

**DEFENSE NUCLEAR FACILITIES SAFETY BOARD**

May 5, 1993

**MEMORANDUM FOR:** G.W. Cunningham, Technical Director

**FROM:** David Lowe  
Steven Stokes

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**SUBJECT:** Trip Report to Hanford by DNFSB  
Board Members Mr. John Conway and  
Mr. Joe DiNunno

1. **Purpose:** This report documents DNFSB staff observations concerning visit to the Hanford Site on April 6-7, 1993 by Mr. John Conway and Mr. Joe DiNunno.
2. **Summary:** Issues reviewed during the visit were the status of irradiated fuel storage at the K-East Basin, Multi-function Waste Tank Facility, the Hanford Waste Vitrification Plant, tank farm transfers of liquid waste, Tank Waste Characterization (including the use of FMEF as an analytical laboratory and operation of the 325 and 222-S analytical laboratories), the Environmental and Molecular Sciences Laboratory, 101-SY mixer pump modifications, and the recently released Tank Waste Remediation System (TWRS) Rebaseling.
3. **Background:** Based upon board interest in the Tank Waste Remediation System Rebaseling, Tank Waste Characterization, and encapsulation of K-East Basin Fuels, a trip to review these subjects was undertaken by Mr. Conway and Mr. DiNunno. Technical staff support was provided by D. Lowe, S. Stokes, and J. Straub (Outside Expert). This report summarizes the issues discussed.
4. **Discussion/Comments:** The following is a brief summary of the topics discussed during the visit.
  - (a) K-East Basin Tour. A general tour of the K-East Basin was conducted. Discussions addressed basin history, leak history (status of the current leak investigation and a comparison between the 1978 and 1993 leaks), and plans to encapsulate exposed irradiated N-Reactor fuel.
  - (b) HWVP and the Initial Pretreatment Module (IPM).

- (1) Review of the ongoing DOE-RL and Washington State negotiations concerning rescoping of the HWVP were conducted. Currently 2 options are being discussed that deal with balancing the amount of the total waste disposed as either HLW (glass) or low level waste. These two options are: (1) Reduced pretreatment of stored waste with accompanying increased glass production, or (2) Increased pretreatment and reduced glass production. Several issues were raised, most notably the long term feed supply and systems integration issues, i.e. what are the plans for HWVP once the initial feed is exhausted? This is especially critical in light of poorly characterized tank wastes and potentially limited application of the IPM since it is to be designed with pretreatment of safety tanks as its primary function. Additionally, it did not appear that HWVP is coupled with the new tank construction which is undesirable from a systems engineering approach.
  - (2) The proposed HWVP and IPM sites were visited. Notably, both HWVP and the IPM are located between the 200 East and West Areas to minimize underground transfer distances. Discussed was the need for cross-site transfer lines that meet RCRA, safety, and operational requirements.
- (c) Environmental and Molecular Sciences Laboratory (EMSL).
- (1) The purpose of the EMSL was discussed. This facility's mission will be research at the molecular, level primarily in the areas of soil and ground water remediation, bioremediation techniques, advanced processing (i.e. chemical separations techniques for application in remediation efforts, waste form development, and organic destruction methods), waste characterization, and health effects due to radioactivity and chemical exposure.
  - (2) This discussion was summary in nature and focused on potential research topics related to waste treatment and environmental restoration. There was little discussion that related the mission of the EMSL to resolution of near term safety issues (i.e. resolution of tanks safety issues).
- (d) 200 Area Tank Farms.
- (1) Transfer of waste tank contents from tank to tank was discussed. Highlighted was the transfer of 101-T pumpable liquids, i.e. what is involved in mechanically making the transfer as well as requirements for documenting the transfer. Specific discussion centered upon the length of time required to actually begin pumping the 101-T once the decision had been made to conduct the transfer. Addressed was DOE-RL and WHCs

inability to initiate pumping following verbal direction from DOE-HQ,  
i.e. safety impacts due to delayed pumping.

- (2) **Monitoring Facilities for 101-SY.** The monitoring equipment for in-tank instrumentation was observed.
- (e) **Tank Waste Characterization and Laboratory Tours.** This discussion addressed:
- (1) **Operations at the 222-S and 325 Laboratories,** (2) **Waste characterization requirements and schedules,** and (3) **applicability of the Fuels and Materials Examination Facility (FMEF) to support hot cell requirements for characterization.**
- (1) **Operations the 222-S and 325 laboratories and Waste Characterization Requirements.** Tours of both facilities were conducted. Observation of extrusion of tank waste cores was observed in a 222-s Hot Cell. Interestingly, the sample core was empty except for small amounts at the beginning and end of the core. This phenomenon has been encountered so frequently with push-mode sampling that all sampling has been suspended it is understood what is causing the problem. Characterization data package requirements were discussed as well as analytical requirements. The single most contentious issue, RCRA sampling and analysis requirements adversely impacting resolution of tank safety issues was discussed. It was not apparent why RCRA sampling was impacting so heavily on resolution of tank safety issues (note: This issue is being followed by the technical staff under the HLW team review of characterization issues). Also discussed was the characterization schedule for the current year and forecasted characterization activities. The technical staff was tasked to review the annual tank waste characterization plan (note: This plan has been received and its review undertaken as a part of the HLW team reviews).
  - (2) **FMEF Tour.** A tour of the FMEF hot cells was conducted.
- (f) **Observation of the 101-SY mixer pump.** The activities currently underway to modify the 101-SY mixer pump were observed. Discussions addressed the methods used to determine required modifications and their schedule.