

Enclosure
Salt Waste Processing Facility: Summary of Safety Strategy

The Salt Waste Processing Facility (SWPF) will separate actinides, strontium, and cesium from salt waste that is currently stored in high-level waste tanks at the Savannah River Site. Actinides and strontium will be removed through a sorption process using monosodium titanate; cesium will be removed using caustic-side solvent extraction, which employs an organic extraction solvent. The Central Process Area building and the adjoining Alpha Finishing Facility contain waste storage and process equipment associated with SWPF. The Central Process Area building houses cells containing process vessels used to (1) accomplish the sorption process; and (2) contain the actinides, strontium, and cesium removed by the sorption and caustic-side solvent extraction processes. The Central Process Area building also houses the caustic-side solvent extraction and analytical laboratory equipment. The Alpha Finishing Facility houses equipment that provides the capability for additional sorption if necessary and stores the clarified salt solution prior to transfer to the Saltstone Production Facility.

Significant hazards include deflagrations in process equipment, release of radioactive liquid as an aerosol, and release of radioactive material caused by a seismic event and ensuing fire. Engineered and administrative controls will prevent and mitigate worker consequences from these and other events identified in safety basis documents, relying on a safety strategy that confines highly radioactive materials within the Central Process Area process cells, prevents combustion of flammable gas in the process vessels, and precludes release of radioactive liquid as an aerosol. Structures, systems, and components credited as safety-significant controls for SWPF include the following:

- Vessels, cells, filters, sumps, piping, and gloveboxes to confine radioactive material.
- Ventilation systems and associated interlocks to confine airborne radioactivity, mitigate the consequences of leaks and spills, and limit the amount of flammable gas in process vessels during operation.
- A high-turbidity interlock to prevent transfer of actinides and strontium from the process cell vessels to the caustic-side solvent extraction equipment.
- A high-gamma radiation interlock to prevent transfer of cesium from the caustic-side solvent extraction equipment to the Alpha Finishing Facility.
- A high-gamma radiation alarm to alert operators so they can prevent exceedance of the limit for concentration of radioactive material in the Strip Effluent Hold Tank.
- A system to provide air flow through process vessels to remove flammable gas during normal operations and following accidents.
- Interlocks that turn off recirculation pumps in the event of a high temperature in process vessels.

- Controls to prevent ignition of flammable gas.
- Design features of the air pulse agitation system, including orifices that limit the flow rate of air through the air pulse agitators.
- Leak detection systems that alert operators to spills.
- The Central Process Area building structure to provide structural support for safety-related systems during natural phenomena events, and to limit the spread of fires.
- System design features that allow operator action to remove flammable gas from process vessels following a seismic event.

Defense-in-depth features include safety management programs and noncredited process system instrumentation and interlocks.

Construction of the Central Process Area building has been initiated. Equipment procurement is ongoing.