April 30, 2001

Brigadier General Thomas F. Gioconda
Acting Deputy Administrator
for Defense Programs
Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-0104

Dear General Gioconda:

The Defense Nuclear Facilities Safety Board (Board) and its staff have been reviewing the quality and adequacy of the authorization bases for defense nuclear facilities at the Y-12 National Security Complex (Y-12). The Board has corresponded with the Department of Energy (DOE) on several recent occasions (e.g., in letters dated October 6, 1999, and August 18, 2000) regarding the slow progress made on improving the quality of the authorization bases, which impedes enhancements to the safety of operations at Y-12. While some improvements have been made on specific tasks, there has not been a corresponding effective change in the overall process for addressing site-wide issues. The Board is pleased to observe the significant progress in emergency preparedness made by one of the contractors (BWXT Y-12) with an effective use of limited resources. On the other hand, deficiencies in the fire protection and safety bases for defense nuclear facilities have continued.

The enclosed report discusses the results of a recent staff review focused on the identification and analysis of hazards and controls documented in the safety bases, emergency management hazard assessments, fire hazard identification and analyses, and environmental impact statement for Y-12 facilities. The Board's staff found that there was little integration and many inconsistencies relating to the hazards identification and analysis for activities at the site. Such widespread differences imply a lack of agreement on basic concepts and safety management. More commonality in assumptions and methods of safety analysis is needed to reflect a uniform philosophy of safety for operations throughout Y-12 and to demonstrate that careful thought has been given to the demands of safety. Additionally, a lack of adequate technical resources within DOE's Y-12 Area Office for overseeing the contractors' activities may be hindering the expected progress.

The Board believes these deficiencies can be overcome by proper management focus and effective use of technical resources, as was demonstrated by BWXT Y-12's emergency management organization. Pursuant to 42 U.S.C. § 2286b(d), the Board would like to be briefed within 60 days of receipt of this letter on DOE's and its contractor's path forward for addressing the issues outlined in the enclosed issue report.

Sincerely,

John T. Conway
Chairman

c: Mr. Mark B. Whitaker, Jr.

Enclosure

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

Staff Issue Report

March 19, 2001

MEMORANDUM FOR: J. K. Fortenberry, Technical Director

COPIES: Board Members

FROM: F. Bamdad

SUBJECT: Integrated Hazard Analysis Review, Oak Ridge Y-12 National Security Complex

This report documents observations made by the staff of the Defense Nuclear Facilities Safety Board (Board) during meetings held at the Y-12 National Security Complex (Y-12) during February 13–16, 2001. Staff members W. Andrews, C. Coones, J. Deplitch, M. Helfrich, D. Kupferer, and F. Bamdad reviewed the integration of the identification and analysis of hazards and controls documented in the safety bases, emergency management hazard assessments (EMHAs), fire hazard analyses (FHAs), and environmental impact statement (EIS) for Y-12 facilities to ensure that the on-site and off-site populations are adequately protected.

Integration of Hazards Identification and Analysis. The staff found that there was little integration of the numerous forms of hazards analyses for activities at the site. Many inconsistencies were identified between the hazards identified in the safety bases, FHAs, EMHAs, and the site-wide EIS for Y-12 facilities. In fact, the contractor asserted at the beginning of the staff's review that their hazards identification and analyses were not integrated. The contractor representative also agreed that the hazards identification and analysis should be integrated and that they had developed standardized procedures to accomplish the integration but effective implementation of those procedures had not yet taken effect. The staff confirmed the fundamental lack of integration of hazards identification and analysis during the review. The staff also observed other significant shortfalls in the Y-12 safety management programs which are discussed below.

Safety Bases—The Board's staff noted that since the new contractor, BWXT Y-12, assumed responsibility last November, some organizational changes have been made to facilitate improvements in the quality and timeliness of hazard analyses. A new Facility Safety Division has been formed with sole responsibility for supporting the preparation of upgraded safety bases. Despite this reorganization, however, progress in upgrading the authorization bases of defense nuclear facilities has been slow. The

current safety bases for defense nuclear facilities at Y-12 consist of documents prepared during the past decade that vary significantly in quality and content. The Board's staff reviewed the quality of Y-12 safety bases and the plans for their upgrade in July 1999; the staff's observations were documented in a report that the Board transmitted to the Department of Energy (DOE) on October 6, 1999. The Board's transmittal letter noted slow progress in identification and analysis of hazards for a majority of the defense nuclear facilities at Y-12.

However, before significant progress could be made the Nuclear Safety Management Rule was issued (October 2000). BWXT Y-12 is currently preparing a compliance status report and plan, to be submitted to DOE by April 2001. The Assistant Secretary for Defense Programs (DP) is responsible for seven Hazard Category 2 and three Hazard Category 3 facilities that need to comply with the rule. The current plan requires significant modification to the existing safety bases of these facilities to meet the requirements of the "safe harbors" of the rule by April 2003. This is partially due to the fact that a recent contractor internal self-assessment revealed significant discrepancies in the identification of hazards at various defense nuclear facilities. Although a site procedure for identification of hazards exists and should be followed, it was found that most facilities did not meet the contractor's expectations.

Emergency Management Hazard Assessments—Progress made in the past year on the preparation of technically sound EMHAs for Y-12 facilities is laudable. BWXT Y-12 appears to have developed effective processes for identifying hazards and for preparing EMHAs and establishing Emergency Action Levels (EALs), and has completed many of these processes for the priority facilities with minimal resources (fewer than three full-time equivalents). It is expected that the same processes will be used for the remaining facilities. The Board's staff noted the following:

- DOE Y-12 Area Office (DOE-YAO) approval of the completed EMHAs and associated EALs is taking an unacceptably long time (almost a year thus far). None of the recently completed EMHAs or EALs had been implemented at the time of the staff's review because of the lack of DOE approval. These EMHAs and EALs could provide plant shift superintendents with valuable information for responding and taking the necessary protective actions in case of an accident. For example, the manner in which the contractor currently evacuates workers to predesignated assembly stations may need to be revised based on the findings of the EMHAs. Some EMHAs have identified significant radiological or toxicological consequences at the assembly stations where the workers may be directed to go following an accident. Therefore, implementation and training for completed EMHAs or EALs needs to occur as soon as possible.

- There are discrepancies between EMHAs and other hazard analyses, particularly the information existing in the facilities' Hazardous Material Inventory Systems. In addition, the results of these hazard assessments have not been coordinated with safety basis analysts to identify potential external hazards. Hazard assessments and analyses need to be integrated to avoid such problems.

- The treatment of a potential chlorine release from the nearby Oak Ridge Water Treatment Facility (WTF) could be further improved. DOE recently turned this facility over to the City of Oak Ridge. A chlorine release from the WTF could result in concentrations exceeding levels that are immediately dangerous to life or health throughout the site. This scenario is not identified as an external event in the safety bases of all the facilities.

Fire Hazard Analyses—The Board noted slow preparation of FHAs at Y-12 in a letter to DOE dated August 18, 2000. In response to this letter, DOE committed to providing an approved corrective action plan by January 31, 2001. The corrective action plan prepared by the contractor was rejected by DOE-YAO, and is being revised. Preparation of FHAs by the contractor is still far behind schedule. Additionally, the Board's staff made the following observations:

- Deficiencies identified in the FHAs are placed into a site-wide tracking system, but there is no emphasis on resolving them. The FHAs typically do not consider the impact of these deficiencies on the fire safety posture of the facilities. Similar results are seen in the deficiencies determined in the Fire Protection Engineering Appraisals (FPEAs), which are basically brief FHAs for less-hazardous facilities. The contractor has identified that production of FPEAs is also significantly behind schedule, with many buildings not having been reviewed in years. A recent FHA for Building 81-22 identified significant deficiencies that merited immediate attention.

- The inadequacy of the fire protection program at Y-12 impacts not only the authorization basis documents, but also the EMHAs. In addition, the staff noted some differences between the FHAs and the EMHAs. For example, the EMHA for Building 9212 indicates that B-1 Wing is bounded by fire-rated walls on the north and south sides, whereas the FHA correctly references only fire-rated's construction on the south side. Such a discrepancy is important during emergency response, as fire spreading beyond nonrated construction would be more probable and the emergency response personnel actions are based on this type of information. Similarly, the EMHA for Building 9215 credits the fire detection system for the O-Wing bag filters with a "local fire alarm" and notification of the fire department, but fire protection engineering personnel indicated that this system was not in service and would not be restored. It is not clear how changing plant equipment configurations are reflected in the EMHAs.

Draft Site-Wide Environmental Impact Statement—The draft EIS for Y-12 was issued for public comment in December 2000. It is the first site-wide EIS to be developed for Y-12. Although prepared quite recently, the EIS appears to contain a number of technical inaccuracies and was found to be at odds with the other hazard assessment efforts on site. While it is not unusual for there to be conflicting data in site-wide EISs that are several years old, the

Y-12 EIS is a current draft document that would be expected to agree much more closely with other existing safety documentation. The staff also found that the draft EIS makes no mention of a number of storage facilities (such as Buildings 9720-18, 9720-14, and 81-22) that have been the subject of a review by the Board's staff (see the Board's letter of August 18, 2000, to DOE).

When asked about coordination strategies, various BWXT Y-12 safety analysts stated that the EIS development effort had not been coordinated with their groups. As a result, it would appear that this was the least integrated of all the hazard assessment efforts. However, the DOE personnel did indicate that they were going to revise the EIS in response to comments received on its adequacy and accuracy.

Resource Issues at Y-12. DOE-YAO is under-staffed to meet its safety basis requirements for DP facilities at Y-12. Currently, DOE-YAO has only two full-time employees responsible for meeting safety basis requirements for DP facilities. DOE-YAO is in the process of hiring three new engineers, none with significant safety basis experience. There have been problems in meeting existing commitments as a result of manpower shortages. For example, the proposed Safety Analysis Report for Building 9204-2E has been undergoing review and enhancement by DOE-YAO since August 1998.

In the last several months, all but one of the BWXT Y-12 facility safety engineers have relocated. Replacement of these engineers is not being expedited. In addition, with the current safety basis staffs of BWXT Y-12 and DOE-YAO being fully tasked to meet existing requirements, any new activities in response to the rule will most likely require additional resources.