

Recommendation #263  
**Final Disposition for Spent Nuclear Fuel, Surplus Plutonium,  
and Vitrified High Level Waste**

**Background**

As a result of the Savannah River Site (SRS) production mission, the site has accumulated an extensive inventory of nuclear materials and waste extending back to the early 1950s when site operations began. While most of the nuclear materials and waste have been generated on-site, some additional materials and waste have been brought to the site in support of the larger Department of Energy (DOE) mission due to unique site capabilities. This inventory is probably the largest such inventory in the entire DOE. Considering the inventory and length of time these materials have been on-site there is some urgency to preparing and moving these materials to a final repository. The discussion below explains each type of nuclear material in greater detail.

**Spent Nuclear Fuel (SNF).** SRS has received from offsite about 8,900 SNF assemblies stored at SRS in L Basin [4]. The SNF at SRS is cold enough to not require water-cooling (where “cold” indicates that the radioactivity has decayed significantly), but L Basin shields workers from SNF radiation. Current plans call for SRS to receive about 7,500 more off-site SNF assemblies through the year 2019. SRS will process the aluminum-clad SNF in H-Canyon (Non-aluminum clad SNF fuels will be consolidated at INEL; see reference [12]).

**Surplus Plutonium (Surplus Pu).** In September 2007, DOE announced its decision to consolidate surplus non-pit plutonium at SRS to reduce DOE's storage costs and enhance security around its complex [5]. About 2,300 plutonium storage containers were to be moved from Hanford to SRS, along with about 700 from both Lawrence Livermore and Los Alamos Labs. DOE's disposition plans in 2007 involved Mixed Oxide (MOX) and H-Canyon facilities. In December 2008, DOE amended its ROD for surplus plutonium [6]; DOE now plans three facilities to dispose of up to 50 metric tons of surplus weapons usable plutonium using both DWPF glass immobilization and conversion into MOX fuel. They are the Pit Disassembly and Conversion Facility (PDCF), the MOX Fuel Fabrication Facility (MFFF), and the Waste Solidification Building (WSB). WSB will solidify liquid transuranic wastes for shipment to WIPP and liquid low-level radioactive wastes for shipment to an offsite location not yet chosen. Recently the contract with Duke Power and DOE expired, leaving DOE with no formal customers to use its MOX fuel [7].

**Vitrified High-Level Wastes (V-HLW).** Since 1996, SRS Defense Waste Processing Facility (DWPF) has vitrified in glass about 2.7 million gallons of HLW, primarily sludge sent to DWPF in sludge batches, by filling over 2,600 canisters for eventual disposition in the Federal Repository [8]. About 36 million gallons of HLW remain in 49 underground tanks at SRS. Interim Salt Processing (ISP), which removes most of the salt's radioactive materials and sends them to DWPF for Vitrification, started operation in early 2008. The decontaminated salt solution is sent to Saltstone for solidification. About

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360,000 gal of salt has been processed to date. The salt waste processing facility (SWPF), which will decontaminate salt waste at a much higher rate, will start-up in 2013. The removed radionuclides are combined with sludge for Vitrification in DWPF. The total number of canisters is expected to exceed 7,000. Presently, the vitrified HLW in canisters is stored in two temporary Glass Waste Storage Buildings at SRS, with a third GWSB planned [9]. Each GWSB can hold up to 2,200 canisters [10], indicating that a fourth GWSB may be needed.

**Comments**

The SRS CAB Waste Management Committee and Nuclear Materials Committee recently sent a letter to DOE reviewing its concerns about SNF, Surplus Pu, and V-HLW [11].

The CAB's concern is that in DOE's new budget, the Yucca Mountain Repository program has been scaled back significantly [2], with funding only sufficient to continue licensing by NRC [3]. The SRS CAB is concerned that SNF, Surplus Pu, and V-HLW may remain indefinitely at SRS. We believe that having a path forward is critical.

In 2002, Congress and the White House accepted DOE's determination that Yucca Mountain was an appropriate location for the repository. In June 2008, DOE applied to the Nuclear Regulatory Commission (NRC) to establish Yucca Mountain as the nation's repository for SNF and V-HLW [1].

To pay for the Yucca Mountain repository, the Nuclear Waste Policy Act of 1982 requires DOE to collect one tenth of a cent per kilowatt-hour for electricity generated in the US. By December 2008 [1], the Nuclear Waste Fund reached a total of \$29.6 billion; by then, DOE had only spent about \$9.5 billion to examine Yucca Mountain out of a planned \$96 billion in estimated life-cycle costs spread over 150 years.

The SRS CAB understands that MOX and Yucca Mountain are not part of EM's Scope of Work. However, until such time as the Pu is converted to commercial fuel or removed from SRS, the SNF is dissolved and removed from SRS, and the HLW is vitrified and removed from SRS, these materials are EM's responsibility. In their current conditions these materials pose a higher risk to the public and the environment than they will once they have been stabilized and are stored prior to disposal. DOE has long asserted that these materials will not remain at SRS indefinitely, however, politics, budgets, and lack of real forward progress on the disposition programs suggest that SRS will retain responsibility for these materials for many years to come.

The SRS CAB understands that SRS has the skills and capabilities to solve many of these

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problems associated with handling nuclear materials. The talent exists at SRS to reprocess SNF and to reuse the uranium and plutonium to generate cost effective power. However, we do not see the urgency on the part of DOE to remove these materials from SRS that we saw to transfer these materials to SRS.

The SRS CAB recognizes that SRS is otherwise safe since all of the SRS High Level waste (HLW) is being converted into glass. But the SRS CAB is concerned that the glass waste storage buildings (GWSB) are not designed for permanent storage.

**Recommendations**

The SRS CAB recommends that DOE:

1. Keep the CAB and the public informed on all decisions, risks and plans relating to the removal or long-term storage of surplus plutonium and nuclear waste at SRS.
2. In view of continuing political and legal action involving Yucca Mountain, indicate continued support for a “good faith” effort to remove all nuclear waste from SRS as soon as reasonably practical.
3. Make a commitment to involve key stakeholders (such as the State of SC) and the public in relevant planning and decisions involving SNF, Surplus Plutonium, and V-HLW at SRS. If public meetings or hearings are planned, schedule appropriate sessions in the Aiken/Augusta area.
4. By September 30, 2009, make a definitive statement on plans for the disposal of nuclear waste from the SRS to include:
  - a. Plans and schedule for the DOE Blue Ribbon Panel (or similar panel) to develop a strategy for the disposal of HLW and SNF nation-wide, which includes determination of a specific nuclear waste repository site.
  - b. Projection of a date when a preliminary schedule can be developed for the removal of HLW and SNF from SRS.
  - c. Determination of limits of interim storage of an undefined duration for SNF, Surplus Pu, and V-HLW including existing and planned Glass Waste Storage Buildings.
  - d. Additional studies necessary to evaluate the worthiness of long-term interim storage for SNF, Surplus Pu, and V-HLW at SRS beyond the presently established limits.
  - e. Additional studies necessary to safely disposition the SRS SNF, Surplus Pu, and V-HLW at the final Federal Repository.

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- f. Periodically inform stakeholders of the status of agreements relating to the utilization of MOX Fuel produced at SRS.

**References**

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- [11] Letter to Mr. Jeffrey M. Allison, Manager, U.S. Department of Energy, Savannah River Operations Office (2009, April 13), Final Disposition for Spent Nuclear Fuel, Surplus Plutonium, and Vitrified High-Level Waste, from J. Ortaldo, Chair, WMC, and D. Bridges, Chair, NMC.
- [12] [inlportal.inl.gov/portal/server.pt?open=514&objID=1350&mode=2](http://inlportal.inl.gov/portal/server.pt?open=514&objID=1350&mode=2)

**Agency Responses**

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