ATTACHMENT 2

Documents Reviewed

[This page intentionally left blank]

DOCUMENTS REVIEWED

ABR, Inc. and CH2M HILL 2003. *2002 Sediment Quality Monitoring Program, Chena River Aquatic Assessment Fort Wainwright, Alaska*. April

Alaska Department of Environmental Conservation (ADEC) 1997. *Memorandum of Understanding Regarding Groundwater Sampling at the Fort Wainwright Landfill*. August 22

ADEC 2012. *Vapor Intrusion Guidance for Contaminated Sites*. Division of Spill Prevention and Response, Contaminated Sites Program

ADEC 2014. *18 AAC75, Oil and Other Hazardous Substances Pollution Control*. October

CH2M HILL 2002. *2002 Sediment Quality Monitoring Program, Chena River Aquatic Assessment, Fort Wainwright, Alaska.*

CH2M HILL 2003a. *CLOSES Evaluation Coal Storage Yard Fort Wainwright, Alaska.* Prepared for U.S. Army, Directorate of Public Works. May

CH2M HILL 2003b. *CLOSES Evaluation Building 1168*. Fort Wainwright, Alaska. August

CH2M HILL 2004a. *Documentation of Operable Unit 3 FEFLOW Model Fort Wainwright, Alaska*. February

CH2M HILL 2004b. *CLOSES Evaluation DRMO Yard Fort Wainwright, Alaska*. March

CH2M HILL 2004c. *CLOSES Evaluation 801 Drum Burial Site Fort Wainwright, Alaska*. April

CH2M HILL 2004d. *Birch Hill Conceptual Model Evaluation Fort Wainwright, Alaska*. April

CH2M HILL 2004e. *CLOSES Evaluation North Post Fort Wainwright, Alaska*. June

CH2M HILL 2004f. *CLOSES Evaluation Milepost 2.7 Fort Wainwright, Alaska*. June

CH2M HILL 2010a. *July 2012 Soil Gas and Ambient Air Sampling Results and Evaluation, Former Communications Site (Taku Gardens)*. September 25

CH2M HILL 2010b. *Remedial Investigation, 102 Former Communications Site*. December

CH2M HILL 2010c. *Remedial Investigation FWA 102 Former Communications Site, Fort Wainwright, Alaska.* December

CH2M HILL 2011. *Feasibility Study Former Communications Site Fort Wainwright, Alaska.* May

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

DoD 2014. *Memorandum regarding Five-Year Review Procedures – Update to DoD Manual (DoDM) 4715.20, "Defense Environmental Restoration Program (DERP) Management"*. March 9

Ecology and Environment, Inc. (E&E) 1994a. *Remedial Investigation Report Operable Unit 4 Fort Wainwright, Alaska.* Prepared for U.S. Army Corps of Engineers Alaska District and U.S. Department of Army. August

E&E 1994b. *Final Risk Assessment Report Operable Unit 4 Fort Wainwright, Alaska.* Prepared for U.S. Army Corps of Engineers Alaska District and U.S. Department of Army. August

E&E 1994c. *Remedial Investigation Report Operable Unit 3 Fort Wainwright, Alaska*. September

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

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

E&E 1995b. *Remedial Investigation Report Operable Unit 4 Fort Wainwright, Alaska*. August

E&E 1995c. *Final Risk Assessment Report Operable Unit 4 Fort Wainwright, Alaska*. August

E&E 1995d. *Feasibility Study Report Operable Unit 4 Fort Wainwright, Alaska, Final Report.* November

ENSR 1996. *Remedial Investigation Report Operable Unit 1 Fort Wainwright, Alaska*. September

ENSR 1997. *Feasibility Study Operable Unit 1 Fort Wainwright, Alaska*. February

ENSR 2000. *Operations, Maintenance, and Monitoring Manual 801 Drum Burial Site Operable Unit 1 Fort Wainwright, Alaska*.

Fairbanks Environmental Services, Inc. (FES) 2011a. *2010 Assessment Report, Underground Injection Control Assessment of Leach Field Soils and Groundwater at the Golf Couse Maintenance Facility, Ski Hill Maintenance Facility, and Landfill CAT Shed, Fort Wainwright, Alaska.* March

FES 2011b. *2010 Monitoring Report Groundwater Monitoring 801 Drum Burial Site Operable Unit 1. ADEC File No. 108.38.068.08 Fort Wainwright, Alaska*. March

FES 2011c. *Decommissioning of Operable Unit 5 Treatment Systems – WQFS Source Area and Horizontal Well Operable Unit 5 Fort Wainwright, Alaska*. October

FES 2012a. *Monitoring Well Survey and GIS Update for U.S. Army Garrison – Fort Wainwright.* February

FES 2012b. *2012 Work Plan Addendum, Decommissioning of the AS/SVE Treatment Systems, OU 3, Draft.* April

FES 2012c. *2011 Monitoring Report Operable Unit 2 Fort Wainwright, Alaska*. May

FES 2012d. *2011 Monitoring Report Operable Unit 5 Fort Wainwright, Alaska*. May

FES 2012e. *2011 Monitoring Well Decommissioning Technical Memorandum, Operable Unit 3, Operable Unit 5 and Two Party Sites.* July

FES 2013a. *2012 Monitoring Report Neely Road Building 3570, Former PX Gas Station, FTWW-101, ADEC File No. 108.38.078 (3570) Fort Wainwright, Alaska*. March

FES 2013b. *Technical Memorandum Decommissioning of Operable Unit 3 Treatment Systems Fort Wainwright, Alaska*. March

FES 2013c. *2012 Monitoring Report Former Buildings 2111 and 2112 Fort Wainwright, Alaska*. April

FES 2013d. *2012 Monitoring Report Operable Unit 2 Fort Wainwright, Alaska*. April

FES 2013e. *2012 Monitoring Report Operable Unit 5 Fort Wainwright, Alaska*. April

FES 2013f. *2012 Monitoring Report Operable Unit 3 Fort Wainwright, Alaska*. May

FES 2013g. *2012 Annual Sampling Report, Groundwater Monitoring and Data Analysis at the Landfill Source Area, Operable Unit 4 Fort Wainwright, Alaska.* June

FES 2013h. *2012 Annual Institutional Controls Report Fort Wainwright, Alaska.* September

FES 2013i. *Technical Memorandum Supplemental Chemical Oxidation Injection at OU5 WQFS Operable Unit 5 Fort Wainwright, Alaska*. October

FES 2013j. *2012 Sampling Report Two-Party Sites Former Building 3564, North Post, Vehicle Wash Rack/FARP, and Building 2077 Fort Wainwright, Alaska*. November

FES 2014a. *2013 Monitoring Report Former Buildings 2111 and 2112 Fort Wainwright, Alaska*. April

FES 2014b. *2013 Monitoring Report Neely Road Building 3570, Former PX Gas Station, FTWW-101, ADEC File No. 108.38.078 (3570) Fort Wainwright, Alaska*. May

FES 2014c. *Final 2013 Sampling Report Two-Party Sites. Former Building 3564 and Former Buildings 2062/2063 Fort Wainwright, Alaska*. May

FES 2014d. *2013 Monitoring Report Operable Unit 2 Fort Wainwright, Alaska*. June

FES 2014e. *2013 Monitoring Report Operable Unit 5 Fort Wainwright, Alaska*. July

FES 2014f. *2014 Work Plan, Operable Unit Sites Fort Wainwright, Alaska.* October

FES 2014g. *2013 Annual Sampling Report, Groundwater Monitoring and Source Data Analysis at the Landfill Source Area, Operable Unit 4 Fort Wainwright, Alaska.* December

FES 2014h. *2013 Monitoring Report Operable Unit 3 Fort Wainwright, Alaska*. December

FES 2015a. *Final 2013 Annual Institutional Controls Report Fort Wainwright, Alaska.* February

FES 2015b. *Federal Facilities Agreement Meeting OU1, OU2, OU3, OU4, OU5 and 2-Party Sites.* February

FES. 2015d. *2014 Monitoring Report Former Buildings 2111 and 2112 Fort Wainwright, Alaska*. May

FES 2015e. *2014 Annual Institutional Controls Report Fort Wainwright, Alaska, Preliminary Draft.* June

FES 2015f. *2014 Sampling Report Two-Party Site Former Building 3564 Fort Wainwright, Alaska, Draft*. June

FES 2015g. *2014 Monitoring Report Neely Road Building 3570, Former PX Gas Station, FTWW-101, ADEC File No. 108.38.078 (3570) Fort Wainwright, Alaska, Draft*. July

FES 2015h. *Final 2014 Annual Sampling Report Groundwater Monitoring and Data Analysis at the Landfill Source Area Operable Unit 4 Fort Wainwright, Alaska.* October

FES 2015i. *Final 2014 Monitoring Report Operable Unit 2 Fort Wainwright, Alaska*. October

FES 2015j. *Final 2014 Monitoring Report Operable Unit 5 Fort Wainwright, Alaska*. October

FES 2016a. *Final 2014 Monitoring Report Operable Unit 3 Fort Wainwright, Alaska*. February

FES 2016b. *2015 Monitoring Report Operable Unit 3 Fort Wainwright, Alaska, Preliminary Draft.* April

FES 2016c. *2015 Annual Institutional Controls Report for Operable Unit 6 Former Communications Site Fort Wainwright, Alaska, Draft.* June

FES 2016d. *Final 2015 Monitoring Report Operable Unit 2 Fort Wainwright, Alaska*. June

FES 2016e. *Final 2015 Monitoring Report Operable Unit 1 Fort Wainwright, Alaska*. July

FES 2016f. *Final 2015 Monitoring Report Operable Unit 5 Fort Wainwright, Alaska*. August

Harding Lawson Associates (HLA) 1996. *Operable Unit 5 Remedial Investigation Report Fort Wainwright, Alaska*. November

HLA 1997a. *Addendum to Operable Unit 5 Remedial Investigation Report Fort Wainwright, Alaska*. June

HLA 1997b. *Postwide Risk Assessment Fort Wainwright, Alaska*. December

Jacobs Engineering Group Inc. (Jacobs) 2011. *Final Revision 1, 2007/2008/2009 Former Communications Site, Drum and Debris and PCB Investigation Report.* January

Jacobs 2012a. *2010 Former Communications Site, Groundwater Monitoring Report, Final.* February.

Jacobs 2012b. *2010 Building 1572 After-Action Report.* February

Jacobs 2012c. *Technical Memorandum Final 2010 Building 1572 After-Action Report.* February

Jacobs 2012d. Former *Communications Site, 2011 Construction Support, After-Action Report.* July

Jacobs 2012e. *Former Communications Site, 2011 Groundwater Monitoring Report, Final.* July

Jacobs 2012f. *2012 Former Communications Site, Action Memorandum.* December

Jacobs 2013. *Former Communications Site, 2012 Groundwater Monitoring Data Report, Final.* April

Jacobs 2014a. *Record of Decision, Operable Unit 6, Former Communications Site, Fort Wainwright, Alaska.* January

Jacobs 2014a. *Former Communications Site, 2013 Activities and Groundwater Monitoring Data Report, Draft.* May

Jacobs 2014b. *OU6, Former Communications Site, Vapor Intrusion Study Spring Sampling event, After-Action Report, Final.* September

Jacobs 2014c. *OU6, Former Communications Site, Vapor Intrusion Study Summer Sampling Event, Year 1, Second Quarter, After-Action Report, Draft.* December

Jacobs 2015. *OU 6, Former Communications Site, Vapor Intrusion Study Winter Sampling Event, (Year One, Fourth Quarter), After Action Report, Pre-Draft.* March

Marsh Creek LLC and Weston Solutions, Inc. (Marsh Creek) 2015a. *Draft Work Plan Addendum Soil Removal Action Fort Wainwright Various Sites Environmental Investigations Fort Wainwright, Alaska*. August

Marsh Creek LLC 2015b. *Final Work Plan Environmental Investigations Various Sites Fort Wainwright, Alaska*. October

OASIS Environmental, Inc (OASIS) 2007. *Preliminary Source Evaluation 1, Narrative Report, Former Communication Site, Fort Wainwright, Alaska, Interim Final Revision 1*. April

Swaim Enterprises, Inc. and FES 2005. *Milepost 2.7 and 3.0 Treatment Cell Decommissioning Report Operable Unit 3 Fort Wainwright, Alaska*. September

U.S. Army Corps of Engineers (USACE) 2013. *EM 200-1-16 Environmental Statistics*. May 31

USACE 2015. *OU 6, Former Communications Site, Remedial Design/Remedial Action Work Plan, Final.* May

U.S. Army No date. *Decision Document for Fire Training Pits, Operable Unit 4.*

U.S. Army 1996a. *Record of Decision for Operable Unit 4 Fort Wainwright, Fairbanks, Alaska*. August

U.S. Army 1996b. *Record of Decision for Operable Unit 3 Fort Wainwright Fairbanks, Alaska.* January

U.S. Army 1997a. *Record of Decision for Operable Unit 2 Fort Wainwright, Fairbanks, Alaska*. January

U.S. Army 1997b. *Record of Decision for Operable Unit 1 Fort Wainwright, Fairbanks, Alaska*. June

U.S. Army 1998. *Final Operable Unit 5 Feasibility Study Fort Wainwright, Alaska*. June

U.S. Army 1999. *Record of Decision for Operable Unit 5 Fort Wainwright, Fairbanks, Alaska*. May

U.S. Army 2001. *First Five Year Review Report Fort Wainwright, Alaska*. Prepared for U.S. Army Alaska Directorate of Public Works. September

U.S. Army 2002. *Explanation of Significant Differences Operable Unit 3 Fort Wainwright, Alaska*. September

U.S. Army 2006. *Second Five-Year Review Report for Fort Wainwright, Alaska.* Prepared for U.S. Army Alaska Directorate of Public Works. September

U.S. Army 2007. *Action Memorandum for a Department of Army Time-Critical Removal Action at the Communications Site (a/k/a Taku Gardens Housing Expansion Area), and Imposition and Maintenance of Interim Land Use Controls.* Fort Wainwright National Priorities List (NPL), Federal Facility Site, Fort Wainwright, Alaska. November 19

U.S. Army 2011. *Third Five-Year Review Report for US Army Garrison Fort Wainwright, Alaska.* September

U.S. Army 2016. *Response to Letter from the Environmental Protection Agency to the Army Regarding Operable Unit 5 Open Burn/Open Detonation, dated March 29, 2016*. May 11

U.S. Army Engineer Research and Development Center (ERDC) and Cold Regions Research and Engineering Laboratory (CRREL) 2015. *Safety Clearance Survey to Support the Evaluation of the Proposed Staging Area for the Tanana River Burial Pit Removal Action, Summary Report.* June

U.S. Environmental Protection Agency (USEPA) 1990. *National Oil and Hazardous Substances Pollution Contingency Plan, Final Rule, FR Vol. 55, No. 46, March 8, 1990*, available from U.S. Government Printing Office, Washington, D.C.

USEPA 1997a. *Military Munitions Rule: Hazardous Waste Identification and Management; Explosives Emergencies; Manifest Exemption for Transport of Hazardous Waste on Right-of-Ways on Contiguous Properties, Final Rule, FR Vol. 62, No. 29, February 12, 1997,* available from the U.S. Government Printing Office, Washington, D.C.

USEPA 1997b. *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments. Interim Final*. USEPA 540-R-97-006.

USEPA 1998. *Guidelines for Ecological Risk Assessment*. USEPA/630/R-95/002Fa. U.S. Environmental Protection Agency.

USEPA 1999. *Microbial Processes Affecting Monitored Natural Attenuation of Contaminants in the Subsurface.* USEPA 540-S-99-001. September

USEPA 2001. *Comprehensive Five-Year Review Guidance*. USEPA 540-R-01-007, June

USEPA, 2003a. *Guidance for Developing Ecological Soil Screening Levels (Eco-SSL)* OSWER Directive 92857-55, November 2003. Eco-SSL last updated October 2010 http://www.epa.gov/ecotox/ecossl/

USEPA 2003b. *Human Health Toxicity Values in Superfund Risk Assessments*. OSWER Directive 9285.7-53. December.

USEPA 2004. R*isk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), Final,* EPA/540/R/99/005, OSWER 9285.7-02EP, Office of Solid Waste and Emergency Response, Washington, DC (including 2007 updates on-line); http://www.epa.gov/oswer/riskassessment/ragse/index.htm

USEPA 2005. *Ecological Soil Screening Levels for Lead Interim Final* OSWER Directive 9285.7-70.

USEPA 2009a. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment), EPA-540-R-070-002 (January), http://www.epa.gov/oswer/riskassessment/ragsf/

USEPA 2009b. Update of the Adult Lead Methodology's Default Baseline Blood Lead concentration and Geometric Standard Deviation Parameters. Office of Superfund Remediation and Technology Innovation. June. http://www.epa.gov/superfund/health/contaminants/lead/products/almupdate.pdf

USEPA 2010. *Toxicological Review of cis-1,2-dichloroethylene CAS No. 156-59-2. In Support of Summary Information on the Integrated Risk Information System*. USEPA/635/R-09/006F September

USEPA 2011. *Toxicological Review of Trichloroethylene CAS No. 79-01-6. In Support of Summary Information on the Integrated Risk Information System* EPA/635/R-09/011F September

USEPA 2012. Memorandum; *Clarifying the Use of Protectiveness Determinations for Comprehensive Environmental Response, Compensation, and Liability Act Five-Year Reviews*, OSWER 9200.2-111. September 13

USEPA 2013. *Hazardous Waste Management Facility Permit, U.S. Army Fort Wainwright, EPA ID No. AK6 21002 2426.* September 30

USEPA 2014a. *Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors*. OSWER Directive 9200.1-120. http://www.epa.gov/oswer/riskassessment/pdf/superfund-hh-exposure/OSWER-Directive-9200-1-120-ExposureFactors.pdf

USEPA 2014b. *OSWER Vapor Intrusion Assessment VISL Calculator Version 3.3.1*, May 2014

USEPA 2014c. *Recommended approach for Evaluating Completion of Groundwater Restoration Remedial Actions at a Groundwater Monitoring Well.* Office of Solid Waste and Emergency Response (OSWER) 9283.1-44. August

USEPA 2015a. *OSWER Technical Guidance for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air*. OSWER Publication 9200.2-154. June

USEPA 2015b. Regional Screening Levels (RSL) Summary Table, June 2015 (table last updated); available via EPA Region web sites, e.g., http://www.epa.gov/reg3hwmd/risk/human/rbconcentration_table/Generic_Tables/index.htm

USEPA 2015c. Integrated Risk Information System (IRIS), National Center for Environmental Assessments. http://www.epa.gov/iris/

USEPA Region X. 2012. Office of Environmental Assessment Recommendations Regarding TCE Toxicity in Human Health Assessments. December

USEPA, Alaska Department of Environmental Conservation, and United States Department of Defense 2007. *Amendment to Federal Facility Agreement Under CERCLA Section 120 Administrative Docket Number: 1092-04-10-120*. February

USEPA, Region 10 and U.S. Army Garrison, Fort Wainwright Alaska 2011. *Consent Agreement and Final Order, Docket No. SDWA 10-2011-0134*. September 14

[This page intentionally left blank]

ATTACHMENT 3

Decision Document Summaries

[This page intentionally left blank]

Table A3-1 Decision Document Summary
Component: Background/Basis for Taking Action
Operable Unit 1 - 801-Drum Burial Site

Decision Document Title:	Record of Decision for Operable Unit 1 fort Wainwright Fairbanks, Alaska, June 1997
Regulatory Framework:	CERCLA NPL
Remedy Chosen:	Alternative 4 - Drum Removal and Disposal, and Natural Attenuation of Groundwater with Long-Term Groundwater Monitoring/Evaluation with Institutional Controls with a Contingency for Soil Vapor Extraction and Air Sparging to Treat Soil and Groundwater. (Page 7-1)
Media of Concern:	Groundwater and soil
Contaminants of Concern (COCs):	Groundwater: 1,1-dichloroethene (DCE), benzene, vinyl chloride, aldrin, dieldrin, and diesel range organics (DRO) Soil: Aldrin, dieldrin, and DRO
Land Use:	Current: Recreational Future: Recreational
Receptors:	Army personnel (residential), small mammals (e.g., shrews and voles)
Exposure Pathway:	Inhalation, ingestion, dermal contact
Ecological Risk:	• Potential ecological risks may result from exposure of terrestrial wildlife to chemicals of potential ecological concern found in the surface soils at the 801 Drum Burial Site. • Potential ecological risk may result from exposure of aquatic organisms to chemicals of potential ecological concern found in surface water and sediment.

[This page intentionally left blank]

Table A3-2 Decision Document Summary
Component: Remedial Action
Operable Unit 1 - 801 Drum Burial Site

Decision Document Title:	Record of Decision for Operable Unit 1 fort Wainwright Fairbanks, Alaska, June 1997
Remedy Chosen:	Alternative 4 - Drum Removal and Disposal, and Natural Attenuation of Groundwater with Long-Term Groundwater Monitoring/Evaluation with Institutional Controls with a Contingency for Soil Vapor Extraction and Air Sparging to Treat Soil and Groundwater. (Page 7-1)
Remedial Action Objectives (RAOs):	Groundwater: • Ensure that groundwater quality at the 801 Drum Burial Site meets Federal and state standards • Minimize potential migration of contaminated groundwater to the Chena River and downgradient drinking water wells • Establish and maintain institutional controls (ICs) to ensure that the groundwater will not be used until Federal and state maximum contaminant levels (MCLs) are attained, except for activities undertaken to initiate the selected remedies Soil: • Prevent further leaching of contaminants from soil to groundwater • Reduce risks associated with exposure to contaminated soil and drums • Prevent migration of soil contaminants to groundwater which could result in groundwater contamination and exceedances of federal MCLs and Alaska Water Quality Standards (AWQS) (18 Alaska Administrative Code [AAC] 70)
Clean-Up Goals:	Groundwater: Five contaminants of concern (COCs) were established for groundwater in the ROD: aldrin, dieldrin, 1,1-DCE, benzene, and vinyl chloride. When available, federal and State of Alaska drinking water MCLs were adopted as the groundwater cleanup goals. At the time of the Record of Decision (ROD), MCLs were available and used for 1,1-DCE, benzene, and vinyl chloride. There were no MCLs for aldrin or dieldrin and the cleanup levels for these COCs were risk-based concentrations equivalent to an excess lifetime cancer risks of $1x10^{-6}$ for residential exposure scenarios. Since the ROD was finalized, groundwater cleanup levels for aldrin and dieldrin have been instituted. The MCLs for 1,1-DCE, benzene, and vinyl chloride have not changed, but the new MCLs for aldrin and dieldrin (18AAC Table C) are an order of magnitude higher than the risk-based levels adopted in the ROD. In addition, the USEPA has requested that cis-1,2-DCE be added to the list of compounds to track at the site. Soil: Two COCs were established for soils in the ROD; aldrin and dieldrin. Since there were no cleanup levels for either contaminant at the time of the ROD, soil cleanup goals were established based on calculated excess lifetime cancer risks

Table A3-2 Decision Document Summary
Component: Remedial Action
Operable Unit 1 - 801 Drum Burial Site

	of $1x10^{-4}$ for a residential exposure scenario. Since the ROD was finalized, soil cleanup levels for aldrin and dieldrin have been established. The new cleanup levels for aldrin and dieldrin are lower than the risk-based levels adopted in the ROD.
Applicable or Relevant and Appropriate Requirements:	• Federal and State of Alaska MCLs - relevant and appropriate for groundwater • National Contingency Plan (NCP) off-site disposal rules - applicable for disposal of drums and contaminated soil
Components of the Remedy:	• Source Removal: Locate potential buried drums and, if found, remove and dispose the drums and contaminated soils, while restricting access to the source area during this work • Monitored natural attenuation (MNA)/Long-term monitoring: Natural attenuation of groundwater with long-term monitoring/evaluation • Air Sparging/Soil Vapor Extraction (AS/SVE): install and operate an AS/SVE system to treat volatile organic compounds (VOCs); to be implemented if the plume shows an increasing trend over any three consecutive sampling events, or if designated monitoring points indicate the plume is migrating. • ICs: Establish and maintain ICs to ensure that the groundwater will not be used until Federal and state MCLs are attained, except for activities undertaken to initiate the selected remedies. Included are restrictions on site access, well installation and development as long as hazardous substances remain on site that preclude unrestricted use.

Table A3-3 Decision Document Summary
Component: Background/Basis for Taking Action
Operable Unit 2 - Former Building 1168 Leach Well

Decision Document Title:	Record of Decision for Operable Unit 2 Fort Wainwright Fairbanks, Alaska, January 1997
Regulatory Framework:	CERCLA NPL
Remedy Chosen:	Alternative 3: Soil Vapor Extraction, Groundwater Air Sparging, and Monitoring
Media of Concern:	Groundwater
Contaminants of Concern (COCs):	Groundwater: Benzene, trichloroethene (TCE), Tetrachloroethene (PCE), vinyl chloride, 1,1-DCE, and cis-1,2 DCE
Land Use:	Current: industrial; residential for groundwater Future: industrial; residential for groundwater
Receptors:	Army personnel (residential)
Exposure Pathway:	Groundwater ingestion, dermal contact, inhalation of VOCs
Ecological Risk:	None

[This page intentionally left blank]

Table A3-4 Decision Document Summary
Component: Remedial Action
Operable Unit 2 - Former Building 1168 Leach Well

Decision Document Title:	Record of Decision for Operable Unit 2 Fort Wainwright Fairbanks, Alaska, January 1997
Remedy Chosen:	Alternative 3: Soil Vapor Extraction, Groundwater Air Sparging, and Monitoring
Remedial Action Objectives (RAOs):	The goal of the remedial action is to restore groundwater to its beneficial use as a drinking water aquifer and to remediate soil to State of Alaska clean-up levels for non- underground storage tank (UST) petroleum contaminated soil. Groundwater: • Restore groundwater to its beneficial use of drinking water quality within a reasonable time frame through source control • Reduce or prevent further migration of contaminated groundwater from the source areas • Prevent the use of groundwater containing contaminants at levels above Safe Drinking Water Act (SDWA) and AWQS • Using natural attenuation to attain AWQS (18 AAC 70) after reaching state and Federal MCLs Soil: • Prevent the migration of soil contaminants to groundwater, which could result in groundwater contamination and exceedances of state and Federal MCLs and AWQS (18 AAC 70). The ROD stated *"because soils contaminated with VOCs and petroleum-related compounds are acting as a continuing source of contamination to groundwater, the remedial action goal for in-situ soils is active remediation until contamination levels in groundwater are consistently below state and federal MCLs."*
Clean-Up Goals:	Clean-up goals were based on Federal and state ARARs. Groundwater: Federal and State of Alaska drinking water MCLs for benzene, TCE, PCE, vinyl chloride, 1,1-DCE, and cis-1,2-DCE at the former Building 1168 Leach Well source area Soil: The ROD stated that *"because soils contaminated with VOCs and petroleum-related compounds are acting as a continuing source of contamination to groundwater, the remedial action goal for in-situ soils is active remediation until contamination levels in groundwater are consistently below state and federal MCLs."* The State of Alaska cleanup levels for non-UST petroleum contaminated soil were considered as a guideline for the treatment of in-situ soils at the former Building 1168 Leach Well source area. Table 7-2 of the ROD adopted Alaska Department of Environmental Conservation (ADEC) soil cleanup matrix Level A cleanup goals for DRO, gasoline range organics (GRO), benzene, and total benzene, toluene, ethylbenzene, and xylenes at this source area.

Table A3-4 Decision Document Summary
Component: Remedial Action
Operable Unit 2 - Former Building 1168 Leach Well

Applicable or Relevant and Appropriate Requirements:	• State and Federal MCLs – relevant and appropriate for groundwater • Alaska Water Quality Standards – applicable • Alaska Oil Pollution Regulations – applicable • Alaska Guidelines for Non-UST Petroleum Contaminated Soil – to be considered
Components of the Remedy:	SVE/AS: • In-situ treatment of groundwater by AS to remove VOCs, thereby attaining state and Federal drinking water standards • In-situ treatment of soil by SVE to prevent contaminated soil from acting as an ongoing source of contamination to groundwater • Treatment system evaluation and modification as necessary to optimize effectiveness • Periodic monitoring and evaluation of air emissions from the SVE/AS system to meet air emission requirements • Periodic groundwater monitoring and off-gas measurements to determine attainment of RAOs MNA/long-term monitoring: Achieve the AWQS through natural attenuation after active treatment attains state and Federal MCLs ICs: Restrict site access and restrict well installation and development activities as long as hazardous substances remain on site at levels that preclude unrestricted use

Table A3-5 Decision Document Summary
Component: Background/Basis for Taking Action
Operable Unit 2 - DRMO Yard

Decision Document Title:	Record of Decision for Operable Unit 2 Fort Wainwright Fairbanks, Alaska, January 1997
Regulatory Framework:	CERCLA NPL
Remedy Chosen:	Alternative 3: Soil Vapor Extraction, Groundwater Air Sparging, and Monitoring.
Media of Concern:	Groundwater
Contaminants of Concern (COCs):	Groundwater: Benzene, tetrachloroethene (PCE), TCE, vinyl chloride, 1,1-DCE, and cis-1,2-DCE
Land Use:	Current: industrial; residential for groundwater Future: industrial; residential for groundwater
Receptors:	Army personnel (residential)
Exposure Pathway:	Groundwater ingestion, dermal contact, inhalation of VOCs
Ecological Risk:	The results of the Ecological Risk Assessment for OU-2 indicate a potential for adverse effects to small terrestrial mammals (e.g., voles) at the DRMO Yard, reflecting ecologically significant concentrations of manganese and lead. These risks are associated with ingestion of soil and vegetation. These contaminants do not appear to be associated with historical source area activities and are consistent with regional background concentrations. Overall, there do not appear to be unacceptable potential ecological risks associated with the DRMO Yard source area.

[This page intentionally left blank]

Table A3-6 Decision Document Summary
Component: Remedial Action
Operable Unit 2 - DRMO Yard

Decision Document Title:	Record of Decision for Operable Unit 2 Fort Wainwright Fairbanks, Alaska, January 1997
Remedy Chosen:	Alternative 3: Soil Vapor Extraction, Groundwater Air Sparging, and Monitoring.
Remedial Action Objectives (RAOs):	The goal of the remedial action is to restore groundwater to its beneficial use as a drinking water aquifer and to remediate soil to State of Alaska cleanup levels for non-UST petroleum contaminated soil. Groundwater: • Restore groundwater to its beneficial use of drinking water quality within a reasonable time frame through source control • Reduce or prevent further migration of contaminated groundwater from the source areas • Prevent use of groundwater containing contaminants at levels above SWDA and State of Alaska Drinking Water Standard MCLs and AWQS • Use natural attenuation to attain AWQS (18 AAC 70) after reaching state and Federal MCLs Soil: • Prevent migration of soil contaminants to groundwater, which could result in groundwater contamination and exceedances of state and Federal MCLs and AWQS (18 AAC 70)
Clean-Up Goals:	Groundwater: Federal and State of Alaska drinking water MCLs were adopted as cleanup goals for benzene, PCE, TCE, vinyl chloride, 1,1-DCE, and cis-1,2-DCE at the DRMO Yard source area. Soil: ADEC soil cleanup matrix cleanup levels were adopted as preliminary remediation goals for DRO in the DRMO Yard source area.
Applicable or Relevant and Appropriate Requirements:	• Federal Safe Drinking Water Act (40 CFR 141) and Alaska Drinking Water Regulations (18 AAC 80): The MCL and non-zero MCL goals were established under the SDWA and are relevant and appropriate for groundwater that is a potential drinking water source. • AWQS (18 AAC 70): Alaska Water Quality Standards for Protection of Class (l)(A) Water Supply, Class (l)(R) Water Recreation, and Class (1) Aquatic Life and Wildlife (18 AAC 70) are applicable to both source areas. Many of the constituents of groundwater regulated by AWQS are identical to MCLs in Drinking Water Standards. • Alaska Oil Pollution Regulations (18 AAC 75): Alaska Oil Pollution Control Regulations, are applicable. Under these regulations, responsible parties are required to clean up oil or hazardous material releases. The Army anticipates achieving a cleanup level consistent with this regulation. • Alaska Regulations for Leaking Underground Storage Tanks (18 AAC 78):

Table A3-6 Decision Document Summary
Component: Remedial Action
Operable Unit 2 - DRMO Yard

	The State of Alaska has established cleanup requirements for petroleum-contaminated soils from leaking USTs to protect groundwater and are relevant and appropriate for the DRMO Yard.
Components of the Remedy:	The remedial action components specified for the DRMO source area included: SVE/AS: • In-situ treatment of groundwater via AS to remove VOCs • In-situ treatment of soil via SVE to prevent contaminated soil from acting as an ongoing source of contamination to groundwater • Treatment system evaluation and modification as necessary to optimize effectiveness • Periodic monitoring and evaluation of air emissions from the AS/SVE system to meet air emission requirements • Periodic groundwater monitoring and off-gas measurements to determine attainment of RAOs MNA/long-term monitoring: Achieve the AWQS through natural attenuation after active treatment attains state and federal MCLs. ICs: Restrict site access and restrict well installation and development activities as long as hazardous substances remain on site at levels that preclude unrestricted use.

Table A3-7 Decision Document Summary
Component: Background/Basis for Taking Action
Operable Unit 3 - Remedial Area 1B Birch Hill Tank Farm

Decision Document Title:	Record of Decision for Operable Unit 3 Fort Wainwright Fairbanks, Alaska, January 1996 Explanation of Significant Differences Operable Unit 3 Fort Wainwright Fairbanks, Alaska, September 2002
Regulatory Framework:	CERCLA NPL
Remedy Chosen:	Alternative 5 - soil vapor extraction and air sparging of groundwater.
Media of Concern:	Groundwater
Contaminants of Concern (COCs):	Groundwater: Benzene, toluene, ethylbenzene, 1,2-dibromoethane (EDB), 1,2 dichloroethane (DCA), 1,2,4-trimethylbenzene (TMB), and 1,3,5-TMB
Land Use:	Current: industrial; surrounding areas are industrial, recreational and residential Future: industrial; surrounding areas will be industrial, recreational and residential
Receptors:	Army personnel (residential), downgradient users (two churches), and users of the Class A municipal drinking water wells
Exposure Pathway:	Ingestion, inhalation
Ecological Risk:	Results of the Ecological Risk Assessment (ERA) did indicate potential effects to wildlife because of 5 COCs at the Tank Farm: 1) lead, 2) 1,2,4- TMB, 3) 1,3,5-TMB, 4) isopropylbenzene, and 5) toluene. Lead posed potential risks to all terrestrial biota except the red fox, while the other four contaminants posed potential risks only to the red squirrel and marten, which are unlikely to inhabit the Tank Farm Source Area. Consequently, the only potentially significant risks at OU-3 are because of wildlife exposure to lead in soils at the Tank Farm. However, given the conservative nature of the ERA, these potential risks are likely to be overestimated. (pg 83)

[This page intentionally left blank]

Table A3-8 Decision Document Summary
Component: Remedial Action
Operable Unit 3 - Remedial Area 1B Birch Hill Tank Farm

Decision Document Title:	Record of Decision for Operable Unit 3 Fort Wainwright Fairbanks, Alaska, January 1996 Explanation of Significant Differences Operable Unit 3 Fort Wainwright Fairbanks, Alaska, September 2002
Remedy Chosen:	Alternative 5 - soil vapor extraction and air sparging of groundwater.
Remedial Action Objectives (RAOs):	Groundwater: • Restore groundwater to drinking water quality within a reasonable time frame • Reduce further migration of contaminated groundwater • Prevent use of groundwater with contaminants at levels above SDWA levels Soil: • Prevent the migration of contaminants from soil into groundwater that would result in groundwater contamination and exceedance of SDWA standards
Clean-Up Goals:	Groundwater: • Federal and State of Alaska drinking water MCLs were adopted as groundwater cleanup goals for benzene, toluene, ethylbenzene, EDB, and DCA • The concentrations corresponding to an excess cancer risk-based level of $1x10^{-4}$ were adopted as the cleanup goals for 1,2,4-TMB and 1,3,5-TMB because there were no MCLs for these contaminants • Although the ROD did not identify specific groundwater cleanup goals for petroleum hydrocarbons, the AWQS and other applicable Alaska environmental regulations are referenced as ARARs. The ROD stated that active remediation would be used to achieve SDWA levels and that natural attenuation would be used to achieve AWQS and other State of Alaska groundwater cleanup levels including DRO and GRO concentrations. Soil: • The remedial action goal for *in-situ* soils contaminated with VOCs and petroleum compounds is protection of groundwater. The ROD stated that since soils are acting as a continuing source of contamination to the groundwater, active remediation of the soils will continue until SDWA levels are consistently met. AWQS will be achieved through natural attenuation. The ROD also stated that petroleum-contaminated soils that are treated *ex-situ* will be treated to State of Alaska Matrix Level A standards before they are returned to the source area.

Table A3-8 Decision Document Summary
Component: Remedial Action
Operable Unit 3 - Remedial Area 1B Birch Hill Tank Farm

Applicable or Relevant and Appropriate Requirements:	• Federal and State of Alaska MCLs – relevant and appropriate for groundwater • Alaska Water Quality Standards – applicable • Alaska Oil Pollution regulations – applicable • Alaska regulations for leaking USTs – relevant and appropriate.
Components of the Remedy:	• AS/SVE: SVE of petroleum-contaminated soil and AS of petroleum-contaminated groundwater in permafrost-free areas at known contaminant sources and at locations where remedial action goals were exceeded to achieve SDWA levels. • Product recovery: During the summer and fall of 2000 a product recovery system was installed on Birch Hill. This sub-area was not a part of the OU3 ROD, but was established as part of an Explanation of Significant Differences (ESD). The ESD also required the implementation of groundwater modeling. • MNA/long-term monitoring: long term groundwater monitoring and natural attenuation to meet the AWQS. • ICs: restrict access and restrict development at the site as long as hazardous substances remain at concentrations above the remedial action goals. The development restrictions apply to construction and well development or placement as long as hazardous substances remain on site at levels that preclude unrestricted use, excluding activities undertaken to initiate the remedial actions.

Table A3-9 Decision Document Summary
Component: Background/Basis for Taking Action
Operable Unit 3 - Remedial Area 2 Valve Pits and ROLF

Decision Document Title:	Record of Decision for Operable Unit 3 Fort Wainwright Fairbanks, Alaska, January 1996 Explanation of Significant Differences Operable Unit 3 Fort Wainwright Fairbanks, Alaska, September 2002
Regulatory Framework:	CERCLA NPL
Remedy Chosen:	Alternative 5 - soil vapor extraction and air sparging of groundwater.
Media of Concern:	Groundwater
Contaminants of Concern (COCs):	Groundwater: Benzene, toluene, ethylbenzene, 1,2-EDB, 1,2-DCA, 1,2,4-TMB, and 1,3,5-TMB
Land Use:	Current: recreational and residential Future: recreational and residential
Receptors:	Army personnel (residential)
Exposure Pathway:	Ingestion
Ecological Risk:	None

[This page intentionally left blank]

Table A3-10 Decision Document Summary
Component: Remedial Action
Operable Unit 3 - Remedial Area 2 Valve Pits and ROLF

Decision Document Title:	Record of Decision for Operable Unit 3 Fort Wainwright Fairbanks, Alaska, January 1996 Explanation of Significant Differences Operable Unit 3 Fort Wainwright Fairbanks, Alaska, September 2002
Remedy Chosen:	Alternative 5 - soil vapor extraction and air sparging of groundwater.
Remedial Action Objectives (RAOs):	Groundwater: • Restore groundwater to drinking water quality within a reasonable time frame • Reduce further migration of contaminated groundwater • Prevent the use of groundwater with contaminants above SDWA levels Soil: • For petroleum-contaminated soil, prevent migration of contaminants from soil into groundwater that would result in groundwater contamination and exceedance of SDWA standards
Clean-Up Goals:	Groundwater: • Federal and State of Alaska drinking water MCLs were adopted as groundwater cleanup goals for benzene, toluene, ethylbenzene, EDB, and 1,2-DCA • The remedial goals for 1,2,4-TMB and 1,3,5-TMB were based on a risk-based concentration equivalent to a non-cancer hazard quotient of 1 using a residential groundwater exposure assumption, since there were no MCLs for these contaminants. The values established in the ROD were erroneously selected from the wrong column in the Region 3 RBC tables. The values listed in the ROD for these chemicals correspond to an inhalation pathway. The residential groundwater assumptions in the remedial investigation/feasibility study (RI/FS) correspond to a remedial goal of 1.85 milligrams per liter (mg/L) for both compounds. This issue was discussed in the ESD. • Although the ROD did not identify specific groundwater cleanup goals for petroleum hydrocarbons, the AWQS and other applicable Alaska environmental regulations are referenced as ARARs. The ROD stated that active remediation would be used to achieve safe drinking water. Soil: • The remedial action goal for in-situ soil contaminated with VOC and petroleum compounds is based on the protection of groundwater. Because soils are acting as a continuing source of

Table A3-10 Decision Document Summary
Component: Remedial Action
Operable Unit 3 - Remedial Area 2 Valve Pits and ROLF

	contamination to the groundwater, active remediation of the soils will continue until SDWA levels are consistently met. Natural attenuation will continue until AWQS are achieved. • Petroleum contaminated soils that are treated ex-situ will meet State of Alaska Matrix Level A standards before they are returned to the source area • No source specific cleanup goals were established for Remedial Area 2
Applicable or Relevant and Appropriate Requirements:	• Federal and State of Alaska MCLs – relevant and appropriate for groundwater • Alaska Water Quality Standards – applicable • Alaska Oil Pollution regulations – applicable • Alaska regulations for leaking USTs – relevant and appropriate
Components of the Remedy:	AS/SVE: AS of petroleum-contaminated groundwater and SVE of petroleum-contaminated soil at known contaminant sources and at locations where remedial action goals were exceeded (i.e., hot spots) to achieve SDWA levels. MNA/long-term monitoring: long term groundwater monitoring and natural attenuation to meet the AWQS. ICs: restrict site access, restrict construction at the site, and restrict water supply well installation as long as hazardous substances remain at levels that preclude unrestricted use

Table A3-11 Decision Document Summary
Component: Background/Basis for Taking Action
Operable Unit 3 - Remedial Area 3 FEP Mileposts 2.7, 3.0 and 15.75

Decision Document Title:	Record of Decision for Operable Unit 3 Fort Wainwright Fairbanks, Alaska, January 1996 Explanation of Significant Differences Operable Unit 3 Fort Wainwright Fairbanks, Alaska, September 2002
Regulatory Framework:	CERCLA NPL
Remedy Chosen:	Alternative 5 - soil vapor extraction and air sparging of groundwater.
Media of Concern:	Groundwater
Contaminants of Concern (COCs):	Groundwater: Benzene, toluene, ethylbenzene, 1,2-EDB, 1,2-DCA, 1,2,4-TMB, and 1,3,5-TMB
Land Use:	Current: recreational and residential Future: recreational and residential
Receptors:	Army personnel
Exposure Pathway:	Ingestion
Ecological Risk:	None

[This page intentionally left blank]

Table A3-12 Decision Document Summary
Component: Remedial Action
Operable Unit 3 - Remedial Area 3 FEP Mileposts 2.7, 3.0 and 15.75

Decision Document Title:	Record of Decision for Operable Unit 3 Fort Wainwright Fairbanks, Alaska, January 1996 Explanation of Significant Differences Operable Unit 3 Fort Wainwright Fairbanks, Alaska, September 2002
Remedy Chosen:	Alternative 5 - soil vapor extraction and air sparging of groundwater.
Remedial Action Objectives (RAOs):	The RAOs are generic for all source areas in OU3. <u>Groundwater</u>: • Restore groundwater to drinking water quality within a reasonable time frame • Reduce further migration of contaminated groundwater • Prevent use of groundwater with contaminants at levels above SDWA levels <u>Soil</u>: • For petroleum-contaminated soil, prevent migration of contaminants from soil into groundwater that would result in groundwater contamination and exceedance of SDWA standards.
Clean-Up Goals:	Based on the results of the baseline risk assessment for current (at the time of the ROD) and projected land use at the site, COCs were identified for establishing numeric cleanup goals for OU3. There were no source specific cleanup goals for Remedial Area 3. The ROD described the point of compliance for achieving the RAOs as wells downgradient of Remedial Area 3. <u>Groundwater</u>: • Federal and State of Alaska drinking water MCLs were adopted as groundwater cleanup goals for benzene, toluene, ethylbenzene, EDB, and 1,2-DCA • In the ROD, the remedial goals for 1,2,4-TMB and 1,3,5-TMB were based on a risk-based equivalent to a non-cancer hazard quotient of 1 using a residential groundwater exposure assumption, since there were no MCLs for these contaminants. However, the values established in the ROD were erroneously selected from the wrong column in the Region 3 RBC tables. The values listed in the ROD for these chemicals correspond to an inhalation pathway. The residential groundwater assumptions in the RI/FS correspond to a remedial goal of 1.85 mg/L for both compounds. This issue was discussed in the ESD. <u>Soil</u>: • The remedial action goal for in-situ soil contaminated with VOC and petroleum compounds is protection of groundwater. Because the soils are

Table A3-12 Decision Document Summary
Component: Remedial Action
Operable Unit 3 - Remedial Area 3 FEP Mileposts 2.7, 3.0 and 15.75

	acting as a continuing source of contamination to the groundwater, active remediation of the soils will continue until SDWA levels are consistently met. Natural attenuation will continue until AWQS are achieved. • Petroleum contaminated soils that are treated ex-situ will be treated to State of Alaska Matrix Level A standards before they are returned to the source area.
Applicable or Relevant and Appropriate Requirements:	• Federal and State of Alaska MCLs – Relevant and appropriate for groundwater • Alaska Water Quality Standards – Applicable • Alaska Oil Pollution regulations – Applicable • Alaska regulations for leaking USTs – Relevant and appropriate
Components of the Remedy:	AS/SVE: of contaminated soil and groundwater in permafrost-free areas. Long-term monitoring: The ROD also specified that long-term groundwater monitoring would be conducted at the three sites to ensure that contaminant concentrations were reduced in nearby wetlands. In addition, ICs would be maintained to restrict access to and development at the sites as long as hazardous substances remain onsite at levels that precluded unrestricted use. ESD: the following actions/changes that were not anticipated at the time of the ROD, but are required pursuant to the ESD. Many of these actions were completed prior to development of the ESD: • Excavation of contaminated soils from Milepost 2.7 (1,500 cubic yards) and Milepost 3.0 (6,000 cubic yards) and treatment in the vicinity of the Truck Fill Stand and Building 1173 treatment systems. • Treatment of contaminated soil from Milepost sites 2.7 and 3.0 in treatment cells to achieve ADEC Level A cleanup levels and soil disposal criteria required for placement in Fort Wainwright's on-Post solid waste landfill or to achieve applicable off-Post soil disposal criteria, as determined appropriate by the Army. • Monitoring of soil and groundwater contamination remaining in the vicinity of Remedial Area 3, for as long as required until RAOs have been achieved, as determined by concurrence of the project managers. Installation of additional monitoring wells and site characterization at Milepost 2.7 and 3.0 to gain a better understanding of local hydrology, impacts of permafrost, and contaminant migration.

Table A3-13 Decision Document Summary
Component: Background/Basis for Taking Action
Operable Unit 4 - Landfill

Decision Document Title:	Record of Decision for Operable Unit 4 Fort Wainwright Fairbanks, Alaska, August 1996
Regulatory Framework:	CERCLA NPL
Remedy Chosen:	**Alternative 3:** A phased approach involving capping of the soils in the older, inactive portion of the landfill, natural attenuation of groundwater; groundwater monitoring/evaluation; and institutional controls. Phase 2, if necessary, would involve evaluation and implementation of an active groundwater treatment system. (ROD Section 7.1, page 94 and Section 5.5.1.3, page 74)
Media of Concern:	Groundwater
Contaminants of Concern (COCs):	Benzene, cis-1,2-DCE, 1,1,2,2-Tetrachloroethane (PCA), 1,1,2-TCA, TCE, vinyl chloride, and bis(2-Ethylhexyl)phthalate
Land Use:	Current: industrial Future: industrial (ROD Section 4.0, page 40); residential for groundwater use (ROD Section 4.4, page 44)
Receptors:	Residential (groundwater use) (ROD Section 4.4, page 44 and Table 4-2)
Exposure Pathway:	Ingestion and dermal contact of groundwater, inhalation of indoor vapors that originate from groundwater (ROD Table 4-2)
Ecological Risk:	Insignificant per ROD Section 4.6.3.2, page 48: *"Barium poses potential risks to passerine birds (robins, sparrows, etc.) at the Landfill….through the ingestion of soil and earthworms. However, these locations represent a relatively small habitat area….the Landfill [is an] industrial area with a significant amount of heavy equipment and human activity. The habitat area in these locations has been significantly altered from the surrounding land. The actual number of animals that could be affected by these chemicals could be very low. No significant effects were predicted for waterfowl (mallards), raptors (kestrels), or terrestrial vegetation. No potential effects were predicted for aquatic species. There do not appear to be unacceptable potential ecological risks associated with the Landfill or CSY source areas."*

[This page intentionally left blank]

Table A3-14 Decision Document Summary
Component: Remedial Action
Operable Unit 4 - Landfill

Decision Document Title:	Record of Decision for Operable Unit 4 Fort Wainwright Fairbanks, Alaska, August 1996
Remedy Chosen:	**Alternative 3:** A phased approach involving capping of the soils in the older, inactive portion of the landfill, natural attenuation of groundwater; groundwater monitoring/evaluation; and institutional controls. Phase 2, if necessary, would involve evaluation and implementation of an active groundwater treatment system. (ROD Section 7.1, page 94 and Section 5.5.1.3, page 74)
Remedial Action Objectives (RAOs):	• Restore groundwater to its beneficial use of drinking water quality within a reasonable timeframe • Reduce or prevent further migration of contaminated groundwater from the source areas • Prevent use of groundwater containing contaminants above Federal MCLs and AWQS (18 AAC 70) • Use natural attenuation to attain AWQS (18 AAC 70) (ROD Section 5.2.1, page 70)
Clean-Up Goals:	**Groundwater**: Federal and State of Alaska maximum contaminant levels (MCLs) for all COCs except 1,1,2,2-PCA; USEPA Region 3 Risk-Based Concentration (RBC) for 1,1,2,2-PCA. (ROD Table 5-1, page 82 and Table 7-1, page 97)
Applicable or Relevant and Appropriate Requirements:	**Chemical-specific:** • SDWA (40 CFR 141)and Alaska Drinking Water Regulation (18 AAC 80) • AWQS (18 AAC 70) for Protection of Class (1)(A) Water Supply, Class (1)(B) Water Recreation, and Class (1) Aquatic Life and Wildlife • Alaska Oil Pollution Regulation (18 AAC 75) • Alaska Solid Waste Management Regulations (18 AAC 60) **Location-specific:** • Clean Water Act Section 404 (40 CFR 230 and 33 CFR 320 – 330) **Action-specific** • RCRA Solid Waste Landfill Closure Criteria (40 CFR 258.60) • Federal Clean Air Act (42 USC 7401) (ROD Sections 8.22, 8.23, and 8.24, pages 101 – 102)

Table A3-14 Decision Document Summary
Component: Remedial Action
Operable Unit 4 - Landfill

Components of the Remedy:	**Landfill:** • Capping with a minimum of 2 feet of native soil of the approximately 8 acres of the inactive portion of the Landfill to achieve a permeability no greater than 10^{-5} centimeters per second • Maintain vegetative growth or grasses [on the cap] and promote natural drainage to prevent ponding and erosion **Contingent Remedy:** • The need for a gas collection system would be considered during remedial design. [The landfill cap remedial design did not include a methane gas collection system] • An active groundwater treatment system would be considered if natural attenuation of groundwater did not progress as projected (70 years to achieve the RAOs) or did not result in a significant reduction in leachate **Groundwater:** • Achieve the RAOs for this source area through natural attenuation • Monitor groundwater downgradient of the landfill and evaluate results to determine the effectiveness of the capping and natural attenuation with respect to the RAOs **Land Use Controls:** • Maintaining institutional controls restricting access to and development at the site as long as hazardous substances remain onsite at levels that precluded unrestricted use (ROD Section 7.1.1, page 94)

Table A3-15 Decision Document Summary
Component: Background/Basis for Taking Action
Operable Unit 4 – Coal Storage Yard

Decision Document Title:	Record of Decision for Operable Unit 4 Fort Wainwright Fairbanks, Alaska, August 1996
Regulatory Framework:	CERCLA NPL
Remedy Chosen:	**Alternative 6:** In situ treatment of soils via vacuum extraction enhanced by steam injection or bioventing, in situ treatment of groundwater via air sparging, groundwater monitoring/evaluation, and institutional controls (ROD Section 7.2, page 95 and Section 5.5.2.6, page 80)
Media of Concern:	Soil Groundwater
Contaminants of Concern (COCs):	Soil: Benzene, BTEX, DRO, GRO Groundwater: Benzene, bis(2-Ethylhexyl) phthalate, toluene, TCE
Land Use:	Current: industrial Future: industrial (ROD Section 4.0, page 40); residential for groundwater use (ROD Section 4.4, page 44)
Receptors:	Residential (groundwater use) (ROD Section 4.4, page 44 and Table 4-3)
Exposure Pathway:	Ingestion and dermal contact of groundwater, inhalation of indoor vapors that originate from groundwater (ROD Table 4-3)
Ecological Risk:	Insignificant per ROD Section 4.6.3.2, page 48: *"Barium and Copper pose a risk to passerine birds at the CSY through ingestion of soil and earthworms. However, these locations represent a relatively small habitat area….the CSY [is an] industrial area with a significant amount of heavy equipment and human activity. The habitat area in these locations has been significantly altered from the surrounding land. The actual number of animals that could be affected by these chemicals could be very low. No significant effects were predicted for waterfowl (mallards), raptors (kestrels), or terrestrial vegetation. No potential effects were predicted for aquatic species. There do not appear to be unacceptable potential ecological risks associated with the Landfill or CSY source areas."*

[This page intentionally left blank]

Table A3-16 Decision Document Summary
Component: Remedial Action
Operable Unit 4 – Coal Storage Yard

Decision Document Title:	Record of Decision for Operable Unit 4 Fort Wainwright Fairbanks, Alaska, August 1996
Remedy Chosen:	**Alternative 6:** In situ treatment of soils via vacuum extraction enhanced by steam injection or bioventing, in situ treatment of groundwater via air sparging, groundwater monitoring/evaluation, and institutional controls (ROD Section 7.2, page 95 and Section 5.5.2.6, page 80)
Remedial Action Objectives (RAOs):	**Groundwater:** • Restore groundwater to its beneficial use of drinking water quality within a reasonable time frame • Reduce further migration of contaminated groundwater from the source areas • Prevent use of groundwater containing contaminants at levels above Federal MCLs and AWQS (18 AAC 70) • Use natural attenuation to attain AWQS (18 AAC 70) **Soil:** • Prevent migration of soil contaminants to groundwater that could result in groundwater contamination and exceedances of Federal MCLs and AWQS (18 AAC 70) (ROD Section 5.2.2, pages 70-71)
Clean-Up Goals:	**Groundwater**: Federal and State of Alaska MCLs (ROD Table 5-2, page 84 and Table 7-2, page 98) **Soil:** (ROD Table 5-2, page 85 and Table 7-2, page 99)
Applicable or Relevant and Appropriate Requirements:	**Chemical-specific:** • SDWA (40 CFR 141)and Alaska Drinking Water Regulation (18 AAC 80) • AWQS (18 AAC 70) for Protection of Class (1)(A) Water Supply, Class (1)(B) Water Recreation, and Class (1) Aquatic Life and Wildlife • Alaska Oil Pollution Regulation (18 AAC 75) • Alaska Regulations for Leaking Underground Storage Tanks (18 AAC 78) **Location-specific:** • Clean Water Act Section 404 (40 CFR 230 and 33 CFR 320 – 330) **Action-specific:** • Federal Clean Air Act (42 USC 7401) **To-be-considered:**

Table A3-16 Decision Document Summary
Component: Remedial Action
Operable Unit 4 – Coal Storage Yard

	• State of Alaska Guidance for Storage, Remediation, and Disposal of Non-UST Petroleum Contaminated Soils (July 29, 1991) • State of Alaska Interim Guidance for Surface and Groundwater Cleanup Levels (September 26, 1990) (ROD Sections 8.22, 8.23, and 8.24, pages 101 – 102)
Components of the Remedy:	**Soil and Groundwater:** • In situ treatment of soils via soil vapor extraction to prevent contaminated soils from acting as an ongoing source of contamination to groundwater. Soil vapor extraction wells will be placed in areas of the highest contamination and operated until groundwater MCLs are achieved • In situ treatment of groundwater via air sparging to remove VOCs, thereby attaining state and Federal drinking water standards. Air sparging wells will be placed in areas of highest contamination. • Evaluate and modify the treatment system as necessary to optimize effectiveness in achieving RAOs • Duration of treatment system operation is estimated to be nine years to meet ADEC soil cleanup goals and Federal MCLs. A combination of groundwater monitoring and off-gas measurements will be used to determine attainment of [the] RAOs • After active treatment achieves [the] MCLs, natural attenuation will be relied on to achieve [the] AWQS • Monitoring of nested downgradient wells to ensure protection of Post drinking water supply wells during remedial action **LUCs:** • Maintain institutional controls, including restricted access and well development restrictions, as long as hazardous substances remain on site at levels that preclude unrestricted use. Restrictions on groundwater will be implemented until contaminant levels are below Federal MCLs and [the] AWQS. (ROD Section 7.2.1, page 95)

Table A3-17 Decision Document Summary
Component: Background/Basis for Taking Action
Operable Unit 5 - WQFS

Decision Document Title:	Record of Decision for Operable Unit 5 Fort Wainwright Fairbanks, Alaska, May 1999
Regulatory Framework:	CERCLA NPL
Remedy Chosen:	Subarea WQFS1: Alternative 5: Alternative 4 with Operation of the Potential Downgradient Groundwater Air Sparging Trench. Subarea WQFS2: Alternative 3: Hot spot (source area) treatment with AS/SVE, continued operation of at downgradient groundwater AS curtain, groundwater monitoring, ICs, and MNA. Subarea WQFS3: Alternative 3: Hot spot (source area) treatment with AS/SVE, ICs, groundwater monitoring, and MNA.
Media of Concern:	WQFS: Groundwater, soil Chena River: surface water
Contaminants of Concern (COCs):	WQFS: Groundwater: 1,2-DCA, benzene, toluene, DRO, GRO, and RRO Soil: DRO, GRO, Benzene, Ethylbenzene, Toluene, Xylenes Surface Water: Total aromatic hydrocarbons (TAH) and total aqueous hydrocarbons (TaqH)
Land Use:	Current: industrial and recreational. Groundwater use: residential Future: industrial and recreational. Groundwater use: residential
Receptors:	Army personnel
Exposure Pathway:	Inhalation of dust, ingestion
Ecological Risk:	COPCs identified for ecological receptors are listed in Table 8 of the ROD. Mammalian indicator species selected for WQFS and EQFS include the meadow vole (exposure pathways include ingestion of plants and ingestion of soil) and the muskrat (exposure pathways include ingestion of aquatic plants, ingestion of sediment, and ingestion of surface water). Aquatic indicators selected for WQFS and EQFS include benthic invertebrates (exposure pathways include exposure to sediment and surface water). The post-wide ecological risk assessment identified the red fox as an indicator species to represent terrestrial receptors because it is omnivorous and, therefore, is more likely to bioaccumulate chemicals than herbivores whose diets consist of plants. Bioaccumulation factors for animals generally are higher than plant uptake.

[This page intentionally left blank]

Table A3-18 Decision Document Summary
Component: Remedial Action
Operable Unit 5-WQFS

Decision Document Title:	Record of Decision for Operable Unit 5 Fort Wainwright Fairbanks, Alaska, May 1999
Remedy Chosen:	Subarea WQFS1: Alternative 5: Alternative 4 with Operation of the Potential Downgradient Groundwater Air Sparging Trench. Subarea WQFS2: Alternative 3: Hot spot (source area) treatment with AS/SVE, continued operation of at downgradient groundwater AS curtain, groundwater monitoring, ICs, and MNA. Subarea WQFS3: Alternative 3: Hot spot (source area) treatment with AS/SVE, ICs, groundwater monitoring, and MNA.
Remedial Action Objectives (RAOs):	Groundwater: • Restore groundwater to its beneficial uses within a reasonable time frame. Reduce or prevent further migration of contaminated groundwater from the source areas to the downgradient aquifer or surface water bodies that are closely hydrologically connected by achieving MCLs (where there are no nonzero maximum contaminant level goals [MCLGs]) and AWQS. For groundwater that is hydrologically connected to surface water, AWQS apply for the following Fresh Water Uses: (l)(A) Water Supply; (l)(B) Water Recreation; and (l)(C) Growth and Propagation of Fish, Shellfish, Other Aquatic Life, and Wildlife. • Ensure there is no risk to aquatic receptors through control of contaminant movement through the groundwater into the Chena River. • Remove light non-aqueous phase liquid to the extent practicable to eliminate film or sheen from groundwater. • Prevent use of groundwater containing contaminants at levels above SDWA MCLs, non-zero MCLGs, or the following AWQS for Fresh Water Uses: (l)(A) Water Supply; (l)(B) Water Recreation; and (l)(C) Growth and Propagation of Fish, Shellfish, Other Aquatic Life, and Wildlife. Soil: • Prevent the migration to groundwater of soil contaminants that could result in groundwater contamination and exceedances of Federal MCLs and nonzero MCLGs and to groundwater that is hydrogeologically connected to surface water (such as the Chena River) that could result in exceedances of AWQS in surface water. Chena River Sediments: • Reduce sources of contaminant releases to the Chena River Chena River Surface Water: • Meet AWQS for the following Fresh Water Uses: (1)(A) Water "J Supply; (1)(B) Water Recreation; and (1)(C) Growth and Propagation of Fish, Shellfish, Other Aquatic Life, and Wildlife

Table A3-18 Decision Document Summary
Component: Remedial Action
Operable Unit 5-WQFS

	• Continue aquatic assessment based on the baseline risk assessment for projected land and resource use at the WQFS, the ROD adopted the following cleanup goals:
Clean-Up Goals:	Groundwater: • Federal and state MCLs for 1,2-DCA, benzene, and toluene, and State of Alaska (18 AAC 75) cleanup levels for GRO, DRO, and RRO were adopted as numeric cleanup goals for the WQFS. In addition, the ROD identified elimination of any sheen caused by floating petroleum product as a cleanup goal. • The cleanup level for GRO in groundwater as presented in Table C of ADEC 18 AAC 75 changed in 2008 from 1,300 micrograms per liter (µg/L) (as it was in 1999 at the time the ROD was signed) to 2,200 µg/L. • The cleanup goals for groundwater hydraulically connected to the Chena River are the AWQS for TAH and TaqH. Soil: • The cleanup goal for soil in the WQFS is active remediation of soils until contaminant levels in groundwater are consistently below state and federal cleanup levels. Chena River Sediments: • No concentrations of toxic substances or petroleum hydrocarbons and other contaminants in bottom sediments that cause deleterious effects to aquatic life, to be determined by a benthic macroinvertebrate assessment • Benthic macroinvertebrate assessment to establish baseline and to monitor aquatic biotic integrity through time Chena River Surface Water: • TAH and TaqH • Eliminate petroleum hydrocarbon sheen • Benthic macroinvertebrate assessment to establish baseline and to monitor aquatic biotic integrity over time • Groundwater monitoring to assess reduction of contaminant releases to the Chena River
Applicable or Relevant and Appropriate Requirements:	• Federal and state MCLs are relevant and appropriate for groundwater that is a potential drinking water source (40 CFR 141 and 18 AAC 80). These ARARs set the active remediation goals for groundwater; AWQS (18 AAC 70) are also applicable to surface water, sediment, and groundwater that is closely hydrologically connected to surface water. • Alaska oil pollution regulations (18 AAC 75) are applicable and require the cleanup of oil or hazardous material releases.

Table A3-18 Decision Document Summary
Component: Remedial Action
Operable Unit 5-WQFS

Components of the Remedy:	WQFS1: • AS/SVE to address solvent and petroleum contamination in the source-area soil and groundwater and floating-product. • In-situ heating at hot spots was proposed as a method to increase the rate of remediation. It would be used in the event that AS was ineffective in achieving progressive reduction of VOC and petroleum hydrocarbon concentrations in soils. • Groundwater monitoring during active system operation and after operations to assess for possible rebound of the COC concentrations. • MNA for deep groundwater and areas not being actively treated. • ICs to ensure that groundwater will not be used as a potable water source. Includes restrictions on site access, construction, and well development or placement. WQFS2: • AS/SVE to address solvent and petroleum contaminated hot spots and floating-product. • Continued operation of a downgradient sparge curtain. • Installing a harbor boom downgradient of the sparge curtain to control contaminant releases into the Chena River. • Pilot-scale operation of an oxygen release compound system • Groundwater monitoring to determine whether cleanup levels are achieved and maintained downgradient of the sparge curtain. The monitoring would be continued after system shut down to assess potential for rebound of the concentrations. • MNA for deep groundwater and areas not being actively treated within WQFS2 • ICs to ensure that groundwater will not be used as a potable water source. They include restrictions on site access, construction, and well development or placement. WQFS3: • AS/SVE to address solvent- and petroleum contaminated hot spots and floating-product. • ICs to ensure that groundwater will not be used except for activities undertaken to initiate the selected remedies detailed in the ROD. ICs include restrictions governing site access, on site construction, and well development or placement. • Groundwater monitoring to determine whether cleanup levels are achieved and maintained. Includes monitoring after system shut down to assess potential rebound of the concentrations. • MNA for deep groundwater and areas not being actively treated within WQFS3.

[This page intentionally left blank]

Table A3-19 Decision Document Summary
Component: Background/Basis for Taking Action
Operable Unit 5 – EQFS

Decision Document Title:	Record of Decision for Operable Unit 5 Fort Wainwright Fairbanks, Alaska, May 1999
Regulatory Framework:	CERCLA NPL
Remedy Chosen:	Alternative 2 – Continued Operation of the Building 1060 SVE/AS Treatability Study System, Institutional Controls, and Monitored and Evaluated Natural Attenuation.
Media of Concern:	Groundwater Soil
Contaminants of Concern (COCs):	Groundwater: 1,2-DCA, toluene, TCE, 1,2-EDB, bis(2-Chloroethyl) ether, RRO, DRO Soil: DRO, GRO, Xylenes Chena River Surface Waters: TAH, TAqH
Land Use:	Current: industrial, groundwater: residential Future: industrial, groundwater: residential
Receptors:	Army personnel
Exposure Pathway:	Inhalation of dust, ingestion
Ecological Risk:	COPCs identified for ecological receptors are listed in Table 8 of the ROD. Mammalian indicator species selected for WQFS and EQFS include the meadow vole (exposure pathways include ingestion of plants and ingestion of soil) and the muskrat (exposure pathways include ingestion of aquatic plants, ingestion of sediment, and ingestion of surface water). Aquatic indicators selected for WQFS and EQFS include benthic invertebrates (exposure pathways include exposure to sediment and surface water). The post-wide ecological risk assessment identified the red fox as an indicator species to represent terrestrial receptors because it is omnivorous and, therefore, is more likely to bioaccumulate chemicals than herbivores whose diets consist of plants. Bioaccumulation factors for animals generally are higher than plant uptake factors for the same chemicals.

[This page intentionally left blank]

Table A3-20 Decision Document Summary
Component: Remedial Action
Operable Unit 5– EQFS

Decision Document Title:	Record of Decision for Operable Unit 5 Fort Wainwright Fairbanks, Alaska, May 1999
Remedy Chosen:	Alternative 2 – Continued Operation of the Building 1060 SVE/AS Treatability Study System, Institutional Controls, and Monitored and Evaluated Natural Attenuation.
Remedial Action Objectives (RAOs):	Groundwater: • Restore groundwater to its beneficial uses within a reasonable time frame. Reduce or prevent further migration of contaminated groundwater from the source areas to the downgradient aquifer or surface water bodies that are closely hydrologically connected by achieving MCLs (where there are no nonzero MCLGs) and AWQS. For groundwater that is hydrologically connected to surface water, AWQS will apply for the following Fresh Water Uses: (l)(A) Water Supply; (l)(B) Water Recreation; and (l)(C) Growth and Propagation of Fish, Shellfish, Other Aquatic Life, and Wildlife. • Ensure there is no risk to aquatic receptors through control of contaminant movement through the groundwater into the Chena River. • Remove light non-aqueous phase liquid (LNAPL) to the extent practicable to eliminate film or sheen from groundwater. • Prevent use of groundwater containing contaminants at levels above SDWA MCLs, nonzero MCLGs, or the following AWQS for Fresh Water Uses: (l)(A) Water Supply; (l)(B) Water Recreation; and (l)(C) Growth and Propagation of Fish, Shellfish, Other Aquatic Life, and Wildlife. Soils: • Prevent the migration to groundwater of soil contaminants that could result in groundwater contamination and exceedances of Federal MCLs and nonzero MCLGs and to groundwater that is closely hydrogeologically connected to surface water (such as the Chena River) that could result in exceedances of AWQS in surface water (EQFS and WQFS). Chena River Sediments: • Reduce sources of contaminant releases to the Chena River. Chena River Surface Water: • Meet AWQS for the following fresh water uses: (1)(A) Water "J Supply; (1)(B) Water Recreation; and (1)(C) Growth and Propagation of Fish, Shellfish, Other Aquatic Life, and Wildlife • Continue aquatic assessment.

Table A3-20 Decision Document Summary
Component: Remedial Action
Operable Unit 5– EQFS

Clean-Up Goals:	Groundwater: Federal and state MCLs for 1,2-DCA, toluene, TCE, EDB; the 10^{-6} residential risk value for bis(2-chloroethyl)ether; and State of Alaska (18 AAC 75) cleanup levels for DRO, and RRO for the EQFS. Elimination of any sheen caused by floating petroleum product (EQFS groundwater). Soil: The cleanup goal for soil in the EQFS is active remediation until contaminant levels in groundwater are consistently below state and federal MCLs. Chena River Sediments: • No concentrations of toxic substances or petroleum hydrocarbons and other contaminants in bottom sediments that cause deleterious effects to aquatic life, to be determined by a benthic macroinvertebrate assessment • Benthic macroinvertebrate assessment to establish baseline and to monitor aquatic biotic integrity through time Chena River Surface Water: • TAH and TAqH • Eliminate petroleum hydrocarbon sheen • Benthic macroinvertebrate assessment to establish baseline and to monitor aquatic biotic integrity over time • Groundwater monitoring to assess reduction of contaminant releases to the Chena River
Applicable or Relevant and Appropriate Requirements:	• Federal and state MCLs are relevant and appropriate for groundwater that is a potential drinking water source (40 CFR 141 and 18 AAC 80). These ARARs set the active remediation goals for groundwater. AWQS (18 AAC 70) are also applicable to surface water, sediment, and groundwater that is closely hydrologically connected to surface water. • Alaska oil pollution regulations (18 AAC 75) are applicable and require the cleanup of oil or hazardous material releases.
Components of the Remedy:	• Continued operation of a Building 1060 AS/SVE system to address solvent- and petroleum-contaminated hot spots and floating-product. • Groundwater monitoring during active system operation and after operation to assess for possible rebound of the COC concentrations. • MNA for deep groundwater and areas were not actively treated within the EQFS. • ICs to ensure that groundwater will not be used as a potable water source. Includes restrictions on site access, construction, and well development or placement.

Table A3-21 Decision Document Summary
Component: Background/Basis for Taking Action
Operable Unit 5 – Remedial Area 1A Birch Hill Above Ground Storage Tanks

Decision Document Title:	Record of Decision for Operable Unit 5 Fort Wainwright Fairbanks, Alaska, May 1999
Regulatory Framework:	CERCLA NPL
Remedy Chosen:	Alternative 2 – Institutional Controls
Media of Concern:	Soil, Groundwater, Surface Water
Contaminants of Concern (COCs):	Soil: Lead (2-party: petroleum hydrocarbons)
Land Use:	Current: industrial, residential (groundwater) Future: industrial, residential (groundwater)
Receptors:	Army personnel
Exposure Pathway:	Inhalation of dust, ingestion
Ecological Risk:	Potential risks from exposure to lead and petroleum hydrocarbons exist for all terrestrial receptors at Remedial Area 1A. However, the source area does not provide suitable habitat for any species because of the presence of existing facilities and human disturbance in the area. Potential receptors would be expected to avoid Remedial Area 1A and preferentially use habitat with less disturbance. Habitat outside the source areas has not been affected. Therefore, Remedial Area 1A is expected to constitute only a portion of the range of ecological receptors and a significant portion of their diet would be obtained from outside the source areas.

[This page intentionally left blank]

Table A3-22 Decision Document Summary
Component: Remedial Action
Operable Unit 5– Remedial Area 1A Birch Hill Above Ground Storage Tanks

Decision Document Title:	Record of Decision for Operable Unit 5 Fort Wainwright Fairbanks, Alaska, May 1999
Remedy Chosen:	Alternative 2 – Institutional Controls
Remedial Action Objectives (RAOs):	Groundwater: • Restore groundwater to its beneficial uses within a reasonable time frame. Reduce or prevent further migration of contaminated groundwater from the source areas to the downgradient aquifer or surface water bodies that are closely hydrologically connected by achieving MCLs (where there are no nonzero MCLGs) and AWQS. For groundwater that is hydrologically connected to surface water, AWQS will apply for the following fresh water uses: (l)(A) Water Supply; (l)(B) Water Recreation; and (l)(C) Growth and Propagation of Fish, Shellfish, Other Aquatic Life, and Wildlife. • Ensure there is no risk to aquatic receptors through control of contaminant movement through the groundwater into the Chena River. • Remove LNAPL to the extent practicable to eliminate film or sheen from groundwater. • Prevent use of groundwater containing contaminants at levels above SDWA MCLs, non-zero MCLGs, or the following AWQS for fresh water uses: (l)(A) Water Supply; (l)(B) Water Recreation; and (l)(C) Growth and Propagation of Fish, Shellfish, Other Aquatic Life, and Wildlife. Soil: Prevent the migration to groundwater of soil contaminants that could result in groundwater contamination and exceedances of federal MCLs and nonzero MCLGs and to groundwater that is closely hydrogeologically connected to surface water (such as the Chena River) that could result in exceedances of AWQS in surface water. Limit human health and terrestrial receptor exposure to lead-contaminated soil. Chena River Sediments: • Reduce sources of contaminant releases to the Chena River Chena River Surface Water: • Meet the AWQS for the following fresh water uses: (1)(A) Water "J Supply; (1)(B) Water Recreation; and (1)(C) Growth and Propagation of Fish, Shellfish, Other Aquatic Life, and Wildlife • Continue aquatic assessment.
Clean-Up Goals:	Soil: No direct contact for total lead concentration greater than 1,000 milligrams per kilogram (mg/kg)

Table A3-22 Decision Document Summary
Component: Remedial Action
Operable Unit 5– Remedial Area 1A Birch Hill Above Ground Storage Tanks

Applicable or Relevant and Appropriate Requirements:	There are no specific ARARs for Remedial Area 1a. To Be Considered (TBC) information for Remedial Area 1a: addressing interim lead soil guidance and preliminary remediation goals is included in the ROD.
Components of the Remedy:	ICs, which include land use restrictions, signage, and maintaining an existing fence.

Table A3-23 Decision Document Summary
Component: Background/Basis for Taking Action
Operable Unit 5 – Open Burning/Open Detonation (OB/OD) Area

Decision Document Title:	Record of Decision for Operable Unit 5 Fort Wainwright Fairbanks, Alaska, May 1999
Regulatory Framework:	CERCLA NPL
Remedy Chosen:	No Further Action/Institutional Controls (monitoring and control of access to the site)
Media of Concern:	N/A - UXO
Contaminants of Concern (COCs):	N/A - UXO
Land Use:	Current/Future: Active small arms impact range
Receptors:	Army personnel
Exposure Pathway:	N/A - UXO
Ecological Risk:	N/A - UXO

[This page intentionally left blank]

Table A3-24 Decision Document Summary
Component: Remedial Action
Operable Unit 5– OB/OD Area

Decision Document Title:	Record of Decision for Operable Unit 5 Fort Wainwright Fairbanks, Alaska, May 1999
Remedy Chosen:	No Further Action/Institutional Controls (monitoring and control of access to the site)
Remedial Action Objectives (RAOs):	N/A
Clean-Up Goals:	N/A
Applicable or Relevant and Appropriate Requirements:	Interim status standards: 40 CFR 265 Closure plan and post-closure plan: 1991 FFCA Subject to RCRA permit
Components of the Remedy:	Monitor and control access, restrict land use

[This page intentionally left blank]

Table A3-25 Decision Document Summary
Component: Background/Basis for Taking Action
Operable Unit 6 – Former Communications Site

Decision Document Title:	Record of Decision Operable Unit 6 Former Communications Site Fort Wainwright, Alaska, January 2014
Regulatory Framework:	CERCLA NPL
Remedy Chosen:	Alternative S2: Institutional Controls to Restrict Excavation of Soil Alternative GW2: Monitored Natural Attenuation and Institutional Controls to Prohibit Groundwater Use
Media of Concern:	Soil and groundwater
Contaminants of Concern (COCs):	Soil: 1,2,3-trichloropropane (TCP), DRO, aluminum, copper, and manganese Groundwater: TCE, 1,2,3-TCP, DRO, and RRO
Land Use:	Current: Residential (housing units are currently unoccupied) Future: Residential
Receptors:	Residential (hypothetical, unrestricted)
Exposure Pathways:	Direct contact with soil, inhalation of VOCs (indoor air), and groundwater ingestion
Ecological Risk:	*"Chemicals of potential ecological concern occurring in the drainage swale and groundwater is considered to be low."* (ROD, Section 2.7.2, page 120)

[This page intentionally left blank]

Table A3-26 Decision Document Summary
Component: Remedial Action
Operable Unit 6 – Former Communications Site

Decision Document Title:	Record of Decision Operable Unit 6 Former Communications Site Fort Wainwright, Alaska, January 2014
Remedy Chosen:	Alternative S2: Institutional Controls to Restrict Excavation of Soil Alternative GW2: Monitored Natural Attenuation and Institutional Controls to Prohibit Groundwater Use
Remedial Action Objectives (RAOs):	Soil: • Protect against human exposure to COCs in soil. This RAO will be achieved if soil containing COCs at concentrations exceeding PCLs is managed through administrative processes, or if COCs in soil are reduced to meet PCLs. Groundwater: • Protect against human exposure to COCs in groundwater. This RAO will be attained if the exposure pathway to human receptors is limited or eliminated through administrative processes, or if COC concentrations in groundwater are reduced to meet PCLs. • Return groundwater to its beneficial use as a drinking water source. VOCs are expected to reach PCLs within 25 years; it is expected that remediation of DRO and RRO will take longer. This RAO will be achieved when groundwater COCs are below PCLs.
Clean-Up Goals:	Soil: ADEC risk-based cleanup levels and USEPA risk-based screening levels. 1,2,3-TCP 0.17 mg/kg DRO 10,250 mg/kg Aluminum 77,000 mg/kg Copper 4,160 mg/kg Manganese 1,800 mg/kg Groundwater: Federal and State of Alaska drinking water MCLs. 1,2,3-TCP 0.12 µg/L DRO 1,500 µg/L RRO 1,100 µg/L TCE 5 µg/L
Applicable or Relevant and Appropriate Requirements:	Federal and State of Alaska MCLs: • 40 CFR Part 141 • 18 AAC 75.345 • 18 AAC 75.360 • 18 AAC 75.375©

Table A3-26 Decision Document Summary
Component: Remedial Action
Operable Unit 6 – Former Communications Site

Components of the Remedy:	• Institutional controls to restrict excavation of soil. • Monitored natural attenuation and institutional controls to prohibit groundwater use.

ATTACHMENT 4

Site Inspection Checklists

[This page intentionally left blank]

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-1

I. SITE INFORMATION

Site name: OU-1 801 Drum Burial Site	**Date of inspection:** 11 August 2015
Location and Region: Fairbanks, Alaska	**EPA ID:** AK6210022426
Agency, office, or company leading the five-year review: US Army Corps of Engineers, Buffalo District	**Weather/temperature:** Overcast/55-65ºC±

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☒ Other Drum removal

  A groundwater contingent remedy was selected including AS/SVE but was not implemented
- ☒ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls

Inspection team roster:

Mr. Brian Adams, Fort Wainwright Restoration Project Manager

Dr. Karen Keil, USACE Buffalo Risk Assessor

Ms. Holly Akers, PE, USACE Buffalo Project Engineer

Attachments: ☒ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** — Joseph Malen (Name) | Restoration Program Manager (Title) | 10-13 August 2015 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone Phone no. (907) 361-4512
   Problems, suggestions; ☒ Report attached See interview form

2. **O&M staff** — Brian Adams (Name) | Restoration Project Manager (Title) | 10-13 August 2015 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☒ Report attached See interview form

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

   Agency USEPA
   Contact Sandra Halstead (Name) | Federal Facilities RPM (Title) | _____ (Date) | (907) 271-1218 (Phone no.)
   Problems; suggestions; ☐ Report attached Not present

   Agency ADEM
   Contact Dennis Sheppard (Name) | ADEC RPM (Title) | _____ (Date) | _____ (Phone no.)
   Problems; suggestions; ☐ Report attached Not present

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-1

4. **Other interviews** (optional) ☒ Reports attached. (See interview forms)

Bob Hazlett, Environmental Scientist (USACE Alaska)

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - ☐ O&M manual — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ As-built drawings — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Maintenance logs — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: _____

2. **Site-Specific Health and Safety Plan** — ☒ Readily available — ☒ Up to date — ☐ N/A
   - ☒ Contingency plan/emergency response plan — ☒ Readily available — ☒ Up to date — ☐ N/A

   Remarks: The Site-Specific Health and Safety Plan was drafted and implemented by the contractor, FES.

3. **O&M and OSHA Training Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: O&M and OSHA training records are maintained by contractors working on Fort Wainwright.

4. **Permits and Service Agreements**
   - ☐ Air discharge permit — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Effluent discharge — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Waste disposal, POTW — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Other permits_____ — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: _____

5. **Gas Generation Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: _____

6. **Settlement Monument Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks : _____

7. **Groundwater Monitoring Records** — ☒ Readily available — ☒ Up to date — ☐ N/A

   Remarks: _____

8. **Leachate Extraction Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks _____

9. **Discharge Compliance Records**
   - ☐ Air — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Water (effluent) — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: _____

10. **Daily Access/Security Logs** — ☐ Readily available — ☐ Up to date — ☒ N/A

    Remarks: Access and security are controlled at the installation access points.

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-1

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☒ Federal Facility in-house ☒ Contractor for Federal Facility
☐ Other: _____

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) Contractor-performed inspections & reporting
Frequency At least annually
Responsible party/agency Federal facility
Contact Joseph Malen (Name) Restoration Program Manager (Title) 10-12 August 2015 (Date) (907) 361-4512 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☒ Yes ☐ No ☐ N/A
Other problems or suggestions: ☐ Report attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: Not applicable.

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☐ Gates secured ☒ N/A

Remarks: Access is controlled by installation fencing (not site-specific).

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☐ N/A

Remarks: Signage is present along installation fencing.

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-1

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) Contractor-performed inspections & reporting
Frequency At least annually
Responsible party/agency Federal facility
Contact Joseph Malen (Name) Restoration Program Manager (Title) 10-12 August 2015 (Date) (907) 361-4512 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☒ Yes ☐ No ☐ N/A
Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident
Remarks: Some debris (cardboard boxes, etc.) observed on site indicating site access is occurring.

2. **Land use changes on site** ☒ N/A
Remarks:

3. **Land use changes off site** ☒ N/A
Remarks:

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☒ Location shown on site map ☒ Roads adequate ☐ N/A
Remarks:

B. Other Site Conditions

Remarks

VII. LANDFILL COVERS ☐ Applicable ☒ N/A

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-1

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☒ N/A

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A

C. Treatment System ☐ Applicable ☒ N/A

D. Monitoring Data ☒ Applicable ☐ N/A

1. Monitoring Data
   ☒ Is routinely submitted on time ☐ Is of acceptable quality

2. Monitoring data suggests:
   ☐ Groundwater plume is effectively contained ☒ Contaminant concentrations are declining

E. Monitored Natural Attenuation ☒ Applicable ☐ N/A

1. **Monitoring Wells** (natural attenuation remedy)
   ☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition
   ☒ All required wells located ☐ Needs Maintenance ☐ N/A
   Remarks : _____

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

Remarks : _____

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The remedy was established to: 1) ensure that groundwater contamination at the site meets federal and state standards, 2) minimize the potential for migration of contaminated groundwater to the Chena River and to downgradient drinking water wells, 3) establish and maintain ICs to ensure that groundwater will not be used until MCLs are arraigned, 4) prevent leaching of contaminants from soil to groundwater, and 5) reduce risks associated with exposure to contaminated soil and drums. The remedy was implemented, it consisted of: 1) locating and removing buried drums, establishing ICs to ensure that groundwater would not be used until MCLs are attained, 3) natural attenuation and long-term monitoring of groundwater, and 4) AS/SVE (contingent remedy) if the contaminant concentrations show an increasing trend over three consecutive sampling events and 2) data indicates that the groundwater contamination is attenuating, albeit at a slow rate, and the plumes are stable. The remedy is functioning as intended by the ROD.

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-1

B.	**Adequacy of O&M**
	Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy. O&M consists of monitoring well inspections and maintenance (if necessary). All wells were found to be in satisfactory condition.
C.	**Early Indicators of Potential Remedy Problems**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future. No early indicators of potential remedy problems were identified.
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. Opportunities for optimization were not identified.

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-2 Sites

I. SITE INFORMATION

Site name: OU-2 1168 Leach Well and DRMO Yard	**Date of inspection:** 11 August 2015
Location and Region: Fairbanks, Alaska	**EPA ID:** AK6210022426
Agency, office, or company leading the five-year review: US Army Corps of Engineers, Buffalo District	**Weather/temperature:** Overcast/55-65ºC±

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☒ Other Air sparge/soil vapor extraction formerly operated on this site
- ☒ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls

Inspection team roster:

Mr. Brian Adams, Fort Wainwright Restoration Project Manager

Dr. Karen Keil, USACE Buffalo Risk Assessor

Ms. Holly Akers, PE, USACE Buffalo Project Engineer

Attachments: ☒ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** — Joseph Malen (Name) — Restoration Program Manager (Title) — 10-12 August 2015 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone — Phone no. (907) 361-4512
   Problems, suggestions; ☒ Report attached — See interview form

2. **O&M staff** — Brian Adams (Name) — Restoration Project Manager (Title) — 10-12 August 2015 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone — Phone no. _____
   Problems, suggestions; ☒ Report attached — See interview form

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

   Agency USEPA
   Contact Sandra Halstead (Name) — Federal Facilities RPM (Title) — _____ (Date) — (907) 271-1218 (Phone no.)
   Problems; suggestions; ☐ Report attached — Not present

   Agency ADEC
   Contact Dennis Sheppard (Name) — ADEC RPM (Title) — _____ (Date) — _____ (Phone no.)
   Problems; suggestions; ☐ Report attached — Not present

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-2 Sites

4. **Other interviews** (optional) ☒ Reports attached. (See interview forms)

Bob Hazlett, Environmental Scientist (USACE Alaska)

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - ☐ O&M manual — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ As-built drawings — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Maintenance logs — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: _____

2. **Site-Specific Health and Safety Plan** — ☒ Readily available — ☒ Up to date — ☐ N/A
   - ☒ Contingency plan/emergency response plan — ☒ Readily available — ☒ Up to date — ☐ N/A

   Remarks: The Site-Specific Health and Safety Plan was drafted and implemented by the contractor, FES.

3. **O&M and OSHA Training Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: O&M and OSHA training records are maintained by contractors working on Fort Wainwright.

4. **Permits and Service Agreements**
   - ☐ Air discharge permit — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Effluent discharge — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Waste disposal, POTW — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Other permits_____ — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: _____

5. **Gas Generation Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: _____

6. **Settlement Monument Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks : _____

7. **Groundwater Monitoring Records** — ☒ Readily available — ☒ Up to date — ☐ N/A

   Remarks: _____

8. **Leachate Extraction Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks _____

9. **Discharge Compliance Records**
   - ☐ Air — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Water (effluent) — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: _____

10. **Daily Access/Security Logs** — ☐ Readily available — ☐ Up to date — ☒ N/A

    Remarks: Access and security are controlled at the installation access points.

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-2 Sites

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☒ Federal Facility in-house ☒ Contractor for Federal Facility
☐ Other: _____

2. **O&M Cost Records** (Not applicable)

☐ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place
Original O&M cost estimate: Not available ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: Not applicable

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: Access is controlled by installation fencing (not site-specific).

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☐ N/A

Remarks: Signs present along installation fencing and portions of OU-2.

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-2 Sites

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) Contractor-performed inspections & reporting
Frequency At least annually
Responsible party/agency Federal facility
Contact Joseph Malen (Name) Restoration Program Manager (Title) 10-12 August 2015 (Date) (907) 361-4512 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☒ Yes ☐ No ☐ N/A
Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident
Remarks

2. **Land use changes on site** ☒ N/A
Remarks:

3. **Land use changes off site** ☒ N/A
Remarks:

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A
Remarks:

B. Other Site Conditions

Remarks

VII. LANDFILL COVERS ☐ Applicable ☒ N/A

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-2 Sites

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☒ N/A

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A

C. Treatment System ☐ Applicable ☒ N/A

D. Monitoring Data ☒ Applicable ☐ N/A

1. Monitoring Data
   ☒ Is routinely submitted on time ☒ Is of acceptable quality

2. Monitoring data suggests:
   ☒ Groundwater plumes are effectively contained ☒ Contaminant concentrations are declining

E. Monitored Natural Attenuation ☒ Applicable ☐ N/A

1. **Monitoring Wells** (natural attenuation remedy)
   ☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition
   ☒ All required wells located ☒ Needs Maintenance ☐ N/A
   Remarks : Monitoring wells in the vicinity of the DRMO yard observed damaged due to frost heaving.

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

Remarks : AS/SVE systems previously operated at each site and have been shut down.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The remedies for each site were established to: 1) restore groundwater to its beneficial use of drinking water quality within a reasonable time frame through source control, 2) reduce or prevent further migration of contaminants from source areas, 3) prevent the use of groundwater containing contaminants above MCLs, 4) use natural attenuation to attain Alaska Water Quality Standards after the MCLs are met, and 5) prevent the migration of soil contaminants to groundwater. The remedies were implemented and consisted of: 1) operating AS/SVE systems, 2) in-situ chemical oxidation (ISCO) (1168 Leach well site) and in-situ chemical reduction (DRMO Yard) treatability studies, 3) groundwater monitoring, and 4) implementing ICs. The remedies are functioning as intended by the ROD. At the Building 1168 Leach well site groundwater concentrations since the ISCO process indicate that COCs have consistently been below the cleanup goals. At the DRMO Yard, groundwater contamination plumes are stable or decreasing and PCE concentrations continue to exceed the MCL in several wells sampled. The remedial actions have prevented further migration of contaminated groundwater from source areas.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

O&M consists of monitoring well inspections and maintenance (if necessary) at each site.

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-2 Sites

C.	Early Indicators of Potential Remedy Problems
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future. No early indicators of potential remedy problems were identified.

D.	Opportunities for Optimization
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. Opportunities for optimization were not identified.

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-3 Sites

I. SITE INFORMATION

Site name: OU-3 Remedial Areas 1B (Birch Hill Tank Farm), 2 (Valve Pits and ROLF), and 3 (FEP Mileposts 2.7 and 3.0)	**Date of inspection:** 11 August 2015
Location and Region: Fairbanks, Alaska	**EPA ID:** AK6210022426
Agency, office, or company leading the five-year review: US Army Corps of Engineers, Buffalo District	**Weather/temperature:** Overcast/55-65ºC±

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☒ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other Formerly operated remedial systems include: 1) AS/SVE systems at Birch Hill Tank Farm, ROLF, and mile post signs 2.7 and 3.0 along the FEP, and 2) product recovery at Birch Hill.

Inspection team roster:

Mr. Brian Adams, Fort Wainwright Restoration Project Manager

Dr. Karen Keil, USACE Buffalo Risk Assessor

Ms. Holly Akers, PE, USACE Buffalo Project Engineer

Attachments: ☒ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** — Joseph Malen (Name) | Restoration Program Manager (Title) | 10-12 August 2015 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone — Phone no. (907) 361-4512
   Problems, suggestions; ☒ Report attached — See interview form

2. **O&M staff** — Brian Adams (Name) | Restoration Project Manager (Title) | 10-12 August 2015 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone — Phone no. _____
   Problems, suggestions; ☒ Report attached — See interview form

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

   Agency USEPA
   Contact Sandra Halstead (Name) | Federal Facilities RPM (Title) | _____ (Date) | (907) 271-1218 (Phone no.)
   Problems; suggestions; ☐ Report attached — Not present

   Agency ADEM
   Contact Dennis Sheppard (Name) | ADEC RPM (Title) | _____ (Date) | _____ (Phone no.)
   Problems; suggestions; ☐ Report attached — Not present

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-3 Sites

4. **Other interviews** (optional) ☒ Reports attached. (See interview forms)

Bob Hazlett, Environmental Scientist (USACE Alaska)

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - ☐ O&M manual — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ As-built drawings — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Maintenance logs — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: _____

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A
   ☒ Contingency plan/emergency response plan ☒ Readily available ☒ Up to date ☐ N/A

   Remarks: The Site-Specific Health and Safety Plan was drafted and implemented by the contractor, FES.

3. **O&M and OSHA Training Records** ☐ Readily available ☐ Up to date ☒ N/A

   Remarks: O&M and OSHA training records are maintained by contractors working on Fort Wainwright.

4. **Permits and Service Agreements**
   - ☐ Air discharge permit — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Effluent discharge — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Waste disposal, POTW — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Other permits_____ — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: _____

5. **Gas Generation Records** ☐ Readily available ☐ Up to date ☒ N/A

   Remarks: _____

6. **Settlement Monument Records** ☐ Readily available ☐ Up to date ☒ N/A

   Remarks : _____

7. **Groundwater Monitoring Records** ☒ Readily available ☒ Up to date ☐ N/A

   Remarks: _____

8. **Leachate Extraction Records** ☐ Readily available ☐ Up to date ☒ N/A

   Remarks _____

9. **Discharge Compliance Records**
   - ☐ Air — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Water (effluent) — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: _____

10. **Daily Access/Security Logs** ☐ Readily available ☐ Up to date ☒ N/A

    Remarks: Access and security are controlled at the installation access points.

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-3 Sites

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☒ Federal Facility in-house ☒ Contractor for Federal Facility
☐ Other: _____

2. **O&M Cost Records** (Not applicable)

☐ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place
Original O&M cost estimate: Not available ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost
From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost
From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost
From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost
From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: Not applicable

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: Access is controlled by installation fencing (not site-specific). Damages to fencing adjacent to the Birch Hill Tank Farm identified in the last FYR were observed repaired.

B. Other Access Restrictions

1. **Signs and other security measures** ☒ Location shown on site map ☐ N/A

Remarks: Signage present at Birch Hill Tank Farm and along installation fencing.

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-3 Sites

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) Contractor-performed inspections & reporting
Frequency At least annually
Responsible party/agency Federal facility
Contact Joseph Malen (Name) Restoration Program Manager (Title) 10-12 August 2015 (Date) (907) 361-4512 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☒ Yes ☐ No ☐ N/A
Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident
Remarks Installation staff mentioned historical vandalism (spray painting of concrete jersey barriers, areas of fencing repaired after being cut). Damage to installation fencing was repaired, a second fence was installation, and no damage to the fence was observed at the time of the site inspection.

2. **Land use changes on site** ☒ N/A
Remarks:

3. **Land use changes off site** ☐ N/A
Remarks: Housing construction downgradient of OU-3 was mentioned in the last five-year review. Additional units were constructed as recently as 2010. A new gate was installed on Lazalle Road.

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A
Remarks:

B. Other Site Conditions

Remarks None

VII. LANDFILL COVERS ☐ Applicable ☒ N/A

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-3 Sites

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☒ N/A

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A

C. Treatment System ☐ Applicable ☒ N/A

D. Monitoring Data ☒ Applicable ☐ N/A

1. Monitoring Data
   ☒ Is routinely submitted on time ☒ Is of acceptable quality

2. Monitoring data suggests:
   ☒ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

E. Monitored Natural Attenuation ☒ Applicable ☐ N/A

1. **Monitoring Wells** (natural attenuation remedy)
   ☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☐ Good condition
   ☒ All required wells located ☒ Needs Maintenance ☐ N/A
   Remarks : Monitoring wells located at Remedial Areas 1B and 2 require maintenance due to frost heaving.

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

Remarks : AS/SVE systems previously operated at the sites have been shut down.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

Remedies at each site were implemented to: 1) restore groundwater to drinking water quality within a reasonable timeframe, 2) reduce further migration of contaminated groundwater, 3) prevent use of groundwater with contaminants at levels above SDWA standards, and 4) prevent the migration of contaminants from soil to groundwater that would result in groundwater contamination and exceedance of SDWA standards. The remedies consisted of: 1) operating AS/SVE systems, 2) operating a dual-phase recovery system (Remedial Area 1B), 3) conducting an ISCO treatability study (Remedial Area 2), 4) injecting ORC into the groundwater (FEP Mileposts 2.7 and 3.0), 5) groundwater monitoring, and 6) implementing ICs. The remedies are functioning as intended by the ROD. At the Birch Hill Tank Farm, all COCs have attenuated to below the cleanup goals in the alluvial aquifer, in the alluvial and bedrock aquifers near the Truck Fill Stand, and in the alluvial and bedrock aquifers at the Thaw Channel Area. At the Valve Pits and ROLF, the remedies have been effective in removing COCs from the subsurface and substantially reducing groundwater contaminant source areas. Small areas of benzene contamination remain at Valve Pit A and at Former Building 1144. No recent COC exceedances have been identified at Valve Pit B, Valve Pit C, the Eight Car Header, and the Central Header. At FEP Mileposts 2.7 & 3.0 the concentrations of benzene remain high and exhibit increasing trends in several wells. Analysis shows that groundwater cleanup goals will not be achieved for these areas within a reasonable period of time. ICs are in place at each site to ensure that groundwater will not be used until cleanup goals are achieved.

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-3 Sites

B.	**Adequacy of O&M**
	Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy. O&M consists of monitoring well inspections and maintenance (if necessary) at each site.
C.	**Early Indicators of Potential Remedy Problems**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future. The concentrations of benzene remain high and exhibit increasing trends in several wells at the FEP Milepost 2.7 and 3.0 sites. A data gap investigation for this area is currently under contract with the U.S. Army. The inhalation pathway should not have been eliminated during development of the cleanup goals for trimethylbenzenes (TMBs) in the 2002 Explanation of Significant Differences. The 1994 baseline risk assessment clearly considered residential inhalation of volatiles from tap water to be a complete exposure pathway. The cleanup goals for 1,2,4-TMB and 1,3,5-TMB should be re-evaluated and re-established.
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. The well inventory at Birch Hill Tank Farm should be incorporated, where necessary, into the attenuation monitoring program for the bedrock aquifer. An optimized alluvium and bedrock well array should be selected to monitor the attenuation of recalcitrant COCs so a remedy completion strategy can be defined. Opportunities for optimization were not identified at the Valve Pits, ROLF, and FEP Milepost 2.7 and 3.0 sites. Five-year reviews should be discontinued at the Building 1168 Leach Well Site.

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-4 Landfill and Coal Storage Yard

I. SITE INFORMATION

Site name: OU-4 Landfill and Coal Storage Yard	**Date of inspection:** 11 August 2015
Location and Region: Fairbanks, Alaska/USEPA Region 10	**EPA ID:** AK6210022426
Agency, office, or company leading the five-year review: US Army Corps of Engineers, Buffalo District	**Weather/temperature:** Overcast/55-65ºC±

Remedy Includes: (Check all that apply)

- ☒ Landfill cover/containment
- ☒ Access controls
- ☐ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☒ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other An air sparging/soil vapor extraction system formerly operated at the coal storage yard. Treatment of groundwater is required if contaminant concentrations increase (not yet implemented).

Inspection team roster:

Mr. Brian Adams, Fort Wainwright Restoration Project Manager

Dr. Karen Keil, USACE Buffalo Risk Assessor

Ms. Holly Akers, PE, USACE Buffalo Project Engineer

Attachments: ☒ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** — Joseph Malen (Name) — Restoration Program Manager (Title) — 10 August 2015 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone — Phone no. (907) 361-4512
   Problems, suggestions; ☒ Report attached — See interview form

2. **O&M staff** — Brian Adams (Name) — Restoration Project Manager (Title) — 10 August 2015 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone — Phone no. Not available
   Problems, suggestions; ☒ Report attached — See interview form

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

   Agency USEPA
   Contact Sandra Halstead (Name) — Federal Facilities RPM (Title) — _____ (Date) — (907) 271-1218 (Phone no.)
   Problems; suggestions; ☐ Report attached — Not present

   Agency ADEC
   Contact Dennis Sheppard (Name) — ADEC RPM (Title) — _____ (Date) — _____ (Phone no.)
   Problems; suggestions; ☐ Report attached — Not present

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-4 Landfill and Coal Storage Yard

4. **Other interviews** (optional) ☒ Reports attached. (See interview forms)

Bob Hazlett, Environmental Scientist (USACE Alaska)

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - ☐ O&M manual — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ As-built drawings — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Maintenance logs — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: _____

2. **Site-Specific Health and Safety Plan** — ☒ Readily available — ☒ Up to date — ☐ N/A
   - ☒ Contingency plan/emergency response plan — ☒ Readily available — ☒ Up to date — ☐ N/A

   Remarks: The Site-Specific Health and Safety Plan was drafted and implemented by the contractor, FES.

3. **O&M and OSHA Training Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: O&M and OSHA training records are maintained by contractors working on Fort Wainwright.

4. **Permits and Service Agreements**
   - ☐ Air discharge permit — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Effluent discharge — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Waste disposal, POTW — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☒ Other permits ADEC Solid Waste — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: _____

5. **Gas Generation Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: _____

6. **Settlement Monument Records** — ☐ Readily available — ☐ Up to date — ☐ N/A

   Remarks : Survey records were not found.

7. **Groundwater Monitoring Records** — ☒ Readily available — ☒ Up to date — ☐ N/A

   Remarks: _____

8. **Leachate Extraction Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks _____

9. **Discharge Compliance Records**
   - ☐ Air — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Water (effluent) — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: _____

10. **Daily Access/Security Logs** — ☐ Readily available — ☐ Up to date — ☒ N/A

    Remarks: Access and security are controlled at the installation access points.

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-4 Landfill and Coal Storage Yard

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☒ Federal Facility in-house ☒ Contractor for Federal Facility
☐ Other: Contractors are used to perform routine O&M tasks while repair work (specifically the landfill cap and fencing) is completed by installation staff.

2. **O&M Cost Records (Not applicable)**

☐ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place
Original O&M cost estimate: Not available ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: Not applicable

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: Access is controlled to all sites by installation fencing. The OU-4 Landfill is fenced independently and was observed in good condition with no damage.

B. Other Access Restrictions

1. **Signs and other security measures** ☒ Location shown on site map ☐ N/A

Remarks: Fencing present around the OU-4 Landfill and Coal Storage Yard.

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-4 Landfill and Coal Storage Yard

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A

Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) Contractor-performed inspections & reporting

Frequency At least annually

Responsible party/agency Federal facility

Contact Joseph Malen (Name) Restoration Program Manager (Title) 10-12 August 2015 (Date) (907) 361-4512 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A

Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A

Violations have been reported ☒ Yes ☐ No ☐ N/A

Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks Installation staff indicated that the Landfill fencing had been damaged in 2014 by vandals but has since been repaired and was observed in good condition at the time of the site inspection.

2. **Land use changes on site** ☒ N/A

Remarks:

3. **Land use changes off site** ☒ N/A

Remarks:

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks:

B. Other Site Conditions

Remarks

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-4 Landfill and Coal Storage Yard

VII. LANDFILL COVERS ☒ Applicable ☐ N/A

A. Landfill Surface ☒ Applicable ☐ N/A

1. **Settlement** (Low spots) ☐ Location shown on site map ☒ Settlement not evident
   Areal extent_____ Depth _____
   Remarks: _____

2. **Cracks** ☐ Location shown on site map ☒ Cracking not evident
   Lengths_____ Widths_____ Depths_____
   Remarks: _____

3. **Erosion** ☐ Location shown on site map ☒ Erosion not evident
   Areal extent_____ Depth _____
   Remarks : _____

4. **Holes** ☐ Location shown on site map ☒ Holes not evident
   Areal extent_____ Depth _____
   Remarks : _____

5. **Vegetative Cover** ☒ Grass ☒ Cover properly established ☒ No signs of stress
   ☒ Trees/Shrubs (indicate size and locations on a diagram)
   Remarks: See photo log and figures depicting photo locations.

6. **Alternative Cover (armored rock, concrete, etc.)** ☒ N/A
   Remarks: _____

7. **Bulges** ☐ Location shown on site map ☒ Bulges not evident
   Areal extent_____ Height _____
   Remarks: _____

8. **Wet Areas/Water Damage** ☒ Wet areas/water damage not evident
   ☐ Wet areas ☐ Location shown on site map Areal extent _____
   ☐ Ponding ☐ Location shown on site map Areal extent _____
   ☐ Seeps ☐ Location shown on site map Areal extent _____
   ☐ Soft subgrade ☐ Location shown on site map Areal extent _____
   Remarks: _____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☒ No evidence of slope instability
   Areal extent_____
   Remarks: _____

B. Benches ☐ Applicable ☒ N/A

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-4 Landfill and Coal Storage Yard

C. Letdown Channels ☐ Applicable ☒ N/A

(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

D. Cover Penetrations ☒ Applicable ☐ N/A

1. **Gas Vents** ☐ Active ☐ Passive
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs Maintenance
   ☒ N/A
   Remarks _____

2. **Gas Monitoring Probes**
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☒ N/A
   Remarks _____

3. **Monitoring Wells** (within surface area of landfill)
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☒ N/A
   Remarks _____

4. **Leachate Extraction Wells**
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☒ N/A
   Remarks _____

5. **Settlement Monuments** ☒ Located ☐ Routinely surveyed ☐ N/A
   Remarks Survey records not located.

E. Gas Collection and Treatment ☐ Applicable ☒N/A

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☒ N/A
   Remarks _____

2. **Outlet Rock Inspected** ☐ Functioning ☒ N/A
   Remarks _____

G. Detention/Sedimentation Ponds ☐ Applicable ☒ N/A

H. Retaining Walls ☐ Applicable ☒ N/A

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☒ N/A

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-4 Landfill and Coal Storage Yard

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☒ N/A

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A

C. Treatment System ☐ Applicable ☒ N/A

D. Monitoring Data ☒ Applicable ☐ N/A

1. Monitoring Data
   ☒ Is routinely submitted on time ☒ Is of acceptable quality

2. Monitoring data suggests:
   ☒ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

E. Monitored Natural Attenuation ☒ Applicable ☐ N/A

1. **Monitoring Wells** (natural attenuation remedy)
   ☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition
   ☒ All required wells located ☐ Needs Maintenance ☐ N/A
   Remarks :

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

Remarks : None

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

Remedies at each site were implemented to: 1) restore groundwater to its beneficial use of drinking water quality within a reasonable time frame, 2) reduce further migration of contaminated groundwater from the source area, 3) prevent use of groundwater containing contaminants at levels above federal MCLs and AWQS, and 4) use natural attenuation to attain AWQS. The landfill was capped, groundwater monitoring and ICs were implemented. Monitoring data indicates that remedy has reduced further migration of contaminated groundwater from the landfill site and prevented the use of groundwater containing contaminants above the site cleanup goals. Reductive dechlorination is occurring is site groundwater. It is too early to determine whether the remedy will restore groundwater to its beneficial use of drinking water quality. An AS/SVE system was operated at the Coal Storage Yard from 1997 to 2000. Groundwater monitoring was performed until COCs were not detected. Monitoring was discontinued in 2003. All RAOs identified in the Rod have been attained.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

The scope and implementation of O&M procedures at the sites are adequate to assess current and long-term protectiveness of the remedies.

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-4 Landfill and Coal Storage Yard

C.	**Early Indicators of Potential Remedy Problems**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future. None.
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. The five-year review concurs with recommendations provided in the 2014 Annual Sampling Report (FES 2014h) for the landfill. No other opportunities for optimization were identified. Five-year reviews should be discontinued at the Coal Storage Yard site.

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-5 Sites

I. SITE INFORMATION

Site name: OU-5 WQFS, EQFS, Area 1A (BHTF), and Open Burning/Open Detonation Area	**Date of inspection:** 11 August 2015
Location and Region: Fairbanks, Alaska	**EPA ID:** AK6210022426
Agency, office, or company leading the five-year review: US Army Corps of Engineers, Buffalo District	**Weather/temperature**: Overcast/55-65ºC±

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☒ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other WQFS had an air sparging/soil vapor extraction system with in situ soil heating option and downgradient AS curtain. A harbor boom is also deployed at this site as a component of the remedy.

Inspection team roster:

Mr. Brian Adams, Fort Wainwright Restoration Project Manager

Dr. Karen Keil, USACE Buffalo Risk Assessor

Ms. Holly Akers, PE, USACE Buffalo Project Engineer

Attachments: ☒ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** — Joseph Malen (Name) | Restoration Program Manager (Title) | 10-12 August 2015 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone — Phone no. (907) 361-4512
   Problems, suggestions; ☒ Report attached — See interview form

2. **O&M staff** — Brian Adams (Name) | Restoration Project Manager (Title) | 10-12 August 2015 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone — Phone no. _____
   Problems, suggestions; ☒ Report attached — See interview form

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

   Agency USEPA
   Contact Sandra Halstead (Name) | Federal Facilities RPM (Title) | _____ (Date) | (907) 271-1218 (Phone no.)
   Problems; suggestions; ☐ Report attached — Not present

   Agency ADEM
   Contact Dennis Sheppard (Name) | ADEC RPM (Title) | _____ (Date) | _____ (Phone no.)
   Problems; suggestions; ☐ Report attached — Not present

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-5 Sites

4. **Other interviews** (optional) ☒ Reports attached.

Bob Hazlett, Environmental Scientist (USACE Alaska)

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - ☐ O&M manual — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ As-built drawings — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Maintenance logs — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: _____

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A
   ☒ Contingency plan/emergency response plan ☒ Readily available ☒ Up to date ☐ N/A

   Remarks: The Site-Specific Health and Safety Plan was drafted and implemented by the contractor, FES.

3. **O&M and OSHA Training Records** ☐ Readily available ☐ Up to date ☒ N/A

   Remarks: O&M and OSHA training records are maintained by contractors working on FWA.

4. **Permits and Service Agreements**
   - ☐ Air discharge permit — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Effluent discharge — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Waste disposal, POTW — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☒ Other permits RCRA permit (OB/OD) — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: _____

5. **Gas Generation Records** ☐ Readily available ☐ Up to date ☒ N/A

   Remarks: _____

6. **Settlement Monument Records** ☐ Readily available ☐ Up to date ☒ N/A

   Remarks : _____

7. **Groundwater Monitoring Records** ☒ Readily available ☒ Up to date ☐ N/A

   Remarks: _____

8. **Leachate Extraction Records** ☐ Readily available ☐ Up to date ☒ N/A

   Remarks _____

9. **Discharge Compliance Records**
   - ☐ Air — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Water (effluent) — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: _____

10. **Daily Access/Security Logs** ☐ Readily available ☐ Up to date ☒ N/A

    Remarks: _____

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-5 Sites

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☒ Federal Facility in-house ☒ Contractor for Federal Facility
☐ Other: Contractors are used to perform routine O&M tasks while repair work is completed by installation staff.

2. **O&M Cost Records** (Not applicable)

☐ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place
Original O&M cost estimate: _____ ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost
From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost
From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost
From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost
From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: Not applicable.

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☒ Gates secured ☒ N/A

Remarks: _____

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☐ N/A

Remarks: Signs are present around select portions of the site (for example, signage is present around the Birch Hill Tank Farm ASTs). See the annual IC report for more detail.

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-5 Sites

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) Contractor-performed inspections & reporting
Frequency At least annually
Responsible party/agency Federal facility
Contact Joseph Malen (Name) Restoration Program Manager (Title) 10-12 August 2015 (Date) (907) 361-4512 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☒ Yes ☐ No ☐ N/A
Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident
Remarks The 2014 IC report documented one trespassing event at the Open Burn/Open Detonation (OB/OD) site.

2. **Land use changes on site** ☒ N/A
Remarks:

3. **Land use changes off site** ☒ N/A
Remarks:

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☒ Location shown on site map ☒ Roads adequate ☐ N/A
Remarks: OU-5 OB/OD road modified significantly in the last five years.

B. Other Site Conditions

Remarks

VII. LANDFILL COVERS ☐ Applicable ☒ N/A

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-5 Sites

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☒ N/A

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A

C. Treatment System ☐ Applicable ☒ N/A (Treatment systems not operational)

D. Monitoring Data ☒ Applicable ☐ N/A

1. Monitoring Data
   ☒ Is routinely submitted on time ☒ Is of acceptable quality

2. Monitoring data suggests:
   ☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

E. Monitored Natural Attenuation ☒ Applicable ☐ N/A

1. **Monitoring Wells** (natural attenuation remedy)
   ☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition
   ☒ All required wells located ☐ Needs Maintenance ☐ N/A
   Remarks : _____

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

Remarks :A boom was deployed in the Chena River.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

Remedies were implemented at the WQFS and EQFS sites to: 1) restore groundwater to its beneficial use within a reasonable time frame, 2) reduce or prevent further migration of contaminated groundwater from source areas, 3) ensure that there is no risk to aquatic receptors through control of contaminant movement through groundwater to the Chena River, 4) remove LNAPL to the extent practicable to eliminate film or sheen from groundwater, 5) prevent use of groundwater containing contaminants above SDWA MCLs or AWQS, 6) prevent the migration of soil contaminants to groundwater at levels above SDWA, non-zero MCLGs, or AWQs, 7) reduce sources of contaminant releases to the Chena River, 8) Meet AWQS for the Chena River, 9) perform an aquatic assessment of the Chena River, 10) collect Chena River benthic macroinvertebrates for toxicological studies and bioassays, and 11) determine the reductions of contaminant load into the Chena River from the remedial actions and the associated changes to aquatic organisms. The remedies at these sites consisted of: 1) operating AS/SVE systems and an AS curtain (WQFS2), 2) seasonal deployment of a boom in the Chena River to collect sheen, 3) abandonment of fuel pipelines, 4) groundwater monitoring and natural attenuation, 5) implementing ICs.

	A remedy was implemented at the BHTF ASTs site to limit human health and terrestrial receptor exposure to lead contaminated soil. The remedy consisted of implementing ICs. In addition, excavation and disposal of lead contaminated soil will be performed after the ASTs are removed (milestone date is 2016). Groundwater contaminant levels at the WQFS remain above the cleanup goals and soil sampling data collected after active treatment indicates the presence of a smear zone that likely contributes to groundwater contamination. Groundwater monitoring in four areas known as Flowpaths A, B, C, and the Apple Street Hotspot has been discontinued because all groundwater cleanup goals have been attained. Groundwater at Flowpath D indicates that all COC concentrations have been attained, although a DRO exceedance was observed during the previous monitoring episode in 2010. An intermittent sheen continues to be observed on the Chena River. ICs are in place at all OU-5 sites and are functioning as intended. Treatment systems are not operated and monitoring is not performed at the OB/OD area.
B.	**Adequacy of O&M**
	Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy. O&M activities at the WQFS sites consist of monitoring well inspections and maintenance (if necessary), and deployment and maintenance of the Chena River boom. O&M activities at the EQFS sites consist of monitoring well inspections during the groundwater sampling events (every five years) and maintenance (if necessary). There are no O&M activities associated with the OU-5 BHTF ASTs.
C.	**Early Indicators of Potential Remedy Problems**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future. The Chena River boom was lifted off its supports in 2014 as a result of high water level. Measures should be implemented to prevent future displacement of the boom.
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. Opportunities for optimization were not identified.

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-6

I. SITE INFORMATION

Site name: Former Communications Site, OU-6	**Date of inspection:** 11 August 2015
Location and Region: Fairbanks, Alaska	**EPA ID:** AK6210022426
Agency, office, or company leading the five-year review: US Army Corps of Engineers, Buffalo District	**Weather/temperature:** Overcast/55-65ºC±

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Other _____
- ☒ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls

Inspection team roster:

Mr. Brian Adams, Fort Wainwright Restoration Project Manager

Dr. Karen Keil, USACE Buffalo Risk Assessor

Ms. Holly Akers, PE, USACE Buffalo Project Engineer

Attachments: ☒ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** — Joseph Malen (Name) — Restoration Program Manager (Title) — 10-12 August 2015 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone — Phone no. (907) 361-4512
   Problems, suggestions; ☒ Report attached — See interview form

2. **O&M staff** — Brian Adams (Name) — Restoration Project Manager (Title) — 10-12 August 2015 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone — Phone no. _____
   Problems, suggestions; ☒ Report attached — See interview form

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

   Agency USEPA
   Contact Sandra Halstead (Name) — Federal Facilities RPM (Title) — _____ (Date) — (907) 271-1218 (Phone no.)
   Problems; suggestions; ☐ Report attached — Not present

   Agency ADEM
   Contact Dennis Sheppard (Name) — ADEC RPM (Title) — _____ (Date) — _____ (Phone no.)
   Problems; suggestions; ☐ Report attached — Not present

4. **Other interviews** (optional) ☐ Reports attached.

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-6

Bob Hazlett, Environmental Scientist (USACE Alaska)

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - ☐ O&M manual — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ As-built drawings — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Maintenance logs — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: _____

2. **Site-Specific Health and Safety Plan** — ☒ Readily available — ☒ Up to date — ☐ N/A
   ☒ Contingency plan/emergency response plan — ☒ Readily available — ☒ Up to date — ☐ N/A

   Remarks: The Site-Specific Health and Safety Plan was drafted and implemented by the contractor, FES.

3. **O&M and OSHA Training Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: O&M and OSHA training records are maintained by contractors working on FWA.

4. **Permits and Service Agreements**
   - ☐ Air discharge permit — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Effluent discharge — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Waste disposal, POTW — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Other permits_____ — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: _____

5. **Gas Generation Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: _____

6. **Settlement Monument Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks : _____

7. **Groundwater Monitoring Records** — ☐ Readily available — ☐ Up to date — ☐ N/A

   Remarks: No post-remedial groundwater monitoring has been performed. The remedy includes MNA and associated groundwater monitoring events are planned to start in FY16.

8. **Leachate Extraction Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks _____

9. **Discharge Compliance Records**
   - ☐ Air — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Water (effluent) — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: _____

10. **Daily Access/Security Logs** — ☐ Readily available — ☐ Up to date — ☒ N/A

    Remarks: Access and security are controlled at the installation access points.

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-6

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☒ Federal Facility in-house ☒ Contractor for Federal Facility
☐ Other: Contractors are used to perform routine O&M tasks while repair work is completed by installation staff.

2. **O&M Cost Records** (Not Applicable)

☐ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place
Original O&M cost estimate: _____ ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost
From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost
From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost
From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost
From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: Not applicable.

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: Access is controlled to all sites by installation fencing.

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☒ N/A

Remarks: _____

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-6

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) Contractor-performed inspections & reporting
Frequency At least annually
Responsible party/agency Federal facility
Contact Joseph Malen (Name) Restoration Program Manager (Title) 10-12 August 2015 (Date) (907) 361-4512 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☒ No ☐ N/A
Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident
Remarks

2. **Land use changes on site** ☐ N/A
Remarks: Residential occupation began in July 2015.

3. **Land use changes off site** ☒ N/A
Remarks:

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☒ Location shown on site map ☒ Roads adequate ☐ N/A
Remarks:

B. Other Site Conditions

Remarks

VII. LANDFILL COVERS ☐ Applicable ☒ N/A

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-6

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☒ N/A

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A

C. Treatment System ☐ Applicable ☒ N/A

D. Monitoring Data ☒ Applicable ☐ N/A

1. Monitoring Data (none submitted)
   ☐ Is routinely submitted on time ☐ Is of acceptable quality

2. Monitoring data suggests:
   ☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

E. Monitored Natural Attenuation ☒ Applicable ☐ N/A

1. **Monitoring Wells** (natural attenuation remedy)
   ☒ Properly secured/locked ☒ Functioning ☐ Routinely sampled ☒ Good condition
   ☒ All required wells located ☐ Needs Maintenance ☐ N/A
   Remarks : _____

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

Remarks : _____

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The remedy for OU-6 includes institutional controls to restrict excavation of soil and prohibit groundwater use and MNA. Groundwater monitoring will be used to assess the effectiveness of natural attenuation and the degradation processes and to track the extent of any contaminant migration; however, this component of the remedy has not yet been implemented. No intrusive activities were observed at OU-6 indicating that this portion of the remedy is effective and functioning as designed.

Five-Year Review Site Inspection Checklist
Fort Wainwright OU-6

B.	Adequacy of O&M
	Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy. O&M procedures at OU-6 include sampling, monitoring and analysis of groundwater; IC inspections; routine maintenance; and, reporting. Groundwater monitoring work plans were recently approved by the USEPA and will be implemented in 2016. No groundwater monitoring was conducted from remedy selection in January 2014 to current (May 2016). Monitoring is an essential component of the remedy and should be conducted on a routine basis. Annual IC inspections and maintenance of the groundwater monitoring well network has been performed as required.

C.	Early Indicators of Potential Remedy Problems
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future. No early indicators of potential remedy problems were identified.

D.	Opportunities for Optimization
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. No opportunities for optimization were identified.

ATTACHMENT 5

Photographic Record

[This page intentionally left blank]

Photograph and Orientation

OU1, 801 Drum Burial Site

N
W E
S

0 125 250 500 Feet

US Army Corps of Engineers
Buffalo District

Document Name: 091215_FWA_A5_1.mxd
Drawn By: H5TDEEMP
Date Saved: 09 Dec 2015
Time Saved: 7:22:40 AM

OU-1 801 Drum Burial Site

United States Army Garrison
Fort Wainwright, Alaska

Figure A5-1

Photograph and Orientation

DRMO Sub-Area 1

DRMO Sub-Area 2

DRMO Sub-Area 3

DRMO Sub-Area 4

DRMO Sub-Area 5

Installation Boundary

N

W E

S

0 125 250 500

Feet

US Army Corps of Engineers
Buffalo District

OU-2 DRMO Storage Yard

Document Name: 091215_FWA_A5_2.mxd
Drawn By: H5TDEEMP
Date Saved: 09 Dec 2015
Time Saved: 7:30:59 AM

United States Army Garrison
Fort Wainwright, Alaska

Figure A5-2

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Photograph and Orientation

OU2, Bldg 1168

Former Building 1168 Footprint

N
W E
S

0 25 50 100
Feet

US Army Corps of Engineers
Buffalo District

OU-2 Building 1168

Document Name: 091215_FWA_A5_3.mxd
Drawn By: H5TDEEMP
Date Saved: 09 Dec 2015
Time Saved: 7:33:58 AM

United States Army Garrison
Fort Wainwright, Alaska

Figure A5-3

Photograph and Orientation

Valve Pit A

Railcar Off-Loading Facility

N
W E
S

0 250 500 1,000
Feet

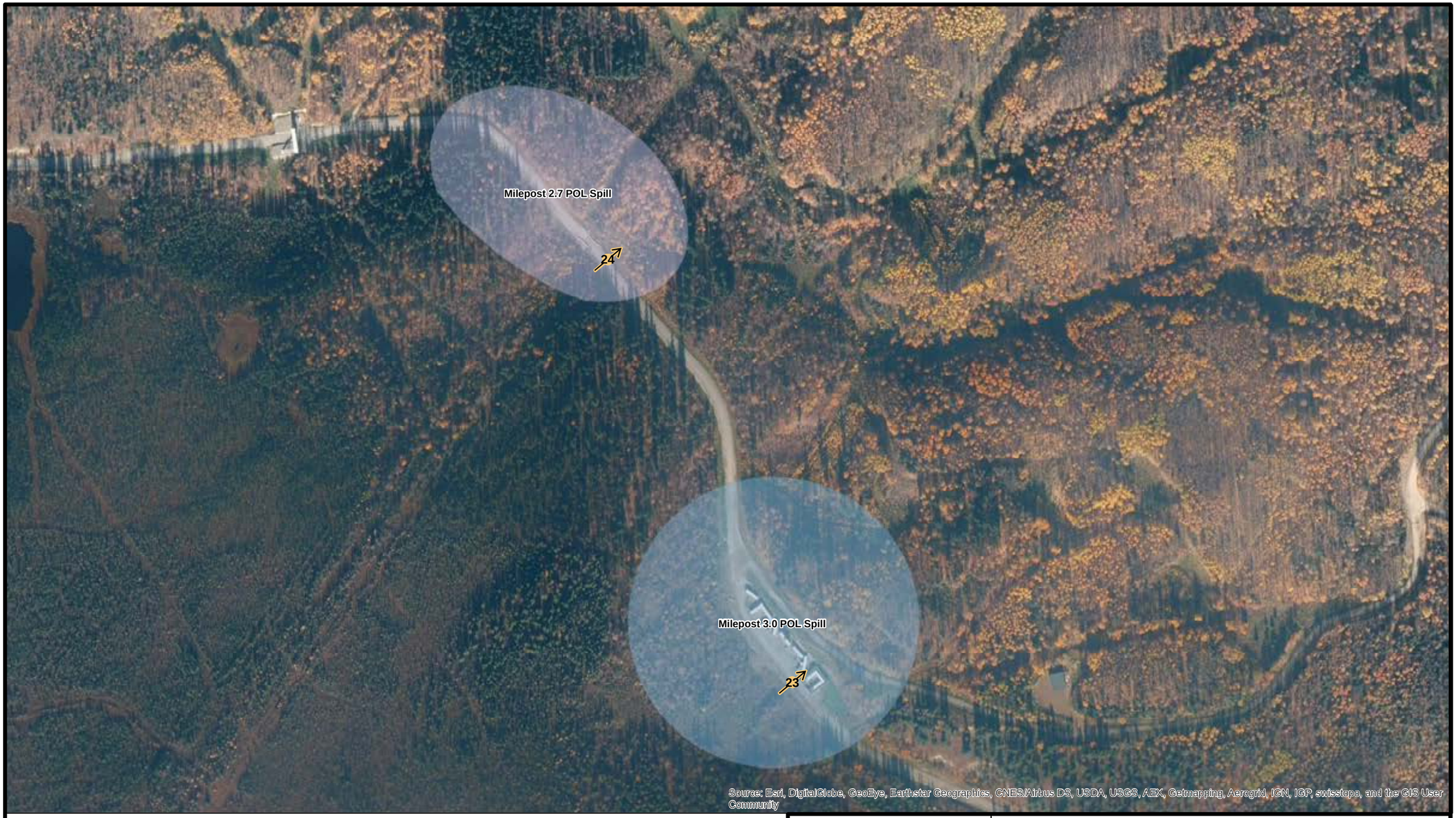
US Army Corps of Engineers
Buffalo District

OU-3 Remedial Area 2

Document Name: 091215_FWA_A5_4.mxd
Drawn By: H5TDEEMP
Date Saved: 09 Dec 2015
Time Saved: 7:42:47 AM

United States Army Garrison
Fort Wainwright, Alaska

Figure A5 - 4



Photograph and Orientation

Milepost 3.0 POL Spill

Milepost 2.7 POL Spill

N
W E
S

0 250 500 1,000
Feet

US Army Corps of Engineers
Buffalo District

OU-3 Remedial Area 3

Document Name: 091215_FWA_A5_5.mxd
Drawn By: H5TDEEMP
Date Saved: 09 Dec 2015
Time Saved: 7:46:27 AM

United States Army Garrison
Fort Wainwright, Alaska

Figure A5 - 5

Photograph and Orientation

OU3 & OU5 - Birch Hill Tank Farm

OU3 - Bldg 1173

OU3 - Fairbanks Fuel Terminal

Installation Boundary

N W E S

0 125 250 500 Feet

US Army Corps of Engineers
Buffalo District

OU-3 & OU-5 Birch Hill Tank Farm

Document Name: 091215_FWA_A5_6.mxd
Drawn By: H5TDEEMP
Date Saved: 09 Dec 2015
Time Saved: 7:50:35 AM

United States Army Garrison
Fort Wainwright, Alaska

Figure A5 - 6

Photograph and Orientation

OU4 - Coal Storage Yard

N
W E
S

0 250 500 1,000
Feet

US Army Corps of Engineers
Buffalo District

OU-4 Coal Storage Yard

Document Name: 091215_FWA_A5_7.mxd
Drawn By: H5TDEEMP
Date Saved: 09 Dec 2015
Time Saved: 8:02:58 AM

United States Army Garrison
Fort Wainwright, Alaska

Figure A5 - 7

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Photograph and Orientation

OU4 - Landfill

OU4 - Landfill Cat Shed

N
W E
S

0 125 250 500
Feet

US Army Corps of Engineers
Buffalo District

Document Name: 091215_FWA_A5_8.mxd
Drawn By: H5TDEEMP
Date Saved: 09 Dec 2015
Time Saved: 8:08:43 AM

OU - 4 Landfill

United States Army Garrison
Fort Wainwright, Alaska

Figure A5 - 8

Photograph and Orientation

OU5 - West Quartermaster's Fueling System

OU5 - East Quartermaster's Fueling System

N
W E
S

0 25 50 100
Feet

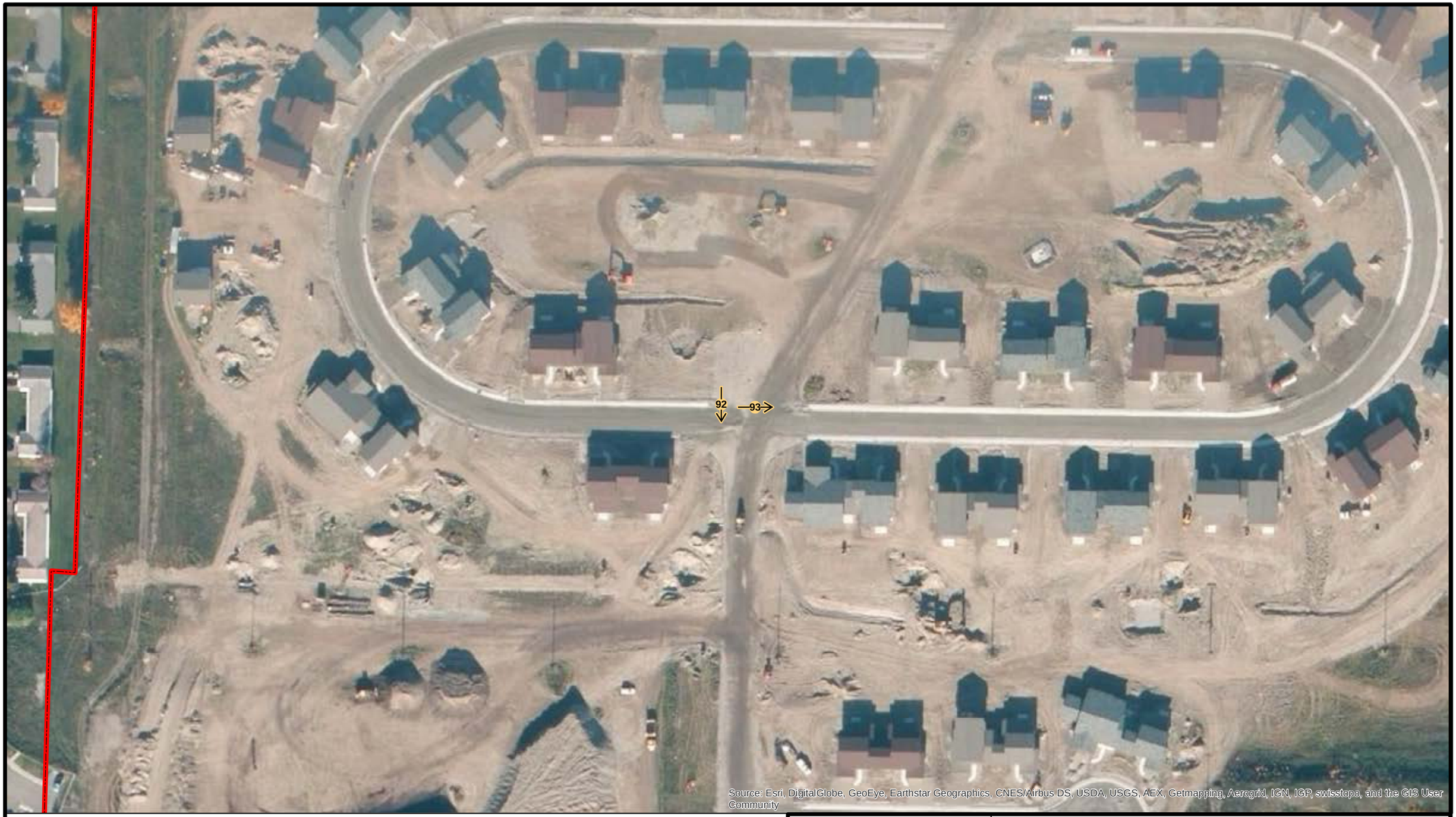
US Army Corps of Engineers
Buffalo District

OU-5 WQFS & EQFS

Document Name: 091215_FWA_A5_9.mxd
Drawn By: H5TDEEMP
Date Saved: 08 Sep 2016
Time Saved: 12:38:04 PM

United States Army Garrison
Fort Wainwright, Alaska

Figure A5 - 9



Photograph and Orientation

OU-6 Boundary

N
W E
S

0 50 100 200
Feet

US Army Corps of Engineers
Buffalo District

OU-6 Former Communications Site

Document Name: 091215_FWA_A5_10.mxd
Drawn By: H5TDEEMP
Date Saved: 16 May 2016
Time Saved: 4:36:00 PM

United States Army Garrison
Fort Wainwright, Alaska

Figure A5 - 10