

March 23, 2001

The Honorable Carolyn L. Huntoon
Acting Assistant Secretary for
Environmental Management
Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-0113

Dear Dr. Huntoon:

The Defense Nuclear Facilities Safety Board (Board) has been following recent thermal stabilization activities in Building 707 at the Department of Energy (DOE) Rocky Flats Environmental Technology Site (RFETS). Stabilization of holdup material in mid-February 2001 resulted in unusual pressure fluctuations in the glovebox. During review of the event, it became apparent to the Board that an existing authorization basis control addressing past Board concerns was not being implemented. The enclosed report summarizes this event and provides observations concerning safety management for these operations.

The Board understands that DOE Rocky Flats Field Office (DOE-RFFO) and Kaiser-Hill have been evaluating the situation. The identification of root causes and appropriate corrective actions is important in ensuring that authorization basis controls are effectively implemented at RFETS. The Board requests to be informed of the corrective actions identified by DOE-RFFO and Kaiser-Hill as a result of this event, including any actions to address the observations in the enclosed report.

Sincerely,

John T. Conway
Chairman

c: Mr. Mark B. Whitaker, Jr.
Ms. Barbara A. Mazurowski

Enclosure

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

Staff Issue Report

March 7, 2001

MEMORANDUM FOR: J. K. Fortenberry, Technical Director

COPIES: Board Members

FROM: D. F. Owen and R. E. Kasdorf

SUBJECT: Safety Management During Thermal Stabilization Activities at Rocky Flats Environmental Technology Site

This report documents a review performed by the staff of the Defense Nuclear Facilities Safety Board (Board) concerning conduct of thermal stabilization activities in Building 707 at the Rocky Flats Environmental Technology Site (RFETS).

Background. Prior to resumption of Building 707 operations in 1993, the Board identified the potential for pressurization or an explosion in a furnace when stabilizing plutonium holdup material containing potentially reactive materials. During the course of the Board's deliberation on resumption of operations in Building 707, the Department of Energy (DOE) committed to sample and characterize potentially reactive feed materials to ensure appropriate safety controls were implemented. As a result, the Building 707 Basis for Interim Operations (BIO) identifies the furnace overpressure/explosion hazard and incorporates an administrative control in the Technical Safety Requirements (TSR) that requires: "Characterization/sampling to identify the presence of organics or other reactive materials to allow appropriate controls for furnace/stabilization operations."

Event Chronology. In mid-February 2001, Building 707 personnel were conducting thermal stabilization of lathe hold-up material (containing plutonium chips, machine oils, and mineral oil). The thermal stabilization crew raised questions regarding the oily characteristic of the material. After consulting with nuclear safety, fire protection, criticality safety, and environmental compliance personnel, the crew was authorized to proceed without any additional specific controls related to the furnace pressurization/explosion hazard. No characterization was performed. The crew again questioned stabilization of this material. A DOE Rocky Flats Field Office (DOE-RFFO) plutonium expert was consulted and verbally recommended draining excess oil before heating and pausing at two temperature hold points during furnace heat-up to burn off combustible material at lower temperatures. The

procedure was then modified to specify draining excess oil, but no temperature hold points were implemented. During thermal stabilization, unusual glovebox pressure fluctuations were observed.

At a pre-evolution briefing for the next can of oily material, personnel were assigned to watch for pressure indications. Again, unusual pressure fluctuations and noticeable movement of the glovebox gloves were observed. Further processing was stopped. The temperature hold points previously recommended by the DOE-RFFO plutonium expert were implemented for stabilizing the next can of oily material; no pressure fluctuations were noted. However, no sampling or characterization of the feed material was performed.

The Board's staff became aware of the unusual glovebox pressure fluctuations and inquired as to what laboratory sampling and characterization had been done on this material (referencing the sampling/characterization protocols established in 1993). Kaiser-Hill management placed a temporary hold on thermal stabilization activities when they could not fully address the staff's questions.

In subsequent conversations with the staff, neither DOE-RFFO nor Kaiser-Hill personnel indicated an awareness of the TSR sampling/characterization control in the Building 707 BIO. Neither the activity-level hazard analysis for thermal stabilization nor the operating procedures incorporated the TSR sampling/characterization control.

Kaiser-Hill performed laboratory characterization of the remaining material to be stabilized in Building 707, and the results were reviewed by subject matter experts. New hold points were recommended to allow combustible material to burn off at lower temperatures. The new hold points were implemented, and the remaining material was safely stabilized with no unusual glovebox pressure fluctuations.

At the end of the month, no determination had been made regarding whether the prior thermal stabilization operations violated the TSR. Following staff discussions of this issue with senior DOE-RFFO management, DOE-RFFO questioned Kaiser-Hill about the failure to perform sampling/characterization for the operation as required by the TSR. Kaiser-Hill declared a TSR violation and indicated that an investigation would be performed.

Staff Observations. This event is significant in that the controls DOE committed to implement to address concerns raised during the Board's deliberations regarding Building 707 resumption were overlooked. More significantly, however, this event revealed a number of fundamental deficiencies in safety management for these thermal stabilization activities:

- ! There was a lack of recognition and implementation of the TSR control in the BIO during these operations. This was evident in Kaiser-Hill's activity-level hazard analysis, the thermal stabilization procedure, execution of the operations, and in DOE-RFFO's oversight.

- ! Although several safety personnel were consulted during the course of this event, the applicable scope of work and hazard analysis were not reviewed. Such review is called for by the basic functions of Integrated Safety Management upon encountering such operational anomalies. Proper review of the BIO/TSR would have identified the TSR control for sampling/characterization. Unreviewed Safety Question Determinations referenced for the procedure changes to incorporate the initial temperature hold points did not address the TSR control for sampling/ characterization.
- ! The recommendations of the DOE-RFFO plutonium expert were informally provided to Kaiser-Hill and informally addressed, as evidenced by the initial failure to implement the temperature hold points. The recommendations for safety controls were made without knowledge of all applicable hazard analysis and controls.
- ! There was no formal reporting of the unusual glovebox pressure fluctuations to RFETS upper management. Lack of such reporting may have contributed to the failure to recognize the BIO/TSR coverage of thermal stabilization.
- ! The determination that a TSR violation had occurred was made more than two weeks following the first unusual glovebox pressure fluctuations, several days after the Board's staff discussion of BIO/TSR coverage with RFETS personnel, and only after the staff specifically identified the issue to senior DOE-RFFO management.

DOE-RFFO and Kaiser-Hill are now looking into the circumstances surrounding this event. The staff will follow the site's efforts to address this event and evaluate the adequacy of the resulting corrective actions.