SAVANNAH RIVER SITE FACT SHEET

Sixth Five-Year Remedy Review Report for SRS Operable Units with Geosynthetic or Stabilization/Solidification Cover Systems

SRNS-RP-2021-05001

Savannah River Site, Aiken, SC
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The United States Department of Energy (USDOE), the United States Environmental Protection Agency (USEPA), and the South Carolina Department of Health and Environmental Control (SCDHEC) have prepared the Sixth Five-Year Remedy Review Report for Savannah River Site (SRS) Operable Units (OUs) with Geosynthetic or Stabilization/Solidification Cover Systems. This report documents the methods, findings, and conclusions for sixteen remedy decision document reviews for the SRS that selected geosynthetic or stabilization/solidification cover systems.

What is a Five-Year Remedy Review?

The Comprehensive Environmental Response, Compensation, and Liability Act requires that a remedy review is conducted every five years for sites where any hazardous substances, pollutants, or contaminants remain following a remedial or cleanup action. The remedies are evaluated to determine whether they are functioning as designed and whether they are protective of human health and the environment. The methods, findings, and conclusions of remedy reviews are documented in a five-year remedy review report.

Three Major Questions:

1) Is the remedy functioning as intended by the decision documents?
2) Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of remedy selection still valid?
3) Has any other information come to light that could call into question the protectiveness of the remedy?

The SRS Sixth Five-Year Remedy Review Report will be conducted in five phases with OUs grouped by the remedy types: (1) native soil covers and/or land use controls (LUCs); 2) groundwater; (3) engineered cover systems; (4) geosynthetic or stabilization/solidification (S/S) cover systems; and (5) operating equipment.

This report presents the Sixth Five-Year Remedy review for SRS OUs that selected geosynthetic or S/S cover systems as part of the final remedy.

Figure 1. SRS General

SRS History

SRS occupies approximately 310 square miles of land adjacent to the Savannah River, principally in Aiken and Barnwell counties of South Carolina. SRS is located approximately 25 miles southeast of Augusta, Georgia, and 20 miles south of Aiken,

South Carolina (Figure 1). Approximately 90 percent of SRS land consists of natural and managed forests.

The SRS was constructed during the 1950s to produce the basic materials used in the fabrication of nuclear weapons, primarily tritium and plutonium, in support of our nation's defense programs. Production of nuclear materials for the defense program was discontinued in 1988. SRS has provided nuclear materials for the space program, as well as for medical, industrial, and research efforts. Chemical and radioactive wastes are by-products of nuclear material production processes. These wastes have been treated, stored, and in some cases, disposed of at SRS. Past disposal practices (e.g., seepage basins, pits and piles, landfills, etc.) have resulted in soil and groundwater contamination.

Site Chronology	
1989	*SRS included on the National Priorities List as needing a long-term cleanup plan.*
1993	*Federal Facility Agreement established with the USDOE, USEPA – Region 4, and the SCDHEC to coordinate remedial actions at SRS into one comprehensive regulatory program.*
1997	*First SRS Five-Year Remedy Review is issued.*
2004	*Second SRS Five-Year Remedy Review is issued.*
2009	*Third SRS Five-Year Remedy Review is issued.*
2014	*Fourth SRS Five-Year Remedy Review is issued.*
2015	*Fifth Five-Year Remedy Review for SRS OUs with Native Soil Covers and/or LUCs (Phase 1) is issued.*
2017	*Fifth Five-Year Remedy Review for SRS OUs with Groundwater Remedies (Phase 2) is issued.*
2018	*Fifth Five-Year Remedy Review for SRS OUs with Engineered Cover Systems (Phase 3) is issued.*
2018	*Fifth Five-Year Remedy Review for SRS OUs with Geosynthetic or S/S Cover Systems (Phase 4) is issued.*
2018	*Fifth Five-Year Remedy Review for SRS OUs with Operating Equipment (Phase 5) is issued.*
2019	*Sixth Five-Year Remedy Review for SRS OUs with Native Soil Covers and/or LUCs (Phase 1) is issued.*
2020	*Sixth Five-Year Remedy Review for SRS OUs with Groundwater Remedies (Phase 2) is issued.*
2021	*Sixth Five-Year Remedy Review for SRS OUs with Engineered Cover Systems (Phase 3) is issued.*

What are the Cleanup Objectives?

Remedial goals are defined for individual OUs, but generally support the following cleanup objectives:

- To prevent unacceptable exposure of human receptors and ecological receptors to contaminants in soils and groundwater.
- To prevent or minimize the migration of contaminants from soils to groundwater at levels that exceed groundwater maximum contaminant levels.
- To prevent or minimize the discharge of contaminated groundwater to surface water.

Remedial Actions

Primary soil contaminants at SRS are cesium-137 and other radionuclides, organic chemicals, metals, polychlorinated biphenyls, and pesticides. The primary contaminants in groundwater are

volatile organic compounds, tritium, strontium-90, iodine-129, and metals to a lesser extent. Surface water has been impacted by the discharge of contaminated groundwater to site streams.

Remedial decisions were implemented for SRS OUs that included geosynthetic or S/S cover systems as part of the final remedy. Geosynthetic cover systems are constructed at SRS OUs when there is a concern that contamination left in place may leach to groundwater above acceptable levels. A typical cross section of a geosynthetic cover system consists of a vegetative/soil protective layer, a geosynthetic drainage layer, an impermeable geosynthetic liner, and compacted common fill placed over the contaminated material. A specific hydraulic conductivity to reduce stormwater infiltration is specified in the design.

In some cases, radioactively contaminated soils have been stabilized with in-situ grouting followed by installation of a low permeability cover (i.e., compacted clay, concrete, etc.) to deter migration of contaminants to the groundwater. Not only does a S/S technology stabilize waste left in place, the in-situ containment also provides another layer of protection to prevent intrusion and exposure to contaminated material.

Table 1 identifies the OUs and associated remedial actions included in the fourth phase of the Sixth Five-Year Remedy Review Report. Figure 2 shows the location of the OUs that correspond with Table 1.

Major Developments Since Last Five-Year Remedy Review

There are no major developments since the last five-year remedy review for geosynthetic or stabilization/solidification cover systems.

Next Five-Year Remedy Review

The Sixth Five-Year Remedy Review Report for SRS OUs with Geosynthetic or S/S Cover Systems is due in January 2023.

Issues and Recommendations

- Maintenance of the stormwater runoff covers at the E-Area Low-Level Waste Facility (LLWF) continues to be problematic due to subsidence, water pooling on the covers, and lifting during wind events. The current geosynthetic covers are not expected to meet the original project life of 25 years and high maintenance and replacement costs are anticipated. The USDOE recommends that discussions continue with the USEPA and SCDHEC on the type of cover system needed for future slit trench disposal units.

Table 1. SRS OUs with Geosynthetic or S/S Cover Systems

#	SEMS No.[a]	Operable Unit	Remedial Action[b]
1	48	B-Area Operable Unit	In Situ S/S, Concrete Cover, Groundwater Monitoring, LUCs
2	60	C-Area Reactor Seepage Basins (904-66G and 904-68G)	In Situ S/S, Soil Cover, LUCs
3	67	D-Area Expanded Operable Unit (comprised of D-Area Ash Basin [488-D] and D-Area Rubble Pit [431-2D])	Excavation, Soil Cover, Groundwater Monitoring, LUCs
4	86	E-Area Low-Level Waste Facility (643-26E)	Interim Stormwater Runoff Covers
5	23	F-Area Retention Basin (281-3F)	In Situ S/S, Soil Cover, LUCs
6	23	F-Area Tank Farms Operable Unit (Waste Tanks 5, 6, 17, 18, 19, and 20)	Annual Visible Engineered Barriers Inspection and Maintenance
7	32	General Separations Area Consolidation Unit (including Old Radioactive Waste Burial Ground [643-E] and Old Solvent Tanks [650-1E through 650-22E])	Excavation, Consolidation, Low Permeability Cover, LUCs
8	23	H-Area Tank Farms Operable Unit (Waste Tanks 12, 16)	Annual Visible Engineered Barriers Inspection and Maintenance
9	55	K-Area Reactor Seepage Basin (904-65G)	In Situ S/S, Soil Cover, LUCs
10	17	L-Area Oil and Chemical Basin (904-83G and 904-79G)	In Situ S/S, Soil Cover, LUCs
11	65, 60	L-Area and C-Area Reactor Seepage Basins (904-64G and 904-67G)	Soil Cover, LUCs
12	16	Old F-Area Seepage Basin (904-49G)	In Situ S/S, Groundwater Mixing Zone, LUCs
13	94	P-Area Operable Unit	Removal Actions (In Situ Decommissioning of P-Reactor Building [105-P], Excavation, Cover), Soil Fracturing with Chemical Oxidation, Soil Vapor Extraction, LUCs
14	66	P-Area Reactor Seepage Basins Operable Unit (904-61G, 904-62G, and 904-63G)	In Situ S/S , Consolidation, Soil Cover, LUCs
15	43	R-Area Burning/Rubble Pits (131-R and 131-1R) and R-Area Rubble Pile (631-25G)	Excavation, Soil Cover, LUCs
16	96	T-Area Operable Unit	Cover, Excavation, Soil Amendments, LUCs

[a] USEPA Superfund Enterprise Management System
[b] OUs may also include subunits with contaminants in building material or groundwater that are also addressed by the remedy decision document.

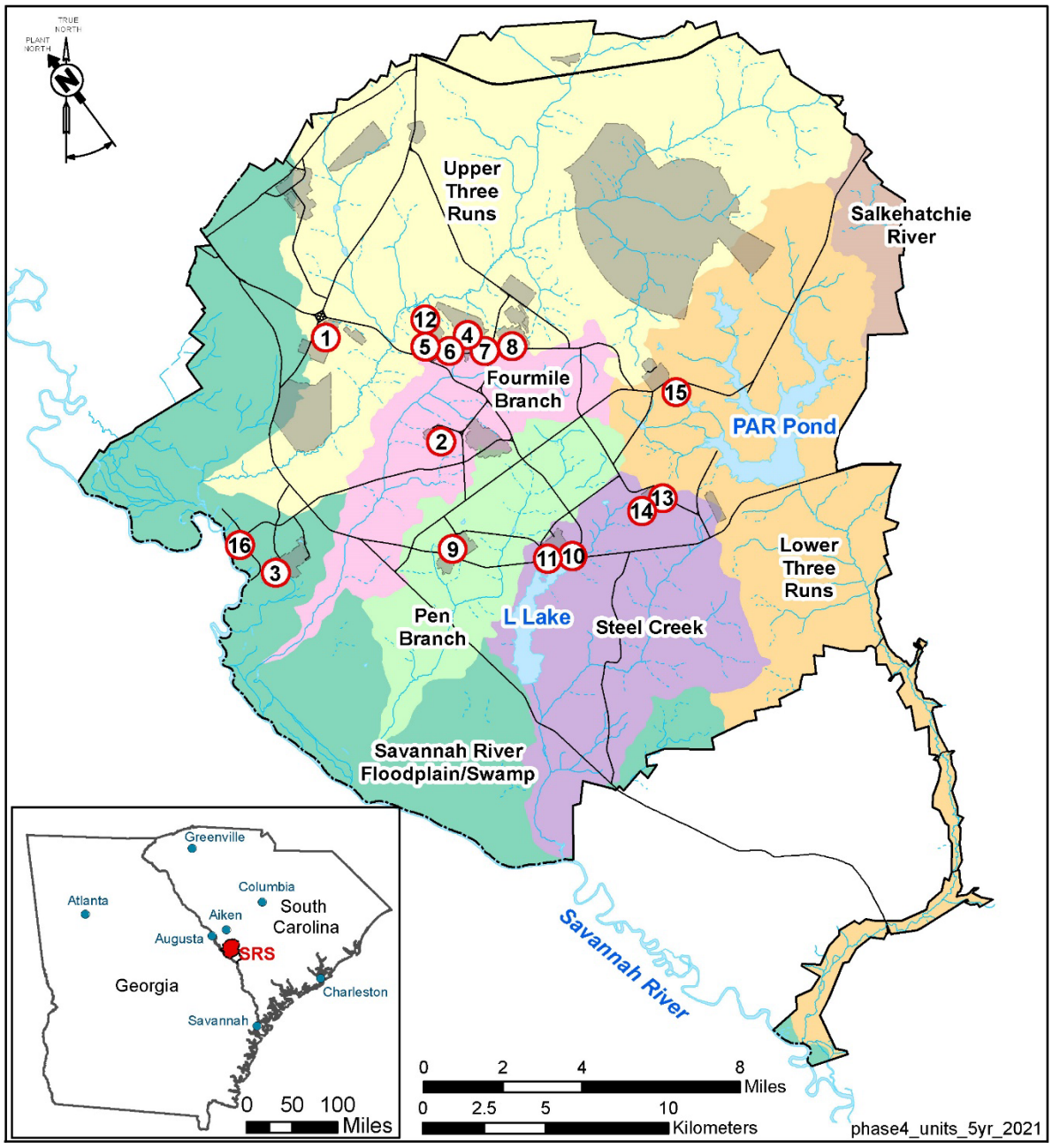

Figure 2. Location Map for SRS OUs with Geosynthetic or S/S Cover Systems

Protectiveness Summary

All sixteen remedies were determined to be protective of human health and the environment. The E-Area LLWF, F-Area Tank Farm OU, and H-Area Tank Farm OU are currently in the operational phase and unit specific LUCs have been deferred until final closure of these OUs. The interim remedies are currently protective because access is controlled by SRS facility security and administrative controls. SRS geosynthetic and S/S cover systems and related activities are functioning as intended.

For More Information

For more information regarding the complete SRS Sixth Five-Year Remedy Report for OUs with Geosynthetic or Stabilization/Solidification Cover Systems, please contact:

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