



The Secretary of Energy  
Washington, DC 20585

July 2, 1999

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DNF SAFETY BOARD

The Honorable John T. Conway  
Chairman  
Defense Nuclear Facilities Safety Board  
625 Indiana Avenue, NW, Suite 700  
Washington, D.C. 20004-2901

Dear Mr. Chairman:

Your January 28, 1999, letter to me regarding Revision 1 of the Department's Implementation Plan for Defense Nuclear Facilities Safety Board Recommendation 94-1, *Remediation of Nuclear Materials in the Defense Nuclear Facilities Complex*, stated that the Board finds the revised Implementation Plan acceptable with three conditions. By letter dated March 26, 1999, Mr. Huizenga provided you with information addressing two of those conditions, and stated that the response to the remaining condition would be provided to you at the end of June 1999. The remaining condition in your letter stated your expectation that the Department would provide a report detailing the effect on material stabilization activities of delays in construction of the Actinide Packaging and Storage Facility at the Savannah River Site (SRS). You asked that the report include proposed resolutions for technical and funding issues as necessary to achieve the material end-states committed to in the Implementation Plan.

Enclosed please find the report on issues related to material stabilization activities at the SRS. The report explains that we are continuing to evaluate technical and funding issues, but that we have decided to begin conceptual design work in July on installation of stabilization and packaging equipment in building 235-F. We have decided to evaluate use of Building 235-F because we believe that it may provide the fastest path for meeting our stabilization and packaging needs, it makes use of an existing facility rather than creating a new cleanup liability and it may prove more cost effective. As part of our evaluations, we will confirm the adequacy of the safety basis for Building 235-F and identify any needed physical modifications and administrative controls necessary to assure safe stabilization and packaging operations. We anticipate that a 35 percent design can be completed within a year, at which time we will complete a revision to our Implementation Plan for SRS commitments. Other commitments at Hanford and Rocky Flats with relationship to the Savannah River decision remain unchanged.



If you have any questions, please contact me or have your staff contact Mr. Huizenga on (202) 586-5151. Also, we are prepared to brief you on the draft systems engineering evaluation for plutonium storage, including evaluation criteria, options, schedules and costs.

Yours sincerely,

A handwritten signature in black ink that reads "Bill Richardson". The signature is written in a cursive style with a long, sweeping horizontal line extending to the right.

Bill Richardson

Enclosure

Enclosure

The following information is provided in response to a January 28, 1999, letter from the Defense Nuclear Facilities Safety Board, which requested:

That pursuant to 42 U.S.C. Section 2286b(d), DOE provide a report within 60 days of receipt of this letter detailing the effect on material stabilization activities of delays in construction of the Actinide Packaging and Storage Facility at the Savannah River Site (SRS). The report should include proposed resolutions for technical and funding issues as necessary to achieve the material end-states committed to in the Implementation Plan.

**Effect on Material Stabilization Activities  
of Delays in Construction of the Actinide Packaging and Storage Facility  
at the Savannah River Site**

**BACKGROUND**

Nuclear material stabilization commitments for the Savannah River Site (SRS) identified in the Department's February 28, 1995, Implementation Plan (IP) for Defense Nuclear Facilities Safety Board (DNSFB) Recommendation 94-1 and in Revision 1 of the IP dated December 28, 1998, include construction of a new facility: the Actinide Packaging and Storage Facility (APSF).

Construction and operation of the APSF was included in the Department's 94-1 IP because it was planned to install within that facility the equipment that would be used at SRS to stabilize and package plutonium oxide and metal in accordance with DOE-STD-3013. It was also planned to use the new facility to store the Np-237 oxide resulting from stabilization of Np-237 solution.

As stated in Revision 1 of the 94-1 IP, Richland was considering alternatives to the BNFL Plutonium Stabilization and Packaging System (PuSPS) for stabilization and packaging of plutonium in accordance with DOE-STD-3013. One of the alternatives cited was use of the SRS bagless transfer system at Hanford to place thermally stabilized oxide into bagless transfer system containers, then shipping the containers to the APSF for addition of the outer 3013 container. Subsequent to submittal of the revised 94-1 IP, the Department decided that, instead of procurement of a BNFL PuSPS, it would pursue an approach for compliance with DOE-STD-3013 using two large capacity stabilization furnaces, an SRS bagless transfer system and a welding station for emplacement of the outer 3013 container at Hanford.

Prior to issuing a contract for construction of the APSF, the Department concluded it was prudent to halt further progress on the facility. This would allow time to conduct a systems engineering evaluation of plutonium material management functions and planned new storage facilities at SRS to determine if changes to the APSF design were warranted. This re-evaluation had become prudent given the significant estimated construction cost increases of the APSF subproject, coupled with the Departmental decision to name the SRS as the preferred location for the plutonium Pit Disassembly and Conversion Facility.

Revision 1 of the 94-1 IP stated that, because of project cost increases, design issues and significant budget challenges, the Department was contemplating a delay in completing the APSF. This potential delay was reflected in the due date of December 2001 - December 2003 shown for IP Commitment Number 202, complete construction of the APSF. The four other SRS commitments that were linked to completion of the APSF were also identified. The Secretary's December 28, 1998, letter, which submitted the IP revision to the Board, stated that the revised IP reflected the most current planning for stabilization activities, recognized the importance of the APSF to those activities, and said that the Department was aggressively pursuing resolution of technical issues, project sequencing and obtaining resources to complete vital activities such as construction of the APSF and startup of HB-Line Phase II.

Subsequent to submitting the IP revision, the Department decided to pursue a budget strategy for preparation of the fiscal year (FY) 2000 Congressional Budget Request that was based on reprogramming most existing funding from APSF in FY 1999, since progress on the APSF was being delayed to allow time to perform the plutonium storage systems engineering evaluation. This would provide additional funding to allow H-Area stabilization activities, primarily startup of HB-Line Phase II, to proceed on schedule and also enable acceleration of safety upgrades to the exhaust equipment in the F- and H-Canyons to avoid a potential future shutdown of those important facilities.

As a result of the APSF construction delay and proposed reprogramming of funding from the subproject, SRS began to examine options for achieving those material end-states committed to in the IP that were dependent upon availability of the APSF, i.e., compliance with DOE-STD-3013 and stabilization of Np-237 solution.

### Evaluation of Plutonium Storage Facilities

The draft systems engineering evaluation report on plutonium storage at SRS has been completed. The study identified five options to address storage and the capability to stabilize and package plutonium at SRS in accordance with DOE-STD-3013. The five options were:

1. Complete the APSF as soon as feasible (a three year delay to December 2004) and include within the facility the equipment to stabilize and package plutonium in accordance with DOE-STD-3013.
2. Do not build the APSF or any other new storage at SRS, make up to 1,400 additional plutonium storage locations available in K-Area (would increase storage to 4,400 positions from the currently planned 3,000 positions), and install within an existing facility (such as 235-F) the equipment to stabilize and package plutonium in accordance with DOE-STD-3013.
3. Construct a larger storage facility than the current APSF design, make up to 1,400 additional plutonium storage locations available in K-Area, and include within the new facility the equipment to stabilize and package plutonium in accordance with DOE-STD-3013.

4. Do not build the APSF, expand planned K-Area storage to 7,200 positions, and install within an existing facility (such as 235-F) the equipment to stabilize and package plutonium in accordance with DOE-STD-3013.
5. Construct a storage facility with vault storage space equivalent to the current APSF design, make up to 1,400 additional plutonium storage locations available in K-Area, and install within an existing facility (such as 235-F) the equipment to stabilize and package plutonium in accordance with DOE-STD-3013.

The Department has not yet chosen a preferred option. However, the second option above results in the potential earliest capability at SRS to stabilize and package plutonium in accordance with DOE-STD-3013, the lowest near-term costs, and additional storage space in K-Area that could be available for SRS, Hanford or other non-Rocky Flats plutonium. We will continue our evaluations in conjunction with development of our FY 2001 budget request, and will advise you of our decision as soon as possible. At the same time, we will begin conceptual design work on installation of stabilization and packaging equipment in building 235-F so that we can complete our commitments to the Board.

#### EFFECT OF AN APSF CONSTRUCTION CANCELLATION ON 94-1 COMMITMENTS

Revision 1 of the 94-1 IP identifies five commitments for SRS that were based on completing construction of the APSF. Those commitments, and the impact on them of a decision not to build the APSF, are identified below.

IP Commitment Number 202: Complete construction of the APSF and fully prepare it for storing SNM.

Due Date: December 2001 - December 2003

When Revision 1 of the 94-1 IP was submitted to the Board, it was believed that the APSF could be completed between December 2001 and December 2003, even though a construction delay was being contemplated. A decision by the Department not to pursue construction of the APSF (or any another new storage facility) at SRS would decouple construction of a new plutonium storage facility from achieving the material end-states committed to in the IP.

IP Commitment Number 203: Repackage all pre-existing SRS plutonium metal and oxide to meet the metal and oxide storage standard.

Due Date: May 2002

As shown in Revision 1 of the 94-1 IP, this commitment was linked to the December 2001 startup of APSF. It is now planned to meet this commitment by stabilizing and packaging the material using equipment to be installed in existing building 235-F at SRS.

IP Commitment Number 204: Complete stabilization and packaging of solutions from dissolution of SRS plutonium residues.

Due Date: September 2004

As shown in Revision 1 of the 94-1 IP, this commitment was linked to the December 2001 startup of APSF. It is now planned to meet this commitment by stabilizing and packaging the material using equipment to be installed in existing building 235-F at SRS.

It should be noted that the environment, health and safety vulnerability that these residues represent will be reduced upon completion of the dissolution of the material and conversion of the resultant solutions to purified solids.

IP Commitment Number 206: Complete stabilization of Np-237 solutions.

Due Date: December 2005

As shown in Revision 1 of the 94-1 IP, this commitment was linked to the December 2001 startup of APSF. Solidification of the Np-237 solution cannot begin until there is suitable storage available for the oxide (due to the rapid ingrowth of a highly radioactive daughter product that will occur following solidification). The schedule for stabilization of this material has, until recently, been contingent upon the schedule for completing construction of the APSF. It is now planned to meet this commitment by providing suitable storage for neptunium oxide at another DOE site or within building 235-F at SRS.

IP Commitment Number 209: Complete stabilization and packaging of RFETS plutonium residues and scrub alloy for long-term storage.

Due Date: May 2002

As shown in Revision 1 of the 94-1 IP, this commitment was linked to the December 2001 startup of APSF. It is now planned to meet this commitment by stabilizing and packaging the material using equipment to be installed in existing building 235-F at SRS.

It should be noted that the environment, health and safety vulnerability that these materials represent will be reduced upon completion of the dissolution of the material and conversion of the resultant solutions to a purified metal.

## PATH FORWARD

### SRS

APSF: Should the Department decide not to construct the APSF, we would request that the commitment to complete construction of the APSF be deleted from the scope of the 94-1 program since compliance with the material end-states committed to in the 94-1 IP would no longer be dependent upon construction of this facility.

Plutonium: The *Stabilization and Packaging (High-Fire) Scoping Study*, completed in March 1999, used a systems engineering approach to identify the minimum essential functions and requirements to accomplish compliance with DOE-STD-3013 and potential alternatives. Several alternatives were evaluated, some which would result in compliance with the standard and others that would not achieve that end-state. The study identified as the favored alternative utilization of existing furnaces in FB-Line to heat plutonium oxide to 650 degrees centigrade, and packaging it in a bagless transfer system container, the same container currently being used to package plutonium metal.

While the study described above was valuable for identifying various options, the favored alternative would not result in compliance with DOE-STD-3013 (oxide stabilization temperature and outer container). Therefore, the Department has decided to pursue installation of equipment in 235-F that will provide the capability to fire oxide to 950 degrees centigrade, place the oxide into inner 3013 containers, and place those containers and the bagless transfer system containers containing metal into outer 3013 containers. The 3013 containers will be stored within 235-F and, potentially, K-Area.

To date, the Department has conducted only feasibility studies on the installation of stabilization and packaging equipment in Building 235-F. While the results of these studies are promising, detailed project scope, schedule and cost baselines and the definitive safety basis for the proposed operations in Building 235-F have not been established. The Department plans to identify funding to commence project conceptual design work in July 1999. It is anticipated that a 35% design can be completed within a year of project start, and that a cost and schedule baseline for the project could be provided at that time in accordance with DOE project management improvement guidance. Once the baseline is established, the Department would assess the stabilization and packaging completion dates for nuclear materials against current 94-1 IP commitments. Our goal, if we pursue this option, would be to complete stabilization and packaging operations by July 2006.

Neptunium: The Department's Office of Nuclear Energy, Science and Technology is currently preparing an environmental impact statement (EIS) for the proposed domestic production of plutonium-238 (Pu-238) for use in radioisotope thermoelectric generators for future space missions. Various DOE sites in Richland, WA, Oak Ridge, TN, and Idaho Falls, ID, are being considered for this production activity. A record of decision (ROD) is currently expected by April 2000. In the event that a decision is made to defer the production of Pu-238, but preserve the option for future production, the EIS is also considering transferring the Np-237 inventory

currently at SRS to another DOE site for storage. This option or a decision to begin production of Pu-238 would lead to storage being made available at another DOE site for the Np-237 oxide. These options would allow the Np solution to be solidified at SRS, then sent directly to the new storage site. The schedule for completing the stabilization is dependent on when the storage at the Pu-238 production and/or Np-237 storage site becomes available. However, the current schedule for the ROD supports meeting the existing 94-1 commitment on schedule, or possibly meeting the commitment early.

Another alternative being considered in the EIS is to leave this material at SRS for it to be disposed of by the Office of Environmental Management. Should the Department select that alternative, the Np-237 solution would be converted to an oxide and stored at SRS, possibly in 3013 containers inside shielded shipping containers within 235-F, pending future disposition.

### Hanford

The stabilization and deactivation work at Hanford's Plutonium Finishing Plant (PFP) are currently being rebaselined. The PFP Integrated Project Management Plan (IPMP) was completed April 1999. It proposes a path forward that involves completing thermal stabilization of plutonium bearing materials and packaging into bagless transfer system containers by October 2004. The containers would then be stored in existing vault storage space until shipped off-site. Just prior to shipment, the outer 3013 container would be added. The IPMP assumption is that SRS would be able to begin receiving Hanford material in 2006 into the APSF, another new storage facility, or a new plutonium disposition facility. This "just-in-time" approach would result in compliance with DOE-STD-3013 when the last shipment to SRS occurred in December 2007. Additional packaging schemes other than the "just-in-time" approach are now being analyzed in order to achieve compliance with DOE-STD-3013 by the 94-1 commitment date of December 2004. By memorandum dated June 4, 1999, the Responsible Manager for the Department's 94-1 Program requested a proposed new approach for compliance with that commitment be provided by the Richland Operations Office by July 30, 1999.

The Department remains committed to achieving compliance with DOE-STD-3013 by December 2004 at Hanford. The material will be thermally stabilized, packaged in accordance with 3013, and stored at Hanford or, possibly SRS if additional storage space is available. However, the Department also plans to continue evaluating other possible scenarios, such as storage of the stabilized plutonium in bagless transfer system containers alone for potentially several years beyond December 2004. The Department may in the future propose to the Board a change in this 94-1 IP commitment if the results of this effort support an alternative other than placing all Hanford plutonium oxide into a 3013 storage configuration by December 2004.