



**The Under Secretary of Energy**

Washington, DC 20585

November 12, 1999

The Honorable John T. Conway  
Chairman  
Defense Nuclear Facilities Safety Board  
625 Indiana Avenue, N.W.  
Suite 700  
Washington, D.C. 20004

Dear Mr. Chairman:

This is in response to your letter requesting information on the Department of Energy's radiation protection programs for work involving tritium compounds.

In our June 10, 1999, letter to the Defense Nuclear Facilities Safety Board, we committed to provide an updated policy approach on radiation protection measures for metal tritides and organically-bound tritium to you by September 30, 1999. This letter provides the update. I apologize for the delay in providing this formal response to you; however, we have briefed members of your staff on the departmental approach in an effort to keep you fully informed in a timely manner.

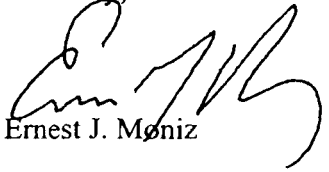
The approach that we are taking is determined by the experience gained at Mound in preparation for the decontamination and decommissioning of tritium facilities (Enclosure 1) and on the present understanding of the extent, complexity, and nature of issues related to work with such special tritium compounds at other sites (Enclosure 2).

Our policy approach is presented in Enclosure 3. This approach identifies the planned actions that will lead to the promulgation of needed formal requirements and guidance. In the interim, the Department of Energy Headquarters will work with Mound and other field organizations to provide the necessary guidance and compensatory measures to allow needed work to continue without delay.

The Assistant Secretaries for Environment, Safety and Health and Environmental Management are working together to resolve the issues raised in your letter and will keep you informed on our progress.

If you have any questions, please contact me or have your staff contact Mr. Rick Jones at (301) 903-6061 or Mr. Ron Knisley at (301) 903-6085.

Sincerely,

A handwritten signature in black ink, appearing to read 'Ernest J. Moniz', with a large, stylized flourish extending to the right.

Ernest J. Moniz

Enclosures

## Path Forward For Work With Special Tritium Compounds at Mound

Special Tritium compounds (STCs), which include metal tritides and organically-bound tritium, have been handled, stored, and processed at Mound over the past 40-years, as a result of research and production campaigns that evaluated many exotic materials. Today's challenge is the Decontamination and Decommissioning (D&D) of the areas, gloveboxes, fumehoods, and ventilation systems potentially contaminated with legacy STCs. Work in these areas is planned to start December 1999. The D&D of tritium facilities is on the critical path for Mound closure.

The Department focused on the following three areas: (1) Review of preparations by the Mound contractor, Babcock and Wilcox of Ohio (BWO), to carry on the work with STCs; (2) DOE technical support to Mound in formulating the approach for work with STCs; and (3) Oversight of readiness for work.

1. Based on process history, on interviews with former workers, and on field surveys, BWO reconstructed the history of Mound usage of stable metal tritides. A first draft of the technical basis document for work in areas with potential STC contamination was developed. This document was reviewed by specialists from other DOE facilities, DOE-Headquarters Environmental Management (EM) and Environment, Safety and Health (EH) offices, Paper, Allied Industrial, Chemical and Energy Workers International Union (PACE), and the Defense Nuclear Facilities Safety Board (DNFSB) staff. The technical basis document was issued, as an updated draft, October 8, 1999. A copy was provided to your staff. Working procedures based on this document were completed by October 15, 1999, and underwent review by EM, EH, PACE, and DNFSB staff. That review was completed by October 26, 1999. The technical basis document and procedures will be finalized prior to the readiness assessment.
2. In order to characterize the hazard associated with inhalation of STCs, DOE (EH and EM) supported research on self-absorption of the tritium beta particulates within the metal tritide particle, bremsstrahlung production within the particle, particle size distribution, and tritium dissolution rates. This effort is based on research performed at Pacific Northwest National Laboratory and Lovelace Respiratory Research Institute. Funding for the development of a real-time air monitoring system, able to detect and quantify airborne stable metal tritides, was identified by EM and the procurement of a commercially available system for testing and evaluation is in progress.

A special technical session at the June 1999 Annual Health Physics Society Meeting, organized by DOE and attended by specialists from sites involved in tritium management from the United States and Canada, allowed for peer review of the results of the research and of the Mound approach in working with STCs. A radiological control technical position for the protection of workers from the hazards of STCs was issued by EH in August 1999. This technical position discussed evaluating airborne concentrations of radioactive and was based on international consensus publications. Until DOE promulgates the necessary requirements and guidance for STCs, EH and EM are working closely with Mound to provide, as needed, on an interim basis, essential written guidance and confirm compensatory measures that allow the needed work to continue.

3. The Miamisburg Environmental Management Project Office (MEMP) requested that, before the work starts, BWO conduct a readiness assessment (RA) of work with special tritium compounds as they relate to D&D of tritium facilities. MEMP will conduct oversight of the readiness verification activities during the performance of the contractor RA. The current proposed schedule for the RA is as follows:

Begin training:	11/22/99
Conduct of RA:	11/29/99-12/2/99
Issue Resolution:	11/30/99-12/7/99
Declare readiness:	12/8/99
MEMP approval:	12/9/99
Start work:	12/10/99

## Enclosure 2

### **Highlight of the Field-Provided Information Related to Special Tritium Compounds (STCs)**

The Assistant Secretaries for Environmental Management (EM) and Defense Programs (DP) requested from the Site Managers across DOE, information needed to identify if there are facilities, other than Mound, where there exist current or future needs to work with metal tritides or organically-bound tritium and to identify past and present radiation protection practices for dealing with such compounds. A set of specific questions allowed DOE to understand the extent and nature of issues related to STCs. The evaluation of field data was performed jointly by EM, DP, and Environment, Safety and Health (EH).

The data provided by the DOE Field elements show that:

- There are sites, other than Mound, with activities in areas in which STCs exist (Savannah River Site, Los Alamos National Laboratory, Sandia National Laboratory) or at which Decontamination and Decommissioning (D&D) activities that can generate STC aerosols are imminent (Princeton Plasma Physics Laboratory).
- There are sites at which, in maintenance or D&D of older structures, components, and systems that contain or have contained tritium gas or tritiated water, rust may be encountered (Savannah River Site and Hanford).
- There are sites that face organically-bound tritium in groundwater (Nevada Test Site).
- There are contractors who consider this DOE request for information as an opportunity to characterize for STCs before significant exposure problems can occur (Bechtel Jacobs Company of Oak Ridge).
- There are sites expecting DOE to issue policy, guidance, or manual of good practices for STC radiation protection programs (Rocky Flats Environmental Technology Site, Nevada Test Site, Bechtel Jacobs Company, and Bechtel Hanford).
- There are contractors offering to participate in development of such documents (Westinghouse Savannah River Company, Los Alamos National Laboratory, and Princeton Plasma Physics Laboratory).
- There are contractors, other than Mound, who started to incorporate recent International Commission on Radiological Protection guidance into their site-specific documents (Los Alamos National Laboratory and Westinghouse Savannah River Company).

Based on the review of the responses received to date, the following recommendations are made:

1. The development of continuous air monitors for tritiated aerosols should be supported.
2. The development of the analytical procedure for STC in fecal bioassay samples should be supported.
3. The characterization of iron oxide tritide is needed (dissolution rate, size distribution, beta self-absorption, bremsstrahlung) in order to develop the corresponding dosimetric model.
4. The development of STC characterization protocols is required.
5. A more complex technical position or guidance for STC work should be developed to unify some efforts already going on in the Field.

## **Enclosure 3**

### **DOE Policy Approach for Special Tritium Compounds**

The Department has reviewed the field-provided information related to special tritium compounds (STCs) and continues to monitor the planning for work involving special tritium compounds at Mound. Based on these activities, DOE has determined that there is a need to enhance DOE policy pertaining to STCs. Enhancement of DOE policy in this area will consist of changes and additions to both DOE requirements and guidance. While these changes are being made, DOE will publish interim guidance as needed.

In order to develop technically sound and useful guidance for STCs, DOE must address a number of technical and policy topics. Some of these key technical topics are derived from the review of field-provided data and are listed as recommendations in Enclosure 2 of this letter. Some of the key policy topics are the need to enhance the formality of air sample evaluations used to assign worker dose of record and the use of observed activity instead of total activity in establishing derived air concentrations (DAC) and dose conversion factors for STCs.

To address these topics, the Office of Environment, Safety and Health (EH) and the Office of Environmental Management (EM) will formally establish and chair a working group of individuals possessing the experience with STCs and appropriate technical expertise necessary to resolve these issues. The mission of the working group will be to provide advice, information, and recommendations to DOE for regulatory changes, and implementation guidance needed for protection of workers, the public, and the environment from the hazards associated with STCs. The objective of the working group is to prepare a report that recommends regulatory changes and the types of guidance needed to effectively protect workers who may be exposed to special tritium compounds. Based on the conclusions of the working group, EH will establish a schedule for issuing needed requirements and guidance.

Specifically, the working group will:

- Review technical and policy issues associated with radiation protection in handling STCs, including metal tritides and organically-bound tritium;
- Recommend approaches for their resolution;
- Prioritize issue resolution considering:
  - importance to safety,
  - technical difficulty,

- resource constraints, and
- time constraints;
- Contribute to issue resolution;
- Recommend compensatory measures; and
- Prepare a final report containing final recommendations and actions.

The working group will be established on or before October 31, 1999. To document its progress, the working group will issue progress reports at the end of each quarter of fiscal year 2000. During the final quarter of fiscal year 2000, the working group will determine if key issues have been sufficiently resolved to issue a final report by September 30, 2000. If a final report cannot be issued, the working group will issue a summary report documenting topics that have been resolved and recommendations that can be made at this time. In addition, the working group will continue functioning (including production of quarterly progress reports) until the final report is produced. DOE will issue a schedule for publication of guidance and requirements one month after the final report is issued.

To expedite the promulgation of requirements and guidance for STCs, DOE will initiate development of needed formal guidance (as distinct from interim guidance) as soon as key issues associated with specific types of guidance are resolved and not wait for issuance of the final report.

This approach identifies the planned actions that will lead to the promulgation of needed formal requirements and guidance. In the interim, DOE Headquarters will work with Mound and other field organizations and provide the necessary guidance and compensatory measures to allow needed work to continue without undue delay.