

R Area Reactor Seepage Basins

Background

The R Area Reactor Seepage Basins are located next to the inactive R Reactor in the central part of the Savannah River Site (SRS). The six unlined, earthen basins were constructed to receive radioactively contaminated purge water from R Reactor's spent fuel storage basin.

In 1957, Basin 1 was placed into operation after a faulty experimental fuel element leaked radioactivity into the disassembly basin. SRS retired and backfilled Basin 1 in 1958.

In 1958, Basins 2-6 were placed into operation. In 1960, Basins 2-5 were retired, backfilled with soil, and then covered with a thin asphalt emulsion to restrict the infiltration of surface water and to inhibit the growth of vegetation. At the same time, clay dikes and clay caps were placed over Basin 1 and the north section of Basin 3 to control the migration of contaminants in the soil and the migration of radioactively contaminated groundwater.

In 1964, Basin 6 was retired. It was backfilled with soil and covered with a thin asphalt emulsion in 1977.

Environmental Concerns

A soil investigation determined that the major radiological contamination is Cesium-137. It is confined to the bottom 3 to 10 foot layer of the backfilled basins. The contaminated portions of the process sewer line and the sanitary sewer line are considered Principal Threat Source Material, which resulted from the history of use. Based on the groundwater investigation, strontium-90 exceeds the maximum contaminant level (MCL) in the shallow water table aquifer.

Environmental Actions and Plans

In 1996, SRS began Resource Conservation and Recovery Act (RCRA) Facility Investigation/Remedial Investigation (RFI/RI) characterization activities and streamlined the list of contaminants of potential concern. SRS also placed new asphalt covers on the six basins because the old caps had deteriorated to the point that surface water could infiltrate the basins and also due to vegetation growth within the basins.

In 1997, SRS initiated Phase II characterization, including additional groundwater characterization, surface radiological surveys, and utilization of a gamma probe in

the basins and adjacent to the pipeline. In 1998, an RFI/RI Baseline Risk Assessment (BRA) was submitted to the U.S. Environmental Protection Agency and the South Carolina Department of Health and Environmental Control. Based on comments from the regulatory agencies, SRS determined additional characterization data was needed.

The remedial action, which is specified in the Record of Decision, consists of several steps. First, all contaminated vegetation will be cut down. Portions of the process pipeline will also be grouted and removed. These materials will be buried on unit. At the contaminated vegetation area, a bio-barrier will be installed to impede the growth of new vegetation. Where the PTSM (Principle Threat Source Material) is identified, an intruder barrier will be placed over the area. Then, groundwater monitoring wells will be installed for the mixing zone. The final steps are to implement institutional controls and regularly sample and analyze the monitoring wells.

In 2001, SRS submitted a revised RFI/RI/BRA to the regulators for approval and initiated the development of a Corrective Measures Study/Feasibility Study (CMS/FS) and a Mixing Zone Permit. Then in 2002, SRS submitted a CMS/FS and a Mixing Zone Permit. In 2003, SRS submitted a Proposed Plan and it was approved by the regulators. The Record of Decision, Revision 0, was submitted in August 2003.