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DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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October 31, 2000

General John A. Gordon
Administrator of the National
Nuclear Security Administration
Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-0701

Dear General Gordon:

The Department of Energy (DOE) recently completed a Phase II Verification Review of the Integrated Safety Management (ISM) System at the Y-12 Plant. The primary purpose of such a review is to assess the adequacy of the ISM System implementation. The secondary purpose is to evaluate the role of DOE in the implementation and oversight of the contractor's ISM System.

The staff of the Defense Nuclear Facilities Safety Board (Board) observed the Verification Review at Y-12 and found that the Verification Team conducted a thorough and professional assessment. The enclosed report provides more details of the staff's observations.

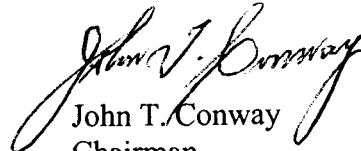
The Verification Team identified a number of issues that have precluded the Y-12 Plant from full implementation of ISM site-wide. The Board is concerned that many of these issues were previously identified during a verification in August 1998 and have not been corrected in more than 2 years. On September 21, 2000, your staff and others from Oak Ridge briefed the Board on the status of ISM implementation. Subsequently, the Y-12 Office of Defense Programs directed the current site contractor, Lockheed Martin Energy Systems, Inc., to analyze the Verification Team issues and draft corrective action plans. These documents will assist the new site contractor, BWXT Y-12, in expeditiously completing ISM implementation at Y-12.

The Verification Team also reported that the Y-12 Office of Defense Programs "is marginally staffed for current and inadequately staffed for future planned work. Technical SMEs (subject matter experts) and qualified FR (Facility Representative) support must increase, with a clear plan for the NNSA (National Nuclear Security Administration) reorganization in October 2000." The Board agrees and is concerned that the Y-12 Office of Defense Programs is not adequately staffed to perform its safety management functions. This situation will be further complicated by the upcoming transition to a new operating contractor for the Y-12 Plant unless DOE takes aggressive action to alleviate the situation.

As noted, the Y-12 Office of Defense Programs has directed its contractor to develop an integrated corrective action plan by November 30, 2000. Following receipt of this plan, the

Board would like to hear from DOE on (1) the content and acceptability of the plan, (2) DOE's approach to ensure timely and effective execution of the plan by the contractor, and (3) DOE's efforts to address Y-12's Office of Defense Programs staffing inadequacies.

Sincerely,



John T. Conway
Chairman

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

Enclosure

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

Staff Issue Report

October 2, 2000

MEMORANDUM FOR: J. K. Fortenberry, Technical Director

COPIES: Board Members

FROM: J. A. DeLoach
R. Lewis (OE)

SUBJECT: Integrated Safety Management System Phase II Verification at the Y-12 Plant, August 14–28, 2000

This report documents a review by the staff of the Defense Nuclear Facilities Safety Board (Board) of the Department of Energy's (DOE) Phase II Verification of the Integrated Safety Management (ISM) System at the Y-12 Plant. The verification was conducted during the period August 21–31, 2000, and was observed in part by staff member J. DeLoach, Oak Ridge Site Representatives P. Gubanc and D. Moyle, and outside expert R. Lewis.

Background. DOE conducted a verification of the implementation of the Nuclear Operations Pilot ISM System Program at Y-12 in August 1998. That verification resulted in nine Opportunities for Improvement (OFIs), including the need for mechanisms to force consistent ISM implementation and ensure consistent operations and maintenance across the Y-12 site. Lockheed Martin Energy Systems, Inc. (LMES) reported completion of ISM implementation in Enriched Uranium Operations (EUO) and the Balance-of-Plant (BOP) in early 1999. In August 1999, LMES conducted an ISM Internal Assessment to meet the annual safety update requirement of the DOE Acquisition Regulations. This assessment noted the need for continued improvement in implementing ISM site-wide.

Several events at Y-12 during 1999 placed operational safety and the effectiveness of ISM implementation in question. These events included the results of the Hydrogen Fluoride (HF) System Independent Assessment, failure of the EUO Reduction Readiness Assessment (RA), an EUO criticality infraction that resulted in an operational shutdown, and an accident involving a sodium-potassium (NaK) liquid alloy. In response to these events and deficiencies identified in the August 1999 ISM Internal Assessment, LMES formulated a Systematic Improvement Plan (SIP) to evaluate the root causes of the degraded operational safety and to integrate corrective actions into a single plan. One of the actions directed by the SIP was to conduct an ISM Independent Internal Assessment that was carried out during August 14–24, 2000. This assessment was observed by members of the ISM System Verification Team, and its results were accepted as part of the ISM System Phase II Verification.

The Y-12 Phase II ISM System Verification (conducted August 21–31, 2000) focused on implementation of ISM at the EUO and BOP facilities that had not been included in the August 1998 verification of Nuclear Operations facilities. The status of ISM within the previously

verified Nuclear Operations was also sampled as part of this verification. LMES conducted the August 14–24, 2000, ISM Independent Internal Assessment, which, as noted, was incorporated in the DOE verification. The results of the DOE verification indicated that nuclear facilities generally were being operated in accordance with ISM practices, but that the BOP and some aspects of EUO were still in the early stages of ISM implementation. The verification of these organizations indicated a continued reliance on personal expertise and several pockets of cultural resistance to ISM principles. Planning and performance of maintenance were areas of particular concern.

During the verification, the team highlighted five of the nine OFIs identified during the August 1998 verification that remained open and had a “significant impact on achieving the required level of implementation of the LMES system”:

- Mechanisms to force consistent use of ISM across the Y-12 Plant
- ISM mechanisms to ensure consistent operations and maintenance across the Y-12 Plant
- Fire protection
- Process for management of issues
- Implementation of consistent training requirements for ISM throughout the Y-12 Plant.

The Board’s staff agrees with most of the findings of the Department of Energy Verification Team. The staff also agrees that ISM in EUO and nuclear operations is more mature than in other areas of Y-12. However, the staff notes that significant obstacles remain to be resolved at Y-12 before implementation of ISM across the plant is achieved. Specifically, safety issues identified in recent Board letters related to EUO (May 15, 2000, August 30, 2000) have highlighted weaknesses in ISM implementation.

Verification and Assessment Teams. The Y-12 Phase II ISM System Verification was conducted by a 16-member Verification Team whose overall experience level was above average. Four of the 16 members were from the Oak Ridge Operations Office. The team used the Criteria and Review Approach Documents from the *ISMS Verification Team Leader’s Handbook*, DOE-HDB-3027-99, to verify the eight Phase II Core Expectations.

The LMES Independent Assessment Team used the Continuing Core Expectations from the *Integrated Safety Management System Guide*, DOE-G-450.4-1A. These were tailored to ensure that areas with identified ISM deficiencies would be assessed. For the most part, the Independent Assessment focused on work planning, control, execution, and conduct of operations. The LMES Independent Assessment Team conducted a thorough and professional assessment that was noted as a strength in DOE’s August 2000 ISM System Verification report.

Implementation Capability. During the verification, there were several indications that LMES line management is not effective in ensuring that guidance, procedures, and direction are being fully carried out and having the desired effect. Additionally, system tools, such as management assessments, that would provide this assurance are not always used effectively.

Assessments conducted during the past 2 years have indicated that efforts to implement the functions and principles of ISM have been less than successful. This lack of success with ISM implementation can also be seen as contributing to the above-noted problems associated with the HF system, the EUO Reduction RA, the criticality infraction, and the NaK accident. In each of these situations, reasonable corrective actions were identified. However, it appears that efforts to ensure that the corrective actions were fully implemented and achieved the desired effect were not successful. For instance, the Independent Assessment Team identified corrective actions stemming from the NaK accident that remained open or were incomplete. As a result of one of these incomplete actions, modifications to general employee training have not been accomplished, and the intent of the corrective actions remains unrealized; this is indicative of a required action that was neither implemented nor tested for effectiveness. A similar example exists in the SIP. With the exception of the ISM Independent Assessment, there appeared to be no provisions for determining whether the actions directed by the plan were having the desired effect.

The lack of progress in implementing the LMES ISM System and continued reliance on an experienced but aging workforce (with the attendant loss of expertise through retirement) were observed on a number of occasions. First, there appeared to be a presumption on the part of line managers that maintenance planners required little or no training on how to carry out their duties. The seriousness of the deficiencies in this area cited by the ISM Internal Assessment Team (despite similar deficiencies having been identified in two earlier assessments) appeared to catch both the contractor and DOE line management by surprise. Second, progress on qualification did not appear to be a genuine priority. Some individuals were unfamiliar with the qualification requirement that applied to them. Third, a number of the contractor's experienced line managers and supervisory personnel were functioning in more than one position because of a lack of qualified personnel. Finally, the remaining pockets of cultural resistance to ISM System changes were open and vocal.

Feedback and Improvement. The DOE team noted that a significant obstacle to achieving implementation of ISM remains in the core function of feedback and continuous improvement, specifically the absence of a site-wide evaluation mechanism that can provide senior management with the current status of the ISM System. Additionally, the DOE team reported that "no issue identified was new or unique. All issues had been previously identified but the ineffectiveness of the Issues Management Process resulted in failure to successfully correct the issues."

Maintenance. The Independent Assessment Team identified significant problems with maintenance planning and execution. Although the seriousness of the problems varied, overall they appeared to indicate a site-wide issue. These problems included a significant number of overdue preventive maintenance actions, a lack of understanding at essentially all organizational

levels of what was required to plan and execute maintenance work safely, and failure to follow procedures. Training and qualifications associated with maintenance planning and execution were lacking. Interviews with maintenance planners indicated they did not understand what was required to process a work package correctly. As a result, deficiencies in work packages included unauthorized personnel signing for package review and approval, obvious safety requirements being marked "N/A," incomplete or missing Job Hazard Identification and Job Hazard Analysis forms, and little or no feedback from personnel performing the maintenance.

Formality of operations in the BOP and in the general maintenance areas requires improvement. Deficiencies in conduct of operations spanned a broad spectrum. Procedures were used improperly or not followed, and in at least one case, workers did not understand the operational requirements imposed by the category assigned to the procedure in use.

Y-12 Site Office. During interviews with senior DOE line managers, there was no indication that the rapidly approaching transfer of the Y-12 Site Office to the National Nuclear Security Administration (NNSA) was progressing in a deliberate and planned manner. Reference was made to planned meetings, telephone or video conferences, visits by NNSA personnel, and criteria for personnel transfer from the Operations Office to the Site Office, but these appeared to be somewhat ad hoc in nature. It was not evident that there was a well-thought-out, detailed transition plan to ensure that all aspects of the transfer would be addressed.

During the August 1998 verification, the technical subject matter experts (SMEs) and Facility Representatives (FRs) were noted as a strength. This strength has eroded to a noted deficiency in the August 2000 report, which states that the Y-12 Site Office "is marginally staffed for current and inadequately staffed for future planned work. Technical SMEs and qualified FR support must increase, with a clear plan for the NNSA reorganization in October 2000." The report further notes that "staffing and training of a cadre of project managers remains a challenge." The Board's staff agrees that the Y-12 Site Office is not adequately staffed to perform its safety management functions, an inadequacy that will be further complicated by the upcoming transition to a new operating contractor for the Y-12 Plant.