[DNFSB LETTERHEAD]

December 16, 1996

The Honorable Alvin L. Alm
Assistant Secretary for Environmental Management
Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585-0113

Dear Mr. Alm:

Defense Nuclear Facilities Safety Board (Board) staff have reviewed plans for deactivation and decommissioning operations in Buildings 771 and 779 (B771 and B779) at the Rocky Flats Environmental Technology Site (RFETS). The staff's observations are documented in the enclosed trip report.

The Board has identified B771 as one of the highest-priority facilities in the DOE nuclear weapons complex to be deactivated and decommissioned, because of significant fissile material holdup and contamination from plutonium processing and research and development activities during a period of nearly 40 years. Many of the processes in B771 involved weapons-grade plutonium dissolved in strong acid solutions that have leaked from equipment during the years and contaminated numerous areas of the building. There is a significant amount of holdup in the production equipment, including gloveboxes, ventilation ducting, and filters, as well as in inaccessible areas. Plutonium holdup in B771 ductwork alone is estimated to be more than 10 kg, with unknown quantities in equipment, tanks, and piping.

Mitigation of hazards expected to be encountered during decommissioning of B771 and similar facilities requires several actions. The Board believes that essential actions still to be taken include the establishment of proper controls through hazard characterization, work planning, integrated safety management, and determination of suitable status of the buildings at the end of deactivation and decommissioning. The enclosed trip report addresses issues that require consideration and resolution in planning decommissioning operations. The Board staff will continue to review preparations for these important activities. Should you need any additional information, please do not hesitate to call me.

Sincerely,

John T. Conway
Chairman

c: Mr. Mark B. Whitaker, Jr.

Enclosure

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

October 8, 1996

MEMORANDUM: G. W. Cunningham, Technical Director

COPIES: Board Members

FROM: T. L. Hunt

SUBJECT: Review of Deactivation and Decommissioning Plans for Buildings 771 and 779 at Rocky Flats Environmental Technology Site, September 17-19, 1996

1. **Purpose**

This report documents a review by Defense Nuclear Facilities Safety Board (Board) staff of the Department of Energy's (DOE) preparations for deactivation and decommissioning operations in Buildings 771 and 779 (B771 and B779) at the Rocky Flats Environmental Technology Site (RFETS). This review was conducted by Timothy Hunt and Ray Daniels.

2. **Summary**

The review evaluated planning and scoping documents, implementation plans, work procedures, and facility/equipment histories for B771 and B779.

Building personnel recently conducted glovebox-by-glovebox walkdowns of both B771 and B779 in an effort to gauge the hazards involved so they can be more safely managed. These appraisals were a positive first step in the deactivation process; however, the resulting hazardous material characterization is inconsistent, and may not support the selected dismantlement methods and waste disposal streams.

In addition, RFETS does not have an integrated work plan that would ensure that systems and capabilities are not removed from service while still needed.

RFETS is not yet ready to proceed with decommissioning activities in B771 because of solution stabilization activities needed to meet Board Recommendation 94-1; however, deactivation activities are under way in B779. All deficiencies identified during the review can be corrected in the near future so that decommissioning can progress on schedule.

3. **Background**

The Board has identified B771 as one of the highest-priority facilities in the DOE nuclear weapons complex to be inventoried for decommissioning. Deactivation of B771 is scheduled to begin during fiscal year (FY) 1998, with decommissioning due to start 2 years later. Plutonium (Pu) processing and research and development activities in B771 have essentially been shut down since 1989. Many of the processes carried out

in B771 involved weapons-grade plutonium dissolved in strong acid solutions that have leaked from equipment over the years and contaminated numerous areas of the building. There is a significant amount of Pu holdup in the production equipment, including gloveboxes, ventilation ducting, and filters, as well as in inaccessible areas. Pu holdup in B771 ductwork alone is estimated to be more than 10 kg, with unknown quantities in equipment, tanks, and piping.

B779 was added to the scope of the visit since RFETS considers this facility to be the pilot for deactivation of other high-hazard buildings. The former mission of Building 779 was research and development of special nuclear material (SNM). Deactivation of B779—expected to last about 3 years—is presently under way with removal of SNM and remaining chemicals. Deactivation and decommissioning tasks will overlap, with dismantlement of process equipment due to begin in March 1997.

4. **Discussion/Observations**

Hazardous Material Characterization. Activities resulting from Board Recommendation 94-1 have resulted in better characterization and control of the quantities of fissile material in B771 and B779. Rocky Mountain Remediation Services (RMRS), the decommissioning subcontractor, has identified a characterization plan as one of the initial priorities related to B779 decommissioning operations scheduled to start in FY 1997.

In B779, all significant SNM items have been removed, 90 of 92 gloveboxes and all but 3 rooms have been gamma scanned for holdup, several Resource Conservation and Recovery Act (RCRA) units have been closed, and some excess chemicals have been characterized and disposed. The final goals for deactivation are minimization of hazards (removal of SNM, waste drums, and excess chemicals), reduction of budget, and development of well-defined end-point criteria. Findings to date show 3 kg of Pu on a filter, 4 gloveboxes with up to 1 kg of holdup in each, and less than 200 g total in the other 86 gloveboxes that have been characterized.

Formal hazardous material assessments and sampling plans have not been developed for chemical and radiological hazards in either building. Without the application of some convention, characterization/sampling is arbitrary, and may not support the dismantlement methods and waste disposition streams chosen. An acceptable approach (Data Quality Objectives Process) for characterization of environmental contamination has been developed by the Environmental Protection Agency (EPA). This approach would provide the formality and rigor needed to support the hazard assessments and ensure that worker safety issues relative to dismantlement and waste stream disposition have been addressed.

Excess Waste Chemicals. Thousands of containers of waste chemicals are presently being stored in B771 (more than 5000) and B779 (about 4200). Many of these chemicals are flammable, explosive, corrosive, and/or toxic. They exist in open or degraded containers that are inconsistent with safe storage of hazardous materials as specified in RCRA 40 Code of Federal Regulations (CFR) Part 265 and National Fire Protection Association (NFPA) 231 standards. Numerous excess waste chemicals have

been identified, but little effort appears to have been expended on their disposition; only 300 of 1000 chemicals in B779 alone have been disposed. Several large tanks of excess nitric acid and chemical makeup are stored on the second floor of B771. Most chemicals are managed as radioactive liquids and disposed as mixed waste, unless laboratory analysis and characterization prove otherwise. Disposition of the excess chemicals would reduce the clutter and remove the hazards they pose to workers.

Removal of Uncontaminated Excess Equipment. There are glovebox lines and associated tank farms in Room 149 in B771 that have never been used and occupy space that could be used to provide greater freedom for movement of personnel and equipment. If the equipment remains in this space, it could become contaminated, requiring special handling for disposal. This action would violate as low as reasonably achievable (ALARA) precepts and be unnecessarily costly. Removing excess uncontaminated equipment would facilitate future deactivation and decommissioning work.

Standard Methods and Techniques for Repetitive Tasks. Several decommissioning tasks will be performed repetitively throughout many facilities on the site. One of these repetitive tasks is glovebox dismantlement and removal. There are over 1000 gloveboxes of similar construction, size, and radiological attributes at RFETS. Consideration could be given to the development of standard methods, or routines, for actions that will be performed on a repetitive basis. A standard technique for glovebox disassembly might include guidance on erection of a radiological barrier or contamination containment with associated ventilation, removal of shielding, cutting methods for various materials, size reduction for removal and packaging, and handling and disposal alternatives. Other functions that may be good candidates for development of standard procedures are exhaust ducting and process piping removal, as well as containment design. During this site visit, the staff became aware of plans to remove a glovebox in B707 that contains a milling machine used in the Pu fabrication process. Lessons learned from that effort could be used as a guide for the development of improved work planning methods. Standard techniques could then be developed to guarantee uniformity of workmanship and ensure the highest level of safety consistent with work planning and performance in accordance with Board Recommendation 95-2, *Safety Management*.

Integrated Work Plan. Logical sequencing of programmatic decommissioning tasks is imperative to ensure that systems and facilities are not removed from service while still needed. RFETS' apparent lack of such a document(s) could result in ripping out structures that might be useful for other purposes (e.g., buildings that could be used for size reduction or storage, ventilation systems, and electrical components). The role of ventilation/filtration systems during deactivation and decommissioning was previously raised in the Board's RFETS trip report of November 9, 1993. Also, long-term plans for vital safety systems, such as criticality alarms and fire protection, are unclear at this time. It has not been specified when in the decommissioning cycle these systems can safely be removed from service. A decommissioning strategy that addresses the interdependency of facilities and systems is essential to ensure conduct of operations.

5. **Future Staff Action**

The Board staff will continue to review issues related to deactivation and decommissioning at RFETS, including the aforementioned items, to ensure that all activities are performed in the best interest of public health and safety.