U.S. Army Materiel Command

U.S. Army Installation Management Command

Record of Decision

Sears Creek Station
Burn Pit, Dry Well, and Site-Wide Groundwater

Final

Prepared By

United States Army

U.S. ARMY GARRISON ALASKA

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List of Acronyms and Abbreviations

°F	degrees Fahrenheit
AAC	Alaska Administrative Code
ACL	alternative cleanup level
ADEC	Alaska Department of Environmental Conservation
AOC	Area of Concern
ARAR	Applicable or Relevant and Appropriate Requirement
AST	aboveground storage tank
bgs	below ground surface
BHC	benzene hexachloride
BTV	background threshold value
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	chemical of concern
COPC	chemical of potential concern
CSM	conceptual site model
DERP	Defense Environmental Restoration Program
DRO	diesel range organics
ECO-SSLs	Ecological Soil Screening Levels
EDB	1,2-dibromoethane
EPA	U.S. Environmental Protection Agency
ERA	ecological risk assessment
ESD	Explanation of Significant Differences
FS	Feasibility Study
ft	feet
FYR	Five-Year Review
GRO	gasoline range organic
HFP	Haines-Fairbanks Pipeline
HHERA	human health and ecological risk assessment
HHSRA	human health screening risk assessment
HI	Hazard Index
HQ	hazard quotient
ISCO	in-situ chemical oxidation
LOD	limit of detection
LOQ	Limit of Quantitation
LUC	land use control
MDC	maximum detected concentration
mg/kg	milligrams per kilogram
mg/kg-d	milligrams per kilogram per day
MNA	monitored natural attenuation
NCP	National Contingency Plan
NPV	net present value
O&M	operation and maintenance
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl

PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
RAO	remedial action objective
RAPM	Risk Assessment Procedures Manual
RCRA	Resource Conservation and Recovery Act
RI	remedial investigation
ROD	Record of Decision
RRO	residual range organic
RSL	Regional Screening Level
SARA	Superfund Amendments and Reauthorization Act
SCS	Sears Creek Station
SLERA	screening level ecological risk assessment
SRI	Supplemental Remedial Investigation
SVOC	semi-volatile organic compound
TBC	to be considered
TCR	target cancer risk
TEQ	toxicity equivalent quotient
TMV	toxicity, mobility, and volume
THQ	target hazard quotient
UIC	underground injection control
USC	United States Code
UST	underground storage tank
UU/UE	unlimited use / unrestricted exposure
UVOST	ultraviolet optical screening tool
VOC	volatile organic compound
WSW	Water Supply Well

PART I – DECLARATION

SITE NAME AND LOCATION

Facility Name:	Sears Creek Station (SCS), Alaska – U.S. Army Garrison Alaska
Site Location:	Milepost 1374 Alaska Highway, Alaska
SEMS ID Number:	Not Applicable
Sites:	Burn Pit Area of Concern (AOC), Dry Well AOC, and Site-Wide Groundwater AOC

STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) presents the selected remedies for three AOCs located at SCS, Alaska, which were chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986 and, to the extent practicable, the National Contingency Plan (NCP). This decision is based on the Administrative Record for this site.

The U.S. Army is managing the SCS by following the Defense Environmental Restoration Program (DERP) Management Manual (USDoD, 2012) and the CERCLA process for remediation of contamination at the Burn Pit, Dry Well, and Site Groundwater AOCs.

The U.S. Army has selected the remedies for the Burn Pit, Dry Well, and Site-Wide Groundwater AOCs. The Alaska Department of Environmental Conservation (ADEC) concurs that the remedy will be protective when implemented.

ASSESSMENT OF SITE

The SCS (**Figure 1-1**) is comprised of 17 AOCs (**Figure 1-2**), outlined in Section 1.1 of this ROD. Three of the 17 AOCs at the SCS were identified as containing CERCLA pollutants or contaminants or a petroleum release related to waste management practices and are addressed in this ROD. The remaining 14 AOCs are addressed as follows: three AOCs are to be addressed in a separate Decision Document under 18 Alaska Administrative Code (AAC) 75; 10 AOCs are to be closed in a separate Decision Document; and one AOC was previously closed under the Class V Underground Injection Program. Figure 1-2 presents the location and outlines the decision document that is applicable to each AOC.

The U.S. Army response actions will integrate the Alaska State Regulations into the U.S. Army's CERCLA response. Contaminants of concern (COCs), including the petroleum-only source areas from waste management activities, will be managed and cleaned up under the federal CERCLA response action. However, the off-site treatment and disposal of petroleum-only contaminated soil (non-CERCLA) is not subject to the U.S. Environmental Protection Agency (EPA) Off-Site Rule under 40 Code of Federal Regulation (CFR) 300.440.

The response actions selected in this ROD are necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment or pollutants or contaminants from the site which may present an imminent and substantial endangerment to public health or welfare. Since hazardous substances and contaminants are expected to remain in place within groundwater for an estimated 20 years above levels that support unlimited use and unrestricted exposure (UU/UE), land use controls (LUCs) will be imposed. LUCs will restrict access to and the use and/or exposure to those areas, including groundwater, that are contaminated above cleanup levels.

DESCRIPTION OF SELECTED REMEDIES

Remedial alternatives for the SCS CERCLA AOCs were developed and evaluated through a Feasibility Study (FS) (U.S. Army, 2020). Based on the results of the FS, the U.S. Army selected the following remedies for the three AOCs addressed in this ROD:

- **Burn Pit AOC.** Excavation and offsite treatment of petroleum-contaminated soil exceeding cleanup levels. Excavated soil will be segregated into groups based on soil sample results characterizing whether or not the excavated material exceeds cleanup levels, with material below the cleanup level utilized as backfill material. Additional backfill material would be imported to fill the balance the excavated area. Approximately 700 cubic yards of soil would be removed from the site and treated at an approved off-site treatment facility.
- **Dry Well AOC.** Excavation and offsite disposal of arsenic and lead contaminated soil exceeding cleanup levels. Excavated soil will be segregated into groups based on soil sample results characterizing whether or not the excavated material exceeds cleanup levels, with material below the cleanup level utilized as backfill material. Additional backfill material would be imported to fill the balance the excavated area. Approximately 20 cubic yards of soil would be removed from the site and disposed of at an approved off-site facility.
- **Site-Wide Groundwater AOC.** Monitored natural attenuation (MNA) and LUCs. Groundwater will be monitored to document reductions in COC concentrations/mass and plume stability or contraction as a result of natural attenuation processes. The Water Supply Well (WSW), adjacent to the Composite Building, will be decommissioned and a monitoring well installed to determine if lead concentrations are above or below cleanup levels. LUCs will be implemented and maintained to prevent exposure with contaminated media until COC concentrations allow for UU/UE. CERCLA Five-Year Reviews (FYR) will evaluate remedy protectiveness until COC concentrations allow for UU/UE.

STATUTORY DETERMINATIONS

The selected remedies for the SCS Burn Pit, Dry Well, and Site-Wide Groundwater AOCs attain the mandates of CERCLA Section 121, and to the extent practicable, the NCP. The remedies are protective of human health and the environment, comply with promulgated requirements that are applicable or relevant and appropriate to the remedial action, and are cost effective. The selected remedies also represent the maximum extent to which permanent solutions can be used in a practicable manner at a site and provide the best balance or trade-offs in terms of balancing criteria.

The NCP establishes the expectation that treatment will be used to address the principal threats posed by a site whenever practicable [40 CFR 300.430 (a)(1)(iii)(A)] to permanently and significantly reduce the toxicity, mobility, or volume of hazardous contaminants. The selected remedies for the Burn Pit and Site-Wide Groundwater AOCs satisfy the statutory preference for treatment as a principal element of the remedy, because the COCs in groundwater will undergo degradation through natural processes and soil contamination will be removed and treated at an off-site facility. The selected remedy for the Dry Well AOC does not satisfy the statutory preference for treatment as a principal element of the remedy, because contamination will be removed and disposed of at an off-site facility.

It is important to note that a selected remedy may change somewhat as a result of the remedial design and construction processes. Changes, if they occur, to a remedy as described in this ROD will be documented using a technical memorandum in the Administrative Record, an Explanation of Significant Differences (ESD), or ROD amendment. Only minor changes may be made without additional public notice and/or involvement.

The selected remedies for the Burn Pit and Dry Well AOCs at the SCS will not result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for UU/UE and, as such, a FYR will not be required for these two remedial actions at these AOCs.

The selected remedy for the Site-Wide Groundwater AOC at the SCS will result in hazardous substances, pollutants, or contaminants remaining on-site within groundwater above levels that allow for UU/UE. A statutory review will be conducted within 5 years after initiation of remedial actions at the Site-Wide Groundwater AOC to ensure that the remedy is, or will be, protective of human health and the environment, and at least once every 5 years until cleanup levels are met, which would allow for UU/UE. The approval and signature of this ROD will signify the initiation of remedial action. The FYR for the SCS Site-Wide Groundwater AOC is scheduled for completion in December 2029.

DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary section (Part II) of this ROD:

- List of COCs and their respective concentrations:
  See **Sections 2.3.3, 3.3.3, and 4.3.3** – Basis For Action.
- Baseline risk represented by the COCs:
  See **Sections 2.3, 3.3, and 4.3** – Summary of Site Risks.
- Cleanup levels established for COCs and the basis for these levels:
  See **Sections 2.3.3, 3.3.3, and 4.3.3** – Basis For Action.
- How source materials constituting principal threats will be addressed:

See **Sections 2.7, 3.7, and 4.7** – Principal Threat Wastes.

- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of groundwater used in the baseline risk assessment and ROD:

  See **Sections 1.6, 2.2.2, 3.2.2, and 4.2.2** – Current and Potential Future Land and Resource Uses and Groundwater and Surface Water Uses.

- Potential land and groundwater use that will be available at the site as a result of the selected remedy:

  See **Sections 1.6, 2.2.2, 3.2.2, and 4.2.2** – Current and Potential Future Land and Resource Uses and Groundwater and Surface Water Uses.

- Estimated capital, annual operation and maintenance (O&M), and net present value (NPV) as appropriate, discount rate, and the number of years over which the remedy cost estimates are projected:

  See **Sections 2.8, 3.8, and 4.8 –** Selected Remedies.

- Key factor(s) that led to selecting the remedy (i.e., describe how the selected remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision):

  See **Sections 2.8, 3.8, and 4.8 –** Selected Remedies.

Additional information can be found in the Administrative Record file for SCS, Alaska, which can be found at the Fort Wainwright CERCLA Library, Building 4320, Fort Wainwright, AK, 99703.

AUTHORIZING SIGNATURES

The following signature sheets document the U.S. Army's approval of the remedy selected in this ROD for SCS, Alaska, and indicates ADEC agreement that the selected remedies, when properly implemented, comply with state law.

Agency Selection
Burn Pit, Dry Well, Site-Wide Groundwater Record of Decision,
Sears Creek Station, Alaska

This signature sheet documents the U.S. Army selection of the remedies contained in the Record of Decision for the Burn Pit, Dry Well, and Site-Wide Groundwater Areas of Concern at Sears Creek Station, Alaska.

Jason A. Cole
Colonel, U.S. Army
Commanding

13 June 2024
Date

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ADEC Concurrence Page
Burn Pit, Dry Well, Site-Wide Groundwater Record of Decision,
Sears Creek Station, Alaska

The Alaska Department of Environmental Conservation concurs that proper implementation of the selected remedies will comply with state environmental laws. This decision will be reviewed and will be modified in the future if information becomes available that indicates the presence of contaminants or exposures that may cause unacceptable risk to human health, welfare, safety, or the environment.

Digitally signed by Dennis Shepard
Date: 2024.06.26 12:02:20 -08'00'

06/26/2024

Dennis Shepard
Environmental Program Manager
Contaminated Sites Program, Federal Facilities Section
Alaska Department of Environmental Conservation

Date

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PART II – DECISION SUMMARY

1.0 INTRODUCTION TO SEARS CREEK STATION

The Decision Summary identifies the selected remedies, explains how the remedies fulfill statutory and regulatory requirements, and provides a substantive summary of the Administrative Record file that supports the remedy selection decision.

1.1 SITE NAME, LOCATION, AND DESCRIPTION

The SCS site is located at Milepost 1374 on the Alaska Highway, approximately 50 miles southeast of Delta Junction, Alaska, and 60 miles northwest of Tok, Alaska (**Figure 1-1**). The SCS consists of the following 17 AOCs (**Figure 1-2**):

- Burn Pit (addressed in this ROD).
- Dry Well (addressed in this ROD).
- Site-Wide Groundwater (addressed in this ROD).
- Valve Manifold Building (to be addressed in a separate decision document).
- Fuel Lines (associated with the Valve Manifold Building and Dewatering Tower) (to be addressed in a separate decision document).
- Drum Storage Area (to be addressed in a separate decision document).
- Dewatering Tower (closure to be documented in a separate decision document).
- Disposal Line (closure to be documented in a separate decision document).
- Diesel Transfer Pump (closure to be documented in a separate decision document).
- Aboveground Fuel Tanks (ASTs) (closure to be documented in a separate decision document).
- Fuel Lines (associated with the ASTs and diesel transfer pump) (closure to be documented in a separate decision document).
- Underground Storage Tanks (USTs) (closure to be documented in a separate decision document).
- Composite Building Sump (closure to be documented in a separate decision document).
- Composite Building (closure to be documented in a separate decision document).
- Scraper Trap (closure to be documented in a separate decision document).
- Warehouse Building (closure to be documented in a separate decision document).
- Septic Tank/Leach Wells (closure documented in the *Class V UIC Well Closure Report, Revision 1* [Bristol, 2016a]).

The SCS was a booster station for the Haines-Fairbanks Pipeline (HFP) and operated between 1961 and 1973. The SCS was one of six booster stations utilized to increase the pressure and flow through the pipeline, to a maximum flow of 27,500 barrels per day. The pipeline and pumping station were deactivated in 1973. The SCS is accessed from the Alaska Highway and the perimeter of the site is fenced and secured with a locked gate (a new perimeter chain link fence and gate were installed in 2007). The land surrounding the SCS is owned by the State of

Alaska Department of Natural Resources. A gravel pit used by the State of the Alaska Department of Transportation and Public Facilities is located to the northwest of the SCS.

As the lead agency for remedial activities, the U.S. Army has conducted environmental restoration at SCS in accordance with CERCLA under DERP, which was established by Section 211 of SARA of 1986 and codified by 10 United States Code (USC) Sections 2701 et seq. ADEC provides oversight of the environmental restoration actions.

Funding for remedial activities is provided by the Defense Environmental Restoration Account; a funding source approved by Congress to clean up contaminated sites on U.S. Department of Defense installations.

1.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

The SCS boosted pressure and flow within the 8-inch HFP, which was located south of the SCS, which carried refined petroleum products such as JP-4 (jet fuel), two grades of aviation gasoline, DF-4 (Arctic diesel), and automotive gasoline. The products were introduced into the pipeline from fuel tankers at the Haines Terminal in Haines, Alaska.

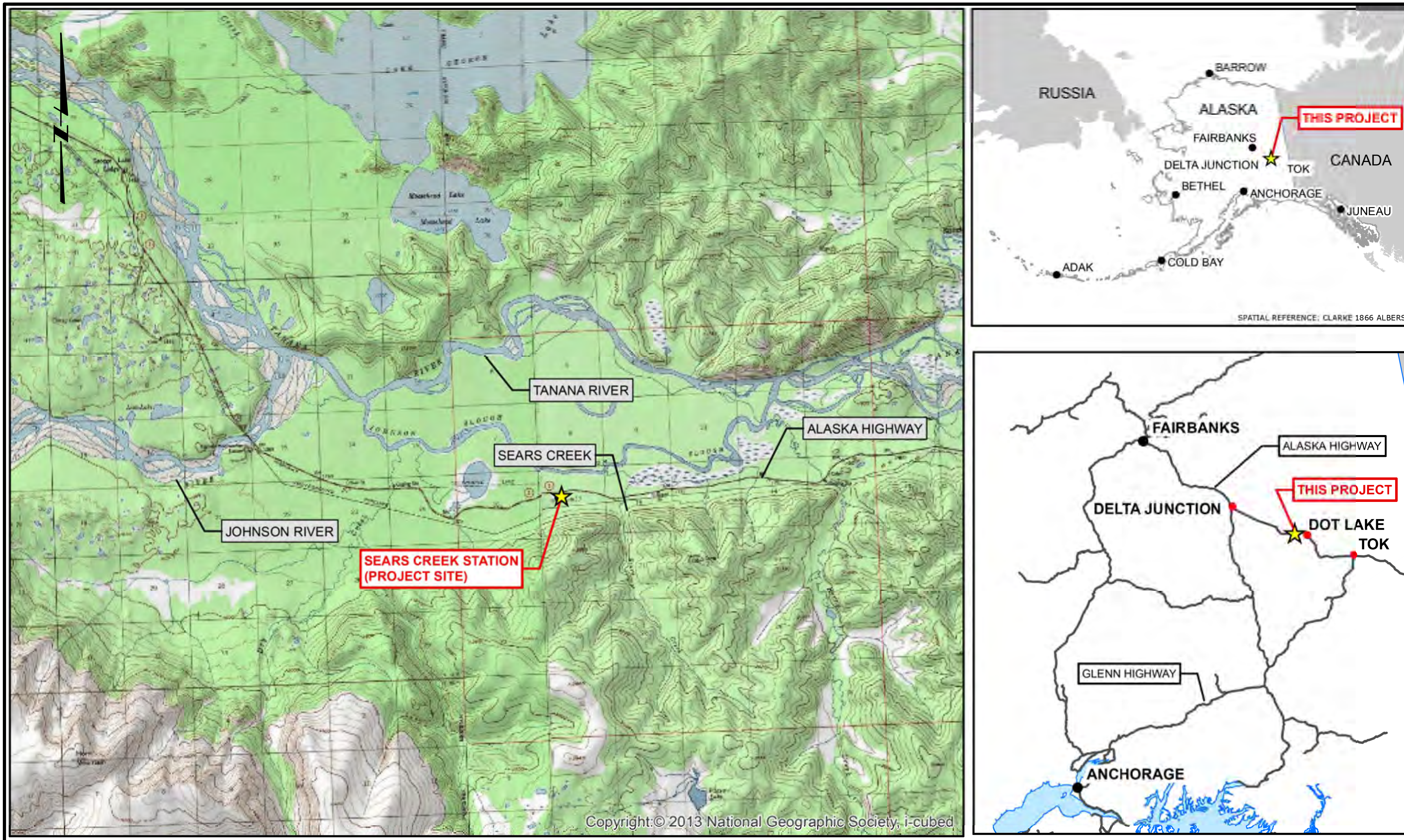
The SCS included: a Composite Building (including engine, pump, generator, and mechanical rooms; an office; storage and refrigeration area; and a garage), a warehouse, trailer houses for personnel lodging, a septic tank and leaching wells, two ASTs, two USTs, fuel piping, a fuel dispenser, a diesel fuel transfer pump, a dry well, a valve manifold building, a day tank/dewatering tower, a scraper trap (pigging station), and a burn pit (Figure 1-2).

The SCS was deactivated in 1973, prior to the enactment of hazardous waste regulations under the Resource Conservation and Recovery Act (RCRA) in 1980. Since deactivation, the site has been visited by trespassers collecting scrap metal (North Wind, 2014).

The following summarizes previous investigations and removal actions at the SCS:

- 1994 – 13 surface soil samples were collected, between 1 and 2 feet (ft) below ground surface (bgs), identifying elevated total petroleum hydrocarbon concentrations near the valve manifold (USAPEHEA, 1994).
- 2007/2008 – 49 soil borings and eight monitoring wells were completed as part of a remedial investigation (RI) investigating the following AOCs: ASTs, Burn Pit, the All-Purpose Warehouse, Composite Building, UST area, Scraper Trap, Valve Manifold Building and Dewatering Tower, Diesel Fuel Transfer Pump, and the Septic System Leach Field. The Burn Pit was identified as the only source area with significant contamination (North Wind, 2010).
- 2014 – A Ultraviolet Optical Screening Tool (UVOST) investigation was attempted at the Burn Pit. The investigations could not be competed due to drilling refusal (North Wind, 2015).
- 2014 – A data gap analysis was conducted to determine site feature characterization (North Wind, 2014).

TIME: 09-FEB-2021 17:29 FILE: C:\D\CAD\Proj\USACE\2021 Sears Creek ROD_185704695\January 2021\Fig1-1 Location Map.dgn



Source:
SCS CERCLA FS, final
Figure 1-1, Site Location, April 2020

SCALE IN MILES 0 1	SEARS CREEK STATION, ALASKA DRY WELL, BURN PIT, AND SITE GROUNDWATER RECORD OF DECISION	SITE LOCATION	FIGURE 1-1 185704695.500.0502

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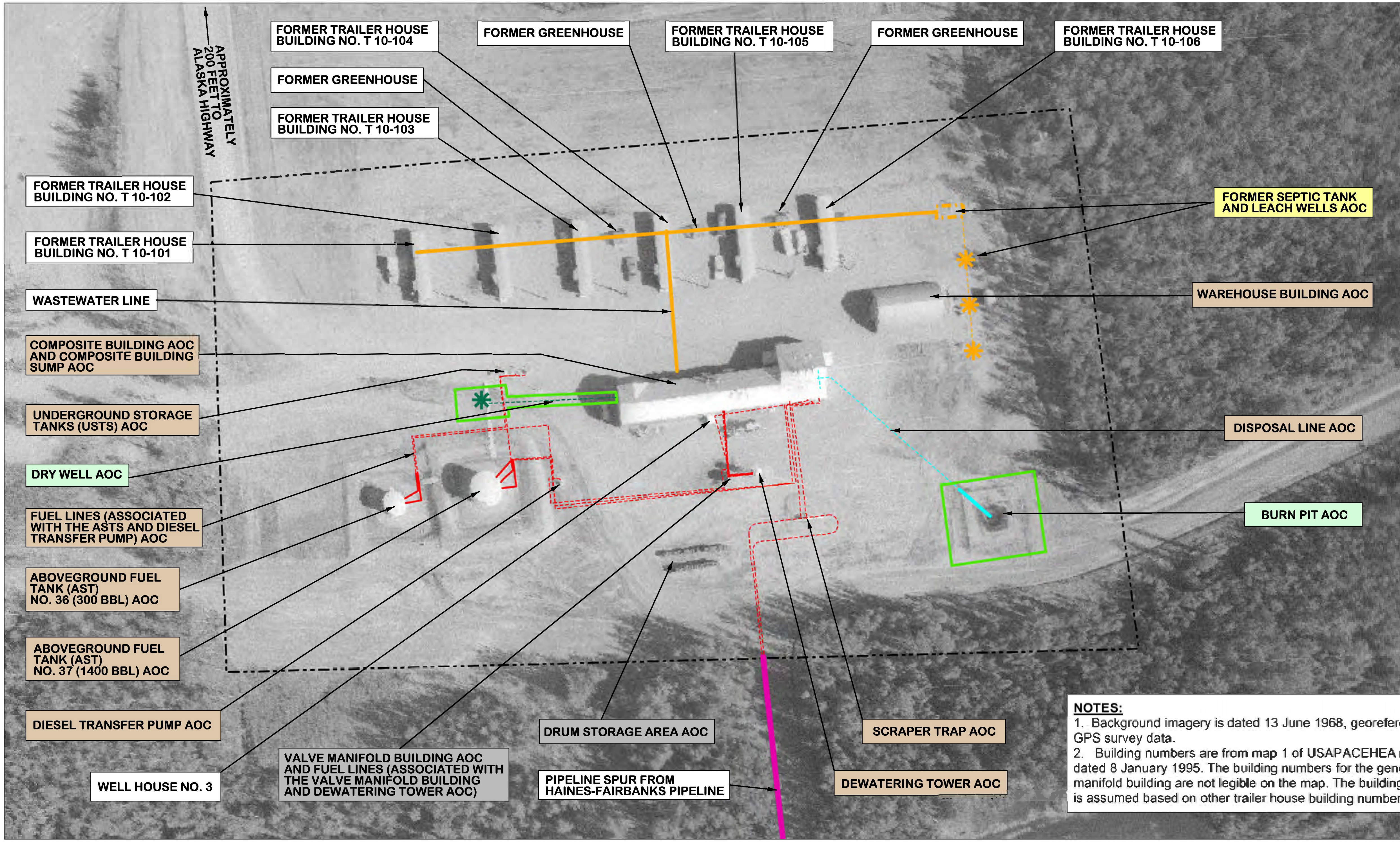

NOTES:

1. Background imagery is dated 13 June 1968, georeferenced to April 2015 and June 2015 GPS survey data.
2. Building numbers are from map 1 of USAPACEHEA report for Project No. 37-91-4102-94; dated 8 January 1995. The building numbers for the general purpose warehouse and valve manifold building are not legible on the map. The building number for Trailer House T 10-101 is assumed based on other trailer house building numbers.

LEGEND:

- FORMER DRY WELL (REMOVEDJUNE 2015)
- FORMER SEPTIC LEACHING WELL (REMOVED JUNE 2015)
- FORMER DRY WELL PIPING (REMOVED IN 2015)
- WASTEWATER LINE REMAINING IN PLACE
- WASTEWATER LINE (REMOVED IN 2015)
- CERCLA AOC
- FORMER SEPTIC TANK (REMOVED IN 2015)
- FENCE
- FUEL LINES REMAINING IN PLACE
- DISPOSAL LINE REMAINING IN PLACE
- FORMER DISPOSAL LINE (REMOVED IN 2015)
- FORMER ABOVEGROUND FUEL LINES (REMOVED IN 2015)
- FORMER UNDERGROUND FUEL LINES (REMOVED IN 2015)

AAC	ALASKA ADMINISTRATIVE CODE
AOC	AREA OF CONCERN
CERCLA	COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT
USAPACEHEA	U.S. ARMY PACIFIC ENVIRONMENTAL HEALTH ENGINEERING AGENCY
GPS	GLOBAL POSITIONING SYSTEM

FORMER SEPTIC LINE AND LEACHING WELLS	GREEN LABEL INDICATES CERCLA AOC
FORMER VALVE MANIFOLD BUILDING	GRAY LABEL INDICATES AOC IN DECISION DOCUMENT UNDER 18 AAC 75
DEWATERING TOWER AOC	BEIGE LABEL INDICATES AOC FOR SITE CLOSURE IN DECISION DOCUMENT
FORMER TRAILER HOUSE BUILDING NO. T 10-106	WHITE LABEL INDICATES BUILDING NOT IDENTIFIED AS AN AOC
FORMER SEPTIC TANK AND LEACH WELLS AOC	YELLOW LABEL INDICATES AOC ALREADY CLOSED

Source:
SCS CERCLA FS, final, Figure 1-3,
Sears Creek Station, Facility Map, April 2020

SCALE IN FEET
0 40

SEARS CREEK STATION, ALASKA
DRY WELL, BURN PIT, AND SITE GROUNDWATER
RECORD OF DECISION

SEARS CREEK STATION
FACILITY MAP

FIGURE
1-2

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- 2015 – Two removal actions were initiated at the SCS. The first was a storage tank and petroleum pipeline removal action that included the: ASTs, USTs, fuel pipelines, scraper trap, valve manifold pit dewatering tower, diesel transfer pump, and disposal line to the burn pit. This activity also included removing petroleum liquid and contaminated soil that was encountered and collecting soil samples from the limits of the excavations. The second removal action included a Class V Underground Injection Control (UIC) closure of the septic tank, leach wells, and dry well. The dry well, drain line to the dry well, septic tank, leach wells, and septic lines from the tank to the leach wells were removed. The septic system piping from the Composite Building to the septic tank was decommissioned in place. End-point samples were collected from the dry well and leach wells (Bristol, 2016a, 2016b; North Wind, 2016a).
- 2015 – A Supplemental RI (SRI) was completed of the following areas: Dry Well; Valve Manifold, Dewatering Tower, and Associated Fuel Lines; Drum Storage Area; Burn Pit; Disposal Line; and the Diesel AST, Diesel Transfer Pump, and Adjacent Fuel Lines. There were 28 soil borings completed, 63 soil samples collected, 10 monitoring wells installed, and 20 groundwater samples collected (U.S. Army, 2018).

Following 2015 decommissioning activities, the only remaining structure at the SCS is the Composite Building and remaining SCS features include the WSW and perimeter fencing.

The current land use designation for the SCS is industrial. The SCS is currently out of operation and the site is largely vacant. Future land use has not been determined, although it is possible the site could be used for residential purposes (U.S. Army, 2018).

1.2.1 Identification of Activities Leading to the Current Contamination at SCS

Contamination present at the SCS may have stemmed from fuel and solvent management and disposal practices associated with fuel pipeline operations.

1.2.2 Regulatory and Enforcement History

There are no records of enforcement actions at the SCS.

1.3 COMMUNITY PARTICIPATION

NCP Section 300.430(f)(3) establishes a number of public participation activities that the lead agency must conduct following preparation of the Proposed Plan (U.S. Army, 2023) and review by the support agency. Components of these items and documentation of how each component was satisfied for the SCS Burn Pit, Dry Well, and Site-Wide Groundwater AOCs are described in **Tables 1-1** and **1-2**.

The U.S Army did not receive comments on the Proposed Plan during the public comment period. The administrative record for SCS is available for public review at Fort Wainwright CERCLA Library, Building 4320, Fort Wainwright, AK, 99703.

Table 1-1 Public Notification of Document Availability

Requirement:	Satisfied by:
Notice of availability of the Proposed Plan and RI/FS must be made in a general circulation major local newspaper.	Notice of availability was published in the *Fairbanks Daily News Miner* on 23 July 2023.
Notice of availability must include a brief abstract of the Proposed Plan which describes the alternatives evaluated and identifies the preferred alternative (NCP Section 300.430(f)(3)(i)(A)	Notice of availability included all of these components and is included for reference as **Appendix A** to this ROD.
Notice of availability should consist of the following information: • Site name and location. • Date and location of public meeting. • Identification of lead and support agencies. • Alternatives evaluated in the detailed analysis. • Identification of preferred alternative. • Request for public comments. • Public participation opportunities including: – Location of information repositories and Administrative Record file. – Methods by which the public may submit written and oral comments, including a contact person. – Dates of public comment period. – Contact for the community advisory group (e.g., Restoration Advisory Board), if applicable.	

Key:
NCP – National Contingency Plan
RI/FS – Remedial Investigation/Feasibility Study
ROD – Record of Decision

Table 1-2 Public Comment Period Requirements

Requirement:	Satisfied by:
Lead agency should make document available to public for review on same date as newspaper notification.	The notification of availability was made on 23 July 2023. Document was made available to the public on 23 July 2023.
Lead agency must ensure that all information that forms the basis for selecting the response action is included as part of the Administrative Record file and made available to the public during the public comment period.	Fort Wainwright maintains the Administrative Record file for SCS which could be accessed by request.
CERCLA Section 117(a)(2) requires the lead agency to provide the public with a reasonable opportunity to submit written and oral comments on the Proposed Plan. NCP Section 300.430(f)(3)(i) requires the lead agency to allow the public a minimum of 30 days to comment on the RI/FS and the Proposed Plan and other supporting information located in the Administrative Record and information repository.	The U.S. Army provided a public comment period for the RI/FS and the Proposed Plan from 23 July 2023 to 22 August 2023.
The lead agency must extend the public comment period by at least 30 additional days upon timely request.	The U.S. Army received no requests to extend the public comment period.
The lead agency must provide the opportunity for a public meeting to be held at or near the site during the public comment period. A transcript of this meeting must be made available to the public and be maintained in the Administrative Record and information repository for the site (pursuant to NCP Section 300.430(f)(3)(i)(E)).	A public meeting was held on 25 July 2023 at the Delta Junction Community Center, Delta Junction, Alaska. A transcript of this meeting has been added to the Administrative Record file and information repository.

Key:
CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act
NCP – National Contingency Plan
RI/FS – Remedial Investigation/Feasibility Study

Regulatory comments on this ROD and the U.S. Army's responses are provided in **Appendix** B.

1.4 SCOPE AND ROLE OF RESPONSE ACTION

As with many sites, the environmental problems at the SCS are complex. As a result, the U.S. Army, with ADEC concurrence, has organized the environmental restoration work at SCS into 17 separate AOCs which are grouped into four categories, as presented below.

AOCs with hazardous substances regulated under CERCLA:

- Burn Pit
- Dry Well
- Site-Wide Groundwater

AOCs with only petroleum hydrocarbons regulated under 18 AAC 75:

- Valve Manifold Building
- Fuel Lines (associated with the Valve Manifold Building and Dewatering Tower)

- Drum Storage Area

AOCs with no elevated contaminant concentrations and requiring closure:

- Dewatering Tower
- Disposal Line
- Diesel Transfer Pump
- Aboveground Fuel Tanks
- Fuel Lines (associated with the ASTs and diesel transfer pump)
- Underground Storage Tanks
- Composite Building
- Composite Building Sump
- Scraper Trap
- Warehouse Building

AOC closed under another regulatory program:

- Septic Tank/Leach Wells (closure documented in the *Draft Class V UIC Well Closure Report, Revision 1* [Bristol, 2016a])

This ROD addresses the three AOCs subject to regulation under CERCLA. The site work to implement the remedies selected in this ROD is tentatively scheduled to begin in 2025.

1.5 SITE CHARACTERISTICS

The following provides an overview of the overall site characteristics associated with the SCS. The nature and extent of contamination for the Burn Pit, Dry Well, and Site-Wide Groundwater AOCs is presented in Sections 2, 3, and 4, respectively.

1.5.1 Conceptual Site Model

Contaminant sources typically result from historical releases, spills, or leaks, and through site operations. Potential sources at the SCS include: a diesel fuel transfer pump and valve manifold, former ASTs, former USTs and pipes, a scraper trap (pigging station), a composite building, a septic system and leach wells, a burn pit, and a warehouse. The primary release mechanisms include spills, leaks, and weathering. Waste petroleum, oils, and lubricants were thought to be regularly disposed of in the Burn Pit and, therefore, could leach into site soils and groundwater. In addition, trailer housing and the septic system were also located on site to accommodate workers. Petroleum fuel components could have been released incidentally or accidentally from these facilities and equipment onto the surface soil or subsurface soil, and/or groundwater.

Exposure media on or near the site include:

- Soil − Release of contamination during SCS operations may have impacted both surface (0 to 2 ft bgs) and subsurface (greater than 2 ft bgs) soils. Surface soil may have been directly impacted by potential surface releases from SCS facilities and/or facility maintenance activities. Subsurface soil may have been directly impacted from leaking USTs and/or underground product lines. Subsurface soil has been indirectly impacted by contaminant migration or leaching transport mechanisms from surface to subsurface soil.

- Groundwater − Direct releases to groundwater have not occurred at the SCS, although potential groundwater impacts may have occurred by releases to soil and subsequent migration or leaching from surface and/or subsurface soil.
- Air − Impacts to air may result from emanation of volatile constituents from subsurface media into ambient air. In addition, potential release of non-volatile constituents to air via wind erosion and entrainment with particulates in ambient air is a potential secondary source.

1.5.2 Physical Description

1.5.2.1 SCS Size

The SCS covers approximately 11.24 acres.

1.5.2.2 Topography and Climate

The regional topography slopes west and north towards the Tanana River, which is approximately 2 miles north of the SCS. Topography where the SCS facilities are located is relatively flat; however, the topography rises sharply immediately to the south of the site as shown on Figure 1-1.

The climate near the SCS is typical of the subarctic region of interior Alaska and is characterized by large diurnal and seasonal temperature variation, low precipitation, and low humidity. Average temperatures from the community of Dot Lake range from a low of -22 degrees Fahrenheit (°F) in the winter (December-February) to a high of 65°F in the summer (June-August). The average annual precipitation is approximately 11.1 inches, and the average snowfall is 27 inches (U.S. Army, 2018).

1.5.2.3 Geology

SCS is located in the Tanana Lowland, where the geology generally consists of gravel, sand, and silt deposits along alluvial streams, outwash fans, and wind-deposited loess. Till deposits (a heterogeneous mixture of cobbles, gravel, sand, silt, and clay transported by glaciers) are also found in the Tanana Lowland (Holmes, 1965). The native soil material overlays bedrock, which was identified between 55 and 60 ft bgs (North Wind, 2010).

1.5.2.4 Hydrogeology and Groundwater Use

The hydrogeology of the Tanana Lowland includes unconfined and confined conditions. The unconfined groundwater is generally found in unconsolidated material in valleys and fractured bedrock underlying high slopes and ridges. Confined groundwater occurs as a result of permafrost or other impermeable sedimentary layers and is generally found under artesian conditions (HLA/Wilder, 2000). Groundwater at the SCS is unconfined (North Wind, 2010).

The depth to groundwater across the SCS ranged between approximately 32 and 52 ft bgs. The shallowest groundwater was observed on the south edge of the site near the Burn Pit and south of the ASTs. The depth to groundwater increased from the south to the north side of the site, with the deepest groundwater observed north of the Composite Building. The groundwater has a northwesterly flow direction on the east side of the site, and a northeast flow direction in the southwest corner of the site. Groundwater flow through the middle of the site appears to generally follow a northwest direction. This is generally consistent with the surrounding site topography (U.S. Army, 2018).

Groundwater underlying the SCS is not currently used for drinking or agricultural purposes. Other than the existing SCS WSW (adjacent to the Composite Building, location shown on Figure 1-2 as Well House No. 3), there are no other drinking water wells currently located in the immediate vicinity of the SCS.

1.5.2.5 Surface Water Hydrology

The closest surface water body is the Johnson Slough, which is 0.4 miles north of the site, and north of the Alaska Highway. The slough empties into the Tanana River near the confluence of the Johnson and Tanana Rivers 3 miles northwest of the SCS.

1.5.2.6 Ecological Setting

SCS vegetation is dominated by a young (relative to surrounding undisturbed areas) but developed understory (shrub/scrub) and overstory dominated by white spruce (*Picea glauca*), birch (*Betula papyrifera*), and aspen (*Populus tremuloides*), which is typical of the Tanana-Kuskokwim Lowlands subregion of Alaska. Undisturbed mature forest is present along the southeastern and eastern boundary along the fence line. Some formerly active areas of the SCS are predominately gravel and/or bare compacted ground (roads, area around the Composite Building, and the location of the former trailer houses). Plant coverage in these areas is sparse, limited, localized to a few areas, and dominated by early successional weedy plant species (U.S. Army, 2018).

Wildlife in the region includes the presence of large and small terrestrial mammals, and resident and migratory birds. No formal wildlife surveys (i.e., systematic bird and/or mammal identification and abundance surveys), other quantitative biological surveys, or sampling have been conducted at the SCS. Large terrestrial mammals expected in the area of the site may include American black bear (*Ursus americanus*) and moose (*Alces americanus*). Small terrestrial mammals expected to occur in the ecoregion include voles (e.g., meadow vole [*Microtus pennsylvanicus*]), shrews (e.g., common shrew [*Sorex araneus*]), mice (e.g., meadow jumping mouse [*Zapus hudsonius*]), squirrels (e.g., Arctic ground squirrel [*Spermophilus parryii*]), and weasels (e.g., ermine [*Mustela erminea*]) (U.S. Army, 2018).

Upland passerine/small bird species and non-passerine bird species are common and abundant in the region. Typical birds found in Interior Bottomland forests include various species of passerines/small bird species (e.g., jays, sparrows, thrushes), and upland species such as grouse (e.g., ruffled grouse [Bonasa umbellus]) and ptarmigan (e.g., willow ptarmigan [*Lagopus lagopus*]), especially in drier regions (U.S. Army, 2018).

1.6 CURRENT AND POTENTIAL FUTURE LAND AND RESOURCE USE

The SCS is currently controlled by the U.S. Department of Defense and is administered by the U.S. Army. There are no manned operations at the SCS, and the majority of the former facility infrastructure has been removed. The SCS is fenced around its entire perimeter and secured with a locked gate. Access to the site is controlled, but trespass onto the property is known to occur. The fencing is a deterrent to site access by some animals as well. Site groundwater is not currently used as a drinking water source.

The SCS is located in an unincorporated borough within the Dry-Creek census-designated place. The closest areas to the SCS of significant residency are the community of Dry Creek (approximately 3 miles to the west) and the community of Dot Lake (approximately 10 miles to the east). The land surrounding the SCS is owned by the State of Alaska Department of Natural Resources. A gravel pit used by the State of the Alaska Department of Transportation and Public Facilities is located to the northwest of the SCS.

The reasonably foreseeable future use of the SCS is expected to remain industrial while under U.S. Army ownership and, as the lead agency, the U.S. Army has the authority to determine the future anticipated land use of the SCS. The U.S. Army has not determined potential future uses and unrestricted use could be a possibility following property transfer.

1.7 SUMMARY OF SITE RISKS

The following provides an overview of the overall human health and ecological risk assessment (HHERA) approach at the SCS, which is documented in the SCS SRI (U.S. Army, 2018). The HHERA evaluated the following SCS AOCs:

- Burn Pit
- Dry Well
- Valve Manifold Building
- Dewatering Tower
- Fuel Lines (associated with the Valve Manifold Building and Dewatering Tower)
- Drum Storage Area
- Disposal Line
- Diesel Transfer Pump
- Aboveground Fuel Tanks
- Fuel Lines (associated with the ASTs and diesel transfer pump)
- Site Groundwater

The HHERA evaluated the Valve Manifold, Dewatering Tower, and associated Fuel Line AOCs as a single unit and the Aboveground Fuel Tanks, Diesel Transfer Pump, and associated Fuel Line AOCs as a single unit. The Site-Wide Groundwater AOC was evaluated on a site-wide basis using data collected in 2015 as part of the SCS SRI (U.S. Army, 2018). The chemicals of potential concern (COPCs) and risk characterization for the Burn Pit, Dry Well, and Site-Wide Groundwater AOCs are presented in Sections 2, 3, and 4, respectively, of this ROD.

1.7.1 Natural or Anthropogenic Background Concentrations

The HHERA reviewed and statistically evaluated available data to determine site-specific soil background threshold values (BTVs) for metals as dedicated background values had not been established for the SCS. Groundwater data from upgradient Monitoring Well MW-8 were utilized as background conditions.

For soil, natural background concentrations were developed in accordance with:

- *Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites* (USEPA, 2002a).
- *Role of Background in the CERCLA Cleanup Program* (USEPA, 2002b).
- *Extracting A Site-Specific Background Dataset for a Constituent from a Broader Dataset Consisting of Onsite Constituent Concentrations & Estimating Background Level Constituent Concentrations* (Singh et al., 2014).

Evaluation of background conditions considered ADEC's *Arsenic In Soil. Technical Memorandum* (ADEC, 2009) that addresses evaluation and soil sampling criteria for arsenic and other naturally occurring inorganics. For some metals, sufficient data was not available to adequately calculate separate BTVs for surface soil (0 to 2 ft bgs) and subsurface soil (2 to 15 ft bgs); therefore, all metals data for surface soil and subsurface soil were compiled into a single dataset and statistically evaluated to determine the 0 to 15 ft bgs BTV. The statistical evaluation was conducted using the EPA's ProUCL version 5.0.00 (USEPA, 2013) and included: normality testing, quantile-quantile plot analysis, outlier evaluation, hypothesis testing (comparing the variability in surface soil versus subsurface soil datasets), and BTV estimation. **Table 1-3** outlines the established soil BTVs for metals.

Table 1-3 Soil Background Threshold Values for Metals

Analyte	Background Threshold Value (mg/kg)
Surface Soil: 0-2 ft bgs	
Chromium	42.4
Lead	22.3
Mercury	0.0523
Thallium	0.152
Vanadium	97.4
Zinc	86.3
Subsurface Soil: 2-15 ft bgs	
Chromium	23.5
Lead	14.9
Mercury	0.0368
Thallium	0.11
Vanadium	47.6
Zinc	47.4
Soil: 0-15 ft bgs	
Arsenic	4.8
Cadmium	0.243
Cobalt	10.2
Copper	30
Manganese	590
Selenium	0.665

Key:
bgs – below ground surface
ft – feet
mg/kg – milligrams per kilogram

Table 1-4 outlines the established groundwater background well concentration from Monitoring Well MW-08.

1.7.2 Summary of Human Health Risk Assessment

Human health was assessed through completion of a Human Health Screening Risk Assessment (HHSRA), completed in accordance with 18 AAC 75 and the ADEC *Risk Assessment Procedures Manual* (RAPM) (ADEC, 2015), and is consistent with EPA and U.S. Army Corps of Engineers (USACE) guidance documents including the: Risk Assessment Handbook, Volumes I and II (USACE, 1999, 2010); *Risk Assessment Guidance for Superfund* (USEPA, 1989, 2004, 2009); and *Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites* (USEPA, 2002a).

Table 1-4 Groundwater Background Threshold Values for Metals

Analyte	Background Threshold Value (mg/L)
Site-Wide Groundwater	
Antimony	0.0015
Arsenic	0.0156
Barium	0.102
Beryllium	0.0005
Cadmium	0.001
Chromium	0.00359
Cobalt	0.00246
Copper	0.00729
Lead	0.00231
Mercury	0.0001
Molybdenum	0.0235
Nickel	0.00556
Selenium	0.01
Silver	0.001
Thallium	0.001
Vanadium	0.01
Zinc	0.0125

Key:
mg/L – milligrams per liter

The risk assessment, as described in ADEC's Cumulative Risk Guidance (ADEC, 2008a), was conducted for the SCS in accordance with the RAPM (ADEC, 2015). Preliminary COPCs in soil and groundwater were selected by comparing: (1) the maximum detected concentrations (MDCs) to background values for inorganic chemicals; and (2) the MDC reported for each media to the applicable risk-based screening level. The HHSRA considered the resulting preliminary COPCs along with the following key elements to draw risk conclusions: 1) preliminary estimate of potential cumulative cancer risks and noncancer hazards; 2) contribution from natural background sources; 3) current and future exposure conditions; and 4) evaluation of uncertainties.

1.7.2.1 Exposure Assessment

Contaminants have been released to surface and subsurface soil at the SCS through historic spills, leaks, and disposal practices. Percolation and leaching of the soil releases can transport contaminants to groundwater. Volatile contaminants in soil and groundwater can result in direct release of volatile COPCs to ambient air through volatilization. A conceptual site model (CSM), presented in the HHERA (U.S. Army, 2018), was developed to aid in determining reasonable exposure scenarios and pathways of concern. The identified exposure media and exposure pathways include:

- Soil – incidental ingestion, dermal absorption, and inhalation of fugitive dust.
- Groundwater – ingestion, dermal absorption, and inhalation of volatile compounds in tap water.
- Air – inhalation of outdoor air, inhalation of indoor air, and inhalation of fugitive dust.

The receptors identified in the CSM included:

- Future residents – exposure to all media and pathways
- Future commercial or industrial workers – exposure to all media and pathways
- Current and future site visitors, trespassers, or recreational users – exposure to all soil pathways and the air inhalation pathways for outdoor air and fugitive dust
- Future construction worker – exposure to all soil pathways and the air inhalation pathways for outdoor air and fugitive dust
- Future farmers/subsistence harvesters – exposure to all soil pathways, groundwater ingestion and dermal absorption pathways, and the air inhalation pathways for outdoor air and fugitive dust
- Future subsistence consumers – exposure to all soil pathways and the air inhalation pathways for outdoor air and fugitive dust

The HHSRA considered potential future risks to residential receptors and potential risks to industrial receptors. As screening levels do not exist for the other identified receptors, they were not quantitatively evaluated in the HHSRA. However, the conservative assumptions used in the development of screening levels for residential and industrial receptors are considered protective of the potential receptors that could exist at the SCS but were not quantitatively evaluated. Specifically, the HHSRA assumes that the hypothetical residential receptor will spend 100 percent of their time at the evaluated AOC.

1.7.2.2 Identification of Chemicals of Potential Concern

Soil and groundwater screening levels, to determine COPCs, were obtained from the EPA Regional Screening Level (RSL) table (USEPA, 2016), except for: the carcinogenic polynuclear aromatic hydrocarbons (PAHs), diesel range organics (DRO), gasoline range organics (GRO), and residual range organics (RRO). The screening levels for the carcinogenic PAHs were calculated using the RSL calculator (USEPA, 2017). To be consistent with ADEC guidance (ADEC, 2015), the RSL table published for noncarcinogens with a target hazard quotient (THQ) equal to 0.1 was used. Soil and groundwater screening levels for DRO, GRO, and RRO were obtained from Tables B2 (under 40-inch zone) and C of 18 AAC 75 (ADEC, 2016), respectively. COPCs were identified for both the residential and industrial exposure scenario. As described in the EPA's RSL user guide (USEPA, 2016), the composite worker land use scenario is used for developing the "industrial soil RSLs".

1.7.2.3 Toxicity Assessment

The carcinogenic and non-carcinogenic toxicity criteria used to calculate the potential risk were based on the values utilized to establish: the 2016 18 AAC 75, Tables B2 and C values for DRO, GRO, and RRO in soil and groundwater, respectively (ADEC, 2016); the 2017 EPA RSL calculator values for carcinogenic PAHs (USEPA, 2017); and the 2016 EPA RSLs (USEPA, 2016) for all other constituents.

1.7.2.4 Risk Characterization

Cumulative cancer risks and noncancer hazards are conservatively based on a future residential exposure scenario. Soil screening levels are also based on receptors spending 100 percent of their time in the affected areas. To evaluate potential future residential risks, a preliminary estimate of the potential cancer risks and noncancer hazards were performed for the COPCs that exceeded residential screening levels.

The excess cancer risk of a COPC that exceeded screening levels was calculated as a ratio of the MDC and the COPC RSL multiplied by the target cancer risk (TCR) used in the derivation of the screening level (1×10^{-6}).

The noncarcinogenic hazard, hazard quotient (HQ), of a COPC that exceeded screening levels was calculated as a ratio of the MDC and the COPC RSL multiplied by the TQH used in the derivation of the screening level (0.1).

The excess cancer risk estimates are then evaluated in the context of EPA's risk management range of 10^{-4} to 10^{-6} (1 in 10,000 to 1 in 1,000,000), as well as ADEC's risk management criterion of 10^{-5} (1 in 100,000). The noncarcinogenic hazard estimates are then evaluated in the context of the EPA's and ADEC's acceptable noncancer hazard index (HI) of 1.

An excess lifetime cancer risk of 1×10^{-6} indicates that an individual experiencing the reasonable maximum exposure estimate has a 1 in 1,000,000 chance of developing cancer as a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer individuals face from other causes – such as smoking or exposure to too much sun. The chance of an individual's developing cancer from all other causes has been estimated to be as high as 1 in 3.

An HQ less than or equal to 1 indicates that toxic noncarcinogenic effects from that chemical are unlikely.

The HI is generated by adding the HQs for all COPCs. An HI less than or equal to 1 indicates that adverse effects are unlikely from additive exposure to site chemicals. An HI greater than 1 indicates that site-related exposures may present a risk to human health.

1.7.3 Summary of Ecological Risk Assessment

Ecological risk was assessed through completion of a Step 1 Ecological Scoping and, as applicable, a Step 2 Preliminary Ecological Screening in accordance with the RAPM (ADEC, 2015) and the Final Risk Assessment Work Plan (USACE, 2016), and is consistent with EPA Ecological Risk Assessment (ERA) guidance (USEPA, 1997a, 1998; 1997b).

The Step 1 Ecological Scoping evaluation is the preliminary set which considers all available site information, including: contaminant toxicity, quantity, and potential for bioaccumulation; quality and extent of habitat; receptor presence; and observations regarding potential impacts. Each of the components (scoping factors) of the ADEC Ecoscoping Guidance (ADEC, 2014) are addressed to determine inclusion or exclusion of a site for further evaluation in a screening level ecological risk assessment (SLERA).

The Step 2 Preliminary Screening evaluation consists of comparing site data to metal BTV concentrations and conservative screening concentrations to determine preliminary ecological COPCs, and to determine the need for further evaluation in additional steps of the process.

An ERA is a qualitative and/or quantitative appraisal of the actual or potential effects of site releases on plants and animals. The SCS ERA concluded that exposure to residual chemicals in surface and shallow subsurface soil is potentially complete, but unlikely to result in significant exposure to ecological receptors. As a result, there is no need of further evaluation or remedial action based on potential ecological risk.

1.7.3.1 Step 1 Ecological Scoping Evaluation

The goal of ecological scoping is identification sites that are likely versus unlikely to pose a potential hazard to the environment. The scoping evaluation is based on observations and investigations completed at the SCS, including: the RI/FS (North Wind, 2010), Final Decision Document (North Wind, 2012), the Data Gap Report (North Wind, 2014), and the SRI (U.S. Army, 2018). The scoping process evaluates five scoping factors:

- Scoping Factor 1 – Visual Impacts
- Scoping Factor 2a – Terrestrial Exposure Routes
- Scoping Factor 2b – Aquatic Exposure Routes
- Scoping Factor 3 – Habitat for Valued Species
- Scoping Factor 4 – Contaminant Quantity

These scoping factors were used to develop the ecological CSM, presented in the HHERA (U.S. Army, 2018). The identified exposure media and exposure pathways included:

- Soil – ingestion and inhalation of fugitive dust.
- Groundwater – ingestion.

The receptors identified in the CSM included:

- Terrestrial Plant Community – exposure to ingestion of surface soil (0-2 ft bgs).
- Terrestrial Invertebrate Community – exposure to ingestion of surface soil (0-2 ft bgs).
- Mammals – exposure to ingestion of surface soil (0-2 ft bgs), ingestion of subsurface soil (greater than 2 ft bgs), and inhalation of fugitive dust from surface soil (0-2 ft bgs).
- Birds – exposure to ingestion of surface soil (0-2 ft bgs), inhalation of fugitive dust from surface soil (0-2 ft bgs), and ingestion of groundwater.

While the pathway for each receptor was complete, the exposure was determined to be insignificant.

Scoping Factor 1 – Visual Impacts

Physically disturbed areas remain in association with the SCS AOCs due to historical and/or RI activities, especially the Composite Building, former Trailer House areas, and along roads where gravel and compact soil is present. No overt signs of toxicity, such as stressed or dead vegetation or absence of biota, have been noted as part of the SCS investigations. Previously disturbed areas are recovering and characterized by the presence of successional vegetation – including weeds, grasses, shrubs, and trees.

Scoping Factor 2a – Terrestrial Exposure Routes

Chemical detections are present in surface and subsurface soil. The potential for direct contact with surface soil, defined as 0 to 2 ft bgs, per ADEC CSM guidance (ADEC, 2010), by terrestrial organisms (i.e., upland birds and mammals) in previously disturbed areas could result in complete exposure to residual chemicals, if present at concentrations of concern. Exposure to subsurface soil (exceeding 2 ft bgs, but less than or equal to 4 ft bgs) is also considered a potentially complete exposure pathway. The majority of biological exposures are likely to occur within the upper foot (0 to 1 ft bgs) or biologically relevant zone of soil (USEPA, 2015) where direct contact and/or integration and uptake into food resources are greatest.

While the potential uptake of contaminants by soil invertebrate and plant communities in contact with soil/soil moisture may be a potentially complete pathway, these communities currently are functional – as evident by recovered vegetation and a functional plant community.

Wildlife ingestion of surface water as a drinking water resource is an incomplete pathway for wildlife exposure, as perennial water sources (i.e., ponds, streams) are not present on or adjacent to the site.

Scoping Factor 2b – Aquatic Exposure Routes

There are no perennial (or temporary) water bodies or groundwater seepage areas present within the defined bounds of the investigation areas or in areas adjacent to the SCS.

Scoping Factor 3 – Habitat for Valued Species

The ecological habitat present at the SCS could support valued species. However, the area of potential impacts at the SCS is limited and localized based on available data and, therefore, potential for significant site presence or exposure to such species is unlikely.

State and/or federally listed (threatened or endangered) species regulated by Alaska Department of Fish and Game, National Marine Fisheries Service, and/or U.S. Fish and Wildlife Service do not occur at, or in association, with the SCS (USACE, 2016).

Scoping Factor 4 – Contaminant Quantity

Contaminant quantity refers to the spatial and/or volumetric quantity of contaminants. Contaminants have been released to surface and subsurface soil at the SCS through historic spills, leaks, and disposal practices. Based on investigations of the SCS, the spatial extent of petroleum impacts does not exceed the 0.5-acre *de minimis* criterion for petroleum-contaminated properties prescribed by ADEC (ADEC, 2014). The areal extent, considering all current AOCs, totals about 0.4 acres or 4 percent of the total acreage of the SCS. Non-petroleum constituents are considered further in the Step 2 Preliminary Screening evaluation.

1.7.3.2 Step 2 Preliminary Screening Evaluation

The Step 2 preliminary screening evaluation is the last step in the ADEC ecoscoping process, evaluation of Scoping Factor 5 – Toxicity Determination. Scoping Factor 5 is utilized to assess non-petroleum constituents at the SCS, as the petroleum constituents met the *de minimis* criterion in Scoping Factor 4.

Preliminary screening was conducted by comparing site concentrations detected in surface soil (0 to 2 ft bgs) and subsurface soil (greater than 2 to 4 ft bgs) to conservative soil screening concentrations protective of ecological endpoints. These conservative screening values are often based on no effect levels derived from laboratory studies conducted on sensitive endpoints (e.g., seedling growth and germination, and sensitive members of a given population or community), and/or individual species that may or may not be present under site-specific conditions.

Dataset

In accordance the *Final Risk Assessment Work Plan* (USACE, 2016) the analytical results considered includes those detections in surface soil (0 to 2 ft bgs) and shallow subsurface soil (greater than 2 to 4 ft bgs). The analytes considered included: organochlorine pesticide, metals, volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs), poly- and perfluoroalkyl substances, and dioxins/furans.

Screening Levels

Screening levels were obtained from the Oak Ridge National Laboratory Risk Assessment Information System (RAIS) tool (http://rais.ornl.gov/) per ADEC guidance (ADEC, 2014, 2015). The following hierarchy of sources, based on those available in the RAIS, (in order of preference) was used:

- Ecological Soil Screening Levels (ECO-SSLs) (USEPA, 2005). Includes interim support documents through 2008.
- *Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants* (Efroymson et al., 1997a); and *Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Soil and litter Invertebrates and Heterotrophic Process* (Efroymson et al., 1997b).
- Region 5 RCRA Corrective Action Ecological Screening Levels (USEPA, 2003).

The lower of the EPA ECO-SSLs (for mammals, birds, invertebrates, and plants) was applied, where available, for screening. In the absence of ECO-SSLs, the lower of the screening benchmarks per Efroymson et al. (1997a and b) was applied, followed by EPA Region 5 ecological screening values for soil.

Chemical compounds present in multiple forms (i.e., isomers, congeners) were summed to provide environmental concentrations on a total basis (i.e., total PAHs, total PCBs, and total xylenes). This process of summing was conducted to accommodate those analyte groups for which medium-specific ecological screening levels (and/or toxicity data) are available on a total basis. For screening purposes, the calculated totals were based on the sum of detected constituent parameters for each individual sample and compared to applicable screening levels. If constituent parameters at a given location were never detected (e.g., 100 percent non-detect for all constituent PAHs at a given sample location), the total concentration was considered non-detected and represented by the maximum limit of detection (LOD) for the constituent parameters at that location.

Ecological Chemicals of Potential Concern Screening and Analysis

Ecological COPCs were established by comparing chemical MDCs to respective screening levels and metal background levels. The maximum LOD was utilized as the constituent MDC in the event that the constituent was non-detect.

Non-petroleum chemicals that exceeded respective screening levels included:

- Surface soil: Dioxin/furans (evaluated as dioxin toxicity equivalent quotient [TEQ]), cobalt, copper, lead, and zinc.
- Subsurface soil: Copper, lead, selenium, vanadium, and zinc.

The cobalt, copper, selenium, vanadium, and subsurface zinc detections exceeded screening levels; however, the detections were comparable to background concentrations and, as such, these constituents are attributed to background metal conditions and potential unacceptable exposure is not expected.

Ecological COPCs were identified as follows:

- Surface soil lead detections exceeded the BTV of 22.4 milligrams per kilogram (mg/kg) and ecological screening level of 11 mg/kg (USEPA, 2005) at the following areas of evaluation: Disposal Line; AST, Diesel Transfer Pump, and associated Fuel Lines; and Valve Manifold, Dewatering Tower, and associated Fuel Lines.

- Surface soil zinc detection exceeded the BTV of 86.3 mg/kg and ecological screening level of 46 mg/kg (USEPA, 2007) at the Drum Storage Area of evaluation.
- Subsurface soil lead detection exceeded the BTV of 14.9 mg/kg and ecological screening level of 11 mg/kg (USEPA, 2005) at the Dry Well area of evaluation.
- Dioxin TEQ exceeded the ecological screening level of 1.99 x 10^{-7} mg/kg (USEPA, 2003) at the Burn Pit evaluation area.

1.7.3.3 Ecological Risk Characterization

While exposure to ecological receptors at the Burn Pit; Disposal Line; AST, Diesel Transfer Pump and associated Fuel Lines; Valve Manifold, Dewatering Tower, and associated Fuel Lines; Drum Storage Area; and the Dry Well is possible, given the small size of the AOCs (together or singly) significant exposure to higher trophic level receptors (birds and mammals) is not expected, especially when considering wildlife home ranges, which exceed the area footprint even for wildlife with very small home ranges. Expected wildlife population densities at the AOC individually, or at the SCS as a whole, are low. In general, a "population" is the minimum viable population size for a given species in an area. For small mammals, the minimum viable population size is typically considered to be around 500 reproducing individuals to maintain population stability (Lehmkuhl, 1984; Thomas, 1990; Reed et al., 2003), but more may be needed to maintain genetic variability (Reed et al., 2003). The area needed for a minimum viable population, therefore, is considerably larger than the AOCs. Based on the limited exposure potential and localized nature of detections, significant exposure is not expected.

1.7.4 Risk Uncertainty

Uncertainty and limitation are inherent in the risk assessment process. The following are areas of uncertainty as they relate to the evaluation of the SCS.

Uncertainties In Data Assessment

Limitations may exist in relation to the type, quality, and quantity of available data as a function of the collection of the data and the ability to evaluate the data according to EPA guidelines. Differences in the limits of quantitation (LOQs) between similar data sets could also introduce uncertainty into the estimation of chemical risk with low concentrations.

Detection Limit/Limit of Detection Evaluations

Constituents may not have been detected as a result of not being present or because the LOD was not low enough to detect the presence of a constituent. The LODs were compared to available screening criteria to understand this uncertainty.

In soil, LODs exceeded screening levels for 28 non-detect human health chemicals in six chemical classes, including: 17 organochlorine pesticides, four VOCs, one PCB (Aroclor 1254), two PAHs, one metal (thallium), and three semi-volatile organic compounds (SVOCs). LODs exceeded screening levels for 25 non-detect ecological chemicals in four chemical classes, including: 19 organochlorine pesticides, three VOCs, total PCBs (evaluated as the sum of aroclors), and two metals. The following summarizes the LOD exceedances:

- 16 human health chemicals and 11 ecological chemicals had non-detect soil results, with LODs that exceeded respective screening levels by a magnitude of 1 to 2. There was little difference between the minimum and maximum LOD and nearly all minimum LODs also exceeded the screening level. Although there is some uncertainty as to whether these chemicals would actually be detected at concentrations above screening levels if LODs were lower, given the small magnitude of exceedance any detection up to the maximum LOD would be at a very low level and unlikely to result in unacceptable exposure. The potential for exposure and risk underestimation for these chemicals is low.
- Seven human health chemicals and five ecological chemicals had non-detect soil results with LODs that exceeded respective screening levels by a magnitude of 2 to 10. The human health chemicals included: 1,2,3 trichloropropane, 1,2-dibromo-3-chloropropane, 4-6-dinitro-2-methylphenol, beta-benzenehexachloride (BHC), delta-BHC, gamma-BHC, and endrin ketone. The ecological chemicals included: 1,2-dibromo-3-chloropropane, alpha- and gamma-chlordane, aldrin, and toxaphene.
- Nine human health chemicals and 18 ecological chemicals had non-detect soil results with LODs that exceeded respective screening levels by a magnitude of greater than 10. The human health chemicals included: 1,2-dibromo-3-chloropropane, 1,2,3-trichloropropane, aldrin, alpha-BHC, dieldrin, heptachlor, heptachlor epoxide, n-nitrosodimethylamine, and toxaphene. The ecological chemicals included: PCBs (total), 4,4'-dichlorodiphenyldichloroethane (DDD), 4,4'- dichlorodiphenyldichloroethylene (DDE), 4,4'-dichlorodiphenyltrichloroethane (DDT), aldrin, alpha-BHC, beta-BHC, dieldrin, endrin, endrin aldehyde, endosulfan I, endosulfan II, endosulfan sulfate, gamma-BHC, heptachlor, heptachlor epoxide, methoxychlor, and toxaphene.

With the exception of PCBs (ecological) where the minimum LOD was always higher than the ecological screening level, indicating that a lower level was not analytically achievable, the number of non-detect samples exceeding the screening level was typically limited to a fraction of the total sample number. The latter indicates that the LOD was adequate to meet applicable screening levels in at least some of the samples, which limits the level of uncertainty. In the extreme case where most or all of the analytical results are non-detected, yet elevated above screening levels, the uncertainty can become very high, especially when high LODs are elevated due to analytical or matrix interferences that can skew sample statistics and hide true exposure. Where screening levels are analytically unachievable to meet LODs due to method limitations, potential uncertainty can be moderate to high, especially where orders of magnitude exceedances exist. However, these chemicals have never been detected during any sampling event and, if present, at least some detection would be expected. There is no known source or documented use of many of these chemicals at the SCS, especially with regards to pesticides. Overall, the level of uncertainty that a chemical is not detected when in fact it is present, is low.

In groundwater, LODs exceeded screening levels for 29 non-detect chemicals in four chemical classes including: six organochlorine pesticides, 20 VOCs, two PAHs, and two metals. The following summarizes the LOD exceedances:

- Eleven chemicals had non-detect groundwater results with LODs that exceeded respective screening levels by a magnitude of 1 (comparable to the screening level). Although this may represent an area of uncertainty as to whether these chemicals would be detected above screening levels if LODs were lower, the low magnitude of exceedance indicates that detections would likely be at very low levels.
- Eight chemicals had non-detect soil results with LODs that exceeded respective screening levels by a magnitude of 2 to 10. The chemicals include: 1,1,2,2-tetrachloroethane, bromodichloromethane, bromomethane, chloroform, hexachlorobutadiene, alpha-BHC, trichloroethene, and dieldrin. The slightly higher magnitude of exceedances gives slightly less certainty that these chemicals would not be detected above screening levels with lower LODs.
- 10 chemicals had non-detect soil results with LODs that exceeded respective screening levels by a magnitude greater than 10. The chemicals include: 1,2-dibromo-3-chloropropane, 1,2-dibromomethane, 1,2,3-trichloropropane, 1,1,2-trichloroethane, aldrin, heptachlor, heptachlor epoxide, thallium, toxaphene, and vinyl chloride. Therefore, there is uncertainty that these chemicals would still be non-detect if LODs were lower.

Because the LODs for these non-detected chemicals exceed the screening levels, there is a possibility that they could be present in groundwater at above the screening levels and risks and hazards could potentially be underestimated. However, these chemicals have never been detected during any sampling event and there is no known source of these chemicals at the SCS. Therefore, the elevated LODs for these chemicals is unlikely to affect the conclusions of the risk assessment.

Precision of Analytical Measurements

The magnitude of analytical error is usually small compared to other sources of uncertainty, although the relative uncertainty increases for results that are near the LOD. For non-detected results at a given location, where no detections were measured, the LOD is considered in the dataset used for the risk assessment. Constituents detected below the sample LOQ but above the LOD (i.e., “J” and/or “QL” [low bias], “QN” [no directional bias], “QH” [high bias] flagged data) lack sufficient precision in the reported concentration and are, therefore, estimated concentrations. These data were included in the dataset for risk analysis as recommended by EPA guidance (USEPA, 1989). In general, inclusion of these data in the risk assessment provides additional robustness to the overall dataset. Except in instances where sample point and/or statistical estimates of exposure concentrations are based solely or in large part on these data, little overall effect on statistical estimates and, consequently, risk estimates or conclusions, is expected.

It is notable that the Burn Pit sample location with the highest detected concentration of dioxins/furans was “B” qualified, indicating blank contamination, resulting in a potential high bias.

Use of the Toxicity Equivalency Factors/Toxicity Equivalent Quotient Approach

Dioxins/furans were investigated at the Burn Pit AOC. For initial COPC screening, the maximum detected TEQ concentration was compared to applicable screening levels. The MDC was calculated for each location having at least one detection, where non-detects were conservatively included at the LOD for computing the TEQ. Based on the sensitivity of the high-resolution gas chromatography/high resolution mass spectrometry method used in the analysis of dioxins/furans, inclusion of the non-detect dioxin/furan congeners in the TEQ summation (either at or 1/2 the congener's detection limit) is likely to overestimate dioxin/furan concentrations and potential exposure attributed to the dioxin/furan TEQs.

Use of Screening Levels to Identify COPCs and Potential Risk

The human health screening process eliminated chemicals that were below screening criteria that are based on a cancer risk of 10^{-6} or a noncancer target HI of 0.1. The RSLs did identify COPCs; therefore, additional risk evaluation could be performed to assess more accurately the site risk and hazards.

EPA RSLs are calculated using default upper-bound estimates for: intake rate, exposure frequency, exposure duration, an average value for body weight, and an averaging time (typically 70 years for carcinogens). These standard default factors are intended for calculation of reasonable maximum exposure (RME) estimates (the 95th percentile) of each applicable scenario at a site. In developing default exposure parameters, a determination of what is considered "reasonable" cannot be based solely on available quantitative information, but also requires the consideration and use of professional judgment, which could lead to either low or high bias of the assumptions. Based on anticipation of uncertainty when quantifying exposure, the RME (i.e., the highest exposure that is reasonably expected to occur at the site) is used so that health risks and hazards are more likely to indicate that chemicals are exceeding target risk goals, although actual health risks may be negligible. As such, the EPA RSLs are calculated using conservative assumptions that are more likely to overestimate exposure and risk than underestimate. Therefore, use of the EPA RSLs, combined with the MDC to estimate potential risks and hazards, is a conservative approach that is more likely to overestimate risk. This approach ensures that no COPC or AOC is prematurely eliminated from further consideration.

Screening criteria are not available for some chemicals and, as such, surrogate chemicals that may have similar physical and chemical properties may be utilized. Comparison to such screening levels would more accurately characterize the risk, as opposed to not screening the COPCs against any criteria at all. However, depending on the nature of the physical and chemical properties of the surrogate chemical, which may not match that of the COPC, inclusion of the surrogate could overestimate or underestimate the risk.

For total chromium, the RSLs for chromium III were used in the COPC screening process. According to ADEC (ADEC, 2017):

> "…due to the prevalence of naturally occurring chromium III throughout the state, sample results reported for total chromium detected at a site will be considered background chromium III unless anthropogenic contribution of chromium III or VI from

a source, activity, or mobilization by means of another introduced contaminant is known or suspected."

Therefore, evaluation of total chromium as chromium III was considered more appropriate for the SCS and the screening levels for chromium III were used to evaluate total chromium, rather than the hexavalent form. The MDC for total chromium in both soil and groundwater was below chromium III RSLs. Thus, total chromium was not identified as a COPC in soil or groundwater, and no cancer risks or noncancer hazards were calculated for total chromium. However, if chromium VI screening levels were considered in the evaluation, chromium VI would be considered a COPC in soil at the Dry Well and Valve Manifold Building and Dewatering Tower AOCs, as well as in site-wide groundwater.

Use of On-Site Data to Develop Background Levels

BTVs were established for metals in soil to evaluate whether the measured site concentrations were indicative of site sources or related to natural or anthropogenic background conditions. As dedicated background values were not available for the SCS, current and historical soil samples were reviewed and statistically evaluated to determine a site-specific soil background concentration for metals. Use of onsite data to develop background levels is an effective method to identify multiple populations of metals concentrations (e.g., natural, anthropogenic, and/or site-related) and allow refinement of data to select a data population that is representative of background conditions on which a BTV can be developed. Operations at the SCS were primarily fuel related, with the exception of lead, which was a component of leaded gasoline, no other metals have documented site use.

It is acknowledged that use of site data to develop background concentrations may be a somewhat less conservative approach than use of a dedicated background dataset obtained from background reference locations. However, as evidenced by the wide-spread spatial distribution and consistent and relatively low magnitude of detected metals results across the SCS, it is likely that most metals are naturally occurring. Generally, concentrations of detected metals in soil were either below conservative risk-based screening levels or exceedances were noted in only single isolated occurrences. The overall uncertainty in the background dataset is low because the characteristics of metals results indicate that, with some isolated exceptions, the SCS has been relatively unimpacted by site activities and use of site data to calculate BTVs is a reasonable approach, in lieu of off-site data.

1.8 ADEC METHOD THREE CALCULATOR AND SITE-SPECIFIC APPROVED CLEANUP LEVELS

ADEC Method Three migration-to-groundwater cleanup levels were developed as part of the SRI (U.S. Army, 2018) to assess a contaminants ability to migrate to groundwater based on site-specific information and were developed for those contaminants that exceeded the 18 AAC 75.341 Method Two migration-to-groundwater values outlined in Tables B1 and B2 (ADEC, 2018a). The *Draft Cleanup Levels Guidance for Methods Two and Three* (ADEC, 2017) was followed to develop site-specific migration-to-groundwater alternative cleanup levels (ACLs) for SCS soils. Migration-to-groundwater ACLs for SCS soils under 18 AAC 75.340 Method Three were based on modification of the migration-to-groundwater cleanup level, using site-specific values (where available), the online ADEC Cleanup Levels Calculator, and the online ADEC Petroleum Cleanup Levels Calculator (ADEC, 2018b). Site-specific parameters used to develop the ADEC Method Three migration-to-groundwater ACLs include: fractional organic carbon, aquifer hydraulic conductivity, source length parallel to groundwater flow, hydraulic gradient, and infiltration rate, each of which are detailed in the SRI (U.S. Army, 2018).

The site-specific approved cleanup levels were then selected based on the most conservative of the human health cleanup level (18 AAC 75.341 Tables B1 and B2, under 40-inch zone), the maximum allowable concentration (for petroleum hydrocarbons only), and the ADEC Method Three migration-to-groundwater value. A comparison of these values is provided in Sections 2 and 3 for the Burn Pit AOC and Dry Well AOC, respectively, based on the constituents detected above the ADEC Method Two migration-to-groundwater values.

1.9 REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAOs) are specific goals for protecting human health and the environment from risks and hazards associated with site-related contamination. The RAOs must address the media-specific Applicable or Relevant and Appropriate Requirements (ARARs) identified for the site. RAOs may be achieved by reducing exposure to the contaminated media or through reduction of concentrations of COCs at exposure points to below protective concentrations. The RAOs for soil and groundwater at the SCS are:

- RAO 1: Prevent the exposure of human receptors with contaminated media that pose a cumulative carcinogenic risk greater than 1 in 100,000 or a cumulative noncarcinogenic HI greater than 1 across all exposure pathways. Specifically:
  - Reduce concentrations of COCs in soil less than 15 ft bgs to below ADEC cleanup levels protective of human health.
- RAO 2: Restore groundwater to water quality standards protective of human receptors considering cumulative exposure through dermal contact, ingestion, and inhalation of volatile compounds in groundwater. Specifically:
  - Reduce concentrations of COCs in groundwater to below ADEC Table C Cleanup Levels.
- RAO 3: Prevent further degradation of groundwater by reducing the concentrations of COCs in soil to levels protective of groundwater quality. Specifically:
  - Reduce concentrations of COCs in soil to below ACLs for protection of migration to groundwater developed using ADEC Method Three.

The RAOs applicable to each AOC are outlined in Sections 2, 3, and 4.

1.10 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

The five alternatives presented in the Proposed Plan (U.S. Army, 2023) and the FS (U.S. Army, 2020) were designed to address the Burn Pit, Dry Well, and Site-Wide Groundwater AOCs as a single alternative. The five alternatives are:

- Alternative 1 – No action. The no action alternative is required by the CERCLA process. It assumes no further work will be conducted to provide a baseline comparison with other actions (40 CFR 430(e)(6)).
- Alternative 2 – LUCs and MNA. LUCs would control exposure to soil and groundwater. MNA would monitor natural attenuation of contaminants in groundwater.
- Alternative 3 – Excavation of Contaminated Soil, MNAs, and LUCs. Excavation and offsite disposal of arsenic and lead at the Dry Well AOC, excavation and offsite treatment of petroleum-contaminated soil at the Burn Pit AOC, MNA would monitor natural attenuation of contaminants in groundwater, and LUCs would control exposure to groundwater.
- Alternative 4 – Excavation of Contaminated Soil, Biosparging, and LUCs. Excavation and offsite disposal of arsenic and lead at the Dry Well AOC, excavation and offsite treatment of petroleum-contaminated soil at the Burn Pit AOC, biosparging would treat contaminants in groundwater, and LUCs would control exposure to groundwater.
- Alternative 5 – Excavation of Contaminated Soil, In-Situ Chemical Oxidation (ISCO), and LUCs. Excavation and offsite disposal of arsenic and lead at the Dry Well AOC, excavation and offsite treatment of petroleum-contaminated soil at the Burn Pit AOC, in-situ chemical oxidation (ISCO) would treat contaminants in groundwater, and LUCs would control exposure to groundwater.

In accordance with the NCP, the alternatives for the SCS were evaluated using the nine criteria described in Section 121(a) & (b) of CERCLA and 40 CFR 300.430(e)(9)(i) as cited in NCP Section 300.430(f)(5)(i). These criteria are classified as threshold criteria, balancing criteria, and modifying criteria. In the final balancing of trade-offs between alternatives upon which the final remedy selection is based, modifying criteria are of equal importance to the balancing criteria.

Threshold criteria are standards that an alternative must meet to be eligible for selection as a remedial action. There is little flexibility in meeting the threshold criteria – the alternative must meet these criteria, or it is unacceptable. The following are classified as threshold criteria:

- Overall protection of human health and the environment.
- Compliance with, or an applicable waiver, of ARARs.

Balancing criteria weigh the tradeoffs between alternatives. These criteria represent the standards upon which the detailed evaluation and comparative analysis of alternatives are based. In general, a high rating on one criterion can offset a low rating on another balancing criterion. Five of the nine criteria are considered balancing criteria:

- Long-term Effectiveness and Permanence
- Reduction of Toxicity, Mobility, and Volume (TMV) Through Treatment
- Short-term Effectiveness
- Implement-ability
- Cost

Modifying criteria which may be considered to the extent that information is available during the FS, but can be fully considered only after public and regulator comments, are:

- Community Acceptance
- State/Support Agency Acceptance

These criteria are discussed relative to the portion of the alternatives that are applicable to the Burn Pit, Dry Well, and Site-Wide Groundwater AOCs in Sections 2, 3, and 4, respectively, of this ROD.

1.11 COMPLIANCE WITH ARARS

Section 121(d) of CERCLA and NCP Section 300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites must attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA Section 121(d)(4). Criteria to be considered (TBCs), are non-promulgated advisories or guidance issued by federal or state government that are not legally binding and do not have the status of potential ARARs. However, in many circumstances, TBCs are considered along with ARARs.

Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental and State environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. State standards that are identified by a state in a timely manner and that are more stringent than Federal requirements may be applicable.

Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental and State environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site (relevant) that their use is well-suited (appropriate) to the particular site. Only those State standards that are identified in a timely manner and are more stringent than Federal requirements may be relevant and appropriate.

ARARs fall into three categories: chemical-specific, location-specific, and action-specific. *Chemical-specific* ARARs are health-based or risk-management-based numbers that provide concentration limits for the occurrence of a chemical in the environment at agreed-upon points of compliance. *Location-specific* ARARs restrict activities in certain sensitive environments. *Action-specific* ARARs are activity-based or technology-based, and typically control remedial activities that generate hazardous wastes (such as with those covered under RCRA). Offsite shipment, treatment, and disposal of excavated contaminated soil invoke action specific ARARs.

Table 1-5 summarizes the ARARs and TBCs for the selected remedies at the SCS and describes how the selected remedies address each one at agreed-upon points of compliance.

Table 1-5 Description of ARARs for Selected Remedies at the SCS

Source	Standard, Requirement, Criterion, Limitation	Description of Standard	Status	Comments
Chemical Specific				
ADEC, Oil and Other Hazardous Substances Pollution Control	18 AAC 75.325(g)	After completing site cleanup, the risk from hazardous substances will be evaluated to ensure it does not exceed a cumulative carcinogenic risk standard of 1 in 100,000 or a cumulative noncarcinogenic hazard index of 1 across all exposure pathways.	Applicable	Complete cumulative risk evaluation to determine the cumulative risks from constituents of interest present at the SCS.
	18 AAC 75.340(e)	Provides procedure for development and application of site-specific alternative soil cleanup levels under method three.	Applicable	Develop site-specific alternative cleanup levels for the migration-to-groundwater pathway for COCs in soil (DRO, arsenic, and lead).
	18 AAC 75.341(c) Tables B1 and B2	Provides tabulated soil cleanup levels for human health and migration-to-groundwater pathways that are not site-specific.	Applicable	Select soil cleanup levels for the human health pathway for COCs in soil (DRO, arsenic, and lead) from the cleanup levels on Tables B1 and B2.
	18 AAC 75.340(d)	Provides for how and when alternative cleanup levels can be applied rather than tabulated Method One or Two soil cleanup levels.	Applicable	Compare tabulated human health cleanup levels for COCs in soil (DRO, arsenic, and lead) to site-specific alternative cleanup levels calculated for migration-to-groundwater to select approved cleanup levels (ACLs). Lower of two is selected. Compare soil concentrations to ACLs.
	18 AAC 75.345	Groundwater must meet the cleanup levels listed in Table C of this Section.	Applicable	Compare concentrations of COCs in groundwater (arsenic, DRO, gasoline range organics, ethylbenzene, xylenes, 1,2,3- trimethylbenzene, 1,3,5-trimethylbenzene, 1-methylnaphthalene, 2-methylnaphthalene, naphthalene, and lead) to Table C values.
Location Specific				
CFR, Public Lands: Interior	43 CFR 7.4(a) and 7.5(b)(1) (Archaeological Resources Protection Act of 1979; 16 USC 470ii	May not excavate, remove, damage, or otherwise alter or deface archaeological resources unless by permit or exception. Must protect any such archaeological resources if discovered.	Applicable	No historic or archaeological resources have been identified at the SCS. In the event that buried historic or archaeological resources are discovered, notification and mitigation measures to protect the area will be implemented.

Table 1-5 (Cont.) Description of ARARs for Selected Remedies at the SCS

Source	Standard, Requirement, Criterion, Limitation	Description of Standard	Status	Comments
Location Specific – Continued				
CFR, Public Lands: Interior	43 CFR 10.4(c) and (d) (Native American Graves Protection and Repatriation Regulations)	Must stop activities in the area of discovery and make a reasonable effort to secure and protect the objects discovered. Must consult with Native organization likely to be affiliated with the objects to determine further disposition per 43 CFR 10.5(b).	Applicable	No human remains, funerary objects, sacred objects, or objects of cultural patrimony have been identified at the SCS. In the event that these items are discovered, notification and mitigation measures to protect the area will be implemented.
Action Specific				
CFR, Protection of Environment	40 CFR 262.11(a)-(d)	Characteristics of Hazardous Waste	Applicable	Properly characterize, label, store, transport hazardous waste. Only dispose of hazardous waste in RCRA permitted treatment, storage, and disposal facilities.
	40 CFR 144.82	What must I do to protect underground sources of drinking water?	Applicable	Prohibits injections that allow movement of fluid into underground sources of drinking water that might cause endangerment and provides closure requirements.
ADEC, Oil and Other Hazardous Substances Pollution Control	18 AAC 75.370(a)	Soil storage and disposal.	Applicable	Prohibits blending contaminated soil with uncontaminated soil and provides requirements for storing of contaminated soil.
ADEC, Solid Waste Management	18 AAC 60.010(a)(4)	Accumulation, storage, and treatment.	Applicable	A person may not store accumulated solid waste in a manner that causes polluted run-off water.

Key:
AAC – Alaska Administrative Code
ADEC – Alaska Department of Environmental Conservation
ARAR – Applicable or Relevant and Appropriate Requirements
CFR – Code of Federal Regulation
COC – contaminant of concern
DRO – diesel range organics
RCRA – Resource Control and Recovery Act
SCS – Sears Creek Station
USC – United States Code

2.0 BURN PIT AOC

The Burn Pit AOC was described as a 6-foot square depression used for disposal of waste fuels and other waste substances, located in the southeast corner of the property (Figure 1-2). Waste fuel was transported to the Burn Pit via a 2-inch underground pipeline which was connected to a sump located at the east end of the Composite Building. It was suspected that the Burn Pit was constructed with a metal liner since a liner was identified at similar burn pits at the Tok Fuel Terminal and the Haines Fuel Terminal, but a metal liner was not found (North Wind, 2007; 2010). However, a piece of geotextile fabric surfaced with soil cuttings during the installation of Monitoring Well MW16 (the fabric surfaced when the hollow stem auger was at a depth of approximately 9 ft bgs).

The 2-inch underground pipeline connecting the sump in the pump room of the Composite Building to the Burn Pit is part of the Disposal Line AOC, which is addressed under separate documentation, in accordance with 18 AAC 75.

2.1 SITE CHARACTERISTICS

2.1.1 Topography and Climate

This is the same for the whole of the SCS (See Section 1.5.2.2).

2.1.2 Geology

This is the same for the whole of the SCS (See Section 1.5.2.3).

2.1.3 Hydrogeology and Groundwater Use

This is the same for the whole of the SCS (See Section 1.5.2.4).

2.1.4 Surface Water Hydrology

This is the same for the whole of the SCS (See Section 1.5.2.5).

2.1.5 Ecological Setting

This is the same for the whole of the SCS (See Section 1.5.2.6).

2.1.6 Site Characterization Activities

Characterization activities discussed below for the Burn Pit AOC are focused on soil. Groundwater characterization activities are discussed as part of the Site-Wide Groundwater AOC in Section 4 of this ROD. Soil detections are compared to the lowest concentrations of the under 40-inch zone human health and migration-to-groundwater levels outlined in ADEC 18 AAC 75.341 Tables B1 and B2 (ADEC, 2020).

2007/2008 RI. Twenty-three soil borings were drilled and sampled within the Burn Pit and two monitoring wells (MW5 and MW6) were installed and sampled along the west side of the Burn Pit. The soil samples were analyzed for GRO, DRO, RRO, VOCs, PAHs, pesticides, PCBs, dioxins, and metals (North Wind, 2010). Locations of soil borings and monitoring wells from previous investigations are shown on **Figure 2-1**.

Contaminant concentrations exceeding cleanup levels in 18 AAC 75.341, Tables B1 and B2 were reported in three soil borings (SB7B, 08SB8, and 08SB9) and both monitoring well borings (Figure 2-1). GRO, DRO, 1,1,2 trichloroethane, ethylbenzene, xylenes, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 2-methylnapthalene, and arsenic all exceeded the ADEC cleanup levels in one or more samples.

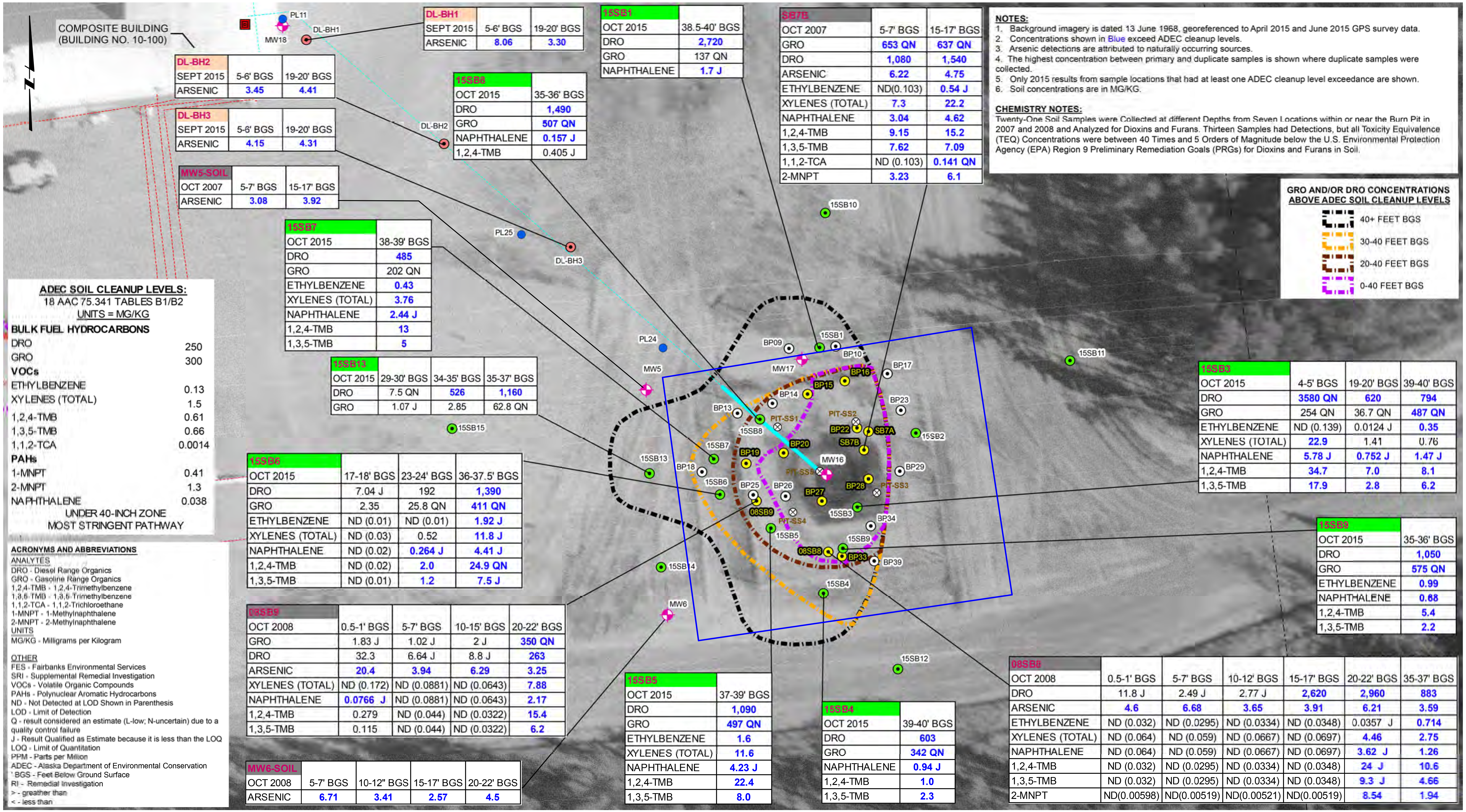
2014/2015 Burn Pit Subsurface Soil Investigation. A UVOST investigation was attempted at the Burn Pit in 2014 (North Wind, 2015) to delineate the lateral and vertical extent of soil contamination. Temporary monitoring wells were to be installed and sampled as well. The 2014 investigation was unsuccessful as the drilling equipment could not advance below 24 ft bgs. The investigation was successfully completed in October 2015, following the SRI. A total of 15 soil borings were drilled to between 33 and 40 ft bgs to delineate the vertical and horizontal extent of soil contamination (North Wind, 2016b). Soil samples were screened using a photoionization detector, and at least one sample from each boring was submitted for laboratory analysis. A total of 21 samples were analyzed for DRO, GRO, and VOCs, and the sampling results showed the only compounds with exceedances above ADEC cleanup levels were fuels and fuel constituents (DRO, GRO, ethylbenzene, xylenes, naphthalene, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene) (North Wind, 2016b). The sampling results from this investigation are summarized on Figure 2-1.

Field screening identified soil contamination extending from the vadose zone to below the water table in six soil borings (15SB3, 15SB4, 15SB5, 15SB6, 15SB8, and 15SB9), and contamination was identified in the smear zone and saturated zone only in three additional borings (15SB1, 15SB7, and 15SB13). The horizontal extent of soil contamination was delineated, including near surface contamination in 15SB3, indicating a possible source area.

2015 SRI. The SRI investigation included collection of five surface soil samples and installation of two groundwater monitoring wells (MW16 and MW17) in the Burn Pit area. The five surface soil samples were analyzed for dioxins/furans, perfluorooctanoic acid (PFOA), and perfluorooctanesulfonic acid (PFOS). No soil samples were collected from the groundwater monitoring wells. PFOA and PFOS were not detected, and dioxins/furans did not exceed ADEC cleanup level.

2.1.7 Nature and Extent of Contamination

GRO, DRO, 1,1,2 trichloroethane, ethylbenzene, xylenes, naphthalene, 1,2,4-trimethylbenzene, 1,3,5- trimethylbenzene, 2-methylnapthalene, and arsenic all exceeded ADEC Method Two soil cleanup levels in one or more samples from the Burn Pit AOC (Figure 2-1). Surface soil samples showed there were no exceedances of ADEC Method Two cleanup levels for dioxins/furans and that neither PFOA nor PFOS were present.



NOTES:
1. Background imagery is dated 13 June 1968, georeferenced to April 2015 and June 2015 GPS survey data.
2. Concentrations shown in Blue exceed ADEC cleanup levels.
3. Arsenic detections are attributed to naturally occurring sources.
4. The highest concentration between primary and duplicate samples is shown where duplicate samples were collected.
5. Only 2015 results from sample locations that had at least one ADEC cleanup level exceedance are shown.
6. Soil concentrations are in MG/KG.

CHEMISTRY NOTES:
Twenty-One Soil Samples were Collected at different Depths from Seven Locations within or near the Burn Pit in 2007 and 2008 and Analyzed for Dioxins and Furans. Thirteen Samples had Detections, but all Toxicity Equivalence (TEQ) Concentrations were between 40 Times and 5 Orders of Magnitude below the U.S. Environmental Protection Agency (EPA) Region 9 Preliminary Remediation Goals (PRGs) for Dioxins and Furans in Soil.

GRO AND/OR DRO CONCENTRATIONS ABOVE ADEC SOIL CLEANUP LEVELS
- 40+ FEET BGS
- 30-40 FEET BGS
- 20-40 FEET BGS
- 0-40 FEET BGS

DL-BH1		
SEPT 2015	5-6' BGS	19-20' BGS
ARSENIC	8.06	3.30

DL-BH2		
SEPT 2015	5-6' BGS	19-20' BGS
ARSENIC	3.45	4.41

DL-BH3		
SEPT 2015	5-6' BGS	19-20' BGS
ARSENIC	4.15	4.31

MW5-SOIL		
OCT 2007	5-7' BGS	15-17' BGS
ARSENIC	3.08	3.92

15SB1	
OCT 2015	38.5-40' BGS
DRO	2,720
GRO	137 QN
NAPHTHALENE	1.7 J

15SB8	
OCT 2015	35-36' BGS
DRO	1,490
GRO	507 QN
NAPHTHALENE	0.157 J
1,2,4-TMB	0.405 J

SB7B		
OCT 2007	5-7' BGS	15-17' BGS
GRO	653 QN	637 QN
DRO	1,080	1,540
ARSENIC	6.22	4.75
ETHYLBENZENE	ND(0.103)	0.54 J
XYLENES (TOTAL)	7.3	22.2
NAPHTHALENE	3.04	4.62
1,2,4-TMB	9.15	15.2
1,3,5-TMB	7.62	7.09
1,1,2-TCA	ND (0.103)	0.141 QN
2-MNPT	3.23	6.1

15SB7	
OCT 2015	38-39' BGS
DRO	485
GRO	202 QN
ETHYLBENZENE	0.43
XYLENES (TOTAL)	3.76
NAPHTHALENE	2.44 J
1,2,4-TMB	13
1,3,5-TMB	5

15SB13			
OCT 2015	29-30' BGS	34-35' BGS	35-37' BGS
DRO	7.5 QN	526	1,160
GRO	1.07 J	2.85	62.8 QN

ADEC SOIL CLEANUP LEVELS:
18 AAC 75.341 TABLES B1/B2
UNITS = MG/KG

BULK FUEL HYDROCARBONS	
DRO	250
GRO	300
VOCs	
ETHYLBENZENE	0.13
XYLENES (TOTAL)	1.5
1,2,4-TMB	0.61
1,3,5-TMB	0.66
1,1,2-TCA	0.0014
PAHs	
1-MNPT	0.41
2-MNPT	1.3
NAPHTHALENE	0.038

UNDER 40-INCH ZONE
MOST STRINGENT PATHWAY

15SB6			
OCT 2015	17-18' BGS	23-24' BGS	36-37.5' BGS
DRO	7.04 J	192	1,390
GRO	2.35	25.8 QN	411 QN
ETHYLBENZENE	ND (0.01)	ND (0.01)	1.92 J
XYLENES (TOTAL)	ND (0.03)	0.52	11.8 J
NAPHTHALENE	ND (0.02)	0.264 J	4.41 J
1,2,4-TMB	ND (0.02)	2.0	24.9 QN
1,3,5-TMB	ND (0.01)	1.2	7.5 J

15SB3			
OCT 2015	4-5' BGS	19-20' BGS	39-40' BGS
DRO	3580 QN	620	794
GRO	254 QN	36.7 QN	487 QN
ETHYLBENZENE	ND (0.139)	0.0124 J	0.35
XYLENES (TOTAL)	22.9	1.41	0.76
NAPHTHALENE	5.78 J	0.752 J	1.47 J
1,2,4-TMB	34.7	7.0	8.1
1,3,5-TMB	17.9	2.8	6.2

15SB9	
OCT 2015	35-36' BGS
DRO	1,050
GRO	575 QN
ETHYLBENZENE	0.99
NAPHTHALENE	0.88
1,2,4-TMB	5.4
1,3,5-TMB	2.2

08SB9				
OCT 2008	0.5-1' BGS	5-7' BGS	10-15' BGS	20-22' BGS
GRO	1.83 J	1.02 J	2 J	350 QN
DRO	32.3	6.64 J	8.8 J	263
ARSENIC	20.4	3.94	6.29	3.25
XYLENES (TOTAL)	ND (0.172)	ND (0.0881)	ND (0.0643)	7.88
NAPHTHALENE	0.0766 J	ND (0.0881)	ND (0.0643)	2.17
1,2,4-TMB	0.279	ND (0.044)	ND (0.0322)	15.4
1,3,5-TMB	0.115	ND (0.044)	ND (0.0322)	6.2

MW6-SOIL				
OCT 2008	5-7' BGS	10-12' BGS	15-17' BGS	20-22' BGS
ARSENIC	6.71	3.41	2.57	4.5

15SB5	
OCT 2015	37-39' BGS
DRO	1,090
GRO	497 QN
ETHYLBENZENE	1.6
XYLENES (TOTAL)	11.6
NAPHTHALENE	4.23 J
1,2,4-TMB	22.4
1,3,5-TMB	8.0

15SB4	
OCT 2015	39-40' BGS
DRO	603
GRO	342 QN
NAPHTHALENE	0.94 J
1,2,4-TMB	1.0
1,3,5-TMB	2.3

08SB8						
OCT 2008	0.5-1' BGS	5-7' BGS	10-12' BGS	15-17' BGS	20-22' BGS	35-37' BGS
DRO	11.8 J	2.49 J	2.77 J	2,620	2,960	883
ARSENIC	4.6	6.68	3.65	3.91	6.21	3.59
ETHYLBENZENE	ND (0.032)	ND (0.0295)	ND (0.0334)	ND (0.0348)	0.0357 J	0.714
XYLENES (TOTAL)	ND (0.064)	ND (0.059)	ND (0.0667)	ND (0.0697)	4.46	2.75
NAPHTHALENE	ND (0.064)	ND (0.059)	ND (0.0667)	ND (0.0697)	3.62 J	1.26
1,2,4-TMB	ND (0.032)	ND (0.0295)	ND (0.0334)	ND (0.0348)	24 J	10.6
1,3,5-TMB	ND (0.032)	ND (0.0295)	ND (0.0334)	ND (0.0348)	9.3 J	4.66
2-MNPT	ND(0.00598)	ND(0.00519)	ND(0.00521)	ND(0.00519)	8.54	1.94

ACRONYMS AND ABBREVIATIONS

ANALYTES
DRO - Diesel Range Organics
GRO - Gasoline Range Organics
1,2,4-TMB - 1,2,4-Trimethylbenzene
1,3,5-TMB - 1,3,5-Trimethylbenzene
1,1,2-TCA - 1,1,2-Trichloroethane
1-MNPT - 1-Methylnaphthalene
2-MNPT - 2-Methylnaphthalene

UNITS
MG/KG - Milligrams per Kilogram

OTHER
FES - Fairbanks Environmental Services
SRI - Supplemental Remedial Investigation
VOCs - Volatile Organic Compounds
PAHs - Polynuclear Aromatic Hydrocarbons
ND - Not Detected at LOD Shown in Parenthesis
LOD - Limit of Detection
Q - result considered an estimate (L-low; N-uncertain) due to a quality control failure
J - Result Qualified as Estimate because it is less than the LOQ
LOQ - Limit of Quantitation
PPM - Parts per Million
ADEC - Alaska Department of Environmental Conservation
' BGS - Feet Below Ground Surface
RI - Remedial Investigation
> - greather than
< - less than

LEGEND:
- GROUNDWATER MONITIORING WELL
- REMOVAL ACTION SOIL SAMPLE (NO ADEC EXCEEDANCES) - BRISTOL
- 2015 SRI SURFACE SOIL SAMPLE
- SUMP
- DISPOSAL LINE REMAINING IN PLACE
- FORMER DISPOSAL LINE (REMOVED IN 2015)
- FORMER UNDERGROUND FUEL LINES (REMOVED IN 2015)
- 2015 SRI SOIL BORING - FES
- 2015 BURN PIT INVESTIGATION SOIL BORING - NORTH WIND
- 2007/2008 RI SOIL BORING WITH PID > 20 PPM - NORTH WIND
- 2007/2008 RI SOIL BORING WITH PID < 20 PPM - NORTH WIND
- FENCE
- BURN PIT AREA OF CONCERN
- SOIL BORING SAMPLE FROM THE 2015 SRI
- SOIL BORING FROM 2015 BURN PIT INVESTIGATION - NORTH WIND
- SOIL BORING SAMPLE FROM PREVIOUS SITE INVESTIGATIONS

Source:
SCS CERCLA FS, final
Figure 2-2, Burn Pit and Disposal Line AOC Soil Samling Results Exceeding ADEC Cleanup Levels, April 2020

SCALE IN FEET
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SEARS CREEK STATION, ALASKA
DRY WELL, BURN PIT, AND SITE GROUNDWATER
RECORD OF DECISION

BURN PIT AOC SOIL SAMPLING RESULTS
EXCEEDING ADEC CLEANUP LEVELS

FIGURE
2-1

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Subsurface soil samples collected at the Burn Pit during the SRI confirmed previous results and further delineated the extent of contaminated soil associated with fuel and fuel constituents. A majority of the contaminated soil was identified below 20 ft bgs and extends into the saturated zone. Figure 2-1 presents the estimated extent of DRO and/or GRO concentrations exceeding ADEC Method Two cleanup levels at various depths.

2.1.8 Conceptual Site Model

The CSM is the same as presented for the whole of the SCS (See Section 1.5.1) and the exposure assessment presented in Section 1.7.2.1.

2.2 CURRENT AND POTENTIAL FUTURE LAND AND RESOURCE USE

2.2.1 Land Use

This is the same for the whole of the SCS (See Section 1.6).

2.2.2 Ground and Surface Water Uses

There are no current groundwater uses at the SCS. The reasonably foreseeable future use of the SCS is expected to remain industrial while under U.S. Army ownership and, as the lead agency, the U.S. Army has the authority to determine the future anticipated land use of the SCS. The U.S. Army has not determined potential future uses and unrestricted use could be a possibility following property transfer.

Surface water is not present at the SCS.

2.3 SUMMARY OF SITE RISKS

A HHERA evaluated the human health and ecological risks associated with the Burn Pit AOC. The HHERA process and approach is presented in Section 1.7 and subsequent sub-sections. The following discussion is focused on the COPCs and risks that the HHERA identified for the Burn Pit AOC.

2.3.1 Summary of Human Health Risk Assessment

This is the same for the whole of the SCS (See Section 1.7.2).

2.3.1.1 Exposure Assessment

This is the same for the whole of the SCS (See Section 1.7.2.1).

2.3.1.2 Identification of Chemicals of Potential Concern

This is the same for the whole of the SCS (See Section 1.7.2.2), apart from the site-specific details described below.

Residential Screening: COPCs, chemicals with MDCs exceeding residential soil RSLs and cleanup levels for GRO, DRO and RRO in 18 AAC 75.341 Table B2, under 40-inch zone, were identified in both surface and subsurface soil at the Burn Pit AOC:

- Surface soil: Dioxin TEQ, aluminum, and cobalt.
- Subsurface soil: Dioxin TEQ, 1,2,4-trimethylbenzene, naphthalene, and aluminum.

Industrial Screening: COPCs, chemicals with MDCs exceeding industrial soil RSLs, and cleanup levels for GRO, DRO and RRO in 18 AAC 75.341 (Table B2, under 40-inch zone) were identified in both surface and subsurface soil at the Burn Pit AOC:

- Surface soil: Dioxin TEQ.
- Subsurface soil: 1,2,4-trimethylbenzene.

The data used in the risk assessment was deemed to be of sufficient quality and quantity for its intended use. The detection frequency (number of samples in which the chemical was detected divided by the total number of samples analyzed), the MDCs, and residential and industrial screening levels are presented in **Table 2-1**.

2.3.1.3 Toxicity Assessment

This is the same for the whole of the SCS (See Section 1.7.2.3).

2.3.1.4 Risk Characterization

This is the same for the whole of the SCS (See Section 1.7.2.4), apart from the site-specific details described below.

The carcinogenic risks and noncarcinogenic impacts for each Burn Pit AOC COPC are presented for the residential receptor, representing a conservative assessment of site COPCs in relation to potential site use, the cumulative risk is summarized in Table 2-1.

Burn Pit AOC surface soil and subsurface soil COPCs MDCs resulted in a residential estimated cancer risk of 8×10^{-6}, within the EPA's acceptable risk range of 10^{-4} to 10^{-6} and below the ADEC excess cancer risk threshold of 1×10^{-5} and a HI of approximately 1.6, slightly exceeding the target HI of 1. The cumulative HI is driven primarily by the MDC of cobalt in surface soil.

The individual HQ for cobalt of approximately 0.8 is less than the target health goal of 1. There is no known source of cobalt at the SCS, and the MDC of 18 mg/kg could be associated with variability in naturally occurring metals concentrations, the BTV was estimated to be 10.2 mg/kg. If cobalt were excluded from the cumulative risk calculations, the cumulative HI would be below the target HI. Therefore, it is unlikely chemicals are present at concentrations that would potentially pose risks or hazards to human health of future residential receptors.

Table 2-1 Summary of Cumulative Risk Estimates for Human Receptors – Burn Pit AOC

Medium/Risk Driver[1]	Number of Samples	Number of detections	MDC (mg/kg)	Residential Soil RSL[2] THQ=0.1 or TCR=1 x 10^{-6}	Industrial Soil RSL[2] THQ=0.1 or TCR=1 x 10^{-6}	Hypothetical Future Resident	
						Estimated Cancer Risk[3]	Estimated Noncancer Hazard[3]
Surface Soil Total						5.4 x 10^{-6}	0.894
Dioxin (TEQ)[4]	7	6	0.0000258	0.0000048	0.000022	5.4 x 10^{-6}	NA
Aluminum	1	1	8,580	7,700	110,000	NA	0.111
Cobalt	2	2	18	2.3	35	NA	0.783
Subsurface Soil Total						2.6 x 10^{-6}	0.705
Dioxin (TEQ)[4]	7	4	0.00000518	0.0000048	0.000022	1.1 x 10^{-6}	NA
Naphthalene	20	4	5.78	3.8	17	1.5 x 10^{-6}	NA
1,2,4-Trimethylbenzene	10	2	34.7	5.8	24	NA	0.598
Aluminum	8	8	8,250	7,700	100,000	NA	0.107
Cumulative Media Cancer Risk/Noncancer Hazard:						8.0 x 10^{-6}	**1.599**
ADEC Risk Criteria:						10^{-5}	1
EPA Risk Range:						10^{-6} – 10^{-4}	1

Key:

1 – Summary of risk estimates for COPCs are presented if the COPC is a risk driver for at least one receptor. Risk estimates for all COPCs are presented in the Human Health and Ecological Risk Assessment which is Appendix H of the Supplemental Remedial Investigation (U.S. Army, 2018).

2 – Human Health Screening levels are the May 2016 EPA Regional Screening Levels for Residential Soil, except for the carcinogenic PAHs. The screening levels for the carcinogenic PAHs were calculated using the RSL calculator in May 2017.

3 – Estimated Cancer Risk = (MDC/RSL) *10^{-6}; Estimated Noncancer Hazard = (MDC/RSL)*0.1

4 – Screening values used is for the dioxin TEQ concentration was calculated using the Kaplan-Meier Method (U.S. Army, 2018).

ADEC – Alaska Department of Environmental Conservation
AOC – Area of Concern
COPC – contaminant of potential concern
EPA – U.S. Environmental Protection Agency
mg/kg – milligrams per kilogram
MDC – maximum detected concentration
NA – not applicable
PAH – polynuclear aromatic hydrocarbon
RSL – regional screening level
TCR – target cancer risk
TEQ – toxicity equivalent factor
THQ – target hazard quotient

Bold indicates exceedance of ADEC acceptable risk criteria.

In surface soil at the Burn Pit AOC, the MDC of aluminum and cobalt are below the industrial RSLs and the dioxin TEQ only slightly exceeds the industrial RSL. In subsurface soil, naphthalene and aluminum do not exceed the industrial RSL, but the MDC for 1,2,4-trimethylbenzene exceeds the industrial RSL. As shown in Table 2-1, the estimated noncancer hazards and cancer risks for residential receptors meet the target health goals (with the exception of a single cobalt detection). Because the residential RSLs are based on more conservative assumptions than those for the industrial RSLs, risks and hazards to industrial workers would also meet target health goals. Therefore, no COPCs are present in surface or subsurface soil at the Burn Pit AOC at concentrations that would potentially pose unacceptable risks or hazards for industrial receptors.

2.3.2 Summary of Ecological Risk Assessment

This is the same for the whole of the SCS (See Section 1.7.3).

2.3.2.1 Step 1 Ecological Scoping Evaluation

This is the same for the whole of the SCS (See Section 1.7.3.1).

2.3.2.2 Step 2 Preliminary Screening Evaluation

This is the same for the whole of the SCS (See Section 1.7.3.2), apart from the site-specific details described below.

Ecological COPCs, chemicals with MDCs exceeding screening levels at the Burn Pit AOC included:

- Surface soil: Dioxin/furans (evaluated as dioxin TEQ) and cobalt.

The cobalt detection was comparable to background concentrations and, as such, was attributed to background metal conditions and potential unacceptable exposure is not expected.

Dioxin TEQ, with an MDC of 2.58×10^{-5} mg/kg exceeded the ecological screening level of 1.99×10^{-7} mg/kg (USEPA, 2003) at the Burn Pit evaluation area.

While exposure to ecological receptors at the Burn Pit AOC is possible, given the small size of the Burn Pit AOC significant exposure to higher trophic level receptors (birds and mammals) is not expected, especially when considering wildlife home ranges, which exceed the area footprint even for wildlife with very small home ranges. Based on the limited exposure potential and localized nature of detections, significant ecological exposure is not expected.

2.3.3 Basis for Action

Based on the results of the HHERA, as summarized above, the Burn Pit AOC does not contain COC's that are risks to human or ecological receptors. However, as noted in Section 2.1.7, there are several COPCs that exceed ADEC Method Two migration-to-groundwater cleanup levels.

As discussed in Section 1.8, ADEC Method Three migration-to-groundwater levels were calculated to further refine the constituents that are a migration to groundwater threat and should be established as COCs. **Table 2-2** presents the COPCs identified, along with the:

- ADEC Method Two migration-to-groundwater cleanup value.
- ADEC maximum allowable concentration (for petroleum hydrocarbons only).
- Most conservative ADEC Method Two human health, under 40-inch zone, cleanup value.
- ADEC Method Three migration-to-groundwater cleanup value.
- Selection of the Site-Specific ACL, which is based on the most conservative of the ADEC Method Two human health cleanup level (18 AAC 75.341 Tables B1 and B2, under 40-inch zone), the maximum allowable concentration (for petroleum hydrocarbons only), and the ADEC Method Three migration-to-groundwater value.

Table 2-2 Cleanup Levels for Soil Contaminants of Potential Concern

Compound	ADEC Method Two Migration-to-Groundwater Cleanup Level[1] (mg/kg)	ADEC Maximum Allowable Concentration[2] (mg/kg)	ADEC Human Health Level[3] (mg/kg)	ADEC Method Three Calculator Value – Migration-to-Groundwater[4] (mg/kg)	Site-Specific Alternative Cleanup Level[5] (mg/kg)	Maximum Detected Concen-tration (mg/kg)
Diesel Range Organics	250	12,500	10,250	3,300	**3,300**	**3,580 QN**
Gasoline Range Organics	300	1,400	1,400	5,000	1,400	653 QN
Ethylbenzene	0.13	NA	49	61	49	1.92 J
Xylenes (Total)	1.5	NA	57	710	57	22.9
Naphthalene	0.038	NA	29	13	13	5.78 J
1,1,2-Trichloroethane	0.0014	NA	1.6	0.72	0.72	0.141 QN
1,2,4-Trimethylbenzene	0.61	NA	43	590	43	34.7
1,3,5-Trimethylbenzene	0.66	NA	37	650	37	17.9
2-Methylnaphthalene	1.3	NA	310	410	310	8.54
Arsenic	0.2	NA	8.8	210	8.8	**20.4**

Key:

1 – Tables B1 and B2, 18 AAC 75.341 (ADEC, 2020).

2 – Table B2, 18 AAC 75.341 (ADEC, 2020).

3 – Human Health value based on the Under 40-inch zone in Table B1 and most conservative of the ingestion and inhalation value for the under 40-inch zone in Table B2 (for diesel range organics and gasoline range organics) (ADEC, 2020).

4 – Value determined for the migration-to-groundwater scenario using the ADEC Cleanup Levels Calculator and the Petroleum Cleanup Levels Calculator (U.S. Army, 2018).

5 – Site-specific alternative cleanup level for soil is the lowest value between: 1) ADEC Maximum Allowable Concentration, 2) ADEC Human Health Level, and 3) ADEC Method Three Calculator Value – Migration-to-Groundwater.

AAC – Alaska Administrative Code
ADEC – Alaska Department of Environmental Conservation
J – Result is considered an estimate because it was reported below the limit of quantitation.
Q – Result is considered an estimate (biased H-high; N-unknown) due to quality control failure.
mg/kg – milligrams per kilogram
NA – not applicable

Bold values exceed the cleanup level.

Although the maximum detected arsenic concentration exceeded its respective BTV (Section 1.7.1) and the site-specific ACL, all other arsenic detections at the Burn Pit AOC are consistent with naturally occurring concentrations and there were no other arsenic exceedances of the site-specific ACL. The arsenic concentrations were compared to the sitewide concentrations using the two-sample t-test, and the results showed the Burn Pit concentration was not statistically different than the sitewide concentration (U.S. Army, 2018).

DRO was the only other constituent to exceed the site-specific ACL and is the only soil COC at the Burn Pit AOC due to the potential for migration to groundwater and degradation of groundwater quality. **Table 2-3** summarizes the COC and cleanup goal (the site-specific ACL) for the Burn Pit AOC. **Figure 2-2** presents the location of the DRO detection that exceeds the cleanup goal and presents the estimated lateral extent of exceedance.

Table 2-3 Soil Contaminant of Concern and Cleanup Goal for the Burn Pit AOC

Contaminant of Concern	Site-Specific Alternative Cleanup Level (mg/kg)	Basis for Cleanup
Diesel Range Organics	3,300	18 AAC 75.340(e)(2), Migration-to-Groundwater

Key:
AAC – Alaka Administrative Code AOC – Area of Concern mg/kg – milligrams per kilogram

2.4 REMEDIAL ACTION OBJECTIVES

The general RAOs are outlined in Section 1.9. Only RAO 3 is appliable to the Burn Pit AOC:

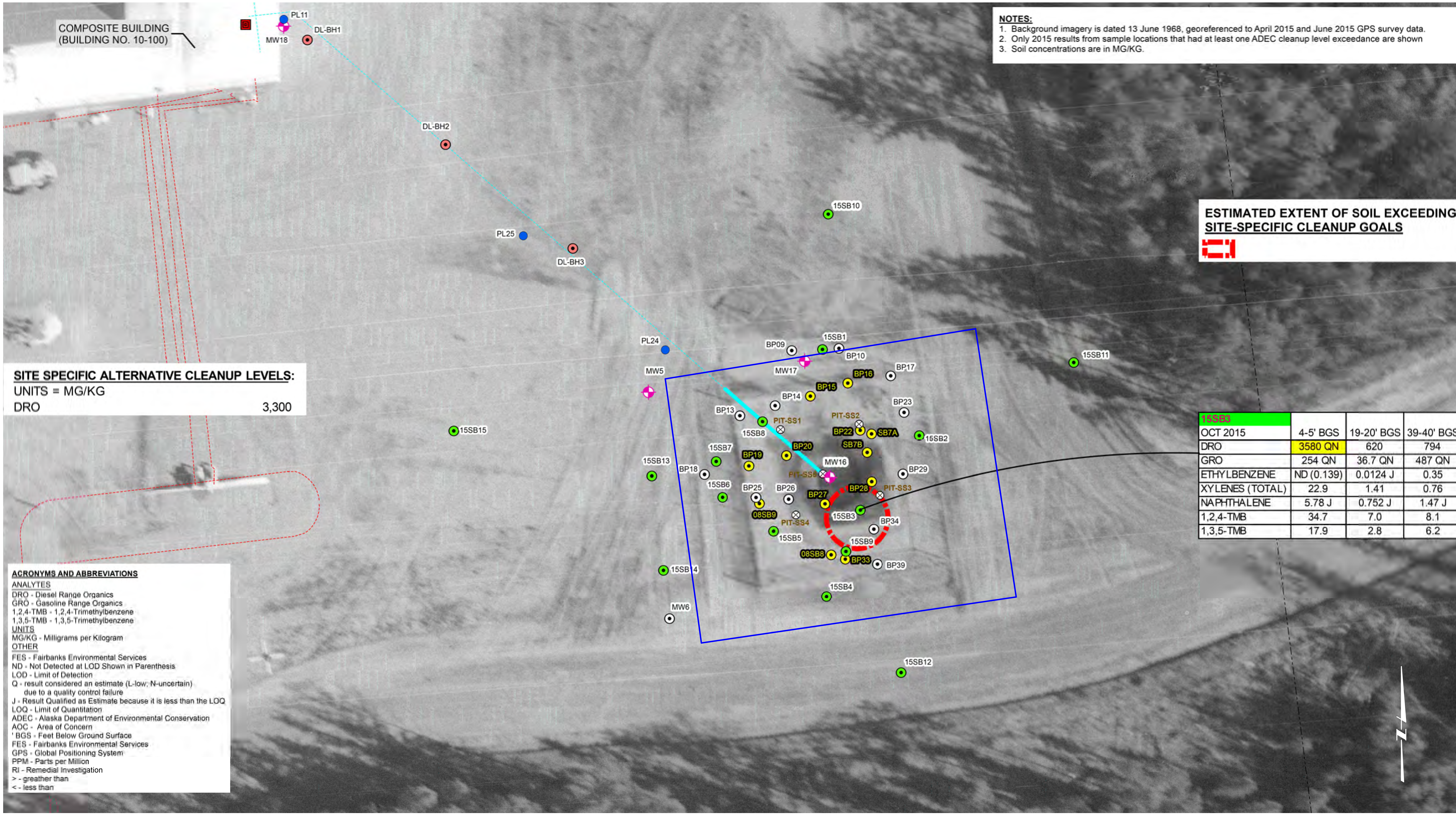
- RAO 3: Prevent further degradation of groundwater by reducing the concentrations of COCs in soil to levels protective of groundwater quality. Specifically:
  - Reduce concentrations of DRO in soil to below ACLs for protection of migration to groundwater developed using ADEC Method Three. Refer to Table 2-3 for the numerical cleanup goal.

2.5 DESCRIPTION OF ALTERNATIVES

The remedial alternatives considered for the Burn Pit AOC were presented in the Proposed Plan (U.S. Army, 2023) and are summarized below. As outlined in Section 1.10, the discussion of alternatives is focused on the portion of the alternative that is applicable to the Burn Pit AOC.

2.5.1 Description of Remedy Components

Alternative 1: No Action. The No Action alternative serves as a baseline against which other alternatives are compared, as required by the NCP. Under this alternative, no remedial actions would be taken, monitoring would not be conducted, and LUCs would not be implemented to prevent exposures. Although natural attenuation would occur, contaminant reductions would not be verified with monitoring.



NOTES:
1. Background imagery is dated 13 June 1968, georeferenced to April 2015 and June 2015 GPS survey data.
2. Only 2015 results from sample locations that had at least one ADEC cleanup level exceedance are shown
3. Soil concentrations are in MG/KG.

ESTIMATED EXTENT OF SOIL EXCEEDING SITE-SPECIFIC CLEANUP GOALS

SITE SPECIFIC ALTERNATIVE CLEANUP LEVELS:

UNITS = MG/KG

DRO 3,300

15SB3			
OCT 2015	4-5' BGS	19-20' BGS	39-40' BGS
DRO	3580 QN	620	794
GRO	254 QN	36.7 QN	487 QN
ETHYLBENZENE	ND (0.139)	0.0124 J	0.35
XYLENES (TOTAL)	22.9	1.41	0.76
NAPHTHALENE	5.78 J	0.752 J	1.47 J
1,2,4-TMB	34.7	7.0	8.1
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ACRONYMS AND ABBREVIATIONS

ANALYTES
DRO - Diesel Range Organics
GRO - Gasoline Range Organics
1,2,4-TMB - 1,2,4-Trimethylbenzene
1,3,5-TMB - 1,3,5-Trimethylbenzene
UNITS
MG/KG - Milligrams per Kilogram
OTHER
FES - Fairbanks Environmental Services
ND - Not Detected at LOD Shown in Parenthesis
LOD - Limit of Detection
Q - result considered an estimate (L-low; N-uncertain) due to a quality control failure
J - Result Qualified as Estimate because it is less than the LOQ
LOQ - Limit of Quantitation
ADEC - Alaska Department of Environmental Conservation
AOC - Area of Concern
' BGS - Feet Below Ground Surface
FES - Fairbanks Environmental Services
GPS - Global Positioning System
PPM - Parts per Million
RI - Remedial Investigation
> - greather than
< - less than

LEGEND:

- GROUNDWATER MONITIORING WELL
- REMOVAL ACTION SOIL SAMPLE (NO ADEC EXCEEDANCES) - BRISTOL
- 2015 SRI SURFACE SOIL SAMPLE
- SUMP
- DISPOSAL LINE REMAINING IN PLACE
- FORMER DISPOSAL LINE (REMOVED IN 2015)
- FORMER UNDERGROUND FUEL LINES (REMOVED IN 2015)
- 2015 SRI SOIL BORING - FES
- 2015 BURN PIT INVESTIGATION SOIL BORING - NORTH WIND
- 2007/2008 RI SOIL BORING WITH PID > 20 PPM - NORTH WIND
- 2007/2008 RI SOIL BORING WITH PID < 20 PPM - NORTH WIND
- FENCE
- BURN PIT AREA OF CONCERN

Source:
SCS CERCLA FS, final
Figure 2-2, Estimated Extent of Soil Exceeding Project Specific Cleanup Levels at the Burn Pit AOC, April 2020

SCALE IN FEET
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SEARS CREEK STATION, ALASKA
DRY WELL, BURN PIT, AND SITE GROUNDWATER
RECORD OF DECISION

BURN PIT AOC ESTIMATED EXTENT OF SOIL EXCEEDING SITE-SPECIFIC CLEANUP GOALS

FIGURE
2-2

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Alternative 2: LUCs and MNA. Alternative 2 includes LUCs and periodic soil sampling, assumed to be every 20-years, to document the progress of the natural attenuation of contaminants in soil. Annual LUC inspection and CERCLA FYRs would be conducted to document the continuing effectiveness of the remedy until soil concentrations were below cleanup goals. Implementation of Remedial Alternative 2 would require: documentation of the LUCs, maintenance of administrative controls through review of work clearance permits, periodic inspections of the site, and corrective action for LUC violations. The U.S. Army would be responsible for documenting, monitoring, maintaining, and enforcing the LUCs. MNA is part of the Site-Wide Groundwater AOC (Section 4) and not discussed further in this section.

Alternative 3: Excavation of Contaminated Soil, MNA, and LUCs. Alternative 3 includes excavation and off-site treatment of petroleum-contaminated soil exceeding cleanup goals. DRO-impacted soil in an area of approximately 35 by 35 ft near the center of the Burn Pit is estimated to be excavated to a depth of approximately 15 ft bgs and hauled to an off-site facility for treatment. Off-site treatment of 700 cubic yards is assumed for the cost estimate. Soil confirmation samples would be collected in accordance with ADEC's Field Sampling Guidance (ADEC, 2022) or current version, to confirm that all soil exceeding approved cleanup levels has been removed. Excavated material would be characterized and segregated onsite into piles that are below cleanup goals for utilization as backfill and above cleanup goals for off-site treatment. Following the soil confirmation, the excavation would be backfilled with clean fill material. MNA and LUCs are part of the Site-Wide Groundwater AOC (Section 4) and not discussed further in this section.

Alternative 4: Excavation of Contaminated Soil, Biosparging, and LUCs. The components of Alternative 4 that apply to the Burn Pit AOC are identical to the remedies in Alternative 3 and would achieve the same outcome. Biosparging and LUCs are part of the Site-Wide Groundwater AOC (Section 4) and not discussed further in this section.

Alternative 5: Excavation of Contaminated Soil, ISCO, and LUCs. The components of Alternative 5 that apply to the Burn Pit AOC are identical to the remedies in Alternative 3 and would achieve the same outcome. ISCO and LUCs are part of the Site-Wide Groundwater AOC (Section 4) and not discussed further in this section.

2.5.2 Expected Outcome of Each Alternative

Alternative 1: No Action. There are no site changes expected from selecting this remedial alternative.

Alternative 2: LUCs and MNA. Alternative 2 for the Burn Pit AOC soil is assumed to achieve cleanup goals through natural attenuation in approximately 40 years (based on professional judgement). Upon achieving cleanup goals, the necessity of LUCs and CERCLA FYRs would be reviewed.

Alternative 3: Excavation of Contaminated Soil, MNA, and LUCs. Alternative 3 is expected to achieve the approved cleanup levels for soil at the Burn Pit AOC after removal actions are completed.

Alternative 4: Excavation of Contaminated Soil, Biosparging, and LUCs. The components of Alternative 4 that apply to the Burn Pit AOC are identical to the remedies in Alternative 3 and achieve the same outcome.

Alternative 5: Excavation of Contaminated Soil, ISCO, and LUCs. The components of Alternative 5 that apply to the Burn Pit AOC are identical to the remedies in Alternative 3 and achieve the same outcome.

2.6 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

Alternatives for the Burn Pit AOC were evaluated using the nine criteria described in Section 121(a) &(b) of CERCLA and 40 CFR Section 300.430(e)(9)(i) as cited in NCP Section 300.430(f)(5)(i). These criteria are classified as threshold criteria, balancing criteria, and modifying criteria, and are outlined in Section 1.10.

This section summarizes how well each alternative satisfies each evaluation criterion and indicates how it compares to the other alternatives under consideration for the Burn Pit AOC. **Table 2-4** compares the cleanup alternatives at the Burn Pit AOC using the nine CERCLA evaluation criteria.

Table 2-4 Remedial Alternative Comparison – Burn Pit AOC

Description	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
	No Action	LUCs and MNA	Excavation of Contaminated Soil, MNA, and LUCs	Excavation of Contaminated Soil, Biosparging, and LUCs.	Excavation of Contaminated Soil, ISCO, and LUCs.
Threshold Criteria					
Overall Protection of Human Health and the Environment	Fail	Fail	Pass	Pass	Pass
Compliance with ARARs	Fail	Fail	Pass	Pass	Pass
Primary Balancing Criteria					
Long-Term Effectiveness and Permanence	NA	NA	High	High	High
Reduction of TMV through Treatment	NA	NA	High	High	High
Short-Term Effectiveness	NA	NA	High	High	High
Implement-ability	NA	NA	High	High	High
Cost	$0	NA	$393,500	$393,500	$393,500
Modifying Criteria					
State/Support Agency Acceptance	NA	NA	Acceptable	Acceptable	Acceptable
Community Acceptance	NA	NA	Acceptable	Acceptable	Acceptable

Key:
AOC – Area of Concern
ARAR – applicable or relevant and appropriate requirement
NA – not applicable
TMV – toxicity, mobility, and volume

Scoring:
Pass – meets threshold criterion.
Fail – does not meet threshold criterion.
High, Medium, and Low indicate the degree to which the alternative satisfies the criterion.

2.6.1 Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or LUCs. This is one of the threshold criteria and an alternative is rated either Pass or Fail for this criterion.

Alternative 1 (No Action) cannot achieve the RAO; therefore, this alternative fails to meet this threshold criterion.

Alternative 2 (LUCs and MNA) is unlikely to achieve the RAO. LUCs do not limit, prevent, or assess soil contaminant migration to groundwater. The collection of soil samples every 20 years would provide information on contaminant concentrations at a point in time and provide limited ability to assess soil migration. Therefore, this alternative fails to meet this threshold criterion.

Alternatives 3 (Excavation of Contaminated Soil, MNA, and LUCs), Alternative 4 (Excavation of Contaminated Soil, Biosparging, and LUCs), and Alternative 5 (Excavation of Contaminated Soil, ISCO, and LUCs) would protect the environment, the Burn Pit AOC soils do not pose a human health risk, and the removal of petroleum-contaminated soil exceeding cleanup goals will achieve the RAO immediately.

2.6.2 Compliance with Applicable or Relevant and Appropriate Requirements

Compliance with ARARs addresses whether a remedy will meet all of the ARARs of other Federal and State environmental statutes or provides a basis for invoking a waiver, the ARARs are provided in Table 1-5. Compliance with ARARs is the second threshold criterion; alternatives either Pass or Fail.

Alternatives 1 (No Action) and 2 (LUCs and MNA) do not comply with applicable ARARs. Both leave contamination in place at concentrations that are not protective of the environment. Because they do not meet this criteria, Alternative 1 (No Action) and Alternative 2 (LUCs) were eliminated from consideration and are not evaluated with respect to the criteria below.

Alternatives 3 (Excavation of Contaminated Soil, MNA, and LUCs), Alternative 4 (Excavation of Contaminated Soil, Biosparging, and LUCs), and Alternative 5 (Excavation of Contaminated Soil, ISCO, and LUCs) are compliant with applicable ARARs.

2.6.3 Long-Term Effectiveness and Permanence

Long-term effectiveness and permanence refer to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once clean-up levels have been met. This criterion includes the consideration of residual risk that will remain onsite following remediation and the adequacy and reliability of controls.

Alternatives 3 (Excavation of Contaminated Soil, MNA, and LUCs), Alternative 4 (Excavation of Contaminated Soil, Biosparging, and LUCs), and Alternative 5 (Excavation of Contaminated Soil, ISCO, and LUCs), evaluated only in relation to the remedy component applicable to the Burn Pit AOC, would score “High”. For the Burn Pit AOC, the alternative actively removes soil contamination exceeding the cleanup goal. The alternative scores in their totality, due to the individual remedy components addressed in the Site-Wide Groundwater AOC, are presented in Section 4.

2.6.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

Reduction of TMV through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

Alternatives 3 (Excavation of Contaminated Soil, MNA, and LUCs), Alternative 4 (Excavation of Contaminated Soil, Biosparging, and LUCs), and Alternative 5 (Excavation of Contaminated Soil, ISCO, and LUCs) were evaluated only in relation to the remedy component applicable to the Burn Pit AOC, would score “High”. For the Burn Pit AOC, the alternative actively removes soil contamination exceeding the cleanup goal. The alternative scores in their totality, due to the individual remedy components addressed in the Site-Wide Groundwater AOC, are presented in Section 4.

2.6.5 Short-Term Effectiveness

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community, and the environment during construction and operation of the remedy until cleanup levels are achieved.

Alternatives 3 (Excavation of Contaminated Soil, MNA, and LUCs), Alternative 4 (Excavation of Contaminated Soil, Biosparging, and LUCs), and Alternative 5 (Excavation of Contaminated Soil, ISCO, and LUCs) were evaluated only in relation to the remedy component applicable to the Burn Pit AOC, would score “High”. For the Burn Pit AOC, the alternative actively removes soil contamination exceeding the cleanup goal. The alternative scores in their totality, due to the individual remedy components addressed in the Site-Wide Groundwater AOC, are presented in Section 4.

2.6.6 Implementability

Implement-ability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

Alternatives 3 (Excavation of Contaminated Soil, MNA, and LUCs), Alternative 4 (Excavation of Contaminated Soil, Biosparging, and LUCs), and Alternative 5 (Excavation of Contaminated Soil, ISCO, and LUCs), evaluated only in relation to the remedy component applicable to the Burn Pit AOC, would score "High". For the Burn Pit AOC, the size of the excavation is relatively small, there are few logistical challenges, no infrastructure to work around, and an excavation can be easily implemented. The alternatives in their totality, due to the individual remedy components addressed in the Site-Wide Groundwater AOC, are presented in Section 4.

2.6.7 Cost

Alternatives 3 (Excavation of Contaminated Soil, MNA, and LUCs), Alternative 4 (Excavation of Contaminated Soil, Biosparging, and LUCs), and Alternative 5 (Excavation of Contaminated Soil, ISCO, and LUCs), evaluated only in relation to the remedy component applicable to the Burn Pit AOC, all have the same capital cost estimated at $393,500. There are no annual O&M or periodic costs associated with an excavation remedy to address the Burn Pit AOC soils.

2.6.8 State/Support Agency Acceptance

The State concurs that, if implemented properly, the following selected remedy as presented in this ROD will comply with state and Federal environmental laws:

- Alternative 3: Excavation of Contaminated Soil.

The State did not provide comments regarding the other alternatives.

2.6.9 Community Acceptance

Written and verbal comments received during the public comment period are summarized and addressed in Section 7.0.

2.7 PRINCIPAL THREAT WASTES

The NCP expects that treatment that reduces the TMV of the principal threat wastes will be used to the extent practicable. The principal threat concept refers to the source materials at a CERCLA site considered to be highly toxic or highly mobile that generally cannot be reliably controlled in place or present a significant risk to human health or the environment should exposure occur. A source material is material that contains hazardous substances, pollutants, or contaminants that act as a reservoir for migration of contamination to groundwater, surface water, or air, or that acts as a source for direct exposure. There is no principal threat waste at the Burn Pit AOC.

2.8 SELECTED REMEDY

The selected remedy for the Burn Pit AOC (Alternative 3) involves excavation and off-site treatment of DRO-contaminated soil exceeding cleanup goals. This remedial action was selected based upon the ability to protect the environment by addressing potential contaminant migration to groundwater and compliance with applicable requirements. The U.S. Army has determined that the selected remedy provides the best balance of trade-offs among the alternatives with respect to the five balancing criteria set out in the NCP Section 300.430(f)(1)(i)(B).

Remedy selections are based on the detailed evaluation of remedial alternatives presented in the Proposed Plan (U.S. Army, 2023) and the FS (U.S. Army, 2020). The U.S. Army is responsible for implementing and monitoring the remedial actions identified herein for the duration of the remedies selected in this ROD. The U.S. Army will exercise this responsibility in accordance with CERCLA and the NCP.

2.8.1 Summary of the Rationale for the Selected Remedy

The U.S. Army believes that the selected remedy for the Burn Pit AOC meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. The remedy is expected to satisfy the nine selection criteria as defined by CERCLA Section 121(b).

Alternative 3 meets the threshold criteria, is the most effective when ranked against the balancing criteria, and also meets with concurrence from the State and acceptance from the community under the modifying criteria.

2.8.2 Description of the Selected Remedy

Under Alternative 3 for the Burn Pit AOC, surface and subsurface soil exceeding DRO cleanup goals will be excavated and transported to an off-site facility for treatment. Soil confirmation samples would be collected in accordance with ADEC's Field Sampling Guidance (ADEC, 2022) or current version, to confirm that all soil exceeding approved cleanup levels has been removed. Excavated material would be characterized and segregated onsite into piles that are below cleanup goals for utilization as backfill and above cleanup goals for off-site treatment. Clean soil, below SCS cleanup goals, would be imported from an off-site facility to be used as backfill. The backfill will be crowned to shed surface water and vegetated. This alternative would rapidly remove contaminated soil at the Burn Pit AOC and no further remedial actions would be necessary for soil at the Burn Pit AOC. The soil volume estimates for the Burn Pit AOC are summarized in **Table 2-5**.

Table 2-5 Burn Pit AOC Soil Volume Estimate

Area (square feet)	Depth (feet)	Volume (cubic feet)	Volume (cubic yards)	Media
1,225	15	18,375	680	Surface and Subsurface Soil

Key:
AOC – Area of Concern

2.8.3 Summary of Estimated Remedy Costs

A summary of the estimated remedy costs for the Burn Pit AOC is provided in **Table 2-6**.

Table 2-6 Burn Pit AOC Summary of Estimated Remedy Costs

Selected Remedy	Capital Cost	O&M Cost	Periodic Cost
Excavation of subsurface soil and off-site disposal.	$393,500	$0	$0

Key:
AOC – Area of Concern O&M – Operation and Maintenance

The information provided in Table 2-6 is based on the best available information regarding the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. Major changes may be documented in an ESD or a ROD amendment. This is an order-of-magnitude engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost. Costs for the Burn Pit AOC were provided in the FS (U.S. Army, 2020).

2.8.4 Expected Outcomes of Selected Remedy

Upon completion of the selected remedy, the Burn Pit AOC will be in compliance with CERCLA and the State of Alaska environmental statutes. No known contamination above site-specific cleanup goals will remain within soil at the Burn Pit AOC after the selected remedy (excavation) has been completed. Refer to Table 2-3 for COCs, cleanup levels, and the basis for the cleanup level.

2.9 STATUTORY DETERMINATIONS

Under CERCLA Section 121 (as required by NCP Section 300.430(f)(5)(ii)), the lead agency must select a remedy that is protective of human health and the environment, complies with ARARs, is cost-effective, and uses permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, periodic FYRs are required if hazardous substances will remain in place above levels allowing for UU/UE after implementing the selected remedy. CERCLA also includes: 1) a preference for remedies that employ treatment which permanently and significantly reduces the TMV of hazardous wastes as a principal element; and 2) a bias against offsite disposal of untreated wastes. The following sections discuss how the selected remedy meets these statutory requirements.

2.9.1 Protection of Human Health and the Environment

Excavation of the COC at the Burn Pit AOC would protect the environment by removing the contaminant mass that poses a soil migration to groundwater risk from the site and transporting the material to an off-site, permitted, treatment facility. There are no contaminants at the Burn Pit AOC that pose a human health risk (Section 2.3).

2.9.2 Compliance with ARARs

Remedial actions must comply with both Federal and State ARARs. ARARs are legally applicable or relevant and appropriate requirements, standards, criteria, or limitations of Federal and State environmental laws and regulations. Criteria TBCs are non-promulgated advisories or guidance issued by federal or state government that are not legally binding and do not have the status of potential ARARs. However, in many circumstances, TBCs are considered along with ARARs.

Table 1-5 summarizes the ARARs and TBCs for the selected remedies at the SCS, including the Burn Pit AOC, and describes how the selected remedies address each one at agreed-upon points of compliance.

The selected remedy for the Burn Pit AOC complies with the chemical-specific, location-specific, and action-specific ARARs. The implementation of the remedy is required to meet the substantive portions of these requirements at agreed-upon points of compliance and is exempt from administrative requirements, such as permitting and notifications. Removal of the contaminated soil would be confirmed by post-excavation sampling of the bottom and sidewalls of the excavation.

2.9.3 Cost Effectiveness

The selected remedy for the Burn Pit AOC is cost-effective and represents a reasonable value for the money to be spent. In making this determination, the following definition was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness" (40 CFR 300.430[f][1][ii][D]). This determination was accomplished by evaluating the "overall effectiveness" of those alternatives that satisfy the threshold criteria (that is, is protective of human health and the environment and ARAR-compliant).

Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination: long-term effectiveness and permanence, reduction in TMV through treatment, and short-term effectiveness. Overall effectiveness was then compared to costs to determine cost-effectiveness. The overall effectiveness of the selected remedy for the Burn Pit AOC was demonstrated in the comparative analysis of alternatives (Section 2.6). The total cost of the selected remedy is $393,500 (Table 2-6).

It is important to note that more than one cleanup alternative can be cost-effective, and the Superfund program does not mandate the selection of the most cost-effective cleanup alternative. In addition, the most cost-effective remedy is not necessarily the remedy that provides the best balance of tradeoffs with respect to the remedy selection criteria, nor is it necessarily the least-costly alternative that is both protective of human health and the environment and ARAR-compliant. Rather, cost-effectiveness is concerned with the reasonableness of the relationship between the effectiveness afforded by each alternative and its costs compared to other available options.

2.9.4 Utilization of Permanent Solutions and Alternative Treatment Technologies

The selected remedy provides the best balance of trade-offs among the alternatives with respect to the five balancing criteria set out in NCP Section 300.430(f)(l)(i)(B). Although no onsite treatment is being utilized for at the Burn Pit AOC, the selected remedy of soil excavation provides the most effective, long-term solution given the conditions at the Burn Pit AOC. Excavation with off-site treatment is protective of human health and the environment by permanently removing contaminated soil from the Burn Pit AOC, readily implementable, and cost effective in comparison to other alternatives.

2.9.5 Preference for Treatment as a Principal Element

The NCP establishes the expectation that treatment will be used to address the principal threats posed by a site wherever practicable (40 CFR 300.430[a][1][iii][A]). The selected remedy of Excavation with Off-site Treatment for soil CERCLA COCs satisfies the statutory preference for treatment as a principal element of the remedy.

3.0 DRY WELL AOC

A Dry Well west of the USTs was located on a 1963 as-built drawing for the SCS (78-15-63, Sheet 1; USACE, 1963). The Dry Well was connected to the floor drains within the Composite Building via a 4-inch buried, cast iron pipe. The as-built drawings showed a total of 11 floor drains in the Composite Building, including three in the Engine Room, three in the Pump Room, one in the Generator Room, two in the Mechanical Room, one in the corridor between the Storage Room and the Refrigerated Rooms, and one in the Garage. The Dry Well AOC is presented on **Figure 3-1**.

The as-built drawing showed that the Dry Well consisted of 55-gallon drums connected together at the top by a 4-inch cast-iron pipe and perforated with 1/2-inch holes from the bottom of the pipe inlet to the bottom of the drums. The drawing indicated that 1.5-inch to 3-inch gravel was placed at 6 inches above and 24 inches away from drum edges. The drawing did not show gravel placed below the drum; however, it was noted that the bottom of each drum was cut out.

3.1 SITE CHARACTERISTICS

3.1.1 Topography and Climate

This is the same for the whole of the SCS (See Section 1.5.2.2).

3.1.2 Geology

This is the same for the whole of the SCS (See Section 1.5.2.3).

3.1.3 Hydrogeology

This is the same for the whole of the SCS (See Section 1.5.2.4).

3.1.4 Surface Water Hydrology

This is the same for the whole of the SCS (See Section 1.5.2.5).

3.1.5 Ecological Setting

This is the same for the whole of the SCS (See SS047 Section 1.5.2.6).

3.1.6 Site Characterization Activities

Characterization activities discussed below are focused on soil. Groundwater characterization activities are discussed as part of the Site-Wide Groundwater AOC in Section 4 of this ROD. Soil detections are compared to the lowest of the under 40-inch zone human health and migration-to-groundwater levels outlined in ADEC 18 AAC 75.341 Tables B1 and B2 (ADEC, 2020).

No previous investigation of the Dry Well area occurred prior to the 2014 data gap evaluation. A monitoring well (MW1) was completed approximately 50 ft north of the Dry Well (Figure 3-1) in 2007 to evaluate potential contamination associated with the UST AOC (North Wind, 2010). No exceedances of 18 AAC 75.345 Table C cleanup levels were observed in groundwater samples collected from MW1 during previous investigations (North Wind, 2010).

2015 Removal Action and Sampling. The Class V UIC closure of the Dry Well was conducted in June and July 2015 (Bristol, 2016a). The Dry Well was found to consist of seven perforated 55-gallon drums buried approximately 10 ft bgs. Bristol removed the drums and piping between the Composite Building and the Dry Well, cleaned the floor drains in the Composite Building, installed expandable plumber's plugs in the inlets/outlets, and plugged the drain basins with concrete grout (Bristol, 2016a). End-point samples were collected below the Dry Well and along the pipe trench after the piping was removed. Following removal of the Dry Well components, the excavation was backfilled using the excavated material.

The end-point sample collected from under the Dry Well had several contaminants that exceeded soil cleanup levels in 18 AAC 75.341, Tables B1 and B2, including: DRO, 1,2-dichloroethane, naphthalene, arsenic, cadmium, lead, mercury, and selenium (Figure 3-1). These results indicated that various waste oils and/or fuels may have been disposed of through the Dry Well, and further investigation was conducted as part of the SRI.

2015 SRI. To characterize and delineate the extent of soil contamination identified during the Class V UIC closure activities, three soil borings were drilled in the former Dry Well area and three soil borings were drilled along the piping that ran from the Composite Building to the Dry Well. Two soils samples were collected from each boring and analyzed for: GRO, DRO, RRO, VOCs, SVOCs, pesticides, PCBs, and metals.

Soil borings DW-BH1 through DW-BH3, located within or immediately adjacent to the Dry Well area, were drilled to depths of 55 to 57 ft bgs. Groundwater was encountered at approximately 53 ft bgs. Soil Borings DW-BH4 through DW-BH6 were completed along the former piping between the Composite Building and the Dry Well. The soil borings were drilled to depths of 19 to 20 ft bgs. Photoionization detector measurements exceeding background levels were not measured in any of the soil borings, and no other evidence of soil contamination was identified.

Soil Boring DW-BH2 was completed as Monitoring Well MW9. A second monitoring well (MW12) was installed approximately 70 ft to the northwest (downgradient) of MW9. Existing Monitoring Well MW1 is approximately 35 ft north of MW9. Analytical results for groundwater samples collected from the three wells in September 2015, showed that arsenic was the only exceedance of ADEC Table C groundwater cleanup levels (ADEC, 2018a) at MW12. However, this arsenic detection was associated with naturally occurring sources, as discussed in the SRI (U.S. Army, 2018). Groundwater is discussed further as part the Site-Wide Groundwater AOC in Section 4.

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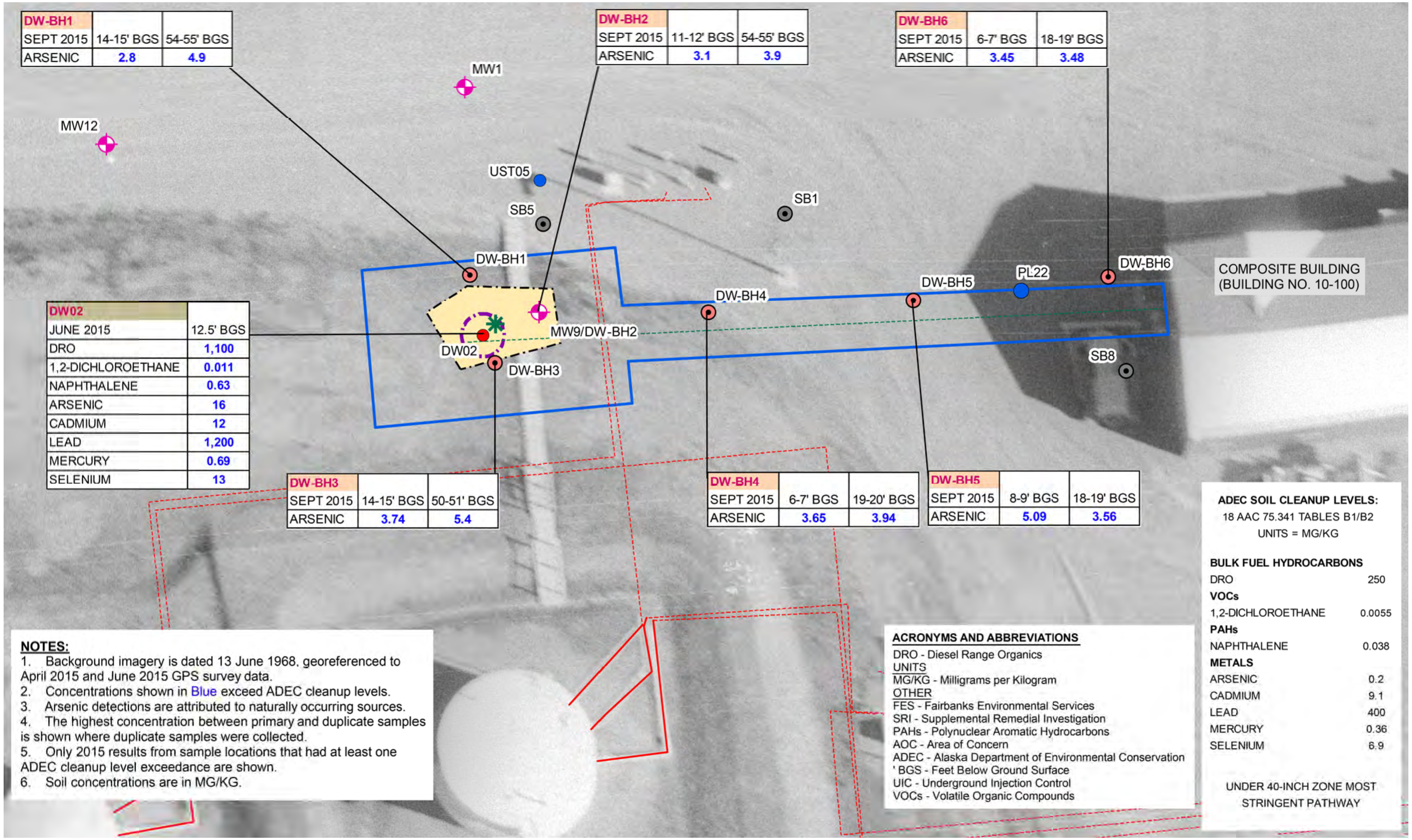

DW-BH1		
SEPT 2015	14-15' BGS	54-55' BGS
ARSENIC	2.8	4.9

DW-BH2		
SEPT 2015	11-12' BGS	54-55' BGS
ARSENIC	3.1	3.9

DW-BH6		
SEPT 2015	6-7' BGS	18-19' BGS
ARSENIC	3.45	3.48

DW02	
JUNE 2015	12.5' BGS
DRO	1,100
1,2-DICHLOROETHANE	0.011
NAPHTHALENE	0.63
ARSENIC	16
CADMIUM	12
LEAD	1,200
MERCURY	0.69
SELENIUM	13

DW-BH3		
SEPT 2015	14-15' BGS	50-51' BGS
ARSENIC	3.74	5.4

DW-BH4		
SEPT 2015	6-7' BGS	19-20' BGS
ARSENIC	3.65	3.94

DW-BH5		
SEPT 2015	8-9' BGS	18-19' BGS
ARSENIC	5.09	3.56

ADEC SOIL CLEANUP LEVELS:
18 AAC 75.341 TABLES B1/B2
UNITS = MG/KG

BULK FUEL HYDROCARBONS	
DRO	250
VOCs	
1,2-DICHLOROETHANE	0.0055
PAHs	
NAPHTHALENE	0.038
METALS	
ARSENIC	0.2
CADMIUM	9.1
LEAD	400
MERCURY	0.36
SELENIUM	6.9

UNDER 40-INCH ZONE MOST STRINGENT PATHWAY

NOTES:

1. Background imagery is dated 13 June 1968, georeferenced to April 2015 and June 2015 GPS survey data.
2. Concentrations shown in Blue exceed ADEC cleanup levels.
3. Arsenic detections are attributed to naturally occurring sources.
4. The highest concentration between primary and duplicate samples is shown where duplicate samples were collected.
5. Only 2015 results from sample locations that had at least one ADEC cleanup level exceedance are shown.
6. Soil concentrations are in MG/KG.

ACRONYMS AND ABBREVIATIONS

DRO - Diesel Range Organics
UNITS
MG/KG - Milligrams per Kilogram
OTHER
FES - Fairbanks Environmental Services
SRI - Supplemental Remedial Investigation
PAHs - Polynuclear Aromatic Hydrocarbons
AOC - Area of Concern
ADEC - Alaska Department of Environmental Conservation
' BGS - Feet Below Ground Surface
UIC - Underground Injection Control
VOCs - Volatile Organic Compounds

LEGEND:

- GROUNDWATER MONITORING WELL
- 2015 UIC EXCAVATION SOIL SAMPLE - BRISTOL
- REMOVAL ACTION SOIL SAMPLE (NO ADEC EXCEEDANCES) - BRISTOL
- 2015 SRI SOIL BORING - FES
- PRE-2015 SOIL BORING
- FORMER DRY WELL (REMOVED IN 2015)
- SOIL BORING SAMPLE FROM THE 2015 SRI
- SOIL SAMPLE FROM THE 2015 UIC - BRISTOL
- FORMER DRY WELL PIPING (REMOVED IN 2015)
- FORMER ABOVEGROUND FUEL LINES (REMOVED IN 2015)
- FORMER UNDERGROUND FUEL LINES (REMOVED IN 2015)
- REMAINING SOIL CONTAMINATION WITH DRO CONCENTRATION ABOVE ADEC SOIL CLEANUP LEVEL
- DRY WELL AREA OF CONCERN
- DRY WELL EXCAVATION - BRISTOL 2015

Source:
SCS Supplemental RI,
Figure 5-1, Dry Well AOC Soil and Groundwater Sampling Results Exceeding ADEC Cleanup Levels, Nov 2018

SCALE IN FEET 0 8	SEARS CREEK STATION, ALASKA DRY WELL, BURN PIT, AND SITE GROUNDWATER RECORD OF DECISION	DRY WELL AOC SOIL SAMPLING RESULTS EXCEEDING ADEC CLEANUP LEVELS	FIGURE 3-1 185704695.500.0502

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3.1.7 Nature and Extent of Contamination

DRO, 1,2-dichloroethane, naphthalene, arsenic, cadmium, lead, mercury, and selenium all exceeded ADEC Method Two soil cleanup levels in one or more samples (Figure 3-1). Based on boring and samples collected, the area of contamination is associated with soils directly under the former Dry Well area at a depth of approximately 12.5 ft bgs. The extent of the contamination is very limited and has not impacted groundwater (discussed as part of the Site-Wide Groundwater AOC in Section 4).

3.1.8 Conceptual Site Model

The CSM is the same as presented for the whole of the SCS (See Section 1.5.1) and the exposure assessment presented in Section 1.7.2.1.

3.2 CURRENT AND POTENTIAL FUTURE LAND AND RESOURCE USE

3.2.1 Land Use

This is the same for the whole of the SCS (See Section 1.6).

3.2.2 Ground and Surface Water Uses

There are no current groundwater uses at the SCS. The reasonably foreseeable future use of the SCS is expected to remain industrial while under U.S. Army ownership, and as the lead agency, the U.S. Army has the authority to determine the future anticipated land use of the SCS. The U.S. Army has not determined potential future uses and unrestricted use could be a possibility following property transfer.

Surface water is not present at the SCS.

3.3 SUMMARY OF SITE RISKS

A HHERA evaluated the human health and ecological risks associated with the Dry Well AOC. The HHERA process and approach is presented in Section 1.7 and subsequent sub-sections. The following discussion is focused on the COPCs and risks that the HHERA identified for the Dry Well AOC.

3.3.1 Summary of Human Health Risk Assessment

This is the same for the whole of the SCS (See Section 1.7.2).

3.3.1.1 Exposure Assessment

This is the same for the whole of the SCS (See Section 1.7.2.1).

3.3.1.2 Identification of Chemicals of Potential Concern

This is the same for the whole of the SCS (See Section 1.7.2.2), apart from the site-specific details described below.

Residential Screening: COPCs, chemicals with MDCs exceeding residential soil RSLs and cleanup levels for GRO, DRO and RRO in 18 AAC 75.341 (Table B2, under 40-inch zone) were identified in subsurface soil at the Dry Well AOC:

- Subsurface soil: arsenic, cadmium, lead, thallium, benzo(b)fluoranthene, benzo(a)pyrene, dibenz(a,h)anthracene, and a PCB (Aroclor 1254).

Industrial Screening: COPCs, chemicals with MDCs exceeding industrial soil RSLs and cleanup levels for GRO, DRO and RRO in 18 AAC 75.341 Table B2, under 40-inch zone) were identified in subsurface soil at the Dry Well AOC:

- Subsurface soil: Arsenic and lead.

The data used in the risk assessment was deemed to be of sufficient quality and quantity for its intended use. The detection frequency (number of samples in which the chemical was detected divided by the total number of samples analyzed), the MDCs, and residential and industrial screening levels are presented in **Table 3-1**.

3.3.1.3 Toxicity Assessment

This is the same for the whole of the SCS (See Section 1.7.2.3).

3.3.1.4 Risk Characterization

This is the same for the whole of the SCS (See Section 1.7.2.4), apart from the site-specific details described below.

The carcinogenic risks and noncarcinogenic impacts for each COPC are presented for the residential receptor, representing a conservative assessment of site COPCs in relation to potential site use, the cumulative risk is summarized in Table 3-1.

Dry Well AOC subsurface soil COPCs MDCs resulted in a residential estimated cancer risk of 3.6×10^{-5}, which is within the EPA's acceptable risk range but slightly exceeds the ADEC excess cancer risk threshold. The cumulative noncancer risk at the Dry Well AOC was estimated with a HI of 0.6. The estimated cumulative risk is driven primarily by arsenic, with a cancer risk of 2.4×10^{-5}, driven by the single arsenic detection of 16 mg/kg at 12.5 ft bgs, collected below the Dry Well drums in 2015. Arsenic concentrations measured in other Dry Well AOC samples were near or below the BTV.

Table 3-1 Summary of Cumulative Risk Estimates for Human Receptors – Dry Well AOC

Medium/Risk Driver[1]	Number of Samples	Number of detections	MDC (mg/kg)	Residential Soil RSL[2] THQ=0.1 or TCR=1 x 10^{-6}	Industrial Soil RSL[2] THQ=0.1 or TCR=1 x 10^{-6}	Hypothetical Future Resident	
						Estimated Cancer Risk[3]	Estimated Noncancer Hazard[3]
Subsurface Soil							
Arsenic	8	8	16	0.68	3	**2.4 x 10^{-5}**	NA
Cadmium	8	7	12	7.1	98	NA	0.169
Lead	10	10	1,200	400	800	> RSL[4]	NA
Thallium	6	2	0.123	0.078	1.2	NA	0.158
Benzo(a)pyrene	13	6	0.91	0.12	2.10	7.9 x 10^{-6}	NA
Benzo(b)fluoranthene	13	6	1.5	1.2	21.0	1.3 x 10^{-6}	NA
Dibenz(a,h)anthracene	13	6	0.34	0.12	2.10	3.0 x 10^{-6}	NA
PCB (Aroclor 1254)	8	2	0.38	0.12	0.97	NA	0.317
Cumulative Media Cancer Risk/Noncancer Hazard:						**3.6 x 10^{-5}**	0.644
ADEC Risk Criteria:						10^{-5}	1
EPA Risk Range:						10^{-6} – 10^{-4}	1

Key:

> – greater than

1 – Summary of risk estimates for COPCs are presented if the COPC is a risk driver for at least one receptor. Risk estimates for all COPCs are presented in the Human Health and Ecological Risk Assessment which is Appendix H of the Supplemental Remedial Investigation (U.S. Army, 2018).

2 – Human Health Screening levels are the May 2016 EPA Regional Screening Levels for Residential Soil, except for the carcinogenic PAHs. The screening levels for the carcinogenic PAHs were calculated using the RSL calculator in May 2017.

3 – Estimated Cancer Risk = (MDC/RSL)*10^{-6}; Estimated Noncancer Hazard = (MDC/RSL)*0.1

4 – Lead cannot be evaluated using the procedures outlined for the rest of the chemicals.

> – greater than
ADEC – Alaska Department of Environmental Conservation
AOC – Area of Concern
COPC – contaminant of potential concern
EPA – U.S. Environmental Protection Agency
mg/kg – milligrams per kilogram
MDC – maximum detected concentration
NA – not applicable
RSL – regional screening level
PAH – polynuclear aromatic hydrocarbon
PCB – polychlorinated biphenyl
TCR – target cancer risk
THQ – target hazard quotient

Bold indicates exceedance of ADEC acceptable risk criteria.

The mechanisms of toxicity by which lead may cause adverse effects to human health are different from other metals and lead is not evaluated in the same manner as other metals. Exposure to lead was evaluated relative to screening levels. The lead MDC at the Dry Well AOC exceeds the 18 AAC 75.340 Method 2 cleanup level, the residential RSL, and the industrial RSL, but only in one sample at 1,200 mg/kg at 12.5 ft bgs, collected below the Dry Well drums in 2015. All other samples were one to two orders of magnitude below the screening levels. Thus, actual exposures to lead in subsurface soil at the Dry Well AOC are unlikely to pose significant concern for residential or industrial receptors.

Benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, Aroclor 1254, cadmium, and thallium do not exceed the industrial RSL (Table 3-1). Therefore, these COPCs are not present at concentrations that would potentially pose risks or hazards to human health of industrial receptors. Because the residential RSLs are based on more conservative assumptions than those for the industrial RSLs, risks and hazards to industrial workers would also meet target health goals.

3.3.2 Summary of Ecological Risk Assessment

This is the same for the whole of the SCS (See Section 1.7.3).

3.3.2.1 Step 1 Ecological Scoping Evaluation

This is the same for the whole of the SCS (See Section 1.7.3.1).

3.3.2.2 Step 2 Preliminary Screening Evaluation

This is the same for the whole of the SCS (See Section 1.7.3.2), apart from the site-specific details described below.

Ecological COPCs, chemicals with MDCs exceeding screening levels included:

- Subsurface soil: Lead

Lead, with an MDC of 99.2 mg/kg (a field duplicate of 15SCSPL022SS with a lead result of 14.1 mg/kg, at location PL22) exceeded the ecological screening level of 11 mg/kg (USEPA, 2005) and the subsurface soil lead BTV of 14.9 mg/kg at the Dry Well evaluation area.

While exposure to ecological receptors at the Dry Well AOC is possible, given the small size of the Dry Well AOC significant exposure to higher trophic level receptors (birds and mammals) is not expected, especially when considering wildlife home ranges, which exceed the area footprint even for wildlife with very small home ranges. Based on the limited exposure potential and localized nature of detections, significant exposure is not expected.

3.3.3 Basis for Action

Based on the results of the HHERA, as summarized above, the Dry Well AOC only contains COC's that are a potential risk to human health and no COCs that are a potential ecological risk.

However, as noted in Section 3.1.7, there are several COPC that exceed ADEC Method Two migration-to-groundwater cleanup levels.

As discussed in Section 1.8, ADEC Method Three migration-to-groundwater levels were calculated to further refine the constituents that are a migration-to-groundwater threat and should be established as COCs. **Table 3-2** presents the COPCs identified at the Dry Well AOC, along with the:

- ADEC Method Two migration-to-groundwater cleanup value.
- ADEC maximum allowable concentration (for petroleum hydrocarbons only).
- Most conservative ADEC Method Two human health, under 40-inch zone, cleanup value.
- ADEC Method Three migration-to-groundwater cleanup value.
- Selection of the Site-Specific ACL, which is based on the most conservative of the ADEC Method Two human health cleanup level (18 AAC 75.341 Tables B1 and B2, under 40-inch zone), the maximum allowable concentration (for petroleum hydrocarbons only), and the ADEC Method Three migration-to-groundwater value.

Table 3-2 Cleanup Levels for Soil Contaminants of Potential Concern – Dry Well AOC

Compound	ADEC Method Two Migration-to-Groundwater Cleanup Level[1] (mg/kg)	ADEC Maximum Allowable Concentration[2] (mg/kg)	ADEC Human Health Level[3] (mg/kg)	ADEC Method Three Calculator Value – Migration-to-Groundwater[4] (mg/kg)	Site-Specific Alternative Cleanup Level[5] (mg/kg)	Maximum Concen-tration Found (mg/kg)
Diesel Range Organics	250	12,500	10,250	3,300	3,300	1,100
1,2-Dichloroethane	0.0055	NA	5.5	3.5	3.5	0.011
Naphthalene	0.038	NA	29	13	13	0.63
Arsenic	0.2	NA	8.8	210	**8.8**	**16**
Cadmium	9.1	NA	92	9,700	92	12
Lead	N/A	NA	200[6]	NA	**200[6]**	**1,200**
Mercury	0.36	NA	3.1	280	3.1	0.69
Selenium	6.9	NA	510	7,100	510	13

Key:

1 – Tables B1 and B2, 18 AAC 75.341 (ADEC, 2020).

2 – Table B2, 18 AAC 75.341 (ADEC, 2020).

3 – Human Health value based on the Under 40-inch zone in Table B1 and most conservative of the ingestion and inhalation value for the under 40-inch zone in Table B2 (for diesel range organics and gasoline range organics) (ADEC, 2020).

4 – Value determined for the migration-to-groundwater scenario using the ADEC Cleanup Levels Calculator and the Petroleum Cleanup Levels Calculator (U.S. Army, 2018).

5 – Site-specific alternative cleanup level for soil is the lowest value between: 1) ADEC Maximum Allowable Concentration, 2) ADEC Human Health Level, and 3) ADEC Method Three Calculator Value – Migration-to-Groundwater.

6 – The lead values have been updated since the completion of the Proposed Plan. The noted value is the residential soil lead removal management level as outlined in US EPA guidance *Updated Residential Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities* dated January 17, 2024.

Bold values exceed the cleanup level.
AAC – Alaska Administrative Code
ADEC – Alaska Department of Environmental Conservation
AOC – Area of Concern
mg/kg – milligrams per kilogram
NA – not applicable

Arsenic and lead were the only constituents to exceed the site-specific ACL and are the only soil COCs at the Dry Well AOC due to the potential risk to human health. **Table 3-3** summarizes the COCs and cleanup goals (the site-specific ACL) for the Burn Pit AOC. **Figure 3-2** presents the location of the arsenic and lead detections that exceed the cleanup goals and presents the estimated lateral extent of exceedance, which is estimated at approximately 10 ft.

Table 3-3 Soil Contaminants of Concern and Cleanup Goals for the Dry Well AOC

Compound	Site-Specific Alternative Cleanup Level (mg/kg)	Basis for Cleanup
Arsenic	8.8	18 AAC 75.341, Table B1, Under 40 Inch Zone, Human Health
Lead	200	US EPA guidance *Updated Residential Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities* dated January 17, 2024.

Key:
AAC – Alaska Administrative Code AOC – Area of Concern mg/kg – milligrams per kilogram

3.4 REMEDIAL ACTION OBJECTIVES

The general RAOs are outlined in Section 1.9. Only RAO 1 is appliable to the Dry Well AOC.

- RAO 1: Prevent the exposure of human receptors with contaminated media that pose a cumulative carcinogenic risk greater than 1 in 100,000 or a cumulative noncarcinogenic HI greater than 1 across all exposure pathways. Specifically:
  - Reduce concentrations of arsenic and lead in soil less than 15 ft bgs to below ADEC cleanup levels protective of human health. Refer to Table 3-3 for the numerical cleanup goal.

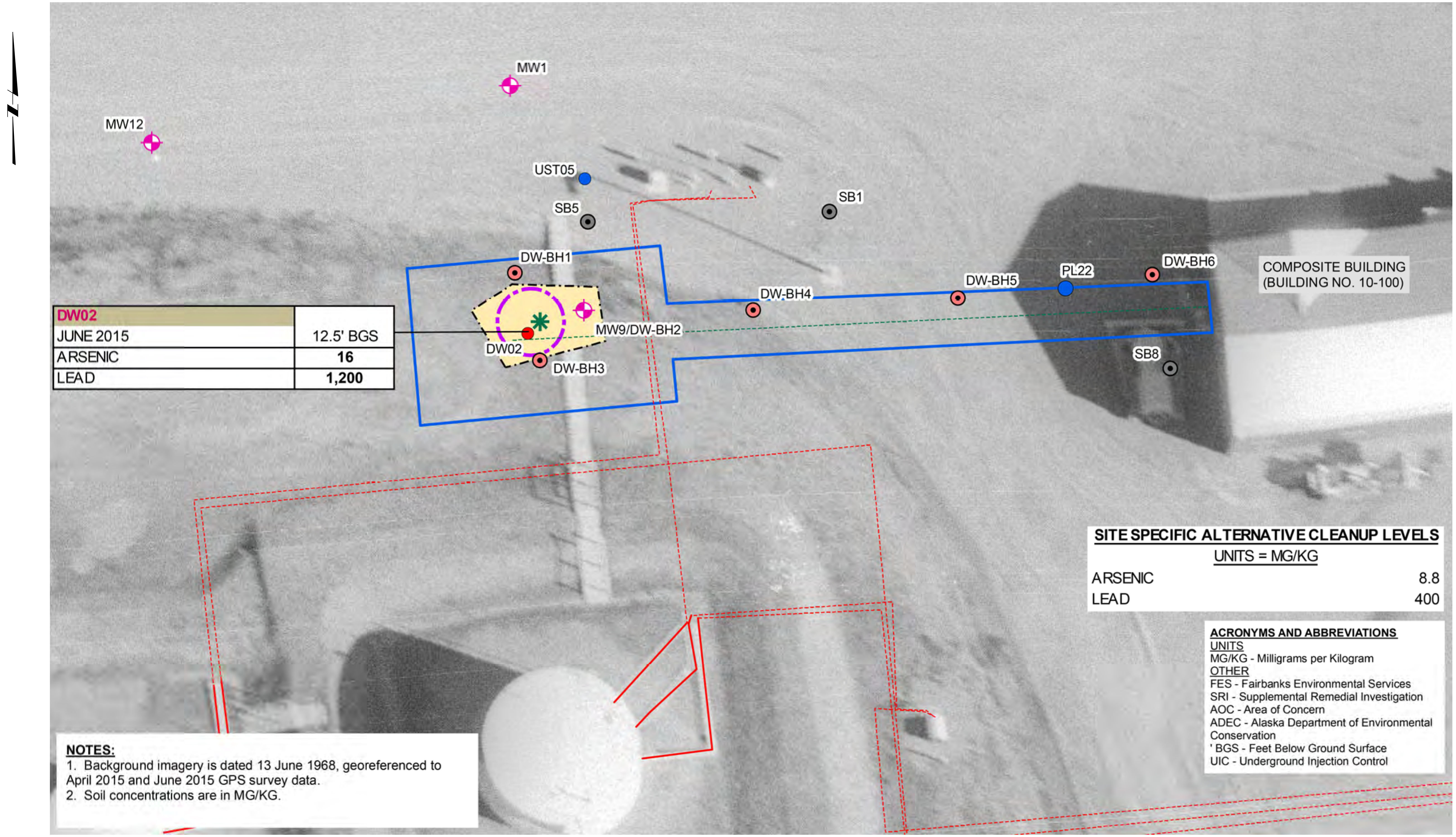
3.5 DESCRIPTION OF ALTERNATIVES

The remedial alternatives considered for the Dry Well AOC were presented in the Proposed Plan (U.S. Army, 2023) and are summarized below. As outlined in Section 1.10, the discussion of alternatives is focused on the portion of the alternative that is applicable to the Dry Well AOC.

3.5.1 Description of Remedy Components

Alternative 1: No Action. The No Action alternative serves as a baseline against which other alternatives are compared, as required by the NCP. Under this alternative, no remedial actions would be taken, monitoring would not be conducted, and LUCs would not be implemented to prevent exposures. Although natural attenuation would occur, contaminant reductions would not be verified with monitoring.

Alternative 2: LUCs and MNA. Alternative 2 includes LUCs to control exposure to COCs where unacceptable risk or hazard is possible. Land use would be restricted to preclude development (residential, commercial, or industrial) in areas with exceedances of the cleanup goals for human health. Annual LUC inspection and CERCLA FYRs would be conducted to document the continuing effectiveness of the remedy.



DW02	
JUNE 2015	12.5' BGS
ARSENIC	**16**
LEAD	**1,200**

SITE SPECIFIC ALTERNATIVE CLEANUP LEVELS

UNITS = MG/KG

ARSENIC	8.8
LEAD	400

ACRONYMS AND ABBREVIATIONS

UNITS
MG/KG - Milligrams per Kilogram
OTHER
FES - Fairbanks Environmental Services
SRI - Supplemental Remedial Investigation
AOC - Area of Concern
ADEC - Alaska Department of Environmental Conservation
' BGS - Feet Below Ground Surface
UIC - Underground Injection Control

NOTES:
1. Background imagery is dated 13 June 1968, georeferenced to April 2015 and June 2015 GPS survey data.
2. Soil concentrations are in MG/KG.

LEGEND:
- GROUNDWATER MONITORING WELL
- 2015 UIC EXCAVATION SOIL SAMPLE - BRISTOL
- REMOVAL ACTION SOIL SAMPLE (NO ADEC EXCEEDANCES) - BRISTOL
- 2015 SRI SOIL BORING - FES
- PRE-2015 SOIL BORING
- FORMER DRY WELL (REMOVED IN 2015)
- SOIL BORING SAMPLE FROM THE 2015 SRI
- SOIL SAMPLE FROM THE 2015 UIC - BRISTOL
- FORMER DRY WELL PIPING (REMOVED IN 2015)
- FORMER ABOVEGROUND FUEL LINES (REMOVED IN 2015)
- FORMER UNDERGROUND FUEL LINES (REMOVED IN 2015)
- ESTIMATED EXTENT OF SOIL EXCEEDING SITE-SPECIFIC CLEANUP GOALS
- DRY WELL AREA OF CONCERN
- DRY WELL EXCAVATION - BRISTOL 2015

Source:
SCS CERCLA FS, final
Figure 2-1, Estimated Extent of Soil Exceeding Alternative Cleanup Levels at Dry Well AOC, April 2020

SCALE IN FEET
0 8

SEARS CREEK STATION, ALASKA
DRY WELL, BURN PIT, AND SITE GROUNDWATER
RECORD OF DECISION

DRY WELL AOC ESTIMATED EXTENT OF SOIL EXCEEDING SITE SPECIFIC CLEANUP GOALS

FIGURE
3-2

185704695.500.0502

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Implementation of Remedial Alternative 2 would require: documentation of the LUCs, maintenance of administrative controls through review of work clearance permits, periodic inspections of the site, and corrective action for LUC violations. The U.S. Army would be responsible for documenting, monitoring, maintaining, and enforcing the LUCs. A total period of 100 years is assumed for LUC inspections and reporting because the arsenic- and lead-contaminated soil at the Dry Well AOC will remain on site. MNA is part of the Site-Wide Groundwater AOC (Section 4) and not discussed further in this section.

Alternative 3: Excavation of Contaminated Soil, MNA, and LUCs. Alternative 3 includes excavation and off-site disposal of arsenic- and lead-contaminated soil exceeding the cleanup goals. Arsenic- and lead-impacted soil in an area of approximately 10 ft in diameter around Sample DW02 (Figure 3-2) is estimated to be excavated to a depth of approximately 12 to 15 ft bgs and hauled to an off-site disposal facility. Off-site disposal of 20 cubic yards is assumed for the cost estimate. Soil confirmation samples would be collected in accordance with ADEC's Field Sampling Guidance (ADEC, 2022) or current version, to confirm that all soil exceeding approved cleanup levels has been removed. Excavated material would be characterized and segregated onsite into piles that are below cleanup goals for utilization as backfill and above cleanup goals for off-site disposal. For the purpose of the cost estimate, it was assumed that soil excavated from the Dry Well AOC would require disposal outside of Alaska at a facility that is certified to accept the waste. MNA and LUCs are part of the Site-Wide Groundwater AOC (Section 4) and not discussed further in this section.

Alternative 4: Excavation of Contaminated Soil, Biosparging, and LUCs. The components of Alternative 4 that apply to the Dry Well AOC are identical to the remedies in Alternative 3 and would achieve the same outcome. Biosparging and LUCs are part of the Site-Wide Groundwater AOC (Section 4) and not discussed further in this section.

Alternative 5: Excavation of Contaminated Soil, ISCO, and LUCs. The components of Alternative 5 that apply to the Dry Well AOC are identical to the remedies in Alternative 3 and would achieve the same outcome. ISCO and LUCs are part of the Site-Wide Groundwater AOC (Section 4) and not discussed further in this section.

3.5.2 Expected Outcome of Each Alternative

Alternative 1: No Action. There are no site changes expected from selecting this remedial alternative.

Alternative 2: LUCs and MNA. Alternative 2 for the Dry Well AOC would continue LUCs and CERCLA FYRs into perpetuity as the arsenic and lead exceeding cleanup goals would not attenuate.

Alternative 3: Excavation of Contaminated Soil, MNA, and LUCs. Alternative 3 is expected to achieve the approved cleanup goals for soil at the Dry Well AOC after removal actions are completed.

Alternative 4: Excavation of Contaminated Soil, Biosparging, and LUCs. The components of Alternative 4 that apply to the Dry Well AOC are identical to the remedies in Alternative 3 and achieve the same outcome.

Alternative 5: Excavation of Contaminated Soil, ISCO, and LUCs. The components of Alternative 5 that apply to the Dry Well AOC are identical to the remedies in Alternative 3 and achieve the same outcome.

3.6 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

Alternatives for the Dry Well AOC were evaluated using the nine criteria described in Section 121(a) &(b) of CERCLA and 40 CFR 300.430(e)(9)(i) as cited in NCP Section 300.430(f)(5)(i). These criteria are classified as threshold criteria, balancing criteria, and modifying criteria, and are outlined in Section 1.10.

This section summarizes how well each alternative satisfies each evaluation criterion and indicates how it compares to the other alternatives under consideration for Dry Well AOC. **Table 3-4** compares the cleanup alternatives at the Dry Well AOC using the nine CERCLA evaluation criteria.

Table 3-4 Remedial Alternative Comparison – Dry Well AOC

Description	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
	No Action	LUCs and MNA	Excavation of Contaminated Soil, MNA, and LUCs	Excavation of Contaminated Soil, Biosparging, and LUCs.	Excavation of Contaminated Soil, ISCO, and LUCs.
Threshold Criteria					
Overall Protection of Human Health and the Environment	Fail	Fail	Pass	Pass	Pass
Compliance with ARARs	Fail	Fail	Pass	Pass	Pass
Primary Balancing Criteria					
Long-Term Effectiveness and Permanence	N/A	N/A	High	High	High
Reduction of TMV through Treatment	N/A	N/A	High	High	High
Short-Term Effectiveness	N/A	N/A	High	High	High
Implementability	N/A	N/A	High	High	High
Cost	$0	N/A	$150,400	$150,400	$150,400
Modifying Criteria					
State/Support Agency Acceptance	N/A	N/A	Acceptable	Acceptable	Acceptable
Community Acceptance	N/A	N/A	Acceptable	Acceptable	Acceptable

Key:
AOC – Area of Concern
ARAR – applicable or relevant and appropriate requirement
NA – not applicable
TMV – toxicity, mobility, and volume

Scoring:
Pass – meets threshold criterion.
Fail – does not meet threshold criterion.
High, Medium, and Low indicate the degree to which the alternative satisfies the criterion.

3.6.1 Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or LUCs. This is one of the threshold criteria and an alternative is rated either Pass or Fail for this criterion.

Alternative 1 (No Action) cannot achieve the RAO; therefore, this alternative fails to meet this threshold criterion.

Alternative 2 (LUCs and MNA) would protect human health through implementation of LUCs; however, it would not achieve the RAO because concentrations of arsenic and lead exceeding cleanup goals protective of human health would remain in soil less than 15 ft bgs. Therefore, this alternative fails to meet this threshold criterion.

Alternatives 3 (Excavation of Contaminated Soil, MNA, and LUCs), Alternative 4 (Excavation of Contaminated Soil, Biosparging, and LUCs), and Alternative 5 (Excavation of Contaminated Soil, ISCO, and LUCs) would protect human health, the Dry Well AOC soils do not pose an environmental risk, and the removal of arsenic- and lead-contaminated soil exceeding cleanup goals will achieve the RAO immediately.

3.6.2 Compliance with Applicable or Relevant and Appropriate Requirements

Compliance with ARARs addresses whether a remedy will meet all of the ARARs of other Federal and State environmental statutes or provides a basis for invoking a waiver, the ARARs are provided in Table 1-5. Compliance with ARARs is the second threshold criterion; alternatives either Pass or Fail.

Alternatives 1 (No Action) and 2 (LUCs and MNA) do not comply with applicable ARARs. Both leave contamination in place at concentrations that are not protective of the environment. Because they do not meet this criteria, Alternative 1 (No Action) and Alternative 2 (LUCs) were eliminated from consideration and are not evaluated with respect to the criteria below.

Alternatives 3 (Excavation of Contaminated Soil, MNA, and LUCs), Alternative 4 (Excavation of Contaminated Soil, Biosparging, and LUCs), and Alternative 5 (Excavation of Contaminated Soil, ISCO, and LUCs) are compliant with applicable ARARs.

3.6.3 Long-Term Effectiveness and Permanence

Long-term effectiveness and permanence refer to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once clean-up levels have been met. This criterion includes the consideration of residual risk that will remain onsite following remediation and the adequacy and reliability of controls.

Alternatives 3 (Excavation of Contaminated Soil, MNA, and LUCs), Alternative 4 (Excavation of Contaminated Soil, Biosparging, and LUCs), and Alternative 5 (Excavation of Contaminated Soil, ISCO, and LUCs), evaluated only in relation to the remedy component applicable to the Dry Well AOC, would score “High”. For the Dry Well AOC, the alternative actively removes soil contamination exceeding the cleanup goal. The alternative scores in their totality, due to the individual remedy components addressed in the Site-Wide Groundwater AOC, are presented in Section 4.

3.6.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

Reduction of TMV through treatment refers to the anticipated performance of the treatment technologies that may be included as part of the remedial alternative.

Alternatives 3 (Excavation of Contaminated Soil, MNA, and LUCs), Alternative 4 (Excavation of Contaminated Soil, Biosparging, and LUCs), and Alternative 5 (Excavation of Contaminated Soil, ISCO, and LUCs), evaluated only in relation to the remedy component applicable to the Dry Well AOC, would score “High”. For the Dry Well AOC, the alternative actively removes soil contamination exceeding the cleanup goal. The alternative scores in their totality, due to the individual remedy components addressed in the Site-Wide Groundwater AOC, are presented in Section 4.

3.6.5 Short-Term Effectiveness

Short-term effectiveness addresses the time needed to implement the remedy and any adverse impacts on workers, the community, and the environment during construction and operation of the remedy. Short-term effectiveness also includes the time until remedial response objectives are met.

Alternatives 3 (Excavation of Contaminated Soil, MNA, and LUCs), Alternative 4 (Excavation of Contaminated Soil, Biosparging, and LUCs), and Alternative 5 (Excavation of Contaminated Soil, ISCO, and LUCs), evaluated only in relation to the remedy component applicable to the Dry Well AOC, would score “High”. For the Dry Well AOC, the alternative actively removes soil contamination exceeding the cleanup goal. The alternative scores in their totality, due to the individual remedy components addressed in the Site-Wide Groundwater AOC, are presented in Section 4.

3.6.6 Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

Alternatives 3 (Excavation of Contaminated Soil, MNA, and LUCs), Alternative 4 (Excavation of Contaminated Soil, Biosparging, and LUCs), and Alternative 5 (Excavation of Contaminated Soil, ISCO, and LUCs), evaluated only in relation to the remedy component applicable to the Dry Well AOC, would score "High". For the Dry Well AOC, the size of the excavation is relatively small, there are few logistical challenges, no infrastructure to work around, and an excavation can be easily implemented. The alternatives in their totality, due to the individual remedy components addressed in the Site-Wide Groundwater AOC, are presented in Section 4.

3.6.7 Cost

Alternatives 3 (Excavation of Contaminated Soil, MNA, and LUCs), Alternative 4 (Excavation of Contaminated Soil, Biosparging, and LUCs), and Alternative 5 (Excavation of Contaminated Soil, ISCO, and LUCs), evaluated only in relation to the remedy component applicable to the Dry Well AOC, all have the same capital cost estimated at $150,400. There is no annual O&M, or periodic costs associated with an excavation remedy to address the Dry Well AOC soils.

3.6.8 State Acceptance

The State concurs that, if implemented properly, the following selected remedy as presented in this ROD will comply with state and Federal environmental laws:

- Alternative 3: Excavation of Contaminated Soil.

The State did not provide comments regarding the other alternatives.

3.6.9 Community Acceptance

Written and verbal comments received during the public comment period are summarized and addressed in Section 7.0.

3.7 PRINCIPAL THREAT WASTES

The NCP expects that treatment that reduces the TMV of the principal threat wastes will be used to the extent practicable. The principal threat concept refers to the source materials at a CERCLA site considered to be highly toxic or highly mobile that generally cannot be reliably controlled in place or present a significant risk to human health or the environment should exposure occur. A source material is material that contains hazardous substances, pollutants, or contaminants that act as a reservoir for migration of contamination to groundwater, surface water, or air, or that acts as a source for direct exposure. There is no principal threat waste at the Dry Well AOC.

3.8 SELECTED REMEDY

The selected remedy for the Dry Well AOC (Alternative 3) involves excavation and off-site disposal of arsenic- and lead-contaminated soil exceeding cleanup goals. This remedial action was selected based upon the ability to protect human health and compliance with applicable requirements. The U.S. Army has determined that the selected remedy provides the best balance of trade-offs among the alternatives with respect to the five balancing criteria set out in the NCP Section 300.430(f)(1)(i)(B).

Remedy selections are based on the detailed evaluation of remedial alternatives presented in the Proposed Plan (U.S. Army, 2023) and the FS (U.S. Army, 2020). The U.S. Army is responsible for implementing and monitoring the remedial actions identified herein for the duration of the remedies selected in this ROD. The U.S. Army will exercise this responsibility in accordance with CERCLA and the NCP.

3.8.1 Summary of the Rationale for the Selected Remedy

The U.S. Army believes that the selected remedy for the Dry Well AOC meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. The remedy is expected to satisfy the nine selection criteria as defined by CERCLA Section 121(b).

Alternative 3 meets the threshold criteria, is the most effective when ranked against the balancing criteria, and also meets with concurrence from the State and acceptance from the community under the modifying criteria.

3.8.2 Description of the Selected Remedy

Under Alternative 3 for the Dry Well AOC, subsurface soil exceeding arsenic and lead cleanup goals will be excavated and transported to an off-site facility for disposal. Soil confirmation samples would be collected in accordance with ADEC's Field Sampling Guidance (ADEC, 2022) or current version, to confirm that all soil exceeding approved cleanup levels has been removed. Excavated material would be characterized and segregated onsite into piles that are below cleanup goals for utilization as backfill and above cleanup goals for off-site treatment. Clean soil, below SCS cleanup goals, would be imported from an off-site facility to be used as backfill. The backfilled will be crowned to shed surface water and vegetated. This alternative would rapidly remove contaminated soil at the Dry Well AOC and no further remedial actions would be necessary for soil at the Dry Well AOC. The soil volume estimates for the Dry Well AOC is summarized in **Table 3-5**.

Table 3-5 Dry Well AOC Soil Volume Estimate

Area (square feet)	Depth (feet)	Volume (cubic feet)	Volume (cubic yards)[1]	Media
80	15	1,200	44	Subsurface Soil

Key:
1 – it is assumed that approximately 50 percent of the soil will require off-site disposal, as the site was backfilled with clean fill as part of the Class V Underground Injection Control Well Closure (Bristol, 2016b).
AOC – Area of Concern

3.8.3 Summary of Estimated Remedy Costs

A summary of the estimated remedy costs for the Dry Well AOC is provided in **Table 3-6**.

Table 3-6 Dry Well AOC Summary of Estimated Remedy Costs

Selected Remedy	Capital Cost	O&M Cost	Periodic Cost
Excavation of subsurface soil and off-site disposal.	$150,400	$0	$0

Key:
AOC – Area of Concern O&M – Operation and maintenance

The information provided in Table 3-6 is based on the best available information regarding the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. Major changes may be documented in the form an ESD or a ROD amendment. This is an order-of-magnitude engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost. Costs for the Dry Well AOC were provided in the FS (U.S. Army, 2020).

3.8.4 Expected Outcomes of Selected Remedy

Upon completion of the selected remedy, the Dry Well AOC will be in compliance with CERCLA and the State of Alaska environmental statutes. No known contamination above site-specific cleanup goals will remain within soil at the Dry Well AOC after the selected remedy (excavation) has been completed. Refer to Table 3-3 for COCs, cleanup levels, and the basis for the cleanup level.

3.9 STATUTORY DETERMINATIONS

Under CERCLA Section 121 (as required by NCP Section 300.430(f)(5)(ii)), the lead agency must select a remedy that is protective of human health and the environment, complies with ARARs, is cost-effective, and uses permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, periodic FYRs are required if hazardous substances will remain in place above levels allowing for UU/UE after implementing the selected remedy. CERCLA also includes: 1) a preference for remedies that employ treatment which permanently and significantly reduces the TMV of hazardous wastes as a principal element; and 2) a bias against offsite disposal of untreated wastes. The following sections discuss how the selected remedy meets these statutory requirements.

3.9.1 Protection of Human Health and the Environment

Excavation of the COCs at the Dry Well AOC would protect human health by removing the contaminant mass that poses a risk and transporting the material to an off-site, permitted, disposal facility. There are no contaminants at the Dry Well AOC that pose an ecological or environmental risk (Section 3.3).

3.9.2 Compliance with ARARs

Remedial actions must comply with both Federal and State ARARs. ARARs are legally applicable or relevant and appropriate requirements, standards, criteria, or limitations of Federal and State environmental laws and regulations. Criteria TBCs are non-promulgated advisories or guidance issued by federal or state government that are not legally binding and do not have the status of potential ARARs. However, in many circumstances, TBCs are considered along with ARARs.

Table 1-5 summarizes the ARARs and TBCs for the selected remedies at the SCS, including the Dry Well AOC, and describes how the selected remedies address each one at agreed-upon points of compliance.

The selected remedy for the Dry Well AOC complies with the chemical-specific, location-specific, and action-specific ARARs. The implementation of the remedy is required to meet the substantive portions of these requirements at agreed-upon points of compliance and is exempt from administrative requirements, such as permitting and notifications. Removal of the contaminated soil would be confirmed by post-excavation sampling of the bottom and sidewalls of the excavation.

3.9.3 Cost Effectiveness

The selected remedy for the Dry Well AOC is cost-effective and represents a reasonable value for the money to be spent. In making this determination, the following definition was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness" (40 CFR 300.430[f][1][ii][D]). This determination was accomplished by evaluating the "overall effectiveness" of those alternatives that satisfy the threshold criteria (that is, is protective of human health and the environment and ARAR-compliant).

Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination: long-term effectiveness and permanence, reduction in TMV through treatment, and short-term effectiveness. Overall effectiveness was then compared to costs to determine cost-effectiveness. The overall effectiveness of the selected remedies for the Dry Well AOC were demonstrated in the comparative analysis of alternatives (Section 3.6). The total cost of the selected remedy is $150,400 (Table 3-6).

It is important to note that more than one cleanup alternative can be cost-effective, and the Superfund program does not mandate the selection of the most cost-effective cleanup alternative. In addition, the most cost-effective remedy is not necessarily the remedy that provides the best balance of tradeoffs with respect to the remedy selection criteria, nor is it necessarily the least-costly alternative that is both protective of human health and the environment and ARAR-compliant. Rather, cost-effectiveness is concerned with the reasonableness of the relationship between the effectiveness afforded by each alternative and its costs compared to other available options.

3.9.4 Utilization of Permanent Solutions and Alternative Treatment Technologies

The selected remedy provides the best balance of trade-offs among the alternatives with respect to the five balancing criteria set out in NCP Section 300.430(f)(l)(i)(B). Although no onsite treatment is being utilized at the Dry Well AOC, the selected remedy of soil excavation provides the most effective, long-term solution given the conditions at the Dry Well AOC. Excavation with off-site disposal is protective of human health and the environment by permanently removing contaminated soil from the Dry Well AOC, readily implementable, and cost effective in comparison to other alternatives.

3.9.5 Preference for Treatment as a Principal Element

The NCP establishes the expectation that treatment will be used to address the principal threats posed by a site wherever practicable (40 CFR 300.430[a][1][iii][A]). The selected remedy of Excavation with Off-site Disposal for soil CERCLA COCs does not satisfy the statutory preference for treatment as a principal element of the remedy but is preferred because the remedial action immediately addresses contaminant risk cost effectively.

4.0 SITE-WIDE GROUNDWATER AOC

The Site-Wide Groundwater AOC encompasses the entirety of groundwater below the SCS footprint. The groundwater well field is currently comprised of 18 groundwater monitoring wells and the inactive WSW (located on the south side of the Composite Building). All wells are presented on **Figure 4-1**. Figure 4-1 also identifies the general location of the five AOCs (Burn Pit, Dry Well, Valve Manifold Building, Fuel Lines [associated with the Valve Manifold Building and Dewatering Tower], and Drum Storage Area) that have soil contamination for which remedial actions will be taken.

4.1 SITE CHARACTERISTICS

4.1.1 Topography and Climate

This is the same for the whole of the SCS (See Section 1.5.2.2).

4.1.2 Geology

This is the same for the whole of the SCS (See Section 1.5.2.3).

4.1.3 Hydrogeology

This is the same for the whole of the SCS (See Section 1.5.2.4).

4.1.4 Surface Water Hydrology

This is the same for the whole of the SCS (See Section 1.5.2.5).

4.1.5 Ecological Setting

This is the same for the whole of the SCS (See Section 1.5.2.6).

4.1.6 Previous Site Characterization Activities

Eighteen groundwater monitoring wells, MW1 through MW18, and the WSW have been used to characterize groundwater at the SCS. Monitoring Wells MW1 through MW8 were installed as part of the 2007/2008 RI (North Wind, 2010) and Monitoring Wells MW9 through MW18 were installed as part of the SRI (U.S. Army, 2018). The location of each well is presented on Figure 4-1 and a characterization of each well is provided below.

Monitoring Well MW1 – Completed in 2007 to evaluate the UST AOC, this well is also about 50 ft north of the Dry Well AOC. No exceedances of 18 AAC 75.345 Table C cleanup levels were observed in samples collected during the RI (North Wind, 2010). An SRI sample analyzed for GRO, DRO, RRO, VOCs, SVOCs, pesticides, and metals was also below 18 AAC 75.345 Table C cleanup levels (U.S. Army, 2018).

Monitoring Well MW2 – Completed in 2007 to evaluate the AST AOC, Diesel Transfer Pump AOC, and Adjacent Fuel Lines AOC. No exceedances of 18 AAC 75.345 Table C cleanup levels were observed in samples collected during the RI (North Wind, 2010). An SRI sample analyzed for GRO, DRO, RRO, VOCs, PAHs, 1,2-dibromoethane (EDB), pesticides, and metals was also below 18 AAC 75.345 Table C cleanup levels for all constituents except arsenic (U.S. Army, 2018).

Monitoring Well MW3 – Completed in 2007 to evaluate the Valve Manifold Building AOC, Dewatering Tower AOC, and Associated Fuel Lines AOC. No exceedances of 18 AAC 75.345 Table C cleanup levels were observed in samples collected during the RI (North Wind, 2010). An SRI sample analyzed for GRO, DRO, RRO, VOCs, PAHs, EDB, pesticides, and metals was also below 18 AAC 75.345 Table C cleanup levels (U.S. Army, 2018).

Monitoring Well MW4 – Completed in 2007 to evaluate the Scrapper Trap AOC. No exceedances of 18 AAC 75.345 Table C cleanup levels were observed in samples collected during the RI (North Wind, 2012). An SRI sample analyzed for GRO, DRO, RRO, VOCs, PAHs, EDB, pesticides, and metals was also below 18 AAC 75.345 Table C cleanup levels (U.S. Army, 2018).

Monitoring Well MW5 – Completed in 2007 to evaluate the Burn Pit AOC. No exceedances of 18 AAC 75.345 Table C cleanup levels were observed in samples collected during RI (North Wind, 2010). A review of the data as part of the SRI indicated that the 2007 sample did exceed the naphthalene and thallium 18 AAC 75.345 Table C cleanup levels. An SRI sample analyzed for GRO, DRO, RRO, VOCs, PAHs, EDB, pesticides, PFOA/PFOS, and metals was also below 18 AAC 75.345 Table C cleanup levels for all constituents except arsenic (U.S. Army, 2018).

Monitoring Well MW6 – Completed in 2008 to evaluate the Burn Pit AOC. No exceedances of 18 AAC 75.345 Table C cleanup levels were observed in samples collected during the RI, with the exception of RRO; however, this detection was discounted due to an elevated method blank detection (North Wind, 2010). An SRI sample analyzed for GRO, DRO, RRO, VOCs, PAHs, EDB, pesticides, PFOA/PFOS, and metals was also below 18 AAC 75.345 Table C cleanup levels (U.S. Army, 2018).

Monitoring Well MW7 – Completed in 2008 to evaluate the Scrapper Trap AOC. No exceedances of 18 AAC 75.345 Table C cleanup levels were observed in samples collected during the RI (North Wind, 2012). An SRI sample analyzed for GRO, DRO, RRO, VOCs, PAHs, EDB, pesticides, and metals was also below 18 AAC 75.345 Table C cleanup levels (U.S. Army, 2018).

Monitoring Well MW8 – Completed in 2008 to evaluate the to evaluate the AST AOC, Diesel Transfer Pump AOC, and Adjacent Fuel Lines AOC. No exceedances of 18 AAC 75.345 Table C cleanup levels were observed in samples collected during the RI (North Wind, 2010). An SRI sample analyzed for GRO, DRO, RRO, VOCs, PAHs, EDB, pesticides, and metals was also below 18 AAC 75.345 Table C cleanup levels for all constituents except arsenic (U.S. Army, 2018).

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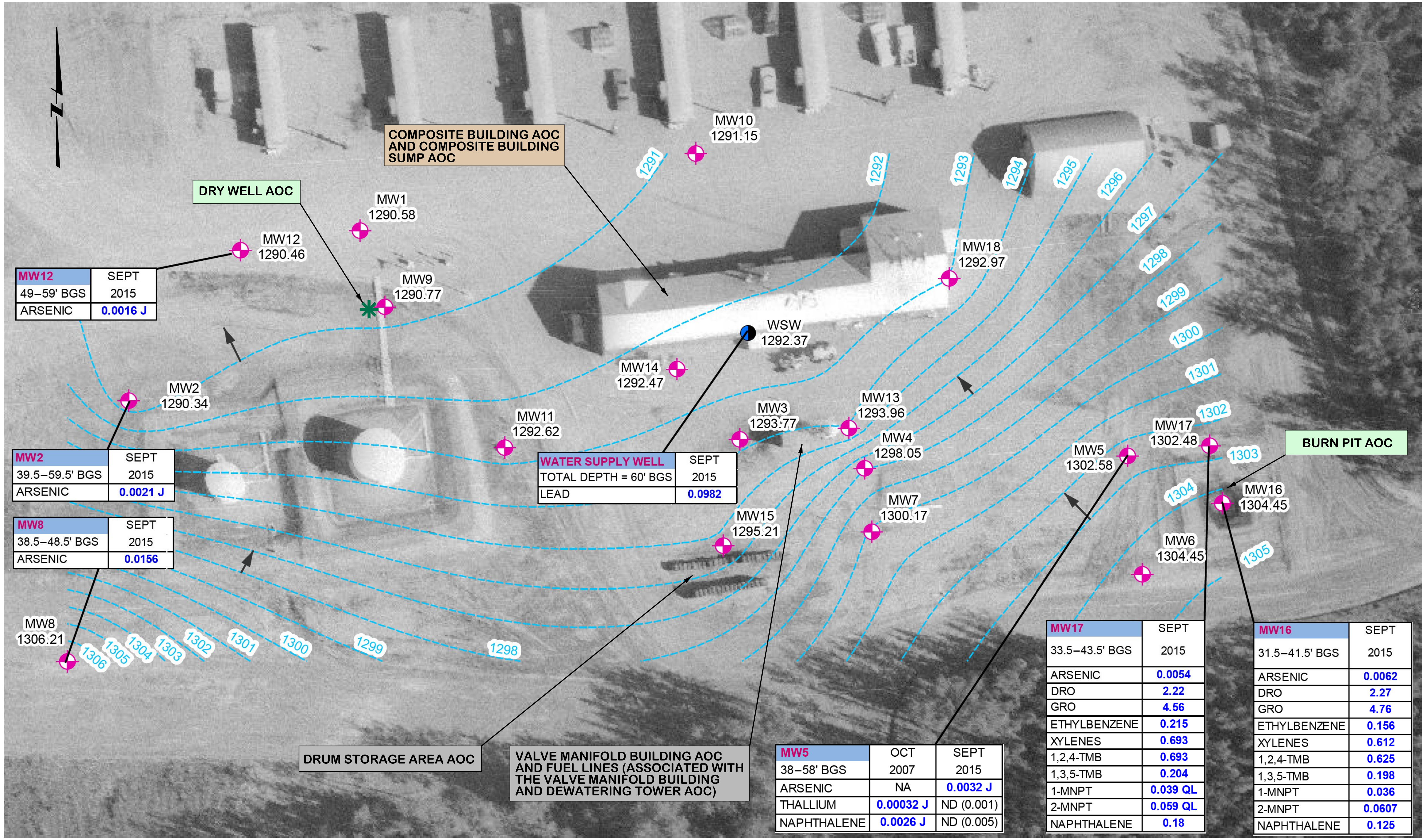

MW12	SEPT
49–59' BGS	2015
ARSENIC	0.0016 J

MW2	SEPT
39.5–59.5' BGS	2015
ARSENIC	0.0021 J

MW8	SEPT
38.5–48.5' BGS	2015
ARSENIC	0.0156

WATER SUPPLY WELL	SEPT
TOTAL DEPTH = 60' BGS	2015
LEAD	0.0982

MW5	OCT	SEPT
38–58' BGS	2007	2015
ARSENIC	NA	0.0032 J
THALLIUM	0.00032 J	ND (0.001)
NAPHTHALENE	0.0026 J	ND (0.005)

MW17	SEPT
33.5–43.5' BGS	2015
ARSENIC	0.0054
DRO	2.22
GRO	4.56
ETHYLBENZENE	0.215
XYLENES	0.693
1,2,4-TMB	0.693
1,3,5-TMB	0.204
1-MNPT	0.039 QL
2-MNPT	0.059 QL
NAPHTHALENE	0.18

MW16	SEPT
31.5–41.5' BGS	2015
ARSENIC	0.0062
DRO	2.27
GRO	4.76
ETHYLBENZENE	0.156
XYLENES	0.612
1,2,4-TMB	0.625
1,3,5-TMB	0.198
1-MNPT	0.036
2-MNPT	0.0607
NAPHTHALENE	0.125

ACRONYMS AND ABBREVIATIONS

ANALYTES
DRO - Diesel Range Organics
GRO - Gasoline Range Organics
1,2,4 TMB - 1,2,4 Trimethylbenzene
1,3,5 TMB - 1,3,5 Trimethylbenzene
1-MNPT - 1-Methylnaphthalene
2-MNPT - 2-Methylnaphthalene

UNITS
MG/L - Milligrams per Liter

OTHER
FS - Feasibility Study
J - Result qualified as estimate because it is less than the LOQ
LOQ - Limit of Quantitation
Q - result considered an estimate (L-low) due to a quality control failure
SRI - Supplemental Remedial Investigation
VOCs - Volatile Organic Compounds
PAHs - Polynuclear Aromatic Hydrocarbons
AAC - Alaska Administrative Code
ADEC - Alaska Department of Environmental Conservation
AOC - Area of Concern

ADEC GROUNDWATER CLEANUP LEVELS:

18 AAC 75.345 TABLE C
UNITS = MG/L

Analyte	Cleanup Level
BULK FUEL HYDROCARBONS	
DRO	1.5
GRO	2.2
VOCs	
ETHYLBENZENE	0.015
XYLENES (TOTAL)	0.19
1,2,4 TMB	0.015
1,3,5 TMB	0.12
PAHS	
1-MNPT	0.011
2-MNPT	0.036
NAPHTHALENE	0.0017
METALS	
ARSENIC	0.00052
LEAD	0.015
THALLIUM	0.0002

LEGEND:

- MW8 1306.21 — MONITORING WELL GROUNDWATER ELEVATION, 20 SEPT 2015 (ELEVATIONS ARE IN NAVD88, FEET)
- WATER SUPPLY WELL
- GROUNDWATER TABLE CONTOUR - 20 SEPT 2015 CONTOUR INTERVAL - 1 FOOT
- INFERRED GROUNDWATER FLOW DIRECTION
- FORMERLY DRY WELL (REMOVED JUNE 2015)
- GROUNDWATER SAMPLE FROM THE 2015 SRI
- ' BGS — FEET BELOW GROUND SURFACE
- BURN PIT AOC — GREEN LABEL INDICATES CERCLA AREA OF CONCERN
- DRUM STORAGE AREA AOC — GRAY LABEL INDICATES AREA OF CONCERN IN DECISION DOCUMENT UNDER 18 AAC 75
- COMPOSITE BUILDING AOC AND COMPOSITE BUILDING SUMP AOC — BEIGE LABEL INDICATES AREA OF CONCERN FOR SITE CLOSURE IN DECICISION DOCUMENT

NOTES:

1. Background imagery is dated 13 June 1968, georeferenced to April 2015 and June 2015 GPS survey data.
2. Monitoring well installation years: MW1-MW5 - 2007, MW6-MW8 - 2008, MW9-MW17 - 2015.
3. Concentrations shown in Blue exceed ADEC cleanup levels (ADEC 2018a).
4. The highest concentration between primary and duplicate samples is shown where duplicate samples were collected.
5. Only 2015 results from sample locations that had at least one ADEC cleanup level exceedance are shown.
6. Concentrations are in MG/L.
7. Depth listed for groundwater sample denotes the screened interval.

Source:
SCS CERCLA FS, final
Figure 1-5, Groundwater Elevations and Groundwater Sample Results Exceeding ADEC Cleanup Levels, April 2020

SCALE IN FEET 0 25

SEARS CREEK STATION, ALASKA
DRY WELL, BURN PIT, AND SITE GROUNDWATER
RECORD OF DECISION

SITE GROUNDWATER ELEVATIONS AND GROUNDWATER SAMPLES EXCEEDING ADEC CLEANUP LEVELS

FIGURE 4-1

185704695.500.0502

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Monitoring Well MW9 – Completed in 2015 to evaluate the Dry Well AOC. An SRI sample analyzed for GRO, DRO, RRO, VOCs, SVOCs, pesticides, and metals was below 18 AAC 75.345 Table C cleanup levels (U.S. Army, 2018).

Monitoring Well MW10 – Completed in 2015 as a down gradient monitoring point. An SRI sample analyzed for GRO, DRO, RRO, VOCs, PAHs, EDB, pesticides, and metals was below 18 AAC 75.345 Table C cleanup levels (U.S. Army, 2018).

Monitoring Well MW11 – Completed in 2015 to evaluate the AST AOC, Diesel Transfer Pump AOC, and Adjacent Fuel Lines AOC. An SRI sample analyzed for GRO, DRO, RRO, VOCs, PAHs, EDB, pesticides, and metals was below 18 AAC 75.345 Table C cleanup levels (U.S. Army, 2018).

Monitoring Well MW12 – Completed in 2015 to evaluate the Dry Well AOC. An SRI sample analyzed for GRO, DRO, RRO, VOCs, SVOCs, pesticides, and metals was below 18 AAC 75.345 Table C cleanup levels for all constituents except arsenic (U.S. Army, 2018).

Monitoring Well MW13 – Completed in 2015 to evaluate the Valve Manifold Building AOC, Dewatering Tower AOC, and Associated Fuel Lines AOC. An SRI sample analyzed for GRO, DRO, RRO, VOCs, PAHs, EDB, pesticides, and metals was below 18 AAC 75.345 Table C cleanup levels (U.S. Army, 2018).

Monitoring Well MW14 – Completed in 2015 to evaluate the Valve Manifold Building AOC, Dewatering Tower AOC, and Associated Fuel Lines AOC. An SRI sample analyzed for GRO, DRO, RRO, VOCs, PAHs, EDB, pesticides, and metals was below 18 AAC 75.345 Table C cleanup levels (U.S. Army, 2018).

Monitoring Well MW15 – Completed in 2015 to evaluate the Drum Storage Area AOC. An SRI sample analyzed for GRO, DRO, RRO, VOCs, PAHs, EDB, pesticides, and metals was below 18 AAC 75.345 Table C cleanup levels (U.S. Army, 2018).

Monitoring Well MW16 – Completed in 2015 to evaluate the Burn Pit AOC. An SRI sample analyzed for GRO, DRO, RRO, VOCs, PAHs, EDB, pesticides, PFOA/PFOS, and metals was below 18 AAC 75.345 Table C cleanup levels for all constituents, except: arsenic, DRO, GRO, ethylbenzene, xylenes, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1-methylnaphthalene, and 2-methylnaphthalene (U.S. Army, 2018).

Monitoring Well MW17 – Completed in 2015 to evaluate the Burn Pit AOC. An SRI sample analyzed for GRO, DRO, RRO, VOCs, PAHs, EDB, pesticides, PFOA/PFOS, and metals was below 18 AAC 75.345 Table C cleanup levels for all constituents except: arsenic, DRO, GRO, ethylbenzene, xylenes, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1-methylnaphthalene, and 2-methylnaphthalene (U.S. Army, 2018).

Monitoring Well MW18 – Completed 2015 to evaluate the Disposal Line AOC. An SRI sample analyzed for GRO, DRO, RRO, VOCs, PAHs, EDB, pesticides, PFOA/PFOS, and metals was below 18 AAC 75.345 Table C cleanup levels (U.S. Army, 2018).

WSW – An SRI sample analyzed for GRO, DRO, RRO, VOCs, PAHs, EDB, pesticides, and metals was below 18 AAC 75.345 Table C cleanup levels for all constituents except lead (U.S. Army, 2018).

4.1.7 Nature and Extent of Contamination

Based on the 2015 SRI groundwater sampling results, the following exceeded 18 AAC 75.345 Table C cleanup levels in one or more samples: arsenic, lead, DRO, GRO, ethylbenzene, xylenes, naphthalene 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1-methylnaphthalene, and 2-methylnaphthalene (Figure 4-1). Based on samples collected, the area of contamination is associated with the Burn Pit AOC. The extent of the contamination is very limited and has not impacted groundwater.

The single lead detection at the WSW is likely associated with the components of the water distribution system (e.g., lead well screen, lead piping, or other lead water supply system components) rather than contaminant migration since lead was not detected above cleanup levels at any other location. Furthermore, the sample was collected by a submersible pump placed at the bottom of the well and it is possible that lead particulates were introduced into the sample container (the sample was unfiltered), which was dissolved by acid (U.S. Army, 2020).

Arsenic was identified above the 18 AAC 75.345 Table C cleanup levels in groundwater in six wells during the 2015 sampling event. However, the distribution of exceedances did not follow a specific pattern indicating a potential arsenic source, or mobilization of arsenic by other contaminants, and the highest arsenic concentration was observed in upgradient Monitoring Well MW8. Therefore, the arsenic exceedances in groundwater were attributed to naturally occurring sources (U.S. Army, 2018).

4.1.8 Conceptual Site Model

The CSM is the same as presented for the whole of the SCS (See Section 1.5.1) and the exposure assessment presented in Section 1.7.2.1.

4.2 CURRENT AND POTENTIAL FUTURE LAND AND RESOURCE USE

4.2.1 Land Use

This is the same for the whole of the SCS (See Section 1.6).

4.2.2 Ground and Surface Water Uses

There are no current groundwater uses at the SCS. The reasonably foreseeable future use of the SCS is expected to remain industrial while under U.S. Army ownership and, as the lead agency, the U.S. Army has the authority to determine the future anticipated land use of the SCS. The U.S. Army has not determined potential future uses and unrestricted use could be a possibility following property transfer.

Surface water is not present at the SCS.

4.3 SUMMARY OF SITE RISKS

A HHERA evaluated the human health and ecological risks associated with the Site-Wide Groundwater AOC. The HHERA process and approach is presented in Section 1.7 and subsequent sub-sections. The following discussion is focused on the COPCs and risks that the HHERA identified for the Site-Wide Groundwater AOC.

4.3.1 Summary of Human Health Risk Assessment

This is the same for the whole of the SCS (See Section 1.7.2).

4.3.1.1 Exposure Assessment

This is the same for the whole of the SCS (See Section 1.7.2.1). Additionally, as groundwater is an interconnected and transient resource, data from the 2015 SRI (the most recent set of data collected) was utilized as the basis for assessing exposure.

4.3.1.2 Identification of Chemicals of Potential Concern

This is the same for the whole of the SCS (See Section 1.7.2.2), apart from the site-specific details described below.

Unrestricted Future Use Screening: COPCs, chemicals with MDCs exceeding Tap water RSLs and cleanup levels for GRO, DRO and RRO in 18 AAC 75.345 Table C were identified at the Site-Wide Groundwater AOC:

- Metals – antimony, cobalt, lead, molybdenum, and vanadium.
- VOCs – 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, ethylbenzene, isopropylbenzene, naphthalene, n-propylbenzene, o-xylene, xylene isomers m&p, and xylenes.
- PAHs – 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene.
- Fuels – GRO and DRO.

The data used in the risk assessment was deemed to be of sufficient quality and quantity for its intended use. The detection frequency (number of samples in which the chemical was detected divided by the total number of samples analyzed), the MDCs, and screening levels are presented in **Table 4-1**.

4.3.1.3 Toxicity Assessment

This is the same for the whole of the SCS (See Section 1.7.2.3).

Table 4-1 Summary of Cumulative Risk Estimates for Unrestricted Future Use – Site-Wide Groundwater AOC

Medium/Risk Driver[1]	Number of Samples	Number of detections	MDC (mg/L)	RSL[2] THQ=0.1 or TCR=1 x 10^{-6}	18 AAC 75.345 Table C Cleanup Level[3] (mg/L)	Hypothetical Future Resident	
						Estimated Cancer Risk[4]	Estimated Noncancer Hazard[4]
Antimony	20	6	*0.00109*	0.00078	0.0078	NA	0.1
Cobalt	20	16	*0.0228*	0.0006	No clean up level listed	NA	4
Lead	20	13	**0.0982**	0.015	0.015	**>RSL[5]**	**>RSL[5]**
Molybdenum	20	20	*0.0527*	0.01	No clean up level listed	NA	0.5
Vanadium	20	2	*0.0144*	0.0086	0.086	NA	0.2
1,2,4-Trimethylbenzene	20	4	**0.693**	0.0015	0.056	NA	**46**
1,3,5-Trimethylbenzene	20	4	**0.204**	0.012	0.060	NA	**2**
Benzene	20	2	*0.00047*	0.00046	0.0046	1 x 10^{-6}	NA
Ethylbenzene	20	4	**0.215**	0.0015	0.015	**1 x 10^{-4}**	NA
Isopropylbenzene	20	4	*0.0596*	0.045	No clean up level listed	NA	0.1
Naphthalene	20	3	**0.18**	0.00017	0.0017	**1 x 10^{-3}**	NA
N-Propylbenzene	20	4	*0.0759*	0.066	0.66	NA	NA
Xylenes	20	4	**0.693**	0.019	0.19	NA	**4**
1-Methylnaphthalene	20	8	**0.0386**	0.0011	0.011	**4 x 10^{-5}**	NA
2-Methylnaphthalene	20	8	**0.0607**	0.0036	0.036	NA	**2**
DRO	20	4	**2.27**	1.5	1.5	NA	**>CUL[6]**
GRO	20	11	**4.76**	2.2	2.2	NA	**>CUL[6]**
Cumulative Media Cancer Risk/Noncancer Hazard:						**1 x 10^{-3}**	**58**
ADEC Risk Criteria:						10^{-5}	1
EPA Risk Range:						10^{-6} – 10^{-4}	1

Key:

1 – Summary of risk estimates for COPCs are presented if the COPC is a risk driver for at least one receptor. Risk estimates for all COPCs are presented in the Human Health and Ecological Risk Assessment which is Appendix H of the Supplemental Remedial Investigation (U.S. Army, 2018).

2 – Human Health Screening levels are the May 2016 EPA Regional Screening Levels for Tap water, except for the carcinogenic PAHs, DRO, and GRO. The screening levels for the carcinogenic PAHs were calculated using the RSL calculator in May 2017, and DRO and GRO are based on ADEC 18 AAC 75 Table C cleanup levels.

3 – 18 AAC 75.345 Table C, Revision date November 7, 2020

4 – Estimated Cancer Risk = (MDC/RSL)*10^{-6}; Estimated Noncancer Hazard = (MDC/RSL)*0.1

5 – Lead cannot be evaluated using the procedures outlined for the rest of the chemicals.

6 – Cleanup levels are based on the toxicity of several indicator compounds. Hazards cannot be calculated for these constituents using the screening level approach.

Table 4-1 (Cont.) Summary of Cumulative Risk Estimates for Unrestricted Future Use – Site-Wide Groundwater AOC

Key (Cont.):
> – greater than
AAC – Alaska Administrative Code
ADEC – Alaska Department of Environmental Conservation
AOC – Area of Concern
COPC – contaminant of potential concern
CUL – cleanup level
DRO – diesel range organics
EPA – U. S. Environmental Protection Agency
GRO – gasoline range organics
mg/L – milligrams per Liter
MDC – maximum detected concentration
NA – not applicable
PAH – polynuclear aromatic hydrocarbon
RSL – regional screening level
TCR – target cancer risk
THQ – target hazard quotient

Italic constituents have an MDC that is less than the 18 AAC 75.345 Table C groundwater human health cleanup level or there is not a groundwater cleanup level.

Bold indicates exceedance of ADEC acceptable risk criteria.

4.3.1.4 Risk Characterization

This is the same for the whole of the SCS (See Section 1.7.2.4), apart from the site-specific details described below.

The carcinogenic risks and noncarcinogenic impacts for each COPC are presented in Table 4-1 for the unrestricted future use scenario, representing a conservative assessment of site COPCs in relation to potential site use. The cumulative risk is summarized in Table 4-1.

Site-Wide Groundwater AOC COPCs MDCs resulted in a residential estimated cumulative cancer risk of 1 x 10^{-3}, exceeding both the EPA's acceptable risk range of 10^{-4} to 10^{-6} and the ADEC excess cancer risk threshold of 1×10^{-5}. In addition, the cumulative HI was approximately 58, exceeding the EPA and ADEC target HI of 1. The cancer risk is driven by naphthalene and the noncancer hazard is driven by 1,2,4-timethylbenzne. It is also noted that while antimony, cobalt, molybdenum, vanadium, benzene, isopropylbenezene, and n-propylbenzene had MDCs that exceeded the RSL, the MDCs were either less than the 18 AAC 75.345 Table C groundwater human health cleanup levels (ADEC, 2020) or groundwater human health cleanup levels have not been established.

4.3.2 Summary of Ecological Risk Assessment

This is the same for the whole of the SCS (See Section 1.7.3).

4.3.2.1 Step 1 Ecological Scoping Evaluation

This is the same for the whole of the SCS (See Section 1.7.3.1).

4.3.2.2 Step 2 Preliminary Screening Evaluation

This is the same for the whole of the SCS (See Section 1.7.3.2), apart from the site-specific details described below.

Ecological receptors do not have a complete pathway to groundwater at the SCS; therefore, the Site-Wide Groundwater AOC does not pose an ecological risk.

4.3.3 Basis for Action

Based on the results of the HHERA, as summarized above, the Site-Wide Groundwater AOC does contain COCs that are risks to human receptors. The HHERA identified COCs, with the exception of cobalt, were also identified in Section 4.1.7 as exceeding the 18 AAC 75.345 Table C cleanup levels (ADEC, 2020). **Table 4-2** summarizes the COCs and cleanup goals for the Site-Wide Groundwater AOC. **Figure 4-2** presents the locations where COCs were identified.

Table 4-2 Contaminants of Concern and Cleanup Goals – Site-Wide Groundwater AOC

Contaminants of Concern	Groundwater Cleanup Goals (mg/L)	Basis
Diesel Range Organics	1.5	18 AAC 75.345, Table C
Gasoline Range Organics	2.2	18 AAC 75.345, Table C
Ethylbenzene	0.015	18 AAC 75.345, Table C
Xylenes	0.19	18 AAC 75.345, Table C
1,2,4-Trimethylbenzene	0.056	18 AAC 75.345, Table C
1,3,5-Trimethylbenzene	0.060	18 AAC 75.345, Table C
1-Methylnaphthalene	0.011	18 AAC 75.345, Table C
2-Methylnaphthalene	0.036	18 AAC 75.345, Table C
Naphthalene	0.0017	18 AAC 75.345, Table C
Lead[1]	0.015	18 AAC 75.345, Table C

Key:
1 – Lead was detected above the cleanup level in the Water Supply Well only.
AAC – Alaska Administrative Code
AOC – Area of Concern
mg/L – milligrams per liter

While cobalt was a contributor to the groundwater total noncancer risk calculation it is not retained as a groundwater COC requiring remedial action for the reasons discussed below.

Cobalt is a metal that is found naturally in most rocks, soil, and water, and has similar properties to iron and nickel. It is usually combined with elements such as oxygen, sulfur, and arsenic, and is mined for use in various products. Cobalt is usually used to make alloys, in applications such as aircraft engines, magnets, and cutting/grinding tools. Cobalt can also be used as a colorant (blue) in glass, ceramics, and paints. The primary anthropogenic sources of cobalt releases to the environment include mining and processing of cobalt-containing ore, emissions from fossil fuel combustion, and the manufacture and use of cobalt chemicals and fertilizers derived from phosphate rocks (ATSDR, 2004). With the possible exception of paints, none of these anthropogenic uses were performed at SCS and facility operations could not have resulted in significant cobalt releases. Furthermore, SCS operations did not include direct discharges into groundwater.

The SCS SRI (U.S. Army, 2018) established that cobalt was only detected in surface soil at two locations (one each at the Burn Pit AOC and the Drum Storage Area AOC) above the established site-specific background value and there were no cobalt detections in subsurface soil above the established site-specific background value. The limited surface soil detections and absence of subsurface detections in excess of the site-specific background value support that cobalt concentrations are attributable to natural heterogeneity in local soils, therefore, cobalt in soils was determined to not pose risks or hazards to human health (U.S. Army, 2018).

As cobalt concentrations in soil reflect naturally occurring conditions and SCS operations did not include anthropogenic sources of cobalt or direct discharges to groundwater, the cobalt concentrations in groundwater are also reflective of naturally occurring conditions. Therefore, cobalt in groundwater is not retained as a COC requiring remedial action.

4.4 REMEDIAL ACTION OBJECTIVES

The general RAOs are outlined in Section 1.9. Only RAO 2 is appliable to the Site-Wide Groundwater AOC.

The RAOs for Site-Wide Groundwater are:

- RAO 2: Restore groundwater to water quality standards protective of human receptors considering cumulative exposure through dermal contact, ingestion, and inhalation of volatile compounds in groundwater. Specifically:
    - Reduce concentrations of the following to below cleanup goals: DRO, GRO, ethylbenzene, xylenes, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1-methylnaphthalene, 2-methylnaphthalene, naphthalene, and lead. Refer to Table 4-2 for the numerical cleanup goals.

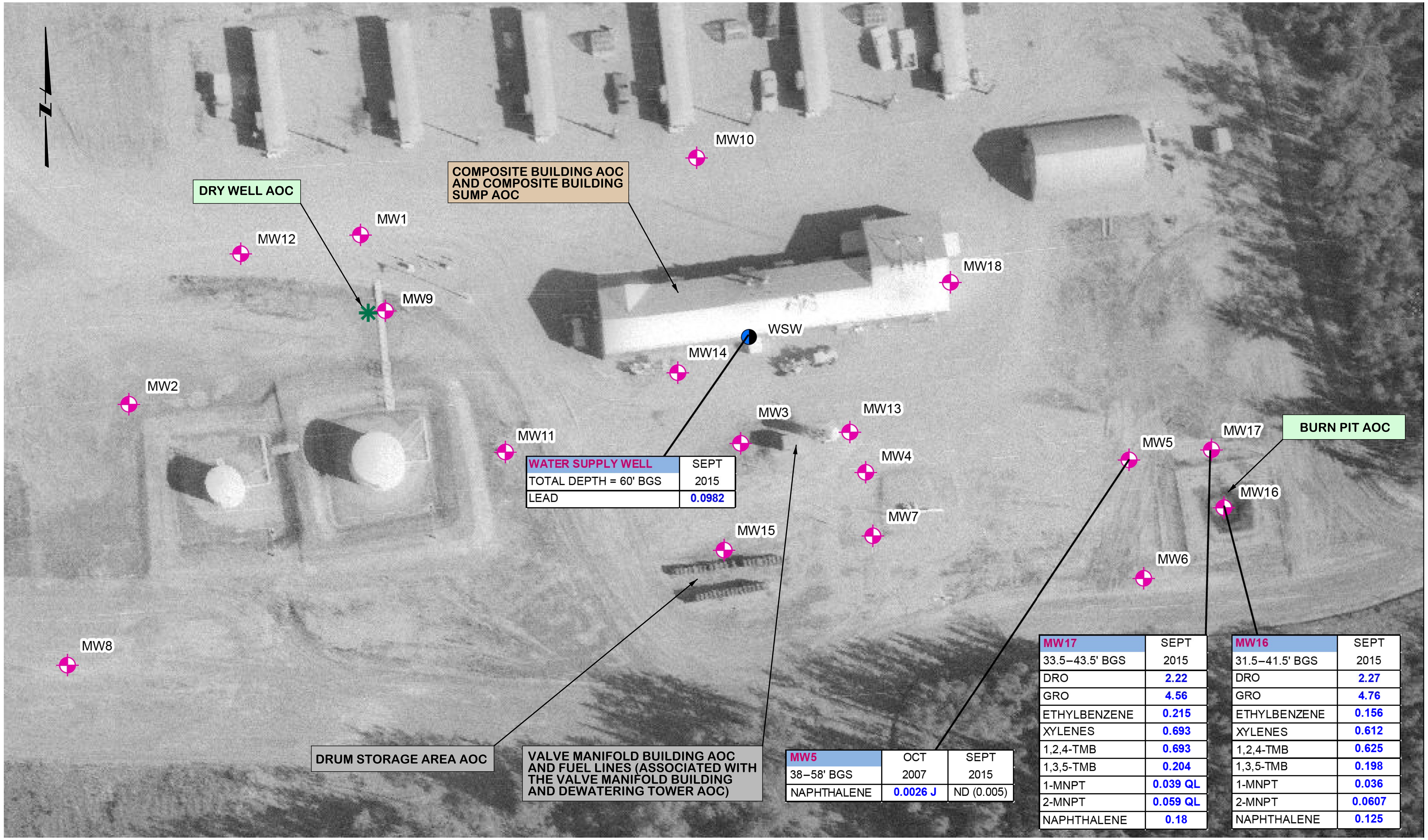
4.5 DESCRIPTION OF ALTERNATIVES

The remedial alternatives considered for the Site-Wide Groundwater AOC were presented in the Proposed Plan (U.S. Army, 2023) and are summarized below. As outlined in Section 1.10, the discussion of alternatives is focused on the portion of the alternative that is applicable to the Site-Wide Groundwater AOC.

4.5.1 Description of Remedy Components

Alternative 1: No Action. The No Action alternative for the Site-Wide Groundwater AOC serves as a baseline against which other alternatives are compared, as required by the NCP. Under this alternative, no remedial actions would be taken, monitoring would not be conducted, and LUCs would not be implemented to prevent exposures. Although natural attenuation would occur, contaminant reductions would not be verified with monitoring.

Alternative 2: LUCs and MNA. Alternative 2 includes LUCs to control exposure to COCs where unacceptable risk or hazard is possible and MNA to monitor and document reductions in COC concentrations/mass and plume stability or contraction at the Site-Wide Groundwater AOC. As part of this alternative, the WSW would be decommissioned, and a monitoring well installed and sampled quarterly for 1 year to assess lead concentrations in groundwater and determine if lead concentrations are above or below the cleanup goal.



WATER SUPPLY WELL	SEPT
TOTAL DEPTH = 60' BGS	2015
LEAD	0.0982

MW5	OCT	SEPT
38–58' BGS	2007	2015
NAPHTHALENE	0.0026 J	ND (0.005)

MW17	SEPT
33.5–43.5' BGS	2015
DRO	2.22
GRO	4.56
ETHYLBENZENE	0.215
XYLENES	0.693
1,2,4-TMB	0.693
1,3,5-TMB	0.204
1-MNPT	0.039 QL
2-MNPT	0.059 QL
NAPHTHALENE	0.18

MW16	SEPT
31.5–41.5' BGS	2015
DRO	2.27
GRO	4.76
ETHYLBENZENE	0.156
XYLENES	0.612
1,2,4-TMB	0.625
1,3,5-TMB	0.198
1-MNPT	0.036
2-MNPT	0.0607
NAPHTHALENE	0.125

ACRONYMS AND ABBREVIATIONS

ANALYTES
DRO - Diesel Range Organics
GRO - Gasoline Range Organics
1,2,4 TMB - 1,2,4 Trimethylbenzene
1,3,5 TMB - 1,3,5 Trimethylbenzene
1-MNPT - 1-Methylnaphthalene
2-MNPT - 2-Methylnaphthalene

UNITS
MG/L - Milligrams per Liter

OTHER
J - Result qualified as estimate because it is less than the LOQ
LOQ - Limit of Quantitation
Q - result considered an estimate (L-low) due to a quality control failure
SRI - Supplemental Remedial Investigation
VOCs - Volatile Organic Compounds
PAHs - Polynuclear Aromatic Hydrocarbons
AAC - Alaska Administrative Code
ADEC - Alaska Department of Environmental Conservation
AOC - Area of Concern
' BGS - Feet Below Groud Surface

ADEC GROUNDWATER CLEANUP LEVELS:
18 AAC 75.345 TABLE C
UNITS = MG/L

BULK FUEL HYDROCARBONS	
DRO	1.5
GRO	2.2
VOCs	
ETHYLBENZENE	0.015
XYLENES, TOTAL	0.19
1,2,4 TMB	0.056
1,3,5 TMB	0.06
PAHS	
1-MNPT	0.011
2-MNPT	0.036
NAPHTHALENE	0.0017
METALS	
LEAD	0.015

LEGEND:

- MW8 — MONITORING WELL
- WATER SUPPLY WELL
- FORMER DRY WELL (REMOVED JUNE 2015)
- GROUNDWATER SAMPLE FROM THE 2015 SRI
- ' BGS — FEET BELOW GROUND SURFACE

- BURN PIT AOC — GREEN LABEL INDICATES CERCLA AREA OF CONCERN
- DRUM STORAGE AREA AOC — GRAY LABEL INDICATES AREA OF CONCERN IN DECISION DOCUMENT UNDER 18 AAC 75
- COMPOSITE BUILDING AOC AND COMPOSITE BUILDING SUMP AOC — BEIGE LABEL INDICATES AREA OF CONCERN FOR SITE CLOSURE IN DECICISION DOCUMENT

NOTES:

1. Background imagery is dated 13 June 1968, georeferenced to April 2015 and June 2015 GPS survey data.
2. Monitoring well installation years: MW1-MW5 - 2007, MW6-MW8 - 2008, MW9-MW17 - 2015.
3. Concentrations shown in Blue exceed ADEC cleanup levels.
4. The highest concentration between primary and duplicate samples is shown where duplicate samples were collected.
5. Only 2015 results from sample locations that had at least one ADEC cleanup level exceedance are shown.
6. Concentrations are in MG/L.
7. Depth listed for groundwater sample denotes the screened interval.

Source:
SCS CERCLA FS, final
Figure 2-4, Groundwater COCs
Exceeding ADEC Cleanup Levels , April 2020

SCALE IN FEET
0 25

SEARS CREEK STATION, ALASKA
DRY WELL, BURN PIT, AND SITE GROUNDWATER
RECORD OF DECISION

SITE GROUNDWATER COCs
EXCEEDING ADEC CLEANUP LEVELS

FIGURE
4-2

185704695.
500.0502

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MNA would be anticipated to be implemented at the Site-Wide Groundwater AOC through the installation of one additional groundwater monitoring well and the annual sampling of three wells annually for 5 years, followed by monitoring every fifth year, corresponding to the CERCLA FYR. Land use would be restricted to preclude withdrawal of groundwater for any beneficial use over the groundwater plume. Annual LUC inspection and CERCLA Five FYRs would be conducted to document the continuing effectiveness of the remedy.

Implementation of Remedial Alternative 2 at the Site-Wide Groundwater AOC would require: maintenance and replacement of monitoring wells, as necessary; documentation of the LUCs; maintenance of administrative controls through review of work clearance permits; periodic inspections of the site; and corrective action for LUC violations. The U.S. Army would be responsible for documenting, monitoring, maintaining, and enforcing the LUCs. A total period of 40 years is assumed for MNA, LUC inspections, and reporting until groundwater COCs reach cleanup goals.

Alternative 3: Excavation of Contaminated Soil, MNA, and LUCs. Alternative 3 for the Site-Wide Groundwater AOC has the same components as Alternative 2; however, the remedy time frames are shorter due to the soil remedial actions taken at the Burn Pit (Section 2). Alternative 3 includes LUCs to control exposure to COCs where unacceptable risk or hazard is possible and MNA to monitor and document reductions in COC concentrations/mass and plume stability or contraction. As part of this alternative, the WSW would be decommissioned, and a monitoring well installed and sampled quarterly for 1 year to assess lead concentrations in groundwater and determine if lead concentrations are above or below the cleanup goal.

MNA would be anticipated to be implemented for the Site-Wide Groundwater AOC through the installation of one additional groundwater monitoring well and the quarterly monitoring for 2 years; followed by annual monitoring for 3 years; and followed by monitoring every 5 years, corresponding to the CERCLA FYR. Land use would be restricted to preclude withdrawal of groundwater for any beneficial use over the groundwater plume. Annual LUC inspection and CERCLA FYRs would be conducted to document the continuing effectiveness of the remedy.

Implementation of Remedial Alternative 3 at the Site-Wide Groundwater AOC would require: maintenance and replacement of monitoring wells, as necessary; documentation of the LUCs; maintenance of administrative controls through review of work clearance permits; periodic inspections of the site; and corrective action for LUC violations. The U.S. Army would be responsible for documenting, monitoring, maintaining, and enforcing the LUCs. A total period of 20 years is assumed for MNA, LUC inspections, and reporting until groundwater COCs reach cleanup goals.

Alternative 4: Excavation of Contaminated Soil, Biosparging, and LUCs. Alternative 4 includes biosparging and LUCs to control exposure to COCs where unacceptable risk or hazard is possible at the Site-Wide Groundwater AOC. As part of this alternative, the WSW would be decommissioned, and a monitoring well installed and sampled quarterly for 1 year to assess lead concentrations in groundwater and determine if lead concentrations are above or below the cleanup goal.

Biosparging would increase dissolved oxygen within groundwater at the Site-Wide Groundwater AOC by injecting air to facilitate aerobic degradation of dissolved fuel. Some VOCs could be reduced through volatilization and aerobic biodegradation of vadose zone soils could be stimulated. The biosparging system would include air injection sparging wells, vapor monitoring points, an additional groundwater monitoring well, and an air injection infrastructure on the surface of the site. A baseline and semi-annual performance monitoring (i.e., groundwater sampling for COCs and field parameters including dissolved oxygen and oxygen reduction potential) would be conducted to monitor the progress of the remedy. In addition, continual groundwater monitoring, semi-annually, would be conducted after completion of biosparging until ADEC cleanup goals have been achieved. Land use would be restricted to preclude withdrawal of groundwater for any beneficial use over the groundwater plume. Annual LUC inspection and CERCLA FYRs would be conducted to document the continuing effectiveness of the remedy.

Implementation of Remedial Alternative 4 at the Site-Wide Groundwater AOC would require: O&M of the air injection system, documentation of the LUCs, maintenance of administrative controls through review of work clearance permits, periodic inspections of the site, and corrective action for LUC violations. The U.S. Army would be responsible for documenting, monitoring, maintaining, and enforcing the LUCs. A total period of 6 years is assumed for biosparging, LUC inspections, and reporting until groundwater COCs reach cleanup goals.

Alternative 5: Excavation of Contaminated Soil, ISCO, and LUCs. Alternative 5 includes ISCO and LUCs at the Site-Wide Groundwater AOC to control exposure to COCs at the Site-Wide Groundwater AOC where unacceptable risk or hazard is possible. As part of this alternative, the WSW would be decommissioned, and a monitoring well installed and sampled quarterly for 1 year to assess lead concentrations in groundwater and determine if lead concentrations are above or below the cleanup goal.

ISCO would oxidize groundwater COCs within the upper 10 ft of the saturated zone at the Site-Wide Groundwater AOC through the injection of reagents such as sodium persulfate and sodium hydroxide through several direct-push injection points. ISCO injection would be anticipated to take two field seasons to complete, followed by an estimated 3 years of groundwater monitoring to monitor ISCO effectiveness and substantiate that groundwater cleanup goals have been achieved. Land use would be restricted to preclude withdrawal of groundwater for any beneficial use over the groundwater plume. Annual LUC inspection and CERCLA FYRs would be conducted to document the continuing effectiveness of the remedy.

Implementation of Remedial Alternative 5 at the Site-Wide Groundwater AOC would require: chemical transportation, storage, and handling documentation of the LUCs; maintenance of administrative controls through review of work clearance permits; periodic inspections of the site; and corrective action for LUC violations. The U.S. Army would be responsible for documenting, monitoring, maintaining, and enforcing the LUCs. A total period of 5 years is assumed for ISCO, LUC inspections, and reporting until groundwater COCs reach cleanup goals.

4.5.2 Expected Outcome of Each Alternative

Alternative 1: No Action. There are no site changes at the Site-Wide Groundwater AOC expected from selecting this remedial alternative.

Alternative 2: LUCs and MNA. Alternative 2 is expected to document compliance with the cleanup goals for lead at the WSW after WSW decommissioning and four quarters of confirmation sampling of the new monitoring well are complete. Site-Wide Groundwater is assumed to achieve cleanup goals through MNA in approximately 40 years, as the Burn Pit AOC contamination would remain in place.

Alternative 3: Excavation of Contaminated Soil, MNA, and LUCs. Alternative 3 is expected to document compliance the cleanup goals for lead at the WSW after WSW decommissioning and four quarters of confirmation sampling of the new monitoring well are complete. As part of Alternative 3, soils exceeding cleanup goals at the Burn Pit and Dry Well AOCs (Sections 2 and 3, respectively) would be removed and, as such, it is assumed that Site-Wide Groundwater would achieve cleanup goals through MNA in approximately 20 years.

Alternative 4: Excavation of Contaminated Soil, Biosparging, and LUCs. Alternative 4 is expected to document compliance the cleanup goals for lead at the WSW after WSW decommissioning and four quarters of confirmation sampling of the new monitoring well are complete. As part of Alternative 4, soils exceeding cleanup goals at the Burn Pit and Dry Well AOCs (Sections 2 and 3, respectively) would be removed and, as such, it is assumed that Site-Wide Groundwater would achieve cleanup goals through biosparging in approximately 6 years.

Alternative 5: Excavation of Contaminated Soil, ISCO, and LUCs. Alternative 5 is expected to document compliance the cleanup goals for lead at the WSW after WSW decommissioning and four quarters of confirmation sampling of the new monitoring well are complete. As part of Alternative 5, soils exceeding cleanup goals at the Burn Pit and Dry Well AOCs (Sections 2 and 3, respectively) would be removed and, as such, it is assumed that Site-Wide Groundwater would achieve cleanup goals through ISCO after the second injection round but that 3 additional years of groundwater monitoring would be necessary to document at that cleanup goals have been maintained.

4.6 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

Alternatives for the Site-Wide Groundwater AOC were evaluated using the nine criteria described in Section 121(a) &(b) of CERCLA and 40 CFR 300.430(e)(9)(i) as cited in NCP Section 300.430(f)(5)(i). These criteria are classified as threshold criteria, balancing criteria, and modifying criteria, and are outlined in Section 1.10. This section summarizes how well each alternative satisfies each evaluation criterion and indicates how it compares to the other alternatives under consideration for the Site-Wide Groundwater AOC. **Table 4-3** compares the cleanup alternatives at the Site-Wide Groundwater AOC using the nine CERCLA evaluation criteria.

Table 4-3 Remedial Alternative Comparison – Site-Wide Groundwater AOC

Description	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
	No Action	LUCs and MNA	Excavation of Contaminated Soil, MNA, and LUCs	Excavation of Contaminated Soil, Biosparging, and LUCs.	Excavation of Contaminated Soil, ISCO, and LUCs.
Threshold Criteria					
Overall Protection of Human Health and the Environment	Fail	Fail	Pass	Pass	Pass
Compliance with ARARs	Fail	Fail	Pass	Pass	Pass
Primary Balancing Criteria					
Long-Term Effectiveness and Permanence	NA	NA	Moderate	High	High
Reduction of TMV through Treatment	NA	NA	Low-Moderate	High	High
Short-Term Effectiveness	NA	NA	Moderate	Moderate-High	Low-Moderate
Implementability	NA	NA	High	Low	Moderate
Cost (total present value at a 0.6 percent discount)	$0	NA	$640,700	$971,400	$809,000
Modifying Criteria					
State/Support Agency Acceptance	NA	NA	Acceptable	Acceptable	Acceptable
Community Acceptance	NA	NA	Acceptable	Acceptable	Acceptable

Key:
AOC – Area of Concern
ARAR – applicable or relevant and appropriate requirement
ISCO – in-situ chemical oxidation
MNA – monitored natural attenuation
LUC – land use control
NA – not applicable
TMV – toxicity, mobility, and volume

Scoring:
Pass – meets threshold criterion.
Fail – does not meet threshold criterion.
High, Medium, and Low indicate the degree to which the alternative satisfies the criterion.

4.6.1 Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or LUCs. This is one of the threshold criteria and an alternative is rated either Pass or Fail for this criterion.

Alternative 1 (No Action) cannot achieve the RAO for the Site-Wide Groundwater AOC, therefore, this alternative fails to meet this threshold criterion.

Alternative 2 (LUCs and MNA) would protect human health at the Site-Wide Groundwater AOC through implementation of LUCs and MNA would monitor the natural attenuation of groundwater COCs. However, Alternative 2 is integrated with Alternative 2 (LUCs) for the Burn Pit and Dry Well AOCs which does not achieve protection of human health and the environment. Therefore, this alternative fails to meet this threshold criterion.

Alternative 3 (Excavation of Contaminated Soil, MNA, and LUCs) would protect human health, the Site-Wide Groundwater AOC does not pose an environmental risk, and groundwater COCs exceeding cleanup goals will achieve the RAO through the natural attenuation process. Therefore, this alternative meets this threshold criterion.

Alternative 4 (Excavation of Contaminated Soil, Biosparging, and LUCs) would protect human health, the Site-Wide Groundwater AOC does not pose an environmental risk, and groundwater COCs exceeding cleanup goals will achieve the RAO through aerobic degradation of COCs. Therefore, this alternative meets this threshold criterion.

Alternative 5 (Excavation of Contaminated Soil, ISCO, and LUCs) would protect human health, the Site-Wide Groundwater AOC does not pose an environmental risk, and groundwater COCs exceeding cleanup goals will achieve the RAO through chemical oxidation of COCs. Therefore, this alternative meets this threshold criterion.

4.6.2 Compliance with Applicable or Relevant and Appropriate Requirements

Compliance with ARARs addresses whether a remedy will meet all of the ARARs of other Federal and State environmental statutes or provides a basis for invoking a waiver, the ARARs are provided in Table 1-5. Compliance with ARARs is the second threshold criterion; alternatives either Pass or Fail.

Alternatives 1 (No Action) and 2 (LUCs and MNA) for the Site-Wide Groundwater AOC do not comply with applicable ARARs. Both leave contamination in place at concentrations that are not protective of human health and/or the environment, as part the alternatives applicability to groundwater or as part of the alternatives integrated applicability with the Burn Pit and Dry Well AOC alternative. Because they do not meet this criteria, Alternative 1 (No Action) and Alternative 2 (LUCs and MNA) were eliminated from consideration and are not evaluated with respect to the criteria below.

Alternatives 3 (Excavation of Contaminated Soil, MNA, and LUCs), Alternative 4 (Excavation of Contaminated Soil, Biosparging, and LUCs), and Alternative 5 (Excavation of Contaminated Soil, ISCO, and LUCs) are compliant with applicable ARARs for the Site-Wide Groundwater AOC.

4.6.3 Long-Term Effectiveness and Permanence

Long-term effectiveness and permanence refer to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time once clean-up levels have been met. This criterion includes the consideration of residual risk that will remain onsite following remediation and the adequacy and reliability of controls.

Alternative 3 (Excavation of Contaminated Soil, MNA, and LUCs) was scored “Moderate” because this alternative relies on natural attenuation processes for groundwater COCs at the Site-Wide Groundwater AOC.

Alternative 4 (Excavation of Contaminated Soil, Biosparging, and LUCs) and Alternative 5 (Excavation of Contaminated Soil, ISCO, and LUCs) were scored “High” as these alternatives actively treat the groundwater contaminants at the Site-Wide Groundwater AOC.

4.6.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

Reduction of TMV through treatment refers to the anticipated performance of the treatment technologies that may be included as part of the remedial alternative.

Alternative 3 (Excavation of Contaminated Soil, MNA, and LUCs) was scored “Low-Moderate” because this alternative relies on natural attenuation processes for groundwater COCs at the Site-Wide Groundwater AOC.

Alternative 4 (Excavation of Contaminated Soil, Biosparging, and LUCs) and Alternative 5 (Excavation of Contaminated Soil, ISCO, and LUCs) was scored “High” as these alternatives actively treat the groundwater contaminants at the Site-Wide Groundwater AOC.

4.6.5 Short-Term Effectiveness

Short-term effectiveness addresses the time needed to implement the remedy and any adverse impacts on workers, the community, and the environment during construction and operation of the remedy. Short-term effectiveness also includes the time until remedial response objectives are met.

Alternative 3 (Excavation of Contaminated Soil, MNA, and LUCs) was scored “Moderate” because this alternative relies on natural attenuation processes for groundwater COCs at the Site-Wide Groundwater AOC, which will have a long duration.

Alternative 4 (Excavation of Contaminated Soil, Biosparging, and LUCs) was scored “Moderate-High” because this alternative actively treats groundwater at the Site-Wide Groundwater AOC and has relatively low risk during remedial action implementation.

Alternative 5 (Excavation of Contaminated Soil, ISCO, and LUCs) was scored “Low-Moderate” because, while this alternative actively treats the groundwater contaminants at the Site-Wide Groundwater AOC, there is a high risk associated with chemical transportation, handling, and injection.

4.6.6 Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

Alternative 3 (Excavation of Contaminated Soil, MNA, and LUCs) was scored “High” because this alternative requires minimal site work, limited maintenance work, and can be implemented immediately at the Site-Wide Groundwater AOC.

Alternative 4 (Excavation of Contaminated Soil, Biosparging, and LUCs) was scored “Low” for the Site-Wide Groundwater AOC, because this alternative requires the installation of an active air injection system, a power system, and year-round O&M.

Alternative 5 (Excavation of Contaminated Soil, ISCO, and LUCs) was scored “Moderate” for the Site-Wide Groundwater AOC because this alternative requires the import and injection of chemicals but does not have an O&M component beyond groundwater monitoring post-injection.

4.6.7 Cost

Alternative 3 (Excavation of Contaminated Soil, MNA, and LUCs) for the Site-Wide Groundwater AOC has a capital cost of approximately $96,400, an O&M cost and periodic cost of approximately $573,800 for 20 years, and a total present value cost of approximately $640,700 at a discount rate of 0.6 percent.

Alternative 4 (Excavation of Contaminated Soil, Biosparging, and LUCs) for the Site-Wide Groundwater AOC has a capital cost of approximately $555,300, an O&M cost and periodic cost of approximately $414,100 for 6 years, and a total present value cost of approximately $971,400 at a discount rate of 0.6 percent.

Alternative 5 (Excavation of Contaminated Soil, ISCO, and LUCs) for the Site-Wide Groundwater AOC has a capital cost of approximately $541,400, an O&M cost and periodic cost of approximately $270,900 for 5 years, and a total present value cost of approximately $809,000 at a discount rate of 0.6 percent.

4.6.8 State Acceptance

The State concurs that, if implemented properly, the following selected remedy for the Site-Wide Groundwater AOC, as presented in this ROD, will comply with state and Federal environmental laws for the:

- Alternative 3: Excavation of Contaminated Soil, MNA, and LUCs.

The State did not provide comments regarding the other alternatives.

4.6.9 Community Acceptance

Written and verbal comments received for the Site-Wide Groundwater AOC during the public comment period are summarized and addressed in Section 7.0.

4.7 PRINCIPAL THREAT WASTES

The NCP expects that treatment that reduces the TMV of the principal threat wastes will be used to the extent practicable. The principal threat concept refers to the source materials at a CERCLA site considered to be highly toxic or highly mobile that generally cannot be reliably controlled in place or present a significant risk to human health or the environment should exposure occur. A source material is material that contains hazardous substances, pollutants, or contaminants that act as a reservoir for migration of contamination to groundwater, surface water, or air, or that acts as a source for direct exposure. There is no principal threat waste at the Site-Wide Groundwater AOC.

4.8 SELECTED REMEDY

The selected remedy for the Site-Wide Groundwater AOC (Alternative 3) involves LUCs and MNA of contaminated groundwater exceeding cleanup goals. This remedial action was selected based upon the ability to protect human health and compliance with applicable requirements. The U.S. Army has determined that the selected remedy provides the best balance of trade-offs among the alternatives with respect to the five balancing criteria set out in NCP Section 300.430(f)(1)(i)(B).

Remedy selections are based on the detailed evaluation of remedial alternatives presented in the Proposed Plan (U.S. Army 2023) and the FS (U.S. Army, 2020). The U.S. Army is responsible for implementing and monitoring the remedial actions identified herein for the duration of the remedies selected in this ROD. The U.S. Army will exercise this responsibility in accordance with CERCLA and the NCP.

4.8.1 Summary of the Rationale for the Selected Remedy

The U.S. Army believes that the selected remedy for the Site-Wide Groundwater AOC meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. The remedy is expected to satisfy the nine selection criteria as defined by CERCLA Section 121(b).

Alternative 3 meets the threshold criteria, is the most effective when ranked against the balancing criteria, and also meets with concurrence from the State and acceptance from the community under the modifying criteria.

4.8.2 Description of the Selected Remedy

Under Alternative 3 for the Site-Wide Groundwater AOC, LUCs control exposure to COCs where unacceptable risk or hazard is possible and MNA is used to monitor and document reductions in COC concentrations/mass and plume stability or contraction. As part of this alternative, the WSW would be decommissioned, and a monitoring well installed and sampled quarterly for 1 year to assess lead concentrations in groundwater and determine if lead concentrations are above or below the cleanup goal.

MNA would be anticipated to be implemented at the Site-Wide Groundwater AOC through the installation of one additional groundwater monitoring well and the quarterly monitoring for 2 years, followed by annual monitoring for 3 years, followed by monitoring every fifth year, corresponding to the CERCLA FYR. Maintenance and replacement of monitoring wells would occur, as necessary, to maintain the monitoring well field.

Land use would be restricted at the Site-Wide Groundwater AOC to preclude withdrawal of groundwater for any beneficial use over the groundwater plume. Annual LUC inspection and CERCLA FYRs would be conducted to document the continuing effectiveness of the remedy. The U.S. Army would be responsible for documenting, monitoring, maintaining, and enforcing the LUCs.

A LUC management plan for the Site-Wide Groundwater AOC will be prepared upon signature of this ROD and will address:

- Specific LUCs.
- LUC performance objectives and duration.
- Description of LUCs and performance responsibilities.
- Location and Notice of Environmental Contamination.
- Notification of corrective measures.
- Notification of property transfers.
- Monitoring, reporting, and concurrence.

4.8.3 Summary of Estimated Remedy Costs

A summary of the estimated remedy costs for the Site-Wide Groundwater AOC is provided in **Table 4-4**.

Table 4-4 Site-Wide Groundwater AOC Summary of Estimated Remedy Costs

Selected Remedy	Capital Cost	O&M Cost	Periodic Cost
Land use Controls and Monitored Natural Attenuation.	$94,400	$166,600	$407,200

Key:
AOC – Area of Concern O&M – Operation and maintenance

The information provided in Table 4-4 is based on the best available information regarding the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. Major changes may be documented in an ESD or a ROD amendment. This is an order-of-magnitude engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost. Costs for the Site-Wide Groundwater AOC were provided in the FS (U.S. Army, 2020).

4.8.4 Expected Outcomes of Selected Remedy

Upon completion of the selected remedy, the Site-Wide Groundwater AOC will be in compliance with CERCLA and the State of Alaska environmental statutes. No known contamination above site-specific cleanup goals will remain within soil at the Site-Wide Groundwater AOC after the selected remedy (LUCs and MNA) has been completed. Refer to Table 4-2 for COCs, cleanup goals, and the basis for the cleanup level.

4.9 STATUTORY DETERMINATIONS

Under CERCLA Section 121 (as required by NCP Section 300.430(f)(5)(ii)), the lead agency must select a remedy that is protective of human health and the environment, complies with ARARs, is cost-effective, and uses permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, periodic 5-year reviews are required if hazardous substances will remain in place above levels allowing for UU/UE after implementing the selected remedy. CERCLA also includes: 1) a preference for remedies that employ treatment which permanently and significantly reduces the TMV of hazardous wastes as a principal element; and 2) a bias against offsite disposal of untreated wastes. The following sections discuss how the selected remedy meets these statutory requirements.

4.9.1 Protection of Human Health and the Environment

LUCs will reduce human exposure to groundwater by preventing development of groundwater resources for any activity other than remediation during the course of contaminant MNA. Upon completion of MNA, the site will meet cleanup goals and will no longer require controls. There are no contaminants at the Site-Wide groundwater AOC that pose an ecological or environmental risk (Section 4.3).

4.9.2 Compliance with ARARs

Remedial actions must comply with both Federal and State ARARs. ARARs are legally applicable or relevant and appropriate requirements, standards, criteria, or limitations of Federal and State environmental laws and regulations. Criteria TBCs are non-promulgated advisories or guidance issued by federal or state government that are not legally binding and do not have the status of potential ARARs. However, in many circumstances, TBCs are considered along with ARARs.

Table 1-5 summarizes the ARARs and TBCs for the selected remedies at the SCS, including the Site-Wide Groundwater AOC, and describes how the selected remedies address each one at agreed-upon points of compliance.

The selected remedy for the Site-Wide Groundwater AOC complies with the chemical-specific, location-specific, and action-specific ARARs. The implementation of the remedy is required to meet the substantive portions of these requirements at agreed-upon points of compliance and is exempt from administrative requirements such as permitting and notifications.

4.9.3 Cost Effectiveness

The selected remedy for the Site-Wide Groundwater AOC is cost-effective and represents a reasonable value for the money to be spent. In making this determination, the following definition was used: “A remedy shall be cost-effective if its costs are proportional to its overall effectiveness” (40 CFR 300.430[f][1][ii][D]). This determination was accomplished by evaluating the “overall effectiveness” of those alternatives that satisfy the threshold criteria (that is, is protective of human health and the environment and ARAR-compliant).

Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination: long-term effectiveness and permanence, reduction in TMV through treatment, and short-term effectiveness. Overall effectiveness was then compared to costs to determine cost-effectiveness. The overall effectiveness of the selected remedies for the Site-Wide Groundwater AOC were demonstrated in the comparative analysis of alternatives (Section 4.6). The total present value cost, at a 0.6 percent discount rate of the selected remedy, is approximately $640,700 (Section 4.6).

It is important to note that more than one cleanup alternative can be cost-effective, and the Superfund program does not mandate the selection of the most cost-effective cleanup alternative. In addition, the most cost-effective remedy is not necessarily the remedy that provides the best balance of tradeoffs with respect to the remedy selection criteria, nor is it necessarily the least-costly alternative that is both protective of human health and the environment and ARAR-compliant. Rather, cost-effectiveness is concerned with the reasonableness of the relationship between the effectiveness afforded by each alternative and its costs compared to other available options.

4.9.4 Utilization of Permanent Solutions and Alternative Treatment Technologies

The selected remedy provides the best balance of trade-offs among the alternatives with respect to the five balancing criteria set out in NCP Section 300.430(f)(l)(i)(B). Although no onsite active treatment is being utilized for the Site-Wide Groundwater AOC, the selected remedy of LUCs and MNA provides the most effective, long-term solution given the conditions of the site. LUCs and MNA are protective of human health and the environment by controlling access to contaminated groundwater, monitoring the natural attenuation of contaminants, are readily implementable, and cost effective in comparison to other alternatives.

4.9.5 Preference for Treatment as a Principal Element

The NCP establishes the expectation that treatment will be used to address the principal threats posed by a site wherever practicable (40 CFR 300.430[a][1][iii][A]). The selected remedy of MNA and LUCs for groundwater CERCLA COCs does satisfy the statutory preference for treatment as a principal element of the remedy and the COCs will undergo biodegradation and MNA will monitor the natural biodegradation process at the Site-Wide Groundwater AOC.

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5.0 DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan (U.S. Army, 2023) for the Burn Pit, Dry Well, and Site-Wide Groundwater AOCs at SCS was released for public comment in July 2023. The Proposed Plan identified Alternative 3 – Excavation of Contaminated Soils, MNA, and LUCs, as the Preferred Alternative for soil and ground water remediation. It was determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate.

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6.0 REFERENCES

Agency for Toxic Substances and Disease Registry (ATSDR). 2004. Toxicological profile for cobalt. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Alaska Department of Environmental Conservation (ADEC). 2009. Arsenic in Soil. Technical Memorandum. State of Alaska Department of Environmental Conservation, Division of Spill Prevention and Response Contaminated Sites Program, March.

ADEC. 2010. Policy Guidance on Developing Conceptual Site Models. Alaska Department of Environmental Conservation, Division of Spill Prevention and Response Contaminated Sites Program, October.

ADEC. 2014. Ecoscoping Guidance: A Tool for Developing an Ecological Conceptual Site Model. State of Alaska Department of Environmental Conservation, Division of Spill Prevention and Response, Contaminated Sites Program, March.

ADEC. 2015. Risk Assessment Procedures Manual. State of Alaska Department of Environmental Conservation, Division of Spill Prevention and Response Contaminated Sites Program, February.

ADEC. 2016. 18 AAC 75. Oil and Other Hazardous Substances Pollution Control. Revised as of April 6, 2016.

ADEC. 2017. Draft Cleanup Levels Guidance for Methods Two and Three. April 2017.

ADEC. 2018a. 18 AAC 75. Oil and Other Hazardous Substances Pollution Control. Revised as of September 29, 2018.

ADEC. 2018b. Cleanup Levels Calculator and Petroleum Cleanup Levels Calculator. Available online: http://dec.alaska.gov/spar/csp/calculators/ Last accessed April 2018.

ADEC. 2020. 18 AAC 75. Oil and Other Hazardous Substances Pollution Control. Revised as of November 7, 2020.

ADEC. 2022. Field Sampling Guidance. Division of Spill Prevention and Response Contaminated Sites Program. January.

Bristol Environmental Remediation Services, LLC (Bristol). 2016a. Draft Class V UIC Well Closure Report, Revision 1. May.

Bristol. 2016b. Final Storage Tank and Petroleum Pipeline Removal Report, Revision 2. August.

Efroymson, R.A., M.E. Will, G.W. Suter II, and A.C. Wooten (Efroymson et al.). 1997a. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants. 1997 Revision. ES/ER/TM-85/R3. Oak Ridge, TN: Department of Energy, Oak Ridge National Laboratory. November.

Efroymson, R.A., M.E. Will, and G.W. Suter II (Efroymson et al.). 1997b. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Processes. 1997 Revision. ES/ER/TM-126/R2. Oak Ridge, TN: Department of Energy, Oak Ridge National Laboratory. November.

Harding-Lawson Associates/Wilder (HLA/Wilder). 2000. Project Plans, Initial Site Characterization Activities, Tok Fuel Demolition, Alaska.

Holmes, G.W. 1965. Geologic Reconnaissance Along the Alaska Highway, Delta River to Tok Junction, Alaska. U.S. Geological Survey Bulletin 1181-H, p. H1-H19.

Lehmkuhl, J.F. 1984. "Determining Size and Dispersion of Minimum Viable Populations for Land Management Planning and Species Conservation". Environmental Management 8:167-176.

North Wind, Inc. (North Wind). 2007. Sears Creek Station Work Plan – Haines-Fairbanks Pipeline Environmental Remediation Services. Sears Creek Station, Alaska. USACE-AK.

North Wind. 2010. Sears Creek Station Remedial Investigation and Feasibility Study Report. Sears Creek Station, Alaska. USACE-AK.

North Wind. 2012. Final Decision Document for Sears Creek Station, Alaska. Prepared for: U.S. Army Garrison Fort Wainwright, Alaska Mission Installation Contracting Command. Contract No. W912CZ-07-C-0002. Delivery Order No. 0002. North Wind, Inc., Anchorage, Alaska.

North Wind. 2014. Former Sears Creek Station Data Gap Analysis Report. Sears Creek Station, Alaska. USACE-AK. June.

North Wind. 2015. Technical Memorandum of the 2014 Field Activities at the Sears Creek Station, Sears Creek Station, Alaska. USACE-AK. May

North Wind. 2016a. Final Interim Site Management Plan for Sears Creek Station, Alaska. USACE-AK. June

North Wind. 2016b. Technical Memorandum of the 2015 Field Activities at the Sears Creek Station, Sears Creek Station, Alaska. USACE-AK. February

Reed, D.H., J.J. O'Grady, B.W. Brook, J.D. Ballou and R. Frankham (Reed et al.). 2003. "Estimates of Minimum Viable Population Sizes for Vertebrates and Factors Influencing those Estimates". Biological Conservation 113:23-34.

Singh, A., T. Frederick, and N. Rios-Jafolla (Singh et al.). 2014. Extracting a Site-specific Background Dataset for a Constituent from a Broader Dataset Consisting of Onsite Constituent Concentrations & Estimating Background Level Constituent Concentrations. Prepared for Environmental Protection Agency.

Thomas, C.D. 1990. "What Do Real Population Dynamics Tell Us About Minimum Population Sizes." Conservation Biology. 4:324-327.

U.S. Army. 2018. Final Report, Supplemental Remedial Investigation, Sears Creek Station, Revision 3. November

U.S. Army. 2020. Feasibility Study, Sears Creek Station, Dry Well, Burn Pit, and Site Groundwater, Revision 2 (Final). April

U.S. Army. 2023. Proposed Plan – Burn Pit, Dry Well, and Site-Wide Groundwater Areas of Concern, Sears Creek Station, Alaska. July

U.S. Army Corps of Engineers (USACE). 1963. As-Built Drawings, Sears Creek Station No. 10. Drawing No. 78-15-65, Premier-H&K Constructors – Construction Contractors. Serial No. Eng 95-507-62-31. April 2.

USACE. 1999. Risk Assessment Handbook Volume I: Human Health Evaluation. Department of the Army, Environmental Quality. EM 200-1-4. C.C. Travis and A.D. Arms. Washington, DC. January 31.

USACE. 2010. Risk Assessment Handbook, Volume II: Environmental Evaluation. EM 200-1-4. C.C. Travis and A.D. Arms. Washington, DC. December.

USACE. 2016. Final Risk Assessment Work Plan. Prepared by AECOM Technical Services, Inc. and Bristol Environmental Remediation Services, LLC. Contract No. W911KB-14-D-0006. Delivery Order No. 0005. February.

U.S. Army Pacific Environmental Health Engineering Agency (USAPEHEA). 1994. Project No. 37-91-4102-94, Sears Creek POL Terminal, Alaska, 1994.

U.S. Department of Defense (USDoD). 2012. Defense Environmental Restoration Program (DERP) Management Manual. Number 4715.20. March 9.

U.S. Environmental Protection Agency (USEPA). 1989. Risk Assessment Guidance for Superfund (RAGS), Volume I, Human Health Evaluation Manual (Part A). Interim Final. EPA/540/1-89/002. Office of Emergency and Remedial Response. December.

USEPA. 1997a. Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessment. Interim final. EPA/540/R-97/006. Office of Solid Waste and Emergency Response. June.

USEPA. 1997b. EPA Region 10 Supplemental Ecological Risk Assessment Guidance for Superfund. EPA 910-R-97-005. June.

USEPA. 1998. Guidelines for Ecological Risk Assessment. Final. EPA/630/R-95-002F. Risk Assessment Forum. April.

USEPA. 2002a. Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites. EPA 540-R-01-003. Office of Emergency and Remedial Response. September.

USEPA. 2002b. Role of Background in the CERCLA Cleanup Program. OSWER 9285.6-07P. Office of Solid Waste and Emergency Response, Office of Emergency and Remedial Response. 26 April.

USEPA. 2003. RCRA Corrective Action Ecological Screening Levels (ESLs). USEPA, Region 5. August 22, 2003.

USEPA. 2004. Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). Final. OSWER No. 9285.7-02 EP. Office of Emergency and Remedial Response. August.

USEPA. 2005. Guidance for Developing Ecological Soil Screening Levels. Office of Emergency and Remedial Response. Washington D.C. November 2003, Revised February 2005. Includes interim documents through 2008.

USEPA. 2007 Guidance for Developing Ecological Soil Screening Levels: Exposure Factors and Bioaccumulation Models for Derivation of Wildlife Eco-SSLs. OSWER Directive 9285.7-55. Office of Solid Waste and Emergency Response. Issued November 2003, Revised April 2007.

USEPA. 2009. Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment). EPA-540-R-070-002. OSWER 9285.7-82. January.

USEPA. 2013. ProUCL Version 5.0.00. Office of Research and Development. September.

USEPA. 2015. Determination of the Biologically Relevant Sampling Depth For Terrestrial And Aquatic Ecological Risk Assessments. EPA/600/R-15/176, ERASC-015F. October.

USEPA. 2016. Regional Screening Levels for Chemical Contaminants at Superfund Sites. EPA Office of Superfund. May.

USEPA. 2017. RSL calculator, accessed online from U.S. EPA website. May.

PART III – RESPONSIVENESS SUMMARY

This section provides a summary of the public comments regarding the Proposed Plan for remedial action at the Burn Pit, Dry Well, and Site-Wide Groundwater AOCs at the SCS and the U.S. Army response to comments. At the time of the public comment period, the proposed remedies were:

- Excavation and off-site treatment of surface and subsurface soil at the Burn Pit AOC.
- Excavation and off-site disposal of surface and subsurface soil at the Dry Well AOC.
- Lead confirmation sampling at the WSW, MNA, and LUCs at the Site-Wide Groundwater AOC.

7.0 STAKEHOLDER COMMENTS AND LEAD AGENCY RESPONSES

Stakeholder comments were not received by the U.S Army during the public review period of the Proposed Plan. No additional written comments were received during the public comment period.

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8.0 TECHNICAL AND LEGAL ISSUES

No technical or legal issues were identified during the public review period of the Proposed Plan (U.S. Army, 2023).

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APPENDIX A

Notice of Availability

(*Fairbanks Daily News Miner* on 23 July 2023.)

AFFP
Sears Creek Public Meeting

Affidavit of Publication

STATE OF ALASKA } SS
COUNTY OF FAIRBANKS
NORTH STAR BOROUGH }

Kaira Lum, being duly sworn, says:

That she is Affidavit Clerk of the Fairbanks Daily News-Miner, a daily newspaper of general circulation, printed and published in Fairbanks, Fairbanks North Star Borough County, Alaska; that the publication, a copy of which is attached hereto, was published in the said newspaper on

July 23, 2023

That said newspaper was regularly issued and circulated on those dates.
SIGNED:

Kaira Lum

Affidavit Clerk

Subscribed to and sworn to me this 23rd day of July 2023.

Jennifer M Robinson

Jennifer M Robinson, Notary Public, Fairbanks North Star Borough County, Alaska
My commission expires: February 11, 2026

00008130 00069200

Stantec Consulting Inc.
475 Riverstone Way Unit 3
Fairbanks, AK 99709-2945

STATE OF ALASKA
NOTARY PUBLIC
Jennifer M. Robinson
My Commission Expires February 11, 2026

UNITED STATES ARMY INVITES PUBLIC COMMENT AND ANNOUNCES A PUBLIC MEETING

The US Army invites public comment on the Proposed Plan for the remediation of the Burn Pit, Dry Well, and Site-Wide Groundwater areas of concern at the Sears Creek Station between Delta Junction and Tok, Alaska. Cleanup activities involve removing contaminated soil and remediating contaminated groundwater.

The US Army and Alaska Department of Environmental Conservation (the Agencies) have considered five alternatives to remediate the site:

1. No Action
2. Monitored Natural Attenuation (MNA) and Land Use Controls (LUCs)
3. Excavation of contaminated soil, MNA, and LUCs
4. Excavation of contaminated soil, biosparging, and LUCs
5. Excavation of contaminated soil, In-situ chemical oxidation, and LUCs

The agencies have identified the preferred alternative based on evaluations and criteria as, excavation of contaminated soil, MNA, and LUCs. The US Army expects the preferred alternative to satisfy the statutory requirements of CERCLA Section 121(b) by protecting human health and the environment, complying with ARARs, being cost effective, utilizing permanent solutions and treatment technologies, and satisfying the preference for treatment.

The U.S. Army invites the public to review and comment on the recommendations in this Proposed Plan. The preferred alternative is a preliminary determination, other alternatives could be selected based upon public comment, new information, or a reevaluation of existing information. The public is encouraged to comment on all the alternatives described in the Proposed Plan. The final decision for the sites will be made after the end of the comment period.

A public meeting is scheduled from 5:00 p.m. to 7:00 p.m. on Tuesday July 25, 2023, at the Delta Junction Community Center located at 2288 Deborah Street. The Proposed Plan will be discussed, and questions taken. If you would like to participate remotely, you can do so by:

On Computer:
https://www.microsoft.com/en-us/microsoft-teams/join-a-meeting
Meeting ID: 210 176 675 40 Passcode: scwjBf

By Phone:
(833)436-6264 (Toll Free)
Phone Conference ID: 436 574 790#

The US Army will prepare a Record of Decision (ROD) to document the alternative selected and summarize responses to public comments. Interested persons can also participate in the public comment process by sending comments or questions to:

Fort Wainwright Public Affairs Officer
Grant Sattler
(907) 353-6701
alan.g.sattler.civ@army.mil
Or
usarmy.wainwright.id-pacific.list.pao@army.mil

The public comment period begins on July 23, 2023, and ends on August 15, 2023. Comments postmarked by August 22, 2023 will be addressed.

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APPENDIX B

Response to Comments

REVIEW COMMENTS **PROJECT: Sears Creek Station**
DOCUMENT: Sears Creek Station, Record of Decision, Burn Pit, Dry Well, and Site-Wide Groundwater

U.S. ARMY CORPS OF ENGINEERS		DATE: 12/22/2023 REVIEWER: ADEC, A. Palmieri PHONE: 907-766-3184	Action taken on comment by:		
Item No.	**Drawing Sheet No., Spec. Para.**	**COMMENTS**	**REVIEW CONFERENCE** A - comment accepted W - comment withdrawn (if neither, explain)	**CONTRACTOR RESPONSE**	**RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)**
1.	Part I – Declaration, Page D-1	This reference should be "SEMS" rather than "CERCLIS" as the EPA has changed its site management system.			Agree, "CLRCLIS" will be changed to "SEMS". **4/2024 DEC response: agree.**
2.	Part I – Declaration, Page D-1	This is an accurate statement, but please use the standard language "ADEC concurs that the remedy will be protective when implemented"			Agree, the sentence will be changed to include the preferred language provided by ADEC. **4/2024 DEC response: agree.**
3.	Part I – Declaration, Page D-2, Description of Selected Remedies, First Sentence.	Correct Acronym			Agree. The acronym will be corrected to read "CERCLA". **4/2024 DEC response: agree.**
4.	Part I – Declaration, Page D-2, Description of Selected Remedies, Second Bullet	EPA recently changed it's lead cleanup level in soil to 200 mg/kg. What is the Army's response to this change in regard to the SCS?			Noted. The Army believes the changes to the soil cleanup level (SCL) for lead will not result in changes to the site-specific remedies but acknowledges soil quantities at some action areas may increase subject to review. Additionally, current citations for lead SCLs will be updated to the new values. **4/2024 DEC response: agree.**
5.	Part I – Declaration, Page D-2, Description of Selected Remedies, Third Bullet	Again, we should discuss the EPA's recent cleanup level change			See response to comment #4. **4/2024 DEC response: agree.**
6.	Part I – Declaration, Page D-3, Description of Selected Remedies, Third paragraph	Please revise to read, "....for these two remedial...".			Agreed. The text will be changed as requested. **4/2024 DEC response: agree.**
7.	Part 1-ADEC Concurrence Page, starting paragraph.	Correct spelling for the word "presence".			Agreed. **4/2024 DEC response: agree.**
8.	Part1- ADEC Concurrence Page, Signature block.	This should read: Dennis Shepard, Environmental Program Manager			Agree. Dennis Shepard will be listed as the Environmental Program Manager. **4/2024 DEC response: agree.**
9.	Part 2- Section 1.1, list of AOCs	We concur with this list - no changes needed.			Noted.
10.	Part 2- Section 1.2, paragraph 4.	Please revise to read: "...Pit was identified as...".			Agree. The text will be corrected. **4/2024 DEC response: agree.**
11.	Part 2- Section 1.2, Figure 1-2	Correct spelling "Decision".			Agree. The text will be corrected. **4/2024 DEC response: agree.**
12.	Section 1.7.2, Paragraph 2, page 1-16.	A risk assessment is Method 4; however, even though a risk assessment was completed at this site, the cleanup levels were calculated using Method 3.			Agree. The text will be changed to "The risk assessment, **…"** **4/2024 DEC response: agree.**

REVIEW COMMENTS **PROJECT:** Sears Creek Station
DOCUMENT: Sears Creek Station, Record of Decision, Burn Pit, Dry Well, and Site-Wide Groundwater

U.S. ARMY CORPS OF ENGINEERS	DATE: 12/22/2023 REVIEWER: ADEC, A. Palmieri PHONE: 907-766-3184	Action taken on comment by:

Item No.	Drawing Sheet No., Spec. Para.	COMMENTS	REVIEW CONFERENCE A - comment accepted W - comment withdrawn (if neither, explain)	CONTRACTOR RESPONSE	RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)
13.	Section 2.2.2. First paragraph.	You could add here that by meeting the Table C cleanup levels, the groundwater will meet UU/UE and residential use.			Noted. This section is intended to outline the current and potential future use of the land. This section is not intended establish the criteria to achieve UU/UE. **4/2024 DEC response: agree.**
14.	Section 6. Table 2-4.	Need better descriptors. These three appear to be the same			Agree. The descriptors in Table 2-4 (and Table 3-4) will be updated utilizing Table 5 from the SCS ROD Proposed Plan as follows: **4/2024 DEC response: agree.** **Table 5** Alternatives Comparative Evaluation Item / Alternatives: 1 – No Action 2 – LUCs and MNA 3 – Excavation of Contaminated Soil, MNA, and LUCs 4 – Excavation of Contaminated Soil, Biosparging, and LUCs 5 – Excavation of Contaminated Soil, ISCO, and LUCs
15.	Section 2.6.1, paragraph 4.	Same issue - need to show why these are different from each other			See comment #14. **4/2024 DEC response: agree.**
16.	Section 2.6.4, paragraph 2.	The only way this is "high" is if the soil is being treated. Mere removal and disposal of contaminated soil does not meet these criteria.			Noted. The score for the Burn Pit AOC was determined during the feasibility stage of this process. The value was also published in the SCS Proposed Plan, thus changing the score for the Burn Pit ACO during this phase of the process would create an incongruency between the three documents. **4/2024 DEC response: agree.**
17.	Section 3.3.3, Table 3-2.	Discuss application of new EPA Lead decision.			Agree. The lead values will be updated in the Table 3-2, and a note indicating that the regulation had changed after the publication of the Proposed Plan will be added to the table's Key. **4/2024 DEC response: agree.**
18.	Section 3.5.1, page 3-13, paragraph 2.	Please update this reference to the current version throughout the document.			Agree- The citation to the current version of the ADEC's Field Samling Guidance, updated in 2022, will be added to the text and updated in the bibliography. **4/2024 DEC response: agree.**
19.	Section 4.5.1, paragraph 2.	Alt 2 and 3 are labeled the same thing			Please see response to comment #14. **4/2024 DEC response: agree.**
20.	Section 6.4, Table 4-3	No treatment so this is "low".			Please see response to comment #16. **4/2024 DEC response: agree.**
21.	Section 4.6.4, paragraph 2.	natural attenuation is not treatment. Modify statement.			Please see response to comment #16. **4/2024 DEC response: agree.**
22.	Section 4.8.1, paragraph 1.	Remove reference to ADEC since this is the Army's ROD.			Agree. The reference to ADEC will be removed from the test. **4/2024 DEC response: agree.**

PROJECT: Sears Creek Station

REVIEW COMMENTS DOCUMENT: Sears Creek Station, Record of Decision, Burn Pit, Dry Well, and Site-Wide Groundwater

U.S. ARMY CORPS OF ENGINEERS		**DATE: 12/22/2023** **REVIEWER: ADEC, A. Palmieri** **PHONE: 907-766-3184**	**Action taken on comment by:**		
Item No.	**Drawing Sheet No., Spec. Para.**	**COMMENTS**	**REVIEW CONFERENCE A - comment accepted W - comment withdrawn (if neither, explain)**	**CONTRACTOR RESPONSE**	**RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)**
23.	Section 4.9.5, paragraph 1.	Request that "expection" is changed to "preference".			Disagree. Expectations is the correct terminology. 40 CFR 300.430(a)(1)(iii) outlines "Expectations". **4/2024 DEC response: agree.** (iii) *Expectations.* EPA generally shall consider the following expectations in developing appropriate remedial alternatives: (A) EPA expects to use treatment to address the principal threats posed by a site, wherever practicable. Principal threats for which treatment is most likely to be appropriate include liquids, areas contaminated with high concentrations of toxic compounds, and highly mobile materials.