DEFENSE NUCLEAR FACILITIES SAFETY BOARD

June 27, 1995

MEMORANDUM FOR: G. W. Cunningham, Technical Director

COPIES: Board Members

FROM: Richard E. Tontodonato

SUBJECT: Status of Hanford Site High-Level Waste Tank Characterization Program Technical Basis

1. **Purpose:** This report summarizes Department of Energy (DOE) and Westinghouse Hanford Company (WHC) efforts to develop a technical basis for characterization of the high-level waste tanks at the Hanford Site.

2. **Summary:** WHC has proposed a sampling and analysis program intended to provide the data needed to establish a technical basis for high-level waste tank characterization. However, the sampling and analysis of the 26 tanks in this new plan would not be completed until July 1997. Based on WHC presentations to the Board on June 6, 1995, WHC expects the forthcoming Hanford Tank Farms Accelerated Safety Analysis (ASA) to eliminate the need for extensive safety-related sampling. The new WHC approach is scheduled to be finalized and provided to the DOE Richland Operations Office (DOE-RL) for approval by June 30, 1995.

3. **Background:** Characterizing the tank wastes is key to resolving high-level waste tank safety issues at the Hanford Site. On July 19, 1993, the Board issued Recommendation 93-5, which addresses the need for the DOE to undertake a comprehensive reexamination and restructuring of the characterization effort. The recommendation sets goals of two years for completing safety-related sampling and analysis for watch list tanks and three years for other tanks. The Board accepted DOE's Implementation Plan on March 25, 1994, and members of the Board's staff have visited Hanford eight times since November 1993 to review implementation of the plan. The Board held a public hearing in Richland, Washington, to discuss implementation problems on March 29, 1995, and visited the site on June 6-7, 1995, to follow up concerns raised at the public hearing.

4. **Discussion:**

   a. Safety-related characterization: WHC is still working to justify a safety-related sampling program which obtains only surface and vapor samples from most tanks. WHC plans to validate this program by performing more extensive sampling on 20 tanks. The chosen

tanks are believed to bound the range of possible tank conditions, based on historical information. Core, auger, and/or vapor samples will be obtained and analyzed to make the following assessments:

- Moisture retention and distribution
- Chemical energy content and reaction propagation behavior
- Aging of ferrocyanide and organic compounds
- Organic solubility
- Vapor homogeneity in tank dome space

This effort is a significant positive step for the characterization program. However, the schedule is a concern. WHC plans to complete sampling and laboratory analysis for the validation effort in December 1996. This does not support the implementation plan commitment to complete safety-related sampling and analysis for all tanks by October 1996.

The tank farms ASA, scheduled for DOE-Headquarters approval by October 1995, has become a significant influence upon WHC characterization program strategy. WHC personnel believe that the ASA will prove that tank safety can be assured using minimal sampling coupled with operational controls. Although WHC has expressed satisfaction with the current draft of the ASA, an independent review by the Idaho National Engineering Laboratory produced about 90 pages of comments, some of which raise significant technical issues. The staff will evaluate the adequacy of the ASA.

b. Integration of process development needs: WHC has begun to integrate the characterization needed by the safety program with that required for retrieval, pretreatment, and disposal process development. WHC has identified a total of 26 tanks which require core sampling to support technical basis development. The list includes representatives from each of the major waste types, as well as the tanks identified for core sampling by the safety program. Tanks which can provide information on several needs (e.g., a relatively dry tank with high organic content and significant layers of saltcake and REDOX waste) will receive highest priority for sampling. These samples will provide information needed to validate the expected composition of the major waste types, improve estimates of the number and types of samples per tank needed for various analytes, and identify unexpected safety issues. An average of three core samples will be obtained from each tank.

This program is sound and should greatly improve the technical underpinnings of the characterization effort. However, WHC does not plan to complete sampling and analysis of these 26 tanks until July 1997.

c. DOE-RL actions: Documents defining the technical basis and schedule for tank characterization will be submitted to DOE-RL for approval by the end of June 1995. DOE-RL expects to complete a revised implementation plan for Recommendation 93-5 by October 1995. The new plan is expected to update the characterization strategy and provide a realistic schedule for completing safety-related sampling and analysis.

5. **Future Staff Actions:** The staff will continue to closely follow implementation of Recommendation 93-5. The staff plans to visit the Hanford Site in mid-July to further discuss the characterization program strategy and schedule as well as the results of efforts to improve sampler performance.