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The Deputy Secretary of Energy
Washington, DC 20585

November 30, 1995

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DNE SAFETY BOARD

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

Dear Chairman Conway:

Enclosed for your information is the Nuclear Materials Stabilization Task Group Quarterly Report on the Implementation of Defense Nuclear Facilities Safety Board Recommendation 94-1. This report presents the status of actions and milestones associated with the 94-1 Implementation Plan for the period June 1 to August 31, 1995. I understand that a copy of this report has previously been provided to your staff.

The detailed status of these milestones including impacts and mitigation options is fully discussed in the quarterly report. If you have any questions, please feel free to contact me or have your staff contact Mr. Henry F. Dalton, Director, Nuclear Materials Stabilization Task Group, (202) 586-7503.

Sincerely,

Charles B. Curtis

Enclosure



DEFENSE NUCLEAR FACILITIES SAFETY BOARD
RECOMMENDATION 94-1 IMPLEMENTATION

QUARTERLY REPORT

2nd Report Period Covered:
June 1 - August 31, 1995

*Developed by the
Nuclear Materials Stabilization Task Group*

Approved:

Henry F. Dalton, Director
Nuclear Materials Stabilization Task Group

Date:

9/21/95

I. GENERAL PROGRAM OVERVIEW

The Nuclear Materials Stabilization Task Group is moving forward with a program to integrate complex-wide initiatives to manage nuclear materials stabilization activities. To date, the Nuclear Materials Stabilization Task Group has addressed stabilization activities in a complex-wide manner that includes: 1) developing a corporate strategy to address stabilization issues; 2) evaluating and integrating facility stabilization capabilities; 3) procuring standardized equipment to support plutonium oxide stabilization and packaging for long-term storage; and 4) focusing research and development efforts on the technical challenges facing stabilization, storage, and disposition of plutonium and other nuclear materials. These coordinated efforts, in the end, will produce more cost-effective results by making the best use of existing departmental capabilities.

A. Strategic Alignment/Office of Environmental Management Reorganization

Under the current structure, the Nuclear Materials Stabilization Task Group reports to the Under Secretary for programmatic decisions and changes to the Implementation Plan (IP). As part of the Office of Environmental Management reorganization, the Nuclear Materials Stabilization Task Group would report to the Deputy Assistant Secretary for Nuclear Materials and Facility Stabilization. The Assistant Secretary for Environmental Management would officially be responsible to the Under Secretary for the continued integration of the 94-1 Implementation Plan. The Defense Programs materials included in the 94-1 Implementation Plan make up a small portion of the overall material and, therefore, should remain part of Defense Programs, coordinated by the Nuclear Materials Stabilization Task Group within Office of Environmental Management. As such, the Under Secretary will issue a program change memorandum describing the new structure affecting a change to the Implementation Plan when organizational changes have been finalized.

B. Stabilization Progress to Date

Implementation Plan milestones scheduled to date have been accomplished with the following results:

- 152 Milestones in Implementation Plan
- 32 Milestones Completed to Date
 - 19 completed on time
 - 13 completed earlier than scheduled
- 2 at risk (F-Canyon solutions stabilization at Savannah River; Begin Mk31 Target Stabilization)
- 3 milestones scheduled for this quarter (June - Aug)
 - 1 completed on time (Issue spent fuel Record of Decision, June 1)
 - 2 missed (Interim Management of Nuclear Materials Record of Decision, Rocky Flats Environmental Technology Site Bldg 371 Sampling)
- 13 milestones scheduled for next quarter (Sept - Nov)

A summary of all completed milestones and milestones due in the next quarter is included at the end of this report.

C. Milestones Missed to Date

1. *Issue the Interim Management of Nuclear Materials Environmental Impact Statement (May 1995).*

The Interim Management of Nuclear Materials Environmental Impact Statement was not issued by the end of May 1995 as originally scheduled. Discussions continue to resolve internal and external concerns over the rationale to support the preferred alternatives. The Environmental Impact Statement is expected to be issued by September 29, 1995.

2. *Issue Record of Decision on Interim Management of Nuclear Materials Environmental Impact Statement (July 1995).*

A Record of Decision is expected to be issued within six weeks of approval of the final Environmental Impact Statement.

3. *Sampling and Inspection at Rocky Flats for Plutonium Oxides in Proximity to Plastic (July 1995).*

This milestone was missed due to delays resulting from repairs to the ventilation system in Building 371, which is required to supply breathing air for sampling operations. With repairs and upgrades to the ventilation system complete, an Unreviewed Safety Question Determination (USQD) was approved on August 4, 1995, to allow movement of material for sampling. However, subsystems associated with backup containment capability (glovebox pneumatic doors) were not fully operational as required by the Unreviewed Safety Question Determination. Corrective actions to meet the requirements of the USQD are expected to be completed by the end of September 1995, followed by recommencement of sampling.

The purpose of the sampling is to establish the appropriate priority of the repackaging effort. Of the 212 items to be sampled, 172 items have been completed. Rocky Flats will issue a preliminary report by September 1995 containing the information on the risk and priority for material in all other buildings where plutonium is stored. This report will contain approximately 80 percent of the required information based on the sampling accomplished to date and will be updated once the information from B371 can be obtained. The impact of missing this milestone may be in the priority order of items to be repackaged once the data from B371 is collected. This should have no effect on repackaging the Plutonium in proximity to plastic (milestone no. IP-3.2-021, October 1996).

D. Milestones at Risk

1. *Stabilization of F-Canyon plutonium solutions; stabilization to be completed by January 1996.*

Completion of F-Canyon plutonium solutions stabilization requires successful FB-Line Restart and F-Canyon Phase 2 Restart. The expected FB-Line restart date has been revised to October 1995 (from July 1995). F-Canyon Phase 2 Restart is currently projected for January 1996 and is not currently on the critical path for plutonium solutions stabilization. FB-Line restart in October 1995 is on the critical path to completion of F-Canyon plutonium solutions stabilization. The new scheduled date for completion of plutonium solutions stabilization is April 1996.

The FB-Line Restart date was revised to account for unplanned repairs of equipment deficiencies and to permit personnel to conduct integrated proficiency evolutions to establish operational readiness. The equipment problems that had the most impact were repairs associated with the FB-Line Ventilation Duct Cut, actions required to correct the cause of solids found in Tank 9.6, actions to clear blockage in Waste Header Number 2, and replacement of the Dissolver 6.4D Off-Gas Reactor. Utilizing technical personnel resources to correct the mechanical deficiencies resulted in inadequate time being devoted to integrated Mechanical Line proficiency training evolutions. As such, the contractor was not able to declare readiness of FB-Line Mechanical Line as scheduled. Contingency time to account for any future deficiencies encountered and the need to conduct practice evolutions (training) have been factored into the revised restart schedule.

2. *Begin MK 31 target stabilization in Savannah River's F-Area. (November 1995)*

The F-Canyon Dissolver, which is needed to begin Mk 31 Target dissolution, is part of the process equipment being started up as part of the F-Canyon Phase 2 Restart. Phase 2 Restart to begin processing of Mk 31 Targets was originally scheduled for November 30, 1995. The emergent issues in FB-Line (FB-Line Ventilation Duct Cut, solids in Tank 9.6, blockage of Waste Header Number 2, and replacement of the Dissolver 6.4D Off-Gas Reactor) impacted the schedule by decreasing the resources available for F-Canyon restart activities. Another issue having significant impact was the unplanned loss of qualified operations, engineering, and supervisory personnel in the face of site-wide layoffs and restructuring. This resulted in the need for training and qualification of new personnel and additional burdens on workers providing the training.

The original schedule for F-Canyon Phase 2 Restart also could not be maintained as a result of optimistic contractor estimates of activity duration

and resource loading associated with restart and normal canyon operations. In particular, the time and resources required for the installation of the first plutonium cycle interlocks and for the discharge stream characterization associated with the Clean Air Act Permit application were underestimated.

These issues resulted in the F-Canyon facility inability to meet the scheduled milestones. A revised schedule has been developed which accounts for the delays already incurred and corrects the errors in estimating activity duration and resource loading. The new scheduled date for Phase 2 Restart is January 24, 1996.

II. SYSTEMS ENGINEERING APPLICATIONS

A. Documentation Development

A draft Technical Requirements Document was developed to organize all requirements from Recommendation 94-1 and the 94-1 Implementation Plan and to take into account the DNFSB letter which accepted the Implementation Plan. The document allocates the requirements to materials groups, facilities, and research needs. The TRD is a management tool for the Task Group which provides a stable, integrated program baseline with precise definition of requirements commitments and identification of requirements sources. The draft TRD had an initial review on August 23 by the Nuclear Materials Stabilization Task Group, with the final document to be available at the beginning of October 1995.

B. Trade Studies

Trade studies are the systems engineering method of identifying, analyzing, and comparing alternative methods for accomplishing a task such as stabilization of materials to safe, secure forms suitable for interim storage or disposal. The following trade studies are currently in progress or planned:

- Disposition of Pyrochemical Salts
- Disposition of Rocky Flats Scrub Alloy
- Disposition of Other Residues (Excluding Pyrochemical Salts and Scrub Alloy).

Disposition of Pyrochemical Salts

A trade study to determine a preferred methodology for stabilization of plutonium bearing pyrochemical salt residues is ongoing. Pyrochemical salt residues exist at Lawrence Livermore, Los Alamos, and Rocky Flats. The salts are corrosive (high Chloride content), contain reactive metals, and generate hydrogen gas from contact with plastic and absorbed moisture (radiolytic decomposition). The trade study group consists of technical representatives from each affected site and also includes individuals from Savannah River and the Materials Disposition Program. The options being considered include:

- Process to a form adhering to established standards for long term storage

- Process to a form for safe interim storage (a few years)
- Repackaging residue to mitigate immediate safety concerns (e.g., venting containers to remediate hydrogen accumulation)
- Investigate and characterize to confirm that materials are stable.

The trade study should be completed in October 1995.

Disposition of Rocky Flats Scrub Alloy

The scrub alloy trade study is identifying and evaluating alternative methods for the disposition of existing scrub alloy at Rocky Flats. Scrub alloy was generated as part of the plutonium recovery process and is composed of approximately 70 weight percent aluminum/magnesium and 30 weight percent plutonium. Rocky Flats Environmental Technology Site has approximately 275 drums containing scrub alloy with <50 percent Plutonium by weight. The scrub alloy contains americium, which contributes to radiation rates and heat generation that can degrade packaging, as well as corrosive chloride contaminants.

The trade study will identify, analyze, and compare alternative methods of scrub alloy disposition. These include:

- No Action
- Ship to Savannah River, process to metal, and store
- Package at Rocky Flats Environmental Technology Site for interim storage, declare waste, and discard to Waste Isolation Pilot Project
- Package at Rocky Flats Environmental Technology Site for long-term storage, transfer to MD program for indefinite storage
- Convert to oxide, package for long-term storage, and store at Rocky Flats Environmental Technology Site.

A draft of the trade study should be available for departmental review by mid-September 1995.

Disposition of Other Residues (Excluding Pyrochemical Salts and Scrub Alloy)

A residues trade study has been commissioned and will begin after issuance of the draft of the pyrochemical salts trade study. This trade study will pursue a systems engineering approach to identify, analyze, and compare alternative methods of residue processing. Options include:

- Process to a form suitable for long-term storage
- Process to a form for interim storage (a few years)
- Repackaging residue to eliminate causes of instability (e.g., venting containers)
- Investigate and characterize to confirm that material is stable.

III. INTEGRATION WORKING GROUP

A. Integrated Facilities Plan Status

The Integration Working Group (IWG) 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/improving safety posture
- enhancing cost-effectiveness of stabilization activities
- improving schedule.

Complex-wide facilities information has been collected and collated by material type being managed. From this, an Integrated Facilities Plan that details all of the facilities to be used in stabilizing the six 94-1 material types has been drafted. Extensive appendices provide detailed facility descriptions, capabilities and capacities, discuss barriers and boundaries with other programs, particularly those dealing with outyear materials disposition planning, and details the process that will be followed to modify the plan should further integration opportunities be identified, or program requirements are otherwise changed.

B. Focus Teams

1. Transportation Focus Team

The Transportation Focus Team was organized to identify integration opportunities and emerging "barrier" issues involving the transportation of nuclear materials. The Focus Team has developed and issued the "Tables of Shipping Packages for 94-1 Materials," SRT-PTG-95-0068, June 30, 1995, which identifies all existing packaging, throughout the DOE complex, available for the transport of 94-1 materials. This document will be utilized as the reference for considering transferring of 94-1 materials. The Focus Team is currently evaluating transportation and shipping alternatives for the Mound 94-1 materials.

2. Uranium Focus Team

The Uranium Focus Team was formed to address uranium issues among multiple sites. As a result of the Focus Team's work, a trade study will assess the stabilization and disposition of U-233. This study will be executed with membership, from the Nuclear Materials Stabilization Task Group staff and the Research Committee with interface with the Office of Materials Disposition. The study is scheduled to be completed by the end of the calendar year.

C. Residues Standard Development

The development of a plutonium residues storage standard has evolved from the development of a standard for long-term storage of plutonium residues to the development of criteria to support interim storage of plutonium residues pending determination of processes for disposition. The new criteria will allow the sites to implement appropriate storage options. Development of the interim storage criteria is expected to be completed in November.

IV. RESEARCH COMMITTEE

The Research Committee has produced a draft research plan that identifies: (1) technology needs; (2) technology programs already in place; and (3) "gaps" in technologies that should be addressed by R&D initiatives. It also contains an analysis of the technical maturity of each of the programs in place. This analysis identifies areas where the relative immaturity of selected baseline technologies may put program milestones at risk. Task statements are under development for recommended R&D to fill the technology gaps and to accelerate development and demonstration of currently immature technologies. The Research Plan is scheduled to be issued in November 1995.

V. CONSOLIDATED PROCUREMENT OF STABILIZING AND PACKAGING EQUIPMENT

The Plutonium Stabilization and Packaging Project was initiated to define and conduct a centralized procurement of equipment needed at Department facilities for stabilizing and packaging plutonium metals and oxides in accordance with the Department standard (DOE-STD-3013-94). A Project working group (composed of federal, contractor, and laboratory personnel) has met to define the scope of the procurement activity and to begin specifying the equipment to be procured. The Oakland Operations Office has been selected as the procurement office for this effort.

The project began with the working group developing a conceptual process flow chart, by which the functional requirements of the procured equipment were identified. A Market Survey, issued through Commerce Business Daily has been completed. The technology options available (either commercially or within the Department) for the procurement are currently being evaluated in a trade study conducted by the Project working group. The trade study will evaluate each option according to several criteria including capital and operational costs, technical maturity, and the amount of waste generated in operations.

Integration goals of the Project include definition of container configuration and design to be implemented throughout the complex and acceptance of a standard stabilization process for plutonium oxide. A container configuration has been proposed, and it is anticipated that a final design will be reached in September 1995. Current plans call for installation of a vendor-supplied prototype at Rocky Flats by September 1996 and delivery of the first production unit by April 1997.

VI. ISSUES

Los Alamos Plutonium-Bearing Material Stabilization and Repackaging

The Department is evaluating the schedule for stabilization and repackaging of Los Alamos National Laboratory plutonium bearing materials. The materials at LANL are divided into several categories (e.g., metals and oxides, impure metals, high priority residues and compounds, combustibles, solutions, and other). The schedule is still under development for completion of non-combustibles, miscellaneous process residues, and plutonium contaminated containers (which constitute the "other" category).

VII. COST OF 94-1 ACTIVITIES

Cost estimates were developed by the respective program offices with support from the Nuclear Materials Stabilization Task Group staff. These estimates use the following basis:

94-1 Costs are the planning costs for 94-1 stabilization activities only, as provided by the DOE Headquarters program offices. These figures do not reflect base costs such as facility availability costs, infrastructure, surveillance and maintenance, safeguards and security, or program direction costs. The figures are based on an 8-year completion schedule in accordance with the 94-1 Implementation Plan, with the exception of Los Alamos National Laboratory for which both 8-year and 15-year schedule costs are shown since a 15-year option is under consideration. The Los Alamos 8-year schedule costs are shown in parentheses. Note, that prior to issuance of Recommendation 94-1, many plans were in place and funding identified to correct known vulnerabilities. Hence, while the costs listed in the tables represent the costs to carry out 94-1 activities, they include those costs that the Department had already planned to incur prior to 94-1.

Base Costs are costs at a particular site associated with facility/program operations required to support 94-1 activities (exclusive of the 94-1 activity costs). The base costs describe the availability/baseline costs (costs of doing business) that are required to support operations, regardless of the activities being performed, including certain overhead costs:

- Prorated share of general site operations costs (fire stations, site maintenance, general support etc.)
- Prorated federal salaries.

Costs that are not included in base costs and 94-1 activities costs are "secondary" waste management costs and Headquarters costs.

FY 1996 cost estimates are derived from the President's FY 1996 Budget Request.

FY 1997 cost estimates are derived from the Department's Internal Review Budget.

94-1 Costs by Site
\$ in Millions

Site	FY 95		FY 96		FY 97	
	94-1 Cost	Base Cost	94-1 Cost	Base Cost	94-1 Cost	Base Cost
Savannah River	25.0	698.3	62.5	512.2	79.7	413.0
Rocky Flats	66.0	227.8	77.4	258.3	121.3	217.7
Hanford	67.0	97.5	122.3	93.4	163.9	90.8
Idaho	23.8	65.1	13.6	80.7	10.9	75.1
Oak Ridge	11.4	14.4	35.8	14.4	39.7	14.4
LLNL	0.0	17.5	5.3	17.5	4.9	17.5
LANL	11.5 (11.5)	70.1	11.6 (17.6)	70.1	13.3 (19.2)	70.1
Total	204.7 (204.7)	1190.7	328.5 (334.5)	1046.6	433.7 (439.6)	898.6

94-1 Costs By Material Category
Total For All Sites
\$ in Millions

All Sites	FY 95	FY 96	FY 97
Pu Metal & Oxides	28.7	44.7	60.7
Pu Solutions	52.5	35.4	42.4
Pu Residues	22.3	37.6	91.1
Special Isotopes	1.0	12.7	16.6
Uranium	24.0	53.6	49.8
Spent Fuel	76.2	144.5	173.1
94-1 Total	204.7	328.5	433.7