Proposed Plan for Former Communications Site (Taku Gardens) Fort Wainwright, Alaska

Final - December 2012

You are encouraged to participate in the selection of the remedial action for the Former Communications Site by providing comments on the alternatives presented in this Proposed Plan. Comments will be accepted by mail or telephone during the public comment period, 14 January 2013 through 12 February 2013, or in person at the public meeting. Your comments will be considered when deciding which of these alternatives best meets the goal of protecting public health and the environment. The U.S. Army Garrison, Fort Wainwright, Alaska will not select a final course of action until all comments received during the public comment period have been reviewed and considered. A pre-addressed comment form has been inserted into this document for your convenience. Additional information about the public meeting and the public comment process is provided on page 16. Detailed information about the work conducted at the Former Communications Site (FCS) and the contamination remaining on the site can be found in the Remedial Investigation and Feasibility Study reports, which are available for review at the libraries listed on page 16 of this document.

Table of Contents

INTRODUCTION

This Proposed Plan presents the cleanup alternatives currently being considered by the U.S. Army, the U. S. Environmental Protection Agency (EPA), and the Alaska Department of Environmental Conservation (ADEC) for remedial action at the Former Communications Site (FCS). This Plan also provides information on the preferred alternatives and explains how you can be involved in the selection process.

Extensive environmental investigation activities have been conducted at the FCS, including two Preliminary Source Evaluations (conducted in 2005 and 2006); a Remedial Investigation, Risk Assessment, and Feasibility Study (conducted between 2007 and 2009); and construction support and groundwater monitoring (conducted between 2011 and 2012). Analytical sample results obtained between 2007 and 2011 indicate that some localized subsurface contamination remains onsite.

Two areas of diesel-contaminated subsurface soil remain in the northern portion of the site. Low levels of other contaminants are limited to small localized areas between 5 and 15 feet below ground surface. Under reasonably anticipated land-use conditions, there is no unacceptable risk to future residents.

Groundwater contaminated with diesel concentrations exceeding project cleanup levels is located in the northern portions of the site but is not near the Fort Wainwright Post supply wells. Groundwater contaminated with 1,2,3-trichloropropane is currently being detected in one monitoring well located near the Post drinking water supply wells. However, the contaminant was not detected in sentry wells located between the Post supply wells and the affected well. Additionally, the Post supply wells are tested regularly in accordance with State of Alaska drinking water regulations and are not contaminated.

Soil vapor samples were collected from boreholes drilled in open areas throughout the FCS, and from boreholes drilled through the concrete garage slabs of each duplex unit. Analytical results of the samples indicate a few isolated detections of volatile organic compounds (VOC) above the project cleanup levels. However, the levels of VOCs detected do not pose an unacceptable risk to residents.

Based on the results of the Remedial Investigation and Feasibility Study, the preferred alternative for soil and groundwater is to implement existing Garrison institutional controls restricting the disturbance and removal of soil deeper than 6 inches below ground surface and to prohibit the use of groundwater within the FCS. Other alternatives considered included active remediation of groundwater, as discussed on page 12. As final construction activities continue to create changing site conditions at the FCS, a proactive, 5-year sub-slab soil vapor monitoring plan will be implemented to ensure there are no unacceptable risks to site residents.

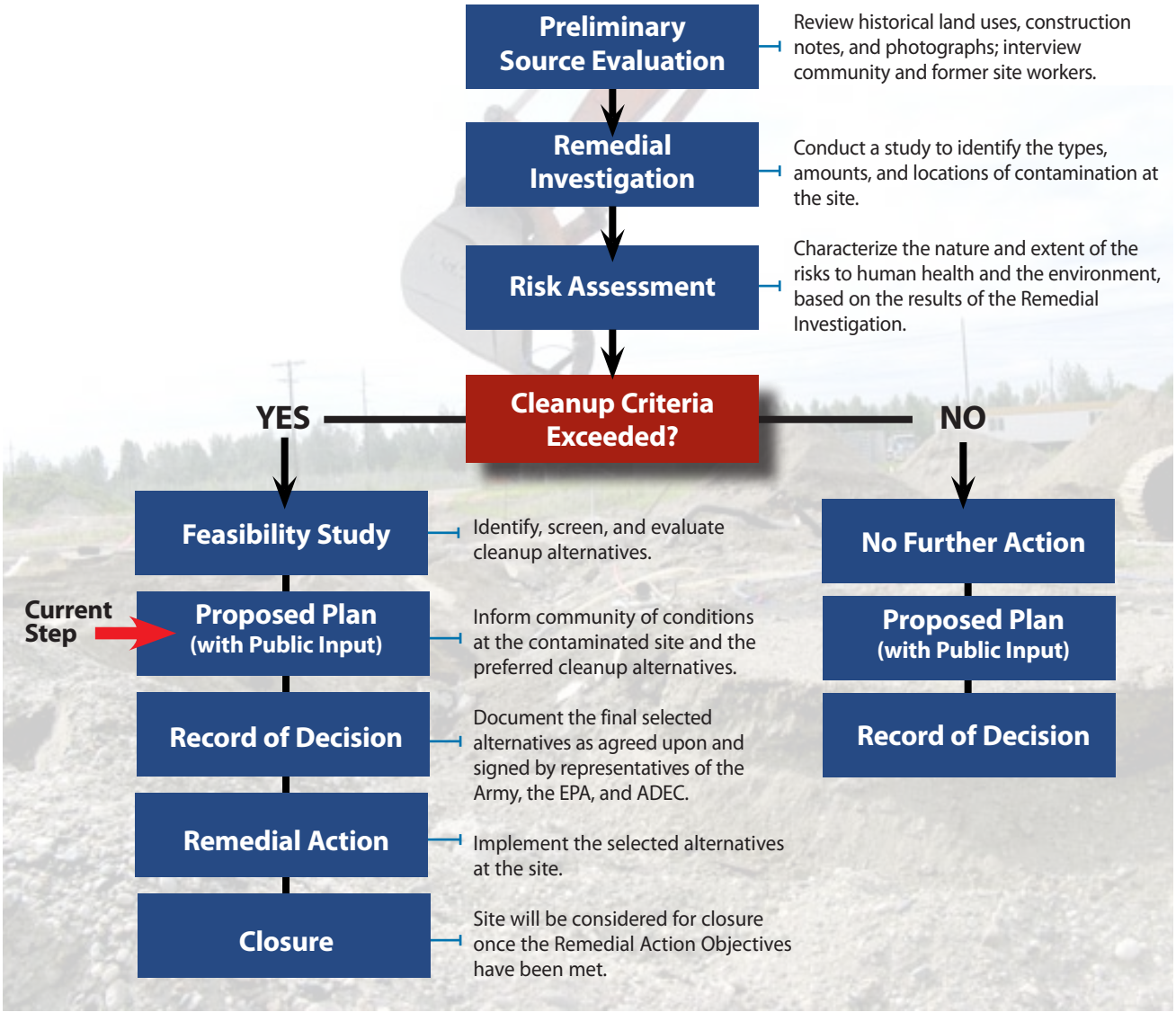
Comments on this Proposed Plan are being solicited from the public from 14 January 2013 through 12 February 2013. Selection of a remedial action will not be made until the public comment period ends and all comments have been reviewed and considered. (See page 16, Public Participation.)

This Proposed Plan fulfills the requirements of Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), also known as Superfund, by providing a discussion of the remedial alternatives for contaminated soil and groundwater at the FCS. From those alternatives, the Army, in cooperation with the EPA and the ADEC has identified the preferred alternatives based on criteria found in the National Contingency Plan Section 300.430(f)(2).

THE DECISION PROCESS

This Proposed Plan is required under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Contingency Plan (NCP) to facilitate public involvement in the remedy selection process. CERCLA and the NCP are the federal law and regulation that establish the cleanup processes for most hazardous waste sites. As the lead agency, the U.S. Army Garrison, Fort Wainwright is responsible for all investigation and remedial actions at the FCS. Support agencies at the FCS include the EPA and the ADEC. All steps in this CERCLA process follow EPA guidelines using risk-based cleanup values, and are being conducted in accordance with the Fort Wainwright Federal Facilities Agreement, as amended.

The diagram below outlines the CERCLA site cleanup process. Two Preliminary Source Evaluations, a Remedial Investigation which included Human Health and Ecological Risk Assessments, and a Feasibility Study have been completed leading up to this Proposed Plan.



Since it began operation, Fort Wainwright has generated and disposed of various hazardous wastes. Fort Wainwright was added to the EPA Superfund National Priorities List in 1990. In spring 1992, the Army, the EPA, and the ADEC signed a Federal Facilities Agreement (FFA), which outlined the procedures and schedules required for thorough investigations of suspected historical hazardous waste source areas associated with Fort Wainwright. The FFA ensures that appropriate actions are taken to protect human health and the environment in accordance with state and federal laws. The FFA also divided Fort Wainwright into five operable units (OU1 through OU5). In February 2007, the FCS (Operable Unit 6) was incorporated into the CERCLA process as OU6 through an amendment to the Fort Wainwright FFA, in accordance with CERCLA Section 120. This amendment also provided Remedial Project Managers with the authority to add additional operable units for newly discovered source areas, if needed.

SCOPE AND ROLE OF PROPOSED PLAN

This Proposed Plan identifies a proposed course of action for the FCS.

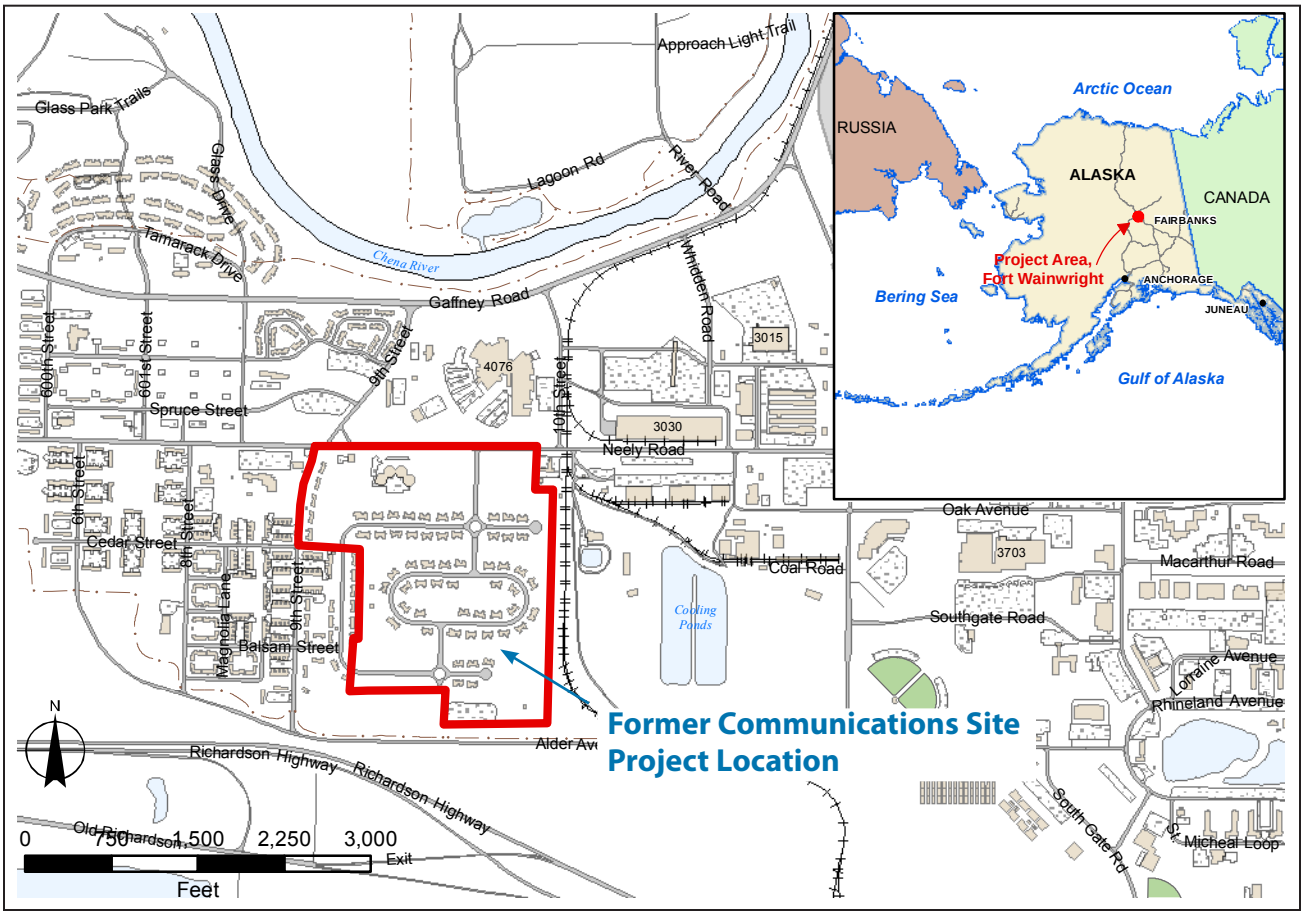
- It describes actions taken and identifies alternatives considered for remaining actions on site.
- It presents the preferred remedial alternative for soil and groundwater to protect human health and the environment.
- It describes the establishment of specific soil and groundwater institutional controls and a short-term sub-slab vapor monitoring program.

SITE HISTORY

The FCS is a construction site being developed within the Taku Gardens neighborhood to provide housing for military personnel and their families. It is located on Fort Wainwright, north of Alder Avenue, south of Neely Road, east of 9th Street, and west of the Alaska Railroad tracks. At present, there are 55 unoccupied duplexes (110 units) at the FCS. The site is enclosed on all sides by temporary chain-link fencing, and access is currently controlled by the onsite contractor.

Fort Wainwright, located on the east side of Fairbanks, Alaska, was originally established as a cold-weather testing station in 1938. It was used as a crew and supply transfer point during the Lend-Lease program of World War II. After World War II, Fort Wainwright operated as a resupply and maintenance base, supporting remote Distant Early Warning sites, Nike Hercules missile sites, and experimental research stations in the Arctic Ocean. In 1961, all operations were transferred to the U. S. Army on Fort Wainwright, which currently encompasses 1.5 million acres.

The U.S. military has occupied the FCS and surrounding area for over 70 years, during which time a variety of land uses occurred throughout the site. Between the late 1940s and 1950s, there were battalion and wing level operations, which included motor pools and administrative buildings, as well as sleeping, dining, and storage facilities in the northwest corner of the site. Historical aerial photos indicate that several other types of activities were conducted on the eastern side of the site, including vehicle and equipment maintenance and salvage operations, fire training exercises, solid waste burial, and communications activities, among others. Some of these activities were associated with disposal of solid waste into a historical river channel (Hoppe's Slough) that formerly ran through the site.



SITE BACKGROUND

2003-2004 The FCS was selected for military family housing. Preconstruction geotechnical samples and a non-intrusive geophysical investigation completed during this time identified debris at the surface and buried throughout the site with heavier areas of debris located near and around Hoppe's Slough.

2005-2006 In 2005, polychlorinated biphenyl (PCB) contamination was discovered in soil while excavating foundations in the southwest corner of the FCS. All work was stopped in the PCB-contaminated area. Fencing and signs were installed. At the time construction was stopped, 55 duplexes were complete and 10 foundations were still under construction. In September 2005, a Time-Critical Removal Action (TCRA) of PCB-contaminated soil was completed, removing 186 cubic yards of the most highly contaminated soil. This soil was disposed of at a permitted hazardous waste facility. The regulations followed for this action included the Federal Toxic Substances Control Act (TSCA) and State of Alaska 18 AAC 62.310 (transportation of hazardous materials). A remedial action goal of 1 mg/kg PCB for residential soil was identified.

Two Preliminary Source Evaluations (PSE I & II) were completed. Records of historical land uses, field notes, and photographs taken during construction were evaluated. Many areas with metal debris, stained soil, and old drums had been encountered during construction and during excavation of the test pits. Based on these findings, the Army negotiated with EPA and ADEC to add an additional Operable Unit (OU6) to the 1992 FFA. Land use and institutional controls were formalized and an action memorandum documenting the 2005 PCB removal was finalized. Following the PSE, the Army developed a CERCLA-compliant Remedial Investigation (RI) work plan to investigate contamination and to evaluate potential risks posed to future residents, site workers, and the environment.

2007–2009 In 2007, a second, non-intrusive geophysical investigation was conducted to determine the amount and location of metal debris buried onsite. The results from the 2007 geophysical investigation are presented in the figure on page 6.

Formal RI activities began after review of the data from the geophysical investigations and PSEs. Project screening levels were developed to identify contaminants of potential concern and determine the extent of contamination at the site. During investigation, contaminated soil and potentially hazardous debris were removed and properly disposed of with EPA and ADEC concurrence and in accordance with federal and state law. Contaminants of potential concern were identified to be fuels, solvents, pesticides, PCBs, and heavy metals.

A second PCB removal effort occurred in the southwest corner of the site during the 2007 and 2008 Remedial Investigation. Additional areas of investigation included the Transformer Service Area to the east of the site and several other hot spots adjacent to the incomplete foundations in the southwest corner. Soil with PCB concentrations greater than 1 mg/kg was removed from the FCS. Soil with PCB less than 10 mg/kg was disposed of at the Fort Wainwright Landfill; soil with PCB greater than 10 mg/kg was disposed of in a permitted hazardous waste landfill. PCB is no longer considered a contaminant of concern at this site because soil with PCB concentrations greater than 1 mg/kg was removed during the TCRA, and during the RI as investigation-derived waste.

Geophysical investigations

Geophysical investigations used an electromagnetic metal detector to gather information about the physical properties of the subsurface. Data from this survey provided a plan view of the subsurface to determine the location and extent of buried metal objects

Munitions-related item

Any debris that may have been associated with munitions including ammunitions cans, shipping containers, expended shell casings, and other metal debris.

Polychlorinated biphenyls (PCB)

PCBs are man-made organic chemical compounds commonly used in transformers and capacitors prior to 1979, when production of the chemical was banned. Concentrations of PCBs in surface and subsurface soil at the FCS do not exceed 1 mg/kg. This meets federal and state requirements for unrestricted residential use.

Project screening levels

Conservative screening levels were used to identify contaminants of potential concern and determine the extent of contamination. These screening levels were 1/10th of the ADEC 18 AAC 75 Method 2 direct contact cleanup levels to account for cumulative risk. EPA Regional Screening Levels were used for chemicals that do not have Method 2 cleanup levels.

Passive soil vapor sampling

One investigative approach used at the FCS was passive soil vapor sampling. GORE™ modules are passive soil vapor sampling devices that utilize a GORE-TEX® membrane to trap vapor molecules while rejecting soil and water. To effectively locate the source of 1,2,3-trichloropropane contamination, 67 GORE™ modules were installed in the open ground on the eastern side of the FCS, left in place for a seven-day exposure period, and then removed and analyzed.

SITE BACKGROUND (CONTINUED)

In 2009, all 10 foundations and utilities in the PCB Exclusion Zone (EZ) were removed. Once investigations were complete, analytical sample results confirmed that no soil with PCB concentrations above 1 mg/kg remained on site. No other contaminants above cleanup levels remain in the EZ.

Investigation activities included the following:

- Disposed of 17,500 cubic yards of construction-generated soil piles
- Collected and analyzed more than 3,500 surface and subsurface soil samples throughout the site
- Installed and sampled 90 groundwater monitoring wells
- Collected sub-slab soil vapor samples from beneath each duplex
- Conducted indoor air monitoring of each duplex
- Collected 67 passive soil vapor samples to determine the extent and delineate the possible source of 1,2,3-trichloropropane contamination in the groundwater on the eastern side of the site
- Installed 53 active soil vapor probes in open areas of the FCS to characterize soil gas and evaluate the potential for contaminants to affect both indoor and outdoor air

In 2009, all 10 foundations and utilities near the PCB area were removed. Once investigations were complete, analytical sample results confirmed that no soil with PCB concentrations over the project cleanup level remained. Although buried munitions were a concern at the site, only two practice 3.5-inch rocket motors containing active propellant residue were found. A total of 2,945 inert, non-hazardous munitions-related items were found across the site. These items included shipping containers, inert practice rounds, training devices, and other metal debris and do not pose any risk.

Geophysical anomalies that were thought to represent large volumes of buried metal debris and/or drums and where contamination was suspected were investigated, as well as a number of randomly selected smaller anomalies. Throughout the investigation process, minimal soil contamination was found in conjunction with metal debris. Therefore, investigation efforts focused on determining soil contamination, rather than on locating all the metal debris onsite. However, based on observations from nearby excavations and construction notes, some residual debris likely remains near and possibly underneath several buildings and utility lines. Investigation of potential residual debris beneath buildings was limited because of concerns about the structural stability of the buildings and because only a small amount of contamination had been found with buried debris at the FCS.

Later in 2009, an expanded and highly engineered excavation removed debris from beneath the Building 49L garage foundation. A total of 45 drums were removed and no soil contamination was found, leading to the decision to leave the possible remaining debris under other structures in place. Limited investigation beneath buried utility lines was undertaken when it was necessary to complete the characterization of an area. Other utilities were not investigated in order to maintain their integrity.

After each large anomaly investigation, a final geophysical survey was conducted in the footprint of the excavations to ensure that the areas of heaviest metal debris, as defined by the Remedial Project Managers, had been investigated. Geophysical survey figures, one showing the locations of buried metal prior to the Remedial Investigation, and one showing the areas where investigations were completed, can be found on pages 6 and 7.

2010-PRESENT Monitoring wells across the FCS were sampled twice a year to evaluate current contaminant levels in the groundwater. In addition, two deep sentry wells were installed near the Post water supply well on the northeast corner of the site. Data will continue to be evaluated to ensure that groundwater contamination continues to pose no unacceptable risk. Soil vapor beneath each duplex was sampled. Results indicated no unacceptable risk to future inhabitants of the duplexes. In 2011, limited soil removal was completed at three locations. Soils in these areas exceeded the State of Alaska Risk Threshold Values but were initially left in place because, due to their locations, they were considered unlikely to be disturbed. When construction activities were scheduled in these areas, these soils were removed to eliminate any concerns over their proper handling and disposal. Additionally, construction activities around utilities and roads unearthed contaminated soil in four other small areas including the suspected source for the diesel groundwater plume in the northern portion of the site. Soil in these four areas was excavated and removed from the site.

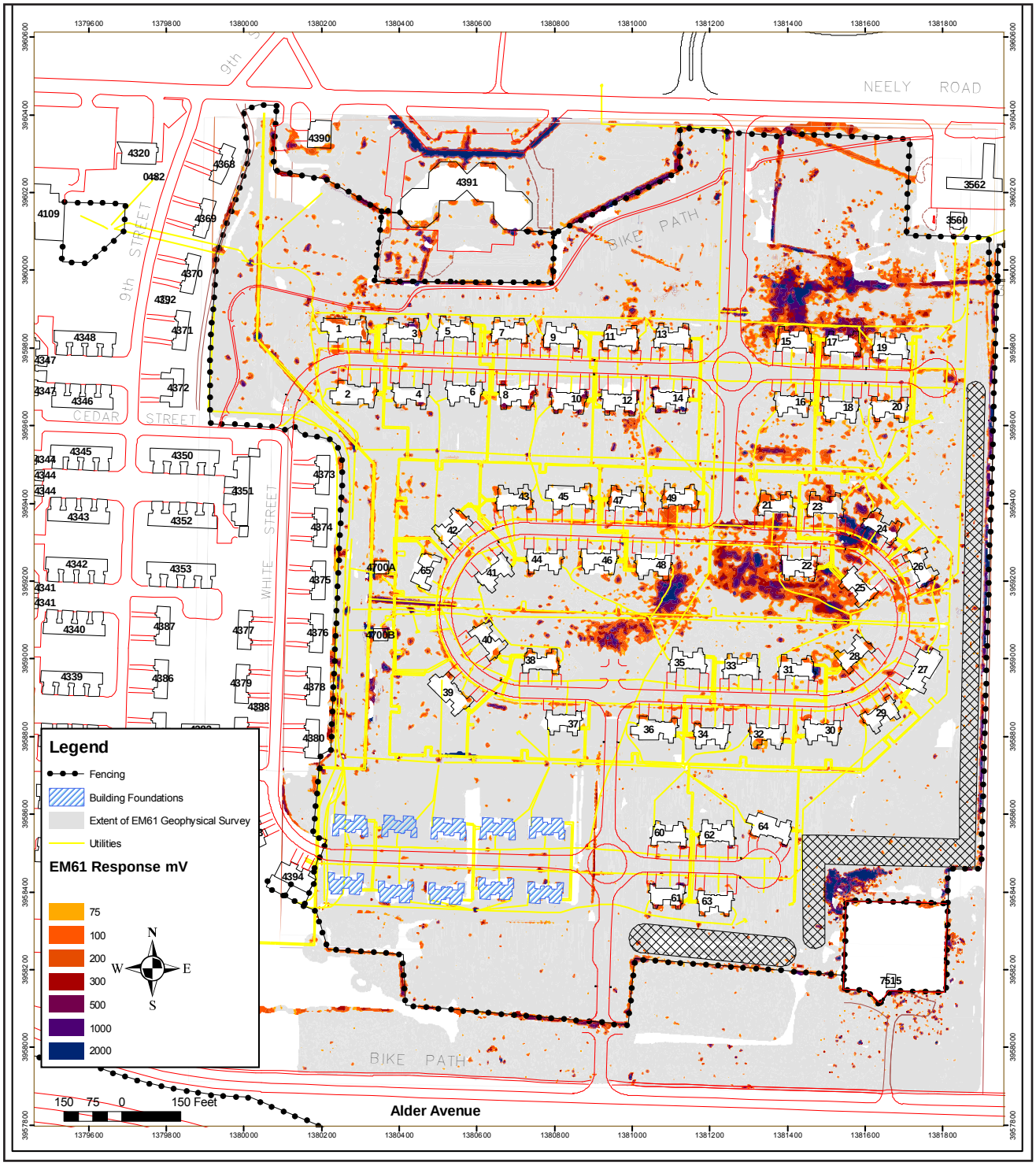
The investigation efforts from 2007 through the present date covered nearly 8 acres. Investigation-derived waste removed from the site included:

- 3,368 cubic yards of PCB-contaminated soil
- 66 cubic yards of pesticide-contaminated soil
- 3,354 cubic yards of petroleum/solvent contaminated soil
- 2,943 items classified as inert munitions-related debris (2 items had residual propellant)
- 1,061 drums (1,053 of these drums were empty and crushed)

Debris, drums, munitions-related items, and contaminated soil encountered during the investigation activities were removed and properly disposed of, as investigation-derived waste, and in accordance with all federal and state Applicable or Relevant and Appropriate Requirements (ARARs). Reports detailing all activities that took place at the FCS can be found at the libraries listed on page 16.

GEOPHYSICAL SURVEY 2007

The figure below presents the results of a 2007 geophysical investigation, and shows the extent of buried metal debris onsite prior to the Remedial Investigation. The electromagnetic metal detector gives responses from zero to 2,000 millivolts. Results between 75 and 2,000 millivolts were considered large enough to present a potential environmental hazard and are displayed in this figure. A higher millivolt reading is displayed as a darker color, indicating a more concentrated area of metal debris.



AREAS OF INVESTIGATION 2007-2009

The figure below presents areas where investigation and removal activities were conducted between 2007 and 2011 (shown in green) overlaying the 2007 geophysical survey results.

SITE CHARACTERISTICS

Remaining Groundwater Contamination

Contamination of 1,2,3-trichloropropane and diesel-range organics (DRO), and residual-range organics (RRO), at concentrations above project cleanup levels exist in the groundwater directly beneath the FCS. The 2010 Risk Assessment showed that anyone regularly consuming the groundwater from the contaminated area over a 30-year period would be at risk. However, all drinking water on Fort Wainwright comes from uncontaminated Post drinking water supply wells that are tested in accordance with State of Alaska drinking water regulations for a community water system.

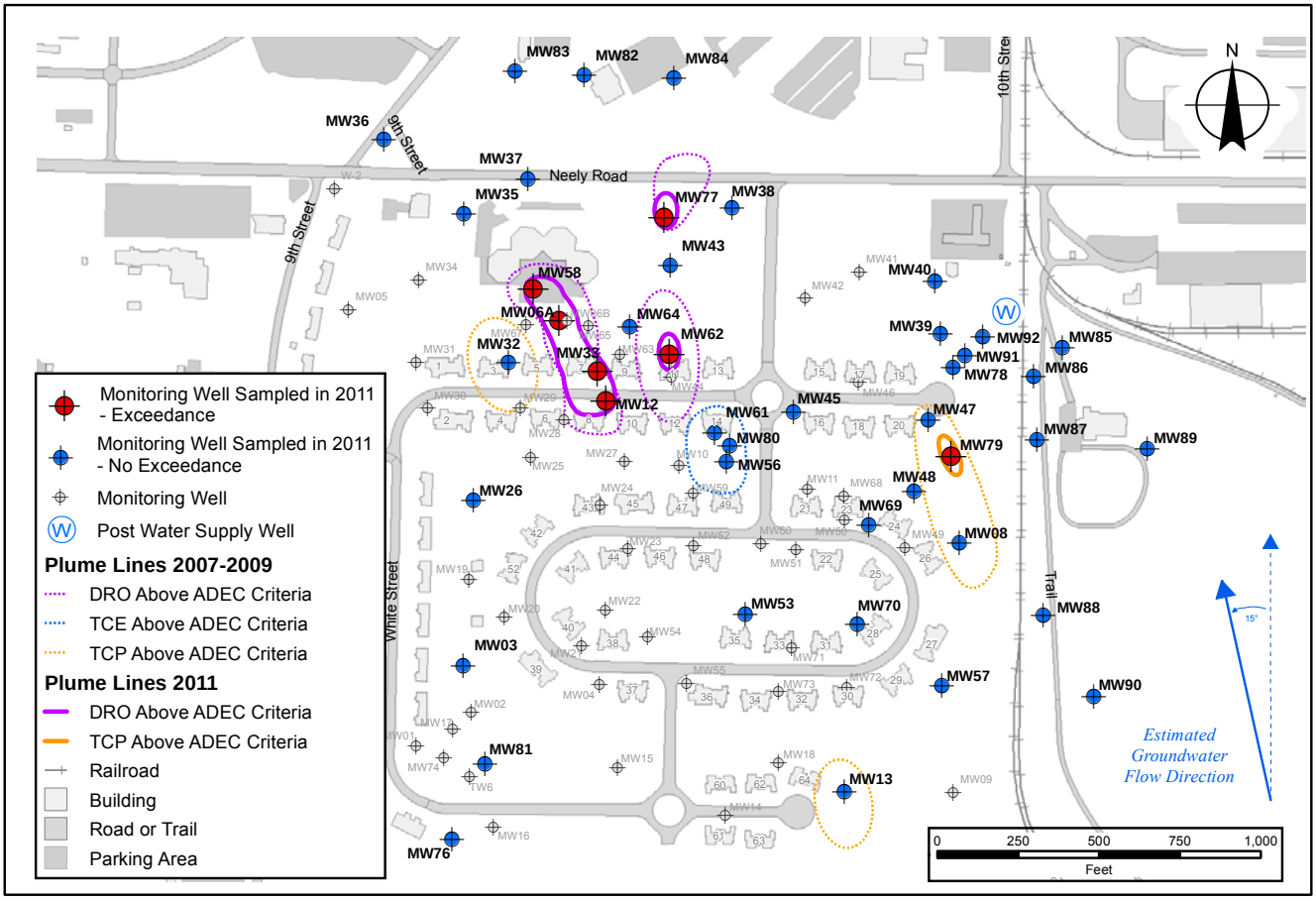
In 2010, two sentry wells were installed between the 1,2,3-trichloropropane contamination and the Post supply wells, and these wells are tested twice a year in order to ensure contamination is not migrating toward the drinking water supply. Results from groundwater monitoring indicate that contamination is naturally degrading and the plumes are shrinking over time. Trichloroethene (TCE) was detected in groundwater at concentrations above the project cleanup level in one area. Sampling results from the last two groundwater sampling events demonstrate that TCE concentrations no longer exceed the cleanup level and the boundaries of TCE contaminant plume are shrinking.

In 2011, one of the suspected sources of the DRO plume was removed and disposed of, which may lead to decreased diesel concentrations in the groundwater sooner than anticipated. The table below shows the levels at which groundwater contaminants exceed cleanup levels, and the figure below lists the location of contaminant plumes and the monitoring wells at the FCS.

Contaminant	Maximum Concentration Detected Onsite* (ug/L)	Project Cleanup Level (ug/L)
1,2,3-Trichloropropane (TCP)	0.38	0.12
Diesel-range organics (DRO)	22,000	1,500
Residual-range organics (RRO)	5,000	1,100
Trichloroethene (TCE)	3.7	5

**Maximum detection from sampling during 2011.*

Groundwater Plume Boundaries 2007-2009 and 2011



SITE CHARACTERISTICS

Remaining Soil Contamination

Some subsurface soil contamination remains at the FCS. Thirty-four contaminants were detected in samples collected between 5 and 15 feet below ground surface at concentrations exceeding the cleanup levels established for the site. These exceedances tend to be concentrated beneath and around portions of the FCS where contaminated soil and debris were removed during investigation activities. These results indicate that, with the exception of diesel-contaminated soil in the north-central portion of the site, concentrations of residual contaminants do not pose an unacceptable risk to residents. The location of these exceedances will be noted, as they remain a potential source of groundwater contamination. Additionally, if future construction requires the removal of these soils, steps would need to be taken to ensure their proper handling and disposal. The table at right lists the contaminants of concern and their respective cleanup levels.

Contaminants of concern

Contaminants in the soil and groundwater at concentrations exceeding project cleanup levels. The cleanup levels are based primarily on the most stringent 2009 ADEC 18 AAC 75 Method 2 cleanup levels. The most stringent EPA Regional Screening Levels were used for analytes that do not have Method 2 levels.

Crushed drums removed from excavation near Building 49

Contaminants of Concern (COCs)	Maximum Contaminant Concentration (mg/kg)	Project Cleanup Levels (mg/kg)
1,1,2-Trichloroethane	0.13	0.018
1,2,4- Trichlorobenzene	6.2	0.85
1,2-DCA	0.048	0.016
1,2,3-Trichloropropane	0.5*	0.00053
1,2-Dichloropropane	0.21	0.018
1,2-Dibromoethane	0.022	0.00016
Benzene	0.34	0.025
Chloroform	0.75	0.46
Dibromochloromethane	0.044	0.032
Methylene chloride	3.2	0.016
PCE	0.71	0.024
TCE	0.33	0.02
Vinyl chloride	0.02	0.0085
2-Hexanone	0.021	0.011
GRO	630	300
DRO	31,900	250
4-Chloroaniline	0.074	0.057
4-Nitroanaline	0.11	0.0014
2,4-Dinitrotoluene	0.1	0.0093
2,6-Dinitrotoluene	0.1	0.0094
Hexachlorobenzene	0.11	0.047
n-Nitrosodimethylamine	0.061*	0.000053
n-Nitrosodi-n-propylamine	0.28	0.0011
Pentachlorophenol	0.33	0.047
bis-(2-Chloroethoxy)methane	0.066	0.025
bis-(2-Chloroethyl)ether	0.054	0.0022
bis-(2-Chloroisopropyl)ether	0.053	0.00012
Beta-BHC	0.4	0.022
Gamma-BHC	0.054	0.0095
2,4,5-T	0.55	0.15
Arsenic	37.1	8.46
Aluminum	664,000	77,000
Copper	36,300	4,100
Manganese	4,360	1,800

** Contaminated soil from these sample locations was removed in 2011*

Building 48 site after backfilling was completed

SUMMARY OF SITE RISKS

NATURE AND EXTENT OF CONTAMINATION The types and amounts of contamination at the FCS were determined through the Remedial Investigation. Potential risks to human health were evaluated for groundwater, soil, and soil gas on the site. Isolated areas with generally low-level contamination exist on site in the subsurface soil between 5 and 15 feet below ground surface; surface soil is not contaminated. Additionally, small groundwater plumes remain below the site (see page 8), and a few scattered VOCs have been detected within the soil vapor beneath the duplexes. The site has been thoroughly investigated and a total of 6,788 cubic yards of contaminated soil, 1,061 drums, and 2,945 pieces of munitions-related debris have been removed. No further assessment of the site is required.

EXPLOSIVES HAZARDS Evidence provided by the geophysical investigations and the numerous test pits dug throughout the site indicates that explosives or munitions that could detonate were not disposed of at the FCS, with the exception of propellant residue found in two rocket motors. Therefore, regarding the issue of explosives safety, the FCS is considered safe for residential use. Details of this conclusion and the work completed on FCS are documented in the Final Explosive Safety Submission. (See Appendix L of the FCS Remedial Investigation Report.)

HUMAN HEALTH RISK ASSESSMENT A site-specific Risk Assessment was conducted to evaluate the potential risks to human health and the environment at the FCS. The Risk Assessment was based on the location and amount of contamination present, toxicity of each contaminant, current and potential future uses of the site, and pathways by which people could be exposed to contaminants. The results of the assessment were used to support decisions concerning the extent of remedial actions and to help in the selection of the remedial action alternatives. The Risk Assessment used a conservative approach that calculated risk by taking the highest sample results of each contaminant from across the site and assumed that the public would be regularly exposed to all of these contaminants over a 30-year period.

The table below shows the risk levels, as determined by the Risk Assessment, to future residents in relation to soil, groundwater, and soil vapor under the reasonably anticipated future use scenario and unrestricted future use scenarios. The results indicate that under the reasonably anticipated future use scenario, the hazard index for non-carcinogenic chemicals in soil is below the EPA and ADEC threshold value of 1 and the cumulative risk is within or below the EPA's acceptable risk of 1 in 1,000,000 to 1 in 10,000 and below the ADEC risk threshold of 1 in 100,000. This shows there is no unacceptable risk to residents who use the Post drinking water supply wells and do not come in contact with subsurface soil.

Future Residential Exposure Exposure Scenario and Medium	Reasonably Anticipated Future Use		Unrestricted Future Use	
	Excess Lifetime Cancer Risk	Noncancer Hazard Index	Excess Lifetime Cancer Risk	Noncancer Hazard Index
Direct Contact with Soil (0-2 ft bgs)	8×10^{-6}	0.5	--	--
Hypothetical Direct Contact with Soil (0-15 ft bgs)	--	--	8×10^{-5}	5
Vapor Intrusion to Indoor Air	6×10^{-6}	0.05	6×10^{-6}	0.05
Domestic Use of Post Supply Well	5×10^{-7}	0.005	--	--
Hypothetical Domestic Use of Groundwater	--	--	2×10^{-3}	16
Cumulative Multi-Media Risk and Hazard	1×10^{-5}	0.6	2×10^{-3}	21

Risk to maintenance workers, excavation workers, and recreational or other site visitors were also calculated considering direct contact to surface and subsurface soil. The results indicate that the hazard indexes for non-carcinogenic chemicals in soil are below the EPA and ADEC threshold value of 1 and the risk levels are within or below the EPA targets and below the ADEC risk threshold. Therefore, there is no unacceptable risk identified for site workers, recreational users, or other site visitors.

Exposure Scenario	Excess Lifetime Cancer Risk	Noncancer Hazard Index
Future maintenance worker – direct contact with soil (0-2 feet bgs)	3×10^{-6}	0.5
Future excavation worker – direct contact with soil (0-15 feet bgs)	2×10^{-6}	0.7
Future recreational/site visitor – direct contact with soil (0-2 feet bgs)	3×10^{-6}	0.2

ECOLOGICAL RISK ASSESSMENT The Ecological Risk Assessment addressed the impacts and potential risks to the plants and animals on the FCS posed by contaminants found on the site. The Ecological Risk Assessment generally focused on the effects of contaminants on populations or communities of a species, not individual animals. No unacceptable risk was identified for wildlife on or offsite, or aquatic wildlife offsite, based on exposure to contamination in the drainage ditches and groundwater at the FCS.

BASIS FOR REMEDIAL ACTIONS

The FCS investigation occurred from the time of discovery in 2005 through 2011. Many contaminants of concern were identified, and contaminated soil and debris were investigated and disposed of with EPA and ADEC concurrence during the 2005 Time-Critical Removal Action, PSE, RI, and follow-on construction activities. Human Health and Ecological Risk Assessments were completed using the concentrations of contaminants remaining in soil, groundwater, and sediment. There is no unacceptable risk to residents who use the public water supplied on Post and do not come into contact with subsurface soil.

It is the Army's current judgment that the preferred alternative identified in this Proposed Plan is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment. If land use is unrestricted at the site, future residents could be exposed to groundwater and/or subsurface soil with contaminant concentrations that pose an unacceptable risk.

REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAO) define the extent of cleanup required in order to protect human health and the environment. The specific RAOs developed for the FCS are as follows:

- Minimize or eliminate potential threats posed by human exposure to residual concentrations of contaminants in soil.
- Return groundwater to its beneficial use wherever practicable, within a reasonable timeframe based on site conditions.
- Prevent human exposure to contaminants of concern in the groundwater.

PROPOSED ACTIONS

The proposed actions for this site include:

- Implement institutional controls to prohibit use of groundwater and restrict access to subsurface soil within site boundaries.
- Implement monitored natural attenuation to monitor the progress of natural degradation processes.
- Provide future residents with a handbook describing potential remaining contamination and hazardous debris, institutional controls, and points of contact.
- Implement a proactive five-year, sub-slab soil vapor monitoring program to further ensure that changing site conditions have not negatively affected the soil vapor beneath the houses.

These actions will prevent current and future exposure to contaminated media and are consistent with remedial actions taken at other operational units (OU) on Fort Wainwright.

Metal debris removed during the 2008 investigation

SUMMARY OF ALTERNATIVES CONSIDERED

Alternative 1 (S1/GW1) – ***No Action***
No Action Alternative is required for consideration under the NCP and serves as a baseline against which other alternatives can be compared. Under the No Action Alternative, no activities would be undertaken to treat the remaining contamination or prevent exposure to the contamination. No monitoring would be conducted.

Alternative Soil 2 (S2) – ***Institutional Controls to Control the Disposition of Excavated Soil (Preferred Alternative)*** This alternative would ensure that soil removed from the site is properly handled and disposed of, and would restrict digging onsite. Institutional controls would be implemented to prevent human exposure to contaminated soil, control the transportation and removal of any soil from the FCS, prohibit any digging onsite without the permission of the U.S. Army Garrison, Fort Wainwright, and ensure that any displaced soil is handled and disposed of in a method agreed upon by both EPA and ADEC.

Alternative Groundwater 2 (GW2) – ***Monitored Natural Attenuation and Institutional Controls to Prohibit Groundwater Use (Preferred Alternative)*** Under Alternative GW2, institutional controls would be implemented to prevent human exposure to contaminants of concern in groundwater. In addition, groundwater monitoring and data evaluation would be performed periodically to monitor progress of natural attenuation and ensure that the contamination continues to pose no unacceptable risk to human health. Current information indicates that natural attenuation processes are already reducing contaminant concentrations in groundwater at the FCS.

Alternative Groundwater 3 (GW3) – ***In Situ Chemical Oxidation and Institutional Controls to Prohibit Groundwater Use*** - Under Alternative GW3, in situ chemical oxidation would be used to decrease concentrations of contamination, ultimately restoring groundwater use at the FCS. Institutional controls would be implemented until cleanup levels are met.

Alternative Groundwater 4 (GW4)* – ***Permeable Reactive Barrier, Monitored Natural Attenuation, and Institutional Controls to Prohibit Groundwater Use*** - Under Alternative GW4, a permeable reactive barrier would be put in place to purify the groundwater. This technology would not remove fuel-related contaminants or VOCs; therefore, institutional controls would be implemented until cleanup levels were met.

**Due to differences in the permeability of aquifer sediments and permeable reactive barrier (PRB) materials, it is unlikely that this technology would be effective. In addition, the barrier would need to be installed at least 20 feet below ground surface causing the installation to be highly intrusive and expensive. Therefore, this alternative was not evaluated further.*

COST ESTIMATES FOR ALTERNATIVES

	S1/GW1	S2	GW2	GW3
Estimated Capital Costs*	$0	$0	$100,000	$1,259,700
Estimated Annual Costs**	$0	$2,000 (30 years)	$17,100 (30 years)	$2,000 (3 years)
Estimated Present Value***	$0	$41,600	$456,000	$1,265,400

** Capital costs include one time costs such as construction and reporting.*
***Annual costs include operation and maintenance.*
****Present value is the estimated cost for the life of the action.*

In situ chemical oxidation
A remediation technique that involves injecting oxidizing chemicals into the ground. When the oxidizing chemicals come in contact with organic contamination, such as fuel, fuel constituents, and chlorinated solvents, they are broken down into harmless materials such as carbon dioxide, hydrogen, chloride, and water.

Institutional controls
Non-engineered methods, such as regulations, standard operating procedures, policies, and directives, which help minimize the potential for human exposure to contamination.

Natural attenuation
Relies on natural processes including a variety of physical, chemical, or biological processes that act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants. Monitored natural attenuation, (MNA) includes the periodic testing of groundwater to show that natural attenuation processes are effectively reducing contaminant concentrations.

Permeable reactive barrier
A passive remedial technology in which a wall of a permeable reactive media, such as iron filings or an iron/sand mixture, is installed across the flow path of the groundwater plume. The medium in the barrier reacts with select contaminants in the water to remove them.

EVALUATION CRITERIA

Evaluation criteria fall into three categories: Threshold Criteria, Balancing Criteria, and Modifying Criteria.

- Threshold Criteria must be met by each alternative to be considered for further evaluation.
- Balancing Criteria are used to compare the alternatives to each other.
- Modifying Criteria are considered after the public comment period is complete.

Threshold Criteria

Overall protection of human health and the environment: Will the alternative protect human health and plant and animal life in or near the area?

Compliance with applicable or relevant and appropriate requirements: Does the alternative meet all pertinent federal and more stringent state and local environmental statutes, regulations, and requirements?

Modifying Criteria

State acceptance: Do state environmental agencies agree with the recommendations? What are their preferences and concerns?

Community acceptance: What suggestions or modifications do residents of the community offer during the comment period? What are their preferences and concerns?

Balancing Criteria

Long-term effectiveness and permanence: How reliable will the alternative be for long-term protection of human health and the environment? Is the contamination likely to present a potential risk in the future?

Reduction of toxicity, mobility, and volume through treatment: Does the alternative incorporate treatment to reduce the harmful effects of the contaminants, their ability to spread, and the amount of contaminated material present?

Short-term effectiveness: How soon will risks be adequately reduced? What are the short-term hazards to workers, the community, or the environment that could occur during the cleanup process?

Implementability: Is the alternative technically and administratively feasible? Are the goods and services needed to implement the alternative readily available?

Cost: How much will each alternative cost to implement? Costs presented in this Proposed Plan include estimates of the capital cost and the present value of the long-term operation and maintenance of the alternative.

In addition to the above criteria, there is a requirement to use permanent solutions and treatment to the maximum extent practicable when selecting a final remedy.

In accordance with the CERCLA process, a Feasibility Study was conducted to evaluate the cleanup alternatives for remaining soil and groundwater contamination, and to determine the best way to open the site for residential use as outlined in the NCP. The full evaluation of the criteria is included in the Feasibility Study, available for review at the libraries listed on page 16.

Applicable, relevant, and appropriate requirements (ARAR) *- the cleanup standards, standards of control, and other major requirements, criteria, or limitations made by the federal environmental or state environmental facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those state standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be applicable.*

RANKING OF ALTERNATIVES

Criteria	Soil Alternatives		Groundwater Alternatives		
	S1	S2	GW1	GW2	GW3
Overall protection of human health and the environment*	No	Yes	No	Yes	Yes
Compliance with ARARs*	No	Yes	No	Yes	Yes
Long-term effectiveness and permanence	3	2	3	2	1
Reduction of toxicity, mobility, or volume through treatment	3	2	3	2	1
Short-term effectiveness	3	1	3	1	2
Implementability	1	2	1	2	3
Cost	1	2	1	2	3
Total *lowest total indicates highest ranking among each set of alternatives.*	**11**	**9**	**11**	**9**	**10**

** The remaining alternatives for soil and groundwater were ranked relative to one another based on seven of the nine CERCLA evaluation criteria. A summary of this ranking is provided in the table above. The first two criteria (overall protection of human health and compliance with ARARs) are threshold criteria and were not ranked numerically, instead, each alternative was determined to either meet or not meet these criteria. The No Action Alternatives (S1 and GW1) do not meet the threshold criteria. For each of the five Balancing Criteria, each alternative was assigned a value between 1 and 3, with 1 representing the most preferable and 3 representing the least preferable. The values for each alternative were then added to determine an overall ranking of alternatives. As shown in the table above, Alternative S2 is the highest-ranking alternative for soil and Alternative GW2 is the highest-ranking alternative for groundwater. The preferred alternative for the FCS is S2/GW2.*

PREFERRED ALTERNATIVES

Alternative Soil 2 (S2): Institutional Controls Contaminants with concentrations above the project cleanup levels remain in the soil in a few localized areas. This soil poses a potential risk if access is unrestricted and water passing through the soil is regularly consumed. This contamination is located between 5 and 15 feet below ground surface. Alternative S2 will use institutional controls to manage any digging, handling, and disposal of soil removed from the FCS. Institutional controls, in accordance with ADEC guidance, will prohibit soil-disturbing activities on the FCS without the permission of the Army, under the direction of the EPA and the ADEC. These restrictions would follow the Post-wide institutional controls already in place.

Alternative Groundwater 2 (GW2): Groundwater Monitoring/Institutional Controls Two plumes of contaminants remain in the groundwater above project cleanup levels. Alternative GW2 will use institutional controls to prohibit the use of groundwater wells at the site, and prevent residents and visitors from coming into contact with the groundwater until a time when the water is safe for human use. Groundwater monitoring and data evaluation will also be performed to monitor the progress of natural degradation processes and ensure that contaminants are not migrating to the Chena River. Select monitoring wells will be sampled periodically until RAOs are met or until the Remedial Project Managers determine that the groundwater plumes are stable. Sentry wells, which are located near existing drinking water sources, will also be monitored to ensure that groundwater contamination is not migrating toward Post drinking water supply wells.

EVALUATION OF ALTERNATIVES

1. Overall protection of human health and the environment Under Alternative S2, an Army policy implementing institutional controls would ensure that displaced FCS soil is handled and disposed of in a method and location approved by both EPA and ADEC. The institutional controls would also restrict residents from using onsite groundwater, thereby preventing exposure to contaminated groundwater. Under Alternative GW2, contamination would be left in place; however, contaminants in groundwater would naturally decrease over time, which would provide additional protection of human health and the environment. Groundwater monitoring would provide data regarding the degradation of contaminants and the migration of contaminants toward water bodies around the FCS. Alternative GW3 would provide protection to human health and the environment by actively treating groundwater contaminated with fuel and VOCs. Alternative GW3 would rely on the use of institutional controls to limit exposure to contaminants in groundwater until cleanup levels are met. Alternatives S1 and GW1 are not protective of human health and the environment. Because Alternatives S1 and GW1 do not meet threshold criteria, they will not be discussed further in this evaluation.

2. Compliance with Applicable or Relevant and Appropriate Requirements - ARARs identified for the FCS include State of Alaska Water Quality Standards, State of Alaska Drinking Water Standards, State of Alaska Oil and Other Hazardous Substances Pollution Control regulations, State of Alaska solid waste management regulations, and the Resource Conservation and Recovery Act (federal hazardous waste regulations). A list of all ARARs considered can be found in Appendix A of the Feasibility Study. Alternatives S2, GW2, and GW3 are expected to meet all state and federal ARARs. Alternative GW3 includes active groundwater remediation and is expected to achieve state and federal standards more quickly than GW2. Institutional controls to properly manage the transport and handling of soil removed from the FCS (S2) would comply with ARARs for soil management, and institutional controls on soil and groundwater (S2, GW2 and GW3) would comply with ARARs for protection of human health.

3. Long-term effectiveness and permanence – Alternative GW3 involves active treatment of contaminated groundwater, which provides long-term effectiveness and permanence. Alternatives S2, G2, and GW3 include institutional controls; institutional controls would provide protection of human health and the environment as long as they are monitored and enforced. For Alternatives S2 and GW2, potential threats associated with residual soil contamination and contaminants in groundwater are expected to decrease as contaminants naturally degrade over time. Groundwater monitoring would provide data to demonstrate the long-term effectiveness of the natural degradation process. Alternative GW3 would effectively treat groundwater contamination more quickly than GW2 but would still rely on institutional controls until cleanup levels are met.

4. Reduction of toxicity, mobility, and volume of contaminants through treatment – Alternative GW3 will reduce the toxicity, mobility, and volume of fuel-related and VOCs in groundwater through active treatment. Alternative GW2 would reduce the toxicity, mobility, and volume of contaminants through natural degradation processes. Alternative GW3 is expected to achieve cleanup goals more quickly than GW2. Contaminated soil at the FCS has already been removed to the greatest extent practicable; therefore, no soil treatment options are presented.

5. Short-term effectiveness – Alternatives S2, GW2, and GW3 would quickly provide short-term effectiveness because institutional controls limiting exposure to contaminated soil and groundwater are already in place, thereby minimizing exposure. GW3 would require installation of a treatment system, which might expose site workers to contaminated soil and groundwater, however, these risks would be minimized through engineering and institutional controls. Because GW3 would actively treat groundwater, it is expected that contaminant levels would be reduced more quickly than with Alternative GW2.

6. Implementability - Institutional controls required for S2, GW2, and GW3 are readily implementable as they are

already in place for the FCS. Because the Army owns the land and has unrestricted access to the property, they can easily monitor and enforce the institutional controls. Should ownership of these facilities be transferred to non-Department of Defense entities, the Army will ensure that all requirements established in the Record of Decision are included in any transfer document. Additionally, the transfer of the facility to other parties will not inhibit enacting the institutional controls. GW2 is readily implementable as the monitoring program for GW2 is already in place. Down-gradient and up-gradient groundwater monitoring wells are located throughout the FCS. If additional monitoring wells are deemed necessary, construction contractors and equipment will be readily available. Implementing a groundwater monitoring plan may interfere with future residential activities at the FCS. GW2 is less intrusive and less expensive than GW3. Implementation of GW3 is less feasible than GW2 because GW3 will require construction and operation of an active treatment system.

7. Cost – Estimated capital and annual costs for each alternative are provided in the table on page 12. At 30 years, the estimated present-worth cost for implementation of S2 is $41,000. The estimated present-worth cost for GW2 is $456,000, and the estimated cost for GW3 is $1,265,400.

8. State/Support Agency acceptance - This criterion will be fully considered after the public comment period.

9. Community acceptance - This criterion will be fully considered after the public comment period.

Based on information currently available, the U.S. Army believes the preferred alternatives meet the threshold criteria and provide the best balance of trade-offs among the other alternatives with respect to the balancing and modifying criteria. The Army expects the preferred alternatives to satisfy the following statutory requirements of CERCLA: (1) be protective of human health and the environment; (2) comply with ARARs; (3) be cost effective; (4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and (5) satisfy the preference for treatment as a principal element or explain why it is not.

5-YEAR SOIL VAPOR MONITORING PLAN

In addition to the preferred alternatives, a sub-slab soil vapor monitoring plan will be proactively implemented to ensure that changing site conditions do not negatively affect the soil vapor beneath the duplexes or the findings of the Risk Assessment. The plan will begin after the Record of Decision is signed. The Army will meet with the EPA and the ADEC after each monitoring event to review the data collected and determine if a different course of action is required. The plan will include alternating sampling of all units and twelve selected units. All samples will be analyzed for VOCs. A timeline of the proposed monitoring plan is provided below. The duplexes proposed for continued soil vapor monitoring were selected based on their location relative to known groundwater plumes, and from previous sampling results greater than the project screening levels but less than applicable cleanup levels. Should sub-slab vapor become a concern, there are readily available technologies that could be implemented to reduce the potential for vapor intrusion.

Soil vapor monitoring
A sampling method by which underground contamination can be identified, and the source, extent, and movement of the pollutants can be traced.

Sampling Timeline		
Scheduled year	Planned sampling events	To be sampled
Year 1	1st sampling event	All houses
	2nd sampling event	12 houses
	3rd sampling event	12 houses
	4th sampling event	12 houses
Year 2	1st sampling event	12 houses
	2nd sampling event	12 houses
	3rd sampling event	12 houses
	4th sampling event	12 houses
Year 3	1 sampling event	All houses
Year 4	1 sampling event	12 houses
Year 5	1 sampling event	TBD

Groundwater sampling at the FCS

PUBLIC PARTICIPATION

You are encouraged to participate in the selection of the remedial action for the FCS by commenting on the cleanup alternatives presented in this Proposed Plan during the public comment period, from 14 January 2013 through 12 February 2013. Your comments can make a difference in the remedy selection. The Army will not select a final course of action until all public comments received during the public comment period have been reviewed and considered. You may present your comments in writing, submit a voice mail message at 1-877-243-6974, or through an email sent to FCS-comments@jacobs.com. Comments are also welcome in person at the public meeting. A pre-addressed comment form is provided in this Proposed Plan for your written comments.

A public meeting will be held at the Fairbanks Princess Hotel, 4477 Pikes Landing Road, Fairbanks, Alaska, on 15 January 2013 from 7:00 - 10:00 p.m., with doors opening at 6 p.m., to discuss the proposed actions for the Fort Wainwright FCS, and to answer questions, address concerns, and receive public comments. The Army will prepare written responses to all significant comments received regarding this Proposed Plan.

Based on public comments, the actual remedy selected for the FCS may be the preferred alternative, a modification to the preferred alternative, or a combination of alternatives. A summary of these responses will accompany the Record of Decision, which will be made available at the libraries listed in the blue box in the right hand column of this page.

GLOSSARY

In addition to those definitions provided throughout the pages of this Proposed Plan, terms used in this document are defined below.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

The federal law that governs hazardous waste sites, CERCLA provides liability for the responsible parties for the release of waste, and sponsors cleanups for sites that do not have an identified responsible party.

Heavy Metals

Heavy metals, also known as Resource Conservation and Recovery Act (RCRA) metals, include arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. RCRA is the federal law that gives EPA the authority to control hazardous waste (including anything corrosive, toxic, ignitable, or reactable) through all processing, from generation to disposal.

Remedial Project Managers

The Army, EPA, and ADEC officials responsible for the oversight and decisions relating to the remedial action on a CERCLA site.

References used to generate this Proposed Plan include:

Remedial Investigation, FWA 102 Former Communications Site, Fort Wainwright, Alaska, Final, December 2010

Feasibility Study, Former Communications Site, Fort Wainwright, Alaska, Final, July 2011

These reports and other information regarding this site are available for public review at the following libraries:

Noel Wien Library
1214 Cowles Street, Fairbanks

Fort Wainwright Post Library
Bldg. 3700, Ft. Wainwright

Directorate of Public Works
CERCLA Library
Bldg. 3023, Ft. Wainwright

For assistance locating documents or if you have questions, contact:

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For questions regarding EPA or ADEC regulations:

Jacques Gusmano
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Federal Building, Room #537
222 W. 7th Avenue, #19
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Gusmano.Jacques@epamail.epa.gov
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Complete information regarding ADEC cleanup criteria can be found in the Alaska Administrative Code (AAC) Title 18, Chapter 75, Oil and Other Hazardous Substances Pollution Control, Article 3, Discharge Reporting, Cleanup, and Disposal of Oil and Other Hazardous Substances, commonly referred to as 18 AAC 75.

COMMENTS ON FCS PROPOSED PLAN

Your input on the remedial alternative discussed in this Proposed Plan is important to the U.S. Army Garrison, Fort Wainwright, Alaska. Comments provided by the public are valuable in helping us select a remedy. Use the space below to prepare your comments. When you are finished, please fold and mail. A return address has been provided on the back of this page for your convenience. Comments must be postmarked by 12 February 2013.

Alternately, if you would prefer to leave your comments by telephone, please call 1-877-243-6974 and leave a voice mail message. You may also email your comments to FCS-comments@jacobs.com. You may leave an anonymous message, or you can provide contact information if you prefer to receive a response.

If you have questions about the comment process, please contact Joe Malen at (907) 361-4512.

	Name:	
	Address:	
	City/State:	
	Zip Code:	Phone:

Comments on Proposed Plan for Former Communications Site Fort Wainwright, Alaska

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