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DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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January 30, 1998

The Honorable Victor H. Reis
Assistant Secretary for Defense Programs
Department of Energy
1000 Independence Ave., SW
Washington, DC 20585-0104

Dear Dr. Reis:

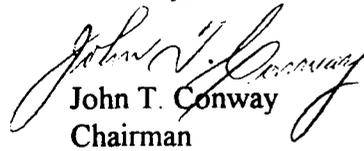
The staff of the Defense Nuclear Facilities Safety Board (Board) recently reviewed the Department of Energy's (DOE's) preparations for Enriched Uranium Operations (EUO) restart at the Y-12 Plant. The enclosure to this letter presents a summary of the issues identified during the staff's December 15-19, 1997, review of the adequacy of the implementation of controls identified by Lockheed Martin Energy Systems (LMES) through their hazard and safety analysis process. This review was a follow-up to previous staff reviews on the same subject.

Some of the controls LMES identified as important to safety credit specific elements of safety management programs with providing safety functions by mitigating and preventing particular accident scenarios. Despite a satisfactory review by LMES of these safety management programs, assessments by DOE and the Board's staff showed an uneven and, in some cases, inadequate implementation of the safety management controls. In addition, the staff assessed the implementation of engineered controls identified as important to safety. This review revealed that at least half of the 10 safety-related hardware systems were not yet ready for EUO restart. Outstanding actions consisted of completing the system design and analysis, updating drawings, and/or installing system upgrades to implement the applicable controls.

The Board notes that a number of the issues discussed in the enclosure were previously communicated to DOE, but progress toward resolving those issues has been slow and in some cases not technically adequate. These continuing issues with the development and implementation of safety controls indicate a basic misunderstanding of the principles associated with the implementation of Board Recommendation 95-2, *Safety Management*. It is essential that EUO have a strong interim integrated safety management system prior to restart of the facility.

The Board remains committed to supporting a safe and timely EUO restart. The enclosed comments are provided in that spirit to assist LMES and DOE in their efforts to prepare the facility for restart.

Sincerely,



John T. Conway
Chairman

c: Mr. Gene Ives
Mr. James C. Hall
Mr. Mark B. Whitaker, Jr.

Enclosure

Enclosure

Review of Safety-Related Systems and Safety Management Programs for Restart of Enriched Uranium Operations at Y-12

This enclosure documents a review by the staff of the Defense Nuclear Facilities Safety Board (Board) of the current status of safety-related systems and safety management programs in preparation for restart of Enriched Uranium Operations (EUO) at the Y-12 Plant, Oak Ridge, Tennessee. This review was conducted during December 15–19, 1997. EUO is being restarted after a shutdown in September 1994, following violations of administrative safety controls associated with material storage arrays in another Y-12 facility. Since that time, efforts have focused on restarting various sections of Y-12 other than EUO. The restart effort at EUO began in October 1996 and will be performed in phases during about the next 18 months. Phase A of EUO restart, which includes processes associated with accountability, casting, rolling, forming, and machining of uranium, is currently scheduled to be completed at the end of March 1998.

Safety Management Program Credited as Safety Controls. The Bases for Interim Operations (BIOs) for the Building 9212 and 9215 complexes credit specific elements of safety management programs with providing safety functions. These controls are associated with the following programs: initial testing and in-service surveillance, radiation and hazardous waste management, criticality safety, maintenance, training, configuration control, and fire protection. Despite a satisfactory review by LMES of these safety management programs, assessments by DOE and the Board's staff showed an uneven and, in some cases, inadequate implementation of the controls credited in the BIOs. The following is a summary of the issues:

- **Fire Protection Program**—A recent DOE review noted numerous significant programmatic noncompliances with the current Operational Safety Requirements (OSRs). The results of this review, which were confirmed by the Board's staff, raised questions about the quality of the previous LMES assessments.
- **Training Program**—The Building 9212 BIO credits the training program for prevention of an explosion outside the Holden furnace. A review of the training for the Holden furnace revealed this control was not being implemented.
- **Criticality Safety Program**—The requirements for criticality safety for a given process are established in a Criticality Safety Evaluation. These requirements are set forth in the Criticality Safety Requirements (CSRs) as passive design features for safety, active design features for safety, and administratively controlled limits and requirements. Reviews of several processes revealed some issues. The CSR for a dry vacuum system contained a mass limit as a control for which there was no means of measuring the specified mass in real time. The procedure for the precipitator centrifuge did not include a step to check the drains as stated in the CSR. Also, this procedure contained some errors in the marking of CSR requirement steps.

- **Radiation and Hazardous Waste Management Programs**—The individual safety program elements identified in the Building 9212 BIO control table were found to be properly implemented.
- **Initial Testing and In-service Surveillance Program**—Elements of the initial testing and in-service surveillance program related to in-place testing of high-efficiency particulate air (HEPA) filters were reviewed. The procedure used for conducting the tests did not take into consideration the available national standard (ANSI/ASME N510). In addition, the functional test for the E-Wing casting furnace water detection system was reviewed to determine whether the safety functions assumed in the Building 9212 BIO were verified. They could not be verified in that there is no provision for testing the backflow preventer.

Hardware Controls. Hardware controls identified as important to safety in the two BIOs applicable to the EUO restart are being evaluated by LMES. The staff review of the Phase A hardware controls resulted in the following observations:

- **HEPA Filter Controls**—The BIOs for Buildings 9212 and 9215 contain numerous accident scenario assessments that identify several safety-class and safety-significant ventilation filtration systems for mitigating postulated exposures. These assessments assume that the filtration systems are operating at peak efficiency. The identified safety filtration systems do not have OSR limits that define the safety envelope. Each safety filtration system needs to have operating parameters incorporated in the Operating Limits and Surveillance Requirements section of the OSRs to properly establish an effective safety envelope. It would be appropriate to make necessary changes to the administrative portion before EUO restart. Hardware changes need to be identified and scheduled for future incorporation.
- **Instrumentation and Control (I&C) Systems**—Based on a staff review of available documentation, the safety-related I&C systems are not yet ready for EUO restart. The only systems that have been fully analyzed to date are the E-Wing casting furnaces, the E-wing dry vacuum system, and the wet vacuum system. Design and analysis still needs to be completed for several Phase A controls.

The following issues were acknowledged by LMES personnel as deficiencies that would be addressed before EUO restart: (1) the designs and system drawings of the controls for the E-Wing and headhouse dry vacuums and the Holden furnace flame management system were not final; and (2) the walkdown of system drawings and review of master equipment lists containing the safety classifications for system components were still being performed.

The staff's review identified the following issues that LMES needs to consider addressing before EUO restart: (1) criticality controls for the D-1 Wing dry vacuum

system require the observation of a trap level that may be impossible to see, and (2) the two E-wing dry vacuum systems can become cross-connected so as to bypass some safety interlocks. The staff also noted that LMES had not established the design criteria for safety-significant I&C systems or the controls for defense-in-depth measures credited in the Building 9212 BIO.

Additional Observations. The following additional issues were raised regarding the application of controls or controls implicit in the accident scenarios:

- **Emergency Lights**—The adequacy of emergency lights and the status of compliance with National Fire Protection Association (NFPA) 101 had not been verified. The Board's staff identified deficiencies related to the time needed to provide illumination, and the level of illumination needed, during a loss of off-site power. The availability of this lighting is assumed in several accident scenarios, but validation of its availability was not shown as a prestart item. LMES needs to consider performing a drill prior to restart and determine appropriate prestart and poststart actions.
- **Routine Administrative Controls**—A review of several administrative controls revealed deficiencies with essentially every record reviewed. The Qualified Personnel Notebook did not support several persons assigned duties on the current watchbill. Several instances of fire patrols not being performed at the frequency required by the Building 9212 BIO were noted. There was no indication of action being taken as a result of missing patrols. Several errors were noted in the surveillance status records. One system was considered to be operational, although a baseline surveillance had not been conducted and was not scheduled for almost a month.