

[DNFSB LETTERHEAD]

March 27, 1990

Honorable James D. Watkins
Secretary of Energy
Washington, DC 29585

Dear Mr. Secretary:

On March 27, 1990, the Defense Nuclear Facilities Safety Board, in accordance with Section 312(5) of Public Law 100-456, approved a number of recommendations which are enclosed for your consideration.

Section 315(A) of Public Law 100-456 requires the Board, after receipt by you, to promptly make these recommendations available to the public in the Department of Energy's regional public reading rooms. Please arrange to have these recommendations placed on file in your regional public reading rooms as soon as possible.

The Board will publish these recommendations in the Federal Register.

Sincerely,

John T. Conway
Chairman

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

Dated: March 27, 1990

During the visit of members of the Defense Nuclear Facilities Safety Board to the Hanford site on December 11-12, 1989, one of the topics discussed was the question of the susceptibility of the old single shell high level waste tanks to an explosion of a spontaneous nature, with resulting release of large amounts of radioactive material to the environment. This potential problem had been brought to the attention of the Board during its confirmation hearing. The Board members received a briefing on the subject during their visit and they were later furnished additional relevant documents.

The Board subsequently obtained the assistance of three highly qualified experts, who visited the Hanford site on March 20-21, 1990, to explore questions that had surfaced through its earlier reviews. The experts developed information on the chemical contents of the tanks and the implications for the possibility of a spontaneous explosive reaction. The experts have now made their preliminary oral report to the Board.

As a result of these activities, the Board concludes that the probability of an explosion in the old single shell waste tanks is low. All evidence available indicates that the conditions that might have contributed to a higher probability of such an explosion were more prevalent in the past than they are now, and these conditions are continuing to lessen as time passes. The principal factor contributing to this moderating of conditions is the reduction of the radiation field in the tanks through radioactive decay of their active contents. This serves to lower both the rate of ionization of the components of the waste and the heat source that might elevate the temperature.

However, the Board does have some residual concerns resulting from the uncertainty of information on the details of composition of the contents of these tanks, the physical conditions within them, and the recent information concerning high levels of hydrogen in some of the double-walled waste tanks. These concerns prompt the Board to recommend the following for future programs for monitoring the single shell tanks:

- o That a study be undertaken of the possible chemical reactions that could be the source of heat generation locally or globally in the single shell tanks, thereby elevating the temperature to a value where explosive ferrocyanide reactions can take place rapidly.
- o That the Department of Energy develop a program for continuous monitoring of those conditions in the single shell tanks that can serve to indicate development of conditions indicating an onset of instability in their contents. These conditions might include such features as abnormal temperatures in local areas, physical deformation of the surface of the waste or unusual components (including hydrogen) in the cover gas within the tanks.
- o That the instruments used in monitoring the tanks be provided with alarm indicators at a

location where decisions can be made and action taken to start a series of measures to neutralize a perceived abnormality

- o That an action plan be developed for the measures to be taken to neutralize the conditions that may be signaled by alarms.

The Board considers the matter of hydrogen generation in the double walled tanks to be potentially more serious than questions related to the single shell tanks, and is pursuing it separately.

John T. Conway, Chairman