SRS Citizen's Advisory Board

Savannah River Site

Citizens Advisory Board

Recommendation 241

Progress of PUREX and TRU Waste Disposition

Background

PUREX Waste Progress

The chemical process for separating plutonium and uranium from fission products is known as PUREX (Plutonium URanium EXtraction Process). The PUREX solvent is composed of tributyl phosphate and n-paraffin and is very similar to kerosene. The Savannah River Site (SRS) legacy PUREX consisted of an aqueous liquid and an organic liquid. The historical disposition path for both of these PUREX waste streams was thermal treatment at the Consolidated Incineration Facility (CIF). The CIF suspended operation in 2000 and an alternative treatment method was required (Ref. 1).

The PUREX solvent was used in organic-aqueous isotope separation processes in F and H-Areas. With the suspension of F-Canyon operations, another PUREX waste stream was added to the disposition inventory. The disposal paths for the PUREX from F-Canyon consisted of incineration in a Toxic Substances Control Act (TSCA) incinerator and by commercial solidification. The legacy aqueous PUREX could be treated and disposed of through the on-site Effluent Treatment Facility (ETF); however, commercial solidification was determined to be the best disposal path for the legacy organic PUREX.

In 2002, SRS and the South Carolina Department of Health and Environmental Control (SCDHEC) negotiated deferral of CIF closure until an alternate technology to treat the organic PUREX could be developed. The current Site Treatment Plan (STP) establishes September 30, 2007 as the date that the legacy organic PUREX must be treated. Under the Resource Conservation Recovery Act (RCRA) permit, closure activity must begin after treatment of the organic PUREX is demonstrated and must be completed within 180 days, estimated to be mid-year of FY2008. Currently, the DOE, the Environmental Protection Agency (EPA), and SCDHEC are considering transferring the CIF closure

requirements to the Federal Facilities Agreement (FFA). If the transfer is approved, CIF decommissioning (closure) would not start until sometime in FY2011. This change would allow SRS to maintain focus and resources on the Area Completion Strategy and other higher risk cleanup activities (Ref. 2) and is not related to disposal of legacy PUREX.

TRU Waste Progress

Transuranic (TRU) waste is defined in DOE Order 435.1 as waste contaminated with alpha-emitting transuranic radionuclides (radionuclides with atomic numbers greater than 92) with half lives greater than twenty years and in concentrations greater than 100 nanocuries per gram of waste matrix. The Waste Isolation Pilot Plant (WIPP) has been developed as the repository for all of the DOE TRU waste. SRS has two principal types of legacy TRU waste; debris waste contaminated with Pu-238 and debris waste contaminated with Pu-239. The TRU waste can also be divided into waste that is stored in 55-gallon drums and waste that is stored in large boxes. SRS TRU waste is mainly heterogeneous debris that consist of job control waste, such as protective clothing, rags, tools, equipment, piping, and gloveboxes used during the processing of plutonium and other nuclear materials (Ref. 3).

The current SRS TRU waste program has been accelerated almost 20 years from the first projected plan and the current SRS Accelerated Cleanup Plan has all legacy TRU waste projected to be off the Ste by FY2013. During FY2006, 2,930 drums of the low activity (principally Pu-239) drummed waste were shipped to the Waste Isolation Pilot Plant (WIPP) and 497 drums were shipped to the Nevada Test Site (NTS). In addition, 450 cubic meters of previously-defined TRU waste was re-classified as low-level waste and disposed of on-site. The shipments of the remaining low activity drummed wastes are to be completed in 2007 (FY2008). Before the remaining high activity (principally Pu-238) drummed waste and non-drummed waste can be shipped, WIPP certification of new technologies and methods are needed for performing large container assay and X-ray and limited intrusive repackaging for large containers and high-activity drums. The start-up of the WIPP certification equipment for non-drummed waste is expected to start in FY2007 and become operational in FY2008. SRS has already initiated a project to repackage non-drummed waste and repackaged 20 large steel boxes in FY2006. Shipment of such waste cannot occur until the National Regulatory Commission (NRC) certification of the TRUPACT-III shipping container is received. It is expected that the TRUPACT-III certification from NRC will be available in 2007, and assuming all goes well with the certification, SRS can begin shipments in FY2008.

TRU Waste – High Activity (Pad 1)

In an effort to begin the process to get some of the high activity (principally Pu-238) drummed waste ready for shipment, SRS plans to submit a RCRA Part B Permit for TRU Pad 1 in FY2007. Activity is based upon half-life; thus, Pu-239 has a half-life of 24,500 years whereas Pu-238 has a much shorter half-life of about 88 years. This means that a

gram of Pu-238 is approximately 280 times more radioactive weight for weight than a gram of Pu-239.

TRU Waste – Remote Handled

As part of an agreement with SCDHEC, SRS was allowed to accept TRU waste from the DOE Mound Site that was under going closure. As part of this agreement, approximately twice as much SRS TRU waste had to be shipped to WIPP than was received from Mound. In August 2005, SRS completed the receipt of 303 cubic meters of TRU waste from the DOE Mound site (located near Cincinnati, Ohio). A similar arrangement was made to accept receipt of TRU Waste from the Battelle Waste Jefferson Site near Columbus, Ohio and in December 2005, SRS completed the receipt of 37 cubic meters of TRU waste from Battelle.

As part of the Battelle-Columbus agreement with SCDHEC, SRS disposition 1,000 cubic meters of SRS legacy TRU waste this past year. DOE must also remove the Battelle Remote-Handled (RH) TRU waste inventory (approximately 25 cubic meters) from SRS by January 1, 2009. The recent WIPP permit modification for RH TRU waste by New Mexico Environment Department (NMED) will help SRS meet this commitment.

Comment

PUREX Waste Progress

The SRS Citizens Advisory Board (CAB) is pleased with the progress of PUREX (canyon and legacy) treatment program that was previously scheduled under the FFA/STP for final disposition by FY2019 but instead will finish at the end of FY2007. The SRS CAB supports the current discussion between DOE, EPA, and SCDHEC to transfer the RCRA closure requirements (closure by FY2008) of CIF to the FFA (closure by FY2011).

TRU Waste Progress

The SRS CAB is also pleased with the progress toward shipping all of the legacy drummed TRU waste to WIPP by the end of FY2008 and with the steps of repackaging the large TRU waste boxes and analyses for accreditation to ship the large-box TRU wastes to WIPP aboard the new TRUPACT III starting in FY2008.

TRU Waste – Remote Handled

The SRS CAB was glad that NMED approved the conditions to accept RH TRU and the other programmatic changes recommended in earlier motions. However, we are concerned about SRS's ability to take advantage of this situation to fulfill the SCDHEC Battelle-Columbus agreement to remove the Battelle RH TRU waste before the January 1, 2009, deadline. Our concern centers around getting the necessary program approvals from EPA, so that any future administration changes cannot negatively impact

the progress made. SRS needs to work cooperatively with WIPP, EPA, and the State of New Mexico Environmental Division (NMED) to help secure the necessary approvals by the end of CY2008.

TRU Waste – High Activity (Pad 1)

In addition, the SRS CAB is pleased to see that initial conversations have begun with SCDHEC on the RCRA Permit for TRU Pad 1. The SRS CAB has expressed its concerns in numerous recommendations over many years beginning in 1995 concerning the need to begin shipment of this waste stream. The SRS CAB would like to see an actual decrease in the high activity TRU wastes inventory as soon as possible.

Recommendation

The SRS CAB recommends that DOE:

1. Continue to accelerate disposition of the final legacy organic PUREX, report to the SRS CAB once it is complete, and prepare a public news release that highlights this accomplishment.

2. Transfer closure of CIF to the FFA program and report to the SRS CAB in October 2007 on the progress made.

3. Expedite shipments of legacy TRU drums, approval of the accreditation program for repackaged large boxed TRU wastes, and pre-licensing activities controlled by DOE for the TRUPACT III and report to the SRS CAB in October 2007 on the progress.

4. Work with WIPP, EPA, and the State of New Mexico Environmental Division (NMED) to accelerate the necessary program approvals from EPA and NMED to begin removing the Battelle RH TRU waste and present the progress to the SRS CAB in October 2007.

5. Expedite the disposal of the high activity TRU wastes on pad 1 including the submission of an application for the issuance of a RCRA Part B Permit and present the progress to the SRS CAB in October 2007.

6. Accelerate the management decisions to decrease the high activity TRU waste inventory at SRS and report to the SRS CAB in October 2007 on the progress.

References

1. PUREX Waste Treatment Update, presentation to the Waste Management Committee by Mike Simmons – DOE-SR, October 24, 2006.

2. CIF Closure, presentation to the Waste Management Committee by Helen Belencan – DOE-SR, October 24, 2006.

3. TRU Waste Program Update, presentation to the Waste Management Committee by Bert Crapse – DOE-SR and Sonny Goldston - WSRC, October 24, 2006.

Agency Responses

Department of Energy-SR