



Environmental Bulletin

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from the Savannah River Site

Caustic Side Solvent Extraction selected

DOE announces decision on salt processing

The Department of Energy (DOE) has announced its Record of Decision on the Savannah River Site's (SRS) Salt Processing Alternatives. A Supplemental Environmental Impact Statement (EIS) considered alternatives for separating the high-activity fraction from the low-activity fraction of the high-level radioactive salt waste now stored in underground tanks at SRS. The Supplemental EIS analyzed and evaluated the potential environmental impacts of five alternatives: Small Tank Precipitation, Ion Exchange, Solvent Extraction, Direct Disposal in Grout, and No Action. The Final Supplemental EIS issued in July 2001 identified Caustic Side Solvent Extraction as the preferred separation alternative.

Based on the analysis in the Supplemental EIS and the results of laboratory scale research and development and independent reviews, DOE determined that any of the alternatives evaluated could be implemented with only small and acceptable environmental impacts.

DOE has decided to implement Caustic Side Solvent Extraction for separation of radioactive cesium from SRS salt wastes because the solvent extraction process is robust and efficient, and DOE has experience with similar solvent extraction processes such as PUREX (Plutonium – Uranium Extraction).

Initial implementation of the Caustic Side Solvent Extraction technology will consist of designing, constructing, and operating a facility in the Site's S-Area. DOE will evaluate the processing capacity needed based on high-level waste system requirements (including, but not limited to, waste removal capabilities, optimization of salt-sludge blending for Defense Waste Processing Facility (DWPF) operations, and saltstone system modifications or upgrades), projected throughput, and conceptual design data.

Based on the evaluations, DOE may elect to build a facility or facilities to carry out the Caustic Side Solvent Extraction process that could accommodate pilot program and production objectives, but would not exceed the size or processing capacity evaluated in the Salt Processing Supplemental EIS. In parallel, DOE will evaluate implementation of any of the other salt processing alternatives for specific waste portions

for which processing could be accelerated or that could not be processed in the Caustic Side Solvent Extraction facility. These evaluations and potential operations would be undertaken to maintain operational capacity and flexibility in the High Level Waste system, and to meet commitments for closure of high-level waste tanks.

The Caustic Side Solvent Extraction technology will use a highly specific organic extractant to separate cesium from the high-level waste salt solution. The cesium will be transferred from the aqueous salt solution into an insoluble organic phase using a centrifugal contactor to separate the two phases. Recovery of the cesium by back extraction from the organic phase into a secondary aqueous phase will generate a concentrated cesium solution. Prior to cesium separation, a separate process step will be used for separation of soluble strontium, key actinides, and residual sludge to meet salt solution decontamination requirements and avoid interference in the solvent extraction process.

After separation, the high-activity fraction of the salt waste (strontium/actinide solids and concentrated cesium solution) will be vitrified in the Defense Waste Processing Facility and stored until it can be disposed as high-level waste in a geologic repository. The low-activity fraction will be disposed as saltstone in vaults at SRS. High-level radioactive sludge waste continues to be successfully vitrified at DWPF, with approximately 1200 glass waste canisters produced since radioactive operations began in 1996.

Documents available

The *Savannah River Site Salt Processing Alternatives Final Supplemental Environmental Impact Statement* (DOE/EIS-0082-S2D) and the Record of Decision are available online at: tis.eh.doe.gov/nepa/docs/docs.htm

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