DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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December 6, 2000

The Honorable Madelyn R. Creedon
Deputy Administrator
for Defense Programs
Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-0104

Dear Ms. Creedon:

The Defense Nuclear Facilities Safety Board (Board) is pleased to note the Department of Energy's (DOE) progress toward developing and implementing an Integrated Safety Management (ISM) System at the Nevada Test Site (NTS). The DOE Nevada Operations Office, each of the NTS users, and the NTS contractors have developed adequate ISM System Descriptions and are beginning to implement ISM. It also is a noteworthy accomplishment that the national laboratories and particularly the Defense Threat Reduction Agency have implemented their ISM Systems at the site.

As observed by the Nevada ISM System verification team and the Board's staff, however, implementation of ISM Systems at NTS is not sufficiently developed. Work planning and feedback and improvement mechanisms appear to require attention. It also appears that better integration and compatibility among the various individual ISM Systems are needed.

The Board is encouraged that DOE plans to improve ISM implementation during the next year and to conduct another verification in May 2001. The Board looks forward to further improvement in the implementation of ISM at NTS.

The enclosed report provides comments resulting from the staff's observation of the recent Phase II ISM System verification at NTS and is forwarded for your information and use as appropriate.

Sincerely,

John T. Conway
Chairman

c: Ms. Kathleen A. Carlson
Mr. Mark B. Whitaker, Jr.

Enclosure

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

Staff Issue Report

October 31, 2000

MEMORANDUM FOR: J. K. Fortenberry, Technical Director

COPIES: Board Members

FROM: J. Deplitch

SUBJECT: Phase II Verification Review of Integrated Safety Management System, Nevada Test Site

This report provides comments resulting from observation of the Phase II Verification Review of the Integrated Safety Management (ISM) System at the Department of Energy's (DOE) Nevada Test Site (NTS). A member of the staff of the Defense Nuclear Facility Safety Board, J. Deplitch, and outside expert B. Lewis observed the verification during the period September 11–21, 2000.

Background. DOE's Nevada Operations Office (DOE/NV) integrates the efforts of its contractors and government facility users to ensure that activities are carried out safely and support the DOE/NV mission areas of national security, environmental management, stewardship of NTS, energy efficiency and renewable energy, and technology diversification. The Phase I Verification Review of the ISM System at NTS was conducted for the site's three main contractors and four facility users during the period April 24, 2000–May 5, 2000. The Phase II Verification Review for two of the three contractors—Wackenhut Services, Inc. and International Technology Corporation—was completed in conjunction with the Phase I verification. The results of the Phase II verification for these two contractors disclosed that while their respective ISM Systems had achieved a satisfactory level of implementation, their implementing mechanism was at a stage of maturity that required continued process improvement and review.

The Phase II verification for the third contractor, Bechtel Nevada (BN), a performance-based contractor that manages and operates the NTS infrastructure, performs work at its assigned facilities, and supports other facility users, was conducted as part of the September verification that is the subject of this report. The NTS facility users participating in this Phase II verification included the NTS-based detachments from Los Alamos National Laboratory (LANL), Lawrence Livermore National Laboratory (LLNL), and the Defense Threat Reduction Agency (DTRA).

Verification Team. The Phase II verification of the NTS ISM System was conducted using a small, focused team. The verification team consisted of seven personnel, five of whom were exceptionally well qualified and experienced in ISM System verifications, operations, and management. Criteria and Review Approach Documents covering the functional areas of management, operations, and DOE oversight were used to conduct the verification. The verification team focused on the following facilities and complexes (managed by the indicated

organization): (1) the U1a Tunnel Complex (LANL); (2) the Area 12 Tunnels (DTRA); (3) the Big Experimental Explosive Facility (BEEF) (LLNL); and (4) the Construction and Maintenance Shops (BN).

Documentation of Implementation. Each of the facilities observed as part of the verification had generated the documentation necessary to implement its ISM System. However, much of the documentation was new, not always understood, and in some cases not yet approved. Overall, implementation had just begun, and progress in terms of feedback, improvement, and training will be necessary before any significant benefits from ISM can be realized. The most positive change noted during the verification was line management's assumption of accountability for safety. Additionally, it appeared that LANL, LLNL, and DTRA had made a noteworthy effort to implement ISM at NTS since the Phase I verification in May.

Each of the four organizations observed during the verification was implementing ISM somewhat differently. The NTS-based detachments from the two national laboratories were working to implement an ISM System that integrates the ISM System requirements of DOE/NV and their home laboratory. In this early stage of implementation, it appeared that ISM had the effect of strengthening the ties between the NTS-based detachments and their home laboratories. DTRA was, for the most part, following the guidance and requirements of DOE/NV. To its credit, DTRA appeared to have made the greatest progress toward implementation thus far. This is significant because DTRA is a relatively new participant in the ISM arena, and its parent organization has no specific ISM requirements or guidance. The primary contractor for the site, BN, appeared to be adjusting slowly to the ISM System requirements of DOE/NV and to line management's assumption of accountability for safety. Additionally, BN was handling the ISM requirements imposed by the national laboratories and DTRA, which it supports.

On the whole, personnel appeared to accept ISM to a greater extent than is usually seen in such early stages of implementation. A clear teamwork attitude existed, and most of the personnel observed demonstrated what appeared to be a sincere and professional interest in safety and its improvement. With a few exceptions, there appeared to be no resistance to the use of procedures, although an expert-based approach was the predominant means of operation in most organizations. Uncertainty was observed, however, in how to develop and apply effective procedures in an environment still entrenched in a proud, historical tradition of reliance on experts.

Feedback and Improvement. With the exception of the subcritical experiments conducted by the national laboratories and some work processes, the feedback and improvement function at most levels within the NTS organizations was found to require significant upgrading. There were no processes in place by which upper-level management could be made aware of the shortcomings and inconsistencies noted by the verification team. As a result, many of the team's findings appeared to surprise upper-level management. Management self-assessment processes were not being used effectively, and in some cases had not yet been implemented. There appeared to be no formalized deficiency tracking systems to ensure that corrective actions are prioritized, tracked to completion, and provided for management review. In general, line management at NTS appeared highly motivated to implement their ISM Systems, but had not put in place processes to track and evaluate the progress of ISM implementation.

Another area in which the feedback function was not fully successful was the lack of cross-talk between the various facility users and contractors. Although some ISM processes were governed by outside factors, such as home laboratory requirements, a significant amount of original process development was required to implement ISM. Some organizations accomplished this development in a resourceful and sometimes innovative manner, while others appeared to have great difficulty with establishing a process. Although DOE/NV provided the necessary framework for the various processes through its requirements, there were no indications that the office acted as a catalyst to establish cross-talk or otherwise highlight processes that could be adapted to a specific use. Because each organization developed its processes relatively independently, there are differences and inconsistencies among the organizations in the means used to attain the same result. This variation causes some confusion and complicates training requirements.

There are isolated cases of portions of self-assessment programs in various elements of the organizations involved. One element had a good peer assessment program, but feedback to management was poor. Some elements had assessment programs involving subject matter experts. And some elements had internal management assessment programs. These cases could be studied and consolidated into a program that could then be applied to each organization on the site. In almost all cases, the assessment programs lacked adequate horizontal and/or vertical feedback and mechanisms for lessons learned.

Training and Qualification. There were several indicators that attrition through retirement of DOE/NV's aging workforce, coupled with the current reliance on expert-based operational safety and the lack of an effective plan for training and qualifying personnel, was starting to have an adverse impact. The verification team's observation of an experiment at the BEEF indicated that although the experiment was conducted safely, those conducting it were older, experienced personnel; few procedures were apparent; and there appeared to be no mentoring. It was not apparent how these types of experiments will be conducted when the current expertise is no longer available.

For the most part, each organization relied on skill-of-the-craft in lieu of procedures to accomplish its work. However, skill-of-the-craft was not defined for any tasks or crafts. There were no apparent skills and qualification programs, and few specified requirements for tasks or crafts. Only mandatory DOE training was required, such as radiological, respirator, and underground worker training. In addition, this training was not tracked with adequate rigor.

Several DOE supervisors commented that it was necessary for the same personnel to attend many of the operational and safety meetings because these individuals were functioning in several different capacities. The supervisors also indicated that full implementation of ISM would require additional personnel. The supervisors did not appear to understand the value of an effective qualification and training program and how such a program could alleviate the need for personnel to act in more than one capacity.

ISM System training was also lacking. There was insufficient training to provide supervisors with a detailed understanding of the basic ISM functions; the advantages they can

yield; and, to a lesser degree, how to establish processes for their implementation. General training is also needed to assist personnel within the various organizations in understanding the new ISM processes being implemented. As an example of this latter inadequacy, personnel indicated that they did not understand feedback and improvement mechanisms and their ability to influence and improve work procedures.

Safe Work Performance. The work planning, authorization, and control programs at the site were new. The manner in which development of procedures, work control, and work authorization were accomplished, as well as the degree to which each was implemented, varied significantly among facilities. Currently there are about four work control programs and work packages in use by the various NTS organizations. Additionally, BN uses several different work packages for its maintenance and construction departments. There is some confusion as a result, but this can be minimized through coordination and information exchange as implementation progresses. Because of its maintenance tasking, BN appeared to have the largest procedure development task, and also appeared to be struggling with accomplishing this task. Many of its work control programs were only a few days old and had not yet been used or tested. The verification team's observation of a relatively simple maintenance action indicated that the procedure in use was not followed, nor was it executable as written. Further complicating the situation was a lack of consistency in the processes by which work is accomplished safely by BN's maintenance and construction organizations, which together accomplish the majority of the work at NTS.

Full Implementation of ISM. DOE/NV, the national laboratories, DTRA, and BN all indicated a commitment to fuller development and implementation of ISM. It appeared that the intent is to continue the current momentum for the next year. Currently, DOE/NV plans to have the verification team conduct a follow-on verification in May 2001. Overall, the multiple ISM programs at NTS need to be more fully integrated. The development and implementation of effective feedback and improvement programs are essential to the success of further progress on the implementation of ISM at NTS.