

Air Force Civil Engineer Center



**Performance-Based
Remediation (PBR) at
the Former Galena
Forward Operating
Location (FOL), Alaska**

Restoration Advisory
Board (RAB) Meeting
26 April 2017

Battle Ready...Built Right!

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Former Galena FOL Performance Based Contract

- Parsons - Prime Contractor
- Partnering Team – CH2M and Ahtna Engineering Services
- Remediation of 32 sites contaminated primarily with fuels and solvents
- To date, two sites have achieved Cleanup Complete
- Installation of remediation systems from 2015 to 2018
- Operations and monitoring through summer 2020



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Winter 2016 to Spring 2017 Activities

- Bioventing, soil vapor extraction (SVE) and vertical air sparging systems running and monitored monthly at nine (9) sites
- April 2016 – The nine operating systems will be shut down for annual soil vapor sampling to track cleanup progress
- April 2016 – Baseline sampling will be conducted at seven (7) additional systems installed in 2016. These systems will be started up later in the summer when water levels drop.
- All sixteen (16) systems will be running in the fall and winter of 2017/2018

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Proposed 2017 Galena PBR Schedule

- **Planned 2017 Field Work (June through September)**
 - Subsurface Aeration (Horizontal Well) Air Sparging**
 - Million Gallon Hill/Missile Storage (Sites CG001/CG002)
 - POL Tank Farm Area/GAVTC Building (Site ST005/CB001)
 - Soil Vapor Extraction**
 - Former South Apron Maintenance Area (Site SS015)
 - Sulfate-Enhanced Bioremediation Injections**
 - Former Bldg 1812 Hazardous Waste Satellite Accumulation (Site CSS002)
 - Former Birchwood Hangar and Truck Fillstands (Sites SS014/SS017)
 - Former JP-4 Fuel Stands at ADOT Maintenance Bldg (Site ST009)
 - Excavation**
 - Former Waste Accumulation Area South of Bldg 1499 (Site SS018)

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Galena PBR 2017 Field Work (continued)

- **Planned 2017 Field Work (June through September)**
 - Site CS001 (Tank 27 Biocell) – DDT Contaminated Soil**
 - Investigation to evaluate concentrations of soil in biocell and tank integrity
 - Other Field Work**
 - System modifications (e.g., expand or replace vent wells)
 - Install new groundwater monitoring wells
 - Annual groundwater monitoring
 - Galena Landfarm**
 - Landfarm reconstruction and operation



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2017 Field Work Locations



Legend

- Excavation
- SVE System Installation
- Horizontal Air Sparge System Installation
- Sulfate-Enhanced Bioremediation Injections

0 300 600
Feet

Figure 1
Installation of 2017 Remediation Systems
at the Former Galena FOL
Former Galena Forward Operating Location, Alaska
PARSONS



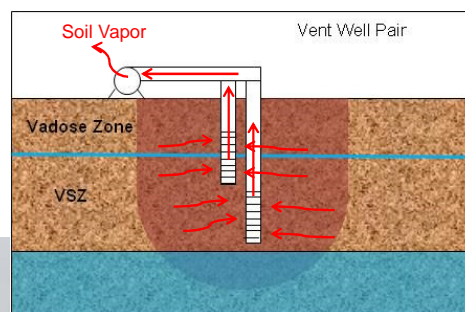
South Apron Maintenance Area (Site SS015)

- Soil and groundwater is contaminated with TCE, PCE, and petroleum-related contaminants
- Contamination is from releases/spills from the above ground storage tank and from maintenance activities that used TCE and PCE
- Selected remedy is SVE to clean up TCE/PCE in soil, enhanced bioremediation followed by monitored natural attenuation (MNA) for groundwater, and land use controls (LUCs) to prevent potential exposure
- SVE system will be installed in 2017, enhanced bioremediation injections to follow in 2018.



Soil Vapor Extraction (SVE) Systems

- SVE removes volatile contaminants in unsaturated soil
- System installed at Site SS015 will remove TCE from soil



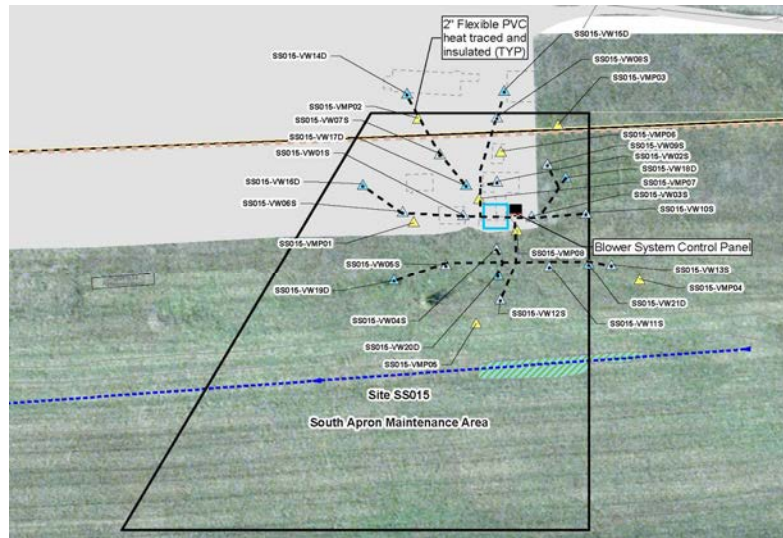
Note: VSZ = variably saturated zone





SS015 – South Maintenance Apron Area SVE Layout

Total of 13 shallow and 8 deep vent wells



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Sulfate Enhanced Bioremediation for Petroleum Hydrocarbons

- Inject sulfate (gypsum) to biodegrade petroleum hydrocarbons by sulfate reduction
- Direct injection of a gypsum slurry through direct-push drill rods
- Boreholes are grouted up with bentonite after injection
- Mixing tanks and pumps on site a few days to weeks only

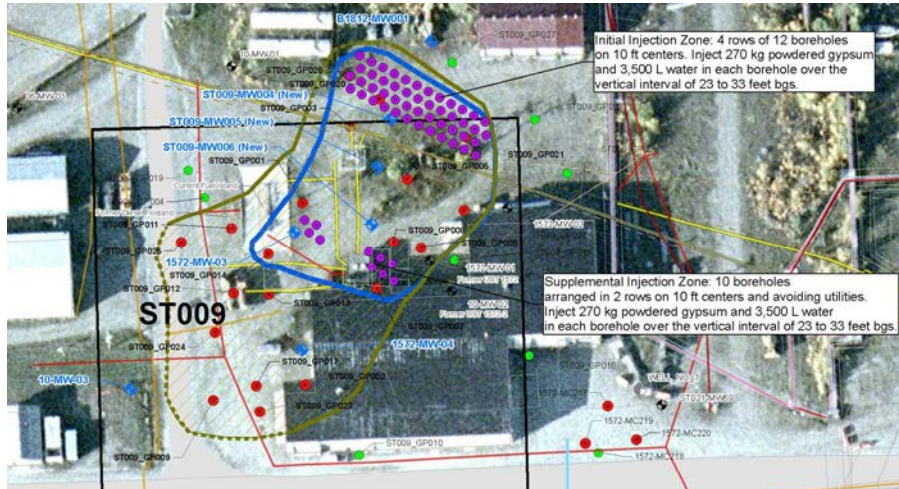


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ST009 – Injection Point Layout

Total of 58 injection points at 23-33 feet

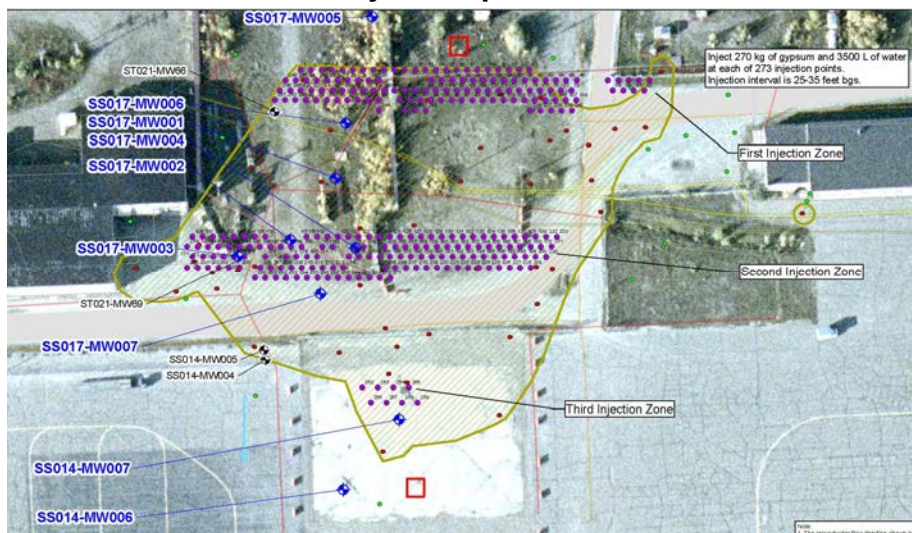


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SS014/SS017 – Injection Point Layout

Total of 273 injection points at 25-35 feet



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CSS002 (B1812) – Injection Point Layout

Total of 10 injection points at 27-37 feet

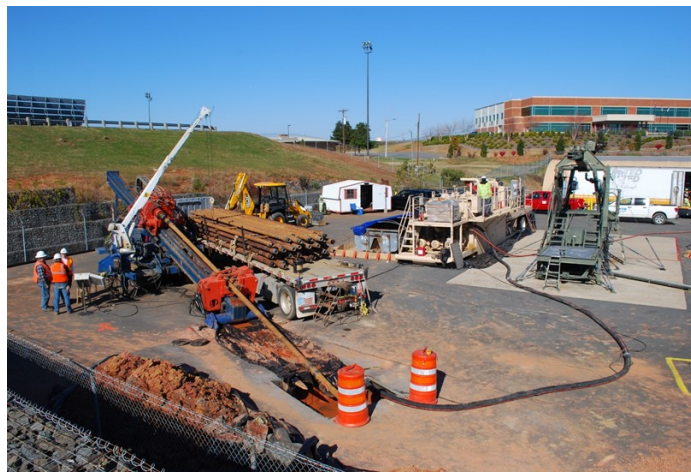


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Horizontal Air Sparge Systems

Injects air below the fuel-contaminated soil to remove volatiles (e.g., benzene) and stimulate aerobic biodegradation of petroleum hydrocarbons



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Horizontal Air Sparge System at CG001/CG002

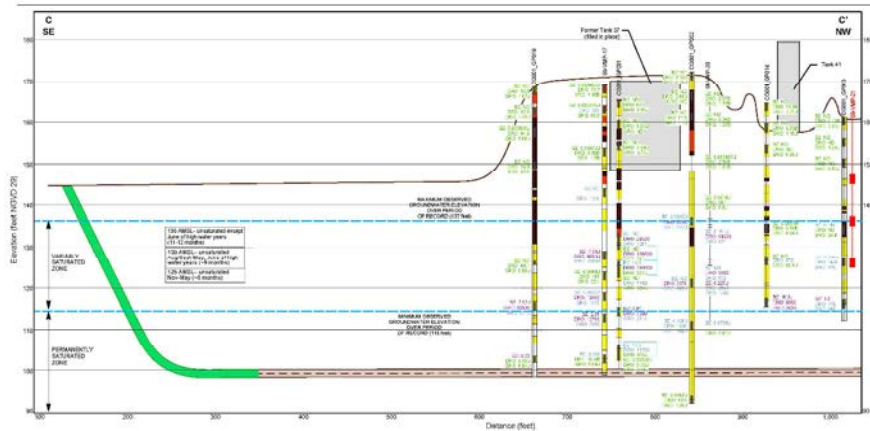


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Horizontal Air Sparge System at CG001/CG002

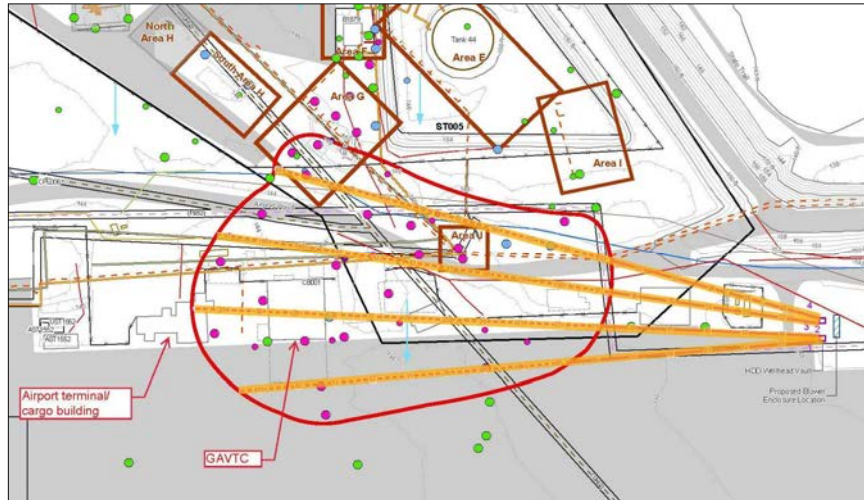
The horizontal wells will be installed 45 to 75 feet beneath Million Gallion Hill so that injected air will pass upwards through the contaminated soil.



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Horizontal Air Sparge System at ST005/CB001



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Horizontal Well System Operation

- Will operate during the winter time (November – April) when groundwater levels are lower
- May operate for 10 years or more, depending on annual groundwater monitoring results meeting cleanup objectives



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Excavation at Site SS018

- Site SS018 was a waste accumulation area south of the steam plant
- Fuel pipeline leak contaminated approximately 1000 cy of soil
- Soil around pipeline will be removed by a vacuum truck, or the pipeline will be cut and replaced.
- Soil will be excavated and treated at the landfarm



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Investigation at Site CS001

- CS001 is the Tank 37 Biocell – contains DDT (pesticide) and petroleum hydrocarbon contaminated soil
- Settling observed in 2005 and 2013 around perimeter of tank
- Investigation will evaluate concentrations of soil in the biocell and the integrity of the tank in the areas of settlement.



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Galena PBR 2018-2020 Schedule Overview

- **2018 – Implement remaining remedies**
 - **DP023 (Disposal Site West of Dike) – complete excavation**
 - **SS006 – Install SVE System and Enhanced Bioremediation Injections**
 - **SS015 – Enhanced Bioremediation Injections**
 - **FT001 – Install Bioventing System and Cover**
 - **Install small vertical aeration system at ST005**
 - **Operate Landfarm**
- **Operate remedies and prepare close out reports, as appropriate (through 2020)**

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Communications

- **Public Review of Proposed Plans for remaining CERCLA sites (SS006/SS019, DP023, and SS013) in fall or spring of 2017/2018**
- **Notices will be published when RODs are finalized for public review**
- **Semi-annual RAB Meetings (April/October)**
- **Air Force maintains Administrative Record for Final Documents at:**
<http://afcec.publicadmin-record.us.af.mil/>

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Questions?

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Air Force Civil Engineer Center



Perfluorinated Compounds (PFCs) Release Determination at the Former Galena Forward Operating Location (FOL), Alaska

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Site Investigation Field Activities

- PFC Site Inspection (SI) field activities were completed in 2016 and included:
 - Sampling groundwater and/or soil at 7 Aqueous Film Forming Foam (AFFF) Areas
 - Fire Training Area, Fire Stations (2), Crash Site, AFFF systems (2), Sanitary Outfall
 - A total of 49 soil and 13 groundwater samples were collected from the AFFF Areas
 - Samples were collected from the two former Air Force potable water supply wells (Well #1 and #7)
 - Decommissioning and disposal of a former AFFF storage tank

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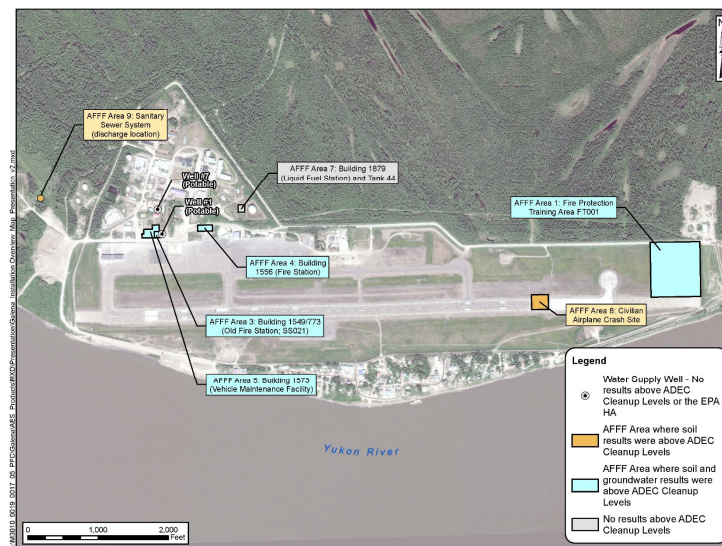
SI Results Summary

- **Preliminary SI Sample Results indicate:**
 - Two AFFF Areas with soil sample results above Alaska Department of Environmental Conservation (ADEC) Method 2 Cleanup Levels (CULs)
 - Four AFFF Areas with soil and groundwater results above ADEC Method 2 CULs or Table C CULs
 - No PFCs were detected in the former Air Force potable water supply wells
- **Next Step:**
 - Air Force currently reviewing and validating the results
 - A SI Report will be prepared and submitted to ADEC and ADOT for review

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AFFF Area SI Results



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