

**A Presentation to the
SRS Citizens Advisory Board
Facilities Disposition and Site Remediation Committee**

SRS Sitewide Groundwater Remediation Progress

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Area Completion Projects

Savannah River Nuclear Solutions, LLC

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Purpose

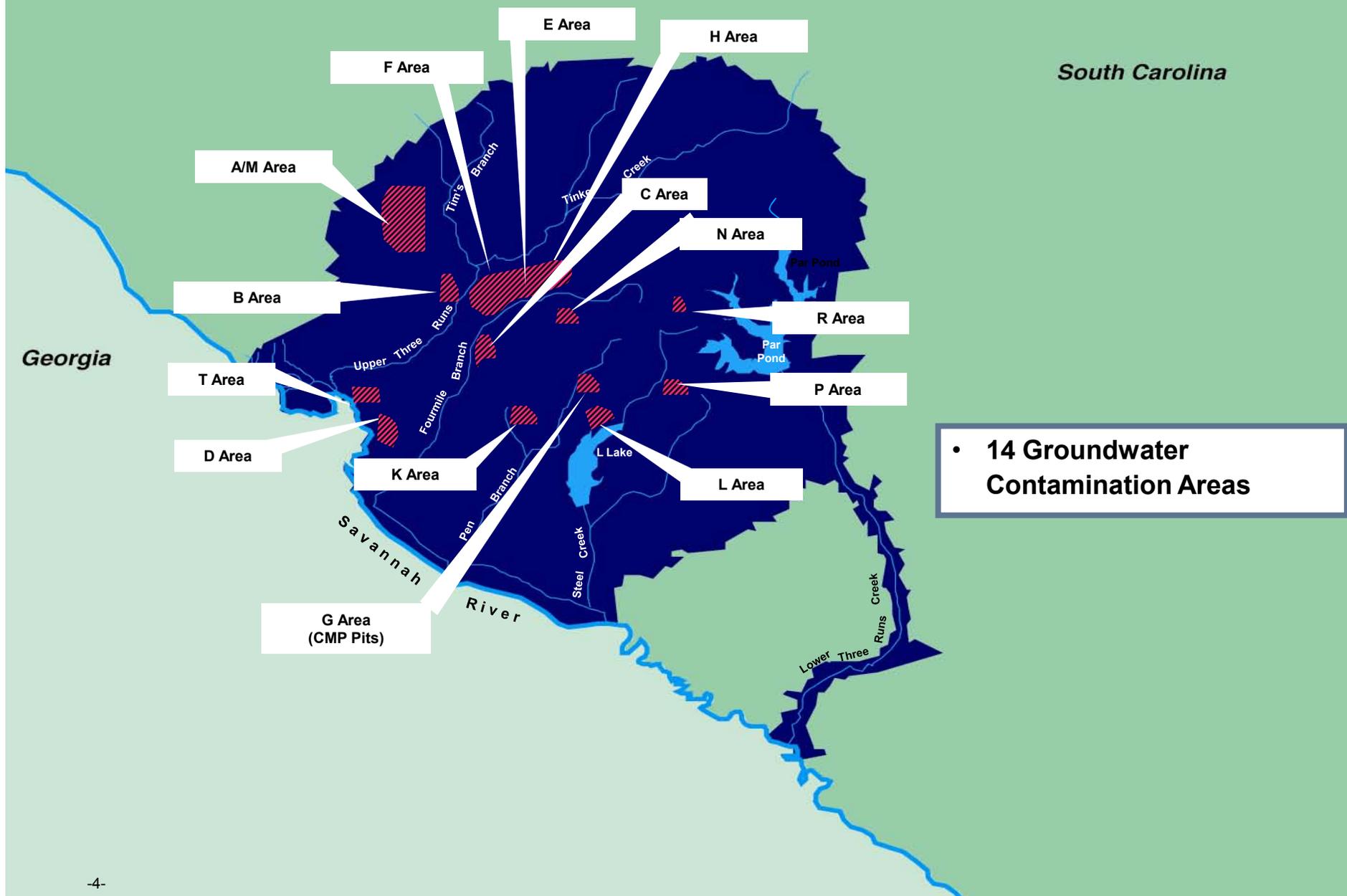
**To status progress of groundwater remediation at
the Savannah River Site**

Agenda

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



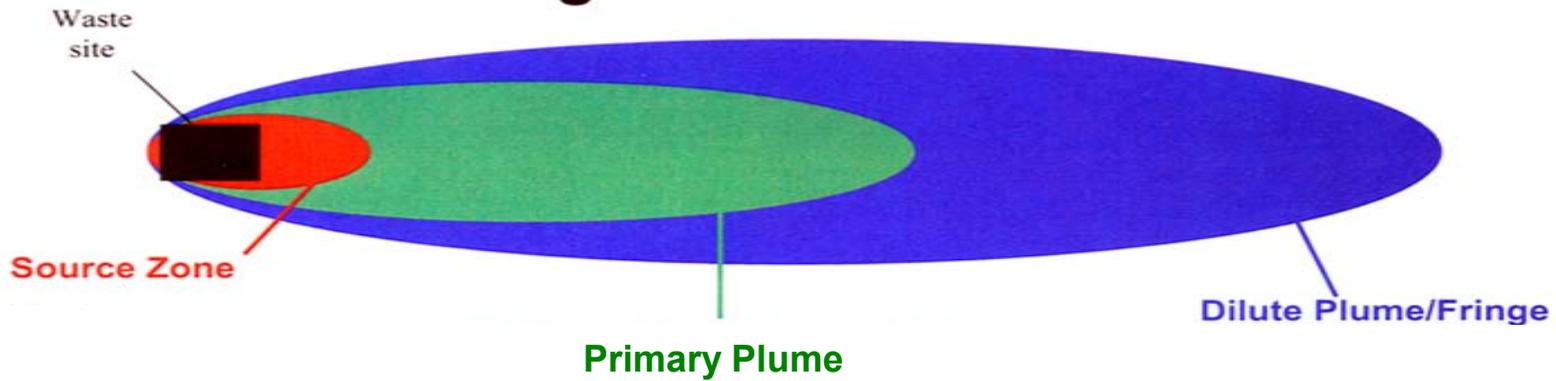
Savannah River Site Groundwater Contamination Areas



• 14 Groundwater Contamination Areas

Remediation Strategy

Treating a Contaminated Site



Active Remediation

Enhanced Natural Remediation

Passive Monitored
Natural Attenuation

High cost

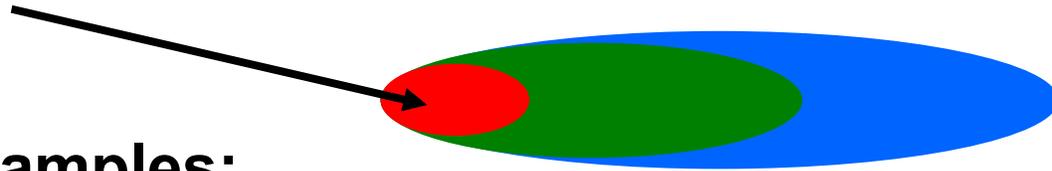


Low Cost

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
 - E Area
 - H Area
 - T Area
 - P Area (Passive at P-Burning Rubble Pit)
 - **Passive natural remediation in 6 areas**
 - L Area
 - G Area
 - B Area
 - R Area
 - C Area
 - D Area
 - **Two groundwater contamination areas remain to be completely characterized**
 - N- Area
 - K-Area (Passive at K-Burning Rubble Pit)

Source Zone



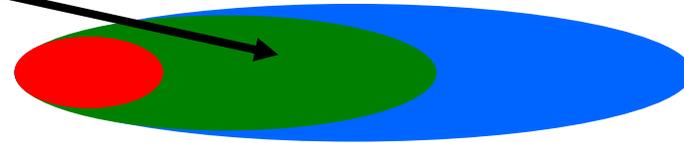
Remediation Examples:

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

Primary Plume

Remediation Examples:

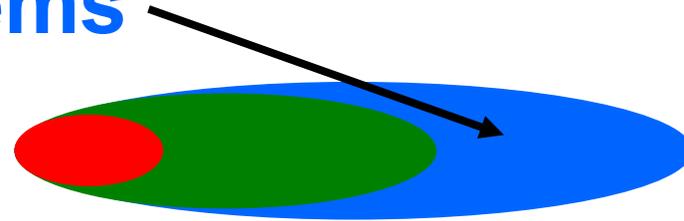
- **Hydraulic Control**
 - Pump and Treat
 - Phytoremediation pond
 - Barrier walls
- **In situ**
 - Airlift recirculation wells
 - Base injection
 - Chemical oxidation injection
 - Nutrient injection to enhance bioremediation



Passive Natural Systems

Remediation Examples:

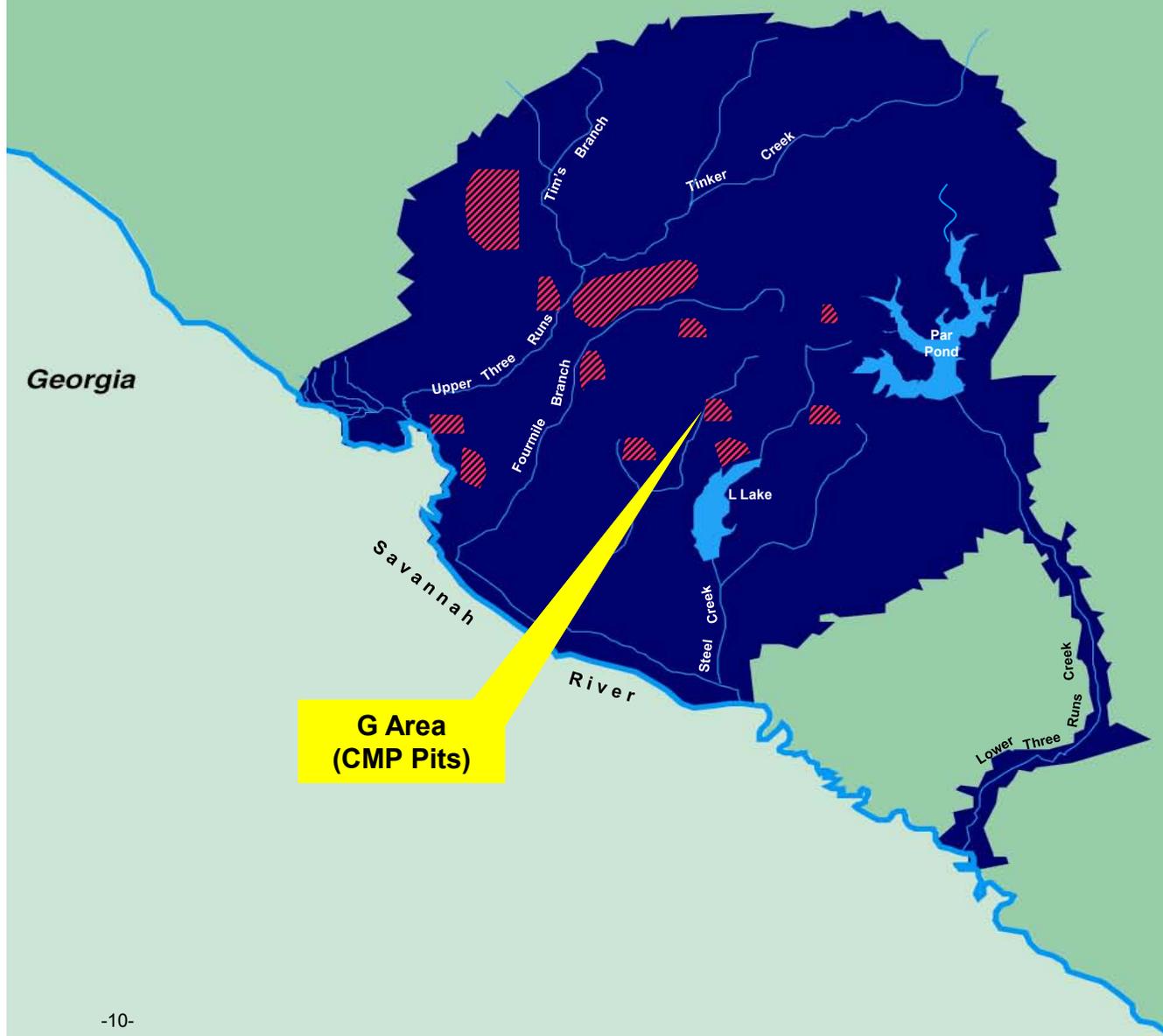
- **Phytoremediation**
- **Monitored Natural Attenuation**





Chemical, Metals, & Pesticides Pits

South Carolina



Chemicals, Metals, & Pesticides Pits *Solvents*



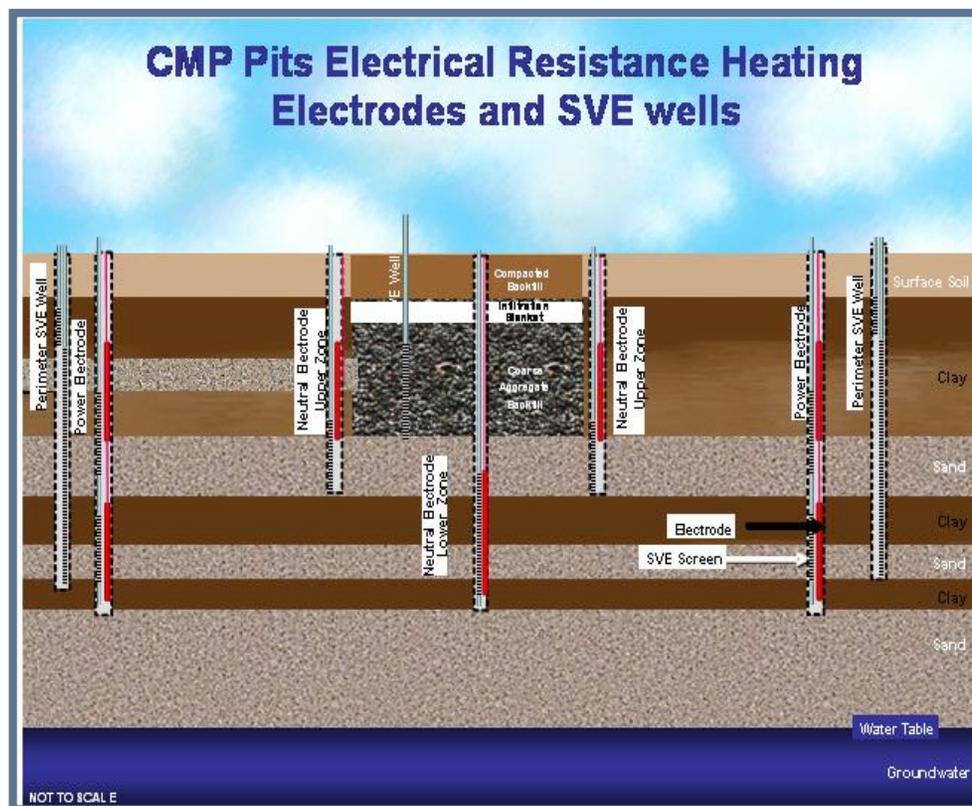
During use as a disposal pit



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

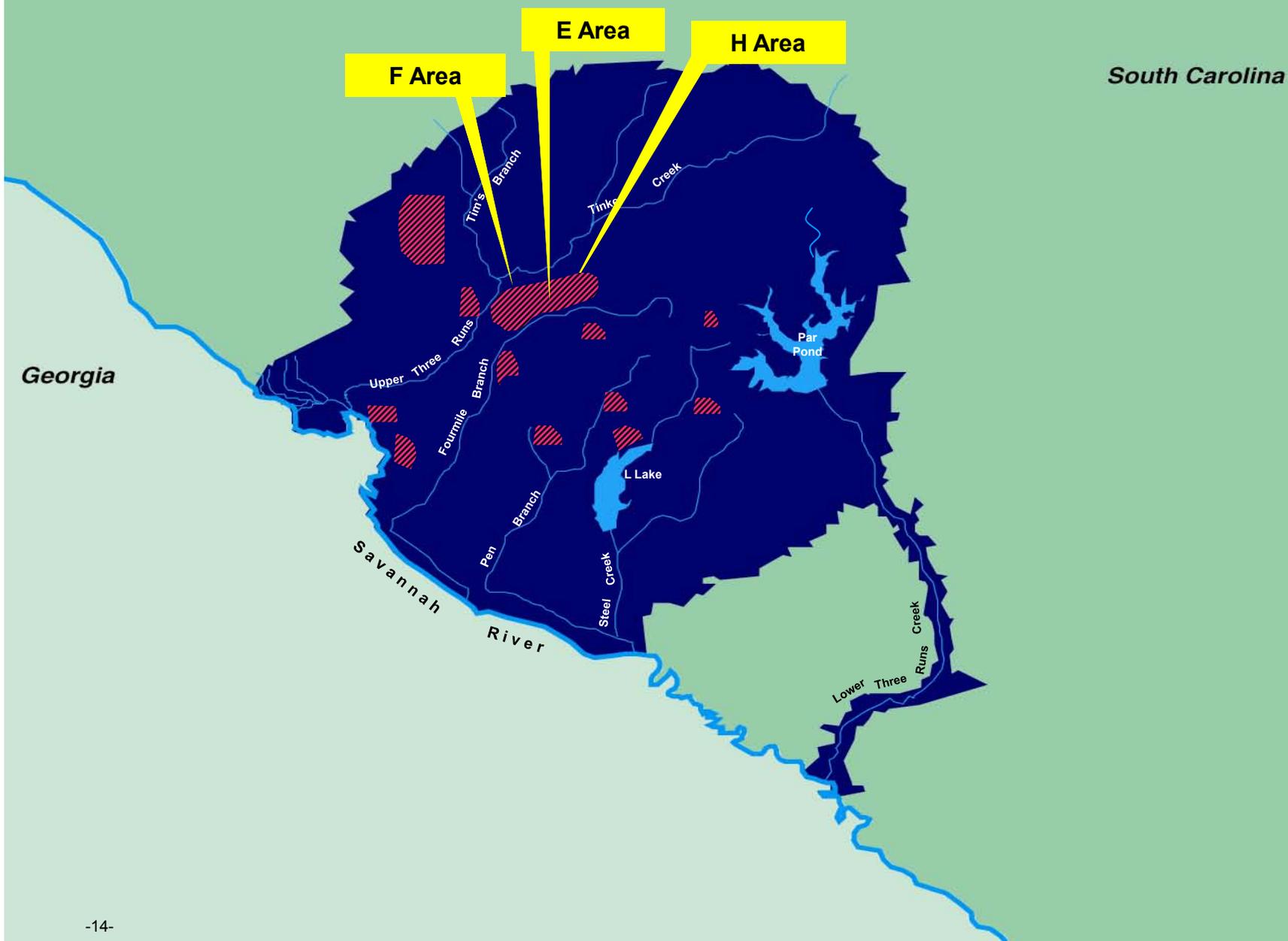




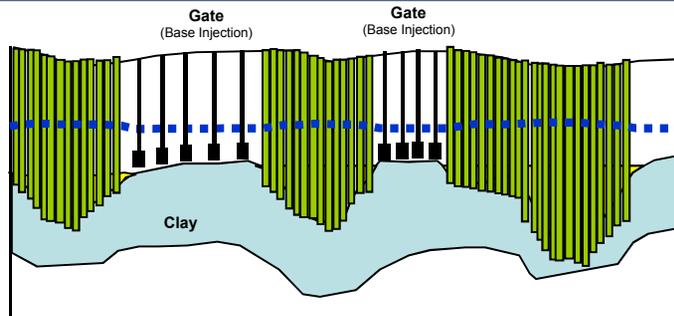
Chemicals, Metals, & Pesticides (CMP) Pits *Solvents*

- **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 Areas



F- and H-Area Barrier Walls

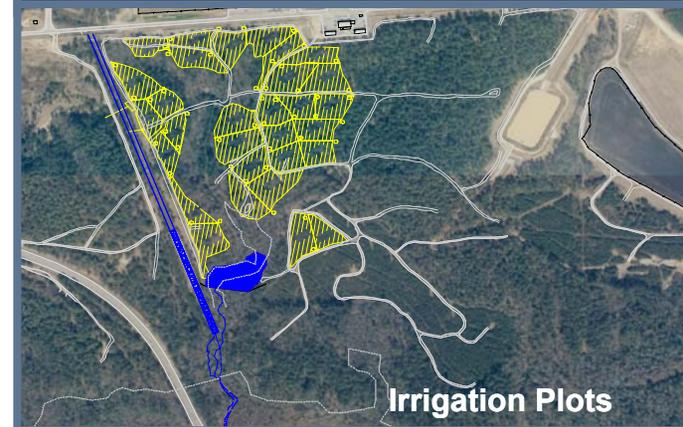


Funnel and Gate System

E-Area Phytoremediation

Upper Three Runs

Pond Created with Sheetpile



General Separations Area

Tritium and Metals

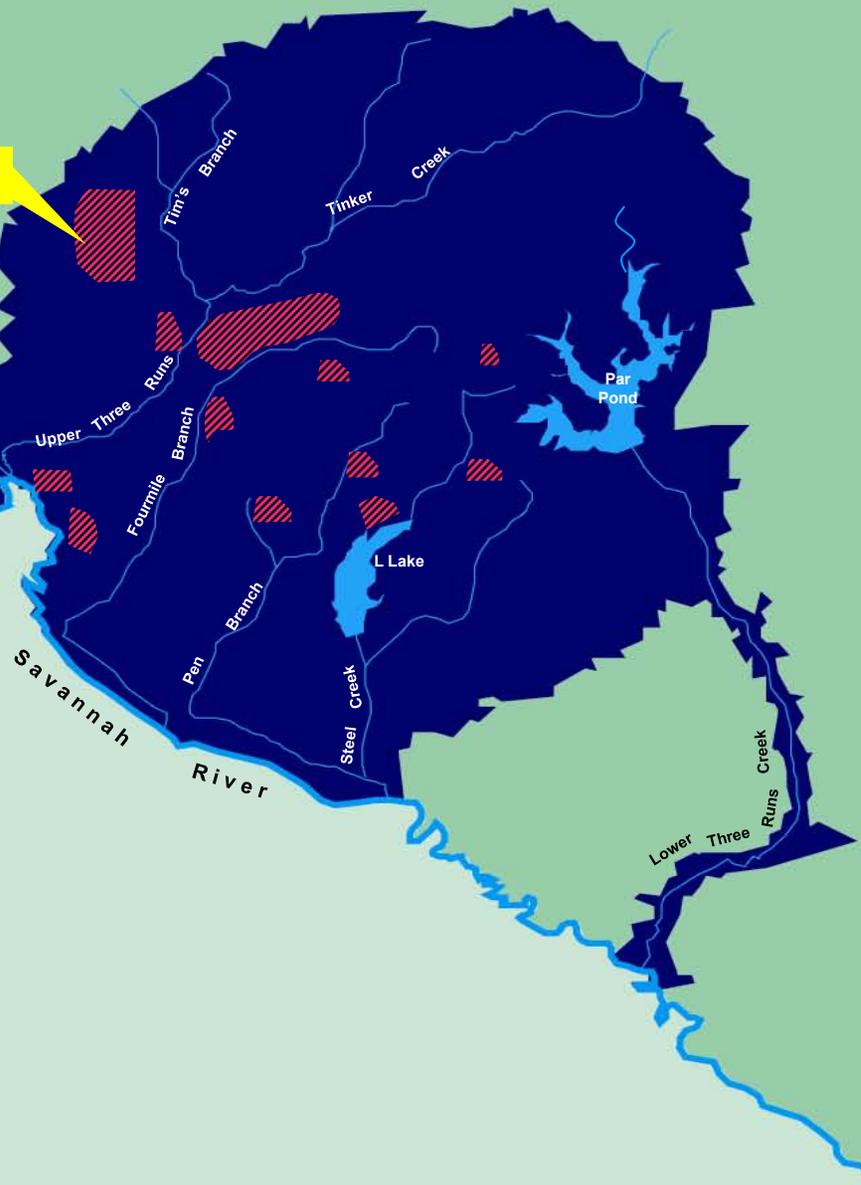
- **Source Control**
 - Capped basins and burial ground
- **Primary Plumes**
 - Used Pump-and-Treat, not cost-effective; terminated
 - Installed barrier walls for funnel and gate treatment system
 - Using pond with phytoremediation



South Carolina

Georgia

A/M Area





30' Soil Borings at
Process Sewer Tie-In



A-2 Airstripper



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

M-Area



Baro-
ball



Completed Passive Soil Vapor
Extraction Well Heads

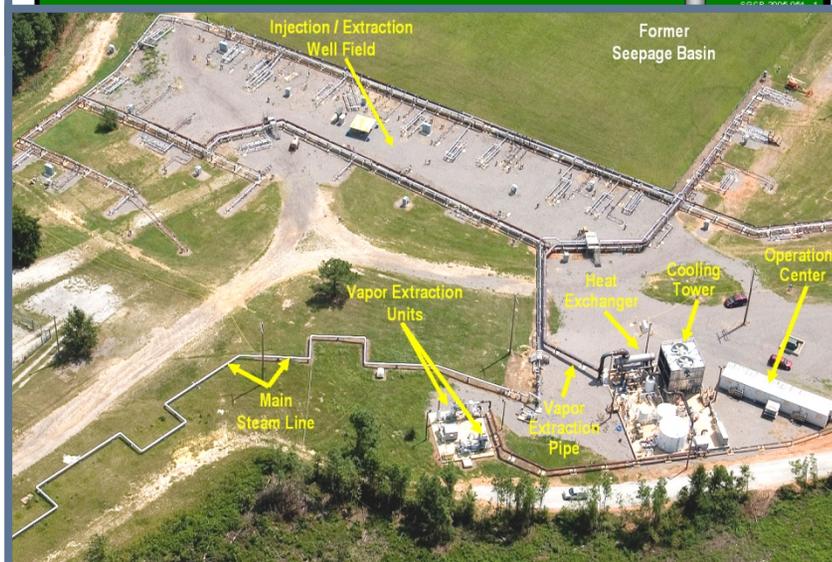
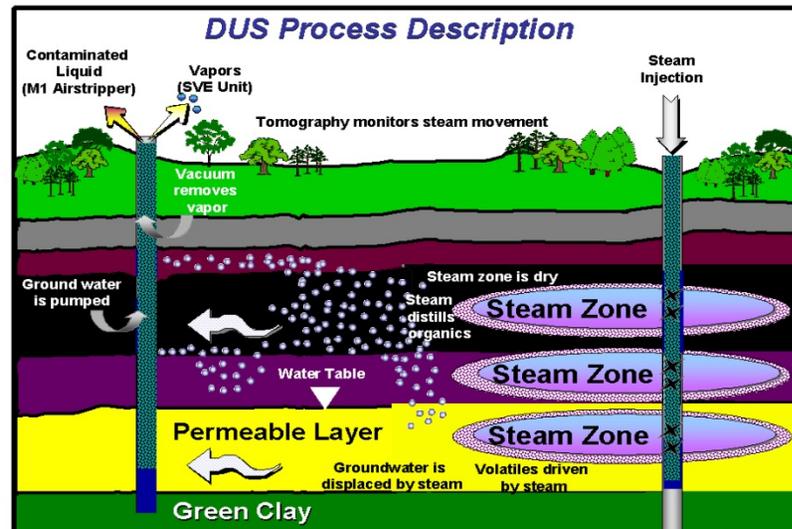
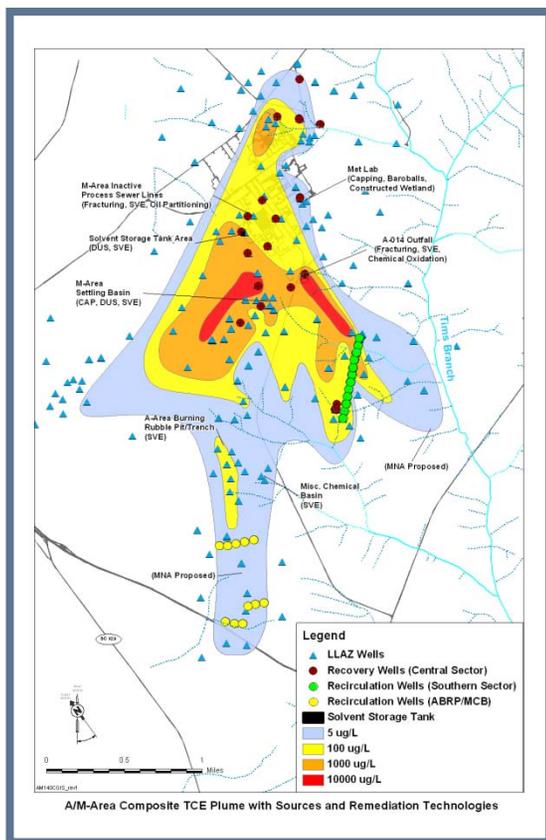


Employees guide the lift liners into roll-off pans for
shipment to Clean Harbors Lone Mountain Facility in
Oklahoma



M-Area Completion Celebration

A/M Area



Dynamic Underground Stripping



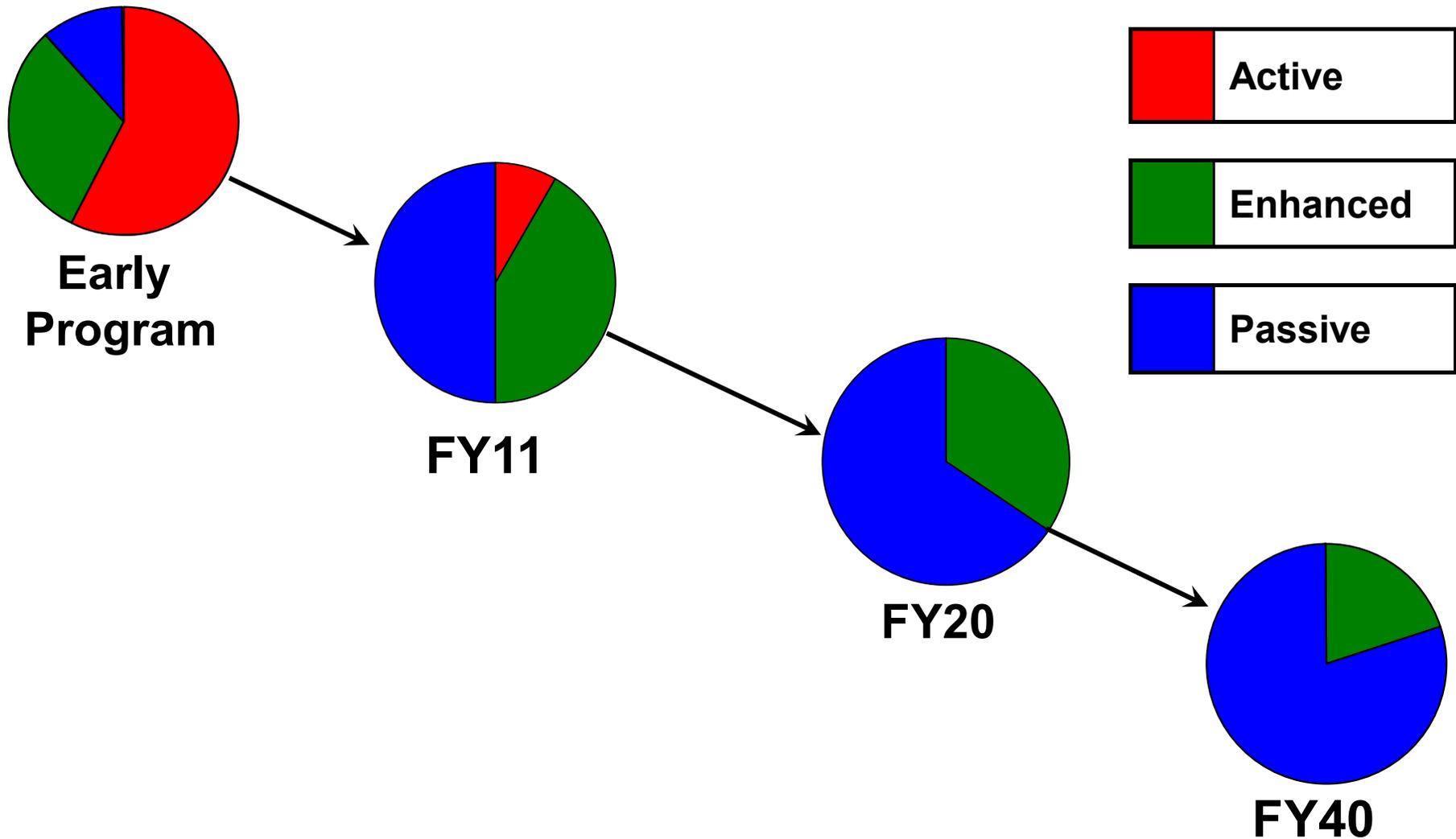
A/M Areas

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



Conclusion

- **Much progress has been made in groundwater remediation at SRS**
 - **Contaminants have been addressed in 12 of 14 groundwater contamination areas:**
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