



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

February 5, 2021

Directorate of Public Works

Subject: Submission of the Final Explanation of Significant Differences for Fort Wainwright Operable Unit 3, to the Environmental Protection Agency

Ms. Sandra Halstead
Environmental Protection Agency
Remedial Project Manager
Alaska Operations Office
222 W. 7th Ave, #19
Anchorage, AK 99513

Dear Ms. Halstead:

This letter documents transmission of the Final Explanation of Significant Differences for Fort Wainwright Operable Unit 3, Fort Wainwright to the Environmental Protection Agency (EPA) for final signature.

A digital copy of the document will be provided to you. A copy of this document is being provided to Ms. Erica Blake, Remedial Project Manager (RPM) and Ms. Sammi Castle, Alternate RPM, Alaska Department of Environmental Conservation, and to Mr. Christopher Zell, Alternate RPM, EPA. If you would like to receive a hard copy of this document, please notify us within the next few weeks.

If you have questions or concerns regarding this action please contact Ms. Bri Clark, RPM at (907) 361-3001 or email brianne.r.clark.civ@mail.mil, Mr. Brian Adams, Alternate RPM at (907) 361-6623 or email brian.m.adams18.civ@mail.mil, or Mr. Seth Reedy, Alternate RPM at (907) 361-6489 or email seth.a.reedy.civ@mail.mil.

Sincerely,

CLARK.BRIANNE.RENEE
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Bri R. Clark
Remedial Project Manager,
Directorate of Public Works

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HQ, USAG FWA CERCLA Information Repository (w/o encls)



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February 5, 2021

Directorate of Public Works

Subject: Submission of the Final Explanation of Significant Differences for Fort Wainwright Operable Unit 3, to the State of Alaska Department Environmental Conservation.

Ms. Erica Blake
Remedial Project Manager
Alaska Department of Environmental Conservation
610 University Avenue
Fairbanks, AK 99709

Dear Ms. Blake:

This letter documents transmission of the Final Explanation of Significant Differences for Fort Wainwright Operable Unit 3 to the State of Alaska Department Environmental Conservation (ADEC) for final signature.

A digital copy of the document will be provided to you. A copy of the document is also being provided to Ms. Sandra Halstead, Remedial Project Manager (RPM) and Mr. Christopher Zell, Alternative RPM, Environmental Protection Agency, and Ms. Sammi Castle, Alternate RPM, ADEC. If you would like to receive a hard copy of this document, please notify us within the next few weeks.

If you have questions or concerns regarding this action please contact Ms. Bri Clark, RPM at (907) 361-3001 or email brianne.r.clark.civ@mail.mil, Mr. Brian Adams, Alternate RPM at (907) 361-6623 or email brian.m.adams18.civ@mail.mil, or Mr. Seth Reedy, Alternate RPM at (907) 361-6489 or email seth.a.reedy.civ@mail.mil.

Sincerely,

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Bri R. Clark
Remedial Project Manager,
Directorate of Public Works

CF:
HQ, USAG FWA CERCLA Information Repository (w/o encls)

**EXPLANATION OF SIGNIFICANT DIFFERENCES
OPERABLE UNIT 3
FORT WAINWRIGHT, ALASKA**

November 2020



U.S. Army Garrison Alaska
Directorate of Public Works
Environmental Division
3023 Engineer Place
Fort Wainwright, Alaska 99703

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LIST OF ACRONYMS

ADEC	Alaska Department of Environmental Conservation
ARAR	Applicable or Relevant and Appropriate Requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CUL	Cleanup Level
E&E	Ecology & Environment
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
HQ	Hazard Quotient
µg/L	micrograms per liter
IRIS	Integrated Risk Information System
mg/L	milligrams per liter
MCL	maximum contaminant level
MP	Milepost
NCP	National Contingency Plan
OU3	Operable Unit 3
RAO	Remedial Action Objective
RBC	Risk-based Concentration
RfD	Reference Dose
RI/FS	remedial investigation/feasibility study
ROD	Record of Decision
ROLF	railcar off-loading facility
SDWA	Safe Drinking Water Act
TMB	trimethylbenzene
USARAK	United States Army Alaska

1.0 INTRODUCTION

1.1 Purpose

The April 9, 1996 Record of Decision (ROD) for Operable Unit 3 (OU3) at Fort Wainwright in Fairbanks, Alaska selected a remedy involving a combination of in-situ soil vapor extraction and air sparging with natural attenuation of groundwater to remove fuel-related contaminants at the following source areas: the Fairbanks Fuel Terminal, a Railcar Off-Loading Facility (ROLF), and three milepost (MP) sites along the Fairbanks-Eielson Pipeline (Mileposts 2.7, 3.0, and 15.75). An Explanation of Significant Differences (ESD) was subsequently signed in September 2002 to clarify institutional controls (ICs), discuss implementation of exit strategy, clarify the remedial action objectives (RAOs) for 1,2,4-trimethylbenzene (1,2,4-TMB) and 1,3,5-trimethylbenzene (1,3,5-TMB) (which applied to all sites except MP15.75), and to clarify applicable or relevant and appropriate requirements (ARARs). The changes in the 2002 ESD did not fundamentally alter the overall cleanup approach within OU3.

The RAOs for 1,2,4-TMB and 1,3,5-TMB in groundwater documented in the 1996 ROD were the concentrations corresponding to the Environmental Protection Agency (EPA) risk based cleanup levels of 14 micrograms per liter ($\mu\text{g/L}$) and 12 $\mu\text{g/L}$, respectively (noncancer risk [10^{-4}] and exceeding the hazard quotient [HQ] of 1). However, the 2002 ESD documented that the RAOs for 1,2,4-TMB and 1,3,5-TMB in the ROD were incorrectly based solely on the inhalation pathway. Therefore, the 2002 ESD changed the RAO to 1,850 $\mu\text{g/L}$ for both 1,2,4-TMB and 1,3,5-TMB, which were the correct EPA risk-based concentrations (RBCs) equivalent to a noncancer HQ of 1. In 2016, Alaska Department of Environmental Conservation (ADEC) groundwater cleanup levels (CULs) were updated for 1,2,4-TMB and 1,3,5-TMB using the most recent EPA toxicity values. The purpose of this ESD is to change the RAOs for 1,2,4-TMB and 1,3,5-TMB from those in the ROD to the most recent ADEC promulgated values (56 $\mu\text{g/L}$ and 60 $\mu\text{g/L}$, respectively) as established in 18 AAC 75.345, Table C (ADEC, 2018).

This ESD was prepared in response to the recommendation set forth in the Fourth Five Year Review Report for US Army Garrison Fort Wainwright, Alaska (Fourth Five-Year Review) (United States Army Alaska (USARAK), 2016).

1.2 Lead and Support Agencies

Fort Wainwright is the lead agency for remedial actions at OU3. The United States EPA co-selects the remedy at Federal Facilities in accordance with the National Contingency Plan (NCP) 300.430(f)(4)(iii) and ADEC was consulted in the development of the remedial actions. All three agencies were signatories to the ROD and 2002 ESD. The agencies have agreed to the significant changes included within this 2020 ESD. All three agencies agree that these changes do not fundamentally alter the overall cleanup approach in OU3.

1.3 Statutory Authority

This ESD was prepared in accordance with Section 117(c) of the Comprehensive Environmental

Response, Compensation, and Liability Act (CERCLA) and 40 CFR Sections 300.435(c)(2)(i) and 300.825(a)(2) of the NCP.

1.4 Administrative Record

This ESD will become part of the Administrative Record for Fort Wainwright, as required by 40 CFR Sections 300.823(a)(2) and 300.825(a)(2) of the NCP. The Administrative Record is available for public review at the following locations:

- Building 4320 on Fort Wainwright;
- Noel Wien Library, 1215 Cowles Street, Fairbanks, Alaska (Hours 10 am to 6 p)

2.0 OVERVIEW OF OPERABLE UNIT 3 DECISION DOCUMENTS

The RAOs for groundwater concentrations of 1,2,4-TMB and 1,3,5-TMB at OU3 have changed over time. This section discusses the various changes.

2.1 OU3 Site, Name, Location, and History

Fort Wainwright is located on the eastern edge of the City of Fairbanks in the Fairbanks-North Star Borough in interior Alaska. The 911,604-acre site includes the main Post area, a range complex, and two maneuver areas. Areas at Fort Wainwright where active investigative and remedial activities associated with past releases of hazardous substances have occurred have been further subdivided into six Operable Units (OUs). Each OU is addressed in a separate ROD, and each OU includes several different remedial areas (source areas) at Fort Wainwright that have been grouped together to facilitate proper management and remedial action.

2.2 1994 Risk Assessment

The 1994 Risk Assessment identified the RBC in groundwater for 1,2,4-TMB as 3 µg/L, and for 1,3,5-TMB as 2.4 µg/L ((Ecology & Environment (E&E), 1994)). These RBCs were calculated based upon provisional Reference Dose (RfD) information provided by the EPA Environmental Criteria and Assessment Office.

2.3 1996 ROD

OU3 was the first Fort Wainwright OU to reach a ROD. That ROD was signed on April 9, 1996 and initially addressed four remedial areas:

1. Remedial Area 1a: Lead-contaminated soils near above-ground storage tanks (ASTs) within the Fairbanks Fuel Terminal (FFT) (Remedial Area 1a was transferred to OU5. The Remedial Program Managers (RPMs) agreed to defer selection of a final remedy because additional time was required to select an appropriate cleanup level and remediation goal for lead in soil.);
2. Remedial Area 1b: Area below the FFT ASTs and around the Truck Fill Stand;
3. Remedial Area 2: Valve Pit A, Valve Pit B, Valve Pit C, and the ROLF; and

4. Remedial Area 3: Milepost 2.7, 3.0, and 15.75 of the Fairbanks-Eielson Pipeline (FEP).

2.3.1 Remedial Area 1b: Fairbanks Fuel Terminal

The FFT was the terminus of the Canadian Soil Pipeline (CANOL), which was constructed in 1943 and later abandoned after construction of the FEP in 1955. The FFT consisted of 16 ASTs located on Birch Hill and 2 ASTs located within the TFS. The tanks were used to store a variety of fuels for use at Fort Wainwright. All of the ASTs were removed in 2016, although much of the pipelines remain in place.

Sources of Contamination

The primary sources of contamination at Remedial Area 1b are associated with fuel and fuel additives storage, transfer, and handling activities and the Fairbanks Fuel Terminal and the TFS. Contamination associated with Remedial Area 1b is as follows:

Groundwater

Benzene, toluene, ethylbenzene, EDB, DCA, 1,2,4-trimethylbenzene (TMB), and 1,3,5-TMB were detected in groundwater at the base of Birch Hill and in the downgradient west transport pathway in concentrations exceeding federal drinking water MCLs and EPA risk-based concentrations used for screening potential contaminants of concern.

Soil

Petroleum hydrocarbons were identified and quantified as diesel in surface soil and Jet A in subsurface soil.

Selected Remedy

The selected remedy for Remedial Area 1b in the ROD was soil vapor extraction of petroleum-contaminated soil and air sparging of petroleum-contaminated groundwater in permafrost-free areas at known contaminant sources and at locations where RAGs were exceeded to achieve Safe Drinking Water Act levels. Additional remedies included ICs, restricting access to and development at the site as long as hazardous substances remain at concentrations above RAGs; long term groundwater monitoring; and natural attenuation to meet Alaska Water Quality Standards (AWQS). During the summer and fall of 2000 a product recovery system was installed on Birch Hill. This sub-area was not a part of the OU3 ROD, but was established as part of the ESD. In addition, the 2002 ESD required the implementation of groundwater modeling.

2.3.2 Remedial Area 2: Valve Pits and ROLF

Remedial Area 2 is located south of the Tank Farm Facility across the Chena River (except for Valve Pit A) and north of Gaffney Road. The ROLF was built in 1939 to receive fuel from tanks on railcars and to distribute the fuels to the airfield refueling points, quartermaster fuel system, and the FFT. The facility covers an area of approximately 40 acres. As part of this distribution system, there were six valve pits (three of which were specified as sub-areas) and the headers where the fuel was off-loaded from the tank cars. Fuel pipelines connect the ROLF to the FFT via the valve pits. Fuel was also stored in USTs within Remedial Area 2 until the tanks were removed in 1990. All known pipelines have been removed from the ROLF area.

Sources of Contamination

The primary sources of contamination at Remedial Area 2 are associated with fuel additives and the storage, transfer, and handling of fuel at the valve pits and headers at the ROLF. Site investigations characterized contamination associated with Remedial Area 2 as follows:

Groundwater

Benzene, toluene, ethylbenzene, EDB, DCA, 1,2,4-TMB, and 1,3,5-TMB were detected in groundwater at levels exceeding federal drinking water MCLs or EPA risk-based concentrations used for screening potential contaminants of concern.

Soil

Petroleum hydrocarbon were identified and quantified as diesel in surface soil and Jet-A in subsurface soil.

Selected Remedy

The selected remedy in the ROD was soil vapor extraction of petroleum-contaminated soil and air sparging of petroleum-contaminated groundwater at known contaminant sources and at locations where RAGs were exceeded (i.e., hot spots) to achieve Safe Drinking Water Act levels.

Additional remedies included ICs, restricting access to and development at the site as long as hazardous substances remain at concentrations above RAGs; groundwater monitoring; and natural attenuation to meet AWQS.

2.3.3 Remedial Area 3: Mileposts 2.7, 3.0, and 15.75

Remedial Area 3 consists of three source areas located along the FEP: Milepost 2.7, Milepost 3.0, and Milepost 15.75. The Milepost 2.7 and 3.0 sites are located in the East Birch Hill Tank Farm (EBHTF) area, and Milepost 15.75 is located near the city of North Pole (this source area was closed in 2007). The Milepost designations represent miles from the FFT. Contamination at the MP 2.7 and 3.0 sites is attributed to the EBHTF and to an associated truck fill stand located near the MP 2.7 site.

Sources of Contamination

The primary sources of contamination at Remedial Area 3 are associated with fuel storage, transfer, and handling activities at the East Birch Hill Underground Storage Tank Facility and the FEP. Investigations prior to and during the RI and post-ROD sampling characterized contamination associated with Remedial Area 3 as follows:

Groundwater

Benzene, toluene, ethylbenzene, EDB, DCA, 1,2,4-TMB, and 1,3,5-TMB were detected in groundwater exceeding federal drinking water MCLs and EPA risk based concentrations used for screening potential contaminants of concern.

Soil

GRO, DRO and benzene are the contaminants found in soil at the Remedial Area 3 source areas.

Selected Remedy

The remedy selected in the ROD for Milepost 2.7, 3.0, and 15.75 in Remedial Area 3 was soil vapor extraction and air sparging of groundwater in permafrost-free areas. This alternative was chosen because it had been proven effective with similar petroleum contamination in soil and groundwater on Fort Wainwright. The ROD also specified that long-term groundwater monitoring would be conducted to ensure that contaminant concentrations were reduced in nearby wetlands. In addition, ICs would be maintained to restrict access to and development at the sites as long as hazardous substances remain onsite at levels that precluded unrestricted use.

A re-evaluation of the remedies in the ROD was conducted in 2002. The evaluation concluded that the remedies selected in the ROD for the Milepost 2.7 and 3.0 sites would not fully achieve the RAOs without significant changes to the remedial method; the selected remedy for Milepost 15.75 was determined to be suitable. An ESD was completed in 2002 that implemented the following actions/changes to the remedy:

- Excavation of contaminated soils from Milepost 2.7 (1,500 cy) and Milepost 3.0 (6,000 cy) for *ex-situ* AS/SVE treatment
- Treatment of contaminated soil from Milepost sites 2.7 and 3.0 in the treatment cells to achieve ADEC Level A cleanup levels and soil disposal criteria required for placement in Fort Wainwright's on-Post solid waste landfill or to achieve applicable off-Post soil disposal criteria, as determined appropriate by the Army
- Monitoring of soil and groundwater contamination remaining in the vicinity of the Milepost 2.7 and 3.0 sites for as long as required until RAOs have been achieved, as determined by concurrence of the RPMs
- Installation of additional monitoring wells and site characterization at Milepost 2.7 and 3.0 to gain a better understanding of local hydrology, impacts of permafrost, and contaminant migration.

2.3.4 Groundwater RAOs

The ROD identified groundwater RAOs for 1,2,4-TMB and 1,3,5-TMB as 14 µg/L and 12 µg/L, respectively (E&E, 1995). The RAOs were based on an RBC equivalent to a noncancer hazard quotient (HQ) of 1 using residential groundwater exposure assumptions. The residential groundwater assumptions included exposure by ingestion, inhalation, and dermal contact. It is unclear why the RBCs changed between the Risk Assessment and the ROD.

2.4 2002 ESD

The 2002 ESD modified the groundwater RAO for 1,2,4-TMB and 1,3,5-TMB to 1,850 µg/L (applies to both 1,2,4-TMB and 1,3,5-TMB). The ESD explained that the values established in the ROD were erroneously selected from the wrong column in the EPA Region 3 RBC tables. The values listed in the ROD correspond to an inhalation pathway; however the residential groundwater assumptions in the feasibility study corresponded to a remedial goal of 1,850 µg/L for both compounds. Therefore, the ESD changed the RAO to 1,850 µg/L for both compounds.

2.5 Fourth Five-Year Review

The Fourth Five-Year Review discussed the change in RAOs for 1,2,4-TMB and 1,3,5-TMB that

was made by the ESD and stated that elimination of the inhalation pathway was an error (USARAK, 2016). The 1994 Risk Assessment clearly considered residential inhalation of volatiles from tap water to be a complete exposure pathway, which was quantified in characterizing the baseline risk from exposure to site contaminants (E&E, 1994). Therefore, the change in risk-based RAOs for the TMBs in the ESD was not justified.

The Fourth Five-Year Review recommended re-establishing the RAOs for 1,2,4-TMB and 1,3,5-TMB in groundwater using either of the following methods:

1. Update the RBCs by including the inhalation pathway and using information from the 2016 EPA Integrated Risk Information System (IRIS) toxicity assessment, or
2. Adopt the ADEC cleanup levels (CULs) established in 18 AAC 75 (ADEC, 2018).

2.6 Changes to ADEC CULs for 1,2,4-TMB and 1,3,5-TMB

In 2016, and again in 2018, ADEC groundwater CULs were updated for 1,2,4-TMB and 1,3,5-TMB using the most recent EPA toxicity values. The most recent ADEC groundwater CULs are also based on the same parameters for residential exposure to drinking water via ingestion, dermal contact, and inhalation as are used in calculation of the RSLs. The current ADEC CULs for 1,2,4-TMB and 1,3,5-TMB in Table C of 18 AAC 75.345 are now based on a risk threshold of 1×10^{-5} , which is less stringent than the EPA tapwater RSLs that are based on a risk threshold of 1×10^{-6} (May 2020 revision <https://semspub.epa.gov/work/HQ/200055.pdf>, HQ of 1).

The current ADEC CULs for 1,2,4-TMB and 1,3,5-TMB are 56 µg/L and 60 µg/L, respectively.

A summary comparison showing the number of wells that exceeded the current ROD Remedial Goals (RGs) in 2019 versus the number that would exceed the revised RGs are shown in the following table (derived from FES 2020):

Analyte	Current ROD RG (µg/L)	Revised ROD RG (µg/L)	Number of Wells Sampled	Number of Wells Exceeding Current ROD RG	Number of Wells Exceeding Revised ROD RG
1,2,4-Trimethylbenzene	1,850 ¹	56	102	0	16
1,3,5-Trimethylbenzene	1,850 ¹	60	102	0	9

¹Remedial Goal established in 2002 Explanation of Significant Differences

3.0 SUMMARY OF SIGNIFICANT DIFFERENCES

Although the RAOs for 1,2,4-TMB and 1,3,5-TMB in the OU3 ROD were risk-based values, concern was raised in the Fourth Five-Year Review because the 2002 ESD removed potential residential inhalation as an exposure pathway from the risk calculations.

The current ADEC CULs in 18 AAC 75.345 Table C for 1,2,4-TMB (56 µg/L) and 1,3,5-TMB (60 µg/L) are risk-based concentrations using the most recent toxicity data, and based on potential residential exposure to groundwater through ingestion, inhalation, and dermal contact at a HQ of 1. As a result, the current ADEC CULs are the same as the current EPA RSLs for residential groundwater exposure (HQ = 1) (EPA, 2018). The current ADEC CULs for 1,2,4-TMB and 1,3,5-TMB are appropriate to be established as the RAOs for OU3 in accordance with the relevant regulatory requirements.

Adoption of the new RAOs for 1,2,4-TMB and 1,3,5-TMB would not significantly impact the current remediation program. The RAOs described in the ROD remain unchanged by this ESD and are as follows:

Groundwater

- Restore to drinking water quality within a reasonable time;
- Reduce further migration of contaminated groundwater; and,
- Prevent use when concentrations exceed Safe Drinking Water Act (SDWA) levels.

Soil

- For petroleum-contaminated soil, prevent migration of contaminants from soil into groundwater that would result in groundwater contamination and exceedance of SDWA standards.

The Applicable or Relevant and Appropriate Requirements (ARARs) established in the ROD for OU3 are not changed by this ESD.

4.0 STATE AGENCY COMMENTS

ADEC has reviewed this ESD and supports these significant changes to the selected remedy. ADEC did not have any comments on this ESD.

5.0 AFFIRMATION OF THE STATUTORY DETERMINATION

Considering the changes that have been made to the selected remedies, the lead and support agencies believe that the remedies remain protective of human health and the environment, comply with federal and state requirements that were identified in the ROD as ARARs to these remedial actions at the time of the ROD, and are cost-effective. In addition, the revised remedies continue to utilize permanent solutions and alternative treatment technologies to the maximum extent practicable for these source areas.

6.0 PUBLIC PARTICIPATION ACTIVITIES

In accordance with 40 CFR 300.435(c)(2)(i), the Army will conduct the following public participation activities:

- The ESD and supporting information will be made available to the public in the

administrative record established under 40 CFR 300.815 and the information repository (administrative record locations are listed in Section 1.4);

- A notice of availability and a brief description of this ESD will be published in the *Fairbanks Daily News Miner* and the *Alaska Post* ; and
- A notice of availability and brief description of this ESD will be published on the Fort Wainwright Facebook page: <https://m.facebook.com/FortWainwrightPAO/> .

7.0 REFERENCES

Alaska Department of Environmental Conservation (ADEC), 2018. Oil and Hazardous Substances Pollution Control Regulations - Alaska Administrative Code, 18 AAC 75. Amended October.

Ecology & Environment (E&E), 1994. Remedial Investigation Report, Operable Unit 3, Fort Wainwright, Alaska. September.

E&E, 1994. Risk Assessment Report, Operable Unit 3, Fort Wainwright. September.

E&E, 1995. Feasibility Study, Operable Unit 3, Fort Wainwright. April.

Fairbanks Environmental Services (FES), 2020. Final 2019 Monitoring Report Operable Unit 3, U.S. Army Garrison Alaska, August.

U.S. Army Alaska (USARAK), 1996. Record of Decision for Operable Unit 3, Fort Wainwright, Fairbanks, Alaska. January.

USARAK, 2002. Explanation of Significant Differences, Operable Unit 3, Fort Wainwright, Alaska. November.

USARAK, 2016. Fourth Five-Year Review Report for US Army Garrison Fort Wainwright, Alaska. November.

United States Environmental Protection Agency (EPA), 2018. EPA On-line Tools for Site Assessment Calculation. Available online: <https://www3.epa.gov/ceampubl/learn2model/part-two/onsite/seepage.html> Last accessed 1/30/18.

**Lead and Support Agency Acceptance of Explanation of Significant Differences to the
Record of Decision
Fort Wainwright
Operable Unit 3**

Signature Sheet for the foregoing Explanation of Significant Differences for the Fort Wainwright Operable Unit 3 between the U. S. Army and the United States Environmental Protection Agency, in consultation with the Alaska Department of Environmental Conservation.

Signed:



Christopher J. Ruga
Colonel, US Army
Commanding

12 JAN 21


Date

**Lead and Support Agency Acceptance of Explanation of Significant Differences to the Record of Decision
Fort Wainwright
Operable Unit 3**

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Signed:

**CALVIN
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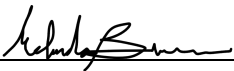
Calvin J. Terada, Director
Superfund and Emergency Management Division
EPA, Region 10

Date

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08 FEB 2021

Date

Section Manager, DOD Section
Division of Spill Prevention and Response
Alaska Department of Environmental Conservation

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