

C Area Reactor Seepage Basins

Background

The C Area Reactor Seepage Basins are located outside the C Reactor perimeter fence in the central part of the Savannah River Site (SRS). Basin 1 is L-shaped and measures approximately 395 feet long by 35 feet wide by 7 feet deep. Basin 2 is approximately 300 feet long by 60 feet wide by 11 feet deep. Basin 3 is approximately 180 feet long by 90 feet wide by 12 feet deep. The three unlined, earthen basins were constructed to receive radioactively contaminated purge water from the C Reactor disassembly basin.

The basins were used from 1957 to 1970 and again from 1978 to 1986. During that time, process purge water was released to the basins via an 850-foot long, 3-inch diameter buried polyethylene pipe to allow a significant portion of the tritium to decay before the water outcropped to surface streams. In addition to tritium and low levels of other radionuclides, the purge water might have also contained trace amounts of non-radioactive organic and inorganic substances and detergents.

Environmental Concerns

From 1996 to 1997, SRS conducted a ground penetrating radar survey, a radiological survey, and a civil engineering survey. After the pre-work plan characterization was completed, extensive groundwater characterization was initiated. Groundwater data indicated there was an extensive plume of chlorinated solvent and tritium. The data also indicated that there might be potential contamination sources upgradient of the basin.

Additional characterization activities showed that 95 percent of the radiological contamination in the basin itself was attributable to cesium-137, strontium-90, carbon-14, and nickel-63.

Environmental Actions and Plans

In 1997, SRS used a sodium iodide detector and soil samples to determine vegetation uptake and to evaluate a means of disposal. SRS performed a time-critical removal action to cut radiologically contaminated vegetation growing in the basins. In 1998 the radioactive vegetation was removed.

In 1999, SRS submitted the Plug-In Decision Document to the U.S. Environmental Protection Agency and the South Carolina Department of Health and Environmental Control, and the Plug-In Record of Decision (ROD) was issued. The Plug-In ROD

identified the C Area Reactor Seepage Basins as a candidate for the Plug-In remedy. The Plug-In ROD selected a remedy common to high risk, radioactively-contaminated Operable Units with similar historical uses, contaminants and locations. The five components of the plug-in remedy included: in-situ stabilization of Basin 1 and 2 soils with a cement based grout, grouting the pipeline, soil consolidation, a low-permeability soil cover system, and institutional controls. An amendment to the Plug-In ROD was approved in August, 2002 that eliminated the in-situ stabilization of Basin 2 soils.

Remediation of the C Area Reactor Seepage Basin was completed in September 2002. Remediation activities included grouting of the pipeline, soil consolidation in Basin 1, grouting of Basin 1, installation of a low-permeability soil cover system over all three basins, and the establishment of institutional controls.