

## DEFENSE NUCLEAR FACILITIES SAFETY BOARD

March 27, 2009

**MEMORANDUM FOR:** T. J. Dwyer, Technical Director  
**FROM:** B. Broderick and R.T. Davis  
**SUBJECT:** Los Alamos Report for Week Ending March 27, 2009

Davis was offsite this week.

**Plutonium Facility:** This week, prompted by concerns raised by the staff, Plutonium Facility management declared a potential inadequacy of the safety analysis (PISA) and implemented a series of compensatory measures related to the transportation, storage and protection of non-safety class (non-SC) heat source plutonium (HS-Pu) containers. About 200 non-SC containers holding a significant quantity of HS-Pu are stored in the Plutonium Facility's safety class vault water bath (VWB). The VWB is relied on to prevent overpressurization of non-SC HS-Pu containers by keeping them fully covered with water to remove heat generated by intense radioactive decay. This week, facility personnel discovered that the process, hazards and controls associated with transporting non-SC HS-Pu containers from the VWB to laboratory rooms and staging these containers in rooms on the laboratory floor are not adequately described and evaluated in the DSA. As a result, even though non-SC containers being transported or staged are subject to the same stresses from internal heat generation as the non-SC containers in the VWB, they did not benefit from the protection of a safety class control to prevent overpressurization. These discoveries resulted in the declaration of a PISA.

This week, facility management also recognized weaknesses in the content and frequency of surveillances used to ensure the safety class VWB was performing its safety function. Existing surveillances were performed monthly to confirm the water in the VWB was above a minimum level and to visually confirm that all non-SC HS-Pu containers remained fully covered with water. However, due to the length of certain non-SC containers, the existing minimum water level checked by the surveillance was too low to keep all non-SC containers fully covered, as required. Additionally, although VWB surveillances were only required to be performed monthly, LANL calculations indicated that credible system upsets could cause water in the VWB to boil in as little as 18 hours, using conservative assumptions. The loss of water level due to this boiling would quickly begin to uncover non-SC containers. Since an unacceptable condition could be created in a matter of hours, the monthly surveillance frequency was deemed to be inappropriate.

In response to the PISA and recognized weaknesses in VWB surveillance practices, facility management took the following actions. All non-SC HS-Pu containers, except for two particularly large containers, were returned to the VWB. Formal controls have been established to protect the two large non-SC containers in their current location until a path forward can be developed. All operations involving transportation and staging of non-SC containers outside the VWB have been restricted pending further evaluation. The minimum water level has been increased to a height sufficient to submerge all non-SC containers currently in the VWB and this level will be verified daily. Control of container configurations inside the VWB will also be established to ensure non-SC containers are not stacked in an arrangement that is higher than the new minimum water level.

LANL and NNSA site office personnel have begun discussing strategies to accelerate longer-term efforts to better understand and protect non-SC HS-Pu containers. Sustained management attention and urgency appear warranted to reduce risk by dispositioning unneeded or unsuitable HS-Pu material and expeditiously processing or robustly overpacking usable HS-Pu stored in non-SC containers.