

John T. Conway, Chairman  
A.J. Eggenberger, Vice Chairman  
Joseph J. DiNunno  
Herbert John Cecil Kouts  
John E. Mansfield

# DEFENSE NUCLEAR FACILITIES SAFETY BOARD

625 Indiana Avenue, NW, Suite 700, Washington, D.C. 20004-2901  
(202) 694-7000



November 3, 1999

Brigadier General Thomas F. Gioconda  
Acting Assistant Secretary for Defense Programs  
Department of Energy  
1000 Independence Avenue, SW  
Washington, DC 20585-0104

Dear General Gioconda:

The staff of the Defense Nuclear Facilities Safety Board (Board) recently completed an assessment of the status of preparations for the first new dismantlement campaign at the Y-12 Plant in more than five years. The staff observed that delays in establishing updated authorization basis continue to occur. The staff also observed inadequacies in a job hazards analysis, in an unreviewed safety question determination, and in the implementation of safety-related controls. A report of these observations is provided for your use in improving current operations as well as future dismantlement activities.

There continue to be shortfalls at the Y-12 Plant regarding the readiness review process. A new startup evaluation for the dismantlement activity was performed and Lockheed Martin Energy Systems and the Department of Energy (DOE) incorrectly selected a contractor process review rather than a review defined by DOE Order 425.1A, *Startup and Restart of Nuclear Facilities*. It is anticipated the DOE-Oak Ridge Operations Office will address this inadequacy during the DOE Headquarters requested review of their readiness review process in response to the Board's recent reporting requirement on this subject.

If you have any questions on this matter please do not hesitate to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "John T. Conway".

John T. Conway  
Chairman

c: Mr. Mark B. Whitaker, Jr.  
Ms. Gertrude Leah Dever

Enclosure

# DEFENSE NUCLEAR FACILITIES SAFETY BOARD

## Staff Issue Report

September 2, 1999

**MEMORANDUM FOR:** G. W. Cunningham, Technical Director  
J. K. Fortenberry, Deputy Technical Director

**COPIES:** Board Members

**FROM:** W. Andrews  
R. West (Outside Expert)

**SUBJECT:** Weapons Dismantlement Preparations at Y-12 Plant

This report documents a review of preparations for dismantlement of a specific weapon at the Y-12 Plant. The review was conducted August 18, 1999, by W. Andrews of the staff of the Defense Nuclear Facilities Safety Board (Board), with assistance from outside expert R. West.

The Disassembly and Assembly Facility has completed preparations and performed a few initial disassembly operations on a specific weapon type. Additional units of this weapon are expected to arrive from Pantex in the near term. The operations for which preparations were completed are designated as Phase I, and consist of receipt, staging, gas monitoring, unpacking, separation from military non-nuclear components, and repackaging and storage of subassemblies. Phase II will consist of dismantlement of the subassemblies. This staff review focused on the hazard analysis, the identification and implementation of controls, and the readiness review process associated with Phase I activities.

**Authorization Basis.** The authorization basis for the planned dismantlement consists of a Basis for Interim Operations (BIO) and Operational Safety Requirements (OSRs). Four Criticality Safety Approvals (CSAs) set forth the controls for prevention of nuclear criticality. The BIO identifies various hazards and states that the dominant accidents are fire and nuclear criticality. The BIO and OSRs identify controls for the prevention and mitigation of fires (e.g., suppression systems, combustible loading, and flammable material limits) and for mitigation of criticality accidents (criticality accident alarm system), as well as miscellaneous controls for specific scenarios (e.g., floor loading restrictions in the area attacked by Kathabar solutions). The CSAs establish the mass and number of unit controls for different parts of the transportation and disassembly process.

A new Safety Analysis Report (SAR) for the facility was submitted to the Department of Energy (DOE) in August 1998 and still has not been approved. It was reported to the staff that significant rewriting of the SAR is required, and it will not be ready for approval for about

2–3 months. The Technical Safety Requirements have not been completed and will not be submitted until 1–2 months after approval of the SAR. As was noted during a June 1999 visit by the Board's staff, the assessment of authorization basis documents by DOE-Oak Ridge (DOE-OR) is taking an exceptionally long time.

**Hazard Identification.** A Job Hazard Analysis (JHA) of the dismantlement process identified hazards associated with hoist lifts, hydraulic fluid temperature/pressure, and machining of asbestos and radioactive material. On the basis of questions, reportedly raised by a design agency representative, concerning the presence of pyrophoric material during disassembly, an additional JHA was performed. This JHA identified a spark and possible fire scenario and recommended that an argon suppression rig be present during part of the disassembly. During a subsequent disassembly, a spark was noted, and the argon rig was used. The process was then revised to include an additional argon purge during the portion of the procedure in which the spark occurred.

**Unreviewed Safety Question Determination (USQD).** To verify that the proposed disassembly activity was within the safety envelope for the facility, a USQD was performed. It found that the proposed activity did not constitute an Unreviewed Safety Question. The USQD did identify a potential fire hazard during a cutting step, but not the fire hazard that was later identified for a subsequent disassembly step. As a result of the fire potential question raised by the facility's Fire Hazard Analysis (FHA), the USQD was revised to include information about the additional hazard potential and the use of argon. It was still found that the process did not constitute an Unreviewed Safety Question. While this scenario is bounded by the existing safety envelope of the facility, a significant worker safety issue was initially missed by the USQD process.

**Implementation of Controls.** The disassembly procedure was reviewed by the Board's staff and found to contain the controls specified in the BIO and OSRs. The staff performed a spot check of fire suppression system surveillances, and records for the selected tests were found to be complete and up to date.

Building 9204-2E is designated as a design feature for safety (DFS) in the OSRs. The description in the OSRs states that the materials of construction help minimize the risk of a major building fire propagating from one area to another and provide a degree of confinement of airborne material should a fire occur. It was reported to the staff that the DFS had not been reviewed for possible degradation to ensure that adequate preventive maintenance was being performed. Additionally, there was no database of the status of these safety basis verifications, as is maintained in other Y-12 Plant facilities to ensure management's awareness of the status of safety components/systems.

A recent FHA notes that a fire barrier program has not been implemented for this building. The FHA recommends implementation of a fire barrier program and identifies such a program as being essential to comply with the authorization basis. A Lockheed Martin Energy Systems (LMES) procedure requires periodic fire barrier inspections at frequencies in accordance with the DOE/OR guide. A search for inspection assessment reports during the past

5 years revealed a single rolling fire door inspection and test inspection (reported 5-year frequency). It should be noted that the FHA includes recommendations to repair or replace 11 doors.

The staff performed a walkthrough of the disassembly area and adjacent spaces. The staff observed what appeared to be excessive numbers of wooden pallets and other flammable material in the area. In particular, it appeared that a criterion of the fire inspection procedure was not being enforced, i.e., that "there shall be no stacks of stored wooden pallets within 5 feet of other combustible materials, machinery, or unprotected steel columns." A number of pallets were stored on shelves within 5 feet of cardboard boxes.

**Readiness Review.** A new startup evaluation for the dismantlement activity was conducted in accordance with LMES procedure Y10-190, *New Activity Start-up Requirements*. The evaluation found positive responses to three questions concerning cost of preparations, changes to qualification/certification, and a new weapons program. These responses required the performance of at least a contractor process review, primarily because of the new program. It should be noted that Question 2 in the procedure asks, "Is the activity a resumption of any hazard category 2 facility that has been shut down for more than 12 months?" The evaluation answer was "No, based on 9204-2E facility is in an operational state. The facility is not in a shutdown state." This answer demonstrates a lack of understanding of the term "facility" as used in DOE Order 425.1A, *Startup and Restart of Nuclear Facilities*. This Order defines facilities as "activities or operations that involve radioactive and/or fissionable materials in such form or quantity that a nuclear hazard potentially exists to the employees or the general public." Therefore, this activity represents the restart of an operation that has been shut down for more than 12 months, and the answer to this question should have been "Yes."

Contributing to this misunderstanding of the meaning of "facility" is the definition in LMES procedure Y10-190. This procedure defines a facility as a usually walled and roofed structure designed for permanent use, such as Buildings 9212, 9204-2E, 9204-4, and 9720-5. This definition does not incorporate the identification of a facility as an activity or operation that exists in DOE Order 425.1A.

It should also be noted that the evaluation resulted in a process review that is not defined by the DOE Order. The Order requires an Operational Readiness Review (ORR) or Readiness Assessment (RA) to review the readiness of processes prior to startup or restart. The RA may be graded to be as simple as a restart check procedure, or it may approach the complexity of an ORR. It is unclear why the LMES procedure creates the additional review categories of process review and program review.

The process review was started on November 30, 1998, and was suspended the next day because the review team found a lack of adequate preparations. The review was restarted in early December and continued intermittently until it was completed in mid-December 1998. The team developed several prestart findings and considered the facility ready for Phase I disassembly of the specified weapon upon correction of the prestart findings. The team also recommended employing a first-use process for the initial performance of the disassembly. This

process was understood to require extra monitoring by line management and the review team during initial disassembly and is not defined in any facility procedure.

It should be noted that the process review was started before the JHA and health and safety inspection had been performed. The review was completed before it had been determined that a safety issue with pyrophoric material existed and required additional controls. The review did not reveal this shortcoming in the hazard identification process.