DEFENSE NUCLEAR FACILITIES SAFETY BOARD

July 29, 1994

MEMORANDUM FOR:	G. W. Cunningham, Technical Director
COPIES:	Board Members
FROM:	Richard E. Tontodonato, Technical Staff
SUBJECT:	Review of Implementation of DNFSB Recommendation 93-5 at the Hanford Site July 19-21, 1994

1. **Purpose:** This trip report documents a visit by DNFSB Staff members (David Lowe and Richard Tontodonato) to the Hanford Site on July 19-21, 1994, to review progress toward implementing DNFSB Recommendation 93-5 regarding characterization of high-level tank waste.

2. **Summary:** The Westinghouse Hanford Company (WHC) has not yet resumed core sampling of the high-level waste tanks, has no firm plans for making up the lost time, and is making little progress toward developing a technical basis for the characterization program. The Department of Energy's Richland Operations Office (DOE-RL) has begun to review technical deliverables produced by WHC. However, DOE-RL has not yet approved or disapproved any of the Data Quality Objectives (DQO) documents which define WHC's sampling and analysis plan.

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 Department of Energy (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.

   DNFSB technical staff members have visited the Hanford Site four times since November 1993 to review implementation of Recommendation 93-5. A letter sent by the Board to the DOE Office of Environmental Management (DOE-EM) on May 11, 1994, identified the following concerns identified during these visits: (1) WHC did not have an adequate basis for the number of tank samples needed to achieve Recommendation 93-5 objectives; (2) DQOs were not being developed with the goal of meeting established tank farm safety limits with high statistical confidence; (3) the sampling schedule was not coordinated with other tank farm programs needing access to risers; (4) WHC's plan to use only one off-site laboratory did not comply with the Recommendation 93-5 implementation plan; and (5) DOE-RL was not providing adequate technical direction to WHC. Staff trip reports have further identified that WHC did not succeed in resuming core sampling as scheduled in the implementation plan and did not have firm plans for recovering the lost time. This review was conducted as a follow-up to the previous reviews.

4. **Discussion:**Discussions among the DNFSB technical staff, DOE-RL, WHC, and Pacific Northwest Laboratory personnel on July 19-21, 1994, are summarized below:

    a. Sampling strategy: WHC has made no demonstrable progress toward defining a strategy for developing a technical basis for the safety-related tank sampling program. Little has been done to define how many samples are needed to adequately characterize tanks for safety purposes. Issues such as whether and how tanks should be grouped for sampling purposes and how the results of sampling and analysis will be used to model the distribution of wastes within a tank continue to be unresolved. The sampling strategy is still based on the "near-term" requirement in the 93-5 implementation plan to sample each available riser in each tank.

    In response to an issue raised during the March 1994 DNFSB Staff review of the characterization program (documented in an April 22, 1994, Staff trip report), WHC is now evaluating recent analytical results to better establish what is currently known about the tanks and to determine how these data can be used in defining a characterization strategy. Although many of the samples were homogenized before analysis, these data are providing useful guidance for the waste pretreatment DQO under development.

    WHC has also assembled a DQO review panel to evaluate the adequacy of DQOs prepared for tank sampling and analysis. The principal findings of this panel are consistent with the concerns documented in the Board's May 11, 1994, letter to DOE-EM and in the DNFSB Staffs April 22, 1994, trip report. WHC plans to revise all DQOs to resolve these findings, but the schedule is not yet defined.

    b. Core sampling status: The rotary mode core sampling truck is in the final stages of the DOE-RL operational readiness evaluation, and sampling is expected to begin on August 3, 1994. Unfortunately, the first tank planned for rotary mode sampling, tank 241-C-106, is now at a temperature above the 200·F upper limit specified in the sampling truck's safety assessment, due to a recent "process test", which appears to have redistributed heat-generating wastes within the tank. If the tank does not stabilize at a temperature below 200·F, WHC plans to choose a different tank within C-farm to sample while the temperature limit is re-evaluated.

    The push mode core sampling truck is now being moved to the SY-farm to sample tank 241-SY-103, which undergoes periodic gas release events. The wastes in tank 241-SY103 are believed to be similar to tank 241-SY-101, which was successfully sampled using the push mode truck in 1991. WHC conducted a test program using the rotary truck in push mode to attempt to determine why recovery was poor for the two tanks most recently sampled (241-C-108 and -111). Testing in a clay simulant revealed that rough handling of the samplers could break them, a fact previously not communicated to sampling crews, and also proved that sampling soft waste with a relatively hard crust on top could result in poor recovery. Based on this testing, WHC plans to use a new bit with a

bayonet-like extension to sample such wastes. The extension on the bit will be inserted into the waste and rotated briefly to cut around the edges of a sample, then the sampler will be inserted to recover the material.

The second and third rotary mode sampling trucks are currently projected to be available for sampling by February 15, 1995, and March 15, 1995, respectively. WHC personnel stated that although these dates were later than estimates provided during the May 1994 DNFSB Staff visit, the apparent slippage resulted from defining the schedule better, and not from additional problems in assembling the trucks.

c. Sampling schedule: WHC has not defined a plan for recovering the time lost due to the delays in resuming core sampling and procuring the new sampling trucks. Further, WHC personnel stated that upcoming budget cuts for the Tank Waste Remediation System (TWRS) program will make it difficult or impossible to apply the effort needed to complete the safety-related sampling program as scheduled in the 93-5 implementation plan. The integrated tank sampling schedule for FY 95-96 was not issued as scheduled in June 1994, and WHC personnel estimate it will probably not be completed until September 1994. During this time, WHC will evaluate various methods to prioritize the tanks for sampling to determine which approach will best meet the goals of Recommendation 93-5.

d. DOE-RL involvement: In response to the concerns raised in the Board's May 11, 1994, letter, DOE-RL has begun to review deliverables provided by WHC. DOE-RL is now forwarding deliverables to the Board, with letters indicating whether they were approved or rejected and identifying any comments provided to WHC. However, DOE-RL has not completed review and disposition of any of the DQOs prepared by WHC. WHC is currently performing sampling and analysis based on the DQOs, so it is important that DOE-RL complete its reviews promptly.

Due to problems in resuming core sampling, the DOE-RL characterization program manager is now questioning the basic strategy outlined in the 93-5 implementation plan. He informed the DNFSB Staff that he plans to assemble a team to assess whether safe storage of high-level tank wastes can be assured without extensive core sampling. The DNFSB Staff agrees that a better strategy may be found, particularly as the requirements for safe interim storage become integrated with the overall TWRS systems engineering effort. However. if this new initiative usurps too much support from the already limited effort to define the strategy DOE committed to in the 93-5 implementation plan, the result may be that the characterization program will simply continue to operate with no defensible technical basis for the foreseeable future.

DOE-RL has decided to accept WHC's recommendation to use only one off-site lab, the Idaho National Engineering Laboratory, for routine analytical support. DOE-RL personnel stated that the Los Alamos National Laboratory will be used for developmental work and will be upgraded to provide routine analytical

services if it becomes necessary. DOE-RL considers this approach meets the commitments in the 93-5 implementation plan.

5. **Future Staff Actions:** The DNFSB technical staff will continue to closely follow implementation of Recommendation 93-5, particularly DOE-RL's proposal to redefine the characterization program's strategy and WHC's efforts to resume core sampling, improve their DQO documents, and develop an integrated sampling schedule for FY 95-96.