

8.11C PBS SR-0011C Nuclear Materials Stabilization and Disposition – 2035

8.11C.1 Background

At the end of the Cold War, the Department of Energy (DOE) was left with a large inventory of nuclear materials in various forms (raw materials, in-process, finished products) and stored in many locations (vaults, reactor basins, etc.). With the decreased need for nuclear materials for the national security mission, the SRS focus shifted from nuclear materials production to nuclear materials stabilization.

K Area Material Storage (KAMS) and building 235-F serve as special nuclear materials inventory management and surveillance facilities for stabilized materials pending final disposition. The SRS offsite receipt, storage, and disposition of materials capability enables the accelerated deinventory and shutdown of other DOE complex sites, providing substantial complex risk reduction and significant mortgage reduction savings.

8.11C.2 End State

The end state for this project is the deactivation of the K Area, KAMS, and 235-F facilities, placing the facilities in a minimum surveillance and maintenance condition, pending transfer of the facilities to PBS SR-0040 for decommissioning.

8.11C.3 Scope and Description

The scope of this PBS includes programmatic and physical support activities related to safe receipt, inventory management, and disposition of special nuclear materials (SNM) at SRS in K Area and building 235-F. SNM within K Area and building 235-F will be protected from theft and sabotage. A plutonium disposition capability will be designed, constructed, and operated.

K Area

K Area provides safe and secure storage of SNM, heavy water in drums and tanks, highly enriched uranium (HEU), and other miscellaneous nuclear materials. The KAMS facility will continue to both ship and receive SNM to support facility missions. It will continue to support storage of SNM designated to be under International Atomic Energy Agency (IAEA) safeguards.

KAMS is currently configured to only store material in a 9975 shipping container that has been stabilized or packaged in accordance with DOE-STD-3013, or specified HEU metal stored in a Pipe Overpack Container. The current plutonium inventory will be provided to the National Nuclear Security Administration (NNSA) for use in the Mixed Oxide (MOX) Fuel Fabrication Facility or dispositioned by EM.

Heavy water currently stored in K Area will be dispositioned prior to decommissioning of the facility. HEU in K Area will be shipped to either the Tennessee Valley Authority (TVA) vendor or H Canyon to be dispositioned.

235-F

The 235-F facility will continue the surveillance, maintenance, and operation activities necessary to support safe and secure storage of SNM. The facility will continue to ship and receive SNM to support facility missions. Stored plutonium will be provided to NNSA for use in the MOX facility or dispositioned by EM. The Pu²³⁸ process and laboratory areas will continue to be maintained in a safe, environmentally sound shutdown condition until deactivated.

The facility will provide short-term storage (less than one year) for neptunium oxide within a 9975 shipping container to support disposition of this material, and preparation for offsite shipment.

The 235-F facility will support the deinventory and shutdown of FB Line (see PBS SR-0011B) by adding an interim Limited Extend Surveillance (LES) program to perform package integrity surveillances that conforms to DOE-STD-3013, while a 3013 Container Surveillance and Storage Capability is constructed in the facility.

The capability to store containers of plutonium and perform destructive and non-destructive surveillance on the containers to validate the storage requirements of DOE-STD-3013 will be installed in 235-F. In addition to the racks and 3013 surveillance equipment, the project is also incorporating the required security and facility upgrades. This capital project is part of the scope and funding for PBS SR-0011B. When completed in FY 2007, this project will provide the facility the means to safely perform surveillance of DOE-STD-3013 containers.

DOE-SR has assumed responsibility for the implementation of the DOE complex *Surveillance and Monitoring Plan for DOE-STD-3013 Materials* from Los Alamos National Laboratory (LANL). The plan provides the elements for ensuring the long-term reliability of 3013 containers.

8.11C.4 Responsibilities

In addition to the overall responsibilities identified in Section 4.3, PBS-specific responsibilities are summarized in this section.

This PBS falls under the responsibility of the DOE-SR Assistant Manager for Nuclear Materials Stabilization Project. In accordance with DOE Order 413.3, *Program and Project Management for the Acquisition of Capital Assets*, a Federal Project Director has been identified to manage this PBS and will be approved by EM-1. The Federal Project Director uses an Integrated Project Team (IPT) approach to manage the PBS. The IPTs are comprised of personnel from a wide variety of disciplines to ensure the work is managed safely and effectively.

The performance of the work scope for this PBS is the responsibility of the management and operations contractor. Currently, the contractor is the Westinghouse Savannah River Company (WSRC). Within WSRC, the responsibility for this work scope resides with the Operations Business Unit Manager.

8.11C.5 Schedule

KAMS will operate until FY 2017 to receive, store, and ship SNM. Deinventory of SNM from the facilities will begin in FY 2010 as the facility begins transferring material to the new MOX facility. Beginning in FY 2011, the facility will begin

transferring the non-MOXable SNM for final disposition. All SNM will be removed from the facility by FY 2017, after which the KAMS facility will be deactivated. Following deactivation, this facility will be maintained in a minimum surveillance and maintenance condition until transferred to PBS SR-0040 for decommissioning.

Building 235-F will operate until FY 2014 to receive, store, and ship SNM. Deinventory of SNM from the facilities will begin in FY 2010 as the facility begins transferring material to the new MOX facility. Beginning in FY 2011, the facility will begin transferring the non-MOXable SNM for final disposition. All SNM will be removed from the facility by FY 2014, after which the 235-F facility will be deactivated. Following deactivation, this facility will be maintained in a minimum surveillance and maintenance condition until transferred to PBS SR-0040 for decommissioning.

8.11C.6 Resources

The funding profile for this PBS is TBD. This EM cost profile includes funding from NNSA for offsite shipment of HEU ingots through FY 2006.

Technology Needs

In addition to the aforementioned resource requirements, the following technology needs have been identified in support of accelerated cleanup:

- § Understanding radiolytic gas generation in plutonium-bearing materials due to adsorbed moisture.
Benefit: Enables safety analyses and packaging certification to be completed so deinventory of Hanford can proceed without risks to schedule and budget
Development timeframe: Long-term storage
- § Moisture measurement methods for plutonium-bearing materials.
Benefit: Measures moisture reliably to ensure stabilized plutonium materials meet the 3013-99 DOE standard for long-term storage
Development timeframe: Long-term storage
- § Plutonium surveillance and validation of models for safe storage (Various models have been developed to predict the behavior of plutonium materials stored in 9975 and/or 3013 packages. Science-based surveillance of these plutonium packages is essential to validate those models).
Benefit: Avoids potential plutonium storage container failures
Development timeframe: Long-term storage, FY 2004 and beyond
- § Technical basis to model the corrosion tendencies of 3013 canisters stored in Building 105-K at SRS (predictive models and a valid technical basis for those models are essential to properly assess corrosion-induced degradation of 3013 canisters and to ensure the long-term safe storage of the canisters in Building 105-K at SRS).
Benefit: Provides criteria for selection and evaluation of packages for surveillance
Development timeframe: Long-term storage, FY 2004 and beyond

8.11C.7 Key Assumptions, Agreements, Alternatives, Trade-offs and Risk Management

Key Assumptions

The following key assumption has been used as the basis for the lifecycle cost and schedule development:

- § All heavy water will be transferred offsite at no net cost prior to 105-K decommissioning.

Agreements

The following agreement is a driver for this project:

- § DNSFB Recommendation 2000-1
- § Interagency agreement between NNSA and Tennessee Valley Authority (TVA).

Alternatives, Tradeoffs and Risk Management

The following risks in achieving the PBS objectives have been identified:

- § The new non-MOXable legacy plutonium disposition capability may not be available by FY 2011. To support the FY 2011 start of operations, extensive funding will be required no later than FY 2005 to support upfront process development and conceptual design activities. Delays to this project would potentially extend KAMS and/or 235-F baseline schedule and lifecycle costs, at greater than \$64,000,000 per year
- § The new 3013 Container Surveillance and Storage Capability line item may not be complete by FY 2007, because of project risks that include implementation of new design basis threat (DBT) safeguards and security (S&S) requirements
- § Application of new building codes and standards on KAMS and building 235-F could require expensive facility upgrades that would impact cost and schedule baselines
- § An acceleration of the disposition of the legacy source term (Pu²³⁸) in 235-F would result in significant additional near term cost. SRS is currently evaluating alternatives for elimination and/or encapsulation of this legacy source term. Newer technologies, successfully implemented both within and outside of the DOE complex may have the potential to greatly reduce the cost for elimination of this source term hazard, if the technologies can be applied to the SRS facilities.

8.11C.8 Performance Monitoring and Evaluation

8.11C.8.1 HQ Monitoring and Evaluation

Monitoring of this PBS at the HQ level is completed primarily through use of the Integrated Planning, Accountability, and Budget System (IPABS) system. Actual cost, schedule, and performance data are collected for each PBS and compared to the established baseline. All elements of the lifecycle baseline are under EM-HQ configuration control. Performance data include the Gold Metrics and the Budget Milestones. Progress toward these measures and any proposed changes to them are provided as follows.

Milestones

K Area

For FY 2005 through FY 2017, maintain K Area and KAMS SNM receipt, storage and shipping facilities in an operable condition capable of supporting planned program requirements.

Complete shipments of neptunium to ORNL by FY 2007.

Complete disposition of plutonium SNM in FY 2017.

235-F Facility

For FY 2005 through FY 2014, maintain 235-F SNM receipt, storage and shipping facilities in an operable condition capable of supporting planned program requirements.

Complete disposition of SNM by FY 2014.

Begin deactivation of 235-F Facility in FY 2015.

Plutonium Disposition

Complete disposition of moxable plutonium and non-moxable plutonium by September 30, 2017.

8.11C.8.2 Site Monitoring and Evaluation

Refer to Section 4.3 for a description of the site's performance monitoring and evaluation process.