

## DEFENSE NUCLEAR FACILITIES SAFETY BOARD

April 19, 1994

**MEMORANDUM FOR:** G.W. Cunningham, Technical Director

**COPIES:** Board Members

**FROM:** Herbert W. Massie, Jr.

**SUBJECT:** Trip Report on Configuration Management, Maintenance, and Inspection at the Y-12 Plant.

1. Purpose: The Defense Nuclear Facilities Safety Board (DNFSB) staff met with the DOE Oak Ridge Operations Office (ORO), DOE Y-12 Site Office (YSO), and Martin Marietta Energy Systems (MMES) personnel to assess the implementation of configuration management, maintenance, and inspection programs at the Y-12 Plant. A representative from DP-643 also actively participated in the meeting. This review, conducted on March 1-4, 1994, by H.W. Massie, Jr. and outside expert, John Porter, entailed the review of adherence to DOE Order 4330.4A and other appropriate standards. The scope of the review was limited to the enriched uranium operations and the disassembly area.
2. Summary:
  - a. The MMES requirements for the implementation of maintenance work packages for Category 2 and 3 equipment are substantially less than for Category 1 equipment. MMES believes that the Y-12 Category 1 equipment is no higher than Class 2 safety class items per the DOE Order 6430.1A, General Design Criteria. This interpretation of the DOE Orders may affect the defense-in-depth of the Y-12 Plant and is a function of the ongoing safety analyses which are being updated in accordance with DOE Order 5480.23.
  - b. MMES is not in compliance with about 60% of the DOE maintenance Order 4330.4A, but is in compliance with the DOE approved Maintenance Implementation Plan (MIP). Key areas of the DOE Order 4330.4A, such as work control, appear to be acceptable.
  - c. The Y-12 programs for predictive maintenance and suspect fasteners appear to be in accordance with guidance provided by DOE-DP Headquarters. It may serve as a model for other sites in weapons complex (e.g., Pantex).
3. Background: Implementation of an effective maintenance program including a

program for periodic inspections and plant upgrades is essential for maintaining a safe and reliable plant. This is particularly important on older plants such as the Y-12 Plant. DOE's Order 4330.4A, Maintenance Management Program, provides an umbrella for effectively maintaining and inspecting key safety and other systems so that Y-12 can safely accomplish its current mission. A new DOE standard, DOE-STD-1073-93, Implementation Guide for Operational Configuration Management Program, Including the Adjunct Programs of Design Reconstitution and Material Condition and Aging, provides further guidance for maintaining Y-12's safety systems. Also, a properly run inspection program of key safety structures and components directly protects public and worker health and safety by minimizing (if not eliminating) equipment failures.

Configuration management was discussed during the first day of the review. The remainder of the review entailed a walkdown of Buildings 9212 (enriched uranium operation) and 9204-2E (disassembly area), review of maintenance and inspection programs, and specific maintenance examples, and a review of work packages and maintenance procedures. The staff also interviewed maintenance personnel.

4. Discussion: The staff's major findings and observations for the configuration management program and the maintenance and inspection program are as follows:
  - a. Configuration Management: The Y-12 configuration management program is defined by Martin Marietta's company policy and standards which MMES believes will meet the intent of the new DOE standard, DOE-STD-1073-93 for configuration management. However, a specific integrated program plan for Y-12 configuration management has not been developed. The initial program focus is on change control of plant modifications and maintenance activities.

The heart of the change control program is equipment classification which is presented in the Y-12 Interim Master Equipment List (IMPEL). The IMPEL is used by engineering, maintenance, and operations personnel to determine the level of effect needed for its work packages. The DNFSB staff noted a fairly large reduction in the minimum level of requirements for work packages on Category 2 and 3 equipment versus Category 1 (high safety risk) equipment. For example, for Category 1 equipment, the work packages must include procedures, certified for construction drawings, and a job plan; for Category 2 equipment these items are not required. Other sites reviewed by the DNFSB staff handled Category 1 (e.g., Nuclear Safety - NS) and Category 2 (e.g., critical protection - CP) almost in an identical manner. Although based on the current safety analysis, MMES believes that the Category 1 Y-12 equipment is no higher than a Class 2 safety class item (SCI) per the DOE Order 6430.1A, General Design Criteria. The final resolution of this issue will depend on the completion of and DOE approval of the new safety analysis reports in accordance with

DOE Order 5480.23, Nuclear Safety Analysis Reports, and with other lower-tiered guidance for preparation of safety documentation. The primary hazards being addressed are nuclear criticality and radiation/contamination associated with enriched uranium operations.

- 1) **As-Built Drawings:** Of about 3,500 drawings planned to be made into as-built drawings, none has been completed. MMES, however, does update specific drawings as they are utilized for a specific work package or plant modification; they are then entered into the Y-12 document control system.
  - 2) **Engineering Calculations:** The DNFSB staff reviewed several engineering calculations and found them to be adequate. No major effort exists, at this time to reconstitute the Y-12 Plant systems design basis. This is an area that may require further review by the staff when the final mission of Y-12 becomes established. The staff noted that MMES is conducting a major study to evaluate the Y-12 Plant seismic design capability.
- b. **Maintenance and Inspection:** The DOE Oak Ridge Operations Office conducts annual maintenance functional appraisals at Y-12; the last one was conducted June 1993, and no significant deficiencies were identified. The Y-12 plant is closely tracking its approved MIP. The Y-12 site office (YSO) personnel reported that they have been conducting monthly surveillance of maintenance (per DOE Order 4330.4A) since January 1993. The January 1993, surveillance identified deficiencies in the control of sub-contractors for conducting maintenance work; this was not evaluated during a repeat surveillance in January 1994.
- 1) **Order Compliance:** MMES is not in compliance with about 60% of the DOE Order 4330.4A but is in compliance with the MIP.
  - 2) **Maintenance Backlog:** The maintenance backlog has remained essentially steady over the last year at about 3 months of backlog. Maintenance capability is limited by the number of maintenance trades personnel. This area may become a future concern if maintenance resources are significantly reduced due to proposed funding cuts in FY 95.
  - 3) **Predictive Maintenance:** The predictive maintenance program appeared to be effective. Vibration testing had identified needed corrective maintenance prior to component failure. However, the predictive maintenance has not been integrated into a systematic aging management program including periodic inservice inspections. This is a requirement of paragraph 11b of the DOE

Order 4330.4A.

- 4) Facility Condition: The condition of Building 9212 enriched uranium operations (EUO) was fair. A deficiency tagging system had been implemented, but the deficiency descriptions were often not clear. Many piping system mechanical joints had insufficient thread engagement (most of the systems were low-pressure systems). Numerous roof leaks were observed. MMES stated that the roof leaks were caused by necessary maintenance and upgrades in the chemical processing area of EUO. The staff believes that these leaks should be fixed as a matter of priority.
- 5) Suspect Fasteners: MMES presented the results of a 3-year indepth program to eliminate suspect fasteners from the Y-12 site. In FY 93, MMES Equipment Testing and Inspection (ET&I) reported in several occurrence reports, the existence of suspect parts in specialized equipment, such as overhead cranes, fork lifts, manipulator hoists, aerial lift trucks, and electric hoists. When suspect parts are found, the equipment is tagged out-of-service by ET&I, and engineering evaluations are made to determine whether or not the equipment may be safely placed back in service.

When suspect fasteners had been identified, a sample was tested for mechanical properties and found to meet specifications. It is significant to note that Y-12 has not found suspect fasteners on safety systems. The staff believes that Y-12 has a pro-active program in the suspect fasteners area. Prevention and elimination of suspect fasteners are requirements of the DOE Order 5700.6C, criterion 7.

5. Future Staff Actions: The DNFSB staff plans the following actions for Y-12:
  - a. Follow the progress of the Y-12 "as-built" drawing program.
  - b. Re-visit the equipment classification listing after completion of DOE safety standards related to worker safety.
  - c. Review status of Y-12's adherence to DOE Order 4330.4A including a program for periodic inspection of equipment during an April review.