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Fourth Phase: Fifth Year Review Report for Savannah River Site Operable Units with Geosynthetic or Stabilization/Solidification Cover Systems

The Fifth Five-Year Remedy Review Report is being conducted in five phases for operable units (OUs) with similar remedies. The OUs are grouped by the following remedy types: (1) native soil cover and/or land use controls, (2) groundwater, (3) engineered cover system, (4) geosynthetic or stabilization/solidification cover system, and (5) operating equipment. The public is notified when each phase of the remedy review is conducted and when the phase is complete. The review for the fourth phase for OUs with geosynthetic or stabilization/solidification cover system remedies is complete and is being made available to the public.

The Comprehensive Environmental Response, Compensation, and Liability Act requires that remedial actions that result in hazardous substances, pollutants, or contaminants remaining at an OU at levels unsuitable for unrestricted land use be subject to a five-year remedy review. *The Fifth Five-Year Remedy Review Report for Savannah River Site Operable Units with Geosynthetic or Stabilization/Solidification Cover Systems* evaluated the remedial actions for geosynthetic or stabilization/solidification cover systems selected through issued Records of Decision (RODs), Interim RODs, ROD Amendments, or Explanations of Significant Differences to determine whether the selected remedies remain protective of human health and the environment. *The Fifth Five-Year Remedy Review Report for Savannah River Site Operable Units with Geosynthetic or Stabilization/Solidification Cover Systems* is complete and is being issued by the U. S. Department of Energy (DOE), the lead agency for the Savannah River Site (SRS), with concurrence by the U. S. Environmental Protection Agency - Region 4 (EPA), and South Carolina Department of Health and Environmental Control (SCDHEC).

The five-year remedy review addressed three major questions:

- Are the remedies functioning as intended by the decision document?
- Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of remedy selection still valid?
- Has any other information emerged that could call into question the protectiveness of the remedy?

The report reviews fifteen (15) remedy decisions for SRS OUs that selected geosynthetic or stabilization/solidification cover systems as part of the final remedy. Many cover systems are designed to protect groundwater by minimizing the infiltration of rainwater through the contaminated material left in place. 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. Low permeability covers are often paired with soil vapor extraction units that remove volatile organic compounds from the subsurface soil beneath the OU to prevent migration of contaminants to groundwater.

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 stabilization/solidification technology stabilize waste left in place, the in-situ containment also provides another layer of protection to prevent intrusion and exposure to contaminated material.

The Fifth Five-Year Remedy Review Report for SRS Operable Units with Geosynthetic or Stabilization/Solidification Cover Systems includes a review of the following operable units:

- B-Area Operable Unit
- C-Area Reactor Seepage Basins (904-66G and 904-68G)
- D-Area Expanded Operable Unit (comprised of D-Area Ash Basin [488-D] and D-Area Rubble Pit [431-2D])
- E-Area Low-Level Waste Facility (LLWF) (643-26E)
- F-Area Retention Basin (281-3F)
- F-Area Tank Farm Operable Unit (Waste Tanks 5, 6, 17, 18, 19, and 20)
- General Separations Area Consolidation Unit (including Old Radioactive Waste Burial Ground [643-E] and Old Solvent Tanks [650-1E through 650-22E])
- K-Area Reactor Seepage Basin (904-65G)
- L-Area Oil and Chemical Basin (904-83G and 904-79G)
- L-Area and C-Area Reactor Seepage Basins (904-64G and 904-67G)
- Old F-Area Seepage Basin (904-49G)
- P-Area Operable Unit (PAOU)

- P-Area Reactor Seepage Basins Operable Unit (904-61G, 904-62G, and 904-63G)
- R-Area Burning/Rubble Pits (131-R and 131-1R) and R-Area Rubble Pile (631-25G)
- T-Area Operable Unit

The exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of remedy selection are still valid for all the remedial actions evaluated. All fifteen (15) remedy decisions were determined to be protective of human health and the environment. The E-Area LLWF and F-Area Tank Farm OUs are currently in the operational phase and unit specific land use controls have been deferred until final closure of the OUs. The interim remedies are currently protective because access is controlled by SRS security and administrative controls.

In the *Fifth Five-Year Remedy Review Report for Savannah River Site Operable Units with Geosynthetic or Stabilization/Solidification Cover Systems*, the DOE, EPA, and SCDHEC made the following determinations:

- The cover inspection frequency for the F-Area Retention Basin, General Separations Area Consolidation Unit, L-Area Oil and Chemical Basin, and P-Area Reactor Seepage Basin OUs has been reduced to annual. This reduction provides consistency since the majority of OU covers at SRS are inspected annually and continues to provide adequate safety and security for the OUs.
- The recommendation from the last five-year remedy review to reduce sampling frequency from annual to every five years has been implemented for the R-Area Burning/Rubble Pits and R-Area Rubble Pile OU. The five-year sampling frequency coincides with the five-year remedy reviews.
- Maintenance of the stormwater runoff covers at the E-Area 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 DOE recommends that discussions continue with the EPA and SCDHEC on the type of cover system needed for future slit trench disposal units.
- Elevated gross alpha concentrations were detected in the groundwater wells at the B-Area OU likely due to turbidity issues. The DOE recommends redevelopment of the wells prior to the next sampling event to reduce turbidity, followed by filtering of samples and speciation, as needed, for radionuclides. The sampling results from the redeveloped wells will be reported in the Sixth Five-Year Remedy Review Report.
- Ten radionuclides identified as contaminant migration constituents of concern for the PAOU are not predicted to impact groundwater before the year 2230. Many of these radionuclides require specialized analytical methods. The DOE recommends a reduction of the PAOU analyte list to focus on radionuclides with the fastest travel times as predicted by the groundwater model. The change to the monitoring strategy will be documented in an addendum to the PAOU Effectiveness Monitoring Plan and will not impact the protectiveness of the remedy.
- The E-Area LLWF and F-Area Tank Farm OUs are currently in the operational phase and OU-specific land use controls have been deferred until final closure of the entire facilities. SRS facility security and administrative controls that restrict unauthorized access to the E-Area LLWF and F-Area Tank Farm OUs are not part of the interim remedies and therefore not recognized as long-term protective. SRS recommends that Appendix A of the Federal Facility Agreement (FFA) Annual Progress Report be revised to include the E-Area LLWF and F-Area Tank Farm OUs to demonstrate long-term protectiveness through the SRS facility security and administrative controls. The report is required by the FFA and includes an annual certification by the DOE SRS Manager that the listed OUs comply with land use requirements.

To aid in the review of the report, a *Savannah River Site Fact Sheet for the Fifth Five-Year Remedy Review Report for SRS Operable Units with Geosynthetic or Stabilization/Solidification Cover Systems* was also developed.

Copies of the *Fifth Five-Year Remedy Review Report for Savannah River Site Operable Units with Geosynthetic or Stabilization/Solidification Cover Systems* and the Fact Sheet are available in the Administrative Record. The Administrative Record is available in the information repositories listed below:

- DOE Public Reading Room at the Gregg-Graniteville Library at the University of South Carolina (USC)-Aiken campus in Aiken, SC; and
- Thomas Cooper Library Government Documents Department at USC in Columbia, SC

Hard copies of the *Fifth Five-Year Remedy Review Report for Savannah River Site Operable Units with Geosynthetic or Stabilization/Solidification Cover Systems* and the Fact Sheet are available at the following locations:

Geosynthetic or Stabilization/Solidification Cover Systems and the Fact Sheet are available at the following locations:

- Reese Library Government Information Section at Augusta University in Augusta, GA; and
- Asa H. Gordon Library at Savannah State University in Savannah, GA

An electronic copy of the *Fifth Five-Year Remedy Review Report for Savannah River Site Operable Units with Geosynthetic or Stabilization/Solidification Cover Systems* can be found at the following website:

- <http://www.srs.gov/general/programs/soil/rod/rod.html>

An electronic copy of the Fact Sheet can be found at the following website:

- <http://www.srs.gov/general/programs/soil/pub/pubinv.html>

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