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Department of Energy

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

Dear Mr. Chairman:

Enclosed is a quarterly report of progress in implementing your Recommendation 94-3. Your recommendation addressed safety improvements for Rocky Flats Building 371, which will temporarily store the site's plutonium pending shipment for disposition. This report describes completion of three additional upgrades for the building. Eleven of the fifteen Priority Safety Upgrades are now complete. The Department expects to transmit a revised Integrated Program Plan for this recommendation in the near future.

Sincerely,

James M. Owendoff
Acting Assistant Secretary for
Environmental Management

Enclosure

cc: Mark Whitaker, S-3.1



Attachment 1
98-RF-00448
12 pages

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U.S. DEPARTMENT OF ENERGY

**DEFENSE NUCLEAR FACILITIES SAFETY BOARD
RECOMMENDATION 94-3**

FIFTH QUARTERLY REPORT

Classified By: L.K. Kwee, DOE/EPDO (U/NU)

Date: 1/30/98

January 1998

EXECUTIVE SUMMARY

This periodic report provides an update on progress with implementation of the Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 94-3. Recommendation 94-3 involves seismic and safety upgrades to the Rocky Flats plutonium storage facility. The Department of Energy prepared and transmitted to the DNFSB an Integrated Program Plan (IPP, designated "Revision G", July 1996) which made commitments for future actions and decisions. Progress on those actions and results of decisions are reported in this fifth quarterly report.

The Board wrote to Secretary Peña on October 15, 1997, expressing pleasure with recent contractor leadership as evident through progress on priority upgrades and the new authorization basis document for Building 371. The Board expressed concern, however, that engineering had not been started on safety margin upgrades as required by the IPP, with the Department apparently relying on possible off-site shipment considerations not specifically addressed therein. The Board requested a revised IPP with justification for changes and contingency plans for accomplishing the safety margin upgrades. The Board also requested that the IPP include a plan for providing additional safety measures (or justification for not doing so) for three scenarios in the new authorization basis document which exceed the public risk evaluation guideline: a large fire on the loading dock; a waste drum hydrogen explosion; and an earthquake of magnitude expected once in 2000 years.

The Department responded to the Board on November 10 committing to revise the IPP as requested by the Board and to complete a review of the controls for the three specific scenarios exceeding the public evaluation guideline. The Department restated its commitment to prepare Building 371 for storage of Site SNM beyond 2002, if necessary, but also stated its intent to emphasize off-site shipment of the material in the revised IPP as the preferred alternative to extended onsite storage.

The revised IPP was completed in early January and is in final review for transmittal to the Board. The revised IPP includes a new section that addresses the Department's plans for achieving timely off-site shipment of SNM from Rocky Flats in a new Chapter. Further, the IPP is revised to be a Department document and not a Rocky Flats Site document, a change responsive to the separate concerns regarding complex-wide integration raised in the Board's letter to Secretary Peña on December 8, 1997. Other changes in the revised IPP include: a commitment to begin engineering on the safety margin upgrades, together with other upgrades for the interim storage mission, with validation and scope resolution in FY-98; a commitment to address additional controls for the scenarios whose consequences exceeded the public evaluation guideline; clarification, with justification, of plans for future revision of the authorization basis; incorporation of the FY-98 and FY-99 upgrades supporting AB-implementation that were identified in the fourth quarterly report; and a general update to current status on all topics. The additional controls for public risk-dominant scenarios will be developed no later than the first annual update to the new authorization basis document.

This quarterly report has been abbreviated recognizing that the revised IPP, being submitted approximately concurrently, communicates additional pertinent status information. Future quarterly reports will be based on the revised IPP and DOE Headquarters will provide the status on the new Section 5 which addresses their coordinated responsibility.

Progress on implementation of the IPP continued while the revision was being prepared. Revision 1 to the BIO-IP was issued in early November to incorporate Revision 2 of the BIO and DOE-RFFO comments on the BIO-IP, including acceleration of implementation of selected Administrative Controls judged to afford substantial improvement over current controls.

Walkdowns to prepare updated as-built drawings for one of the priority upgrades thought to have been completed (attic piping supports) led to the identification of deviations from design requirements that became a significant construction quality issue for the responsible sub-contractor. The K-H 94-3 Project Team responded decisively to ensure sound technical resolution of the issues raised and acceptable quality for all upgrade projects.

Progress continued to be made in completing the Building 371 priority safety upgrades specified in Table 3-1 of the IPP. Three additional upgrades were completed so that eleven of the fifteen were completed by December of 1997 per IPP milestone 3-2. Of the remaining four, one (HVAC supports -- scheduled for February 1998 completion) was delayed by two hidden as-built deviations for the existing facility that require design changes to the upgrade, the second (attic piping supports -- scheduled for February 1998 completion) was delayed by the quality issue reported above, the third (plenum deluge -- scheduled for April 1998 completion) was delayed by scope growth necessary to ensure the safety function, and the fourth (HVAC isolation valves -- scheduled for July 1998 completion) was delayed by the backflow damper discovery issue.

Scopes of work were drafted for all of the additional BIO-required upgrades and their completion in FY-98 and FY-99 is being managed to support the BIO-IP.

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1.0 PROGRAM ORGANIZATION

This section corresponds to section one of the IPP. It addresses key changes to the organization identified in that section as modified in subsequent quarterly reports. There have been no changes to the organization presented in the second quarterly report. That organization update is being incorporated in the revised IPP.

2.0 BUILDING 371

This section corresponds with Section 3 of the IPP that focuses on "Goal 1: Establish safe operation of Building 371 in conformance with an updated Authorization Basis (AB)." The following Goal 1 Objectives are specifically addressed: "Provide an updated Building 371 AB, complete definition and implementation of necessary upgrades in Building 371, and establish building operations in conformance with the updated AB."

2.1 Accomplishments and Status Summary

2.1.1 Building 371 Authorization Basis (AB)

The Rocky Flats Environmental Technology Site (Site) continued to make progress toward the achievement of milestone 3-3, "Establish and document operation of Building 371 in conformance with an updated AB by December 1996." The BIO-IP, Revision 1, was completed and issued on November 4, 1997. The BIO-IP revision incorporates Revision 2 of the BIO and DOE-RFFO comments, including acceleration of implementation of selected Administrative Controls judged to afford substantial improvement over current controls.

Implementation efforts were initiated in this quarter. The first of four planned implementation phases was completed to implement five of the fifteen Safety Management Programs (SMPs) established in Chapter 3 of the BIO. These are the SMPs that entailed the least change from current facility practice. The management review was successfully performed in December. The Unreviewed Safety Question Determination against the FSAR-based, currently effective authorization basis will be completed in January. Phase 1 implementation is planned for early February.

2.1.2 Building 371 Priority Safety Upgrades

Progress was made in completing the Building 371 priority safety upgrades specified in Table 3-1 of the IPP. Three additional upgrades were completed so that eleven of the fifteen are now in place. The completed upgrades include:

Penetrations for Room 3206 Fire Wall -- approximately 250 penetrations in the walls of Room 3206 were inspected for fire rating; 50 penetrations were identified as not adequately sealed and repairs were made. Most of the penetrations requiring repair were for sprinkler piping ceiling penetrations. Room 3206 was chosen for this inspection based on its potential future use for SNM processing. The lessons

learned are being applied for the balance of the building as part of the BIO implementation projects in Table 2-1.

Basement Level Firewalls -- the firewalls surrounding the Zones I and IA filter plena and exhaust ductwork in the Building 371 basement were rigorously inspected to ensure a minimum one-hour fire rating. Over 100 items were identified as deficient and repaired, including numerous penetrations, several small openings, and caulking at the floor interface.

Relocate High Risk residues in Room 3189 -- all residue drums whose content exceeded the 200 g equivalent plutonium limit established by the BIO were relocated from Room 3189 into acceptable storage locations made available within the building. The plutonium equivalence addresses the increased risk of those residues with above-equilibrium americium content. Unlike Room 3189 which was found to have inadequate ventilation capability, the new storage locations afford two stages of effective HEPA filtration should the stored material be involved in an accident.

Walkdowns to prepare updated as-built drawings for one of the priority upgrades thought to have been completed (attic piping supports) led to the identification of deviations from design requirements that became a significant construction quality issue for the responsible sub-contractor. The deficiencies were reported promptly to DOE, the DNFSB, and in a Price-Anderson Occurrence Report. Both K-H quality assurance personnel and the sub-contractor conducted root cause investigations. Numerous actions are being taken to ensure that both the generic implications and the specific construction defects are addressed. The K-H 94-3 Project Team responded decisively to ensure sound technical resolution of the issues raised and acceptable quality for all 94-3 upgrade projects. Their response included steps to ensure identification of all related defects, technical adequacy of proposed corrective action, and sufficiency of the subcontractor's organizational and institutional changes to preclude a recurrence.

Four of the priority upgrades were not completed by December 1997 as committed in the IPP. The status of those upgrades, including the reasons the schedule was not met and the new completion schedule, include:

Seismic HVAC Upgrades -- two of the three sub-tasks involved with this project are complete. The installation of new required seismic bracing on HVAC ducting was completed in November 1997, and the removal of ducting and piping associated with an HVAC steam ejector that was no longer used was completed in December 1997. The final sub-task involved addition of anchor bolts for existing ducting supports. The work was underway in December when a discovery was made that the existing floor slab thickness for some of the affected areas did not match the drawing and would be insufficient to support the planned anchors as designed. Redesigns were developed and work was restarted by mid-January when unexpected embedded plates were encountered. This second issue is also being resolved and completion is scheduled for February 1998.

Seismic Bracing for Attic Water Pipes -- this project was completed and in final inspection when quality deficiencies were identified. Two non-conformance reports identified 8 attic piping supports not installed per drawing requirements and 72 anchors not installed to the required depth. Specific rework packages have been developed, reviewed and approved. Appropriate sub-contractor organizational

changes have been made (addressing definition of roles and responsibilities, craft and supervisory training, and quality assurance staffing and training) to ensure satisfactory completion of rework as scheduled in February 1998.

Plenum Deluge System Modifications -- engineering is complete and field work packages have been issued. The JCO required to permit interruption of deluge capability without requiring a termination of nuclear operations has been prepared and approved based on the Action statements in the BIO which are not yet in effect. Detailed construction plans have been developed to parallel activities where practical. The work has been initiated. Completion is scheduled for April 1998. Delays were caused by initial underestimation of the scope (i.e., number of seismic restraints required and number and qualification of valves required).

HVAC Isolation Valves -- design is underway to provide supply HEPA filtration that would obviate reliance on either the backdraft dampers or the supply isolation valves. This design concept passively precludes unfiltered leakage due to backflow in the supply ductwork under loss of ventilation conditions and affords the added benefit of preventing intake of any contamination that might be released by an accident at another Site facility. The design is scheduled for completion in March and construction is scheduled for completion in July 1998. The original isolation valve concept involving remote closure proved impractical when available instrumentation was found insufficient to ensure that a decision to close the valves could be made safely; further complications were introduced by a discovery issue on the pressure capacity of the installed ductwork. A second manual closure strategy, the current basis for Revision 2 of the BIO, required reliance on backdraft dampers which were then inspected to verify the required capability, but were discovered to be inadequate as a temporary barrier and impractical to repair or upgrade to achieve required performance.

Work on the additional BIO-required upgrades identified for completion in FY-98 and FY-99 was initiated in support of BIO implementation. The scopes-of-work for all of these tasks were drafted and work was initiated on five tasks. The upgrades and current schedule are presented in Table 2-1. The schedule is being managed with the BIO-IP.

2.2 Deliverables

IPP Milestone 3-2 Report completion of priority safety upgrades specified in Table 3-1 by the end of 1997.

Eleven of the fifteen priority safety upgrades were completed on schedule. Firm dates have been established as reported above for completion of the remaining four.

IPP Milestone 3-3 Establish and document operation of Building 371 in conformance with an updated AB by December 1996.

This milestone is now scheduled for August 1, 1998, based on the approved Authorization Agreement of September 11, 1997. The BIO-IP provides a sound roadmap for timely completion.

IPP Milestone 3-4 Issue schedule (implementation plan) for further Building 371 upgrades identified during the initial AB development by November 1996.

Completion of this milestone on August 25, 1997, was reported in the fourth quarterly report.

IPP Milestone 3-5 Report completion of other Building upgrades on the following Schedule:

The revised IPP will update this milestone.

IPP Milestone 3-6 Reassess the need to complete the other upgrades and inform the Board by September 1998 (Milestone 3-6).

The revised IPP will update this milestone.

2.3 Schedule of Activities

2.3.1 Building 371 Authorization Basis

The BIO controls are being implemented in accordance with the BIO-IP. Planned progress in the next quarter includes:

- Phase one implementation complete 2/98
- Phase two (the remaining ten SMPs and the first two of the System Evaluation Reports) management review 3/98

2.3.2 Building 371 Priority Safety Upgrades

The schedule of key milestones for completion of the priority upgrades, including additional upgrades identified by the BIO and the Implementation Plan, includes:

- Two of the fifteen priority safety upgrades (IPP Table 3-1, Seismic HVAC Supports and Seismic Bracing for Attic Water Pipes) are to be completed in February.
- Plenum deluge system modifications will be completed by April 1998.
- HVAC Isolation Valves (now Supply HEPA Filtration) will be completed by July 1998.
- The BIO-IP provides the schedule for additional upgrades to be completed in FY-98 and FY-99. None are scheduled for completion in the coming quarter.

Table 2-1: BIO-Driven Upgrades and Schedule

1	Install Emergency Lights	Provide seismically qualified egress emergency lighting (SC-3 function in Administrative Control [AC] 5.9)	JUN 98
2	Evaluate/Reinforce HVAC Ducting	Ensure ducts credited for tertiary confinement have adequate pressure capacity for tornado atmospheric pressure transient or abnormal ventilation lineups	AUG 98
3	Ensure Lightning Protection	Ensure that security systems to prevent helicopter intrusion do not compromise lightning protection for Building 371	AUG 98
4	Inspect/Repair SC-3 Fire Barriers	Apply lessons learned from Room 3206 evaluation as necessary to ensure one-hour capability of fire barriers that are SC-3 in AC 5.9	OCT 98
5	SNM Storage Rack Repairs	Ensure adequate seismic capacity for storage racks used in vault-type material storage rooms (SC-1/2 SNM Storage Racks in AC 5.9)	OCT 98
6	HVAC Interlock Modifications	Ensure safe failure mode (credited as Passive Design Feature in BIO) in EBE for the supply fan trip function and upgrade interlock to trip return fans as well as supply	JUL 98
7	Extend Roof Drains	Improve runoff during extreme weather conditions	JUL 98
8	N2 Failure Prevention Mods	Ensure nitrogen shutoff credited as Passive Design Feature in BIO to prevent Central Storage Vault pressurization after earthquake	JUN 98
9	Counterfeit Bolt Inspection	Review usage of counterfeit bolts and replace any whose capacity will not meet BIO requirements for SC-1/2 systems (94-3 low cost issue)	SEP 98
10	Redundant Zone 3 HVAC Controllers	Provide redundant ΔP controllers in Zone 3/Zone 4 areas for reliable implementation of LCO 3.1, item 6	AUG 98
11	Drain Chemical Storage Tanks	Reduce inventories of KOH and HNO ₃ in outdoor storage tanks to meet requirements of AC 5.2.2, items e and f	JUN 98
12	Upgrade Vault Penetrations for Fire where Practical	Upgrade central storage vault boundaries to SC-1/2 (2-hour) fire barrier requirements where practical (BIO-IP will otherwise ensure that appropriate combustible control limits are established per AC 5.4.2, item 4c)	OCT 98
13	Repair Attic Beam	Compensate for omitted negative reinforcement at the junction of beams B55 and B56	JUL 98

			COMPLETION DATE
14	Install Attic Leak Detection	Provide capability to detect and alarm if significant attic flooding occurs	JUL 98
15	Miscellaneous BIO Upgrades	a) Install Dock 18T Roll-up Door Interlock b) Verify Seismic Capacity of SC-1/2 HVAC ΔP Sensor Lines c) Provide Lab Propane Tank Seismic Supports d) Complete Any Additional SQUG Walkdowns e) Determine HVAC Scrubber Disposition f) Provide Seismic Restraint for Flammable Liquid Cabinets	MAY 98 SEP 98 Cancelled ¹ FEB 98 MAR 98 MAY 98
16	Life safety Code Upgrades	Correct Deficiencies in B371 (Material Access Area) per Updated Facility Fire Hazards Analysis	OCT 98

¹ Building 371 has determined that propane will not be used in the laboratory so restraints will not be required.

3.0 INTEGRATED Pu CONSOLIDATION AND MANAGEMENT

This section corresponds with section 4 of the IPP, and follows the sequence of the Programmatic Elements in that section. The IPP states that, "The insights gained on the overall Site risk from residues and the effects of the decision to proceed with the priority Building 371 upgrades and a new ISV are to be integrated with the actions committed to the Board under Recommendation 94-1 to ensure an integrated Site plan for safe Pu management and storage. System engineering principles will be used to develop a strategic plan for residue storage and shipment that incorporates timely consideration of contingencies, such as possible delays in Waste Isolation Pilot Plant (WIPP) opening."

As reported in the second quarterly report, the evaluation of alternatives for achieving the IPP-required risk reduction for highly dispersible residues has been completed. Conclusions were issued and incorporated into the Site's 94-1 program plan. The Site Integrated Stabilization and Management Plan (SISMP), Version 7.0, dated July 15, 1997, incorporated the 94-3 residue management recommendations. Included were: pre-stabilization drum removals from Buildings 771 and 776/777 to Building 371; utilization of the pipe overpack container for the TRU waste from dispersible residues after processing; and storage of WIPP-ready waste packages in waste management facilities as necessary outside the Protected Area. Residue storage requirements and the available capacity will be updated as Site planning evolves to ensure residue risk reduction goals can be met.

The Site is actively investigating options with varying reliance on support from other sites in the DOE complex to accelerate 94-1 commitments in a manner that would support Rocky Flats Site closure by 2006. Several of these options are noted as contingencies in the revised IPP. Any that are chosen for implementation will be incorporated in future plan revisions.

All current activities related to this task are governed by the SISMP and 94-1. There are no near-term milestones for the 94-3 program.

4.0 INTERIM STORAGE MISSION

This section corresponds with Section 5 of the original IPP and addresses the following mission need: "provide safe and secure interim storage of the Site's plutonium metal and oxide inventory, including pits (if still onsite) and any oxide generated due to residue and solution stabilization activities. The interim storage mission is to begin upon completion of the May 2002 commitment for plutonium metal and oxide repackaging to DOE Standard 3013 and continue until the inventory is shipped off-site (goal is no later than 2015)." Chapter 5 focuses on plans to perform an environmental impact evaluation for an Interim Storage Vault, complete predecisional activities, and base any further action (such as ISV design, construction and operation) on the NEPA outcome.

As reported in the second quarterly report, DOE issued the Record of Decision for the Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Environmental Impact Statement on January 14, 1997. In this Storage and Disposition ROD, DOE concluded that Site SNM should be shipped to Pantex and Savannah River and thus not require interim storage at Rocky Flats. The DOE elected to make early off-site shipment the preferred option for the ten-year planning that will integrate programs throughout the DOE complex. The DOE also suspended preparation of an Environmental Impact Statement for the ISV (while keeping the option open to recommit to the effort if necessary) and took other actions to prepare for early shipment of Site SNM to Pantex and Savannah River Site (SRS). Work on an ISV for Rocky Flats will not proceed beyond the conceptual design completed in 1997.

This section of the original IPP is being superseded by two new sections in the revised IPP. One is addressing plans for off-site shipment of the Site's SNM soon enough to preclude an extended storage mission at the Site. The other is addressing the Department's commitment and plan to proceed with preparing Building 371 for storage beyond 2002 until firm evidence is available that off-site shipment will occur soon enough to obviate this mission.