

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

August 19, 2016

MEMORANDUM FOR: S.A. Stokes, Technical Director
FROM: R.K. Verhaagen and J.W. Plaué
SUBJECT: Los Alamos Report for Week Ending August 19, 2016

Plutonium Facility–Issue Recurrence: The recent spill of about 100 mL of solution containing an estimated 10 g of plutonium-238 in 9.8 M nitric acid and hydrofluoric acid (see 7/8/16 and 7/29/16 weeklies) brought to light the practice of using cellulosic materials (i.e., cheesecloth) as an absorbent for acid spills despite strong evidence indicating that this can create a chemically unstable material. In 1994, LANL requested an emergency permit from the New Mexico Environmental Department to allow treatment of plutonium-impregnated nitrated cheesecloth to remove hazardous waste characteristics of ignitability and reactivity. Additionally, the Plutonium Facility has been the subject of two formal accident investigations concerning this material, including two instances in 1994 of the material self-igniting due to the presence of plutonium-238. A 2006 memo documenting corrective actions from the 2003 Type B accident notes this material is considered a potential fire hazard, as does current institutional LANL guidance for spill response. Other sites (e.g., Savannah River Site) have long prohibited the use of cellulosic material for acid applications. From about 2009 to 2015, LANL procedures for plutonium-238 glovebox cleanup acknowledged this hazard, emphasized minimizing use of cheesecloth, and provided operators with explicit instruction for rinsing, handling, and stabilization of cheesecloth through pyrolysis.

On Thursday, Plutonium Facility management responded to a request from the NNSA Field Office for information regarding the safety and waste management implications of the continued use of cheesecloth. LANL management maintains that these materials are covered by the safety basis and represent an acceptable waste form. Further, they assert that reporting is unnecessary under a DOE data call (OE-2: 2015-1) which focused on the addition of organic absorbents to “nitrate-bearing” transuranic waste streams because cellulose cannot be chemically nitrated solely by nitric and hydrofluoric acids. The Site Representatives note that LANL’s own experiments indicate that the organic cat litter that caused the Waste Isolation Pilot Plant radiological release event did not require the waste to be chemically nitrated, but was nitrate-bearing and therefore represented an ignitable material and an unsuitable waste form. Plutonium Facility management has temporarily suspended the use of cheesecloth for acid spills while they develop a paper to address the chemistry of this application.

Plutonium Facility–Infrastructure: Last week, LANL management provided the NNSA Field Office with a proposal for a revised execution strategy for Phase C of the TA-55 Reinvestment Project II. In order to accommodate cost overruns, the strategy proposes to defer scope on several elements. NNSA is currently reviewing the proposal, which includes:

- The Criticality Alarm System will be completed under its current reduced scope.
- The Uninterruptible Power Supply building will be completed with the exception of the batteries, automated transfer switch, and cable connection to the Plutonium Facility.
- The remaining Plutonium Facility exhaust stack work will be suspended.

Transuranic Waste Facility Project: Last week, the NNSA Field Office approved permanent equivalencies to several National Fire Protection Association code requirements for this newly constructed facility. The equivalency covers a missing drain valve, an undersized pipeline on the pump test header, an undersized pump test flow meter, and an insufficient flush rate for the pump suction pipeline. The approval letter concludes that no adverse reliability concerns are posed by LANL’s proposed equivalencies for these conditions.