

SC Department of Health and Environmental Control

**Philip Services Corporation
(PSC) Site
aka ThermalKEM**

Project Manager

Lucas Berresford

August 26, 2014

Meeting Goals

- Site History
- Remedial Investigation Results
- Evaluation of Remedial Alternatives
- Proposed Remedy
- Start Public Comment Period

1979 Aerial Photo



Site History

- 1966-Quality Drum – Storage, Treatment and Recycling
- 1981-Hazardous Waste Incinerator
- 1983- Stablex Inc
- 1987 ThermalKEM
- 1995 PSC
- 1998 Incinerator Closure Plan Submitted



Site History

- June 2003 PSC files for bankruptcy protection
- Dec 2003 Bankruptcy Settlement
 - Established Trustee
 - Established Trust Account (approximately \$4.3 M)
 - DHEC assigned as the Lead Agency

Post Operational History

- December 2003 DHEC continues Operation of the Treatment System
- 2004 – Removal of Incinerator Building and Start of Remedial Investigation (RI)
- Upgrades to Existing Groundwater Treatment System
- 2008 Remedial Investigation Report
- 2011 Feasibility Study
- 2014 Proposed Plan



Remedial Investigation Results

- Groundwater Assessment
- Surface Water Assessment
- Soil Assessment

Areas of Concern

- Stablex Materials Area
- Truck Wash
- Stormwater Pond
- Drum Repackaging Area (Fire Area)
- Drum Management Area
- Contaminant Ditch Area
- Container Storage Area
- Incinerator Sump Area
- Fuel Oil Area

**Figure 2-2
 Areas of Concern**

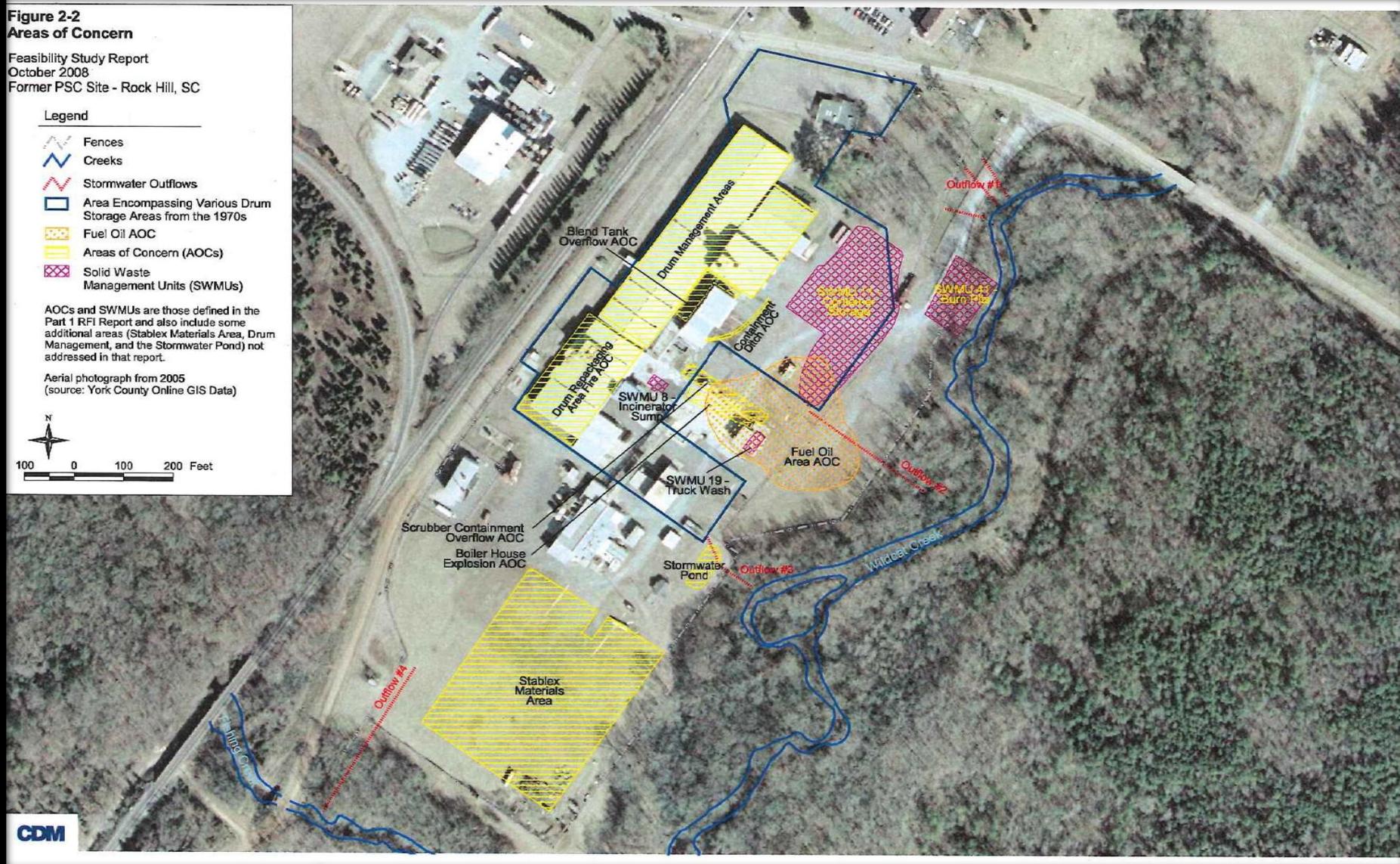
Feasibility Study Report
 October 2008
 Former PSC Site - Rock Hill, SC

Legend

- Fences
- Creeks
- Stormwater Outflows
- Area Encompassing Various Drum Storage Areas from the 1970s
- Fuel Oil AOC
- Areas of Concern (AOCs)
- Solid Waste Management Units (SWMUs)

AOCs and SWMUs are those defined in the Part 1 RFI Report and also include some additional areas (Stablex Materials Area, Drum Management, and the Stormwater Pond) not addressed in that report.

Aerial photograph from 2005
 (source: York County Online GIS Data)



Groundwater Sampling

- Samples were Collected from the 54 monitoring wells
- Elevated levels of SVOCs and VOCs

Contaminants in Groundwater

- BTEX – Benzene, toluene, ethylbenzene, and xylene.
- Chlorinated ethenes and ethanes (CEE)– Chloroethane; 1,1-dichloroethane; 1,2-dichloroethane; 1,1-dichloroethene; cis-1,2-dichloroethene; 1,1,2,2-tetrachloroethane; tetrachloroethene; 1,1,1-trichloroethane; trichloroethene; 1,1,2-trichloroethane; and vinyl chloride.
- Chlorinated benzenes (CB)– Chlorobenzene; 1,2-dichlorobenzene; 1,3-dichlorobenzene; 1,4-dichlorobenzene; 1,2,3-trichlorobenzene; and 1,2,4-trichlorobenzene.

BTEX Groundwater Concentration

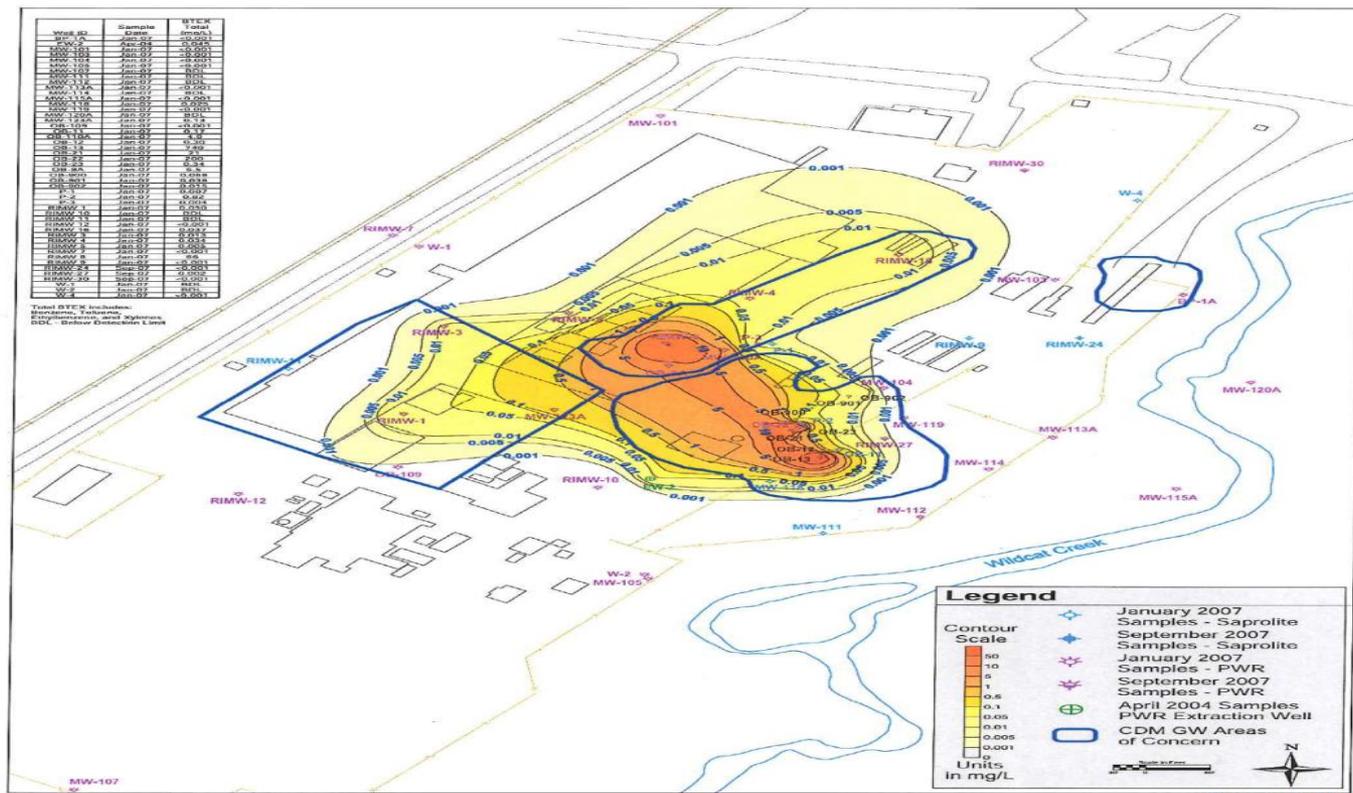


Figure 4-16
Total BTEX Concentration Map
Regolith Groundwater
Remedial Investigation Report
December 2007
Former PSC Site, Rock Hill, South Carolina



Groundwater Chlorinated Ethenes

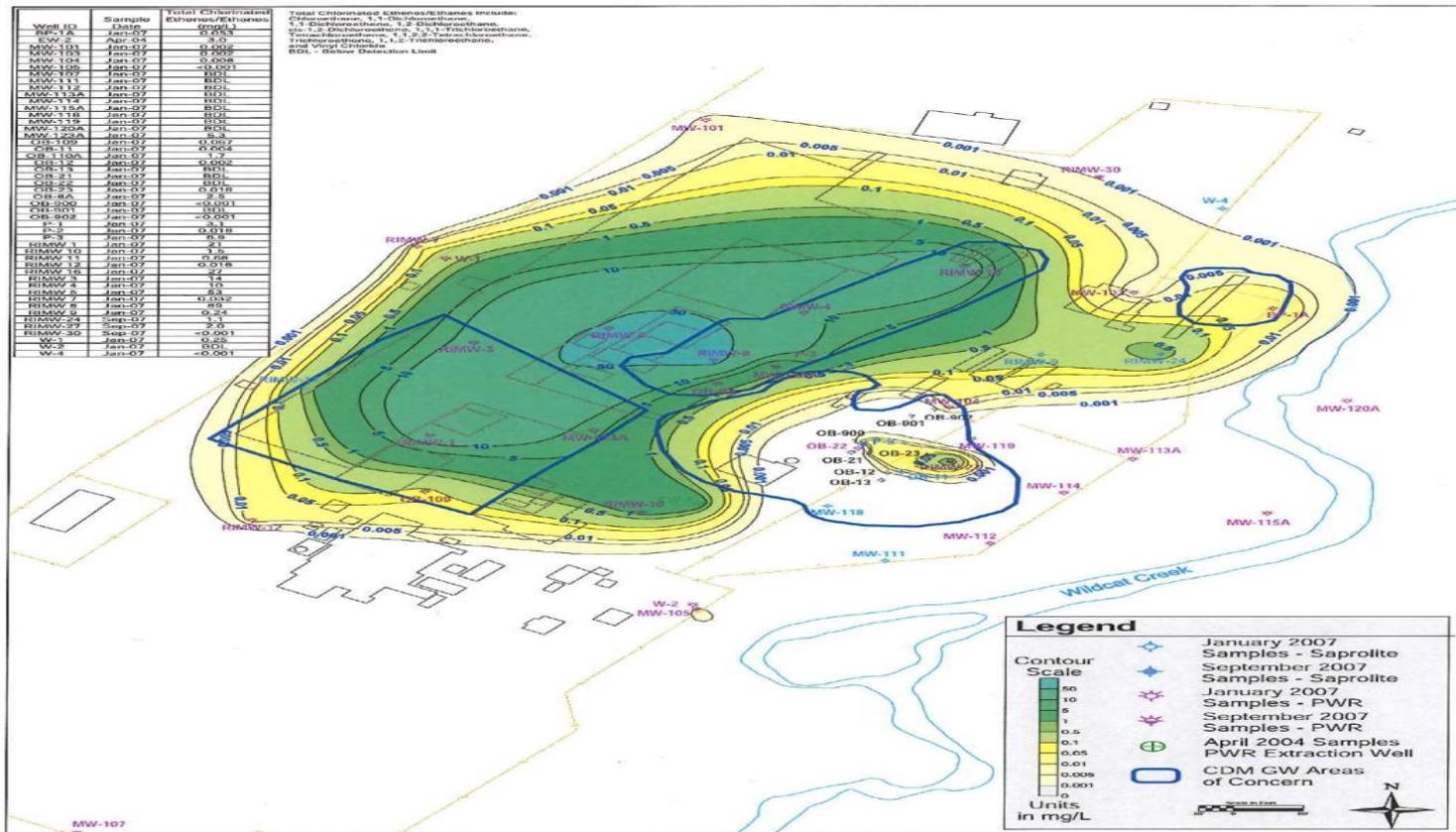


Figure 4-17
 Total Chlorinated Ethene/Ethanes Concentration Map
 Regolith Groundwater
 Remedial Investigation Report
 December 2007
 Former PSC Site, Rock Hill, South Carolina

Chlorinated Ethene Bedrock Groundwater Concentrations

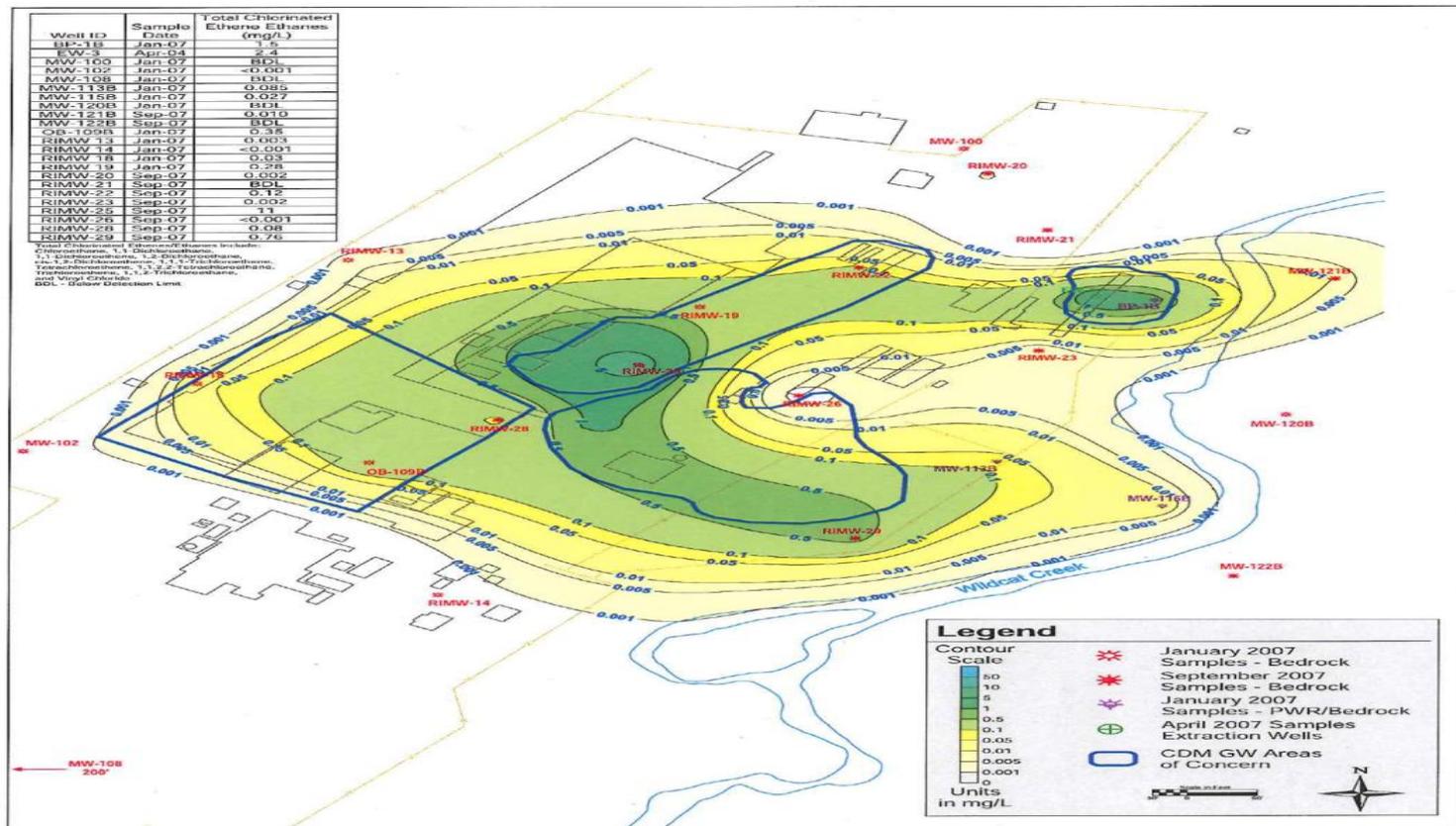


Figure 4-20
 Total Chlorinated Ethene/Ethane Concentration Map
 Bedrock Groundwater
 Remedial Investigation Report
 December 2007
 Former PSC Site, Rock Hill, South Carolina

Groundwater Areas of Concern

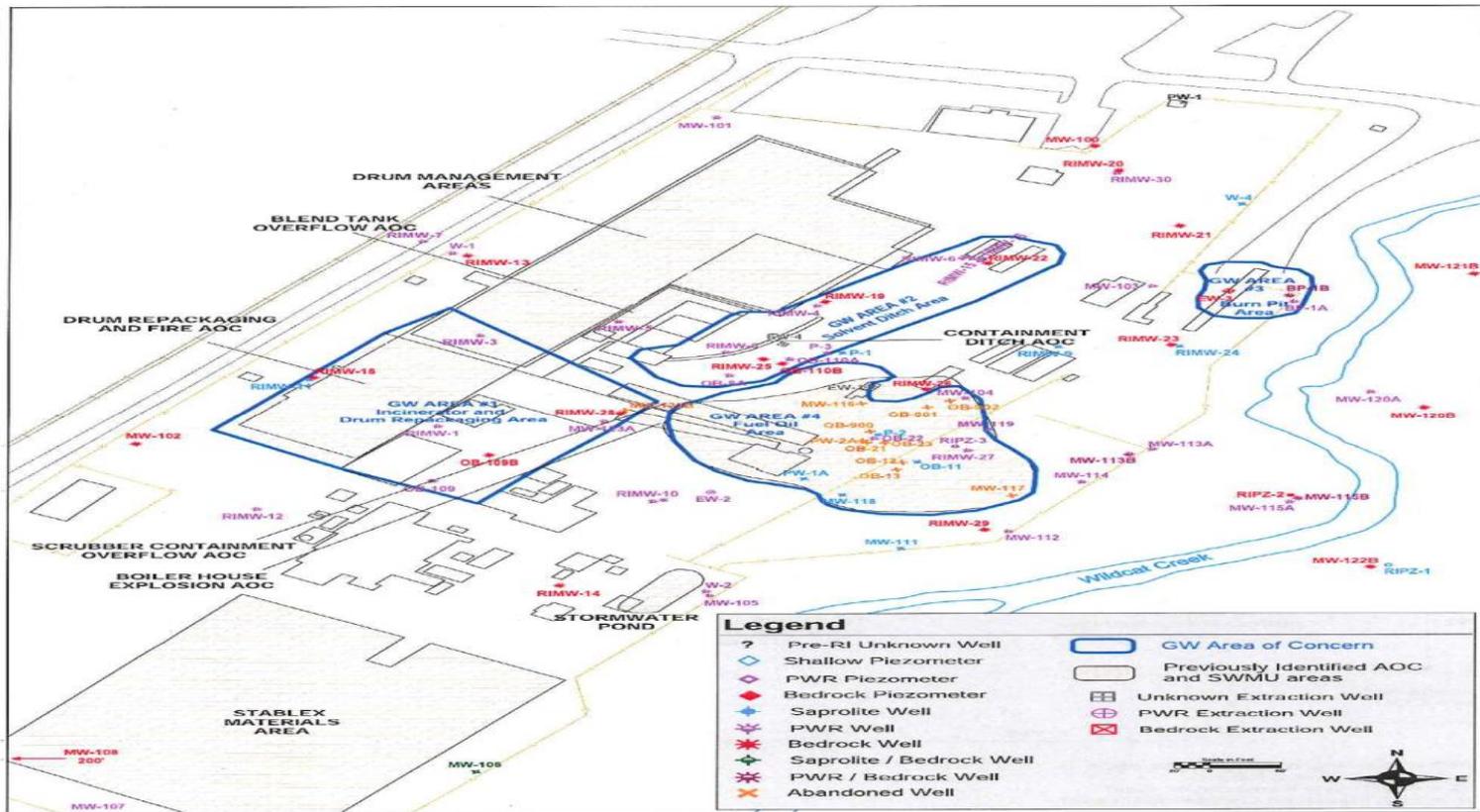
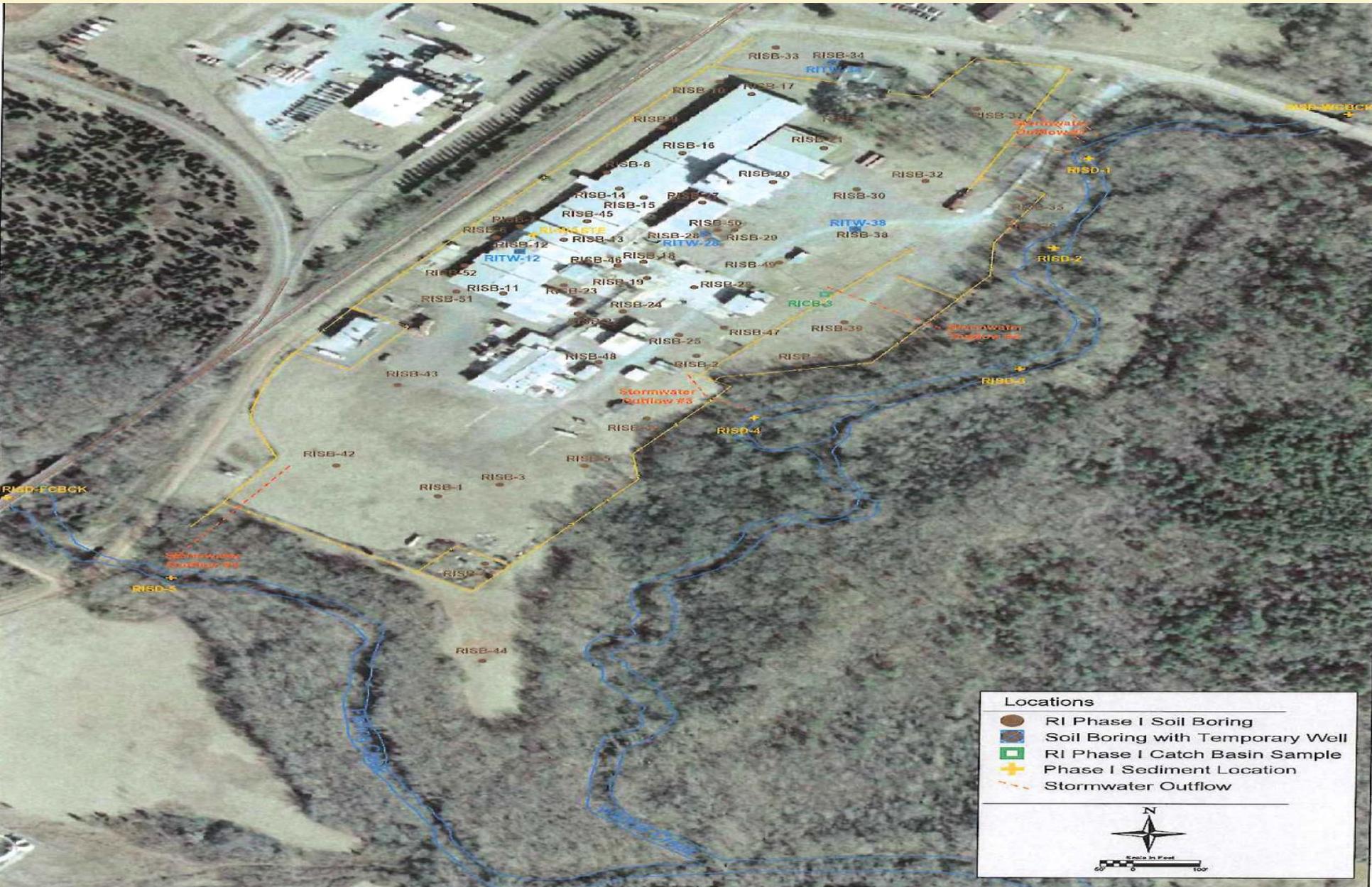


Figure 2-4
Groundwater Areas of Concern

Feasibility Study Report
October 2008
Former PSC Site, Rock Hill, South Carolina



Locations

- RI Phase I Soil Boring
- Soil Boring with Temporary Well
- RI Phase I Catch Basin Sample
- Phase I Sediment Location
- Stormwater Outflow

Soil Areas of Concern

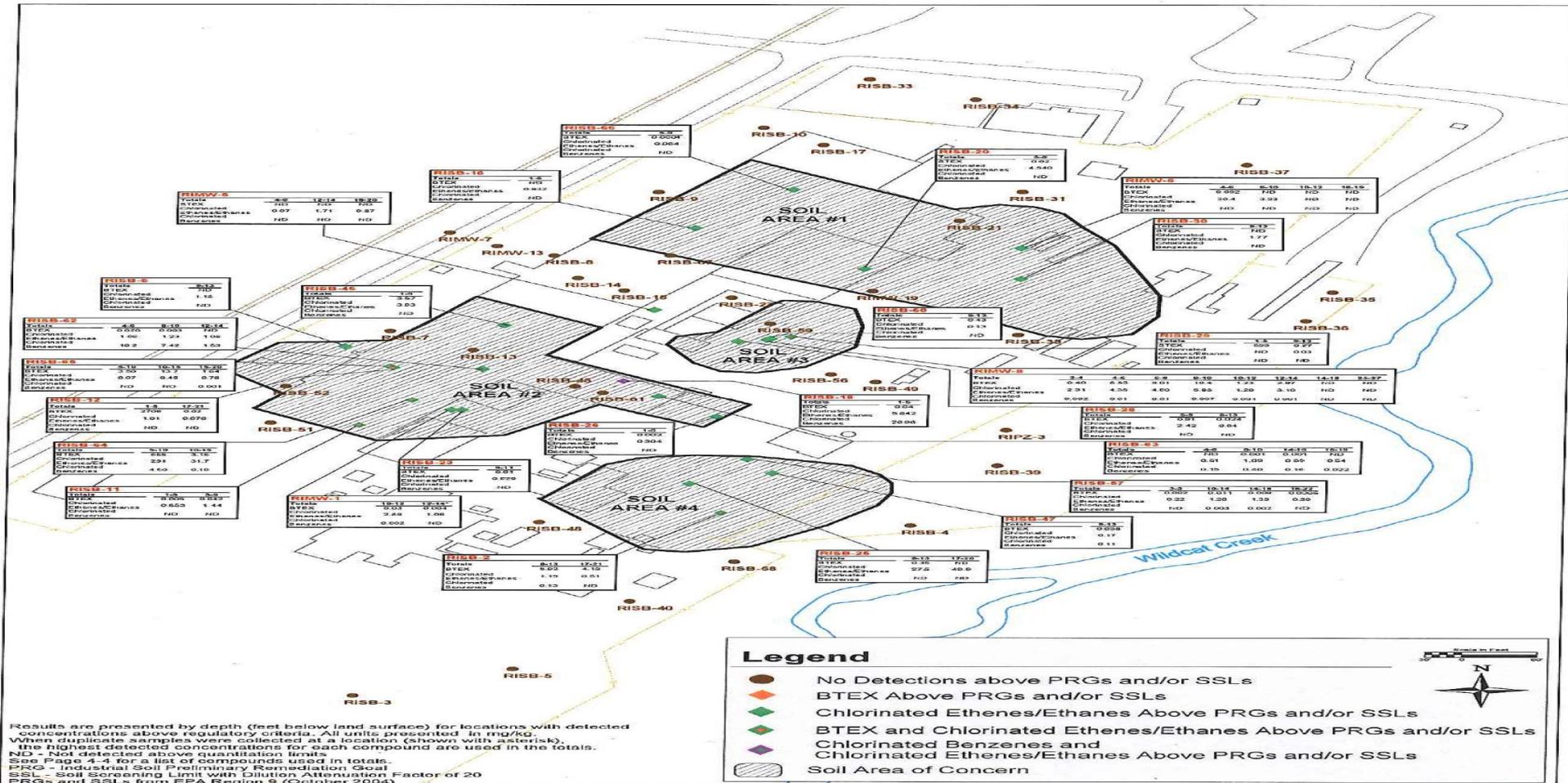


Figure 4-15
Subsurface Soil Locations with Detections
of VOCs above Screening Criteria

Contaminants in Soil

- BTEX
- Chlorinated ethenes and ethanes (CEE)
- Chlorinated benzenes (CB)
- Metals

Stream Sampling

- 23 screening samples collected from Fishing Creek
- 59 screening samples collected from Wildcat Creek
- Surface water and sediment samples collected showed no compounds elevated above background

Remedial Action Objectives

- Minimize potential for human contact with COCs in soil.
- Minimize future releases of COCs from soil to groundwater and from groundwater to surface water.
- Prevent human exposure to groundwater having concentrations in excess of remedial goals (MCLs)
- Restore groundwater to drinking water standards (MCLs).
- Minimize future releases of COCs from soil and groundwater to indoor air.

Evaluation of Remedial Alternatives

Remedial Alternatives Soil

- No Action
- Institutional Controls
- Source Containment
- Soil Excavation and Onsite Treatment
- Soil Excavation and Offsite Disposal
- Soil Vapor Extraction
- In-situ Thermal Treatment

Remedial Alternatives Groundwater

- No Action
- Institutional Controls and Long Term Monitoring
- Hydraulic Containment
- In-Situ Chemical Oxidation
- In-Situ Air Sparging
- Permeable Reactive Barrier Wall

Additional Evaluation of Remedial Alternatives

- No one catch all remedy for treatment
- Develop additional alternatives

Combined Alternatives Common Components

- Thermal enhanced multi-phased extraction (MPE) – Fuel Oil Area
- Excavation of metals contaminated soils
- Soil vapor extraction in burn pit area, if necessary
- Monitoring
- Deed Restrictions

Remedial Alternatives Combinations

- **Alternative 1 – Hydraulic Containment, Removal, SVE and Deep Soil Mixing**
- **Alternative 2 – Removal, SVE and Air Sparging**
- **Alternative 3 – Hydraulic Containment, In-Situ Thermal Treatment**

Alternative 1

Hydraulic Containment, Select Excavation, SVE, Deep Soil Mixing

- Excavation and offsite disposal of VOC Principal Threat Source Material (PTSM). VOCs whose concentration exceeds 1,000 times the corresponding SSL
- Deep soil mixing with oxidant in VOC impacted areas in soil and regolith groundwater outside of the Burn Pit and Fuel Oil areas.
- Hydraulic containment with onsite physical/chemical treatment for both the regolith and bedrock hydraulic zones.

Alternative 2 Hydraulic Containment, Select Excavation, SVE, and Air Sparging

- Excavation and offsite disposal of VOC PTSM,
- SVE for VOC impacted soil areas above the water table,
- Air sparging for VOC impacted areas in regolith groundwater,
- Bedrock groundwater containment

Alternative 3

In-Situ Thermal Treatment

- In situ thermal treatment for select areas to treat for VOCs in soil and regolith groundwater.
- Hydraulic containment with onsite physical/chemical treatment for both the regolith and bedrock hydraulic zones

Evaluation Criteria

- Overall Protection of Human Health and Environment
- Compliance with State and Federal Regulations
- Reduction of contaminant toxicity, mobility, and volume through treatment
- Short-Term Effectiveness
- Long-Term Effectiveness
- Implementability
- Cost
- Community Acceptance

Protection of Human Health and Environment

Compliance with ARARs

- All combined alternatives are effective in being protective of Human Health and the Environment and comply with ARARs
- Alternative 3 is best because it reduces contamination levels in soils

Reduction of Mobility, Toxicity and Volume by Treatment

- All remedies would reduce M/T/V
- Alternative 3 provides more treatment of contamination
- Alternatives 1 and 2 rely on removal and placement of material in an acceptable disposal facility

Short Term Effectiveness

- All Alternatives would involve minimal short term risk to site workers
- Alternative 3 is slightly more effective because it does not involve the direct excavation and handling of VOC impacted material

Long Term Effectiveness

- Alternatives 1 and 2 – May have areas that are difficult to treat due to distribution in subsurface
- Alternative 3 – More certainty that contamination within treatment areas is reduced

Implementability

- Alternatives 1 and 2 – Subsurface conditions may cause issues with uniform treatment
- Alternative 3 – Would require additional data collection to estimate length of operation for system

Costs

- Alternative 1 \$ 43,242,000
- Alternative 2 \$ 28,960,000
- Alternative 3 \$ 35,854,000

Table 6-5
Comparative Analysis of Soil Alternatives
 Feasibility Study Report
 Former PSC Site - Rock Hill, SC

Remedial Alternative	Criteria Rating						Approximate Present Worth
	Overall Protection of Human Health and the Environment	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of M/T/V Through Treatment	Short-Term Effectiveness	Implementability	
1 - No Action	0	0	0	0	0	5	\$418,000
2 - Institutional Controls	1.5	1	1.5	0	3	5	\$604,000
3 - Excavation and Offsite Disposal	5	5	5	4.5	3	3.5	\$32,308,000
4 - Source Containment	2.5	2	2.5	2	3.5	4	\$4,936,000
5 - Source Removal, Ex Situ Treatment, and Onsite Reuse	5	5	5	4.5	1	2	\$24,459,000
6A - Soil Vapor Extraction (SVE)	3.5	3.5	3.5	3.5	3	4	\$9,528,000
6B - In Situ Thermal Enhanced SVE	4	4	4	4	3	3	\$45,462,000
Combination Alternative 1, Soil Components: Select Excavation, SVE, and Deep Soil Mixing	4	4	4	4	3	3	\$43,242,000 ¹
Combination Alternative 2, Soil Components: Select Excavation and SVE	3.5	3.5	4	4	3	3	\$28,960,000 ¹
Combination Alternative 3, Soil Components: SVE and In Situ Thermal Treatment	4.5	4.5	4.5	5	3.5	4	\$35,854,000 ¹

Notes:

A ranking of "0" indicates that the criterion is not met while a ranking of "5" indicates that the criterion is completely met.

Combination alternative rankings are based on the soil component only.

¹ Total cost including both soil and groundwater components.

CDM

Preferred Remedy Alternative 3 – Hydraulic Containment, SVE, Thermal-Enhanced MPE, and In Situ Thermal Treatment

- Excavation and offsite disposal of metals contaminated soil exceeding RGs outside of VOC treatment areas,
- Hydraulic containment with onsite physical/chemical treatment for the regolith and bedrock hydraulic zones
- SVE in the Burn Pit Area, if necessary,
- Thermal-enhanced MPE for the Fuel Oil Area,
- In situ thermal treatment for select areas to treat for VOCs in soil and regolith groundwater.
- Groundwater and surface water monitoring.
- Institutional controls

Public Comment Period

- Administrative Record
 - York County Library Main Branch
138 East Black Street, Rock Hill

Public Comment Period :

August 26,2014 – September 26,2014

Next Steps

- Record of Decision (ROD) : identifies the selected cleanup method after review and consideration of all comments
- Remedial Design (RD) : development of specifications and drawings necessary for construction of the remedy
- Implementation of the Remedy (Funding)

Questions and Comments?

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