

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.