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## DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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July 8, 1999

The Honorable Bill Richardson  
Secretary of Energy  
1000 Independence Avenue, SW  
Washington, DC 20585-1000

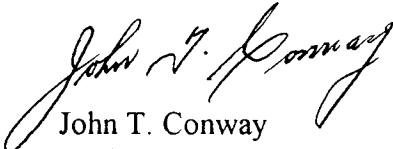
Dear Secretary Richardson:

The results of recent reviews of chemical hazards assessments at the Y-12 Plant in Oak Ridge, Tennessee, are discussed in the two enclosed Issue Reports prepared by the Defense Nuclear Facilities Safety Board's (Board) staff, which the Board is providing for your consideration. The Board considers that the major issues addressed in these reports—the contractor's tardy response to Secretary of Energy directives, the apparent failure of Department of Energy (DOE) management to take aggressive action to ensure timely response, the lack of up-to-date accurate information concerning the inventory of potentially hazardous chemicals, and DOE management's failure to follow up open occurrence reports and unresolved safety questions—warrant the attention of senior DOE managers.

The Board is mindful of the need for program managers to assign priorities, particularly in times of tight budgets. Nevertheless, the Board considers that deferral or cancellation of responses to explicit Secretarial directives is a serious matter requiring resolution at the highest levels of DOE management.

The Board would be interested in hearing what corrective actions may be taken to address these issues, and will be evaluating the extent to which they may be evident at other defense nuclear facilities.

Sincerely,

  
John T. Conway  
Chairman

c: Mr. Mark B. Whitaker, Jr.

Enclosures

# DEFENSE NUCLEAR FACILITIES SAFETY BOARD

## DNFSB Staff Issue Report

June 10, 1999

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

**COPIES:** Board Members

**FROM:** D. Thompson

**SUBJECT:** Chemical Hazards Assessment at Y-12

This issue report addresses the subject of chemical hazards assessment, including those required for emergency management.

Members of the staff of the Defense Nuclear Facilities Safety Board (Board) (P. Gubanc, R. Robinson, D. Thompson, and W. Von Holle) met with representatives of the Department of Energy (DOE) Oak Ridge Operations Office (ORO), Emergency Management Program Office (EMPO), the DOE Y-12 Site Office (YSO), and the Y-12 operating contractor, Lockheed-Martin Energy Systems (LMES).

The Board's staff was briefed on the status of the following:

- The chemical hazards surveys initiated following the recent discovery of weaknesses in the plant's system for keeping track of its inventory of potentially hazardous non-nuclear materials.
- The progress in completing actions called for by:
  - DOE Order 151.1, *Comprehensive Emergency Management*.
  - Two memoranda from the Secretary of Energy—"Lessons Learned from the Emergency Response to the May 14, 1997, Explosion at Hanford's Plutonium Reclamation Facility" and "Timely Notification of Emergencies and Significant Events (both dated August 27, 1997)."
  - A memorandum from the Deputy Secretary of Energy, "Follow-on Actions to Improve Emergency Event Recognition, Classification and Notification" (dated December 16, 1997).

- The associated follow-up reports from the Offices of Emergency Management (NN-60) and Environment, Safety and Health Oversight (EH-2) (dated November 1997 [NN-60], July 7, 1998 [EH-2], and December 1998 [EH-2]).

The Y-12 Corrective Action Plan called for in the references cited above is seriously behind schedule. The plant has only recently begun to conduct chemical hazards surveys and hazards assessments arising from those surveys, as required by the Secretary of Energy's directives. LMES does not foresee completion of these efforts before the end of calendar year 2000. It is not evident that any follow-up actions to address this tardiness have been taken by either ORO or any cognizant DOE Headquarters office.

The lack of progress in ORO and Y-12 emergency management, as documented in the December 1998 EH-2 report, is clearly DOE's responsibility. While LMES recommended activities to respond to the requirements of DOE Order 151.1, the Secretary of Energy's initiatives, and the EH-2 findings, DOE chose (1) not to fund these actions, (2) not to provide direction or seek approval for alternative actions, and (3) not to actively encourage cooperation among the ORO prime contractors and their counterpart DOE program managers.

This review by the Board's staff disclosed that while YSO and LMES are moving forward, albeit belatedly, the fundamental issues associated with a lack of DOE leadership remain. Furthermore, there have been no substantive ORO actions suggesting that changes are likely in the near term (e.g., staff augmentation).

Representatives of DOE and LMES participating in the review noted that delays in implementing corrective actions called for by the Secretary of Energy's initiatives and the NN-60 and EH-2 reports were the result of several factors. These factors are associated primarily with management inattention to emergency management issues in general; poor cooperation on these matters among the senior managers of the major prime contractors on the Oak Ridge Reservation; and low priority attached to these issues, resulting in perennial budget shortfalls.

When asked to explain their role, the ORO EMPO representative stated that EMPO provided guidance only, and that the cognizant ORO Assistant Managers (i.e., for Defense Programs [DP], Environmental Management, and the new Office of Science) were responsible for implementation. The ORO EMPO representative further admitted that EMPO was aware of problems associated with line management's execution of responsibilities shared among the prime contractors, but had not insisted on raising these issues to ORO senior management for resolution. The result is that whereas LMES formerly had responsibility for coordinating emergency response to events at or involving Y-12, each of the prime contractors and their counterpart ORO line organizations now act independently under the site-wide emergency management plan, with no overall ORO guidance or standards for those emergency responses.

The Y-12 plan for the corrective actions associated with non-nuclear hazardous materials, as mandated by the Secretary of Energy's directive and called for by the Deputy Secretary of

Energy's memorandum, is seriously behind schedule. LMES activities to conduct *de novo* chemical hazards surveys and hazards assessments arising from those surveys for both authorization basis documents and emergency planning were initiated in earnest only after the December 1998 EH-2 report had been issued. LMES does not foresee completion of the surveys and hazards assessments before the end of calendar year 2000.

An LMES Corrective Action Plan (CAP) addressing needed improvements in emergency management was forwarded to DP Headquarters by the ORO Assistant Manager for Defense Programs on April 1, 1999. These improvement opportunities were identified in EH-2's December 1998 report, which referred, in turn, to EH-2's July 1998 report of deficiencies following up on the earlier Secretary of Energy directives. ORO's concurrence with the LMES CAP was contingent on funding availability. (Subsequently the staff learned that DP returned the CAP to ORO, noting that it was unacceptable to concur "subject to budget availability." Instead, the plan is to be reworked to indicate the schedule for completion within available funding. Then, if the schedule is unacceptably long, DOE Headquarters will search for supplemental funding to accelerate completion.)

Finally, the Board's staff has identified two major issues that merit attention:

- The tardy response to the Secretary of Energy's directives
- The apparent failure of senior management in ORO and DOE Headquarters programmatic offices to verify progress toward complying with the requirements of DOE Order 151.1 and addressing the deficiencies identified in the NN-60 and EH-2 reports.

These issues reflect apparent indifference to clear directives from senior DOE management—on the part of both DOE Headquarters and field elements. They also indicate an inability or unwillingness to take prompt steps to correct identified weaknesses in contractor performance regarding a major component of the defense-in-depth approach to protection of workers, the public, and the environment.

# DEFENSE NUCLEAR FACILITIES SAFETY BOARD

## DNFSB Staff Issue Report

June 10, 1999

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

**COPIES:** Board Members

**FROM:** W. Von Holle

**SUBJECT:** Y-12 Lithium Operations and Chemical Safety Site Review

This issue report documents information in a review at Oak Ridge Y-12 on May 5 and 6, 1999, by members of the staff of the Defense Nuclear Facilities Safety Board (Board) P. Gubanc, R. Robinson, D. Thompson, and W. Von Holle.

**Lithium Operations Explosion.** On March 31, 1999, an explosion occurred in a salvage operation vat used to recover lithium from high efficiency particulate air (HEPA) filters and other objects. The explosion occurred when an operator lowered a wood-frame box HEPA filter into the vat containing water from several previous washings. The HEPA contained considerable LiH from the pressing operation. After the operator left the area, a loud report was heard all around the building, and the HEPA box was recovered in shreds with scorch marks around the wood frame. Some water (LiOH solution) was erupted, but the total lost was estimated to be only about a quart. It was customary (but undocumented) for the operator to puncture the filter elements with a screwdriver to vent any build up of pressure inside from hydrogen produced by the reaction of LiH with the water. This was not done on this particular operation. The staff believes that management's explanation of the build up and subsequent violent reaction or detonation of a trapped pocket of hydrogen and air is a plausible explanation for the incident. A Hazard and Operability (HAZOP) analysis has since been performed for this operation, and procedures are being written based on the recommendations of the HAZOP. Lockheed Martin Environmental Systems Special Materials Operations management has scheduled all lithium operations for a structured hazards assessment (HA) with an outside facilitator. Because of budget and resource constraints, the schedule stretches out to the year 2005. The staff suggested they use in-house facilitators who may be available from Enriched Uranium Operations, and the two groups met while the staff was present to exchange ideas.

**Chemical Safety Management.** A representative of the Oak Ridge Operations Office described progress on a site-wide chemical safety management plan. It appeared that little has been done on this since a previous staff visit in December 1998.

**Excess Calcium Metal in Building 9720-27.** The staff heard an explanation of the recent unresolved safety question (USQ) involving Building 9720-27, the Reactive Metals Storage Facility. In March 1999, Building 9720-27 was discovered to contain drums of calcium metal and other materials beyond its authorization basis (AB). Each drum was assumed to contain a single one-gallon pail of calcium metal, but records indicate 15-21 such pails per drum is more likely. In February 1999, Building 9720-27 had been the subject of a similar discovery when it was found to contain more drums of calcium metal and other materials outside its AB. While the AB was subsequently updated, no one ever completely understood what was stored in this warehouse. This building is in an unoccupied corner of Y-12, and does not represent a major personnel threat. However, the lack of rigor and follow up are indicative of a lack of management attention and closure. At the time this report was prepared, occurrence reports for both of these incidents were still open, and the corrective actions contained did not have the support of senior management. The staff believes the reason for this lack of support is the lower priority given to non-nuclear facilities.

**Building 9206 Clean Up.** Building 9206 managers reported considerable progress since the staff's last review in December 1998. Hazardous chemicals have been removed, residues have been repackaged, and several residue containers and safe bottles of uranyl nitrate have been transferred to Building 9212. A 2,750 square foot radiological area has been eliminated. Combustible loading has been reduced, and other Fire Hazard Analysis corrective actions have been completed. The facility is preparing for contractor and DOE Operational Readiness Reviews for repacking and treatment of residues.