Department of Energy
Savannah River Operations Office
P.O. Box A
Aiken, South Carolina 29802

AUG 2 2 2001

The Honorable John T. Conway
Chairman, Defense Nuclear Facilities Safety Board
625 Indiana Avenue, N. W., Suite 700
Washington, D. C. 20004

Dear Mr. Chairman:

SUBJECT: Removal of Tank 49 and Tank 50 from Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 96-1

References:
1. DNFSB Recommendation 96-1 to the Secretary of Energy, 8/14/96
2. Letter, Schepens to Conway, "DNFSB Recommendation 96-1 Implementation Plan" – Suspension of Restart Activities at the In-Tank Precipitation (ITP) Facility, 3/3/98
3. Estimate of Residual Benzene Potential in Tank 50 from 1995 ITP Transfers (U), WSRC-RP-2000-00005, Revision 1, 6/20/00
4. Final Report on Phenylborate Decomposition in Tank 49, WSRC-TR-2001-00338, Revision 0, 7/18/01

The Department of Energy no longer intends to consider DNFSB Recommendation 96-1 (Reference 1) applicable to Tanks 49 and 50 since the benzene hazard associated with tetraphenylborate (TPB) and TPB decomposition products in these tanks has been significantly reduced and/or removed.

Recommendation 96-1 expressed concern about benzene generation, retention and release at the ITP Facility at the Savannah River Site. The flammable organic compound benzene was being formed from the decomposition of tetraphenylborate (TPB) and TPB decomposition products [triphenylboron (3PB), diphenylboronic acid (2PB) and phenylboric acid (1PB)] collectively referred to as phenylborates. TPB was added in the form of Sodium Tetraphenylborate to radioactive waste as part of the ITP process in order to separate the radioactive cesium as high activity precipitate solids from the decontaminated salt solution. Considerable efforts and extensive testing were performed to resolve the issues in Recommendation 96-1, but in early 1998 it was determined that the ITP process could not be cost effectively implemented to meet safety and production objectives as currently configured. Reference 2 notified the Board of this determination and the suspension of the ITP startup preparations, along with the implementation of a comprehensive review of alternative methods for salt disposition. Even with the suspension of the ITP process, Recommendation 96-1 has remained open for the ITP tanks containing phenylborates and for applicability to any alternative salt disposition method which involves TPB.

The initial demonstration of the ITP process in 1983 and the startup testing of the process in 1995 resulted in phenylborates in Tanks 48, 49 and 50 at the ITP Facility. Tank 50 received approximately 341,000 gallons of decontaminated salt solution (filtrate) from the startup testing in 1995. Prior to receiving filtrate, Tank 50 contained approximately 390,000 gallons of low radioactivity non-organic waste, mostly from the Effluent Treatment Facility (ETF) evaporator bottoms. The majority of this material was subsequently transferred to the Saltstone Facility, leaving a heel of approximately 117,000 gallons. Tank 50 presently contains approximately 527,000 gallons, mostly from routine transfers of the ETF evaporator bottoms. As discussed in Reference 3, all samples of Tank 50 material since 1998 have shown that the concentration of TPB and TPB decomposition products are less than detectable (1 mg/L).

Approximately 180,000 gallons of the wash water from the ITP demonstration was transferred to Tank 49 in 1983. In 1998, higher than expected benzene generation rates were observed in Tank 49, at which time natural evaporation had reduced the volume of waste to approximately 75,000 gallons. These higher than expected benzene generation rates were attributed to the low free hydroxide level in the tank which may have resulted from carbon dioxide absorption by the liquid waste. As demonstrated in some of the earlier testing, the benzene generation rate from decomposing phenylborates varies inversely with the free hydroxide concentration. Tank 49 has been inerted with nitrogen since 1998, to mitigate the increased flammability hazard due to these higher than expected benzene generation rates. Slurry pump operations commenced in February 2000 to deplete retained benzene in the liquid waste.

In December 2000, a Disposition Plan was implemented to decompose the remaining phenylborates in Tank 49 by elevating the temperature in the tank and adding copper nitrate catalyst. As discussed in Reference 4, this disposition effort has recently been successfully completed, resulting in the decrease of the concentration of phenylborates close to or below the detection limit for all of the species. Based on the most recent Tank 49 samples, the potential benzene from the remaining phenylborates is less than 10 Kg which is significantly less than the quantity of benzene needed to reach the lower flammability limit in Tank 49 (approximately 185 Kg). This allows Tank 49 to be returned to air-based operations (versus nitrogen inerting). The current plan for this material is to transfer it to Tank 50 where it will eventually be transferred to the Saltstone Facility for processing into saltstone. This will allow Tank 49 to be returned to Tank Farm use for the storage of supernate/salt waste.

Based on the history of less than detectable concentrations of phenylborates in Tank 50 and the successful completion of the decomposition of phenylborates in Tank 49, the Department of Energy believes that the benzene hazard associated with phenylborates in Tanks 49 and 50 has been significantly reduced and/or removed. Therefore, DOE no longer intends to consider Recommendation 96-1 applicable to Tanks 49 and 50. Recommendation 96-1 issues will continue to be considered for Tank 48, any future Tank 48 disposition efforts, and any alternative salt processing method which involves TPB. This action has been discussed with your staff.

If you have any questions, please contact me at (803) 208-6072 or have your staff contact Carl Everatt at (803) 208-6084.

Sincerely,

Charles E. Anderson
Assistant Manager
for High Level Waste

PC-01-050

cc: A. B. Poston, AMHST, 703-47A
M. B. Whitaker, Jr., (S-3.1), HQ