


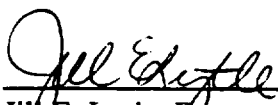


**DEFENSE NUCLEAR FACILITIES SAFETY BOARD
RECOMMENDATION 94-1 IMPLEMENTATION**

ANNUAL REPORT

*Covering the period
February 28, 1995 – February 29, 1996*

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**DEFENSE NUCLEAR FACILITIES SAFETY BOARD
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EXECUTIVE SUMMARY

Defense Nuclear Facilities Safety Board Recommendation 94-1, Improved Schedule for Remediation, addresses the need within the Department to improve the schedule for remediating situations involving the storage of nuclear materials within the defense nuclear facilities complex. The Recommendation also calls for an accelerated schedule for stabilizing and repackaging unstable special nuclear materials, spent fuel, unstable solid plutonium residues, highly radioactive liquids, etc. The Department is faced with increased requirements, competing needs, and additional challenges in remediation and storage of materials from disassembled nuclear weapons, materials that still remain in the production pipelines through which the process flow has been halted, and reclamation of former production sites, equipment, and stored products and wastes.

On February 28, 1995, the Department of Energy submitted an implementation plan to the Board in response to Recommendation 94-1. The Implementation Plan contains the complex-wide plan of action and milestones to resolve various nuclear materials stabilization issues identified in Recommendation 94-1. This is the first annual report presenting the status of actions and milestones of the 94-1 Implementation Plan.

The Nuclear Materials Stabilization Task Group was established on February 28, 1995 to integrate the Department's programs for stabilizing excess nuclear material to achieve safe, stable states for interim and long-term storage pending ultimate disposition. The Task Group has established a program to integrate complex-wide initiatives to manage nuclear materials stabilization activities. To date, stabilization activities have been addressed complex-wide in the following areas:

- Integrated Department-wide approach to stabilization issues
- Evaluating facility stabilization capabilities
- Procuring standardized equipment to support plutonium oxide stabilization and packaging for long-term storage
- Focusing research and development efforts on the technical challenges facing stabilization, storage, and disposition of plutonium and other nuclear materials.

The Department made significant process in 1995 toward meeting schedules and commitments.

I. FIRST YEAR STATUS**A. First Year Stabilization Progress:**

- 152 total milestones in Implementation Plan
- 57 milestones completed since February 1995
 - » 23 milestones completed early
 - » 29 milestones completed on time
 - » 5 milestones completed late
- 5 milestones are past due
- 3 milestones at risk

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

B. Milestones Past Due

IP-3.6-010 *Issue "Management of SNF from the K-Basins" EIS ROD for Hanford (December 1995)*

Issuing the draft EIS was delayed until March 1996 because significant rework was required to achieve consensus on the number of alternatives and comparison among the alternatives, refinement of the path forward (preferred alternative) in parallel with the EIS development, and an ambitious schedule. The draft EIS was approved for public comment on October 27, 1995. The Record of Decision is expected to be issued by March 22, 1996.

To adjust to the delay in the ROD, work around strategies are being developed to enable completion of the Canister Storage Building on schedule and to receive fuel, beginning December 31, 1997. The strategy includes an early construction contract award and parallel construction activities.

IP-3.3-034 *Develop Risk-based, Complex-wide Categorization and Prioritization Decision Criteria for All Stored Residues (September 1995)*

The risk-based prioritization analysis criteria was developed by Los Alamos National Laboratory, and discussed in a January 1996 meeting between Los Alamos and affected sites to establish a prioritization framework that can be utilized at the respective sites. Programmatic implementation guidance will be issued by the Task Group to all affected sites in March 1996.

IP-3.6-008 *Issue Foreign Research Reactor SNF EIS ROD (December 1995)*

The Departments of Energy and State are in the final stages of completing the EIS process concerning management of foreign research reactor spent fuel. The plan

currently calls for the final EIS to be issued in February 1996 with a Record of Decision in April 1996.

IP-3.1-009 *Complete Stabilization of F-Canyon Plutonium Solutions (January 1996)*

The stabilization of the 320,000 liters of solution in F-Canyon has been rescheduled for May 1996 as a result of the delayed FB-Line restart, which began on November 13, 1995. F-Canyon Phase II restart, also required for the stabilization of these solutions, occurred on February 9, 1996. All facilities required for completion of this milestone are now in operation.

IP-3.6-037 *Complete Fuel Consolidation to Free Up Approximately 1,250 Additional Storage Spaces in Savannah River's RBOF (December 1995)*

The milestone to perform fuel consolidation to free up additional storage space in Savannah River's Receiving Basin for Off-site Fuel (RBOF) is expected to be delayed until December 1996. Savannah River has requested this delay due to changes in plans for SNF activities. The majority of offsite SNF receipts, previously expected to be sent to RBOF, will now be directed to the L-Basin. Also, previous SNF proposals included sending seriously degraded fuel to RBOF to benefit from its superior water chemistry. Improvements in conductivity and sludge vacuuming in the L- and K-Basins during 1995 have improved conditions in those basins such that little benefit would be realized by moving their degraded SNF to RBOF. This has reduced the urgency of creating additional space in RBOF and allowed the site to redirect resources to deinventory the P Reactor Basin and the M-Area. This change will have no impact on Savannah River's capability to support planned spent fuel receipts (foreign research reactor and other DOE spent fuel). The delay in meeting this milestone will have no impact on the risks associated with the RBOF facility, and the accelerated removal of SNF and special nuclear material from the P and M Areas will result in greatly reduced risk there.

C. Milestones at Risk

IP-3.1-021 *Complete Solution Technology Development at Hanford Plutonium Finishing Plant (March 1996)*

The milestone is at risk because the shutdown of plutonium operations in the PFP in December delayed testing of the vertical calciner, which is the site's first choice to solidify the plutonium solutions. Also, failures of bushings and heater elements in the prototype calciner have delayed the acquisition of test data to support the technology program.

The technology program will establish the processing of 4,800 liters of plutonium solutions in PFP by January 1999 (milestone IP-3.1-017). By June 30, 1996, a

program decision will be made as to whether or not to complete the acquisition of data on the vertical calciner or to establish precipitation as the method of stabilization.

IP-3.2-045 *Begin Repackaging Material to Meet Metal and Oxide Storage Standard at Lawrence Livermore National Laboratory (May 1996)*

Consolidated stabilization equipment procurement will not provide delivery of prototype unit to Rocky Flats until early fiscal year 1997. This milestone cannot be met until subsequent equipment units are available for site purchase or a different treatment alternative is developed suitable for LLNL holding. As such, this milestone will be missed. A program review will be conducted and a new plan for this material will be established in May 1996.

IP-3.3-042 *Complete Trade-off Study to Develop Plans for the Stabilization and Packaging of Ash/Residues for Long-term Storage (April 1996)*

The Task Group has chartered an Ash Trade Study. The requirements associated with Lawrence Livermore ash and this milestone will be included in this study, which is scheduled for completion in June 1996.

II. INTEGRATION ACTIVITIES

A. Integration Working Group

The Integration Working Group (IWG) was chartered on March 27, 1995 to provide a complex-wide forum for integrating information, perform trades studies, and develop the Integrated Facilities Plan for nuclear material stabilization. Activities to date include:

- Developing and exercising a systems engineering screening process for identifying and scoping integration opportunities for analyses and resolution using trade studies.
- Establishing specific focus groups to evaluate, conduct analyses, and form recommendations regarding the issues, barriers, and requirements related to inter-site transportation plus considerations pertinent to inclusion of "small sites" within the purview of the Task Group.

Key IWG activities planned for the coming year include:

- Producing a set of lessons learned gained during the Savannah River facilities startups related to facility readiness and planning
- Develop an integrated strategy for dealing with material holdings at small sites and small holdings at large sites.

Integrated Facilities Plan

The Integration Working Group conducted a detailed review of the individual site facility plans with a view towards identifying integration opportunities across the complex that would enhance 94-1 stabilization activities by:

- Reducing risk and improving safety posture
- Enhancing cost-effectiveness of stabilization activities
- Improving schedules.

Complex-wide facilities information was collected and collated by material type being managed. From this the IWG developed an Integrated Facilities Plan that details all of the facilities to be used in stabilizing the six 94-1 material types.

The plan specifically delineates those facilities needed for remediation of materials identified as being at-risk in Recommendation 94-1, preparing them for safe interim storage pending disposition. The plan depicts the boundaries between 94-1 activities and various other programs. As noted in the plan, many of the decisions regarding long-range use of facilities, subsequent to the completion of the 94-1 program, have not been made. The IFP will, therefore, be maintained current via continuing liaison with other programs, both to provide a starting point for their facility planning deliberations and to ensure that any impact emanating from their evolving plans is formally factored into the timely execution of the 94-1 program commitments.

B. Trade Studies

Trade studies are the systems engineering method of identifying, analyzing, and comparing alternative methods for stabilizing of materials to forms suitable for interim storage or disposal. In conducting trade studies, worker exposure, risk to worker, risk to public, discharge to the environment, secondary waste generated, cost, and timeliness are the performance measures used as the basis for comparison.

The following trade studies are in progress or have been completed:

- Plutonium Metal and Oxide Stabilization (Completed May 1995)
- Disposition of Pyrochemical Salts (Completed November 1995)
- Disposition of Rocky Flats Scrub Alloy (Completed January 1996)
- Disposition of Sand, Slag, and Crucible (Planned Completion May 1996)
- Disposition of Ash (Planned Completion June 1996)
- Disposition of Combustibles (Planned Completion July 1996)

Plutonium Metal and Oxide Stabilization

The Plutonium Metal and Oxide Trade Study, completed May 1995, was undertaken to evaluate the benefits and impacts associated with the repackaging of plutonium metal and oxide (>50% assay) in accordance with DOE Standard 3013-94 on different schedules (2002, 2006, or 2010). A number of techniques were employed to ensure a comprehensive and technically defensible

study including review of the Plutonium Vulnerability Assessment, expert opinions, parametric methods, analogy methods, and bottom-up engineering methods.

The results of this study concluded that the only performance area impacted by extending stabilization beyond the original commitment date was the increased cost associated with maintaining facilities operable for the longer schedules. There were no significant differences in the remaining performance measures between completing stabilization and packaging by 2002, 2006, or 2010.

Disposition of Pyrochemical Salts

The Pyrochemical Salts Trade Study Group concluded its study in November 1995 and presented results on various technical alternatives to stabilizing Rocky Flats residue salts. Of the alternatives assessed, the Trade Study Group identified the four best alternatives for dealing with residue salts that include:

- Direct shipment to the Waste Isolation Pilot Plant using a pipe component system
- Shipping all of the Rocky Flats salts to Los Alamos National Laboratory for plutonium separation by distillation
- A combination of approaches consisting of off-site treatment of salts at Los Alamos National Laboratory (distillation) and Lawrence Livermore National Laboratory (salt scrub with further processing of the alloy at Savannah River) with some pyrooxidation activities
- Pyrooxidation and distillation at Rocky Flats.

The Trade Study revealed that each of these alternatives contain critical assumptions that, if they do not materialize, can invalidate the alternative. To minimize the schedule and financial risk associated with stabilizing plutonium salts, a multiple option approach will be pursued that does not prematurely exclude viable options and select any single alternative until related critical assumptions have been validated. The Plutonium Salts Trade Study identified several activities (e.g., characterization) that are common to multiple alternatives and will be pursued irrespective of the alternative selected. Alternatives being considered by the Department include salt scrub of certain high plutonium content salts at LLNL and salt distillation of others at LANL.

Disposition of Rocky Flats Scrub Alloy

The Trade Study group completed the analysis of Rocky Flats scrub alloy in January 1996. The study identified three general technical approaches to managing the material: partitioning the scrub alloy to meet Waste Isolation Pilot Plant acceptance criteria; converting it to oxide and calcining; and dissolving it in the F-Canyon followed by conversion to metal in the FB-Line at Savannah River. From these technical approaches, alternatives were developed and assessed:

- Ship to Savannah River, dissolve in the F-canyon, and convert the scrub alloy to metal in the FB-line
- Ship as waste to WIPP using the pipe component system

- Repackage to interim safe storage standards and store at Rocky Flats
- Convert to oxide, calcine and store at Rocky Flats.

The alternatives were then analyzed against the performance measures of worker risk, public risk, worker exposure, waste generation, discharge to the environment, cost, and timeliness. The assessment showed that the ship to Savannah River Site, dissolve in the F-Canyon, and convert the scrub alloy to metal alternative possessed significant technical advantages over other alternatives considered, particularly in minimizing worker radiological exposure and cost. Program decisions are pending utilizing the results of the trade study as an input to the decision process.

Trade Studies in Progress or Planned

The following three trade studies have been chartered to determine the preferred method for dealing with the material type located at Rocky Flats, LANL, Hanford, LLNL and other sites. Residues from other sites may be included as a subtask. These efforts are focused at arriving at the most desirable pathway(s) to an acceptable end-state such disposition as waste or separated material. All of the studies will use worker risk, public risk, worker exposure, waste generation, discharge to the environment, cost, and timeliness as performance measures for comparison of options.

- Disposition of Sand, Slag, and Crucible (Planned Completion May 1996)
- Disposition of Ash (Planned Completion June 1996)
- Disposition of Combustibles (Planned Completion July 1996).

C. Research Activities

Research Plan

Prepared by the Research Committee, a Research and Development Plan was issued by the Task Group on November 30, 1995. The Research Committee concluded that, in general, the technology needs for stabilizing 94-1 nuclear materials are being adequately met by existing or planned programs. The committee recommended specific R&D program areas that should be addressed by the Task Group. These recommendations are based on:

- Existing "gaps" in the Department's R&D stabilization program
- Relative maturity of various technologies
- Other important R&D program issues that, in the judgement of the committee, should be addressed by the Task Group.

The Research Committee focused its review on existing technologies and on technologies currently under development to determine their adequacy relative to the near term commitments in the implementation plan. The committee also outlined R&D requirements to address technologies needed to support the longer term commitments. The committee concluded that new initiatives involving costly R&D programs for extensive technology development are not necessary. The systems engineering approach used in formulating the plan offers an effective

model for tracking and decision making and should prove valuable to the Task Group in ensuring the timely implementation of these technologies.

The plan was based solely on those nuclear materials stabilization requirements available to the committee at the time the plan was developed. In part because these requirements are still evolving, the nature of the R&D required to support this effort will change over time. Thus, the plan represents a snapshot in time and will be updated annually. The Research Committee was dissolved with the issuance of the R&D Plan and replaced by the Plutonium Focus Area. Responsibility for tracking the information contained in the plan and for preparing updates to the plan will fall to the Plutonium Focus Area, an organizational unit charged with fulfilling the functions formerly assigned to the Research Committee. Los Alamos National Laboratory is the Lead Laboratory for 94-1 Plutonium-related research and has developed a program plan, including cost and schedules, to accomplish baseline research activities identified in the Research and Development Plan.

Plutonium Focus Area

The Plutonium Focus Area, reporting to the Task Group, was chartered on October 2, 1995. It is managed by the Idaho Operations Office with support from Lockheed Martin Idaho Technologies and Argonne National Laboratories. The Focus Area is tasked with identifying and recommending solutions and monitoring progress in achieving solutions to the technical issues identified in the Task Research and Development Plan, while seeking opportunities for industry participation.

The Focus Area will employ a Technical Advisory Panel that will review research lab work and proposals for development of technology. Membership of the advisory panel includes most members of the former Research Committee.

The Focus Area will provide advice to the Task Group on the technical direction and progress of the projects tasked to the lead laboratory. The Focus Area activities will be coordinated with the Office of Technology Development (EM-50) programs and other focus areas to ensure effective use of resources and to prevent duplication of efforts.

Lead Laboratory Activities

In November 1995, Los Alamos National Laboratory issued a Technical Program Plan outlining six high priority research and development tasks and a work breakdown structure based on the outline used in the Research and Development Plan. The work breakdown structure includes Standards Development, Stabilization Process Development, Surveillance, Packaging, Transportation, Core Technology, and Infrastructure and Administration. Development programs initiated under the November 1995 Technical Program Plan included: Salt Distillation, Combustibles Treatment, Electrolytic Decontamination, and the Metal, Oxide, and Residue Shelf-Life Program.

The January 1996 revision to the Technical Program Plan included all of the development programs outlined in the Research and Development Plan. Several of the sites have provided updated information concerning Research and Development needs that have been incorporated

into the latest revision of the Technical Program Plan (March 1996). The technical work is lead by Los Alamos, but several other sites are actively involved in the individual research and development projects. Those sites include Rocky Flats, Sandia National Laboratory, and the Savannah River Technology Center. Work is now in progress on 32 separate tasks.

Plutonium Stabilization and Packaging Procurement Project

The Plutonium Stabilization and Packaging Procurement Project was initiated to define requirements and conduct a centralized procurement of equipment needed at Department facilities for packaging plutonium metals and oxides. Integration goals of the Project include development of a standard packaging process for plutonium metal and oxide and development of a common storage package configuration and design to be used throughout the complex.

The Oakland Operations Office was selected from four competing field offices to manage this procurement. A contract will be awarded in March 1996 for a prototype unit to be installed and demonstrated in Building 707 at Rocky Flats. The contract will allow options to purchase additional units for Rocky Flats, Savannah River, and Hanford.

III. GENERAL ISSUES

Savannah River Canyon Utilization

During 1995 the Department began an examination of various options for utilization of the chemical separation and storage facilities at the Savannah River Site (F- and H-Canyon facilities) to implement both planned and potential future material stabilization activities. An evaluation of the most effective utilization of these facilities was desired in light of continuing budget pressures and limitations on the availability of trained and qualified personnel. The options being considered are: the current SRS Baseline Plan (using F- and H-Canyons); consolidation of activities in F-Canyon; and consolidation of activities in H-Canyon. A move to consolidate to one of the canyons could impact the timing of some material stabilization activities. Decisions are still pending on a preferred canyon utilization option.

Rocky Flats Residues

The 94-1 Implementation Plan calls for the processing of all high-risk residues at Rocky Flats in 1997. During a meeting with the Defense Board staff on January 25, 1996, Rocky Flats presented a path forward for conducting residue characterization and stabilization that included delays of six months and one year, respectively, for stabilizing salts and sand, slag, and crucible residues. In a January 31, 1996 letter to the Department, the Board expressed concern over the pending delays and requested that the Department provide a recovery plan. The recovery plan was forwarded to the Board on March 1, 1996.

APPENDIX
Milestone Status Summary

DEPARTMENT OF ENERGY
NUCLEAR MATERIALS STABILIZATION TASK GROUP
DNFSB Recommendation 94-1 Implementation Plan Milestones
As of February 29, 1996

NMSTG Milestone Number	NMSTG Material Group	DOE Site	Milestone	Due Date	Finish Date
IP-ES-042	General	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-3.2-018	Pu Met/Ox	HAN	Thermally stabilize and repackage all plutonium oxide to meet the metal and oxide storage standard.	May 2002	
IP-3.2-028	Pu Met/Ox	HAN	Start engineering studies of a new repackaging line.	Sep 1995	Sep 1995
IP-3.2-029	Pu Met/Ox	HAN	Complete detailed design, equipment procurement, and installation of a new repackaging system.	Dec 1998	
IP-3.2-030	Pu Met/Ox	HAN	Train staff, prepare procedures, perform operational readiness testing (prior to commencing operations).	Sep 1999	
IP-3.2-031	Pu Met/Ox	HAN	Commence repackaging operations at Hanford.	Oct 1999	
IP-3.2-032	Pu Met/Ox	HAN	Complete metal repackaging at Hanford.	Sep 2000	
IP-3.2-033	Pu Met/Ox	HAN	Start restabilizing high assay oxides at the PFP.	Jul 1999	
IP-3.3-026	Pu Res	HAN	Complete stabilization of sand, slag & crucible (reactive solids).	Jan 2000	
IP-3.3-027	Pu Res	HAN	Stabilization and repackaging of interim-stabilized materials completed.	Jan 2002	
IP-3.3-028	Pu Res	HAN	Begin stabilization of Polycubes.	Jul 1999	
IP-3.3-029	Pu Res	HAN	Complete polycube stabilization.	Jan 2001	
IP-3.3-031	Pu Res	HAN	Stabilize existing inventory of sludge (low organic residues) in muffle furnaces.	Sep 1995	Jun 1995
IP-3.3-032	Pu Res	HAN	Stabilize 46 cans of selected ash from RF in the muffle furnaces.	Mar1996	Jan 1996
IP-3.3-033	Pu Res	HAN	Stabilize and package all remaining residues to safe storage standards.	May 2002	

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NMSTG Milestone Number	NMSTG Material Group	DOE Site	Milestone	Due Date	Finish Date
IP-3.1-014	Pu Soln	HAN	Inspect all bottles of plutonium solutions to ensure proper venting.	Sep 1995	May 1995
IP-3.1-015	Pu Soln	HAN	220 liters of chloride solutions stabilized as part of a developmental testing program.	Sep 1995	Sep 1995
IP-3.1-016	Pu Soln	HAN	ROD issued for PFP Clean-out and Stabilization EIS.	Jun 1996	
IP-3.1-017	Pu Soln	HAN	Stabilization of 4,800 liters at PFP completed.	Jan 1999	
IP-3.1-021	Pu Soln	HAN	Complete solution technology development at PFP.	Mar 1996	
IP-3.1-022	Pu Soln	HAN	Begin processing solutions at PFP.	Jun 1997	
IP-3.1-024	Pu Soln	HAN	Complete transfer of 22,700 liters of PUREX solutions to tank farms.	Aug 1995	Apr 1995
IP-3.6-001	SNF	HAN	Complete removal of all SNF from K-Basins.	Dec 1999	
IP-3.6-201	SNF	HAN	Complete removal of all sludge from K-Basins.	Dec 2000	
IP-3.6-010	SNF	HAN	Issue "Management of SNF from the K-Basins" EIS ROD.	Dec 1995	
IP-3.6-012	SNF	HAN	Begin SNF and sludge removal from K-Basins.	Dec 1997	
IP-3.6-014	SNF	HAN	Develop K-Basin potential funding options and an acquisition strategy, as appropriate.	Mar 1995	Mar 1995
IP-3.6-015	SNF	HAN	Issue Notice of Intent for K-Basins EIS.	Mar 1995	Mar 1995
IP-3.6-016	SNF	HAN	Complete cofferdam installation in K-West Basin.	Feb 1995	Feb 1995
IP-3.6-017	SNF	HAN	Complete cofferdam installation in K-East Basin.	Apr 1995	Apr 1995
IP-3.6-018	SNF	HAN	Start fuel characterization in K-Basin hot cells.	Apr 1995	Apr 1995
IP-3.6-019	SNF	HAN	Initiate sludge retrieval demonstration in conjunction with cofferdam installation in K-Basins.	Apr 1995	Dec 1994
IP-3.6-020	SNF	HAN	Issue K-Basins Integrated Path Forward Schedule providing details of major system acquisitions and material movements.	May 1995	Apr 1995
IP-3.6-005	SNF	ID	Remove all SNF from the CPP-603 Fuel Storage	Dec 2000	
IP-3.6-043	SNF	ID	Move an additional 189 SNF units from CPP-603 North and Middle Fuel Storage Facility to CPP-666.	Dec 1995	Sep 1995
IP-3.6-044	SNF	ID	Move all SNF (6.84 metric tons) from CPP-603 North/Middle Basins to CPP-666.	Dec 1996	

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NMSTG Milestone Number	NMSTG Material Group	DOE Site	Milestone	Due Date	Finish Date
IP-3.6-045	SNF	ID	Begin movement of CPP-603 South Basin SNF.	Jul 1995	May 1995
IP-3.6-046	SNF	ID	Complete the removal of all SNF not requiring overpacking from CPP-603.	Dec 1998	
IP-3.6-047	SNF	ID	Construct and startup a CPP-603 dry storage overpacking station.	Dec 1998	
IP-3.2-014	Pu Met/Ox	LANL	Thermally stabilize and repackage all plutonium oxide to meet the metal and oxide storage standard.	May 2002	
IP-3.2-035	Pu Met/Ox	LANL	Stabilize and repackage high risk vault items to meet long-term storage standards.	Sep 1997	
IP-3.2-037	Pu Met/Ox	LANL	Complete peer review of LANL packaging operations for long-term storage.	Apr 1995	Apr 1995
IP-3.2-039	Pu Met/Ox	LANL	Integrate and demonstrate repackaging operations at the TA-55 plutonium facility at LANL.	Apr 1995	Apr 1995
IP-3.2-040	Pu Met/Ox	LANL	Begin repackaging of plutonium metal and oxide at the TA-55 plutonium facility in LANL.	May 1995	May 1995
IP-3.3-034	Pu Res	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	
IP-3.3-035	Pu Res	LANL	Perform 100% visual inspection of vault inventory.	May 1995	Apr 1995
IP-3.3-036	Pu Res	LANL	Recover 100 neutron sources.	Oct 1995	Apr 1995
IP-3.3-037	Pu Res	LANL	Process 90% of analytical solutions.	Oct 1995	Aug 1995
IP-3.3-038	Pu Res	LANL	Process 100 kgs of sand, slag and crucible materials.	Oct 1995	Apr 1995
IP-3.3-039	Pu Res	LANL	Process 70 kgs of hydroxide solids.	Oct 1995	Apr 1995
IP-3.3-040	Pu Res	LANL	Oxidize 50 kgs of corroded metal items.	Oct 1995	Oct 1995
IP-ES-100	Pu Res	LANL	Stabilize 220 kgs of residues.	Oct 1995	Oct 1995
IP-3.2-015	Pu Met/Ox	LLNL	Thermally stabilize and repackage all plutonium oxide to meet the metal and oxide storage standard.	May 2002	
IP-3.2-042	Pu Met/Ox	LLNL	Complete the Plutonium ES&H Corrective Action Plan at LLNL.	Jan 1997	

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NMSTG Milestone Number	NMSTG Material Group	DOE Site	Milestone	Due Date	Finish Date
IP-3.2-043	Pu Met/Ox	LLNL	Excess plutonium metal items at LLNL repackaged in compliance with DOE-STD-3013-94.	May 2002	
IP-3.2-044	Pu Met/Ox	LLNL	Begin initial inspection of metal items.	Apr 1995	Apr 1995
IP-3.2-045	Pu Met/Ox	LLNL	Begin repackaging material to meet the metal and oxide storage standard.	May 1996	
IP-3.3-041	Pu Res	LLNL	Stabilize and package all containers of ash/residue.	Apr 1998	
IP-3.3-042	Pu Res	LLNL	Complete trade-off study to develop plans for the stabilization and packaging of ash/residues for long-term storage.	Apr 1996	
IP-3.3-043	Pu Res	LLNL	Process materials identified in the Pu ES&H Vulnerability study requiring stabilization during the first year of Phase 3 operations.	Apr 1997	
IP-3.3-045	Pu Res	LLNL	Identify, characterize, and non-destructively assay all Pu items.	Jan 1997	
IP-3.3-046	Pu Res	LLNL	Ship all excess items to LANL.	May 2002	
IP-3.2-003	Pu Met/Ox	Mound	Repackage all plutonium metal in direct contact with plastic.	Sep 1996	
IP-3.2-101	Pu Met/Ox	Mound	Repackage all plutonium metals and oxides to meet the DOE metal and oxide storage standard.	May 2002	
IP-ES-001	General	NMSTG	Issue a DNFSB 94-1 Integrated Program Plan.	Feb 1995	Feb 1995
IP-ES-004	General	NMSTG	Research Committee established.	Mar 1995	Mar 1995
IP-ES-005	General	NMSTG	Research Committee's comprehensive Research and Technology Development Plan issued (RC).	Nov 1995	Nov 1995
IP-ES-006	General	NMSTG	Research and technology development efforts will be measured against the comprehensive plan, which will be updated annually.	Nov 1996	
IP-ES-041	General	NMSTG	Complete the "Facilities Section" of the Integrated Program Plan (IWG).	Dec 1995	Nov 1995
IP-3.2-011	Pu Met/Ox	NMSTG	Pu Metals/Oxides Trade Study Completed.	May 1995	May 1995

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As of February 29, 1996

NMSTG Milestone Number	NMSTG Material Group	DOE Site	Milestone	Due Date	Finish Date
IP-3.3-050	Pu Res	NMSTG	Develop complex-wide secondary material storage standard for materials that are less than 50% assay.	Dec 1995	Jan 1995
IP-3.6-006	SNF	NMSTG	Issue the SNF Program Plan.	Nov 1995	Nov 1995
IP-3.6-008	SNF	NMSTG	Issue Foreign Research Reactor SNF EIS ROD.	Dec 1995	
IP-3.6-048	SNF	NMSTG	Environmental Management PEIS ROD issued.	Sep 1995	Jun 1995
IP-3.6-049	SNF	NMSTG	Repository EIS Record of Decision.	Sep 2000	
IP-3.6-053	SNF	NMSTG	Issue Programmatic SNF EIS Record of Decision.	Jun 1995	Jun 1995
IP-3.6-100	SNF	NMSTG	Issue Final Programmatic SNF EIS.	Apr 1995	Apr 1995
IP-3.4-008	Spec Iso	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-3.4-009	Spec Iso	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	
IP-3.4-012	Spec Iso	NMSTG	Activities will be initiated to clarify end-states and disposition pathways.	None	
IP-3.4-013	Spec Iso	NMSTG	Activities will be initiated to establish storage standards and/or criteria for unique material forms as required.	None	
IP-3.4-014	Spec Iso	NMSTG	Activities will be initiated to resolve transportation, storage space, and consolidation issues related to Special Isotopes.	None	
IP-3.2-017	Pu Met/Ox	OR	Thermally stabilize and repackage all plutonium oxide to meet the metal and oxide storage standard.	May 2002	
IP-3.5-003	Uranium	OR	Complete mechanical removal of HEU deposits in the K-25 Plant.	Sep 1997	
IP-3.5-004	Uranium	OR	Complete chemical removal of remaining HEU deposits in the K-25 Plant.	Apr 1999	
IP-3.5-005	Uranium	OR	Remove the Molten Salt Reactor Experiment (MSRE) HEU uranium deposits.	Feb 1998	

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IP-3.5-010	Uranium	OR	Complete MSRE "interim corrective measures": drain water from ACB cell; partition the off-gas system; eliminate water sources.	Nov 1995	Nov 1995
IP-3.5-011	Uranium	OR	Remove MSRE fuel salts.	May 2000	
IP-3.2-012	Pu Met/Ox	RF	Thermally stabilize the existing backlog of all known reactive plutonium oxide (estimate: 63 kgs).	Oct 1996	
IP-3.2-016	Pu Met/Ox	RF	Thermally stabilize and repackage all plutonium oxide to meet the metal and oxide storage standard.	May 2002	
IP-3.2-020	Pu Met/Ox	RF	Repackage a total of 256 items in Building 707 where Pu metal is in direct contact with plastic.	Oct 1995	Nov 1995
IP-3.2-021	Pu Met/Ox	RF	Repackage 1, 602 Rocky Flats Pu metal items not in direct contact with, but in proximity to, plastic.	Oct 1996	
IP-3.2-022	Pu Met/Ox	RF	New Pu metal/oxide processing line operational in Building 371 at Rocky Flats.	Sep 1998	
IP-3.2-046	Pu Met/Ox	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
IP-3.3-008	Pu Res	RF	Vent 700 unvented residue drums.	Oct 1996	Dec 1995
IP-3.3-011	Pu Res	RF	Vent 2,045 residue drums with a potential for hydrogen gas generation.	Oct 1995	Sep 1995
IP-3.3-012	Pu Res	RF	Stabilize by pyrochemical oxidation and repackage 6,000 kgs of higher risk Plutonium containing salts.	May 1997	
IP-3.3-013	Pu Res	RF	Stabilize remaining high risk salts (4,000 kgs.) via chemical oxidation.	Dec 1997	
IP-3.3-014	Pu Res	RF	Stabilize all sand, slag, and crucible materials and graphite fines.	May 1997	
IP-3.3-015	Pu Res	RF	Vent all inorganic residues.	Oct 1996	Dec 1995
IP-3.3-016	Pu Res	RF	Vent all wet/miscellaneous residues.	Oct 1996	Dec 1995
IP-3.3-017	Pu Res	RF	Stabilize high risk combustibles (11,000 kgs).	Nov 1998	
IP-ES-025	Pu Res	RF	Repackage all Pu inorganic oxides and wet/miscellaneous residues (1,113 drums).	May 2002	

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IP-3.1-003	Pu Soln	RF	Place plutonium metal and oxide generated from stabilizing solutions in a form suitable for safe storage.	May 2002	
IP-3.1-004	Pu Soln	RF	Complete NEPA analysis for solution stabilization.	Apr 1995	Apr 1995
IP-3.1-005	Pu Soln	RF	All solutions in Building 771 (12,000 liters) stabilized.	Dec 1997	
IP-3.1-006	Pu Soln	RF	18,000 liters of solutions in Building 371 stabilized.	Jun 1999	
IP-3.1-020	Pu Soln	RF	Stabilize 80% of high-level solutions and 50% of low-level solutions (18,000 liters).	May 1997	
IP-3.5-001	Uranium	RF	Remove all HEU uranyl nitrate solutions (2,700 liters) from Building 886 and complete all shipments offsite.	Sep 1996	
IP-3.5-006	Uranium	RF	Begin bottling and shipping 2,700 liters of HEU solutions offsite for stabilization.	May 1996	
IP-ES-018	General	RF, SR, Mound	All Pu Metal in direct contact with plastic repackaged.	Sep 1996	
IP-3.2-024	General	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
IP-3.2-100	General	SR	Final IMNM EIS issued.	May 1995	May 1995
IP-3.2-013	Pu Met/Ox	SR	Thermally stabilize and repackage all plutonium oxide to meet the metal and oxide storage standard.	May 2002	
IP-3.2-025	Pu Met/Ox	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
IP-3.2-026	Pu Met/Ox	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	
IP-3.2-027	Pu Met/Ox	SR	Modifications to the FB-Line facility (installation of a bagless transfer system) completed.	Sep 1997	
IP-3.3-018	Pu Res	SR	Characterization methods used will include NDA using digital radiography equipment, with selected sampling of containers using existing gloveboxes with modifications.	Dec 1997	
IP-3.3-021	Pu Res	SR	Processing in F-Area begins.	Sep 1996	

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IP-3.3-022	Pu Res	SR	Processing of existing inventories of SS&C material completed.	Dec 1997	
IP-ES-032	Pu Res	SR	Stabilize all other residues at SR.	May 2002	
IP-3.1-007	Pu Soln	SR	ROD for the F-Canyon plutonium solutions issued.	Feb 1995	Feb 1995
IP-3.1-008	Pu Soln	SR	Begin F-Canyon processing operations.	Feb 1995	Feb 1995
IP-3.1-009	Pu Soln	SR	Complete Stabilization of F-Canyon plutonium solutions (320,000 liters converted to metal).	Jan 1996	
IP-3.1-011	Pu Soln	SR	Begin H-Canyon stabilization operations.	Feb 1999	
IP-3.1-012	Pu Soln	SR	H-Canyon stabilization operations (34,000 liters converted to oxide) completed.	Feb 2000	
IP-3.1-013	Pu Soln	SR	HB-Line Phase II start-up.	Feb 1999	
IP-3.6-002	SNF	SR	Complete Mk31 target stabilization by dissolution in F-Canyon.	Sep 1996	
IP-3.6-003	SNF	SR	Complete dissolution Mk16 and MK22 SNF.	Nov 1999	
IP-3.6-004	SNF	SR	Complete stabilization of Uranium solutions resulting from MK16/22 dissolution.	Apr 2000	
IP-3.6-032	SNF	SR	Begin Mk31 target stabilization in F-Area.	Nov 1995	Feb 1996
IP-3.6-033	SNF	SR	Begin stabilization Mk16 and Mk22 HEU SNF.	Nov 1996	
IP-3.6-034	SNF	SR	Complete vacuum consolidation of L-Reactor Disassembly Basin sludge.	Sep 1995	Mar 1995
IP-3.6-035	SNF	SR	Reorient fuel in SR's L-Reactor Disassembly Basin to a horizontal configuration.	Feb 1996	Nov 1995
IP-3.6-036	SNF	SR	Reorient fuel in K-Reactor Disassembly Basin to a horizontal configuration.	Feb 1997	
IP-3.6-037	SNF	SR	Complete fuel consolidation to free up an approximate additional 1,250 RBOF storage spaces.	Dec 1995	
IP-3.6-038	SNF	SR	Complete K- & L-Reactor Disassembly Basin upgrades.	May 1996	
IP-3.6-040	SNF	SR	Complete vacuum consolidation of K-Reactor Disassembly Basin sludge.	Sep 1996	
IP-3.6-041	SNF	SR	Remove consolidated basin sludge from SR's K-Reactor Disassembly Basins.	Sep 1997	
IP-3.6-042	SNF	SR	Remove consolidated L-Reactor Disassembly Basins' sludge.	Sep 1997	

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IP-3.6-101	SNF	SR	Re-examine L-Basin corrosion surveillance coupons.	Feb 1995	Feb 1995
IP-3.4-001	Spec Iso	SR	Immediately discontinue F-Canyon water cooling of Am/Cm solutions.	Feb 1995	Feb 1995
IP-3.4-003	Spec Iso	SR	Implement surveillance and monitoring programs to reduce the risk of extended storage of special isotope	None	Mar 1995
IP-3.4-015	Spec Iso	SR	Start vitrification of Am/Cm Solutions.	Mar 1998	
IP-3.4-016	Spec Iso	SR	Complete Am/Cm solutions vitrification.	Sep 1998	
IP-3.4-017	Spec Iso	SR	Begin stabilization of Pu-242 Solutions at HB-Line, Phase III.	May 1997	
IP-3.4-018	Spec Iso	SR	Complete stabilization of Pu-242 Solutions at HB-Line, Phase III.	Nov 1997	
IP-3.4-019	Spec Iso	SR	Begin stabilization of Np-237 Solutions HB-Line, Phase II.	Jul 2001	
IP-3.4-020	Spec Iso	SR	Complete stabilization of Np-237 Solutions at HB-Line, Phase II.	Dec 2002	
IP-3.4-021	Spec Iso	SR	Transport inadequately stored Pu-238 solids to HB-Line for venting and repackaging.	Apr 1995	Mar 1995
IP-ES-008	Spec Iso	SR	Conceptual design report for the stabilization of Am/Cm Solutions completed.	Dec 1995	Nov 1995
IP-3.5-002	Uranium	SR	Complete FA-Line blending and processing of 230,000 liters of HEU solutions into a stable oxide.	Dec 1997	
IP-3.5-008	Uranium	SR	Complete construction of blending facilities at F- and H-Areas (HEU Dilution Project).	Jul 1996	