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DEFENSE NUCLEAR FACILITIES SAFETY BOARD

625 Indiana Avenue, NW, Suite 700, Washington, D.C. 20004
(202) 208-6400



July 5, 1995

Mr. Mark Whitaker, EH-9
Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585

Dear Mr. Whitaker:

Enclosed for your information and distribution are 20 Defense Nuclear Facilities Safety Board staff reports. The reports have been placed in our Public Reading Room.

Sincerely,

A handwritten signature in black ink, appearing to read "G. W. Cunningham", is written over the typed name and title.

George W. Cunningham
Technical Director

Enclosures (20)

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

January 12, 1994

MEMORANDUM FOR: G. W. Cunningham, Technical Director**COPIES:** Board Members**FROM:** Larry Zull, DNFSB Staff**SUBJECT:** Trip Report on DOE Fifteenth Annual Low-Level Radioactive Waste Management Conference, December 1-3, 1993

1. **Purpose:** The purpose of attending this conference was to obtain information about the Department of Energy's (DOE's) current Low-Level Radioactive Waste (LLRW) management organizations, programs, and personnel.
2. **Summary:**
 - a. DOE Headquarters does not presently have an integrated plan for the management of low-level radioactive waste. However, the DOE Office of Environmental Restoration and Waste Management is working to develop a long-range plan which focuses on providing adequate treatment and disposal capabilities.
 - b. Each DOE low-level radioactive waste disposal facility is required to conduct a performance assessment to demonstrate that the facility is in compliance with the requirements of DOE Order 5480.2A, *Radioactive Waste Management*. The technical quality of the individual low-level waste disposal facility assessments is reviewed by a Peer Review Panel (PRP). The Order requires that the PRP consist of representatives of the DOE, the contractor, and other specialists in performance assessments. However, the PRP presently consists only of contractor personnel.
 - c. DOE Order 5480.2A, *Radioactive Waste Management*, which describes policies, guidelines, and requirements for managing radioactive and mixed wastes, is being revised to address the organizational and policy changes which have occurred since the Order was issued in 1988. The revised Order is expected to be released for review in June 1994.
 - d. Waste kept in interim storage at individual sites can present potential health and safety hazards which have not been analyzed. Criteria for the interim storage of low-level radioactive waste have not been developed by DOE.
 - e. Radioactive and mixed low-level waste containers not designed for long-term storage are degrading, causing potential worker health and safety issues associated with the survey, retrieval, and repackaging of waste. The issues include radiological and chemical exposure, and occupational safety.

3. **Background:** The Fifteenth Annual Department of Energy Low-Level Radioactive Waste Management Conference was held December 1-3, 1993, in Phoenix, AZ. The goal of the conference was to identify and discuss low-level radioactive waste management issues, share lessons learned, and present some of the latest advances in waste technology. The conference featured presentations organized along three tracks: Performance Management, Technical Topics, and Institutional Topics. Presentations were made by representatives of the DOE and its contractors, the U.S. Nuclear Regulatory Commission, the Environmental Protection Agency, and various State, Local, Tribal, and medical community representatives. The staff will receive a copy of the proceedings on diskette.

4. **Discussion:**

- a. DOE Management of Low-Level Waste - The DOE Office of Environmental Restoration and Waste Management (EM) is responsible for the management of low-level waste at DOE facilities. EM does not presently have an integrated plan for the management of low-level radioactive waste. However, EM is working to develop a long-range plan which focuses on providing adequate treatment and disposal capabilities. DOE funded research is being conducted to develop new technologies for the treatment, storage, and disposal of low-level radioactive waste.

DOE Headquarters has delegated authority for low-level waste management to the individual DOE facilities. DOE Order 5820.2A, *Radioactive Waste Management*, provides requirements for the storage, treatment, and disposal of low-level waste. The policies and procedures used to manage low-level radioactive waste are developed at each individual site. At the various DOE sites, low-level radioactive waste may be held in interim storage; incinerated; buried in shallow earth burial-grounds; or stored in above-ground vaults.

The Order also requires each disposal facility to conduct a performance assessment to demonstrate that the facility is in compliance with the requirements of the Order. The technical quality of the individual low-level waste disposal facility assessments are reviewed by a Peer Review Panel (PRP). The Order requires that the PRP consist of representatives of the DOE, the contractor, and other specialists in performance assessments. However, the PRP presently consists only of contractor personnel.

DOE personnel are aware of proposed legislation for independent regulation of DOE. Several DOE personnel expressed the belief that independent regulation could occur within the next several years.

- b. Waste Inventory - DOE low-level waste is currently generated at more than 30 different sites, and is disposed of at six sites: Savannah River, Oak Ridge, Idaho National Engineering Laboratory, Nevada Test Site, Los Alamos National Laboratory, and Hanford.

DOE plans to continue to dispose of most of its low-level waste at DOE sites. However, DOE is considering privatization of low-level radioactive waste processing, treatment, and disposal because of lower design and construction costs, lower life cycle costs, and access to commercially developed technology. However, DOE Orders and policy documents would need to be revised to remove restrictions and biases against privatization of services.

DOE plans to reduce the amount of all low-level radioactive waste being generated by aggressively implementing waste minimization programs at all DOE facilities. Waste minimization includes source reduction, reevaluating processes and waste streams, material substitutions, and worker awareness and training. A hazardous solvent substitution database has been developed by the Idaho National Engineering Laboratory to help minimize mixed waste.

c. Mixed Low-Level Waste

Mixed wastes are defined as any low-level radioactive waste that also contains hazardous chemicals governed by the Resource Conservation and Recovery Act (RCRA). Most mixed low-level wastes can be treated to meet the applicable Land Disposal Restriction (LDR) standards under the RCRA. As of December 1992, 42% of DOE's total mixed wastes by volume were low-level mixed wastes (247,036 cu. meters). Of the mixed waste projected to be generated in the next five years, 94% is expected to be mixed low-level waste.

Although mixed low-level waste represents only approximately 5% of the total DOE low-level waste inventory, delays in the selection of treatment methods to remove the hazardous components, and in the design and selection of disposal sites, are resulting in potential environmental issues associated with the long-term storage of the waste, including groundwater and aquifer contamination.

d. Revision of DOE Order 5480.2A - DOE Order 5480.2A, *Radioactive Waste Management*, which describes policies, guidelines, and requirements for managing radioactive and mixed wastes, is being revised to address the organizational and policy changes which have occurred since the Order was issued in 1988. The Office of Environmental Restoration and Waste Management (EM) has replaced the Office of Defense Programs (DP) as the lead organization responsible for waste management. Also, the change in mission of the defense nuclear complex places increased emphasis on environmental, health, and safety issues.

The revised Order 5480.2B, *Waste Management*, will include management of all DOE wastes, not only radioactive and mixed wastes. The revision is expected to include radiological performance objectives for other radioactive waste types besides low-level waste. The mixed waste section of the Order will be revised to implement the new mixed waste requirements in the Federal Facility Compliance Act (FFCA) of 1992. Disposal at private, non-DOE facilities will be allowed. The management of spent nuclear fuel, although not considered a waste, will be covered in the revised Order. Intruder dose limits

will be eliminated from the performance objectives, but the requirement to consider the intruder will be included as part of the design, waste acceptance, and/or waste classification criteria. Finally, the revision does not cover the management or decontamination and decommissioning of radioactively contaminated facilities.

The revision of the Order is in progress. A draft 5820.2B, Waste Management, is expected to be sent out for department-wide review in June 1994. The DOE is interested in obtaining outside reviews, but the extent and details of public participation have not been decided.

There are several major issues not addressed by the revised Order or other DOE policy guidance. Performance assessment criteria have not been developed for long-term storage facilities. Hazardous waste performance objectives have not been defined. There is also no DOE policy for the release of low-level waste materials to the public.

- e. Potential Environmental, Health and Safety Issues - Some presentations discussed potential environmental concerns associated with low-level mixed and radioactive wastes, but very few presentations discussed potential worker health and safety issues. Concerns discussed during the meeting included the following:
- 1) Treatment Methods - DOE is sponsoring research to develop cost-effective treatment methods to reduce waste volumes requiring disposal, to remove hazardous components from mixed waste, and to provide stable waste forms. Stable waste forms are important because they form the basis for performance of the disposal facility with regard to the protection of public health and safety.
 - 2) No Interim Storage Criteria - Delays in the establishment of permanent disposal sites require that existing low-level radioactive waste at some DOE facilities be kept in interim storage for a longer time. Waste kept in interim storage at individual sites can present potential health and safety hazards. Criteria for the interim storage of low-level radioactive waste have not been developed by DOE.
 - 3) Disposal Facilities - Most low-level waste is stored or buried in trenches or near surface land disposal facilities. The waste containers in many of these facilities have degraded, causing groundwater and aquifer contamination. The waste buried in many low-level waste burial sites will have to be retrieved, reprocessed and/or repackaged, and placed in long-term below or above grade disposal facilities with multiple engineered barriers. However, many State and local governments, and the public have not accepted the low-level waste treatment and disposal technologies proposed by DOE. Potential worker health and safety issues are associated with the survey, retrieval, and repackaging of the waste. The issues include radiological and chemical exposure, and occupational safety.

5. **Future Staff Actions:** In 1994 the Defense Nuclear Facilities Safety Board staff plans to conduct reviews at selected DOE facilities to evaluate potential environmental and worker health and safety issues associated with low-level and transuranic waste storage, treatment, and disposal.