DEFENSE NUCLEAR FACILITIES SAFETY BOARD

September 3, 1999

TO: G.W. Cunningham, Technical Director
FROM: Paul F. Gubanc and David T. Moyle, Oak Ridge Site Representatives
SUBJ: Activity Report for Week Ending September 3, 1999

Mr. Fortenberry toured the Y-12 nuclear facilities on Monday. Staff members Massie and Thompson were at Oak Ridge for a Recommendation 97-1 Technical Team meeting. Outside expert West was at Y-12 observing the readiness assessment (RA) for Reduction at Enriched Uranium Operations (EUO). Mr. Gubanc was on annual leave Friday.

A. EUO Reduction Process: The LMES RA, which started Monday, was suspended on Thursday due to several significant issues raised by the team. Major concerns were identified with the following areas: performance of surveillances; testing and inspection of the reduction furnace pressure vessels; effectiveness of the Operational Safety Board (OSB) in closing issues; and the restart plan. The team questioned the lack of retesting of the pressure vessel lids following recent modifications and the adequacy of current visual inspections of the pressure vessel to verify integrity prior to reduction firing. The team also noted several inconsistencies in the Basis for Interim Operation (BIO) that raised concern about the quality of documentation reviews. Conduct of operations, procedures, and training had no significant issues. The initial estimate for recommencing the RA is late next week, which will probably delay the start of the DOE RA currently planned to start September 13.

The RA also revealed a lack of engineering rigor and formality in modifying the reduction vessels and control of a criticality surveillance. These weaknesses are identical to concerns identified in the LMES review of the HF supply system issued four weeks ago. LMES management has yet to take substantive corrective action in response to that report. DOE and LMES will brief the Board on September 14 on the schedule and substance of their corrective actions in this regard. (II-B.2)

B. Y-12 Hydrogen Fluoride Supply System (HFSS):

1. **Gas Preheaters** - The latest preheater tests failed this week, resulting in gas temperatures 200 ^{o}F less than required for normal operations. While increased insulation solved the heat loss problem, increased vessel wall temperatures likely changed the gas flow pattern within the heaters and resulted in poorer heat transfer than previously observed. LMES will likely procure new heaters, but is also considering a different fluidizing gas with better heat transfer properties (e.g., helium instead of nitrogen). In either case, significant system rework is needed.

2. **Vessel Temperature Excursion** - The HF fluid bed exceeded its code rated temperature by approximately 275 ^{o}F during testing. The vessel temperature is controlled through a dual element thermocouple. One element feeds to computer control of the clamshell heater, and one is hardwired to a high temperature cutoff. A failure in both thermocouple elements resulted in low temperature readings, and allowed the control system to continue to supply heat to the fluid bed in a runaway fashion. When test personnel suspected the problem and inserted a new thermocouple, the vessel had already exceeded its rated limit by 275 degrees F. The vessel's pressure rating was not approached, and engineering is currently evaluating whether vessel integrity was adversely affected by this incident. (I-A, II-B)

cc: Board Members