

November 2, 1999

The Honorable Ernest J. Moniz
Under Secretary of Energy
1000 Independence Avenue, SW
Washington, DC 20585-1000

Dear Dr. Moniz:

The staff of the Defense Nuclear Facilities Safety Board (Board) has continued to follow activities at the Miamisburg Environmental Management Project (MEMP) and those of Department of Energy (DOE) Headquarters in response to the need to develop radiation protection measures for work involving metal tritides and organically bound tritium.

The Board recognizes that some progress has been made in this regard and that more work needs to be done on developing the technical basis for these radiation protection measures. The recent publication of DOE's radiological technical position for the evaluation and control of exposure to these materials is a positive step that will assist with field implementation. The Board looks forward to DOE's continued attention to this issue throughout the complex and the development of a comprehensive technical approach.

Recent experience at MEMP exemplifies the difficulty of arriving at and implementing an appropriate program for protecting personnel from metal tritides in a timely manner, and illustrates the need for compensatory measures when work is undertaken before a technical basis for the work is complete. The enclosed issue report, prepared by the Board's staff, is provided for your consideration. Compensatory measures such as those identified in the enclosed report warrant consideration to ensure adequate worker protection as work proceeds at Mound.

If you have comments or questions on this matter, please do not hesitate to contact me.

Sincerely,

John T. Conway
Chairman

c: The Honorable Carolyn L. Huntoon
The Honorable David Michaels
Mr. Mark B. Whitaker, Jr.

Enclosure

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

Staff Issue Report

September 7, 1999

MEMORANDUM FOR: G. W. Cunningham, Technical Director
J. K. Fortenberry, Deputy Technical Director

COPIES: Board Members

FROM: J. W. Troan

SUBJECT: Work Involving Stable Metal Tritides at Miamisburg Environmental Management Project

The staff of the Defense Nuclear Facilities Safety Board (Board) has been following technical issues associated with the detection, control, bioassay, and internal dosimetry of metal tritides. The staff's work has included reviewing related efforts at the Miamisburg Environmental Management Project (MEMP), as well as Department of Energy (DOE) Headquarters. Recent work by the Board's staff included an on-site review at MEMP conducted by J. W. Troan and L. M. Zull during August 3-5, 1999; review of a draft DOE-MEMP memorandum that is intended for use in approving selected work involving metal tritides; review of a draft technical basis document; review of a DOE technical position paper; and discussions with a MEMP contractor union representative.

Low-potential-exposure/minor work involving stable metal tritide (SMT) contamination continues to be performed at MEMP. However, work beyond the level approved by DOE-MEMP was found to have been performed as a result of inadequate control of work authorization. DOE-MEMP has requested that the contractor conduct a Readiness Assessment (RA) before proceeding with deactivation and decommissioning work involving SMT and stable tritiated particulate; in the interim, DOE-MEMP's approval is required for work beyond the previously agreed upon scope. Because of technical shortfalls and uncertainties associated with SMT detection, use of compensatory measures until a sound technical basis has been completed, documented, approved, and proven, as discussed below, would be prudent.

Work Involving Metal Tritides. The staff's review included issues related to past, present, and future work activities involving metal tritides.

Past and Present Work Activities—DOE-MEMP verbally directed the Babcock and Wilcox of Ohio, Inc. (BWO) Main Hill Tritium Project to proceed with only low-potential-exposure/minor work in areas that could have SMT contamination. Engineered controls and monitoring methods that are typically used for work with tritium, supplemented by monitoring methods to identify metals associated with SMT, are used for this work.

The monitoring methods for SMT rely on existing procedures and technical approaches. Given the developmental and evolutionary status of the approach at MEMP, the staff questions the validity and completeness of the methods used. The staff believes compensatory measures may be appropriate until a sound technical basis has been completed, documented, approved, and proven, and supporting procedures are approved and in place. These measures might include (1) delaying or minimizing work involving potential SMT contamination; (2) eliminating or minimizing potential SMT exposure by using proven engineered controls (e.g., gloveboxes, glovebags, local ventilation) or wearing personal protective equipment (PPE) as an additional barrier, as appropriate; (3) assessing potential SMT intake by lapel air samplers on all people who enter areas suspected to be contaminated with SMT or who do work with the potential for exposure to SMT; (4) keeping a record of protocols used as they evolve, to facilitate dose reconstruction, should it be necessary; and (5) retaining sample media from surface monitoring for future analysis, should the need arise.

In light of questions raised by the Board's staff regarding recent work involving metal tritides, BWO personnel reviewed work activities accomplished since May 1, 1999. This review revealed that work beyond the agreed-upon level of low-potential-exposure/minor work had been performed. BWO indicated that they have now curtailed this work.

DOE-MEMP has requested that BWO conduct an RA before expanding the scope of work involving SMT and stable tritiated particulate. This RA is scheduled for November 1999. Prior to completion of the RA, any work above the previously approved level will be reviewed and approved by DOE-MEMP on a case-by-case basis. DOE-MEMP has agreed with DOE-HQ to provide additional oversight of BWO activities and to authorize SMT work only after specific agreement for each task has been reached with the DOE Office of Environmental Management (DOE-EM) and the Office of Environment, Safety, and Health (DOE-EH). As of August 16, 1999, DOE-MEMP had defined and implemented additional oversight of BWO's safe shutdown and decommissioning activities involving SMT.

Future Work Activities—Work is currently limited to low-potential-exposure/minor work in areas that may contain SMT. However, BWO has requested approval from DOE-MEMP to proceed with certain work activities that go beyond that level. DOE-MEMP has prepared a memorandum regarding this request and is seeking agreement from DOE-EM and DOE-EH. The staff understands that the DOE-MEMP approach to this new work continues to rely on detection and bioassay methods that do not have a final technical basis. Compensatory measures similar to those cited above, along with the following additional measures, may be appropriate until a sound technical basis has been developed, approved, and proven, and supporting procedures are approved and in place. Examples of additional compensatory measures that may be appropriate include (1) identifying and using other workplace indicators that are known to reveal a loss of contamination control (e.g., lapel air samples, tritium air monitors); (2) increasing sampling frequency to compensate for the lack of real time monitoring capabilities; (3) applying appropriate work restrictions; and (4) increasing/improving oversight.

Development of Technical Basis Document. BWO has prepared a draft technical basis document, *Mound Technical Basis Document for Stable Tritiated Particulate and Organically Bound Tritium* (MD-10516). This document is intended to provide a technical rationale on which worker protection procedures are to be based, as well as practical approaches to internal dosimetry, air monitoring, and workplace characterization. Both DOE Headquarters personnel and the Board's staff have reviewed this document, and have found that the technical rationale supporting relevant technical procedures is generally not adequate. Specific comments have been provided to BWO, and comment resolution is in progress.

DOE Technical Position Paper. On April 29, 1999, the Board sent a letter to DOE stating the Board's belief that it was appropriate for DOE Headquarters to articulate a technical position on radiation protection measures for metal tritides and organically bound tritium (OBT), and requesting that DOE provide information on its approach in this regard. DOE committed to providing an updated policy approach on radiation protection measures for metal tritides and OBT. In support of that commitment, DOE has requested information from the field regarding work with SMT and OBT, and is working toward determining whether additional guidance, a technical position, or regulatory changes are needed.

As an interim measure, on August 20, 1999, DOE distributed a technical position on an acceptable approach for developing air concentration values for controlling exposures to tritiated particulate aerosols and OBT. The Board's staff views this action as a positive step toward satisfying the need for development of a comprehensive approach to dealing with SMT and OBT. Additional work needs to be done by DOE Headquarters to prepare a complete response to this issue. A complete response is not expected in the near future, and compensatory measures similar to those discussed above may therefore be appropriate in the interim. Appropriate compensatory measures should become better defined as DOE proceeds with its evaluation.