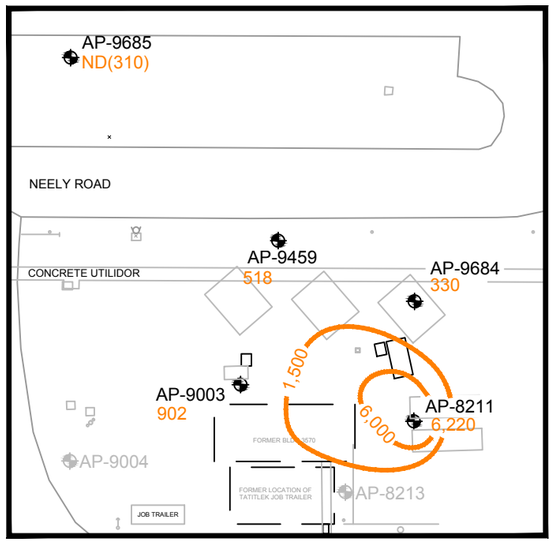
2014 Estimated DRO Concentration Contours



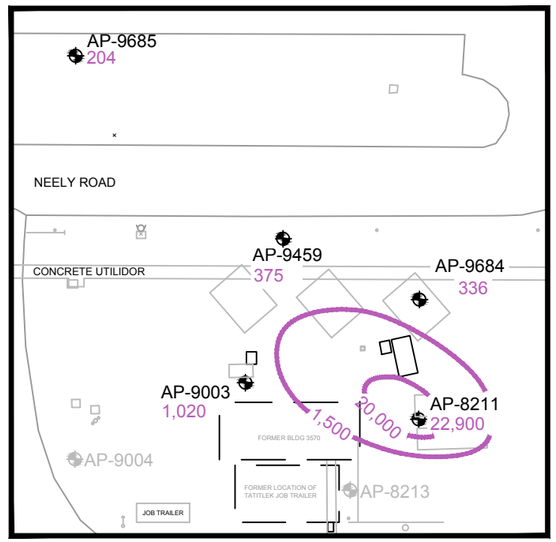
2015 Estimated DRO Concentration Contours



2016 Estimated DRO Concentration Contours



2017 Estimated DRO Concentration Contours



2018 Estimated DRO Concentration Contours

LEGEND

350	2011 DRO CONCENTRATION CONTOURS 2011 DRO CONCENTRATIONS	2,100	2015 DRO CONCENTRATION CONTOURS 2015 DRO CONCENTRATIONS
240	2012 DRO CONCENTRATION CONTOURS 2012 DRO CONCENTRATIONS	17,000	2016 DRO CONCENTRATION CONTOURS 2016 DRO CONCENTRATIONS
660	2013 DRO CONCENTRATION CONTOURS 2013 DRO CONCENTRATIONS	6,220	2017 DRO CONCENTRATION CONTOURS 2017 DRO CONCENTRATIONS
660	2014 DRO CONCENTRATION CONTOURS 2014 DRO CONCENTRATIONS	150	2018 DRO CONCENTRATION CONTOURS 2018 DRO CONCENTRATIONS

MONITORING WELL
WATER MANHOLE
SEWER MANHOLE
FIRE HYDRANT
UTILITY POLE WITH GUY
UTILITY POLE
DRO DIESEL RANGE ORGANICS

0 40 80 160
SCALE IN FEET

KEY
AP-9003
660
CONTAMINANT CONCENTRATION DURING SAMPLING EVENT

CLEANUP CRITERIA
DRO 1,500

NOTES
1. CONCENTRATIONS SHOWN IN µG/L
2. HIGHEST CONCENTRATIONS PER YEAR SHOWN ON MAP

NORTH

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2011 - 2018 Estimated DRO Concentration Contours

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Neely Road AS/SVE Treatment System
U.S. Army Garrison Alaska

USACE Contract: W911KB-16-D-0005	Figure: 3-3	Date: 1/19

4.0 INSTITUTIONAL CONTROL SURVEY

ICs include restrictions for unauthorized excavation and restrictions for installation of drinking water wells to prevent exposure to contaminants remaining on site at levels that are above ADEC cleanup levels (ADEC, 2018). These ICs are maintained as part of the Fort Wainwright Land Use Controls/IC program (FWA Garrison Policy #38)(USAGAK, 2017).

4.1 Institutional Control Survey

An IC survey was completed on May 22, 2018. The purpose of the IC inspection is to ensure that the IC's for Neely Road are being met. The following are the site specific IC's:

- Prevent unauthorized soil disturbing activities to a depth more than six inches bgs
- Prevent installation of wells for drinking water purposes
- Prevent use of groundwater except for monitoring and remediation activities; and
- Protect existing monitoring wells.

The IC inspection included site visits, review of the Fort Wainwright IC geographic information system (GIS) layer, and a review of the site-specific information in the ADEC Contaminated Sites database. The results of the IC survey are presented in Appendix F. The 2018 IC inspection did not identify IC violations or concerns at the site. IC inspections will continue in 2019. The following summarizes the findings of the IC survey.

- There was no evidence of vandalism or soil disturbance;
- All the monitoring wells were in good condition and secured; and
- The treatment system connex and two RME's were securely locked.

5.0 CONCLUSIONS

With the exception of DRO, the Neely Road treatment system effectively treated groundwater contamination within the area of the treatment system influence. Volatile contaminants such as GRO, benzene, and EDB were all below ADEC cleanup levels in 2018. However several contaminants were detected at concentrations above ADEC cleanup levels such as 1,2,4-Trimethylbenzene, 1,3,5-Trimethylbenzene, ethylbenzene, naphthalene and trichloroethene. All but one sample (August sample of downgradient well AP-9685) exceeded the new ADEC cleanup level for manganese. As a result of an increase in the ADEC cleanup level for PCE, all PCE detections were below the ADEC cleanup level in the 2018 sampling events.

The Army is currently planning to conduct a separate investigation of the PCE source area near AP-9685 and under ADEC Contaminated Sites File Number: 108.38.137, Hazard ID: 26796.

The MAROS evaluation results showed that all wells were recommended for annual or biennial sampling. The sampling frequency results are based on the rate of change of contaminant concentrations relative to the cleanup level. The current sampling frequency for the Neely Road site is semiannual, and semiannual sampling is recommended due to the increasing trends in AP-9003 and the continued evaluation of solvent detections in AP-9685.

6.0 REFERENCES

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APPENDIX A

SAMPLE SUMMARY AND ANALYTICAL RESULTS TABLES

Table A-1. Groundwater Sample Summary
Neely Road AS/SVE Treatment System
Fort Wainwright, Alaska

Sample Number	Sample Location	Sample Type	Matrix	Sampler Initials	Sample Date	Sample Time	VOC[1] 8260C	GRO AK101	DRO AK102SV	Iron/ Manganese 6020A	Sulfate 300.0	SDG	Cooler ID
Groundwater Samples													
18FWNR01WG	AP-9685	Primary	WG	JK	5/24/2018	1030	X	X	X	X	X	1182471	052901,02
18FWNR02WG	AP-9684	Primary	WG	JK	5/24/2018	1140	X	X	X	X	X	1182471	052901,02
18FWNR03WG	AP-9459	Primary/MS/MSD	WG	JK	5/24/2018	1315	X	X	X	X	X	1182471	052901,02
18FWNR04WG	AP-2020 (AP-9459)	Field Duplicate of 17FWNR03WG	WG	JK	5/24/2018	1330	X	X	X	X	X	1182471	052901,02
18FWNR05WG	AP-8211	Primary	WG	JK	5/24/2018	1500	X	X	X	X	X	1182471	052901,02
18FWNR06WG	AP-9003	Primary	WG	JK	5/24/2018	1615	X	X	X	X	X	1182471	052901,02
18FWNR07WG	AP-9685	Primary	WG	JK	8/10/2018	930	X	X	X	X	X	1184468	FES11
18FWNR08WG	AP-9684	Primary	WG	JK	8/10/2018	1030	X	X	X	X	X	1184468	FES11
18FWNR09WG	AP-9459	Primary/MS/MSD	WG	JK	8/10/2018	1145	X	X	X	X	X	1184468	FES11
18FWNR10WG	AP-2020 (AP-9459)	Field Duplicate of 17FWNR09WG	WG	JK	8/10/2018	1200	X	X	X	X	X	1184468	FES11
18FWNR11WG	AP-8211	Primary	WG	JK	8/10/2018	1315	X	X	X	X	X	1184468	FES11
18FWNR12WG	AP-9003	Primary	WG	JK	8/10/2018	1415	X	X	X	X	X	1184468	FES11
Quality Control Samples													
18FWNREB01WQ	Rinsate 01	Equipment Blank	WQ	JK	5/24/2018		X	X	X	X	X	1182471	052901,02
18FWNRTB01WQ	Trip Blank	Trip Blank	WQ	--	5/24/2018		X	X				1182471	052901
18FWNREB02WQ	Rinsate 02	Equipment Blank	WQ	JK	8/10/2018		X	X	X	X	X	1184468	FES11
18FWNRTB02WG	Trip Blank	Trip Blank	WQ	--	8/10/2018		X	X				1184468	FES11

Notes: All samples were submitted to SGS North America of Anchorage, Alaska. The standard 21-day turnaround time was requested for all analyses. All work was performed under NPDL work order number 18-089.

[1] EDB is included in the VOC 8260C analytical suite and the LOD is adequate for project use.

DRO - diesel range organics
EDB - 1,2-dibromoethane
Fe - iron
GRO - gasoline range organics
HCl - hydrochloric acid
HDPE - high-density polyethylene
HNO_3 - nitric acid
JK - Josh Klynstra
)D - limits of detection
mL - milliters
Mn - manganese
MS/MSD - matrix spike/matrix spike duplicate samples
SDG - sample data group
SO_4 - sulfate
VOC - volatile organic compounds
WG - groundwater matrix
WQ - water quality control

Water Sample Collection (all samples were field-preserved at 0 to 6°C)
VOC - three HCl-preserved, 40 mL VOA vials
GRO - three HCl-preserved, 40 mL VOA vials
DRO - two HCl-preserved, 250 mL amber bottles
Fe/Mn - one HNO_3-preserved, 250 mL HDPE bottle (field-filtered)
SO_4 - one non-preserved, 125 mL HDPE bottle

Table A-2. Groundwater Sample Results
Neely Road AS/SVE Treatment System
Fort Wainwright, Alaska

			Sample ID	18FWNR01WG	18FWNR02WG	18FWNR03WG	18FWNR04WG	18FWNR05WG	18FWNR06WG	18FWNR07WG	18FWNR08WG	18FWNR09WG	18FWNR10WG	18FWNR11WG	18FWNR12WG	18FWNREB01WQ	18FWNREB02WQ	18FWNRTB01WQ	18FWNRTB02WQ
			Location ID	AP-9685	AP-9684	AP-9459	AP-2020	AP-8211	AP-9003	AP-9685	AP-9684	AP-9459	AP-2020	AP-8211	AP-9003	RINSATE 01	Rinsate 02	TRIP BLANK	Trip Blank
			Sample Data Group	1182471	1182471	1182471	1182471	1182471	1182471	1184468	1184468	1184468	1184468	1184468	1184468	1182471	1184468	1182471	1184468
			Laboratory ID	1182471001	1182471002	1182471003	1182471006	1182471007	1182471008	1184468001	1184468002	1184468003	1184468006	1184468007	1184468008	1182471009	1184468009	1182471010	1184468010
			Collection Date	5/24/2018	5/24/2018	5/24/2018	5/24/2018	5/24/2018	5/24/2018	8/10/2018	8/10/2018	8/10/2018	8/10/2018	8/10/2018	8/10/2018	5/24/2018	8/10/2018	5/24/2018	8/10/2018
			Matrix	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WQ	WQ	WQ	WQ
			Sample Type	Primary	Primary	Primary/MS/MSD	Field Duplicate of 18FWNR03WG	Primary	Primary	Primary	Primary	Primary/MS/MSD	Field Duplicate of 18FWNR09WG	Primary	Primary	Equipment Blank	Equipment Blank	Trip Blank	Trip Blank
Analyte	**Method**	**Units**	**ADEC Cleanup Level[1]**	**Result [LOD] Qualifier**	**Result [LOD] Qualifier**	**Result [LOD] Qualifier**	**Result [LOD] Qualifier**	**Result [LOD] Qualifier**	**Result [LOD] Qualifier**	**Result [LOD] Qualifier**	**Result [LOD] Qualifier**	**Result [LOD] Qualifier**	**Result [LOD] Qualifier**	**Result [LOD] Qualifier**	**Result [LOD] Qualifier**	**Result [LOD] Qualifier**	**Result [LOD] Qualifier**	**Result [LOD] Qualifier**	**Result [LOD] Qualifier**
Gasoline Range Organics	AK101	µg/L	2,200	ND [50]	646 [50]	362 [50]	139 [50]	1,540 [50]	565 [50]	ND [50]	410 [50]	ND [50]	ND [50]	749 [50]	1,500 [50] J+	ND [50]	ND [50]	ND [50]	ND [50]
Diesel Range Organics	AK102	µg/L	1,500	ND [318]	346 [302] J,B	559 [296] J,B	555 [303] J,B	**2,200 [308]**	652 [302] B	204 [332] J	336 [332] J	347 [332] J	375 [321] J	**22,900 [329]**	1,020 [324]	217 [305] J	ND [313]	-	-
Sulfate	E300.0	µg/L	NE	36300 [500]	60300 [500]	31800 [500]	32400 [500]	57000 [500]	56500 [500]	35500 [500]	73900 [500]	36200 [500]	36100 [500]	198000 [2000]	83200 [500]	62 [100] J	ND [100]	-	-
Iron	SW6020A	µg/L	NE	ND [250]	7320 [250]	4250 [250]	4230 [250]	6410 [250]	6860 [250]	ND [250]	10700 [250]	4040 [250]	3950 [250]	10100 [250]	6790 [250]	ND [250]	ND [250]	-	-
Manganese	SW6020A	µg/L	430	**1180 [1]**	**1940 [1]**	**3600 [5]**	**3620 [5]**	**3800 [5]**	**3040 [5]**	9.69 [1]	**2240 [1]**	**3120 [5]**	**3010 [5]**	**7720 [10]**	**3400 [5]**	0.709 [1] J	1.59 [1] J	-	-
1,1,1,2-Tetrachloroethane	SW8260C	µg/L	5.7	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.250]	ND [0.250]
1,1,1-Trichloroethane	SW8260C	µg/L	8,000	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
1,1,2,2-Tetrachloroethane	SW8260C	µg/L	0.76	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.250]	ND [0.250]
1,1,2-Trichloro-1,2,2-trifluoroethane	SW8260C	µg/L	10,000	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5.00]	ND [5.00]
1,1,2-Trichloroethane	SW8260C	µg/L	0.41	ND [0.2]	ND [0.2]	ND [0.2]	ND [0.2]	ND [0.2]	ND [0.2]	ND [0.2]	ND [0.2]	ND [0.2]	ND [0.2]	ND [0.2]	ND [0.2]	ND [0.2]	ND [0.2]	ND [0.200]	ND [0.200]
1,1-Dichloroethane	SW8260C	µg/L	28	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
1,1-Dichloroethene	SW8260C	µg/L	280	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
1,1-Dichloropropene	SW8260C	µg/L	NE	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
1,2,3-Trichlorobenzene	SW8260C	µg/L	NE	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
1,2,3-Trichloropropane	SW8260C	µg/L	0.0075	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
1,2,4-Trichlorobenzene	SW8260C	µg/L	4.0	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
1,2,4-Trimethylbenzene	SW8260C	µg/L	56	ND [0.5]	46.9 [0.5]	1.8 [0.5]	1.61 [0.5]	**389 [5]**	2.19 [0.5]	ND [0.5]	40.7 [0.5]	2.16 [0.5]	2.25 [0.5]	**319 [5]**	27.8 [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
1,2-Dibromo-3-chloropropane	SW8260C	µg/L	NE	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5.00]	ND [5.00]
1,2-Dibromoethane	SW8260C	µg/L	0.075	ND [0.0375]	ND [0.0375]	ND [0.0375]	ND [0.0375]	ND [0.0375]	ND [0.0375]	ND [0.0375]	ND [0.0375]	ND [0.0375]	ND [0.0375]	ND [0.0375]	ND [0.0375]	ND [0.0375]	ND [0.0375]	ND [0.0375]	ND [0.0375]
1,2-Dichlorobenzene	SW8260C	µg/L	300	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
1,2-Dichloroethane	SW8260C	µg/L	1.7	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.250]	ND [0.250]
1,2-Dichloropropane	SW8260C	µg/L	8.2	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
1,3,5-Trimethylbenzene	SW8260C	µg/L	60	ND [0.5]	18.1 [0.5]	2.36 [0.5]	2.23 [0.5]	**101 [0.5]**	ND [0.5]	ND [0.5]	13.5 [0.5]	2.99 [0.5]	3.03 [0.5]	**105 [0.5]**	10.8 [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
1,3-Dichlorobenzene	SW8260C	µg/L	300	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
1,3-Dichloropropane	SW8260C	µg/L	4.7	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.250]	ND [0.250]
1,4-Dichlorobenzene	SW8260C	µg/L	4.8	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.250]	ND [0.250]
2,2-Dichloropropane	SW8260C	µg/L	NE	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
2-Butanone	SW8260C	µg/L	5,600	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5.00]	ND [5.00]
2-Chlorotoluene	SW8260C	µg/L	NE	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
2-Hexanone	SW8260C	µg/L	38	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5.00]	ND [5.00]
4-Chlorotoluene	SW8260C	µg/L	NE	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
4-Isopropyltoluene	SW8260C	µg/L	NE	ND [0.5]	1.8 [0.5]	ND [0.5]	ND [0.5]	14.4 [0.5]	0.97 [0.5] J	ND [0.5]	0.31 [0.5] J	0.37 [0.5] J	0.37 [0.5] J	1.59 [0.5]	7.75 [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
4-Methyl-2-pentanone	SW8260C	µg/L	6,300	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5.00]	ND [5.00]
Benzene	SW8260C	µg/L	4.6	ND [0.2]	ND [0.2]	1.39 [0.2]	1.31 [0.2]	0.19 [0.2] J	1.54 [0.2]	ND [0.2]	ND [0.2]	0.35 [0.2] J	0.35 [0.2] J	0.25 [0.2] J	2.49 [0.2]	ND [0.2]	ND [0.2]	ND [0.200]	ND [0.200]
Bromobenzene	SW8260C	µg/L	62	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
Bromochloromethane	SW8260C	µg/L	NE	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
Bromodichloromethane	SW8260C	µg/L	1.3	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.250]	ND [0.250]
Bromoform	SW8260C	µg/L	33	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
Bromomethane	SW8260C	µg/L	7.5	ND [2.5]	ND [2.5]	ND [2.5]	ND [2.5]	ND [2.5]	ND [2.5]	ND [2.5]	ND [2.5]	ND [2.5]	ND [2.5]	ND [2.5]	ND [2.5]	ND [2.5]	ND [2.5]	ND [2.50]	ND [2.50]
Carbon disulfide	SW8260C	µg/L	810	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5.00]	ND [5.00]
Carbon tetrachloride	SW8260C	µg/L	4.6	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
Chlorobenzene	SW8260C	µg/L	78	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.250]	ND [0.250]
Chloroethane	SW8260C	µg/L	21,000	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
Chloroform	SW8260C	µg/L	2.2	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	0.46 [0.5] J	ND [0.5]	ND [0.500]	ND [0.500]
Chloromethane	SW8260C	µg/L	190	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
cis-1,2-Dichloroethene	SW8260C	µg/L	36	4.13 [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
cis-1,3-Dichloropropene	SW8260C	µg/L	4.7	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.250]	ND [0.250]
Dibromochloromethane	SW8260C	µg/L	8.7	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.250]	ND [0.250]
Dibromomethane	SW8260C	µg/L	8.3	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
Dichlorodifluoromethane	SW8260C	µg/L	200	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
Ethylbenzene	SW8260C	µg/L	15	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	**22.6 [0.5]**	**78 [0.5]**	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	10.1 [0.5]	**144 [0.5]**	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
Hexachlorobutadiene	SW8260C	µg/L	1.4	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
Isopropylbenzene	SW8260C	µg/L	450	ND [0.5]	1.01 [0.5]	ND [0.5]	ND [0.5]	8.78 [0.5]	12.1 [0.5]	ND [0.5]	0.82 [0.5] J	ND [0.5]	ND [0.5]	4.98 [0.5]	19.4 [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
Methylene chloride	SW8260C	µg/L	110	ND [2.5]	ND [2.5]	ND [2.5]	ND [2.5]	ND [2.5]	ND [2.5]	ND [2.5]	ND [2.5]	ND [2.5]	ND [2.5]	ND [2.5]	ND [2.5]	ND [2.5]	ND [2.5]	ND [2.50]	ND [2.50]
Methyl-tert-butyl ether (MTBE)	SW8260C	µg/L	140	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5.00]	ND [5.00]
Naphthalene	SW8260C	µg/L	1.7	ND [0.5]	0.37 [0.5] J	ND [0.5]	ND [0.5]	**121 [0.5]**	**5.15 [0.5]**	ND [0.5]	ND [0.5]	0.53 [0.5] J	0.58 [0.5] J	**100 [0.5]**	**42.4 [0.5]**	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
n-Butylbenzene	SW8260C	µg/L	1,000	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
n-Propylbenzene	SW8260C	µg/L	660	ND [0.5]	5.47 [0.5]	ND [0.5]	ND [0.5]	14.5 [0.5]	9.64 [0.5]	ND [0.5]	4.35 [0.5]	ND [0.5]	ND [0.5]	10.5 [0.5]	28.9 [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
sec-Butylbenzene	SW8260C	µg/L	2,000	ND [0.5]	0.54 [0.5] J	ND [0.5]	ND [0.5]	ND [0.5]	2.75 [0.5]	ND [0.5]	0.36 [0.5] J	ND [0.5]	ND [0.5]	1.75 [0.5]	4.9 [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
Styrene	SW8260C	µg/L	1,200	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
tert-Butylbenzene	SW8260C	µg/L	690	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	5.48 [0.5]	5.35 [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	3.64 [0.5]	7.46 [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
Tetrachloroethene (PCE)	SW8260C	µg/L	41	25.9 [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	2.7 [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
Toluene	SW8260C	µg/L	1,100	ND [0.5]	0.34 [0.5] J,B	ND [0.5]	ND [0.5]	1.02 [0.5] B	1.69 [0.5] B	ND [0.5]	0.4 [0.5] J,B	ND [0.5]	ND [0.5]	1.97 [0.5] B	4.54 [0.5]	0.74 [0.5] J,B	0.4 [0.5] J	0.8 [0.500] J	ND [0.500]
trans-1,2-Dichloroethene	SW8260C	µg/L	360	9.46 [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]

Table A-2. Groundwater Sample Results
Neely Road AS/SVE Treatment System
Fort Wainwright, Alaska

Sample ID				18FWNR01WG	18FWNR02WG	18FWNR03WG	18FWNR04WG	18FWNR05WG	18FWNR06WG	18FWNR07WG	18FWNR08WG	18FWNR09WG	18FWNR10WG	18FWNR11WG	18FWNR12WG	18FWNREB01WQ	18FWNREB02WQ	18FWNRTB01WQ	18FWNRTB02WQ
Location ID				AP-9685	AP-9684	AP-9459	AP-2020	AP-8211	AP-9003	AP-9685	AP-9684	AP-9459	AP-2020	AP-8211	AP-9003	RINSATE 01	Rinsate 02	TRIP BLANK	Trip Blank
Sample Data Group				1182471	1182471	1182471	1182471	1182471	1182471	1184468	1184468	1184468	1184468	1184468	1184468	1182471	1184468	1182471	1184468
Laboratory ID				1182471001	1182471002	1182471003	1182471006	1182471007	1182471008	1184468001	1184468002	1184468003	1184468006	1184468007	1184468008	1182471009	1184468009	1182471010	1184468010
Collection Date				5/24/2018	5/24/2018	5/24/2018	5/24/2018	5/24/2018	5/24/2018	8/10/2018	8/10/2018	8/10/2018	8/10/2018	8/10/2018	8/10/2018	5/24/2018	8/10/2018	5/24/2018	8/10/2018
Matrix				WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WQ	WQ	WQ	WQ
Sample Type				Primary	Primary	Primary/MS/MSD	Field Duplicate of 18FWNR03WG	Primary	Primary	Primary	Primary	Primary/MS/MSD	Field Duplicate of 18FWNR09WG	Primary	Primary	Equipment Blank	Equipment Blank	Trip Blank	Trip Blank
Analyte	**Method**	**Units**	**ADEC Cleanup Level[1]**	**Result [LOD] Qualifier**	**Result [LOD] Qualifier**	**Result [LOD] Qualifier**	**Result [LOD] Qualifier**	**Result [LOD] Qualifier**	**Result [LOD] Qualifier**	**Result [LOD] Qualifier**	**Result [LOD] Qualifier**	**Result [LOD] Qualifier**	**Result [LOD] Qualifier**	**Result [LOD] Qualifier**	**Result [LOD] Qualifier**	**Result [LOD] Qualifier**	**Result [LOD] Qualifier**	**Result [LOD] Qualifier**	**Result [LOD] Qualifier**
trans-1,3-Dichloropropene	SW8260C	µg/L	4.70	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
Trichloroethene (TCE)	SW8260C	µg/L	2.8	**5.06 [0.5]**	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	0.32 [0.5] J	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
Trichlorofluoromethane	SW8260C	µg/L	5,200	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
Vinyl acetate	SW8260C	µg/L	410	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5]	ND [5.00]	ND [5.00]
Vinyl chloride	SW8260C	µg/L	0.19	ND [0.075]	ND [0.075]	ND [0.075]	ND [0.075]	ND [0.075]	ND [0.075]	ND [0.075]	ND [0.075]	ND [0.075]	ND [0.075]	ND [0.075]	ND [0.075]	ND [0.075]	ND [0.075]	ND [0.0750]	ND [0.0750]
o-Xylene	SW8260C	µg/L	190	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	3.07 [0.5]	0.36 [0.5] J	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	8.26 [0.5]	3.84 [0.5]	ND [0.5]	ND [0.5]	ND [0.500]	ND [0.500]
Xylene, Isomers m & p	SW8260C	µg/L	190	ND [1]	ND [1]	ND [1]	ND [1]	111 [1]	6.84 [1]	ND [1]	ND [1]	ND [1]	ND [1]	73.2 [1]	55.8 [1]	ND [1]	ND [1]	ND [1.00]	ND [1.00]
Xylenes	SW8260C	µg/L	190	ND [1.5]	ND [1.5]	ND [1.5]	ND [1.5]	114 [1.5]	7.2 [1.5]	ND [1.5]	ND [1.5]	ND [1.5]	ND [1.5]	81.5 [1.5]	59.7 [1.5]	ND [1.5]	ND [1.5]	ND [1.50]	ND [1.50]

Neely Road contaminants of concern are identified in blue text.

Yellow highlighted and **bolded** results exceed ADEC groundwater cleanup levels

Grey shaded results are non-detect with LODs above the ADEC groundwater cleanup levels

[1] ADEC cleanup levels are Groundwater Human Health values listed in ADEC 18 AAC 75.345 (revised as of September 29, 2018).

Data Qualifiers:
B - result may be due to cross-contamination
J - result qualified as estimate because it is less than the LOQ or due to a QC failure
J+ - result qualified as estimate with a high-bias due to a QC failure
J- - result qualified as estimate with a low-bias due to a QC failure
ND - not detected [LOD presented in brackets]

Acronyms:
AAC - Alaska Administrative Code
ADEC - Alaska Department of Environmental Conservation
LOD - limit of detection
LOQ - limit of quantitation
MS/MSD - matrix spike/matrix spike duplicate
µg/L - micrograms per liter
NE - not established
QC - quality control
WG - groundwater
WQ - water QC sample

APPENDIX B

CHEMICAL DATA QUALITY REVIEW, ADEC CHECKLISTS, AND SUPPORTING INFORMATION

FINAL

CHEMICAL DATA QUALITY REVIEW

Neely Road

Fort Wainwright, Alaska

NPDL # 18-089

Prepared: October 22, 2018
Revised: December 10, 2018

Prepared for and Under Contract to

Army Corps of Engineers - Alaska District

Prepared by

Fairbanks Environmental Services, Inc.

I certify that all data quality review criteria described in Section 1.1 were assessed, and that qualifications were made according to the criteria outlined in the Postwide UFP-QAPP.

Vanessa Ritchie
Senior Chemist

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LIST OF ACRONYMS AND ABBREVIATIONS

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
AK	Alaska
B	analytical result is qualified as a potential high estimate due to contamination present in a blank sample
°C	degrees Celsius
CAP	Corrective Action Plan
CCV	continuing calibration verification
CDQR	Chemical Data Quality Review
COC	chain-of-custody
DL	detection limit
DoD	United States Department of Defense
DQO	data quality objective
DRO	diesel range organics
EDB	1,2-dibromoethane
ELAP	Environmental Laboratory Accreditation Program
EPA	United States Environmental Protection Agency
FES	Fairbanks Environmental Services, Inc.
GRO	gasoline range organics
ICV	initial calibration verification
J	analytical result is qualified as an estimated value because the concentration is less than the LOQ
J+	analytical result is qualified as an estimated value with a high-bias due to a QC deviation
J-	analytical result is qualified as an estimated value with a low-bias due to a QC deviation
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LOD	limit of detection
LOQ	limit of quantitation
µg/L	micrograms per liter
mg/L	milligrams per liter
MS	matrix spike sample
MSD	matrix spike duplicate sample
NA	not applicable
NPDL	North Pacific Division Laboratory
PCE	tetrachloroethene
QC	quality control
QSM	Quality Systems Manual for Environmental Laboratories
R	analytical result is rejected and is not suitable for project use
RPD	relative percent difference
SDG	sample data group

SGS	SGS North America, Inc.
UFP-QAPP	Postwide Uniform Federal Policy Quality Assurance Project Plans
USACE	United States Army Corps of Engineers
VOA	volatile organic analysis
VOC	volatile organic compounds

1.0 INTRODUCTION

This Chemical Data Quality Review (CDQR) summarizes the technical review of analytical results generated in support of groundwater sample collection at the Neely Road site during 2018. The spring and fall groundwater sampling events are summarized in Section 1.3. Groundwater sample summary and analytical results tables are presented in Appendix A.

Fairbanks Environmental Services, Inc (FES) reviewed project and quality control (QC) analytical data to assess whether the data met the designated quality objectives and were acceptable for project use. The project data were reviewed for deviations to the requirements presented in the Final 2018 Postwide Work Plan (FES, 2018); Final Postwide Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP; FES, 2016); Alaska Department of Environmental Conservation (ADEC) Data Quality Objectives, Checklists, Quality Assurance Requirements for Laboratory Data, and Sample Handling Technical Memo (ADEC, 2017b); and United States Department of Defense (DoD) Quality Systems Manual for Environmental Laboratories (QSM), Version 5.1 (DoD, 2017). The review included evaluation of the following: sample collection and handling, holding times, blanks (to assess contamination), project sample and laboratory quality control sample duplicates (to assess precision), laboratory control samples (LCSs) and sample surrogate recoveries (to assess accuracy), and matrix spike sample (MS) recoveries (to assess matrix effects). QC deviations that do not impact data quality (e.g., high LCS recovery associated with non-detect results), are not discussed. More elaborate data quality descriptions are reported in the ADEC Laboratory Data Review Checklist, which is included at the end of Appendix B.

Groundwater results (and limits of detection [LODs] for non-detect results) were compared to 2018 ADEC groundwater cleanup levels presented in Title 18 of the Alaska Administrative Code (AAC) Chapter 75.345, Table C (ADEC, 2018).

Groundwater data quality is discussed in Section 2. Applicable data quality indicators are discussed for each method under separate subheadings. Data which did not meet acceptance criteria have been described and the associated samples and data quality implications or qualifications are summarized. All cited documents within the CDQR are listed in Section 3.

1.1 Analytical Methods and Data Quality Objectives

The analytical methods and associated data quality objectives (DQOs) used for this review were established in the UFP-QAPP (FES, 2016). The DQOs represent the minimum acceptable QC limits and goals for analytical measurements and are used as comparison criteria during data quality review to determine both the quality and usability of the analytical data. Table B-1 below summarizes the analytical methods employed, and the associated DQO goals, for groundwater samples.

Table B-1. Groundwater Analytical Methods and Data Quality Objectives

Parameter	Preparation Method	Analytical Method	Limit of Detection	Precision (RPD, %)	Accuracy (%)	Completeness (%)
Gasoline Range Organics (GRO)	SW5030B	AK101	0.050 mg/L	20	60-120	90
Diesel Range Organics (DRO)	SW3520C	AK102	0.300 mg/L	20	75-125	90
Benzene	SW5030B	SW8260C	200 µg/L	20	79-120	90
Toluene			500 µg/L	20	80-121	90
Ethylbenzene			500 µg/L	20	79-121	90
o-Xylene			500 µg/L	20	78-122	90
m,p-Xylene			1000 µg/L	20	80-121	90
1,2-Dichloroethane			250 µg/L	20	73-128	90
1,2,4-Trimethylbenzene			500 µg/L	20	79-124	90
1,2-Dibromoethane (EDB)			0.0040 µg/L	20	77-121	90
Tetrachloroethene (PCE)			500 µg/L	20	74-129	90
Remaining Volatile Organic Compounds (VOC)			Analyte Specific[a]	20	Analyte Specific[a]	90
Dissolved Iron/Manganese	SW3010A	SW6020A	250 µg/L (Fe) 1.0 µg/L (Mn)	20	87-118 (Fe) 87-115 (Mn)	90
Sulfate	E300.0	E300.0	100 µg/L	15	90-110	90

[a] The analyte-specific LODs and accuracies are presented in the Work Plan (FES, 2018)
µg/L – micrograms per liter
mg/L – milligrams per liter
RPD – relative percent difference

The six DQOs used for this review were accuracy, precision, representativeness, comparability, sensitivity, and completeness.

- *Accuracy* measures the correctness, or the closeness, between the true value and the quantity detected. It is measured by calculating the percent recovery of known concentrations of spiked compounds that were introduced into the appropriate sample matrix. Surrogate, LCS, and MS recoveries were used to measure accuracy for this project. LCS and surrogate recovery criteria are defined in the QSM.
- *Precision* measures the reproducibility of repetitive measurements. It is measured by calculating the relative percent difference (RPD) between duplicate samples. Laboratory duplicate samples, field duplicate samples, MS and matrix spike duplicate sample (MSD) pairs, and LCS and laboratory control sample duplicate (LCSD) pairs were used to measure precision for this project. LCS/LCSD precision criteria are defined in the QSM and field duplicate precision criteria are defined in the ADEC Laboratory Data Review Checklist (water: ≤30%).

- *Representativeness* describes the degree to which data accurately and precisely represents site characteristics. This is addressed in more detail in the following section(s).
- *Comparability* describes whether two data sets can be considered equivalent with respect to the project goal. This is addressed in more detail in the following section(s).
- *Sensitivity* describes the lowest concentration that the analytical method can reliably quantitate, and is evaluated by verifying that the detected results and/or LODs meet the project specific cleanup levels and/or screening levels.
- *Completeness* describes the amount of valid data obtained from the sampling event(s). It is calculated as the percentage of valid measurements compared to the total number of measurements. The completeness goal for this project was set at 90 percent.

In addition to these criteria for the six DQOs described above, sample collection and handling procedures and blank samples were reviewed to ensure overall data quality. Sample collection forms were reviewed to verify that representative samples were collected and samples were without headspace (if applicable). Sample handling was reviewed to assess parameters such as chain-of-custody (COC) documentation, the use of appropriate sample containers and preservatives, shipment cooler temperature, and method-specified sample holding times. Blank samples were analyzed to detect potential field or laboratory cross-contamination. Each of these parameters contributes to the general representativeness and comparability of the project data. The combination of evaluations of the above-mentioned parameters will lead to a determination of the overall project data completeness.

1.2 Data Qualifiers

Table B-2 below outlines general flagging criteria used for this project, listed in increasing severity, to indicate QC deficiencies. Data are qualified pursuant to findings determined in the review of project data.

Table B-2. Data Qualifier Definitions

Qualifier	Definition
ND	The analyte was analyzed for, but not detected.
J	The analyte is considered an estimated value. The analyte may be estimated due to its quantitation level (≥ DL and < LOQ), or it may signify that there is a QC deviation and the bias is unknown.
J+	The analyte is considered an estimated value with a high-bias due to a QC deviation.
J-	The analyte is considered an estimated value with a low-bias due to a QC deviation.
B	The analyte is detected in an associated blank. Result is less than 5x or 10x (for the common lab contaminants) the concentration. Therefore, the result may be high-biased.
R	Analyte result is rejected because of deficiencies in meeting QC criteria and may not be used for decision making.

1.3 Summary of Groundwater Samples

A total of 12 groundwater samples, consisting of 10 project samples and 2 field duplicate samples, were collected from monitoring wells at the Neely Road site during the spring and fall sampling events. In addition, one MS/MSD sample was submitted with each shipment for every analysis (one per 20 samples), one trip blank sample accompanied each cooler containing samples for volatile analyses, and equipment blank samples were collected to assess the potential for cross-contamination of the submersible pump. Samples were analyzed by the methods presented in Table B-1.

All project and quality control samples were analyzed by SGS North America, Inc. (SGS) of Anchorage, Alaska. The laboratory is validated by the State of Alaska through the Contaminated Sites Program for all methods employed, with the exception of sulfate by United States Environmental Protection Agency (EPA) Method 300.0 (method 300.0 is not listed as a Contaminated Sites analysis). In addition, the laboratory is Environmental Laboratory Accreditation Program (ELAP) certified for all methods. SGS is compliant with the DoD QSM for Environmental Laboratories, Version 5.1 (DoD, 2017), for the methods employed for this project.

All samples were shipped in two sample data groups (SDGs) and assigned the SGS report numbers 1182471 and 1184468. A sample summary table (Table A-1) and an analytical results table (Table A-2) are included in Appendix A. Groundwater sample data quality is discussed in Section 2.

2.0 GROUNDWATER DATA QUALITY REVIEW

This section presents the findings of the data quality review and the resulting data qualifications for groundwater samples. All samples were analyzed by SGS and are included in two SDGs, as discussed in Section 1.3. See the associated ADEC Laboratory Data Review Checklists for more elaborate data quality descriptions.

2.1 Sample Collection

All monitoring wells were purged and sampled with submersible pumps, and groundwater sampling activities were recorded on the groundwater sample forms provided in Appendix C. Groundwater sample forms were reviewed to ensure that well drawdown and groundwater parameters met the stabilization criteria identified in the ADEC Field Sampling Guidance (ADEC, 2017a) and the UFP-QAPP (FES, 2016), that low-flow sampling criteria was employed (Puls and Barcelona, 1996), and that all groundwater levels were within the screened intervals at the time of sampling. The following was noted upon review of the groundwater sample forms:

- All samples met stabilization criteria and all water levels were within the screened interval during sample collection.
- No free product was measured. Odor was observed on purge water from three wells (AP-8211, AP-9459, and AP-9684) during the spring and/or fall sample event. Petroleum sheen was observed on purge water from one well (AP-8211) during the fall sampling event.

An equipment blank sample was collected during each sampling event to evaluate the potential for submersible pump cross-contamination. Equipment blank results are further discussed in Section 2.3.

2.2 Sample Handling

The evaluation of proper sample handling procedures include verification of the following: correct COC documentation, appropriate sample containers and preservatives, cooler temperatures maintained within the ADEC-recommended temperature range (0 to 6 degrees Celsius [°C]), and sample analyses performed within method-specified holding times. No discrepancies were noted upon receipt at the laboratory.

2.3 Blanks

Method blanks, trip blanks, and equipment blanks were utilized to detect potential cross-contamination of project samples. Method blanks detect laboratory cross-contamination, trip blanks assess shipment and storage cross-contamination, and equipment blanks evaluate the potential for cross-contamination associated with wells that were sampled with non-dedicated submersible pumps. A trip blank accompanied every cooler containing samples for volatile analyses. The following blank contaminations were noted.

Method Blanks

Method blank samples were analyzed in every batch, as required. No method blank contamination was noted.

Trip Blanks

Trip blank samples were shipped in every cooler containing samples for volatile analyses. The analyte was detected in the trip blank sample and was also detected in associated project samples at a concentration less than 5 times that of the trip blank. Consequently, these results were qualified (B) as potential travel/storage cross-contamination. In all cases, impact to the project is negligible as the affected results are a minimum of two orders of magnitude below the ADEC cleanup level.

- Toluene: 18FWNR02WG, 18FWNR05WG, 18FWNR06WG, and equipment blank 18FWNREB01WQ (report 1183471)

Equipment Blanks

Two equipment blank samples were collected to evaluate the potential for submersible pump cross-contamination; one during the spring event (sample 18FWNREB01WQ) and one during the fall event (sample 17FWNREB02WQ). The results of the equipment blanks were compared against the results of the project samples for each sampling event.

The following analytes were detected in an equipment blank sample and were also detected in associated project samples within 5 times the concentration detected in the equipment blank. Consequently, the analytical results were qualified (B) as potential sampling cross-contamination. In all cases, impact to data quality was minor as the affected results were below the applicable groundwater cleanup level. See the associated ADEC Laboratory Data Review Checklists for more elaborate data quality descriptions and for equipment blank detections that did not result in data qualification.

- DRO: 18FWNR02WG, field duplicate pair 18FWNR03WG/18FWNR04WG, and 18FWNR06WG (report 1182471)
- Toluene: 18FWNR08WG and 18FWNR11WG (report 1184468)

2.4 Laboratory Control Samples

The LCS/LCSD samples were prepared by adding spike compounds to blank samples in order to assess laboratory extraction and instrumentation performance. The performance of a LCS sample is a requirement for every QC batch to evaluate recovery accuracy. In addition, a LCSD is required for all Alaska fuel methods to evaluate batch precision. For QC batches that do not contain a LCSD, precision is evaluated by performing a sample duplicate, which is further discussed in Section 2.5.

All LCS and/or LCSD samples were performed, as required. The accuracy of analyte recoveries for LCS samples, and precision of the LCS/LCSD sample pair (when applicable), was evaluated. No LCS and/or LCSD accuracy or precision discrepancies requiring qualifications were noted.

2.5 Matrix Spike Samples and Sample Duplicates

MS samples were prepared by adding spike compounds to project samples in order to assess potential matrix interference. The performance of a MS sample analysis is a requirement in every QC batch, at a minimum frequency of 1 for every 20 samples, to evaluate recovery accuracy. In addition, precision of each QC batch was evaluated by performing either a MSD sample analysis or a sample duplicate analysis and calculating the RPD. All QC batches have met these criteria, with the exception VOC batch MXX32906. This batch contained one sample (18FWNR11WG) that was being re-analyzed for 1,2,4-trimethylbenzene due to a required dilution. Impact to the project was negligible as all other analytes associated with the affected sample were reported in the preceding batch containing an MS/MSD sample.

For the batches containing MS/MSD samples, the accuracy and precision of the MS/MSD pair were evaluated. No MS/MSD accuracy or precision discrepancies requiring qualifications were noted. Criteria exceedances that did not result in data qualification are discussed in the associated ADEC Laboratory Data Review Checklists.

2.6 Surrogate Recovery

Surrogate compounds were added to project samples by the laboratory prior to analysis, in accordance with method requirements. Surrogate recoveries were then calculated as percentages and reported by the laboratory as a measure of analytical extraction efficiency. The following surrogate recovery was outside the established limits and resulted in data qualification.

- GRO surrogate 4-bromofluorobenzene was recovered above the upper control limit in sample 18FWNR12WG (156% vs 150%). Consequently, the GRO result for this sample was qualified (J+) as an estimate with a high bias. Impact to the project is negligible as the exceedance was not significant and the affected result (1.5 µg/L) is below the ADEC cleanup level (2.2 µg/L).

2.7 Field Duplicates

Two field duplicate samples were collected and submitted to the laboratory as blind samples during groundwater sampling operations at the Neely Road site; one from each sampling event. Field duplicates were collected at a minimum frequency of 10 percent for each analytical method, and for each SDG, which meets the UFP-QAPP requirement.

Field duplicate results for detected analytes, contaminants of concern (detected and not detected), and natural attenuation parameters are summarized in Table B-3. In the case where a result was non-detect, the LOD was used for RPD calculation purposes. The non-detect results are identified

with "ND" and the LOD in brackets. If both results of the field duplicate pair were less than the LOQ (i.e., J-flagged or non-detect), the RPD was calculated but the comparison criterion is not applicable, per the UFP-QAPP.

All (applicable) field duplicate sample results were within the ADEC criterion of ≤30% and, therefore, are considered comparable, with the exception of GRO in field duplicate sample pair 18FWNR03WG/17FWNR04WG (identified in gray shading in Table B-3) collected during the spring 2018 sampling event. Consequently, the results for these analytes in the field duplicate sample pair were qualified (J) due to imprecision. Impact to the project is negligible as both results are below the ADEC cleanup level. GRO has not exceeded the cleanup level in this well (AP-9459) since 2009.

Table B-3. Groundwater Field Duplicate Sample Results Evaluation

Analyte	Method	Units	Primary 18FWNR03WG (AP-9459) [1]	Field Duplicate 18FWNR04WG (AP-9459) [1]	RPD, %	Comparable Criteria Met? [3]
GRO	AK101	mg/L	0.362 [0.05]	0.139 [0.05]	89	No
DRO	AK102	mg/L	0.559 [0.296] J	0.555 [0.303] J	1	Not Applicable
Sulfate	E300.0	µg/L	31800 [500]	32400 [500]	2	Yes
Iron	SW6020A	µg/L	4250 [250]	4230 [250]	0	Yes
Manganese	SW6020A	µg/L	3600 [5]	3620 [5]	1	Yes
1,2,4-Trimethylbenzene	SW8260C	µg/L	1.8 [0.5]	1.61 [0.5]	11	Yes
1,2-Dibromoethane	SW8260C	µg/L	ND [0.0375]	ND [0.0375]	0	Not Applicable
1,2-Dichloroethane	SW8260C	µg/L	ND [0.25]	ND [0.25]	0	Not Applicable
1,3,5-Trimethylbenzene	SW8260C	µg/L	2.36 [0.5]	2.23 [0.5]	6	Yes
Benzene	SW8260C	µg/L	1.39 [0.2]	1.31 [0.2]	6	Yes
Ethylbenzene	SW8260C	µg/L	ND [0.5]	ND [0.5]	0	Not Applicable
Naphthalene	SW8260C	µg/L	ND [0.5]	ND [0.5]	0	Not Applicable
o-Xylene	SW8260C	µg/L	ND [0.5]	ND [0.5]	0	Not Applicable
Tetrachloroethene	SW8260C	µg/L	ND [0.5]	ND [0.5]	0	Not Applicable
Toluene	SW8260C	µg/L	ND [0.5]	ND [0.5]	0	Not Applicable
Trichloroethene	SW8260C	µg/L	ND [0.5]	ND [0.5]	0	Not Applicable
Xylene, Isomers m & p	SW8260C	µg/L	ND [1]	ND [1]	0	Not Applicable
Xylenes	SW8260C	µg/L	ND [1.5]	ND [1.5]	0	Not Applicable
Analyte	**Method**	**Units**	**Primary 18FWNR09WG (AP-9459) [2]**	**Field Duplicate 18FWNR10WG (AP-9459) [2]**	**RPD, %**	**Comparable Criteria Met? [3]**
GRO	AK101	mg/L	ND [0.05]	ND [0.05]	0	Not Applicable
DRO	AK102	mg/L	0.347 [0.332] J	0.375 [0.321] J	8	Yes
Sulfate	E300.0	µg/L	36200 [500]	36100 [500]	0	Yes
Iron	SW6020A	µg/L	4040 [250]	3950 [250]	2	Yes
Manganese	SW6020A	µg/L	3120 [5]	3010 [5]	4	Yes
1,2,4-Trimethylbenzene	SW8260C	µg/L	2.16 [0.5]	2.25 [0.5]	4	Yes
1,2-Dibromoethane	SW8260C	µg/L	ND [0.0375]	ND [0.0375]	0	Not Applicable
1,2-Dichloroethane	SW8260C	µg/L	ND [0.25]	ND [0.25]	0	Not Applicable
1,3,5-Trimethylbenzene	SW8260C	µg/L	2.99 [0.5]	3.03 [0.5]	1	Yes
4-Isopropyltoluene	SW8260C	µg/L	0.37 [0.5] J	0.37 [0.5] J	0	Not Applicable
Benzene	SW8260C	µg/L	0.35 [0.2] J	0.35 [0.2] J	0	Not Applicable
Ethylbenzene	SW8260C	µg/L	ND [0.5]	ND [0.5]	0	Not Applicable

Table B-3. Groundwater Field Duplicate Sample Results Evaluation (continued)

Analyte	Method	Units	Primary 18FWNR09WG (AP-9459) [2]	Field Duplicate 18FWNR10WG (AP-9459) [2]	RPD, %	Comparable Criteria Met? [3]
Naphthalene	SW8260C	µg/L	0.53 [0.5] J	0.58 [0.5] J	9	Not Applicable
Tetrachloroethene	SW8260C	µg/L	ND [0.5]	ND [0.5]	0	Not Applicable
Toluene	SW8260C	µg/L	ND [0.5]	ND [0.5]	0	Not Applicable
Trichloroethene	SW8260C	µg/L	ND [0.5]	ND [0.5]	0	Not Applicable
Xylenes	SW8260C	µg/L	ND [1.5]	ND [1.5]	0	Not Applicable

All results are in µg/L, except for DRO and GRO, which are in mg/L. Non-detected (ND) results are shown with limits of detection (LODs) in brackets, which are used for relative percent difference (RPD) calculations.
[1] – The samples are associated with report 1182471.
[2] – The samples are associated with report 1184468.
[3] – RPD of ≤30 percent was used for evaluating water-matrix field duplicate samples
J – Result is estimated since it is reported below the LOQ

2.8 Additional Quality Control Discrepancies

Additional QC samples and procedures not discussed in the preceding sections of this CDQR are evaluated if deviations are noted by the laboratory in the case narratives. Additional QC samples/procedures may include, but are not limited to, instrument tuning, initial calibration verification (ICV) samples, continuing calibration verification (CCV) samples, and internal standards.

No QC discrepancies were noted by the laboratory that affected project samples. Criteria exceedances that did not result in data qualification are discussed in the associated ADEC Laboratory Data Review Checklists.

2.9 Analytical Sensitivity

Several project data analytes were reported above the detection limit (DL) but below the limit of quantitation (LOQ) and were thus qualified as estimates due to the unknown accuracy of the analytical method at those concentrations. These data qualifications are not reported again in this CDQR, but they are noted with a "J" in the associated results table in Appendix A.

Analytical sensitivity was evaluated to verify that LODs met the applicable ADEC cleanup level for non-detect results, as appropriate. 1,2,3-Trichloropropane in all samples analyzed by 8260C did not meet applicable ADEC groundwater cleanup level listed in 18 AAC 75.345. This analyte may not be detected, if present, at the respective cleanup level. Impact to the project is not significant as this analyte is not a site contaminant of concern.

2.10 Summary of Qualified Results

Overall, the review process deemed the groundwater project data acceptable for use. Several results were qualified as estimates; however, data quality impact is minor and no data were rejected pursuant to FES's data quality review.

Table B-4 below summarizes the qualified 2018 groundwater results associated with the sampling events at the Neely Road site, including the associated sample numbers, analytes, and the reason for qualification.

Table B-4. Summary of Groundwater Data Qualifications

SDG	Sample Numbers	Analytes	Qualification	Explanation
1182471	18FWNR02WG 18FWNR05WG 18FWNR06WG equipment blank 18FWNREB01WQ	Toluene	B	Trip blank contamination
	18FWNR03WG 18FWNR04WG	GRO	J	Field duplicate imprecision
	18FWNR02WG 18FWNR03WG 18FWNR04WG 18FWNR06WG	DRO	B	Equipment blank contamination
1184468	18FWNR12WG	GRO	J+	High-biased surrogate recovery
	18FWNR08WG 18FWNR11WG	Toluene	B	Equipment blank contamination

2.11 Completeness

Completeness scores were calculated for each analytical method employed for the project. Scores were obtained by assigning points to 14 different data quality categories during the review process. A maximum of 10 points was awarded for each category; points were based on the number of samples successfully meeting data quality objectives for that category. Points were subtracted when failure to meet DQOs resulted in data qualification or data rejection. The scores were then summed to determine the total points for a method, and completeness scores were determined as follows: (total points received)/(total points possible) x 100.

A breakdown of the points received for each category and method is shown in Table B-5 on the following page. All Neely Road site data quality categories met the completeness criteria of 90 percent established in the UFP-QAPP for the sampling events. No data were rejected pursuant to the data quality review, and all data may be used, as qualified, for the purposes of the 2018 Neely Road Monitoring Report.

Table B-5. Completeness Scores for Groundwater Samples

Data Quality Category	Points VOC	Points GRO	Points DRO	Points Fe/Mn	Points Sulfate
Sample Collection	10	10	10	10	10
COC Documentation	10	10	10	10	10
Sample Containers/Preservation	10	10	10	10	10
Cooler Temperature	10	10	10	10	10
Holding Times	10	10	10	10	10
Method Blanks	10	10	10	10	10
Trip Blanks	9	10	NA	NA	NA
Equipment Blank	9	10	8	10	10
LCS/LCSD Recovery & RPD	10	10	10	10	10
MS/MSD Recovery & RPD	10	10	10	10	10
Surrogate Recovery	10	9	10	NA	NA
Field Duplicate	10	9	10	10	10
CCV, Internal Stds, other	10	10	10	10	10
Sensitivity (DL/LOD)	9	10	10	10	10
Total Points Received	137	138	128	120	120
Total Points Possible	140	140	130	120	120
Percent Completeness	98	99	98	100	100

NA – not applicable

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3.0 REFERENCES

Alaska Department of Environmental Conservation (ADEC), 2018. *18 AAC 75, Oil and Other Hazardous Substances Pollution Control*. As amended through September 29, 2018.

ADEC, 2017a. *Field Sampling Guidance*. August.

ADEC, 2017b. *Technical Memorandum – Data Quality Objectives, Checklists, Quality Assurance Requirements for Laboratory Data, and Sample Handling.* March.

Department of Defense (DoD), 2017. *DoD Quality Systems Manual for Environmental Laboratories, Version 5.1.*

Fairbanks Environmental Services (FES), 2018. *Final 2018 Postwide Work Plan, Fort Wainwright, Alaska.* July.

FES, 2016. *Final Postwide Uniform Federal Policy for Quality Assurance Project Plans, Fort Wainwright, Alaska.* August.

Puls, R.W. and M. J. Barcelona, 1996. *Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures.* EPA/540/S-95/504. April.

Laboratory Data Review Checklist

Completed By:

Vanessa Ritchie

Title:

Senior Chemist

Date:

08/07/2018

CS Report Name:

Fort Wainwright Neely Road

Report Date:

06/15/2018

Consultant Firm:

Fairbanks Environmental Services

Laboratory Name:

SGS North America Inc. – Anchorage, AK

Laboratory Report Number:

1182471

ADEC File Number:

108.38.078 (Building 3570)

Hazard Identification Number:

3691 (Building 3570)

1182471

1. Laboratory

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

   (•) Yes ( ) No Comments:

Yes; however, EPA Method 300.0 is not listed as a CS analysis.

   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, samples were not transferred to another laboratory.

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:

The coolers arrived at the laboratory containing temperature blanks with readings within the ADEC recommended temperature range of 0° to 6°C.

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

   (•) Yes ( ) No Comments:

   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:

No discrepancies were noted upon sample login.

e. Data quality or usability affected?

Comments:

No data quality or usability was affected by the sample receipt documentation.

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No Comments:

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

(•) Yes ( ) No Comments:

Not applicable. No analytical discrepancies associated with the data reported in this work order were noted.

c. Were all corrective actions documented?

(•) Yes ( ) No Comments:

Not applicable. No analytical discrepancies were noted.

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

Comments:

Case narrative does not discuss effect on data quality, it only discusses discrepancies and what was done in light of them. Any notable data quality issues mentioned in the case narrative are discussed above in 4b or elsewhere within this ADEC checklist.

5. Samples Results

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

(•) Yes ( ) No Comments:

b. All applicable holding times met?

(•) Yes ( ) No Comments:

c. All soils reported on a dry weight basis?

○ Yes ◉ No Comments:

Not applicable. No soil samples were included in this work order.

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

○ Yes ◉ No Comments:

Analytical sensitivity was evaluated to verify that LODs met the applicable ADEC cleanup level for non-detect results, as appropriate. 1,2,3-Trichloropropane in all samples analyzed by 8260C did not meet applicable ADEC groundwater cleanup level listed in 18 AAC 75.345. This analyte may not be detected, if present, at the respective cleanup level. Impact to the project is not significant as this analyte is not a site contaminant of concern.

All analytes that are non-detect with LODs elevated above cleanup levels are identified with gray shading in the results table (Table A-2) presented in the Annual Monitoring Report.

e. Data quality or usability affected?

○ Yes ◉ No Comments:

See discussion above in 5d.

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:

No target analytes were detected in the method blank samples.

iii. If above LOQ, what samples are affected?

Comments:

Not applicable, target analytes were not detected in the method blank samples.

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

○ Yes ◉ No Comments:

Not applicable, qualifications were not necessary.

v. Data quality or usability affected?

Comments:

No data quality or usability was affected by the method blank samples.

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:

All LCS/LCSD and MS/MSD samples were performed as required.

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

(•) Yes ( ) No Comments:

All LCS and MS/MSD samples were performed as required.

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:

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:

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

Comments:

Not applicable. All analytes were recovered within control limits.

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

( ) Yes (•) No Comments:

Not applicable. All analytes were recovered within control limits.

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

Comments:

No data quality or usability was affected by the LCS/LCSD or MS/MSD samples.

c. Surrogates – Organics Only

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

(•) Yes ( ) No 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 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. All surrogates were recovered within control limits.

iv. Data quality or usability affected?

Comments:

No data quality or usability was affected by the surrogates.

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:

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:

Trip blank sample 18FWNRTB01WQ for VOC and GRO analyses were included in cooler 052901.

iii. All results less than LOQ?

(●) Yes ( ) No Comments:

No trip blank results were above the LOQ; however; toluene (0.8 µg/L) was detected in the trip blank sample at a concentration below the LOQ (1.00 µg/L). Toluene was detected at a concentration less than five-times that of the trip blank in associated samples 18FWNR02WG, 18FWNR05WG, 18FWNR06WG, and equipment blank 18FWNREB01WQ. Consequently, the results were qualified (B) as potential travel/storage cross-contamination. Impact to the project is negligible as the affected results are a minimum of two orders of magnitude below the ADEC cleanup level.

iv. If above LOQ, what samples are affected?

Comments:

See 6div above.

v. Data quality or usability affected?

Comments:

See 6div above.

e. Field Duplicate

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

(●) Yes ( ) No Comments:

One groundwater field duplicate was collected for the five primary samples associated with this work order.

ii. Submitted blind to lab?

(●) Yes ( ) No Comments:

Sample 18FWNR04WG was a field duplicate of 18FWNR03WG.

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

RPD (%) = 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:

All detected analytes and contaminants of concern (detected and not detected) are shown in the table below. In the case where a result was non-detect, the LOD was used for RPD calculation purposes. The non-detect results are identified with "ND" and the LOD in brackets. In the event that both results are less than the LOQ (i.e., J-flagged or non-detect), the RPD was calculated but the comparison criterion is not applicable, per the Postwide UFP-QAPP.

All (applicable) results for field duplicate sample pair 18FWNR03WG/18FWNR04WG were comparable (RPD ≤ 30%), with the exception of GRO (89%). Consequently, the GRO results for the field duplicate pair were qualified (J) as estimated values due to the imprecision. Impact to the project is negligible as both results are below the ADEC cleanup level. GRO has not exceeded the cleanup level in this well (AP-9459) since 2009.

Analyte	Method	Units	Primary 18FWNR03WG (AP-9459)	Field Duplicate 18FWNR04WG (AP-9459)	RPD, %	Comparable Criteria Met?
Gasoline Range Organics	AK101	mg/L	0.362 [0.05]	0.139 [0.05]	89	No
Diesel Range Organics	AK102	mg/L	0.559 [0.296] J	0.555 [0.303] J	1	Not Applicable
Sulfate	E300.0	µg/L	31800 [500]	32400 [500]	2	Yes
Iron	SW6020A	µg/L	4250 [250]	4230 [250]	0	Yes
Manganese	SW6020A	µg/L	3600 [5]	3620 [5]	1	Yes
1,2,4-Trimethylbenzene	SW8260C	µg/L	1.8 [0.5]	1.61 [0.5]	11	Yes
1,2-Dibromoethane	SW8260C	µg/L	ND [0.0375]	ND [0.0375]	0	Not Applicable
1,2-Dichloroethane	SW8260C	µg/L	ND [0.25]	ND [0.25]	0	Not Applicable
1,3,5-Trimethylbenzene	SW8260C	µg/L	2.36 [0.5]	2.23 [0.5]	6	Yes
Benzene	SW8260C	µg/L	1.39 [0.2]	1.31 [0.2]	6	Yes
Ethylbenzene	SW8260C	µg/L	ND [0.5]	ND [0.5]	0	Not Applicable
Naphthalene	SW8260C	µg/L	ND [0.5]	ND [0.5]	0	Not Applicable
o-Xylene	SW8260C	µg/L	ND [0.5]	ND [0.5]	0	Not Applicable
Tetrachloroethene (PCE)	SW8260C	µg/L	ND [0.5]	ND [0.5]	0	Not Applicable
Toluene	SW8260C	µg/L	ND [0.5]	ND [0.5]	0	Not Applicable
Trichloroethene (TCE)	SW8260C	µg/L	ND [0.5]	ND [0.5]	0	Not Applicable
Xylene, Isomers m & p	SW8260C	µg/L	ND [1]	ND [1]	0	Not Applicable
Xylenes	SW8260C	µg/L	ND [1.5]	ND [1.5]	0	Not Applicable

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

Comments:

See 6eiii above.

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

(•) Yes ( ) No ( ) Not Applicable

Equipment blank sample 18FWNREB01WQ was included in this work order to assess the potential for cross-contamination of the submersible pump. All wells in this SDG were sampled with a submersible pump, per the UFP-QAPP.

i. All results less than LOQ?

(•) Yes ( ) No Comments:

All detected results were less than the LOQ; however, the following five analytes were detected at concentrations less than the LOQ: DRO (0.217 mg/L), sulfate (62 µg/L), manganese (0.709 µg/L), chloroform (0.47 µg/L), and toluene (0.74 µg/L). The detection of toluene may be due to travel/storage cross-contamination, as suggested by a similar concentration in the associated trip blank sample. No additional qualifiers were added to toluene data due to equipment blank contamination. Moreover, no data were qualified due to sulfate, manganese, or chloroform detections in the equipment blank as all project sample data were at concentrations exceeding five-times that of the equipment blank sample (sulfate and manganese) or were not detected in sample data (chloroform). DRO data in the following samples were qualified (B) as potential submersible pump cross-contamination as the results were within five-times that of the equipment blank sample: 18FWNR02WG, field duplicate pair 18FWNR03WG/18FWNR04WG, and 18FWNR06WG. Impact to the project is negligible as the affected data are less than the ADEC cleanup level.

ii. If above LOQ, what samples are affected?

Comments:

See 6fi above.

iii. Data quality or usability affected?

Comments:

See 6fi above.

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

a. Defined and appropriate?

( ) Yes (•) No Comments:

No other data flags/qualifiers were used.

Laboratory Data Review Checklist

Completed By:

Vanessa Ritchie

Title:

Senior Chemist

Date:

10/04/2018

CS Report Name:

Fort Wainwright Neely Road

Report Date:

09/14/2018

Consultant Firm:

Fairbanks Environmental Services

Laboratory Name:

SGS North America Inc. – Anchorage, AK

Laboratory Report Number:

1184468

ADEC File Number:

108.38.078 (Building 3570)

Hazard Identification Number:

3691 (Building 3570)

1184468

1. Laboratory

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

   (•) Yes ( ) No Comments:

Yes; however, EPA Method 300.0 is not listed as a CS analysis.

   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, samples were not transferred to another laboratory.

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:

The coolers arrived at the laboratory containing temperature blanks with readings within the ADEC recommended temperature range of 0° to 6°C.

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

   (•) Yes ( ) No Comments:

   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:

No discrepancies were noted upon sample login.

e. Data quality or usability affected?

Comments:

No data quality or usability was affected by the sample receipt documentation.

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No Comments:

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

(•) Yes ( ) No Comments:

The case narrative described MS/MSD and surrogate recovery exceptions discussed in sections 6b and 6c, respectively. The narrative also described CCV and low level quantitation check exceptions, which are discussed here.

The 8260C CCV in batch VMS18184 had recovery for bromomethane (126%) and chloroethane (124%) above the upper control limit (120%). These analytes were not detected in associated project samples, so no data were impacted by the high recoveries. The 8260C CCV in batch VMS18188 had recovery for dichlorodifluoromethane, bromomethane, and chloroethane above the upper control limit. However, 1,2,4-trimethylbenzene was the only analyte reported in this batch, so no data were impacted.

The case narrative described a low level quantitation check failure for mercury; however, mercury was not reported in this SDG so no data were impacted.

c. Were all corrective actions documented?

(•) Yes ( ) No Comments:

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

Comments:

Case narrative does not discuss effect on data quality, it only discusses discrepancies and what was done in light of them. Any notable data quality issues mentioned in the case narrative are discussed above in 4b or elsewhere within this ADEC checklist.

1184468

5. Samples Results

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

(•) Yes ( ) No Comments:

b. All applicable holding times met?

(•) Yes ( ) No Comments:

c. All soils reported on a dry weight basis?

( ) Yes (•) No Comments:

Not applicable. No soil samples were included in this work order.

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

( ) Yes (•) No Comments:

Analytical sensitivity was evaluated to verify that LODs met the applicable ADEC cleanup level for non-detect results, as appropriate. 1,2,3-Trichloropropane in all samples analyzed by 8260C did not meet applicable ADEC groundwater cleanup level listed in 18 AAC 75.345. This analyte may not be detected, if present, at the respective cleanup level. Impact to the project is not significant as this analyte is not a site contaminant of concern.

All analytes that are non-detect with LODs elevated above cleanup levels are identified with gray shading in the results table (Table A-2) presented in the Annual Monitoring Report.

e. Data quality or usability affected?

( ) Yes (•) No Comments:

See discussion above in 5d.

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:

No target analytes were detected in the method blank samples.

iii. If above LOQ, what samples are affected?

Comments:

Not applicable, target analytes were not detected in the method blank samples.

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

○ Yes ◉ No Comments:

Not applicable, qualifications were not necessary.

v. Data quality or usability affected?

Comments:

No data quality or usability was affected by the method blank samples.

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:

All LCS/LCSD and MS/MSD samples were performed as required, with the exception that no MS/MSD sample was analyzed in VOC batch MXX32906. This batch contained one sample (18FWNR11WG) that was being re-analyzed for 1,2,4-trimethylbenzene due to a required dilution. Impact to the project was negligible as all other analytes associated with the affected sample were reported in the preceding batch containing an MS/MSD sample.

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

◉ Yes ○ No Comments:

All LCS and MS/MSD samples were performed as required.

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:

The sulfate MS and MSD prepared from sample 18FWNR09WG recovered marginally below the lower control limit for sulfate (87%/88% vs 90%). The spike amounts were less than the parent sample concentration, so the recovery criteria were not applicable. No data were qualified.

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:

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

Comments:

Not applicable. No recovery failures required qualification. See 6biii.

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

( ) Yes (•) No Comments:

Not applicable. No recovery failures required qualification. See 6biii.

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

Comments:

No data quality or usability was affected by the LCS/LCSD or MS/MSD samples.

c. Surrogates – Organics Only

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

(•) Yes ( ) No 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 Comments:

GRO surrogate 4-bromofluorobenzene was recovered above the upper control limit in sample 18FWNR12WG (156% vs 150%). Consequently, the GRO result for this sample was qualified (J+) as an estimate with a high bias. Impact to the project is negligible as the exceedance was not significant and the affected result (1.5 µg/L) is below the ADEC cleanup level (2.2 µg/L).

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

(•) Yes ( ) No Comments:

iv. Data quality or usability affected?

Comments:

See the discussion in 6cii above.

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:

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:

Trip blank sample 18FWNRTB02WQ for VOC and GRO analyses were included in cooler FES11.

iii. All results less than LOQ?

(•) Yes ( ) No Comments:

No target analytes were detected in the trip blank sample.

iv. If above LOQ, what samples are affected?

Comments:

Not applicable. No target analytes were detected in the trip blank sample.

v. Data quality or usability affected?

Comments:

No data quality or usability was affected by the trip blank sample.

e. Field Duplicate

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

(•) Yes ( ) No Comments:

One groundwater field duplicate was collected for the five primary samples associated with this work order.

ii. Submitted blind to lab?

(•) Yes ( ) No Comments:

Sample 18FWNR10WG was a field duplicate of 18FWNR09WG.

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

RPD (%) = 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:

All detected analytes and contaminants of concern (detected and not detected) are shown in the table below. In the case where a result was non-detect, the LOD was used for RPD calculation purposes. The non-detect results are identified with "ND" and the LOD in brackets. In the event that both results are less than the LOQ (i.e., J-flagged or non-detect), the RPD was calculated but the comparison criterion is not applicable, per the Postwide UFP-QAPP.

All (applicable) results for field duplicate sample pair 18FWNR09WG/18FWNR10WG were comparable (RPD ≤ 30%).

Analyte	Method	Units	Primary 18FWNR09WG (AP-9459)	Field Duplicate 18FWNR10WG (AP-9459)	RPD, %	Comparable Criteria Met?
Gasoline Range Organics	AK101	mg/L	ND [0.05]	ND [0.05]	0	Not Applicable
Diesel Range Organics	AK102	mg/L	0.347 [0.332] J	0.375 [0.321] J	8	Yes
Sulfate	E300.0	µg/L	36200 [500]	36100 [500]	0	Yes
Iron	SW6020A	µg/L	4040 [250]	3950 [250]	2	Yes
Manganese	SW6020A	µg/L	3120 [5]	3010 [5]	4	Yes
1,2,4-Trimethylbenzene	SW8260C	µg/L	2.16 [0.5]	2.25 [0.5]	4	Yes
1,2-Dibromoethane	SW8260C	µg/L	ND [0.0375]	ND [0.0375]	0	Not Applicable
1,2-Dichloroethane	SW8260C	µg/L	ND [0.25]	ND [0.25]	0	Not Applicable
1,3,5-Trimethylbenzene	SW8260C	µg/L	2.99 [0.5]	3.03 [0.5]	1	Yes
4-Isopropyltoluene	SW8260C	µg/L	0.37 [0.5] J	0.37 [0.5] J	0	Not Applicable
Benzene	SW8260C	µg/L	0.35 [0.2] J	0.35 [0.2] J	0	Not Applicable
Ethylbenzene	SW8260C	µg/L	ND [0.5]	ND [0.5]	0	Not Applicable
Naphthalene	SW8260C	µg/L	0.53 [0.5] J	0.58 [0.5] J	9	Not Applicable
Tetrachloroethene (PCE)	SW8260C	µg/L	ND [0.5]	ND [0.5]	0	Not Applicable
Toluene	SW8260C	µg/L	ND [0.5]	ND [0.5]	0	Not Applicable
Trichloroethene (TCE)	SW8260C	µg/L	ND [0.5]	ND [0.5]	0	Not Applicable
Xylenes	SW8260C	µg/L	ND [1.5]	ND [1.5]	0	Not Applicable

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

Comments:

See 6eiii above.

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

(•) Yes ( ) No ( ) Not Applicable

Equipment blank sample 18FWNREB02WQ was included in this work order to assess the potential for cross-contamination of the submersible pump. All wells in this SDG were sampled with a submersible pump, per the UFP-QAPP.

i. All results less than LOQ?

(•) Yes ( ) No Comments:

All detected results were less than the LOQ; however, manganese and toluene were detected at concentrations less than the LOQ. No manganese data were qualified as all project sample data were at concentrations exceeding five-times that of the equipment blank sample. The toluene data in samples 18FWNR08WG and 18FWNR11WG were qualified (B) as potential submersible pump cross-contamination as the results were within five-times that of the equipment blank sample. Impact to the project is negligible as the affected data were three orders of magnitude less than the ADEC cleanup level.

ii. If above LOQ, what samples are affected?

Comments:

See 6fi above.

iii. Data quality or usability affected?

Comments:

See 6fi above.

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

a. Defined and appropriate?

( ) Yes (•) No Comments:

No other data flags/qualifiers were used.

APPENDIX C

GROUNDWATER SAMPLING FORMS, GROUNDWATER FIELD MEASUREMENTS, AND FIELD FORMS

Table C-1 - 2018 Neely Road Groundwater Sample Field Measurements

Well ID	Sample ID	Sample Date	Sample Time	Field Measurements							
				Water Depth[1] (feet btoc)	Temp (°C)	Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Well Stabilized[2] (Y/N)
Neely Road - Spring Groundwater 2018											
AP-9685	18FWNR01WG	5/24/2018	1030	12.82	9.25	0.735	0.83	6.40	146.10	6.24	Y
AP-9684	18FWNR02WG	5/24/2018	1140	16.83	9.37	0.797	0.58	6.42	48.80	4.36	Y
AP-9459	18FWNR03WG	5/24/2018	1315	15.71	14.71	0.763	0.82	6.24	1.00	1.88	Y
AP-2020	18FWNR04WG	DUPLICATE OF 18FWNR03WG									
AP-8211	18FWNR05WG	5/24/2018	1500	16.64	7.02	0.822	0.93	6.65	3.70	8.30	Y
AP-9003	18FWNR06WG	5/24/2018	1615	17.80	7.60	0.831	1.160	5.97	-3.90	4.59	Y
Neely Road - Fall Groundwater 2018											
AP-9685	18FWNR07WG	8/10/2018	930	12.96	12.10	0.857	5.07	7.03	177.90	2.57	Y
AP-9684	18FWNR08WG	8/10/2018	1030	16.96	11.25	0.978	0.58	6.79	-118.00	1.23	Y
AP-9459	18FWNR09WG	8/10/2018	1145	15.86	17.32	0.693	0.35	6.96	-116.00	1.19	Y
AP-2020	18FWNR10WG	DUPLICATE OF 18FWNR09WG									
AP-8211	18FWNR11WG	8/10/2018	1315	16.71	8.40	1.301	0.94	6.54	-43.70	19.33	Y
AP-9003	18FWNR12WG	8/10/2018	1415	17.89	8.07	1.115	0.96	6.66	-20.00	6.13	Y

Notes:

[1] Water depth shown was measured on the date shown prior to removing purge water

[2] Well stabilization as defined by ADEC Field Sampling Guidance (March 2016).
Individulal parameter stabilization discrepancies and potential impact to data quality is discussed in the CDQR.

Acronyms

°C - degree Celcius
bgs - below ground surface
DO - dissolved oxygen
mg/L - milligrams per liter
mS/cm - millisiemens per centimeter
mV - millivolts
NTU - nephelomatic turbidity units
ORP - oxidation reduction potential

GROUNDWATER SAMPLE FORM | **NEELY ROAD** | **Ft. Wainwright, Alaska**

Project #: 9011-08 | Site Location: NEELY RD

Date: 5/24/18 | Probe/Well #: AP-9685

Time: 1030 | Sample ID: 18FWNR 01 WG

Sampler: SK

Weather: Rain | Outside Temperature: 45°F

QA/QC Sample ID/Time/LOCID: | MS/MSD Performed? Yes/(No)

Purge Method: Peristaltic Pump / (Submersible) / Bladder | Sample Method: Peristaltic Pump / (Submersible) / Hydrasleeve / Bladder / Other

Equipment Used for Sampling: YSI # 8 | Turbidity Meter #: 11 | Water Level: SOL

Free Product Observed in Probe/Well? Yes/(No) | If Yes, Depth to Product:

Column of Water in Probe/Well | Sampling Depth

Total Depth in Probe/Well (feet btoc): 22.22 | Well Screened (Across) / Below water table

Depth to Water from TOC (feet): - 12.82 | Depth tubing / pump intake set* approx. 14 feet below top of casing

Column of Water in Probe/Well (feet): = 9.40 | *Tubing/pump intake must be set approximately 2 feet below the water table for wells screened across the water table, or in the middle of the screened interval for wells screened below the water table

Circle: Gallons per foot of 1.25" (X 0.064) or 2" (X 0.163) or 4" (X 0.65)

Volume of Water in 1 Probe/Well Casing (gal): 1.53

Micropurge well/probe at a rate of 0.03 to 0.15 GPM until parameters stabilize or 3 casing volumes have been removed. If well draws down below tubing or pump intake, stop purging and sample as a low-yield well using a no-purge technique.

Field Parameters:		±3% (or ±0.2°C max)	*At least 3 of the 5 parameters below must stabilize*					<0.33 feet after initial drawdown
			±3%	±10% (<1mg/L, ±0.2 mg/L)	±0.1 units	±10 mV	±10% (<10NTU, ±1NTU)	
Water Removed (gal)	Time Purged (min)	Temperature (°C)	Conductivity (mS/cm)	Dissolved O_2 (mg/L)	pH	Potential (mV)	Turbidity (NTU)	Water Level (ft)
0.4	5	9.13	0.735	2.23	6.98	150.5	22.03	12.85
0.8	10	9.46	0.733	1.37	6.62	152.3	14.77	12.85
1.2	15	9.49	0.734	1.05	6.54	147.6	11.98	12.85
1.6	20	9.36	0.733	0.92	6.50	147.1	9.19	12.85
2.0	25	9.29	0.735	0.86	6.41	146.8	8.03	12.85
2.4	30	9.25 ✓	0.735 ✓	0.83 ✓	6.40 ✓	146.1 ✓	6.24 X	12.85
			SK					

Did groundwater parameters stabilize? (Yes) / No If no, why not?

Did drawdown stabilize? (Yes) / No If no, why not?

Was flowrate between 0.03 and 0.15 GPM? (Yes)/No If no, why not?

Water Color: (Clear) Yellow Orange Brown/Black (Sand/Silt) Other:

Well Condition: Locked (Y) / N Labeled with LOC ID: (Y) / N Comments:

Sheen: Yes / (No) Odor: Yes / (No) Notes/Comments:

Laboratory Analyses (Circle): (VOC) GRO DRO, Iron, Manganese, Sulfate

pH checked of samples: (Y) / N Approximate volume added (mL): HCl = 0 HNO_3 = 0

Purge Water

Gallons generated: 3.5 Containerized and disposed as IDW? (Yes) / No If No, why not?

Disposal method*: POL Water / (CERCLA Waste) * Purge water stored in the DERA Building for characterization prior to disposal

Sampler's Initials: SK

GROUNDWATER SAMPLE FORM NEELY ROAD Ft. Wainwright, Alaska

Project #: 9011-08 Site Location: NEELY RD

Date: 5/24/18 Probe/Well #: AP-9684

Time: 1140 Sample ID: 18FWNR 02 WG

Sampler: SK

Weather: Rain Outside Temperature: 45°F

QA/QC Sample ID/Time/LOCID: MS/MSD Performed? Yes/No

Purge Method: Peristaltic Pump / Submersible / Bladder Sample Method: Peristaltic Pump / Submersible / Hydrasleeve / Bladder / Other

Equipment Used for Sampling: YSI # 8 Turbidity Meter #: 11 Water Level: SOL 13

Free Product Observed in Probe/Well? Yes/No If Yes, Depth to Product: —

Column of Water in Probe/Well

Total Depth in Probe/Well (feet btoc): 24.74

Depth to Water from TOC (feet): - 16.83

Column of Water in Probe/Well (feet): = 7.91

Circle: Gallons per foot of 1.25" (X 0.064) or 2" (X 0.163) or 4" (X 0.65)

Volume of Water in 1 Probe/Well Casing (gal): 1.29

Sampling Depth

Well Screened Across / Below water table

Depth tubing / pump intake set* approx. 18 feet below top of casing

*Tubing/pump intake must be set approximately 2 feet below the water table for wells screened across the water table, or in the middle of the screened interval for wells screened below the water table

Micropurge well/probe at a rate of 0.03 to 0.15 GPM until parameters stabilize or 3 casing volumes have been removed. If well draws down below tubing or pump intake, stop purging and sample as a low-yield well using a no-purge technique.

Field Parameters:		±3% (or ±0.2°C max)	At least 3 of the 5 parameters below must stabilize					<0.33 feet after initial drawdown
			±3%	±10% (<1mg/L, ±0.2 mg/L)	±0.1 units	±10 mV	±10% (<10NTU, ±1NTU)	
Water Removed (gal)	Time Purged (min)	Temperature (°C)	Conductivity (mS/cm)	Dissolved O_2 (mg/L)	pH	Potential (mV)	Turbidity (NTU)	Water Level (ft)
0.4	5	9.58	0.781	1.93	6.94	80.9	8.20	16.90
0.8	10	9.44	0.787	1.08	7.05	65.4	3.76	16.90
1.2	15	9.41	0.790	0.90	7.06	59.0	2.76	16.90
1.6	20	9.40	0.793	0.73	6.92	48.8	2.81	16.90
~~2.0~~	~~25~~							
~~2.4~~	~~30~~							
		Pump just died. Restart with new pump						
2.0	25	9.48	0.792	0.71	6.35	43.5	4.59	16.89
2.4	30	9.40	0.794	0.66	6.37	42.2	4.56	16.90
2.8	35	9.36	0.798	0.61	6.41	40.8	4.44	16.90
3.2	40	9.37	0.797	0.58	6.42	38.8	4.36	16.90
				SK				

Did groundwater parameters stabilize? Yes / No If no, why not?

Did drawdown stabilize? Yes / No If no, why not?

Was flowrate between 0.03 and 0.15 GPM? Yes/No If no, why not?

Water Color: Clear Yellow Orange Brown/Black (Sand/Silt) Other:

Well Condition: Lock (Y) N Labeled with LOC ID (Y) N Comments:

Sheen: Yes / No Odor: Yes / No Notes/Comments:

Laboratory Analyses (Circle): VOC GRO DRO Iron Manganese Sulfate

pH checked of samples: (Y) N Approximate volume added (mL): HCl = 0 HNO_3 = 0

Purge Water

Gallons generated: 4.0 Containerized and disposed as IDW? Yes / No If No, why not?

Disposal method*: POL Water / CERCLA Waste * Purge water stored in the DERA Building for characterization prior to disposal

Sampler's Initials: SK

GROUNDWATER SAMPLE FORM NEELY ROAD Ft. Wainwright, Alaska

Project #: 9011-08 Site Location: NEELY RD

Date: 5/24/18 Probe/Well #: AP-9459

Time: 1315 Sample ID: 18FWNR03 WG

Sampler: SK

Weather: Rain Outside Temperature: 45°F

QA/QC Sample ID/Time/LOCID: 18FWNR04WG / 1330 / AP-2020 MS/MSD Performed? (Yes) No

Purge Method: Peristaltic Pump / (Submersible) / Bladder Sample Method: Peristaltic Pump / (Submersible) / Hydrasleeve / Bladder / Other

Equipment Used for Sampling: YSI # 8 Turbidity Meter #: 11 Water Level: SOL 13

Free Product Observed in Probe/Well? Yes (No) If Yes, Depth to Product: —

Column of Water in Probe/Well

Total Depth in Probe/Well (feet btoc): 22.78

Depth to Water from TOC (feet): - 15.71

Column of Water in Probe/Well (feet): = 7.07

Circle: Gallons per foot of 1.25" (X 0.064) or 2" (X 0.163) or 4" (X 0.65)

Volume of Water in 1 Probe/Well Casing (gal): 1.15

Sampling Depth

Well Screened (Across) / Below water table

Depth tubing / pump intake set* approx. 16.75 feet below top of casing

*Tubing/pump intake must be set approximately 2 feet below the water table for wells screened across the water table, or in the middle of the screened interval for wells screened below the water table

Micropurge well/probe at a rate of 0.03 to 0.15 GPM until parameters stabilize or 3 casing volumes have been removed. If well draws down below tubing or pump intake, stop purging and sample as a low-yield well using a no-purge technique.

Field Parameters:		±3% (or ±0.2°C max)	At least 3 of the 5 parameters below must stabilize					<0.33 feet after initial drawdown
			±3%	±10% (<1mg/L, ±0.2 mg/L)	±0.1 units	±10 mV	±10% (<10NTU, ±1NTU)	
Water Removed (gal)	Time Purged (min)	Temperature (°C)	Conductivity (mS/cm)	Dissolved O_2 (mg/L)	pH	Potential (mV)	Turbidity (NTU)	Water Level (ft)
0.4	5	14.51	0.780	2.01	6.41	33.4	12.17	15.74
0.8	10	14.67	0.780	1.11	6.20	25.3	6.47	15.74
1.2	15	14.69	0.767	0.86	6.22	18.3	6.33	15.74
1.6	20	14.69	0.769	0.80	6.23	12.1	4.86	15.74
2.0	25	14.68	0.768	0.81	6.23	4.9	2.72	15.74
2.4	30	14.71	0.763	0.82	6.24	1.0	1.88	15.74

SK

Did groundwater parameters stabilize? (Yes) / No If no, why not?

Did drawdown stabilize? (Yes) / No If no, why not?

Was flowrate between 0.03 and 0.15 GPM? (Yes) / No If no, why not?

Water Color: (Clear) Yellow Orange Brown/Black (Sand/Silt) Other:

Well Condition: Lock (Y) / N Labeled with LOC ID: (Y) / N Comments:

Sheen: Yes / (No) Odor: Yes / (No) Notes/Comments:

Laboratory Analyses (Circle): (VOC) GRO/ DRO/ Iron/ Manganese/ Sulfate

pH checked of samples: (Y) / N Approximate volume added (mL): HCl = 0 HNO3 0

Purge Water

Gallons generated: 3.5 Containerized and disposed as IDW? (Yes) / No If No, why not?

Disposal method*: (POL Water) / CERCLA Waste * Purge water stored in the DERA Building for characterization prior to disposal

Sampler's Initials: SK

GROUNDWATER SAMPLE FORM NEELY ROAD Ft. Wainwright, Alaska

Project #: 9011-08 Site Location: NEELY RD

Date: 5/24/18 Probe/Well #: AP-8211

Time: 1500 Sample ID: 18FWNR05WG

Sampler: SK

Weather: Rain Outside Temperature: 45°F

QA/QC Sample ID/Time/LOCID: MS/MSD Performed? Yes/(No)

Purge Method: Peristaltic Pump / (Submersible) / Bladder Sample Method: Peristaltic Pump / (Submersible) / Hydrasleeve / Bladder / Other

Equipment Used for Sampling: YSI # 3 Turbidity Meter #: 11 Water Level: 506/3

Free Product Observed in Probe/Well? Yes/(No) If Yes, Depth to Product:

Column of Water in Probe/Well

Total Depth in Probe/Well (feet btoc): 21.97

Depth to Water from TOC (feet): - 16.64

Column of Water in Probe/Well (feet): = 5.33

Circle: Gallons per foot of 1.25" (X 0.064) or 2" (X 0.163) or 4" (X 0.65)

Volume of Water in 1 Probe/Well Casing (gal): 0.9

Sampling Depth

Well Screened (Across) / Below water table

Depth tubing / pump intake set* approx. 17.5 feet below top of casing

*Tubing/pump intake must be set approximately 2 feet below the water table for wells screened across the water table, or in the middle of the screened interval for wells screened below the water table

Micropurge well/probe at a rate of 0.03 to 0.15 GPM until parameters stabilize or 3 casing volumes have been removed. If well draws down below tubing or pump intake, stop purging and sample as a low-yield well using a no-purge technique.

Field Parameters:		±3% (or ±0.2°C max)	At least 3 of the 5 parameters below must stabilize					<0.33 feet after initial drawdown
			±3%	±10% (<1mg/L, ±0.2 mg/L)	±0.1 units	±10 mV	±10% (<10NTU, ±1NTU)	
Water Removed (gal)	Time Purged (min)	Temperature (°C)	Conductivity (mS/cm)	Dissolved O_2 (mg/L)	pH	Potential (mV)	Turbidity (NTU)	Water Level (ft)
0.4	5	6.91	0.814	4.46	6.49	32.3	9.91	16.83
0.8	10	6.91	0.820	2.74	6.76	28.7	10.67	16.82
1.2	15	6.99	0.819	1.83	6.52	23.0	9.77	16.82
1.6	20	7.04	0.819	1.53	6.63	18.2	9.32	16.82
2.0	25	6.98	0.819	1.27	6.84	12.8	9.57	16.82
2.4	30	6.96	0.818	1.09	6.71	8.1	8.55	16.82
2.8	35	6.94	0.820	1.01	6.69	5.4	8.36	16.82
3.2	40	7.02	0.822	0.96	6.65	3.7	8.30	16.82

SK

Did groundwater parameters stabilize? (Yes) / No If no, why not?

Did drawdown stabilize? (Yes) / No If no, why not?

Was flowrate between 0.03 and 0.15 GPM? (Yes)/No If no, why not?

Water Color: Clear (Yellow) Orange Brown/Black (Sand/Silt) Other:

Well Condition: Locked (Y) / N Labeled with LOC ID (Y) / N Comments:

Sheen: Yes / (No) Odor: (Yes) / No Notes/Comments:

Laboratory Analyses (Circle): (VOC) GRO, DRO, Iron, Manganese, Sulfate

pH checked of samples: (Y) / N Approximate volume added (mL): HCl = 10 HNO_3 = 10

Purge Water

Gallons generated: 4.0 Containerized and disposed as IDW? (Yes) / No If No, why not?

Disposal method*: (POL Water) / CERCLA Waste * Purge water stored in the DERA Building for characterization prior to disposal

Sampler's Initials: SK

GROUNDWATER SAMPLE FORM | **NEELY ROAD** | **Ft. Wainwright, Alaska**

Project #: 9011-08 | Site Location: NEELY RD

Date: 5/24/18 | Probe/Well #: AP-9003

Time: 1615 | Sample ID: 18FWNR 06 WG

Sampler: SK

Weather: Cloudy | Outside Temperature: 45°F

QA/QC Sample ID/Time/LOCID: | MS/MSD Performed? Yes/(No)

Purge Method: Peristaltic Pump / (Submersible) / Bladder | Sample Method: Peristaltic Pump / (Submersible) / Hydrasleeve / Bladder / Other

Equipment Used for Sampling: YSI # 8 | Turbidity Meter #: 11 | Water Level: SOL 13

Free Product Observed in Probe/Well? Yes/(No) | If Yes, Depth to Product: —

Column of Water in Probe/Well | Sampling Depth

Total Depth in Probe/Well (feet bloc): 22.35 | Well Screened (Across) / Below water table

Depth to Water from TOC (feet): - 17.80 | Depth tubing / pump intake set* approx. 18.8 feet below top of casing

Column of Water in Probe/Well (feet): = 4.55 | *Tubing/pump intake must be set approximately 2 feet below the water table for wells screened across the water table, or in the middle of the screened interval for wells screened below the water table

Circle: Gallons per foot of 1.25" (X 0.064) or 2" (X 0.163) or 4" (X 0.65)

Volume of Water in 1 Probe/Well Casing (gal): 0.74

Micropurge well/probe at a rate of 0.03 to 0.15 GPM until parameters stabilize or 3 casing volumes have been removed. If well draws down below tubing or pump intake, stop purging and sample as a low-yield well using a no-purge technique.

Field Parameters:		±3% (or ±0.2°C max)	At least 3 of the 5 parameters below must stabilize					<0.33 feet after initial drawdown
			±3%	±10% (<1mg/L, ±0.2 mg/L)	±0.1 units	±10 mV	±10% (<10NTU, ±1NTU)	
Water Removed (gal)	Time Purged (min)	Temperature (°C)	Conductivity (mS/cm)	Dissolved O_2 (mg/L)	pH	Potential (mV)	Turbidity (NTU)	Water Level (ft)
0.4	5	6.77	0.757	4.71	6.24	18.2	68.37	17.89
0.8	10	7.38	0.760	1.82	5.92	13.6	54.39	17.89
1.2	15	7.35	0.778	1.51	5.90	9.2	25.36	17.89
1.6	20	7.41	0.816	1.28	5.95	5.3	12.99	17.89
2.0	25	7.46	0.837	1.20	5.97	1.1	7.04	17.89
2.4	30	7.52	0.829	1.15	5.96	-2.6	4.73	17.89
2.8	35	7.60	0.831	1.16	5.97	-3.9	4.59	17.89

SK

Did groundwater parameters stabilize? (Yes) / No If no, why not?

Did drawdown stabilize? (Yes) / No If no, why not?

Was flowrate between 0.03 and 0.15 GPM? (Yes)/No If no, why not?

Water Color: (Clear) Yellow Orange Brown/Black (Sand/Silt) Other:

Well Condition: Locked (Y) / N Labeled with LOC ID (Y) / N Comments:

Sheen: Yes / (No) Odor: Yes / (No) Notes/Comments:

Laboratory Analyses (Circle): (VOC, GRO, DRO, Iron, Manganese, Sulfate)

pH checked of samples: (Y) / N Approximate volume added (mL): HCl = 0 HNO_3 = 0

Purge Water

Gallons generated: 3.5 Containerized and disposed as IDW? (Yes) / No If No, why not?

Disposal method*: (POL Water) / CERCLA Waste * Purge water stored in the DERA Building for characterization prior to disposal

Sampler's Initials: SK

Submersible Pump Equipment Blank

Rinsate #: Rinsate 01

Sample ID: 18FWNREB01WQ

Date: 5/24/18

Time: 1730

Analysis: VOC/GRO/DRO/Fe/Mn/SO4

Well that the pump was last used on: AP-9003

GROUNDWATER SAMPLE FORM NEELY ROAD Ft. Wainwright, Alaska

Project #: 9011-08 Site Location: NEELY RD

Date: 8/10/18 Probe/Well #: AP-9685

Time: 0930 Sample ID: 18FWNR07 WG

Sampler: SK

Weather: Cloudy Outside Temperature: 45°F

QA/QC Sample ID/Time/LOCID: ____ MS/MSD Performed? Yes/(No)

Purge Method: Peristaltic Pump / (Submersible) / Bladder Sample Method: Peristaltic Pump / (Submersible) / Hydrasleeve / Bladder / Other

Equipment Used for Sampling: YSI # 8 Turbidity Meter #: 12 Water Level: SOL13

Free Product Observed in Probe/Well? Yes/(No) If Yes, Depth to Product: ____

Column of Water in Probe/Well Sampling Depth 10'screen

Total Depth in Probe/Well (feet btoc): 22.22 Well Screened (Across) / Below water table

Depth to Water from TOC (feet): - 12.96 Depth tubing / pump intake set* approx. 14 feet below top of casing

Column of Water in Probe/Well (feet): = 9.26 *Tubing/pump intake must be set approximately 2 feet below the water table for wells screened across the water table, or in the middle of the screened interval for wells screened below the water table

Circle: Gallons per foot of 1.25" (X 0.064) or 2" (X 0.163) or 4" (X 0.65)

Volume of Water in 1 Probe/Well Casing (gal): 1.5

Micropurge well/probe at a rate of 0.03 to 0.15 GPM until parameters stabilize or 3 casing volumes have been removed. If well draws down below tubing or pump intake, stop purging and sample as a low-yield well using a no-purge technique.

Field Parameters:		±3% (or ±0.2°C max)	At least 3 of the 5 parameters below must stabilize					<0.33 feet after initial drawdown
			±3%	±10% (<1mg/L, ±0.2 mg/L)	±0.1 units	±10 mV	±10% (<10NTU, ±1NTU)	
Water Removed (gal)	Time Purged (min)	Temperature (°C)	Conductivity (mS/cm)	Dissolved O_2 (mg/L)	pH	Potential (mV)	Turbidity (NTU)	Water Level (ft)
0.5	5	12.33	0.841	7.33	7.01	184.0	9.39	12.99
1.0	10	12.19	0.847	6.28	7.02	183.4	10.20	12.99
1.5	15	12.14	0.851	5.75	7.02	182.5	3.36	12.99
2.0	20	12.18	0.852	5.32	7.03	181.6	2.91	12.99
2.5	25	12.19	0.855	5.09	7.03	178.7	2.81	12.99
3.0	30	12.10	0.857	5.07	7.03	177.9	2.57	12.99
			SK					

Did groundwater parameters stabilize? (Yes) / No If no, why not? ____

Did drawdown stabilize? (Yes) / No If no, why not? ____

Was flowrate between 0.03 and 0.15 GPM? (Yes)/No If no, why not? ____

Water Color: (Clear) Yellow Orange Brown/Black (Sand/Silt) Other: ____

Well Condition: Locked (Y) / N Labeled with LOC ID (Y) / N Comments: ____

Sheen: Yes / (No) Odor: Yes / (No) Notes/Comments: ____

Laboratory Analyses (Circle): (VOC) (GRO) (DRO) Iron, Manganese, Sulfate

pH checked of samples: (Y) / N Approximate volume added (mL): HCl = 0 HNO_3 = 0

Purge Water

Gallons generated: 3.5 Containerized and disposed as IDW? (Yes) / No If No, why not?

Disposal method*: POL Water / (CERCLA Waste) * Purge water stored in the DERA Building for characterization prior to disposal

Sampler's Initials: SK

GROUNDWATER SAMPLE FORM NEELY ROAD Ft. Wainwright, Alaska

Project #: 9011-08
Site Location: NEELY RD
Date: 8/10/18
Probe/Well #: AP-9684
Time: 1030
Sample ID: 18FWNR 03 WG
Sampler: JK
Weather: P.Cloudy
Outside Temperature: 48°F
QA/QC Sample ID/Time/LOCID:
MS/MSD Performed? Yes/No

Purge Method: Peristaltic Pump / Submersible / Bladder
Sample Method: Peristaltic Pump / Submersible / Hydrasleeve / Bladder / Other
Equipment Used for Sampling: YSI # 8 Turbidity Meter #: 12 Water Level: SOL13
Free Product Observed in Probe/Well? Yes/No If Yes, Depth to Product: —

Column of Water in Probe/Well
Total Depth in Probe/Well (feet btoc): 24.75
Depth to Water from TOC (feet): - 16.96
Column of Water in Probe/Well (feet): = 7.79
Circle: Gallons per foot of 1.25" (X 0.064) or 2" (X 0.163) or 4" (X 0.65)
Volume of Water in 1 Probe/Well Casing (gal): 1.3

Sampling Depth
Well Screened Across / Below water table
Depth tubing / pump intake set* approx. 18 feet below top of casing
*Tubing/pump intake must be set approximately 2 feet below the water table for wells screened across the water table, or in the middle of the screened interval for wells screened below the water table

Micropurge well/probe at a rate of 0.03 to 0.15 GPM until parameters stabilize or 3 casing volumes have been removed. If well draws down below tubing or pump intake, stop purging and sample as a low-yield well using a no-purge technique.

Field Parameters:		±3% (or ±0.2°C max)	At least 3 of the 5 parameters below must stabilize					<0.33 feet after initial drawdown
			±3%	±10% (<1mg/L, ±0.2 mg/L)	±0.1 units	±10 mV	±10% (<10NTU, ±1NTU)	
Water Removed (gal)	Time Purged (min)	Temperature (°C)	Conductivity (mS/cm)	Dissolved O_2 (mg/L)	pH	Potential (mV)	Turbidity (NTU)	Water Level (ft)
0.5	5	11.32	0.940	2.12	6.66	-77.2	7.27	17.01
1.0	10	11.12	0.962	1.29	6.72	-97.3	6.11	17.01
1.5	15	11.13	0.969	0.86	6.76	-108.1	1.36	17.01
2.0	20	11.21	0.969	0.73	6.77	-113.2	1.59	17.01
2.5	25	11.20	0.974	0.63	6.78	-117.2	1.45	17.01
3.0	30	11.15	0.978	0.58	6.79	-118.0	1.23	17.01

JK

Did groundwater parameters stabilize? Yes / No If no, why not?
Did drawdown stabilize? Yes / No If no, why not?
Was flowrate between 0.03 and 0.15 GPM? Yes/No If no, why not?
Water Color: Clear Yellow Orange Brown/Black (Sand/Silt) Other:
Well Condition: Locked Y / N Labeled with LOC ID: Y / N Comments:
Sheen: Yes / No Odor Yes / No Notes/Comments:

Laboratory Analyses (Circle): VOC, GRO, DRO, Iron, Manganese, Sulfate
pH checked of samples: Y / N Approximate volume added (mL): HCl = 40 HNO_3 = 40

Purge Water
Gallons generated: 3.25 Containerized and disposed as IDW? Yes / No If No, why not?
Disposal method*: POL Water / CERCLA Waste * Purge water stored in the DERA Building for characterization prior to disposal
Sampler's Initials: JK

GROUNDWATER SAMPLE FORM NEELY ROAD Ft. Wainwright, Alaska

Project #: 9011-08
Site Location: NEELY RD
Date: 8/10/18
Probe/Well #: AP-9459
Time: 1145
Sample ID: 18FWNR09 WG
Sampler: SK
Weather: Cloudy
Outside Temperature: 50°F
QA/QC Sample ID/Time/LOCID: 18FWNR10WG / 1200 / AP-2020 MS/MSD Performed? Yes/No

Purge Method: Peristaltic Pump / Submersible / Bladder
Sample Method: Peristaltic Pump / Submersible / Hydrasleeve / Bladder / Other
Equipment Used for Sampling: YSI # 8 Turbidity Meter #: 12 Water Level: SOL/S
Free Product Observed in Probe/Well? Yes/No If Yes, Depth to Product: ∝
Column of Water in Probe/Well
Sampling Depth 10' Screen

Total Depth in Probe/Well (feet btoc): 22.78
Well Screened Across / Below water table
Depth to Water from TOC (feet): - 15.86
Depth tubing / pump intake set* approx. 16.8 feet below top of casing
Column of Water in Probe/Well (feet): = 6.92
*Tubing/pump intake must be set approximately 2 feet below the water table for wells screened across the water table, or in the middle of the screened interval for wells screened below the water table
Circle: Gallons per foot of 1.25" (X 0.064) or 2" (X 0.163) or 4" (X 0.65)
Volume of Water in 1 Probe/Well Casing (gal): 1.13

Micropurge well/probe at a rate of 0.03 to 0.15 GPM until parameters stabilize or 3 casing volumes have been removed. If well draws down below tubing or pump intake, stop purging and sample as a low-yield well using a no-purge technique.

Field Parameters:		±3% (or ±0.2°C max)	At least 3 of the 5 parameters below must stabilize					<0.33 feet after initial drawdown
			±3%	±10% (<1mg/L, ±0.2 mg/L)	±0.1 units	±10 mV	±10% (<10NTU, ±1NTU)	
Water Removed (gal)	Time Purged (min)	Temperature (°C)	Conductivity (mS/cm)	Dissolved O_2 (mg/L)	pH	Potential (mV)	Turbidity (NTU)	Water Level (ft)
0.5	5	17.92	0.673	0.68	6.95	-93.5	19.54	15.94
1.0	10	17.44	0.672	0.51	6.96	-104.4	8.49	15.94
1.5	15	17.43	0.670	0.43	6.96	-109.9	3.34	15.94
2.0	20	17.38	0.673	0.37	6.96	-113.1	2.54	15.94
2.5	25	17.33	0.683	0.34	6.98	-115.5	1.22	15.94
3.0	30	17.32	0.693	0.35	6.96	-116.0	1.19	15.94
			SK					

Did groundwater parameters stabilize? Yes / No If no, why not?
Did drawdown stabilize? Yes / No If no, why not?
Was flowrate between 0.03 and 0.15 GPM? Yes/No If no, why not?
Water Color: Clear Yellow Orange Brown/Black (Sand/Silt) Other:
Well Condition: Locked Y / N Labeled with LOC ID Y / N Comments:
Sheen: Yes / No Odor: Yes / No Notes/Comments:

Laboratory Analyses (Circle): VOCs, GRO, DRO, Iron, Manganese, Sulfate
pH checked of samples: Y / N Approximate volume added (mL): HCl = 0 HNO_3 = 0

Purge Water
Gallons generated: 4.0 Containerized and disposed as IDW? Yes / No If No, why not?
Disposal method*: POL Water / CERCLA Waste * Purge water stored in the DERA Building for characterization prior to disposal
Sampler's Initials: SK

GROUNDWATER SAMPLE FORM NEELY ROAD Ft. Wainwright, Alaska

Project #: 9011-08 Site Location: NEELY RD

Date: 8/10/18 Probe/Well #: AP-8211

Time: 1315 Sample ID: 18FWNR 11 WG

Sampler: SK

Weather: Cloudy Outside Temperature: 51°F

QA/QC Sample ID/Time/LOCID: MS/MSD Performed? Yes / No

Purge Method: Peristaltic Pump / Submersible / Bladder Sample Method: Peristaltic Pump / Submersible / Hydrasleeve / Bladder / Other

Equipment Used for Sampling: YSI # 8 Turbidity Meter #: 12 Water Level: SOL / S

Free Product Observed in Probe/Well? Yes / No If Yes, Depth to Product: 2

Column of Water in Probe/Well

Total Depth in Probe/Well (feet btoc): 21.94

Depth to Water from TOC (feet): - 16.71

Column of Water in Probe/Well (feet): = 5.23

Circle: Gallons per foot of 1.25" (X 0.064) or 2" (X 0.163) or 4" (X 0.65)

Volume of Water in 1 Probe/Well Casing (gal): 0.85

Sampling Depth

Well Screened Across / Below water table

Depth tubing / pump intake set* approx. 17.7 feet below top of casing

*Tubing/pump intake must be set approximately 2 feet below the water table for wells screened across the water table, or in the middle of the screened interval for wells screened below the water table

Micropurge well/probe at a rate of 0.03 to 0.15 GPM until parameters stabilize or 3 casing volumes have been removed. If well draws down below tubing or pump intake, stop purging and sample as a low-yield well using a no-purge technique.

Field Parameters:		±3% (or ±0.2°C max)	At least 3 of the 5 parameters below must stabilize					<0.33 feet after initial drawdown
			±3%	±10% (<1mg/L, ±0.2 mg/L)	±0.1 units	±10 mV	±10% (<10NTU, ±1NTU)	
Water Removed (gal)	Time Purged (min)	Temperature (°C)	Conductivity (mS/cm)	Dissolved O_2 (mg/L)	pH	Potential (mV)	Turbidity (NTU)	Water Level (ft)
0.5	5	8.30	1.341	6.38	6.53	-28.3	20.97	16.78
1.0	10	8.37	1.329	2.27	6.54	-32.2	22.80	16.78
1.5	15	8.45	1.327	1.75	6.56	-36.1	22.74	16.78
2.0	20	8.38	1.315	1.32	6.57	-39.8	20.97	16.78
2.5	25	8.39	1.311	1.27	6.57	-41.8	20.80	16.78
3.0	30	8.40 ✓	1.301 ✓	0.94 ×	6.54 ✓	-43.7 ✓	19.33 ✓	16.78

Did groundwater parameters stabilize? Yes / No If no, why not?

Did drawdown stabilize? Yes / No If no, why not?

Was flowrate between 0.03 and 0.15 GPM? Yes/No If no, why not?

Water Color: Clear Yellow Orange Brown/Black (Sand/Silt) Other:

Well Condition: Locked Y / N Labeled with LOC ID Y / N Comments:

Sheen Yes / No Odor Yes / No Notes/Comments:

Laboratory Analyses (Circle): VOC GRO, DRO, Iron, Manganese, Sulfate

pH checked of samples: Y / N Approximate volume added (mL): HCl = 10 HNO_3 = 10

Purge Water

Gallons generated: 3.75 Containerized and disposed as IDW? Yes / No If No, why not?

Disposal method*: POL Water / CERCLA Waste * Purge water stored in the DERA Building for characterization prior to disposal

Sampler's Initials: SK

GROUNDWATER SAMPLE FORM | **NEELY ROAD** | **Ft. Wainwright, Alaska**

Project #: 9011-08 | Site Location: NEELY RD

Date: 8/10/18 | Probe/Well #: AP-9003

Time: 1415 | Sample ID: 18FWNR 12 WG

Sampler: SK

Weather: Cloudy | Outside Temperature: 52°F

QA/QC Sample ID/Time/LOCID: | MS/MSD Performed? Yes/(No)

Purge Method: Peristaltic Pump / (Submersible) / Bladder | Sample Method: Peristaltic Pump / (Submersible) / Hydrasleeve / Bladder / Other

Equipment Used for Sampling: YSI # 8 | Turbidity Meter #: 12 | Water Level: SOL/3

Free Product Observed in Probe/Well? Yes/(No) | If Yes, Depth to Product: ∅

Column of Water in Probe/Well | **Sampling Depth**

Total Depth in Probe/Well (feet btoc): 22.35 | Well Screened (Across) / Below water table

Depth to Water from TOC (feet): - 17.89 | Depth tubing / pump intake set* approx. 18.9 feet below top of casing

Column of Water in Probe/Well (feet): = 4.46 | *Tubing/pump intake must be set approximately 2 feet below the water table for wells screened across the water table, or in the middle of the screened interval for wells screened below the water table

Circle: Gallons per foot of 1.25" (X 0.064) or (2" (X 0.163)) or 4" (X 0.65)

Volume of Water in 1 Probe/Well Casing (gal): 0.73

Micropurge well/probe at a rate of 0.03 to 0.15 GPM until parameters stabilize or 3 casing volumes have been removed. If well draws down below tubing or pump intake, stop purging and sample as a low-yield well using a no-purge technique.

Field Parameters:		±3% (or ±0.2°C max)	*At least 3 of the 5 parameters below must stabilize*					<0.33 feet after initial drawdown
			±3%	±10% (<1mg/L, ±0.2 mg/L)	±0.1 units	±10 mV	±10% (<10NTU, ±1NTU)	
Water Removed (gal)	Time Purged (min)	Temperature (°C)	Conductivity (mS/cm)	Dissolved O_2 (mg/L)	pH	Potential (mV)	Turbidity (NTU)	Water Level (ft)
0.5	5	8.36	1.093	6.00	6.56	22.6	46.49	17.96
1.0	10	7.97	1.092	1.27	6.61	3.6	20.73	17.97
1.5	15	8.00	1.101	1.09	6.63	-3.7	12.66	17.97
2.0	20	8.09	1.090	0.93	6.66	-13.2	9.01	17.97
2.5	25	8.06	1.110	0.98	6.66	-21.8	7.56	17.97
3.0	30	8.07	1.115	0.96	6.66	-20.0	6.13	17.97

Did groundwater parameters stabilize? (Yes) / No If no, why not?

Did drawdown stabilize? (Yes) / No If no, why not?

Was flowrate between 0.03 and 0.15 GPM? (Yes)/No If no, why not?

Water Color: (Clear) Yellow Orange Brown/Black (Sand/Silt) Other:

Well Condition: Lock (Y) / N Labeled with LOC ID (Y) / N Comments:

Sheen: Yes / (No) Odor: Yes / (No) Notes/Comments:

Laboratory Analyses (Circle): (VOC) GRO (DRO) Iron, Manganese, Sulfate

pH checked of samples: (Y) / N Approximate volume added (mL): HCl = ∅ HNO_3 = ∅

Purge Water

Gallons generated: 3.5 Containerized and disposed as IDW? (Yes) / No If No, why not?

Disposal method* (POL Water) / CERCLA Waste * Purge water stored in the DERA Building for characterization prior to disposal

Sampler's Initials: SK

Submersible Pump Equipment Blank

Rinsate #: Rinsate 02

Sample ID: 18FWNREB02WQ

Date: 8/10/18

Time: 1440

Analysis: DRO/VOC/GRO/Fe/Mn/SO4

Well that the pump was last used on: AP-9459

YSI AND TURBIDIMETER CALIBRATION FORM

Operable Unit

Name: Neely Rd

Calibration Liquid Lot Numbers/ Expiration Dates:

SPC	ORP	Ph 4	Ph 7 or Ph 10
176100637 / 01/2019	0621 / 10/2021	17E31R / May 2019	17D2S / April 2019

Date	Project	YSI# / Turbidity #	Bar. PSI mmHg	D.O. Pre	D.O. Post	SPC Pre	SPC Post	ORP Pre	ORP Post	Ph 4 Pre	Ph 4 Post	Ph 7 Pre	Ph 7 Post	Calibrate Turbidity Meter (Y/N)
5/24/18	Neely Rd	8/4	750.8	8.51	8.71	1.005	1.000	255.2	240.0	3.68	4.00	6.93	7.00	Y
8/10/18	NR	8/12	759.6	9.05	8.91	0.997	1.000	237.6	240.0	4.01	4.00	6.98	7.00	Y

Notes/ Maintenance Items:

2018 FWA Fieldbook JK

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JOURNAL
№ 393N

9011-08 Neely Rd

9011-05 OU5

CONTENTS

PAGE	REFERENCE	DATE
1-2	Neely Rd	5/24

5/24/18 Rain 40°F

0630 - Prepare gear for GW sampling @ Neely Road.

0820 - PSI and Turbidimeter calibrated
- sample kit complete except for labels
↳ Driving to DERA bldg to pick up empty poly's for today.

0900 - Set up to sample @ well AP-9685.
→ purge water from this well is to be kept separate as CERCLA waste.

1027 - Move to next well.
→ set up to sample @ AP-9684

1055 - Bryan Adams stopped by for a site visit.
↳ pump in 9684 just stopped working and water drained back down well. start over with a new pump.

1/2

5/24/18 Rain 45°F

1147 - Completed sampling @ AP-9684
↳ move to AP-9459

1333 - Completed sampling @ AP-9459
↳ move to AP-8211

1450 - completed sampling @ 8211
↳ move to sample AP-9003

1608 - Completed sampling @ NR
↳ take IDW to DERA Building and return to the shop to collect the rinsate from the pump used in AP-9003

1730 Rinsate 01 for NR is about ready to collect. pump has been running in not clean decon water for 15 minutes

1745 - Prep gear for sampling @ OUS tomorrow.
↳ End Day @ 1830.

2/2

APPENDIX D

PHOTO LOG

Overview of Neely Road site, AP-8211 is on right side of photo.
(View to Northwest).

Monitoring well AP-8211, connex in background (View to North).

Monitoring well AP-9685, Building 3030 to the left (View to East).

Monitoring well AP-9459 (View to East).

Monitoring well AP-9684 and treatment system connex (View to South).

Monitoring well AP-9003 (View to North).

APPENDIX E

LTMO ANALYSIS RESULTS

Table E-1. MAROS Statistical Analysis Summary for Neely Road

MAROS Statistical Trend Analysis Summary

Project: Neely Road 2016 **User Name:** FES
Location: Fort Wainwright **State:** Alaska

Time Period: 11/16/2007 to 10/10/2016
Consolidation Period: No Time Consolidation
Consolidation Type: Average
Duplicate Consolidation: Average
ND Values: Detection Limit
J Flag Values : Actual Value

Well	Source/ Tail	Number of Samples	Number of Detects	Average Conc. (mg/L)	Median Conc. (mg/L)	All Samples "ND" ?	Mann-Kendall Trend	Linear Regression Trend
1,2-DIBROMOETHANE (ETHYLENE DIBROMID								
AP-8211	S	22	18	2.2E-03	2.4E-04	No	D	D
AP-8213	T	22	0	4.0E-06	4.0E-06	Yes	ND	ND
AP-9003	T	22	1	4.0E-06	4.0E-06	No	NT	I
AP-9004	T	22	0	4.0E-06	4.0E-06	Yes	ND	ND
AP-9459	T	22	1	4.2E-06	4.0E-06	No	NT	I
AP-9684	T	22	4	5.0E-05	4.0E-06	No	NT	NT
AP-9685	T	22	0	4.0E-06	4.0E-06	Yes	ND	ND
1,2-DICHLOROETHANE								
AP-8211	S	22	4	6.9E-04	1.5E-04	No	NT	NT
AP-8213	T	22	0	1.5E-04	1.5E-04	Yes	ND	ND
AP-9003	T	22	4	1.6E-04	1.5E-04	No	S	S
AP-9004	T	22	1	1.5E-04	1.5E-04	No	NT	NT
AP-9459	T	22	9	1.9E-03	1.5E-04	No	NT	PD
AP-9684	T	22	3	2.3E-04	1.5E-04	No	NT	D
AP-9685	T	22	13	3.8E-04	1.5E-04	No	D	D
BENZENE								
AP-8211	S	22	18	1.1E-01	3.7E-02	No	D	D
AP-8213	T	22	21	9.0E-05	6.0E-05	No	D	D
AP-9003	T	22	22	3.3E-03	2.0E-03	No	D	PD
AP-9004	T	22	18	1.5E-04	4.0E-05	No	D	D
AP-9459	T	22	22	1.0E-01	1.5E-02	No	D	D
AP-9684	T	22	19	1.4E-03	4.4E-04	No	D	D
AP-9685	T	22	13	3.1E-03	1.1E-04	No	D	D
PHC as DIESEL FUEL								
AP-8211	S	22	22	1.1E+01	9.8E+00	No	I	I
AP-8213	T	22	22	1.2E-01	1.2E-01	No	PI	PI
AP-9003	T	22	22	5.7E-01	4.6E-01	No	PI	I
AP-9004	T	22	22	5.9E-02	4.8E-02	No	S	S
AP-9459	T	22	22	1.5E+00	9.4E-01	No	NT	NT
AP-9684	T	22	22	6.0E-01	5.6E-01	No	D	D
AP-9685	T	22	22	1.4E-01	1.3E-01	No	PD	S
PHC as GASOLINE								

MAROS Version 2.2, 2006, AFCEE Thursday, November 10, 2016 Page 1 of 2

Table E-1 cont'd. MAROS Statistical Analysis Summary for Neely Road

MAROS Statistical Trend Analysis Summary

Well	Source/ Tail	Number of Samples	Number of Detects	Average Conc. (mg/L)	Median Conc. (mg/L)	All Samples "ND" ?	Mann-Kendall Trend	Linear Regression Trend
PHC as GASOLINE								
AP-8211	S	22	22	1.9E+01	1.4E+01	No	D	D
AP-8213	T	22	21	3.0E-02	1.7E-02	No	D	D
AP-9003	T	22	19	2.6E-01	2.2E-01	No	S	S
AP-9004	T	22	16	2.3E-02	2.1E-02	No	D	D
AP-9459	T	22	22	1.6E+00	1.3E+00	No	D	D
AP-9684	T	22	22	1.6E+00	1.3E+00	No	D	D
AP-9685	T	22	12	3.3E-02	2.5E-02	No	PD	PD

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A); Not Applicable (N/A) - Due to insufficient Data (< 4 sampling events); No Detectable Concentration (NDC)

The Number of Samples and Number of Detects shown above are post-consolidation values.

MAROS Version 2.2, 2006, AFCEE Thursday, November 10, 2016 Page 2 of 2

Table E-2. MAROS Statistical Analysis Summary for Neely Road—PCE

MAROS Statistical Trend Analysis Summary

Project: Neely Road 2016
Location: Fort Wainwright
User Name: FES
State: Alaska

Time Period: 11/16/2007 to 10/10/2016
Consolidation Period: No Time Consolidation
Consolidation Type: Average
Duplicate Consolidation: Average
ND Values: Detection Limit
J Flag Values : Actual Value

Well	Source/ Tail	Number of Samples	Number of Detects	Average Conc. (mg/L)	Median Conc. (mg/L)	All Samples "ND" ?	Mann-Kendall Trend	Linear Regression Trend
TETRACHLOROETHYLENE(PCE)								
AP-9685	T	22	22	1.4E-02	2.5E-03	No	NT	NT

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A); Not Applicable (N/A) - Due to insufficient Data (< 4 sampling events); No Detectable Concentration (NDC)

The Number of Samples and Number of Detects shown above are post-consolidation values.

MAROS Version 2.2, 2006, AFCEE Thursday, November 17, 2016 Page 1 of 1

Table E-3. MAROS Spatial Moment Analysis Summary for Neely Road

MAROS Spatial Moment Analysis Summary

Project: Neely Road 2016 **User Name:** FES
Location: Fort Wainwright **State:** Alaska

	0th Moment	1st Moment (Center of Mass)			2nd Moment (Spread)		
Effective Date	Estimated Mass (Kg)	Xc (ft)	Yc (ft)	Source Distance (ft)	Sigma XX (sq ft)	Sigma YY (sq ft)	Number of Wells
1,2-DIBROMOETHANE (ETHYLENE DIBROMIDE)							
11/16/2007	3.8E-05	1,383,355	3,960,259	60	1,443	1,008	7
2/14/2008	3.1E-05	1,383,350	3,960,262	65	1,667	1,141	7
5/9/2008	2.1E-05	1,383,339	3,960,268	78	2,088	1,429	7
8/7/2008	2.7E-05	1,383,347	3,960,263	69	1,812	1,231	7
11/4/2008	3.1E-05	1,383,350	3,960,261	65	1,660	1,136	7
2/11/2009	2.9E-05	1,383,349	3,960,262	66	1,722	1,174	7
5/4/2009	1.7E-05	1,383,333	3,960,272	86	2,209	1,548	7
8/4/2009	2.5E-05	1,383,345	3,960,265	71	1,890	1,283	7
10/26/2009	2.5E-05	1,383,344	3,960,265	72	1,915	1,300	7
5/5/2010	1.8E-05	1,383,334	3,960,271	84	2,189	1,524	7
9/14/2010	1.7E-05	1,383,333	3,960,272	86	2,209	1,548	7
7/12/2011	2.2E-05	1,383,337	3,960,282	86	1,943	1,411	7
9/29/2011	2.2E-05	1,383,333	3,960,292	96	1,725	1,414	7
8/24/2012	2.3E-05	1,383,328	3,960,294	101	1,783	1,394	7
4/15/2013	1.0E-05	1,383,306	3,960,289	117	1,826	1,723	7
8/20/2013	1.1E-05	1,383,309	3,960,286	112	1,953	1,731	7
7/11/2014	1.1E-05	1,383,307	3,960,288	115	1,890	1,728	7
10/13/2014	1.4E-05	1,383,322	3,960,281	99	2,205	1,655	7
5/11/2015	1.1E-05	1,383,306	3,960,288	116	1,845	1,725	7
8/24/2015	1.1E-05	1,383,306	3,960,288	116	1,849	1,725	7
7/6/2016	1.1E-05	1,383,311	3,960,285	110	2,028	1,731	7
10/10/2016	1.0E-05	1,383,306	3,960,289	117	1,826	1,723	7
1,2-DICHLOROETHANE							
11/16/2007	5.1E-04	1,383,298	3,960,297	128	1,698	1,597	7
2/14/2008	6.8E-04	1,383,308	3,960,300	120	1,929	1,523	7
5/9/2008	5.6E-04	1,383,296	3,960,300	131	1,643	1,536	7
8/7/2008	3.9E-04	1,383,306	3,960,289	117	1,826	1,723	7
11/4/2008	4.2E-04	1,383,315	3,960,289	109	1,964	1,640	7
2/11/2009	2.3E-03	1,383,285	3,960,314	147	1,123	758	7
5/4/2009	6.3E-04	1,383,299	3,960,297	127	1,646	1,427	7
8/4/2009	1.9E-03	1,383,303	3,960,298	124	1,958	1,328	7
10/26/2009	1.6E-03	1,383,293	3,960,305	136	1,422	1,060	7
5/5/2010	8.6E-04	1,383,288	3,960,309	143	1,321	1,103	7
9/14/2010	5.7E-04	1,383,317	3,960,283	104	2,270	1,725	7
7/12/2011	4.0E-04	1,383,305	3,960,289	118	1,820	1,719	7
9/29/2011	4.4E-04	1,383,304	3,960,291	120	1,780	1,649	7
8/24/2012	8.3E-04	1,383,296	3,960,301	131	1,548	1,260	7
4/15/2013	3.9E-04	1,383,306	3,960,289	117	1,826	1,723	7

MAROS Version 2.2, 2006, AFCEE Thursday, November 10, 2016 Page 1 of 4

Table E-3 cont'd. MAROS Spatial Moment Analysis Summary for Neely Road

Project: Neely Road 2016 **User Name:** FES
Location: Fort Wainwright **State:** Alaska

	0th Moment	1st Moment (Center of Mass)			2nd Moment (Spread)		
Effective Date	Estimated Mass (kg)	Xc (ft)	Yc (ft)	Source Distance (ft)	Sigma XX (sq ft)	Sigma YY (sq ft)	Number of Wells
1,2-DICHLOROETHANE							
8/20/2013	3.9E-04	1,383,306	3,960,289	117	1,826	1,723	7
7/11/2014	3.6E-04	1,383,309	3,960,285	112	1,843	1,730	7
10/13/2014	3.2E-04	1,383,305	3,960,286	116	1,768	1,831	7
5/11/2015	3.8E-04	1,383,306	3,960,288	116	1,832	1,727	7
8/24/2015	3.3E-04	1,383,306	3,960,289	117	1,826	1,723	7
7/6/2016	5.8E-04	1,383,310	3,960,289	113	2,134	1,687	7
10/10/2016	3.9E-04	1,383,306	3,960,289	117	1,826	1,723	7
BENZENE							
11/16/2007	2.3E-02	1,383,340	3,960,286	87	1,730	1,048	7
2/14/2008	2.0E-02	1,383,342	3,960,279	80	1,634	1,030	7
5/9/2008	6.0E-03	1,383,330	3,960,286	94	2,260	1,418	7
8/7/2008	9.2E-03	1,383,358	3,960,271	63	1,340	990	7
11/4/2008	3.2E-02	1,383,289	3,960,310	142	1,528	841	7
2/11/2009	1.1E-02	1,383,324	3,960,291	102	2,118	1,254	7
5/4/2009	7.7E-03	1,383,299	3,960,299	128	2,044	1,362	7
8/4/2009	7.7E-03	1,383,333	3,960,293	91	1,913	1,129	7
10/26/2009	5.0E-03	1,383,326	3,960,291	101	1,977	1,134	7
5/5/2010	4.0E-03	1,383,308	3,960,303	122	2,017	1,137	7
9/14/2010	2.8E-03	1,383,328	3,960,290	98	2,007	1,192	7
7/12/2011	1.7E-03	1,383,314	3,960,307	120	1,825	1,050	7
9/29/2011	2.5E-03	1,383,315	3,960,311	121	1,565	840	7
8/24/2012	3.0E-03	1,383,320	3,960,297	109	1,558	829	7
4/15/2013	4.0E-04	1,383,328	3,960,272	90	1,757	1,424	7
8/20/2013	5.6E-04	1,383,332	3,960,277	98	1,762	1,312	7
7/11/2014	3.5E-04	1,383,308	3,960,294	117	1,864	1,442	7
10/13/2014	6.3E-04	1,383,326	3,960,287	98	1,940	1,336	7
5/11/2015	7.4E-04	1,383,329	3,960,280	93	1,823	1,286	7
8/24/2015	4.8E-04	1,383,326	3,960,277	93	1,912	1,428	7
7/6/2016	8.1E-04	1,383,317	3,960,287	106	1,715	1,235	7
10/10/2016	8.6E-04	1,383,329	3,960,282	93	1,809	1,240	7
PHC as DIESEL FUEL							
11/16/2007	7.6E-01	1,383,324	3,960,293	104	1,886	1,311	7
2/14/2008	8.8E-01	1,383,335	3,960,284	89	1,957	1,390	7
5/9/2008	1.1E+00	1,383,339	3,960,278	83	1,908	1,298	7
8/7/2008	1.3E+00	1,383,336	3,960,276	84	1,983	1,349	7
11/4/2008	1.8E+00	1,383,334	3,960,284	90	2,017	1,328	7
2/11/2009	1.8E+00	1,383,331	3,960,284	93	2,017	1,337	7
5/4/2009	6.8E-01	1,383,334	3,960,278	87	2,039	1,412	7
8/4/2009	9.2E-01	1,383,340	3,960,278	82	1,949	1,336	7
10/26/2009	1.5E+00	1,383,323	3,960,290	103	2,186	1,387	7
5/5/2010	6.0E-01	1,383,332	3,960,281	90	2,119	1,490	7

MAROS Version 2.2, 2006, AFCEE Thursday, November 10, 2016 Page 2 of 4

Table E-3 cont'd. MAROS Spatial Moment Analysis Summary for Neely Road

Project: Neely Road 2016 **User Name:** FES
Location: Fort Wainwright **State:** Alaska

	0th Moment	1st Moment (Center of Mass)			2nd Moment (Spread)		
Effective Date	Estimated Mass (kg)	Xc (ft)	Yc (ft)	Source Distance (ft)	Sigma XX (sq ft)	Sigma YY (sq ft)	Number of Wells
PHC as DIESEL FUEL							
9/14/2010	9.4E-01	1,383,335	3,960,282	89	2,073	1,440	7
7/12/2011	5.7E-01	1,383,338	3,960,277	83	2,006	1,432	7
9/29/2011	9.6E-01	1,383,338	3,960,280	85	1,882	1,343	7
8/24/2012	6.9E-01	1,383,337	3,960,276	83	1,943	1,378	7
4/15/2013	8.8E-01	1,383,329	3,960,284	95	1,953	1,380	7
8/20/2013	1.5E+00	1,383,346	3,960,274	74	1,590	1,125	7
7/11/2014	7.1E-01	1,383,333	3,960,281	89	2,125	1,495	7
10/13/2014	1.8E+00	1,383,352	3,960,265	65	1,315	920	7
5/11/2015	1.6E+00	1,383,340	3,960,275	80	1,788	1,233	7
8/24/2015	1.2E+00	1,383,345	3,960,272	74	1,688	1,201	7
7/6/2016	1.4E+00	1,383,339	3,960,277	82	1,918	1,345	7
10/10/2016	1.8E+00	1,383,344	3,960,273	76	1,746	1,229	7
PHC as GASOLINE							
11/16/2007	2.1E+00	1,383,354	3,960,277	70	1,221	962	7
2/14/2008	3.0E+00	1,383,361	3,960,270	61	829	751	7
5/9/2008	1.5E+00	1,383,353	3,960,276	70	1,321	953	7
8/7/2008	1.5E+00	1,383,354	3,960,273	68	1,372	974	7
11/4/2008	1.4E+00	1,383,349	3,960,278	75	1,508	1,100	7
2/11/2009	2.4E+00	1,383,354	3,960,274	69	1,246	929	7
5/4/2009	9.3E-01	1,383,350	3,960,276	73	1,574	1,072	7
8/4/2009	1.2E+00	1,383,351	3,960,278	72	1,422	1,010	7
10/26/2009	7.8E-01	1,383,342	3,960,287	86	1,821	1,238	7
5/5/2010	6.5E-01	1,383,347	3,960,281	78	1,670	1,142	7
9/14/2010	6.7E-01	1,383,345	3,960,285	82	1,729	1,205	7
7/12/2011	3.8E-01	1,383,354	3,960,275	69	1,457	1,054	7
9/29/2011	5.0E-01	1,383,333	3,960,295	97	1,826	1,222	7
8/24/2012	3.3E-01	1,383,321	3,960,300	110	1,861	1,147	7
4/15/2013	4.0E-01	1,383,345	3,960,279	78	1,481	1,020	7
8/20/2013	4.7E-01	1,383,349	3,960,277	74	1,403	985	7
7/11/2014	3.1E-01	1,383,347	3,960,279	77	1,592	1,119	7
10/13/2014	1.6E-01	1,383,326	3,960,289	100	2,108	1,403	7
5/11/2015	4.9E-01	1,383,349	3,960,275	72	1,391	955	7
8/24/2015	4.2E-01	1,383,347	3,960,277	75	1,500	1,027	7
7/6/2016	4.8E-01	1,383,349	3,960,275	73	1,495	1,013	7
10/10/2016	2.4E-01	1,383,333	3,960,285	92	1,966	1,309	7

MAROS Version 2.2, 2006, AFCEE Thursday, November 10, 2016 Page 3 of 4

Table E-3 cont'd. MAROS Spatial Moment Analysis Summary for Neely Road

Project: Neely Road 2016 **User Name:** FES
Location: Fort Wainwright **State:** Alaska

Moment Type	Constituent	Coefficient of Variation	Mann-Kendall S Statistic	Confidence in Trend	Moment Trend
Zeroth Moment: Mass					
	1,2-DIBROMOETHANE (ETHYLEN	0.41	-149	100.0%	D
	1,2-DICHLOROETHANE	0.79	-93	99.6%	D
	BENZENE	1.32	-157	100.0%	D
	PHC as DIESEL FUEL	0.37	47	90.1%	PI
	PHC as GASOLINE	0.83	-165	100.0%	D
1st Moment: Distance to Source					
	1,2-DIBROMOETHANE (ETHYLEN	0.23	177	100.0%	I
	1,2-DICHLOROETHANE	0.09	-79	98.7%	D
	BENZENE	0.18	5	54.4%	NT
	PHC as DIESEL FUEL	0.10	-99	99.8%	D
	PHC as GASOLINE	0.15	85	99.2%	I
2nd Moment: Sigma XX					
	1,2-DIBROMOETHANE (ETHYLEN	0.11	51	92.0%	PI
	1,2-DICHLOROETHANE	0.14	43	88.0%	NT
	BENZENE	0.12	-19	69.2%	S
	PHC as DIESEL FUEL	0.10	-55	93.6%	PD
	PHC as GASOLINE	0.18	95	99.7%	I
2nd Moment: Sigma YY					
	1,2-DIBROMOETHANE (ETHYLEN	0.16	151	100.0%	I
	1,2-DICHLOROETHANE	0.18	79	98.7%	I
	BENZENE	0.17	59	94.9%	PI
	PHC as DIESEL FUEL	0.10	-25	74.8%	S
	PHC as GASOLINE	0.14	69	97.3%	I

Note: The following assumptions were applied for the calculation of the Zeroth Moment:

Porosity: 0.33 **Saturated Thickness:** Uniform 10 ft

Mann-Kendall Trend test performed on all sample events for each constituent. Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A)-Due to insufficient Data (< 4 sampling events).

Note: The Sigma XX and Sigma YY components are estimated using the given field coordinate system and then rotated to align with the estimated groundwater flow direction. Moments are not calculated for sample events with less than 6 wells.

MAROS Version 2.2, 2006, AFCEE Thursday, November 10, 2016 Page 4 of 4

Table E-4. MAROS First Moment Analysis Results for Benzene at Neely Road

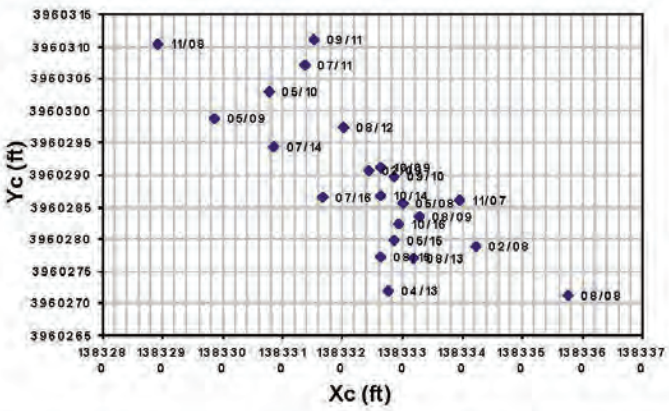
MAROS First Moment Analysis

Project: Neely Road 2016 **User Name:** FES

Location: Fort Wainwright **State:** Alaska

COC: BENZENE

Change in Location of Center of Mass Over Time



Effective Date	Constituent	Xc (ft)	Yc (ft)	Distance from Source (ft)	Number of Wells
11/16/2007	BENZENE	1,383,340	3,960,286	87	7
2/14/2008	BENZENE	1,383,342	3,960,279	80	7
5/9/2008	BENZENE	1,383,330	3,960,286	94	7
8/7/2008	BENZENE	1,383,358	3,960,271	63	7
11/4/2008	BENZENE	1,383,289	3,960,310	142	7
2/11/2009	BENZENE	1,383,324	3,960,291	102	7
5/4/2009	BENZENE	1,383,299	3,960,299	128	7
8/4/2009	BENZENE	1,383,333	3,960,283	91	7
10/26/2009	BENZENE	1,383,326	3,960,291	101	7
5/5/2010	BENZENE	1,383,308	3,960,303	122	7
9/14/2010	BENZENE	1,383,328	3,960,290	98	7
7/12/2011	BENZENE	1,383,314	3,960,307	120	7
9/29/2011	BENZENE	1,383,315	3,960,311	121	7
8/24/2012	BENZENE	1,383,320	3,960,297	109	7
4/15/2013	BENZENE	1,383,328	3,960,272	90	7
8/20/2013	BENZENE	1,383,332	3,960,277	88	7
7/11/2014	BENZENE	1,383,308	3,960,294	117	7
10/13/2014	BENZENE	1,383,326	3,960,287	98	7
5/11/2015	BENZENE	1,383,329	3,960,280	93	7
8/24/2015	BENZENE	1,383,326	3,960,277	93	7
7/8/2016	BENZENE	1,383,317	3,960,287	106	7
10/10/2016	BENZENE	1,383,329	3,960,282	93	7

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A) - Due to insufficient Data (< 4 sampling events). Moments are not calculated for sample events with less than 6 wells.

MAROS Version 2.2, 2006, AFCEE 11/10/2016 Page 1 of 1

Table E-5. MAROS First Moment Analysis Results for DRO at Neely Road

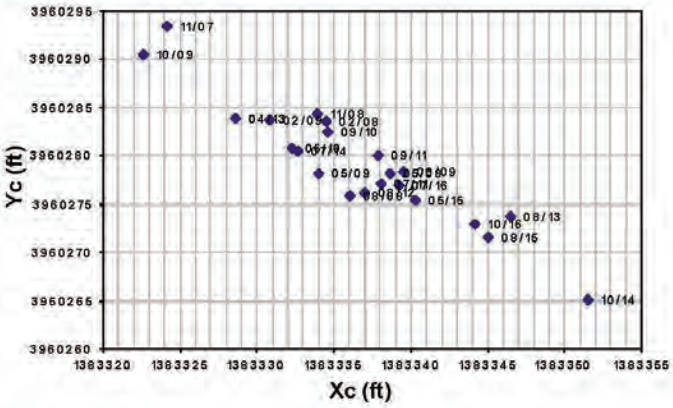
MAROS First Moment Analysis

Project: Neely Road 2016 **User Name:** FES

Location: Fort Wainwright **State:** Alaska

COC: PHC as DIESEL FUEL

Change in Location of Center of Mass Over Time



Groundwater Flow Direction:

Source Coordinate:

X: 1,383,409

Y: 3,960,234

Effective Date	Constituent	Xc (ft)	Yc (ft)	Distance from Source (ft)	Number of Wells
11/16/2007	PHC as DIESEL FUEL	1,383,324	3,960,293	104	7
2/14/2008	PHC as DIESEL FUEL	1,383,335	3,960,284	89	7
5/9/2008	PHC as DIESEL FUEL	1,383,339	3,960,278	83	7
8/7/2008	PHC as DIESEL FUEL	1,383,336	3,960,276	84	7
11/4/2008	PHC as DIESEL FUEL	1,383,334	3,960,284	90	7
2/11/2009	PHC as DIESEL FUEL	1,383,331	3,960,284	93	7
5/4/2009	PHC as DIESEL FUEL	1,383,334	3,960,278	87	7
8/4/2009	PHC as DIESEL FUEL	1,383,340	3,960,278	82	7
10/26/2009	PHC as DIESEL FUEL	1,383,323	3,960,290	103	7
5/5/2010	PHC as DIESEL FUEL	1,383,332	3,960,281	90	7
9/14/2010	PHC as DIESEL FUEL	1,383,335	3,960,282	89	7
7/12/2011	PHC as DIESEL FUEL	1,383,338	3,960,277	83	7
9/29/2011	PHC as DIESEL FUEL	1,383,338	3,960,280	85	7
8/24/2012	PHC as DIESEL FUEL	1,383,337	3,960,276	83	7
4/15/2013	PHC as DIESEL FUEL	1,383,329	3,960,284	95	7
8/20/2013	PHC as DIESEL FUEL	1,383,346	3,960,274	74	7
7/11/2014	PHC as DIESEL FUEL	1,383,333	3,960,281	89	7
10/13/2014	PHC as DIESEL FUEL	1,383,352	3,960,265	65	7
5/11/2015	PHC as DIESEL FUEL	1,383,340	3,960,275	80	7
8/24/2015	PHC as DIESEL FUEL	1,383,345	3,960,272	74	7
7/8/2016	PHC as DIESEL FUEL	1,383,339	3,960,277	82	7
10/10/2016	PHC as DIESEL FUEL	1,383,344	3,960,273	76	7

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A) - Due to insufficient Data (< 4 sampling events). Moments are not calculated for sample events with less than 6 wells.

MAROS Version 2.2, 2006, AFCEE 11/10/2016 Page 1 of 1

Table E-6. MAROS First Moment Analysis Results for GRO at Neely Road

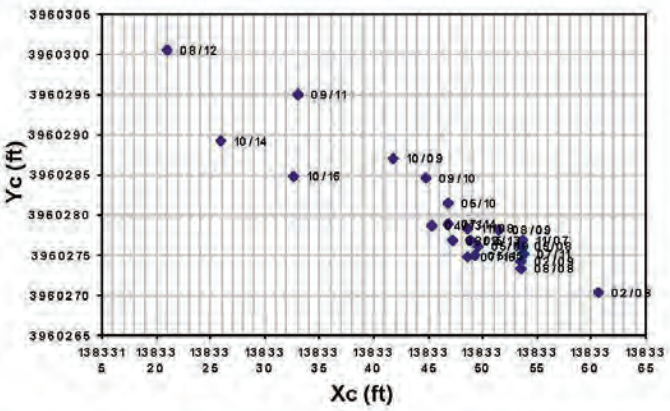
MAROS First Moment Analysis

Project: Neely Road 2016 **User Name:** FES

Location: Fort Wainwright **State:** Alaska

COC: PHC as GASOLINE

Change in Location of Center of Mass Over Time



Effective Date	Constituent	Xc (ft)	Yc (ft)	Distance from Source (ft)	Number of Wells
11/16/2007	PHC as GASOLINE	1,383,354	3,960,277	70	7
2/14/2008	PHC as GASOLINE	1,383,361	3,960,270	61	7
5/9/2008	PHC as GASOLINE	1,383,353	3,960,276	70	7
8/7/2008	PHC as GASOLINE	1,383,354	3,960,273	68	7
11/4/2008	PHC as GASOLINE	1,383,349	3,960,278	75	7
2/11/2009	PHC as GASOLINE	1,383,354	3,960,274	69	7
5/4/2009	PHC as GASOLINE	1,383,350	3,960,276	73	7
8/4/2009	PHC as GASOLINE	1,383,351	3,960,278	72	7
10/26/2009	PHC as GASOLINE	1,383,342	3,960,287	86	7
5/5/2010	PHC as GASOLINE	1,383,347	3,960,281	78	7
9/14/2010	PHC as GASOLINE	1,383,345	3,960,285	82	7
7/12/2011	PHC as GASOLINE	1,383,354	3,960,275	69	7
9/29/2011	PHC as GASOLINE	1,383,333	3,960,295	97	7
8/24/2012	PHC as GASOLINE	1,383,321	3,960,300	110	7
4/15/2013	PHC as GASOLINE	1,383,345	3,960,279	78	7
8/20/2013	PHC as GASOLINE	1,383,349	3,960,277	74	7
7/11/2014	PHC as GASOLINE	1,383,347	3,960,279	77	7
10/13/2014	PHC as GASOLINE	1,383,326	3,960,289	100	7
5/11/2015	PHC as GASOLINE	1,383,349	3,960,275	72	7
8/24/2015	PHC as GASOLINE	1,383,347	3,960,277	75	7
7/8/2016	PHC as GASOLINE	1,383,349	3,960,275	73	7
10/10/2016	PHC as GASOLINE	1,383,333	3,960,285	92	7

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A) - Due to insufficient Data (< 4 sampling events). Moments are not calculated for sample events with less than 6 wells.

MAROS Version 2.2, 2006, AFCEE 11/10/2016 Page 1 of 1

Table E-7. MAROS Sampling Location Optimization Results for Neely Road

MAROS Sampling Location Optimization Results

Project: Neely Road 2016 **User Name:** FES

Location: Fort Wainwright **State:** Alaska

Sampling Events Analyzed: **From** Sample Event 14 (8/24/2012) **to** Sample Event 22 (10/10/2016)

Parameters used:

Constituent	Inside SF	Hull SF	Area Ratio	Conc. Ratio
1,2-DIBROMOETHANE (ETHYLE	0.2	0.1	0.9	0.8
1,2-DICHLOROETHANE	0.2	0.1	0.9	0.8
BENZENE	0.2	0.1	0.9	0.8
PHC as DIESEL FUEL	0.2	0.1	0.9	0.8
PHC as GASOLINE	0.2	0.1	0.9	0.8

Well	X (feet)	Y (feet)	Removable?	Average Slope Factor*	Minimum Slope Factor*	Maximum Slope Factor*	Eliminated?
1,2-DIBROMOETHANE (ETHYLENE DIBROMIDE)							
AP-8211	1383408.63	3960234.00	☑	0.270	0.000	0.658	☐
AP-8213	1383372.38	3960196.75	☑	0.156	0.000	0.535	☐
AP-9003	1383317.13	3960253.25	☑	0.108	0.000	0.399	☐
AP-9004	1383227.75	3960213.00	☑	0.015	0.000	0.106	☐
AP-9459	1383337.00	3960329.25	☑	0.049	0.000	0.300	☐
AP-9684	1383409.00	3960297.25	☑	0.115	0.000	0.714	☐
AP-9685	1383227.50	3960426.00	☑	0.023	0.000	0.208	☐
1,2-DICHLOROETHANE							
AP-8211	1383408.63	3960234.00	☑	0.103	0.000	0.850	☐
AP-8213	1383372.38	3960196.75	☑	0.102	0.000	0.774	☐
AP-9003	1383317.13	3960253.25	☑	0.165	0.000	0.618	☑
AP-9004	1383227.75	3960213.00	☑	0.115	0.000	0.657	☐
AP-9459	1383337.00	3960329.25	☑	0.184	0.000	0.877	☐
AP-9684	1383409.00	3960297.25	☑	0.168	0.000	0.770	☐
AP-9685	1383227.50	3960426.00	☑	0.233	0.000	0.809	☐
BENZENE							
AP-8211	1383408.63	3960234.00	☑	0.205	0.039	0.500	☐
AP-8213	1383372.38	3960196.75	☑	0.511	0.293	0.595	☐
AP-9003	1383317.13	3960253.25	☑	0.409	0.175	0.646	☐
AP-9004	1383227.75	3960213.00	☑	0.624	0.505	0.733	☐
AP-9459	1383337.00	3960329.25	☑	0.294	0.051	0.580	☐
AP-9684	1383409.00	3960297.25	☑	0.268	0.024	0.523	☐

MAROS Version 2.2, 2006, AFCEE Thursday, November 10, 2016 Page 1 of 2

Table E-7 cont'd. MAROS Sampling Location Optimization Results for Neely Road

Project: Neely Road 2016 **User Name:** FES
Location: Fort Wainwright **State:** Alaska

Well	X (feet)	Y (feet)	Removable?	Average Slope Factor*	Minimum Slope Factor*	Maximum Slope Factor*	Eliminated?
AP-9685	1383227.50	3960426.00	☑	0.244	0.011	0.606	☐
PHC as DIESEL FUEL							
AP-8211	1383408.63	3960234.00	☑	0.419	0.242	0.521	☐
AP-8213	1383372.38	3960196.75	☑	0.570	0.464	0.642	☐
AP-9003	1383317.13	3960253.25	☑	0.151	0.011	0.269	☑
AP-9004	1383227.75	3960213.00	☑	0.586	0.483	0.646	☐
AP-9459	1383337.00	3960329.25	☑	0.283	0.163	0.354	☐
AP-9684	1383409.00	3960297.25	☑	0.102	0.002	0.230	☐
AP-9685	1383227.50	3960426.00	☑	0.298	0.001	0.741	☐
PHC as GASOLINE							
AP-8211	1383408.63	3960234.00	☑	0.140	0.001	0.346	☐
AP-8213	1383372.38	3960196.75	☑	0.847	0.768	0.884	☐
AP-9003	1383317.13	3960253.25	☑	0.333	0.078	0.612	☐
AP-9004	1383227.75	3960213.00	☑	0.640	0.434	0.722	☐
AP-9459	1383337.00	3960329.25	☑	0.160	0.003	0.575	☑
AP-9684	1383409.00	3960297.25	☑	0.398	0.312	0.577	☐
AP-9685	1383227.50	3960426.00	☑	0.529	0.326	0.717	☐

Note: The Slope Factor indicates the relative importance of a well in the monitoring network at a given sampling event; the larger the SF value of a well, the more important the well is and vice versa; the Average Slope Factor measures the overall well importance in the selected time period; the state coordinates system (i.e., X and Y refer to Easting and Northing respectively) or local coordinates systems may be used; wells that are NOT selected for analysis are not shown above.
* When the report is generated after running the Excel module, SF values will NOT be shown above.

MAROS Version 2.2, 2006, AFCEE Thursday, November 10, 2016 Page 2 of 2

Table E-8. MAROS Sampling Location Optimization Results for Neely Road—Considering All COCs

MAROS Sampling Location Optimization

Results by Considering All COCs

Project: Neely Road 2016 **User Name:** FES

Location: Fort Wainwright **State:** Alaska

Sampling Events Analyzed: **From** Sample Event 14 8/24/2012 **to** Sample Event 22 10/10/2016

Well	X (feet)	Y (feet)	Number of COCs	COC-Averaged Slope Factor*	Abandoned?
AP-8211	1383408.63	3960234.00	5	0.227	☐
AP-8213	1383372.38	3960196.75	5	0.437	☐
AP-9003	1383317.13	3960253.25	5	0.233	☐
AP-9004	1383227.75	3960213.00	5	0.396	☐
AP-9459	1383337.00	3960329.25	5	0.194	☐
AP-9684	1383409.00	3960297.25	5	0.210	☐
AP-9685	1383227.50	3960426.00	5	0.265	☐

Note: the COC-Averaged Slope Factor is the value calculated by averaging those "Average Slope Factor" obtained earlier across COCs; to be conservative, a location is "abandoned" only when it is eliminated from all COCs; "abandoned" doesn't necessarily mean the abandon of well, it can mean that NO samples need to be collected for any COCs.
* When the report is generated after running the Excel module, SF values will NOT be shown above.

MAROS Version 2.2, 2006, AFCEE Thursday, November 10, 2016 Page 1 of 1

Figure E-1. MAROS Delaunay Results for Benzene Neely Road Wells

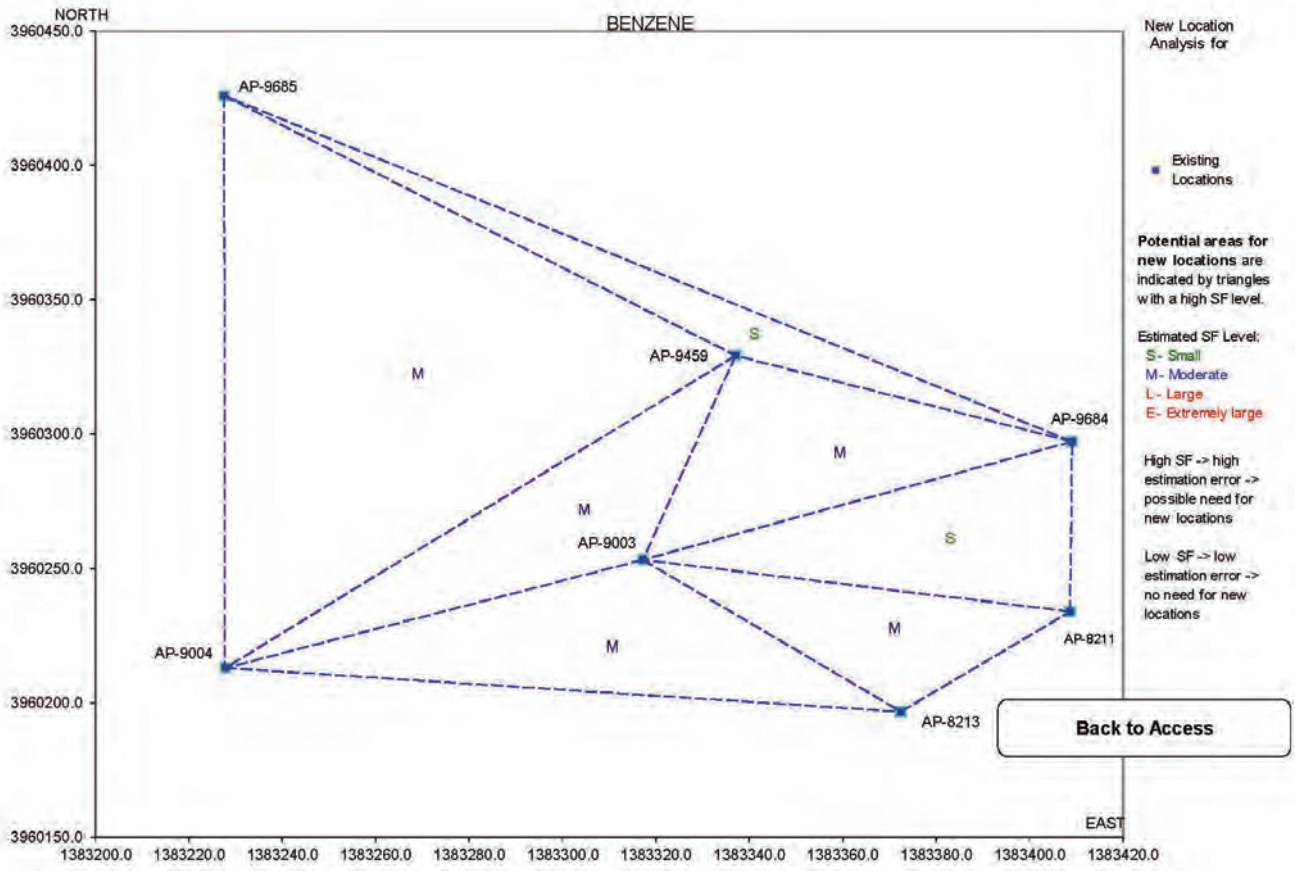


Figure E-2. MAROS Delaunay Results for DRO in Neely Road Wells

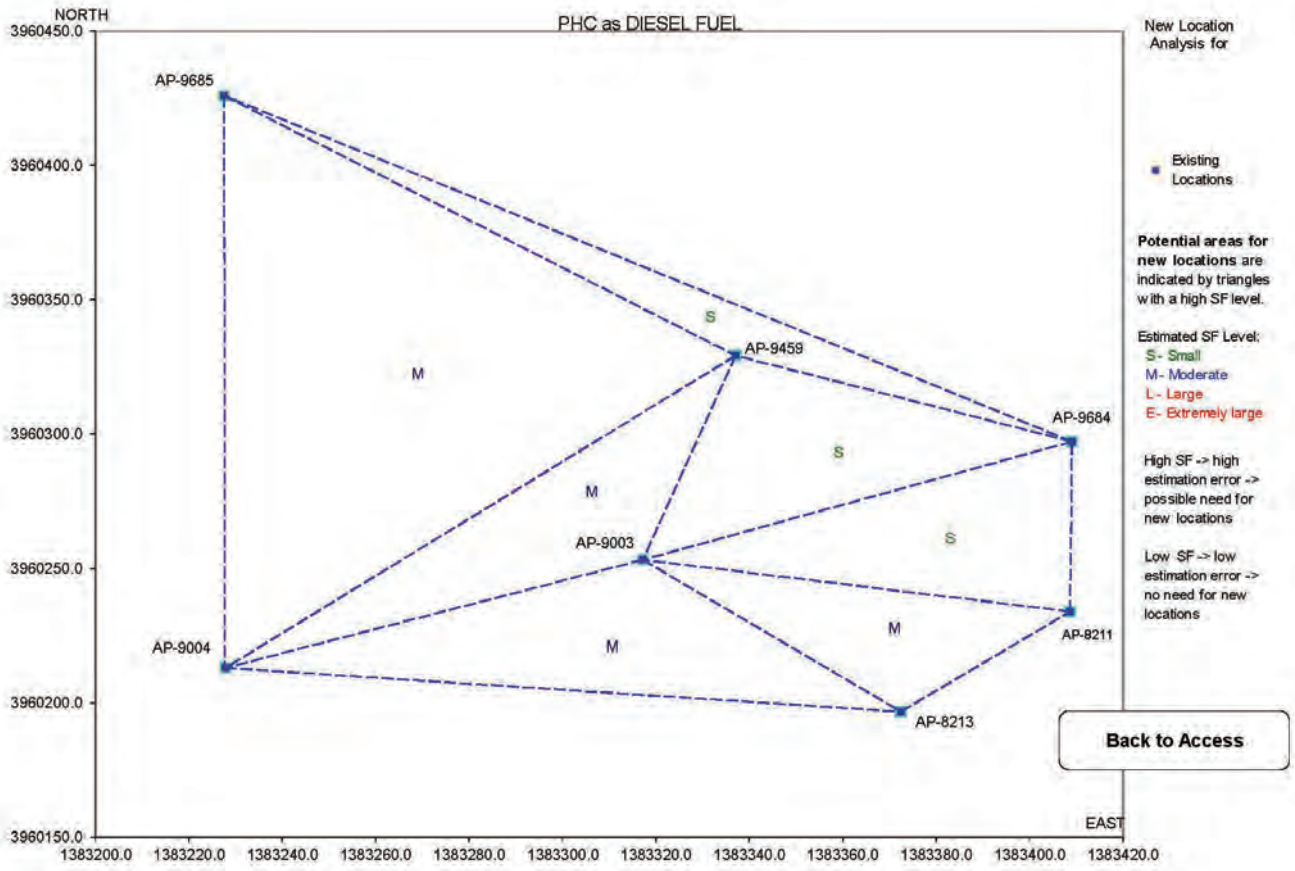


Figure E-3. MAROS Delaunay Results for GRO in Neely Road Wells

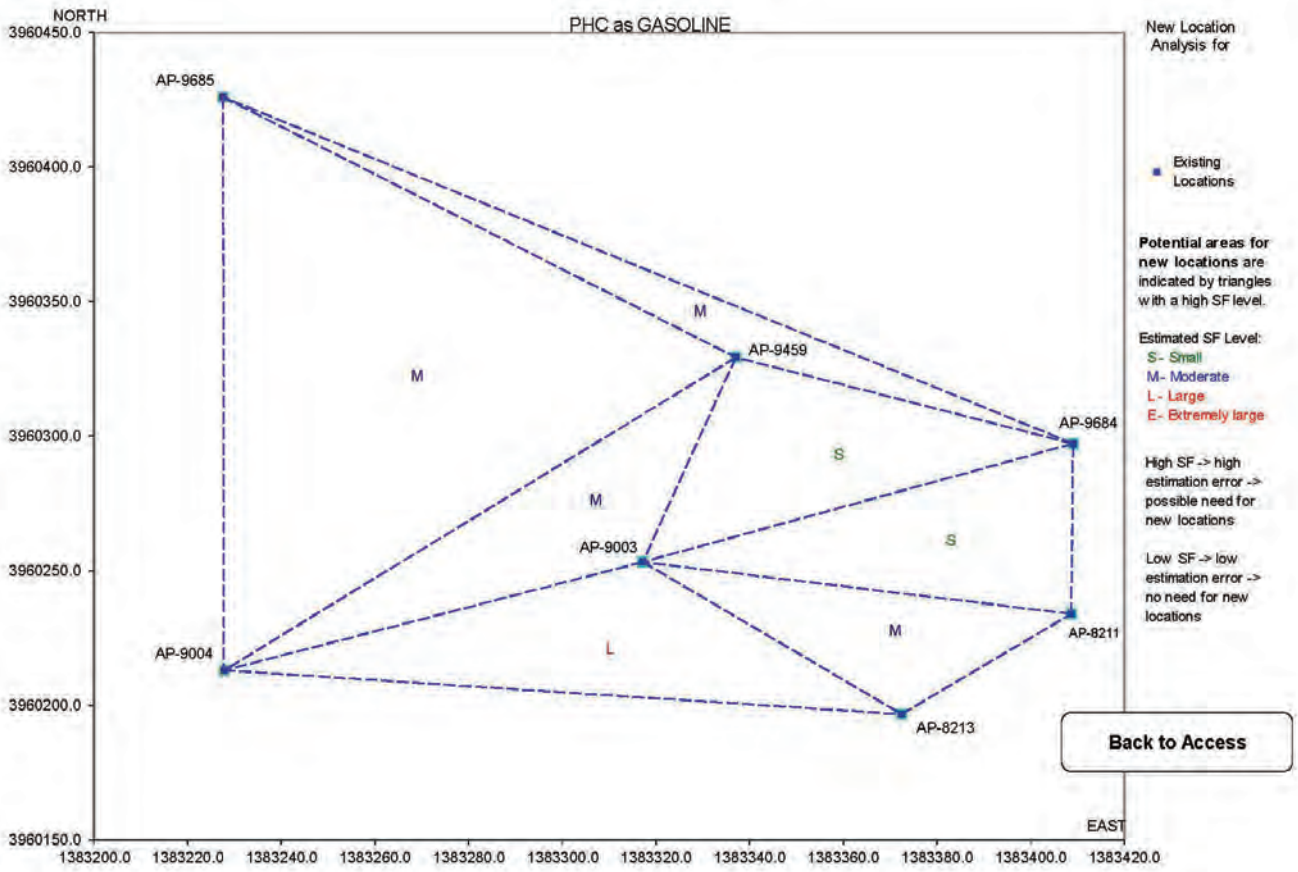


Table E-9. MAROS Sampling Frequency Optimization Results for Neely Road Wells

MAROS Sampling Frequency Optimization Results

Project: Neely Road 2016 **User Name:** FES

Location: Fort Wainwright **State:** Alaska

The Overall Number of Sampling Events: 22

"Recent Period" defined by events: **From** Sample Event 14 (8/24/2012) **To** Sample Event 22 (10/10/2016)

"Rate of Change" parameters used:

Constituent	Cleanup Goal	Low Rate	Medium Rate	High Rate
1,2-DIBROMOETHANE (ETHYLE	0.00005	0.000025	0.00005	0.0001
1,2-DICHLOROETHANE	0.005	0.0025	0.005	0.01
BENZENE	0.005	0.0025	0.005	0.01
PHC as DIESEL FUEL	1.5	0.75	1.5	3
PHC as GASOLINE	2.2	1.1	2.2	4.4

Units: Cleanup Goal is in mg/L; all rate parameters are in mg/L/year.

Well	Recommended Sampling Frequency	Frequency Based on Recent Data	Frequency Based on Overall Data
1,2-DIBROMOETHANE (ETHYLENE DIBROMIDE)			
AP-8211	Annual	Annual	Annual
AP-8213	Biennial	Annual	Annual
AP-9003	Biennial	Annual	Annual
AP-9004	Biennial	Annual	Annual
AP-9459	Biennial	Annual	Annual
AP-9684	Annual	Annual	Annual
AP-9685	Biennial	Annual	Annual
1,2-DICHLOROETHANE			
AP-8211	Biennial	Annual	Annual
AP-8213	Biennial	Annual	Annual
AP-9003	Biennial	Annual	Annual
AP-9004	Biennial	Annual	Annual
AP-9459	Annual	Annual	Annual
AP-9684	Biennial	Annual	Annual
AP-9685	Biennial	Annual	Annual
BENZENE			
AP-8211	Biennial	Annual	Annual
AP-8213	Biennial	Annual	Annual

MAROS Version 2.2, 2006, AFCEE Thursday, November 10, 2016 Page 1 of 2

Table E-9 cont'd. MAROS Sampling Frequency Optimization Results for Neely Road Wells

Project: Neely Road 2016 **User Name:** FES

Location: Fort Wainwright **State:** Alaska

Well	Recommended Sampling Frequency	Frequency Based on Recent Data	Frequency Based on Overall Data
AP-9003	Biennial	Annual	Annual
AP-9004	Biennial	Annual	Annual
AP-9459	Annual	Annual	Annual
AP-9684	Biennial	Annual	Annual
AP-9685	Biennial	Annual	Annual
PHC as DIESEL FUEL			
AP-8211	SemiAnnual	SemiAnnual	SemiAnnual
AP-8213	Biennial	Annual	Annual
AP-9003	Annual	Annual	Annual
AP-9004	Biennial	Annual	Annual
AP-9459	Annual	Annual	Annual
AP-9684	Annual	Annual	Annual
AP-9685	Annual	Annual	Annual
PHC as GASOLINE			
AP-8211	Annual	Annual	Annual
AP-8213	Biennial	Annual	Annual
AP-9003	Biennial	Annual	Annual
AP-9004	Biennial	Annual	Annual
AP-9459	Annual	Annual	Annual
AP-9684	Annual	Annual	Annual
AP-9685	Annual	Annual	Annual

Note: Sampling frequency is determined considering both recent and overall concentration trends. Sampling Frequency is the final recommendation; Frequency Based on Recent Data is the frequency determined using recent (short) period of monitoring data; Frequency Based on Overall Data is the frequency determined using overall (long) period of monitoring data. If the "recent period" is defined using a different series of sampling events, the results could be different.

MAROS Version 2.2, 2006, AFCEE Thursday, November 10, 2016 Page 2 of 2

APPENDIX F

IC INSPECTION FORM

Institutional Control Inspection Form — **Ft. Wainwright, Alaska**

Project #:	9011-10	**Site ID:**	FTWW-101
Date:	5/22/2018	**Site Name:**	Neely Road
Time:	1030	**Operable Unit:**	Two-Party
Inspector (Agency/Company and Observers Name):		FES Bryan Johnson/Karol Johnson	
Ground Conditons (wet, snow cover, etc)	Overgrown Brush	**Temperature and Weather Conditions**	58° High clouds, sunny

Remedy Includes (check all that apply)

- [ ] Access Controls (signs, fences, gates, etc)
- [X] Air Sparge Soil Vapor Extraction
- [ ] Surface Water Containment
- [X] Institutional Controls
- [ ] Landfill Cover/Containment
- [X] Monitored Natural Attenuation
- [ ] Other _____

ACCESS AND INSTITUTIONAL CONTROLS

				Notes
Fencing	[ ] Damaged	[ ] Intact	[X] N/A	
Gate(s)	[ ] Damaged	[ ] Intact	[X] N/A	
Signage	[ ] Damaged	[ ] Intact	[X] N/A	
Other Security Measures	[ ] Damaged	[ ] Intact	[X] N/A	
Institutional Controls are properly implemented	[X] Yes	[ ] No	[ ] N/A	
ICs Adequate	[X] Yes	[ ] No	[ ] N/A	
Vandalism/Trespassing Evident	[ ] Yes	[X] No	[ ] N/A	
Land Use Changes On Site	[ ] Yes	[X] No	[ ] N/A	

GENERAL SITE CONDITIONS

Vegetation is in acceptable condition	[X] Yes	[ ] No	[ ] N/A
Clutter or Trash Present			
Is there visual evidence of unauthorized soil disturbance below 6 inches, on-site well installation, or groundwater use?	[ ] Yes	[X] No	[ ] N/A
	[ ] Yes	[X] No	[ ] N/A

Monitoring Wells (Including Off-Post Wells)

- [X] All Required Wells Located
- [X] Good Condition
- [X] Properly Secured/Locked
- [ ] Need Maintenance (specify below)

TRANSMITTAL LETTER

FES

3538 International Street
Fairbanks, Alaska 99701

Phone: (907) 452-1006
FAX: (907) 452-2692
Email: FES@Alaska.com

FAIRBANKS ENVIRONMENTAL SERVICES

Letter of Transmittal

To: U.S. Army Corps of Engineers
Alaska District
P.O. Box 6898
JBER, AK 99506-6898

Date: January 24, 2019

Job No.: 9011-08

Attn: Bob Glascott, CEPOA-PM-E

Re: Final 2018 Neely Road Monitoring Report
Fort Wainwright Alaska
Contract W911KB-16-D-0005, Task Order 11

Date	*Paper Copies*	*Electronic/CD's*	*Description*
January 2019	1	Email and CD	Final 2018 Neely Road Monitoring Report - Fort Wainwright, Alaska

These are transmitted:

☐ *For your information* ☐ *For action specified below* ☐ *For review and comment* ☒ *For your use* ☐ *As requested*

Remarks

This transmittal letter documents submission of the Final 2018 Neely Road Monitoring Report. The work was completed by FES under contract to USACE (W911KB-16-D-0005, TO 11). The document was distributed and is submitted as follows:

I. USAGAK DPW-Environmental

Email, Hardcopy and CD	Brian Adams, Seth Reedy and Tamara Scholten (Fort Wainwright, AK)

II. USACE

Email/CD	Bob Hazlett (JBER, AK))

III. AEC

Email	Dave Mays and Jennifer Rawlings (Fort Sam Houston, TX)

IV. ADEC

Email/CDs	Erica Blake and Kevin Fraley (Fairbanks, AK)

By: Bryan Johnson

Title: Project Manager

REVIEW COMMENTS AND RESPONSES

THE STATE of ALASKA
GOVERNOR MICHAEL J. DUNLEAVY

Department of Environmental Conservation
SPILL PREVENTION & RESPONSE
Contaminated Sites Program

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File: 108.38.078

December 31, 2018

Electronic Delivery Only
Dept. of the Army
Directorate of Public Works
ATTN: IMFW-PWE (Adams)
1046 Marks Road
Fort Wainwright, Alaska 99703

RE: DEC comments for *2018 Monitoring Report, Neely Road Building 3570 Former PX Gas Station, Fort Wainwright, Ak.* Dated December 2018.

Dear Mr. Adams:

The Alaska Department of Environmental Conservation (DEC) has completed a review of the above-referenced document. The document describes 2018 groundwater monitoring activities and an institutional control (IC) inspection at the Neely Road – Former Building 3570 PX Gas Station (Neely Road) site on Fort Wainwright, Alaska. The following contaminants of concern (COCs) were detected above DEC cleanup levels; diesel range organics (DRO), trichloroethene (TCE), 1,2,4-trimethlybenzene, 1,3,5-trimethylbenzene, ethylbenzene, and naphthalene. Manganese is not a COC for this site, it is part of the geochemical parameter monitoring. DEC recently added a cleanup level for manganese, and all but one sample result was above the cleanup level.

No compliance issues were noted during the IC inspection. Due to the increasing trends in AP-9003 and the continued evaluation of solvent detections in AP-9685, the semiannual sampling frequency is recommended for future sampling events.

DEC has provided comments (See Enclosure). If there are any questions, please contact me at (907) 451-2104, or at kevin.fraley@alaska.gov.

Sincerely,

Kevin Fraley
Environmental Program Specialist

Enclosure: DEC Review Comments

cc (via email): Sandra Halstead, EPA
Tamara Scholten, FWA ENVR
Seth Reedy, FWA ENVR
Matthew Sprau, FWA ENVR Branch Chief
Richard Morris, FWA ENVR Division Chief
Bob Hazlett, USACE
Robert Glascott, USACE
Guy Warren, USACE
David Mays AEC
Jennifer Rawlings, AEC
Melinda Brunner, DEC
Erica Blake, DEC

REVIEW COMMENTS **PROJECT: Two Party Sites, Former Building 3570**
DOCUMENT: Draft 2018 Monitoring Report Neely Road Site **Location: Fort Wainwright, Alaska**

FTWW- DPW Environmental	**DATE: 12/31/18** **REVIEWER: Kevin Fraley** **PHONE: 907-451-2104**	**Action taken on comment by:** Bryan Johnson

Item No.	Drawing Sheet No., Spec. Para.	COMMENTS	REVIEW CONFERENCE A - comment accepted W - comment withdrawn (if neither, explain)	CONTRACTOR RESPONSE	ADEC RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)
1.	Executive Summary, paragraph 3	Recommend rewording "only one sample did not exceed the new ADEC cleanup level for manganese" to "All but one sample exceeded the new ADEC cleanup level for manganese" to better-match the adjacent statements about other contaminants. Recommend applying this change throughout document.	A	The text will be changed as suggested.	A
2.	Figure 3-2	AP-9684 has the 5/24/18 and 8/10/18 results for 1,2,4-trimethylbenzene (1,2,4-TMB) highlighted blue for exceedance. However, the 1,2,4-TMB result is actually below cleanup levels. With the 2018 cleanup level changes, 1,2,4-TMB went from 15 µg/L to 56 µg/L Please revise the figure to reflect the correct cleanup level for 1,2,4-TMB.	A	The figure will be changed as suggested.	A
3.	Section 5.0, paragraph 1	Please revise the conclusion statement, *"However several contaminants were detected at concentrations above ADEC cleanup levels (primarily as a result of a decrease in the ADEC cleanup levels), such as 1,2,4-Trimethylbenzene, 1,3,5- Trimethylbenzene, ethylbenzene, naphthalene and trichloroethene."* Please remove/revise the following "*primarily as a result of a decrease in the ADEC cleanup levels."* During the recent cleanup level changes in 2018, the cleanup level for 1,2,4-trimethylbenzene went up, but the cleanup level for 1,3,5-trimethylbenzene went down. The 2016 cleanup levels for ethylbenzene, naphthalene and trichloroethene did not change in 2018.	A	The text will be changed as suggested.	A
4.	Section 5.0, General	There are no conclusion or recommendation statements for the IC survey, will this continue in 2019? Please clarify and include in the report text.	A	The following will be added "The 2018 IC inspection did not identify IC violations or concerns at the site. IC inspections will continue in 2019."	A
5.		----- End of Comments ----			