DEFENSE NUCLEAR FACILITIES SAFETY BOARD

August 10, 1994

MEMORANDUM FOR: G. W. Cunningham, Technical Director

COPIES: Board Members

FROM: Steven Stokes

SUBJECT: Report on 93-5 Laboratory Support

1. **Purpose:** This report documents the DNFSB Staff visit to the Hanford Site on June 27-28, 1994, to review the Laboratory Support for Recommendation 93-5. The DNFSB Staff participants were Steven Stokes and Dermot Winters.

2. **Summary:** Recently, Westinghouse Hanford Company (WHC) selected the Idaho National Engineering Laboratory as the sole off-site lab for performance of safety related analysis in support of Recommendation 93-5. Operations are to commence in October 1994, and the additional capacity provided is expected to be sufficient to support timely completion of the commitments made in the 93-5 implementation plan.

   The design basis for archiving of core samples does not appear to include any special conditions which would allow these samples to be used for organics, rheological, or moisture content analyses at a later time. This may restrict the usefulness of archived materials and could result in having to obtain additional tank wastes for certain analyses.

   Integration of analytical error into the Data Quality Objectives (DQO) decision making process has not been achieved. WHC has recognized this and stated that they are reviewing it as a part of a newly established effort to review all DQOs.

3. **Background:** Accomplishing the Recommendation 93-5 objectives for completing safety-related sampling and analysis of Hanford's high level waste tanks requires the full support of the analytical laboratories at the Hanford Site. Efforts are underway to expand laboratory capacity and focus analysis on resolution of safety issues. The Department of Energy (DOE) has committed to utilize laboratory services at the Idaho National Engineering Laboratory and Los Alamos National Laboratory, and to greatly reduce turnaround time for analytical results at the two Hanford Site laboratories. Additionally, plans to increase the sample archiving capacity at the Hanford Site are being developed.

4. Discussion/Observations:

a. Offsite Laboratories:

1. Idaho National Engineering Laboratory (INEL). Activities to establish the laboratory at INEL as a part of Hanford's tank waste characterization program are progressing as scheduled, including resolution of National Environmental Policy Act (NEPA) issues. Currently, WHC representatives expect INEL to be fully operational by October 31, 1994. WHC management has sent teams to INEL to review their progress. This has included reviews of quality assurance/quality control activities, procedures, and plans to monitor INEL's final readiness activities (to begin on October 1, 1994). Completion of these reviews is scheduled to coincide with the anticipated October 31, 1994, INEL start date.

2. Los Alamos National Laboratory (LANL). Plans to use LANL in support of tank waste characterization are restricted to research and development (R&D) activities. This decision is based on completion of a study that compared upgrade requirements for INEL and LANL. WHC personnel stated that the capacity provided by INEL is expected to be sufficient to support Recommendation 93-5, but the LANL facilities could be used to support characterization activities other than R&D if needed. This may be important if, in the future, characterization for reasons other than safety are needed, e.g., for RCRA purposes. LANL personnel stated that capacity currently exists to do more than R&D work and that given sufficient resources, LANL could quickly be in a position to do more characterization work (including RCRA or safety).

b. Sample Archiving. Sample archiving facilities are currently being or have been constructed in the new and existing hot cells. Archiving essentially consists of splitting samples for storage. DNFSB Staff review of the design basis for archiving revealed that very little technical basis exists for the recommended hold times and volumes saved. It is not clear to the DNFSB Staff that any criteria other than the storage capacity necessary to save the projected number of samples were used to determine appropriate storage conditions. For example, WHC laboratory personnel stated that 40 ml of each sample would be saved for a period of 18 months (this 18 month clock begins when the results are reported). After the initial 18 month period, the sample material would be removed from the 40 ml vial and placed in a 100 ml vial, along with sample material from the same core or segment, and then retained for five years with an option to store for another five years. The 18 month and five year storage periods do not appear to have any technical basis. WHC laboratory personnel presented no information to suggest that special storage requirements, i.e., temperature, humidity, etc., were assessed to determine what would be required to maintain sample representativeness for all safety-related analyses. The only archiving requirement currently well understood is the storage capacity necessary to support the projected number of 40 ml and 100 ml vials given 18 month and 5 year storage times.

Based on the current archiving conditions, WHC laboratory personnel stated that several key analyses, if performed on archived samples, would have little value due to the dramatically different environments existing between a tank and the archive facility. In particular, all volatile or semi-volatile organics, rheological, energetics, and water content measurements would be of very little, if any, value. Measurements of heavy metals, long half-life radioactive elements, and isotopic breakdowns, however, would not be expected to change significantly during the archival period. It is not clear to the DNFSB Staff that the safety programs requesting archival of samples understand these limitations. WHC laboratory personnel stated that it was also not clear to them that these limitations were well understood by the safety, pretreatment, or other programs that requested archiving of samples. The DNFSB Staff believes that unless these limitations are well understood by the program elements using these data, then a much higher potential exists for having to resort to retrieval of additional tank materials.

c. Measurement of Analytical Error and Incorporation in Decision Making. Analytical error is measured using a series of controls, blanks, duplicates, and spiked samples. The controls established by laboratory personnel appear to be adequate to accurately determine this type of error. However, WHC laboratory personnel stated that integration of analytical error into the DQO process has not been accomplished. Specifically, error tolerances from an analytical standpoint are not included in the decision making process outlined in the DQO. WHC personnel recognize the importance of this issue and stated that the recently formed DQO review team initiated by WHC's characterization organization will address this issue. (This issue was originally documented in an April 22, 1994, DNFSB Staff trip report.)

5. **Future Staff Actions:** The Board's Staff will continue to follow implementation of Recommendation 93-5 as it pertains to laboratory support. Specifically, the Staff will assess the timeliness of initiation of operations at INEL, the ability of onsite labs to support rapid completion of safety-related analyses, the results of the DQO review team's assessment concerning integrating analytical error into the decision making process, and a more in-depth review of the design basis for archiving of samples.