

## DEFENSE NUCLEAR FACILITIES SAFETY BOARD

March 13, 1995

### MEMORANDUM

#### FOR:

G. W. Cunningham, Technical Director

#### COPIES:

Board Members

#### FROM:

W.L. Andrews, Jr.

#### SUBJECT:

Maintenance Program at Lawrence Livermore National Laboratory

1. **Purpose:** This report documents Defense Nuclear Facilities Safety Board (Board) staff review of the nuclear facility maintenance programs at Buildings 332 (Plutonium Facility), 251 (Heavy Element Facility), and 334 (Hardened Engineering Test Facility) at Lawrence Livermore National Laboratory (LLNL), Livermore, California. Board staff member W. Andrews and outside expert D. Boyd conducted the review on February 6-10, 1995.
2. **Summary:** The review activities included briefings by LLNL and Department of Energy (DOE) Oakland Operations Office representatives, document reviews, walk-downs of facilities, observation of maintenance and maintenance training activities, and interviews of maintenance personnel.
  - a. Organizational Structure: As noted in previous trip reports, LLNL's matrix management structure lends itself to an increase in the complexity of controls, documentation, and training and qualification, as well as ambiguous lines of responsibility. Three Associate Directors (ADs) (programs, facilities, and plant operations) share responsibility for maintenance of defense nuclear facilities at LLNL.
  - b. Procedures and Documentation: In general, LLNL's procedures and documentation processes lack accuracy, rigor, and formality. It has been almost three years since LLNL's initial submission of a Maintenance Implementation Plan for DOE approval. LLNL does not have an approved Maintenance Implementation Plan. The procedures and records for monthly tests of Building 332's emergency diesel generators do not adequately support the Basis for Interim Operations (BIO) surveillance requirements. In addition, procedures for quarterly checks of ventilation system fans do not include specific instructions or criteria for performance of tasks. Finally, compliance with LLNL's lockout and tagout procedures is inconsistent.
  - c. Training: On a more positive note, the training documentation in the plutonium facility has improved significantly. On previous reviews it was noted that some training requirements for many of the certified plutonium handlers had lapsed. This situation has been resolved; a documentation review indicates that all training is current and procedures are in place to ensure it remains that way. The LLNL apprenticeship training program is an excellent one.

### 3. Discussion/Observations:

- a. Organizational Structure: The ADs for Programs, Facilities, and Plant Operations share responsibility for maintenance of defense nuclear facilities at LLNL. For example, the plutonium building facility manager is in the AD for Defense and Nuclear Technology organization and has primary responsibility for maintenance of the facility, its equipment, and systems. Maintenance is performed by craftspeople matrixed to the facility from other organizations or, in some cases, assigned to other organizations. For example, craftspeople assigned to Plant Engineering Maintenance and Operations in the AD for Plant Operations organization maintain some installed equipment such as emergency diesel generators. However, programmatic equipment in Building 332 associated with R&D projects is maintained by the responsible programmatic AD. Finally, other support groups maintaining assigned equipment in Building 332 include Hazards Control, Mechanical Engineering, and Electronic Engineering. Shared responsibilities such as these could lend themselves to a loss of control and maintenance requirements "falling through the crack."
- b. Procedures and Documentation:
  1. In July of 1992, LLNL submitted a draft Maintenance Implementation Plan to DOE-OAK for approval in accordance with DOE Order 4330.4A. The most current draft Maintenance Implementation Plan is now dated March 1994. It is expected that LLNL will submit their final draft to DOE in March of 1995 with DOE-OAK approval expected in April 1995. This process has taken a total of three years. In this document it is explicitly stated that a Maintenance Implementation Plan will not be required for Building 334; although, it is still characterized as a nuclear facility by LLNL.
  2. The Safety Authorization Basis for Building 332 is defined by the DOE-approved BIO dated May 1994. The Building 332 emergency power system, including the emergency diesel generators, is designated a safety class system by the BIO. Surveillance requirements to ensure that the emergency power system complies with the Limiting Conditions of Operations of the BIO's Technical Safety Requirements include monthly power transfer tests with generator switch-drop and starting-times checks. These tests were most recently done on January 17, 1995. A review of the test documentation and discussions with the cognizant engineer revealed a number of deficiencies with the procedure used. First, the approval of the test procedure is not documented. The draft procedure used is presently in Revision 4 (January 9, 1995) and has been under revision for several months. Second, the test procedure did not include limits or acceptable ranges for certain test parameters.

For example, the step to verify and record the startup time of a generator

had an actual time of 25 seconds while the set time is six seconds. This was called a successful test. Finally, the test procedure had four pen and ink changes without any evidence of their review or approval. In a subsequent discussion we further learned that it was common for changes to be made in a procedure and then used without technical review or approval.

3. Portions of weekly continuous air monitor (CAM) checks, daily passive air sampling (PAS) filter checks, daily functional check of hand and shoe monitors, and field leak test of recertified pressure relief devices were observed and the following deficiencies were noted. Format and content of instructions used were inconsistent with guidance in LLNL's Maintenance Operations Manual (MOM) and DOE-STD-1029-92, *Writer's Guide for Technical Procedures*. Again, some instructions contained pen and ink changes without any indication of a review and approval process.
4. LLNL's MOM states procedures in the LLNL Health and Safety Manual shall be adhered to by all individuals performing lockouts and tagouts in the B332 complex. A review of records, observation of maintenance activities, and discussions with craftspeople and facility management personnel identified compliance deficiencies. For example, several personnel stated it is a common practice not to tagout equipment with facility tags if work is expected to be completed within a period of time variously described as eight to 24 hours. LLNL directives indicate that lockout and tagout procedures apply without regard to the expected duration of the work.

c. Training:

1. Training documentation, and its subsequent review for currency, has improved significantly at LLNL for personnel who are certified as plutonium handlers. During a previous review at LLNL, it was observed that many training records for plutonium handlers were out of date and many individuals were not in compliance with training requirements. After this was noted, the Building 332 training manager took positive action to ensure all certified plutonium handlers' training requirements were current and decertified many individuals who were not.
2. LLNL has a comprehensive and thorough apprenticeship program. Almost all crafts are included. The program is 8,000 hours (approximately four years) in duration. Apprentices work and train under the supervision of an experienced journey-level craftsman and the classroom instruction is structured with objectives, lesson plans, periodic, exams and evaluations. The one noted deficiency in the program was a lack of documentation with respect to 1) the qualification criteria of craftsmen and, 2) what specific tasks are included in craftsman OJT training and evaluation.

4. **Future Staff Actions:** The staff will follow plans to improve maintenance activities at LLNL.