DECISION DOCUMENT FOR FIVE AREAS OF CONCERN ON THE FORMERLY USED DEFENSE SITE PROPERTY

(FUDS Project No. F10AK084501/02)

FORT RANDALL
COLD BAY, ALASKA

FINAL
AUGUST 2005

U.S. Army Engineer District, Alaska
P.O. Box 6898
Elmendorf AFB, Alaska 99506-6898

JACOBS ENGINEERING GROUP INC.

Alaska District

TOTAL ENVIRONMENTAL RESTORATION CONTRACT

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Prepared for:
U.S. Army Corps of Engineers
P.O. Box 6898
Elmendorf AFB, Alaska 99506-6898

Prepared by:
Jacobs Engineering Group Inc.
4300 B Street, Suite 600
Anchorage, Alaska 99503

Total Environmental Restoration Contract
Contract No. DACA 85-95-D-0018
Task Order No. 05

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APPENDICES

Appendix A Applicable or Relevant and Appropriate Requirements
Appendix B Responses to Comments

ACRONYMS AND ABBREVIATIONS

AAC	Alaska Administrative Code
ACL	alternative cleanup level
ADEC	Alaska Department of Environmental Conservation
ADOT&PF	Alaska Department of Transportation and Public Facilities
ARAR	applicable or relevant and appropriate requirements
AST	aboveground storage tank
AvGas	aviation gasoline
bgs	below ground surface
BSA	Beach Seep Area
BTEX	benzene, toluene, ethylbenzene, and xylenes
COC	contaminant of concern
COPC	contaminant of potential concern
CSM	conceptual site model
CWB	Collapsed Wooden Building
cy	cubic yards
DERP	Defense Environmental Restoration Program
DDA	Drum Disposal Area
DRO	diesel-range organics
EDB	1,2-dibromoethane
EPA	U.S. Environmental Protection Agency
EWR	East-West Runway
FAA	Federal Aviation Administration
FS	feasibility study
FUDS	Formerly Used Defense Site
GAC	granular activated carbon
gpm	gallons per minute
GPR	ground-penetrating radar
GRO	gasoline-range organics

ACRONYMS AND ABBREVIATIONS
(continued)

HVE	high-vacuum extraction
IRA	interim removal action
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MHW	mean high water
N/A	not applicable
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
O&M	operations and maintenance
OSHA	Occupational Safety and Health Administration
ORNL	Oak Ridge National Laboratory
PAH	polycyclic aromatic hydrocarbon
PRG	preliminary remediation goal
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RI	remedial investigation
RRO	residual-range organics
SHPO	State Historic Preservation Office
SVE	soil vapor extraction
TAH	total aromatic hydrocarbon
TAqH	total aqueous hydrocarbon
USAED	U.S. Army Engineer District, Alaska
UST	underground storage tank
VOC	volatile organic compound
WAX	Western Anomaly Excavation
WPL	Western Pipeline Excavation
WWII	World War Two
µg/kg	micrograms per kilogram
µg/L	micrograms per liter

PART 1: DECISION DOCUMENT EXECUTIVE SUMMARY

FIVE AREAS OF CONCERN ON THE FORMERLY USED DEFENSE SITE AT FORT RANDALL, COLD BAY, ALASKA

The Formerly Used Defense Site (FUDS) at Fort Randall is adjacent to the city of Cold Bay, Alaska. Cold Bay is located approximately 30 miles from the west end of the Alaska Peninsula and approximately 640 miles southwest of Anchorage. The U.S. Environmental Protection Agency identification number is AKS9799F7088, and the Alaska Department of Environmental Conservation (ADEC) contaminated site record key numbers are 199725X105001, 199725X105002, 199725X105004, and 199725X105005. The Fort Randall site is not listed on the National Priorities List.

The property was divided into six areas of concern for remedial purposes:

Area of Concern	Description
Drum Disposal Area	Former location of four drum disposal trenches and three wood-stave ASTs
Beach Seep Area	Former location of 210,000-gallon AST
Collapsed Wooden Building	Former building location that was used to store drums of jet fuel
Stapp Creek	Former location of 34 USTs, one of which remains
East-West Runway	Former location of five USTs, one of which remains
Asphalt Seep Area	Location of two drum trenches and exposed asphalt

This Decision Document addresses only the Drum Disposal Area (DDA), Beach Seep Area (BSA), Collapsed Wooden Building (CWB), Stapp Creek, and East-West Runway (EWR). A separate decision document will be issued to address the Asphalt Seep Area.

Earlier actions were conducted under removal authority to control releases from the site and remove buried drums, aboveground storage tanks, underground storage tanks (UST), and pipelines.

The Fort Randall FUDS was a military hub during World War Two. The current owners of the properties include the Alaska Department of Transportation and Public Facilities and the University of Alaska.

STATEMENT OF BASIS AND PURPOSE

Authorities: Defense Environmental Restoration Program (DERP), United States Code, Title 10, Chapter 2701 et seq. Determination of whether environmental damage creates an imminent and substantial endangerment to the public health or welfare or to the environment has been based on ADEC risk-based cleanup levels as defined in Alaska Administrative Code, Title 18, Chapter 75, *Oil and Other Hazardous Substances Pollution Control*, and on the inclusion of Cold Bay on the State of Alaska's list of impaired water bodies under Section 303(d) of the Clean Water Act.

This Decision Document presents the U.S. Army Engineer District, Alaska (USAED), selected remedy for Fort Randall, chosen in accordance with the Administrative Record for this site. The sites within this decision document fall under the Comprehensive Environmental Response, Compensation, and Liability Act petroleum exclusion and are thus being addressed under the authority of the DERP statute. The proposed response action meets ADEC requirements for cleanup of petroleum contaminated sites and is consistent with the response process set forth in the National Contingency Plan.

ADEC concurs with the selected remedies. This concurrence is based on all information available in the administrative record for the site. This decision may be reviewed and modified in the future if new information becomes available that indicates the presence of previously undiscovered contamination or exposure that may cause an unacceptable risk to human health and the environment.

ASSESSMENT OF SITE

The response action selected in this Decision Document is necessary to protect the public health or welfare or the environment from actual or threatened releases of petroleum substances into the environment, which may present an imminent and substantial endangerment to public health or welfare.

DESCRIPTION OF SELECTED REMEDIES

The selected remedy for each site involves the following:

- **DDA and BSA Soils:** Soil contaminated with diesel fuel at concentrations above 10,480 milligrams per kilogram (mg/kg) of diesel-range organics (DRO) is considered a primary contaminant of concern (COC) and will be excavated to a depth of 15 feet below ground surface (bgs) and thermally treated onsite. Soil contaminated with diesel fuel at concentrations above the cleanup level of 524 mg/kg DRO, but less than 10,480 mg/kg DRO, will be treated with bioventing. Soils contaminated with diesel fuel and located at depths greater than 15 feet bgs will also be treated with bioventing. Soil contaminated with volatile contaminants will be treated with soil vapor extraction (SVE). The estimated timeline for this remedy is 10 years: 1 year for excavation and thermal treatment, 2 years for soil vapor extraction, and 8 years for bioventing. Cleanup levels guiding the selected remedy are found in Table 1-1.
- **DDA and BSA Sediments, Free Product, and Groundwater:** This remedy will rely on the existing high-vacuum extraction (HVE) system to capture free product that is floating on the groundwater surface. This free product is considered a primary COC. Approximately three additional extraction wells will be added to the system to maximize mass capture of free product. Operation of the HVE system will continue as long as removal of free product is feasible and cost effective. The removal of free product and the remediation of contaminated soil will reduce the migration of contaminants to groundwater and downgradient sediments. Following treatment, monitored natural attenuation will be used until cleanup goals are met. The estimated timeline for this remedy is 16 years: 1 year for system design and modification, 10 years for HVE operations, and 5 years for monitoring of natural attenuation. Cleanup levels guiding the selected remedy are found in Table 1-1.
- **CWB:** All known contaminants have been removed from the site. Thus, the selected remedy calls for no further action.
- **Stapp Creek and EWR Sites:** Contaminated water contained in two 25,000-gallon USTs will be treated. The USTs will then be removed and shipped offsite for recycling. Soil with contaminant concentrations above the cleanup level will be removed. An estimated 12 cubic yards of soil contains fuel-related contaminants at concentrations above cleanup levels. The excavated soil will be treated onsite, using thermal treatment (in conjunction with DDA/BSA treatment) or shipped offsite for treatment or disposal. The estimated timeline for this remedy is one year. Cleanup levels guiding the selected remedy are found in Table 1-1.

Table 1-1
Cleanup Levels

Site	Contaminant	Soil Cleanup Level[1] (mg/kg)	Groundwater Cleanup Level[2] (mg/L)
DDA	DRO	524	1.5
	GRO	578	1.3
	RRO	-	1.1
	Benzene	0.0228	0.005
	Ethylbenzene	9.15	-
	Toluene	8.01	1.00
	Xylenes	129	-
	Beta-BHC (b-HCH)	0.0176	-
	2-Methylnaphthalene	86.6	-
	1,2,4-Trimethylbenzene	25.2	-
	1,3,5-Trimethylbenzene	35.5	-
	1,2-Dibromoethane	0.000173	0.00005
	1,2-Dichloroethane	-	0.005
	Trichloroethene	-	0.005
BSA	DRO	524	1.5
	RRO	-	1.1
	Benzene	-	0.005
	1,2-Dibromoethane	-	0.00005
	TAH	-	0.010
	TAqH	-	0.015
Stapp Creek	DRO	250	-
	Benzo(a)anthracene	6	-
	Benzo(a)pyrene	1	-
	Benzo(b,k)fluoranthene	11	-
	Dibenzo(a,h)anthracene	1	-
EWR	GRO	300	-
	DRO	250	-
	Dibenzo(a,h)anthracene	1	-
	Benzene	0.02	-
	Ethylbenzene	5.5	-
	Toluene	5.4	-

Notes:

[1] Soil cleanup levels for the DDA and BSA sites were developed based on 18 AAC 75 Method 3 using site-specific total organic carbon data. Soil cleanup levels for the Stapp Creek and EWR sites are based on the values listed in 18 AAC 75 Method 2, Tables B1 and B2.

[2] Groundwater cleanup levels are generally based on 18 AAC 75.345 Table C values. The cleanup level for 1,2-dibromoethane is based on Technical Memo 01-007 (ADEC 2001). The cleanup levels for TAH and TAqH are based on 18 AAC 70.

For definitions, see the Acronyms and Abbreviations section.

STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with federal and state requirements that are applicable or relevant and appropriate to the remedial action, is cost effective, and utilizes permanent solutions to the maximum extent practicable. This remedy also satisfies the statutory preference for treatment as a principal element of the remedy (i.e., reduces the toxicity, mobility, or volume of petroleum concentrations as a principal element through treatment). A five-year review is not mandated; however, USAED will continue close coordination with ADEC to ensure that the remedy is, or will be, protective of human health and the environment.

DATA CERTIFICATION CHECKLIST

The following checklist is discussed in Part 2 of this Decision Document, Decision Summary. Additional details can be found in the information repository for this site maintained at the Cold Bay City Clerk's office and at the USAED Elmendorf Air Force Base office:

- COCs and contaminants of potential concern (COPC) and their respective concentrations (Tables 2-2, 2-3, 2-4, 2-18, 2-19, 2-20, 2-21)
- Baseline risk represented by the COCs and COPCs (Tables 2-16, 2-17, 2-23, 2-24)
- Cleanup levels established for COCS and COPCs and the basis for these levels (Tables 2-1, 2-16, 2-17, 2-23, 2-24)
- How contaminated media and COCs will be addressed (Table 2-10)
- Current and reasonably anticipated future land-use assumptions and current and potential future beneficial uses of groundwater used in the baseline risk screening and decision document (Sections 6A.0, 6B.0, 6C.0)
- Potential land and groundwater use that will be available at the site as a result of the selected remedy (Sections 12A.4, 6B.0, 12C.4)
- Estimated capital, annual operations and maintenance, and total present-worth costs, discount rate, and the number of years over which the remedy cost estimates are projected (Tables 2-14, 2-15, 2-25; Section 12B.0)
- Key factors that led to selecting the remedy (Sections 12A.1, 8B.0, 12C.1)

AUTHORIZING SIGNATURES

This Decision Document presents the selected remedies at Fort Randall, Cold Bay, Alaska. The U.S. Army Corps of Engineers is the lead agency under the DERP at the Fort Randall FUDS, and has developed this Decision Document consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This Decision Document will be incorporated into the larger Administrative Record file for the former Fort Randall site, which is available at the City Clerk's office in Cold Bay, Alaska. This document, presenting the selected remedies with a total present-worth cost estimate of $9.3 million dollars, is approved by the undersigned, pursuant to Memorandum DAIM-ZA, 9 September 2003, Subject: Policies for Staffing and Approving Decision Documents, and Engineer Regulation 200-3-1, FUDS Program Policy.

APPROVED

Patricia A. Rivers, P.E. | Date

Chief, Department of Defense Support Team
Directorate of Military Programs

PART 2: THE DECISION SUMMARY

The following sections provide a summary of the facility's history, remedial investigation (RI) findings, remedial alternatives considered, and the selected remedies. Additional information is available in the administrative record, specifically:

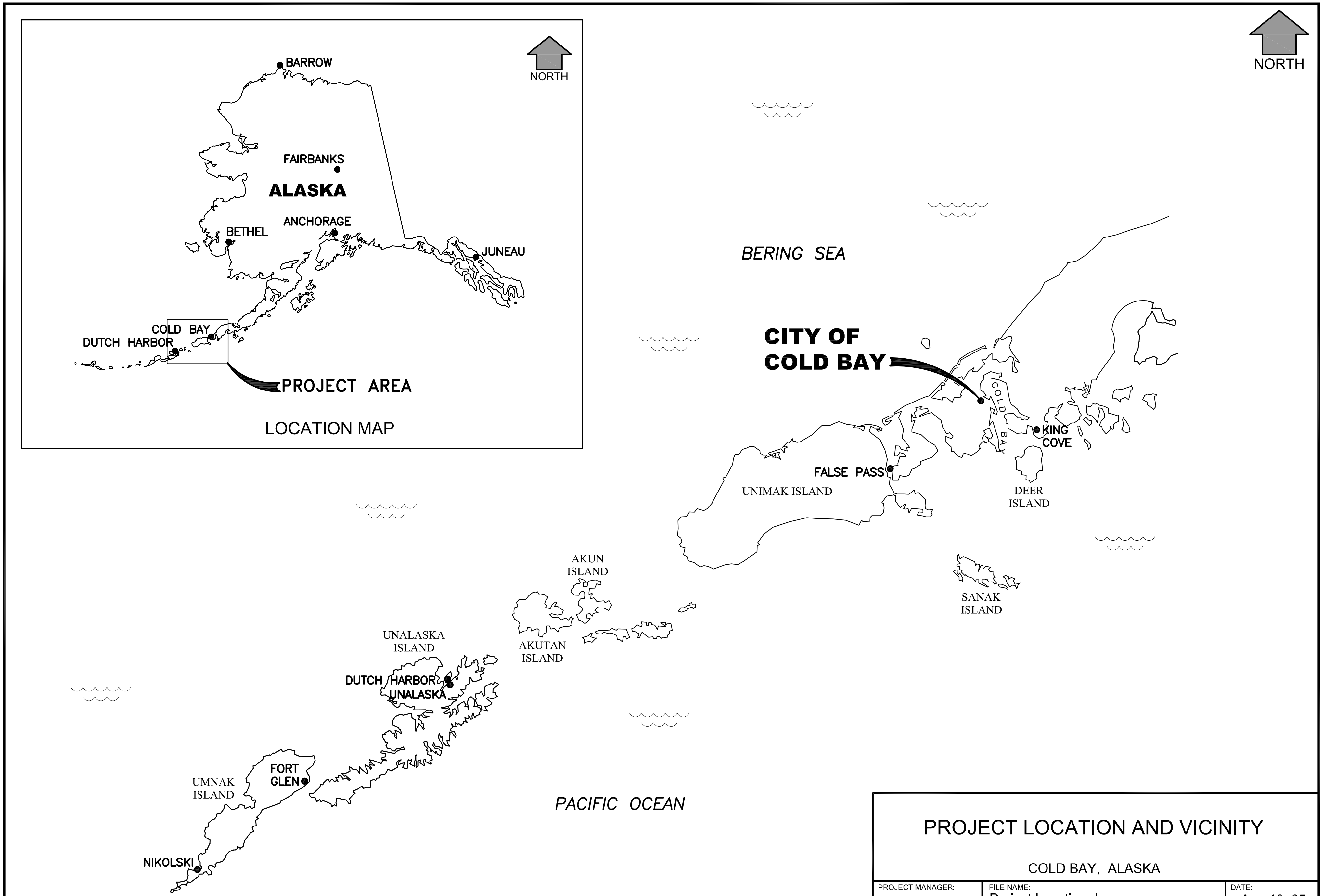
- Historical data from the site is summarized in the Beach Seep Area (BSA) and Drum Disposal Area (DDA) RI and Feasibility Study (FS) Work Plan (USAED 2002a) and RI/FS Supplemental Work Plan (USAED 2002b).
- Detailed description of the extent of contamination is provided in the final RI report (USAED 2003b).
- The final FS (USAED 2003a) evaluates remedial alternatives to address site contamination.

1.0 SITE NAME, LOCATION, AND BRIEF DESCRIPTION

Fort Randall is adjacent to the city of Cold Bay, located approximately 30 miles from the west end of the Alaska Peninsula and approximately 640 miles southwest of Anchorage (Figure 2-1). The only available transportation to the community is by air or sea.

The lead agency for addressing environmental contamination at Fort Randall is USAED. The Alaska Department of Environmental Conservation (ADEC) is the lead regulatory agency. Cleanup monies are provided by the U.S. Department of Defense Formerly Used Defense Site (FUDS) program.

Fort Randall is a former military facility. Environmental contamination at the facility resulted from fuel handling and disposal of drums. To date, a series of interim removal actions (IRA) has been taken that include removal of 2,267 drums from the DDA (1998-1999), installation of the high-vacuum extraction (HVE) system to capture free product discharging to the BSA (1998), and treatment of over 5,000 cubic yards (cy) of contaminated soil at the DDA (2000-2001). The HVE system is currently operational and has removed over 51,000 pounds of contaminant to date.



PROJECT LOCATION AND VICINITY

COLD BAY, ALASKA

PROJECT MANAGER: S. Witzmann	FILE NAME: Project Location.dwg	DATE: Aug 18, 05
DRAWN BY: BJP	LAYOUT TAB: Project Location	FIGURE NO.: 2-1
	FILE LOCATION: Cold Bay \ 05M30608 \ 2004 Decision Document	

An RI of the sites was conducted in 2002, and an FS was prepared to evaluate cleanup options for each location. With the exception of the Collapsed Wooden Building (CWB) site, action is required at each of the sites to ensure continued protection of human health and the environment.

2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

2.1 SITE HISTORY

Cold Bay's history of military activities began in 1890, when Cold Bay became a Naval Reservation by Executive Order. No action was taken initially on the Executive Order, and from 1890 to 1940, Cold Bay was uninhabited, except for a few subsistence hunters and trappers.

During World War Two (WWII), Cold Bay's strategic location was recognized as important for national defense; therefore, the Civil Aeronautics Administration started construction of the East-West Runway (EWR) in September 1940. The U.S. Army took over runway construction in February 1942 (Fort Randall). In addition to completing the paving of the EWR with asphalt, the Army also constructed the North-South Runway, docking facilities, and related support facilities, including fuel storage tanks, fuel piping systems, Yakutat huts, Quonset huts, and wooden frame structures (USAED 1988). On 24 April 1942, the U.S. Department of Interior awarded 519,000 acres of land in the Cold Bay area to the U.S. War Department under Public Land Order 103 (USAED 1997).

The military constructed fuel storage and distribution systems along the Stapp Creek and EWR sites to support aircraft fueling operations. This storage and distribution system included 38 aviation gasoline (AvGas) underground storage tanks (UST) and five truck fill stations, two of which had associated USTs. Historical fuel spills and releases from this system have resulted in contamination of site soils with AvGas at the Stapp Creek and EWR sites.

In addition to the AvGas storage and distribution system, a diesel fuel storage and distribution system was also constructed. This system originally included three 25,000-gallon wood-stave tanks that received diesel fuel by pipeline from the Cold Bay dock. The wood-stave tanks were later abandoned in place, and a 210,000-gallon aboveground storage tank (AST) replaced them for diesel fuel storage (USAED 2003b). Spills and releases also have resulted in contamination of soils with diesel fuel at the DDA/BSA site.

The Fort Randall Army Base was activated in 1942. Two coastal defense sites also were established, one at Grant Point and the other at Mortensen's Lagoon. Military activities at Cold Bay expanded in 1943, with the construction of the Naval Auxiliary Air Facility (now called Old Navy Town).

In 1943, the airfield at Cold Bay was named Thornbrough Army Airfield in honor of Captain George W. Thornbrough's valiant but fatal pursuit of a Japanese carrier in the Bering Sea. After the United States captured Attu and Kiska in August 1943, the military importance of Cold Bay diminished. The peak population of this area was approximately 9,000 military personnel (USAED 1988).

During WWII, Fort Randall was supplied with approximately 4,000 to 5,000 55-gallon drums of heating oil, lubricants, solvents, volatile fuels, and similar liquids (USAED 1997).

In January 1944, Fort Randall and the Thornbrough Army Airfield were placed in caretaker status. The Naval Auxiliary Air Facility was decommissioned in November of that year. In January 1947, the airfield was renamed Thornbrough Air Force Base. The base was maintained in caretaker status until it and Fort Randall were closed and abandoned in 1950, leaving hundreds of structures in place. In 1954, the U.S. Department of the Interior revoked Public Land Order 103. However, under Public Land Order 1001, the War Department retained control over 49,070 acres that included Cold Bay.

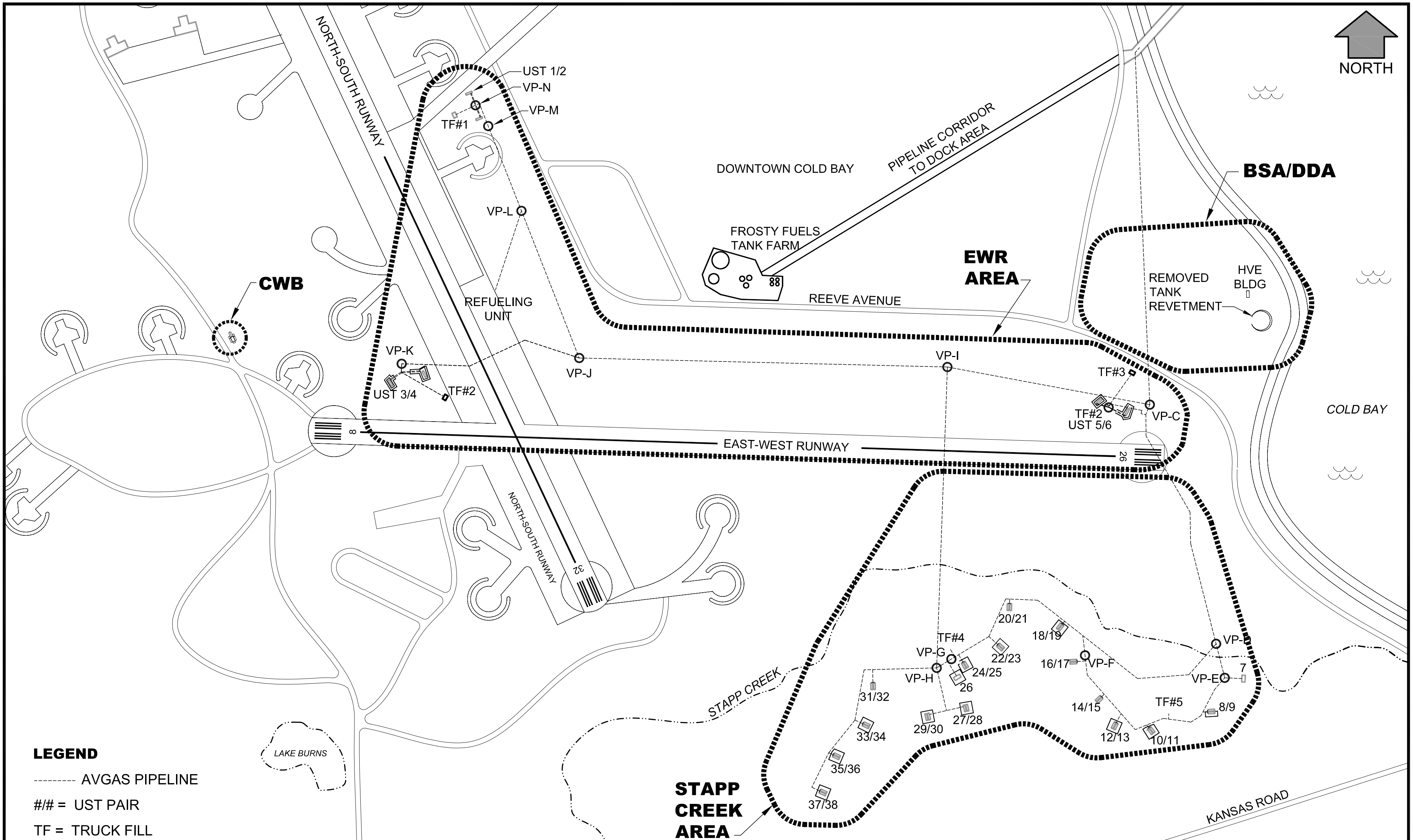
By 1957, a darkened area was present on the beach below the 210,000-gallon AST; this is in the area where diesel fuel currently discharges to the beach and stains the sediments (USAED 1997, 20 May 1957). Based on the available information, use of the AST was probably discontinued in the 1950s due to the reported appearance of fuel on the beach below the tank (USAED 1997).

In 1961, the U.S. War Department transferred use of the lands originally outlined under Public Land Orders 103 and 1001 to the Federal Aviation Administration (FAA) and the Bureau of Land Management (Public Land Order 2451). Interviews with FAA personnel indicate that the 210,000-gallon AST was not used by the FAA (USAED 1997). However, throughout this time, the AST may still have contained a substantial quantity of military fuel; due to deterioration of the tank, removal of the fuel was infeasible (USAED 1997). There is no evidence that drums were disposed of at the site after ownership of the property was transferred to FAA, nor is there evidence of beneficial use of the USTs, ASTs, or pipelines following the property transfer.

There is no evidence of any post-military use of the DDA, BSA, or Stapp Creek. However, the runway area continued to be used intermittently following WWII. Notably, the Flying Tigers leased the runway in the late 1960s, when they had a military contract to fly supplies to Asia (USAED 1988). As the war in Vietnam expanded, the Flying Tigers built a number of new facilities located on the east side of the north-south runway (USAED 1988). Because the Flying Tigers built their own facilities, it appears that they did not have access to or gain beneficial use from the pre-existing facilities. Specifically, it appears that the Flying Tigers did not have access to the USTs associated with the EWR site; USAED reviewed the available data and concluded that the EWR site is FUDS-eligible (USAED 1997).

The available data suggest that the facilities constructed by the Flying Tigers currently house Frosty Fuels, the local commercial fuel supplier (Figure 2-2). This was confirmed by a local Cold Bay resident (Ferguson 2005). The Frosty Fuels facility includes a number of ASTs and buildings, and the tanks are connected directly to the Cold Bay dock by a pipeline corridor. Presently, the Frosty Fuels station supplies AvGas for aircraft using the runway. Environmental contamination associated with the Flying Tigers/Frosty Fuels site is not included in this decision document and will not be addressed under the Defense Environmental Restoration Program (DERP).

In 1985, the 210,000-gallon AST was removed under DERP (USAED 1997).



SITE LOCATIONS

COLD BAY, ALASKA

PROJECT MANAGER: S. Witzmann	FILE NAME: Site Locations.dwg	DATE: Aug 18, 05
DRAWN BY: BJP	LAYOUT TAB: Site Locations	FIGURE NO.: 2-2
	FILE LOCATION: Cold Bay \ 05M30608 \ 2004 Decision Document	

In 1996, the property was transferred to the State of Alaska (USAED 1997). The runway area is currently used for commercial and private flights and is operated by the Alaska Department of Transportation and Public Facilities (ADOT&PF). The remainder of Fort Randall belongs to ADOT&PF and the University of Alaska and is currently used in association with the runway or for recreational use. Specific land uses are described under each site.

2.2 ACTIONS TO DATE

A series of IRAs has taken place to address environmental contamination at Fort Randall. Cleanup activities at the DDA and BSA sites began in 1985. Early work included removing the 210,000-gallon diesel AST and demolishing adjacent structures, as follows:

- In 1998, 2,138 drums were removed from three DDAs (DDA-A, DDA-B, and DDA-C). Approximately 3,000 cy of contaminated soil was removed and stockpiled.
- In 1998, the HVE system was constructed at the BSA to remove free product as it accumulates on the water table surface.
- In 1999, a geophysical survey was conducted, and 129 drums were removed from DDA-D and disposed of offsite. Approximately 1,340 cy of contaminated soil was removed and stockpiled.
- In 2000, 4,950 cy of stockpiled soil was thermally treated. Over 2,000 crushed drums and associated scrap metal were recycled.
- In 2001, all remaining stockpiled, contaminated soil was thermally treated. Treated soil was returned to its original location. The site was then graded and seeded.
- As of February 2005, the HVE system has removed 51,000 pounds (6,900 gallons) of diesel fuel contamination.

2.3 INVESTIGATION HISTORY

Data collected from the removal actions and investigations at the site identified main contamination areas. In 2002, an RI was conducted to define the extent of contamination at each of the five sites addressed in this document. Additional site specific information may be found under the sections addressing each of the five individual sites.

2.4 ENFORCEMENT HISTORY

RIs and IRAs at the Fort Randall sites were carried out under the FUDS program. There have been no enforcement activities, notices of violation, or lawsuits pertaining to U.S. Department of Defense activities at the Fort Randall sites.

3.0 COMMUNITY PARTICIPATION

To inform the public of environmental investigations and IRAs at Fort Randall, USAED has held periodic public meetings in Cold Bay. In support of this Decision Document, additional efforts were made by USAED to inform the community and to solicit public input. The final RI (USAED 2003b), final FS (USAED 2003a), and *Proposed Plan for Six Formerly Used Defense Sites at Fort Randall, Cold Bay, Alaska* (USAED 2004) were made available to the public in May 2004. For public access, these documents were added to the Information Repository maintained at the Cold Bay City Clerk's office. A notice of the availability of these documents was published in the *Dutch Harbor Fisherman* on 29 April 2004. A public comment period was held from 26 April to 21 May 2004. In addition, a public meeting was held at the Cold Bay Community Center on 3 May 2004 to present the Proposed Plan to a broader community audience than those that had already been involved at the sites. At this meeting, representatives from USAED and ADEC presented the Proposed Plan and answered questions about contamination at the sites and the remedial alternatives under consideration.

4.0 SCOPE AND ROLE OF RESPONSE ACTION

For the purposes of RI, Fort Randall was divided into the following six sites (Figure 2-2):

- DDA
- BSA
- Asphalt Seep
- CWB
- Stapp Creek
- EWR

For the purpose of remedial action and due to their close proximity, the DDA and BSA sites have been combined. In addition, separate media-specific remedies for 1) soils and 2) sediments, free product, and groundwater have been selected for the DDA/BSA. The contaminants found at the Stapp Creek and EWR sites are very similar; therefore, for the purposes of remedial action, these two sites also have been combined. The Asphalt Seep site differs from the others and will be addressed in a separate decision document. Thus, remedies have been selected for the following areas:

- DDA/BSA soil
- DDA/BSA sediments, free product, and groundwater
- CWB
- Stapp Creek and EWR sites

The overall cleanup objectives at Fort Randall are to restore each site to a level that is protective of human health and the environment and to comply with applicable or relevant and appropriate requirements (ARAR) (Appendix A). The restoration will be complete when cleanup levels for soil and groundwater are met. Cleanup levels are shown in Table 2-1.

The remedies presented in this decision document build upon IRAs conducted in 1998, 1999, 2000, and 2001 (USAED 1998a, 1998b, 1999, 2000, and 2001).

These removal actions addressed primary sources of contamination, such as drums, fuel tanks, and piping. They also began to address secondary sources, such as impacted soil beneath the buried drums and diesel free product at the BSA site.

The process used to arrive at selected remedies has included a RI, FS, and the Proposed Plan. As discussed in Section 3.0, a community involvement program has been used to inform the public and to solicit public input into the decision-making process. Cleanup goals have been established consistent with ADEC regulations. Specifically, cleanup goals for soil and groundwater have been established based on Alaska Administrative Code (AAC), Title 18, Chapter 75; cleanup goals for surface waters have been established based on 18 AAC 70. ADEC regulations are based on hazard and risk evaluations, which are equal to or more conservative than the EPA hazard and risk assessment values (hazard index = 1 and risk range

Table 2-1
Soil and Groundwater Cleanup Levels

Site	Contaminant	Soil Cleanup Level[1] (mg/kg)	Groundwater Cleanup Level[2] (mg/L)
DDA	DRO	524	1.5
	GRO	578	1.3
	RRO	-	1.1
	Benzene	0.0228	0.005
	Ethylbenzene	9.15	-
	Toluene	8.01	1.00
	Xylenes	129	-
	Beta-BHC (b-HCH)	0.0176	-
	2-Methylnaphthalene	86.6	-
	1,2,4-Trimethylbenzene	25.2	-
	1,3,5-Trimethylbenzene	35.5	-
	1,2-Dibromoethane	0.000173	0.00005
	1,2-Dichloroethane	-	0.005
	Trichloroethene	-	0.005
BSA	DRO	524	1.5
	RRO	-	1.1
	Benzene	-	0.005
	1,2-Dibromoethane	-	0.00005
	TAH	-	0.010
	TAqH	-	0.015
Stapp Creek	DRO	250	-
	Benzo(a)anthracene	6	-
	Benzo(a)pyrene	1	-
	Benzo(b,k)fluoranthene	11	-
	Dibenzo(a,h)anthracene	1	-
EWR	GRO	300	-
	DRO	250	-
	Dibenzo(a,h)anthracene	1	-
	Benzene	0.02	-
	Ethylbenzene	5.5	-
	Toluene	5.4	-

Notes:

Source of cleanup levels for contaminants in soil: 18 AAC 75 Method 2 for Stapp Creek and EWR; 18 AAC 75 Method 3 for DDA and BSA.

Source of cleanup levels for contaminants in groundwater: 18 AAC 75.345, Table C, except 1,2-dibromoethane from Technical Memo 01-007 and TAH and TAqH based on 18 AAC 70.

For definitions, see the Acronyms and Abbreviations section.

of 1.0 x 10^{-4} to 1.0 x 10^{-6}). Therefore, federal cleanup regulations will be met through the enforcement of state regulations.

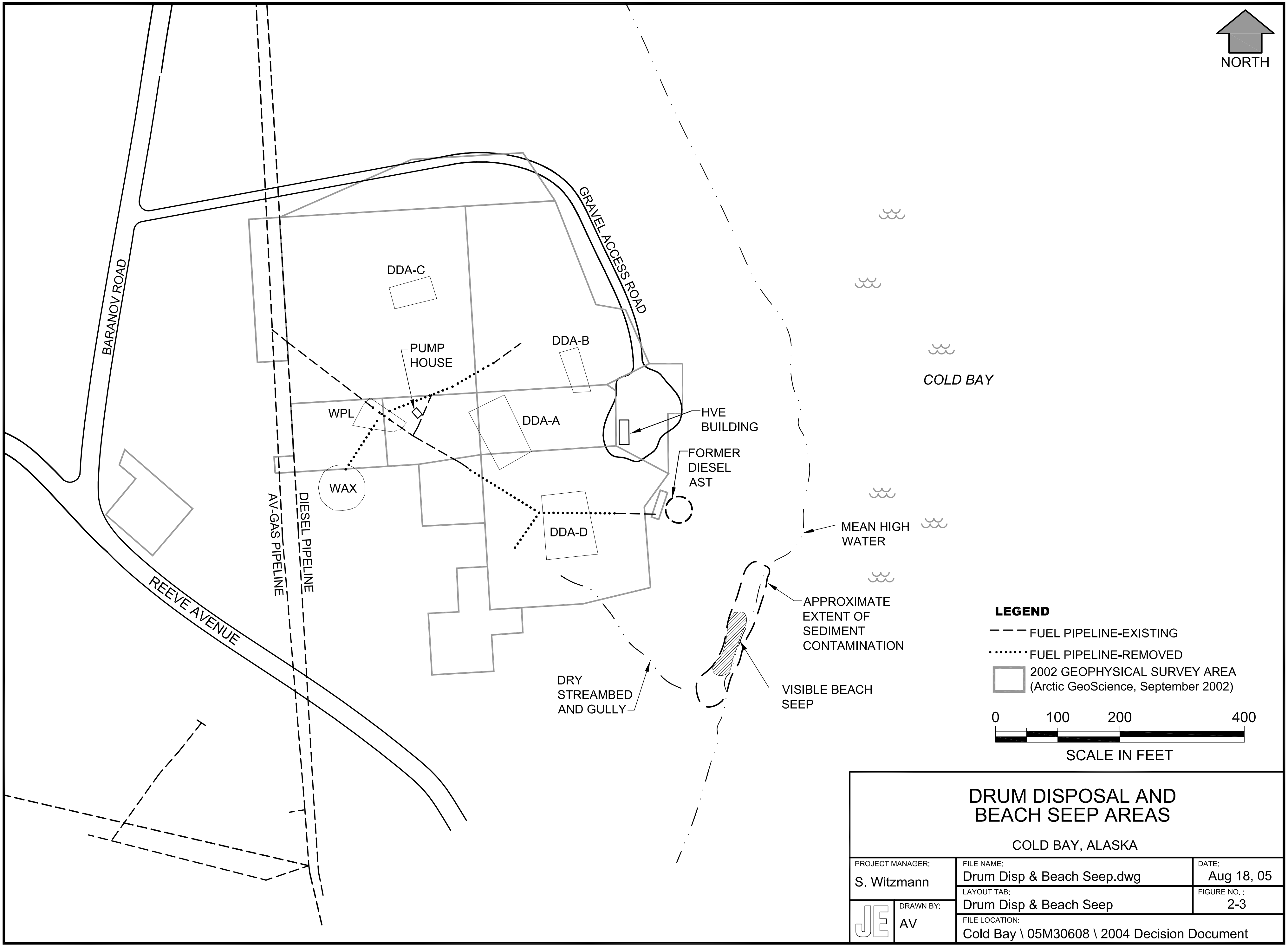
Initial response actions included in the selected remedies will focus on treating or removing primary contaminants of concern (COC), including highly contaminated soils and free product at the DDA/BSA. Subsequent actions will focus on residual contamination at each of the sites. Until cleanup goals are met, institutional controls will be used to ensure continued protection of human health.

DRUM DISPOSAL AREA/BEACH SEEP AREA SITE

5A.0 DRUM DISPOSAL AREA/BEACH SEEP AREA SITE CHARACTERISTICS

5A.1 OVERVIEW

In total, the DDA/BSA site covers approximately 15 acres of land. Although the BSA and DDA sites are juxtaposed, there is no defined border between the two. The approximate boundaries of the DDA and BSA sites are shown in Figure 2-3. Dirt work from past military and remedial activities at the DDA/BSA site has left the areas relatively flat. Graded areas in the center of the DDA site have been revegetated with grass. Undisturbed areas are covered with low and brushy vegetation. To the south of the removed AST revetment, there is an overgrown gully containing metal debris. There also appears to be a dry streambed running from west to east, leading to the gully, which might have been used as a beach access road during WWII. The elevation of the BSA site varies between sea level and approximately 55 feet above mean high water (MHW). The elevation of the edge of the bluff is approximately 55 feet above MHW. The DDA site is relatively flat, with the central area at elevations between 40 and 50 feet above MHW, rising to about 75 feet above MHW at the western extent. The DDA/BSA site slopes slightly to the south and drains into the dry streambed and gully to the south of the removed AST.



DRUM DISPOSAL AND BEACH SEEP AREAS

COLD BAY, ALASKA

PROJECT MANAGER: S. Witzmann	FILE NAME: Drum Disp & Beach Seep.dwg	DATE: Aug 18, 05
	LAYOUT TAB: Drum Disp & Beach Seep	FIGURE NO. : 2-3
JE — DRAWN BY: AV	FILE LOCATION: Cold Bay \ 05M30608 \ 2004 Decision Document	

Static groundwater levels in the DDA/BSA site range from 40 to 60 feet below ground surface (bgs). The groundwater elevation is about 16 feet above MHW at the west extent of the DDA site and gradually decreases to about 1 foot above MHW at the beach. Groundwater flow appears to be generally easterly toward the bay of Cold Bay. Groundwater at the DDA/BSA site discharges to the surface water of Cold Bay.

5A.2 CONCEPTUAL SITE MODELS, HUMAN HEATH, AND ECOLOGICAL RECEPTORS

5A.2.1 Conceptual Site Model for Human Health

The conceptual site model (CSM) of potential current and future exposure pathways at the DDA/BSA is presented in Figure 2-4. The CSM illustrates contaminant sources, release mechanisms, transport media, exposure routes, and receptors. A graphical representation of the distribution and movement of contaminants at the DDA/BSA site is presented as Figure 2-5.

The primary contamination sources are historic leaks and spills associated with aboveground tanks and related piping, as well as drum and unidentified source leaks. The primary release mechanisms include infiltration/percolation and overland flow. These release mechanisms caused surface and subsurface soils, light nonaqueous phase liquid, and groundwater to become secondary contaminant sources.

Possible secondary release mechanisms include infiltration/percolation, biouptake, overland flow, volatilization, and groundwater discharge, all of which could result in contamination of potential contact media such as groundwater, subsurface soil, berries, fish, shellfish, surface soil, air, marine sediment, and marine surface water. Potential exposure routes include inhalation, ingestion, and dermal contact. Potential exposure receptors include current or future recreational visitors, offsite receptors, future onsite workers, future residents, as well as aquatic and terrestrial wildlife and biota.

5A.2.2 Ecological Receptors

Ecological receptors identified for the DDA/BSA site include aquatic (salt water only) and terrestrial organisms. Potential exposure routes include ingestion of surface water, soil, or sediment; dermal exposure to constituents in surface water, soil, or sediments; inhalation of vapors or particulates from soil; uptake of contaminants by flora; and ingestion of contaminants in food resources.

5A.3 SURFACE AND SUBSURFACE FEATURES

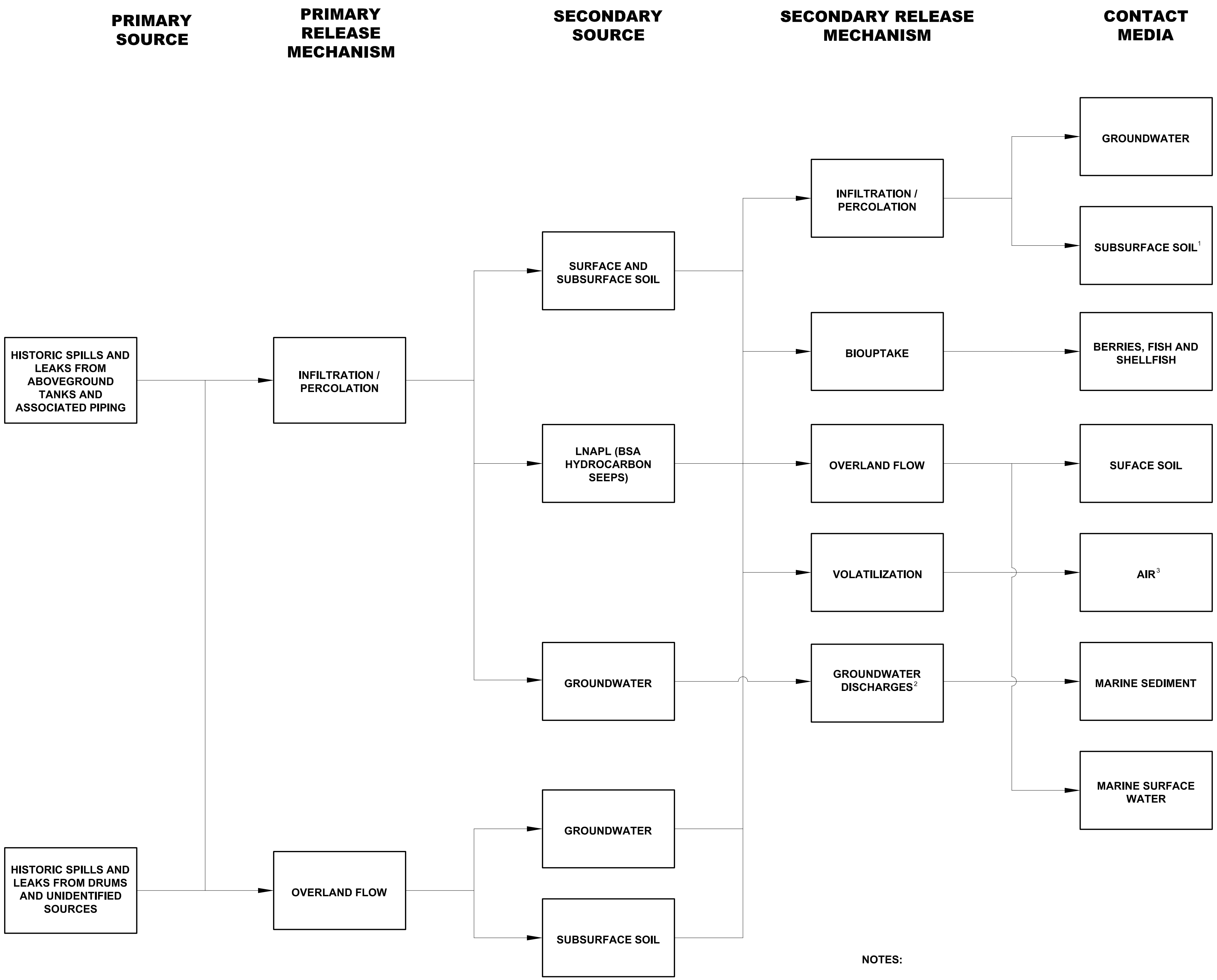
Surface and subsurface features at the DDA/BSA site include 15 monitoring wells installed to monitor free-product thickness and groundwater contamination at the site as well as an HVE system installed in 1998 to remove diesel free product. Historically, there were a number of additional surface and subsurface features. The most prominent of these was a 210,000-gallon diesel AST located near the center of the BSA site on the edge of the bluff. In addition, there were four DDAs containing over 2000 55-gallon drums, underground AvGas and diesel pipelines, and two truck filling stations within the DDA site. Three 25,000-gallon wood-stave tanks were also present at the site.

To date, no areas of historical or archaeological significance have been encountered in the BSA/DDA site.

5A.4 SAMPLING STRATEGY

Most of the field sampling took place during the 2002 remedial investigation. Specifically, soil, groundwater, sediment and surface water were analyzed for the full suite of chemicals that could be present as a result of historical and permitted site activities. The elements of remedial investigation included:

- Geophysical surveys
- Test pit excavation
- Soil screening
- Surface soil and test pit sampling
- Borehole installation and subsurface soil sampling



POTENTIAL RECEPTORS

EXPOSURE ROUTE	HUMAN: CURRENT OR FUTURE RECREATIONAL VISITOR	HUMAN: CURRENT OR FUTURE OFFSITE RECEPTOR	HUMAN: FUTURE ONSITE WORKER	HUMAN: FUTURE RESIDENT	ECOLOGICAL: AQUATIC	ECOLOGICAL: TERRESTERIAL
INGESTION (VOCs)	–	–	X	X	–	--
INGESTION	–	–	X	X	–	--
DERMAL	–	–	X	X	–	--
INHALATION-PARTICLES	–	–	X	X	–	--
INGESTION	–	–	X	X	–	--
DERMAL	–	–	X	X	–	--
INGESTION	X	X	X	X	X	X
INHALATION-PARTICLES	X	–	X	X	–	X
INGESTION	X	–	X	X	–	X
DERMAL	X	–	X	X	–	X
INHALATION (VOCs)	–	–	X	X	–	X
INGESTION	–	–	–	–	X	X
DERMAL	X	–	–	–	X	X
INGESTION	–	–	–	–	X	X
DERMAL	–	–	–	–	X	X

X= A POTENTIALLY COMPLETED EXPOSURE PATHWAY.

NOTES:

1. THE POSSIBILITY EXISTS THAT SUBSURFACE CONTAMINATION MAY BE BROUGHT TO THE SURFACE AS A RESULT OF FUTURE CONSTRUCTION OR EXCAVATION ACTIVITIES.
2. GROUNDWATER IS THOUGHT TO DISCHARGE TO THE MARINE ENVIRONMENT ONLY (i.e., GROUNDWATER ONLY CONTACTS MARINE SEDIMENTS AND SURFACE WATER).
3. VAPOR SOURCES INCLUDE SOIL AND/OR GROUNDWATER CONTAMINATION. VAPOR MIGRATION FROM VOLATILE ORGANIC COMPOUNDS (VOCs) INTO A FUTURE COMMERCIAL, INDUSTRIAL, OR RESIDENTIAL STRUCTURE IS CONSIDERED.

CONCEPTUAL SITE MODEL
BEACH SEEP AND DRUM DISPOSAL AREAS

COLD BAY, ALASKA

PROJECT MANAGER:	FILE NAME:	DATE:
S. Witzmann	Conceptual Site Model.dwg	Aug 18, 05
DRAWN BY: BJP	LAYOUT TAB: BSA-DDA	FIGURE NO.: 2-4
	FILE LOCATION: Cold Bay \ 05M30608 \ 2004 Decision Document	

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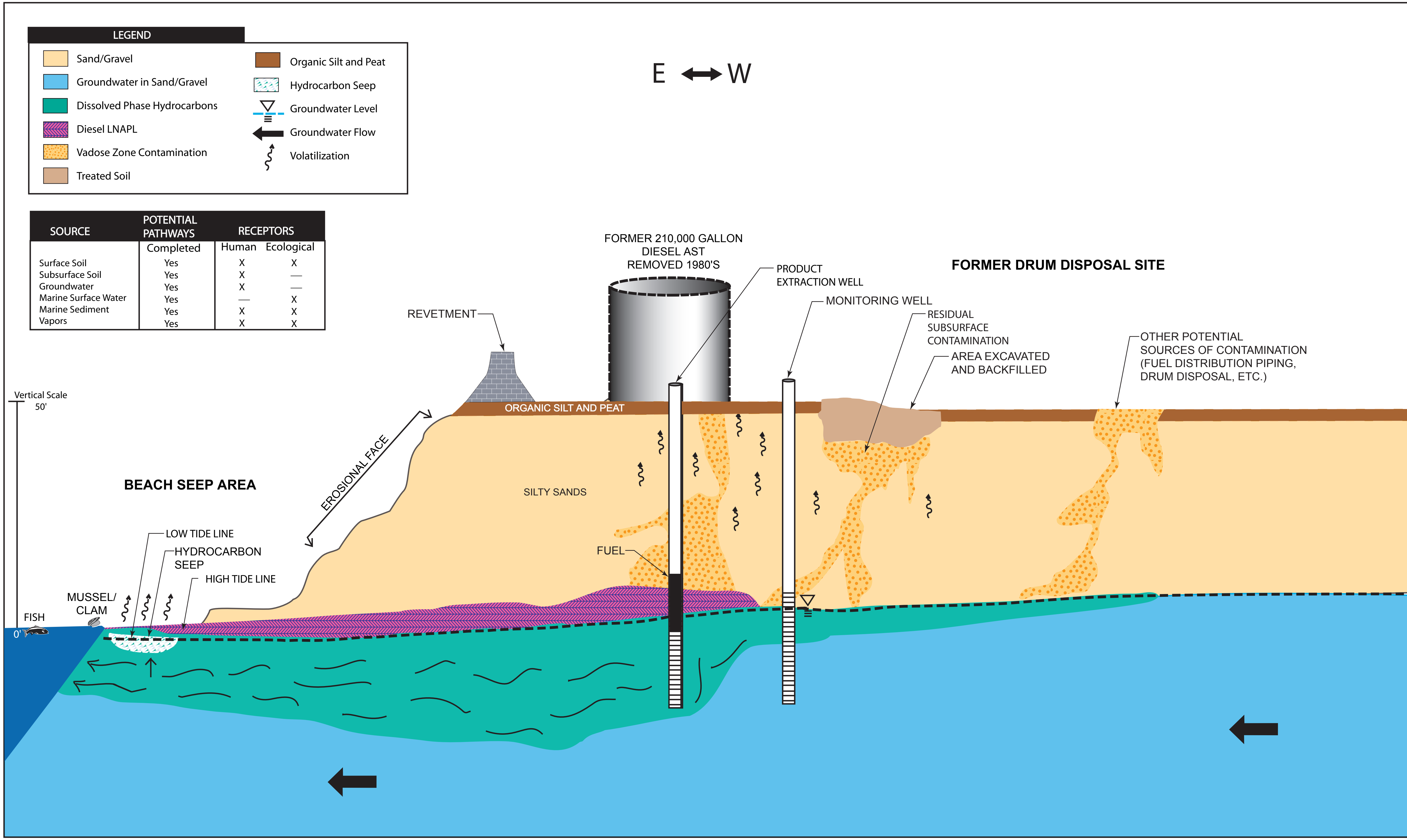


CONCEPTUAL SITE FLOW MODEL
BEACH SEEP AND DRUM DISPOSAL AREAS

COLD BAY, ALASKA

PROJECT MANAGER: S. Witzmann	FILE NAME: Site Flow Model BSDA-DDA.ai	DATE: Aug. 18, 05
	LAYOUT TAB:	FIGURE NO: 2-5
JE DRAWN BY: BJP	FILE LOCATION: Cold Bay \ 05M30608 \ 2004 Decision Document	

- Monitoring well installation and development
- Groundwater sampling
- Land surveying
- Pipeline investigation and confirmation of previous decommissioning actions

A geophysical survey was completed to guide other RI activities. The survey used electromagnetic detection, dual-head magnetometery, and ground-penetrating radar (GPR). The results of the geophysical survey were used to determine where test pits should be dug and to help determine the existence of additional potential contamination sources.

Test pits were excavated at areas of suspected or known contamination to determine the lateral and vertical extent of contamination. Test pit locations were based primarily on field observations and screening. To determine the extent of contamination at each of the four drum disposal areas, the four corners of each area were staked and test pits were excavated just outside the sidewalls of the original excavation. When contamination was encountered, step-out test pits were excavated. This process was repeated until clean soil was encountered.

Soil borings were advanced where contamination was too deep for test pits. In addition, a soil boring was advanced at the location of the highest measured contaminant concentration within the floor of each of the four DDAs (DDA-A, DDA-B, DDA-C, and DDA-D). Wells were placed to define the extent of groundwater contamination. To date, 15 monitoring wells have been installed in the DDA/BSA site, and samples have been collected. Well locations appear in Figure 2-6. An additional eight monitoring wells were installed and have been converted to extraction wells for the HVE system (labeled W-1301 through W-1308 on Figure 2-6).

5A.5 KNOWN OR SUSPECTED SOURCES OF CONTAMINATION

The primary suspected sources of contamination for soil at the DDA/BSA site are former buried drum trenches and a 210,000-gallon AST. Cleanup activities for soil at the DDA and BSA sites began in 1985. Early work included removing the 210,000-gallon diesel AST and demolishing adjacent structures:

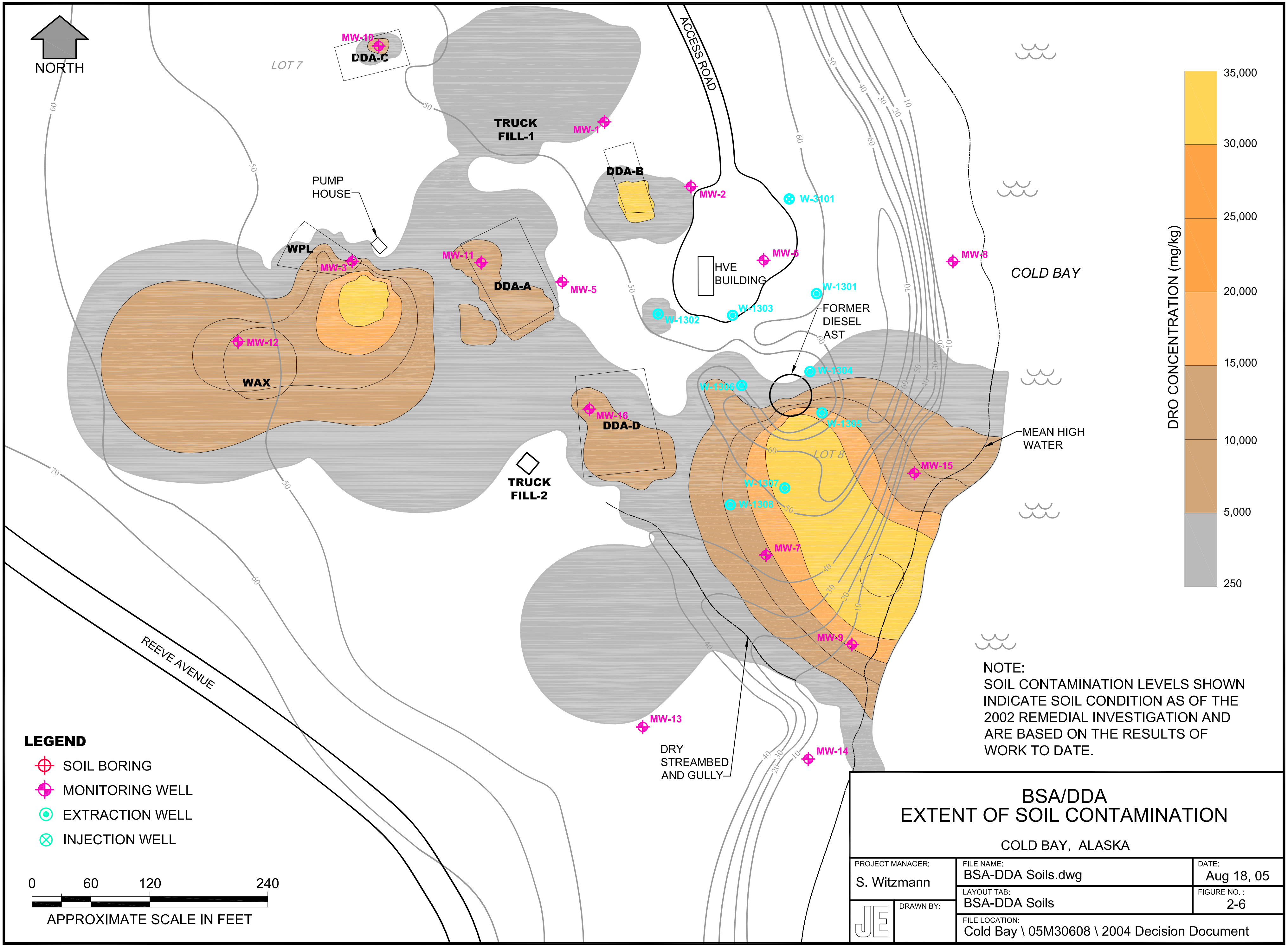
- In 1998, 2,138 drums were removed from three DDAs (DDA-A, DDA-B, and DDA-C). Approximately 3,000 cy of contaminated soil was removed and stockpiled. The HVE system was constructed and began operation.
- In 1999, a geophysical survey was conducted, and 129 drums were removed from DDA-D and disposed of. Approximately 1,340 cy of contaminated soil was removed and stockpiled. Approximately 140 feet of 4-inch-diameter steel pipe was removed and disposed of.
- In 2000, 4,950 cy of stockpiled soil was thermally treated. Over 2,000 crushed drums and associated scrap metal were recycled.
- In 2001, all remaining stockpiled and contaminated soil was thermally treated. Treated soil was returned to its original location. The site was then graded and seeded.
- In 2002, an RI was conducted to define the extent of soil contamination remaining at the site.

This work has removed the primary sources of contamination for the site.

5A.6 TYPES OF CONTAMINATION AND THE AFFECTED MEDIA

During the 2002 RI, all chemicals detected were initially considered as contaminants of potential concern (COPC). Chemicals then were screened, based on media-specific, risk-based values and retained as final COPCs. In general, COPCs for the DDA/BSA include fuel-related compounds, volatile organic compounds (VOC), and pesticides. COCs are the subset of COPCs that require cleanup.

The COCs and COPCs for soil and groundwater within the DDA/BSA site and their characteristics are addressed in Tables 2-2, 2-3, and 2-4.



NOTE:
SOIL CONTAMINATION LEVELS SHOWN INDICATE SOIL CONDITION AS OF THE 2002 REMEDIAL INVESTIGATION AND ARE BASED ON THE RESULTS OF WORK TO DATE.

BSA/DDA
EXTENT OF SOIL CONTAMINATION

COLD BAY, ALASKA

PROJECT MANAGER: S. Witzmann	FILE NAME: BSA-DDA Soils.dwg	DATE: Aug 18, 05
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	FILE LOCATION: Cold Bay \ 05M30608 \ 2004 Decision Document	

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Table 2-2
DDA/BSA Soil Contaminants of Concern and Contaminants of Potential Concern

Contamination	Maximum Detected Concentration	Cleanup Level by Exposure Pathway			Cumulative Risk Level
		Ingestion	Inhalation	Migration to Groundwater	
DRO	39,000	10,100	12,500	**524**	-
GRO	5,700	1,400	1,400	**578**	-
Benzene	11	151	9.9	**0.0228**	7.5
Ethylbenzene	24	10,100	155	**9.15**	-
Toluene	50	20,300	278	**8.01**	-
Xylenes	400	203,000	-	**129**	-
Beta-BHC (b-HCH)	0.0487	4.61	61.4	**0.0176**	-
2-Methylnaphthalene	154	2030	-	**86.6**	-
1,2,4-Trimethylbenzene	99	5,070	133	192	**25.2**
1,3,5-Trimethylbenzene	140	5,070	52.8	46.9	**35.5**
1,2-Dibromoethane	0.017	0.0977	1.35	**0.000173**	-

Notes:

Source of cleanup level for all contaminants: 18 AAC 75 Method 3; cumulative risk levels apply to 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene.

All values are in mg/kg.

Bold text represents the cleanup level.

For definitions, see the Acronyms and Abbreviations section.

5A.7 LOCATION OF CONTAMINATION AND KNOWN/POTENTIAL ROUTES OF MIGRATION

The contamination present at the site includes surface and subsurface soil contamination, free-product contamination, soil impacted by product floating on a fluctuating water table (the smear zone), groundwater contamination, and contamination in marine sediments. All known primary sources of contamination have been removed, though contamination remains near the sources described in Section 5A.5.

Table 2-3
DDA/BSA Sediment Contaminants of Concern and Contaminants of Potential Concern

Contaminant	Maximum Detected Concentration	Minimum Ecological Screening Criteria
Toluene	13.4	0.05
2-Methylnaphthalene	17,300	0.07
Anthracene	2,260	0.0853
Benzo(a)pyrene	125	0.43
Benzo(b)fluoranthene and Benzo(k)fluoranthene	260	0.027
Benzo(g,h,i)perylene	51.8	0.29
Fluorene	4,840	0.019
Indeno(1,2,3-c,d)pyrene	72.6	0.078
Naphthalene	3,840	0.16
Phenanthrene	15,300	0.24
Pyrene	3,390	0.665

Notes:

Source of screening criteria: National Oceanic and Atmospherics Associations guidelines are effects-range low values published in *Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects in Sediment-Associated Biota* (ORNL 1997).

All values are in mg/kg. The values listed represent screening values, not cleanup levels.

For definitions, see the Acronyms and Abbreviations section.

Table 2-4
DDA/BSA Groundwater Contaminants of Concern and Contaminants of Potential Concern

Analyte	Units	Maximum Detected Value	Cleanup Level	Source of Cleanup Level
DRO	mg/L	58.3	1.5	18 AAC 75
GRO	mg/L	6.37	1.3	18 AAC 75
RRO	mg/L	1.16	1.1	18 AAC 75
1,2-Dibromoethane	µg/L	10	0.05	Tech Memo 01-007
1,2-Dichloroethane	µg/L	12.5	5	18 AAC 75
Benzene	µg/L	1,150	5	18 AAC 75
Toluene	µg/L	1,390	1,000	18 AAC 75
Trichloroethene	µg/L	6.8	5	18 AAC 75
TAH	µg/L	115.87	10	18 AAC 70
TAqH	µg/L	225	15	18 AAC 70

Note: For definitions, see the Acronyms and Abbreviations section.

5A.8 NATURE AND EXTENT OF CONTAMINATION

The free-product plume floats atop a larger plume of dissolved phase groundwater contamination. Although the extent of the free-product plume has changed over time, the plume has extended for as much as 425 feet along the beach and up to 375 feet inland, covering as much as 2.8 acres. Cross-sections showing the distribution of contamination can be seen in Figures 2-7 and 2-8. These figures provide cross-sections of the BSA/DDA site and indicate the locations of contaminated soil and free product. Contaminated sediment along the beach extends approximately 250 feet in length by 35 feet in width, with depths ranging from 1.5 to 2 feet. The total volume of contaminated sediment is estimated to be 650 cy. Figure 2-6 depicts the area of DRO soil contamination. Figure 2-9 shows the extent of groundwater contamination.

The groundwater below Cold Bay is present in an unconfined aquifer of sand and gravel lenses within glacial till. Groundwater is assumed to flow along the slopes of Mount Frosty from north to south, discharging into Cold Bay and Izembek Lagoon. Runoff from nearby Mount Frosty infiltrates the soils at lower elevations to recharge the aquifer (Alaska Department of Community and Regional Affairs 1982).

Within the DDA/BSA site, groundwater flow appears to be easterly toward the bay of Cold Bay. Figure 2-10 shows the interpreted groundwater contours and flow lines for the area.

Soil contaminants at the DDA/BSA site tend to sorb strongly onto site soils. However, as precipitation percolates downward through contaminated soils, a small but significant amount of contamination dissolves, resulting in mobile groundwater contamination. Overlying soil contamination may also contribute to the free-product layer. In addition, the free-product layer is migrating slowly downgradient, resulting in sediment contamination.

The interaction between soil and groundwater plays a prominent role in the groundwater contamination. As the water table moves up and down, free product, the petroleum floating on the groundwater surface, spreads from the water table into the surrounding soil, also known as the smear zone. Results from the FS indicate that if the free product and contamination within the soil and smear zone are addressed, then natural processes will rapidly restore the groundwater quality beneath the site and sediment along the beach.

6A.0 CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

6A.1 LAND USE

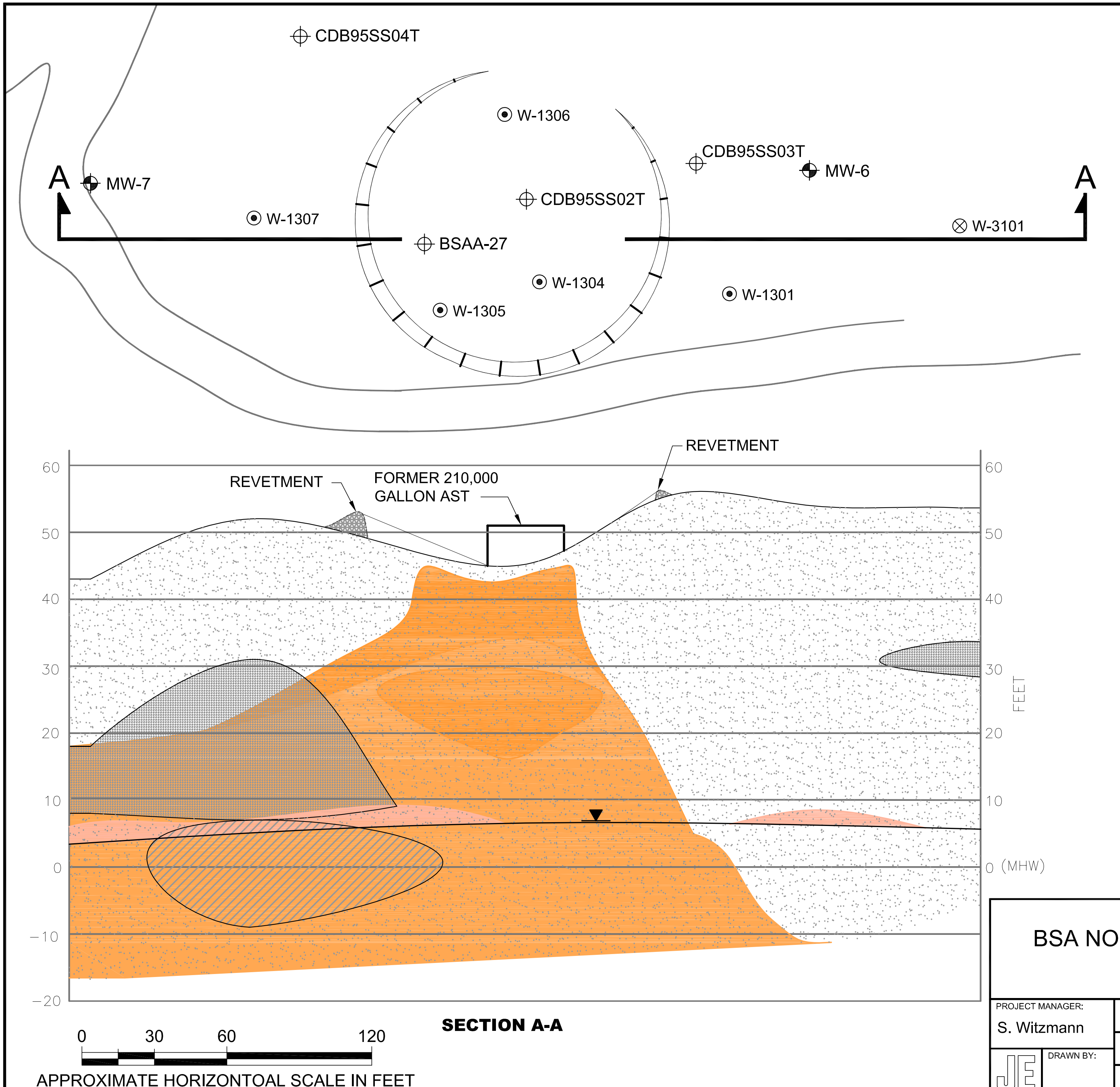
The land containing the DDA/BSA site currently is owned by the University of Alaska, pursuant to a land grant. Current land use is recreational with ongoing cleanup activities. There are no residential or commercial establishments at either the BSA or DDA. Both areas are uninhabited and are used for recreational and subsistence purposes. The University is not actively using the land at present and has indicated its desire to sell it some time in the near future. These areas are not zoned, and based on land use at surrounding properties, potential future use of the land (following site cleanup activities) is relatively unlimited. Future uses of the areas could include residential applications or such commercial applications as a bed and breakfast or lodge.

6A.2 GROUNDWATER USE

The city of Cold Bay supplies its residents with drinking water pumped from a deep aquifer. It is not anticipated that groundwater will be extracted from the site in the near future; however, the aquifer remains a potential future source of drinking water.

6A.3 SURFACE WATER USE

Surface water at the site includes the bay of Cold Bay. The bay has only recreational use in the area near the site.



LEGEND

LITHOLOGY

SOIL TYPE RANGE: GRAVEL TO SAND
PERMEABILITY RANGE: HIGH (3.00×10^{-2} m/sec to 2.00×10^{-7} m/sec)

SOIL TYPE RANGE: SAND TO SILT
PERMEABILITY RANGE: MIDDLE (6.00×10^{-3} m/sec to 9.00×10^{-7} m/sec)

SOIL TYPE RANGE: SILT TO CLAY
PERMEABILITY RANGE: LOW (2.00×10^{-5} m/sec to 1.00×10^{-11} m/sec)

RELATIVE CONTAMINATION

DIESEL-RANGE ORGANICS RANGE: GREATER THAN 5,000 mg/kg

DIESEL-RANGE ORGANICS RANGE: 0 to 5,000 mg/kg

FREE PRODUCT

SYMBOLS

MONITORING WELL
HVE EXTRACTION WELL
WATER LEVEL
SOIL BORING
HVE RE-INJECTION WELL

NOTES:
1. RELATIVE LEVELS OF CONTAMINATION ARE ESTIMATED BASED ON:
   (A) DIESEL-RANGE ORGANICS CONCENTRATIONS IN ANALYTICAL SAMPLES
   (B) PHOTOIONIZATION DETECTOR READINGS TAKEN FROM SOIL BORINGS AND TEST PITS FROM 1995 TO 2002.
2. CONTOURS ARE EXAGGERATED BECAUSE VERTICAL SCALE IS NOT EQUAL TO HORIZONTAL SCALE.

BSA NORTH-SOUTH CROSS SECTION

COLD BAY, ALASKA

PROJECT MANAGER: S. Witzmann	FILE NAME: North-South X-Sect.dwg	DATE: Aug 18, 05
DRAWN BY:	LAYOUT TAB: North-South X-Sect	FIGURE NO.: 2-7
	FILE LOCATION: Cold Bay \ 05M30608 \ 2004 Decision Document	

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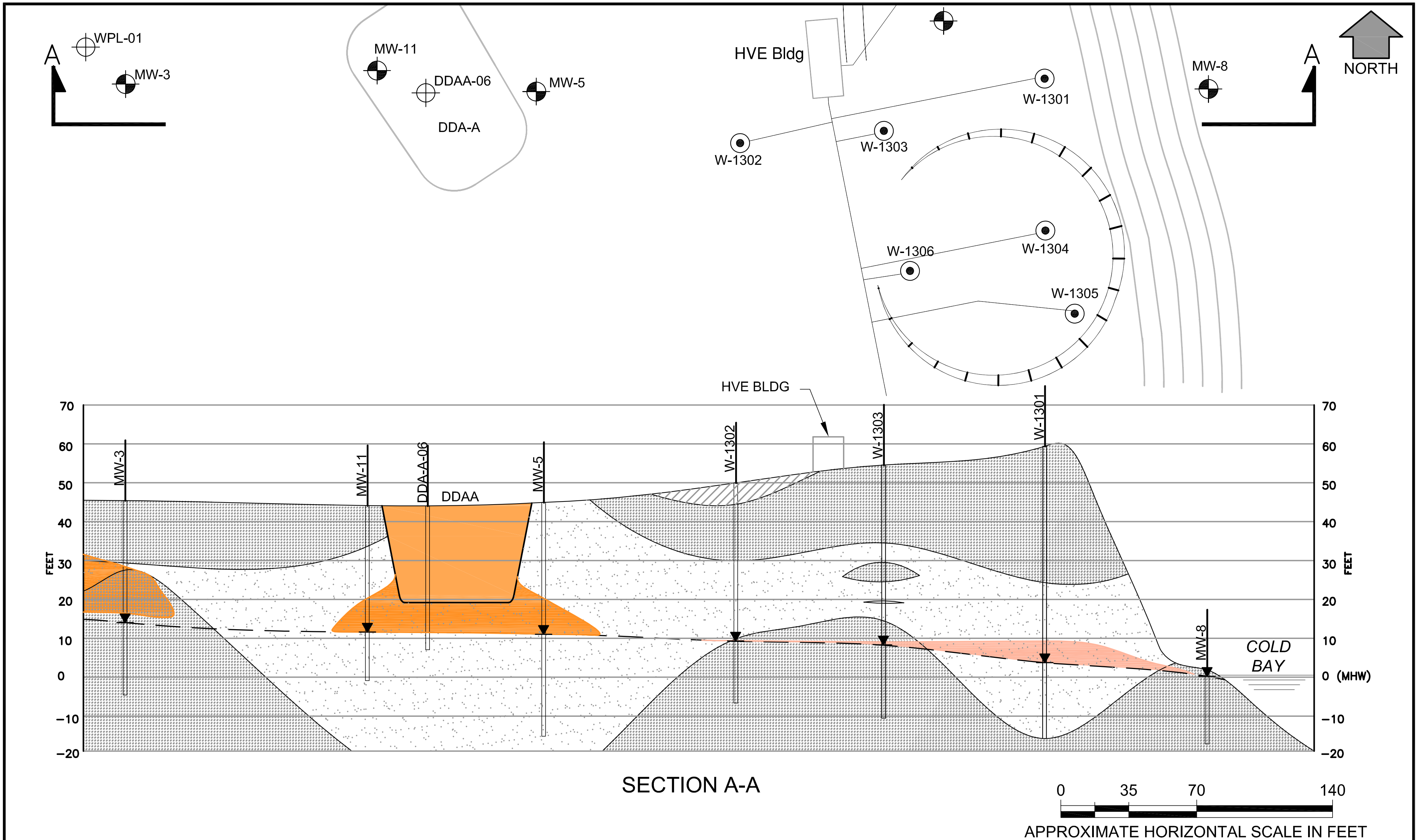

MONITORING WELL

HVE EXTRACTION WELL

WATER LEVEL

SOIL BORING

SOIL TYPE RANGE: GRAVEL TO SAND
PERMEABILITY RANGE: HIGH (3.00×10^{-2} m/sec to 2.00×10^{-2} m/sec)

SOIL TYPE RANGE: SAND TO SILT
PERMEABILITY RANGE: MIDDLE (6.00×10^{-3} m/sec to 9.00×10^{-7} m/sec)

SOIL TYPE RANGE: SILT TO CLAY
PERMEABILITY RANGE: LOW (2.00×10^{-5} m/sec to 1.00×10^{-11} m/sec)

CONTAMINATED SOIL (EXTENT ESTIMATED)

PREVIOUSLY TREATED SOIL

FREE PRODUCT

BSA/DDA EAST-WEST CROSS-SECTION

COLD BAY, ALASKA

PROJECT MANAGER: S. Witzmann	FILE NAME: East-West X-Sect.dwg	DATE: Aug 18, 05
	LAYOUT TAB: East-West X-Section	FIGURE NO.: 2-8
JE DRAWN BY:	FILE LOCATION: Cold Bay \ 05M30608 \ 2004 Decision Document	

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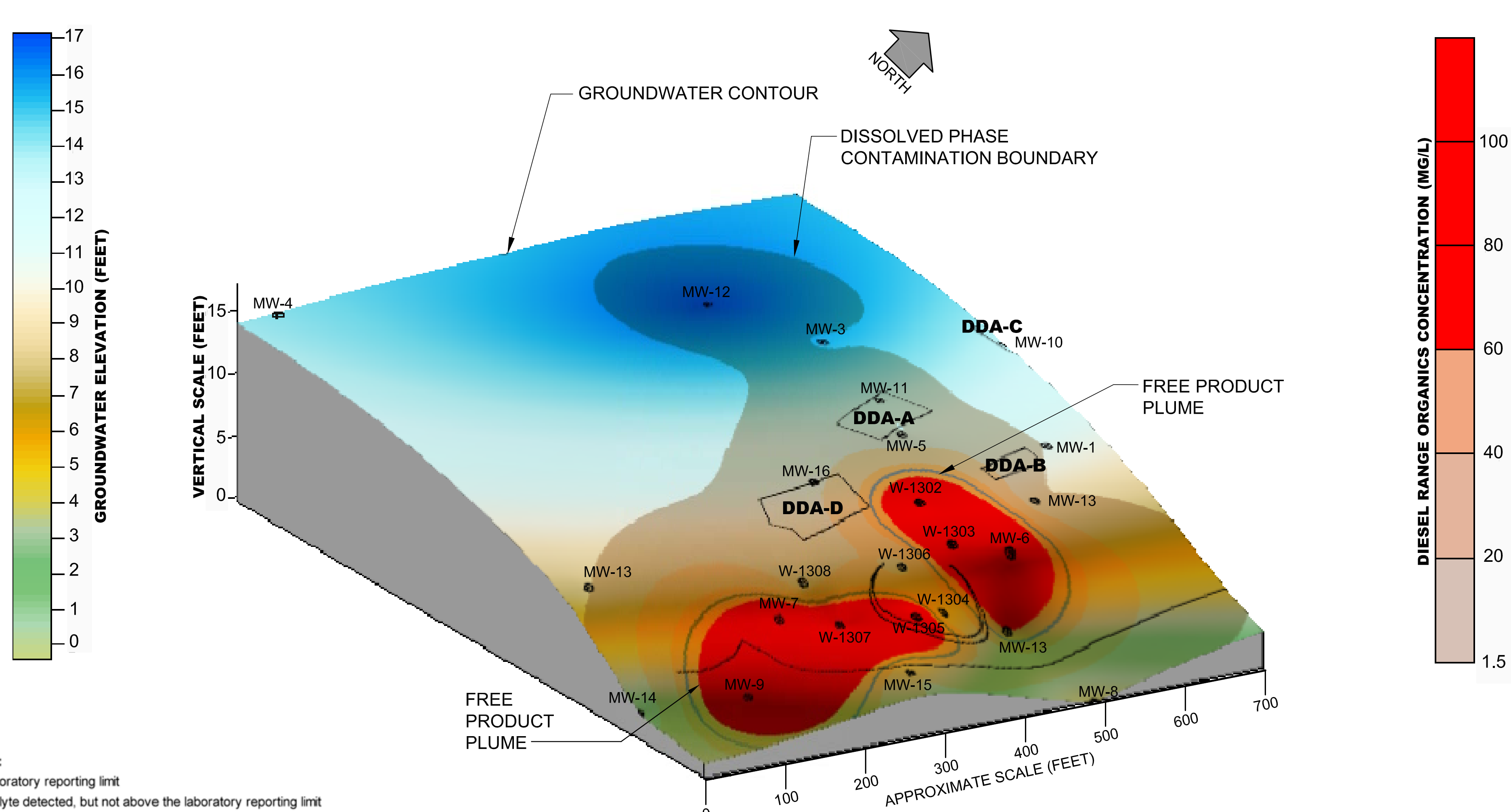

Notes:

[ ] - laboratory reporting limit
J - analyte detected, but not above the laboratory reporting limit
mg/L - milligrams per liter
ND - non detect
WG - groundwater
Screening Criteria from 18 AAC 75 Table C
Bold indicates exceedence value

MAY 2004 BIANNUAL GROUNDWATER SAMPLING-DDA AND BSA SUMMARY OF CONTAMINATION EXCEEDING ADEC CLEANUP LEVELS

				DDAMW-2 CB-A616402 CTE 1042354002 5/4/2004 WG		DDAMW-8 CB-A616407 CTE 1042354009 5/4/2004 WG		W-1306 CB-A616501 CTE 1042354011 5/5/2004 WG		W-1308 CB-A616601 CTE 1042382001 5/6/2004 WG	
Analyte	**Method**	**Screening Criteria**	**Units**								
Diesel Range Organics (DRO)	AK102	1.5	mg/L	1.1	[0.400]	0.368 J	[0.400]	**5.72**	[0.400]	**2.57**	[0.400]
1,2-Dibromoethane	SW8260B	0.00005	mg/L	**0.00729**	[0.001]	ND	[0.001]	ND	[0.001]	**0.00088**	[0.001] J
Benzene	SW8260B	0.005	mg/L	0.0709	[0.0004]	0.00073	[0.0004]	**0.135**	[0.004]	**0.0828**	[0.0004]
Trichloroethene (TCE)	SW8260B	0.005	mg/L	ND	[0.001]	**0.0068J**	[0.001]	**0.0055**	[0.01] J	0.00273	[0.001]

NOTE:
GROUNDWATER ELEVATIONS AND CONTAMINATION CONCENTRATIONS SHOWN ARE BASED ON MAY 2004 SAMPLING EVENT.

EXTENT OF GROUNDWATER CONTAMINATION

COLD BAY, ALASKA

PROJECT MANAGER: S. Witzmann	FILE NAME: BSA-DDA GW.dwg	DATE: Aug 18, 05
JE / DRAWN BY:	LAYOUT TAB: BSA-DDA GW	FIGURE NO. : 2-9
	FILE LOCATION: Cold Bay \ 05M30608 \ 2004 Decision Document	

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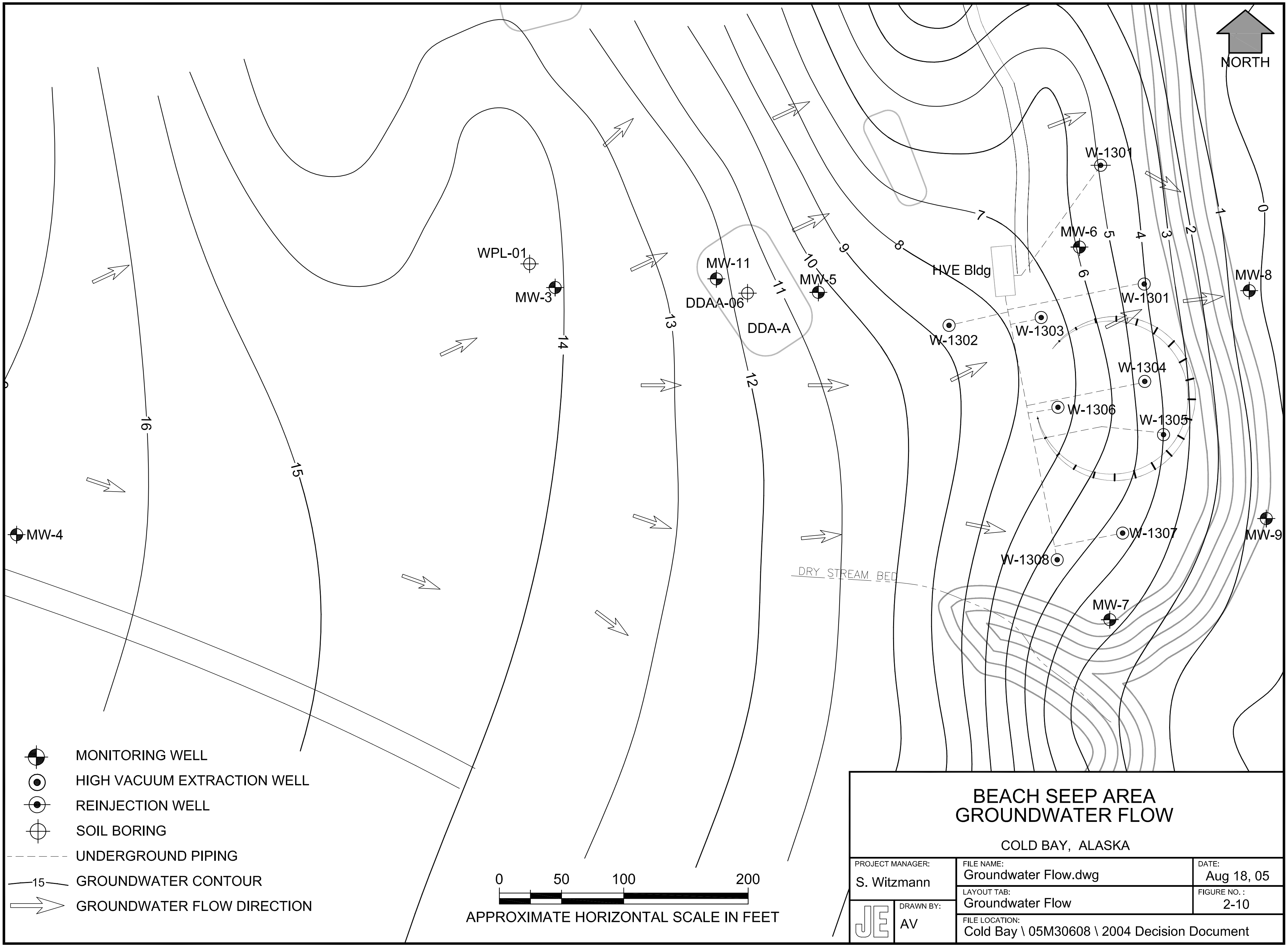

NORTH
W-1301
MW-6
HVE Bldg
MW-8
W-1301
WPL-01
MW-3
MW-11
DDAA-06
MW-5
DDA-A
W-1302
W-1303
W-1304
W-1306
W-1305
MW-4
W-1307
W-1308
MW-9
MW-7
DRY STREAM BED
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
MONITORING WELL
HIGH VACUUM EXTRACTION WELL
REINJECTION WELL
SOIL BORING
UNDERGROUND PIPING
15
GROUNDWATER CONTOUR
GROUNDWATER FLOW DIRECTION
0 50 100 200
APPROXIMATE HORIZONTAL SCALE IN FEET
BEACH SEEP AREA
GROUNDWATER FLOW
COLD BAY, ALASKA
PROJECT MANAGER:
S. Witzmann
FILE NAME:
Groundwater Flow.dwg
DATE:
Aug 18, 05
LAYOUT TAB:
Groundwater Flow
FIGURE NO.:
2-10
JE
DRAWN BY:
AV
FILE LOCATION:
Cold Bay \ 05M30608 \ 2004 Decision Document

7A.0 SUMMARY OF SITE RISKS

An RI was performed at Fort Randall, as a FUDS, to support an informed risk management decision for remediation of contaminated areas. The response action selected in this Decision Document is necessary to protect the public health or welfare, or the environment, from actual or threatened releases of petroleum compounds into the environment.

7A.1 SUMMARY OF HUMAN HEALTH RISK ASSESSMENT

This section summarizes the results of the risk screening for this site. This approach applies to human health risk screening at all sites addressed in this document.

Soil and groundwater samples were taken in the DDA/BSA site to allow for risk-based screening using the maximum concentration of each analyte detected. To assess the risks that each site could pose to human health and the environment, contaminant concentrations were measured and compared to appropriate cleanup levels or other quantitative criteria. Exposure pathways considered in this analysis included:

- Use of groundwater as drinking water
- Inhalation of contaminants located in soil at depths of 15 feet or less
- Ingestion of soil located at depths of 15 feet or less
- Potential for soil contaminants to migrate to the underlying groundwater
- Impacts that the contaminants could pose to the marine environment at the BSA site
- Impacts that contaminants could pose to human health or the freshwater environment at Stapp Creek (only applicable to Stapp Creek/ EWR)

The ADEC standards published in 18 AAC 75, *Oil and Other Hazardous Substances Pollution Control* (ADEC 2002c), are risk based and were used as risk benchmarks. These regulations address the selection or development of cleanup levels for contaminated soil and groundwater to protect human health and the environment. The proposed cleanup levels address both short-term (acute) and long-term (chronic) risks associated with the sites. ADEC regulations provide four methods for determining soil cleanup levels:

- Method One is a standard table for soils contaminated only with petroleum products (gasoline-range organics [GRO], DRO, residual-range organics [RRO], and benzene, toluene, ethylbenzene, and xylenes [BTEX]).
- Method Two is a standard table for soils contaminated with petroleum products or other chemicals.
- Method Three allows for modification of Method Two values based on site-specific soil and aquifer data.
- Method Four is a risk assessment.

Methods One and Four were not used in the development of cleanup levels for this site. Method Two cleanup levels are taken directly from the values listed in 18 AAC 75.341, Tables B1 and B2, and have been used as the cleanup levels for the Stapp Creek, EWR, and CWB sites.

Method Three cleanup levels have been developed for Cold Bay's DDA/BSA site. In developing Method Three cleanup levels, the only parameter that was changed from the default values listed in the ADEC regulations was the fraction of the soil composed of organic carbon. Contaminants tend to accumulate on the surface of organic carbon, reducing their mobility. In other words, the higher the carbon concentration, the slower the migration of contaminants to groundwater. Approximately 0.21 percent of the soil at the DDA/BSA site is organic. Although the Method Three cleanup levels apply to upland soils at the site, they do not apply to the sediments along the beach, which contain much lower levels of organic carbon and are in contact with surface waters.

For groundwater, the cleanup levels used are the concentrations listed in Table C of the ADEC standards (18 AAC 75.345).

ADEC regulations require evaluating the potential cumulative risk for all contaminants at a site. Cumulative risk calculations assess the potential impacts that contaminants could pose through multiple exposure pathways. For instance, a contaminant in soil could pose a risk if the soil is ingested directly and poses additional risk if the contaminant migrates to the underlying groundwater and the groundwater is used as a source of drinking water. At the DDA/BSA site, the cumulative risk potentially posed by contaminants at the alternative cleanup levels (ACL) was above ADEC standards, which necessitated lowering the proposed cleanup levels for two COPCs (1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene) in order to reduce cumulative risk (Table 2-2).

The results of the risk screening can be found in Tables 2-5 and 2-6. The statistical measure represents the value used to establish the exposure and risk from each COC and COPC in the soil. In this case, the maximum detected concentration was used for all analytes. The frequency of detection represents the number of samples in which a contaminant is detected over the number of samples subjected to analysis.

Table 2-5
DDA/BSA Soil: Summary of Contaminants of Concern, Contaminants of Potential Concern, and Concentrations

Site Area: DDA/BSA					
Scenario Timeframe: Current					
Medium: Soil					
COPC	**Concentration Detected**		**Screening Criteria**	**Units**	**Frequency of Detection**
	Min	**Max**			
DRO	4.8	39,000	250	mg/kg	133 / 188
GRO	0.536[1]	5,700	300	mg/kg	81 / 155
Benzene	21.1[1]	11,000	20	µg/kg	21 / 149
Ethylbenzene	18[1]	24,000	5,500	µg/kg	40 / 149
Toluene	150	50,000	5,400	µg/kg	31 / 149
Xylenes	51.15[1]	400,000	78,000	µg/kg	51 / 132
Beta-BCH (b-HCH)	2.1429	48.7	9	µg/kg	4 / 76
2-Methylnaphthalene	3.3[1]	154,000	43,000	µg/kg	47 / 113
1,2,4-Trimethylbenzene	103[1]	99,000	92,200	µg/kg	54 / 133
1,3,5-Trimethylbenzene	160	140,000	25,000	µg/kg	51 / 133
1,2-Dibromoethane	0.309[1]	17	0.2	µg/kg	5 /134

Notes:
[1] Estimated value below reporting limit
Screening criteria from ADEC Method Two in 18 AAC 75.345
Statistical measure for all contaminants: maximum
For definitions, see the Acronyms and Abbreviations section.

Table 2-6
DDA/BSA Groundwater: Summary of Contaminants of Potential Concern and Concentrations

Site Area: DDA/BSA					
Scenario Timeframe: Current					
Medium: Groundwater					
COPC	**Concentration Detected**		**Screening Criteria**	**Units**	**Frequency of Detection**
	Min	**Max**			
DRO	0.266	58.3	1.5	mg/L	11 / 14
GRO	0.141	6.37	1.3	mg/L	3 / 4
RRO	0.285	1.16	1.1	mg/L	4 / 4
1,2-Dibromoethane	1.35	10	0.05	μg/L	4 / 6
1,2-Dichloroethane	0.062	12.5	5	μg/L	2 / 4
Benzene	11.5	1150[2]	5	μg/L	5 / 14
Naphthalene	67.8	216	700	μg/L	7 / 14
Toluene	29.4	1390[2]	1000	μg/L	3 / 14
Trichloroethene	0.726[1]	6.8	5	μg/L	3 / 14
Xylenes	5.96	705	10,000	μg/L	6 / 14
Benzo(b)fluoranthene	0.157[3]	0.157[3]	1	μg/L	1 / 4
Benzo(k)fluoranthene	0.157[3]	0.157[3]	10	μg/L	1 / 4
Phenanthrene	3.94	7.57	11,000	μg/L	3 / 4
Lead	0.0003[1]	0.0087	0.015	mg/L	4 / 4
TAH	-	115.87	-	μg/L	-
TAqH	-	225	-	μg/L	-

Notes:
[1] Estimated value below reporting limit
[2] Estimated above calibrated range
[3] Previous analysis measured benzo(b)fluoranthene and benzo(k)fluoranthene as one analyte.
Screening criteria from 18 AAC 75.345, Table C, except 1,2-dibromoethane and phenanthrene from Technical Memo 01-007
Statistical measure for all contaminants: maximum
For definitions, see the Acronyms and Abbreviations section.

Tests of the DDA soil indicated that 77 sample locations had at least one contaminant at concentrations exceeding ADEC Method Two screening levels (ADEC 2002c). Based on this comparison, there is a potential risk associated with the soil within the DDA site. Of the

33 BSA soils sampled, 17 had concentrations of DRO greater than the most stringent ADEC migration-to-groundwater value of 250 milligrams per kilogram (mg/kg). Based on this comparison, there is a potential risk associated with the soil within the BSA site. To further characterize potential risk, an ADEC Method Three evaluation of contaminants was performed. Only the organic carbon content of the soil was modified in this comparison. A value of 0.002076 gram per gram was used.

This value was averaged from analysis of the organic carbon content of seven soil samples taken from the DDA/BSA site. The results of the Method Three comparison may be found in Table 2-7; the values presented in bold represent proposed cleanup levels for the site.

Table 2-7
Summary of Method Three Calculations for DDA/BSA Soils

Chemical Name	Chemical Type	Ingestion	Inhalation	Modified Migration to Groundwater	Cumulative Risk Level
DRO	Petroleum	10,100	12,500	**524**	-
GRO	Petroleum	1,400	1,400	**578**	-
Benzene	Organic	151	9.9	**0.0228**	7.5
Ethylbenzene	Organic	10,100	155	**9.15**	-
Toluene	Organic	20,300	278	**8.01**	-
Xylene	Organic	203,000	-	**129**	-
Beta-BHC	Pesticide	4.61	61.4	**0.0176**	-
2-Methylnaphthalene	Organic	2,030	-	**86.6**	-
1,2,4-Trimethylbenzene	Organic	5,070	133	192	**25.2**
1,3,5-Trimethylbenzene	Organic	5,070	52.8	46.9	**35.5**
1,2-Dibromoethane	Organic	0.0977	1.35	**0.000173**	-

Notes:
All amounts are mg/kg.
Bold indicated cleanup level.
For definitions, see the Acronyms and Abbreviations section.

Groundwater also was subjected to risk-based screening. In the DDA site, 10 monitoring wells were sampled in June and September 2002. Fuel-related contamination at concentrations greater than 18 AAC 75.345, Table C, groundwater cleanup levels was found in the groundwater obtained from five of these wells. In addition, free product was found in one of these five wells and in an additional well, creating a total of six wells that contain contamination. In the BSA site, 14 monitoring wells were sampled in June and September 2002. Fuel-related contamination at concentrations greater than ADEC Table C groundwater cleanup levels was found in the groundwater obtained from five of these wells.

In addition, free product was found in another 6 monitoring wells in the area, creating a total of 11 wells that contain contamination. Therefore, a degree of risk was associated with 17 of the 24 groundwater sampling locations within the DDA/BSA site.

Free product is present on groundwater within the DDA/BSA site, and both soil and groundwater concentrations are at levels greater than ADEC Methods Two and Three. Therefore, formal calculations of cumulative risk and hazard were not performed. It is evident that the hazard index and cumulative carcinogenic risk for both the groundwater and soil media exceed applicable standards.

7A.2 ECOLOGICAL RISKS

Ecological risk-based screening was performed using the maximum concentration for detected compounds in the DDA/BSA site. Soil COCs and COPCs are presented in Table 2-7. It was conservatively assumed that measured groundwater concentrations (Table 2-6) reflect the maximum possible contaminant concentration in downgradient surface waters. Criteria for evaluation were based on criteria from 18 AAC 70, U.S. Environmental Protection Agency's (EPA) National Recommended Water Quality Criteria, and the Oak Ridge National Laboratory (ORNL) preliminary remediation goal (PRG) values. Samples screened for human heath risk were not reevaluated for ecological risk; rather, it was assumed that the cleanup levels determined by 18 AAC 75 are protective of the environment. This assumption pertains to all sites evaluated in this document.

To assess the ecological risk associated with the discharge of contaminated groundwater to Cold Bay, groundwater concentrations were compared to ecological screening criteria. VOCs and polycyclic aromatic hydrocarbons (PAH) are present in DDA groundwater at concentrations greater than ecological marine water criteria. Four monitoring well locations had concentrations greater than ecological screening criteria. Free product also was observed in one of these wells and found in an additional well. This created a total of 6 wells, with contamination above the ecological screening criteria. Total aromatic hydrocarbon (TAH) and total aqueous hydrocarbon (TAqH) values calculated (Table 2-6) also were significantly greater than the ADEC standard of 10 and 15 micrograms per liter, respectively (ADEC 2002b). From these values, it appears that discharge of DDA groundwater, as a whole, presents a potential for ecological risk.

In the BSA site, risk screening indicates that benzene and/or naphthalene are present in groundwater at concentrations greater than ecological marine water criteria. Four monitoring wells contained these contaminants. Free product was found in an additional six wells. This information indicates that there is a significant potential for ecological risk in marine sediment and water from contaminants in these 10 wells. In addition, TAH and TAqH values calculated were notably greater than the ADEC standard. From these values, it appears that there is potential for ecological risk from discharge of BSA groundwater, as a whole. Some degree of risk is associated with 16 of the 24 wells sampled.

Sediment contamination in the DDA/BSA extends along the beach. The State of Alaska currently does not have established cleanup standards for sediment. Therefore, ecological benchmarks were used as screening criteria. As part of the risk screening process, analytical results were conservatively compared to National Oceanic and Atmospheric Administration sediment quality guidelines and ORNL toxicological benchmarks shown in Table 2-3. Measured values exceed these guidelines/benchmarks; thus, sediments at the site pose a potential ecological risk. Note that screening values should not be considered cleanup standards; rather, they represent the lowest concentration at which ecological impacts are considered possible.

7A.3 BASIS FOR RESPONSE ACTION

The response actions selected in this Decision Document are necessary to protect public health or welfare, or the environment, from actual or threatened releases of petroleum compounds from this site that present an imminent and substantial endangerment to public health or welfare.

8A.0 REMEDIATION OBJECTIVES

Remedial action objectives (RAO) will be considered accomplished when sampling indicates that the exposure point concentration is below contaminant cleanup level. The exposure point concentration for soil and groundwater will be calculated assuming that analytical results below the detection limit are present at concentrations equal to one-half the detection limit, the data is normally distributed (lognormal data will be transformed), and the exposure point concentration is the lesser of the 95 percent upper confidence limit of the arithmetic mean of the data and the maximum detected concentration. Once contaminant concentrations in groundwater beneath the site have attained site cleanup levels, it will be assumed that overlying soils have attained the migration to groundwater cleanup levels.

The RAOs for the DDA/BSA soils include the following:

- Prevent migration of contaminants in soil to groundwater.
- Prevent ingestion or inhalation of contaminants in soil containing contaminants in excess of cleanup levels shown in Table 2-2.

The RAOs for the DDA/BSA sediments, free product, and groundwater include the following:

- Prevent ingestion of groundwater or negative ecological impacts to marine surface water caused by the discharge of groundwater containing contaminants in excess of cleanup levels listed in Table 2-4.
- Prevent negative ecological impacts from marine sediments contaminated with contaminants in excess of screening criteria listed in Table 2-3.

In addition, the DDA/BSA site poses an imminent and substantial endangerment to human health or welfare or the environment. Without remedial action, diesel free product from the site will continue to discharge to Cold Bay. Thus, the following RAO is also applicable to the site:

- Prevent the discharge of diesel free product to downgradient surface waters.

In this manner, the selected remedy will contribute toward removal of Cold Bay from the Clean Water Act, Section 303(d), list of impaired water bodies.

8A.1 KEY APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Key ARARs can be found in Appendix A.

9A.0 DESCRIPTION OF ALTERNATIVES TO ADDRESS DRUM DISPOSAL AREA/BEACH SEEP AREA SOILS

9A.1 DESCRIPTION OF REMEDY COMPONENTS – DRUM DISPOSAL AREA/ BEACH SEEP AREA SOIL

The following eight remedial alternatives were developed to address soil contamination at the DDA site. The alternatives and cost estimates are based on the RAOs and the results of technology screening included in the FS (USAED 2003a):

- DDA Alternative 1: No Action
- DDA Alternative 2: Impermeable Cap with Institutional Controls
- DDA Alternative 3: Limited Source Removal
- DDA Alternative 4: Excavation and Thermal Desorption
- DDA Alternative 5: Bioventing
- DDA Alternative 6: Soil Vapor Extraction (SVE)
- DDA Alternative 7: Bioventing and SVE
- DDA Alternative 8: Thermal Treatment, Bioventing, and SVE

During the screening process, Alternatives 1, 7, and 8 were retained for detailed analysis. (Refer to the FS.) These alternatives are discussed in the following sections.

9A.1.1 Drum Disposal Area Alternative 1: No Action

Under the No Action alternative, no activities would be undertaken to treat the contamination present or to prevent exposure to the contamination. No monitoring would be conducted. A No Action alternative serves as a baseline against which other alternatives can be compared.

9A.1.2 Drum Disposal Area Alternative 7: Bioventing and Soil Vapor Extraction

Under this alternative, SVE would be used to remediate soils containing highly volatile analytes, such as GRO, BTEX, and 1,2-dibromoethane (EDB). In areas where high concentrations of DRO contamination are present, SVE would be used to rapidly decrease the mass of DRO. However, the volatility of some diesel fuel components is too low to achieve the DRO ACL using only SVE. Because DRO will degrade under aerobic conditions, bioventing would be used in combination with SVE to address DRO-contaminated soil. Prior to implementation, a pilot test would be conducted to verify the effectiveness of bioventing and SVE for this site and to determine well spacing.

9A.1.3 Drum Disposal Area Alternative 8: Thermal Treatment, Bioventing, and Soil Vapor Extraction

DDA Alternative 8 would use three separate technologies to address contamination beneath the DDA site. As with Alternative 7, a pilot test would be conducted prior to implementing this alternative to verify the effectiveness of bioventing and SVE for this site and to determine well spacing. Under this alternative, most of the soil contaminated with DRO at concentrations greater than 10,480 mg/kg located at less than 15 feet bgs would be excavated and thermally treated. The remainder of the DRO-contaminated soil would be treated using bioventing. Volatile contaminants would be removed using SVEs.

9A.2 COMMON ELEMENTS AND DISTINGUISHING FEATURES OF EACH ALTERNATIVE – DRUM DISPOSAL AREA/BEACH SEEP AREA SOIL

9A.2.1 Key Applicable or Relevant and Appropriate Requirements

Key ARARs for this Decision Document may be found in Appendix A.

9A.2.2 Long-Term Reliability of Remedy

The long-term reliability of remedy is best met by DDA Alternative 8. DDA Alternative 7 has the potential to be effective as a long-term remedy, but there is uncertainty concerning effectiveness associated with the alternative, particularly with respect to its ability to address soil contaminated with greater than 10,480 mg/kg DRO. The No Action alternative would not have any long-term reliability.

9A.2.3 Quantity of Untreated Waste and Treatment Residuals to Be Disposed Offsite or Managed Onsite

The No Action alternative would leave all waste onsite, untreated and unmanaged. Both DDA Alternatives 7 and 8 would restore the site to cleanup levels, with minimal waste requiring offsite disposal.

9A.2.4 Estimated Time for Design and Construction

Implementation time frame for the No Action alternative would not apply, as there would be no design or construction. The implementation time frame for DDA Alternatives 7 and 8 would be similar to each other. Design time would be on the order of three months and construction on the order of one year.

9A.2.5 Estimated Time to Reach Remediation Goals

Remediation goals would not be reached for the No Action alternative. DDA Alternative 8 would reach the remediation goals more quickly (approximately 10 years) than DDA Alternative 7 (approximately 15 years).

9A.2.6 Estimated Costs

The No Action alternative would have no costs. Costs for DDA Alternatives 7 and 8 are very similar with DDA Alternative 7 costing $4.3 million to implement and DDA Alternative 8 costing $3.9 million to implement.

9A.3 EXPECTED OUTCOMES OF EACH ALTERNATIVE – DRUM DISPOSAL AREA/BEACH SEEP AREA SOIL

The No Action alternative would leave the site unfit for residential use. Completion of either DDA Alternative 7 or DDA Alternative 8 would leave the site unrestricted and thus available for residential use.

9A.4 DESCRIPTION OF REMEDY COMPONENTS – DRUM DISPOSAL AREA/BEACH SEEP AREA SEDIMENTS, FREE PRODUCT, AND GROUNDWATER

The following six remedial alternatives were developed to address sediment, free product, and groundwater contamination at the DDA/BSA. The alternatives are based on the RAOs and the results of technology screening included in the FS:

- BSA Alternative 1: No Action
- BSA Alternative 2: Dual-Phase Extraction Along Beach
- BSA Alternative 3: High Vacuum Extraction from an Extraction Well Fence
- BSA Alternative 4: Separate Groundwater and Free Product Extraction
- BSA Alternative 5: High Vacuum Extraction for Mass Capture
- BSA Alternative 6: Biosparging

Although sediment contamination along the BSA site is a primary concern for remedial action at this site, none of the alternatives considered focuses directly on sediment remediation. The reasoning behind this is that, as long as a free-product layer remains at the site, any sediment that is treated will be rapidly recontaminated. On the other hand, the available data indicates that once the free-product layer is addressed, natural processes will result in rapid decreases in sediment and groundwater-contaminant concentrations.

During the screening process, BSA Alternatives 1, 3, and 5 were retained for detailed analysis. (Refer to the FS.) These alternatives are discussed in the following sections.

9A.4.1 Beach Seep Area Alternative 1: No Action

Under the No Action alternative, no activities would be undertaken to treat the contamination present or to prevent exposure to the contamination. Operation of the existing HVE system would be discontinued. No monitoring would be conducted. A No Action alternative serves as a baseline against which other alternatives can be compared.

9A.4.2 Beach Seep Area Alternative 3: High-Vacuum Extraction from an Extraction Well Fence

Under this alternative, existing wells would be combined with a series of new wells to form a line of extraction wells along the east side of the site. These wells would serve as a downgradient cutoff fence to prevent free-phase contamination from migrating toward Cold Bay. To implement this alternative, approximately 13 new extraction wells would be installed. The extracted groundwater and product would be treated by the existing HVE system. The treated water then would be discharged to the existing injection well.

9A.4.3 Beach Seep Area Alternative 5: High-Vacuum Extraction for Mass Capture

Under this alternative, the existing HVE system would be modified to maximize mass capture of free product and groundwater contamination. The modification would be designed to remove as much product from the groundwater, as quickly as possible. The proposed modification would include approximately three additional extraction wells. A second injection well would be required to discharge treated water to improve hydraulic control. In addition, the HVE controls system would be upgraded, and the operational strategy would be modified. A telemetry system would be added that would allow the remote control of selected instrumentation, pumps, and valves. This would allow early detection and resolution of potential problems and help minimize system downtime.

9A.5 COMMON ELEMENTS AND DISTINGUISHING FEATURES OF EACH ALTERNATIVE – DRUM DISPOSAL AREA/BEACH SEEP AREA SEDIMENTS, FREE PRODUCT, AND GROUNDWATER

9A.5.1 Key Applicable or Relevant and Appropriate Requirements

Key ARARs for this Decision Document may be found in Appendix A.

9A.5.2 Long-Term Reliability of Remedy

The long-term reliability of remedy is best met by BSA Alternative 5. BSA Alternative 3 is not as likely to remove contaminants as rapidly. The No Action alternative would not have any long-term reliability.

9A.5.3 Quantity of Untreated Waste and Treatment Residuals to Be Disposed Offsite or Managed Onsite

The No Action alternative would leave all waste onsite, untreated and unmanaged. Both BSA Alternatives 3 and 5 would restore the site to cleanup levels, with minimal waste remaining to be disposed of offsite.

9A.5.4 Estimated Time for Design and Construction

Implementation timeframe for the No Action alternative would not apply, as there would be no design or construction. The implementation time frame for BSA Alternatives 3 and 5 would be similar to each other. Design time would be on the order of three months and construction on the order of one year.

9A.5.5 Estimated Time to Reach Remediation Goals

Remediation goals would not be reached for the No Action alternative. BSA Alternatives 3 and 5 would reach the remediation goals in about the same amount of time as each other (10 years plus monitoring). Note it is assumed that for both alternatives after five years the cumulative effects of cleanup will allow operations to be reduced.

9A.5.6 Estimated Costs

The No Action alternative would have no costs. Costs for BSA Alternatives 3 and 5 are similar, with BSA Alternative 3 costing $5.3 million to implement and BSA Alternative 5 costing $5.0 million to implement.

9A.6 EXPECTED OUTCOMES OF EACH ALTERNATIVE – DRUM DISPOSAL AREA/BEACH SEEP AREA SEDIMENTS, FREE PRODUCT, AND GROUNDWATER

The No Action alternative would leave the site unfit for residential use. Completion of either BSA Alternative 3 or Alternative 5 would leave the site unrestricted and thus available for residential use.

10A.0 COMPARATIVE ANALYSIS OF ALTERNATIVES

10A.1 DRUM DISPOSAL AREA/BEACH SEEP AREA SOIL

As shown in Table 2-8, DDA Alternative 1 fails to comply with the threshold criteria. Because this alternative lacks institutional controls or active treatment, there is a significant possibility that humans could be exposed to site contaminants at concentrations above health-based cleanup levels. Alternatives 7 and 8 both protect human health and the environment and could be implemented in a manner that complies with all chemical-, location-, and action-specific ARARs.

Table 2-8
Comparison of Alternatives for the DDA and BSA Soils

Evaluation Criteria	DDA Alternative 1	DDA Alternative 7	DDA Alternative 8
Overall Protection of Human Health and the Environment	○	●	●
Compliance with ARARs	○	●	●
Long-Term Effectiveness and Permanence	○	◗	●
Reduction in Toxicity, Mobility, and Volume through Treatment	○	●	●
Short-Term Effectiveness	◗	◗	◗
Implementability	◗	◗	◗
Cost (in millions)	$0	$4.3	$3.9
State Acceptance	○	◗	●
Community Acceptance	○	◗	●
● = meets or exceeds criteria	◗ = partially meets criteria	○ = does not meet criteria	

Note: For definitions, see the Acronyms and Abbreviations section.

Because DDA Alternative 1 fails to attain the threshold criteria, it will not be considered further.

The primary difference between DDA Alternatives 7 and 8 is that DDA Alternative 8 would excavate and thermally treat approximately 6,269 cy of soil contaminated with high concentrations of diesel fuel, while under DDA Alternative 7, this soil would be treated using bioventing. Thus, DDA Alternative 8 would offer a more aggressive treatment and would reach the RAOs more rapidly.

There also is less uncertainty regarding the potential effectiveness of DDA Alternative 8. Estimated costs for DDA Alternative 8 are less than estimated costs for DDA Alternative 7. In contrast, DDA Alternative 7 would be considerably easier to implement and would involve less disruption to the site.

While DDA Alternative 8 would result in a quicker, more reliable cleanup, DDA Alternative 7 would be easier to implement, would minimize ecological impacts and safety concerns. Greater difficulties with implementing DDA Alternative 8 include the need to excavate large volumes of soil and to coordinate the various treatment approaches. Much of the soil to be excavated is deep, and some of it underlies clean soil. This would result in large excavations that present possible environmental impacts and pose a potential safety risk to the local community and to site workers. Because the treatment proposed under DDA Alternative 7 would be entirely in situ, excavations and their impacts would be avoided entirely.

Because DDA Alternative 8 would rapidly remove much of the contaminant mass, would result in more rapid cleanup, and would involve less uncertainty than DDA Alternative 7, DDA Alternative 8 was recommended in the FS and proposed in the Proposed Plan as the preferred alternative.

10A.2 DRUM DISPOSAL AREA/BEACH SEEP AREA SEDIMENTS, FREE PRODUCT, AND GROUNDWATER

As shown in Table 2-9, BSA Alternative 1 fails to comply with the threshold criteria. Without action or institutional controls, human exposure to site contaminants at unacceptable levels could occur through ingestion, inhalation, or exposure to groundwater. Without continued operation of the HVE system, the volume of contamination discharging to the beach could increase. Concentrations of contaminants in sediment along the beach are expected to remain above PRGs. The large mass of contamination present has overwhelmed the ability of natural processes to degrade and disperse the contamination. Thus, natural processes are not expected to result in significant reductions in contaminant concentrations in the short term.

Table 2-9
Comparison of Alternatives for DDA and BSA Sediments, Free Product, and Groundwater

Evaluation Criteria	BSA Alternative 1	BSA Alternative 3	BSA Alternative 5
Overall Protection of Human Health and the Environment	○	●	●
Compliance with ARARs	○	●	●
Long-Term Effectiveness and Permanence	○	◗	●
Reduction in Toxicity, Mobility, and Volume through Treatment	○	●	●
Short-Term Effectiveness	○	●	◗
Implementability	◗	●	●
State Acceptance	○	◗	●
Community Acceptance	○	●	●
Cost (in millions)	$0	$5.3	$5.0

● = meets or exceeds criteria ◗ = partially meets criteria ○ = does not meet criteria

Note: For definitions, see the Acronyms and Abbreviations section.

BSA Alternatives 3 and 5 both protect human health and the environment and could be implemented in a manner that complies with all chemical-, location-, and action-specific ARARs.

Because BSA Alternative 1 would fail to attain the threshold criteria, it will not receive further consideration.

The primary difference between BSA Alternatives 3 and 5 is their pumping scenarios. BSA Alternative 3 would incorporate an extraction well fence approach, with approximately 18 closely spaced wells arranged linearly along the east side of the site. This arrangement would result in reliable capture at pumping rates similar to what the system is currently treating. BSA Alternative 5 would use fewer wells, pumping at higher flow rates. Instead of waiting for the contamination to flow to an extraction well fence, BSA Alternative 5 would focus extraction in the most contaminated areas and rely on higher pumping rates to control the site hydraulically. Additionally, because extraction wells proposed under BSA Alternative 5 would be located beneath some of the most contaminated soil at the site, this alternative has the potential to result in significant reductions in smear zone contaminant mass through biodegradation.

Based on groundwater modeling results (USAED 2003a), BSA Alternative 5 appears to offer better long-term effectiveness and permanence than BSA Alternative 3. Because BSA Alternative 5 incorporates a more robust extraction scenario, which includes higher pumping rates and focuses extraction on the most contaminated areas, it minimizes long-term uncertainty. BSA Alternative 5 would extract more contamination during the initial phase of its operating life. Although minimizing downtime is critical to the successful implementation of either alternative, it would be particularly important under BSA Alternative 3. Any contamination that migrated past the extraction well fence would eventually discharge to the beach.

Both alternatives would provide very good reduction of toxicity, mobility, or volume of contamination through treatment. Both alternatives would target free product contamination, which is the most mobile and concentrated contamination. Neither alternative would take action to address soil contamination in the smear zone or groundwater contamination beyond the zone of influence of the extraction wells. Removal of the free-product contamination would allow natural processes to address this residual contamination, but these natural processes are expected to act only slowly.

BSA Alternative 3 is expected to provide slightly better short-term effectiveness than BSA Alternative 5. This is because BSA Alternative 3 incorporates extraction downgradient from W-1303 and includes six extraction wells upgradient of sediment staining in the BSA; BSA Alternative 5 incorporates only two extraction wells upgradient of the stained sediment. Extraction wells are only capable of capturing contamination upgradient and in the immediate vicinity of the well. Because some extraction wells proposed under BSA Alternative 3 are farther downgradient than the extraction wells proposed under BSA Alternative 5, BSA Alternative 3 is expected to restore the BSA sediments more rapidly.

Either BSA Alternative 3 or 5 could be implemented relatively easily. Both rely heavily on the existing, operational HVE system. BSA Alternative 3 would require the installation of more extraction wells (approximately 13 versus 3).

The additional wells could require additional air moving capacity. BSA Alternative 5 would require higher flow rates and more significant modification to the water treatment system.

BSA Alternative 3 is expected to cost approximately $300,000 more than BSA Alternative 5. Based on its ability to clean up the site's groundwater more rapidly (thus allowing the development and sale of the site) and its lower cost, BSA Alternative 5 was recommended by the FS and named in the Proposed Plan as the preferred alternative.

11A.0 PRIMARY CONTAMINANT OF CONCERN

Principal threat wastes exclude petroleum and any fraction thereof. Because of this, no principal threat waste is associated with the DDA/BSA site. The primary COC at the site is diesel fuel. Historical fuel spills and releases have impacted soils and groundwater. Concerns with diesel fuel contamination are associated with the mobility of free product at the groundwater table surface. Free product migrates downgradient along the water table surface and discharges to marine sediments along Cold Bay. In addition, soil-bound diesel-fuel contamination is abundant and will continue to contribute to groundwater (and possibly free-product layer) contamination unless additional cleanup action is taken. The ability of each alternative to address the primary contaminants of potential concern is summarized in Table 2-10.

Table 2-10
Primary Contaminants of Concern

Alternative	Primary Contaminants of Concern Addressed	How Addressed
BSA 1: No Action	None	Not Addressed
BSA 3: HVE from an Extraction Well Fence	Free Product	Cutoff Migration / Extraction, Treatment & Reinjection
BSA 5: HVE for Mass Capture	Free Product	Extraction / Mass Capture / Reinjection
DDA 1: No Action	None	Not Addressed
DDA 7: Bioventing and SVE	Contaminated Soils	Increased Bacterial Activity & Degradation / Air Removal of Volatile Contaminants
DDA 8: Thermal Treatment, Bioventing, and SVE	Contaminated Soils	Increased Bacterial Activity & Degradation / Air Removal of Volatile Contaminants / Thermal Destruction of Contaminants

Note: For definitions, see the Acronyms and Abbreviations section.

12A.0 SELECTED REMEDY

The selected remedy for DDA/BSA soil contamination is Alternative DDA 8: Thermal Treatment, Bioventing, and SVE. The selected remedy for DDA/BSA sediment, free product, and groundwater contamination is Alternative BSA 5: HVE for Mass Capture. Together these alternatives will address risks posed by site contaminants.

12A.1 SUMMARY OF THE RATIONALE FOR THE SELECTED REMEDY

The selected remedies provide a unified response to the contamination at the DDA/BSA site. They will address soil and groundwater contamination by fuel products at the site using thermal treatment, bioventing, and SVE as well as HVE for mass capture. These remedies best meet evaluation criteria including overall protection of human health and the environment; compliance with ARARs; long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; short-term effectiveness; implementability; and cost.

12A.2 DESCRIPTION OF THE SELECTED REMEDY

The selected remedy for soil provides four primary advantages because it includes excavation and thermal treatment of soil with DRO concentrations greater than 10,480 mg/kg, rather than treatment of this soil using bioventing. First, fuel concentrations greater than approximately 25,000 mg/kg can be inhibitory or toxic to aerobic bacteria. Thus, in areas of soil with such high concentrations, biodegradation might not be significant, even after initiating bioventing. In such areas, DRO volatilization could be more significant than biodegradation and treatment would be very slow until sufficient volatilization had reduced DRO concentrations to the point where biodegradation would begin.

Second, because bioventing can generally only reduce contaminant concentrations by 95 percent, soil with initial concentrations greater than 10,480 mg/kg could still be above the ACL following bioventing. If the contamination is not susceptible to biodegradation, it may not be bioavailable to human or ecological receptors.

Third, if the highly contaminated soil was treated thermally, bioventing would only need to address soil contamination with lower concentrations. This would result in the RAOs being achieved far more quickly.

Fourth, the higher the concentration of DRO contamination, the more mobile it will be in the subsurface. Thus, the more quickly the high concentration soil is treated, the less contamination will dissolve and migrate to the underlying aquifer. In addition, the highly contaminated soil may be a significant contributor to the free-product layer.

The selected remedy for groundwater, free product, and sediment provides the primary advantage of long-term effectiveness because its pumping scenario allows the most rapid removal of free product.

12A.2.1 Drum Disposal Area/Beach Seep Area Soils: Thermal Treatment, Bioventing, and Soil Vapor Extraction

The selected remedy, summarized in Table 2-11, will use three separate technologies to address soil contamination at the DDA/BSA site.

Table 2-11
Summary of the Selected Remedy for DDA/BSA Soils

Technology	Target Contaminants	Estimated Volume (cy)	Reasoning
Excavation and Thermal Treatment	DRO at concentrations exceeding 10,480 mg/kg at depths up to 15 feet bgs	6,269	Concentrations above this threshold might not be able to be adequately treated using bioventing.
SVE with Bioventing as a Polishing Step	Mixed EDB and DRO	7,792	EDB cannot be treated using aerobic biological treatment processes, such as bioventing. Once the EDB is removed, treatment of DRO would continue using bioventing.
Bioventing	DRO at concentrations less than 10,480 mg/kg and DRO-contaminated soil at depths greater than 15 feet bgs	33,639	Bioventing is the least expensive treatment technology available for diesel-fuel-contaminated soil.
	Total =	**47,700**	

Note: For definitions see the Acronyms and Abbreviations section.

The 10,480-mg/kg threshold used in Table 2-11 for determining how DRO-contaminated soils would be treated is based on the limitations of bioventing. Generally, bioventing is not able to decrease contaminant concentrations by more than 95 percent (EPA 1995a). With a DRO cleanup standard of 524 mg/kg (USAED 2003b), soils contaminated at concentrations above 10,480 mg/kg would still be above cleanup standards following bioventing.

Most of the soils contaminated with DRO at concentrations greater than 10,480 mg/kg will be excavated and thermally treated. Table 2-12 lists soil samples that exceed this threshold, their depth and location, and the proposed treatment.

Table 2-12
Proposed Treatment for Highly Contaminated Soil under DDA Alternative 8

Sample Location Identification	Sample Depth (feet bgs)	DRO (mg/kg)	Location	Proposed Treatment	Volume to Be Excavated (cy)
DDAA-06-02SO	30 – 32	11,600	Beneath DDA-A	SVE followed by bioventing	N/A
EXB006SO	5	30,000	Beneath DDA-B	Excavation	1,074
EXB007SO	5	15,000	Beneath DDA-B	Excavation	
EXB008SO	5	12,000	Beneath DDA-B	Excavation	
EXB009SO	5	31,000	Beneath DDA-B	Excavation	
EXB010SO	5	13,000	Beneath DDA-B	Excavation	
EXB011SO	5	20,000	Beneath DDA-B	Excavation	
EXB012SO	5	11,000	Beneath DDA-B	Excavation	
EXBD-07SO	10	39,000	DDA-D	Excavation	3,122
EXBD-08SO	14	14,000	DDA-D	Excavation	
EXBD-11SO	10	13,000	DDA-D	Excavation	
EXBD-12SO	15	19,000	DDA-D	Excavation	
EXSD-06SO	5.9	33,000	West of DDA-D	Excavation	
WAX-17SO	17.5	25,000	North side of WAX	Bioventing	N/A[2]
WAX-20SO	22	18,000	North side of WAX	Bioventing	
WAX-23SO	15	12,000	North side of WAX	Bioventing	
WAX-01-03SO	25 – 27	14,600	North side of WAX	Bioventing	
WPL-05SO	2.8	11,000	WPL	Excavation	1,000
WPL-09SO	10.7	16,000	WPL	Excavation	
WPL-10SO	17	15,000	WPL	Bioventing	
DDAX-36-01SO	4	32,200	WPL	Excavation	
DDAX-42-01SO	4	15,900	WPL	Excavation	
CD-A10201 – 03 (W-1308)	35 – 36.5	18,000	BSA	[1]	-
BSAA15-01SO	2	31,400	BSA	Excavation	1072
BSAA27-01SO	0 – 2.0	24,500	BSA	Excavation	
BSAA27-03SO	10 – 12	30,400	BSA	Excavation	
				Total =	**6,269**

Notes:

[1] Because this sample was collected in the immediate vicinity of the water table at extraction well W-1308, the results are considered no longer valid.

[2] Historical excavation removed highly contaminated soil to a depth of 15 feet.

For definitions, see the Acronyms and Abbreviations section.

Thermal treatment of soil could take place either onsite or offsite. Onsite treatment has a higher treatment cost per ton, but avoids the costs associated with marine transport of the soil to an offsite treatment facility. Experience treating soil at Cold Bay indicates that onsite treatment is generally less expensive than offsite treatment when the mass of contaminated soil is significant. Therefore, the selected remedy will thermally treat contaminated soil onsite.

The soil beneath DDA-A and DDA-C would be treated with SVE. Soil in these areas is contaminated with volatile compounds, such as GRO, BTEX, and EDB. A pilot test will be conducted to demonstrate the potential effectiveness of SVE on the given soils and to provide data required for system design.

The pilot test for SVE will be conducted in the DDA-A area. A vapor extraction well will be constructed with a screened interval set from approximately 25 feet bgs (the depth of the 1998 excavation) to the water table. The vacuum pumps from the existing HVE system will be used to induce a vacuum in the new vapor extraction well. Neighboring wells MW-5 and MW-11 will be used as vacuum monitoring points. Based on historical vacuum influence testing, additional wells might also need to be constructed. The vacuum monitoring wells will be sealed and fitted with vacuum gauges. Vacuum will be inducted at the extraction well and measured there and at each of the monitoring wells. The airflow rate from the extraction well will be measured and samples will be collected from the extracted air. The pilot system will be tested under various airflow rates. If necessary to comply with ARARs, vapor extracted during the pilot test will be treated through vapor-phase granular activated carbon (GAC).

The remaining soil at the site, approximately two-thirds of the total volume of contaminated soil present, will be treated using bioventing. The effectiveness of bioventing will need to be demonstrated with pilot testing, which also will provide data required for design of the bioventing system. The pilot test for the bioventing system will likely be conducted beneath the former 210,000-gallon AST because of the large volume of contaminated soil in that area.

Data acquisition will include determination of soil measurements of acidity and alkalinity (pH), temperature, and nutrient levels (nitrogen and phosphorous) and determination of background rates for in situ respiration through a soil/gas survey. In order to support installation of a bioventing system, the soil/gas survey will need to show depressed oxygen concentrations and elevated carbon dioxide levels, thus demonstrating the existence of biological activity that will be promoted by bioventing at the site. Following successful soil/gas survey results, two additional tests will be conducted: an in situ air permeability test and an in situ respiration test. The air permeability test will ensure that adequate airflow rates through the soil will be achieved. The respiration test will document the biological activity present, and if results are above published standards, full-scale design of the bioventing system will begin.

Data from the two pilot tests will be used to determine well spacing and airflow rates. All wells will be designed and plumbed so that they could function either as air injection wells or as air extraction wells. Following design of the system, air-moving equipment and piping will be constructed for the bioventing system. For the SVE system, air-moving equipment and a vapor phase treatment system will be constructed. Extracted vapor could be treated using biofiltration, vapor-phase GAC adsorption, catalytic oxidation, or flame incineration. Direct discharge of extracted vapor could also be possible, depending on the concentrations present in the extracted vapor. The method of treatment will be determined, based on the concentrations measured in the extracted vapor, during the pilot test. If needed, treatment of any extracted liquids will be similar to the treatment process used in the existing HVE system: centrifuge followed by filtration and liquid-phase GAC. If practical, such treatment will take place in the existing treatment system.

Because exposure to soils contaminated at concentrations that could potentially affect human health could occur while the selected remedy is being implemented, USAED will provide written notice to the Aleutians East Borough, the City of Cold Bay, and the property owner that contaminated soil is present at the site and that, if contaminated soil is excavated from the site, it must be handled in accordance with applicable state regulations.

12A.2.2 Drum Disposal Area/Beach Seep Area Sediments, Free Product, and Groundwater: Bioslurping/Soil Vapor Extraction for Mass Capture

The existing HVE system will be modified to maximize mass capture. This will remove as much product from the groundwater as quickly as possible. The selected remedy includes approximately three additional extraction wells to provide additional capture toward the southern end of the BSA site. A second reinjection well will be added just beyond the southernmost extraction well to allow for discharge of treated water and to improve hydraulic control.

Modeling of this alternative indicates that approximately 3 gallons per minute (gpm) would be required to establish effective hydraulic control of the upper section of the aquifer (USAED 2003a). The modeled pumping scenario focuses extraction in the areas where the greatest thickness of product has previously been detected. Historically, the HVE system has treated approximately 1.5 gpm, and some modification to the system might be required to treat the higher flow rate. However, high-cost system components (vacuum pumps and centrifuge) appear to be capable of handling the additional flow. Table 2-13 lists key components of the HVE system, their design capacity, and modifications proposed under the selected remedy.

Table 2-13
Limitations of the HVE System

Component	Design Capacity	Modification Proposed under the Selected Remedy
Extraction Wells	Not rated. Existing extraction wells can handle the required flow rate, but additional wells would be required to improve capture at the south end of the site.	Yes
Vacuum Pumps	The vacuum pumps are rated by airflow (two pumps at 250 actual cubic feet per minute per pump); additional entrained liquid will not significantly reduce the air flow rate.	No
Liquid Transfer Pumps	Two in parallel at 7 gpm each	No
5-Micron Absolute Filter	12 gpm	No
Centrifuge	30 gpm	No
Influent Tank	100 gallons	Yes
Influent Transfer Pumps	Two in parallel at 6 gpm each	No
10-Micron Bag Sediment Filters	Two in parallel at 12 gpm each	No
Organo-Clay Filters	Four in parallel at 6 gpm each	Yes
Liquid-Phase GAC Vessels	Two series of two in parallel at 6 gpm per series	No
Treated Water Strainers	Two in parallel at 12 gpm each	No
Effluent Tank	100 gallons	No

Note: For definitions see the Acronyms and Abbreviations section.

The capacity of the system appears to be limited by the influent tank (directly downstream of the centrifuge) and by rapid differential pressure buildup in the organo-clay filters. The capacity of the influent tank will be increased by modifying the tank and pump control scheme. Additional organo-clay filters might be added in parallel to address differential pressure buildup, but the filters would likely require additional space. A second reinjection well will be required to discharge the additional water.

In addition to physical modifications to the HVE system under the selected remedy, the controls system may be upgraded and the operational strategy may be modified. A telemetry system may be added to the system that would allow selected instrumentation to be read remotely and selected pumps and valves to be controlled remotely. This would allow for early detection and resolution of potential problems and help minimize system downtime.

The selected remedy does not propose to capture and treat the bulk of groundwater contamination beneath the site. It relies on removal of free product and remediation of contaminated soils to reduce groundwater contaminant concentrations. Both during and following treatment system operations, it will be necessary to monitor groundwater contaminant concentrations. Monitoring would continue to occur until cleanup levels have been obtained or until it can be demonstrated that groundwater contamination does not pose an unacceptable risk to human health and the environment. Cleanup levels will be considered obtained when sampling indicates that the exposure point concentration is below contaminant cleanup level. The exposure point concentration for groundwater will be calculated assuming that analytical results below the detection limit are present at concentrations equal to one-half the detection limit, the data are normally distributed, and the exposure point concentration is the lesser of the 95 percent upper confidence limit of the arithmetic mean of the data and the maximum detected concentration.

Because exposure to groundwater contaminated at concentrations that could potentially affect human health could occur while the selected remedy is being implemented, USAED will provide written notice to the Aleutians East Borough, the City of Cold Bay, and the property owner that contaminated groundwater is present at the site and that, due to human health risks, groundwater contaminated at concentrations above state regulations should not be used as a source of drinking water.

12A.3 SUMMARY OF THE ESTIMATED REMEDY COSTS

The information in this cost estimate summary table is based on the best available information regarding the anticipated scope of the selected remedy. 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 of a memorandum in the Administrative Record file, an explanation of significant differences, or a decision document 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.

The estimated costs of the selected remedies are broken down in Tables 2-14 and 2-15.

Table 2-14
DDA/BSA Soils Cost Estimates

Year	Excavation and Thermal Treatment	Bioventing and SVE Design	Bioventing and SVE Construction	SVE O&M (2 years)	Bioventing O&M (8 years)	Yearly Total
1	$1,758025	$44,886				$1,802,911
2			$630,485			$630,485
3				$166,039	$158,431	$324,470
4				$121,044	$158,431	$279,475
5					$158,431	$158,431
6					$165,009	$165,009
7					$163,364	$163,364
8					$158,431	$158,431
9					$158,431	$158,431
10					$78,393	$78,393
Totals	**$1,758,025**	**$44,886**	**$630,485**	**$287,083**	**$1,198,921**	
					Alternative Total	**$3,919,399**

Note: For definitions, see the Acronyms and Abbreviations section.

Table 2-15
DDA/BSA Sediments, Free Product, and Groundwater Cost Estimates

Year	Design HVE System Modifications	Modify HVE System	Modified HVE System O&M (10 years)	Long-Term Monitoring (5 years)	Yearly Total
1	$25,606	$228,238			$253,844
2			$508,058		$508,058
3			$497,636		$497,636
4			$508,058		$508,058
5			$643,549		$643,549
6			$479,528		$479,528
7			$344,541		$344,541
8			$333,682		$333,682
9			$344,541		$344,541
10			$485,699		$485,699
11			$236,307	$45,823	$282,130
12				$78,599	$78,599
13				$78,599	$78,599
14				$78,599	$78,599
15				$78,599	$78,599
16				$32,776	$32,776
Totals	**$25,606**	**$228,238**	**$4,381,599**	**$392,995**	
				Alternative Total	**$5,028,438**

Note: For definitions, see the Acronyms and Abbreviations section.

12A.4 EXPECTED OUTCOMES OF THE SELECTED REMEDY

Upon achieving cleanup levels, the DDA/BSA site would be available for a wide range of uses including commercial, industrial, and residential application. Method Two and Method Three cleanup levels are protective of residential use. The time estimate for attaining cleanup goals is in the range of 16 years, including monitoring. The selected remedy focuses on soil contaminant removal and free-product contaminant removal. Using the HVE system, some of the dissolved-phase contaminant will be captured from the groundwater. However, the selected remedy will not actively address most of the groundwater contamination. Instead, by removing the free product and the contaminated soil, natural attenuation should begin to lower groundwater contaminant levels. The groundwater will be monitored to determine the groundwater contaminant concentration after the selected remedy has been completed. The results of this monitoring will determine the potential groundwater uses. The cleanup levels for the COCs and COPCs in soil and groundwater can be seen in Tables 2-16 and 2-17.

Table 2-16
DDA/BSA Soil Cleanup Levels

Media: Soil

Site Area: DDA/BSA

Available Use: Unrestricted

Controls to Ensure Restricted Use (if applicable): N/A

COPC	Maximum Concentration	Cleanup Level	Basis for Cleanup Level	Exposure Pathway Basis for the Cleanup Level
DRO	39,000	524	Method Three	Migration to Groundwater
GRO	5,700	578	Method Three	Migration to Groundwater
Benzene	11	0.0228	Method Three	Migration to Groundwater
Ethylbenzene	24	9.15	Method Three	Migration to Groundwater
Toluene	50	8.01	Method Three	Migration to Groundwater
Xylenes	400	129	Method Three	Migration to Groundwater
Beta-BCH (b-HCH)	0.0487	0.0176	Method Three	Migration to Groundwater
2-Methylnaphthalene	154	86.6	Method Three	Migration to Groundwater
1,2,4-Trimethylbenzene	99	25.2	Method Three	Cumulative Risk Level
1,3,5-Trimethylbenzene	140	35.5	Method Three	Cumulative Risk Level
1,2-Dibromoethane	0.017	0.000173	Method Three	Migration to Groundwater

Notes:

The cumulative hazard index and the cumulative cancer risk will be less than 1.0 and 1x 10^{-5} respectively at cleanup the level.

Although the Method Three cleanup levels apply to upland soils at the BSA, they do not apply to sediment along the beach, which contain much lower levels of organic carbon and are in contact with surface waters.

The exposure pathway basis for cleanup level represents the exposure pathway requiring the most stringent cleanup level to ensure adequate protection of human health and the environment. All cleanup levels are protective of the ingestion, inhalation, and migration-to-groundwater exposure pathways. Information on cumulative risk levels is presented in Section 7A.1.

All results are mg/kg.

For definitions, see the Acronyms and Abbreviations section.

Table 2-17
DDA Groundwater Cleanup Levels

Media: Groundwater
Site Area: DDA/BSA
Available Use: Unrestricted
Controls to Ensure Restricted Use (if applicable): N/A

COPC	Maximum Concentration	Cleanup Level	Basis for Cleanup Level
DRO	58.3 mg/L	1.5 mg/L	18 AAC 75
GRO	6.37 mg/L	1.3 mg/L	18 AAC 75
RRO	1.16 mg/L	1.1 mg/L	18 AAC 75
1,2-Dibromoethane	10 μg/L	0.05 μg/L	Tech Memo 01-007
1,2-Dichloroethane	12.5 μg/L	5 μg/L	18 AAC 75
Benzene	1150 μg/L	5 μg/L	18 AAC 75
Naphthalene	216 μg/L	700 μg/L	18 AAC 75
Toluene	1390 μg/L	1,000 μg/L	18 AAC 75
Trichloroethene	6.8 μg/L	5 μg/L	18 AAC 75
Xylenes	705 μg/L	10,000 μg/L	18 AAC 75
Benzo(b)fluoranthene	0.157 μg/L	1 μg/L	18 AAC 75
Benzo(k)fluoranthene	0.157 μg/L	10 μg/L	18 AAC 75
Phenanthrene	7.57 μg/L	11,000 μg/L	Tech Memo 01-007
Lead	0.0087 μg/L	0.015 mg/L	18 AAC 75
TAH	115.87 μg/L	10 μg/L	18 AAC 70
TAqH	225 μg/L	15 μg/L	18 AAC 70

Notes:
The cumulative hazard index and the cumulative cancer risk will be less than 1.0 and 1x 10^{-5} respectively at cleanup the level.
For definitions, see the Acronyms and Abbreviations section.

The completion of the selected remedies at the DDA/BSA site could have some socio-economic and community revitalization impacts. Development of the land as a commercial or residential property could increase jobs and tax revenue, enhance human use of the resources, and provide other benefits to the community. The completion of the selected remedy at the DDA/BSA site will provide environmental and ecological benefits. The cleanup will prevent harmful exposure to contaminants potentially affecting human, wildlife, and environmental populations.

COLLAPSED WOODEN BUILDING SITE

5B.0 COLLAPSED WOODEN BUILDING SITE CHARACTERISTICS

5B.1 OVERVIEW

The CWB site is located to the northwest of the runway intersection. The site covers approximately 750 square feet. The ground surface immediately around the site is fairly flat, sloping gradually to the east. Drainage from the site flows to the east, ponding in low spots within a larger depression. The boundaries of the CWB site can be seen in Figure 2-11. The building was used to store drums of jet fuel, presumably during the late 1960s when the Flying Tigers leased the runway. There are no known live utilities near the CWB site.

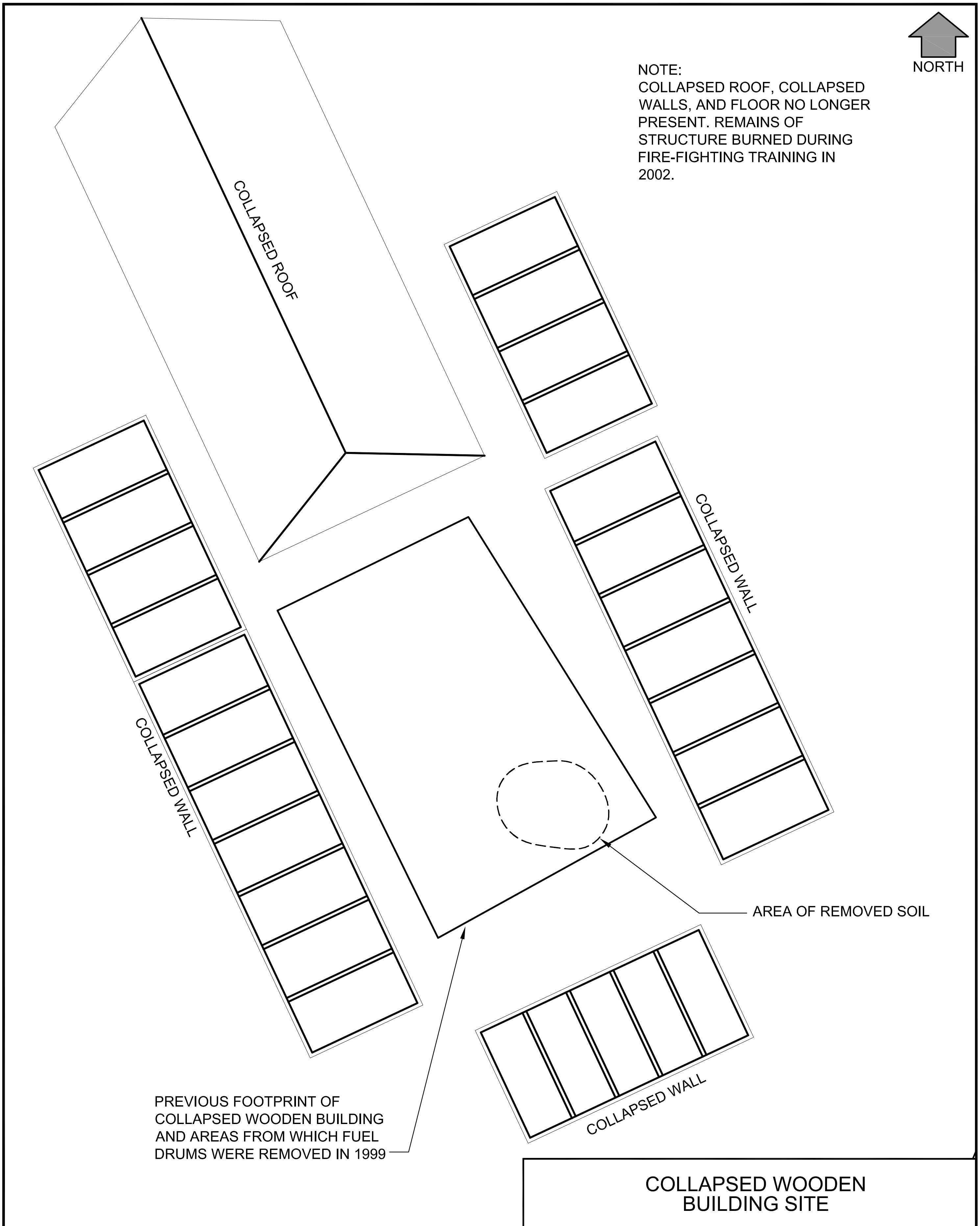
5B.2 CONCEPTUAL SITE MODELS, HUMAN HEALTH, AND ECOLOGICAL RECEPTORS

5B.2.1 Conceptual Site Model for Human Health

A CSM was developed that identifies potential exposure pathways for each contaminant or class of contaminants applicable to each area. A CSM for the CWB site is shown in Figure 2-12. The primary source of potential contamination within the CWB site was fuel drums that were stored in the building. There are no longer any drums remaining on the site; however, historical releases from the drums resulted in soil contamination. A limited removal action was conducted as part of the 2002 RI. Results from samples collected after the removal action indicate that residual concentrations of fuel contaminants were below the cleanup goals.

5B.2.2 Ecological Receptors

Potential ecological receptors include terrestrial biota. Ecological receptors have exposure pathways that are similar to human receptors.



COLLAPSED WOODEN BUILDING SITE

COLD BAY, ALASKA

PROJECT MANAGER:	FILE NAME:	DATE:
S. Witzmann	Collapsed Building Site.dwg	Aug 18, 05
	LAYOUT TAB: Collapsed Building Site	FIGURE NO.: 2-11
JE / DRAWN BY: BJP	FILE LOCATION: Cold Bay \ 05M30608 \ 2004 Decision Document	

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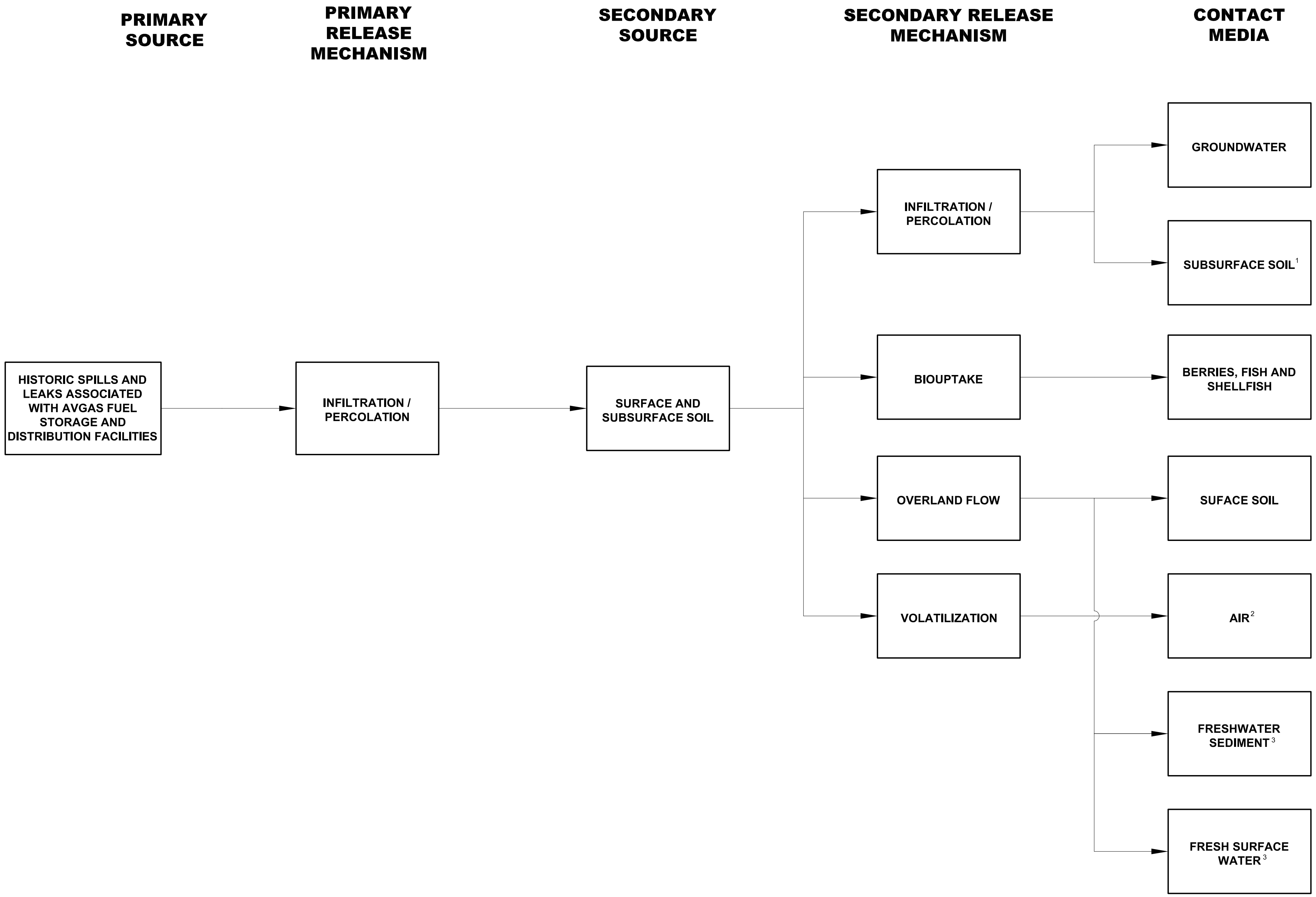

POTENTIAL RECEPTORS

EXPOSURE ROUTE	HUMAN				ECOLOGICAL	
	CURRENT OR FUTURE RECREATIONAL VISITOR	CURRENT OR FUTURE OFFSITE RECEPTOR	FUTURE ONSITE WORKER	FUTURE RESIDENT	AQUATIC	TERRESTERIAL
INGESTION (VOCs) INGESTION DERMAL	– – –	– – –	X X X	X X X	– – –	– – –
INHALATION-PARTICLES INGESTION DERMAL	– – –	– – –	X X X	X X X	– – –	– – –
INGESTION	X	X	X	X	X	X
INHALATION-PARTICLES INGESTION DERMAL	X X X	– – –	X X X	X X X	– – –	X X X
INHALATION (VOCs)	–	–	X	X	–	X
INGESTION DERMAL	X X	– –	– –	– –	X X	X X
INGESTION DERMAL	X X	– –	– –	– –	X X	X X

X= A POTENTIALLY COMPLETED EXPOSURE PATHWAY.

NOTES:

1. THE POSSIBILITY EXISTS THAT SUBSURFACE CONTAMINATION MAY BE BROUGHT TO THE SURFACE AS A RESULT OF FUTURE CONSTRUCTION OR EXCAVATION ACTIVITIES.

2. VAPOR SOURCES POTENTIALLY INCLUDE SOIL AND/OR GROUNDWATER CONTAMINATION. VAPOR MIGRATION FROM VOLATILE ORGANIC COMPOUNDS (VOCs) INTO A FUTURE COMMERCIAL, INDUSTRIAL, OR RESIDENTIAL STRUCTURE IS CONSIDERED.

3. SURFACE WATER AND SEDIMENT CONTACT MEDIA AND ASSOCIATED EXPOSURE ROUTES ARE APPLICABLE TO THE STAPP CREEK AREA ONLY.

4. DUE TO THE LACK OF ACCESS RESTRICTIONS, THE RECREATIONAL USER AND OFFSITE RECEPTOR SCENERIOS ARE APPLICABLE TO THE COLLAPSED WOODEN BUILDING AND STAPP CREEK AREAS ONLY. ACCESS TO THE EAST-WEST RUNWAY AREA IS RESTRICTED SINCE IT IS PART OF THE ACTIVE COLD BAY AIRPORT RUNWAY AREA.

5. LAND ASSOCIATED WITH THESE THREE SITES IS CURRENTLY OWNED BY THE ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES AND IS ASSOCIATED WITH THE COLD BAY AIRPORT OPERATIONS. CLEAN UP LEVELS AT THESE SITES WILL BE PROTECTIVE OF RESIDENTIAL LAND USE.

CONCEPTUAL SITE MODEL
COLLAPSED WOODEN BUILDING, STAPP CREEK, AND EAST-WEST RUNWAY
COLD BAY, ALASKA

PROJECT MANAGER: S. Witzmann	FILE NAME: Conceptual Site Model.dwg	DATE: Aug 18, 05
DRAWN BY: BJP	LAYOUT TAB: CWB-Stapp-EWR	FIGURE NO.: 2-12
	FILE LOCATION: Cold Bay \ 05M30608 \ 2004 Decision Document	

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5B.3 SURFACE AND SUBSURFACE FEATURES

Surface features historically included the actual building as well as drums that were stacked on the wooden floor area of the building. In 1999, crews removed 207 empty drums and 18 drums containing liquid from the building area. The remains of the building structure were burned during a fire-fighting training exercise in 2002. The only surface or subsurface feature remaining at the site is the charred construction material where the building was once located.

Although the CWB previously has been treated conservatively as a State Historic Preservation Office (SHPO) site of concern, the SHPO later concurred with USAED's determination that the building is not a protected historic site.

5B.4 SAMPLING STRATEGY

To determine the nature and extent of contamination at the site, soil samples were collected beneath the former drum storage area and downgradient of the site.

5B.5 KNOWN OR SUSPECTED SOURCES OF CONTAMINATION

The primary suspected sources of contamination are drums historically stored in the building. In 2002, a RI was conducted to identify the nature and extent of contamination (USAED 2003b).

5B.6 TYPES OF CONTAMINATION AND THE AFFECTED MEDIA

Based on historic information, the COPCs identified for the site are petroleum hydrocarbons and lead. Because of the fate and transport characteristics for the COPCs, which tend to sorb strongly onto site soils, the investigation focused on analysis of soil samples collected beneath the former drum storage area. Analytical results revealed that there was minimal contamination at the building site. A small quantity of contaminated soil was removed and shipped offsite. Confirmation samples showed that all contamination above cleanup levels has been removed.

Surface soil downgradient of the CWB also was sampled and sent offsite for analysis. Contaminant concentrations were found to be well below cleanup levels, eliminating the concern that overland flow of contamination had occurred in the area. Since site COPCs were below cleanup levels, no COCs were established. No Resource Conservation and Recovery Act (RCRA) hazardous wastes have been identified at the site.

5B.7 LOCATION OF CONTAMINATION AND KNOWN/POTENTIAL ROUTES OF MIGRATION

No contamination is known to remain at the site.

5B.8 NATURE AND EXTENT OF CONTAMINATION

No contamination is known to remain at the site.

6B.0 CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

6B.1 LAND USE

The CWB site is located on land belonging to the State of Alaska and administered by ADOT&PF. This land is currently used for operations and maintenance (O&M) of the runway and airport facilities. Because of the runway's economic and military significance, it is anticipated this land will continue to be used for this purpose indefinitely. Adjacent land is also used for runway maintenance and operation. (ADEC Method Two standards, the basis for cleanup levels at the site, are protective of residential land use.)

6B.2 GROUNDWATER USE

Groundwater is not currently extracted from the CWB site. No surface water presently exists at the CWB site. The city of Cold Bay supplies its residents with drinking water pumped from a deep aquifer.

It is not anticipated that groundwater will be extracted from the CWB site in the foreseeable future; however, the aquifer remains a potential future source of drinking water.

6B.3 SURFACE WATER USE

There is no surface water at the site.

7B.0 SUMMARY OF SITE RISKS

To assess risks posed by site contaminants, detected contaminant concentrations were compared to ADEC values. Only DRO, RRO, and lead were detected within the CWB samples. The concentrations of DRO (maximum detected concentration = 11.3J mg/kg), RRO (52J mg/kg), and lead (6.44 mg/kg) were all below ADEC Method Two values (250 mg/kg, 10,000 mg/kg, and 400 mg/kg, respectively). Thus, site risks are considered less than ADEC target values.

In addition, all drums have been removed from the CWB site, and there is no available evidence indicating additional contaminant sources exist at this location. Therefore, no further action is recommended for this area.

8B.0 REMEDIATION OBJECTIVES

Because risk screening indicates that site contaminants do not pose an unacceptable risk, no RAOs have been established for the CWB site.

9B.0 DESCRIPTION OF ALTERNATIVES

Only the No Action alternative has been evaluated for the CWB site.

10B.0 COMPARATIVE ANALYSIS OF ALTERNATIVES

There is no comparison of alternatives for the CWB site since only the No Action alternative has been considered.

11B.0 PRINCIPAL THREAT WASTE

No principal threat waste has been identified at the CWB site.

12B.0 SELECTED REMEDY

The selected remedy is the No Action alternative. There are no costs or outcomes associated with this selection.

STAPP CREEK AND EAST-WEST RUNWAY SITES

5C.0 STAPP CREEK AND EAST-WEST RUNWAY SITE CHARACTERISTICS

5C.1 OVERVIEW

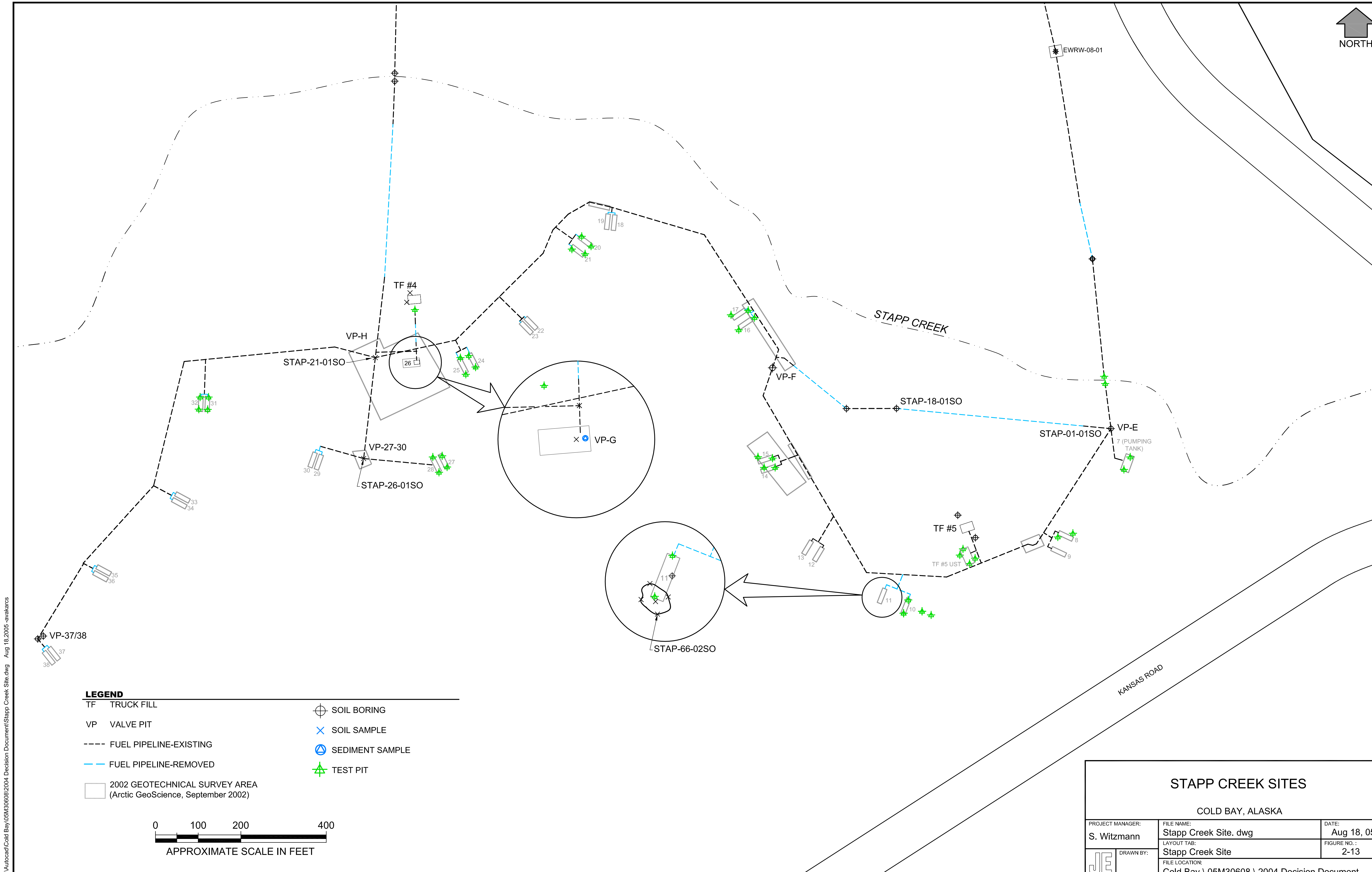
5C.1.1 Stapp Creek

The Stapp Creek site covers approximately 85 acres. The estimated boundaries of the site are shown on Figure 2-13. The Stapp Creek site is located approximately ½-mile south of the EWR site. The site included a series of AvGas USTs linked by about 0.8 miles of pipe, roughly paralleling the eastern portion of Stapp Creek.

The Stapp Creek site is situated in an area of low hills and includes depressions from the removed USTs. The site is mainly covered with grassy and brushy vegetation. Stapp Creek runs to the north of the UST locations through a wetland. The creek runs clear and appears to be pristine, with a sandy bottom and green aquatic plants. Stapp Creek is an anadromous stream, supporting a run of chum salmon. The only live utilities known to exist at the Stapp Creek site are the runway lights. Near Stapp Creek's discharge into Cold Bay, the creek runs through a flat-bottomed valley, with shallow bluffs to the north and south. The USTs were generally located along the side of a bluff, at about 90 feet above MHW.

5C.1.2 East-West Runway

The EWR site covers approximately 100 acres. The estimated boundaries of the EWR site are shown on Figure 2-14. The EWR site is located just to the north of the EWR.


NORTH
EWRW-08-01
STAPP CREEK
TF #4
VP-H
STAP-21-01SO
VP-G
VP-27-30
STAP-26-01SO
VP-F
STAP-18-01SO
VP-E
STAP-01-01SO
7 (PUMPING TANK)
TF #5
TF #5 UST
STAP-66-02SO
VP-37/38
KANSAS ROAD
LEGEND
TF TRUCK FILL
VP VALVE PIT
FUEL PIPELINE-EXISTING
FUEL PIPELINE-REMOVED
2002 GEOTECHNICAL SURVEY AREA (Arctic GeoScience, September 2002)
SOIL BORING
SOIL SAMPLE
SEDIMENT SAMPLE
TEST PIT
0 100 200 400
APPROXIMATE SCALE IN FEET
STAPP CREEK SITES
COLD BAY, ALASKA
PROJECT MANAGER: S. Witzmann
DRAWN BY:
FILE NAME: Stapp Creek Site. dwg
LAYOUT TAB: Stapp Creek Site
FILE LOCATION: Cold Bay \ 05M30608 \ 2004 Decision Document
DATE: Aug 18, 05
FIGURE NO.: 2-13
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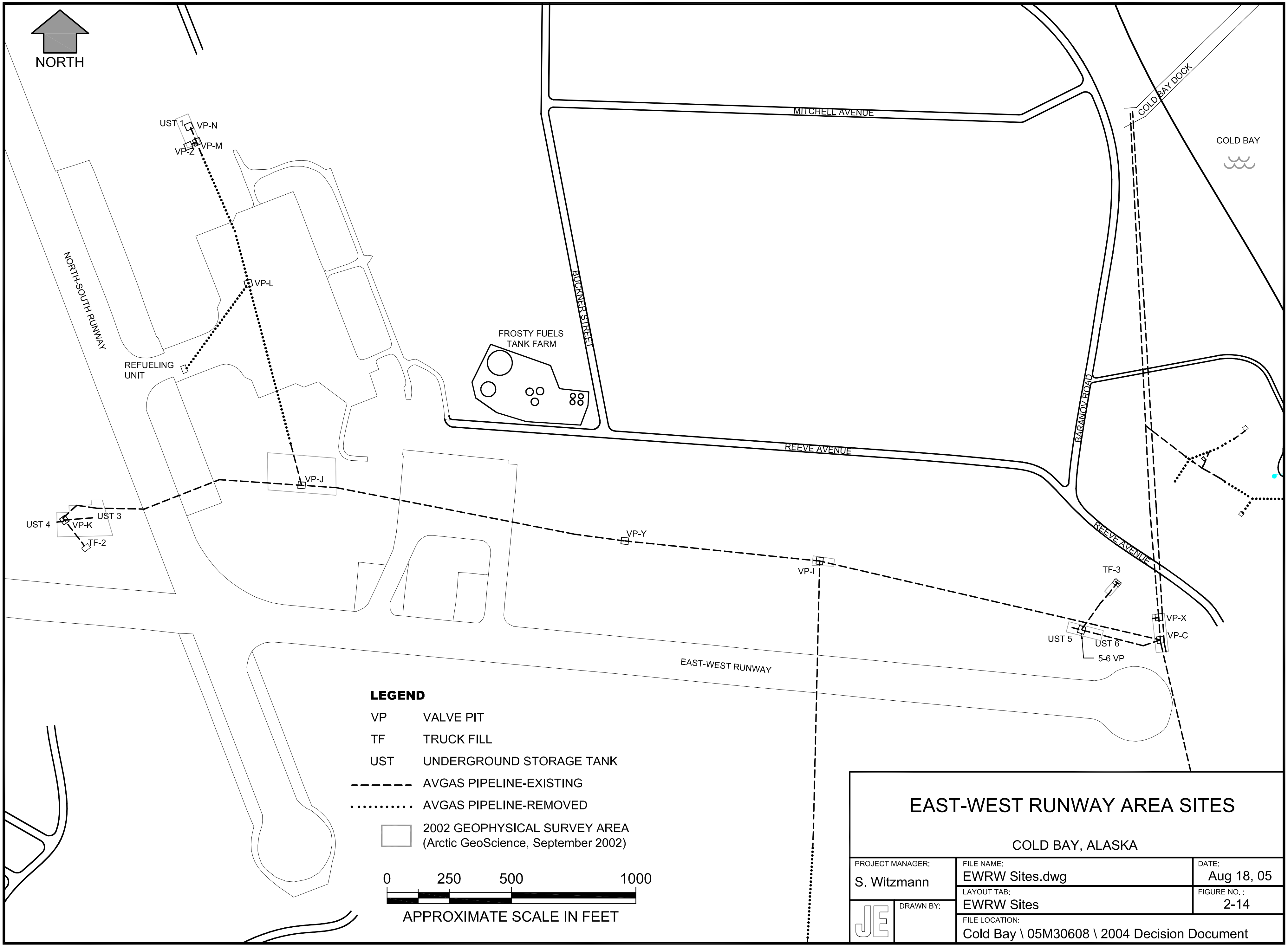

Due to its location, the area is relatively flat and free of vegetation. The EWR site sits atop a flat area that slopes gradually to the north and the south along the length of the EWR. Runoff drains to the south into Stapp Creek and, to the north, into a large, shallow depression. Stapp Creek discharges into Cold Bay. Static groundwater levels in monitoring wells to the north of the EWR site, in and around the Frosty Fuel Tank Farm (Figure 2-2), are between approximately 10 to 20 feet bgs. The interpreted groundwater flow direction for this area is to the east or southeast.

5C.2 CONCEPTUAL SITE MODELS, HUMAN HEALTH, AND ECOLOGICAL RECEPTORS

5C.2.1 Conceptual Site Model for Human Health

A CSM for the Stapp Creek and EWR sites is shown in Figure 2-12. The sources of contamination within the Stapp Creek and EWR sites are historical spills and leaks associated with AvGas fuel storage and distribution facilities. Two AvGas USTs remain at the site and contain water with a visible petroleum sheen. Based on findings of the 2002 RI, the two remaining USTs contained elevated levels of DRO, GRO, and BTEX compounds. The tank at Stapp Creek also contained lead.

Varieties of potential exposure routes exist. The primary release mechanism of contamination is infiltration/percolation. This allows surface and subsurface soils to become a secondary source of contamination. Possible secondary release mechanisms include infiltration/ percolation, biouptake, overland flow, and volatilization. They could result in exposure to contact medium such as groundwater, surface soil, subsurface soil (brought to the surface by construction or excavation activity), berries, fish, shellfish, air, freshwater (Stapp Creek) and freshwater sediment. However, site data and documented fate and transport parameters for the COCs indicate that significant contaminant concentrations are limited to site soils. Human or ecological exposure could occur through inhalation, ingestion, or dermal contact. Potential human receptors include recreational visitors to the site, onsite workers, potential future residents, and offsite receptors.

5C.2.2 Ecological Receptors

Potential ecological receptors include aquatic and terrestrial biota. Ecological receptors have exposure pathways that are similar to human receptors.

5C.3 SURFACE AND SUBSURFACE FEATURES

5C.3.1 Stapp Creek

Surface and subsurface features of the Stapp Creek site include one remaining UST (UST 26) and limited sections of subsurface pipe. Historically, there were 31 USTs and associated pipelines, as well as two truck filling stations associated with the Stapp Creek site. In addition, each of the truck filling stations appears to have included a UST. Pre-1997, a USAED contractor removed approximately 17 USTs. In 1997, 15 tanks were removed and shipped off for recycling. In 1998, a 20-foot section of the 8-inch pipeline crossing Stapp Creek was removed. The site holds no known archaeological or historical importance at this time.

5C.3.2 East-West Runway

Surface and subsurface features of the EWR site include one remaining UST (UST 1). Historically, there were four additional USTs and associated valve pits as well as underground piping associated with the EWR. In 1999, the four additional USTs and piping pairs connecting the USTs to their associated valve pits were removed. The piping pairs associated with UST 3 were left in place due to electrical lines which prevented their removal. Only UST 1 remains at the site. In 2002, the site pipeline was investigated and was found to be previously decommissioned leaving most of the pipeline abandoned in place (Figure 2-14).

At this time, no archaeological or historical importance has been attributed to the site.

5C.4 SAMPLING STRATEGY

5C.4.1 Stapp Creek

To determine the nature and extent of contamination at the site, a geophysical survey was conducted, soil samples were collected, test pits were excavated, and a surface water sample was collected from Stapp Creek.

A geophysical survey was conducted to guide the RI. The survey used electromagnetic detection, dual-head magnetometery, and GPR. Using the results of the geophysical survey, historical maps of the fuel distribution system, and depressions from previous UST removals, the original locations of each of the USTs were identified. Test pits were excavated in areas where historical data was insufficient to demonstrate that contamination was not present.

Two test pits were excavated at each former UST location. One test pit was dug at each end of the former UST location. In addition, test pits were excavated at current and former valve pit locations.

Following the 1997 UST removal, 39 confirmation samples were collected. In 2002, an additional 63 soil samples were collected. All 2002 samples were analyzed for GRO, DRO, RRO, BTEX, VOCs, PAHs, and lead. In addition, a surface water sample was collected from Stapp Creek to ensure that contaminants were not migrating offsite.

5C.4.2 East-West Runway

To determine the nature and extent of contamination at the site, a geophysical survey was conducted, soil samples were collected, and test pits were excavated. EWR sampling strategy was similar to the Stapp Creek sampling strategy.

During the 1999 UST removal action, 57 confirmation samples were collected. Samples were analyzed for GRO, DRO, RRO, BTEX, and lead. Select samples were also analyzed for PAHs.

5C.5 KNOWN OR SUSPECTED SOURCES OF CONTAMINATION

The primary suspected sources of contamination are the USTs and underground pipelines used for AvGas transportation. In 2002, a RI was conducted to identify the nature and extent of contamination (USAED 2003b).

5C.6 TYPES OF CONTAMINATION AND THE AFFECTED MEDIA

Based on the CSM, the COPCs are petroleum hydrocarbon and lead (a component of AvGas). Because of the fate and transport characteristics for the COPCs, which tend to sorb strongly onto site soils, the investigation focused on analysis of soil samples collected beneath former UST locations.

Soil contaminants for Stapp Creek, detected at concentrations above ADEC Method Two standards, are listed in Table 2-18. No RCRA hazardous waste has been identified at the site.

Table 2-18
Stapp Creek Contaminants of Concern

Contamination	Maximum Detection Concentration	Cleanup Level by Exposure Pathway			Source of Cleanup Level
		Ingestion	Inhalation	Migration to Groundwater	
DRO	361	10,250	12,500	**250**	ADEC Method 2
Benzo(a)anthracene	16.6	11	-	**6**	
Benzo(a)pyrene	14.4	**1**	-	3	
Benzo(b)fluoranthene and Benzo(k)fluoranthene	27.4	**11** **110**	-	20	
Dibenzo(a,h)anthracene	1.81	**1**	-	6	

Notes:
All values are in mg/kg. **Bold** text represents the proposed cleanup level.
For definitions, see the Acronyms and Abbreviations section.

Soil contaminants for the EWR site detected at concentrations above ADEC's Method Two standards are listed in Table 2-19.

Table 2-19
EWR Contaminants of Concern

Contaminant	Maximum Detected Concentration	Cleanup Level by Exposure Pathway			Source of Cleanup Level
		Ingestion	Inhalation	Migration to Groundwater	
GRO	1,200	1,400	1,400	**300**	ADEC Method 2
DRO	21,500	10,250	12,500	**250**	
Dibenzo(a,h)anthracene	1.05	**1**	-	6	
Benzene	95	150	9	**0.02**	
Ethylbenzene	370	10,000	89	**5.5**	
Toluene	42	20,300	180	**5.4**	

Notes:
All values are in mg/kg. **Bold** text represents the proposed cleanup level.
For definitions, see the Acronyms and Abbreviations section.

5C.7 LOCATION OF CONTAMINATION AND KNOWN/POTENTIAL ROUTES OF MIGRATION

Sampling during the 2002 RI indicated that five areas within the Stapp Creek site exceeded cleanup levels. The locations of these contaminated sites are shown on Figure 2-13. Two of the areas were located directly below pipe valves (STAP-21-01SO and STAP-26-01SO), two were located where pipe segments ended (STAP-01-01SO and STAP-18-01SO), and one was located were a volume of contaminated soil was removed during the 2002 RI (STAP-66-02SO).

Sampling also indicated that three areas within the EWR site exceeded cleanup levels. The areas are valve pit VP-X, VP-M, and north of VP-N, as shown in Figure 2-14.

As shown on the CSM (Figure 2-12), a variety of potential contact media exist. However, site data and documented fate and transport parameters for the COCs indicate that significant contaminant concentrations are limited to site soils.

5C.8 NATURE AND EXTENT OF CONTAMINATION

5C.8.1 Stapp Creek

The available data for Stapp Creek soil indicates that the vertical and lateral extent of each of these areas of contamination is limited and that each isolated area contains approximately 2 cy of contaminated soil.

COCs for the sites are DRO and PAHs. The fate and transport parameters for these contaminants indicate limited mobility in the environment. Specifically, PAHs and DRO have low-water solubility, have low volatility, and sorb strongly to soil. Thus, these compounds tend to be relatively immobile in soil.

To document that contaminants are not migrating offsite, one surface water sample was collected from Stapp Creek and analyzed for VOCs, PAHs, TAH, TAqH, and lead. Only lead was found at a detectable concentration (0.0018 mg/L) within the Stapp Creek surface water sample. This concentration is less than ecological screening criteria and likely associated with naturally occurring background conditions.

5C.8.2 East-West Runway

The available data for EWR soil indicates that the vertical and lateral extent of each of these areas of contamination is limited and that each isolated area contains approximately 2 cy of contaminated soil.

Based on findings of the 2002 RI, COCs for the site are DRO, GRO, PAH, and BTEX compounds.

The fate and transport parameters of DRO, BTEX, and PAHs indicate the possibility for limited migration of the COCs. PAHs have low-water solubility, low volatility, and high sorption potential, which tend to be relatively immobile in soil. GRO are somewhat more mobile in the environment, but also are more volatile and subject to biodegradation under aerobic conditions.

6C.0 CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

6C.1 LAND USE

The Stapp Creek and EWR sites are located on land, belonging to the State of Alaska and administered by the ADOT&PF. The state currently uses the land for O&M of the runway and airport facilities; the Cold Bay Airport is expected to remain active and continue to provide a vital transportation link for Cold Bay and surrounding communities. Access to the EWR site is restricted, because the area is part of the active Cold Bay airport. Because of the runway's economic and military significance, ADOT&PF anticipates this land will continue to be used for this purpose, indefinitely. Adjacent land use includes commercial and recreational land use. (ADEC's Method Two standards are protective of residential land use.)

6C.2 GROUNDWATER USE

Groundwater is not currently extracted from the site. Site groundwater appears to migrate toward Stapp Creek, which discharges to Cold Bay. The city of Cold Bay supplies its residents with drinking water pumped from a deep aquifer. It is not anticipated that groundwater will be extracted from the Stapp Creek or EWR sites in the foreseeable future; however, the aquifer remains a potential future source of drinking water.

6C.3 SURFACE WATER USE

The surface water of Stapp Creek has shown no signs of contamination. It is presently used only for recreational purposes. It is not anticipated that surface water from Stapp Creek will be used as drinking water in the near future.

7C.0 SUMMARY OF SITE RISKS

An RI was performed at Fort Randall, as a FUDS, to support an informed risk management decision for remediation of contaminated areas. The response action selected in this Decision Document is necessary to protect the public health or welfare, or the environment from actual or threatened releases of hazardous substances into the environment.

7C.1 SUMMARY OF HUMAN HEALTH RISK SCREENING

7C.1.1 Stapp Creek Soil

To assess potential health risks associated with contamination at the Stapp Creek site, measured contaminant concentrations were compared to ADEC Method Two standards. The data indicate the potential for risk associated with five sample locations in the Stapp Creek site. Table 2-18 presents the maximum detected concentration for each COC detected in the soil. Table 2-20 lists each sample containing contaminant concentrations exceeding site cleanup goals. The locations of these samples define the area where site risks have the potential to exceed ADEC target values.

Table 2-20
Stapp Creek Soil Contaminants of Concern and Concentrations

Sample	Depth (feet bgs)	DRO (mg/kg)	Benzo(a) anthracene (μg/kg)	Benzo(a) pyrene (μg/kg)	Benzo(b,k) fluoranthene (μg/kg)	Dibenzo(a,h) anthracene (μg/kg)
ADEC Method Two Value	-	250	6,000	1,000	11,000	1,000
STAP-01-01	0.5	23.6	**16,600**	**14,400**	**27,400**	**1,690**
STAP-18-01	0.5	36.3	2,760	**2,780**	1,670	263
STAP-21-01	3	**269**	457	**1,190**	1,130	ND
STAP-26-01	3	**361**	ND	ND	ND	ND
STAP-66-02	10	**293**	ND	ND	ND	ND

Notes:
Bold indicates value > ADEC standard.
For definitions, see the Acronyms and Abbreviations section.

7C.1.2 East-West Runway Soil

To assess potential health risks associated with contamination at the EWR site, measured contaminant concentrations were compared to ADEC Method Two standards. The data indicate the potential for risk associated with three sample locations at the site. Table 2-19 presents the maximum detected concentration for each COC detected in the soil. Table 2-21 lists each sample containing contaminant concentrations exceeding site cleanup goals. The locations of these samples define the area where site risks have the potential to exceed ADEC target values.

Table 2-21
EWR Soil Contaminants of Concern and Concentrations

Sample	Location	Depth (feet bgs)	DRO (mg/kg)	GRO (mg/kg)	Dibenzo(a,h) anthracene (µg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Benzene (mg/kg)
ADEC Method Two Value	-	-	250	300	1,000	5.4	5.5	0.02
EWRW-03-01	VP-X	1.5	**21,500**	2.01	ND	ND	ND	ND
EWRW-20-01	North of VP-N	13	191	**397**	ND	ND	**85.7**	ND
EWRW-24-01	VP-M	4.5	73.6	ND	**1,050**	ND	ND	ND
PT3PI-01SO	VP-K	4.3	8.2	13	--	ND	**370**	**95**
PT4PI-01SO	Valve Box for UST-4	1.5 below valve pit	78	**1,200**	ND	**42**	**28**	**4.9**

Note:
Bold indicates value > ADEC standard.
For definitions, see the Acronyms and Abbreviations section.

7C.1.3 Stapp Creek and East-West Runway Surface Water

Analytical results from the one surface water sample collected from Stapp Creek were subjected to the risk-based screening process. The sample was analyzed for VOCs, PAHs, TAH, TAqH, and lead. Only lead was found at a detectable concentration within the Stapp Creek surface-water sample: 0.0018 mg/L, less than the corresponding screening criteria of 0.0025 mg/L. The lead concentration found in the Stapp Creek surface water is most likely associated with naturally occurring background conditions. Since there were no detections of any VOCs or PAHs, TAH and TAqH values were not calculated. The risk screening indicates that contaminants within Stapp Creek surface water are present at levels that do not pose a risk to human health.

7C.2 ECOLOGICAL RISKS

Analytical results from the surface-water sample taken at Stapp Creek were compared to ecological screening criteria. No results exceeded these criteria. The risk screening indicates that contaminants within Stapp Creek surface water are present at levels that are not of concern. The lead concentration found in the Stapp Creek surface water is most likely associated with naturally occurring background conditions and is not considered likely to have a significant ecological impact.

8C.0 REMEDIATION OBJECTIVES

RAOs will be considered accomplished when sampling indicates that the exposure point concentration is below contaminant cleanup level. The exposure point concentration for soil will be calculated assuming that analytical results below the detection limit are present at concentrations equal to one-half the detection limit, the data is normally distributed (lognormal data will be transformed), and the exposure point concentration is the lesser of the 95 percent upper confidence limit of the arithmetic mean of the data and the maximum detected concentration.

The RAOs for the Stapp Creek site include the following:

- Prevent uncontrolled release of petroleum-contaminated water in the UST buried at the site.
- Prevent migration of contaminants in soil to groundwater, specifically prevent DRO in excess of 250 mg/kg and benzo(a)anthracene in excess of 6 mg/kg, from impacting groundwater.
- Prevent ingestion of contaminants in soil containing benzo(a)pyrene in excess of 1 mg/kg, benzo(b)fluoranthene in excess of 11 mg/kg, benzo(k)fluoranthene in excess of 110 mg/kg, and dibenzo(a,h)anthracene in excess of 1 mg/kg.

The RAOs for the EWR site include the following:

- Prevent uncontrolled release of petroleum-contaminated water in the UST buried at the site.
- Prevent migration of contaminants in soil to groundwater and prevent ingestion or inhalation of contaminants in soil containing DRO in excess of 250 mg/kg, GRO in excess of 300 mg/kg, benzene in excess of 0.02 mg/kg, ethylbenzene in excess of 5.5 mg/kg, toluene in excess of 5.4 mg/kg, and dibenzo(a,h)anthracene in excess of 1 mg/kg.

These RAOs will address potential risks posed by site contaminants and will allow unlimited future use of the site.

8C.1 KEY APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Key ARARs can be found in Appendix A.

9C.0 DESCRIPTION OF ALTERNATIVES

9C.1 DESCRIPTION OF REMEDY COMPONENTS

The following remedial alternatives were developed to address soil contamination at the Stapp Creek and EWR sites. The alternatives and cost estimates are based on the RAOs and the results of technology screening included in the FS (USAED 2003a):

- Alternative SC/EWR-1: No action
- Alternative SC/EWR-2: UST removal and monitored natural attenuation
- Alternative SC/EWR-3: UST removal, soil excavation, and treatment/disposal

During the screening process, Alternatives 1 and 3 were retained for detailed analysis. These alternatives are discussed below.

9C.2 STAPP CREEK/EAST-WEST RUNWAY ALTERNATIVE 1: NO ACTION

Under this alternative, no activities would be undertaken to remove the USTs, treat the soil contamination, or prevent exposure to the contamination. No monitoring would be conducted. A No Action alternative serves as a baseline against which other alternatives can be compared.

9C.3 STAPP CREEK/EAST-WEST RUNWAY ALTERNATIVE 3: UST REMOVAL, SOIL EXCAVATION, AND TREATMENT/DISPOSAL

Alternative SC/EWR-3 includes the following elements:

- Approximately 50,000 gallons of contaminated water would be removed from the USTs and treated, using pH adjustment and GAC (presumptive remedy).
- The two USTs will be removed and shipped offsite for recycling.
- Pockets of contaminated soils at the Stapp Creek and EWR sites will be excavated and shipped offsite for treatment or disposal.

Field screening would guide removal and analytical confirmation samples would be collected. Although onsite treatment of this small quantity of soil would not be cost effective as a stand-alone action, if the removal were coordinated with other soil removal actions, such as a removal action at the DDA/BSA site, onsite thermal treatment would be used in lieu of offsite soil treatment/disposal. Following removal of contaminated soil, excavations would be backfilled (or treated soil would be returned to the excavations) and existing valve pits would be filled to eliminate the hazards presented by the openings in the ground surface. Neither institutional controls nor monitoring would be required following implementation of the remedial action. Upon implementation of this alternative, the site would be available for unlimited use.

9C.4 COMMON ELEMENTS AND DISTINGUISHING FEATURES OF EACH ALTERNATIVE – STAPP CREEK/EAST-WEST RUNWAY

9C.4.1 Key Applicable or Relevant and Appropriate Requirements

Key ARARs for this Decision Document may be found in Appendix A.

9C.4.2 Long-Term Reliability of Remedy

The long-term reliability of remedy is best met by Alternative 3. The No Action alternative would not have any long-term reliability.

9C.4.3 Quantity of Untreated Waste and Treatment Residuals to Be Disposed Offsite or Managed Onsite

The No Action alternative would leave all waste onsite, untreated and unmanaged. Alternative 3 would restore the site to cleanup levels, with minimal waste remaining. DRO-contaminated soil at STAP-66-02SO and STAP-26-01SO would remain in place. See Section 12C.4 for details.

9C.4.4 Estimated Time for Design and Construction

Implementation time frame for the No Action alternative would not apply, as there would be no design or construction. Design time for Alternative 3 would be weeks or months.

9C.4.5 Estimated Time to Reach Remediation Goals

Remediation goals would not be reached for the No Action alternative. Alternative 3 would reach the remediation goals in one year.

9C.4.6 Estimated Costs

The No Action alternative would have no costs. The cost for Alternative 3 is approximately $400,000 to implement.

9C.5 EXPECTED OUTCOMES OF EACH ALTERNATIVE – STAPP CREEK/ EAST-WEST RUNWAY

The No Action alternative would leave the site unfit for residential use. Completion of Alternative 3 would leave the site unrestricted and thus available for residential use.

10C.0 COMPARATIVE ANALYSIS OF ALTERATIVES

The PAH and petroleum contamination in the USTs and soil locations poses a potential risk to human health. Alternative SC/EWR-3 addresses this risk and complies with ARARs by removing essentially all contamination above cleanup levels. Table 2-22 summarizes the ability of each alternative to achieve evaluation criteria.

Alternative SC/EWR-1 fails to protect human health or comply with ARARs. Since Alternative SC/EWR-1 fails to meet the threshold criteria, Alternative SC/EWR-3 is the only alternative that is acceptable and viable.

11C.0 PRINCIPAL THREAT WASTE

Based on factors of contaminant mobility and toxicity, it was determined that no principal threat waste is present at the Stapp Creek or EWR sites.

Table 2-22
Comparison of Alternatives for Stapp Creek and EWR

Evaluation Criteria	SC/EWR 1	SC/EWR 3
Overall Protection of Human Health and the Environment	○	●
Compliance with ARARs	○	●
Long-Term Effectiveness and Permanence	○	●
Reduction in Toxicity, Mobility, and Volume through Treatment	○	●
Short-Term Effectiveness	●	◗
Implementability	●	●
Cost (in thousands)	$0	$400
State Acceptance	○	●
Community Acceptance	○	●
● = meets or exceeds criteria ◗ = partially meets criteria ○ = does not meet criteria		

Note: For definitions, see the Acronyms and Abbreviations section.

12C.0 SELECTED REMEDY

The selected remedy for the Stapp Creek/EWR sites is Alternative SC/EWR-3: UST Removal, Soil Excavation, and Treatment/Disposal.

12C.1 SUMMARY OF THE RATIONALE FOR THE SELECTED REMEDY

The selected remedy provides a simple and rapid solution to contamination found at the Stapp Creek/EWR sites. Due to the small volume of contaminants, onsite treatment options are limited. Offsite treatment rapidly addresses the contamination and is cost effective. The USTs will be removed to prevent contamination from spreading, in the event of a leak or rupture.

12C.2 DESCRIPTION OF THE SELECTED REMEDY

The selected remedy proposes to treat the contaminated water in the two USTs remaining at the site (UST 1 and UST 26), remove the USTs, and ship them offsite for recycling.

The contaminated water will be pumped from the USTs and treated using pH adjustment and GAC. Water will be treated in accordance with ADEC's Contaminated Sites Remediation

Program guidance prior to discharge onsite. The two USTs will be removed from the subsurface and shipped offsite for recycling.

Under this alternative, the pockets of contaminated soils in the Stapp Creek and EWR sites will be excavated, confirmation soil samples will be collected, and the excavated soils will be shipped offsite for treatment or disposal. Field screening will guide removal, and analytical confirmation samples will be collected. Although onsite treatment of this small quantity of soil would not be cost effective, if the removal were coordinated with other soil removal actions, onsite thermal treatment would be used in lieu of offsite treatment or disposal. By removing essentially all sources of contamination and all soils contaminated above cleanup levels, this remedy addresses the RAOs, including prevention of uncontrolled releases of petroleum-contaminated water from the USTs buried at the sites and prevention of ingestion, inhalation, or migration to groundwater of soil not meeting ARARs. Since soil contamination has likely not affected the groundwater, indicated by soil concentrations and quantities of impacted soil, the sites would be ready for closure once analytical results confirm that the exposure point concentration (the lesser of the 95 percent upper confidence limit of the arithmetic mean of the data and the maximum detected concentration) is below cleanup levels.

This alternative does not include the removal or treatment of DRO-contaminated soil at STAP-66-02SO or STAP-26-01SO. Although DRO concentrations in these samples were above ADEC's Method Two standards for migration to groundwater, the available data indicate that they will not adversely affect groundwater quality. (Refer to Section 12C.4 for additional details.)

Following removal of contaminated soils, excavations will be backfilled (or treated soils will be returned to the excavations), and existing valve pits will be filled in to eliminate the hazards presented by the openings in the ground surface.

12C.3 SUMMARY OF THE ESTIMATED REMEDY COSTS

Due to the simplicity of this remedy, there is only a one-time cost associated with it. The cost incorporates UST removal and disposal as well as soil excavation and treatment/disposal. The estimated total cost is $400,186.

12C.4 EXPECTED OUTCOMES OF THE SELECTED REMEDY

Upon achieving cleanup levels, the Stapp Creek and EWR sites will be available for unrestricted use and the sites will be cleaned to standards protective of residential use. Approximately one field season will be required to attain cleanup goals. Cleanup will be complete after removal and disposal or treatment. The available soil data (concentration and quantity of impacted soil) indicate that it is not likely that groundwater quality has been impacted by site contaminants. The cleanup levels for the COCs are listed in Tables 2-23 and 2-24.

Table 2-23
Stapp Creek Cleanup Goals

Media: Soil
Site Area: Stapp Creek
Available Use: Commercial/Industrial
Controls to Ensure Restricted Use (if applicable): N/A

COPC	Maximum Concentration	Cleanup Level	Basis for Cleanup Level
DRO	361	250	ADEC Method Two
Benzo(a)anthracene	17.2	6	ADEC Method Two
Benzo(a)pyrene	14.4	1	ADEC Method Two
Benzo(b)fluoranthene	27.4	11	ADEC Method Two
Benzo(k)fluoranthene	27.4	11	ADEC Method Two
Dibenzo(a,h)anthracene	1.81	1	ADEC Method Two

Notes:

The cumulative hazard index and the cumulative cancer risk will be less than 1.0 and 1x 10^{-5}, respectively, after cleanup levels have been attained.

All units are mg/kg.

For definitions, see the Acronyms and Abbreviations section.

Table 2-24
EWR Cleanup Goals

Media: Soil

Site Area: EWR

Available Use: Commercial/Industrial

COPC	Maximum Concentration	Cleanup Level	Basis for Cleanup Level
GRO	1,200	300	ADEC Method Two
DRO	21,500	250	ADEC Method Two
Dibenzo(a,h)anthracene	1.05	1	ADEC Method Two
Benzene	95	0.02	ADEC Method Two
Ethylbenzene	370	5.5	ADEC Method Two
Toluene	42	5.4	ADEC Method Two

Notes:

The cumulative hazard index and the cumulative cancer risk will be less than 1.0 and 1x 10^{-5}, respectively, after cleanup levels have been attained.

All units are mg/kg.

For definitions, see the Acronyms and Abbreviations section.

The selected remedy will remove and dispose of or treat contamination associated with the following soil samples: STAP-01-01SO, STAP-18-01SO, STAP-21-01SO, EWRW-03-01SO, EWRW-20-01SO, EWRW-24-01SO, PT3PI-01SO, and PT4PI01SO. The selected remedy does not include actions to remove or monitor contamination associated with soil samples STAP-66-02SO and STAP-26-01SO. No further action will be taken to address these isolated detections based on the following:

- Although the DRO concentrations detected are above the Method Two migration to groundwater standard (250 mg/kg), given the low concentration of DRO detected (293 mg/kg and 361 mg/kg, respectively) and the limited volume of soil impacted, the contamination will not adversely impact groundwater quality. (For comparison, the Method Two standards assume that the length of the source area is 32 meters versus an estimated 2 cy of contamination at each sampling location).
- Both samples were below the detection limit for all PAHs, the risk drivers normally associated with diesel fuel.

Thus, the untreated DRO contamination to remain at the site is not expected to affect surface water or groundwater quality.

The completion of the selected remedy at the Stapp Creek and EWR sites will have minimal socioeconomic and community revitalization impacts. It is possible that there could be enhanced human use of the areas; however, due to its proximity to the runways, the land probably will serve the same function as it had before cleanup. The completion of the selected remedy at the Stapp Creek and EWR sites will provide environmental and ecological benefits. The cleanup will prevent harmful exposure by human and ecological populations.

13.0 STATUTORY DETERMINATIONS (APPLIES TO ALL SITES)

Selected remedies must:

- Be protective of human health and the environment
- Comply with ARARs (unless a waiver is justified)
- Be cost effective
- Use permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable

In addition, preference is given to remedies that employ treatments that permanently and significantly reduce the volume, toxicity, or mobility of contaminants as a principal element. The following sections discuss how the selected remedies meet these statutory requirements and describe regulatory input during the cleanup process.

13.1 PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

Current contaminant concentrations at the DDA, BSA, Stapp Creek, and EWR sites pose potential risks to human health and the environment. Under the selected remedies, treatment and institutional controls will be used to protect human health and the environment from site contaminants.

The selected remedies incorporate risk-based cleanup goals. The soil and groundwater cleanup goals to be used in these remedial actions were established under 18 AAC 75 and are designed to reduce cancer risks to below 1×10^{-5} and non-cancer risks to below a hazard index of 1.0. Cumulative risks (i.e., risks associated with exposure through more than one exposure media) were also considered in the development of cleanup goals. Thus, at the completion of remedial action, site cancer risks will be below 1 X 10^{-5} and non-cancer risks will be below a hazard index of 1.0. Although there has been no formal risk assessment of the subsistence use pathway, USAED and ADEC believe that there will be no substantial risk associated with use of the site for subsistence activities once RAOs are obtained.

Although contaminants at the DDA/BSA site currently pose a potential ecological risk, actions incorporated into the selected remedy will result in a reduction in the volume and concentration of contaminants being released into the marine environment. Monitoring will be conducted until ecological risks have been reduced to acceptable levels.

Implementation of the selected remedies will not pose unacceptable short-term risks or cross-media impacts.

13.2 COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

The selected remedies for each of the five areas of concern comply with all ARARs. The selected remedies do not require waivers for any ARARs. Chemical-, location-, and action-specific ARARs for the selected remedies are presented in Appendix A.

13.3 COST EFFECTIVENESS

In the judgment of the USAED, the selected remedies are cost effective and represent 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)]. Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness). The relationship of the overall effectiveness of the selected remedies was determined proportional to their costs and, hence, represents a reasonable value for the money to be spent. The estimated present-worth cost (EPA 2000) of the selected remedies are presented in Table 2-25.

Table 2-25
Estimated Present-Worth Cost of Selected Remedies

Selected Remedy	Description	Estimated Present-Worth Cost
DDA Alternative 8	Thermal treatment, bioventing, and SVE	$3,900,000
BSA Alternative 5	HVE for mass capture	$5,030,000
SC/EWR Alternative 3	UST removal, soil excavation, and treatment/disposal	$400,000

13.4 UTILIZATION OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE

USAED has determined that the selected remedies represent the maximum extent to which treatment technologies can be used in a practicable manner to address contamination at the five sites. The selected remedies include the following treatment components:

- Thermal treatment of DDA/BSA soil contaminated with DRO at concentrations above 10,480 mg/kg to depths of 15 feet bgs
- Bioventing of DDA/BSA soil containing DRO concentrations greater than cleanup goals but less than 10,480 mg/kg and bioventing DRO-contaminated soil at depths greater than 15 feet bgs
- SVE to address volatile soil contaminants at the DDA/BSA site
- Monitored natural attenuation to address residual groundwater and sediment contamination at the DDA/BSA site
- HVE for mass capture to remove diesel (free product) floating on the water table at the DDA/BSA site
- Treatment of contaminated water in two USTs at the Stapp Creek and EWR sites
- Removal of the USTs at the Stapp Creek and EWR sites
- Excavation and treatment or disposal of contaminated soil at the Stapp Creek and EWR sites

To ensure continued protection of human health and the environment, a nontreatment component of instituting controls will be incorporated into the selected remedies for the DDA/BSA and EWR. Institutional controls at the DDA/BSA will remain in place only until RAOs are achieved.

Of those alternatives that are protective of human health and the environment and comply with ARARs, USAED has determined that the selected remedies provide the best balance of tradeoffs, in terms of the five balancing criteria, while also considering the statutory preference for treatment as a principal element and considering state and community acceptance.

13.5 PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT

The selected remedies address primary contaminants of concern at the facility using treatment technologies. At the BSA/DDA site, soil contaminated with DRO at concentrations above 10,480 mg/kg will be excavated and thermally treated. Free product at the site will be extracted, using HVE. The extracted free product will be recycled for energy recovery.

As listed in Section 13.4, the selected remedies use a variety of additional treatment technologies to address contamination and reduce risk at the facility. In addition to addressing principal threat waste through treatment, the selected remedy for each site focuses the use of treatment to reduce risk. Institutional controls will be used until treatment can reduce risks to acceptable levels in most areas. By using treatment as a central portion of the selected remedies, the statutory preference for remedies that employ treatment as a principal element is satisfied.

13.6 FIVE-YEAR REVIEW REQUIREMENTS

A five year review is not mandated; however, USAED will continue close coordination with ADEC to ensure the remedy is, or will be, protective of human health and the environment.

14.0 DOCUMENTATION OF SIGNIFICANT CHANGES FROM PREFERRED ALTERNATIVE OF PROPOSED PLAN

The *Proposed Plan for Six Formerly Used Defense Sites at Fort Randall, Cold Bay, Alaska* (USAED 2004) was released for public comment 26 April 2004 and incorporated all five sites addressed in this document. The Proposed Plan identified the following preferred alternatives:

- For DDA/BSA soil – Alternative 8: Thermal treatment, bioventing, and SVE

- For DDA/BSA sediments, Free Product and Groundwater – Alternative 5: HVE for mass capture
- For the CWB site – no further action
- For the Stapp Creek and EWR sites – Alternative 3: UST removal, soil excavation, and treatment/disposal

In addition, the Proposed Plan included a sixth site, the Asphalt Seep Area. However, a separate decision document is planned for the Asphalt Seep Area; therefore, that site has not been incorporated into this document.

No public comments were submitted during the public comment period. The selected remedies for the CWB, Stapp Creek, and EWR sites remain unchanged from the proposed plan.

Following extensive discussions with ADEC, USAED has determined that modifying the selected remedy for DDA/BSA soil will result in a remedy that better attains the balancing criteria. Rather than excavating and thermally treating all soil above a concentration of 10,480 mg/kg DRO, excavation will cease at approximately 15 feet bgs, even if contaminant concentrations are still above the excavation action level. This change is based on consideration of the factors below.

14.1 LONG-TERM EFFECTIVENESS AND PERMANENCE

The selected remedy will excavate and thermally treat soils containing greater than 10,480 mg/kg DRO to a depth of 15 feet. Residual shallow soil contamination will be treated using a combination of bioventing and SVE. This will directly address risks associated with inhalation and ingestion of contaminated soil; inhalation and ingestion cleanup levels do not apply to soil at depths below 15 feet bgs.

Highly contaminated soil left in place at depths greater than 15 feet bgs will continue to contribute to groundwater contamination. However, because of the low solubility of diesel fuel, the rate at which contaminants migrate to groundwater is not expected to be significantly impacted by the change. The rate at which such soils contribute contamination to the free-product layer is unknown.

14.2 REDUCTION OF TOXICITY, MOBILITY, AND VOLUME THROUGH TREATMENT

The modification to the selected remedy will decrease the volume of contaminated soil to be excavated and thermally treated. This contamination will instead be addressed primarily using bioventing. Generally, bioventing is not able to decrease contaminant concentrations by more than 95 percent (EPA 1995b). With a migration-to-groundwater DRO cleanup standard of 524 mg/kg, soils contaminated at concentrations above 10,480 mg/kg may still be above cleanup standards following bioventing. However, recalcitrant residual organic matter detected in the DRO range may be attributed to accumulated biomass and may not pose risks similar to diesel fuel. In addition, based on discussions with ADEC, the migration-to-groundwater cleanup levels will be considered to have been attained once site groundwater cleanup levels are met.

Very high fuel concentrations (greater than approximately 25,000 mg/kg) can be toxic to aerobic bacteria (EPA 1995b). Thus, there may be volumes of soil in which it is difficult to initiate biodegradation strictly using bioventing. The selected remedy for DDA/BSA soils includes a combined bioventing/SVE system, and it may be possible to use SVE to decrease contamination concentrations to levels at which bioventing can be successfully initiated.

14.3 SHORT-TERM EFFECTIVENESS

Limiting the depth of excavation helps address health and safety concerns at the site. A shallower excavation will limit the physical hazard of the excavation and the amount of contaminated soil exposed. This will increase protection for the community during the remedial action and reduce risks to site workers. The smaller excavation will also help to minimize the environmental impacts associated with the cleanup. However, more time may be required to attain the RAOs.

14.4 IMPLEMENTABILITY

Excavations greater than 15 feet pose significant challenges, and limiting excavation depths to 15 feet will make the selected remedy far easier to implement. Soils at the site generally have low compressive strength (Type C soils) and the Occupational Safety and Health Administration (OSHA) requires sloping the sidewalls at 1.5 to 1. Thus, for every additional foot of excavation depth, the surfacial footprint of the excavation must increase by 3 feet. Due to health and safety concerns, OSHA requires that excavations greater than 20 feet be designed by a Professional Engineer. Deep excavations require that a tremendous amount of overburden be removed, even if this soil is not going to be treated.

Uncertainty associated with excavation to an action level is also narrowed by limiting the depth of excavation. Planning and conducting the remedial action is simplified when there is a known maximum depth of soil to be excavated and treated.

14.5 COST

The change will decrease capital costs associated with excavation and thermal treatment. However, it may raise O&M costs associated with continued operation of the HVE and bioventing/SVE systems.

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PART 3: RESPONSIVENESS SUMMARY

The *Proposed Plan for Six Formerly Used Defense Sites at Fort Randall, Cold Bay, Alaska* (USAED 2004) was issued in April 2004. Prior to the document being issued, ADEC concurred with the actions proposed. The USAED received no comments during the public comment period (26 April through 21 May 2004).

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APPENDIX A

Applicable or Relevant and Appropriate Requirements

APPENDIX A

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

COLD BAY, ALASKA

FINAL
AUGUST 2005

Prepared for:
U.S. Army Corps of Engineers
P.O. Box 6898
Elmendorf AFB, Alaska 99506-6898

Prepared by:
Jacobs Engineering Group Inc.
4300 B Street, Suite 600
Anchorage, Alaska 99503

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ACRONYMS AND ABBREVIATIONS

AAC	Alaska Administrative Code
ACL	alternative cleanup level
ADEC	Alaska Department of Environmental Conservation
ARAR	applicable or relevant and appropriate requirements
ARCS	Assessment and Remediation of Contaminated Sediments program
AS	Alaska Statute
BHC	beta-Hexachlorocyclohexane
BSA	Beach Seep Area
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DDA	Drum Disposal Area
EPA	U.S. Environmental Protection Agency
EqP	equilibrium partitioning
ER-L	effects range-low
ER-M	effects range-median
EWR	East-West Runway
MCL	maximum contaminant level
MCLGs	maximum contaminant level goals
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
NAWQC	National Ambient Water Quality Criteria
NOAA	National Oceanic and Atmospheric Administration
ORNL	Oakridge National Laboratory
PAH	polynuclear aromatic hydrocarbon
POL	petroleum, oil, and lubricants
PRG	preliminary remediation goal
SQG	sediment quality guideline
SQL	sample quantitation limit
TAH	total aromatic hydrocarbons
TAqH	total aqueous hydrocarbons
TBC	to-be-considered

ACRONYMS AND ABBREVIATIONS
(continued)

TEC	threshold effects concentration
USC	Unites States Code
UST	underground storage tank
µg/L	micrograms per liter

1.0 INTRODUCTION

The selected remedies for the Fort Randall sites will be conducted under the authority in Defense Environmental Restoration Program (DERP). One of the goals of the program is "Correction of other environmental damage … which creates an imminent and substantial endangerment to the public health or welfare or to the environment" (10 USC 2701(b)(2)). As a matter of Department of Defense policy, response actions taken under DERP to address such environmental damage are conducted in accordance with the provisions of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Executive Orders 12590 and 13016, and the National Oil and Other Hazardous Substances Contingency Plan (NCP) (DoD 2001).

Because the selected remedies are intended primarily to address petroleum, oil, and lubricant (POL) contamination, the CERCLA petroleum exclusion is applicable. Interim Formerly Used Defense Sites (FUDS) policy on POL-only cleanups states that the FUDS program should use a characterization, decision, response process consistent with that defined in the NCP; or a U.S. Environmental Projection Agency (EPA)-approved state underground storage tank/aboveground storage tank (UST/AST) program. Therefore, the process used to identify potentially relevant standards and cleanup levels for these sites was designed to ensure that the decision-making and cleanup process for POL contaminated sites is as consistent as possible with the procedural requirements of the NCP.

However, because POL contamination is excluded from CERCLA and the NCP, the identified standards are neither legally applicable nor relevant and appropriate. In addition, because of the POL exclusion, the waiver of sovereign immunity for CERCLA sites does not apply to POL sites.

This appendix defines the concept of applicable or relevant and appropriate requirements (ARAR) and summarizes the ARARs considered during the selection of remedies for the Beach Seep Area (BSA), Drum Disposal Area (DDA), Collapsed Wooden Building site, East-West Runway (EWR) site, and Stapp Creek site at the Fort Randall FUDS in Cold Bay, Alaska. Based on Code of Federal Regulations (CFR), Title 40, Section 300.5, the following definitions apply:

- **Applicable requirements** are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at the Cold Bay areas.
- **Relevant and appropriate requirements** are cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state environmental or facility siting law that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at the Cold Bay areas, address problems or situations sufficiently similar to those found at the Cold Bay areas that their use is well-suited.

ARARs are not the only factors determining what happens at a contaminated site; they represent the minimum requirements for which an action must be taken. In some instances–for example, because of multiple contaminants or pathways–compliance with ARARs will not achieve an acceptable degree of protection. In such cases, nonpromulgated criteria, advisories, and other forms of guidance need to be considered. Therefore, health-based risk levels, ARARs, environmental impacts, and possibly to-be-considered (TBC) criteria or guidelines are used to set cleanup levels. The health-based risk levels developed for cleanup goals must also consider the potential future uses of the site.

U.S. Environmental Protection Agency (EPA) guidance divides ARARs into three categories:

- **Chemical-specific ARARs** define cleanup levels in the ambient environment.
- **Action-specific ARARs** define performance and design standards for actions to be taken.
- **Location-specific ARARs** modify chemical- and/or action-specific ARARs to reflect the unique requirements of the location (EPA 1988).

2.0 CHEMICAL-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Identified chemical-specific ARARs and TBC guidance are summarized in Table 2-1 and explained in the following sections.

Table 2-1
Summary of Chemical-Specific ARARs and TBC Guidance for Cold Bay Areas

Media	Standard	Function
Soil	18 AAC 75.341 – Tables B1 and B2	Provides cleanup levels for specific contaminants
Groundwater	18 AAC 75.345 – Table C	Provides cleanup standards for specific contaminants in groundwater
	18 AAC 70	Establishes water quality standards for protection of groundwater and surface water in Alaska
Surface water	18 AAC 70	Establishes water quality standards for protection of groundwater and surface water in Alaska
	18 AAC 80	Applies preliminary MCLs to water that is or may be used for drinking water
	Safe Drinking Water Act	Applies drinking water MCLs and non-zero MCLGs to water that is or may be used for drinking water
	NAWQC from the Clean Water Act	Applies to surface water
Freshwater Sediment	EqP values based on NAWQC	Applies to fresh water sediment
	EPA SQGs	ARCS TEC values will be used for screening when EqP values are not available. Secondary chronic values will be used for screening when EqP and ARCS TEC values are not available
Marine Sediment	EPA SQGs	ER-L values will be used to screen marine sediment data

Notes:
Where possible, sediment criteria were developed following the EPA equilibrium partitioning approach from the National Ambient Water Quality Criteria. These criteria have preference over the TEC values because they are ARARs (ORNL 1997).
For definitions, see the Acronyms and Abbreviations section.

2.1 SOIL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Soil cleanup levels were developed based on 18 Alaska Administrative Code (AAC) 75, Article 3, *Oil and Hazardous Substances Pollution Control Regulations - Discharge Reporting, Cleanup, and Disposal of Oil and Other Hazardous Substances*. These regulations provide four methods of establishing cleanup levels for soils: two methods (Methods One and Two) that derive cleanup levels from standard tables and two methods (Methods Three and Four) that derive site-specific alternative cleanup levels. Each of these methods is explained below.

Alaska Department of Environmental Conservation Method One soil cleanup levels [18 AAC 75.341(a) – Table A1 for nonarctic zones, such as Cold Bay] apply to soil contaminated only with petroleum products; these standards are not considered risk-based. Method One soil cleanup levels were not used.

ADEC Method Two soil cleanup levels (18 AAC 75.341(c) and (d) – Tables B1 and B2) apply to soils contaminated with petroleum hydrocarbons or other chemicals. The regulation tabulates soil cleanup levels for gasoline-range organics, diesel-range organics, residual-range organics, and specific organic and inorganic chemicals. The Cold Bay sites are located in a non-Arctic zone with annual precipitation of less than 40 inches. The regulations present different cleanup levels for each of three exposure routes: ingestion, inhalation, and migration to groundwater. These standards are presented in Table 2-2 for all contaminants of concern indicated in the proposed plan. On December 18, 2001, the ADEC published Technical Memorandum 01-007, which presents calculated cleanup levels for additional compounds. These cleanup levels have also been included in Table 2-2. In addition, Table 2-2 presents cleanup levels for groundwater and surface water, which are discussed in Sections 2.2 and 2.3, respectively.

Because the Cold Bay areas have virtually unlimited possibilities for future use, any exposure pathway – inhalation, ingestion or migration to groundwater – is possible. Therefore, the most stringent of the pathway-specific cleanup levels is applicable. Where Method Two, Table B soil cleanup values are not available, EPA Region 9 preliminary remediation goals (PRGs) residential soil values are presented (EPA 2000).

ADEC Method Three, as prescribed in 18 AAC 75.340(e), allows for modification of selected default soil cleanup levels to account for site-specific soil and aquifer data. The applicable cleanup level is the most stringent of the site-specific calculated cleanup levels for a particular pathway or pathways and the Method Two level for the remaining exposure pathways. Site-specific alternative cleanup levels (ACLs) can be developed as follows:

Table 2-2
Cleanup Levels Based on Non-Arctic Zone with Precipitation Less Than 40 Inches

Analyte	Soils			Groundwater (mg/L	Surface Water	
	Ingestion (mg/kg)	Inhalation (mg/kg)	Migration to Groundwater (mg/kg)		Freshwater (mg/L	Marine (mg/L
HYDROCARBONS						
Diesel-range organics	10,250	12,500	**250**	1.5		
Gasoline-range organics	1,400	1,400	**300**	1.3		
Residual-range organics	**10,000**	22,000	11,000	1.1		
METALS						
Lead	400	**400**		0.015	0.0032	0.0056
ORGANOCHLORINATED PESTICIDES						
beta-BHC	4.6	43	**0.009**	0.00047	0.00014	0.00014
SEMI-VOLATILE ORGANIC COMPOUNDS						
2-Methylnaphthalene	4,100		**43**	1.5		
Anthracene	30,000		**4,300**	11	8.3	0.00073
Benzo(a)anthracene	11		**6**	0.001	0.000028	0.000028
Benzo(a)pyrene	**1**		3	0.0002	0.000028	0.000028
Benzo(b)fluoranthene	**11**		20	0.001	0.000028	0.000028
Benzo(g,h,i)perylene	3,000		**1,500**	1.1		
Benzo(k)fluoranthene	**110**		200	0.01	0.000028	0.000028
Dibenzo(a,h)anthracene	**1**		6	0.0001	0.000028	0.000028
Fluorene	4,100		**270**	1.46	1.1	0.0039
Indeno(1,2,3-c,d)pyrene	**11**		54	0.001	0.000028	0.000028
Phenanthrene	30,000		**4,300**	11	0.0063	0.0063
Pyrene	3,000		1,500	1.1	0.83	
VOLATILE ORGANIC COMPOUNDS						
1,2,4-Trimethylbenzene	5,070	**92.2**	95.2	1.85		
1,2-Dibromoethane (EDB)	0.1	1.3	**0.0002**	0.00005		
1,2-Dichloroethane	91	5	**0.015**	0.005	0.0038	0.0038
1,3,5-Trimethylbenzene	5,070	38.3	**25**	1.85		
Benzene	150	9	**0.02**	0.005	0.012	0.012
Ethylbenzene	10,000	89	**5.5**	0.7	1.4	1.4
Naphthalene	2,000	120	**21**	0.7	0.012	0.012
Toluene	20,300	180	**5.4**	1	14.3	14.3
Trichloroethene (TCE)	750	43	**0.027**	0.005	0.027	0.027
Xylenes (total)	203,000	81	**78**	10	0.013	0.013

Legend:

- No applicable regulatory standard available
- From EPA Region 9 PRGs Table; "residential soils" value for soils and "tap water" value for groundwater
- Freshwater Aquatic Life Criteria; "chronic" value
- EPA National Recommended Water Quality Criteria: 2002; "human health for consumption of water + organism"
- Oakridge National Laboratory, Preliminary Remediation Goals for Ecological Endpoints, August 1997; Surface Water table
- 1992 National Toxic Rule Human Health Criteria for Carcinogens; "fish & water consumption"
- Human Health Criteria for Non-carcinogens; "water + organism"
- Saltwater Aquatic Life Criteria; chronic

Notes:

Soil cleanup levels in **bold text** indicate value of most stringent pathway.
Site specific, migration to groundwater, alternative cleanup levels were developed for the DDA/BSA site. The cleanup levels for this site and other sites addressed in the decision document may be found in Tables 1-1, 2-1, 2-16, 2-17, 2-23, and 2-24 of the decision document.
More information on criteria may be obtained at http://www.state.ak.us/dec/water/wqsar/wqs/pdfs/70wqsmanual.pdf
For definitions, see the Acronyms and Abbreviations section.

- The inhalation or migration to groundwater cleanup levels can be modified using site-specific soil data and standard equations referenced in the ADEC *Guidance of Cleanup Levels Equations and Input Parameters* (ADEC 1999).
- The inhalation or migration to groundwater cleanup levels can be modified using site-specific data and/or a fate and transport model prepared in accordance with the ADEC *Guidance on Fate and Transport Modeling* (ADEC 1998).
- The ingestion or inhalation levels can be modified using acceptable commercial/industrial exposure parameters and standard equations referenced in the ADEC *Guidance of Cleanup Standards Equations and Input Parameters* (ADEC 1999), if ADEC has determined that a commercial/industrial use of the site is appropriate.

Method Three cleanup levels for the DDA and BSA sites were presented in the *Final Cold Bay Feasibility Study* (USAED 2003).

ADEC Method Four provides for establishing site-specific ACLs based on the results of a risk assessment. The results of the risk assessment provide a basis for determining whether, and to what extent, cleanup of impacted media is warranted. It is not expected that Method Four will be used at the Cold Bay areas.

2.2 GROUNDWATER APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Under provisions of 18 AAC 75.345, groundwater cleanup levels are established based on the current use and reasonably expected potential future use of groundwater. For the DDA and BSA areas, groundwater is currently not used as a source of drinking water; however, groundwater is expected to be of suitable quality for use as drinking water if the areas are ever developed in the future. Therefore, the groundwater standards presented in 18 AAC 75.345 – Table C have been used as cleanup levels for the BSA and DDA sites. For water that is closely connected hydrologically to nearby surface water, these regulations incorporate the ADEC Water Quality Standards (18 AAC 70).

Cleanup levels for site groundwater are presented in Table 2-2. Where ADEC Table C values are not available, EPA Region 9 tap water PRGs are presented (EPA 2000).

2.3 SURFACE WATER CRITERIA

In the Cold Bay areas with fresh surface water (i.e., Stapp Creek), the lowest value from 18 AAC 70's (1) freshwater aquatic life criteria (chronic value) and (2) human health criteria for carcinogens and non-carcinogens (water plus organism value) are applicable. Fresh surface water is protected based on its most conservative classification (i.e. water supply, water recreation, or growth and propagation of fish, shellfish, other aquatic life, and wildlife) since all may be applicable to the site. These values are presented in Table 2-2. Where 18 AAC 70 freshwater criteria do not exist, the water plus organism values in EPA *National Recommended Water Quality Criteria* (NRWQC) (EPA 2002) are first presented and, where the NRWQC does not provide standards, the Oak Ridge National Laboratory (ORNL) surface water PRGs (ORNL 1997) are presented.

ADEC surface water standards also establish regulatory levels for total aromatic hydrocarbons (TAH) and total aqueous hydrocarbons (TAqH). For the evaluation of TAH and TAqH in groundwater potentially in hydraulic connection with the marine waters of Cold Bay, the summed values were compared to the ADEC water quality standards of 10 micrograms per liter (μg/L) and 15 μg/L, respectively. The TAH is the sum of the maximum detected concentration for four mono-aromatic compounds (i.e., benzene, toluene, ethylbenzene, and xylenes). One half of the sample quantitation limit (SQL) was used if the compound was not detected. The TAqH is the sum of the TAH plus the maximum detected concentration for all detected polynuclear aromatic hydrocarbon (PAH) compounds, plus one half of the SQL for all undetected PAH compounds.

Under provisions of 18 AAC 75.345(f), groundwater that is "closely connected hydrologically to nearby surface water may not cause a violation of the water quality standards in 18 AAC 70 for surface water or sediment." Since groundwater at the BSA and DDA has been determined to be in hydraulic connection with the marine waters of Cold Bay, the water quality standards of 18 AAC 70 have been incorporated into BSA and DDA groundwater cleanup levels. The lowest value from 18 AAC 70's (1) saltwater aquatic life criteria (chronic value) and (2) human health criteria for carcinogens and non-carcinogens (water plus organism value) are presented in Table 2-2. Where 18 AAC 70 marine water criteria do not exist, ORNL surface water PRGs (ORNL 1997) are presented.

2.4 SEDIMENT STANDARDS

Samples collected at or below the water table in places where sediments are being moved on a relatively rapid time scale will be considered sediment samples. No ARARs have been identified for sediments and the following subsections present TBC guidance that will be used as screening values for freshwater and marine sediments. Numerical values are presented in Table 2-3.

2.4.1 Freshwater Sediments

Freshwater sediment data will be compared to ecologically-based benchmark values protective of sediment-dwelling organisms in freshwater aquatic environments. Specifically, sediment quality guidelines from ORNL sediment PRGs for ecological endpoints (ORNL 1997) will be considered. The sediment quality guidelines (SQGs) developed by the National Biological Services provide three levels of sediment effects concentrations: the threshold effects concentration (TEC), the probable effects concentration, and the high no effects concentration. For the screening of freshwater sediment data at the Cold Bay areas, the TEC was selected because it is the most conservative (i.e., lowest) value of the three and represents a threshold for which effects are rarely expected to occur. The TEC, where available, will be used in the screening in most cases.

Per ecological risk assessment guidance and the ORNL document, detections of inorganic analytes at concentrations above toxicological benchmark values (e.g., TECs) do not indicate the presence of contamination. Additionally, remedial or risk management decisions should not be made based solely on exceedences of benchmark values. Per these documents, areas with TEC exceedences warrant further evaluation, such as toxicity testing, site-specific evaluations, or biological assessments.

Table 2-3
Freshwater and Marine Sediment Screening Values

Analyte	Sediment Quality Guidelines (mg/kg)		
	Freshwater		Marine
	ORNL TEC	ORNL PRGs	NOAA ER-L
PETROLEUM HYDROCARBONS			
Diesel-range organics			
Gasoline-range organics			
Residual-range organics			
METALS			
Lead	34.2	110	46.7
ORGANOCHLORINATED PESTICIDES			
beta-Hexachlorocyclohexane (-BHC)			
SEMI-VOLATILE ORGANIC COMPOUNDS			
2-Methylnaphthalene			0.07
Anthracene	0.03162	0.25	0.0853
Benzo(a)anthracene	0.26	0.69	0.261
Benzo(a)pyrene	0.35	0.394	0.43
Benzo(b)fluoranthene	0.027	4	
Benzo(g,h,i)perylene	0.29	6.3	
Benzo(k)fluoranthene		4	
Dibenzo(a,h)anthracene		0.0282	0.0634
Fluorene	0.03464	0.14	0.019
Indeno(1,2,3-c,d)pyrene	0.078	0.837	
Phenanthrene		0.54	0.24
Pyrene	0.57	1.4	0.665
VOLATILE ORGANIC COMPOUNDS			
1,2,4-Trimethylbenzene			
1,2-Dibromoethane (EDB)			
1,2-Dichloroethane		4.3	
1,3,5-Trimethylbenzene			
Benzene		0.16	
Ethylbenzene		5.4	
Naphthalene	0.03275	0.39	0.16
Toluene		0.05	
Trichloroethylene (-ethene) (TCE)		52	
Xylenes (total)		0.16	

Notes:

All values given on a dry weight basis.
For definitions, see the Acronyms and Abbreviations section.

2.4.2 Marine Sediments

Marine sediment data collected from the intertidal zone of the BSA will be compared to National Oceanic and Atmospheric Administration (NOAA) SQGs established for marine aquatic environments. SQGs were selected from *Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Sediment-Associated Biota* (ORNL 1997). The SQGs are based on two guideline values, the effects range-low (ER-L) and effects range-medium (ER-M), which delineate three concentration ranges for a particular chemical. The concentrations below the ER-L value represent a minimal-effects range, a range intended to estimate conditions in which effects would rarely be observed. Concentrations equal to and above the ER-L, but below the ER-M, represent a possible effect range within which effects would occasionally occur. Finally, the concentrations equivalent to and above the ER-M value represent a probable-effects range within which effects would frequently occur. Analytical results will be conservatively compared to the NOAA ER-L values as presented in Table 2-3. These values were obtained from NOAA Screening Quick Reference Tables.

Per ecological risk assessment guidance and ORNL and NOAA documents, detections of inorganic analytes above toxicological benchmark values (ER-Ls and ER-Ms) do not indicate the presence of contamination. Additionally, remedial or risk management decisions should not be made based solely on exceedences of benchmark values. Per these documents, areas with ERL exceedences warrant further evaluation such as toxicity testing, site-specific evaluations, or biological assessments.

2.6 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS FOR LIQUIDS IN UNDERGROUND STORAGE TANKS

Liquids contained in underground storage tanks (USTs) will be evaluated as wastes to determine if treatment will be required prior to discharge. The two USTs remaining in the Cold Bay areas essentially contain petroleum contaminated water; therefore, cleanup levels presented in Table 2-2 (from 18 AAC 75.345, Table C) will be used. If the water present in these tanks meets these standards, it can be directly discharged, provided that it is discharged on-site and not to any surface water body. If the water fails to meet these standards, treatment will be required prior to discharge. The treated water would need to meet the standards listed in Table 2-2. If discharge is to take place off-site or to a surface water body, a discharge permit will be required from the ADEC. In that case, the surface water quality standards presented in 18 AAC 70 (Table 2-2) would be applicable and need to be met prior to discharge.

3.0 LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Location-specific ARARs are restrictions developed on the basis of the conduct of activities in specific locations. These ARARs may restrict or preclude certain remedial actions, or they may apply only to certain portions of an action. Location-specific factors that may trigger ARARs include sensitive habitats, floodplains, wetlands, endangered species habitat, and historic or archeological resources.

Table 3-1 lists potential location-specific ARARs identified for the Cold Bay areas and their general applicability for the selected remedies proposed in this report.

4.0 ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Action-specific ARARs are additional requirements that would apply to a specific investigative or remedial action. Different ARARs are identified depending on the interim remedial actions or remedial actions discussed during the overall site remediation process. Action-specific requirements do not in themselves determine the remedial alternatives; they indicate how a selected alternative must be implemented.

Table 4-1 lists potential action-specific ARARs identified for the Cold Bay areas and their general applicability for the selected remedies presented in this decision document.

Table 3-1
Potential Location-Specific ARARs

Requirement	Citation	ARAR Assessment	Description
Protect surface waters	Clean Water Act Section 303(d)	TBC	In 1998, Cold Bay was placed on the 303(d) list for non-attainment of the Petroleum Hydrocarbons, Oil, and Grease standard for petroleum products. Inclusion in the 303(d) list signifies that a water body is not in compliance with the Clean Water Act, Section 303(d).
Protect wetlands[a]	Clean Water Act Section 404; 40 CFR 230, 33 CFR 320-330 40 CFR 6, Appendix A	TBC	Requires consideration of impacts to wetlands in order to minimize their destruction or degradation and to preserve/enhance wetland values. Potentially applicable to activities that would impact wetlands.
Protect floodplains	Fish and Wildlife Coordination Act (16 USC 661, et seq.); 40 CFR 6.302 40 CFR 6, Appendix A	TBC	Potentially applicable to activities occurring within the 100-year floodplain.
Fish and wildlife coordination	Fish and Wildlife Coordination Act (16 USC 661, et seq.); 40 CFR 6.302 Fish and Wildlife Conservation Act (PL 99-645) Rivers and Harbors Act of 1899, Section 10 (33 USC 403) Protection of Fish and Game AS 16.05.870; 5 AAC 95.010	TBC	Fish or wildlife resource that may be affected by actions resulting in control or modification of any natural stream or water body should be protected. Federal agencies taking such actions must consult with the U.S. Fish and Wildlife Service.
Do not cause irreparable harm, loss, or destruction of significant artifacts	National Historic Preservation Act (16 USC 470); 36 CFR 800 Archaeological and Historic Preservation Act 16 USC 469, 40 CFR 6.301(c) Historic Sites, Buildings, and Antiquities Act 16 USC 461	TBC	The National Historic Preservation Act identifies procedures for the protection of historically and culturally significant properties. 16 USC 469 prohibits alteration of terrain that threatens significant scientific, prehistoric, historic, or archaeological data. The Archeological and Historic Preservation Act of 1974 requires that a federal agency notify the Secretary of Interior regarding any agency project that will destroy a significant archeological site.

Table 3-1
Potential Location-Specific ARARs
(continued)

Requirement	Citation	ARAR Assessment	Description
Protect the coastal zone	Coastal Zone Management Act (16 USC 1451-1564, 15 CFR 921) Alaska Coastal Management Act (AS 46.40) and Alaska Coastal Zone Management Program	TBC	Establishes goals and a mechanism for states to control use and development of their coastal zone. Authorizes states to administer approved coastal non-point pollution programs.
Protect endangered species	Endangered Species Act 16 USC 1531, 50 CFR 402	TBC	Established requirements for the protection of federally listed threatened and endangered species. Potentially applicable to activities which could affect threatened or endangered species or their habitat.
Protect bird migratory routes	Migratory Bird Treaty Act of 1972 (16 USC 703-712) 50 CFR, Parts 10, 20, and 21 Bald Eagle and Golden Eagle Protection Act (16 USC 668-668d)	Applicable	Requires that federal agencies examine proposed actions relative to species impacts pertaining to habitat loses or losses of individual birds. Requires protection of most species of native birds in U.S. from unregulated "take," which can include poisoning at waste sites.

Notes:

[a] 40 CFR 6, Appendix A, sets forth U.S. Environmental Protection Agency policy for carrying out the provisions of Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands). Executive orders are binding on the level of government (federal or state) for which they are issued.
For definitions see Acronyms and Abbreviations section.

Table 4-1
Potential Action-Specific ARARs

Activity	Standard Requirement, Criteria, or Limitation	Federal Citation	State Citation	ARAR Assessment
Solid Waste Disposal Act/Resource Conservation and Recovery Act		**42 USC Sec. 6901-6987**	**AS Title 46, Chapter 3**	
Landspreading or landfarming of hazardous waste, polluted soil, solid waste	• Criteria for classification of solid waste disposal facilities and practices; permits • Standards for management of hazardous waste for owners or operators of facilities that treat, store, or dispose of hazardous waste • Restrictions on land disposal of specific types of hazardous waste based on levels achievable by current technology	40 CFR 257 40 CFR 264 49 CFR 265 40 CFR 266 40 CFR 268 40 CFR 270	18 AAC 60–Solid Waste Management Regulations 18 AAC 75–Oil and Hazardous Substances Pollution Control Regulations 18 AAC 62–Hazardous Waste Management Regulations (federal requirements with additional criteria and standards)	Applicable
Onsite generation of hazardous waste	• Identification and listing of hazardous waste • Standards for generators of hazardous waste	40 CFR 261 40 CFR 262	8 AAC 62–Alaska Hazardous Waste Regulations	Applicable
Transport of hazardous waste offsite	• Standards for transporters of hazardous waste within the U.S.	40 CFR 263	18 AAC 62–Hazardous Waste Regulations	Applicable
Recycling hazardous waste onsite or offsite	• Standards for recycling materials, recycling materials in a manner constituting disposal, and burning hazardous waste for energy recovery	40 CFR 266	18 AAC 62–Alaska Hazardous Waste Regulations 18 AAC 63–Siting of Hazardous Waste Management Facilities	Applicable
Onsite treatment or disposal of hazardous waste	• Requirements for acquiring state permit for hazardous waste management facility		18 AAC 62–Alaska Hazardous Waste Regulations 18 AAC 63–Siting of Hazardous Waste Management Facilities	Applicable

Table 4-1
Potential Action-Specific ARARs
(continued)

Activity	Standard Requirement, Criteria, or Limitation	Federal Citation	State Citation	ARAR Assessment
Clean Water Act		**33 USC Sec. 1251-1376**	**AS Title 46, Chapter 3**	
Remedial action requiring point source discharge to U.S. waters	• Permit required for outfall discharge: NPDES • Standards and criteria for NPDES permits and operations that cause or contribute to degradation of water body	40 CFR 122 40 CFR 125 40 CFR 230	18 AAC 70–Alaska Water Quality Standards 18 AAC 72–Alaska Wastewater Disposal Regulations	TBC
Clean Air Act		**33 USC Sec. 1251-1376**	**AS Title 46, Chapter 3**	
Vapor emissions	• Emission standards for hazardous air pollutants • Standards for ambient air quality to protect public health and welfare • Classification of air pollution sources	40 CFR 61 40 CFR 50	18 AAC 50–Alaska Air Quality Control Regulations 18 AAC 15–Alaska Administrative Procedures and Permit Regulations	Applicable to thermal treatment, and soil vapor extraction processes
Occupational Safety and Health Act		**29 USC Sec. 657 and 667**	**AS Title 18, Chapter 60**	
All onsite remedial actions	• General standards for safety in the workplace • Protection standards for workers at hazardous waste sites and construction sites who are performing work under federal service contracts	29 CFR 1910 29 CFR 1926 29 CFR 1925	8 AAC 61–Alaska Occupational Safety and Health (Subchapter 10, Hazardous Waste Operations and Emergency Response Code)	Applicable
State of Alaska, Underground Storage Tank Regulations				
Closure of USTs that contained petroleum	• Requirements for the closure and removal of USTs that contained petroleum	--	18 AAC 78-Underground Storage Tanks	Relevant and Appropriate
State of Alaska, Oil Pollution Control Law			**AS Title 46, Chapters 3, 4, 9**	
Hazardous substance cleanup	• Approval required for cleanup of oil or hazardous substance discharge	--	18 AAC 75–Alaska Oil and Hazardous Substances Pollution Control Regulations	Applicable

Note:

For definitions, see the Acronyms and Abbreviations section.

5.0 WAIVERS OF APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Section 40 CFR 300.430(f)(1)(ii)(C) provides that, under certain circumstances, ARARs may be waived. However, because this decision document applies only to sites contaminated with POL, the ARAR waiver provisions do not apply. The cleanup levels incorporated into the selected remedies are risk based. An analysis of these cleanup levels indicates that the selected remedy will meet all standards required to protect human health and the environment.

6.0 REFERENCES

ADEC (Alaska Department of Environmental Conservation). 2000 (August). *Installer's Manual for Conventional Onsite Domestic Wastewater Treatment and Disposal Systems*. Issued by the Division of Environmental Health Drinking Water and Domestic Wastewater Program.

ADEC. 1999. *Guidance on Cleanup Levels Equations and Input Parameters*. Electronic copies of this publication are available at <http://www.state.ak.us/local/akpages/ENV.CONSERV/dspar/csites/csitesf.htm>. 28 July.

ADEC. 1998 (July). *Guidance for Fate and Transport Modeling*. Guidance No. CSRP-98-0001.

DoD (Department of Defense). 2001 (September). *Management Guidance for the Defense Environmental Restoration Program*. Office of the Deputy Under Secretary of Defense (Installations and Environment).

EPA (U.S. Environmental Protection Agency). 2001. "Current Drinking Water Standards." Web page lists current National Primary and Secondary Drinking Water Regulations. Accessed via <http://www.epa.gov/safewater/mcl.html>. 24 September.

EPA. 1996. *Calculation and Evaluation of Sediment Effect Concentrations for the Amphipod* Hyalella azteca *and Midge* Chironomus riparius. EPA 905-R96-008. Great Lakes National Program Office, Chicago, Illinois.

EPA. 1988 (October). *Guidance for Conducting Investigations and Feasibility Studies Under CERCLA*. Interim Final. EPA/540/G-89/004.

Jones, D. S., G. W. Suter, and R. N. Hull. 1997 *Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Sediment-Associated Biota: 1997 Revision*. Prepared for the Department of Energy by Oak Ridge National Laboratories.

Long, E. R., D. MacDonald, S. Smith, and F. Calder. 1995. "Incidence of Adverse Biological Effects within Ranges of Chemical Concentrations in Marine and Estuarine Sediments." *Environmental Management*. Volume 19, No. 1, pp. 81-97.

USAED (U.S. Army Engineer District, Alaska). 2003 (November). *2003 Feasibility Study, Cold Bay, Alaska*. Final. Prepared by Jacobs Engineering Group.

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APPENDIX B

Responses to Comments

REVIEW COMMENTS

PROJECT: Cold Bay, Fort Randall

DOCUMENT: Interim Final, Version 2 Decision Document for 5 AOCs

U.S. ARMY CORPS OF ENGINEERS CEPOA-EN-EE-TE	DATE: 8/22/2005 REVIEWER: Deb Caillouet PHONE: (907) 269-0298	Action taken on comment by: Stephen Witzmann

Item No.	Drawing Sheet No., Spec. Para.	COMMENTS	REVIEW CONFERENCE A - comment accepted W - comment withdrawn (if neither, explain)	CONTRACTOR RESPONSE	USAED RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)
1.	General	There are several instances where the term Contaminant of Potential Concern (COPC) is used where the more appropriate term would be Contaminant of Concern (COC). COPCs are contaminants known or suspected to have been stored, used, or released at a site. These are compared to background and risk-based screening levels; contaminants that exceed these levels are carried through the risk assessments. COCs are contaminants that exceed cleanup levels or pose an unacceptable risk, thus warrant cleanup action.		The acronym COPC will be replaced with the acroynm COC in the following locations: ▪ Page 1-2, bullet at the bottom of the page ▪ Page 1-3, first bullet on the page ▪ Page 2-70, second paragraph of Section 5C.2.1 ▪ Table 2-19 ▪ Page 2-74, last paragraph of Section 5C.7 ▪ Page 2-74, second paragraph of Section 5C.8.1 ▪ Page 2-75, second and third paragraphs of Section 5C.8.2 ▪ Page 2-73, Section 7C.1.1 ▪ Table 2-20 ▪ Page 2-77, Section 7C.1.2 ▪ Table 2-21 ▪ Page 2-84, last sentence on the page In Section 5B.6, the second to last sentence will be reworded: "Since site COPCs were below cleanup levels, no COCs were established."	
2.	Table 1-1	The basis for the cleanup levels selected should be included as a footnote to this table and to Table 2-1. The information that is contained in the footnotes to Tables 2-2, 2-3, 2-4, 2-5, 2-6 and 2-7 should be incorporated into the footnotes for Tables 2-1 and 2-2 as appropriate.		The following notes will be added to Table 2-1: "Source of cleanup levels for contaminants in soil: 18 AAC 75 Method 2 for Stapp Creek and the East-West Runday, 18 AAC 75 Method 3 for the Drum Disposal Area and Beach Seep Area.	

U.S. ARMY CORPS OF ENGINEERS CEPOA-EN-EE-TE	**DATE: 8/22/2005** **REVIEWER: Deb Caillouet** **PHONE:** (907) 269-0298	**Action taken on comment by: Stephen Witzmann**

Item No.	**Drawing Sheet No., Spec. Para.**	**COMMENTS**	**REVIEW CONFERENCE** A - comment accepted W - comment withdrawn (if neither, explain)	**CONTRACTOR RESPONSE**	**USAED RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)**
				Source of cleanup levels for contaminants in groundwater: 18 AAC 75.345 Table C, except 1,2-Dibromoethane from Tech Memo 01-007. For definitions, see the Acronyms and Abbreviations list." The first note to Table 2-2 will be modified to state: "Source of regulatory limit for all contaminants: 18 AAC 75 Method 3, cumulative risk levels apply to 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene."	
3.	Page 1-2	Please add after the sentence that DEC concurs the following. This concurrence is based on all information available in the administrative record for the site. This decision may be reviewed and modified in the future if new information becomes available that indicates the presence of previously undiscovered contamination or exposure that may cause an unacceptable risk to human health and the environment.		The suggested change will be made.	
4.	Page 1-5	In the data certification checklist, the 4th bullet should read "How contaminated media and COCs will be addressed"		The suggested changes will be made.	
5.	Page 2-2, Sec. 5A.7	The 2nd sentence should say, "All known primary sources…"		The second sentence in Section 5A.7 will be modified to state: "All known primary sources of contamination have been removed…"	
6.	Page 2-36, Sec. 8A0	Removing Cold Bay from the Clean Water Act 303(d), impaired water bodies should also be included as a remedial action objective.		A third remedial action objective for DDA/BSA sediments, free product, and groundwater will be added stating: "Reduce contaminant concentrations so that Cold Bay can be removed from the Clean Water Act, Section 303(d), list of impaired water bodies."	

REVIEW COMMENTS

PROJECT: Cold Bay, Fort Randall
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U.S. ARMY CORPS OF ENGINEERS CEPOA-EN-EE-TE	DATE: 8/22/2005 REVIEWER: Deb Caillouet PHONE: (907) 269-0298	Action taken on comment by: Stephen Witzmann

Item No.	Drawing Sheet No., Spec. Para.	COMMENTS	REVIEW CONFERENCE A - comment accepted W - comment withdrawn (if neither, explain)	CONTRACTOR RESPONSE	USAED RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)
7.	Page 2-48, Sec. 12A.2	The information contained in the second sentence of the second paragraph and the third paragraph does not add to the description of the selected remedy and should be deleted. The last sentence of this section should be rephrased to say, "pumping scenario allows the most rapid removal…"		The second sentence of the second paragraph and the third paragraph of Section 12A.2 will be deleted. The last sentence of Section 12A.2 will be reworded as suggested.	
8.	Table 2-16	Please verify and then include in the table that the pathway for each cleanup level selected is migration to groundwater.		With the exception of two contaminants, the basis for each of the cleanup levels shown in Table 2-16 is the migration to groundwater exposure pathway. The cleanup levels listed for 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene are the cumulative risk levels. A column will be added to Table 2-16 with the header "Exposure Pathway Basis for the Cleanup Level." In this column, "Migration to Groundwater" or "Cumulative Risk Level" will be listed for each contaminant, as appropriate. A footnote will be added to the table stating "The exposure pathway basis for cleanup level represents the exposure pathway requiring the most stringent cleanup level to ensure adequate protection of human health and the environment. All cleanup levels are protective of the ingestion, inhalation, and migration to groundwater exposure pathways. Information on cumulative risk levels is presented in Section 7A.1."	

REVIEW COMMENTS

PROJECT: Cold Bay, Fort Randall
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U.S. ARMY CORPS OF ENGINEERS CEPOA-EN-EE-TE	DATE: 8/22/2005 REVIEWER: Deb Caillouet PHONE: (907) 269-0298	Action taken on comment by: Stephen Witzmann

Item No.	Drawing Sheet No., Spec. Para.	COMMENTS	REVIEW CONFERENCE A - comment accepted W - comment withdrawn (if neither, explain)	CONTRACTOR RESPONSE	USAED RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)
9.	Table 2-17	The cleanup level for 1,2-dibromoethane should be 0.05 µ/l.		Table 2-17 will be corrected as suggested.	
10.	2-71	In Section 5C.3.2, last sentence the word abandon should be abandoned.		The referenced sentence will be reworded "…leaving most of the pipeline abandoned in place."	
11.	2-79, Sec. 8C.0	The second bullet for the RAOs for Stapp Creek is unclear. It should read "Prevent migration of contaminants in soil to groundwater and prevent ingestion and inhalation of contaminants in soil…" The pathway for each of the cleanup levels should be included with the numerical value.		For clarity, the referenced RAO will be divided into two parts. Because the Method 2 inhalation exposure pathway cleanup level was not exceeded for any contaminant (Table 2-18), reference to this pathway will be deleted from the RAOs. The text will be revised to state: • Prevent migration of contaminants in soil to groundwater and prevent ingestion of contaminants in soil containing DRO in excess of 250 mg/kg and benzo(a)anthracene in excess of 6 mg/kg • Prevent ingestion of contaminants in soil containing benzo(a)pyrene in excess of 1 mg/kg, benzo(b)fluoranthene in excess of 11 mg/kg, benzo(k)fluoranthene in excess of 11 mg/kg, and dibenzo(a,h)anthracene in excess of 1 mg/kg	
12.	2-87	Section 13.1, This section states that the selected remedies include treatment and institutional controls. However, institutional controls are not proposed as a component of any remedy discussed in this document. They were part of the proposed remedy for the asphalt seep, which is not included in this document.		Please see the response to the third part of comment 13.	

REVIEW COMMENTS

PROJECT: Cold Bay, Fort Randall

DOCUMENT: Interim Final, Version 2 Decision Document for 5 AOCs

U.S. ARMY CORPS OF ENGINEERS CEPOA-EN-EE-TE	**DATE: 8/22/2005** **REVIEWER: Deb Caillouet** **PHONE:** (907) 269-0298	**Action taken on comment by: Stephen Witzmann**

Item No.	**Drawing Sheet No., Spec. Para.**	**COMMENTS**	**REVIEW CONFERENCE** A - comment accepted W - comment withdrawn (if neither, explain)	**CONTRACTOR RESPONSE**	**USAED RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)**
13.	2-89, Sec. 13.5	The first sentence should state, "The selected remedies address primary contaminants of concern…" The first sentence of the second paragraph should read "…to address contamination and reduce risk at the facility." The second paragraph goes on to say that, institutional controls (ICs) will be used. The ICs need to be included in the remedy for the DDA/BSA and should be notice in the appropriate land record that there is groundwater contamination, that the groundwater should not be used as a drinking water source, and that contaminated soils must be managed properly. This notice should be given to the Borough, City, and landowner.		The first sentence in Section 13.5 will be reworded: "The selected remedies address primary contaminants of concern…" The first sentence of the second paragraph will be reworded as suggested. The following text will be added to Section 12A.2.1, which describes the selected remedy for DDA/BSA soils: "Because exposure to soils contaminated at concentrations that could potentially affect human health could occur while the selected remedy is being implemented, USAED will provide written notice to the Aleutians East Borough, the City of Cold Bay, and the property owner that contaminated soil is present at the site and that, if contaminated soil is excavated from the site, it must be handled in accordance with applicable state regulations." The following text will be added to Section 12A.2.2, which describes the selected remedy for DDA/BSA sediments, free product, and groundwater: "Because exposure to groundwater contaminated at concentrations that could potentially affect human health could occur while the selected remedy is being implemented, USAED will provide written notice to the Aleutians East Borough, the City of Cold Bay, and the property owner that contaminated groundwater is present at the site and that, due to human health risks, groundwater	

U.S. ARMY CORPS OF ENGINEERS CEPOA-EN-EE-TE	DATE: 8/22/2005 REVIEWER: Deb Caillouet PHONE: (907) 269-0298	Action taken on comment by: Stephen Witzmann

Item No.	Drawing Sheet No., Spec. Para.	COMMENTS	REVIEW CONFERENCE A - comment accepted W - comment withdrawn (if neither, explain)	CONTRACTOR RESPONSE	USAED RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)
				contaminated at concentrations above state regulations should not be used as a source of drinking water.”	
14.	2-89	Section 13.6, please correct the phrase "continued work will ADEC " to "continued work with ADEC".		The suggested change will be made.	
15.	2-90	This section, on significant changes from the preferred alternatives in the Proposed Plan should describe why the Proposed Plan covered six sites, and the Decision Document is only covering five sites.		The following paragraph will be added following the bullets in Section 14.0: “In addition, the Proposed Plan included a sixth site, the Asphalt Seep Area. However, a separate Decision Document is planned for the Asphalt Seep Area; therefore, that site has not been incorporated into this document.”	
16.	Appendix A. Table 4-1	40 CFR 261-262 and 8 AAC 62 should be listed as applicable. The Clean Water Act should also be applicable, including Section 303.		40 CFR 261-262 and 8 AAC 62 will be listed as applicable in Table 4-1. The Section 303(d) of the Clean Water Act will be added to Table 3-1, which describes location-specific ARARs. The following information will be added to the table: Requirement: Protect surface waters Citation: Clean Water Act Section 303(d) ARAR Assessment: Applicable Description: In 1998, Cold Bay was placed on the 303(d) list for non-attainment of the Petroleum Hydrocarbons, Oil, and Grease standard for petroleum products. Inclusion in the 303(d) list signifies that a water body is not in compliance with the Clean Water Act,	

REVIEW COMMENTS

PROJECT: Cold Bay, Fort Randall
DOCUMENT: Interim Final, Version 2 Decision Document for 5 AOCs

U.S. ARMY CORPS OF ENGINEERS CEPOA-EN-EE-TE	DATE: 8/22/2005 REVIEWER: Deb Caillouet PHONE: (907) 269-0298	Action taken on comment by: Stephen Witzmann

Item No.	Drawing Sheet No., Spec. Para.	COMMENTS	REVIEW CONFERENCE A - comment accepted W - comment withdrawn (if neither, explain)	CONTRACTOR RESPONSE	USAED RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)
				Section 303(d).	

REVIEW COMMENTS

PROJECT: Formerly Used Defense Site Property Fort Randall
DOCUMENT: Decision Document for Five Areas of Concern, Interim Final Version 2, May 2005

U.S. ARMY CORPS OF ENGINEERS CEPOA-EN-EE-TE	DATE: 8/12/2005 REVIEWER: Deb Caillouet PHONE: (907) 269-0298	Action taken on comment by: Katie Bloom, Jacobs 8/16/2005

Item No.	Drawing Sheet No., Spec. Para.	COMMENTS	CONTRACTOR RESPONSE	USAED RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)
1	Table of Contents	In item 5A.2, the word "receptors" is missing an "e". Item 11A.0 was renamed in the text but not changed in the Table of Contents; it should be changed to "Primary Contaminant of Concern". In addition, titles for many of the tables have been changed in the body of the document and should be changed accordingly in the Table of Contents.	The suggested changes will be made.	
2	Tables 2-23 and 2-24	The footnotes for these tables are no longer necessary as the column showing risk has been removed from the tables.	The footnotes for these tables will be modified to say, "The cumulative hazard index and the cumulative cancer risk will be less than 1.0 and 1x 10^{-5} respectively after cleanup levels have been attained." This will eliminate the reference to risk values that are no longer in the tables.	
3	8C.0	Under the RAOs, the 2nd bullet addresses migration to groundwater and should state, "Prevent the migration of soil contamination to groundwater, specifically prevent DRO in excess of 250 mg/kg and benzo(a)anthracene in excess of 6 mg/kg from impacting groundwater. The 3rd bullet describes RAOs based on the ingestion pathway. The ingestion pathway cleanup level for benzo(k)fluoranthene should be listed as 110 mg/kg rather than 11 mg/kg.	The suggested changes will be made. In the RAOs, the 2nd bullet will be modified to say, "Prevent migration of contaminants in soil to groundwater, specifically prevent DRO in excess of 250 mg/kg and benzo(a)anthracene in excess of 6 mg/kg from impacting groundwater". The 3rd bullet will be modified to say, "Prevent ingestion of contaminants in soil containing benzo(a)pyrene in excess of 1 mg/kg, benzo(b)fluoranthene in excess of 11 mg/kg, benzo(k)fluoranthene in excess of 110 mg/kg, and dibenzo(a,h)anthracene in excess of 1 mg/kg". In addition, Table 2-18 will be updated to list 110 mg/kg as the ingestion limit for benzo(k)fluoranthene.	
4	13.0	In the first paragraph following the introductory bullets, a five-year review is mentioned. This contradicts other sections that were changed to say they were not required but coordination with DEC will occur.	The referenced sentence will be modified to say, "The following sections discuss how the selected remedies meet these statutory requirements and describe regulatory input during the cleanup process."	

REVIEW COMMENTS **PROJECT: Formerly Used Defense Site Property Fort Randall**
DOCUMENT: Decision Document for Five Areas of Concern, Interim Final Version 2, May 2005

U.S. ARMY CORPS OF ENGINEERS CEPOA-EN-EE-TE	DATE: 8/12/2005 REVIEWER: Deb Caillouet PHONE: (907) 269-0298	Action taken on comment by: Katie Bloom, Jacobs 8/16/2005

Item No.	Drawing Sheet No., Spec. Para.	COMMENTS	CONTRACTOR RESPONSE	USAED RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)
5	13.1	In the 2nd paragraph, the document states that the remedies will be protective of people who use the site for subsistence activities. While DEC does not believe there is substantial risk associated with this pathway, there has been no risk assessment of the subsistence use pathway, therefore this statement is not supported and should be removed	The final sentence of the reference paragraph will be modified to say, "Although there has been no formal risk assessment of the subsistence use pathway, USAED and ADEC believe that there will be no substantial risk associated with use of the site for subsistence activities once RAOs are obtained."	
6	13.4, 13.5	In the sentence after the bullets in 13.4, it would be more precise to indicate that institutional controls will be incorporated in the remedies for the DDA/BSA area. The same type of revision could be added to the 3rd sentence of the 2nd paragraph in 13.5. Section 13.5 still states that the remedy will address principal threat waste through treatment, however, there are no known principal threat wastes at the site. We suggest replacing "principal threat wastes" with "contaminants of concern".	The suggested changes will be made. The referenced sentence, after the bullets in 13.4, will be modified to say, "To ensure continued protection of human health and the environment, a non-treatment component of instituting controls will be incorporated in the selected remedies for the DDA/BSA and EWR. Institutional controls at the DDA/BSA will remain in place only until the RAOs are achieved." Section 13.5 will be modified to say "primary contaminants of concern" rather than "principal threat wastes".	
7	Appendix A – ARARs, Table 2-2	It would help to include a footnote clarifying that site specific method three, migration to groundwater, alternative cleanup levels were developed for the DDA/BSA and listing those cleanup levels.	The suggested change will be made. A footnote will be added to Table 2-2 stating, "Site specific, migration to groundwater, alternative cleanup levels were developed for the DDA/BSA site. The cleanup levels for this site and other sites addressed in the decision document may be found in Tables 1-1, 2-1, 2-16, 2-17, 2-23, and 2-24 of the decision document."	

REVIEW COMMENTS

PROJECT: Fort Randall, Cold Bay, Alaska
DOCUMENT: Decision Document for Six Areas of Concern, Interim Final December 2004

U.S. ARMY CORPS OF ENGINEERS CEPOA-EN-EE-TE	**DATE: 2/15/2005** **REVIEWER: Dennis Druck, Environmental Health Risk Assessment, US Army Center for Health Promotion and Preventive Medicine** **PHONE: DSN 584-2953 or (410) 436-2953** **EMAIL: Dennis.Druck@apg.amedd.army.mil**	**Action taken on comment by: Katie Fay, Jacobs 6/01/2005**

Item No.	Drawing Sheet No., Spec. Para.	COMMENTS	CONTRACTOR RESPONSE	USAED RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)
1	Section 6A.1	In Section 6A.1, Land Use, it states that both areas are used for subsistence purposes. Please indicate in the DD that the cleanup levels will also be protective of a subsistence receptor. We concur with the selected remedial alternatives as being protective of human health and the environment.	The following text will be added to Section 13.1: Protection of Human Health and the Environment: "The selected remedies will also be protective of people who use the site for subsistence activities."	

REVIEW COMMENTS **PROJECT: Cold Bay, Fort Randall**
DOCUMENT: Interim Final, Version 2 Decision Document for 5 AOCs

U.S. ARMY CORPS OF ENGINEERS CEPOA-EN-EE-TE	DATE: 8/22/2005 REVIEWER: Anne Roth PHONE: (907) 753-2537	Action taken on comment by: Stephen Witzmann, PE

Item No.	Drawing Sheet No., Spec. Para.	COMMENTS	REVIEW CONFERENCE A - comment accepted W - comment withdrawn (if neither, explain)	CONTRACTOR RESPONSE	USAED RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)
1.	p. 1-2, Statement of Basis and Purpose, 1st para.	Add to end of last sentence of first paragraph "…and on the inclusion of Cold Bay on the State of Alaska's list of impaired water bodies under section 303(d) of the Clean Water Act."		The suggested change will be made.	
2.	p. 1-2, Statement of Basis and Purpose, 2nd para	Change paragraph to read: "This decision document presents the U.S. Army Engineer District, Alaska (USAED) selected remedy for Fort Randall, chosen in accordance with the Administrative Record for this site. The sites within this decision document fall under the Comprehensive Environmental Response, Compensation, and Liability Act (CERLCA) petroleum exclusion and are thus being addressed under the authority of the DERP statute. The proposed response action meets ADEC requirements for cleanup of petroleum contaminated sites, and is consistent with the response process set forth in the National Contingency Plan (NCP)."		The suggested change will be made.	
3.	p. 1-3, Statutory Determinations, 3rd sent.	Change sentence to read: A five-year review is not mandated, however, USAED will continue close coordination with ADEC to ensure that the remedy is, or will be, protective of human health and the environment."		The suggested change will be made.	
4.	p. 1-4, Table 1-1	Include footnote with source for cleanup levels.		Two footnotes will be added. The following footnote will be added to the soil cleanup level column: "Soil cleanup levels for the DDA and BSA sites were developed based	

REVIEW COMMENTS

PROJECT: Cold Bay, Fort Randall

DOCUMENT: Interim Final, Version 2 Decision Document for 5 AOCs

U.S. ARMY CORPS OF ENGINEERS CEPOA-EN-EE-TE	**DATE: 8/22/2005** **REVIEWER: Anne Roth** **PHONE:** (907) 753-2537	**Action taken on comment by: Stephen Witzmann, PE**

Item No.	**Drawing Sheet No., Spec. Para.**	**COMMENTS**	**REVIEW CONFERENCE** A - comment accepted W - comment withdrawn (if neither, explain)	**CONTRACTOR RESPONSE**	**USAED RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)**
				on 18 AAC 75 Method 3 using site-specific total organic carbon data. Soil cleanup levels for the Stapp Creek and EWR sites are based on the values listed in 18 AAC 75 Method 2, Tables B1 and B2." The following footnote will be added to the groundwater cleanup level column: "Groundwater cleanup levels are generally based on 18 AAC 75.345 Table C values. The cleanup level for 1,2-dibromoethane is based on ADEC Technical Memo 01-007. The cleanup levels for total aromatic hydrocarbons and total aqueous hydrocarbons are based on 18 AAC 70."	
5.	Throughout	Please review and ensure that COPCs are referenced where appropriate and COCs are referenced where appropriate.		The following sentence will be added to the end of the first paragraph in Section 5A.6: "COCs are the subset of COPCs that require cleanup." The document was modified such that, in most cases, it refers to both COCs and COPCs when describing planned remedial actions at the DDA/BSA site. For the Collapsed Wooden Building, no COCs were identified, and no remedial action is required. For the EWR and Stapp Creek sites, all COPCs require some level of cleanup. Thus, COC, not COPC, is generally used throughout these sections.	

REVIEW COMMENTS

PROJECT: Cold Bay, Fort Randall

DOCUMENT: Interim Final, Version 2 Decision Document for 5 AOCs

U.S. ARMY CORPS OF ENGINEERS CEPOA-EN-EE-TE	**DATE: 8/22/2005** **REVIEWER: Anne Roth** **PHONE:** (907) 753-2537	**Action taken on comment by: Stephen Witzmann, PE**

Item No.	**Drawing Sheet No., Spec. Para.**	**COMMENTS**	**REVIEW CONFERENCE** A - comment accepted W - comment withdrawn (if neither, explain)	**CONTRACTOR RESPONSE**	**USAED RESPONSE ACCEPTANCE** (A-AGREE) (D-DISAGREE)
6.	p. 2-4, sect. 2.1, 2nd para.	The Site History discussion must be very clear that there has been no beneficial use of the fuel storage/distribution system that we are cleaning up since DOD left the site. It would be good to state how post-DOD users of the facility managed their fuel. The Flying Tigers reference is problematic unless we can cite a date during DOD control of the property because I think they were a contractor, and without the contract indicating who (between them and the Govt) was responsible for any environmental contamination there's an eligibility issue that HQ is likely to raise.		The Site History section has been rewritten; see attached. Figure 2-2 has been updated to show the pipeline corridor from the Frosty Fuels tank farm to the Cold Bay dock.	
7.	p. 2-8, Table 2-1	Add footnote identifying source of cleanup levels.		In accordance with the response to ADEC comment #2, the following notes will be added to Table 2-1: "Source of cleanup levels for contaminants in soil: 18 AAC 75 Method 2 for Stapp Creek and the East-West Runway; 18 AAC 75 Method 3 for the Drum Disposal Area and Beach Seep Area. "Source of cleanup levels for contaminants in groundwater: 18 AAC 75.345 Table C, except 1,2-dibromoethane from Technical Memo 01-007 and total aromatic hydrocarbons and total aqueous hydrocarbons based on 18 AAC 70. "For definitions, see the Acronyms and Abbreviations list."	

REVIEW COMMENTS

PROJECT: Cold Bay, Fort Randall

DOCUMENT: Interim Final, Version 2 Decision Document for 5 AOCs

U.S. ARMY CORPS OF ENGINEERS CEPOA-EN-EE-TE	**DATE: 8/22/2005** **REVIEWER: Anne Roth** **PHONE:** (907) 753-2537	**Action taken on comment by: Stephen Witzmann, PE**

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8.	sect. 4.0, p. 2-9, 2nd para.	Change sentence to read "Cleanup goals have been established consistent with ADEC regulations."		The suggested change will be made.	
9.	Sect. 4.0, p. 2-9, 1st sent.	Delete "potential"—the selected remedies will focus on treating or removing COCs.		The word "potential" will be deleted from the 1st sentence of the final paragraph of Section 4.0.	
10.	Sect. 5A.2.1, p. 2-11, 2nd para, 1st sent	Delete this sentence or rewrite it so it makes sense.		The referenced sentence will be deleted.	
11.	Sect. 10A.1, p. 2-42, Table 2-8	Change column headings to read "DDA Alternative 1," "DDA Alternative 7," and "DDA Alternative 8."		The suggested change will be made.	
12.	Table 2-9	Same comment as above		The suggested change will be made.	
13.	Sect. 11A.0	Confirm whether this section should be talking about COCs, not COPCs.		The title of Section 11A.0 will be changed to "Primary Contaminant of Concern." The third and fourth sentences of the referenced paragraph will be replaced with the following text: "The primary COC at the site is diesel fuel. Historical fuel spills and releases have impacted soils and groundwater. Concerns with diesel fuel contamination are associated with the mobility of free product at the groundwater table surface. Free product migrates downgradient	

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				along the water table surface and discharges to marine sediments along Cold Bay." The word "potential" will be deleted from Table 2-10.	
14.	Sect. 5B.1, 6th sent.	Fix wording to make eligibility determination clearer. If the Flying Tigers were a lessee, and their activities are the source of the contamination, the project probably is not eligible.		This section discusses the Collapsed Wooden Building site. No further action is planned for the Collapsed Wooden Building site. Thus, FUDS eligibility does not appear to be a concern for this site.	
15.	Table 2-19	In "Source of Regulatory Limit" column, add "ADEC" above "Method 2."		The suggested change will be made.	
16.	Sect. 13-5, 2nd para.	Concur with ADEC comments and proposed response.		Comment noted.	
17.	Sect. 13-6	Change first sentence to read "A five year review is not mandated, however, USAED will continue close coordination with ADEC to ensure the remedy is, or will be, protective of human health and the environment.		The suggested change will be made.	
18.	Appendix A	This is a POL cleanup being conducted under the authority in DERP, 10 USC 2701(b)(2), and not under CERCLA. There's a clear waiver of sovereign immunity for CERCLA sites, but not for POL sites. The Interim FUDS policy on POL cleanups states that the FUDS program should use a characterization, decision, response process consistent with that defined in the NCP, or an EPA approved State UST/AST program when cleaning up POL-only sites. Therefore, the process of identifying potentially relevant standards and cleanup levels for POL sites is employed to ensure that the POL cleanup process is		Section 1.0 of Appendix A has been rewritten, as attached.	

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		as consistent as possible with the procedural requirements of the NCP. We should state that the identified ARARs are neither legally applicable nor relevant and appropriate because POL contamination is excluded from CERCLA and the NCP. POL decision documents should not state that the cleanup is "subject to" or "regulated by" ADEC cleanup levels. (Please do a text search and remove all such language). Instead, we should state that we are employing ADEC cleanup levels because they are risk-based and thus indicative of when an imminent and substantial endangerment to the public health or welfare or the environment has been mitigated. My recommendation for Appendix A is to include introductory text explaining the above, then go ahead with the same analysis and use of the ARAR language. I realize this issue is a thorny one, and I'm available for in-person discussion if that would be helpful. I also am willing to review a revised Appendix A prior to production of the final document. On Table 2-1, remove the column entitled "ARAR Assessment"		The phrases "subject to" and "regulated by" ADEC cleanup levels have been eliminated from the document. Sentences that used phrases such as "applicable" and "regulated under" have been rephrased, as appropriate. For instance, "Soils at the Cold Bay area are regulated under…" was replaced with "Soil cleanup levels were developed based on 18 AAC 75…" Where the phrase "regulatory standard" applies to site-specific standards, it has been replaced with "cleanup level" to further signify that these concentrations are being used because they are risk based and not because of their regulatory status. The column entitled "ARAR Assessment" will be deleted from Table 2-1.	
19.	Appendix A, Section 5.0	Replace this paragraph with a statement that although the ARAR waiver analysis is not pertinent to this DD because the DD applies to a POL site, the risk-based analysis of appropriate cleanup levels indicates that all standards		The referenced paragraph will be replaced with the following text: "Section 40 CFR 300.430(f)(1)(ii)(C) provides, that under certain circumstances, ARARs may be waived.	

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		required to protect human health and the environment with respect to the proposed remedial action will be met..		However, because this decision document applies only to sites contaminated with POL, the ARAR waiver provisions do not apply. The cleanup levels incorporated into the selected remedies are risk based. An analysis of these cleanup levels indicates that the selected remedies will meet all standards required to protect human health and the environment."	
20.	ADEC comments 6 and 16	CWA 303(d) requirement should not be a RAO and should not be an ARAR. We should discuss it as something indicating that the site poses an imminent and substantial endangerment to human health or welfare or the environment, and that our cleanup will contribute toward removal of Cold Bay from the 303(d) list. We could state that our RAO is to eliminate the source area for the exposure pathway to Cold Bay.		The referenced RAO will be deleted and replaced with the following text: "In addition, the DDA/BSA site poses an imminent and substantial endangerment to human health or welfare or the environment. Without remedial action, diesel free product from the site will continue to discharge to Cold Bay. Thus, the following RAO is also applicable to the site: • Prevent the discharge of diesel free product to downgradient surface waters. In this manner, the selected remedy will contribute toward removal of Cold Bay from the Clean Water Act, Section 303(d), list of impaired water bodies." In Appendix A, Table 3-1, Section 303(d) of the Clean Water Act will be listed as TBC criteria.	