

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

March 19, 2010

MEMORANDUM FOR: Timothy Dwyer, Technical Director
FROM: Jonathan Plaue, DNFSB Site Representative
SUBJECT: LLNL Activity Report for Week Ending March 19, 2010

Work Planning and Control: On March 11, 2010, Tritium Facility personnel discovered a bulging 55 gallon drum containing mop water. Bulging was visible beyond the rim of both the top and bottom of the drum. The drum had been used to collect mop water since June 2007 and was expected to contain low levels of tritium, cleaning surfactants, floor wax, and wax stripper. Operations to relieve the pressure were authorized under an existing approved Integration Work Sheet (IWS) covering general waste management services across the lab. The IWS had also been determined to be within the facility safety basis under a categorical exclusion. For relieving excess pressure buildup in containers (one of 11 tasks analyzed), the 55 page IWS identified hazards associated with mixed and hazardous waste, radioactive waste and materials, hand tools, off-hour work, spills, and potentially unique emergency issues (which suggests use of remote puncturing). No specific training, equipment, or work instructions were specified for drum venting. Given the abnormal circumstances, facility management elected to utilize an additional emergency/non-routine work permit. The work permit referenced the IWS controls and added use of a plastic bag catchment, spill pads, and several additional controls related to radiological protection. Actual pressure relief of the drum was accomplished without incident using a remotely operated hydraulic puncture device.

Of note, the IWS did not identify any potential hazards associated with flammable gas buildup and the associated risk of deflagration or detonation. Since the IWS was generic, it could not reasonably rule out this hazard. In this case, the work planning team considered the presence of flammable gas, but determined the hazard to be low based on the experience of a waste chemist. The planning team also judged the headspace to be of limited volume and the standoff distance to be adequate. No fire protection or chemical process safety personnel were involved in the planning. Lessons learned around the complex have demonstrated the significant hazard associated with pressurized drums. In addition to remote operations, these lessons indicate the need for additional controls such as non-sparking tools, grounding straps, and lid restraints. While the activity was successful, the work planning did not conservatively incorporate all appropriate controls based on lessons learned. The event was determined not to meet reporting criteria; however, facility management elected to schedule a lessons learned discussion. Mop water samples will also be analyzed to attempt to ascertain the cause of the gas generation.

Tritium Facility: On March 17, 2010, the Livermore Site Office (LSO) approved the Justification for Continued Operations submitted in response to identified weaknesses in the safety basis (see weekly report dated March 12, 2010). LSO's approval articulates three scenarios of concern: large tritium release, tritium glovebox deflagration, and tritium release coincident with fire. For the first two scenarios, the approval identifies as appropriate the laboratory's three proposed compensatory measures associated with the tritium room monitors, but directs them to be treated as a Specific Administrative Control (SAC). For the fire scenario, LSO concluded an additional compensatory measure was necessary and directed the laboratory to ensure operability of the fire detection and alarm system via a separate SAC. These compensatory measures will be replaced with a control set appropriately derived from the revised hazards analysis currently in development.