



THE STATE
of **ALASKA**
GOVERNOR BILL WALKER

**Department of
Environmental Conservation**

DIVISION OF SPILL PREVENTION AND RESPONSE
Contaminated Sites Program

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File: 860.38.022

August 13, 2018

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Subject: **DECISION DOCUMENT: CLEANUP COMPLETE DETERMINATION**
Galena AFS/Airport - SS002 CTDSA/SS013 CTDSA South

Dear Ms. Hewitt:

The Alaska Department of Environmental Conservation (DEC) has completed a review of the environmental records associated with the site, Galena AFS/Airport - SS002 Control Tower Drum Storage Area (CTDSA)/SS013 CTDSA South (SS013), located in Galena, AK. Based on the information provided to date, it has been determined that the contaminant concentrations remaining at Site SS013 do not pose an unacceptable risk to human health or the environment. No further remedial action will be required at Site SS013 unless new information becomes available that indicates residual contaminants may pose an unacceptable risk.

This Cleanup Complete determination is based on the administrative record for the Former Galena Forward Operating Location, which is located in the DEC office in Fairbanks, Alaska. This decision letter summarizes the site history, cleanup actions and levels, and standard site closure conditions that apply.

Site Name and Location:

SS002 CTDSA/SS013 CTDSA South
Nulato C-2 Quadrangle
Section 6, Township 9S 10E
Kateel River Meridian
Galena, Alaska 99741

Name and Mailing Address of Contact Party:

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DEC Site Identifiers:

File No.: 860.38.022
Hazard ID: 1946

Regulatory Authority for Determination:

18 AAC 75

Site Description and Background

Site SS013 is located between the runway and the apron just south of the southeast corner of the cantonment "triangle." The site boundary and layout are presented on Figure 1. The site is a former storage and handling area for 55-gallon drums, used until the 1970s, where spills and releases occurred from drum handling. The site (formerly known as Spill/Leak No. 1) was an unpaved area located between the runway and apron that stored a large number

of drums (stacked horizontally about three drums high and ten drums wide), which contained unused aviation gasoline, JP-4, JP-1, diesel fuel, solvents, thinners, cooking fuel, and possibly some waste products. Unused drum residues were reportedly dumped on the ground regularly prior to shipping the empty drums off-site. Aerial photographs dating from 1963 to 1971 indicate that the drum holding area extended from the southeastern quadrant of the present-day air services parking ramp to 600 feet east of the control tower (approximately 500 feet south of the dike road).

Site SS002, which is entirely encompassed within Site SS013, was a former drum storage area where spills and regular dumping reportedly occurred from the 1940s to the 1960s. Site SS002 has been administratively closed and incorporated into Site SS013. The western portion of Site SS013 is a paved apron used for aircraft parking, and the eastern portion is mostly unpaved.

In the 1970s, the Alaska Department of Transportation & Public Facilities (ADOT & PF) paved over a portion of Site SS013 to expand the tarmac near the control tower. As a result, the western portion of Site SS013 is now covered with concrete, and the eastern portion remains unpaved. A variety of underground utilities are present beneath Site SS013, as shown on Figure 1. Underground utilities include electrical lines and a communications line. An abandoned aboveground fuel pipeline was removed from the northern boundary of the site.

Contaminants of Concern

The following contaminants of concern (those above approved cleanup levels) were identified during the course of investigation summarized in the Characterization and Cleanup Activities section of this decision letter.

- Aldrin
- Dieldrin
- Diesel-Range Organics (DRO)
- Heptachlor Epoxide
- Hexachlorocyclohexane, alpha (alpha-BHC)
- Lead
- Trichloroethene (TCE)

Cleanup Levels

The Method Two Migration to groundwater (MTG) and Human Health/Ingestion soil cleanup levels in 18 AAC 75.341(c) Table B1 and 18 AAC 75.341(d) Table B2 or Method Three MTG cleanup levels developed in accordance with 18 AAC 75.340(e) apply to this site. The 18 AAC 75.345 Table C groundwater cleanup levels apply to this site.

Table 1 – Approved Soil and Groundwater Cleanup Levels

Contaminant	Soil Migration to Groundwater (mg/kg)	Soil Human Health (mg/kg)	Groundwater (µg/L)
alpha-BHC	0.0077*	1.1	0.072
Dieldrin	0.0160*	0.44	0.018
DRO	580*	10,250	1500
Heptachlor Epoxide	0.0052*	0.86	0.014
Lead	-	400	0.015
TCE	0.011	4.9	2.8

mg/kg = milligrams per kilogram; µg/L = micrograms per liter;

* indicates Method Three MTG alternative cleanup level

Characterization and Cleanup Activities

Characterization and cleanup activities began in 1985 and continued through 2017. These activities are described below.

In 1985, a Phase I Records Search was conducted. Spill/Leak Site No. 1, which is part of what is now Site SS013, was identified. Remedial Investigations (RIs) were conducted in 1986-1989 and 1993-1995. The RI objectives included determining the nature and extent of potential contaminants, site physical characteristics that may affect contaminant distribution, and possible migration pathways. During the RI, pesticides alpha-BHC, dieldrin, and heptachlor epoxide were detected above the Table B1 MTG cleanup levels (CULs) in surface soil samples (0 - 0.5 feet below ground surface) collected from the site (0.0070 mg/kg, 0.0116 mg/kg, and 0.0026 mg/kg, respectively are the maximum concentrations detected). TCE was detected above the Table B1 Method two MTG CUL with exceedances of 0.580 mg/kg and 0.038 mg/kg. With regard to groundwater, aldrin and heptachlor epoxide were detected during a single sample event at concentrations of 0.0177 µg/L and 0.0555 µg/L. TCE was detected at a concentration of 9.28 µg/L, which is above the Table C Groundwater CUL.

During the RI, surface soil samples for antimony (49.2 mg/kg) and arsenic (55.3 mg/kg) exceeded Method Two Table B1 MTG CULs (4.6 mg/kg and 0.20 mg/kg, respectively). However, no groundwater samples representative of current conditions (2010-2017) exceeded Table C CULs for antimony. Antimony is known to be naturally occurring in Galena and any remaining concentrations in soil are protective of groundwater at Site SS013. With regard to arsenic, the soil screening criterion is the background threshold value (BTv) of 13.3 mg/kg presented in the approved *Final Characterization of Background Concentrations of Metals in Soil (January 2013)* and the groundwater criteria is the Table C CUL of 0.52 µg/L. Arsenic concentrations in soil exceeded both the BTv and the Table B1 human health CUL for soil, but it is important to note that the approved arsenic BTv also exceeds human health CULs. The 2013 site characterization report notes that although arsenic is naturally occurring in Galena, uncertainty exists because some pesticides may contain arsenic. A background concentration for arsenic in groundwater at Galena has not been approved. However, a background study conducted for the *Final Groundwater Contaminant Characterization Report for 2010 and 2011* reported concentrations from 0.2 µg/L – 9.35 µg/L in monitoring wells throughout Galena. Groundwater samples collected at site SS013 between 1994 and 2011 detected arsenic concentrations above the Table C CUL. Arsenic was detected in groundwater samples collected in 1994, 2009 and 2011 at a concentration of 19.8 µg/L, 3.1 µg/L and 1.2 µg/L respectively. These groundwater monitoring results indicate a declining arsenic concentration. Although, the presence of arsenic in groundwater may in part be attributed to anthropogenic soil contamination at site SS013, the concentrations of arsenic in groundwater shows a decreasing trend toward the low end of the range seen during the background study.

For the soil samples analyzed for DRO during the RI, one surface soil sample had a DRO concentration of 500 mg/kg, in exceedance of the Table B2 migration to groundwater CUL of 250 mg/kg in 18 AAC 75.341(d). In subsequent groundwater monitoring events, DRO has not been detected above Table C CULs for groundwater, indicating that any residual soil concentrations of DRO are protective of groundwater at Site SS013. DRO concentrations are below a site specific alternative cleanup level (ACL) of 580 mg/kg for DRO developed using the DEC Petroleum Cleanup Level Calculator. TCE detections at site SS013 were limited to a small area within the center of the site. Soil gas samples collected in 1993 confirmed that TCE concentrations were limited to a small source area. In 2007, an RI/Feasibility Study (FS) was prepared for ten sites, including Site SS013. The RI recommended installation of two new monitoring wells at Site SS013 to confirm the presence of TCE. The two new groundwater monitoring wells were sampled in 2008, 2010, and 2011. During these subsequent groundwater sampling events, there were no detections of TCE exceeding DEC Table C Cleanup Levels. This indicates that any residual TCE soil concentrations present are protective of groundwater for Site SS013. Any residual TCE soil contamination is considered de minimis.

Groundwater was analyzed for pesticides in 2017. The analytical results from the 2017 sampling event indicate that no pesticides including Aldrin and heptachlor epoxide are present in either of the downgradient wells sampled. The 1995 detections of pesticides in surface soil are isolated and have not resulted in impacts to groundwater above the Table C Groundwater CULs. Method Three MTG CULs using approved site specific soil and groundwater parameters were developed for the pesticides and are presented in Table 1. Residual concentrations of alpha-BHC and heptachlor epoxide are below the approved alternate cleanup levels. The highest remaining dieldrin concentrations in soil are slightly above the approved ACL. However, any remaining concentrations of dieldrin in surface soil are protective of groundwater at Site SS013 and considered de minimis.

Table 2 – Contaminant Concentrations Remaining at Site SS013

Contaminant	Highest Remaining Concentrations (mg/kg)
alpha-BHC	0.0070
Dieldrin	0.0116
DRO	500
heptachlor epoxide	0.0026
TCE	0.580

mg/kg = milligrams per kilogram

Cumulative Risk Evaluation

Pursuant to 18 AAC 75.325(g), when detectable contamination remains onsite, a cumulative risk determination must be made that the risk from hazardous substances does not exceed a cumulative carcinogenic risk standard of 1 in 100,000 across all exposure pathways and does not exceed a cumulative non-carcinogenic risk standard at a hazard index (HI) of one across all exposure pathways. Cumulative risk is calculated using all contaminant concentrations remaining on site at concentrations above 1/10th the cleanup level, per 18 AAC 75.340 (k).

For soil, cumulative risk was evaluated using all residual contaminants including historic exceedances of metals arsenic and antimony representative of worst case site conditions (1985-2017). This conservative approach, yielded results of a HI of 3 (rounded to one significant figure as per DEC regulation) and a carcinogenic risk (CR) of 6.39×10^{-5} . The non-carcinogenic HI and the CR exceed the DEC regulatory criteria and indicates unacceptable risk. Arsenic is the primary carcinogenic risk driver for exceedances (6.30×10^{-5}), and antimony and arsenic drive the non-carcinogenic risk (1.21 and 1.22). The cumulative risk evaluation for soil was run again without metals, which yielded a HI of one and a CR of 5.22×10^{-6} , which does not exceed DEC criteria for unacceptable risk associated with chronic exposure to the remaining chemicals on site.

For groundwater, cumulative risk was evaluated using all contaminants detected above 1/10th Table C CULs during current 2017 sampling events and included the most recent (2011) arsenic concentration identified (arsenic was not analyzed in 2017). The cumulative risk calculation yielded results of a HI of one (rounded to one significant figure as per DEC regulation) and a CR of 2.40×10^{-5} , which exceeds the DEC threshold for unacceptable risk. Concentrations of arsenic in excess of Table C CULs are ubiquitous in groundwater in Galena. To determine if arsenic is a driver for the HI and CR exceedances, the cumulative risk evaluation for groundwater was run again, excluding arsenic data. Results without arsenic yielded a HI of 1 and a CR of 1.51×10^{-6} . The risk from site contaminants in groundwater excluding arsenic does not exceed DEC regulatory criteria for unacceptable risk.

Exposure Pathway Evaluation

Following investigation at the site, exposure to the remaining contaminants was evaluated using DEC's Exposure Tracking Model (ETM). Exposure pathways are the conduits by which contamination may reach human or ecological receptors. ETM results show all pathways to be one of the following: De-Minimis

Exposure, Exposure Controlled, or Pathway Incomplete. A summary of this pathway evaluation is included in Table 3.

Table 3 – Exposure Pathway Evaluation

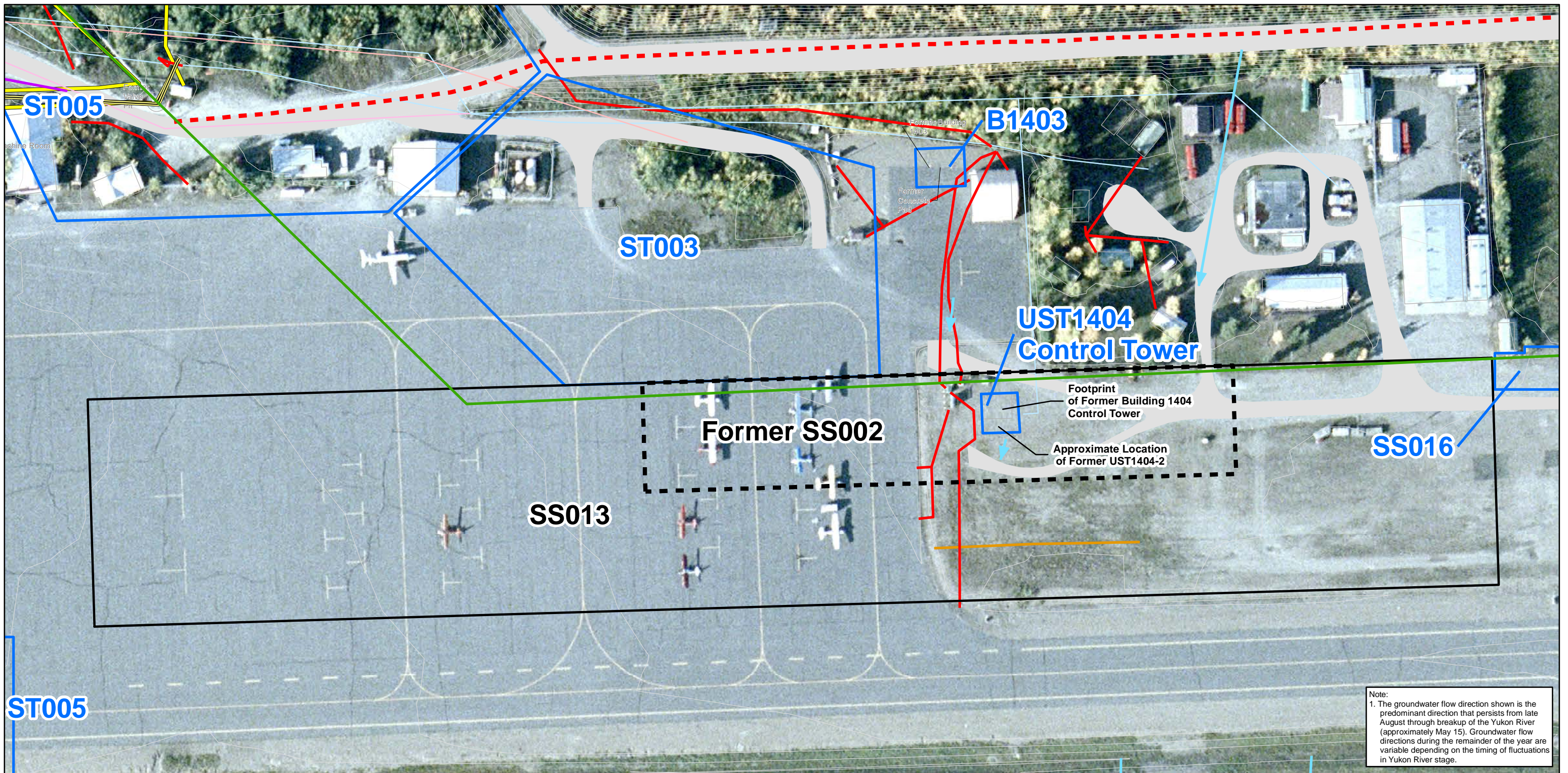
Pathway	Result	Explanation
Surface Soil Contact	De Minimis Exposure	Contamination remains in the surface soil (0-2 ft.), but concentrations are less than Method Two, Table B1 Human Health cleanup levels.
Sub-Surface Soil Contact	De Minimis Exposure	Contamination remains in the sub-surface soil (2-15 ft.), but concentrations are below the Method Two, Table B1 Human Health cleanup levels.
Inhalation - Outdoor Air	Pathway Incomplete	There are no volatile organic compounds present in groundwater above DEC's Vapor Intrusion Guidance, Appendix G Target Levels for Groundwater. The residual soil concentrations were evaluated with the DEC Method Three calculator and do not pose a cumulative risk through the inhalation pathway.
Inhalation (Vapor Intrusion) - Indoor Air	Pathway Incomplete	There are no volatile organic compounds present in groundwater above DEC's Vapor Intrusion Guidance, Appendix G Target Levels for Groundwater.
Groundwater Ingestion	Pathway Incomplete	There is no groundwater contamination attributed to this site.
Surface Water Ingestion	Pathway Incomplete	There is no surface water within ¼ mile of the site. Contaminants are not expected to migrate to surface water in the future.
Wild and Farmed Foods Ingestion	Pathway Incomplete	This site is not used for hunting, fishing, or harvesting wild or farmed food.
Exposure to Ecological Receptors	Pathway Incomplete	There are no concerns regarding direct ecological impacts at this site. There is no viable ecologic habitat since the site surface is mainly gravel, concrete or asphalt pavement. Terrestrial and aquatic exposure routes are not present.

Notes to Table 3: “De-Minimis Exposure” means that in DEC’s judgment receptors are unlikely to be affected by the minimal volume or concentration of remaining contamination. “Pathway Incomplete” means that in DEC’s judgment contamination has no potential to contact receptors.

DEC Decision

A small volume of TCE contaminated soil above the Method Two, Table B1, MTG cleanup and/or dieldrin above the Method Three MTG alternative cleanup level identified in Table 1 (above) may have been left in place. Soil samples identified an original exceedance, which could not be duplicated in subsequent sampling, and delineating samples found no other exceedances. For both TCE and dieldrin, subsequent groundwater sampling found no detections above the Table C groundwater cleanup levels, indicating that the residual soil concentrations are protective of groundwater at Site SS013. Based on historic site characterization soil and soil gas sampling results, any remaining concentrations are considered de minimis.

Antimony and arsenic have also been detected above Method Two, Table B1 and Table C cleanup levels; however, both of these metals are known to be naturally occurring at elevated levels in Galena and are not confirmed attributed to anthropogenic soil or groundwater contamination.



Legend

- SS013
- Approximate Groundwater
- Flow Direction
- Main Wastewater Line
- Service Wastewater Line
- Water Line
- Heating/Cooling Line
- Underground Utility Locates - 2010
- Communications
- Electrical
- Fuel/Gas
- Potable Water
- Sanitary Sewer

- Revised Old Abandoned Pipeline (OAP) Locations**
- 1952 and 1962 Aboveground Pipeline (1963 and 1985 Aerial)
 - 1952 and 1962 Underground Pipeline (Not Visible on Aerials)
 - Aboveground Pipeline (1985 Aerial)
 - Abandoned 4-inch Underground Pipeline (2009 survey)
 - Active Fuel Line (Not Part of Site OAP)

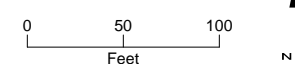
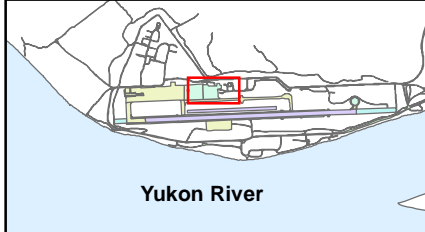
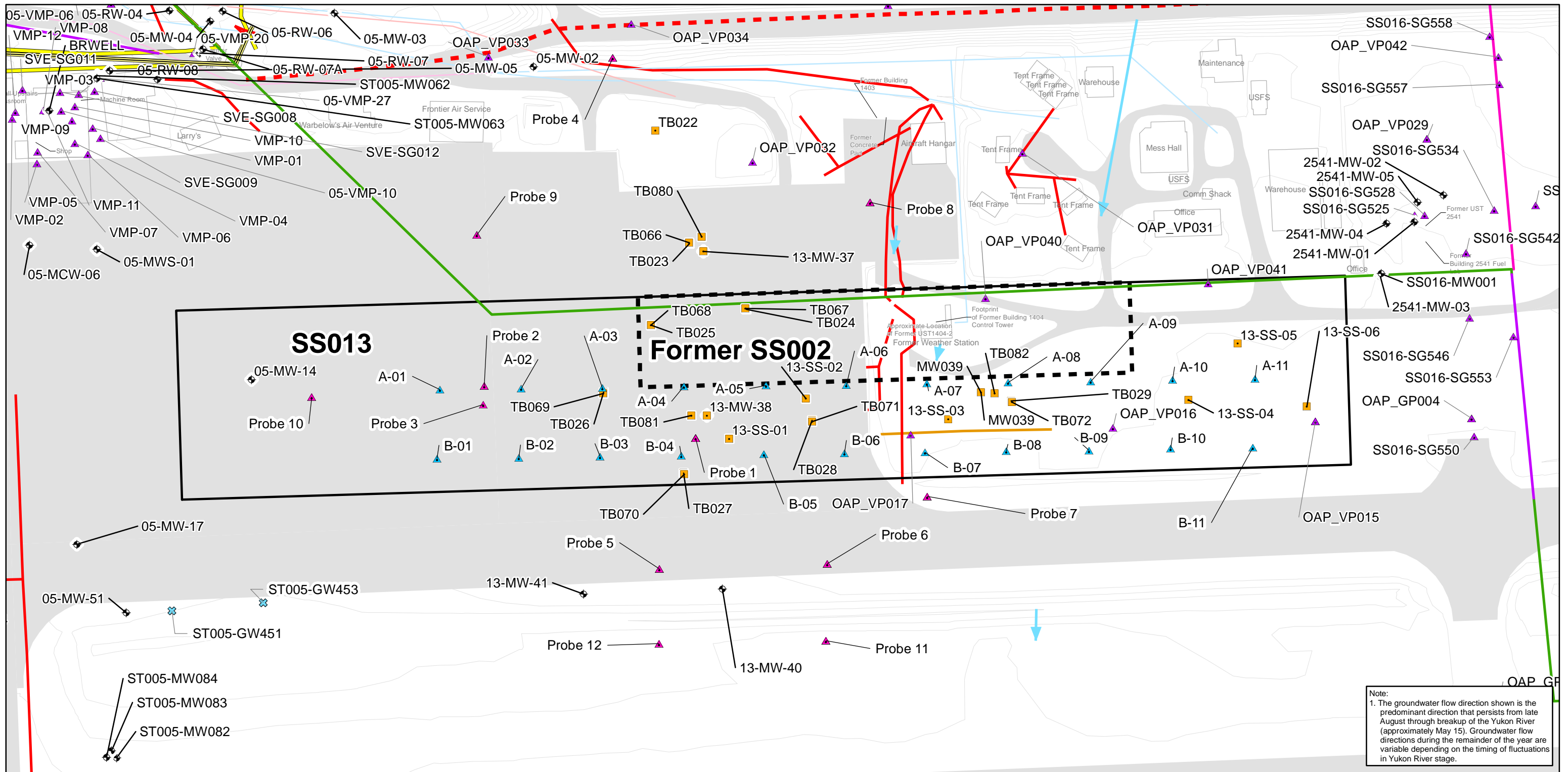


FIGURE 1

**Site SS013
Site Layout**

Site Investigation for Site SS013
Former Galena Forward Operating Location, Alaska





Legend

- SS013
- Airfield Surface or Road
- Approximate Groundwater
- Flow Direction
- Main Wastewater Line
- Service Wastewater Line
- Water Line
- Heating/Cooling Line
- Underground Utility Locates - 2010
- Communications
- Electrical
- Fuel/Gas
- Potable Water
- Sanitary Sewer
- Soil Gas Sample
- Soil Boring
- Temporary Groundwater Sample Point
- Monitoring Well
- Soil Gas Sample in 1988
- Soil Gas Sample in 1993

- Revised Old Abandoned Pipeline (OAP) Locations**
- 1952 and 1962 Aboveground Pipeline (1963 and 1985 Aerial)
 - 1952 and 1962 Underground Pipeline (Not Visible on Aerials)
 - Aboveground Pipeline (1985 Aerial)
 - Abandoned 4-inch Underground Pipeline (2009 survey)
 - Active Fuel Line (Not Part of Site OAP)

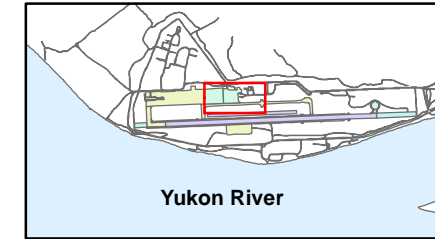
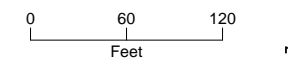


FIGURE 2
Site SS013
Soil, Soil Gas, and Groundwater
Sample Locations



Site Investigation for Site SS013
Former Galena Forward Operating Location, Alaska

