DEFENSE NUCLEAR FACILITIES SAFETY BOARD

625 Indiana Avenue, NW, Suite 700, Washington, D.C. 20004
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July 15, 1996

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

Dear Mr. Alm:

The Defense Nuclear Facilities Safety Board's (Board) staff has reviewed the analyses supporting an Authorization Basis for Building 771 at the Rocky Flats Environmental Technology Site (RFETS). Observations made by the Board's staff are reflected in the enclosed trip reports.

The Board believes that the action proposed by Kaiser-Hill to apply the Process Hazards Analysis methodology, similar to that presented in 29 CFR 1910, *Occupational Safety and Health Standards*, to the higher hazard activities will enhance safety of operations at RFETS. This methodology has also been implemented at the Savannah River Site and is a systematic approach to identifying the vulnerabilities from an operation or activity. Implementation of controls to prevent or mitigate such vulnerabilities, coupled with considerations of defense-in-depth, would provide a reliable process for protection of the workers. Therefore, application of this safety process may be warranted at other defense nuclear facilities.

A significant number of transuranic (TRU) waste drums are stored in plutonium buildings and waste storage facilities at RFETS. An attendant safety issue for such storage is the potential for generation of flammable gases as a result of radiolytic decomposition of the waste forms. The site had scheduled all these drums to be vented by the end of fiscal year 1995 as part of the site risk reduction program. Although more than 500 drums remain unvented, venting of the drums was discontinued last year. The Board believes that venting of TRU waste drums, especially those containing ion exchange resins or cemented sludge, warrants a priority higher than the one currently assigned by the Department of Energy.

Should you need any additional information, please do not hesitate to call me.

Sincerely,

John T. Conway
Chairman

c: Mr. Mark B. Whitaker, Jr.

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

May 17, 1996

MEMORANDUM FOR:	G. W. Cunningham, Technical Director
COPIES:	Board Members
FROM:	M. J. Merritt
SUBJECT:	Review of Preparations for Liquid Stabilization of Plutonium Solutions in Building 771 at Rocky Flats Environmental Technology Site, April 29-May 1, 1996

1. **Purpose:** This memorandum comments on the preparations for liquid stabilization of plutonium solutions in Building 771 at the Rocky Flats Environmental Technology Site (RFETS). The review was conducted by Michael Merritt and Roy Kasdorf with assistance from outside expert Ralph West.
2. **Summary:** This review assessed Authorization Bases implementation, procedures, training and qualification of operators and equipment readiness. Based on this review, the site is not ready to process solutions in Building 771. However, no deficiencies were identified that could not be corrected in the near future to allow processing to proceed.

   The Authorization Basis (AB) for the planned activity is still in the approval process after a recent change in the development method. The Defense Nuclear Facilities Safety Board's (Board) staff (Bamdad, et.al.) reviewed the adequacy of the AB the previous week and will report the results separately. There is no mechanism in place for verifying that applicable AB requirements have been incorporated into implementing procedures. Also, no effort has been made to check a draft process procedure against the proposed AB document. The site intends to proceed with a hydroxide precipitation process using the existing AB.

   The procedures for the solution stabilization processes are still in development. The draft procedure provided to the Board's staff has several weaknesses in content and format.

   The training and qualification program had several weaknesses. The qualification requirements for stabilization process specialists and supervisors did not contain items that the contractor considered essential to ensure proper capabilities for certifying personnel for these positions. The qualification program needs to be better defined to match operator qualification to the specific tasks to be performed. These specific qualifications (e.g. solution precipitation) should build on the existing qualifications for routine building operations.

   Due to the lack of an approved AB, facility management had not prepared a list of safety- related systems needed for the hydroxide precipitation process scheduled to start in June 1996. The systems and components that are essential for the stabilization

processes have not been defined. As a result, the Facility Manager was unable to provide an overview of the status of operability of safety-related systems and work required to bring these systems to the required state of readiness.

3. **Background:** Building 771 has been essentially shut down since 1989. The shutdown left a significant amount of plutonium solutions in tanks and bottles primarily in Buildings 771 and 371. A program has been initiated to stabilize these solutions by converting them into safe, storable, solid forms and disposable liquid wastes.

   The two primary categories, or feed types, of solutions in Building 771 are: (1) plutonium nitrate solutions containing uranium or chloride impurities; and (2) plutonium nitrate eluate solutions with various cationic impurities. A hydroxide precipitation is planned for the first feed type. A two-step oxalate and hydroxide precipitation process is planned for the second feed type. The processes to be used were developed by Los Alamos National Laboratory (LANL) and are now being adapted to the equipment and conditions at RFETS.

4. **Discussion/Observations:**
   a. ***Authorization Basis***. The current AB for Building 771 consists of: (1) a 1987 Final Safety Analysis Report (FSAR); (2) Operational Safety Requirements (OSRs) updated in 1994 and 1995; (3) 28 Unreviewed Safety Questions Determinations (USQDs); and (4) a Justification for Continued Operations (JCO). The scope of the JCO covers mostly the minor, low hazard activities that are currently being pursued.

      Early this year, the site decided to develop a Basis For Operations (BFO) for planned process activities. The BFO is a new document that RFETS plans to use for all future building and activity authorization basis. This document is planned to: (1) characterize the facility, its hazards and planned activities; (2) define hazard categorization protocol; (3) define facility activity tempos; and (4) define the recognized controls. The BFO is planned to develop event scenarios in each tempo for each hazard category and determine those scenarios that are scenarios of concern (SOCs). All SOCs will be analyzed and control sets will be developed for each. The Board's staff reviewed the adequacy of this AB process the previous week and will report on it separately.

      There was no mechanism for verifying that applicable AB requirements had been incorporated into procedures and no effort had been made to check a draft process procedure against the proposed AB document.

      The development of a BFO has caused delays and an approved AB was not available in February 1996 as scheduled. The site is now questioning the BFO approach to developing an AB so that an approved document is not expected to be available for the start of hydroxide precipitation operations. The site intends to use the existing AB with an updated JCO for the hydroxide precipitation process.

   b. ***Procedures***. Procedures are developed in accordance with RFETS Site

Procedure PROCDEV-400, *Procedure Process.* This procedure provides a method of development, review, change and approval of process procedures. The process as described appears satisfactory. Several procedures have been published in the facility as Operations Orders, a form of standing orders. This is contrary to the Department of Energy (DOE) guidance and circumvents the review and approval process of the above procedure. The facility management stated that this was necessary because the site procedure was cumbersome and frequently resulted in late issuance of procedures.

The staff reviewed a draft hydroxide precipitation procedure and found that no standard process exists to ensure the incorporation of all applicable AB requirements.

c. ***Training and Qualification***. The review of the training program provided a confusing picture of the state of training and qualification. For processing solutions, the site intends to train and qualify a small core team consisting of process specialists, shift technical advisor (STA), shift manager, process engineer and criticality engineer. The initial team has received training at LANL. Mock-up training at the site is also planned. Verbal description of the core team training provided by the building Facility Manager laid out a fairly rigorous training program. However, qualification cards under preparation for the processing activity did not reflect this verbal description. The training and qualification of individuals outside the core team (e.g., the Stationary Operating Engineers (SOE)) were consistent with general site requirements (i.e., no special training was being provided for the processing activities).

   The qualification cards for the hydroxide precipitation process specialist and supervisor were reviewed and the following weaknesses were noted:
   - There was no requirement for fundamental training.
   - There was no requirement to evaluate the performance of mock-up Training. Additionally, this qualification step was not documented in the manner prescribe by DOE requirements which prevented an evaluation of on-the-job training evaluation methodology.
   - Supervisors were not required to be trained to an increased depth to reflect the added responsibility of their position, contrary to the requirements of DOE Order 5480.20A.

d. ***Work Control/Equipment Status***. Work control is performed in accordance with the site requirements in their *Integrated Work Control Program Manual,* especially Integrated Work Control Program (IWCP) procedures IWCP-1, "Work Control Form Processing," and IWCP-3, "Maintenance Work Package Planning Process." These procedures appear to provide a system of ensuring the proper identification of work and the development, review and approval of individual work packages. However, the briefing by the Technical Services Manager was not consistent with the program set forth in the IWCP Manual. He described an informal system of prioritizing and assigning work. This system relied on status boards in the Shift Manager's office and a weekly plan maintained on a blackboard in a conference room. The performance of work control items was resourced for 500 jobs a year by the contract, although there

were about 290 open work control forms and about 35 were initiated every month.

Preventive maintenance was also limited by contract to 150 actions per year. The briefer stated that this ensures the accomplishment of about 50-60 percent of the preventative maintenance requirements. The briefer could not describe how this program ensured safety related systems and other critical components were properly maintained by a selection process.

Equipment calibrations are managed by a central group. This group maintains a recall system for identifying equipment requiring calibration. The calibration group promulgates a monthly report of overdue calibration, but does not track any further status on these items. Accomplishment of overdue calibrations is considered the responsibility of operations management. The calibration group assumes any overdue items for which no action is taken are inactive. Accordingly, after a given period items are automatically assigned an inactive status.

5. **Future Staff Action**:

The Board's staff will continue to review issues relating to AB implementation, procedure development, operator training and equipment readiness to ensure adequacy prior to resumption of solution processing.