DEFENSE NUCLEAR FACILITIES SAFETY BOARD

March 30, 1993

MEMORANDUM FOR: G.W. Cunningham, Technical Director

FROM: Russell A. Green

THROUGH: Timothy J. Dwyer
Hanford Site Team Leader

COPIES: Board Members

SUBJECT: Trip Report - Review of the Multi-function Waste Tank Facility (MWTF) at the Hanford Site, February 9-11, 1993

1. **Purpose:** This report documents observations made by the DNFSB staff (R. Green and A. Stadnik) and outside experts (OEs: W.J. Hall, J.D. Stevenson and P.C. Rizzo) during the meetings on the Multi-function Waste Tank Facility (MWTF) project held at the DOE offices in Richland, WA on February 9-11, 1993. The purpose of the meetings was to review the progress made in the MWTF project.

2. **Summary:** The organizational relationships for the MWTF project do not satisfy Recommendation 92-4 by clearly outlining the responsibilities of each participating organization. The lack of a clear organizational chain of command could result in design deficiencies. Also of concern are the industry consensus standards chosen for use as the design bases, and the non-safety class designation of the monitoring instrumentation.

3. **Background:** The mission of the MWTF has changed since the beginning of the project. As stated in the "Multi-Function Waste Remediation Facility Justification of Mission Need," the current purpose of this facility is to provide additional high-level waste storage capacity. The facility will consist of four underground tanks, each with a capacity of one million gallons. Each underground tank shall consist of three concentric structures: a free-standing, stainless steel, primary tank; a steel secondary tank liner; and a reinforced concrete secondary tank. A layer of insulating refractory will be placed between the bottom of the primary tank and the secondary liner to protect the reinforced concrete floor from thermal stresses. An above ground permanent enclosure shall be provided over the top of the four tanks to provide weather protection.

   The lack of consideration for technical issues by the MWTF project management and the need for a definitive chain of command prompted the issuance of DNFSB Recommendation

92-4. This recommendation was issued to DOE on July 6, 1992 and was accepted by the Secretary of Energy on August 28, 1992. The 92-4 Implementation Plan was originally required to be submitted to the Board by December 22, 1992, but DOE requested a 45-day extension. DOE submitted the plan on February 5, 1993.

4. **Discussion:** A clear organizational relationship or chain of command for the MWTF project does not exist. Board Recommendation 92-4 specifies that the responsibilities of each participating organization shall be clearly outlined. Design deficiencies for which no organization would be responsible could result as a consequence of not having a well established organizational chain of command. For example, the functional and detailed designs are to be prepared by Kaiser Engineers Hanford (KEH) for approval by Westinghouse Hanford Company (WHC) and ultimately DOE. However, approval signatures on all drawings will be executed by KEH personnel. Additionally, as-built reconciliation will be performed by a separate KEH department, under a direct contract with DOE, rather than the MWTF contract.

   The exclusive use of a probabilistic approach to radiological release following accidents results in a Safety Classification requirement for only a few components. Specifically, only the primary tank and liner require seismic qualification. Although this may meet the literal requirements of DOE SEN-35-91, "Nuclear Safety Policy," it would seem prudent to also require monitoring instruments to be Safety Class Components. For example, this would allow post-accident monitoring of waste temperature and therefore aid in situation assessments.

   The DNFSB staff and OEs discussed the use of alternative design standards to the ones proposed by DOE. DOE proposes to use ASME III, Div. 1, Subsection NC-3900 and ACI-349, ACI-301 as the design standards for the steel waste tank and the concrete secondary confinement, respectively. The DNFSB staff and OEs advocated the use of ASME III, Div. 1, Subsection NE and ASME III, Div. 2, Subsection CC (ACI-359) for these components, respectively. The suggested alternatives are considered more directly applicable to the confinement of hazardous material, as opposed to codes that have a safety related function with regard to the general storage of fluids.

   The only proposed corrosion testing program consists of approximately four months of real time testing of two different metals. No accelerated corrosion testing will be performed. A linear extrapolation based on the four months of data will be used to predict the useful life of the tanks. It would seem prudent to test various metals at accelerated corrosion rates and base material selection and operational life on the results.

   From the presentations it was not clear if any consideration is being given to decontamination and decommissioning (D&D) in the design of the MWTF. It would seem prudent that past D&D projects, both commercial and government, be studied for lessons learned.

There has been no thought given to the matter of how to ascertain if the secondary barrier is leak tight, or if it will function properly in the near term, much less long term, in the event of a leak in the primary tank. Logic dictates that a method of verification should be devised to ensure the leak tightness of the secondary liner.