


[DOE LETTERHEAD]

January 31, 1997

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

Dear Chairman Conway:

Enclosed is the Department of Energy's Second  [Annual Report of activities related to the implementation of Recommendation 94-1](#), Improved Schedule for Remediation. This report, covering the period March 1, 1996 through December 31, 1996, presents the status of actions and milestones associated with the 94-1 Implementation Plan and describes activities underway to address emerging issues associated with nuclear materials stabilization. The reporting dates for this report have been revised to coincide with the calendar year to align with other reports produced by the Department.

In addition, the following missed milestones for 1996 have been subsequently been completed:

IP-3.6- *Complete Stabilization of Mk 31 Targets Via Dissolution in Savannah River F-Canyon*
002 (September 1996). Completed on January 2, 1997.

IP-3.2- *Thermally Stabilize backlog of reactive plutonium oxides at Rocky Flats* (October 1996)
012 Completed January 9, 1997.

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

Sincerely,

Alvin L. Alm
Assistant Secretary for Environmental Management

Enclosure

cc: M. Whitaker



DEFENSE NUCLEAR FACILITIES SAFETY BOARD
RECOMMENDATION 94-1 IMPLEMENTATION

ANNUAL REPORT

*Covering the period
March 1, 1996 – December 31, 1996*

Submitted: _____ Date: _____
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EXECUTIVE SUMMARY

Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 94-1, Improved Schedule for Remediation, addressed the need within the Department of Energy (DOE) to improve the schedule for remediating situations involving the storage of nuclear materials within the defense nuclear facilities complex. The Recommendation also called for an accelerated schedule for stabilizing and repackaging unstable special nuclear materials, spent fuel, unstable solid plutonium residues, highly radioactive liquids, etc.

On February 28, 1995, DOE submitted an Implementation Plan (IP) to the Board in response to Recommendation 94-1. The Implementation Plan describes the complex-wide plan of action and milestones to resolve the various nuclear materials stabilization issues identified in Recommendation 94-1. This report is the second annual update to the status of actions pertinent to the 94-1 Implementation Plan.

A 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 was made a permanent office (EM-66) within the Office of Environmental Management (EM) during the 1996 EM reorganization conducted as a part of the Department's organizational review process.

Their efforts to date have addressed stabilization activities complex-wide in the following areas:

- Integrating Department-wide approaches 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 (R&D) efforts on the technical challenges facing stabilization, storage, and disposition of plutonium and other nuclear materials.

Significant progress was achieved in 1996 toward meeting 94-1 schedules and commitments. Per agreement with the Defense Board Staff and for consistency with other DOE reporting schedules, this annual report's schedule submission has been revised to coincide with the calendar year. The report contains a summary of completed 94-1 Implementation Plan milestone progress, a description of major program initiatives including plutonium residue trade studies, research and development program progress, plutonium stabilization and packaging system procurement progress, and a description of general issues related to 94-1 progress at selected sites. The data cut off date for this report was December 31, 1996.

I. SECOND YEAR STATUS**A. Overall Stabilization Progress**

- 165 total milestones in Implementation Plan*
- 77 milestones completed since February 1995
 - 28 milestones completed early
 - 36 milestones completed on time
 - 13 milestones completed late
- 5 milestones past due

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

* Total milestones through RFETS change June 1996 submission.

B. Milestones Past Due**IP-3.2-045**

Begin Repackaging Material to Meet Metal and Oxide Storage Standard at Lawrence Livermore National Laboratory (May 1996)

Packaging will begin in April 1998. The original plans anticipated procurement of a full plutonium stabilization and packaging system. However, a full system would be costly relative to the small amount of material at LLNL. Livermore will obtain sufficient stabilization equipment to complete stabilization and packaging by May 2002.

IP-3.6-040

Complete Vacuum Consolidation of Savannah River's K-Reactor Disassembly Basin Sludge (September 1996)

Upgrades to basin water chemistry have superseded the need for basin sludge consolidation and removal. An Implementation Plan change reflecting this change is being prepared and will be submitted coincident with any changes emanating from the ongoing review of canyon utilization strategies.

IP-3.6-002

Complete Stabilization of Mk 31 Targets Via Dissolution in Savannah River F-Canyon (September 1996)

During mid-1996, Westinghouse Savannah River Company investigated seismic structural concerns with the F- and H-Canyons. As a result, progress on stabilization was delayed due to restrictions on introducing new materials into the canyons until resolution of the seismic concerns. The issues related to F-Canyon were resolved in August, and processing of Mk 31 targets has progressed well since recommencement of dissolution activities. This milestone was completed January 2, 1997.

IP-3.6-033

Begin Stabilization of Mk16/22 HEU SNF at Savannah River (November 1996)

Stabilization of Mk 16/22 spent fuel was scheduled to follow stabilization of Mk 31 targets. Stabilization of Mk 31 targets in the F-Canyon facility has been delayed as a result of canyon seismic issues requiring resolution. Additionally, more spent fuel requiring processing has been added to the schedule since the 94-1 Implementation Plan was prepared. Mk 16/22 stabilization is currently scheduled to commence July 1997.

IP-3.2-012

Thermally Stabilize Backlog of Reactive Plutonium Oxides at Rocky Flats (October 1996)

Delays were experienced due to emerging criticality concerns regarding storage of fissile material in the Building 371 stacker retriever and the storage of moderated residues in other vaults. Existing analyses did not adequately model either condition. These issues were resolved in late October, however, subsequent mechanical failure of the "XY Retriever" prevented movement of the last four plutonium metal items and 10 kg of plutonium oxide that remained to be stabilized and packaged. This milestone was completed on January 9, 1997.

II. ACTIVITIES**A. Trade Studies**

Trade studies are the systems engineering method of identifying, analyzing, and comparing alternative methods for stabilizing materials to forms suitable for interim storage or disposal. The following listed trade studies have been completed during the past year to determine preferred methods for dealing with certain residue materials located at Rocky Flats, Los Alamos National Laboratory, Hanford, Lawrence Livermore National Laboratory, and other sites. The objective of each study was to evaluate alternatives for treating a category of residue to an end-state suitable for disposition. An end-state is either plutonium metal or oxide that meets the criteria for long term storage per DOE-STD-3013 or a form that meets criteria for disposal as waste. All of the studies evaluated 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 Residues (Completed June 1996)
- Disposition of Ash (Completed October 1996)
- Disposition of Combustibles (Completed October 1996).

Plutonium Sand, Slag, and Crucible Residues Trade Off Analysis Study

The scope of this trade study was to perform a technical assessment of approaches available to stabilize plutonium-bearing sand, slag, and crucible (SS&C) residues within the DOE complex, develop and compare alternative courses of action that have the highest probability of success, and to provide input for decision makers to select the most feasible stabilization and disposition approach. The Trade Study began in February 1996 and completed in June 1996.

The trade study developed 10 alternatives (with the primary focus on Rocky Flats materials) grouped in the following areas:

- Direct disposal as waste to Waste Isolation Pilot Plant (WIPP)
- Immobilize (vitrify or cement) and ship to WIPP as waste

- Separate plutonium from matrix; store separated plutonium, dispose of remainder to WIPP
- Current Rocky Flats plan (heating in furnace to destroy reactive constituents).

Results: Analysis of the Department stabilization plans for SS&C resulted in a trade study recommendation to cement the majority of Hanford material and separate the small amount of high plutonium content SS&C; to send the Rocky Flats material to Savannah River for processing; and to separate the Plutonium from Los Alamos and Savannah River SS&C. As backup approaches, if shipment of SS&C proves impractical, the trade study team recommended cementation of all of the Hanford SS&C and vitrification of all Rocky Flats SS&C.

Recommendations were formulated based on the ability to implement technologies at a given site or existing site capabilities. Two key technical requirements drove the results to further treatment of the material. The first requirement was that there remains reactive calcium metal, a hazardous constituent in the matrix, which must be oxidized in order to meet shipping requirements for storage at WIPP. All alternatives analyzed, except for direct disposal, can meet this requirement. The second requirement was to make this material difficult from which to recover plutonium, thereby making it unattractive for proliferation. This requirement is met by reducing the plutonium concentration (<5% plutonium by weight) and/or by storage in hard to recover material forms (such as cementation or vitrification). As a result, further treatment of the SS&C residues is required beyond the baseline Rocky Flats plan.

Next Steps: The field office, in conjunction with the program office and the Task Group, must determine the path forward for this material to allow for its disposal. A decision point must be established for cementation at Hanford. Reactivity limits at WIPP must be resolved and the family of 6M shipping containers must be reviewed for the effects on safety of increased radioactivity levels. Research into microwave vitrification, a promising technology, is being accelerated.

Plutonium Ash Residues Trade Off Analysis Study

The scope of this trade study was to perform a technical assessment of approaches available to stabilize and dispose of existing plutonium ash residues at Rocky Flats, Hanford, Los Alamos, and Lawrence Livermore, develop and compare alternative courses of action which have the highest probability of success, and provide input for decision makers to select the most feasible stabilization/disposition approach. The Trade Study began in May 1996 and was completed in October 1996.

The trade study developed 20 alternatives for existing plutonium ash residues grouped in the following areas:

- No processing with storage meeting minimum requirements (No Action)
- Repackaging and shipped as waste
- Immobilization on site through a chemical treatment process and shipment to WIPP as waste or stored onsite
- Separate plutonium from matrix; store separated plutonium, dispose of remainder to WIPP.

Results: This evaluation confirmed that further treatment of the ash residues is required to place material in a form suitable for safe, long-term storage. The study recommended that Livermore, Hanford and Los Alamos ash residue be processed and plutonium separated from the ash matrix. For Rocky Flats ash, the study identified technical uncertainties, however, the lowest lifecycle cost approach to ash residue disposition is to vitrify the material and ship to WIPP. Additionally, the vitrification option has favorable outcomes related to a number of trade study performance measures.

Next Steps: The Department must accelerate the development of microwave vitrification and ceramic encapsulation at Rocky Flats. At Hanford, the silver persulfate technology must be demonstrated and National Environmental Policy

Act documentation prepared. The WIPP capacity and schedule must also be integrated with other transuranic waste sources.

Plutonium Combustible Residues Trade Off Analysis Study

The scope of this trade study was to perform a technical assessment of approaches available to stabilize plutonium-bearing combustible residues within the DOE complex, develop and compare alternative courses of action which have the highest probability of success, and to provide input for decision makers to select the most feasible stabilization/disposition approach. The Trade Study began in March 1996 and was completed in October 1996. The trade study developed ten alternatives (with the primary focus on Rocky Flats materials) grouped in the following areas:

- Washing, volume reduction of materials and shipping to WIPP as waste
- Stand alone technologies with plutonium separated from the matrix, stored and the remainder shipped to WIPP
- Combination of technologies with plutonium immobilized or separated from the matrix and the remainder material shipped to WIPP.

Results: Analysis of the Department stabilization plans for Combustible residues resulted in the trade study recommendation to separate the plutonium from the residue matrix at Rocky Flats using mediated electrochemical oxidation (MEO) and cryogenic crushing technology. Additionally, the study recommended continued development of three other promising technologies: Sonication Washing, Detox, and Nitric/Phosphoric Acid Digestion. Recommendations were based on the ability to implement technologies at a given site with existing site capabilities. Plutonium separation will mediate the strict transportation requirement unique to this type of residue, reduce cost, and minimize radiological exposure to workers.

Next Steps: The Department must actively pursue the development of the MEO and cryogenic crush

technology, and continue the development of the other back-up technologies.

B. Plutonium Stabilization and Packaging Procurement Project

On March 11, 1996, the Oakland Operations Office awarded a \$54 million contract to provide the Department with plutonium stabilization and packaging equipment. The design of the stabilization and packaging system was reviewed and approved; the System Design and System Specification Documents were approved; and the Quality Assurance Program was approved. Authorization for fabrication of the prototype unit was granted. The prototype is to be delivered to Rocky Flats in mid-1997. Additionally, the plutonium storage package design was given preliminary approval. Prototype storage packages have been fabricated with testing completed successfully in September 1996. Final approval of the design depends on satisfactory completion of testing and review of the final test reports. The storage package meets the Department's criteria for long-term storage as defined in DOE-STD-3013-96. The ASME Boiler and Pressure Vessel Code Section VIII criteria was used as the basis for the package design. Upon final approval of the design, the storage package will become the Departmental standard for long-term storage of plutonium metals and oxides.

C. Research Activities

The original Research and Development Plan was prepared by the Research Committee and issued by the Task Group on November 30, 1995. The Research Committee was disbanded upon issuance of the 1995 R&D Plan, and the Plutonium Focus Area (PFA), reporting to the Task Group, was chartered as the follow-on organization.

The Focus Area is managed by the Idaho Operations Office with support from Lockheed Martin Idaho Technologies and Argonne National Laboratories. The PFA purpose 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 Pu-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 R&D 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 1995 R&D Plan, LANL published a Technical Program Plan in December 1995, which defined its activities for calendar year 1996.

Plutonium Focus Area Progress

The products produced by the PFA in 1996 are shown in Table 1. These products were focused on defining a systems engineering management approach for the PFA, soliciting white papers from the at-large research community, direct support to the NMSTG for the 94-1 R&D Plan and trade studies, direct systems engineering support to the PuSAP procurement, and providing PFA-sponsored technology development for identified R&D needs which were of a complex-wide, integrating nature and which were not covered by ongoing research under the Stabilization R&D Program or at other DOE sites.

Table 1. PFA Products for Fiscal Year 1996

CATEGORY	PRODUCT	PURPOSE
Management	PFA Management Plan	Define roles & responsibilities
	PFA Quality Assurance Plan	Define Quality Assurance approach
White Paper Solicitation	PFA Technology Summary	Present R&D needs to general community
NMSTG Support	94-1 R&D Plan	Document R&D requirements including need dates, R&D recommendations, technology status, and R&D requirements gaps
	Ash End-state Trade Study	Recommend best technical path forward and options to NMSTG
Procurement Support	PuSAP System Specification	Support PuSAP procurement
	PuSAP Container Specification	Support PuSAP procurement
	PuSAP Marking Specification	Support PuSAP procurement
	PuSAP QA Support	Support PuSAP procurement
Integrated Technology Development	Ceramification Demonstration	Evaluate innovative technology for application at RFETS using SRS facilities
	Recycled Metal Trade Study	Prove feasibility of complex-wide mortgage reduction alternative to standardized can procurement
	Integrated Surveillance System Requirements Analysis	Document complex-wide R&D needs to meet identified R&D gap from 1995 R&D Plan

Technical Advisory Panel

The Technical Advisory Panel (TAP) of the PFA is a complex-wide panel of plutonium technical experts organized and applied to assessing research needs and relevance. Inclusion of systems engineering provided a thorough grounding in plutonium stabilization requirements and facilitated a process for technical and peer review of complex-wide and site-specific technical research.

The TAP completed the 1996 Research and Development Plan on an accelerated schedule, completed technical peer-review of the Materials Stabilization R&D Program at LANL, assessed 18 technology white papers, met with the Defense

Board, and met with a senior Russian delegation to identify 15 potential technologies for cooperative research. A follow-up visit to Russia is planned by the PFA to the International Conference on Radwaste and to review additional contacts, facilities, and candidate technologies.

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, 6 have been closed and the other 12 are effectively underway toward closure to meet 94-1 Implementation Plan commitments. In general, the technology needs for stabilizing

94-1 nuclear materials continue to be addressed by existing DOE programs.

In general, the technology needs for stabilizing 94-1 nuclear materials are being addressed by existing programs. The principal programmatic risk identified this year by the TAP is that the technology need dates may not be met in all cases. This year, the TAP has also identified several research needs that address the path forward to materials stewardship and disposition.

Using the same system engineering approach employed in last year's R&D Plan, the TAP developed programmatic risk assessments based on the technical maturity score and R&D need date of each technology considered. The number of technologies reviewed for this plan was 64 compared with 99 for the November 1995 plan. Based on the systems engineering analysis, there is only one high risk technology, and there are 14 medium risk technologies that cause some programmatic risk with respect to meeting 94-1 Implementation Plan Milestone dates. The NMSTG has initiated a tracking program that incorporates the technology insertion schedules into the end-use Site Integrated Stabilization Management Plans (SISMP), and requires a monthly status of the schedule progress for these 15 technologies.

In comparing R&D activities to the comprehensive set of technical requirements, the TAP identified two new areas of R&D requirements, or "gaps" for immediate R&D efforts: (1) the need for a comprehensive assessment of the inventory of miscellaneous residues not subject to previous trade studies and their treatment alternatives, and (2) the need for a trade study to evaluate the approach to treating pyrochemical crucible residues at Rocky Flats.

Four gaps were identified for R&D efforts that relate to long-term stewardship and materials disposition interfaces:

1. Assessment of adequacy of storage configurations of stabilized materials awaiting disposition;

2. Interface with the Office of Materials Disposition to support high level waste disposition R&D to evaluate ultimate disposition options;
3. Assessment of the 94-1 stabilization processing baseline against safeguards and security requirements;
4. The need for a comprehensive trade study to determine the necessity and validity of automation of processes that involve handling of plutonium storage containers that meet DOE-STD-3013.

Materials Stabilization R&D Program Progress

As the Lead Laboratory for 94-1 plutonium R&D, Los Alamos issued a Technical Program Plan outlining 29 funded R&D tasks with 180 milestones. At the end of FY96, 156 milestones were completed as scheduled. Of the incomplete milestones, seven are in projects continued in FY97.

The technological successes for FY96 are more significant than the milestone success ratio. The return on investment has resulted in a number of new technologies developed to address problems regarding plutonium stabilization and remediation. These include the development and testing of prototype equipment for cryogenic crushing and compaction; electrolytic decontamination of storage cans and gloveboxes; cold-testing and installation of a prototype hydrothermal processing reactor; and the technological data to support the long-term storage of pure plutonium oxide and metal (per DOE-STD-3013).

Several of the technology development tasks specific to Rocky Flats Environmental Technology Site (RFETS) were demonstrated in FY96. The precipitation flow sheet development for RFETS solution stabilization was developed, optimized, and delivered to RFETS. This work is currently being applied at the site in order to meet several milestones. Salt oxidation technology has been demonstrated and processing optimization is nearly complete. In addition, a prototype salt distillation unit has been demonstrated at Los

Alamos on actual salt residue and has produced low level salt waste and oxide suitable for long-term storage. This unit will provide sufficient data to support the design and procurement of a production unit. Finally, a number of technologies related to the stabilization of combustibles and ash were initiated to support RFETS baseline activities. Key core technology work includes the demonstration of x-ray absorption near edge structure and x-ray absorption fine structure techniques for plutonium residue characterization.

Research work for 1997 has been documented and approved by the NMSTG to meet upcoming stabilization commitments. Additionally, progress on critical technologies will be tracked on a quarterly basis and managed by the NMSTG.

D. Integration Working Group/Nuclear Materials Stewardship

Integration Working Group Activities

The Integration Working Group was chartered on March 27, 1995 to provide a complex-wide forum for integrating information, performing trades studies, and developing an 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.
- Producing a set of lessons learned gained during the Savannah River facilities startups related to facility readiness and planning.
- Commencing development of an integrated strategy for dealing with material holdings at small sites and small holdings at large sites.

Transition to Nuclear Materials Stewardship

In that the Office of Environmental Management (EM) is responsible for most of DOE's excess nuclear materials and facilities, it will play a critical role in DOE's mandate to provide stewardship for these nuclear materials and

facilities in 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 and allowing scarce funds to be directed to other tasks. 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 materials across their entire life cycles, through processes of production, use, recycle and recovery, storage, transportation, and disposition. DOE 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.

EM is, therefore, establishing a Nuclear Materials Stabilization and Stewardship (EM-NMSS) program to further these goals for the materials it controls. This 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.

The EM-NMSS program will develop policy and provide technology and implementation support for all materials that are within the scope of the emerging EM Ten-Year Plan to include excess weapons-capable fissile materials and byproduct materials that will be retained or stabilized for safe disposition. Stewardship will be implemented in a way that permits a possible hand-off to any future organization that may be assigned responsibility for all Department nuclear materials that are excess to National Security.

III. GENERAL ISSUES

Savannah River

During the spring and fall of 1996, Westinghouse Savannah River Company investigated seismic structural concerns with the F- and H-Canyons. Issues related to F-Canyon were resolved in August, and processing of Mk 31 targets has progressed well since recommencement of dissolution activities. Completion of this overdue milestone is expected in January 1997. Concerns related to the H-Canyon seismic status are expected to be resolved in January 1997.

DOE Savannah River has given Westinghouse approval to implement a phased restart of H-Canyon. This initiative will accelerate startup of the H-Canyon fuel dissolution capability from September 1998 to July 1997.

Since the loss of the second generation Americium/Curium (Am/Cm) test melter in July, Am/Cm vitrification process development has continued through use of the first generation melter. A new melter incorporating lessons learned has been designed and is being procured. The new melter is expected to be delivered in late February 1997. The latest projection for the initiation of stabilization is June 1999—15 months after the scheduled milestone date.

Savannah River program managers at the Operations Office and Headquarters continue to examine the impacts of various scenarios for canyon utilization at the site. Any impacts and revisions to IP milestones will be reflected in an IP change.

Rocky Flats

The 94-1 Implementation Plan calls for the processing of all high-risk materials at Rocky Flats. During the course of the year Rocky Flats has presented a new set of baseline activities to resolve issues associated with stabilizing high-risk residues. Eleven new milestones have been added to the Implementation Plan and changes have been submitted to the Board for Rocky Flats, modifying three areas of the plan:

1. Highly-enriched uranium solutions were drained directly to bottles versus the original plan to blend down prior to shipment off-site. This milestone was completed late in November 1996 instead of September 1996.
2. Schedules for solid residue stabilization have been revised to reflect delays in completion of higher risk salt stabilization by six months, from December 1997 to June 1998, and SS&C stabilization by one year, from May 1997 to May 1998.
3. Schedules for liquid residue stabilization have been revised to reflect a nine-month delay, from December 1997 to September 1998, in completion of stabilization activities in Building 771. Additional interim milestones have been added for Buildings 771 and 371.

A recent review of plutonium storage at Rocky Flats was conducted and revealed that up to 100 additional plutonium metal items may be in contact with plastic. A 10% sampling plan, conducted in 1995, identified 256 items out of a total of 1,858 items held as being in direct contact with plastic. Repackaging of this material to meet the 94-1 milestone was reported complete in September 1995. The original sampling plan did not recognize differences in packaging configurations for similar items stored at different locations (e.g., inert gloveboxes versus air vault). Consequently, 111 items were not inspected. Of these 111 items, 100 are now suspected to be in contact with plastic. The site is preparing a corrective action plan to inspect and repackage these items as necessary. The headquarters program office and the NMSTG will track and ensure completion of required repacking activities.

As a result of the recommendations provided through completion of the residues trade studies, progress on selected R&D initiatives, and the above mentioned implementation plan changes, Rocky Flats is evaluating various alternatives for integrating site-wide residue stabilization and disposition activities. With the addition of the preparation of an environmental impact statement to address disposition of selected Rocky Flats residues, Rocky Flats management is reexamining

the current stabilization plans to determine more cost effective plans, if any, for remediating selected residues. The headquarters program office and the NMSTG are participating in this review process.

Los Alamos National Laboratory

Los Alamos plutonium vault sampling efforts conducted in July 1996 identified two small subsets (64 items) of the legacy 94-1 inventory, silica solids and cellulose cleanup rags, with unacceptably high sample failure rates. These material subsets have been reclassified as high-risk, and have been included in the Implementation Plan milestone requiring all high-risk items to be stabilized by September 1997.

LANL's mission requirements have been modified, resulting in two changes in the Los Alamos response to the DNFSB Recommendation 94-1. First, the legacy 94-1 inventory has been redefined to reflect upgrades to the inventory based on completion of annual nuclear material assessment reports required by DOE Order 5660.1B. The 94-1 inventory includes items which are currently required for actively funded user projects in their present form/packaging system. These materials will not be subject to plutonium separation and recovery as long as they are required for programmatic activities. Any potential safety issues surrounding the age of the item, its form, or its current packaging system are being addressed with the same level of attention currently afforded the remaining 94-1 inventory. Second, because LANL is a DOE Defense Programs site, portions of the plutonium under Recommendation 94-1 will be available for movement into planned programmatic or active user projects. New programs and expansions of existing programs before 2002 make it inappropriate, from both a waste generation and a worker exposure standpoint, to package the stabilized plutonium metal and oxide per DOE-STD-3013 for long-term storage. The material is expected to be used within 5-7 years, and its temporary packaging will meet or exceed the Requirements of current LANL vault storage procedures.

Hanford

DOE and contractor management at the Plutonium Finishing Plant (PFP) are implementing breakthrough strategies to integrate stabilization activities with facility deactivation. These strategies include installing stabilization and packaging system equipment in the vault building rather than in PFP. These and other initiatives may result in changes to the methods and locations of stabilization activities. Once finalized, any changes from the breakthrough strategies will be included in an IP change.

Hanford is delaying the stabilization of polycubes from the accelerated schedule identified in its June 1996 Site Integrated Stabilization Management Plan. Stabilization of polycubes will still be completed by January 2001, as scheduled in the Implementation Plan. Decelerating polycube stabilization will allow resources to be focused on higher priority solution stabilization and plutonium packaging needs, which are part of the 94-1 program.

Oak Ridge

Oak Ridge has submitted a draft implementation plan change to the NMSTG for the Molten Salt Reactor Experiment (MSRE) Project and proposes extending schedule completion dates for the three original milestones. In addition, Oak Ridge has committed to include several internal milestones within their SISMP to align project progress with the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) activities involving the fuel salt.

The K-25 Enriched Uranium Deposit Removal Program at Oak Ridge is under review at this time and could possibly result in Implementation Plan changes in the near future. Recent criticality assessments indicate that there may exist low enriched uranium deposits in the K-29 Building that exceed risks imposed by the K-25 deposits. DOE is evaluating the K-29 criticality concerns to determine if reprioritizing deposit removal activities will be necessary.

Mound

A program review was conducted at Mound on May 8, 1996, at which the conclusion was reached that plutonium could be shipped to Los Alamos without significant repackaging thereby reducing repackaging costs by over \$500,000 and reducing the schedule by approximately 9 months. Mound shipped 1.2 kg of plutonium to Hanford and the remainder of its plutonium holdings to LANL. Mound's 94-1 commitments to repackage material in contact with plastic has been met through their efforts to repackage material for shipment offsite. Mounds remaining 94-1 commitment will be completed in early 1997.

Plutonium Residues Environmental Impact Statement

The current RFETS baseline path for residues satisfies DNFSB commitments for safe interim storage. However, for approximately 43 metric tons of the residue inventory, implementation of

different options, in addition to or in place of those identified in the baseline, may be desirable in order to ensure that the resulting waste forms will meet the new safeguards and security requirements (issued on July 22, 1996, by the Office of Safeguards and Security, NN-51) and provide further advantages with respect to waste minimization and ALARA.

The Department intends to prepare an Environmental Impact Statement (EIS) to evaluate the impacts associated with alternatives to preparing plutonium residues and scrub alloy currently being stored at Rocky Flats for disposition or disposal. The EIS will serve to ensure that the significant effects of the treatment alternatives are identified and decisions are made on safe and cost-effective treatment for disposal of the affected plutonium residues and scrub alloy. A Notice of Intent (NOI) to conduct the EIS was issued November 19, 1996. The EIS is currently scheduled for completion in November 1997.

APPENDIX

Milestone Status Summary