DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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

October 12, 1990

The Honorable James D. Watkins
Secretary of Energy
Washington, DC 20585

Dear Mr. Secretary:

On October 11, 1990, the Defense Nuclear Facilities Safety Board, in accordance with Section 312(5) of the Atomic Energy Act of 1954, as amended, 42 U.S.C.A. Section 2286a(5), approved a recommendation which is enclosed for your consideration.

42 U.S.C.A. Section 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. Please arrange to have this recommendation placed on file in your regional public reading rooms as soon as possible.

The Board will publish this recommendation in the Federal Register.

It is to be noted that the enclosed recommendation applies to the Department of Energy's proposed implementation of the Board's Recommendation 90-3 dated March 27, 1990.

Sincerely,

John T. Conway
Chairman

Enclosure

RECOMMENDATION TO THE SECRETARY OF ENERGY
pursuant to Section 312(5) of the
Atomic Energy Act of 1954, as amended.

Dated: October 11, 1990

On March 27, 1990, the Board transmitted to you its Recommendation 90-3, regarding the single shell high level waste tanks at the Hanford site. On May 10, 1990, you replied stating that you agreed with our recommendations and accepted them. On August 10, 1990, you forwarded to the Board your plan for implementation of the Board's recommendations on this issue.

In the intervening time, members of the Board and their staff and technical experts have visited the Hanford site on several more occasions and have further discussed the measures proposed and the plans for implementation. After careful consideration, the Board has concluded that the DOE proposed implementation plan for Recommendation 90-3 is not adequately responsive. In particular, it does not reflect the urgency that the circumstances merit and that was implicit in the Board's recommendations. Nor does it appear that the contractor involved has been required by DOE to marshall the technical and managerial resources required, and to focus them on the problem in a measure commensurate with its gravity.

The Board specifically recommends that the implementation plan be modified as follows:

0 Immediate steps should be taken to add instrumentation as necessary to the single shell tanks containing ferrocyanide that will establish whether hot spots exist or may develop in the future in the stored waste. The instrumentation should include as a minimum additional thermocouple trees. Trees should be introduced at several radial locations in all tanks containing substantial amounts of ferrocyanide, to measure the temperature as a function of elevation at these radii. The use of infra-red techniques to survey the surface of waste in tanks should continue to be investigated as a priority matter, and on the assumption that this method will be found valuable, monitors based on it should be installed now in the ferrocyanide bearing tanks.

0 The temperature sensors referred to above should have continuous recorded readouts and alarms that would signal at a permanently manned location any abnormally high temperatures and any failed temperature instrumentation.

0 Instrumentation should also be installed to monitor the composition of cover gas in the tanks, to establish if flammable gas is present.

0 The program of sampling the contents of these tanks should be greatly accelerated. The proposed schedule whereby analysis of two core samples from each single shell tank is to be completed by September, 1998 is seriously inadequate in light of the uncertainties as to safety of these tanks. Furthermore, additional samples are required at several radii and at a range of elevations for the tanks containing substantial amounts of ferrocyanide.

0 The schedule for the program on study of the chemical properties and explosive behavior of the waste in these tanks is indefinite and does not reflect the urgent need for a comprehensive and definitive assessment of the probability of a violent chemical reaction. The study should be extended to other metallic compounds of ferrocyanide that are known or believed to be present in the tanks, so that conclusions can be generalized as to the range of temperature and other properties needed for a rapid chemical reaction with sodium nitrate.

0 The Board had recommended "that an action plan be developed for the measures to be taken to neutralize the conditions that may be signaled by alarms." Two types of measures are implied: actions to respond to unexpected degradation of a tank or its contents, and actions to be taken if an explosion were to occur. Your implementation plan stated that "the current contingency plans ..... will be reviewed and revised if needed." We do not consider that this proposed implementation of the Board's recommendation is adequately responsive. It is recommended that a written action plan founded on demonstrated principles be prepared as soon as possible, that would respond to indications of onset of abnormal temperatures or other unusual conditions in a ferrocyanide-bearing tank, to counter any perceived growth in hazard. A separate emergency plan should be formulated and instituted, covering measures that would be taken in event of an explosion or other event leading to an airborne release of radioactive material from the tanks, and that would protect personnel both on and off the Hanford site. The Board believes that even though it is considered that the probability is small that such an event will occur, prudence dictates that steps be taken at this time to prepare the means to mitigate the unacceptable results that could ensue.

John T. Conway, Chairman