APPENDIX D

Site-specific Attachments

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Site-specific Attachments

This appendix consists of the following site-specific attachments, grouped by site category:

Environmental Restoration Program Sites

Attachment D-1	Fire Protection Training Area (FT001)
Attachment D-2	JP-4 Fill-stands (ST009), 1572 Liquid Fuel Pump Station, 3,000-gallon UST (UST 1572), 2,000-gallon UST (UST 1572-2)
Attachment D-3	Southeast Runway Fuel Spill (ST010)
Attachment D-4	Building Demolition/Drum Removal (OT099)
Attachment D-5	Wilderness Hall, Building 1872 (SS005)

Other Sites

Attachment D-6	Possible Tar Pit Construction Area (TAR)
Attachment D-7	Hydrogeologic Study (provided under separate cover)

The information provided for each of the sites consists of the following elements:

- Site location, characteristics, description and history
- Summary of previous investigations, including the October 2009 site visit
- Findings of previous investigations and chemicals of interest
- Secondary data use information
- Conceptual site model (CSM) for exposure
- Data quality objectives
- Investigation activities

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ATTACHMENT D-1

Fire Protection Training Area (FT001)

ATTACHMENT D-1

Fire Protection Training Area (Site FT001)

This attachment provides background information, and describes the conceptual site model (CSM), data quality objectives (DQOs), and the proposed field sampling plan for the Fire Protection Training Area (FPTA) (Site FT001) at the Former Galena Forward Operating Location (FOL). Because Site FT001 is on the Remedial Investigation Pathway, as defined in Worksheet #10, the objective of data collection at this site is to characterize the nature and extent of soil and groundwater contamination laterally and vertically (throughout the entire thickness of the variably saturated zone and 10 feet into the permanently saturated zone). The data collected during site characterization will be evaluated for usability in a future risk assessment, if required.

1.1 Site Location

FT001, previously designated as Sites 5 and G5, is within Parcel I north of the runway overrun at the eastern end of the FOL. Site FT001 is bounded by the flood control dike to the north and east, the runway overrun to the south, and an open field vegetated primarily by tall grasses to the west.

1.2 Site Characteristics

Current and former features of Site FT001 are presented on Figure D1-FT001 (figures are located at the end of this attachment). The primary feature of Site FT001 is the former FPTA circle. This area now consists of an unlined, topographically low-lying region of approximately 0.15 acre surrounded by a 1-foot-high sand and gravel berm. The FPTA once contained an aircraft mock-up surrounded by several fuel sprayers. The sprayers were fed by an underground fuel pipeline that ran from the FPTA circle to an aboveground stand pipe, approximately 300 feet to the south.

Large seasonal fluctuations in groundwater elevations have been recorded at the FOL. Figure D2-FT001 present time series plots of groundwater elevation at Site FT001 groundwater monitoring well 01-MW-08R from 2004 through 2008. A complete set of groundwater hydrographs for monitoring wells at the FOL are presented in Standard Operating Procedure (SOP)-13 *(Groundwater Sampling Procedures)*. The data presented on Figure D2-FT001 indicate that groundwater elevations at Site FT001 have ranged from approximately 116 to 137 feet mean sea level (msl) over the 4-year period. Given a ground surface elevation of 151.1 feet msl at well 01-MW-08R (USAF, 2010), the variably saturated zone at Site FT001 ranges in depth from approximately 14 to 35 feet below ground surface (bgs).

1.3 Site Description and History

FT001 was used for fire training activities from the late 1950s until 1991. As part of these activities, an aircraft mock-up was covered with fuel, ignited, and extinguished with firefighting chemicals. The aircraft mock-up used in fire training exercises was reportedly removed during summer 1992; however, as shown on Figure D3-FT001, it was not present in the 1987 aerial photograph. Historical aerial photographs from 1963 to 1978 suggest that drums were stored on the ground around the FPTA circle (U.S. Air Force [USAF], March 1996). An underground fuel pipeline connected to fuel sprayers around the former simulated aircraft was believed to have been used to deliver flammable liquids to the FPTA circle during training exercises. Surface soils in the area are stained black, presumably from remaining unburned and residual materials.

Based on the 1993 Site Investigation (SI) Report, from the late 1950s through 1985, approximately 8,000 to 13,000 gallons of fuel were used annually for fire training exercises (Woodward-Clyde Consultants, July 1993). The 1996 Remedial Investigation Report (USAF, March 1996) indicated that approximately 300 to 500 gallons of fuel were used per fire, and two fires per training session were typical. The site was used for fire training exercises approximately once per week during June through November and once per month during April and May. The facility was not used during December through March (USAF, March 1996). This would suggest that up to 28,000 gallons of fuel may have been used annually for fire training exercises. When the surface soils were not frozen, the FPTA circle was pre-wetted with water prior to distributing fuel directly to the ground surface and igniting. In the 1950s and 1960s, some combustible shop wastes (such as aviation gasoline [AVGAS], thinners, paints, and oils) were used (USAF, 1985). Since the 1960s, fuels used included clean and contaminated jet-propulsion fuel, grade 4 (JP-4). Fire extinguishing agents used at the site included protein foam, chlorobromethane, dry chemicals, halon, and aqueous film forming foam (AFFF) (USAF, 1985). Some unburned fuel and firefighting chemicals infiltrated downward into the soils (USAF, March 1996).

1.4 Summary of Previous Investigations and Remedial Actions

Beginning in 1985, multiple site investigations of soil, groundwater, and soil gas were conducted at Site FT001. Figure D4-FT001 presents the locations of previous investigation sample locations. Electronically available analytical laboratory data associated with Site FT001 are provided in Supplement D1-FT001. Statistical summaries of soil and groundwater analytical data provided in Supplement D1-FT001 are provided in Tables D1-FT001 (tables are located at the end of this attachment) and D2-FT001. Tables D3-FT001 and D4-FT001 present summaries of analytes exceeding the extent soil screening levels (SLs) and extent groundwater to surface water SLs defined in Worksheet #15. Figure D4-FT001 presents historical sample locations associated with the data in Supplement D1-FT001.
Figures D5-FT001, D6-FT001, and D7-FT001 show areas where at least one analyte exceeded the extent soil SL in surface soil (0 to 2 feet below ground surface [bgs]) and subsurface soil (greater than 2 feet bgs), and the extent groundwater to surface water SLs in groundwater. The areas shown on these figures represent locations where at least one analyte has exceeded the respective screening level for the field sample plan design. These figures are

not intended to represent iso-concentration contour or plume maps for a given analyte group or medium.

1.4.1 Installation Restoration Program Phase I – Initial Assessment/Records Search (1985)

FT001 was initially identified as an area of interest during the Installation Restoration Program (IRP) Phase I Initial Assessment/Records Search of the Galena FOL in 1985 (Engineering-Science, September 1985). The IRP Phase I concluded that Site FT001 warranted a Phase II environmental investigation.

1.4.2 Installation Restoration Program Phase II – Confirmation/Quantification, Stage 1 (1986 to 1987)

During 1986 and 1987, an IRP Phase II Confirmation/Quantification investigation was conducted at Site FT001. This work involved installing four soil borings (TB048 through TB051) and four monitoring wells (referred to as MW005 through MW008 in the project report, but labeled on Figure D4-FT001 with the USAF IRP nomenclature as 01-MW-03 through 01-MW-06) around the perimeter of the FPTA circle (Woodward-Clyde Consultants, April 1989). Soil samples were collected during the drilling of each monitoring well and soil boring location at the surface and at intervals of suspected contamination as indicated by an organic vapor analyzer field screening instrument. Soil samples at each monitoring well location were analyzed for unspecified carbon ranges of total petroleum hydrocarbons (TPH) using Method 418.1, and soil samples from 01-MW-03 and 01-MW-04 were analyzed for total polychlorinated biphenyls (PCBs) using Method 8080. Samples at each soil boring location were analyzed for volatile organic compounds (VOCs) and lead using Methods 8240 and 7420, respectively. As shown in Supplement D1-FT001, TPH concentrations were detected in surface soil samples collected during installation of the groundwater monitoring wells at concentrations up to 37 milligrams (mg) per kilogram (kg), with the highest concentration at the surface at 01-MW-06. Lead concentrations ranged from 9.5 to 44 mg/kg in the soil borings. VOCs and PCBs were not detected in soils at the sampled locations. The areal extent of measured surface soil contamination was estimated at approximately 0.75 acre.

In August 1986, groundwater from each monitoring well was sampled and analyzed for TPH by Method 418.1. In September 1987, groundwater samples from each monitoring well were analyzed for lead (SW7420), VOCs (SW8010), and benzene, ethylbenzene, toluene, and xylenes (BTEX) (SW8020). Historical analytical data are provided in Supplement D1-FT001. TPH was not detected in the groundwater samples. However, benzene, toluene, and ethylbenzene were detected. As shown in Table D4-FT001, benzene and toluene exceeded the extent groundwater to surface water SLs at 01-MW-06.

1.4.3 Installation Restoration Program Phase II – Remedial Investigation/Feasibility Study, Stage 2 (1989 to 1990)

From August 1989 to August 1990, an IRP Phase II Remedial Investigation (RI)/Feasibility Study (FS) was conducted at Site FT001 to investigate potential groundwater contamination at the site (Woodward-Clyde Consultants, July 1991). Groundwater samples were collected from 01-MW-03 through 01-MW-06 during September 1989, December 1989, and June 1990. Groundwater samples were analyzed for TPH, BTEX, VOCs, and lead using Methods 418.1, 8020, 8010, and 7421, respectively. Historical analytical data are presented in Supplement D1-FT001. TPH was detected at concentrations up to 620 micrograms (µg) per liter (L), with the highest concentration at 01-MW-06. Multiple VOCs were detected in groundwater, including benzene, xylenes, methylene chloride, and 1,2-dichloroethane (1,2-DCA). Benzene was detected at concentrations up to 990 µg/L in 01-MW-06. Total xylenes were detected at a concentration of 9.5 µg/L in 01-MW-04, and 1,2-DCA was detected in 01-MW-06 at a concentration of 1.2 µg/L. Toluene, ethylbenzene, and lead were below detection limits in all water samples collected from the site. As shown in Table D4-FT001, benzene and 1,2-DCA were the only analytes to exceed the extent groundwater to surface water SLs, both at 01-MW-06.

1.4.4 Former Galena FOL Site Investigation (1992)

During September 23–27, 1992, a site investigation was conducted at the FOL (Woodward-Clyde Consultants, July 1993). Six soil samples were collected around the FPTA circle from three soil boring locations (GA-S050-A-501, GA-S050-A-503, and GA-S050-A-505) in areas previously identified as stained (Figure D4-FT001). A surface soil sample (0.5 foot bgs) and a subsurface soil sample (5 feet bgs) were collected from each soil boring location. All soil samples were analyzed for Target Compound List (TCL)/Target Analyte List (TAL) compounds, which include VOCs, semivolatile organic compounds (SVOCs), and PCBs/pesticides (using Methods 8240, 8270, and 8080, respectively), and metals (using Methods 6000/7000 series). Historical analytical data are provided in Supplement D1-FT001. Multiple VOCs, SVOCs, metals, and pesticides were detected in the soil samples, ranging up to an estimated concentration of 170 mg/kg for benzene. Table D3-FT001 presents all data exceeding the extent soil SLs. These analytes include 2-methylnaphthalene, 1,2-DCA, benzene, ethylbenzene, xylene, trichloroethene (TCE), and vinyl chloride. The highest VOC concentrations were detected in the soil boring near the southern portion of the FPTA circle (GA-S050-A-505). The pesticide 4,4-dichlorodiphenyldichloroethane (DDD) was detected in two subsurface soil samples, with concentrations of 0.037 mg/kg and 0.0095 mg/kg (Supplement D1-FT001); however, concentrations did not exceed the extent soil SL.

1.4.5 Former Galena FOL Remedial Investigation (1992–1994)

During the 1992 to 1994 Remedial Investigation, surface soil, subsurface soil, and groundwater were sampled to characterize potential contamination at Site FT001 (USAF, March 1996).

Four soil borings (01-SB-01 through 01-SB-04) were advanced up to 15 feet bgs, and four monitoring wells (01-MW-01, 01-MW-02, 01-MW-07, and 01-MW-08) were installed to depths ranging from 30 to 60 feet bgs (Figure D4-FT001). Ten surface soil samples (01-SS-01 through 01-SS-10) were collected, and three hand auger samples (01-HA-11 through 01-HA-13) were advanced to 5 feet bgs within and around the FPTA circle. Two sediment samples were collected (01-SD-01 and 01-SD-02) outside the dike surrounding Site FT001.

Additionally, the four previously installed wells were sampled (01-MW-03 through 01-MW-06), and two surface water samples were collected (01-SW-01 and 01-SW-02).

Soil and sediment samples were analyzed for diesel-range organics (DRO), gasoline-range organics (GRO), VOCs, polynuclear aromatic hydrocarbons (PAHs), metals, and PCBs/pesticides using Methods SW8015D, SW8015V, SW8240, SW8310, SW6010/7060/7421/ 7470/7740, and SW8080, respectively. Historical analytical data are presented in Supplement D1-FT001. Table D3-FT001 presents analytical data exceeding the extent soil SLs. Surface soil samples (0 to 2 feet bgs) showed exceedances of the extent soil SLs for GRO, DRO, aldrin, benzene, xylene, 1,1,2,2,-TCA, bromodichloromethane, methylene chloride, and naphthalene. As shown in Table D3-FT001, DRO, GRO, BTEX, benzo(a)anthrene, benzo(a)pyrene, benzo(b)fluoranthrene, dibenzo(a,h)anthracene, naphthalene, and lead were detected in subsurface soils at concentrations exceeding the extent soil SLs. The highest subsurface soil concentrations of DRO, GRO, and BTEX were encountered in the upper 7 feet bgs at 01-SB-02 (in the center of the FPTA circle), with additional extent soil SL exceedances in soil samples to 15 feet bgs. Dioxins (including total heptachlorodibenzo-p-dioxins [HpCDD] and octachlorodibenzo-p-dioxin [OCDD]) were detected in the surface and subsurface soils at 01-HA-11 through 01-HA-13 at maximum concentrations of 137 picograms (pg) per kilogram (kg) and 359 pg/kg, respectively (Supplement D1-FT001). 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) was not detected above the method detection limits. The area of most significant soil contamination appears to be generally limited to the area within and adjacent to the FPTA circle on the southeast.

All water samples were analyzed for DRO, GRO, VOCs, PAHs, PCBs/pesticides, and metals using Methods AK102, AK101, SW8010/8015/8020 or SW8260, SW8310, SW8080, and SW6010/7060/7421/7470/7740, respectively. Groundwater samples were collected from the four new monitoring wells (01-MW-01, 01-MW-02, 01-MW-07, and 01-MW-08) and from four older monitoring wells (01-MW-03 through 01-MW-06). As shown in Table D4-FT001, benzene, 1,2-DCA, sec-butyl alcohol, DRO, GRO, 4,4-dichlorodiphenyltrichloroethane (DDT), dieldrin, heptachlor, and methoxychlor were detected above the extent groundwater to surface water SLs in at least one sampling event. Benzene, DRO, and GRO were consistently detected, with maximum concentrations of 420 µg/L, 980 µg/L, and 1,400 µg/L, respectively.

1.4.6 Remedial Investigation Soil Gas Survey (1993)

A soil gas survey was conducted at Site FT001 in 1993 to determine the downgradient extent of the benzene groundwater plume that extended past the southernmost well at the time, 01-MW-01 (Radian Corporation, December 1993a, USAF, March 1996).

Soil gas samples were collected at 26 sampling points using a portable photoionization detector (PID) and a flame ionization detector (FID). As shown in Supplement D2-FT001, two areas of hydrocarbon soil gas contamination were detected: one area beneath the FPTA circle and another approximately 300 feet south of the FPTA circle. The area beneath the FPTA circle corresponds to soil and groundwater contamination identified in earlier field investigation activities. The second area of soil gas contamination was hydrologically cross-gradient and downgradient from the FPTA circle near a pipe and valve sticking out of the ground. It was assumed that the exposed pipe and valve were used to transfer fuels to the simulated aircraft mock-up within the FPTA circle via an underground pipe. Contamination in this southern area may have been the result of spills or leaks associated with underground fuel transfer.

1.4.7 Remedial Investigation Geophysical Survey (1993)

A geophysical survey using both ground penetrating radar (GPR) and induction electromagnetic (EM) methods was performed at Site FT001 during July and August 1993 (Radian Corporation, December 1993b). These surveys were conducted over a 300-foot-by-280-foot grid area to confirm previously encountered permafrost, determine the location and depth of any continuous permafrost, and assess the effect of a permafrost layer on groundwater flow beneath Site FT001. Neither the EM nor the GPR survey detected shallow permafrost beneath the site shallower than 70 feet bgs. Shallow permafrost zones encountered during previous investigations were determined to be isolated lenses of frozen soil not continuously present from year to year. However, two linear anomalies were detected at approximately 6 feet bgs. They originated from the center of the FPTA circle and led south and southeast toward 01-MW-06. The nature of these anomalies was not clearly defined at the time of the survey. However, it is believed they are fuel lines used to spray fuel on the simulated airplane within the FPTA circle. Despite the inability to detect continuous permafrost at Site FT001, the GPR survey provided insight into the site stratigraphy and detected a well-developed accretionary channel running north-south across the site from the surface to approximately 16 feet bgs. The GPR data showed a hummocky, cross-bedded stratigraphy that was expected from the lateral migration of a recent depositional tributary or slough cutting across the large point bar on which the FOL was constructed. It was concluded that this channel may serve as a potential pathway for contaminant migration during high river stages and may influence groundwater flow at the site.

1.4.8 Health Risk Survey – Air Pathway Evaluation (1993)

In June 1993, the USAF Armstrong Laboratory/Environmental Sciences Branch conducted an environmental health risk survey of the FOL to assess environmental emissions of volatile contaminants in the air exposure pathway and provide a preliminary evaluation of the possible human health risks to potential onsite and offsite receptors (Wireman et al., May 1994). Air sampling was conducted to quantitatively evaluate ambient air BTEX chemicals throughout the FOL and surrounding areas. Ambient air samples were collected using calibrated DuPont Alpha® 1 and 2 pumps to pull air through graphitized carbon and activated charcoal collection media tubes. Two samples, one of each media type, were collected at each sample location. All samples were collected approximate 4 to 5 feet above the ground surface to simulate actual human exposure conditions. They were sampled and analyzed for BTEX in accordance with National Institute of Occupational Safety and Health (NIOSH) and U.S. Environmental Protection Agency (EPA) sampling methods. All graphitized carbon and activated charcoal samples were analyzed by EPA Method TO-2 and NIOSH Method 1501, respectively. The ambient air BTEX sample results were below all other results, including samples taken in residential areas. The graphitized carbon samples collected at Site FT001 (presented on Figure D4-FT001 as A11, A12, and A29) resulted in benzene concentrations of 0.14 μ/cubic meter (m^3) southeast of the FPTA circle and 0.20 μg/m^3 northwest and upwind of Site FT001. No toluene, ethylbenzene, or xylene results approached their chemical-specific environmental or occupational comparison values (Wireman et al., May 1994).

1.4.9 Louden Village Council Initial Sampling Investigation (1996)

In June 1996, the Louden Village Council and the Village of Galena investigated concerns that Galena residents' health and safety may be jeopardized by chemical contamination from past practices at the FOL. Two surface soil samples (FTA-001 and FTA-002) were collected from the center and edge of the FPTA circle. Samples were analyzed for TPH and PCB/pesticides using Methods 418.1 and SW8080, respectively (Figure D4-FT001). Analytical data for these samples are presented in Supplement D1-FT001. TPH was detected at concentrations of 7,700 mg/kg and 160 mg/kg. 4,4-DDD was detected at 0.0046 mg/kg. No PCBs or other pesticides were detected (USKH, Inc., October 1996).

1.4.10 Comprehensive Environmental Monitoring Program (1998–2002)

Beginning in 1998, the Comprehensive Environmental Monitoring Program (CEMP) was developed for the FOL to obtain additional data to define the current status of contaminants at investigation areas, to further characterize groundwater quality with respect to local groundwater flow characteristics, and to evaluate remediation system performance at specified locations throughout the installation (Radian Corporation, August 1999). Semi-annual CEMP groundwater sampling events were conducted from October 1998 to October 2001 at 01-MW-01, 01-MW-03, and 01-MW-07 (Radian Corporation, October 2002). Four monitoring wells (01-MW-02, 01-MW-04, 01-MW-06, and 01-MW-08) were abandoned during the CEMP in 1998 and 2001. 01-MW-08 was abandoned in 1998 because of severe damage that compromised the integrity of the well. 01-MW-02, 01-MW-04, and 01-MW-06 were abandoned in 2001 in accordance with the CEMP (Radian Corporation, October 2002).

Groundwater elevation data collected during sampling indicate that the local groundwater flow direction is to the south-southwest from July to April (when the Yukon River stage is average or low) and changes to the north during May and June (when the Yukon River stage is near flood levels). The seasonal variation in groundwater elevation at the site is large, with fluctuations of 20 feet or greater. During winter, groundwater elevations typically fall below the bottom of 01-MW-03 through 01-MW-06. The hydraulic gradient at Site FT001 is greater during periods of predominant groundwater flow direction (to the south-southwest) compared with other FOL sites. Groundwater elevation data recorded via datalogging pressure transducers in site monitoring wells and the Yukon River during June 1992 indicate that groundwater fluctuations at the site are more sensitive to variations in Yukon River stage fluctuations than those at other sites. This is likely the result of the site's relative proximity to the Yukon River and a more direct connection between the groundwater and surface water systems.

Because historical analytical data showed elevated concentrations of VOCs, particularly benzene, in groundwater, VOCs were included as target analytes at Site FT001. Analytical data for the semi-annual sampling events are presented in Supplement D1-FT001. During the initial limited groundwater sampling event in July 1998, 01-MW-07 was sampled and analyzed for VOCs using Method SW8260B. Starting in October 1998, 01-MW-01, 01-MW-03, and 01-MW-07 were sampled in June and October for VOCs and natural attenuation parameters (including chloride, sulfate, and nitrate/nitrite using Methods SW8260B, E300.0, and E353.2, respectively). In June 2000, GRO, DRO, residual-range organics (RRO), iron, and manganese (using Methods AK101, AK102, AK103, and SW6010B, respectively) were added to the sample analyte suite along with VOCs and the previous natural attenuation parameters. As shown in Supplement D1-FT001, multiple VOCs (including benzene, toluene, 1,1-dichloroethene (1,1-DCE), 1,2-dichlorobenzene, 1,4-dichlorobenzene, 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, isopropylbenzene, 4-isopropyltoluene, chloroethane, methylene chloride, and naphthalene) were detected in the groundwater at Site FT001. As shown in Table D4-FT001, benzene, xylene, methylene chloride, GRO, DRO, and RRO were detected above the extent groundwater to surface water SLs in 01-MW-01 during this period. 01-MW-03 had limited extent groundwater to surface water SL exceedances of GRO, naphthalene, and methylene chloride, while 01-MW-07 had no extent groundwater to surface water SL exceedances. From October 1998 to October 2001, benzene was consistently detected above the extent groundwater to surface water SL in 01-MW-01, at concentrations ranging from 59 to 280 µg/L. The highest detections of DRO GRO, and RRO were observed in 01-MW-01. Free product was not detected in any well at Site FT001.

A temporal and spatial analysis of benzene groundwater concentrations was performed at Site FT001. A Mann-Kendall test and a Seasonal Kendall test were performed for 01-MW-01 to determine the probability that a statistically significant increasing or decreasing trend was present and to further evaluate the data based on interferences posed by seasonal variations in groundwater elevations. Benzene concentrations showed a decreasing trend in 01-MW-01 in the spring data set and for the seasonally adjusted analysis. Benzene concentrations showed a direct relationship to groundwater elevation—increasing significantly when groundwater elevations increased. Overall, the conclusion was that the magnitude of the spring increase of benzene concentrations was decreasing. The decreasing trend in benzene concentrations is supported by observations of depleted nitrate and dissolved oxygen concentrations and periodically elevated iron levels in 01-MW-01 that coincide with elevated benzene and fuel concentrations. These observations suggest that natural attenuation may be reducing benzene concentrations in the groundwater plume. Changes in benzene concentrations in relation to distance from the source were also evaluated by comparing iso-concentration contours through time. Results of this spatial analysis showed that there was no significant movement of the benzene plume from June 1993 to October 2001. In addition, spatial analysis of DRO and GRO concentrations showed no significant migration from June 2000 to October 2001.

1.4.11 Remedial Process Optimization Field Activities (2002)

Between August 6 and August 30, 2002, soil gas sampling activities were performed at Site FT001 to characterize the extent of hydrocarbon and VOC contamination within the vadose zone soil beneath the FPTA circle (Earth Tech, Inc., May 2004). Using direct push sampling techniques, soil gas samples were collected at two discrete depths (approximately 9 feet bgs and 14 feet bgs) from within the vadose zone from 10 sample locations (FT-SG-001 through FT-SG-010). Sample locations and analytical data are presented in

Supplement D3-FT001. The samples were analyzed for total volatile hydrocarbons (TVH), oxygen, and carbon dioxide (using an Innova SVTM portable gas monitor, Landtec GEM 500™) and for BTEX (using an SRI environmental field gas chromatograph [GC]). TVH was detected at elevated concentrations of greater than 10,000 parts per million by volume (ppmv) beneath the FPTA circle at FT-SG-009 at 9 feet bgs and approximately 280 feet southeast of the FPTA circle at FT-SG-004 at 9 feet bgs. These samples also showed high methane (>1.5%), high carbon dioxide (>13.7%), and low oxygen (<3.5%) levels, indicating biodegradation was occurring. In addition, TVH was detected at concentrations of 9,880 ppmv southeast of the FPTA circle at FT-SG-004 at 14 feet bgs and 2,340 ppmv southeast of the FPTA circle at FT-SG-003 at 14 feet bgs. BTEX was detected beneath the FPTA circle and approximately 140 feet northwest of the FPTA circle at FT-SG-009 and FT-SG-010. The highest BTEX concentrations were observed at FT-SG-009 at 9 feet bgs, with a benzene concentration of 738.5 ppmv and a toluene concentration of 522.2 ppmv. Benzene and toluene were only slightly detected at FT-SG-010 at concentrations of 3.4 ppmv and 2.9 ppmv, respectively. The conclusion from the results was that the vadose zone contamination was localized around the FPTA circle (FT-SG-009) and southeast of the FPTA circle (FT-SG-004).

1.4.12 Former Galena FOL Remedial Investigation/Feasibility Study (2003–2005)

In April 2003, one groundwater monitoring well, 01-MW-08R, was installed near abandoned 01-MW-08 (Earth Tech, Inc., March 2003, May 2007) (Figure D4-FT001). Based on Remedial Process Optimization (RPO) recommendations, datalogging pressure transducers were installed in 01-MW-08R and 01-MW-03, and data were collected from October 2003 to October 2005 to evaluate groundwater elevation and gradient changes over time. Fluctuations in groundwater elevations measured over this timeframe were compared with those observed during previous investigations at Site FT001. During June and October 2004, groundwater samples were collected from 01-MW-01, 01-MW-05, 01-MW-07, and 01-MW-08R. These samples were analyzed for VOCs (by Method SW8260B) and natural attenuation parameters (Earth Tech, Inc., May 2007). Historical analytical data are presented in Supplement D1-FT001. Benzene was the only VOC detected during these monitoring events. As shown in Table D4-FT001, groundwater samples collected during June 2004 had detected benzene concentrations above the extent groundwater to surface water SL in 01-MW-01 (60.7 μg/L) and 01-MW-08R (22.3 μg/L). The October 2004 data indicated that the benzene concentration exceeded the extent groundwater to surface water SL at 01-MW-01 (20.6 μg/L). No VOCs were detected above the method detection limits in 01-MW-05 and 01-MW-07 during the 2004 groundwater sampling events.

As part of the Remedial Investigation, the CEMP benzene trend analyses at 01-MW-01 were re-evaluated to incorporate analytical data collected in 2004. More credence was placed on sampling results from 1998 to 2004. The June 2004 benzene concentrations (60.7 μg/L) in 01-MW-01 were approximately 60 percent lower than the corresponding June events in 2000 to 2001. Re-evaluation of the benzene trend analyses confirmed the previous CEMP conclusions that benzene concentrations in 01-MW-01 showed decreasing trends in the spring data set and for the seasonally adjusted analysis and that benzene concentrations immediately downgradient of the FPTA circle were decreasing. Although concentrations still exceeded the extent groundwater to surface water SL, the decreasing concentration was approaching the extent groundwater to surface water SL. A comparison of the June 2004 and October 2004 benzene iso-concentration groundwater contours with previous benzene groundwater contours from June 1993 to October 2001 indicated that no significant spreading of the benzene groundwater plume was occurring, that the groundwater source area was stable, and that natural attenuation was occurring.

1.4.13 Follow-on Remedial Process Optimization (RPO) Field Activities (2006)

In August 2006, one new monitoring well, 01-MW-06R, was installed near former abandoned 01-MW-06 (Earth Tech, Inc., April 2006) (Figure D4-FT001). Between August 25 and August 30, 2006, 01-MW-01, 01-MW-06R, and 01-MW-08R were sampled for VOCs (by Method SW8260B) and natural attenuation parameters (Earth Tech, Inc., May 2007). Historical analytical data are presented in Supplement D1-FT001. Benzene, isopropylbenzene, and acetone were detected in 01-MW-01, and benzene was detected in 01-MW-08R. Only benzene exceeded the extent groundwater to surface water SL in 01-MW-01 and 01-MW-08R, at concentrations of 4.3 μg/L and 7.3 μg/L, respectively. No VOCs were detected above method detection limits in 01-MW-06R.

1.4.14 Long-term Groundwater Monitoring Program (2006–2007)

In October 2007, long-term groundwater monitoring began at Site FT001, with groundwater sampling at 01-MW-01, 01-MW-03, 01-MW-07, and 01-MW-08R for VOCs (by Method SW8260B) and natural attenuation parameters (Bethel Services, Inc., April 2009). Historical analytical data are presented in Supplement D1-FT001. The 2007 results indicated detections of toluene (0. 62 μg/L) and o-xylene (0. 79 μg/L) in 01-MW-01, toluene (0. 49 μg/L) in 01-MW-03, and 1,1-dichloropropene (1.3 μg/L) at 01-MW-07. All detected concentrations were below the extent groundwater to surface water SLs. Benzene was not detected in the groundwater samples collected. 01-MW-01 and 01-MW-08R were sampled for VOCs (by Method SW8260B) and natural attenuation parameters in October 2008. No VOCs were detected during this sampling event. Results related to the natural attenuation analytes confirmed the continuing occurrence of natural attenuation as documented in previous investigations. In addition to groundwater sampling, groundwater elevation data were retrieved from datalogging pressure transducers installed in 01-MW-03 and 01-MW-08R during the Remedial Investigation/Feasibility Study in October 2004.

1.4.15 Baseline Surface Soil Sampling (2009)

In July 2009 surface soil samples were collected from 21 locations (FT001-SS001 through FT001-SS021) in Site FT001 to spatially delineate an area to be land-farmed. Samples were collected from 0 to 0.75 foot bgs at 16 locations and from 1 to 2 feet bgs at 5 locations. Analytical data associated with these samples is presented in Supplement D1-FT001. Surface soil samples were analyzed for one or more of the following analyte groups: GRO (AK101), DRO (AK102), RRO (AK103), metals (SW6010B), SVOCs (SW8270C), and general chemistry parameters. As shown in Table D3-FT001, GRO and DRO exceeded the extent soil SLs in 15 of the 21 sample locations. The highest concentration of DRO (21,000 mg/kg) was found near the northern edge of the FPTA circle (FT001-SS005), just south of the former drum storage area. The highest concentration of GRO (11,000 mg/kg) was detected at two sample locations (FT001-SS004 and FT001-SS006) also near the north/northwest edge of the FPTA circle. Other analytes exceeding their extent soil SLs included naphthalene, and 2-methylnaphthalene (Table D3-FT001).

1.4.16 Previous Remedial Actions

Surface soil at the FTPA was reportedly tilled without the addition of soil amendment during the 2009 field season (Air Force Center for Engineering and the Environment [AFCEE], March 11, 2010).

1.5 October 2009 Site Visit Observations

During the October 2009 site visit, it was observed that Site FT001 consisted of a level (inside the dike) vegetated open field. Within the FPTA circle, it was noted that the ground surface consisted of recently scraped bare soil. This is consistent with the report of surface soil tilling during the 2009 field season (AFCEE, March 11, 2010). Shallow pools of surface water were noted within the FPTA circle, as was vole activity in surrounding vegetation (short grass and forbs).

1.6 Use of Secondary Data

Secondary data (historical data) for the site include data tabulated in Supplement D1-FT001 and summarized in Tables D1-FT001 and D2-FT001. Data will be evaluated for usability using the general procedures outlined in Worksheet #13. Data that are properly validated, collected by an Alaska Department of Environmental Conservation (ADEC) approved analytical method, have analytical detections greater than limit of detection (LOD) or limit of quantification (LOQ) or LODs at or below the extent soil and/or extent groundwater to surface water SLs can be used for quantitative nature and extent evaluations and risk assessment calculations, if needed. Data that do not meet these criteria can be used as reference or screening level data only. Although screening level data will not be used for quantitative analyses, these data will be used to qualitatively evaluate the presence or absence of contamination at a given location and/or depth to guide the design of the field sample plan.

Historical soil vapor data collected in 1993 and 2002 do not meet usability requirements outlined in Worksheet #13 and will be used as screening level data. Historical soil samples for GRO and DRO were analyzed with Method SW8015, rather than AK101 and AK102; therefore, these data do not meet requirements for unrestricted data use and will be used for screening level only. The recent surface soil data, July 2009, were analyzed using appropriate analytical methods; however, quantitative use of these data for site characterization and risk assessment will require further quality assurance (QA)/quality control (QC) review. Groundwater data collected prior to 1993 do not meet the requirements for unrestricted data use outlined in Worksheet #13 and will be used for screening level only. Groundwater data collected between 1993 and 2007 meet data usability requirements for use in nature and extent evaluations. If needed, these data could also be used for risk assessment evaluations. Groundwater data collected in 2008 will require additional review before being used for quantitative analysis.

The review of the usability of the secondary data is in progress and follows procedures outlined in Worksheet #13. If this evaluation results in modifying data classification to "screening level" rather than "unlimited use," the sample design in this field sampling plan may be modified.

1.7 Findings of Previous Investigations

Historical site use and previous investigation findings suggest that the primary source of contamination at Site FT001 was from FPTA activities in which a simulated aircraft was covered with fuel, ignited, and extinguished with firefighting chemicals. Data collected during previous investigations indicated the presence of DRO, GRO, VOCs, PAHs, and aldrin in site surface and subsurface soil and DRO, GRO, RRO, VOCs, pesticides, and naphthalene in groundwater at concentrations exceeding the extent soil and extent groundwater to surface water SLs. As shown in Tables D1-FT001 and D2-FT001 the following metals have been detected in soil and/or groundwater samples collected during previous investigations: aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, molybdenum, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc. Similarly, TVH and VOCs were detected in soil gas. Figures D5-FT001, D6-FT001, and D7-FT001 show the approximate areas where at least one analyte exceeded its extent soil or extent groundwater to surface water SL in surface soil, subsurface soil, and groundwater, respectively. It should be noted that complete suites of analytes were not collected from all sample locations. Although a sample location may fall outside the "exceedance area," samples from that location may not have been analyzed for a constituent that exceeds extent soil SL or extent groundwater to surface water SLs elsewhere. Results from historical sampling indicated higher soil contaminant concentrations near the FPTA circle area near the former drum storage area to the north. Groundwater samples at all monitoring wells exceeded the extent groundwater to surface water SLs during one or more sampling events (Figure D6-FT001). As shown in Supplements D2-FT001 and D3-FT001, two distinct soil gas source areas are present: one area beneath the FPTA circle and another approximately 300 feet south of the FPTA circle near 01-MW-08 and 01-MW-08R and the former underground fuel pipeline stand pipe.

Multiple data gaps and additional data needs to fully delineate the nature and extent of contamination at the site are as follows:

- The lateral and vertical extent of DRO/RRO, GRO, VOC, SVOCs, PAHs, and dioxins/furans contamination in soil has not been adequately delineated at the site. Additional surface soil and subsurface soil data are needed to fully characterize the nature and extent of contamination at Site FT001.
- Previous investigations have focused predominantly within and near the FPTA circle and at the underground fuel pipeline stand pipe. Drums of unknown materials were stored on the ground around the perimeter of the FPTA circle area. Although recent

surface soil sampling was conducted in the former drum storage area north of the FPTA circle, additional surface and subsurface soil data are needed to fully delineate the later and vertical extent of contamination.

- Continued long-term groundwater sampling is needed to monitor the natural attenuation of VOCs in groundwater at Site FT001 and evaluate attainment of groundwater cleanup goals.

1.8 Target Analytes

Based on site history, exceedances of extent soil screening levels and extent groundwater to surface water SLs, and guidance listed in Worksheets #14 and #15, 15 target analytes for Site FT001 include GRO, DRO, RRO, VOCs (including low level analysis for 1,2-DCA and ethylene dibromide [EDB] in groundwater), PAHs/SVOCs, PCBs, pesticides, and metals. Although several metals have been detected in soil and groundwater at Site FT001, based on site history indication fuel possibly drums of waste oil arsenic, barium, cadmium, chromium, lead, nickel, and vanadium are considered target analytes in accordance with the metals analysis recommended for fuels and waste oil/used oil in Table 14-1. There will be additional, targeted sampling to confirm historical detections of dioxins/furans. Additionally, in accordance with the information provided in the *Draft Field Sampling Guidance* (ADEC, 2010), PAH, 1,2-DCA, and EDB analysis will be performed on approximately 10 percent of the samples collected. The sample(s) selected for these analyses will be those anticipated to have the highest GRO, DRO, and/or RRO concentrations.

Following the guidance in Step 6 of Figure 15-1, an additional analysis was conducted in which historical analytical data from locations within 500 feet of the FT001 site boundary were evaluated to determine the potential for contaminants to migrate from another location to the site. The only data within 500 feet of Site FT001 were samples collected on the north side of Airport Road (Figure D4-FT001) and east of the perimeter dike (Figure D9-FT001). These data included sediment samples that exceeded the extent soil SLs for DRO and methylene chloride and surface water samples that exceeded the extent groundwater to surface water SLs for DRO, , pesticides, PAHs, and toluene. These data do not affect the field sample design for Site FT001 because the target analyte list for the site already incorporates these compounds. The following metals were detected in these samples: aluminum, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, sodium, vanadium, and zinc. Metals related to site use are already included as target analytes for Site FT001.

Following the guidance in Step 6 of Figure 15-1, a final analysis was conducted to determine which of the sites evaluated in the Preliminary Assessment (CH2M HILL, 2010) were located within 500 feet of the FT001 site boundary. The only Preliminary Assessment site within this radius is B408, which housed a transformer that contained PCB oil. The target analyte list for Site FT001 was not amended based on this analysis because PCBs are already included as a target analyte based on historic presence of drums within the FT001 site boundary.

1.9 Potential Exposure Pathways and Receptors

FT001 falls under the Remedial Investigation (RI) category for investigation of surface petroleum, oils, and lubricants (POL) and multi-chemical releases, as defined in Worksheet #17, and needs additional sampling to delineate the nature and extent of contamination. Known sources of contamination include:

- POL and unknown combustibles burned during fire training exercises
- Leaks or spills of POL during fire training exercises at the underground fuel pipeline stand pipe approximately 300 feet south of the FPTA circle
- Storage of drums with unknown contents north of the FPTA circle

POL and other unknown combustibles that were not completely burned during fire training exercises resulted in surface-soil contamination in excess of the current extent soil SLs for surface soil, subsurface soil, and groundwater. Additionally, leaking or spilling of POL and other unknown combustibles at the underground fuel pipeline stand pipe resulted in contamination in excess of the current extent groundwater to surface water SLs. Limited soil sampling has been conducted near the underground fuel pipeline stand pipe or along the underground fuel pipeline; therefore, the degree to which surface and subsurface soil in this area has been affected by past site use is uncertain.

Figure D8-FT001 depicts the CSM for exposure for the site, including past or current sources of contamination, chemical release mechanisms, transport or exposure media, potential exposure points, potential exposure routes, and potential receptors. The most plausible exposure scenario under current site conditions is the excavation/construction worker scenario due to the potential for excavations for utility repair or replacement. There are no standard work places or residences currently on the site; however, these scenarios will be evaluated to assess the potential impacts of hypothetical land use changes. Based on the CSM for Site FT001, potential human receptors and exposure pathways to be evaluated include the following:

- **Excavation/construction workers:** Potential exposure to chemicals in soil to 15 feet bgs and shallow groundwater. Potentially complete routes of exposure to soil include incidental soil ingestion, dermal contact with soil, and inhalation of ambient vapors or dust generated from wind or during onsite excavation activities. Potentially complete routes of exposure to shallow groundwater include dermal contact with groundwater and inhalation of ambient vapors from groundwater.
- **Future occupational workers:** Potential exposure chemicals in soil to 2 feet bgs. Potentially complete routes of exposure to surface soil include incidental soil ingestion, dermal contact with soil, and inhalation of ambient vapors or dust generated from wind. Vapor intrusion from VOCs in environmental media migrating into current or future occupational buildings is also a potentially complete exposure route.
- **Hypothetical future residents:** Potential exposure to chemicals in soil to 15 feet bgs and groundwater. Potentially complete routes of exposure to soil include incidental soil ingestion, dermal contact with soil, and inhalation of ambient vapors or dust generated

from wind. Potentially complete routes of exposure to groundwater include ingestion, dermal contact, and inhalation of VOCs during showering or other household activities. Vapor intrusion from VOCs in environmental media migrating into current or future residences is also a potentially complete exposure route.

As specified in the eco-scoping form for Site FT001 provided in Appendix G, at the time of the October 2009 site visit, habitat within Site FT001 was bare soil/gravel that had been scraped recently. Shallow pools of surface water were present onsite, and vole activity was seen in the surrounding vegetation (short grass and forbs). Ecological exposure pathways are considered potentially complete at Site FT001 if target analytes are found to be present in surface soil or in groundwater that will daylight downgradient. Therefore, additional site information is needed to determine if any pathways are complete. Consequently, terrestrial ecological receptors will be evaluated for exposures onsite using site characterization data. Because groundwater from Site FT001 may discharge to the Yukon River, which is less than 1,000 feet away, an aquatic ecological exposure pathway is considered potentially complete at Site FT001 and will be further evaluated.

1.10 Data Quality Objectives

DQOs are pre-established goals that help monitor and assess project progress and provide benchmarks against which the quality of fieldwork and the resultant analytical data are evaluated. DQOs specify the type, quality, quantity, and uses of the data necessary to support investigation objectives. General DQOs for characterizing contaminant sources, determining the nature and extent of contamination, and evaluating the potential for contaminants to migrate or affect additional media are presented in Worksheet #10, Table 10-2. The following general DQOs apply to Site FT001:

- DQO 1 – Investigate Possible Releases and Determine Need for Further Sampling
- DQO 2 – Nature and Extent of Contamination in Soil
- DQO 3 – Free Product/Smear Zone Characterization
- DQO 5 – Delineate Nature and Extent of Groundwater Contamination
- DQO 6 – Hydrogeological Characterization

During investigation of the nature and extent of potential contamination, if target analytes are found at concentrations that may pose a risk to human or ecological health, the following DQOs may apply and will be addressed under a FOL-wide risk assessment field sampling plan:

- DQO 7 - Human Health Risk Assessment
- DQO 8 - Ecological Risk Assessment

The sample design that will be employed at Site FT001 to fill data gaps associated with these DQO is based on the source/release group investigation model for surface POL releases and the multi-chemical surface release sites, as described in Worksheet #17. Because Site FT001 is categorized as an RI investigation pathway site, the extent soil SLs described in Worksheet #15 will be used to delineate the nature and extent of contamination in soil. The extent groundwater to surface water SLs will be used to delineate the nature and extent of contamination in groundwater, as the site is located within 1,000 feet of the Yukon River.

The following section summarizes the sample design specific to Site FT001.

1.11 Investigation Activities

The following section provides details regarding the planned investigation activities for Site FT001 and presents the rationale for each activity. SOPs referenced in these sections are provided in Appendix H of this Work Plan.

1.11.1 Pre-investigation Activities

Before field-related activities begin, a thorough search of historical documentation will be performed to supplement information gathered during this investigation. The goals of the record search are to:

- Determine when the underground fuel pipeline was installed and how it was used to supply combustibles to the FPTA circle
- Determine the locations of all underground fuel piping
- Determine the duration of storage of drums north of the FPTA circle, what type of protective measures were taken for drum storage, and what the contents were

The record search will consist of examining historical maps, historical photographs, and documents and conducting interviews with former base personnel, if possible. If the locations of the drum storage area and underground fuel pipeline (or former piping) are conclusively determined, field sample locations may be added to the plan.

Before field activities begin, staff will review work planning documentation (including SOPs and Health, Safety, and Environment [HS&E] information) and will ensure that materials and equipment identified in the SOPs have been procured. Before intrusive field activities begin, utility clearance will be performed in accordance with SOP-03 *(Utility Clearance for Intrusive Operations)*.

1.11.2 Field Investigation Tasks

Geophysical Work

During GPR and EM surveys conducted in 1993 at Site FT001, two suspected fuel lines were detected at approximately 6 feet bgs. However, because the intent of the geophysics work was to delineate permafrost, the fuel lines were not traced and mapped. If the results of the records search indicate that piping may still be present and the location of this piping cannot be conclusively defined with existing information, additional geophysical surveying (GPR) will be required to identify the piping location and will be performed in accordance with SOP-26 *(Geophysical Survey)*. Equipment needs are listed in this SOP. The results of the geophysical survey will be used to adjust current sampling locations or more precisely select additional sampling locations, if required.

Soil Sampling

As shown in Table D3-FT001, there have been exceedances of extent soil SLs for target analytes in historical surface and subsurface soil samples collected throughout Site FT001. Limited soil sampling within the site boundary has been conducted for the full suite of target analytes. Additionally, there has been limited subsurface soil sampling conducted at Site FT001. Because Site FT001 is in the Remedial Investigation and both surface and subsurface soil contamination has been recorded, the goal of the current investigation is to characterize the nature and extent of soil contamination laterally and vertically (throughout the variably saturated zone). Based on water table fluctuations measured at 01-MW-08R from 2004 through 2008 (Figure D2-FT001), the variably saturated zone to be characterized at Site FT001 extends to approximately 35 feet bgs.

Soil samples will be collected at 14 soil boring locations (FT001GP001 through FT001GP014), as shown on Figure D9-FT001, to delineate the extent of contamination in surface and subsurface soil and groundwater. These locations include seven soil borings within and adjacent to the FPTA circle (FT001GP001, FT001GP002, FT001GP003, FT001GP004, FT001GP005, FT001GP011, and FT001GP012), three soil borings north of the FPTA circle where elevated DRO concentrations (greater than 200 mg/kg) in soil have been detected in historical soil samples, as shown on Figure 3.2-1 of the 1996 RI (USAF, 1996) (FT001GP006, FT001GP007, and FT001GP008), two soil borings along the suspected underground fuel pipeline near the area of elevated soil vapor concentrations shown in Supplement D2-FT001 (FT001GP009 and FT001FP013), one soil boring east of the elevated soil vapor concentrations (FT001FP014), and one soil boring at the underground fuel pipeline stand pipe south of the FPTA circle (FT001GP010).

Table D5-FT001 presents the proposed soil samples for Site FT001. Currently, a minimum of six soil samples (at approximately 0 to 2, 5 to 7, 10 to 12, the mid-point of the variably saturated zone, the bottom of the variably saturated zone, and 10-feet below the bottom of the variably saturated zone) are proposed for each of the 14 soil boring locations shown on Figure D9-FT001. If evidence of contamination is observed at other depths (for example, staining, odors, or high PID readings), additional soil samples may be collected. Additionally, if discrete soil samples at any of the proposed soil boring locations shown on Figure D9-FT001 and listed in Table D5-FT001 have concentrations of target analytes exceeding the respective extent soil SLs, step-out sampling may be required to achieve full lateral and/or vertical delineation.

Boreholes will be installed using direct push drilling equipment in accordance with SOP-05 *(Hollow Stem Auger and Direct Push Drilling Methods)*. The presence of heaving sands are a known issue at the FOL. Where encountered, appropriate drilling techniques will be used in order to minimize the impact. Discrete soil samples will be collected using the methods described in SOP-07 *(Discrete Surface and Subsurface Soil Sampling)*. Soil will be classified and logged in accordance with SOP-06 *(Boring Log Completion, Soil Classification, and Logging)* and field screening of soil samples will be performed in accordance with SOP-04 *(Organic Vapor Monitoring and Air Monitoring)*.

As shown in Table D5-FT001, the soil samples will be analyzed for one or more of the following analytes (specific analytes for a given sample are provided in Table D5-FT001):

GRO, DRO, RRO, VOCs, SVOCs/PAHs, PCBs, pesticides, and metals. A subset of samples in locations around the PFTA circle will be analyzed for dioxins/furans. Specific laboratory methods, bottle requirements, field preservation requirements, and sample volumes for these analyses are provided in Worksheet #19. QA/QC samples will be collected as specified in Worksheet #20. Sample handling procedures will follow SOP-18 *(Packing and Shipping of Environmental Samples)* and SOP-19 *(Sample Handling, Identification, and Custody)*. Air monitoring procedures will follow SOP-04 *(Organic Vapor Monitoring and Air Monitoring)*.

Groundwater Sampling

As shown in Table D4-FT001, there have been exceedances of extent groundwater to surface water SLs for target analytes in historical groundwater samples collected within Site FT001. The goal of the current investigation is to characterize the nature and extent of groundwater contamination laterally and vertically. Information collected as part of this investigation will be incorporated into the FOL-wide strategy for evaluating groundwater contamination discussed in Worksheet #14. Based on water table fluctuations measured at 01-MW-08R from 2004 through 2008, the variably saturated zone at Site FT001 ranges from approximately 14 to 35 feet bgs.

As shown on Figure D9-FT001, groundwater samples will be collected from the groundwater monitoring wells at Site FT001 (01-MW-01, 01-MW-03, 01-MW-05, 01-MW-06R, 01-MW-07, and 01-MW-08R) twice during the field season (spring and fall). These samples will provide a synoptic snapshot of current groundwater contamination levels under both high and low water table conditions. Specific details regarding sampling of existing monitoring wells at the FOL are provided in the FSP for the 2010 Hydrogeologic Study. Additionally, grab groundwater samples will be collected from nine soil boring locations (as shown on Figure D9-FT001). These locations include FT001GP001, FT001GP002, FT001GP006, FT001GP007, FT001GP008, FT001GP011, FT001GP012, FT001GP013, and FT001GP014. As listed in Table D5-FT001, grab groundwater samples will be collected at two depths (one at the top of the water table and one 10 feet below the top of the permanently saturated zone) to characterize impacts to groundwater beneath the major source areas at the site (the FPTA circle and the underground pipeline/fill stand) and to evaluate the lateral and vertical extent of potential groundwater contamination. The groundwater sample 10 feet beneath the bottom of the variably saturated zone will be co-located with the soil sample described in the previous section. If there is visible evidence of soil contamination at other depths within the variably saturated zone, additional grab groundwater and co-located soil samples will be collected. The purpose of collecting co-located soil and groundwater samples is to provide information for evaluating phase partitioning from contaminated soil. Grab groundwater samples will be collected via direct push groundwater sampling techniques, as described in SOP-24 *(Direct Push Groundwater Sampling)*. If evidence of contamination (for example, staining, odors, or high PID readings) and saturated conditions are observed in the field at shallower depths than in the soil boring, additional groundwater samples will be co-located with soil samples within the variably saturated zone. The results from the spring groundwater sampling round from existing wells and initial grab groundwater sampling at soil boring locations will be used to determine whether step-out groundwater samples may be necessary to laterally delineate the nature and extent of groundwater contamination at the site.

Groundwater samples will be analyzed for GRO, DRO, RRO, VOCs (including low-level analysis for EDB and 1,2-DCA), pesticides, PAHs, dissolved metals, and field parameters (pH, temperature, specific conductivity, dissolved oxygen, and ORP). Field parameters will be collected in accordance with SOP-12 (*Field Water Quality Measurements and Calibration*). Specific laboratory methods, bottle requirements, field preservation requirements, and sample volumes for these analyses are provided in Worksheet #19. Field sample QA/QC protocols will be performed in accordance with Worksheet #20. Air monitoring procedures will follow SOP-04 *(Organic Vapor Monitoring and Air Monitoring)*. Sample handling procedures will follow SOP-18 *(Packing and Shipping of Environmental Samples)* and SOP-19 *(Sample Handling and Custody)*.

Surveying

Soil sample locations will be surveyed for horizontal position and vertical elevation in accordance with SOP-16 *(Global Positioning Satellite System [GPS] Surveying)*.

The geophysical survey subcontractor will provide survey coordinates for the survey grid and subsurface features identified during the survey, if performed.

Equipment Calibration

Field water quality measurement equipment will be calibrated in accordance with SOP-12 *(Field Water Quality Measurements and Calibration)*.

1.11.3 Equipment Decontamination

Non-dedicated equipment will be decontaminated in accordance with SOP-14 (*Equipment Decontamination Procedures)*.

1.11.4 Investigation-derived Waste Management

All IDW will be handled in accordance with Appendix B *(Project-specific Waste Management Plan)*.

1.11.5 Sample Identification

Samples collected at Site FT001 will be named in accordance with SOP-19 *(Sample Handling, Identification, and Custody)*.

1.11.6 Post-investigation Activities

During the field investigation, meetings or conference calls will be held to discuss the investigation results, provide a suggested path forward, and reach consensus on additional work needs. After the fieldwork is performed for this investigation, the results will be documented in a data evaluation report, and the anticipated path for further action or site closure will be identified.

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TABLE D1-FT001

Statistical Summary of Soil Analytical Results[a]

Analyte Name	Result Units	Minimum ND	Maximum ND	Number of Samples	Number of Locations	Frequency of Detection	Location of Minimum Detection	Minimum Detection Result	Location of Maximum Detection	Maximum Detection Result	Extent Soil Screening Level	Number of Exceedances
Explosives												
1,2,3,4,6,7,8-HpCDD	pg/g	238	268	6	3	50.0%	01-HA-12 (9/23/1994)	51	01-HA-13 (9/23/1994)	137		0
1,2,3,4,6,7,8-HpCDF	pg/g	87	222	6	3							
1,2,3,4,7,8-HxCDD	pg/g	91.1	198	6	3							
1,2,3,7,8-PeCDD	pg/g	92.2	175	6	3							
2,3,4,6,7,8-HxCDF	pg/g	60	129	6	3							
2,3,4,7,8-PeCDF	pg/g	73.6	122	6	3							
2,3,7,8-TCDD	pg/g	100	177	6	3							
2,3,7,8-TCDF	pg/g	82.6	145	6	3							
OCDD	pg/g			1	1	100.0%	01-HA-12 (9/23/1994)	359	01-HA-12 (9/23/1994)	359		0
OCDF	pg/g	138	462	6	3							
2,4-Dinitrotoluene	mg/kg	0.46	4.5	6	6							
2,6-Dinitrotoluene	mg/kg	0.62	6	6	6							
Nitrobenzene	mg/kg	0.47	4.6	6	6							
Hydrocarbons												
C10-C25 DRO	mg/kg	20	24	47	37	91.5%	01-SB-04 (8/10/1993), 01-SB-04 (8/10/1993), 01-SB-04 (8/10/1993), 01-SB-03 (8/9/1993), 01-SB-04 (8/10/1993)	1	01-SS-05 (8/4/1992)	72000	250	22
C25-C36 RRO	mg/kg	11	12	21	21	76.2%	FT001-SS17 (7/20/2009)	87	FT001-SS16 (7/20/2009)	1000	1000	0
C6-C10 GRO	mg/kg	9.8	520	46	36	56.5%	FT001-SS21 (7/20/2009)	10	01-SB-02 (8/8/1992)	24000	140	17
Total Petroleum Hydrocarbons	mg/kg			6	6	100.0%	01-MW-04 (7/25/1986)	2.6	FTA-001 (7/11/1996)	7700		0
Metals												
Aluminum	mg/kg			30	23	100.0%	GA-S050-A-505 (9/24/1992)	3470	GA-S050-A-505 (9/24/1992)	13800	b	c
Antimony	mg/kg	3.8	12	30	23	23.3%	FT001-SS13 (7/20/2009)	0.494	GA-S050-A-505 (9/24/1992)	3.8	b	c
Arsenic	mg/kg			30	23	100.0%	01-SS-10 (8/4/1992)	4.1	01-SB-01 (8/8/1992), GA-S050-A-505 (9/24/1992)	11	b	c
Barium	mg/kg			30	23	100.0%	GA-S050-A-505 (9/24/1992)	53	01-SS-02 (8/4/1992)	280	b	c
Beryllium	mg/kg	0.2	0.25	30	23	76.7%	01-SS-10 (8/4/1992)	0.15	GA-S050-A-503 (9/24/1992)	0.7	b	c
Cadmium	mg/kg	0.36	0.62	30	23	40.0%	GA-S050-A-503 (9/24/1992)	0.54	FT001-SS06 (7/20/2009)	1.9	b	c
Calcium	mg/kg			30	23	100.0%	GA-S050-A-505 (9/24/1992)	1860	GA-S050-A-501 (9/24/1992)	18200	b	c
Chromium	mg/kg			30	23	100.0%	GA-S050-A-505 (9/24/1992)	7.7	FT001-SS01 (7/20/2009)	30.5	b	c
Cobalt	mg/kg			30	23	100.0%	GA-S050-A-505 (9/24/1992)	4	01-SS-03 (8/4/1992), 01-SB-01 (8/8/1992)	13	b	c
Copper	mg/kg			30	23	100.0%	GA-S050-A-505 (9/24/1992)	5.9	GA-S050-A-503 (9/24/1992)	39.5	b	c
Iron	mg/kg			30	23	100.0%	GA-S050-A-505 (9/24/1992)	7520	GA-S050-A-501 (9/24/1992)	30900	b	c
Lead	mg/kg			35	27	100.0%	GA-S050-A-505 (9/24/1992)	3.7	FT001-SS01 (7/20/2009)	125	b	c
Magnesium	mg/kg			30	23	100.0%	GA-S050-A-505 (9/24/1992)	1980	GA-S050-A-501 (9/24/1992)	9620	b	c
Manganese	mg/kg			30	23	100.0%	GA-S050-A-505 (9/24/1992)	108	GA-S050-A-505 (9/24/1992)	596	b	c
Mercury	mg/kg	0.04	0.14	24	17	45.8%	01-SS-02 (8/4/1992)	0.061	01-SS-01 (8/4/1992)	0.13	b	c
Molybdenum	mg/kg	3.6	6.2	18	14	0.0%					b	c
Nickel	mg/kg			30	23	100.0%	GA-S050-A-505 (9/24/1992)	10.4	GA-S050-A-501 (9/24/1992)	36.9	b	c
Potassium	mg/kg			30	23	100.0%	GA-S050-A-505 (9/24/1992)	393	01-SS-03 (8/4/1992), 01-SS-05 (8/4/1992)	1500	b	c
Selenium	mg/kg	0.127	0.61	30	23	20.0%	FT001-SS01 (7/20/2009)	0.172	GA-S050-A-503 (9/24/1992)	0.74	b	c
Silver	mg/kg	0.71	1.5	30	23	20.0%	FT001-SS10 (7/20/2009)	0.503	FT001-SS07 (7/20/2009)	0.675	b	c
Sodium	mg/kg			12	9	100.0%	FT001-SS13 (7/20/2009)	296	GA-S050-A-501 (9/24/1992)	915	b	c
Thallium	mg/kg	0.41	12	30	23	20.0%	FT001-SS06 (7/20/2009)	0.309	FT001-SS07 (7/20/2009)	0.508	b	c
Vanadium	mg/kg			30	23	100.0%	GA-S050-A-505 (9/24/1992)	14.2	GA-S050-A-501 (9/24/1992)	50.6	b	c
Zinc	mg/kg			30	23	100.0%	GA-S050-A-505 (9/24/1992)	21.1	GA-S050-A-503 (9/24/1992)	145	b	c

TABLE D1-FT001

Statistical Summary of Soil Analytical Results[a]

Analyte Name	Result Units	Minimum ND	Maximum ND	Number of Samples	Number of Locations	Frequency of Detection	Location of Minimum Detection	Minimum Detection Result	Location of Maximum Detection	Maximum Detection Result	Extent Soil Screening Level	Number of Exceedances
PCBs/Pesticides												
4,4-DDD	mg/kg	0.0036	0.0036	23	19	95.7%	01-SB-01 (8/8/1992)	0.00014	01-SS-01 (8/4/1992)	0.15	3	0
4,4-DDE	mg/kg	0.00034	0.0036	20	16	80.0%	01-SB-01 (8/8/1992)	0.00013	01-SS-01 (8/4/1992)	0.038	2.1	0
4,4-DDT	mg/kg	0.0036	0.0036	20	16	90.0%	01-SB-01 (8/8/1992)	0.00005	01-SS-01 (8/4/1992)	0.4	2.1	0
Aldrin	mg/kg	0.00034	0.0018	20	16	65.0%	01-SB-01 (8/8/1992)	0.000032	01-SS-05 (8/4/1992)	0.033	0.03	1
alpha-BHC	mg/kg	0.00034	0.0018	20	16	60.0%	01-SB-01 (8/8/1992)	0.00024	01-SB-02 (8/8/1992)	0.005	0.0064	0
alpha-Chlordane	mg/kg	0.0018	0.0018	2	2							
alpha-Endosulfan	mg/kg	0.00034	0.0018	20	16	35.0%	01-SB-01 (8/8/1992)	0.00012	01-SS-01 (8/4/1992)	0.0032		0
Aroclor 1016	mg/kg	0.0034	0.036	20	16							
Aroclor 1221	mg/kg	0.0067	0.073	20	16							
Aroclor 1232	mg/kg	0.0067	0.036	20	16							
Aroclor 1242	mg/kg	0.0034	0.036	20	16							
Aroclor 1248	mg/kg	0.0034	0.036	20	16							
Aroclor 1254	mg/kg	0.0067	0.036	20	16							
Aroclor 1260	mg/kg	0.0067	0.036	20	16							
beta-BHC	mg/kg	0.00034	0.0018	20	16	50.0%	01-SB-01 (8/8/1992)	0.000066	01-SS-03 (8/4/1992)	0.0061	0.022	0
beta-Endosulfan	mg/kg	0.001	0.0036	20	16	65.0%	01-SS-07 (8/4/1992)	0.00012	01-SS-05 (8/4/1992)	0.01		0
Chlordane	mg/kg	0.0017	0.0052	18	14							
delta-BHC	mg/kg	0.00034	0.0018	20	16	35.0%	01-MW-01 (8/3/1992)	0.000013	01-SS-05 (8/4/1992)	0.0075		0
Dieldrin	mg/kg	0.00034	0.0036	20	16	25.0%	01-SS-06 (8/4/1992)	0.00025	01-SS-05 (8/4/1992)	0.0025	0.0076	0
Endosulfan Sulfate	mg/kg	0.0017	0.0052	20	16	30.0%	01-SB-01 (8/8/1992)	0.00004	01-SB-02 (8/8/1992)	0.0019		0
Endrin	mg/kg	0.00034	0.0036	20	16	10.0%	01-SB-02 (8/8/1992)	0.000017	01-SS-05 (8/4/1992)	0.006	0.2	0
Endrin Aldehyde	mg/kg	0.00067	0.0036	20	16	70.0%	01-SB-01 (8/8/1992)	0.000052	01-SS-05 (8/4/1992)	0.003		0
gamma-BHC	mg/kg	0.00034	0.0018	20	16	75.0%	01-SS-02 (8/4/1992)	0.00019	01-SS-01 (8/4/1992)	0.0021	0.0095	0
gamma-Chlordane	mg/kg	0.0018	0.0018	2	2							
Heptachlor	mg/kg	0.0004	0.0018	20	16	70.0%	01-SS-08 (8/4/1992)	0.000061	01-SB-02 (8/8/1992)	0.006	0.13	0
Heptachlor Epoxide	mg/kg	0.0018	0.0018	20	16	90.0%	01-SB-01 (8/8/1992)	0.000026	01-SS-05 (8/4/1992)	0.01	0.014	0
Methoxychlor	mg/kg	0.0018	0.018	20	16	60.0%	01-SS-02 (8/4/1992)	0.000017	01-SB-01 (8/8/1992)	0.002	23	0
Total PCBs	mg/kg	0.1	0.1	2	2							
Toxaphene	mg/kg	0.017	0.18	20	16							
SVOCs												
2,4,5-Trichlorophenol	mg/kg	0.79	7.7	6	6							
2,4,6-Trichlorophenol	mg/kg	0.84	8.1	6	6							
2,4-Dichlorophenol	mg/kg	0.58	5.7	6	6							
2,4-Dimethylphenol	mg/kg	1.3	5.4	6	6	16.7%	FT001-SS01 (7/20/2009)	0.96	FT001-SS01 (7/20/2009)	0.96	8.8	0
2,4-Dinitrophenol	mg/kg	0.46	4.5	6	6							
2-Chloronaphthalene	mg/kg	0.87	8.5	6	6							
2-Chlorophenol	mg/kg	0.52	5	6	6							
2-Methylnaphthalene	mg/kg			11	9	100.0%	GA-S050-A-505 (9/24/1992), GA-S050-A-501 (9/24/1992)	3.1	FT001-SS07 (7/20/2009)	110	6.1	9
2-Methylphenol	mg/kg	0.49	4.8	6	6							
2-Nitroaniline	mg/kg	0.45	4.4	6	6							
2-Nitrophenol	mg/kg	0.54	5.2	6	6							
3- & 4-Methylphenol	mg/kg	0.61	5.9	6	6							
3,3-Dichlorobenzidine	mg/kg	0.56	5.5	6	6							
3-Nitroaniline	mg/kg	0.52	5	6	6							
4,6-Dinitro-2-Methylphenol	mg/kg	0.68	6.6	6	6							
4-Bromophenyl Phenyl Ether	mg/kg	0.52	5	6	6							

TABLE D1-FT001

Statistical Summary of Soil Analytical Results[a]

Analyte Name	Result Units	Minimum ND	Maximum ND	Number of Samples	Number of Locations	Frequency of Detection	Location of Minimum Detection	Minimum Detection Result	Location of Maximum Detection	Maximum Detection Result	Extent Soil Screening Level	Number of Exceedances
4-Chloro-3-Methylphenol	mg/kg	0.54	5.2	6	6							
4-Chloroaniline	mg/kg	0.7	6.8	6	6							
4-Chlorophenyl Phenyl Ether	mg/kg	0.58	5.7	6	6							
4-Methylphenol	mg/kg			2	2	100.0%	GA-S050-A-501 (9/24/1992)	0.28	GA-S050-A-503 (9/24/1992)	0.72	1.5	0
4-Nitroaniline	mg/kg	0.58	5.7	6	6							
4-Nitrophenol	mg/kg	1.5	15	6	6							
Acenaphthene	mg/kg	0.061	4.9	32	22	28.1%	01-SS-10 (8/4/1992)	0.0061	01-SB-03 (8/9/1993)	0.173	180	0
Acenaphthylene	mg/kg	0.079	4.9	32	22	18.8%	01-SS-01 (8/4/1992)	0.0054	01-SS-05 (8/4/1992)	0.41	180	0
Anthracene	mg/kg	0.023	4.7	32	22	15.6%	01-SB-03 (8/9/1993)	0.000969	01-SS-05 (8/4/1992)	3.7	2060	0
Benzo(a)anthracene	mg/kg	0.0005	4.5	31	22	54.8%	01-SB-04 (8/10/1993)	0.000012	01-SB-01 (8/8/1992)	1.4	0.49	1
Benzo(a)pyrene	mg/kg	0.00088	4.6	35	24	62.9%	01-SS-09 (8/4/1992)	0.00032	01-SB-01 (8/8/1992)	1.5	0.049	1
Benzo(b)fluoranthene	mg/kg	0.00069	5.1	30	21	70.0%	01-SB-03 (8/9/1993)	0.000739	01-SB-01 (8/8/1992)	0.94	0.49	1
Benzo(g,h,i)perylene	mg/kg	0.0028	7.8	32	22	75.0%	01-SB-04 (8/10/1993)	0.000313	01-SB-01 (8/8/1992)	0.75	140	0
Benzo(k)fluoranthene	mg/kg	0.00076	5	32	22	71.9%	01-SS-09 (8/4/1992)	0.00019	01-SB-01 (8/8/1992)	0.65	4.9	0
Benzoic acid	mg/kg											
Benzyl alcohol	mg/kg	1.1	11	6	6							
bis(2-Chloroethyl)ether	mg/kg	0.5	4.9	6	6							
bis(2-Chloroisopropyl)ether	mg/kg	1	9.7	6	6							
bis(2-Ethylhexyl)phthalate	mg/kg	0.66	6.5	6	6							
Butyl Benzyl Phthalate	mg/kg	0.46	4.5	6	6							
Chrysene	mg/kg	0.0052	7.4	32	22	9.4%	01-SB-04 (8/10/1993)	0.00398	01-SB-01 (8/8/1992)	2.9	49	0
Dibenz(a,h)anthracene	mg/kg	0.001	4.6	32	22	34.4%	01-SS-06 (8/4/1992)	0.00053	01-SB-01 (8/8/1992)	0.26	0.049	1
Dibenzofuran	mg/kg	0.52	5	8	8	62.5%	GA-S050-A-505 (9/24/1992)	0.32	FT001-SS07 (7/20/2009)	7.3	11	0
Diethyl phthalate	mg/kg	0.66	6.5	6	6							
Dimethyl phthalate	mg/kg	0.55	5.4	6	6							
di-n-Butyl Phthalate	mg/kg	0.7	6.8	6	6							
di-n-Octyl Phthalate	mg/kg	0.48	4.7	6	6							
Fluoranthene	mg/kg	0.0071	5.4	32	22	12.5%	01-SS-03 (8/4/1992)	0.0028	01-SB-01 (8/8/1992)	4.2	190	0
Fluorene	mg/kg	0.0072	5.7	36	25	47.2%	01-SS-03 (8/4/1992)	0.0021	FT001-SS07 (7/20/2009)	4.8	220	0
Hexachlorobenzene	mg/kg	0.45	4.4	6	6							
Hexachloroethane	mg/kg	0.47	4.6	6	6							
Indeno(1,2,3-cd)pyrene	mg/kg	0.0015	4.6	32	22	56.3%	01-SS-04 (8/4/1992)	0.0028	01-SB-01 (8/8/1992)	0.073	0.49	0
Isophorone	mg/kg	0.55	5.4	6	6							
N-Nitrosodiphenylamine	mg/kg	0.74	7.3	6	6							
N-Nitrosodipropylamine	mg/kg	0.65	6.4	6	6							
Pentachlorophenol	mg/kg	0.5	4.9	6	6							
Phenanthrene	mg/kg	0.022	4.7	34	24	64.7%	01-SS-01 (8/4/1992)	0.0055	01-SS-05 (8/4/1992)	16	2060	0
Phenol	mg/kg	1.6	16	6	6							
Pyrene	mg/kg	0.0095	4.9	32	22	25.0%	01-SS-10 (8/4/1992)	0.0033	01-SS-05 (8/4/1992)	0.98	140	0
VOCs												
1,1,1-Trichloroethane	mg/kg	0.0052	32	31	20	25.8%	01-SB-04 (8/10/1993)	0.0011	01-SB-03 (8/9/1993)	0.0082	0.82	0
1,1,2,2-Tetrachloroethane	mg/kg	0.005	32	25	15	4.0%	01-SS-04 (8/4/1992)	0.27	01-SS-04 (8/4/1992)	0.27	0.017	1
1,1,2-Trichloroethane	mg/kg	0.005	32	25	15							
1,1-Dichloroethane	mg/kg	0.00005	32	30	19	16.7%	01-SB-04 (8/10/1993)	0.0009	01-SB-03 (8/9/1993)	0.0019	25	0
1,1-Dichloroethene	mg/kg	0.005	32	30	19							
1,2,4-Trichlorobenzene	mg/kg	0.47	4.6	6	6							
1,2-Dichlorobenzene	mg/kg	0.45	4.4	6	6							

TABLE D1-FT001

Statistical Summary of Soil Analytical Results[a]

Analyte Name	Result Units	Minimum ND	Maximum ND	Number of Samples	Number of Locations	Frequency of Detection	Location of Minimum Detection	Minimum Detection Result	Location of Maximum Detection	Maximum Detection Result	Extent Soil Screening Level	Number of Exceedances
1,2-Dichloroethane	mg/kg	0.005	32	36	22	16.7%	GA-S050-A-505 (9/24/1992)	0.00008	GA-S050-A-503 (9/24/1992)	0.8	0.016	4
1,2-Dichloropropane	mg/kg	0.005	32	25	15							
1,3-Dichlorobenzene	mg/kg	0.5	4.9	6	6							
1,4-Dichlorobenzene	mg/kg	0.55	5.4	6	6							
2-Butanone (MEK)	mg/kg	0.03	640	31	20	19.4%	01-SB-04 (8/10/1993)	0.0054	01-SS-04 (8/4/1992)	15	59	0
2-Chloroethyl Vinyl Ether	mg/kg	0.005	64	25	15							
2-Hexanone	mg/kg	0.03	320	27	17	11.1%	GA-S050-A-501 (9/24/1992), GA-S050-A-503 (9/24/1992)	3.5	01-SS-04 (8/4/1992)	3.7	21	0
4-Methyl-2-Pentanone (MIBK)	mg/kg	0.03	320	25	15	4.0%	01-SB-03 (8/9/1993)	0.0037	01-SB-03 (8/9/1993)	0.0037	8.1	0
Acetone	mg/kg	0.1	640	35	22	34.3%	01-SB-04 (8/10/1993)	0.0035	GA-S050-A-503 (9/24/1992)	46	88	0
Benzene	mg/kg	0.0052	0.57	36	22	41.7%	01-SB-04 (8/10/1993)	0.0004	GA-S050-A-505 (9/24/1992)	170	0.025	9
bis(2-Chloroethoxy)methane	mg/kg	0.55	5.4	6	6							
Bromodichloromethane	mg/kg	0.005	32	25	15	4.0%	01-SS-04 (8/4/1992)	0.5	01-SS-04 (8/4/1992)	0.5	0.044	1
Bromoform	mg/kg	0.005	32	25	15							
Bromomethane	mg/kg	0.005	64	25	15							
Carbon Disulfide	mg/kg	0.0052	32	30	18	16.7%	GA-S050-A-503 (9/24/1992), GA-S050-A-505 (9/24/1992)	0.0001	GA-S050-A-501 (9/24/1992), GA-S050-A-503 (9/24/1992)	0.005	12	0
Carbon Tetrachloride	mg/kg	0.005	32	25	15							
Chlorobenzene	mg/kg	0.005	32	26	16	11.5%	GA-S050-A-501 (9/24/1992)	0.029	01-SS-07 (8/4/1992)	0.059	0.63	0
Chloroethane	mg/kg	0.005	64	25	15							
Chloroform	mg/kg	0.005	32	31	20	3.2%	GA-S050-A-503 (9/24/1992)	0.26	GA-S050-A-503 (9/24/1992)	0.26	0.32	0
Chloromethane	mg/kg	0.005	64	29	18	13.8%	GA-S050-A-501 (9/24/1992)	0.001	GA-S050-A-505 (9/24/1992)	1	0.21	1
cis-1,2-Dichloroethene	mg/kg	0.005	0.007	8	2							
cis-1,3-Dichloropropene	mg/kg	0.005	32	25	15							
Dibromochloromethane	mg/kg	0.005	32	25	15							
Ethylbenzene	mg/kg	0.005	0.59	35	22	22.9%	GA-S050-A-503 (9/24/1992)	0.22	01-SB-02 (8/8/1992)	200	6.9	3
Hexachlorobutadiene	mg/kg	0.64	6.2	6	6							
m- & p-Xylene	mg/kg	0.02	0.03	8	2							
Methylene Chloride	mg/kg	0.005	32	30	19	10.0%	01-SB-01 (8/8/1992)	0.0095	01-SS-07 (8/4/1992)	0.13	0.016	1
Naphthalene	mg/kg	0.062	0.468	37	25	59.5%	01-SS-06 (8/4/1992)	0.0035	FT001-SS07 (7/20/2009)	26	2.8	15
o-Xylene	mg/kg	0.01	0.01	8	2							
sec-Butyl Alcohol	mg/kg	0.005	0.007	8	2							
Styrene	mg/kg	0.005	32	25	15							
Tetrachloroethene (PCE)	mg/kg	0.005	32	30	19							
Toluene	mg/kg	0.005	0.5	32	21	28.1%	01-SB-01 (8/8/1992)	0.00048	01-SB-02 (8/8/1992)	1100	6.5	3
trans-1,2-Dichloroethene	mg/kg	0.005	32	30	19							
trans-1,3-Dichloropropene	mg/kg	0.005	32	25	15							
Trichloroethane	mg/kg			1	1	100.0%	GA-S050-A-503 (9/24/1992)	2.2	GA-S050-A-503 (9/24/1992)	2.2		0
Trichloroethene (TCE)	mg/kg	0.005	32	31	20	3.2%	GA-S050-A-505 (9/24/1992)	2.2	GA-S050-A-505 (9/24/1992)	2.2	0.02	1
Vinyl Acetate	mg/kg	0.0052	32	25	15	4.0%	01-SS-04 (8/4/1992)	12	01-SS-04 (8/4/1992)	12	100	0
Vinyl Chloride	mg/kg	0.005	64	29	17	13.8%	GA-S050-A-501 (9/24/1992)	0.005	GA-S050-A-503 (9/24/1992)	0.014	0.0085	1
Xylenes, Total	mg/kg	0.0052	0.5	32	21	37.5%	GA-S050-A-505 (9/24/1992)	0.044	01-SB-02 (8/8/1992)	1200	6.3	7
General Chemistry												
Nitrogen, Nitrate-Nitrite	mg/kg	0.28	0.3	6	6	50.0%	FT001-SS06 (7/20/2009)	0.29	FT001-SS13 (7/20/2009)	0.6		0
Phosphorus	mg/kg			6	6	100.0%	FT001-SS11 (7/20/2009)	0.65	FT001-SS01 (7/20/2009)	4.8	0.036	6
Total Kjeldahl Nitrogen	mg/kg			6	6	100.0%	FT001-SS13 (7/20/2009)	220	FT001-SS01 (7/20/2009)	1000		0
Total Organic Carbon	mg/kg			6	6	100.0%	FT001-SS13 (7/20/2009)	14000	FT001-SS06 (7/20/2009)	37000		0

TABLE D1-FT001

Statistical Summary of Soil Analytical Results[a]

Analyte Name	Result Units	Minimum ND	Maximum ND	Number of Samples	Number of Locations	Frequency of Detection	Location of Minimum Detection	Minimum Detection Result	Location of Maximum Detection	Maximum Detection Result	Extent Soil Screening Level	Number of Exceedances

[a]May not include all historical site data, only includes available validated electronic (data provided in Air Force database). See text for discussion of other historical data project screening level exceedances, if applicable

[b] Screening levels for metals have not been been finalized for this Work Plan; therefore, no screening levels are shown in this statistical summary table. Appendix C and Tables in Worksheet 15 identify ADEC Table B1/C Method 2 Cleanup levels and 1/10th of ADEC Table B1/C Method 2 Cleanup Levels as s levels for the purpose of identifying if LOD/LOQ are sufficient for this project.

[c] Screening levels for metals have not been finalized for this Work Plan; therefore, number of exceedances was not calculated. Metals will be analzed at sites based on site use in accordance with steps outlined in Figure 15-1.

Notes:

ND = non detect

mg/kg = Milligrams per Killogram

TABLE D2-FT001

Statistical Summary of Groundwater Analytical Results[a,b,c]

Analyte Name	Result Units	Minimum ND	Maximum ND	Number of Samples	Number of Locations	Frequency of Detection	Location of Minimum Detection	Minimum Detection Result	Location of Maximum Detection	Maximum Detection Result	Groundwater Screening Level	Number of Exceedances
Hydrocarbons												
C10-C25 DRO	µg/L	100	210	25	8	84%	01-MW-07 (9/15/1993)	2	01-MW-04 (9/9/1992)	980	150	9
C25-C36 RRO	µg/L	30	30	8	3	88%	01-MW-01 (6/22/2001), 01-MW-07 (6/15/2000)	30	01-MW-01 (6/19/2000)	200	110	1
C6-C10 GRO	µg/L	20	200	25	8	52%	01-MW-05 (9/13/1994)	15	01-MW-06 (9/2/1992)	1400	220	6
Diethyl Ether	µg/L	1160	1200	5	4							
Ethanol	µg/L	300	301	5	4							
n-Tetracosane	µg/L			7	6	100%	01-MW-01 (9/13/1994)	69	01-MW-08 (9/16/1994)	113		0
Total Petroleum Hydrocarbons	µg/L	1000	1000	9	4	44%	01-MW-05 (6/6/1990)	150	01-MW-06 (6/6/1990)	620		0
Metals												
Aluminum	mg/L	0.0284	0.0284	5	4	80%	01-MW-02 (9/13/1994)	0.0188	01-MW-01 (6/13/1993)	0.0249	b	c
Antimony	mg/L	0.0241	0.1	11	8	27%	01-MW-01 (6/13/1993)	0.0003	01-MW-02 (9/13/1994)	0.00997	b	c
Arsenic	mg/L	0.0007	0.004	11	8	36%	01-MW-07 (9/15/1993)	0.00739	01-MW-01 (6/13/1993)	0.0196	b	c
Barium	mg/L			5	4	100%	01-MW-07 (9/15/1993)	0.183	01-MW-01 (6/13/1993)	0.502	b	c
Beryllium	mg/L	0.000554	0.0006	5	4	20%	01-MW-02 (9/13/1994)	0.00001	01-MW-02 (9/13/1994)	0.00001	b	c
Cadmium	mg/L			5	4	100%	01-MW-08 (9/15/1993), 01-MW-08 (9/16/1994)	0.0015	01-MW-07 (9/15/1993)	0.00389	b	c
Calcium	mg/L			5	4	100%	01-MW-01 (6/13/1993)	180	01-MW-08 (9/15/1993), 01-MW-08 (9/16/1994)	210	b	c
Chromium	mg/L			5	4	100%	01-MW-07 (9/15/1993)	0.0006	01-MW-01 (6/13/1993)	0.0047	b	c
Cobalt	mg/L	0.0034	0.0034	5	4	80%	01-MW-07 (9/15/1993)	0.00205	01-MW-08 (9/15/1993), 01-MW-08 (9/16/1994)	0.0122	b	c
Copper	mg/L			5	4	100%	01-MW-02 (9/13/1994)	0.00128	01-MW-07 (9/15/1993)	0.0028	b	c
Iron	mg/L	0.2	0.2	15	6	93%	01-MW-03 (10/4/2001)	0.0489	01-MW-01 (6/13/1993)	38.7	b	c
Lead	mg/L	0.002	0.005	20	8	60%	01-MW-02 (9/13/1994)	0.0018	01-MW-02 (9/9/1992)	0.042	b	c
Magnesium	mg/L			5	4	100%	01-MW-01 (6/13/1993)	35.1	01-MW-07 (9/15/1993)	52.2	b	c
Manganese	mg/L	0.0005	0.0005	21	9	95%	01-MW-03 (6/19/2001)	0.0033	01-MW-08 (9/15/1993), 01-MW-08 (9/16/1994)	15.1	b	c
Mercury	mg/L	0.000048	0.000048	5	4	60%	01-MW-07 (9/15/1993)	0.00016	01-MW-02 (9/13/1994)	0.00022	b	c
Molybdenum	mg/L	0.0046	0.0046	5	4	60%	01-MW-07 (9/15/1993)	0.00071	01-MW-08 (9/15/1993), 01-MW-08 (9/16/1994)	0.0042	b	c
Nickel	mg/L			5	4	100%	01-MW-01 (6/13/1993)	0.0058	01-MW-08 (9/15/1993), 01-MW-08 (9/16/1994)	0.0326	b	c
Potassium	mg/L			5	4	100%	01-MW-02 (9/13/1994)	4.24	01-MW-07 (9/15/1993)	5.43	b	c
Selenium	mg/L	0.0008	0.005	11	8	36%	01-MW-02 (9/13/1994)	0.0074	01-MW-01 (6/13/1993)	0.019	b	c
Silver	mg/L	0.0049	0.0049	5	4	60%	01-MW-07 (9/15/1993)	0.00002	01-MW-08 (9/15/1993), 01-MW-08 (9/16/1994)	0.0024	b	c
Sodium	mg/L			5	4	100%	01-MW-01 (6/13/1993)	6.16	01-MW-07 (9/15/1993)	11.7	b	c
Thallium	mg/L	0.017	0.1	11	8	27%	01-MW-08 (9/15/1993), 01-MW-08 (9/16/1994)	0.0148	01-MW-07 (9/15/1993)	0.0228	b	c
Vanadium	mg/L	0.0024	0.0024	5	4	60%	01-MW-08 (9/15/1993), 01-MW-08 (9/16/1994)	0.0022	01-MW-07 (9/15/1993)	0.00242	b	c
Zinc	mg/L			5	4	100%	01-MW-01 (6/13/1993)	0.0094	01-MW-08 (9/15/1993), 01-MW-08 (9/16/1994)	0.0164	b	c

TABLE D2-FT001

Statistical Summary of Groundwater Analytical Results[a,b,c]

Analyte Name	Result Units	Minimum ND	Maximum ND	Number of Samples	Number of Locations	Frequency of Detection	Location of Minimum Detection	Minimum Detection Result	Location of Maximum Detection	Maximum Detection Result	Groundwater Screening Level	Number of Exceedances
PCBs/Pesticides												
4,4-DDD	µg/L	0.0021	0.01	12	8							
4,4-DDE	µg/L	0.0045	0.01	14	8							
4,4-DDT	µg/L	0.0068	0.02	14	8	57%	01-MW-02 (9/13/1994)	0.0069	01-MW-02 (9/9/1992)	0.016	0.000011	8
Aldrin	µg/L	0.0027	0.01	11	7							
alpha-BHC	µg/L	0.0021	0.0042	8	6	25%	01-MW-06 (9/16/1994)	0.0081	01-MW-01 (6/13/1993)	0.0109	0.014	0
alpha-Endosulfan	µg/L	0.0032	0.01	14	8	14%	01-MW-05 (9/9/1992)	0.0047	01-MW-03 (9/9/1992)	0.0059		0
Aroclor 1016	µg/L	0.0228	0.1	14	8							
Aroclor 1221	µg/L	0.0217	0.2	14	8							
Aroclor 1232	µg/L	0.0164	0.2	14	8							
Aroclor 1242	µg/L	0.0536	0.118	14	8							
Aroclor 1248	µg/L	0.0289	0.1	14	8							
Aroclor 1254	µg/L	0.0288	0.2	14	8							
Aroclor 1260	µg/L	0.0326	0.2	14	8							
beta-BHC	µg/L	0.0032	0.0098	10	7	20%	01-MW-02 (9/9/1992)	0.0074	01-MW-01 (9/13/1994)	0.0189	0.047	0
beta-Endosulfan	µg/L	0.0036	0.031	14	8	21%	01-MW-05 (9/9/1992)	0.0003	01-MW-06 (9/2/1992)	0.0084		0
Chlordane	µg/L	0.0096	0.051	14	8							
delta-BHC	µg/L	0.0017	0.01	10	7	30%	01-MW-07 (9/17/1994), 01-MW-07 (9/15/1993)	0.0079	01-MW-01 (6/13/1993)	0.0131		0
Dieldrin	µg/L	0.0024	0.01	13	7	69%	01-MW-07 (9/17/1994), 01-MW-08 (9/16/1994), 01-MW-06 (9/16/1994), 01-MW-07 (9/15/1993)	0.0023	01-MW-02 (9/9/1992)	0.01	0.0053	3
Endosulfan Sulfate	µg/L	0.0051	0.051	14	8	36%	01-MW-05 (9/9/1992)	0.0071	01-MW-06 (9/2/1992)	0.017		0
Endrin	µg/L	0.0068	0.0113	11	7							
Endrin Aldehyde	µg/L	0.0037	0.02	14	8	21%	01-MW-03 (9/9/1992)	0.0034	01-MW-02 (9/9/1992)	0.014		0
gamma-BHC	µg/L	0.0013	0.01	10	6	10%	01-MW-01 (6/13/1993)	0.0144	01-MW-01 (6/13/1993)	0.0144	0.02	0
Heptachlor	µg/L	0.0022	0.0023	14	8	57%	01-MW-07 (9/17/1994), 01-MW-07 (9/15/1993)	0.0006	01-MW-06 (9/2/1992)	0.01	0.0038	6
Heptachlor Epoxide	µg/L	0.0021	0.01	13	7	23%	01-MW-08 (9/16/1994)	0.0009	01-MW-05 (9/9/1992)	0.0035	0.0038	0
Methoxychlor	µg/L	0.0412	0.0531	14	8	7%	01-MW-05 (9/13/1994)	0.0525	01-MW-05 (9/13/1994)	0.0525	0.019	1
Toxaphene	µg/L	0.0351	0.51	14	8							
SVOCs	µg/L											
Acenaphthene	µg/L	1.8	1.9	8	6	25%	01-MW-02 (9/13/1994)	0.0054	01-MW-01 (6/13/1993)	0.219	5.8	0
Acenaphthylene	µg/L	1.64	2.4	8	6							
Anthracene	µg/L	0.28	0.69	8	6							
Benzo(a)anthracene	µg/L	0.0056	0.014	8	6							
Benzo(a)pyrene	µg/L	0.0072	0.024	8	6							
Benzo(b)fluoranthene	µg/L	0.018	0.022	8	6							
Benzo(g,h,i)perylene	µg/L	0.056	0.079	8	6							
Benzo(k)fluoranthene	µg/L	0.0032	0.018	8	6							

TABLE D2-FT001

Statistical Summary of Groundwater Analytical Results[a,b,c]

Analyte Name	Result Units	Minimum ND	Maximum ND	Number of Samples	Number of Locations	Frequency of Detection	Location of Minimum Detection	Minimum Detection Result	Location of Maximum Detection	Maximum Detection Result	Groundwater Screening Level	Number of Exceedances
Benzyl chloride	µg/L	6.8	34	5	4							
bis(2-Chloroisopropyl)ether	µg/L	10	50	5	4							
Chrysene	µg/L	0.098	0.16	8	6							
Dibenz(a,h)anthracene	µg/L	0.017	0.031	8	6	13%	01-MW-02 (9/9/1992)	0.01	01-MW-02 (9/9/1992)	0.01	0.012	0
Fluoranthene	µg/L	0.1	0.22	8	6							
Fluorene	µg/L	0.16	0.22	8	6							
Indeno(1,2,3-cd)pyrene	µg/L	0.043	0.045	8	6	25%	01-MW-01 (6/13/1993)	0.0403	01-MW-02 (9/13/1994)	0.0409	0.12	0
Methane	µg/L	10	10	6	4	83%	01-MW-01 (10/5/2007)	42	01-MW-01 (10/25/2008)	110000		0
Phenanthrene	µg/L	0.32	0.67	8	6	13%	01-MW-03 (9/9/1992)	0.083	01-MW-03 (9/9/1992)	0.083	0.4	0
Pyrene	µg/L	0.106	0.28	8	6							
VOCs												
1,1,1,2-Tetrachloroethane	µg/L	0.04	25	44	10	2%	01-MW-01 (6/13/1993)	0.0033	01-MW-01 (6/13/1993)	0.0033	0.52	0
1,1,1-Trichloroethane	µg/L	0.092	1	55	10	4%	01-MW-07 (9/15/1993)	0.0016	01-MW-01 (6/13/1993)	0.117	11	0
1,1,2,2-Tetrachloroethane	µg/L	0.1	7	49	10							
1,1,2-Trichloroethane	µg/L	0.092	1	45	10	2%	01-MW-01 (6/13/1993)	0.0243	01-MW-01 (6/13/1993)	0.0243	0.5	0
1,1,2-Trichlorotrifluoroethane	µg/L	0.5	0.5	1	1							
1,1-Dichloroethane	µg/L	0.048	2	45	10	2%	01-MW-01 (10/9/2001)	0.11	01-MW-01 (10/9/2001)	0.11	47	0
1,1-Dichloroethene	µg/L	0.0806	3.5	48	10	6%	01-MW-02 (9/13/1994)	0.0047	01-MW-03 (6/15/2000), 01-MW-07 (6/15/2000)	0.4	0.7	0
1,1-Dichloropropene	µg/L	0.13	1	27	4	4%	01-MW-07 (10/6/2007)	1.13	01-MW-07 (10/6/2007)	1.13		0
1,2,3-Trichlorobenzene	µg/L	0.044	1	27	4	4%	01-MW-03 (6/10/1999)	0.91	01-MW-03 (6/10/1999)	0.91	2.9	0
1,2,3-Trichloropropane	µg/L	0.115	25	44	10	5%	01-MW-08 (9/15/1993), 01-MW-08 (9/16/1994)	0.0107	01-MW-08 (9/15/1993), 01-MW-08 (9/16/1994)	0.0107	0.012	0
1,2,4-Trichlorobenzene	µg/L	0.1	1	30	5	3%	01-MW-03 (6/10/1999)	0.38	01-MW-03 (6/10/1999)	0.38	7	0
1,2,4-Trimethylbenzene	µg/L	0.086	1	37	6	5%	01-MW-03 (10/10/2000)	0.93	01-MW-01 (10/9/2001)	8.1	180	0
1,2-Dibromo-3-Chloropropane	µg/L	0.38	5	28	5							
1,2-Dichlorobenzene	µg/L	0.085	2.5	51	10	6%	01-MW-01 (6/13/1993)	0.102	01-MW-02 (9/13/1994)	0.238	0.7	0
1,2-Dichloroethane	µg/L	0.074	2.5	49	10	20%	01-MW-08 (9/15/1993)	0.0727	01-MW-01 (9/13/1994)	1.62	0.5	7
1,2-Dichloropropane	µg/L	0.0742	2.5	45	10							
1,3,5-Trimethylbenzene	µg/L	0.121	1	37	6	5%	01-MW-03 (10/10/2000)	0.75	01-MW-01 (10/9/2001)	2.5	180	0
1,3-Dichlorobenzene	µg/L	0.11	5	51	10	4%	01-MW-02 (9/13/1994)	0.0614	01-MW-01 (6/13/1993)	0.173	50.2	0
1,3-Dichloropropane	µg/L	0.076	0.4	30	5							
1,4-Dichlorobenzene	µg/L	0.087	2.5	51	10	10%	01-MW-01 (6/13/1993)	0.0386	01-MW-03 (10/1/1998)	0.21	7.5	0
1-Chlorohexane	µg/L	0.118	25	44	10							
2,2-Dichloropropane	µg/L	0.18	1	27	4							
2-Butanone (MEK)	µg/L	10	2400	11	6							
2-Chloroethyl Vinyl Ether	µg/L	0.124	28	15	8	7%	01-MW-07 (9/15/1993)	0.0693	01-MW-07 (9/15/1993)	0.0693		0
2-Chlorotoluene	µg/L	0.098	1	30	5							
2-Hexanone	µg/L	0.766	0.766	8	6							
4-Chlorotoluene	µg/L	0.089	115	32	7							

TABLE D2-FT001

Statistical Summary of Groundwater Analytical Results[a,b,c]

Analyte Name	Result Units	Minimum ND	Maximum ND	Number of Samples	Number of Locations	Frequency of Detection	Location of Minimum Detection	Minimum Detection Result	Location of Maximum Detection	Maximum Detection Result	Groundwater Screening Level	Number of Exceedances
4-Methyl-2-Pentanone (MIBK)	µg/L	10	1500	11	6							
Acetone	µg/L	0.75	10	17	9	53%	01-MW-02 (9/13/1994)	4.62	01-MW-01 (8/25/2006)	10	1500	0
Benzene	µg/L	0.105	0.7	61	10	46%	01-MW-07 (9/17/1994), 01-MW-05 (9/13/1994), 01-MW-07 (9/15/1993)	0.04	01-MW-06 (6/6/1990)	990	0.5	21
Bromobenzene	µg/L	0.098	25	44	10							
Bromochloromethane	µg/L	0.126	1	31	6	13%	01-MW-02 (9/13/1994)	75	01-MW-08 (9/16/1994)	99		0
Bromodichloromethane	µg/L	0.0536	2.5	45	10							
Bromoform	µg/L	0.1	5	41	10							
Bromomethane	µg/L	0.056	30	45	10							
Carbon Disulfide	µg/L	0.161	0.161	8	6							
Carbon Tetrachloride	µg/L	0.107	3	45	10							
Chlorobenzene	µg/L	0.045	5	51	10	2%	01-MW-01 (6/13/1993)	0.143	01-MW-01 (6/13/1993)	0.143	1.3	0
Chloroethane	µg/L	0.0972	15	45	10	9%	01-MW-08 (9/15/1993), 01-MW-08 (9/16/1994)	0.0117	01-MW-01 (10/1/1998)	0.22	29	0
Chloroform	µg/L	0.0363	1.5	49	10							
Chloromethane	µg/L	0.14	5.5	43	10	14%	01-MW-05 (9/13/1994)	0.28	01-MW-01 (9/13/1994)	0.65	6.6	0
cis-1,2-Dichloroethene	µg/L	0.0785	1	39	9	3%	01-MW-01 (10/9/2001)	0.3	01-MW-01 (10/9/2001)	0.3	7	0
cis-1,3-Dichloropropene	µg/L	0.074	0.5	40	9							
Dibromochloromethane	µg/L	0.0283	3	45	10	4%	01-MW-08 (9/15/1993), 01-MW-08 (9/16/1994)	0.0272	01-MW-08 (9/15/1993), 01-MW-08 (9/16/1994)	0.0272	1	0
Dibromomethane	µg/L	0.0598	25	44	10	5%	01-MW-01 (9/13/1994), 01-MW-01 (6/13/1993)	0.22	01-MW-01 (9/13/1994), 01-MW-01 (6/13/1993)	0.22	37	0
Dichlorodifluoromethane	µg/L	0.19	45	15	8							
Ethylbenzene	µg/L	0.098	100	62	10	10%	01-MW-06 (9/16/1994)	0.02	01-MW-01 (10/9/2001)	2.7	7.3	0
Ethylene Dibromide (EDB)	µg/L	0.073	0.37	24	5							
Hexachlorobutadiene	µg/L	0.13	1.9	30	5							
Isopropylbenzene	µg/L	0.068	1	30	5	27%	01-MW-01 (10/13/2000)	0.39	01-MW-01 (6/13/1999)	16	370	0
m- & p-Xylene	µg/L	0.186	2	38	8	3%	01-MW-01 (10/9/2001)	36	01-MW-01 (10/9/2001)	36		0
Methyl tert-Butyl Ether (MTBE)	µg/L	0.16	5	9	5							
Methylene Chloride	µg/L	0.193	10	46	10	28%	01-MW-08 (9/15/1993)	0.168	01-MW-01 (6/22/2001)	3	0.5	2
Naphthalene	µg/L	0.072	1.9	37	9	11%	01-MW-03 (6/10/1999)	0.44	01-MW-03 (10/10/2000)	1.3	1.1	1
n-Butylbenzene	µg/L	0.1	1.11	30	5							
n-Propylbenzene	µg/L	0.097	1	30	5	3%	01-MW-01 (10/9/2001)	1.9	01-MW-01 (10/9/2001)	1.9	37	0
o-Xylene	µg/L	0.079	1	38	8	8%	01-MW-06 (9/16/1994)	0.06	01-MW-01 (10/9/2001)	5.9	120	0
p-Isopropyltoluene	µg/L	0.13	1	26	4	8%	01-MW-03 (10/10/2000)	0.24	01-MW-01 (10/9/2001)	0.28		0
sec-Butyl Alcohol	µg/L	0.0962	0.0962	5	4	80%	01-MW-08 (9/16/1994)	99000	01-MW-01 (6/13/1993)	102000	7300	4
sec-Butylbenzene	µg/L	0.1	1	30	5	3%	01-MW-01 (10/9/2001)	0.63	01-MW-01 (10/9/2001)	0.63	37	0
Styrene	µg/L	0.074	1	38	9							
tert-Butylbenzene	µg/L	0.11	1	30	5							
Tetrachloroethene (PCE)	µg/L	0.0381	2	49	10	4%	01-MW-08 (9/15/1993), 01-MW-08 (9/16/1994)	0.0043	01-MW-08 (9/15/1993), 01-MW-08 (9/16/1994)	0.0043	0.5	0

TABLE D2-FT001

Statistical Summary of Groundwater Analytical Results[a,b,c]

Analyte Name	Result Units	Minimum ND	Maximum ND	Number of Samples	Number of Locations	Frequency of Detection	Location of Minimum Detection	Minimum Detection Result	Location of Maximum Detection	Maximum Detection Result	Groundwater Screening Level	Number of Exceedances
Toluene	µg/L	0.0336	100	62	10	32%	01-MW-08 (9/15/1993), 01-MW-08 (9/16/1994)	0.09	01-MW-06 (9/20/1987)	4	2	1
trans-1,2-Dichloroethene	µg/L	0.1	2.5	55	10	2%	01-MW-07 (9/15/1993)	0.0042	01-MW-07 (9/15/1993)	0.0042	10	0
trans-1,3-Dichloropropene	µg/L	0.0302	10	45	10							
Trichloroethene (TCE)	µg/L	0.0439	3	55	10	7%	01-MW-08 (9/15/1993), 01-MW-08 (9/16/1994)	0.0035	01-MW-01 (6/13/1993)	0.0043	0.5	0
Trichlorofluoromethane	µg/L	0.075	25	41	10	5%	01-MW-08 (9/15/1993), 01-MW-08 (9/16/1994)	0.0124	01-MW-08 (9/15/1993), 01-MW-08 (9/16/1994)	0.0124	1100	0
Vinyl Acetate	µg/L	0.127	0.127	8	6							
Vinyl Chloride	µg/L	0.0992	3	45	10							
Xylenes, Total	µg/L	0.13	200	24	8	25%	01-MW-08 (9/15/1993), 01-MW-08 (9/16/1994)	0.0446	01-MW-04 (6/6/1990)	9.5	13	0
General Chemistry												
Alkalinity, total (as CaCO3)	mg/L			15	8	100%	01-MW-05 (9/13/1994)	531	01-MW-03 (10/5/2007)	863		0
Chloride	mg/L			37	6	100%	01-MW-07 (10/6/2007)	0.786	01-MW-03 (10/5/2007)	12.7		0
Dissolved Oxygen	µg/L			6	4	100%	01-MW-08R (10/25/2008)	550	01-MW-08R (10/6/2007)	8790		0
Nitrogen, Nitrate (as N)	mg/L	0.01	0.01	3	2	33%	01-MW-07 (9/15/1993)	0.177	01-MW-07 (9/15/1993)	0.177		0
Nitrogen, Nitrate-Nitrite	mg/L	0.001	0.1	34	5	59%	01-MW-08R (10/6/2007)	0.0485	01-MW-05 (6/1/2004)	1.79		0
pH	PH UNITS			15	8	100%	01-MW-07 (10/6/2007)	6.27	01-MW-08 (9/15/1993), 01-MW-08 (9/16/1994)	6.86		0
Sulfate	mg/L			37	6	100%	01-MW-01 (10/5/2007)	6.9	01-MW-03 (10/5/2007)	468		0
Suspended Solids	mg/L			3	2	100%	01-MW-08 (9/16/1994), 01-MW-08 (9/15/1993)	5	01-MW-07 (9/15/1993)	8		0
Total Dissolved Solids	mg/L			5	4	100%	01-MW-01 (6/13/1993)	679	01-MW-08 (9/15/1993), 01-MW-08 (9/16/1994)	768		0

[a]May not include all historical site data, only includes available validated electronic (data provided in Air Force database). See text for discussion of other historical data project screening level exceedances, if applicable

[b] Screening levels for metals have not been been finalized for this Work Plan; therefore, no screening levels are shown in this statistical summary table. Appendix C and Tables in Worksheet 15 identify ADEC Table B1/C Method 2 Cleanup levels and 1/10th of ADEC Table B1/C Method 2 Cleanup Levels as screening levels for the purpose of identifying if LOD/LOQ are sufficient for this project.

[c] Screening levels for metals have not been finalized for this Work Plan; therefore, number of exceedances was not calculated. Metals will be analzed at sites based on site use in accordance with steps outlined in Figure 15-1.

Notes:

ND = non detect

mg/L = Milligrams per Liter

µg/L = Micrograms per Liter

TABLE D3-FT001

Historical Samples Exceeding Soil Extent Screening Levels[a,b]

Location		01-MW-01	01-MW-02	01-SB-01			01-SB-02			01-SB-03				01-SB-04		
Sample ID		01-MW-01-8/3/1992	01-MW-02-8/6/1992	01-SB-01-03	01-SB-01-01	01-SB-01-02	01-SB-02-03	01-SB-02-01	01-SB-02-02	01-SB-03-01	01-SB-03-02	01-SB-03-03	01-SB-03-04	01-SB-04-01	01-SB-04-02	01-SB-04-03
Sample Depth (feet bgs)		5 - 7	5 - 7	12 - 15	3 - 5	8 - 10	12 - 15	3 - 5	5 - 7	0 - 2	2.5 - 4.5	5 - 7	7.5 - 9.5	0 - 2	2.5 - 4.5	5 - 7
Sample Date		8/3/1992	8/6/1992	8/8/1992	8/8/1992	8/8/1992	8/8/1992	8/8/1992	8/8/1992	8/9/1993	8/9/1993	8/9/1993	8/9/1993	8/10/1993	8/10/1993	8/10/1993
Analyte	**Screening Level**															
Hydrocarbons (mg/kg)																
C10-C25 DRO	250	**27**	24 U	**33**	**100**	**51**	**1500**	**30000**	**9800**	20 U	20 U	20 U	20 U	**1 J**	**1 J**	**1 J**
C6-C10 GRO	140	13 U	**16 B**	12 U	230 U	12 U	520 U	**24000**	**13000**	10 U	10 U	10 U	10 U	10 U	10 U	10 U
PCB/Pesticides (mg/kg)																
Aldrin	0.03	**0.00004 J**	0.00041 U	**0.00041**	**0.0006 B**	**0.000032 J**	**0.0034**	**0.0028**	**0.0011**	- -	- -	- -	- -	- -	- -	- -
SVOCs (mg/kg)																
2-Methylnaphthalene	6.1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Benzo(a)anthracene	0.49	0.00058 U	**0.0007 J**	**0.00031 J**	**1.4**	**0.00063 J**	**0.002**	- -	0.017 U	0.0015 U	**0.000563 J**	**0.00047 J**	**0.000413 J**	**0.00143 J**	**0.000012 J**	0.00166 U
Benzo(a)pyrene	0.049	0.001 U	**0.00092 J**	**0.00097 J**	**1.5**	**0.0014 J**	**0.0015 J**	**0.02 J**	0.029 U	**0.000674 J**	**0.00101 J**	**0.00346 J**	**0.00165 J**	**0.00273 J**	**0.00181 J**	**0.00174 J**
Benzo(b)fluoranthene	0.49	- -	**0.0017 J**	**0.00095 J**	**0.94**	**0.0031**	**0.0038**	- -	0.023 U	**0.000739 J**	**0.00454 J**	**0.0047 J**	**0.00645 J**	**0.00362 J**	**0.00322 J**	**0.00207 J**
Dibenz(a,h)anthracene	0.049	0.0013 U	0.0037 U	0.0037 U	**0.26**	0.0037 U	0.0039 U	0.035 U	0.038 U	0.00349 U	**0.000649 J**	**0.00242 J**	**0.00166 J**	**0.00303 J**	**0.00528**	**0.00112 J**
VOCs (mg/kg)																
1,1,2,2-Tetrachloroethane	0.017	- -	0.0062 U	0.0062 U	0.13 U	0.0062 U	0.13 U	5.8 U	32 U	0.007 U	0.007 U	0.006 U	0.006 U	0.005 U	0.007 U	0.006 U
1,2-Dichloroethane	0.016	- -	0.0062 U	0.0062 U	0.13 U	0.0062 U	0.13 U	5.8 U	32 U	0.007 U	0.007 U	0.006 U	0.006 U	0.005 U	0.007 U	0.006 U
Benzene	0.025	- -	0.0062 U	0.0062 U	0.13 U	0.0062 U	**3**	**120**	**49**	0.007 U	0.006 U	**0.0009 J**	0.006 U	**0.0004 J**	**0.001 J**	**0.0008 J**
Bromodichloromethane	0.044	- -	0.0062 U	0.0062 U	0.13 U	0.0062 U	0.13 U	5.8 U	32 U	0.007 U	0.007 U	0.006 U	0.006 U	0.005 U	0.007 U	0.006 U
Chloromethane	0.21	- -	0.0124 U	0.012 U	0.26 U	0.012 U	0.26 U	11.6 U	64 U	0.007 U	0.007 U	0.006 U	0.006 U	0.005 U	0.007 U	0.006 U
Ethylbenzene	6.9	- -	0.0062 U	0.0062 U	0.13 U	0.0062 U	**2.3**	**200**	**74**	0.007 U	0.007 U	0.006 U	0.006 U	0.005 U	0.007 U	0.006 U
Methylene Chloride	0.016	- -	**0.011 B**	**0.0095 B**	0.13 U	0.0062 U	0.13 U	5.8 U	32 U	0.007 U	0.007 U	0.006 U	0.006 U	0.005 U	0.007 U	0.006 U
Naphthalene	2.8	0.08 U	0.22 U	0.22 U	**0.26 J**	0.22 U	**2.8**	- -	**23**	0.393 U	0.419 U	0.416 U	0.468 U	0.407 U	0.456 U	0.434 U
Toluene	6.5	- -	0.0062 U	**0.00048 J**	0.13 U	0.0062 U	**14**	**1100**	**370**	0.007 U	0.007 U	0.006 U	0.006 U	0.005 U	0.007 U	0.006 U
Trichloroethene (TCE)	0.02	- -	0.0062 U	0.0062 U	0.13 U	0.0062 U	0.13 U	5.8 U	32 U	0.007 U	0.007 U	0.006 U	0.006 U	0.005 U	0.007 U	0.006 U
Vinyl Chloride	0.0085	- -	0.0124 U	0.012 U	0.26 U	0.012 U	0.26 U	11.6 U	64 U	0.007 U	0.007 U	0.006 U	0.006 U	0.005 U	0.007 U	0.006 U
Xylenes, Total	6.3	- -	0.0062 U	0.0062 U	**0.053 J**	0.0062 U	**12**	**1200**	**380**	- -	- -	- -	- -	0.02 U	0.03 U	0.02 U
General Chemistry (mg/kg)																
Phosphorus	0.036	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

TABLE D3-FT001

Historical Samples Exceeding Soil Extent Screening Levels[a,b]

	Location		01-SS-01	01-SS-02	01-SS-03	01-SS-04	01-SS-05	01-SS-06	01-SS-07	01-SS-08	01-SS-09	01-SS-10	FT001-SS01		FT001-SS02	FT001-SS03
	Sample ID	01-SB-04-04	01-SS-01-01	01-SS-02-01	01-SS-03-01	01-SS-04-01	01-SS-05-01	01-SS-06-01	01-SS-07-01	01-SS-08-01	01-SS-09-01	01-SS-10-01	FT001-SS01-0_75	FT001-SS01-0_75D	FT001-SS02-2_0	FT001-SS03-0_75
	Sample Depth (feet bgs)	7.5 - 9.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.75	0 - 0.75	1 - 2	0 - 0.75
	Sample Date	8/10/1993	8/4/1992	8/4/1992	8/4/1992	8/4/1992	8/4/1992	8/4/1992	8/4/1992	8/4/1992	8/4/1992	8/4/1992	7/20/2009	7/20/2009	7/20/2009	7/20/2009
Analyte	**Screening Level**															
Hydrocarbons (mg/kg)																
C10-C25 DRO	250	**1 J**	**130**	**130**	**410**	**210**	**72000**	**220**	**15000**	**190**	**32**	**1500**	**6700**	**8600**	**4500**	**1400**
C6-C10 GRO	140	10 U	9.8 U	9.9 U	**13 B**	**370**	11 U	11 U	**130**	11 U	240 U	10 U	**5400 J**	**2700 J**	- -	**910 J**
PCB/Pesticides (mg/kg)																
Aldrin	0.03	- -	**0.000094 J**	0.00035 U	0.00039 U	**0.00012 J**	**0.033**	**0.00023 J**	0.00034 U	**0.00014 J**	0.00041 U	**0.00017 J**	- -	- -	- -	- -
SVOCs (mg/kg)																
2-Methylnaphthalene	6.1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	**14**	**69**	- -	- -
Benzo(a)anthracene	0.49	0.00158 U	0.0045 U	**0.0014**	**0.0031 J**	0.0005 U	**0.063**	**0.00073**	**0.03 J**	**0.0018**	0.00053 U	**0.0023**	0.46 U	2.2 U	- -	- -
Benzo(a)pyrene	0.049	**0.00304 J**	0.008 U	**0.0042 J**	**0.0088 J**	0.00088 U	**0.027 J**	**0.0015**	**0.02 J**	**0.0054**	**0.00032 J**	**0.0044 J**	0.47 U	2.3 U	- -	- -
Benzo(b)fluoranthene	0.49	**0.00396 J**	0.0063 U	**0.0058 J**	**0.0091**	0.00069 U	**0.021 J**	**0.0016**	**0.025**	**0.0061**	**0.00086**	**0.0047 J**	0.53 U	2.5 U	- -	- -
Dibenz(a,h)anthracene	0.049	**0.00479**	0.01 U	0.01 U	0.012 U	0.0011 U	0.11 U	**0.00053 J**	**0.0042 J**	**0.0011 J**	0.0012 U	0.001 U	0.47 U	2.3 U	- -	- -
VOCs (mg/kg)																
1,1,2,2-Tetrachloroethane	0.017	0.006 U	0.0053 U	0.0052 U	0.59 U	**0.27 J**	0.0055 U	0.0054 U	0.5 U	0.0054 U	0.0061 U	0.0052 U	- -	- -	- -	- -
1,2-Dichloroethane	0.016	0.006 U	0.0053 U	0.0052 U	0.59 U	0.57 U	0.0055 U	0.0054 U	0.5 U	0.0054 U	0.0061 U	0.0052 U	- -	- -	- -	- -
Benzene	0.025	0.006 U	0.0053 U	0.0052 U	**0.048 J**	0.57 U	0.0055 U	0.0054 U	0.5 U	0.0054 U	0.0061 U	0.0052 U	- -	- -	- -	- -
Bromodichloromethane	0.044	0.006 U	0.0053 U	0.0052 U	0.59 U	**0.5 J**	0.0055 U	0.0054 U	0.5 U	0.0054 U	0.0061 U	0.0052 U	- -	- -	- -	- -
Chloromethane	0.21	0.006 U	0.0106 U	0.0104 U	1.2 U	1.1 U	0.011 U	0.011 U	1 U	0.011 U	0.012 U	0.01 U	- -	- -	- -	- -
Ethylbenzene	6.9	0.006 U	0.0053 U	0.0052 U	0.59 U	0.57 U	0.0055 U	0.0054 U	0.5 U	0.0054 U	0.0061 U	0.0052 U	- -	- -	- -	- -
Methylene Chloride	0.016	0.006 U	0.0053 U	0.0052 U	0.59 U	0.57 U	0.0055 U	0.0054 U	**0.13 J**	0.0054 U	0.0061 U	0.0052 U	- -	- -	- -	- -
Naphthalene	2.8	0.413 U	0.063 U	**0.0049 J**	**0.067 J**	**0.0088 J**	**12**	**0.0035 J**	**4.2**	**0.01 J**	0.074 U	0.062 U	**3.3 J**	**24 J**	- -	- -
Toluene	6.5	0.006 U	0.0053 U	0.0052 U	**0.1 J**	**0.55 J**	0.0055 U	0.0054 U	**0.043 J**	0.0054 U	0.0061 U	0.0052 U	- -	- -	- -	- -
Trichloroethene (TCE)	0.02	0.006 U	0.0053 U	0.0052 U	0.59 U	0.57 U	0.0055 U	0.0054 U	0.5 U	0.0054 U	0.0061 U	0.0052 U	- -	- -	- -	- -
Vinyl Chloride	0.0085	0.006 U	0.0106 U	0.0104 U	1.2 U	1.1 U	0.011 U	0.011 U	1 U	0.011 U	0.012 U	0.01 U	- -	- -	- -	- -
Xylenes, Total	6.3	0.02 U	0.0053 U	0.0052 U	**0.077 J**	**120**	0.0055 U	0.0054 U	0.5 U	0.0054 U	0.0061 U	0.0052 U	- -	- -	- -	- -
General Chemistry (mg/kg)																
Phosphorus	0.036	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	**4.8 J**	**1.4 J**	- -	- -

TABLE D3-FT001

Historical Samples Exceeding Soil Extent Screening Levels[a,b]

	Location	FT001-SS04	FT001-SS05	FT001-SS06	FT001-SS07	FT001-SS08	FT001-SS09	FT001-SS10	FT001-SS11	FT001-SS12	FT001-SS13	FT001-SS14	
	Sample ID	FT001-SS04-2_0	FT001-SS05-0_75	FT001-SS06-0_75	FT001-SS07-0_75	FT001-SS08-0_75	FT001-SS09-2_0	FT001-SS10-0_75	FT001-SS11-0_75	FT001-SS12-2_0	FT001-SS13-0_75	FT001-SS14-0_75	FT001-SS14-0_75D
	Sample Depth (feet bgs)	1 - 2	0 - 0.75	0 - 0.75	0 - 0.75	0 - 0.75	1 - 2	0 - 0.75	0 - 0.75	1 - 2	0 - 0.75	0 - 0.75	0 - 0.75
	Sample Date	7/20/2009	7/20/2009	7/20/2009	7/20/2009	7/20/2009	7/20/2009	7/20/2009	7/20/2009	7/20/2009	7/20/2009	7/20/2009	7/20/2009
Analyte	**Screening Level**												
Hydrocarbons (mg/kg)													
C10-C25 DRO	250	**17000**	**21000**	**18000**	**18000**	**2800**	**4400**	**5500**	**8800**	**5500**	**5600 M**	**12000**	- -
C6-C10 GRO	140	**11000 J**	**8800 J**	**11000**	**3400**	**3100 J**	**14000 J**	**10000**	**3200**	**7300 J**	**5000**	**500 J**	**430 J**
PCB/Pesticides (mg/kg)													
Aldrin	0.03	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
SVOCs (mg/kg)													
2-Methylnaphthalene	6.1	- -	- -	**70**	**110**	- -	- -	**35**	**70 J**	- -	**54**	- -	- -
Benzo(a)anthracene	0.49	- -	- -	2.3 U	3.5 U	- -	- -	1.1 U	4.5 U	- -	2 U	- -	- -
Benzo(a)pyrene	0.049	- -	- -	2.3 U	3.6 U	- -	- -	1.1 U	4.6 U	- -	2.1 U	- -	- -
Benzo(b)fluoranthene	0.49	- -	- -	2.6 U	4.1 U	- -	- -	1.3 U	5.1 U	- -	2.4 U	- -	- -
Dibenz(a,h)anthracene	0.049	- -	- -	2.3 U	3.6 U	- -	- -	1.1 U	4.6 U	- -	2.1 U	- -	- -
VOCs (mg/kg)													
1,1,2,2-Tetrachloroethane	0.017	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
1,2-Dichloroethane	0.016	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Benzene	0.025	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Bromodichloromethane	0.044	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Chloromethane	0.21	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Ethylbenzene	6.9	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Methylene Chloride	0.016	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Naphthalene	2.8	- -	- -	**24 J**	**26 J**	- -	- -	**11 J**	**25 J**	- -	**17 J**	- -	- -
Toluene	6.5	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Trichloroethene (TCE)	0.02	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Vinyl Chloride	0.0085	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Xylenes, Total	6.3	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
General Chemistry (mg/kg)													
Phosphorus	0.036	- -	- -	**3.1**	**0.83**	- -	- -	**1.6**	**0.65**	- -	**1.4 J**	- -	- -

TABLE D3-FT001

Historical Samples Exceeding Soil Extent Screening Levels[a,b]

	Location	FT001-SS15	FT001-SS16	FT001-SS17	FT001-SS18	FT001-SS19	FT001-SS20	FT001-SS21	FTA-001	FTA-002	GA-S050-A-501		GA-S050-A-503	GA-S05
	Sample ID	FT001-SS15-0_75	FT001-SS16-0_75	FT001-SS17-0_75	FT001-SS18-0_75	FT001-SS19-2_0	FT001-SS20-0_75	FT001-SS21-0_75	FTA-001-17A	FTA-002-18A	GA-K005-A-502	GA-S050-A-501	GA-S050-A-503	GA-K005-A-506
	Sample Depth (feet bgs)	0 - 0.75	0 - 0.75	0 - 0.75	0 - 0.75	1 - 2	0 - 0.75	0 - 0.75	0 - 0	0 - 0	0.5 - 0.5	5 - 5	5 - 5	0.5 - 0.5
	Sample Date	7/20/2009	7/20/2009	7/20/2009	7/20/2009	7/20/2009	7/20/2009	7/20/2009	7/11/1996	7/11/1996	9/24/1992	9/24/1992	9/24/1992	9/24/1992
Analyte	**Screening Level**													
Hydrocarbons (mg/kg)														
C10-C25 DRO	250	**16**	**11000**	**73**	**12**	**10**	**18**	**9.8**	- -	- -	- -	- -	- -	- -
C6-C10 GRO	140	**13**	**6600 J**	**28**	**12**	**14**	**14**	**10**	- -	- -	- -	- -	- -	- -
PCB/Pesticides (mg/kg)														
Aldrin	0.03	- -	- -	- -	- -	- -	- -	- -	0.0018 U	0.0018 U	- -	- -	- -	- -
SVOCs (mg/kg)														
2-Methylnaphthalene	6.1	- -	- -	- -	- -	- -	- -	- -	- -	- -	**3.1**	**10 J**	**12 J**	**3.1**
Benzo(a)anthracene	0.49	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Benzo(a)pyrene	0.049	- -	- -	- -	- -	- -	- -	- -	- -	- -	0.38 U	0.5 U	0.42 U	- -
Benzo(b)fluoranthene	0.49	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Dibenz(a,h)anthracene	0.049	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
VOCs (mg/kg)														
1,1,2,2-Tetrachloroethane	0.017	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
1,2-Dichloroethane	0.016	- -	- -	- -	- -	- -	- -	- -	- -	- -	**0.43 J**	**0.6 J**	**0.8 J**	**0.007**
Benzene	0.025	- -	- -	- -	- -	- -	- -	- -	- -	- -	**0.019 J**	**14 J**	**11 J**	**0.91**
Bromodichloromethane	0.044	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Chloromethane	0.21	- -	- -	- -	- -	- -	- -	- -	- -	- -	**0.001 J**	**0.066**	**0.079**	**1**
Ethylbenzene	6.9	- -	- -	- -	- -	- -	- -	- -	- -	- -	**0.8 J**	**58 J**	**6.8 J**	**0.69 J**
Methylene Chloride	0.016	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Naphthalene	2.8	- -	- -	- -	- -	- -	- -	- -	- -	- -	**10 J**	**3.8**	**5.4**	**0.58**
Toluene	6.5	- -	- -	- -	- -	- -	- -	- -	- -	- -	**0.67 J**	- -	- -	**0.012**
Trichloroethene (TCE)	0.02	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Vinyl Chloride	0.0085	- -	- -	- -	- -	- -	- -	- -	- -	- -	**0.007 J**	**0.005 J**	**0.014**	- -
Xylenes, Total	6.3	- -	- -	- -	- -	- -	- -	- -	- -	- -	**0.67 J**	**39 J**	**21 J**	**0.044 M**
General Chemistry (mg/kg)														
Phosphorus	0.036	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

TABLE D3-FT001

Historical Samples Exceeding Soil Extent Screening Levels[a,b]

	Location	0-A-505	TB048	TB049	TB050	TB051	
	Sample ID	GA-S050-A-505	791-SO-048-GS-87-0001	791-SO-049-GS-87-0001	791-SO-050-GS-87-0001	791-SO-051-GS-87-0001	791-SO-051-GS-87-0001
	Sample Depth (feet bgs)	5 - 5	0 - 1	0 - 1	0 - 1	0 - 1	15 - 16.5
	Sample Date	9/24/1992	9/28/1987	9/28/1987	9/28/1987	9/28/1987	9/28/1987
Analyte	**Screening Level**						
Hydrocarbons (mg/kg)							
C10-C25 DRO	250	- -	- -	- -	- -	- -	- -
C6-C10 GRO	140	- -	- -	- -	- -	- -	- -
PCB/Pesticides (mg/kg)							
Aldrin	0.03	- -	- -	- -	- -	- -	- -
SVOCs (mg/kg)							
2-Methylnaphthalene	6.1	**31**	- -	- -	- -	- -	- -
Benzo(a)anthracene	0.49	- -	- -	- -	- -	- -	- -
Benzo(a)pyrene	0.049	- -	- -	- -	- -	- -	- -
Benzo(b)fluoranthene	0.49	- -	- -	- -	- -	- -	- -
Dibenz(a,h)anthracene	0.049	- -	- -	- -	- -	- -	- -
VOCs (mg/kg)							
1,1,2,2-Tetrachloroethane	0.017	- -	- -	- -	- -	- -	- -
1,2-Dichloroethane	0.016	**0.00008 J**	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Benzene	0.025	**170 J**	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Bromodichloromethane	0.044	- -	- -	- -	- -	- -	- -
Chloromethane	0.21	- -	- -	- -	- -	- -	- -
Ethylbenzene	6.9	- -	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methylene Chloride	0.016	- -	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Naphthalene	2.8	**17**	- -	- -	- -	- -	- -
Toluene	6.5	- -	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene (TCE)	0.02	**2.2**	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Vinyl Chloride	0.0085	- -	- -	- -	- -	- -	- -
Xylenes, Total	6.3	**150 J**	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
General Chemistry (mg/kg)							
Phosphorus	0.036	- -	- -	- -	- -	- -	- -

TABLE D3-FT001

Historical Samples Exceeding Soil Extent Screening Levels[a,b]

[a]May not include all historical site data, only includes available validated electronic (data provided in Air Force database). See text for discussion of other historical data project screening level exceedances, if applicable

[b]Metals are not included in this table.

Notes:
-- = Not Analyzed
B = The analyte was detected in the associated method and/or calibration blank.
J = The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
M = A matrix effect was identified.
R = The sample results are rejected due to serious deficiencies in the ability to analyze the sample and to meet the quality control criteria. The presence or absence of the analyte cannot be verified.
U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
UJ = The analyte was below the reported sample quantitation limit. However, the reported value is approximate.
mg/kg = Milligrams per Kilogram
bgs = below ground surface
Bold indicates the analyte was detected
Shading indicates the result exceeded screening criteria
Field Duplicates are included is this table.

TABLE D4-FT001

Historical Samples Exceeding Groundwater Screening Levels[a,b]

	Location	01-MW-01										
	Sample ID	01-MW-01-9/2/1992	01-MW-01-6/13/1993	01-MW-01-9/13/1994	01-MW-01/005	G99-01-MW-01-02	G99-01-MW01-03	G00-01-MW01-04	G00-01-MW01-05	G01-01MW01-1601	G01-01MW-01-1701	GFT001-01MW01-W060104
	Sample Depth (feet bgs)	7.19 - 46.8	7.19 - 46.8	7.19 - 46.8	7.19 - 46.8	7.19 - 46.8	7.19 - 46.8	7.19 - 46.8	7.19 - 46.8	7.19 - 46.8	7.19 - 46.8	7.19 - 46.8
	Sample Date	9/2/1992	6/13/1993	9/13/1994	10/1/1998	6/13/1999	10/30/1999	6/19/2000	10/13/2000	6/22/2001	10/9/2001	6/1/2004
	Depth to Water (feet bgs)	14.12	15.52	--	19.46	18.96	27.66	9.46	--	8.26	--	9.5
	Measurement Date	8/20/1992	8/15/1993	--	10/1/1998	6/1/1999	10/1/1999	6/1/2000	--	6/17/2001	--	6/1/2004
Analyte	**Screening Level**											
Hydrocarbons (ug/L)												
C10-C25 DRO	150	**390**	**4 J**	- -	- -	- -	- -	**180 B**	**620**	**240**	**600**	- -
C6-C10 GRO	220	200 U	**610**	- -	- -	- -	- -	**560**	**150**	**620**	**550**	- -
C25-C36 RRO	110	- -	- -	- -	- -	- -	- -	**200 J**	- -	**30 J**	- -	- -
PCB/Pesticides (ug/L)												
4,4-DDT	0.000011	0.02 U	0.0068 U	**0.008 J**	- -	- -	- -	- -	- -	- -	- -	- -
Dieldrin	0.0053	**0.0047 J**	0.0044 U	**0.0025 J**	- -	- -	- -	- -	- -	- -	- -	- -
Heptachlor	0.0038	**0.0089 J**	0.0023 U	0.0024 U	- -	- -	- -	- -	- -	- -	- -	- -
Methoxychlor	0.019	0.05 U	0.0412 U	0.0547 U	- -	- -	- -	- -	- -	- -	- -	- -
VOCs (ug/L)												
1,2-Dichloroethane	0.5	- -	**1.4**	**1.62**	0.16 U	0.13 U	0.22 U	0.114 U	0.114 U	0.58 U	0.114 U	- -
Benzene	0.5	**38**	**372**	**152**	**180**	**280**	**R**	**210**	**59 J**	**200**	**94**	**60.7**
Methylene Chloride	0.5	- -	**0.22**	**0.22**	- -	**0.27 J**	0.27 U	0.2 U	0.2 U	**3 J**	0.2 U	- -
Naphthalene	1.1	1.8 U	1.1 U	- -	0.13 U	0.13 U	**R**	0.072 U	**1.1**	0.36 U	**0.83 B**	- -
sec-Butyl Alcohol	7300	- -	**102000**	- -	- -	- -	- -	- -	- -	- -	- -	- -
Toluene	2	0.4 U	**1.09**	**0.28**	**0.11 J**	**0.14 J**	0.09 U	0.1 U	**0.12 J**	0.49 U	**1 J**	0.31 U
Calculated Total Xylenes	13	- -	- -	- -	- -	0.245 U	0.245 U	0.135 U	0.133 U	0.665 U	**41.9**	0.465 U

TABLE D4-FT001

Historical Samples Exceeding Groundwater Screening Levels[a,b]

	Location					01-MW-02				
	Sample ID	GFT001-01MW01-W102204	FT001-01MW01-W082506	07GAL01MW01-007WG	08GAL01MW01-002WG	01-MW-02-9/9/1992	01-MW-02-6/13/1993	791-NG-005-GN-87-0006	791-GN-005-NG-90-0300	01-MW-03-9/9/1992
	Sample Depth (feet bgs)	7.19 - 46.8	7.19 - 46.8	7.19 - 46.8	7.19 - 46.8	7.48 - 27	7.48 - 27	15 - 25	15 - 25	15 - 25
	Sample Date	10/22/2004	8/25/2006	10/5/2007	10/25/2008	9/9/1992	9/13/1994	9/20/1987	6/6/1990	9/9/1992
	Depth to Water (feet bgs)	23.6	12.14	16.53	18.64	12.36	--	--	--	9.04
	Measurement Date	10/19/2004	8/25/2006	10/1/2007	10/29/2008	8/19/1992	--	--	--	7/29/1992
Analyte	**Screening Level**									
Hydrocarbons (ug/L)										
C10-C25 DRO	150	- -	- -	- -	- -	210 U	**4 J**	- -	- -	200 U
C6-C10 GRO	220	- -	- -	- -	- -	100 U	**36 J**	- -	- -	100 U
C25-C36 RRO	110	- -	- -	- -	- -	- -	- -	- -	- -	- -
PCB/Pesticides (ug/L)										
4,4-DDT	0.000011	- -	- -	- -	- -	**0.016 J**	**0.0069 J**	- -	- -	**0.011 J**
Dieldrin	0.0053	- -	- -	- -	- -	**0.01**	0.0024 U	- -	- -	**0.0088 J**
Heptachlor	0.0038	- -	- -	- -	- -	**0.0057 J**	0.0023 U	- -	- -	**0.009 J**
Methoxychlor	0.019	- -	- -	- -	- -	0.052 U	0.0412 U	- -	- -	0.052 U
VOCs (ug/L)										
1,2-Dichloroethane	0.5	- -	0.074 U	0.5 U	0.5 U	- -	**1.09**	0.5 U	0.5 U	- -
Benzene	0.5	**20.6 J**	**4.3**	0.4 U	0.4 U	0.3 U	**0.111**	0.2 U	0.7 U	0.3 U
Methylene Chloride	0.5	- -	1 U	1 U	1 U	- -	**0.26**	0.5 U	2 U	- -
Naphthalene	1.1	- -	0.1 U	1 U	1 U	1.9 U	1.1 U	- -	- -	2 U
sec-Butyl Alcohol	7300	- -	- -	- -	- -	- -	**101000**	- -	- -	- -
Toluene	2	0.202 U	0.21 U	**0.62 J**	1 U	0.2 U	**0.138**	0.2 U	1 U	0.2 U
Calculated Total Xylenes	13	0.3415 U	0.21 U	**1.79**	1.5 U	- -	- -	- -	- -	- -

TABLE D4-FT001

Historical Samples Exceeding Groundwater Screening Levels[a,b]

Location		01-MW-03									01-MW-04	
Sample ID		01-MW-03/003	G99-01-MW-03-02	G99-01-MW03-03	G00-01-MW03-04	G00-01-MW03-05	G01-01MW03-1601	G01-01MW03-1701	G01-01MW03-5701	07GAL01MW03-008WG	791-NG-006-GN-87-0006	791-GN-006-NG-90-0300
Sample Depth (feet bgs)		15 - 25	15 - 25	15 - 25	15 - 25	15 - 25	15 - 25	15 - 25	15 - 25	15 - 25	UNK	UNK
Sample Date		10/1/1998	6/10/1999	10/27/1999	6/15/2000	10/10/2000	6/19/2001	10/4/2001	10/4/2001	10/5/2007	9/20/1987	6/6/1990
Depth to Water (feet bgs)		18.42	18.25	22.88	11.03	14.88	7.96	17.99	--	18.06	--	--
Measurement Date		10/1/1998	6/1/1999	10/1/1999	6/1/2000	10/1/2000	6/17/2001	10/1/2001	--	10/5/2007	--	--
Analyte	**Screening Level**											
Hydrocarbons (ug/L)												
C10-C25 DRO	150	- -	- -	- -	**30 J**	**170**	**86 J**	**150**	19 U	- -	- -	- -
C6-C10 GRO	220	- -	- -	- -	20 U	21 U	**23 J**	20.6 U	20.6 U	- -	- -	- -
C25-C36 RRO	110	- -	- -	- -	30 U	- -	**97 J**	**81 J**	**29 J**	- -	- -	- -
PCB/Pesticides (ug/L)												
4,4-DDT	0.000011	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Dieldrin	0.0053	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Heptachlor	0.0038	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Methoxychlor	0.019	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
VOCs (ug/L)												
1,2-Dichloroethane	0.5	0.16 U	0.13 U	0.22 U	0.114 U	0.114 U	0.114 U	0.114 U	0.114 U	0.5 U	0.5 U	0.5 U
Benzene	0.5	0.12 U	0.22 U	0.13 U	0.105 U	0.105 U	0.105 U	0.105 U	0.105 U	0.4 U	0.2 U	0.7 U
Methylene Chloride	0.5	- -	0.27 U	0.27 U	0.193 U	0.2 U	**0.4 J**	0.2 U	**1.1**	1 U	0.5 U	2 U
Naphthalene	1.1	0.13 U	**0.44**	0.16 U	0.072 U	**1.3**	0.072 U	0.072 U	0.072 U	1 U	- -	- -
sec-Butyl Alcohol	7300	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Toluene	2	0.1 U	0.09 U	**0.39 J**	0.1 U	**0.12 J**	**0.4 J**	**0.13 J**	**0.16 J**	**0.49 J**	0.2 U	1 U
Calculated Total Xylenes	13	- -	0.245 U	0.245 U	0.135 U	0.133 U	0.1325 U	- -	0.265 U	1.5 U	- -	- -

TABLE D4-FT001

Historical Samples Exceeding Groundwater Screening Levels[a,b]

	Location		01-MW-05							
	Sample ID	01-MW-04-9/9/1992	791-NG-007-GN-87-0006	791-GN-007-NG-90-0300	01-MW-05-9/9/1992	01-MW-05-9/13/1994	GFT001-01MW05-W060104	GFT001-01MW05-W060104D	791-NG-008-GN-87-0006	791-GN-008-NG-89-0200
	Sample Depth (feet bgs)	UNK	UNK	UNK	UNK	UNK	UNK	UNK	UNK	UNK
	Sample Date	9/9/1992	9/20/1987	6/6/1990	9/9/1992	9/13/1994	6/1/2004	6/1/2004	9/20/1987	12/6/1989
	Depth to Water (feet bgs)	12.11	--	--	7.93	--	10.62	--	--	--
	Measurement Date	9/9/1992	--	--	7/29/1992	--	6/1/2004	--	--	--
Analyte	**Screening Level**									
Hydrocarbons (ug/L)										
C10-C25 DRO	150	**980**	- -	- -	210 U	100 UJ	- -	- -	- -	- -
C6-C10 GRO	220	100 U	- -	- -	100 U	**15 J**	- -	- -	- -	- -
C25-C36 RRO	110	- -	- -	- -	- -	- -	- -	- -	- -	- -
PCB/Pesticides (ug/L)										
4,4-DDT	0.000011	**0.0086 J**	- -	- -	**0.0074 J**	0.0073 U	- -	- -	- -	- -
Dieldrin	0.0053	- -	- -	- -	**0.0099 J**	0.004 U	- -	- -	- -	- -
Heptachlor	0.0038	**0.0094 J**	- -	- -	**0.004 J**	0.0023 U	- -	- -	- -	- -
Methoxychlor	0.019	0.051 U	- -	- -	0.05 U	**0.0525 J**	- -	- -	- -	- -
VOCs (ug/L)										
1,2-Dichloroethane	0.5	- -	0.5 U	0.5 U	- -	**0.77**	- -	- -	0.5 U	2.5 U
Benzene	0.5	0.3 U	**0.5**	0.7 U	0.3 U	**0.04**	0.12 U	0.12 U	**928**	**95**
Methylene Chloride	0.5	- -	0.5 U	2 U	- -	**0.23**	- -	- -	0.5 U	10 U
Naphthalene	1.1	1.9 U	- -	- -	1.9 U	- -	- -	- -	- -	- -
sec-Butyl Alcohol	7300	- -	- -	- -	- -	- -	- -	- -	- -	- -
Toluene	2	0.2 U	**0.5**	1 U	0.2 U	0.0336 U	0.31 U	0.31 U	**4**	5 U
Calculated Total Xylenes	13	- -	- -	- -	- -	0.2445 U	- -	0.93 U	- -	- -

TABLE D4-FT001

Historical Samples Exceeding Groundwater Screening Levels[a,b]

	Location	01-MW-06			01-MW-06R						
	Sample ID	791-GN-008-NG-90-0300	01-MW-06-9/2/1992	01-MW-06-9/16/1994	FT001-01MW06R-W-083006	01-MW-07-9/15/1993	01-MW-07-9/15/1993	G98-01-MW-07-7-22	01-MW-07/004	G99-01-MW-07-02	G99-01-MW07-03
	Sample Depth (feet bgs)	UNK	UNK	UNK	12 - 22	6.7 - 46	6.7 - 46	6.7 - 46	6.7 - 46	6.7 - 46	6.7 - 46
	Sample Date	6/6/1990	9/2/1992	9/16/1994	8/30/2006	9/15/1993	9/17/1994	7/22/1998	10/1/1998	6/12/1999	10/26/1999
	Depth to Water (feet bgs)	--	7.95	14.79	10.97	30.06	--	--	29.73	30.71	33.74
	Measurement Date	--	7/29/1992	9/16/1994	8/30/2006	8/15/1993	--	--	10/1/1998	6/1/1999	10/1/1999
Analyte	**Screening Level**										
Hydrocarbons (ug/L)											
C10-C25 DRO	150	- -	**260**	**350**	- -	**2 J**	- -	- -	- -	- -	- -
C6-C10 GRO	220	- -	**1400 J**	**580**	- -	**30 J**	- -	- -	- -	- -	- -
C25-C36 RRO	110	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
PCB/Pesticides (ug/L)											
4,4-DDT	0.000011	- -	0.02 U	0.007 U	- -	**0.0072 J**	**0.0072 J**	- -	- -	- -	- -
Dieldrin	0.0053	- -	0.01 U	**0.0023 J**	- -	**0.0023 J**	**0.0023 J**	- -	- -	- -	- -
Heptachlor	0.0038	- -	**0.01**	0.0022 U	- -	**0.0006 J**	**0.0006 J**	- -	- -	- -	- -
Methoxychlor	0.019	- -	0.05 U	0.0516 U	- -	0.0511 U	0.0511 U	- -	- -	- -	- -
VOCs (ug/L)											
1,2-Dichloroethane	0.5	**1.2**	- -	**1.23**	0.074 U	**0.48**	**0.48**	0.5 U	0.16 U	0.13 U	0.22 U
Benzene	0.5	**990**	**420**	**224**	0.12 U	**0.04**	**0.04**	0.12 U	0.12 U	0.22 U	0.13 U
Methylene Chloride	0.5	2.8 U	- -	**0.35**	1 U	**0.23**	**0.23**	5 U	- -	0.27 U	0.27 U
Naphthalene	1.1	- -	1.8 U	- -	0.1 U	- -	- -	- -	0.13 U	0.13 U	0.16 U
sec-Butyl Alcohol	7300	- -	- -	- -	- -	**100000**	- -	- -	- -	- -	- -
Toluene	2	100 U	**0.87**	**0.33**	0.21 U	0.0336 U	0.0336 U	0.1 U	0.1 U	0.09 U	0.09 U
Calculated Total Xylenes	13	- -	- -	**0.2425**	0.21 U	0.2445 U	- -	- -	- -	0.245 U	0.245 U

TABLE D4-FT001

Historical Samples Exceeding Groundwater Screening Levels[a,b]

	Location	01-MW-07							01-MW-08	
	Sample ID	G00-01-MW07-04	G00-01-MW07-05	G01-01MW07-1601	G01-01MW07-1701	GFT001-01MW07-W060204	GFT001-01MW07-W102204	07GAL01MW07-009WG	01-MW-08-9/15/1993	01-MW-08-9/15/1993
	Sample Depth (feet bgs)	6.7 - 46	6.7 - 46	6.7 - 46	6.7 - 46	6.7 - 46	6.7 - 46	6.7 - 46	13.2 - 42.5	13.2 - 42.5
	Sample Date	6/15/2000	10/10/2000	6/19/2001	10/6/2001	6/2/2004	10/22/2004	10/6/2007	9/15/1993	9/16/1994
	Depth to Water (feet bgs)	23.77	26.29	20.51	--	18.14	28.91	22.46	22.07	22.92
	Measurement Date	6/1/2000	10/1/2000	6/17/2001	--	6/2/2004	10/19/2004	10/1/2007	8/15/1993	9/16/1994
Analyte	**Screening Level**									
Hydrocarbons (ug/L)										
C10-C25 DRO	150	**30 J**	**130**	**95**	**88 J**	- -	- -	- -	**110 J**	**110 J**
C6-C10 GRO	220	20 U	21 U	20.6 U	20.6 U	- -	- -	- -	**68 J**	**68 J**
C25-C36 RRO	110	**30 J**	- -	**73 J**	**84 J**	- -	- -	- -	- -	- -
PCB/Pesticides (ug/L)										
4,4-DDT	0.000011	- -	- -	- -	- -	- -	- -	- -	- -	0.0072 U
Dieldrin	0.0053	- -	- -	- -	- -	- -	- -	- -	- -	**0.0023 J**
Heptachlor	0.0038	- -	- -	- -	- -	- -	- -	- -	- -	0.0023 U
Methoxychlor	0.019	- -	- -	- -	- -	- -	- -	- -	- -	0.0531 U
VOCs (ug/L)										
1,2-Dichloroethane	0.5	0.114 U	0.114 U	0.114 U	0.114 U	- -	- -	0.5 U	**0.0727**	**1.07**
Benzene	0.5	0.105 U	0.105 U	0.105 U	0.105 U	0.12 U	**0.226 J**	0.4 U	**29.4**	**29.4**
Methylene Chloride	0.5	0.193 U	0.2 U	0.2 U	0.2 U	- -	- -	1 U	**0.168 J**	**0.26**
Naphthalene	1.1	0.072 U	0.072 U	0.072 U	0.072 U	- -	- -	1 U	- -	- -
sec-Butyl Alcohol	7300	- -	- -	- -	- -	- -	- -	- -	0.0962 U	**99000**
Toluene	2	0.1 U	0.1 U	0.098 U	**0.23 J**	0.31 U	0.202 U	1 U	**0.09 J**	**0.09 J**
Calculated Total Xylenes	13	0.135 U	0.133 U	0.1325 U	0.1325 U	0.465 U	0.3415 U	1.5 U	- -	0.2445 U

TABLE D4-FT001

Historical Samples Exceeding Groundwater Screening Levels[a,b]

	Location	01-MW-08R				
	Sample ID	GFT001-01MW08R-W060704	GFT001-01MW08R-W102204	FT001-01MW08R-W-083006	07GAL01MWD8R-010WG	08GAL01MW08R-003WG
	Sample Depth (feet bgs)	3.86 - 43.86	3.86 - 43.86	3.86 - 43.86	3.86 - 43.86	3.86 - 43.86
	Sample Date	6/7/2004	10/22/2004	8/30/2006	10/6/2007	10/25/2008
	Depth to Water (feet bgs)	15.18	31.47	19.58	24.91	26.45
	Measurement Date	6/7/2004	10/19/2004	8/15/2006	10/6/2007	10/29/2008
Analyte	**Screening Level**					
Hydrocarbons (ug/L)						
C10-C25 DRO	150	- -	- -	- -	- -	- -
C6-C10 GRO	220	- -	- -	- -	- -	- -
C25-C36 RRO	110	- -	- -	- -	- -	- -
PCB/Pesticides (ug/L)						
4,4-DDT	0.000011	- -	- -	- -	- -	- -
Dieldrin	0.0053	- -	- -	- -	- -	- -
Heptachlor	0.0038	- -	- -	- -	- -	- -
Methoxychlor	0.019	- -	- -	- -	- -	- -
VOCs (ug/L)						
1,2-Dichloroethane	0.5	- -	- -	0.074 U	0.5 U	0.5 U
Benzene	0.5	**22.3**	**0.37 BJ**	**7.3**	0.4 U	0.4 U
Methylene Chloride	0.5	- -	- -	1 U	1 U	1 U
Naphthalene	1.1	- -	- -	0.1 U	1 U	1 U
sec-Butyl Alcohol	7300	- -	- -	- -	- -	- -
Toluene	2	0.31 U	0.202 U	0.21 U	1 U	1 U
Calculated Total Xylenes	13	0.465 U	0.3415 U	0.21 U	1.5 U	1.5 U

TABLE D4-FT001

Historical Samples Exceeding Groundwater Screening Levels[a,b]

[a]May not include all historical site data, only includes available validated electronic (data provided in Air Force database). See text for discussion of other historical data project screening level exceedances, if applicable

[b]Metals are not included in this table.

Notes:
-- = Not Analyzed
Calculated total xylenes is equal to the sum of m-xylene, o-xylene, and p-xylene
B = The analyte was detected in the associated method and/or calibration blank.
J = The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
M = A matrix effect was identified.
R = The sample results are rejected due to serious deficiencies in the ability to analyze the sample and to meet the quality control criteria. The presence or absence of the analyte cannot be verified.
U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
UJ = The analyte was below the reported sample quantitation limit. However, the reported value is approximate.
ug/L = Micrograms per Liter
bgs = below ground surface
Bold indicates the analyte was detected
Shading indicates the result exceeded screening crit

TABLE D5-FT001

Proposed Sampling Locations and Rationale

Sampling Location	Field Sample ID	Easting (meters)	Northing (meters)	Media	Sample Type	Sample Depth (feet bgs)	GRO[a] AK101	DRO[a] AK102	RRO[a] AK103	BTEX Screening for PCE and TCE[a] SW8021B	VOCs[b] SW8260B	EDB, 1,2-DCA[b] E504.1/SW8011	SVOCs[b] SW8270C	PAHs[b] SW8270CSIM	Pesticides[b] SW8081A	Total Metals[b,c] SW6010B/SW6020	Dissolved Metals[b,c] SW6010B/SW6020	Dioxins/Furans[b] SW8290	PCBs[b] SW8081A	Field Parameters[d]	Rationale
FT001GP001	FT001GP001-SO_00-02	TBD	TBD	Surface Soil	N	0 - 2	1	1	1	1	1		1		1	1		1	1		Determine the vertical extent of impacts to soil and groundwater from former fire training activities beneath the former FPTA circle. Samples will be co-located with historical sample location 01-SB-02 to evaluate attentuation of contamination.
	FT001GP901-SO_00-02			Surface Soil	FD	0 - 2	1	1	1	1	1		1		1	1		1	1		
	FT001GP001-SO_03-05			Subsurface Soil	N	3 - 5	1	1	1	1	1		1		1	1		1	1		
	FT001GP001-SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1		1		1	1		1	1		
	FT001GP001-SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1		1		1	1		1			
	FT001GP001-SO_12-15			Subsurface Soil	N	12 - 15	1	1	1	1	1		1		1	1		1			
	FT001GP001-SO_12-15SPT			Subsurface Soil	SPT	12 - 15	1	1	1												
	FT001GP001-SO_24-26			Subsurface Soil	N	~25 (Mid-point of Variably Saturated Zone)	1	1	1	1	1		1		1	1					
	FT001GP001-SO_34-36			Subsurface Soil	N	~35 (Bottom of Variably Saturated Zone)	1	1	1	1	1		1		1	1					
	FT001GP001-SO_44-46			Subsurface Soil	N	~45 Permanently Saturated Zone	1	1	1	1	1		1		1	1					
	FT001GP001-GW_15-20			Groundwater	N	~15 (Top of Water Table)	1	1	1		1	1	1		1		1			1	
	FT001GP901-GW_15-20			Groundwater	FD	~15 (Top of Water Table)	1	1	1		1	1	1		1		1				
	FT001GP001-GW_45-50			Groundwater	N	~45 Permanently Saturated Zone	1	1	1		1	1	1		1		1			1	
FT001GP002	FT001GP002-SO_00-02	TBD	TBD	Surface Soil	N	0 - 2	1	1	1	1	1		1		1	1		1	1		Determine lateral and vertical extent of impacts to soil and groundwater from former fire training activities using a step-out sample location to the east of historical sampling location 01-SB-02.
	FT001GP002-SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1		1		1	1		1	1		
	FT001GP902-SO_05-07			Subsurface Soil	FD	5 - 7	1	1	1	1	1		1		1	1		1	1		
	FT001GP002-SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1		1		1	1		1			
	FT001GP002-SO_24-26			Subsurface Soil	N	~25 (Mid-point of Variably Saturated Zone)	1	1	1	1	1		1		1	1					
	FT001GP002-SO_24-26SPT			Subsurface Soil	SPT	~25 (Mid-point of Variably Saturated Zone)	1	1	1												
	FT001GP002-SO_34-36			Subsurface Soil	N	~35 (Bottom of Variably Saturated Zone)	1	1	1	1	1		1		1	1					
	FT001GP002-SO_44-46			Subsurface Soil	N	~45 Permanently Saturated Zone	1	1	1	1	1		1		1	1					
	FT001GP002-GW_15-20			Groundwater	N	~15 (Top of Water Table)	1	1	1		1		1		1		1			1	
	FT001GP002-GW_45-50			Groundwater	N	~45 Permanently Saturated Zone	1	1	1		1		1		1		1			1	
FT001GP003	FT001GP003-SO_00-02	TBD	TBD	Surface Soil	N	0 - 2	1	1	1	1	1		1		1	1		1	1		Determine lateral and vertical extent of impacts to soil from former fire training activities using a step-out sample location to the north of historical sampling location 01-SB-02 and a southwest step-out sample to historical sampling location 01-SB-01.
	FT001GP003-SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1		1		1	1		1	1		
	FT001GP003-SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1		1		1	1		1			
	FT001GP903-SO_10-12			Subsurface Soil	FD	10 - 12	1	1	1	1	1		1		1	1		1			
	FT001GP003-SO_24-26			Subsurface Soil	N	~25 (Mid-point of Variably Saturated Zone)	1	1	1	1	1		1		1	1					
	FT001GP003-SO_34-36			Subsurface Soil	N	~35 (Bottom of Variably Saturated Zone)	1	1	1	1	1		1		1	1					
	FT001GP003-SO_34-36SPT			Subsurface Soil	SPT	~35 (Bottom of Variably Saturated Zone)	1	1	1												
	FT001GP003-SO_44-46			Subsurface Soil	N	~45 Permanently Saturated Zone	1	1	1	1	1		1		1	1					
FT001GP004	FT001GP004-SO_00-02	TBD	TBD	Surface Soil	N	0 - 2	1	1	1	1	1		1		1	1		1	1		Determine the lateral and vertical extent of impacts to soil from former fire training activities using a step-out sample location to the west of historical sampling location 01-SB-02.
	FT001GP004-SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1		1		1	1		1	1		
	FT001GP004-SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1		1		1	1		1			
	FT001GP004-SO_24-26			Subsurface Soil	N	~25 (Mid-point of Variably Saturated Zone)	1	1	1	1	1		1		1	1					
	FT001GP904-SO_24-26			Subsurface Soil	FD	~25 (Mid-point of Variably Saturated Zone)	1	1	1	1	1		1		1	1					
	FT001GP004-SO_34-36			Subsurface Soil	N	~35 (Bottom of Variably Saturated Zone)	1	1	1	1	1		1		1	1					
	FT001GP004-SO_44-46			Subsurface Soil	N	~45 Permanently Saturated Zone	1	1	1	1	1		1		1	1					
	FT001GP004-SO_44-46SPT			Subsurface Soil	SPT	~45 Permanently Saturated Zone	1	1	1												
FT001GP005	FT001GP005-SO_00-02	TBD	TBD	Surface Soil	N	0 - 2	1	1	1	1	1		1		1	1		1	1		Determine the lateral and vertical extent of impacts to soil from former fire training activities using a step-out sample location to the south of historical sampling location 01-SB-02.
	FT001GP005-SO_00-02MS			Surface Soil	MS	0 - 2	1	1	1	1	1		1		1	1		1	1		
	FT001GP005-SO_00-02SD			Surface Soil	MSD	0 - 2	1	1	1	1	1		1		1	1		1	1		
	FT001GP005-SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1		1		1	1		1	1		
	FT001GP005-SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1		1		1	1		1			

TABLE D5-FT001

Proposed Sampling Locations and Rationale

Sampling Location	Field Sample ID	Easting (meters)	Northing (meters)	Media	Sample Type	Sample Depth (feet bgs)	GRO[a] AK101	DRO[a] AK102	RRO[a] AK103	BTEX Screening for PCE and TCE[a] SW8021B	VOCs[b] SW8260B	EDB, 1,2-DCA[b] E504.1/SW8011	SVOCs[b] SW8270C	PAHs[b] SW8270CSIM	Pesticides[b] SW8081A	Total Metals[b,c] SW6010B/SW6020	Dissolved Metals[b,c] SW6010B/SW6020	Dioxins/Furans[b] SW8290	PCBs[b] SW8081A	Field Parameters[d]	Rationale
	FT001GP005-SO_24-26			Subsurface Soil	N	~25 (Mid-point of Variably Saturated Zone)	1	1	1	1	1		1		1	1					
	FT001GP005-SO_34-36			Subsurface Soil	N	~35 (Bottom of Variably Saturated Zone)	1	1	1	1	1		1		1	1					
	FT001GP905-SO_34-36			Subsurface Soil	FD	~35 (Bottom of Variably Saturated Zone)	1	1	1	1	1		1		1	1					
	FT001GP005-SO_44-46			Subsurface Soil	N	~45 Permanently Saturated Zone	1	1	1	1	1		1		1	1					
FT001GP006	FT001GP006-SO_00-02	TBD	TBD	Surface Soil	N	0 - 2	1	1	1	1	1				1	1			1		Determine lateral and vertical extent of impacts to soil and groundwater from fire training activities using a step-out sample location to the east of historical sampling location 01-SB-01 and the area of elevated DRO concentrations shown on Figure 3.2-1 of the 1996 RI.
	FT001GP006-SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1			1	1	1			1		
	FT001GP006-SO_05-07MS			Subsurface Soil	MS	5 - 7	1	1	1	1	1			1	1	1			1		
	FT001GP006-SO_05-07SD			Subsurface Soil	MSD	5 - 7	1	1	1	1	1			1	1	1			1		
	FT001GP006-SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1			1	1	1					
	FT001GP006-SO_24-26			Subsurface Soil	N	~25 (Mid-point of Variably Saturated Zone)	1	1	1	1	1			1	1	1					
	FT001GP006-SO_34-36			Subsurface Soil	N	~35 (Bottom of Variably Saturated Zone)	1	1	1	1	1				1	1					
	FT001GP006-SO_44-46			Subsurface Soil	N	~45 Permanently Saturated Zone	1	1	1	1	1				1	1					
	FT001GP906-SO_44-46			Subsurface Soil	FD	~45 Permanently Saturated Zone	1	1	1	1	1				1	1					
	FT001GP006-GW_15-20			Groundwater	N	~15 (Top of Water Table)	1	1	1		1	1		1	1		1			1	
	FT001GP006-GW_45-50			Groundwater	N	~45 Permanently Saturated Zone	1	1	1		1				1		1			1	
	FT001GP906-GW_45-50			Groundwater	FD	~45 Permanently Saturated Zone	1	1	1		1				1		1				
FT001GP007	FT001GP007-SO_00-02	TBD	TBD	Surface Soil	N	0 - 2	1	1	1	1	1				1	1			1		Determine lateral and vertical extent of impacts to soil and groundwater from fire training activities using a step-out sample location to the north of historical sampling location 01-SB-01 and the area of elevated DRO concentrations shown on Figure 3.2-1 of the 1996 RI.
	FT001GP907-SO_00-02			Surface Soil	FD	0 - 2	1	1	1	1	1				1	1			1		
	FT001GP007-SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1			1	1	1			1		
	FT001GP007-SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1			1	1	1					
	FT001GP007-SO_10-12MS			Subsurface Soil	MS	10 - 12	1	1	1	1	1			1	1	1					
	FT001GP007-SO_10-12SD			Subsurface Soil	MSD	10 - 12	1	1	1	1	1			1	1	1					
	FT001GP007-SO_24-26			Subsurface Soil	N	~25 (Mid-point of Variably Saturated Zone)	1	1	1	1	1			1	1	1					
	FT001GP007-SO_34-36			Subsurface Soil	N	~35 (Bottom of Variably Saturated Zone)	1	1	1	1	1				1	1					
	FT001GP007-SO_44-46			Subsurface Soil	N	~45 Permanently Saturated Zone	1	1	1	1	1				1	1					
	FT001GP007-GW_15-20			Groundwater	N	~15 (Top of Water Table)	1	1	1		1	1		1	1		1			1	
	FT001GP007-GW_15-20MS			Groundwater	MS	~15 (Top of Water Table)	1	1	1		1	1		1	1		1				
	FT001GP007-GW_15-20SD			Groundwater	MSD	~15 (Top of Water Table)	1	1	1		1	1		1	1		1				
	FT001GP007-GW_45-50			Groundwater	N	~45 Permanently Saturated Zone	1	1	1		1				1		1			1	
FT001GP008	FT001GP008-SO_00-02	TBD	TBD	Surface Soil	N	0 - 2	1	1	1	1	1				1	1			1		Determine lateral and vertical extent of impacts to soil and groundwater from fire training activities using a step-out sample location to the west of historical sampling location 01-SB-01 and the area of elevated DRO concentrations shown on Figure 3.2-1 of the 1996 RI.
	FT001GP008-SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1			1	1	1			1		
	FT001GP908-SO_05-07			Subsurface Soil	FD	5 - 7	1	1	1	1	1			1	1	1			1		
	FT001GP008-SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1			1	1	1					
	FT001GP008-SO_24-26			Subsurface Soil	N	~25 (Mid-point of Variably Saturated Zone)	1	1	1	1	1			1	1	1					
	FT001GP008-SO_24-26MS			Subsurface Soil	MS	~25 (Mid-point of Variably Saturated Zone)	1	1	1	1	1				1	1					
	FT001GP008-SO_24-26SD			Subsurface Soil	MSD	~25 (Mid-point of Variably Saturated Zone)	1	1	1	1	1				1	1					
	FT001GP008-SO_34-36			Subsurface Soil	N	~35 (Bottom of Variably Saturated Zone)	1	1	1	1	1				1	1					
	FT001GP008-SO_44-46			Subsurface Soil	N	~45 Permanently Saturated Zone	1	1	1	1	1				1	1					
	FT001GP008-GW_15-20			Groundwater	N	~15 (Top of Water Table)	1	1	1		1	1		1	1		1			1	
	FT001GP008-GW_45-50			Groundwater	N	~45 Permanently Saturated Zone	1	1	1		1				1		1			1	
FT001GP009	FT001GP009-SO_00-02	TBD	TBD	Surface Soil	N	0 - 2	1	1	1	1	1				1	1			1		Determine presence or absence of contamination in soil east of historical sampling location 01-SB-03. This sample will also be used to determine if the underground fuel pipeline leaked.
	FT001GP009-SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1			1	1	1			1		
	FT001GP009-SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1			1	1	1					
	FT001GP909-SO_10-12			Subsurface Soil	FD	10 - 12	1	1	1	1	1			1	1	1					
	FT001GP009-SO_24-26			Subsurface Soil	N	~25 (Mid-point of Variably Saturated Zone)	1	1	1	1	1			1	1	1					
	FT001GP009-SO_34-36			Subsurface Soil	N	~35 (Bottom of Variably Saturated Zone)	1	1	1	1	1				1	1					

TABLE D5-FT001

Proposed Sampling Locations and Rationale

Sampling Location	Field Sample ID	Easting (meters)	Northing (meters)	Media	Sample Type	Sample Depth (feet bgs)	GRO[a] AK101	DRO[a] AK102	RRO[a] AK103	BTEX Screening for PCE and TCE[a] SW8021B	VOCs[b] SW8260B	EDB, 1,2-DCA[b] E504.1/SW8011	SVOCs[b] SW8270C	PAHs[b] SW8270CSIM	Pesticides[b] SW8081A	Total Metals[b,c] SW6010B/SW6020	Dissolved Metals[b,c] SW6010B/SW6020	Dioxins/Furans[b] SW8290	PCBs[b] SW8081A	Field Parameters[d]	Rationale
	FT001GP009-SO_34-36MS			Subsurface Soil	MS	~35 (Bottom of Variably Saturated Zone)	1	1	1	1	1				1	1					
	FT001GP009-SO_34-36SD			Subsurface Soil	MSD	~35 (Bottom of Variably Saturated Zone)	1	1	1	1	1				1	1					
	FT001GP009-SO_44-46			Subsurface Soil	N	~45 Permanently Saturated Zone	1	1	1	1	1				1	1					
FT001GP010	FT001GP010-SO_00-02	TBD	TBD	Surface Soil	N	0 - 2	1	1	1	1	1			1	1	1			1		Determine the lateral and vertical extent of impacts to soil from former fire training activites near the former fill-stand at the southern end of the underground fuel line.
	FT001GP010-SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1			1	1	1			1		
	FT001GP010-SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1			1	1	1					
	FT001GP010-SO_24-26			Subsurface Soil	N	~25 (Mid-point of Variably Saturated Zone)	1	1	1	1	1				1	1					
	FT001GP010-SO_24-26SPT			Subsurface Soil	SPT	~25 (Mid-point of Variably Saturated Zone)	1	1	1												
	FT001GP010-SO_34-36			Subsurface Soil	N	~35 (Bottom of Variably Saturated Zone)	1	1	1	1	1				1	1					
	FT001GP010-SO_44-46			Subsurface Soil	N	~45 Permanently Saturated Zone	1	1	1	1	1				1	1					
FT001GP011	FT001GP011-SO_00-02	TBD	TBD	Surface Soil	N	0 - 2	1	1	1	1	1		1		1	1		1	1		Determine lateral and vertical extent of impacts to soil and groundwater from former fire training activities using a step-out sample location to the east of historical sampling location 01-SB-02.
	FT001GP011-SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1		1		1	1		1	1		
	FT001GP011-SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1		1		1	1		1			
	FT001GP011-SO_24-26			Subsurface Soil	N	~25 (Mid-point of Variably Saturated Zone)	1	1	1	1	1		1		1	1					
	FT001GP011-SO_34-36			Subsurface Soil	N	~35 (Bottom of Variably Saturated Zone)	1	1	1	1	1		1		1	1					
	FT001GP011-SO_34-36SPT			Subsurface Soil	SPT	~35 (Bottom of Variably Saturated Zone)	1	1	1												
	FT001GP011-SO_44-46			Subsurface Soil	N	~45 Permanently Saturated Zone	1	1	1	1	1		1		1	1					
	FT001GP011-GW_15-20			Groundwater	N	~15 (Top of Water Table)	1	1	1		1	1	1		1		1			1	
	FT001GP011-GW_45-50			Groundwater	N	~45 Permanently Saturated Zone	1	1	1		1		1		1		1			1	
FT001GP012	FT001GP012-SO_00-02	TBD	TBD	Surface Soil	N	0 - 2	1	1	1	1	1				1	1			1		Determine lateral and vertical extent of impacts to soil and groundwater from former fire training activities using a step-out sample location to the southeast of historical sampling location 01-SB-02.
	FT001GP012-SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1				1	1			1		
	FT001GP012-SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1				1	1					
	FT001GP012-SO_24-26			Subsurface Soil	N	~25 (Mid-point of Variably Saturated Zone)	1	1	1	1	1				1	1					
	FT001GP012-SO_34-36			Subsurface Soil	N	~35 (Bottom of Variably Saturated Zone)	1	1	1	1	1				1	1					
	FT001GP012-SO_44-46			Subsurface Soil	N	~45 Permanently Saturated Zone	1	1	1	1	1				1	1					
	FT001GP012-SO_44-46SPT			Subsurface Soil	SPT	~45 Permanently Saturated Zone	1	1	1												
	FT001GP012-GW_15-20			Groundwater	N	~15 (Top of Water Table)	1	1	1		1				1		1			1	
	FT001GP012-GW_45-50			Groundwater	N	~45 Permanently Saturated Zone	1	1	1		1				1		1			1	
FT001GP013	FT001GP013-SO_00-02	TBD	TBD	Surface Soil	N	0 - 2	1	1	1	1	1				1	1			1		Determine presence or absence of contamination in soil and groundwater along the underground fuel pipeline in the vicinity of the elevated soil gas concentrations shown on Supplement D2-FT001.
	FT001GP013-SO_00-02SPT			Surface Soil	SPT	0 - 2	1	1	1												
	FT001GP013-SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1			1	1	1			1		
	FT001GP013-SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1			1	1	1					
	FT001GP013-SO_24-26			Subsurface Soil	N	~25 (Mid-point of Variably Saturated Zone)	1	1	1	1	1			1	1	1					
	FT001GP013-SO_34-36			Subsurface Soil	N	~35 (Bottom of Variably Saturated Zone)	1	1	1	1	1				1	1					
	FT001GP013-SO_44-46			Subsurface Soil	N	~45 Permanently Saturated Zone	1	1	1	1	1				1	1					
	FT001GP013-GW_15-20			Groundwater	N	~15 (Top of Water Table)	1	1	1		1	1		1	1		1			1	
	FT001GP013-GW_45-50			Groundwater	N	~45 Permanently Saturated Zone	1	1	1		1				1		1			1	
FT001GP014	FT001GP014-SO_00-02	TBD	TBD	Surface Soil	N	0 - 2	1	1	1	1	1				1	1			1		Determine presence or absence of contamination in soil and groundwater along the underground fuel pipeline in the vicinity of the elevated soil gas concentrations shown on Supplement D2-FT001.
	FT001GP014-SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1				1	1			1		
	FT001GP014-SO_05-07SPT			Subsurface Soil	SPT	5 - 7	1	1	1												
	FT001GP014-SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1				1	1					
	FT001GP014-SO_24-26			Subsurface Soil	N	~25 (Mid-point of Variably Saturated Zone)	1	1	1	1	1				1	1					

TABLE D5-FT001

Proposed Sampling Locations and Rationale

Sampling Location	Field Sample ID	Easting (meters)	Northing (meters)	Media	Sample Type	Sample Depth (feet bgs)	GRO[a] AK101	DRO[a] AK102	RRO[a] AK103	BTEX Screening for PCE and TCE[a] SW8021B	VOCs[b] SW8260B	EDB, 1,2-DCA[b] E504.1/SW8011	SVOCs[b] SW8270C	PAHs[b] SW8270CSIM	Pesticides[b] SW8081A	Total Metals[b,c] SW6010B/SW6020	Dissolved Metals[b,c] SW6010B/SW6020	Dioxins/Furans[b] SW8290	PCBs[b] SW8081A	Field Parameters[d]	Rationale
	FT001GP014-SO_34-36			Subsurface Soil	N	~35 (Bottom of Variably Saturated Zone)	1	1	1	1	1				1	1					
	FT001GP014-SO_44-46			Groundwater	N	~45 Permanently Saturated Zone	1	1	1	1	1				1	1					
	FT001GP014-GW_15-20			Groundwater	N	~15 (Top of Water Table)	1	1	1		1	1		1	1		1			1	
	FT001GP014-GW_45-50			Groundwater	N	~45 Permanently Saturated Zone	1	1	1		1				1		1			1	
FT001GP001	FT001-EB001	TBD	TBD	ASTM Type II	EB	NA	1	1	1		1		1	1	1	1		1	1		Equipment blank for Geoprobe equipment
TBD	FT001-EB002	TBD	TBD	ASTM Type II	EB	NA	1	1	1		1		1	1	1	1		1	1		Equipment blank for Geoprobe equipment
TBD	FT001-EB003	TBD	TBD	ASTM Type II	EB	NA	1	1	1		1				1	1			1		Equipment blank for Geoprobe equipment
TBD	FT001-EB004	TBD	TBD	ASTM Type II	EB	NA	1	1	1		1	1	1		1	1	1	1			Equipment blank for Hydropunch equipment
TBD	FT001-EB005	TBD	TBD	ASTM Type II	EB	NA	1	1	1		1	1		1	1	1	1				Equipment blank for Hydropunch equipment
TBD	FT001-EB006	TBD	TBD	ASTM Type II	EB	NA	1	1	1		1			1	1	1	1				Equipment blank for Hydropunch equipment
NA	FT001-TB01	NA	NA	ASTM Type II	TB	NA	1				1										Trip blank for cooler with GRO and/or VOC samples
NA	FT001-TB02	NA	NA	ASTM Type II	TB	NA	1				1										Trip blank for cooler with GRO and/or VOC samples
NA	FT001-TB03	NA	NA	ASTM Type II	TB	NA	1				1										Trip blank for cooler with GRO and/or VOC samples
NA	FT001-TB04	NA	NA	ASTM Type II	TB	NA	1				1										Trip blank for cooler with GRO and/or VOC samples
Totals																					
FT001				Surface Soil			19	19	19	18	18	0	9	1	18	18	0	9	18	0	
FT001				Subsurface Soil			95	95	95	87	87	0	36	23	87	87	0	16	19	0	
FT001				Groundwater			22	22	22	0	22	11	7	7	22	0	22	0	0	18	
FT001				ASTM Type II			10	6	6	0	10	2	3	4	6	6	3	3	3	0	

[a]Analytical methods AK101, AK102, AK103, and SW8021B for soil will be performed at the on-site mobile lab; 10 percent of these samples have been identified for split analysis according to Worksheet #20.

[b]Soil sample analysis by this method will be performed at an off-site lab.

[c]All metals samples will be analyzed for arsenic, barium, cadmium, chromium, lead, nickel, and vanadium

[d]Field parameters will be anlayzed for pH, temperature, specific conductivity, dissolved oxygen, and ORP using a water quality meter and flow-through cell as described in SOP-12.

Notes:

Analysis of all groundwater and split (SPT) soil samples will be performed at an off-site lab.

If visible evidence of soil contamination is observed (in soil borings where grab groundwater samples are to be collected) at depths within the variably saturated zone other than those specified in the table, additional soil and co-located groundwater samples will be collected at those depths.

Per Guidance in Appendix F of ADEC, 2010: "For each source area, PAH, EDB, and 1,2-DCA analysis must be performed on a sufficient percentage of the samples with the highest GRO, DRO and/or RRO concentrations to determine if these analytes are contaminants of concern. In general, 10% is recommended for site characterization. If concentrations are less than applicable cleanup levels, further analysis is generally not required. PAHs should be sampled in groundwater if soil samples concentrations are above applicable cleanup levels and groundwater sampling is required."

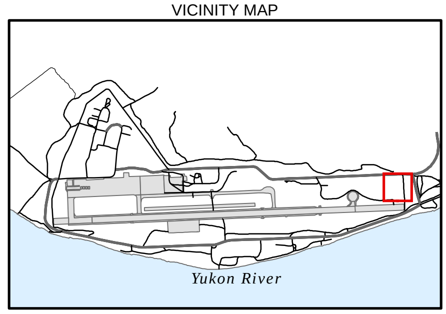
bgs = below ground surface
NA = not applicable
TBD = to be determined
N = normal sample
FD = field duplicate sample
MS = matrix spike sample
MSD = matrix spike duplicate sample
EB = equipment blank
TB = trip blank
SPT = split sample

LEGEND

- FT001
- Aboveground Fillstand
- Fire Training Circle
- Fuel Sprayer
- Approximate Location of Underground Fuel Transfer Pipe

Note:
1. Imagery September 4, 2009. Pixel size 0.25 meter

VICINITY MAP



N

0 50 100
Feet

FIGURE D1-FT001
Site Layout

Work Plan for Site Inspection, Remedial Investigation, and Site Characterization
Former Galena Forward Operating Location, Alaska

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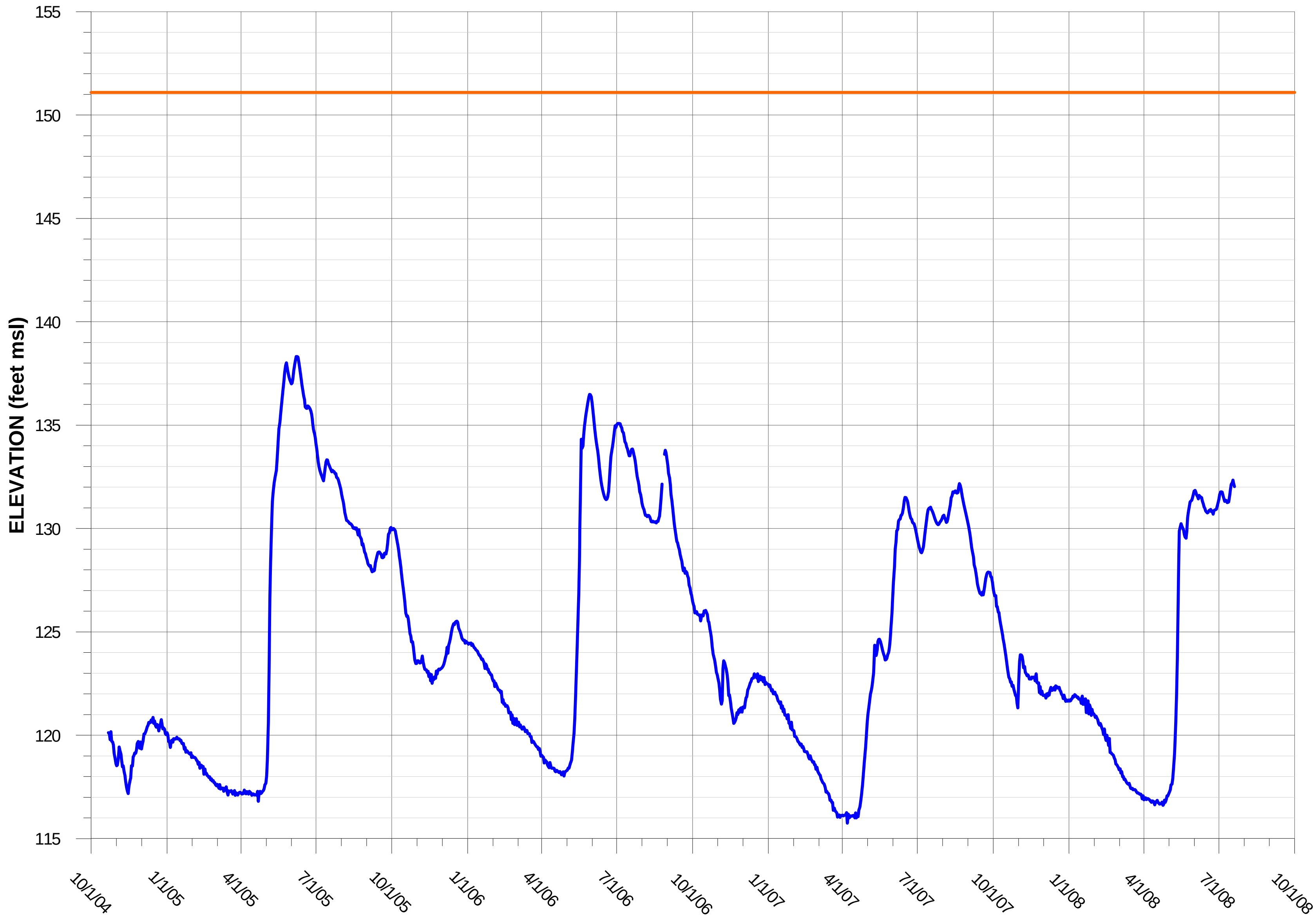
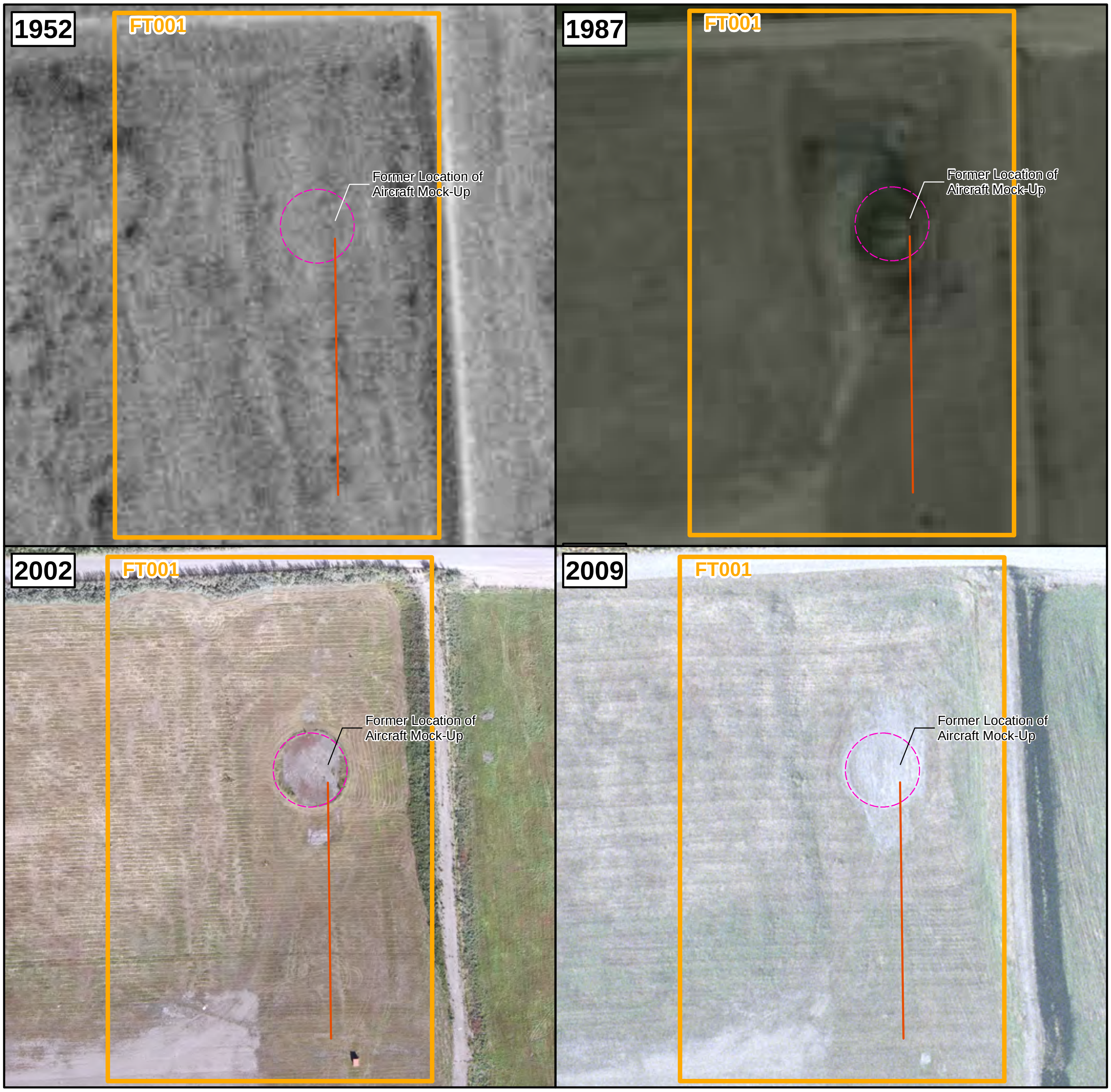


LEGEND

Groundwater Elevation

Ground Surface Elevation

FIGURE D2-FT001
Hydrograph of Groundwater Elevation versus Time; 01-MW-08R
Work Plan for Site Inspection, Remedial Investigation, and Site Characterization
Former Galena Forward Operating Location, Alaska

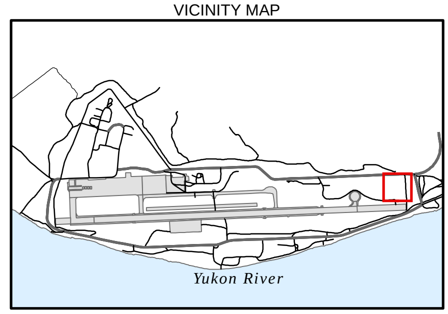


LEGEND

- FT001
- Fire Training Circle
- Approximate Location of Underground Fuel Transfer Pipe

Notes:
1. Photography dated 11-28-1952, georeferenced
2. Photography dated 1987, georeferenced
3. Imagery August 2002. Pixel size 0.075 meter
4. Imagery September 4, 2009. Pixel size 0.25 meter

VICINITY MAP



N

0 100 200
Feet

FIGURE D3-FT001
Historical Aerial Photography
Work Plan for Site Inspection, Remedial Investigation, and Site Characterization
Former Galena Forward Operating Location, Alaska

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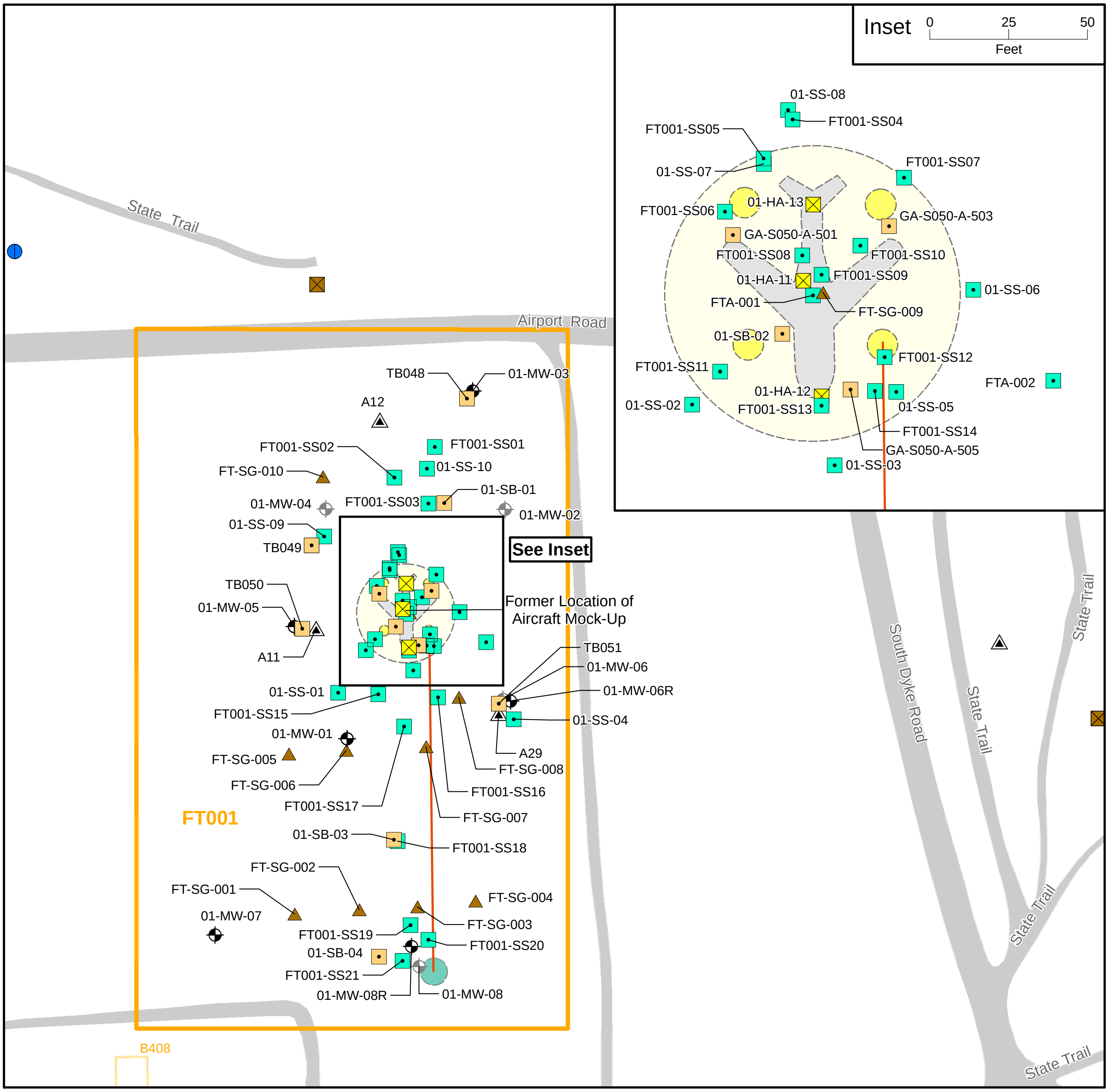
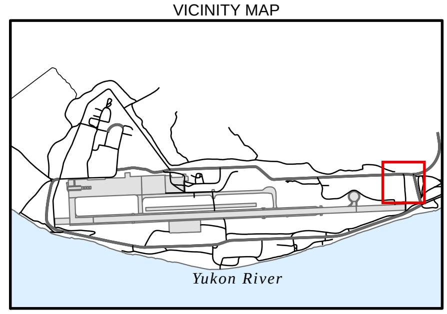


VICINITY MAP



LEGEND

- FT001
- Adjacent Site
- Aboveground Fillstand
- Fire Training Circle
- Fuel Sprayer
- Road
- Approximate Location of Underground Fuel Transfer Pipe

Historical Sample Location

- Hand-Augered Boring
- Sediment Sample
- Soil Boring
- Surface Soil Sample
- Monitoring Well
- Abandoned Monitoring Well
- Surface Water Sample
- Ambient Air
- Soil Vapor Sample

N

0 70 140
Feet

FIGURE D4-FT001
Historical Sample Locations

Work Plan for Site Inspection, Remedial Investigation, and Site Characterization
Former Galena Forward Operating Location, Alaska

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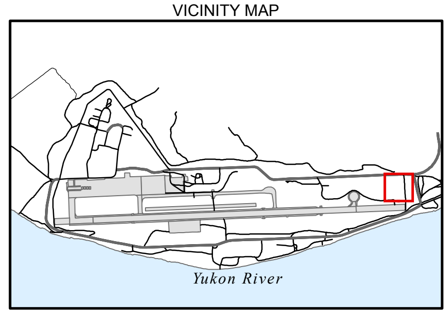
LEGEND

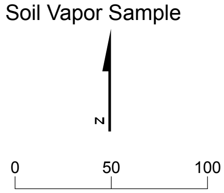
- FT001
- Aboveground Fillstand
- Fire Training Circle
- Fuel Sprayer
- Road
- Approximate Location of Underground Fuel Transfer Pipe
- Area where Analyte Exceeds Screening Level (dashed where inferred)

Historical Sample Location

- Hand-Augered Boring
- Sediment Sample
- Soil Boring
- Surface Soil Sample
- Monitoring Well
- Abandoned Monitoring Well
- Surface Water Sample
- Ambient Air
- Soil Vapor Sample

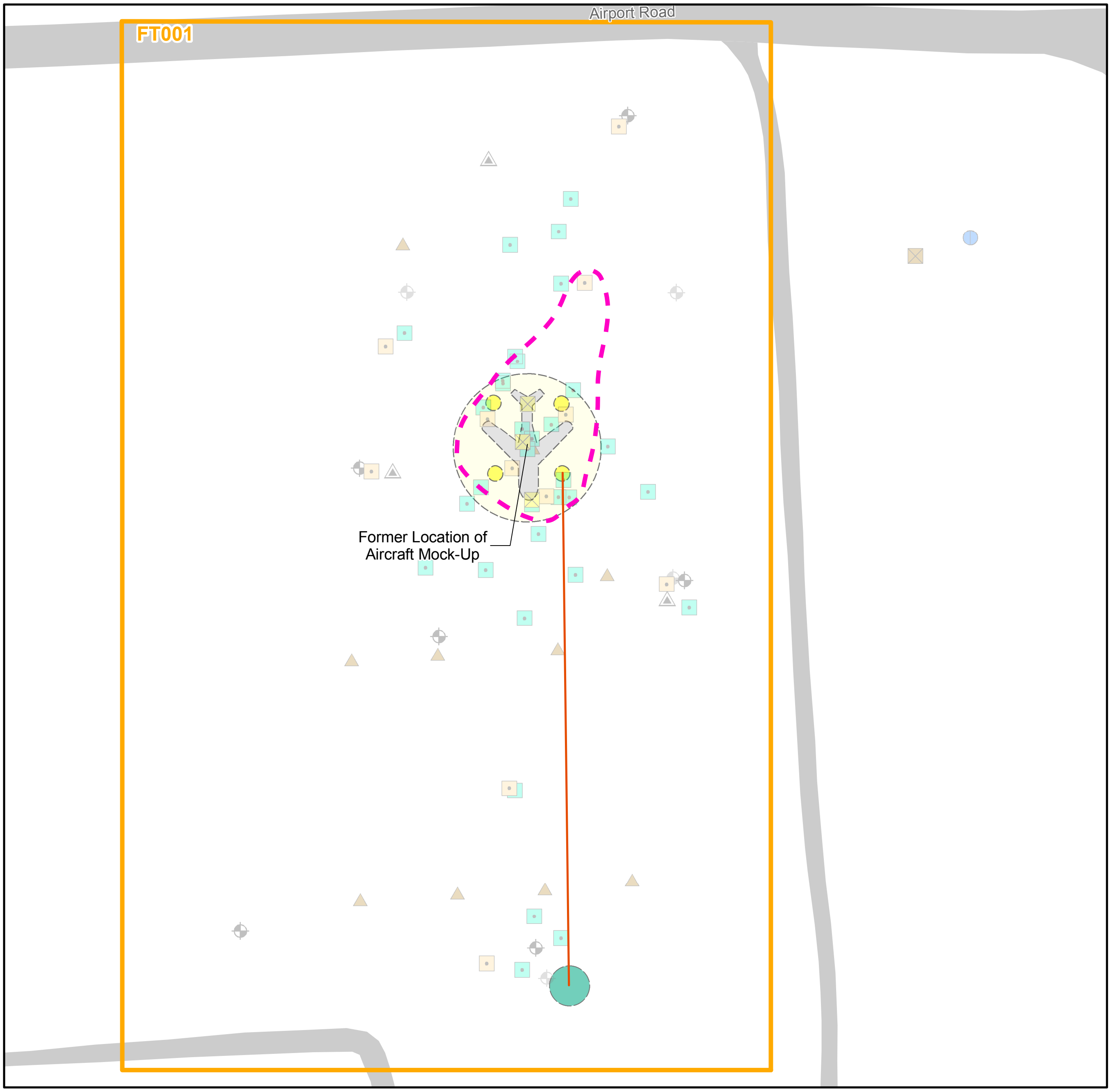
VICINITY MAP



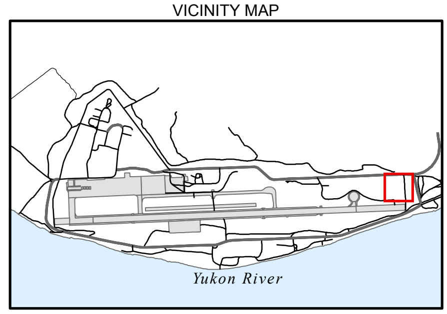


Note:
1. Refer to historical analytical data supplement for the site screening levels.

FIGURE D5-FT001
Extent of Historical Exceedances of Screening Levels in Surface Soil
Work Plan for Site Inspection, Remedial Investigation, and Site Characterization
Former Galena Forward Operating Location, Alaska



VICINITY MAP



LEGEND

- FT001
- Aboveground Fillstand
- Fire Training Circle
- Fuel Sprayer
- Road
- Approximate Location of Underground Fuel Transfer Pipe
- Area where Analyte Exceeds Screening Level (dashed where inferred)

Historical Sample Location

- Hand-Augered Boring
- Sediment Sample
- Soil Boring
- Surface Soil Sample
- Monitoring Well
- Abandoned Monitoring Well
- Surface Water Sample
- Ambient Air
- Soil Vapor Sample

N

0 50 100
Feet

Note:
1. Refer to historical analytical data supplement for the site screening levels.

FIGURE D6-FT001
Extent of Historical Exceedances of Screening Levels in Subsurface Soil

Work Plan for Site Inspection, Remedial Investigation, and Site Characterization
Former Galena Forward Operating Location, Alaska

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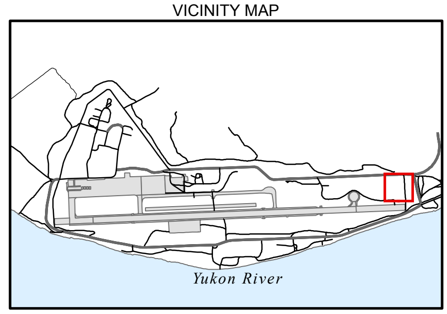
LEGEND

- FT001
- Aboveground Fillstand
- Fire Training Circle
- Fuel Sprayer
- Road
- Approximate Location of Underground Fuel Transfer Pipe
- Area where Analyte Exceeds Screening Level (dashed where inferred)

Historical Sample Location

- Hand-Augered Boring
- Sediment Sample
- Soil Boring
- Surface Soil Sample
- Monitoring Well
- Abandoned Monitoring Well
- Surface Water Sample
- Ambient Air
- Soil Vapor Sample

VICINITY MAP



N

0 50 100
Feet

Note:
1. Refer to historical analytical data supplement for the site screening levels.

FIGURE D7-FT001
Extent of Historical Exceedances of Screening Levels in Groundwater

Work Plan for Site Inspection, Remedial Investigation, and Site Characterization
Former Galena Forward Operating Location, Alaska

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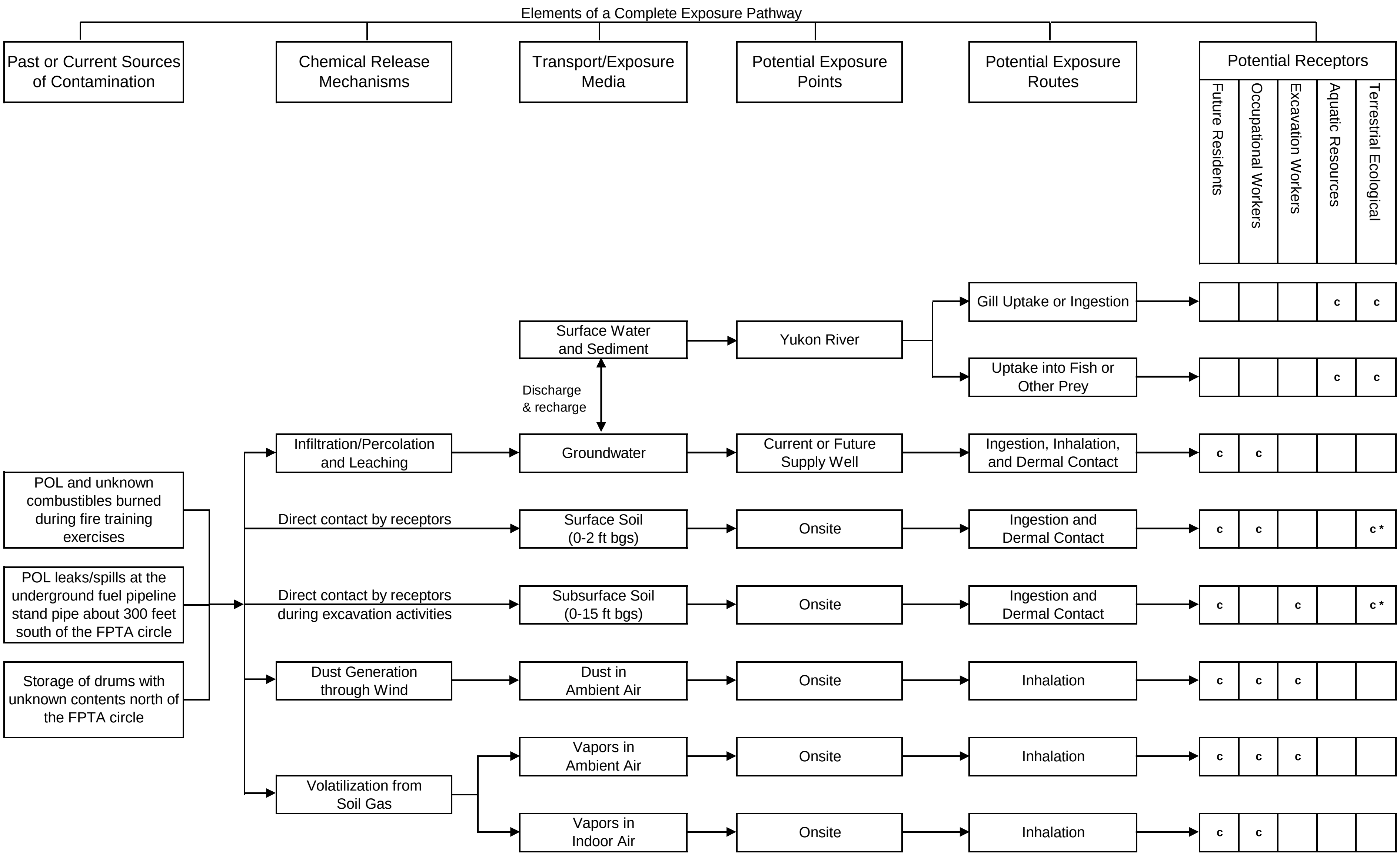
Figure D8-FT001

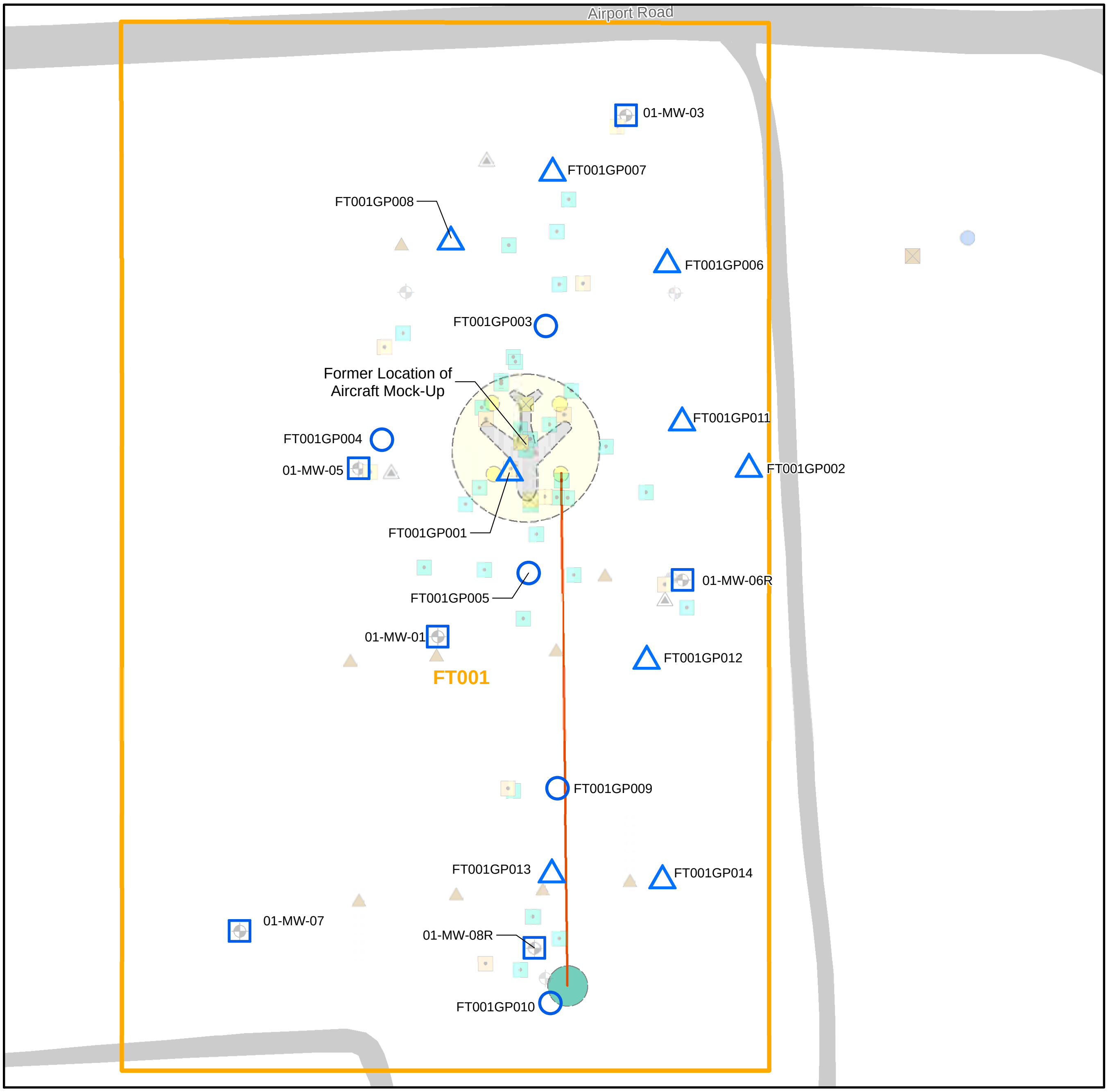
Conceptual Site Model for Potential Human and Ecological Exposures

Work Plan for Site Inspection, Remedial Investigation, and Site Characterization

Former Galena Forward Operating Location, Alaska



Notes:
c = Potentially complete pathway
Blank = Incomplete pathway
* Depth of soil for ecological receptors will be based on site-specific receptor types



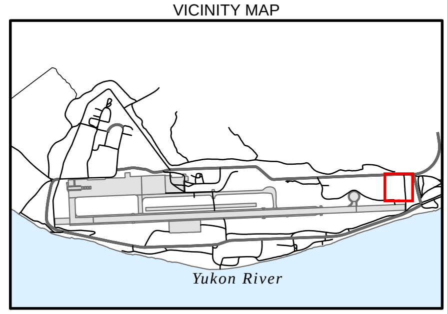
LEGEND

- FT001
- Aboveground Fillstand
- Fire Training Circle
- Fuel Sprayer
- Road
- Approximate Location of Underground Fuel Transfer Pipe
- Proposed Soil Sample
- Proposed Soil\Groundwater Sample
- Proposed Groundwater Sample

Historical Sample Location

- Hand-Augered Boring
- Sediment Sample
- Soil Boring
- Surface Soil Sample
- Monitoring Well
- Abandoned Monitoring Well
- Surface Water Sample
- Ambient Air
- Soil Vapor Sample

VICINITY MAP



N

0 50 100
Feet

FIGURE D9-FT001
Proposed Sample Locations

Work Plan for Site Inspection, Remedial Investigation, and Site Characterization
Former Galena Forward Operating Location, Alaska

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SUPPLEMENTS D1-FT001 AND D2-FT001

(provided on enclosed CD)

ATTACHMENT D-2

JP-4 Fill-stands (ST009), 1572 Liquid Fuel Pump Station, 3,000-gallon UST (UST 1572), 2,000-gallon UST (UST 1572-2)

ATTACHMENT D-2

JP-4 Fill-stands (ST009), 1572 Liquid Fuel Pump Station, 3,000-gallon UST (UST 1572), 2,000-gallon UST (UST 1572-2)

This attachment provides background information, and describes the CSM, DQOs, and the proposed field sampling plan for the JP-4 Fill-stands (ST009), and Underground Storage Tanks (USTs) 1572 and 1572-2, which collectively compose the "parent" Environmental Restoration Program (ERP) Site ST009 at the Former Galena Forward Operating Location (FOL). Because Site ST009 is on the Site Characterization (SC) investigation pathway, as defined in Worksheet #10, the objective of data collection at this site is to characterize the nature and extent of soil contamination laterally and vertically (throughout the entire thickness of the variably saturated zone and 10 feet into the permanently saturated zone) and to evaluate the degree to which soil contamination is contributing to the underlying groundwater plumes. The data collected during site characterization will be evaluated for usability in a future risk assessment, if necessary.

2.1 Site Location

Site ST009 is in the south-western portion of the cantonment "triangle" area and is within Block 8, Lots 9A and 11. The site is in the Petroleum, Oil, and Lubricant (POL) Tank Farm, across from the commercial flight service buildings and fire station on the north side of the runway. Buildings at the site include the Vehicle Maintenance Facility (VMF) (Building 1573) and the Liquid Fuel Pump Station (Building 1572). Figure D1-ST009 (figures are located at the end of this attachment) shows the current boundary of Site ST009, and the location of major site features (including existing and removed JP-4, JP-8, and diesel fill-stands, buildings, USTs, and pipelines). Several other sites fall within the ST009 site boundary that are not associated with historical operations at Site ST009. These four sites are aboveground storage tank (AST) 1572, AST1573, old abandoned pipeline (OAP), and oil-water separator (OWS) 1573, and they will be evaluated in the Preliminary Assessment Report (CH2M HILL, April 2010).

2.2 Site Characteristics

The Site ST009 source area was identified by U.S. Air Force (USAF) as an Installation Restoration Program (IRP) source area (Remedial Investigation (RI) Technical Memorandum, May 1994). The RI concluded that numerous sources of contamination exist in this area: *"It appears that fuel handling and transport activities at the JP-4 Fill-stands source area have resulted in the contamination of soil and groundwater. The analytical results support the* *presence of multiple surface and subsurface sources of fuel contamination within the investigation area."*

Historically, Site ST009 was defined as the West Unit. The West Unit is in the western half of the Galena Airport main base triangle. The West Unit was comprised of seven source areas that, because of their proximity and some degree of overlap, were treated as one management zone. The individual source areas of the West Unit consisted of the following:

- JP-4 Fill-stands (two historical fill-stands: one used for diesel and one for JP-4; currently one fill-stand is in use at the site for JP-8)
- Waste Accumulation Area (AOC023)
- Million Gallon Hill (CG001)
- Power Plant UST No. 49 (TU001)
- Building 1845 (SS006)
- Building 1700 (Refueling Vehicle Maintenance Building) (SS019)
- Building 1850 (S1850)

The current designation of Site ST009 is specific to only the JP-4 Fill-stands, UST 1572, and UST 1572-2 area.

Current and former features of Site ST009 are presented on Figure D1-ST009. These include two former USTs, two removed fill-stands, a current fill-stand, a 300-gallon aboveground storage tank (AST), Liquid Fuel Pump Station (Building 1572), and portions of the VMF (Building 1573). Building 1572 is eligible for inclusion in the National Register of Historic Places (NRHP) as a contributor to the Galena Airport Historic District (Center for Environmental Management of Military Lands, November 2008).

Large seasonal fluctuations in groundwater elevations have been recorded at the FOL. Figure D2-ST009 presents time series plots of groundwater elevation at groundwater monitoring well in the boiler room of the GAVTC Building (BRWELL) from 2004 through 2008. Although the well is located approximately 1,100 feet east of Site ST009, it is considered to be the most representative of groundwater conditions at Site ST009 of the wells instrumented with data logging pressure transducers because of the similar ground surface elevation (approximately 143 feet mean sea level [msl]) and proximity to the Yukon River. A complete set of groundwater hydrographs for monitoring wells at the FOL are presented in Standard Operating Procedure (SOP)-13 *(Groundwater Sampling Procedures)*. The data presented on Figure D2-ST009 indicate that groundwater elevations near Site ST009 have been as high as approximately 137 feet msl, but typically peak at 131 to 132 feet msl. Seasonal low groundwater elevations are generally on the order of 116 feet msl. Given a ground surface elevation of approximately 143 feet msl at BRWELL, the variably saturated zone at Site ST009 ranges in depth from approximately 11 to 27 feet below ground surface (bgs).

2.3 Site Description and History

The site has been used for fuel storage since the 1950s. Fuel management practices prior to 1980, including ground application of tank sludge and surface discharge of water/fuel mixtures, resulted in numerous releases. In addition, two reported spills/leaks occurred at the site in the 1980s. Aerial photographs of the site from 1963 and 1969, prior to the installation of the fill-stands, are shown on Figure D3-ST009.

At a later date, two fill-stands were located in the central part of Site ST009 (Figure D1-ST001) with one diesel fuel island to the east and one JP-4 fuel island to the west (the JP-4 Fill-stands). Currently, only one fill-stand is onsite (the eastern fuel island), which provides JP-8 fuel. This fill-stand is shown on the 2002 and 2009 aerial photographs on Figure D3-ST009. Pipelines originating from Million Gallon Hill (CG001) supplied fuel to the fill-stands. The depths of the pipelines are not known. A 300-gallon JP-8 AST also remains in place at Building 1572. This AST aids in the distribution of JP-8 fuel to the current fill-stand.

Approximately 110 feet east of the JP-4 Fill-stands was a buried 3,000-gallon waste oil tank (UST 1572). UST 1572 originally held diesel fuel for Building 1572 and was later used to collect waste oil and petroleum, oils, and lubricants from the VMF (Building 1573). UST 1572 was removed in 1998.

Approximately 100 feet east of the JP-4 Fill-stands was Building 1572, which served as a fuel/water separator building and had a buried 2,000-gallon waste fuel tank (UST 1572-2). The UST was approximately 4 feet east of Building 1572 (DOWL, September 1994). A floor drain in the fuel/water separator building was connected to the waste fuel tank by a drain pipe. UST 1572-2 was used for storage of JP-4 waste fuel (DOWL, September 1994). Building 1572 was constructed in 1957, and the tank was reportedly installed in the mid- to late 1950s (DOWL, September 1994, p. 2). The tank was removed in May 1994 (DOWL, September 1994, p. 4). The top of the tank was approximately 2 feet bgs, and the bottom of the tank was approximately 7.5 feet bgs and measured 5.3 feet in diameter and 12 feet long (DOWL, September 1994, p. 5).

The UST locations are shown on Figure D1-ST009. Information associated with these USTs is as follows:

- Removed UST 1572

Capacity:	3,000 gallons
Contents:	Diesel fuel, then waste oil
Construction:	Steel
Secondary Containment:	Unknown
Condition:	Unknown
Use:	Waste oil collection from Building 1573
Installation Date:	Unknown, after 1957
Status:	Removed 1998

- Removed UST 1572-2

Capacity:	2,000 gallons
Contents:	Waste fuel
Construction:	Steel
Secondary Containment:	Unknown
Condition:	Good condition upon removal
Use:	JP-4 waste fuel tank for Building 1572
Installation Date:	Unknown, mid- to late 1950s
Status:	Removed May 1994

2.4 Summary of Previous Investigations and Remedial Actions

Electronically available analytical laboratory data associated with Site ST009 are provided in Supplement D1-ST009. Statistical summaries of soil and groundwater analytical data listed in Supplement D1-ST009 are provided in Tables D1-ST009 and D2-ST009 (tables are located at the end of this attachment). Tables D3-ST009 and D4-ST009 present summaries of analytes exceeding the extent soil SLs and extent groundwater SLs defined in Worksheet #15. Figure D54-ST009 presents historical sample locations associated with the data in Supplement D1-ST009. Figures D5-ST009 and D6-ST009 show areas where analytes exceeded extent soil SLs in surface (0 to 2 feet bgs) and subsurface (greater than 2 feet bgs), respectively. The areas shown on these figures represent generalized locations where at least one analyte has exceeded the respective screening level for the field sampling plan design. Data used to generate the exceedance figures can be found in the exceedance table Tables D3-ST009. These figures are not intended to represent iso-concentration contour or plume maps for a given analyte group or medium.

Several investigations have been performed at Site ST009.

2.4.1 1994 UST Closures

UST 1572

Alaska Department of Environmental Conservation (ADEC) determined that 18 Alaska Administrative Code (AAC) 78 requirements for corrective action at the UST 1572 excavation site could be addressed through the Galena Air Force Station IRP.

UST 1572-2

A letter from ADEC indicated that the agency had completed its review of the Tank Closure/Site Assessment Report for Building 1573 at Galena Airport, Alaska, dated September 1994 (report not available in the Administrative Record). The report described closure activities associated with the removal of a 2,000-gallon JP-4 waste fuel UST (UST 640-1572-42 [UST 1572-2]) east of Building 1572 (Figure D1-ST009). Closure activities were conducted in accordance with 18 AAC 78.090.

During tank excavation activities, UST 1572-2 was found to be in good condition with no corrosion or thin spots noted on the exterior or interior of the tank (DOWL, September 1994,

p. 5). However, petroleum-contaminated soils were encountered during excavation and were removed to the limits specified for the project. Excavation limits in the horizontal direction for this project were defined as 20 feet horizontal from the edge of the tank in each direction, limited by the location of the Building 1572 foundation, which could not be disturbed for structural integrity reasons. The excavation limit in the vertical direction was the water table, which was encountered at approximately 12 feet bgs (DOWL, September 1994, p. 5). A concrete slab anchoring the tank was also left in place, as removal of this would have compromised the structural integrity of Building 1572. The excavation footprint covered 2,300 square feet (DOWL, September 1994).

Confirmation soil samples and one groundwater sample were collected from the excavation when the UST was removed, which indicated that "clean closure" was not attained. Significant petroleum-contaminated soil and groundwater was found in the excavation, including gasoline-range organics (GRO) (196 to 6,590 milligrams per kilogram [mg/kg]) and diesel-range organics (DRO) (145 to 3,800 mg/kg). Benzene and toluene compounds above ADEC Method 2 levels were detected in the groundwater sample. In addition, contaminated soil was found to extend from the ground surface to the top of the tank (DOWL, September 1994, p. 4), indicating that a source other than the UST had contaminated this shallow soil. The excavation was backfilled with clean fill (DOWL, September 1994, p.8).

2.4.2 1996 Final Remedial Investigation Report

1991 Preconstruction Field Investigation (Soil, Soil Vapor, and Groundwater)

Excavation for a new Building 1573 began in 1993 at Site ST009, and construction was completed in 1994. Investigations were conducted by the U.S. Army Corps of Engineers (USACE) (report not available in the Administrative Record) to help characterize the soils for construction design and potential contamination. To support Building 1573 construction planning, in February 1991, samples from eight soil borings were collected from the surface and at 5-foot intervals to 25 feet bgs and were submitted for chemical analysis (preconstruction sampling). The analytical data from USACE investigation indicated the presence of jet fuel above action levels at 25 feet bgs. The static water level was reported to be at 23 to 24 feet bgs during the February 1991 investigation, and it was therefore likely that groundwater had been affected by the fuels contamination. The highest concentration of jet fuel, 16,400 mg/kg, was encountered at the surface approximately 100 feet south of the JP-4 Fill-stands. Subsurface soil samples collected south (downgradient) of Building 1572 were also contaminated with fuel-related compounds.

Three of the samples collected during the preconstruction sampling in 1991 for the new Building 1573 were also analyzed for pesticides. Historically, there was a practice of widespread application of pesticides for mosquito control throughout the West Unit. Therefore, pesticides in soils are not attributable to waste management practices at the source areas in the West Unit. One of the pesticide samples was reported to contain 4,4'-DDE at elevated concentrations. Analysis of an additional 10 soil samples collected near the southwest corner of the planned Building 1573 indicated 4,4'-DDT was also present in soil above action levels. As a result of the pesticide detections above action levels, approximately 625 cubic yards of soil designated as pesticide contaminated were temporarily stockpiled at Site ST009. This soil was eventually placed in a decommissioned fuel storage tank at Million Gallon Hill.

Following excavation of the pesticide contaminated soils near the southwest corner of the planned Building 1573 in 1991, four soil confirmation samples were collected at a depth of three feet bgs. Three of the four samples did not contain pesticides above action levels; however, one sample in the northwest corner of the pesticide contaminated excavation area did contain 4,4'-DDD above action levels. Figures and data associated with the pesticide excavation are presented as Supplement D3-ST009.

Other Remedial Investigation activities conducted in 1991 at Site ST009 included a soil gas survey, installation and sampling of four monitoring wells, completion of five additional soil borings, and the collection and analysis of surface soil samples.

A soil gas survey and direct push technology groundwater sampling were conducted at Site ST009 to help determine the source and extent of contamination. The results of the soil gas survey are shown in Supplement D2-ST009 (Figure 3 of the Final Remedial Investigation Report [Radian Corporation, March 1996]). The highest concentrations of organic vapors are within an area approximately defined by the pipeline to the north, the fill-stands to the west, Building 1572 to the east, and extending downgradient (south) to the road. Three direct push technology groundwater samples were collected from 24 feet bgs downgradient (south) of Birchwood Drive. The samples were analyzed using both field infrared (IR) methods and the mobile gas chromatograph laboratory. The results for total petroleum hydrocarbons and aromatic hydrocarbons by IR were below the detection limit except at location F-10 (100 micrograms per liter [µg/L] total petroleum hydrocarbons). Gas chromatograph analyses yielded detections of trichloroethylene (TCE) (0.67 µg/L maximum at location F-14), 1,2-DCE (4.2 µg/L maximum at location F-14), 1,1,1-TCA (0.025 µg/L at location F-14), and benzene (5.6 µg/L at location F-12).

2.4.3 1992 and 1993 Field Investigation (Soil and Groundwater)

Soil samples throughout the source area contained fuel-related compounds at various depths in elevated concentrations. A surface soil sample collected at 10-SS-01 in 1992 contained 5,200 mg/kg DRO and 1,400 mg/kg GRO. The shallowest sample (1 to 3 feet) collected from a nearby soil boring, 10-SB-02, contained GRO, DRO, and benzene, toluene, ethylbenzene, and xylenes, (BTEX) compounds at elevated concentrations. A sample collected from 4 to 6 feet bgs within this same borehole contained significantly lower concentrations of these constituents. These data suggest a surface source of contamination. Subsurface soil samples collected at 10-SB-03 (4 to 5.5 feet bgs) contained GRO at 11,000 mg/kg and DRO at 87,000 mg/kg. Subsurface soil samples collected at 10-SB-05 (11 to 13 feet bgs), which was off the northwest corner of Building 1572, contained benzene at 66 mg/kg, ethylbenzene at 92 mg/kg, toluene at 370 mg/kg, and total xylenes at 450 mg/kg. The 10-SB-05 soil sample results suggest that contamination at this location is coming from the Building 1572 Liquid Fuel Pump Station or the associated lines or tank.

In 1992, six additional surface soil samples were collected at Site ST009 for characterizing arsenic and lead concentrations in the main base triangle. The maximum arsenic soil concentration was 47 mg/kg from the 10-SS-02 sample at 0 to 0.5 foot bgs. However, the average Site ST009 arsenic concentrations were not determined to be significantly higher than the West Unit background concentrations. Average Site ST009 lead concentrations were higher than the West Unit background concentrations, and the maximum lead concentration was 53 mg/kg from the 10-SS-06 sample at 0 to 0.5 foot bgs.

Polychlorinated biphenyls (PCBs) were detected at one location above the extent soil SL (10-SS-04) at a concentration of 1.2 J mg/kg. This was also a location of elevated polyaromatic hydrocarbon (PAH) detections. The field sampling log book noted that the sample was collected at the base of a treated telephone pole, which may be the isolated contamination source.

Monitoring wells 10-MW-01, 10-MW-02, and 10-MW-03 were installed in 1992 and sampled in September/October 1992 and June 1993. 10-MW-02 was abandoned in fall 1993 to allow for construction of the new Building 1573. The two remaining wells were sampled again in September 1994. All groundwater samples from 10-MW-02 and 10-MW-03 contained benzene above the extent groundwater SL. The maximum benzene concentration from these wells was 310 µg/L from 10-MW-02. Bis(2-ethylhexyl)phthalate was found in 10-MW-01 above the extent groundwater SL at a concentration of 184 µg/L.

10-MW-04 was installed downgradient of the Site ST009 source area, near the southeast corner of the Combat Alert Cell hangar. The location of this monitoring well was chosen, using the results of the soil gas survey and calculated groundwater flow direction, to be outside the contaminant plume. However, a groundwater sample collected from this well in September 1993 contained 35.8 µg/L of benzene, which exceeded the extent groundwater SL, but it is uncertain if Site ST009 is the source of this contamination or a more localized, undocumented release. This well was damaged by a snowplow and was not re-sampled in 1994. The well was deemed unusable and abandoned in 1995. Supplement D2-ST009 (Figure 4 of the final RI report [Radian Corporation, March 1996]) shows the estimated area of groundwater contamination associated with Site ST009.

2002 Environmental Monitoring Report #7

Environmental Monitoring Report #7 reported additional results from the 1991 USACE investigation near the proposed Building 1573. It included soil boring sample results for TCE of 0.018 mg/kg, naphthalene of 1.20 mg/kg, and 2-methylnaphthalene of 2.6 mg/kg. These results are below the extent soil SLs.

Removal of UST 1572 (Soil and Groundwater)

In 1998, USAF reportedly removed UST 1572 from an area approximately 15 feet east of Building 1572. No environmental samples were collected during the UST and associated piping removal; however, in 1999, three soil samples were collected from 9.5 to 13 feet bgs outside the boundaries of the buried concrete slab. The samples were analyzed for DRO, which was detected in the soil samples at concentrations from 4.7 mg/kg to 890 mg/kg. The maximum detected concentration exceeded the extent soil SL. Results were presented in *1999 UST Sampling and Closure Report, UST Nos. 1552, 1572, 1837, 1854 and 2541, Galena Air Station, Alaska* (Restoration Science and Engineering, 1999). Based on these results, ADEC recommended additional investigation to further characterize the extent of contamination at UST 1572 and its associated piping (ADEC, 2000).

Additional UST 1572 soil and groundwater characterization activities were performed in 2001. Investigation activities included the advancement of five soil borings and installation of four monitoring wells. One of the soil borings was converted into a monitoring well (1572-MW-01). Two monitoring wells were installed upgradient of the release (1572-MW-02 and 1572-MW-03), and one monitoring well was installed downgradient (1572-MW-04) of the release. Two primary soil samples were collected from each boring and analyzed for GRO, DRO, and BTEX. Groundwater samples from each well were analyzed for GRO, DRO, residual-range organics (RRO), and volatile organic compounds (VOCs). The locations of the wells are shown in Supplement D2-ST009 (Figure 5 of the Final Remedial Investigation Report [Radian Corporation, March 1996]).

The 2001 UST 1572 soil sample results had concentrations of at least one fuel constituent above extent soil SLs in four of the five borings. No analytes were detected above extent soil SLs in the soil boring placed within the limits of the excavation because clean backfill material was sampled. Fuel-related compounds were detected in most soil borings at 5 to 14.5 feet bgs. Concentrations of GRO, DRO, benzene, toluene, ethylbenzene, methylene chloride, and 1,2-dichloropropane in soil were detected in several borings above extent soil SLs. The highest concentrations of GRO (810 mg/kg) and DRO (4,300 mg/kg) were reported in 1572-SB-05 approximately 25 feet north of the UST excavation at 7.5 to 8.5 feet bgs.

Groundwater sample results from the four wells installed during the UST 1572 investigation included the following maximum concentrations for samples collected in June 2001: GRO was 59,000 µg/L, DRO was 3,900 µg/L, benzene was 8,700 µg/L, methylene chloride was 26 µg/L (estimated value), ethylbenzene was 1,100 µg/L, and toluene was 11,000 µg/L, all at 1572-MW-03. The TCE maximum concentration for June 2001 was 6 µg/L at 1572-MW-04. These maximum values all exceeded the extent groundwater SLs. Extent groundwater SLs were exceeded for analytes at three of the four new wells. Although there were exceedances of VOCs at Site ST009, there is no known source within the site. The VOC plume observed within Site ST009 appears to originate to the north, in the area of Buildings 1342 and 1844 (Figure 3.4-2 in Supplement D2-ST009).

Changes in concentration of benzene and DRO in relation to distance from the source were evaluated by comparing iso-concentration contours over time. Figure 6 of Supplement D2-ST009 illustrates benzene iso-concentration contours using sampling data from the June 1993, June 2001, and October 2001 sampling events. Figure 7 of Supplement D2-ST009 illustrates iso-concentration contours for DRO, as estimated from the June 1993, June 2001, and October 2001 sampling events. The DRO plume is generally centered near the area of high benzene concentrations in the source area. Low concentrations of DRO were detected in downgradient wells, which suggests that the DRO plume is not migrating significantly in a downgradient direction.

A limited evaluation of natural attenuation performance using calculated biodegradation rates and BIOSCREEN model results indicated that natural attenuation is effectively reducing BTEX compounds in the Site ST009 area.

Remedial Process Optimization Scoping Field Activities (2003)

As part of the Birchwood Hangar study, groundwater sampling was conducted at 10-MW-03 at Site ST009. Sampling included passive diffusion bag (PDB) sampling and low flow sampling. The PDB sampling was conducted to investigate the vertical distribution of dissolved contaminants in the groundwater. Twelve samplers were installed 2 to 3 feet apart along the lower half of the well screen and allowed to equilibrate for 1 month. Borehole flowmeter tests were also conducted.

Results of the groundwater sampling at 10-MW-03 included maximum benzene concentrations of 50 µg/L at 30 feet below top of casing for PDB sampling, and 53 µg/L at 24 feet below top of casing for low flow sampling. These samples were collected in September 2002. EPA also sampled the well in August 2002, and the result indicated 120 µg/L of benzene. Borehole flowmeter test results typically indicated little or no vertical flow under ambient conditions in the 30 to 40 feet bgs screened intervals of the wells tested in August 2002.

2.4.4 Remedial Actions

In summary, several remedial actions have occurred at Site ST009:

- Removal of former fill-stands (one active fill-stand remains onsite)
- Removal of UST 1572 and associated piping and excavation of surrounding area
- Removal of UST 1572-2 and associated piping and excavation of surrounding area
- Excavation associated with Building 1573 to remove pesticide contaminated soils

No physical remedial technologies have been used at this site for groundwater treatment.

2.5 October 2009 Site Visit Observations

During the October 2009 site visit (CH2M HILL, 2010), it was observed that the JP-8 Fill-stand is still in use and has a concrete containment berm around its perimeter. The area is mostly paved, with some gravel cover. An AST was observed at Building 1572. The site visit also indicated that there is no vegetation at the site and, therefore, no viable ecological habitat.

2.6 Use of Secondary Data

Secondary data (historical data) for the site include data tabulated in Supplement D1-ST009 and summarized in figures presented in Supplement D2-ST009. Data will be evaluated for usability using the general procedures outlined in Worksheet #13. Data that are properly validated, collected by an ADEC-approved analytical method, have analytical detections greater than the limit of detection (LOD) or limit of quantification (LOQ) or LODs at or below the appropriate screening levels, will be used for quantitative nature and extent evaluations and risk assessment calculations, if needed. Data that do not meet this criteria will be used as reference, or screening level data only. Although screening level data will not be used for quantitative analyses, these data will be used to qualitatively evaluate the presence or absence of contamination at a given location and/or depth to guide the design of the field sample plan.

Data shown in Supplements D2-ST009 and D3-ST009 but not available electronically (data not tabulated in Supplement D1-ST009) are used as reference data only to help determine data gap sample placement and to aid in determining target analytes for Site ST009 in soil and groundwater.

Historical soil vapor data tabulated in Supplement D1-ST009 are also used as reference data only to evaluate extent of potential VOC contamination and to aid in determining target VOC analytes for Site ST009 site-specific soil analysis.

Soil and groundwater data tabulated in Supplement D1-ST009 from locations shown in D4-ST009 are assumed to meet usability requirements outlined in Worksheet #13 for use in soil and groundwater nature and extent evaluations, to evaluate potential contamination within and downgradient of the site, and to aid in determining target analytes for Site ST009-specific soil and groundwater analysis. However, the usability of these data to support risk assessment evaluations is still being determined following procedures outlined in Worksheet #13. If this evaluation results in modifying data classification to “SL” instead of “unlimited use,” the sample design in this field sampling plan may be modified.

2.7 Findings of Previous Investigations

Previous investigations at Site ST009 indicated that fuel-related releases at the site from JP-4 Fill-stands operation and UST use associated with the Liquid Fuel Pump Station (Building 1572) and the VMF (Building 1573) have affected soil, soil vapor, and groundwater.

2.7.1 Soil

Comparison of available electronic historical soil data to the extent soil SLs indicate the following fuel-related analytes were detected at elevated concentrations:

- GRO
- DRO
- RRO
- BTEX
- Other VOCs (1,1,2,2-tetrachloroethane, 1,2-dichloropropane, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, chlorobenzene, isopropylbenzene, n-butylbenzene, n-propylbenzene, sec-butylbenzene)
- PAHs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, naphthalene, 2-methylnaphthalene]
- Other semi-volatile organic compounds (SVOCs) (4-chloroaniline, pentachlorophenol)

The following metals were detected in soil samples at the site: aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, vanadium, and zinc. Of these, only arsenic, barium, cadmium, chromium, lead, nickel, and vanadium are considered related to site use (fuel and waste oil) and are target analytes in accordance with Table 14-1.

In addition, phosphorus, tetrachloroethene (PCE), and methylene chloride exceeded extent soil SLs at the site.

Total PCBs were found above extent soil SLs in only one location at Site ST009 (10-SS-04, at the base of a treated telephone pole); however, individual PCB compounds were below the detection limit. Therefore, this area will be resampled for PCBs to determine if there is a PCB source. Otherwise, PCBs will also be analyzed for at site-specific locations where there is a potential PCB source (for example, the transformer pad shown on Figure D1-ST009).

In addition, pesticide contamination (from widespread historical use) was identified, but was addressed by a soil removal action (Radian Corp, March 1996). One excavation confirmation sample of 4,4′-DDD was detected at a concentration above the extent soil SL, therefore, pesticide contamination may not be fully addressed.

2.7.2 Groundwater

Comparison of available electronic historical groundwater data to the extent groundwater SLs indicate the following fuel-related analytes were detected at elevated concentrations:

- GRO
- DRO
- RRO
- BTEX
- Other VOCs (1,2,4-trimethylbenzene, 1,2-DCA, 1,3,5-trimethylbenzene, 1,4-dichlorobenzene, 1,2-dichloropropane, 1,2-dibromo-3-chloropropane, 1,2,3-trichlorobenzene, 1,2,3-trichloropropane, 1,2,4-trichlorobenzene, bromodichloromethane, bromoform, chloromethane, dibromochloromethane, n-propylbenzene, and sec-butyl alcohol, EDB, hexachlorobutadiene)
- PAHs (naphthalene, 2-methylnaphthalene)
- Other SVOC [bis(2-ethylhexyl)phthalate]

The following metals were detected in groundwater samples at the site: aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, molybdenum, nickel, potassium, selenium, sodium, vanadium, and zinc. Of these, only arsenic, barium, cadmium, chromium, lead, nickel, and vanadium are considered related to site use (fuel and waste oil) and are target analytes in accordance with Table 14-1.

In addition, arsenic, barium, iron, aldrin, methylene chloride, 1,1,1,2-tetrachloroethane, 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, 1,1-dichloroethene, cis- and trans-1,2-DCE, carbon tetrachloride, PCE, TCE, and vinyl chloride exceeded extent groundwater SLs at the site. Site ST009 is at the southern (downgradient) end of the base triangle area, and contaminated groundwater from upgradient sources affects the area. Therefore, it is planned that the nature and extent of groundwater contamination will be evaluated as part of the FOL-wide groundwater sampling program (see Table 10-2 in Worksheet #10). Only site-specific impacts to groundwater from known soil Site ST009 contamination sources will be evaluated as part of the investigation outlined in this attachment.

2.8 Target Analytes

Based on site history, exceedances of extent soil SLs and groundwater SLs, and guidance listed in Worksheets #14 and #15, as well as ADEC requirements as described in Section 14.3.1 of this Work Plan, for waste oil (UST 1572), waste fuel (UST 1572-2), and diesel and jet fuel (JP-4 Fill-stands), target analytes for Site ST009 include GRO, DRO, RRO, VOCs, PAHs, and metals. Metal contamination will be delineated associated with the waste oil UST site, and not site-wide. In isolated areas, PCBs and pesticides will also be analyzed to verify historical detections that exceeded the extent soil SLs. However, determining the lateral and vertical extent of the diesel and jet fuel-related contamination in soil at Site ST009 is the primary goal of the planned investigation. Additionally, in accordance with the information provided in the *Draft Field Sampling Guidance* (ADEC, 2010), PAH analysis will be performed on approximately 10 percent of the samples collected. The sample(s) selected for PAH analysis will be those anticipated to have the highest GRO, DRO and/or RRO concentrations.

Following the guidance in Step 6 of Figure 15-1, an additional analysis was conducted in which historical analytical data from locations within 500 feet of the ST0009 site boundary were evaluated to determine the potential for contaminants to migrate from another location to the site. A total of 300 samples contained at least one analyte at a concentration that exceeded extent soil SLs for at least one of the following: metals, GRO, DRO, RRO, PAHs, PCBs, pesticides, or VOCs, including chlorinated solvents. A total of 554 groundwater samples contained at least one analyte that exceeded extent groundwater SLs for at least one of the following: metals, GRO, DRO, RRO, PAHs, PCBs, pesticides, and VOCs, including chlorinated solvents. The following metals were detected in soil and or groundwater samples from these locations: aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, molybdenum, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc. Of these, only arsenic, barium, cadmium, chromium, lead, nickel, and vanadium are considered related to site use (waste oil). Waste oil related metals are already included as target analytes for areas of Site ST009 associated with the USTs. Other data do not affect the majority of the field sampling design for Site ST009, as the target analyte list for the site already incorporates most of these compounds.

Following the guidance in Step 6 of Figure 15-1, a final analysis was conducted to determine whether sites evaluated in the Preliminary Assessment (CH2M HILL, 2010) are located within 500 feet of the ST009 site boundary. Preliminary Assessment sites within this radius include S1850, AOC023, AST1428, AST1573, AST1578, AST1850, AST77506, B1558, B1812, B400, BERM, OAP, OWS1573, PADS, S1850, TACAN3, UST1428, UST1428, UST1429, UST1572, UST15783, and VP09. Of these, a multi-chemical site (such as B1812 or AOC023) would have the largest analyte list. In accordance with the guidance in Figure 15-1, this would include VOCs, SVOCs, metals, PCBs, pesticides, in additional to POL-related analytes. The majority of these compounds are already included in the target analyte list for Site ST009. The target analyte list will retain PAHs rather than SVOCs because of historical site use.

2.9 Potential Exposure Pathways and Receptors

The ST009 site falls under the site characterization stage for the POL surface and subsurface release site/source category, as defined in Worksheet #17, and needs additional sampling to delineate the nature and extent of soil contamination and potential groundwater impacts. Known sources of contamination specific to Site ST009 include the following:

- Leakage from JP-4 Fill-stands and associated piping use (diesel and jet fuels)
- Leakage from historical UST and associated piping use (waste oil and waste fuel)

Surface and subsurface spills from these sources resulted in fuel-related soil and groundwater contamination in excess of the extent soil and groundwater SLs.

Figure D7-ST099 depicts the conceptual site model for exposure for the site, including: past or current sources of contamination, chemical release mechanisms, transport/exposure media, potential exposure points, potential exposure routes, and potential receptors. The most plausible exposure scenarios under current site conditions are (1) the excavation/ construction worker scenario due to the potential for excavations for utility repair and/or replacement, (2) Current workers at the Vehicle Maintenance Building (B1573). There are no residences currently on the site; however, this scenario will be evaluated to assess the potential impacts of hypothetical land use changes. Based on the CSM for Site ST009, potential human receptors and exposure pathways to be evaluated include the following:

- **Excavation/Construction Workers:** Potential exposure to chemicals in soil to 15 feet bgs and shallow groundwater. Potentially complete routes of exposure to soil include incidental soil ingestion, dermal contact with soil, and inhalation of ambient vapors or dust generated from wind or during onsite excavation activities. Potentially complete routes of exposure to shallow groundwater include dermal contact with groundwater and inhalation of ambient vapors from groundwater.

- **Current and Future Occupational Workers:** Potential exposure chemicals in soil to 2 feet bgs. Potentially complete routes of exposure to surface soil include incidental soil ingestion, dermal contact with soil, and inhalation of ambient vapors or dust generated from wind. Vapor intrusion from VOCs in environmental media migrating into current or future occupational buildings is also a potentially complete exposure route.

- **Hypothetical Future Residents:** Potential exposure to chemicals in soil to 15 feet bgs and groundwater. Potentially complete routes of exposure to soil include incidental soil ingestion, dermal contact with soil, and inhalation of ambient vapors or dust generated from wind. Potentially complete routes of exposure to groundwater include ingestion, dermal contact, and inhalation of VOCs during showering or other household activities.

Vapor intrusion from VOCs in environmental media migrating into current or future residences is also a potentially complete exposure route.

As specified in the eco-scoping forms for Site ST009 provided in Appendix G, The ground surface around the ST009 is pavement/gravel and provides no viable habitat for plants or animals. Ecological exposure pathways are considered incomplete at the site. Consequently, no ecological receptors were identified for evaluation onsite. Because Site ST009 is located further than 1,000 feet from the Yukon River, an aquatic ecological exposure pathway is unlikely to be complete at the; however, this pathway may be evaluated further.

2.10 Data Quality Objectives

DQOs are pre-established goals that help monitor and assess project progress. They provide benchmarks against which the quality of fieldwork and the resultant analytical data are evaluated. DQOs specify the type, quality, quantity, and uses of the data necessary to support investigation objectives. General DQOs for characterizing contaminant sources, determining the nature and extent of contamination, and evaluating the potential for contaminants to migrate or affect additional media at the FOL are presented in Worksheet #10, Table 10-2. Site ST009 is currently categorized as being in the site characterization stage. As such, the following general DQOs apply to Site ST009:

- DQO 2 – Nature and Extent of Contamination in Soil
- DQO 3 – Free Product/Smear Zone Characterization
- DQO 4 – Characterize Possible Site-Related Groundwater Contamination (Sites in Vicinity of Larger FOL Plumes)

During investigation of the nature and extent of potential contamination, if target analytes are found at concentrations that may pose a risk to human or ecological health, the following DQOs may apply and will be addressed under a FOL-wide risk assessment field sampling plan:

- DQO 7 – Human Health Risk Assessment
- DQO 8 – Ecological Risk Assessment

The sample design that will be employed at Site ST009 to fill data gaps associated with these DQOs is based on the source/release group investigation model for site characterization, as described in Worksheet #17. This investigation model contains the following elements that will be applied at Site ST009:

- POL Surface Release Site
- POL Subsurface Release Site (UST-related)

Because Site ST009 is categorized as an SC investigation pathway site, the extent soil SLs described in Worksheet #15 will be used to delineate the nature and extent of contamination in soil. The extent groundwater SLs (described in Worksheet #15) will be used to evaluate groundwater data collected during the current study, as Site ST009 is located greater than 1,000 feet from the Yukon River.

The following sections summarize the sample design specific to Site ST009.

2.11 Investigation Activities

The following section provides details regarding the planned investigation activities for Site ST009 and presents the rationale for each activity. SOPs referenced in these sections are provided in Appendix H of this Work Plan.

2.11.1 Pre-investigation Activities

Before field activities begin, staff will review work planning documentation (including SOPs and HSE information) and will ensure that materials and equipment identified in the SOPs have been procured. Before intrusive field activities begin, utility clearance will be performed in accordance with SOP-03 *(Utility Clearance for Intrusive Operations)*, with records maintained consistent with SOP-01 *(Note Taking and Field Log Books)*.

2.11.2 Field Investigation Tasks

Soil Sampling

As shown in Table D3-ST009, there have been exceedances of extent soil SLs for target analytes in historical surface and subsurface soil samples collected throughout Site ST009. Because Site ST009 is on the SC investigation pathway and both surface and subsurface soil contamination has been recorded, the goal of the current investigation is to characterize the nature and extent of soil contamination laterally and vertically (throughout the variably saturated zone and into the permanently saturated zone). Based on water table fluctuations measured at BRWELL from 2004 through 2008 (Figure D2-ST009), the depth of the variably saturated zone to be characterized at Site ST009 extends to approximately 27 feet bgs.

Soil samples will be collected at 18 soil boring locations (ST009GP001 through ST009GP018), as shown on Figure D8-ST009 and detailed in Table D5-ST009, to delineate the extent of fuel-related contamination in surface and subsurface soil and to investigate potential PCB and pesticide contamination in isolated areas. At a minimum, samples will be collected at the following depths at each soil boring: 0 to 2 feet, 5 to 7 feet, 10 to 12 feet, mid-point of the variably saturated zone (~19 feet), the bottom of the variable saturated zone (approximately 27 feet), and 10 feet beneath the top of the permanently saturated zone (~37 feet). Samples may be collected at additional depths depending on the goal of sampling at a particular soil boring. These soil borings include the following:

- Two soil borings to investigate vertical contamination near the former and current fill-stands source, including potential groundwater impacts from these sources (ST009GP001 and ST009GP011).
- Three soil borings to investigate presence or absence of contamination from fuel pipelines that supplied/supply the former and current fill-stands (ST009GP012 through ST009GP014) and to better delineate lateral and vertical extent of fill-stand-related contamination. In addition to the sample depths described above, soil samples will be collected at approximately 4 feet bgs (to coincide with the interval that is likely 2 feet

below the pipeline). Because the pipeline depths are not known at this time, sample depths are subject to change based on field observations.

- One soil boring to investigate vertical contamination near the former UST source area, including potential groundwater impacts from these sources (ST009GP006).
- Nine soil borings to delineate the lateral and vertical extent of contamination associated with the fill-stands and former USTs, collected as step-outs from existing sample locations with known extent soil SL exceedances (ST009GP002 through ST009GP010, ST009GP015 and ST009GP016). Samples from soil borings collected to delineate contamination from the USTs will include metal analysis because of the use of waste oil. ST009GP003 will also provide an upgradient groundwater sample to compare to the fill-stand and UST source area groundwater data. ST009GP007 will be analyzed for PCBs in addition to fuel-related compounds to determine the presence or absence of PCB contamination associated with the potential transformer pad in this area.
- One soil boring to investigate the presence or absence of PCB (and PAH) contamination associated with historical sampling location 10-SS-04 near the telephone pole (ST009GP018).
- One soil boring to investigate vertical contamination of pesticides near the northwest corner of the formerly pesticide-contaminated excavation area on the south side of Building 1573 (ST009GP017). This area was previously excavated to a depth of 3 feet bgs, and backfilled with clean material, however the excavation confirmation sample had a detection of 4,4′-DDD that exceeds the extent soil SL. In addition to the sample depths described above, soil samples will be collected at 3 feet bgs.

Soil samples may be collected at additional depths if field evidence of contamination (for example, staining, odors, high PID readings) is observed. Additionally, if discrete soil samples at any of the proposed soil boring locations shown on Figure D8-ST009 and listed in Table D5-ST009 have concentrations of target analytes exceeding the respective extent soil SLs, step-out sampling may be required to achieve full lateral and/or vertical delineation.

Boreholes will be installed using direct push drilling equipment in accordance with SOP-05 (*Hollow Stem Auger and Direct Push Drilling Methods*). The presence of heaving sands are a known issue at the FOL. Where encountered, appropriate drilling techniques will be used in order to minimize the impact. Discrete soil samples will be collected in accordance with SOP-07 (*Discrete Surface and Subsurface Soil Sampling*). Soil will be classified and logged in accordance with SOP-06 (*Boring Log Completion, Soil Classification, and Logging*), and field screening of soil samples will be collected in accordance with SOP-04 (Organic Vapor *Monitoring and Air Monitoring)*.

The soil samples will be analyzed for GRO, DRO, RRO, VOCs, and PAHs at a minimum to address known fuel- and oil-related contamination. Metals will be analyzed in soil samples from borings associated with delineating the nature and extent of contamination from the waste oil UST. PCBs and pesticides will be analyzed at isolated locations (as specified in Table D5-ST009) to confirm historical sample information. Specific laboratory methods, bottle requirements, field preservation requirements, and sample volumes for these analyses are provided in Worksheet #19. Quality assurance (QA)/quality control (QC) samples will be collected as specified in Worksheet #20. Sample handling procedures will follow SOP-18 *(Packing and Shipping of Environmental Samples)* and SOP-19 *(Sample Handling and Custody)*.

Groundwater Sampling

Groundwater sampling will be performed at Site ST009 at discrete groundwater sampling locations within and upgradient of the source area as described in Table D5-ST009. The purpose of groundwater sampling is to determine whether groundwater has been affected by site-specific fuel contamination in the soil at Site ST009 as described in DQO 4 (Table 10-2) of Worksheet #10 and in the groundwater sampling approach discussion in Worksheet #14. Therefore, an upgradient groundwater sample and Site ST009 source area groundwater samples will be collected to determine how the site may locally be contributing to underlying groundwater contamination. The nature and extent of groundwater contamination of the Base triangle area will be evaluated as part of the FOL-wide groundwater sampling program, as discussed the 2010 Hydrogeologic Study Field Sampling Plan.

Grab groundwater samples will be collected at the borings at the fill-stands and USTs (ST009GP001, ST009GP011, and ST009GP006) and at an upgradient location (ST009GP003). As indicated in Table D5-ST009, grab groundwater samples will be collected at the top of the water table (first water, potentially between 14 and 20 feet bgs), and approximately 10 feet below the permanently saturated zone (expected at approximately 37 feet bgs). The groundwater sample 10 feet beneath the bottom of the variably saturated zone will be co-located with the soil sample described in the previous section. If there is visible evidence of soil contamination at other depths within the variably saturated zone, additional grab groundwater and co-located soil samples will be collected. The purpose of collecting co-located soil and groundwater samples is to provide information for evaluating phase partitioning from contaminated soil. Grab groundwater samples will be collected following SOP-24 *(Direct Push Groundwater Sampling)*. Sample collection procedures will follow SOP-13 (*Groundwater Sampling Procedures*).

Groundwater samples will be analyzed for GRO, DRO, RRO, VOCs, PAHs and field parameters (pH, temperature, specific conductivity, dissolved oxygen, and oxidation reduction potential [ORP]) at a minimum to address known fuel- and oil-related contamination. Field parameters will be collected in accordance with SOP-12 (*Field Water Quality Measurements and Calibration*). Dissolved metals will also be analyzed in groundwater samples from ST009GP003 and ST009GP006. Table D5-ST009 presents proposed sampling locations, depths, media, and target analytes for the investigation. Specific laboratory methods, bottle requirements, field preservation requirements, and sample volumes for these analyses are provided in Worksheet #19. QA/QC samples will be collected as specified in Worksheet #20. Sample handling procedures will follow SOP-18 *(Packing and Shipping of Environmental Samples)* and SOP-19 *(Sample Handling and Custody)*.

Surveying

Sample locations will be surveyed for horizontal position in accordance with SOP-16 (*Global Positioning Satellite System [GPS] Surveying)*.

Equipment Calibration

Field water quality measurement equipment will be calibrated in accordance with SOP-12 *(Field Water Quality Measurements and Calibration)*.

Equipment Decontamination

Non-dedicated equipment will be decontaminated in accordance with SOP-14 (*Equipment Decontamination Procedures)*.

Investigation-derived Waste Management

Investigation-derived waste will be handled in accordance with Appendix B (*Project-specific Waste Management Plan)*.

Sample Identification

Samples will be named in accordance with SOP-19 *(Sample Handling and Custody)*.

2.11.3 Post-investigation Activities

During the field investigation, meetings or conference calls will be held to discuss the investigation results, provide a suggested path forward, and reach consensus on additional work needs. After the fieldwork related to this investigation has been performed, the results will be documented in a data evaluation report, and the anticipated path for further action or site closure will be identified.

2.12 Works Cited

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SUPPLEMENTS D1-ST009 AND D2-ST009

(provided on enclosed CD)

ATTACHMENT D-3

Southeast Runway Fuel Spill (Site ST010)

ATTACHMENT D-3

Southeast Runway Fuel Spill (Site ST010)

This attachment provides background information, and describes the conceptual site model (CSM), data quality objectives (DQOs), and the proposed field sampling plan for the Southeast Runway Fuel Spill (Site ST010) at the Former Galena Forward Operating Location (FOL). Because Site ST010 is on the Site Characterization (SC) investigation pathway, as defined in Worksheet #10, the objective of data collection at this site is to characterize the nature and extent of soil and groundwater contamination laterally and vertically (throughout the entire thickness of the variably saturated zone and 10-feet into the permanently saturated zone) and to evaluate whether sediment and surface water near the palustrine emergent persistent wetlands within the swale and south of the swale at Site ST010 have been affected. The data collected during site characterization will be evaluated for usability in a future risk assessment, if necessary.

3.1 Site Location

ST010 is south of the eastern half of the Galena Airport runway and is approximately 1,500 feet long. The site is bounded on the north by the runway edge of pavement and bounded to the east and west by unpaved roads (Figure D1-ST010) (figures are located at the end of this attachment).

3.2 Site Characteristics

The site is on the shoulder of the runway and vegetated primarily with grass, which is maintained by the State of Alaska to prevent the establishment of taller vegetation in the general runway area. A shallow drainage ditch runs parallel to the runway. When the drainage ditch is seasonally active, water flows from east to west and accumulates against the dike approximately 300 feet beyond and south of the site boundary. Figure D2-ST010 presents a comparison of historical aerial photographs of Site ST010 in 1985 and in 2009, and the 1985 photograph shows the ditch at a time when it is conveying water.

Active petroleum, oil, and lubricant (POL) supply pipelines originating from the barge loading area are on the south side of the site, as shown on Figure D1-ST010.

Large seasonal fluctuations in groundwater elevations have been recorded at the FOL. Figure D3-ST010 presents a time series plot of groundwater elevation at Site ST010 groundwater monitoring well SE-MW-07 from 2004 through 2007. A complete set of groundwater hydrographs for monitoring wells at the FOL are presented in Standard Operating Procedure (SOP)-13 *(Groundwater Sampling Procedures)*. The data presented on Figure D3-ST010 indicate that groundwater elevations at Site ST010 have been as high as approximately 140 feet mean sea level (msl), but typically peak at 135 to 137 feet msl. Seasonal low groundwater elevations are generally on the order of 117 feet msl. Given a ground surface elevation of approximately 141 feet msl at SE-MW-07, the variably saturated zone at Site ST010 ranges in depth from approximately 5 to 25 feet below ground surface (bgs).

3.3 Site Description and History

A diesel spill was reported at Site ST010 during winter 1984 (Radian Corporation, March 1996). The accumulation area for this diesel spill was the drainage ditch running parallel to the runway. The source of the diesel spill was from a north-south trending 4-inch-diameter diesel pipeline, which ran from the barge offloading area to the POL Tank Farm (ST005) under the east end of the runway. Although the volume of the spill is unknown, it was reported that fuel covered the ground in the area and collected in the low area of the ditch.

Attempts were made to remove the fuel before it infiltrated the frozen ground (Radian Corporation, March 1996). The 4-inch-diameter steel pipeline was subsequently abandoned on either side of the runway. The pipeline was drained, flushed, and grouted in-place with steel end plates attached (Radian Corporation, March 1996). The fuel delivery pipeline was replaced with a re-routed pipeline trending east-west along the south side of the runway (Figure D1-1-ST010).

Other potential sources of contamination in the area reported in the 1996 RI Report (Radian Corporation, March 1996) included a barrel dump, a tar pit, and a building of unknown purpose and content. The tar pit is being addressed in a separate field sampling plan (Attachment D-6) and is not considered a feature of Site ST010. The 1996 RI Report noted that the location of the barrel dump was shown on the plot plan for the fuel line abandonment and reinstallation project and that several barrels were visible above ground; however, no maps were provided in historical documentation and the location of this potential site feature remains unknown. The building was reported to have burned down (Radian Corporation, March 1996); however, there is no information to suggest that the structure is a potential source of contamination for Site ST010.

3.4 Summary of Previous Investigations and Remedial Actions

Electronically available analytical laboratory data associated with Site ST010 are provided in Supplement D1-ST010. Statistical summaries of soil and groundwater analytical data provided in Supplement D1-ST010 are provided in Tables D1- ST010 and D2-ST010 (tables are located at the end of this attachment). Tables D3-ST010 and D4-ST010 present summaries of analytes exceeding the extent soil screening levels (SLs) and extent groundwater to surface water SLs defined in Worksheet #15. Figure D3-ST010 presents historical sample locations associated with the data in Supplement D1-ST010. Figures D4-ST010, D5-ST010, and D6-ST010 show areas where analytes exceeded soil extent SLs in surface soil (0 to 2 feet bgs) and subsurface soil (greater than 2 feet bgs), and the extent groundwater to surface water SLs in groundwater. The areas shown on these figures represent locations where at least one analyte has exceeded the respective screening level for the field sampling plan design. These figures are not intended to represent iso-concentration contour or plume maps for a given analyte group or medium.

3.4.1 Previous Investigations

1996 Remedial Investigation Report

Field efforts for the 1996 Remedial Investigation (RI) Report occurred during the 1993 and 1995 field seasons. The investigation included photoionization detector (PID) field screening of soil gas, infrared (IR) analysis of soils, and laboratory analysis of surface soil, subsurface soil, and groundwater samples to determine the extent of fuel contamination (Radian Corporation, March 1996).

Initially in 1993, 24 soil gas samples (no map available) were collected at 5 feet bgs along the drainage ditch to aid in determining the extent of contamination and positioning subsequent soil and groundwater sample points. Results indicated an area of elevated hydrocarbons including 11 points where PID results ranged from 104 to 764 parts per million by volume (ppmv) and catalytic analyzer results ranged from 86 to 1,250 ppmv (Radian Corporation, March 1996). Sixteen shallow soil samples were analyzed for total petroleum hydrocarbon (TPH) and aromatic hydrocarbons using field IR analysis from 15 of the soil gas sampling locations (spanning the area of hydrocarbon contamination). TPH results supported the area of contamination indicated by the soil gas results and ranged up to 16,500 milligrams per kilogram (mg/kg) (Radian Corporation, March 1996).

During 1995, additional soil gas analysis was conducted south of the ditch line to help determine placement of 10 direct push groundwater sampling points (SE-GP-01 through SE-GP-10 on Figure D3-ST010), which were used to determine the placement of 4 permanent groundwater monitoring wells (SE-MW-01 through SE-MW-04 on Figure D3-ST010). The 10 direct push sampling points were mainly positioned in a single line along the groundwater flow direction (to the southwest), with a few more southern points spread to the east and west (Radian Corp, March 1996). Supplements D2-ST010 and D3-ST010 present groundwater elevation contour maps for May and October 2004. These supplements show that during the break-up of the Yukon River in early spring, groundwater flow direction is to the north (away from the Yukon River). As shown on Figure D6-GW of the 2010 Hydrogeologic Study Field Sampling Plan, during the 2007-2008 monitoring period this flow condition persisted for approximately 4 month period when the groundwater elevations were seasonally high. The predominant flow direction, towards the Yukon River, persisted for approximately 8 months. As shown on Supplement D3-ST010, the predominant groundwater flow direction at Site ST010 is south/southwest. As shown in Supplement D1-ST010, groundwater samples were analyzed for Diesel-range organics (DRO) (AK102). DRO concentrations exceeded the extent groundwater to surface water SL at locations SE-GP-01, SE-GP-02, and SE-GP-03 (Table D4-ST010) with the highest concentration (9,200 micrograms per liter [µg/L]) detected in the sample location closest to the ditch. Groundwater monitoring wells SE-MW-01 through SE-MW-04 were installed and screened approximately 5 to 20 feet bgs (Radian Corporation, March 1996). As shown in Supplement D1-ST010, groundwater samples from these wells were analyzed for DRO (AK102), gasoline-range organics (GRO) (AK101, volatile organic compounds [VOCs] (SW8260B), lead (SW7421), metals (SW6010), specific conductance (SW9050), pH (SW9040), temperature (E170.1), and alkalinity (A403) (Earth Tech, 2004). There were exceedances of extent groundwater to surface water SLs in all four of the monitoring wells for DRO (Table

D4-ST010). The highest DRO concentration (9,300 µg/L) was detected at SE-MW-01, which also had exceedances for GRO, benzene, toluene, ethylbenzene, and xylenes, (BTEX), 1,2-DCA, methylene chloride, perchloroethylene (PCE), naphthalene, 2-methylnaphthalene, and phenanthrene. SE-MW-04 also had an exceedance of the extent groundwater to surface water SL for 1,2-DCA (Table D4-ST010).

Soil samples were also collected at three of the four monitoring wells (SE-MW-02, SE-MW-03, and SE-MW-04) at 10 to 12 feet bgs (Supplement D1-ST010). A surface soil sample was collected from SE-MW-04 at 0 to 0.5 foot bgs. Additionally, soil samples were collected at two depths (0-0.5 foot bgs and 5-7.5 feet bgs) from three soil borings (SE-SB-01 through SE-SB-03). Soils samples were analyzed for GRO (AK101), DRO (AK102), VOCs (SW8260B), semi-volatile organic compounds (SVOCs) (SW8270), and lead (SW7421) (Earth Tech, 2004). As shown in Table D3-ST010, there were exceedances of the extent soil SLs for DRO, GRO, lead, naphthalene, benzo(a)pyrene, and dibenz(a,h)anthracene, benzene, and xylene. DRO and GRO concentrations were higher in the deeper soil samples at SE-SB-01 and SE-SB-03 with exceedances of the extent soil SLs up to 18,000 mg/kg and 540 mg/kg, respectively, at SE-SB-01.

3.4.2 1996 Baseline Risk Assessment Addendum

Analytical results of this investigation were used in the 1996 baseline risk assessment. At that time, the only calculated human risk in excess of 1 in 1 million was for beryllium in groundwater (detected up to 3.94 µg/L). Site beryllium concentrations, however, are not significantly different than the regulatory maximum contaminant level (MCL) of 4 µg/L (Earth Tech, 2004).

2002 Environmental Monitoring Report #7

Environmental Monitoring Report #7 covers the monitoring activities conducted at Site ST010 from 1997 through 2001 primarily under the Continued Environmental Monitoring Program (CEMP), initiated in 1998. Two additional wells (SE-MW-05 and SE-MW-06) were installed in 2000, and eight groundwater monitoring events were conducted, although not all six wells were sampled during each event (Radian, 2002).

During the monitoring period, samples were analyzed for some or all of the following: VOCs (SW8260B), GRO (AK101), DRO (AK102), residual-range organics (RRO) (AK103), and metals (SW7841 and SW7740) (Earth Tech, 2004). Supplement D1-ST010 provides analytical data associated with these monitoring events. Changes in selected analysis over time included the removal and later reinstating of GRO, DRO, and RRO and the addition of natural attenuation parameters using specific metals (Radian, 2002). Analytical results indicated that SE-MW-01 was the only well with results that frequently exceeded extent groundwater to surface water SLs during this period for DRO (ranging from 330 to 46,000 µg/L) and benzene (ranging from 8.2 to 46 µg/L). This well also contained 0.1 foot of free product during the October 2000 sampling event, the only recorded occurrence of free product at the site. As shown in Table D4-ST010, SE-MW-01 also exceeded extent ground-water to surface water SLs GRO, RRO, ethylbenzene, toluene, xylenes, methylene chloride, and naphthalene during at least one of the monitoring events. The remaining five wells exceeded the extent groundwater to surface water SLs for DRO or RRO during at least one monitoring event (Table D4-ST010).

2007 Remedial Investigation/Feasibility Study Report

SE-MW-07 and SE-MW-08 were installed as part of the field activities for the 2007 RI (Earth Tech, 2007). SE-MW-01, SE-MW-05, SE-MW-06, SE-MW-07, and SE-MW-08 were sampled in spring (May/June) and fall (October) 2004. Groundwater samples were analyzed for BTEX (SW8260B), DRO (AK102), and monitored natural attenuation parameters (Earth Tech, 2007). Analytical data associated with these monitoring events are presented in Supplement D1-ST010. As shown in Table D4-ST010, DRO exceeded the extent groundwater to surface water SL in all wells but SE-MW-06 (which had no extent groundwater to surface water SL exceedances during the 2004 sampling events) during spring 2004, with the highest concentration (2,320 µg/L) at SE-MW-01. Only the groundwater sample at this well exceeded the extent groundwater to surface water SL for DRO during the fall 2004 sampling event, with a concentration of 20,800 µg/L. Benzene concentrations exceeded the extent groundwater to surface water SLs in SE-MW-01 during both spring and fall 2004 and in SE-MW-04 during fall 2004, with a maximum concentration of 1.09 µg/L. Toluene exceeded the extent groundwater to surface water SL in fall 2004 at SE-MW-01 (5.56 µg/L). The 2007 RI Report also evaluated natural attenuation parameter data and concluded that not enough data had been collected to determine the rate and percentage of DRO concentration attenuation, but depleted oxygen and nitrate levels along with increased ferrous iron in SE-MW-01 suggested biodegradation was occurring in the source area (Earth Tech, 2007).

2008 Field Investigation

During the 2008 field season, eight soil borings (old abandoned pipeline [OAP]-MC263 through OAP-MC265 and OAP-MC270 through OAP-MC274), five soil vapor sampling points (OAP-SG265 through OAP-SG269), and one direct push groundwater sampling point (OAP-GW261) were drilled along the OAP at the eastern boundary of the site (Figure D3-ST010). Up to 12 soil vapor samples were collected at each of the individual vapor sampling points and four of the soil borings (OAP-MC263, OAP-MC270, OAP-MC271, and OAP-MC272) at depths ranging from 1 to 12 feet bgs. Soil vapor samples were field screened with a PID and analyzed for one or more of the following: TPH, total recoverable petroleum hydrocarbons (TRPH), VOCs, carbon dioxide, and oxygen. As shown in Supplement D1-ST010, TPH, TRPH, and VOC concentrations were highest at OAP-SG267, OAP-SG268, and OAP-SG269, with maximum concentrations of 1,200,000 parts per billion by volume (ppbv), 696,000 ppbv, and 10,805 ppbv (ethylbenzene), respectively.

One or two soil samples were collected from depths ranging 3 to 12 feet bgs at the soil boring locations. As shown in Supplement D1-ST010, soil samples at all borings were analyzed for VOCs. GRO was included in the analysis in samples from all but two of the soil borings. Data in Table D3-ST010 indicate that GRO was detected at concentrations exceeding the extent soil SL at three of the soil borings with a maximum concentration of 287 mg/kg at OAP-MC265. One or more VOCs, including 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, n-butylbenzene, naphthalene, and xylene were detected at concentrations exceeding extent soil SLs at four soil boring locations (Table D3-ST010). Grab groundwater samples were collected from 16 and 23 feet bgs at OAP-GW261 and were analyzed for VOCs. As shown in Supplement D1-ST0101, no analytes were detected in these samples.

As discussed in the Use of Secondary Data section below, data associated with the 2008 field investigation are under review to determine their usability for quantitative site characterization.

3.4.3 Previous Remedial Actions

After the 1995 remedial investigation fieldwork, a single well biovent system was installed at SE-MW-01. The system operated for approximately 9 months. It was shut down because of maintenance and refueling issues associated with the generator that powered the system (AECOM, 2007).

3.5 October 2009 Site Visit Observations

During the October 2009 site visit, it was observed that the site was an open, level, grassy area within the airfield. There were no visible signs of odors, staining, or stressed vegetation. No fuel tanks, chemical storage areas, or hazardous materials storage areas were observed onsite.

3.6 Use of Secondary Data

Secondary data (historical data) for the site include data tabulated in Supplement D1-ST010 and summarized in Tables D1- ST010 and D2- ST010. Data will be evaluated for usability using the general procedures outlined in Worksheet #13. Data that are properly validated, collected by an Alaska Department of Environmental Conservation (ADEC)-approved analytical method, and have analytical detections greater than the limit of detection (LOD) or limit of quantification (LOQ) or LODs at or below the extent soil SLs or extent groundwater SLs can be used for quantitative nature and extent evaluations and risk assessment calculations, if needed. Data that do not meet these criteria can be used as reference or screening level data only. Although screening level data will not be used for quantitative analyses, these data will be used to qualitatively evaluate the presence or absence of contamination at a given location and/or depth to guide the design of the field sampling plan.

Field screened soil (IR) and soil vapor (PID) samples collected in 1993 and 1995 do not meet usability requirements outlined in Worksheet #13 and may be used for reference only.

Soil and groundwater data collected between 1995 and 2005 meet the usability criteria in Worksheet #13 for use in quantitative nature and extent evaluations. If needed, these data could also be used for risk assessment evaluations.

The 2008 data require additional evaluation to determine usability because they were not collected under an approved Work Plan and Quality Assurance Project Plan. These data will be used for site nature and extent evaluations, assuming the data meet DQO usability requirements. The review of the usability of the secondary data is in progress and follows procedures outlined in Worksheet #13. If this evaluation results in modifying the data classification to screening level rather than “unlimited use,” the sample design in this field sampling plan may be modified.

3.7 Findings of Previous Investigations

The primary source of contamination at Site ST010 was the fuel spill in winter 1984. Although there has been relatively limited soil sampling at the site, data from 1995 indicate that the extent of contamination exceeding extent soil SLs is limited to the northeast quadrant of the site and at historical sample location SE-SB-03, in the western portion of the site (Figures D4-ST010 and D5-ST010). In 1995, soil sample analytical results from the source area exceeded the extent soil SLs for DRO, lead, and polyaromatic hydrocarbons (PAHs) (Table D3-ST010). The shallow soil sample from SE-MW-04, near the western area of the ditch where infiltration was most likely, had a DRO concentration of 150 mg/kg, indicating the possibility that fuel contamination was likely conveyed westward in the ditch. The only soil sampling that has been conducted since 1995 focused on the area in the immediate vicinity of OAP along the eastern boundary of the site.

As shown on Figure D6-ST010, contamination exceeding the extent groundwater to surface water SLs extends southwest of the source area. In groundwater, several fuel constituents have exceeded the extent groundwater to surface water SLs in the past, and samples collected through 2004 indicate that GRO, DRO, RRO, PAHs, and VOCs exceeded their extent groundwater to surface water SLs (Table D4-ST010). Monitored natural attenuation parameters indicate conditions are favorable for biodegradation at the source area.

3.8 Target Analytes

Based on historical exceedances of extent soil SLs and extent groundwater to surface water SLs and guidance listed in Worksheet #14, target analytes for Site ST010 include GRO, DRO, RRO, VOCs, and PAHs. Although there has been an exceedance of the extent soil SL for lead in one soil sample near the source area (SE-SB-01), the detected 50 mg/kg is not significantly above the extent soil SL (which is based on one-tenth of the 2009 ADEC Table B1 Method 2) of 40 mg/kg. As shown in Table D2-ST010, several metals have been detected in groundwater samples at Site ST010 (aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, molybdenum, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc). The source of the contamination is a release from a diesel pipeline and following the guidance f in Table 14-1 lead is not a target analyte. Additionally, in accordance with the information provided in the *Draft Field Sampling Guidance* (ADEC, 2010), PAH analysis will be performed on approximately 10 percent of the samples collected. The sample(s) selected for PAH analysis will be those anticipated to have the highest GRO, DRO and/or RRO concentrations. If a drum disposal area is identified at the site, the target analyte list may be expanded in accordance with the process outlines in Figure 15-1 to include target analytes from unknown POL sites listed in Table 14-1.

Following the guidance in Step 6 of Figure 15-1, an additional analysis was conducted in which historical analytical data from locations within 500 feet of the Site ST010 boundary were evaluated to determine the potential for contaminants to migrate from another location to the site. No additional data exist within this radius; therefore, the target analyte list specified above is not impacted.

Following the guidance in Step 6 of Figure 15-1, a final analysis was conducted to determine whether sites evaluated in the Preliminary Assessment (CH2M HILL, 2010) were located within 500 feet of the ST010 site boundary. Preliminary Assessment sites within this radius include TAR, AAS3, PIPE, BLA, and OAP. All of the Preliminary Assessment sites identified within the 500-foot radius were included in the Preliminary Assessment because fuel conveyance or handling occurred at those sites. There are no target analytes for AAS3 and PIPE because no releases have occurred at these sites. Target analytes for BLA and OAP include fuel-related compounds which are already included in the target analyte list for Site ST010. The target analyte list for TAR will be based on the results of the tar speciation analysis. The target analyte list for Site ST010 may be modified during the Triad process in response to sampling results from TAR.

3.9 Potential Exposure Pathways and Receptors

ST010 site falls under the Site Characterization stage for the POL surface release site/source category, as defined in Worksheet #17, and requires additional sampling to delineate the nature and extent of soil contamination and groundwater impacts. Known and potential sources of contamination include the 1984 POL release from the fuel pipeline resulting in a release to surface soil, subsurface soil, and groundwater contamination in excess of extent soil SLs and extent groundwater to surface water SLs.

Figure D8-ST010 depicts the CSM for exposure for the site, including past or current sources of contamination, chemical release mechanisms, transport/exposure media, potential exposure points, potential exposure routes, and potential receptors. The most plausible soil exposure scenario under current site conditions is the excavation/construction worker scenario due to the potential for excavations for utility repair and/or replacement. There are no standard work places or residences currently on the site; however, there are residences downgradient from the site in Old Galena. Future onsite occupational worker and residents will be evaluated to assess the potential impacts of hypothetical land use changes. For groundwater, current residential exposure will be evaluated due to the presence of residential wells downgradient from the site. Based on the CSM for Site ST010, potential human receptors and exposure pathways to be evaluated include the following:

- **Excavation/Construction Workers:** Potential exposure to chemicals in soil to 15 feet bgs and shallow groundwater. Potentially complete routes of exposure to soil include incidental soil ingestion, dermal contact with soil, and inhalation of ambient vapors or dust generated from wind or during onsite excavation activities. Potentially complete routes of exposure to shallow groundwater include dermal contact with groundwater and inhalation of ambient vapors from groundwater.

- **Future Occupational Workers:** Potential exposure chemicals in soil to 2 feet bgs. Potentially complete routes of exposure to surface soil include incidental soil ingestion, dermal contact with soil, and inhalation of ambient vapors or dust generated from wind. Vapor intrusion from VOCs in environmental media migrating into current or future occupational buildings is also a potentially complete exposure route.
- **Current or Hypothetical Future Residents:** Potential exposure to chemicals in soil to 15 feet bgs and groundwater. Potentially complete routes of exposure to soil include incidental soil ingestion, dermal contact with soil, and inhalation of ambient vapors or dust generated from wind. Potentially complete routes of exposure to groundwater include ingestion, dermal contact, and inhalation of VOCs during showering or other household activities. Vapor intrusion from VOCs in environmental media migrating into current or future residences is also a potentially complete exposure route.

ST010 is a vegetated site that was identified in Worksheet #14 as having higher quality ecological habitat. As described on the eco-scoping form in Appendix G, the vegetation (forbs, dandelion is most common) is maintained to minimize excessive growth, but tall enough to provide small mammal habitat. Many vole runways were observed in the swale of Site ST010 during the October 2009 site visit. The U.S. Fish and Wildlife Service (1999) identified wetlands on the National Wetlands Inventory Map at Site ST010 as palustrine emergent persistent wetlands within the swale and in close proximity south of the swale. The U.S. Fish and Wildlife Service did not find any listed species occurring in the project area and found no designated or proposed critical habitat units in the vicinity of the project area (USFWS 2010). However, the Alaska tiny shrew (*Sorex yukonicus*), and American peregrine falcon (*Falco peregrinus anatum*) are state ranked as rare or uncommon in state (21-100 occurrences) and rare or uncommon in state (21-100 occurrences), breading status, respectively (Alaska National Heritage Program, 2010). Although both species could occur at Site ST010, the shrew has not been observed in the project area and most likely does not occur at the site (U.S. Air Force [USAF], 2008). The falcon, if present, would only fly over the site and most likely not be adversely affected by any potential contamination. Ecological exposure pathways are potentially complete if target analytes are found to be present in surface soil, sediment, surface water in the swale, or in groundwater that may daylight downgradient. Therefore, additional site information or current surface soil and sediment data are needed to determine if any pathways are complete. Consequently, terrestrial ecological receptors will be evaluated for exposures onsite using site characterization data. Because groundwater from Site ST010 may discharge to the Yukon River, which is less than 1,000 feet away, an aquatic ecological exposure pathway is considered potentially complete at Site ST010 and may be further evaluated.

3.10 Data Quality Objectives

DQOs are pre-established goals that help monitor and assess project progress. They provide benchmarks against which the quality of fieldwork and the resultant analytical data are evaluated. DQOs specify the type, quality, quantity, and uses of the data necessary to support investigation objectives. General DQOs for characterizing contaminant sources, determining the nature and extent of contamination, and evaluating the potential for contaminants to migrate or affect additional media at the FOL are presented in

Worksheet #10, Table 10-2. Site ST010 is currently categorized as being in the Site Characterization investigation phase. As such, the following general DQOs apply:

- DQO 2 – Nature and Extent of Contamination in Soil
- DQO 3 – Free Product/Smear Zone Characterization
- DQO 5 – Delineate Nature and Extent of Groundwater Contamination
- DQO 6 – Hydrogeological Characterization

During investigation of the nature and extent of potential contamination, if target analytes are found at concentrations that may pose a risk to human or ecological health, the following DQOs may apply and will be addressed under a FOL-wide risk assessment field sampling plan:

- DQO 7 – Human Health Risk Assessment
- DQO 8 – Ecological Risk Assessment

The sample design that will be employed at Site ST010 to fill data gaps associated with these DQO is based on the source/release group investigation model for POL/surface and subsurface release sites, as described in Worksheet #17. Because Site ST010 is categorized as an SC investigation pathway site, the extent soil SLs described in Worksheet #15 will be used to delineate the nature and extent of contamination in soil. The extent groundwater to surface water SLs (described in Worksheet #15) will be used to delineate the nature and extent of contamination in groundwater, as Site ST010 is located within 1,000 feet of the Yukon River.

The following sections summarize the sample design specific to Site ST010.

3.11 Investigation Activities

This section provides details regarding the planned investigation activities for Site ST010 and presents the rationale for each activity. SOPs referenced in this section are provided in Appendix H of this Work Plan.

3.11.1 Pre-investigation Activities

Before field activities begin, staff will review work planning documentation (including SOPs and HSE information) and will ensure that materials and equipment identified in the SOPs have been procured. Before intrusive field activities begin, utility clearance will be performed in accordance with SOP-03 *(Utility Clearance for Intrusive Operations)*, with records maintained consistent with SOP-01 *(Note Taking and Field Log Books)*.

ST010 is defined in part by the edge of runway pavement. Because of its proximity to the runway, investigation personnel must establish clear lines of communication with the Federal Aviation Administration, the Alaska Department of Transportation, and the Galena Airport operator. The procedures for runway access under federal and state requirements must be detailed for personnel and equipment egress and regress onto the active airport facilities.

3.11.2 Field Investigation Tasks

Site Reconnaissance

A site reconnaissance will be performed to find site features that will assist in locating proposed site characterization sampling points. These features include the main east-west trending drainage swale, dirt roads, monitoring wells and previous boreholes (grout puddles), lineaments from subsurface utility alignments expressed as changes in vegetation or narrow depressions, or stains or odors. SE-MW-01 and SE-MW-02 (or other wells) can be used as reference points for land survey techniques to establish site boundaries, previous soil boring points, and the proposed sampling locations. It was noted in the 1996 RI Report (Radian Corporation, March 1996) that drums were visible protruding from the ground. If evidence of a drum disposal area is found during the site reconnaissance, additional soil and groundwater sampling for an expanded analyte list may be necessary.

Work performed under the site reconnaissance will follow SOP-01 *(Note Taking and Field Log Books)* and SOP-02 *(Site Reconnaissance, Preparation, and Restoration)*.

Soil Sampling

As shown in Table D3-ST010, there have been exceedances of extent soil SLs for target analytes in historical surface and subsurface soil samples collected at Site ST010. Limited soil sampling within the site boundary has been conducted for the full suite of target analytes. Because Site ST010 is on the SC investigation pathway and both surface and subsurface soil contamination has been recorded (to a known depth of 12 feet bgs), the goal of the current investigation is to characterize the nature and extent of soil contamination laterally and vertically (throughout the variably saturated zone). Based on water table fluctuations at SE-MW-07 from 2004 through 2007, the variably saturated zone to be characterized at Site ST010 typically ranges from 5 to 25 feet bgs.

Nine direct push borings will be advanced within and downgradient (south) of Site ST010 (Figure D9-ST010). To avoid implementing a large sampling program, a limited number of soil boring locations were selected to optimize the existing data set by infilling spatial data gaps. The proposed nine direct push borings for soil and groundwater samples will be combined with the existing data set to fulfill the following objectives:

- Delineate the lateral and vertical extent of soil contamination
- Evaluate the vadose zone POL release in the pipeline failure source area and along the trend of the drainage ditch
- Evaluate the vadose zone POL contamination and its contribution as a source of groundwater contamination
- Refine the CSM for the hydrogeological site conditions

Table D5-ST010 presents the sample details and rationale, which include:

- Sample location ST010GP001 will serve to evaluate potential contamination at the western boundary of Site ST010, near the culvert under the unpaved road. As shown on

Figure D2-ST010, water accumulates in this area and may promote infiltration of fuel from the spill.

- Sample location ST010GP003 is co-located with historical sample location SE-SB-03 to evaluate potential attenuation of contamination. ST010GP002, ST010GP004, and ST010GP005 will serve as step-out borings to the north, south, and east.
- Sample locations ST010GP006 through ST010GP009 are step-out borings to confirm POL constituent concentrations in the former pipeline failure and surface release source area.

The proposed soil borings locations may be adjusted based on visual and olfactory observations and the results of the surface geophysics surveys. Soil borings may be added if warranted in specific areas of interest determined from additional site information, surface features and clues, or the surface geophysical surveys. As specified in Table D5-ST010, samples will be collected at each soil boring at 0 to 2 feet bgs, 5 to 7 feet bgs, 10 to 12 feet bgs, at the midpoint of the variably saturated zone (~15 feet bgs), at the bottom of the variable saturated zone (~25 feet bgs), and 10 feet beneath the top of the permanently saturated zone (~35 feet bgs). If contamination is observed at other depths (for example, staining, odors, or high PID readings), additional soil samples may be collected. Additionally, if discrete soil samples at any of the proposed soil boring locations shown on Figure D9-ST010 and listed in Table D5-ST010 have concentrations of target analytes exceeding the respective extent soil SLs, step-out sampling may be required to achieve full lateral and/or vertical delineation.

Boreholes will be installed using direct push drilling equipment in accordance with SOP-05 *(Hollow Stem Auger and Direct* Push Drilling Methods). The presence of heaving sands are a known issue at the FOL. Where encountered, appropriate drilling techniques will be used in order to minimize the impact. Discrete soil samples will be collected in accordance with SOP-07 *(Discrete Surface and Subsurface Soil Sampling)*. Soil will be classified and logged in accordance with SOP-06 *(Boring Log Completion, Soil Classification, and Logging)*, and field screening of soil samples will be collected in accordance with SOP-04 *(Organic Vapor Monitoring and Air Monitoring)*.

The soil samples will be analyzed for the following analytes: GRO, DRO, RRO, VOCs, and PAHs. If a drum disposal area is located at the site, the target analyte list may be expanded. Specific laboratory methods, bottle requirements, field preservation requirements, and sample volumes for these analyses are provided in Worksheet #19. Quality assurance (QA)/quality control (QC) samples will be collected as specified in Worksheet #20. Sample handling procedures will follow SOP-18 *(Packing and Shipping of Environmental Samples)* and SOP-19 *(Sample Handling, Identification, and Custody)*. Air monitoring procedures will follow SOP-04 *(Organic Vapor Monitoring and Air Monitoring)*.

Groundwater Sampling

As shown in Table D4-ST010, there have been exceedances of extent groundwater to surface water SLs for target analytes in historical groundwater samples collected within Site ST010. The goal of the current investigation is to characterize the nature and extent of groundwater contamination laterally and vertically. Information collected as part of this investigation will be incorporated into the FOL-wide strategy for evaluating groundwater contamination discussed in Worksheet #14. Based on water table fluctuations measured at groundwater monitoring well SE-MW-07 from 2004 through 2007, the variably saturated zone at Site ST010 ranges from approximately 5 to 25 feet bgs.

Groundwater samples will be collected from the existing groundwater monitoring wells at Site ST010 (SE-MW-01 through SE-MW-08) twice during the field season (spring and fall). Specific details regarding sampling of existing monitoring wells at the FOL are provided in the 2010 Hydrogeologic Study Field Sampling Plan. These samples will provide a synoptic snapshot of current groundwater contamination levels under both high and low water table conditions. Additionally, grab groundwater samples will collected from six of the soil boring and two grab groundwater sampling locations presented on Figure D9-ST010. Groundwater samples at locations ST010GP001, ST010GP002, ST010GP003, ST010GP005, ST010GP007, and ST010GP008 will be collected at two depths: one at the top of the water table and one 10 feet below the top of the permanently saturated zone. The groundwater sample 10 feet beneath the bottom of the variably saturated zone will be co-located with the soil sample described in the previous section. If there is visible evidence of soil contamination at other depths within the variably saturated zone, additional grab groundwater and co-located soil samples will be collected. The purpose of collecting co-located soil and groundwater samples is to provide information for evaluating phase partitioning from contaminated soil. The purpose of sample locations ST010HP001 and ST010HP002 is to provide groundwater data at depths greater than the screen intervals of existing wells near the perimeter dike. These data will be used to evaluate the potential for groundwater contamination, if present, to impact residential wells in Old Galena. Groundwater samples will be collected at depths of 35 to 40, 50 to 55, and 65 to 70 feet bgs at these locations.

Grab groundwater samples will be collected via direct push groundwater sampling techniques, as described in SOP-24 *(Direct Push Groundwater Sampling)*. If contamination (for example, staining, odors, or high PID readings) and saturated conditions are observed in the field at shallower depths than in the soil boring, additional groundwater samples will be co-located with soil samples within the variably saturated zone. The results from the spring groundwater sampling round will be used to determine whether step-out groundwater samples may be necessary to laterally delineate the nature and extent of groundwater contamination at the site.

Groundwater samples will be analyzed for GRO, DRO, RRO, VOCs, PAHs, and field parameters (pH, temperature, specific conductivity, dissolved oxygen, and oxidation reduction potential). Specific laboratory methods, bottle requirements, field preservation requirements, and sample volumes for these analyses are provided in Worksheet #19. Field sample QA/QC protocols will be performed in accordance with Worksheet #20. Air monitoring procedures will follow SOP-04 *(Organic Vapor Monitoring and Air Monitoring)*. Sample handling procedures will follow SOP-18 *(Packing and Shipping of Environmental Samples)* and SOP-19 *(Sample Handling, Identification, and Custody)*.

Sediment and Surface Water Sampling

As discussed in the "Potential Exposure Pathways and Receptors" section above, the U.S. Fish and Wildlife Service (1999) identified palustrine emergent persistent wetlands within the swale and south of the swale at Site ST010. As shown on Figure D9-ST010, sediment and surface water samples will be collected at five locations (ST010HA001 through ST010HA005) to support ecological risk assessment. Grab sediment samples will be collected in accordance with sampling techniques described in SOP-30 *(Sediment Sampling)*. Grab surface water samples will be collected in accordance with SOP-31 (*Surface Water Sampling*). Sample details are provided in Table D5-ST010. Sediment and surface water samples will be analyzed for GRO, DRO, RRO, VOCs, PAHs, and field parameters (surface water samples). Specific laboratory methods, bottle requirements, field preservation requirements, and sample volumes for these analyses are provided in Worksheet #19. Field sample QA/QC protocols will be performed in accordance with Worksheet #20. Air monitoring procedures will follow SOP-04 (*Organic Vapor Monitoring and Air Monitoring*). Sample handling procedures will follow SOP-18 (*Packing and Shipping of Environmental Samples*) and SOP-19 (*Sample Handling, Identification, and Custody*).

Surveying

Sample locations will be surveyed for horizontal position and vertical elevation in accordance with SOP-16 *(Global Positioning Satellite System [GPS] Surveying)*.

The geophysical survey subcontractor will provide survey coordinates for the survey grid and subsurface features identified during the survey, if performed.

Equipment Calibration

Field water quality measurement equipment will be calibrated in accordance with SOP-12 *(Field Water Quality Measurements and Calibration)*.

Equipment Decontamination

Non-dedicated equipment will be decontaminated in accordance with SOP-14 (*Equipment Decontamination Procedures)*.

Investigation-derived Waste Management

Investigation-derived waste will be handled in accordance with Appendix B *(Project-specific Waste Management Plan)*.

3.11.3 Sample Identification

Samples will be named in accordance with SOP-19 *(Sample Handling, Identification, and Custody)*.

3.11.4 Post-investigation Activities

During the field investigation, meetings or conference calls will be held to discuss the investigation results, provide a suggested path forward, and reach consensus on additional work needs. After the fieldwork related to this investigation has been performed, the results will be documented in a data evaluation report, and the anticipated path for further action or site closure will be identified.

3.12 Works Cited

Alaska Department of Environmental Conservation (ADEC). 2010. *Draft Field Sampling Guidance*. May.

CH2M HILL. 2010. *Draft Preliminary Assessment Report for the Former Galena Forward Operating Location, Galena, Alaska*. Prepared for the Air Force Center for Engineering and the Environment (AFCEE). April.

Earth Tech. May 2007. *Final Remedial Investigation/Feasibility Study Report for United States Air Force Sites at Galena Airport and Campion Air Station*.

Earth Tech, Inc. May 2004. *Final Work Plan for Remedial Investigation/Feasibility Study at Galena Airport and Campion Air Station, Alaska*.

Radian Corporation. October 2002. *Revised Draft Installation Restoration Program Environmental Monitoring Report #7, Volume 1 for United States Air Force Galena Airport, Alaska*. Prepared for the United States Air Force, 611th Civil Engineer Squadron/Environmental Restoration Element (CES/CEVR), Elmendorf Air Force Base, Alaska.

Radian Corporation. March 1996. *Final Remedial Investigation Report, Galena Airport and Campion Air Station.*

TABLE D1-ST010

Statistical Summary of Soil Analytical Results[a]

Analyte Name	Result Units	Minimum ND	Maximum ND	Number of Samples	Number of Locations	Frequency of Detection	Location of Minimum Detection	Minimum Detection Result	Location of Maximum Detection	Maximum Detection Result	Extent Soil Screening Level	Number of Exceedances
Explosives												
2,4-Dinitrotoluene	mg/kg	0.0206	9.16	7	6							
2,6-Dinitrotoluene	mg/kg	0.0164	19.8	7	6							
Nitrobenzene	mg/kg	0.0129	7.39	7	6							
Hydrocarbons												
C10-C25 DRO	mg/kg	4	5	10	6	80.0%	SE-MW-04 (8/4/1995)	0.25	SE-SB-01 (8/1/1995)	18000	250	2
C6-C10 GRO	mg/kg			20	12	100.0%	SE-SB-01 (8/1/1995)	0.022	SE-SB-01 (8/1/1995)	540	140	5
Metals												
Lead	mg/kg			7	6	100.0%	SE-MW-03 (8/3/1995)	2.9	SE-SB-01 (8/1/1995)	51.3	40	1
SVOCs												
2,4,5-Trichlorophenol	mg/kg	0.0157	7.28	7	6							
2,4,6-Trichlorophenol	mg/kg	0.0112	16.2	7	6							
2,4-Dichlorophenol	mg/kg	0.0125	5.65	7	6							
2,4-Dimethylphenol	mg/kg	0.0277	15.5	7	6							
2,4-Dinitrophenol	mg/kg	0.047	30.1	7	6							
2-Chloronaphthalene	mg/kg	0.0284	12.2	7	6							
2-Chlorophenol	mg/kg	0.0105	10.7	7	6							
2-Methylnaphthalene	mg/kg	0.02	0.263	7	6	14.3%	SE-SB-03 (8/1/1995)	0.0336	SE-SB-03 (8/1/1995)	0.0336	6.1	0
2-Methylphenol	mg/kg	0.00787	7.06	7	6							
2-Nitroaniline	mg/kg	0.0187	4.13	7	6							
2-Nitrophenol	mg/kg	0.0265	11.8	7	6							
3,3-Dichlorobenzidine	mg/kg	0.0226	7.18	7	6							
3-Nitroaniline	mg/kg	0.00936	9.99	7	6							
4,6-Dinitro-2-Methylphenol	mg/kg	0.0125	92.3	7	6							
4-Bromophenyl Phenyl Ether	mg/kg	0.0145	8.66	7	6							
4-Chloro-3-Methylphenol	mg/kg	0.0224	4.34	7	6							
4-Chloroaniline	mg/kg	0.0252	9.97	6	5							
4-Chlorophenyl Phenyl Ether	mg/kg	0.00704	15.1	7	6							
4-Methylphenol	mg/kg	0.0168	9.57	7	6							
4-Nitroaniline	mg/kg	0.0207	9.83	7	6							
4-Nitrophenol	mg/kg	0.0404	10.2	7	6							
Acenaphthene	mg/kg	0.0227	10.3	7	6							
Acenaphthylene	mg/kg	0.0167	9.26	7	6							
Anthracene	mg/kg	0.0218	12.5	7	6							
Benzo(a)anthracene	mg/kg	0.0213	13.7	7	6							
Benzo(a)pyrene	mg/kg	0.0175	14.3	10	6	10.0%	SE-SB-01 (8/1/1995)	0.554	SE-SB-01 (8/1/1995)	0.554	0.049	1
Benzo(b)fluoranthene	mg/kg	0.0195	12.9	10	6							
Benzo(g,h,i)perylene	mg/kg	0.0218	0.34	7	6	14.3%	SE-SB-01 (8/1/1995)	0.212	SE-SB-01 (8/1/1995)	0.212	140	0
Benzo(k)fluoranthene	mg/kg	0.0618	22.4	7	6							
Benzoic acid	mg/kg	0.223	144	7	6							
Benzyl alcohol	mg/kg	0.0214	28.5	7	6							

Statistical Summary of Soil Analytical Results[a]

Analyte Name	Result Units	Minimum ND	Maximum ND	Number of Samples	Number of Locations	Frequency of Detection	Location of Minimum Detection	Minimum Detection Result	Location of Maximum Detection	Maximum Detection Result	Extent Soil Screening Level	Number of Exceedances
bis(2-Chloroethyl)ether	mg/kg	0.0142	9.59	7	6							
bis(2-Chloroisopropyl)ether	mg/kg	0.0136	9.59	7	6							
bis(2-Ethylhexyl)phthalate	mg/kg	0.0134	16.3	7	6	28.6%	SE-MW-03 (8/3/1995)	0.047	SE-MW-04 (8/4/1995)	0.285	13	0
Butyl Benzyl Phthalate	mg/kg	0.00787	15.1	7	6							
Chrysene	mg/kg	0.0284	14.7	7	6							
Dibenz(a,h)anthracene	mg/kg	0.0258	18.4	10	6	10.0%	SE-SB-01 (8/1/1995)	0.0947	SE-SB-01 (8/1/1995)	0.0947	0.049	1
Dibenzofuran	mg/kg	0.0169	14.8	7	6							
Diethyl phthalate	mg/kg	0.0156	10.2	7	6							
Dimethyl phthalate	mg/kg	0.0116	8.73	7	6							
di-n-Butyl Phthalate	mg/kg	0.0121	14	7	6							
di-n-Octyl Phthalate	mg/kg	0.0118	21.5	7	6							
Fluoranthene	mg/kg	0.0227	14.4	7	6							
Fluorene	mg/kg	0.0201	15.3	7	6							
Hexachlorobenzene	mg/kg	0.0268	10.4	7	6							
Hexachlorocyclopentadiene	mg/kg	0.114	130	7	6							
Hexachloroethane	mg/kg	0.0288	9.04	7	6							
Indeno(1,2,3-cd)pyrene	mg/kg	0.0298	16.7	7	6							
Isophorone	mg/kg	0.0127	8.83	7	6							
N-Nitrosodiphenylamine	mg/kg	0.0366	10.8	4	4							
N-Nitrosodipropylamine	mg/kg	0.0199	6.06	7	6							
Pentachlorophenol	mg/kg	0.0119	4.13	7	6							
Phenanthrene	mg/kg	0.0151	17.2	7	6							
Phenol	mg/kg	0.0265	9.59	7	6							
Pyrene	mg/kg	0.0216	17.6	7	6							
VOCs												
1,1,1-Trichloroethane	mg/kg	0.000788	0.00104	7	6							
1,1,2,2-Tetrachloroethane	mg/kg	0.001126	0.001486	7	6							
1,1,2-Trichloroethane	mg/kg	0.000813	0.001073	7	6							
1,1-Dichloroethane	mg/kg	0.001068	0.00141	7	6							
1,1-Dichloroethene	mg/kg	0.00075	0.00099	7	6							
1,2,4-Trichlorobenzene	mg/kg	0.0152	0.167	7	6							
1,2,4-Trimethylbenzene	mg/kg	0	0	13	8	46.2%	OAP-MC273 (9/1/2008)	0.949	OAP-MC274 (9/1/2008)	24.8	4.9	4
1,2-Dichlorobenzene	mg/kg	0.00912	10.4	7	6							
1,2-Dichloroethane	mg/kg	0.000775	0.001022	7	6							
1,2-Dichloropropane	mg/kg	0.000605	0.000799	7	6							
1,3,5-Trimethylbenzene	mg/kg	0	0	13	8	69.2%	OAP-MC272 (9/1/2008)	0.786	OAP-MC274 (9/1/2008)	6.18	4.2	2
1,3-Dichlorobenzene	mg/kg	0.0102	10.3	7	6							
1,4-Dichlorobenzene	mg/kg	0.0122	14.7	7	6							
2-Butanone (MEK)	mg/kg	0.003762	0.004965	7	6							
2-Chloroethyl Vinyl Ether	mg/kg	0.000868	0.001145	7	6							
2-Hexanone	mg/kg	0.002579	0.003403	7	6							

TABLE D1-ST010

Statistical Summary of Soil Analytical Results[a]

Analyte Name	Result Units	Minimum ND	Maximum ND	Number of Samples	Number of Locations	Frequency of Detection	Location of Minimum Detection	Minimum Detection Result	Location of Maximum Detection	Maximum Detection Result	Extent Soil Screening Level	Number of Exceedances
4-Methyl-2-Pentanone (MIBK)	mg/kg	0.00229	0.003022	7	6							
Acetone	mg/kg	0	0.006324	20	14	10.0%	SE-MW-04 (8/4/1995)	0.00315	OAP-MC273 (9/1/2008)	1.48	88	0
Benzene	mg/kg	0	0.00204	23	14	4.3%	SE-SB-01 (8/1/1995)	0.336	SE-SB-01 (8/1/1995)	0.336	0.025	1
bis(2-Chloroethoxy)methane	mg/kg	0.00912	9.59	7	6							
Bromodichloromethane	mg/kg	0.000775	0.001023	7	6							
Bromoform	mg/kg	0.000623	0.000822	7	6							
Bromomethane	mg/kg	0.001058	0.001397	7	6							
Carbon Disulfide	mg/kg	0.000749	0.000988	7	6							
Carbon Tetrachloride	mg/kg	0.000846	0.001116	7	6							
Chlorobenzene	mg/kg	0.000769	0.001015	7	6							
Chloroethane	mg/kg	0.001068	0.00141	7	6							
Chloroform	mg/kg	0.001039	0.001371	7	6							
Chloromethane	mg/kg	0.000937	0.001237	7	6							
cis-1,2-Dichloroethene	mg/kg	0.000893	0.001178	7	6							
cis-1,3-Dichloropropene	mg/kg	0.000637	0.000841	7	6							
Dibromochloromethane	mg/kg	0.000795	0.001049	7	6							
Ethylbenzene	mg/kg	0	0.00154	23	14	26.1%	OAP-MC273 (9/1/2008)	0.165	SE-SB-01 (8/1/1995)	6.81	6.9	0
Hexachlorobutadiene	mg/kg	0.0205	10.6	7	6							
Isopropylbenzene	mg/kg	0	0	13	8	30.8%	OAP-MC274 (9/1/2008)	0.795	OAP-MC274 (9/1/2008)	2.29	6.2	0
m- & p-Xylene	mg/kg	0	0.002032	20	14	30.0%	OAP-MC272 (9/1/2008)	0.448	OAP-MC274 (9/1/2008)	20.5		0
Methylene Chloride	mg/kg			7	6	100.0%	SE-MW-04 (8/4/1995)	0.000422	SE-MW-02 (8/3/1995)	0.00111	0.016	0
Naphthalene	mg/kg	0	0.34	20	14	40.0%	OAP-MC272 (9/1/2008)	5.84	SE-SB-01 (8/1/1995)	109	2.8	8
n-Butylbenzene	mg/kg	0	0	13	8	38.5%	OAP-MC272 (9/1/2008)	0.331	OAP-MC274 (9/1/2008)	7.35	4.2	1
n-Propylbenzene	mg/kg	0	0	13	8	46.2%	OAP-MC273 (9/1/2008)	0.195	OAP-MC274 (9/1/2008)	3.63	4.2	0
o-Xylene	mg/kg	0	0.000918	20	14	15.0%	OAP-MC273 (9/1/2008)	4.59	OAP-MC274 (9/1/2008)	5.69	380	0
p-Isopropyltoluene	mg/kg	0	0	13	8	53.8%	OAP-MC271 (9/1/2008)	0.51	OAP-MC274 (9/1/2008)	3.63		0
sec-Butylbenzene	mg/kg	0	0	13	8	30.8%	OAP-MC274 (9/1/2008)	0.857	OAP-MC274 (9/1/2008)	2.04	4.1	0
Styrene	mg/kg	0.000867	0.001144	7	6							
Tetrachloroethene (PCE)	mg/kg	0.00102	0.001346	7	6							
Toluene	mg/kg	0	0.00176	23	14	17.4%	OAP-MC272 (9/1/2008)	0.283	SE-SB-01 (8/1/1995)	4.54	6.5	0
trans-1,2-Dichloroethene	mg/kg	0.001078	0.001422	7	6							
trans-1,3-Dichloropropene	mg/kg	0.000599	0.000791	7	6							
Trichloroethene (TCE)	mg/kg	0.000744	0.000982	7	6							
Vinyl Acetate	mg/kg	0.000861	0.001137	7	6							
Vinyl Chloride	mg/kg	0.000719	0.000949	7	6							
Xylenes, Total	mg/kg	0.00159	0.00159	3	3	66.7%	SE-SB-03 (8/1/1995)	0.01892	SE-SB-01 (8/1/1995)	43	6.3	1

[a]May not include all historical site data, only includes available validated electronic (data provided in Air Force database). See text for discussion of other historical data project screening level exceedances, if applicable

Notes:

ND = non detect

mg/kg = Milligrams per Kilogram

TABLE D2-ST010

Statistical Summary of Groundwater Analytical Results[a]

Analyte Name	Result Units	Minimum ND	Maximum ND	Number of Samples	Number of Locations	Frequency of Detection	Location of Minimum Detection	Minimum Detection Result	Location of Maximum Detection	Maximum Detection Result	Groundwater Screening Level	Number of Exceedances
Explosives												
2,4-Dinitrotoluene	µg/L	0.986	1.04	4	4							
2,6-Dinitrotoluene	µg/L	0.803	0.847	4	4							
Nitrobenzene	µg/L	0.754	0.795	4	4							
Hydrocarbons												
C10-C25 DRO	µg/L	20	100	43	18	88.4%	SE-GP-04 (8/1/1995)	30	SE-MW-01 (10/13/2000)	46000	150	22
C25-C36 RRO	µg/L	30	30	9	6	88.9%	SE-MW-01 (6/22/2001)	36	SE-MW-01 (6/18/2000)	400	110	3
C6-C10 GRO	µg/L	0	21	24	6	41.7%	SE-MW-04 (8/9/1995)	12	SE-MW-01 (5/1/1998)	1300	220	3
Metals												
Aluminum	mg/L			4	4	100.0%	SE-MW-03 (8/8/1995)	0.00093	SE-MW-01 (8/9/1995)	0.0904	b	c
Antimony	mg/L			4	4	100.0%	SE-MW-01 (8/9/1995)	0.00583	SE-MW-03 (8/8/1995)	0.103	b	c
Arsenic	mg/L	0.001	0.001	5	5	80.0%	SE-MW-02 (8/8/1995)	0.0104	SE-MW-03 (8/8/1995)	0.0326	b	c
Barium	mg/L			4	4	100.0%	SE-MW-04 (8/9/1995)	0.148	SE-MW-01 (8/9/1995)	0.632	b	c
Beryllium	mg/L	0.001	0.001	4	4	75.0%	SE-MW-03 (8/8/1995)	0.00025	SE-MW-01 (8/9/1995)	0.00394	b	c
Cadmium	mg/L	0.0002	0.0002	6	4	83.3%	SE-MW-02 (10/7/2001)	0.0002	SE-MW-01 (8/9/1995)	0.00851	b	c
Calcium	mg/L			4	4	100.0%	SE-MW-03 (8/8/1995)	87.6	SE-MW-01 (8/9/1995)	217	b	c
Chromium	mg/L			4	4	100.0%	SE-MW-04 (8/9/1995)	0.00152	SE-MW-01 (8/9/1995)	0.0022	b	c
Cobalt	mg/L	0.004	0.004	4	4	75.0%	SE-MW-02 (8/8/1995)	0.00176	SE-MW-01 (8/9/1995)	0.0228	b	c
Copper	mg/L	0.009	0.009	4	4	75.0%	SE-MW-02 (8/8/1995), SE-MW-04 (8/9/1995)	0.00255	SE-MW-03 (8/8/1995)	0.00714	b	c
Iron	mg/L			15	6	100.0%	SE-MW-03 (8/8/1995)	0.0107	SE-MW-01 (8/9/1995)	22	b	c
Lead	mg/L	0.001	0.001	6	4	66.7%	SE-MW-03 (8/8/1995)	0.00019	SE-MW-04 (8/9/1995)	0.00118	b	c
Magnesium	mg/L			4	4	100.0%	SE-MW-03 (8/8/1995)	9.68	SE-MW-01 (8/9/1995)	63.7	b	c
Manganese	mg/L			15	6	100.0%	SE-MW-03 (10/4/2001)	0.004	SE-MW-01 (8/9/1995)	31.2	b	c
Molybdenum	mg/L			4	4	100.0%	SE-MW-03 (8/8/1995)	0.00652	SE-MW-02 (8/8/1995)	0.0173	b	c
Nickel	mg/L			4	4	100.0%	SE-MW-03 (8/8/1995)	0.00697	SE-MW-01 (8/9/1995)	0.0418	b	c
Potassium	mg/L			4	4	100.0%	SE-MW-04 (8/9/1995)	2.74	SE-MW-03 (8/8/1995)	9.05	b	c
Selenium	mg/L	0.001	0.005	26	6	30.8%	SE-MW-02 (10/1/1998), SE-MW-03 (10/1/1998)	0.001	SE-MW-01 (8/9/1995)	0.142	b	c
Silver	mg/L			4	4	100.0%	SE-MW-03 (8/8/1995)	0.00082	SE-MW-01 (8/9/1995)	0.0043	b	c
Sodium	mg/L			4	4	100.0%	SE-MW-03 (8/8/1995)	1.43	SE-MW-01 (8/9/1995)	11.4	b	c
Thallium	mg/L	0.001	0.001	26	6	23.1%	SE-MW-01 (6/13/1999)	0.001	SE-MW-04 (8/9/1995)	0.204	b	c
Vanadium	mg/L			4	4	100.0%	SE-MW-03 (8/8/1995)	0.00003	SE-MW-01 (8/9/1995)	0.00346	b	c
Zinc	mg/L	0.004	0.004	4	4	75.0%	SE-MW-04 (8/9/1995)	0.00078	SE-MW-01 (8/9/1995)	0.00463	b	c
SVOCs												
2,4,5-Trichlorophenol	µg/L	0.812	0.854	4	4							
2,4,6-Trichlorophenol	µg/L	0.976	1.03	4	4							
2,4-Dichlorophenol	µg/L	1.092	1.151	4	4							
2,4-Dimethylphenol	µg/L	1.025	1.08	4	4							
2,4-Dinitrophenol	µg/L	2.586	2.726	4	4							
2-Chloronaphthalene	µg/L	0.794	0.837	4	4							
2-Chlorophenol	µg/L	0.797	0.84	4	4							
2-Methylnaphthalene	µg/L	0.934	0.971	4	4	25.0%	SE-MW-01 (8/9/1995)	98.9	SE-MW-01 (8/9/1995)	98.9	15	1
2-Methylphenol	µg/L	0.698	0.736	4	4							
2-Nitroaniline	µg/L	0.949	1.001	4	4							
2-Nitrophenol	µg/L	0.882	0.93	4	4							
3- & 4-Methylphenol	µg/L	0.751	0.791	4	4							
3,3-Dichlorobenzidine	µg/L	0.646	0.681	4	4							
3-Nitroaniline	µg/L	1.073	1.131	4	4							
4,6-Dinitro-2-Methylphenol	µg/L	1.053	1.111	4	4							
4-Bromophenyl Phenyl Ether	µg/L	6.062	6.391	4	4							
4-Chloro-3-Methylphenol	µg/L	0.864	0.911	4	4							
4-Chloroaniline	µg/L	0.958	1.01	4	4							

TABLE D2-ST010

Statistical Summary of Groundwater Analytical Results[a]

Analyte Name	Result Units	Minimum ND	Maximum ND	Number of Samples	Number of Locations	Frequency of Detection	Location of Minimum Detection	Minimum Detection Result	Location of Maximum Detection	Maximum Detection Result	Groundwater Screening Level	Number of Exceedances
4-Chlorophenyl Phenyl Ether	µg/L	0.986	1.04	4	4							
4-Nitroaniline	µg/L	1.197	1.262	4	4							
4-Nitrophenol	µg/L	1.36	1.434	4	4							
Acenaphthene	µg/L	1.02	1.06	4	4	25.0%	SE-MW-01 (8/9/1995)	0.792	SE-MW-01 (8/9/1995)	0.792	5.8	0
Acenaphthylene	µg/L	0.878	0.926	4	4							
Anthracene	µg/L	0.749	0.789	4	4							
Benzo(a)anthracene	µg/L	0.76	0.802	4	4							
Benzo(a)pyrene	µg/L	0.583	0.615	4	4							
Benzo(b)fluoranthene	µg/L	0.696	0.734	4	4							
Benzo(g,h,i)perylene	µg/L	0.674	0.711	4	4							
Benzo(k)fluoranthene	µg/L	1.159	1.222	4	4							
Benzoic acid	µg/L	6.014	6.34	4	4							
Benzyl alcohol	µg/L	0.641	0.675	4	4	25.0%	SE-MW-04 (8/9/1995)	3.13	SE-MW-04 (8/9/1995)	3.13	370	0
bis(2-Chloroethyl)ether	µg/L	0.855	0.902	4	4							
bis(2-Chloroisopropyl)ether	µg/L	0.889	0.937	4	4							
bis(2-Ethylhexyl)phthalate	µg/L	0.729	0.768	4	4							
Butyl Benzyl Phthalate	µg/L	0.958	1.01	4	4							
Chrysene	µg/L	0.856	0.903	4	4							
Dibenz(a,h)anthracene	µg/L	0.646	0.681	4	4							
Dibenzofuran	µg/L	0.863	0.91	4	4							
Diethyl phthalate	µg/L	0.958	1.01	4	4							
Dimethyl phthalate	µg/L	0.806	0.85	4	4							
di-n-Butyl Phthalate	µg/L	0.883	0.918	4	4	25.0%	SE-MW-01 (8/9/1995)	0.476	SE-MW-01 (8/9/1995)	0.476	3	0
di-n-Octyl Phthalate	µg/L	0.397	0.418	4	4							
Diphenyl Amine	µg/L	0.958	1.01	4	4							
Fluoranthene	µg/L	0.749	0.789	4	4							
Fluorene	µg/L	1.049	1.09	4	4	25.0%	SE-MW-01 (8/9/1995)	1.29	SE-MW-01 (8/9/1995)	1.29	3	0
Hexachlorobenzene	µg/L	0.654	0.69	4	4							
Hexachlorocyclopentadiene	µg/L	2.251	2.373	4	4							
Hexachloroethane	µg/L	1.015	1.07	4	4							
Indeno(1,2,3-cd)pyrene	µg/L	0.55	0.579	4	4							
Isophorone	µg/L	0.768	0.81	4	4							
N-Nitrosodipropylamine	µg/L	0.894	0.942	4	4							
Pentachlorophenol	µg/L	0.832	0.877	4	4							
Phenanthrene	µg/L	0.943	0.98	4	4	25.0%	SE-MW-01 (8/9/1995)	0.739	SE-MW-01 (8/9/1995)	0.739	0.4	1
Phenol	µg/L	0.415	0.437	4	4							
Pyrene	µg/L	0.856	0.903	4	4							
VOCs												
1,1,1,2-Tetrachloroethane	µg/L	0.111	0.399	28	6							
1,1,1-Trichloroethane	µg/L	0.111	0.36	28	6							
1,1,2,2-Tetrachloroethane	µg/L	0.071	0.212	28	6							
1,1,2-Trichloroethane	µg/L	0.068	0.21	28	6							
1,1-Dichloroethane	µg/L	0.065	0.194	28	6							
1,1-Dichloroethene	µg/L	0.12	0.636	24	6							
1,1-Dichloropropene	µg/L	0.13	0.21	24	6							
1,2,3-Trichlorobenzene	µg/L	0.044	0.12	24	6							
1,2,3-Trichloropropane	µg/L	0.09	0.271	28	6							
1,2,4-Trichlorobenzene	µg/L	0.1	1.05	28	6							
1,2,4-Trimethylbenzene	µg/L	0	0.31	36	9	19.4%	SE-MW-01 (10/29/1999)	0.16	SE-MW-01 (10/13/2000)	42	180	0
1,2-Dibromo-3-Chloropropane	µg/L	0.47	1	24	6							
1,2-Dichlorobenzene	µg/L	0.085	0.546	28	6	10.7%	SE-MW-04 (10/1/1998), SE-MW-02 (10/1/1998)	0.15	SE-MW-01 (10/1/1998)	0.18	0.7	0
1,2-Dichloroethane	µg/L	0.048	0.22	28	6	21.4%	SE-MW-02 (6/21/2001)	0.1	SE-MW-04 (8/9/1995)	4.55	0.5	2

TABLE D2-ST010

Statistical Summary of Groundwater Analytical Results[a]

Analyte Name	Result Units	Minimum ND	Maximum ND	Number of Samples	Number of Locations	Frequency of Detection	Location of Minimum Detection	Minimum Detection Result	Location of Maximum Detection	Maximum Detection Result	Groundwater Screening Level	Number of Exceedances
1,2-Dichloropropane	µg/L	0.044	0.14	28	6							
1,3,5-Trimethylbenzene	µg/L	0	0.31	36	9	13.9%	SE-MW-01 (10/1/1998)	0.22	SE-MW-01 (10/13/2000)	30	180	0
1,3-Dichlorobenzene	µg/L	0.11	0.684	28	6							
1,3-Dichloropropane	µg/L	0.076	0.14	24	6							
1,4-Dichlorobenzene	µg/L	0.087	0.648	28	6	14.3%	SE-MW-03 (10/1/1998)	0.14	SE-MW-02 (10/1/1998)	0.24	7.5	0
1-Chlorohexane	µg/L	0.118	1.071	28	6	3.6%	SE-MW-01 (10/1/1998)	0.27	SE-MW-01 (10/1/1998)	0.27		0
2,2-Dichloropropane	µg/L	0.18	0.23	24	6							
2-Butanone (MEK)	µg/L	1.29	3.87	4	4							
2-Chloroethyl Vinyl Ether	µg/L	0.131	0.393	4	4							
2-Chlorotoluene	µg/L	0.111	0.16	24	6							
2-Hexanone	µg/L	0.347	1.041	4	4							
4-Chlorotoluene	µg/L	0.089	0.14	24	6							
4-Methyl-2-Pentanone (MIBK)	µg/L	0.316	0.948	4	4							
Acetone	µg/L			4	4	100.0%	SE-MW-03 (8/8/1995)	2.59	SE-MW-04 (8/9/1995)	13.5	1500	0
Benzene	µg/L	0	0.226	46	9	34.8%	SE-MW-04 (8/9/1995)	0.0505	SE-MW-01 (8/9/1995)	58.1	0.5	12
bis(2-Chloroethoxy)methane	µg/L	0.967	1.02	4	4							
Bromobenzene	µg/L	0.098	0.501	28	6							
Bromochloromethane	µg/L	0.126	0.18	24	6							
Bromodichloromethane	µg/L	0.046	0.16	28	6							
Bromoform	µg/L	0.1	0.408	28	6							
Bromomethane	µg/L	0.05	0.22	28	6							
Carbon Disulfide	µg/L	0.19	0.57	4	4							
Carbon Tetrachloride	µg/L	0.13	0.393	28	6							
Chlorobenzene	µg/L	0.094	0.615	28	6							
Chloroethane	µg/L	0.09	0.269	28	6	7.1%	SE-MW-04 (8/9/1995)	0.0589	SE-MW-01 (10/1/1998)	0.36	29	0
Chloroform	µg/L	0.096	0.296	28	6	7.1%	SE-MW-04 (8/9/1995)	0.0388	SE-MW-02 (10/11/2000)	1.3	1.8	0
Chloromethane	µg/L	0.089	0.268	24	6	8.3%	SE-MW-03 (10/1/1998)	0.19	SE-MW-01 (10/1/1998)	0.41	6.6	0
cis-1,2-Dichloroethene	µg/L	0	0.312	30	7							
cis-1,3-Dichloropropene	µg/L	0.081	0.348	28	6							
Dibromochloromethane	µg/L	0.082	0.261	28	6							
Dibromomethane	µg/L	0.098	0.1	28	6	14.3%	SE-MW-02 (8/8/1995)	0.189	SE-MW-01 (8/9/1995)	0.559	37	0
Ethylbenzene	µg/L	0	0.31	46	9	21.7%	SE-MW-04 (8/9/1995)	0.0438	SE-MW-01 (8/9/1995)	21.6	7.3	2
Ethylene Dibromide (EDB)	µg/L	0.073	0.18	24	6							
Hexachlorobutadiene	µg/L	0.13	1.524	28	6							
Isopropylbenzene	µg/L	0.068	0.18	24	6	25.0%	SE-MW-01 (10/29/1999)	0.81	SE-MW-01 (10/1/1998)	3	370	0
m- & p-Xylene	µg/L	0	0.62	36	9	27.8%	SE-MW-04 (8/9/1995)	0.172	SE-MW-01 (8/9/1995)	28.4		0
Methylene Chloride	µg/L	0.193	0.27	24	6	29.2%	SE-MW-03 (8/8/1995)	0.18	SE-MW-01 (8/9/1995)	1	0.5	2
Naphthalene	µg/L	0.072	1.05	28	6	14.3%	SE-MW-01 (10/29/1999)	2.1	SE-MW-01 (8/9/1995)	80.7	1.1	4
n-Butylbenzene	µg/L	0.13	0.23	24	6	8.3%	SE-MW-01 (10/1/1998)	0.23	SE-MW-01 (10/29/1999)	0.61	37	0
n-Propylbenzene	µg/L	0.097	0.2	24	6	25.0%	SE-MW-01 (6/13/1999)	0.23	SE-MW-01 (10/13/2000)	1.4	37	0
o-Xylene	µg/L	0	0.31	36	9	16.7%	SE-MW-02 (10/11/2000)	0.1	SE-MW-01 (8/9/1995)	10.8	120	0
p-Isopropyltoluene	µg/L	0.13	0.15	24	6	16.7%	SE-MW-01 (10/1/1998)	0.32	SE-MW-01 (10/13/2000)	5.5		0
sec-Butylbenzene	µg/L	0.13	0.14	24	6	25.0%	SE-MW-01 (6/13/1999)	0.48	SE-MW-01 (10/13/2000)	1.4	37	0
Styrene	µg/L	0.095	0.552	28	6							
tert-Butylbenzene	µg/L	0.13	0.14	24	6	4.2%	SE-MW-01 (10/13/2000)	0.51	SE-MW-01 (10/13/2000)	0.51	37	0
Tetrachloroethene (PCE)	µg/L	0	0.42	30	7	10.0%	SE-MW-04 (8/9/1995)	0.0289	SE-MW-01 (8/9/1995)	1.74	0.5	1
Toluene	µg/L	0	0.31	46	9	47.8%	SE-MW-06 (6/17/2001), SE-MW-01 (6/18/2000), SE-MW-03 (10/11/2000)	0.1	SE-MW-01 (8/9/1995)	6	2	3
trans-1,2-Dichloroethene	µg/L	0	0.636	30	7							
trans-1,3-Dichloropropene	µg/L	0.072	0.217	28	6							
Trichloroethene (TCE)	µg/L	0	0.2	30	7	10.0%	SE-MW-04 (8/9/1995)	0.0208	SE-MW-01 (8/9/1995)	0.206	0.5	0
Trichlorofluoromethane	µg/L	0.1	0.3	24	6							

TABLE D2-ST010

Statistical Summary of Groundwater Analytical Results[a]

Analyte Name	Result Units	Minimum ND	Maximum ND	Number of Samples	Number of Locations	Frequency of Detection	Location of Minimum Detection	Minimum Detection Result	Location of Maximum Detection	Maximum Detection Result	Groundwater Screening Level	Number of Exceedances
Vinyl Acetate	µg/L	0.381	1.143	4	4							
Vinyl Chloride	µg/L	0	0.23	30	7							
Xylenes, Total	µg/L	0	0.19	10	4	40.0%	SE-MW-01 (9/1/1997)	0.4	SE-MW-01 (5/1/1998)	28.2	13	1
General Chemistry												
Chloride	mg/L	0.05	0.05	44	8	97.7%	SE-MW-01 (5/28/2004)	1.14	SE-MW-03 (6/12/1999)	6.4		0
Nitrogen, Nitrate-Nitrite	mg/L	0	0.1	42	8	69.0%	SE-MW-04 (6/18/2001)	0.02	SE-MW-06 (10/23/2004)	18.9		0
Nitrogen, Nitrite (as N)	mg/L			1	1	100.0%	SE-MW-01 (10/25/2004)	0.374	SE-MW-01 (10/25/2004)	0.374		0
Sulfate	mg/L	0.07	0.07	44	8	97.7%	SE-MW-01 (5/28/2004)	1.23	SE-MW-06 (10/23/2004)	163		0

[a]May not include all historical site data, only includes available validated electronic (data provided in Air Force database). See text for discussion of other historical data project screening level exceedances, if applicable

[b] Screening levels for metals have not been been finalized for this Work Plan; therefore, no screening levels are shown in this statistical summary table. Appendix C and Tables in Worksheet 15 identify ADEC Table B1/C Method 2 Cleanup levels and 1/10th of ADEC Table B1/C Method 2 Cleanup Levels as screening levels for the purpose of identifying if LOD/LOQ are sufficient for this project.

[c] Screening levels for metals have not been finalized for this Work Plan; therefore, number of exceedances was not calculated. Metals will be analzed at sites based on site use in accordance with steps outlined in Figure 15-1.

Notes:
ND = non detect
mg/L = Milligrams per liter
µg/L = Micrograms per liter

TABLE D3-ST010

Historical Samples Exceeding Groundwater Screening Levels[a,b]

	Location	OAP-MC263		OAP-MC264	OAP-MC265	OAP-MC270		OAP-MC271	OAP-MC272		OAP-MC273		OAP-MC274		SE-MW-02	SE-MW-03
	Sample ID	OAP-MC263	OAP-MC263	OAP-MC264	OAP-MC265	OAP-MC270	OAP-MC270	OAP-MC271	OAP-MC272	OAP-MC272	OAP-MC273	OAP-MC273	OAP-MC274	OAP-MC274	G95-SE-MW-02-02	G95-SE-MW-03-02
	Sample Depth (feet bgs)	5	7	3	5	3	7	6	10	5	12	6	11	7	10 - 12	10 - 12
	Sample Date	9/1/2008	9/1/2008	9/1/2008	9/1/2008	9/1/2008	9/1/2008	9/1/2008	9/1/2008	9/1/2008	9/1/2008	9/1/2008	9/1/2008	9/1/2008	8/3/1995	8/3/1995
Analyte	**Screening Level**															
Hydrocarbons (mg/kg)																
C10-C25 DRO	250	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	5 UJ	4 UJ
C6-C10 GRO	140	- -	- -	- -	**287**	**173**	**1.87**	**9.21**	**139**	**56.5**	**124**	**35.1**	**211**	**70.8**	**0.48 J**	**0.15 J**
Metals (mg/kg)																
Lead	40	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	**3.36**	**2.9**
SVOCs (mg/kg)																
Benzo(a)pyrene	0.049	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	0.0217 U	0.0175 U
Dibenz(a,h)anthracene	0.049	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	0.032 U	0.0258 U
VOCs (mg/kg)																
1,2,4-Trimethylbenzene	4.9	0 U	0 U	0 U	**1.32**	0 U	0 U	0 U	**17.1**	0 U	**14.5**	**0.949**	**24.8**	**10.8**	- -	- -
1,3,5-Trimethylbenzene	4.2	0 U	0 U	0 U	**3.22**	**1.57**	0 U	**0.904**	**4.21**	**0.786**	**3.62**	**1.43**	**6.18**	**2.77**	- -	- -
Benzene	0.025	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0.001071 U	0.00086 U
n-Butylbenzene	4.2	0 U	0 U	0 U	0 U	0 U	0 U	0 U	**2.99**	**0.331**	**2.47**	0 U	**7.35**	**1.57**	- -	- -
Naphthalene	2.8	0 U	0 U	0 U	0 U	0 U	0 U	**24.4**	**48.2**	**5.84**	**39.6**	**13.4**	**44.1**	**37.1**	0.0227 U	0.0183 U
Xylenes, Total	6.3	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Calculated Total Xylenes	6.3	U	U	U	U	U	U	U	**19.07**	**0.448**	**15.09**	**0.785**	**26.19**	**2.26**	0.001391 U	0.0011175 U

TABLE D3-ST010

Historical Samples Exceeding Groundwater Screening Levels[a,b]

	Location	SE-MW-04		SE-SB-01		SE-SB-02		SE-SB-03	
	Sample ID	G95-SE-SS-01	G95-SE-MW-04-02	G95-SE-SB-01-01	G95-SE-SB-01-02	G95-SE-SB-02-01	G95-SE-SB-02-02	G95-SE-SB-03-01	G95-SE-SB-03-02
	Sample Depth (feet bgs)	0 - 0.5	10 - 12	0 - 0.5	6 - 7.5	0 - 0.5	6 - 7.5	0 - 0.5	5 - 6.5
	Sample Date	8/4/1995	8/4/1995	8/1/1995	8/1/1995	8/1/1995	8/1/1995	8/1/1995	8/1/1995
Analyte	**Screening Level**								
Hydrocarbons (mg/kg)									
C10-C25 DRO	250	**150**	**0.25 J**	**250**	**18000**	**120**	**26**	**110**	**7100**
C6-C10 GRO	140	**0.12 J**	**0.12 J**	**0.022 J**	**540**	**0.055 J**	**0.13 J**	**0.028 J**	**150**
Metals (mg/kg)									
Lead	40	**8.9**	**3.28**	**51.3**	- -	**12.9**	- -	**36.1**	- -
SVOCs (mg/kg)									
Benzo(a)pyrene	0.049	0.0232 U	0.0182 U	**0.554**	14.3 U	0.24 U	0.0217 U	0.025 U	0.0715 U
Dibenz(a,h)anthracene	0.049	0.0342 U	0.0268 U	**0.0947**	18.4 U	0.307 U	0.0278 U	0.032 U	0.0916 U
VOCs (mg/kg)									
1,2,4-Trimethylbenzene	4.9	- -	- -	- -	- -	- -	- -	- -	- -
1,3,5-Trimethylbenzene	4.2	- -	- -	- -	- -	- -	- -	- -	- -
Benzene	0.025	0.001135 U	0.000894 U	0.000909 U	**0.336**	0.000993 U	0.00089 U	0.001013 U	0.00204 U
n-Butylbenzene	4.2	- -	- -	- -	- -	- -	- -	- -	- -
Naphthalene	2.8	0.0243 U	0.0191 U	**109**	- -	0.34 U	- -	0.34 U	- -
Xylenes, Total	6.3	- -	- -	- -	**43**	- -	0.00159 U	- -	**0.01892**
Calculated Total Xylenes	6.3	0.001475 U	0.0011615 U	0.001181 U	- -	0.0012905 U	- -	0.001316 U	- -

[a]May not include all historical site data, only includes available validated electronic (data provided in Air Force database). See text for discussion of other historical data project screening level exceedances, if applicable

Notes:
-- = Not Analyzed
Calculated total xylenes is equal to the sum of m-xylene, o-xylene, and p-xylene
J = The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
UJ = The analyte was below the reported sample quantitation limit. However, the reported value is approximate.
mg/kg = Milligrams per Kilogram
bgs = below ground surface
Bold indicates the analyte was detected
Shading indicates the result exceeded screening criteria
Field Duplicates are included in this table.

TABLE D4-ST010

Historical Samples Exceeding Groundwater Screening Levels[a,b]

	Location	OAP-GW261		SE-GP-01	SE-GP-02	SE-GP-03	SE-GP-04	SE-GP-05	SE-GP-06	SE-GP-07	SE-GP-08	SE-GP-09
	Sample ID	OAP-GW261	OAP-GW261	G95-SE-GP-01	G95-SE-GP-02	G95-SE-GP-03	G95-SE-GP-04	G95-SE-GP-05	G95-SE-GP-06	G95-SE-GP-07	G95-SE-GP-08	G95-SE-GP-09
	Sample Depth (feet bgs)	16 - 16	23 - 23	UNK	UNK	UNK	UNK	UNK	UNK	UNK	UNK	UNK
	Sample Date	9/1/2008	9/1/2008	8/1/1995	8/1/1995	8/1/1995	8/1/1995	8/1/1995	8/1/1995	8/1/1995	8/1/1995	8/1/1995
	Depth to Water (feet bgs)	--	--	--	--	--	--	--	--	--	--	--
	Measurement Date	--	--	--	--	--	--	--	--	--	--	--
Analyte	**Screening Level**											
Hydrocarbons (ug/l)												
C10-C25 DRO	150	- -	- -	**9200**	**940**	**200**	**30 J**	100 U	**80 J**	**130**	**130**	**80 J**
C6-C10 GRO	220	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
C25-C36 RRO	110	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
SVOCs (ug/l)												
2-Methylnaphthalene	15	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Phenanthrene	0.4	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
VOCs (ug/l)												
1,2-Dichloroethane	0.5	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Benzene	0.5	0 U	0 U	- -	- -	- -	- -	- -	- -	- -	- -	- -
Ethylbenzene	7.3	0 U	0 U	- -	- -	- -	- -	- -	- -	- -	- -	- -
Methylene Chloride	0.5	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Naphthalene	1.1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Tetrachloroethene (PCE)	0.5	0 U	0 U	- -	- -	- -	- -	- -	- -	- -	- -	- -
Toluene	2	0 U	0 U	- -	- -	- -	- -	- -	- -	- -	- -	- -
Xylenes, Total	13	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Calculated Total Xylenes	13	U	U	- -	- -	- -	- -	- -	- -	- -	- -	- -

TABLE D4-ST010

Historical Samples Exceeding Groundwater Screening Levels[a,b]

	Location	SE-GP-10	SE-MW-01									
	Sample ID	G95-SE-GP-10	G95-SE-MW-01-01	SE-MW-010697	SE-MW-010997	SE-MW-010598	SE-MW-01/007	G99-SE-MW-01-02	G99-SE-MW-01-022	G99-SE-MW01-033	G00-SE-MW01-04	G00-SE-MW01-044
	Sample Depth (feet bgs)	UNK	5.2 - 24.8	5.2 - 24.8	5.2 - 24.8	5.2 - 24.8	5.2 - 24.8	5.2 - 24.8	5.2 - 24.8	5.2 - 24.8	5.2 - 24.8	5.2 - 24.8
	Sample Date	8/1/1995	8/9/1995	6/1/1997	9/1/1997	5/1/1998	10/1/1998	6/13/1999	6/13/1999	10/29/1999	6/18/2000	6/18/2000
	Depth to Water (feet bgs)	--	--	--	--	--	18.99	17.43	--	20.83	10.84	--
	Measurement Date	--	--	--	--	--	10/1/1998	6/1/1999	--	10/1/1999	6/1/2000	--
Analyte	**Screening Level**											
Hydrocarbons (ug/l)												
C10-C25 DRO	150	**60 J**	**9300**	**2840**	**3200**	- -	- -	- -	- -	- -	**330 B**	- -
C6-C10 GRO	220	- -	**790**	**206**	0 U	**1300**	- -	- -	- -	- -	**130**	- -
C25-C36 RRO	110	- -	- -	- -	- -	- -	- -	- -	- -	- -	**400 J**	- -
SVOCs (ug/l)												
2-Methylnaphthalene	15	- -	**98.9**	- -	- -	- -	- -	- -	- -	- -	- -	- -
Phenanthrene	0.4	- -	**0.739 J**	- -	- -	- -	- -	- -	- -	- -	- -	- -
VOCs (ug/l)												
1,2-Dichloroethane	0.5	- -	**1.07**	- -	- -	- -	0.16 U	- -	**0.32 J**	0.22 U	**0.2 J**	- -
Benzene	0.5	- -	**58.1**	**22**	0 U	**8.2**	**34**	- -	**17**	**22**	**9.8 B**	- -
Ethylbenzene	7.3	- -	**21.6**	0 U	**0.2 J**	**16.4**	**2.5**	**0.74**	- -	0.16 U	**0.6**	- -
Methylene Chloride	0.5	- -	**1 J**	- -	- -	- -	- -	**0.81 J**	- -	0.27 U	0.2 U	- -
Naphthalene	1.1	- -	**80.7**	- -	- -	- -	**3.1**	- -	0.13 U	**2.1**	0.072 U	- -
Tetrachloroethene (PCE)	0.5	- -	**1.74 B**	- -	- -	- -	0.18 U	- -	0.18 U	0.12 U	0.11 U	- -
Toluene	2	- -	**6**	0 U	0 U	**3.8**	**0.23 J**	- -	**0.18 J**	**0.27 J**	**0.1 J**	- -
Xylenes, Total	13	- -	- -	**2**	**0.4 J**	**28.2 J**	**0.73 J**	- -	- -	- -	- -	- -
Calculated Total Xylenes	13	- -	**39.2**	- -	- -	- -	- -	- -	0.245 U	**1.04**	**0.54**	- -

TABLE D4-ST010

Historical Samples Exceeding Groundwater Screening Levels[a,b]

	Location											
	Sample ID	G00-SE-MW01-05	G00-SE-MW01-55	G01-SEMW01-1601	G01-SEMW-01-1701	GST010-SEMW01-W052804	GST010-SEMW01-W102504	G95-SE-MW-02-01	SE-MW-020697	SE-MW-020997	SE-MW-020598	SE-MW-02/009
	Sample Depth (feet bgs)	5.2 - 24.8	5.2 - 24.8	5.2 - 24.8	5.2 - 24.8	5.2 - 24.8	5.2 - 24.8	4.5 - 24.7	4.5 - 24.7	4.5 - 24.7	4.5 - 24.7	4.5 - 24.7
	Sample Date	10/13/2000	10/13/2000	6/22/2001	10/9/2001	5/28/2004	10/25/2004	8/8/1995	6/1/1997	9/1/1997	5/1/1998	10/1/1998
	Depth to Water (feet bgs)	19.83	--	7.96	18.49	16.44	23.62	--	--	--	--	16.66
	Measurement Date	10/1/2000	--	6/17/2001	10/1/2001	5/28/2004	10/19/2004	--	--	--	--	10/101998
Analyte	**Screening Level**											
Hydrocarbons (ug/l)												
C10-C25 DRO	150	- -	**46000 J**	**780**	- -	**2320**	**20800 J**	**770**	**280**	**116**	**620**	- -
C6-C10 GRO	220	- -	**460**	**58**	- -	- -	- -	**21 J**	0 U	0 U	0 U	- -
C25-C36 RRO	110	- -	- -	**36 J**	- -	- -	- -	- -	- -	- -	- -	- -
SVOCs (ug/l)												
2-Methylnaphthalene	15	- -	- -	- -	- -	- -	- -	0.962 U	- -	- -	- -	- -
Phenanthrene	0.4	- -	- -	- -	- -	- -	- -	0.971 U	- -	- -	- -	- -
VOCs (ug/l)												
1,2-Dichloroethane	0.5	- -	0.114 U	**0.4 J**	- -	- -	- -	0.048 U	- -	- -	- -	0.16 U
Benzene	0.5	**46**	- -	**5.6**	- -	**1.09**	**0.79 J**	0.122 U	0 U	0 U	0 U	0.12 U
Ethylbenzene	7.3	- -	**3.9**	**0.3 J**	- -	0.31 U	**1.36 J**	0.246 U	0 U	0 U	0 U	0.17 U
Methylene Chloride	0.5	- -	0.2 U	0.2 U	- -	- -	- -	**0.423 J**	- -	- -	- -	- -
Naphthalene	1.1	- -	**80 J**	0.072 U	- -	- -	- -	1.04 U	- -	- -	- -	0.13 U
Tetrachloroethene (PCE)	0.5	- -	0.11 U	0.11 U	- -	- -	- -	**0.0346 J**	- -	- -	- -	0.18 U
Toluene	2	- -	**0.53 J**	**0.2 J**	- -	**0.87 F**	**5.56**	**0.195**	0 U	0 U	0 U	0.1 U
Xylenes, Total	13	- -	- -	- -	- -	- -	- -	- -	0 U	0 U	0 U	0.19 UJ
Calculated Total Xylenes	13	- -	**31.8**	**0.3395**	- -	**3.05**	**2.33**	0.3805 U	- -	- -	- -	- -

TABLE D4-ST010

Historical Samples Exceeding Groundwater Screening Levels[a,b]

	Location	SE-MW-02						SE-MW-03				
	Sample ID	G99-SE-MW-02-02	G00-SE-MW02-04	G00-SE-MW02-51	G00-SE-MW02-05	G01-SEMW02-1601	G01-SEMW02-5701	G95-SE-MW-03-01	SE-MW-03/010	G99-SE-MW-03-02	G99-SEMW03-03	G00-SE-MW03-04
	Sample Depth (feet bgs)	4.5 - 24.7	4.5 - 24.7	4.5 - 24.7	4.5 - 24.7	4.5 - 24.7	4.5 - 24.7	5 - 24.6	5 - 24.6	5 - 24.6	5 - 24.6	5 - 24.6
	Sample Date	6/13/1999	6/16/2000	10/11/2000	10/12/2000	6/21/2001	10/7/2001	8/8/1995	10/1/1998	6/12/1999	10/27/1999	6/17/2000
	Depth to Water (feet bgs)	15.56	5.86	--	--	3.94	--	--	16.68	15.88	23.71	7.13
	Measurement Date	6/1/1999	6/1/2000	--	--	6/17/2001	--	--	10/1/1998	6/1/1999	10/1/1999	6/1/2000
Analyte	**Screening Level**											
Hydrocarbons (ug/l)												
C10-C25 DRO	150	- -	**120 B**	**45 J**	**190**	**150**	- -	**710**	- -	- -	- -	20 U
C6-C10 GRO	220	- -	20 U	21 U	21 U	20.6 U	- -	**15 J**	- -	- -	- -	20 U
C25-C36 RRO	110	- -	**300 J**	- -	- -	**39 J**	- -	- -	- -	- -	- -	30 U
SVOCs (ug/l)												
2-Methylnaphthalene	15	- -	- -	- -	- -	- -	- -	0.971 U	- -	- -	- -	- -
Phenanthrene	0.4	- -	- -	- -	- -	- -	- -	0.98 U	- -	- -	- -	- -
VOCs (ug/l)												
1,2-Dichloroethane	0.5	0.13 U	0.114 U	0.114 U	0.114 U	**0.1 J**	- -	0.048 U	0.16 U	0.13 U	0.22 U	0.114 U
Benzene	0.5	0.22 U	0.105 U	**0.2 J**	0.105 U	0.105 U	- -	0.122 U	0.12 U	0.22 U	0.13 U	0.105 U
Ethylbenzene	7.3	0.17 U	0.098 U	0.098 U	0.098 U	0.098 U	- -	0.246 U	0.17 U	0.17 U	0.16 U	0.098 U
Methylene Chloride	0.5	0.27 U	0.193 U	0.2 U	0.2 U	0.2 U	- -	**0.18 J**	- -	0.27 U	0.27 U	0.193 U
Naphthalene	1.1	0.13 U	0.072 U	0.072 U	0.072 U	0.072 U	- -	1.05 U	0.13 U	0.13 U	0.16 U	0.072 U
Tetrachloroethene (PCE)	0.5	0.18 U	0.11 U	0.11 U	0.11 U	0.11 U	- -	0.42 U	0.18 U	0.18 U	0.12 U	0.11 U
Toluene	2	0.09 U	0.1 U	**0.54 J**	**0.19 J**	**0.3 J**	- -	**0.202**	0.1 U	0.09 U	0.09 U	0.1 U
Xylenes, Total	13	- -	- -	- -	- -	- -	- -	- -	0.19 UJ	- -	- -	- -
Calculated Total Xylenes	13	0.245 U	0.135 U	**0.33**	0.133 U	0.1325 U	- -	0.3805 U	- -	0.245 U	0.245 U	0.135 U

TABLE D4-ST010

Historical Samples Exceeding Groundwater Screening Levels[a,b]

Location				SE-MW-04						SE-MW-05	
Sample ID		G00-SE-MW03-05	G01-SEMW03-1601	G95-SE-MW-04-01	SE-MW-04/008	G99-SE-MW-04-02	G00-SE-MW04-05	G01-SEMW04-1601	G01-SEMW05-1601	G01-SEMW05-1701	GST010-SEMW05-W052604
Sample Depth (feet bgs)		5 - 24.6	5 - 24.6	5 - 24.7	5 - 24.7	5 - 24.7	5 - 24.7	5 - 24.7	5 - 34.49	5 - 34.49	5 - 34.49
Sample Date		10/11/2000	6/18/2001	8/9/1995	10/1/1998	6/12/1999	10/11/2000	6/18/2001	6/17/2001	10/3/2001	5/26/2004
Depth to Water (feet bgs)		14.16	3.76	--	16.21	14.21	13.57	2.36	2.72	--	12.86
Measurement Date		10/1/2000	6/17/2001	--	10/1/1998	6/1/1999	10/1/2000	6/17/2001	6/17/2001	--	5/23/2004
Analyte	**Screening Level**										
Hydrocarbons (ug/l)											
C10-C25 DRO	150	**43 J**	**220**	**330**	- -	- -	**52 J**	**390**	**41 J**	- -	**278 B**
C6-C10 GRO	220	21 U	20.6 U	**12 J**	- -	- -	21 U	**21 J**	20.6 U	- -	- -
C25-C36 RRO	110	- -	**73 J**	- -	- -	- -	- -	**43 J**	**68 J**	- -	- -
SVOCs (ug/l)											
2-Methylnaphthalene	15	- -	- -	0.934 U	- -	- -	- -	- -	- -	- -	- -
Phenanthrene	0.4	- -	- -	0.943 U	- -	- -	- -	- -	- -	- -	- -
VOCs (ug/l)											
1,2-Dichloroethane	0.5	0.114 U	0.114 U	**4.55**	0.16 U	0.13 U	0.114 U	0.114 U	0.114 U	- -	- -
Benzene	0.5	0.105 U	0.105 U	**0.0505 J**	0.12 U	0.22 U	0.105 U	0.105 U	0.105 U	- -	0.12 U
Ethylbenzene	7.3	0.098 U	0.098 U	**0.0438 J**	0.17 U	0.17 U	0.098 U	0.098 U	0.098 U	- -	0.31 U
Methylene Chloride	0.5	0.2 U	**0.2 J**	**0.291 J**	- -	0.27 U	0.2 U	0.2 U	**0.3 J**	- -	- -
Naphthalene	1.1	0.072 U	0.072 U	1.01 U	0.13 U	0.13 U	0.072 U	0.072 U	0.072 U	- -	- -
Tetrachloroethene (PCE)	0.5	0.11 U	0.11 U	**0.0289 J**	0.18 U	0.18 U	0.11 U	0.11 U	0.11 U	- -	- -
Toluene	2	**0.1 J**	**0.2 J**	**0.256**	0.1 U	0.09 U	**0.12 J**	**0.2 J**	**0.3 J**	- -	0.31 U
Xylenes, Total	13	- -	- -	- -	0.19 UJ	- -	- -	- -	- -	- -	- -
Calculated Total Xylenes	13	0.133 U	0.1325 U	**0.2755**	- -	0.245 U	0.133 U	0.1325 U	0.1325 U	- -	0.93 U

TABLE D4-ST010

Historical Samples Exceeding Groundwater Screening Levels[a,b]

	Location			SE-MW-06			SE-MW-07
	Sample ID	GST010-SEMW05-W052604D	GST010-SEMW05-W102304	G01-SEMW06-1601	GST010-SEMW06-W052604	GST010-SEMW06-W102304	GST010-SEMW07-W061104	GST010-SEMW07-W061104D
	Sample Depth (feet bgs)	5 - 34.49	5 - 34.49	5 - 34.71	5 - 34.71	5 - 34.71	12.85 - 32.85	12.85 - 32.85
	Sample Date	5/26/2004	10/23/2004	6/17/2001	5/26/2004	10/23/2004	6/11/2004	6/11/2004
	Depth to Water (feet bgs)	--	24.09	11.44	19.45	26.2	4.82	--
	Measurement Date	--	10/19/2004	6/17/2001	5/23/2004	10/19/2004	6/11/2004	--
Analyte	**Screening Level**							
Hydrocarbons (ug/l)								
C10-C25 DRO	150	**267 B**	**61.4 J**	**130**	**140 B**	73.2 U	**156 B**	**150 B**
C6-C10 GRO	220	- -	- -	20.6 U	- -	- -	- -	- -
C25-C36 RRO	110	- -	- -	**140 J**	- -	- -	- -	- -
SVOCs (ug/l)								
2-Methylnaphthalene	15	- -	- -	- -	- -	- -	- -	- -
Phenanthrene	0.4	- -	- -	- -	- -	- -	- -	- -
VOCs (ug/l)								
1,2-Dichloroethane	0.5	- -	- -	0.114 U	- -	- -	- -	- -
Benzene	0.5	0.12 U	**0.53 BJ**	0.105 U	0.12 U	**0.46 BJ**	0.12 U	0.12 U
Ethylbenzene	7.3	0.31 U	0.241 U	0.098 U	0.31 U	0.241 U	0.31 U	0.31 U
Methylene Chloride	0.5	- -	- -	0.2 U	- -	- -	- -	- -
Naphthalene	1.1	- -	- -	0.072 U	- -	- -	- -	- -
Tetrachloroethene (PCE)	0.5	- -	- -	0.11 U	- -	- -	- -	- -
Toluene	2	0.31 U	0.202 U	**0.1 J**	0.31 U	0.202 U	0.31 U	0.31 U
Xylenes, Total	13	- -	- -	- -	- -	- -	- -	- -
Calculated Total Xylenes	13	- -	0.3415 U	0.1325 U	0.465 U	0.3415 U	- -	0.93 U

TABLE D4-ST010

Historical Samples Exceeding Groundwater Screening Levels[a,b]

	Location		SE-MW-08	
	Sample ID	GST010-SEMW07-W102304	GST010-SEMW08-W061104	GST010-SEMW08-W102404
	Sample Depth (feet bgs)	12.85 - 32.85	12.85 - 32.85	12.85 - 32.85
	Sample Date	10/23/2004	6/11/2004	10/24/2004
	Depth to Water (feet bgs)	22.2	10.09	26.12
	Measurement Date	10919/2004	6/11/2004	10/19/2004
Analyte	**Screening Level**			
Hydrocarbons (ug/l)				
C10-C25 DRO	150	73.2 U	**160 B**	73.2 U
C6-C10 GRO	220	- -	- -	- -
C25-C36 RRO	110	- -	- -	- -
SVOCs (ug/l)				
2-Methylnaphthalene	15	- -	- -	- -
Phenanthrene	0.4	- -	- -	- -
VOCs (ug/l)				
1,2-Dichloroethane	0.5	- -	- -	- -
Benzene	0.5	**0.226 J**	0.12 U	0.226 U
Ethylbenzene	7.3	0.241 U	0.31 U	0.241 U
Methylene Chloride	0.5	- -	- -	- -
Naphthalene	1.1	- -	- -	- -
Tetrachloroethene (PCE)	0.5	- -	- -	- -
Toluene	2	0.202 U	0.31 U	0.202 U
Xylenes, Total	13	- -	- -	- -
Calculated Total Xylenes	13	0.3415 U	0.465 U	**0.5715**

TABLE D4-ST010

Historical Samples Exceeding Groundwater Screening Levels[a,b]

[a]May not include all historical site data, only includes available validated electronic (data provided in Air Force database). See text for discussion of other historical data project screening level exceedances, if applicable

[b]Metals are not included in this table.

Notes:
-- = Not Analyzed
Calculated total xylenes is equal to the sum of m-xylene, o-xylene, and p-xylene
B = The analyte was detected in the associated method and/or calibration blank.
J = The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
R = The sample results are rejected due to serious deficiencies in the ability to analyze the sample and to meet the quality control criteria. The presence or absence of the analyte cannot be verified.
U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
UJ = The analyte was below the reported sample quantitation limit. However, the reported value is approximate.
mg/L = Milligrams per Liter
ug/L= Micrograms per Liter
bgs = below ground surface
Bold indicates the analyte was detected
Shading indicates the result exceeded screening criteria

Field Duplicates are included in this table.

UKN = unknown

TABLE D5-ST010

Proposed Sampling Locations and Rationale

Sampling Location	Field Sample ID	Easting (meters)	Northing (meters)	Media	Sample Type	Sample Depth (feet bgs)	GRO[a] AK101	DRO[a] AK102	RRO[a] AK103	BTEX and Screening for TCE and PCE[a] SW8021B	VOCs[b] SW8260B	PAHs[b] SW8270CSIM	Field Parameters[c]	Rationale
ST010GP001	ST010GP001_SO_00-02	TBD	TBD	Surface Soil	N	0 - 2	1	1	1	1	1			Determine the lateral and vertical extent of soil contamination along the drainage ditch at the western boundary of ERP Site ST010 through the entire thickness of the variably saturated zone.
	ST010GP901_SO_00-02			Surface Soil	FD	0 - 2	1	1	1	1	1			
	ST010GP001_SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1			
	ST010GP001_SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1			
	ST010GP001_SO_14-16			Subsurface Soil	N	~15 (Mid-point of Variably Saturated Zone)	1	1	1	1	1			
	ST010GP001_SO_14-16SPT			Subsurface Soil	SPT	~15 (Mid-point of Variably Saturated Zone)	1	1	1					
	ST010GP001_SO_24-26			Subsurface Soil	N	~25 (Bottom of Variably Saturated Zone)	1	1	1	1	1			
	ST010GP001_SO_34-36			Subsurface Soil	N	~35 (Permanently Saturated Zone)	1	1	1	1	1			
	ST010GP001_GW_05-15			Groundwater	N	~5 (Top of Water Table)	1	1	1		1	1	1	Determine the lateral and vertical extent of groundwater contamination along the drainage ditch at the western boundary of ERP Site ST010.
	ST010GP001_GW_35-40			Groundwater	N	~35 (Permanently Saturated Zone)	1	1	1		1		1	
	ST010GP901_GW_35-40			Groundwater	FD	~35 (Permanently Saturated Zone)	1	1	1		1			
ST010GP002	ST010GP002_SO_00-02	TBD	TBD	Surface Soil	N	0 - 2	1	1	1	1	1			Determine the lateral and vertical extent of soil contamination along the drainage ditch in the western portion of ERP Site ST010 through the entire thickness of the variably saturated zone. Soil samples will serve as a step-out to the north of historical location SE SB-03.
	ST010GP002_SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1			
	ST010GP902_SO_05-07			Subsurface Soil	FD	5 - 7	1	1	1	1	1			
	ST010GP002_SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1			
	ST010GP002_SO_14-16			Subsurface Soil	N	~15 (Mid-point of Variably Saturated Zone)	1	1	1	1	1			
	ST010GP002_SO_24-26			Subsurface Soil	N	~25 (Bottom of Variably Saturated Zone)	1	1	1	1	1			
	ST010GP002_SO_24-26SPT			Subsurface Soil	SPT	~25 (Bottom of Variably Saturated Zone)	1	1	1					
	ST010GP002_SO_34-36			Subsurface Soil	N	~35 (Permanently Saturated Zone)	1	1	1	1	1			
	ST010GP002_GW_05-15			Groundwater	N	~5 (Top of Water Table)	1	1	1		1	1	1	Determine the lateral and vertical extent of groundwater contamination along the drainage ditch in the western portion of ERP Site ST010. Samples will serve as a step-out to the north of historical location SE-SB-03.
	ST010GP002_GW_35-40			Groundwater	N	~35 (Permanently Saturated Zone)	1	1	1		1		1	
ST010GP003	ST010GP003_SO_00-02	TBD	TBD	Surface Soil	N	0 - 2	1	1	1	1	1			Determine the vertical extent of impacts of soil contamination in the western portion of ERP Site ST010 through the entire thickness of the variably saturated zone. Samples will be co-located with historical sample location SE-SB-03 to evaluate attentuation of contamination.
	ST010GP003_SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1	1		
	ST010GP003_SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1	1		
	ST010GP903_SO_10-12			Subsurface Soil	FD	10 - 12	1	1	1	1	1	1		
	ST010GP003_SO_14-16			Subsurface Soil	N	~15 (Mid-point of Variably Saturated Zone)	1	1	1	1	1			
	ST010GP003_SO_24-26			Subsurface Soil	N	~25 (Bottom of Variably Saturated Zone)	1	1	1	1	1			
	ST010GP003_SO_34-36			Subsurface Soil	N	~35 (Permanently Saturated Zone)	1	1	1	1	1			
	ST010GP003_SO_34-36SPT			Subsurface Soil	SPT	~35 (Permanently Saturated Zone)	1	1	1					

Sampling Location	Field Sample ID	Easting (meters)	Northing (meters)	Media	Sample Type	Sample Depth (feet bgs)	GRO[a] AK101	DRO[a] AK102	RRO[a] AK103	BTEX and Screening for TCE and PCE[a] SW8021B	VOCs[b] SW8260B	PAHs[b] SW8270CSIM	Field Parameters[c]	Rationale
	ST010GP003_GW_05-15			Groundwater	N	~5 (Top of Water Table)	1	1	1		1	1	1	Determine the lateral and vertical extent of groundwater contamination in the western portion of ERP Site ST010. Samples will be collected at historical sample location SE-SB-03, no groundwater samples were collected at this location in 1995.
	ST010GP003_GW_35-40			Groundwater	N	~35 (Permanently Saturated Zone)	1	1	1		1		1	
ST010GP004	ST010GP004_SO_00-02	TBD	TBD	Surface Soil	N	0 - 2	1	1	1	1	1			Determine the lateral and vertical extent of soil contamination along the drainage ditch in the western portion of ERP Site ST010 through the entire thickness of the variably saturated zone. Soil samples will serve as a step-out to the south of historical location SE-SB-03.
	ST010GP004_SO_00-02MS			Surface Soil	MS	0 - 2	1	1	1	1	1			
	ST010GP004_SO_00-02SD			Surface Soil	MSD	0 - 2	1	1	1	1	1			
	ST010GP004_SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1			
	ST010GP004_SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1			
	ST010GP004_SO_14-16			Subsurface Soil	N	~15 (Mid-point of Variably Saturated Zone)	1	1	1	1	1			
	ST010GP904_SO_14-16			Subsurface Soil	FD	~15 (Mid-point of Variably Saturated Zone)	1	1	1	1	1			
	ST010GP004_SO_24-26			Subsurface Soil	N	~25 (Bottom of Variably Saturated Zone)	1	1	1	1	1			
	ST010GP004_SO_34-36			Subsurface Soil	N	~35 (Permanently Saturated Zone)	1	1	1	1	1			
ST010GP005	ST010GP005_SO_00-02	TBD	TBD	Surface Soil	N	0 - 2	1	1	1	1	1			Determine the lateral and vertical extent of contamination along the drainage ditch in the central portion of ERP Site ST010 through the entire thickness of the variably saturated zone. Samples will serve as a step-out to the east of historical sample locaiton SE-SE-03
	ST010GP005_SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1			
	ST010GP005_SO_05-07MS			Subsurface Soil	MS	5 - 7	1	1	1	1	1			
	ST010GP005_SO_05-07SD			Subsurface Soil	MSD	5 - 7	1	1	1	1	1			
	ST010GP005_SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1			
	ST010GP005_SO_14-16			Subsurface Soil	N	~15 (Mid-point of Variably Saturated Zone)	1	1	1	1	1			
	ST010GP005_SO_24-26			Subsurface Soil	N	~25 (Bottom of Variably Saturated Zone)	1	1	1	1	1			
	ST010GP905_SO_24-26			Subsurface Soil	FD	~25 (Bottom of Variably Saturated Zone)	1	1	1	1	1			
	ST010GP005_SO_34-36			Subsurface Soil	N	~35 (Permanently Saturated Zone)	1	1	1	1	1	1		
	ST010GP005_GW_05-15			Groundwater	N	~5 (Top of Water Table)	1	1	1		1	1	1	Determine the lateral and vertical extent of groundwater contamination along the drainage ditch in the central portion of ERP Site ST010. Samples will serve as a step-out to the east of historical location SE-SB-03.
	ST010GP005_GW_05-15MS			Groundwater	MS	~5 (Top of Water Table)	1	1	1		1	1		
	ST010GP005_GW_05-15SD			Groundwater	MSD	~5 (Top of Water Table)	1	1	1		1	1		
	ST010GP005_GW_35-40			Groundwater	N	~35 (Permanently Saturated Zone)	1	1	1		1		1	
ST010GP006	ST010GP006_SO_00-02	TBD	TBD	Surface Soil	N	0 - 2	1	1	1	1	1	1		Determine the lateral and vertical extent of soil contamination to the east of the former pipeline failure and surface release source area through the entire thickness of the variably saturated zone.
	ST010GP006_SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1	1		
	ST010GP006_SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1	1		
	ST010GP006_SO_10-12MS			Subsurface Soil	MS	10 - 12	1	1	1	1	1	1		
	ST010GP006_SO_10-12SD			Subsurface Soil	MSD	10 - 12	1	1	1	1	1	1		
	ST010GP006_SO_14-16			Subsurface Soil	N	~15 (Mid-point of Variably Saturated Zone)	1	1	1	1	1			
	ST010GP006_SO_24-26			Subsurface Soil	N	~25 (Bottom of Variably Saturated Zone)	1	1	1	1	1			
	ST010GP006_SO_34-36			Subsurface Soil	N	~35 (Permanently Saturated Zone)	1	1	1	1	1			
	ST010GP906_SO_34-36			Subsurface Soil	FD	~35 (Permanently Saturated Zone)	1	1	1	1	1			

TABLE D5-ST010

Proposed Sampling Locations and Rationale

Sampling Location	Field Sample ID	Easting (meters)	Northing (meters)	Media	Sample Type	Sample Depth (feet bgs)	GRO[a] AK101	DRO[a] AK102	RRO[a] AK103	BTEX and Screening for TCE and PCE[a] SW8021B	VOCs[b] SW8260B	PAHs[b] SW8270CSIM	Field Parameters[c]	Rationale
ST010GP007	ST010GP007_SO_00-02	TBD	TBD	Surface Soil	N	0 - 2	1	1	1	1	1	1		
	ST010GP007_SO_00-02SPT			Surface Soil	SPT	0 - 2	1	1	1					
	ST010GP007_SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1	1		
	ST010GP007_SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1	1		Determine the lateral and vertical extent of soil contamination to the north of the former pipeline failure and surface release source area through the entire thickness of the variably saturated zone.
	ST010GP007_SO_14-16			Subsurface Soil	N	~15 (Mid-point of Variably Saturated Zone)	1	1	1	1	1			
	ST010GP007_SO_24-26			Subsurface Soil	N	~25 (Bottom of Variably Saturated Zone)	1	1	1	1	1			
	ST010GP007_SO_34-36			Subsurface Soil	N	~35 (Permanently Saturated Zone)	1	1	1	1	1			
	ST010GP007_GW_05-15			Groundwater	N	~5 (Top of Water Table)	1	1	1		1	1	1	Determine the lateral and vertical extent of groundwater contamination to the north of the former pipeline failure and surface release source area.
	ST010GP007_GW_35-40			Groundwater	N	~35 (Permanently Saturated Zone)	1	1	1		1		1	
ST010GP008	ST010GP008_SO_00-02	TBD	TBD	Surface Soil	N	0 - 2	1	1	1	1	1	1		
	ST010GP008_SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1	1		
	ST010GP008_SO_05-07SPT			Subsurface Soil	SPT	5 - 7	1	1	1					
	ST010GP008_SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1	1		Determine the lateral and vertical extent of soil contamination to the west of the former pipeline failure and surface release source area through the entire thickness of the variably saturated zone.
	ST010GP008_SO_14-16			Subsurface Soil	N	~15 (Mid-point of Variably Saturated Zone)	1	1	1	1	1			
	ST010GP008_SO_24-26			Subsurface Soil	N	~25 (Bottom of Variably Saturated Zone)	1	1	1	1	1			
	ST010GP008_SO_34-36			Subsurface Soil	N	~35 (Permanently Saturated Zone)	1	1	1	1	1			
	ST010GP008_GW_05-15			Groundwater	N	~5 (Top of Water Table)	1	1	1		1	1	1	Determine the lateral and vertical extent of groundwater contamination to the west of the former pipeline failure and surface release source area.
	ST010GP008_GW_35-40			Groundwater	N	~35 (Permanently Saturated Zone)	1	1	1		1		1	
ST010GP009	ST010GP009_SO_00-02	TBD	TBD	Surface Soil	N	0 - 2	1	1	1	1	1			
	ST010GP009_SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1			
	ST010GP009_SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1			
	ST010GP009_SO_10-12SPT			Subsurface Soil	SPT	10 - 12	1	1	1					Determine the lateral and vertical extent of soil contamination to the south of the former pipeline failure and surface release source area through the entire thickness of the variably saturated zone.
	ST010GP009_SO_14-16			Subsurface Soil	N	~15 (Mid-point of Variably Saturated Zone)	1	1	1	1	1			
	ST010GP009_SO_24-26			Subsurface Soil	N	~25 (Bottom of Variably Saturated Zone)	1	1	1	1	1			
	ST010GP009_SO_34-36			Subsurface Soil	N	~35 (Permanently Saturated Zone)	1	1	1	1	1			
ST010HP001	ST010HP001-GW_35-40	TBD	TBD	Groundwater	N	35 - 40	1	1	1		1	1	1	Determine if groundwater contamination is present along the southern portion of the site at depths below the screened intervals of existing wells.
	ST010HP901-GW_35-40			Groundwater	FD	35 - 40	1	1	1		1	1		
	ST010HP001-GW_50-55			Groundwater	N	50 - 55	1	1	1		1		1	
	ST010HP001-GW_65-70			Groundwater	N	65 - 70	1	1	1		1		1	
ST010HP002	ST010HP002-GW_35-40	TBD	TBD	Groundwater	N	35 - 40	1	1	1		1	1	1	Determine if groundwater contamination is present along the southern portion of the site at depths below the screened intervals of existing wells.
	ST010HP002-GW_50-55			Groundwater	N	50 - 55	1	1	1		1		1	
	ST010HP002-GW_65-70			Groundwater	N	65 - 70	1	1	1		1		1	
ST010HA001	ST010HA001-SE_00-01	TBD	TBD	Sediment	N	0 - 1	1	1	1		1	1		Determine the potential impacts to ecological receptors within the swale where wetlands have been identified.
	ST010HA901-SE_00-01			Sediment	FD	0 - 1	1	1	1		1	1		
	ST010HA001-SW			Surface Water	N	NA	1	1	1		1	1	1	

TABLE D5-ST010

Proposed Sampling Locations and Rationale

Sampling Location	Field Sample ID	Easting (meters)	Northing (meters)	Media	Sample Type	Sample Depth (feet bgs)	GRO[a] AK101	DRO[a] AK102	RRO[a] AK103	BTEX and Screening for TCE and PCE[a] SW8021B	VOCs[b] SW8260B	PAHs[b] SW8270CSIM	Field Parameters[c]	Rationale
ST010HA002	ST010HA002-SE_00-01	TBD	TBD	Sediment	N	0 - 1	1	1	1		1			
	ST010HA002-SW			Surface Water	N	NA	1	1	1		1		1	Determine the potential impacts to ecological receptors within the swale where wetlands have been identified.
	ST010HA002-SWMS			Surface Water	MS	NA	1	1	1		1			
	ST010HA002-SWSD			Surface Water	MSD	NA	1	1	1		1			
ST010HA003	ST010HA003-SE_00-01	TBD	TBD	Sediment	N	0 - 1	1	1	1		1			
	ST010HA003-SW			Surface Water	N	NA	1	1	1		1		1	Determine the potential impacts to ecological receptors within the swale where wetlands have been identified.
	ST010HA903-SW			Surface Water	FD	NA	1	1	1		1			
ST010HA004	ST010HA004-SE_00-01	TBD	TBD	Sediment	N	0 - 1	1	1	1		1			
	ST010HA004-SW			Surface Water	N	NA	1	1	1		1		1	Determine the potential impacts to ecological receptors within the swale where wetlands have been identified.
ST010HA005	ST010HA005-SE_00-01	TBD	TBD	Sediment	N	0 - 1	1	1	1		1	1		
	ST010HA005-SE_00-01MS			Sediment	MS	0 - 1	1	1	1		1	1		Determine the potential impacts to ecological receptors within the swale where wetlands have been identified.
	ST010HA005-SE_00-01SD			Sediment	MSD	0 - 1	1	1	1		1	1		
	ST010HA005-SW			Surface Water	N	NA	1	1	1		1	1	1	
TBD	ST010-EB001	NA	NA	ASTM Type II	EB	NA	1	1	1		1	1		Equipment blank for Geoprobe equipment
TBD	ST010-EB002	NA	NA	ASTM Type II	EB	NA	1	1	1		1	1		Equipment blank for Geoprobe equipment
TBD	ST010-EB003	NA	NA	ASTM Type II	EB	NA	1	1	1		1			Equipment blank for Geoprobe equipment
TBD	ST010-EB004	NA	NA	ASTM Type II	EB	NA	1	1	1		1	1		Equipment blank for Hydropunch equipment
TBD	ST010-EB005	NA	NA	ASTM Type II	EB	NA	1	1	1		1			Equipment blank for Hydropunch equipment
TBD	ST010-EB006	NA	NA	ASTM Type II	EB	NA	1	1	1		1	1		Equipment blank for sediment sampling
TBD	ST010-EB007	NA	NA	ASTM Type II	EB	NA	1	1	1		1	1		Equipment blank for surface water sampling
NA	ST010-TB01	NA	NA	ASTM Type II	TB	NA	1				1			Trip blank for cooler with GRO and/or VOC
NA	ST010-TB02	NA	NA	ASTM Type II	TB	NA	1				1			Trip blank for cooler with GRO and/or VOC
NA	ST010-TB03	NA	NA	ASTM Type II	TB	NA	1				1			Trip blank for cooler with GRO and/or VOC
Totals														
ST010				Surface Soil			13	13	13	12	12	3	0	
ST010				Subsurface Soil			59	59	59	54	54	12	0	
ST010				Groundwater			22	22	22	0	22	11	18	
ST010				Sediment			8	8	8	0	8	5	0	
ST010				Surface Water			8	8	8	0	8	2	5	
ST010				ASTM Type II			10	7	7	0	10	5	0	

[a]Analytical methods AK101, AK102, AK103, and SW8021B for soil will be performed at the on-site mobile lab; 10 percent of these samples have been identified for split analysis according to Worksheet #20.

[b]Soil sample analysis by this method will be performed at an off-site lab.

[c]Field parameters will be anlayzed for pH, temperature, specific conductivity, dissolved oxygen, and ORP using a water quality meter and flow-through cell as described in SOP-12.

Notes:

Analysis of all groundwater, surface water, sediment, and split (SPT) soil samples will be performed at an off-site lab.

If visible evidence of soil contamination is observed (in soil borings where grab groundwater samples are to be collected) at depths within the variably saturated zone other than those specified in the table, additional soil and co-located groundwater samples will be collected at those depths.

Per Guidance in Appendix F of ADEC, 2010: "*For each source area, PAH analysis must be performed on a sufficient percentage of the samples with the highest GRO, DRO and/or RRO concentrations to determine if PAHs are contaminants of concern. In general, 10% is recommended for site characterization. If PAH concentrations are less than applicable cleanup levels, further PAH analysis is generally not required. PAHs should be sampled in groundwater if soil samples concentrations are above applicable cleanup levels and groundwater sampling is required.*"

bgs = below ground surface

NA = not applicable

TBD = to be determined

N = normal sample

FD = field duplicate sample

MS = matrix spike sample

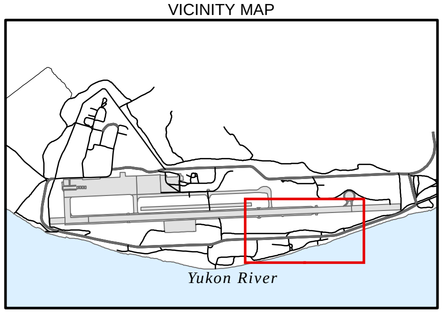
MSD = matrix spike duplicate sample

EB = equipment blank

TB = trip blank

SPT = split sample

VICINITY MAP



LEGEND

- ST010
- Adjacent Site
- Geophysical Survey Limit
- Geophysical Survey Feature
- Abandoned Fuel Line (1952)
- Abandoned Fuel Line (1962)
- Unpaved Road

Notes:
1. Imagery September 4, 2009. Pixel size 0.25 meter

N

0 150 300
Feet

FIGURE D1-ST010
Site Layout

Work Plan for Site Inspection, Remedial Investigation, and Site Characterization
Former Galena Forward Operating Location, Alaska

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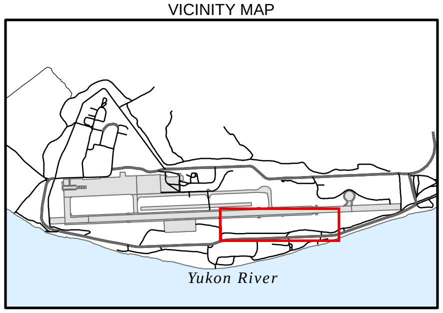
VICINITY MAP



LEGEND

ST010

Notes:
1. Photography dated 1985, georeferenced
2. Imagery September 4, 2009. Pixel size 0.25 meter

0 150 300
Feet

N

FIGURE D2-ST010
Historical Aerial Photography

Work Plan for Site Inspection, Remedial Investigation, and Site Characterization
Former Galena Forward Operating Location, Alaska

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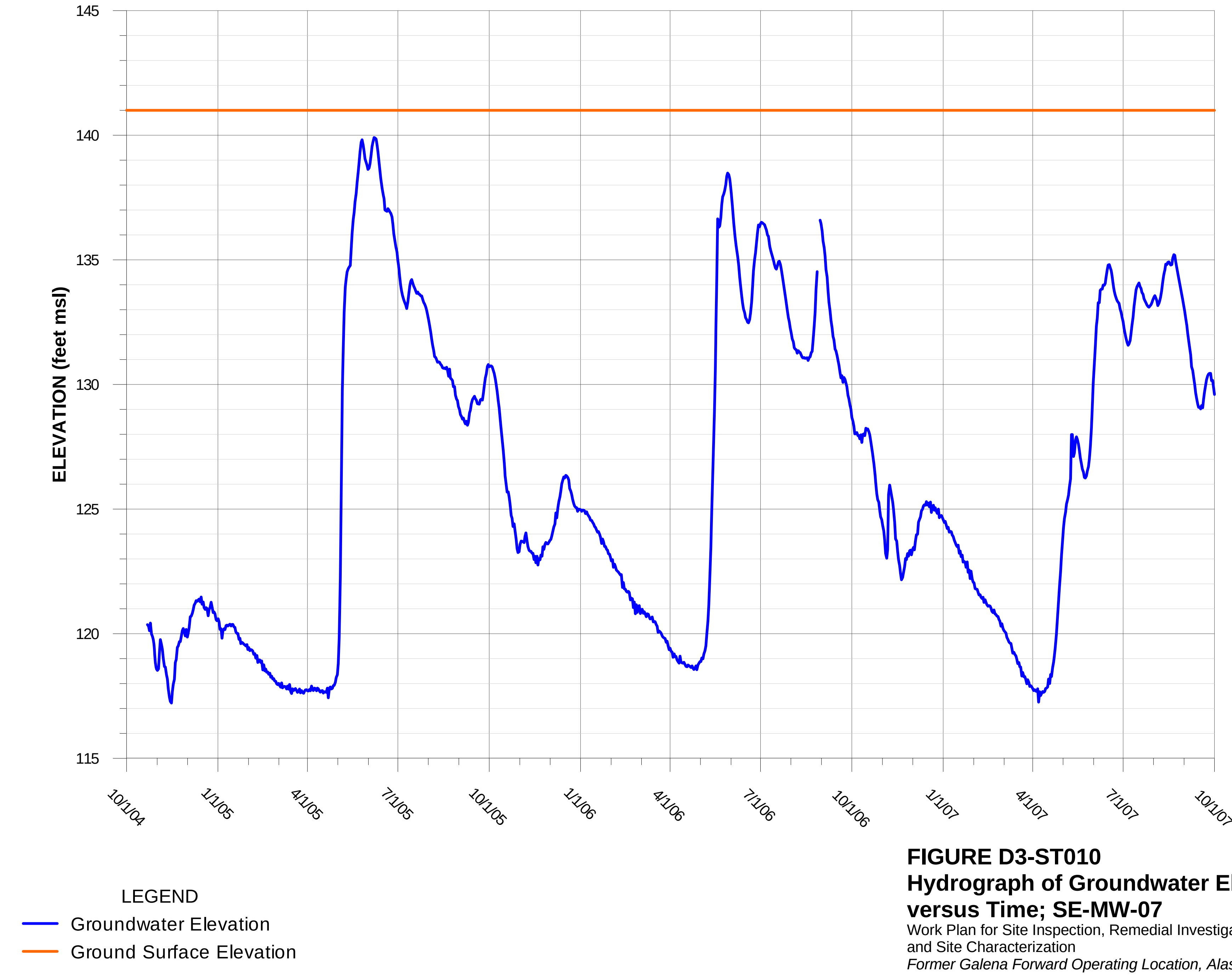

FIGURE D3-ST010
Hydrograph of Groundwater Elevation versus Time; SE-MW-07
Work Plan for Site Inspection, Remedial Investigation, and Site Characterization
Former Galena Forward Operating Location, Alaska

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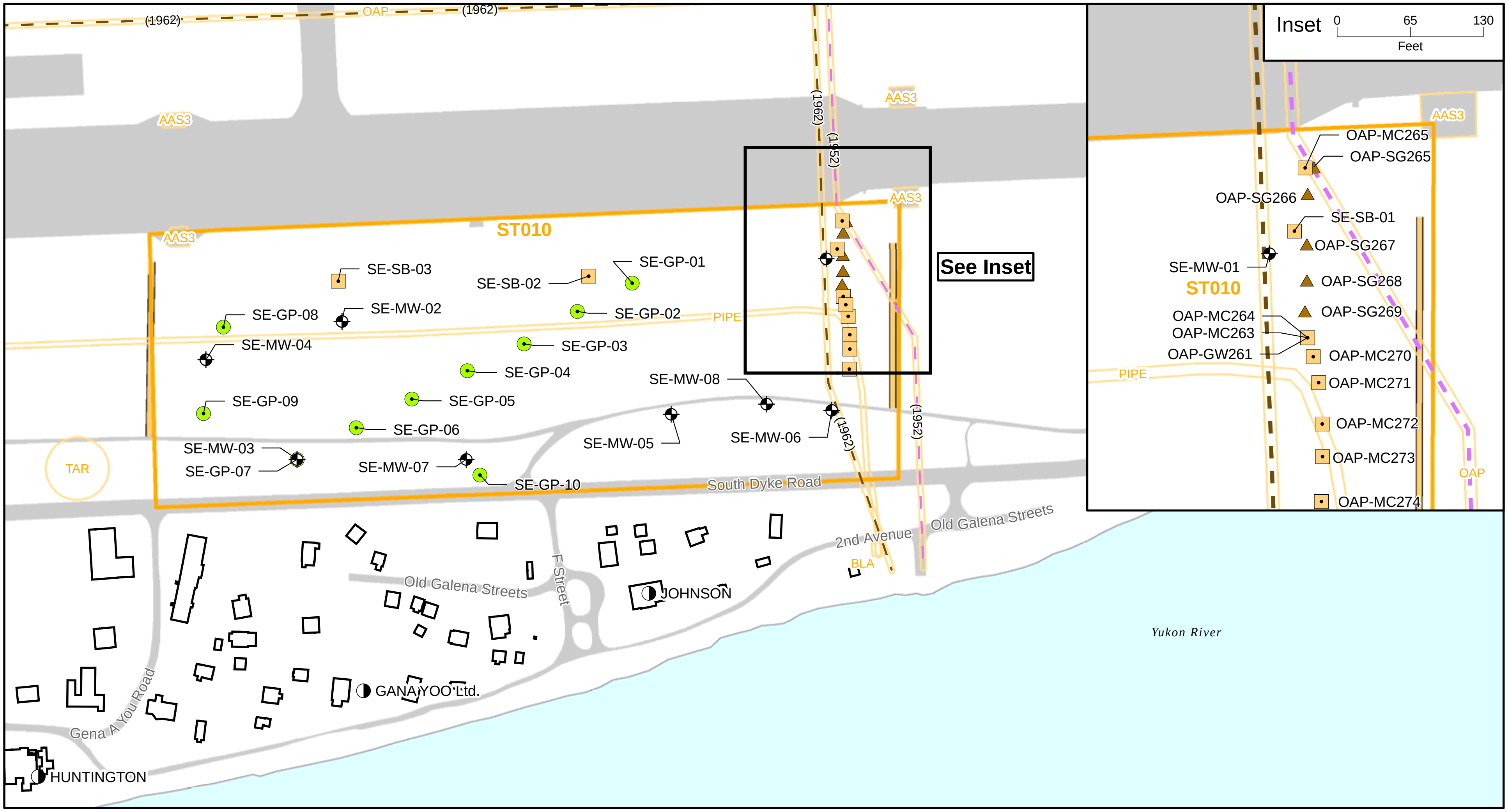
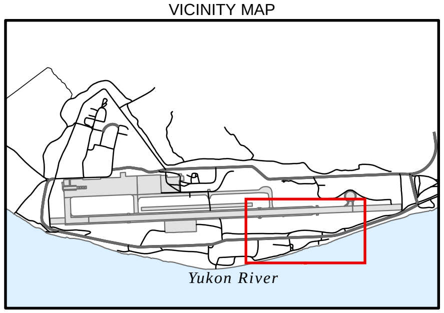


VICINITY MAP



LEGEND

- ST010
- Adjacent Site
- Airfield or Road
- Structure
- Abandoned Fuel Line (1952)
- Abandoned Fuel Line (1962)
- Unpaved Road

Historical Sample Location

- Soil Boring
- Hydro Punch
- Monitoring Well
- Production Well
- Soil Vapor Sample

N

0 150 300
Feet

FIGURE D4-ST010
Historical Sample Locations

Work Plan for Site Inspection, Remedial Investigation, and Site Characterization
Former Galena Forward Operating Location, Alaska

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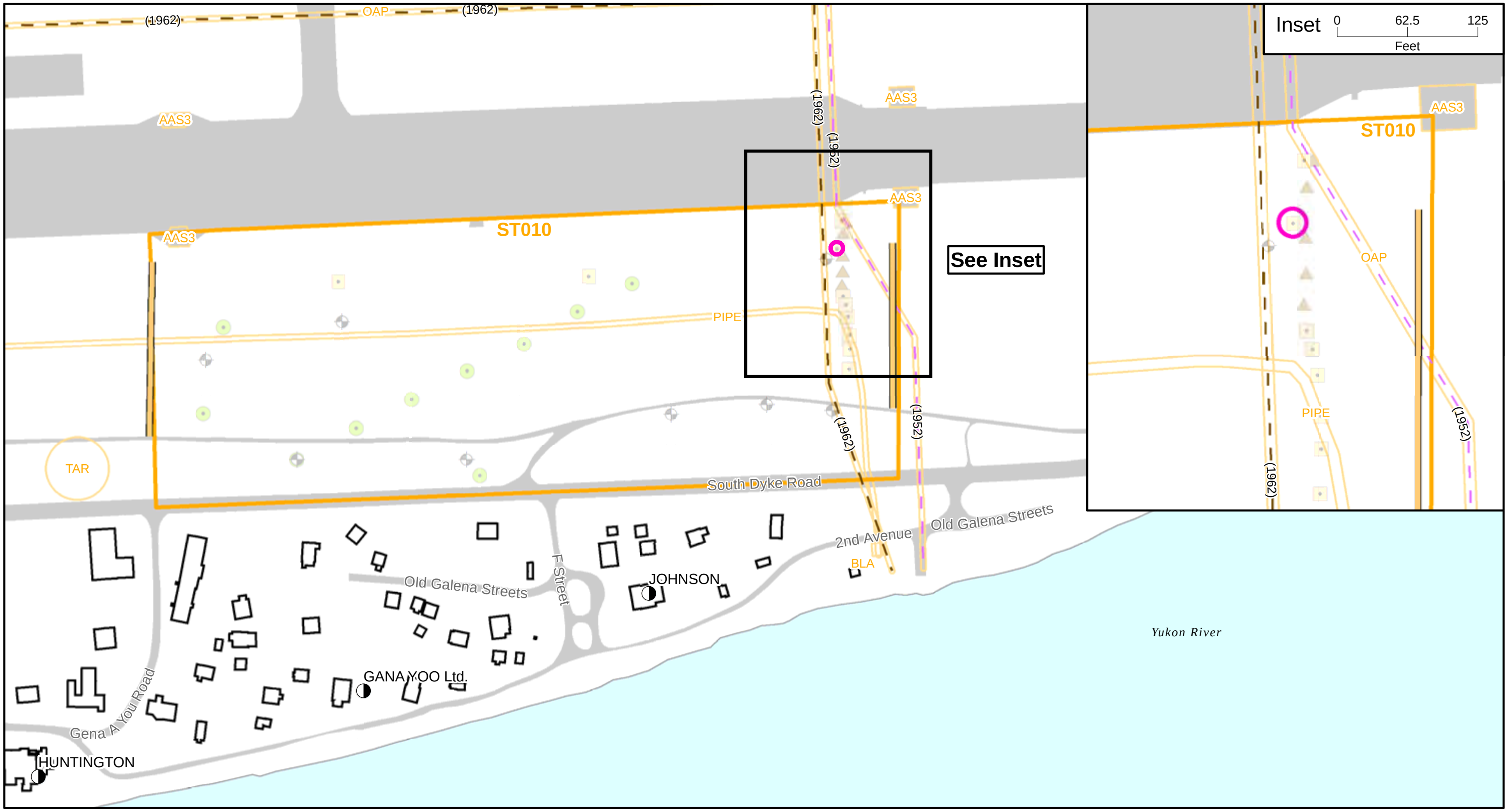
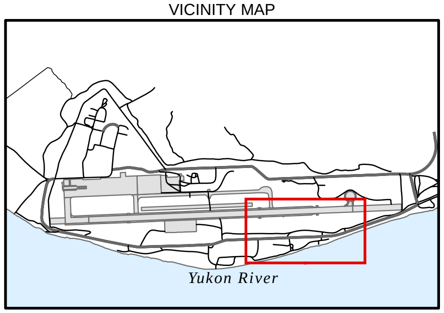


VICINITY MAP



LEGEND

- ST010
- Adjacent Site
- Airfield or Road
- Structure
- Abandoned Fuel Line (1952)
- Abandoned Fuel Line (1962)
- Unpaved Road
- Area where Analyte Exceeds Screening Level (dashed where inferred)

Historical Sample Location

- Soil Boring
- Hydro Punch
- Monitoring Well
- Production Well
- Soil Vapor Sample

N

0 150 300
Feet

FIGURE D5-ST010
Extent of Historical Exceedances of Screening Levels in Surface Soil

Work Plan for Site Inspection, Remedial Investigation, and Site Characterization
Former Galena Forward Operating Location, Alaska

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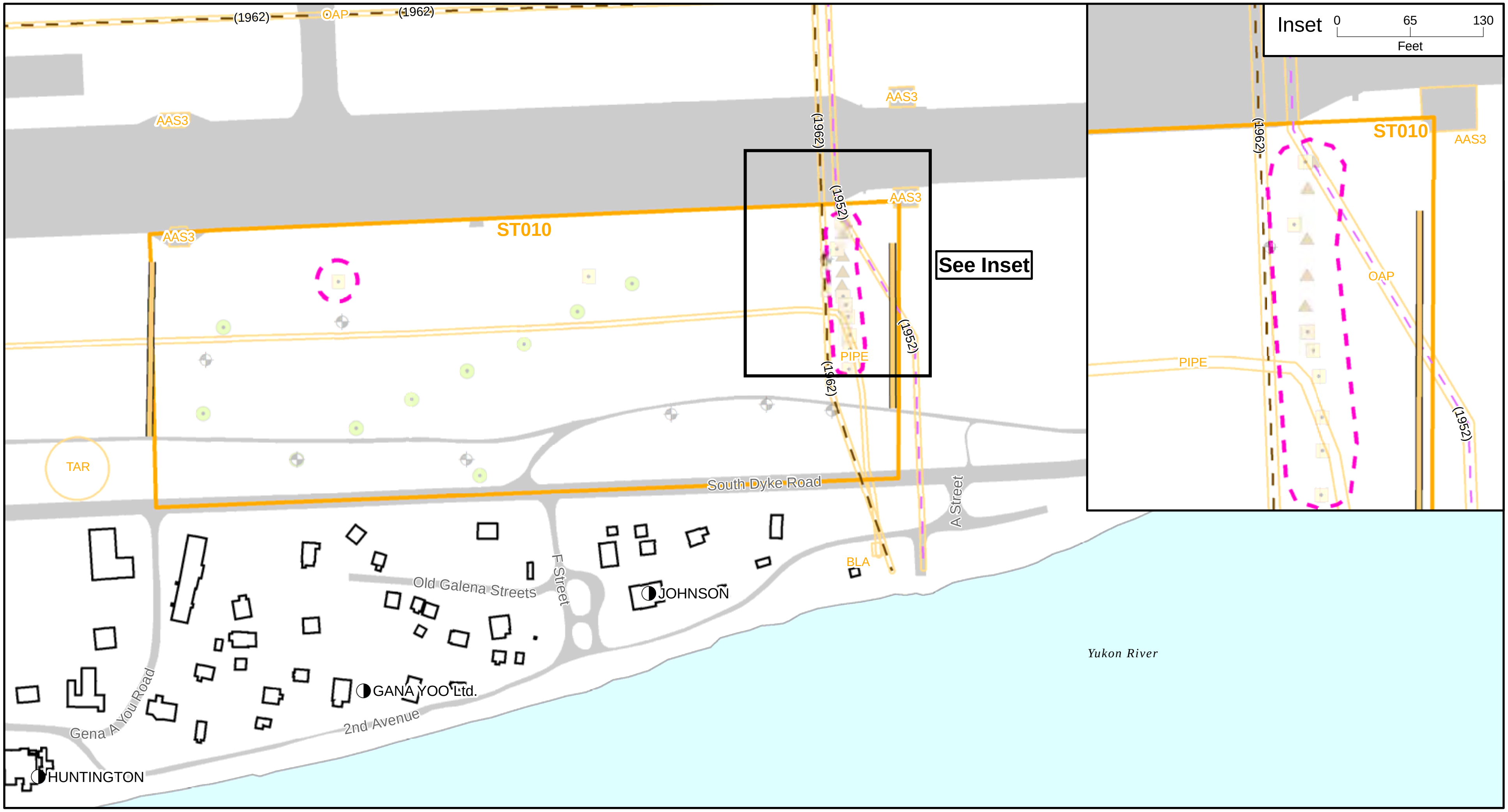
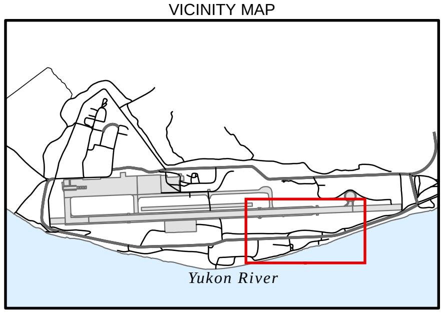


VICINITY MAP



LEGEND

- ST010
- Adjacent Site
- Airfield or Road
- Structure
- Abandoned Fuel Line (1952)
- Abandoned Fuel Line (1962)
- Unpaved Road
- Area where Analyte Exceeds Screening Level (dashed where inferred)

Historical Sample Location

- Soil Boring
- Hydro Punch
- Monitoring Well
- Production Well
- Soil Vapor Sample

N

0 150 300
Feet

FIGURE D6-ST010
Extent of Historical Exceedances of Screening Levels in Subsurface Soil

Work Plan for Site Inspection, Remedial Investigation, and Site Characterization
Former Galena Forward Operating Location, Alaska

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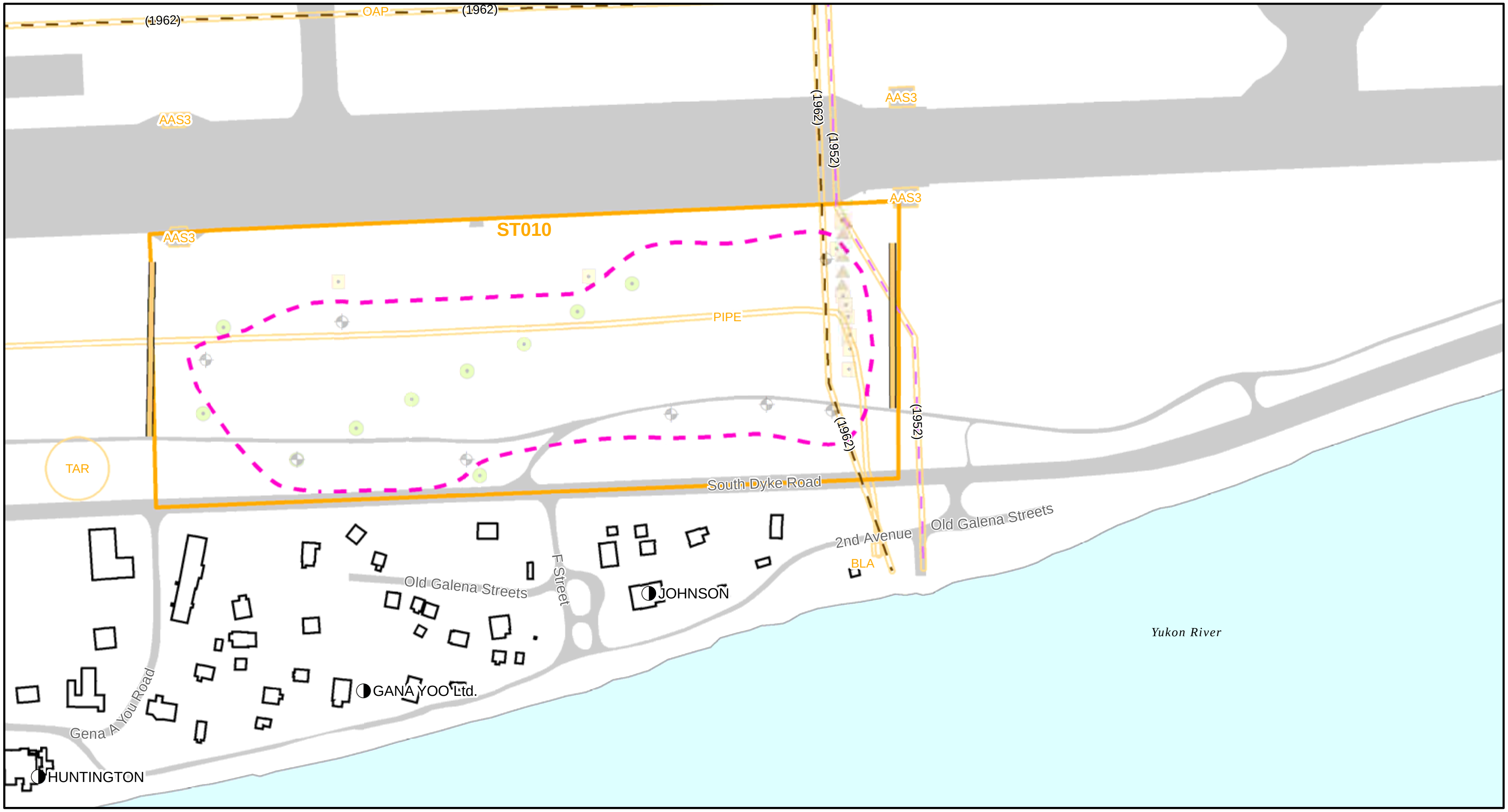
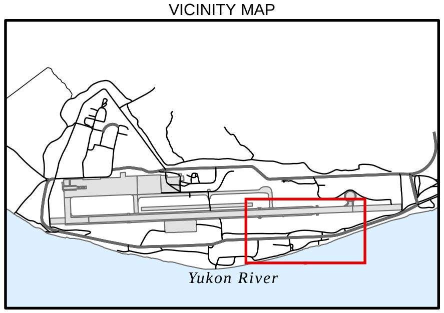


VICINITY MAP



LEGEND

- ST010
- Adjacent Site
- Airfield or Road
- Structure
- Abandoned Fuel Line (1952)
- Abandoned Fuel Line (1962)
- Unpaved Road
- Area where Analyte Exceeds Screening Level (dashed where inferred)

Historical Sample Location

- Soil Boring
- Hydro Punch
- Monitoring Well
- Production Well
- Soil Vapor Sample

N

0 150 300
Feet

FIGURE D7-ST010
Extent of Historical Exceedances of Screening Levels in Groundwater

Work Plan for Site Inspection, Remedial Investigation, and Site Characterization
Former Galena Forward Operating Location, Alaska

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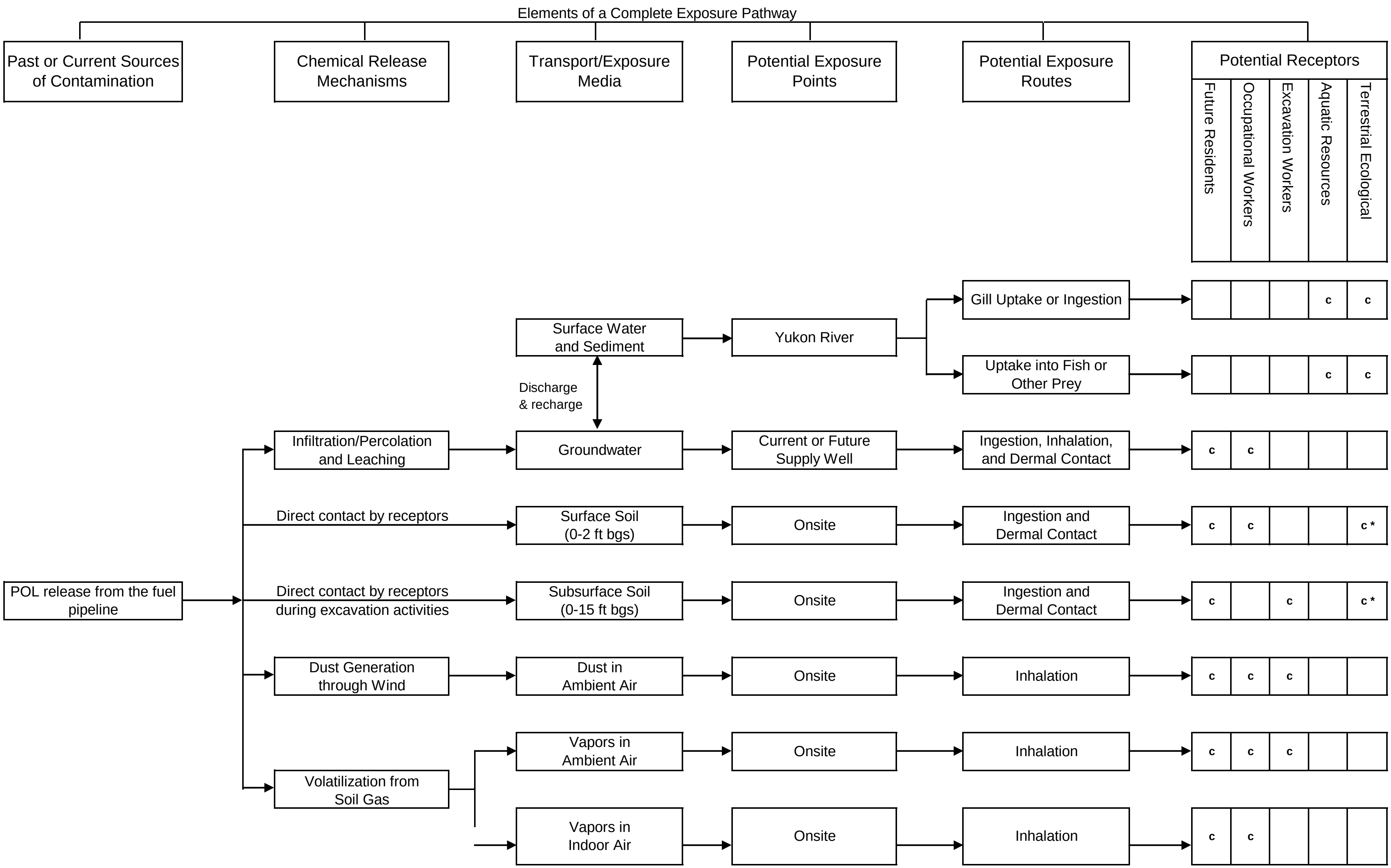
Figure D8-ST010

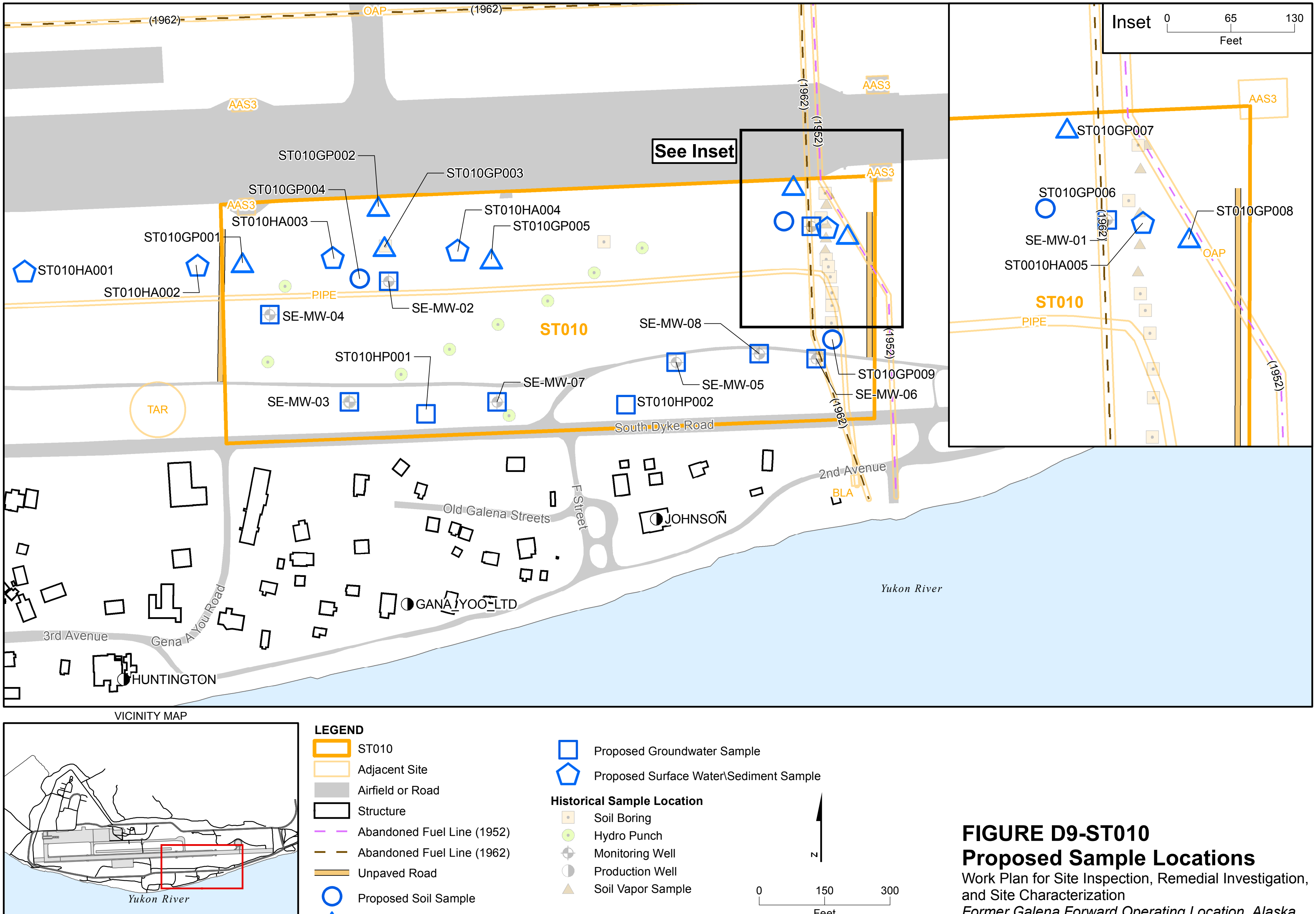
Conceptual Site Model for Potential Human and Ecological Exposures

Work Plan for Site Inspection, Remedial Investigation, and Site Characterization

Former Galena Forward Operating Location, Alaska



Notes:
c = Potentially complete pathway
Blank = Incomplete pathway
* Depth of soil for ecological receptors will be based on site-specific receptor types



LEGEND

- ST010
- Adjacent Site
- Airfield or Road
- Structure
- Abandoned Fuel Line (1952)
- Abandoned Fuel Line (1962)
- Unpaved Road
- Proposed Soil Sample
- Proposed Soil\Groundwater Sample
- Proposed Groundwater Sample
- Proposed Surface Water\Sediment Sample

Historical Sample Location

- Soil Boring
- Hydro Punch
- Monitoring Well
- Production Well
- Soil Vapor Sample

FIGURE D9-ST010
Proposed Sample Locations

Work Plan for Site Inspection, Remedial Investigation, and Site Characterization
Former Galena Forward Operating Location, Alaska

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SUPPLEMENT D1-ST010

(provided on enclosed CD)

ATTACHMENT D-4

Building Demolition/Drum Removal
(Site OT099)

ATTACHMENT D-4

Building Demolition/Drum Removal (Site OT099)

This attachment provides background information, and describes the conceptual site model (CSM), data quality objectives (DQOs), and the proposed field sampling plan for the Building Demolition/Drum Removal site (Site OT099) at the Former Galena Forward Operating Location (FOL). Although Site OT099 is on the Site Characterization (SC) investigation pathway, as defined in Worksheet #10, the objective of data collection at the site is a:

- Delineate the vertical extent of known fuel- and oil-related contamination in subsurface soil to better plan excavation activities
- Collect sufficient confirmation soil samples following excavation to achieve Alaska Department of Environmental Conservation (ADEC) Method 2 closure at the site in accordance with 18 Alaska Administrative Code (AAC) 75.340 (ADEC, 2008)
- Evaluate the degree to which contamination the site is contributing to the underlying groundwater plumes, as described in DQO 4 (Table 10-2) of Worksheet #10 and in the groundwater sampling approach discussed in Worksheet #14.

4.1 Site Location

Site OT099 is located within Parcel EE in the western portion of the FOL. It is approximately 300 feet north of a Yukon River bank. The site is bordered to the north by an aboveground portion of the active fuel pipeline and the Galena Airport runway, to the east by Parcel G, to the west by grassy open space, and to the south by South Dyke Road. Figure D1-OT099 (figures are located at the end of this attachment) shows the current boundary of Site OT099.

4.2 Site Characteristics

During the 2001 and 2002 drum-crushing operation at Site OT099 significant site features included a 1.8-acre fenced area on a level-graded gravel pad, a drum containment pad, and two dirt entrance roads (one in the southwest corner of the fenced area, and the other in the northeast corner of the fenced area), as shown in Figure D2-OT099. Grass had grown throughout the site and was thick along the northern boundary. An earthen road berm extended along the southern boundary of the site. In September 2002, the fence and containment area liner were removed, and the site was leveled.

Large seasonal fluctuations in groundwater elevations have been recorded at the FOL. Figure D3-OT099 presents a time series plot of groundwater elevation at ST010 groundwater monitoring well SE-MW-07 from 2004 through 2007. Although the well is located approximately 4,000 feet east of Site OT099, it is considered to be the most representative of groundwater conditions at Site OT099 of the wells instrumented with data logging pressure transducers because of the similar ground surface elevation (approximately 141 feet mean sea level [msl]) and proximity to the Yukon River. A complete set of groundwater hydrographs for monitoring wells at the FOL are presented in Standard Operating Procedure (SOP)-13 *(Groundwater Sampling Procedures)*. The data presented on Figure D3-OT099 indicate that groundwater elevations at SE-MW-07 have been as high as approximately 140 feet msl, but typically peak at 135 to 137 feet msl. Seasonal low groundwater elevations are generally on the order of 117 feet msl. Given a ground surface elevation of approximately 141 feet msl at SE-MW-07, the variably saturated zone at Site OT099 likely ranges in depth from approximately 5 to 25 feet below ground surface (bgs).

4.3 Site Description and History

In 2001 and 2002, under a contract with the State of Alaska, U.S. Air Force (USAF) collected drums and containers at Site OT099. Figure D2-OT099 shows an aerial photograph of the site from 2002. These items originated from the banks of the Yukon River and associated sloughs and lakes near Galena. During the drum-crushing phase of the project, drums were loaded onto the landing craft and transported back to Galena for processing. Processing included such tasks as waste characterization, repackaging drum contents for disposal, and drum cleaning and crushing (USAF, 2001). During the project, 840 drums and containers were collected and disposed of. Approximately 76 percent of the drums were empty, 16 percent contained water, 6 percent contained mud or sediment, 1 percent contained tar or small amounts of tar residue, and less than 1 percent contained a liquid other than water, typically fuel, oil, or sludge (Yukaana Development Corporation [YDC]/Bethel Services, Inc. [BSI], August 2006). The tar contained in the drums was characterized as non-hazardous. Approximately 633 tons of tar were sent to a thermal treatment facility in Palmer, Alaska for energy recovery. Used oil was consolidated and also shipped to the Palmer facility for energy recovery. Approximately 200 drums of tar not suitable for energy recovery were shipped to a disposal facility in Oregon for landfilling. Two drums containing mixed fluids were characterized as hazardous, and shipped to a Washington facility for treatment and disposal (Yukaana Development Corporation, 2006).

In September 2002, the fence and containment area liner were removed, and the site was leveled. Neither YDC nor USAF used the site after the drum-crushing project was completed in 2002. From 2002 to 2005, the site was used by the State of Alaska Department of Transportation and Public Facilities (AKDOT&PF) for storage of heavy equipment. During a site visit in 2005, numerous stains were observed in the southern portion of the site, which reportedly were not present at the completion of the drum-crushing project (YDC/BSI, August 2006).

Also during the 2005 site visit, a pile of gravel mixed with mangled drums was observed in the southwest corner of the parcel adjacent to the eastern boundary of the site. Drums observed in this area were not associated with USAF's drum-crushing investigation. Therefore, they were not investigated, because they likely belonged to the Alaska

Department of Transportation, who was the only known user of the site following completion of USAF's drum-crushing project.

The presence of the gravel and drum pile was not noted during the October 2009 Site visit.

4.4 Summary of Previous Investigations and Remedial Actions

4.4.1 Previous Investigations

Electronically available analytical laboratory data associated with Site OT099 are provided in Supplement D1-OT099. Statistical summaries of soil and groundwater analytical data provided in Supplement D1-OT099 are provided in Tables D1-OT099 and D2-OT099 (tables are located at the end of this attachment). Tables D3-OT099 and D4-OT099 present summaries of analytes exceeding the extent soil and extent groundwater to surface water screening levels (SLs) defined in Worksheet #15. Figure D4-OT099 presents historical sample locations associated with the data in Supplement D1-OT099. Figures D5-OT099 and D6-OT099 show areas where analytes exceeded extent soil SLs in surface (0 to 2 feet bgs) and subsurface (greater than 2 feet bgs), respectively. The areas shown on these figures represent locations where at least one analyte has exceeded the respective SL for the field sample plan design. These figures are not intended to represent iso-concentration contour or plume maps for a given analyte group or medium.

Post Drum Crushing Site Inspection and Limited Remedial Action (2002)

In June 2002, at the completion of the drum-crushing project, Site OT099 was inspected and one stained area was observed in the southwestern corner of the site. The stain was located where, reportedly, a damaged Bobcat® vehicle leaking hydraulic oil had been parked. The stained soil was hand-shoveled into a drum, and the soil was shipped to Anchorage, Alaska, for treatment and disposal. A confirmation soil sample was collected from the small excavation. Diesel-range organics (DRO) and residual-range organics (RRO) were detected at concentrations (41 milligrams per kilogram [mg/kg] and 37 mg/kg, respectively) (YDC/BSI, August 2006) that did not exceed the extent soil SLs for surface soil (listed in Worksheet #15). No other samples were collected. These data were not available electronically and, therefore, are not included in the data tables of this attachment.

Site Investigation (2005)

In July 2005, a surface soil investigation was conducted at Site OT099 (YDC/BSI, August 2006). Personnel collected 204 field screening soil samples from 195 grid squares (20 feet by 20 feet each) at the site and analyzed the samples with Dexsil® PetroFLAG™ field screening kits. If surface soil staining was not observed within a grid cell, field screening samples were collected from the center of the grid. If staining was observed, samples were collected from the stained area and adjacent unstained areas within the same grid. Approximately 25 surface stains were observed at the site, 24 of which were observed in the southern half of Site OT099. The sizes of observed stains ranged from 0.5 foot to 3 feet in diameter (YDC/BSI, August 2006). The Dexsil® PetroFLAG™ field screening results are shown in Supplement D2-OT099. These screening level data were not available electronically and, therefore, are not included in the data tables of this attachment.

At observed stains (or locations with high PetroFLAG™ results), 26 soil samples for confirmation laboratory analysis were collected from the upper 3 feet of soil. SGS Environmental Services, Alaska Division, analyzed the soil samples for the following:

- Benzene, toluene, ethylbenzene, and xylenes, (BTEX) using U.S. Environmental Protection Agency (EPA) Methods 8021B or 8269B
- Gasoline-range organics (GRO) using Alaska Method AK101
- DRO using Alaska Method AK102
- RRO using Alaska Method AK103

In addition to the above-listed analyses, the three locations with the highest PetroFLAG™ results (05DC-E10-001, 05DC-I10-002, and 05DC-J10-003) were analyzed for polyaromatic hydrocarbons (PAHs) using EPA Method 8270 SIM. A majority of the samples had "chromatogram patterns consistent with a lube oil" (YDC/BSI, August 2006). These laboratory data are tabulated in Supplement D1-OT099 and included in the soil statistical summary table (Table D1-OT099) and extent soil SL exceedance table (Table D3-OT099). The sample locations are shown on Figure D4-OT099. DRO, RRO, and benzene concentrations from the 2005 site investigation exceeded the extent soil SLs (see Table D3-OT099).

GRO was detected at concentrations up to 2.8 F[1] mg/kg (05DC-E9-010), DRO was detected at concentrations up to 8,400 mg/kg (05DC-J10-003), and RRO was detected at concentrations up to 39,000 mg/kg (05DC-K10-004). Benzene was detected at one sample location, 05DC-I9-011, with a concentration of 0.0338 mg/kg (higher than the extent soil SL of 0.025 mg/kg). Xylenes were detected at 0.0288 mg/kg (05DC-I10-002), but the results did not exceed the extent soil SL. PAHs were also detected in low concentrations that did not exceed the extent soil SLs.

After reviewing the investigation report (YDC/BSI, August 2006), ADEC requested remedial action for the petroleum contamination at the site and suggested excavation and confirmation sampling in the areas of surficial stains documented in the southern third of the site (ADEC, September 7, 2006).

Site Investigation (2008)

Soil samples were collected at eight locations in the southern portion of the site in 2008 (DCA-HA1 through DCA-HA8). The sample locations are shown on Figure D4-OT099. Two to three samples were collected from each location at depths ranging from ground surface to 7 feet bgs. These samples were analyzed for GRO, DRO, RRO, VOCs, and SVOCs (AECOM, 2009). Elevated GRO, DRO, RRO, benzene, naphthalene, 1-methylnaphthalene, 2-methylnaphthalene, and methylene chloride concentrations above the extent soil SLs were detected, in some cases as deep as 5 feet bgs (see Table D3-OT099).

GRO was detected at concentrations up to 154 mg/kg (DCA-HA8, 1 to 2 feet bgs), DRO was detected at concentrations up to 12,900 mg/kg (DCA-HA2, 1 to 2 feet bgs), and RRO was detected at concentrations up to 28,900 mg/kg (DCA-HA5, 0 to 1 foot bgs). Benzene

[1] F means that the analyte was positively identified but the value was at or below the reporting limit.

exceeded the extent soil SL at one sample location, DCA-HA2, with a concentration of 0.0527 mg/kg. Naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene exceeded their extent soil SLs at DCA-HA1 at 4 to 5 feet bgs in a sample with elevated DRO concentrations as well. Methylene chloride exceeded the extent soil SL in six samples at the site (maximum concentration of 0.114 mg/kg) within the top 2 feet of soil.

Groundwater Sampling

Groundwater sampling has been conducted near Site OT099, and results are summarized in Table D2-OT099 with extent groundwater to surface water SL exceedances shown in Table D4-OT099. This sampling is not linked with a specific investigation or report, but the data were provided in a historical electronic project database.

Groundwater samples were collected at 12-MW-01 near the northern (upgradient) edge of the site in 1992 and 1993 and analyzed for explosives, hydrocarbons, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, and pesticides. Only bis(2-ethylhexyl)phthalate, a common laboratory contaminant, exceeded the extent groundwater to surface water SL. Additional grab groundwater samples were collected in 2008 for VOC analysis at DCA-GW407, petroleum, oil, and lubricant (POL)-GW328, and POL-GW329. Only benzene, at a concentration of 0.68 microgram per liter (µg/L), exceeded the extent groundwater to surface water SL (at 123 feet bgs). This deep contamination is not considered to be associated with the OT099 surface spill site.

4.5 October 2009 Site Visit Observations

During the October 2009 site visit (CH2M HILL, 2010), an open, level gravelly area with recent regrading on the south side of the site adjacent to a dike was observed. Oil stains marked with sampling flags were also observed at the site. The site contained sparse grass and forbs (yarrow, clover) that had been mowed, as well as scattered small willows and alders on and adjacent to the site. A subsequent site visit in May 2010 confirmed that the sample flags from the 2005 site investigation, described in the previous section, were still present.

4.6 Use of Secondary Data

Secondary data (historical data) for the site include data tabulated in Supplement D1-OT099 and summarized in Tables D1-OT099 and D2-OT099. Data will be evaluated for usability using the general procedures outlined in Worksheet #13. Data that are properly validated, collected by an ADEC-approved analytical method, have analytical detections greater than limit of detection (LOD) or limit of quantification (LOQ) or LODs at or below the appropriate screening levels, will be used for quantitative nature and extent evaluations and risk assessment calculations, if needed. Data that do not meet this criteria will be used as reference, or screening level data only. Although screening level data will not be used for quantitative analyses, these data will be used to qualitatively evaluate the presence or absence of contamination at a given location and/or depth to guide the design of the field sample plan.

Dexsil® PetroFLAG™ data collected in 2005 do not meet usability requirements outlined in Worksheet #13; therefore, these data will not be used as screening level only.

The 2005 laboratory-analyzed surface soil data meet the usability criteria in Worksheet #13. If needed, these data can be used for quantitative nature and extent and risk assessment evaluations.

The 2008 soil data require additional evaluation to determine usability because they were not collected under an ADEC-approved work plan and quality assurance project plan. Analytical data from these soil samples will be used for site nature and extent evaluations, assuming the data meet DQO usability requirements. The review of the usability of this 2008 subsurface soil secondary data is in progress and follows procedures outlined in Worksheet #13. Because the 2008 sample locations fall within the area of the planned excavation (all locations had exceedances of the extent soil SLs), the field sampling plan would not be modified based on the outcome of the data usability review. If this evaluation results in modifying the data classification to SL the data would not be available for other quantitative uses.

Existing groundwater data associated with the site will be used for reference only.

4.7 Findings of Previous Investigations

Results of the 2005 and 2008 investigations indicated that the area of affected soil was restricted to three general areas: the northeast corner of the site, the northwest corner of the site, and the southern portion of the site (YDC/BSI, August 2006; AECOM, 2009). Figures D5-OT099 and D6-OT099 show areas where analytes exceeded the extent soil SLs in surface (0 to 2 feet bgs) and subsurface (greater than 2 feet bgs), respectively. The depth of contamination at the site is not delineated vertically, and potential impacts to groundwater have not been evaluated.

4.8 Target Analytes

GRO, DRO, RRO, benzene, naphthalene, 1-methylnaphthalene, 2-methylnaphthalene, and methylene chloride concentrations exceeded the extent soil SLs for soil as shown in Table D3-OT099, in some cases to 5 feet bgs. Based on site history, exceedances of extent soil SLs, and guidance listed in Worksheets #14 and #15 for fuel- and oil-related contamination, target analytes for Site OT099 include: GRO, DRO, RRO, VOCs, PAHs, and metals. As shown in Tables D1-OT099 and D2-OT099, the following metals have been detected in soil and/or groundwater at the site: aluminum, arsenic, barium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, sodium, vanadium, and zinc. As listed in Table 14-1, only arsenic, barium, cadmium, chromium, lead, nickel, and vanadium are considered target analytes for Site OT099 based on site use as a drum-crushing area for fuel and oil-related drums. Additionally, in accordance with the information provided in the *Draft Field Sampling Guidance* (ADEC, 2010), PAH analysis will be performed on approximately 10 percent of the samples collected. The sample(s) selected for PAH analysis will be those anticipated to have the highest GRO, DRO, and/or RRO concentrations.

Following the guidance in Step 6 of Figure 15-1, an additional analysis was conducted in which historical analytical data from locations within 500 feet of the OT099 site boundary were evaluated to determine the potential for contaminants to migrate from another location to the site. Sample locations within 500 feet of Site OT099 include monitoring well 12-MW-02 (located approximately 470 feet east/northeast of the site), eight grab groundwater sample locations located along the flight line north of the site, and two grab groundwater sample locations located south of the site along the Yukon River. These data included groundwater samples that exceeded the extent groundwater to surface water SLs for bis(2-Ethylhexyl)phthalate, phenanthrene, benzene, and sec-butyl alcohol. Metals detected in soil and groundwater in these samples included aluminum, antimony, arsenic, barium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, sodium, vanadium, and zinc. The target analyte list will not be modified based on review of these data because VOCs, metals related to site use, and PAHs are included and bis(2-Ethylhexyl)phthalate is a common laboratory contaminant.

Following the guidance in Step 6 of Figure 15-1, a final analysis was conducted to determine whether sites evaluated in the Preliminary Assessment (CH2M HILL, 2010) are located within 500 feet of the OT099 site boundary. The only Preliminary Assessment sites within this radius are AAS3 and PIPE. These two sites were included in the Preliminary Assessment based on use of fuel at the sites. Fuel and waste-oil target analytes are already included.

4.9 Potential Exposure Pathways and Receptors

Site OT099 falls under the SC investigation stage for the POL surface release site/source category, as defined in Worksheet #17, and needs additional sampling to delineate the nature and extent of soil contamination and potential groundwater impacts. Known sources of contamination include:

- Leakage from historical drum-crushing operations (fuels)
- Hydraulic-oil leakage from the damaged Bobcat® vehicle in 2002
- AKDOT&PF equipment storage activities between 2002 and 2005 (potential hydraulic oil/fuel spills)

Surface spills from these sources resulted in surface soil contamination in excess of the extent soil SLs for surface soil at least to 5 feet bgs. It is unknown whether groundwater has been affected by the surface releases.

Figure D7-OT099 depicts the CSM for exposure for the site, including past or current sources of contamination, chemical release mechanisms, transport/exposure media, potential exposure points, potential exposure routes, and potential receptors. The most plausible exposure scenario under current site conditions is the excavation/construction worker scenario due to the potential for excavations for utility repair and/or replacement.

There are no standard work places or residences currently on the site; however, these scenarios will be evaluated to assess the potential impacts of hypothetical land use changes. Based on the CSM for Site OT099, potential human receptors and exposure pathways to be evaluated include the following:

- **Excavation/Construction Workers:** Potential exposure to chemicals in soil to 15 feet bgs and shallow groundwater. Potentially complete routes of exposure to soil include incidental soil ingestion, dermal contact with soil, and inhalation of ambient vapors or dust generated from wind or during onsite excavation activities. Potentially complete routes of exposure to shallow groundwater include dermal contact with groundwater and inhalation of ambient vapors from groundwater.
- **Future Occupational Workers:** Potential exposure chemicals in soil to 2 feet bgs. Potentially complete routes of exposure to surface soil include incidental soil ingestion, dermal contact with soil, and inhalation of ambient vapors or dust generated from wind. Vapor intrusion from VOCs in environmental media migrating into current or future occupational buildings is also a potentially complete exposure route.
- **Hypothetical Future Residents:** Potential exposure to chemicals in soil to 15 feet bgs and groundwater. Potentially complete routes of exposure to soil include incidental soil ingestion, dermal contact with soil, and inhalation of ambient vapors or dust generated from wind. Potentially complete routes of exposure to groundwater include ingestion, dermal contact, and inhalation of VOCs during showering or other household activities. Vapor intrusion from VOCs in environmental media migrating into current or future residences is also a potentially complete exposure route.

As specified in the eco-scoping form for Site OT099 provided in Appendix G, the site is an open, gravelly area with sparse grass and forbs (yarrow, clover), as well as scattered small willows and alders that had been mowed. However, the site has minimal favorable habitat. Ecological exposure pathways are considered likely to be incomplete onsite at Site OT099, but possible if target analytes are present in surface soil or in groundwater that may daylight downgradient. Therefore, additional site information is needed to determine if any pathways are complete. Consequently, terrestrial ecological receptors will be evaluated for exposures onsite using SC data. Because groundwater from Site OT099 may discharge to the Yukon River, which is less than 1,000 feet away, an aquatic ecological exposure pathway is considered potentially complete at the site and will be further evaluated.

4.10 Data Quality Objectives

DQOs are pre-established goals that help monitor and assess project progress. They provide benchmarks against which the quality of fieldwork and the resultant analytical data are evaluated. DQOs specify the type, quality, quantity, and uses of the data necessary to support investigation objectives. General DQOs for characterizing contaminant sources, determining the nature and extent of contamination, and evaluating the potential for contaminants to migrate or affect additional media at the FOL are presented in Worksheet #10, Table 10-2. OT099 is categorized as being in the SC investigation phase. Therefore, the following general DQOs apply to Site OT099:

- DQO 2 – Nature and Extent of Contamination in Soil
- DQO 4 – Characterize Possible Site-Related Groundwater Contamination (Sites in Vicinity of Larger FOL Plumes)

During investigation of the nature and extent of potential contamination, if target analytes are found at concentrations that may pose a risk to human or ecological health, the following DQOs may apply and will be addressed under a FOL-wide risk assessment field sampling plan:

- DQO 7 – Human Health Risk Assessment
- DQO 8 – Ecological Risk Assessment

The sample design that will be employed at Site OT099 to fill data gaps associated with these DQOs is based on the source/release group investigation model for POL surface release sites/source category, as described in Worksheet #17. In addition, interim remedial actions are proposed that will support further characterization of the lateral and vertical extent of soil contamination at the site. Although Site OT099 is categorized as an SC investigation pathway site, a remedial action is planned for the site. Because the goal of the current field effort is to gain an ADEC Method 2 closure at the site in accordance with 18 AAC 75.340 (ADEC, 2008), the SI soil SLs described in Worksheet #15 will be used to evaluate excavation confirmation samples in soil. The extent groundwater to surface water SLs (described in Worksheet #15) will be used to when evaluating groundwater data collected during the current investigation because Site OT099 is located within 1,000 feet of the Yukon River.

The following sections summarize the sample design specific to Site OT099.

4.11 Investigation Activities

This section provides details regarding the planned investigation activities for Site OT099 and presents the rationale for each activity. SOPs referenced in this section are provided in Appendix H of this Work Plan.

4.11.1 Pre-investigation Activities

Before field activities begin, staff will review work planning documentation (including SOPs and HSE information) and will ensure that materials and equipment identified in the SOPs have been procured. Before intrusive field activities begin, utility clearance will be performed in accordance with SOP-03 *(Utility Clearance for Intrusive Operations)*, with records maintained consistent with SOP-01 *(Note Taking and Field Log Books)*.

4.11.2 Field Investigation Tasks

Soil Sampling

As shown in Table D3-OT099, there have been exceedances of extent soil SLs for target analytes in historical surface and subsurface soil samples collected within Site OT099 (predominantly the southwest corner of the site). Site OT099 is on the SC investigation pathway and both surface and subsurface soil contamination have been recorded. Because of the presence of visible surface contamination at the site, the goal of the current investigation is to achieve ADEC Method 2 closure at the site per *18 AAC 75.340* (ADEC, 2008).

As shown on Figure D8-OT099 and listed in table D5-OT099, five soil borings are proposed. Four soil borings (OT099GP001 through OT099GP004) will be installed within the area of known previous surface and subsurface soil contamination within the southern portion of the site to delineate the vertical extent of known fuel- and oil-related contamination in subsurface soil to better plan excavation activities. One soil boring (OT099GP005) will be installed along the northern boundary of Site OT099 to evaluate concentrations of target analytes upgradient of the site.

As listed in Table D5-OT099, soil samples will be collected at depths of 0 to 2, 5 to 7, 10 to 12, 14 to 16 (middle of the variably saturated zone), 24 to 26 (bottom of the variably saturated zone), and 34 to 36 (10 feet into the permanently saturated zone) feet bgs. Additional samples may be collected if evidence of contamination (for example, staining, odor, elevated PID/FID readings) is observed at other depths. Because a soil excavation is planned for the site, step-out soil borings will not be installed based on the analytical results from discrete soil boring sampling; however, the lateral and/or vertical extents of the planned excavation may be modified.

Boreholes will be installed using direct push drilling equipment in accordance with SOP-05 *(Hollow Stem Auger and Direct Push Drilling Methods)*. The presence of heaving sands are a known issue at the FOL. Where encountered, appropriate drilling techniques will be used in order to minimize the impact. Discrete soil samples will be collected in accordance with SOP-07 *(Surface and Subsurface Soil Sampling)*. Soil will be classified and logged in accordance with SOP-06 *(Boring Log Completion, Soil Classification, and Logging)*, and field screening of soil samples will be collected in accordance with SOP-04 *(Organic Vapor Monitoring and Air Monitoring)*.

The soil samples will be analyzed for GRO, DRO, RRO, VOCs, PAHs, and metals to address known fuel- and oil-related contamination. Table D5-OT099 presents proposed sampling locations, depths, media, and target analytes for the investigation. Specific laboratory methods, bottle requirements, field preservation requirements, and sample volumes for these analyses are provided in Worksheet #19. Quality assurance (QA)/quality control (QC) samples will be collected as specified in Worksheet #20. Procedures listed in SOP-18 *(Packing and Shipping of Environmental Samples)* and SOP-19 *(Sample Handling and Custody)* will be followed during sample handling.

Groundwater Sampling

Because Site OT099 is located south of the cantonment “triangle” area, the goal of groundwater sampling at the site is to evaluate the degree to which contamination at the site is contributing to the underlying groundwater plumes, as described in DQO 4 (Table 10-2) of Worksheet #10 and in the groundwater sampling approach discussed in Worksheet #14.

The nature and extent of groundwater contamination of the Base triangle area will be evaluated as part of the FOL-wide groundwater sampling program described in the 2010 Hydrogeologic Study Field Sampling Plan. As shown in Table D5-OT099, groundwater samples will be collected at discrete direct push sampling locations OT099GP004 and OT099GP005 situated within the source area and upgradient of the site (Figure D8-OT099). The purpose of groundwater sampling is to determine whether groundwater has been affected by documented surface spills at the site. Additional sampling of existing monitoring well 12-MW-01 will be addressed in the 2010 Hydrogeologic Study Field Sampling Plan.

As listed in Table D5-OT099, grab groundwater samples will be collected at two depths (one at the top of the water table and one 10 feet below the top of the permanently saturated zone). The groundwater sample 10 feet beneath the bottom of the variably saturated zone will be co-located with the soil sample described in the previous section. If there is visible evidence of soil contamination at other depths within the variably saturated zone, additional grab groundwater and co-located soil samples will be collected. The purpose of collecting co-located soil and groundwater samples is to provide information for evaluating phase partitioning from contaminated soil. Grab groundwater samples will be collected using direct push methods following SOP-24 *(Direct Push Groundwater Sampling)*. Sample collection procedures will follow SOP-13 (*Groundwater Sampling Procedures*).

Groundwater samples will be analyzed for GRO, DRO, RRO, VOCs, PAHs, dissolved metals, and field parameters (pH, temperature, specific conductivity, dissolved oxygen, and ORP). Field parameters will be collected in accordance with SOP-12 (*Field Water Quality Measurements and Calibration*). Specific laboratory methods, bottle requirements, field preservation requirements, and sample volumes for these analyses are provided in Worksheet #19. QA/QC samples will be collected as specified in Worksheet #20. Procedures listed in SOP-18 *(Packing and Shipping of Environmental Samples)* and SOP-19 *(Sample Handling and Custody)* will be followed during sample handling.

Soil Excavation and Confirmation Sampling

As shown on Figure D8-OT099, the lateral extent of the excavation will initially target the areas of known surface and subsurface exceedances of the extent soil SLs shown on Figures D5-OT099 and D6-OT099. Because the two excavation areas in the northern portion of the site are targeting localized exceedances of the extent soil SLs (as shown in Supplement D2-OT099), discrete soil borings to delineate the vertical extent of excavation will not be installed. Excavation activities will proceed in accordance with SOP-23 (*Soil Excavation and Confirmation Sampling*). Soil samples collected during excavation will be analyzed using appropriate field kit methods following SOP-22 (*Field Test Kit Analyses*). Excavation will continue until field analysis indicates soil concentrations of target analyses are below extent soil SLs or a decision is made through the Triad process to limit the extent of the excavation based on other criteria. Once the field analysis indicates soil concentrations of target analyses are below SI soil SLs (or the excavation is discontinued for other reasons), confirmation samples will be sent for laboratory analysis. If SI soil SLs are exceeded in the laboratory confirmation samples, the Triad team will discuss the need for and location of step-out samples, as well as the need for additional excavation. If target analyte concentrations are below SI soil SLs in the laboratory confirmation samples, the excavation can be considered complete, and no further action will be required.

If possible, excavated soil will be transported to a landfarming site established for treatment of FOL soils. Otherwise, it will be containerized and properly disposed of in accordance with Appendix B (Project-specific Waste Management Plan).

Confirmation soil samples will be collected from locations within the sidewalls and bottom of the excavation following SOP-29 (*Soil Excavation and Confirmation Sampling*). Example sample information is provided in Table D5-OT099. Soil will be classified and logged in accordance with SOP-06 *(Boring Log Completion, Soil Classification, and Logging)*, and field screening of soil samples will be collected in accordance with SOP-04 *(Organic Vapor Monitoring and Air Monitoring)*.

Specific laboratory methods, bottle requirements, field preservation requirements, and sample volumes for these analyses are provided in Worksheet #19. QA/QC samples will be collected as specified in Worksheet #20. Procedures listed in SOP-18 *(Packing and Shipping of Environmental Samples)* and SOP-19 *(Sample Handling and Custody)* will be followed during sample handling.

Surveying

Sample locations will be surveyed for horizontal position in accordance with SOP-16 (*Global Positioning Satellite System [GPS] Surveying)*.

Equipment Calibration

Field water quality measurement equipment will be calibrated in accordance with SOP-12 *(Field Water Quality Measurements and Calibration)*.

Equipment Decontamination

Non-dedicated equipment will be decontaminated in accordance with SOP-14 (*Equipment Decontamination Procedures)*.

Investigation-derived Waste Management

Investigation-derived waste will be handled in accordance with Appendix B *(Project-specific Waste Management Plan).*

4.11.3 Sample Identification

Samples collected at Site OT099 will be named in accordance with SOP-19 *(Sample Handling and Custody)*.

4.11.4 Post-investigation Activities

During the field investigation, meetings or conference calls will be held to discuss the investigation results, provide a suggested path forward, and reach consensus on additional work needs. After the fieldwork related to this investigation has been performed, the results will be documented in a data evaluation report, and the anticipated path for further action or site closure will be identified.

4.12 Works Cited

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Table D1-OT099
Statistical Summary of Soil Analytical Results[a]

Analyte Name	Result Units	Minimum ND	Maximum ND	Number of Samples	Number of Locations	Frequency of Detection	Location of Minimum Detection	Minimum Detection Result	Location of Maximum Detection	Maximum Detection Result	Extent Soil Screening Level	Number of Exceedances
Explosives												
2,4-Dinitrotoluene	mg/kg	0.35	0.35	1	1							
2,6-Dinitrotoluene	mg/kg	0.35	0.35	1	1							
Nitrobenzene	mg/kg	0.35	0.35	1	1							
Hydrocarbons												
C10-C25 DRO	mg/kg	2.06	2.06	45	33	97.8%	05DC-K10A-024 (7/23/2005)	0.0043	DCA-HA2 (7/19/2008)	12900	250	24
C25-C36 RRO	mg/kg			44	32	100.0%	05DC-K10A-024 (7/23/2005)	0.0531	05DC-K10-004 (7/22/2005)	39000	1000	21
C6-C10 GRO	mg/kg	0.47	10	38	29	60.5%	DCA-HA4 (7/22/2008)	0.616	DCA-HA8 (7/22/2008)	154	140	1
Metals												
Aluminum	mg/kg			1	1	100.0%	12-MW-01 (8/27/1992)	7800	12-MW-01 (8/27/1992)	7800	b	c
Antimony	mg/kg	7.3	7.3	1	1	0.0%					b	c
Arsenic	mg/kg			1	1	100.0%	12-MW-01 (8/27/1992)	4.3	12-MW-01 (8/27/1992)	4.3	b	c
Barium	mg/kg			1	1	100.0%	12-MW-01 (8/27/1992)	110	12-MW-01 (8/27/1992)	110	b	c
Beryllium	mg/kg	0.15	0.15	1	1	0.0%					b	c
Cadmium	mg/kg	0.36	0.36	1	1	0.0%					b	c
Calcium	mg/kg			1	1	100.0%	12-MW-01 (8/27/1992)	7900	12-MW-01 (8/27/1992)	7900	b	c
Chromium	mg/kg			1	1	100.0%	12-MW-01 (8/27/1992)	15	12-MW-01 (8/27/1992)	15	b	c
Cobalt	mg/kg			1	1	100.0%	12-MW-01 (8/27/1992)	8.1	12-MW-01 (8/27/1992)	8.1	b	c
Copper	mg/kg			1	1	100.0%	12-MW-01 (8/27/1992)	11	12-MW-01 (8/27/1992)	11	b	c
Iron	mg/kg			1	1	100.0%	12-MW-01 (8/27/1992)	15000	12-MW-01 (8/27/1992)	15000	b	c
Lead	mg/kg			1	1	100.0%	12-MW-01 (8/27/1992)	3.7	12-MW-01 (8/27/1992)	3.7	b	c
Magnesium	mg/kg			1	1	100.0%	12-MW-01 (8/27/1992)	4800	12-MW-01 (8/27/1992)	4800	b	c
Manganese	mg/kg			1	1	100.0%	12-MW-01 (8/27/1992)	260	12-MW-01 (8/27/1992)	260	b	c
Mercury	mg/kg			1	1	100.0%	12-MW-01 (8/27/1992)	0.081	12-MW-01 (8/27/1992)	0.081	b	c
Molybdenum	mg/kg	3.6	3.6	1	1	0.0%					b	c
Nickel	mg/kg			1	1	100.0%	12-MW-01 (8/27/1992)	18	12-MW-01 (8/27/1992)	18	b	c
Potassium	mg/kg			1	1	100.0%	12-MW-01 (8/27/1992)	620	12-MW-01 (8/27/1992)	620	b	c
Selenium	mg/kg	0.37	0.37	1	1	0.0%					b	c
Silver	mg/kg	0.73	0.73	1	1	0.0%					b	c
Thallium	mg/kg	7.3	7.3	1	1	0.0%					b	c
Vanadium	mg/kg			1	1	100.0%	12-MW-01 (8/27/1992)	32	12-MW-01 (8/27/1992)	32	b	c
Zinc	mg/kg			1	1	100.0%	12-MW-01 (8/27/1992)	39	12-MW-01 (8/27/1992)	39	b	c
PCBs												
Total PCBs	mg/kg	1.7	1.7	1	1							
SVOCs												
1-Methylnaphthalene	mg/kg	0.0186	0.0753	12	7	66.7%	05DC-I10-002 (7/22/2005)	0.00278	DCA-HA1 (7/19/2008)	9.59	6.2	1
2,4,5-Trichlorophenol	mg/kg	0.35	0.35	1	1							
2,4,6-Trichlorophenol	mg/kg	0.35	0.35	1	1							
2,4-Dichlorophenol	mg/kg	0.35	0.35	1	1							
2,4-Dimethylphenol	mg/kg	0.35	0.35	1	1							
2,4-Dinitrophenol	mg/kg	1.7	1.7	1	1							
2-Chloronaphthalene	mg/kg	0.35	0.35	1	1							
2-Chlorophenol	mg/kg	0.35	0.35	1	1							
2-Methylnaphthalene	mg/kg	0.0186	0.35	13	8	61.5%	05DC-I10-002 (7/22/2005)	0.00361	DCA-HA1 (7/19/2008)	12	6.1	1
2-Methylphenol	mg/kg	0.35	0.35	1	1							
2-Nitroaniline	mg/kg	1.7	1.7	1	1							
2-Nitrophenol	mg/kg	0.35	0.35	1	1							
3,3-Dichlorobenzidine	mg/kg	0.69	0.69	1	1							

Table D1-OT099
Statistical Summary of Soil Analytical Results[a]

Analyte Name	Result Units	Minimum ND	Maximum ND	Number of Samples	Number of Locations	Frequency of Detection	Location of Minimum Detection	Minimum Detection Result	Location of Maximum Detection	Maximum Detection Result	Extent Soil Screening Level	Number of Exceedances
3-Nitroaniline	mg/kg	1.7	1.7	1	1							
4,6-Dinitro-2-Methylphenol	mg/kg	1.7	1.7	1	1							
4-Bromophenyl Phenyl Ether	mg/kg	0.35	0.35	1	1							
4-Chloro-3-Methylphenol	mg/kg	0.35	0.35	1	1							
4-Chloroaniline	mg/kg	0.35	0.35	1	1							
4-Chlorophenyl Phenyl Ether	mg/kg	0.35	0.35	1	1							
4-Methylphenol	mg/kg	0.35	0.35	1	1							
4-Nitroaniline	mg/kg	1.7	1.7	1	1							
4-Nitrophenol	mg/kg	1.7	1.7	1	1							
Acenaphthene	mg/kg	0.00163	0.35	13	8							
Acenaphthylene	mg/kg	0.00163	0.35	13	8							
Anthracene	mg/kg	0.00163	0.35	13	8							
Benzo(a)anthracene	mg/kg	0.00167	0.516	13	8	7.7%	DCA-HA2 (7/19/2008)	0.00198	DCA-HA2 (7/19/2008)	0.00198	0.49	0
Benzo(a)pyrene	mg/kg	0.00167	0.516	13	8	15.4%	DCA-HA2 (7/19/2008)	0.00227	DCA-HA3 (7/19/2008)	0.0294	0.049	0
Benzo(b)fluoranthene	mg/kg	0.00163	0.516	13	8							
Benzo(g,h,i)perylene	mg/kg	0.00167	0.516	13	8	30.8%	DCA-HA2 (7/19/2008)	0.00316	DCA-HA3 (7/19/2008)	0.0531	140	0
Benzo(k)fluoranthene	mg/kg	0.00163	0.516	13	8							
Benzoic acid	mg/kg	1.7	1.7	1	1							
Benzyl alcohol	mg/kg	0.35	0.35	1	1							
bis(2-Chloroethyl)ether	mg/kg	0.35	0.35	1	1							
bis(2-Chloroisopropyl)ether	mg/kg	0.35	0.35	1	1							
bis(2-Ethylhexyl)phthalate	mg/kg	0.35	0.35	1	1							
Butyl Benzyl Phthalate	mg/kg	0.35	0.35	1	1							
Chrysene	mg/kg	0.00167	0.516	13	8	15.4%	DCA-HA2 (7/19/2008)	0.0021	DCA-HA1 (7/19/2008)	0.00216	49	0
Dibenz(a,h)anthracene	mg/kg	0.00163	0.516	13	8							
Dibenzofuran	mg/kg	0.35	0.35	1	1							
Diethyl phthalate	mg/kg	0.35	0.35	1	1							
Dimethyl phthalate	mg/kg	0.35	0.35	1	1							
di-n-Butyl Phthalate	mg/kg	0.35	0.35	1	1							
di-n-Octyl Phthalate	mg/kg	0.35	0.35	1	1							
Fluoranthene	mg/kg	0.00167	0.516	13	8	23.1%	DCA-HA2 (7/19/2008)	0.00234	DCA-HA1 (7/19/2008)	0.0317	190	0
Fluorene	mg/kg	0.00163	0.35	13	8	15.4%	05DC-J10-003 (7/22/2005)	0.313	DCA-HA1 (7/19/2008)	0.46	220	0
Hexachlorobenzene	mg/kg	0.35	0.35	1	1							
Hexachlorocyclopentadiene	mg/kg	0.35	0.35	1	1							
Hexachloroethane	mg/kg	0.35	0.35	1	1							
Indeno(1,2,3-cd)pyrene	mg/kg	0.00163	0.516	13	8	7.7%	DCA-HA3 (7/19/2008)	0.0202	DCA-HA3 (7/19/2008)	0.0202	0.49	0
Isophorone	mg/kg	0.35	0.35	1	1							
N-Nitrosodiphenylamine	mg/kg	0.35	0.35	1	1							
N-Nitrosodipropylamine	mg/kg	0.35	0.35	1	1							
Pentachlorophenol	mg/kg	1.7	1.7	1	1							
Phenanthrene	mg/kg	0.00182	0.35	13	8	53.8%	DCA-HA3 (7/19/2008)	0.0027	05DC-J10-003 (7/22/2005)	0.51	2060	0
Phenol	mg/kg	0.35	0.35	1	1							
Pyrene	mg/kg	0.00167	0.516	13	8	30.8%	DCA-HA2 (7/19/2008)	0.00378	DCA-HA2 (7/19/2008)	0.0897	140	0
VOCs												
1,1,1,2-Tetrachloroethane	mg/kg	0.00734	0.0195	17	8							
1,1,1-Trichloroethane	mg/kg	0.0052	0.0195	18	9							
1,1,2,2-Tetrachloroethane	mg/kg	0.0052	0.0374	18	9							
1,1,2-Trichloroethane	mg/kg	0.0052	0.0195	18	9							

Table D1-OT099
Statistical Summary of Soil Analytical Results[a]

Analyte Name	Result Units	Minimum ND	Maximum ND	Number of Samples	Number of Locations	Frequency of Detection	Location of Minimum Detection	Minimum Detection Result	Location of Maximum Detection	Maximum Detection Result	Extent Soil Screening Level	Number of Exceedances
1,1-Dichloroethane	mg/kg	0.0052	0.0195	18	9							
1,1-Dichloroethene	mg/kg	0.0052	0.0195	18	9							
1,1-Dichloropropene	mg/kg	0.00734	0.0195	17	8							
1,2,3-Trichlorobenzene	mg/kg	0.0141	0.0374	17	8							
1,2,3-Trichloropropane	mg/kg	0.0141	0.0374	17	8							
1,2,4-Trichlorobenzene	mg/kg	0.0141	0.35	18	9							
1,2,4-Trimethylbenzene	mg/kg	0	0.0192	27	8	3.7%	DCA-HA1 (7/19/2008)	0.058	DCA-HA1 (7/19/2008)	0.058	4.9	0
1,2-Dibromo-3-Chloropropane	mg/kg	0.0292	0.0773	17	8							
1,2-Dichlorobenzene	mg/kg	0.00734	0.35	18	9							
1,2-Dichloroethane	mg/kg	0.0052	0.0195	18	9							
1,2-Dichloropropane	mg/kg	0.0052	0.0195	18	9							
1,3,5-Trimethylbenzene	mg/kg	0	0.0192	27	8	3.7%	DCA-HA1 (7/19/2008)	0.0287	DCA-HA1 (7/19/2008)	0.0287	4.2	0
1,3-Dichlorobenzene	mg/kg	0.00734	0.35	18	9							
1,3-Dichloropropane	mg/kg	0.00734	0.0195	17	8							
1,4-Dichlorobenzene	mg/kg	0.00734	0.35	18	9							
1-Chlorohexane	mg/kg	0.00734	0.0195	17	8							
2,2-Dichloropropane	mg/kg	0.00734	0.0195	17	8							
2-Butanone (MEK)	mg/kg	0.0734	0.195	18	9							
2-Chloroethyl Vinyl Ether	mg/kg	0.1	0.1	1	1							
2-Chlorotoluene	mg/kg	0.00734	0.0195	17	8							
2-Hexanone	mg/kg	0.052	0.195	18	9							
4-Chlorotoluene	mg/kg	0.00734	0.0195	17	8							
4-Methyl-2-Pentanone (MIBK)	mg/kg	0.052	0.195	18	9							
Acetone	mg/kg	0.0734	0.195	18	9							
Benzene	mg/kg	0	0.0394	48	29	4.2%	05DC-I9-011 (7/22/2005)	0.0338	DCA-HA2 (7/19/2008)	0.0527	0.025	2
bis(2-Chloroethoxy)methane	mg/kg	0.35	0.35	1	1							
Bromobenzene	mg/kg	0.00734	0.0195	17	8							
Bromochloromethane	mg/kg	0.00734	0.0195	17	8							
Bromodichloromethane	mg/kg	0.0052	0.0195	18	9							
Bromoform	mg/kg	0.0052	0.0195	18	9							
Bromomethane	mg/kg	0.01	0.155	18	9							
Carbon Disulfide	mg/kg	0.0052	0.0052	1	1							
Carbon Tetrachloride	mg/kg	0.0052	0.0195	18	9							
Chlorobenzene	mg/kg	0.0052	0.0195	18	9							
Chloroethane	mg/kg	0.01	0.155	18	9							
Chloroform	mg/kg	0.0052	0.0195	18	9							
Chloromethane	mg/kg	0.00734	0.0195	18	9							
cis-1,2-Dichloroethene	mg/kg	0	0.0195	27	8							
cis-1,3-Dichloropropene	mg/kg	0.0052	0.0195	18	9							
Dibromochloromethane	mg/kg	0.0052	0.0195	18	9							
Dibromomethane	mg/kg	0.00734	0.0195	17	8							
Dichlorodifluoromethane	mg/kg	0.0141	0.0374	17	8							
Ethylbenzene	mg/kg	0	0.158	48	29	4.2%	DCA-HA2 (7/19/2008)	0.0242	05DC-I9-011 (7/22/2005)	0.135	6.9	0
Ethylene Dibromide (EDB)	mg/kg	0.00734	0.0195	17	8							
Hexachlorobutadiene	mg/kg	0.0141	0.35	18	9							
Isopropylbenzene	mg/kg	0.00734	0.0195	17	8							
m- & p-Xylene	mg/kg	0	0.158	47	28	14.9%	05DC-I10-002 (7/22/2005)	0.0282	05DC-I9-011 (7/22/2005)	0.135		0
Methyl tert-Butyl Ether (MTBE)	mg/kg	0.0113	0.0299	17	8							

Table D1-OT099
Statistical Summary of Soil Analytical Results[a]

Analyte Name	Result Units	Minimum ND	Maximum ND	Number of Samples	Number of Locations	Frequency of Detection	Location of Minimum Detection	Minimum Detection Result	Location of Maximum Detection	Maximum Detection Result	Extent Soil Screening Level	Number of Exceedances
Methylene Chloride	mg/kg	0.0292	0.0773	18	9	38.9%	12-MW-01 (8/27/1992)	0.0021	DCA-HA7 (7/22/2008)	0.114	0.016	6
Naphthalene	mg/kg	0.018	0.35	24	12	50.0%	05DC-I10-002 (7/22/2005)	0.00254	DCA-HA1 (7/19/2008)	3.45	2.8	1
n-Butylbenzene	mg/kg	0.00734	0.0195	17	8							
n-Propylbenzene	mg/kg	0.00734	0.0195	17	8							
o-Xylene	mg/kg	0	0.158	47	28	2.1%	05DC-I9-011 (7/22/2005)	0.135	05DC-I9-011 (7/22/2005)	0.135	380	0
p-Isopropyltoluene	mg/kg	0.00734	0.0195	17	8							
sec-Butylbenzene	mg/kg	0.00734	0.0195	17	8							
Styrene	mg/kg	0.0052	0.0195	18	9							
tert-Butylbenzene	mg/kg	0.00734	0.0195	17	8							
Tetrachloroethene (PCE)	mg/kg	0	0.0195	28	9							
Toluene	mg/kg	0	0.158	48	29	2.1%	05DC-I9-011 (7/22/2005)	0.135	05DC-I9-011 (7/22/2005)	0.135	6.5	0
trans-1,2-Dichloroethene	mg/kg	0	0.0195	28	9							
trans-1,3-Dichloropropene	mg/kg	0.0052	0.0195	18	9							
Trichloroethene (TCE)	mg/kg	0	0.0195	28	9							
Trichlorofluoromethane	mg/kg	0.0141	0.0374	17	8							
Vinyl Acetate	mg/kg	0.0052	0.0052	1	1							
Vinyl Chloride	mg/kg	0	0.0299	28	9							
Xylenes, Total	mg/kg	0.0052	0.0052	1	1							

[a]May not include all historical site data, only includes available validated electronic (data provided in Air Force database). See text for discussion of other historical data project screening level exceedances, if applicable.

[b] Screening levels for metals have not been finalized for this Work Plan; therefore, no screening levels are shown in this statistical summary table. Appendix C and Tables in Worksheet 15 identify ADEC Table B1/C Method 2 Cleanup levels and 1/10th of ADEC Table B1/C Method 2 Cleanup. Levels as screening levels for the purpose of identifying if LOD/LOQ are sufficient for this project.

[c] Screening levels for metals have not been finalized for this Work Plan; therefore, number of exceedances was not calculated. Metals will be analyzed at sites based on site use in accordance with steps outlined in Figure 15-1.

Notes:

ND = non detect

mg/kg = Milligrams per Kilogram

Table D2-OT099
Statistical Summary of Groundwater Analytical Results[a]

Analyte Name	Result Units	Minimum ND	Maximum ND	Number of Samples	Number of Locations	Frequency of Detection	Location of Minimum Detection	Minimum Detection Result	Location of Maximum Detection	Maximum Detection Result	Groundwater Screening Level	Number of Exceedances
Explosives												
2,4-Dinitrotoluene	µg/L	0.59	9.9	2	1							
2,6-Dinitrotoluene	µg/L	0.86	9.9	2	1							
Nitrobenzene	µg/L	0.84	9.9	2	1							
Hydrocarbons												
C10-C25 DRO	µg/L			1	1	100.0%	12-MW-01 (6/6/1993)	11	12-MW-01 (6/6/1993)	11	150	0
C6-C10 GRO	µg/L			1	1	100.0%	12-MW-01 (6/6/1993)	49	12-MW-01 (6/6/1993)	49	220	0
Diethyl Ether	µg/L	1200	1200	1	1							
Ethanol	µg/L	300	300	1	1							
Metals												
Aluminum	mg/L			1	1	100.0%	12-MW-01 (6/6/1993)	0.0072	12-MW-01 (6/6/1993)	0.0072	b	c
Antimony	mg/L	0.024	0.1	2	1	0.0%					b	c
Arsenic	mg/L	0.0007	0.004	2	1	0.0%					b	c
Barium	mg/L			1	1	100.0%	12-MW-01 (6/6/1993)	0.21	12-MW-01 (6/6/1993)	0.21	b	c
Beryllium	mg/L	0.0006	0.0006	1	1	0.0%					b	c
Cadmium	mg/L	0.005	0.005	2	1	50.0%	12-MW-01 (6/6/1993)	0.0009	12-MW-01 (6/6/1993)	0.0009	b	c
Calcium	mg/L			1	1	100.0%	12-MW-01 (6/6/1993)	160	12-MW-01 (6/6/1993)	160	b	c
Chromium	mg/L			1	1	100.0%	12-MW-01 (6/6/1993)	0.0016	12-MW-01 (6/6/1993)	0.0016	b	c
Cobalt	mg/L	0.0034	0.0034	1	1	0.0%					b	c
Copper	mg/L			1	1	100.0%	12-MW-01 (6/6/1993)	0.0027	12-MW-01 (6/6/1993)	0.0027	b	c
Iron	mg/L			1	1	100.0%	12-MW-01 (6/6/1993)	0.0914	12-MW-01 (6/6/1993)	0.0914	b	c
Lead	mg/L			2	1	100.0%	12-MW-01 (9/23/1992)	0.0065	12-MW-01 (6/6/1993)	0.0129	b	c
Magnesium	mg/L			1	1	100.0%	12-MW-01 (6/6/1993)	30.1	12-MW-01 (6/6/1993)	30.1	b	c
Manganese	mg/L			2	1	100.0%	12-MW-01 (9/23/1992)	0.034	12-MW-01 (6/6/1993)	0.105	b	c
Mercury	mg/L	0.000048	0.000048	1	1	0.0%					b	c
Molybdenum	mg/L	0.0046	0.0046	1	1	0.0%					b	c
Nickel	mg/L	0.0099	0.0099	1	1	0.0%					b	c
Potassium	mg/L			1	1	100.0%	12-MW-01 (6/6/1993)	2.79	12-MW-01 (6/6/1993)	2.79	b	c
Selenium	mg/L	0.005	0.005	2	1	50.0%	12-MW-01 (6/6/1993)	0.0054	12-MW-01 (6/6/1993)	0.0054	b	c
Silver	mg/L	0.0049	0.0049	1	1	0.0%					b	c
Sodium	mg/L			1	1	100.0%	12-MW-01 (6/6/1993)	5.97	12-MW-01 (6/6/1993)	5.97	b	c
Thallium	mg/L	0.017	0.1	2	1	0.0%					b	c
Vanadium	mg/L	0.0024	0.0024	1	1	0.0%					b	c
Zinc	mg/L			1	1	100.0%	12-MW-01 (6/6/1993)	0.0067	12-MW-01 (6/6/1993)	0.0067	b	c
PCBs/Pesticides												
4,4-DDD	µg/L	0.0081	0.011	2	1							
4,4-DDE	µg/L	0.0055	0.011	2	1							
4,4-DDT	µg/L	0.0101	0.021	2	1							
Aldrin	µg/L	0.0035	0.011	2	1							
alpha-BHC	µg/L	0.004	0.011	2	1							
alpha-Endosulfan	µg/L	0.0063	0.011	2	1							
Aroclor 1016	µg/L	0.101	0.11	2	1							
Aroclor 1221	µg/L	0.192	0.21	2	1							
Aroclor 1232	µg/L	0.0566	0.21	2	1							
Aroclor 1242	µg/L	0.0586	0.11	2	1							
Aroclor 1248	µg/L	0.11	0.152	2	1							
Aroclor 1254	µg/L	0.0798	0.21	2	1							
Aroclor 1260	µg/L	0.0455	0.21	2	1							
beta-BHC	µg/L	0.0065	0.011	2	1							
beta-Endosulfan	µg/L	0.0051	0.032	2	1							
Chlordane	µg/L	0.0303	0.053	2	1							
delta-BHC	µg/L	0.0022	0.0022	1	1							
Dieldrin	µg/L	0.0081	0.011	2	1							

Table D2-OT099
Statistical Summary of Groundwater Analytical Results[a]

Analyte Name	Result Units	Minimum ND	Maximum ND	Number of Samples	Number of Locations	Frequency of Detection	Location of Minimum Detection	Minimum Detection Result	Location of Maximum Detection	Maximum Detection Result	Groundwater Screening Level	Number of Exceedances
Endosulfan Sulfate	µg/L	0.053	0.053	2	1	50.0%	12-MW-01 (6/6/1993)	0.012	12-MW-01 (6/6/1993)	0.012		0
Endrin	µg/L	0.011	0.0121	2	1							
Endrin Aldehyde	µg/L	0.0067	0.021	2	1							
gamma-BHC	µg/L	0.0047	0.011	2	1							
Heptachlor	µg/L	0.011	0.0333	2	1							
Heptachlor Epoxide	µg/L	0.0253	0.0253	1	1							
Methoxychlor	µg/L	0.0495	0.053	2	1							
Total PCBs	µg/L	0.89	49	2	1							
Toxaphene	µg/L	0.0101	0.53	2	1							
SVOCs												
2,4,5-Trichlorophenol	µg/L	0.51	9.9	2	1							
2,4,6-Trichlorophenol	µg/L	0.5	9.9	2	1							
2,4-Dichlorophenol	µg/L	0.57	9.9	2	1							
2,4-Dimethylphenol	µg/L	1.3	9.9	2	1							
2,4-Dinitrophenol	µg/L	4.2	49	2	1							
2-Chloronaphthalene	µg/L	0.39	9.9	2	1							
2-Chlorophenol	µg/L	0.64	9.9	2	1							
2-Methylnaphthalene	µg/L	0.36	9.9	2	1							
2-Methylphenol	µg/L	0.31	9.9	2	1							
2-Nitroaniline	µg/L	0.66	49	2	1							
2-Nitrophenol	µg/L	0.52	9.9	2	1							
3,3-Dichlorobenzidine	µg/L	0.33	20	2	1							
3-Nitroaniline	µg/L	0.39	49	2	1							
4,6-Dinitro-2-Methylphenol	µg/L	0.43	49	2	1							
4-Bromophenyl Phenyl Ether	µg/L	0.49	9.9	2	1							
4-Chloro-3-Methylphenol	µg/L	0.52	9.9	2	1							
4-Chloroaniline	µg/L	0.74	9.9	2	1							
4-Chlorophenyl Phenyl Ether	µg/L	0.42	9.9	2	1							
4-Methylphenol	µg/L	0.46	9.9	2	1							
4-Nitroaniline	µg/L	0.61	49	2	1							
4-Nitrophenol	µg/L	0.94	49	2	1							
Acenaphthene	µg/L	0.27	1.9	2	1							
Acenaphthylene	µg/L	0.42	2.4	2	1							
Anthracene	µg/L	0.139	0.69	2	1							
Benzo(a)anthracene	µg/L	0.0028	0.014	2	1							
Benzo(a)pyrene	µg/L	0.024	0.024	2	1	50.0%	12-MW-01 (6/6/1993)	0.0027	12-MW-01 (6/6/1993)	0.0027	0.014	0
Benzo(b)fluoranthene	µg/L	0.019	0.019	2	1	50.0%	12-MW-01 (6/6/1993)	0.0081	12-MW-01 (6/6/1993)	0.0081	0.12	0
Benzo(g,h,i)perylene	µg/L	0.0277	0.08	2	1							
Benzo(k)fluoranthene	µg/L	0.018	0.018	2	1	50.0%	12-MW-01 (6/6/1993)	0.0059	12-MW-01 (6/6/1993)	0.0059	1.2	0
Benzoic acid	µg/L	39	49	2	1							
Benzyl alcohol	µg/L	0.61	9.9	2	1							
bis(2-Chloroethyl)ether	µg/L	0.38	9.9	2	1							
bis(2-Chloroisopropyl)ether	µg/L	0.8	9.9	2	1							
bis(2-Ethylhexyl)phthalate	µg/L	0.58	0.58	2	1	50.0%	12-MW-01 (9/23/1992)	2.9	12-MW-01 (9/23/1992)	2.9	0.3	1
Butyl Benzyl Phthalate	µg/L	0.62	9.9	2	1							
Chrysene	µg/L	0.0485	0.16	2	1							
Dibenz(a,h)anthracene	µg/L	0.032	0.032	2	1	50.0%	12-MW-01 (6/6/1993)	0.0054	12-MW-01 (6/6/1993)	0.0054	0.012	0
Dibenzofuran	µg/L	0.54	9.9	2	1							
Diethyl phthalate	µg/L	0.52	9.9	2	1							
Dimethyl phthalate	µg/L	0.34	9.9	2	1							
di-n-Butyl Phthalate	µg/L	0.32	9.9	2	1							
di-n-Octyl Phthalate	µg/L	0.35	9.9	2	1							
Diphenyl Amine	µg/L	0.27	0.27	1	1							

Table D2-OT099
Statistical Summary of Groundwater Analytical Results[a]

Analyte Name	Result Units	Minimum ND	Maximum ND	Number of Samples	Number of Locations	Frequency of Detection	Location of Minimum Detection	Minimum Detection Result	Location of Maximum Detection	Maximum Detection Result	Groundwater Screening Level	Number of Exceedances
Fluoranthene	µg/L	0.0495	0.22	2	1							
Fluorene	µg/L	0.0792	0.22	2	1							
Hexachlorobenzene	µg/L	0.31	9.9	2	1							
Hexachlorocyclopentadiene	µg/L	5.9	9.9	2	1							
Hexachloroethane	µg/L	0.63	9.9	2	1							
Indeno(1,2,3-cd)pyrene	µg/L	9.9	9.9	2	1	50.0%	12-MW-01 (6/6/1993)	0.0022	12-MW-01 (6/6/1993)	0.0022	0.12	0
Isophorone	µg/L	0.62	9.9	2	1							
N-Nitrosodiphenylamine	µg/L	9.9	9.9	1	1							
N-Nitrosodipropylamine	µg/L	0.65	9.9	2	1							
Phenanthrene	µg/L	0.158	0.67	2	1							
Phenol	µg/L	0.88	9.9	2	1							
Pyrene	µg/L	0.0525	0.28	2	1							
VOCs												
1,1,1,2-Tetrachloroethane	µg/L	0.04	0.04	1	1							
1,1,1-Trichloroethane	µg/L			1	1	100.0%	12-MW-01 (6/6/1993)	0.163	12-MW-01 (6/6/1993)	0.163	11	0
1,1,2,2-Tetrachloroethane	µg/L	0.1	0.1	1	1							
1,1,2-Trichloroethane	µg/L	0.1	0.1	1	1							
1,1-Dichloroethane	µg/L	0.048	0.048	1	1							
1,1-Dichloroethene	µg/L	0.1	0.1	1	1							
1,2,3-Trichloropropane	µg/L	0.12	0.12	1	1							
1,2,4-Trichlorobenzene	µg/L	0.59	9.9	2	1							
1,2,4-Trimethylbenzene	µg/L	0	0	18	3							
1,2-Dichlorobenzene	µg/L	0.14	9.9	2	1							
1,2-Dichloroethane	µg/L	0.054	0.054	1	1							
1,2-Dichloropropane	µg/L	0.075	0.075	1	1							
1,3,5-Trimethylbenzene	µg/L	0	0	18	3							
1,3-Dichlorobenzene	µg/L	0.13	9.9	2	1							
1,4-Dichlorobenzene	µg/L	0.13	9.9	2	1							
1-Chlorohexane	µg/L	0.12	0.12	1	1							
2-Butanone (MEK)	µg/L	2400	2400	1	1							
2-Chloroethyl Vinyl Ether	µg/L	0.17	0.17	1	1							
4-Methyl-2-Pentanone (MIBK)	µg/L	1500	1500	1	1							
Benzene	µg/L	0	0	19	4	10.5%	12-MW-01 (6/6/1993)	0.0412	POL-GW328 (9/1/2008)	0.68	0.5	1
bis(2-Chloroethoxy)methane	µg/L	0.61	9.9	2	1							
Bromobenzene	µg/L			1	1	100.0%	12-MW-01 (6/6/1993)	0.645	12-MW-01 (6/6/1993)	0.645	8.8	0
Bromochloromethane	µg/L			1	1	100.0%	12-MW-01 (6/6/1993)	81	12-MW-01 (6/6/1993)	81		0
Bromodichloromethane	µg/L	0.068	0.068	1	1							
Bromoform	µg/L	0.14	0.14	1	1							
Bromomethane	µg/L	0.056	0.056	1	1							
Carbon Tetrachloride	µg/L	0.11	0.11	1	1							
Chlorobenzene	µg/L	0.12	0.12	1	1							
Chloroethane	µg/L	0.11	0.11	1	1							
Chloroform	µg/L	0.085	0.085	1	1							
Chloromethane	µg/L	0.15	0.15	1	1							
cis-1,2-Dichloroethene	µg/L	0	0	18	3							
cis-1,3-Dichloropropene	µg/L	0.074	0.074	1	1							
Dibromochloromethane	µg/L	0.17	0.17	1	1							
Dibromomethane	µg/L	0.14	0.14	1	1							
Ethylbenzene	µg/L	0	0	19	4	5.3%	12-MW-01 (6/6/1993)	0.0642	12-MW-01 (6/6/1993)	0.0642	7.3	0
Hexachlorobutadiene	µg/L	0.51	9.9	2	1							
m- & p-Xylene	µg/L	0	0	18	3							
Methylene Chloride	µg/L	0.22	0.22	1	1							
Naphthalene	µg/L	1.9	1.9	2	1	50.0%	12-MW-01 (6/6/1993)	0.0893	12-MW-01 (6/6/1993)	0.0893	1.1	0

Table D2-OT099
Statistical Summary of Groundwater Analytical Results[a]

Analyte Name	Result Units	Minimum ND	Maximum ND	Number of Samples	Number of Locations	Frequency of Detection	Location of Minimum Detection	Minimum Detection Result	Location of Maximum Detection	Maximum Detection Result	Groundwater Screening Level	Number of Exceedances
o-Xylene	µg/L	0	0	18	3							
sec-Butyl Alcohol	µg/L	0.1	0.1	1	1							
Tetrachloroethene (PCE)	µg/L	0	0.1	19	4							
Toluene	µg/L	0	0	19	4	15.8%	12-MW-01 (6/6/1993)	0.0712	POL-GW328 (9/1/2008)	0.39	2	0
trans-1,2-Dichloroethene	µg/L	0	0.1	19	4							
trans-1,3-Dichloropropene	µg/L	0.057	0.057	1	1							
Trichloroethene (TCE)	µg/L	0	0.11	19	4							
Trichlorofluoromethane	µg/L	0.075	0.075	1	1							
Vinyl Chloride	µg/L	0	0.2	19	4							
Xylenes, Total	µg/L			1	1	100.0%	12-MW-01 (6/6/1993)	0.131	12-MW-01 (6/6/1993)	0.131	13	0
General Chemistry												
Alkalinity, total (as CaCO3)	mg/L			1	1	100.0%	12-MW-01 (6/6/1993)	540	12-MW-01 (6/6/1993)	540		0
pH	PH UNITS			1	1	100.0%	12-MW-01 (6/6/1993)	6.17	12-MW-01 (6/6/1993)	6.17		0

[a]May not include all historical site data, only includes available validated electronic (data provided in Air Force database). See text for discussion of other historical data project screening level exceedances, if applicable.

[b] Screening levels for metals have not been finalized for this Work Plan; therefore, no screening levels are shown in this statistical summary table. Appendix C and Tables in Worksheet 15 identify ADEC Table B1/C Method 2 Cleanup levels and 1/10th of ADEC Table B1/C Method 2 Cleanup Levels as screening levels for the purpose of identifying if LOD/LOQ are sufficient for this project.

[c] Screening levels for metals have not been finalized for this Work Plan; therefore, number of exceedances was not calculated. Metals will be analyzed at sites based on site use in accordance with steps outlined in Figure 15-1.

Notes:
ND = non detect
mg/L = Milligrams per Liter
µg/L = Micrograms per Liter

Table D3-OT099

Historical Samples Exceeding Soil Extent Screening Levels[a,b]

	Location	05DC-A2-018	05DC-E10-001	05DC-E10A-021	05DC-E9-010		05DC-F10-006	05DC-G10-007	05DC-G11-014	05DC-G12-009	05DC-H10-019	05DC-H11-013	05DC-I10-002		05DC-I10A-022
	Sample ID	05DC-A2-018	05DC-E10-001	05DC-E10A-021	05DC-E9-010	05DC-Z2-110	05DC-F10-006	05DC-G10-007	05DC-G11-014	05DC-G12-009	05DC-H10-019	05DC-H11-013	05DC-I10-002	05DC-Z1-102	05DC-I10A-022
	Sample Depth (feet bgs)	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
	Sample Date	7/21/2005	7/22/2005	7/23/2005	7/22/2005	7/22/2005	7/22/2005	7/22/2005	7/22/2005	7/23/2005	7/22/2005	7/22/2005	7/22/2005	7/22/2005	7/23/2005
Analyte	**Screening Level**														
Hydrocarbons (mg/kg)															
C10-C25 DRO	250	**136 F**	**4590 J**	**4.65 F**	**237**	**158**	**1550 J**	**1000 J**	**600 J**	**148**	**1210**	**4200 J**	**514**	**651**	**3.96 F**
C6-C10 GRO	140	**2.42**	4.84 U	- -	**2.8 F**	4.9 U	3.55 U	4.84 U	5.34 U	**1.13 JB**	**1.07 JB**	3.11 U	4.57 U	**1.49 JB**	- -
C25-C36 RRO	1000	**1830**	**27200 J**	**51.8**	**1590**	**926**	**24900 J**	**24000 J**	**8010 J**	**742**	**7820 J**	**19600 J**	**3420 J**	**3750 J**	**53.9**
SVOCs (mg/kg)															
1-Methylnaphthalene	6.2	- -	0.0494 U	- -	- -	- -	- -	- -	- -	- -	- -	- -	**0.00278 JB**	0.00507 U	- -
2-Methylnaphthalene	6.1	- -	0.0494 U	- -	- -	- -	- -	- -	- -	- -	- -	- -	**0.00361 JB**	0.00507 U	- -
VOCs (mg/kg)															
Benzene	0.025	0.0244 U	0.0242 U	- -	0.0236 U	0.0245 U	0.0178 U	0.0242 U	0.0267 U	0.0211 U	0.0175 U	0.0156 U	0.0228 U	0.0213 U	- -
Methylene Chloride	0.016	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Naphthalene	2.8	- -	0.0494 U	- -	- -	- -	- -	- -	- -	- -	- -	- -	**0.00254 F**	0.00507 U	- -

Table D3-OT099

Historical Samples Exceeding Soil Extent Screening Levels[a,b]

	Location	05DC-I11-015	05DC-I12-005	05DC-I9-011	05DC-J10-003	05DC-J10A-023	05DC-J11-018	05DC-J9-008	05DC-K10-004	05DC-K10A-024	05DC-K11-020	05DC-K9-012	05DC-N5-017	12-MW-01		DCA-HA1
	Sample ID	05DC-I11-015	05DC-I12-005	05DC-I9-011	05DC-J10-003	05DC-J10A-023	05DC-J11-016	05DC-J9-008	05DC-K10-004	05DC-K10A-024	05DC-K11-020	05DC-K9-012	05DC-N5-017	12-MW-01-8/27/1992	HA123	DCA-HA1
	Sample Depth (feet bgs)	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	5 - 7	2 - 3	3
	Sample Date	7/22/2005	7/23/2005	7/22/2005	7/22/2005	7/23/2005	7/22/2005	7/22/2005	7/22/2005	7/23/2005	7/22/2005	7/22/2005	7/22/2005	8/27/1992	7/19/2008	7/1/2008
Analyte	**Screening Level**															
Hydrocarbons (mg/kg)																
C10-C25 DRO	250	**3670**	**1030 J**	**1210 J**	**8400 J**	**3.87 F**	**6.49 F**	**221 J**	**4610 J**	**0.0043 F**	**633**	**643**	**1890**	**20**	**345**	- -
C6-C10 GRO	140	**1.13 F**	4.5 U	**6.75**	**4.01 F**	- -	3.6 U	7.49 U	**1.78 JB**	- -	3.84 U	**1.52 F**	**2.28 JB**	10 U	**3.05 J**	- -
C25-C36 RRO	1000	**23900 J**	**26900 J**	**17200 J**	**18000 J**	**45.4**	**102**	**3080 J**	**39000 J**	**0.0531**	**4740 J**	**3710**	**38.3 JB**	- -	**482**	- -
SVOCs (mg/kg)																
1-Methylnaphthalene	6.2	- -	- -	- -	0.0516 U	- -	- -	- -	- -	- -	- -	- -	- -	- -	**0.016**	- -
2-Methylnaphthalene	6.1	- -	- -	- -	0.0516 U	- -	- -	- -	- -	- -	- -	- -	- -	0.35 U	**0.0349**	- -
VOCs (mg/kg)																
Benzene	0.025	0.0281 U	0.0225 U	**0.0338**	0.0257 U	- -	0.018 U	0.0375 U	0.0176 U	- -	0.0192 U	0.032 U	0.0394 U	0.0052 U	0.0125 U	0 U
Methylene Chloride	0.016	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	**0.0021 J**	0.0773 U	- -
Naphthalene	2.8	- -	- -	- -	0.0516 U	- -	- -	- -	- -	- -	- -	- -	- -	0.35 U	**0.0169**	- -

Table D3-OT099

Historical Samples Exceeding Soil Extent Screening Levels[a,b]

	Location				DCA-HA2						DCA-HA3					DCA-HA4			DCA-HA5		
	Sample ID	HA145	HA201	DCAHA2-0	HA212	DCA-HA2	HA245	DCA-HA2	HA301	DCAHA3-0	DCA-HA3	HA323	DCA-HA3	DCAHA4-0	DCAHA4-1	HA412	DCA-HA4	HA467	DCAHA5-0	DCA-HA5	DCAHA6-0
	Sample Depth (feet bgs)	4 - 5	0 - 1	0 - 1	1 - 2	2	4 - 5	5	0 - 1	0 - 1	1	2 - 3	3	0 - 1	1 - 2	1 - 2	2	6 - 7	0 - 1	1	0 - 1
	Sample Date	7/19/2008	7/19/2008	7/22/2008	7/19/2008	7/1/2008	7/19/2008	7/1/2008	7/19/2008	7/22/2008	7/1/2008	7/19/2008	7/1/2008	7/22/2008	7/22/2008	7/20/2008	7/1/2008	7/20/2008	7/22/2008	7/1/2008	7/22/2008
Analyte	**Screening Level**																				
Hydrocarbons (mg/kg)																					
C10-C25 DRO	250	**4230**	**40.1**	2.06 U	**12900**	- -	**137**	- -	**36.7**	**2400**	- -	**1490**	- -	**4.44 J**	**3.23 J**	**60.8**	- -	**27**	**2560**	- -	**247**
C6-C10 GRO	140	- -	**4.64 J**	0.806 U	**131**	- -	**4.9 J**	- -	**3.75 J**	0.523 U	- -	**50.1**	- -	**0.849 J**	**0.616 J**	- -	- -	- -	**1.03 J**	- -	0.47 U
C25-C36 RRO	1000	**310**	**173**	**16.2 J**	**531**	- -	**145**	- -	**137**	**16600**	- -	**192**	- -	**40.5**	**32.6**	**56.3**	- -	**29.7**	**28900**	- -	**8920**
SVOCs (mg/kg)																					
1-Methylnaphthalene	6.2	**9.59**	**0.00551 J**	- -	0.0186 U	- -	**0.0223**	- -	**0.0112**	- -	- -	0.0753 U	- -	- -	- -	**0.0141**	- -	**0.00591 J**	- -	- -	- -
2-Methylnaphthalene	6.1	**12**	**0.011**	- -	0.0186 U	- -	**0.0287**	- -	**0.0244**	- -	- -	0.0753 U	- -	- -	- -	**0.0281**	- -	**0.00955**	- -	- -	- -
VOCs (mg/kg)																					
Benzene	0.025	- -	**0.0527**	0.00806 U	0.0108 U	0 U	0.0118 U	0 U	0.0123 U	0.0057 U	0 U	0.012 U	0 U	0.00809 U	0.00613 U	- -	0 U	- -	0.00789 U	0 U	0.0047 U
Methylene Chloride	0.016	- -	0.0752 U	0.05 U	0.0671 U	- -	0.0734 U	- -	0.0765 U	0.0353 U	- -	0.0742 U	- -	0.0502 U	**0.0524 J**	- -	- -	- -	0.0489 U	- -	0.0292 U
Naphthalene	2.8	**3.45**	**0.00977**	**0.0427 J**	0.0186 U	- -	**0.0119**	- -	**0.0864 J**	**0.0202 J**	- -	0.0359 U	- -	0.0243 U	0.0184 U	**0.0132**	- -	**0.00453 J**	**0.0746 J**	- -	**0.0151 J**

Table D3-OT099

Historical Samples Exceeding Soil Extent Screening Levels[a,b]

	Location	DCA-HA6			DCA-HA7				DCA-HA8		
	Sample ID	DCAHA6-1	DCA-HA6	DCAHA7-0	DCAHA7-0D	DCAHA7-1	DCA-HA7	DCAHA8-0	DCAHA8-1	DCAHA8-1D	DCA-HA8
	Sample Depth (feet bgs)	1 - 2	2	0 - 1	0 - 1	1 - 2	2	0 - 1	1 - 2	1 - 2	2
	Sample Date	7/22/2008	7/1/2008	7/22/2008	7/22/2008	7/22/2008	7/1/2008	7/22/2008	7/22/2008	7/22/2008	7/1/2008
Analyte	**Screening Level**										
Hydrocarbons (mg/kg)											
C10-C25 DRO	250	**3.75 J**	- -	**817**	**972**	**30.8**	- -	**287**	**819**	**796**	- -
C6-C10 GRO	140	0.683 U	- -	0.663 U	**2.5 J**	0.747 U	- -	**7.83**	**154**	**98.4**	- -
C25-C36 RRO	1000	**27.5**	- -	**17000**	**18600**	**534**	- -	**39.1**	**37.1**	**267**	- -
SVOCs (mg/kg)											
1-Methylnaphthalene	6.2	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
2-Methylnaphthalene	6.1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
VOCs (mg/kg)											
Benzene	0.025	0.00683 U	0 U	0.00663 U	0.00675 U	0.00747 U	0 U	0.00688 U	0.006 U	0.00672 U	0 U
Methylene Chloride	0.016	**0.0509 J**	- -	**0.114 J**	**0.0847 J**	**0.0668 J**	- -	**0.0933 J**	0.0372 U	**0.0588 J**	- -
Naphthalene	2.8	0.0205 U	- -	0.0199 U	0.0203 U	0.0224 U	- -	0.0206 U	0.018 U	0.0201 U	- -

Table D3-OT099

Historical Samples Exceeding Soil Extent Screening Levels[a,b]

[a]May not include all historical site data, only includes available validated electronic (data provided in Air Force database). See text for discussion of other historical data project screening level exceedances, if applicable.

[b]Metals are not included in this table.

Notes:
-- = Not Analyzed
B = The analyte was detected in the associated method and/or calibration blank.
F = The sample result is between the method detection limit and the reporting limit.
J = The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
JB = The analyte detected in the associated field, equipment, and/or trip blank.
U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
mg/kg = Milligrams per Kilogram
bgs = below ground surface
Bold indicates the analyte was detected
Shading indicates the result exceeded screening criteria
Field duplicates are included in this table.

Table D4-OT099
Historical Samples Exceeding
Groundwater Screening Levels[a,b]

Location		12-MW-01		DCA-GW407				POL-GW328							POL-GW329						
Sample ID		12-MW-01-9/23/1992	12-MW-01-6/6/1993	DCA-GW407	DCA-GW407	DCA-GW407	DCA-GW407	POL-GW328	POL-GW328	POL-GW328	POL-GW328	POL-GW328	POL-GW328	POL-GW328	POL-GW329	POL-GW329	POL-GW329	POL-GW329	POL-GW329	POL-GW329	POL-GW329
Sample Depth (feet bgs)		11.3 - 30.4	11.3 - 30.4	30	50	70	90	26	36	56	76	96	116	123	25	35	55	75	95	115	126
Sample Date		9/23/1992	6/6/1993	10/1/2008	10/1/2008	10/1/2008	10/1/2008	9/1/2008	9/1/2008	9/1/2008	9/1/2008	9/1/2008	9/1/2008	9/1/2008	9/1/2008	9/1/2008	9/1/2008	9/1/2008	9/1/2008	9/1/2008	9/1/2008
Depth to Water (feet bgs)		14.74	8.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Measurement Date		9/1/1992	7/1/1993	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Analyte	**Screening Level**																				
SVOCs (µg/L)																					
bis(2-Ethylhexyl)phthalate	0.3	**2.9 J**	0.58 U	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
VOCs (µg/L)																					
Benzene	0.5	- -	**0.0412 J**	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	**0.68**	0 U	0 U	0 U	0 U	0 U	0 U	0 U

[a]May not include all historical site data, only includes available validated electronic (data provided in Air Force database). See text for discussion of other historical data project screening level exceedances, if applicable.

[b]Metals are not included in this table.

Notes:
-- = Not Analyzed
J = The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
µg/L = Micrograms per Liter
bgs = below ground surface
Bold indicates the analyte was detected
Shading indicates the result exceeded screening criteria
Field duplicates are included in this table.

TABLE D5-OT099

Proposed Sampling Locations and Rationale

Sampling Location	Field Sample ID	Easting (meters)	Northing (meters)	Media	Sample Type	Sample Depth (feet bgs)	GRO[a] AK101	DRO[a] AK102	RRO[a] AK103	Field Screening for TCE and PCE[a] SW8021B	VOCs[b] SW8260B	PAHs[b] SW8270C SIM	Total Metals[b,c] SW6010B/SW6020	Dissolved Metals[b,c] SW6010B/SW6020	Field Parameters[d]	Rationale
OT099GP001	OT099GP001-SO_00-02	597566.5578	7180440.837	Surface Soil	N	0 - 2	1	1	1	1	1	1	1			Collect soil samples between between ground surface and 10-feet into the permanently saturated zone to determine vertical extent of fuel-related contamination in soil beneath an area of known surface soil contamination.
	OT099GP001-SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1	1	1			
	OT099GP901-SO_05-07			Subsurface Soil	FD	5 - 7	1	1	1	1	1	1	1			
	OT099GP001-SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1		1			
	OT099GP001-SO_14-16			Subsurface Soil	N	~15 (Mid-point of Variably Saturated Zone)	1	1	1	1	1		1			
	OT099GP001-SO_24-26			Subsurface Soil	N	~25 (Bottom of Variably Saturated Zone)	1	1	1	1	1		1			
	OT099GP001-SO_34-36			Subsurface Soil	N	~35 (Permanently Saturated Zone)	1	1	1	1	1		1			
	OT099GP001-SO_34-36SPT			Subsurface Soil	SPT	~35 (Permanently Saturated Zone)	1	1	1							
OT099GP002	OT099GP002-SO_00-02	597524.1272	7180456.718	Surface Soil	N	0 - 2	1	1	1	1	1		1			Collect soil samples between between ground surface and 10-feet into the permanently saturated zone to determine vertical extent of fuel-related contamination in soil beneath an area of known surface soil contamination.
	OT099GP902-SO_00-02			Surface Soil	FD	0 - 2	1	1	1	1	1		1			
	OT099GP002-SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1		1			
	OT099GP002-SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1		1			
	OT099GP002-SO_14-16			Subsurface Soil	N	~15 (Mid-point of Variably Saturated Zone)	1	1	1	1	1		1			
	OT099GP002-SO_24-26			Subsurface Soil	N	~25 (Bottom of Variably Saturated Zone)	1	1	1	1	1		1			
	OT099GP002-SO_34-36			Subsurface Soil	N	~35 (Permanently Saturated Zone)	1	1	1	1	1		1			
OT099GP003	OT099GP003-SO_00-02	597521.9952	7180442.508	Surface Soil	N	0 - 2	1	1	1	1	1	1	1			Collect soil samples between between ground surface and 10-feet into the permanently saturated zone to determine vertical extent of fuel-related contamination in soil beneath an area of known surface soil contamination.
	OT099GP003-SO_00-02MS			Surface Soil	MS	0 - 2	1	1	1	1	1	1	1			
	OT099GP003-SO_00-02SD			Surface Soil	MSD	0 - 2	1	1	1	1	1	1	1			
	OT099GP003-SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1	1	1			
	OT099GP003-SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1		1			
	OT099GP003-SO_14-16			Subsurface Soil	N	~15 (Mid-point of Variably Saturated Zone)	1	1	1	1	1		1			
	OT099GP903-SO_14-16			Subsurface Soil	FD	~15 (Mid-point of Variably Saturated Zone)	1	1	1	1	1		1			
	OT099GP003-SO_24-26			Subsurface Soil	N	~25 (Bottom of Variably Saturated Zone)	1	1	1	1	1		1			
	OT099GP003-SO_34-36			Subsurface Soil	N	~35 (Permanently Saturated Zone)	1	1	1	1	1		1			
OT099GP004	OT099GP004-SO_00-02	597552.6321	7180446.499	Surface Soil	N	0 - 2	1	1	1	1	1	1	1			Collect soil samples between between ground surface and 10-feet into the permanently saturated zone to determine vertical extent of fuel-related contamination in soil beneath an area of known surface soil contamination.
	OT099GP004-SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1	1	1			
	OT099GP004-SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1		1			
	OT099GP004-SO_10-12SPT			Subsurface Soil	SPT	10 - 12	1	1	1							
	OT099GP004-SO_14-16			Subsurface Soil	N	~15 (Mid-point of Variably Saturated Zone)	1	1	1	1	1		1			
	OT099GP004-SO_24-26			Subsurface Soil	N	~25 (Bottom of Variably Saturated Zone)	1	1	1	1	1		1			
	OT099GP004-SO_34-36			Subsurface Soil	N	~35 (Permanently Saturated Zone)	1	1	1	1	1		1			
	OT099GP004-GW_05-15			Groundwater	N	~5 - 25 (Top of Water Table)	1	1	1		1	1		1	1	Collect groundwater samples beneath an area of known soil contamination to evaluate the degree to which the site is contributing to the underlying groundwater plume.
	OT099GP904-GW_05-15			Groundwater	FD	~5 - 25 (Top of Water Table)	1	1	1		1	1		1	1	
	OT099GP004-GW_35-40			Groundwater	N	~35 (Permanently Saturated Zone)	1	1	1		1			1	1	
OT099GP005	OT099GP005-SO_00-02	597559.0756	7180508.111	Surface Soil	N	0 - 2	1	1	1	1	1		1			Collect soil samples between between ground surface and 10-feet into the permanently saturated zone to evaluate soil concentrations at the upgradient boundary of the site.
	OT099GP005-SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1		1			
	OT099GP005-SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1		1			
	OT099GP005-SO_10-12MS			Subsurface Soil	MS	10 - 12	1	1	1	1	1		1			
	OT099GP005-SO_10-12SD			Subsurface Soil	MSD	10 - 12	1	1	1	1	1		1			

TABLE D5-OT099
Proposed Sampling Locations and Rationale

Sampling Location	Field Sample ID	Easting (meters)	Northing (meters)	Media	Sample Type	Sample Depth (feet bgs)	GRO[a] AK101	DRO[a] AK102	RRO[a] AK103	Field Screening for TCE and PCE[a] SW8021B	VOCs[b] SW8260B	PAHs[b] SW8270C SIM	Total Metals[b,c] SW6010B/SW6020	Dissolved Metals[b,c] SW6010B/SW6020	Field Parameters[d]	Rationale
	OT099GP005-SO_14-16			Subsurface Soil	N	~15 (Mid-point of Variably Saturated Zone)	1	1	1	1	1		1			
	OT099GP005-SO_24-26			Subsurface Soil	N	~25 (Bottom of Variably Saturated Zone)	1	1	1	1	1		1			
	OT099GP005-SO_24-26SPT			Subsurface Soil	SPT	~25 (Bottom of Variably Saturated Zone)	1	1	1							
	OT099GP005-SO_34-36			Subsurface Soil	N	~35 (Permanently Saturated Zone)	1	1	1	1	1		1			
	OT099GP005-GW_05-15			Groundwater	N	~5 - 25 (Top of Water Table)	1	1	1		1	1		1	1	Collect groundwater samples at the upgradient boundary of OT099 to evaluate the degree to which the site is contributing to the underlying groundwater plume.
	OT099GP005-GW_35-40			Groundwater	N	~35 (Permanently Saturated Zone)	1	1	1		1			1	1	
	OT099GP005-GW_35-40MS			Groundwater	MS	~35 (Permanently Saturated Zone)	1	1	1		1			1		
	OT099GP005-GW_35-40SD			Groundwater	MSD	~35 (Permanently Saturated Zone)	1	1	1		1			1		
OT099HA00#	OT099HA00#-SO_##-##			Subsurface Soil	N	TBD	1	1	1	1	1	1	1			Confirmation sample to be collected during excavation activities. Specific number of confirmation samples, locations, and depths will be determined based on field screening.
TBD	OT099-EB002	NA	NA	ASTM Type II	EB	NA	1	1	1		1	1	1			Equipment blank for Geoprobe equipment
TBD	OT099-EB003	NA	NA	ASTM Type II	EB	NA	1	1	1		1	1	1	1		Equipment blank for monitoring well sampling equipment
NA	OT099-TB01	NA	NA	ASTM Type II	TB	NA	1				1					Trip blank for cooler with GRO and/or VOC samples
NA	OT099-TB02	NA	NA	ASTM Type II	TB	NA	1				1					Trip blank for cooler with GRO and/or VOC samples
Totals																
OT099				Surface Soil			8	8	8	8	8	5	8	0	0	
OT099				Subsurface Soil			32	32	32	29	29	4	29	0	0	
OT099				Groundwater			7	7	7	0	7	3	0	7	5	
OT099				ASTM Type II			4	2	2	0	4	2	2	1	0	

[a]Analytical methods AK101, AK102, AK103, and SW8021B for soil will be performed at the on-site mobile lab; 10 percent of these samples have been identified for split analysis according to Worksheet #20.

[b]Soil sample analysis by this method will be performed at an off-site lab.

[c]Metals samples will be analyzed for arsenic, barium, cadmium, chromium, lead, nickel, and vanadium.

[d]Field parameters will be anlayzed for pH, temperature, specific conductivity, dissolved oxygen, and ORP using a water quality meter and flow-through cell as described in SOP-12.

Notes:

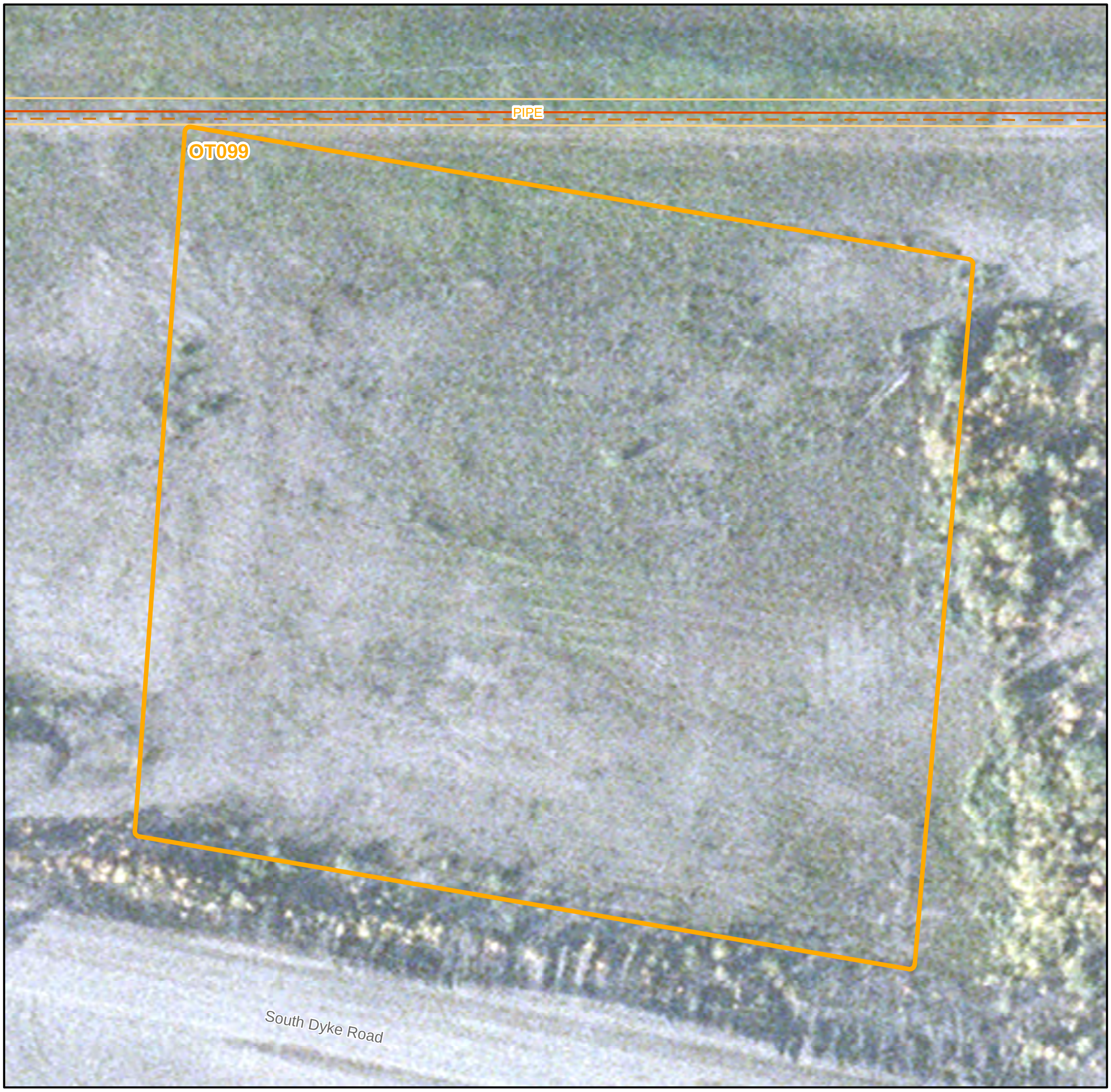
= sequential numbering, starting with 6; Not included in sample totals.

Analysis of all groundwater and split (SPT) soil samples will be performed at an off-site lab.

If visible evidence of soil contamination is observed (in soil borings where grab groundwater samples are to be collected) at depths within the variably saturated zone other than those specified in the table, additional soil and co-located groundwater samples will be collected at those depths.

Per Guidance in Appendix F of ADEC, 2010: "*For each source area, PAH analysis must be performed on a sufficient percentage of the samples with the highest GRO, DRO and/or RRO concentrations to determine if PAHs are contaminants of concern. In general, 10% is recommended for site characterization. If PAH concentrations are less than applicable cleanup levels, further PAH analysis is generally not required. PAHs should be sampled in groundwater if soil samples concentrations are above applicable cleanup levels and groundwater sampling is required* ."

bgs = below ground surface
NA = not applicable
TBD = to be determined
N = normal sample
FD = field duplicate sample
MS = matrix spike sample
MSD = matrix spike duplicate sample
EB = equipment blank
TB = trip blank
SPT = split sample

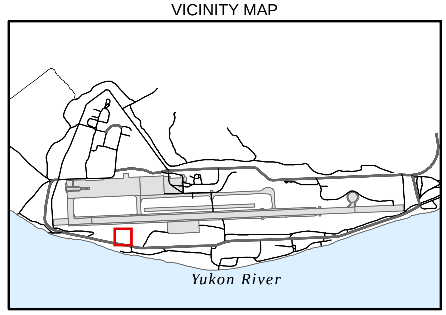


LEGEND

- OT099
- Adjacent Site
- Abandoned Fuel Line
- Main Fuel Line

Note:
1. Imagery September 4, 2009. Pixel size 0.25 meter

VICINITY MAP

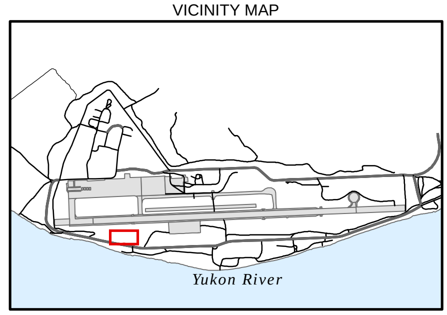


N

0 30 60
Feet

FIGURE D1-OT099
Site Layout
Work Plan for Site Inspection, Remedial Investigation, and Site Characterization
Former Galena Forward Operating Location, Alaska

VICINITY MAP



LEGEND

OT099

Notes:
1. Imagery August 2002. Pixel size 0.075 meter
2. Imagery September 4, 2009. Pixel size 0.25 meter

N

0 50 100
Feet

FIGURE D2-OT099
Historical Aerial Photography

Work Plan for Site Inspection, Remedial Investigation, and Site Characterization
Former Galena Forward Operating Location, Alaska

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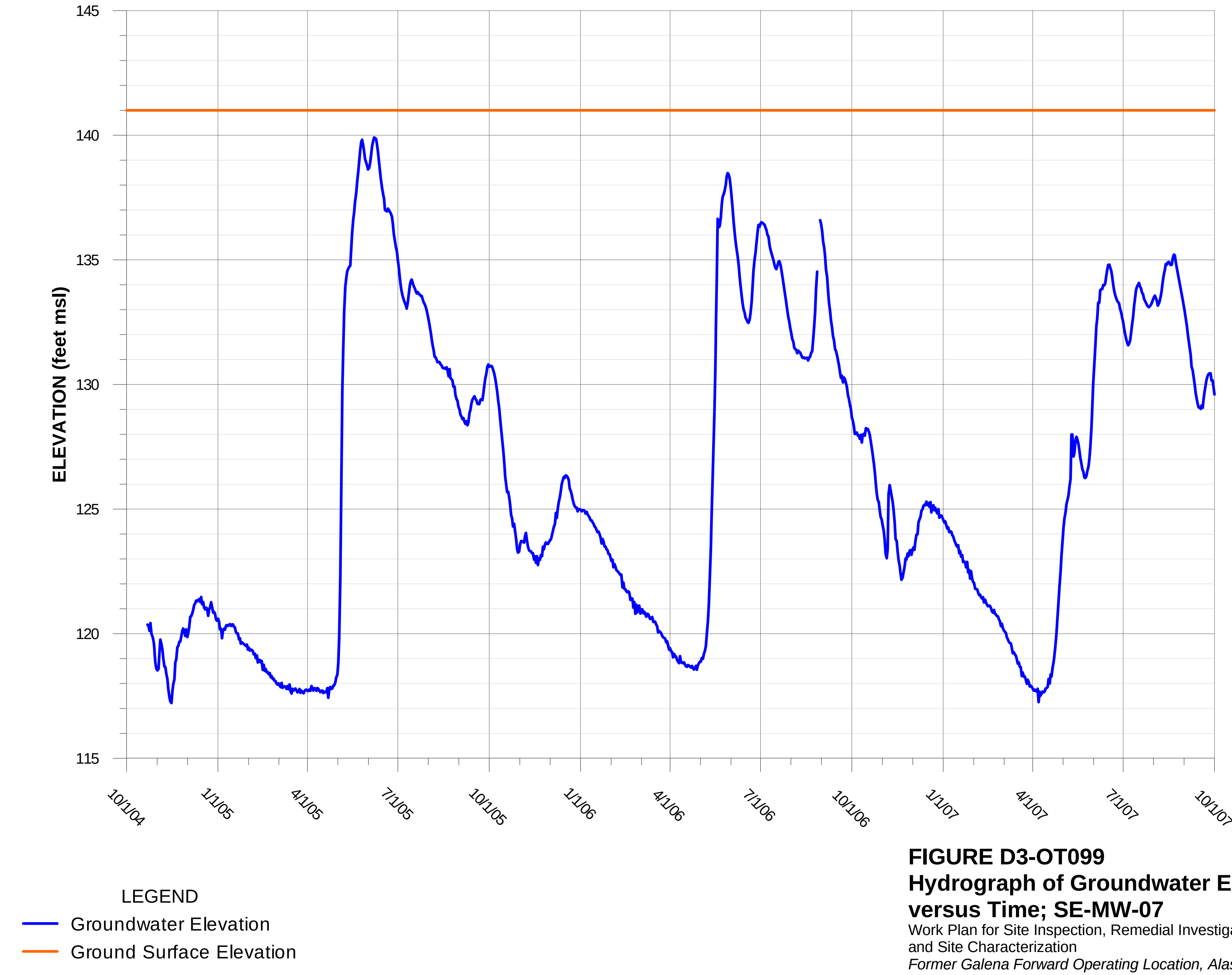

FIGURE D3-OT099
Hydrograph of Groundwater Elevation versus Time; SE-MW-07
Work Plan for Site Inspection, Remedial Investigation, and Site Characterization
Former Galena Forward Operating Location, Alaska

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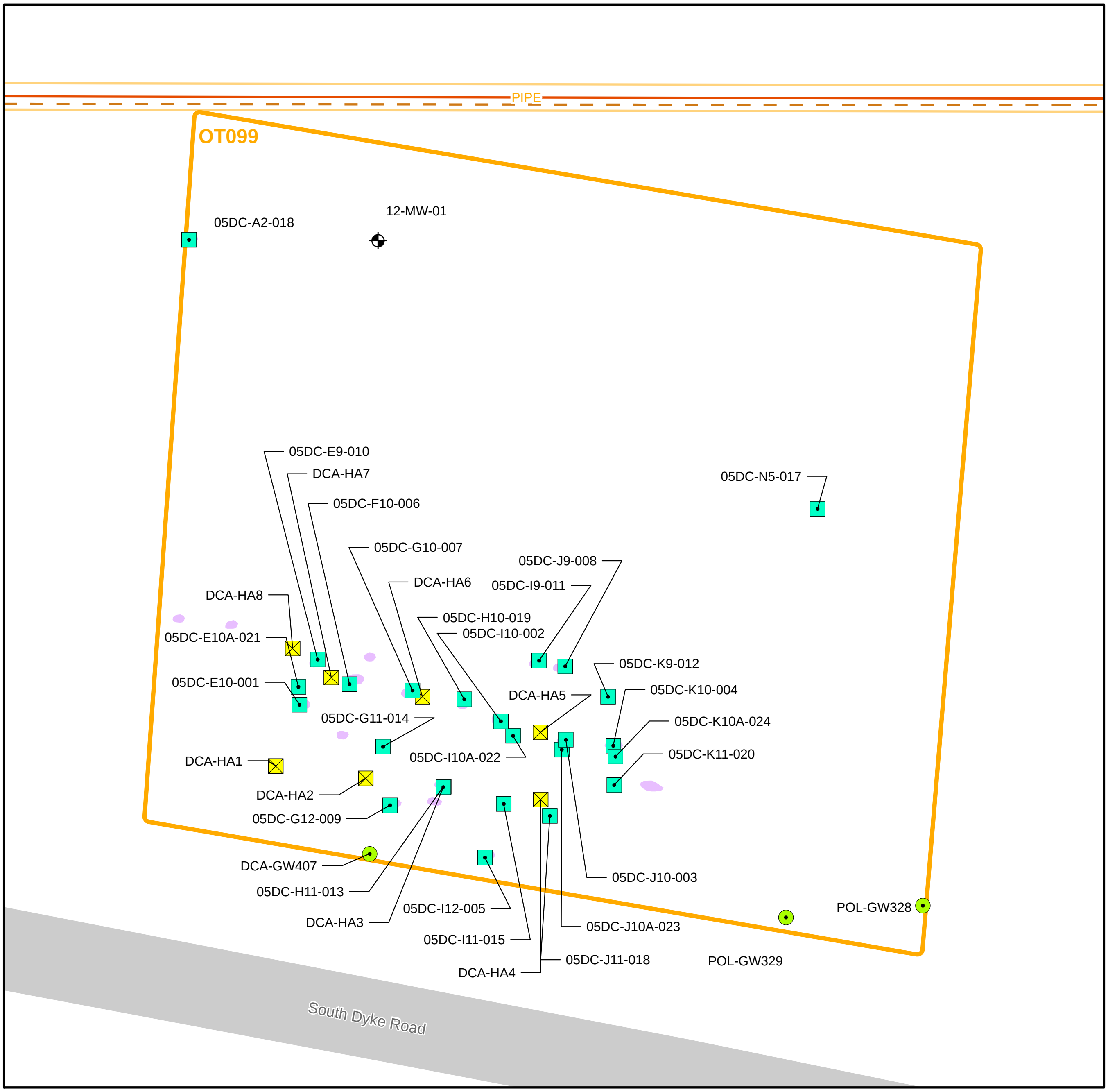
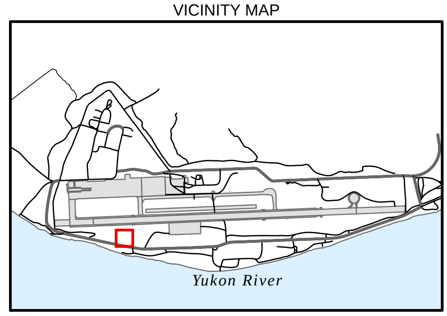
\\odin\proj\afcee\394439Galena\285-Assessment_Reports\RDD_Sites\Figures\Grapher\Figure_D3-OT099.grf



VICINITY MAP



LEGEND

- OT099
- Adjacent Site
- Road
- Stain
- Abandoned Fuel Line
- Main Fuel Line

Historical Sample Location

- Hand-Augered Boring
- Surface Soil Sample
- Hydro Punch
- Monitoring Well

N

0 30 60
Feet

FIGURE D4-OT099
Historical Sample Locations

Work Plan for Site Inspection, Remedial Investigation, and Site Characterization
Former Galena Forward Operating Location, Alaska

\\BALDUR\PROJ\GALENATO184_394439\MAPFILES\QAPP\OT099\OT099_QAPP_SAMP.MXD TMCBROOM 6/4/2010 08:38:53

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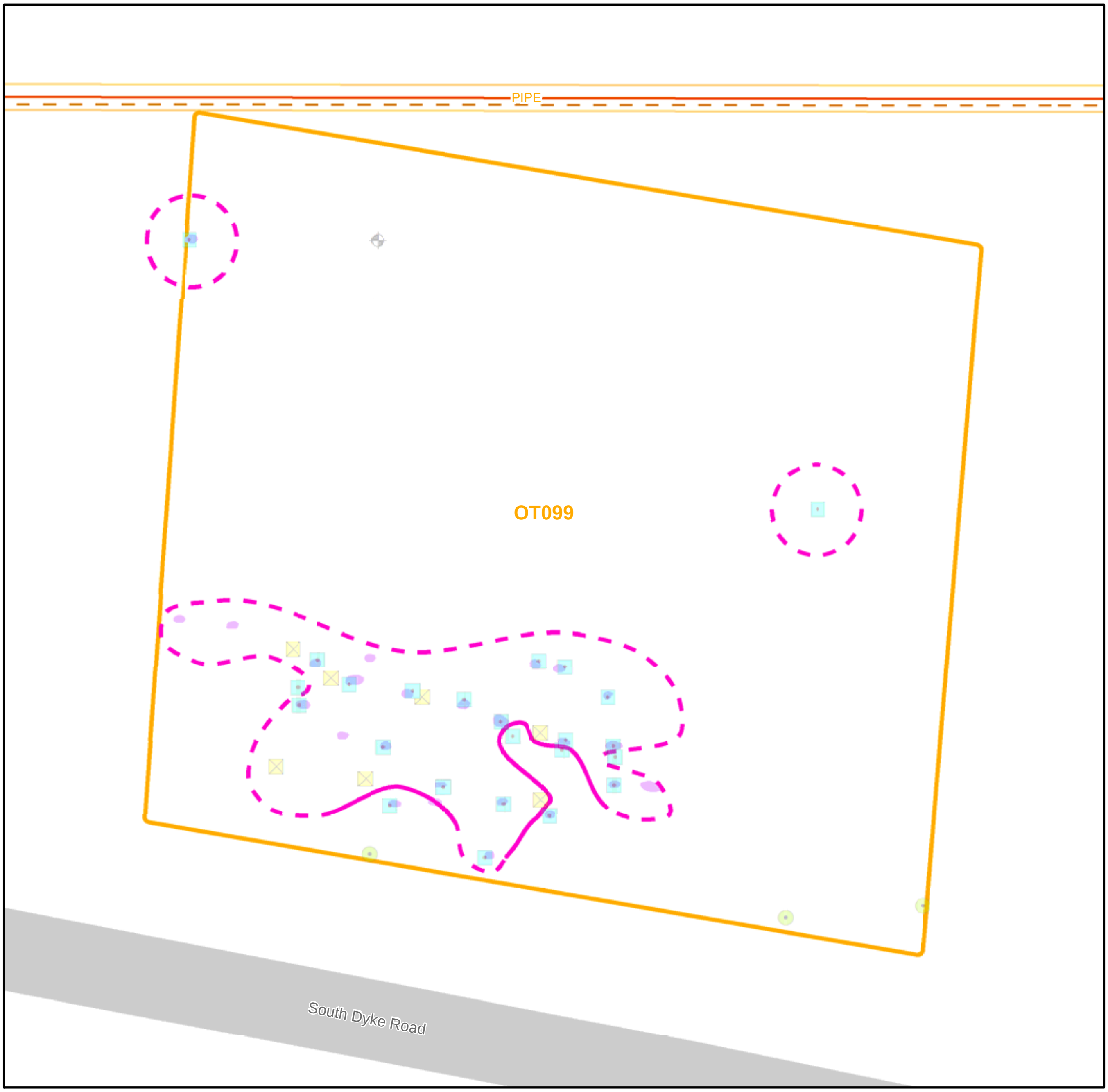


LEGEND

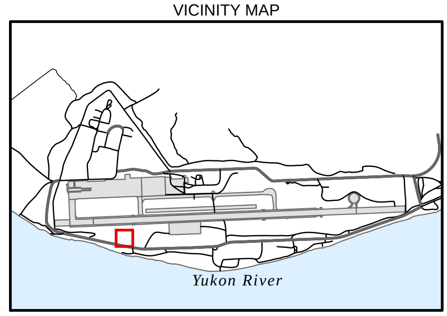
OT099
Adjacent Site
Road
Stain
Abandoned Fuel Line
Main Fuel Line
Area where Analyte Exceeds Screening Level (dashed where inferred)

Historical Sample Location

Hand-Augered Boring
Surface Soil Sample
Hydro Punch
Monitoring Well

Note:
1. Refer to historical analytical data supplement for the site screening levels.

VICINITY MAP



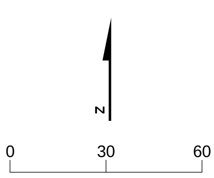
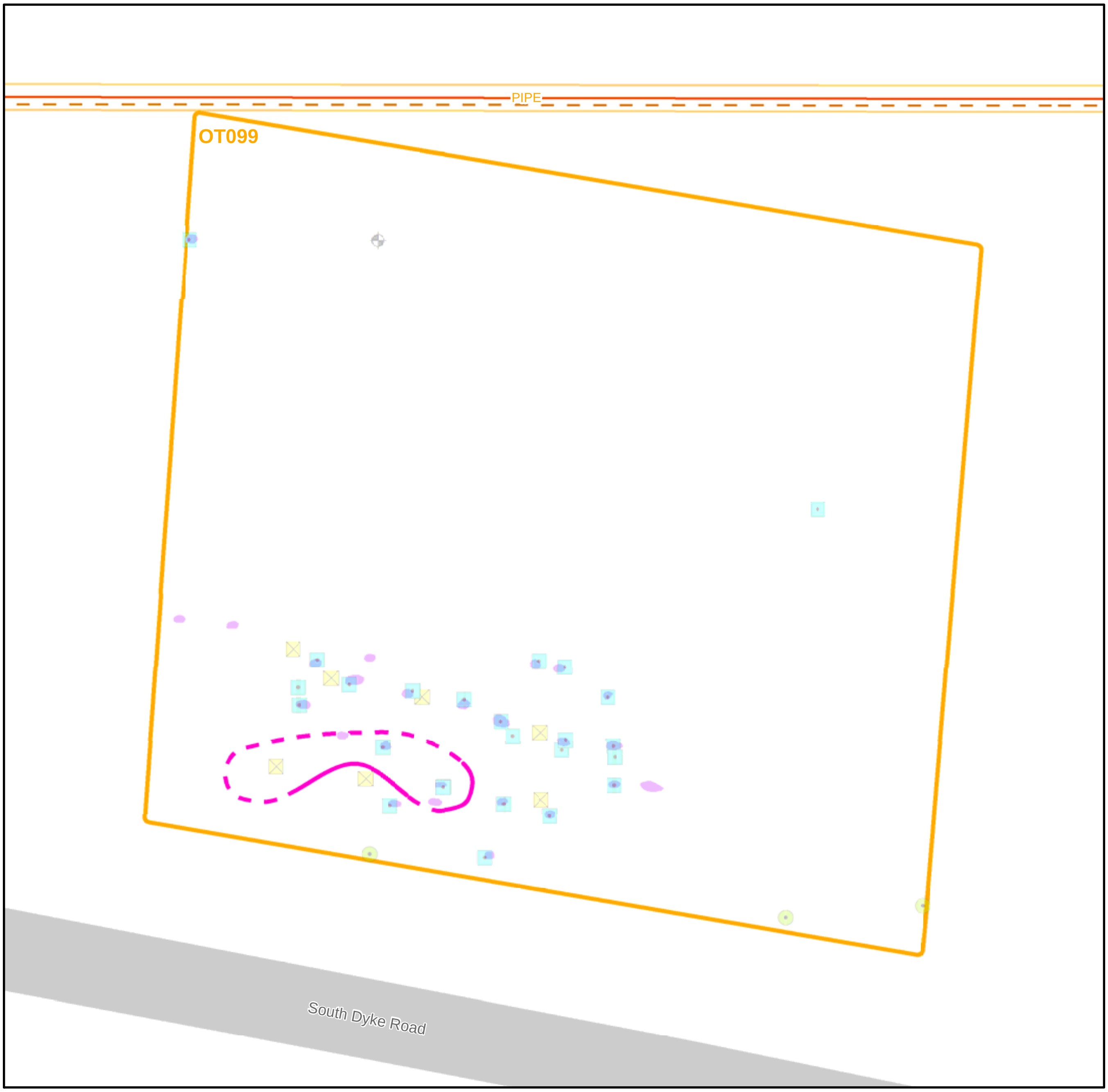


FIGURE D5-OT099
Extent of Historical Exceedances of Screening Levels in Surface Soil

Work Plan for Site Inspection, Remedial Investigation, and Site Characterization
Former Galena Forward Operating Location, Alaska



LEGEND

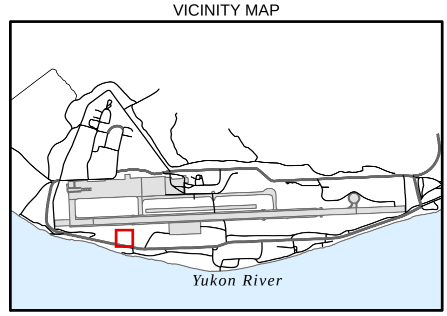
- OT099
- Adjacent Site
- Road
- Stain
- Abandoned Fuel Line
- Main Fuel Line
- Area where Analyte Exceeds Screening Level (dashed where inferred)

Historical Sample Location

- Hand-Augered Boring
- Surface Soil Sample
- Hydro Punch
- Monitoring Well

Notes:
1. The only locations with samples collected below 2-feet bgs include: DCA-HA1 through DCA-HA4
2. Refer to historical analytical data supplement for the site screening levels.

VICINITY MAP



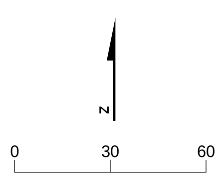


FIGURE D6-OT099
Extent of Historical Exceedances of Screening Levels in Subsurface Soil

Work Plan for Site Inspection, Remedial Investigation, and Site Characterization

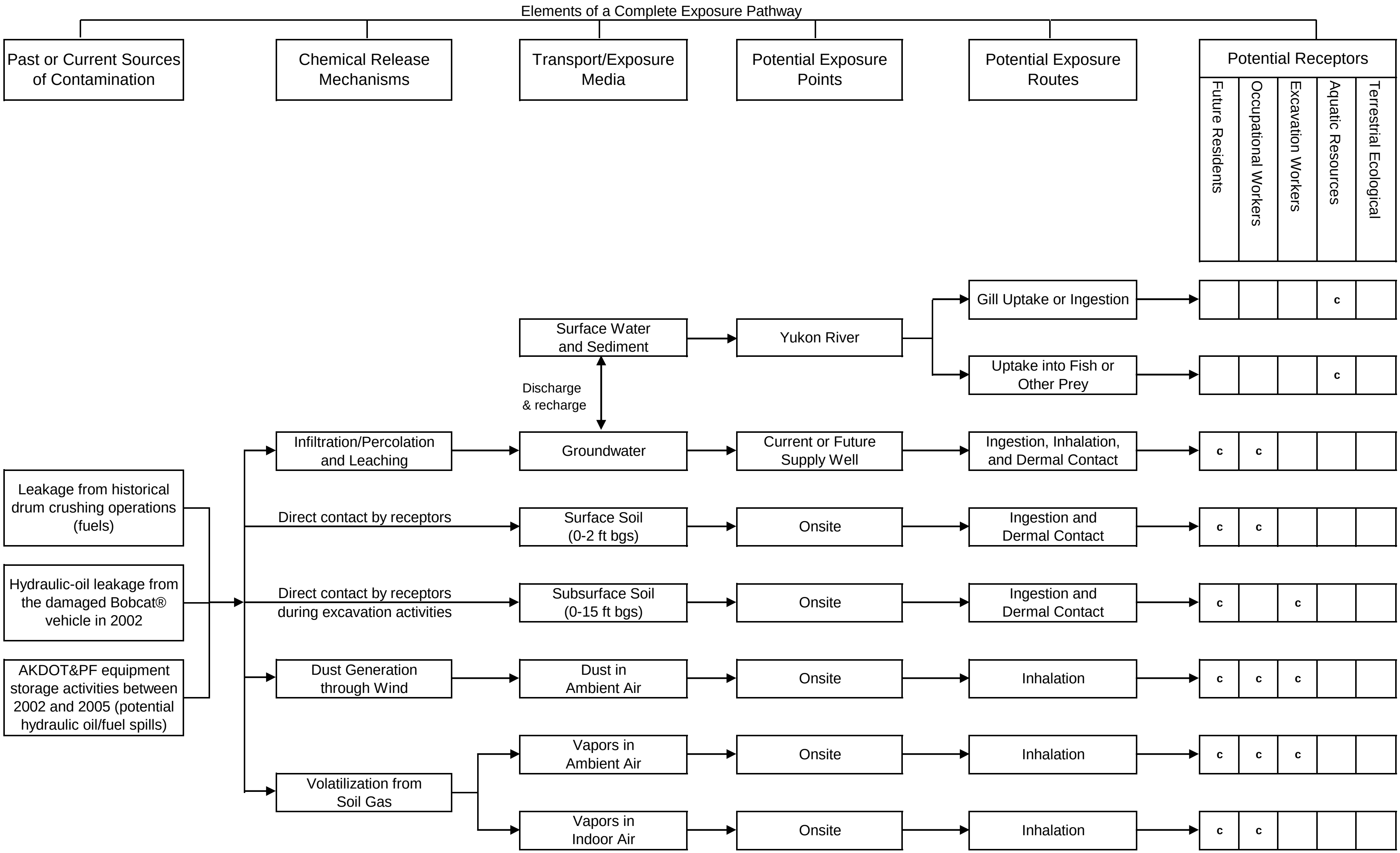
Former Galena Forward Operating Location, Alaska

Figure D7-OT099

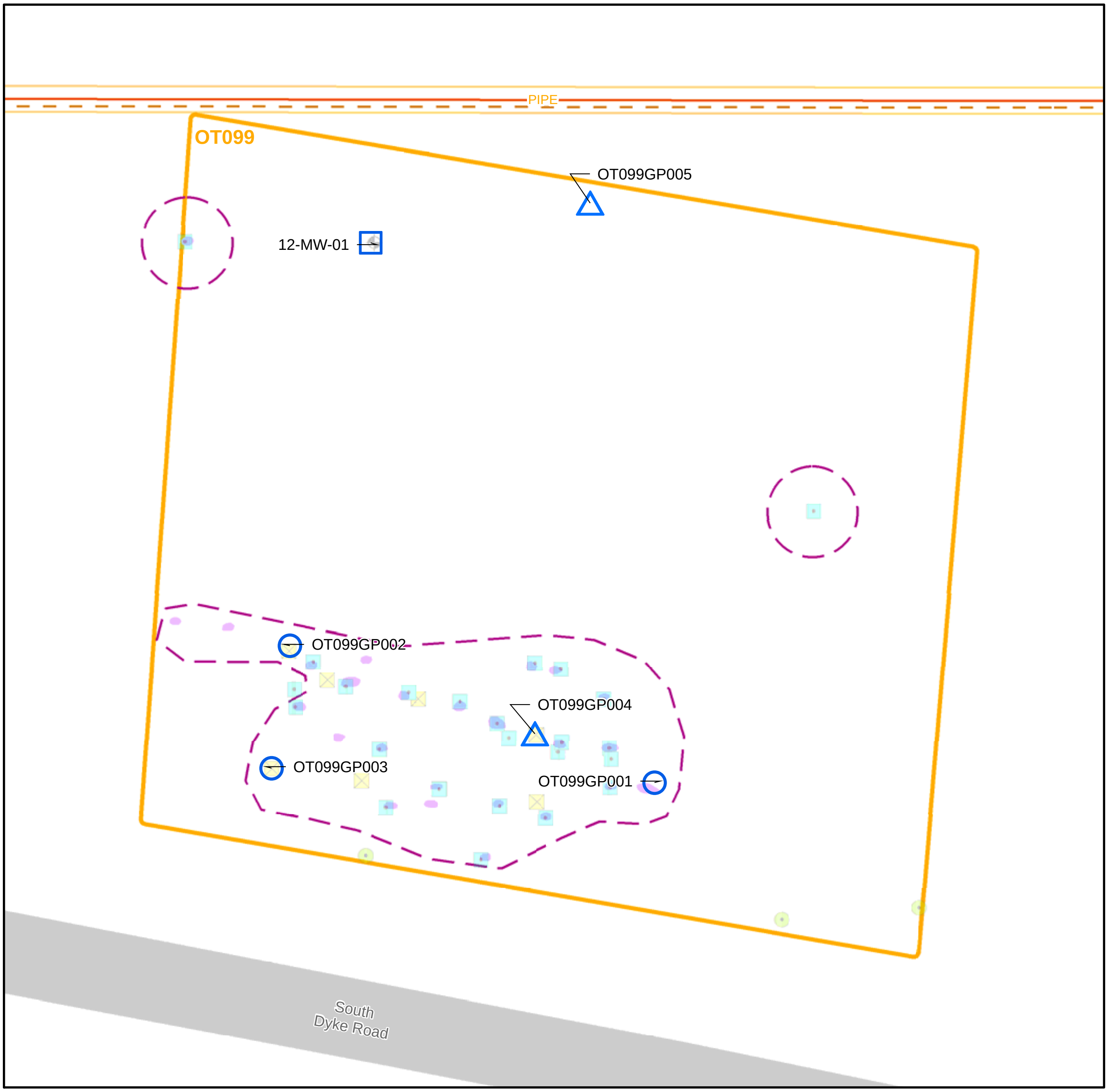
Conceptual Site Model for Potential Human and Ecological Exposures

Work Plan for Site Inspection, Remedial Investigation, and Site Characterization

Former Galena Forward Operating Location, Alaska



Notes:
c = Potentially complete pathway
Blank = Incomplete pathway



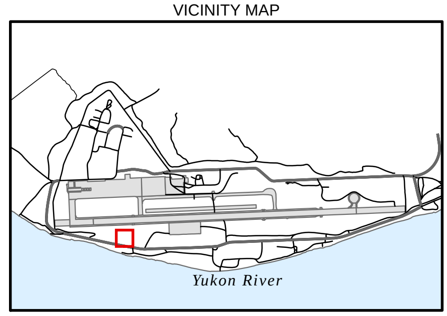
LEGEND

- OT099
- Adjacent Site
- Road
- Stain
- Proposed Excavation Area
- Proposed Soil Sample
- Proposed Soil\Groundwater Sample
- Proposed Groundwater Sample

Historical Sample Location

- Hand-Augered Boring
- Surface Soil Sample
- Hydro Punch
- Monitoring Well

VICINITY MAP



N

0 30 60
Feet

FIGURE D8-OT099
Proposed Sample Locations

Work Plan for Site Inspection, Remedial Investigation, and Site Characterization
Former Galena Forward Operating Location, Alaska

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SUPPLEMENTS D1-OT099 AND D2-OT099

(provided on enclosed CD)

<Insert Figure D1-OT099, Site Layout)>

<Insert Figure D2-OT099, Historic Aerial photos)>

<Insert Figure D3-OT099, Hydrograph of Groundwater Elevation vs Time; SE-MW-07)>

<Insert Figure D4-OT099, Historic Sample locs)>

<Insert Figure D5-OT099, PSL exceedances in SS)>

<Insert Figure D6-OT099, PSL exceedances in Subsurface Soil)>

<Insert Figure D7-OT099, Conceptual Site Model for Exposure; OT099)>

<Insert Figure D8-OT099, Proposed Sample locs)>

Insert Tables D1 – D5

ATTACHMENT D-5

Wilderness Hall, Former Building 1872
(Site SS005)

ATTACHMENT D-5

Wilderness Hall, Former Building 1872 (Site SS005)

This attachment provides background information, and describes the conceptual site model (CSM), data quality objectives (DQOs), and the proposed field sampling plan for the Wilderness Hall, former Building 1872 (Site SS005) at the Former Galena Forward Operating location (FOL). Because Site SS005 is on the Site Characterization (SC) investigation pathway, as defined in Worksheet #10, the objective of data collection at this site is to characterize the nature and extent of soil and groundwater contamination laterally and vertically (throughout the entire thickness of the variably saturated zone and 10 feet into the permanently saturated zone). The data collected during site characterization will be evaluated for usability in a future risk assessment, if required.

5.1 Site Location

SS005 is located in the east-central portion of the cantonment triangle area and crosses portions of Parcels W and U-2. The site is situated in the northwest corner of the Petroleum, Oil, and Lubricant (POL) Tank Farm, north of the Petroleum Operations Building (1837) and south of Keskund Dining Hall (Building 1873), as shown on Figure D1-SS005 (figures are located at the end of this attachment).

5.2 Site Characteristics

Current and former features of Site SS005 are presented on Figure D1-SS005. Features include 11 former aboveground storage tanks (ASTs), 2 removed 4-inch aboveground pipelines, and Wilderness Hall, which was demolished in 2007, but the foundation remains in place.

Large seasonal fluctuations in groundwater elevations have been recorded at the FOL. Figures D2-SS005 presents a time series plot of groundwater elevation at FT001 groundwater monitoring well 05-MW-19 (located approximately 550 feet to the southeast) from 2004 through 2008. A complete set of groundwater hydrographs for monitoring wells at the FOL are presented in Standard Operating Procedure (SOP)-13 *(Groundwater Sampling Procedures)*. The data presented on Figure D2-SS005 indicate that groundwater elevations near Site SS005 have been as high as approximately 137 feet above mean sea level (msl), but typically peak at 132 to 133 feet msl. Seasonal low groundwater elevations are generally on the order of 115 feet msl. Given a ground surface elevation of 145.6 feet msl at well 05-MW-19 (U.S. Air Force [USAF], 2010), the variably saturated zone near Site SS005 ranges in depth from approximately 14 to 31 feet below ground surface (bgs).

5.3 Site Description and History

Historically, 11 ASTs were within or adjacent to the footprint of Wilderness Hall (Figure D1-SS005). The contents of the cluster of three 27,000-gallon ASTs to the southwest were identified as motor gasoline (MOGAS) storage tanks on a 1962 map titled "MOGAS Bulk Storage Relocation Project 3097-2, Galena AES Site Plan." The contents of the cluster of eight 25,000-gallon ASTs to the northeast were not identified on the map. Two 4-inch pipelines (now removed) connected the ASTs to the southern portions of the POL Tank Farm, terminating at Valve Pit #2 in the southeastern corner of the cantonment triangle area. General information on the ASTs is as follows:

- Three Removed ASTs

Capacity:	27,000 gallons each
Contents:	MOGAS
Construction:	Unknown
Secondary Containment:	Unknown
Condition:	Unknown
Use:	Unknown
Installation Date:	Unknown, prior to 1963
Status:	Removed, prior to 1978

- Eight Removed ASTs

Capacity:	25,000 gallons each
Contents:	Unknown
Construction:	Unknown
Secondary Containment:	Unknown
Condition:	Unknown
Use:	Unknown
Installation Date:	Unknown, prior to 1963
Status:	Removed, prior to 1978

Figure D3-SS005 presents a sequence of historical aerial photographs of the Site SS005 area. This figure shows that in 1963 the ASTs and associated pipelines were present at the site, but were removed by 1978. Wilderness Hall was constructed in 1979 and was demolished in 2007. Historically, the building was used as a dormitory (Center for Environmental Management of Military Lands, November 2008).

In 2002, the POL Tank Farm area was administratively split into two sites: Wilderness Hall (SS005) and POL Tank Farm (ST005) (USAF, May 2007). The 2007 Remedial Investigation (RI)/Feasibility Study (FS) described the three potential sources of contamination in the northern POL Tank Farm area as Wilderness Hall (SS005), the northwest POL tanks and associated piping (ST005), and an underground storage tank (UST) at Building 1837. At the time of the 2007 RI/FS, contamination associated with Building 1837 was addressed under the 611th Compliance Program. Potential contaminant sources within Site SS005 have been recorded as a fuel valve rack (near Building 1836, just south of Wilderness Hall) and abandoned fuel tanks and fill-stands near Wilderness Hall. The fuel valve rack near Building 1836 is addressed as part of ST005. The POL Tank Farm and associated infrastructure are the only known potential environmental contamination sources for the site. Wilderness Hall dormitory activities are not expected to have caused hazardous material releases.

5.4 Summary of Previous Investigations and Remedial Actions

5.4.1 Previous Investigations

Previous investigations at Site SS005 include soil gas, soil, and groundwater sampling. These investigations were discussed in two RI/FSs from 1996 and 2007 (USAF, March 1996, May 2007). These investigations are summarized below. Because Site SS005 was not administratively separated from ST005 until 2002, investigations near Wilderness Hall prior to this time were part of larger investigations of the POL Tank Farm as a whole. A portion of the analytical data and sample location coordinates were not readily available in electronic format. Where these data are discussed in bulleted list below, supplements from the 2007 RI/FS (USAF, May 2007) are provided. Analytical data associated with investigations within Site SS005 that were available electronically are provided in Supplement D1-SS005. Statistical summaries of soil and groundwater analytical data in Supplement D1-SS005 are provided in Tables D1-SS005 and D2-SS005. Tables D3-SS005 and D4-SS005 (tables are located at the end of this attachment) present summaries of analytes exceeding the soil extent and extent groundwater screening levels (SLs) defined in Worksheet #15. Figure D4-SS005 presents historical sample locations associated with the data in Supplement D1-SS005. Figure D5-SS005 shows the area where at least one analyte exceeded the extent soil SL in subsurface soil (greater than 2 feet bgs). The areas shown on this figure represents the location where at least one analyte has exceeded the respective screening level for the purposes of field sampling plan design. The figure is not intended to represent an iso-concentration contour or plume map for a given analyte group or medium.

Following is a synopsis of these investigations, organized chronologically:

- **1988:** A soil vapor survey was conducted in the POL Tank Farm, ST005. Nine of the soil vapor monitoring points were installed in the northwest portion of the POL Tank Farm. These locations (5, 13, 14, 15, 16, 17, 18, 19, and 21) are shown in Supplement D2-SS005. Soil vapor samples were collected at depths ranging from 2.5 to 25 feet bgs. They were analyzed using a field portable gas chromatograph for TVH. Elevated concentrations of TVH were found at four monitoring points (13, 16, 18, and 21).

- **1993:** Soil samples were collected from one soil boring (05-SB-04) within Site SS005 (Figure D4-SS005) at depth intervals of 0 to 2 feet bgs, 2.5 to 4.5 feet bgs, 5 to 7 feet bgs, and 7.5 to 9.5 feet bgs. Samples were analyzed for gasoline-range organics (GRO), diesel-range organics (DRO) volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), explosives, polychlorinated biphenyls (PCBs), arsenic, and lead. A complete set of analytical data associated with this sample location is provided in Supplement D1-SS005. As shown in Table D3-SS005, GRO, DRO, benzene, ethylbenzene, toluene, xylenes (BTEX), 2-methylnaphthalene, and naphthalene exceeded the extent soil SLs in the samples 5 to 7 feet bgs and 7.5 to 9.5 feet bgs. The lack of elevated concentrations of POL-related compounds in surface soil may be related to the excavation required for construction of Wilderness Hall.

- **1993 and 1995:** Soil vapor surveys were conducted by driving monitoring points to depths ranging from 6 to 8 feet bgs. Soil vapor was screened using a photoionization detector (PID) and a flame ionization detector (FID) to delineate potential areas of contamination. The locations and PID/FID readings are presented in Supplement D2-SS005. Results showed elevated PID/FID readings near the southwest corner and east of the northern wing of Wilderness Hall (although this reading is flagged as questionable).
- **2001:** One soil sample was collected from soil boring POLBVSB01 (Figure D4-SS005) at a depth interval of 7.5 to 8.5 feet bgs. The sample was analyzed for GRO, DRO, residual-range organic (RRO), VOCs, and polyaromatic hydrocarbons (PAHs). As shown in Table D3-SS005, GRO, DRO, xylenes, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, methylene chloride, benzo(a)pyrene, and naphthalene exceeded the extent soil SLs.
- **2002:** A passive screening-level soil vapor survey was conducted using Gore Sorbers®. Six Gore Sorbers® (1872-G-01, 1872-G-02, 1872-G-03, 1872-G-07, 1872-G-08, and 1872-G-10) were installed at 3 feet bgs around the southern wing of Wilderness Hall (Figure D4-SS005). Analytical results, as presented in Supplement D3-SS005, indicated BTEX in all Gore Sorber® locations.
- **2002:** Seven soil vapor sampling points (1872-SG-001 through 1872-SG-007) were installed using a direct-push drill rig. The locations of all seven monitoring points and analytical data are shown in Supplement D3-SS005. As shown on Figure D4-SS005, three of these locations (1872-SG-001, 1872-SG-002, and 1872-SG-005) were within the boundary of Site SS005. Soil vapor samples were collected at 5 and 10 feet bgs. Samples were analyzed using field instruments for oxygen, carbon dioxide, methane, total volatile hydrocarbons (TVH), BTEX, and trichloroethylene (TCE). As shown in Supplement D3-SS005, TVH was detected at 5 and 10 feet bgs at all three soil vapor monitoring locations. Benzene was detected at concentrations exceeding the extent soil SL at 5 feet bgs at 1872-SG-001 and 1872-SG-002. Toluene was detected at concentrations exceeding the extent soil SL at 5 feet bgs at 1872-SG-001.
- **2002:** Two laser-induced fluorescent probes (HLWH01 and HLWH02) were installed at 32.21 and 32.27 feet bgs (locations shown in Supplement D3-SS005). Fluorescence readings at the probes did not indicate the presence of hydrocarbons.
- **1997–2004:** Six groundwater samples were collected from one bioventing system well, 05-SV-06 (on the southwest corner of Wilderness Hall, Figure D4-SS005), between 1997 and 2004. (The bioventing system is discussed in the Previous Remedial Actions section.) Analytical data associated with these samples are provided in Supplement D1-SS005. Samples were analyzed for GRO, DRO, RRO, VOCs, PAHs, dissolved metals, and anions. As shown in Table D4-SS005, GRO, DRO, RRO, benzene, ethylbenzene, and 1,2-dichloroethane (DCA) were detected at concentrations exceeding the extent groundwater SLs.

- **2007:** A groundwater sample was collected from well 05-SV-06 in October 2007 and analyzed for GRO and VOCs. The sampling results, summarized in Supplement D4-SS005, include minor detections of GRO, benzene, TCE, and cis-1,2-DCE. Benzene and TCE were detected at concentrations exceeding the respective extent groundwater SLs.

5.4.2 Previous Remedial Actions

In 1996, a bioventing system was installed on the southwest corner of Wilderness Hall (USAF, May 2007). The system was initially set up such that a blower injected air into 05-SV-06. Figure D4-SS005 presents the locations of 05-SV-06 and the four vapor monitoring points (1872-VMP-001 through 1872-VMP-004) installed in 2002 to evaluate system performance. The system was intermittently active from 1996 through 2004, and injection rates were adjusted periodically due to concerns regarding vapor intrusion into Wilderness Hall. In 2001, a soil sample was collected near the air injection well (POLBVSB01) to evaluate the effectiveness of the bioventing system. A comparison of analytical data from soil borings 05-SB-04 and POLBVSB01 shows a reduction in GRO and benzene concentrations between 1993 and 2001. No soil sampling has been conducted since 2001.

In 2004, the system was converted from air injection to air extraction and was operated intermittently in this mode through 2005. During a 2008 groundwater sampling event, it was noted that 05-SV-06 no longer existed (AFCEE, March 2009). It is assumed that the well was abandoned or destroyed during demolition of Wilderness Hall.

5.5 October 2009 Site Visit Observations

During the October 2009 site visit, it was observed that the remaining building foundation consists of approximately 4 inches of concrete. The outer edge of the foundation is covered with a 1.5-inch-thick layer of building insulation material. Basketball hoops have been set up on the building foundation for use by students at the Galena Interior Learning Academy.

5.6 Use of Secondary Data

Secondary data (historical data) for the site include data tabulated in Supplement D1-SS005 and summarized in Tables D1-SS005 and D2-SS005. Data will be evaluated for usability using the general procedures outlined in Worksheet #13. Data that are properly validated, collected by an Alaska Department of Environmental Conservation (ADEC)-approved analytical method, have analytical detections greater than limit of detection (LOD) or limit of quantification (LOQ) or LODs at or below the extent soil and/or extent groundwater SLs can be used for quantitative nature and extent evaluations and risk assessment calculations, if needed. Data that do not meet these criteria can be used as reference or screening level data only. Although screening level data will not be used for quantitative analyses, these data will be used to qualitatively evaluate the presence or absence of contamination at a given location and/or depth to guide the design of the field sample plan.

Historical soil vapor data collected between 1988 and 2002 and the laser-induced fluorescence data do not meet usability requirements outlined in Worksheet #13 and will be used as screening level data.

Analytical data from soil samples collected in 1993 and 2001 meet usability requirements outlined in Worksheet #13 for use in soil nature and extent evaluations. If needed, these data could also be used for risk assessment evaluations. Groundwater samples collected between 1997 and 2007 likely meet usability requirements of quantitative analysis; however, further review will be performed to verify the data quality.

The review of the usability of the secondary data is in progress and follows procedures outlined in Worksheet #13. If this evaluation results in modifying data classification to SL rather than "unlimited use," the sample design in this field sampling plan may be modified.

5.7 Findings of Previous Investigations

Tables D1-SS005 and D2-SS005 present statistical summaries of historical soil and groundwater samples collected at Site SS005. The results of previous investigations suggest that there are elevated levels of GRO, DRO, VOCs, and PAHs in soil vapor, soil, and groundwater at Site SS005. Figure D5-SS005 presents the lateral extent of historical exceedances of extent soil SLs in subsurface soil. It should be noted that there has been extremely limited soil sampling (two locations) within Site SS005 and this figure may not represent the extent of soil contamination at the site. Surface soil samples have only been collected at historical location 05-SB-04, there were no exceedances of extent soil SLs at this location. Groundwater samples have only been collected at one location (05-SV-06) within Site SS005; therefore, a figure showing the extent of groundwater contamination is not included.

5.8 Target Analytes

As listed in Table 14-1 of Worksheet #14, target analytes for leaded gasoline and unknown fuels include GRO, DRO, RRO, BTEX, 1,2-DCA, ethylene dibromide (EDB), PAHs, and lead. Because there have been historical exceedances of the extent soil SL for methylene chloride and the extent groundwater SL for 1,2-DCA, the samples will be analyzed for the full suite of VOCs rather than volatile constituents of BTEX. As shown in Tables D1-SS005 and D2-SS005, arsenic, barium, cadmium, and manganese have been detected in soil and/or groundwater; however, these metals are not considered target analytes in accordance with required metals analysis listed on Table 14-1. Although the content of the cluster of eight 25,000-gallon ASTs is unknown, it is unlikely that the tanks contained waste oils; therefore, PCBs are not included as target analytes. The source of this contamination is likely the former fuel ASTs and associated piping (Figure D4-SS005). Additionally, in accordance with the information provided in the *Draft Field Sampling Guidance* (ADEC, 2010), PAH, 1,2-DCA, and EDB analysis will be performed on approximately 10 percent of the samples collected. The sample(s) selected these analyses will be those anticipated to have the highest GRO, DRO and/or RRO concentrations.

Following the guidance in Step 6 of Figure 15-1, an additional analysis was conducted in which historical analytical data from locations within 500 feet of the Site SS005 site boundary were evaluated to determine the potential for contaminants to migrate from another location to the site. Historical sample locations within 500 feet of Site SS005 that had exceedances of either the extent soil or extent groundwater SLs include nine soil sample locations and nine groundwater monitoring wells. These data included soil samples that exceeded the extent soil SLs for GRO, DRO, PAHs, dibenzofuran, and VOCs. Groundwater samples had exceedances of the extent groundwater SLs for DRO, GRO, RRO, pesticides, bis(2-Ethylhexyl)phthalate, and VOCs. Metals detected in soil and/or groundwater include aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, molybdenum, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc. Of these metals, only lead is considered a target analyte for Site SS005 based on the site history and use as a preturle product storage tank and in accordance with Table 14-1 lead is the only metal analysis required. Most of the constituents exceeding screening levels in historical samples in the vicinity of Site SS005 are already included in the target analyte list specified above (GRO, DRO, RRO, PAHs, lead, and VOCs). Bis(2-Ethylhexyl)phthalate is a common laboratory contaminant and is not considered a site environmental contaminant. The exceedance of dibenzofuran is associated with a surface soil sample at Site SS006 (approximately 450 feet cross-gradient to Site SS005) and is not likely to affect the site. The target analyte list will be expanded to include the pesticides as these constituents were detected in groundwater at concentrations exceeding the extent groundwater SL at 05-MW-11 (Figure D4-SS005).

Following the guidance in Step 6 of Figure 15-1, a final analysis was conducted to evaluate the presence of sites evaluated in the Preliminary Assessment (CH2M HILL, 2010) located within 500 feet of the SS005 site boundary. Preliminary Assessment site within this radius include AST1568, AST1569, AST1854, AST1858, AST1859, AST1875, OAP, OWS1833, S1850, TACAN3, UST 1837, UST1854, UST1859, UST1858. Groundwater elevation contour maps for May and October 2004 are included as Supplements to field sampling plan for the Southeast Runway Fuel Spill (Supplements D2-ST010 and D3-ST010). These figures show that during the break-up of the Yukon River in early spring, groundwater flow direction is to the north (away from the Yukon River) and during the remainder of the year the groundwater flow direction is to the south (towards the Yukon River). As shown on Figure D6-GW of the 2010 Hydrogeologic Study Field Sampling Plan, during the 2007-2008 monitoring period this flow condition persisted for approximately 4-month period when the groundwater elevations were seasonally high. The predominant flow direction, toward the Yukon River, persisted for approximately 8 months. Because none of the identified Preliminary Assessment sites are located hydraulically upgradient from Site SS005, it is unlikely that potential releases from these sites would affect Site SS005 and therefore no target analytes based on Preliminary Assessment sites were added to Site SS005.

5.9 Potential Exposure Pathways and Receptors

Site SS005 falls under the SC stage for the POL surface site source/release category, as defined in Worksheet #17, and needs additional sampling to delineate the nature and extent of soil contamination and potential groundwater impacts. If releases from the former ASTs or associated piping occurred at the site, soil vapor, surface soil, subsurface soil, and groundwater may be affected.

Figure D6-SS005 depicts the CSM for exposure for the site, including past or current sources of contamination, chemical release mechanisms, transport/exposure media, potential exposure points, potential exposure routes, and potential receptors. The most plausible exposure scenario under current site conditions is the excavation/construction worker scenario due to the potential for excavations from utility repair and/or replacement. There are no standard work places or residences currently on the site; however, these scenarios will be evaluated to assess the potential impacts of hypothetical land use changes. Based on the CSM for Site SS005, potential human receptors and exposure pathways to be evaluated include the following:

- **Excavation/Construction Workers**: Potential exposure to chemicals in soil to 15 feet bgs and shallow groundwater. Potentially complete routes of exposure to soil include incidental soil ingestion, dermal contact with soil, and inhalation of ambient vapors or dust generated from wind or during onsite excavation activities. Potentially complete routes of exposure to shallow groundwater include dermal contact with groundwater and inhalation of ambient vapors from groundwater.
- **Future Occupational Workers**: Potential exposure to chemicals in surface soil to 2 feet bgs. Potentially complete routes of exposure to surface soil include incidental soil ingestion, dermal contact with soil, and inhalation of ambient vapors or dust generated from wind.
- **Hypothetical Future Residents**: Potential exposure to chemicals in soil to 15 feet bgs and groundwater. Potentially complete routes of exposure to soil include incidental soil ingestion, dermal contact with soil, and inhalation of ambient vapors or dust generated from wind. Potentially complete routes of exposure to groundwater include ingestion, dermal contact, and inhalation of VOCs during showering or other household activities. Vapor intrusion from VOCs in environmental media migrating into current or future residences is also a potentially complete exposure route.

As specified in the eco-scoping form for Site SS005 provided in Appendix G, the site consists of a concrete slab surrounded by pavement and gravel that provides no viable habitat for plants or animals. Ecological exposure pathways are considered incomplete at Site SS005. Therefore, no ecological receptors were identified, and the site will not be evaluated for ecological risk. Because Site SS005 is located farther than 1,000 feet from the Yukon River, an aquatic ecological exposure pathway is unlikely to be complete; however, this pathway may be evaluated further.

5.10 Data Quality Objectives

DQOs are pre-established goals that help monitor and assess project progress. They provide benchmarks against which the quality of fieldwork and the resultant analytical data are evaluated. DQOs specify the type, quality, quantity, and uses of the data necessary to support investigation objectives. General DQOs for characterizing contaminant sources, determining the nature and extent of contamination, and evaluating the potential for contaminants to migrate or affect additional media are presented in Worksheet #10, Table 10-2. Site SS005 is currently categorized as being in the Site Characterization phase and is located at the hydraulically upgradient (northern) end of the POL Tank Farm groundwater contamination plume. As such, the following general DQOs apply to Site SS005:

- DQO 2 – Nature and Extent of Contamination in Soil
- DQO 3 – Free Product/Smear Zone Characterization
- DQO 5 – Delineate Nature and Extent of Groundwater Contamination
- DQO 6 – Hydrogeological Characterization

During investigation of the nature and extent of potential contamination, if target analytes are found at concentrations that may pose a risk to human or ecological health, the following DQOs may apply and will be addressed under an FOL-wide risk assessment field sampling plan:

- DQO 7 – Human Health Risk Assessment
- DQO 8 – Ecological Risk Assessment

The sample design that will be employed at Site SS005 to fill data gaps associated with these DQOs is based on the source/release group investigation model for POL surface release sites, as described in Worksheet #17. Because Site SS005 is categorized as an SC investigation pathway, the extent soil SLs described in Worksheet #15 will be used to delineate the nature and extent of contamination in soil. The extent groundwater SLs (described in Worksheet #15) will be used to evaluate groundwater data collected during the current study because Site SS005 is located greater than 1,000 feet from the Yukon River.

The following sections summarize the sample design specific to Site SS005.

5.11 Investigation Activities

Previous investigations have shown detected elevated concentrations of POL-related compounds in soil vapor, soil, and groundwater within Site SS005. However, the lateral and vertical extent of contamination at the site has not been fully delineated. Therefore, the site is identified as having additional site characterization needs in Worksheet #10, Table 10-1.

This section provides details regarding the planned investigation activities for Site SS005 and presents the rationale for each activity. SOPs referenced in this section are provided in Appendix H of this Work Plan. Table D5-SS005 presents proposed sampling locations, depths, media, and target analytes for the investigation. The goal of this sampling program is to delineate the nature and extent of contamination at Site SS005, which is assumed to be related to historical releases from the former fuel ASTs and related infrastructure. As such, if a discrete sample has concentrations of target analytes exceeding the extent soil and/or extent groundwater SLs (as listed in Worksheet #15), additional sampling may be required for complete site characterization.

5.11.1 Pre-investigation Activities

Before field activities begin, staff will review work planning documentation (including SOPs and HS&E information) and ensure that materials and equipment identified in the SOPs have been procured. Before intrusive field activities begin, utility clearance will be performed in accordance with SOP-03 (*Utility Clearance for Intrusive Operations*). Because the approximately 4-inch-thick foundation of Wilderness Hall still exists, concrete coring will be necessary prior to drilling within the former building footprint. If possible, additional information should be obtained on tank removal activities, building construction/ destruction activities that could affect the sampling design (for example, additional information on recent fill use that would not require sampling), and the current status of well 05-SV-06 (whether it still exists or was properly abandoned during building demolition).

5.11.2 Field Investigation Tasks

Soil Sampling

As shown in Table D3-SS005, there have been exceedances of extent soil SLs for POL target analytes in historical soil samples collected at the southwest corner of Site SS005. Limited soil sampling within the site boundary has been conducted, and no soil sampling within the area covered by the former fuel ASTs has been performed. Because Site SS005 is in the Site Characterization investigation phase and subsurface soil contamination has been previously detected, the goal of the current investigation is to characterize the nature and extent of soil contamination laterally and vertically (throughout the variably saturated zone). Based on water table fluctuations measured at 05-MW-19 from 2004 through 2008, the variably saturated zone to be characterized at Site SS005 extends to approximately 30 feet bgs (Figure D2-SS005).

Soil samples will be collected at 10 soil boring locations (SS005GP001 through SS005GP010), as shown on Figure D7-SS005, to delineate the extent of contamination in surface and subsurface soil. Table D5-SS005 presents the details for proposed soil samples at Site SS005. Currently, six soil samples (at approximately 0 to 2, 5 to 7, 10 to 12, the midpoint of the variably saturated zone, the bottom of the variably saturated zone, and 10 feet into the permanently saturated zone) are proposed for each of the 10 soil boring locations shown on Figure D7-SS005. If information is obtained indicating that the excavation for the foundation of Wilderness Hall was greater than 2 to 5 feet bgs, surface soil samples within the building footprint will not be collected at those depth intervals. If evidence of contamination is observed at other depths (for example, staining, odors, or high PID readings), additional soil samples may be collected. Additionally, if discrete soil samples at any of the proposed soil boring locations shown on Figure D7-SS005 and listed in Table D5-SS005 have concentrations of target analytes exceeding the respective extent soil SLs, step-out sampling may be required to achieve full lateral and/or vertical delineation.

Boreholes will be installed using direct push drilling equipment in accordance with SOP-05 *(Hollow Stem Auger and Direct Push Drilling Methods*). Soil samples will be collected using procedures specified in SOP-07 *(Surface and Subsurface Soil Sampling)*. The presence of heaving sands is a known issue at the FOL. Where encountered, appropriate drilling techniques will be used to minimize the impact. Soil borings will be logged in accordance with SOP-06 (*Boring Log Completion, Soil Classification, and Logging*) and field screening of soil samples will be performed in accordance with SOP-04 *(Organic Vapor Monitoring and Air Monitoring)*.

The soil samples will be analyzed for GRO, DRO, RRO, VOCs, PAHs, pesticides, and lead. Specific laboratory methods, bottle requirements, field preservation requirements, and sample volumes for these analyses are provided in Worksheet #19. Field sample QA/QC protocols will be performed in accordance with Worksheet #20. Air monitoring procedures will follow SOP-04 *(Organic Vapor Monitoring and Air Monitoring)*. Sample handling procedures will follow SOP-18 *(Packing and Shipping of Environmental Samples)* and SOP-19 *(Sample Handling and Custody)*.

Groundwater Sampling

As shown in Table D4-SS005, there have been exceedances of extent groundwater SLs for POL target analytes in historical groundwater samples collected at the southwest corner of Wilderness Hall (05-SV-06). No groundwater sampling has been conducted within the area covered by the former fuel ASTs. Although Site SS005 is within the cantonment triangle area where numerous commingled plumes of groundwater contamination are present, the site is at the northern end of the groundwater plume related to the POL Tank Farm. Any fuel-related groundwater contamination beneath Site SS005 is likely the result of spills at the site, rather than being associated with a potential upgradient source. The goal of the current investigation is to characterize the nature and extent of groundwater contamination laterally and vertically. Information collected as part of this investigation will be incorporated into the FOL-wide strategy for evaluating groundwater contamination discussed in Worksheet #14 and the 2010 Hydrogeologic Study Field Sampling Plan. Based on water table fluctuations measured at 05-MW-19 from 2004 through 2008, the variably saturated zone at Site SS005 ranges from approximately 14 to 31 feet bgs.

Table D5-SS005 presents the proposed groundwater samples for Site SS005. Two groundwater samples (one at the top of the water table, and one within the permanently saturated zone) are proposed for seven of the soil boring locations shown on Figure D7-SS005. The groundwater sample 10 feet beneath the bottom of the variably saturated zone will be co-located with the soil sample described in the previous section. If there is visible evidence of soil contamination at other depths within the variably saturated zone, additional grab groundwater and co-located soil samples will be collected. The purpose of collecting co-located soil and groundwater samples is to provide information for evaluating phase partitioning from contaminated soil. Groundwater samples will be collected via direct-push groundwater sampling techniques, in accordance with SOP-24 *(Direct Push Groundwater Sampling)*. If evidence of contamination (for example, staining, odors, or high PID readings) and saturated conditions are observed in the field at other depths in the soil borings, additional groundwater samples may be co-located with soil samples within the variably saturated zone. Additionally, if the discrete groundwater samples show concentrations of target analytes exceeding their extent groundwater SLs, step-out sampling may be required to achieve full lateral characterization.

The groundwater samples will be analyzed for GRO, DRO, RRO, VOCs, low-level analysis for EDB and 1,2-DCA, PAHs, pesticides, lead, and field parameters (pH, temperature, specific conductivity, dissolved oxygen, and ORP). Field parameters will be collected in accordance with SOP-12 (*Field Water Quality Measurements and Calibration*). Specific laboratory methods, bottle requirements, field preservation requirements, and sample volumes for these analyses are provided in Worksheet #19. Field sample QA/QC protocols will be performed in accordance with Worksheet #20. Air monitoring procedures will follow SOP-04 *(Organic Vapor Monitoring and Air Monitoring)*. Sample handling procedures will follow SOP-18 *(Packing and Shipping of Environmental Samples)* and SOP-19 *(Sample Handling and Custody)*.

Surveying

The easting and northing coordinates and ground surface elevations of discrete sampling locations will be surveyed in accordance with SOP-16 *(Global Positioning Satellite System [GPS] Surveying)*.

Equipment Calibration

Field water quality measurement equipment will be calibrated in accordance with SOP-12 *(Field Water Quality Measurements and Calibration)*.

Equipment Decontamination

Non-dedicated equipment will be decontaminated in accordance with SOP-14 (*Equipment Decontamination Procedures)*.

Investigation Derived Waste Management

Investigation-derived waste will be handled in accordance with Appendix B *(Project-specific Waste Management Plan)*.

5.11.3 Sample Identification

Samples collected at Site SS005 will be named in accordance with SOP-19 *(Sample Handling and Custody)*.

5.11.4 Post-investigation Activities

During the field investigation, meetings or conference calls will be held to discuss the investigation results, provide a suggested path forward, and achieve consensus on additional work needs. After the fieldwork is performed for this investigation, the results will be documented in a data evaluation report, and the anticipated path for further action or site closure will be identified.

5.12 Works Cited

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TABLE D1-SS005

Statistical Summary of Soil Analytical Results[a]

Analyte Name	Result Units	Minimum ND	Maximum ND	Number of Samples	Number of Locations	Frequency of Detection	Location of Minimum Detection	Minimum Detection Result	Location of Maximum Detection	Maximum Detection Result	Extent Soil Screening Level	Number of Exceedances
Explosives												
2,4-Dinitrotoluene	mg/kg	0.0188	0.571	4	1							
2,6-Dinitrotoluene	mg/kg	0.0118	0.359	4	1							
Nitrobenzene	mg/kg	0.018	0.548	4	1							
Hydrocarbons												
C10-C25 DRO	mg/kg			5	2	100%	05-SB-04 (8/11/1993)	5	POLBVSB01 (6/16/2001)	3000	250	3
C25-C36 RRO	mg/kg			1	1	100%	POLBVSB01 (6/16/2001)	39	POLBVSB01 (6/16/2001)	39	1000	0
C6-C10 GRO	mg/kg	10	10	5	2	60%	POLBVSB01 (6/16/2001)	400	05-SB-04 (8/11/1993)	5800	140	3
Metals												
Arsenic	mg/kg			4	1	100%	05-SB-04 (8/11/1993)	4.02	05-SB-04 (8/11/1993)	9.81	b	c
Lead	mg/kg			4	1	100%	05-SB-04 (8/11/1993)	3.58	05-SB-04 (8/11/1993)	10.9	40	0
PCBs/Pesticides												
Total PCBs	mg/kg	0.0295	0.897	4	1							
SVOCs												
2,4,5-Trichlorophenol	mg/kg	0.0113	0.343	4	1							
2,4,6-Trichlorophenol	mg/kg	0.0119	0.363	4	1							
2,4-Dichlorophenol	mg/kg	0.0151	0.46	4	1							
2,4-Dimethylphenol	mg/kg	0.0376	1.14	4	1							
2,4-Dinitrophenol	mg/kg	0.239	7.27	4	1							
2-Chloronaphthalene	mg/kg	0.0111	0.337	4	1							
2-Chlorophenol	mg/kg	0.0261	0.794	4	1							
2-Methylnaphthalene	mg/kg	0.0225	0.0225	4	1	75%	05-SB-04 (8/11/1993)	0.0142	05-SB-04 (8/11/1993)	20	6.1	2
2-Methylphenol	mg/kg	0.0182	0.555	4	1							
2-Nitroaniline	mg/kg	0.0137	0.418	4	1							
2-Nitrophenol	mg/kg	0.015	0.457	4	1							
3,3-Dichlorobenzidine	mg/kg	0.0167	0.509	4	1							
3-Nitroaniline	mg/kg	0.0174	0.529	4	1							
4,6-Dinitro-2-Methylphenol	mg/kg	0.027	0.823	4	1							
4-Bromophenyl Phenyl Ether	mg/kg	0.0156	0.474	4	1							
4-Chloro-3-Methylphenol	mg/kg	0.0247	0.751	4	1	25%	05-SB-04 (8/11/1993)	0.0418	05-SB-04 (8/11/1993)	0.0418	610	0
4-Chloroaniline	mg/kg	0.0191	0.581	4	1							
4-Chlorophenyl Phenyl Ether	mg/kg	0.018	0.548	4	1							
4-Methylphenol	mg/kg	0.0196	0.597	4	1							
4-Nitroaniline	mg/kg	0.0165	0.503	4	1							
4-Nitrophenol	mg/kg	0.0236	0.718	4	1							
Acenaphthene	mg/kg	0.0163	0.497	5	2	20%	POLBVSB01 (6/16/2001)	0.18	POLBVSB01 (6/16/2001)	0.18	180	0
Acenaphthylene	mg/kg	0.0077	0.235	5	2							
Anthracene	mg/kg	0.0198	0.604	5	2	40%	05-SB-04 (8/11/1993)	0.029	POLBVSB01 (6/16/2001)	0.056	2060	0
Benzo(a)anthracene	mg/kg	0.535	0.535	5	2	80%	05-SB-04 (8/11/1993)	0.0297	POLBVSB01 (6/16/2001)	0.12	0.49	0
Benzo(a)pyrene	mg/kg	0.0425	0.398	5	2	60%	05-SB-04 (8/11/1993)	0.0362	POLBVSB01 (6/16/2001)	0.053	0.049	1
Benzo(b)fluoranthene	mg/kg	0.591	0.591	5	2	80%	05-SB-04 (8/11/1993)	0.0253	POLBVSB01 (6/16/2001)	0.074	0.49	0
Benzo(g,h,i)perylene	mg/kg	0.0541	0.506	5	2	60%	05-SB-04 (8/11/1993)	0.0275	POLBVSB01 (6/16/2001)	0.072	140	0
Benzo(k)fluoranthene	mg/kg	1.01	1.01	5	2	80%	05-SB-04 (8/11/1993)	0.0253	POLBVSB01 (6/16/2001)	0.073	4.9	0
Benzoic acid	mg/kg	0.135	4.11	4	1	25%	05-SB-04 (8/11/1993)	0.179	05-SB-04 (8/11/1993)	0.179	410	0
Benzyl alcohol	mg/kg	0.0369	1.12	4	1							
bis(2-Chloroethyl)ether	mg/kg	0.025	0.76	4	1							
bis(2-Chloroisopropyl)ether	mg/kg	0.0248	0.754	4	1							
bis(2-Ethylhexyl)phthalate	mg/kg	0.0625	0.0625	4	1	75%	05-SB-04 (8/11/1993)	0.0711	05-SB-04 (8/11/1993)	0.485	13	0

TABLE D1-SS005

Statistical Summary of Soil Analytical Results[a]

Analyte Name	Result Units	Minimum ND	Maximum ND	Number of Samples	Number of Locations	Frequency of Detection	Location of Minimum Detection	Minimum Detection Result	Location of Maximum Detection	Maximum Detection Result	Extent Soil Screening Level	Number of Exceedances
Butyl Benzyl Phthalate	mg/kg	0.0134	0.408	4	1	25%	05-SB-04 (8/11/1993)	0.0119	05-SB-04 (8/11/1993)	0.0119	290	0
Chrysene	mg/kg	0.695	0.695	5	2	80%	05-SB-04 (8/11/1993)	0.0362	POLBVSB01 (6/16/2001)	0.13	49	0
Dibenz(a,h)anthracene	mg/kg	0.042	0.492	5	2	40%	05-SB-04 (8/11/1993)	0.0217	05-SB-04 (8/11/1993)	0.027	0.049	0
Dibenzofuran	mg/kg	0.0139	0.424	4	1	25%	05-SB-04 (8/11/1993)	0.098	05-SB-04 (8/11/1993)	0.098	11	0
Diethyl phthalate	mg/kg	0.0115	0.349	4	1							
Dimethyl phthalate	mg/kg	0.0096	0.291	4	1							
di-n-Butyl Phthalate	mg/kg	0.0168	0.512	4	1	25%	05-SB-04 (8/11/1993)	0.008	05-SB-04 (8/11/1993)	0.008	80	0
di-n-Octyl Phthalate	mg/kg	0.0314	0.946	4	1	50%	05-SB-04 (8/11/1993)	0.0052	05-SB-04 (8/11/1993)	0.0167	310	0
Diphenyl Amine	mg/kg	0.0193	0.588	4	1							
Fluoranthene	mg/kg	0.663	0.663	5	2	80%	05-SB-04 (8/11/1993)	0.0427	POLBVSB01 (6/16/2001)	0.28	190	0
Fluorene	mg/kg	0.0115	0.349	5	2	20%	POLBVSB01 (6/16/2001)	0.29	POLBVSB01 (6/16/2001)	0.29	220	0
Hexachlorobenzene	mg/kg	0.008	0.243	4	1							
Hexachlorocyclopentadiene	mg/kg	0.305	9.27	4	1							
Hexachloroethane	mg/kg	0.0203	0.617	4	1							
Indeno(1,2,3-cd)pyrene	mg/kg	0.0583	0.545	5	2	60%	05-SB-04 (8/11/1993)	0.0251	POLBVSB01 (6/16/2001)	0.043	0.49	0
Isophorone	mg/kg	0.0098	0.298	4	1							
N-Nitrosodipropylamine	mg/kg	0.0256	0.78	4	1							
Phenanthrene	mg/kg			5	2	100%	05-SB-04 (8/11/1993)	0.0184	POLBVSB01 (6/16/2001)	0.76	2060	0
Phenol	mg/kg	0.0136	0.414	4	1							
Pyrene	mg/kg	0.486	0.486	5	2	80%	05-SB-04 (8/11/1993)	0.0451	POLBVSB01 (6/16/2001)	0.3	140	0
VOCs												
1,1,1,2-Tetrachloroethane	mg/kg	0.35	0.35	1	1							
1,1,1-Trichloroethane	mg/kg	0.005	6	5	2	20%	05-SB-04 (8/11/1993)	0.0014	05-SB-04 (8/11/1993)	0.0014	0.82	0
1,1,2,2-Tetrachloroethane	mg/kg	0.005	6	5	2							
1,1,2-Trichloroethane	mg/kg	0.005	6	5	2							
1,1-Dichloroethane	mg/kg	0.005	6	5	2							
1,1-Dichloroethene	mg/kg	0.005	6	5	2							
1,1-Dichloropropene	mg/kg	0.41	0.41	1	1							
1,2,3-Trichlorobenzene	mg/kg	0.139	0.139	1	1							
1,2,3-Trichloropropane	mg/kg	0.67	0.67	1	1							
1,2,4-Trichlorobenzene	mg/kg	0.0202	0.63	5	2							
1,2,4-Trimethylbenzene	mg/kg			1	1	100%	POLBVSB01 (6/16/2001)	300	POLBVSB01 (6/16/2001)	300	4.9	1
1,2-Dibromo-3-Chloropropane	mg/kg	3.12	3.12	1	1							
1,2-Dichlorobenzene	mg/kg	0.0266	0.809	5	2							
1,2-Dichloroethane	mg/kg	0.005	6	5	2							
1,2-Dichloropropane	mg/kg	0.005	6	5	2							
1,3,5-Trimethylbenzene	mg/kg			1	1	100%	POLBVSB01 (6/16/2001)	110	POLBVSB01 (6/16/2001)	110	4.2	1
1,3-Dichlorobenzene	mg/kg	0.0135	0.411	5	2							
1,3-Dichloropropane	mg/kg	0.24	0.24	1	1							
1,4-Dichlorobenzene	mg/kg	0.0276	0.839	5	2							
1-Chlorohexane	mg/kg	0.38	0.38	1	1							
2,2-Dichloropropane	mg/kg	0.55	0.55	1	1							
2-Butanone (MEK)	mg/kg	0.03	39	4	1							
2-Chloroethyl Vinyl Ether	mg/kg	0.005	6	4	1							
2-Chlorotoluene	mg/kg	0.35	0.35	1	1							
2-Hexanone	mg/kg	0.03	39	4	1							
4-Chlorotoluene	mg/kg	0.28	0.28	1	1							
4-Methyl-2-Pentanone (MIBK)	mg/kg	0.03	39	4	1							

TABLE D1-SS005

Statistical Summary of Soil Analytical Results[a]

Analyte Name	Result Units	Minimum ND	Maximum ND	Number of Samples	Number of Locations	Frequency of Detection	Location of Minimum Detection	Minimum Detection Result	Location of Maximum Detection	Maximum Detection Result	Extent Soil Screening Level	Number of Exceedances
Acetone	mg/kg	0.1	130	4	1	25%	05-SB-04 (8/11/1993)	0.0043	05-SB-04 (8/11/1993)	0.0043	88	0
Benzene	mg/kg	0.005	0.33	5	2	60%	05-SB-04 (8/11/1993)	0.0007	05-SB-04 (8/11/1993)	340	0.025	2
bis(2-Chloroethoxy)methane	mg/kg	0.0192	0.584	4	1							
Bromobenzene	mg/kg	0.306	0.306	1	1							
Bromochloromethane	mg/kg	0.4	0.4	1	1							
Bromodichloromethane	mg/kg	0.005	6	5	2							
Bromoform	mg/kg	0.005	6	5	2							
Bromomethane	mg/kg	0.005	6	4	2							
Carbon Disulfide	mg/kg	0.01	13	4	1							
Carbon Tetrachloride	mg/kg	0.005	6	5	2							
Chlorobenzene	mg/kg	0.005	6	5	2							
Chloroethane	mg/kg	0.005	6	5	2							
Chloroform	mg/kg	0.005	6	5	2							
Chloromethane	mg/kg	0.005	6	5	2							
cis-1,2-Dichloroethene	mg/kg	0.005	6	5	2							
cis-1,3-Dichloropropene	mg/kg	0.005	6	5	2							
Dibromochloromethane	mg/kg	0.005	6	5	2							
Dibromomethane	mg/kg	0.31	0.31	1	1							
Ethylbenzene	mg/kg	0.005	0.31	5	2	60%	05-SB-04 (8/11/1993)	0.0007	05-SB-04 (8/11/1993)	91	6.9	2
Ethylene Dibromide (EDB)	mg/kg	0.23	0.23	1	1							
Hexachlorobutadiene	mg/kg	0.0238	1.2	5	2							
Isopropylbenzene	mg/kg	0.22	0.22	1	1							
m- & p-Xylene	mg/kg	0.02	0.02	5	2	80%	05-SB-04 (8/11/1993)	0.0016	05-SB-04 (8/11/1993)	510		0
Methylene Chloride	mg/kg	0.005	6	5	2	20%	POLBVSB01 (6/16/2001)	5.8	POLBVSB01 (6/16/2001)	5.8	0.016	1
Naphthalene	mg/kg	0.0249	0.0249	5	2	80%	05-SB-04 (8/11/1993)	0.0119	POLBVSB01 (6/16/2001)	21	2.8	3
n-Butylbenzene	mg/kg	0.695	0.695	1	1							
n-Propylbenzene	mg/kg	0.31	0.31	1	1							
o-Xylene	mg/kg	0.01	0.01	5	2	80%	05-SB-04 (8/11/1993)	0.0009	05-SB-04 (8/11/1993)	190	380	0
p-Isopropyltoluene	mg/kg			1	1	100%	POLBVSB01 (6/16/2001)	3.8	POLBVSB01 (6/16/2001)	3.8		0
sec-Butyl Alcohol	mg/kg	0.005	6	4	1							
sec-Butylbenzene	mg/kg			1	1	100%	POLBVSB01 (6/16/2001)	2.2	POLBVSB01 (6/16/2001)	2.2	4.1	0
Styrene	mg/kg	0.005	6	5	2							
tert-Butylbenzene	mg/kg	0.39	0.39	1	1							
Tetrachloroethene (PCE)	mg/kg	0.005	6	5	2							
Toluene	mg/kg	0.005	0.005	5	2	80%	05-SB-04 (8/11/1993)	0.0006	05-SB-04 (8/11/1993)	430	6.5	2
trans-1,2-Dichloroethene	mg/kg	0.005	6	5	2							
trans-1,3-Dichloropropene	mg/kg	0.005	6	5	2							
Trichloroethene (TCE)	mg/kg	0.005	6	5	2							
Trichlorofluoromethane	mg/kg	0.42	0.42	1	1							
Vinyl Acetate	mg/kg	0.05	65	4	1							
Vinyl Chloride	mg/kg	0.005	6	5	2							

[a]May not include all historical site data, only includes available validated electronic (data provided in Air Force database). See text for discussion of other historical data project screening level exceedances, if applicable

[b] Screening levels for metals have not been been finalized for this Work Plan; therefore, no screening levels are shown in this statistical summary table. Appendix C and Tables in Worksheet 15 identify ADEC Table B1/C Method 2 Cleanup levels and 1/10th of ADEC Table B1/C Method 2 Cleanup. Levels as screening levels for the purpose of identifying if LOD/LOQ are sufficient for this project.

[c] Screening levels for metals have not been finalized for this Work Plan; therefore, number of exceedances was not calculated. Metals will be analyzed at sites based on site use in accordance with steps outlined in Figure 15-1.

Notes:

ND = non detect

mg/kg = Milligrams per Kilogram

TABLE D2-SS005

Statistical Summary of Groundwater Analytical Results[a]

Analyte Name	Result Units	Minimum ND	Maximum ND	Number of Samples	Number of Locations	Frequency of Detection	Location of Minimum Detection	Minimum Detection Result	Location of Maximum Detection	Maximum Detection Result	Groundwater Screening Level	Number of Exceedances
Hydrocarbons												
C10-C25 DRO	µg/L			5	1	100%	05-SV-06 (5/26/2004)	671	05-SV-06 (6/1/1997)	3080	150	5
C25-C36 RRO	µg/L			1	1	100%	05-SV-06 (10/11/2001)	130	05-SV-06 (10/11/2001)	130	110	1
C6-C10 GRO	µg/L			5	1	100%	05-SV-06 (10/11/2001)	54	05-SV-06 (6/1/1997)	3200	220	4
Metals												
Arsenic	mg/L			1	1	100%	05-SV-06 (6/30/2001)	0.0026	05-SV-06 (6/30/2001)	0.0026	b	c
Barium	mg/L			1	1	100%	05-SV-06 (6/30/2001)	0.678	05-SV-06 (6/30/2001)	0.678	b	c
Cadmium	mg/L			1	1	100%	05-SV-06 (6/30/2001)	0.0024	05-SV-06 (6/30/2001)	0.0024	b	c
Chromium	mg/L	0.004	0.004	1	1	0%						
Lead	mg/L			1	1	100%	05-SV-06 (6/30/2001)	0.00331	05-SV-06 (6/30/2001)	0.00331	b	c
Manganese	mg/L			1	1	100%	05-SV-06 (6/30/2001)	16.7	05-SV-06 (6/30/2001)	16.7	b	c
Nickel	mg/L	0.02	0.02	1	1	0%						
Vanadium	mg/L	0.007	0.007	1	1	0%						
SVOCs												
Acenaphthene	µg/L			1	1	100%	05-SV-06 (6/30/2001)	0.095	05-SV-06 (6/30/2001)	0.095	220	0
Acenaphthylene	µg/L	0.0018	0.0018	1	1							
Anthracene	µg/L			1	1	100%	05-SV-06 (6/30/2001)	0.0045	05-SV-06 (6/30/2001)	0.0045	1100	0
Benzo(a)anthracene	µg/L			1	1	100%	05-SV-06 (6/30/2001)	0.0049	05-SV-06 (6/30/2001)	0.0049	0.12	0
Benzo(a)pyrene	µg/L			1	1	100%	05-SV-06 (6/30/2001)	0.0025	05-SV-06 (6/30/2001)	0.0025	0.02	0
Benzo(b)fluoranthene	µg/L			1	1	100%	05-SV-06 (6/30/2001)	0.0037	05-SV-06 (6/30/2001)	0.0037	0.12	0
Benzo(g,h,i)perylene	µg/L	0.0037	0.0037	1	1							
Benzo(k)fluoranthene	µg/L			1	1	100%	05-SV-06 (6/30/2001)	0.0031	05-SV-06 (6/30/2001)	0.0031	1.2	0
Chrysene	µg/L			1	1	100%	05-SV-06 (6/30/2001)	0.0062	05-SV-06 (6/30/2001)	0.0062	12	0
Dibenz(a,h)anthracene	µg/L			1	1	100%	05-SV-06 (6/30/2001)	0.0023	05-SV-06 (6/30/2001)	0.0023	0.012	0
Fluoranthene	µg/L			1	1	100%	05-SV-06 (6/30/2001)	0.019	05-SV-06 (6/30/2001)	0.019	150	0
Fluorene	µg/L			1	1	100%	05-SV-06 (6/30/2001)	0.068	05-SV-06 (6/30/2001)	0.068	150	0
Indeno(1,2,3-cd)pyrene	µg/L			1	1	100%	05-SV-06 (6/30/2001)	0.0028	05-SV-06 (6/30/2001)	0.0028	0.12	0
Phenanthrene	µg/L			1	1	100%	05-SV-06 (6/30/2001)	0.015	05-SV-06 (6/30/2001)	0.015	1100	0
Pyrene	µg/L			1	1	100%	05-SV-06 (6/30/2001)	0.015	05-SV-06 (6/30/2001)	0.015	110	0
VOCs												
1,1,1,2-Tetrachloroethane	µg/L	0.111	0.15	2	1							
1,1,1-Trichloroethane	µg/L	0.111	0.31	2	1							
1,1,2,2-Tetrachloroethane	µg/L	0.138	0.15	2	1							
1,1,2-Trichloroethane	µg/L	0.1	0.31	2	1							
1,1-Dichloroethane	µg/L	0.31	0.31	2	1	50%	05-SV-06 (6/30/2001)	0.19	05-SV-06 (6/30/2001)	0.19	730	0
1,1-Dichloroethene	µg/L	0.12	0.31	2	1							
1,1-Dichloropropene	µg/L	0.13	0.31	2	1							
1,2,3-Trichlorobenzene	µg/L	0.044	0.31	2	1							
1,2,3-Trichloropropane	µg/L	0.22	0.31	2	1							

TABLE D2-SS005

Statistical Summary of Groundwater Analytical Results[a]

Analyte Name	Result Units	Minimum ND	Maximum ND	Number of Samples	Number of Locations	Frequency of Detection	Location of Minimum Detection	Minimum Detection Result	Location of Maximum Detection	Maximum Detection Result	Groundwater Screening Level	Number of Exceedances
1,2,4-Trichlorobenzene	µg/L	0.2	0.31	2	1							
1,2,4-Trimethylbenzene	µg/L			2	1	100%	05-SV-06 (6/30/2001)	1.7	05-SV-06 (5/26/2004)	3.05	180	0
1,2-Dibromo-3-Chloropropane	µg/L	0.62	1	2	1							
1,2-Dichlorobenzene	µg/L	0.085	0.31	2	1							
1,2-Dichloroethane	µg/L			2	1	100%	05-SV-06 (5/26/2004)	7.86	05-SV-06 (6/30/2001)	23	0.5	2
1,2-Dichloropropane	µg/L	0.31	1.3	2	1							
1,3,5-Trimethylbenzene	µg/L			2	1	100%	05-SV-06 (6/30/2001)	0.92	05-SV-06 (5/26/2004)	60.3	180	0
1,3-Dichlorobenzene	µg/L	0.11	0.31	2	1							
1,3-Dichloropropane	µg/L	0.076	0.12	2	1							
1,4-Dichlorobenzene	µg/L	0.087	0.15	2	1							
1-Chlorohexane	µg/L	0.118	0.31	2	1							
2,2-Dichloropropane	µg/L	0.18	0.31	2	1							
2-Butanone (MEK)	µg/L	3.1	3.1	1	1							
2-Chlorotoluene	µg/L	0.111	0.31	2	1							
4-Chlorotoluene	µg/L	0.089	0.31	2	1							
4-Methyl-2-Pentanone (MIBK)	µg/L	3.1	3.1	1	1							
Acetone	µg/L	3.1	3.1	1	1							
Benzene	µg/L			5	1	100%	05-SV-06 (9/1/1997)	1	05-SV-06 (6/1/1997)	530	0.5	5
Bromobenzene	µg/L	0.098	0.31	2	1							
Bromochloromethane	µg/L	0.126	0.31	2	1							
Bromodichloromethane	µg/L	0.085	0.15	2	1							
Bromoform	µg/L	0.28	0.5	2	1							
Bromomethane	µg/L	0.22	0.94	2	1							
Carbon Tetrachloride	µg/L	0.13	0.31	2	1							
Chlorobenzene	µg/L	0.094	0.15	2	1							
Chloroethane	µg/L	0.31	0.31	2	1	50%	05-SV-06 (6/30/2001)	0.25	05-SV-06 (6/30/2001)	0.25	29	0
Chloroform	µg/L	0.094	0.094	2	1	50%	05-SV-06 (6/30/2001)	0.13	05-SV-06 (6/30/2001)	0.13	14	0
Chloromethane	µg/L	0.31	0.31	2	1	50%	05-SV-06 (6/30/2001)	0.72	05-SV-06 (6/30/2001)	0.72	6.6	0
cis-1,2-Dichloroethene	µg/L	0.12	0.31	2	1							
cis-1,3-Dichloropropene	µg/L	0.081	0.15	2	1							
Dibromochloromethane	µg/L	0.082	0.15	2	1							
Dibromomethane	µg/L	0.098	0.31	2	1							
Dichlorodifluoromethane	µg/L	0.17	0.31	2	1							
Ethylbenzene	µg/L	0	0	5	1	80%	05-SV-06 (6/30/2001)	31	05-SV-06 (5/26/2004)	363	70	3
Ethylene Dibromide (EDB)	µg/L	0.073	0.31	2	1							
Hexachlorobutadiene	µg/L	0.18	0.38	2	1							
Isopropylbenzene	µg/L			2	1	100%	05-SV-06 (6/30/2001)	1.6	05-SV-06 (5/26/2004)	13.1	370	0
m- & p-Xylene	µg/L			2	1	100%	05-SV-06 (5/26/2004)	3.66	05-SV-06 (6/30/2001)	6.1		0
Methyl tert-Butyl Ether (MTBE)	µg/L	1.5	1.5	1	1							

TABLE D2-SS005

Statistical Summary of Groundwater Analytical Results[a]

Analyte Name	Result Units	Minimum ND	Maximum ND	Number of Samples	Number of Locations	Frequency of Detection	Location of Minimum Detection	Minimum Detection Result	Location of Maximum Detection	Maximum Detection Result	Groundwater Screening Level	Number of Exceedances
Methylene Chloride	µg/L	0.2	0.31	2	1							
Naphthalene	µg/L			2	1	100%	05-SV-06 (5/26/2004)	13.2	05-SV-06 (6/30/2001)	34	73	0
n-Butylbenzene	µg/L			2	1	100%	05-SV-06 (6/30/2001)	0.46	05-SV-06 (5/26/2004)	1.62	37	0
n-Propylbenzene	µg/L			2	1	100%	05-SV-06 (6/30/2001)	3	05-SV-06 (5/26/2004)	21	37	0
o-Xylene	µg/L			2	1	100%	05-SV-06 (5/26/2004)	0.89	05-SV-06 (6/30/2001)	0.95	120	0
p-Isopropyltoluene	µg/L			2	1	100%	05-SV-06 (6/30/2001)	0.14	05-SV-06 (5/26/2004)	0.78		0
sec-Butylbenzene	µg/L			2	1	100%	05-SV-06 (6/30/2001)	0.37	05-SV-06 (5/26/2004)	1.46	37	0
Styrene	µg/L	0.095	0.31	2	1							
tert-Butylbenzene	µg/L	0.13	0.31	2	1							
Tetrachloroethene (PCE)	µg/L	0.11	0.31	2	1							
Toluene	µg/L	0	0	5	1	80%	05-SV-06 (5/26/2004)	1.75	05-SV-06 (6/1/1997)	82	100	0
trans-1,2-Dichloroethene	µg/L	0.139	0.31	2	1							
trans-1,3-Dichloropropene	µg/L	0.087	0.31	2	1							
Trichloroethene (TCE)	µg/L	0.12	0.31	2	1							
Trichlorofluoromethane	µg/L	0.131	0.31	2	1							
Vinyl Acetate	µg/L	3.1	3.1	1	1							
Vinyl Chloride	µg/L	0.22	0.31	2	1							
Xylenes, Total	µg/L			3	1	100%	05-SV-06 (9/1/1997)	2.8	05-SV-06 (6/1/1997)	172	1000	0
General Chemistry												
Chloride	mg/L			3	1	100%	05-SV-06 (9/1/1997)	3.1	05-SV-06 (6/1/1997)	3.8		0
Nitrogen, Nitrate-Nitrite	mg/L	0	0.031	2	1							
Sulfate	mg/L			3	1	100%	05-SV-06 (9/1/1997)	7.7	05-SV-06 (5/26/2004)	109		0

[a]May not include all historical site data, only includes available validated electronic (data provided in Air Force database). See text for discussion of other historical data project screening level exceedances, if applicable

[b] Screening levels for metals have not been been finalized for this Work Plan; therefore, no screening levels are shown in this statistical summary table. Appendix C and Tables in Worksheet 15 identify ADEC Table B1/C Method 2 Cleanup levels and 1/10th of ADEC Table B1/C Method 2 Cleanup Levels as screening levels for the purpose of identifying if LOD/LOQ are sufficient for this project.

[c] Screening levels for metals have not been finalized for this Work Plan; therefore, number of exceedances was not calculated. Metals will be analyzed at sites based on site use in accordance with steps outlined in Figure 15-1.

Notes:

ND = non detect

mg/L = Milligrams per Liter

µg/L = Micrograms per Liter

TABLE D3-SS005

Historical Samples Exceeding Soil Extent Screening Levels[a,b]

	Location	05-SB-04				POLBVSB01
	Sample ID	05-SB-04-01	05-SB-04-02	05-SB-04-03	05-SB-04-04	G01-POL-BV-SB01-1001
	Sample Depth (ft)	0 - 2	2.5 - 4.5	5 - 7	7.5 - 9.5	7.5 - 8.5
	Sample Date	8/11/1993	8/11/1993	8/11/1993	8/11/1993	6/16/2001
Analyte	**Screening Level**					
Hydrocarbons (mg/kg)						
C10-C25 DRO	250	**5 J**	**46**	**1300**	**2600**	**3000**
C6-C10 GRO	140	10 U	10 U	**420**	**5800**	**400**
SVOCs (mg/kg)						
2-Methylnaphthalene	6.1	0.0225 U	**0.0142 J**	**13.3**	**20**	- -
Benzo(a)pyrene	0.049	**0.0362**	**0.038**	0.0425 U	0.398 U	**0.053 J**
VOCs (mg/kg)						
1,2,4-Trimethylbenzene	4.9	- -	- -	- -	- -	**300**
1,3,5-Trimethylbenzene	4.2	- -	- -	- -	- -	**110**
Benzene	0.025	0.005 U	**0.0007 J**	**1.1**	**340**	0.33 U
Ethylbenzene	6.9	**0.0007 J**	0.005 U	**10**	**91**	0.31 U
Methylene Chloride	0.016	0.005 U	0.005 U	1 U	6 U	**5.8**
Naphthalene	2.8	0.0249 U	**0.0119 J**	**11.6**	**14.9**	**21**
Toluene	6.5	0.005 U	**0.0006 J**	**33**	**430**	**0.53 J**
Calculated Total Xylenes	6.3	**0.0025**	0.015 U	**167**	**700**	**109**

[a]May not include all historical site data, only includes available validated electronic (data provided in Air Force database). See text for discussion of other historical data project screening level exceedances, if applicable

[b]Metals are not included in this table.

Notes:

-- = Not Analyzed

Calculated total xylenes is equal to the sum of m-xylene, o-xylene, and p-xylene

J = The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

mg/kg = Milligrams per Kilogram

bgs = below ground surface

Bold indicates the analyte was detected

Shading indicates the result exceeded screening criteria

Field Duplicates are included in this table.

TABLE D4-SS005

Historical Samples Exceeding Groundwater Screening Levels[a,b]

	Location				05-SV-06			
	Sample ID	05-SV-060697	05-SV-060997	05-SV-060598	G01-05SV06-1001	G01-05-SV06-1002	GSS005-05SV06-W052604	GSS005-05SV06-W052604D
	Sample Depth (feet bgs)	24 - 39	24 - 39	24 - 39	24 - 39	24 - 39	24 - 39	24 - 39
	Sample Date	6/1/1997	9/1/1997	5/1/1998	6/30/2001	10/11/2001	5/26/2004	5/26/2004
	Depth to Water (feet bgs)	--	--	--	--	--	21.36	--
	Measurement Date	--	--	--	--	--	5/26/2004	--
Analyte	**Screening Level**							
Hydrocarbons (ug/L)								
C10-C25 DRO	150	**3080**	**1260**	**2080**	- -	**980**	**671 J**	**668 J**
C6-C10 GRO	220	**3200 J**	**432**	**1800 J**	- -	**54**	**1440 M**	**1520 M**
C25-C36 RRO	110	- -	- -	- -	- -	**130 J**	- -	- -
VOCs (ug/L)								
1,2-Dichloroethane	0.5	- -	- -	- -	**23**	- -	**7.56 J**	**7.86 J**
Benzene	0.5	**530 J**	**1**	**167**	**270**	- -	**68.4 J**	**71.7 J**
Ethylbenzene	70	**173**	0 U	**101**	**31**	- -	**336 J**	**363 J**

[a]May not include all historical site data, only includes available validated electronic (data provided in Air Force database). See text for discussion of other historical data project screening level exceedances, if applicable

[b]Metals are not included in this table.

Notes:

-- = Not Analyzed

J = The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

M = A matrix effect was identified.

µg/L = Micrograms per Liter

bgs = below ground surface

Bold indicates the analyte was detected

Shading indicates the result exceeded screening criteria

Field Duplicates are included in the table.

TABLE D5-SS005
Proposed Sampling Locations and Rationale

Sampling Location	Field Sample ID	Easting (meters)	Northing (meters)	Media	Sample Type	Sample Depth (feet bgs)	GRO[a] AK101	DRO[a] AK102	RRO[a] AK103	BTEX Screening for PCE and TCE[a] SW8021B	VOCs[b] SW8260B	EDB, 1,2-DCA[b] E504.1	PAHs[b] SW8270C	Total Lead[b] SW6010B	Dissolved Lead[b] SW6010B	Pesticides[b] SW8081A	Field Parameters[c]	Rationale
SS005GP001	SS005GP001-SO_00-02	597566.9222	7181194.167	Surface Soil	N	0 - 2	1	1	1	1	1			1		1		Soil samples will be collected to help delineate the lateral and vertical extent of potential soil contamination in the northern portion of SS005 through the entire thickness of the variably saturated zone.
	SS005GP901-SO_00-02			Surface Soil	FD	0 - 2	1	1	1	1	1			1		1		
	SS005GP001-SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1			1		1		
	SS005GP001-SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1			1		1		
	SS005GP001-SO_22-24			Subsurface Soil	N	~23 (Mid-point of Variably Saturated Zone)	1	1	1	1	1			1		1		
	SS005GP001-SO_30-32			Subsurface Soil	N	~31 (Bottom of Variably Saturated Zone)	1	1	1	1	1			1		1		
	SS005GP001-SO_30-32SPT			Subsurface Soil	SPT	~31 (Bottom of Variably Saturated Zone)	1	1	1									
	SS005GP001-SO_40-42			Subsurface Soil	N	~41 (Permanently Saturated Zone)	1	1	1	1	1			1		1		
	SS005GP001-GW_14-19			Groundwater	N	~14 (Top of Water Table)	1	1	1		1				1	1	1	Groundwater samples will be collected to help delineate the lateral and vertical extent of potential groundwater contamination in the northern portion of SS005.
	SS005GP001-GW_14-19MS			Groundwater	MS	~14 (Top of Water Table)	1	1	1		1				1	1		
	SS005GP001-GW_14-19SD			Groundwater	MSD	~14 (Top of Water Table)	1	1	1		1				1	1		
	SS005GP001-GW_41-46			Groundwater	N	~41 (Permanently Saturated Zone)	1	1	1		1				1	1	1	
SS005GP002	SS005GP002-SO_00-02	597554.1375	7181185.37	Surface Soil	N	0 - 2	1	1	1	1	1			1		1		Soil samples will be collected to help delineate the lateral and vertical extent of potential soil contamination in the northwestern portion of SS005 through the entire thickness of the variably saturated zone.
	SS005GP002-SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1			1		1		
	SS005GP902-SO_05-07			Subsurface Soil	FD	5 - 7	1	1	1	1	1			1		1		
	SS005GP002-SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1			1		1		
	SS005GP002-SO_22-24			Subsurface Soil	N	~23 (Mid-point of Variably Saturated Zone)	1	1	1	1	1			1		1		
	SS005GP002-SO_30-32			Subsurface Soil	N	~31 (Bottom of Variably Saturated Zone)	1	1	1	1	1			1		1		
	SS005GP002-SO_40-42			Subsurface Soil	N	~41 (Permanently Saturated Zone)	1	1	1	1	1			1		1		
	SS005GP002-SO_40-42SPT			Subsurface Soil	SPT	~41 (Permanently Saturated Zone)	1	1	1									
	SS005GP002-GW_14-19			Groundwater	N	~14 (Top of Water Table)	1	1	1		1	1	1		1	1	1	Groundwater samples will be collected to help delineate the lateral and vertical extent of potential groundwater contamination in the northern portion of SS005.
	SS005GP002-GW_41-46			Groundwater	N	~41 (Permanently Saturated Zone)	1	1	1		1				1	1	1	
SS005GP003	SS005GP003-SO_00-02	597585.5181	7181179.963	Surface Soil	N	0 - 2	1	1	1	1	1			1		1		Soil samples will be collected to help delineate the lateral and vertical extent of potential soil contamination in the northeastern portion of SS005 through the entire thickness of the variably saturated zone.
	SS005GP003-SO_00-02MS			Surface Soil	MS	0 - 2	1	1	1	1	1			1		1		
	SS005GP003-SO_00-02SD			Surface Soil	MSD	0 - 2	1	1	1	1	1			1		1		
	SS005GP003-SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1			1		1		
	SS005GP003-SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1			1		1		
	SS005GP903-SO_10-12			Subsurface Soil	FD	10 - 12	1	1	1	1	1			1		1		
	SS005GP003-SO_22-24			Subsurface Soil	N	~23 (Mid-point of Variably Saturated Zone)	1	1	1	1	1			1		1		
	SS005GP003-SO_30-32			Subsurface Soil	N	~31 (Bottom of Variably Saturated Zone)	1	1	1	1	1			1		1		
	SS005GP003-SO_40-42			Subsurface Soil	N	~41 (Permanently Saturated Zone)	1	1	1	1	1			1		1		
	SS005GP003-GW_14-19			Groundwater	N	~14 (Top of Water Table)	1	1	1		1				1	1	1	Groundwater samples will be collected to help delineate the lateral and vertical extent of potential groundwater contamination in the northeastern portion of SS005.
	SS005GP003-GW_41-46			Groundwater	N	~41 (Permanently Saturated Zone)	1	1	1		1				1	1	1	
SS005GP004	SS005GP004-SO_00-02	597561.3077	7181180.017	Surface Soil	N	0 - 2	1	1	1	1	1			1		1		Soil samples will be collected to help characterize the nature and extent of potential soil contamination in the vicinity of the former cluster of eight fuel ASTs through the entire thickness of the variably saturated zone.
	SS005GP004-SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1		1	1		1		
	SS005GP004-SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1		1	1		1		
	SS005GP004-SO_10-12MS			Subsurface Soil	MS	10 - 12	1	1	1	1	1		1	1		1		
	SS005GP004-SO_10-12SD			Subsurface Soil	MSD	10 - 12	1	1	1	1	1		1	1		1		
	SS005GP004-SO_22-24			Subsurface Soil	N	~23 (Mid-point of Variably Saturated Zone)	1	1	1	1	1		1	1		1		
	SS005GP904-SO_22-24			Subsurface Soil	FD	~23 (Mid-point of Variably Saturated Zone)	1	1	1	1	1			1		1		
	SS005GP004-SO_30-32			Subsurface Soil	N	~31 (Bottom of Variably Saturated Zone)	1	1	1	1	1			1		1		
	SS005GP004-SO_40-42			Subsurface Soil	N	~41 (Permanently Saturated Zone)	1	1	1	1	1			1		1		

TABLE D5-SS005
Proposed Sampling Locations and Rationale

Sampling Location	Field Sample ID	Easting (meters)	Northing (meters)	Media	Sample Type	Sample Depth (feet bgs)	GRO[a] AK101	DRO[a] AK102	RRO[a] AK103	BTEX Screening for PCE and TCE[a] SW8021B	VOCs[b] SW8260B	EDB, 1,2-DCA[b] E504.1	PAHs[b] SW8270C	Total Lead[b] SW6010B	Dissolved Lead[b] SW6010B	Pesticides[b] SW8081A	Field Parameters[c]	Rationale
SS005GP005	SS005GP005-SO_00-02	597568.8037	7181172.951	Surface Soil	N	0 - 2	1	1	1	1	1			1		1		Soil samples will be collected to help characterize the nature and extent of potential soil contamination in the vicinity of the former cluster of eight fuel ASTs through the entire thickness of the variably saturated zone.
	SS005GP005-SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1			1		1		
	SS005GP005-SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1		1	1		1		
	SS005GP005-SO_22-24			Subsurface Soil	N	~23 (Mid-point of Variably Saturated Zone)	1	1	1	1	1		1	1		1		
	SS005GP005-SO_22-24MS			Subsurface Soil	MS	~23 (Mid-point of Variably Saturated Zone)	1	1	1	1	1		1	1		1		
	SS005GP005-SO_22-24SD			Subsurface Soil	MSD	~23 (Mid-point of Variably Saturated Zone)	1	1	1	1	1		1	1		1		
	SS005GP005-SO_30-32			Subsurface Soil	N	~31 (Bottom of Variably Saturated Zone)	1	1	1	1	1			1		1		
	SS005GP905-SO_30-32			Subsurface Soil	FD	~31 (Bottom of Variably Saturated Zone)	1	1	1	1	1			1		1		
	SS005GP005-SO_40-42			Subsurface Soil	N	~41 (Permanently Saturated Zone)	1	1	1	1	1			1		1		
	SS005GP005-GW_14-19			Groundwater	N	~14 (Top of Water Table)	1	1	1		1	1	1		1	1	1	Groundwater samples will be collected to help delineate the lateral and vertical extent of potential groundwater contamination in the vicinity of the former cluster of eight fuel ASTs.
	SS005GP005-GW_41-46			Groundwater	N	~41 (Permanently Saturated Zone)	1	1	1		1				1	1	1	
SS005GP006	SS005GP006-SO_00-02	597579.92	7181172.05	Surface Soil	N	0 - 2	1	1	1	1	1			1		1		Soil samples will be collected to help characterize the nature and extent of potential soil contamination in the vicinity of the former cluster of eight fuel ASTs (through the entire thickness of the variably saturated zone) co-located with historical sample 1872-SG-001.
	SS005GP006-SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1			1		1		
	SS005GP006-SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1			1		1		
	SS005GP006-SO_22-24			Subsurface Soil	N	~23 (Mid-point of Variably Saturated Zone)	1	1	1	1	1			1		1		
	SS005GP006-SO_30-32			Subsurface Soil	N	~31 (Bottom of Variably Saturated Zone)	1	1	1	1	1			1		1		
	SS005GP006-SO_40-42			Subsurface Soil	N	~41 (Permanently Saturated Zone)	1	1	1	1	1			1		1		
	SS005GP906-SO_40-42			Subsurface Soil	FD	~41 (Permanently Saturated Zone)	1	1	1	1	1			1		1		
SS005GP007	SS005GP007-SO_00-02	597582.3036	7181156.467	Surface Soil	N	0 - 2	1	1	1	1	1		1	1		1		Soil samples will be collected to help characterize the nature and extent of potential soil contamination in the southeastern portion of SS005 (through the entire thickness of the variably saturated zone) along the former pipelines feeding the ASTs.
	SS005GP007-SO_00-02SPT			Surface Soil	SPT	0 - 2	1	1	1									
	SS005GP007-SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1			1		1		
	SS005GP007-SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1			1		1		
	SS005GP007-SO_22-24			Subsurface Soil	N	~23 (Mid-point of Variably Saturated Zone)	1	1	1	1	1			1		1		
	SS005GP007-SO_30-32			Subsurface Soil	N	~31 (Bottom of Variably Saturated Zone)	1	1	1	1	1			1		1		
	SS005GP007-SO_40-42			Subsurface Soil	N	~41 (Permanently Saturated Zone)	1	1	1	1	1			1		1		
SS005GP008	SS005GP008-SO_00-02	597549.83	7181171.603	Surface Soil	N	0 - 2	1	1	1	1	1			1		1		Soil samples will be collected to help characterize the nature and extent of potential soil contamination in the vicinity of the former cluster of three fuel ASTs through the entire thickness of the variably saturated zone.
	SS005GP008-SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1			1		1		
	SS005GP008-SO_05-07SPT			Subsurface Soil	SPT	5 - 7	1	1	1									
	SS005GP008-SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1		1	1		1		
	SS005GP008-SO_22-24			Subsurface Soil	N	~23 (Mid-point of Variably Saturated Zone)	1	1	1	1	1		1	1		1		
	SS005GP008-SO_30-32			Subsurface Soil	N	~31 (Bottom of Variably Saturated Zone)	1	1	1	1	1		1	1		1		
	SS005GP008-SO_40-42			Subsurface Soil	N	~41 (Permanently Saturated Zone)	1	1	1	1	1			1		1		
	SS005GP008-GW_14-19			Groundwater	N	~14 (Top of Water Table)	1	1	1		1	1	1		1	1	1	Groundwater samples will be collected to help characterize the nature and extent of potential groundwater contamination in the vicinity of the former cluster of three fuel ASTs.
	SS005GP908-GW_14-19			Groundwater	FD	~14 (Top of Water Table)	1	1	1		1	1	1		1	1		
	SS005GP008-GW_41-46			Groundwater	N	~41 (Permanently Saturated Zone)	1	1	1		1	1	1		1	1	1	
SS005GP009	SS005GP009-SO_00-02	597538.0093	7181158.906	Surface Soil	N	0 - 2	1	1	1	1	1			1		1		This sample is located near historical locations 05-SB-04 and POLBVSB01, which have shown exceedances of extent soil SLs. Soil samples will confirm historical data and help delineate the nature and extent of potential soil contamination southwest of former Building 1872 through the entire thickness of the variably saturated zone.
	SS005GP009-SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1			1		1		
	SS005GP009-SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1			1		1		
	SS005GP009-SO_10-12SPT			Subsurface Soil	SPT	10 - 12	1	1	1									

TABLE D5-SS005
Proposed Sampling Locations and Rationale

Sampling Location	Field Sample ID	Easting (meters)	Northing (meters)	Media	Sample Type	Sample Depth (feet bgs)	GRO[a] AK101	DRO[a] AK102	RRO[a] AK103	BTEX Screening for PCE and TCE[a] SW8021B	VOCs[b] SW8260B	EDB, 1,2-DCA[b] E504.1	PAHs[b] SW8270C	Total Lead[b] SW6010B	Dissolved Lead[b] SW6010B	Pesticides[b] SW8081A	Field Parameters[c]	Rationale
	SS005GP009-SO_22-24			Subsurface Soil	N	~23 (Mid-point of Variably Saturated Zone)	1	1	1	1	1			1		1		
	SS005GP009-SO_30-32			Subsurface Soil	N	~31 (Bottom of Variably Saturated Zone)	1	1	1	1	1			1		1		
	SS005GP009-SO_40-42			Subsurface Soil	N	~41 (Permanently Saturated Zone)	1	1	1	1	1			1		1		
	SS005GP009-GW_14-19			Groundwater	N	~14 (Top of Water Table)	1	1	1		1				1	1	1	This sample is located near historical location 05-SV-06, which has shown exceedances of extent groundwater SLs. A vapor extraction well was abandoned during building demolition. This sample will confirm historical data and help delineate the nature and extent of groundwater contamination southwest of former Building 1872.
	SS005GP009-GW_41-46			Groundwater	N	~41 (Permanently Saturated Zone)	1	1	1		1	1	1		1	1	1	
SS005GP010	SS005GP010-SO_00-02	597559.9602	7181149.323	Surface Soil	N	0 - 2	1	1	1	1	1			1		1		Soil samples will be collected to help delineate the lateral and vertical extent of potential soil contamination in the southern portion of SS005 through the entire thickness of the variably saturated zone.
	SS005GP010-SO_05-07			Subsurface Soil	N	5 - 7	1	1	1	1	1			1		1		
	SS005GP010-SO_10-12			Subsurface Soil	N	10 - 12	1	1	1	1	1			1		1		
	SS005GP010-SO_22-24			Subsurface Soil	N	~23 (Mid-point of Variably Saturated Zone)	1	1	1	1	1			1		1		
	SS005GP010-SO_22-24SPT			Subsurface Soil	SPT	~23 (Mid-point of Variably Saturated Zone)	1	1	1									
	SS005GP010-SO_30-32			Subsurface Soil	N	~31 (Bottom of Variably Saturated Zone)	1	1	1	1	1			1		1		
	SS005GP010-SO_40-42			Subsurface Soil	N	~41 (Permanently Saturated Zone)	1	1	1	1	1			1		1		
	SS005GP010-GW_14-19			Groundwater	N	~14 (Top of Water Table)	1	1	1		1				1	1	1	Groundwater samples will be collected to help delineate the lateral and vertical extent of potential groundwater contamination in the southern portion of SS005.
	SS005GP010-GW_41-46			Groundwater	N	~41 (Permanently Saturated Zone)	1	1	1		1				1	1	1	
	SS005GP910-GW_41-46			Groundwater	FD	~41 (Permanently Saturated Zone)	1	1	1		1				1	1		
TBD	SS005-EB001	NA	NA	ASTM Type II	EB	NA	1	1	1		1		1	1		1		Equipment blank for Geoprobe equipment
TBD	SS005-EB002	NA	NA	ASTM Type II	EB	NA	1	1	1		1		1	1		1		Equipment blank for Geoprobe equipment
TBD	SS005-EB003	NA	NA	ASTM Type II	EB	NA	1	1	1		1			1	1	1		Equipment blank for Geoprobe equipment
TBD	SS005-EB004	NA	NA	ASTM Type II	EB	NA	1	1	1		1	1	1	1	1	1		Equipment blank for Hydropunch equipment
TBD	SS005-EB005	NA	NA	ASTM Type II	EB	NA	1	1	1		1	1		1	1	1		Equipment blank for Hydropunch equipment
NA	SS005-TB01	NA	NA	ASTM Type II	TB	NA	1				1							Trip blank for cooler with GRO and/or VOC samples
NA	SS005-TB02	NA	NA	ASTM Type II	TB	NA	1				1							Trip blank for cooler with GRO and/or VOC samples
NA	SS005-TB03	NA	NA	ASTM Type II	TB	NA	1				1							Trip blank for cooler with GRO and/or VOC samples
Totals																		
SS005				Surface Soil			14	14	14	13	13	0	1	13	0	13	0	
SS005				Subsurface Soil			64	64	64	59	59	0	12	59	0	59	0	
SS005				Groundwater			18	18	18	0	18	6	6	0	18	18	14	
SS005				ASTM Type II			8	5	5	0	8	2	3	5	3	5	0	

[a]Analytical methods AK101, AK102, AK103, and SW8021B for soil will be performed at the on-site mobile lab; 10 percent of these samples have been identified for split analysis according to Worksheet #20.
[b]Soil sample analysis by this method will be performed at an off-site lab.
[c]Field parameters will be analyzed for pH, temperature, specific conductivity, dissolved oxygen, and ORP using a water quality meter and flow-through cell as described in SOP-12.

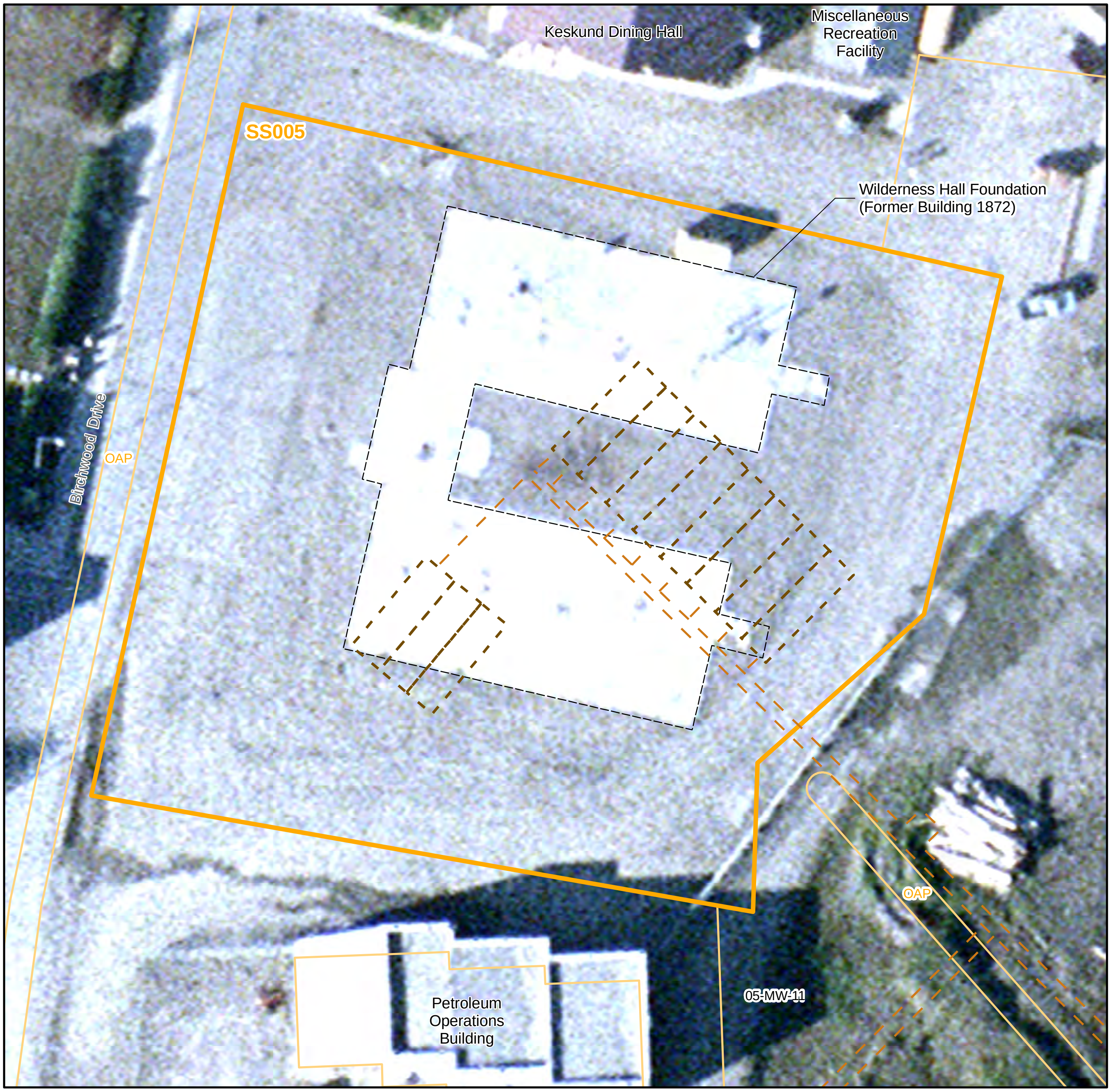
Notes:

Analysis of all groundwater and split (SPT) soil samples will be performed at an off-site lab.

If visible evidence of soil contamination is observed (in soil borings where grab groundwater samples are to be collected) at depths within the variably saturated zone other than those specified in the table, additional soil and co-located groundwater samples will be collected at those depths.

Per Guidance in Appendix F of ADEC, 2010: "*For each source area, PAH, EDB, and 1,2-DCA analysis must be performed on a sufficient percentage of the samples with the highest GRO, DRO and/or RRO concentrations to determine if these analytes are contaminants of concern. In general, 10% is recommended for site characterization. If concentrations are less than applicable cleanup levels, further analysis is generally not required. PAHs should be sampled in groundwater if soil samples concentrations are above applicable cleanup levels and groundwater sampling is required.* "

bgs = below ground surface
NA = not applicable
TBD = to be determined
N = normal sample
FD = field duplicate sample
MS = matrix spike sample
MSD = matrix spike duplicate sample
EB = equipment blank
TB = trip blank
SPT = split sample

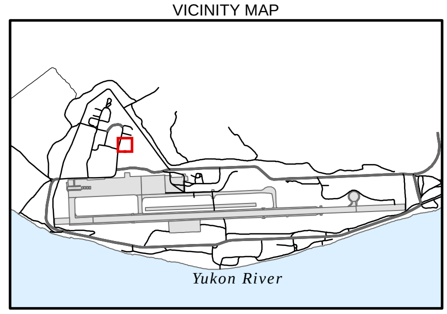


LEGEND

- SS005
- Adjacent Site
- Former Aboveground Storage Tank
- Approximate Location of Former Feature
- Removed Fuel Pipeline

Note:
1. Imagery September 4, 2009. Pixel size 0.25 meter

VICINITY MAP



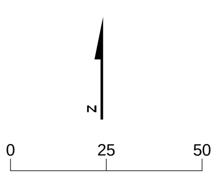
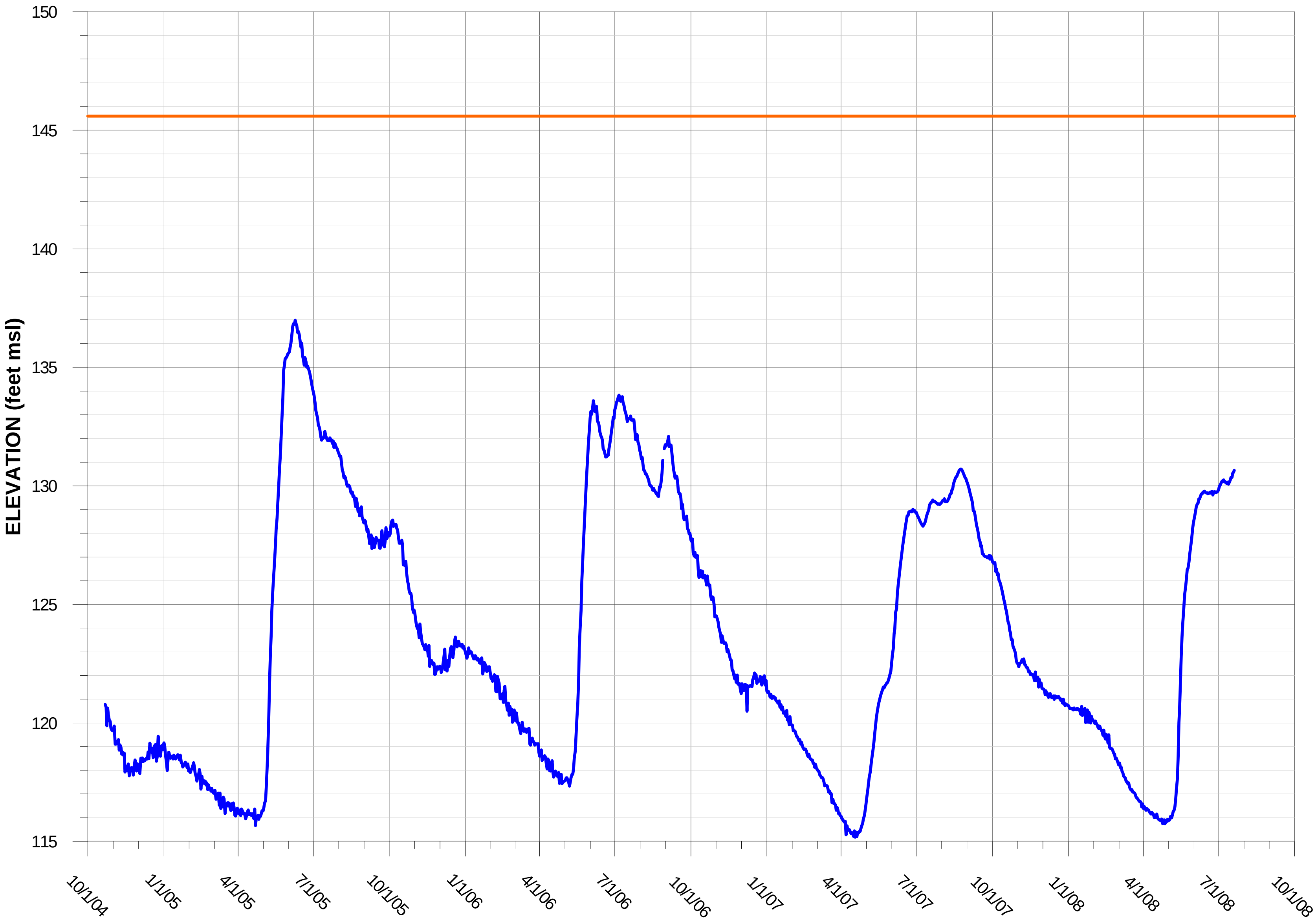


FIGURE D1-SS005
Site Layout

Work Plan for Site Inspection, Remedial Investigation, and Site Characterization
Former Galena Forward Operating Location, Alaska

CH2MHILL



LEGEND

Groundwater Elevation

Ground Surface Elevation

FIGURE D2-SS005
Hydrograph of Groundwater Elevation versus Time; 05-MW-19

Work Plan for Site Inspection, Remedial Investigation, and Site Characterization

Former Galena Forward Operating Location, Alaska

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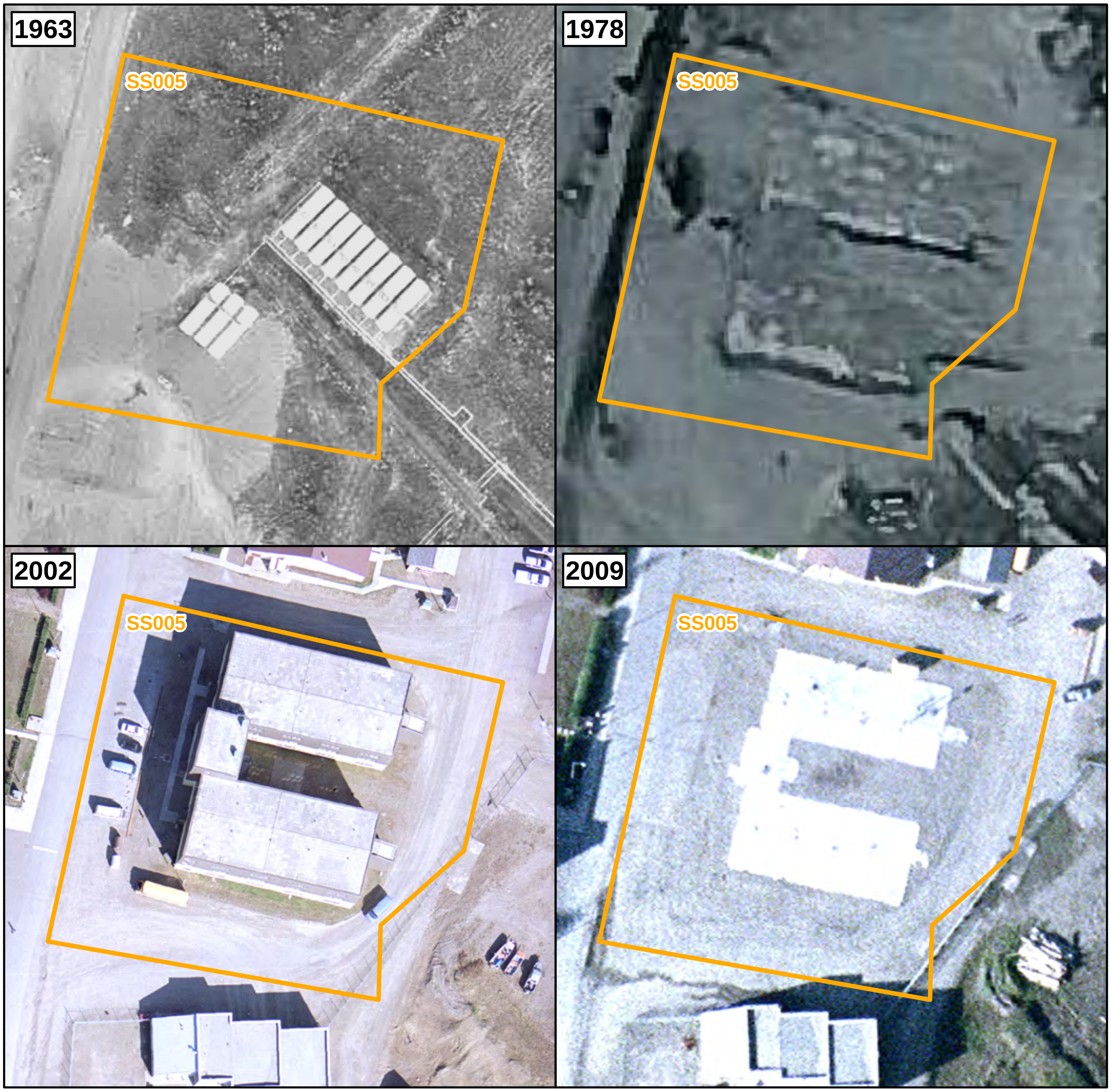
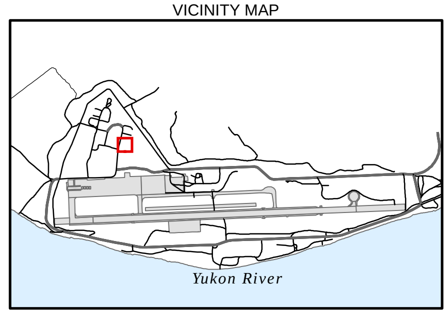


LEGEND

SS005

Notes:
1. Photography dated 9-4-1963, georeferenced
2. Photography Dated 5-30-1978, Georeferenced
3. Imagery August 2002. Pixel size 0.075 meter
4. Imagery September 4, 2009. Pixel size 0.25 meter

VICINITY MAP



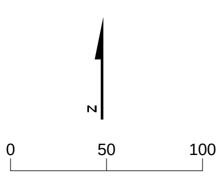
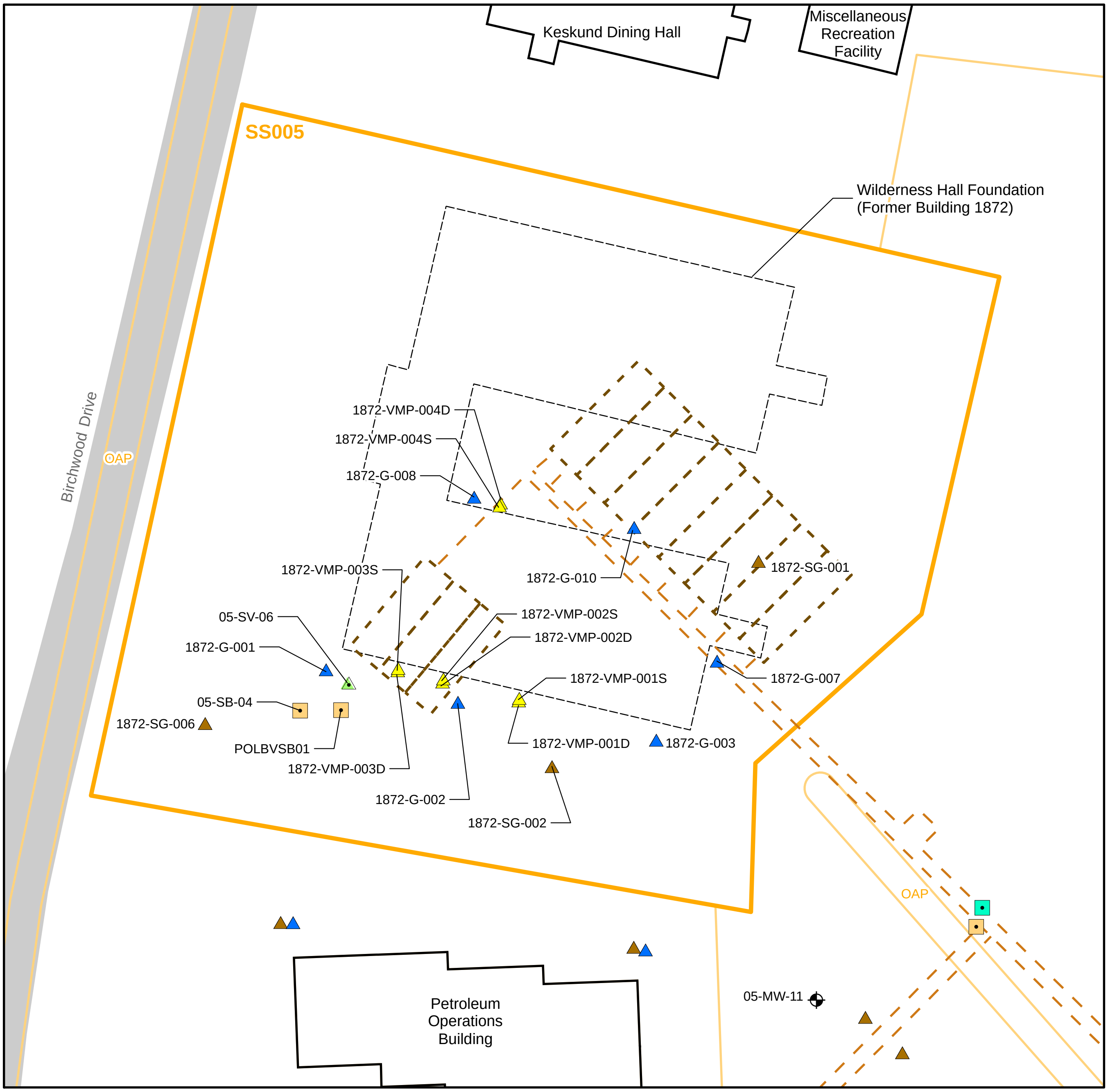


FIGURE D3-SS005
Historical Aerial Photography

Work Plan for Site Inspection, Remedial Investigation, and Site Characterization
Former Galena Forward Operating Location, Alaska



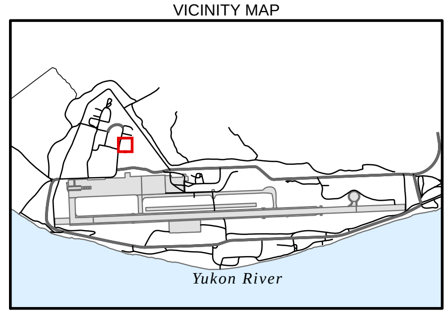
LEGEND

- SS005
- Adjacent Site
- Former Aboveground Storage Tank
- Approximate Location of Former Feature
- Structure
- Road
- Removed Fuel Pipeline

Historical Sample Location

- Soil Boring
- Surface Soil Sample
- Monitoring Well
- Gore Sorber
- Soil Vapor Sample
- Bioventing System Well
- Vapor Monitoring Point

VICINITY MAP



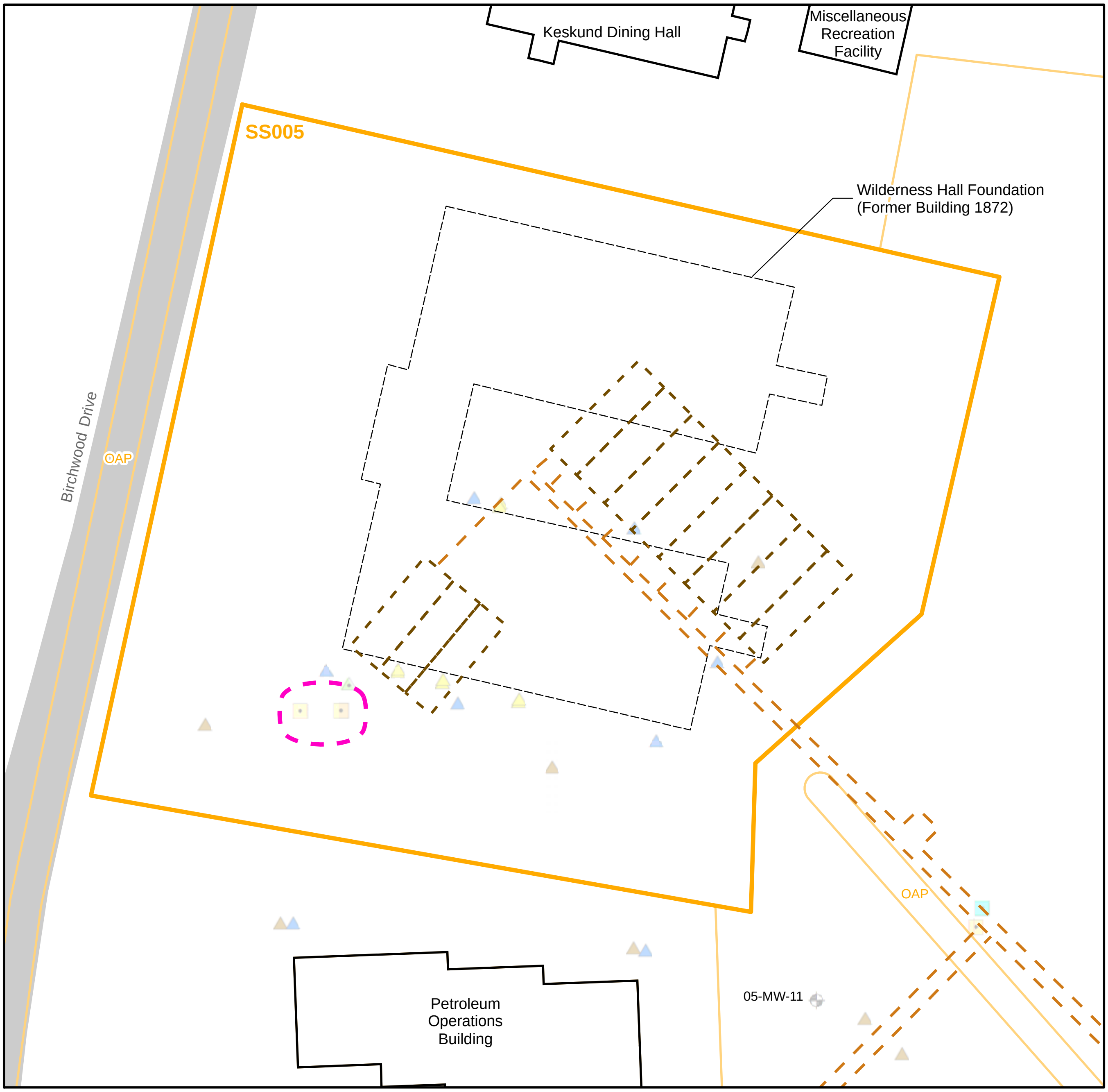
N

0 25 50
Feet

FIGURE D4-SS005
Historical Sample Locations

Work Plan for Site Inspection, Remedial Investigation, and Site Characterization
Former Galena Forward Operating Location, Alaska

CH2MHILL



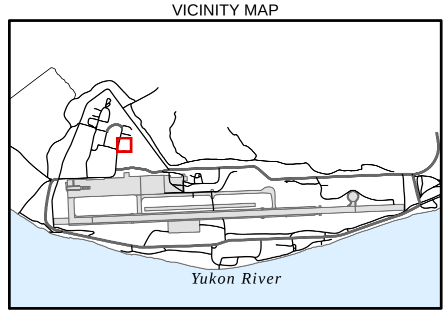
LEGEND

- SS005
- Adjacent Site
- Former Aboveground Storage Tank
- Approximate Location of Former Feature
- Structure
- Road
- Removed Fuel Pipeline
- Area where Analyte Exceeds Screening Level (dashed where inferred)

Historical Sample Location

- Soil Boring
- Surface Soil Sample
- Monitoring Well
- Gore Sorber
- Soil Vapor Sample
- Bioventing System Well
- Vapor Monitoring Point

VICINITY MAP



N

0 25 50
Feet

Note:
1. Refer to historical analytical data supplement for the site screening levels.

FIGURE D5-SS005
Extent of Historical Exceedances of Screening Levels in Subsurface Soil

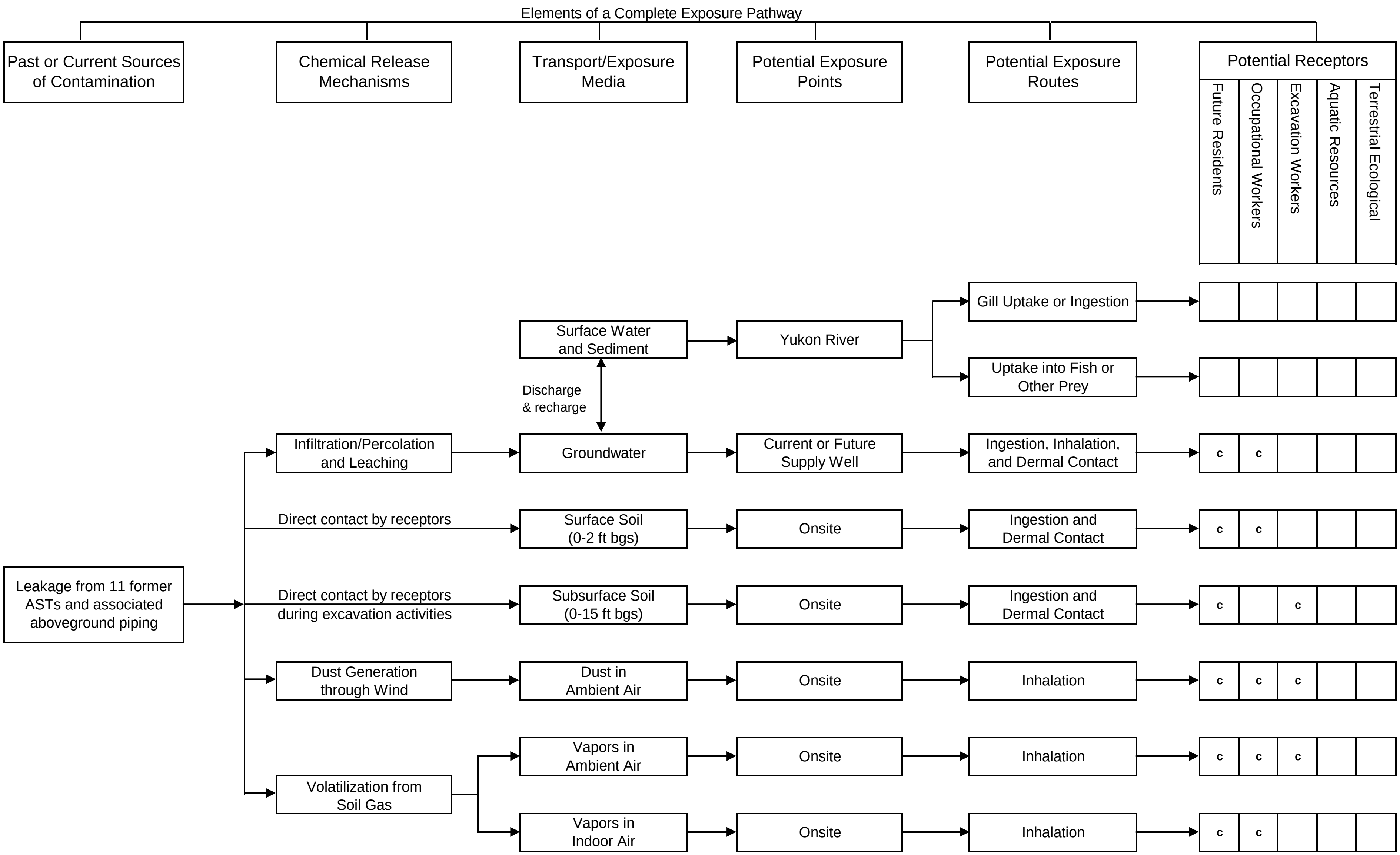
Work Plan for Site Inspection, Remedial Investigation, and Site Characterization
Former Galena Forward Operating Location, Alaska

Figure D6-SS005

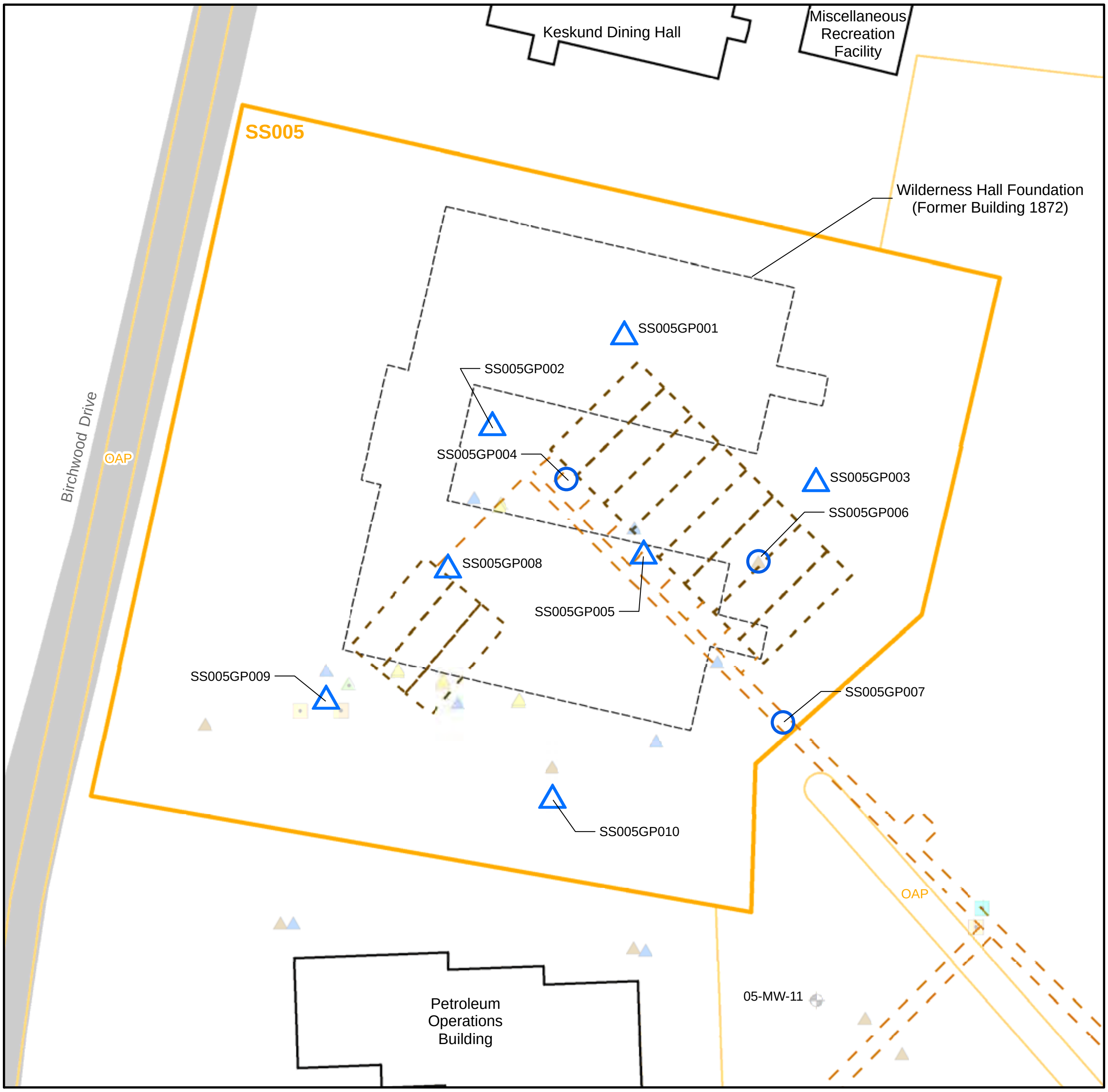
Conceptual Site Model for Potential Human and Ecological Exposures

Work Plan for Site Inspection, Remedial Investigation, and Site Characterization

Former Galena Forward Operating Location, Alaska



Notes:
c = Potentially complete pathway
Blank = Incomplete pathway



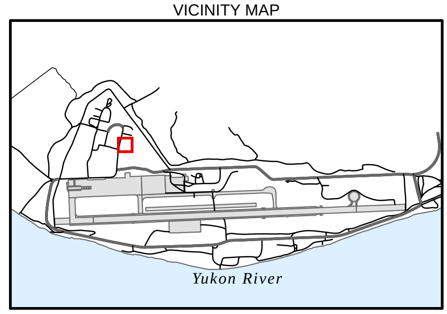
LEGEND

- SS005
- Adjacent Site
- Former Aboveground Storage Tank
- Approximate Location of Former Feature
- Structure
- Road
- Removed Fuel Pipeline
- Proposed Soil Sample
- Proposed Soil\Groundwater Sample

Historical Sample Location

- Soil Boring
- Surface Soil Sample
- Monitoring Well
- Gore Sorber
- Soil Vapor Sample
- Bioventing System Well
- Vapor Monitoring Point

VICINITY MAP



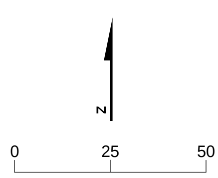


FIGURE D7-SS005
Proposed Sample Locations

Work Plan for Site Inspection, Remedial Investigation, and Site Characterization

Former Galena Forward Operating Location, Alaska

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SUPPLEMENTS D1-SS005 THROUGH D3-SS005

(provided on enclosed CD)

ATTACHMENT D-6

Possible Tar Pit Construction Area (TAR)

ATTACHMENT D-6

Possible Tar Pit Construction Area (TAR)

This attachment provides background information and describes the conceptual site model (CSM), data quality objectives (DQOs), and the proposed field sampling plan for the Possible Tar Pit Construction Area (TAR) site at the Former Galena Forward Operating Location (FOL). Although TAR is on the Site Inspection (SI) investigation pathway, as defined in Worksheet #10, the objective of data collection at the site is as follows:

1. Profile the tar prior to excavation and disposal.
2. Collect sufficient confirmation soil samples following excavation to achieve Alaska Department of Environmental Conservation (ADEC) Method 2 closure at the site in accordance with 18 Alaska Administrative Code (AAC) 75.340 (ADEC, 2008).
3. If soil contamination is found to extend below 5 feet below ground surface (bgs), evaluate whether groundwater has been impacted.

6.1 Site Location

The TAR site was located south of the eastern half of the Galena Airport runway, southwest of the Southeast Runway Fuel Spill (Site ST010). The location is shown on Figure D1-TAR (figures are located at the end of this attachment), but will be verified through site reconnaissance.

6.2 Site Characteristics

Site features consist mostly of visible patches of tar in a grassy area; however, the accurate TAR site location and boundary have not yet been determined. Representative pictures of the site are shown on Figure D2-TAR.

Large seasonal fluctuations in groundwater elevations have been recorded at the FOL. Figure D3-TAR presents a time series plot of groundwater elevation near TAR groundwater monitoring well SE-MW-07 from 2004 through 2007, which is the closest well with a transducer to TAR site. A complete set of groundwater hydrographs for monitoring wells at the FOL are presented in Standard Operating Procedure (SOP)-13 *(Groundwater Sampling Procedures)*. The data presented on Figure D3-TAR indicate that groundwater elevations near TAR have been as high as approximately 140 feet above mean sea level (msl), but typically peak at 135 to 137 feet msl. Seasonal low groundwater elevations are generally on the order of 117 feet msl. Given a ground surface elevation of approximately 141 feet msl at SE-MW-07, the variably saturated zone near TAR ranges in depth from approximately 5 to 25 feet bgs.

6.3 Site Description and History

The period during which the tar pits were used is unknown. They were once included as “additional potential sources of contamination” for ST010 (Radian Corporation, March 1996, p. 3-121). In the Preliminary Assessment report (CH2M HILL, 2010), the TAR site was identified as a separate site because it is west of the area of soil contamination resulting from the ST010 fuel spill and is associated with a separate source.

The 1996 final Remedial Investigation Report indicated that the tar pits had been partially covered with soil and a building had been constructed on top, but had later burned down. It further indicated that patches of tar remained visible (Radian, March 1996, p. 3-121).

6.4 Summary of Previous Investigations and Remedial Actions

6.4.1 Previous Investigations

No previous sampling investigations have occurred at the TAR site. A site reconnaissance was conducted in approximately 2006, during which photographs were taken (Figure D2-TAR) (ADEC, October 2009). At several locations, visible patches of tar still remain, although the site is partially covered with long grass. Additionally, previous investigations for nearby ST010 did not address the tar pits.

6.4.2 Previous Remedial Actions

To date, no remedial actions have been conducted at this site.

6.5 October 2009 Site Visit Observations

This site was not included in the October 2009 site visit because it was not identified as a potential site at that time.

6.6 Use of Secondary Data

Currently, no secondary data (historical data) is associated with the TAR site because no environmental sampling has been conducted at the site. As such there are currently no secondary data (historical data) associated with the site. If there were secondary data associated with the site, it would be evaluated for usability using the general procedures outlined in Worksheet #13. Data that are properly validated, collected by an ADEC-approved analytical method, have analytical detections greater than the limit of detection (LOD) or limit of quantification (LOQ), or LODs at or below the SI soil SLs for ecological sites (0 to 2 feet bgs), SI soil SLs (>2 feet bgs), or SI groundwater to surface water SLs can be used for quantitative presence/absence evaluations and risk assessment calculations, if needed. Data that do not meet these criteria can be used as reference or screening level data only. Although screening level data will not be used for quantitative analyses, these data will be used to qualitatively evaluate the presence or absence of contamination at a given location and/or depth to guide the design of the field sample plan. Although screening level data will not be used for quantitative analyses, these data will be used to qualitatively evaluate the presence or absence of contamination at a given location and/or depth to guide the design of the field sampling plan.

6.7 Findings of Previous Investigations

Tar is visible at the site, which indicates that a release has occurred; however, the extent of the former tar pits and the chemical composition of the tar are unknown. The tar pits appear to have been unlined, based on site photos (Figure D2-TAR).

6.8 Target Analytes

The specific carbon ranges of interest within the tar deposits at the TAR site will be determined by collecting a speciation sample of tar. Additional target analytes in the tar include diesel-range organics (DRO)/residual-range organics (RRO), polyaromatic hydrocarbons (PAHs) and Resource Conservation and Recovery Act (RCRA) metals, at a minimum. Target analytes for site soil (and potentially groundwater) samples, including excavation area confirmation samples will also include DRO/RRO, PAHs and RCRA metals may be modified according to the process described in Figure 15-1 using the Triad process after the tar chemical characterization is complete. In accordance with the information provided in the *Draft Field Sampling Guidance* (ADEC, 2010), PAH analysis will be performed on approximately 10 percent of the samples collected. The sample(s) selected for PAH analysis will be those anticipated to have the highest gasoline-range organic (GRO), DRO and/or RRO concentrations.

6.9 Potential Exposure Pathways and Receptors

The TAR site falls under the site inspection stage for the unknown source category, as defined in Worksheet #17. The presence or the extent of potential environmental contamination has not been determined through sampling; however, the CSM includes a known source area of partially exposed and subterranean tar deposits. The materials remaining in the tar pits may have leached to surrounding soils, potentially affecting both soil and groundwater.

The type and use of the tar are unknown and require characterization through a tiered analysis approach prior to developing a list of target analytes and analysis methods to be used at this site.

Figure D4-TAR depicts the conceptual site model for exposure for the site, including: past or current sources of contamination, chemical release mechanisms, transport/exposure media, potential exposure points, potential exposure routes, and potential receptors. The most plausible exposure scenario under current site conditions is the excavation/construction worker scenario due to the potential for excavations for utility repair and/or replacement. There are no standard work places or residences currently on the site; however, these scenarios will be evaluated to assess the potential impacts of hypothetical land use changes.

Based on the CSM for TAR, potential human receptors and exposure pathways to be evaluated include the following:

- **Excavation/Construction Workers**: Potential exposure to chemicals in soil to 15 feet bgs and shallow groundwater. Potentially complete routes of exposure to soil include incidental soil ingestion, dermal contact with soil, and inhalation of ambient vapors or dust generated from wind or during onsite excavation activities. Potentially complete routes of exposure to shallow groundwater include dermal contact with groundwater and inhalation of ambient vapors from groundwater.
- **Future Occupational Workers**: Potential exposure chemicals in soil to 2 feet bgs. Potentially complete routes of exposure to surface soil include incidental soil ingestion, dermal contact with soil, and inhalation of ambient vapors or dust generated from wind. Vapor intrusion from VOCs in environmental media migrating into current or future occupational buildings is also a potentially complete exposure route.
- **Hypothetical Future Residents**: Potential exposure to chemicals in soil to 15 feet bgs and groundwater. Potentially complete routes of exposure to soil include incidental soil ingestion, dermal contact with soil, and inhalation of ambient vapors or dust generated from wind. Potentially complete routes of exposure to groundwater include ingestion, dermal contact, and inhalation of VOCs during showering or other household activities. Vapor intrusion from VOCs in environmental media migrating into current or future residences is also a potentially complete exposure route.

As specified in the eco-scoping form for the TAR site provided in Appendix G, and based on available information and site photos, it appears that direct impacts and toxicity cannot be excluded for this site, although there is uncertainty about site conditions. The site and surrounding area provide potentially higher-quality habitat for plants and animals than many other sites at FOL, and ecological exposure pathways may be complete if target analytes are present in surface soil or in groundwater that may daylight downgradient. The site was not among those seen during the October 2009 site visit, but grasses and forbs occur at the site (some of the feathery vegetation appears to be horsetail [Equisetum sp.]), and a wooded area is located nearby. Therefore, additional site information is needed to determine if any pathways are complete and the site should be included in the next site ecological survey. Terrestrial ecological receptors will be evaluated for exposures at the site using site characterization data. Because groundwater from the TAR site may discharge to the Yukon River, which is less than 1,000 feet away, an aquatic ecological exposure pathway is considered potentially complete at the TAR site and may be further evaluated.

6.10 Data Quality Objectives

DQOs are pre-established goals that help monitor and assess project progress. They provide benchmarks against which the quality of fieldwork and the resultant analytical data are evaluated. DQOs specify the type, quality, quantity, and uses of the data necessary to support investigation objectives. General DQOs for characterizing contaminant sources, determining the nature and extent of contamination, and evaluating the potential for contaminants to migrate or affect additional media at the FOL are presented in

Worksheet #10, Table 10-2 (tables are located at the end of this attachment). Currently, the TAR site is categorized as being in the SI phase. Therefore, the following general DQO applies to the TAR site:

- DQO 1 – Investigate Possible Releases and Determine Need for Further Sampling

However, visible tar is present at the site but the tar composition and its potential impact to soil and groundwater are unknown. If the tar has affected soil or groundwater above applicable screening levels listed in Worksheet #15, the site will move to the Site Characterization/Remedial Investigation phase, where the following DQOs may apply:

- DQO 2 – Nature and Extent of Contamination in Soil
- DQO 3 – Free Product/Smear Zone Characterization
- DQO 5 – Delineate Nature and Extent of Groundwater Contamination (Isolated Plumes)

During investigation of the nature and extent of potential contamination, if target analytes are found at concentrations that may pose a risk to human or ecological health, the following DQOs may apply and will be addressed under a FOL-wide risk assessment field sampling plan:

- DQO 7 – Human Health Risk Assessment
- DQO 8 – Ecological Risk Assessment

The sample design that will be employed at the TAR site to fill data gaps associated with these DQOs is based on the source/release group investigation model for SI sites, as described in Worksheet #17. This investigation model contains the following elements that will be applied at the TAR site:

- Unknown source
- POL surface release

Although TAR is categorized as an SI investigation pathway site, a remedial action (excavation) is planned for the site. Because the goal of the current field effort is to gain an ADEC Method 2 closure at the site in accordance with 18 AAC 75.340 (ADEC, 2008), the SI soil SLs for ecological sites (0 to 2 feet bgs) and SI soil SLs (>2 feet bgs) described in Worksheet #15 will be used to evaluate excavation confirmation samples in soil. The SI groundwater to surface water SLs (described in Worksheet #15) will be used to evaluate groundwater data, if it is collected during the current investigation, as TAR is located within 1,000 feet of the Yukon River.

The following sections summarize the sample design specific to the TAR site.

6.11 Investigation Activities

This section provides details regarding the planned investigation activities for the TAR site and presents the rationale for each activity. SOPs referenced in these sections are provided in Appendix H of this Work Plan.

6.11.1 Pre-investigation Activities

Before field activities begin, staff will review work planning documentation (including SOPs and health, safety, security and environmental information) and will ensure that materials and equipment identified in the SOPs have been procured. Before intrusive field activities begin, utility clearance will be performed in accordance with SOP-03 *(Utility Clearance for Intrusive Operations)*, with records maintained consistent with SOP-01 *(Note Taking and Field Log Books)*.

6.11.2 Field Investigation Tasks

Site Reconnaissance and Tar Pit Visual Delineation

Visible contamination in the form of liquid or semi-solid tar is evident at the TAR site; however, additional site reconnaissance is necessary to further delineate the extent of visible tar deposits. Work performed under the site reconnaissance will follow SOP-02 *(Site Reconnaissance, Preparation, and Restoration)*, with records maintained consistent with SOP-01 *(Note Taking and Field Log Books)*.

The extent of the tar deposits will be delineated during a site walk, using a GPS unit in accordance with SOP-16 (*Global Positioning Satellite System [GPS] Surveying)*. The extent of tar deposits will be considered the new TAR site boundary.

Tar Analysis

Because the source and historical use of the tar are unknown, a tar sample will be collected and submitted for speciation analysis to profile the tar prior to excavation and disposal. The speciation will determine the carbon ranges included in the chemical composition of the tar at the TAR site, and aid in developing a target analyte list for confirmation samples. The tar sample will be distilled by ASTM Method D2887 (Simulated Distillation for Petroleum Fractions), which will fractionate the sample into individual carbon ranges. Ranges identified and quantified will include GRO, DRO, and RRO. If necessary, following the results of the analysis, further analysis for constituents particular to various fuels may be conducted using ASTM Method D5739 for oil spill identification.

Additional analyses for the tar will include PAHs and RCRA metals. The target analyte list for confirmation soil (and potentially groundwater) samples at the TAR site will be refined once results of the tar identification sampling are obtained, however, at a minimum, should include DRO/RRO, PAHs and RCRA metals.

Specific laboratory methods, bottle requirements, field preservation requirements, and sample volumes for sample analyses (to be determined after tar characterization) are provided in Worksheet #19. QA/QC samples will be collected as specified in Worksheet #20. Procedures listed in SOP-18 *(Packing and Shipping of Environmental Samples)* and SOP-19 *(Sample Handling and Custody)* will be followed during sample handling.

Tar Excavation and Confirmation Sampling

Visible tar will be excavated following SOP-29 (*Soil Excavation and Confirmation Sampling*), containerized, and properly disposed of in accordance with SOP-23 (*IDW Management)*.

Over-excavation of soil will be performed following SOP-29 (*Soil Excavation and Confirmation Sampling*) to meet SI soil SLs (using SI soil SLs for ecological habitat in the top 2 feet of soil). If possible, over-excavated soil will be transported to a landfarming site established for treatment of FOL soils. Otherwise, it will be containerized and properly disposed of in accordance with Appendix B *(Project-specific Waste Management Plan)*.

Confirmation soil samples will be collected from locations within the sidewalls and bottom of the tar pit excavation following SOP-29 (*Soil Excavation and Confirmation Sampling*) and SOP-07 *(Discrete Surface and Subsurface Soil Sampling)*. Soil will be classified and logged in accordance with SOP-06 *(Boring Log Completion, Soil Classification, and Logging)*, and field screening of soil samples will be collected in accordance with SOP-04 *(Organic Vapor Monitoring and Air Monitoring)*.

Soil samples will be analyzed using appropriate field kit methods following SOP-22 (*Field Test Kit Analyses*). For tar soil samples, the SiteLab UVF-3100 Analyzer will be used because it can detect concentrations of petroleum and PAHs from gasoline, jet fuel, diesel fuel, heating oils, waste oils, coal tars, coal ash, creosote, crude oils, and many other petroleum products within soil, water, and sediment samples (U.S. Environmental Protection Agency, 2010; Sitelab Corporation, 2010). For more information see SOP-22 (*Field Test Kit Analyses*). Excavation will continue until field analysis indicates soil concentrations of target analyses are below SI soil SLs or a decision is made through the Triad process to limit the extent of the excavation based on other criteria. Once the field analysis indicates soil concentrations of target analyses are below for ecological sites (0 to 2 feet bgs) or SI soil SLs (> 2 feet bgs) (or the excavation is discontinued for other reasons), confirmation samples will be sent for laboratory analysis for analytes identified in the TAR speciation and DRO/RRO, PAHs and RCRA metals. If SI soil SLs for ecological sites (0 to 2 feet bgs) or SI soil SLs (> 2 feet bgs)are exceeded in the laboratory confirmation samples, the Triad team will discuss the need for and location of step-out samples, as well as the need for additional excavation. If target analytes concentrations are below SI soil SLs for ecological sites (0 to 2 feet bgs) or SI soil SLs (> 2 feet bgs) in the laboratory confirmation samples, the excavation can be considered complete, and no further action will be required.

Example sample information is provided in Table D1-TAR. Specific laboratory methods, bottle requirements, field preservation requirements, and sample volumes for sample analyses (to be determined after tar characterization) are provided in Worksheet #19. QA/QC samples will be collected as specified in Worksheet #20. Procedures listed in SOP-18 *(Packing and Shipping of Environmental Samples)* and SOP-19 *(Sample Handling and Custody)* will be followed during sample handling.

Groundwater Sampling

If concentrations of target analyses in soil within the variably saturated zone (below 5 feet bgs) are above SI soil SLs, then grab groundwater samples will be collected both upgradient of the tar pit and within the tar pit source area to determine potential tar-related impacts to groundwater. Grab groundwater samples, if needed, will be collected at the top of the water table and 10 feet beneath the top of the permanently saturated zone.

If groundwater sampling is needed, grab groundwater samples will be collected using direct push methods following SOP-24 *(Direct Push Groundwater Sampling)*. Example sample information is provided in Table D1-TAR.

Specific laboratory methods, bottle requirements, field preservation requirements, and sample volumes for sample analyses (to be determined after tar characterization) are provided in Worksheet #19. QA/QC samples will be collected as specified in Worksheet #20. Field parameters will be collected in accordance with SOP-12 (*Field Water Quality Measurements and Calibration*). Procedures listed in SOP-18 *(Packing and Shipping of Environmental Samples)* and SOP-19 *(Sample Handling and Custody)* will be followed during sample handling.

Surveying

Sample locations will be surveyed for horizontal position in accordance with SOP-16 (*Global Positioning Satellite System [GPS] Surveying)*.

Equipment Calibration

Field water quality measurement equipment will be calibrated in accordance with SOP-12 *(Field Water Quality Measurements and Calibration)*.

Equipment Decontamination

Non-dedicated equipment will be decontaminated in accordance with SOP-14 (*Equipment Decontamination Procedures)*.

Investigation-derived Waste Management

Investigation-derived waste will be handled in accordance with Appendix B *(Project-specific Waste Management Plan)*.

6.11.3 Sample Identification

Samples collected at the TAR site will be named in accordance with SOP-19 *(Sample Handling and Custody)*.

6.11.4 Post-investigation Activities

During the field investigation, meetings or conference calls will be held to discuss the investigation results, provide a suggested path forward, and reach consensus on additional work needs. After the fieldwork related to this investigation has been performed, the results will be documented in a data evaluation report, and the anticipated path for further action or site closure will be identified.

6.12 Works Cited

AECOM. May 2007. *Final Remedial Investigation/Feasibility Study Report for United States Air Force Sites at Galena Airport and Campion Air Station*.

Alaska Department of Environmental Conservation (ADEC). 2010. *Draft Field Sampling Guidance*. May.

Alaska Department of Environmental Conservation (ADEC). October 2009. Fred Vreeman. Personal Communication with Vivian Tokar/CH2M HILL.

CH2M HILL. 2010. *Preliminary Assessment Report for the Former Galena Forward Operating Location, Galena, Alaska*. Prepared for the Air Force Center for Engineering and the Environment (AFCEE).

Earth Tech, Inc. May 2004. *Final Work Plan for Remedial Investigation/Feasibility Study at Galena Airport and Campion Air Station, Alaska*.

Radian Corporation. March 1996. *Final Remedial Investigation Report, Galena Airport and Campion Air Station*.

TABLE D1-TAR

Proposed Sampling Locations and Rationale

Sampling Location	Field Sample ID	Easting (meters)	Northing (meters)	Media	Sample Type	Sample Depth (feet bgs)	TAR Speciation ASTM D2887	GRO[a] AK101	DRO[a] AK102	RRO[a] AK103	BTEX Screening for PCE and TCE[a] SW8021B	PAHs[b] SW8270C SIM	Total Metals[b,c] SW6010B/7471A	Dissolved Metals[b,c] SW6010B/7471A	Field Parameters[d]	Rationale
TARPR001	TARPR001-PR	TBD	TBD	Tar	N	0	1					1	1			Determine carbon ranges of petroleum hydrocarbons, PAHs and metals present in tar deposits to support determination of target analyte list for confirmation soil samples (and potential groundwater samples).
	TARPR901-PR	TBD	TBD	Tar	FD	0	1					1	1			
TARHS00#	TARHA00#-SO_TBD-TBD	TBD	TBD	Soil	N	TBD		TBD	TBD	TBD	TBD	TBD	TBD			Confirmation samples from sidewalls and bottom of tar pit excavation. Target analyte list will be determined after tar characterization sampling is performed.
	TARHA90#-SO_TBD-TBD	TBD	TBD	Soil	N	TBD		TBD	TBD	TBD	TBD	TBD	TBD			
	TARHA00#-SO_TBD-TBD	TBD	TBD	Soil	SPT	TBD		TBD	TBD	TBD	TBD					
	TARHA00#-SO_TBD-TBDMS	TBD	TBD	Soil	MS	TBD		TBD	TBD	TBD	TBD	TBD	TBD			
	TARHA00#-SO_TBD-TBDSD	TBD	TBD	Soil	MSD	TBD		TBD	TBD	TBD	TBD	TBD	TBD			
TARHP001	TARHP001-GW_05-25	TBD	TBD	Groundwater	N	5 to 15 (Top of Water Table)		TBD	TBD	TBD	TBD	TBD		TBD	TBD	Groundwater samples will be collected upgradient of the TAR site. Target analyte list will be determined after tar characterization sampling is performed.
	TARHP901-GW_05-25	TBD	TBD	Groundwater	FD	5 to 15 (Top of Water Table)		TBD	TBD	TBD	TBD	TBD		TBD		
	TARHP001-GW_35-40	TBD	TBD	Groundwater	N	~35 (Permanently Saturated Zone)		TBD	TBD	TBD	TBD			TBD	TBD	
TARHP002	TARHP002-GW_05-15	TBD	TBD	Groundwater	N	5 to 15 (Top of Water Table)		TBD	TBD	TBD	TBD			TBD	TBD	Groundwater samples will be collected downgradient of the TAR site. Target analyte list will be determined after tar characterization sampling is performed.
	TARHP002-GW_35-40	TBD	TBD	Groundwater	N	~35 (Permanently Saturated Zone)		TBD	TBD	TBD	TBD	TBD		TBD	TBD	
	TARHP002-GW_35-40MS	TBD	TBD	Groundwater	MS	~35 (Permanently Saturated Zone)		TBD	TBD	TBD	TBD	TBD		TBD		
	TARHP002-GW_35-40SD	TBD	TBD	Groundwater	MSD	~35 (Permanently Saturated Zone)		TBD	TBD	TBD	TBD	TBD		TBD		
TBD	TAR-EB001	NA	NA	ASTM Type II	EB	NA		TBD	TBD	TBD	TBD	TBD	TBD	TBD		Equipment blank for soil sample equipment
TBD	TAR-EB002	NA	NA	ASTM Type II	EB	NA		TBD	TBD	TBD	TBD	TBD		TBD		Equipment blank for Hydropunch sample equipment, if needed
NA	TAR-TB01	NA	NA	ASTM Type II	TB	NA		TBD			TBD					Trip blank for cooler with volatile compound samples, if needed
Totals																
TAR				Tar			2	0	0	0	0	2	2	0	0	
TAR				Surface Soil			0	TBD	TBD	TBD	TBD	TBD	TBD	TBD	0	
TAR				Subsurface Soil			0	TBD	TBD	TBD	TBD	TBD	TBD	TBD	0	
TAR				Groundwater			0	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	
TAR				ASTM Type II			0	TBD	TBD	TBD	TBD	TBD	TBD	TBD	0	

[a]Analytical methods AK101, AK102, AK103, and SW8021B for soil will be performed at the on-site mobile lab; 10 percent of these samples have been identified for split analysis according to Worksheet #20.

[b]Soil sample analysis by this method will be performed at an off-site lab.

[c]Specific metals to be analyzed in soil and groundwater will be based on the results of Tar speciation. Dissolved metals analysis for groundwater will also include calcium, and magnesiu

[d]Field parameters will be anlayzed for pH, temperature, specific conductivity, dissolved oxygen, and ORP using a water quality meter and flow-through cell as described in SOP-1

Notes:

Full target analyte list for soil and groundwater samples will be determined based on the results of the tar speciation.

= sequential numbering, starting with 1; Not included in sample totals.

Analysis of all groundwater and split (SPT) soil samples will be performed at an off-site lab.

Per Guidance in Appendix F of ADEC, 2010: *"For each source area, PAH analysis must be performed on a sufficient percentage of the samples with the highest GRO, DRO and/or RRO concentrations to determine if PAHs are contaminants of concern. In general, 10% is recommended for site characterization. If PAH concentrations are less than applicable cleanup levels, further PAH analysis is generally not required. PAHs should be sampled in groundwater if soil samples concentrations are above applicable cleanup levels and groundwater sampling is required."*

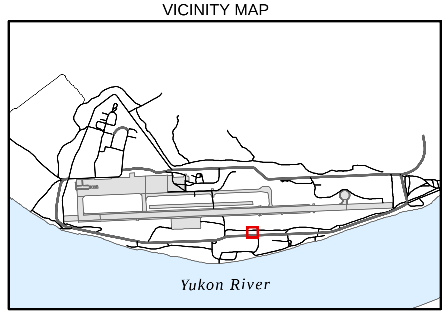
bgs = below ground surface
NA = not applicable
TBD = to be determined
N = normal sample
FD = field duplicate sample
MS = matrix spike sample
MSD = matrix spike duplicate sample
EB = equipment blank
TB = trip blank
SPT = split sample

LEGEND

TAR

Notes:
1. Imagery September 4, 2009. Pixel size 0.25 meter

VICINITY MAP



N

0 20 40
Feet

FIGURE D1-TAR
Site Layout

Work Plan for Site Inspection, Remedial Investigation, and Site Characterization
Former Galena Forward Operating Location, Alaska

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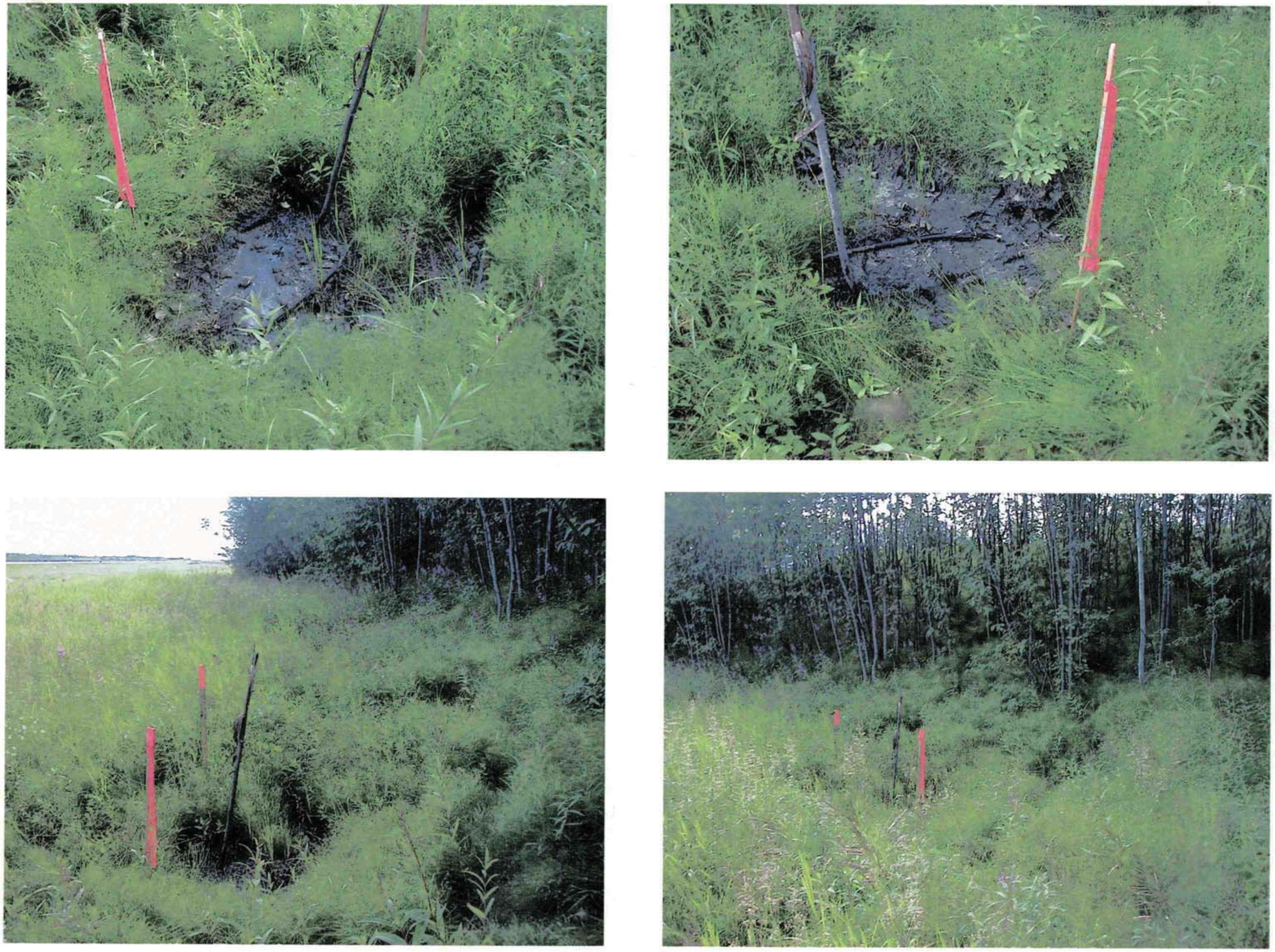

FIGURE D2-TAR
Site Photographs
Work Plan for Site Inspection, Remedial Investigation, and Site Characterization
Former Galena Forward Operating Location, Alaska

CH2MHILL

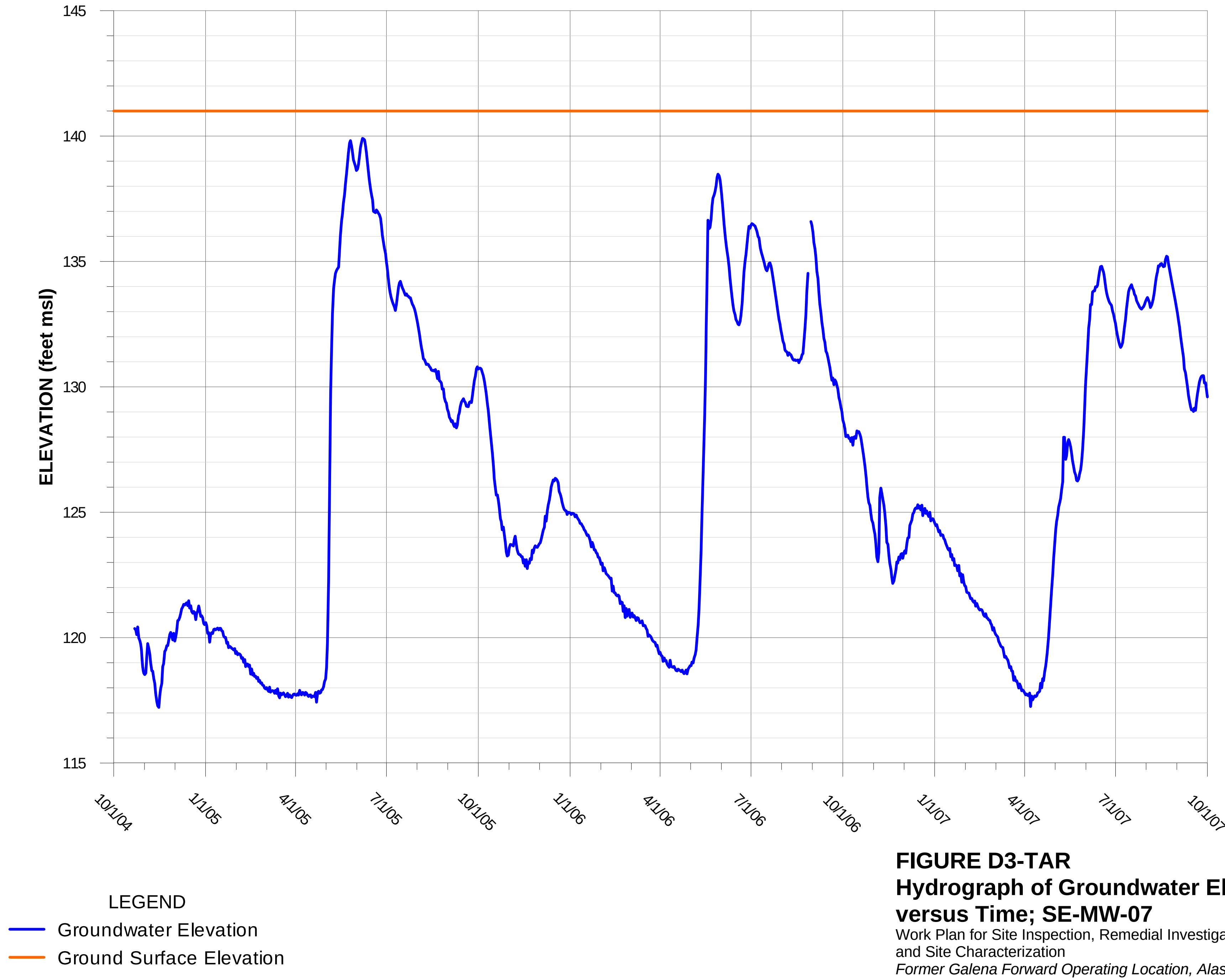

FIGURE D3-TAR
Hydrograph of Groundwater Elevation versus Time; SE-MW-07
Work Plan for Site Inspection, Remedial Investigation, and Site Characterization
Former Galena Forward Operating Location, Alaska

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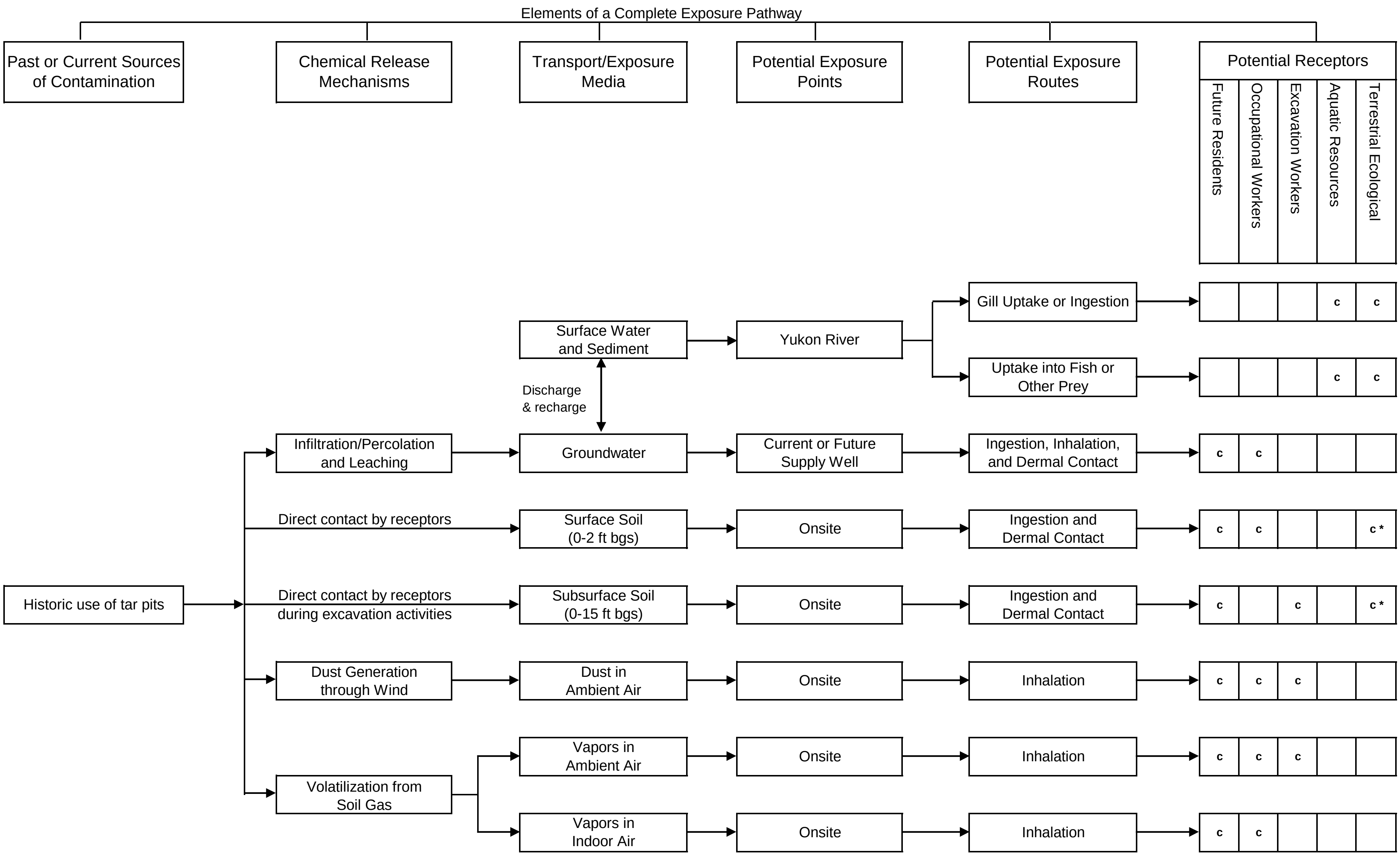
Figure D4-TAR

Conceptual Site Model for Potential Human and Ecological Exposures

Work Plan for Site Inspection, Remedial Investigation, and Site Characterization

Former Galena Forward Operating Location, Alaska



Notes:

c = Potentially complete pathway

Blank = Incomplete pathway

* Depth of soil for ecological receptors will be based on site-specific receptor types