



Department of Energy  
Washington, DC 20585

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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, DC 20004

Dear Mr. Chairman:

Enclosed is the Department of Energy's Consolidated Annual Report of activities related to the implementation of Recommendation 94-1, *Improved Schedule for Remediation*, and Recommendation 97-1, *Safe Storage of Uranium-233*. This report, covering the period January 1–December 31, 1997, presents the status of actions and milestones associated with the 94-1 and 97-1 Implementation Plans and describes activities underway to address emerging issues associated with nuclear materials stabilization and uranium-233 storage.

The following missed 94-1 milestone for 1997 was completed subsequent to the reporting period:

IP-3.3-12A *Begin stabilization by pyrochemical oxidation of 6,000 kg higher-risk Pu salts at Rocky Flats (August 1997), was completed on January 16, 1998.*

Also, the following three overdue 94-1 milestones were proposed for deletion in a letter forwarded to you by the Secretary on January 9, 1998:

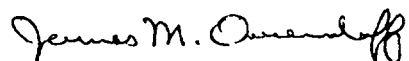
IP-3.6-040 *Complete vacuum consolidation of Savannah River's K-Reactor Disassembly Basin sludge (September 1996).*

IP-3.6-041 *Remove consolidated basin sludge from Savannah River's K-Reactor Disassembly Basins (September 1997).*

IP-3.6-042 *Remove consolidated basin sludge from Savannah River's L-Reactor Disassembly Basins (September 1997).*

If you have any questions, please contact me or have your staff contact Mr. John C. Tseng, Acting Director, Nuclear Materials Stabilization Task Group, (202) 586-0383.

Sincerely,



James M. Owendoff  
Acting Assistant Secretary  
for Environmental Management

Enclosure



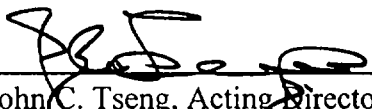
DEFENSE NUCLEAR FACILITIES SAFETY BOARD  
RECOMMENDATIONS 94-1 and 97-1: IMPLEMENTATION

# RECOMMENDATIONS 94-1 AND 97-1 CONSOLIDATED ANNUAL REPORT

*Covering the period  
January 1, 1997 – December 31, 1997*

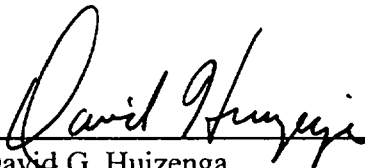
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Submitted:

  
John C. Tseng, Acting Director  
Nuclear Materials Stabilization Task Group

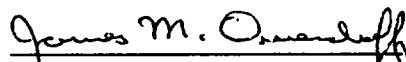
Date: \_\_\_\_\_

Reviewed,  
Recommending  
Approval:

  
David G. Huizenga  
Acting Deputy Assistant Secretary for  
Nuclear Material and Facility Stabilization

Date: 2-12-98

Approved:

  
James M. Owendoff  
Acting Assistant Secretary for  
Environmental Management

Date: 2/21/98

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## RECOMMENDATION 94-1: EXECUTIVE SUMMARY

This report is the third annual update of the status of actions required by the Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 94-1. The data cut off date for this report was December 31, 1997.

Recommendation 94-1 Implementation Plan, *Improved Schedule for Remediation*, addressed the need for the Department of Energy (DOE) to achieve safe, stable states for interim and long-term storage of nuclear materials pending ultimate disposition. The Recommendation also called for an accelerated schedule for stabilizing and repackaging unstable special nuclear materials, spent fuel, unstable solid plutonium residues, and highly radioactive liquids.

In response to Recommendation 94-1, the Department submitted an Implementation Plan (IP) to the Board on February 28, 1995, describing a complex-wide plan of action with milestones to resolve the various nuclear materials stabilization issues identified in the Recommendation.

The Nuclear Materials Stabilization Task Group, later recognized as the Office of Nuclear Material Stabilization (EM-66), within the Office of Environmental Management, has been addressing 94-1 stabilization activities for the DOE complex in the following areas:

- Integration of planning for resolution of stabilization issues;
- Evaluation of facility stabilization capabilities;
- Procurement of standardized equipment to support plutonium oxide stabilization and packaging for long-term storage; and

- Research and development (R&D) to resolve the technical challenges of stabilization, storage, and disposition of plutonium and other nuclear materials.

This report summarizes 94-1 Implementation Plan milestone progress; describes major program initiatives including trade studies, research and development program progress, and Plutonium Stabilization and Packaging System procurement progress; and finally, describes general issues related to 94-1 progress at selected sites.

In 1997 most of the actions intended to mitigate urgent risks and a transition into the longer-term stabilization program to place all the remaining materials in safe storage forms were completed. This phase of the program is relying increasingly on intersite coordination to complete the 94-1 mission. The Nuclear Materials Stewardship and Nuclear Materials Integration programs, described in this report, are the catalysts for accomplishing the needed coordination.

**RECOMMENDATION 97-1: EXECUTIVE SUMMARY**

DNFSB Recommendation 97-1, *Safe Storage of Uranium-233*, issued on March 3, 1997, addressed the need for the Department of Energy to safely and systematically stabilize and store the remaining inventory of Uranium-233 (U-233). This is the first annual update of the status of actions committed to in the Implementation Plan response to 97-1.

The Department has an inventory of approximately two metric tons of U-233 in many different forms stored under a variety of conditions throughout the complex. The bulk of the U-233 has remained in various storage packages and systems. Due to inherent radiation, many of these packages have not been inspected for years, and their condition is unconfirmed. The majority is located at the Oak Ridge National Laboratory and the Idaho National Engineering and Environmental Laboratory, with significantly lesser quantities at Los Alamos National Laboratory. Even smaller quantities of material exist at numerous other sites as oxides, metal, solutions and fluorides.

The Recommendation had been preceded in February 1997 by a Board technical report entitled "Uranium-233 Storage Safety at Department of Energy Facilities" (DNFSB/Tech-13). The report acknowledged the Department's August 1996 Highly Enriched Uranium Vulnerability Assessment (HEU VA). As a result of that assessment, the Department was aware of the legacy issues surrounding the storage of U-233 bearing material. At the time of issuance of Recommendation 97-1, the Department had undertaken the development of a plan describing the necessary corrective actions for the most significant vulnerabilities identified in the HEU VA. The HEU Vulnerability Management Plan was issued on June 13, 1997. The

Secretary accepted the Recommendation on April 25, 1997, and an Implementation Plan was sent to the Board on September 29, 1997. The Board accepted the Plan on October 21, 1997. The primary safety issue addressed in the Implementatin Plan is the lack of material characterization and uncertainty of storage conditions for U-233.

The Department is using a systems engineering approach to manage the implementation of Recommendation 97-1. Recognizing that it will take time to perform the systems engineering efforts, there are near-term actions described in the implementation plan to further assess material characterization and storage conditions and make necessary changes to mitigate interim identified risks.

## SECTION ONE: RECOMMENDATION 94-1

### I. THIRD YEAR STATUS

#### A. Overall Stabilization Progress

- 167 total milestones in Implementation Plan\*
- 94 milestones completed since February 1995
  - 35 milestones completed early
  - 40 milestones completed on time
  - 19 milestones completed late
  - 11 milestones past due

An appendix provides milestone descriptions and progress status by site and material group.

\* Total milestones incorporate OR/LLNL/RFETS IP changes since the September 1997 submission.

#### B. Milestones Past Due

##### Hanford

*Begin processing solutions at the Plutonium Finishing Plant at Hanford (IP-3.1-022), due June 1997.*

Fissile material handling at the site has been suspended since December 1996 because of criticality safety issues. Resolution has progressed to the extent that successful completion of a Readiness Assessment will allow fissile material movement operations to resume. Due to the continuing delay in resuming fissile material work and prioritization of PFP activities, the milestone to begin processing solutions may slip into FY 1999. A reassessment of the schedule is continuing.

*Begin SNF and sludge removal from Hanford K-Basins (IP-3.6-012), due December 1997.*

Construction of the facilities for processing and storage of the Spent Nuclear Fuel has been delayed while the facility is redesigned to meet more stringent construction standards, and to permit using an improved technology for processing the fuel for storage. A new project baseline schedule with start of spent nuclear fuel removal in July 1999 has been approved by the Richland Operations Office. The Tri-Party Agreement on the milestone dates is being negotiated by DOE, the Environmental Protection Agency, and the State of Washington Department of Ecology. When the Tri-Parties reach agreement, a Recommendation 94-1 Implementation Plan change request will be submitted.

##### Los Alamos National Laboratory

*Stabilize and repackage high risk vault items to meet the long-term storage standards at Los Alamos National Laboratory (IP-3.2-035), due September 1997.*

Chemical recovery operations in Building TA-55 have been slowed because of competing missions for limited resources and repairing leakage problems in the processing equipment. Both the resource loading and leakage problems have been mitigated; milestone completion is projected for March 1998.

##### Lawrence Livermore National Laboratory

*Complete the Plutonium ES&H Corrective Action Plan at Lawrence Livermore National Laboratory (IP-3.2-042), due October 1997.*

Operations in the processing facility, Building 332, were suspended in October 1997 due to a criticality safety infraction. Operations are scheduled to resume incrementally in February



1998, and it is estimated that the milestone will be completed in April 1998.

*Identify, characterize, and non-destructively assay all Pu items in the inventory including residues (IP-3.3-045), due October 1997.*

(See the discussion about milestone IP-3.3-042 above.) Returning the facilities in Building 332 to operational status is also required to complete this milestone. An April 1998 completion is projected.

### Rocky Flats

*Begin stabilization by pyrochemical oxidation of 6,000 kg higher-risk Pu salts at Rocky Flats, (IP-3.3-12A), due August 1997.*

Technical difficulties were encountered during glovebox installation. The milestone was completed on January 16, 1998.

### Savannah River

*Complete processing of existing inventories of SS&C material at Savannah River (IP-3.3-022), due December 1997.*

Resolution of issues with complexing of fluoride with boron caused the start of dissolution to be delayed. Dissolution began October 2, 1997, and a March 1998 completion is projected.

*Complete vacuum consolidation of Savannah River's K-Reactor Disassembly Basin sludge (IP-3.6-040), due September 1996;*

*Remove consolidated basin sludge from Savannah River's K-Reactor Disassembly Basins (IP-3.6-041), due September 1997;*

*Remove consolidated basin sludge from Savannah River's L-Reactor Disassembly Basins (IP-3.6-042), due September 1997.*

Installation of an ion exchange system to remove contaminants from the K-and L-Basins water has mitigated the corrosion problems that were the basis for establishing these three milestones. A proposal to delete these milestones from the Recommendation 94-1 Implementation Plan was signed by the Secretary and forwarded to the Board on January 9, 1998.

*Complete FA-Line blending and processing of 230,000 liters of HEU solutions into a stable oxide (IP-3.5-002), due December 1997.*

Blending is being delayed until the ultimate end-use of the material is defined. Potential users include the Tennessee Valley Authority. A disposition decision is expected late in the FY98 third quarter.

## II. ACTIVITIES

### A. Trade Studies

Trade-off (or trade) studies are the systems engineering method of identifying, analyzing, and comparing alternative methods for stabilizing materials to forms suitable for long-term storage or disposal.

A trade study to evaluate alternatives for stabilization and storage of metals and oxides at the Hanford site was completed in July 1997. The objective of the study was to determine the recommended strategy for safely packaging plutonium metals and oxides pending implementation of the disposition alternatives identified in the Storage and Disposition Programmatic Environmental Impact Statement Record of Decision of January 1997.

There were eight stabilization, packaging and storage alternatives evaluated in this study. The major assumptions for the Hanford material were that the Savannah River Site (SRS) would

be selected as the immobilization facility for the Department, and that the Hanford material would only be dispositioned via the immobilization technology. (Sensitivity analyses were conducted for Hanford as the immobilization facility, but the final recommendation was not impacted.) The alternatives were then divided into two categories based on the packaging configuration they would be in once shipped to SRS. The DOE-STD-3013-96 storage standard options considered use of existing stabilization equipment at Hanford and procurement and use of the Plutonium Stabilization and Packaging System (PuSPS), as well as timing of when and how quickly material could be shipped to SRS, relative to the Office of Fissile Materials Disposition plans and schedules. The "food-pack" can alternatives (conformance to the Interim Storage Standard) ranged from shipping material to SRS as soon as possible and using the SRS PuSPS machine to stabilize and repackage material, to maintaining "food-pack" can storage at Hanford until disposition.

Performance measures were used to distinguish between alternatives and included life cycle and near-term capital and operational costs, and radiological risk to both the worker and the public. A sensitivity analysis was also conducted to determine impacts to alternatives from changes in schedule assumptions. Finally, programmatic considerations were applied to the alternatives to develop a recommendation.

The trade study recommended that Hanford should buy a PuSPS machine and should stabilize and repackage their material to the DOE-STD-3013-96. In parallel, SRS should expand the Actinide Packaging and Storage Facility (APSF) into a 10,000-position vault and prepare to receive Hanford's repackaged material between 2002 and 2004. Hanford's material would then be stored at SRS until disposition.

The backup alternative, should insurmountable problems arise with regard to utilizing a PuSPS at Hanford, is that Hanford should maintain its inventory in existing "food-pack" cans until SRS can receive it into an expanded 10,000-position APSF. Hanford would then ship to SRS between 2002 and 2005, and SRS would stabilize the material, repackage it to meet DOE-STD-3013-96, and store it in the APSF until disposition.

Both options minimize worker and public exposure and could save the Department approximately \$300M over Hanford's current 2006 plan. The recommendation, however, provides additional benefits of quicker packaging to meet DOE-STD-3013-96 and quicker deinventory of the Plutonium Finishing Plant, resulting in accelerated deactivation and potentially more cost savings. The results of this study will feed into larger nuclear material stewardship efforts aimed at optimizing the storage of nuclear materials pending ultimate disposition.

A Nuclear Materials Processing Needs Assessment was initiated in August 1997 to determine if any additional nuclear materials may require the Savannah River Site (SRS) canyon facilities for stabilization or preparation for disposition prior to canyon decommissioning. This effort is focused on arriving at the most desirable pathway(s) to acceptable material end-state(s) using efficiency, cost, waste, facility capabilities, and worker and public safety as performance measures. Completion is expected in early 1998.

## **B. Plutonium Stabilization and Packaging System**

The prototype Plutonium Stabilization and Packaging System (PuSPS) developed by BNFL, Inc., was delivered to the Rocky Flats Environmental Technology Site (RFETS) in

April 1997. Assembly of the prototype PuSPS has been completed at an off-site facility with "cold" testing and functional acceptance testing having commenced. DOE acceptance via a full system demonstration is currently scheduled for February 1998.

Oakland Operations Office (OAK) negotiated a Cost Plus Incentive Fee contract and issued a notice to proceed for a second PuSPS for Savannah River Site (SRS) in November 1997. The SRS PuSPS is currently at 30% design and is scheduled for delivery in July 1999. A small fully manual PuSPS is currently being negotiated by DOE OAK for the Lawrence Livermore National Laboratory (LLNL). Award is expected to take place in January 1998, with delivery of the system in August 1998. The System specifications for a PuSPS for Richland is targeted to be completed in July 1998, with procurement to occur in FY 1999.

The PuSPS contract with BNFL, Inc., originally valued at \$54 million, is now \$72 million, based on various scope increases to the prototype. The long-term storage package design has been completed by BNFL, Inc., and is currently under final review for compliance with contractual technical requirements based on the DOE-STD-3013-96 and the ASME Boiler and Pressure Vessel Code Section VIII criteria. DOE acceptance is expected to be issued in February 1998. Based on the acceptance of the BNFL, Inc. long-term storage design, OAK will proceed to qualify and select American manufacturers to supply long-term storage containers for PuSPSs currently being installed and those under design.

### C. Research Activities

The Plutonium Focus Area (PFA) was chartered as the follow-on organization to the original 94-1 Research Committee, and is managed by the Idaho Operations Office with

support from Lockheed Martin Idaho Technologies and Argonne National Laboratory. The purpose of the PFA is to recommend solutions to site-specific and complex-wide technology issues associated with plutonium remediation, stabilization, and preparation for disposition. Its scope is primarily on plutonium-bearing materials (excluding transuranic wastes and final-form weapons components), and includes interest in other fissile materials and special isotopes as assigned. It is organized to meet immediate and long-term requirements of the NMSTG. The PFA activities are coordinated with the Office of Technology Development programs and other focus areas to ensure effective use of resources and to prevent duplication of effort.

The Materials Stabilization Research & Development Program is executed by Los Alamos National Laboratory (LANL) under direction from the NMSTG. In response to the R&D needs identified in the November 1996 R&D Plan, LANL carried out R&D activities in 1997 to provide technologies needed for 94-1 stabilization programs.

#### *Plutonium Focus Area Progress*

An example of the products produced by the Plutonium Focus Area in 1997 are shown in Table I. These products were focused on the following activities:

- Defining a systems engineering management approach for the PFA;
- Soliciting white papers from the at-large research community;
- Providing direct support to the NMSTG for the 94-1 R&D Plan and the Storage of Metals and Oxides Pending Disposition Trade Study and the Processing Needs Assessment; and

■ Providing PFA-sponsored technology development for identified R&D needs that were of a complex-wide, integrating nature

and were not covered by ongoing research under the Stabilization R&D Program or at other DOE sites.

**Table 1. PFA Products for FY 1997**

CATEGORY	PRODUCT	PURPOSE
White Paper Submissions	•PFA Technology Summary	•Present R&D needs to general community
NMSTG Support	•94-1 R&D Plan •SE Support to the Storage of Metals and Oxides Pending Disposition Trade Study and the Processing Needs Assessment	•Document R&D requirements including need dates, R&D recommendations, technology status, and R&D requirements gaps •Recommend best technical path forward and options to NMSTG
Integrated Technology Development	•Chemically bonded phosphate ceramics •Integrated Monitoring and Surveillance System (IMSS)	•Develop and evaluate innovative technology for application at RFETS using SRS facilities •Demonstrations to meet needs identified R&D gap from 1995 R&D Plan

**Technical Advisory Panel**

The November 1997 R&D Plan provides a review of the system requirements maturity for materials end-states. It was concluded that immature requirements can place the program at significant risk if they remain unresolved. The areas of the 94-1 program with immature requirements include: (1) long-term storage of impure plutonium-oxide (30 to 50 wt%); (2) interim safe storage of stabilized residues pending disposition to the Waste Isolation Pilot Plant (WIPP); (3) safeguards termination limits (STLs) to permit disposition to WIPP; and (4) safety surveillance requirements for long-term plutonium storage.

The plan has narrowed the focus to more effectively target specific problem areas by incorporating results from trade studies

(namely, salt; ash; sand, slag, and crucible [SS&C]; combustibles; and scrub alloy) and rebaselining activities at the Rocky Flats Environmental Technology Site (RFETS). The focus was further narrowed to reflect technology progress reviews of applied and core technology from the Stabilization R&D Program at Los Alamos National Laboratory, a progress review of Savannah River Site (SRS) applied technologies, and the Plutonium Focus Area Technical Advisory Panel (TAP) prioritization of Russian technology, which resulted in a focused set of joint R&D projects. Finally, the plan specifically identifies 28 technologies no longer under consideration by the 94-1 stabilization program in a baseline or backup role; these technologies have been concluded with respect to the 94-1 stabilization R&D program.

The principal programmatic risk identified during FY97 by the TAP is that technology need dates may not be met in some cases; this is because the necessary equipment has not been installed at the end-use site and National Environmental Policy Act (NEPA) documentation is not complete.

The November 1995 R&D Plan contained 18 recommendations based on technology gaps, technologies that needed to be tracked based on maturity scores, and other issues identified separately by the R&D Committee. Of the 18 recommendations from 1995, 15 have been closed and the other three are effectively underway toward closure to meet 94-1 IP commitments. The November 1996 R&D Plan contained eight recommendations based on technology gaps, technologies that needed to be tracked based on maturity scores, and other issues identified separately by the R&D Committee. Of the eight recommendations from 1996, five have been closed and the other three are effectively underway toward closure to meet 94-1 IP commitments.

In 1997, using the same system engineering approach employed in the previous R&D Plans, the TAP developed programmatic risk assessments of baseline and competitive alternative technologies based on the technical maturity score and R&D need date of each technology considered. Within this context, baseline refers to a technology selected by the sites in coordination with NMSTG for a particular use at a specific site; a competitive alternative is one of two or more technologies that are recommended as candidates for a baseline application. Thirty-four technologies are being pursued as baseline or competitive alternative technologies compared with 38 from FY97. Based on this evaluation, there are two high-risk technologies: 1) the wash and dry process at RFETS for plutonium combustibles and 2) the vitrification/ agglomeration process at RFETS for plutonium ash. A focused

commitment by NMSTG and RFETS will be required to complete NEPA actions and equipment installation to meet 94-1 milestone commitments.

There are seven medium risk technologies that cause some programmatic risk with respect to meeting 94-1 IP Milestone dates and will require close tracking by the NMSTG. They are 1) the vertical calciner and 2) anion exchange at Hanford for plutonium solutions; 3) distillation at RFETS for plutonium salts; 4) preparation for shipment at RFETS for SS&C; 5) pyrolysis at Hanford for polycubes; and 6) direct fluorination and 7) charcoal bed removal at the Oak Ridge National Laboratory for highly-enriched uranium. A complete discussion of the above evaluations is contained in the November 1997 94-1 R&D Plan.

#### ***Materials Stabilization R&D Program Progress***

Research and development activities to provide the needed stabilization technologies continue. Los Alamos National Laboratory, the lead Laboratory for plutonium research and development, managed 34 funded technical projects with 81 specific milestones in FY 1997. Of the 34 technical projects, six were performed at other DOE laboratories throughout the country. At the end of FY 1997, 52 of these milestones were completed as scheduled. Of the incomplete milestones, 19 are associated with projects continued in FY 1998.

Activities assuring the technical requirements of the long-term storage standard continued with LANL stabilizing and characterizing representative items from Hanford and Rocky Flats inventories for incorporation into the shelf-life program. Thermal analysis of metal and oxide in long-term storage containers and more efficient and cost-effective methods for material characterization were also explored.

Stabilization technology development progressed on a low-temperature vitrification process to stabilize Rocky Flats incinerator ash and graphite fines in a form suitable for disposition at the Waste Isolation Pilot Plant. Final verification of the combustible washing flowsheet was largely completed in FY 1997. The coupling of salt oxidation with distillation, a requirement to meet the issue of safeguards termination limits, has been demonstrated on a full-scale production unit, but has run into some technical difficulties due to the oxidation chemistry. These issues should be resolved in time for the start of operations at Rocky Flats. Two off-gas technologies were demonstrated in FY 1997 to support the pyrolysis of polycubes at Hanford, with a final process flowsheet and equipment design to be completed in FY 1998.

#### D. Nuclear Materials Stewardship and Integration Activities

The Integration Working Group, chartered on March 27, 1995 to provide a complex-wide forum for integrating information, performing trade studies, and developing an Integrated Facilities Plan for nuclear material stabilization, was superseded during 1997 by the EM Nuclear Material Stewardship Program. The Department established the Nuclear Materials Stewardship program to broaden and enhance these functions as described below.

##### *Transition to Nuclear Materials Stewardship*

As the Office of Environmental Management (EM) is responsible for most of DOE's excess nuclear materials and facilities, EM will play a critical role in DOE's mandate to provide stewardship for these nuclear materials and facilities for the long term. EM must pursue all available opportunities to remove and consolidate nuclear material inventories, thereby reducing the mortgage costs of

maintaining surplus facilities. Accordingly, as materials stabilization progresses and the nuclear materials program moves towards long-term storage and management of facilities and materials, a stewardship function within EM will be required.

In the broad sense, "stewardship" means the responsible management of material across its entire life cycle through processes of production, use, recycle and recovery, storage, transportation, and disposition. The Department intends to fulfill its stewardship missions in a way that:

- Ensures worker safety and public health;
- Provides cost-effective management of facilities and materials;
- Maintains the availability of resources for defense, medical, and industrial programs; and
- Enhances public perception of DOE as a responsible custodian of materials missions.

The EM Nuclear Materials Stabilization and Stewardship (EM-NMSS) program will draw upon expertise from DOE Headquarters and the operations offices at Albuquerque and Savannah River to define, evaluate, and implement stabilization, consolidation, storage, and disposition tasks, and to ensure close cooperation with other DOE programs and stakeholders who share responsibilities or interests. In its first year, the Stewardship Program's accomplishments are:

- Coordinated start up of shipments of Pits from Rocky Flats to Pantex, supporting the goal to close Rocky Flats by 2006.
- Completed a trade study on the disposition of plutonium metal and oxide. The study identified several million dollars could be

saved if Hanford plutonium could be consolidated at the Savannah River Site awaiting disposition.

- Embarked on the following initiatives, which will be completed in 1998:

- Development of a stabilization, packaging and storage standard that will integrate the technical requirements between stabilization and the emerging Fissile Material Disposition Program acceptance criteria. This effort may allow more material to be dispositioned through MD with less processing than current requirements.

- Identification of any additional materials requiring Savannah River Canyon processing for disposition via the Processing Needs Assessment. The results of this study will provide the first insight on the Department's disposition planning and give input to the next two Stewardship program initiatives.

- Development of an integrated Nuclear Material Stewardship database that will consolidate, for the first time, the disposition path information and technical requirements for all surplus nuclear material.

- Initiation of the Nuclear Material Integration (NMI) effort. As the largest 1998 project, the NMI will identify disposition paths for all surplus nuclear material and will perform technical assessments resulting in recommendations for disposition. The Stewardship Program will be responsible for driving technical issues and recommendations to conclusion.

### ***Nuclear Material Integration***

The Environmental Management Nuclear Material Integration (NMI) Project will identify the inventories, characteristics, and

locations of excess Environmental Management-related nuclear materials; identify future use options; identify disposition alternatives; and recommend sound, integrated management strategies for these excess nuclear materials. The scope of NMI will include all nuclear materials excess to national security that belong to Environmental Management; excess nuclear materials belonging to other Departmental organizations that are located at sites and/or facilities for which Environmental Management is responsible; and excess nuclear materials that could reasonably be expected to become the responsibility of Environmental Management by 2015.

The NMI Project will be performed by a cross-cutting team of Department and contractor employees from the field and Headquarters. The NMI will be led by the Nuclear Materials Stewardship Program from the Office of Nuclear Material Stabilization, Office of Environmental Management. Working integrally with the EM Nuclear Material Stewardship Program, this project will undertake the tasks and efforts needed to fully define and understand the scope and optimize the nuclear materials system to include baseline material inventory identification and categorization; future use analyses; disposition path definition, mapping, and analysis; storage consolidation analyses, and material integration opportunity analyses. Integration options envisioned include: consolidating operations for treatment, storage, or disposal, where appropriate; applying innovative technologies among sites; and working to ensure consistency in reporting data on waste and nuclear material inventory, generation, packaging, and transportation.

The overall objective of the Nuclear Material Integration Project is to use complex-wide, systems based, integrated planning to develop a Master Material Management Plan for Environmental Management's excess nuclear

materials. This management plan will represent recommended changes to the baseline disposition plans contained in the draft EM National 2006 Plan and would be used as the basis for changes to the 94-1 Implementation Plan and associated Site Integrated Stabilization Management Plans. If implemented, this integrated nuclear material management plan would produce an optimized nuclear material management system to support the Environmental Management accelerated cleanup vision.

### III. GENERAL ISSUES

#### Savannah River

The Secretary approved the Savannah River Site (SRS) Phased Canyon Strategy in July 1997, and DOE issued the *Savannah River Site Chemical Separation Facilities Multi-Year Plan* to Congress in September 1997. This plan illustrates the phased approach to operate both canyons to optimize materials stabilization activities. To this end, H-Canyon began dissolution of spent nuclear fuel in August 1997 and began preparing for an early 1998 start of separation operations. HB-Line completed Pu-242 solution stabilization and began preparation for startup to dissolve and process Pu-239 residues to oxide. This startup was originally planned for late 1997 but will not occur until early 1998. F-Canyon/FB-Line completed Mk-31 target and Taiwan Research Reactor (TRR) and Experimental Breeder Reactor-II failed spent nuclear fuel stabilization and began stabilization of the remaining TRR fuel. F-Canyon also began stabilization of SRS sand, slag, and crucible.

The Americium/Curium (Am/Cm) stabilization effort has met with considerable technical difficulties. Melter failures have served to highlight the significant research and development issues that still remain. Due to

these uncertainties, DOE has directed Westinghouse Savannah River Company (WSRC) to cease design and testing until R&D has progressed sufficiently to warrant resumption of these activities. DOE has asked WSRC to submit a proposed path forward including analysis of the vitrification R&D program, as well as alternatives for disposition of the Am/Cm, including transfer to the high level waste tanks.

The Department is continuing efforts to transfer SRS and some Oak Ridge "off-spec" Highly Enriched Uranium (HEU) to the Tennessee Valley Authority (TVA) for manufacture into fuel for use in TVA's commercial power reactors. TVA has developed a draft Request For Proposals (RFP) that is scheduled to be issued to interested parties in late January 1998. Proposals will be due about three months after the RFP is issued, and TVA plans to select the vendor(s) in the summer of 1998. The selected vendor(s) will become partner to TVA and DOE in determining specific technical aspects of the blend program. Once these have been defined, TVA will enter into appropriate contracts with the vendor(s) and into specific inter-agency agreements with DOE.

DOE has drafted an Implementation Plan change request that proposes deleting three milestones related to K-area sludge removal. The draft IP change request also provides detailed discussion on the status and path forward for Am/Cm and HEU solution stabilization. This IP change request package was sent to the Board on January 9, 1998.

#### Rocky Flats

The Rocky Flats Field Office has requested that Kaiser-Hill, the site management and integrating contractor, provide a modification to their 94-1 Implementation Plan that reflects the final disposition paths for the removal of



both plutonium residues and metal and oxide. This modification should reflect current plans for disposal of ash and salt and reflect the baseline removal schedule for metal and oxide. Milestones are expected to be added to show ash and salt repacking into pipe overpack components; shipment of ash and salts to WIPP; shipment of sand, slag and crucible and fluorides to Savannah River; and shipment of metal and oxide.

### **Los Alamos National Laboratory**

The Office of Defense Programs (DP) is examining the effects of resource allocations on achieving 94-1 stabilization goals concurrently with carrying out DP programmatic missions at Los Alamos National Laboratory (LANL). DP is preparing a proposed restructuring of its 94-1 program at LANL that takes into account the competition for limited facilities, personnel and funding currently being experienced at the laboratory. The goal is to address the larger site issues of plutonium remediation and scrap recovery while meeting DP's programmatic and mission requirements for its operating facilities. A briefing to describe the attributes of alternative paths forward is being prepared for presentation to the Board.

### **Hanford**

The Plutonium Finishing Plant was under a curtailment of all fissile material handling in calendar year 1997 as a result of a criticality safety infraction that occurred in December 1996. Resumption of stabilization activities was also impacted by corrective actions related to a chemical explosion, which occurred on May 14, 1997 in the Plutonium Reclamation Facility.

On November 26, 1997, Fluor-Daniel Hanford declared the B&W Hanford Company's

readiness to resume Phase I material movement. Because of criticality concerns identified in a November 20, 1997 event, the Richland Operations Office (RL) requested an independent assessment by the Office of Environment, Safety and Health of the operational implementation of the Criticality Safety Program. The assessment resulted in a report to RL that included recommended near and long-term corrective actions. Richland plans to make a determination on which corrective actions should be completed prior to restart. Upon the contractor's completion of the designated prestart actions, an RL independent team plans to verify readiness to resume Phase I material movement.

During 1997, Fluor-Daniel Hanford completed detailed engineering and project management baseline reviews of the Hanford Spent Nuclear Fuel Project. These reviews indicated an estimated cost increase for the project of \$274 million and a two-year extension of the project. An extensive DOE review confirmed this result, and on December 15, 1997, the Richland Operations Office approved a baseline change request for the project, which has the start of fuel removal in July 1999. Approval is contingent on completion of a Check Estimate of the change request. A check estimate is a specifically defined tool described in DOE's Cost Estimating Guide for DOE Order 5700.2 Cost Estimating. The North-western Program Office (EM-65) is organizing the check estimate but has not yet fixed a completion date.

When the check estimate is complete and the contingency is removed, the Project can agree to milestones for Hanford's Tri-Party Agreement and forward a Recommendation 94-1 Implementation Plan revision to the Nuclear Material Stabilization Task Group.

### *Residues EIS*

In November 1997, the Department published the Draft Environmental Impact Statement (EIS) describing stabilization options for certain Rocky Flats residues and scrub alloy. The EIS described and analyzed the alternatives for stabilizing those materials based on the information learned through trade studies and subsequent investigations. Public meetings were held in December on the Draft EIS near Rocky Flats, Los Alamos, and the Savannah River sites. A Record of Decision is expected in April 1998.

### *Safeguards Termination*

Safeguards termination allows for specific low-grade nuclear materials to be placed under waste management controls and disposed as waste. The Waste Isolation Pilot Plant (WIPP) can accept this material after domestic safeguards, material control and accountability as special nuclear material are terminated.

The safeguard termination guidelines establish limits on plutonium concentration by material form. In general, as the guidelines apply for plutonium-bearing solid residues, the plutonium concentration limits are low, e.g. 0.2% plutonium by weight, for terminating safeguards on salt residues as is. However, if the same material is microencapsulated in glass, cement, or other vessel, safeguards can be terminated on material containing 5% plutonium by weight. Rocky Flats has submitted variances that request safeguards termination on residues exceeding the 0.2%

limit, and which will receive no further processing.

Although some variances were approved, variances for the majority of the salt and ash residues were rejected. Variances eliminate the need for planned plutonium separation of most of the salts and vitrification of all of the ash because the material would be packaged, as is, for shipment to WIPP when it opens. Since residue treatment is on the critical path for Rocky Flats site closure, approval of variances would help support acceleration of site closure by 4 years, from 2010 to 2006, and saves \$80 million in processing costs. The intent is to resolve issues preventing approval of the variances for salt and ash residues. Only about 5% of the 106 metric tons of Rocky Flats residues require processing for disposal at WIPP.

The Office of Safeguards and Security cited its efforts in approving previous variances, technology available to implement the safeguards termination guidance for salt and ash residues, and concerns on setting an undesirable nonproliferation policy precedent as reasons for variance denial. The Nuclear Materials Stabilization Task Group will work with Rocky Flats, the Office of Arms Control and Nonproliferation, and other organizations to establish a path forward for variance approval for ash and salt residues. The approach will consist of ensuring the proliferation resistance of nuclear materials to be disposed as waste. Senior Departmental management is committed to resolve this issue.

## SECTION TWO: RECOMMENDATION 97-1

### I. FIRST YEAR STATUS

#### Overall Progress

- 18 total milestones in Implementation Plan\*
- 1 milestone completed since September 1997
  - 1 milestone completed on time

*\*An appendix provides milestone descriptions and representation of milestone progress by site and material group.*

### II. ACTIVITIES

#### A. Site-Specific Activities

##### Idaho National Engineering and Environmental Laboratory

The Idaho National Engineering and Environmental Laboratory (INEEL) is storing the ceramic fuel materials from the Light Water Breeder Reactor (LWBR) program. This material includes irradiated spent fuel as well as an unirradiated fuel assembly, fuel rods, pellets, scrap from the fuel fabrication process and process wastes. The fuel assembly and the fuel rods are stored in below grade sealed vaults at the Idaho Chemical Processing Plant. Most of the pellets are stored in standard shipping containers that met the DOT-6M specifications at the time the drums were shipped to INEEL.

Short term actions included visual inspections and gas sampling of half of the underground storage vaults in which the LWBR fuel materials are stored. No contamination was found that would be indicative of leaking fuel. The visual inspection of the vault walls and the containers did not indicate that there had been

any significant corrosion. These inspections have been an annual requirement since this material was placed in these vaults.

The material stored at the Radioactive Waste Management Complex (RWMC) was stored behind a concrete barricade inside cargo containers or in one of the air support buildings. One of the short term action items was to consolidate these drums into a storage building. To accomplish this, the drums were overpacked with a shielding container and then placed in a large storage building. As the drums were handled during the overpacking operation, they were inspected for damage and corrosion. Several of the drums were opened and the internal DOT-2R container examined. Minor corrosion was noted on some of the exterior surfaces of some of the drums. No contamination or degradation of the DOT-2R container on the inside of the DOT-6M drums was noted. In addition, twelve of the drums were examined by x-ray tomography. No unusual conditions were observed during this inspection.

The near term action list for the INEEL site was completed during calendar year 1997, and no corrective actions were required as the result of any of the examinations of this material.

##### Oak Ridge National Laboratory

##### *Site Assessment for U-233*

The ORNL Site Assessment activity determined from direct radiation and smear samples that off-gas lines from the storage vaults in Building 3019 are uncontaminated. This preliminary information indicates that packages, some of which have been stored for more than 30 years, have maintained their gross integrity. Gas sampling equipment has been installed in the off-gas system to further test storage vaults for hydrogen and mobile radionuclides, such as Rn-220, a decay product

in the U-232 chain. A natural phenomena hazard analysis has been initiated to assess the acceptability of current ventilation and structural systems in Building 3019. Package handling equipment is being installed to enable sampling, inspection, and repackaging of U-233 materials and packages. Consolidation of small holdings of U-233 from other-sites at ORNL is being evaluated. A NEPA review of consolidation at ORNL determined that this action is a part of an ongoing activity and mission of the U-233 National Repository at ORNL to ship, receive, and store U-233.

### Los Alamos National Laboratory

In preparation for moving the TA-18 material, a radiography study of the material was completed. The results of this study did not identify any critical safety concerns. However, it did provide information regarding the contents of each package. Many of the larger packages contain a variety of smaller containers. The smaller containers were identified as being glass, plastic, and metal containers. This information will be used when opening the containers for repackaging. It is now known that these contain packaging material not suitable for storage of U-233.

A neutron streaming study was also completed on the floor hole storage array in the CMR building. This was done to verify that the material to be stored in the floor holes will be adequately contained to minimize radiation fields outside of the storage locations. It is also used to ensure that there is no interaction of radiation fields between each storage location. The results of this study confirmed that these locations are suitable for storage of U-233. The radiation field measurements on top of the storage location were only background. This indicates that there will be no transient personnel dose from storage of material in these locations. Hole to hole neutron measurements were taken at a variety of depths

ranging from unshielded readings at the top of the hole to readings at the bottom of the hole. The readings observed were approximately 1 mr/hr at the top to 300 mr/hr at the bottom of the hole. Gamma radiation readings were only taken at floor level, and no readings above background were observed. This does not raise any concern for storage of U-233 in these locations.

### *Small Sites/Small Holdings*

Approximately 25 sites are believed to have small quantities of U-233 in their facilities. The amount at these sites is less than 5kg and typically less than 50g. An inventory and assessment of the integrity of packaging of this material has begun. Material that is surplus to a site's requirements will be sent to Oak Ridge National Laboratory (ORNL). Material from the Portsmouth site was consolidated at ORNL in 1997.

## **B. Other Activities**

### *Systems Engineering of the DNFSB 97-1 Recommendation Response*

The Systems Engineering support team from LMITCO facilitated the development of a requirements and functional analysis of the recommendation in order to develop the implementation plan and to establish the process for implementation by the team. The Implementation Plan for 97-1. This plan represents a departure from past efforts in that it focuses on establishing and implementing the systems engineering process for developing the solution rather than prematurely focusing on an underdeveloped solution. The functional analysis was developed in team meetings facilitated by the systems engineering staff. A comprehensive model of the process that the team will follow to successfully implement a safe storage system for U-233 was developed

and accepted by the team. The process was briefed to the Board.

The initial deliverable under the Implementation Plan is a System Requirements Document (SRD), which defines the technical requirements for the system. These requirements will include DOE and external regulatory requirements that the processes and facilities for stabilization and storage of U-233 must meet. Work on the SRD began as planned, and a workshop on the SRD produced an early draft that is being reviewed by the 97-1 Technical Team. Work during the first quarter of FY98 was temporarily halted due to difficulties with the reallocation of funds to 97-1, but resumed in January 1998.

#### *Storage Standard for U-233*

A first draft of a U-233 Storage Standard was developed by the multi-site 97-1 Technical Team. Oak Ridge prepared a hazard analysis for long-term storage of U-233 based on the Target-Barrier-Hazard methodology. The hazard analysis defines the framework for the technical basis for the storage standard. Safeguards, criticality, and waste acceptance criteria have been identified for defining a waste threshold value for U-233. An initial inventory of U-233 wastes at ORNL has been

analyzed against selected waste threshold criteria to evaluate possible ramifications.

#### *Disposition Options Study for U-233*

The Office of Fissile Materials Disposition has sponsored a study to identify possible disposition options and the associated issues for the U-233 inventory. Oak Ridge National Laboratory has drafted reports that identify the possible disposition options, inventory, history, and characteristics of the stored U-233 inventory. The report will be used as a screening report for possible disposition options that could be evaluated in the environmental review process to support the Department decision for the preferred disposition option. The document, "Strategy for the Future Use and Disposition of Uranium-233: Overview" will be finalized and issued in January 1998.

#### *Technical Competencies in U-233 and Related Actinides*

Information has been compiled on the Department's scientific and technical expertise on U-233 and related actinides. This information will form the basis of a report titled "Technical Competencies for the Safe Interim Storage and Management of U-233 at DOE Facilities" that is to be submitted to the Board in January 1998.

# APPENDIX A

## 94-1 Milestone Status Summary

**DEPARTMENT OF ENERGY**  
**NUCLEAR MATERIALS STABILIZATION TASK GROUP**  
**DNFSB Recommendation 94-1 Implementation Plan Milestones**  
**January 23, 1998**

169 Milestones

<i>NMSTG</i> Milestone Number	<i>SIMS</i> Cmt #	<i>Key</i> Milestones	<i>Material</i> Group	<i>IP</i> Page #	<i>DOE</i> Site	<i>Milestone</i>	<i>Due</i> Date	<i>Revised</i> Due Date	<i>Completion</i> Date	<i>Status</i>
IP-ES-042	001	*	General	6	All	Facilities will be started or restarted in accordance with DOE Order 5480.31. These restart and start-up requirements will be taken into account in the development of the "Facilities Section" of the Program Plan.	None			
IP-3.2-028	002		Pu Met/Ox	47		Start engineering studies of a new repackaging line at Hanford.	Sep 1995		Sep 1995	Completed September 8, 1995.
IP-3.2-029	003		Pu Met/Ox	47	HAN	Complete detailed design, equipment procurement, and installation of a new repackaging system.	Dec 1998			Site reports budget shortfall delays PuSAP buy. PuSAP System Preparation Phase stalled 28% complete since PFP Dec 96 shutdown. (Aug 97 Rpt) DOE-RL recommended approval of Trade Study Case 3' - ship pu to SRS in 3013 containers. (Sep 97 Rpt)
IP-3.2-033	004	*	Pu Met/Ox	48	HAN	Start restabilizing high assay oxides at the PFP.	Jul 1999			
IP-3.2-030	005		Pu Met/Ox	47	HAN	Train staff, prepare procedures, perform operational readiness testing (prior to commencing operations).	Sep 1999			Budget shortfall delays PuSPS purchase. Completion delayed until Sep 2000. (May 97 Rpt)
IP-3.2-031	006	*	Pu Met/Ox	47	HAN	Commence repackaging operations at Hanford.	Oct 1999			Budget shortfall delays PuSPS purchase. Completion delayed until Oct 2000. (May 97 Rpt) Preparation phase activities have been stalled at 80% complete since PFP shutdown in Dec 96. (Jun 97 Rpt)
IP-3.2-032	007	*	Pu Met/Ox	47	HAN	Complete metal repackaging at Hanford.	Sep 2000			Budget shortfall delays PuSPS purchase. Completion delayed until Sep 2001. (May 97 Rpt)
IP-3.2-018	008	*	Pu Met/Ox	41, 48 50	HAN	Thermally stabilize and repackage all plutonium oxide to meet the metal and oxide storage standard.	May 2002			
IP-3.3-031	009	*	Pu Res	4, 67 73	HAN	Stabilize existing inventory of sludge (low organic residues) in muffle furnaces.	Sep 1995		Jun 1995	Completed early June 13, 1995.
IP-3.3-032	010	*	Pu Res	4, 67 73	HAN	Stabilize 46 cans of selected ash from RF in the muffle furnaces.	Mar 1996		Jan 1996	Completed early in January 1996.
IP-3.3-028	011	*	Pu Res	67	HAN	Stabilization of Polycubes begins.	Jul 1999			Preparation phase progress remains stalled at 10%. (Jun 97 Rpt)
IP-3.3-026	012	*	Pu Res	67	HAN	Stabilization of reactive solids (SS&C) completed.	Jan 2000			
IP-3.3-029	013	*	Pu Res	67, 73	HAN	Stabilization of Polycubes completed.	Jan 2001			
IP-3.3-027	014		Pu Res	67	HAN	Stabilization and repackaging of interim-stabilized materials completed.	Jan 2002			Supporting action necessary to meet IP-3.3-033 due May 2002.
IP-3.3-033	015	*	Pu Res	4, 67 73	HAN	Stabilize and package all remaining residues to safe storage standards.	May 2002			
IP-3.1-024	016	*	Pu Soln	3, 36 37	HAN	Complete transfer of 22,700 liters of PUREX solutions to tank farms at Hanford.	Aug 1995		Apr 1995	Completed early April 28, 1995.
IP-3.1-018	017		Pu Soln	36	HAN	All bottles of plutonium solutions at Hanford inspected to ensure proper venting.	Sep 1995		May 1995	Completed early May 16, 1995.
IP-3.1-015	018		Pu Soln	36	HAN	220 liters of chloride solutions at Hanford stabilized as part of a developmental testing program.	Sep 1995		Sep 1995	Completed September 29, 1995.

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MMSTG Milestone Number	SIMS Cmt #	Key Milestones	Material Group	IP Page #	DOE Site	Milestone	Due Date	Revised Due Date	Completion Date	Status
IP-3.1-021	019	*	Pu Soln	37	HAN	Complete solution technology development at Hanford Plutonium Finishing Plant (PFP).	Mar 1996		Apr 1996	Completed late in April 1996.
IP-3.1-016	020		Pu Soln	36, 37	HAN	ROD issued for PFP Clean-out and Stabilization EIS.	Jun 1996		Jun 1996	Completed in June 1996.
IP-3.1-022	021	*	Pu Soln	37	HAN	Begin processing solutions at PFP.	Jun 1997			Past due. Fissile material handling work stoppage continues. Due to continuing delay in resuming fissile material work and best prioritization of PFP activities, milestone completion has potential to slip into FY-99. (Jan 98 Status)
IP-3.1-017	022	*	Pu Soln	3, 36, 37	HAN	Stabilization of 4,800 liters at PFP completed.	Jan 1999			See IP-3.1-022. Schedule for solution stabilization is being reassessed.
IP-3.6-001	032	*	SNF	5, 96, 105, 112	HAN	Complete removal of all SNF from K-Basins.	Dec 1999			See IP-3.6-012. (Nov 97 Rpt)
IP-3.6-010	030		SNF	101, 103, 105, 112	HAN	Issue "Management of SNF from the K-Basins" EIS ROD.	Dec 1995		Mar 1996	Completed late March 4, 1996.
IP-3.6-012	031	*	SNF	105, 112	HAN	Begin SNF and sludge removal from K-Basins.	Dec 1997			Past Due. Completion delayed because of fuel testing and facility construction problems. Milestone schedule has been reassessed and will be forwarded to DOE-HQ as an IP change request. (Dec 97 Rpt)
IP-3.6-014	024		SNF	105	HAN	Develop K-Basin potential funding options and an acquisition strategy, as appropriate.	Mar 1995		Mar 1995	Completed March 1995.
IP-3.6-015	025		SNF	105, 112	HAN	Issue Notice of Intent for K-Basins EIS.	Mar 1995		Mar 1995	Completed March 1995.
IP-3.6-016	023		SNF	105	HAN	Complete cofferdam installation in K-West Basin	Feb 1995		Feb 1995	Completed February 1995.
IP-3.6-017	026		SNF	5, 105	HAN	Complete cofferdam installation in K-East Basin	Apr 1995		Apr 1995	Completed April 1995.
IP-3.6-018	028		SNF	5, 102, 105, 112	HAN	Start fuel characterization in K-Basin hot cells	Apr 1995		Apr 1995	Completed March 30, 1995.
IP-3.6-019	027		SNF	105	HAN	Initiate sludge retrieval demonstration in conjunction with cofferdam installation in K-Basins.	Apr 1995		Dec 1994	Completed early in December 1994.
IP-3.6-020	029		SNF	105, 112	HAN	K-Basins Integrated Path Forward Schedule providing details of major system acquisitions and material movements issued.	May 1995		Apr 1995	Completed early April 25, 1995
IP-3.6-201	153	*	SNF		HAN	Complete removal of all sludge from K-Basins.	Dec 2000			See IP-3.6-012. (Nov 97 Rpt)
IP-3.6-045	033	*	SNF	111	ID	Begin movement of CPP-603 South Basin SNF.	Jul 1995		May 1995	Completed early May 12, 1995.
IP-3.6-043	034	*	SNF	110, 111, 113	ID	Move an additional 189 SNF units from CPP-603 North and Middle Fuel Storage Facility to CPP-666.	Dec 1995		Sep 1995	Completed early September 11, 1995.
IP-3.6-044	035	*	SNF	110, 111, 113	ID	Move all SNF (6.84 metric tons) from CPP-603 North/Middle Basins to CPP-666.	Dec 1996		Aug 1996	Completed early August 5, 1996



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NMSTG Milestone Number	SIMS Cnt #	Key Milestones	Material Group	IP Page #	DOE Site	Milestone	Due Date	Revised Due Date	Completion Date	Status
IP-3.6-046	036	*	SNF	111 113	ID	Complete the removal of all SNF not requiring overpacking from CPP-603.	Dec 1998			Completion is projected to be delayed 18 months due to Canning Facility startup problems, allocation of resources to facility deactivation & required fuel receipts, and redirection of CPP-666 EBR-II fuel to CPP-603. (Dec 97 Rpt)
IP-3.6-047	037	*	SNF	111 113	ID	Construct and startup a CPP-603 dry storage overpacking station.	Dec 1998		Jul 1997	Completed early July 8, 1997.
IP-3.6-005	038	*	SNF	96, 110 112, 113	ID	Remove all SNF from the CPP-603 Fuel Storage Facility.	Dec 2000			Preps for Phase VIII Groups I and II fuel transfers continue - Group I expected to begin in Oct 97, Group II expected to begin in May 1998 (Aug 97 Qrtly Rpt)
IP-3.2-037	039		Pu Met/Ox	49	LANL	Complete peer review of LANL packaging operations for long term storage.	Apr 1995		Apr 1995	Completed April 28, 1995.
IP-3.2-039	040		Pu Met/Ox	49	LANL	Integrate and demonstrate repackaging operations at the TA-55 plutonium facility at LANL.	Apr 1995		Apr 1995	Completed April 28, 1995.
IP-3.2-040	041		Pu Met/Ox	49	LANL	Begin repackaging of plutonium metal and oxide at the TA-55 plutonium facility in LANL.	May 1995		May 1995	Completed May 1995.
IP-3.2-035	042	*	Pu Met/Ox	48	LANL	Stabilize and repackage high risk vault items to meet the long-term storage standards.	Sep 1997			Past due. None of the four material categories are complete. Processing continues. Milestone completion is projected to be second quarter FY-98. (Dec 97 Rpt)
IP-3.2-014	043	*	Pu Met/Ox	41, 48 49, 50	LANL	Thermally stabilize and repackage all plutonium oxide to meet the metal and oxide storage standard.	May 2002			All packaging efforts remain unfunded in FY98. Integrated program being developed that will incorporate 94-1 legacy material into processing of currently generated TA-55 scrap. (Dec 97 Rpt)
IP-3.3-035	044		Pu Res	73	LANL	Perform 100% visual inspection of vault inventory.	May 1995		Apr 1995	Completed early April 7, 1995.
IP-3.3-034	045		Pu Res	73	LANL	(LANL lead; HAN, LLNL, RF and SR assist) Develop risk-based, complex-wide categorization and prioritization decision criteria that all stored residues will be required to meet.	Sep 1995		Mar 1996	Completed late March 1996
IP-ES-100	046	*	Pu Res	4	LANL	Stabilize 220 kgs of residues.	Oct 1995		Oct 1995	Completed in October 1995.
IP-3.3-037	047	*	Pu Res	74	LANL	Process 90% of analytical solutions.	Oct 1995		Aug 1995	Completed early August 31, 1995.
IP-3.3-036	048		Pu Res	74	LANL	Recover 100 neutron sources	Oct 1995		Apr 1995	Completed early April 21, 1995.
IP-3.3-038	049		Pu Res	74	LANL	Process 100 kgs of sand, slag and crucible materials	Oct 1995		Apr 1995	Completed early April 21, 1995.
IP-3.3-039	050		Pu Res	74	LANL	Process 70 kgs of hydroxide solids.	Oct 1995		Apr 1995	Completed early April 21, 1995.
IP-3.3-040	051	*	Pu Res	74	LANL	Oxidize 50 kgs of corroded metal items.	Oct 1995		Oct 1995	Completed revised milestone on time. Revised milestone is: "Stabilize 100 metal items by October 31, 1995."
IP-3.2-015	056	*	Pu Met/Ox	2, 41 50	LLNL	Thermally stabilize and repackage all plutonium oxide to meet the metal and oxide storage standard.	May 2002			
IP-3.2-042	054		Pu Met/Ox	49	LLNL	Complete the Plutonium ES&H Corrective Action Plan at LLNL.	Jan 1997	Oct 1997		Past due. Behind schedule due to B332 facility placed in standby. B332 reopens incrementally beginning February 1, 1998. Milestone completion estimated in April 1998. (Nov 97 Rpt)

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NMSTG Milestone Number	SIAMS Cmt #	Key Milestones	Material Group	IP Page #	DOE Site	Milestone	Due Date	Revised Due Date	Completion Date	Status
IP-3.2-043	055	*	Pu Met/Ox	49	LLNL	Excess plutonium metal items at LLNL repackaged in compliance with DOE-STD-3013-94.	Jan 2002			
IP-3.2-044	052		Pu Met/Ox	49	LLNL	Begin initial inspection of metal items.	Apr 1995		Apr 1995	Completed in April 1995.
IP-3.2-045	053	*	Pu Met/Ox	49	LLNL	Begin repackaging material to meet the metal and oxide storage standard when bagless transfer capability is established.	May 1996	Apr 1998		At Risk. delivery and installation of bagless transfer equipment scheduled for August 1998. (Jan 98 Status)
IP-3.3-041	060	*	Pu Res	4, 71 73	LLNL	Stabilize and package 111 cans of ash/residue.	Apr 1998	Apr 1999		Building 332 shutdown has delayed ash stabilization research. (Nov 97 Rpt)
IP-3.3-042	057		Pu Res	71 73	LLNL	Complete trade-off study to develop plans for the stabilization and packaging of ash/residues for long-term storage.	Apr 1996		Nov 1996	Completed late in November 1996.
IP-3.3-043	059	*	Pu Res	71	LLNL	Stabilize, process, and package all other residues.	Apr 1997	Apr 2000		
IP-3.3-045	058	*	Pu Res	73	LLNL	Identify, characterize, and non-destructively assay all Pu items in the inventory including residues.	Jan 1997	Oct 1997		Past due. See IP-3.2-042. (Nov 97 Rpt)
IP-3.2-003	062	*	Pu Met/Ox	41 50	Mound	Repackage all plutonium metal in direct contact with plastic.	Sep 1996		Sep 1996	Completed September 26, 1996.
IP-3.2-101	065	*	Pu Met/Ox	50	Mound	Repackage all plutonium metals and oxides to meet the DOE metal and oxide storage standard.	May 2002		Mar 1997	Completed early on March 31, 1997
IP-ES-001	064	*	General	2	NMSTG	Issue a DNFSB 94-1 Integrated Program Plan.	Feb 1995		Feb 1995	Completed February 28, 1995.
IP-ES-004	065	*	General	3	NMSTG	Research Committee established.	Mar 1995		Mar 1995	Completed March 15, 1995.
IP-ES-005	066	*	General	3	NMSTG	Research Committee's comprehensive Research and Technology Development Plan issued (RC).	Nov 1995		Nov 1995	Completed November 30, 1995
IP-ES-041	067	*	General	5	NMSTG	Complete the "Facilities Section" of the Integrated Program Plan (IWG).	Dec 1995		Nov 1995	Completed early November 7, 1995
IP-ES-006	068	*	General	3	NMSTG	Research and technology development efforts will be measured against the comprehensive plan, which will be updated annually	Nov 1998			The second annual update is complete. (November 22, 1997)
IP-3.2-011	069		Pu Met/Ox	2, 41	NMSTG	Pu Metals/Oxides Trade Study Completed	May 1995		May 1995	Completed May 15, 1995
IP-3.3-C50	070	*	Pu Res	73	NMSTG	Develop complex-wide secondary material storage standard for materials that are less than 50% assay.	Dec 1995		Jan 1996	Completed late January 25, 1996.
IP-3.6-100	071		SNF	100	NMSTG	Issue Final Programmatic SNF EIS.	Apr 1995		Apr 1995	Completed in April 1995.
IP-3.6-055	072		SNF	100, 103 112	NMSTG	Issue Programmatic SNF EIS ROD.	Jun 1995		Jun 1995	Completed June 1, 1995.
IP-3.6-006	073		SNF	99 112	NMSTG	Issue the SNF Program Plan	Nov 1995		Nov 1995	Completed November 30, 1995

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NMSTG Milestone Number	SAMS Cmt #	Key Milestones	Material Group	IP Page #	DOE Site	Milestone	Due Date	Revised Due Date	Completion Date	Status
IP-3.6-008	074		SNF	100 112	NMSTG	Issue Foreign Research Reactor SNF EIS ROD.	Dec 1995		May 1996	Completed late May 13, 1996.
IP-3.6-048	075		SNF	112	NMSTG	Environmental Management PEIS ROD issued	Sep 1995		Jun 1995	Completed early June 1, 1995
IP-3.6-049	076		SNF	112134	NMSTG	Repository EIS ROD.	Sep 2000			EIS ROD is being drafted by YUCCA Mtn Project Office (Wendy Dixon). Projected draft completion in FY98. (Status as of 24Nov 97)
IP-3.4-012	077		Spec Iso	80	NMSTG	Activities will be initiated to clarify end-states and disposition pathways.	None			Will be addressed by the IWG Small Sites, Small Holdings Initiative.
IP-3.4-013	078		Spec Iso	80	NMSTG	Activities will be initiated to establish storage standards and/or criteria for unique material forms as required.	None			Local standards/criteria for material storage are being developed for Am/Cm, Np and Pu-238.
IP-3.4-014	079		Spec Iso	80	NMSTG	Activities will be initiated to resolve transportation, storage space, and consolidation issues related to Special Isotopes.	None			Will be addressed by the IWG Small Sites, Small Holdings Initiative.
IP-3.4-009	080		Spec Iso	78	NMSTG	Non-defense users will define requirements for programmatic and National Asset reserves, in concert with DOE representatives (including NE). Inventories in excess of these requirements will be considered for long-term storage or disposal.	None			Will be addressed by the IWG Small Sites, Small Holdings Initiative.
IP-3.4-008	081		Spec Iso	78	NMSTG	Strategic goals will be refined for which parts of current inventories must be retained for future use. DOE(DP) will define isotope quantities and forms that will be reserved for national security needs.	None			
IP-3.2-017	082	*	Pu Met/Ox	2, 41 50	OR	Thermally stabilize and repackage all plutonium oxide to meet the metal and oxide storage standard.	May 2002	Dec 2000		Production Phase is proceeding on schedule. Shipping to LLNL is being negotiated. (Dec 97 Rpt)
IP-3.5-003A	084	*	Uranium	87, 92 93	OR	Place Category I deposits in a safe configuration	Sep 1997	Dec 1997	Dec 1997	Completed December 9, 1997.
IP-3.5-004A	086	*	Uranium	87, 92 93	OR	Place Category II deposits in a safe configuration	Apr 1998	Mar 1998		Deposits removed from Whitehead Converters #1 & #2. Removal from #3, #4, & #5 scheduled in January, Ur is in safe configuration. Removal of third and final K-29 deposit is in progress. (Dec 97 Rpt)
IP-3.5-005	085	*	Uranium	87, 92 93	OR	Remove HEU Uranium deposits for ORNL's Molten Salt Reactor Experiment (MSRE) project.	Feb 1998	Feb 1999		Remote entry made into drain tank cell. Heat source introduced is being used to verify heat input versus cell temp rise calculations. PMS shield disassembled, surveyed, and decontaminated. It is being refurbished and reconfigured (Dec 97 Rpt)
IP-3.5-010	083	*	Uranium	92, 93	OR	Complete "interim corrective measures:" drain water from ACB cell; partition the off-gas system; eliminate water	Nov 1995		Nov 1995	Completed November 29, 1995.
IP-3.5-011	087	*	Uranium	92	OR	Fuel salts at OR's MSRE project removed.	May 2001	May 2002		Drain Tank Cell mockup was completed. Draft ROD submitted to DOE-OR by contractor. (Nov 97 Rpt)
IP-3.2-046	088	*	Pu Met/Ox	50	RF	Conduct a sampling and inspection program at Rocky Flats to determine the relative risk and priority for repackaging plutonium metals and oxides in close proximity to plastic and other synthetic materials.	Jul 1995		Sep 1995	Completed late September 30, 1995.
IP-3.2-020	089	*	Pu Met/Ox	41, 45 50	RF	Repackage a total of 256 items in Building 707 where Pu metal is in direct contact with plastic.	Oct 1995		Nov 1995	Completed late November 14, 1995.

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IP-3.2-021	090	*	Pu Met/Ox	45, 50	RF	Repackage 1,602 Rocky Flats Pu metal items not in direct contact with, but in proximity to, plastic	Oct 1996	Nov 1996	Dec 1996	Completed late in December 1996.
IP-3.2-012	091	*	Pu Met/Ox	41, 50	RF	Thermally stabilize the existing backlog of all known reactive plutonium oxide at Rocky Flats. (63 kgs.)	Oct 1996	Nov 1996	Jan 1997	Completed late January 9, 1997.
IP-3.2-022	092	*	Pu Met/Ox	45	RF	New Pu metal/oxide processing line operational in Building 371 at Rocky Flats.	Sep 1998			Unfunded in FY97 & FY98. Evaluation of impact ongoing. (Oct 97 Rpt)
IP-3.2-016	093	*	Pu Met/Ox	2, 41 50	RF	Thermally stabilize and repackage all plutonium oxide to meet the metal and oxide storage standard.	May 2002			Delivery of prototype PuSPS has been delayed an additional 4 weeks to January 20, 1998 as BNFL continues to work to resolve furnace leakage and resulting throughput capacity problems. (Nov 97 Rpt)
IP-3.3-011	094	*	Pu Res	4, 63 73	RF	Vent 2,045 residue drums with a potential for hydrogen gas generation.	Oct 1995		Sep 1995	Completed early September 25, 1995.
IP-3.3-008	095	*	Pu Res	63	RF	Vent 700 unvented residue drums.	Oct 1996		Dec 1995	Completed early December 22, 1995.
IP-3.3-015	096	*	Pu Res	4, 73	RF	Vent all inorganic residues.	Oct 1996		Dec 1995	Completed early on December 22, 1995.
IP-3.3-016	097	*	Pu Res	4, 73	RF	Vent all wet/miscellaneous residues.	Oct 1996		Dec 1995	Completed early December 22, 1995.
IP-3.3-014	098	*	Pu Res	4, 63 73	RF	Complete stabilizing graphite fines and high hazard incinerator ash.	May 1997	Sep 1998		On schedule, but see milestone IP-3.3-014A. Plan is to move SS&C to B371 to permit concentration of B707 resources on graphite fines. (Nov 97 Rpt).
IP-3.3-014B			Pu Res		RF	Complete shipping SS&C to Savannah River.	TBD			Place-holder milestone added by NMSTG.
IP-3.3-014A	154	*	Pu Res		RF	BEGIN stabilization of graphite fines.	Sep 1997	Mar 1998		At risk. LANL has not completed development of agglomeration process. Actions are underway to resolve funding shortfalls. (Nov 97 Rpt)
IP-3.3-014C			Pu Res		RF	Begin shipping SS&C to Savannah River.	TBD			Place-holder milestone added by NMSTG. Management of SS&C repackaging for shipment to Savannah River is transferred to B371 Project Management. (Nov 97 Rpt)
IP-3.3-012	099	*	Pu Res	4, 61 73	RF	Stabilize by pyrochemical oxidation and repackage 6,000 kgs of higher risk Plutonium containing salts.	May 1997	Jan 1999		Impact of delayed startup will be evaluated after throughput established. (Nov 97 Rpt)
IP-3.3-012A	155	*	Pu Res		RF	BEGIN stabilization by pyrochemical oxidation 6,000 kg higher-risk Pu salts.		Aug 1997	Jan 1998	Completed late on January 8, 1998.
IP-3.3-013	100	*	Pu Res	4, 61 73	RF	Stabilize remaining high risk salts (4,000 kgs.) via chemical oxidation.	Dec 1997	Sep 1999		On schedule. (Nov 97 Rpt)
IP-3.3-013A			Pu Res		RF	Complete stabilization of remaining salt residues	May 2002	Jul 2001		On schedule. (Nov 97 Rpt)
IP-3.3-017	101	*	Pu Res	4, 61 73	RF	Stabilize high risk combustibles (11,000 kgs).	Nov 1998	Apr 1999		On schedule. (Nov 97 Rpt)
IP-ES-025	102	*	Pu Res	4, 63	RF	Repackage all Pu inorganic oxides and wet/miscellaneous residues (1,113 drums).	May 2002			On schedule. (Nov 97 Rpt)
IP-3.3-004	103	*	Pu Salt	34, 37	RF	Complete NEPA analysis (an Environmental Assessment) for solution stabilization.	Apr 1995		Apr 1995	Completed April 28, 1995.

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IP-3.1-020A	156	*	Pu Soln		RF	START draining B771 hydroxide tanks and begin processing.		Nov 1996	Nov 1996	Completed November 4, 1996.
IP-3.1-020B	157	*	Pu Soln		RF	COMPLETE draining four (4) B771 hydroxide tanks.		Jan 1997	Aug 1996	Completed early in August 1996.
IP-3.1-020C	158	*	Pu Soln		RF	COMPLETE B771 hydroxide precipitation process.		Mar 1997	Mar 1997	Completed in March 1997.
IP-3.1-020D	159	*	Pu Soln		RF	START draining four (4) B771 high level tanks and begin processing.		Sep 1997	Sep 1997	Completed in September 1997.
IP-3.1-020F	161	*	Pu Soln		RF	COMPLETE removal of all liquids in B771		Sep 1998		Scheduled completion slipped to October 98. Portable Filling Station engineering problems delaying progress. Developing a rebaselined recovery schedule. (Nov 97 Rpt)
IP-3.1-020G	162	*	Pu Soln		RF	START draining B371 tanks and begin processing.		Dec 1996	Dec 1996	Completed in December 1996.
IP-3.1-020H	163	*	Pu Soln		RF	COMPLETE draining six (6) B371 Cat B tanks.		Feb 1997	Feb 1997	Completed February 18, 1997.
IP-3.1-020I	164	*	Pu Soln		RF	COMPLETE draining one (1) B371 criticality tanks.		Jun 1997	May 1997	Completed early on May 12, 1997.
IP-3.1-020J	165	*	Pu Soln		RF	COMPLETE processing liquids from seven(7) B371 tanks		Jun 1997	Jun 1997	Completed June 12, 1997.
IP-3.1-020K	166	*	Pu Soln		RF	COMPLETE processing all liquids in B371 and B771.		Jun 1999		Scheduled completion slipped to Dec 99. Developing recovery plan. Projected completion in December 1999 (Nov 97 Rpt)
IP-3.1-020W		*	Pu Soln		RF	Complete processing liquids from the B771 high level tanks and B371 bottles.	Jul 1998			On schedule. (Nov 97 Rpt)
IP-3.1-020X		*	Pu Soln		RF	Complete draining four (4) B771 high level tanks.	Dec 1997		Dec 1997	Completed in December 1997.
IP-3.1-020Y		*	Pu Soln		RF	Complete draining of remaining B371 criticality line tanks	Jul 1998			On schedule. (Nov 97 Rpt)
IP-3.1-020Z		*	Pu Soln		RF	Start tap and draining of B371 room/systems.	Jun 1998			On schedule. (Nov 97 Rpt)
IP-3.1-020V			Pu Soln		RF	Start tap and draining of B771 room/systems	Jan 1998			At Risk Portable filling station engineering problems delayed start of draining, however recovery plan puts milestone back on track for completion on time. (Jan 98 Verbal Rpt)
IP-3.1-003	107	*	Pu Soln	31	RF	Place plutonium metal and oxide generated from stabilizing solutions at RF in a form suitable for safe storage.	May 2002			On schedule. (Nov 97 Rpt)
IP-3.5-006	108	*	Uranium	90, 93	RF	Begin bottling and shipping 2,700 liters of HEU solutions offsite for stabilization.	May 1996		Aug 1996	Completed late on August 13, 1996.
IP-3.5-001	109	*	Uranium	87, 90 93	RF	Remove all HEU uranyl nitrate solutions (2,700 liters) from Building 886 and complete all shipments offsite.	Sep 1996	Nov 1996	Nov 1996	Completed November 8, 1996.
IP-ES-018	110	*	General	4	RF, SR, Mound	All Pu Metal in direct contact with plastic repackaged.	Sep 1996		May 1997	Completed late SR completed in November 1995, Mound in September 1996, and Rocky Flats in May 1997.
IP-3.2-100	111		General	101	SR	Final IMNM EIS issued.	May 1995		Oct 1995	Completed in May 1995.

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<i>NMSTG</i> Milestone Number	<i>SIMS</i> Cmt #	<i>Key</i> Milestones	<i>Material</i> Group	<i>IP</i> Page #	<i>DOE</i> Site	<i>Milestone</i>	<i>Due</i> Date	<i>Revised</i> Due Date	<i>Completion</i> Date	<i>Status</i>
IP-3.2-024	112		General	5, 35 37, 46 64, 81 82, 90 108, 112	SR	IMNM EIS ROD issued. (The ROD will select a method for stabilizing SR fuel and targets, H-Canyon Pu-239 solutions, metals & oxides, Pu residues, special isotopes, and HEU solutions.)	Jul 1995		Dec 1995	Completed late December 12, 1995. Added TRR fuel (82 cans).
IP-3.2-025	113	*	Pu Met/Ox	46, 50	SR	Metal turnings where plutonium metal is known to be in direct contact with plastic at Savannah River will either be processed (using the F-Canyon and FB-Line facilities) to a safe storable form, or repackaged.	Dec 1995		Nov 1995	Completed early November 20, 1995
IP-3.2-027	114		Pu Met/Ox	47, 65	SR	Modifications to the FB-Line facility (installation of a bagless transfer system) completed.	Sep 1997		Aug 1997	Completed early August 28, 1997.
IP-3.2-026	115		Pu Met/Ox	46, 65	SR	A new or modified Actinide Repackaging Facility at Savannah River, required to fully meet the metal and oxide storage standard, is available. (Assumes the approval of an FY98 Line Item Project).	Dec 2001			Early completion in October 2001 is projected.
IP-3.2-013	116	*	Pu Met/Ox	2, 41 46, 50	SR	Thermally stabilize and repackage all plutonium oxide to meet the metal and oxide storage standard.	May 2002			
IP-3.3-021	117	*	Pu Res	65	SR	Processing in F-Area begins.	Sep 1996		Jun 1996	Completed early in June 1996.
IP-3.3-018	118		Pu Res	65	SR	Characterization methods used will include NDA using digital radiography equipment, with selected sampling of containers using existing gloveboxes with modifications.	Dec 1997		Mar 1997	Completed early in March 1997.
IP-3.3-022	119	*	Pu Res	4, 65 74	SR	Processing of existing inventories of SS&C material completed	Dec 1997			Past Due (Jan 98). Delay caused by boron complexing with fluoride. Dissolution began October 2, 1997. March 1998 completion projected. (Nov 97 Rpt)
IP-ES-032	120	*	Pu Res	4, 65 74	SR	Stabilize all other residues at SR.	May 2002			Projected completion date has slipped to February 2003. (Nov 97 Rpt)
IP-3.1-007	121		Pu Soln	35, 37	SR	ROD for the F-Canyon plutonium solutions issued.	Feb 1995		Feb 1995	Completed February 2, 1995.
IP-3.1-008	122		Pu Soln	35, 37	SR	Begin F-Canyon processing operations.	Feb 1995		Feb 1995	Completed February 3, 1995.
IP-3.1-009	123	*	Pu Soln	3, 35 37	SR	Complete Stabilization of F-Canyon plutonium solutions (320,000 liters converted to metal)	Jan 1996		Apr 1996	Completed late April 11, 1996.
IP-3.1-011	124	*	Pu Soln	35, 37	SR	Begin H-Canyon stabilization operations.	Feb 1999			Projected completion has slipped to October 1999. (Nov 97 Rpt)
IP-3.1-013	125		Pu Soln	35	SR	SR's HB-Line Phase II start-up.	Feb 1999			Projected completion has slipped to October 1999. (Nov 97 Rpt)
IP-3.1-012	126	*	Pu Soln	35, 37	SR	Stabilization operations completed for Pu-239 solutions in SR's H-Canyon (34,000 liters converted to oxide).	Feb 2000			Projected completion has slipped to August 2000. (Nov 97 Rpt)
IP-3.6-002	133	*	SNF	8, 96 108, 110 112	SR	Complete stabilization of SR's Mk31 targets via dissolution in F-Canyon	Sep 1996		Jan 1997	Completed late January 2, 1997

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MMSTG Milestone Number	STMS Cmt #	Key Milestones	Material Group	IP Page #	DOE Site	Milestone	Due Date	Revised Due Date	Completion Date	Status
IP-3.6-003	139	*	SNF	5, 96 108, 110 112	SR	Complete dissolution of SR's Mk16 and MK22 SNF.	Nov 1998			Projected completion has slipped to December 2000 (Nov 97 Rpt)
IP-3.6-004	140	*	SNF	5, 96 110, 112	SR	Complete stabilization of SR's resultant Uranium solutions from the dissolution of Mk16/22 SNF.	Apr 2000			Deletion of milestone will be recommended based on HEU program redirection. (Nov 97 Rpt)
IP-3.6-032	131	*	SNF	107, 110 112	SR	Begin Mk31 target stabilization in SR's F-Area.	Nov 1995		Feb 1996	Completed late February 12, 1996.
IP-3.6-033	135	*	SNF	108, 110 112	SR	Begin stabilization of SR's Mk16 and Mk22 HEU SNF.	Nov 1996		Jul 1997	Completed late July 21, 1997.
IP-3.6-034	128	*	SNF	109	SR	Complete vacuum consolidation of SR's L-Reactor Disassembly Basin sludge.	Sep 1995		Mar 1995	Completed early March 31, 1995.
IP-3.6-035	129	*	SNF	109	SR	Reorient fuel in SR's L-Reactor Disassembly Basin to a horizontal configuration.	Feb 1996		Nov 1995	Completed early November 29, 1995.
IP-3.6-036	136	*	SNF	109	SR	Reorient fuel in SR's K-Reactor Disassembly Basin to a horizontal configuration.	Feb 1997		Jul 1997	Completed late in July 1997.
IP-3.6-037	130	*	SNF	110 112	SR	Complete fuel consolidation to free up approximately 1,250 additional storage spaces in SR's RBOF.	Dec 1995		Aug 1996	Completed late August 26, 1996.
IP-3.6-038	132	*	SNF	5, 109 110, 112	SR	Complete K- & L-Reactor Disassembly Basin upgrades.	May 1996		May 1996	Completed May 31, 1996.
IP-3.6-040	134	*	SNF	110	SR	Complete vacuum consolidation of SR's K-Reactor Disassembly Basin sludge.	Sep 1996			Past due. Maintenance of basin water quality satisfies intent. Milestone deletion request is being processed at DOE-HQ. (Nov 97 Rpt)
IP-3.6-041	137	*	SNF	110	SR	Remove consolidated basin sludge from SR's K-Reactor Disassembly Basins.	Sep 1997			Past due. See status of milestone IP-3.6-040.
IP-3.6-042	138	*	SNF	110	SR	Remove consolidated basin sludge from SR's L-Reactor Disassembly Basins.	Sep 1997			Past due. See status of milestone IP-3.6-040.
IP-3.6-101	127		SNF	109	SR	Re-examine L-Basin corrosion surveillance coupons.	Feb 1995		Feb 1995	Completed in February 1995.
IP-3.4-001	141		Spec Iso	77	SR	Immediately discontinue active water cooling for Am/Cm solutions in F-Canyon.	Feb 1995		Feb 1995	Completed in February 1995.
IP-3.4-021	142		Spec Iso	77, 83 84	SR	Transport Pu-238 solids currently in inadequate storage to the HB-Line for venting and repackaging.	Apr 1995		Mar 1995	Completed early March 2, 1995.
IP-ES-008	143		Spec Iso	3, 81	SR	Conceptual design report for the stabilization of Am/Cm Solutions completed.	Dec 1995		Nov 1995	Completed early November 30, 1995
IP-3.4-017	144	*	Spec Iso	82, 84	SR	Begin stabilization of Pu-242 Solutions at HB-Line, Phase III.	May 1997		Aug 1996	Completed early in August 1996.
IP-3.4-018	145	*	Spec Iso	3, 77 82, 84	SR	Complete stabilization of Pu-242 Solutions at HB-Line, Phase III.	Nov 1997		Dec 1996	Completed early in December 1996
IP-3.4-015	146		Spec Iso	84	SR	Start vitrification of Am/Cm Solutions.	Mar 1998			At Risk. Melter "pluggage" problems slow R&D progress. Construction & design activities held in abeyance until resolved. Rebaselined for January 2000 completion date. (Nov 97 Rpt)

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NMSTG Milestone Number	SIMS Cmt #	Key Milestones	Material Group	IP Page #	DOE Site	Milestone	Due Date	Revised Due Date	Completion Date	Status
IP-3.4-016	147	*	Spec Iso	3, 77 80, 84	SR	Complete vitrification of Am/Cm Solutions	Sep 1998			Rebaselined for June 2000 completion. See Milestone IP-3.4-015. (Nov 97 Rpt)
IP-3.4-019	148	*	Spec Iso	84	SR	Begin stabilization of Np-237 Solutions HB-Line. Phase II	Jul 2001			Revision of milestone is awaiting pending material disposition/shipment decisions. Projected completion date TBD. (Nov 97 Rpt)
IP-3.4-020	149	*	Spec Iso	3, 77 84	SR	Complete stabilization of Np-237 Solutions at HB-Line, Phase II.	Dec 2002			See Milestone IP-3.4-019.
IP-3.4-003	150		Spec Iso	77	SR	Implement effective surveillance and monitoring programs to reduce the risk of extended storage of special isotope solutions	None		Mar 1995	Completed in March 1995.
IP-3.5-008	151	*	Uranium	91	SR	Complete construction of blending facilities at F- and H-Areas (HEU Dilution Project).	Jul 1996		Jul 1996	Completed July 25, 1996.
IP-3.5-002	152	*	Uranium	3, 87 91, 93	SR	Complete FA-Line blending and processing of 230,000 liters of HEU solutions into a stable oxide.	Dec 1997			Past Due (Jan 98). Milestone will be missed. Requires HEU blending decision. Completion TBD. (Nov 97 Rpt)



# APPENDIX B

## 97-1 Milestone Status Summary

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NMSTG Milestone Number	SIMS Cmt #	IP Page #	HQ Program Office	Milestone Descriptions	Due Date	Completion Date	Status
<b>DOE-HQ</b>							
<b>Key Near-Term Milestones</b>							
HQ-01	018	17	EM-66	Prepare annual reports (due January 1998, then annually thereafter).	Jan 1998		
HQ-01-01			EM-66	Submit final draft to tech team for review/comment.	12/30/97		
HQ-02	011	15	MD-1	Document long-term disposition alternatives for U-233.	Jan 1998		Report summarizing path forward for identified disposition alternatives has been prepared and promulgated for review. Comments are being incorporated. Publication will be in January 1998. (Dec 98 Rpt)
HQ-02-01			MD-1	Submit final draft to tech team for review/comment.	1/1/98		
HQ-03	012	15	EM-66	Document technical competency in ongoing actinide programs applicable to the U-233 Safe Storage Program.	Jan 1998		Report "Technical Competencies for Safe INterm Storage and Management of U-233 at DOE Facilities" has been drafted and reviewed. Comments are resolved and incorporated. (Dec 97 Rpt)
HQ-03-01			EM-66	Submit final draft to tech team for review/comment.	12/30/97		
HQ-04	015	16	EM-66	Develop system requirements for U-233 Safe Storage System.	Mar 1998		
HQ-04-01			EM-66	Submit final draft to tech team for review/comment.	2/1/98		
HQ-05	002	13	EM-66	Develop Draft U-233 Safe Storage Standard.	Apr 1998		
HQ-05-01			EM-66	Final revised draft to tech team for review/comment.	3/1/98		
HQ-06	001	13	EM-66	Establish U-233 Waste Threshold Criteria.	May 1998		
HQ-06-01			EM-66	Final draft to tech team for review/comment.	4/1/98		
HQ-06-02			EM-66	Append DOE waste order.	10/1/98		
HQ-07	003	14	EM-66	Develop Final U-233 Safe Storage Standard.	Sep 1998		
HQ-07-01			EM-66	Final draft to tech team for review/comment.	7/30/98		
HQ-07-02			EM-66	Issue standard.	XXX		
HQ-08	014	16	EM-66	Complete Building 3019 Alternatives Trade Study	Sep 1998		

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NMSTG Milestone Number	SIMS Cmt #	IP Page #	HQ Program Office	Milestone Descriptions	Due Date	Completion Date	Status
HQ-08-01			EM-66	Final draft to tech team for review/comment.	8/1/98		
HQ-08-02			EM-66	Select long term storage facility.	XXX		
HQ-09	016	16	EM-66	Develop a system design description for interim and long-term storage of U-233	Oct 1998		
HQ-09-01			EM-66	Final draft to tech team for review/comment.	8/30/98		
HQ-10	017	17	EM-66	Develop a multi-year Program Execution Plan for implementation of the selected system design.	Dec 1998		
HQ-10-01			EM-66	Final draft to tech team for review/comment.	10/1/98		
HQ-10-02			EM-66	Concurrence by DOE management.	12/15/98		
HQ-11	010	15	EM-66	Prepare Small Holdings Sites Assessment Report.	Dec 1998		
HQ-11-01			EM-66	Final draft to tech team for review/comment.	11/1/98		
HQ-12		14, 15	EM-66	Compile interim final U-233 site assessments (INEL/LANL/Small Holdings).	Dec 1998		
HQ-13	013	16	EM-66	Assemble Technical Data Book documenting U-233 operations knowledge for future reference.	Apr 1999		Preliminary outline distributed for review. Parts of Section 1 prepared. (Dec 97 Rpt)
HQ-13-01			EM-66	Final draft to tech team for review/comment.	3/15/99		
HQ-14		15	EM-66	Compile final U-233 site assessments (add ORNL).	Jun 1999		
<b>Long Term Milestones:</b>							
HQ-15		iii	EM-66	Manage long-term milestone requirements.	TBD		Long-term milestones will be developed from the Program Execution Plan due December 1998.
<b>Idaho National Engineering and Environmental Laboratory</b>							
<b>Key Near Term Milestones:</b>							
ID-01	006	14	DOE-ID	Complete INEL initial U-233 Site Assessment Report.	Mar 1998		
ID-01-01			DOE-ID	Final draft to tech team for review/comment.	2/1/98		

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**NUCLEAR MATERIALS STABILIZATION TASK GROUP**  
**DNFSB Recommendation 97-1 Implementation Plan Milestones**  
**January 23, 1998**

18 97-1 commitments  
(highlighted)

NMSTG Milestone Number	SIMS Cmt #	IP Page #	HQ Program Office	Milestone Descriptions	Due Date	Completion Date	Status
ID-02	009	15	DOE-ID	Complete INEEL final U-233 Site Assessment Report.	Dec 1998		
ID-02-02			DOE-ID	Final draft to tech team for review/comment.	11/1/98		
ID-03		iii	DOE-ID	Update SISMP to incorporate Program Execution Plan for the long-term use and disposition of U-233.	Dec 1998		
ID-04		ii	DOE-ID	Relocate 12 drums from Air Support Building (ASB) to Intermediate Level Transuranic Storage Facility (ILTSF)	*		
ID-05		ii	DOE-ID	Complete required NEPA review for relocating 65 drums from ILTSF to enclosed storage.	*		
ID-06		ii	DOE-ID	Relocate 65 drums from ILTSF to enclosed storage.	*		
ID-07		ii	DOE-ID	Complete x-ray tomography of 12 drums in ASB-II.	*		
ID-08		ii	DOE-ID	Inspect and overpack 53 drums at ILTSF.	*		
ID-09		ii	DOE-ID	Analyze gas samples from 50% of Light Water Breeder Reactor (LWBR) vaults.	*		
ID-10		ii	DOE-ID	Complete video inspection of LWBR dry storage vaults.	*		
				* Milestone due dates to be provided by DOE-ID in site input to PEP in December 1998.			
<b>Long Term Milestones</b>							
ID-13		iii	DOE-ID	Execute individual site-specific long-term Program Execution Plan milestone requirements.	TBD		INEEL specific long-term milestones will be developed from the Program Execution Plan due December 1998.
<b>Los Alamos National Laboratory</b>							
<b>Key Near Term Milestones</b>							
LA-01	004	14	DOE-AL	Complete LANL initial U-233 Site Assessment Report.	Dec 1997	Dec 1997	Complete. Reported to DNFSB by Albuquerque Operations Office letter dated December 29, 1997.
LA-01-01			DOE-AL	Final draft to tech team for review/comment.	11/30/97		
LA-02	007	13	DOE-AL	Complete LANL final U-233 Site Assessment Report.	Dec 1998		
LA-02-01			DOE-AL	Final draft to tech team for review/comment.	11/1/98		

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MMSTG Milestone Number	SIMS Cmt #	IP Page #	HQ Program Office	Milestone Descriptions	Due Date	Completion Date	Status
LA-03		iii	DOE-AL	Update SISMP to incorporate Program Execution Plan for the long-term use and disposition of U-233.	Dec 1998		
LA-04		ii	DOE-AL	Complete steaming study to prepare Chemical and Metallurgical Research (CMR) floor hole storage array.	**		
LA-05		ii	DOE-AL	Radiograph U-233 material currently in TA-18 Hillside Vault.	**		
LA-06		ii	DOE-AL	Complete USQD for storage, consolidation, and stabilization of material in the CMR Building	**		
LA-11		ii	DOE-AL	Complete required NEPA review for transporting excess U-233 material from Hillside Vault to CMR Building.	**		
LA-12		ii	DOE-AL	Transport excess U-233 material from Hillside Vault to CMR Building.	**		
				** Milestone due dates to be provided by DOE-AL in site input to PEP in December 1998.			
<b>Long Term Milestones</b>							
LA-07		iii	DOE-AL	Execute individual site-specific long-term Program Execution Plan milestone requirements.	TBD		LANL specific long-term milestones will be developed from the Program Execution Plan due December 1998.
<b>Oak Ridge National Laboratory</b>							
<b>Key Near Term Milestones</b>							
OR-01		iii	DOE-OR	Update SISMP to incorporate Program Execution Plan for the long-term use and disposition of U-233.	Dec 1998		
OR-02	005	14	DOE-OR	Complete ORNL initial U-233 Site Assessment Report.	Mar 1998		Tube vault off-gas sampling equipment and facilities installed. Hot cell and equipment install proceeding. Detailed evaluation of storage options is proceeding. (Dec 97 Rpt)
OR-02-01			DOE-OR	Final draft to tech team for review/comment.	2/15/98		
OR-03	008	15	DOE-OR	Complete ORNL final U-233 Site Assessment Report.	Jun 1999		
OR-03-01			DOE-OR	Final draft to tech team for review/comment.	4/15/99		
OR-04		ii	DOE-OR	Conduct smear samplings of storage vaults off-gas piping.	***		
OR-05		ii	DOE-OR	Perform gas and smear sampling of 50% of storage vaults.	***		
OR-06		ii	DOE-OR	Procure hot cells and equipment.	***		

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NMSTG Milestone Number	SIMS Cmt #	IP Page #	HQ Program Office	Milestone Descriptions	Due Date	Completion Date	Status
OR-07		ii	DOE-OR	Install hot cells and equipment.	***		
OR-08		ii	DOE-OR	Perform trend analysis of off-gas survey data.	***		
OR-09		ii	DOE-OR	Review hazards and risks of P-24 tank transfer.	***		
OR-10		ii	DOE-OR	Conduct natural phenomena hazards analysis.	***		
OR-11		ii	DOE-OR	Assess ventilation system requirements.	***		
OR-12		ii	DOE-OR	Complete required NEPA review for consolidating U-233 from small-holdings sites.	***		
OR-13		ii	DOE-OR	Complete glove box off-gas system upgrades.	***		
				*** Milestone due dates to be provided by DOE-OR in site input to PEP in December 1998.			
<b>Long Term Milestones</b>							
OR-14		iii	DOE-OR	Execute individual site-specific long-term Program Execution Plan milestone requirements .	TBD		ORNL specific long-term milestones will be developed from the Program Execution Plan due December 1998.
<b>Other Sites</b>							
<b>Key Near Term Milestones</b>							
LL-01		15		Submit small sites U-233 assessment report.	Dec 1998		
LL-02		ii		Assess U-233 storage conditions	****		
LL-03		ii		Identify excess U-233 materials for consolidation.	****		
LL-04		ii		Complete required NEPA review for shipping U-233 materials to ORNL.	****		
LL-05		ii		Prepare U-233 material for shipment.	****		
LL-06				Ship excess U-233 materials to ORNL.	****		
				**** Milestone due dates to be provided DOE-OAK (LLNL) in input to PEP in December 1998			