DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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

September 8, 1994

The Honorable Hazel R. O'Leary
Secretary of Energy
Washington, D.C. 20585

Dear Secretary O'Leary:

On September 8, 1994, the Defense Nuclear Facilities Safety Board, in accordance with 42 U.S.C. § 2286a(5), unanimously approved Recommendation 94-2 which is enclosed for your consideration. Recommendation 94-2 deals with Conformance with Safety Standards at DOE Low-Level Nuclear Waste and Disposal Sites.

42 U.S.C. § 2286d(a) requires the Board, after receipt by you, to promptly make this recommendation available to the public in the Department of Energy's regional public reading rooms. The Board believes the recommendation contains no information which is classified or otherwise restricted. To the extent this recommendation does not include information restricted by DOE under the Atomic Energy Act of 1954, 42 U.S.C. §§ 2161-68, as amended, please arrange to have this recommendation promptly placed on file in your regional public reading rooms.

The Board will publish this recommendation in the Federal Register.

Sincerely,

John T. Conway
Chairman

Enclosure

Copy to: Mark B. Whitaker, Acting EH-6

RECOMMENDATION 94-2 TO THE SECRETARY OF ENERGY
pursuant to 42 U.S.C. § 2286a(5)
Atomic Energy Act of 1954, as amended.

Dated: September 8, 1994

The high-level radioactive wastes that are a result of weapons material production have been the strong focus of waste management activities of the Department of Energy (DOE). Considerably less attention has been placed upon the large volumes of low-level radioactive waste that have been generated to date and that are projected for the future. Operation of waste management facilities and the maintenance of the defense nuclear complex will continue to generate considerable low-level waste and the need for adequate waste storage and disposal facilities. This volume is likely to increase dramatically with the decommissioning and decontamination of excess facilities.

The Board and its staff have been reviewing low-level waste management within the defense nuclear complex pursuant to 42 U.S.C. § 2286a(a)(1), which requires the Board to review and evaluate the content and implementation of standards, including DOE orders and regulations, at defense nuclear facilities. DOE Order 5820.2A, *Radioactive Waste Management*, and the Nuclear Regulatory Commission's regulation on low-level waste disposal, Code of Federal Regulations Section 10 Part 61, have provided the basic frame of reference for this review. Further, it was useful to examine the low-level waste management program of the Department in terms of its past, present, and the future operations.

The results of our review are summarized as follows:

- As of 1993, the DOE and its predecessor agencies have buried approximately 2.8 million cubic meters of low-level radioactive waste. This waste has largely been disposed of at six sites through the use of shallow land burial -- Savannah River Site, Hanford, Idaho National Engineering Laboratory, Oak Ridge National Laboratory, Nevada Test Site, and Los Alamos National Laboratory.

- Low-level waste disposal as practiced by DOE contractors has not kept pace with the evolution of commercial practices. For example, DOE disposal programs are generally characterized by minimal barriers to infiltration and biologic intrusion, no requirements to protect inadvertent human intruders, and operational practices not geared toward maintaining integrity of the waste form and the cover.

- In 1988, DOE issued Order 5820.2A, *Radioactive Waste Management*, which adopted the basic performance objectives of the Nuclear Regulatory Commission's 10 CFR 61. A key feature of the Order is the requirement to prepare a Performance Assessment (PA). This Performance Assessment is intended to demonstrate that the buried waste will remain sufficiently confined to pose no undue risk to public health and safety. Although the

Order was issued six years ago, no defense nuclear facilities site has to date completed the performance assessment process.

- In establishing low-level waste burial ground source terms, current DOE guidance for performance assessments required by DOE Order 5820.2A allows the evaluators to neglect waste disposed of prior to 1988. Further, it allows evaluators to apply reference dose criteria to disposal facilities individually rather than assessing composite effects when contiguous burial facilities exist. A number of other factors also complicate site specific assessments. For example: (1) a commercial low-level waste burial site is situated adjacent to a DOE burial site at Hanford; (2) some sites have multiple burial grounds, a situation not explicitly addressed by DOE Order 5820.2A; and (3) agreements have been established with State/Environmental Protection Agency authorities for closeout of some burial sites under the *Resource Conservation Recovery Act* and the *Comprehensive Environmental Response, Compensation, and Liability Act* provisions.

- Some effort is being made by those tasked with site waste management to have generators of waste provide long-range forecasts of the amount of wastes they will have to send for disposal, but the forecasts are beset with such uncertainty as to provide little confidence in the projections. This is especially true as the projections pertain to wastes from decontamination and decommissioning, and environmental restoration.

The DOE's burial of low-level waste in some locations within the complex actually constitutes nuclear waste storage, since inadequate emplacement may require later retrieval of the waste, further processing or packaging, and final disposal in a demonstrably adequate facility. Given the substantial volume of low-level waste buried prior to 1988 in old burial sites using practices which do not meet current standards, the lack of complete compliance with requirements of DOE Order 5820.2A at currently operating sites, and the likely dramatic increase in future waste volumes, the Board recommends that:

1. A comprehensive complex-wide review be made of the low-level waste issue similar to the review the Department conducted regarding spent nuclear fuel. As with spent fuel, the objective of such review should be the establishment of the dimensions of the low-level waste problem and the identification of necessary corrective actions to address safe disposition of past, present, and future volumes. The Implementation Plan provided the Board should include:

    a. A regularized program for forecasting future burial needs relative to existing capacity, taking into account the projected programs for decontamination and decommissioning of defense nuclear facilities and environmental restoration activities as well as current operational units.

    b. The development and issuance of additional requirements, standards or guidance on low-level waste management that address safety aspects of waste form and packaging, burial ground siting and performance assessment, facility design, construction, operation, and closure, and

environmental monitoring. Such guidance should reflect consideration of concepts of good practices in low-level waste management as applied in the commercial sector, both nationally and internationally, and results of DOE's technological developments and advisories to the State Compacts pursuant to the *Low Level Radioactive Waste Nuclear Waste Policy Act of 1982*, as amended.

c. Planned studies directed towards (1) improving modeling and predictive capability for assessing migration of radionuclides and (2) enhancing the stability of buried waste forms, deterring intrusion and inhibiting migration of radionuclides.

d. Studies of enhanced methods that can be used to reduce the volume of waste to be disposed of, such as compaction and more environmentally acceptable incineration.

e. Assessments of the safety merits/demerits of privatization of facilities for disposal of DOE low-level wastes.

2. More immediate steps be taken to complete the performance assessment process for all active low-level waste burial sites as required by DOE Order 5820.2A. In so doing clarifying instructions should be issued to insure that:

a. Performance assessments are based upon the total inventories (past, present, and future) emplaced or planned for the burial site(s).

b. Performance objectives (dose criteria) of DOE Order 5820.2A are achieved for the composite of all low-level waste disposal facilities on the site.

3. If non-compliance with reference dose criteria set forth in DOE Order 5820.2A is found, an action plan with schedule be developed for bringing operations into compliance or other acceptable compensating measures be undertaken in the interim pending final closure.

John T. Conway, Chairman

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

[Recommendation 94–2]

Conformance With Safety Standards at DOE Low-Level Nuclear Waste and Disposal Sites

AGENCY: Defense Nuclear Facilities Safety Board.

ACTION: Notice; recommendation.

SUMMARY: The Defense Nuclear Facilities Safety Board has made a recommendation to the Secretary of Energy pursuant to 42 U.S.C. 2286a concerning conformance with safety standards at DOE low-level nuclear waste and disposal sites. The Board requests public comments on this recommendation.

DATES: Comments, data, views, or arguments concerning this recommendation are due on or before October 17, 1994.

ADDRESSES: Send comments, data, views, or arguments concerning this recommendation to: Defense Nuclear Facilities Safety Board, 625 Indiana Avenue NW., Suite 700, Washington, DC 20004–2901.

FOR FURTHER INFORMATION CONTACT: Kenneth M. Pusateri or Carole C. Morgan, at the address above or telephone (202) 208–6400.

Dated: September 12, 1994.

John T. Conway,

Chairman.

Dated: September 8, 1994.

The high-level radioactive wastes that are a result of weapons material production have been the strong focus of waste management activities of the Department of Energy (DOE). Considerably less attention has been placed upon the large volumes of low-level radioactive waste that have been generated to date and that are projected for the future. Operation of waste management facilities and the maintenance of the defense nuclear complex will continue to generate considerable low-level waste and the need for adequate waste storage and disposal facilities. This volume is likely to increase dramatically with the decommissioning and decontamination of excess facilities.

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The results of our review are summarized as follows:

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- Low-level waste disposal as practiced by DOE contractors has not kept pace with the evolution of commercial practices. For example, DOE disposal programs are generally characterized by minimal barriers to infiltration and biologic intrusion, no requirements to protect inadvertent human intruders, and operational practices not geared toward maintaining integrity of the waste form and the cover.
- In 1988, DOE issued Order 5820.2A, *Radioactive Waste Management*, which adopted the basic performance objectives of the Nuclear Regulatory Commission's 10 CFR part 61. A key feature of the Order is the requirement to prepare a Performance Assessment (PA). This Performance Assessment is intended to demonstrate that the buried waste will remain sufficiently confined to pose no undue risk to public health and safety. Although the Order was issued six years ago, no defense nuclear facilities site has to date completed the performance assessment process.
- In establishing low-level waste burial ground source terms, current DOE guidance for performance assessments required by DOE Order 5820.2A allows the evaluators to neglect waste disposed of prior to 1988. Further, it allows evaluators to apply reference dose criteria to disposal facilities individually rather than assessing composite effects when contiguous burial facilities exist. A number of other factors also complicate site specific assessments. For example: (1) A commercial low-level waste burial site is situated adjacent to a DOE burial site at Hanford; (2) some sites have multiple burial grounds, a situation not explicitly addressed by DOE Order 5820.2A; and (3) agreements have been established with State/Environmental Protection Agency authorities for closeout of some burial sites under the Resource Conservation Recovery Act and the Comprehensive Environmental Response, Compensation, and Liability Act provisions.
- Some effort is being made by those tasked with site waste management to have generators of waste provide long-range forecasts of the amount of wastes they will have to send for disposal, but the forecasts are beset with such uncertainty as to provide little confidence in the projections. This is especially true as the projections pertain to wastes from decontamination and decommissioning, and environmental restoration.

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John T. Conway,

Chairman.

September 8, 1994.

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Secretary of Energy,
Washington, DC 20585

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The Board will publish this recommendation in the Federal Register.

John T. Conway,

Chairman.

[FR Doc. 94-22875 Filed 9-14-94; 8:45 am]

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