

SAVANNAH RIVER SITE FACT SHEET

SIXTH FIVE-YEAR REMEDY REVIEW REPORT FOR SRS OPERABLE UNITS WITH OPERATING EQUIPMENT

SRNS-RP-2022-00488

Savannah River Site, Aiken, SC
~~December 2022~~ June 2023

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) has prepared the Sixth Five-Year Remedy Review Report for Savannah River Site (SRS) Operable Units (OUs) with Operating Equipment. This report documents the methods, findings, and conclusions for eleven remedy decision reviews for the SRS that selected operating equipment as part of the final remedy.

What is a Five-Year Remedy Review?

The Comprehensive Environmental Response, Compensation, and Liability Act requires that a remedy review be 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.

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 OUs that selected operating equipment as part of the final remedy.

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,

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?

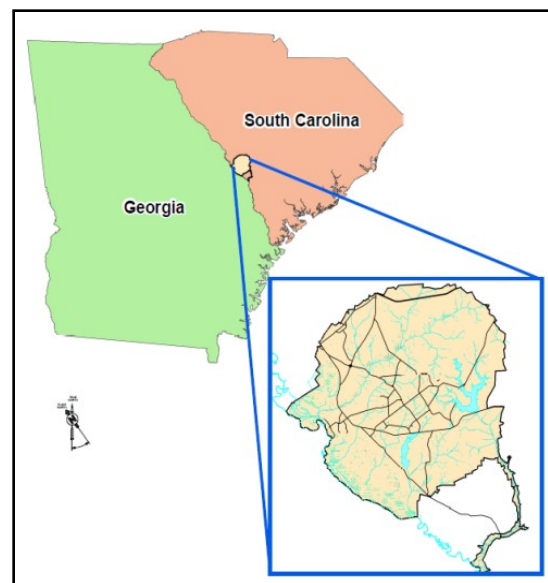


Figure 1. SRS General

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.

<i>Site Chronology</i>	
1989	<i>SRS included on the National Priorities List as needing a long-term cleanup plan.</i>
1993	<i>Federal Facility Agreement established with the USDOE, USEPA – Region 4, and the SCDHEC to coordinate remedial actions at SRS into one comprehensive regulatory program.</i>
1997	<i>First SRS Five-Year Remedy Review is issued.</i>
2004	<i>Second SRS Five-Year Remedy Review is issued.</i>
2009	<i>Third SRS Five-Year Remedy Review is issued.</i>
2014	<i>Fourth SRS Five-Year Remedy Review is issued.</i>
2015	<i>Fifth Five-Year Remedy Review for SRS OUs with Native Soil Covers and/or LUCs (Phase 1) is issued.</i>
2017	<i>Fifth Five-Year Remedy Review for SRS OUs with Groundwater Remedies (Phase 2) is issued.</i>
2018	<i>Fifth Five-Year Remedy Review for SRS OUs with Engineered Cover Systems (Phase 3) is issued.</i>
2018	<i>Fifth Five-Year Remedy Review for SRS OUs with Geosynthetic or S/S Cover Systems (Phase 4) is issued.</i>
2018	<i>Fifth Five-Year Remedy Review for SRS OUs with Operating Equipment (Phase 5) is issued.</i>
2019	<i>Sixth Five-Year Remedy Review for SRS OUs with Native Soil Covers and/or LUCs (Phase 1) is issued.</i>
2020	<i>Sixth Five-Year Remedy Review for SRS OUs with Groundwater Remedies (Phase 2) is issued.</i>
2021	<i>Sixth Five-Year Remedy Review for SRS OUs with Engineered Cover Systems (Phase 3) is issued.</i>
TBD2022	<i>Sixth Five-Year Remedy Review for SRS OUs with Geosynthetic or Stabilization/Solidification Cover Systems (Phase 4) is issued.</i>

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 to contaminants in soils, surface water, and groundwater containing unacceptable levels of contaminants.
- To prevent unacceptable exposure of ecological receptors to contaminants in soils, surface water, and groundwater containing unacceptable levels of contaminants.

- To prevent or minimize the migration of contaminants from soils to groundwater at levels that exceed groundwater maximum contaminant levels/remediation goals.
- 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 (VOCs), 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 that included operating equipment as part of the final remedy were implemented for SRS OUs. A range of active remediation systems are used at SRS. Soil vapor extraction (SVE) systems are used to remove VOCs from vadose zone source areas before the contaminants can migrate to the water table. Air strippers are employed to remove VOC contaminants from groundwater in the source zone. Pump and treat systems are used to remove contaminant mass and exert hydraulic control over contaminated groundwater plumes. Thermal technologies have been employed in several areas to mobilize dense non-aqueous phase liquid (DNAPL) VOCs in the vadose zone and groundwater. Dynamic Underground Stripping is a technology employed at SRS that utilizes steam injection to enhance removal from large DNAPL source zones. Electrical Resistance Heating has been used in smaller DNAPL source zones.

Many existing SVE systems have been converted from active vacuum extraction powered by fossil fuel to enhanced-passive systems powered by natural non-fossil-fuel energy sources. BaroBall™ and MicroBlower™ systems are two types of low-energy-consumption, low-carbon-emission SVE systems currently used at SRS to remove VOC contaminants from the subsurface.

Table 1 identifies the OUs and associated remedial actions included in the fifth 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 operating equipment.

Next Five-Year Remedy Review

The Sixth Five-Year Remedy Review Report for SRS OUs with Operating Equipment is due in January 2024.

Table 1. SRS OUs with Operating Equipment

#	SEMS No. ^a	Operable Unit	Remedial Action ^b
1	28	A-Area Burning/Rubble Pits (731-A and 731-1A) and Rubble Pit (731-2A), Miscellaneous Chemical Basin (731-4A) and Metals Burning Pit (731-5A)	SVE (Active and Passive), Air Sparging, Soil Cover, LUCs
2	36	A/M-Area Groundwater	SVE (Active and Passive), Pump-and-Treat with Air Stripping, Humate Amendment, Recirculation Wells (Dynamic Underground Stripping previously implemented (Resource Conservation and Recovery Act [RCRA] Permit Renewal)
3	30	A-Area Miscellaneous Rubble Pile (731-6A)	Excavation, SVE, Soil Cover, LUCs
4	31	C-Area Burning/Rubble Pit (131-C) and Old C-Area Burning/Rubble Pit (NBN)	SVE, Air Sparging, Soil Cover, Monitored Natural Attenuation
5	63	D-Area OU	Removal Action (Excavation, Thermal Treatment, SVE), LUCs
6	8	F-Area Groundwater	Barrier Wall Funnel and Gate System with Base Injection (Pump-and-Treat Groundwater previously implemented), LUCs (RCRA Permit Renewal)
7	9	H-Area Groundwater	Barrier Wall Funnel and Gate System with Base Injection (Pump-and-Treat Groundwater previously implemented), LUCs (RCRA Permit Renewal)
8	19	M-Area Settling Basin Inactive Process Sewer Lines to Manhole 1 (081-M)	LUCs ^c
9	92	M-Area OU	Removal Actions (Excavation, Backfill), Passive SVE, LUCs
10	59	P-Area Burning/Rubble Pit (131-P)	Soil Cover, Passive SVE, Groundwater Monitoring
11	21, 29	TNX Area	Excavation, In Situ S/S, SVE (Pump-and-Treat with Air Stripping, Recirculation Wells, Air Sparging previously implemented), Treatability Study (Enhanced Bioremediation with Edible Oil), Cover, Groundwater Monitoring, LUCs

a USEPA Superfund Enterprise Management System

b OUs may include subunits with contaminants in building material or groundwater that are also addressed by the remedy decision document.

c Remedial action originally listed as SVE, Soil Fracturing, LUCs. Since the remedial goals (RGs) for TCE and PCE have been met, the SVE system was shutdown.

NBN – No Building Number

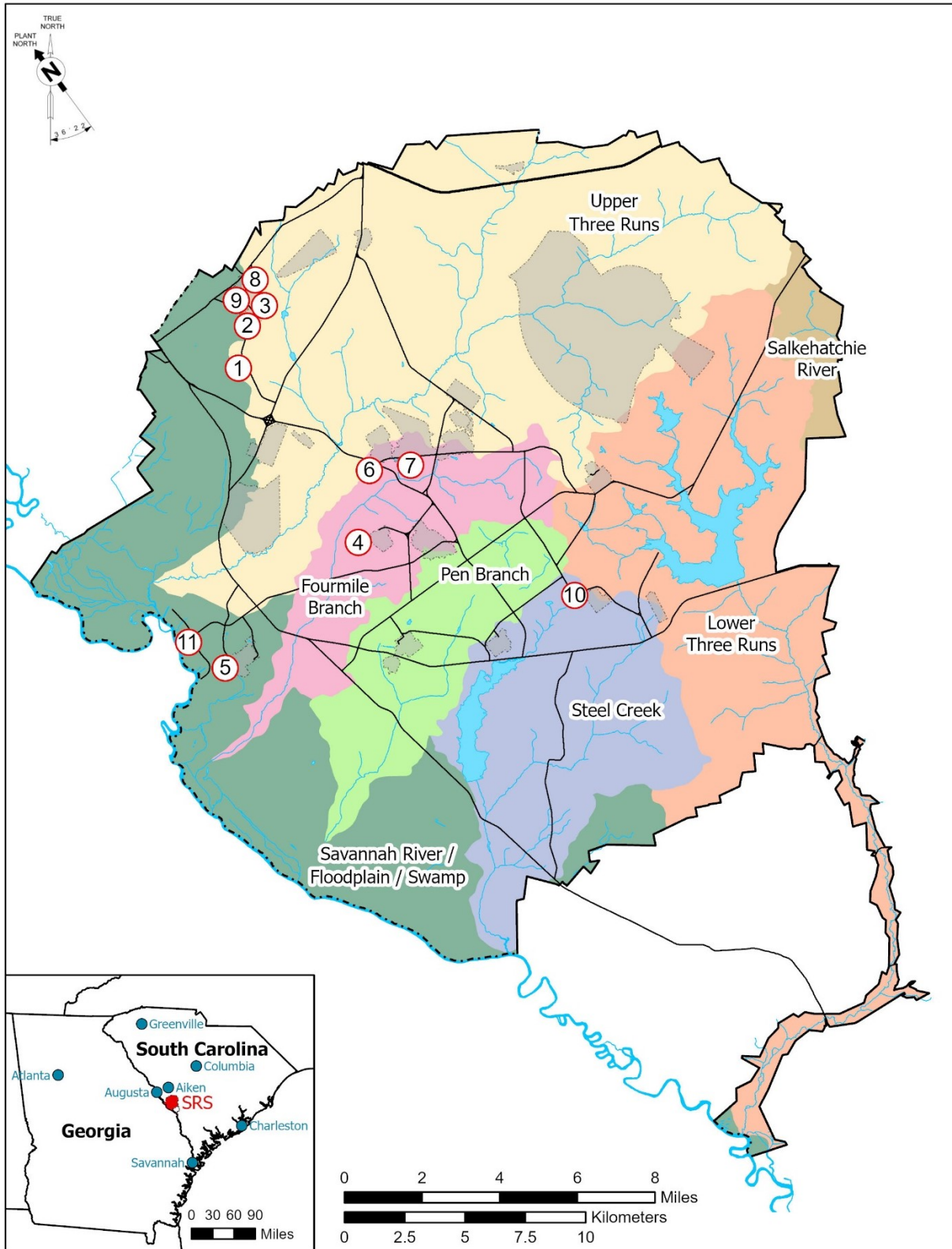


Figure 2. Location Map for SRS OUs with Operating Equipment

Issues and Recommendations

- Soil confirmation sampling is recommended at A-Area Burning/Rubble Pits (731-A, 731-1A) and Rubble Pit (731-2A), Miscellaneous Chemical Basin (731-4A) / Metals Burning Pit (731-5A) Operable Unit to evaluate the current soil concentrations against remedial goals (RGs) with the intent to justify shutting down the passive SVE system if the RGs have been met.
- Due to the D-Area Operable Unit Bubble Tower Subunit MicroBlower™ SVE system's minimal removals of contaminants for at least the last four years, SRS proposes to convert the MicroBlower™ SVE system to a passive BaroBall™ SVE system until confirmation soil samples can be collected to determine whether the tetrachloroethylene soil RG has been met (20 µg/kg). If the RG has been achieved, the results will be submitted to the USDOE, USEPA, and SCDHEC for consensus to justify discontinuing operation of the SVE system and/or monitoring.
- Since the M-Area Settling Basin Inactive Process Sewer Lines (MIPSL) SVE system has been taken offline and removed, and the LUC boundaries of the MIPSL OU and M-Area OU (MAOU) overlap, SRS recommends moving the M-Area Settling Basin Inactive Process Sewer Lines Operable Unit from the Operating Equipment group to the Native Soil Cover and/or LUCs group incorporating the MIPSL OU into the MAOU to eliminate the operation and maintenance costs for the smaller OU. A meeting to discuss the appropriate regulatory path forward for this recommendation is needed. This recommendation would take effect during the Seventh Five Year Remedy Review Report for the SRS OUs with Native Soil Covers and/or Land Use Controls.

For More Information

For more information regarding the complete SRS Sixth Five-Year Remedy Report for OUs with Operating Equipment, please contact:

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