

## DEFENSE NUCLEAR FACILITIES SAFETY BOARD

March 13, 2009

**MEMORANDUM FOR:** T. J. Dwyer, Technical Director  
**FROM:** B. Broderick and R.T. Davis  
**SUBJECT:** Los Alamos Report for Week Ending March 13, 2009

Elliott and Pasko were onsite this week to review criticality safety.

**Transuranic Waste Operations:** In late February, LANL submitted a proposed waste disposition project strategy for Technical Safety Requirement (TSR) page changes and specific TSR changes to support clarification of safety basis requirements and to improve the efficiency of transuranic waste operations. The submittal of the Area G documented safety analysis, previously scheduled to occur in February, has been delayed to support these and other proposed TSR changes. Last week, the site office approved the following Area G TSR changes: 1) removal of the restriction to only open one transuranic waste container inside the Area G Dome 231 permacon 2) identification of a specific administrative control for arc flash standoff distance between unbonded metal items and the lightning protection down conductors and 3) a revision to the lightning protection system inspection criteria to provide specific requirements and remove broad reference to NFPA 780. The site office also noted that the LANL proposal to change the WCRR repackaging facility allowable headspace gas concentration limit from less than 25% lower flammability limit (LFL) to less than 100% LFL for hydrogen will be evaluated as part of the WCRR annual safety basis update.

Per direction from the NNSA site office, LANL has also submitted a final report on the November 2008 drum deflagration event that occurred during remote drum venting operations at Area G and a proposed path forward for addressing the remaining population of unvented drums. The report postulates that the most credible cause of the event was an electrostatic discharge igniting a flammable mixture of hydrogen and air that had been trapped inside the drum. The electrostatic discharge was thought to be created when the grounded, conductive venting tool punctured the 55-gallon drum lid and a thin layer of lead shielding and came into contact (or near contact) with the charged surface of an insulative plastic containment bag or the charged conductive surface of one of the one-gallon tin cans that were electrically isolated from the larger drum by the bag. This type of electrostatic discharge would be sufficiently energetic to ignite flammable gas concentrations trapped inside the plastic bag since hydrogen-air mixtures have very low ignition energies. Based on analysis of the structural deformation of the affected drum, the report estimates that an 11-12% hydrogen concentration deflagrated during the event. The 'sulfur smell' reported by operators who experienced respiratory distress after the event is thought to be the result of nitrogen oxides created by a chemical reaction initiated by the high temperatures of the deflagration.

Remote drum venting operations have been suspended since November 2008 when the deflagration event occurred. Thousands of additional drums will require venting prior to ultimate disposition, including the 21 remaining above ground unvented drums that are currently in a controlled and segregated storage array. LANL has recommended continued suspension of remote drum venting operations until the existing venting apparatus can be replaced with a more robust engineered system that includes a blast chamber, blast shields, a glovebox, and a HEPA filter train. Until this robust venting system can be procured and fielded (with a target to be operational in 3QFY10), LANL has proposed affixing drum lid restraints and then overpacking the 21 above ground unvented drums to improve the safety of interim storage (site rep weeklies 12/19/08, 11/28/08).