

Other

APPENDIX A

AAS3

Aircraft Arresting System (Site ID AAS3)

Site Location

Site AAS3 is located along the sides of the runway.

Site Characteristics

Site characteristics are shown on Figure A1-AAS3. Site AAS3 consists of the former location of an Aircraft Arresting System (AAS) and is covered in pavement. The feature of concern at Site AAS3 is the former equipment contained in concrete vaults located on either side of the runway.

Site Description and History

The AAS used at the Former Galena FOL was a Boeing BAK-12 cable system with energy-absorbing friction brakes on each side of the cable (USAF, 1960). The cables were retracted after use with small gasoline-powered arresting engines housed in belowground concrete vaults located on either side of the runway (Boeing, February 17, 2010). In addition to the arresting engine, each concrete vault contained an electric heater, an exhaust fan, and a sump pump (USAF, 1960). According to interviews with personnel stationed at the Former Galena FOL, the arresting engines were fueled with gasoline from 5-gallon gas cans transported to the vaults as needed. There was no fuel storage in the vaults (Lurk, December 4, 2009).

Historical aerial photographs of the site, dated 1985 and 2002, are shown on Figure A2-AAS3. A Boeing BAK-12 cable is shown in Figure A3-AAS3.

The AAS was removed in 2007. USAF personnel who removed the AAS stated that the vaults where the main equipment was housed were demolished by breaking up the concrete in the vaults and filling them in with clean soil. Associated small vaults that allowed access to the electrical lines that provided power for the AAS equipment are still intact, located adjacent to the runway markings that indicated the location of the AAS. The patched runway following the removal of the AAS is shown in Figure A4-AAS3.

Summary of Previous Investigations

No previous investigations were performed at Site AAS3.

October 2009 Site Visit Observations

An inspection of Site AAS3 was conducted in October 2009. Black patched circles were observed on the tarmac where the AAS wire used to go. Two sets of small vaults were observed on each end of the runway and electrical wires were observed inside the vaults. No evidence was found that would indicate a potential release from Site AAS3.

Target Analytes

Because a release has not occurred from Site AAS3, no target analytes are present at the site.

Potential Exposure Pathways and Receptors

Because a release has not occurred from Site AAS3, media at the site have not been impacted. Therefore, no complete human health or ecological exposure pathways exist at the site.

Conclusions

The AAS was removed in 2007, and the main vaults were demolished by breaking up the concrete in the vaults and filling them in with clean soil. No fuels were stored in the vaults. During the October 2009 site visit, no evidence was found that would indicate a potential release from Site AAS3.

Recommendation: "Non-Site"

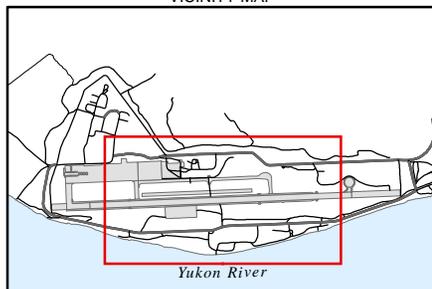
Based on available information on the composition and operation of the AAS and associated vaults, designation of Site AAS3 as a "Non-Site" is recommended.

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http://www.boeing.com/commercial/aeromagazine/aero_13/runway_fig2.html.
Accessed February 17, 2010.
- Lurk, Ron. December 4, 2009. Ron Lurk, 611th CES Operations Flight Chief. Personal communication with Vivian Tokar/CH2M HILL.
- U.S. Air Force (USAF). 1960. Air Force Form 1430 Real Property, Facility No 74040 Aircraft Arresting Barrier.



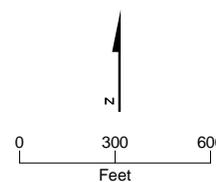
VICINITY MAP



LEGEND

- AAS3
- Adjacent Site

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

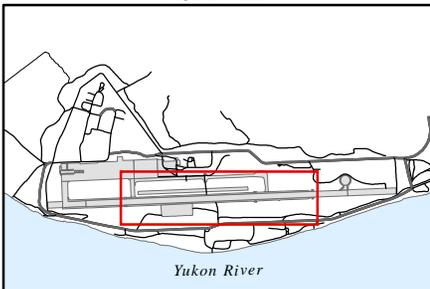


**FIGURE A1-AAS3
Site Layout**

Preliminary Assessment Report
Former Galena Forward Operating Location, Alaska



VICINITY MAP

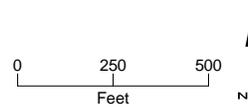


LEGEND

 AAS3

Notes:

1. Photography Dated 1985, Georeferenced.
2. Imagery August, 2002. Pixel size 0.075 meters.



**FIGURE A2-AAS3
Historical Aerial Photography**

Preliminary Assessment Report
Former Galena Forward Operating Location, Alaska



FIGURE A3-AAS3
BAK-12 Aircraft Arresting System Cable
Source: Boeing, February 17, 2010



FIGURE A4-AAS3
Patched Runway Following the Removal of the Aircraft Arresting System and Concrete Vault, October 2009

APPENDIX A

AOC023

Waste Accumulation Area (Site ID AOC023)

Site Location

Site AOC023, is located in the southwestern portion of the cantonment “triangle.” Site AOC023 is bordered to the southwest by the Munitions Storage Building (Building 1488), to the northeast by Power Plant 49 (Buildings 1498 and 1499) and associated diesel storage tanks, and to the west by the sewage treatment plant (Building 500) and aerated sewer lagoon. The Yukon River is located approximately 1,900 feet southwest of the site.

Site Characteristics

Site features are shown on Figure A1-AOC023. Site AOC023 occupies approximately 1.25 acres of relatively flat and low topography, with an approximate elevation range of 140 to 145 feet mean sea level (msl). The surface of the site is covered predominately with gravel that is sparsely vegetated with grasses, wildflowers, and willow.

The top several feet of soil at Site AOC023 consist of fill material that was historically graded flat, generally consisting of brown/gray sand with silt and occasional gravel lenses. The observed depth to groundwater at the site ranges from 11 to 19 feet bgs with no evidence of permafrost.

The major features and/or potential source areas at Site AOC023 include the following:

- Existing 30-foot- by-50-foot bermed concrete pad historically used for drum storage. The concrete pad was known to flood periodically because of accumulated precipitation and snowmelt (Woodward-Clyde, April 1989)
- Historical unlined drum storage areas to the east, south, and west of the concrete pad
- Existing Building 1497 (sewer pump station)
- Existing underground utility infrastructure (diesel, sewer, water, and electrical)

Site Description and History

Since the 1950s, waste lube oil, antifreeze, solvents, oil rags, and other wastes from power plant operations and other Former Galena FOL operational activities were accumulated and stored onsite in drums. The drums were stored at Site AOC023 before their shipment off-Base for disposal through the USAF Defense Property Disposal Office (Engineering Science, September 1985, p. 4-11). Liquid wastes were accumulated and applied to the local roads for dust control until 1984, when the State of Alaska discontinued permits for road oiling. From 1984 to approximately 1996, Site AOC023 was used to store the liquid waste. It is believed that Site AOC023 was not used as an accumulation or disposal area for incinerator ash as this material was disposed of at the landfill located west of the cantonment “triangle” (Engineering Science, September 1985, p. 4-42).

The drummed wastes were originally stored on the ground or on pallets. In 1984, a 30-foot-by-50-foot, bermed, concrete pad was constructed in the central portion of Site AOC023 to control drum leakage. During a 1985 site visit, it was observed that a section of the containment curb had been broken at the lower portion of the pad and that waste liquids from leaking drums were draining out of the containment area and onto the adjacent ground (Engineering Science, September 1985, p. 4-11).

Drummed waste was also historically stored outside the concrete pad. During a 1990 site visit, approximately 290 drums were observed stored within the concrete containment pad and an additional 370 drums were stored outside of the bermed area. Waste drums were stored around the concrete pad and in a cordoned-off zone approximately 35 feet by 80 feet, separated from the concrete pad by a dirt road. A majority of the drums were 55-gallon drums, but some 85-gallon overpack drums were observed. Most of drums were stored on pallets. Drum markings indicated some drums had been stored at Site AOC023 since 1986 (Woodward-Clyde, July 1991, p. 1-10). In 1992, over 1,000 drums were observed at Site AOC023. A majority of the drums were 55-gallon drums, but some 85-gallon overpack drums were observed. The drums were stored on pallets (Woodward-Clyde, July 1993, p. 2-2).

Historical aerial photographs dated 1963, 1969, 1978, 1985, and 2002, are shown on Figure A2-AOC023. A review of these historical photographs indicates the following:

- Soil grading was evident in the 1963 aerial photograph. There is a dark spot on the photograph in the approximate center of Site AOC023. The power plant does not appear in this photograph.
- Various unknown features appear in the southern portion of the site near Building 1497 in the 1969 aerial photograph. The power plant is visible at the northern side of Site AOC023.
- In the 1978 aerial photograph, the majority of Site AOC023 soil appears to be disturbed. Various unknown features appear throughout the site.
- In the 1985 aerial photograph, the drum storage area is visible in the center of the site.
- The drum storage area is visible in the center of the site and unknown features are present on the concrete pad and east of Building 1497 in the 2002 aerial photograph.

Photographs in the supporting documentation show the site on September 24, 1992 (Woodward-Clyde, July 1993; Figures 1 through 5). Accumulations of waste drums throughout Site AOC023 are shown in the photographs. A few of the drums are stacked. An AST is shown in Figure 1. Building 1497 is shown in the photographs.

Summary of Previous Investigations

Locations of samples collected during previous investigations conducted at Site AOC023 are shown on Figure A3-AOC023.

Site AOC023 is identified by different site names in historical documents. Site AOC023 is identified as the Waste Accumulation Area (WAA) in a 1985 Phase I Record Search

(Engineering Science, September 1985). In some documents, such as the 1995 EBS report for Air Force Lease DACA 84-4-80-10, an "IRP Site Map" refers to Site AOC023 as "Site 1." In the March 1996 RI report (Radian, March 1996), Site AOC023 is referred to as "SS006." However, the designation SS006 is also used for the Building 1845/TCE area in later documents. Documents prepared in 2007, 2008, and 2009 refer to Site AOC023 as SS018. For this PA, documents were reviewed for all known Site AOC023 designations: WAA, Site 1, SS006, and SS018.

IRP Phase I - Initial Assessment/Records Search (1985)

Site AOC023 was initially identified as an area of interest during the IRP Phase I, Initial Assessment/Records Search of the Former Galena FOL in 1985. A noticeable oil odor and soil staining was extensively evident during the site visit. The Installation Restoration Program (IRP) Phase I concluded that the WAA warranted a further intensive Phase II environmental investigation (Engineering-Science, September 1985, p. 4-11 and Table 5-1).

No samples were collected during the Phase I inspection.

IRP Phase II - Confirmation/Quantification, Stage 1 (1986 to 1988)

From June 1986 to December 1988, an IRP Phase II - Confirmation/Quantification investigation was conducted at Site AOC023 (Woodward-Clyde, April 1989). Seven test borings (TB001 through TB003, TB044 through TB047) and one monitoring well (MW004) were completed at Site AOC023. A soil gas survey employing 17 probes was also completed at the site.

Soil samples were collected from the soil boring and analyzed for VOCs, TPH, and PCBs/pesticides using Methods 8010/8020/8240, 418.1, and 8080, respectively. Results, presented in Section 5.4.1 of the Phase II report (Woodward-Clyde, April 1989, p. 5-19), include the following:

- TPH was detected in soil at depths up to 11.5 feet bgs, with highest concentrations at the surface and in general decreasing with depth. TPH in soil ranged from 20 mg/kg to 680 mg/kg. A petroleum sheen and odor were observed in boring TB003, collected 2 feet west of the concrete pad. Staining was observed in the upper 5 feet of boring TB046, collected from approximately 20 feet west of the concrete pad.
- VOCs were detected in the soil at depths up to 20 feet bgs. TCE, tetrachloroethene (PCE), 1,1-dichloroethene (1,1-DCE), and 1,2-DCA were detected in soil. Toluene, TCE, PCE, 1,1-DCE, and 1,2-DCA were all detected above ADEC Method 2 cleanup levels.
- PCBs were not detected in any soil samples.

In 1986 and 1987, Groundwater Monitoring Well MW004 was sampled and the samples analyzed for VOCs and TPH by Method 601/602 and Method 418.1, respectively.

- Chloroform and 1,1,1-trichloroethane were both detected in well MW004 at concentrations of 0.00006 mg/L and 0.00072 mg/L, respectively.
- No groundwater concentrations were detected above ADEC Method 2 cleanup levels applicable at the time of the investigation.

A soil-gas investigation was conducted at Site AOC023 from August 15 to September 3, 1988, using a field portable Varian 3400 gas chromatograph. Soil gas samples were collected from each soil gas probe. BTEX constituents were analyzed at WAA-SG65, collected from the concrete pad. In general, BTEX concentrations within Site AOC023 were in the range of 10 ppmv throughout the site with isolated "hot spots" of 100 ppmv located toward the northeast and southwest adjacent to the power plant, water supply building, and sewage treatment plant.

IRP Phase II – Remedial Investigation/Feasibility Study, Stage 2 (1989 to 1990)

From August 1989 to August 1990, an IRP Phase II RI was conducted to investigate soil and groundwater at Site AOC023 (Woodward-Clyde, July 1991). A total of 10 soil samples (791-SO-GAL1-GS-001 through -GS-010) were collected at locations of visible soil staining during August 1990. All soil samples were collected from 10 inches bgs, except at two locations where samples were collected at the surface and 10 inches bgs. All the soils samples were analyzed for TPH, VOCs, and lead using Methods 418.1, 8240, and SW7421.

Results, summarized in Section 4.1.3 of the Phase II report (Woodward-Clyde, July 1991, p. 4-3 to p. 4-4), include the following:

- TPH was detected in soil ranging from concentrations of 1,390 mg/kg to 59,500 mg/kg.
- Acetone was the only VOC detected, with a maximum concentration of 5.1 mg/kg.
- Lead was also detected in the soil at concentrations ranging from 5.3 to 29.3 mg/kg.
- An estimated 500 cubic yards of contaminated soil was determined to be present at Site AOC023. Overall, the IRP Phase II RI categorized Site AOC023 as a Category 3 site (FS process complete) and recommended an excavation and landfarming remedial alternative.

Groundwater Monitoring Well MW004 was sampled on September 1989 and June 1990 and the samples analyzed for VOCs using Methods 601/602 and 8010/8020. 1,1,1-trichloroethane was detected during both sampling events at a maximum concentration of 0.0008 mg/L. No other VOCs were detected during either sampling event.

Galena AFS Site Investigation (1992)

During September 1992, a site investigation was conducted at Site AOC023 (Woodward-Clyde, July 1993). A total of six surface and subsurface soil samples were collected from three soil boring locations near the concrete pad. A surface soil sample (0.5 foot bgs) and a subsurface soil sample (5 feet bgs) were collected from each boring (GA-K005-A-101/GS-S050-A-102, GA-K005-A-103/GS-S050-A-104, and GA-K005-A-105/GS-S050-A-106). Each boring was located downhill from the concrete pad. All soil samples were analyzed for TCL/TAL which includes VOCs, SVOCs, PCBs/pesticides, and metals using Methods 8240, 8270, 8080, and metals 6000/7000 series, respectively.

Results for the organic analyses are presented in Table 3.1 and results for metals analyses in Table 3.3 of the Site Investigation report (Woodward-Clyde, July 1993). Results include the following:

- Multiple VOCs were detected in the soil samples, ranging in concentration from 0.0001 to 0.8 mg/kg. Detected analytes included BTEX, TCE, 1,2-DCA, chloroform, bromodichloromethane, chlorobenzene, carbon disulfide, bromomethane, and acetone. Benzene and bromodichloromethane were the only VOC analytes to exceed ADEC Method 2 cleanup levels and were both detected in one surface soil sample (GA-K005-A-105) at concentrations of 0.38 mg/kg and 0.32 mg/kg, respectively.
- Pesticides including DDT, DDD, and DDE were detected in several soil samples with concentrations ranging from 0.0013 mg/kg to 0.15 mg/kg; however, no analytes were detected above the ADEC Method 2 cleanup levels.
- Metals were detected in the soil samples. Antimony, arsenic, and total chromium were the only metals to exceed ADEC Method 2 cleanup levels.

No SVOC or PCB analytes were detected in the soil samples.

Remedial Investigation (1992 - 1994)

During the 1992 to 1994 RI, two soil borings were advanced, one new monitoring well was installed and sampled, one existing monitoring well was sampled, and surface soil was collected and analyzed to further characterize contamination at Site AOC023 (Radian, March 1996). Analytical results for the RI samples are presented in the RI report (Radian, March 1996, p. 3-89 to 3-91 [soil], p. 3-92 [groundwater]).

In 1993, Soil Borings 06-SB-02 and 11-SB-01 were advanced to 7 feet bgs. Shallow subsurface soil samples were collected from the upper 7 feet and analyzed for DRO, GRO, VOCs, SVOCs, PCBs/pesticides, and metals.

Results include the following:

- DRO subsurface soil concentrations ranged from non-detect to 56 mg/kg.
- GRO was detected in a soil sample from 06-SB-02 at concentrations of 37 and 43 mg/kg.
- Arsenic and lead were detected with concentrations ranging from 4.2 to 12 mg/kg and 3.2 to 12 mg/kg, respectively. Arsenic exceeded the ADEC Method 2 cleanup levels in subsurface soils.
- SVOCs and pesticides were also detected including benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene, DDT, DDD, DDE, dieldrin, aldrin, heptachlor epoxide, and hexachlorocyclohexane.

Surface soil samples were also collected during the RI and analyzed for DRO, GRO, VOCs, SVOCs, PCBs/pesticides, and metals (Soil Borings 06-SS-02, 06-SS-03, 11-SS-07, 11-SS-09, 11-SS-10, MB-SS-12, MB-SS-22, and MB-SS-23). Results for these samples include the following:

- DRO concentrations in surface soil ranged from 130 to 1,600 mg/kg and GRO was detected at 11 mg/kg and 14 mg/kg. DRO concentrations exceeded ADEC Method 2 cleanup levels at Soil Boring 06-SS-02 with a concentration of 1,600 mg/kg.

- SVOCs were detected at concentrations ranging from 0.0321 mg/kg anthracene to 1.6 mg/kg bis(2-ethylhexyl)phthalate.
- Maximum arsenic and lead concentrations were 10.3 mg/kg and 30.3 mg/kg, respectively.
- Pesticides concentrations were below ADEC Method 2 cleanup levels. PCBs were not detected.

Groundwater was collected from monitoring wells 06-MW-05 and 06-MW-03 (south of Site AOC023) and analyzed for DRO, GRO, VOCs, SVOCs, PCBs/pesticides, and metals.

- DRO, GRO, and benzene were detected in the groundwater at the site with concentrations ranging from 0.004 to 0.058 mg/L (DRO), 0.007 to 1 mg/L (GRO), and 0.00033 to 0.00336 mg/L (benzene), respectively. No groundwater analytes exceeded the ADEC Method 2 cleanup levels.

Package Wastewater Treatment Plant Geotechnical Investigation (2004)

In August 2004, nine boreholes (WA-ESB-01 through -09) were advanced to provide geotechnical and soil analytical data to support design of a package wastewater treatment plant (Earth Tech, September 2004). Soil samples were collected at 5 feet bgs and analyzed for GRO, DRO, and RRO using Methods AK-101, 102, and 103.

DRO and RRO soil concentrations ranged from 5.25 to 18,700 mg/kg and 22.2 to 507 mg/kg, respectively. GRO was only detected at one location at a concentration of 2,890 mg/kg. DRO and GRO concentrations exceeded ADEC Method 2 cleanup levels at only one location (borehole WA-ESB-01) with concentrations of 18,700 mg/kg and 2,890 mg/kg, respectively. All other sample results were below ADEC cleanup levels.

Additional Site Investigations (2007-2009)

In 2007, an additional site investigation of soil, soil gas, and groundwater was conducted at Site AOC023 in support of the Base Closure Program (BCP) program (Earth Tech, Inc., June 2008; Earth Tech., January 2009). Two soil borings (WAA-MC72 and WAA-MC73) were advanced within Site AOC023 down to groundwater at approximately 14 feet bgs. Sample results were summarized in a work plan (Earth Tech, June 2008, Figure 26-1 [field results] and Figure 26-2 [laboratory results]).

Soil samples were collected between 6 and 14 feet bgs and were analyzed for DRO/RRO, GRO, and VOCs using Methods AK102/103, AK101, and SW8260B. Soils sample were also field tested using the PetroFlag™ TPH analysis.

- DRO, GRO, RRO, BTEX, TCE, cis-1,2,-DCE, and trans-1,2-DCE were all detected in the subsurface soils. DRO and GRO concentrations both exceeded ADEC Method 2 cleanup levels at one location, Soil Boring WAA-MC72, down to 14 feet bgs. Similarly, BTEX also exceeded ADEC Method 2 cleanup levels at Soil Boring WAA-MC72 down to at least 9 feet bgs. TCE, cis-1,2,-DCE, and trans-1,2-DCE all also exceeded ADEC Method 2 cleanup levels at multiple locations onsite.

Groundwater was sampled from three temporary well points (WAA-GW74 through WAA-GW76) and analyzed for DRO, GRO, and VOCs using Method AK102, AK101, and SW8260B.

- DRO, GRO, BTEX, TCE, cis-1,2,-DCE, and trans-1,2-DCE were all detected in the groundwater. Benzene and TCE were the only analytes detected above ADEC Method 2 cleanup levels.

Soil gas was sampled and analyzed at 10 temporary monitoring points (WAA-SG62 through WAA-SG71) at a depth of 10 feet bgs using an Eagle RKI multi-gas monitor, a Mini-Rae PID, and at one location for a laboratory analysis for VOCs, VPH, and EPH.

- The highest concentrations of VOCs were observed in samples collected from the western end of the AOC023 concrete pad. TVH concentrations ranged from 50 to 1,350 ppmv at locations WAA-SG62 through WAA-SG64. The highest PID readings were also observed at these locations. A soil gas sample collected from WAA-SG65 detected BTEX, TCE, cis-1,2,-DCE, and trans-1,2-DCE, with a maximum VOC concentration of 23.8 ppmv total xylenes. Predominately lighter, short-chained VPH (C4-C12) was detected at a concentration of 582 ppmv, compared to heavier, longer-chained EPH (C11-C18) at a concentration of 0.76 ppmv.

In 2007 and 2009, two temporary groundwater sampling locations were installed using direct push methods at Site AOC023 in association with an investigation for the Power Plant (Building 1499). In 2007, samples were collected at 14 feet and 19 feet bgs at borehole 1499-GW61. In 2009, samples were collected at 22, 24, and 46 feet bgs at borehole 1499-GW464. Samples were analyzed for GRO, DRO, RRO, and VOCs using Methods AK101, AK102, AK103, 8021, and 8260B.

- DRO, BTEX, TCE, cis-1,2,-DCE, 1,1-DCA, chloromethane, vinyl chloride, acetone, MEK, 1,3,5-TMB, and naphthalene were all detected in the groundwater.

October 2009 Site Visit Observations

An inspection of Site AOC023 was conducted in October 2009. A photograph of the site in October 2009 is provided in Figure A4-AOC023. The surface of the site was observed to be pavement and gravel. No observations regarding odors or staining were recorded. No viable ecological habitat exists at the site.

Target Analytes

Historical site use and previous investigation findings suggest that the primary source of contamination at Site AOC023 was from spilled and leaking waste POL and solvent storage at the site. Data collected during previous investigations indicate the presence of petroleum hydrocarbons, chlorinated hydrocarbons, and metals in site surface and subsurface soil and petroleum hydrocarbons and chlorinated hydrocarbons in the groundwater above the corresponding ADEC Method 2 cleanup levels. Similarly, petroleum and chlorinated volatile hydrocarbons were also observed in site soil gas. Therefore, target analytes are VOCs, DRO, GRO, RRO, pesticides, and metals.

Potential Exposure Pathways and Receptors

Based on current and reasonably anticipated potential future land uses at Site AOC023, potential human receptors and potentially complete exposure pathways 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. 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.

Terrestrial ecological exposure pathways are considered incomplete at Site AOC023. The site is covered with a pavement/gravel surface and has only ruderal (weedy) vegetation that provides no viable habitat. Therefore, no ecological receptors were identified, and the site will not be evaluated for ecological risk. An aquatic pathway is unlikely to be complete at Site AOC023, as the site is more than 1,000 feet from the Yukon River. Data are being collected as part of the Hydrogeologic Study to refine the understanding of the groundwater system at the FOL. This pathway may be further evaluated if the data collected as part of the hydrogeological characterization suggest there is a potential for site contamination to impact the Yukon River.

Conclusions

Since the 1950s, waste lube oil, antifreeze, solvents, oil rags, and other wastes from power plant operations and other Former Galena FOL operational activities were accumulated and stored onsite in drums at Site AOC023. Historic activities at Site AOC023 associated with the former waste storage resulted in contamination from fuel-related compounds, chlorinated hydrocarbons, and metals in site surface and subsurface soil and petroleum hydrocarbons and chlorinated hydrocarbons in the groundwater above the corresponding ADEC Method 2 cleanup levels. The full nature and extent of contamination at the site has not been adequately determined.

Recommendation: Remedial Investigation

Remedial investigation is recommended to identify the nature and extent of contaminants in soil and groundwater at Site AOC023, in accordance with Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (commonly known as Superfund) (CERCLA) regulations.

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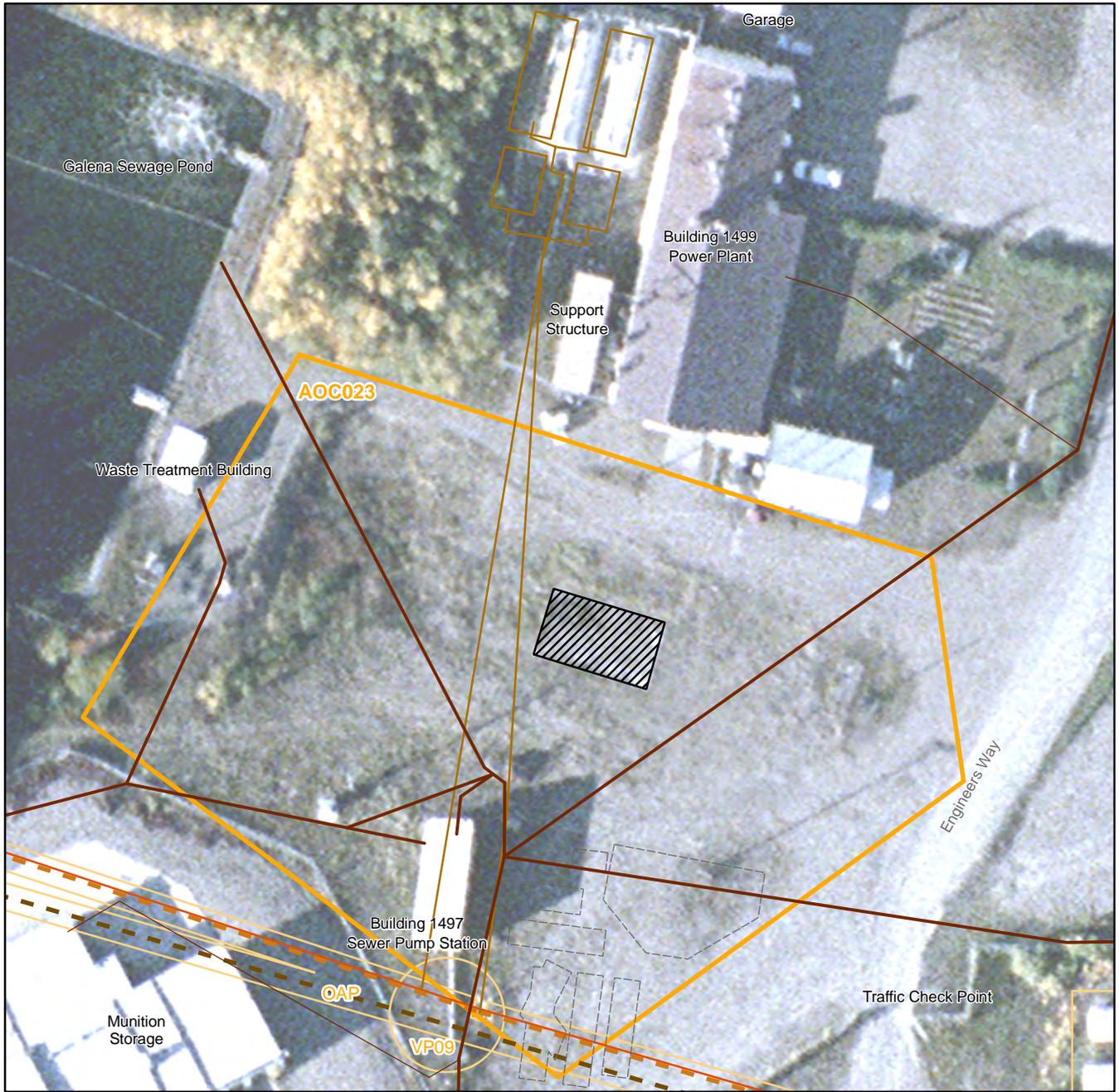
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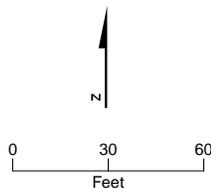
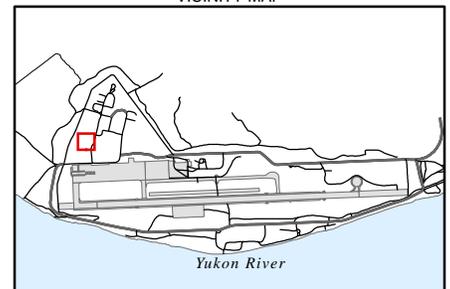


VICINITY MAP

LEGEND

- AOC023
- Adjacent Site
- Aboveground Storage Tank
- Approximate Location of Unknown Former Feature Digitized from Historical Information
- Concrete Drum Storage Pad
- Abandoned Fuel Line (1962)
- Abandoned Fuel Line
- Main Fuel Line
- Service Fuel Line
- Main Wastewater Line
- Service Wastewater Line

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



**FIGURE A1-AOC023
Site Layout**

Preliminary Assessment Report
Former Galena Forward Operating Location, Alaska



LEGEND
 AOC023

- Notes:
1. Photography Dated 9-4-1963, Georeferenced.
 2. Photography Dated 1969, Georeferenced.
 3. Photography Dated 1985, Georeferenced.
 4. Imagery August, 2002. Pixel size 0.075 meters.

VICINITY MAP

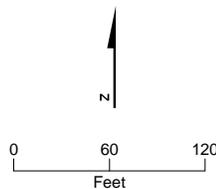
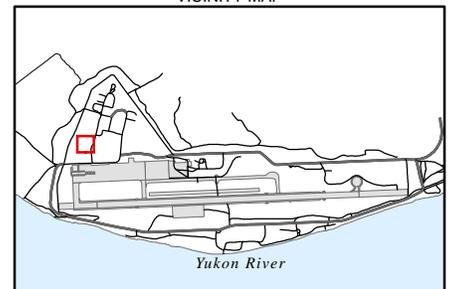
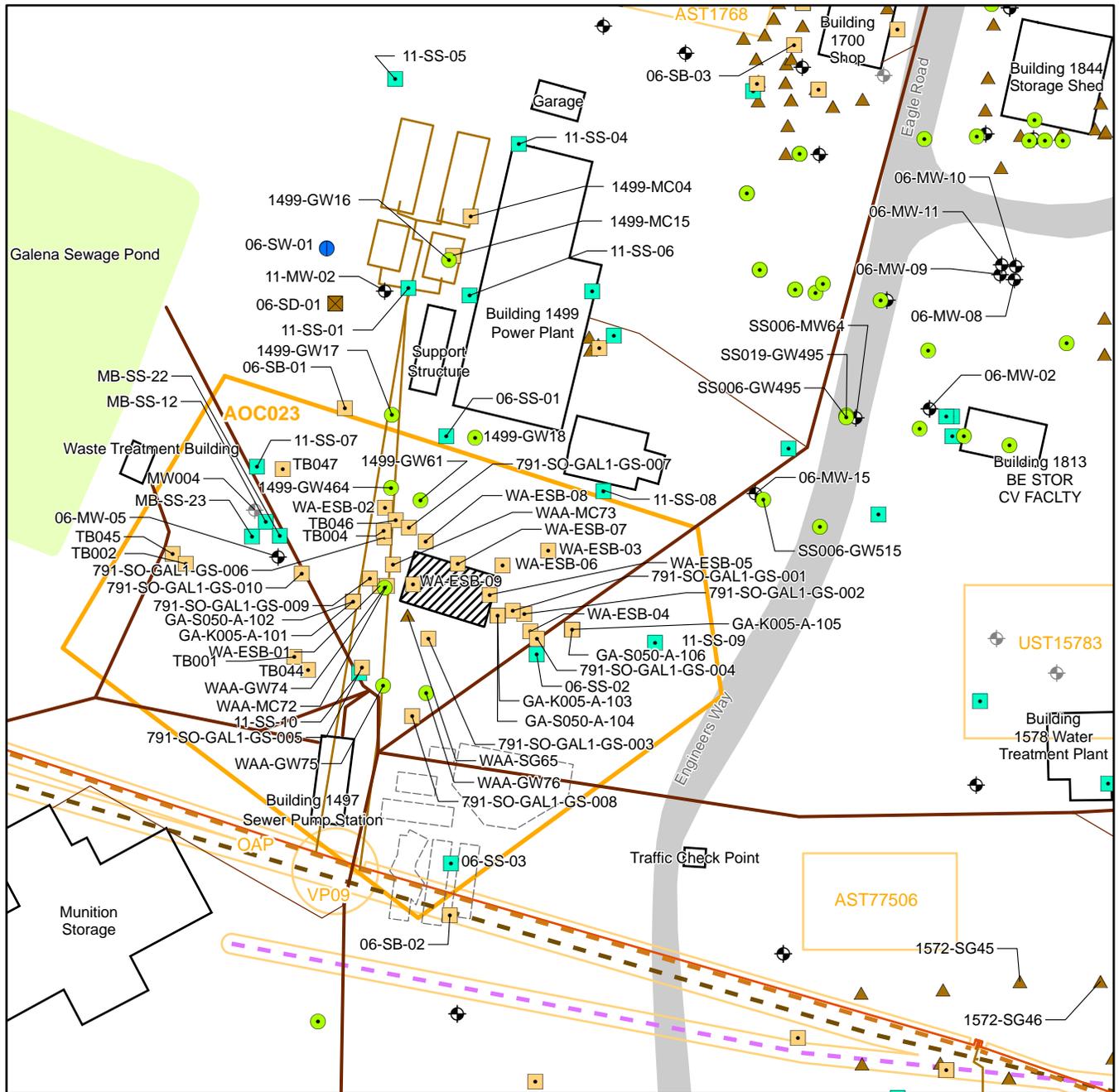


FIGURE A2-AOC023
Historical Aerial Photography
 Preliminary Assessment Report
 Former Galena Forward Operating Location, Alaska



LEGEND

- AOC023
- Adjacent Site
- Aboveground Storage Tank
- Approximate Location of Unknown Former Feature Digitized from Historical Information
- Concrete Drum Storage Pad
- Structure
- Road
- Abandoned Fuel Line (1952)
- Abandoned Fuel Line (1962)
- Abandoned Fuel Line
- Main Fuel Line
- Service Fuel Line
- Main Wastewater Line
- Service Wastewater Line
- Historical Sample Location**
- Sediment Sample
- Soil Boring
- Surface Soil Sample
- Hydro Punch
- Monitoring Well
- Abandoned Monitoring Well
- Surface Water Sample
- Soil Vapor Sample

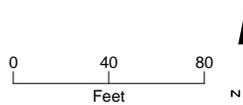
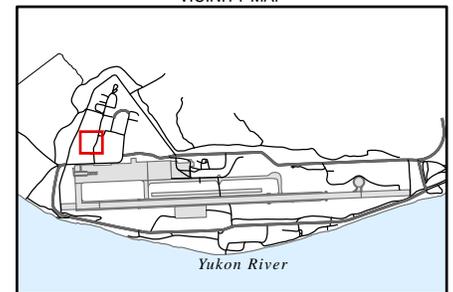


FIGURE A3-AOC023
Historical Sample Locations

Preliminary Assessment Report
 Former Galena Forward Operating Location, Alaska



FIGURE A4-AOC023
Site AOC023, October 2009

Supporting Documentation



Figure 1. Waste Accumulation Area, looking southeast. (Sept. 24, 1992). AST can be seen at the right side of photo. (Source: Woodward-Clyde Consultants, July 1993)



Figure 2. Waste Accumulation Area, looking northwest toward Power Plant (Sept. 24, 1992). (Source: Woodward-Clyde Consultants, July 1993)



Figure 3. Waste Accumulation Area, looking west (Sept. 24, 1992). (Source: Woodward-Clyde Consultants, July 1993)



Figure 4. Waste Accumulation Area, looking southwest (Sept. 24, 1992). Concrete pad can be seen in the front portion of the photo. (Source: Woodward-Clyde Consultants, July 1993)



Figure 5. Waste Accumulation Area, looking south (Sept. 24, 1992). (Source: Woodward-Clyde Consultants, July 1993)

APPENDIX A

B1859 Grease Trap

Building 1859 Grease Trap (Site ID B1859 Grease Trap)

Site Location

Site B1859 Grease Trap is located within Parcel Block 3, on the eastern side of the cantonment "triangle." The grease trap is located to the west of the dining facility, and adjacent to Building 1858.

Site Characteristics

Site features are shown on Figure A1-B1859 Grease Trap. Site B1859 Grease Trap consists of the grease trap used by Building 1859, the Two Seasons Dining Hall.

Site Description and History

The grease trap is adjacent to Building 1858, a cold storage facility, and to the west of Building 1859. Building 1859 has been used as a dining facility since its construction; therefore, it is unlikely that the grease trap was used for improper disposal of petroleum products or industrial solvents. The grease trap measures approximately 9 feet by 6.5 feet, and is used during the school year. The trap collects grease from the dining hall, and discharges to the sanitary sewer.

Historical aerial photographs of Site B1859 Grease Trap dated 2002 and 2009 are shown on Figure A2-B1859 Grease Trap.

Summary of Previous Investigations

The cold storage facility (Building 1858), dining facility (Building 1859), and associated structures such as the dormitory (Building 1874) were inspected as part of the Building Environmental Baseline Condition Report for Facilities 1858, 1859, and 1874 conducted in June 2007 (Earth Tech, June 2007). Based on this investigation, the cold storage facility, dining facility, and the grease trap are considered Department of Defense Environmental Condition Category 1 sites, which indicates these are areas where no disposal or releases of hazardous substances or petroleum products have occurred.

No hazardous substances were stored within the grease trap. In addition, hazardous substances and petroleum products were not released or disposed of within the grease trap. The site is situated at the northern portion of the FOL, so groundwater migration of these substances from adjacent areas is not likely to have occurred.

October 2009 Site Visit Observations

No inspection of Site B1859 Grease Trap was conducted in October 2009. However, an inspection was conducted in July 2011. The grease trap measures approximately 9 feet by 6.5 feet, and is used during the school year. The trap collects grease from the dining hall, and discharges to the sanitary sewer. The location of the grease trap is shown in Figures A3-B1859 Grease Trap and A4-B1859 Grease Trap.

Target Analytes

There is no evidence of a release from Site B1859 Grease Trap; therefore, no target analytes are associated with the site.

Potential Exposure Pathways and Receptors

Because there is no evidence that a release has occurred from Site B1859 Grease Trap, media at the site have not been impacted. Therefore, no complete human or ecological exposure pathways are associated with Site B1859 Grease Trap.

Conclusions

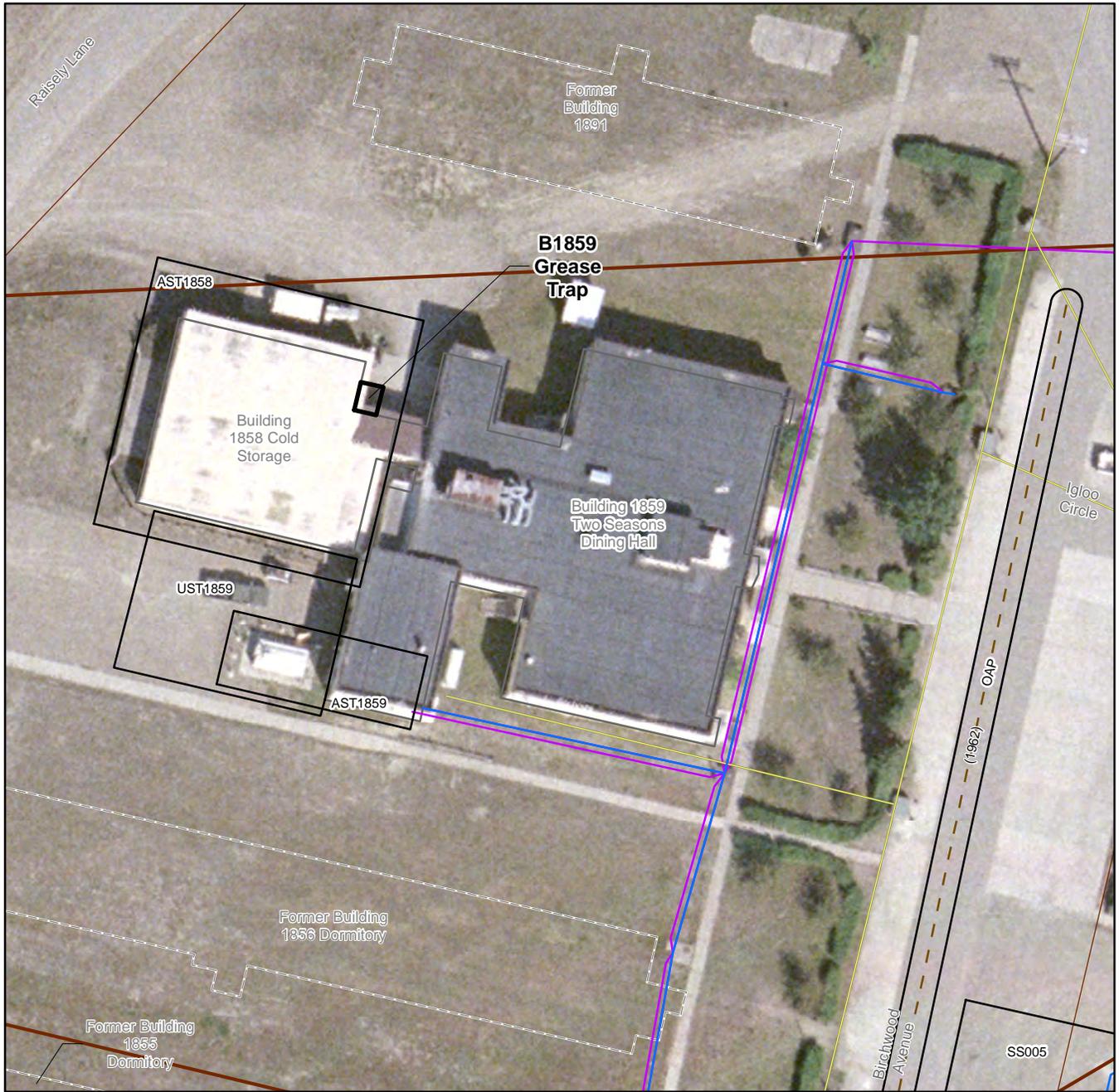
Site B1859 Grease Trap consists of the grease trap used for the dining facility at Building 1859. The grease trap is west of the dining facility and adjacent to Building 1858, a cold storage facility. No documented release or disposal of hazardous substances or petroleum products exists for Site B1859 Grease Trap. An investigation of these facilities was conducted in 2007 before property transfer and these facilities were concluded to be uncontaminated properties.

Recommendation: “Non-Site”

Because Site B1859 Grease Trap is not the source of any releases or disposals of hazardous substances or petroleum products, designation of Site B1859 Grease Trap as a “Non-Site” is recommended.

Reference

Earth Tech. June 2007. *Building Environmental Baseline Condition Report: Facilities 1858, 1859, and 1874 at Galena Airport, Alaska.*



VICINITY MAP

LEGEND

- B1859 Grease Trap
- Adjacent Site
- Structure
- Approximate Location of Former Feature
- Abandoned Fuel Line (1962)
- Electrical Line
- Heating/Cooling Line
- Main Wastewater Line
- Service Fuel Line
- Water Line

Note:
 1. Aerial photography and CAD drawing file vector themes courtesy Alaska Department of Commerce, Community and Economic Development, Division of Community and Regional Affairs. July 7, 2009. Aerial photography pixel size 6-inch.

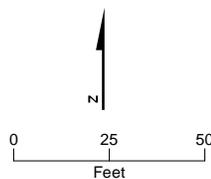
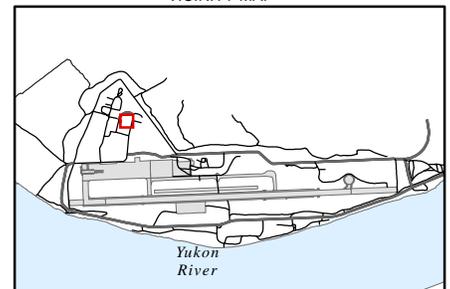
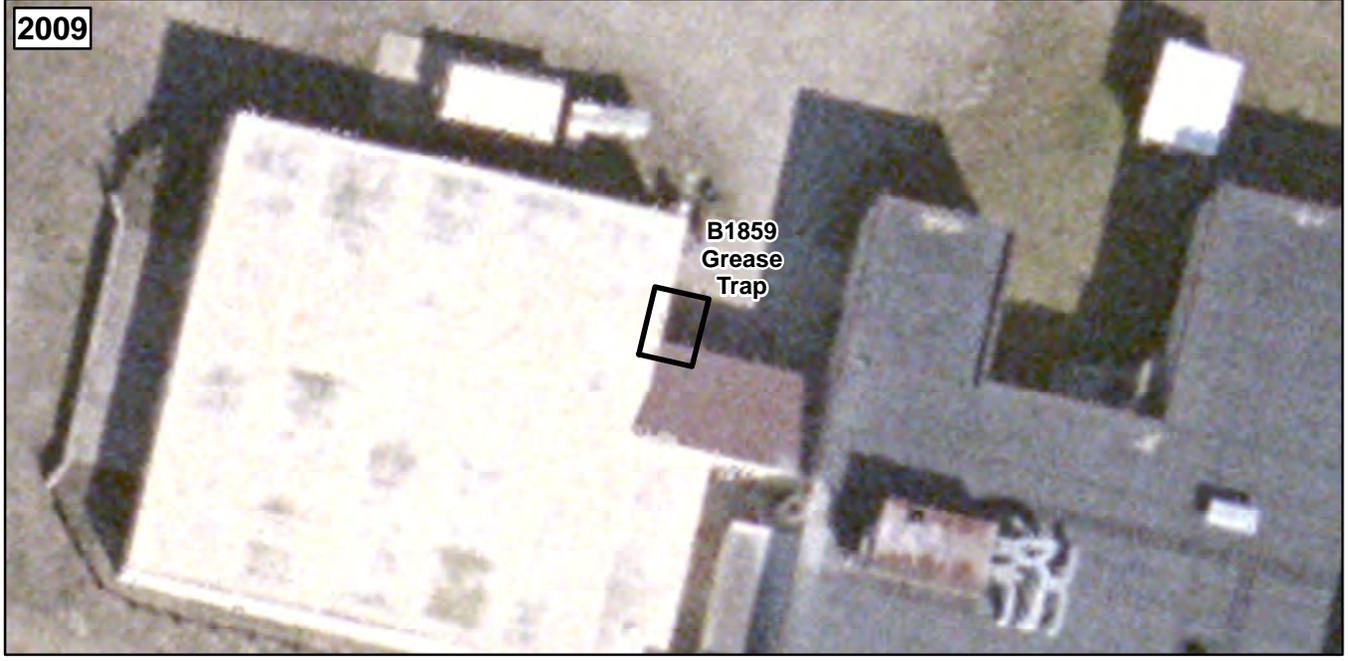


FIGURE A1-B1859 Grease Trap Site Layout
 Preliminary Assessment Report
 Former Galena Forward Operating Location, Alaska



LEGEND
 B1859 Grease Trap

Notes:
 1. Imagery August 2002 Pixel size 0.075 meter
 2. Aerial photography and CAD drawing file vector themes courtesy Alaska Department of Commerce, Community and Economic Development, Division of Community and Regional Affairs. July 7, 2009. Aerial photography pixel size 6-inch.

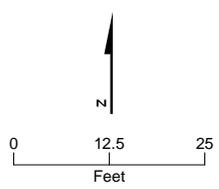
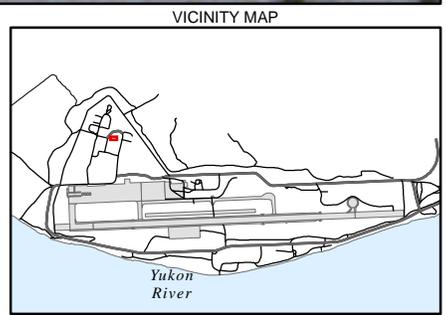


FIGURE A2-B1859 Grease Trap Historical Aerial Photography
 Preliminary Assessment Report
 Former Galena Forward Operating Location, Alaska



FIGURE A3-B1859 GREASE TRAP
Site B1859 Grease Trap Facing Southwest, July 2011



FIGURE A4-B1859 GREASE TRAP
Site B1859 Grease Trap Close Up, July 2011

APPENDIX A

BERM

BERM (Site ID BERM)

Site Location

Site BERM is located in the southern part of the cantonment “triangle” on Block 9, Lots 4 and 6, north of Building 1551, the former Birchwood Hangar.

Site Characteristics

Site features are shown on Figure A1-BERM. Site BERM consists of a small soil berm of saplings (such as balsam poplar) and grass surrounded by pavement and gravel with unknown historical use.

Site Description and History

According to interviews with a Galena resident, the USAF placed an aboveground diesel tank in this area temporarily. This statement was corroborated by Mr. Joe Williamson, former 5099th Air Force personnel (Williamson, December 28, 2009; provided in the supporting documentation). No records have been located to determine why the tank was temporarily placed in the berm.

Historical aerial photographs of Site BERM, dated 1963, 1985 and 2002, are shown on Figure A2-BERM. The 1963 photograph shows a building, but no tank is present in the area of Site BERM. The building had been removed by the time the 1985 photograph was taken. No tank in the area of Site BERM could be identified because the resolution of the photograph was too low. The 2002 photograph shows a small soil berm with some vegetation present, but no tank is present in the area of the site.

Summary of Previous Investigations

No investigations have been conducted or samples collected at Site BERM.

October 2009 Site Visit Observations

An inspection of Site BERM was conducted in October 2009. The ground surface near Site BERM was observed to consist of saplings (such as balsam poplar) and grass surrounded by pavement and gravel (see Figure A3-BERM). A utility vault was observed approximately 50 feet south of the berm. No surface staining or petroleum odors or visual signs of ecological impact or acute toxicity were observed. No evidence was found that would indicate a potential release for an aboveground diesel tank.

Target Analytes

Because a release has not occurred from Site BERM, no target analytes are present at the site.

Potential Exposure Pathways and Receptors

Because a release has not occurred from Site BERM, environmental media at the site have not been impacted. Therefore, no complete human health or ecological exposure pathways exist at the site.

Conclusions

There is no documented release for Site BERM and the historical use of the site is unknown. The berm most likely was used to temporarily hold a diesel AST in the late 1980s. During the 2009 site visit, no surface staining or petroleum odors were observed. Because a release has not occurred from Site BERM, environmental media at the site have not been impacted.

Recommendation: "Non-Site"

Because there are no documented releases, and no surface staining or petroleum odors were observed during the 2009 site inspection, designation of Site BERM as a "Non-Site" is recommended.

Reference

Williamson, Joe. December 28, 2009. Joe Williamson, former officer stationed at Galena Forward Operating Location, Alaska. Personal Communication with Vivian Tokar/CH2M HILL.

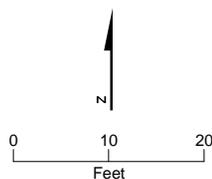
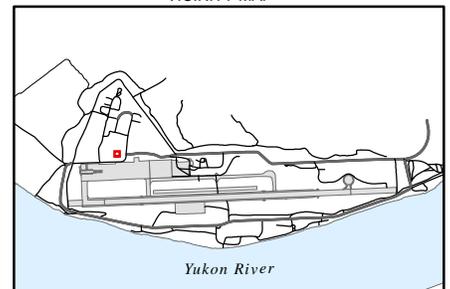


VICINITY MAP

LEGEND

-  BERM
-  Adjacent Site
-  Abandoned Fuel Line (1952)
-  Abandoned Fuel Line (1962)
-  Abandoned Fuel Line
-  Main Fuel Line
-  Main Wastewater Line

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



**FIGURE A1-BERM
Site Layout**

Preliminary Assessment Report
Former Galena Forward Operating Location, Alaska



LEGEND

 BERM

- Notes:
1. Photography Dated 9-4-1963, Georeferenced.
 2. Photography Dated 1985, Georeferenced.
 3. Imagery August, 2002. Pixel size 0.075 meters.

VICINITY MAP

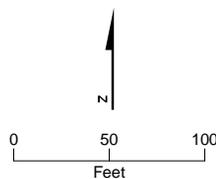
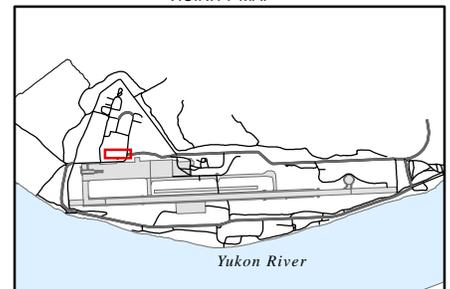


FIGURE A2-BERM
Historical Aerial Photography
 Preliminary Assessment Report
 Former Galena Forward Operating Location, Alaska



FIGURE A3-BERM

Soil Berm, North of Former Birchwood Hangar Building 1551, October 2009

Utility vault is visible in the upper right corner of photo, the southern end of the berm area.

Supporting Documentation

CH2MHILL TELEPHONE CONVERSATION RECORD

Call To: Mr. Joe Williamson

Phone No.: 406-600-4307

Date: December 28, 2009

Call From: Vivian Tokar

Time: 11:22 AM

Subject: Former Galena FOL PCBs

Mr Joe Williamson was a member of the 5099th and was responsible for environmental operational aspects of King Salmon, Galena, and Eareckson AS from 1986-1989. He was also the Environmental Restoration Chief, 3rd CES, until his retirement in 2008.

Mr. Pat Coullihan, former 5999th Commander, recommended Ms. Tokar call Mr. Williamson to ask him about handling and disposal of possible PCB at the Former Galena FOL.

Mr. Williamson did not recall a soil clean-up effort in the late 1980s. He recalled that transformers were shipped out and the 3rd CES at Elmendorf should have all records of PCB shipped to the TSD facility (DRMO). He recalled that Galena had no real place to stockpile PCBs, and there were regular flights hauling wastes, etc back to Elmendorf (including planes as large as C-141 dedicated to waste hauling).

Ms. Tokar explained that some of the emphasis on PCB contamination is partly driven by the fact that PCB contamination in soil has been discovered at most of the remote radar sites. Mr. Williamson stated that he would think the missions of the FOLs were different enough from the RSS that there would be no similarity between the disposal practices at the RRS and Galena. PBC use at Galena would be limited to power plant (old one, across from the Birchwood hanger) and pole-mounted transformers.

Mr. Williamson stated that he remembers renewing a road oiling permit for Galena. Since the facility had a permit to use waste oil for road oiling why they would dispose of it elsewhere (i.e. out the door)? It could be assumed that if waste PCB oil was disposed of it was with the other waste oil.

Mr. Williamson also stated that the AF operated the landfill right outside the runway- but it was used by City of Galena, AK-DOT, etc- and that would be the other potential disposal area.

Mr. Williamson recommended I contact the 3rd and DRMO to see the records from the 1980's that documented the shipment of PCB-items.

Mr. Williamson commented that the Air Force had a diesel tank in a soil containment berm across from the Birchwood Hanger, near to demolished old power plant.

APPENDIX A

BLA

Barge Loading Area (Site ID BLA)

Site Location

Site BLA is located at the eastern end of Old Town Galena, at the southern end of the pipeline right-of-way (ROW).

Site Characteristics

Site features are shown on Figure A1-BLA. Site BLA is an off-loading fuel header, also known as the BLA. The ground surface at Site BLA is gravel and is surrounded by the riparian habitat of the Yukon River. The area occupied by USAF is approximately 0.32 acre (13,900 square feet) in Tract J (BLM, March 21, 1973; provided in the supporting documentation). The feature of concern at Site BLA is the fuel-header equipment and aboveground section of the pipeline, which is currently surrounded by an 8-foot-tall chain-link fence.

Site Description and History

The BLA has been in operation since 1952, and has been used to off-load JP-4, JP-8, and diesel fuel transported to the Former Galena FOL by barge. The fuel-header equipment and aboveground section of the pipeline is currently surrounded by an 8-foot-tall chain-link fence that was installed in 2005 (USAF, March 26, 2004; provided in the supporting documentation).

The BLA is currently used as the fuel off-loading area for the Former Galena FOL.

Several spills have been reported near Site BLA. Responsible parties have been identified as Coastal Marine Transport, City of Galena, and Yutana Barge Line. One ADEC contamination sites file, 860.38.031 Galena Marine Header Release, is currently active (ADEC, 2010; provided in the supporting documentation).

Historical aerial photographs of Site BLA, dated 2002 and 2009, are shown on Figure A2-BLA. The 2002 and 2009 photographs show fuel-header equipment adjacent to the Yukon River.

Summary of Previous Investigations

No previous investigations or sampling have been conducted at Site BLA.

October 2009 Site Visit Observations

No site visit was conducted at Site BLA in October 2009.

Target Analytes

Because the site is a fuel off-loading site, target analytes related to JP-4, JP-8, and diesel fuel include DRO, GRO, RRO, BTEX, and PAHs.

Potential Exposure Pathways and Receptors

Based on current and reasonably anticipated potential future land uses at Site BLA, potential human receptors and potentially complete exposure pathways 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. 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.

The ground surface at Site BLA is gravel and surrounded by the riparian habitat of the Yukon River. Ecological exposure pathways are considered to be potentially complete at the site if COPECs are found to be present in surface soil, sediment, surface water, or in groundwater. Therefore, more site data or a refined understanding of the groundwater system will be needed to determine if any pathways are complete. In addition, an aquatic ecological exposure pathway is potentially complete because the site is located less than 1,000 feet from the Yukon River. Therefore, this pathway requires further evaluation if target analytes are discovered at concentrations exceeding applicable SLs.

Conclusions

Fuel off-loading activities at Site BLA resulted in releases of fuel to the environment by non-USAF entities. According to a 1973 letter from the BLM, USAF responsibility should be limited to spills and leaks originating from the barge delivery header pipes within the defined USAF pipeline ROW and occupied area of Tract J currently delineated by the fenced barge delivery header area (BLM, March 21, 1973; provided in the supporting documentation).

Recommendation: Site Inspection

Limited site inspection sampling is recommended to confirm the presence or absence of fuel-related constituents in soil.

References

- Alaska Department of Environmental Conservation (ADEC). 2010. *Contaminated Sites Database*.
http://www.dec.state.ak.us/spar/csp/search/IC_Tracking/Site_Report.aspx?Hazard_ID=4101, Accessed February 15, 2010.
- Bureau of Land Management (BLM). March 21, 1973. Letter to Department of the Army, Alaska District, "Notice of Records Noted."
- U.S. Air Force (USAF). May 2008. *Final Environmental Baseline Survey, Air Force Property at Galena Alaska*, 611th Civil Engineer Squadron, Elmendorf AFB, AK.
- U.S. Air Force (USAF). March 26, 2004. Colonel Steven E. Armstrong, Commander. Letter to Vernal Berry.

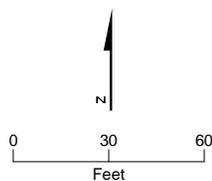
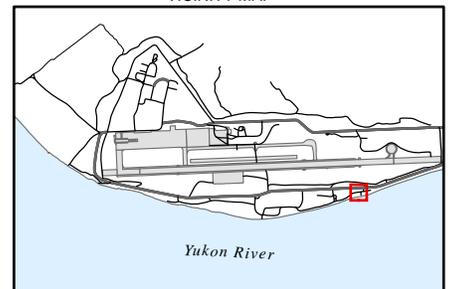


VICINITY MAP

LEGEND

- BLA
- Adjacent Site
- Approximate Location of Former Feature
- Abandoned Fuel Line (1952)
- Abandoned Fuel Line (1962)
- Abandoned Fuel Line
- Main Fuel Line

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



**FIGURE A1-BLA
Site Layout**

Preliminary Assessment Report
Former Galena Forward Operating Location, Alaska



LEGEND
 BLA

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

VICINITY MAP

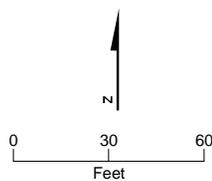
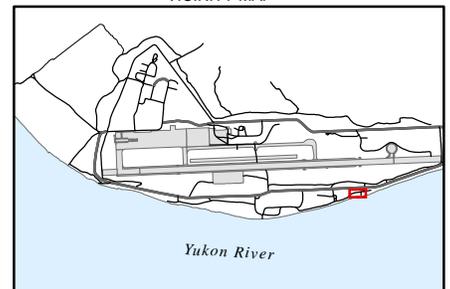


FIGURE A2-BLA
Historical Aerial Photography
 Preliminary Assessment Report
 Former Galena Forward Operating Location, Alaska



FIGURE A3-BLA
Fenced Barge Landing Area Looking Southwest
Source: USAF, May 2008, Photo 97

Supporting Documentation



United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Fairbanks District Office
P. O. Box 1150
Fairbanks, Alaska 99707

F-1
186-12
IN REPLY REFER TO: 63

2800 (220)
F-15934

March 21, 1973

NOTICE

Department of the Army	:	F-15934
Alaska District	:	44 L.D. - 513
Corps of Engineers	:	Galena Airport,
Anchorage, Alaska 99510	:	Tract J

Records Noted

By letter of March 14, 1973, you have requested that the public land records be noted to reflect occupancy by the Department of the Air Force of Tract J, Galena Airport, under the provisions of 44 L.D. - 513. A satisfactory report by the Yukon Area Manager has been reviewed, accordingly the records are so noted effective the date of this NOTICE.

Sincerely yours,


Acting District Manager

Galena Airport
POL Line R/W

U.S. Department of Interior
(BLM)

Tract J
(0.32 ± acre)

LEGAL DESCRIPTION

A strip of land located in the Galena Townsite, Fourth Judicial District, State of Alaska; said strip being 50.00 feet wide, lying 25.00 feet on each side of a centerline for a POL line as described hereinbelow:

COMMENCING at Corner No. 3 of U.S. Survey No. 2023;
thence North, a distance of 95 feet to the north boundary of Galena Townsite;
thence N. 89°30' E. along said boundary, a distance of 1420 feet, more or less, to the intersection of a POL line and being the TRUE POINT OF BEGINNING;
thence on an approximate bearing of S. 15° E., along said POL line, a distance of 280 feet, more or less to the terminus of said POL line.

Contains 0.32 of an acre, more or less.

DEK
3/8/72

inform



DEPARTMENT OF THE AIR FORCE
PACIFIC AIR FORCES

MAR 26 2004

Colonel Steven E. Armstrong
611 ASG/CC
10471 20th St Ste 361
Elmendorf AFB AK 99506-2200

Mr. Vernal Berry
PO Box 162
Galena AK 99741

Dear Mr. Berry

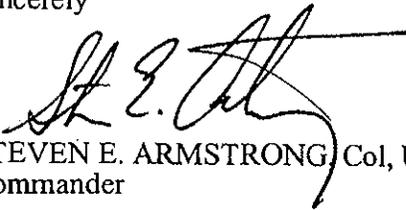
This letter is to inform you the Air Force plans to install a security fence around the off-loading fuel header located on the Air Force right-of-way (ROW). This ROW crosses your property at Lot 2, Block 2, US Survey 4179. The Air Force ROW, under provisions of 44 LD 513 for 0.32 acres, provides the Air Force use of the strip of land 25 feet on each side of the pipeline's centerline, along the length of the pipeline, within the Galena town site. We ask that you respect this 50-foot wide clearance area within the Air Force ROW by removing personal property within that area to prevent possible damage to the header.

The purpose of the security fence is to promote public and pipeline safety, inhibit sabotage, theft, vandalism, and unauthorized access. Damage to the fuel header or pipeline could result in fuel delivery delays, subsequent fuel shortages, or the inadvertent release of petroleum into the environment.

The fence will surround the header's equipment and pipeline. It will be a maximum of 8 feet tall with 3-inch posts and two double gate entrances, one each on the north and south sides. We expect to execute this project in the summer 2005.

We look forward to working with you to ensure the safety of the local community while enhancing our mission readiness. If you have any questions or concerns, please call Ms. Mary Adams at 552-5226 or Ms. Cathi Moody at 552-8757.

Sincerely


STEVEN E. ARMSTRONG, Col, USAF
Commander

cc:
611 ASUS/CC
611 ASUS/PMF

Alaska Department of Environmental Conservation

Contaminated Sites Database

Cleanup Chronology Report for Galena Marine Header Release

File Number	860.38.031	Hazard ID	4101
SiteName	Galena Marine Header Release	Staff	Jim Fish - 9074512117
Address 1	within 100' Yukon River	Status	Active
Address 2	Old Town	Landowner	
City/State/Zip	Galena, AK 99741		
Latitude	64.734722	Meridian	Kateel River
Longitude	-156.935215	Range	010
Section		Township	009

Problem/Comments This spill was discovered on June 5, 2004. The City of Galena estimates approximately 1000 gallons of #2 diesel fuel spilled approximately 100 feet from the Yukon River near the barge delivery header in Galena. The City of Galena utilities manager suspects that the rupture of the underground barge delivery pipeline made from High Density Poly Ethylene (HDPE) was due to the freezing and thawing of the ground resulting in stressing the pipe to the point of rupture. An estimated 550 gallons of free product was recovered from the spill site. Approximately 200 - 250 cubic yards of contaminated soil was removed and placed on a liner. The contaminated soil will remain in Galena and the City will attempt to remediate the soil via biological activity. No observed impact to the Yukon River or any wildlife. This site was transferred from PERP.

Action Date	Action	Description	DEC Staff
07/15/2004	Site Added to Database	Site transferred from PERP. DRO contamination within 100 feet from the Yukon River and close to drinking water wells.	Williams, Deborah
07/15/2004	Spill Transferred from Prevention and Emergency Response Program	Site transferred from PERP.	Williams, Deborah
07/15/2004	Site Ranked Using the AHRM	Preliminary ranking.	Williams, Deborah
07/20/2004	Update or Other Action	Telephone conversation with Walt Wilcox and he stated that they had recovered approximately 600 gallons of diesel and excavated approximately 200 cubic yards of contaminated soil. He estimates that the clay layer that is in the bottom of the excavation is 2 feet deep. The closest drinking water well is 300 feet from the site and the well is 303 feet deep. All the residences in the area are on piped water. The next closest well from the site is another city drinking water well and it is over 1/2 mile from the site. The groundwater direction is from the mountains towards the river. The excavation is still open and there are no odors present. The excavated soil was placed in a biocell (20 mil liner) with the dimensions of 120' x 10'. The outside perimeter has pipes around it with the liner laying over the pipes. They plan to till the biocell annually and sample to verify remediation is occurring. A progress report will be sent to ADEC annually.	Williams, Deborah
	Update or	Telephone conversation with Walt Wilcox and he wanted to know what steps he needed take with the biocell in order to close it. I recommended that he till it again this summer, cover it with a liner for the winter and then take off the	Williams,

08/24/2005	Other Action	liner in the spring, till it all summer and have a consultant sample it late next summer. If there is no hurry to remove the biocell, it would be good to let it remediate another year.	Deborah
04/15/2008	Exposure Tracking Model Ranking	Initial ranking with ETM completed.	Cardona-Marek, Tamara
06/06/2008	Update or Other Action	Sent letter to City of Galena (Walt Wilcox) requesting current status of biocell.	Cardona-Marek, Tamara
06/30/2008	Update or Other Action	Contacted by Mr. Wilcox on 6/23. He indicated that the 200 cubic yards of contaminated soil are still in the containment area and they continue to be turned over every year. The soil will be sampled this summer to verify current status.	Cardona-Marek, Tamara
03/27/2009	Update or Other Action	Contacted current City Manager of Galena requesting update on the site and follow up to samples that would be collected by Wilcox in 2008.	Cardona-Marek, Tamara
11/06/2009	Update or Other Action	Transferred site management from Tamara Cardona-Marek to Jim Fish.	Wiegers, Janice

APPENDIX A

BLM Pesticides

Pesticide Area North of BLM Housing (Site ID BLM Pesticides)

Site Location

Site BLM Pesticides is located at the northern corner of the cantonment “triangle,” north of the BLM housing area. The site is located outside of USAF property boundaries (Radian, March 1996) and is currently a storage reserve for ADOT.

Site Characteristics

Site features are shown on Figure A1-BLM Pesticides. Site BLM Pesticides consists of an area of DDT-contaminated soil identified during the 1996 RI (Radian, March 1996).

Site Description and History

Site BLM Pesticides consists of an area of DDT-contaminated soil identified during the 1996 RI located outside of USAF property boundaries, and north of the BLM housing area (Radian, March 1996, Section 3.9 and Figure 3.9-1). The area is currently a storage reserve for ADOT.

The area north of BLM housing where elevated pesticides were detected during the 1996 RI was not owned or operated by the USAF. Real estate records, maps, and other supporting documents which traced Galena's development from 1925 through the 1990s were reviewed and no documentation or evidence of USAF ownership or lease of this area was found.

Figure A2-BLM Pesticides shows historical aerial photographs of the site from 1963, 1985, 2002, and 2009.

Summary of Previous Investigations

Pesticide sampling was conducted between 1992 and 1994 at the Former Galena FOL and surrounding area as described in the 1996 RI report (Radian, March 1996). Pesticides were detected at varying levels in surface soil, subsurface soil, and groundwater. Pesticides were addressed on a site-by-site basis in the Baseline Risk Assessment (USAF, March 1996), and/or will be addressed in site-specific FSPs, where applicable.

Only samples collected in 1993, from within the BLM storage area, contained pesticides in concentrations in excess of EPA Region III risk-based concentrations (RBCs) (Radian, March 1996). Sample BLM-03 was collected from 0 to 3 feet bgs, and contained DDT at a concentration of 968 µg/kg and DDE at a concentration of 665 µg/kg. Sample BLM-04 was also collected from 0 to 3 feet bgs, and contained DDT at a concentration of 21,400 µg/kg, DDE at a concentration of 1,760 µg/kg, and DDD at a concentration of 122 PJ µg/kg (the P data qualifier was used to show that analyte identification was not confirmed because the quantitation from primary and secondary gas chromatograph columns differed by greater than a factor of three. The lower result was reported because the higher result is generally

because of coelution¹ with a non-target analyte. The J data qualifier is used to show that the reported analyte concentration is less than the sample quantitation limit.) During 1994, the USAF collected additional samples to characterize surface soils from within the cantonment “triangle” for pesticide content. None of the samples within the USAF property contained pesticides in excess of Region III RBCs (Radian, March 1996). The 1996 RI report concluded that elevated pesticide concentrations detected in the area north of the BLM housing area were because of pesticide storage in the BLM storage area.

October 2009 Site Visit Observations

No inspection of Site BLM Pesticides was conducted in October 2009.

Target Analytes

Because there are no records to indicate the USAF owned or operated in this area, and there is documentation that the elevated pesticides are attributed to BLM storage/use of pesticides, no target analytes have been identified for this investigation.

Potential Exposure Pathways and Receptors

Because there are no records to indicate the USAF owned or operated in this area, and there is documentation that the elevated pesticides are attributed to BLM storage/use of pesticides, no human health or ecological exposure pathways have been identified for this investigation.

Conclusions

Site BLM Pesticides consists of an area of DDT-contaminated soil located north of the BLM housing area. Because of widespread use of pesticides in the area by multiple entities, it is not possible to determine the independent source of the contamination. AFRPA records indicate that this area was never owned nor operated by the USAF.

Recommendation: “Non-Site”

The widespread use of pesticides throughout the Former Galena FOL is being considered on a site-by-site basis in areas where pesticide storage or spills is suspected. Because of the low levels of DDT detected at Site BLM Pesticides, the difficulty in determining the independent source of the pesticides, and the fact that the USAF has never owned the site property, designation of Site BLM Pesticides as a “Non-Site” is recommended.

References

- Radian Corporation. March 1996. Remedial Investigation. Final Report. Volume I of VII.
- U.S. Air Force (USAF), 611th Civil Engineer Squadron. March 1996. Final Baseline Risk Assessment Report, Galena Airport, Alaska.

¹ The process whereby two or more compounds elute from a column at the same time, making separation and identification difficult.



VICINITY MAP

LEGEND

 BLM Pesticides

Note:
 1. Aerial photography and CAD drawing file vector themes courtesy Alaska Department of Commerce, Community and Economic Development, Division of Community and Regional Affairs. July 7, 2009. Aerial photography pixel size 6-inch.

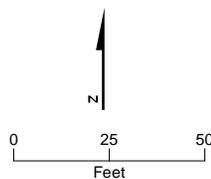
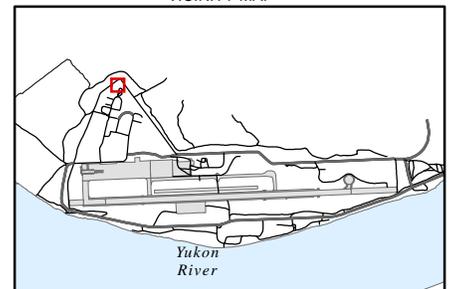


FIGURE A1-BLM Pesticides Site Layout
 Preliminary Assessment Report
 Former Galena Forward Operating Location, Alaska



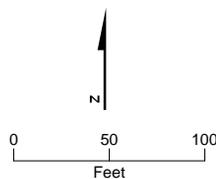
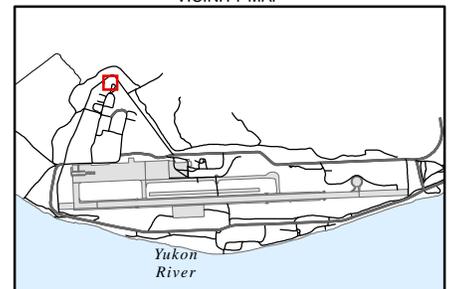
LEGEND

 BLM Pesticides

Notes:

1. Photography date 9-4-1963, georeferenced
2. Photography date 5-26-1985, georeferenced
3. Imagery August 2002 Pixel size 0.075 meter
4. Aerial photography and CAD drawing file vector themes courtesy Alaska Department of Commerce, Community and Economic Development, Division of Community and Regional Affairs. July 7, 2009. Aerial photography pixel size 6-inch.

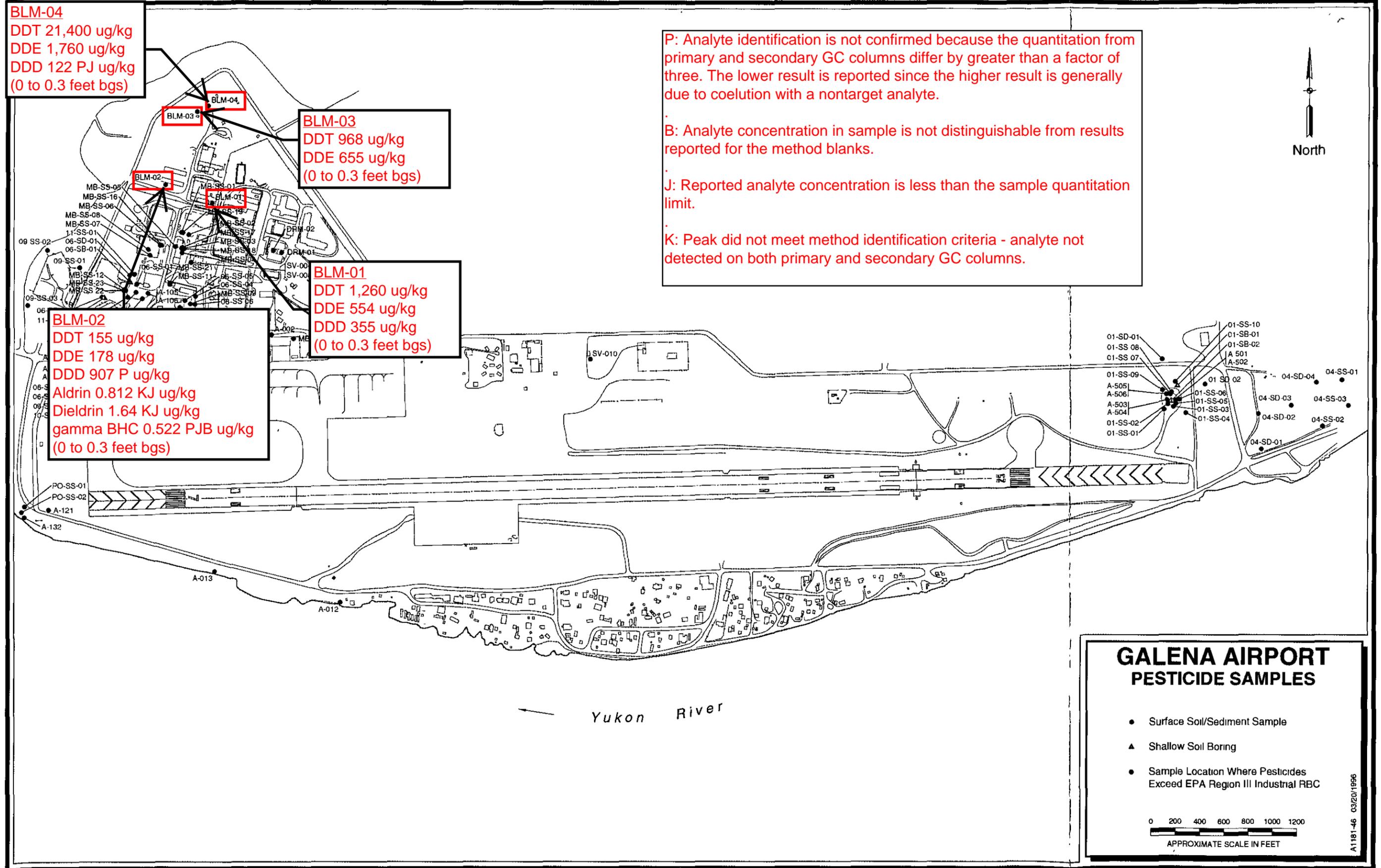
VICINITY MAP



**FIGURE A2-BLM Pesticides
Historical Aerial Photography**

Preliminary Assessment Report
Former Galena Forward Operating Location, Alaska

Supporting Documentation



3.9 Pesticides at Galena Airport

Several pesticide compounds have been detected in soil and water samples from throughout the Galena Airport facility. In general, their occurrence does not appear to result from spills or leaks in areas of bulk storage or waste accumulation but from widespread application for insect control. Therefore, the following sections discuss pesticides on an installation-wide basis rather than at individual sites.

3.9.1 Background

The use of pesticides at the Galena Airport facility is not well documented. Although pesticides are still being used for mosquito control, detailed records of the types and quantities of pesticides applied in the past have not been located. The IRP Phase I Records Search conducted in 1985 stated:

Pesticides have not been used in significant quantities. . . usage has been limited to occasional spraying of malathion to control mosquitos and/or spraying to control insects inside of buildings. There has been no usage of pesticides at (Galena Airport) that would indicate a potential for contamination because of pesticide handling.

Use of pesticides by the State of Alaska, BLM personnel, or the community of Galena cannot be ruled out.

Soil samples collected near the JP-4 Fillstand source area by the U.S. Army Corps of Engineers (USACE) in 1991 contained measurable quantities of 4,4'-DDD, -DDE, and -DDT, dieldrin, endosulfan I, and heptachlor. With the exception of one detection of 4,4'-DDD, at 5 ft bgl, all of the pesticides were detected in surface samples. Because of the presence of breakdown products (e.g., 4,4'-DDD from 4,4'-DDT; dieldrin from

aldrin), the pesticides detected were thought to be the result of old releases (USACE, 1991).

3.9.2 Investigation Results and Discussion

The attachment to Section 3.9, located at the end of this section, provides tables that summarize the results of pesticide analyses in waters and soils within the Galena Airport facility. Only the results for those pesticides that have been detected above one-half their respective screening criteria in soil and water samples from the Galena Airport have been included in the tables. Results of pesticide analyses for samples collected at the Galena ambient location (background) are also given in these tables. All of the pesticides detected in soil and water samples collected at Galena Airport sites also have been detected in background soil and water samples. The source(s) of pesticides at the Galena Ambient Location is not known.

Groundwater

Groundwater sampling conducted from 1992 to 1994 indicates that low levels of pesticides are present in groundwater samples from all Galena Airport locations. Pesticides with multiple detections above screening criteria include aldrin, dieldrin, alpha- and beta-BHC, and 4,4'-DDD, -DDE, and -DDT. Many of these pesticides were detected at very low concentrations, often below the SQL or at concentrations similar to those found in laboratory method blanks. Although aldrin, dieldrin, and alpha- and beta-BHC occurred in groundwater samples from all sites, 4,4'-DDD, -DDD, and -DDT exceeded the screening criteria in only a very few cases. Groundwater samples collected in 1992 from 05-MW-10 in the POL Tank Farm contained 4,4'-DDE at 0.27 µg/L. Those collected in 1992 from 06-MW-01 contained 4,4'-DDT in excess of the screening criteria, and from 06-MW-02 contained 4,4'-DDD and -DDT in excess of screening criteria. Both of these wells are in the Building 1845 source area. A sample collected in 1994 from 09-MW-12, near the base of Million Gallon Hill, contained 0.552-µg/L 4,4'-DDD.

Pesticides also have been detected in airport and community water supply wells. The specific pesticides detected in samples from the privately owned supply wells in the old town of Galena were not consistent from sampling event to sampling event. The results of water supply analyses are discussed in more detail in Section 3.1.

Surface Water

Surface water samples were collected at the West Unit, POL Tank Farm, and the FPTA during 1992. All of these samples were collected in drainage ditches where standing water occurs following breakup of the Yukon River, and all contained pesticides in excess of the screening criteria. However, nearly all of the pesticide detections in surface water samples were less than the SQL, were detected at similar concentrations in a laboratory method blank, or were not adequately quantified based on second-column results. Aldrin, dieldrin, and alpha-BHC were the most common pesticides detected above screening criteria in surface water samples. In one surface water sample (06-SW-02) from the West Unit, heptachlor epoxide was also detected above the screening criteria.

Surface Soils and Sediments

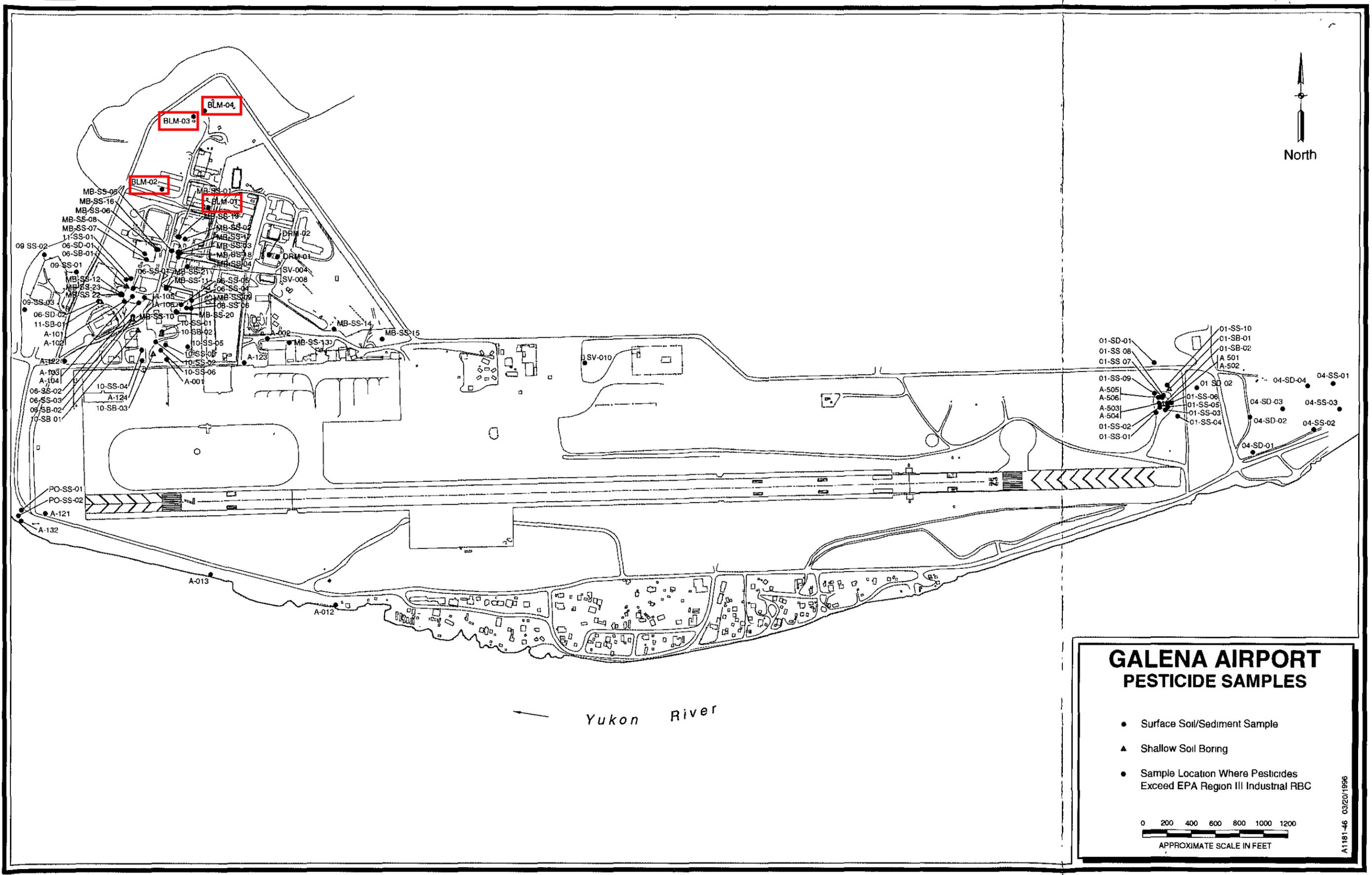
From 1992 to 1994, numerous surface soils and sediment samples have been collected within the Galena Airport boundaries for characterization of pesticides. Figure 3.9-1 shows the distribution of surface soil/sediment samples throughout the installation. Sampling locations where pesticides exceeded the screening criteria are also indicated on Figure 3.9-1.

Detections of "hot spots" of pesticides in surface soils and sediments within the Galena Airport are limited primarily to 4,4'-DDD, 4,4'-DDT, and dieldrin in the West Unit. Although the concentrations of these compounds in the surface soils are generally higher and more widely distributed than those in the subsurface, they are below

the screening criteria in all but a few instances. Of the nearly 75 samples collected in these media as part of the RI, only 6 samples (2 of which are step-out samples) contained pesticides in excess of the Region III RBCs. Each site was evaluated using the most appropriate land use classification (residential or industrial)—see the data tables in the attachment to Section 3.9.

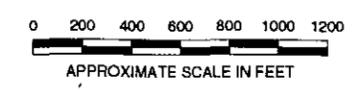
None of the surface soil or sediment samples collected during the 1992 field season exceeded the Region III RBCs. During 1993, some samples were collected in the northern portion of the main airport triangle, within the BLM housing area. One sample, collected near the apex of the triangle, was found to contain 21,400- $\mu\text{g}/\text{kg}$ 4,4'-DDT (see Figure 3.9-1). A sample collected approximately 50 ft away did not contain any pesticides in excess of the screening criteria. Both of these samples were collected in an area that is apparently used as storage by the BLM. Old boats, rubber rafts, heavy equipment, and the wreckage of a small plane were located in this area at the time of sampling.

During 1994, an additional effort was made to characterize the main airport triangle surface soils for pesticide content. Current or former drum storage areas, as determined from aerial photographs, were targeted for field screening activities. Low points and obvious drainage ways around these storage areas were sampled and screened for total DDX compounds (4,4'-DDT, -DDD, and -DDE) using an immunoassay test kit. On the basis of the screening results, samples were submitted for laboratory analysis; step-out sampling was also conducted. The step-out samples were collected at the topographic high and low points of a 10-ft-radius circle centered on the original sample. These samples were also screened for DDX using the immunoassay test kit and, based on the results, submitted for laboratory confirmation. The results of the laboratory analysis showed that the step-out samples often contained lower concentrations than the original



GALENA AIRPORT PESTICIDE SAMPLES

- Surface Soil/Sediment Sample
- ▲ Shallow Soil Boring
- Sample Location Where Pesticides Exceed EPA Region III Industrial RBC



A1181-46 03/20/1996

Galena Airport

sample. Samples from three sample/step-out locations, all located within the West Unit, contained pesticides in excess of the screening criteria. Figure 3.9-1 gives the concentrations and locations of the exceedences.

During the 1994 field season, two surface soil samples were collected at the stormwater pump station outfall, just outside the southwest corner of the dike road. These samples were analyzed for a full suite of analytes to determine any potential effects of drainage water from the installation on soils at the outfall. No pesticides (or any other compounds) were detected above the screening criteria in either of these samples.

Several surface soil and sediment samples collected from within the installation have been analyzed for pesticides as part of other investigations. These data are also in the attachment to Section 3.9, and the sample locations are shown in Figure 3.9-1.

Subsurface Soils

Detections of pesticides in subsurface soils (more than 2 ft bgl) at the Galena Airport are not as widespread as in other sampled media. Pesticides concentrations in the subsurface soils did not exceed the screening criteria at any of the Galena Airport sites.

3.9.3 Conclusions

An effort has been made to determine the nature and extent of pesticide occurrence at the Galena Airport. Pesticides have been detected in all sampling media within the Galena Airport boundary and the Galena Ambient Location. Low concentrations of several pesticides have been detected in groundwater samples collected from wells and in surface water throughout the area. However, pesticide concentrations in water samples from the Galena Airport are often less than the

SQL, similar to concentrations detected in laboratory blanks, or unconfirmed by second-column analysis.

Pesticides are generally found in higher concentrations in surface soil and sediment samples than subsurface soil samples. These data are consistent with the widespread application of pesticides for mosquito control. Although low levels of pesticides are present in soils throughout the Galena Airport, certain areas in the West Unit appear to have limited areas of elevated DDT-related compounds. These areas of high-concentration, limited-extent pesticide detections may indicate the accumulation of applied pesticides in low points and drainageways, or possibly small spills and leaks from storage. However, these "hot spots" that exceed screening criteria are the exception.

The presence of high concentrations of DDT-related compounds in surface soils from the BLM housing area indicates that these pesticides have been stored and used by the BLM. The presence of pesticides in all sampling media from the Galena Ambient Location also suggests that the use of pesticides in the Galena area is not limited to the Air Force.

3.9.4 Recommendations

Pesticides were addressed on a site-by-site basis in the baseline risk assessment (USAF, 1996). The widespread use of pesticides in the Galena area, by the local population, the BLM, the Air Force, and others, makes it impossible to determine independent sources of pesticides and assign risk from those sources. Because of this and the limited habitat present at most of the sites, no remedial action is being recommended. A removal action to address the widespread presence of pesticides at the Galena Airport would be prohibitively expensive, impractical, and ineffective.

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**ATTACHMENT TO SECTION 3.9
PESTICIDES AT GALENA AIRPORT
DATA SUMMARY REPORT**

HOW TO USE THE DATA

The data presented in the following tables have been screened as discussed in Section 1.3. Data presented are for those analytes that exceeded the screening criteria in any sample of a given matrix (soil or water) at the site or source area. For ease of comparison, the analytes presented for 1992, 1993, and 1994 for a given matrix and site are the same. The following tables provide an explanation for the screening criteria source codes, data flags, and sample types presented in the data summary tables.

Screening Criteria Source Codes

Screening Criteria	Code
State of Alaska Cleanup Levels	AK
Maximum Contaminant Level (MCL)	M
EPA Region III Risk-Based Concentrations (RBC), Carcinogenic Level	RC
EPA Region III RBC, Noncarcinogenic Level	RN
EPA Lead Guidance (EPA, 1994)	EL

Sample Type Code

Sample Type	ID Code
Surface Soil	SS
Soil Boring	SB
Sediment	SD
Hand Auger	HA
Groundwater from Monitoring Well	MW
Groundwater from Water Supply Well	GW
Surface Water	SW

Data Flags

Flag	Definition
NA	Sample was not analyzed for indicated parameter.
ND	Not detected—no instrument response for analyte or result was less than zero
<	The sample quantitation limit (SQL) is reported because the result is below the SQL and is less than one-half the screening criteria.
()	SQL—calculated based on the method detection limit (determined according to 40 CFR), QA/QC results (see Appendix B), and preparation, analytical, and moisture factors
B	Analyte concentration in the sample is not distinguishable from results reported for the method blanks
E	Analyte concentration exceeded calibration curve but did not saturate detector, therefore data are usable.
F	Interference or coelution suspected.
J	Reported analyte concentration is less than SQL.
K	Peak did not meet method identification criteria—analyte not detected on both primary and secondary GC columns.
L	Analyte concentration may be biased low—see Appendix B (QA/QC) for details.
P	Analyte identification is not confirmed because the quantitation from primary and secondary GC columns differ by greater than a factor of three. The lower result is reported since the higher result is generally due to coelution with a nontarget analyte
R	Result has been invalidated—see Appendix B (QA/QC) for details.
S	Analyte concentration was obtained using the method of standard additions.
T	Second-column confirmation analysis was not performed
X	One or more surrogate recoveries outside of control limits. Potentially affected analytes are flagged with an X
Z	Only drops suspended in extract. A homogenized extract aliquot was analyzed.
	Shaded cells indicate that the result exceeds the screening criterion (values are presented in Appendix A).
	Underlined results exceed the UTLs (inorganic analytes only) The UTLs are given in Section 2.0 and Appendix D

Results for Pesticides in Galena Airport 1992 Soil Samples

Analyte	4,4'-DDD (µg/kg)	4,4'-DDE (µg/kg)	4,4'-DDT (µg/kg)	Aldrin (µg/kg)	Dieldrin (µg/kg)	Heptachlor epoxide (µg/kg)	alpha-BHC (µg/kg)	Beta-BHC (µg/kg)	gamma-BHC (µg/kg)
Industrial RBC	12,000	8,400	8,400	170	180	310	450	1,600	2,200
Sample ID Residential RBC	2,700	1,900	1,900	38	40	70	100	350	490
Galena Ambient Location (Residential)									
04-MW-01 (4-6 ft)	11 (0.54)	51 (0.54)	36 (1.1)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	11 B (0.54)
04-MW-02 (5-6.5 ft)	ND (0.50)	ND (0.50)	ND (1.0)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	0.44 KJB (0.50)	ND (0.50)
04-MW-03 (5-6.5 ft)	0.11 PJB (0.49)	0.22 KJB (0.49)	0.91 JB (0.98)	1.0 (0.49)	ND (0.49)	0.84 PB (0.49)	ND (0.49)	2.1 (0.49)	0.58 B (0.49)
04-MW-04 (4-6 ft)	ND (0.62)	ND (0.62)	0.85 JB (1.2)	1.1 (0.62)	ND (0.62)	ND (0.62)	ND (0.62)	0.80 PB (0.62)	0.60 JB (0.62)
04-SD-01 (0-0.5 ft)	0.95 B (0.35)	ND (0.35)	1.1 P (0.69)	ND (0.35)	ND (0.35)	ND (0.35)	ND (0.35)	0.23 PJB (0.35)	ND (0.35)
04-SD-02 (0-0.5 ft)	46 (0.43)	37 (0.43)	43 (0.86)	ND (0.43)	ND (0.43)	1.9 B (0.43)	ND (0.43)	0.94 B (0.43)	1.0 B (0.43)
04-SD-03 (0-0.5 ft)	45 (0.50)	40 (0.50)	16 (1.0)	0.33 KBJ (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	0.41 KJB (0.50)	1.0 B (0.50)
04-SD-04 (0-0.5 ft)	3.0 (0.54)	4.5 (0.54)	2.5 (1.1)	ND (0.54)	ND (0.54)	2.6 B (0.54)	ND (0.54)	3.0 (0.54)	1.2 B (0.54)
04-SS-01 (0-0.5 ft)	28 (0.59)	36 (0.59)	64 (1.2)	ND (0.59)	ND (0.59)	3.6 B (0.59)	0.43 JB (0.59)	ND (0.59)	1.6 (0.59)
04-SS-02 (0-0.5 ft)	ND (0.54)	ND (0.54)	ND (1.1)	0.47 JB (0.54)	ND (0.54)	2.6 B (0.54)	ND (0.54)	0.67 PB (0.54)	ND (0.54)
04-SS-03 (0-0.5 ft)	ND (0.55)	ND (0.55)	0.91 JB (1.1)	ND (0.55)	ND (0.55)	2.9 B (0.55)	1.9 (0.55)	1.4 B (0.55)	1.3 B (0.55)
Fire Protection Training Area (Industrial)									
01-MW-01 (5-7 ft)	3.9 (0.44)	1.5 (0.44)	6.3 (0.89)	0.040 PJB (0.44)	0.42 KJ (0.44)	0.056 PJB (0.44)	0.32 KJB (0.44)	0.013 PJB (0.44)	1.4 B (0.44)
01-MW-02 (5-7 ft)	3.3 (0.41)	2.1 (0.41)	4.2 (0.82)	ND (0.41)	ND (0.41)	0.14 JB (0.41)	0.26 KJB (0.41)	ND (0.41)	0.47 B (0.41)
01-SB-01 (3.5 ft)	1.3 (0.40)	1.6 (0.40)	1.1 (0.79)	0.60 B (0.40)	ND (0.40)	0.23 PJB (0.40)	0.24 KJB (0.40)	ND (0.40)	0.54 PB (0.40)
01-SB-01 (8-10 ft)	1.8 (0.41)	0.13 PJB (0.41)	0.24 JB (0.83)	0.032 PJB (0.41)	ND (0.41)	0.056 PJB (0.41)	0.27 KJB (0.41)	0.066 KJB (0.41)	0.44 B (0.41)

Results for Pesticides in Galena Airport 1992 Soil Samples (Continued)

84 244

Sample ID	Analyte	4,4'-DDD (µg/kg)	4,4'-DDE (µg/kg)	4,4'-DDT (µg/kg)	Aldrin (µg/kg)	Dieldrin (µg/kg)	Heptachlor epoxide (µg/kg)	alpha-BHC (µg/kg)	beta-BHC (µg/kg)	gamma-BHC (µg/kg)
	Industrial RBC	12,000	8,400	8,400	170	180	310	450	1,600	2,200
	Residential RBC	2,700	1,900	1,900	38	40	70	100	350	490
01-SB-01 (12-15 ft)		0.14 PJB (0.41)	ND (0.41)	0.050 PJB (0.83)	ND (0.41)	0.026 PJB (0.41)	0.026 PJB (0.41)	0.52 B (0.41)	ND (0.41)	0.46 B (0.41)
01-SB-02 (3-5 ft)		14 (0.39)	0.73 P (0.39)	0.84 B (0.77)	2.8 (0.39)	1.3 (0.39)	1.0 BP (0.39)	5.0 (0.39)	0.36 PJB (0.39)	1.8 P (0.39)
01-SB-02 (5-7 ft)		12 (0.43)	2.0 (0.43)	0.48 KJB (0.85)	1.1 (0.43)	ND (0.43)	0.53 BP (0.43)	0.73 B (0.43)	0.21 KJB (0.43)	ND (0.43)
01-SB-02 (12-15 ft)		4.0 (0.44)	0.95 (0.44)	0.31 JB (0.87)	3.4 (0.44)	ND (0.44)	1.4 PB (0.44)	ND (0.44)	1.1 PB (0.44)	0.49 PB (0.44)
01-SD-01 (0-0.5 ft)		180 (4.9)	110 (4.9)	330 (9.8)	ND (4.9)	ND (4.9)	2.0 PJB (4.9)	ND (4.9)	ND (4.9)	ND (4.9)
01-SD-02 (0-0.5 ft)		30 (0.48)	32 (0.48)	26 (0.95)	0.80 B (0.48)	ND (0.48)	0.59 BP (0.48)	0.72 B (0.48)	ND (0.48)	0.79 B (0.48)
01-SS-01 (0-0.5 ft)		150 (1.0)	38 (1.0)	400 (1.0)	0.094 KJB (1.0)	ND (1.0)	0.21 PJB (1.0)	ND (1.0)	ND (1.0)	2.1 (1.0)
01-SS-02 (0-0.5 ft)		19 (0.35)	2.0 (0.35)	21 (0.69)	ND (0.35)	ND (0.35)	0.20 JB (0.35)	0.34 PJB (0.35)	ND (0.35)	0.19 PJB (0.35)
01-SS-03 (0-0.5 ft)		55 (0.39)	5.0 (0.39)	2.9 (0.79)	ND (0.39)	ND (0.39)	0.67 BP (0.39)	0.50 PB (0.39)	6.1 (0.39)	1.2 B (0.39)
01-SS-04 (0-0.5 ft)		24 (0.38)	7.5 (0.38)	8.1 (3.8)	0.12 KJB (0.38)	ND (0.38)	0.17 PJB (0.38)	0.61 B (0.38)	0.29 KJB (0.38)	0.82 B (0.38)
01-SS-05 (0-0.5 ft)		5.5 (0.37)	1.1 P (0.37)	1.9 (0.74)	3.3 (0.37)	2.5 P (0.37)	1.0 P (0.37)	4.6 P (0.37)	2.3 P (0.37)	2.0 P (0.37)
01-SS-06 (0-0.5 ft)		17 (0.36)	0.90 (0.36)	6.8 (0.72)	0.23 KJB (0.36)	0.25 JB (0.36)	0.15 JB (0.36)	0.83 B (0.36)	ND (0.36)	ND (0.36)
01-SS-07 (0-0.5 ft)		5.2 (0.34)	ND (0.34)	0.52 JB (0.67)	ND (0.34)	0.96 (0.34)	0.11 PJB (0.34)	1.8 P (0.34)	0.45 PB (0.34)	ND (0.34)
01-SS-08 (0-0.5 ft)		83 (1.8)	11 (0.36)	7.7 (3.6)	0.14 KJB (0.36)	ND (0.36)	0.91 PB (0.36)	ND (0.36)	ND (0.36)	0.68 B (0.36)
01-SS-09 (0-0.5 ft)		2.4 (0.41)	4.5 (0.41)	3.1 (0.82)	ND (0.41)	ND (0.41)	0.13 PJB (0.41)	ND (0.41)	0.17 KJB (0.41)	0.75 B (0.41)
01-SS-10 (0-0.5 ft)		37 (0.34)	9.8 (0.34)	310 (6.8)	0.17 KJB (0.34)	ND (0.34)	0.16 JB (0.34)	ND (0.34)	ND (0.34)	0.78 B (0.34)

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Results for Pesticides in Galena Airport 1992 Soil Samples (Continued)

	Analyte	4,4'-DDD (µg/kg)	4,4'-DDE (µg/kg)	4,4'-DDT (µg/kg)	Aldrin (µg/kg)	Dieldrin (µg/kg)	Heptachlor epoxide (µg/kg)	alpha-BHC (µg/kg)	beta-BHC (µg/kg)	gamma-BHC (µg/kg)
	Industrial RBC	12,000	8,400	8,400	170	180	310	450	1,600	2,200
Sample ID	Residential RBC	2,700	1,900	1,900	38	40	70	100	350	490
West Unit (Industrial)										
06-MW-01 (8-10 ft.)		18 (0.40)	43 (0.40)	82 (0.80)	0.050 PJB (0.40)	ND (0.40)	0.35 PJB (0.40)	0.26 PJB (0.40)	ND (0.40)	0.65 PB (0.40)
06-MW-02 (3-5 ft.)		10,000 (60)	160 (60)	3,700 (120)	0.45 PJB (1.2)	ND (1.2)	1.3 BP (1.2)	1.8 (1.2)	ND (1.2)	ND (1.2)
06-MW-03 (4-7 ft.)		7.3 (0.42)	2.0 (0.42)	26 (0.84)	ND (0.42)	ND (0.42)	ND (0.42)	ND (0.42)	ND (0.42)	ND (0.42)
06-MW-04 (4-6 ft.)		ND (0.44)	ND (0.44)	ND (0.87)	0.58 B (0.44)	0.40 KJB (0.44)	ND (0.44)	ND (0.44)	1.1 PB (0.44)	ND (0.44)
06-SB-01 (6.5-9 ft.)		240 (13)	32 (13)	38 (26)	3.6 PJ (13)	12 KJ (13)	12 PJ (13)	11 KJ (13)	18 P (13)	50 (13)
06-SB-01 (10-12 ft.)		ND (0.45)	ND (0.45)	0.39 JB (0.89)	0.15 PJB (0.45)	ND (0.45)	0.36 PJB (0.45)	ND (0.45)	2.5 (0.45)	ND (0.45)
06-SB-02 (2-4 ft.)		2.8 (0.34)	2.5 (0.34)	20 (0.69)	ND (0.34)	ND (0.34)	ND (0.34)	ND (0.34)	0.20 KJB (0.34)	ND (0.34)
06-SB-02 (5-7 ft.)		35 (0.42)	11 (0.42)	3.0 (0.84)	0.57 B (0.42)	ND (0.42)	ND (0.42)	ND (0.42)	0.18 PJB (0.42)	ND (0.42)
06-SD-01 (0-0.5 ft.)		57 (12)	17 (12)	15 KJ (24)	ND (12)	8.8 J (12)	1.2 PJB (12)	16 (12)	ND (12)	15 (12)
06-SD-02 (0-0.5 ft.)		46 (0.41)	5.0 (0.41)	18 (0.82)	0.089 KJB (0.41)	ND (0.41)	0.048 PJB (0.41)	ND (0.41)	0.32 KJB (0.41)	0.86 B (0.41)
06-SS-01 (0-0.5 ft.)		14 (0.35)	ND (0.35)	24 (0.7)	ND (0.35)	ND (0.35)	0.61 B (0.35)	0.58 PB (0.35)	ND (0.35)	ND (0.35)
06-SS-02 (0-0.5 ft.)		120 (1.1)	12 (1.1)	130 (2.1)	0.63 KJB (1.1)	ND (1.1)	1.9 BP (1.1)	ND (1.1)	ND (1.1)	ND (1.1)
06-SS-03 (0-0.5 ft.)		60 (1.0)	9.1 (1.0)	170 (2.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
06-SS-04 (0-0.5 ft.)		130 P (3.4)	140 (3.4)	1,200 (34)	0.79 B (0.34)	ND (0.34)	0.32 PJB (0.34)	0.64 B (0.34)	ND (0.34)	0.74 B (0.34)
06-SS-05 (0-0.5 ft.)		130 (3.4)	32 (0.34)	690 (34)	ND (0.34)	ND (0.34)	1.6 B (0.34)	ND (0.34)	ND (0.34)	ND (0.34)
06-SS-06 (0-0.5 ft.)		79 (1.0)	96 (1.0)	480 (21)	0.64 PJB (1.0)	ND (1.0)	1.3 BP (1.0)	1.5 (1.0)	ND (1.0)	ND (1.0)

Results for Pesticides in Galena Airport 1992 Soil Samples (Continued)

84 246

Sample ID	Analyte	4,4'-DDD (µg/kg)	4,4'-DDE (µg/kg)	4,4'-DDT (µg/kg)	Aldrin (µg/kg)	Dieldrin (µg/kg)	Heptachlor epoxide (µg/kg)	alpha-BHC (µg/kg)	beta-BHC (µg/kg)	gamma-BHC (µg/kg)
	Industrial RBC	12,000	8,400	8,400	170	180	310	450	1,600	2,200
	Residential RBC	2,700	1,900	1,900	38	40	70	100	350	490
09-MW-06 (4-7 ft)		21 (0.42)	5.9 (0.42)	37 (0.83)	0.64 B (0.42)	ND (0.42)	ND (0.42)	ND (0.42)	0.16 PJB (0.42)	ND (0.42)
09-SS-01 (0-0.5 ft.)		44 (3.8)	14 (3.8)	150 (7.6)	ND (3.8)	ND (3.8)	1.7 JB (3.8)	ND (3.8)	ND (3.8)	ND (3.8)
09-SS-02 (0-0.5 ft.)		15 (0.96)	5.7 (0.96)	76 (1.9)	ND (0.96)	1.3 (0.96)	0.30 PJB (0.96)	1.3 (0.96)	ND (0.96)	1.5 (0.96)
09-SS-03 (0-0.5 ft.)		42 (0.46)	13 (0.46)	53 (0.93)	ND (0.46)	ND (0.46)	0.40 PJB (0.46)	0.93 B (0.46)	3.4 (0.46)	1.7 (0.46)
10-MW-01 (3-6 ft)		10 (0.43)	4.4 (0.43)	29 (0.87)	0.50 B (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)
10-MW-02 (4-5.5 ft)		290 (6.6)	19 (1.3)	89 (2.7)	1.3 (1.3)	ND (1.3)	0.61 KJB (1.3)	ND (1.3)	5.7 (1.3)	ND (1.3)
10-MW-03 (4-6 ft)		4.8 (1.4)	2.3 (1.4)	21 (2.7)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)
10-SB-01 (2-4 ft)		120 (1.8)	14 (0.37)	100 (3.7)	0.50 B (0.37)	ND (0.37)	ND (0.37)	ND (0.37)	1.4 PB (0.37)	ND (0.37)
10-SB-01 (5-7 ft)		ND (0.43)	0.94 (0.43)	7.3 (0.86)	ND (0.43)	ND (0.43)	0.15 PJB (0.43)	ND (0.43)	0.72 PB (0.43)	ND (0.43)
10-SB-02 (1-3 ft)		140 (3.8)	32 (3.8)	370 (7.6)	0.80 B (0.38)	ND (0.38)	ND (0.38)	ND (0.38)	0.60 PB (0.38)	ND (0.38)
10-SB-02 (4-6 ft)		0.72 B (0.45)	0.59 (0.45)	1.7 (0.89)	ND (0.45)	0.29 JB (0.45)	ND (0.45)	ND (0.45)	1.1 B (0.45)	ND (0.45)
10-SB-03 (1-2.5 ft)		220 (5.5)	17 (1.1)	210 (2.2)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)
10-SB-03 (4-5.5 ft)		50 (1.3)	7.5 (1.3)	11 (2.7)	ND (1.3)	1.1 KJ (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)
10-SB-03 (7-8.5 ft)		1.9 P (1.3)	ND (1.3)	ND (2.6)	ND (1.3)	0.71 PJ (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)
10-SS-01 (0-0.5 ft)		54 (0.37)	4.7 (0.37)	65 (0.75)	0.68 B (0.37)	ND (0.37)	0.21 KJB (0.37)	0.25 JB (0.37)	ND (0.37)	0.56 PB (0.37)
10-SS-02 (0-0.5 ft)		740 (7.1)	15 (7.1)	86 (14)	ND (7.1)	ND (7.1)	ND (7.1)	ND (7.1)	ND (7.1)	ND (7.1)

3-154

Results for Pesticides in Galena Airport 1992 Soil Samples (Continued)

Sample ID	Analyte	4,4'-DDD (µg/kg)	4,4'-DDE (µg/kg)	4,4'-DDT (µg/kg)	Aldrin (µg/kg)	Dieldrin (µg/kg)	Heptachlor epoxide (µg/kg)	alpha-BHC (µg/kg)	beta-BHC (µg/kg)	gamma-BHC (µg/kg)
		Industrial RBC	12,000	8,400	8,400	170	180	310	450	1,600
	Residential RBC	2,700	1,900	1,900	38	40	70	100	350	490
10-SS-03 (0-0.5 ft.)		20 (1.7)	13 (1.7)	240 (3.5)	ND (1.7)	ND (1.7)	0.73 KJB (1.7)	ND (1.7)	ND (1.7)	ND (1.7)
10-SS-04 (0-0.5 ft.)		140 (18)	81 (18)	1,300 (36)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)
10-SS-05 (0-0.5 ft.)		1,000 (9.4)	500 (9.4)	2,400 E (19)	ND (9.4)	ND (9.4)	ND (9.4)	ND (9.4)	ND (9.4)	ND (9.4)
10-SS-06 (0-0.5 ft.)		750 (7.4)	52 (7.4)	350 (15)	ND (7.4)	ND (7.4)	ND (7.4)	ND (7.4)	ND (7.4)	ND (7.4)
11-SB-01 (2-4 ft.)		ND (0.45)	0.57 (0.45)	0.83 JB (0.9)	ND (0.45)	0.32 JB (0.45)	0.24 PJB (0.45)	0.42 KJB (0.45)	2.2 P (0.45)	ND (0.45)
11-SB-01 (5-7 ft.)		1.7 (0.42)	0.99 (0.42)	3.0 (0.84)	1.4 (0.42)	0.37 KJB (0.42)	0.46 BP (0.42)	ND (0.42)	0.39 KJB (0.42)	0.61 B (.42)

Results for Pesticides in Galena Airport 1993 Soil Samples

84 248

Sample ID	Analyte	4,4'-DDD (µg/kg)	4,4'-DDE (µg/kg)	4,4'-DDT (µg/kg)	Aldrin (µg/kg)	Dieldrin (µg/kg)	Heptachlor epoxide (µg/kg)	alpha-BHC (µg/kg)	beta-BHC (µg/kg)	gamma-BHC (µg/kg)
	Industrial RBC	12,000	8,400	8,400	170	180	310	450	1,600	2,200
	Residential RBC	2,700	1,900	1,900	38	40	70	100	350	490
Building 1872 (Residential)										
DRM-01		ND (0.202)	ND (0.212)	ND (0.227)	0.105 KJ (0.183)	0.104 JB (0.219)	ND (0.115)	0.0929 P (0.0702)	ND (0.230)	0.291 B (0.111)
DRM-02		0.594 P (0.207)	1.96 (0.217)	17.7 (0.232)	0.0774 KJ (0.307)	0.198 J (0.255)	ND (0.118)	ND (0.0719)	ND (0.235)	0.246 B (0.114)
BLM Housing Area (Residential)										
BLM-01		355 (23.5)	55.4 (24.7)	1,260 (26.5)	ND (21.3)	ND (25.6)	ND (13.4)	ND (8.19)	ND (26.8)	ND (13.0)
BLM-02		9.07 P (2.29)	17.8 (2.4)	155 (2.57)	0.812 KJ (3.40)	1.64 KJ (1.68)	ND (1.30)	ND (0.796)	ND (2.60)	0.522 PJB (1.26)
BLM-03		ND (24.1)	655 (25.3)	968 (27.1)	ND (21.8)	ND (26.2)	ND (13.7)	ND (8.38)	ND (27.4)	ND (13.3)
BLM-04		122 PJ (238)	1,760 (249)	21,400 (267)	ND (215)	ND (259)	ND (135)	ND (82.8)	ND (271)	ND (131)

Note. All sample depths are from 0 to 0.3 ft

3-156

Results for Pesticides in Galena Airport 1994 Soil Samples

Sample ID	Analyte	4,4'-DDD (µg/kg)	4,4'-DDE (µg/kg)	4,4'-DDT (µg/kg)	Aldrin (µg/kg)	Dieldrin (µg/kg)	Heptachlor epoxide (µg/kg)	alpha-BHC (µg/kg)	beta-BHC (µg/kg)	gamma-BHC (µg/kg)
	Industrial RBC	12,000	8,400	8,400	170	180	310	450	1,600	2,200
	Residential RBC	2,700	1,900	1,900	40	40	70	100	350	490
Galena POL Tank Farm (Residential)										
MB-SS-13		35.0 (1.74)	8.62 (2.00)	42.9 (2.13)	ND (1.39)	11.7 P (1.63)	1.26 P (1.09)	ND (1.66)	ND (2.35)	10.2 (1.04)
MB-SS-14		245 (1.89)	49.6 (2.18)	80.9 (2.32)	ND (1.51)	10.9 P (2.57)	ND (5.92)	ND (1.81)	ND (2.56)	ND (1.13)
MB-SS-15		79.1 (10.8)	40.0 (12.5)	127 (13.3)	ND (8.67)	ND (10.2)	2.90 PJ (33.9)	ND (10.4)	ND (14.7)	ND (6.47)
West Unit (Industrial)										
MB-SS-01		23.2 (1.66)	5.09 (1.92)	33.4 (2.04)	ND (1.33)	7.33 (1.56)	1.77 KJ (5.21)	ND (1.59)	ND (2.25)	ND (0.993)
MB-SS-02		350 (6.63)	52.0 (7.63)	625 (8.13)	ND (5.30)	87.5 (6.22)	3.05 PJ (4.17)	ND (6.35)	ND (8.98)	ND (3.96)
MB-SS-03		278 (33.4)	115 (38.5)	542 (41.0)	62.0 (45.9)	ND (45.5)	ND (105)	ND (32.0)	ND (45.3)	ND (20.0)
MB-SS-04		142 (6.81)	71.8 (7.83)	949 (8.35)	ND (9.35)	29.7 P (9.26)	ND (21.3)	ND (6.52)	ND (9.22)	ND (4.06)
MB-SS-05		129 (6.26)	52.9 (7.20)	547 (7.67)	ND (5.17)	27.0 (5.87)	ND (19.6)	ND (5.99)	ND (8.47)	ND (3.73)
MB-SS-06		2,930 (43.3)	597 (49.8)	13,400 (53.0)	ND (34.6)	484 (40.6)	10.5 KJ (135)	ND (41.4)	ND (58.6)	ND (25.8)
MB-SS-07		275 (7.61)	28.0 (8.75)	363 (9.33)	ND (10.4)	ND (10.3)	ND (23.8)	ND (7.28)	ND (10.3)	ND (4.54)
MB-SS-08		170 (1.66)	39.4 (1.91)	112 (2.04)	ND (2.28)	24.0 (1.56)	ND (5.20)	ND (1.59)	ND (2.25)	ND (0.992)
MB-SS-09		431 (3.24)	120 (3.73)	1180 (3.97)	ND (4.45)	9.15 (3.04)	ND (10.1)	ND (3.10)	ND (4.39)	ND (1.93)
MB-SS-10		37,800 (131)	1,280 (151)	81,900 (161)	ND (180)	490 P (179)	ND (41.1)	ND (126)	ND (178)	ND (78.4)
MB-SS-11		176 (3.48)	67.4 (4.00)	1170 (4.26)	ND (2.78)	34.1 (3.26)	ND (10.9)	ND (3.33)	ND (4.71)	ND (2.08)
MB-SS-12		1,180 (3.47)	56.9 (3.99)	376 (4.25)	ND (2.78)	58.8 (3.25)	ND (10.9)	ND (3.32)	ND (4.70)	11.9 (2.07)

Results for Pesticides in Galena Airport 1994 Soil Samples (Continued)

84 250

Sample ID	Analyte	4,4'-DDD (µg/kg)	4,4'-DDE (µg/kg)	4,4'-DDT (µg/kg)	Aldrin (µg/kg)	Dieldrin (µg/kg)	Heptachlor epoxide (µg/kg)	alpha-BHC (µg/kg)	beta-BHC (µg/kg)	gamma-BHC (µg/kg)
	Industrial RBC	12,000	8,400	8,400	170	180	310	450	1,600	2,200
	Residential RBC	2,700	1,900	1,900	40	40	70	100	350	490
MB-SS-16		1510 (31.1)	507 (35.8)	3510 (38.2)	ND (34.9)	338 (29.2)	ND (97.3)	ND (29.8)	ND (42.1)	ND (18.6)
MB-SS-17		179 (12.9)	32.2 (14.8)	325 (15.8)	21.2 (17.7)	63.9 (12.1)	ND (40.3)	ND (12.3)	ND (17.4)	ND (7.68)
MB-SS-18		158 (12.9)	33.1 (14.8)	272 (15.8)	ND (17.7)	ND (17.5)	ND (40.3)	ND (12.3)	ND (17.5)	ND (7.70)
MB-SS-19		2,920 (35.4)	1,950 (40.7)	8,450 (43.4)	ND (48.6)	409 (33.2)	ND (111)	ND (33.9)	ND (47.9)	ND (21.1)
MB-SS-20		5,810 (31.9)	249 (36.7)	8,540 (39.1)	ND (43.8)	109 P (43.4)	ND (99.8)	ND (30.5)	ND (43.2)	ND (19.0)
MB-SS-21		105 (6.97)	94.6 (8.02)	861 (8.55)	ND (5.58)	26.5 (6.54)	3.27 KJ (4.39)	ND (6.67)	ND (9.44)	ND (4.16)
MB-SS-22		213 (3.63)	22.6 (4.18)	72.2 (4.45)	ND (2.90)	ND (4.94)	ND (11.4)	ND (3.48)	ND (4.92)	ND (2.17)
MB-SS-23		146 (4.34)	19.4 (5.00)	116 (5.33)	24.4 (5.97)	13.2 (4.07)	ND (13.6)	ND (4.16)	ND (5.88)	71.4 (2.59)
Pump Station Outfall (Industrial)										
PO-SS-01		3.87 P (0.368)	0.911 (0.424)	18.3 (0.452)	ND (0.295)	ND (0.501)	ND (0.232)	ND (0.353)	ND (0.499)	ND (0.220)
PO-SS-02		9.80 P (0.352)	1.75 (0.405)	75.7 (0.432)	ND (0.282)	2.87 (0.330)	ND (0.222)	ND (0.337)	ND (0.477)	1.16 (0.210)

Note. All sample depths are from 0-0.5 ft

Results for Pesticides in Galena Airport 1992 Water Samples

Sample ID	Analyte Screening Criteria	4,4'-DDD (µg/L)	4,4'-DDE (µg/L)	4,4'-DDT (µg/L)	Aldrin (µg/L)	Dieldrin (µg/L)	Heptachlor epoxide (µg/L)	alpha-BHC (µg/L)	beta-BHC (µg/L)	gamma-BHC (µg/L)
		0.28	0.20	0.20	0.004	0.0042	0.20	0.011	0.037	0.20
Fire Protection Training Area										
01-MW-01		ND (0.0099)	ND (0.0099)	ND (0.020)	ND (0.0099)	0.0047 JB (0.0099)	0.0075 KJB (0.0099)	0.025 (0.0099)	ND (0.0099)	ND (0.0099)
01-MW-02		ND (0.010)	ND (0.010)	0.016 KJ (0.021)	ND (0.010)	0.012 (0.010)	0.0039 KJB (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
01-MW-03		ND (0.0098)	ND (0.0098)	0.011 KJ (0.020)	ND (0.0098)	0.0083 JB (0.0098)	ND (0.0098)	ND (0.0098)	ND (0.0098)	0.010 B (0.0098)
01-MW-04		ND (0.010)	ND (0.010)	0.0086 KJB (0.020)	0.018 B (0.010)	0.016 (0.010)	0.012 B (0.010)	0.031 (0.010)	0.013 (0.010)	ND (0.010)
01-MW-05		ND (0.010)	ND (0.010)	0.00050 PJ (0.020)	ND (0.010)	0.0099 J (0.010)	0.0035 B (0.010)	ND (0.010)	0.011 (0.010)	0.014 B (0.010)
01-MW-06		ND (0.010)	ND (0.010)	ND (0.020)	ND (0.010)	0.0068 KJB (0.010)	0.0050 KJB (0.010)	0.014 B (0.010)	ND (0.010)	ND (0.010)
01-SW-01		0.0019 PJB (0.0095)	0.00060 PJB (0.0095)	0.00060 PJB (0.019)	ND (0.0095)	0.0068 JB (0.0095)	0.056 B (0.0095)	0.012 B (0.0095)	ND (0.0095)	0.013 B (0.0095)
01-SW-02		0.0021 PJB (0.0095)	0.015 B (0.0095)	ND (0.019)	0.0038 PJB (0.0095)	0.0071 JB (0.0095)	0.012 BP (0.0095)	0.020 (0.0095)	0.00090 PJB (0.0095)	0.016 B (0.0095)
Airport Supply Wells										
02-GW-01		ND (0.010)	ND (0.010)	ND (0.020)	ND (0.010)	0.0079 KJB (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
02-GW-02		ND (0.010)	ND (0.010)	0.0062 KJB (0.020)	ND (0.010)	0.0090 KJ (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
02-GW-03		ND (0.011)	ND (0.011)	ND (0.022)	ND (0.011)	0.010 KJ (0.011)	ND (0.011)	ND (0.011)	ND (0.011)	ND (0.011)
02-GW-04		ND (0.011)	ND (0.011)	ND (0.021)	0.011 B (0.011)	0.0096 KJ (0.011)	ND (0.011)	ND (0.011)	ND (0.011)	0.012 B (0.011)
Community Supply Wells										
03-GW-01		ND (0.0099)	ND (0.0099)	ND (0.020)	ND (0.0099)	ND (0.0099)	2.0 (0.0099)	0.017 P (0.0099)	0.061 P (0.0099)	ND (0.0099)
03-GW-02		ND (0.0099)	ND (0.0099)	ND (0.020)	ND (0.0099)	ND (0.0099)	ND (0.0099)	ND (0.0099)	ND (0.0099)	0.010 B (0.0099)
03-GW-03		ND (0.010)	ND (0.010)	ND (0.021)	ND (0.010)	0.011 (0.010)	0.016 B (0.010)	ND (0.010)	ND (0.010)	ND (0.010)

Results for Pesticides in Galena Airport 1992 Water Samples (C ntinued)

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	Analyte	4,4'-DDD (µg/L)	4,4'-DDE (µg/L)	4,4'-DDT (µg/L)	Aldrin (µg/L)	Dieldrin (µg/L)	Heptachlor epoxide (µg/L)	alpha-BHC (µg/L)	beta-BHC (µg/L)	gamma-BHC (µg/L)
Sample ID	Screening Criteria	0.28	0.20	0.20	0.004	0.0042	0.20	0.011	0.037	0.20
03-GW-04		ND (0.011)	ND (0.011)	ND (0.022)	ND (0.011)	0.0099 KJ (0.011)	ND (0.011)	ND (0.011)	ND (0.011)	ND (0.011)
Galena Ambient Location										
04-MW-02		ND (0.011)	ND (0.011)	ND (0.022)	ND (0.011)	0.0073 KJB (0.011)	ND (0.011)	0.0073 JB (0.011)	ND (0.011)	ND (0.011)
04-MW-03		ND (0.010)	ND (0.010)	ND (0.021)	ND (0.010)	0.0094 J (0.010)	ND (0.010)	0.014 B (0.010)	0.023 (0.010)	0.0086 KJB (0.010)
04-SW-01		ND (0.010)	0.012 PB (0.010)	0.00090 PJB (0.020)	ND (0.010)	0.0086 J (0.010)	0.0033 JB (0.010)	0.015 B (0.010)	ND (0.010)	0.0040 PJB (0.010)
04-SW-02		ND (0.0095)	0.0082 KJB (0.0095)	0.0085 KJB (0.019)	ND (0.0095)	0.0073 JB (0.0095)	0.010 BP (0.095)	ND (0.0095)	ND (0.0095)	0.014 B (0.0095)
04-SW-03		ND (0.0095)	0.011 B (0.0095)	0.0018 PJB (0.019)	ND (0.0095)	0.0070 JB (0.0095)	0.0048 JB (0.095)	0.012 B (0.0095)	ND (0.0095)	0.0044 KJB (0.0095)
04-SW-04		ND (0.011)	0.010 KJB (0.011)	0.0098 KJB (0.021)	0.00010 PJB (0.011)	0.0090 J (0.011)	0.093 PJ (0.011)	ND (0.011)	ND (0.011)	ND (0.011)
POL Tank Farm										
05-MW-01		ND (0.0099)	ND (0.0099)	0.0088 JB (0.020)	0.014 B (0.0099)	0.0088 J (0.0099)	0.046 PJB (0.0099)	ND (0.0099)	0.014 (0.0099)	0.011 B (0.0099)
05-MW-02		ND (0.0099)	ND (0.0099)	ND (0.020)	ND (0.0099)	0.017 (0.0099)	0.0073 PJB (0.0099)	ND (0.0099)	ND (0.0099)	0.012 B (0.0099)
05-MW-03		0.026 P (0.010)	0.021 (0.010)	0.014 J (0.020)	0.014 B (0.010)	ND (0.010)	0.0062 PJB (0.010)	0.013 B (0.010)	ND (0.010)	ND (0.010)
05-MW-04		ND (0.010)	ND (0.010)	0.010 JB (0.020)	0.023 PB (0.010)	0.026 (0.010)	0.048 BP (0.010)	0.094 (0.010)	0.086 (0.010)	0.033 PB (0.010)
05-MW-05		0.025 (0.0099)	ND (0.0099)	0.00070 PJB (0.020)	0.026 (0.0099)	0.0087 J (0.0099)	0.023 BP (0.0099)	0.054 (0.0099)	0.072 (0.0099)	0.068 (0.0099)
05-MW-06		0.021 B (0.0099)	ND (0.0099)	0.00090 PJB (0.020)	0.013 B (0.0099)	0.0095 J (0.0099)	0.0050 PJB (0.0099)	0.016 (0.0099)	0.011 (0.0099)	0.011 B (0.0099)
05-MW-07		0.038 (0.010)	ND (0.010)	ND (0.021)	0.018 B (0.010)	ND (0.010)	0.071 P (0.010)	0.038 (0.010)	0.11 (0.010)	0.046 (0.010)
05-MW-08		ND (0.0097)	ND (0.0097)	0.0081 KJB (0.019)	ND (0.0097)	ND (0.0097)	0.0011 KJB (0.0097)	ND (0.0097)	ND (0.0097)	ND (0.0097)

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Results for Pesticides in Galena Airport 1992 Water Samples (C ntinued)

Sample ID	Analyte	4,4'-DDD (µg/L)	4,4'-DDE (µg/L)	4,4'-DDT (µg/L)	Aldrin (µg/L)	Dieldrin (µg/L)	Heptachlor epoxide (µg/L)	alpha-BHC (µg/L)	beta-BHC (µg/L)	gamma-BHC (µg/L)
	Screening Criteria	0.28	0.20	0.20	0.004	0.0042	0.20	0.011	0.037	0.20
05-MW-09		ND (0.011)	ND (0.011)	0.014 KJ (0.022)	ND (0.011)	0.0092 KJ (0.011)	ND (0.011)	ND (0.011)	ND (0.011)	ND (0.011)
05-MW-10		0.22 (0.010)	0.27 (0.010)	0.16 (0.020)	ND (0.010)	ND (0.010)	0.078 P (0.010)	0.13 (0.010)	0.14 (0.010)	0.073 (0.010)
05-MW-11		0.00060 KJB (0.0098)	ND (0.0098)	ND (0.020)	0.0064 JB (0.0098)	0.0089 J (0.0098)	ND (0.0098)	0.016 (0.0098)	0.0060 KJB (0.0098)	0.0083 JB (0.0098)
05-MW-12		ND (0.0097)	ND (0.0097)	ND (0.019)	ND (0.0097)	ND (0.0097)	0.014 B (0.0097)	0.010 PB (0.0097)	0.0057 PJB (0.0097)	ND (0.0097)
05-SW-01		ND (0.010)	ND (0.010)	0.031 (0.020)	ND (0.010)	0.0070 JB (0.010)	0.0053 PJB (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
05-SW-02		ND (0.010)	ND (0.010)	0.0010 PJB (0.020)	0.0055 PJB (0.010)	0.0080 JB (0.010)	0.0061 PJB (0.010)	ND (0.010)	ND (0.010)	0.015 B (0.010)
05-SW-03		ND (0.0095)	ND (0.0095)	0.0030 PJB (0.019)	0.0046 PJB (0.0095)	0.0071 JB (0.0095)	0.0097 BP (0.0095)	ND (0.0095)	ND (0.0095)	0.0046 PJB (0.0095)
West Unit										
06-MW-01		0.11 (0.010)	0.16 (0.010)	0.56 (0.020)	ND (0.010)	ND (0.010)	ND (0.010)	0.0096 KJB (0.010)	ND (0.010)	0.013 B (0.010)
06-MW-02		3.1 (0.019)	0.022 (0.0097)	0.24 (0.019)	0.0040 KJB (0.0097)	ND (0.0097)	ND (0.0097)	0.0076 KJB (0.0097)	ND (0.0097)	0.0082 JB (0.0097)
06-MW-03		ND (0.010)	ND (0.010)	0.0083 KJB (0.020)	ND (0.010)	0.0081 JB (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
06-MW-04		ND (0.0099)	ND (0.0099)	0.016 KJ (0.020)	0.011 BL (0.0099)	ND (0.0099)	0.0068 PJB (0.0097)	ND (0.0099)	0.0012 PJB (0.0099)	0.025 PB (0.0099)
06-MW-06		ND (0.0098)	ND (0.0098)	ND (0.020)	0.0058 JB (0.0098)	0.0067 PJB (0.0098)	ND (0.0098)	ND (0.0098)	0.071 (0.0098)	0.027 B (0.0098)
06-SW-01		ND (0.0096)	ND (0.0096)	0.0066 JB (0.019)	0.013 B (0.0096)	0.0068 JB (0.0096)	0.0064 PJB (0.0096)	ND (0.0096)	0.027 (0.0096)	ND (0.0096)
06-SW-02		0.25 (0.0095)	0.023 (0.0095)	0.0013 PJB (0.019)	0.015 B (0.0095)	ND (0.0095)	0.43 P (0.0095)	0.013 PB (0.0095)	0.030 (0.0095)	0.018 B (0.0095)
09-MW-01		ND (0.0096)	ND (0.0096)	0.0015 PJB (0.019)	ND (0.0096)	0.0084 KJB (0.0096)	0.0032 PJB (0.0096)	ND (0.0096)	0.0055 KJB (0.0096)	0.012 B (0.0096)
09-MW-02		0.014 B (0.010)	ND (0.010)	0.017 J (0.020)	ND (0.010)	0.011 (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)

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Results for Pesticides in Galena Airport 1992 Water Samples (Continued)

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Sample ID	Analyte	4,4'-DDD (µg/L)	4,4'-DDE (µg/L)	4,4'-DDT (µg/L)	Aldrin (µg/L)	Dieldrin (µg/L)	Heptachlor epoxide (µg/L)	alpha-BHC (µg/L)	beta-BHC (µg/L)	gamma-BHC (µg/L)
	Screening Criteria	0.28	0.20	0.20	0.004	0.0042	0.20	0.011	0.037	0.20
09-MW-03		ND (0.010)	ND (0.010)	ND (0.020)	ND (0.010)	0.0083 JB (0.010)	0.0094 KJB (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
09-MW-04		ND (0.0097)	ND (0.0097)	0.0097 KJB (0.019)	ND (0.0097)	0.0097 (0.0097)	0.0029 PJB (0.0097)	ND (0.0097)	ND (0.0097)	0.010 B (0.0097)
09-MW-05		0.023 B (0.010)	ND (0.010)	ND (0.020)	ND (0.010)	0.011 (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
09-MW-06		0.028 (0.010)	0.017 (0.010)	0.0033 PJB (0.020)	0.013 B (0.010)	ND (0.010)	0.0039 JB (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
09-MW-07		ND (0.010)	ND (0.010)	ND (0.021)	ND (0.010)	0.0083 KJB (0.010)	0.00030 KJB (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
09-MW-08		ND (0.050)	ND (0.050)	ND (0.10)	ND (0.050)	0.046 KJ (0.050)	0.027 JB (0.050)	ND (0.050)	0.019 PJ (0.050)	0.21 P (0.050)
09-MW-10		0.016 PB (0.0099)	0.0091 KJB (0.0099)	ND (0.020)	ND (0.0099)	ND (0.0099)	ND (0.0099)	0.053 (0.0099)	ND (0.0099)	0.016 B (0.0099)
09-MW-11		0.0015 PJB (0.0097)	0.0061 KJB (0.0097)	0.0029 JB (0.019)	0.012 B (0.0097)	ND (0.0097)	ND (0.0097)	0.013 PB (0.0097)	ND (0.0097)	0.0034 PJB (0.0097)
09-MW-12		0.088 (0.051)	ND (0.051)	ND (0.10)	0.053 (0.051)	ND (0.051)	0.026 PJB (0.051)	0.19 (0.051)	0.15 (0.051)	0.18 (0.051)
09-MW-14		0.020 B (0.010)	0.016 (0.010)	0.032 (0.020)	0.012 B (0.010)	0.013 (0.010)	0.0079 JB (0.010)	ND (0.010)	0.022 (0.010)	ND (0.010)
10-MW-01		0.027 (0.010)	ND (0.010)	0.0020 PJB (0.021)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	0.038 (0.010)	ND (0.010)
10-MW-02		ND (0.0099)	ND (0.0099)	0.010 KJB (0.020)	0.016 B (0.0099)	ND (0.0099)	0.0036 PJB (0.0099)	ND (0.0099)	0.038 (0.0099)	ND (0.0099)
10-MW-03		ND (0.010)	ND (0.010)	0.010 KJB (0.020)	ND (0.010)	ND (0.010)	0.0042 PJB (0.010)	0.022 (0.010)	0.043 (0.010)	ND (0.010)
11-MW-01		0.016 B (0.0097)	ND (0.0097)	0.021 (0.019)	ND (0.0097)	0.0094 KJ (0.0097)	ND (0.097)	ND (0.0097)	0.0031 KJB (0.0097)	ND (0.0097)
11-MW-02		ND (0.011)	ND (0.011)	0.011 KJ (0.021)	0.0064 JB (0.011)	ND (0.011)	ND (0.011)	ND (0.011)	0.044 (0.011)	0.049 (0.011)

Results for Pesticides in Galena Airport 1993 Water Samples

Sample ID	Analyte	4,4'-DDD (µg/L)	4,4'-DDE (µg/L)	4,4'-DDT (µg/L)	Aldrin (µg/L)	Dieldrin (µg/L)	Heptachlor epoxide (µg/L)	alpha-BHC (µg/L)	beta-BHC (µg/L)	gamma-BHC (µg/L)
	PAL	0.28	0.20	0.20	0.004	0.0042	0.20	0.011	0.037	0.20
Fire Protection Training Area										
01-MW-01		ND (0 00598)	ND (0 00629)	ND (0 00680)	ND (0 00546)	ND (0 00443)	ND (0 00340)	0 0109 B (0 00206)	ND (0 00680)	0 0144 (0 00330)
01-MW-02		ND (0.00433)	ND (0 00629)	ND (0 00680)	ND (0 00897)	ND (0 00443)	ND (0 00340)	ND (0 00206)	ND (0 00680)	ND (0 00330)
Galena Ambient Location										
04-MW-02		ND (0 00926)	0 0101 B (0 00532)	0.0163 B (0 00985)	ND (0 00916)	ND (0 00788)	0.0043 PJB (0 0246)	ND (0 00345)	0 00120 PJ (0 00916)	ND (0 00453)
04-MW-03		ND (0.00913)	ND (0 00524)	ND (0 00971)	0.00880 PJB (0.00903)	0.0113 (0.00777)	0 0174 PJB (0 0243)	ND (0 00388)	ND (0 00903)	ND (0 0126)
POL Tank Farm										
05-MW-01		ND (0 0239)	ND (0.00348)	ND (0 00696)	ND (0 00408)	0.00920 B (0.00557)	0 00200 JB (0 00328)	0.0173 (0.00199)	0 0139 J (0.0468)	0 0140 (0.00229)
05-MW-02		ND (0 0239)	ND (0 00488)	ND (0 00696)	ND (0 00239)	ND (0.00557)	ND (0 00328)	ND (0 00199)	ND (0 0468)	ND (0 00229)
05-MW-03		ND (0 0238)	ND (0 00485)	ND (0 00693)	ND (0 00406)	ND (0 00465)	0 00820 PB (0 00327)	ND (0 00198)	ND (0 0465)	0 0239 (0 00228)
05-MW-04		0 0308 B (0 0236)	0 0113 B (0 00483)	0 0196 B (0 00690)	0.0205 (0.00236)	0.0140 (0.00552)	0 00420 PB (0.00325)	0.0457 (0.00197)	ND (0 0463)	0 0629 (0 00227)
05-MW-05		0 101 (0 0245)	ND (0 00357)	ND (0 00714)	0.0344 (0.00245)	ND (0 00480)	0 0237 B (0 00337)	ND (0.00143)	ND (0 0480)	0 0624 (0 00235)
05-MW-06		ND (0 0238)	ND (0 00485)	ND (0 00634)	ND (0 00238)	ND (0 00554)	ND (0 00327)	ND (0 00198)	ND (0 0465)	ND (0 00228)
West Unit										
06-MW-01		0 00290 PJB (0 00598)	0 00560 JB (0 00629)	0 0316 (0 00680)	ND (0 00897)	ND (0 00660)	ND (0 00340)	0 00810 B (0 00206)	ND (0 00680)	0 0109 B (0.00330)
06-MW-02		0 101 (0 00577)	0 00120 PJB (0 00607)	0 0227 B (0 00657)	ND (0 00866)	ND (0 00637)	ND (0 00328)	ND (0 00199)	ND (0 00657)	ND (0 00318)
06-MW-03		ND (0 00792)	ND (0 00653)	ND (0 00990)	0.00910 PJB (0.00921)	ND (0 00792)	0 0428 B (0 00337)	0.0173 (0.00396)	ND (0.00921)	ND (0 00455)
06-MW-04		ND (0 00571)	ND (0 00601)	0 0163 B (0 00650)	0 00360 JB (0 00522)	0.0113 (0.00630)	ND (0 00325)	ND (0 00197)	0.0708 (0.00650)	ND (0 00197)
09-MW-01		ND (0 00598)	0 000600 PJB (0 00629)	ND (0 00680)	0 00220 JB (0 00546)	ND (0 00660)	ND (0 00340)	ND (0 00186)	ND (0 00680)	0 0122 (0.00330)

Results for Pesticides in Galena Airport 1993 Water Samples (Continued)

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Sample ID	Analyte	4,4'-DDD (µg/L)	4,4'-DDE (µg/L)	4,4'-DDT (µg/L)	Aldrin (µg/L)	Dieldrin (µg/L)	Heptachlor epoxide (µg/L)	alpha-BHC (µg/L)	beta-BHC (µg/L)	gamma-BHC (µg/L)
	PAL	0.28	0.20	0.20	0.004	0.0042	0.20	0.011	0.037	0.20
09-MW-02		ND (0.00598)	ND (0.00629)	ND (0.00680)	ND (0.00897)	0.0127 (0.00660)	ND (0.00340)	ND (0.00206)	ND (0.00680)	0.0115 B (0.00330)
09-MW-03		ND (0.00769)	ND (0.00519)	ND (0.00962)	ND (0.00894)	ND (0.00769)	0.0132 B (0.00327)	ND (0.00385)	ND (0.00615)	ND (0.00442)
09-MW-04		ND (0.00769)	ND (0.00519)	ND (0.00962)	ND (0.00894)	ND (0.00769)	ND (0.0240)	ND (0.00385)	ND (0.00615)	ND (0.0125)
09-MW-05		ND (0.00769)	ND (0.00519)	ND (0.00962)	ND (0.00894)	ND (0.00769)	0.00870 B (0.00327)	ND (0.00385)	ND (0.00615)	ND (0.0125)
09-MW-06		ND (0.00769)	0.0100 B (0.00519)	ND (0.00962)	ND (0.00336)	ND (0.00769)	0.00820 B (0.00327)	0.00800 B (0.00385)	ND (0.00894)	ND (0.0125)
10-MW-01		ND (0.00922)	ND (0.00647)	ND (0.00980)	ND (0.00912)	ND (0.00784)	ND (0.0245)	ND (0.00392)	ND (0.00627)	ND (0.00451)
10-MW-02		ND (0.00800)	ND (0.00540)	ND (0.0100)	ND (0.00350)	ND (0.00800)	0.00510 PJB (0.0250)	ND (0.00350)	ND (0.00640)	0.0191 P (0.0130)
10-MW-03		ND (0.00808)	ND (0.00545)	ND (0.0101)	0.0173 (0.00354)	ND (0.00808)	ND (0.0253)	ND (0.00404)	0.0230 (0.00646)	ND (0.00465)

Results for Pesticides in Galena Airport 1994 Water Samples

Sample ID	Analyte Screening Criteria	4,4'-DDD (µg/L)	4,4'-DDE (µg/L)	4,4'-DDT (µg/L)	Aldrin (µg/L)	Dieldrin (µg/L)	Heptachlor epoxide (µg/L)	alpha-BHC (µg/L)	beta-BHC (µg/L)	gamma-BHC (µg/L)
		0.28	0.20	0.20	0.004	0.0042	0.20	0.011	0.037	0.20
Fire Protection Training Area										
01-MW-01		ND (0.00225)	ND (0.00464)	0.00800 KJ (0.00878)	ND (0.00292)	0.00250 KJB (0.00403)	ND (0.00227)	ND (0.00429)	0.0144 P (0.00339)	ND (0.00135)
01-MW-02		ND (0.00220)	ND (0.00453)	0.00690 KJ (0.008566)	ND (0.00285)	ND (0.00242)	ND (0.00221)	ND (0.00418)	ND (0.00331)	ND (0.00381)
01-MW-05		ND (0.00220)	ND (0.00455)	ND (0.00731)	ND (0.00286)	ND (0.00395)	ND (0.00222)	ND (0.00289)	ND (0.00332)	ND (0.00383)
01-MW-06		ND (0.00212)	ND (0.00540)	ND (0.00704)	ND (0.00275)	0.00230 KJB (0.00380)	0.00330 P (0.00236)	0.00810 (0.00405)	ND (0.00320)	ND (0.00369)
01-MW-07		ND (0.00210)	ND (0.00536)	0.00720 KJ (0.00820)	ND (0.00273)	0.00230 KJB (0.00377)	ND (0.00212)	ND (0.00401)	ND (0.00317)	ND (0.00365)
01-MW-08		ND (0.00218)	ND (0.00556)	ND (0.00724)	ND (0.00283)	0.00230 KJB (0.00391)	0.000900 KJ (0.00220)	ND (0.00416)	ND (0.00329)	ND (0.00380)
POL Tank Farm										
05-MW-02		ND (0.0162)	ND (0.00358)	ND (0.00382)	ND (0.00428)	ND (0.00292)	ND (0.00973)	ND (0.00298)	ND (0.00421)	ND (0.00186)
05-MW-03		ND (0.00302)	ND (0.00376)	0.0106 KJ (0.0132)	ND (0.00415)	0.00620 (0.00283)	0.0155 (0.00944)	ND (0.00289)	0.000600 KJ (0.00409)	0.0363 (0.00180)
05-MW-04		ND (0.0147)	ND (0.0169)	ND (0.0180)	0.0407 (0.0201)	ND (0.0137)	0.124 (0.0459)	0.132 (0.0140)	ND (0.0199)	0.0924 (0.00875)
05-MW-05		ND (0.00293)	ND (0.00337)	0.00970 KJ (0.0128)	0.00530 P (0.00403)	0.00750 (0.00275)	0.0320 P (0.00185)	ND (0.00240)	ND (0.00326)	0.0168 (0.00175)
05-MW-06		ND (0.00288)	ND (0.00331)	ND (0.00353)	0.0114 (0.00395)	0.0169 (0.00270)	0.00850 P (0.00181)	ND (0.00236)	ND (0.00390)	0.00860 (0.00172)
05-MW-07		ND (0.0150)	ND (0.0172)	0.0506 KJ (0.0652)	ND (0.0120)	ND (0.0140)	0.0270 P (0.00941)	0.161 (0.0143)	ND (0.0166)	0.156 (0.00892)
05-MW-11		ND (0.00299)	ND (0.00344)	0.00640 (0.00367)	0.00540 (0.00411)	0.0102 (0.00280)	0.00510 P (0.00188)	ND (0.00245)	0.00230 PJ (0.00332)	0.00850 (0.00178)
05-MW-13		ND (0.0110)	ND (0.0227)	ND (0.0366)	ND (0.0143)	ND (0.0198)	ND (0.0111)	0.0662 (0.0210)	ND (0.0166)	ND (0.00662)
05-MW-14		ND (0.00293)	ND (0.00365)	ND (0.00360)	0.00510 (0.00400)	ND (0.00399)	0.0132 (0.00917)	ND (0.00240)	ND (0.00397)	ND (0.00175)

Results for Pesticides in Galena Airport 1994 Water Samples (Continued)

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Sample ID	Analyte Screening Criteria	4,4'-DDD (µg/L)	4,4'-DDE (µg/L)	4,4'-DDT (µg/L)	Aldrin (µg/L)	Dieldrin (µg/L)	Heptachlor epoxide (µg/L)	alpha-BHC (µg/L)	beta-BHC (µg/L)	gamma-BHC (µg/L)
		0.28	0.20	0.20	0.004	0.0042	0.20	0.011	0.037	0.20
05-MW-15		ND (0 00311)	ND (0 00388)	0 0121 KJ (0 0136)	ND (0 00428)	ND (0 00292)	0 000800 J (0 00973)	ND (0.00255)	ND (0 00421)	ND (0 00186)
West Unit										
02-GW-01		ND (0.0153)	ND (0.00337)	0 00620 (0 00360)	ND (0.00403)	ND (0 00399)	0 000400 KJ (0 00917)	ND (0 00281)	ND (0 00397)	ND (0 00175)
02-GW-03		ND (0 0149)	ND (0 00328)	ND (0 0124)	0.00680 (0.00392)	0.00840 (0.00267)	0 00490 P (0 00179)	ND (0.00273)	ND (0 00386)	ND (0 00160)
02-GW-04		ND (0 00214)	ND (0 00442)	0.00770 KJ (0 00836)	ND (0 00278)	ND (0 00384)	0 00140 KJ (0 00238)	ND (0 00408)	ND (0 00323)	ND (0 00372)
06-MW-01		ND (0 00223)	0 00460 (0 00459)	0 00840 KJ (0 00869)	ND (0 00289)	ND (0 00399)	ND (0 00225)	ND (0 00425)	ND (0 00336)	ND (0 00387)
06-MW-02		0 0910 (0 00296)	0.00760 (0 00341)	0.0108 (0 00363)	0.00630 (0.00407)	0.0204 (0.00278)	0 00820 KJ (0 00926)	ND (0 00283)	ND (0 00401)	ND (0 00177)
06-MW-03		ND (0 00285)	ND (0.00328)	ND (0.00350)	ND (0 00392)	ND (0 00267)	ND (0 00892)	ND (0 00273)	ND (0 00386)	ND (0 00170)
06-MW-04		ND (0 0110)	ND (0 0227)	ND (0 0366)	ND (0 0143)	ND (0 0198)	ND (0 0123)	ND (0 0210)	ND (0 0166)	0 0511 P (0 00662)
06-MW-05		ND (0 00308)	ND (0 00354)	ND (0 00378)	ND (0 00423)	0.00910 (0.00289)	ND (0 00194)	ND (0 00252)	ND (0 00417)	ND (0 00184)
06-MW-06		ND (0 00298)	ND (0 00342)	0 0170 (0.00365)	0.0613 (0.00409)	0.0344 (0.00279)	0 0257 P (0 00187)	0.0441 (0.00285)	0.284 (0.00403)	0 111 (0 00178)
06-MW-07		ND (0 00218)	ND (0.00556)	0 00850 KJ (0.00852)	ND (0 00283)	0 00250 KJB (0 00391)	ND (0 00220)	ND (0 00416)	ND (0 00329)	ND (0 00380)
09-MW-01		ND (0 00290)	ND (0 00334)	0 0123 KJ (0 0127)	ND (0 00232)	0.00720 (0.00272)	0 00270 P (0.00183)	ND (0.00278)	ND (0 00393)	0 0102 (0 00173)
09-MW-02		ND (0 00302)	ND (0 00348)	ND (0 00370)	ND (0 00415)	ND (0 00283)	0 00550 KJ (0 00944)	ND (0 00289)	ND (0 00409)	0.00700 (0 00180)
09-MW-03		ND (0 00308)	ND (0 00354)	ND (0.00378)	ND (0 00246)	ND (0 00289)	0 00710 KJ (0 00964)	ND (0 00295)	ND (0 00417)	ND (0 00173)
09-MW-04		ND (0 00295)	ND (0.00339)	ND (0 00361)	ND (0 00405)	ND (0 00276)	0 00560 KJ (0 00922)	ND (0 00282)	ND (0 00399)	ND (0 00176)

Results for Pesticides in Galena Airport 1994 Water Samples (Continued)

Sample ID	Analyte Screening Criteria	4,4'-DDD (µg/L)	4,4'-DDE (µg/L)	4,4'-DDT (µg/L)	Aldrin (µg/L)	Dieldrin (µg/L)	Heptachlor epoxide (µg/L)	alpha-BHC (µg/L)	beta-BHC (µg/L)	gamma-BHC (µg/L)
		0.28	0.20	0.20	0.004	0.0042	0.20	0.011	0.037	0.20
09-MW-05		ND (0 00299)	ND (0 00344)	0 00620 (0 00367)	ND (0 00411)	ND (0 00280)	ND (0 00188)	ND (0 00286)	ND (0 00405)	0 00670 (0 00178)
09-MW-06		ND (0 00296)	ND (0 00341)	0 0260 (0 00363)	ND (0 00237)	0 0137 (0 00278)	0 0161 (0 00926)	ND (0 00283)	ND (0 00401)	0 00870 (0 00177)
09-MW-08		0 0510 (0 0212)	0 0577 (0 0438)	ND (0 0704)	ND (0 0275)	ND (0 0380)	ND (0 0236)	0 105 (0 0405)	ND (0 0320)	ND (0 0127)
09-MW-12		0 552 (0 0225)	0 0791 (0 0464)	ND (0 0746)	0 00810 PJ (0 0292)	ND (0 0403)	ND (0 0227)	ND (0 0295)	ND (0 0339)	ND (0 0391)
09-MW-15		ND (0 00300)	ND (0 00346)	ND (0 00368)	0 00590 (0 00413)	ND (0 00282)	0 00550 KJ (0 00940)	ND (0 00288)	ND (0 00407)	ND (0 00179)
10-MW-01		0 0122 KJ (0 0276)	ND (0 00453)	ND (0 00728)	ND (0 00285)	0 00240 KJB (0 00393)	ND (0 00244)	ND (0 00418)	ND (0 00331)	ND (0 00381)
10-MW-03		ND (0 00288)	ND (0 00358)	0 00970 KJ (0 0125)	ND (0 00230)	ND (0 00270)	0 00450 P (0 00181)	ND (0 00275)	ND (0 00390)	0 00650 (0 00172)
Control Tower Drum Storage Area										
13-MW-37		ND (0 00299)	ND (0 00344)	ND (0 00367)	ND (0 00411)	ND (0 00280)	0 000100 KJ (0 00935)	ND (0 00286)	ND (0 00405)	ND (0 00178)
13-MW-38		ND (0 00305)	0 00500 P (0 00351)	0 0126 KJ (0 0133)	0 0177 (0 00419)	0 00790 (0 00286)	0 0555 (0 00954)	ND (0 00292)	0 00710 P (0 00413)	0 0133 (0 00182)

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Pesticide Data From Other Investigations at Galena Airport

Sample ID	Analyte	4,4'-DDE ($\mu\text{g}/\text{kg}$)	4,4'-DDT ($\mu\text{g}/\text{kg}$)	4,4'-DT ($\mu\text{g}/\text{kg}$)	Aldrin ($\mu\text{g}/\text{kg}$)	Dieldrin ($\mu\text{g}/\text{kg}$)	Heptachlor epoxide ($\mu\text{g}/\text{kg}$)	alpha-BHC ($\mu\text{g}/\text{kg}$)	beta-BHC ($\mu\text{g}/\text{kg}$)	gamma-BHC ($\mu\text{g}/\text{kg}$)
	Industrial RBC	12,000	8,400	8,400	170	180	310	450	1,600	2,200
Residential RBC	2,700	1,900	1,900	40	40	70	100	350	490	
Ecology and Environment, 1992 (Industrial)										
(FAA-GAL-) SV-004	ND (2,000)	ND (2,000)	5,000 (5,000)	ND (1,000)	ND (2,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)
(FAA-GAL-) SV-008 (dup)	ND (2,000)	ND (2,000)	ND (5,000)	ND (1,000)	ND (2,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)
(FAA-GAL-) SV-010	ND (20)	ND (20)	220 (50)	ND (10)	ND (20)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
USAF, 1993 (Industrial)										
(GA-K005-) A-101	36 P (3.6)	ND (3.6)	4.1 P (3.6)	ND (1.8)	ND (3.6)	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.8)
(GA-K005-A-) 103	51 P (3.7)	ND (3.7)	33 P (3.7)	1.8 J (1.8)	3.7 J (3.7)	1.8 J (1.8)	1.8 J (1.8)	1.8 J (1.8)	1.8 J (1.8)	1.8 J (1.8)
(GA-K005-) A-105	11 P (3.5)	5.0 P (3.5)	150 (35)	ND (1.7)	ND (3.5)	ND (1.7)	ND (1.7)	ND (1.7)	ND (1.7)	ND (1.7)
(GA-K005-) A-502	ND (3.8)	ND (3.8)	ND (3.8)	ND (1.9)	ND (3.8)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)
(GA-K005-) A-504	ND (4.1)	ND (4.1)	ND (4.1)	ND (2.1)	ND (4.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)
(GA-K005-) A-506	ND (3.4)	ND (3.4)	ND (3.4)	ND (1.7)	ND (3.4)	ND (1.7)	ND (1.7)	ND (1.7)	ND (1.7)	ND (1.7)
(GA-K005-) A-001	64 P (34)	4.7 J (34)	130 (34)	ND (17)	ND (34)	ND (17)	17 J (17)	ND (17)	ND (17)	ND (17)
(GA-K005-) A-002	2.8 JP (3.4)	1.1 J (3.4)	24 P (3.4)	1.7 J (1.7)	3.4 J (3.4)	1.7 J (1.7)	1.7 J (1.7)	1.7 J (1.7)	1.7 J (1.7)	1.7 J (1.7)
(GA-E005-) A-012	3.6 J (3.6)	3.6 J (3.6)	3.6 J (3.6)	0.76 J (1.8)	ND (3.6)	ND (1.8)	1.8 J (1.8)	1.8 J (1.8)	ND (1.8)	ND (1.8)
(GA-E005-) A-013	3.7 J (3.7)	3.7 J (3.7)	3.7 J (3.7)	ND (1.8)	ND (3.7)	ND (1.8)	1.8 J (1.8)	1.8 J (1.8)	ND (1.8)	ND (1.8)
(GA-E005-) A-121	220 (42)	21 (4.2)	63 P (4.2)	ND (2.1)	ND (4.2)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)
(GA-E005-) A-122	1,700 (87)	40 J (87)	410 (87)	ND (44)	ND (87)	ND (44)	44 J (44)	ND (44)	ND (44)	ND (44)
(GA-E005-) A-123	630 (73)	29 J (73)	170 (73)	ND (37)	ND (73)	ND (37)	37 J (37)	ND (37)	ND (37)	ND (37)
(GA-E005-) A-124	140 (36)	14 J (36)	210 (36)	ND (18)	ND (36)	ND (18)	18 J (18)	ND (18)	ND (18)	ND (18)

APPENDIX A

Radiological Materials

Radiological Materials (Site ID Radiological Materials)

Site Location

Site Radiological Materials addresses the Base-wide possibility of nuclear weapons storage or use and associated releases at the Former Galena FOL. The entire FOL was considered under this evaluation.

Site Characteristics

The entire FOL was considered when addressing concerns related to the possibility of releases associated with possible nuclear weapons storage or use at the Former Galena FOL.

Site Description and History

Concerns regarding the potential of former nuclear weapons storage or use at the Former Galena FOL were mentioned by the public at Restoration Advisory Board (RAB) meetings and in correspondence with ADEC and the USAF. Specifically, the following three statements were made regarding radiological materials (AFCEE, January 10, 2011):

- According to an article provided to the USAF, on October 27, 1962, "Alaska Air Defense Command scrambled a pair of F-102 interceptors armed with nuclear warheads from Galena FOL to protect a U-2 reconnaissance plane in Russian air space."
- A Galena resident recalled an airplane accident in 1986, during which an F-16 crashed off the end of the runway, and suggested that the aircraft "may have been carrying a nuclear weapon that went into the Yukon River."
- A Galena resident formerly employed by a USAF contractor recalled that during field work conducted in 1986, a soil sample was collected that "emitted high levels of radioactivity."

Summary of Previous Investigations

The above-cited concerns, as well as a general request for information regarding possible nuclear weapons storage and use and any related incidents or accidents at the Former Galena FOL, were forwarded to Air Force Safety Center (AFSC) and Air Force Radio Isotope Committee Secretariat (AFRIS). The AFSC and AFRIS performed a records review and analysis, and summarized their findings in a memorandum prepared for the Galena RAB (AFCEE, January 10, 2011). The memorandum is included in the supporting documentation. The findings presented in the memorandum are summarized below in the order of the concerns noted above.

- The F-102 aircraft was commonly used for fighter-interceptor missions. The Falcon missile, which had both conventional and nuclear variants, was the only missile carried by this aircraft. The nuclear weapon carried in this aircraft would not have released any residual radioactive materials or radioactivity during the course of normal training operations. The only USAF aviation accidents report at the Former Galena FOL involved

aircraft on training missions. According to the memorandum, "it is highly unlikely that nuclear weapons would have been deployed for such training missions."

- Nuclear weapons were deployed throughout the contiguous United States for defense purposes during the Cold War era. The F-102 and F-16 aircraft were "operationally capable" of carrying nuclear munitions, though this does not mean that they always carried nuclear arms. The only USAF aviation accidents reported at the Former Galena FOL were for aircraft on training missions. According to the memorandum, "it is highly unlikely that nuclear weapons would have been deployed for such training missions." In addition, no USAF nuclear weapons incidents or accidents have been reported for the Former Galena FOL or within the State of Alaska.
- The radioactivity in the 1986 soil sample "is not connected with nuclear weapons." The AFSC investigation concluded that the Former Galena FOL did not stockpile early, unsealed nuclear weapons with the potential for radioactive maintenance wastes. No USAF nuclear weapons incidents have been reported for the Former Galena FOL or within the State of Alaska. An AF RICS Certified Health Physicist reviewed the results of the 1986 soil boring in question and found that although the radioisotopes present could be associated with weapons-grade radioactive material, the level of radioactivity was not elevated enough to be from the release of such material. In addition, the maximum reading was less than two times the background levels, which is not sufficient to raise any human health or safety concerns.

The soil boring from 1986 referenced above was collected on August 7, 1986, by Tester Drilling Services, Inc. with oversight provided by Woodward-Clyde Engineers. The boring was named Boring 029 on the log, and was located approximately 50 feet north of the communications trailer on the runway, and approximately 75 feet southeast of the former control tower. The former control tower (Building 1404) was located in Parcel Block 12, Lot 4, approximately 600 feet southeast of the main cantonment "triangle," near the northern edge of the runway. Radioactivity was measured with a Geiger counter during drilling at 5-foot intervals to a completed depth of 25 feet bgs. Readings were consistently 45 millirem. As discussed above, according to the AF RICS Certified Health Physicist, this reading is less than two times the background level, which is not sufficient to raise any human health or safety concerns. The boring log is included in the supporting documentation.

October 2009 Site Visit Observations

No inspection of Site Radiological Materials was conducted during the October 2009 site visit.

Target Analytes

There is no evidence of a release from Site Radiological Materials; therefore, no target analytes are associated with the site.

Potential Exposure Pathways and Receptors

Because there is no evidence that a release occurred from Site Radiological Materials, media at the site have not been impacted. Therefore, no complete human or ecological exposure pathways are associated with Site Radiological Materials.

Conclusions

Site Radiological Materials consists of the Base-wide possibility of releases associated with possible nuclear weapons storage or use at the Former Galena FOL. No documented release or disposal of nuclear or radiological material exists for the Galena FOL and an expert records review and analysis concluded that there are no radiological human health or safety concerns connected with operations at the Former Galena FOL.

Recommendation: "Non-Site"

Because the former Galena FOL is not the source of any releases or disposals of nuclear or radioactive materials, a designation of Site Radiological Materials as a "Non-Site" is recommended.

Reference

Air Force Center for Engineering and the Environment (AFCEE). January 10, 2011. "Nuclear Weapons Storage/Use at the Former Galena Forward Operating Location (FOL), Alaska." Memorandum for the Galena Restoration Advisory Board.

Supporting Documentation



DEPARTMENT OF THE AIR FORCE
AIR FORCE CENTER FOR ENGINEERING AND THE ENVIRONMENT
LACKLAND AIR FORCE BASE TEXAS

10 January 2011

MEMORANDUM FOR THE GALENA RESTORATION ADVISORY BOARD

FROM: AFCEE/EXC

SUBJECT: Nuclear Weapons Storage/Use at the Former Galena Forwarding Operating Location (FOL), Alaska

The purpose of this letter is to address concerns raised by the public during previous Restoration Advisory Board (RAB) meetings. The concerns relate to the possibility of nuclear weapons storage/use and associated releases at the former Galena FOL. The following comments or anecdotes were presented by the public:

- 1) An article was provided to the Air Force describing an October 27, 1962, incident where the Alaska Air Defense Command scrambled a pair of F-102 interceptors armed with nuclear warheads from Galena FOL to protect a U-2 reconnaissance plane in Russian air space (refer to http://www.gwu.edu/~nsarchiv/nsa/cuba_mis_cri/dobbs/maultsby.htm).
- 2) A Galena resident recalled an airplane accident, circa 1986, in which an F-16 crashed off the end of the runway. He suggested that the aircraft may have been carrying a nuclear weapon that went in the Yukon River.
- 3) A Galena resident was employed by an Air Force contractor and recalled that during field work conducted in 1986 a soil sample was collected that emitted high levels of radioactivity (Note: data from this 1986 field work is included in the administrative record at-- <http://www.adminrec.com/TOC.asp?Base=Galena&Command=PACAF, AR IR 09-11>).

The above concerns were forwarded to experts at the Air Force Safety Center (AFSC) and Air Force Radioisotope Committee Secretariat (AF RICS), along with a general request for any information regarding possible nuclear weapons storage/use, as well as related incidents or accidents at Galena FOL. The AFSC and AF RICS are experts in these matters and have access to Air Force historical records concerning incidents or accidents involving nuclear weapons. Below is a summary of the results from their records review and analysis:

- 1) The aircraft commonly used for fighter-interceptor missions from Galena FOL was the F-102, as mentioned in the article. While this type of aircraft could be armed for air-to-air "dog fighting" or close air support to ground forces, its internal missile bays were used to carry air-to-air missiles with the Falcon missile being the only missile carried by the F-102 with both nuclear and conventional variants. The nuclear variant carried a sealed-pit style nuclear weapon that would not have released any residual radioactive materials or radioactivity, unless there was a reportable aviation accident that involved conventional explosives detonations and/or fire. The only Air Force aviation accident reports associated

with the Galena FOL were for aircraft that were on training missions. It is highly unlikely that nuclear weapons would have been deployed for such training missions.

2) Throughout the Cold War era, the Air Force deployed nuclear weapons throughout the Contiguous United States (CONUS) and Outside the Contiguous United States (OCONUS) for defense purposes. Although aircraft like the F-102 or F-16 were operationally capable of carrying nuclear munitions, this does not necessarily mean that these aircraft always carried nuclear munitions. The only Air Force aviation accident reports associated with the Galena FOL were for aircraft that were on training missions. It is highly unlikely that nuclear weapons would have been deployed for such training missions. No Air Force nuclear weapons incidents or accidents, such as the loss of nuclear munitions in the Yukon River, have been reported for Galena FOL or even within the State of Alaska.

3) The radioactivity in the 1986 soil sample is not connected with nuclear weapons. The results of the AFSC investigation concluded that Galena FOL did not stockpile early, unsealed nuclear weapons that had the potential for radioactive maintenance wastes. No Air Force nuclear weapons incidents or accidents have been reported for Galena FOL or even within the State of Alaska.

- a) The referenced soil sample with elevated radioactivity from the 1986 field work is not due to a release of weapons grade radioactive material. The Geiger-Muller Counter is a simple field screening tool that detects ionizing radiation, but it only detects the presence of ionizing radiation and does not identify which radioisotope is causing the ionizing radiation. The Geiger-Muller Counter readings are challenging to interpret if the source radioisotope is unknown; thus, these 1986 results were forwarded to an AF RICS Certified Health Physicist for expert analysis. To be conservative, the Certified Health Physicist reviewed the results assuming that the radioisotopes present could be associated with weapons grade radioactive material (e.g., Radium-226 or Caesium-137). This analysis indicated that the level of radioactivity was not elevated enough to be from the release of weapons grade material.
- b) The maximum Geiger-Muller Counter reading of 90 counts per second (cps) was documented for one soil sample, collected 0-5 feet below ground surface, within the Petroleum, Oil, Lubricant yard (i.e., cleanup Site ST005). The maximum reading was less than two times the background levels (roughly 40-60 cps). Radioactivity at this level is not sufficiently above background level to raise any human health or safety concerns.

If you have any additional questions regarding the information provided, please do not hesitate to contact me at (866) 725-7617.

Regards,
AL Weilbacher
BEC Galena FOL

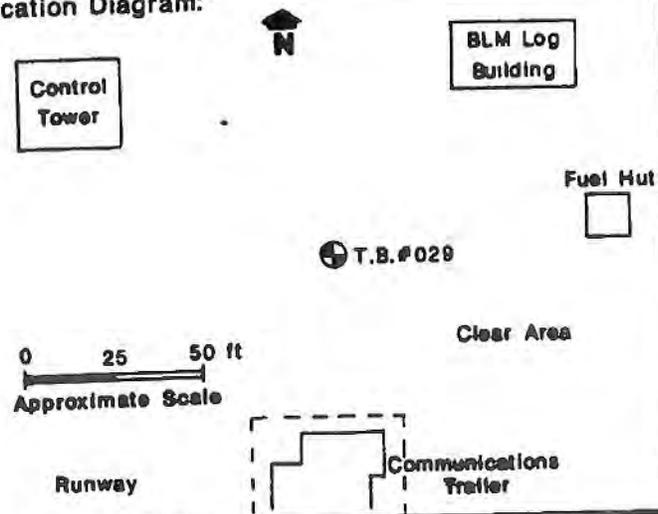


* ONLY 1986 Borings had Geiger counter readings

Project: U.S. Air Force Hazardous Waste Site
Investigations: GALENA AIR FORCE STATION

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LOG OF BORING NO. 029

Location Diagram:



Monitoring Well Test Boring

Logged By: S. Erdmann
Contractor: Tester Drilling Services, Inc.
Drill Rig: B-61
Driller's Name: R. Roberson
Drilling Method: Hollow-stem auger
Sampling Method: Split spoon, grab
Hammer Wt.: 340 lbs. Drop: 30 inches
Start Time: 1300 hrs. Date: 8/7/86
Complete Time: 1430 hrs. Date: 8/7/86
Weather: Overcast, windy, 62°F
Instrumentation: HNu, CGI, Geiger, pH, Temp.

Comments: Background levels: HNu 0.6 ppm, CGI 0% LEL, Geiger 35 cps.

Water Depth:	17.50'	16.55'	16.25'
Time:	1420	1445	0818
Date:	8/7/86	8/7/86	8/8/86

Depth, ft.	SAMPLES	Frozen	MATERIAL DESCRIPTION	TEST RESULTS						
				pH	Temperature	HNu Meter	Combustible Gas Meter	Geiger Counter	Odor	Screen Setting
0-5			0.0-5.0 ft: Gravelly fine to coarse SAND with trace silt. Some visible surface contaminants (oil?). Damp. Grading to finer materials.	-	56	B	B	45	N	
5-10			5.0-10.0 ft: Brown/gray, silty fine SAND and sandy SILT with organics. Moist. No visible contamination. Benzene Drager 0 ppm.	-	45	B	B	45	N	
10-15			10.0-15.0 ft: Brown/gray, silty fine to medium SAND. Moist. Trace of organics. No visible contamination.	-	39	B	B	45	N	
15-20	0791 50 029 GS 86 0001 418.1		15.0-20.0 ft: Brown/gray, gravelly fine to coarse SAND. Moist. No visible contamination. Water table at 17.5 ft.	-	38	B	B	45	N	
20-21.5			20.0-21.5 ft: Gravelly fine to coarse SAND with trace silt. Saturated. No visible contamination. Total depth 21.5 ft.	-	37	B	B	45	N	

APPENDIX A

TAR

Possible Tar Pit Construction Area (Site ID TAR)

Site Location

Site TAR site is located south of the eastern half of the runway, southwest of the Southeast Runway Fuel Spill (ERP Site ST010).

Site Characteristics

Site features are shown on Figure A1-TAR. The site consists mostly of visible patches of tar in a grassy area. The accurate Site TAR location and boundary have not yet been determined, but will be verified through site reconnaissance.

Site Description and History

The time period during which the tar pits were used is unknown, though they were once included as “additional potential sources of contamination” for ERP Site ST010 (Radian, March 1996, p. 3-121, fifth para.). Site TAR has been identified as a separate site because it is west of the area of soil contamination resulting from the ERP Site ST010 fuel spill and is associated with a separate source.

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

Historic aerial photographs of the site from 1985 and 2002 are shown on Figure A2-TAR.

Summary of Previous Investigations

No previous sampling investigations have occurred at Site TAR. A site reconnaissance was conducted in approximately 2006, and although the site is partially covered with long grass, visible patches of tar still remained at several locations. Previous investigations for nearby ERP Site ST010 did not address the tar pits.

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.

Target Analytes

Because the source and historical use of the tar are unknown, a tar sample will be collected before excavation and disposal and submitted for speciation analysis to profile the tar. The speciation will determine the carbon ranges included in the chemical composition of the tar, and aid in developing a target analyte list for confirmation samples. The tar sample will be distilled by ASTM Method D2887, which will fractionate the sample into individual carbon ranges. Ranges identified and quantified will include GRO, DRO, and RRO. If necessary,

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 Site TAR will be refined once results of the tar identification sampling are obtained, however, at a minimum, should include DRO/RRO, PAHs, and RCRA metals.

Potential Exposure Pathways and Receptors

Based on current and projected land uses at Site TAR, potential human receptors and potentially complete exposure pathways 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.

Based on available information and site photos, direct ecological impacts and toxicity cannot be excluded for Site TAR, 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 the Former Galena FOL, and ecological exposure pathways may be complete.

Groundwater from Site TAR 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.

Conclusions

Site TAR features consist mostly of visible patches of tar in a grassy area. No previous sampling investigations have occurred at Site TAR.

Recommendation: Site Inspection Sampling

Removal of visible tar is recommended. Limited site inspection sampling is recommended to confirm the presence or absence of contamination associated with the tar. Collection of a tar sample is recommended for speciation analysis to profile the tar before excavation and disposal. It is also recommended to evaluate potential additional tar disposal areas if they are encountered.

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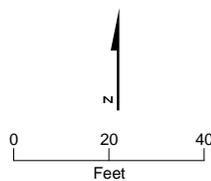
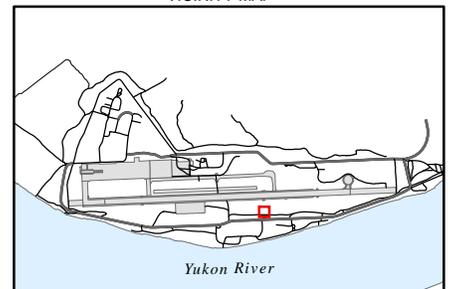


VICINITY MAP

LEGEND

-  TAR (approximate boundary)
-  Adjacent Site
-  Abandoned Fuel Line
-  Main Fuel Line

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



**FIGURE A1-TAR
Site Layout**

Preliminary Assessment Report
Former Galena Forward Operating Location, Alaska



LEGEND
 TAR (approximate boundary)

Notes:
 1. Photography Dated 1985, Georeferenced.
 2. Imagery August, 2002. Pixel size 0.075 meters.

VICINITY MAP

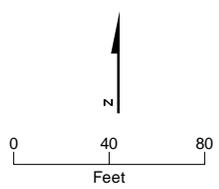
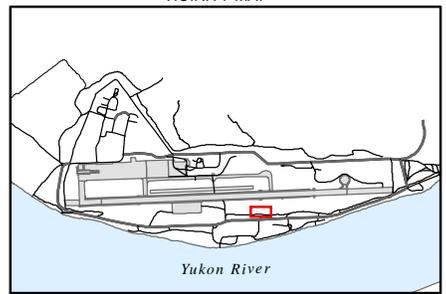


FIGURE A2-TAR
Historical Aerial Photography
 Preliminary Assessment Report
 Former Galena Forward Operating Location, Alaska

APPENDIX A

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Appendix A Master References

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