

Air Force Civil Engineer Center



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

Restoration Advisory
Board (RAB) Meeting
11 April 2018

Battle Ready...Built Right!

1



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, five sites have achieved Cleanup Complete
- Installation of remediation systems from 2015 to 2019
- Operations and monitoring through Summer 2020



Horizontal well installation in 2017

2



Winter 2017 to Spring 2018 Activities

- Bioventing and soil vapor extraction (SVE) running and monitored monthly at 11 sites
- Vertical and horizontal air sparging systems running and monitored monthly at 8 sites (3 with SVE)
- April/May 2018 – The 19 operating systems will be shut down for annual soil vapor sampling to track cleanup progress
- Eighteen (18) of the systems will be started back up in the fall and operated over the winter of 2018/2019 when water levels are lower
- One system (Site SS025) operates during the summer

3



Horizontal Well System at Million Gallon Hill/Missile Storage Area

- Four aeration wells ranging from 1,013 to 1,180 feet in length.
- Screened beneath the petroleum-contaminated soil area (**red boundary**) that is the contaminant source for groundwater.
- Startup testing in October included “distance of influence” measurements, and air pressure was observed greater than 200 feet from a single horizontal well, creating a very large aerated treatment zone.

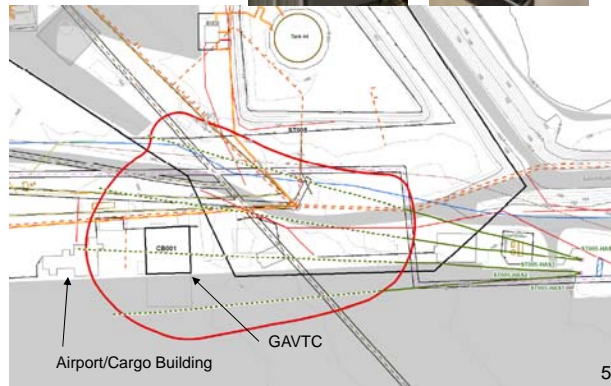


4



Horizontal Well System at POL Tank Farm and GAVTC

- Another 4 horizontal wells ranging from 777 to 868 feet in length.
- Similar distance of influence testing showed air pressure greater than 200 feet from a single well.
- The air is cycled through the 4 wells at both sites on 6-hour intervals.
- Vapor intrusion mitigation systems (VIMS) are installed and operate at the GAVTC and Airport terminal/cargo building.



Planned 2018 Galena PBR Schedule

Subsurface Aeration (Vertical Well) Air Sparging

- Complete small system at Million Gallon Hill/Missile Storage (Sites CG001/CG002)

Soil Vapor Extraction

- Complete system at Former South Apron Maintenance Area (Site SS015)
- Install small system POL Yard (Site ST005 Area C)
- Install system at Building 1845 TCE Area/Building 1700 Refueler Maintenance Shop (Sites SS006/SS019)

Bioventing

- Install system at Former Fire Protection Training Area (Site FT001)

Enhanced Anaerobic Bioremediation/Enhanced Biogeochemical Transformation (EAB/EBT) Injections

- Former South Apron Maintenance Area (Site SS015)
- Building 1845 TCE Area (Site SS006)

6



Galena PBR 2018 Field Work (continued)

Excavations

- Former Waste Accumulation Area South of Building 1499 (Site SS018)
- Surface soil excavation at Building 1845 TCE Area (Site SS006)
- Complete small excavation at former Birchwood Hangar (Site SS014)

In Situ Chemical Oxidation (ISCO) Injection

- Old Abandoned Pipeline (CPL006 Area 2 – along ski strip)

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



7



2018 Field Work Locations



Legend	
ADOT Runway Control Areas	Excavation
Approach (TERPG)	Excavation/Asbestos Bioremediation
CFA	Soil Vapor Extraction
CFZ	Boasting
Safety Area	In Situ Chemical Oxidation
Runway Centerline	Vertical Air Sparge
Building	



Installation of 2018 Remediation Systems at the Former Galena FOL

April 2018 Presentation by
Former Galena Former Operating Location, Alaska
PARSONS



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



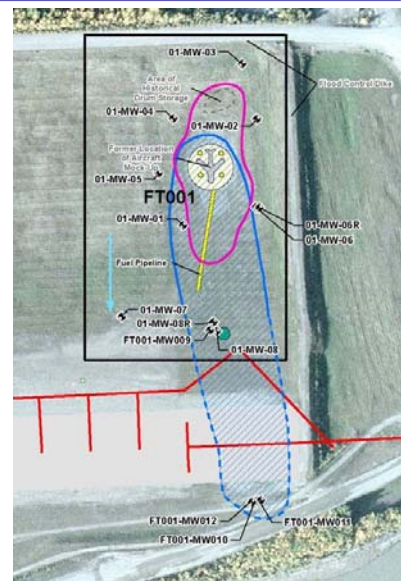
9



Bioventing System at FT001

- Soil and groundwater contaminated with petroleum hydrocarbons from fire training exercises
- Per- and polyfluoroalkyl substances (PFAS) are also present in soil and groundwater but will be addressed separately
- Bioventing selected to treat petroleum hydrocarbons in unsaturated soil as an interim remedy

Magenta outline is extent of soil contamination above cleanup levels
Blue hatch is extent of benzene in groundwater

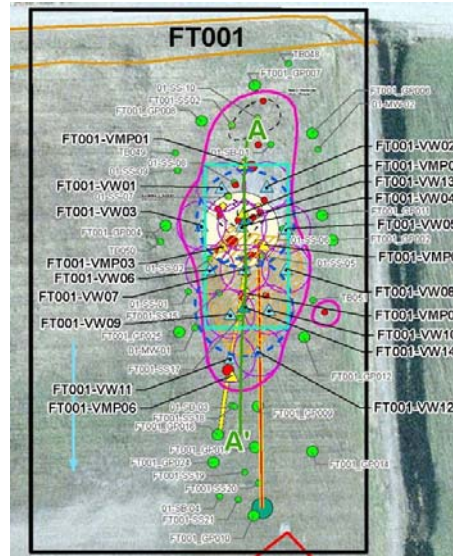


10



Bioventing System at FT001

- 12 shallow and 2 deep vent wells will be installed under an impermeable cover
- Cover will limit infiltration and enhance influence of bioventing
- Benzene and DRO in groundwater will attenuate as soil bioventing removes petroleum hydrocarbons from soil



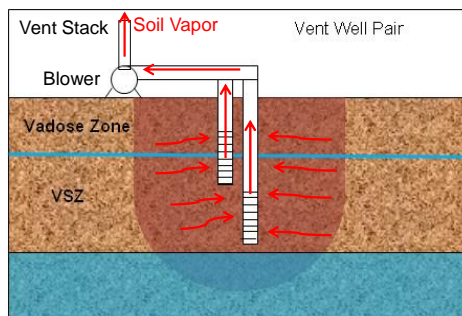
Circles show extent of bioventing influence
Light blue line is extent of cover

11



Soil Vapor Extraction (SVE) for TCE

- SVE will be completed at Site SS015 (started in 2017) and installed at Site SS006 in 2018 (SS019 system was installed in 2015 as pilot test)
- SVE removes volatile TCE in unsaturated soil and vents it to the atmosphere
- Ultra-violet light from sun degrades TCE quickly in the atmosphere
- Air quality is monitored to ensure ADEC exposure levels are not exceeded



Note: VSZ = variably saturated zone



SVE blower shed at Site SS015

12



Enhanced Anaerobic Bioremediation/ Enhanced Biogeochemical Transformation (EAB/EBT)

- TCE degrades in groundwater:
 - Biologically by anaerobic microorganisms (EAB)
 - Abiotically by reactions with reduced iron sulfide minerals (EBT)
- End products of degradation products (e.g., ethene) are unstable in groundwater and further degrade to carbon dioxide and water
- Injected chemicals/cultures:
 - Emulsified vegetable oil to stimulate anaerobic conditions for biological degradation of TCE
 - Bioaugmentation culture that is capable of complete degradation of TCE to ethene
 - Sulfate which is reduced to sulfide that precipitates with iron to form reactive iron sulfide minerals

13



Direct-Push Injection for EAB/EBT

Amendments are mixed with water at the surface

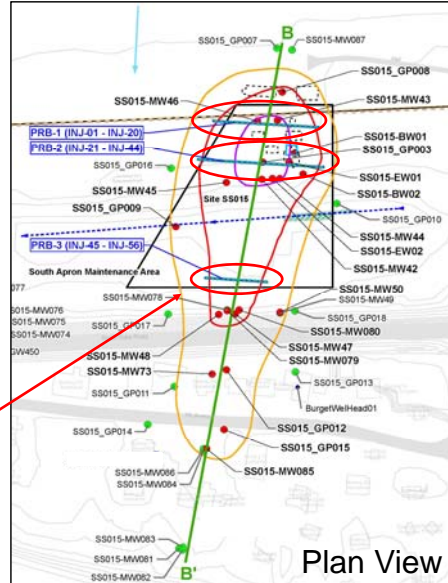


Amendments injected directly into groundwater through direct-push rods and tools



EAB/EBT at Site SS015

- Emulsified vegetable oil, sulfate amendment, and bioaugmentation culture will be injected into three rows of injection points to form permeable reactive barriers (PRBs) oriented perpendicular to groundwater flow



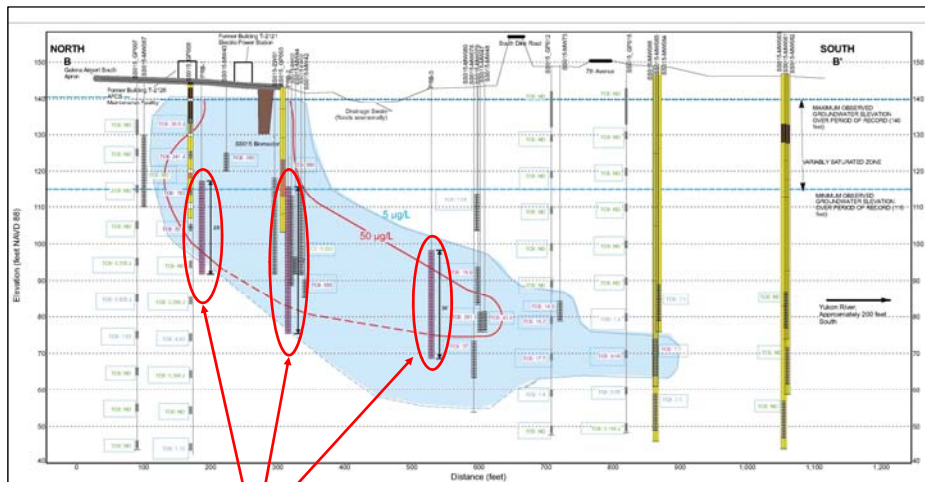
PRBs intercept TCE in groundwater above 50 micrograms per liter

Plan View

15



Injection into Permeable Reactive Barriers at Site SS015



PRBs intercept TCE in groundwater

Cross Section View

16



Galena PBR 2019-2020 Schedule Overview

- **2019 – Implement remaining remedies**
 - DP023 (Disposal Site West of Dike) complete excavation
- **Operate remedies and prepare close out reports, as appropriate (through 2020)**
- **Operate Landfarm**
- **Current PBR Contract ends September 2020**

17



Communications

- **Public Review of Proposed Plan for remaining CERCLA sites**
 - Sites SS006/SS019 in April/May of 2018
 - DP023 in October of 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/>

18



Questions?

Air Force Installation and Mission Support Central (AFIMSC) Public Affairs

AFCEC/Public Affairs
2261 Hughes Ave., Suite 155
JBSA Lackland, TX 78236-9853
Toll Free (866) 725-7617

afimsc.pa.workflow@us.af.mil



19

