SRS Sitewide Groundwater Remediation Progress

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Purpose

To status progress of groundwater remediation at the Savannah River Site
Agenda

- Groundwater Contamination Areas at SRS
- Remediation Strategies
- Status
- Technology Examples
  - Chemicals, Metals, Pesticides (CMP) Pits
  - General Separations Area
  - A/M Area
- Conclusion
Savannah River Site
Groundwater Contamination Areas

- A/M Area
- B Area
- C Area
- D Area
- F Area
- E Area
- H Area
- K Area
- L Area
- G Area (CMP Pits)
- N Area
- P Area
- R Area
- T Area

- 14 Groundwater Contamination Areas

South Carolina
Georgia
Remediation Strategy

Low Energy Technologies:
- Phytoremediation
- Passive Soil Vapor Extraction (baroballs)
- Monitored Natural Attenuation

High Energy Technologies:
- Excavation
- Heating (Dynamic Underground Stripping or Electrical Resistance Heating)
- In situ chemical oxidation

Less Aggressive Active Technologies:
- Air stripping
- Recirculation wells
- Hydraulic barrier / Phyto-irrigation
- Base injection

Primary Plume

Active Remediation | Enhanced Natural Remediation | Passive Monitored Natural Attenuation
High cost | Low Cost
Status Overview

• Much progress has been made in groundwater remediation at SRS
  – Contaminants are being addressed in 12 of 14 groundwater contamination areas:
    • Active remediation continues in 1 area
      – A/M Area
    • Enhanced natural remediation in 5 areas
      – F Area – T Area
      – E Area – P Area (Passive at P-Burning Rubble Pit)
      – H Area
    • Passive natural remediation in 6 areas
      – L Area – R Area
      – G Area – C Area
      – B Area – D Area
  – Two groundwater contamination areas remain to be completely characterized
    – N- Area
    – K-Area (Passive at K-Burning Rubble Pit)
Source Zone

Remediation Examples:

- Excavation
- Low permeability covers
- Thermal technologies
- In-situ chemical oxidation
- Soil vapor extraction (SVE)
Primary Plume

Remediation Examples:

• Hydraulic Control
  – Pump and Treat
  – Phytoremediation pond
  – Barrier walls

• In situ
  – Airlift recirculation wells
  – Base injection
  – Chemical oxidation injection
  – Nutrient injection to enhance bioremediation
Passive Natural Systems

Remediation Examples:

- Phytoremediation
- Monitored Natural Attenuation
Chemicals, Metals, & Pesticides Pits

**Solvents**

During use as a disposal pit

During excavation of drums and contaminated soil
Electrical Resistance Heating Successful at Chemicals, Metals, & Pesticides Pits

- Electrical Resistance Heating removed ~99% of the solvents
- Verified with samples
- Source controlled with Electrical Resistance Heating
- Allowing groundwater to be treated with passive remediation
Chemicals, Metals, & Pesticides (CMP) Pits

Solvents

• Source Control
  – Excavated contaminated soil and drums
  – Used Electrical Resistance Heating (ERH) to remove high concentration solvents
  – Used Soil Vapor Extraction to remove residual solvents

• Primary Plume
  – Currently performing Monitored Natural Attenuation
General Separations Area

Tritium and Metals

• Source Control
  – Capped basins and burial ground

• Primary Plumes
  – Used Pump-and-Treat, not cost-effective; terminated
  – Installed barrier walls for funnel and gate treatment system
  – Using pond with phytoremediation
M-Area

30' Soil Borings at Process Sewer Tie-In

Employees guide the lift liners into roll-off pans for shipment to Clean Harbors Lone Mountain Facility in Oklahoma

M-Area Completion Celebration

A-2 Airstripper

M Area Passive Soil Vapor Extraction Piping of Treatment Cell #1

Baro-ball

Completed Passive Soil Vapor Extraction Well Heads
A/M Area

D US Process Description

Dense Non-Aqueous Phase Liquid (DNAPL)

Dynamic Underground Stripping

Dense Non-Aqueous Phase Liquid (DNAPL)
A/M Areas

Solvents

- **Source Control**
  - Excavated contaminated soil
  - Capped basins
  - Dynamic Underground Stripping removed high concentration solvents
  - Using Chemical Oxidation to remove small pockets of high concentration solvents
  - Using Soil Vapor Extraction to remove residual solvents

- **Primary plume**
  - Using Pump-and-Treat with Airstripping for hydraulic control
  - Using Airlift Recirculation Wells to remove contaminants

- **Depleted sources**
  - Using passive Soil Vapor Extraction (baroballs)
  - Using Solar Powered Soil Vapor Extraction
SRS Groundwater Program
Active to Passive

Early Program

FY11

FY20

FY40

Active
Enhanced
Passive
Conclusion

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  - Two groundwater contamination areas remain to be fully characterized