May 29, 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:

On October 6, 1999, and August 18, 2000, the Defense Nuclear Facilities Safety Board (Board) transmitted letters to the Department of Energy (DOE) regarding the less-than- satisfactory identification and analysis of hazards and associated controls and the physical condition of some defense nuclear facilities at the Y-12 National Security Complex (Y-12). Subsequently, a fire hazard analysis performed by the contractor for one of these facilities concluded that "the condition of the building is substandard … at least three beams … have rotted through. Portions of the roof deck have sustained previous water leakage-related damage. Interior wood posts have cracks due to age; one was observed to have termite damage."

A recent review by the Board's staff, documented in the enclosed issue report, revealed that little progress has been made in addressing the potential safety issues at these facilities. The Board is concerned that proper attention may not have been paid to the storage of hazardous materials, some of which are needed to meet the requirements of the enduring nuclear weapons stockpile. DOE needs to identify and protect these materials in an appropriate manner. Moreover, the facilities and containers that store these materials should be properly maintained or upgraded to provide adequate protection and ensure the health and safety of the workers, the public, and the environment. In addition, a significant amount of excess material exists throughout the Y-12 site that should be prepared for disposition in a timely manner.

Therefore, the Board requests that you examine the issues outlined in the enclosed report and, pursuant to 42 U.S.C. § 2286b(d), provide a report to the Board within 90 days of receipt of this letter that identifies (1) DOE's path forward for identification and disposition of excess hazardous materials stored at Y-12, and (2) DOE's activities to ensure that materials needed to support long-term national security are stored in a manner that will not pose undue risk to the public, the workers, or the environment.

Sincerely,

John T. Conway
Chairman

c: Mr. William J. Brumley
Mr. Mark B. Whitaker, Jr.

Enclosure

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

Staff Issue Report

May 3, 2001

MEMORANDUM FOR: J. K. Fortenberry, Technical Director

COPIES: Board Members

FROM: M. Helfrich
D. Kupferer

SUBJECT: Material Storage Facilities, Oak Ridge Y-12 National Security Complex

This report documents observations made by the staff of the Defense Nuclear Facilities Safety Board (Board) during a review of material storage facilities at the Y-12 National Security Complex (Y-12). Members of the Board's staff W. Andrews, F. Bamdad, C. Coones, J. Deplitch, M. Helfrich, and D. Kupferer walked down selected facilities to ascertain their physical condition and then compared the results of these walkdowns with the authorization basis documentation for the facilities.

Background. Storage facilities at Y-12 for nuclear materials other than highly-enriched uranium fall into two categories: environmental management (EM) and non-Material Access Area (MAA) facilities. EM facilities at Y-12 are operated by Bechtel Jacobs Company (BJC) and are under the control of the Department of Energy Office of Environmental Management (DOE-EM), while non-MAA storage facilities are operated by BWXT Y-12 and are under the control of the National Nuclear Security Administration (NNSA).

Observations. During the course of this review, the Board's staff observed that the EM facility operators had substantially less knowledge of safety basis requirements than the operators of the non-MAA facilities. The staff also observed inadequate characterization of material hazards, poor development and implementation of controls for the non-MAA storage facilities, and a general lack of maintenance of these facilities. In particular, the staff is concerned that the non-MAA materials, which are needed to meet the requirements of the enduring nuclear weapons stockpile, are not characterized, stored, and protected in an appropriate manner. The facilities that store these materials must protect workers, the public, and the environment from the potential radiological and toxicological hazards posed by the materials. The staff also observed a significant amount of excess material that needs to be prepared for disposition in a timely manner by both NNSA and DOE-EM.

Environmental Management Facilities—The staff made the following observations regarding the EM facilities:

- Uranium Oxide Vaults—This Category 2 EM facility consists of two vaults that resemble concrete tombs: one contains uranium oxide chips; the other is empty. This storage configuration is classified as being temporary; however, retrieval of this material will be difficult. There was a fire in the occupied vault in 1992, after which no more material was added to either vault. Instead, the oxide is being stored above ground in 55-gallon steel drums on wooden pallets in a metal shed with only a draped plastic curtain protecting the drums from the weather. The EM personnel who participated in the review demonstrated a lack of knowledge of the safety basis for their facility and could not effectively answer questions regarding the facility's Technical Safety Requirements, current inventory of material, or future plans. This was due in part to the fact that BJC has hired an outside contractor to prepare the safety bases of these facilities.

Non-MAA Nuclear Material Storage Facilities—The staff's observations with regard to the non-MAA facilities include the following:

- Building 81-22—This facility consists of an old wooden structure that has been poorly maintained through the years. Problems with the building include National Electric Code deficiencies (exposed 50-year-old wiring is evident) and large roof leaks that result in standing water on top of storage containers holding both nuclear material and beryllium. The Board has previously noted the poor condition of Building 81-22 (as stated in a letter to DOE dated August 18, 2000). The fire hazards analysis for this building notes significant deficiencies associated with the electrical system and the physical condition of the facility, including beams, columns, and roof decking that are damaged and rotting. The contractor recently approved the funding needed to upgrade the electrical wiring; however, a more cost-effective approach to providing adequate protection for the material stored in Building 81-22 needs to be identified and implemented.

- Sea Land Trailer Storage—Many metric tons of uranium and thorium are being stored in these metal/wooden trailers, which do not appear to protect the material from the environment. In almost all cases, the Board's staff found the trailer doors only partially closed, and observed rainwater flowing through the trailers and potentially carrying contaminants outside.

- Building 9720-14—There is a wide variety of material stored in this building; however, the Emergency Management Plan for the building does not include a listing of hazards associated with these materials. There is no fire hazard or safety analysis for this building. In addition, the building's wooden loft currently holds unnecessary combustible materials that appear to have been there for an extended period. The

Board's staff made the following observations regarding specific materials and their storage containers:

- Freezers—Three freezers in Building 9720-14 are apparently being used to store material that was shipped to Y-12 more than two decades ago, and site personnel do not have a clear understanding of their contents. It was also unclear to the staff whether constant temperature control is required and if so, for what reason (such as safety or material quality). Site personnel present at the meeting were not cognizant of any potential hazards associated with long-term storage of the material, such as radiolysis resulting from interactions between the material and the substrate of packing material and/or the atmosphere, which could result in a large buildup of hydrogen. Additionally, it is possible that a significant amount of radon could be released when the freezers are finally opened.

- Unknown Material—There are many packages marked "radioactive material" in this facility that are also marked "unknown contents, QE [Quality Evaluation]." This marking refers to a program that was ongoing prior to September 1994. Under this program, packages with unknown contents were shipped to Building 9402-4, where they were opened, characterized, and then repackaged if necessary. It appears that these containers were forgotten after the plant-wide shutdown in 1994.

- Beryllium—According to the facility hazard assessment, thousands of kilograms of beryllium oxide is stored in the facility. It was asserted to the staff that the majority of this beryllium is in fire-retardant cargo boxes, but the staff observed that the fire-retardant paint is flaking off the "cardboard" storage containers (about half of the fire-retardant material has fallen off the boxes and is lying on the floor). Beryllium metal in damaged wooden crates is also stored in the area. This building is not provided with a fire protection system, either suppression or detection. In general, it appears that the condition of beryllium being stored in this facility may be compromised by the use of inadequate storage containers.

Toxicological Safety Basis—Analyses by both BWXT Y-12 and the Board's staff indicate that the toxicological impact of some non-MAA materials on both workers and the public is potentially more significant than the impact associated with radiological exposures. If toxicological limits—such as Emergency Response Planning Guideline-2, Temporary Emergency Exposure Limit-2, or Immediately Dangerous to Life or Health levels—are exceeded on site or at the site boundaries as a result of untoward events, controls must be in place to prevent and/or mitigate the consequences to workers and the public. Toxicological risks are currently underrepresented in the hazard analysis. For example, the facility hazard analysis confirms that the quantitative toxicological consequences of a large fire in Building 81-22 exceed the limit governing toxic exposure to the public. Despite this assessment, the contractor states that the issue has been addressed *qualitatively* through the physical limitations and operational conditions of the facility and that no additional controls are required.

Disposition of Non-MAA Material—To aid in the disposition of non-MAA material, BWXT Y-12 recently established a Non-MAA Material Task Team. The Board's staff was not able to obtain a copy of a charter for this team or a list of team members and their responsibilities. Technical information associated with the disposition of excess non-MAA material has already been captured through previous analytical efforts undertaken in 1997. Unfortunately, Y-12 has not provided funding to continue these activities.