[DNFSB LETTERHEAD]

May 28, 1996

The Honorable Victor H. Reis
Assistant Secretary for Defense Programs
Department of Energy
Washington, D.C. 20585-0104

Dear Dr. Reis:

Members of the Defense Nuclear Facilities Safety Board's (Board) staff and an outside expert recently performed two reviews at the Oak Ridge Y-12 Plant. The staff reviewed readiness preparations for resumption of the Disassembly and Assembly (D&A) mission area prior to the authorization to start D&A operations by the Oak Ridge Operations Office on March 22, 1996. In another recent review, the staff assessed implementation of criticality safety requirements used in Highly Enriched Uranium (HEW) operations. The enclosed reports are provided for your information and use.

The Board is pleased to note the progress made in D&A operations since September 1994 in implementing Board Recommendation *94-4, Deficiencies in Criticality Safety at Oak Ridge Y-12 Plant.* Improvements were observed in implementation of criticality safety requirements, conduct of operations, compliance with operational safety requirements, and the training of Department of Energy and contractor personnel.

The enclosed report on Y-12 D&A operations contains an observation that preparations for operations on weapon systems in the future may not require an independent readiness review of the procedures, personnel training, and equipment specific to that system. In general, the Board has observed that appropriately scoped, independent reviews of procedures, personnel training, and equipment are useful in order to confirm readiness prior to startup of such operations. Reviews of this kind are performed at Pantex for startup and restart of specific weapon system assembly and disassembly activities. However, such independent reviews may not be warranted for every D&A operation, especially those on weapon systems that have hazards, procedures, and equipment similar to those recently worked.

With respect to implementation of criticality safety requirements in HEU operations, the staff noted that many deficiencies still exist and that insufficient analysis is being done to identify the root causes for these deficiencies. On the other hand, the process by which these deficiencies are identified and corrected is much improved.

The Board would appreciate being advised of the actions taken regarding the above observations.

Sincerely,

John T. Conway
Chairman

c:
Mr. Mark B. Whitaker, Jr.
Mr. James Hall

Enclosures

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

April 19, 1996

MEMORANDUM FOR:	G. W. Cunningham, Technical Director
COPIES:	Board Members
FROM:	D. Owen
SUBJECT:	Y-12 Plant (Y-12) - Review of Resumption of the Disassembly and Assembly (D&A) Mission Area

1. **Purpose:** This memorandum provides Defense Nuclear Facilities Safety Board (Board) staff observations from a review of Y-12's preparations for resumption of D&A operations. The review included an on-site observation of the Department of Energy's (DOE) Readiness Assessment (RA) completed March 7, 1995; review of the DOE RA report issued March 15, 1995; and review of actions taken to close DOE RA prestart findings prior to authorization of D&A operations on March 22, 1996. Board staff member D. Owen and outside expert R. West conducted this review.

2. **Summary:**

   a. Progress under Board Recommendation 94-4, *Deficiencies in Criticality Safety at Oak Ridge Y-12 Plant*, has been made for the D&A mission area at Y-12 since September 1994 in:

      - Criticality safety.
      - Conduct of operations.
      - Operational safety requirements (OARS) compliance.
      - DOE and contractor personnel, performance, and training.

   b. The staff review of D&A readiness activities, including the DOE RA and corrective actions, indicates that Y-12 can resume D&A operations for the planned initial weapon system in a safe manner that is consistent with the objectives of Recommendation 94-4. It is noted, however, that conduct of operations mentor oversight is still required and is being provided.

   c. The Y-12 procedure for determining the type of readiness review for weapon systems undergoing D&A operations beyond the initial system planned for resumption may allow new operations to be started/restarted without appropriate independent readiness reviews. Such reviews are performed for the specific weapon operations at Pantex. The process for training and certifying operations personnel for weapon D&A operations in the future is unclear regarding documentation of certification, use of mockups, and system-specific drills.

3. **Discussion:**

a. D&A Operations Improvements: Efforts in implementing Recommendation 94-4 have resulted in a number of improvements that were demonstrated in D&A operations during the DOE RA. Examples include:

1. Procedures for disassembly and control and implementation of building Operational Safety Requirements (OSR) were executable as written and were accomplished satisfactorily by a team of personnel that included a conduct of operations mentor. The mentors are a key compensatory measure being taken by Y-12 during implementation of conduct of operations improvements under Recommendation 94-4. During the observed evolutions, the mentors participated actively in ensuring proper execution of procedures.

2. Y-12 had a mockup unit fabricated for procedure validation and training purposes. While the DOE RA team noted certain areas that need improvement to obtain the full benefit of the intended purpose of the mockup, the mockup disassembly demonstration conducted for the RA indicated the value of the mockup for achieving readiness for these D&A operations

3. Verification of implementation of Criticality Safety Approval (CSA) requirements during the RA indicates much improvement over the conditions existing prior to Recommendation 94-4. Very few minor discrepancies were noted and Y-12 personnel took appropriate response actions. Disassembly areas had clear postings of key criticality safety requirements.

4. A new drill program applicable to D&A operations has been developed and implemented. The program exercises several credible scenarios such as the evacuation of an injured, potentially contaminated worker and the spill of a hazardous liquid in a radiologically controlled area.

5. The DOE Facility Representative assigned to D&A operations is highly competent and aggressive in impressing appropriate conduct of operations principles in D&A operations.

b. DOE Readiness Assessment: The staff observed the RA from February 29 through March 1, 1996. The RA team consisted of personnel having sound qualifications and technical expertise to review the assigned areas. The RA team observed a disassembly evolution of a mockup system, two abnormal event drills, CSA walkdowns, and OSR surveillance on the fire protection and criticality alarm systems. RA prestart findings were made in the following areas: coverage planned by DOE Y-12 Site Office (DOE-YSO) to monitor resumption;

lack of a defined startup plan detailing required oversight during initial operations; lack of criticality alarm audibility in a utility room in Building 9204-2E; and lack of a procedure to remove certification for lack of proficiency. Corrective action plans developed for the prestart finding are considered by the staff to adequately resolve the prestart findings for D&A resumption.

c. Staff Observations: While not considered as cause to delay restart of D&A operations for the initial planned weapon system, the staff has the following observations regarding readiness preparations for weapon systems undergoing startup/restart of D&A operations beyond the initial planned system:

    1. The Y-12 procedure governing future startup of D&A activities (Y10-190, *New Activity Startup Requirements)* for weapon systems could allow a major new D&A program to be started without an independent readiness review. This would not be consistent with the approach to startup of disassembly, assembly, and modification operations for weapon systems at Pantex. The practice at Pantex is to employ independent reviews by National Laboratory and DOE personnel for startup of each new program for a weapon system. These reviews are focused on operational readiness of the new procedures including demonstrations on a mockup, the new tooling and related facility support systems and personnel, including system-specific training and level of knowledge. For follow-on weapon systems at Y-12 that require new or substantially changed procedures, tooling, training, etc., appropriately focused, independent readiness reviews of the new procedures, equipment, and personnel appear warranted.

    2. While training for the initial weapon system has been performed, the certification of D&A operators and supervisors for a given system did not formally include system-specific training requirements. Per discussions with D&A training personnel, Y-12 intends (as part of a contractor RA post-start finding) to incorporate such system-specific training requirements so that certification for a given weapon system is clearly documented and tracked for operations personnel.

    3. Discussions with DOE-YSO personnel indicate that use of a mockup as procedure verification and training tools may not be a standard practice for weapon systems in the future. Based on the benefit realized by the mockup used to prepare for initial D&A operations, it is not clear why use of mockups would not be considered a standard practice for readiness preparations for new or restarted D&A programs.

    4. While the drill program has several scenarios to exercise response to credible abnormal events, apparently no attempts in defining or exercising response to credible, system specific abnormal event scenarios have been made. Credible abnormal event scenarios based on special hazards of certain weapon systems could be considered for the drill program and exercised as part of readiness preparations and continuing training for a

given weapon system program. Such scenarios are to be developed for weapon operations at Pantex.

4. **Future Staff Actions:** As part of continued monitoring of Y-12 progress under Recommendation 94-4, the staff will review the action taken in response to post-start findings and other actions related to readiness preparations for D&A operations on new weapon systems.

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

April 3, 1996

MEMORANDUM FOR:	G. W. Cunningham, Technical Director
COPIES:	Board Members
FROM:	W. Andrews
SUBJECT:	Staff Review of Y-12's Criticality Safety Approvals in Highly Enriched Uranium (HEU) Processing

1. **Purpose:** This memorandum provides Defense Nuclear Facilities Safety Board (Board) staff observations during a review of Y-12's Criticality Safety Approvals in HEU Processing. Board staff members W. Andrews, D. Hayes, and S. Krahn conducted the review March 14-15, 1996.

2. **Summary:** On March 7, 1996, Lockheed Martin Energy Systems (LMES) submitted an Unusual Occurrence Report, which identified 966 Criticality Safety Approval (CSA) nonconformances in the HEU processing area. The report did not indicate whether the nonconformances were in addition to or a subset of the original 1344 nonconformances identified in September 1994. The staff review revealed that only a cursory analysis had been performed to determine whether the current nonconformances were new and unique, or merely mirrored those discovered in September 1994. However, the distribution of nonconformances among the various categories was clearly different from those identified in September 1994. LMES and the Department of Energy (DOE) assumed that the root causes for these nonconformances were the same as those found in 1994. While deficiencies were noted by the Board's staff, this CSA walkdown exhibited improvement from the walkdowns of 1994. Areas of improvement included team composition, procedures used, and corrective actions taken. Although the walkdowns and subsequent corrective actions serve only to "band-aid" the problems, the efforts are necessary to establish a baseline and raise the facility to minimum compliance with national standards. Comprehensive long term solutions are required prior to restarting HEU operations.

3. **Background:**

   a. On September 22, 1994, several members of the Board's staff identified a violation of a CSA for a special nuclear material (SNM) storage vault at Y-12. LMES management decided to curtail Y-12 activities performed under CSAs. LMES also began a comprehensive site-wide review of compliance with all CSAs that eventually identified 1344 violations. The majority of these were in the area of HEU processing. Subsequently, the Board issued Recommendation 94-4, *Deficiencies in Criticality Safety at the Oak Ridge Y-12 Plant* that recommended DOE take steps to resolve Y-12 deficiencies in: nuclear criticality safety; Operational Safety Requirements compliance; conduct of operations; and experience, training, and performance of DOE and contractor personnel.

   b. Since DOE's acceptance of Recommendation 94-4, LMES and DOE have engaged in a number of initiatives to prepare the Y-12 facilities for resumption, in accordance with the DOE Implementation Plan for Recommendation 94-4. DOEs course of action for resumption of operations was to take immediate steps to correct safety deficiencies and then

validate them through a formal restart process in accordance with Order 5480.31 (425.1), *Startup and Restart of Nuclear Facilities.* This has been completed for the Receipt, Shipping and Storage, and the Disassembly & Assembly mission areas. Management's focus has now shifted to HEU processing mission area.

4. **Discussion:**

   a. LMES had done little, if any, analysis to determine whether the nonconformances were similar to those identified in 1994. In 1994, of the 1344 total nonconformances identified at Y-12, 1058 of them were in HEU processing. Corrective actions were completed for these nonconformances. Nevertheless, 966 nonconformances were identified during the most recently completed CSA review. In fact, it became clear during the review that corrective actions had not been adequately implemented on many of the original nonconformances. In addition, there were significant differences between the 1994 and 1995 data. That data is shown below.

Category	1994%	1995%
Dimensions and Tolerances	27	21
Accuracy and Clarity of CSA	20	58
Configuration Control	29	6
Signage	9	8
Adherence to CSA Requirement	6	5
Equipment Inspection	2	1
Other	7	1

The differences are notable. Twenty-four CSAs were reviewed by the staff to determine the proportion of nonconformances that could be construed to be "technically significant." This portion was <10% even with a very liberal interpretation of what could be considered "significant." However, some of the nonconformances had potentially significant technical impacts. Examples included water collecting inside an array of fissile material, posting limit exceeding the mass limit within the same CSA, and material stored with a higher uranium concentration than allowed by the CSA.

In order to fully resolve the occurrence report, it would appear that further analyses committed to in the report should include, at a minimum, a statistical analysis of the 966 nonconformances compared to: (1) the population of the 1344 from 1994, (2) the subset of the 1344 that applied only to HEU processing, and (3) an evaluation of why the CSAs improved through the Special Package process failed the walkdown. Finally, the follow-up occurrence report should describe the corrective action program established to resolve the nonconformances identified with an associated scheduled completion date. LMES is

currently planning to implement this approach.

b. LMES and DOE had assumed that the root causes for these nonconformances were the same as those found in 1994. It is difficult to understand how one could come to this conclusion without any of the analyses described above. The HEU processing mission area does not draw significantly on the support functions of the rest of Y-12 and thus is perceived to be a very "closed society." It is reasonable to believe that the root causes that led to the nonconformances of September 1994, as well as those that allowed 966 nonconformances to exist for the following year and a half, are potentially different from those for the other mission areas at Y-12. A new root cause analysis focused on HEU processing needs to be accomplished along with a discussion of how management systems now in place, or to be developed, will address these root causes (e.g., Special Package System, new Criticality Safety Program, etc.).

c. The most recent walkdowns of CSAs were much improved over those of 1994. The team composition, procedures used, and corrective actions identified were all improved. Four "fix-it teams" comprised the effort to walkdown the CSAs. Each team consisted of a nuclear criticality engineer, an operations supervisor, and a mentor or quality evaluation individual. In addition, a checklist was developed for the 1995 walk down which detailed specific typical nonconformances which the "fix-it" teams should attempt to identify. In 1994 the walkdowns were accomplished by operations personnel with little guidance or a checklist. Personnel had only a cursory knowledge of the CSAs which they were walking down. Finally, because of the large number of"repeat" nonconformances identified in 1995, one could assume that the corrective actions implemented with respect to the 1994 nonconformances were not effective.

   In 1995, all 245 CSAs required for shutdown operations (storage, special projects, etc.) were walked down, nonconformances noted (966), and corrective actions identified and begun. In spite of the improved nature of the walkdowns, some additional deficiencies were noted by the Board's staff.

d. This effort appeared to be a necessary initial step to raise the facility to a minimum level of compliance with national standards and establish a baseline prior to instituting comprehensive, long-term solutions. However, prior to restarting HEU operations, LMES will have to revise all CSAs in accordance with a new criticality safety management program they are currently implementing.

5. **Future Staff Actions:** The Board's staff will review follow-up reports issued and adequacy of corrective actions. They will also continue to monitor restart activities for HEU processing at Y-12.