

## DEFENSE NUCLEAR FACILITIES SAFETY BOARD

December 26, 2003

**MEMORANDUM FOR:** J. Kent Fortenberry, Technical Director  
J. J. McConnell, Deputy Technical Director  
**FROM:** R. T. Davis/ T. D. Burns  
**SUBJECT:** SRS Report for Week Ending December 26, 2003

**TCON Project:** Two of the three new gloveboxes installed under the TCON project have been connected to the main glovebox stripper system. Pipe integrity testing with low concentration tritium gas (site rep weekly 11/7/03) is underway in these gloveboxes. The third glovebox, which contains the TCAP isotopic separation columns, has not yet received NNSA-SR approval for tritium introduction due to performance problems with the TCAP columns.

Cold testing of the TCAP columns with H-D mixtures achieved separation factors of only ~10 versus expected separation factors of ~500. Adjustments to operational parameters were unsuccessful in improving performance, and a decision was made to remove the TCAP columns for further examination. Radiography of the columns indicated the presence of unexpected voids and channels in the granular palladium packing. These voids and channels preclude proper gas interaction with the palladium and are likely a significant contributor to the performance issues. These TCAP columns employed a new internal aluminum foam to improve heat transfer and it is believed that this foam may have impeded proper loading of the granular palladium packing. Additional testing is on-going to determine other potential contributors to the performance problems and development of an improved loading process for the granular palladium packing is underway.

As a result of these emergent issues, a six months schedule delay is expected thereby pushing the project completion date back to the September 2004 baseline (project had been tracking six months ahead of schedule). Since Building 232-H capabilities are required until the TCON process is successfully started up, operators from 232-H who are slated to move to TEF will not be available for training in the near-term as expected. This may affect the TEF start-up schedule.

**3H Evaporator:** The Technical Safety Requirements for the High-Level Waste Concentration, Storage, and Transfer facilities require periodic calculations, supported by necessary sampling data, be performed to ensure that the formation rate of sodium alumino-silicate scale in the evaporator pots is acceptable. Because this scale may contain elevated fissile material concentrations, the formation of large amounts of scale must be avoided to preclude generation of critically unsafe solutions during pot acid-cleaning evolutions. Accurate formation rate calculations ensure that pot cleaning is performed before problematic levels of scale have accumulated.

Last weekend, it was determined that a current formation rate calculation for the 3H evaporator had not been performed within the required periodicity. In response, the 3H evaporator was secured and the required calculations were commenced. The completed calculations indicated that the formation rate was acceptable and the evaporator was restarted. A critique was held and corrective actions are being developed to improve the tracking of these periodic calculations.